

5ESS®-2000 Switch
SYSTEM MAINTENANCE REQUIREMENTS AND TOOLS
5E12 and Later Software Release

Document: 235-105-110

Issue Date: September 1999

Issue Number: 13.00

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Acknowledgment

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1. INTRODUCTION

1.1 NOTICE

In accordance with the 5ESS®-2000 Switch Software Support Plan, the 5E11 software release will be rated Discontinued Availability (DA) on November 15, 1999. The information supporting 5E11 and earlier is being removed from all documentation. The actual removal of the information will occur over time instead of concurrently.

If you are supporting offices using a software release prior to 5E12 and have a need for the information that is being removed, it is recommended that you retain the associated pages as they are removed from the paper documents or the earlier copy of the CDRom.

Effective with the 5E9(1) software release, the name of the 5ESS® switch was changed to be 5ESS®-2000 switch, therefore the name 5ESS® switch is no longer valid. The documentation will not be totally reissued to make the name revision. The changes will be made over time as other technical changes are required. In the interim, please assume that any reference to the 5ESS® switch is also applicable to the 5ESS®-2000 switch. It should be noted that this name change may not have been carried forward into software influenced items such as input and output messages, Master Control Center screens, Recent Change/Verify screens, etc.

1.2 PURPOSE

This document describes the maintenance concepts and built-in maintenance capabilities of the 5ESS®-2000 switch. Knowledge of information included in this document allows maintenance personnel to perform system evaluation and maintenance. To be adequately prepared to maintain the 5ESS®-2000 switch, the following prerequisites also are recommended for maintenance personnel:

- (a) Must be familiar with telephone equipment and terminology.
- (b) Must complete maintenance training on the 5ESS®-2000 switch.
- (c) Must be familiar with the information in the following manual(s):
 - 235-100-125, *System Description 5E12 and Later*.
 - 235-900-111, *Product Specification 5E12*.
 - 235-900-112, *Product Specification 5E13*.
 - 235-900-113, *Product Specification 5E14*.

The 235-XXX-XXX manuals do not provide maintenance procedures for the repair of equipment (for example, tape drives or disk drives) manufactured by vendors other than Lucent Technologies. To identify the appropriate maintenance manual for each unit of such vendor equipment, refer to 235-001-001, *Documentation Description and Ordering Guide*. This guide **only** provides the vendor's address associated to the unit in question, not the procedures used to repair the faulty equipment.

1.3 UPDATE INFORMATION

1.3.1 GENERAL

Along with other network switching products, the 5ESS®-2000 switch has been positioned to support Service

Net-2000 (SN-2000). Effective with the 5E9(1) software release, the name of the 5ESS® switch was changed to the 5ESS®-2000 switch. It should be noted that this name change has not been carried forward into software influenced items such as input and output messages, Master Control Center screens, Recent Change/Verify screens, etc.

The 5E9(2) software release introduced the new Switching Module-2000 (SM-2000). There are many references to the SM in this document that are also applicable to the SM-2000. The document will not be totally reissued to add the SM-2000 to the appropriate SM references. Instead, the changes will be made over time as other technical changes are required. However, on the pages provided with this update, changes which are specific to the SM-2000 are included, and all references to the SM have been changed to SM/SM-2000, where appropriate. Until all the document pages are reissued, please assume that all references to the SM also apply to the SM-2000.

The new SM-2000 name has not been carried forward into all 5E9(2) and later software influenced items such as input and output messages, Master Control Center screens, Recent Change/Verify screens, etc. Please assume that all references to the SM in these areas also apply to the SM-2000.

and section tabs for those software releases have been removed from this document. ***Product rating for the 5E11 and earlier software releases has been changed to discontinued availability (DA). Effective with this issue (Issue 13.00), all information on the 5E11 and earlier software releases and section tabs for those software releases have been removed from this document.***

Issue 13.00 of this document is updated for the following reasons:

- Update Section 1 to reflect DA rating of the 5E11 software release.
- Update the Master Control Center (MCC) Page Location Guide in Section 4. The update includes removing references to 5E9(2) and 5E11 software release examples and adding references for all MCC pages included in the 5E14 section.
- Remove MCC page information from the 5E11 section in Section 4. Move to the 5E12 section all MCC page information valid for 5E12 [or 5E12 and later] previously included in the 5E11 subsection. Remove subsection tabs for the 5E11 software releases.
- Moved 5E12 and 5E13 MCC page information to new Sections 5 and 6 respectively.
- Add a new Section 7. Section 7 contains MCC page displays that were added or changed with the 5E14 software release.
- Added 5E12 and later software update feature changes to Section 5 (1130/1140) and Section 6 (1130/1140 and 1135/1145).
- Added 5E13 and later software update feature changes to Section 6 (1120/1121/1122, 1512, and 1740/1741).
- Added reference to new 235-200-150 document in this Section.
- Update the document Glossary.
- Update the document Index.
- Make minor corrections to text, tables, and figures throughout the document.

1.4 APPLICABLE SOFTWARE RELEASE

The information in this document is applicable to all switches equipped with 5E12 and later software releases. When text applies to a specific software release, the applicable software release is indicated.

1.5 ORGANIZATION OF INFORMATION

When new software releases are developed that affect this document, updates will be made by reissuing the affected pages. Also, this document is utilizing an issue number.

This document is organized into two volumes because of its size. Volume 1 contains an overall table of contents and Sections 1, 2, and 3. Volume 2 contains Section 4, 5, 6, 7, a Glossary, and an Index. Each numerically numbered section (and subsection) has its own table of contents. The overall structure is outlined as follows:

1. **Section 1 - Introduction:** This section summarizes the type of information contained in the document, gives the purpose of this information, and defines its organization. In addition, this section identifies the three procedural maintenance manuals used for maintenance and explains the function of each. This subsection also references additional documentation that would be helpful to the user.
2. **Section 2 - Maintenance Philosophy:** This section describes the following maintenance capabilities of the 5ESS®-2000 switch:
 - Maintenance overview.
 - Remote maintenance capabilities.
 - Central office maintenance plan.
 - System evaluation and maintenance stimuli.
 - Maintenance tasks:
 - Scheduled routine maintenance
 - Nonscheduled routine maintenance
 - Corrective maintenance tasks
 - System recovery
 - Operator Services Position System (OSPS) maintenance
 - Maintenance of vendor equipment.
 - Line unit trouble clearing guide.
 - Trunk and line maintenance:
 - Per-call tests
 - Routine line and trunk tests
 - Tests provided
 - Call monitor.
 - Recent change (RC), field, and software release retrofit/update.
 - Change notices (CN).

3. **Section 3 - Maintenance Tools:** This section describes the following maintenance tools available for use in the 5ESS[®]-2000 switch:

- Display administration process (DAP)/Non-DAP terminal.
- MCC.
- Supplementary trunk and line work station (STLWS).
- TLWS.
- Trunk and line maintenance.
- Test access unit (TAU).
- Directly connected test unit (DCTU).
- SLIM metallic test capability.
- Remote office test line (ROTL).
- Performance monitoring for Digital Networking Unit - SONET.
- TLWS task selection page displays.
- Recent change/verify (RC/V).
- Screen program user's guide.
- How to use input/output (I/O) messages.
- Office data base editor (ODBE).
- Access editor (ACCED).
- Common network interface data base consolidator (CNIDBOC).
- Automated circuit pack return tag (RTAG) tool.
- Software debugging and troubleshooting tools.
- Generic utilities.
- System log files.
- Diagnostics:
 - Diagnostic types
 - Diagnostic input/output messages
 - Routine exercises (REX)
 - Automatic REX scheduler.
- How to use SM/SM-2000 peripheral fault recovery message.

- Routine tests.
 - How to use office backup schedules.
 - Circuit pack handling procedures.
 - Spare circuit packs.
 - How to use (circuit pack) repair service and return procedures.
 - Dynamic Audits.
 - Static Audits.
 - How to use program record and program map documents.
 - How to use program change document.
 - TR303 Integrated Digital Carrier Unit (IDCU) remote terminal provisioning.
 - Quad link packet switch network verifier (Qnetver) tool.
 - J1 Path Trace (5E13 and later)
 - ISDN Protocol Monitor
4. **Section 4 - MCC Page Displays:** This section contains a detailed description of the page displays of the 5ESS®-2000 switch MCC video terminal and the MCC Page Location Guide that can be used to locate specific page displays for specific 5E12 and later software releases.
- NOTE:** The VCDX users should refer to 235-120-110, *Very Compact Digital Exchange (VCDX) Reference Guide* for information on VCDX-specific MCC page displays.
5. **Section 5 :** Covers the 5E12 software release.
6. **Section 6 :** Covers the 5E13 software release.
7. **Section 7 :** Covers the 5E14 software release.

Glossary: This section includes a listing of abbreviations, acronyms, and terms used in this document.

Index: This section includes an alphabetized listing by subject that is cross-referenced to the associated page number.

1.6 ORGANIZATION OF INFORMATION FOR ASSOCIATED MAINTENANCE MANUALS

Since this document has been developed to describe maintenance concepts and maintenance capabilities for the 5ESS®-2000 switch, it is appropriate to identify the manuals that contain the procedures used to maintain the switch.

1. 235-105-210, *Routine Operations and Maintenance Procedures*: Contains the descriptive material and detailed procedures for routine operations and maintenance of the 5ESS®-2000 switch. Following is a list of the information included this document:
 - Equipment Test List

- System Control Operations Description and Procedures
- Memory Alteration Description and Procedures
- Remote Office Test Line
- Fan and Alarm Tests
- Moving Head Disk Description and Procedures
- Miscellaneous Routine Procedures
- Routine Exercise Description and Procedures.

The 235-105-210 also has an appendix for the O&M Checklist.

2. 235-105-220, *Corrective Maintenance Procedures*: Contains the following sections:

- SECTION 1 - INTRODUCTION: This section contains information about this manual.
- SECTION 2 - TEST EQUIPMENT PROCEDURES: This section contains calibrating procedures and/or maintenance procedures for the test equipment used for the 5ESS-2000 switch.
- SECTION 3 - DIAGNOSTIC FAILURE PROCEDURES: This section contains the procedures for clearing trouble that caused a diagnostic failure.
- SECTION 4 - DIAGNOSTIC TEST SUPPORTING INFORMATION: This section contains supporting information in the form of Diagnostic Phase Descriptions tables and ISLU U-DSL BRI troubleshooting diagrams.
- SECTION 5 - ANALYSIS AND CLEARING PROCEDURES: This section contains procedures for the task of analyzing and clearing troubles.
- SECTION 6 - ALARM RESPONSE PROCEDURES: This section contains procedures for responding to alarms.
- SECTION 7 - LINE MAINTENANCE PROCEDURES: This section contains procedures for performing maintenance to line units.
- SECTION 8 - TRUNK MAINTENANCE PROCEDURES: This section contains procedures for performing maintenance to trunk units.
- SECTION 9 - FAN MAINTENANCE PROCEDURES: This section contains procedures for performing maintenance to fan equipment.
- SECTION 10 - ADMINISTRATIVE MODULE MAINTENANCE PROCEDURES: This section contains procedures for maintenance of Administrative Module (3B20D and/or 3B21D) equipment.
- SECTION 11 - COMMUNICATION MODULE MAINTENANCE PROCEDURES: This section contains procedures for maintenance of Communication Module equipment. Included is the Quad Link Packet Switch (QLPS).
- SECTION 12 - CIRCUIT PACK MAINTENANCE PROCEDURES: This section contains procedures for proper maintenance and/or replacement of circuit packs.
- SECTION 13 - MISCELLANEOUS EQUIPMENT MAINTENANCE PROCEDURES: This section contains

procedures for maintenance of miscellaneous equipment.

- SECTION 14 - POWER-UP/POWER-DOWN EQUIPMENT PROCEDURES: This section contains procedures to correctly power-up/power-down equipment.
- SECTION 15 - UTILITY CALL TRACE PROCEDURES: This section contains procedures to perform the utility call trace function.
- SECTION 16 - OFFICE DEPENDENT DATA - MAINTENANCE PROCEDURES: This section contains procedures for the office dependent data (ODD).

The 235-105-220 also has a group of job aids for the TLWS poke commands which must be ordered separately (see 235-001-001, Documentation Description and Ordering Guide).

3. 235-105-250, *System Recovery*: Contains the descriptive material and detailed procedures of the software and hardware recovery capabilities of the 5ESS[®]-2000 switch. Both automatic and manual recovery capabilities are covered. The following is a list identifying what is covered in this manual:
 - DIOP, Dead Start, and Tape Load Procedures
 - Power
 - Administrative Module
 - Communications Module
 - Switching Module/Remotes
 - Common Network Interface Ring
 - Miscellaneous Procedures
 - System Recovery Description.
4. 235-105-119, *Maintenance Guide Utilizing OMS5*: This document provides information related to utilization of the OMS5 program. The OMS5 program summarizes the receive-only printer (ROP) output into a readable format. This program provides the maintenance personnel with an easy way to analyze how the office is performing. After analyzing the OMS5 program summary, the maintenance personnel should use the Corrective and Routine Maintenance Manuals (listed previously) with this manual to correct faults that occur in the switch.

The OMS5 program runs on the switching control center (SCC) minicomputer. The tape that contains the OMS5 program can be obtained via the order number 235-105-120. This maintenance guide and the OMS5 program can only be used via the SCC.

1.7 USER FEEDBACK

The producers of this manual are constantly striving to improve quality and usability. Please use the enclosed user feedback form for your comments and to advise us of any errors. If the form is missing or your comments will not fit, you can write to the following address:

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1.8 DISTRIBUTION

This manual is distributed by the Lucent Technologies Customer Information Center (CIC) in Indianapolis, Indiana. Most operating telephone companies should place orders through their documentation coordinator. Some companies may allow customers to order directly from the Customer Information Center; however, the majority do not. Companies that use documentation coordinators to manage their orders receive a significant discount. If you do not know the name/number of the documentation coordinator for your company, you may call **1-888-LUCENT-8 (1-888-582-3688)** to obtain the name and telephone number.

Customers not represented by a documentation coordinator and Lucent Technologies employees can order the documentation for the 5ESS-2000 switch directly from the Lucent Technologies Customer Information Center. Proper billing information must be provided. These orders may be mailed to the following address:

Customer Information Center
Customer Service
2855 N. Franklin Road
Indianapolis, IN 46219

Orders may also be called in on **1-888-LUCENT-8 (1-888-582-3688)** or faxed in on **1-800-566-9568**.

1.9 TECHNICAL ASSISTANCE

Technical assistance for the 5ESS-2000 switch can be obtained by calling the Regional Technical Assistance Center (RTAC) at **1-800-225-RTAC (1-800-225-7822)**. This telephone number is monitored 24 hours a day, 7 days a week. During regular business hours, your call will be answered by your local RTAC. Outside of normal business hours, all calls will be answered at a centralized technical assistance center where service-affecting problems will be dispatched immediately to your local RTAC. All other problems will be referred to your local RTAC on the next regular business day.

1.10 REFERENCES

The Compact Digital Exchange (CDX) and the Very Compact Digital Exchange (VCDX) are switching systems based on the 5ESS[®]-2000 switch. This document is a standard 5ESS[®]-2000 switch document that is also applicable to the CDX and VCDX switching systems. Information applicable only to CDX or VCDX may be found in the following manuals:

- 235-120-010, *Compact Digital Exchange (CDX) Reference Guide*
- 235-120-020, *Compact Digital Exchange (CDX) User's Guide*
- 235-120-110, *Very Compact Digital Exchange (VCDX) Reference Guide*
- 235-120-120, *Very Compact Digital Exchange (VCDX) User's Guide.*

When appropriate, this document contains references to the applicable CDX or VCDX documents.

The following manuals also contain information that can be helpful to a user of this document:

- 235-600-700, *5ESS® Switch Input Messages Manual*
- 235-600-750, *5ESS® Switch Output Messages Manual*
- 235-105-119, *Maintenance Guide Utilizing OMS5*
- 235-105-210, *Routine Operations and Maintenance Procedures*
- 235-105-220, *Corrective Maintenance Procedures*
- 235-105-250, *System Recovery*
- 235-200-150, *5ESS® Distinctive Remote Module (DRM) User's Guide*
- 235-600-112, *Translations Data Manual 5E12*
- 235-600-113, *Translations Data Manual 5E13*
- 235-600-114, *Translations Data Manual 5E14*
- 235-600-400, *Audits Manual*
- 235-600-500, *Asserts Manual*
- 235-600-510, *Software Analysis Guide*
- 235-600-601, *Processor Recovery Messages*
- 235-900-112, *Product Specification 5E12*
- 235-900-113, *Product Specification 5E13.*
- 235-900-114, *Product Specification 5E14.*

NOTE: Other manuals not identified previously that can be helpful to the customer are listed in 235-000-000, Numerical Index - Division 235. This index is for informational purposes only. Site documents should be ordered from the applicable H-drawing. The index can be ordered from the Customer Information Center in Indianapolis, Indiana.

2. MAINTENANCE PHILOSOPHY

2.1 MAINTENANCE OVERVIEW

2.1.1 MAINTENANCE AIDS

The 5ESS®-2000 switch is designed with many built-in maintenance aids including the following:

- Simplified human interface system
- System status displays
- Combined audible and visual alarm system
- Automatic routine testing of circuitry
- Routine exercise (REX) capability
- Automatic fault detection and recovery
- Manual testing capability
- Remote maintenance capability
- Duplication of common control equipment
- Compact physical size.

2.1.2 SIMPLIFIED HUMAN INTERFACE SYSTEM

2.1.2.1 Master Control Center (MCC)

The MCC is the primary communication link between on-site maintenance personnel and the 5ESS®-2000 switch. The MCC provides the interface capability for administrative and maintenance tasks. The major components of the MCC (Figure 2-1) consist of the following:

- A video display terminal with keyboard
- A receive-only printer (ROP) (optional)
- A key telephone set with loudspeaker
- A test access unit (TAU).

Page displays on the video display terminal provide the status and control information needed to perform maintenance tasks. Maintenance requests are input using the keyboard. The ROP provides a hardcopy of input and output messages. Thus, a record is available for future reference. The key telephone set is used to communicate with work areas outside the office. This telephone set can be used independently of the switch, thereby ensuring outside communication if an office outage occurs. A loudspeaker is provided for communication at times when maintenance personnel need the use of both hands. The TAU provides telephone jacks that enable communications with other work areas in the office. In addition, TAU provides access to trunks and lines for maintenance activities.

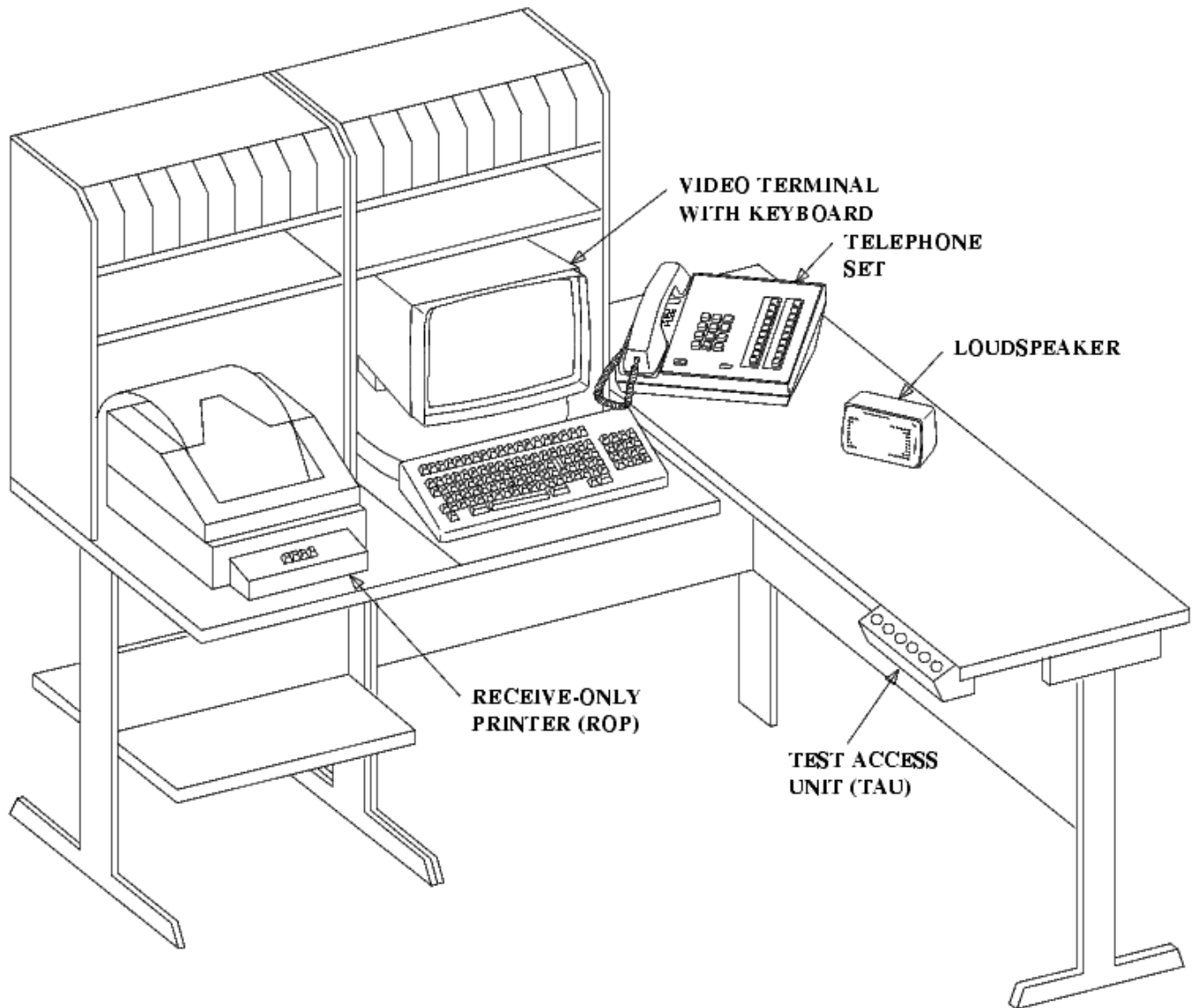


Figure 2-1 Master Control Center

2.1.2.2 System Status Display

The real-time system status is shown at the MCC video terminal on the second and third lines of the page display. (See Figure 2-2.) Thus, the occurrence of any abnormal conditions is displayed immediately. The MCC status display must be valid at all times. This requires monitoring of the time indicator to ensure reliable display indications. The time-of-day indicator (24-hour clock) at the top right of the video display is incremented every five seconds. Observation of this time indicator helps to determine if the display interface is operating. If the indicator is not changing, the interface is not working, and the entire video display is invalid. Figure 2-2 is an example of the MCC page display design.

OFFICE NAME	TYPE	GENERIC & ISSUE		TERMINAL ID		DATE & 24-HOUR CLOCK	
SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: INPUT ACK		HM ACK		PAGE NUMBER & TITLE			
DISPLAY REGION							
INPUT/OUTPUT MESSAGE SCROLLING REGION							
INPUT MESSAGE LINE							

Figure 2-2 MCC Page Display Design

Abbreviations:

ACK	Acknowledgment	EAI	Emergency Action Interface
AM	Administrative Module	HM	Human Machine
AM PERPH	AM Peripherals	MISC	Miscellaneous
BLDG/PWR	Building/Power	OS LINKS	Operating System Links
BLDG INH	Building Inhibits	SM	Switching Module
CKT LIM	Circuit Limit	SYS EMER	System Emergency
CM	Communication Module	SYS INH	System Inhibit
CMD	Command	SYS NORM	System Normal

2.1.2.3 Combined Audible and Visual Alarm System

Whenever an alarm condition occurs, an audible/visual alarm is activated to ensure that maintenance personnel are informed even if the MCC terminal is not being monitored. To make it easier for maintenance personnel to quickly locate off-normal conditions on the video displays, various video attributes such as reverse video, flashing, intensity, and color (optional) are used in addition to text. The particular combination of these attributes depends on the maintenance "state." Refer to Section 4.1.5, Table 4-2, for additional information on the most commonly used MCC states and their video characteristics. When an alarm condition occurs, the severity of the alarm is indicated by the level indicator (**CRITICAL**, **MAJOR**, or **MINOR**) backlighting in the summary status area at the top of each display. Each alarm level (**CRIT**, **MAJ**, or **MIN**) also has its own distinct sound. The unit indicator that represents the particular area of alarm condition (for example, **OVERLOAD** or **BLDG/PWR**) flashes until the alarm is retired. To retire the audio/visual alarms, depress the **ALM RLS** function key. Once the alarm is retired, the level indicator returns to normal video and the unit indicator stops flashing. The alarm level color remains until the MCC page associated with the unit has been displayed. At this point, the unit indicator goes to black on cyan which indicates the problem still exists but is being investigated. When the condition causing the alarm is corrected, the unit

indicator returns to normal video.

2.1.3 AUTOMATIC ROUTINE TESTS

Automatic routine tests are checks and tests run automatically on a prescheduled basis to verify the integrity of a circuit, a unit, or the entire system. The system has built-in self-checks which constantly check parity, framing, and protocol of words and messages. In addition, periodic routine exercises are run. These exercises verify the complete integrity of all units including both the operational and the maintenance-related parts of units. Per-call tests are run on a line every time it is used. Table 2-1 provides a list of automatic routine tests, intervals, and functions. Audits are also run to check software programs. Audits are run periodically and during slack call processing periods. The Call Monitor makes test calls for periodic analysis to detect the loss of call processing functionality.

Table 2-1 Automatic Routine Tests

TEST	INTERVAL	FUNCTION
Self-Checks	Continuously	To check parity, framing, protocol, and timing (basically hardware checks).
Per-Call Tests	Whenever the line is used	To check all hardware and interface circuits used in call line processing.
Routine Exercises	Periodically (run at low-traffic time)	To verify integrity of all units including both operational and maintenance-related parts.
Audits	Periodically and when traffic permits	To detect erroneous state before system performance is affected
Routine Hashsum Checks	Periodically	To check the integrity of the text and static data which is stored in the memory of the processor.
SM Hardware Verification	Periodically	To make sure the SM can access its peripherals.
Sanity Check Message	Periodically	To verify that communications are maintained between processors (AM, CM, and MSGS).
Call Monitor	Continuously (unless inhibited)	To detect and report loss of call processing functionality when other system indicators appear normal.

2.1.4 MANUAL TESTING CAPABILITY

The MCC enhances the manual testing capabilities of the system. Diagnostics can be run using the keyword at the MCC to input the appropriate messages. If the appropriate input message is not known, the user can enter the **dgn:keyword?**, where the keyword for example could be ``luhlsc" and the symbol ``?" indicates help when an appropriate input message is desired. Figure 2-3 is an example of how the **help** command can be used. The first help command gives the complete input message, and the second help command gives the options associated with the input message. User's actions are indicated in bold type.

dgn:luhlsc?

The message format is: DGN:LUHLSC=a-b-c-d,[RAW],[UCL],[TLP],[RPT(=e)],[PH=f&g];

dgn:luhlsc?

LUHLSC=a-b-c-d for a: enter an SM number between 1 and 192: 1; for b: enter a number between 0 and 7: 0; for c: enter 0 or 1: 0; for d: enter a number between 0 and 2: 0; do you want RAW (enter y or n): y; do you want UCL (enter y or n): y; do you want TLP (enter y or n): y; do you want RPT (enter y or n): n; do you want GROW (enter y or n): n; do you want PH (enter y or n): n;

append text, hit <return> to execute, or hit <delete> to reject

Figure 2-3 Manual Testing - Help Command

In addition, many block diagram-type page displays (that is, MCC page displays — see Section 4) are available to help in locating and identifying faults. The TAU provides a means of connecting test equipment to various lines and trunks. Direct connection and terminal access jacks are contained in the TAU. Section 3 contains a description of TAU.

2.1.5 DUPLICATION OF COMMON EQUIPMENT

The duplication of common control equipment permits switching from a faulty unit which is active to a standby unit. Thus, the faulty unit can be taken out of service (OOS) and repaired without impairing the switching capability of the office.

2.2 REMOTE MAINTENANCE CAPABILITIES

Maintenance of the system can be performed remotely by operational support systems (OSS), located at the remote switching control center (SCC). The MCC human interface capabilities are available at the remote SCC. This includes the video display, input/output, and alarm control capabilities. The trunk and line work station (TLWS) TAU is not provided at the remote SCC.

2.3 CENTRAL OFFICE MAINTENANCE PLAN

2.3.1 CUSTOMER COMPLAINTS

The objective of this maintenance plan is to identify both hardware and software faults in the 5ESS®-2000 switch before they reach a service-affecting level. If this maintenance plan is followed, customer complaints can be reduced to a minimum and be a useful indication of the switch performance. If customer complaints suddenly increase in a normal office, the complaints can provide information useful in identifying problems and their causes. Therefore, customer complaints can help identify the following:

Complaint location:

- Switching module (SM) or switching module-2000 (SM-2000) or group of SMs/SM-2000s
- Remote switching module (RSM)
- Line unit (LU) or group of line units.

Complaint type:

- Plain old telephone service (POTS)
- Private branch exchange (PBX)
- Features
- No dial tone
- Call cutoff.

Complaint cause:

- Software update
- Change notice (CN) Application
- Unusual office activity
- Cable cut
- Nondiagnosable hardware fault.

If unusual or unresolved conditions and complaints cannot be resolved at the local level, contact your next level of technical support.

Until such time as the customer complaint rate is under control, the number of customer complaints received is not an accurate indication of switch performance. A more accurate accounting can be achieved through the monitoring of the operational test failures (OTFs) and the grid fabric failures.

2.3.2 HARDWARE OBSERVATION

ROP Analysis: Periodic checks should be made using the daily reports to determine whether or not hardware faults are occurring. 235-105-220, *Corrective Maintenance Procedures*, can be used to identify the hardware involved in the following instances (except for the line removal reports; they are covered in this manual):

- Unit diagnostic (routine exercise) failure
- Grid fabric failures
- OTFs — Set the verbose mode periodically to allow printing of these messages
- Per-call test failures (PCTFs)
- Machine detected interoffice irregularities (MDIIs)
- Line removals.

Action: If any of the previous conditions occur, then go to the appropriate section in this manual for a more complete description and the appropriate action.

NOTE: If you are unable to resolve the errors after referencing the section and documents mentioned, then contact the next level of technical support.

2.3.3 SOFTWARE OBSERVATION

ROP Analysis: Periodic checks using 235-070-100, *Traffic and Plant Measurements*, Appendix 1 of Administration and Engineering Guidelines, should be made to detect if large numbers of the following types of messages have occurred:

- Manual action asserts
- Audits
- Interrupts [for example, single-process purges (SPP) is a first-level interrupt].

Action: Set the print log status periodically to print these types of messages. Upon receiving a repetition of these, refer to 235-600-500, *Asserts Manual*, and 235-600-400, *Audits Manual*, for the proper action to take.

NOTE: If you are unable to resolve the errors after referencing the document mentioned, then contact the next level of technical support.

2.3.4 INITIALIZATIONS

Remember, initializations can cause codes 5, 7, 8, etc., customer complaints, so frequently check the ROP for indications of trouble. For more information on initializations, refer to 235-105-250, *System Recovery*, which has some general information about system recovery/initialization.

2.3.5 CENTRAL OFFICE OPERATING PROCEDURES

2.3.5.1 Review Disk Procedures

Office Backup Methods: There are four levels of backup for the 5ESS[®]-2000 switch disk drives. These levels are as follows:

- (a) Memory to primary disk backup
- (b) UNIX[®] Real-Time Reliable (RTR) operating system root partition to backup-root partition backup
- (c) Office dependent data (ODD) backup to tape
- (d) Full office backup to tape.

For detailed procedures covering the disk drives, refer to the *Memory Allocation Procedures* in 235-105-210. For information on Backup Schedules and Guidelines, refer to Section 3.25.4 in this manual.

2.3.5.2 Software Updates

Program update is the process that activates orderly program changes in the switching equipment software. The changes are made to solve a system problem. The following two types of program updates are available:

- **Official Fixes:** Software updates
- **Emergency Fixes:** Temporary measurement plan (TMP) software updates.

In-service offices receive most software fixes via software updates.

The following list of operations should be adhered to when applying software updates:

- (1) In a post-turnover office, when it is not in a retrofit or restart mode, the Operating Telephone Company (OTC) is responsible for obtaining and applying all applicable software updates.
- (2) Maintain software updates to the current Software Change Administration and Notification System (SCANS) level.
- (3) Follow the software update's special and soak instructions exactly. In an in-service office, remember to SOAK all software updates for at least a full day.
- (4) Some software updates require a boot of the administrative module (AM) or a craft initialization in order to make portions work properly; therefore, the application of the software update should be carefully monitored by the Switching Control Center System (SCCS) or site personnel until it is complete.
- (5) When a software update requires a boot, always perform the boot during a low-traffic period.
- (6) If a software update fails during application (apply, soak, and/or official), and the situation cannot be resolved, escalate to the next level of technical support.

CAUTION: DO NOT remove files such as ``Cud" and ``.pupstat," or any file in ``/etc/bwm" without first consulting with Electronic Switching Assistance Center (ESAC), Regional Technical Assistance Center (RTAC), or Customer Technical Support (CTS) Organization.

2.3.6 CHECK LIST FOR CENTRAL OFFICE

2.3.6.1 General

This section represents some preventive maintenance procedures needed to keep the 5ESS®-2000 switch operating efficiently.

2.3.6.2 Fan Filter Replacement

The fan filters in the switch frames and moving head disks (MHDs) should be checked periodically. A dirty filter does not allow adequate air to circulate within the equipment and could lead to early failure in the hardware.

For information regarding replacement frequency and replacement procedures for both frame fans and MHD fans, refer to 235-105-210, *Routine Operations and Maintenance Procedures*.

2.3.6.3 REX Output Reviews

Review the REX output messages daily to see if any failures have occurred. Normally, if a diagnostic failure occurs during REX, that hardware remains OOS and must be manually diagnosed and restored to service.

This is a very important action to conscientiously perform. If one side of a duplex unit fails REX diagnostics, it is not restored. If the other side of this unit takes a fault, there is no way to recover and the unit is put in duplex failure mode. It is easy to see how critical this is if the unit was important to call processing.

2.3.6.4 Relation Reorganization

Check the ROP Reference Guide section of 235-105-119, *Maintenance Guide* Utilizing OMS5, for canceled or needed REORGANIZATION messages. Determine why the relation reorganization failed. If unable to locate the trouble or resolve it, escalate to the next level of technical support.

2.4 SYSTEM EVALUATION AND MAINTENANCE STIMULI

2.4.1 SYSTEM STATUS AND ALARM INDICATIONS

All critical system status indications are provided locally and remotely. The MCC provides real-time system status summary indications, control and display capabilities, and human interface. These capabilities are also remoted to the remote switching control center. System status and alarm indications are displayed on the remote switching control center critical indicator panel.

2.4.2 STATUS DISPLAYS

2.4.2.1 Overview

The status display provides a comprehensive presentation of system conditions including the following:

- Alarms and other abnormalities
- Abnormal load conditions
- Significant control in effect
- Individual unit status.

The status display is made up of abbreviated name displays of each monitored unit or condition. Normal operating conditions are displayed in dynamic (light on dark) text. Trouble conditions are displayed in steady bold reverse video (dark letters on enlarged bright background) or a color combination. All alarm conditions are displayed by a unit indicator such as - AM, SM/SM-2000, and a level indicator - (**CRITICAL**, **MAJOR**, or **MINOR**). An audible indication is also sounded as follows:

- In minor alarm conditions, the minor alarm horn sounds (if office is equipped).
- For major alarm conditions, the audible alarm chimes at a slow rate.
- For critical alarm conditions, the audible alarm chimes at a fast rate.

2.4.2.2 System Alarm Release Modes

There are two system alarm release modes: automatic alarm release and manual alarm release. If the system is in the automatic alarm release mode, the audible alarm and the flashing alarm conditions are released five seconds after initialization. If the system is in the manual alarm release mode, the audible alarm and flashing alarm conditions are released by operating the **ALM RLS** function key on the video terminal keyboard. Minor audible alarms are retired after five seconds in either mode. Released alarms and controls in effect remain in the alarm condition until the system has been restored to normal operating condition. The alarm release mode is changed via a maintenance command available on display Page **105/106**, **116**, or an input message. Table 2-2 lists MCC status indicators and their meanings.

Table 2-2 MCC Status Summary Indicators

SYSTEM STATUS SUMMARY INDICATORS	INDICATIONS
SYS EMER	This indicator is turned on when the peripheral controller recognizes system insanity or a problem with communication between the MCC and AM.
CRITICAL	This indicator is turned on when a critical alarm condition is detected.
MAJOR	This indicator is turned on when a major alarm condition is detected.
MINOR	This indicator is turned on when a minor alarm condition is detected.
BLDG/PWR	This indicator is turned on when a building or power alarm is detected.
BLDG INH	This indicator is turned on when a building alarm is inhibited.
CKT LIM	This indicator is turned on when the trunk OOS limit (automatic maintenance limit) is exceeded or a primary rate interface (PRI) D-channel outage is

	detected.
SYS NORM	This indicator is normally on. It is turned off when an abnormal system condition is detected.
OVERLOAD	This indicator is turned on when a processor detects a real-time and/or resource overload and overload controls are activated.
SYS INH	This indicator is turned on when any system function is inhibited.
AM	This indicator is turned on when an AM abnormality is detected.
AM PERPH	This indicator is turned on when an AM peripheral unit abnormality is detected.
OS LINKS	This indicator is turned on when an operational support system data link problem is detected.
SM	This indicator is turned on when a problem in the switching module is detected.
CM	This indicator is turned on when a problem in the CM is detected.
MISC	This indicator is turned on to indicate a frame/cabinet fuse alarm and other miscellaneous alarms.

2.4.2.3 Control and Display Functions

NOTE: A display administration process (DAP) terminal must be used to access the control and display portion of the MCC or remote switching control center video display. The DAP terminal can be used to perform any command that is needed to maintain the switch (for example, poke command 330 on MCC display Page 1240 restores MSGS 0 to service). These terminals are defined in the data base, and a number (office dependent) of DAPs can be assigned. A maximum of 16 DAP terminals can be used simultaneously per switch.

Non-DAP terminals enable the user to perform the same functions as DAP terminals except for being able to access and display the MCC page displays. The non-DAP terminals use message mode commands to maintain the switch (for example, input message, RST:MSGS=0).

The control and display portion of the MCC or remote switching control center video display is used to monitor at a subsystem level. Control and display consists of many separate pages that can be displayed individually. Each page shows the operating condition and a menu of possible input commands for a particular subsystem. Figure 2-4 shows an example of a control and display page. The display conventions used for equipment status are also used for all control and display page displays. An index page is provided to allow quick access to any of the control and display pages during trouble situations. A message page is used whenever control and display information is not required (that is, the display of system status is all that is desired). This avoids confusion, since the display provides only the system status and input message information when the blank page (Figure 2-2) is used.

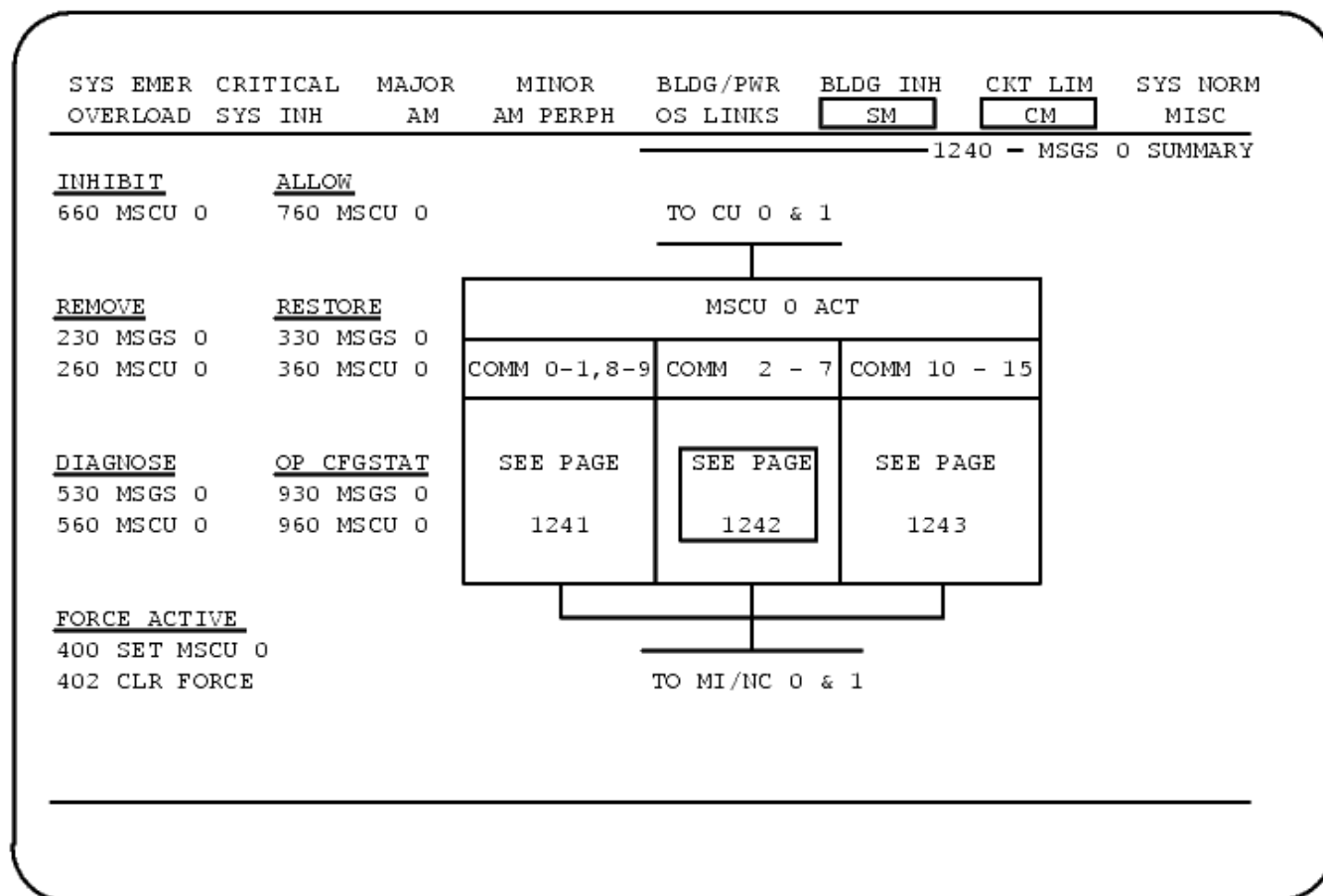


Figure 2-4 MCC Control and Display Page Example

2.4.2.4 Input and Output Messages

The input message area is used for inputting human interface messages. Refer to Section 3 of this document for details of how to use input messages.

Any deviation from normal system operating conditions produces a printout on the MCC or remote switching control center. The printout contains all data relevant to the condition, diagnostic results, and a list (by priority) of suspected faulty circuit boards. Periodic traffic and plant summaries are also printed on the printer. All of these printouts are important in determining system status, with diagnostic information and circuit board lists being of primary importance to maintenance personnel. The printer should be connected whenever maintenance is being performed in the office. For detailed analysis of printouts, refer to 235-600-750, *Output Messages Manual*.

2.5 MAINTENANCE TASKS

2.5.1 SCHEDULED ROUTINE MAINTENANCE

Routine maintenance is performed on a specified schedule to secure maximum performance of the total network. Since peak load periods and features are different from office to office, some tests (for example, REX test) may not have specific test schedules that are best for all of the offices. In this situation, the equipment test list (ETL) can be very helpful in giving references to procedures and recommended time intervals to perform these types of tests.

Refer to 235-105-210, *Routine Operations and Maintenance Procedures*, for routine maintenance schedules (residing in the ETL). More importantly, this manual contains descriptive and detailed procedures for the schedules

listed in the ETL.

2.5.2 NONSCHEDULED ROUTINE MAINTENANCE

Nonscheduled routine maintenance procedures are basically those procedures that are not listed on the ETL. The following list contains some of the nonscheduled operations:

- System Control Functions:
 - (a) Loading automatic message accounting (AMA) tapes
 - (b) Set/change date and time
 - (c) Alarm system assignments.
- Call Trace Procedures:
 - (a) Nuisance call trace
 - (b) Interoffice call trace
 - (c) Utility call trace.
- Miscellaneous Routine Procedures:
 - (a) Bring up AMA teleprocessing system (AMATPS)
 - (b) Bring up central trunk test unit (CTTU)
 - (c) Bring up Engineering Administration Data Acquisition System (EADAS).
- Memory Alteration Procedures:
 - (a) Request software update summary
 - (b) Obtain ODD backup schedule
 - (c) Load software updates from tape.

For the complete list of nonscheduled routine operations, refer to 235-105-210, *Routine Operations and Maintenance Procedures*.

2.5.3 CORRECTIVE MAINTENANCE TASKS

2.5.3.1 Trouble Location Process

The video display pages are used together with the system status display and ROP output messages to isolate a hardware trouble to a specific unit. Then the system's diagnostic and grid exercise programs are used to pinpoint the trouble to the specific circuit pack(s) as described in Section 2.5.3.2, Hardware Repair Procedure (following). Also, a simplified trouble location procedure is shown in Figure 2-5.

NOTE: Periods of AM insanity may affect MCC display and functional capabilities.

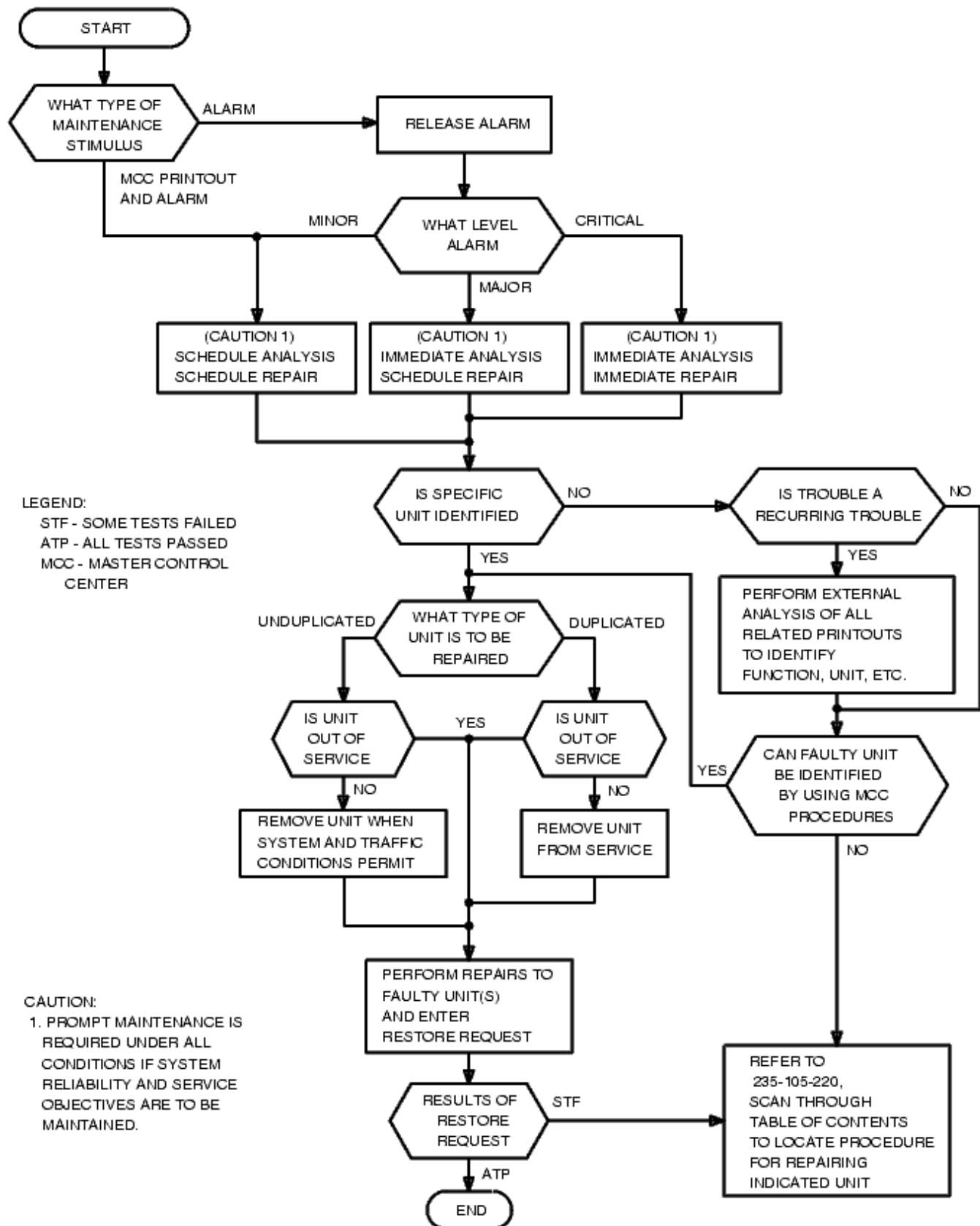


Figure 2-5 Simplified Trouble Location Procedure

2.5.3.2 Hardware Repair Procedure

Automatic trouble location is an integral part of the diagnostic and grid exercise programs in the 5ESS®-2000 environment. These programs are designed to test functions at the circuit pack (board) level. Therefore, most test failures can pinpoint the fault to a small number of circuit packs.

The diagnostic and grid exercise programs maintain a list (by priority) of suspect circuit packs at each test point in the diagnostic. During execution, this list expands and contracts as testing shifts attention among the hardware. Upon the first failure, the current circuit pack list is converted to a suspected faulty equipment list containing location information and printed on the ROP. Combined use of this list and the frame and shelf-mounted designation strips provide direct access to suspect circuit packs. The trouble repair procedures in 235-105-220, *Corrective Maintenance Procedures*, should be used to replace the faulty circuit pack. A sample faulty equipment list printout is shown in Figure 2-6.

```
560-60 89-01-36 09:34:03 007895 DGN:LUHLSC=1-0-0-0,RAW,TLP; PF
570-1310771 89-01-36 09:34:04 077896 DGN LUHLSC=1-0-0-0 STF PH 1 SFG 1 TEST 1
570-1310771 89-01-36 09:34:11 007897 DGN LUHLSC=1-0-0-0 SUSPECTED FAULTY
EQUIPMENT LAST RECORD
  AISLE  MODULE  CABINET  CODE      FORM    EQL      TYPE    NOTE
  0101    SM 1    LTP 0    TN844     5    53-016  ----     8
  0101    SM 1    LTP 0    TN843     3    53-086  HPR
  0101    SM 1    SMC 1    HC5D1234  1    36-018  ONL
```

Figure 2-6 Faulty Equipment List

For each circuit pack, the following information is given:

- **AISLE:** Aisle equipment frame location within the office.
 - **MODULE:** Switching module number.
 - **CABINET:** Cabinet type and number.
 - **CODE:** Circuit pack number.
 - **FORM:** Equipment forms. A form can be one of two types as follows:
 - (a) Series number with carrier pack
 - (b) Issue number with micro code.
 - **EQL:** Equipment physical location [for example, 53-016 (where 53 = vertical distance, in inches, of the circuit above the floor and 016 = horizontal distance of circuit from LEFT edge of bay in 1/8-inch increments)]. A third field [53-016-XX, where XX = depth (in the unit) in 1/10-inch increments] is also included.
 - **TYPE:** Helper unit.
- NOTE:** When a note (for example, 8) appears in this column, refer to the "TLP (Trouble Locating Process) NOTE APPENDIX" in 235-600-750, *Output Messages Manual*.

- **DGN:** Diagnose.

- **LUHLSC:** Line unit high-level service circuit.

2.5.3.3 Utility Call Trace

Another maintenance tool available to maintenance personnel for locating trouble is the utility call trace. Utility call trace allows users to do the following:

- Snapshot the hardware path representing a call connection.
- Trace all connections of a call.
- Trigger a call trace with a utility break point.
- Print the path of the call through the switch in diagnostic format on the ROP and show it on the MCC screen.

Craft and/or maintenance personnel can also use utility call trace to trace test calls. For example, to troubleshoot customer complaints, a test call can be traced to or from the customer to see what hardware is in use.

2.5.3.4 Data Base Trouble Location Process

In the 5ESS[®]-2000 switch, data base inconsistencies can be identified by asserts and audits. The results of the asserts and audits can be sent to the system log file and/or the ROP. Audits and asserts are used in the switch to verify and check the validity of software data structures such as the ODD and equipment configuration data (ECD) in the AM. Data base repair procedures are provided in 235-105-220, *Corrective Maintenance Procedures*.

2.5.4 SYSTEM RECOVERY

2.5.4.1 Reconfiguration

2.5.4.1.1 System Responses

Reconfiguration is necessary to prevent faulty hardware from affecting system processing. Equipment can be reconfigured either automatically or manually. Basically, reconfiguration consists of the following:

- Appointing other hardware to assume functions of the faulty hardware
- Removing traffic from the faulty hardware
- Removing faulty hardware from service
- Updating system status with appropriate alarms, indicators, printouts, etc.

Since the 5ESS[®]-2000 switch varies in size and equipment usage, the recovery procedures vary in complexity. The large office obviously has a wider range of reconfiguration possibilities since it contains more hardware. Fault recovery is performed at a subsystem level whenever possible. Only the fault-associated subsystem(s) is affected during recovery.

2.5.4.1.2 Automatic Recovery

When a hardware fault is identified, the system begins automatic recovery procedures. If the system is in good operating condition prior to the fault and the fault is not catastrophic, automatic recovery should restore normal processing. ***Automatic recovery performs all the reconfiguration and initialization processes necessary to***

correct the problem. Automatic recovery restores the system in the great majority of all faults.

2.5.4.1.3 Manual Reconfiguration

Manual reconfiguration is used in the repair of a unit following automatic recovery or if automatic recovery does not place the faulty unit OOS and restore processing. Most manual reconfiguration is done from the MCC or the remote maintenance center (if provided). There are several numeric input commands on the control and display pages that can be entered from the terminal keyboard. They are as follows:

- **REMOVE:** This series of commands (2XX and 2XXX) reroutes traffic from the affected unit and places the unit OOS.
- **RESTORE:** This series of commands (3XX and 3XXX) diagnoses the unit to determine if it is capable of operating. If diagnostic returns all tests passed (ATP) or conditional all tests passed (CATP), the unit is restored to service. Otherwise, the unit is left OOS.
- **SWITCH:** This series of commands (4XX and 4XXX) causes all traffic and processing to be switched to the mate controller.
- **DIAGNOSE:** This series of commands (5XX and 5XXX) requests diagnostics to be run on specified unit(s). The unit remains out of service until manual restoral to service is requested.
- **FORCE:** This series of commands (4XX and 4XXX) unconditionally forces operation to the desired unit and puts the mate unit OOS Forced Unavailable.

2.5.4.1.4 Command Entry

All of these commands are entered conditionally, and the system enables them. The video page display for each unit has a menu of commands (and input codes) available for that unit. If the system is experiencing problems, it may not honor these input requests. Unconditional options and manual overrides are provided for these cases. The amount of direct control available depends on the type of unit involved.

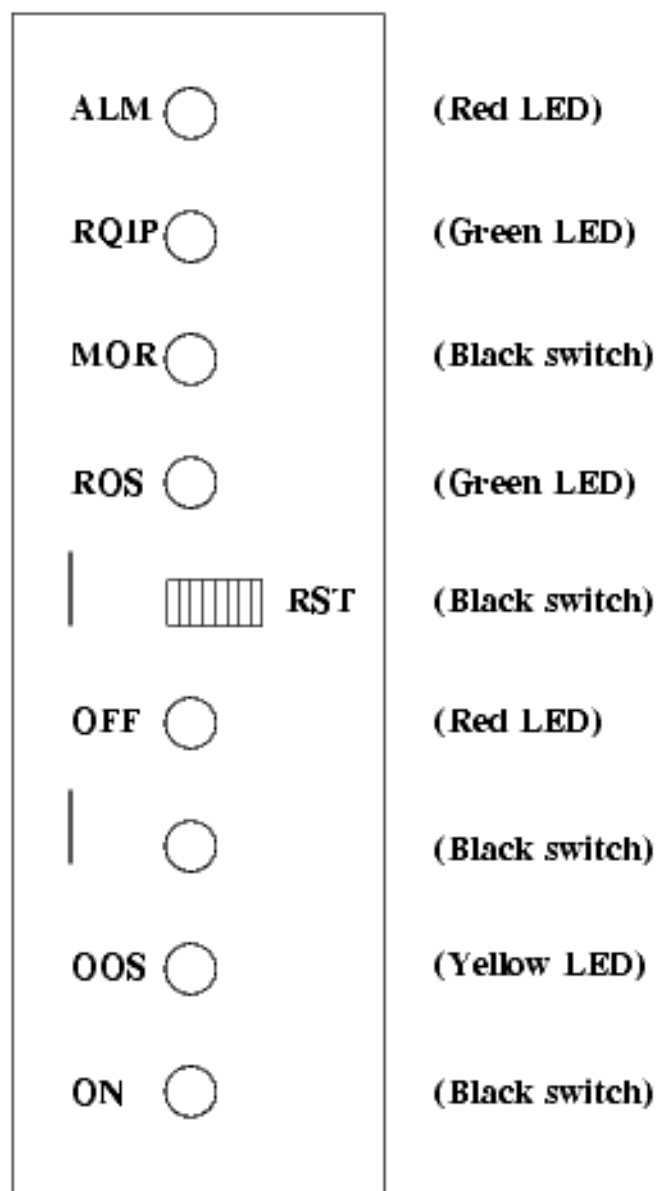
2.5.4.1.5 Control and Display Functions

Fully duplicated (duplex) units [for example, message switch control unit (MSCU), office network timing complex (ONTC), and module controller/time slot interchanger unit (MCTSI)] contain control/display (CD) packs with several status light-emitting diodes (LEDs) and manual reconfiguration switches. CD packs such as SN516, UN516, and TN1424 with power convertor plus dual link interface TN1077 all contain four switches and five LEDs which provide and display the following capabilities:

- **ON:** A momentary pushbutton switch used to power up the unit.
- **OFF:** A momentary pushbutton switch used to power down the unit **only** if that unit is not in service or is unavailable.
- **RST/ROS:** A rocker switch used to request a unit be restored to service or conditionally removed from service.
- **MOR:** A momentary manual override switch. Whenever this switch is simultaneously depressed with the **OFF** switch, power is turned off regardless of the hardware state (**ACT**, **STBY**, or **OOS**).
- **OFF:** A red LED that lights whenever unit power is off.
- **ALM:** A red LED that lights whenever there is a power fault on the unit (fuse or converter alarm). Note that in the alarm state, all power may not be off in the unit. Once maintenance personnel power down the unit for repairs, the **OFF** LED lights and the **ALM** LED goes off.

- **OOS:** A yellow LED controlled by the system. This LED lights whenever the unit is out of service.
- **RQIP:** A green LED controlled by the system. This LED lights whenever a request to restore or remove a unit from service has been received by the system. If this request is denied or fails, this LED flashes for five to six seconds. The LED goes off when the requested action has been completed.
- **ROS:** A green LED that lights whenever the restore/request out-of-service (**RST/ROS**) switch is in the **ROS** position.

Figure 2-7 shows an example of the SN516/UN516/TN1424/TN1077 unit layout.

**LEGEND :**

ALM ALARM
 LED LIGHT-EMITTING DIODE
 MOR MANUAL OVERRIDE
 ROS REQUEST OUT OF SERVICE
 RQIP REQUEST IN PROGRESS
 RST RESTORE TO SERVICE
 OOS OUT OF SERVICE

Figure 2-7 SN516/UN516/TN1424/TN1077 Unit Layout Duplex 5ESS -2000 Switch

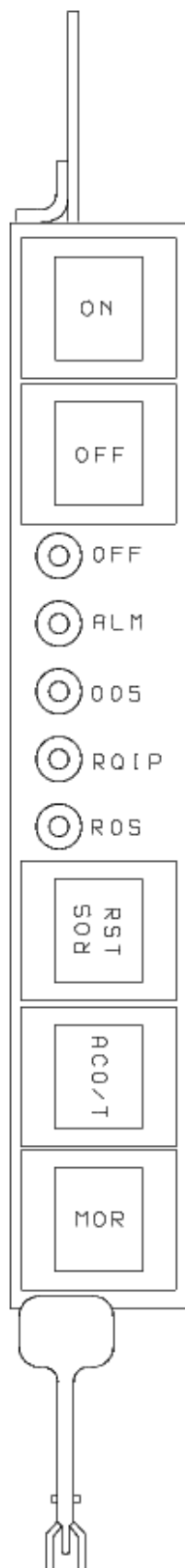
Table 2-3 summarizes duplex control and display pack features for the 5ESS®-2000 switch.

Table 2-3 Unit Indicator and Control Comparison

DUPLEX UNIT	CONTROL INDICATOR	TYPE INDICATOR	FUNCTION/INDICATION
TMS	ROS	LED	Request out of service.
MSGs	RQIP	LED	Request in progress.
MSCU	OOS	LED	Out of service.
MPU	ALM	LED	Alarm.
TMCU	OFF	LED	Power is off.
MCU	ON	Switch	Turns power on.
TSIU	OFF	Switch	Turns power off.
CMCU	ROS-RST	Switch	(1) ROS enters ROS request. (2) RST enters RESTORE request.
MSPU	MOR	Switch	Manual override. Enters control pack functions unconditionally.

Unduplicated (simplex) units are not equipped with control and display packs. All simplex requests (**RST**, **ROS**, etc.) are input via an input message. Simplex status [request in progress (**RQIP**, **OOS**, etc.)] is displayed and printed at the MCC or SCC.

The 3B20D computer units are equipped with the TN5 AM C/D pack shown in Figure 2-8. This pack is equipped with an additional alarm cutoff/test (**ACO/T**) LED and switch.



LEGEND:

- ACO/T - ALARM CUT OFF/TEST
- ALM - ALARM
- MOR - MANUAL OVERRIDE
- OOS - OUT OF SERVICE
- ROS - REQUEST OUT OF SERVICE
- ROS/RST - REQUEST OUT OF SERVICE/
RESTORE TO SERVICE
- RQIP - REQUEST IN PROGRESS

Figure 2-8 TN5 AM Control and Display Pack 3B20D Processor**2.5.4.1.6 Unit Controller Status States**

Unit controller conditions must be known at all times. This information is needed to determine system status. Four general status states have been defined for the switch unit controllers. They are active (ACT), standby (STBY), out of service (OOS), and unavailable (UNAV). Table 2-4 summarizes basic controller states. At times, it is necessary to know how, or why, a controller entered a particular state. A set of state-qualifiers has been developed to further define a controller state. A combination of qualifiers may be required to specifically define a state. Table 2-5 shows qualifiers used and sample applications in the 5ESS®-2000 switch.

All duplex subsystems follow the same general methods of manual reconfiguration. Reconfiguration is accomplished by manual inputs at the MCC or remote maintenance center and/or the unit control and display circuit pack. Since simplex units are unique, they **cannot** be reconfigured as such. Therefore, circuit board replacement is the method of restoring simplex units.

Table 2-4 Basic Controller States

ABBREVIATION	DEFINITION	CONTROLLER STATE
ACT	Active	Actively processing tasks. In control of periphery. Updating other controller memories.
STBY	Standby	Not processing. Not in control of periphery. Memory is being kept up to date by ACT controller. Ready to be made ACT if needed. Not supplying source data.
OOS	Out-of-Service	Not processing. Not in control of periphery. Memory may not be up to date. Cannot assume ACT state (without initialization).
UNAV	Unavailable	Not processing. Not in control of periphery. Memory is not up to date. Cannot assume any other state (ACT, STBY, OOS) without severe initialization. System will not attempt automatic revival. Can only be revived manually.

Table 2-5 Qualifiers for Basic Controller States

QUALIFIER ^a	MEANING	SAMPLE INDICATIONS
FRCD	Controller forced into its present state by an external manual control. Cannot change states until the external control is removed.	ACT: FRCD UNAV: FRCD
FLT	Controller is in present state due to an associated fault detected by diagnosis.	OOS: AUTO: FLT
TEMP	Controller or unit is temporarily removed from service to assist in testing another unit and is restored subsequently to service.	OOS: AUTO: TEMP
TBLA	Unit exceeded an error threshold. Diagnosis passed. Indicates need for expert analysis.	OOS: AUTO: TBLA
DGN	The unit is being diagnosed by the system.	OOS: AUTO: DGN
UPDATE	Controller memory is being updated. When it is completed, the unit is restored to service.	OOS: AUTO: UPDATE
PWR OFF	Power has been removed from the controller.	UNAV: FRCD: PWROFF
PWR ALM	Power has automatically been removed from the controller.	OOS: AUTO: PWRALM
MINOR	Ready to run updated spare.	ACT: MINOR

MAJOR	Controlling unit of duplex units.	ACT: MAJOR
DRGD	Service could be impacted.	ACT: MAJOR: DRGD
RMVD	Units no longer in service.	OOS: AUTO: RMVD
FE	Family of equipment.	OOS: FE
Notes:		
a. While a state may appear alone, a qualifier is always displayed with its associated state.		

2.5.4.2 Initialization

2.5.4.2.1 General

The other part of system recovery is initialization. Serious system difficulties may be caused by equipment (hardware) troubles, difficulties in executing the program (software), or by human error.

CAUTION: If the system is failing to process calls properly (is not able to complete test calls, etc.), the system should be automatically attempting to recover itself by taking automatic emergency actions. This should be indicated to office personnel by status indicators, printouts, switching of system controllers, etc. If automatic emergency actions do not restore normal system processing and control, manual emergency actions or system recovery procedures are required.

2.5.4.2.2 Distributed Processing Architecture

The distributed processing architecture of the switch employs many autonomous processors. The main processing units are the AM, the Communication Module Processor (CMP), and the individual SMs/SM-2000s. Initialization can treat these processors both independently and collectively. Therefore, the following four types of initialization have been defined:

- **AM Initialization:** This is an initialization of the AM.
- **CMP Initialization:** This is an initialization of the CMP.
- **SM Initialization:** This is an initialization of the SM/SM-2000.
- **System Initialization:** This is a complete initialization of the AM, the CMP, and the SMs/SM-2000s.

NOTE: Although slightly different actions can take place at each level in the AM, CMP, and SMs/SM-2000s, the overview of the philosophy and objectives of the initializations are the same. The various levels of recovery, their attributes, and recovery time estimates for individual SMs/SM-2000s, the CMP, and the AM are explained in Table 2-6.

2.5.4.2.3 Stimulus for Initialization

In any case, the stimulus of an initialization is the failure of a check that indicates if the integrity of a processor or data base is questionable. Initialization is caused by a signal which is generated when the hardware or software detects an error (resets). It can also be caused by manually inputting initialization requests (interrupts) at the video terminal keyboard. An initialization consists of some or all of the following:

- Restoring processor(s) to a good software state
- Restoring the periphery to a good software state
- Aborting certain activities
- Zeroing or setting temporary data to a known good state
- Reloading the memory from disk file.

Not all of the preceding actions are performed on every initialization. An initialization can be more or less drastic depending on which and how many of the preceding routines are performed. The degree of initialization is determined by the system level count. The level count is incremented each time a recovery attempt fails within a predetermined time lapse. The higher the level count, the more drastic the recovery actions become.

After an initialization occurs, an initialization timing interval exists for a short period of time. If no other initializations occur within this time interval, the level count is reset to zero. For detailed information on initializations and recovery procedures, refer to 235-105-250, *System Recovery*.

Table 2-6 Initialization Levels and Attributes

LEVEL	INITIALIZATION TYPE	ATTRIBUTES OF INITIALIZATION (WORST CASE)	APPROXIMATE MODULE INITIALIZATION TIME
SM/SM-2000 ONLY	SPP (Single-Process Purge)	Single call idled	50 ms
	DA (Directed Audit)	Single call idled	4 sec.
	SI (Selective Initialization)	New service requests suspended; all transient call idled	1.5 min.
	FI (Full Initialization)	New service requests suspended; all SM calls idled	2 min. ^a (with no pump) 3 min. ^a (with pump)
AM ONLY	SPP (Single-Process Purge)	Single call idled	100 ms
	DA (Directed Audit)	Single call idled	5 sec.
	FPI (Full Process Initialization)	New service requests routed to reorder; some transient calls idled	10 sec.
	SI (Selective Initialization)	New service requests routed to reorder ^b ; all transient calls idled	2 min.
	FI (Full Initialization)	New service requests routed to reorder ^b ; intermodule calls idled	3.5 min.
CMP ONLY	SPP (Single-Process Purge)	Single call idled	50 ms
	DA (Directed Audit)	Single call idled	4 sec.
	PGI (Purging Initialization)	Multiple transient calls idled	0.5 sec.
	SI (Selective Initialization)	New service requests suspended; all transient calls idled	13 sec.
	FI (Full Initialization)	New service requests suspended; all transient calls idled	15 sec. (with no pump) 1 min. (with pump)
Notes: a. Time shown is for a standard configuration SM and varies slightly from one software release to another. Corresponding time for a loaded configuration SM or for an SM-2000 may be significantly longer (especially for FI with pump), depending on the equipage of the ISDN peripherals. b. On an SM/SM-2000 with stand-alone feature subscription, limited call processing will be available.			

2.5.4.3 Return to Point of Interrupt (RPI)

This is the lowest level of software initialization. It is performed automatically in response to audit features, user program defensive check failures (asserts), and restarting from maintenance interrupts. Action associated with this level may be as follows:

- Localized initialization of user-owned global data
- Scheduling elevated audits

- Logging failure information.

Control flow is then returned to the previously interrupted point.

2.5.4.4 Single-Process Purge

The single-process purge (SPP) level is used whenever an error is detected which is severe enough to make it unsafe to return to the point of interrupt. The initialization action varies somewhat with the processing environment, but the primary objective is to restore a software configuration that can support resumption of normal processing. In general, the recovery actions associated with an SPP are as follows:

- The running process or task is killed and, if essential, reinitialized.
- Any global data being used by the process is restored.
- Any hardware or software resources are recovered.
- Any associated processes are informed.
- Control is reestablished at a "safe point."
- Failure information is logged.

Some recovery may be performed on a deferred basis by audits requested by the purge. In terms of call processing, if the current process is associated with a call, the call is idled and the subscriber given reorder or dial tone. Wideband calls are idled if the process is associated with a wideband call.

2.5.4.5 Directed Audits

Directed audits are used as an initialization action whenever inconsistencies are discovered in critical data structures such that continued operation is not possible. This level is generally invoked from either an audit or a user program defensive check failure (assert). The action taken is to audit, in an unsegmented mode, enough data to ensure that system operation can resume, and to schedule on a deferred basis any additionally required audit activity. Restart from a directed audit is generally via a single-process purge of the current process. Again, failure information is logged. If the running process was associated with a call, the call is idled and the subscriber given reorder or dial tone.

2.5.4.6 Full-Process Initialization

This is a full initialization of a single AM kernel process. All dynamic nonshared data is initialized or audited. All data shared among known processes is audited. Common channel signaling is suspended during this short initialization.

2.5.4.7 Selective Initialization

A selective initialization (SI) is a high-level initialization (although it is the lowest level processor-wide recovery action). This initialization can be performed automatically due to recovery actions or manually by maintenance personnel. The basic actions of an SI in the various processors are described as follows:

- In the AM, an SI includes an unconditional bootstrap for all static text and data for both the *UNIX*® RTR operating system and the *5ESS*®-2000 switch application processes. Then, all dynamic data is either initialized or audited (OOS hardware status and stable calls are preserved). Call processing functions in this processor are suspended during this time interval, but stable calls are preserved.

- In the CMP, an SI does not include any hashsum checks or pumps. All dynamic data is either initialized or audited. Call processing functions are suspended during this interval, but stable calls are preserved.
- In the SM/SM-2000, an SI does not include any hashsum checks or pumps. All dynamic data is either initialized or audited, preserving OOS hardware status and most stable calls (certain connections that appear to be stable are disconnected due to their more complex dynamic data or ongoing message interaction with the switch, that is, 3- and 6-way calls and AP data links). Call processing functions within the initializing processor are suspended during the initialization interval. A manual SM/SM-2000 selective initialization with an unconditional full pump is available (though it has additional affects on the SM/SM-2000 of longer downtime and, possibly, a few lost stable calls due to the pump use of time slots).

NOTE: Stable calls over SM/SM-2000 selective initialization include wideband.

Options to back out temporary recent changes and program updates are supplied when pumps are involved in the previous processors.

2.5.4.8 Full Initializations

A full initialization (FI) is the highest software level of processor-wide recovery actions. The FI can be performed automatically due to recovery actions or manually by maintenance personnel. There are several types of FI which can be used (for example, power up FI and FI with pump) each of which changes the severity of recovery action. Every FI initializes hardware at some level even though it is mainly a software initialization. Different hardware levels are seen depending on the processor being initialized. The basic actions of an FI in the various processors are described as follows:

- In the AM, an FI includes an unconditional bootstrap of all static text and data for both *UNIX*[®] RTR operating system and the *5ESS*[®]-2000 switch application processes. Then, all dynamic data is initialized. When the AM undergoes an FI, the hardware level selected can cause the loss of stable calls routed through the time multiplexed switch (TMS). During the initialization of the AM, the SMs/SM-2000s are supplying dial tone and giving reorder to the customers or processing intra-processor SM/SM-2000 calls if the stand-alone option is utilized. Call processing is maintained during an AM FI except at the highest hardware level, which reinitializes the TMS. New CCS calls are inhibited until the CNI Ring is initialized.
- In the CMP, an FI does not affect stable calls although any transient calls being processed at the time of the FI is lost. The FI includes a conditional partial pump of any static text or data that fails to pass a hashsum check against a disk copy of the hashsum tables. All dynamic data is initialized. Both manual and automatic full CMP initialization with an unconditional pump can be invoked.
- In the SM/SM-2000, an FI includes a conditional partial pump of any static text or data that fails to pass a hashsum check against a disk copy of the hashsum tables. Then, all dynamic data is initialized. Depending on the type of FI, an FI is also performed on the SM/SM-2000's peripheral hardware and software. Any transient and stable calls being processed by the processor undergoing the full initialization or on connected peripherals are lost. A manual SM/SM-2000 full initialization with an unconditional pump is available.

Options to back out temporary recent changes and program updates are supplied on any pump of the various processors. Office bring-up and dead-start situations use a manual system-wide FI (that is, AM, CMP, and all SMs/SM-2000s).

2.5.4.9 Postmortem Dump

2.5.4.9.1 Overview

A postmortem dump is normally printed via the ROP to permit analysis of the cause of the system troubles;

however, postmortem dumps can be logged in the postmortem dump log (PMLOG) or the DAYLOG file. The output message class (MSGCLS) is used by the maintenance personnel to specify where the postmortem dumps are to be sent, that is, to the physical device (ROP) or the software device (PMLOG or DAYLOG). Output consists of all data relevant to the trouble, such as the following:

- Value of program counter at time of occurrence
- Value of latched address and data bus
- System process that last had control
- Values of internal control registers
- Stack area values of last system process
- Contents of register area for last system process
- Contents of all error registers which indicate the source of the error(s)
- Contents of counters used for escalation to higher levels of initialization.

2.5.4.9.2 Switching Module Postmortem Dump

A SM/SM-2000 postmortem dump is normally sent to the ROP approximately one to five minutes after the system has gained sanity. The first report to indicate a SM/SM-2000 initialization has been started is the high-level initialization report. The first line is as follows:

REPT SM=a INITIALIZATION TRIGGER=bb EVENT=cc

Refer to 235-600-750, *Output Messages Manual*, for details concerning the REPT SM message.

Efforts should be made to analyze the cause of the initialization and to verify that the SM/SM-2000 recovers properly. When the SM/SM-2000 recovers, analyze the postmortem dump and any related error reports. The related reports have the same event numbers.

If the postmortem dump is not printed automatically, it is possible to obtain the postmortem dump by using the input command:

OP:POSTMORT,SM=a [,OFL] [,SPP] [,EVENT] [,ESCAL] [,RCVY] [,DCF];

Refer to 235-600-750, *Output Messages Manual*, for details concerning the OP:POSTMORT,SM message.

The postmortem dump report contains information about type and source of the interrupt that occurred in the SM/SM-2000 controller and the resulting level of initialization. This report has two possible formats, the shortest of which is normally printed on the ROP, while the extended version is stored in the log file DAYLOG.

The log file DAYLOG is kept in general to locate severe software faults. The contents of the file can be dumped by entering the following message:

**OP:LOG:LG="DAYLOG":[DATE=b[&&c],][TIME=d[&&c],][KW="f",][ID=g,]
[MSGCLS=i][TYPE=h,][LIMIT=i,][CLASS=j,][DEVICE="k"]];**

Refer to 235-600-750, *Output Messages Manual*, for details of this message.

The short version of the previously mentioned SM/SM-2000 postmortem dump reports has the following format:

```

REPT SM=a,b HWLVL=c SWLVL=d e f g EVENT=h i
j-ERR FAILING ADDR=k PROCESS:BG=r,s,t CM=u,v FG=w,x,y z
[,TYPE=h] [,LIMT=i] [,CLASS=j],DEVICE=k]]

```

The extended version from the log file DAYLOG looks as follows:

```

REPT SM=a,b HWLVL=c SWLVL=d EVENT=h i   e f g
j-ERR FAIL-ADDR=k l-m DATA-BUS=n TIME=o:p.q
PROCESS: BG=r,s,t CM=u,v FG=w,x,y z
ORIG-HW-STATUS:   a : b c d a : b c d
FINAL-HW-STATUS:   a : b c d a : b c d
PREVIOUS TYPE/COUNT: e f
SHADOW TYPE/COUNT:  g h
AUX DATA:         m n o p
ESCALATION-COUNTS: i j k l

```

Refer to 235-600-750, *Output Messages Manual*, for details of the REPT SM message.

In addition to the postmortem dump reports, related error reports should be analyzed to locate the fault. Related error reports have the same event number. Examples of related error reports are illustrated as follows:

- INIT SM=a LVL=b SUMMARY EVENT=g ...
- INIT SM=a,b LVL=c OSDS-M EVENT=f g
- REPT SM=a DLI HW REGS EVENT=g ...
- REPT SM=a SP HW REGS EVENT=b ...
- REPT SM=a TSI HW REGS EVENT=c ...
- REPT SM=a CI b HW REGS EVENT=c ...
- REPT SM=a PI b HW REGS EVENT=c ...
- REPT SM=a RLI b HW REGS EVENT=c ...
- REPT SM=a MC b HW REGS EVENT=c ...

Suppressing 5-Minute Automatic Dumps: The input command **RLS:POSTMORT,SM=a;** (MML format) may be used to suppress the 5-minute automatic dump. The command also clears the postmortem area; otherwise, the area is cleared automatically one hour after the initialization.

Error Source of Interrupt: In the report **REPT SM=a,b HWLVL=c SWLVL=d e f EVENT=h i**, field ``e" reports hardware subunit which triggered the interrupt, and field ``f" indicates the source of the error that caused the interrupt (see 235-600-750, *Output Messages Manual*).

2.5.4.9.3 CMP Postmortem Dump

A CMP postmortem dump contains information about the error(s) that caused the CMP to take recovery action. Information is sent to the ROP, usually within one to five minutes after the system has gained sanity, and is displayed in several types of output messages beginning as follows:

```

REPT:CMP

```

INIT:CMP
REPT CMP= POSTMORT

For additional information on these messages, refer to 235-600-750, *Output Messages Manual*.

If the postmortem dump is not printed automatically, it can be requested via the following input message:

OP:POSTMORT,CMP,[EVENT][,RCVY][,DCF];

To suppress the 5-minute automatic dumps, enter the input command beginning as follows:

RLS:POSTMORT,CMP=a;

For details of both messages, refer to 235-600-700, *Input Messages Manual*.

Note that the "RLS" message "unlocks" the area where postmortem area is stored, that is, allows it to be overwritten with information about subsequent postmortems. Otherwise, the system preserves postmortem information for an hour.

There may be additional error reports and status dumps that provide more information about the error(s). They have the same event numbers as the postmortem dumps. Some information is stored in a log file on disk. To display information from the log file, enter the following message:

**OP:LOG:LG="DAYLOG"[:[DATE=b[&&c],][TIME=d[&&c],][KW="f",][ID=g,]
 [MSGCLS=l|TYPE=h,][LIMIT=i,][CLASS=j,DEVICE="k"]];**

For details, refer to 235-600-700, *Input Messages Manual*. Try to analyze the cause of the initialization and verify that the CMP recovers properly.

2.5.4.9.4 Communication Module Postmortem Dump

Software in the various peripheral controllers of the communication module (CM) produces several types of postmortem dumps. Each is identified by the controller which produced it. All have the following form:

REPT:POST MORTEM a EVENTNO=b

The peripheral controllers which produce postmortem dumps for both CM1 and CM2 are as follows:

- **CLNK** = Communication Link
- **MSCU** = Message Switch Control Unit
- **MMP** = Module Message Processor
- **PPC** = Peripheral Pump Controller
- **FPC** = Foundation Peripheral Controller
- **TMS** = Time Multiplexed Switch
- **CMP** = Communication Module Processor.

The basic format of the postmortem dumps on the units listed previously is as follows:

REPT:POST MORTEM a EVENTNO=b
cccccccc

The variable field definitions are as follows:

- a = hardware identity (for example, MSCU=0)
- b = decimal number indicating the event number
- c = hexadecimal array of eight digits in a sequence of eight words and in four lines.

Each of the hardware identities listed previously is explained in detail in 235-600-750, *Output Messages Manual*.

The postmortem dump report for the TMS hardware identity is an exception to the general format that the other hardware identities follow. The format for TMS is as follows:

REPT POST MORTEM DUMP TMS=a EVENTNO=b
c c c c c c c c

The variable field ``cccccccc" can appear more than once; however, the most useful information is contained in the first four words.

With the various postmortem dump reports, an autonomous dump on the Network Clock is possible. The layout of this report is as follows:

DUMP NC a b c
NETWORK CLOCK a CCB/CLRT REGISTERS X'
ddddddddd

This message can be used to identify the exact problem according to the bits that are set as shown in the format description. For details of this message, refer to 235-600-750, *Output Messages Manual*.

2.5.4.9.5 Administrative Module Postmortem Dump

NOTE: Information concerning the register layouts for the registers referred to in the error reports (in the log files) can be obtained from the Appendixes section of 235-600-750, *Output Messages Manual*.

Two types of interrupts may occur in the AM. These interrupts are indicated by either a **REPT CU a ERROR INTERRUPT** or a **REPT CU a MAINTENANCE INTERRUPT** report. When either of these reports are printed on the ROP, more information about the interrupt is written in a log file. The AM uses three error log files: memory history log (MEMLOG), error interrupt handler log (ERLOG), and automatic postmortem log (PMLOG). Entries in the MEMLOG file and the ERLOG file are generated with an REPT CU interrupt report. Entries in the PMLOG file are generated following a system initialization and are accompanied by an REPT CU interrupt report.

Each log file entry has a sequence number associated with it. Since all three log files use the same sequence counter, the order in which a set of entries occurs can be determined from the sequence numbers. These numbers appear in the REPT CU interrupt report. Each entry has a date and time stamp to relate log entries to other printouts. Therefore, it is important to save the ROP output of the last 12 hours prior to a REPT CU interrupt report to be able to extract any data that might be useful for error analysis.

Memory Error Types: When a MEMLOG report must be analyzed, the type of memory error can be indicated in the report. Descriptions of these errors are as follows.

- **ERROR A:** An OR of internal memory hardware checks resulted in error detection. If this occurs in the active

control unit, a stop-and-switch occurs. At least one bit is set in error register 1 (ER1) bits 0-11 or 22. In the trapped address register (TAR), the bits 28 and 29 are both reset.

- **ERROR B:** An out-of-range address is detected. The bits 0-11 and 22 in ER1, plus the bits 28 and 29 of TAR are all reset.
- **ERROR C:** The Hamming check circuitry detected a multibit uncorrectable error during a system access of memory. TAR bit 29 is set.
- **ERROR D:** A correctable data parity of Hamming check error or uncorrectable refresh error is detected (during system access or refresh access). TAR bit 28 is set.

Error Interrupts: Normally error interrupts are nonfatal errors, detected by the system in either the on-line or standby control unit. However, they can escalate to a processor switch or an initialization if preset thresholds are exceeded. When an error interrupt occurs, the information printed on the ROP or contained in the log files can be used for error analysis. The log file information should be saved in case the next level of technical support is needed.

The error interrupts can be classified into the following three areas:

- (1) Less serious hardware errors (for example, memory errors, input/output errors, or refresh parity)
- (2) Errors related to standby CU in a duplex (active/standby) configuration
- (3) Software-related errors.

When error interrupts occur, the associated information is written in one of the following error log files:

- MEMLOG
- ERLOG.

If the **REPT CU a ERROR INTERRUPT b c** is output, the ``a" indicates the control unit side 0 or 1; the ``b" indicates the interrupt type; and the ``c" indicates the sequence number under which supplementary data is available in the particular log file. Therefore, when log file output is requested, this sequence number should be specified for the parameter ``KW" in the input command:

**OP:LOG:LG=a[:DATA,DATE=b[&&c]] [,TIME=d[&&e]] [,KW=f] [,ID=g]
[,TYPE=h] [,LIMT=i] [,CLASS=j],DEVICE=k];**

The variable ``a" equals the log file name (that is, MEMLOG or ERLOG).

Maintenance Interrupts: Maintenance interrupts are output after a system initialization. These reports indicate that a maintenance reset function (MRF) has occurred. The postmortem dump, normally printed automatically or requested via **OP:LOG: a** message, can be used to determine the problem. The variable ``a" in this situation equals **PMLOG**. See 235-600-750, *Output Messages Manual*, for details of the **OP:LOG: a** message. The postmortem dump is used to determine the reason for a particular initialization. The data provided consists of most of the critical hardware registers from both control units and some nonhardware type of information dealing with the past and present configuration of the AM. The start of an initialization is usually indicated by the following reports:

- **REPT CU a MAINTENANCE INTERRUPT** (where a = the member number)
- **REPT PHASE IN PROGRESS**

- **START OF CU a RECOVERY** (where a = the member number).

Normally, the first report printed is the **START OF CU a RECOVERY** report. The MAINTENANCE INTERRUPT indicates the associated log entry in the PMLOG. The AM postmortem dump is subdivided into the following sections:

NOTE: The AM postmortem dump sections are described in 235-600-750, *Output Messages Manual*.

- **Heading:** The PMLOG reports are either labeled MAINTENANCE INTERRUPT or POSTMORTEM DUMP. The header POSTMORTEM DUMP appears in a manually requested initialization and sometimes when the initialization was started due to the application software.
- **Initialization message:** This section indicates the source of initialization, the on-line processor at the time of initialization, the processor actually involved in the initialization, and the recovery action that took place. Also, the source of the request is indicated (by the SOURCE field): hardware, software, or manually requested. Note, this source does not indicate the problem source.
- **Requested initialization parameters.**
- **EAI buffer.**
- **Timer.**
- **General registers.**
- **Faulty CU registers.**
- **Interrupt stack saved state.**
- **Off-line registers.**
- **Main store registers.**
- **Real-time clock.**

The faulty control unit registers, timers, and the main store registers are primarily of interest when the initialization is a hardware request. When the initialization is software requested, the requested initialization parameters and the general registers are of interest. The initialization message should be analyzed for both types of initialization.

Postmortem Analysis: When a postmortem dump is generated, the response is a **REPT CU a MAINTENANCE INTERRUPT b** report, where ``b" indicates the sequence number belonging to the postmortem dump entry in the PMLOG file. When not printed, the postmortem dump can be requested via the **OP:LOG:LG="PMLOG",KW=a;** (a = the sequence number). Refer to 235-600-700, *Input Messages Manual*, for details of the OP:LOG message.

2.5.5 OSPS MAINTENANCE

The Operating Service Position System (OSPS) maintenance is provided by AM software, switching module processor (SMP) software, and firmware located in the link adapter unit (LAU), the video display terminal (VDT), the basic services terminal (BST), and the combined services terminal (CST). The OSPS maintenance, through software in the areas of system initialization (SI) and recovery, terminal maintenance (TM), and the human/machine interface, support OSPS maintenance in the following areas:

- OSPS operator positions (VDTs, BSTs, and CSTs)

- Data links [Directory Assistance System/Computer (DAS/C), Real-Time Rating System (RTRS), etc.]
- Remote alarms
- Miscellaneous OSPS features [automatic charge quotation (AUTOQUOTE), busy line verify (BLV), etc.].

Refer to the following manuals when performing OSPS maintenance:

- 250-505-100, *OSPS Description and Procedures*
- 250-505-11X, *OSPS Maintenance and Growth* (X = manual number associated to the applicable software release)
- 250-520-100, *OSPS Directory Assistance/Listing Services Basic Services Terminal, Description and Operation*
- 250-520-105, *OSPS Toll and Assistance Video Display Terminal, Description and Operation*
- 250-520-110, *OSPS Combined Services Terminal, Description and Operation*.

Refer to 235-001-001, *Documentation Description and Ordering Guide*, for the complete list of OSPS manuals.

2.5.6 MAINTENANCE OF VENDOR EQUIPMENT

The 235-XXX-XXX manuals do not provide maintenance procedures for the repair of equipment manufactured by vendors other than (for example, tape drives and disk drives). To identify the appropriate maintenance manual for each unit of such vendor equipment, refer to Section 3 of 235-001-001, *Documentation Description and Ordering Guide*.

2.6 LINE UNIT TROUBLE CLEARING GUIDE

2.6.1 OBJECTIVE

The objective of this section is to provide a working knowledge of line unit (LU) architecture necessary to understand and resolve complex LU problems.

NOTE: This subsection contains only descriptive information about the different LUs. Refer to 235-105-220, *Corrective Maintenance Procedures*, for the procedures needed to resolve LU failures.

Currently there are three types of switch analog LUs in use. These LUs are referred to as the Model 1 LU (LU1), Model 2 LU (LU2), and Model 3 LU (LU3).

2.6.2 MODEL 1 LINE UNIT

The Model 1 LU is a 2-shelf unit. Fully equipped, the Model 1 LU contains 48 circuit packs and two DC power converters (-48 V to 5 V). The Model 1 LU consists of eight grids; each grid has three circuit packs.

2.6.3 MODEL 2 LINE UNIT

The Model 2 LU is a 2-shelf unit. Fully equipped, the Model 2 LU contains 38 circuit packs and two DC power converters (-48 V to 5 V). The Model 2 LU consists of eight grids; each grid has two circuit packs.

2.6.4 MODEL 3 LINE UNIT

The Model 3 LU is a 2-shelf unit. Fully equipped, the Model 3 LU contains 40 circuit packs and two DC power

converters (-48 V to 5 V). The Model 3 LU consists of 10 grids; each grid has two circuit packs.

2.6.5 LINE UNIT FUSES

To provide -48 V DC power to the SM/SM-2000 cabinet local fuse panel, the Models 1, 2, and 3 LUs are fused with one 20-amp fuse each at the power distribution bay or one 25-amp fuse each at a global power distribution frame (GPDF). Twelve fuses at the local fuse panel are assigned to distribute -48 V to each Model 1, Model 2, or Model 3 LU.

2.6.6 LINE UNIT FUNCTION

2.6.6.1 General

The LU is a peripheral unit located in the SM or SM-2000. Up to eight LUs may be assigned to one SM, and up to 43 LUs may be assigned to one SM-2000. The most important function that an LU has to perform is to connect an analog subscriber line to the switch. To accomplish this, the line must be connected to a channel. The analog voice then is converted to pulse code modulation (PCM) digital data, and the PCM digital data is then put on a peripheral time slot.

2.6.6.2 Line Unit Concentration

One fully equipped LU has the following service capabilities:

- **Model 1 or Model 2:** Has the capability of serving 512 subscribers
- **Model 3:** Has the capability of serving 640 subscribers.

With 64 peripheral time slots available to each LU, following are the concentration ratios for each model LU:

- **Model 1 or Model 2:** Has a ratio of 512 lines to 64 time slots; a concentration ratio of 8:1.
- **Model 3:** Has a ratio of 640 lines to 64 time slots; a concentration ratio of 10:1.

Any condition that causes an LU service group to be removed from service, also causes the line to channel concentration ratio of that LU to be changed (for example, in a Model 2 LU, it changes from 8:1 to 16:1). This usually results in slow dial tone, no dial tone, or incoming calls going to recorder. To avoid customer complaints, it is recommended that LU service groups not be removed from service during heavy traffic hours. If a service group is forced OOS automatically, by peripheral fault recovery, it should be treated as a service-affecting condition and repaired and restored to service as soon as possible.

2.6.7 PERIPHERAL INTERFACES

Each LU is controlled by a peripheral interface control bus (PICB). Also, each LU is connected to a peripheral interface data bus (PIDB). The PIDB is used to send and receive PCM digital voice time slots, between the LU and the time slot interchanger (TSI). Each LU is assigned a total of 64 peripheral voice time slots, 32 time slots for each service group. There are also 32 channels in each LU service group. The 64 LU channels are dedicated to the 64 PIDB time slots.

2.6.8 LINE UNIT GRID REMOVALS — SERVICE AFFECTING

Each LU grid services 64 subscribers. When a grid in the Model 1 LU is removed from service, 64 subscribers are removed from service. The grid in Model 2 and Model 3 LUs can be removed from service at the half-grid level. When a Model 2 or Model 3 LU half grid is removed from service, 32 subscribers are removed from service.

Any LU grid OOS condition is service affecting and should be resolved as soon as possible. See 235-105-220, *Corrective Maintenance Procedures*, for details on restoring OOS grids to service.

2.6.9 LINE UNIT A-LINKs

The LU A-LINKs are wired paths between the first and second stage switches in LU grids. If an A-LINK is OOS, a path is not available through the concentrator grid network. An accumulation of OOS A-LINKs can cause network blockage and can be service affecting. To avoid subscriber complaints, OOS A-LINKs should be restored to service as soon as possible. See 235-105-220, *Corrective Maintenance Procedures*, for details on restoring OOS A-LINKs to service.

2.6.10 LINE UNIT DUPLICATION

The LU hardware is not duplicated. If an LU function is out of service, that function is unavailable for call processing. If operational test failures (OTF) are occurring or REX grid fabric exerciser failures are being reported, the affected LU is being forced to complete calls with defective hardware. This can be service affecting and a source of subscriber complaints. A fabric exerciser fault in the grid of LU Models 1 or halfgrid of LU Models 2 or 3 changes its MCC display state to degraded (DGR).

2.6.11 LINE UNIT SUMMARY

In summary, restore OOS hardware to service as soon as possible. Take action to resolve OTFs and grid fabric exercise faults. Refer to 235-105-220, *Corrective Maintenance Procedures*, for assistance in resolving LU faults. Any LU fault that cannot be resolved at the local level should be supported by the next level of technical support.

2.7 TRUNK AND LINE MAINTENANCE

2.7.1 OVERVIEW

The terminal maintenance subsystem is designed to detect faults in lines, trunks, and associated equipment. Fault detection is performed either automatically or manually by software controlled tests. Testing is performed locally by utilizing the TLWS capabilities. Remote testing can be implemented from centralized test systems such as the following:

- Local Test Desk (LTD)
- Mechanized Loop Test (MLT)
- Remote maintenance center, for example, SCCS
- Centralized Automatic Reporting on Trunks (CAROT) System
- Centralized Trunk Test Unit (CTTU).

These remote test positions have powerful testing capabilities to supplement the local TLWS.

2.7.2 PER-CALL TESTS

Per-call testing by call processing software is a primary means of line fault detection. A number of these tests are performed on every call processed by the switch. Per-call tests are performed independently on both the originating and terminating sides of the call. In addition, tests are done at one of three phases of a normal call. These are as follows:

- (a) **Origination:** Origination is the interval between the calling party off-hook detection and talking path

connection.

- (b) **Termination:** Termination is the interval from when the called party line is determined to be idle to when one of the following occurs:
- Calling customer goes on-hook
 - A talking path connection is broken down.
- (c) **Disconnect:** Disconnect is the interval between customer on-hook and line restoration to idle.

When a per-call test detects a failure, all data associated with the call is sent to terminal maintenance for a test failure that indicates a trouble on the line. Trouble indications within the line unit are referred to switch maintenance. The problem is then analyzed, and a decision is made on what course of action is to be taken. This could result in any of several maintenance actions such as diagnostic tests, changing equipment status states, or a system alarm.

2.7.3 ROUTINE LINE AND TRUNK TESTS

2.7.3.1 Periodic Maintenance Checks

Routine tests are periodic maintenance checks run by the terminal maintenance subsystem. These tests are used to assure trunk and line integrity. Routine tests are run on circuits that are assumed to be in good operating condition. These tests can be initiated either automatically or manually.

2.7.3.2 Automatic Progression Testing

Flexible scheduling of automatic trunk testing is possible through automatic progression testing (APT). In APT, a test history keeps track of information concerning the tests. This allows interruptions of the testing cycle when the trunks are needed for service. When traffic subsides, the testing resumes where it left off. Test results are analyzed and displayed locally and/or at a remote testing location.

2.7.3.3 Operational or Transmission Test

Routine trunk tests can be classified as operational or transmission tests. Operational testing of trunks encompasses the following objectives:

- Verify the operational characteristics of interface and carrier facilities and distant central office equipment.
- Verify the end-to-end ability to detect and send signaling and supervision.
- Routinely exercise the interface circuits in a distant central office.

2.7.3.4 Trunk Error Analysis

A trunk error analysis (TERA) analyzes MDIIs that result from trunk or universal tone decoder failures. The results (pass or fail) of trunk operational tests are also routed to TERA. When TERA determines that a trunk or universal tone decoder is experiencing a high-error rate, recovery actions are initiated. The recovery actions can consist of an output message, or, when applicable, an operational test on an outgoing trunk. Refer to 235-105-119, *Maintenance Guide Utilizing OMS5*, for details of how to use TERA. For information about the activation of TERA, refer to the appropriate RC manual (235-118-XXX, where XXX = manual number associated to the applicable software release. See 235-000-000, Numerical Index — Division 235 and Associated Documents, for specific manual numbers) that contains the RC symbolic view name **RC_TERA**.

2.7.3.5 Automatic Line Insulation Test

The 5ESS®-2000 switch supports incoming test calls for operational tests. The operational test for lines is the automatic line insulation test (ALIT), an automatic test system that scans lines and identifies faults before they affect normal service.

2.7.3.6 Subscriber Line and Instrument Measurement (SLIM) Routine Mode

In the routine mode, SLIM functions like an ALIT to perform noninteractive (automatic) tests on analog lines only; trunks or ISDN lines are not tested.

Routine mode test parameters are set via the RC/V subsystem. The status of routine mode test sessions is shown on MCC Page 162, Slim Routine Mode Summary.

For additional information about the SLIM routine mode and an example of Page 162, see Section 3.8 in this document.

2.7.4 TESTS PROVIDED

2.7.4.1 Major Tests and Functions

Many tests and functions are provided to aid in trunk and line testing. These include the standard test line (TL) and functions used in previous switching systems.

2.7.4.2 Routine Tests

The routine test facilities provided include the following:

- 100TL (Balance)
- 101TL (Communication)
- 102TL (Milliwatt)
- 103TL (Signal supervisory)
- 104TL (Transmission measuring and noise checking)
- 105TL (Automatic transmission test line)
- Synchronous test line
- Nonsynchronous test line
- Permanent-busy test line
- Touch-tone dialing test line
- Open circuit test line.

2.7.4.3 Per-Call Tests

The per-call tests (lines only) are as follows:

- (a) ***Origination of calling party:***

- False cross and ground test
- Power cross
- Continuity check.

(b) **Termination of called party:**

- False cross and ground test
- Power cross
- 20-Hz ringing current
- Loop resistance to detect pretrip
- Continuity check.

(c) **Disconnect:**

- Restore verify.

2.7.5 CALL MONITOR

The Call Monitor provides an early detection mechanism for loss of call processing functionality when all other system indicators appear normal. The Call Monitor reports to the craft by ROP and an alarm indicator on MISC Page 116 when a failure in call completion analysis occurs. The ROP output is in the form of a REPT CALLMON 5- or 15-minute report. The ROP output message has either a major, minor, or no alarm.

The failure criteria is defined as follows:

- For the 5-minute report, failure occurs if more than 50 percent of the total calls attempted in a 5-minute period are not passed.
- For the 15-minute report, failure occurs if more than 90 percent of the total calls attempted in a 15-minute period are not passed.

The major alarm criteria is defined as follows:

- For the 5-minute report, a major alarm occurs if 40 percent or more of the total tests are ``operational test failures."
- For the 15-minute report, a major alarm occurs if 50 percent or more of the total tests are ``operational test failures."

The minor alarm criteria is defined as follows:

- For both the 5- and 15-minute reports, a minor alarm occurs if 70 percent or more of the total tests are ``indeterminate" plus ``not attempted" failures.

If no alarm criteria is met, no alarm is printed with either analysis report.

The Call Monitor performs separate analyses for common channel signaling (CCS) test calls (if equipped) along with non-CCS test calls. It utilizes the Terminal Maintenance APT functionality to make these operational test calls. Non-CCS test calls are based on the default APT test for the trunk group in the AM ODD. All CCS test calls use the Voice Path Assurance (VPA) continuity test.

For 5E9(2) and later, ability to inhibit the Call Monitor on a per-trunk-group basis is provided by a new field in the static AM ODD relation RT_TRKG. The new field, ``*callmon_inh*`, is populated from recent change trunk view 5.1 (as is the existing field for inhibiting APT). If APT is inhibited, then the Call Monitor must be inhibited.

The monitor routinely cycles through the AM ODD for trunk groups and selects trunk groups to use for making the test calls. A test call is attempted every 30 seconds.

The monitor can be inhibited as well as requested to print the past 15-minute history and print per-test call results (verbose mode). The alarm indicator on MISC Page 116 can also be retired.

Additional information on the Call Monitor is provided in Sections 3 and 4 of this document and in 235-105-210, *Routine Operations and Maintenance Procedures*.

2.8 RECENT CHANGE, FIELD, AND SOFTWARE RELEASE RETROFIT/UPDATE

2.8.1 RECENT CHANGE

Recent change (RC) is a system function that allows maintenance personnel access to the 5ESS®-2000 data base. Recent change is used to add to or delete from the data base. Also, recent change is used to update or verify the data base using a select/mask format. The data base for the switch supports a relational data base with the following methods of access:

- Recent change/verify (RC/V)
- Office data administration (ODA)
- Office record programs (called views because they are user-oriented)
- Remote memory administration system (RMAS).

For details concerning the recent change and verify subsystem, refer to Section 3.12 of this manual.

2.8.2 FIELD UPDATE

2.8.2.1 Software Updates

Field update is the process of activating orderly program changes in the switch software. In-service offices receive most official software changes in the form of software updates. The software update originates as a program enhancement or as a fix for a problem within the software release. Function, file, and byte replacement are the three types of software updates provided. The switch software updates usually replace entire sections of program software as compared to the word-by-word changes of other Electronic Switching Systems.

Aiding in the updating of a switch are three external interfaces to the program update subsystem. These three interfaces provide for the generation, distribution, and activation of software updates. The interfaces are as follows:

- A Programmer Support System (PSS)
- A SCANS

- Remote maintenance center (for example, SCCS).

2.8.2.2 Programmer Support System

The PSS originates program updates via the generation and initial distribution of software updates. After a software update has been composed, tested, and approved at the PSS, it is assigned a software update identification number and transmitted to SCANS. In an emergency (such as SCANS outage), a software update could be transmitted from the PSS over a data link directly to the office if the situation requires immediate action to maintain switching system integrity. Craft and/or maintenance personnel at the remote SCC or switch must make a verbal request to the program update coordinator at the PSS. The coordinator sets up the emergency data link (from the PSS to the switch) and manually transmit the software update, after maintenance personnel primes the switch for reception of the software update files.

2.8.2.3 Software Change and Notification System

The SCANS is a time-shared computer system for distributing software updates. It is usually accessed by maintenance personnel at the remote SCC work station using the No. 2 remote SCC computer to receive and record the software updates. The SCANS can also be accessed by maintenance personnel at the local office. The SCANS should be checked prior to inserting or activating any software updates to ensure that they have not been canceled or changed.

2.8.2.4 Switching Control Center System

The remote SCC provides for remote activation of software updates at a 5ESS[®]-2000 switch. It uses a 1200-baud dial-up terminal to access SCANS and activates the program update subsystem to apply the software update. Communication between the remote SCC and the program update subsystem is via the maintenance channel. It is not necessary to have maintenance personnel present at the local office to aid in the activation of the software update(s).

2.8.2.5 Software Update Activation

Although software updates are usually activated by the remote switching control center, they may also be activated locally through the MCC video terminal for one or more of the following reasons:

- (a) The remote SCC option is not carried by the switch being accessed.
- (b) The remote SCC (if the option is carried) is down, and a software update must be activated to maintain switching integrity.

NOTE: Reasons (a) and (b) require that a 1200-baud terminal be present at the switch. The terminal must be full duplex, be capable of printing at least 80 characters per line, and must have a 212A-type data set. This terminal is used to access SCANS and poll the SCANS data base for relevant software updates.

- (c) Local control of the software update activation is desired. This carries the following two options:
 - (1) The entire activation procedure (including access of SCANS) is to be done locally.
 - (2) The remote SCC accesses SCANS and turns control of the activation over to local personnel at the MCC.

2.8.2.6 Activation Responsibility

The software update activation responsibility between Lucent Technologies and a switch owner (normally an OTC) is as follows:

- (a) During preturnover (new office), retrofit, and restart intervals, the installer is responsible for obtaining and activating all current software updates in the SCANS data base which apply to that office.
- (b) At all other times, in a working office (when not in a retrofit or restart mode), the switch owner or the remote switching control center is responsible for obtaining and implementing all applicable software updates.

2.8.2.7 Emergency Fixes

Regular field updates are done in a timely and orderly fashion through software updates. Unexpected problems with the software release can occur that require immediate correction, not allowing time for the normal software update development and issue processes. Emergency fixes are accomplished on a word-by-word basis under direction of the Customer Technical Support (CTS) Organization.

Emergency fixes are assigned a sequential craft number similar to the software update number. The program update subsystem provides emergency fixes with the same status and options as software updates (that is, make temporary, make permanent, backout). Emergency fixes specify the address to be changed, the new data to be inserted, and the old data to be matched. Emergency fixes are also known as address-data couplets.

As with software updates, most emergency fixes are activated remotely from the remote SCC. Communication between the remote and local program update subsystem is via the maintenance channel. It is not necessary to have maintenance personnel present at the local office to aid in the activation of the fix. Emergency fixes may also be activated locally through the MCC if the following occurs:

- (a) The switch does not carry the remote SCC option.
- (b) The remote SCC (if the option is carried) is down, and the fix must be activated to maintain switching system integrity.
- (c) Local control of the fix is desired.

2.8.3 SOFTWARE RELEASE RETROFIT/UPDATE/LARGE TERMINAL GROWTH

Software release retrofit refers to the software and procedures used to replace the resident software release text and data bases [ECD, ODD, and System Generation (SG)] in an operational 5ESS[®]-2000 switch with new software release text and evolved data bases.

Software release update refers to the software and procedures used to replace the resident software release text in an operational switch. Software release update allows for replacement of text for installation of a software update (formerly BWM) consolidation load or a software point load release. Software release update does not include evolution and replacement of the SG or ODD data bases. Although there is no ECD evolution, the application of point load specific keystroke files to the ECD is allowed.

Large terminal growth (LTG) refers to the software and procedures used to add large quantities of lines and trunks to an operational switch by evolution and replacement of the ODD data base. It does not include replacement of the software release text, ECD, or SG data bases.

Software release retrofit, software release update, and LTG are referred to collectively as software release transitions. New software release text and data bases are delivered to the office on magnetic tapes supplied by Lucent Technologies. Recent change activity should be kept to a minimum or stopped, if possible, for two weeks prior to a software release retrofit or LTG. Prior to all transitions, a copy of the existing software release should be

saved on spare disk packs or magnetic tapes. In some cases, associated hardware and/or read-only memory (ROM) circuit pack changes may be required prior to starting the transition process. When the transition process begins, however, all essential duplex and simplex equipment must be operational.

Although stable 2-port circuit-switched calls are saved over a software release transition initialization, a software release transition should be planned for a low-traffic period to minimize the number of calls that might be affected by call processing interruptions. The types of calls not saved during a software release transition initialization include calls involving more than two ports, such as calls using conference circuits. Transient calls (that is, originating, dialing, ringing, calls on hold, calls being forwarded/transferred, etc.), packet calls, and test calls are also not saved.

For detailed information concerning software release retrofit procedures, refer to 235-105-24X (X = manual number associated with applicable software release). For detailed information concerning software release update procedures, refer to 235-105-34X (X = manual number associated with applicable software release). For detailed information concerning LTG procedures, refer to 235-105-44X (X = manual number associated with applicable software release). For additional information, refer to 235-000-000, Numerical Index - Division 235 and Associated Documents.

2.9 CHANGE NOTICES

2.9.1 GENERAL

NOTE: The Design Change Management System (DCMS) data base is not restricted to only covering the CNs for the 5ESS®-2000 switch. This data base provides CN coverage for all of the Network Systems products.

The DCMS data base is the official vehicle for notification of product changes (that is, CNs) for all of the Network System products. Also, this data base notifies the customer of service enhancements that can be purchased. The DCMS data base service is free to the customers.

The following information concerning CNs is provided to the customer by DCMS:

- (1) **DOCUMENTATION** on the changes that are made to Network Systems products. Documentation is in the form of a product change notice (PCN). A PCN is issued for each change. The PCN document consists of the following:
 - (a) Product being changed
 - (b) Reason for the change
 - (c) Description of the change
 - (d) Effect that the change has on the customer's operations during implementation
 - (e) Affected product drawings and their titles
 - (f) A comparison of the markings that the product bears before and after the change
 - (g) Other miscellaneous information.
- (2) **APPLICATION STATUS REPORTS** that track and report on the status of the implementation of these changes in the offices that employ affected products. Application status reports are compiled interactively. The reports illustrate the current status of the offices that are affected by product changes. The status reports can be obtained in a standard format or can be customized on an ad hoc basis to meet the DCMS user's specific needs.
- (3) **HISTORICAL INFORMATION** by CN, office, or product once the implementation process has been

completed. Historical information is available on an ad hoc basis. The DCMS data base covers CN office implementations made by the company installation group from 1983 to the present date.

2.9.2 DCMS USER'S MANUAL

The DCMS user's manual explains how to use the menu driven DCMS data base. The manual is distributed by the National CN Engineering Group located at the Southwestern Region. With a proper ID number and login, customers can obtain an on-line version of the manual. For additional information, call the telephone number shown in the address for Southwestern Region as follows:

Southwestern Region
Department NF93D6T00
1111 Woods Mill Road
Ballwin, Missouri 63011
(314) 891-2930

3. MAINTENANCE TOOLS

3.1 DISPLAY ADMINISTRATION PROCESS (DAP)/NON-DAP TERMINAL

3.1.1 WHAT IS A DAP TERMINAL

The DAP terminal can be used to perform all commands/functions that are needed to maintain the switch. A maximum of 16 terminals can be accessed. These terminals are defined in the data base. The master control center (MCC), trunk and line work station (TLWS) (TLWS is mode of MCC), supplementary TLWS [with the exception of being able to access the emergency action interface (EAI) page display] are DAP-type terminals.

3.1.2 WHAT IS A NON-DAP TERMINAL

Non-DAP terminals can be used to perform the same functions that the DAP terminals perform with the exception of being able to access the MCC page displays. When using a non-DAP terminal, input messages (message function mode) must be entered to maintain the switch. No input commands (for example, poke commands) can be entered from a non-DAP terminal.

3.2 MCC

3.2.1 FUNCTION KEYS

3.2.1.1 Description

The MCC uses four function keys. When one of these keys (Figure 3-1) is depressed, the system performs the corresponding function. The keys are as follows:

- **ALM RLS:** Alarm release
- **CMD/MSG:** Input command or input message
- **NORM DISP:** Normal display
- **EA DISP:** Emergency action display [can only be performed from the MCC or switching control center (SCC)].

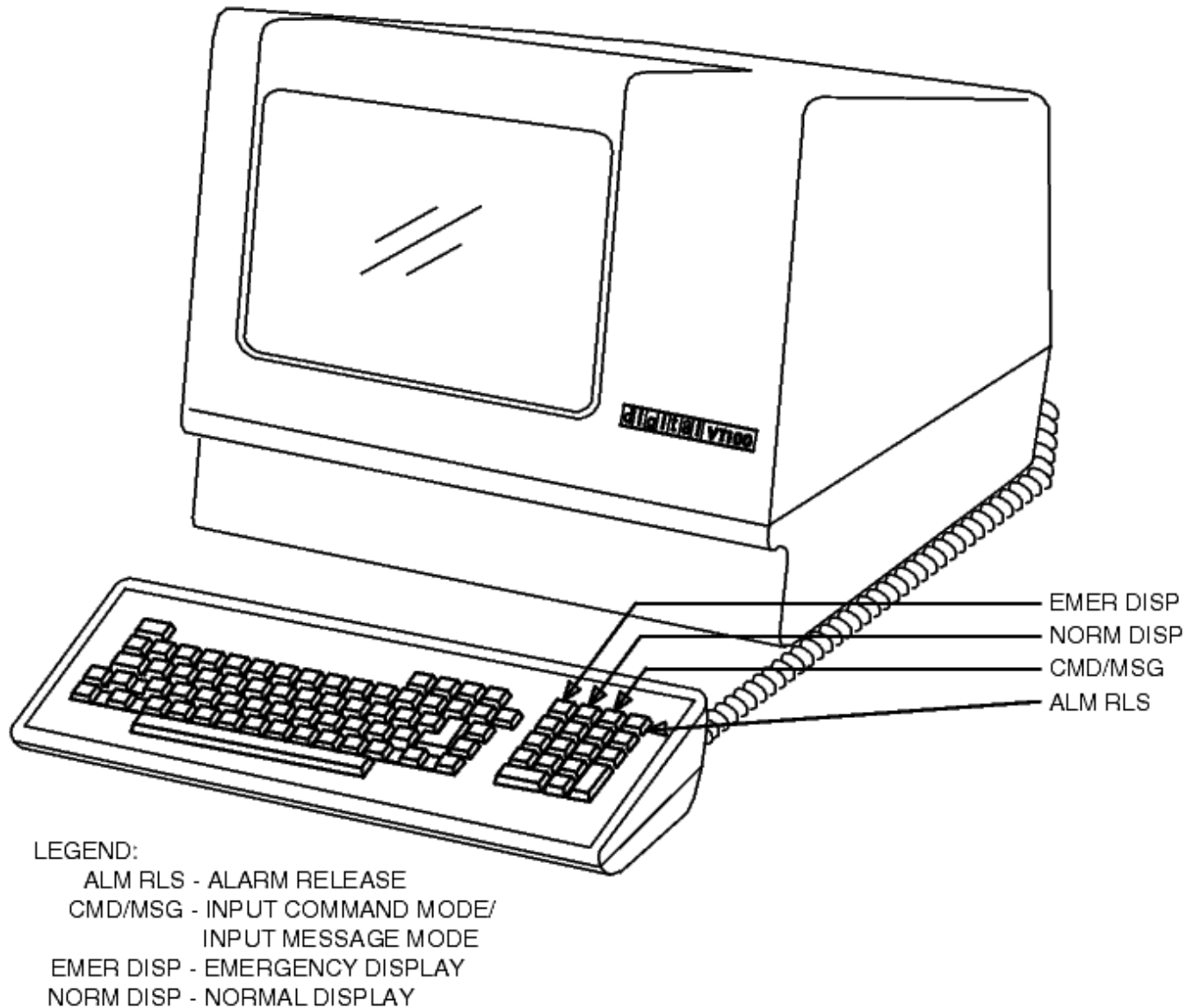


Figure 3-1 MCC Video Terminal with Function Keys

3.2.1.2 Alarm Release Function

When the system is in the manual retire mode, the **ALM RLS** function key releases audible and visual alarm indications (**CRITICAL**, **MAJOR**, or **MINOR**, and flashing indicators). Flashing indicators go to steady reverse video when retired.

NOTE: The minor alarm audible is self-releasing after five seconds, but its visual indication must be released manually.

3.2.1.3 Input Command or Message Function

The command/message (**CMD/MSG**) function key configures the MCC to accept either input **CMDs** or input **MSGs**. The key acts as a toggle and allows input in one mode or the other. The user may switch between either mode after acknowledgment of the previously entered message. Any unexecuted data in either area is lost if a switch is made before an acknowledgment is received. Unexecuted data in the input message area is normally saved until an

intercharacter time-out occurs. If a time-out occurs before the message is completed, all data is lost. The position of the cursor on the video display indicates which input mode the MCC is in. The cursor resides in the input message line area while in the **MSG** mode. If the MCC is in the **CMD** mode, the cursor resides at the **CMD** entry area (at the top left of the control and display area). Whenever the display is brought on-line or a new page is selected, the input mode remains unchanged.

3.2.1.4 Normal Display Function

The **NORM DISP** function key places a page controlled from the administrative module (**AM**) on the display. The page displayed is the previously displayed page. Depressing the **NORM DISP** key again redraws a clean display without aborting any processes in progress.

3.2.1.5 Emergency Action Mode and Display Function

The **EA DISP** function key enables emergency action mode and displays the EAI page on the screen. This page is used during a system emergency for system recovery functions. Depressing the **EA DISP** function key again aborts all incompletely entered actions and redraw the emergency action interface page display.

NOTE: The emergency action mode can only be enabled from the MCC or SCC.

3.2.1.6 Data Entry Functions

Most other keyboard keys are used in a normal fashion to enter numeric codes, input messages, and alphanumeric responses to the system. Their input is respective to the symbol designated on the key. Certain keys are used for line administration as explained in the remainder of this section.

3.2.2 MCC PAGE SELECTION

3.2.2.1 How to Access an MCC Page Display

The following procedure may be used to access an MCC page display:

- (1) Select a normal system display page by depressing the **NORM DISP** function key.
- (2) If the maintenance terminal is not in the command mode, depress the **CMD MSG** function key.

NOTE: When in the command mode, the **CMD:_** prompt is displayed and the cursor is positioned in the command input area in the upper left-hand portion of the display.

- (3) Enter the desired MCC page number (for example, **100** - Page Index display) that is to be displayed.

3.2.2.2 How to Specify Initial Display Pages for Terminals in the ECD

A capability is provided to specify in their equipment configuration data base (ECD) getty forms the page that is to be displayed automatically on each display device following a terminal restore (for example, initialization, system boot, or remove/restore). The process that initializes a page specified in the ECD must be connected to a port. Therefore, not every page in the system can be displayed automatically following a terminal restore.

The following list contains the page names and port numbers of the system pages that may be specified in an ECD getty form:

PAGE NAME		PORTID
CPDP		17
INDEX		17
CDUP		17

For applications not desiring a specific display upon a terminal restore, the common processor display page (CPDP) is the default page for the maintenance terminals. If another system page is requested and displayed, depressing the **NORM DISP** function key causes the last page requested to be displayed again. The following procedure can be used to specify the initial page for a display device.

- (1) At the maintenance terminal, invoke RC/V by entering **199**.
- (2) Fill in the necessary information to initiate an update of the getty form for the desired display device. Procedures for updating data base forms are explained in the *ECD/SG Data Base Manuals* for example, 235-600-312 for 5E12, 235-600-313 for 5E13, and 235-600-314 for 5E14.
- (3) When the getty form is displayed, enter the name of the initial page desired in the pagename field and the port number of the process that initializes the page in the portid field.
- (4) After updating the getty form, remove and restore the device for which the getty form was updated.

3.2.2.3 How to Switch a Device to an Alternate Peripheral Controller

One of the following methods can be used to switch one or more switchable devices [that is, the receive-only printer (ROP) and/or maintenance terminal] to an alternate peripheral controller:

- (a) Input message **SW:PORTSW**, refer to the 235-600-700 for details.

NOTE: The port switch must be in the **AUTO** position.

- (b) Poke input command (401 - PORTSW, 402 - ROP, or 403 - MCRT) illustrated on the 111/112 - AM, AM Peripherals page display.

NOTE: The port switch must be in the **AUTO** position.

- (c) Flip the port switch associated with the switchable device to either 0 (zero) or 1 (one). (0 = peripheral controller 0, 1 = peripheral controller 1).

NOTE: In either of these two positions, the port switch cannot be reconfigured using the previous two methods.

3.2.2.4 Page Index Display

The MCC provides the ability to select a control and display page at any time. The index display is brought into the control and display area by entering **100** (into the **CMD** entry area) and executing it. The 100 index page consists of a list of MCC control and display pages. Those pages not shown are requested by entry from other pages in a meaningful hierarchy relationship. Then, the needed page can be selected by entering the page identifier in the command area and executing it.

The 100 index page does not list the per-SM/SM-2000 pages or the CM pages. The 1000 page is the index into the per-SM/SM-2000 pages, and the 1001 page is the index into the CM pages. Also, any one of the SM/SM-2000-related display pages can be accessed from any page display. For example, to reach the status display of SM 24, you would enter **1010,24**, **1190,24**, **1800,24**, or **141**. It is possible to enter a page identifier in the command (CMD) entry area if the appropriate page identifiers are known. The page index display can be used to determine the appropriate page identifier.

3.2.2.5 Display Page Identifier

A display page can be selected by entering its unique 3-, 4-, or 6-digit identifier. All display page commands begin with the number 1. For example, 100 is the PAGE INDEX display. Identifiers 105 through 116 are directly related to the SUMMARY STATUS AREA indicators. The page number for the page can be derived from the physical position of the indicator. For example, BLDG/PWR is the fifth summary status indicator; its display page is 105. The SM is the fourteenth indicator; its associated page is 114. As was noted earlier, the system emergency page, corresponding to the SYS EMER indicator, is displayed by depressing the **EA DISP** function key. Page displays are not provided for alarm-level indicators. Other pages are assigned the remaining identifiers grouped on a functional basis, where possible.

3.2.2.6 Display Validity

Whenever the MCC terminal is brought on-line from an off-line state, the terminal displays the identification line, the status summary indicators, the emergency action page, and the input message entry area. The time-of-day indicator should be checked immediately to determine display validity.

3.2.2.7 Maintenance Terminal Options

Options are provided on the maintenance terminal to turn the terminal features on or off. To set these options, see the user's guide for the specific type of terminal being used. Set the options (if available) as listed in Figure 3-2.

Option/Function	Desired Selection
Characters per line	80
Scrolling	Jump (line at a time)
Autorepeat	Off
Screen	Dark background
Cursor	Underline or block
Margin bell	Disabled
Key click	On
Control mode	ANSI
Line protocol	ASCII DC1/DC3
Automatic wrap around	Disabled
New line	Off
Parity	Enabled
Parity sense	Even
Bits per character	7
Automatic DC1/DC3	Enabled
# (shifted)	0
Interface	Off
Tab stops	None
Local echo	Disabled
Display flashing characters	Enabled
Power	60 Hz
Transmit speed	9600 Asynchronous
Receive speed	9600 Asynchronous

Figure 3-2 Maintenance Terminal Options

3.2.2.8 ROP Options

Options are provided on the ROP to turn the terminal features on or off. To set these options, see the user's guide for the specific type of terminal being used. Set the options (if available) as listed in Figure 3-3:

NOTE: Systems equipped with the TELETYPE 5310 teleprinter and related equipment have the capability of suspending output to the ROP temporarily. Pressing the **BREAK** key on the printer suspends output for two minutes or until the **BREAK** key is pressed again, whichever occurs first. The **HERE IS** key does the same.

Option/Function	Desired Selection
Characters per inch	10*
Line per inch	6
Form length (in-line)	66
Left margin	1*
Right margin	80*
Top margin	1
Bottom margin	66
Character set	ASCII
Alternate font	ASCII
Wrap at right margin	Yes
Print with controls	No
Ctrl sequence emulation	ANSI emulation
Character view	Disable (manual)
Auto LF on CR	No
Auto CR on LF	No
Horizontal tab settings	1, 9, 17, 25, 33, 41, 49, 57, 65, 73
Vertical tab settings	N/A
Line protocol	EIA (RS-232-C)
Parity	Even
Speed	1200 baud
Flow control	DC3/DC1 enabled
Secondary request to send	N/A
DC2/DC4 control	No
Disconnect on paper out	Yes
Disconnect on EOT received	No
Low paper	No
Local echo	No
Send answer-back on auto answer	No

*The left margin can accommodate holes for putting the printout in binders by using these options:

Characters per inch	12
Left margin	7
Right margin	96

Figure 3-3 ROP Options

3.2.3 MAINTENANCE COMMANDS

Maintenance commands provided on the MCC displays are entered via numeric codes. The desired code(s) is found in the control and display page menu listing of possible input commands. Any command to be entered **must** be selected from a list currently displayed or be a page selection command. The input sequence is as follows:

- (1) Make sure the MCC is in **CMD** input mode.

- (2) Find code of desired command on the display.
- (3) Enter correct numeric code using the semicolon (;) to execute input commands or messages.
- (4) Execute by depressing either of the following:
 - (a) ; (semicolon)
 - (b) **ENTER** key
 - (c) **RETURN** key.

The system acknowledges the input request. Section 3.14, **HOW TO USE INPUT/OUTPUT MESSAGES**, explains system responses to input messages.

3.2.4 MCC EMERGENCY ACTION FUNCTIONS

3.2.4.1 Emergency Action Interface (EAI)

The primary function of the EAI is to provide manual recovery capabilities during periods of system emergency. This interface enables configuring a working system when normal recovery procedures prove inadequate. The emergency page has a menu of control and initialization functions that can be forced on the system. Each function is defined and input by a 2-digit command code. The codes are shown with their associated functions on the display. These functions can be used to do the following:

- Recover from duplex-processor failures
- Disable the sanity timer
- Disable hardware checks
- Boot the system from other devices.

NOTE: A Recovery from Alternate Boot Disk (ABD) feature may be purchased separately (available 5E13 and later) which provides the capability to recover a 5ESS[®] switch from a remote monitoring location [such as the Switching Control Center (SCC)] from a disk other than the primary or secondary boot disks. SCC personnel will be able to select an alternate boot disk on the EAI page (Figure 3-5) and initiate a recovery from the selected MHD without having to manipulate hardware. This feature requires the UN597 circuit pack.

The conventions used for displaying data and selecting functions are similar to those used by other control and display pages. Due to the crucial functions provided, maintenance personnel **must** be familiar with these commands and their use.

NOTE: There is a sequence of EAI commands that can reduce downtime during periods of system emergency. This command sequence, the **42!9!54** and **42!9!50** pokes, executes a full office initialization (FOI) with full pump of the SMs/SM-2000s and CMPs in two parts. The 42!9!54 poke must be entered first and causes a full initialization of the AM, including CNI Ring (if equipped) and CMPs. When the AM has completed the initialization process, the 42!9!50 poke must be entered next within 30 minutes of the entry of the 42!9!54. The 42!9!50 poke performs a full initialization with full pump of all SMs/SM-2000s sequentially by SM/SM-2000 type. If the 42!9!50 poke is entered before the 42!9!54 or after the 30-minute window, the initialization of the SMs/SM-2000s does not occur. Refer to 235-105-250, *System Recovery*, for detailed procedures on the use of this poke sequence and for information and procedures on other FOI variations.

An in-progress FOI can be cancelled by executing pokes 42!q!50 or 42!Q!50. The execution of these pokes results in the cancellation of the SMs/SM-2000s marked for full initialization with or without pump. The pending initialization of one or more SMs/SM-2000s can be cancelled by input command **INIT:SM=a[&&b],NOINIT;**. See 235-600-700, *Input Messages Manual*, for additional information on this command.

3.2.4.2 Verify EAI Circuit Pack Equipage

The EAI circuit pack in the AM must be an MTTYC TN983/UN583/UN597 circuit pack (ABD feature). One of these circuit packs is located in equipment location (EQL) 19-094 in the input/output processor (IOP) Basic Unit Shelf located in the processor control cabinet (PCC). These circuit packs provide the capability to store the last application parameter used for a recovery action.

3.2.4.3 Displaying Emergency Action Functions

The **EA DISP** function key on the MCC keyboard is used to display the emergency action page. When the **EA DISP** function key is depressed, it brings the emergency action page into the control and display area of MCC. This page is available for selection at all times.

NOTE: When the system emergency action page is present on the MCC, the **only** way to remove it is to depress the **NORM DISP** function key on the MCC keyboard.

Depressing the **EA DISP** function key again clears unexecuted input actions and redraw the emergency action display page.

3.2.4.4 Emergency Action Interface Validity

After requesting the emergency action display page, the **video terminal digit indicator** must be checked to ensure a valid display. The video terminal indicator is located in the upper center portion of the display (Figure 3-4). The video terminal digit indicator consists of the maintenance teletypewriter (MTTY) or maintenance cathode ray tube/terminal (MCRT) followed by a numeric digit displayed in dynamic text. The digit is incremented every two seconds by the peripheral controller (PC). If this indicator is not displayed and is not incrementing, the **entire** display is invalid. Once the validity of the display is determined, other indicators are used to qualify EAI and emergency functions. Table 3-1 summarizes these indicators.

NOTE: The rest of the indicators on the display are valid only for EAI's indicating all seems well (**ASW**).

3.2.4.5 Emergency Action Interface Indicator Area

The EAI indicators reflect the progress of the emergency action. The emergency action is progressing successfully if the **ASW** indication is present (Figure 3-4).

The control unit (CU) status area is located at the upper left portion of the EAI page display (Figure 3-4). This area informs the maintenance personnel which of the CUs is active and which is on- or off-line. The term CU refers to the control unit or the processor of the AM.

At the upper right portion of the EAI page display is the processor recovery message (PRM) area (Figure 3-4). The PRMs display the systems coded failure/success recovery information. The PRMs change continuously during an initialization, reflecting the current state.

The EAI page display will look like the one shown in Figure 3-5 if the ABD feature has been purchased. The figure shows the ABD feature enabled. If the ABD feature is not enabled commands 28 and 29 will not be shown.

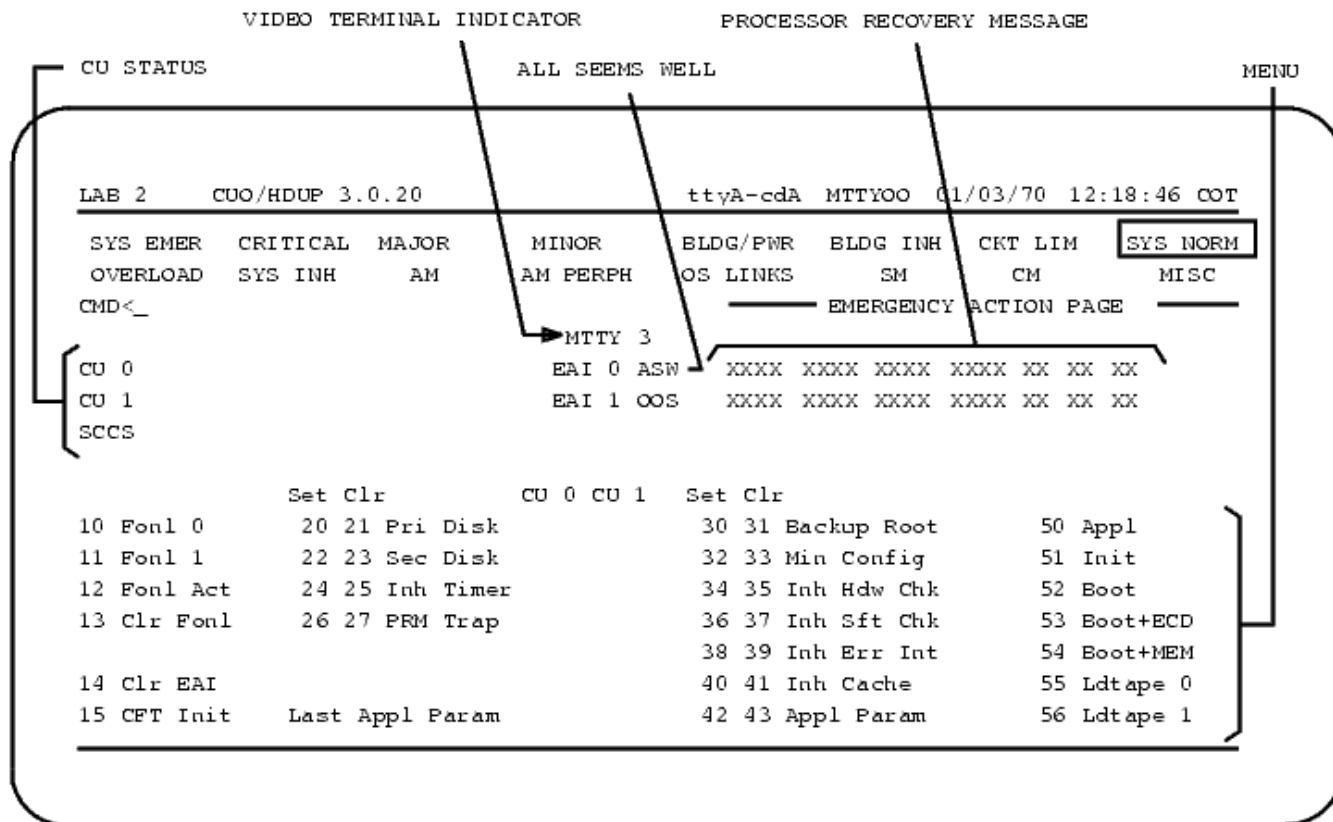


Figure 3-4 Emergency Action Interface (EAI) Page (TN983 Circuit Pack)

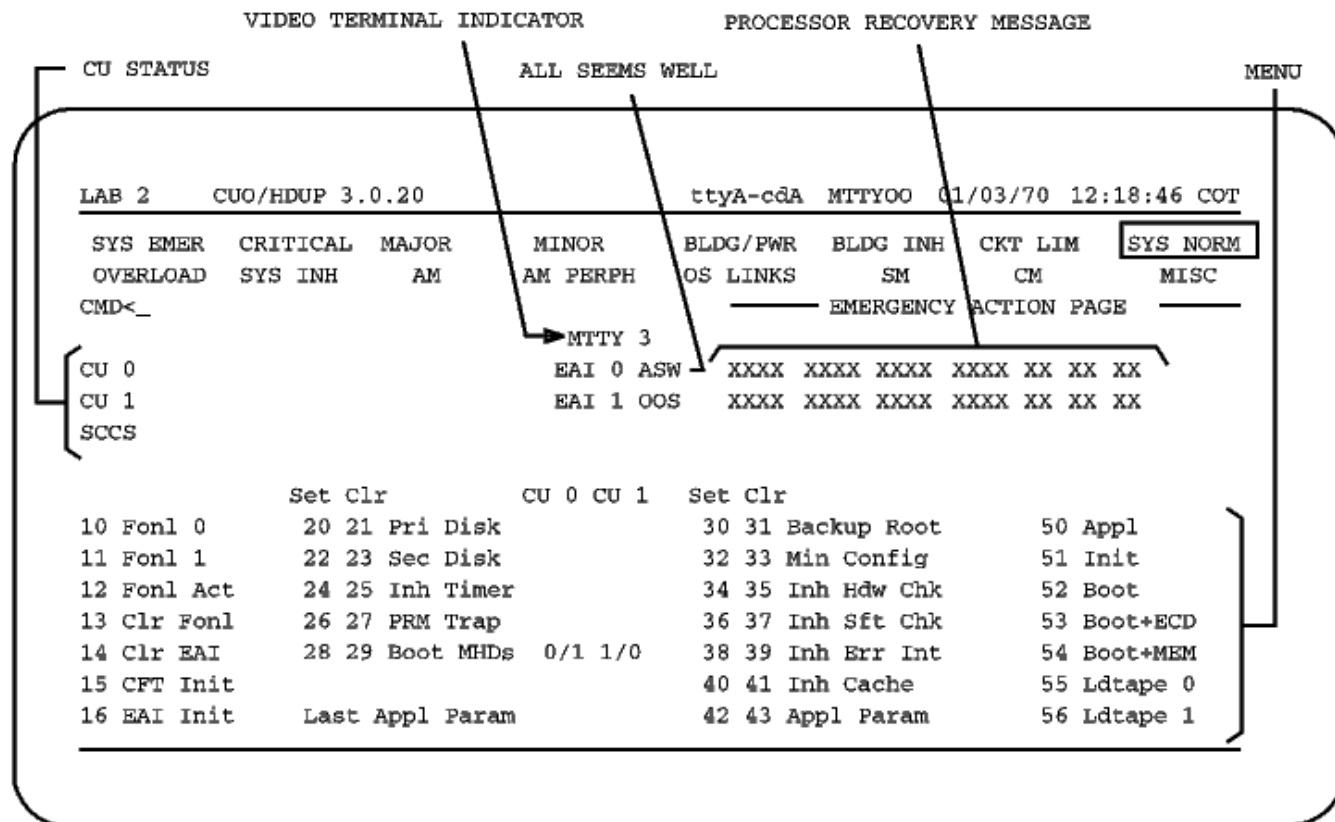


Figure 3-5 EAI Page with ABD Feature (MTTYC UN597 Circuit Pack)

Table 3-1 Emergency Action Indications and Qualifiers

INDICATIONS	MEANING
EAI INDICATIONS	MEANING WHEN DISPLAYED IN REVERSE VIDEO
ASW	(1) Peripheral controller (PC) is communicating with the EAI. (2) EAI reports all seem well (ASW).
ERR	(1) PC is communicating with the EAI. (2) EAI reports internal EAI problem.
OOS	(1) PC is not communicating with the EAI. (2) Displayed EAI status is unreliable.
CU INDICATIONS	MEANING WHEN DISPLAYED IN REVERSE VIDEO
ACT	Control unit (CU) Software is on-line (active).
FOFL	Emergency action has forced hardware on-line.
FOFL	Emergency action has forced hardware off-line.
RUN	CU is running under software release control.
RCVRY	CU firmware has begun recovery.
SET	Associated function is set.
INH	Associated function is inhibited.
PRM DIGITS	MEANING OF THE DIGITS
rrrr rrrr rrrr rrrr	Indicates the processor recovery message (PRM).
ss ss	Indicates the emergency action status at the time the PRM time the PRM was received.
nn	Indicates the low-priority PRM state at the time the PRM was received.
PRM TEXT DISPLAYED	MEANING WHEN IN PARTICULAR TEXT
rrrr rrrr rrrr rrrr ss ss nn (bold reverse video)	Trapped failure PRM.
rrrr rrrr rrrr rrrr ss ss nn (dynamic text)	Last PRM received from the EAI.

3.2.4.6 Emergency Action Interface Menu

Emergency functions are entered by typing the appropriate 2-digit command code and executing it. Table 3-2 provides a list of the EAI commands with a description of their actions. For more details of how to use these

functions, refer to 235-105-250, *System Recovery*. The carriage return is used to execute emergency functions.

The menu commands can be grouped into the following three categories:

- **Commands 10 through 15:** These commands have a direct and immediate effect on the system. Some commands force the AM into a particular configuration and some release a forced configuration.
- **Commands 20 through 43:** These commands are preparation commands that specify certain conditions prior to a system initialization. These conditions do not take effect until an initialization command is given.
- **Commands 50 through 56:** These are the initialization commands. These commands cause the conditions that were specified previously with commands 20 through 43 to take effect.

The severity of the initialization increases with the command number (command 54 has the greatest impact). The system can automatically trigger commands 50 through 53 during an initialization.

Command 54 can only be triggered manually and causes an AM and a possible CM initialization. This takes these processors completely off-line, and call processing is disabled for a short period of time.

Commands 55 and 56 are normally required during the initial installation interval or when an initialization from tape is required due to a massive corruption of disk data. During this tape load, the system is off-line and call processing is disabled for a considerable period of time.

The 51 through 56 commands when entered on the command line cause the system to immediately enter an emergency action mode.

Once the emergency action has completed, the system is restored (automatically) to a stable state and call processing resumes. The EAI page display disappears and the MCC Page Display 111/112, AM Peripherals, is automatically displayed.

Commands from the EAI page display should only be used under the direction of your technical assistance group. Improper use of the commands on the EAI page can have a very negative impact on the integrity of the system.

Each command executed is acknowledged either **OK** or **NG**. This acknowledgment appears adjacent to the command entry area in the top left line of the display. After entering a command, the input and response are displayed until the next character is typed. Errors may be erased a character at a time by pressing the backspace key or by pressing **CTRL h**.

Table 3-2 Emergency Action Interface Maintenance EAI Pokes and Commands

COMMAND	DESCRIPTION	"UNIX®" RTR SYSTEM LEVEL
10	Inhibits automatic processor recovery switch capability. Forces CU-0 to be the on-line processor and CU-1 to be the off-line processor. May result in recovery action if CU-0 was not on-line at time of force.	N/A
11	Same as 10 except that CU-1 is forced on-line, and CU-0 is forced off-line.	N/A
12	Same as 10 except the currently active processor is forced on-line, and the other is forced off-line.	N/A
13	Removes on-line and off-line forces and allows automatic processor recovery action to determine the on-line and off-line control unit (CU).	N/A
14	Clears all of the following which may be in effect: forces on- or off-line, sets on primary or secondary disk, and timer inhibits.	N/A
15	Is used together with the application parameters (1, 2, or 3) to produce three different levels of craft initializations.	N/A
20	Inhibits automatic processor recovery disk unit selection and forces	52-54

	both processors to access their primary disk units on a boot.	
21	Removes force on primary disk unit select.	52-54
22	Same as 20 except forces the processors to access their secondary disk units.	52-54
23	Removes force on secondary disk unit select.	52-54
24	Inhibits the sanity timer from expiring and initiating automatic recovery action.	N/A
25	Removes the sanity timer inhibit.	N/A
26	Releases any trapped failure processor recovery messages (PRM) and causes the next failure PRM to be displayed in reverse video and to remain displayed until released.	N/A
27	Releases any trapped failure PRMs and allows further PRMs to be displayed.	N/A
28 a	Allows an ABD (Alternate Boot Disk) to be specified.	N/A
29 a	Will restore the system default boot disks.	N/A
30 b	Forces the processor to initialize from the backup root file system.	53 and up
31 b	Allows the processor to initialize from the primary root file system.	53 and up
32 b	Forces the processor to initialize only the <i>UNIX</i> [®] RTR operating system. The applications software is not initialized. Only used in minimum configuration.	53 and up
33 b	Allows the processor to initialize both the <i>UNIX</i> [®] RTR operating system and application software, while in normal operating mode.	53 and up
34 b	Inhibits AM hardware checks from initiating automatic recovery action. Prior to the 5E8 software release, it also inhibits CM hardware checks.	51 and up
35 b	Allows AM hardware checks to initiate automatic recovery action. Prior to the 5E8 software release, it also allows CM hardware checks.	51 and up
36 b	Inhibits AM software checks from initiating automatic recovery action.	51 and up
37 b	Allows AM software checks to initiate automatic recovery action.	51 and up
38 b	Inhibits error interrupts.	51 and up
39 b	Allows error interrupts.	51 and up
40 b	Inhibits use of cache memory.	51 and up
41 b	Allows use of cache memory.	51 and up
42 b	Allows the setting of a parameter which is made available to application software.	50 and up
43 b	Clears the application parameter.	N/A
50 c	Passes application parameter to AIM.	N/A
51 c	Forces initialization of the <i>UNIX</i> [®] RTR operating system (level 1 initialization).	N/A
52 c	Forces bootstrap and reloads the <i>UNIX</i> [®] RTR operating system from disk (level 2 initialization).	N/A
53 c	Same as 52 plus reloads equipment configuration data (level 3 initialization) and ODD.	N/A
54 c	Same as 53 plus clears the memory (level 4 initialization).	N/A
55 c d	Loads selected disk from tape unit 0.	N/A
56 c d	Loads selected disk from tape unit 1.	N/A

Notes:

- a. Commands 28 and 29 are only supported in the *UNIX*[®] RTR operating system software when the EAI page is maintained by the MTTYC UN597 circuit pack and when the ABD feature (purchased separately) is enabled(active).
- b. Commands 30 through 43 are sent to the 3B20/3B21 computer the next time commands 50 through 56 are executed.
- c. Commands 50 through 56, in addition to the description given, cause the current next state information to be sent to the processor.
- d. Commands 55 and 56, require a CU to be forced on-line (command 10, 11, or 12) and a disk unit to be selected (command 20 or 22).

3.3 SUPPLEMENTARY TRUNK AND LINE WORK STATION

The STLWS terminal is a DAP-type terminal which means maintenance personnel can perform the same functions or commands from the STLWS that can be performed from the MCC (with the exception of being able to access the EAI page display). Refer to Section 3.1.1 for additional information on DAP.

3.4 TRUNK AND LINE WORK STATION

3.4.1 INTRODUCTION

The trunk and line work station (TLWS) is an interactive menu interface used to test, monitor, or measure trunks and lines. The TLWS is a mode of the MCC or STLWS and has 32 software controlled test positions. The test positions are used to access other menu pages which are used to perform the actual testing. The other menu pages display information needed to perform TLWS operations. One TLWS terminal can utilize all test positions. The status of test positions may be checked from the Test Position Summary Screen pages to determine which test positions are in use and which ones are available. The basic equipment used for trunk/line testing includes the following:

- A video display terminal
- A key telephone set with a speaker
- A test access unit
- A ROP.

Following are some of the operations that may be performed using the TLWS:

- Controlling lines and trunks being tested
- Monitoring a short circuit
- Measuring/sending frequencies
- Making continuous metallic measurements
- Providing remove or restore commands used for testing.

The basic input sequence for starting a test procedure in the menu mode is as follows:

- Make sure the STLWS is in **CMD** input mode.
- Find command of desired test in the task selection display area.
- Enter correct numeric code plus additional information (if required).
- Execute by depressing the return key.

3.4.2 USING THE TLWS

3.4.2.1 Line and Trunk Testing

The TLWS is used to test lines and trunks, make measurements, and monitor calls. This testing can be done in either the menu mode or the command mode. There are five basic steps in trunk and line testing. They are as

follows:

- Seize/access a test position
- Seize line or trunk
- Perform one or more tests
- Release line or trunk
- Release test position.

NOTE: Only individual trunks can be seized and tested. Wideband test calls are not supported.

3.4.2.2 Test Positions

The TLWS software feature provides access to a menu-type interactive test system and MML input commands which allow a user to select a trunk or line for testing and to choose the type of test to be performed on the item selected. These functions, as well as that of performing the actual tests, are conducted at test positions. There are 32 test positions (numbered 1 through 32) available for test purposes.

3.4.2.3 Test Position Resources

Associated with each test position are the resources commonly used to test 5ESS[®]-2000 switch terminations. The test position resources are separated into two groups as follows:

- **Directly associated resources:** These resources are directly associated with the test position throughout its use and are those that are commonly used in testing. Directly associated resources include the talk and monitor (T&M) phone, 101 test line callback access, and the alternating current (AC) and direct current (DC) jack terminations.
- **As needed resources:** These resources are associated with the test position on an as-needed basis during testing. This group includes the directly connected test unit (DCTU), the transmission test facility (TTF) or global digital services function (GDSF), the integrated services test facility (ISTF), and subscriber line and instrument measurement (SLIM) metallic test equipment.

3.4.2.4 Test Position Resource Assignment

The capability is provided to allow the user to choose the set of resources to be directly associated with the test position for the duration of testing.

The arrangement implemented by this capability creates a pool of usable resource sets (RLtlwsr relations) from which the user chooses one of the sets and assigns it to the test position. The assignment is made when the test position is seized by either command **SET:WSPOS[,TP=X][,ID=Y]**; or poke **161,X[,Y]** and the RLtlwsr tuple ID is entered (by default or manually) as the value for Y. (In both commands, X = TP number and Y = the RLtlwsr tuple ID.) The set of resources chosen is associated with that particular test position until the position is released.

3.4.2.5 Test Position Summary Page and Test Position Summary Screen Pages

The status of all 32 test positions is shown on Page 160 named Test Position Status Summary. Page 160 lists the 32 test positions along with the ID for each. Also included on Page 160 is command **160,Z** (where Z = screen number) that is used to display the four Test Position Summary Screen pages (Pages 160,1, 160,2, 160,3, and 160,4). The Summary Screen pages show status information for the 32 test positions. Each page shows status for

eight test positions: Page 160,1 for test positions 1-8, Page 160,2 for test positions 9-16, Page 160,3 for test positions 17-24, and 160,4 for test positions 25-32. The poke **162,Z** (where Z = screen number) is used to display the SLIM Routine Mode Summary page.

To display Page 160, Test Position Status Summary, enter command **160**. Enter the command **160,Z** from Page 160 to display the desired Test Position Summary Screen page.

Examples of Page 160 and Page 160,2 are shown in Figures 3-6 and 3-7 .

Once a test position is seized, the line or trunk data for that test position is displayed in the status box of the Test Position Summary page or appropriate Test Position Summary Screen page. The status box contains the following information for each test position:

- Test position number
- TLWS location
- Identification field (TLWS number)
- Line/trunk data (DN/TKGMN)
- Test type (or test access)
- T&M phone status.

The absence of data in the status box for a particular test position indicates that the test position has not been seized and is available for use.

When a command is entered at the keyboard, it is displayed to the right of the **CMD:** symbol located in the upper left portion of the screen on Page 160 and the other TLWS pages.

Figure 3-6 is an example of Page 160, which includes poke **162,Z** to display the SLIM Routine Mode Summary page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

160 - TEST POSITION STATUS SUMMARY

SELECT TP
161,X[,Y]

RELEASE TP
201,X[,UCL]

DISPLAY TP SUMMARY
160,Z

DISPLAY SLIM ROUTINE
MODE SUMMARY
162,Z

TP	ID	TP	ID	TP	ID	TP	ID
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	
8		16		24		32	

MAX TP :
MAJOR TP :
MINOR TP :
DIGIT ZERO:

DISPLAY SUMMARY PAGE: 160,1 160,2 160,3 160,4

X=TP NUMBER
Y=TLWS ID
Z=SCREEN NUMBER

Figure 3-6 160 - Test Position Status Summary

Figure 3-7 is an example of Test Position Summary Screen 160,1, which shows the status box for test positions 1 through 8. This example shows the **162,Z** poke which displays the SLIM Routine Mode Summary.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

160 - TEST POSITION SUMMARY SCREEN

SELECT/DISPLAY
161,X[Y]

RELEASE
201,X[,UCL]

SLIM ROUTINE
MODE SUMMARY
162,Z

X=TP NUMBER
Y=TLWS ID
Z=SCREEN NUMBER

TP	TLWS LOCATION	DEV/ ID	LINE/TRUNK DATA	TEST ACCESS	T&M
1					
2					
3					
4					
5					
6					
7					
8					

TOTAL TEST POSITIONS

Figure 3-7 160,1 - Test Position Summary Screen

3.4.2.6 Seize a Test Position

Any test position shown as available on Pages 160 or 160,Z may be seized by a user. The command **SET:WSPOS[,TP=X][,ID=Y]**; or poke **161,X[,Y]** (where X = TP number and Y = the RLtlwsr tuple ID) may be used. If all test positions are in use, it is necessary to try again later.

All the test positions can be used at the same time.

NOTE: When a test position is requested and the value for option Y is not specified, a default value for that terminal is entered. If the default is null, an error message is output. The user must then request the test position with the RLtlwsr tuple ID (Y value) specified, or the test position is not seized.

3.4.2.7 Seize a Line or Trunk

When a test position is seized, Page 8000, **TASK SELECTION**, is displayed from which a user selects Page 4000,X.

At this point, the next action is to seize a line or trunk. Page 4000,X lists the different types of seizure commands for both lines and trunks. The task command area occupies the entire left side of the page. Test results are then displayed in the response area of the TLWS page Figure 3-8 shows an example of the command and response areas. [See Table 3-3 (Section 3.11, TLWS TASK SELECTION PAGE DISPLAYS) for the page numbers that are associated with the particular software release used in the switch.]

3.4.2.8 Task Selection Menu Pages

The major test categories that can be performed using the TLWS are shown on Page 8000, Task Selection.

The individual menu pages list the possible tests that may be performed along with the command to execute that test. The task selection/menu pages all have the same basic format (see Figure 3-8). The section of the task selection/menu page that contains the commands used to perform tests is different for trunks and lines. Table 3-3 contains a list of all available task selection/menu pages (see paragraph TLWS TASK SELECTION PAGE DISPLAYS).

NOTE: Task selections **9200** and **9201** on Page 9000,1 support testing of digital subscriber lines and customer premises equipment (CPE) for the integrated services digital network (ISDN).

Figure 3-8 shows the TLWS page layout and identifies the areas where certain information appears. The specific tests and their commands have been omitted for simplification.

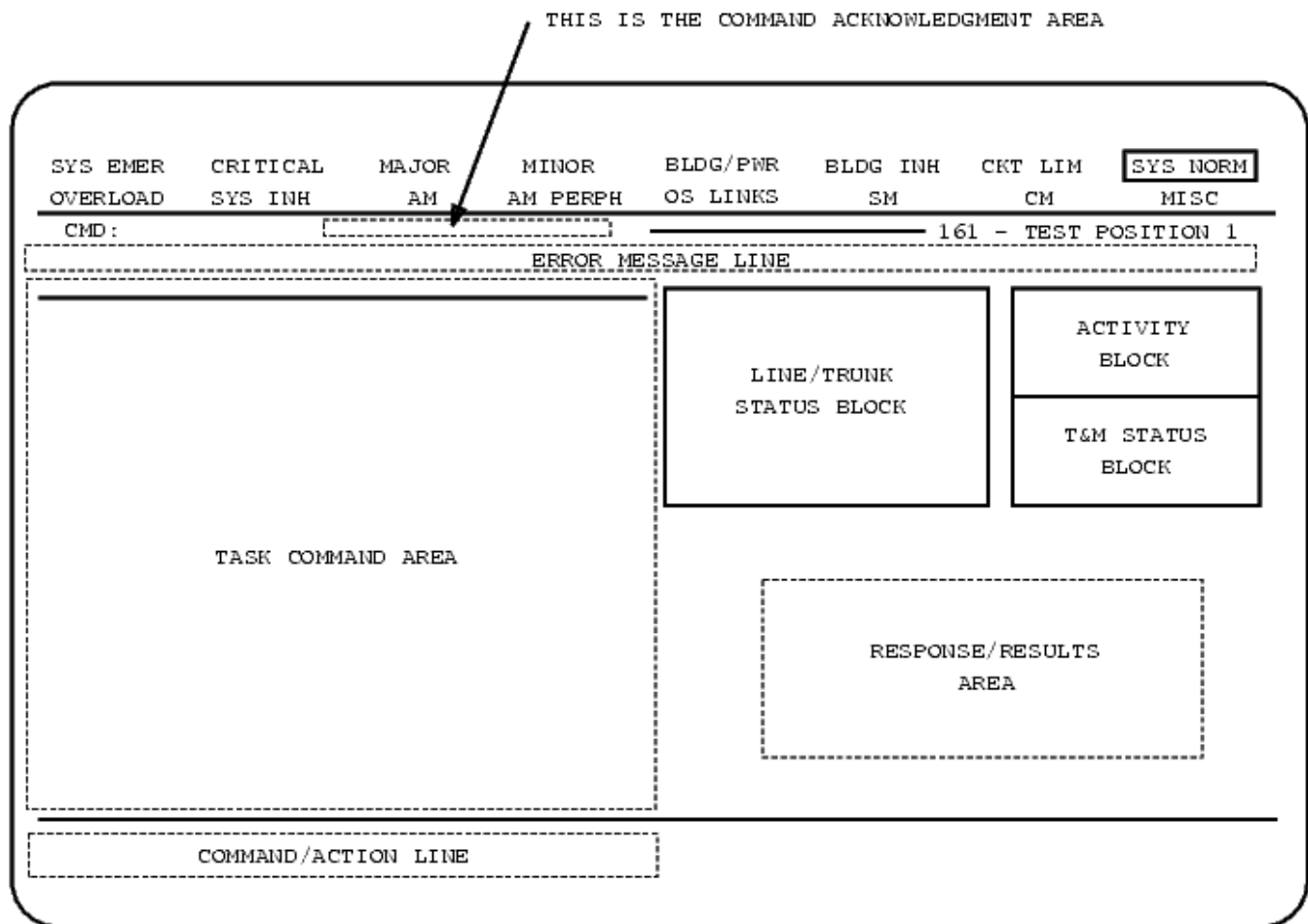


Figure 3-8 TLWS Page Layout

3.4.2.9 Performing Test

3.4.2.9.1 General

After seizing a line or trunk and displaying a task selection/menu page, the user can choose the type of test to execute. The status/response messages of the task selection pages is updated as the test is executed. When the test has finished running a message, the results of the test are displayed in the response area block. If any

problems have been encountered during the test, a related error message is displayed on the error message line.

3.4.2.9.2 Test Example

This test is to monitor a trunk using the menu mode. The following is a step-by-step example of how to monitor a trunk.

- (1) While in the menu mode of the MCC or STLWS, enter menu command **160** to access the TLWS test system.

Response: The Test Position Status Summary page is displayed. This page lists the 32 test positions and provides the 160,Z command that can be used to display availability and status information for the test positions.

Where: Z = Screen number (160,1, 160,2, 160,3, or 160,4)

- (2) Enter menu command **161,X[,Y]** to seize a test position.

Where: X = Test position number
Y = the RLtlwsr tuple ID.

- (3) Enter menu command **4000,2** to display the seize-trunk commands and seize trunk to be monitored.

NOTE: The 8000 page is displayed after a test position is seized, and the 4000 series commands are included on the 8000 page.

- (4) Enter menu command **5000** to display the commands for transmission-type test.

NOTE: A user can skip this step and go directly from step 3 to step 5.

- (5) Enter menu command **4301** and connect the talk and monitor phone to the seized trunk.

Response: **MONITOR** is backlighted in the response block of Page 5000, and T&M telephone set rings.

- (6) Take T&M phone off-hook and listen for conversation, off-hook, or some type of suspected trouble.

- (7) Take appropriate action per local practice.

- (8) If no further testing is to be performed on the trunk, enter menu command **4999** to release the seized trunk.

- (9) When all TLWS testing is completed, enter menu command **201,X** on MCC Pages 160 or 160,Z to release the test position.

Where: X = Test position number and Z = screen number.

- (10) **STOP. You have completed this test.**

3.4.2.9.3 Error Messages

If there is a problem that keeps the test from completing correctly, an error message is displayed on the screen in one of the special fields provided for error messages. There are also messages which explain what kept the test from running correctly. The message is usually printed on the error message line which is above the status block.

Information related to an error may also be displayed in the response area or on the command/action line. The command/action line displays the command being executed, the test position number, and the action that is taking place. The command is displayed in a command mode format.

For a complete description of each error message, see the TLWS Appendix or TLWS Progress and Error Reports Appendix in 235-600-750, *Output Messages Manual*.

3.4.2.10 Release Line or Trunk

After the test is finished and no more tests are to be done on the seized line or trunk, it should be released. To release the line or trunk, enter **4999**. The line or trunk may also be released by releasing the test position. There is a default time limit on the release of a line or trunk. If there are no actions on a seized line or trunk for five minutes, it is automatically released.

3.4.2.11 Release Test Position

The last thing to do when a test session is over is to release the test position(s) used. A test position can be released from Page 160 or from any of the four Page 160,Z pages.

To release a test position, return to Page 160 or Page 160,Z by entering **160** or **160,Z**, as appropriate. Release the test position by entering **201,X**.

Where: X = Test position number to be released and Z = screen number.

At this point, the test session is over.

NOTE: When a test position is left idle for one hour, the test position is automatically released.

3.5 TRUNK AND LINE MAINTENANCE

3.5.1 TRUNK MAINTENANCE

3.5.1.1 General

There are two types of trunk tests: interactive and noninteractive. The noninteractive test always does the same thing, and the maintenance personnel has no control over the test. The interactive trunk test requires manual action from the maintenance personnel to control the test. Usually, the maintenance personnel on each end of the trunk run a series of interactive tests to resolve the problem(s).

NOTE: Trunk tests are performed on a single-trunk basis. Wideband test calls are not supported.

Transmission Test Calls: Test equipment is required at both the incoming and outgoing ends for implementing transmission test calls. The actual measured results are compared against the normal required characteristics for a particular type trunk being tested.

The following transmission test calls are provided on the system:

- 100
- 101
- 102
- 104

- 105.

Operational Test Calls: Operational test calls provide a pass/fail indication rather than a measured value. All the tests except Code Answer Test Line (CATL) only need test equipment at the outgoing side of the test call. A predefined sequence of signaling events and tones are used to test the trunk at the outgoing side of the test.

The following operational test calls are provided on the system:

- Permanent-busy
- Synchronous
- Nonsynchronous
- 103-type test line
- CATL-AAD2 or Automatic Test and Measuring Apparatus (ATEMA).

Loopback Test Calls: The digital service unit-2 (DSU2) integrated services test facility (ISTF) and digital service unit-3 (DSU3) or combined services unit (CSU) GDSF peripherals provide digital-circuit transmit and loopback capabilities to test digital trunks. The transmit service sends an outgoing test signal and, through the use of a digital loopback, receives back test data. The loopback service takes bits (test signal) from the input channel and places them on the output channel either directly [noninverting (LBK)] or with their polarity changed [inverting (LBKINV)].

The time slot interchanger (TSI) also can be used for LBK. The ISTF/GDSF is used for LBKINV.

NOTE: The LBK test line for ISDN trunking meets the functional requirements announced in the *ANSI*[®] standard T1.206-1988 (Digital Exchanges and PBXs - Digital Circuit Loopback Test Line). The *ANSI*[®] standard designates the test line as a 108-type test line. The *5ESS*[®]-2000 switch 108-type test line deviates in one minor detail from the *ANSI*[®] standard in that time-out is currently fixed at one hour (in the event the caller fails to disconnect), whereas the *ANSI*[®] specification calls for a time-out period that can be set by the operating company.

Procedures for implementing the 108-type test line capabilities of ISTF/GDSF are documented in 235-105-210, *Routine Operations and Maintenance Procedures*.

The following loopback test calls are provided on the system:

- LBK/108-type test line
- LBKINV.

3.5.1.2 Transmission Test Call Descriptions

Following are descriptions of the transmission test calls:

- **100 - Balance:** The incoming side sends a 1004-Hz tone at 0 dBm for 5.5 seconds followed by a quiet termination. The outgoing side does a 1-way loss and noise measurement of the trunk with the tone.
- **101 - Communication:** The outgoing side calls the number of the T&M phone in another office. At the incoming side, the T&M phone rings and be connected to the trunk under test. Testing can then be completed.

NOTE: The T&M is not supported for wideband calls.

- **102 - Milliwatt:** The incoming side sends a 1004-Hz tone at 0 dBm and the outgoing side does a 1-way loss measurement test.
- **104 - Transmission Measuring and Noise Checking:** Provides a test termination for 2-way loss and 2-way noise. The outgoing side sends a 1004-Hz tone, and the incoming side measures the loss and noise. Then the incoming side sends a 1004-Hz tone, and the outgoing side measures the loss and noise.
- **105 - Automatic Transmission Measuring Test Line:** Provides far-end access to a responder and permits 2-way loss and noise measurements to be made on trunks from a near-end office equipped with a Remote Office Test Line (ROTL) and responder.

3.5.1.3 Operational Test Call Descriptions

Following are descriptions of the operational test calls:

- **Permanent-Busy:** The incoming side sends a busy signal.
- **Synchronous:** The outgoing side sends at least one complete cycle but less than three cycles of audible ringing followed by a silent interval. The incoming side sends OFF-HOOK/ON-HOOK transitions.
- **Nonsynchronous:** This test is similar to the synchronous test but runs faster because it is a less exhaustive test.
- **103-type Test Line:** This test provides a connection to a supervisory and signaling test circuit for overall testing of these features on intertoll trunks (equipped with ring forward features) which can be reached by an automatic trunk test frame or by dialing manually.
- **CATL - AAD2 or ATEMA:** The incoming side returns zero to three complete cycles of audible ringing and a tone while the outgoing side detects the tone.

3.5.1.4 Loopback Test Call Descriptions

Following are descriptions of LBK/108-type test line and LBKINV test calls:

- **LBK/108-type test line:** The LBK test line provides a dialable, 4-wire test line capability that accepts binary signals (bits) and loops back received octets (eight bits) from a digital circuit to test digital carrier voice and data trunk facilities.
- **LBKINV:** The operation of the LBKINV test line is the same as that of the LBK except that the polarity of each bit is changed in the loopback service. For example, an input bit that is a ``1" is placed on the output channel as a ``0".

NOTE: Loopback tests are supported on a single-trunk basis. Wideband test calls are not supported.

3.5.1.5 Manual Trunk Testing Features

The following manual trunk testing features are available at the TLWS:

- Seize/release a trunk
- Test trunk using T&M phone
- Send OFF-HOOK/ON-HOOK

- Manually set up call
- Monitor a busy port
- Connect trunk to an AC/DC jack
- Connect trunk to TTF/GDSF
- Remove trunks

CAUTION: If a digital facility interface (DFI) is unconditionally removed, the unit is taken out of service (OOS) along with all of the voice/signaling trunks associated with that DFI.

- Restore trunks

CAUTION: If a DFI is OOS and a restoral command for a trunk (associated with that DFI) is issued before the DFI restoral command, audits show inconsistencies between the hardware status of the DFI and the port status of the trunk.

- Get status of trunks
- Seize incoming call (101 test)
- Perform transmission test
- Perform operational test
- Perform loopback/108-type test line tests.

3.5.1.6 Automatic Trunk Testing

3.5.1.6.1 Automatic Progression Testing

The automatic progression testing (APT) runs operational tests and code answer test line (CATL) tests on trunks on a specified schedule. The APT tests can determine only if the test passed or failed, not the actual measured characteristics of the trunk. If a trunk fails a test, the test is repeated; and if it fails again, it is placed OOS. However, if an excessive number of trunks are OOS, the trunk remains in service.

NOTE: APT is disabled in a 5ESS[®]-2000 switch for AUTOPLEX[®] System 1000.

The APT has the following 10 parameters which may be programmed:

- The starting time in hours
- The starting time in minutes
- The length of time for test to run
- Each of the seven days of the week.

3.5.1.6.2 Automatic Trunk Test Scheduler

The automatic trunk test scheduler (ATTS) is used primarily for automatic trunk testing in a 5ESS[®]-2000 switch for AUTOPLEX[®] System 1000. (The ATTS is a secured feature that can be purchased independently for use in regular

5ESS®-2000 switch applications.) The ATTS feature provides the ability to schedule routine testing on a periodic basis and is capable of supporting multiple, independent schedules of test sessions. Features of the ATTS include the following:

- Programmable scheduling of tests including ability to add, modify, and delete test sessions
- Automatic logging of test results
- Optional real-time printing of test results
- Report generation
- Flexible test session control such as skipping, linking, etc.

Refer to 235-105-210, *Routine Operations and Maintenance Procedures*, for additional information on ATTS and procedures for usage.

3.5.1.7 Trunk Administrative Functions

Maintenance personnel may also be allowed to enter administrative functions using input messages. Emergency situations may make it necessary for a trunk or group of trunks to be removed from service. A trunk may also be manually placed back in service under certain conditions regardless of its status.

Conditional and unconditional removals on trunks involved in wideband calls operate the same as for trunks involved in DS0 calls.

The following administrative functions are provided by the TLWS:

- Removing trunks from service
- Restoring trunks to service
- Unconditionally replacing failed trunks to service
- Requesting trunk status.

3.5.1.8 TOPAS and 5ESS®-2000 Switch Interface

The testing, operations, provisioning, and administration system (TOPAS) is an operation support system developed to provide centralized trunk maintenance and administration for trunks terminating on 5ESS®-2000 switch - "toll configurations" in the Communications network. The TOPAS and 5ESS®-2000 switch capabilities are as follows:

- Preservice testing, trouble isolation, and repair verification via remote measurement system - digital-3 (RMS-D3).
- Current status of all trunks on the switch through trunk state change reports from the 5ESS®-2000 switch and periodic audits.
- Direct facility failure reports from the switch to facility administrative surveillance system (FAST).

Basically, this feature provides the craft at TOPAS with a set of TTY input and output messages that enables communication with the switch to perform trunk maintenance.

These operational trunk tests can be initiated as follows:

- Manually via the input messages **TST:TRK** or **TST:WSAUTO** and the TLWS poke commands on menu page **5400,2**. Refer to Table 3-3 (see Section 3.11, TLWS TASK SELECTION PAGE DISPLAYS) for examples of TLWS Menu Page 5400,2.

The **TST:TRK** input message can be used to request automatic operational or transmission tests on individual trunks, a range of trunks in a trunk group, or an entire trunk group. Refer to 235-600-700, *Input Messages Manual*, for details. If the test type and directory number are omitted from the **TST:TRK** message, the default values (obtained in the Automatic Trunk Test Table) are used to implement the test.

The **TST:WSAUTO** input message can be used to perform TLWS automatic tests through the menu interface. The trunk being tested must have been seized via the **CONN:WSLINE**, **CONN:WSTRK**, or **CONN:WSIC** input message. The specified test position must have previously been selected with the **SET:WSPOS** input message. Refer to 235-600-700, *Input Messages Manual*, for details of these messages.

- Automatically via the trunk error analysis (TERA) or automatic progression test (APT) capabilities.

When TERA or APT initiates a trunk test, the default test type and trunk group number are obtained from the Automatic Trunk Test Table. The Automatic Trunk Test Table contains the default test type and trunk group number for each trunk group.

For details of this feature, refer to 235-190-115, *Local and Toll System Features*.

3.5.1.9 RMS-D3 and 5ESS®-2000 Switch Interface

The RMS-D3 is a microprocessor based system providing message trunk testing and maintenance of digital and analog switched circuits. The testing of switched circuits via RMS-D3 is controlled by TOPAS. The 5ESS®-2000 switch hardware interface to RMS-D3 consists of a control link (X.25 level 3) and a T1 interface. The commands from RMS-D3 as well as responses transmitted by the switch utilize the control link. The T1 interface provides access to the RMS-D3 test ports. The 5ESS®-2000 switch provides the following capabilities for RMS-D3:

- Route 104, 105, 109, and 606 calls to RMS-D3 ports.
- Route 101 test position calls from RMS-D3 ports and reroute them to the TLWS if these ports are busy.
- Ability to originate test calls from RMS-D3 - test call with outpulsing or without outpulsing, signaling test access with outpulsing or without outpulsing, monitor connection, split talk access, and out-tandem connection.
- Mapping of trunk groups and test position numbers, RMS-D3 test access trunks and test position numbers, TOPAS test position number and status (attended/unattended).
- Ability to reconfigure RMS-D3 test access trunks to meet testing needs during any given time.

For details of this feature, refer to 235-190-115, *Local and Toll System Features*.

3.5.1.10 Call Monitor Reports

The Call Monitor allows for the early detection of loss of call processing when all other system indicators appear normal. It requires either a global digital service unit (GDSU) equipped with TTF responder circuits or GDSF configured with the guard data guard (GDG) transceiver circuits. The Call Monitor also requires ISTF/GDSF hardware for performing digital loopback test calls. The Call Monitor reports to the craft by ROP and an alarm indicator on MISC Page 116 when a failure in call completion analysis occurs. The ROP output is in the form of a

REPT CALLMON 5- or 15-minute report. The ROP output message has either a major, minor, or no alarm.

The failure criteria are defined as follows:

- For the 5-minute report, failure occurs if more than 50 percent of the total calls attempted in a 5-minute period are not passed.
- For the 15-minute report, failure occurs if more than 90 percent of the total calls attempted in a 15-minute period are not passed.

The major alarm criteria are defined as follows:

- For the 5-minute report, a major alarm occurs if 40 percent or more of the total tests are ``operational test failures."
- For the 15-minute report, a major alarm occurs if 50 percent or more of the total tests are ``operational test failures."

The minor alarm criteria are defined as follows:

- For both the 5- and 15-minute reports, a minor alarm occurs if 70 percent or more of the total tests are ``indeterminate" plus ``not attempted" failures.

If no alarm criteria are met, no alarm is printed with either analysis report.

The body of the REPT CALLMON message is as follows:

```

REPT CALLMON CURRENT [5 or 15] MINUTE REPORT
  CALLMON PRINTMODE = [NORMAL or VERBOSE]
  CALLMON STATE = ALLOWED
  NON-CCS TEST CALL COMPLETION SUMMARY
  PASSED   FAILED   INDETERMINATE   NOT-ATTEMPTED   LAST-TRKG-PASSED
  a         b         c                 d                 e
  CCS TEST CALL COMPLETION SUMMARY
  PASSED   FAILED   INDETERMINATE   NOT-ATTEMPTED   LAST-TRKG-PASSED
  f         g         h                 i                 j
  TOP FIVE HIGHRUNNER FAILURE TYPES
  FAILURE-CODE   NUMBER-OF-OCCURRENCES
  H'k             l
  H'm             n
  H'o             p
  H'q             r
  H's             t

```

NOTE: The lowercase letters (a through j, l, n, p, r, and t) are decimal numbers and the letters associated with failure codes (k, m, o, q, and s) are in hexadecimal.

The range of valid trunk group decimal numbers in the data base is 0 - 4001. The monitor uses the decimal value 4002 (the values of e and j in the previous message example) to indicate that no trunk group has passed a test call since the last time the monitor was initialized.

The Call Monitor performs separate analyses for common channel signaling (CCS) test calls (if equipped) along with non-CCS test calls. It utilizes the terminal maintenance (TM) APT functionality to make these operational test calls.

Non-CCS test calls are based on the default APT test for the trunk group in the AM ODD relations RT_TRKG and TM_ATTT. All CCS test calls use the voice path assurance (VPA) continuity test.

The ability to inhibit the Call Monitor on a per-trunk-group basis is provided by a field in the static AM ODD relation RT_TRKG. The field, ``**callmon_inh**'', is populated from recent change trunk view 5.1 (as is the field for inhibiting APT). If APT is inhibited, then the Call Monitor must also be inhibited.

NOTE: APT is disabled in a 5ESS®-2000 switch for AUTOPLEX® System 1000.

The monitor routinely cycles through the AM ODD relation RT_TRKG and selects trunk groups to use for making the test calls. A test call is attempted every 30 seconds unless CCS is equipped, in which case two test calls (non-CCS and CCS) are attempted. It is recommended that telephone company personnel set up their APT schedule to allow testing on at least one trunk group from each possible SM/SM-2000. This maximizes the benefit from this feature. The monitor keeps an ever changing list of possible trunk groups to select from in case it does not find a testable trunk group at the 30-second entry as it continues to step through the ODD. This guarantees that the monitor always has a trunk to test.

The monitor can be inhibited or requested to print the past 15-minute history and the per-test call results (verbose mode).

The CALL MONITOR indicator on MISC Page 116 shows whether the Call Monitor is inhibited or allowed. Entering command **601** from this page generates the message **INH:CALLMON** which inhibits the call monitor from making test calls and performing call completion analyses. This also clears the monitor's history data. Command **701** generates the message **ALW:CALLMON** which allows the monitor to start the cycle of making test calls and performing call completion analyses. Command **801** generates the message **RTR:CALLMON,ALARM** which retires the alarm indicator in the Call Monitor box. Command **901** generates the message **OP:CALLMON** which prints the OP CALLMON message on the ROP. The body of the message is identical to the REPT CALLMON message except for the first line which is as follows:

MOP CALLMON PAST 15 MINUTE REPORT

The verbose mode may be entered by typing **SET:CALLMON,VERBOSE**. The per-test call results is printed in the form of a REPT CALLMON message.

The body of the verbose-mode message is as follows:

```
REPT CALLMON VERBOSE TEST CALL
      SM = a                PORT = b
      TRUNK GROUP = c       MEMBER = d
      SIGNALING TYPE = e    TEST TYPE = f
      RESULT = g
      RETURN CODE = h
```

NOTE: The values of the lowercase letters; a, c, d, e, and f are decimal numbers; b and h are hexadecimal numbers; and g is a character string.

To clear the verbose mode, enter **CLR:CALLMON,VERBOSE**.

In the event the REPT CALLMON CURRENT [5 or 15] MINUTE REPORT message is printed, the data to analyze is the call completion summary. The failure indicates a less than expected call completion percentage (50 percent in the current five minutes or 90 percent in the current 15 minutes). The number of ``failed'' tests is of most importance because this indicates a possible call processing, hardware, or network problem. The CCS data (if equipped) should be compared with non-CCS data to determine if a common problem exists or if the problem is related only to CCS. The **OP:CALLMON** input message (poke 901 on MCC Page 116) can be typed to compare the past 15 minutes worth of data. Also, the ``LAST_TRKG-PASSED'' field indicates the last trunk group to pass a test call. If the

number 4002 appears in the field, no tests have passed since the monitor was last initialized. A manual trunk test can be performed on this trunk group.

NOTE: The Call Monitor reports failures if the AM, CMP, CNI, or critical SM(s)/SM-2000(s) undergo recoveries or initializations.

If failures are caused by "indeterminate" or "not-attempted" calls, the high-runner failure codes can indicate the reason for the problem. Because of the nature of the Call Monitor's interface with TM APT, it is possible that the failures are TM related; meaning that the front-end setup of a test call could have failed due to one of many reasons. This results in no idle trunk member being hunted and verbose output messages printing the null value for SM (0), port (0), and member (4096). In these cases, the monitor should not be interpreted as having detected a loss of call processing functionality. This is the reason for variable alarm levels.

Following are typical reasons for **indeterminate** failures:

- **TM ABORT:** These types of errors occur if TM times out waiting for a message, TM is interrupted while waiting for a message, a route failure occurs when routing for a logical test port (LTP), or an invalid state is encountered.
- **TM INTERNAL:** This error can occur when TM fails to send the route request for the test equipment.
- **BAD TEST RESULT:** Internal program error.

Following are typical reasons for **not attempted** failures:

- **RESOURCE:** These types of errors occur if TM cannot route to the LTP due to busy or reorder, TTF/GDSF hardware is out of service or unavailable, test equipment failure, inability to allocate tone decoder, failure to reserve equipment, or other equipment allocation errors.
- **BAD DATA:** The ODD related to APT may be invalid.
- **DSIG OFF NORMAL:** Direct signaling capability is unavailable (for CCS).
- **TSIG OFF NORMAL:** Trunk signaling capability is unavailable (for CCS).
- **CNI INIT IN PROGRESS:** The CNI initialization is in progress.

If it is determined that failure reports are TM in nature, inspect the GDSU status on MCC Page 1100,Y,X (where Y is the GDSU number and X is the SM/SM-2000 number). Make sure the TTFCOM circuits of the GDSU are in service and pass diagnostics. If they are in service, turn on the verbose mode to identify specific trunk groups that are failing and perform a manual operational trunk test, TST:TRK,TKGMN-x-y, (where x is the trunk group number and y is any valid in-service/idle member found in the ODD). The TST:TRK operation gives additional details as to the exact problem, whether it be TM or call processing related.

Other reasons for operational test failures include trip failure, pre-trip failure, activation failure, plain old telephone service (POTS) glare, outpulse failure, and high and dry. For CCS-related operational test failures, refer to 235-190-120, *Common Channel Signaling Service Features*.

Under certain circumstances, the Call Monitor skips test calls which are not counted as part of the 5- and 15-minute analysis. These fall under the category of "no test" when monitored under verbose mode and include the following:

- **AM MIN MODE:** The AM is in Min Mode.
- **ASSERT:** Internal Assert failure.

- **CNI MIN MODE:** The CNI is in Min Mode.
- **NO IN-SERVICE IDLE MEMBER FOUND:** Trunk under test is OOS (automatic or manual) or all busy.

Operational test failures are the most severe problem and may indicate a true call processing, hardware, or network problem. If the number of "failures" is the reason for the alarmed report, analyze the high-runner failure types and turn on the verbose mode to identify specific trunk groups. A manual operational trunk test can then be performed to obtain additional information.

For details on interpreting the input and output messages used with the Call Monitor feature, refer to 235-600-700, *Input Messages Manual*, and 235-600-750, *Output Messages Manual*.

3.5.2 LINE MAINTENANCE

3.5.2.1 General

There are two types of line tests: interactive and noninteractive. Noninteractive tests include the line insulation test (LIT) and the SLIM metallic test capability (functioning in the routine mode). Both LIT and SLIM can be run automatically or manually. These tests use metallic access to do measurements and do not actually place a call on the line. All other line tests are interactive tests and are initiated either locally or remotely.

3.5.2.2 How to Defer Line Unit Maintenance

Deferred maintenance for the LU A-Links is provided which allows the switch to operate normally with a few A-links OOS. The **SET:ALINK a b c d e DEFR** input message places the A-link into the OOS deferred state (see 235-600-700, *Input Messages Manual*, for details). Maintenance activity can be scheduled at a more convenient time.

3.5.2.3 Manual Line Testing Features

Following are some of the manual line tests available from the TLWS:

- Seize/release a line
- Send receiver off-hook tone
- Ring the line under test
- Monitor busy port
- Connect a line to an AC/DC jack
- Connect a line to the TTF/GDSF
- Connect a circuit to the 101 test line
- Perform a line insulation test
- Remove/restore lines (ports)
- Get the status of lines.

Some of the operations available through the TTF/GDSF are as follows:

- Measure noise
- Measure level
- Measure broadband
- Measure echo return-loss
- Measure singing return-loss
- Measure singing return-loss high
- Send tones at specific level and frequency
- Apply open termination
- Apply quiet termination.

Some of the operations available through the DSU2 ISTF loopback/108-type test line and DSU3 or CSU GDSF are as follows:

- Provide ISTF/GDSF loopback terminations
- Send a pseudo-random bit pattern
- Receive and monitor a pseudo-random bit pattern.

A user can measure the integrity of digital data being transmitted on BRI lines between the CPE and the switch by placing test calls to a 108-type test line.

Operations available through BRI access to the 108-type test line include the following:

- Provide TSI loopback terminations
- Send a pseudo-random bit pattern
- Receive and measure a pseudo-random bit pattern
- Perform continuity test of BRI path
- Verify signaling operation of the D-channel.

Additional information on feature, BRI access to the 108-type test line, and procedures for its use are included in 235-105-220, *Corrective Maintenance Procedures*.

3.5.2.4 Automatic Line Testing Features

An automatic (noninteractive) test for lines is the automatic line insulation test (ALIT). An ALIT uses the line insulation circuit in the modular metallic service unit (MMSU) and the metallic connections provided by the MMSU to the lines in the line unit to detect gradual cable deterioration. An ALIT may be inhibited on a line-by-line basis using the RC/V subsystem. The number of ALIT circuits should be engineered to make it possible to test all of the lines in the office in about eight hours. For maximum efficiency of the testing session, all of the available ALIT circuits are used in parallel. There are four types of ALIT tests. These tests are as follows:

- Foreign electromotive force (FEMF)
- Short circuit and ring to ground (SRG)
- Tip and ring to ground (TRG)
- All of the previous.

NOTE: The SLIM metallic test capability functioning in the routine mode (see Section 3.8) is also available as an addition to or alternative to the ALIT.

3.5.2.5 Line Administrative Functions

Maintenance personnel are allowed to enter administrative functions using input messages. Emergency situations may make it necessary for a line to be removed from service and placed in one of several specific out-of-service (OOS) states. If the line is busy, it is **camped-on** and waits for control. The message **seized** is displayed in the test area when the line is free for testing. When the line is camped-on, the maintenance personnel cannot perform any test requests. Only the busy-monitor or monitor busy and idle commands can be used during the camped-on period if the maintenance personnel wants to "listen in." If the maintenance personnel does not want to wait for the line to become available, a release command can be performed at this time. An alternative to entering a release command is to enter new line data at the same test position. When new data is entered, the old test in progress is automatically torn down. In the test area, the message **DO MNTR BUSY [4600] OR B&I [4601] ONLY** is displayed. All other test requests cause an error message. If the control of the line is not obtained within five minutes, a message in the test area, **RL - FAILED TO OBTAIN BUSY PORT** is displayed. When the line becomes available for testing, the graphic representation is changed from **CAMPED ON** to **SEIZED**. Only one test position at a time is able to access a specific line. In other words, two test positions cannot access the same line. Camping on to a line that is being tested at another test position is not allowed. A message is displayed in the test area stating that the line just entered is already being tested.

The following administrative functions are provided by the TLWS:

- Removing line from service
- Restoring line to service
- Unconditionally restoring failed line to service
- Line status is displayed when line is seized
- Line identification [line equipment number (LEN) or directory number (DN)] is displayed when line is seized.

3.5.3 MISCELLANEOUS FUNCTIONS

3.5.3.1 Miscellaneous Trunk and Line Commands

There are several functions of the TLWS that deal with both trunks and lines. Some of these functions are as follows:

- Talk and monitor
- Retiring alarms
- Routing messages

- Scheduling tests
- Outputting general information
- Outputting machine detected interoffice irregularity (MDII) reports
- Restoring trunks.

NOTE: All of the previous functions can be performed from the STLWS terminal.

3.5.3.2 Talk and Monitor

The talk and monitor phone is used to connect to a trunk or line in order to test the circuit. No test equipment is used between the talk and monitor phone and the circuit under test when it is used from the TLWS. This operation would normally be done to call the maintenance personnel in another office or to monitor a trunk or line. The talk and monitor phone is the terminating end of the 101 test line call. When the far-end craft and/or maintenance person dials the 101 test line directory number, the call terminates at the talk and monitor phone. If the near-end person requests transmission testing on the 101 test line call, the connection is put in the monitor mode for monitoring interactive test.

NOTE: Talk and monitor is not supported for wideband calls.

To verify the operation of the ISTF/GDSF loopback feature, the craft can place an interoffice call to the 108-type test line which has the inverting option (LBKINV). If the loopback feature is operational, the squelch of the data stream should be clearly audible.

3.5.3.3 Retiring Alarms

Alarms can be turned off at the STLWS by depressing the alarm release (**ALM RLS**) function key. Status display alarm indications remain until the alarm condition is repaired.

3.5.3.4 Routing Messages

Output messages can be routed to the TLWS or to the remote switching control center, depending on whether the TLWS office is staffed.

3.5.3.5 Scheduling Tests

A routine test scheduler is provided for APT, ALIT, and SLIM. Maintenance personnel can override the routine test scheduler by entering new parameters for the test session. The new parameters are for the next session only. The automatic scheduler then returns to the preprogrammed schedules for test sessions.

3.5.3.6 Outputting General Information

Many types of information can be requested and received at the TLWS. The information can then be printed at the ROP. Some requests are as follows:

- List of carrier group alarm (CGA) trunks
- CGA member number
- Member number of active CGAs
- Number of active CGAs

- Perform conversion of equipment identifiers
- Convert member number to equipment number
- Conversions between DNs and LENS.

3.5.3.7 Outputting MDII Reports

Due to emergencies or intensive test sessions, MDII reports may need to be stopped temporarily. Therefore, the maintenance personnel can control the MDII reports by entering the input message **INH:MDII** (see 235-600-700, *Input Messages Manual*, for details). When the user desires to have the MDII reports printed again, enter the input message **ALW:MDII** (see 235-600-700 for details).

If the user desires to change the device(s) that receive the MDII reports, the ECD (**classdef**) must be changed to reflect the desired device. Refer to 235-600-30X, ECD Data Base Manual, where X = the manual number associated to the applicable software release. See 235-000-000, Numerical Index - Division 235 and Associated Documents, for the complete list of the ECD data base manuals.

3.5.3.8 Restoring Trunks

When a trunk or group of trunks is restored conditionally by the maintenance personnel, the default test call is run. The default trunk test information (for example, the test type and trunk group number) is stored in the Automatic Trunk Test Table. If the test fails, the trunk or trunk group may or may not remain OOS. The trunk remains OOS if the OOS trunk group threshold has been exceeded.

3.5.3.9 Miscellaneous Test Commands

The miscellaneous test commands associated with the TLWS menu can be grouped by function and are used to perform operations on specific lines or trunks. The commands must be entered from task selection Pages 9000,1 and 9000,2. (Refer to Table 3-3, for examples of Pages 9000,1 and 9000,2 and to Section 3.11.3 for descriptions of commands appearing on each page.

3.6 TEST ACCESS UNIT

The test access unit (TAU) is of specific interest to the TLWS user. The TAU provides several plug-in jacks. These jacks are used in conjunction with portable test equipment and system software control to gain trunk or line access and perform tests. The following jacks are provided:

- TEL A and TEL B - to the interframe communications circuit (TEL=telephone)
- TEL A MON and TEL B MON - to the interframe communications circuit (TEL=telephone)
- DIRECT ACCESS 1 and DIRECT ACCESS 2 - for direct connection
- ANALOG ACCESS 1 and ANALOG ACCESS 2 - each with S, R, and ear & mouth (E&M) jacks for analog connection (S=send, R=receive)
- Four spare jacks for future applications.

3.7 DIRECTLY CONNECTED TEST UNIT

The directly connected test unit (DCTU) is a test set that is integrated into the 5ESS®-2000 switch to provide basic metallic tests. These tests can be performed by the DCTU without using the portable test equipment. Any analog

line, U-interface digital subscriber line (U-DSL), or 2-wire trunk that terminates metallically to the switch can be tested. Control of the DCTU is via commands entered at the TLWS which identifies the particular line or trunk under test from previous seize line or trunk requests. Measurements requested at the TLWS are taken by the DCTU and transmitted back to the TLWS for display on the terminal.

3.8 SLIM METALLIC TEST CAPABILITY

3.8.1 General

The SLIM metallic test capability feature can be used as an addition to or alternative to both the interactive testing capability provided by the TLWS and the noninteractive testing capability provided by ALIT.

SLIM metallic testing is performed interactively in the operator mode and noninteractively in the routine mode.

3.8.2 SLIM Operator Mode

In the operator mode, SLIM functions much like the DCTU (see Section 3.7) to provide basic metallic tests. Analog lines, U-DSLs, integrated *SLC*[®] Carrier lines, or 2-wire trunks that terminate metallically to the switch can be tested. SLIM is controlled via commands entered at the TLWS from the 5700 series SLIM Metallic Measurements pages as follows:

- **5700:** Task selections for trunk tests (see Figure 3-32)
- **5700,1:** Task selections for line tests (see Figure 3-33)
- **5700,1:** Task selections for coin line tests (see Figure 3-34)
- **5700,2:** Task selections for off-hook tests (see Figure 3-35).

SLIM offers two tests not available with the DCTU. These tests are dial pulse analysis and keytone analysis, both associated with OFFHOOK TEST on Page 5700,2.

3.8.3 SLIM Routine Mode

In the routine mode, SLIM functions like an ALIT (see Section 3.5.2.4) to perform noninteractive (automatic) tests on analog lines only; trunks or ISDN lines are not allowed to be tested.

SLIM uses the SLIM unit and the MMSU-provided metallic connections to lines in the line unit to detect gradual cable deterioration. Routine mode test parameters (lines to test, lines to inhibit from test, time of day to perform tests, etc) are set via the RC/V subsystem.

The status of routine mode test sessions is shown on Page 162, Slim Routine Mode Summary (see Figure 3-9). The 162 page has a four-screen format and can show status for up to 40 different test sessions (for example, sessions 1-10 appear on screen 162,1, sessions 11-20 appear on screen 162,2, etc.)

In addition to showing test session status, the 162 page provides commands to allow, inhibit, or abort test sessions, and to display and print status of test sessions.

Figure 3-9 is an example of the 162,1 page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

162 -SLIM ROUTINE MODE SUMMARY

SELECT TEST SESSION XX

400,XX ALLOW

500,XX INHIBIT

599,XX ABORT

910,XX DISPLAY STATUS

941,XX PRINT STATUS

DISPLAY SCREEN Z

162,Z

SCREEN - 1 OF 4

USAGE: SLIM UNITS ARE AVAILABLE

SUSP											SUSP
DONE											DONE
IP											IP
SCHD											SCHD
DEF											DEF
FLNS											FLNS

Figure 3-9 162,1 - SLIM Routine Mode Summary

Abbreviations:

DEF	Defined	SCHD	Scheduled
FLNS	Failed Lines	SUSP	Suspended
IP	In Progress		

3.9 REMOTE OFFICE TEST LINE

The Remote Office Test Line (ROTL) feature allows interoffice trunk testing automatically from a Centralized Automatic Reporting on Trunks (CAROT) system. The CAROT system is a computerized system that accesses and tests trunks for a maximum of 14 offices simultaneously. The ROTL supports the following capabilities:

- Transmission tests - 100, 102, and 105 test lines
- Connection appraisal - 100, 102, and 105 test lines
- Security callback
- Trunk make-busy and restore
- Trunk status request
- Balance and long-term test.

The 100, 102, and 105 test lines are at the far end of the trunk. Transmission test calls and connection appraisal calls are placed via ROTL toward the distant test lines. The ROTL supports test calls toward the indicated test lines

by providing trunk access and seizure, and outpulsing of the digits necessary to reach the test line. Also, a tone detection capability is provided that recognizes when the indicated test line has answered the test call.

The transmission tests listed previously can also be performed locally by using the **TST:TRK** input message.

The ROTL functions consist of answering calls from the CAROT controller, receiving information in the form of multifrequency (MF) digits, and causing trunks to be accessed and attached to the responder for transmission measurements.

NOTE: ROTL initiated trunk testing is denied on trunks assigned to a 5ESS®-2000 switch for AUTOPLEX® System 1000 traffic.

Refer to 235-105-210, *Routine Operations and Maintenance Procedures*, for details concerning the hardware functions, trunk conditioning, test performed by ROTL, and the ODD requirements.

3.10 PERFORMANCE MONITORING FOR DIGITAL NETWORKING UNIT - SONET

3.10.1 GENERAL

Performance monitoring is the systematic monitoring (or tracking) of a particular entity's health through the continuous collection and analysis of data derived by observing its performance. Performance monitoring detects changes in the quality of service which may indicate impending trouble for the Digital Networking Unit - SONET (DNU-S).

3.10.2 PERFORMANCE PARAMETERS

In order to provide end-to-end performance measurements of a digital path, performance data must be calculated by the network entities that terminate the path. Termination is defined to be where the frame format is generated and transmitted or received and decoded. These monitoring actions are required to capture the performance degradations and provide a basis for network maintenance.

For the DNU-S, performance monitoring refers to the set of functions and capabilities necessary for the DNU-S to collect, store, threshold, and report end-to-end performance parameters associated with the digital signal level 1 (DS1), virtual tributary 1.5 (VT1.5), and SONET terminating equipment (STE). Performance parameters are counts of various error events, or counts of seconds containing such events, accumulated over specified collection periods.

The performance monitoring process in the DNU-S transmission multiplexer (TMUX) collects and updates error counts every second. In the DNU-S common control (CC), performance parameters are normally collected continuously in 15-minute and 1-day (current-day) registers.

Default values for all performance monitoring threshold registers embedded in the DNU-S hardware are read by the software at power up and during initialization and recovery. Most performance monitoring parameters have a corresponding user-settable threshold register. Registers containing performance monitoring parameters can be reset (zeroed) either autonomously by the switch or manually on demand.

3.10.3 THRESHOLD VIOLATIONS

The performance monitoring counts are reported autonomously when any of the error counts has reached or exceeded its threshold. The DNU-S recognizes a 15-minute threshold crossing within one minute of its occurrence and a daily threshold crossing within 15 minutes of its occurrence. When the DNU-S recognizes a threshold crossing for a parameter, a threshold crossing alert (TCA) is sent to the ROP and SCC. The TCA messages identify the particular facility (DS1, VT1.5, or STE) being monitored, the parameter register (specific parameter), the current threshold value, the direction of transmission (near end or far end), the accumulation interval (15 minutes or 1 day), and the current register value.

3.10.4 PERFORMANCE MONITORING COMMANDS

The autonomous performance monitoring can be inhibited/allowed by input message **INH:FAC/ALW:FAC** or through recent change. Performance monitoring counts can be reported on demand by input message **OP:FAC**. The counts can be initialized on any given facility or range of facilities by input command **INIT:FAC**.

For additional information on DNU-S performance monitoring commands, refer to 235-600-700, *Input Messages Manual* and 235-600-750, *Output Messages Manual*. For procedural information, refer to 235-105-210, *Routine Operations and Maintenance Procedures*.

3.11 TLWS TASK SELECTION PAGE DISPLAYS

3.11.1 GENERAL

Table 3-3 lists each TLWS task selection, the TLWS page number, the applicable software release (5E12 and later), and the figure number that shows an example of each page.

Table 3-3 TLWS Task Selection Pages

TASK SELECTION ^a	TLWS PAGE NUMBER	APPLICABLE SOFTWARE RELEASE	FIGURE NUMBER
SEIZE LINE/INCOMING CALL	4000,1	5E12 and later	3-10
SEIZE TRUNK/INCOMING CALL	4001,2	5E12	3-11
	4001,2	5E13 and later	3-12
TRANSMISSION TEST (LINE)	5000,1	5E12 and later	3-13
	5000,2	5E12 and later	3-14
	5000,3	5E12 and later	3-15
TRANSMISSION TEST (TRUNK)	5000,1	5E12 and later	3-16
	5000,2	5E12 and later	3-17
	5000,3	5E12 and later	3-18
SUPERVISION TEST (LINE)	5200	5E12 and later	3-19
SUPERVISION TEST (TRUNK)	5200,1	5E12 and later	3-20
	5200,2	5E12 and later	3-21
	5200,3	5E12 and later	3-22
AUTOMATIC TEST (LINE)	5400,1	5E12 and later	3-23
	5400,2	5E12 and later	3-24
	5400,3	5E12 and later	3-25
	5400,4	5E12 and later	3-26
AUTOMATIC TEST (TRUNK)	5400,1	5E12 and later	3-27
	5400,2	5E12 and later	3-28
METALLIC TEST (COIN)	5600	5E12 and later	3-29
METALLIC TEST (LINE)	5600	5E12 and later	3-30
METALLIC TEST (TRUNK)	5600	5E12 and later	3-31
SLIM METALLIC TEST (TRUNK)	5700	5E12 and later	3-32
SLIM METALLIC TEST (LINE)	5700,1	5E12 and later	3-33
SLIM METALLIC TEST (COIN)	5700,1	5E12 and later	3-34
SLIM METALLIC TEST (OFFHOOK)	5700,2	5E12 and later	3-35
JACKS TEST (LINE)	5800	5E12 and later	3-36
JACKS TEST (TRUNK)	5800	5E12 and later	3-37
TASK SELECTION	8000	5E12 and later	3-38
MISC TLWS COMMANDS	9000,1	5E12 and later	3-39
	9000,2	5E12 and later	3-40
CPE TESTS (ISDN)	9200	5E12 and later	3-41
CPE USPID TESTS (ISDN)	9201	5E12 and later	3-42
Notes: a. When some poke commands are entered from a Task Selection Page, the system might respond with a message indicating that no supporting software exists. In other words, the poke command appears on the screen, but it is not supported in that particular software release.			

3.11.2 TLWS TASK SELECTION PAGES

3.11.2.1 Overview

This section contains the TLWS task selection pages. Abbreviations appearing on each TLWS page are defined. All commands shown on these task selection pages are listed and described in Section 3.11.3 .

3.11.2.2 Task Selection Page 4000,1 (Line)

See Figure 3-10 .

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD<				161 - TEST POSITION			
4000,1 (of 2) - SEIZE LINE/INCOMING CALL							
4001,X[,Z]	DN	X=DN					
4002,X	LEN	X=SM, LU, GR, HG, SW, LV					
4003,X	SLEN	X=SM, DCLU, RT, LINE					
4004,X[,Z]	MLHG	X=GRP, MEM					
4005,X[,Z]	LCEN	X=SM, ISLU, LNGRP, LTN					
4006,X	AP	X=AP, RL					
4007,X	LTSB/MLHG	DN X=DN, MEM					
4008,X[,Z]	ILEN	X=SM, IDCU, RT/DS1, LT/DS0					
4009,X[,Z]	LCKEN	X=SM, ISLU, LNGRP, LBD, LCKT					
4010,X[,Z]	AIUEN	X=SM, AIU, PACK, CKT					
4011,X	INEN	X=SM, DNUS, DS1, DS0					
4200	INCOMING CALL						
4800	RESEIZE SAME LINE						
4999	RELEASE LINE		Z=CPE|USPID				
4000,2	SEIZE TRUNK/INCOMING CALL						
8000	TASK SELECTION						

Figure 3-10 Task Selection Page 4000,1 Line (5E12 and Later)

Abbreviations:

AIU	Access Interface Unit	LCKT	Line Circuit
AIUEN	Access Interface Unit Equipment Number	LEN	Line Equipment Number
AP	Application Processor	LNGRP	Line Group Number
BD	Board	LTN	Line Termination Number
CKT	Line Circuit	LT	Line/Trunk
CPE	Customer Premises Equipment	LTSB	Line Time Slot Bridging
DCLU	Digital Carrier Line Unit	LU	Line Unit
DN	Directory Number	LV	Level
DNUS	Digital Networking Unit - SONET	INEN	IDLC Network Equipment Number
DS0	Digital Signal Level 0	MEM	Member
DS1	Digital Signal Level 1	MLHG	Multiline Hunt Group
GR	Grid	PACK	Line Pack
GRP	Group	RL	Relative Link
IDCU	Integrated Digital Carrier Unit	RT	Remote Terminal
ILEN	IDCU Line Equipment Number	SLEN	Subscriber Loop Carrier
ISLU	Integrated Services Line Unit	SM	Switching Module
LBD	Line Board	SW	Switch
LCEN	Line Card Equipment Number	TRK	Trunk
LCKEN	Line Circuit Equipment Number	USPID	User Service Profile Identifier

3.11.2.3 Task Selection Page 4000,2 (Trunk)

See Figures 3-11 and 3-12 .

SYS EMER CRITICAL MAJOR MINOR BLDG/PWR BLDG INH CKT LIM SYS NORM OVERLOAD SYS INH AM AM PERPH OS LINKS SM CM MISC	161 - TEST POSITION	
4000, 2 (of 2) - SEIZE TRUNK/INCOMING CALL		
4008, X ILEN X=SM, IDCU, RT/DS1, LT/DS0		
4101, X TG X=GROUP		
4102, X TKGMN X=GROUP, MEMEBER		
4103, X TEN X=SM, TU, SG, BD, CKT		
4104, X DEN X=SM, DLTU, DFI, CH		
4105 NEXT MEMBER OF TRUNK GROUP		
4106, X RAF TRUNK X=SM, RAF, MEM		
4107, X NEN X=SM, DNUS, DG, STS, VT, DS0		
4110, X INEN X=SM, DNUS, RT, LT		
4200 INCOMING CALL		
4800 RESEIZE SAME TRUNK		
4000, 1 SEIZE LINE/INCOMING CALL		
8000 TASK SELECTION		

Figure 3-11 Task Selection Page 4000,2 Trunk [5E12]

Abbreviations:			
BD	Board	MEM	Member
CH	Channel	NEN	Networking Equipment Number
CKT	Circuit	RAF	Recorded Announcement Function
DEN	Digital Equipment Number	RT	Remote Terminal
DFI	Digital Facility Interface	SAS	Service Announcement System
DG	Data Group	SG	Service Group
DLTU	Digital Line and Trunk Unit	SM	Switching Module
DNUS	Digital Networking Unit - SONET	STS	Synchronous Transport System
DS0	Digital Signal Level 0	TEN	Trunk Equipment Number
DS1	Digital Signal Level 1	TG	Trunk Group
IDCU	Integrated Digital Carrier Unit	TKGMN	Trunk Group Member Number
ILEN	IDCU Line Equipment Number	TU	Trunk Unit
INEN	IDLC Network Equipment Number	VT	Virtual Tributary 1.5
LT	Line/Trunk		

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD<				161 - TEST POSITION			
4000,2 (of2) - SEIZE TRUNK/INCOMING CALL							
4008,X ILEN X=SM,IDCU,RT/DS1,LT/DS0							
4101,X TG X=GROUP							
4102,X TKGMN X=GROUP, MEMBER							
4103,X TEN X=SM,TU,SG,BD,CKT							
4104,X DEN X=SM,DLTU,DFI,CH							
4105 NEXT MEMBER OF TRUNK GROUP							
4106,X RAF TRUNK X=SM,RAF,MEM							
4107,X SAS TRUNK X=SM,SAS,MEM							
4108,X NEN X=SM,DNUS,DG,STE,STS,VG,VM,DS0							
4109,X PSNEN X=SM,PSU,SHELF,CHGRP,MEM							
4110,X INEN X=SM,DNUS,RT,RTLINE							
4200 INCOMING CALL							
4800 RESEIZE SAME TRUNK							
4999 RELEASE TRUNK							
4000,1 SEIZE LINE/INCOMING CALL							
8000 TASK SELECTION							

Figure 3-12 Task Selection Page 4000,2 Trunk [5E13 and later]

Abbreviations:			
BD	Board	NEN	DNU-S Networking Equipment Number
CH	Channel	RAF	Recorded Announcement Function
CKT	Circuit	RT	Remote Terminal
DEN	Digital Equipment Number	SAS	Service Announcement System
DFI	Digital Facility Interface	SG	Service Group
DG	Data Group	SM	Switching Module
DLTU	Digital Line and Trunk Unit	STE	Signaling Terminal Equipment (X'75) or
DNUS	Digital Networking Unit - SONET	STE	SONET Termination Equipment
DS0	Digital Signal Level 0	STS	Synchronous Transport Signal
DS1	Digital Signal Level 1	TEN	Trunk Equipment Number
IDCU	Integrated Digital Carrier Unit	TG	Trunk Group
ILEN	IDCU Line Equipment Number	TKGMN	Trunk Group Member Number
INEN	IDLC Network Equipment Number	TU	Trunk Unit
LT	Line/Trunk	VG	Virtual Tributary Group
MEM	Member	VM	Virtual Tributary member

3.11.2.4 Task Selection Page 5000,1 (Line)

See Figure 3-13 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

5000,1 (of 3) - TRANSMISSION

— SEND TONE REQUESTS — (X=Hz, Y=dBm)

4501,X,Y STORE FREQ (Hz) AND LEVEL (-dBm)

4502,X,Y STORE FREQ (Hz) AND LEVEL (+dBm)

5001 SEND STORED FREQ and LEVEL

5002,X,Y SEND FREQ (Hz) AND LEVEL (-dBm)

5003,X,Y SEND FREQ (Hz) AND LEVEL (+dBm)

5004 SEND 404 Hz 0 dBm 5201 SEND ROH

5005 SEND 1004 Hz 0 dBm 5202 RING LINE

5006 SEND 2804 Hz 0 dBm

4300 DROP T&M 4301 ADD T&M

5990 RELEASE TEST PATH 5999 STOP TEST

5000,P TRANSMISSION SCREEN (P = SCREEN #)

8000 TASK SELECTION

Figure 3-13 Task Selection Page 5000,1 Line [5E12 and Later)

Abbreviations:

dBm Decibels Above or Below 1 Milliwatt

FREQ Frequency

Hz Hertz (Unit of Frequency)

ROH Receiver Off Hook

T&M Talk and Monitor

3.11.2.5 Task Selection Page 5000,2 (Line)

See Figure 3-14 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

5000,2 (of 3) - TRANSMISSION

- MEASURE TONE REQUESTS - (ST=SEND TONE)

5100	MEASURE	5104 MEAS ERL
5101[,ST]	MEASURE BB	5105 MEAS SRL
5102[,ST]	MEASURE NOISE	5106 MEAS SRLHI
5103[,ST]	MEASURE NWT	

4300 DROP T&M	4302 T&M--TALK MODE
4301 ADD T&M	4303 T&M--MNTR MODE

5990 RELEASE TEST PATH 5999 STOP TEST

5000,P TRANSMISSION SCREEN (P = SCREEN #)

8000 TASK SELECTION

Figure 3-14 Task Selection Page 5000,2 Line [5E12 and Later]

Abbreviations:

BB Broadband
 ERL Echo-Return Loss
 MEAS Measurements
 MNTR Monitor

NWT Noise with Tone
 SRL Singing Return Loss
 SRLHI Singing Return Loss, High
 T&M Talk and Monitor

3.11.2.6 Task Selection Page 5000,3 (Line)

See Figure 3-15 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
				161 - TEST POSITION			
5000,3 (of 3) - TRANSMISSION							
5031 DIGITAL TEST (DEFAULTS)							
(LT [T] or NT1 [U], 56000, ALL)							
5032,W,X,Y[,ps][,ucl]							
DSL LOOPBACK TEST							
5034 DIGITAL TEST (STORED W,X,Y,Z)							
5035,Z DISPLAY PHEN/ISTF EQ ID							
W = TERM (PH, LT, EXT, NT1, CU1 - CU6)							
X = BLKSZ (1-64000)							
Y = CHAN (D, B1, B2, ALL)							
Z = TESTEQ (D, B1, B2)							
5990 RELEASE TEST PATH 5999 STOP TEST							
5000,P TRANSMISSION SCREEN (P = SCREEN #)							
8000 TASK SELECTION							

Figure 3-15 Task Selection Page 5000,3 Line [5E12 and Later]

Abbreviations:

BLKSZ	Block Size	PH	Protocol Handler
CHAN	Channel	PHEN	Packet Handler Equipment
CU1	Channel Unit 1		Number
CU6	Channel Unit 6	ps	Packet Switch
DSL	Digital Subscriber Line	T	T-DSL Default (LC)
EQ	Equipment	TERM	Termination
EXT	External	TESTEQ	Test Equipment
ID	Identification	TRANS	Transmission
ISTF	Integrated Services Test Function	U	U-DSL Default (NT1)
LT	Line/Trunk	ucl	Unconditional
NT1	Network Termination 1		

3.11.2.7 Task Selection Page 5000,1 (Trunk)

See Figure 3-16 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

5000,1 (of 3) - TRANSMISSION

— SEND TONE REQUESTS — (X=Hz, Y=dBm)

4501,X,Y STORE FREQ (Hz) AND LEVEL (-dBm)

4502,X,Y STORE FREQ (Hz) AND LEVEL (+dBm)

5001 SEND STORED FREQ and LEVEL

5002,X,Y SEND FREQ (Hz) AND LEVEL (-dBm)

5003,X,Y SEND FREQ (Hz) AND LEVEL (+dBm)

5004 SEND 404 Hz 0 dBm 5007 SEND OPEN

5005 SEND 1004 Hz 0 dBm 5008 SEND QUIET

5006 SEND 2804 Hz 0 dBm 5203 TRUNK ONHK

5204 TRUNK OFFHK

5990 RELEASE TEST PATH 5999 STOP TEST

5000,P TRANSMISSION SCREEN (P = SCREEN #)

8000 TASK SELECTION

Figure 3-16 Task Selection Page 5000,1 Trunk [5E12 and Later]

Abbreviations:

FREQ	Frequency
dBm	Decibels Above or Below 1 Milliwatt
Hz	Hertz (Unit of Frequency)
OFFHK	Off Hook
ONHK	On Hook

3.11.2.8 Task Selection Page 5000,2 (Trunk)

See Figure 3-17 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
				161 - TEST POSITION			
5000,2 (of 3) - TRANSMISSION							
- MEASURE TONE REQUESTS - (ST=SEND TONE)							
5100	MEASURE	5104	MEAS ERL				
5101[,ST]	MEASURE BB	5105	MEAS SRL				
5102[,ST]	MEASURE NOISE	5106	MEAS SRLHI				
5103[,ST]	MEASURE NWT						
5203	TRUNK ONHK	5204	TRUNK OFFHK				
4300	DROP T&M	4301	ADD T&M				
4401,Z[,FRCD] SET/OUTPULSE (Z=DIGITS)							
5990 RELEASE TEST PATH 5999 STOP TEST							
5000,P TRANSMISSION SCREEN (P = SCREEN #)							
8000 TASK SELECTION							

Figure 3-17 Task Selection Page 5000,2 Trunk [5E12 and Later]

Abbreviations:			
BB	Broadband	OFFHK	Off Hook
ERL	Echo-Return Loss	ONHK	On Hook
FRCD	Forced (Outpulsing)	SRL	Singing Return Loss
MEAS	Measurements	SRLHI	Singing Return Loss, High
NWT	Noise with Tone	T&M	Talk and Monitor

3.11.2.9 Task Selection Page 5000,3 (Trunk)

See Figure 3-18 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

5000,3 (of 3) - TRANSMISSION

5031 DIGITAL TRK TEST (DEFAULTS)
 (TERM=LBK or LBKOCU[PKT], BLKSZ=56000)
 5033,X,Y DIG TRK LOOPBACK TEST
 5034 DIGITAL TRK TEST (STORED X,Y)

X = TERM (LBK, LBKINV, LBKOCU, LBKCSU
 MANSRCE or MANSINK)
 Y = BLKSZ (1-64000)

5990 RELEASE TEST PATH 5999 STOP TEST

5000,P TRANSMISSION SCREEN (P = SCREEN #)
 8000 TASK SELECTION

Figure 3-18 Task Selection Page 5000,3 Trunk (5E12 and Later)

Abbreviations:

BLKSZ	Block Size	LBKSHT	Loopback to Speech Handler
DIG	Digital	MANSINK	Manual Loopback Sink
LBK	Loopback	MANSRCE	Manual Loopback Source
LBKCSU	Loopback to Channel Service Unit	PKT	Packet
LBKINV	Loopback Inverted	TERM	Termination
LBKOCU	Loopback to Office Channel Unit	TRANS	Transmission
		TRK	Trunk

3.11.2.10 Task Selection Page 5200 (Line)

See Figure 3-19 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
				161 - TEST POSITION			
5200 - SUPERVISION							
5201 SEND ROH							
5202 RING LINE							
5209 SEND PPTONE							
5212 U-DSL LT/NT1 MISMATCH							
4300 DROP T&M PHONE							
4301 ADD T&M PHONE							
4302 T&M--TALK MODE							
4303 T&M--MNTR MODE							
4999 RELEASE LINE							
5999 STOP TEST							
8000 TASK SELECTION							

Figure 3-19 Task Selection Page 5200 Line [5E12 and Later]

Abbreviations:

LT	Line Termination
MNTR	Monitor
NT1	Network Termination 1
PPTONE	Preemption Tone
ROH	Receiver Off Hook
T&M	Talk and Monitor
U-DSL	U-interface Digital Subscriber Line

3.11.2.11 Task Selection Page 5200,1 (Trunk)

See Figure 3-20 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
				161 - TEST POSITION			
5200,1 (of 3) - SUPERVISION							
5203 TRUNK ON HOOK	5204 TRUNK OFF HOOK						
5205 WINK TEST	5206 QUICK WINK TEST						
5501 TURN ON EC	5502 TURN OFF EC						
4400 CLR OPD	4300 DROP T&M PHONE						
4401,X[,FRCD] SET/ OUTPULSE OPD	4301 ADD T&M PHONE						
	4302 T&M--TALK MODE						
	4303 T&M--MNTR MODE						
5227 SHT LOOPBACK							
5228 SHT UNLOOPBACK							
4999 RELEASE TRUNK							
5200,P SUPERVISION SCREEN (P = SCREEN #)							
8000 TASK SELECTION							

Figure 3-20 Task Selection Page 5200,1 Trunk (5E12 and Later)

Abbreviations:

CLR	Clear
EC	Echo Canceler
FRCD	Forced (Outpulsing)
MNTR	Monitor
OPD	Outpulse Digits
SHT	Speech Handler Trunk
T&M	Talk and Monitor

3.11.2.12 Task Selection Page 5200,2 (Trunk)

See Figure 3-21 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

5200,2 (of 3) - SUPERVISION

5221 RINGBACK TONE		
5222 OPERATOR ATTACHED		
5223 OPERATOR RELEASED		
5224 COIN COLLECT		
5225 COIN RETURN		
5226 COIN COLLECT AND OPERATOR RELEASED		

4999 RELEASE TRUNK

5200,P SUPERVISION SCREEN (P = SCREEN #)

8000 TASK SELECTION

Figure 3-21 Task Selection Page 5200,2 Trunk [5E12 and Later]

3.11.2.13 Task Selection Page 5200,3 (Trunk)

See Figure 3-22 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

5200,3 (of 3) - SUPERVISION

5207,V PLAY PHRASE
 5208,W,X,Y,Z PLAY ANNOUNCEMENT
 5210,W,X,Y,Z DTA TEST
 V=PHRASE NUMBER (0=ALL PHRASES)
 X=HDR ID, Y=TRLR ID, Z=INFL
 W=2LVL, OSPSDA, OSPSTA, RAS, ACSR,
 PVN, LASS, L2-L7

4300 DROP T&M PHONE 4302 T&M--TALK MODE
 4301 ADD T&M PHONE 4303 T&M--MNTR MODE
 4999 RELEASE TRUNK
 5999 STOP TEST

5200,P SUPERVISION SCREEN (P = SCREEN #)
 8000 TASK SELECTION

Figure 3-22 Task Selection Page 5200,3 Trunk [5E12 and Later]

Abbreviations:			
ACSR	Automatic Customer Station Rearrangement	MNTR	Monitor
DTA	Dial-Through Announcement	OSPS	Operator Services Position System
HDR	Header	OSPSDA	OSPS Directory Assistance
ID	Identification	OSPSTA	OSPS Toll and Assistance
INFL	Inflection	PVN	Private Virtual Network
L2-L7	Non-English Language 2-7 for OSPS	RAS	Remote Access Service
LASS	Local Area Signaling Service	T&M	Talk and Monitor
LVL	Level	TRLR	Trailer

3.11.2.14 Task Selection Page 5400,1 (Line)

See Figure 3-23 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
				161 - TEST POSITION			
5400,1 (of 4) - AUTOMATIC							
2000 RMV LINE		3000[,UCL] RST LINE					
5401 EXECUTE LIT (LINE INSULATION TEST)							
5404 EXECUTE ALE (AUTO. LINE EVALUATION)							
default (LEVEL1, LEVEL2 and PER, REPT)							
5408 DGN CIRCUIT							
5415 UCT							
4999 RELEASE LINE							
5400,P AUTOMATIC SCREEN (P = SCREEN #)							
8000 TASK SELECTION							

Figure 3-23 Task Selection Page 5400,1 Line (5E12 and Later)

Abbreviations:

DGN	Diagnose
INT	Internal
ISLULC	Integrated Services Line Unit Line Card
PER	Protocol Error Records
REPT	Report
RMV	Remove
RST	Restore
UCL	Unconditional
UCT	Utility Call Trace

3.11.2.15 Task Selection Page 5400,2 (Line)

See Figure 3-24 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
161 - TEST POSITION							
5400,2 (of 4) - AUTOMATIC							
2000 RMV LINE 3000[,UCL] RST LINE 5402 TST DSL Defaults (NT1[U] / LT[T], 20, 56000, ALL, 6) 5403,V,W,X,Y,Z[,ps][,ucl] TST DSL V = TERM (PH, LT, NT1, CU1-CU6, EXT) W = DUR (SECS 1-3600) X = BLKSZ (1-64000) Y = CHAN (D, B1, B2, ALL) Z = ABER (0 - 9) 4999 RELEASE LINE							
5400,P AUTOMATIC SCREEN (P = SCREEN #) 8000 TASK SELECTION							

Figure 3-24 Task Selection Page 5400,2 Line [5E12 and Later]

Abbreviations:

ABER	Acceptable Bit Error Rate	ps	Packet Switch
BLKSZ	Block Size	RMV	Remove
CHAN	Channel	RST	Restore
CU1	Channel Unit 1	SECS	Seconds
CU6	Channel Unit 6	T	T-DSL Default (LC)
DSL	Digital Subscriber Line	TERM	Termination
DUR	Duration	TST	Test
EXT	External	U	U-DSL Default (NT1)
LT	Line Termination	ucl	Unconditional
NT1	Network Termination 1	UCL	Unconditional
PH	Protocol Handler		

3.11.2.16 Task Selection Page 5400,3 (Line)

See Figure 3-25 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

5400,3 (of 4) - AUTOMATIC

5410 SECTIONALIZATION TEST Defaults
 (NT1[U]/LT[T], 20, 56000, ALL, SECT, 6)
 5411,S,T,W,X,Y,Z[,v][,ucl] SECT/SEQ TEST
 S = TERM (NT1, CU6 - CU1, LT, PH)
 T = DUR (SECS 1 - 3600)
 W = BLKSZ (1 - 64000)
 X = CHAN (D, B1, B2, ALL)
 Y = MODE (SECT, SEQ)
 Z = ABER (0 - 9)

5414 TST DSL TEST=MSMTCH

5400,P AUTOMATIC SCREEN (P = SCREEN #)
 8000 TASK SELECTION

Figure 3-25 Task Selection Page 5400,3 Line [5E12 and Later]

Abbreviations:			
ABER	Acceptable Bit Error Rate	PH	Protocol Handler
BLKSZ	Block Size	SECS	Seconds
CHAN	Channel	SECT	Sectionalization
CU1	Channel Unit 1	SEQ	Sequential
CU6	Channel Unit 6	T	T-DSL Default (LC)
DSL	Digital Subscriber Line	TST	Test
DUR	Duration	TERM	Termination
LT	Line Termination	U	U-DSL Default (NT1)
MSMTCH	Mismatch	ucl	Unconditional
NT1	Network Termination 1	v	Verbose

3.11.2.17 Task Selection Page 5400,4 (Line)

See Figure 3-26 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

5400,4 (of 4) - AUTOMATIC

5404 EXC ALE (AUTO. LINE EVALUATION)
 default (LEVEL1, LEVEL2 and PER, REPT)

5412,X,Y[,Z] EXC ALE
 X = LEVEL1, LEVEL2, PER, ALL
 Y = REPT, RESET, SRESET
 Z = CURR, PREV, HOUR, INT, DAY
 HIST, LCCU, CU, CU1 - CU6, ALL

5413,X,Y[,ucl] TST DSL
 X = TEST (CRC, CRC-UP, CRC-DWN)
 Y = DUR (SECS 0 - 3600)

5400[,X] AUTOMATIC SCREEN (P = SCREEN #)
 8000 TASK SELECTION

Figure 3-26 Task Selection Page 5400,4 Line [5E12 and Later]

Abbreviations:			
AUTO	Automatic	HIST	History
CRC	Cyclic Redundancy Check	INT	Interval
CRC-DWN	CRC Downstream	LCCU	Hour and Interval Counts on All BRITE Calls
CRC-UP	CRC Upstream	PER	Protocol Error Records
CU	Channel Unit	PREV	Previous
CU1	Channel Unit 1	REPT	Report
CU6	Channel Unit 6	SECS	Seconds
CURR	Current	SRESET	Silently Reset
DSL	Digital Subscriber Line	TST	Test
DUR	Duration	ucl	Unconditional
EXC	Execute		

3.11.2.18 Task Selection Page 5400,1 (Trunk)

See Figure 3-27 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
				161 - TEST POSITION			
5400,1 (of 2) - AUTOMATIC							
2000 RMV TRUNK							
3000[,UCL] RST TRUNK							
5405 TEST TRUNK Default TYPE and OPD							
5406,X TEST TRUNK Default OPD							
X = TYPE (100, 102, 102LB, 103, 104, 105, 106, PERM, SYNC, NSYNC, or CONT)							
5407,X,Y TEST TRUNK							
X = TYPE Y = OUTPUTSE DIGITS							
5408 DGN TEN							
5415 UCT							
4999 RELEASE TRUNK							
5400,P AUTOMATIC SCREEN (P = SCREEN #)							
8000 TASK SELECTION							

Figure 3-27 Task Selection Page 5400,1 Trunk [5E12 and Later]

Abbreviations:

CONT	Continuity	RMV	Remove
DGN	Diagnose	RST	Restore
INT	Internal	SYNC	Synchronous
LB	Loopback	TEN	Trunk Equipment Number
NSYNC	Non-Synchronous	UCL	Unconditional
OPD	Outputse Digits	UCT	Utility Call Trace
PERM	Permanent		

3.11.2.19 Task Selection Page 5400,2 (Trunk)

See Figure 3-28 .

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC

161 - TEST POSITION

5400,2 (of 2) - AUTOMATIC

2000 RMV TRUNK 3000[UCL] RST TRUNK

5405 TST TRK Defaults
(TYPE, OPD, DUR and BLKSZ)

5409,W,X,Y,Z (digital lpbk test)

W = TYPE (LBK, LBKINV, LBKOCU, SXS)
LBKCSU, LBKSHT, CTX2, CTX3,)

X = OPD (OUTPUT PULSE DIGITS)

Y = DUR (SECS 1-3600)

Z = BLKSZ (1 - 64000)

4999 RELEASE TRUNK

5400,P AUTOMATIC SCREEN (P = SCREEN #)

8000 TASK SELECTION

Figure 3-28 Task Selection Page 5400,2 Trunk (5E12 and Later)

Abbreviations:			
BLKSZ	Block Size	MANSRCE	Manual Loopback Source
CTX2	Phase II Centrex	OPD	Output Pulse Digits
CTX3	Phase III Centrex	RMV	Remove
DUR	Duration	RST	Restore
LBK	Loopback	SECS	Seconds
LBKCSU	Loopback to Channel Service Unit	SXS	Step-by-Step
LBKINV	Loopback Inverted	TRK	Trunk
LBKOCU	Loopback to Office Channel Unit	TST	Test
LBKSHT	Loopback to Speech Handler	UCL	Unconditional
lpbk	Loopback		

3.11.2.20 Task Selection Page 5600 (Coin)

See Figure 3-29 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
				161 - TEST POSITION			
5600 - METALLIC MEASUREMENTS							
5601 VOLTAGE, RESISTANCE, and CAPACITANCE							
5602 VOLTAGE 5201 SEND ROH							
5603 RESISTANCE 5202 RING LINE							
5604 CAPACITANCE 5999 STOP TEST							
5605 DISTANCE TO OPEN							
5606 RINGER COUNT 4300 DROP T&M PHONE							
5607 HOME TOTALIZER 4301 ADD T&M PHONE							
5608 DETECT COIN 4302 T&M--TALK MODE							
5609 COLLECT COIN 4304 T&M--ON HOLD							
5610 RETURN COIN							
5611 MONITOR FOR A SHORT							
5612 ADD PGTC							
4999 RELEASE LINE							
5990 RELEASE TEST PATH							
8000 TASK SELECTION							

Figure 3-29 Task Selection Page 5600 Coin [5E12 and Later]

Abbreviations:

PGTC	Pair Gain Test Controller
ROH	Receiver Off Hook
T&M	Talk and Monitor

3.11.2.21 Task Selection Page 5600 (Line)

See Figure 3-30 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
161 - TEST POSITION							
5600 - METALLIC MEASUREMENTS							
5601 VOLTAGE,	5602 VOLTAGE						
RESISTANCE,	5603 RESISTANCE						
and CAPACITANCE	5604 CAPACITANCE						
5605 DISTANCE TO OPEN	4300 DROP T&M PHONE						
5606 RINGER COUNT	4301 ADD T&M PHONE						
5611 MNTR FOR A SHORT	4302 T&M--TALK MODE						
5612 ADD PGTC	4304 T&M--ON HOLD						
5201 SEND ROH	5202 RING LINE						
4999 RELEASE LINE							
5990 RELEASE TEST PATH							
5999 STOP TEST							
8000 TASK SELECTION							

Figure 3-30 Task Selection Page 5600 Line [5E12 and Later]

Abbreviations:

MEAS	Measurements
MNTR	Monitor
PGTC	Pair Gain Test Controller
ROH	Receiver Off Hook
T&M	Talk and Monitor

3.11.2.22 Task Selection Page 5600 (Trunk)

See Figure 3-31 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

5600 - METALLIC MEASUREMENTS

5601 VOLTAGE, RESISTANCE, and CAPACITANCE	5602 VOLTAGE 5603 RESISTANCE 5604 CAPACITANCE		

5203 TRUNK ON HOOK	4300 DROP T&M PHONE
5204 TRUNK OFF HOOK	4301 ADD T&M PHONE
	4302 T&M--TALK MODE
5999 STOP TEST	4303 T&M--MNTR MODE
4999 RLS TRUNK	4304 T&M--ON HOLD
5990 RELEASE TEST PATH	

8000 TASK SELECTION

Figure 3-31 Task Selection Page 5600 Trunk [5E12 and Later]

Abbreviations:

MNTR	Monitor
RLS	Release
T&M	Talk and Monitor

3.11.2.23 Task Selection Page 5700 (Trunk)

See Figure 3-32 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

5700 - SLIM METALLIC MEASUREMENTS

5701 VOLTAGE, RESISTANCE, and CAPACITANCE

5702 VOLTAGE

5703 RESISTANCE

5704 CAPACITANCE

5203 TRUNK ON HOOK 4300 DROP T&M PHONE

4204 TRUNK OFF HOOK 4301 ADD T&M PHONE

4302 T&M--TALK MODE

4999 RLS TRUNK 4304 T&M--ON HOLD

5990 RELEASE TEST PATH

5999 STOP TEST

8000 TASK SELECTION

Figure 3-32 Task Selection Page 5700 Trunk (5E12 and Later)

Abbreviations:

ROH Receiver Off Hook
T&M Talk and Monitor

3.11.2.24 Task Selection Page 5700,1 (Line)

See Figure 3-33 .

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC

161 - TEST POSITION

5700,1 (of 2) - SLIM METALLIC MEASUREMENTS

5701 VOLTAGE, RESISTANCE, and CAPACITANCE

5702 VOLTAGE 5201 SEND ROH

5703 RESISTANCE 5202 RING LINE

5704 CAPACITANCE 5999 STOP TEST

5705 DISTANCE TO OPEN

4300 DROP T&M PHONE

4301 ADD T&M PHONE

4302 T&M--TALK MODE

4304 T&M--ON HOLD

5711 MONITOR FOR A SHORT

4999 RELEASE LINE

5990 RELEASE TEST PATH

8000 TASK SELECTION

Figure 3-33 Task Selection Page 5700,1 Line (5E12 and Later)

Abbreviations:

ROH Receiver Off Hook
T&M Talk and Monitor

3.11.2.25 Task Selection Page 5700,1 (Coin)

See Figure 3-34 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
161 - TEST POSITION							
5700,1 (of 2) - SLIM METALLIC MEASUREMENTS							
5701 VOLTAGE, RESISTANCE, and CAPACITANCE							
5702 VOLTAGE 5201 SEND ROH							
5703 RESISTANCE 5202 RING LINE							
5704 CAPACITANCE 5999 STOP TEST							
5705 DISTANCE TO OPEN							
4300 DROP T&M PHONE							
5707 HOME TOTALIZER 4301 ADD T&M PHONE							
5708 DETECT COIN 4302 T&M--TALK MODE							
5709 COLLECT COIN 4304 T&M--ON HOLD							
5710 RETURN COIN							
5711 MONITOR FOR A SHORT							
4999 RELEASE LINE							
5990 RELEASE TEST PATH							
8000 TASK SELECTION							

Figure 3-34 Task Selection Page 5700,1 Coin (5E12 and Later)

Abbreviations:

ROH Receiver Off Hook
T&M Talk and Monitor

3.11.2.26 Task Selection Page 5700,2 (SLIM Off-hook Tests)

See Figure 3-35 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
161 - TEST POSITION							
<u>5700,2 (of 2) - SLIM METALLIC MEASUREMENTS</u>							
5712 DIALPULSE OFFHOOK	5201 SEND ROH						
5713 FLASH OFFHOOK	5202 RING LINE						
5714 KEYTONE OFFHOOK	5999 STOP TEST						
5715 LOOPRES OFFHOOK							
5716 RING OFFHOOK	4300 DROP T&M PHONE						
	4301 ADD T&M PHONE						
	4302 T&M--TALK MODE						
	4304 T&M--ON HOLD						
4999 RELEASE LINE							
5990 RELEASE TEST PATH							
8000 TASK SELECTION							

Figure 3-35 Task Selection Page 5700,2 SLIM Off-hook Tests (5E12 and Later)

Abbreviations:

DIALPULSE	Dial Pulse Test
FLASH	Flash Timing Test
KEYTONE	Touch Tone Keytone Test
LOOPRES	Loop Resistance Test
RING	Ring Line
ROH	Receiver Off Hook
T&M	Talk and Monitor

3.11.2.27 Task Selection Page 5800 (Line)

See Figure 3-36 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
				161 - TEST POSITION			
5800 - JACKS							
5801 AC1 JACK		5803 DC1 JACK					
5802 AC2 JACK		5804 DC2 JACK					
-----AC ONLY-----							
5201 SEND ROH		4300 DROP T&M PHONE					
5202 RING LINE		4301 ADD T&M PHONE					
5999 STOP TEST		4302 T&M--TALK MODE					
		4303 T&M--MNTR MODE					

4999 RELEASE LINE							
5990 RELEASE TEST PATH							
8000 TASK SELECTION							

Figure 3-36 Task Selection Page 5800 Line [5E12 and Later]

Abbreviations:

AC	Alternating Current
DC	Direct Current
MNTR	Monitor
ROH	Receiver Off Hook
T&M	Talk and Monitor

3.11.2.28 Task Selection Page 5800 (Trunk)

See Figure 3-37 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
161 - TEST POSITION							
5800 - JACKS							
5801 AC1 JACK	5803 DC1 JACK						
5802 AC2 JACK	5804 DC2 JACK						
-----AC ONLY-----							
4401,X[,FRCD] SET/	4300 DROP T&M PHONE						
OUTPULSE DIGITS	4301 ADD T&M PHONE						
5203 TRUNK ON HOOK	4302 T&M--TALK MODE						
5204 TRUNK OFF HOOK	4303 T&M--MNTR MODE						

4999 RELEASE TRUNK							
5990 RELEASE TEST PATH							
8000 TASK SELECTION							

Figure 3-37 Task Selection Page 5800 Trunk [5E12 and Later)

Abbreviations:

AC	Alternating Current
DC	Direct Current
FRCD	Forced (Outpulsing)
MNTR	Monitor
T&M	Talk and Monitor

3.11.2.29 Task Selection Page 8000 (Task Selection)

See Figure 3-38 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
				161 - TEST POSITION			
8000 - TASK SELECTION							
4000,1 SEIZE LINE/INCOMING CALL							
4000,2 SEIZE TRUNK/INCOMING CALL							
5000[,P] TRANSMISSION							
5200[,P] SUPERVISION							
5400[,P] AUTOMATIC							
5600 DCTU METALLIC							
5700[,P] SLIM METALLIC							
5800 JACKS							
8000 TASK SELECTION (THIS PAGE)							
9000[,P] MISCELLANEOUS TLWS COMMANDS							
P = SCREEN NUMBER							

Figure 3-38 Task Selection Page 8000 (Task Selection) (5E12 and Later)

Abbreviation:

TLWS Trunk and Line Work Station

3.11.2.30 Task Selection Page 9000,1 (Miscellaneous TLWS Commands)

See Figure 3-39 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

9000,1 - MISCELLANEOUS TLWS COMMANDS
(X=FREQ, Y=LEVEL, Z=DIGITS)

2000 RMV LN/TRK 3000[,UCL] RST LN/TRK

4400 CLR OPD 4401,Z[,FRCD] SET/OPL

4500 CLR FREQ/LEVEL

4501,X,Y SET FREQ (H-) AND LEVEL (-dBm)

4502,X,Y SET FREQ (H-) AND LEVEL (+dBm)

9500[,LOG] PRINT RESULTS

9600[,ROP] PRINT TP STATUS

9601[,ROP] PRINT ALL TP STATUS

9200 CPE TESTS 9201 USPID TESTS

9700 OP CPE

4999 RELEASE LINE/TRUNK

5990 RELEASE TEST PATH 5999 STOP TEST

9000,2 MISCELLANEOUS TLWS COMMANDS

8000 TASK SELECTION

Figure 3-39 Task Selection Page 9000,1 Miscellaneous [5E12 and Later]

Abbreviations:			
CLR	Clear	OPD	Output Digits
CPE	Customer Premises Equipment	OPL	Output
dBm	Decibels Above or Below	RMV	Remove
	1 Milliwatt	RST	Restore
FRCD	Forced (Outpulsing)	TLWS	Trunk and Line Work Station
FREQ	Frequency	TP	Test Position
Hz	Hertz (Unit of Frequency)	UCL	Unconditional
LN/TRK	Line/Trunk	USPID	User Service Profile
OP	Output		Identifier

3.11.2.31 Task Selection Page 9000,2 (Miscellaneous TLWS Commands)

See Figure 3-40 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

161 - TEST POSITION

9000,2 - MISCELLANEOUS TLWS COMMANDS

4300 DROP T&M PHONE	4302 T&M--TALK MODE
4301 ADD T&M PHONE	4303 T&M--MNTR MODE
4600 MNTR BUSY	4304 T&M--ON HOLD
4601 MNTR BUSY/IDLE	4504,U,W SET U,W
4305,Z SET RT&M DN (Z = OVERRIDE DN)	
4503,V,W,X,Y SET V,W,X,Y	

U = TERM (LBK, LBKINV, LBKOCU, LBKCSU, MANSRCE or MANSINK)

V = TERM (PH, LT, EXT, NT1, CU1 - CU6)

W = BLKSZ (1 - 64000)

X = CHAN (D, B1, B2, ALL)

Y = TESTEQ (D, B1, B2)

4505 CLR DIGITAL TEST USER DEFAULTS

9602 DISPLAY USER DEFAULT VALUES

9000,1 MISCELLANEOUS TLWS COMMANDS

8000 TASK SELECTION

Figure 3-40 Task Selection Page 9000,2 Miscellaneous (5E12 and Later)

Abbreviations:			
BLKSZ	Block Size	LT	Line Termination
CHAN	Channel	MANSINK	Manual Loopback Sink
CLR	Clear	MANSRCE	Manual Loopback Source
CU1	Channel Unit 1	MNTR	Monitor
CU6	Channel Unit 6	NT1	Network Termination 1
DN	Directory Number	PH	Protocol Handler
EXT	External	RT&M	Remote T&M
LBK	Loopback	T&M	Talk and Monitor
LBKCSU	Loopback to Channel Service Unit	TERM	Termination
LBKINV	Loopback Inverted	TESTEQ	Test Equipment
LBKOCU	Loopback to Office Channel Unit	TLWS	Trunk and Line
LBKSHT	Loopback to Speech Handler		Work Station

3.11.2.32 Task Selection Page 9200 (CPE Tests) (ISDN)

See Figure 3-41 .

NOTE: Although not shown in Figure 3-41 (static screen examples), the following messages for protocol (PRT) and SERVICE may appear on actual 9200 page displays:

PRT		SERVICE	
F	Fully Initializing Terminal	SUBSCR	Subscribed
FF	Fully Initializing Terminal that Failed to initialize	FXD TEI	Provisioned Fixed Terminal End-point Identifier Service
N	Non Initializing Terminal	DFLT DN	Default Directory Number Service (different than Default Service)
B	Basic	DENIED	Denied
?	Unknown	DEFAULT	Default Service (different than

Default DN Service)

For more detailed information, see the **OP:CPE** output message in 235-600-750, *Output Messages Manual*.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLD INH SM	CKT LIM CM	SYS NORM MISC				
CMD: (NOTE)				15 - TEST POSITION							
9200 - CPE TESTS REMOVE RESTORE 2000[,W] DSL 3000[,W] DSL 21XX CPE 31XX CPE XX=CPE NUM(01-08) 53XX,Y,Z[,PS] CPE LPBK TEST Y=BLKSZ(1-64000) Z=B1|B2|ANY W=D|B1|B2 5999 STOP TEST 4999 EXIT 9201 CPE USPID 9700 OP CPE 4800 SEIZE DSL				CPE NUM	CPE DN/MLHG	CPE PRT STAT	CPE SERVICE	SIG STAT	PKT STAT	CPE TYPE	TEI
				01							
				02							
				03							
				04							
				05							
				06							
				07							
				08							

Figure 3-41 Task Selection Page 9200 CPE Tests (ISDN) [5E12 and Later]

NOTE: This display format can be invoked via the 9200 poke command or use of the [,Z] option (where Z = CPE) on the 4000,1 screen. Use of the 4800 or 4999 poke command on this display allows return to the standard TLWS format.

Abbreviations:

B	B Channel	OP	Output
BLKSZ	Block Size	PKT	Packet
CMD	Command	PRT	Protocol
CPE	Customer Premises Equipment	PS	Packet Switch
D	D Channel	SIG	Signaling
DN	Directory Number	STAT	Status
DSL	Digital Subscriber Line	TEI	Terminal End-point Identifier
LPBK	Loopback	USPID	User Service Profile Identifier
MLHG	Multiline Hunt Group		
NUM	Number		

3.11.2.33 Task Selection Page 9201 (CPE USPID Tests) (ISDN)

See Figure 3-42 .

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLD INH SM	CKT LIM CM	SYS NORM MISC			
CMD: (NOTE)				16 - TEST POSITION						
9201 - CPE USPID REMOVE RESTORE 2000[,W] DSL 3000[,W] DSL 21XX CPE 31XX CPE XX=CPE NUM(01-08) 53XX,Y,Z[,PS] CPE LPBK TEST Y=BLKSZ(1-64000) Z=B1|B2|ANY W=D|B1|B2 5999 STOP TEST 4999 EXIT 9200 CPE TESTS 9700 OP CPE 4800 SEIZE DSL				CPE NUM	DN/MLHG	USER-SPID-NUMBER	TID	STAT	SERVICE	TEI
				01						
				02						
				03						
				04						
				05						
				06						
				07						
				08						

Figure 3-42 Task Selection Page 9201 CPE USPID Tests (ISDN) [5E12 and Later]

NOTE: This display format can be invoked via the 9201 poke command or use of the [,Z] option (where Z = USPID) on the 4000,1 screen. Use of the 4800 or 4999 poke command on this display allows return to the standard TLWS format.

Abbreviations:			
B	B Channel	NUM	Number
BLKSZ	Block Size	OP	Output
CMD	Command	PKT	Packet
CPE	Customer Premises Equipment	PS	Packet Switch
D	D Channel	SIG	Signaling
DN	Directory Number	SPID	Service Profile Identifier
DSL	Digital Subscriber Line	STAT	Status
LPBK	Loopback	TEI	Terminal End-point Identifier
MLHG	Multiline Hunt Group	TID	Terminal Identifier

3.11.3 TLWS TASK SELECTION PAGE COMMANDS

Table 3-4 contains a listing and brief description of each TLWS command. The commands are listed in numerical order.

Table 3-4 Trunk and Line Work Station Commands

CMD	RESULT
2000	The seized line or trunk is removed; state changed to OOS. TST:WSAUTO,TP=Z,RMV
21XX	The CPEXX is removed from service. Valid for standard BRI CPEs and custom multipoint CPEs which support testing. TST:WSCPE,TP=Z,TEST=RMV,CPE=XX
3000	The seized line or trunk is diagnosed, restored if diagnostic passes, and is released from TLWS control; state changed to IS. TST:WSAUTO,TP=Z,RST

31XX The CPEXX is restored to service. Valid for standard BRI CPEs and custom multipoint CPEs which support testing. TST:WSCPE,TP=Z,TEST=RST,CPE=XX

4001,X DN X is seized. CONN:WSLINE,TP=Z,DN=X

4002,X LEN X is seized. CONN:WSLINE,TP=Z,LEN=AA,BB,CC,DD,EE,FF

4003,X SLEN X is seized. CONN:WSLINE,TP=Z,SLEN=AA,GG,HH,II

4004,X MLHG X is seized. CONN:WSLINE,TP=Z,MLHG=JJ,KK

4005,X LCEN X is seized. CONN:WSLINE,TP=Z,LCEN=AA,LL,MM,NN

4006,X AP X is seized. CONN:WSLINE,TP=Z,AP=OO,PP

4007,X DN member X is seized. CONN:WSLINE,TP=Z,DN=QQ,KK

4008,X ILEN X or PUB43801 IFAC X (plus 51) is seized.
CONN:WSLINE,TP=Z,ILEN=AA,RR,SS,TT
or
CONN:WSTRK,TP=Z,ILEN=CC,LL,MM,NN

4009,X LCKEN X is seized.
CONN:WSLINE,TP=Z,LCKEN=AA,LL,MM,VV,WW

4101,X TG X is seized. CONN:WSTRK,TP=Z,TG=X

4102,X TKGMN X is seized.
CONN:WSTRK,TP=Z,TKGMN=AA,BB

4103,X TEN X is seized.
CONN:WSTRK,TP=Z,TEN=CC,DD,EE,FF,GG

4104,X DEN X is seized.
CONN:WSTRK,TP=Z,DEN=CC,HH,II,JJ

4105 The next member of TG is seized.
CONN:WSTRK,TP=Z,NEXTMEM

4106,X RAF X is seized.
CONN:WSTRK,TP=Z,RAF=CC,KK,BB

4107,X SAS X is seized.
For 5E11 and 5E12 only CONN:WSTRK,TP=Z,SAS=CC,OO,BB

4108,X NEN X is seized.
For 5E11 and 5E12 CONN:WSTRK,TP=Z,NEN=CC,PP,QQ,RR,SS,NN
For 5E13
CONN:WSTRK,TP=Z,NEN=SM,DNU,DG,STE,STS,VTG,VTM,DS0

4109,X PSUEN X is seized.
CONN:WSTRK,TP=Z,PSUEN=CC,TT,UU,VV,BB
Note: Variables for commands 4002,X, 4003,X, 4004,X, 4005,X, 4006,X, 4007,X, 4008,X, 4009,X, 4102,X, 4103,X, 4104,X, 4106,X, 4107,X, 4108,X, and 4109,X are defined at the end of this listing.

4200 Incoming 101TL call is seized.
CONN:WSIC,TP=Z

4300 Talk and monitor (T&M) phone is disconnected.
DISC:WSPHONE,TP=Z

4301 T&M phone is connected.
CONN:WSPHONE,TP=Z

4302 The mode of the T&M phone connected to the indicated test position (TP) is set to talk so the user can talk and listen. SET:WSPHONE,TP=Z,MODE=TALK

4303 The mode of the T&M phone connected to the indicated TP is set to monitor so the user can only listen.
SET:WSPHONE,TP=Z,MODE=MNTR

4304 The mode of the T&M phone connected to the indicated TP is set to on hold.
SET:WSPHONE,TP=Z,MODE=TEST

4305,X The digits X are used for outpulsing to the remote T&M phone.
SET:WSPHONE,TP=Z,MODE=OVER,DN=X

4400 The digits for outpulsing are cleared.
CLR:WSOPD,TP=Z

4401,X The digits X are set to be used for outpulsing and/or are outpulsed over the seized trunk.
SET:WSOPD,TP=Z,OPD=X

4500 The frequency and level at a particular TLWS TP are cleared.
CLR:WSFREQ,TP=Z

4501,X,Y The frequency is set to X and/or the level is set to -Y to be used later with TST:WSEND.
SET:WSFREQ,TP=Z,FREQ=X,LVN=Y

4502,X,Y The frequency is set to X and/or the level is set to +Y to be used later with TST:WSEND.
SET:WSFREQ,TP=Z,FREQ=X,LVP=Y

4503,V,W,X,Y User defined default values are set; termination is set to V, block size is set to W, channel is set to X,

	and test equipment is set to Y. Values are to be used later with TST:WSDGTL,USERDEF (DSL).
	SET:WSDGTL,TP=Z,TERM=V,BLKSZ=W,CHAN=X,TESTEQ=Y
4504,V,W	User defined default values are set; termination is set to V, and block size is set to W. Values are to be used later with TST:WSDGTL,USERDEF (TRUNK).
	SET:WSDGTL,TP=Z,TERM=V,BLKSZ=W,TRUNK
4505	The values for TERM, BLKSZ, CHAN, and TESTEQ are cleared. CLR:WSDGTL,TP=Z
4600	The audio of a busy line or trunk is monitored from the T&M phone.
	TST:WSMNTR,TP=Z,MODE=BUSY
4601	The audio of a busy or idle line or trunk is monitored from the T&M phone.
	TST:WSMNTR,TP=Z,MODE=IDLE
4800	The line or trunk most recently requested for seizure on the TP is reseized. CONN:WSPORT,TP=Z
4999	The seized line or trunk is released. DISC:WSPORT,TP=Z
5001	Tone is sent over seized line or trunk. TST:WSEND,TP=Z,TEST=SEND
5002,X,Y	Tone at frequency X is sent at level -Y over seized line or trunk.
	TST:WSEND,TP=Z,SEND,FREQ=X,LVN=Y
5003,X,Y	Tone at frequency X is sent at level +Y over seized line or trunk.
	TST:WSEND,TP=Z,SEND,FREQ=X,LVP=Y
5004	Tone of 404 Hz is sent at level 0 over seized line or trunk.
	TST:WSEND,TP=Z,SEND,FREQ=404,LVP=0
5005	Tone of 1004 Hz is sent at level 0 over seized line or trunk.
	TST:WSEND,TP=Z,SEND,FREQ=1004,LVP=0
5006	Tone of 2804 Hz is sent at level 0 over seized line or trunk.
	TST:WSEND,TP=Z,SEND,FREQ=2804,LVP=0
5007	The open termination test is sent over seized trunk. TST:WSEND,TP=Z,TEST=OPEN
5008	The quiet termination test is sent over seized trunk. TST:WSEND,TP=Z,TEST=QUIET
5031	Digital loopback test is run on seized line or trunk using default values. TST:WSDGTL,TP=Z
5032,X,Y,Z	Digital loopback test is run on seized line using termination X, block size Y, and channel Z.
	TST:WSDGTL,TP=P,TERM=X,BLKSZ=Y,CHAN=Z
5032,W,X,Y	Digital loopback test is run on seized line using termination W, block size X, and channel Y.
	TST:WSDGTL,TP=P,TERM=W,BLKSZ=X,CHAN=Y
5033,X,Y	Digital loopback test is run on seized trunk using termination X and block size Y.
	TST:WSDGTL,TP=Z,TERM=X,BLKSZ=Y
5034	Digital loopback test is run on seized line or trunk using default values defined and preset by the user.
	TST:WSDGTL,TP=Z,USERDEF
5035,Z	Test equipment ID of selected channel is displayed. TST:WSDGTL,TP=Y,TESTEQ=Z
5100	The composite measurement is done on the seized line or trunk.
	TST:WSMEAS,TP=Z,TEST=MEASURE
5101	The broadband level is measured on the seized line or trunk. TST:WSMEAS,TP=Z,TEST=BBAND
5102	The far-to-near noise level is measured on the seized line or trunk.
	TST:WSMEAS,TP=Z,TEST=NOISE
5103	The far-to-near level at 1004 Hz -16 dB is measured on the seized line or trunk.
	TST:WSMEAS,TP=Z,TEST=NWT
5104	The echo-return loss is measured on the seized line or trunk. TST:WSMEAS,TP=Z,TEST=ERL
5105	The singing-return loss is measured on the seized line or trunk. TST:WSMEAS,TP=Z,TEST=SRL
5106	The singing-return loss, high, is measured on the seized line or trunk.
	TST:WSMEAS,TP=Z,TEST=SRLHI
5201	The receiver off-hook test is run on the seized line. TST:WSSUPV,TP=Z,TEST=ROH
5202	The ring test is run on the seized line. TST:WSSUPV,TP=Z,TEST=RING
5203	The trunk on-hook test is run on the seized trunk. TST:WSSUPV,TP=Z,TEST=ON
5204	The trunk off-hook test is run on the seized trunk. TST:WSSUPV,TP=Z,TEST=OFF
5205	The wink test is run on the seized trunk. TST:WSSUPV,TP=Z,TEST=WINK
5206	The quick wink test is run on the seized trunk. TST:WSSUPV,TP=Z,TEST=QWINK
5207,X	The DSU2-RAF/SAS phrase X is played. For SAS, a range of phrases also may be played.
	TST:WSSUPV,TP=Z,TEST=PHRASE,PHRASE=X
5208,W,X,Y,Z	The DSU2-RAF/SAS announcement is played with application W, header announcement X, tail announcement Y, and inflection Z.
	TST:WSSUPV,TP=P,
	TEST=ANN,APPL=W,HANN=X,TANN=Y,INFL=Z
5209	The defense switch network preemption tone test is run on the seized line.
	TST:WSSUPV,TP=Z,TEST=PPTONE
5210,W,X,Y,Z	The DSU2-RAF/SAS dial-through announcement test is run with application W, header announcement X, tail announcement Y, and inflection Z.
	TST:WSSUPV,TP=P,

	TEST=DTA,APPL=W,HANN=X,TANN=Y,INFL=Z
5212	The network termination 1 mismatch test is run on the seized line. TST:WSSUPV,TP=Z,TEST=MSMTCH
5221	The ringback test is run on the seized trunk. TST:WSSUPV,TP=Z,TEST=RNGBK
5222	The operator attached signal test is run on the seized trunk. TST:WSSUPV,TP=Z,TEST=OPAT
5223	The operator released signal test is run on the seized trunk. TST:WSSUPV,TP=Z,TEST=OPRL
5224	The coin collect signal test is run on the seized trunk. TST:WSSUPV,TP=Z,TEST=CNCL
5225	The coin return signal test is run on the seized trunk. TST:WSSUPV,TP=Z,TEST=CNRT
5226	The coin collect and operator released signal test is run on the seized trunk. TST:WSSUPV,TP=Z,TEST=CCOR
5227	Loopback the speech handler trunk. TST:WSSUPV,TP=Z,TEST=SHLB
5228	Unloopback the speech handler trunk. TST:WSSUPV,TP=Z,TEST=SHUNLB
53XX,Y,Z	An interactive digital test with a loopback established at CPEXX is performed using block size Y on channel Z (only valid for CPEs that support testing). TST:WSCPE,TP=P,TEST=LPBK,CPE=XX,BLKSZ=Y,CHAN=Z
5401	The line insulation test (LIT) is performed on the seized line. TST:WSAUTO,TP=Z,LIT
5402	The automatic digital subscriber line (DSL) test is run on the seized line using default values. TST:WSAUTO,TP=Z,TSTDLS
5403,V,W,X,Y,Z	The automatic DSL test is run on the seized line using termination V, duration W, block size X, channel Y, and acceptable bit error rate Z. TST:WSAUTO,TP=P,TSTDLS,TERM=V,DUR=W,BLKSZ=X,CHAN=Y,ABER=Z
5404	The automatic line evaluation (ALE) session is run on the seized line, and error counts are reported. TST:WSAUTO,TP=Z,ALE=ALL,REPT
5405	The automatic trunk test is run on the seized trunk using default values. TST:WSAUTO,TP=Z,TSTTRK
5406,X	The automatic trunk test of type X is run on the seized trunk. TST:WSAUTO,TP=Z,TSTTRK,TYPE=X
5407,X,Y	The automatic trunk test of type X using output pulse digits Y is run on the seized trunk. TST:WSAUTO,TP=Z,TSTTRK,TYPE=X,OPD=Y
5408	The seized line or trunk is diagnosed. TST:WSAUTO,TP=Z,DGN
5409,W,X,Y,Z	The automatic trunk test is run on the seized trunk using type W, output pulse digits X, duration Y, and block size Z. TST:WSAUTO,TP=P,TSTTRK,TYPE=W,OPD=X,DUR=Y,BLKSZ=Z
5410	The automatic DSL fault sectionalization test is run on the seized line using default values. TST:WSAUTO,TP=Z,TSTDLS,SECT
5411,S,T,W,X,Y,Z	The automatic DSL fault sectionalization test is run on the seized line using termination S, duration T, block size W, channel X, mode Y, and acceptable bit error rate Z. TST:WSAUTO,TP=P, TSTDLS,SECT,TERM=S,DUR=T,BLKSZ=W,CHAN=X,MODE=Y,ABER=Z
5412,X,Y	The ALE session is run on type X using option Y. TST:WSAUTO,TP=Z,ALE=X,Y
5413,X,Y	The automatic DSL CRC test type X is run on the seized line for duration Y. TST:WSAUTO,TP=Z,TSTDLS,TEST=X,DUR=Y
5414	The network termination 1 mismatch test is run on the seized line. TST:WSAUTO,TP=Z,TSTDLS,TEST=MSMTCH
5415	A utility call trace is requested on the port known to the TLWS (SEIZED, CAMPED, or UNDER TEST). TST:WSAUTO,TP=Z,UCT
5501	Enable the echo canceler. TST:WSSUPV,TP=Z,TEST=ENEC
5502	Disable the echo canceler. TST:WSSUPV,TP=Z,TEST=DSEC
5601	The voltage, resistance, and capacitance tests are performed on the seized line or trunk. TST:WSMET,TP=Z,TEST=ALL
5602	The voltage test is performed on the seized line or trunk. TST:WSMET,TP=Z,TEST=V
5603	The resistance test is performed on the seized line or trunk. TST:WSMET,TP=Z,TEST=R
5604	The capacitance test is performed on the seized line or trunk. TST:WSMET,TP=Z,TEST=C
5605	The distance-to-open test is performed on the seized line. TST:WSMET,TP=Z,TEST=DIS
5606	The ringer count test is performed on the seized line. TST:WSMET,TP=Z,TEST=RINGER
5607	The home totalizer test is performed on the seized line. TST:WSMET,TP=Z,TEST=HT
5608	The detect coin test is performed on the seized line. TST:WSMET,TP=Z,TEST=DC
5609	The collect coin test is performed on the seized line. TST:WSMET,TP=Z,TEST=CC
5610	The return coin test is performed on the seized line. TST:WSMET,TP=Z,TEST=RC
5611	The monitor-for-short test is performed on the seized line. TST:WSMET,TP=Z,TEST=SHORT
5612	The pair gain test controller (PGTC) is added into the metallic connection on the seized port. TST:WSMET,TP=Z,TEST=PGTC
5701	The voltage, resistance, and capacitance tests are performed on the seized line or trunk. TST:WSMET,TP=Z,TEST=ALL,TESTEQ=SLIM
5702	The voltage test is performed on the seized line or trunk. TST:WSMET,TP=Z,TEST=V,TESTEQ=SLIM
5703	The resistance test is performed on the seized line or trunk. TST:WSMET,TP=Z,TEST=R,TESTEQ=SLIM
5704	The capacitance test is performed on the seized line or trunk.

5705 TST:WSMET,TP=Z,TEST=C,TESTEQ=SLIM
The distance-to-open test is performed on the seized line.

5707 TST:WSMET,TP=Z,TEST=DIST,TESTEQ=SLIM
The home totalizer test is performed on the seized line. TST:WSSUPV,TP=Z,TEST=HMTO

5708 The detect coin test is performed on the seized line. TST:WSSUPV,TP=Z,TEST=CNDDT

5709 The collect coin test is performed on the seized line. TST:WSSUPV,TP=Z,TEST=CNCL

5710 The return coin test is performed on the seized line. TST:WSSUPV,TP=Z,TEST=CNRT

5711 The monitor-for-short test is performed on the seized line.

5712 TST:WSMET,TP=Z,TEST=SHORT,TESTEQ=SLIM
The off-hook dialpulse test is performed on the seized line.

5713 TST:WSMET,TP=Z,TEST=OFKT,OFFTEST=DIALPULSE,TESTEQ=SLIM
The off-hook flash test is performed on the seized line.

5714 TST:WSMET,TP=Z,TEST=OFKT,OFFTEST=FLASH,TESTEQ=SLIM
The off-hook keytone test is performed on the seized line.

5715 TST:WSMET,TP=Z,TEST=OFKT,OFFTEST=KEYTONE,TESTEQ=SLIM
The off-hook loop resistance test is performed on the seized line.

5716 TST:WSMET,TP=Z,TEST=OFKT,OFFTEST=LOOPRES,TESTEQ=SLIM
The off-hook ring test is performed on the seized line.

5801 TST:WSMET,TP=Z,TEST=OFKT,OFFTEST=RING,TESTEQ=SLIM
The seized line or trunk is connected to the test access unit (TAU) jack AC1 for digital testing.

5802 CONN:WSJACK,TP=Z,JACK=AC1
The seized line or trunk is connected to TAU jack AC2 for digital testing.

5803 CONN:WSJACK,TP=Z,JACK=AC2
The seized line or trunk is connected to TAU jack DC1 for metallic testing.

5804 CONN:WSJACK,TP=Z,JACK=DC1
The seized line or trunk is connected to TAU jack DC2 for metallic testing.

5990 CONN:WSJACK,TP=Z,JACK=DC2

5999 The test is stopped, and all associated testing hardware is released. RLS:WSTST,TP=Z

9200 Any test that is running on the seized line or trunk is stopped. STP:WSTST,TP=Z
The CPE information for the line seized is displayed on the TLWS screen.

9201 TST:WSCPE,TP=Z,TEST=CPE
The USPID information for the line seized is displayed on the TLWS screen.

9500 TST:WSCPE,TP=Z,TEST=USPID
The test results from the specified TLWS test position are printed immediately or with [,LOG] option set for automatic printing. OP:WSDATA,TP=Z

9600 The testing status of TLWS test position Z is printed. OP:WSSTAT,TP=Z

9601 The testing status of all TLWS test positions is printed. OP:WSSTAT

9602 All default values defined and preset by the user are displayed. OP:WSDATA,TP=Z,USERDEF

9700 The CPE information along with information about CPE provisioned for service on the DSL is printed.

TST:WSCPE,TP=Z,TEST=PRINT

The variables for commands 4002,X, 4003,X, 4004,X, 4005,X, 4006,X, 4007,X 4008,X (Line) and 4009,X are as follows:

AA=SM	LL=ISLU
BB=LU	MM=LNGRP
CC=GR	NN=LCN
DD=BD	OO=AP
EE=SW	PP=RL
FF=LV	QQ=DN
GG=DCLU	RR=IDCU
HH=RT	SS=RT or PUB43801 IFAC (plus 51)
II=Line	TT=LT or DS0
JJ=GRP	VV=LBD
KK=MEM	WW=LCKT

The variables for Commands 4008,X (Trunk), 4102,X, 4103,X, 4104,X, 4106,X, 4107,X 4108,X, and 4109,X are as follows:

AA=GRP	LL=IDCU
BB=MEM	MM=RT or PUB43801 IFAC (plus 51)
CC=SM	NN=LT or DS0
DD=TU	OO=SAS
EE=SG	PP=DNU-S
FF=BD	QQ=DG
GG=CKT	RR=STS
HH=DLTU	SS=VT
II=DFI	TT=PSU
JJ=CH	UU=SHELF
KK=RAF	VV=CHGRP

3.12 RECENT CHANGE/VERIFY

The recent change/verify (RC/V) system is a function that allows maintenance personal access to the 5ESS®-2000 switch data base. The RC/V system is used to: add to, delete from, update, or verify the data base. A stand-alone RC/V subsystem is provided at the 5ESS®-2000 switch. Therefore, operation support system (OSS) interfaces are **not** required to use RC/V capabilities. The stand-alone RC/V enables craft and/or maintenance personnel to change or verify the data base using video displays and menu selection.

For detailed information applicable to RC/V procedures, refer to 235-118-XXX (XXX = manual number associated to applicable software release). Specific manuals are listed in 235-000-000, Numerical Index - Division 235 and Associated Documents.

3.13 SCREEN PROGRAM USER'S GUIDE

3.13.1 INTRODUCTION

The screen program allows the craft to run office data base editor (ODBE), access editor (ACCED), Common Network Interface Data Base Consolidator (CNIDBOC), and *UNIX*® operating system shell via the SCC data link or at the MCC terminal. The screen program allows the craft to run the Automated Circuit Pack Return Tag (RTAG) tool. Also, the screen program provides page-at-a-time output filtering for ODBE, ACCED, *UNIX*® operating system shell, CNIDBOC, and RTAG from other terminals in the office.

3.13.2 ACTIVATE SCREEN PROGRAM

At the SCC, MCC, or STLWS terminal, enter poke command **194** to activate the **screen** program. Also, the screen program can be activated via the input message **RCV:MENU:SCREEN**.

NOTE: If the user enters the **RCV:MENU:SCREEN** from a terminal that accepts poke commands, a rejection message appears indicating that the poke command **194** should be used instead of the **RCV:MENU:SCREEN** message.

Main Menu Display Page: After the user enters the poke command/input message successfully, the main menu page is displayed (see Figure 3-43). Select the desired program, by entering the appropriate command [where o = ODBE, a = ACCED, u = *UNIX*® program, c = CNIDBOC, or r = RTAG. To exit the screen program, enter **Q**. Once a desired program has been selected, the user can begin entering commands on the terminal.

```
What is the desired command?
```

- o) ODBE
- a) ACCED
- u) *UNIX* shell
- c) CNIDBOC
- r) RTAG
- Q) To Quit

```
Please enter o, a, u, c, r, or Q
```

Figure 3-43 Screen Program Main Menu Page

3.13.3 USER INTERACTION

Running programs from the **screen** program is similar to running programs directly from the *UNIX*® program. However, some differences do exist and are explained in the following sections.

Entering Special Characters: Certain characters cannot be directly entered from all types of terminals in the office. The following identifies characters that need a 2-character representation.

DESIRED CHARACTER -----	ENTER TWO CHARACTER REPRESENTATION -----
;	\:
_	\-
!	\1
\$	\s
&	\8
@	\a
?	\/
\	\\

Figure 3-44 Screen Program Scrolling Message (Scrolling Stop)

Paging and Scrolling: The **screen** program displays the user's entries and the responses on the terminal starting from the top of the screen and working towards the bottom. When the user has filled the screen, the screen program scrolls (that is, rewriting the affected lines) the display upward. Scrolling automatically stops so the user can review any line that was not visible since the last user input command. When scrolling stops for this reason, the message shown in Figure 3-44 is displayed:

```
*MORE* Enter NP for next page or RUN to continue to next user input
```

At this point, the user can enter **NP**, **RUN**, or wait for the 2-minute timeout.

If **NP** is entered or the **2-minute timeout** occurs, the screen continues to scroll again until either the display fills with new lines (the ***MORE*** prompt is displayed) or until the output is complete (whichever occurs first).

If **RUN** is entered, the screen continues to scroll again until the output is complete.

Clear Screen: If the user desires to clear the display screen and have the output to fill in the screen from the top, enter **CS**.

NOTE: The **CS** cannot be used when user is in the main menu mode or when output is paused with the ***MORE*** prompt.

Break Program in Progress: The user can send a break signal to stop the program running (via the screen program) by entering **BREAK**.

NOTE: The **BREAK** cannot be used when user is in the main menu mode or when output is paused with the ***MORE*** prompt.

Exiting Screen Program:

The user can exit the **screen** program by doing the following:

- (1) Entering **Q** or **EOF** to return to main menu
- (2) Entering **Q** to exit the screen program.

NOTE: The user cannot exit the **screen** program when the output is being paused with the *MORE* prompt.

Abort Screen Program: The user can abort the program being run by the screen program as follows:

- (a) If the *MORE* prompt displayed, enter **RUN**.
- (b) If the program is ``not" at the *MORE* prompt or if **RUN** has been entered, enter either **Q** or **EOF**.

Depending on the state of the program aborted, in about two minutes the screen program either returns the user to the main menu or exits entirely.

3.13.4 LIMITATIONS AND RESTRICTIONS

3.13.4.1 Redirecting Output

When using the screen program, do not attempt to direct any output to the terminal by redirecting to the *UNIX*® program port name. If user needs to direct output to the terminal, use the ``1pr" *UNIX*® program command as follows:

```
date | 1pr ttyv #
```

3.13.4.2 Interactive Programs

When using the *UNIX*® operating system shell from within the screen program, do not run interactive programs (that is, lbrowse, apprc, genbkup, ODBE, rcvecd, rcvsg, ACCED, CNIDBOC, or RTAG). These interactive programs are not compatible with the screen program when running directly from the *UNIX*® operating system shell. However, we know that ODBE, ACCED, CNIDBOC, and RTAG can be run from the screen program's main menu.

NOTE: The ``ed" editor can be used with the screen program.

3.13.4.3 Exclusive Terminal Use

If the user accessed the screen program via poke command **194**, other display pages cannot be accessed until the user exits the screen program.

3.13.5 ABNORMAL EVENTS

The following message can appear when exiting the **screen** program:

UNRECOVERABLE FAULT

This response indicates some event (such as the TTY channel detecting errors) that the screen program was unable to compensate for, occurred.

3.14 HOW TO USE INPUT/OUTPUT MESSAGES

3.14.1 MESSAGE ENTRY INFORMATION

3.14.1.1 Human Interface for Data Entry

The input message area is used to enter human-interface input messages. These messages are comprised of alphanumeric abbreviations instructing the system to perform required tasks. **DGN:MCTSI=1-1,RPT=5,TLP;** is a sample message. It instructs the switch to diagnose the module controller unit 1 in interface module 1, repeat the diagnostic five times, and provide a trouble location process (TLP) printout.

3.14.1.2 Inputting Messages

The basic method for inputting a message is to enter it on the bottom line of the input message area and execute it with the semicolon (;). An acknowledgment is returned by the system within seconds from the time the semicolon was entered. At the time the acknowledgment is issued, the message with acknowledgment is scrolled up one line to clear the bottom line for the entry of an input message. It is also printed on the ROP. The cursor is then automatically repositioned at the start of the bottom line for entry of the next input message. The message display page may be used to display the message(s) in the control and display portion of the video display terminal. When the message display page is not displayed, the message with acknowledgment continues to be displayed on the next to the bottom line until another message is executed or the next output message is printed. When the display message page is used, the message with acknowledgment is printed on the ROP and scrolled into the control and display area.

3.14.2 MESSAGE FORMAT

3.14.2.1 Selecting Input Formats

Message input formats may be selected by using different end-of-line characters for input messages. The placement of the cursor on the input line is dependent upon what message input format has been selected. Different input formats are possible by using various end-of-line characters. They are as follows:

- (a) ; (MML) executes (and terminates) all types of input formats.
- (b) ! (MML) continues message that is more than one line long.

3.14.2.2 Multiple Line Format

Multiple line input messages may be entered by using the forward exclamation point (!) at the end of each command line. The message can be terminated after the last line with the semicolon (;). This format causes the input subsystem to save all the information entered by each message line and then act on the saved data after the final message line is entered. Once an input message line has been entered, the procedure for entering another line is the same as the one for messages using the exclamation point. When the last message line is entered, the message lines are placed sequentially into the output stream and printed.

3.14.2.3 Erasing Input Errors

The capability to erase or cancel characters just entered (versus characters repeated) is provided. Input the underscore (_) character or backspace for each character back to **and** including the character to be erased or canceled. The entering of the underscore or backspace once a message has been executed (end-of-line character entered) is prohibited. The input message entry area is cleared and any incomplete input format in progress canceled by entering <del> key on the input line. A single-input line can be restarted (cleared of input entered) at any time by entering the @ character. The input cleared by these functions are not printed on the ROP. The **RETURN** and **ENTER** keys are accepted in place of the exclamation (!) or semicolon (;) and echo the characters when used. Table 3-5 explains line administration and end-of-line characters.

Table 3-5 Line Administration and End-of-Line Characters (MML)

SYMBOL	FUNCTION
Backspace	Erase last character.
@	Erase input message line and remove from buffer.
;	Execute.
!	Continue.

3.14.2.4 Input Message Editing and History

The input message editing and history are provided by the system. A history mechanism maintains a list of up to 200 input commands that have been previously entered and saved on a given terminal. These saved commands can be recalled, edited, and then reexecuted.

Commands saved in the list can be recalled by number or with a search string. The last command also can be recalled directly. Once a command is recalled, the user can append or substitute until the desired new command is constructed. The new command can then be executed.

The User Guidelines section in 235-600-700, *Input Messages Manual*, Volume 1, contains detailed information on input message editing and history.

3.14.3 INPUT ACKNOWLEDGMENTS

When a valid command is executed, it is sent to the subsystem that performs the function. If a command does not meet the following criteria, the **NG** acknowledgment is displayed.

- Is not from the page currently displayed
- Is not a valid page selection command
- Cannot be executed with the current system configuration.

If the subsystem is unable to perform the function because of a lack of system resources, the **RL** acknowledgment is displayed. When a subsystem accepts the requested command and is able to start the function, a **PF** acknowledgment is displayed to indicate that the completion results of the function are forthcoming on the printer. At the time the **PF** is displayed, a message identifying the action requested and its origin is printed on the printer. The **NG**, **RL**, and **PF** are displayed within seconds from the time of execution of the command. The command with acknowledgment is displayed on line 4, column 25. When the **MSG** (message) input mode is selected, the MCC is placed in a state for entering a human-interface input message. While in this mode, the system performs timing checks for the interval between characters. This interval is 45 seconds. If an expected character is not input within this interval, a **?T** acknowledgment is issued, the line is scrolled up one, and the cursor is repositioned at the start of the input message entry line. Several additional acknowledgments are used to signify syntax, unit selection, and execution errors as defined in 235-600-700, *Input Messages Manual*, Volume 1, User Guidelines section. Two possible conditions that prevent an input mode (**CMD** or **MSG**) from being selected are a duplex-processor failure or a failure of the interface between the 3B20 computer and the video display terminal.

A help feature is provided on input messages that provides the following:

- Improved error messages in cases where syntax or semantic errors are found on entered messages.
- Help on input messages formats, including argument type and range.
- Prompting for entering input messages.

For more information on how to get help, how to get prompted for keywords or parameters, and how to terminate help, refer to 235-600-700, *Input Messages Manual*, Volume 1, User Guidelines section.

3.14.4 OUTPUT MESSAGES

Any deviation from normal system operating conditions produces a printout on the MCC or remote switching control center. The printout contains all data relevant to the condition, diagnostic results, and a list (by priority) of suspected faulty circuit boards. Periodic traffic and plant summaries are also printed on the ROP. All of these printouts are important in determining system status, with diagnostic information and circuit board lists being of primary importance to maintenance personnel. The printer should be connected whenever maintenance is being performed in the office. For detailed analysis of printouts, refer to 235-600-750, *Output Messages Manual*.

3.15 OFFICE DATA BASE EDITOR (ODBE)

3.15.1 GENERAL

This section describes the ODBE at a high level. For a more detailed description or before using ODBE, refer to 235-105-220, *Corrective Maintenance Procedures*.

3.15.2 OVERVIEW

The ODBE is a tool which allows maintenance personnel to make manual changes to the 5ESS®-2000 switch data base. Information is stored in the data base in relations which are groups of predefined, associated attributes. Each instance of data in a relation is referred to as a tuple. Relations, tuples, and attributes can be viewed as a table (the table being a relation) where each item (row) in the table is a tuple, and each column in the table is an attribute. The ODBE manipulates this relational data base structure. Refer to 235-600-10X (X = manual number associated to applicable software release), *Translations Data Manuals*, for details concerning the attribute and relation names, attribute and relation descriptions, population rules for each attribute, and other applicable information. Refer to 235-000-000, Numerical Index - Division 235 and Associated Documents, for the complete list of 235-600-10X, *Translations Data Manuals*.

CAUTION: By using ODBE, it is possible to update, delete, or insert information into ODD relations which is critical to the operation of the switch. Improper use of ODBE can be service affecting. Before updating, deleting, or inserting information into a base relation, consult local supervision concerning policy.

The ODBE offers a user the ability to create, inspect, and modify the contents of the data base in an interactive mode. It is driven by data definition information which is contained in the switch data dictionaries and accessed through the data base manager (DBM) interface. This interface permits the user to review, update, insert, and delete information in the data base one tuple at a time. Any relation defined in the data dictionaries can be inspected and modified.

3.15.3 INVOKING ODBE

The ODBE is controlled by input from the RC/V, TLWS, STLWS, or the MCC (Page 194) video display terminals. The output data is displayed at the terminal where input is entered and cannot be displayed on the ROP.

The input message, **RCV:MENU:[DATA,]ODBE;**, is used to access the ODBE function on the terminal.

NOTE: The keyword **DATA** in the input message is optional. If the switch accepts the input message, the system responds with a printout follows (PF) followed by an output message, OFFICE DATA BASE EDITOR. A password may optionally be required to use ODBE.

3.15.4 ODBE STATES

3.15.4.1 General

When using ODBE, the response of the user to a given prompt is usually a data base defined name, an encoded

choice from a menu of options, or an ODBE special character.

The ODBE is a finite state process and, as such, has a set of states, inputs, and resulting states. Following are the possible ODBE states:

- (1) Enter processor number (the highest state)
- (2) Enter relation name
- (3) Enter tuple operation
- (4) Enter primary key
- (5) Enter attribute value (the lowest state).

3.15.4.2 Special Characters

Special characters have a meaning only if they are the first character in a user response. All special characters and their meanings can be found in 235-105-220, *Corrective Maintenance Procedures*.

The most commonly used special characters include an exclamation (!), which lifts the user to the next higher state (for example, "Enter Primary Key" to "Enter Tuple Operation"), **control-d**, which exits ODBE (that is, depressing **CTRL** and **d** keys simultaneously ends the ODBE session), and a question (?) which displays valid possible responses for that state. When possible user values are listed in the following sections, special character entries are not generally listed.

When data is input into ODBE, white space (blanks, tabs, new lines, etc.,) is ignored and only delimits item values. White space may be input as an item value by placing the entire value in double quote characters (" "). This holds true whether the input is interactive or from a bulk input file.

3.15.4.3 Enter Processor Number

In the Enter Processor Number state of ODBE, the user is prompted for the processor/module number where the data in question resides. Following is a list of possible responses to the prompt:

- **1-192** for the SM/SM-2000 number
- **193** for the AM
- **194-205** for the primary CMP number
- **206-217** for the mate CMP number
- **ALL** for redundant tuple read.

NOTE: The "ALL" response refers to an ODBE feature that allows the user to examine redundant or partitioned tuples across **all** SM/SM-2000 processors. Upon selecting the "ALL" option, the user is prompted for the relation name and then a key value. All tuples that match this key across all SMs/SM-2000s is written to a user-specified file. ***This feature is useful for debugging split translations when one SM/SM-2000 has inconsistent data in association to other SMs/SM-2000s.***

3.15.4.4 Enter Relation Name

In the Enter Relation Name state of ODBE, the user is prompted for the base relation name. See 235-105-220, *Corrective Maintenance Procedures*, for additional details concerning these responses. Following is a list of possible responses to the prompt:

- (1) **Valid relation name.** (When a relation name is entered, ODBE goes into the Enter Tuple Operation state.)
- (2) **PARAMETER** to edit parameters. Parameters are global variables which are used for ODD sizing, ODD engineering, and other office-specific information.

CAUTION: Extreme caution is required when using this option.

- (3) **STORAGE** to modify storage table relations This option is used to read or insert tuples of a storage table relation.

CAUTION: Extreme caution is required when using this option.

After entering **STORAGE**, the user is prompted for a **Storage Table Name**. (Upon accepting a valid **Storage Table Name**, ODBE goes into the Enter Tuple Operation state.)

3.15.4.5 Enter Tuple Operation

In the **Enter Tuple Operation** state of ODBE, the user is prompted for the data operation to be performed. Valid tuple operations at this level depend on what was entered at the **Enter Relation Name** prompt.

- (1) If a valid relation name was entered, then the valid tuple operations are as follows:

- **I:** Insert or add a new tuple.
- **R:** Review or display a tuple.
- **U:** Update or modify a tuple.
- **D:** Delete or remove a tuple.
- **W:** Write a tuple to a file.
- **BI:** Batch Insert or add tuples from a file.

CAUTION: Batch Insert of files larger than 1000 tuples must be split into smaller files. Large files can time out during processing, and also require RC/V logging to be inhibited. It is very important not to allow RC/V while logging is inhibited.

- **BR:** Batch Review or output a relation to a file.
- **BW:** Batch Write (write tuples into specified file).
- **VIRT:** Display information about a virtual relation.

- (2) If **PARAMETER** was entered, ODBE prompts for the parameter name. After ODBE accepts a valid parameter name, the valid parameter operations are as follows:
 - **R:** Review or display a parameter.
 - **U:** Update a parameter.

- **BR**: Batch Review parameters to a file.

(3) If **STORAGE** was entered, the valid tuple operations are as follows:

- **I**: Insert or add a new tuple.
- **R**: Review (display a tuple without entering the generated key).
- **BI**: Batch Insert (add generated key tuples from a file).
- **BR**: Batch Review (output generated key tuples from a file).
- **GKR**: Generated Key Review (display a tuple with the generated key specified).
- **GKVIRT**: Display the parent relations of a storage table relation.

Tuple operations BI, BW, and BR prompt for the *UNIX*® operating system filename in which to print the data or in which the data is stored. Tuple operations VIRT and GKVIRT print information to the terminal screen then prompt for another tuple operation. The tuple operation ODDOVWT prompts for the memory type, the ODD address, and associated data to be overwritten. For all other tuple operations, ODBE enters the Enter Primary Key state.

3.15.4.6 Enter Primary Key

In the **Enter Primary Key** state of ODBE, the user is prompted by name for the components of the key which uniquely defines a tuple in the relation. The only valid response to the **Enter Primary Key** prompt is a valid primary key value.

Upon entering a valid primary key value, ODBE goes into the Enter Attribute Value state.

3.15.4.7 Enter Attribute Value

In the **Enter Attribute Value** state of ODBE, the user is prompted for an attribute value by name. Possible responses to the prompt are as follows:

- A valid attribute value.
- A ``<" to go back to the previous attribute.
- A ``>" to skip remaining items and complete whatever tuple operation you are involved in
- A plus (+) to list attributes.

This is the lowest level in ODBE. After entering the attribute values, the user may return to a higher level by entering an exclamation (!) or exit ODBE by entering a ``**control-d**".

3.16 ACCESS EDITOR (ACCED)

3.16.1 OVERVIEW

ACCED is an interactive tool which allows the craft to manually locate, investigate, and correct data base corruption, and to reorganize hashed relations.

CAUTION: Misuse of ACCED could result in premature exhaustion of data base memory.

3.16.2 INVOKING ACCED

ACCED is invoked via input message **RCV:MENU:ACCED** or by typing the full path to ACCED from the *UNIX*® system shell. ACCED can also be executed via the screen program (**RCV:MENU:SCREEN**) or MCC Page 194. Information on the screen program and MCC Page 194 can be found in Section 3.13 of this document.

Upon access to ACCED, the craft enters into an interactive session of prompts and responses.

3.16.3 ACCED DESCRIPTION

3.16.3.1 General

The ACCED tool includes six data base utility operations: REVIEW, SCAN, OVERWRITE, DESTROY, REORG, and HASHSIM. The ACCED data base utilities allow craft to locate, investigate, and correct data corruption without manually performing the extensive, error-prone calculations required in the past. The HASHSIM operation is used for hashing simulation to determine optimal hashing parameters for reorganizing hashed relations.

The enhanced ACCED gives the user capabilities to do the following:

- Review head table, intermediate data pages (IDP), and data pages (DP) of a relation.
- Review memory and disk office dependent data (ODD) by block ID or by address.
- Review the run-time access dictionary for a relation, including past, current, future, and ODD versions.
- Review information about a relation, such as its tuple size, tuple address, IDP information, and DP information.
- Scan a relation for corruption by searching for unreadable tuples.
- Overwrite one, two, or four bytes of data at a given memory or disk address.
- Destroy an entire relation, an IDP in a relation, or a DP in a relation.
- Manually reorganize relations of access types DBACC_GK and DBACC_HASH.
- Simulate hashing a relation of access type DBACC_GK or DBACC_HASH to help determine optimal parameters for a manual reorganization.

When ACCED is entered, the craft specifies one of the six data base utility operations. All six operations are permitted on the AM, SM/SM-2000, and the active side of the CMP. Only the REVIEW operation is available on standby CMP because ODD data on the standby side may not be current. Each operation, in turn, has its own submenu. The user interactively traverses ACCED's menu hierarchy to perform operations on the data base. Four concurrent ACCED processes can be run at any time in a processor (AM, SM/SM-2000, CMP).

Following is an overview of each ACCED operation. Refer to 235-105-220, *Corrective Maintenance Procedures*, for additional information on ACCED operations and procedures for their use.

3.16.3.2 Review Operation

When REVIEW is selected from the main menu, ACCED prompts the user for the relation name and the item to review. Following are possible things to review:

- **Head table:** The head table option is displayed only for relations with head tables (all but 1-level indexed relations). When head table is selected for review, ACCED prompts for the starting relative address and

number of bytes to review. The address is relative to the beginning of the head table, so address 0 (zero) is the start of the head table. Results of the review are dumped to the screen and routed to the ROP and Switching Control Center System (SCCS) if output message (OM) printing is on.

- **IDP or DP:** The IDP option is displayed only for relations with IDPs (3-level indexed relations). When IDP (or DP) is selected for review, ACCED prompts for the intermediate data page number (or data page number), the starting relative address, and the number of bytes to review. The address is relative to the beginning of the IDP (or DP), so address 0 (zero) is the start of the IDP (or DP). Results of the review are dumped to the screen and routed to the ROP and SCCS if OM printing is on.
- **Access dictionary:** When the access dictionary is selected for review, ACCED prompts for the version to review; **current**, **any**, or **ODD**. For **current** and **ODD** versions, the appropriate access dictionary is dumped to the screen and routed to the ROP and SCCS if OM printing is on. For **any** version, the craft must provide an index into the access dictionary array. The access dictionary of the given index is dumped. The craft can use this feature to dump the past version of the access dictionary (referred to as ``acc\_bidx" in the access dictionary) or the future version (referred to as ``acc_nidx").
- **Data at a specified memory address:** When data at a memory address is selected for review, ACCED prompts for the memory type, the starting physical address, and the number of bytes to review. It is important to note that the address is absolute. Results of the review are dumped to the screen and routed to the ROP and SCCS if OM printing is on.
- **Data within a specified memory block:** When data within a memory block is selected for review, ACCED prompts for the block ID, the starting relative address within the block, the number of bytes to review, and the memory type. The address is relative to the beginning of the block, so address 0 (zero) is the start of the block. Results of the review are dumped to the screen and routed to the ROP and SCCS if OM printing is on.
- **Tuple information:** When tuple information is selected for review, ACCED prompts for the tuple key of interest. ACCED supplies the following information for that tuple: IDP number, IDP address, IDP block ID, DP number, DP address, DP block ID, tuple address, physical tuple size, logical tuple size, and memory type. The IDP information is provided only for 3-level indexed relations. The information is dumped to the screen and routed to the ROP and SCCS if OM printing is on.

3.16.3.3 Scan Operation

When SCAN is selected at the main menu, ACCED prompts for the relation name, the starting IDP (if appropriate), and the starting DP. Then, ACCED begins reading tuples from that point until it reaches the end of the relation or until it finds a bad tuple. When data corruption is found, the following information is furnished for the corrupted tuple: IDP number, IDP block ID, DP number, DP block ID, tuple address, and physical tuple size. The IDP information is provided only for 3-level indexed relations. The information is dumped to the screen and routed to the ROP and SCCS if OM printing is on.

3.16.3.4 Overwrite Operation

When OVERWRITE is selected at the main menu, ACCED prompts for the memory type, the length of overwrite (one, two, or four bytes), the starting physical address, the current memory contents for that location and length, and the new data. The user must know the current memory contents before ACCED permits the overwrite to continue. The results of the overwrite are dumped to the screen and always routed to the ROP and SCCS.

It is important to note the following:

- (1) Recent Change (RC) must be inhibited before overwriting memory to avoid possible ODD splits. An RC can be inhibited by typing input message **INH:RC**.

- (2) The OVERWRITE operation is not logged for all processors, so an ODD backup is required immediately after the change.
- (3) OVERWRITE is permitted only on the active side of the CMP. To update the standby side of the CMP, a soft switch (which does a physical memory copy) is required immediately after the backup.

3.16.3.5 Destroy Operation

When DESTROY is selected at the main menu, ACCED prompts for the relation name and for whether to destroy the whole relation, an IDP (if the relation is 3-level indexed), or a DP. If the whole relation is to be destroyed, then the head table block ID in its access method common dictionary is zeroed out. If an IDP is to be destroyed, ACCED prompts for the IDP number whose entry in the head table is subsequently zeroed out. If a DP is to be destroyed, ACCED prompts for the DP number whose entry in the head table (or IDP if 3-level indexed) is subsequently zeroed out. The DESTROY is reported to the screen and always routed to the ROP and SCCS.

It is important to note the following:

- (1) Recent Change (RC) must be inhibited before destroying memory to avoid possible ODD splits. An RC can be inhibited by typing input message **INH:RC**.
- (2) The DESTROY operation is logged for the CMP so the standby CMP is updated through continuous roll-forward. The DESTROY operation is not logged on processors other than the CMP.

An ODD backup is required immediately after a DESTROY on all processors, except CMP. But, backup is recommended for all processors.

3.16.3.6 Reorg Operation

When REORG is selected at the main menu, ACCED prompts for the relation name and checks to see if the relation is hashed (that is, access type DBACC_GK or DBACC_HASH). If the relation is not hashed, ACCED prompts for another relation name. If the relation is hashed, the access method common dictionary and dictionary for DBACC_GK or DBACC_HASH are displayed for the craft (they are not printed on the ROP). Then, ACCED asks if a hashing simulation is desired before manual reorganization is performed, and, if so, runs HASHSIM (described under Hashsim Operation, following). Whether or not HASHSIM is run, ACCED now prompts for the following reorganization parameters: foldtype (if relation not optimized), linear probe depth, head table size, data page size (DBACC_HASH relation only), and TMAX.

NOTE: Data page size must not exceed 2-KB unless the physical tuple size is a power of 2 (two). This guarantees that no tuple crosses a data page boundary which would violate the memory protection mechanism.

ACCED first runs a conditional reorganization, that is, it looks to see if enough memory exists in the ODD segment to accommodate the reorganization. If enough memory exists, the reorganization continues. If there is a memory shortage, a warning message is displayed stating that ODD growth is desirable, and ACCED asks if an unconditional reorganization is desired. If so, a warning message is displayed stating that unconditional reorganization may fail, and reorganization continues. If reorganization succeeds, the access dictionaries that are dumped represent the new access dictionaries resulting from reorganization. If reorganization fails, no reorganization is done, and the access dictionaries that are dumped represent the access dictionaries that would have resulted from reorganization had it not failed. The access dictionaries are routed to the ROP and SCCS if OM printing is on.

3.16.3.7 Hashsim Operation

After an automatic reorganization failure, HASHSIM is used by the craft to determine optimal parameter values to be

used in a manual reorganization of the relation. In this scheme, the craft is prompted to provide information about the relation to be simulated; such as the processor the relation resides on and the name of the relation. A batch review is performed to generate an American standard code for information interchange (ASCII) data file. Then, a file is generated that contains the folded keys of the relation. The newly created folded key file, along with some additional access dictionary information for the relation being simulated, is made available to the *UNIX*® system ACCED process to run the simulation. The additional access dictionary information specified by the craft through prompts include the following: (range of) maximum number of tuples (TMAX), (range of) data page sizes (for access type DBACC_HASH only), foldtype (nonoptimized relations only), and probe depth.

Simulator outputs are sent to the craft via the terminal or selectively to the ROP and contain the following information about each simulation executed:

- Tuple size used
- TMAX value used
- Data page size used
- Head page size required
- Number of data pages required for each stage in multistage hashing
- TPAG value that was calculated
- Number of tuples that would end up in overflow
- Load factor
- Average search time that would exist if these values were used in the manual reorganization of the relation
- Maximum search time that would exist if these values were used in the manual reorganization of the relation
- A score based on all these results.

The craft would then evaluate those simulations having the lowest scores to determine which parameters should be used in the manual reorganization of the relation.

3.17 COMMON NETWORK INTERFACE DATA BASE CONSOLIDATOR (CNIDBOC)

3.17.1 OVERVIEW

The CNIDBOC is a menu-driven interactive *UNIX*® system process which incorporates the Functional Listing, Recent Change (RC), and disk verification and modification of individual fields of RC structures. It is used by Common Network Interface (CNI) applications for emergency purposes, such as field troubleshooting or if the application's RC interface to CNI becomes inoperable.

3.17.2 INVOKING CNIDBOC

The CNIDBOC is accessed from the TLWS or RC/V terminal by entering the following input message:

rcv:menu:cnidboc

or from the **screen** program (MCC Page 194) by entering menu option ``c" (see Section 3.13, Screen Program User's Guide).

235-105-220, *Corrective Maintenance Procedures*, contains additional information on CNIDBOC and procedures for its use.

3.18 AUTOMATED CIRCUIT PACK RETURN TAG (RTAG) TOOL

3.18.1 GENERAL

The Automated Circuit Pack Return Tag tool allows a user to display and print recent diagnostic faults and to interactively generate the Returned Circuit Pack Tag used in returning defective circuit packs to Lucent Technologies for repair.

The Automated Circuit Pack Return Tag tool can be invoked as follows:

- From the *UNIX*® system terminal, enter `"/usr/bin/rtag;"` at the prompt.
- From the TLWS terminal, enter `"RCV:MENU:RTAG;"` at the prompt.
- From the MCC terminal, enter poke command 194 to access the screen program and then select option `"r"` RTAG. Also, a user can enter command `"RCV:MENU:SCREEN;"` to access the screen program. For detailed information about poke command 194 and the screen program, refer to Section 3.13 of this document.

Procedures for using the Automated Circuit Pack Return Tag tool are documented in 235-105-220, *Corrective Maintenance Procedures*.

3.19 SOFTWARE DEBUGGING AND TROUBLESHOOTING TOOLS

3.19.1 GENERAL

This subsection contains information describing the application of a group of tools that can be useful for debugging and troubleshooting 5ESS®-2000 switch software running on the 3B20 duplex (3B20D) computer.

These tools offer a user the ability to view and change application text and data residing in the computer's processor, memory, and disks.

Information is given on the use of the following tools:

- BROWSE
- File System Debugger (FSDB)
- Generic Access Package (GRASP)
- Ring Generic Access Package (RGRASP)
- IBROWSE
- IDUMP (interactive dump utility)
- UPEDCUD [current update data base (CUD) and history file editor].

CAUTION: The tools described in this section allow changes to be made to low-level operations of the AM. Improper use of these tools can be service affecting. Before implementing any of the functionalities provided, consult local supervision concerning policy. It is recommended that the implementation of any of these programs be discussed with the technical assistance organization prior to starting the

procedure.

3.19.2 BROWSE

3.19.2.1 Overview

The browse program is a data base debugger which allows a user to interactively peruse low-level access (LLA) data bases, formatted output of user data, and LLA internal structures. It is also used to:

- Verify data
- Find corrupted structures
- Gather information
- Repair damage.

The support computer versions of browse examine files in the Software Demand Paging (SDP) address space format, files in loadf format, and ordinary files. The 3B20D computer version examines files in all of the previously mentioned formats and incore copies of loadf and ordinary files.

3.19.2.2 Invocation and Input

Under the Bourne shell, the browse program is invoked by entering:

```
browse [%][+-]name
```

where:

+ indicates *name* is an ordinary file.

- indicates *name* is a loadf file.

% indicates named ordinary file or loadf file resides in core (3B20D computer only).

If *name* is not preceded by a **+** or **-**, *name* is in SDP address space format.

If **%** is used, *name* must have one of the following forms:

ecd

pmdb

<filename>, *<index>*, *<segno>*

<segname>, *<segno>*

Where:

ecd=

ECD incore data base (segment name defined in header file *<init_btodb.h>*)

pmdb=

Plant measurement incore data base (segment name defined in header file

<init_btodb.h>)

filename=

Segment names associated with the file system.

index=

Segment names associated with the file system.

segname=	A 32-bit number by which the system names segment.
segno=	Index of the segment in the virtual address space.

The program has read only permission to the file, data base, or segment.

Under the MML shell, the browse program is invoked by entering:

RCV:MENU:DATA,BROWSE;

The browse program may be invoked from any craft terminal except the MTTY or SCC.

Specification of a data base is the same as in the Bourne shell but must be done via the browse command **db** (see Browse subheading, Printing, Section 3.19.2.5). Table 3-6 summarizes the invocation modes.

Table 3-6 Data Base Invocation Modes

MODE	IN CORE (% PREFIX)	ON DISK (NO PREFIX)
<name>	unsupported	Support computer, 3B20D
-<name>	3B20D computer	Support computer, 3B20D
+<name>	3B20D computer	Support computer, 3B20D

Browse accepts commands from standard input as follows:

<expr><cmd><str>

3.19.2.3 Expressions

An expression **<expr>** has the syntax shown as follows:

<expr> ::

<expr> <op> <expr>

| <constant>

| /<format> <values>/

| ?<format> <values>?

| (<expr>)

<op> ::

+ | - | * | / | % | , | ;

<constant> ::

<decimal digits>

|0<octal digits>

|0x<hex digits>

|<char>

|.

|\$

The operators and digit strings have their standard meanings.

Because printing, searching, and division share the slash character, that character's use as an operator may require enclosure in parentheses to avoid ambiguity.

A <char> is a C-language character representation as shown in Table 3-7. Therefore, **'8'-060-o** prints **010** because the value of character **'8'** is 070.

Table 3-7 'c C Language Character Format

'\02'	'\"'	'B'	'b'
'\03'	'#'	'C'	'c'
'\04'	'\$'	'D'	'd'
'\05'	'%'	'E'	'e'
'\06'	'&'	'F'	'f'
'\07'	'\'	'G'	'g'
'\b'	'('	'H'	'h'
'\t'	')'	'I'	'i'
'\n'	'*'	'J'	'j'
'\013'	'+'	'K'	'k'
'\f'	'.'	'L'	'l'
'\r'	'.'	'M'	'm'
'\016'	'.'	'N'	'n'
'\017'	'/'	'O'	'o'
'\020'	'0'	'P'	'p'
'\021'	'1'	'Q'	'q'
'\022'	'2'	'R'	'r'
'\023'	'3'	'S'	's'
'\024'	'4'	'T'	't'
'\025'	'5'	'U'	'u'
'\026'	'6'	'V'	'v'
'\027'	'7'	'W'	'w'
'\030'	'8'	'X'	'x'
'\031'	'9'	'Y'	'y'
'\032'	'.'	'Z'	'z'
'\033'	'.'	'['	'{'
'\034'	'<'	'\'	'|'
'\035'	'='	']'	'}'
'\036'	'>'	'^'	'~'
'\037'	'?'	'_'	'\177'

An item enclosed in slashes (/) is the next address with given values; an item enclosed in question marks (?) is the previous address with the given values; wraparound applies to searching in both directions. Therefore, **/d 8/** locates the next short integer, 8 (eight). The previous integer '8' is located with **?d 8?**. The value does not have to match the format: **/d 010/** locates the next '8'. The value can also be an expression; for example, **/d '8'-060/** also locates the next '8'.

An empty **<format><value>** list refers to the list specified previously.

The dot (.) is the current address; the dollar sign (\$) is the number of bytes in the file or address space. (Because browse addressing is zero based, \$-1 is the highest address.)

Evaluation is left-to-right, with the only precedence established by parentheses. All computations are performed with long operands.

3.19.2.4 Format Usage

A slash (/) following an expression prints data base information at the address equal to the value of the expression. The address formats following the slash control printing and have the syntax shown as follows:

<aformat> ::
 <item>

| <item> <aformat>

<item> ::

 <term>

 | <count> <term>

<term> ::

 (<aformat>)

 | [<aformat>]

 | < <aformat> >

 | { <aformat> }

 | <byteformat>

 | <memformat>

 | <numformat>

 | <specialformat>

 | <userformat>

 | *"any characters"*

<byteformat> ::

 'a | 'c | 'd | 'o | 'u | 'x | b | c

<memformat> ::

 .<C structure member identifier>

<numformat> ::

 D | d | I | i | O | o | U | u | X | x

<specialformat> ::

 A | B | C | H | L | Q | R | S | T | r | s

<userformat> ::

 E | F | G | J | K | M | N | P | V | W | Y | Z

<count> ::

 Positive decimal number

The format letters and grouping characters have the meanings shown in Tables 3-8 and 3-9 , respectively.

Table 3-8 Format Letters

LETTER	MEANING	NUMBER OF BYTES
A	access method	sizeof(ABLOCK)
'a	ASCII character	sizeof(char)
B	hash bucket	sizeof(struct bucket)
b	byte	sizeof(char)
C	SDP header	sizeof(struct SPACE)
c	character	sizeof(char)
'c	C character	sizeof(char)
D	decimal	sizeof(long)

octal. The formats **'a** and **'c** print a byte in ASCII mnemonic form and C-language form, respectively. The ASCII mnemonics are those established in the file */usr/pub/ascii*. The **c** format prints a byte in the last character format entered; the initial format is ASCII mnemonic (see Table 3-10).

Table 3-10 ASCII Mnemonic Character Format

nul	sp	@	_
soh	!	A	a
stx	"	B	b
etx	#	C	c
eot	\$	D	d
enq	%	E	e
ack	&	F	f
bel	'	G	g
bs	(	H	h
ht	)	I	i
nl	*	J	j
vt	+	K	k
np	,	L	l
cr	-	M	m
so	.	N	n
si	/	O	o
dle	0	P	p
dc1	1	Q	q
dc2	2	R	r
dc3	3	S	s
dc4	4	T	t
nak	5	U	u
syn	6	V	v
etb	7	W	w
can	8	X	x
em	9	Y	y
sub	:	Z	z
esc	;	[	{
fs	<	\	|
gs	=	]	}
rs	>	^	~
us	?		del

Browse echoes literal text between double quotes ("). The backslash (\) affects the escape sequence shown in Table 3-11 .

Table 3-11 Browse Escape Sequences

ESCAPE	MEANING
\b	backspace
\f	linefeed
\n	newline
\r	carriage return
\t	tab
\"	double quote
\\	backslash
\ddd	octal byte

Browse prints strings with the **'s'** format using the same conventions.

3.19.2.5 Printing

A slash (/) following an expression causes data base information to print at the address equal to the value of the expression. The formats following the slash control printing.

Printing data base information depends on two automatically calculated values: the current address and the current offset. Each format item prints the information at its target location, which is the current offset from the current address. A slash following an expression establishes the value of the expression as the current address and sets the current offset to zero. Generally, each format letter increments the current offset by the number of bytes it prints

(Table 3-8), and a carriage return alone increments the current address by the current offset. The effect of these computations is that stringing together format items prints sequentially through the data base. An example formatted printout is shown in Figure 3-45 which illustrates printing seven items starting at address 100.

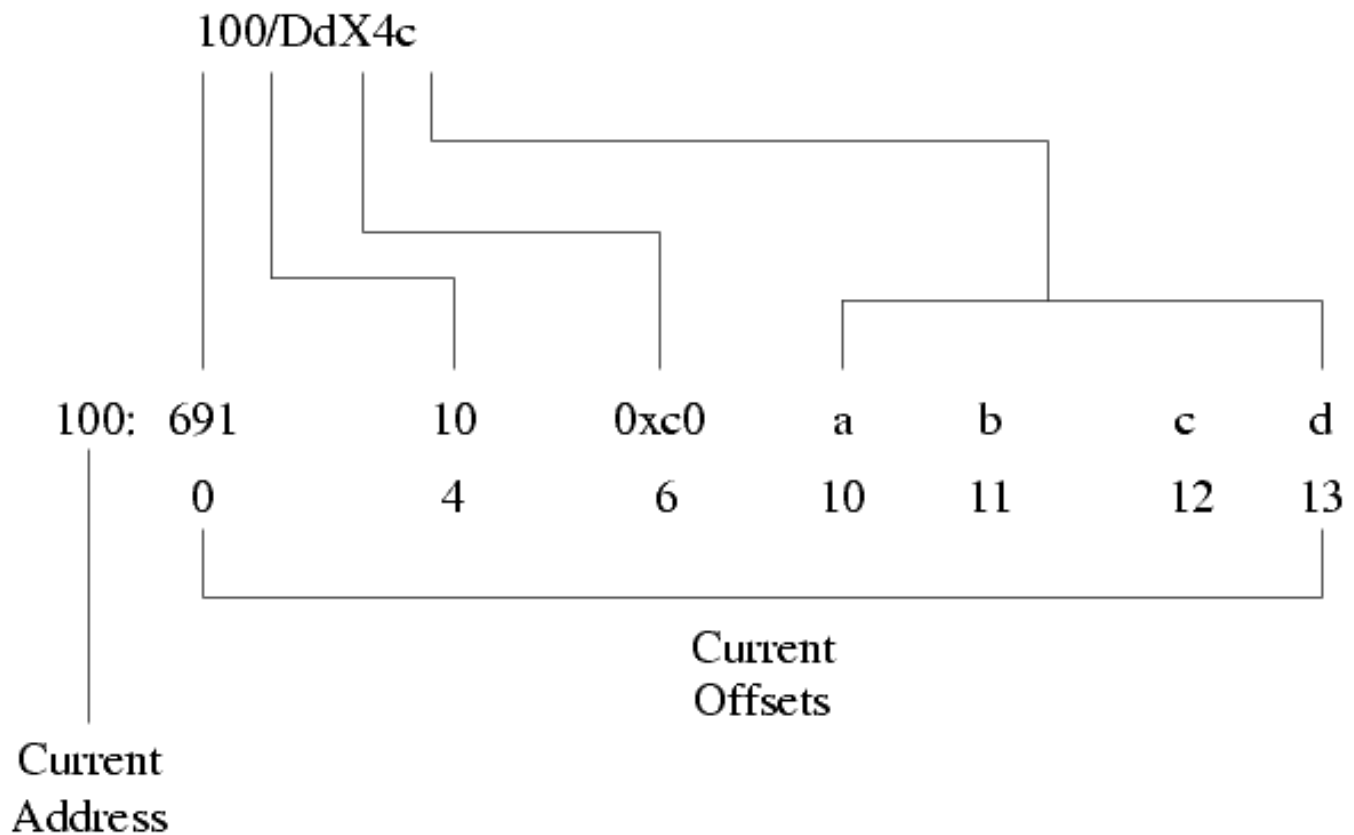


Figure 3-45 Browse Formatted Print Example

Browse prints the address followed by a colon (:) and then the information from the data base in the indicated format. The vertical lines in the diagram show the relationship between format item and printed value. Pressing carriage return again yields:

114:	692	11	xcl	b	c	d	e

If the fields starting at 114 have values one more than their corresponding fields starting at 100.

Four exceptions to the description of address calculations are as follows:

- **Linked structures buckets, rid blocks, queues/stacks, and sets** (formats **B**, **L**, **Q**, and **S**, respectively): In these formats, the computation of the current offset is made so that the next item printed is the next structure on the linked list, not the next sequence of logically contiguous bytes. If 044 is the address of the first set, the command **044/3S** prints the first three sets. Use right recursive format definition for these formats. If **J** is defined as **SJ**, the command **044/J** prints all the sets.
- **Items in square brackets or braces**: The items within square brackets are used to calculate a new target location offset from the current record by the value in the target location. To get a current record, use **R** format. The items within braces are used to calculate a new target location at the address given the current address itself. Printing begins at the new target location obtained by the indirection. The altered offset has effect only within the brackets or braces. An item enclosed in brackets is treated as having length **sizeof(int)**; an item

enclosed in braces has length **sizeof(ITEMID)**. Figure 3-46 is an example of a location printed with **R** format. It indicates that the user area of the record begins at address 100 in the data base.

The **[2c]** prints two characters at offset 10 (the value at 104) from address 100 (the start of the record). The format item **X** following the **[2c]** resumes printing at 106 as though the bracketed item were a simple integer field. In this example, the command **100/{c}[2c]X4c** is equivalent to the consecutive commands **691/c** and **104/[2c]X4c**. The indirect formats are useful for printing LLA vectors, which consist of fixed and variable portions. The variable portions are located at positions determined by the fixed portion.

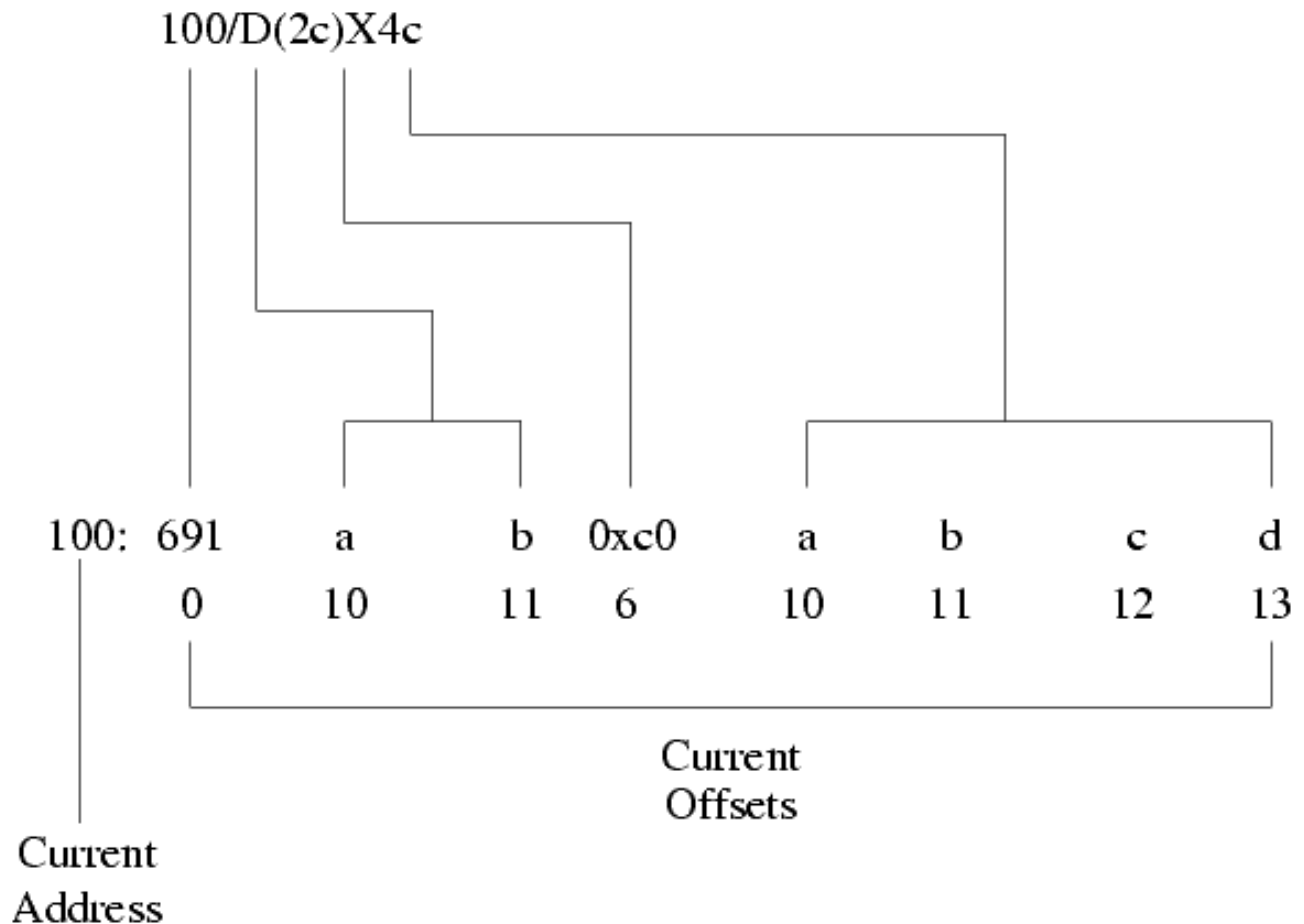


Figure 3-46 Browse Indirection Print

- **Btree access method** (format **T**): The **T** format prints (in depth-first order) the subtree with root at the current address. The **T** format changes neither current address nor current offset.
- **Formats for symbolic record printing**: If an **r2a** process is started via the **dd** command, then at the address of a record, the **r** format prints all record members and their values. A dot (.) followed by a name prints only the names and values of record members with matching names. In either case, current address and offset are not affected.

3.19.2.6 Browse Commands

Browse commands take the following form:

<expr> <command> <parameters>

In the following list, default addresses are enclosed in braces and are *not* part of the command.

< [name]

The < command causes browse to interpret a trailing string as a filename from which input is accepted. If the command itself appears in the named file, browse places the new file on a stack and switches input to the new file. An end of file (EOF) pops the stack. A missing name causes a switch to standard input.

> name

The > command interprets a trailing string as a filename or a shell command to which standard output is directed. If the trailing string starts with an !, then it names a shell command; otherwise, a file. The special name **stderr** redirects output to stderr instead of to a file. If the trailing string is omitted, output returns to standard output. An interrupt redirects output to standard output unless a previous redirection was to stderr.

>> name

The >> command is the same as >, except that output is appended to the file.

{.}/<formats>

The " / " command prints the locations in the data base starting at the given address in the given formats. Available formats are given in Table 3-8 along with the number of bytes each represents.

{.}#/<formats> <value list>/

The patch command substitutes the values in the given list in the indicated formats for the values at the given address. The value list is a space-separated list of expressions, each of which must correspond to a printing item in the format. The **s** format patches a number of bytes equal to the length of the string following the format. For a patch, browse prints:

<addrs>: <old value list> ← <new value list>

The format letter controls message printing. The **s** format patches a variable number of bytes and care must be taken with its use.

{last}=<format>

An equal sign (=) between an expression and a format controls expression value printing. The format may be any letter in <pformat> except **s**. In the character format, non-ASCII values are printed in octal; ASCII characters are printed either as C-language constants or as ASCII mnemonics (depending on the last given '**a**' or '**c**' format). An octal format forces a leading **zero** in the print; a hexadecimal format, a leading **0x**. Thus, **4+6*2=x** prints **0x14**.

!<string>

Submits the string to the shell.

<cap> [string]

Capital letter commands associate the letter with the trailing string. Appearances of the capital letter in formats are replaced by the associated string. The replacement is recursive; appearances of defined capitals may appear in other capital commands. Left or circular recursion in formats leads to disaster. If the trailing string is omitted, the current value of the macro letter is reported; if the string is whitespace, the macro is cleared.

db [name]

If a name follows the data base command, then browse disconnects any currently attached data

base and attempts to attach the named data base with no permission to patch.

If no string follows the **db** command, then the currently attached data base name and its access permissions are printed. [The code (#) indicates permission to patch.]

dbp [name]

If a name follows the data base patch command, then browse disconnects any currently attached data base and attempts to attach the named data base with permission to patch. If no name follows the **dbp** command, then browse toggles the access permission of the currently attached data base. In either case, **dbp** reports the currently attached data base and its access permissions.

dd [name][tabstops]

If a name follows the data dictionary command, then browse starts the named dictionary process. This process, which must be generated by **record to ascii program generator (r2agen)**, provides symbolic information about records. With a data dictionary process, the user may print entire records by member name and value via the **r** format, print single or related sets of record members with their values via the **.name** format, and patch single record members by name. The data dictionary process also augments the R, S, and A formats by including the record, set, and access method names, respectively. The name may be followed with a number, interpreted as the number of tab positions after which to place values. This number is helpful in formatting values in record prints. If the **dd** command is not given a name, then it reports the name and tab stop of the current process.

The data dictionary processes that are available for use with the ECD and SG data bases are *ecd-aux* and *sg-aux*, respectively.

files

Reports the stack of input files, most recent last.

frame size

Sets the frame size for the internal pager. For an SDP address space, the frame size must be a multiple of the page size with which the space was generated.

g/**<formats>** **<value list>**/**<command>**

The global command searches the addresses in the data base which have the given values and performs the given command at those addresses. More than one command may be given on succeeding lines if a backslash terminates the previous line. The value list is a space-separated list of expressions, each of which must correspond to a printing item in the format. The delimiting slashes may be uniformly replaced by any other character except backslash. For example,

```
g/X<4c>d 0x210 6/ .+8#/d 8/
```

looks for addresses that contain a long 0x210, any four characters, and a short 6 (six). It then patches the 6 (six) to an 8 (eight). Note that there are two printing formats (**X** and **d**) and two values (**0x210** and **6**). Because the values may be expressions, the 0x210 of the previous example could be replaced by (256*2)+16.

h

Reports the address of the LLA header structure.

help

Prints a summary of commands and formats.

macinfo Reports the values of the user-settable format letters.

q Disconnects a currently attached data base and exits. A **q** command is equivalent to an end of tape (EOT) (control-d) when there are no files from a **<** command on the input file stack.

r/**<formats>** **<value list>**/**<command>**

Given a trailing string composed of a format and a list of values, the record command searches the data base for the occurrence of values in a record and executes the given command when a match is found. The match is located at the beginning of the record. Multiple commands may be given on succeeding lines when the previous line ends in a backslash. The formats and values are the same as in the global search request. The default command prints the RIDs of matching records; an empty format/value list matches any record. Therefore, the command **"r /r"** matches all records (the first **r**) and prints (**/**) them symbolically (the second **r**).

3.19.2.7 Error Messages

The following error messages result from improper commands and do not terminate the browse session. All other messages are fatal and result from internal or other errors from which there is no recovery (for example, inability to read a file after a proper and successful open).

"bad alignment" illegal data-type alignment (for example, int at odd address)

"bad byte format" format letter following ' not a,c,d,o,u,x

"bad expression" illegal expression construction (for example, missing operand)

"bad format" illegal format (attempt to set l to other than D,O,U,X; bad count field, attempt print from nonmacro letter)

"bad frame size" frame size not a multiple of page size

"bad grouping" (), [], <>, or {} not balanced

"bad id" address negative

"<adrs> : bad id" address out of bounds

"bad operand" nonnumeric operand in expression

"bad recdisp information" incorrect information from auxiliary process

"bad segment specification" incorrect segment specified for incore attach

"bad string" string does not begin with a "

"can't allocate frames" frame size too large

"can't connect <name>" data base <name> nonexistent or no permissions to <name>

"can't establish pipe" cannot get pipe descriptor for ! command

"can't execute" cannot execute named auxiliary process

"can't fork dd process" fork failed before execution of auxiliary process

"can't fork" cannot fork before execution of process named in ! command

"can't get segment" getseg call failed on incore segment

"can't malloc space for search" search command too complicated

"can't open file" cannot connect to named file with +

"can't open input pipe" cannot get pipe descriptor for <! command

"can't open input file" trouble getting to command file for input

"can't read control structure" cannot connect to file as a loadf file

"can't read in get__c" trouble with auxiliary process

"can't seek in data base" file or loadf file corrupted

"can't seek to control structure" bad loadf file

"dd process out of sync" nonsense messages from auxiliary process

"id out of range" address greater than file size

"improper value list" value list in search or patch not of form /<formats><values>/

"line too long" command line more than 80 characters

"lost out child" a process spawned by the ! command has disappeared

"missing value list" no values follow formats in search or patch command

"no closing <char>" delimiters not balanced in search or patch command

"no data dictionary process" the r format requires an auxiliary process

"no data base attached" a command requires a data base for its completion

"no match" search failed to find values

"no permission to patch" patch command attempted before dbp command issued

"no remembered command" !! given before !<command>

"no remembered search string" // given before /<format> <value list>/

"non-C character constant" a C-character constant not enclosed in single quotes (')

"read error after fork" auxiliary process gives/sends bad initial information

"search unsuccessful" search command failed to find values in data base

"<adrs> not bucket" structure at <adrs> not a bucket

"<adrs> not a head" structure at <adrs> not a dml header

"<adrs> not rec head, not indirect to one" <adrs> not a RID

"<adrs> not a rid block header" structure at <adrs> not a rid block

"<adrs> not queue or stack" structure at <adrs> not an access method queue or stack

"<adrs> not set header" structure at <adrs> not a set

"shared SDP not supported" cannot connect with %<name>

"too many input files" system limit reached on open input files

"unable to get segment code" data base not associated with segment name

"unable to open <name> for getseg" data base <name> nonexistent or no permissions to <name>

"unable to open output file <name>" > or >> command unable to open or create file

"unbalanced patch delimiter" delimiters on /<format> <value list>/ in patch command not balanced

"unknown character format" encountered byte format other than 'a','c','d','o','u','x'

"unknown enum name" auxiliary process has incorrect enumeration name list

"unknown reply" auxiliary process sends incorrect initial information

"unsupported member type for formatted patch" patching with auxiliary process is restricted to the following types: char,

enum, int, link, long, owner, short, string, unsigned

"wrong packet type in get__c" bad communication from auxiliary process

"zero or negative record length" bad communication from auxiliary process

3.19.3 FILE SYSTEM DEBUGGER (FSDB)

3.19.3.1 Overview

CAUTION: *The fsdb should NEVER be used on a mounted file system unless absolutely necessary, and it should not be used on any file system that the user cannot afford to lose completely!*

When modifying a mounted file system it is necessary to modify BOTH the disk copy and any related global data maintained by the File Manager (FMGR). It is virtually impossible to be CERTAIN that everything has been modified correctly. Failure to CORRECTLY modify BOTH the FMGR and the disk copy of the file system may necessitate a system reboot, a boot from backup, or a complete Load Disk From Tape (LDFT) procedure.

The fsdb command is a tool which provides a convenient means of examining and correcting data within a file system, special device type file, such as **/dev/vtoc**, or any file.

Contained in fsdb are conversions that translate block and i-numbers into their corresponding disk addresses. Also included are mnemonic offsets which are used to access different parts of an i-node. These features simplify correcting control block entries or descending the file system tree.

3.19.3.2 Invoking FSDB

The fsdb is normally invoked through the *UNIX*® operating system shell by specifying the command name, **fsdb**, followed by the name of the file system or special device file to be examined. For example, to examine the **etc** file system, the command would be as follows:

```
fsdb /dev/etc <return>.
```

If the target for examination is a special device file such as **/dev/vtoc**, fsdb must be invoked as follows:

```
fsdb /dev/vtoc - <return>.
```

Several error checking routines to verify i-node and block addresses are contained in fsdb. These are disabled, if necessary, by invoking fsdb with the optional **``-** argument or by using the 0 (zero) symbol. (The fsdb reads i-size entries from the superblock of the file system in order to perform these checks.) In the command for examination of a special device file (see previous example), the **``-** at the end of the input string disables error checking. This is necessary because **vtoc** is not a file system, so there is no superblock for fsdb to read.

Numbers are considered decimal by default. Octal numbers must be prefixed with a **zero (0)**. Hexadecimal numbers must be prefixed by either **x** or **0x** and must be terminated with a colon (:). During any assignment operation, numbers are checked for a possible truncation error due to a size mismatch between source and destination.

Since fsdb reads a block at a time, it handles both raw and block I/O. A buffer routine retains commonly used blocks of data and reduces the number of read system calls. Some assignment operations result in a delayed write-through of the corresponding block.

3.19.3.3 Symbols Recognized by FSDB

The symbols recognized by fsdb are as follows:

i Converts from i-number to i-node address.

b Converts to block address.

d Directory slot offset.

+, -, *, / Address arithmetic.

q Quit.

>, < Saves, restores an address.

new-line Increments current address.

= Numerical assignment.

NOTE: This symbol must be entered without spaces, and the assignment must be terminated with a colon (:).

+= Incremental assignment.

-= Decremental assignment.

=" Character string assignment.

0 (zero) Error checking flip-flop.

<i>p</i>	General print facilities.
<i>f</i>	File print facility.
<i>B</i>	Byte mode.
<i>W</i>	Word mode.
<i>S</i>	Half-word mode.
<i>!</i>	Escapes to shell.

3.19.3.4 FSDB Print Options

The print facilities generate a formatted output in various styles. The current address is normalized to an appropriate boundary before printing begins. It advances with the printing and is left at the address of the last item printed. To terminate the output at any time, use the delete character. If a number follows the ***p*** symbol, that many entries are printed. A check is made to detect block overflows since logically sequential blocks are generally not physically sequential. If a count of zero is used, all entries to the end of the current block are printed. These print options are available:

<i>i</i>	Prints as i-nodes.
<i>d</i>	Prints as directories.
<i>o</i>	Prints as octal half-words.
<i>e</i>	Prints as decimal words.
<i>c</i>	Prints as ASCII characters.
<i>b</i>	Prints as hexadecimal bytes.
<i>h</i>	Prints as hexadecimal words.

The ***f*** symbol prints data blocks associated with the current i-node. (Blocks are numbered starting with zero.) The desired print option letter follows the block number, or the ***f*** symbol. Checks are made for special devices and for nonzero block pointers.

Dots, tabs, and spaces are used as function delimiters but are not necessary. A line containing only a ***new-line*** character increments the current address by the size of the data type last printed. That is, the address is set to the next byte, word, half-word, directory entry, or i-node, allowing you to step through a region of a file system. Information is printed in a format appropriate to the data type. Bytes, words, and double words are displayed with the hexadecimal address followed by the value in the hexadecimal and decimal. The symbol ***'B'*** or ***'S'*** is appended to the address for byte and half-word values, respectively. Directories are printed as a directory slot offset followed by the decimal i-number and the character representation of the entry name. I-nodes are printed with the labeled fields describing each element.

3.19.3.5 FSDB Mnemonics

The following mnemonics are used for i-node examination and refer to the current working i-node:

<i>md</i>	Mode.

<i>ln</i>	Link count.
<i>uid</i>	User ID numbers.
<i>gid</i>	Group ID number.
<i>sz</i>	File size.
<i>a#</i>	Data block numbers (0-7).
<i>at</i>	Access time.
<i>mt</i>	Modification time.
<i>maj</i>	Device class number.
<i>min</i>	Logical device ID number.

3.19.3.6 FSDB Examples

The following are examples of fsdb command use:

386i	Prints i-number 386 in an i-node format. This now becomes the current working i-node.
ln=4	Changes the link count for the working i-node to four.
ln=+1	Increments the link count by one.
falc	Prints, in ASCII, block one of the file associated with the working i-node.
a0b.p0x10:h	Prints the first 16 words of the file in hexadecimal for which "a0" is the starting block number.
2i.fd	Prints the first 32 directory entries for the root i-node of this file system.
d5i.fc	Changes the current i-node to the i-node associated with the fifth directory. The first 512 bytes of the file are then printed in ASCII.
1b.p0o	Prints the superblock of this file system in octal.
2i.a0b.d7=3	Changes the i-number for the seventh directory slot in the root directory to three. (This example shows how several operations can be combined on one command line.)
d7.nm=" name"	Changes the name field in the directory slot to the given string. Quotes are optional when used with nm if the first character is alphabetic.

3.19.4 GENERIC ACCESS PACKAGE (GRASP)

3.19.4.1 Description

GRASP in the 3B20D computer is a single-user utility system and is a subsystem of the software release of *UNIX*® Real-Time Reliable (RTR) operating system software. The GRASP tools allow software maintenance personnel to observe the behavior of *UNIX*® RTR operating system software in an operational environment. GRASP aids in the analysis of software faults and is a means of observing the flow of system software in order to isolate software bugs. It is intended to be used to gather information on known problems rather than to detect or correct problems.

GRASP is controlled by input from any maintenance terminal or from the SCC. GRASP output appears on the ROP and on the controlling (INPUT) terminal.

CAUTION: Although GRASP can be used by the craft, care should be exercised. Improper use of GRASP can result in program mutilation or excessive utilization of system resources.

3.19.4.2 Capabilities

GRASP capabilities consist of the following:

- **Data Transfer Functions:** The **COPY**, **DUMP**, and **LOAD** commands allow the user to move, print, and write data to addressable system locations.
- **Breakpoints:** The **WHEN** command allows the user to execute instruction and perform utility functions when the program flow reaches or matches a specified condition.
- **Breakpoint Manipulation Commands:** These commands allow the GRASP user to create, enable, disable, view, and remove breakpoints.
- **Override Commands:** These commands enable the user to override GRASP default time limits.
- **Trace:** The primary function of the trace feature is to indicate the flow of execution around a target event; for example, branch instruction.

GRASP uses the UN615 dual access utility circuit (DUC) or the UN21 utility circuit (UC) hardware to access the 3B20D computer. Breakpoint functions appear the same with either the DUC or UC.

If the DUC or UC is not installed in the 3B20D computer, fails during use, or the Field Test Set (FTS) is installed, GRASP clears all affected breakpoints and invalidates the trace mechanism. All other GRASP features are still available. In addition, GRASP rejects all new breakpoint/trace definitions that would require DUC or UC.

NOTE: The FTS is a separate debugging processor that can be connected to the DUC only. When the FTS is connected, it appears to the computer that the DUC is not installed.

When a working utility circuit is reinstalled, GRASP must be notified of the change by the **INIT:UC** input message. After receipt of this input message, GRASP again allows trace and hardware breakpoint definitions.

In *UNIX*® RTR Operating System, Release 6, the enhanced GRASP (EGRASP) feature is available in the 3B20D computer. This feature is provided as an alternative to the FTS for real-time software debugging. EGRASP is a resident software package that provides on-line real-time software debugging capabilities. It supports an interface to the UN615 DUC to provide all of the existing GRASP functions, in addition to the new trace and matching functions. It also provides the capability to place multiple breakpoints in code, to read and write memory registers, and to dump the contents of memory.

All GRASP command examples given here are in Man Machine Language (MML).

3.19.4.3 Data Transfer Functions

Table 3-12 lists the 5ESS®-2000 switch input messages that move, print, and with certain restrictions, write data into any addressable location in the system. See the *UNIX*® RTR Operating System Input/Output Messages Manuals for details on any specific input message and for system responses.

Table 3-12 GRASP Data Transfer Commands

TO:	USE COMMAND:

Copy data in main memory to a utility variable (immediate)	COPY:UID,ADDR;UVAR PID
Copy data in main memory to a utility variable main memory or register (in breakpoint)	COPY:ADDR;UVAR ADDR REG
Copy data in a utility variable to another utility variable (immediate)	COPY:UVAR;UVAR
Copy data in a utility variable to main memory, another utility variable, or a register (in breakpoint)	COPY:UVAR;ADDR UVAR REG
Copy data in a register to a utility variable (immediate)	COPY:REG;UVAR
Copy data in a register to main memory, a utility variable, or another register (in breakpoint)	COPY:REG;UVAR ADDR REG
Display data in main memory at the maintenance terminal and print the data at the ROP (immediate)	DUMP:UID,ADDR PID
Display data in main memory at the maintenance terminal and print the data at the ROP (on breakpoint)	DUMP:ADDR
Display data in the kernel's address space at the maintenance terminal and the ROP (immediate)	DUMP:KERN
Display data in a utility variable at the maintenance terminal and print the data at the ROP (immediate or on breakpoint)	DUMP:UVAR
Display data in a readable register at the maintenance terminal and print the data at the ROP (on breakpoint)	DUMP:REG
Display data in physical memory at the maintenance terminal and print the data on the ROP (immediate or on breakpoint)	DUMP:PMEM
Load a location in main memory with specified data (on breakpoint)	LOAD:ADDR
Load data into a utility variable (immediate or on breakpoint)	LOAD:UVAR
Load data into a writable register (on breakpoint)	LOAD:REG
Load a location in physical memory with specified data (immediate or on breakpoint)	LOAD:PMEM

3.19.4.4 Breakpoints

3.19.4.4.1 Description

Breakpoints detect the existence of a set of specified conditions on the machine. The definition of a breakpoint has two parts: (1) description of conditions that are to be matched and (2) list of actions (maximum of five action clauses) to take place when the match occurs.

The **WHEN** command starts a list of GRASP commands that are performed when a specified breakpoint condition exists.

The list must be terminated with the **END:WHEN** command which is not counted as a part of the action list itself and does not count against the limit of five action clauses. (In MML, the complete list of **WHEN** commands is terminated with a semicolon`;". Individual clauses within the list are terminated with an exclamation point `!".)

After a **WHEN** command, with its conditions and action list, is entered successfully, the breakpoint is assigned a number by GRASP. The breakpoint is then referred to exclusively by its number. Up to 20 different breakpoints can be defined in the system at any time. The numbers assigned to breakpoints during a debugging session are not reused. However, the RESET option to the **CLR:UTIL** command is used to restart the breakpoint number at one after clearing the currently defined breakpoints.

GRASP prints two output messages in response to a breakpoint definition after the print follows (PF) is given. The first message assigns a number to the breakpoint. This message should appear soon after the PF. The second message confirms that the breakpoint was set up successfully or indicates that the breakpoint was aborted and gives the reason. This should occur within one minute.

When a breakpoint fires, its action list is executed sequentially. The **INH:UTILFLAG ME** command, if used, can be anywhere in the work list without affecting the rest of the actions being executed in the action list for that firing of the breakpoint. A count of the number of times the breakpoint has fired is kept. Each time the breakpoint fires, **FIRENUM** increases by one. All output generated by the action list is labeled with the breakpoint number and the firing number as shown in the following example.

Breakpoint Definition

```
WHEN: UID=h'112, ADDR=h': W!
DUMP: REG=PA!
DUMP: ADDR=h'20130!
END: WHEN;
```

Output Produced When Breakpoint Fires

```
REPT GRASP BREAKPOINT FIRED
UTILID = h'112 PID = _____ BREAKPOINT = 1 FIRENUM =1
REGISTER: CONTENTS(h'):
PA: h'00005286
DUMP REG COMPL #G1
ADDRESS(h'): CONTENTS OF MEMORY(h'):
20130: 0000016A
DUMP ADDR h'20130 COMPL #G2
```

3.19.4.4.2 Breakpoint on Execution of an Instruction

Breakpoints that fire on execution of an instruction are called software breakpoints because of the way they are implemented. The breakpoint itself is an instruction that transfers control to GRASP when it is executed. See the *UNIX® RTR Operating System Input Messages Manual*, (303-082, MML) **WHEN:UID** or **WHEN:PID** (Generic 2) for details. One exception is when the action list contains any command that controls or affects the transfer trace (see Transfer Trace in Section 3.19.4.7.2). When the transfer trace is affected, the breakpoint is implemented in hardware rather than software. Starting the transfer trace is implemented in software for execution (EXC) breakpoints.

Software breakpoints are set up [at the location specified by the utility identification (UID) or process identification (PID), and **ADDR** keywords of the **WHEN** command] as soon as possible after the breakpoint is defined. The **OPCODE** itself is not changed until the breakpoint is allowed.

Processes are described by the UID or PID and, in some cases, a user process name. However, more than one process can be active with the same UID and process name. When this happens, GRASP sets up the first breakpoint in one of the matching processes at random. If another breakpoint is defined for the same UID or process name, GRASP sets up the breakpoint in the same process as the first.

If a process on the machine does not match the described conditions, the breakpoint is not set up. However, some commands (listed in Table 3-12 and labeled "immediate") can be used outside a breakpoint.

The **OPC** parameter is required on software breakpoints to ensure that the user knows what he is doing. Severe problems occur if a breakpoint is accidentally set up in the data portion of an instruction.

When the breakpoint is set up, the second of the breakpoint messages is actually printed. The message indicates

either that the breakpoint was set up successfully or, if unsuccessful, the reason for its failure.

Because the breakpoint OPCODE is not placed until the breakpoint is allowed, an inhibited software breakpoint does not fire and does not use any machine resources.

Because of the way software breakpoints are implemented, the breakpoint fires before the instruction where it is placed executes. The instruction in the original text is saved before it is overwritten by the breakpoint instruction. Only after the breakpoint fires and the action list is executed, is the displaced instruction executed. Execution then resumes with the instruction following the displaced one. For hardware implemented breakpoints, the breakpoint fires after the instruction where it is placed executes.

Table 3-13 summarizes the breakpoint implementation types (**H** - hardware, **S** - software), which depend on two factors: breakpoint mode (**EXC** - execution, **R** - read, **W** - write, or **RW** - read write) and the presence or absence of trace commands in the action list.

Table 3-13 Breakpoint Implementation Action Types

MODE	START OR STOP TRACE IN THE ACTION LIST ^a	NO TRACE OPERATIONS IN THE ACTION LIST
EXC	H	S
R	H	H
W	H	H
RW	H	H
Notes:		
a. Starting a trace within the breakpoint is implemented as a software breakpoint when mode is EXC .		

3.19.4.4.3 Breakpoint on Access of Data

Breakpoints that fire on accesses of data are implemented with hardware using matchers on either the UN21 UC, UN61 DUC, or UN615 DUC. Hardware breakpoint functions appear, to the user, to be identical with either the UC or DUC.

To set up a hardware breakpoint, GRASP configures the matchers that are needed and supplies the values that are to be matched. The circuitry continually compares the values with what is taking place on the machine. If the breakpoint is enabled, the breakpoint fires when all the matchers specified during setup match. If a hardware breakpoint is disabled, the hardware passively tries to match but does not interrupt processing on the machine. Disabled hardware breakpoints do not use any resources of the machine.

Because the amount of hardware on the utility circuit is limited, a maximum of four hardware breakpoints can be defined at one time. Because the trace also uses hardware matchers, fewer breakpoints are available while a trace is defined.

If the particular matchers needed are not available, it is possible to have fewer than four hardware items defined but have a command rejected for lack of resources. This is generally true when using an address range. Only one matcher on the utility circuit can be set up to match on a range of addresses. A second command requesting an address range is rejected even though a breakpoint using a single address is accepted.

Following is a hardware breakpoint example and the resulting system response. See the appropriate input or output message in 235-600-700 or 235-600-750, *Input Messages Manual* and *Output Messages Manual*, respectively, for specific details.

Breakpoint Definition

```

WHEN:PID=65536, ADDR=h'A0000 - h'A00FF ;RW!
DUMP:REG=PA!
END: WHEN!

```

System Response

```

WHEN PID 65536 ADDR X'A0000 STARTED HARD 18 #G5
WHEN PID 65536 ADDR X'A0000 COMPL DISABLED 18 #G6

```

3.19.4.4.4 Breakpoint on External Condition

A breakpoint can be defined to fire upon receiving an active external event backplane signal. This is implemented using a hardware trigger and the DUC matcher. If the condition matcher is already being used for a trace, a trigger allocation error results if an attempt is made to define a condition breakpoint.

The condition breakpoint fires immediately upon receipt of the external event regardless of an executing process. The processor can in fact be idle when this occurs. In this event, any register copy and load commands inside the breakpoint action list deal directly with the current machine registers, which may be of limited value. If a process is running when the breakpoint fires, register copy and loads deal with the saved values of the interrupted process. This feature would be most useful when some external analysis equipment, such as a logic analyzer, triggers the event. The breakpoint continues to fire if not inhibited inside the action list as long as the external event signal is active:

Following is a condition breakpoint example and the resulting system response

Breakpoint Definition

```

WHEN:COND=E!
DUMP:REG=PA!
INH:UTILFLAG=ME!
END:WHEN;

```

System Response

```

WHEN COND E STARTED HARD 1 #G5
WHEN COND E COMPL DISABLED 1 #G6

```

3.19.4.5 Breakpoint Manipulation Commands

Breakpoints can be allowed or inhibited from firing, their definitions can be cleared, and a summary of all breakpoints can be printed. The commands to manipulate breakpoints are given in Table 3-14. See the appropriate input or output message in 235-600-700 or 235-600-750, *Input Messages Manual* and *Output Messages Manual*, respectively, for details on any specific input message and for system responses.

Table 3-14 Breakpoint Manipulation Commands

TO	USE COMMAND	SYSTEM RESPONSE
Enable an individual breakpoint	ALW:UTILFLAG=a; where a = breakpoint number assigned when breakpoint was defined	ALW UTILFLAG a COMPLETED
Enable all breakpoints	ALW:UTIL;	ALW UTIL COMPLETED
Disable an individual breakpoint	INH:UTILFLAG=a ; where a = breakpoint number assigned when breakpoint was defined	INH UTILFLAG a COMPLETED
Disable all breakpoints	INH:UTIL;	INH UTIL COMPLETED
Cause a breakpoint to disable itself in an action list	INH:UTILFLAG=M ;	INH UTILFLAG ME COMPLETED
Display breakpoint status	OP:UTIL;	The OP:UTIL output includes: the breakpoint number, the utility ID (in hexadecimal), the process ID (in decimal), the address (in hexadecimal), length, the mode (R , W , RW , or EXC), and the state (ENABLED or DISABLED) for every breakpoint currently in the system. The mode is annotated with H for hardware items and the user process name, if specified. If no breakpoints are set up, the system response is as follows: OP UTIL COMPLETED NO FLAGS DEFINED
Clear all breakpoints	CLR:UTIL;	CLR UTIL COMPLETED

3.19.4.6 Override Commands

The input message, **IN:DTIME**, overrides the GRASP default dynamic real-time limit. See the appropriate input or output message in 235-600-700 or 235-600-750, *Input Messages Manual* and *Output Messages Manual*, respectively, for details on any specific input message and for system responses.

If GRASP uses all of the time it is allowed according to the value of the dynamic real-time limit, an output message is printed indicating that all GRASP breakpoints were inhibited. The breakpoints must be selectively reallocated.

The output message, **REPT GRASP DYNAMIC RESET**, indicates that a GRASP real-time limit override has expired and has been reset to the normal installation default value.

3.19.4.7 Trace

3.19.4.7.1 Trace Uses

GRASP supports a trace feature which permits the user to record and view the flow of program execution on the machine. The trace can be used in either of two ways: (1) to record the events leading to a target event or (2) to record program flow following a target event.

NOTE: The trace memory for the DUC is larger than the memory for the UC. The UN615 DUC holds 8192 entries, the UN61 DUC holds 2048, but the UC holds only 256 entries.

3.19.4.7.2 Trace Operation

This section describes trace states and transitions, discusses trace hardware issues, and gives details on trace options.

States and Transitions: The five operations available to trace program flow and the commands to implement these operations are shown in Table 3-15.

Table 3-15 Trace Operations

OPERATION	COMMAND
initialize	INIT:UMEM
start	ALW:UMEM
stop	INH:UMEM
dump	OP:UMEM
clear	CLR:UMEM

Any of these operations can be done as immediate operations. Only the commands to start and stop the trace are allowed in breakpoint action lists.

The trace can be in any one of the following states:

- Undefined
- New
- Running
- Stopped
- Dumped.

Before any trace command is executed, the trace state is checked and the command is rejected if it is logically incorrect for the trace state. The allowed transitions are shown in Figure 3-47 .

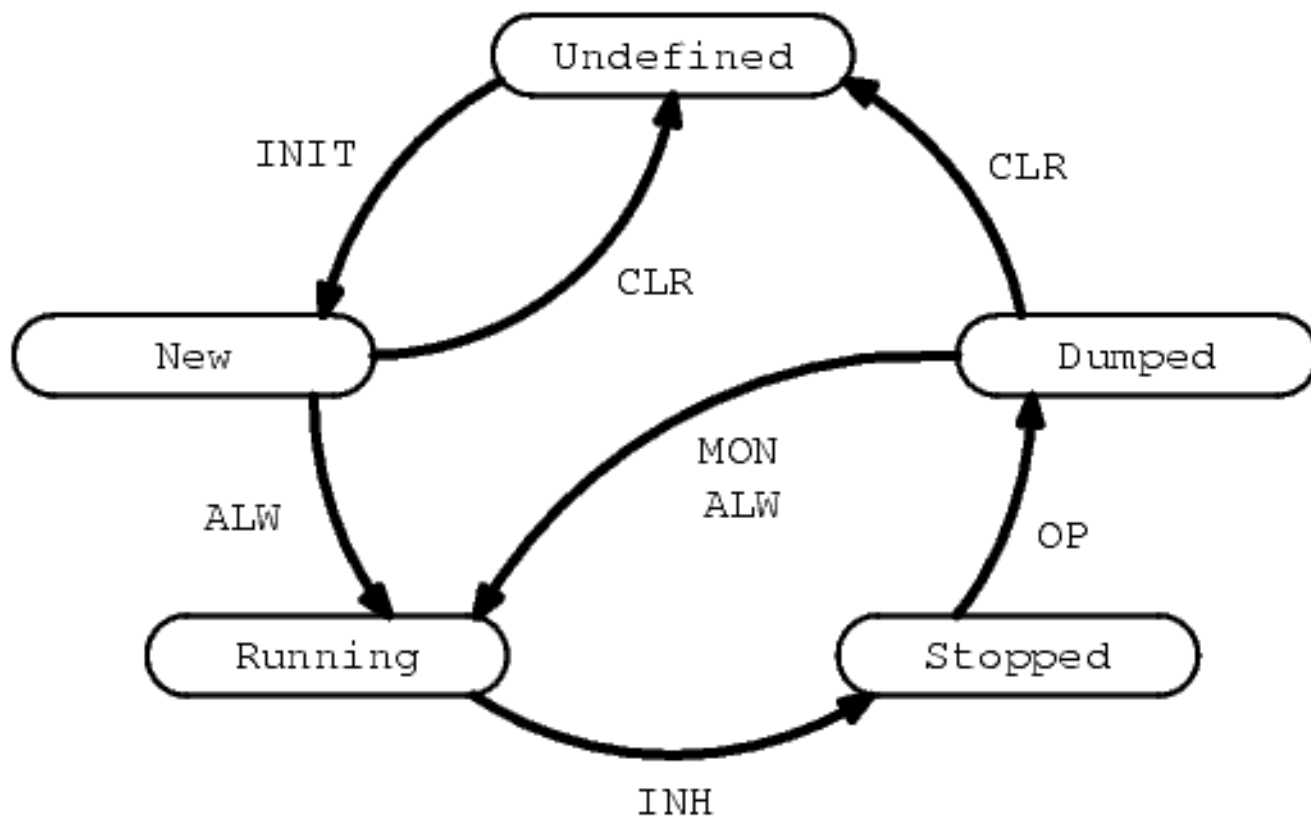


Figure 3-47 GRASP Transfer Trace State Diagram

For trace commands in breakpoint action lists, only minimal state checking is done when the breakpoint is defined. A command to start the trace is rejected if the trace is undefined. The full state check is done only at the time the breakpoint fires and the action list is executed. Rejected trace commands do not affect the rest of the action list processing.

The trace operations fall into two classes, slow and fast, according to the amount of data they move to or from the utility circuit. The slow operations initialize the trace and dump its memory. These operations currently take over 20 milliseconds and are performed at execution priority level 3. The other operations are fast and add little time when used in breakpoint action lists.

Hardware Issues: The trace is controlled by one of four utility circuit triggers depending on trace type. As long as a trace is defined, one of the utility circuit triggers is unavailable for breakpoints. The trigger used is also the one that allows a range of data addresses to be matched. When a trace is defined, the range matcher is unavailable and vice versa. This special trigger is marked with an asterisk in the output from the **OP:UTIL** input command for easy identification.

Hardware implemented execution breakpoints differ from software implemented execution breakpoints in one respect. That is, the breakpoint action list for a software implemented breakpoint is executed **before** the instruction where the breakpoint is set up. For a hardware implementation, the action list is executed **after** the instruction. This should be kept in mind when defining the breakpoint and interpreting its output.

Because only one matcher that traps the execution of an address is available on the utility circuit, only one execution breakpoint that controls the trace can be defined at one time. Starting a trace from an execution (**EXC**) mode breakpoint allows control of the transfer trace with two execution breakpoints.

In summary, when a trace is defined:

- The data access range matcher is unavailable for breakpoints.
- Only three data access breakpoints (at most) can be defined depending on trace type (two if an execution breakpoint controls the trace).

Trace Options: The following options are available to tailor the exact type of information that is recorded in the trace memory:

- *UID Trace*
- *Transfer Trace*
- *Data History Trace*
- *Simultaneous Data History and Transfer Trace*
- *Function Trace*
- *Function With Parameters Trace*
- *Simultaneous Data History and Function With Parameter Trace*
- *UID Restriction*
- *ADDR - Address Range Selection*
- *Stop When Full Versus Circular*
- *Stop Trace on Condition*

These options are described in the following paragraphs:

UID Trace: With this type of trace, the output indicates every process switch including those to the kernel and the special processes. For more details on how to read the trace output, see the Section 3.19.4.7.4 , Interpreting Trace Output Formats.

Because the trace memory is limited, the duration of the trace is inversely proportional to the amount of detail recorded. One way to get a long history of activity is to restrict the trace to store only the UIDs of the processes that run. This gives a good, long picture but little resolution.

Transfer Trace: An alternate method (which is the default) is to store the addresses involved in every nonsequential change in execution flow. That is, for every branch, jump, call, and return instruction, the address of the instruction (or **from** address) and the destination (or **to** address) are recorded. In addition, whenever a change in process occurs, the new process UID is recorded so the **to** and **from** address can be interpreted in context. This gives more detail than the UID-only option.

Data History Trace: The data history mode allows recording of the program data accesses. Each time a data access occurs, the trace memory records the data, the data address, a read/write flag, and the current program address. When an address range is specified on the **INIT:UMEM** input message, the block matcher is used and the trace only records data when a memory location within the range is accessed.

By using a UID comparator, the trace can be limited to a unique process.

Simultaneous Data History and Transfer Trace: A simultaneous data history and transfer trace records all data associated with a data history trace and a transfer trace with the exception of a load or store flag indicating data accesses. The data history and transfer trace data are previously described. Each time a nonsequential program instruction is fetched, the UN615 DUC board receives a signal from the 3B20D computer. When an address range is specified on the **INIT:UMEM** input message, the block matcher is used and the trace only records data when a read instruction, a write instruction or a transfer occurs within the address range.

Function Trace: The function trace memory mode records software function changes. The 3B20D computer native instructions, **SAVE** and **RETURN**, are set up using OPCODE matchers and any other conditions established by the **INIT:UMEM** input message. When a **SAVE** instruction is executed, the **CALL address** (the previous program address), the **SAVE address**, and the current UID value are recorded. Execution of **RETURN** instruction allows trace memory to record the **RETURN address** (the current program address), the following program address, and the current UID value.

When using an address range with function trace, the range specified must be matchable with a DUC address matcher. This is more restricted than UID, transfer, data history, or simultaneous data history and transfer traces (these traces use the block matcher and can therefore match on any specified address range). In order to use the address matcher for an address range, the starting and ending addresses must be of a form where the leftmost hex digits of both are equal, and the

rightmost digits of the starting address are all ``0" and the rightmost digits of the ending address are ``F" (for example, 0x123000 - 0x123FFF or 0x10000 - 0x1FFFF). A function trace uses two triggers.

Function With Parameters Trace: The trace of functions with parameters records call instruction address, save instruction address, and parameters pushed on the stack. The stack address and stack size may be specified with the **INIT:UMEM** input message. If these values are not supplied, default values are used. Unlike the function trace, return instructions are not recorded. The **ADDR** keyword may not be used with function and parameter traces to restrict the address range of function calls which are recorded. This is due to the difficulty in resolving which stack writes are due to function calls outside of an address range which would not be recorded.

An address matcher is used to detect stack writes. If a stack address and stack size are specified, they must specify an address range as described in the previous section. For example, the default stack address is 0x6A0000 and stack size is 0x1000. This specifies an address range of 0x6A0000 through 0x6A0FFF. A function with parameters trace uses two triggers.

Simultaneous Data History and Function With Parameter Trace: The simultaneous trace of data and functions with parameters trace records data history trace information (with the exception of the read/write flag) and function with parameter trace information. The data history and function with parameters traces were described in previous paragraphs.

As with the previous trace type, if a stack address and range are specified, they must describe a range that can be matched with an address matcher. In addition, if a data history address range is specified, it too must be of this form (for example, 0x2000 - 0x2FFF). This trace uses three triggers.

UID Restriction: A trace can be restricted to trace only while a particular process is running using the **UID** option. The UID specified on the input message is the *pcode* of the process to be traced. Any copy of the process with that pcode is traced; and since the UID recorded whenever the process changes includes the dct slot, multiple incarnations of a pfile can be distinguished.

ADDR - Address Range Selection: The **ADDR** keyword limits program tracing to the access of a specific word of memory or to a given range of addresses. When a trace uses the block matcher, any address range can be specified. This is the case for UID, transfer, data history, and simultaneous data history and transfer trace.

The function trace uses an address matcher to implement the ADDR range. This is more restricted and is described in the function trace section. The **ADDR** keyword is not implemented for function with parameter traces. For simultaneous data history and function with parameter traces, the **ADDR** keyword uses an address matcher to specify the data history address range.

Stop When Full Versus Circular: The trace can be set up either to automatically stop tracing when the memory fills up or to trace indefinitely, always replacing the old data with the new. This pair of options is used to set up the various scenarios of tracing as described in the next section. The options are independent of the type of data stored.

If the **STOP FULL** option is chosen, an output message is printed indicating that the trace stopped

for that reason.

Stop Trace on Condition: The **COND** keyword may be specified along with any combination of **E**, **M**, and **S** to stop a running trace if one of the following conditions occurs:

- E:** Stop the trace if an external event occurs. This is triggered by the external event backplane signal on the DUC board.
- S:** Stop the trace if a hardware stop-and-switch occurs.
- M:** Stop the trace if a hardware maintenance reset function occurs.
- E:** Stop the trace if an external event occurs. This is triggered by the external event backplane signal on the DUC board.
- S:** Stop the trace if a hardware stop-and-switch occurs.
- M:** Stop the trace if a hardware maintenance reset function occurs.

The condition matcher uses another trigger for trace.

3.19.4.7.3 Trace Scenarios

The following paragraphs describe the most common trace scenarios. The trace input messages and associated output messages are shown in the Table 3-16 .

Table 3-16 Trace Input/Output Messages

INPUT MESSAGE	OUTPUT MESSAGE
INIT:UMEM	INIT UMEM
ALW:UMEM	ALW UMEM
INH:UMEM	INH UMEM
OP:UMEM	OP UMEM
CLR:UMEM	CLR UMEM

See the appropriate input or output message in 235-600-700 or 235-600-750, *Input Messages Manual* and *Output Messages Manual*, respectively, for details on any specific input message and for system responses.

Before Trace: To record the sequence of execution that precedes a known event, do the following:

- (1) Decide what type of trace to use. There are seven trace types:
 - UID Trace
 - Transfer Trace
 - Data History Trace
 - Simultaneous Data History and Transfer Trace
 - Function Trace
 - Function With Parameters Trace
 - Simultaneous Data History and Function With Parameter Trace.

- (2) Decide whether to restrict the trace to a particular UID or PID or to allow all processes to be traced. These decisions depend on the scope of the problem being debugged (system wide versus internal to a process) and the length of history needed.
- (3) Start the trace in the circular mode and define a breakpoint to trap the target event and stop the trace. When the breakpoint fires and the trace stops, the history leading up to the event is in the trace memory.

After Trace: To see the sequence of execution that occurs after a target event, do the following:

- (1) Decide what type of trace to use. There are seven trace types:
 - UID Trace
 - Transfer Trace
 - Data History Trace
 - Simultaneous Data History and Transfer Trace
 - Function Trace
 - Function With Parameters Trace
 - Simultaneous Data History and Function With Parameter Trace.
- (2) Decide whether to restrict the trace to a particular UID or PID or to allow all processes to be traced. Another option is to restrict the trace to a particular PID.
- (3) Configure the trace to stop when trace memory is full.
- (4) Define a breakpoint to trap the target event and start the trace.

Between Trace: A trace can be set up to record data between two target events (up to the memory limit of the utility circuit installed). The breakpoint used to trap one target event starts the trace and another breakpoint defined for the other event stops the trace. To record this information, do the following:

- Use the **STOP FULL** option on the **INIT** command to indicate whether any data gets lost because of the finite size of the trace memory. The data lost, if any, is the new data. If the new data is needed, repeat the trace in the **CIRCULAR** mode. In the circular mode, the old data is lost, preserving the new data.
- Use the **UID** option to restrict the trace to those processes from a particular pfile or the **PID** option to restrict the trace to a particular process incarnation.
- Because of utility circuit hardware restrictions, choose the two breakpoints carefully.
- An execution breakpoint that starts the trace is implemented in software.

3.19.4.7.4 Interpreting Trace Output Formats

UID and Transfer Output Formats

The trace memory dumped by the **OP:UMEM** command is printed in order, oldest to newest, row by row. Every

entry is one of three types as follows:

- (1) **utility id** marked with **U**
- (2) **from** address marked with **F**
- (3) **to** address marked with **T**

The utility id entries are 24-bit hexadecimal numbers that are presented in the format shown as follows. The rightmost 12 bits (three hexadecimal digits) are the process pcode. The leftmost eight bits (two hexadecimal digits) are the dct slot. The remaining hexadecimal digit is unused.

23	16	15	12	11	0
dct slot (8)		unused (4)		pcode (16)	

Utility id Print Format

A process identification (pid) consists of a dct slot or index (of which the higher order byte is always zero) and an incarnation count as shown as follows.

31	16	15	8	7	0
incarnation count (16)				dct slot (16)	

Process id

An easy correspondence can be made between the trace UID entries and the pids if the pids are expressed in hexadecimal. In kernel processes, the

OP:STATUS:PROCESS, ALLKERNs;

command prints out the dct slot directly; however, it is in decimal and must be converted.

The address entries are all virtual addresses within the process indicated by the most recent preceding UID entry in the trace memory. Any **from** address is the address of a branch, jump, call, or return instruction that was executed. The following **to** address is the address to which control transferred. Occasionally two **to** addresses are recorded adjacent to each other. This implies that the first **to** address itself caused a transfer of control (not an uncommon occurrence in compiler generated code). Between any **to**, **from** pair, the code was executed without branching.

NOTE: Although the disassembler decodes the **a1** OP CODE as a 4-byte return instruction, the microcode (and hence the trace output) treats it differently. The **a1** is really a 2-byte no-op instruction. The actual return instruction is the 2-byte **7b** instruction. As a result, the **from** address recorded for a return is the address of the **7b** -- two bytes beyond the return indicated in the disassembly listing.

Typically with the UN21 utility circuit, several **to** and **from** addresses precede the first UID entry in a transfer trace. If it is important to know (but not obvious) what process they belong to, rerun the same trace scenario with the **STORE UID** option on the **INIT:UMEM** command. Working backwards from the end of the two dumps, UID entries can be matched to determine the UID of the early transfers in the first trace.

Data History Trace Format: The data history trace records the program address at which a specified address is being accessed, the data address, a read or write flag, and the data value. The format for this trace is displayed in the following example:

DATA HISTORY TRACE

PROGRAM ADDRESS	DATA ADDRESS		DATA
000076	3c0034	<-	00000004
00005e	3c0034	->	00000004
00007c	3c0034	->	00000004
000090	020068	<-	61000000

The leftmost column contains the program address accessing a specified memory address or address within a specified range of memory addresses. The center column contains the data address, and the rightmost column contains the data value. A read operation on the data address is indicated by a right arrow -> and a write operation by a left arrow <-.

Function Trace Format

The function trace records calls and returns, the address branched to, and the utility ID. A sample of the output is as follows:

FUNCTION TRACE			
CALL OR RETURN ADDRESS		SAVE OR RETURN-TO ADDRESS	UID
0000a8	call	000248	00000900c0
000272	call	000420	00000900c0
000260	reto	000276	00000900c0
000300	reto	0000ac	00000900c0

Output lines contain keywords, **call** or **reto**, in the second column to indicate a call or return. Calls and their respective returns are indented equal amounts to reflect nesting. For calls, the first column contains the address of the call instruction. The third column contains the save address branched to. For returns, the first column contains the address of the return instruction, and the third column lists the program address being branched to. The fourth column contains the utility ID for both calls and returns.

Simultaneous Transfer Trace and Data History Format

This trace records transfer trace and data history trace. A sample of the output is given as follows.

SIMULTANEOUS TRANSFER AND DATA HISTORY TRACE			
PROG ADD		DATA ADD	DATA VALUE
FROM-ADD		TO-ADD	UID
000026	goto	020010	?61000000
00002e		020011	?00620000
00029a	goto	00029c	u=0x17d (282fa0)
000029e		6a0190	?000001a6

The indented output represents data history. The lines not indented represent program transfer trace data. The left column of the program trace is the **from program address**. The middle column is the **to program address**, and the right column is the **uid** of the **to address**. The data history's left column is the **program address**. The middle column is the **data address**, and the right column is the **data**. With the simultaneous transfer and data history trace, it is not possible to know whether the data history trace is a read or a write, thus a question mark is inserted in data history trace output.

Function With Parameter Trace Format: The function with parameter trace records function calls and full-word data write accesses on the process stack. A sample of the output follows:

FUNCTION TRACE WITH PARAMETERS PASSED		
CALL ADD	SAVE ADD	PARAMETERS/AUTOMATICS
000120	0002d4	(0x00000019)
0001a0	000258	(0x0000000a,0x00000020,
		0x00000000,0x00000002)
000280	0002a0	?(0x00000000,0x00000002)

The left column provides the program address of the call instruction. The next column contains the save instruction address. The remaining one or more columns enclosed within parentheses contain the parameter(s) pushed; where the last parameter pushed appears first in the list. The automatics from the previous function may also appear with

the parameters. When it is unclear which parameters were pushed on the stack, a ``?" precedes the left parenthesis.

Simultaneous Data History and Function Trace Format: This trace records the data history and function trace. A sample of the output is given as follows:

SIMULTANEOUS DATA HISTORY AND FUNCTION TRACE FORMAT		
PROG ADD	DATA ADD	DATA VALUE (data history)
CALL ADD	SAVE ADD	PARAMETERS/AUTOMATICS (function)
0000a4	0001d8	?(0x00000005,0x00000045)
000d0	0001a8	?(0x00000002,0x00000063)
000112	020038 ?	0x00000045
00011c	02003c ?	0x61000000
000126	020040 ?	0x00034567

The indented output is the function call with its parameters. Among these parameters, the automatics from the previous function may also appear. The left column is the call instruction address. The next column is the save instruction address. The next column is the parameter pushed, and the rightmost column is an automatic from the previous function.

The unindented output is the data history for the data range specified. The left column is the program address. The middle column is the data address, and the right column is the data value. The left arrow, <-, means that the data was written. The right arrow, ->, means that the data was read.

3.19.4.8 UNIX[®] RTR Operating System Process Information

Table 3-17 lists information about the UNIX[®] RTR operating system processes.

Table 3-17 UNIX[®] RTR Operating System Process Information

LISTING NAME	MODE ^a	L ^b	UID#s HEX	GRASP PATH NAME	DESCRIPTION
DSCH	K	10			Dual serial channel driver
bf:3bnub	S	0	h'9		Creates supervisor process
bf:3bpmgr	S	0	h'5		Process Manager
bf:3bsgen.kern		ALL	h'A		KERN - Kernel Interrupt Handling Routines
bf:3bsgen.kern	K	2	h'1		MMGR - Memory Manager
bf:3bsgen.kern	K	2	h'2		CMGR - Capability Manager
bf:3bsgen.kern	K	2	h'3		UMGR - Utility Manager
bf:3bsgen.kern	K	2	h'6		KAUDPRC - Kernel Audits Process
bf:3bsgen.kern	K	2	h'9		SCHED - Scheduler
bf:dkdrv	K	10	h'C1		Disk driver
bf:eih	K	15	h'83		Error Interrupt Handler
bf:fifo			h'17		FIFO driver
bf:fmprc	K	7	h'4		File Manager
bf:inhadm	K	4	h'86		Error Source Inhibit Administrator
bf:pcpaud.g	K	7	h'85		Hardware audit
bf:plib				/usr/3blib/pllib	Plant measurements library
bf:prcpkillp			h'16		pkill by pathname
bf:simprc	K	13	h'187		System Integrity Monitor
bn:abt	U	0	h'51	abt	Abort diagnostic
bn:alw	U	0	h'6B	alw	Allow diagnostic requests from a source
bn:dgn	U	0	h'52	dgn	Run diagnostic
bn:ducbb	U	0	h'53	ducbb	Display UCB information
bn:ex	U	0	h'54	ex	Interactive diagnostic
bn:inh	U	0	h'55	inh	Inhibit diagnostic request source
bn:ldparm	U	0	h'56	ldparm	Load parameters for

					diagnostic
bn:loop	U	0	h'57	loop	Loop in a diagnostic phase
bn:pause	U	0	h'58	pause	Pause within a diagnostic phase
bn:ports	U	0	h'59	ports	Display process IDs connected to ports
bn:rmv	U	0	h'5A	rmv	Remove a unit from service
bn:rst	U	0	h'5B	rst	Restore a unit to service
bn:sta	U	0	h'5C	sta	Report status of all diagnostic requests
bn:step	U	0	h'5D	step	Step through a diagnostic phase
bn:stop	U	0	h'5E	stop	Stop looping in a diagnostic phase
bn:tlpscn	U	0	h'5O	tlpscn	Trouble Location Process scan
cf:DEL/LOG	U	0	h'213	DEL	
cf:OP/LOG	U	0	h'214	OP	
cf:OP/MAP	U	0	d	OP	
cf:RTE	U	0	d	RTE	
cf:TEST	U	0	h'217	/cft/shl/cmds1/TEST	
cf:acp	U	0	h'205	acp	Alarm Control Process
cf:ccdate	U	0	h'212	/etc/ccdate	
cf:cdgetty			h'20D		
cf:cia	U	0	h'202	/cft/dap/cia	Critical Indicators Administrator
cf:cmon	U	0	h'201	/cft/cmon/cmon	Craft Interface Monitor
cf:csop	U	0	h'209	csop	Coordinator of Spooler Output Processes
cf:dap	U	0	h'203	dap	
cf:errport	U	0	h'200	/bin/errport	
cf:inph	U	0	h'210	/cft/dap/inph	
cf:msgsh	U	0	h'211	/cft/dap/msgsh	
cf:opgaud	U	0	h'20C	/cft/bin/opquad	
cf:pdsgetty	U	0	h'207	/cft/bin/pdsgetty	
cf:pdshl	U	0	h'208	/cft/bin/pdshl	
cf:pdshlA			h'20E		
cf:poker			h'204	/cft/dap/poker	
cf:rts	U	0	h'206	rts	Real-time status report of the common hardware units of the 3B20D computer
cf:sip	U	0	h'20A	/cft/bin/sip	
cf:sop	U	0	h'20B	sop	
cf:splgetty			h'20F		
cm:banner	U	0	h'241	/bin/banner	Make posters
cm:binpkill			h'242	pkill	
cm:binkillp			h'243	killp	
cm:cat	U	0	h'245	/bin/cat	Concatenate and print files
cm:chgrp	U	0	h'246	/bin/chgrp	Change group
cm:chmod	U	0	h'247	/bin/chmod	Change mode of a file
cm:chown	U	0	h'248	/bin/chown	Change owner, group of a file
cm:cmp	U	0	h'249	/bin/cmp	Compare two files
cm:cp	U	0	h'24A	/bin/cp	Copy, link, or move files
cm:cpio	U	0	h'24B	cpio	Copy file archives in and out
cm:date	U	0	h'24E	/bin/date	Print or set the date
cm:diff	U	0	h'250	/bin/diff	Differential file comparator
cm:dlsu			h'251		
cm:du	U	0	h'252	/bin/du	Summarize disk usage
cm:echo	U	0	h'253	/bin/echo	Echo arguments
cm:ed	U	0	h'254	/bin/ed	Text Editor
cm:env	U	0	h'255	/bin/env	Set environment for command execution
cm:expr	U	0	h'256	/bin/expr	Evaluate arguments as an expression
cm:falloc	U	0	h'257	/bin/falloc	Allocate space for contiguous file

cm:fgrep	U	0	h'258	/bin/fgrep	Search a file for a pattern
cm:find	U	0	h'259	/bin/find	Find files
cm:fmove	U	0	h'25A	/bin/fmove	Move file into contiguous area
cm:fsize	U	0	h'25B	/bin/fsize	Get size of file
cm:getty	U	0	h'10	/etc/getty	Set the modes of a TTY
cm:grep	U	0	h'25C	/bin/grep	Search a file for a pattern
cm:hd	U	0	h'25D	/bin/hd	
cm:id	U	0	h'25E	/bin/id	Print user and group ID
cm:init	U	0	h'11	/etc/init	Process control initialization
cm:kill	U	0	h'25F	/bin/kill	Terminate a process
cm:kpskill	U	0	h'262	/bin/kpskill	Terminate a kernel process (supervisor)
cm:line	U	0	h'263	/bin/line	Read one line
cm:ln	U	0	h'264	/bin/ln	Link
cm:logdir	U	0	h'265	/bin/logdir	Get login directory
cm:ls	U	0	h'266	/bin/ls	List contents of directory
cm:mail	U	0	h'268	/bin/mail	Send mail to users or read mail
cm:makekey	U	0	h'269	/usr/lib/makekey	Make encryption key
cm:mesg	U	0	h'26A	/bin/mesg	Permit or deny messages
cm:mkdir	U	0	h'26B	/bin/mkdir	Make a directory
cm:mv	U	0	h'267	/bin/mv	
cm:ncpio			h'26C		
cm:newgrp	U	0	h'26D	/bin/newgrp	Log in to a new group
cm:news	U	0	h'26E	/bin/news	Print news items
cm:nice	U	0	h'26F	/bin/nice	Run a command at low priority
cm:nohup	U	0	h'270	/bin/nohup	Run a command immune to hangups and quits
cm:od	U	0	h'271	/bin/od	Octal dump
cm:pio	U	0	h'273	/bin/pio	Physical I/O
cm:pkill	S	0	h'B		Terminate a process (super-user)
cm:pr	U	0	h'274	/bin/pr	Print files
cm:pwd	U	0	h'27A	/bin/pwd	Print working directory name
cm:rm	U	0	h'27B	/bin/rm	Remove files
cm:rmdir	U	0	h'27C	/bin/rmdir	Remove directories
cm:run	U	0	h'27E	/bin/run	
cm:sdiff	U	0	h'27F	/bin/sdiff	Side-by-side difference program
cm:sed	U	0	h'292	/bin/sed	Stream Editor
cm:sh	U	0	h'13	/bin/sh	Shell, the standard command programming language
cm:sleep	U	0	h'280	/bin/sleep	Suspend execution for an interval
cm:sort	U	0	h'281	/bin/sort	Sort or merge files
cm:split	U	0	h'282	/bin/split	Split a file into pieces
cm:stat	U	0	h'283	/bin/stat	
cm:stty	U	0	h'284	/bin/stty	Set and retrieve terminal modes
cm:su	U	0	h'285	/bin/su	Become super-user or another user
cm:sum	U	0	h'286	/bin/sum	Sum and count blocks in a file
cm:sync	U	0	h'288	/bin/sync	Update super-block
cm:tail	U	0	h'289	/bin/tail	Deliver the last part of a file
cm:tee	U	0	h'28A	/bin/tee	Pipe fitting
cm:time	U	0	h'28B	/bin/time	Get a date and time
cm:touch	U	0	h'28C	/bin/touch	Update access and modification times of a file
cm:tty	U	0	h'28D	/bin/tty	Get a terminal's name
cm:uname	U	0	h'28E	/bin/uname	Get name of current system
cm:update	U	0	h'14	/etc/update	
cm:wc	U	0	h'28F	/bin/wc	Word count
cm:who	U	0	h'290	/bin/who	Who is on the system
cm:write	U	0	h'291	/bin/write	Write to another user
dg:3bmsb	U	0	h'6A	3bmsb	CCIOBUS/DSCH simulator diagnostic
dg:ALW:DGN	U	0	h'44	DGN	Allow diagnostic requests from a source

dg:DGN	U	0	h'45	DGN	Run diagnostic
dg:EX	U	0	h'46	EX	Interactive diagnostic
dg:EX/LDPARM	U	0	h'48	LDPARM	Load parameters for diagnostic
dg:EX/LOOP	U	0	h'49	LOOP	Loop in a diagnostic phase
dg:EX/PAUSE	U	0	h'4A	PAUSE	Pause within a diagnostic phase
dg:EX/STEP	U	0	h'4E	STEP	Step through a diagnostic phase
dg:EX/STOP	U	0	h'4F	STOP	Stop looping in a diagnostic phase
dg:INH/DGN	U	0	h'47	DGN	Inhibit diagnostic request source
dg:OP/DGN	U	0	d	DGN	Report status of all diagnostic requests
dg:RMV	U	0	h'4B	RMV	Remove a unit from service
dg:RST	U	0	h'4C	RST	Restore a unit to service
dg:STOP/DGN	U	0	h'7	DGN	Abort diagnostic
dg:cdt	K	3	h'C6		Ost - CCIOTBUS/DSCH link diagnostic driver (dschex.g)
dg:cdt	K	5	h'C6		Event - CCIOTBUS/DSCH link diagnostic driver (dschex.g)
dg:cudiagc	U	0	h'67	cudiagc	CU diagnostic control
dg:dfdiag	U	0	h'63	dfdiag	DFC diagnostic control
dg:dfrmv	U	0	h'66	dfrmv	DFC remove/restore
dg:inhtimer	U	0	h'5F	inhtimer	Inhibit duration timer
dg:iodiag	U	0	h'64	iodiag	IOP diagnostic control
dg:iormv	U	0	h'65	iormv	IOP remove/restore
dg:mhdtlp	U	0	h'61	mhdtlp	Moving Head Disk Trouble Location Process
dg:mira	U	0	h'42	mira	Maintenance Input Request Administrator
dg:ppdiamon	U	0	h'60	ppdiamon	Diagnostic Monitor
dg:STA			h'4D		Status command Distributor Administrator (prc)
dg:tlp	U	0	h'62	tlp	Trouble Location Process
dp:scsd	K	4	h'12E		Fault - Scanner and Signal
ec:RCV/MENU	U	0	h'307	RCV	
ec:RCV/SPAWN	U	0	h'308	RCV	
ec:cdn	K	3	h'41		Fault - ECD Manager
ec:cdn	K	3	h'41		Ost - ECD Manager
ec:cdn	K	5	h'41		Event - ECD Manager - gives user and supervisor processes restricted access to the ECD
ec:createdb	U	0	h'309	/usr/bin/createdb	Create DB template for ECD and SG data bases
ec:ecdaud.g	K	3	h'1A0		Audit of internal ECD structures
ec:ecdlib					ECD access functions - this is a public library
ec:evol	U	0	h'304	/usr/bin/evol	Evolve a data base
ec:loadf3b	U	0	h'301	/usr/bin/loadf3b	Make core image of ECD from a standard SDP address space
ec:rcv3b	U	0	h'30A	/usr/bin/rcv3b	3B20D Computer Recent Change/Verify
ec:sdfinfo			h'302		
ec:sdfrii			h'303		
ec:transgen	U	0	h'305	/usr/bin/transgen	Evolution translation data base generate
ec:treebld	U	0	h'306	/usr/bin/treebld	TREE build (to be used in translation data base generation for evolution)

fo:3btprt	U	0	h'2D6	/prc/3btprt	Physical Disk to Tape Writer
fo:gspovmon	K	3	h'111		Graph Overload Monitor
fo:PDSed	U	0	h'2C3	/usr/bin/PDSed	PDS editor controller
fo:STOP/BKDSK	U	0	h'2D8	STOP	Stop backup disk to tape (PDT)
fo:STOP/GEN	U	0	h'2E6	STOP	Generic update STOP - stop any SUPR process
fo:UPD/GEN/ACK	U	0	h'2DF	UPD	PDSHL interface for acknowledgement process
fo:UPD/GEN/BACKO	U	0	h'2E0	UPD	PDSHL interface for ``backout"
fo:UPD/GEN/COMMI	U	0	h'2E1	UPD	PDSHL interface for ``commit"
fo:UPD/GEN/ENTER	U	0	h'2E2	UPD	PDSHL interface for ``enter"
fo:UPD/GEN/PROCE	U	0	h'2E3	UPD	PDSHL interface for ``proceed"
fo:UPD/GEN/READL			h'2E4		System updates readlog
fo:UPD/GEN/RESTO	U	0	h'2E5	UPD	PDSHL interface for ``restore"
fo:ack	U	0	h'2DC	/prc/supr/ack	System update acknowledgement process
fo:applhook	U	0	h'2DD	/prc/supr/applhook	
fo:backout	U	0	h'2EA	/prc/supr/backout	Process for backout of new generic
fo:cmdctrl	U	0	h'2C4	/prc/cmdctrl	PDSFMC controller
fo:commit	U	0	h'2E8	/prc/supr/commit	Process for committing to a new generic
fo:continue			h'2D7		Tape Writer continue
fo:enter	U	0	h'2EB	/prc/supr/enter	New generic entry process
fo:gspac	K	14	h'112	/prc/gspac	GRASP Action Controller (prc)
fo:gspop	U	0	h'114	/prc/gspop	GRASP Output Processor
fo:gspshl	U	0	h'113	/prc/gspshl	GRASP Shell (parser)
fo:pdsop	U	0	d	/prc/pdsop	PDSFMC
fo:pldmon	K	3	h'117		Plant Measurement Data Base Monitor
fo:proceed	U	0	h'2EC	/prc/supr/proceed	Preparation for reboot on new generic for proceed with System Update
fo:prtcp	U	0	h'2ED	/bin/prtcp	System Update partition copy
fo:readlog	U	0	h'2DE	/prc/supr/readlog	Read SUPR log (output to MTTY and ROP)
fo:restore	U	0	h'2E9	/prc/supr/restore	Restore old generic
fo:stop			h'2E7	/prc/supr/stop	
fo:tpack	U	0	h'2DA	/prc/tpack	BKDSK acknowledgement (PDT)
fo:tpstop	U	0	h'2DB	/prc/tpstop	Stop BKDSK (PDT)
fo:urun	U	0	d	/bin/urun	Run a user's process
fr:ALW/ERRLOG	U	0	h'93	ALW	allow CONFIG error logging
fr:ALW/REX	U	0	h'90	ALW	Allow routine exercises
fr:INH/ERRLOG	U	0	h'95	INH	Inhibit CONFIG error logging
fr:INH/REX	U	0	h'91	INH	Inhibit routine exercises
fr:OP/OOS	U	0	h'88	OP	Output list of out-of-service units
fr:OP/REXINH	U	0	h'92	OP	Output list of Routine Exercise inhibits
fr:SW/CU	U	0	h'96	SW	
fr:adp.ab	U	0	h'8F	/etc/adp.ab	Auto restoral of HW units after
fr:adp.af	U	0	h'87	/etc/adp.af	Auto restoral of HW units after faults
fr:cdm	K	3	h'82		Event - Processor Control Process and Maintenance Driver
fr:cdm	K	3	h'82		Ost - Processor Control Process and Maintenance Driver

fr:cdm	K	4	h'82		Fault - Processor Control Process and Maintenance Driver
fr:curstrmv	U	0	h'97	/unixutil/cu/curstrmv	CU restore/remove
fr:rex	U	0	h'89	/etc/rex	Routine Exercise program
fr:rmf	U	0	h'84	/cft/misc/rmf	Recovery Message Formatter
fu:3bswab	U	0	h'109	/bin/3bswab	Guarantees various fields in symbol table and section header are swabbed in any 3B20D computer common-object-formatted file
fu:UPD/UCNTL	U	0	h'102	UPD	Field Update Control program
fu:dufr	S	0	h'104		Dynamic Update for Function Replacement (prc)
fu:fufmgr	S	0	h'10A		Field Update File Manager
fu:kop	K	3	h'105		Event - Kernel Overwrite Process (prc)
fu:kop	K	4	h'105		Fault - Kernel Overwrite Process (prc)
fu:ogen	U	0	h'107	/prc/ogen	Overwrite generation program
fu:oidd	U	0	h'106	/prc/oidd	Bound Overwrite Incremental Loader
fu:prchk	S	0	h'103		Process Checker (prc)
gn:isgen	U	0	h'11E	/bin/isgen	Incremental SGEN - needed to recreate a boot image
gn:mkdsk			h'11D	/etc/mkdsk	
ll:browse	U	0	h'11F	/usr/lib/browse	Formatted debugger for data bases
of:fsdb	U	0	h'1C	/etc/fsdb	File system debugger
os:cdi	K	3	h'F		Ost - Memory driver for /dev/*mem (prc)
os:cdi	K	4	h'F		Event - Memory driver for /dev/*mem (prc)
os:cdi	K	4	h'F		Fault - Memory driver for /dev/*mem (prc)
os:clrfs	U	0	h'18	/etc/clrfs	Construct a file system
os:clri	U	0	h'19	/etc/clri	Clear an i-node
os:cron	U	0	h'15	/etc/cron	Clock daemon
os:df	U	0	h'1A	df	Report on free space of a file system
os:dgnnm	U	0	h'1B	/etc/dgnnm	Assign special diagnostic filename
os:ichk	U	0	h'1D	/etc/ichk	File system consistency check
os:mkmnttab	U	0	h'1E	/etc/mkmnttab	Configure mount table
os:mknod	U	0	h'1F	/etc/mknod	Build special file
os:mount	U	0	h'20	/etc/mount	Mount a file system
os:ps	U	0	h'21	ps	Print process status
os:udgnnm	U	0	h'22	/etc/udgnnm	Release special diagnostic filename
os:umount	U	0	h'23	/etc/umount	Dismount a file system
os:unix	S	0	h'7		Entry - UNIX [®] System supervisor (prc)
os:unix	S	0	h'7		Fault - UNIX [®] System supervisor (prc)
os:unix	S	0	h'7		Ost - UNIX [®] System supervisor (prc)
os:unix	S	1	h'7		Event - UNIX [®] System supervisor (prc)
os:vcp	U	0	h'24	/etc/vcp	Volume copy
pd:ALW/SCSD	U	0	h'D3	ALW	
pd:CONFIG/PORTSW	U	0	d	CONFIG:PORTSW :cmds	Portswitch command interpreter
pd:INH/SCSD	U	0	h'D4	INH	

pd:INIT/MHD	U	0	d	INIT	Initialize (format) a disk pack
pd:OP/SCSD	U	0	h'D5	OP	
pd:ORD/SCSD	U	0	h'D6	ORD	
pd:SET/IODRV	U	0	d	SET	IOP driver option processor
pd:SW/PORTSW	U	0	d	SW	Portswitch command interpreter
pd:VER/MHD	U	0	h'CE	VER	Verify the format of a disk pack
pd:bde	K	10	h'C1		Disk driver
pd:drpcp	S	1	h'C7		Fault - PC Pump
pd:psm	U	0	h'C3	/prc/psm	Power Switch Monitor
pd:ptswsdint	U	0	h'C8	/etc/ptswsdint	
pd:s_update	S	0	h'C4	/prc/s_update	Fault - Duplex disk restore
pd:s_update	S	0	h'C4	/prc/s_update	Start - Duplex disk restore
pd:s_update	S	1	h'C4	/prc/s_update	Event - Duplex disk restore
pd:scsd	K	4	h'C2		Event - Scanner and Signal Distributor Administrator (prc)
pf:cdq	K	3	h'1C4		Event - (prc)
pf:cdq	K	3	h'1C4		Fault - (prc)
pf:cdq	K	3	h'1C4		Ost - (prc)
si:ABT/AUD	U	0	h'322	ABT	Abort and audit
si:ALW/AUD	U	0	h'323	ALW	Allow and audit
si:AUD	U	0	h'324	AUD	Request an audit
si:CLR/AUD	U	0	h'325	CLR	Clear an audit
si:INH/AUD	U	0	h'326	INH	Inhibit an audit
si:INIT/ULARP	U	0	h'32E	INIT/ULARP	Initialize ULARP
si:OP/AUD	U	0	h'327	OP	Output the status of an audit
si:SET/AUD	U	0	h'328	SET	Set and audit
si:audmgr	S	0	h'191		Entry point - Audit Manager
si:audmgr	S	0	h'191		Fault - Audit Manager
si:audmgr	S	0	h'191		Start - Audit Manager
si:audmgr	S	1	h'191		Event - Audit Manager
si:fsaudit	K	3	h'192		File System Audit (prc)
si:fsmon	U	0	h'8A	/etc/fsmon	File System Overflow Monitor
si:klmon	K	3	h'186		Kernel-level Overload Monitor (prc)
si:suovprc	S	0	h'188		Supervisor/User-level Overload Monitor Process
si:ularp	U	0	h'8B	/etc/ularp	UNIX [®] System Level Automatic Restart Process

Notes:

- a. K=Kernel, S=Supervisor, U=UNIX[®] system.
- b. Execution Level.
- c. UNIX[®] is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited.
- d. Unknown at time of publication.

3.19.5 RING GENERIC ACCESS PACKAGE (RGRASP)**3.19.5.1 Description**

The RGRASP, a troubleshooting tool with an MML interface, is a single-user utility system for the Common Network Interface (CNI) ring nodes. The user interface is based on the GRASP tool found in the AM. However, several major differences exist, and the user should be familiar with RGRASP capabilities before using the tool.

No new hardware is required for the RGRASP tool.

CAUTION: Although RGRASP can be used by the craft, care should be exercised. Improper use of RGRASP can result in program mutilation or excessive utilization of system resources, both of which can lead to call

processing down time.

3.19.5.2 Software Overview

The current implementation consists of four processes; three in the AM and the fourth (monitor) in the DLN AP. The four processes are as follows:

- **RGP_KER:** This is a *UNIX*® system process kernel for the feature. It acts as the interface between the AM (RGP_CFT and RGP_PRT) and the ring node (monitor) processes. This process has to be killed-off in order to install the new version if it is updated via software update procedures.
- **RGP_CFT:** This is a *UNIX*® system process called to handle input messages from the craft shell. It parses and performs some preliminary checks on the input command and then relays it to the RGP_KER process for further processing.
- **RGP_PRT:** This is a *UNIX*® system process that handles printing of output. Message class SWM01 is used for the output.
- **Monitor:** This is a system process that performs the actual operations required to handle breakpoints, memory dumping, and memory loading. It communicates with the RGP_KER process.

3.19.5.3 Capabilities

RGRASP capabilities consist of the following:

- READ memory in a ring node with the **DUMP:RUTIL** command.
- WRITE memory in a ring node with the **LOAD:RUTIL** command.
- Perform actions on breakpoints in ring node memory as follows:
 - Set breakpoints in ring node memory with the **WHEN:RUTIL** command.
 - Determine status of breakpoints with the **OP:RUTIL** and **OP:RUTILFLAG** commands.
 - Temporarily disable breakpoints with the **INH:RUTIL** and **INH:RUTILFLAG** commands.
 - Completely remove breakpoints with the **CLR:RUTIL** and **CLR:RUTILFLAG** commands.
 - Enable/allow breakpoints with the **ALW:RUTIL** and **ALW:RUTILFLAG** commands.

For detailed explanations, refer to 235-600-700, *Input Messages Manual* and 235-600-750, *Output Messages Manual*.

3.19.5.4 Operations Example

3.19.5.4.1 Overview

Initial Setup

Determine the address in memory that requires investigation by using the latest PR/PK listings provided. In other cases, these addresses may be provided by a field support organization.

Determine which processor is to be looked at (the DLN has an active and a standby processor). Use command **OP:SLK** or poke MCC Page 118 to determine this.

Setting Breakpoints

As a precaution, set breakpoints in only one processor at a time.

Before setting a breakpoint in a program, the opcode code (OPC) must be known. Verify the OPC by using the **DUMP:RUTIL** command to dump the memory at the breakpoint address. If the expected OPC does not match the dump output, then the listings don't match the memory. At this point, don't go any further until the discrepancy is resolved.

One possible explanation for the discrepancy is that the node software is out of date. To eliminate this possibility, remove and restore the target node (node to be breakpointed) to make sure that the newest version of the code has been pumped from the disk. Use the **RMV:LN** and **RST:LN** commands or MCC Page 118 pokes to achieve this. After the node has been pumped, try dumping the breakpoint address again. If it doesn't match up now, the listing is out of date. In this case, stop and get a current listing before proceeding.

To set a breakpoint at address h'XXXXXX which has an opcode of h'YYYY, use the following command:

< WHEN:RUTIL=32-2,AP,ADDR=h'XXXXXX,OPC=h'YYYY;

After the command is entered, the user is prompted for the action list. It is best to use the most current **WHEN:RUTIL** manual page to see all the possible actions. A single breakpoint may execute up to 25 commands in its action list when hit.

Only 25 action list commands are possible in any one processor. For example, if one breakpoint contained 15 action list commands, then only 10 more action list commands are available for other breakpoints in the same processor.

The action list must be terminated by the **WHEN:END** command. As with GRASP, there need not be any commands in the action list except **WHEN:END**. It may be useful to know whether or not a piece of code was being executed.

Initially all breakpoints are inhibited. Use the **ALW:RUTIL** command to allow all breakpoints in a given ring node or the **ALW:RUTILFLAG** to allow an individual breakpoint.

Only five breakpoints can be set in any one ring node processor.

3.19.5.4.2 Loading Memory

Loading memory may drastically change program execution. If memory is not correctly loaded, it can interrupt or degrade service (for example, lose calls).

The RGRASP tool has write permission to all parts of available memory. This makes the tool very powerful but also dangerous. Since OPC checking is not performed, it is possible to type in the wrong address and overwrite good data with bad data. If this should occur and the original contents cannot be loaded, the ring node should be removed and restored (pumped) to get back an original disk copy. Use the **RMV:LN** and **RST:LN** commands to remove and restore data.

After a load, use the **DUMP:RUTIL** to verify the new contents in memory.

Registers can only be loaded during breakpoint action lists.

3.19.5.4.3 Reading Memory

Dumping memory is a fairly straight forward and safe operation. All that is required is the address to dump. The

current implementation allows 468 bytes of hexadecimal output to be dumped in one operation with the **DUMP:RUTIL** command. A user may dump memory either higher or lower than the starting address, or a range of addresses may be specified.

Registers can only be read during breakpoint action lists.

3.19.6 IBROWSE

3.19.6.1 Overview

Ibrowse is an interactive tool that examines files containing a dump of *UNIX*® RTR operating system physical memory. On the 3B20D computer, this file is usually **/dev/pmem** for the currently running processes, or **/dev/ofln** for the contents of the off-line memory. Locations in the address space of any process in memory can be displayed. Ibrowse also provides facilities for examining core dump files, as well as primitives to display ordinary unstructured files. These types of operation allow the use of Ibrowse as an on-line debugging aid as well as a static debugger.

3.19.6.2 Invoking Ibrowse

To execute Ibrowse, enter the command:

```
ibrowse [file]
```

File should contain the contents of physical memory.

3.19.6.3 Ibrowse Commands

Following is a listing of Ibrowse commands:

buf	Turns on internal memory management (default).
db file	Examines the contents of file .
null n	Sets value for termination of indirect formats [initially 0 (zero)].
pn n	Treats subsequent addresses from the perspective of process n .
pn k	Switches to kernel's address space.
pn p	Uses physical addressing - no virtual address translation is performed. This mode is also used for examining unstructured files.
pn c	Treats currently attached file as a core dump file.
pn	Displays current process.
sup	Switches to supervisor address space.
sym pfile	Uses the symbols from pfile to allow symbolic addressing.
user	Switches to user address space.
vtop n	Converts virtual address to physical.

The **db** command informs Ibrowse of the file containing the physical memory spectrum. For example, **db /dev/pmem** causes Ibrowse to reference the physical memory driver for subsequent requests. Entering this command is equivalent to invoking **ibrowse** with the name of the physical memory file as its argument.

The **db** command without an argument causes Ibrowse to name the current physical memory file.

3.19.6.4 Displaying Values

After a physical memory file is specified, Ibrowse can then display virtual addresses. Initially, these addresses are interpreted within the kernel's address space. A command for changing to the address space of any process in memory is described as follows.

Display commands in Ibrowse are of the form:

addr/format

Address can be a number, arithmetic expression, search string, or variable name enclosed in quotes (for example, ``*buffer*''+30 is a legal address).

If the `` / '' in a display command is replaced by `` = '', lbrowse evaluates an arbitrary arithmetic expression to determine an address. The address is then printed, rather than its contents. This allows lbrowse to be used as a calculator. The command:

[(3+5)/[2*1)]*8=X

displays the result of the calculation in hexadecimal (0x20).

A **format** consists of a concatenation of the following symbols:

a	Name of variable at address.
b	Byte.
c	Character.
'd, d, D	Decimal of one, two, and four bytes, respectively.
'o, o, O	Octal of one, two, and four bytes, respectively.
s	Null terminated string.
'u, u, U	Unsigned decimal of one, two, and four bytes, respectively.
'x, x, X	Hexadecimal of one, two, and four bytes, respectively.

In addition, any format descriptor preceded by a number causes that descriptor to be used the specified number of times. For example, transfer vectors are stored at virtual address 0x760000 in the kernel. The command:

0x760000/10X

displays the first 10 entries in this segment as long hexadecimal numbers.

Segment descriptor entries (SDE) reside at address 0x1a000 in the kernel. The command:

0x1a0000/XX'd'ddddd'd'dXXX

displays the fields of the first **sde** structure in this segment.

Internally, lbrowse supports three concepts useful in displaying structured data:

- A current address
- A next address
- A current format.

After a display command, the current address (available as ``." in address calculations) is set to the first address displayed (0x1a0000 in the example). The next address is set to the first address following the last item displayed (0x1a0020). The current format is set to the format used in the display. Successive carriage returns after a display cause lbrowse to use the current format to display the information starting at the next address. Therefore, similar structures stored in consecutive memory locations are easily displayed.

The formats commonly used to display data from memory have been described previously. For each format, lbrowse prints one value for each format entry using a tab separator. Additional format components that allow a more structured display are shown in Table 3-18 .

Table 3-18 Additional lbrowse Formats

COMPONENT	DESCRIPTION
quotes	A quoted string ("text") within a format echoes the contents of text at this point in the display.
(format)	Formats can contain arbitrarily nested subformats (generally used with a repetition count).
<format>	The values ordinarily displayed by the format enclosed in angle brackets are not printed. However, the current address is advanced as though the values were displayed. Angle brackets are also useful within the format component of a search pattern, because they offer a limited "don't care" facility.
{format}	The long word ordinarily displayed at this part of the format is instead treated as an address. The enclosed format displays items beginning at this address. (When the indirect address equals the special null address, no action is taken allowing perusal of a linked structure without misinterpreting list terminators. The null address, initially zero , can be set to a value N with the command null N .)
[skip]	The current offset in the address space is advanced by the value in the brackets. The value may be negative to back up a given amount.
[kmark, 'mark]	The current offset in the address space can be saved in one of 26 registers labeled a-z . [ka] saves the current address in register a ; [a] continues from the saved address. This format is useful in synchronizing structures with variable length fields. The current address is printed on a new line at this point.

3.19.6.5 Changing Virtual Address Spaces

lbrowse initially interprets addresses as references to the kernel's address space. The command:

pn N

references the address space of process **N** for successive displays. The command:

pn k

returns to kernel space, while:

pn

reminds the user of the current address space.

lbrowse also directly addresses physical memory. The command:

pn p

enters physical addressing.

All **UNIX**® system processes run at the supervision level, and the **sup** and **user** commands are excluded.

To peruse core dump files with lbrowse, enter the command:

pn c

This command treats the currently attached file as a formatted core dump. The data, text, stack, etc., of the late process may then be accessed with virtual addresses as though the process were still in memory.

A virtual address may be converted to the physical address by entering the command:

vtop N

This returns the physical address corresponding to the virtual address **N**.

3.19.6.6 Searching

lbrowse searches forward or backward for a particular sequence of values in the current address space. The search pattern consists of two parts: a format and a sequence of values. lbrowse uses each format letter to determine the size of the corresponding value in the value list. For example, when the following pattern is specified:

```
/2X2x 1 2 3 4/
```

lbrowse scans forward in the current address space searching for a sequence of 12 bytes containing a long 1, long 2, short 3, and short 4, respectively. The same sequence enclosed in question marks causes lbrowse to search backwards for the sequence. (Note that the values still appear in ascending memory locations.)

When in virtual addressing mode, lbrowse limits its searches to the current segment. Therefore, if the current address is x760008, a forward search examines locations x760008 to x780000 first, followed by locations x760000 to x760008. In physical addressing, the entire range of the physical memory file is examined.

3.19.6.7 Symbolic Addressing

The command:

```
sym [pfile]
```

reads the symbol table of the **pfile**. Functions and external variables maybe subsequently referenced by name. The symbol section of the pfile must be swabbed correctly; otherwise, lbrowse reports **``symbol not found''**.

For example, consider checking the file manager's tasks. The information needed, located in the **tasktab** array, consists of four word entries. The following commands display the first eight entries in the table:

pn 4	/* enter fmgr's address space */
sym /bootfiles/fmprc	/* attach to current file manager. */ * (it may be necessary to run * 3bswab to examine the symbols * on the 3b) */
``tasktab"/8(4X=)	/* quoted string causes symbol lookup */

To find the virtual address of the i-node table, enter:

```
``i-nodes"=X
```

Occasionally, it is useful to convert a virtual address into a symbolic name (for example, looking up a program address). lbrowse provides a special format (**a**) for this translation. If, for example, the address of the **i-nodes** previous array was x1000, the command:

```
x1010=a
```

prints the string **``i-nodes+16''** (the offset is always decimal).

3.19.6.8 Internal Buffering

To avoid excessive reads of the current file, lbrowse maintains a cache of recently accessed memory areas. To

adjust the size of pages used for this memory management (initially 512 bytes), use the command:

framesize n

To disable buffering completely, use the command:

nobuf

The **nobuf** command is useful when examining volatile locations on a running machine. To restore buffering to its initial 512-byte frame size, use the command:

buf

3.19.6.9 Patching

lbrowse overwrites contiguous memory locations with a set of values. At present, however, the physical memory driver (*/dev/pmem*) does not support writing, so the feature may be unusable on a running 3B20D computer. If the driver is changed to allow writes, or if there is reason to modify an off-line dump, patching is straightforward.

The core file must be reattached with permission to patch by entering the command:

dbp [file]

Modifications then take the form:

addr#`format value1 value2 ..."

The supplied values are written in memory beginning at the addressed location. As with searches, the format determines the size of each supplied value. As a result, **3X** is equivalent to **3D** or **DXD**, etc.; each value in the value list determines its own radix. For example, to replace three transfer vectors beginning at location 760010 with 120, 130 and 140, the patch command is:

x760010#`3X 120 130 140"

3.19.6.10 Escape

When a line begins with an exclamation point (!), lbrowse invokes the shell for the remainder of the line.

The **q** command terminates lbrowse.

3.19.6.11 lbrowse Macros

lbrowse stores some formats as macros. Macro names are drawn from the set of capital letters unused by lbrowse (lbrowse uses D, I, U, O, and X at present). A macro is defined by entering the letter, a space, and the desired format string. Entering the letter alone gives the current definition of the macro (if any). The following examples clarify both the use of macros and the additional format facilities.

Example 1

The command:

P 5(4X=)

This command defines a macro P which prints 20 hexadecimal longs, four to a line. Each line is preceded by the address of the first word on the line. (The ``=' issues a newline, then prints the address.) The macro P is then used in formats in the same way as any predefined letter.

The command:

x76000/2P

This command prints the first 40 transfer vectors.

Example 2

Macros can be recursive. A recursive macro is useful when used in conjunction with the indirect addressing capability of the curly braces. If a program has a binary tree consisting of the following structures:

```
struct btree
{
  char title[40] ;
  struct btree *left ;
  struct btree *right ;
}
```

The macro:

B 40c{B}{B}

This macro effects a preorder traversal of the tree. An in-order traversal of the same tree is accomplished with the [mark] and [skip] feature:

B [40]{B}[ka][-44]s['a]{B}

This macro skips the character string, displays the left subtree, marks where it is (ready to print the right subtree), jumps back to the start of the title, displays it as a string, and finally jumps back and displays the right subtree.

NOTE: Use the **null** command note to set the termination criteria for an empty child if it is other than the default zero.

Example 3

On the 3B20D computer, a stack entry has the following format:

struct stack

{

<i>int args[NARGS];</i>	<i>/* arguments to function - variable number. */</i>
<i>int ret_addr;</i>	<i>/* return address. */</i>
<i>int *oargp;</i>	<i>/* old argument pointer */</i>
<i>int *ofp;</i>	<i>/* old frame pointer - points to caller's local * data. */</i>
<i>int save[10]</i>	<i>/* 10 words of save information */</i>
<i>int locals[NLOC]</i>	<i>/* local variables for</i>

```
function. */
```

Given the address of the top (that is, most recent) stack entry's local variables, a macro to format a stack trace is defined as:

```
S [-52]=a{XX}{S}
```

This macro skips back to the parent's return address, prints the current location and the function's name (*=a*), prints the first two arguments (*{XX}*), and recurses (*{S}*). The current program address is not on the stack and must be obtained from the save state in the processes' *pcb*.

Example 4

The structure:

```
struct xyzzy
{
    long good ;
    char dull [2000] ;
    long better ;
}
```

This structure can be viewed with the macro:

```
Z "good "D<2000c>"better "D
```

The resulting output lines have the following form:

good	(goodva11)	better	(betterva11)
good	(goodva12)	better	(betterva12)
.	.	.	.
.	.	.	.
.	.	.	.

3.19.6.12 Ibrowse I/O (Input/Output) Facilities

Ibrowse redirects I/O to or from a file.

The command:

```
> [file]
```

This command directs subsequent output to the named file. If *file* is not specified, **stdout** is used. Redirection is terminated by an interrupt or a line containing only a ``>".

The command:

```
>> file
```

This command appends to an existing file.

The command:

```
< [file]
```

This command takes a set of commands from the specified file (or **stdin** if no file is specified). The **<[file]** command

is useful when reading in a file of predefined macros.

File can be replaced with a shell escape to allow redirection to or from a command. For example,

```
> !fgrep ffffffff
0/50 (4X=)
> /* terminate redirection */
```

This string locates the -1's in the first 400 words.

3.19.7 INTERACTIVE DUMP UTILITY (IDUMP)

3.19.7.1 Description

The `idump` is a tool which allows a user to dump parts of common object format files for interactive examination of their contents. It can be used for:

- A.out files (the output of the 3B20D linkage editor, **3bld**)
- Pfiles and shared libraries (the output of the 3B20D linkage edit process, **3bldp**)
- Minimal files (the output of file extraction, **fextract**)
- Update files (the output of overwrite generator, **ogen**)
- Simple object files (the output of the 3B20D C-language compiler, **3bcc**).

`Idump` also permits the examination of multiple object files by specifying on the command line either a list of files or an archive that contains object file members.

3.19.7.2 Invoking Idump

Under the Bourne shell, `idump` is invoked by entering the command:

```
idump [file...]
```

3.19.7.3 Idump Commands

Table 3-19 provides a listing of the `idump` commands and their output.

Table 3-19 Idump Command Menu

CMD	ARGUMENT	OUTPUT
!	cmd	Execute the <i>UNIX</i> ® system command from a subshell.
a	symbol	All occurrences of the specified symbol in the symbol table.
b		Reset input number base to decimal.
b	number	Set input number base to the number (16 for hex, 8 for oct).
c		Close the current archive member and open the next archive member.
d	storage	Dump all the symbol table entries with the specified storage class.
	class	
e	type	Dump all symbols in symbol table with the specified type.
f		Dump the file header of the currently accessed file.
F		Dump the .file symbol table entry of the current symbol table entry.
F	filename	Dump the symbol table entry for the named source file.
g		Open and dump the next file header for the next file on the command line.
h		Section header for the last specified section.
h	section	Section header for the named section.
h	secndx	Section header for the section with a given index.

h	*	All section headers for the current file.
l		Dump line number information for last specified function.
l	function	Dump line number information for named function.
l	symndx	Dump line number information for referenced symbol index.
l	*	Dump all line number entries for all sections.
m		Print a list of idump commands.
m	command	Print a description of the specified command.
n		Dump the next symbol table entry from the current position in the symbol table.
n	count	Dump symbol table information for next <count> symbols.
n	*	Dump rest (all) the symbol table information.
o		Dump entire optional header and patch list.
o	a|o|p	Selected part of optional header or patch list. a = aout header; o = aout header and pfile header; p = patch list.
o	*	Entire optional header and patch list.
r		Relocation information for last specified section.
r	section	Relocation information for named section.
r	secndx	Relocation information for referenced symbol index.
r	*	All relocation entries for all sections.
s		Dump the section contents for the last specified section.
s	section name	Dump the contents of the named section.
s	section number	Dump the contents of the indicated section number.
s	name [start]:[end]	Raw section data for the last specified section.
s	scn [start]:[end]	Raw section data for the named section.
t		Dump the symbol table entry for the next symbol.
t	symbol name	Dump the named symbol table entry.
t	symbol index	Dump the symbol table entry for the referenced symbol index.
t	symbol name :symbol name	Dump the symbol table entries between the two named entries inclusively.
t	symbol index :symbol index	Dump the symbol table entries between the two specified indexes inclusively.
t	*	All symbol table entries.
*		Entire optional header and patch list. All section headers for current file. Raw section data for the named section. All line number entries for all sections. All relocation entries for all sections. All symbol table entries.
q or x		Exit from idump session.

An example of the use of the idump **m** command is as follows:

m g - Open the next object file in argument list and dump the file header.

If the **m** is used alone, explanations for all the commands available in idump are listed.

3.19.7.4 Diagnostics

The idump returns an exit code of zero. If an interrupt signal is received, idump returns to its command mode.

3.19.7.5 Idump Via the Craft Shell

NOTE: Normally, idump is used in the interactive mode. Idump should **NOT** be executed through the craft shell except as described as follows.

Idump may be executed via the craft shell by using the **EXC:ENVIR:UPROC** command. Special steps must be taken with **UNIX**® system commands, however, to make interactive communications with the user possible.

One method that can be used to execute an interactive command, such as idump, via the craft shell is shown in the following example:

```

<INPUT>
EXC:ENVIR:UPROC, FN="/bin/sh", ARGS ("-c", "/usr/bin/idump
/bin/date<<<!\<lf>
t main<lf>
q<lf>

```

```

!)<CR>
PF
                                <OUTPUT>

<
M EXC ENVIR UPROC /tmp/dumper COMPLETED
  CURRENT FILE: /bin/date Sat Sep 8 02:27:49 1984
  F_AR32W F_LSYMS F_LNNO F_EXEC F_RELFLG
  Magic Nscns Time/Date Symptr Nsyms Opthdr
  Flags
    00550 17 0x1ba016f5 0x00002800 549 0x0fec
  0x020f
  :
  Symndx Name Value Scnum Type Sclass Numaux
  [16] main 0x00000048 1 ()INT EXT 1
    s/u/e tag=0 fcn size=0x788 lptr=0x0 endx=22 tv=0
  :

```

In the previous example, the Bourne shell (*UNIX*[®] operating system shell) is called to execute by the **EXC:ENVIR:UPROC,FN="/bin/sh"** portion of the command line.

The argument list follows the command name and is of the general format, **ARGS("arg1","arg2",..."argN")!**. In the example, the first argument, **"-c"**, is an argument to the *UNIX*[®] operating system shell (/bin/sh) program. This argument instructs the *UNIX*[®] operating system shell to interpret the next argument as if it were a string of characters from a terminal. The effect is a *UNIX*[®] operating system terminal that executes a single command line. The **EXC:ENVIR** command limits the line to a maximum of 63 characters.

The second argument, which begins with **"usr/bin/idump** and terminates several lines later with **!"**), constitutes the string being passed by the *UNIX*[®] operating system shell program. Typically, the idump program reads commands from the terminal in an interactive mode with the user. Noninteractive *UNIX*[®] system commands to be processed by idump can be made interactive by passing them in the second argument string in the form of a **here document**.

3.19.7.6 Here Document

As the name implies, the **here document** commands are read from **"here"** rather than the terminal. Some characteristics of a **here document** are as follows:

- A **here document** begins with the sequence, **<<!**, and terminates with the next occurrence of **!** at the start of a line. The use of **!** is arbitrary; any character can be substituted in its place.
- Each line within the **here document** represents a command; in this case to idump.
- Each line within the **here document** is terminated with a **<lf>** (line feed) rather than a **<cr>** (carriage return).
- A **<cr>** is a statement terminator which indicates the end of an input message to the craft shell.

In the previous input/output example, the **symbol table entry** for **symbol main** of process **"/bin/date"** was specified in the **EXC:ENVIR** command line as **"t main"**.

3.19.7.7 Executable Scripts

Sometimes it is convenient to place command strings into files called **scripts**, and then execute the script. Following are three examples which show the creation of executable scripts:

Example 1:

```

<INPUT>
EXC:ENVIR:UPROC, FN="/bin/sh", ARGS("-c", "/bin/echo
' /usr/bin/idump<<!
\\n\\$2 \\$3\\nq\\n'>>/tmp/dumper") !
PF

```

```

<OUTPUT>
<M EXC ENVIR UPROC /bin/sh COMPLETED

```

Example 1 illustrates the use of `"/bin/echo"` to create a file, `/tmp/dumper`, via the craft shell. In this example, the `"/bin/sh"` program is passed a string in argument 2 by the use of the `"-c"` argument. Argument 2 contains the following:

- (a) The command, `/bin/echo`, used to echo its output into a file named `/tmp/dumper`. The entire string inside the single quotes, `'`, is redirected into `tmp dumper`.
- (b) The symbol, `>>`, directs the output into a file, in this case `/tmp/dumper`. The use of the double `>` appends the output to any existing text in `/tmp/dumper`. A single `>` overwrites any existing contents in `/tmp/dumper`.
- (c) A single backslash, `\`, hides the meaning of special characters from the *UNIX*® operating system shell.

Example 2:

```

<INPUT>
DUMP:FILE:ALL=FN="/tmp/dumper"
PF
<OUTPUT>
<M 09 DUMP FILE ALL COMPLETED
/usr/bin/idump $1<<!
$2 $3
q
!

```

Example 2 illustrates the use of the **DUMP:FILE** command to examine the contents of the newly created file, `/tmp/dumper`. Dumper contains the pathname to the **idump** command followed by **\$1** and the beginning of a *here document*. Run time arguments to be passed from the command line to **idump** are represented by **\$1**, **\$2**, and **\$3**.

The name of the file to be acted upon is contained in **\$1**. Arguments to **idump** is contained in **\$2** and **\$3**.

Example 3:

```

<INPUT>
<ALW:FILESYS:ACCESS=700, FN="/tmp/dumper"
PF
<OUTPUT>
<
M ALW FILESYS ACCESS COMPLETED

```

Example 3 illustrates the use of **ALW:FILESYS:ACCESS** to make `/tmp/dumper` executable.

3.19.7.8 Execution of Script

NOTE: Caution should be exercised in writing and using scripts. Only persons thoroughly familiar with shell programming should write scripts. Also, scripts should not be executed out of *crontab* unless approved by

a high-level support.

The script created in the dumper execution command (see the following) can be executed using **EXC:ENVIR**. In this case, arguments are passed to **/tmp/dumper** in the argument list of the **EXC:ENVIR** message as follows:

- (a) **"/bin/date"** is substituted for **\$1** in **"/tmp/dumper"**.
- (b) **"t"** is substituted for **\$2** in **"/tmp/dumper"**.
- (c) **"main"** is substituted for **\$3** in **"/tmp/dumper"**.

Therefore, **/user/bin/idump** is passed the command, **`t main**", inside the *here document* of **`/tmp/dumper"**. The result is, idump outputs the **symbol table entry** for function, **main**.

An example of script execution as described previously is as follows:

```

                                <DUMPER EXECUTION>
EXC:ENVIR:UPROC=FN="/tmp/dumper",ARGS("/bin/date",
  "t", "main")!
PF
<
                                <DUMPER OUTPUT>
M EXC ENVIR UPROC /tmp/dumper COMPLETED
  CURRENT FILE: /bin/date Sat Sep 8 02:27:49 1984
  F_AR32W F_LSYMS F_LNNO F_EXEC F_RELFLG
  Magic Nscns Time/Date Symptr Nsyms Opthdr
  Flags
    00550 17 0x1ba016f5 0x00002800 549 0x0fec
0x020f
:
Symndx Name Value Scnum Type Sclass Numaux
[ 16] main 0x00000048 1 ()INT EXT 1
  s/u/e tag=0 fcn size=0x788 lptr=0x0 endx=22 tv=0
:

```

3.19.8 CURRENT UPDATE DATA BASE AND HISTORY FILE EDITOR (UPEDCUD)

3.19.8.1 Description

The **UPedcud** is an interactive, menu-driven tool which allows a user to read, edit, or alter the contents of the CUD and History files maintained in the **5ESS®-2000** switch by the Program Update subsystem.

From the contents of the CUD entry, a user can verify what type of change was applied to which file for a particular BWM. The status of that particular BWM can be determined from the contents of the history file.

CAUTION: This tool overwrites data in system files. Incorrect use of this command results in the removal of needed information. If a change to either the CUD or History File is necessary, it should be made to a copy of the file; not to the original. Changes should not be made to original files without the concurrence of the Customer Technical Support (CTS) Organization.

Before using the UPedcud tool, make sure that Program Update commands are not executing. The UPedcud affects Program Update and could cause a disruption of service.

Changes which have been agreed to by the CTS Organization and entered are made to a buffered copy of the CUD or History file. They are not made in the permanent copy until the **w** command has been entered to update that level

of the editor.

3.19.8.2 UPedcud Menus

UPedcud offers 10 major menus and a number of submenus. The major menus are as follows:

- Password
- Program Update File Editor
- CUD Header Editor
- CUD Item Display
- CUD Item Editor
- History File Main Menu
- History Header Item Editor
- History File Item Editor
- Dependent Files - History Header Item Editor
- Dependent Files - History File Item Editor.

UPedcud menus and submenus are presented to the user on a scrolling screen display. A given menu page is always displayed in its entirety. The UPedcud menu structure is shown in Figure 3-48 .

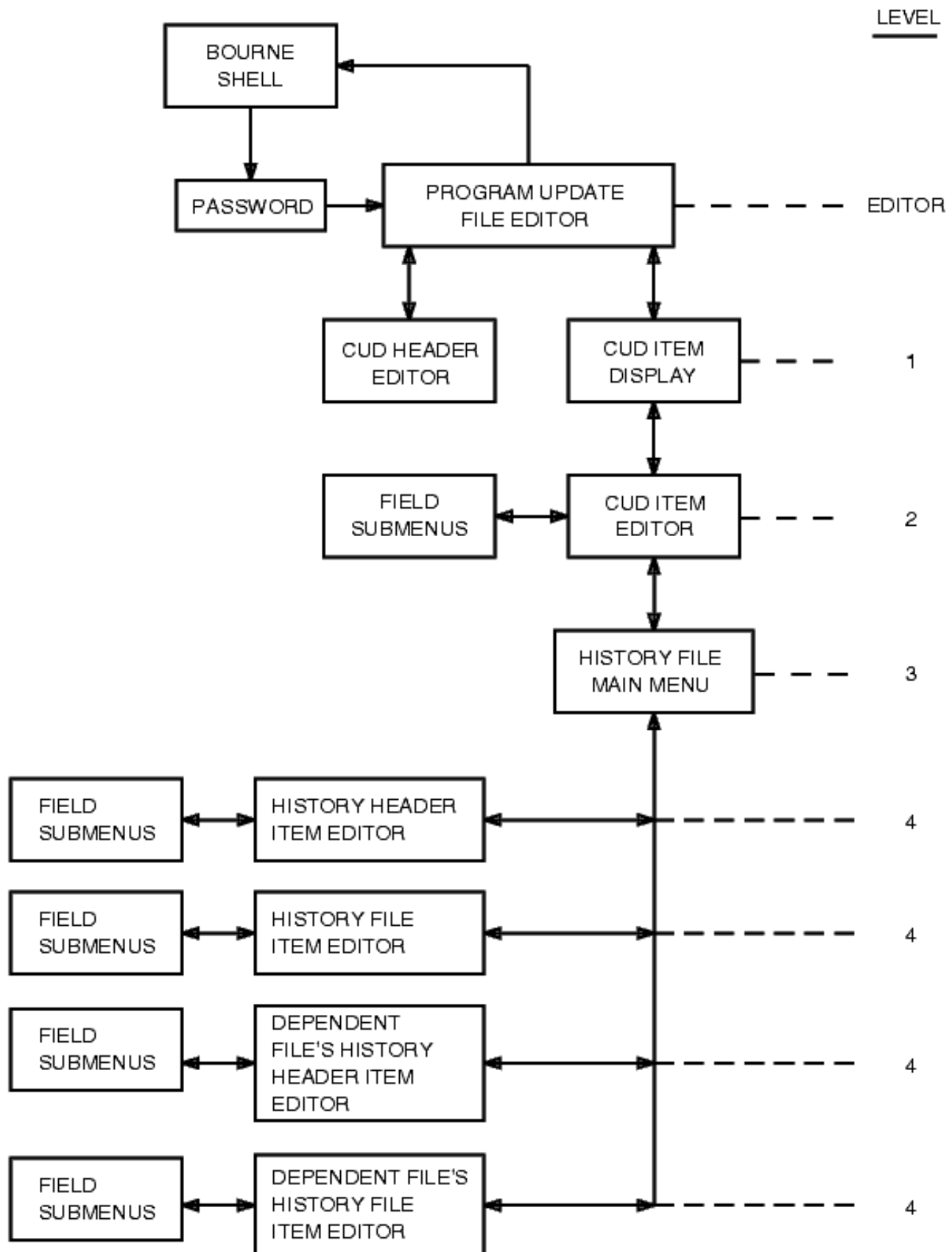


Figure 3-48 UPedcud Menu Structure

As each major menu item is quit, the user is returned to the next higher level in the editor until the Program Update File Editor is reached. Quitting the Program Update File Editor returns the user to the Bourne shell.

3.19.8.3 Password Menu

A user password is required for access to the UPedcud program. The password requirement serves as an additional check to prevent accidental modification of files. Passwords may be obtained from the CTS Organization.

When the command `/no5text/prc/UPedcud` is entered at the Bourne shell prompt, the password menu appears as shown in Figure 3-49 .

```
# /no5text/prc/UPedcud

*****ENTER THE PASSWORD *****

passwd:
```

Figure 3-49 UPedcud Password Menu

3.19.8.4 Program Update File Editor Menu

When the password has been successfully entered, the Program Update File Editor menu is displayed showing the two types of data that can be accessed:

- (1) CUD header
- (2) CUD item.

Figure 3-50 shows an example of the Program Update File Editor display.

```
*****PROGRAM UPDATE FILE EDITOR*****

FILE LIST:

1) Cud header
2) Cud item

Select a target file or 'q' to quit:
```

Figure 3-50 UPedcud Program Update File Editor Menu

3.19.8.5 CUD Header Editor Menu

Option number 1 from the Program Update File Editor menu calls up the CUD Header Editor menu which displays **some** of the information stored in the CUD file header. Information stored in the CUD file header includes the following:

1. The number of CUD entries

2. The pointer to the end fo CUD
3. The number of the last system update
4. The number of the last BWM header sequence recorded in CUD
- 5-10. The number of temporary overwrites (Temps) to the SM, Sm-2000, CMP, MSHG, PERF, and MHPERF
- 11-13. The pump maps used during a CMP, an SM, or an SM-2000 pump (The SM and SM-2000 pump maps include peripheral targets.)
14. The CUD lock value

Figure 3-51 is an example of the CUD Header Editor menu.

```
***** EDIT CUD HEADER *****

1) # of cud entries 104          2) cud end ptr 0x1c614
3) last upd number 795          4) last BWM hdr seq# 13
5) Temps Against SM 0           6) Temps Against SM2K 0
7) Temps Against CMP 0          8) Temps Against MSGH 0
9) Temps Against PERF 0         10) Temps Against MHPERF 0
11) Map Used Against CMP (0=NA, 1=PUMPMAP, 2=OFCMAP) 0
12) Map Used Against SM (0=NA, 1=PUMPMAP, 2=OFCMAP) 0
13) Map Used Against SM2K (0=NA, 1=PUMPMAP, 2=OFCMAP) 0
14) cud lock value (0=UNLOCKED, 1=LOCKED) 0

a) view OSsyspatch address      s) edit BWM SEQ pkg seq numbers
d) display record sizes         t) edit BWM table
l) edit last OFC BWM names for BOLO w) write cud header and exit
q) not write cud header and exit

Enter number/letter choice:
```

Figure 3-51 UPedcud CUD Header Editor Menu

Options on the CUD Header Editor menu allow a user to view or edit information stored in the CUD file header as follows:

- Option **a**: View system patch addresses
- Option **d**: View CUD and History record sizes
- Option **l**: Edit names of the last three official BWMs which are permitted to be backed out (These names are used by the back out last official three deep (BOLO3) feature.)
- Option **s**: Edit package sequence numbers stored in CUD header
- Option **t**: Edit the BWM table.

Option **w** writes the CUD Header and exits the user from the CUD Header Editor menu, and option **q** quits the CUD Header Editor menu and returns the user to the Program Update File Editor menu.

If the BWM package is backed out, the number of CUD entries is reduced by the number of temps backed out. The last update number is not reduced. If the BWM package is reapplied, the number of CUD entries starts at the reduced number and the last update number from its current value.

Option **a** from the CUD Header Editor displays **pumpable peripheral OSsyspatch addresses**. Each address number in the submenu corresponds to an image. The submenu includes all the SM/SM-2000, CMP, and peripheral (pumpable or nonpumpable) targets.

Figure 3-52 is an example of the OSsyspatch address display.

```

Enter number/letter choice: a

***** View OSsyspatch Address *****

  1) 0x0      2) 0x0      3) 0x0      4) 0x0      5) 0x0
  6) 0x0      7) 0x0      8) 0x0      9) 0x0     10) 0x0
 11) 0x0     12) 0x0     13) 0x0     14) 0x0     15) 0x0
 16) 0x0     17) 0x0     18) 0x0     19) 0x0     20) 0x0
 21) 0x0     22) 0x0     23) 0x0     24) 0x0     25) 0x0
 26) 0x0     27) 0x0     28) 0x0     29) 0x0     30) 0x0
 31) 0x0     32) 0x0     33) 0x0     34) 0x0     35) 0x0

q) quit without saving changes
r) return with all changes

Enter address no. (1-35) to change or option: 1

1) Enter new address for ISLU (in hex):

```

Figure 3-52 OSsyspatch Addresses - All SM/SM-2000, CMP, and Peripheral Targets

Table 3-20 is a list of address numbers and corresponding images.

Table 3-20 Peripheral Image Addresses

ADDRESS NUMBER	Peripheral Image
1	ISLU (Integrated Services Line Unit)
2	IDCU CCP (Integrated Digital Carrier Unit Common Control Processor)
3	IDCU LSI (Integrated Digital Carrier Unit Loop Side Interface)
4	IDCU DLP (Integrated Digital Carrier Unit Data Link Processor)
5	DNUS CC (Digital Networking Unit - SONET Common Control)
6	TMUX (Transmission Multiplexer)
7	LDSU (Local Digital Service Unit)
8	LDSF (Local Digital Services Function - Model 3)
9	RAF (Recorded Announcement Function - DSU2)
10	SAS (Service Announcement System)
11	ISTF (Integrated Services Test Function)
12	PH2A (128-Channel Protocol Handler, ACCESS Image)
13	PH2G (128-Channel Protocol Handler, GATEWAY Image)
14	ODMA (Operational Direct Memory Access)
15	PH3C (128-Channel Protocol Handler, Common Image)
16	OIOP (Operational Input/Output Processor)
17	IP4F (Input/Output Processor, PSU PH4 Frame Relay)
18	PHV1C (Protocol Handler Voice - Version 1, Common Image)

19	PHA1A (Protocol Handler ATM - Version 1)
20	ISLU2 (Integrated Services Line Unit - Model 2)
21	PH4I (128-Channel Protocol Handler 4, ISDN Image)
22	IP4I (Input/Output Processor, PSU PH4 ISDN)
23	GDSF (Global Digital Services Function - Model 3)
24	SMPMHLB (Switching Module Processor Message Handler Little Boot)
25	SMPMHOP (Switching Module Processor Message Handler Operational)
26	PI (Packet Interface)
27	PI2 (Packet Interface 2)
28	HDSU (Digital Service Unit - Model 2 Diagnostic)
29	DSC3 (Digital Service Circuit - Model 3 Diagnostic)
30	HSAS (DSU2 Service Announcement System Diagnostic)
31	DDMA (Diagnostic Direct Memory Access - PHA Processor)
32	SM (Switching Module)
33	SM-2000 (Switching Module - 2000)
34	CMP AP (Communications Module Processor Application Processor)
35	CMP MSGH (Communications Module Processor Message Handler)

Option **d** displays the sizes of various records in CUD and History files. This is a display-only option (changes cannot be made). Figure 3-53 is an example of the information displayed when option **d** is entered (The information displayed may vary depending on the software release).

```

Enter number/letter choice: d

Sizes (in bytes):

Cud header: 596 (0x254)
Cud entry : 1112 (0x458)

History header: 160 (0xa0)
History entry: 432 (0x1b0)
History Ufile path entry: 72 (0x48)
History Function address entry: 20 (0x14)
History address overwrite entry: 6016 (0x1780)

Hit RETURN to continue

```

Figure 3-53 CUD and History Record Size Option

To support the BOLO3 feature, names of the last three official BWMs can be displayed and edited by selecting option **I** from the CUD Header Editor Menu. An example of the BOLO3 submenu is shown in Figure 3-54 (The information displayed may vary depending on the software release).

```
Enter number/letter choice: 1

***** Edit names of last official BWMs *****

  1) BWM95-0001
  2) BWM94-0012
  3) BWM94-0011

q) quit without saving changes
r) return with all changes

Enter BWM no. (1-3) to change or option: q
No change. Quitting ..
```

Figure 3-54 BWM Names for BOLO3 Submenu

The package sequence numbers for current BWMs can be displayed and edited by selecting option **s** from the CUD Header Editor menu.

Each sequence number on the display corresponds to a loadable package. The name of the loadable package referenced by each sequence number is displayed at the prompt line as the sequence number is selected. The number of loadable packages changes from one software release to another.

An example of the display of package sequence numbers is shown in Figure 3-55. In this example, the name of the 27th loadable package is "GLISDNBASE".

Enter number/letter choice: s

***** EDIT BWM SEQ pkg seq# *****

Current package sequence numbers:

1)	13,	2)	4,	3)	0,	4)	0,	5)	6,	6)	0,
7)	1,	8)	0,	9)	7,	10)	0,	11)	1,	12)	0,
13)	0,	14)	0,	15)	0,	16)	0,	17)	0,	18)	1,
19)	0,	20)	0,	21)	0,	22)	1,	23)	0,	24)	4,
25)	5,	26)	0,	27)	3,	28)	1,	29)	0,	30)	4,
31)	0,	32)	0,	33)	3,	34)	0,	35)	0,	36)	0,
37)	0,	38)	0,	39)	0,	40)	1,	41)	0,	42)	0,
43)	0,	44)	10,	45)	9,	46)	0,	47)	0,	48)	0,
49)	0,	50)	0,	51)	0,	52)	0,	53)	2,	54)	0,
55)	5,	56)	3,	57)	4,	58)	1,	59)	6,	60)	0,
61)	2,	62)	1,	63)	5,	64)	0,	65)	0,	66)	0,
67)	6,	68)	0,								

Options:

r) return to prev screen with changes.

q) quit to prev screen without saving changes.

Enter sequence number or option: 27

Current value of sequence #27 (GLISDNBASE): 3

>>>Change value to:

No changes made.

Figure 3-55 Package Sequence Numbers for Current BWMs

Option **t** is used to edit the BWM table of 20 slots. The BWM table is created in the CUD header to store the information of the first 20 BWMs contained in the CUD file and is used to avoid the sequential search of the CUD file for a particular BWM. The BWM names, in chronological order, are shown in the first column of each entry. The second column is the file offset to the beginning of the BWM's last CUD entry. This information is critical and should not be changed.

Figure 3-56 is an example of the BWM table (The information displayed may vary depending on the software release).

```

Enter number/letter choice: t

***** Edit BWM Name and Offset Table (in HEX) *****

  1) BWM94-0011 000000b014      02) BWM94-0012 0000016f34
  3) BWM95-0001 000001c1bc      04) NONE      0000000000
  5) NONE      0000000000      06) NONE      0000000000
  7) NONE      0000000000      08) NONE      0000000000
  9) NONE      0000000000      10) NONE      0000000000
 11) NONE      0000000000      12) NONE      0000000000
 13) NONE      0000000000      14) NONE      0000000000
 15) NONE      0000000000      16) NONE      0000000000
 17) NONE      0000000000      18) NONE      0000000000
 19) NONE      0000000000      20) NONE      0000000000

q) quit without saving changes
r) return with all changes

Enter BWM no. (1-20) to change or option:

```

Figure 3-56 BWM Table Edit Option Display

3.19.8.6 CUD Item Display Menu

Option number 2 from the Program Update File Editor menu calls up the CUD Item Display menu. The CUD Item Display main menu shows a listing of up to 10 CUD entry summaries. If a CUD contains more than 10 entry summaries, initially the last 10 are displayed. Regardless of which CUD entry summaries are included in the window of displayed items, they are always numbered 1 through 10 on the display. The number of the CUD item starting the list and the total number of CUD items are identified on the screen above the listing. The number of CUD entry summaries may vary from one software release to another.

Figure 3-57 (Example 1), Figure 3-58 (Example 2), and Figure 3-59 (Example 3), shows the CUD Item Display menu.

Figure 3-57 (Example 1), shows 10 CUD entry summaries starting with #95 (and going through number 104).

```

Select a target file or 'q' to quit: 2
..... Cud Editor - - Version 1.0 .....
Initializing...Last 10 entries read in.

>..... Main Menu .....<
(Starting with Cud item #95 of 104 total items)

      BWM name      Target      Type      File_path of entry
      -----      -
1) BWM95-0001      AM          AMFILER    /no5text/ims/npfile/CDL23.lv
2) " "            AM          AMFILER    /no5text/prc/QGPCM2OPER.out
3) " "            AM          AMFILER    /prc/3btprwt
4) " "            AM          AMFUNCR    /no5text/prc/okp
5) " "            AM          AMFUNCR    /no5text/prc/mskp
6) " "            AM          AMFUNCR    /no5text/prc/smkp
7) " "            AM          AMFUNCR    /bootfiles/3bsgen.kern
8) " "            SM          SMFUNCR    /no5text/im/smtxt/IM.out
9) " "            CMP          CMPFUNCR    /no5text/cmp/CMP.out
10) " "           SM2K        SMFUNCR    /no5text/im/sm2txt/IM.out

b) Move backward in entries
q) Quit Cud editor
>Enter option or Cud entry number to examine: b
>Move backward how many entries (default = 10)?

```

Figure 3-57 UPedcud CUD Item Display Menu (Example 1)

Figure 3-58 (Example 2), shows the screen display with the window moved backward 10 entries. The listing now starts with CUD item #85 (and goes through number 94). Since neither the first or last CUD item is included in either listing, the user can move the window either forward or backward as indicated by the **f** and **b** move options on the display.

Moved backward 10 entries.

```
>..... Main Menu .....<
(Starting with Cud item #85 of 104 total items)

      BWM name      Target      Type      File path of entry
      -----      -
1) BWM94-0012      SM2K      SMFUNCR   /no5text/im/sm2ktxt/IM.out
1) BWM95-0001      AM      AMFILER   /no5text/hm/imcatlg
3) " "            AM      AMFILER   /no5text/rcv/SODD/FArt_routi
4) " "            AM      AMFILER   /no5text/rcv/SODD/RLchk_al.B
5) " "            AM      AMFILER   /no5text/rcv/SODD/RLchk_bd.B
6) " "            AM      AMFILER   /no5text/rcv/SODD/FAfc_portt
7) " "            AM      AMNREL    /no5text/ims/npfile/CNIA.lv
8) " "            AM      AMFILER   /no5text/hm/HModb
9) " "            AM      AMFILER   /no5text/prc/QGPAP.out
10) " "           AM      AMFILER   /no5text/prc/pucr

f) Move forward in entries
b) Move backward in entries
q) Quit Cud editor
>Enter option or Cud entry number to examine:
```

Figure 3-58 UPedcud CUD Item Display Menu (Example 2)

To get from the display shown in Figure 3-58 (Example 2) to one that includes CUD item number 102, the user would enter **f** and press **return**. A screen would then appear with summary data for CUD items #95 through #104 as shown in Figure 3-59 (Example 3).

```

>Enter option or Cud entry number to examine: f
>Move forward how many entries (default = 10)? 10
Moved forward 10 entries.

>..... Main Menu .....<
(Starting with Cud item #95 of 104 total items)

      BWM name      Target      Type      File path of entry
      -----
1) BWM95-0001      AM          AMFILER    /no5text/ims/npfile/CDL23.lv
2) " "            AM          AMFILER    /no5text/prc/QGPCM2OPER.out
3) " "            AM          AMFILER    /prc/3btprwt
4) " "            AM          AMFUNCR    /no5text/prc/okp
5) " "            AM          AMFUNCR    /no5text/prc/mskp
6) " "            AM          AMFUNCR    /no5text/prc/smkp
7) " "            AM          AMFUNCR    /bootfiles/3bsgen.kern
8) " "            SM          SMFUNCR    /no5text/im/smtxt/IM.out
9) " "            CMP        CMPFUNCR    /no5text/cmp/CMP.out
10) " "           SM2K       SMFUNCR    /no5text/im/sm2ktxt/IM.out

b) Move backward in entries
q) Quit Cud editor
>Enter option or Cud entry number to examine: 8

```

Figure 3-59 UPedcud CUD Item Display Menu (Example 3)

In addition to offering forward and backward movement options, the CUD Item Display main menu allows the user to either quit and return to the Program Update File Editor menu or go down another level in the editor for more detailed examination of specific CUD items.

The next level down from the CUD Item Display menu is the CUD Item Editor menu.

3.19.8.7 CUD Item Editor Menu

From the CUD Item Display menu, a user can access additional information about a specific CUD item by entering the **screen** number of the item at the system prompt.

In Figure 3-59 (Example 3), the user has entered **8** (to examine CUD item 102). When **8** is entered, the CUD Item Editor menu displays detailed information about CUD item #8 as shown in Figure 3-60 .

```

>>..... Cud Item #8      Menu .....<<
1) BWM name: BWM95-0001      14) BWM seq. number: 13
2) Update type: 0x202 SMFUNCR  15) Last BWM seq no: 13
3) Target: SM                16) Hst file offset: 0x2c30
4) Configuration: 730        17) DF file offset: 0xd90
5) Status flags: 0x1         . Permanent
6) File: /no5text/im/smtxt/IM.out
7) History file: /etc/HstFilNBa07050
8) Dependent file: /no5text/im/smtxt/IMhs.out
9) Dependent file hst. file: /etc/HstFilOBa07050
10) BOLO saved file: /update/.updofc/BWM95-0001/UPau0a07244
11) BOLO dependent file: NONE
12) BOLO's saved file check sum: 61032
13) BOLO depeht. file check sum: 28273

h) Show history files
k) Show package seq no.
l) Show last pkg seq s) Show affected SM(s)
n) Move to menu for next Cud item
p) Move to menu for previous Cud item
q) Quit to main menu

>>Enter option or field number to modify:

```

Figure 3-60 UPedcud CUD Item Editor Menu

In the CUD Item Editor menu, all data fields for a particular CUD item are displayed in a readable format, including English descriptions for the status bits. The user can modify the data in any field by entering the number for that field at the system prompt, **>>Enter option or field number to modify:**.

NOTE: It is strongly advised that **NO** changes be made to a CUD item without the concurrence of the CTS Organization.

When a field number is entered for modification, a submenu (if there is one) for that field is presented; otherwise, it is a toggle.

From the submenu, the user can change the value of the field and return to the CUD Item Editor menu. If no change is desired, pressing the return key returns the user to the CUD Item Editor menu by default without changes being made.

If it is a toggle, the user can select the number and its value is changed.

Figure 3-61 is the submenu shown when field number 2, **Update type:**, is selected for modification.

```
>>Enter option or field number to modify: 2
Current update type: SMFUNCR
Possible data types:
  1) AMFILER      (0x101)
  2) AMFUNCR      (0x102)
  3) AMBYTER      (0x104)
  4) AMNREL       (0x108)
  5) AMUNIX       (0x10a)
  6) SMFILER      (0x201)
  7) SMFUNCR      (0x202)
  8) SMBYTER      (0x204)
  9) SMNREL       (0x208)
 10) PERFILER     (0x401)
 11) PERFUNCR     (0x402)
 12) PERBYTER     (0x404)
 13) PERNREL      (0x408)
 14) CMPFILER     (0x801)
 15) CMPFUNCR     (0x802)
 16) CMPBYTER     (0x804)
 17) CMPNREL      (0x808)
 18) MSGHFILER    (0xa01)
 19) MSGHFUNCR    (0xa02)
 20) MSGHBYTER    (0xa04)
 21) MSGHNREL     (0xa08)
 22) EMPKGADD     (0x1010)
>>Enter number of new type (default = no change):
No changes made.
```

Figure 3-61 UPedcud CUD Item Editor Submenu, Update Type

The affected SM list submenu is accessed by selecting option **s [Show affected SM(s)]** from CUD Item 1 menu.

Figure 3-62 is an example of the affected SM list display.

```

>>Enter option or field number to modify: s
Config  0 has 3 sms
  1)    1    2)    20    3)    21
Config  1 has 3 sms
  4)    2    5)    5    6)    6
Config  2 has 3 sms
  7)    7    8)    8    9)    192
Config  3 has 0 sms

d) delete a SM/CMP from list
a) add a SM/CMP to the list
q) return to prev screen without saving changes
Enter SM/CMP list number (not SM/CMP#) to modify or option: q
No change. Quit.

```

Figure 3-62 UPedcud CUD Item Editor Submenu, Show Affected SM(s)

3.19.8.8 History File Main Menu

One level down from the CUD Item Editor Menu is the History File Main Menu which offers four options as shown in Figure 3-63.

```

>>Enter option or field to modify: h

***** History File Main Menu *****

1) Edit history file header information
2) Edit history file information
3) Edit dependent file history file header information
4) Edit dependent file history file information

q) to return to Cud item edit menu

```

Figure 3-63 UPedcud History File Main Menu

The History File Main Menu allows a user to access the history file header (choice #1), the history file item (choice #2), the dependent file's history file header (choice #3), or the dependent file's history file item (choice #4).

Menu displays of choices #3 and #4 are identical to displays of choices #1 and #2, respectively. The difference is that choices #1 and #2 edit the history file while choices #3 and #4 use the dependent file's history file as input.

3.19.8.9 History Header Item Editor Menu

To edit the history header information, the user would select **1 (Edit history file header information)** from the History File Main Menu. If the dependent file's history file is targeted, **3 (Edit dependent file history file header information)** should be selected instead.

Figure 3-64 shows an example of the History Header Editor Menu when 1 is selected from the History File Main Menu.

```
>>>Enter option: 1

>>>..... Cud Item #8      History File Header Menu      .....<<<
.. BWM name- BWM95-0001 trgt- SM          type- SMFUNCR ..
1) No. of entries in history file: 3
2) File ptr to end of file: 0x2de0
3) Count of upd's using 9): 0
4) Utility id of proc (if any) none
5) Highest temp upd number: 0
6) Highest perm upd number: 3
7) File Update Type = 0xc08:
.NON-KILLABLE PROCESS      .SM                      .DECFCNS USED
.CONTIGUOUS FILE
8) File: /no5ext/im/smtxt/IM.out
9) Ogen-working copy (if any) or temp copy (if killable):

q) Quit to prev menu
>>>>Enter option or History header field number to modify:
```

Figure 3-64 UPedcud History File Header Editor Menu

Figure 3-65 is an example of a submenu of file update type that is displayed when the user enters 7 at the prompt, **>>>>Enter option or History header field number to modify**. (The information displayed may vary depending on the software release.)

```

>>>>Enter option or History header field number to modify: 7
Current update type bits: 0xc08
Possible update types:
  1) KILLABLE                -- not set
  2) PUBLIC LIBRARY          -- not set
  3) DATA LIBRARY           -- not set
  4) SM or CMP                -- set
  5) INOS                     -- not set
  6) UNIX PROCESS            -- not set
  7) SUPERVISOR PROCESS      -- not set
  8) KERNEL PROCESS          -- not set
  9) DMERT KERNEL/BOOT IMAGE -- not set
 10) SM PERIPHERAL           -- not set
 11) DECFCNS USED            -- set
 12) CONTIGUOUS FILE         -- set
 13) NEW FILE                 -- not set
 14) KILLABLE KERNEL PROCESS -- not set
>>>Toggle which flag number (default = return to history header item menu): q
Returning to history header menu.

```

Figure 3-65 History File Header Update Type Submenu

3.19.8.10 History File Item Editor Menu

In the History File Item Editor Menu the fields of a CUD item's associated history file are displayed in a readable form. A 1-line summary of the CUD item is included at the top of the menu. English descriptions are given for the transaction types and the status flags.

To select a history file for examination from the CUD Item Editor Menu, enter **h (Show history files)** followed by **2** from the History File Main Menu.

Figure 3-66 is an example of the History File menu.

```

>>>>..... Cud Item #8      History File Menu .....<
.. BWM name- BWM95-0001 trgt- SM          type- SMFUNCR ..
1) Time & Date Stamp: Tue Jan 24 13:46:25 1995
2) File ptr to prev entry: 0x230c          14) Update number: 730
3) File ptr to UF path names: 0x278c
4) Ptr to new function address: 0x2c1c
5) File ptr to addr overwrite: 0x0         15) File ptr to cnfgrec: 0x29f4
6) Transaction type: 0x2
.FUNCTION REPLACEMENT
7) Status flags: 0x39
.INSTALLED      .OGEN      .OFC      .AUDT
8) Official Pfile path: /no5text/im/smtxt/IM.out
9) Working Pfile path:
10) Bound Upd file path:
11) Tmp Pfile/Delta path:
12) Reclaimed Ufile Path:
13) Reclaimed Pfile Path:

c) Modify Config Specific Records
f) To edit function names and addresses
g) Quit to Cud item menu
>>>>>Enter option or History field number to modify:

```

Figure 3-66 UPedcud History File Item Editor Menu

The user may modify any of the fields by inputting the appropriate field number at the system prompt, >>>>>Enter option or History field number to modify:.

NOTE: Changes should not be made to history files without the concurrence of the CTS Organization.

Figure 3-67 is an example of the display shown when field 6 (**Transaction type:**) is entered from the History File Item Editor menu.

```

>>>>>Enter option or History field number to modify: 6
Current transaction type flags: 0x2
 1) FUNCTION REPLACEMENT      -- set
 2) FILE REPLACEMENT          -- not set
 3) BYTE REPLACEMENT          -- not set
 4) NEW RELEASE OF FILE       -- not set
>>>>Toggle which flag number (default = return to history menu):
Returning to history menu.

```

Figure 3-67 UPedcud History File Item Editor Submenu, Transaction Type

The transaction type must not be changed. To do so causes the Program Update subsystem to be (or not be) expecting certain temporary files associated with this BWM.

Status flags indicate the current status of the BWM associated with this history file.

Figure 3-68 is an example of the display shown when field 7, **Status flags**: is entered from the History File Item Editor menu.

```
>>>>>Enter option or History field number to modify: 7
Current status flags: 0x39
 1) INSTALLED      -- set
 2) OGEN           -- set
 3) OILD           -- not set
 4) FREPL          -- not set
 5) SGEN           -- not set
 6) OFC            -- set
 7) APP_OFC        -- not set
 8) DM_OFC         -- not set
 9) AUDT           -- set
10) APP_AUD        -- not set
11) DM_AUD         -- not set
12) AUDABT        -- not set
>>>>>Toggle which flag number (default = return to history menu):
Returning to history menu.
```

Figure 3-68 UPedcud History File Item Editor Submenu, Status Flags

Figure 3-69 is an example of the Function Names and Addresses screen displayed when option f (**To edit function names and addresses**) is entered from the History File Item Editor menu.

```
>>>>>Enter option or History field number to modify: f
***** Function Names and Addresses (in hex) *****
01) PCconds1 00a72ada 02) TMdpterm 00ddafd6
03) TMans_ro 005dbb0c 04) MStf15_o 00349d0a
05) MSostape 00d9bbfe 06) MSo7etoa 00e4aff6
07) MSo7esmc 00dda37e 08) MSostacl 00d72004
09) MSo7csmc 00cbflc4 10) MSo7ctoa 00a7190c
11) CCcs7fmt 010e4aa4 12) OAacc_ta 010c209c
13) OAottoan 00fa8164 14) FCasp_rt 00c0fc82
15) OA=q04 01258ebe

Hit RETURN to continue
```

Figure 3-69 UPedcud History File Function Names and Addresses

As shown in Figure 3-66, the History File Item Editor menu includes option **c** (**Modify Config Specific Records**) which allows a user to obtain configuration-specific information from the Configuration Menu. When **c** is entered, the Configuration Menu showing information for the first configuration (# 0) is displayed as shown in Figure 3-70 (Example 1).

```
>>>>>Enter option or History field number to modify: c
>>>>>..... SMcnfg.out Menu for config = 0 .....<<<<<
1) Fileptr cfg addr overwrites: 0x0                2) Configuration # : 0
3) Fileptr to next cfgrecord: 0x28e4
4) Open output file: /update/UPauim000cfg
5) Old output file:
6) Reclaim ufile path: /update/UPruim000cfg
7) Reclaim pfile path: /no5text/im/..smtxt/000/SMcnfg.out

q) Quit to previous menu
n) Display next CFITEM in list
>>>>>Enter option or CFITEM field number to modify:
```

Figure 3-70 UPedcud History File Configuration Menu (Example 1)

To examine information about the next configuration, enter **n** (**Display next CFITEM in list**) from the Configuration Menu.

Figures 3-71 (Example 2) and 3-72 (Example 3) show information for configurations # 1 and # 2, respectively. Note that in Figure 3-72 (Example 3), option **n** does not appear on the menu because the last configuration has been reached.

```
>>>>>Enter option or CFITEM field number to modify: n
>>>>>..... SMcnfg.out Menu for config = 1 .....<<<<<
1) Fileptr cfg addr overwrites: 0x0                2) Configuration # : 1
3) Fileptr to next cfgrecord: 0x27d4
4) Open output file: /update/UPauim001cfg
5) Old output file:
6) Reclaim ufile path: /update/UPruim001cfg
7) Reclaim pfile path: /no5text/im/..smtxt/001/SMcnfg.out

q) Quit to previous menu
n) Display next CFITEM in list
>>>>>Enter option or CFITEM field number to modify:
```

Figure 3-71 UPedcud History File Configuration Menu (Example 2)

```

>>>>>Enter option or CFITEM field number to modify: n
>>>>>..... SMcnfg.out Menu for config = 2 .....<<<<<
1) Fileptr cfg addr ovrwrwrites: 0x0          2) Configuration # : 2
3) Fileptr to next cfgrecord: 0x0
4) Open output file: /update/UPauim002cfg
5) Old output file:
6) Reclaim ufile path: /update/UPruim002cfg
7) Reclaim pfile path: /no5text/im/..smtxt/002/SMcnfg.out

q) Quit to previous menu
>>>>>Enter option or CFITEM field number to modify: q

```

Figure 3-72 UPedcud History File Configuration Menu (Example 3)

3.20 GENERIC UTILITIES

3.20.1 GENERAL

Generic utilities are resident, real-time software debugging tools which support a set of commands to aid maintenance personnel with the verification, localization, and temporary correction of application programs running in some 5ESS®-2000 switch processors such as the CMP, CMPMSG, DNUSCC, FPC, IDCU, IDCULSI, ISLUCC, MH, MMP, PHA, PHV, PH2, PH3, PH4, PH22, PI, PPC, QGP (AP/MSHG), SM/SM-2000, and TMUX.

CAUTION: The improper application of generic utility programs can be service affecting. Before implementing any of the generic utility functions, consult local supervision concerning policy. It is recommended that the implementation of any generic utility program be discussed with the Electronic Switching Assistance Center (ESAC) prior to starting the procedure.

The 5ESS®-2000 switch generic utilities allow a user to do the following:

- To dynamically display the target processor's memory as hexadecimal output or in a disassembled format.
- To perform function traces.
- To temporarily overwrite the target processor's memory.
- To copy data from one memory location to another location in the target processor's memory.
- To copy data from one memory location, modify the data by using bitwise or arithmetic operators, and then place the result in another location in the target processor's memory.
- To combine a series of UT input commands into a single command clause.
- To perform comparisons of data and alter UT command selection based on the comparison. This is the IF and ELSE commands which can also be nested.
- To do limited conversions of a function name or global symbol to an address or location for symbolic debugging.
- To temporarily store data and constants through the use of utility variables.

- To call or execute a function in the target processor and pass up to 20 bytes of data as parameters.
- To change the operational flow of a program by performing a GOTO operation.
- To routinely perform a user defined set of UT commands on a timed basis.
- To perform a user defined set of UT commands at specific user defined points in the target processor's operational text.
- To perform a user defined set of UT commands when a match is found when comparing information from the processor's backplane to user defined addresses, data, and bus control signals.
- To utilize the scripting capability to create a file on the *UNIX*[®] operating system using the MCC terminal.

Not all of the features and capabilities listed are maintained by UT for all of the supported processors. The UT input and output manual pages must be used to determine which commands, options, and software releases are supported for each processor.

The implementation of generic utilities commands is controlled by the following:

- The input of UT commands by maintenance personnel via the MCC or a corresponding terminal.
- The firing of UT breakpoints which have been set by maintenance personnel.
- The sequencing of a UT TIMED WHEN clause that has been scheduled by maintenance personnel to run after some time delay.
- The triggering of an active UT WHEN match command which has been set by maintenance personnel.
- The initiation of fault recovery operations in the switch which can inhibit or remove UT WHEN commands.

All UT output data or error messages are printed on the ROP and displayed on the originating video terminal.

3.20.2 GENERIC UTILITY COMMANDS

3.20.2.1 General

All generic utility input commands are entered manually by maintenance personnel at the MCC or a corresponding terminal. The commands are input as either an immediate command, DUMP-SYMID command, immediate clause, or a WHEN command clause. Following is a description of each type:

- An immediate command is any single UT input command (except the WHEN command) which is entered by the user. Upon entry, the command is validated for errors. If no errors are found, the command is executed, an output message is printed at the ROP and calling TTY, and the command is removed from the target processor. If an error is found, the same process is followed except the command is not executed. It should also be noted that real-time breaks may occur and are acceptable during the execution of an immediate command.
- A **DUMP-SYMID** command is a single UT input command entered by the user. Upon entry, the command is validated for errors. If no errors are found, the command is executed. An output message indicating an error or providing the requested information is always printed at the ROP and calling TTY. Unlike the immediate commands, this command is not subject to blocking, based on clause/terminal rules.
- An immediate clause is any group of UT input commands (except WHEN commands) which are entered by the

user. The operation of the immediate clause is the same as an immediate command except each operation is performed on the entire clause. This means that upon entry, the entire clause must pass validation to be executed, and each command is then executed. If any single command of the clause does not pass validation, the entire clause is not executed, and a single error message is printed on the ROP and calling TTY. It should also be noted that real-time breaks may occur and are acceptable during the execution of an immediate clause.

- A WHEN command clause is a single WHEN command or any group of commands that start with a WHEN command. The operation of a WHEN command clause is different from either an immediate command or immediate clause because the command, or entire clause, is stored in the target processor's memory for later execution, provided no errors are found in the validation phase. If a WHEN command clause passes validation, it is stored in an inhibited state. This means a second command must be used to enable the clause. Following are definitions of the three types of WHEN command clauses which can be formed:
 - (1) A WHEN breakpoint clause sets up a software interrupt in the target processor which allows UT to execute the given sequence of commands at specific points in the application code. It should be noted that real-time breaks are not acceptable during the execution of a breakpoint clause.
 - (2) A timed WHEN clause sets up a cyclical timer in the target processor which allows UT to execute the given sequence of commands on a scheduled basis. It should be noted that real-time breaks may occur and are acceptable during the execution of a timed WHEN clause.
 - (3) A WHEN match clause (SM-2000 only) sets up a software interrupt in the target processor which allows UT to execute the given sequence of commands when a defined match of addresses, data, and control signals are seen by the backplane of the processor. It should be noted that real-time breaks are not acceptable during the execution of a WHEN match clause.

3.20.2.2 Syntax Information

In order to use the generic utility commands, an understanding of how the commands are formatted in the input manual pages is required. Table 3-21 can be referenced to determine the conventions, definitions, and symbols used for formatting input commands.

Table 3-21 MML Syntax Information

SYMBOL	DEFINITION
[]	Used to indicate optional occurrence of the enclosed keywords. For example, [,MATE1] means that the keyword MATE1 need not be specified. Any parameter which is optional is assigned a default value indicated under Defaults.
{ }	Used to indicate that a choice must be made from the enclosed expressions or keywords.
|	Used to separate expressions or keywords within braces; meaning interpreted as "or."
=	Used as a separator between the parameter name and its arguments.
;	Used as an end-of-message character.
!	Used to separate utility function clauses.
:	Used to separate fields (action field, identification field, and data field) within a utility function command and to separate subfields within a field. A field may have several subfields (for example, source, destination, and action options).
" "	Used to enclose the Global Variable (GVAR) symbol to prevent the system from changing characters from lower case to upper case.
,	Used to separate a string of keywords in a field or subfield.
—	Used to separate a list of variables in a field or subfield.
&&	Used to indicate a range of SM/SM-2000 numbers to be used for this operation.
#space	Required between keyword and its argument, not permitted within keyword. Optional throughout message.

3.20.2.3 Command Format

Generic utility (UT) commands consist of an action verb, identification field(s), and optional data field(s). Several commands which are executed sequentially can be strung together. All commands, which are part of a string of commands, except the last one must be terminated with a ``!'. The last command should be the END command and must terminate with ``;" (MML format).

All UT input commands are very similar in format. The basic UT input command format is **action verb:UT:processor ID,optional and required parameters,message terminator**.

Following is an example of the **DUMP:UT:CMP** input message syntax format which is similar to that used in all of the UT input manual pages:

```
DUMP:UT:CMP=0, {MATE|PRIM} [,DIS] [,EA] [,L=a] ,
{ADDR=b|REG=c|REGS|FTRACE|UVAR=d|GVAR="e"|SYMIDX=f}
[,INDIR=g] [,OFF=h[-h] [-h]] {!|;} }
```

A breakdown of the format syntax in this example is as follows:

- **DUMP** is the action verb which indicates the action requested by the user and to be performed by UT.
- **UT** is always present in generic utility input commands. It serves as one of the identifiers of the input message.
- **CMP=0** identifies the processor where the operation is to take place. This identifier can be used with other qualifiers to further describe which physical unit is the target of the operation (for example, MATE, PRIM).
- **MATE** or **PRIM** is a required parameter for this UT input message. The user must use one of these qualifiers. The field converts a logical processor into a physical location. This field is not always used in all UT messages; but when it is there, it must be filled in.
- **DIS**, **EA**, **L**, **INDIR**, and **OFF** are optional parameters used in this UT input message. These fields allow the user to further define the type of information retrieved, the format of the output, or the starting location of the operation. The optional fields are always defaulted to a value, and not all optional parameters can be used at one time.
- **ADDR**, **FTRACE**, **GVAR**, **REG**, **REGS**, **SYMIDX**, and **UVAR** are addressing field identifiers used to determine where the information is going to or coming from. The addressing field is required in almost all of the UT input messages, but the identifiers used vary from message to message.
- The ``!' or ``;" is used to end each UT input command. One of these symbols is required for each message. The ``!' terminates the input message and also indicates that the message is part of an on-going clause. The ``;" indicates that this is the absolute end of the message or clause.

Based on this format, an example of a valid input command could be as follows:

```
DUMP:UT:CMP=0,PRIM,GVAR="INsynch",EA;
```

This example would print in hexadecimal the effective starting address of the global symbol **INsynch** (in this case a function) from the active or primary CMP to the ROP and calling TTY.

There are many more combinations of commands which can be created, all of which have their own uses and abilities. Some of the options, however, are only valid when used in combination with other commands.

Refer to 235-600-700, *Input Messages Manual*, Volume 1, User Guidelines section, for additional information on command format.

3.20.2.4 Action Verb Categories

The generic utilities consist of 13 commands (action verbs) which are separated into five functional categories as

follows:

- (1) **Data Transfer Commands** include the following:
 - DUMP
 - LOAD
 - COPY.
- (2) **Conditional Commands** include the following:
 - IF
 - ELSE
 - ENDIF.
- (3) **The When Command** is as follows:
 - WHEN.
- (4) **When Controlling Commands** include the following:
 - ALW (allow)
 - INH (inhibit)
 - OP (operational status)
 - CLR (clear)
 - END.
- (5) **Execute Command** is as follows:
 - EXC (execute).

3.20.2.5 Data Transfer Commands

3.20.2.5.1 General

Data transfer commands allow the user to move, print, and write data to addressable system locations. Data transfer commands are described in the following sections.

3.20.2.5.2 Dump Command

The DUMP command gives a user the ability to collect information and print it at the ROP. Generic Utilities provides two flavors of DUMP commands; NORMAL DUMP and SYMID DUMP which are defined as follows:

3.20.2.5.3 Normal Dump

The DUMP command is used to print the contents of one or more sequential memory locations, utility variables, microprocessor registers, or to obtain a function trace listing. The dumping of the microprocessor registers or a function trace (due to the dynamic nature of these operations) can only be performed inside UT breakpoint or matcher WHEN clause. These operations are dependent on the true values of the microprocessor registers and/or stack linkages at a given instant of time. A UT breakpoint or matcher WHEN clause is necessary to cause a snapshot of these values to be obtained.

The length of dumps is always provided in bytes, but the maximum dump length changes for each of the different processors supported. The output is printed in hexadecimal (the default case) but can be printed in a disassembled (string) format. There are two basic differences in the gathering of data which need to be noted. They are as follows:

- (1) When a dump is performed outside a breakpoint or matcher WHEN clause, real-time breaks are taken after each message is formatted. This means the dumping of data (which does not fit in one message) is not a snap shot of the memory to be dumped but rather is a gathering of the requested data over a period of time. This is acceptable for dumping information which is not real dynamic such as the operational text of a function.
- (2) When a dump is performed within a non-timed WHEN clause, real-time breaks are not taken. This means that the dumping of requested data is a true snapshot. However, the amount of data dumped in a non-timed WHEN clause is limited to less than 2000 bytes. The processing of a non-timed WHEN clause causes UT to store all output messages for that clause in an output buffer (2000 byte) which is then printed out as a deferred operation. All messages formatted are placed here; not just the data being dumped. Therefore, the real length limit must include the overhead of each message when included in a breakpoint or match clause. This approach is very useful when dumping dynamic data or data which is only accessible during non-timed WHEN clauses.

3.20.2.5.4 SYMID Dump

The **DUMP-SYMID** command gives a user the ability to print several types of symbolic information. This command does not perform clause/terminal checks, so the command can be run from any of the TTYs without concern of being blocked. There are four combinations of command line parameters to be discussed for this command:

- (1) Given the processor and symbol index as information - provide the full name of the global symbol referenced by the index and the path used by that processor.
- (2) Given the processor and a symbol name (part or whole) as information - provide the full name of all global symbols which match the given name (up to 40 matches), their index numbers and the path used by that processor.
- (3) Given a path to a COFF file on the AM and a symbol index as information - provide the full name of the global symbol referenced by the index.
- (4) Given a path to a COFF file on the AM and a symbol name (part or whole) as information - provide the full name of all global symbols which match the given name (up to 40 matches) and their index numbers.

The output of this command is intended to give the user the ability to access an address (symbolically) when the symbol name is larger than 15 characters in length or provide the full name of a symbol based on a symbol index number.

3.20.2.5.5 Load Command

The LOAD command allows the user to overwrite memory in increments of long word, word, or byte sizes. The user specifies the start address (where the load shall begin) and the size of the values (one to four bytes per value) to be

loaded. The maximum total length per command (in bytes) is dependent on the target processor. The length (L) divided by the SIZE of each value provides the number of values expected. However, it is illegal to have a remainder. As part of the overwrite operation, most of the target processor's write protection is removed. Thus, the user is allowed to overwrite almost anything in memory. There are obvious exceptions however, such as read-only memory (ROM) which is addressable, but physically cannot be written. A load complete message is printed for each successful operation unless the load is part of a UT breakpoint or matcher WHEN clause.

3.20.2.5.6 Copy Command

The COPY command is used to transfer data from one internal processor location (that is, absolute address, register, variable, utility variable, or symbolic address) to another, move constants to an internal location, and to modify the value by using bitwise or arithmetic operators. The COPY command consists of three sets of parameters of which the third set is optional. In the first set, the user specifies the destination address. The second set, or second and third sets, allow the user to supply the value to be transferred or give a description of where to find the values. The COPY command is in fact an assignment statement in the form of $A=B[(OPER)C]$, where A, B, and C are the three sets of parameters and OPER is the bitwise or arithmetic operator to be used in the equation. The operators and their resulting equations are as follows:

OPERATOR	EQUATION
<i>DIV:</i>	A equals B divided by C.
<i>AND:</i>	A equals B bitwise ANDed with C.
<i>OR:</i>	A equals B bitwise ORed with C.
<i>XOR:</i>	A equals B bitwise exclusive ORed with C.
<i>SHL:</i>	A equals B shifted left the number of bits defined in C.
<i>SHR:</i>	A equals B shifted right the number of bits defined in C.
<i>INVERT:</i>	A equals the one's complement of B. That is, it converts each 1-bit into a 0-bit and vice versa.

The parameters can be a combination of absolute addresses, registers of the microprocessor, utility variables (UVAR), symbolic addresses, or constants. Following are two different forms of operation which need to be noted:

- (1) When a COPY command is performed outside a breakpoint or match clause, options which deal with the microprocessor registers are not allowed. A copy completed message is printed for each successful operation.
- (2) When a COPY command is performed inside a breakpoint or match clause, all available operations are valid, but no copy completed message is printed.

The COPY command is limited to four bytes of data copied per command. During the overwrite operations, most of the write protections are removed. Thus, the user can transfer data to almost anywhere. This command then allows for the transfer of data based on dynamic addresses.

3.20.2.6 Conditional Commands

3.20.2.6.1 General

Conditional commands allow the user to make comparisons of data of up to four bytes per test and to optionally execute a list of UT commands if the comparison is true. The conditional commands also provide the ability to execute a separate list of UT commands if the comparison is false. The basic form of the conditionals is as follows: if the tested condition is true, perform the following user defined list of UT commands, else perform a secondary list of user defined UT commands.

Conditional commands can also be nested, which allows the user to have several conditions evaluated before executing the list of UT commands. The conditional commands are described as follows:

3.20.2.6.2 IF Command

The IF command allows the user to set up a comparison of two values. Both values are user defined and can be constants, data, addresses, registers, and more. The comparison is also user defined and can be one of the following types; equal to, greater than, greater than equal to, less than, or less than equal to. The IF command does not print any messages, but it allows a list of UT input commands to be performed when the condition is tested and is found to be true. It should be noted that the comparison is made with sign-extended logic, and not all command options are allowed outside a breakpoint or match clause (basically the microprocessor registers).

3.20.2.6.3 ELSE Command

The ELSE command allows the user to establish an alternate list of UT commands to be executed whenever the comparison performed in the associated IF command is found to be false. This command is only used in conjunction with the IF command.

3.20.2.6.4 ENDIF Command

The ENDIF command allows the user to continue entering utility commands that are not associated with the IF or ELSE condition of a command clause. Nesting of IF, ELSE, and ENDIF commands is allowed, and the only limit to the amount of nesting is the maximum of 45 commands total in any single processor. The nesting of the conditional commands can be shown by the following:

```

if (A > B)
    then if (A < C)
        dump data (X)
    else (A >= C)
        dump data (Y)
        copy data (A to address P)
    endif
else
    copy data (1 plus counter to address counter)
endif

```

3.20.2.7 The When Command

3.20.2.7.1 General

The WHEN command gives a user the ability to sequence through a defined list of UT commands at a given point in the application code, at the time of a given data/address/operation match of the matcher registers (SM-2000 only), or at an approximate time interval. Generic utilities provide for three types of WHEN commands; WHEN BREAKPOINT, TIMED WHEN, and WHEN MATCH which are defined as follows:

3.20.2.7.2 WHEN Breakpoint Command

WHEN breakpoint clauses allow maintenance personnel to interrupt the application code of a process in the target processor, execute a predefined sequence of UT commands, and resume execution of the process with minimal effect to the real time and operation of the process. A WHEN command can be placed at any memory location in random access memory (RAM), but it must be placed at the start of any executable instruction for it to work. For memory protection, the value at the desired address in RAM is compared with what the user provides as the value of the OPCODE. If the comparison is false, the WHEN command is removed, and an error message is printed.

After a valid WHEN clause is entered by maintenance personnel, it is stored in memory in an inhibited state. While the clause is in the inhibited state, the breakpoint (trap instruction) has not been placed in memory at the specified location, and none of the commands of the clause can be executed. Maintenance personnel must use the ALW command to enable the breakpoint.

The ALW command places the trap instruction in the specified memory location and marks the state of the WHEN

command to active. This means that any time the microprocessor executes the trap instruction located at this address, the following events occur:

- (1) Microprocessor registers are saved by the operating system. This allows UT to access the data contained in these registers at the time the exception occurred. After UT has processed the breakpoint, the registers are used to return the operational flow of the code back to the original point of the trap instruction.
- (2) Maskable interrupts are blocked during the processing of the UT WHEN clause.
- (3) Generic utilities determines which breakpoint has been hit and sequences through the list of UT commands contained in the WHEN clause.
- (4) Output messages formatted by this sequence of UT commands are placed in an output buffer maintained by the UT process. The buffer is currently limited in size (2000 bytes), so care must be taken to prevent an overflow of information. This buffer cannot be unloaded when UT is processing a breakpoint.

The placement of the breakpoint determines what data is available and how to access it. The OPCODE, which is replaced by the breakpoint, is not executed until the WHEN breakpoint clause has been performed. Thus, if data is dumped from a location defined by a dynamic pointer, the breakpoint cannot be placed at the address of the instruction which sets up the pointer.

3.20.2.7.3 Timed WHEN Command

Timed WHEN clauses allow maintenance personnel to execute a predefined sequence of UT commands at a user defined interval of time. Timed WHEN commands operate with a cyclical timer at the processor's normal level of operation and do not operate at interrupt level.

After a WHEN clause is entered by maintenance personnel, it is stored in memory in an inhibited state. While the clause is in the inhibited state, the cyclical timer has not been established, and none of the commands of the clause can be executed. Maintenance personnel must use the ALW command to enable the timed WHEN.

The ALW command sets up a cyclical timer with the operating system for the specified length of time and marks the state of the WHEN command to active. This means that when the time interval is reached, a message is sent to the UT process indicating a timed WHEN needs to be processed.

Generic utilities determine which timed WHEN has fired and sequences through the list of UT commands contained in the WHEN clause. As part of timed WHEN processing, the UT code does not have access to the microprocessor registers, and dumped data is taken over a period of time (not necessarily a single a snapshot of the data).

3.20.2.7.4 WHEN Match Command (SM-2000 only)

WHEN match clauses allow maintenance personnel to interrupt the application code of a process in the target processor, execute a predefined sequence of UT commands, and resume execution of the process with minimal effect to the real time of the process. A WHEN command can be defined to match on addresses, data, and control signals as seen by the backplane of the processor.

A WHEN match command is controlled by defining a set of six registers. These six registers provide the matching information for the address bus, data bus, and control signals. The registers are a set of three pairs, one for each bus and control signals, that define what match value is being looked for. The value defined by the registers is compared against the control signals and the data on the respective buses of each backplane bus cycle.

The three pairs of registers consist of basically the same combination, a match register and a corresponding mask register. With this combination of registers, each of the individual bits can be set to trigger on 0 (zero), 1 (one), or don't care. Each bit in the match register can be set to 0 (zero) or 1 (one). The mask registers are then used to indicate which bits must match exactly [bit set to 0 (zero)] and which ones are don't care indications [bit set to 1

(one)]. The address defined in the address match register (MPMTCHA) and the mask register (MPMMTCA) is compared against the address present on the LS or RS bus during every cycle. The data pattern defined in the data match register (MPMTCHD) and the mask register (MPMMTCD) is compared against the data present on the LS or RS bus during every cycle. The operations match register (MPMTHOP) and its mask (MPMMTOP) are compared against the control signals being sent on each bus cycle.

Below is an example of a possible matcher setup to match on a range of hex values. The match register has a value of h'0808ffff, and the mask register has a value of h'000000ff. Since the low eight bits of the mask register are ones (don't care), a match would occur for any value between h'0808ff00 and h'0808ffff.

0	8	0	8	f	f	f	f

Match Register

0	0	0	0	0	0	f	f

Mask Register ↓

0	8	0	8	f	f	X	X

Resultant Match Values

The following is used for the default setting of the matcher registers for the WHEN match command:

- Address match: required field
- Address mask: 0x00000000 (all must match)
- Data match: 0x00000000
- Data mask: 0xffffffff (all don't care)
- Operations match: 0x00002000
- Operations mask: 0xffffcffd (match on write and LS bus grant (LSGNT))

The address should always be provided or the matchers should not be enabled. It is assumed if the user does not specify data, then they probably don't care; all match should be okay. The reasoning behind the operations setup is: specifying writes eliminates text fetches (could match too often if the user isn't careful) while specifying LSGNT eliminates pump DMA and reduces risk if the matchers aren't disabled properly on side switches (eliminates cycles received from the update bus).

After a valid WHEN clause is entered by maintenance personnel, it is stored in memory in an inhibited state. While the clause is in the inhibited state, the matcher registers have not been set, and none of the commands of the clause can be executed. Maintenance personnel must use the ALW command to enable the matchers.

The ALW command writes the matcher registers, enables the matcher control bit of the BSN control and status register (MPBSNCS), and marks the state of the WHEN command to active. This means that any time a match is found the following events occur:

- (1) Microprocessor registers are saved by the operating system. This allows UT to access the data contained in these registers at the time the interrupt occurred. After UT has processed the interrupt, the registers are used to return to the application code at the same location being operated on when the interrupt occurred.
- (2) Maskable interrupts are blocked during the processing of the UT WHEN clause.
- (3) Generic utilities determines which match command has been hit and sequences through the list of UT

commands contained in the WHEN clause.

- (4) Output messages formatted by this sequence of UT commands are placed in an output buffer maintained by the UT process. The buffer is currently limited in size (2000 bytes), so care must be taken to prevent an overflow of information. This buffer cannot be unloaded when UT is processing at interrupt level.

3.20.2.7.5 Matcher Register Limitations

The matcher registers have some limitations which do not allow a user to match on everything. Since the matcher registers are maintained by hardware external to the microprocessor, the internal microprocessor cycles are not seen on the bus and cannot be matched on. The ability to match on non-longword boundaries may be limited due to the effects of the caches and bus sizing.

There are several problems with the cache which can have an effect on the use or results of the matcher registers. The following problems can be seen:

- (a) The microprocessor uses quad-longword accesses to load information into the caches. Since only one address is sent out on the bus, the use of the matchers may not provide the expected output. Quad-longword accesses are based on longword alignment (addresses ending in 0x0, 4, 8, C). If the requested address is not longword aligned and a quad-longword access is to be performed, the microprocessor uses the next lower longword aligned address to perform the operation.
- (b) If the user is attempting to match on a write of an address that is copy back cache mode (that is, user stack or system stack only), the matcher is not triggered at the time of the write. The information is stored in the cache until the cache is flushed or the entry is marked as invalid and pushed. This allows the matchers to trigger on this, but the results may not be exactly as expected.
- (c) If the user is attempting to match on a read of an address that is write-through cache mode (that is, most of memory), the matcher is not triggered if the information is stored in the cache. This could prevent a user from seeing all accesses to this address using the matcher registers.

The matcher registers on an SM-2000 with a core board other than the UN540 exhibit similar problems but also are affected by the following:

- (a) The use of quad-longword accesses by the microprocessor increase.
- (b) With the larger caches, the possibility of a cache hit is increased. With a larger cache hit rate, less information is seen on the backplane.
- (c) The addition of core DRAM and core I/O reduces the amount of information being sent on the backplane. The operation being performed by the microprocessor on core DRAM and core I/O indicate what the matcher registers can trigger on. The matchers are able to trigger on writes, but not on reads to these memory locations.
- (d) The write posting buffer can create a time skew between the backplane and the microprocessor. The impact of this is in determining what location in the application code actually performed the write. A function back trace performed at this time provides all of the functions called in the current call stream, but the list may not contain the guilty function. The function back trace points to functions owned by the last process dispatch which can lead to areas of application code.

The basic statement is that the matchers only work on information which is seen on the backplane (that is, passed on or uses the RS/LS bus and the bus control signals).

3.20.2.7.6 WHEN Command Removal

Once a WHEN breakpoint, match WHEN, or a timed WHEN command is allowed, it remains active until one of the following events occurs:

- (a) The WHEN clause has been executed the number of times the user specified (refer to the HIT option described in Section 3.20.2.11).
- (b) The user clears or inhibits the WHEN clause (refer to the CLR and INH commands described in Section 3.20.2.8, WHEN Controlling Commands).
- (c) The generic utilities audit has removed the WHEN clause because an error has occurred in the storage of the WHEN command clause.
- (d) Pumping of the particular processor containing the WHEN removes all WHEN command clauses in the processor. If these WHEN command clauses are needed, they must be reentered by the craft.
- (e) As part of a selective initialization or a single process purge of generic utilities, all timed WHEN commands in the processor are inhibited. The craft needs to allow the timed WHEN commands to use them again.
- (f) As part of a full initialization, all timed WHEN commands are cleared from the processor. If these timed WHENs are needed, the craft must reenter the command clause.
- (g) When a CMP soft switch occurs, UT follows these rules:
 - All breakpoints in the old active CMP are moved to the new active CMP and maintained in their current state.
 - All timed WHENs in the old active CMP are moved to the new active CMP, but they are in the inhibited state. The craft needs to allow the timed WHENs to use them again.
 - All WHEN command clauses in the old standby CMP are removed and not moved to the new standby CMP. If these WHEN commands are needed, the craft must reenter the command clause.
- (h) As part of a selective initialization of a CMP, UT performs an inhibit operation on any active WHEN command in the processor. The craft needs to allow the WHEN commands to use them again.
- (i) As part of a full initialization of a CMP, UT performs a clear operation on any WHEN command in the processor. If these WHEN commands are needed, the craft must reenter the command clause.
- (j) As part of a selective initialization of an SM or a PSUPH, UT performs an inhibit operation on any active WHEN command in the processor. The craft needs to allow the WHEN commands to use them again.
- (k) As part of a full initialization of an SM or a PSUPH, UT performs a clear operation on any WHEN command in the processor. If these WHEN commands are needed, the craft must reenter the command clause.

3.20.2.8 WHEN Controlling Commands

3.20.2.8.1 General

The WHEN controlling commands enable the user to allow/enable, inhibit, clear/remove, and view the operational status of one or more WHEN commands in the target processors. These commands may be entered within a WHEN clause to manipulate other WHEN clauses. The WHEN controlling commands are allow (ALW), clear (CLR), inhibit (INH), operational status (OP), and END. They are described as follows:

3.20.2.8.2 ALW Command

The ALW command enables a single WHEN clause or all WHEN clauses that are in the inhibited state in the target processors. Following are three basic types of operations which can be performed:

- (1) When the ALW command enables a WHEN breakpoint command, a trap instruction is placed at the address defined in the WHEN command. Checks are performed to make sure the OPCODE expected at the given address matches what is truly in memory. If the check does not pass, an error message is printed and the WHEN command is removed by the UT audit. If the trap is placed in memory, whenever the trap instruction is hit by the microprocessor, the list of commands associated with the WHEN command is executed.
- (2) When the ALW command enables a TIMED WHEN command, a cyclical timer is started. Whenever the timer expires, a message to perform the list of commands associated with the WHEN command is sent to the UT process. A TIMED WHEN cannot be allowed inside a WHEN breakpoint or match clause due to operating system constraints.
- (3) When the ALW command enables a WHEN match command, the matcher registers are set up as defined in the WHEN command and the matcher registers are enabled. Checks are performed to make sure the matcher registers are not currently in use. If the registers are currently being used, an error message is printed and the WHEN command is left in the INHIBITED state. If the matcher registers are enabled and the defined match condition occurs in the SM-2000, the list of commands associated with the WHEN command is executed.

If a WHEN command is enabled or reenabled (for example, an ALW command is being performed on WHEN which is currently in the active state) its hit count is set to the value originally defined by the user.

3.20.2.8.3 CLR Command

The CLR command removes a single WHEN clause or all WHEN clauses from the target processors regardless of their current state. Following are three basic operations which can be performed:

- (1) When the CLR command removes a WHEN breakpoint command, the WHEN cannot be reenabled; it must be typed in again by the user. If the WHEN command was inhibited at the time of the clear operation, the WHEN is only removed from UT's knowledge. If the WHEN command was active, the correct OPCODE is placed back into the operational code at the address defined in the WHEN command, and then UT's knowledge of the WHEN is removed.
- (2) When the CLR command removes a TIMED WHEN command, the WHEN cannot be reenabled; it must be typed in again by the user. If the WHEN command was inhibited at the time of the clear operation, the WHEN is only removed from UT's knowledge. If the WHEN command was active, the cyclical timer is retired and then UT's knowledge of the WHEN is removed.
- (3) When the CLR command removes a WHEN match command, the WHEN cannot be reenabled; it must be typed in again by the user. If the WHEN command was inhibited at the time of the clear operation, the WHEN is only removed from UT's knowledge. If the WHEN command was active, the control bit of the matcher registers is disabled and then UT's knowledge of the WHEN is removed.

3.20.2.8.4 INH Command

The INH command disables a single WHEN clause or all WHEN clauses that are in the active state in the target processors. Following are three basic operations which can be performed:

- (1) When the INH command disables a WHEN breakpoint command, the correct OPCODE is placed back into

the operational code at the address defined in the WHEN command. The WHEN command clause, however, is left in the UT memory and can be reenabled with another ALW command. The WHEN breakpoint command is then effectively ignored at this point.

- (2) When the INH command disables a TIMED WHEN command, the cyclical timer is deleted. The WHEN command clause, however, is left in the UT memory and can be reenabled with another ALW command. A TIMED WHEN command cannot be inhibited inside of a WHEN breakpoint clause due to operating system constraints.
- (3) When the INH command disables a WHEN match command, the control bit of the matcher registers is disabled. The WHEN command clause, however, is left in the UT memory and can be reenabled with another ALW command.

3.20.2.8.5 OP Command

The OP command causes an output list of the status (inhibited or active) of a single WHEN clause or all WHEN clauses contained in the target processor's memory. The output lists the status, WHEN identification, hit count, and some detailed information of the WHEN such as the defined address of the WHEN.

3.20.2.8.6 END Command

The END command is used to signify the end of a utility request. The END command is only used as the last command of a clause and must terminate with a ``;". However, the user may terminate any clause with any other UT input command provided its terminator is a ``;".

3.20.2.9 Execute Command

The **execute command (EXC)** is described as follows:

There are two different forms of the EXC command which can be used in the supported processors. The two forms are identified by the indicators CALL and GOTO and are described as follows:

- (1) The EXC command which performs the CALL option allows the user to enter a function name to make a function call while passing up to 20 bytes of data. The user is responsible for determining the correct parameters and the order in which to pass them. The returned data of the function is printed and saved. It should be noted that the execute command can handle a function returning any type of data (for example, the function returns a short, pointer to a structure, long, etc.). A check is performed to make sure the function being called is truly a function.
- (2) The EXC command which performs the GOTO option allows for an immediate jump of the microprocessor to a user defined absolute address. This command is only valid inside a WHEN breakpoint clause.

3.20.2.10 Processor Identification (ID)

The processor ID refers to the particular 5ESS[®]-2000 switch processor on which program analyses are being performed. Following (in alphabetical order) is a listing of processor IDs and the processor associated with each. All generic utility commands are used to analyze programs in all 5ESS[®]-2000 switch processors using currently supported generics.

PROCESSOR ID	PROCESSOR
CMP	Communication Module Processor
CMPMSG	Communication Module Processor Message Handler
DNUSCC	Digital Networking Unit - SONET Common Control
FPC	Foundation Peripheral Controller
IDCU	Integrated Digital Carrier Unit

IDCULSI	Integrated Digital Carrier Unit Loop Side Interface
ISLUCC	Integrated Service Line Unit Common Controller
MH	Message Handler
MMP	Module Message Processor
PHA	Packet Switch Unit Protocol Handler Access
PHV	Packet Switch Unit Protocol Handler Voice
PH2	Packet Switch Unit Protocol Handler (Model 2)
PH3	Packet Switch Unit Protocol Handler (Model 3)
PH4	Packet Switch Unit Protocol Handler (Model 4)
PI1	Peripheral Interface (Version 1)
PI2	Peripheral Interface (Version 2)
PPC	Pump Peripheral Controller
QGP(AP/MSGH)	Quad Link Packet Switch (QLPS) Gateway Processor (AP/MSGH)
SM/SM-2000	Switching Module/Switching Module-2000
TMUX	Transmission Multiplexer (TMUX) for Digital Networking Unit - SONET (DNU-S)

3.20.2.11 Command Parameters

The UT command parameters, which include optional data fields and the required addressing modes, vary depending upon the command (action verb) being used and the processor being analyzed. Table 3-22 is a listing of UT command parameters and description.

Refer to 235-600-700, *Input Messages Manual*, for details on specific input messages and 235-600-750, *Output Messages Manual*, for system responses.

Table 3-22 UT Command Parameter Description

PARAMETER	DESCRIPTION
ADDR	This specifies a physical address at which the action is to take place. The starting address can be modified in some commands by using indirections and offsets.
ADRS	This specifies a physical address for the WHEN match command. It is used with the address mask value (AMSK) to define a range of address for comparison matching.
AMSK	This specifies an address mask value to be used with the WHEN match command. This value together with the physical address (ADRS) defines a range of addresses for comparison matching.
AND	This is one of the optional keywords used in the COPY command. This indicator causes the data defined in the source field of the command to be bitwise anded with the data defined in the optional third field of the command before the copy of data is performed.
AP	This is a keyword which causes the action to occur only on the QGP's application processor.
ARG	This specifies the number of arguments or parameters to be passed as 2-byte numbers to a function.
CALL	This identifier indicates the function (whose name is specified by the symbol contained in FUNC) to be called by the UT process in the specified processor. A check is performed to make sure the symbol is a function.
DATA	This specifies the data value for the WHEN match command. It is used with the data mask value (DMSK) to define a range of data or specific data to be used for comparison matching.
DIS	This causes the data to be dumped in a disassembled format instead of straight hexadecimal output. The disassembly of the data is performed based on the type of microprocessor used in the target processor. Two different forms of disassembly can be produced. The first is based on the <i>MOTOROLA</i> ® 680XX instruction set, and the second is based on the <i>INTEL</i> ® 80X86 microprocessor. This option causes the processor to route the raw memory data to one of the disassemblers which are located in the AM. The AM receives raw data from the processor, disassembles it, stores the output in an AM buffer, and then prints it at the ROP and the calling TTY.
DIV	This is one of the optional keywords used in the COPY command. This indicator causes the data defined in the source field of the command to be divided by the data defined in the optional third field of the command before the copy of the data is performed.
DMSK	This specifies the data mask value to be used with the WHEN match command. This value together with the data value (DATA) define specific data or range of data to be used for comparison matching.
EA	This indicates that the data to be used (that is, dumped, copied, or compared) is the determined

	effective starting address of the operation instead of the contents of the address.
EQ	This is a keyword identifier which indicates equal to. It is used in the COPY command to separate the source and destination parameters. Data identified to the right of "EQ" is transferred to the location identified at the left of "EQ". In the IF command, "EQ" is the type of condition to be performed.
FOREVER	This indicates that the WHEN command, once it has been allowed, is not removed by the UT process based on the number of times it has been utilized. When this option is used, the WHEN command is only removed or inhibited by fault recovery actions or another manual UT input WHEN controlling command.
FTRACE	This keyword specifies that the program counter addresses be dumped from the current stacks. This provides a trace of current function calls on the recovery, system, and user stacks.
FUNC	This indicates that the function is specified symbolically (for example, FUNC = "function name"). Must be entered as a string of up to 15 characters enclosed in double quotes. If the function name is longer than 15 characters in length, the symbol index number of the function may need to be used to access this function symbolically. The function's symbol index number can be determined by using the DUMP:UT:SYMID input command.
GE	This is a keyword identifier which indicates the condition to be evaluated is greater than or equal to.
GOTO	This identifier indicates that a C-statement GOTO is to be performed. This option is only allowed in conjunction with a WHEN breakpoint, and the jump is from the address of the breakpoint to the address defined by the ADDR field of the EXC command.
GT	This is a keyword identifier which indicates the condition to be evaluated is greater than.
GVAR	This is the global variable which indicates that the address is specified symbolically (for example, GVAR = "function name"). Must be entered as a string of up to 15 characters enclosed in double quotes. If the global variable name is longer than 15 characters in length, the symbol index number of the symbol may need to be used to access this global variable symbolically. When the GVAR is used with the DUMP:UT:SYMID input command, a string of 127 characters is acceptable. The global variable's symbol index number can be determined by using the DUMP:UT:SYMID input command.
HIT	This is the hit option which accepts a number as an input parameter. This number is used by UT in the target processor to indicate the number of times a WHEN command can be utilized before it is automatically inhibited by the UT process. The primary use of this option is to provide a method which prevents UT from using too much of a processor's real time which can cause fault recovery actions to take place. The hit count is ignored if the FOREVER flag is enabled.
INDIR	This is the indirection option which accepts a number as an input parameter. This number is used by UT to indicate the number of levels of indirection. The definition of a level of indirection is to take the contents of an address and use the contents as a pointer. Thus, one level of indirection means UT goes to the address defined by the contents of the address of the main level. If more than one level of indirection is indicated, the second level is determined based on the first level (that is, a pointer points to a pointer).
INVERT	This is one of the optional keywords used in the COPY command. This indicator causes a bitwise invert (1 -> 0, 0 -> 1) to be performed on the data defined in the source field of the command before the copy of data is performed.
IO	This keyword accepts a number as an input parameter. The number indicates the particular input/output port to be used in the operation. An 8-bit length is imposed on any operation performed on an IO port.
L	This option specifies the length (in bytes) of the action to be taken.
LE	This is a keyword identifier which indicates the condition to be evaluated is less than or equal to.
LT	This is a keyword identifier which indicates the condition to be evaluated is less than.
MATE	This is a keyword which causes the action to occur only to the standby processor. In fully duplex units (such as the SM), the operation is actually performed on the active unit by doing reads/writes across the update bus. In units which are duplex but do not have an update bus (such as the CMP), the entire action is performed on the standby unit.
MINUS	This is one of the optional keywords used in the COPY command. This indicator causes the data defined in the source field command to be subtracted by the data defined in the of the optional third field of the command before the copy of data is performed.
MSGH	This is a keyword which causes the action to occur only on the QGP's message handler processor.
MSK	This is the mask option which accepts a number as an input parameter. This number specifies the value to be "anded" with the final result before evaluating the conditional statement.

MULTIPLY	This is one of the optional keywords used in the COPY command. This indicator causes the data defined in the source field of the command to be multiplied by the optional third field of the command before the copy of data is performed.
NE	This is a keyword identifier which indicates the condition to be evaluated is not equal to.
NOPRINT	This keyword causes the suppression of two messages which would normally be printed every time an active WHEN command was processed by UT. The messages are the WHEN STARTED and WHEN COMPLETED messages. However, commands contained in the WHEN command clause may still print messages (for example, the DUMP command). The use of this option reduces ROP messages and speeds up the processing of WHEN command clauses.
OFF	This is the offset option which accepts a number as an input parameter. This number specifies the number of bytes to be added to the address contained in the message before determining the final starting address for the action. For the WHEN command, offsets are added to the address of a function (determined symbolically) to determine the final address of the breakpoint (this is a description of relative offsets). In any other UT command, an offset is illegal unless an indirection is indicated. The offset in these commands is added to the data found at each level of indirection.
OMSK	This specifies the operations mask value to be used with the WHEN match command. This value together with the operation value (OPER) defines a specific or range of operations to be used for comparison matching.
OPC	This is the OPCODE option which accepts a number as an input parameter. This number is expected to be a match to the OPCODE instruction found in the target processor's memory at the given address. The OPCODE must be a 2-byte value. If this parameter does not provide a match, the WHEN command is not accepted by UT in the target processor.
OPER	This keyword identifier indicates which operation is used in the COPY and WHEN commands. In the COPY command, this optional keyword defines the operation (that is, AND, OR, XOR, INVERT, MULT, DIV, PLUS, MINUS, SHL, or SHR) to be performed between the data defined in the source field and the optional third field of the command before the copy is performed. In the WHEN match command, this specifies the operation mask value (OMSK). It is used with the OMSK to define a specific or range of operations to be used for comparison matching.
PARM	This is the parameter option used to supply the data needed by a function being called by the user. All parameters must be two bytes each. If more than one parameter is to be entered, they should be entered as a list separated by dashes (10 values maximum). If the parameters are long words or addresses, two adjacent values are combined by UT. The order of the two bytes combined change with the type of processor (see 235-600-700, <i>Input Messages Manual</i> , for details). If a function needing parameters is called, but insufficient or no parameters are provided, the parameters are taken from the stack UT is currently running on.
PATH	This is the complete path from "root" on the AM processor to the COFF file to be used in finding the symbol name(s) or symbol index requested by the user. PATH must be entered as a string of up to 39 characters enclosed in double quotes (for example, PATH = "/no5text/prc/fpc286ram.o").
PLUS	This is one of the optional keywords used in the COPY command. This indicator causes the data defined in the optional third field of the command to be added to the source field of the command before the copy of data is performed.
PRIM	This is a keyword which causes the action to occur only to the active processor. This keyword is used by UT to indicate the CMP which is logically active. Output messages printed indicate which physical CMP is active.
REG	This keyword accepts the symbol of a single MC680XX microprocessor as an input parameter. The symbol identifies which register is to be acted upon. A set of dummy registers is used for the operation if the command is not part of a WHEN breakpoint clause.
REGS	This keyword specifies that the contents of all the MC680XX microprocessor registers be dumped. A set of dummy registers is used for the operation if the command is not part of a WHEN breakpoint clause.
SHL	This is one of the optional keywords used in the COPY command. This indicator causes the data defined in the source field of the command to be shifted (bitwise) left by the number of bits defined in the optional third field of the command before the copy is performed. Zeros are shifted into the low order bit.
SHR	This is one of the optional keywords used in the COPY command. This indicator causes the data defined in the source field of the command to be shifted (bitwise) right by the number of bits defined in the optional third field of the command before the copy is performed. The signed bit is

	replicated into the higher order bit.
SYMIDX	This keyword accepts a number as an input parameter. The number is a unique symbol identification number of a COFF symbol table. This number is used to search the COFF file indicated by the PATH parameter or the unit type provided for the symbol name and address information.
SIZE	This keyword accepts a number as an input parameter. This number is used to define the size of each value (number of bytes) to be written into the target processor's memory. The size of each value (long word, word, or byte) must be constant for the message.
TIME	This keyword accepts a number as an input parameter. The number is in milliseconds and defines the time interval between successive executions of this timed WHEN clause.
UTIL	This keyword indicates that the operation is to be performed on all WHEN command clauses in the specified processor.
UTILFLAG	This keyword accepts a number as an input parameter. The number is a unique label which identifies a WHEN command in the specified processor. Checks are performed to make sure the label is unique.
UVAR	This keyword accepts a number as an input parameter. The number is an index (starting at zero) of an array of longs in the specified processor's memory. This memory is owned by UT and can be used by maintenance personnel as a temporary storage location.
VAL	This is the value option used to provide the data or constant to be used in the operation. If more than one value is to be entered, they should be entered as a list separated by dashes. The number of values allowed in the list varies from message to message.
XOR	This is one of the optional keywords used in the COPY command. This indicator causes the data defined in the source field of the command to be bitwise exclusive or'ed with the data defined in the optional third field of the command before the copy of data is performed.

3.20.2.12 Scripting

The scripting capability allows the user to create a file on the *UNIX*® operating system using the MCC terminal. The file, created in advance consisting of WHEN-clause sequences, would be executed at a later time from the MCC terminal. The following is a typical scripting scenario:

- (a) The user creates a file (a series of *UNIX*® operating system commands) similar to the following:

```
IN: FILESYS: DIR, DN "/tmp/script";
```

```
IN: FILE: APND, FN "/tmp/script", LINE 1!
```

```
"/cft/bin/pdshl "WHEN:UT: SM=1, ADDR=X'51008, OPC=h' 321A,UTILFLAG=0 ;
```

```
IN: FILE: APND, FN "/tmp/script", LINE 2!
```

```
"/cft/bin/pdshl "ALW:UT: SM=1,UTILFLAG=0 ;
```

```
IN: FILE: APND, FN "/tmp/script", LINE 3!
```

```
"/cft/bin/pdshl "INH:UT: SM=1, UTILFLAG=0 ;
```

```
IN: FILE: APND, FN "/tmp/script", LINE 4!
```

```
"/cft/bin/pdshl "OP:UT: SM=1, UTILFLAG=0 ;
```

- (b) The file is enabled by typing the following command:

```
ALW:FILESYS:ACCESS "755", FN "/tmp/script";
```

- (c) The user can now execute the file from the MCC terminal by typing the following command:

```
EXC:ENVIR:UPROC, FN "/tmp/script";
```

where ``tmp" represents the complete path to the file, and ``script" is the filename. The EXC command executes the file which, in turn, executes the input commands in the file.

- (d) The following command removes the file:

```
CLR:FILESYS:FILE, FN "/tmp/script";
```

There are also commands to delete, replace, and append lines to a file. For additional information, refer to 235-600-700, *Input Messages Manual*.

3.21 SYSTEM LOG FILES

3.21.1 GENERAL

In the 5ESS[®]-2000 switch, hardware and software errors generate reports or messages. These reports come in several forms [for example, audits, asserts, or processor recovery messages (PRM)] and generally provide information about what has happened. The reports, with the exception of PRMS, may be printed at the ROP, collected in a log file, or both. The PRMs may only be printed at the ROP. The message class of the report determines its handling or disposition.

The purpose of the log files is to reduce the number of messages being printed at the ROP and still maintain gathered information. The log files can be used for:

- Detecting and correcting transient errors before they cause system outages. For example, AM correctable memory errors can occur at an increasing rate over many days. This problem can be detected by studying the log file entries and making corrections to errors before they occur at a rate high enough to cause automatic recovery actions.

NOTE: Transient errors are usually not detected by diagnostics because of their transient nature. However, sufficient information exists in the log file entry to determine the cause.

- Determining the sequence of events that led to an initialization or maintenance interrupt. Each event in a log file has time-of-day information and sequence numbers. A study of this data can help determine possible machine problems. For example, if multiple errors caused an excessive error rate and triggered an initialization, the sequence numbers indicate the order of occurrence and the time stamp can verify that the occurrence was sufficiently short to cause the initialization.

Entries from several log files may have to be pieced together to give a chronological order of events. Recreating the order of events is most easily accomplished by examining printouts of all the appropriate log files.

3.21.2 LOG FILE TYPES

There are two basic forms of log files in the 5ESS[®]-2000 switch: *UNIX*[®] RTR system log files and log files for the rest of the switch. A number of *UNIX*[®] RTR system log files (for example, CONFLOG, the switch. MEMLOG, and PMLOG) contain specific types of messages. The MEMLOG file, which is the memory history file for the AM, contains supplementary data for memory error interrupts. The log files for the rest of the switch may or may not contain specific material. For example, log files such as RCLOG and ECDLOG contain specific information, but this is not true of the DAYLOG file. The DAYLOG file contains information from all of the SMs/SM-2000s and attached peripherals (for example, PSUPH), the CMP, and most of the application error reports from the AM (for example, application audit failures).

The log files are defined in the classdef and device forms in the ECD. All log files are contained in the directory, /log/log.

Any entry made in a log file is an indication of trouble. Often a report which indicates the problem is printed on the ROP. However, maintenance personnel have to look in the DAYLOG file for a detailed reason for the report. For

example, a defensive check failure prints on the ROP, but associated stack traces, stack frames, and register dumps are stored in the DAYLOG file.

3.21.3 LOG FILE CONSTRAINTS

Log files are constrained by size limitations. The size of log files is handled in one of two ways depending on the type of file:

- (1) *UNIX*[®] RTR system log files are limited in size to prevent system overflow. When a log file is first created, the file is called XXXXX1, where XXXXX stands for the log name. When half of the disk space is used, the contents of XXXXX1 are copied into XXXXX0. The most recent information is again stored in XXXXX1. When all the disk space is used, the ``1-part" is again copied into the ``0-part" overwriting the oldest data. This process continues indefinitely.
- (2) The DAYLOG file is handled like a *UNIX*[®] RTR system file. This means that the most recent information is contained in DAYLOG1, and older information is contained in DAYLOG0.

3.21.4 LOG FILE CONTROLS

To help maintenance personnel determine if minor problems exist in the switch, a set of messages can be used to operate on the log files. Following is a basic list of functionalities provided and the commands to use for each:

- (1) **View the entire log file or its specific parts:** Commands give a user the ability to view a file on the basis of time (starting time and ending time are used), view certain message classes, or view reports coming from a particular unit (for example, SM=3). Combinations of options can also be requested. The **OP:LOG** command can be used in all software releases for the *UNIX*[®] RTR system log files and for the DAYLOG log file.

The correct syntax and detailed information about command parameters can be found in 235-600-700, *Input Messages Manual*. Care should be taken when printing these files on the ROP because some files can hold over 1800 reports. When this many reports are being printed, messages for the current time frame may not be seen for some time.

- (2) **Determine routing status of message classes:** The routing status of message classes can be determined by using the **OP:LPS:MSGCLS** command. This command outputs the current log/print status of all or specific message classes. It can also be used to determine where all message classes are being sent [as can poke command **902** on MCC Display Page 110]. See 235-600-700, *Input Messages Manual*, for detailed information about this command.
- (3) **Change routing status of message classes:** The routing status of message classes can be changed by using the **CHG:LPS** command. This command permits a user to define where the reports are to be sent [for example, logged, printed, both logged and printed, or neither (in which case the message is discarded in the generating module)]. The routing status can be changed on all messages or on specific message classes.
- (4) **Use OP:STATUS:DATA,LISTDIR command to obtain information:** The command **OP:STATUS:DATA,LISTDIR** can be used to obtain a list of files in a directory, their current sizes, and other information. The list of files produced may include some with the name rmfxxxx, where xxxx is any number. These files are generated when the AM is not sane enough to write to the log files. After these files are examined, they should be removed by using the **CLR:FILESYS:FILE** command.

Refer to 235-600-700, *Input Messages Manual*, for detailed information on syntax, parameters, and format for both the **OP:STATUS:DATA** and **CLR:FILESYS:FILE** commands.

3.21.5 CORE DUMP ADMINISTRATION

A core dump takes place if certain faults occur or if a termination message requests one. Core dumps are images of the run-time state of processes that have been placed on disk in the /cdmp directory (or in a user defined directory specified by the termination message).

Generally, a core dump implies an abnormal process termination. A core dump should be investigated to determine the cause of termination. Each site should save the core dump files when log files are saved, or as often as necessary. Core dump files must be removed periodically to allow enough space for future core dumps.

NOTE: Files in the cdmp directory may not be useful to the office personnel. However, these files should be saved (just as log files and ROP output are saved) for forwarding to the technical assistance organization, if necessary.

3.22 DIAGNOSTICS

3.22.1 OVERVIEW

Diagnostic maintenance programs are integrated into the switch hardware and software to provide self-diagnosis and trouble-locating capabilities for hardware faults. The diagnostics programs are controlled by the maintenance fault recovery, maintenance personnel, and routine exercises. Once the diagnostic has been initiated, the unit is removed from service and tested. When fault indications are found and the correct input message options are used, information is printed which identifies the board or circuit that needs replacing. This is known as the trouble location procedure (TLP). The TLP provides a fast method for determining the cause of a hardware fault and therefore, its correction. After the trouble has been repaired, the unit can then be restored. This is done automatically by autonomous recovery actions or manually by maintenance personnel.

To better understand the actions of diagnostics in the system, some of the following sections are separated into diagnostics in the *UNIX*® RTR operating system area, and diagnostics in the CM and SM/SM-2000.

3.22.2 DIAGNOSTIC TYPES

3.22.2.1 General

Diagnostics can be invoked from three separate sources; maintenance fault recovery (FR), craft requests, and routine exercises (REX). The FR requests are made when operational errors are detected and identified in a particular hardware unit. These are called automatic (AUTO) requests. Craft requests via input messages on the MCC generate manual (MAN) requests. REX generates both AUTO and MAN diagnostic requests. The OSS REX Scheduler program generates AUTO requests, while a REX request by craft generates a MAN diagnostic request.

The type of request (AUTO, MAN, or REX) determines a particular set of diagnostic test phases to be run. Each hardware unit type has a unique set of test phases and execution options dependent on request type. Information on specific hardware units is contained in 235-105-220, *Corrective Maintenance Procedures*.

3.22.2.2 Automatic Diagnostics

The automatic diagnostics process schedules diagnostic and restorals of units not brought up at boot (initialization) time and when units are removed through fault recovery actions. When the diagnostic is run as part of a fault recovery action, one of two basic actions occurs.

- The unit passes the diagnostic testing and is restored to service. This is indicated by some form of a restore completed message, although these messages have various forms for the different units.
- The unit fails the diagnostic testing and is not restored to service. As part of this failure, information is printed on the ROP indicating the failing phase and the hardware that is most probably bad. This automatically provides maintenance personnel with the information needed to recover from a hardware failure without having to

perform the diagnostics manually. As indicated previously, the output messages which provide this information has various forms for the different units.

The diagnostics which are run automatically utilize the same commands that craft personnel would use for manually diagnosing the units. The commands use enough of the diagnostic options to provide the needed information without the craft having to run it manually, such as the TLP option. All of these options are discussed in the Manual Diagnostics section of this document (following) and in greater detail in the appropriate pages of 235-600-700, *Input Messages Manual*.

3.22.2.3 Manual Diagnostics

3.22.2.3.1 General

Manual diagnostics provides the maintenance personnel the ability to force specific options of diagnostic commands or control diagnostics when automatic recovery actions are inhibited. These commands are split into two categories: AM diagnostic commands and the rest of the system diagnostic commands.

3.22.2.3.2 AM Manual Diagnostics

The basic form of the diagnostic input message is as follows:

DGN:unit=a,subunit=b;

For input/output processor (IOP) and disk file controller (DFC) diagnostics where no subunit is specified, the basic input messages are as follows:

DGN:IOP=a:<optional keywords>

or

DGN:DFC=a:<optional keywords>.

(Optional keywords are defined in 235-600-700, *Input Messages Manual*, and under the following full command format example).

When each of these commands is entered, the named unit and all units under it in the diagnostic hierarchy are tested. Table 3-23 shows the diagnostic hierarchy. The subunit designation is optional and is used only when a specific subunit of the CU (control unit) is being diagnosed.

Table 3-23 Diagnostic Hierarchy

CONTROL UNIT	DISK FILE CONTROLLER	INPUT/OUTPUT PROCESSOR
Central Control (CC)	Disk File Controller (DFC)	Input/Output Processor (IOP)
Main Store Controller (MASC) (includes memory arrays)	Moving Head Disk (MHD)	Maintenance TTY Controller (MTTYC)
Store Address Translator (SAT)		TTY Controller (TTYC)
Cache Store Unit (CSU)		Magnetic Tape Controller (MTC)
Direct Memory Access (DMA) controller		Synchronous Data Link Controller (SDLC)
Direct Memory Access Channel (DMCH)		Scan Point and Signal Distributor Controller (SCSDC)
Channel (CH)		Direct User Interface Controller (DUIC)
Utility Circuit (UC)		

In addition to the basic diagnostic input message, eight optional parameters may be specified. The full command format is:

DGN:unit=a[,subunit=b]:[RPT=c][,RAW][,UCL]

[,REX|,DEX]][,PH=d[&&e]][,CONT][,TLP][,f];

Descriptions of the optional fields are as follows:

- **RPT=** (Repeat). Indicates the diagnostic should be repeated **c** times. The maximum is 256.

NOTE: The RPT option does not override early terminations. The UCL should also be specified if the diagnostic terminates.

- **RAW=** Indicates the diagnostic results of every phase should be printed. If all tests pass, this fact is printed. If any failures occur, data from up to 100 failing tests is printed. If you do not use the RAW option, only the first five failures per phase are printed.
- **UCL=** (Unconditional). Indicates the diagnostic should be unconditionally executed with no early terminations. The basic diagnostic contains many early termination points. If one of these points is reached and previous tests have failed, the diagnostic does not continue. This may occur for two reasons:
 - Data obtained from the previous tests is sufficient to uncover the problem.
 - If previous tests have failed, going further may be dangerous.

CAUTION: The UCL option should not be specified unless absolutely necessary since there is a risk of the diagnostic structure or the operating system crashing.

- **REX=** (Routine exercise). Requests that automatic and routine exercise phases within the specified range be run. If no range is specified, all automatic and routine exercise phases are run.
- **DEX=** (Demand exercise). Requests that automatic, routine, and demand exercise phases within the specified range be run. If no range is specified, all automatic, routine, and demand exercise phases are run. Variable **d** specifies the phase or range of phases.
- **PH=** (Phase). Requests either a particular phase or a range of phases (in the form first-last). This may be a subset of the automatic phases and/or a demand phase or phases. Using the PH option is the only way that demand phases can be run. See 235-105-220, *Corrective Maintenance Procedures*, for the complete list of phases (that is, routine demand phases and supplementary demand phases for IOP, CU, and DFC).
- **CONT=** (Controller). Specifies that subunits under the requested unit (and subunit) are *not* to be diagnosed. Due to limitations in the DFC and IOP drivers, the CONT option is the default for DFC and IOP diagnostic (DGN) requests. The CONT option is also available for the direct memory access (DMA) subunit of the CU.
- **TLP=** (Trouble location process). Generates a circuit pack list if failures are detected by the diagnostic.

NOTE: The UCL and TLP options should not be specified together because a TLP output of reduced accuracy can be produced.

3.22.2.3.3 AM Demand Diagnostics

3.22.2.3.3.1 General

Within the diagnostic system, demand phase selection allows pinpointing problems or potential problem areas. Demand phases are optional and test specific units and subunits within the diagnostic hierarchy. The following guidelines may be helpful in understanding the demand diagnostic phases:

- A phase is marked as demand because it takes a long time to run, requires manual intervention, or should not

be run automatically. The demand phase, when requested, tests part of the unit specified.

- Diagnostic demand phases are grouped in the same hierarchy as other diagnostics (CU, DFC, and IOP).
- Demand phases are normally requested when standard routine diagnostics do not locate the problem area or can be requested as part of a preventive maintenance plan.
- Some phases take up to 40 minutes to complete.
- Some demand diagnostic phases require special procedures (refer to 235-105-220, *Corrective Maintenance Procedures*).

3.22.2.3.3.2 MASC Phase 95

This demand diagnostic phase needs some special attention. When invoked with the **EX** input command, main store controller (MASC) phase 95 accepts input parameters from **EX:LDPARM**. The MASC phase 95 allows the user to supply the address range to be tested on the MASC (default is entire address range); the data pattern and complement (default=0xffffffff and complement=0x00000000); and the refresh rate, 2-ms standard or 4-ms extended (default). To execute MASC phase 95, use the following procedure:

- (1) Determine the address range of the main store arrays (MASAs) to be tested by using the information shown in Table 3-26. The MASC 0 starting address is X'0. End addresses are determined by the number and type of MASAs.

- (2) Using the STANDBY or OOS CU, enter:

EX: CU=a, MASC=b: <optional keywords>, PH=95, TLP;

where a = control unit (0 or 1) and b = main store controller (0 or 1). (Optional keywords are defined in 235-600-700, *Input Messages Manual*.) The machine responds with a message that the diagnostic started and gives a task (or slot) number.

- (3) Enter:

EX: LDPARM: CU=a, MASC=b: , SA=H' [starting address],

EA=H' [ending address] REF=4, PAT=H' 5A5A5A5A;

Other good choices for PAT value are as follows:

A5A5A5A5

FFFFFFFF

0

Use the information shown in Table 3-26 for starting and ending address.

The machine responds with a message indicating the chosen parameters and runs the diagnostic.

- (4) If the diagnostic fails, use the information generated by the TLP option to correct the problem. Rerun phase 95 diagnostics starting with **Step 2**.
- (5) Restore the CU (RST:CU), softswitch (SW:CU), and run the same diagnostic sequence on the other CU.

3.22.2.3.3.3 How to Inhibit AM Diagnostics

Diagnostic requests must be inhibited (always denied) while a field update is applied to the diagnostic files. Stop entering manual requests and perform the following procedure to inhibit automatic requests:

- (1) Enter: **INH:DMQ:SRC=a,TINH=b,AINH=c;** to inhibit (always deny) automatic diagnostics. The options have the following meanings:

SRC a= The source of the requests to be denied. This may be either ADP, REX, or ALL.

TINH b= The number of minutes the inhibit is in effect. The default is infinity.

AINH c= The number of minutes between warning messages informing the user that an inhibit is in effect. The default is a message every five minutes.

- (2) Observe the following **Caution:**

CAUTION: DGN:INHIBIT a ACTIVE, REMAINING TIME n MIN or, for an infinite inhibit, DGN:INHIBIT a ACTIVE.

- (3) The inhibit may be deactivated manually by entering the following commands:

Enter: **ALW:DMQ:SRC=a;**

- (4) Observe the following output message indicating that the inhibit is deactivated: **ALW DGN ENABLED a**

Only automatic diagnostics may be inhibited. A request to inhibit a manual source is denied, and the following message is output:

INH CAN'T INHIBIT A MANUAL SOURCE - source.

Also, only a limited number of inhibits may be active at one time. If this limit is reached, further inhibit requests result in the following message:

INH TOO MANY ACTIVE INHIBITS.

In this case, another source must be allowed or the **ALL** source must be used in place of all currently active inhibits.

3.22.2.3.3.4 How to Obtain Status of AM Diagnostics

To obtain information on the status of a diagnostic, enter:

OP:DMQ;

The output from this command indicates the slot number [the number on the far left in the sample from **OP:DMQ;** (Figure 3-73) and the queue assigned to a particular job. Slots that are inactive (are not assigned to either queue) are not displayed.

```
OP:DMQ!PF
OP:DMQ
REQUEST ACTIVE
```

```
0  RST: DFC 1  BPH=1  EPH=100
      SOURCE = MAN          PRIORITY = 0
      STATUS = ACTIVE
```

```
REQUEST WAITING
```

```

1  RMV:  CU 0  BPH=1  EPH=100
        SOURCE = MAN          PRIORITY = 0
        STATUS = W

```

```
INHIBIT SOURCES
```

```
NONE
```

Figure 3-73 Status of Diagnostics

3.22.2.3.3.5 How to Abort or Cancel an AM Diagnostic Request

It may be necessary to cancel a request in the waiting queue or to abort a request in the active queue if:

- The request was entered by mistake.
- A request of high importance is in the waiting queue, and an active queue must be cleared to make room.
- An interactive diagnostic is to be executed.
- The active and waiting queues of all requests must be cleared for the field update of diagnostic files.

This is the procedure to use when aborting or canceling a request.

- (1) Enter **OP:DMQ;**

The output from this command indicates the slot number and queue assigned to a particular job. (See Figure 3-73 for an example of this output.)

NOTE: Slots that are inactive (not assigned to either the active or waiting queues) are not displayed.

The source in the output message may be (but is not limited to) one of the following:

- **ADP:** Automatic diagnostic process.
- **MAN:** Manual requests input by the user.
- **PSM:** Power switch monitor. This request is either a remove request on a unit when the request-out-of-service (ROS) key on the unit power switch is activated or a restore request when the ROS key is released. The PSM requests are classified as manual.
- **REX:** Routine exercise.

- (2) To abort a job in the active queue or to cancel it from the waiting queue:

Enter **STOP** or **STP:DMQ:[unit=a,subunit=b][,ACTIVE],WAITING];**

(Valid units and subunits are defined in 235-600-700, *Input Messages Manual*.)

3.22.2.3.3.6 How to Remove and Restore Units

It is necessary to remove and restore units when applying a hardware change or when it is desired to prevent automatic restoration of a unit you suspect may be faulty.

To remove a unit, enter:

RMV:unit=a;

To restore a unit, enter:

RST:unit=a:UCL:DATA,CONT;

When a unit is removed from service or restored to service, all units under it in the hierarchy are also affected. However, if the CONT option is specified for the restore, the subunits are not affected. If a diagnostic is available for a unit, it is executed before the unit is restored unless the UCL option is specified. The restore is denied if the diagnostic fails. An entire CU must be restored and removed at the same time; its subunits may not be handled separately. Subunits in the DFC and IOP may not be restored unless all units above them in the hierarchy are restored.

3.22.2.3.3.7 How to Inform Diagnostic Program of Hardware Changes

Occasionally hardware change notices (CN) that require a change in the diagnostic program are issued to the field. These CNs specify changes to the unit control block (UCB) that must be entered into the equipment configuration data base (ECD). These changes should be implemented with the following procedure:

- (1) Enter **RMV:unit=a;** to remove the affected unit from service.
- (2) If the affected unit is a CU, activate key 13 on the emergency action display page. This deactivates any CU force that is in effect.
- (3) Install any updates to the diagnostic program using standard field update procedures.
- (4) To diagnose the affected unit and verify that its state is all tests pass (ATP), enter:
DGN:unit=a:<optional keywords>,TLP;
 (Optional keywords are defined in 235-600-700, *Input Messages Manual*.)
- (5) Install the new hardware.
- (6) Update the UCB for the affected unit using the recent change and verify (RC/V) system. (See the RECENT CHANGE/VERIFY section (Section 3.12) in this manual to identify the correct RC/V manual to reference.) Four separate transactions are required. Each transaction requires entries to the **trbegin**, **ucb**, and **trend** pages. The transactions are as follows:
 - (a) Change the unit status from OOS or unavailable (UNAV) to unequipped (UNEQ).
 - (b) Change the unit UCB fields to the values as the CN directs.
 - (c) Change the unit status from UNEQ to GROW.
 - (d) Change the unit status from GROW to OOS.
- (7) To diagnose the unit and verify that the change was installed correctly, enter the following:
DGN:unit=a:<optional keywords>,TLP;
 (Optional keywords are defined in 235-600-700, *Input Messages Manual*.)

- (8) Activate the recent change to the UCB using the activate RC/V page.
- (9) To restore the unit to service, enter the following:

RST:unit=a:DATA,TLP,CONT;

NOTE: If the change is applied to more than one unit, all steps should be completed for each unit before beginning work on the next unit.

3.22.2.3.4 CM and SM/SM-2000 Diagnostics

3.22.2.3.4.1 General

The CM and SM/SM-2000 diagnostic operations differ from that of the AM described previously. The following is a high level description of the operations of the CM and SM/SM-2000 diagnostic functions. Detailed information on specific hardware modules can be found in 235-105-220, *Corrective Maintenance Procedures*, and 235-105-210, *Routine Operations and Maintenance Procedures*.

3.22.2.3.4.2 CM and SM/SM-2000 Demand Diagnostics

Demand diagnostics refer to test phases of a particular hardware unit type that are not normally run by either MAN or AUTO requests from all sources. These phases are usually very time consuming and in most cases only useful in finding a small percentage of unusual hardware failures. These demand phases can only be invoked by craft requests that specify a specific range of test phases.

For example, if a hardware unit has five test phases numbered 1 through 5, and phases 2 and 4 are demand phases, only phases 1, 3, and 5 would execute under normal circumstances. To force the execution of the demand phases, the craft must enter a message on the MCC of the following form:

DGN:unit=x-y-z,PH=1&&5;

With this input message, all five diagnostic test phases execute, including the demand phases.

3.22.3 DIAGNOSTIC INPUT/OUTPUT MESSAGES

3.22.3.1 Craft Diagnostic CM and SM/SM-2000 Input Messages

When the craft desires to execute a diagnostic on a CM or SM/SM-2000 hardware unit, a message of the following form is entered on the MCC:

DGN:unit=x-y-z,PH=a&&b,TLP;

The verb DGN requests that a diagnostic be executed. UNIT denotes the unit name of the circuit to be diagnosed, followed by the unit number. The PH qualifier is an option. If specified, only the diagnostic test phases a through b are executed. If not specified, all non demand phases are executed. The TLP qualifier requests that if a diagnostic test fails, the Trouble Location Procedure (TLP) report that identifies the suspected faulty equipment be printed on the ROP. Specific details for all CM and SM/SM-2000 hardware unit diagnostics are contained in 235-600-700, *Input Messages Manual*.

3.22.3.2 How to Obtain Status of CM and SM/SM-2000 Diagnostics

Each SM/SM-2000 may have up to eight diagnostics in a running or waiting state due to requests from any or all sources. To view the diagnostic status of a particular SM/SM-2000, the following message is entered at the MCC:

OP:DMQ,SM=[SM number 1-192];

A report of the following form is printed on the ROP:

OP DMQ SM 107 LAST RECORD			
ACTION	UNIT	SOURCE	STATUS
RST	MCTSI=1-0	AUTO	RUNNING
DGN	TAC=1-0-1	MAN	WAITING

The report heading either indicates CM for Control Module or the Switch Module number. In this case, the report is for SM 107. The report indicates the action being taken. In this example, the two actions are a restoral (RST) and a diagnostic (DGN). The unit name and number are contained in the UNIT column. The source of the requested action is shown in the SOURCE field. The sources are AUTO and MAN in this example. The STATUS indicates whether the action is either RUNNING or WAITING.

3.22.3.3 How to Stop CM and SM/SM-2000 Diagnostics by Craft Intervention

It may at times be necessary to have the craft intervene and stop one or more queued or running diagnostics. A two step procedure is required to accomplish this. First, the craft needs to get a dump of the diagnostic queue for the CM or SM/SM-2000 in which the diagnostic is to be stopped. This is done by entering the following message on the MCC:

For the CM,

OP:DMQ,CM;

For the SM/SM-2000,

OP:DMQ,SM=[SM number 1-192];

A range of SMs/SM-2000s is also possible with this command by specifying two SM/SM-2000 numbers separated by &&.

The report generated shows the status of all running and waiting diagnostics for the CM or selected SMs/SM-2000s. Both running and waiting diagnostics may be stopped. The craft then decides which diagnostic is to be stopped, and enters a message of the following type:

STP:DGN,unit=x-y-z;

The unit name and number are obtained from the previous DMQ report.

NOTE: The **STP:DGN** command does not stop diagnostics that are running as a result of a restore done on a piece of hardware. For example, suppose a conditional restore was done on a protocol handler (PH). An **OP:DMQ** on the SM/SM-2000 that contains the PH shows a restore (RST) action is running on that PH. The ROP proceeds to show diagnostics that are running as a result of the restore. To stop the process, the craft should enter **STP:RST,unit=x-y-z;** or **STP:unit=x-y-z;**. These commands are valid for both SM/SM-2000 and CM processes.

When the diagnostic stops, a message prints on the ROP indicating this fact, and the MCC page display for the selected unit changes its status display from out-of-service transient (OOST) to OOS. The unit is left in the OOS state after a STP command is executed. If the STP command does not stop the desired diagnostic, the following command always terminates it:

ABT:DGN,unit=x-y-z;

Use this command with caution. It always eliminates the requested diagnostic, but does so in a brute force way,

causing several audit and assert reports to print on the ROP. After the ABT completes, the hardware unit is likewise left in the OOS state.

3.22.3.4 How to Remove or Restore CM and SM/SM-2000 Hardware

Whenever a hardware unit is to be removed from service by the craft for any reason, the following message is entered on the MCC:

RMV:unit=x-y-z[,UCL];

If the hardware unit is actively involved in a call, the request is denied, unless the UCL option is included. A UCL removal request always removes the hardware from service; however, calls set up using the affected hardware are torn down, causing one or more lost calls. The UCL option should only be used when the customer accepts this service affecting action.

Whenever a hardware unit is to be restored to service by the craft, the following message format is entered on the MCC:

RST:unit=x-y-z[,STBY][,UCL];

If the hardware is a duplex unit having two duplicate, redundant circuits, either capable of providing its intended function, the inclusion of the STBY option restores the requested unit to its standby state. In this case, the mate unit provides the intended service. The standby unit is ready to take over control of the active unit at any time it is needed. Omission of the STBY option, results in the selected unit being restored to the active role and the mate unit being made standby.

A normal restoral request executes the hardware circuit diagnostic, and if all diagnostic tests pass, the unit is restored to its active, in-service state. Including the UCL option, omits the diagnostic execution and directly restores the unit to its active, in-service state.

3.22.3.5 How to Inform Diagnostics Program of Hardware Changes

Occasionally, hardware changes which are packaged and distributed as Change Notices (CN) require changes in the associated diagnostic program. These CNs specify changes to the Change Level Indicator (CLI) for the hardware circuit and must be coordinated with the new diagnostic program update. The details for coordinating the hardware and software changes are found in 235-105-231, *Hardware Growth Procedures*.

3.22.3.6 How to Interpret AM Diagnostic Output

If an automatic or manual diagnostic encounters trouble, a message is output. There are three basic scenarios for this procedure.

When a unit is automatically removed from service, a major alarm is sounded and a message is output to the MCC and ROP. A diagnostic is automatically requested by the ADP with the TLP option specified. You may verify that a diagnostic is in progress by entering **OP:DMQ;**.

If no diagnostic is in progress, begin one by entering **RST:unit=a:DATA,TLP;**.

A TLP circuit pack list is produced.

At the completion of a routine automatic diagnostic (that is, REX), a summary table is printed. Any units that have failed are marked some tests failed (STF), and a TLP circuit pack list is produced.

Manual diagnostics also produce an output message. If the TLP option was specified, as is recommended, a TLP circuit pack list is also produced.

The failed test data in the output message and the TLP circuit pack list are your tools for locating and correcting trouble.

3.22.3.7 How to Interpret AM Diagnostic Output Message Format

The diagnostic output message consists of a header line followed by the failed test data (if failures occurred). (See Figure 3-74 printout of diagnostic failure.) The header line identifies the unit (for the CU and subunit), the phase number, and the phase results as described in Table 3-24. If there are test failures or if all available tests are not run, the number of test failures and the conditional test result words appear in parentheses on the header line. The two conditional test result words are 64 bits numbered from 0 to 63 starting from the right. When a bit is set, it indicates why some or all of the phase tests were not run. See Table 3-25 for explanation of conditional test results.

If there are test failures, the header line is followed by a 5-column failing test display. The TEST column identifies the failing test numbers in the phase. Unless the RAW option was specified on the diagnostic request, only the first five failing tests are printed. The MASK column indicates which bits are actually included in the test. A one in the MASK means that bit is part of the test. The ACTUAL column displays the results read from the hardware under test. The EXPECTED column displays the expected results. The MISMATCH column indicates which bits failed the test.

The data in the MISMATCH column is derived from the ACTUAL, MASK, and EXPECTED data in the following manner. First, the ACTUAL and EXPECTED data are EXCLUSIVE ORed, which yields a one in the bits that are not in agreement. Second, the results of the EXCLUSIVE OR are logically ANDed with the MASK to filter out disagreeing bits not included in the test. The ACTUAL, MASK, and EXPECTED data are not available for some 3B20D computer peripheral unit diagnostics. When this is the case, "N/A" (not available) is printed for the ACTUAL, MASK, and EXPECTED data.

```
DGN    CU    1  MASC 0  PH 35    STF    (2 00000000 00000000)
```

TEST	MISMATCH	ACTUAL	MASK	EXPECTED
7	00100000	00100000	FFFFFFFF	00000000
8	01000000	54555555	FFFFFFFF	55555555

```
DGN:   CU 1  MASC 0  TERMINATED AT PH 35 STMT 32 AFTER TEST 8
```

```
DGN:   CU 1  MASC 0  COMPLETED STF    ( 2 00000000 00000000 )
```

Figure 3-74 Diagnostic Output Message - Diagnostic Failure

Table 3-24 Return Status

STATUS	EXPLANATION	ACTION TO BE TAKEN
ATP	All tests passed.	None
CATP	Conditional all tests passed. Not all tests were run, but those that were run passed. Two 8-digit hexadecimal numbers appear; these should be interpreted as a 64-bit binary number. Bit positions that are a 1	Determine why the indicated tests were not run and rerun them.

	indicate a reason why tests were not run. The currently assigned bit positions are listed in Table 3-25 in this manual.	
NTR	No tests run. Two 8-digit reason numbers appear.	Determine why the tests were not run and rerun the diagnostic. If the reason numbers are all 0s, no action is necessary.
STF	Some tests failed. The number of tests that failed appears followed by two 8-digit reason numbers. These results list the failing test numbers along with their mismatch patterns. Only the first five test failures are output unless the RAW option was specified on the input message.	Determine why the tests failed and rerun them. Refer to Sections 3.22.3.8 and 3.22.3.9 for information to help resolve this problem. Also, 235-105-220 has procedures concerning diagnostic problems.

Table 3-25 Explanation of Conditional Test Results

UNIT	BIT NUMBER	REASON
CU	0	Not used.
	1	Unit under test is forced on-line.
	2	Sanity timers are disabled.
	3	EAI forces are active.
	4	Peripheral unit controller OOS.
	5	Invalid helper unit specified.
	6	Helper unit unavailable.
DFC and IOP	7	Unit under test is forced off-line.
	0	Not used.
	1	Helper unit not specified or invalid.
	2	Helper unit cannot be reserved.
	3	Helper unit is not OOS.
	4	Helper unit is not ATP.

Failure data for faults detected in main store is also output in the form of a histogram. (See Figure 3-75 for an example.) A data pattern is 40 bits wide: 32 data bits, 4 hamming bits, and 4 parity bits. The address spectrum is divided among several memory arrays (circuit packs) as shown in Table 3-26. When the data pattern read back from the store does not match the one that was written, a failure has occurred. Memory testing stops after the first 100 faults are detected.

A detailed failure analysis is output for the first fault. This includes the failing address, expected value, received value, mismatch for both the data and parity bits, and a dump of three main store controller registers. The number of addresses that failed and a list of the first five failing addresses is next followed by the memory failure histogram which shows:

- For each data, hamming, or parity bit, how many times the bit failed as a 0 (zero) and how many times the bit failed as a 1 (one).
- For each address bit, how many times the bit failed as a 0 (zero) and how many times it failed as a 1 (one).
- How many multibit errors were detected.
- How many error-logic failures were detected (single bit-error indication on a multibit error).

The numbers in these columns can be used to determine the location and extent of the problem. For example, in the DATA FAIL columns, a 1 (one) indicates a single memory-cell failure and a 100 indicates a fault on a data signal path. If the counts for a particular bit are approximately equal, the bit is probably good. But, if on all failures a particular bit always has the same value, then the bit is stuck at that value.

NOTE: The upper address bits select the memory array. They usually appear as stuck bits, because the effect of a fault is usually isolated to one memory array circuit pack.

In the example shown in Figure 3-75, data bit 24 is stuck at 0(zero) but only when address bit 2 is 0 (zero). The address bit is the array half-select. Therefore, since the main store under test contains TN14s, the fault is that the data bit 24-signal path is stuck at 0 (zero) for the A-half of memory array 2.

DGN: CU 1 MASC 0 PH 35 MEMORY FAILURE RESULTS
FIRST FAULT DATA

FAILING ARRAY = TN14 at EQL 056-048
FAILING ADDRESS = X'00100000
DATA MISMATCH = X'01000000
ACTUAL DATA = X'54555555
EXPECTED DATA = X'55555555
PARITY MISMATCH = X'00000000
ACTUAL PARITY = X'00000000
EXPECTED PARITY = X'00000000
MAS ERROR REG 2 = X'00003270
TRAPPED ADDRESS REG = X'1B900001
MAS ERROR REG = X'00000000

NUMBER OF FAILING ADDRESSES = 100

FIRST 5 FAILING ADDRESS:

X'100000

X'100008

X'100010

X'100018

X'100020

MEMORY FAILURE HISTOGRAM

DATA/ADR	DATA FAIL COUNT		ADDRESS FAIL COUNT	
BITS	EXP=1 RTN=0	EXP=0 RTN=1	AS 0	AS 1
00	0	0	0	0
01	0	0	0	0
02	0	0	100	0
03	0	0	50	50
04	0	0	50	50
05	0	0	52	48
06	0	0	52	48
07	0	0	52	48
08	0	0	64	36
09	0	0	64	36
10	0	0	100	0
11	0	0	100	0
12	0	0	100	0
13	0	0	100	0
14	0	0	100	0
15	0	0	100	0
16	0	0	100	0
17	0	0	100	0
18	0	0	100	0
19	0	0	100	0
20	0	0	0	100
21	0	0	100	0
22	0	0	100	0
23	0	0	100	0
24	100	0	100	0
25	0	0		
26	0	0		
27	0	0		
28	0	0		
29	0	0		
30	0	0		
31	0	0		
H0	0	0		
H1	0	0		
H2	0	0		
H3	0	0		
PX	0	0		
PY	0	0		
PZ	0	0		
PA	0	0		
MULTI		0		
LOGIC		0		

Figure 3-75 Sample Memory Failure Histogram

Table 3-26 Partitioning of Address Spectrum in Memory Arrays

MASA TYPE ^a	MASA	CONTROLLER 0 ADDRESS RANGE (HEX)	CONTROLLER 1 ADDRESS RANGE (HEX)
TN14	00	000000 - 07ffff	800000 - 87ffff
	01	080000 - 0ffffc	880000 - 8ffffc
	02	100000 - 17ffff	900000 - 97ffff
	03	180000 - 1ffffc	980000 - 9ffffc
	04	200000 - 27ffff	a00000 - a7ffff
	05	280000 - 2ffffc	a80000 - affffc
	06	300000 - 37ffff	b00000 - b7ffff
	07	380000 - 3ffffc	b80000 - bffffc
	08	400000 - 47ffff	c00000 - c7ffff
	09	480000 - 4ffffc	c80000 - cffffc
	10	500000 - 57ffff	d00000 - dffffc
	11	580000 - 5ffffc	d80000 - dffffc
	12	600000 - 67ffff	e00000 - e7ffff
	13	680000 - 6ffffc	e80000 - effffc
	14	700000 - 77ffff	f00000 - f7ffff
	15	780000 - 7ffffc	f80000 - fffffc
TN28	00	000000 - 0ffffc	Not equipped
	01	100000 - 1ffffc	Not equipped
	02	200000 - 2ffffc	Not equipped
	03	300000 - 3ffffc	Not equipped
	04	400000 - 4ffffc	Not equipped
	05	500000 - 5ffffc	Not equipped
	06	600000 - 6ffffc	Not equipped
	07	700000 - 7ffffc	Not equipped
	08	800000 - 8ffffc	Not equipped
	09	900000 - 9ffffc	Not equipped
	10	a00000 - affffc	Not equipped
	11	b00000 - bffffc	Not equipped
	12	c00000 - cffffc	Not equipped
	13	d00000 - dffffc	Not equipped
	14	e00000 - effffc	Not equipped
	15	f00000 - fffffc	Not equipped
TN56	00	000000 - 1ffffc	Not equipped
	01	200000 - 3ffffc	Not equipped
	02	400000 - 5ffffc	Not equipped
	03	600000 - 7ffffc	Not equipped
	04	800000 - 9ffffc	Not equipped
	05	a00000 - bffffc	Not equipped
	06	c00000 - dffffc	Not equipped
	07	e00000 - fffffc	Not equipped
	08 b	1000000 - 11ffffc	Not equipped
	09 b	1200000 - 13ffffc	Not equipped
	10 b	1400000 - 15ffffc	Not equipped
	11 b	1600000 - 17ffffc	Not equipped
	12 b	1800000 - 19ffffc	Not equipped
	13 b	1a00000 - 1bffffc	Not equipped
	14 b	1c00000 - 1dffffc	Not equipped
	15 b	1e00000 - 1ffffc	Not equipped
TN2012	00	000000 - 3ffffc	Not equipped
	01	400000 - 7ffffc	Not equipped
	02	800000 - bffffc	Not equipped
	03	c00000 - fffffc	Not equipped
	04 b	1000000 - 13ffffc	Not equipped
	05 b	1400000 - 17ffffc	Not equipped
	06 b	1800000 - 1bffffc	Not equipped
	07 b	1c00000 - 1ffffc	Not equipped
	08 c	2000000 - 23ffffc	Not equipped
	09 c	2400000 - 27ffffc	Not equipped

10	c	2800000 - 2bffffc	Not equipped
11	c	2c00000 - 2fffffc	Not equipped
12	c	3000000 - 33ffffc	Not equipped
13	c	3400000 - 37ffffc	Not equipped
14	c	3800000 - 3bffffc	Not equipped
15	c	3c00000 - 3fffffc	Not equipped

Notes:

a. Model 2 machines have only one MAS controller (controller 0). Model 1 machines can have up to two MAS controllers (controllers 0 and 1).

b. Requires extended main memory (EMM) feature or very large main memory (VLMM) feature.

c. Requires VLMM feature.

3.22.3.8 How to Interpret AM Diagnostic Output from TLP Option

The TLP option of the DGN command produces a list of suspected faulty circuit packs when a diagnostic fails. A circuit pack list is output after the diagnostic has completed. Figure 3-76 is a sample TLP circuit pack list. The pack most likely to be faulty is listed at the top followed by other suspected packs in descending order. For each pack, the following information is given:

- Code (circuit pack type)
- EQL (equipment location) (for example, 60-042, where 60 = vertical coordinate in the cabinet and 042 = horizontal coordinate in the cabinet)
- SD (schematic drawing) number and the FS and symbol (SYM) number within the SD
- Unit in which the circuit pack resides (if not the unit under diagnosis)
- WT (Weight) on a scale from 1 to 10 with the circuit packs most likely to be faulty given a 10.

NOTE: If the note field is nonzero, consult 235-600-750, *Output Messages Manual*, for further information.

```

062-5505150 88-01-26 09:50:15 008027
ANALY TLPFILE CU 0 CC 0      TLPSRCH      MSG IP
      TLPFILE # 14418023

062-5505150 88-01-26 09:50:20 008028
ANALY TLPFILE CU 0 CC 0      SUSPECTED FAULTY EQUIPMENT  MSG COMPL
      CODE      EQL      FS      SYM      SD      UNIT      WT      NOTE
      UN48B      60-042    1      2      4C098    --      10      0
      UN03B      60-092    1      9      4C098    --      10      0

060-14418023 88-01-26 09:50:21 008029
DGN CU 0      STOPPED COMPLETED

```

Figure 3-76 TLP Option Output - Faulty Circuit Packs

3.22.3.9 How to Respond to a Diagnostic Audit Message

At various points within the diagnostic control structure, audits are performed to verify that all is well. These include verification that:

- Called functions do not give bad return codes.
- Needed system resources are available.
- Necessary files can be opened and read or executed.
- Hardware errors have not occurred.
- Illegal operations are not attempted.

If an audit fails, a report is printed on the maintenance terminals. You should respond to an audit report as detailed in the following procedure:

- (1) If a test fails prior to an audit failure, clear the problem indicated by the test failure. This may also clear the audit failure.
- (2) Consult 235-600-750, *Output Messages Manual*, to determine the reason for the audit failure. It may be due to a situation you can control. For example, an attempt to execute a nonexistent diagnostic phase would cause an audit failure.
- (3) Save the printout pertaining to the diagnostic request and return it to your technical assistance organization.
- (4) Consult 235-600-750, *Output Messages Manual*, to see if any additional data should be collected and returned to your technical assistance organization.

3.22.3.10 Audit Failure Within the DIAMON

An audit failure within the DIAMON appears as follows:

REPT DIAMON ERROR = a ERRNO = b

The numbers following ``ERROR=" and ``ERRNO=" are system error numbers. The meanings of these error numbers are defined in 235-600-750, *Output Messages Manual*.

3.22.3.11 How to Interpret CM and SM/SM-2000 Diagnostic Output Message Format

Whenever a hardware unit diagnostic is executed by the craft or through a fault recovery (FR) request, several output messages are printed on the ROP giving the results of the requested diagnostic.

Whenever a hardware diagnostic is completed successfully, messages of the following format are printed on the ROP:

DGN UNIT=x-y-z COMPLETED ATP PH a

This message indicates that Phase (PH) a of the diagnostic completed successfully, having All Tests Pass (ATP). One message of this format is printed for each test phase that completes successfully.

At the completion of all diagnostic test phases, the following message is printed on the ROP:

DGN UNIT=x-y-z COMPLETED ATP

This message indicates that the hardware unit diagnostic has completed its execution, and that all tests that were executed were done so successfully.

Whenever a hardware unit diagnostic fails any diagnostic test phase, the following messages are printed on the ROP:

DGN UNIT=x-y-z STF PH a SEG b TEST c MM H'hhhh

This message indicates that Phase a, Segment b, Test c failed. The MisMatch (MM) field gives the test data for the indicated test. Further details of the use of the MM data is found in 235-105-220, *Corrective Maintenance Procedures*.

DGN UNIT=x-y-z COMPLETED STF PH e

This message indicates that the Phase (PH) e completed execution, and that Some Tests Failed (STF) during its execution.

DGN UNIT=x-y-z COMPLETED STF

When all requested test phases have completed execution, this message is printed to indicate that the requested diagnostic has completed; and that during its course of execution, one or more tests have failed.

3.22.3.12 CM and SM/SM-2000 Trouble Location Procedure Message Analysis

Whenever hardware unit diagnostic program is executed and any test fails, a hardware fault has been detected. If the Trouble Location Procedure (TLP) option has been included in the diagnostic input message, and a hardware failure is found, a TLP list is printed on the ROP indicating the suspected faulty equipment for the diagnostic test phase that failed. Figure 3-77 is a sample TLP list for a diagnostic failure.

M DGN	PSUPH=1-0-0-0-15	SUSPECTED FAULTY EQUIPMENT				LAST	RECORD		
	AISLE	MODULE	CABINET	CODE	FORM	EQL	TYPE	NOTE	
1002	SM 10	LTP 2	MC5D115A1	4	53-178	---			
1002	SM 10	LTP 2	MC5D103A1	2A	53-106	ONL			
1002	SM 10	LTP 2	MC5D102A1:123A1-3:1		53-114	ONL			
1002	SM 10	SMC 1	MC5D095A1	7	28-112	ONL			

Figure 3-77 TLP List - Diagnostic Failure

The intent of the TLP report is to give the location in the switching office of the hardware unit that failed the diagnostic. The AISLE is the equipment aisle, the MODULE is the switch module, in this example, SM number 10. The CABINET gives the cabinet number of the specified switch module, in this case, LTP 2. CODE refers to the circuit pack code that is at fault. The EQL is the equipment location in the specified CABINET. The first number is the vertical distance in inches from the floor to the faulty circuit pack. The second number is the horizontal distance in eighths of an inch from the left side of the specified cabinet. These dimensions are rubber stamped on the equipment cabinets. The TYPE field specifies the circuit under test as ---, ONL meaning an on line interfacing circuit, or HLP for a helper circuit. If some additional information is required, such as specific repair procedures or precautions, the NOTE field contains a number. This number is defined in 235-600-750, *Output Messages Manual*, Appendix.

3.22.4 ROUTINE EXERCISES

3.22.4.1 Objectives

The routine exercise capability provides the following:

- Scheduling of the routine diagnostics for hardware units of all SMs/SM-2000s

- Scheduling of the routine diagnostics for the CM based hardware units
- Enhanced scheduling flexibility
- Control for the previous schedulers
- An improved craft interface
- Scheduling of electronics loop segregation (ELS) tests and fabric tests of grids.

3.22.4.2 Purpose of REX

The purpose of REX is to routinely schedule testing in the CM and/or SMs/SM-2000s, in order to detect latent faults present in in-service units. In other words, REX is an automatic scheduler of tests. The types of tests that REX schedules are dependent upon the module type (CM or SM/SM-2000).

- (a) In the CM, two types of tests are available for scheduling. They are full and partial diagnostics. See the descriptions that follow:
 - **Full diagnostic (DGN):** Results in a conditional restore request including the trouble location process (TLP) option. For details of the TLP option, refer to the TLP subsection within this manual.
 - **Partial Diagnostic (switch):** Results in a soft switch of the pump peripheral controller (PPC), the foundation peripheral controller (FPC), the office network and timing complex (ONTC), and the communication module processor (CMP). No diagnostics are executed.
- (b) In the SM/SM-2000, three types of tests can be specified:
 - **Full Diagnostics:** Same results as indicated for CM.
 - **Fabric Exerciser (FAB):** Tests the operation of the gated-diode crosspoints (GDX) in the line unit (LU) concentrator grids or grid boards. It requests a path to each crosspoint to be tested by calling peripheral control (PC) path hunt routines. A series of tests are then performed on the crosspoint and its associated path using a high-level service circuit (HLSC).
 - **ELS:** Tests customer lines to determine a suitable network balance necessary to reduce the amount of potential echoing in the transmission path. Office data is updated, as needed, storing the proper balance network value to be used in call setup.

3.22.4.3 Scheduling of Routine Exercises

Each module has its own REX schedule. A schedule is defined as the start time and duration for each test type along with a verbose option flag. The REX schedule resides in the office dependent data (ODD) data base and can be changed and/or displayed via recent change/verify (RC/V) mechanisms. ***The REX program obtains the schedule from the ODD relation "rIRXSCHD" for the current day at midnight. Therefore, if the REX schedule is modified, the new schedule is not effective until the midnight following the change.***

Also, REX provides the ability to turn off the REX schedule without modifying the data base. This can be accomplished by putting a module test type in an inhibit state via the **INH:REX** command. The inhibit state remains active until it is removed via the **ALW:REX** command. The inhibit status is printed automatically at midnight so that the craft can keep track of what modules have been inhibited or what modules have individual units inhibited for test.

REX can be inhibited or allowed for a **range** of SMs/SM-2000s with one input message. Prior to the implementation of this capability, REX had to be inhibited or allowed by entering a message for each specific SM/SM-2000. The following input messages illustrate a range of SM/SM-2000 being set up to allow and inhibit REX:

- **ALW:REX,SM=1&&20;**
- **INH:REX,SM=1&&20;**

Two CM models are included in the switch architecture: communication module, model 1 (CM1) for configurations up to 48 SMs/SM-2000s and communication module, model 2 (CM2) for configurations up to 192 SMs. For the CM, REX schedules full diagnostics for the message switch (MSGS) and the ONTC. Growable units, that is, module message processors (MMP), are scheduled as they become fully operational in the ODD data base.

In both CM1 and CM2, the MSGS consists of the message switch control unit (MSCU), the PPC, the FPC, the MMPs, and the CMP.

- For the CM1, the ONTC consists of the link interface (LI), the network clock (NC), the message interface (MI), the time multiplexed switch (TMS), and the dual link interfaces (DLI).
- For CM2, the dual message interface (DMI) replaces both the MI and the LI to account for both the dual and single fabric configurations of the TMS. The role of the NC, TMS, and DLIs remains the same for CM2 as in CM1.

In the SMs/SM-2000s, the module controller/time slot interchange (MCTSI) and its associated peripheral units are scheduled for full diagnostics. The number and types of peripheral units scheduled are based on how the SM/SM-2000 is equipped.

Certain precautions must be observed when constructing a REX schedule for the CM and SMs/SM-2000s. The CM REX should not be scheduled to run at the same time as the 3B20D REX because all active CM diagnostics are aborted when a soft switch of the Control Units (CU) is executed. This could leave the ONTC or MSGS in a simplex configuration.

The SM/SM-2000 REX schedule must be planned so that DGN, FAB, and ELS tests do not run concurrently. Overlapping of these tests results in resource contention which may abort some exercises, cause tests to be skipped, or leave equipment out of service.

The Automatic REX Scheduler, a feature integrated into the switch software, can be used to calculate and update the REX schedule. For more detailed information, refer to Section 3.22.5, Automatic REX Scheduler.

3.22.4.4 Reference to Additional REX Information

235-105-210, *Routine Operations and Maintenance Procedures*, devotes an entire section to REX and the Automatic REX Scheduler.

3.22.5 AUTOMATIC REX SCHEDULER

3.22.5.1 General

The Automatic REX Scheduler tool performs a data base read of the ODD to determine office equipage and uses this information to construct an optimum REX schedule. The Automatic REX Scheduler offers several options including automatic updating of RC/V views 8.1 and 8.3 and printing of the REX schedule on the ROP.

NOTE: Verify that RC/V view 8.3 exists before executing the Automatic REX Scheduler with the update (UPD) option. If RC/V view 8.3 does not exist (as with a newly grown SM/SM-2000), it must be inserted or the

Automatic REX Scheduler fails.

3.22.5.2 Command Syntax

The basic command, entered at the MCC or TLWS, is as follows:

EXC:SCHED,[ALL|REX|ALIT];

where the choices in brackets indicate the scheduling desired, whether REX, ALIT, or ALL (both). Details of input and output messages to the ROP are shown in 235-600-700, *Input Messages Manual*, and 235-600-750, *Output Messages Manual*.

3.22.5.3 Options

Options allow the user to specify (1) the days of the week for which REX is to be scheduled, (2) the REX start time, and (3) the REX duration. The user also may specify ALIT end time and duration, along with the option to update the ODD with the new REX schedule. When options are not specified, the program uses a set of default options.

3.22.5.4 Default Options

Default options are as follows:

REX REX runs seven days a week, beginning at midnight and running for six hours.

CM REX The CM REX begins at 1:00 a.m. and runs for five hours.

NOTE: ALIT runs every day, regardless of options.

3.22.5.5 Schedule Viability

One of the goals of the Automatic REX Scheduler is to construct a REX schedule that results in the testing of all equipment in the central office within a one-week period. If this is not possible, the program informs the user how much of the equipment (stated in percent) is to be diagnosed within a week (if the UPDATE option is specified, the new schedule goes into effect anyway). The user may desire to try different values for the number of days and hours allowed for REX testing in order to achieve more complete REX coverage.

The Automatic REX Scheduler also informs the user if SM/SM-2000 REX and ALIT overlap or if CM and AM REX schedules overlap. (This does not happen unless the user-specified options override the default options.)

3.22.5.6 Output

The ROP output shows the calculated REX schedule for each day of the week, listing all of the SMs/SM-2000s to be tested on any given day. This list is generated for each REX type (DGN, FAB, and ELS). The REX and ALIT start times and duration, which remain constant for each day of the week, are printed at the top of each form.

3.22.5.7 Recommended Usage

The Automatic REX Scheduler should be used for all installing offices, after equipment growth that changes the office configuration, or if there is a change in the number of days or hours available for REX testing. The scheduler may be invoked any number of times to try various combinations of REX days and hours because changes to the REX schedule take effect only at midnight. For example, a change to the REX schedule made at 10:00 p.m. does not go into effect until the following day.

For additional information on the Automatic REX Scheduler and procedures for its use, refer to 235-105-210,

*Routine Operations and Maintenance Procedures.***3.23 HOW TO USE SM/SM-2000 PERIPHERAL FAULT RECOVERY MESSAGE****3.23.1 VERBOSE MODE**

There are several changes in the philosophy of printing switch maintenance for IM (SMIM) peripheral fault recovery (PFR) messages. Originally, all SMIM PFR output messages were printed at the ROP, including those indicating that no recovery action had taken place ("ANALYSIS ONLY"). Through analysis of various field sites, approximately 80 to 90 percent of all PFR output messages contained a recovery action of "ANALYSIS ONLY." For 192-SM/SM-2000 offices, this would result in PFR consuming 10 percent of AM real time for the printing of "ANALYSIS ONLY." One of the objectives of the SMIM large office enhancements capability is to decrease the AM real-time usage for printing of PFR output messages to under one percent of total AM real time. The changes made to SMIM output message processing are as follows:

- (a) Only alarmed (minor, major, critical) PFR output messages are printed at the ROP.
- (b) All PFR output messages sent to the AM are logged.
- (c) The PFR output messages with recovery actions of "ANALYSIS ONLY" and "NO RECOVERY ACTION TAKEN" are not sent to the AM. The remaining messages are logged.
- (d) The PFR output messages are separated by peripheral unit type into unique message classes. This allows maintenance personnel to control routing of PFR output messages based on unit type.
- (e) Summary output messages can be used to alert maintenance personnel of units experiencing transient peripheral errors that do not cause a recovery action to be taken.

Information contained in the following sections can help maintenance personnel track faulty or marginal hardware through the use of summary output messages and message classes. The following input/output commands can be used to track faulty hardware:

- The input message command **OP:PERPH,SM=[a&&b],CLR,SUM=c**; is used to request a summary of peripheral transient errors on SMs/SM-2000s. This command also can be used to clear error counts in a given SM/SM-2000.
- The input message command **SET:PERPH,SM=a[&&b],VERBOSE**; requests that the verbose status in a single SM/SM-2000 or a range of SMs/SM-2000s be set.
- The input message command **CLR:PERPH,SM=a[&&b],VERBOSE**; is used to clear the verbose status in a single SM/SM-2000 or a range of SMs/SM-2000s.
- The output message **OP PERPH SM=a SUM=UNIT SUMMARY NOT AVAILABLE** provides a response to the **OP:PERPH,SUM=UNIT** command. It indicates there is no summary data from the indicated SM/SM-2000 due to lack of response from the SM/SM-2000.
- The output message **OP PERPH SYSTEM UNIT ERROR SUMMARY** provides a systemwide SM/SM-2000 peripheral transient error summary and gives an overall indication of transient errors that occurred on peripherals in a given SM/SM-2000. This message does not provide counts for all peripheral errors, but only for those errors that do not cause a recovery action to be taken on a circuit.
- The output message **OP PERPH SYSTEM ERROR SUMMARY** provides a summary of transient peripheral errors that have occurred on SM/SM-2000 peripheral units. This message gives an overall indication of transient errors that have occurred on the SM(s)/SM-2000(s).

Refer to 235-600-700, *Input Messages Manual*, and 235-600-750, *Output Messages Manual*, for a complete explanation of each message listed.

3.23.2 STEP-BY-STEP PROCEDURES

The method for investigating peripheral problems is designed to work in a step-by-step procedural fashion. By using both the system error summary and unit error summary output messages, maintenance personnel can obtain a "pattern" of where errors are occurring.

- (1) First, it needs to be determined which SMs/SM-2000s are taking peripheral errors. This information is printed daily at 7:00 a.m. in the system error summary output message, at which time the system wide error counts are also cleared. The automatic system error summary message contains counts for only the 20 SMs/SM-2000s which have taken the most errors in the last 24 hours. To get error counts for all of the SMs/SM-2000s in the system, enter the following message:

OP:PERPH,SM,SUM=SYS;

Figure 3-78 is an example of the resulting output message.

M OP PERPH SYSTEM ERROR SUMMARY				LAST RECORD	
SM	ERRCNT	SM	ERRCNT	SM	ERRCNT
1	20	2	12	3	45
4	0	5	3	6	
7	5				

Figure 3-78 OP PERPH System Error Summary Output Message (Example 1)

It is important to remember that these error counts reflect only the errors which have occurred since 7:00 a.m. If the ERRCNT column is blank for an SM/SM-2000, that means that the information was not available because the SM/SM-2000 was not able to communicate with the AM.

From this information, the SMs/SM-2000s which are taking the most peripheral errors can be found. These are the ones which should be targeted for investigation.

If only a certain range of SMs/SM-2000s needs to be examined, the range can be specified in the **OP:PERPH** input message when entered as follows:

OP:PERPH,SM=1&&20,SUM=SYS;

This gives a summary for all SMs/SM-2000s between 1 and 20.

- (2) Next, find out which kind of peripherals on the SMs/SM-2000s are taking the errors by entering the following command:

OP:PERPH,SM=a[&&b],SUM=UNIT;

This command can be entered to specify each SM/SM-2000 or a range of SMs/SM-2000s. Error counts in the SM/SM-2000 are not cleared automatically; they are cleared by maintenance personnel using the CLR option (as shown in Step 6).

Figure 3-79 is an example of the report from each SM/SM-2000.

M	OP	PERPH	SM=1	UNIT	ERROR	SUMMARY
		UNIT	COF	SERV	OPER	PAR
		LU	5	10	2	200
		DLTU	1	20	0	10
		DSU	0	5	0	0

Figure 3-79 OP PERPH Unit Error Summary Report (Example 1)

In this example, the line unit (LU) would be the unit to target for investigation.

- (3) Set the message class to print for the unit targeted for investigation by entering the following command:

CHG:LPS,MSGCLS=HW_MON,PRINT=ON;

All the unit type message classes are logged by default, so the previous command allows all the messages for that unit type to be printed, as well as logged. If it is desired to have the messages only printed and not logged, enter the following command:

CHG:LPS,MSGCLS=a,PRINT=ON,LOG=OFF;

- (4) At this point, the peripheral error messages is seen when an error results in a recovery action on that peripheral (for example, a remove and restore of the peripheral).

To see all peripheral error messages for the unit being investigated, use the following command for the SMs/SM-2000s targeted in Step 1.

NOTE: Do not set the VERBOSE mode in more than 10 SMs/SM-2000s; this causes the loss of ROP messages by increasing the number of messages going to the AM.

SET:PERPH,SM=a[&&b],VERBOSE;

The VERBOSE mode also can be set with poke **412** on MCC Page 1800 (Inhibit and Recovery Control) causing display message PFR MSG VERBOSE to backlight.

- (5) If the problem units are taking control interface (CI) errors or time slot interchanger (TSI) PIDB parity errors, it is also useful to inhibit brevity control in the targeted SMs/SM-2000s with the following command, due to the large number of messages which these types of errors generate. This allows more messages to go to the AM. Brevity control should not be inhibited for more than 10 SMs/SM-2000s, otherwise messages to the ROP may be lost.

INH:BREVC,SM=a[&&b];

Poke **609** on MCC Page 1800 also can be used to inhibit the SM/SM-2000s brevity control.

- (6) Wait for the desired information to come out on the ROP.

Once the investigation is completed and problems are cleared, the controls should be returned back to their default state as follows:

ALW:BREVC,SM=a[&&b],VERBOSE; or poke **709** on Page 1800

CLR:PERPH,SM=a[&&b],VERBOSE; or poke **512** on Page 1800

CHG:LPS,MSGCLS=a,PRINT=OFF,LOG=ON;

If more than one message class was changed, the following command can be used to restore the previous message class status:

CHG:LPS,MSGCLS=ALL,FROMBKUP;

The error counts on a per-unit basis can be cleared in the SM/SM-2000 using the following command, to see new patterns as they emerge:

OP:PERPH,SM=a[&&b],CLR,SUM=UNIT;

HW_MON is the message class for all peripheral units.

3.23.3 EXAMPLE OF USING PERIPHERAL FAULT RECOVERY MESSAGE CONTROLS

Suppose that TSI DI-ERR-BUFF errors have been coming out occasionally, but the peripherals which are the source of the problem are unknown.

- (1) First, one needs to determine which SMs/SM-2000s are taking peripheral errors. Enter the following command to get the counts for all the SMs/SM-2000s in the system:

OP:PERPH,SM,SUM=SYS;

The resulting output message is shown in Figure 3-80 .

M	OP	PERPH	SM=8	UNIT	ERROR	SUMMARY
		UNIT		COF	SERV	OPER
		DCLU		1	61	0
		LU		4	98	0
						PAR
						274
						0

M	OP	PERPH	SM=10	UNIT	ERROR	SUMMARY
		UNIT		COF	SERV	OPER
		LU		0	0	5
		DLTU		0	20	0
		DCLU		0	3	0
						PAR
						193
						2
						0

M	OP	PERPH	SM=3	UNIT	ERROR	SUMMARY
		UNIT		COF	SERV	OPER
		DCLU		0	26	5
		LU		0	0	11
						PAR
						3
						0

Figure 3-80 OP PERPH System Error Summary Output Message (Example 2)

From this information, it can be seen that SMs/SM-2000s 8 and 10 should be targeted for investigation.

- (2) Find out which kind of peripherals on these SMs/SM-2000s are taking the errors. Enter the following commands:

OP:PERPH,SM=8,SUM=UNIT;

OP:PERPH,SM=10,SUM=UNIT;

OP:PERPH,SM=3,SUM=UNIT;

Figure 3-81 is an example of the report from each SM/SM-2000.

M	OP	PERPH	SM=8	UNIT	ERROR	SUMMARY
		UNIT		COF	SERV	OPER
		DCLU		1	61	0
		LU		4	98	0
						PAR
						274
						0

M	OP	PERPH	SM=10	UNIT	ERROR	SUMMARY
		UNIT		COF	SERV	OPER
		LU		0	0	5
		DLTU		0	20	0
		DCLU		0	3	0
						PAR
						193
						2
						0

M	OP	PERPH	SM=3	UNIT	ERROR	SUMMARY
		UNIT		COF	SERV	OPER
		DCLU		0	26	5
		LU		0	0	11
						PAR
						3
						0

Figure 3-81 OP PERPH Unit Error Summary Report (Example 2)

From this information, it is determined that the peripherals to be investigated are the DCLU, LU, and DLTU.

- (3) Enter the following command:

CHG:LPS,MSGCLS=PFR_MON,PRINT=ON,LOG=OFF;

- (4) In order to see all peripheral error messages for the unit which are being investigated, use the following command for the SMs/SM-2000s which were targeted in Step 1. (Remember: The VERBOSE mode should not be set in more than 10 SMs/SM-2000s, or this causes the loss of ROP messages by increasing the number of messages going to the AM.)

SET:PERPH,SM=8,VERBOSE;

SET:PERPH,SM=10,VERBOSE;

SET:PERPH,SM=3,VERBOSE;

The VERBOSE mode also can be set with poke **412** on MCC Page 1800 (Inhibit and Recovery Control) causing display message PFR MSG VERBOSE to backlight.

- (5) Inhibit brevity control in the SMs/SM-2000s with the following command. (Again, this should not be done for more than 10 SMs/SM-2000s, otherwise messages to the ROP could be lost.)

INH:BREVC,SM=3;

INH:BREVC,SM=8;

INH:BREVC,SM=10;

Poke **609** on MCC Page 1800 also can be used to inhibit the SM/SM-2000 brevity control.

- (6) Now, wait for the desired information to come out on the ROP. Once the investigation is finished and problems are cleared, the control should be returned to their default state as follows:

- (a) Allow brevity control:

- **ALW:BREVC,SM=3;**
 - **ALW:BREVC,SM=8;**
 - **ALW:BREVC,SM=10;**
- (b) Clear the verbose mode:
- **CLR:PERPH,SM=8,VERBOSE;**
 - **CLR:PERPH,SM=10,VERBOSE;**
 - **CLR:PERPH,SM=3,VERBOSE;**
- (c) Set the message classes back to their default logging state by use of the following command:
- **CHG:LPS,MSGCLS=ALL,FROM BKUP**
- (d) The error counts in all the SMs/SM-2000s that are on a per-unit basis in the SM/SM-2000 can be cleared using the following command, in order to see new patterns as they emerge.
- **OP:PERPH,SM=1&&16,CLR,SUM=UNIT;**

3.23.4 ISDN PERIPHERAL VERBOSE MODE

While the volume of teletypewriter (TTY) output messages generated from within the integrated services digital network (ISDN) peripherals is expected to be modest, the total equipage in a medium-to-large size switch may be very large with a correspondingly high potential for a large quantity of output messages. The possibility of generating such a high volume of messages makes it necessary to throttle port processor messages unless maintenance personnel specifically requests them. Therefore, separate print controls are provided for each of the ISDN peripheral units.

The various input messages for peripheral print control are listed as follows (in MML). Refer to 235-600-700, *Input Messages Manual*, and 235-600-750, *Output Messages Manual*, for a complete explanation of these messages.

- **CHG:PRNTMODE=a, SM=b, {PSUPH=b | PI | PP};**

This input command is used to change the print control status of the specified peripheral. If the print mode is set to "ON," output messages from the specified unit are logged in the AM as they occur. If the print mode is set to "OFF" (the default), output messages are not sent to the AM for logging or printing. When the print mode is off, output messages are temporarily logged within the unit itself and may be retrieved via the "HISTORY" option or the OP:HISTORY input message.

- **OP:HISTORY, {PSUPH=a | CHNG=a | MCTSI=a,PI} [,PRNTMODE=a];**

When history is requested, the output messages logged in the specified unit are printed on the ROP. This input command also provides the option of changing the print mode status (see the **CHG:PRNTMODE** command described previously).

- **OP:POSTMORT, MCTSI=a,PP;**

This input command requests port processor postmortem reports to be printed on the ROP. Postmortem reports consist of those output messages that were logged in the port processor at the time of the initialization. Refer to the **OP:POSTMORT** and **RLS:POSTMORT** messages in the input message manual for the complete explanations.

- **OP:STATUS, {PSUPH=b | CHNG=b | MCTSI=b,PI};**

This input command requests summary information for the specified unit. The status information printed on the ROP includes print mode status, overload status, and initialization summary information.

3.24 ROUTINE TESTS

NOTE: The descriptive text and detailed procedures within 235-105-210, *Routine Operations and Maintenance Procedures*, can be very helpful when maintenance personnel are concerned with the routine operations of the 5ESS®-2000 switch.

Routine tests are run by the terminal maintenance subsystem to assure trunk and line integrity. Routine tests are run on circuits that are assumed to be in good operating condition. These tests can be implemented either automatically or manually.

Flexible scheduling of automatic trunk testing is possible through automatic progression testing (APT). In APT, a test history keeps track of information concerning the tests. This allows interruptions of the testing cycle when the trunks are needed for service. When traffic subsides, the testing resumes where it left off. Test results are analyzed and displayed locally at a remote testing location.

NOTE: APT is disabled in a 5ESS®-2000 switch for AUTOPLEX® System 1000.

The ATTS is primarily used to automatically test trunks for a 5ESS®-2000 switch for AUTOPLEX® System 1000. (The ATTS is a secured feature that can be purchased independently for use in regular 5ESS®-2000 switch applications.) The ATTS schedules routine testing on a periodic basis and is capable of supporting multiple, independent schedules of test sessions. See Section 3.5.1.6.2 for additional information on ATTS.

Routine tests can be classified as operational or transmission and encompass the following objectives:

- Verify the operational characteristics of interface and carrier facilities and distant office equipment.
- Verify the end-to-end ability to detect and send signaling and supervision.
- Routinely exercise the interface circuits in a distant office.
- Verify the operational characteristics of digital carrier voice and data trunk facilities through the use of a digital-circuit loopback and transmit capability (loopback/108-type test line).

One of several test actions can be selected for each trunk. The switch supports incoming test calls for operational tests.

The ALIT and SLIM, automatic test systems that scan lines and identify faults before they become service affecting, are the operational tests for lines.

The switch performs all the functions of the 105-type test line and responder. Manual transmission tests utilize the AC and DC jacks and portable test equipment to accomplish transmission testing. This testing is performed at the TLWS. Refer to Section 2.7 of this manual for more details concerning the different transmission tests that can be implemented via the TLWS.

3.25 HOW TO USE OFFICE BACKUP SCHEDULES

3.25.1 MEMORY (CORE) TO PRIMARY DISK BACKUP

This backup is done any time changes to the office text or data are made permanent. This includes software updates and data base recent changes. The data base recent changes consist of office dependent data (ODD) and equipment configuration data (ECD). It consists of saving the changes from memory to MHD 0 and 1. When the memory changes have been made permanent, they are available on disk for automatic recovery situations which require booting.

3.25.2 *UNIX*[®] OPERATING SYSTEM ROOT TO BACKUP-ROOT PARTITIONS

This backup is performed prior to making changes permanent to data, program, or other files in the *UNIX*[®] RTR operating system root partitions (/dev/root, /dev/db, /dev/etc, and /dev/boot). These changes are the result of software updates or ECD recent changes. The term primary partitions refers to the root partitions. This backup activity depends on the frequency of changes made to the root partitions. It is not necessary to perform this backup for every change made to the root partitions. This backup consists of copying the partitions from the primary to backup partitions and is included in the full office backup procedures. Files in these partitions are identified by pathnames that begin with something other than /no5text.

Normally, system operation is performed from the files in the root partitions. This is indicated by the emergency action interface page having item 31 (BACKUP-ROOT) cleared. Backup-root partitions are used only for recovery situations. This means that if backup-root is used to perform recovery operations, the required corrections should be made to the root partitions and control of the system must be returned to the root partitions. No recent changes or software updates should ever be applied to the system while it is running on the backup-root partitions.

3.25.3 ODD BACKUP TO TAPE (340-MB DISKS) AND SMALL COMPUTER SYSTEMS INTERFACE (SCSI)

The ODD backup to tape is a backup of the office data base and the 3B20D computer data base on one or more tapes. The ODD tape contains the current working data base in the following partitions:

/dev/db
/dev/no5odd1 or /dev/no5odd2
/dev/no5odd1 or /dev/no5odd2

The set of data base partitions to be backed up depends on the contents of the /no5text/rcv/aimrc file.

3.25.4 BACKUP SCHEDULES AND GUIDELINES

3.25.4.1 General

The scheduling of various backup levels is determined by local practices based on the following guidelines.

3.25.4.2 Memory to Primary Disk (MHD 0/1)

Memory to primary disk backup should be scheduled based on recent change and software update activity. Scheduled intervals for disk backup may vary; they can be performed as often as daily, or as infrequently as monthly.

3.25.4.3 *UNIX*[®] RTR Operating System Root Partitions to Backup Partitions

The *UNIX*[®] RTR operating system root partitions backup should be based on root partition changes associated with the ECD and software update activity. The primary partitions should be copied to the backup partitions before ECD

and/or software updates are made permanent. This backup activity is not required for individual changes but should be done for sets of changes. If there is a number of software updates which affect the root partitions, the root partitions should be copied to backup-root and the software updates should be applied. However, if all software update changes were made to files with pathnames beginning with /no5text, then this type of backup is not needed. The no5text partition does not have a backup partition on the disk.

3.25.4.4 ODD Backup to Tape (340-MB Disks) and Small Computer Systems Interface (SCSI)

The frequency of the ODD backup to tape depends on how often an ODD backup (from main store to disk) is performed in the particular office. The ODD backups should be performed on a regular basis. The appropriate time to schedule an ODD disk image backup to tape is before an ODD backup. This allows the maximum soak period for the ODD disk image before it is written to tape. Also, whenever the ECD has been altered, the ODD backup to tape should not be used. The full office to tape backup should be used instead. This is because the ODD backup to tape does not cover the ECD. All ODD disk image backup tapes made between two full office to tape backups should be saved. Then, when a new ODD backup tape is made after a full office backup, the oldest ODD disk image backup tape made since the previous office backup should be discarded first. The following schedule for ODD backup to tape is recommended:

- (a) If an ODD backup is performed daily, the ODD disk image backup should be done once a week.
- (b) If an ODD backup is performed twice a week, the ODD disk image backup should be done once every two weeks.
- (c) If an ODD backup is performed weekly, the ODD disk image backup should be done once a month.

In any event, an ODD disk image backup should be done at least once a month and no more than once a week. In addition to the ODD backup to tape, ODD recovery from tape procedures are provided in 235-105-210, *Routine Operations and Maintenance Procedures*, and 235-105-250, *System Recovery*.

3.25.5 FULL-OFFICE BACKUP TO TAPE (340-MB DISKS) AND SCSI

3.25.5.1 Backup Considerations

The full office backup to tape consists of all the text and data partitions required to recover an office to a call processing state. Two tapes are required, one tape for the text and one for the data base data.

The full office backup tapes should be made based on the following considerations:

- (a) Office backup tapes should be made when the number of permanent software updates in the office reaches a point that makes it desirable to backup the software changes to tape. The number of software updates is office dependent but should not be more than 25.
- (b) Office backup tapes should be made when there is text/data base coupling that results from a recent change or software update change. The coupling and the need to make an office backup should be specified in the software update documentation.
- (c) Office backup tapes should be made whenever the office experiences a *UNIX*® RTR operating system level 3 or higher initialization. The backup should be done after the system stabilizes and the disks are duplexed.
- (d) After a software release retrofit, a set of office backup tapes should be made of the new software release. Once the office is committed to the new software release, the old software release backup tapes should be purged from the office in approximately two weeks. Also, the new software release tapes that were used to boot the office during the software release retrofit should be kept as certified tapes until they are no longer usable as backup tapes.

The purpose of ODD backup is to provide a sound basis for recovery by allowing the system to recover quickly from a boot or pump. The changes to the ODD may be introduced by regular recent change, customer-originated recent change (CORC), maintenance, and ODBE.

Backup of the ODD makes the current memory image (that is, in-core contents) of the ODD permanent on disk. The ODD in the AM and in all the SMs/SM-2000s is backed up during this operation.

3.25.6 ODD BACKUP

3.25.6.1 Origination

Origination for ODD backup is under local control. Local control is required for the following reasons:

- (a) The ODD backup is run ``on demand."
- (b) After the first initialization of the office, the dynamic head blocks stored in the ODD must be backed up.

3.25.6.2 Frequency

The frequency of ODD backup depends on the disk space allocated to log regular recent changes and CORCs, and the number of these changes in the system. The percentage of disk log capacity may be obtained by using the **OP:LOGSTAT** message. In addition to showing the percentage, the output message also indicates the number of regular recent changes and CORCs in the disk log.

It is recommended that the ODD be backed up weekly or whenever the disk log contains 80 percent of the changes that can be restored in one hour. To avoid recent change performance degradation, the backup should be run in off-peak hours when system load and recent change input are minimal.

3.25.6.3 Safeguards

When the disk log files reach 80 percent of the changes that can be restored in one hour, an alarmed output message notifies local maintenance personnel.

When an ODD backup is in progress, CORCs are blocked, and the subscriber receives reorder tone. Similarly, if an attempt to perform an ODD backup is initiated while a recent change is in progress or when the **EXC:ODDRCVY=ALL**; message is in progress, the backup request is denied.

3.25.6.4 Disk Space Requirements

The ODD backup requires disk space for two copies of the entire ODD in addition to the official copy. The first copy is used as a working copy for the file update during backup; while the other copy is considered a ``save" copy.

3.25.6.5 Reliability and Recovery

Errors may be introduced during an ODD backup operation. These errors may be due to bad or lost messages, buffer overwrites, etc.

All processes used during an ODD backup are automatically released if a failure occurs. If the backup fails, a manual restart of the ODD backup operation should correct the problem. If not, a more serious system malfunction may be indicated, and technical assistance should be obtained from your Network Systems Regional Technical Assistance Center (RTAC).

The ODD backup does not interface directly with any of the levels of software recovery. If a processor or the system

has an initialization during an ODD backup, the ODD backup is normally aborted with no damage done to the official ODD files. The ODD backup can be restarted at another time. After the initialization, a recent change recovery must be performed to reinstate the lost recent changes and CORCs.

3.25.7 OFFICE DEPENDENT DATA RECOVERY

A stable or transient clear backs out all recent changes and CORCs entered since the last ODD backup. This is because system initialization restores the memory version of the ODD with the disk version created by the most recent ODD backup. The ODD recovery consists of reapplying the backed-out recent changes and CORCs. Records of the recent changes and CORCs are logged in disk files during the updating process. The ODD recovery provides all features needed by maintenance personnel to recover the ODD.

The **EXC:ODDRCVY** input message is usually generated automatically after a system initialization is completed. The output message generated is prefixed with an ``A" to indicate that the ODD recovery was automatically started.

Manual recovery is needed after all craft-initiated system initializations. Manual recovery is also needed after automatic initializations when the system integrity monitor determines that the ODD recovery may be faulty. When manual intervention is needed, the EXC ODDRCVY NOT STARTED alarm message is dumped to indicate that the automatic recovery was not started and that a manual ODD recovery is needed. All recent change activity is blocked until the command has been completed.

If a manual recovery is needed and the **OP:LOGSTAT** message is run, the OP LOGSTAT output message displays a reminder that the ODD recovery has not been performed since the system initialization occurred.

3.26 CIRCUIT PACK HANDLING PROCEDURES

3.26.1 GENERAL INFORMATION AND PRECAUTIONS

Semiconductor devices are constructed to withstand mechanical shocks and drops of a limited nature. However, they are not indestructible and excessive shocks may shorten their life expectancy and/or change their electrical characteristics.

- The integrated circuit (IC) packs and their film circuits are usually more susceptible to mechanical shock than conventional circuit packs due to their multiplicity of components and construction.
- Damage may result from dirt and other contaminants that wear down the gold contacts. Once the gold plating has been worn off or scratched, an oxidized film may form on the exposed copper. This film may cause electrical noise in the circuit and, if undisturbed for a long time, could open the circuit.
- Semiconductor devices and circuit packs in general are sensitive to static charges. Circuit pack IC damage can be attributed to a discharge of static electricity.
- For a person to feel the discharge of static electricity, a minimum voltage level of 1,500 to 3,500 volts must exist. A person walking across a floor can generate electrostatic voltages in excess of 12,000 volts.
- Tests have shown that ICs can be damaged by discharges of 100 to 200 volts.
- Since electrostatic discharges contain little or no current, there is no personal safety hazard.
- In addition to electrostatic discharge resulting from an ungrounded person touching a circuit pack, static charges may result from other sources. If a piece of plastic is placed near one end of a circuit pack lying on an insulated table top, it can direct its charge into the circuit pack.
- Identifying damage due to electrostatic discharge can be difficult, as in many cases physical damage cannot be seen. A circuit pack or semiconductor device which has been exposed to an electrostatic discharge may:

- (a) Not be affected, that is, work perfectly with normal life expectancy
- (b) Function normally, but with reduced life expectancy
- (c) Function erratically at times
- (d) Stop functioning altogether.

3.26.2 CIRCUIT PACK PACKAGING AND STORAGE

3.26.2.1 Packaging

Circuit packs are shipped from the factory in corrugated containers which are specially designed to prevent static buildup. Most switch circuit packs are shipped in pink antistatic bags. Warning labels are placed on bags and cartons of static sensitive devices.

3.26.2.2 Storage

Circuit packs shall be stored in their original factory shipping container. Do not break the seal on this container until ready to use the circuit pack.

3.26.2.3 Proper Packaging for Return

When returning circuit packs to Lucent Technologies' locations, ship the packs in the shipping materials in which they were originally packed. The packaging material of new packs received may be used to return the old packs. To facilitate quick repair of defective circuit packs, firmly string tie a completed information tag to the hole above the faceplate of the pack. Circuit packs are shipped with a blank information tag. Circuit pack information tags can be ordered from:

Lucent Technologies Consumer Products
Installation Stock-keeping
P.O. Box 265
West Chicago, IL 60185

Defective circuit pack information tags must be completed and string tied to the circuit pack. Packing should take place at a static-free work station. Place the circuit pack in a pink antistatic bag or carton before placing in a regular box.

3.26.3 CIRCUIT PACK HANDLING

3.26.3.1 General Handling Procedures

CAUTION: A properly grounded antistatic wrist strap must be worn when handling any circuit pack.

The following general guidelines should be followed when handling circuit packs:

- The power should be turned off before inserting or removing a plug-in circuit pack, unless specified by test requirements.
- Carry the pack (in packing materials) to replacement site before removing it from packaging. Do not remove the pack from the box and walk with it.
- Avoid unnecessary removal of circuit packs.

- Before replacing a circuit pack, check the identification code to ensure the proper pack is being used.

3.26.4 ELECTROSTATIC DISCHARGE PROTECTION

Grounded antistatic wrist straps **must** be worn for **all** circuit pack handling. The alligator clip connector of the wrist strap must be connected to a bare metal frame ground. The wrist strap must contact the skin and is not to be worn over clothing. If a static sensitive pack has already been found faulty, **do not** ignore requirements for handling static sensitive packs. Continued mishandling may create other, more serious, problems with the pack. The following guidelines should be followed to protect circuit packs from electrostatic discharge damage:

- A grounded person must **never** hand an unprotected circuit pack to an ungrounded second person. A static discharge from the ungrounded person through the circuit pack to the grounded person could cause an electrostatic discharge failure. All persons and equipment at a work location must be at the same common ground potential to be static safe.
- Do not rub or wipe circuit packs containing ICs.
- Work areas **must** be kept clear of common plastics, because they are a major source of static electricity. When handled, these plastics produce a static charge that does not readily dissipate when grounded. These common plastics must **not** make direct contact with ICs or circuit packs. Common plastic materials in this classification include polystyrene (styrofoam) packing containers, clear plastic bags, plastic drinking cups, food wrappers, notebooks, and nonconductive plastic solder suckers. The plastic insulation on small hand tools does not represent a static hazard.
- Put circuit pack into antistatic bag or carton immediately upon removing it from a frame.
- Keep adhesive tape (scotch, masking, etc.) away from sensitive devices.
- Do not wax the equipment aisles in the central office.
- Maintain relative humidity above the 20 percent level.
- When soldering static-sensitive semiconductor devices, the soldering iron must be grounded to the work table which must also be earth grounded. Individuals should also wear an antistatic wrist strap so that all items contacted are at the same potential.
- Verify that the resistance between the wrist strap and its connector plug is 1-megohm ± 10 percent at least once every week of use.

3.26.5 PRECAUTIONS TO PREVENT MECHANICAL DAMAGE

- Make sure that both male and female connectors are clean.
- Make sure the circuit pack is aligned with the guide.
- Never force the circuit pack.
- If unusual resistance is felt, determine and correct the cause before inserting the pack.
- Avoid letting any components of a circuit pack scrape the adjacent packs.

3.26.6 ASSOCIATED DOCUMENT REFERENCES

The following documents can be ordered from the Customer Information Center through your document coordinator by document number.

- 802-001-180: *Protective Grounding Systems - General Grounding Requirements for Common Systems in Central Offices, Radio Stations, and Other Structures*
- 802-001-196: *Protective Grounding Systems - General Grounding Requirement for Data Processing Computer Installation*

3.27 SPARE CIRCUIT PACKS

Achieving a high level of hardware reliability in the 5ESS®-2000 switch requires that each office maintain a stock of spare circuit packs. Circuit packs are thoroughly tested by Lucent Technologies prior to shipment and therefore do not require site testing.

Observe the following guidelines for maintaining a stock of spare circuit packs:

- Ensure that instructions for the proper handling and storing of circuit packs are adhered to. (These instructions are described in Section 3.26 of this document.)
- Establish a circuit pack inventory log (Figure 3-82) to track all circuit packs including those used for troubleshooting.

CIRCUIT PACK INVENTORY LOG				
DATE IN	PACK CODE	SLOT	SERIAL NUMBER	DATE OUT

Figure 3-82 Circuit Pack Inventory Log

3.28 HOW TO USE REPAIR SERVICE AND RETURN PROCEDURES

3.28.1 GENERAL

A Repair Service and Return (RS&R) is a maintenance support service which provides repair services for all 5ESS®-2000 switch equipment owned by the customer. Repair and return instructions are outlined in the following subsections for readily returnable material and nonreadily returnable material, respectively.

3.28.2 READILY RETURNABLE MATERIAL

- (1) The 5ESS®-2000 switch readily returnable material includes circuit packs and plug-ins located in the SM/SM-2000, the CM, and the PCC of the AM.
- (2) The Master Item File and/or Regional Control File provide repair locations for 5ESS®-2000 switch readily returnable material. Readily returnable material should be shipped directly to the specified repair location to receive the optimal replacement interval. Both the Master Item File and the Regional Control File are available from the Carolinas Service Center at the following address:
Carolinas Service Center
Lucent Technologies, Inc.
6701-A Northpark Boulevard
Charlotte, NC 28216
- (3) The RS&R repair interval is 14 days from receipt of defective material to shipment of repaired material.
- (4) All defective material submitted for repair should be shipped with a completed RS&R form and a completed "5ESS®-2000 Switch Returned Circuit Pack Tag." The RS&R forms are typically customer provided. Lucent Technologies RS&R forms can be obtained from the Customer Information Center, SD-44-326.

The Automated Circuit Pack Return Tag Tool can be used to generate the Returned Circuit Pack Tag. Refer to Section 3.18 of this document for additional information about this tool. For procedures on its use, refer to 235-105-220, *Corrective Maintenance Procedures*.

- (5) Customers are notified by mail in cases where material is unrepairable or is uneconomical to repair. Any material disposal occurs as specified by the customer. If under warranty, unrepairable material is automatically replaced.
- (6) Equivalent replacements are only shipped to customers if the availability of repair parts is expected to exceed the 14-day interval.
- (7) All repaired material receives a warranty equal to the remainder of the 2-year new equipment warranty or six months, whichever is longer.
- (8) Repair during the warranty period is provided at no charge to the customer. Current post warranty repair prices for readily returnable material can be obtained from your Network Systems Representative upon request.

3.28.3 NON-READILY RETURNABLE MATERIAL

- (1) The 5ESS®-2000 switch nonreadily returnable material consists of all equipment (including pluggable packs) located in the tape cabinet and the disk cabinets of the AM, terminals, printers, cable rack, and office framework.
- (2) Repair of nonreadily returnable material is performed by Service Support Center (SSC) personnel during normal business hours, Monday through Friday.
- (3) Emergency SSC service outside normal business hours is billable to the customer unless a maintenance contract applies. Emergency service is billable at a minimum of four hours labor. Maintenance contracts are available from Network Systems SSC for the entire office or specific units as specified. All SSC servicing of post warranty equipment is billable as incurred unless covered by a maintenance contract.
- (4) Table 3-27 provides a list of designated SSCs. The nearest SSC should always be contacted as repair assistance is needed.

- (5) Repair resolution of nonreadily returnable material is customized per occurrence as the resolution could take several forms, such as a phone call diagnosis/resolution, Lucent Technologies personnel on site for repair, or submission of unit or portion of equipment to a specified Lucent Technologies location for repair.
- (6) If resolution requires shipment of any material to Lucent Technologies for repair as determined by Lucent Technologies personnel, existing RS&R routines should be utilized. The normal SSC repair interval is 28 days upon receipt of defective material to shipment of repaired material or equivalent replacement.
- (7) All repaired products receive a warranty equal to the remainder of the 2-year new equipment warranty or six months, whichever is longer.

Figure 3-83 summarizes maintenance support services available from Network Systems.

MAINTENANCE SUPPORT SERVICES

	Repair (RS&R)	Replacement (SES-5/SES-5 PLUS)
SM Circuit Packs	X	X
CM Circuit Packs	X	X
AM PCC Circuit Packs	X	X
AM Tape/disk Cabinet Equipment	X	Not Currently Available
Terminals, Printers	X	Not Available
Framework, Cable Rack	X	Not Available

Figure 3-83 Maintenance Support Services

Specific information regarding the Spares Exchange Service (SES)-5/SES-5 PLUS services is provided in Section 3.28.4, following. Sparing recommendations for 5ESS®-2000 switch equipment is provided in ED-5D133-01 which can be obtained from the Customer Information Center in Indianapolis, Indiana.

For additional information or technical assistance, contact your Network Systems Regional Technical Assistance Center or the Account Executive serving your company.

Table 3-27 Directory of Service Support Centers

REGION	STATE/AREA SERVED	
East	New York ZIP Codes® 10XXX - 11XXX	Lucent Technologies Network Systems 811 - 10th Avenue New York, NY 10019 212-903-7413 800-452-4184 FAX 212-903-6356
	New York ZIP Codes 12XXX	Lucent Technologies Network Systems 26 Aviation Road

		Albany, NY 12205 518-453-0869 7D/24H 800-872-3251 FAX 518-489-1496
	New York ZIP Codes 13XXX - 14XXX	Lucent Technologies Network Systems 287 Commerce Drive Amherst, NY 14228 716-691-2711 7D/24H 800-872-3251 FAX 716-691-2714
	New Jersey ZIP Codes 070XX - 079XX ZIP Codes 088XX - 089XX	Lucent Technologies Network Systems 121 Fieldcrest Edison, NJ 08837 908-225-8706 7D/24H 800-524-2372 FAX 908-225-8729
	Delaware, New Jersey, Area Code 609 ZIP Codes 080XX - 087XX	Lucent Technologies Network Systems 514 Kaiser Drive Folcroft, PA 19032
	Pennsylvania Area Codes 215 & 717 ZIP Codes 166XX - 196XX Pennsylvania Area Codes 412 & 814 ZIP Codes 15XXX ZIP Codes 160XX - 168XX	610-237-2124 7D/24H 800-524-2372 FAX 610-534-7366 Lucent Technologies Network Systems 8th Floor 635 Grant Street Pittsburgh, PA 15219 412-227-7150 7D/24H 800-524-2372 FAX 412-227-7740
	Connecticut, Rhode Island, Massachusetts ZIP Codes 010XX - 013XX	Lucent Technologies Network Systems Building E18 Lakeside Business Park Hood Terrace Extension West Haven, CT 06516 203-934-5203 7D/24H 800-221-0141 FAX 203-933-4408
	Maine, New Hampshire, Vermont, Massachusetts ZIP Codes 014XX - 027XX	Lucent Technologies Network Systems Unit B 11 Industrial Way Salem, NH 03079 603-894-4438 7D/24H 800-872-3251 FAX 603-894-4603
	Maryland, Virginia, West Virginia, District of Columbia	Lucent Technologies 9305-D Gerwig Lane 9305-D Gerwig Lane Columbia, MD 21046 410-381-6182 7D/24H MD Only 800-422-1103 7D/24H Others 800-233-5827 FAX 410-381-6168
South	Georgia Atlanta North Georgia ZIP Codes 300XX - 303XX ZIP Codes 305XX - 307XX ZIP Codes 311XX ZIP Codes 399XX	Lucent Technologies Network Systems 1159 Morrow Indust. Blve. Morrow, GA 30260 GA Only 800-672-8702 Others 800-422-4565 After Hours 404-266-4351 FAX 404-968-2518
	Georgia ZIP Codes 304XX ZIP Codes 308XX - 310XX ZIP Codes 313XX - 319XX	Lucent Technologies Network Systems 1030 Georgia Avenue Macon, GA 31201 912-749-8343 After Hours 912-986-3996

	FAX 912-749-8324
North Carolina	Lucent Technologies Network Systems 3700 West Wendover Avenue Greensboro, NC 27407 910-299-0325 7D/24H 910-299-0301 FAX 910-299-5278
South Carolina	Lucent Technologies Network Systems 720 Chris Drive West Columbia, SC 29169 803-796-0440 After Hours 803-345-9253 FAX 803-794-4484
Alabama ZIP Codes 350XX - 355XX ZIP Codes 359XX ZIP Codes 362XX	Lucent Technologies Network Systems Suite 424 2100 Riverchase Center Birmingham, AL 35244 205-987-2183 After Hours 800-548-0076 FAX 205-987-2170
Alabama ZIP Codes 356XX - 358XX	Lucent Technologies Network Systems Suite B 1031 Putman Drive Huntsville, AL 35816 205-987-2183 After Hours 205-837-6101 FAX 205-837-9043
Alabama ZIP Codes 360XX - 361XX ZIP Codes 363XX ZIP Codes 367XX - 369XXi	Lucent Technologies Network Systems 25 Adams Avenue Montgomery, AL 36104 205-265-1291 After Hours 205-328-4154 FAX 205-262-4349
Alabama ZIP Codes 364XX - 366XX	Lucent Technologies Network Systems 100 North Franklin Street Mobile, AL 36602 205-434-6016 After Hours 800-548-0076 FAX 205-434-6019
Florida ZIP Codes 320XX - 322XX ZIP Codes 326XX	Lucent Technologies Network Systems Station 6 10592 Balmoral Circle East Jacksonville, FL 32218 904-751-1000 After Hours 904-744-8637 FAX 904-757-5812
Florida ZIP Codes 323XX - 324XX	Lucent Technologies Network Systems 111 East 5th Street Panama City, FL 32401 904-785-9524 After Hours 904-744-8637 FAX 904-784-0577
Florida ZIP Codes 325XX	Lucent Technologies Network Systems 30 West Belmont Street Pensacola, FL 32501 904-433-1184 After Hours 904-744-8637 FAX 904-434-7850
Florida ZIP Codes 327XX - 329XX ZIP Codes 347XX	Lucent Technologies Network Systems Suite 100 8500 Parkline Boulevard Orlando, FL 32809

		407-850-4978 After Hours 407-898-4082 FAX 407-849-5433
	Florida ZIP Codes 330XX - 334XX ZIP Codes 339XX - 340XX ZIP Codes 339XX - 340XX ZIP Codes 349XX	Lucent Technologies Network Systems Suite 109 6500 N.W. 12th Avenue Ft. Lauderdale, FL 33309 305-938-3717 7D/24H FL Only 800-626-7375 Others After Hours 407-793-5953 FAX 305-938-3710
	Florida ZIP Codes 335XX - 338XX ZIP Codes 342XX ZIP Codes 346XX	Lucent Technologies Network Systems Suite 700 6802 Citicorp Boulevard Tampa, FL 33619-1107 813-628-5220 After Hours 813-238-1481 FAX 813-628-5223
	Mississippi	Lucent Technologies Network Systems Suite L 181 Kroger Drive Jackson, MS 39218 601-949-8277 After Hours 601-372-2037 FAX 601-949-8272
	Kentucky (Except Cinn. Bell ZIP Codes serviced in Columbus, OH	Lucent Technologies Network Systems 4110 Eastmoor Road Louisville, KY 40218 502-429-1348 After Hours 800-678-2337 FAX 502-429-1355
	Tennessee	Lucent Technologies Network Systems 431 Harding Industrial Drive Nashville, TN 37211 615-333-8077 After Hours 615-859-7769 FAX 615-333-8072
	Louisiana Area Code 504 ZIP Codes 700XX - 704XX ZIP Codes 707XX - 708XX	Lucent Technologies Network Systems 57338 Salem Street Harahan, LA 70123 504-734-5846 After Hours 504-626-9367 FAX 504-734-5854
	Louisiana ZIP Codes 705XX - 706XX ZIP Codes 710XX - 714XX	Lucent Technologies Network Systems 2225 Beckett Street Bossier City, LA 71111 318-747-8910 After Hours 318-798-3198 FAX 318-459-7302
Midwest	Indiana	Lucent Technologies Network Systems Suite 100 9263 Castlegate Drive Indianapolis, IN 46256 317-578-0070 After Hours 800-225-3499 FAX 317-578-1340
	Illinois	Lucent Technologies Network Systems Room SSC 4513 Western Avenue Lisle, IL 60532 708-810-7475 7D/24H 800-255-3499 FAX 708-810-7562

Michigan	Lucent Technologies Network Systems 13201 Northend Avenue Oak Park, MI 48237 810-544-4820 After Hours 800-255-3499 FAX 810-544-3125
Wisconsin (Except ZIP Code 54729 which is serviced in Arden Hills MN)	Lucent Technologies Network Systems 22388 West Bluemound Road Waukesha, WI 53186 414-798-8826 7D/24H 800-255-3499 FAX 414-784-8203
Ohio, Kentucky (Cinn. Bell ZIP Codes)	Lucent Technologies Network Systems 1762 Dividend Drive Columbus, OH 43228 614-876-1414 After Hours 800-255-3499 FAX 614-876-8846
Texas ZIP Codes 75XXX - 76XXX	Lucent Technologies Network Systems 1751 International Parkway Richardson, TX 75081 214-994-4291 7D/24H 800-426-9826 FAX 214-994-4247
Texas ZIP Codes 77XXX	Lucent Technologies Network Systems Suite B1 2501 B. Central Parkway Houston, TX 77092-7726 713-681-1524 After Hours 800-972-8227 FAX 713-684-5369
Texas ZIP Codes 780XX - 785XX	Lucent Technologies Network Systems 6890 Alamo Downs Parkway San Antonio, TX 78238 210-509-1872 7D/24H 210-509-1870 FAX 210-509-1876
Texas ZIP Codes 786XX - 799XX	Lucent Technologies Network Systems 4201 Friedrich Lane Austin, TX 78744 512-462-2446 7D/24H 210-509-1870 FAX 512-443-2890
Kansas, Missouri ZIP Codes 64XXX ZIP Codes 653XX ZIP Codes 656XX - 657XX	Lucent Technologies Network Systems 9501 West 67 Street Merriam, KS 66203-3613 913-677-6111 After Hours 800-972-8227 FAX 913-677-6032
Missouri ZIP Codes 63XXX ZIP Codes 650XX - 652XX ZIP Codes 654XX - 655XX ZIP Codes 658XX	Lucent Technologies Network Systems 1111 Woods Mill Road Ballwin, MO 63011 314-891-3926 After Hours 800-972-8227 FAX 314-891-2923
Oklahoma	Lucent Technologies Network Systems 1208 Sovereign Row Oklahoma City, OK 73108 405-491-5800 After Hours 405-376-4017 FAX 405-491-3100
Arkansas	Lucent Technologies

		Network Systems Suite 105 5705 West 65th Street Little Rock, AR 72209 501-569-5564 After Hours 501-455-9921 FAX 501-569-5566
	Minnesota, North Dakota, Wisconsin ZIP Code 54729	Lucent Technologies Network Systems 4480 West Round Lake Road Arden Hills, MN 55112 612-633-8065 After Hours 612-295-3089 FAX 612-631-2344
	Colorado, Wyoming	Lucent Technologies Network Systems Unit 312 5885 Stapleton Drive North Denver, CO 80216 303-331-8860 After Hours 303-331-8801 FAX 303-331-8853
	Arizona	Lucent Technologies Network Systems Dock #6 3750 West Indian School Road Phoenix, AZ 85019 602-269-6535 7D/24H 800-532-8379 FAX 602-269-6540
	Utah	Lucent Technologies Network Systems 1272 West 2240 South Salt Lake City, UT 84119 206-395-6124 After Hours 206-743-9789 FAX 801-973-5731
	New Mexico	Lucent Technologies Network Systems 1001 Menaul Boulevard NE Albuquerque, NM 87107 602 269-6535 7D/24H 800-532-8379 FAX 505-761-6394
	Nebraska, South Dakota	Lucent Technologies Network Systems 3616 D. Street Omaha, NE 68107-1342 303-331-8860 After Hours 303-331-8801 FAX 402-449-6533
	Iowa	Lucent Technologies Network Systems Suite Q 920 Morgan Street Des Moines, IA 50309 303-331-8860 After Hours 303-331-8801 FAX 515-283-7379
	Montana, Idaho ZIP Codes 832XX - 834XX ZIP Codes 836XX - 837XX	Lucent Technologies Network Systems 619 Bannock Boise, ID 83701 206-395-6124 After Hours 206-743-9789 FAX 208-338-2851
	Washington, Idaho ZIP Codes 833XX ZIP Codes 838XX	Lucent Technologies Network Systems 22165 68th Avenue South Kent, WA 98032 206-395-6124 After Hours 206-743-9789

	FAX 206-395-6129
Oregon	Lucent Technologies Network Systems 1904 S.E. Ochoco Street Milwaukie, OR 97222 206-395-6124 After Hours 206-743-9789 FAX 503-786-5399
California ZIP Codes 900XX - 918XX ZIP Codes 9220X - 9221X ZIP Codes 9225X - 935XX	Lucent Technologies Network Systems 6300 Gateway Drive Cypress, CA 90630 714-220-6159 After Hours 714-748-7867 FAX 714-220-6280
California, ZIP Codes 919XX - 921XX ZIP Codes 9222X - 9224X Nevada ZIP Codes 889XX - 891XX	Lucent Technologies Network Systems 3940 7th Avenue San Diego, CA 92103 619-296-8091 After Hours 619-440-5917 FAX 619-296-4861
California, ZIP Codes 936XX - 951XX ZIP Codes 962XX - 966XX Nevada ZIP Codes 893XX - 898XX	Lucent Technologies Network Systems 1288 San Luis Obispo Avenue Hayward, CA 94544 510-475-5032 After Hours 510-884-6349 FAX 510-475-5069
California ZIP Codes 952XX - 961XX	Lucent Technologies Network Systems Suite 40 4630 Beloit Drive Sacramento, CA 95838 510-475-5032 After Hours 510-884-6349 FAX 916-927-6735
Alaska	Lucent Technologies Network Systems 2627 C Street Anchorage, AK 99503 206-395-6124 After Hours 206-743-9789 FAX 907-274-2624
Hawaii	Lucent Technologies Network Systems Suite 314 3375 Koapaka Street Honolulu, HI 96819 619-296-8091 After Hours 619-440-5917 FAX 808-526-6811

3.28.4 SPARES EXCHANGE SERVICE

3.28.4.1 Introduction

The SES-5 and SES-5 PLUS services are additional service offerings intended to be maintenance support services. Their primary purpose is to meet a customer's need for immediate replacement material while minimizing total inventory. They are available to domestic customers with 5ESS[®]-2000 switches that are in service or turned over to the customer.

Generally, SES-5 and SES-5 PLUS can exchange all Lucent Technologies manufactured spare material normally required to support a 5ESS[®]-2000 switch and the embedded 3B20D Computer. All material is new or can be reconditioned/refurbished to new to meet Network Systems high-quality standards. The spare material covered is considered to be "readily returnable" material (for example, circuit packs and plug-ins; not disk drives).

The SES-5 PLUS service does not replace the SES-5 service. The SES-5 PLUS offers the customer a fixed annual subscription fee for easier billing administration during both the warranty and the post-warranty period. The SES-5 PLUS service is offered at a yearly subscription price based on the number of switching modules deployed. The host SM/SM-2000 and the RSM subscription fees are identical. In order to qualify for SES-5 PLUS service, the customer must agree to have all SMs/SM-2000s under contract.

The SES-5 and SES-5 PLUS services are intended to be maintenance support services. They are not intended to be the vehicle for obtaining large quantities of materials associated with establishment of central stocks. Orders to establish central stocks should be entered under normal ordering routines.

3.28.4.2 How to Use the Services

To utilize the services, customers must obtain account numbers. It is recommended that the customer obtain one account number per 5ESS[®]-2000 switch location. To obtain an account number, the regional sales offices for the customer's area can help them complete an Account Requisition Form. The purpose of this process is to establish a customer's account against which he may issue orders for replacement parts.

The primary information requested is as follows:

- Company name, office name, and address
- Authorized ``Ship to" address (can be restricted to one location or multiple locations)
- A customer order number
- Customer accounting data
- Customer approval.

The local sales office writes the customer and confirms establishment of the account number. This letter provides basic information on the service and advises the customer that since the account number is used for ordering purposes, it should only be provided to those who are authorized to use it.

3.28.4.3 Order Entry

To obtain an exchange under either SES-5 or SES-5 PLUS, call the toll-free number, 1-800-325-9890.

Upon receipt of a call, personnel confirms the customer's eligibility to use the service by requesting their account number.

Customers are requested to provide the following information when calling in the order:

- Account number
- Office name and ``Ship to" address
- Item description and quantity
- Required ``on job" date
- CLEI code (Obtained for part to be exchanged)
- Shipping instructions
- Caller name and number.

On emergency orders, customers are provided appropriate shipping information by the transportation organization shipping the material.

3.28.4.4 Delivery Intervals

The delivery of replacement circuit packs is controlled by the customer. Accordingly, it is the responsibility of the calling party to specify the date by which the replacement pack must be delivered. It is expected that emergency deliveries are requested only at such times as the urgency of the situation dictates, such as when no replacement on site is available.

3.28.4.5 Pricing

3.28.4.5.1 Delivery Service Charge

The following list contains the different types of delivery intervals available for circuit packs or other plug-in units. Use the number 800-325-9890 to find out what the charge is for each of these delivery intervals.

- SES-5:
 - (a) Normal service (2- to 7-day service)
 - (b) Emergency service (24-hour service)
 - (c) Critical service (less than 24-hour service).
- SES-5 PLUS: A yearly subscription fee is charged per SM/SM-2000 billed monthly.

3.28.4.5.2 Product Exchange Price

The following items apply to the charges for the replacement of plug-ins under both SES-5 and SES-5 PLUS services:

- Under warranty material exchanged not abused - No charge
- Out of warranty material exchanged not abused and repairable/updatable - Call 800-325-9890 for price per plug-in unit
- In or out of warranty material exchanged abused - Stock order price (800-325-9890)
- Material not exchanged within 30 days - Stock order price (800-325-9890).

3.28.4.6 Returns

The customer shall return the defective material to Goddard, Kansas, within thirty (30) days of receipt of the replacement, along with a "Returned Material Authorization." The returned package postmark is used to verify the timeliness of the return.

The Returned Material Authorization has been prepopulated with all information on file. The customer must complete only the shaded portion of the form which requests the following:

- Quantity of parts being returned
- Customer signature

- Date
- How defective part was shipped
- Product number (CLEI code)
- Weight and number of cartons shipped.

Replacement material is shipped in reusable cartons. It is requested that customers use these cartons to return the defective units. When these cartons are not used, it is the responsibility of the customers to use packaging materials that adequately protect the equipment. The customer is also supplied with a preprinted return label which facilitates the return procedure.

All SES-5 return material should be mailed to this address for proper billing and crediting: B

Lucent Technologies
SES-5/Dock 44
21999 W. Highway 54
Goddard, Kansas 67052

3.28.4.7 Warranty

The individual General Sales Agreements cover the specifics of each customer's warranty; however, the following general guidelines are represented.

- During warranty periods, the replacement material carries a warranty equal to the remainder of the warranty period applicable to the material per contract with Lucent Technologies, or 6-months, whichever is longer.
- During post warranty periods, the replacement material carries a 6-month warranty if the customer pays the replacement price for Lucent Technologies manufactured material. If, however, the customer purchases material at the new stock order price through SES-5, the material carries the new product warranty.

3.29 DYNAMIC AUDITS

3.29.1 AUDIT REPORTS

3.29.1.1 Description

An audit is a program that verifies software memory for consistency of data. The audit program checks the data base for lost hardware data and broken links between data structures. In other words, audits are used to detect and recover software data errors before the switch's performance is affected.

Application audits are administered by the audits subsystem. System audits are administered by the dmert subsystem. (See 235-600-400, *Audits Manual*, for a description of this subsystem.)

When an audit finds an error in the data base, it immediately begins to correct the software data error. If the audit cannot fix the problem, it is because the error is extensive and higher level audits are necessary, or because the data has an inconsistency that must be repaired manually via recent change (RC) or the office data base editor (ODBE). The use of ODBE is explained in Section 3.15 .

NOTE: The RC is the preferred method.

Routine audits are scheduled to run automatically in a continuous repetitive pattern. Scheduled audits run in a

continuous repetitive pattern. Also, an audit can be run manually by entering an input message (except in the PH or PI) or as a result of defensive check failures (see asserts section that follows).

Audits are run at a low priority to minimize any interference with operational functions vital to call processing.

3.29.1.2 Audit Messages

3.29.1.2.1 General

NOTE: This section is for general information only, refer to 235-600-400, *Audits Manual*, for the audits applicable to the 5ESS®-2000 switch.

An audit that runs successfully and does not find any problem does not cause a printout. Only those audits that fail cause a printout. Figure 3-84 is an example of a typical *UNIX*® RTR operating system audit failure.

```
S214-9044088 88-02-08 14:27:04 0000188
MAUD CUSTAT 1 ERROR 18 REPORT
  DATA1 X'00001208          DATA2 X'00000001
  DATA3 X'd096304C          DATA4 X'80210085
```

NO SUPPLEMENTARY DATA

Figure 3-84 *UNIX* *UNIX* is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited. X/Open Company Limited RTR Operating System Audit Failure Printout

All audit failure printouts contain the letters AUD as illustrated in Figure 3-84 .

3.29.1.2.2 Log Files

Audit failures are normally logged in the **AUDLOG** and **DAYLOG** log files.

- **AUDLOG:** The AUDLOG log file contains the **system audit** failures that are run under the *UNIX*® RTR operating system environment. The user can dump the AUDLOG log file by entering the **OP:LOG:AUDLOG** input message (refer to 235-600-700, *Input Messages Manual*, for details). Only *UNIX*® RTR operating system audit failures are logged in the AUDLOG log file.
- **DAYLOG:** The DAYLOG log file contains the audits (for example, application audits) that run under the operating system for distributed switching (OSDS) environment. Audits logged in the DAYLOG log file are of the message class LAUDIT. The user must specify message class AUDTFST to retrieve the audits, because DAYLOG contains other message classes. Use the **OP:LOG:LG=DAYLOG** input message to dump the audits. (Refer to 235-600-700, *Input Messages Manual*, for details.)

3.29.1.3 Audit Environment

3.29.1.3.1 General

The term environment means which processor and which operating system within the processor caused the audit failure to print. The audit environments are as follows:

- **AM:** *UNIX*® RTR operating system
- **AM:** OSDS-operating kernel process (OKP)

- **AM:** OSDS-switching module kernel process (SMKP)
- **SM:** OSDS
- **CMP:** OSDS
- **PH:** OSDS
- **PI:** OSDS

3.29.1.3.2 AM - *UNIX*[®] RTR Operating System

The *UNIX*[®] RTR operating system audits are also known as **system audits**. These audits run under control of the system integrity monitor (SIM). The SIM is responsible for the integrity of the software that controls the AM hardware. The SIM schedules and dispatches audits in the *UNIX*[®] RTR operating system environment.

3.29.1.3.3 AM - OSDS-OKP/SMKP

Audits that run under control of OSDS are called **application audits**. In this case, an application means that it is not part of the *UNIX*[®] RTR operating system. Application software makes the system implement jobs it was intended to perform. Operating system software provides the environment where the application software runs. The OSDS software is part of the 5ESS[®]-2000 switch application software.

All OSDS audits, in the AM, run under two environments:

- **OKP:** Administers the call processing operations
- **SMKP:** Administers the switch maintenance functions.

3.29.1.3.4 SM/SM-2000 - OSDS

Audits that occur in the SMs/SM-2000s run under control of OSDS-switching module (OSDS-M). The OSDS-M administers call processing and maintenance functions in the SMs/SM-2000s. These audits identify the SM number where audit failures occurred.

3.29.1.3.5 CMP - OSDS

Audits that occur in the primary or mate CMP run under the control of OSDS. The OSDS administers call processing and maintenance functions on the CMP. The audits identify the CMP (primary or mate) where audit failures occurred.

3.29.1.3.6 PH/PI - OSDS

Audits that occur in the PH/PIs run under the control of OSDS-switching module (OSDS-M). The OSDS-M administers call processing and maintenance functions in the PH/PIs. These audits identify the PH/PI number where audit failures occurred.

3.29.1.4 Analyzing Audit Messages

3.29.1.4.1 Manual Action Audits

NOTE: 235-600-400, *Audits Manual*, identifies the action for audits requiring manual action.

The OSDS application audits have an identifier that indicates manual action is required. A manual action required audit is identified by the letter ``A". Figure 3-85 is an example of an audit requiring manual action.

```
A  AUD ENV=OKP RTTRKG ERROR-CODE=HTYPE EVENT=632
    ERROR-ADDR=H'b759d0  BAD-DATA=H'2
    LOG-KEY=H'7  GOOD-DATA=H'0
```

```
A  AUD ENV=OKP RTTRKG COMPLETED ERRORS=1 EVENT=632
```

Figure 3-85 Audit Message - Manual Action

An audit with the letter ``A" is not usually self-correcting. Manual action must be made to the office data base.

Whenever a manual action audit appears, make a note and save the printout for analysis. If this problem is not resolved by local maintenance personnel, escalate to the technical assistance organization.

3.29.1.4.2 Nonmanual Action Audits

Audits that do not have the letter ``A" at the left side of the printout are considered to be nonmanual action audits.

When nonmanual action audits occur, the maintenance personnel should be concerned with the quantity of audits dumped. One or two failures of the same audit on an infrequent basis should not require any special attention by the maintenance personnel. However, when the same audit fails *continuously*, special attention is required.

If the audit is failing continuously, determine the location and source of the audit. If a single SM/SM-2000 is printing streams of audit failures, a problem may exist in the office data base or in the hardware (of the specific SM/SM-2000). Figure 3-86 is an example of a nonmanual action audit.

```
S570-64 88-09-30 13:11:43 003146
AUD SM=2 HLSC ERROR-CODE=HSCKT EVENT=14402
    ERROR-ADDR=H'0  BAD-DATA=H'0
    LOG-KEY=H'825  GOOD-DATA=H'825

S570-64 88-09-30 13:11:50 003148
AUD SM=2 HLSC COMPLETED ERRORS=1 EVENT=14402
```

Figure 3-86 Audit Message - Nonmanual Action

3.29.2 ASSERT REPORTS

3.29.2.1 Description

Asserts, also called defensive checks, are small segments of code within programs or processes that check the validity of data during system operation. Each time a program reaches a defensive check, a test is made to determine if the assertion is true. If it is true (for example, an index is within its specified range), no action is taken and the program continues. If the assertion is false (for example, a resource in one data block is marked as ``idle" while the same resource in another data block is marked as ``in use"), an assert failure exists. The program calls the assert handler to report the failure and the assert handler then initiates the appropriate action.

Asserts perform various kinds of checks, including:

- Range checks on pointers, global data, and function arguments to ensure that reads and writes occur within restricted ranges.

- Redundancy checks made on duplicate copies of data stored at different locations to detect memory mutilation.
- Point-to/point-back linkage checks to prevent network data structure corruption.
- Consistency checks between logically related blocks of data.
- Message acknowledgment checks to ensure that static and dynamic data agree.
- Return code checks to detect bad return values from function calls.

The assert handler cannot correct the error directly. After an error is discovered and reported, the assert may trigger an audit or other corrective action via the assert handler (DCF asserts), or it may print a message to the ROP requesting repairs be made to the switch ODD (manual action assert).

3.29.2.2 Assert Handler

3.29.2.2.1 General

The assert handler is the software that is called when a defensive check fails. The assert handler is responsible for the reporting and the recovery of an assert. When an assertion is evaluated as false, an assert macro calls the assert handler to process the assert failure. The assert handler dumps related data and schedules the necessary recovery actions by doing one or more of the following:

- Dump data relevant to the error. This includes process-related data and data specified by the assert macro, including stack traces and stack frames (see 235-600-510, *Software Analysis Guide*, for message analysis information).
- Invoke audits
- Initiate single-process purges
- Initiate selective initialization
- Initiate a call for manual action
- Escalate/de-escalate the requested recovery action.

3.29.2.2.2 Manual Action Assert

This type of assert points to a problem that requires manual action. The switch does not correct the problem that caused this assert. In the illustration shown in Figure 3-87, the letter ``A" located at the left of the second line of the printout indicates manual action is required.

```

S570-786518 87-05-18 10:26:26 051606
A REPT MANUAL ACTION ASSERT-22073, MOD=1, EVENT=211
FCro_fs.c AT LINE 220
2-party TPI failure - LEN follows
Port = 0XB066,
im = 0X1, lu/dclu = 0, grid/rt = 0X1, board/RTline = 0X1,
switch = 0X1, level = 0X2

```

Figure 3-87 Assert Report - Manual Action Required

235-600-500, *Asserts Manual*, identifies the asserts requiring manual action and details the steps to be taken to correct the problem.

3.29.2.2.3 Differences Between Audits and Asserts

Both audits and asserts operate in the same data base and perform dynamic verification of the data (that is, data is checked for validity as it is used by the system). However, audits and asserts are different, and the following list indicates the differences between audits and asserts:

- Audits are **external programs** that operate on other programs and data.
- Asserts are small bits of software code that are **inside the program** and operate on programs and data in which they reside.

Audits detect errors and recover lost resources; asserts detect errors but cannot recover lost resources. Asserts perform a passive or defensive check for errors or problems. An assert failure such as invoking an audit can trigger a fault-correction procedure separate from the assert itself.

3.29.2.2.4 Non-Standard RTA DCF Error

The RTA DCF assert failure does not fit the pattern of most asserts. This assert does not have a 5-digit failure number and does not appear in the assert message summary. It is logged in the DAYLOG log file under message class LDCF. Figure 3-88 illustrates the RTA DCF error message.

```

S570-72 87-05-28 13:35:30 004506
M DUMP DAYLOG ENTRY 1
Thu May 28 10:11:16 1987

REPT RTA DCF ERROR EVENT=20
PROCESSOR AM 0 ERRORTYPE BAD_PARAM CAUSE NULL
RETURN 0 CLASS 159 236 ACTIONS DCF NONE NONE
MSGTYPE TM_REQ ENVIRONMENT PRIM DATA:
H'e120001 H'1330100 H'1003f H'1330002 H'30002 H'336 H'31342003

```

Figure 3-88 Assert Report - RTA DCF Error Message

Most of the time this assert reflects a problem in the data base that is covered by a 5-digit assert. This means the problem is probably going to be reported twice. Some problems can be reported by an RTA DCF error that does not show up any other way. Therefore, this assert should be watched for excessive occurrences.

3.29.2.2.5 Assert Message Summary

The assert summary message prints every 15 minutes and contains a list of the assert failures that have occurred during that interval. If no failures have occurred, no summary is printed.

The assert code is printed along with the number of occurrences of the assert and the number of discarded assert messages. When a large number of assert messages are generated within a 15-minute interval, a number of these messages can be discarded to prevent needless repetition. Assert messages are discarded if brevity control is allowed (brevity control is normally allowed). If brevity control is inhibited, an attempt is made to print all assert messages.

In Figure 3-89, assert number 22184 occurred three times, and messages from one event were discarded and an attempt is made to print two of these events. Assert number 23439 occurred twice, and messages from one were

discarded. Each discarded assert includes several related messages (for example, SPP, RPI, related stack trace/frame messages) all with the same event number.

```

S570-65643 87-04-12 00:25:02 068063
A  REPT  SM=1  DEF-CHK-FAIL  MESSAGE  SUMMARY
    AUTOMATIC DCF MESSAGE BREVITY CONTROL=ON
    DEF-CHK-FAIL CODE   :  OCCURRENCES   :  DISCARDED
        22184           :           3       :           1
        23439           :           2       :           1

```

Figure 3-89 Assert Report - Summary Message

3.29.2.2.6 Logging of Asserts

The SPP asserts are logged with all of the other SPP interrupt messages in the DAYLOG log file under the LSPPIN message class.

The RPI asserts are logged with all of the other RPI interrupt messages in the DAYLOG log file under the message class LDCF.

The summary message is printed and not logged.

The DCF SPP assert stimulus message is printed and not logged. The associated assert messages are logged in the DAYLOG log file under the INT-MON message class.

The DCF RPI assert stimulus message is printed and not logged. The associated assert messages are logged in the DAYLOG log file under the ASRT-MON message class.

Manual action assert messages are printed and not logged.

3.29.2.2.7 Status of Asserts

The assert status can be determined by examining switch output messages.

To retrieve the logged messages associated with a stimulus message with event number xxxx an **OP:LOG:LG=DAYLOG, KV="EVENT=xxxx"**... command would be input from the MCC or a TLWS to dump all logged events associated with event number xxxx.

DCF assert stimulus messages are printed and not logged. The remaining DCF assert messages are logged.

3.29.2.2.8 Repeating Asserts

Be aware of any assert that repeats regularly, whether or not the assert calls for manual action. This indicates a hard or solid problem.

Any time a "manual action required" assert occurs, the failure should be resolved. Manual action asserts occur when there is an inconsistency in the data base that cannot be resolved by an initialization.

3.29.2.3 Assert Identification

3.29.2.3.1 General

When analyzing assert failures, use 235-600-500, *Asserts Manual*, and 235-600-510, *Software Analysis Guide*.

3.29.2.3.2 Receive-Only Printer (ROP) Output

While not all asserts utilize them, there are five basic assert messages from the AM, an SM/SM-2000 or a CMP that may be printed on the ROP (see Figures 3-90, 3-91, and 3-92). The messages printed are determined by which assert macro originated the assert. The five messages are as follows:

Stimulus Message	Contains general information about the DCF, including failing address of the function, event number, etc.
Stack Trace	Contains the address where the function itself failed and the addresses of functions preceding the failing function.
Stack Frame	There are two stack frames output to the ROP. One belongs to the failing function and the other to the function that called the failing function.
Data Dumps	Optional hexadecimal data dumps specified by the programmer.

Figure 3-90 is an example of an AM assert printout.

```
S570-262181 88-09-28 06:03:55 000640
INIT AM LVL=RPI FPUMP DEF-CHK-FAIL= 1275 EVENT=373 COMPLETED
SW-ERR FAIL-ADDR=H'1a26 AM-MODE NORMAL CU 1 TIME 3:52:3
  PROCESS: OSDS=0,0 CALL-INTJ NONE DMERT 262254 EVENT-FLAGS=O'0 FCODE=0
  REQ-PROC 0 HDW-LVL 0      SPP-COUNTS=0,0  NO-AUD-SCHED
```

```
S570-262181 88-09-28 06:03:55 000641
REPT AM STACK TRACE ENV=FPUMP SRC=DCF EVENT=373
  USER: 00001A26 00000C14 00002844 0000292C 000026F8 0000D66
        00000D42 0000289F
```

```
S570-262181 88-09-28 06:03:55 000642
REPT AM STACK FRAME ENV FPUMP SRC DCF EVENT=373
  FUNC ADDR: H'1a26
  PARAMETERS: 000004FB 00000C14 00040160 00040190 00040190
              00000000 00040000 00200000 00000001 00000000
  LOCAL DATA: 000004FB 00001A26 00040190 000401D4 00000001
              00060014 010002A6 00000001 00000000 00040000
              .         .         .         .         .
              .         .         .         .         .
              .         .         .         .         .
```

```
S570-262181 88-09-28 06:03:55 000643
REPT AM STACK FRAME ENV FPUMP SRC DCF EVENT=373
  FUNC ADDR: H'c14
  PARAMETERS: 00040110 40000000 00002844 000400D4 00040110
              00040000 00200000 00000001 00000001 00000000
  LOCAL DATA: 000004FB 00000C14 00040160 00040190 00040190
              00000000 00040000 00200000 00000001 00000000
              .         .         .         .         .
              .         .         .         .         .
              .         .         .         .         .
```

Figure 3-90 AM Assert Printout

Figure 3-91 is an example of an SM/SM-2000 assert printout.

S570-66 90-01-11 10:54:16 000630 LSWRPIN E U.BWM89-0063

INIT SM=96, 1 LVL=RPI OSDSM EVENT=25 COMPLETED

DEF-CHK-FAIL=26204

SW-ERR FAILING-ADDR=H'4e4714 SM-MODE=NORMAL TIME=53:34:9

PROCESS: BG=80,0,H'4e3a14,RPI. CM=NONE, FG=NONE,,

SPP-COUNTS=0,0 NO-AUD-SCHED

S570-66 90-01-11 10:54:40 000646 LSWRPIN E U.BWM89-0063

REPT SM=96 STACK TRACE ENV=OSDSM SRC=DCF EVENT=25

USER: 004E4714 004E3E38 004E3CA6 0043A2E

S570-66 90-01-11 10:54:48 000650 LSWRPIN E U.BWM89-0063

REPT SM=96 STACK FRAME ENV=OSDSM SRC=DCF EVENT=25

FUNC ADDR: H'4e4714

PARAMETERS: 0010A026 00000001 000A1FC8 00020000 00000005

0001CB01 000A004E 60000094 0610A026 001EEAC2

LOCAL DATA: C0006000 18003000 00303030 80210033 30204554

4953202D 20454241 4C030000 00007E1F 0A004502

.

.

.

S570-66 90-01-11 10:54:57 000654 LSWRPIN E U.BWM89-0063

REPT SM=96 STACK FRAME ENV=OSDSM SRC=DCF EVENT=25

FUNC ADDR: H'4e3e38

PARAMETERS: 000A1FEE 004E3A2E 00000000 000A1FFC 001E89C2

FFFFD000 0000000A 1FFC0000 00000000 00000000

LOCAL DATA: 00014544 FFFF8352 6F021100 2F00C2EA 1E0026A0

10069400 00604E00 0A0001CB 01000500 00000000

.

.

.

S570-66 90-01-11 10:55:05 000658 LSWRPIN E U.BWM89-0063

REPT SM=96 REGISTER DUMP ENV=OSDSM SRC=DCF EVENT=25

REGISTER DATA= 000A1E96 000A1DE2 00000000 00000000

00000000 00000000 000A1E74 000A1E2A

0000FF9B 00000002 00000001 0002BF20

00000000 00000001 0000A080 00000000

S570-66 90-01-11 10:55:13 000662 LSWRPIN E U.BWM89-0063

REPT SM=96 REGISTER DUMP ENV=OSDSM SRC=DCF EVENT=25

A0800000 00000000 00000000 00000000 00000C0A 1F760051 F2D6002F 0014000A

1F530000 00000000 00080002 2F000000 00000000 00000300 C0000000 00000030

.

.

.

Figure 3-91 SM/SM-2000 Assert Printout

Figure 3-92 is an example of a CMP assert printout.

S570-63 90-03-11 01:50:12 005276 ASRT E K19.0

INIT CMP=0-0 PRIM LVL=RPI EVENT=2543 COMPLETED


```

DEF-CHK-FAIL=25374 AUD-SCHED=NONE
FAILING-ADDR=H'bd08d86 CMP-MODE=NORMAL TIME=25:2:1
PROCESS: BG=11,0,H'bd9b94,RPI INTJ=NONE FG=NONE

S570-63 90-03-11 01:50:26 005281 ASRTMON E K19.0
REPT CMP=0-0 PRIM STACK TRACE ENV=CMP-AP SRC=DCF EVENT=2543
USER: 0BD08D86 0BD09FA8 0BD09C58 0BD09BAA

S570-63 90-03-11 01:50:42 005285 ASRTMON E K19.0
REPT CMP=0-0 PRIM STACK FRAME ENV=CMP-AP SRC=DCF EVENT=2543
FUNC ADDR: H'bd08d86
PARAMETERS: 1C0157E6 0BD09C58 0BF26BB8 00000000 00010BF2
             6BB01C01 57EE0BD0 9BAA1C01 57FC0BCD B214FFFD
LOCAL DATA: E49DD00B D057011C 00000000 00000000 5C01C2C1
             00000000 FE9CE70B 00002300 00000100 FFFF0000
             . . . . .
             . . . . .
             . . . . .

S570-63 90-03-11 01:50:58 005290 ASRTMON E K19.0
REPT CMP=0-0 PRIM STACK FRAME ENV=CMP-AP SRC=DCF EVENT=2543
FUNC ADDR: H'bd09fa8
PARAMETERS: 0BF26BB8 00000000 00010BF2 6BB01C01 57EE0BD0
             9BAA1C01 57FC0BCD B214FFFD 00000000 1C0157FC
LOCAL DATA: A89FD00B D057011C E49DD00B D057011C 00000000
             00000000 5C01C2C1 00000000 FE9CE70B 00002300
             . . . . .
             . . . . .
             . . . . .

S570-63 90-03-11 01:51:14 005293 ASRTMON E K19.0
REPT CMP=0-0 PRIM REGISTER DUMP ENV=CMP-AP SRC=DCF EVENT=2543
REGISTER DATA= 0BE792ED 1C015753 0BF26BB8 00000000
                00000000 00000000 1C015794 1C015750
                . . . . .
                . . . . .
                . . . . .

```

Figure 3-92 CMP Assert Printout

The packet interface (PI) and protocol handler (PH) asserts are two types of Defensive Check Failures that do not use all five messages. Their output messages consist of a combined stimulus and stack trace message (See Figures 3-93 , 3-94 , and 3-95).

In the PH, the packet switching data structures LLCB, ALCB, and/or LCCB that are implicated during a nonreturning assert are also dumped. These types of assert messages are normally logged and not printed on the ROP. The ROP Message Volume Reduction Capabilities restrict assert output in general to the stimulus message unless complete output is requested.

Figure 3-93 is an example of a packet interface assert message.

```

S570-62 90-01-11 22:57:03 001116
REPT DEF-CHK-FAIL=30276 MCTSI=48-1 PI EVENT=9

```

```

EVENT-REPORTED-FROM-MCTSI,PI=48-1
ACTIVE-PSUCOM=1
PROCESS=65535 MESSAGE-NO=2
STIMULUS=ASSERT RCVY=PRINT
FAIL-ADDR=H'b672 PP-MODE=OPFULL ASSERT-COUNT=1
STACK-TRACE: 0001480B 00014C81 00019285 00015A20
              00017BFD 0001254C 000122BC 00010477
IMAGE=PI IMAGE

```

Figure 3-93 Packet Interface Assert Message

Figure 3-94 is an example of a protocol handler 2 assert message.

```

S570-62 90-01-11 22:57:03 001116
REPT DEF-CHK-FAIL=32125 PSUPH=20-0-2-0 CHNG=20-0-2-15 EVENT=2
EVENT-REPORTED-FROM-PSUPH=20-0-2-0
ACTIVE-PSUCOM=0
PROCESS=15 MESSAGE-NO=2 TIME=22:57 1-11-90
STIMULUS=ASSERT RCVY=PRINT
FAIL-ADDR=H'1A3F4 PP-MODE=NORMAL ASSERT-COUNT=1
STACK-TRACE: 0001A296 0001A0D8 0001FCF4
IMAGE=PH2 ACCESS IMAGE

```

Figure 3-94 Protocol Handler 2 Assert Message

Figure 3-95 is an example of a protocol handler 3 assert message.

```

S570-62 90-01-11 22:57:03 02896
REPT DEF-CHK-FAIL=32137 PSUPH=9-0-0-2 CHNG=9-0-0-10 EVENT=30
EVENT-REPORTED-FROM-PSUPH=9-0-0-2
ACTIVE-PSUCOM=1
PROCESS=15 MESSAGE-NO=26 TIME=22:57 1-11-90
STIMULUS=ASSERT RCVY=PRINT
FAIL-ADDR=H'bc13bc PP-MODE=NORMAL ASSERT-COUNT=1
STACK-TRACE: 0BC1e12E 0BC12DD8 0BC0FE12 0BC1013A
              0BC10202 0BC232E0
IMAGE=PH3 COMMON IMAGE

```

Figure 3-95 Protocol Handler 3 Assert Message

See the Assert Analysis section of the *Software Analysis Guide* for a complete description of these assert messages.

3.30 STATIC AUDITS

3.30.1 AUTOMATED STATIC ODD (SODD) AUDIT

3.30.1.1 General

3.30.1.1.1 Definition

The existing switch-resident ODD Population Rule Audit is replaced by the Automated SODD Audit, a version that allows the operating company to maintain a cleaner data base. The new audit is automatically generated from the Population Rule Language, version 5.0, (PRL5) data base population rule source files, ensuring completeness and accuracy.

There are three modes of Automated SODD Audit execution as follows:

- **Full Audit:** The full audit validates the ODD with respect to a 149-relation set of population rules. The Automated SODD Audit executes in a continuous loop, auditing the 149 relations from beginning to end in an on-going review of data. The audit starts and suspends itself according to a schedule selected by the craft. Each time the audit resumes execution, it begins where the previous execution was suspended.

When the audit is first deployed, a 7-day, 24-hour schedule is set up automatically. The craft can change this schedule to one more suitable to a particular office. Because of the thoroughness of the audit, a single cycle through the full audit may take several weeks.

- **Incremental Audit:** The incremental audit automatically executes after each successful ODD backup (BKUP:ODD). It validates data base transactions (both RCs and CORCs) input since the previous BKUP:ODD.
- **Entity Audit:** The craft can request immediate execution of the audit. Such requests typically limit the scope of an audit to a particular processor and relation, or to a particular data base entity such as a line, trunk, multiline hunt group, or trunk group.

Each audit execution produces a summary message that indicates how many errors were found. Additionally, each audit execution produces a detailed log of individual error conditions. The high-runner error conditions are documented by special error messages. Other error conditions are documented by mechanically generated error messages. Tools are provided to output this detailed error log.

3.30.1.1.2 Establishing Automated SODD Audit Schedules

3.30.1.1.2.1 Schedule for the Full Audit

When deployed, the full audit is automatically started with a 24-hour-a-day, 7-day-a-week schedule. The craft may alter that schedule by using the **SCHED:AUD** input message. Refer to 235-600-700, *Input Messages Manual*, for explanations of input message variables.

Refer to 235-105-210, *Routine Operations and Maintenance Procedures*, for detailed procedures pertaining to the Automated SODD Audit.

3.30.1.1.2.2 Schedule for the Incremental Audit

The incremental log-file-directed audit is automatically scheduled for execution after each successful **BKUP:ODD** command. When the craft establishes the backup schedule by using the **BKUP:ODD** command, the incremental audit schedule is implicitly established.

3.30.1.1.2.3 Immediate Execution of the Entity Audit

The craft may elect to investigate subscriber complaints by running the Automated SODD Audit on a specific entity, such as a subscriber line or trunk. This is accomplished by entering input message **EXC:AUD=SODD** to request immediate execution of this entity audit. The resulting error log file is then analyzed to determine if the subscriber trouble is data related.

3.30.1.1.3 Inhibiting/Allowing Scheduled Audits

Input messages **INH:AUD=SODD,FULL** and **INH:AUD=SODD,INCR** are used, respectively, to inhibit execution of the explicitly scheduled full audit and the implicitly scheduled log-file-directed incremental audit.

These audits are reallocated by entering input messages **ALW:AUD=SODD,FULL** and **ALW:AUD=SODD,INCR**, respectively.

3.30.1.1.4 Monitoring Automated SODD Audit Status

To determine the current status of the audit, enter input message **REPT:AUD=SODD**. The status includes an indication of which audits are active, which entity is currently being audited, how far along the audits are, and so forth.

3.30.1.1.5 Analyzing and Repairing Automated SODD Audit Error Reports

Each audit execution concludes with a summary message indicating how many errors were detected. To obtain the contents of an existing error log generated by a previously executed full or incremental audit, enter input message **OP:AUD=SODD,ERRLOG**. After investigating the reported error, make any necessary data base corrections using RC (and ODBE when needed). Then request an entity audit to verify the corrections.

Refer to 235-105-220, *Corrective Maintenance Procedures*, for detailed information on analyzing error reports and making data base corrections.

3.30.1.1.6 Stopping and Restarting Automated SODD Audits

The **STP:AUD=SODD,FULL** command stops the current execution of the full audit, and the **STP:AUD=SODD,INCR** command stops the current execution of the incremental audit. Properly formatted, the **STP:AUD=SODD** command stops execution of all (full, incremental, and entity) running audits. If multiple entity audits are running, each is stopped individually.

If the **STP:AUD=SODD,FULL** command has been used, the **EXC:AUD=SODD,FULL** command can be used to restart the full audit (provided the schedule allows it). Otherwise, at the next scheduled time, the full audit restarts from where it left off.

If the incremental audit is stopped, it does not restart until after the next backup is completed. Hence, some of the transactions from the first log file that were not audited may not get audited. If the **STP:AUD=SODD,INCR** command has been used, the **EXC:AUD=SODD,INCR** command may be used to restart the incremental audit before the next backup begins.

3.31 HOW TO USE PROGRAM RECORD AND PROGRAM MAP DOCUMENTS

3.31.1 INTRODUCTION

The source and disassembly listing files of the system are contained in the PRs. The naming concept for PRs is defined as follows:

- The complete name is in capital letters.
- The first part of the name is the processor (SM/SM-2000/AM) on which the code is executed.
- The second part of the name is the subsystem process/software module.
- The two parts are divided by a colon ":".

The following is an example of a PR name reflecting the guidelines defined previously (processor:subsystem product):

SM:FCPOTS

The PRs are available only in the form of microfiche. Therefore, the user must use a microfiche viewer to read the PRs. Remember, some users refer to microfiche as "fiche".

3.31.2 PR COVER SHEET

The first page of the PR is the cover sheet containing the system name, PR name, PR descriptive title, software release issue, PR number, date of issue, page count, and the proprietary message.

3.31.3 PR SECTIONS

3.31.3.1 General

The PR document can be divided into the following seven sections:

- (1) Prologue (optional)
- (2) PR section index
- (3) Global header index
- (4) Local header files
- (5) Function index
- (6) Main body (source listing and disassemblies)
- (7) Epilogue (optional).

3.31.3.2 Prologue

If a prologue is provided, it can be used to supply a variety of information to the user (for example, instructions, program's functions). Remember, this section is optional.

3.31.3.3 PR Section Index

The **Section Name** appears in either the upper left-hand corner or in the center of the first page of each section. If presented in the left-hand corner, the section name appears directly below the PR name. The PR name appears on the upper left-hand corner of every page of the PR document. The PR title description (from the cover page) also appears in the lower left-hand corner of every page of the PR document.

There is an exception to this rule, concerning the **Main Body** section where the function name (instead of the section name) appears in the upper left-hand corner of the first page of the function listing.

3.31.3.4 Global Header Files

3.31.3.4.1 General

The global header files contain definitions of program constants and data structures which may be shared.

The global header file section follows the PR section index. It contains the names of all global header files referenced in the PR document and the PK document in which it is found. If no global header files are used within the program, the word ``NONE" appears after the words ``GLOBAL HEADER FILES".

3.31.3.4.2 Global Header File Declarations

These declarations are declared by the ``include" statement in the program where they are to be used. See the ``include" statement that follows:

```
!include <hdr/as/ASmacros.h>
```

Symbols ``< >'' indicate a global header file named **hdr/as/ASmacros.h**. The ``#include'' gives the complete pathname of the file. It must be included as a part of each function in which it is to be used.

3.31.3.4.3 Documentation

All global header files are documented in the PK cross-reference indexes. These indexes are named: symbol address cross-reference index and function address PR name cross-reference index. These indexes are covered later in the section.

3.31.3.5 Local Header Files

3.31.3.5.1 General

Local header files contain private definitions and data structures for a particular program. Local header files appear after the last page of the global header file section. It defines all the local header files declared by the program as well as the listing of the sources for local headers. If no local header files are used in the program, the word ``NONE'' appears after the words ``LOCAL HEADER FILES:".

3.31.3.5.2 Local Header File Declarations

The local header files are defined in the local header section and are declared within the function where they are used. The declaration is performed with the ``#include'' statement. See the following example.

```
!include <fc/hdr/FC1st_stag.h>
```

In this example, the ``< >'' indicates a local header file named **fc/hdr/FC1st_stag.h**. The statement indicates this file is to be used as a part of the process in which it was declared. Remember, the complete pathname must be specified.

3.31.3.5.3 Documentation

Local header files are defined within the ``LOCAL HEADER FILES'' section of the program where they are used.

- These files are arranged alphabetically by the local header filename within the specific section.
- The name of each local header file appears in the upper left-hand corner, directly below the section name of each page on which it is documented.

3.31.3.5.4 Header File Identity

Global header files can be distinguished from local header files by the placement of the ``hdr'' directory in the pathname. When the ``hdr'' is the first directory in the path, the header file is global. When the ``hdr'' is the second directory in the pathname, the file is local. See the following example.

HEADER FILES

Global and Local Header File Differences

Global - hdr/xxx/xxxxxx.h

Local - xxx/hdr/xxxxxx.h

3.31.3.6 Function Index

The function index section provides an index to all of the functions that make up a particular PR. The functions are sorted by their assembly language starting address and function name within the PR.

The index is presented in a 2-section format. The first section, Figure 3-96, is sorted by ``name" and the second, Figure 3-97, by ``address." The first column indicates how the functions are sorted.

- The name sort section shows the functions sorted alphabetically by name. The first column in this section lists the function name, the second column lists the starting address, and the third is the PR document page number.
- The second section is sorted by starting address. The format for this section is the same as outlined previously, except the **first and second columns are swapped**.

PR FUNCTION INDEX FORMAT		
Name Sort		
FCPOTS		
FUNCTION INDEX (name sort)		
NAME	ADDRESS	PAGE DEFINED
FC_exit	0	249
FCcvsgnl	910	280
FCdenied	0	1011
FCdetime	c78	297
FCdig_re	cbc	299
FCdir_co	e2	1018
FCentry	d76	304
FCfex.bp		314
FCinccyl	b28	290
FCinpots		1087

Figure 3-96 PR Function Index - Name Sort

PR FUNCTION INDEX FORMAT		
Address Sort		
FUNCTION INDEX (addr sort)		
ADDRESS	NAME	PAGE DEFINED
0	MCdpfa	3464
0	MCcc0000	1683

0	MCpt0001	3392
0	MCpo0000	3308
0	MCcn0047	2685
0	MCro_fs	3064
0	MCcfcra	3240
0	FCreaddn	170
0	MCac0000	214

Figure 3-97 PR Function Index - Address Sort

3.31.3.7 Main Body

3.31.3.7.1 General

The main body contains the functions which make up the program. Each function has the ``C" language source code listing in one section followed by the disassembled listing in the next section.

- Functions are arranged numerically in the main body section by their physical address.
- The function's name is listed at the top of the first page of each function description.

3.31.3.7.2 Naming Conventions

Functions can be distinguished from macros by the name. A macro name can/may not be all capital letters, and a function has only the subsystem abbreviation capitalized. The remainder of the name is in lowercase letters. (See following examples.)

Function FCdig_coll()

Macro FCGETPORT()

Disassembly statements associated with a function begin at the top of the next page after the last right-hand brace ``}" of the source code listing for that function.

The fields of the disassembly listing portion of the function (Figure 3-98) are as follows:

- First field: **LINE NUMBER** - The numbers in [n] brackets are break points (expand function).
- Second field: **LOCATION** - This field contains the hexadecimal address of the first byte of the instruction offset from the beginning of the memory block containing the function.
- Third field: **CONTENTS** - This field is made up of three subfields and contains the hexadecimal encoding of the instruction. ***All three subfields are not always used.***
- Fourth field: **INSTRUCTION** - This field contains the instruction mnemonics.
- Fifth field: **INSTRUCTION OPERANDS** - This field contains the instruction labels or operands.

SM:FCPOTS

FCrddn()


```

[12]  0:      4e56 ffe0      link      %fp,$-0x20
      4:      206e 0008      movel     0x8(%fp),%a0
      8:      4240          cir       %d0
      a:      1028 0064      moveb     %0x64(%a0),%d0
      e:      e448          lsr       $0x2,%d0
     10:      3400          move      %d0,%d2
     12:      e90a          lslb      $0x4,%d2
     14:      022e 000f ffe4  andb      $0xf,-0x1c(%fp)
     1a:      852e ffe4      orb       %d2,-0x1c(%fp)
[14]  1e:      426e ffe0      cir       -0x20(%fp)

```

Figure 3-98 PR Disassembly Listing Fields

3.31.3.7.3 Source to Object Code Relation - Line Numbers

Both the ``C" language and the disassembly portions of a function have decimal numbers within [n] brackets. The numbers relate specific ``C" source lines to their disassembled counterparts as follows:

- Function line numbers always begin with number one [1] starting at the first left-hand brace ``{" of the function.
- Lines are numbered consecutively until the last right-hand brace ``}" of the function.
- The numbers within brackets [n] provide a convenient reference point between the ``C" and disassembled code.

Figures 3-99 and 3-100 illustrate a portion of both the ``C" source and disassembled code for the function **FCann_id** of program **SM:FCTN_ANN**. The line numbers can be used to reference between the two listings as follows:

- Line [5] of the ``C" source code indicates a function call to **PHrel** passing the symbol **FCPATHO** as an argument.
- Within the disassembled listing line [5], the first statement is a **move**.
 - The next instruction is **move long** (move L),
 - Followed by a jump to **subroutine** (jsr),
 - And finally an **add long** (add L).

SOURCE CODE LISTING

FCann_id

SM:FCTN_ANN

FUNCTION: FCann_id

```

/*
 * FCann_idle()      Announcement Idle
 *

```

```

* This routine is used to idle the terminating announcement
* process (by releasing the path, idling the port, and killing
* the process).
*
* This routine is called to take down the announcement
* when a failure occurs in setting up an announcement, or
* after the announcement has been successfully given.
*
* This return does not return.
*/

FCann_idle()
(
    /* Take down the announcement */

[5]    PHrel (FCPATHO);
[6]    RTrmport(FCGETPORT());
        /*Set customer state */

[9]    FCSETCUST(FCC_IDLE);

```

Figure 3-99 PR Source Code Listing

DISASSEMBLY CODE LISTING

FCann_id

SM:FCTN_ANN

```

FCann_id()
87a: 4e56 0000      link    %fp,$0x0
[5]  87e: 3f3c 0000      move    $0x0,-(%sp)
      882: 246d 0000      movel   0x0(%tp),%a2
      886: 4e92          jsr     (%a2)
      888: 548f          addl    $0x2,%sp
[6]  88a: 2039 0000 0000  movel   0x0,%d0
      890: 0680 0000 002c  addl    $0x2c,%d0
      896: 2040          movel   %d0,%a0
      898: 2f10          movel   (%a0),-(%sp)
      89a: 246d 0000      movel   0x0(%tp),%a2
      89e: 4e92          jsr     (%a2)
      8a0: 588f          addl    $0x4,%sp
[9]  8a2: 2079 0000 0000  movel   0x0,%a0
      8a8: 0028 0010 0043  orb     $0x10,0x43(%a0)
      8ae: 2079 0000 0000  movel   0x0,%a0
      8b4: 0228 0007 003f  andb    $0x7,0x3f(%a0)
      8ba: 0028 0008 003f  orb     $0x8,0x3f(%a0)
[11] 8c0: 246d 0000      movel   0x0(%tp),%a2

```

Figure 3-100 PR Disassembly Code Listing

3.31.3.8 Epilogue

The epilogue is an optional section of the program record. When included, this section provides:

- Printable data files used by the program
- Explanatory comments.

3.31.4 HOW TO USE PROGRAM MAP DOCUMENT

3.31.4.1 General

The PKs contain information on the global headers, symbol, function, address information, and PR cross-reference. The naming format for the PK documents is as follows:

- Unlike the PRs, only part of the title is capitalized.
- The first part of the name identifies the **processor**. This part is capitalized.
- The second part of the name identifies the **process_name**. This part can be made up of partially capitalized letters or no capital letters at all.
- The two parts are separated by a colon ":".

processor:process_name

SM:FCimp

The first page of the PK is the cover sheet.

The global header information is defined in a set of PKs.

The PK document is organized as follows:

- Global Header PKs are presented alphabetically and numerically (for example, A through E is represented in PK-100).
- SYMBOL ADDRESS CROSS-REFERENCE INDEX and the FUNCTION ADDRESS PR NAME CROSS-REFERENCE INDEX are provided for all products that can be updated by function replacement (for example, OKP and IM.out).

NOTE: The SYMBOL ADDRESS CROSS-REFERENCE INDEX and the FUNCTION ADDRESS PR NAME CROSS-REFERENCE INDEX are orderable as a set of PKs (PK number is PK-5DXXXXXX-YY). These indexes are reissued with every point load. All telephone companies on standing order for group 80 automatically receive these indexes.

3.31.4.2 Header Files

The header file section can be identified by locating the filenames listed at the far right portion of the second and third lines of the microfiche page header. These filenames are in alphabetical order. To find where the file is on the microfiche page, look at the page index area (G09 - lower right-hand display area -- see Figure 3-101). The header files can be identified as the files that end with ".h".

MICROFICHE INDEX AREA (G09)

GLOBAL HEADERS

P#	95/_RLIDP_GP	....	E05
P#	96/_TMGETFPID2	....	F05
P#	97/_dummy	....	G05
P#	98/num_signals	....	A06
P#	99/tag	....	B06
P#	100/ASmacros.h	....	C06
P#	101/ASmacros.h	....	D06
P#	102/ASmacros.h	....	E06

Figure 3-101 PK Header Files

From illustration shown in Figure 3-101, the first entry on Page 99 contains the information on the symbol **tag** (line P# 99/tag B06), and Page 100 starts the header file section with the file **ASmacros.h** in area C06. These header files define the symbols listed in the Global Header File External Symbol Table.

3.31.4.3 Symbol Address Cross-Reference

The symbol address cross-reference section can be identified by looking at the microfiche page header and the index area (G09) for the filenames ending with **.SYM**. See the illustration in Figure 3-102 for the example of the G09 symbol address cross-reference list.

MICROFICHE INDEX AREA (G09)
SYMBOL ADDRESS CROSS REFERENCE

P#	1788/fgl.TV	....	C08
P#	1789/fgl.TV	....	D08
P#	1790/fgl.TV	....	E08
P#	1791/fgl.TV	....	F08
P#	1792/symsort.SYM	....	G08
P#	1793/symsort.SYM	....	A09
P#	1794/symsort.SYM	....	B09

Figure 3-102 PK Symbol Cross Reference**3.32 HOW TO USE PROGRAM CHANGE DOCUMENT****3.32.1 PROGRAM CHANGE DOCUMENT****3.32.1.1 General**

The program change (PC) documents for the 5ESS[®]-2000 switch are issued with each consolidation load (that is, with each new software release). The PC document describes all changes applied by these software updates since the first issue of PRs and PKs. The PC document is intended to be used in conjunction with the PRs and PKs as a supplementary update. The PC document only contains switch code changes and does not include any changes produced for the UNIX[®] RTR computer system.

The attributes of the PC document are as follows:

- An index is supplied that is sorted by the software update number, and indicates associated PR number, PR name, changed function names, PC issue, and the section of the document where the function listing appears.
- Contains all changed functions since the last release of the PR documentation.
- The PC document is cumulative. Previous issues are contained in each release.
- If more than one change affects the same function, only the most current copy of the function appears in the document.
- The microfiche produced is based on an individual PR. One PR per page or pages of microfiche.
- Global headers are not included in the PC document; however, their affect upon the functions are included by the listing and disassembly contained in the document.

3.32.1.2 Availability

The PCs are issued for every point load (PC number is PC-5DXXXXX-YY). Also, the telephone companies on standing order for PRs and PKs automatically receive the PCs.

3.32.2 SYMBOL ADDRESS CROSS-REFERENCE INDEX

3.32.2.1 Purpose

The SYMBOL ADDRESS CROSS-REFERENCE INDEX is a document that provides a way to convert an external symbol within a bound product to its starting address. The external symbols defined are functions, arrays, structures, and variables.

3.32.2.2 Data Representation

The information is sorted two ways. The first sort is keyed by address (left two columns). The second sort is keyed by function (right two columns).

3.32.2.3 User's Information

The primary application of this document is for analysis of addresses printed on the ROP. For this application, the user scans the address sort looking for an address that is greater than the failing address. Once the address is found, the user must back up one entry to find the starting address of the symbol containing the desired address and the symbol's name. To determine the PR document that contains a function, refer to the FUNCTION ADDRESS PR NAME CROSS-REFERENCE INDEX. To determine the PR document that contains a symbol (that is, not a function), refer to the SYMBOL ADDRESS CROSS-REFERENCE INDEX.

3.32.2.4 Limitations

The address information contained in this document is correct for any office that applies the standard software updates. If a craft software update is applied, the address information can be skewed by the size of the function added in the CFT software update.

If an entry in this document is in doubt, the definitive answer can always be obtained from the switch by using of the **UPD:FTRC** command.

3.32.3 FUNCTION ADDRESS PR NAME CROSS-REFERENCE INDEX

3.32.3.1 Purpose

The FUNCTION ADDRESS PR NAME CROSS-REFERENCE INDEX provides a way to convert an address within a bound product to the PR document that contains the source code of that address. The document defines all external functions within the bound product, their starting address, and the PR document that contains that specific function.

3.32.3.2 Data Representation

The information is sorted three ways. The first sort is keyed by address (left three columns). The second sort is keyed by function (middle three columns). The third sort is keyed by PR name (right three columns).

3.32.3.3 User's Information

The primary application of the FUNCTION ADDRESS PR NAME CROSS-REFERENCE INDEX is for analysis of addresses printed on the ROP. For this application, the user scans the address sort looking for an address that is greater than the failing address. Once the address is found, the user must back up one entry to find the starting address of the function containing the desired address, the function's name, and the PR that contains the source for that specific function. The function index in the appropriate PR is consulted to determine which microfiche page contains the source code for the function being analyzed.

3.32.3.4 Limitations

The address information contained in this document is correct for any office that applies the standard software updates. If a craft software update is applied, the address information can be skewed by the size of the function added in the CFT software update.

If an entry in this document is in doubt, the definitive answer can always be obtained from the switch by using the **UPD:FTRC** command.

3.32.4 USER'S GUIDE FOR THE CROSS-REFERENCE INDEXES

The SYMBOL ADDRESS CROSS-REFERENCE and FUNCTION ADDRESS PR NAME CROSS-REFERENCE INDEXES, when used with the appropriate PR document, can guide a user from an address printed on the ROP to the associated source code. This guide is only applicable for addresses from OKP and IM.out. The address information assumes that no CFT software updates have been added to the switch. Figure 3-103 shows how the cross-reference indexes can be used.

NOTE: This example pertains to IM.out, but the steps are the same for OKP.

- (1) An assert has occurred, and the associated stack information has printed on the ROP or has been retrieved from the DAYLOG. Review the first line of the assert message to determine the process that asserted (refer to the 21200 assert message display in Figure 3-103). The display shows OSDSM, which indicates the assert came from IM.out (line 1 on Figure 3-103).

```
INIT SM=14,1 LVL=RPI OSDSM EVENT=13959 COMPLETED
DEF-CHK-FAIL=21200
SW-ERR FAILING-ADDR=H'cf6d2 SM-MODE=NORMAL TIME=14:1:6
PROCESS: BG=14,0,RPI CM=NONE, FG=NONE,,
SPP-COUNTS=0,0 NO-AUD-SCHED

S570-9043999 86-05-27 08:14:43 025294
REPT SM=14 STACK TRACE ENV=OSDSM SRC=DCF EVENT=13959
USER: 000CF6D2 00289BEC 000CB792 0027C888 003F6CC6 0024A1A4
      00248672 00252868 002527CA 00252736
```

```

S570-9043999 86-05-27 08:15:00 025298
REPT SM=14 STACK FRAME ENV=OSDSM SRC=DCF EVENT=13959
  FUNC ADDR:  H'cf6d2
  PARAMETERS: 00446632 00085AD4 0061B754 005AFA06 00085ABC
                000CB792 00446632 005E3D80 00085AD4 00020002
  LOCAL DATA: D45A0800 54B76100 D3FA5A00 B3000000 00000000
                00000000 803DD5E0 9A5C0800 805A0800 D052D2F6

```

Figure 3-103 PC Cross-Reference Index

- (2) Extract the list of processes that were on the stack by analyzing the USER stack (refer to line 8 of Figure 3-103 ``000CF6D2"). The USER stack defines all of the open function calls that existed at the time of the assert. An analysis of the actions performed by these functions provide details concerning the status of the process at the time of the assert. The address closest to the word ``USER" (that is, 000CF6D2) is the most recent function. Other functions are represented in reverse chronological order, left to right.
- (3) To determine the function of an address on the USER stack, consult the SYMBOL ADDRESS CROSS-REFERENCE INDEX that is sorted by address. The list is analyzed until an address greater than the address in question is located. The function containing the address in question is the function previous to the address just located. Refer to the IM.out locations (by address) display shown in Figure 3-104 (address 0x000CF6D2 is between 0 x000cf548 and 0x000cf714).

OSpass11: 0x000c68b0	MCcb0711: 0x00c9b4c	MCmw0026: 0x000cf3ea
OSpass12: 0x000c68be	MCcb0821: 0x000c9b78	MCmw0103: 0x000cf4e8
OSpass13: 0x000c68c8	MCcb0817: 0x000c9bce	DBstg2ex: 0x000cf548
OSpass14: 0x000c68d6	MCcbssss: 0x000c9c24	PCnwloss: 0x000cf714
OSpass15: 0x000c68e4	SMprds1r: 0x000c9ca2	MCmw011d: 0x000cf76c

Figure 3-104 PC Symbol Address Cross-Reference

NOTE: The address in the SYMBOL ADDRESS CROSS-REFERENCE INDEX is the starting address of a function. The address in question is from the middle of a function. To locate a function, locate the starting address of the next function, then back up one entry.

- (4) Refer to the FUNCTION ADDRESS PR NAME CROSS-REFERENCE INDEX sorted by function for the appropriate product. Find the function located in the previous step. The number to the left of the function name is the PR number which contains the source code. Refer to the FUNCTION ADDRESS PR NAME CROSS-REFERENCE INDEX sorted by function name display shown in Figure 3-105 [look for PR name (that is, AM:IMFPUMP): DBstg2ex].

5D51775: DBstg2cm	5D62325: DCdiode	5D51975: dctuinit
5D51775: DBstg2ex	5D62275: DCdisc	5D60875: DDclrwp
5D51775: DBstgcop	5D62275: DCdpwsu	5D60875: DDcrend
5D51775: DBstnxt	5D62325: DCdropac	5D60725: DDcwrite

Figure 3-105 PC Function Address PR Name Cross-Reference

- (5) Refer to the index page of the microfiche within the appropriate PR. Locate the page that contains the FUNCTION ADDRESS PR NAME CROSS-REFERENCE INDEX. Go to that page and look up the function name that had been previously found. This gives the microfiche page of the source code for the function.

3.33 TR303 IDCU REMOTE TERMINAL PROVISIONING

3.33.1 GENERAL

Provisioning of the TR303 RT is the process by which selected system parameters and end user subscription data are transferred from the switch into a TR303 RT. This is done automatically by the switch whenever a change is detected in the switch's copy of the provisioned data. In order to maintain the integrity of provisioned data in the RT, the data is refreshed once daily. A failure reporting mechanism is provided to aid in troubleshooting provisioning problems and to offer a way to provision all or a subset of the data on demand.

3.33.2 PROVISIONING INHIBIT/ALLOW

When a TR303 RT is "grown in," field 164 in RC view 18.15 determines whether or not the switch is responsible for RT provisioning. If field 164 is set to N, the switch does not provision any data into the RT. It is assumed that some other Operations System (OS) provisions the RT with data consistent with the corresponding 5ESS®-2000 switch line assignment data. If the field is set to Y, the switch is responsible for provisioning all global, DS1, and line assignment data into the RT. If field 164 in RC view 18.15 is updated from N to Y, then the input message **EXC:RT,PROV,TYPE=ALL** must be used to provision the RT. The switch does not automatically provision the RT upon the commitment of the update.

3.33.3 AUTOMATIC PROVISIONING

When the 5ESS®-2000 switch data base is updated via RC or ODBE, an automatic provisioning operation is invoked if the changed data is also kept in the RT. This automatic provisioning operation collects the necessary data, formats it according to the TR303 interface specification, and sends it to the RT. If this operation is unsuccessful because of a **transient** problem [for example, embedded operations channel (EOC) is OOS, RT has resource limitations, switch is in an overload condition, etc.], the switch stops the current provisioning operation and tries again 15 minutes later. The provisioning operation is retried every 15 minutes until it is successful. If the provisioning operation is unsuccessful because of a **nontransient** type of error (for example, switch data base corruption or RT responds with an unexpected failure to a provisioning request), the provisioning operation is aborted and is not subject to the 15-minute retry scheme. Nontransient types of failures are reported to the ROP if provisioning reporting is enabled.

In addition to data base updates, there are several other stimuli that cause the switch to provision selected parameters into the RT. These include but are not limited to the following:

- **EOC Recovery from Duplex Fail:** All global and DS1 parameters are provisioned when the RT's EOC channels are restored from a duplex fail state.
- **System Clock Change:** When the system clock changes for any reason, the new local time is provisioned into the RT.
- **RT Provisioning Request:** When the RT requests to be reprovisioned via a memory corruption alarm, the switch provisions all of the data into the RT.

3.33.4 ROUTINE PROVISIONING

In order to maintain the integrity of provisioned data in the RT, a routine provisioning operation begins 15 minutes after midnight in every SM/SM-2000 that has a TR303 remote terminal assigned. The routine provisioning operation sequentially steps through all TR303 RTs on the SM/SM-2000 and refreshes system-level parameters per DS1 and line parameters. Provisioning status messages and individual failure messages are sent to the ROP during this operation if provisioning reporting is enabled.

3.33.5 PROVISIONING FAILURE REPORT

The failure report is available to report provisioning failures to the ROP. The failure report shows the operation that was attempted as well as the specific reason for the failure. Reporting can be enabled/disabled on a per-SM/SM-2000 as well as a per-RT basis. The default state for reporting is **disabled**. Failure reporting must specifically be enabled via input message **ALW:RT,PROV,REPT**. The **INH:RT,PROV,REPT** command is used to disable reporting. The **OP:RT,PROV** input message is used to get the current reporting state for a given RT. Refer to 235-600-700, *Input Messages Manual*, for information on the use of these commands.

3.33.6 PROVISIONING ON DEMAND

If for some reason it is believed that the provisioned data is out of sync with the switch data, an input message is available to cause the switch to refresh on demand, either a subset or all of the data in the RT. The **EXC:RT,PROV** input message causes the switch to immediately try to provision the selected data and report the results. The argument (**TYPE=a**) used in the input message specifies the subset of data to be provisioned. Arguments are as follows:

- **ALL**: All provisioned data is refreshed. A RT identifier must be provided.
- **GLOBAL**: Only RT global and DS1-related data is refreshed. A RT identifier must be provided.
- **IFAC**: Only DS1-related data is refreshed. A RT identifier must be provided.
- **LINE**: Only data for a single line is refreshed. A line identifier must be provided.

Refer to 235-600-700, *Input Messages Manual*, for details.

3.33.7 PROVISIONING INTERACTIONS WITH RT ALARMS

When the RT sends a "memory corruption" alarm to the switch, the switch reprovisions the RT immediately. This should be a rare event, caused by a field technician clearing the RT's memory. The other RT alarm that affects provisioning is a "memory mismatch" alarm. This is an indication of an internal RT memory failure which cannot be cleared automatically. While in this state, it is unlikely that any provisioning operations would be successful. Therefore, all provisioning operations are inhibited for that RT while it has an active "memory mismatch" alarm. The **OP:RT,PROV** input message described previously also retrieves this inhibit status. When the alarm is cleared via a "memory mismatch clear" indication from the RT, the inhibit is removed. However, this is not an indication to reprovision the RT. Any service order changes that are processed while in the "memory mismatch" alarm state results in the provisioning operations being deferred. These operations should begin within 15 minutes of the alarm being cleared.

3.33.8 PROVISIONING INTERACTIONS WITH PORT STATUS ADMINISTRATION

When a TR303 line is assigned, it is placed in the Circuit Administration - Provisioning state (OOS CADN DSBLD PROV). It remains in this state until the line parameters are successfully provisioned into the RT. Since provisioning is normally done immediately following line assignment, the line should only be in this state for a few seconds. However, if the EOC is OOS or if the RT responds to the provisioning request with an error, the line may stay in the CADN state until the error condition is cleared. The **OP:LIST,LINES,CADN** input message can be used to find lines stuck in the CADN state, an indication of potential provisioning problems.

3.33.9 PROVISIONING SPECIAL CHANNEL UNITS

Some TR303 channel units that the switch does not know how to provision are used for nailups/hairpins. These "specials" are either provisioned locally or provisioned remotely through an OS that communicates directly with the RT. To avoid having the switch overwrite this data with its own subscription data, a field in RC view 1.6 is used to mark lines so that provisioning knows not to touch these specific line terminations. Field "TR303 NAILUP" is added to the analog line assignment RC view 1.6 to indicate whether or not the switch is responsible for provisioning this

line. If the field is set to Y, the switch does not provision the line termination data for this line, and the line can only be used for a nailup/hairpin. If the field is set to N, the switch provisions the line termination data for this line. In either case, Y or N, the switch provisions the time slot cross-connection data provided in the nailup/hairpin view (RC view 7.11).

See 235-105-220, *Corrective Maintenance Procedures*, and 235-105-210, *Routine Operations and Maintenance Procedures*, for TR303 RT provisioning procedures.

3.34 QUAD LINK PACKET SWITCH NETWORK VERIFIER (QNETVER) TOOL

3.34.1 DESCRIPTION

The Qnetver tool is used to verify the usability of the quad link packet switch (QLPS) network components. Qnetver routes test messages and displays counts kept at QLPS network components that encounter the test messages. These network components are the QLPS gateway processors (QGP) and SM-2000 message handlers (MH).

Qnetver identifies the number of messaging paths available between the user-specified messaging endpoints and works with the message route selection software to send messages along each of those paths. The path taken by the test messages can be observed from the counts printed in the reports, that is, QGP counts, MH counts, and communication link (CLNK) counts. For each messaging path identified, Qnetver sends five test messages to exercise the path.

Qnetver utilizes another tool, *cp3bmsgdrv*, with a user-specifiable option set that has been narrowed down to exclude that tool's potentially system-impacting features.

CAUTION: The *cp3bmsgdrv* is intended to be directly invoked by 5ESS[®]-2000 switch developers under test-only conditions and should not be directly invoked in a live office.

Qnetver validates SM/SM-2000 numbers only to the extent that they are in range, that is, they are greater than or equal to 1 and less than or equal to 192. Qnetver **does not** verify that the SM/SM-2000s are actually equipped. Specifying an SM/SM-2000 number that is not equipped results in a timeout on a response from the (non-existent) SM/SM-2000.

3.34.2 QNETVER INPUT COMMAND

The Qnetver program is invoked by entering:

```
qnetver -o <SM#> -t okp|cmp|<SM#> [-i]
```

where the command parameters are as follows:

- o <SM#> (Mandatory) Specifies the SM/SM-2000 that **originates** the test messages. <SM#> is a number between 1 and 192 (inclusive) that identifies that SM/SM-2000.
- t okp|cmp|<SM#> (Optional) Specifies the processor that **terminates** the test messages. This can be the operational kernel process (OKP) which is the default, the CMP, or another SM/SM-2000 (identified by <SM #>).
- i (Optional) Specifies **incremental status reporting**. A report is printed for each iteration of test messages sent, that is, each round of test messages sent over a specific path.

3.34.3 QNETVER DIAGNOSTICS

Qnetver performs diagnostics and displays the following messages for error conditions:

- **Originating SM number (n) is out of range (1:192):** The specified originating SM/SM-2000 number is outside the range of valid SM/SM-2000 numbers which is 1 through 192, inclusive.
- **Invalid originating SM number (n):** An invalid value was specified for an SM/SM-2000 number.
- **Terminating SM number (n) is out of range (1:192):** The specified terminating SM/SM-2000 number is outside the range of valid SM/SM-2000 numbers which is 1 through 192, inclusive.
- **Unexpected parameter (p):** Check input command line against valid command parameters (described previously).
- **Session aborting due to e(r):** ``e'' is the endpoint (originating or terminating). ``r'' is one of the following reasons:

0	(CMQTCOORDHELLO) At an endpoint, the test session coordinator timed out on the expected periodic ``hello" message from the test session administrator software in the AM.
1	(CMQTMHELLO) At an endpoint, the test message handler timed out on the expected periodic ``hello" message from the test session coordinator software at the same endpoint.
2	(CMQTACKHELLO) At an endpoint, the test session coordinator timed out on the expected periodic acknowledgment ``hello" message from the test message handler software at the same endpoint.
3	(CMQTBCACKNEWSESSION) At a SM-2000 endpoint, the test session coordinator timed out on the expected acknowledgment message for a new session set up from the test message counter in the SM-2000 MH.
4	(CMQTACKNEWSESSION) At an originating endpoint, the test session coordinator timed out on the expected acknowledgment message for a new session set up from the test session coordinator in the terminating endpoint.
5	(CMQTBCSTATUS) At a SM-2000 endpoint, the test session coordinator timed out on the expected status query response from the test message counter in the SM-2000 MH.
6	(CMQTACKSTART) At an originating endpoint, the test session coordinator timed out on the expected acknowledgment message to start the exchange of test messages from the test session coordinator in the terminating endpoint.

3.34.4 QNETVER TEST EXAMPLES

Example 1

To exercise messaging between an SM-2000 whose processor number is 14 and OKP, enter the following command:

```
qnetver -o 14 -t okp
```

Observe in Figure 3-106 that the network is supported by two QGPs. Observe also that the counts for QGP 0,0 are 0 (zero) because at the time the session was run, QGP 0,0 was out of service.

```
QLPS NETWORK TEST SESSION REPORT AT Fri Aug 12 14:14:17 1994
  START TIME: Fri Aug 12 14:14:16 1994
  END TIME: Fri Aug 12 14:14:17 1994
```

```

STATUS: Completed
TEST MODE: Network Component Usage Verification
TEST OPTIONS: NONE
PARAMETERS: 5 MESSAGE(S) PER ITERATION

```

NETWORK	0		1	
-----	-----	-----	-----	-----
MSGs,QGP	0,0	1,0	0,0	1,0
-----	-----	-----	-----	-----
SENT	0	10	0	10
RECEIVED	0	10	0	10

```

ORIGINATING PCR: 14
SENT|          10          |          10
RECEIVED|          10          |          10
D/QLNK SELECTED|          5          5|          5          5
CLNK0 SELECTED: 0
CLNK1 SELECTED: 0
SEQUENCE ERRORS: 0
HASHING ERRORS: 0
MSG. TIMEOUTS: 0

```

	LINK0	LINK1	LINK2	LINK3	LINK4	LINK5
CANDIDATE	n	n	y	y	y	y

```

TERMINATING PCR: OKP
SENT|          0          |          0
RECEIVED|          0          |          0
D/QLNK SELECTED|          5          5|          5          5
CLNK0 SELECTED: 0
CLNK1 SELECTED: 0
SEQUENCE ERRORS: 0
HASHING ERRORS: 0
MSG. TIMEOUTS: 0

```

	LINK0	LINK1	LINK2	LINK3	LINK4	LINK5
CANDIDATE	n	n	n	n	n	n

Figure 3-106 Quad Link Packet Switch Network Verifier (QNETVER) Test Example 1

Example 2

To exercise messaging between two SM-2000s whose processor numbers are 13 & 14, enter the following command:

qnetver -o 13 -t 14

Observe in Figure 3-107 that the QGP counts are 0 (zero) because direct QLNs are used between SM-2000s.

```

QLPS NETWORK TEST SESSION REPORT AT Fri Aug 12 14:14:57 1994
START TIME: Fri Aug 12 14:14:57 1994
END TIME: Fri Aug 12 14:14:57 1994
STATUS: Completed
TEST MODE: Network Component Usage Verification
TEST OPTIONS: NONE
PARAMETERS: 5 MESSAGE(S) PER ITERATION

```

NETWORK	0		1	
-----	-----	-----	-----	-----

	0,0		1,0	
MSGs, QGP	0,0	1,0	0,0	1,0
SENT	0	0	0	0
RECEIVED	0	0	0	0

ORIGINATING PCR: 13
 SENT | 5 | 5
 RECEIVED | 5 | 5
 D/QLNK SELECTED | 0 | 5 | 5 | 0
 CLNK0 SELECTED: 0
 CLNK1 SELECTED: 0
 SEQUENCE ERRORS: 0
 HASHING ERRORS: 0
 MSG. TIMEOUTS: 0

	LINK0	LINK1	LINK2	LINK3	LINK4	LINK5
CANDIDATE	n	n	n	y	y	n

TERMINATING PCR: 14
 SENT | 5 | 5
 RECEIVED | 5 | 5
 D/QLNK SELECTED | 0 | 5 | 5 | 0
 CLNK0 SELECTED: 0
 CLNK1 SELECTED: 0
 SEQUENCE ERRORS: 0
 HASHING ERRORS: 0
 MSG. TIMEOUTS: 0

	LINK0	LINK1	LINK2	LINK3	LINK4	LINK5
CANDIDATE	n	n	n	n	n	n

Figure 3-107 Quad Link Packet Switch Network Verifier (QNETVER) Test Example 2**Example 3**

To exercise messaging between an SM-2000 whose processor number is 14 and OKP with incremental reporting, enter the following command:

qnetver -o 14 -t okp -i

Observe in Figure 3-108 that the network is supported by two QGPs. Observe also that the counts for QGP 0,0 are 0 (zero) because at the time the session was run, QGP 0,0 was out of service.

QLPS NETWORK TEST SESSION REPORT AT Fri Aug 12 14:15:40 1994

START TIME: Fri Aug 12 14:15:40 1994

STATUS: Running

TEST MODE: Network Component Usage Verification

TEST OPTIONS: INCR. STATUS REPORTING

PARAMETERS: 5 MESSAGE(S) PER ITERATION

	0		1	
MSGs, QGP	0,0	1,0	0,0	1,0
SENT	0	5	0	0
RECEIVED	0	5	0	0

ORIGINATING PCR: 14

SENT|	5	|	0		
RECEIVED|	5	|	0		
D/QLNK SELECTED|	0	5|	0	0	
CLNK0 SELECTED:	0				
CLNK1 SELECTED:	0				
SEQUENCE ERRORS:	0				
HASHING ERRORS:	0				
MSG. TIMEOUTS:	0				
	LINK0	LINK1	LINK2	LINK3	LINK4
CANDIDATE	n	n	y	y	y

TERMINATING PCR: OKP

SENT|	0	|	0		
RECEIVED|	0	|	0		
D/QLNK SELECTED|	0	5|	0	0	
CLNK0 SELECTED:	0				
CLNK1 SELECTED:	0				
SEQUENCE ERRORS:	0				
HASHING ERRORS:	0				
MSG. TIMEOUTS:	0				
	LINK0	LINK1	LINK2	LINK3	LINK4
CANDIDATE	n	n	n	n	n

QLPS NETWORK TEST SESSION REPORT AT Fri Aug 12 14:15:41 1994

START TIME: Fri Aug 12 14:15:40 1994

STATUS: Running

TEST MODE: Network Component Usage Verification

TEST OPTIONS: INCR. STATUS REPORTING

PARAMETERS: 5 MESSAGE(S) PER ITERATION

NETWORK|	0	|	1	
-----	-----		-----	
MSGs,QGP|	0,0	1,0|	0,0	1,0
-----	-----		-----	
SENT|	0	5|	0	5
RECEIVED|	0	5|	0	5

ORIGINATING PCR: 14

SENT|	5	|	5		
RECEIVED|	5	|	5		
D/QLNK SELECTED|	0	5|	0	5	
CLNK0 SELECTED:	0				
CLNK1 SELECTED:	0				
SEQUENCE ERRORS:	0				
HASHING ERRORS:	0				
MSG. TIMEOUTS:	0				
	LINK0	LINK1	LINK2	LINK3	LINK4
CANDIDATE	n	n	y	y	y

TERMINATING PCR: OKP

SENT|	0	|	0	

RECEIVED|	0	|	0		
D/QLNK SELECTED|	0	5|	0	5	
CLNK0 SELECTED:	0				
CLNK1 SELECTED:	0				
SEQUENCE ERRORS:	0				
HASHING ERRORS:	0				
MSG. TIMEOUTS:	0				
	LINK0	LINK1	LINK2	LINK3	LINK4
CANDIDATE	n	n	n	n	n

QLPS NETWORK TEST SESSION REPORT AT Fri Aug 12 14:15:42 1994

START TIME: Fri Aug 12 14:15:40 1994

STATUS: Running

TEST MODE: Network Component Usage Verification

TEST OPTIONS: INCR. STATUS REPORTING

PARAMETERS: 5 MESSAGE(S) PER ITERATION

NETWORK|	0	|	1	
-----	-----		-----	
MSGs,QGP|	0,0	1,0|	0,0	1,0
-----	-----		-----	
SENT|	0	5|	0	10
RECEIVED|	0	5|	0	10

ORIGINATING PCR: 14

SENT|	5	|	10		
RECEIVED|	5	|	10		
D/QLNK SELECTED|	0	5|	5	5	
CLNK0 SELECTED:	0				
CLNK1 SELECTED:	0				
SEQUENCE ERRORS:	0				
HASHING ERRORS:	0				
MSG. TIMEOUTS:	0				
	LINK0	LINK1	LINK2	LINK3	LINK4
CANDIDATE	n	n	y	y	y

TERMINATING PCR: OKP

SENT|	0	|	0		
RECEIVED|	0	|	0		
D/QLNK SELECTED|	0	5|	5	5	
CLNK0 SELECTED:	0				
CLNK1 SELECTED:	0				
SEQUENCE ERRORS:	0				
HASHING ERRORS:	0				
MSG. TIMEOUTS:	0				
	LINK0	LINK1	LINK2	LINK3	LINK4
CANDIDATE	n	n	n	n	n

QLPS NETWORK TEST SESSION REPORT AT Fri Aug 12 14:15:42 1994

START TIME: Fri Aug 12 14:15:40 1994

END TIME: Fri Aug 12 14:15:42 1994

STATUS: Completed

TEST MODE: Network Component Usage Verification

TEST OPTIONS: INCR. STATUS REPORTING

```

PARAMETERS: 5 MESSAGE(S) PER ITERATION
NETWORK |          0          |          1          |
-----|-----|-----|
MSGS,QGP|    0,0    |    1,0    |    0,0    |    1,0    |
-----|-----|-----|
SENT    |    0      |    10     |    0      |    10     |
RECEIVED|    0      |    10     |    0      |    10     |

ORIGINATING PCR: 14
SENT    |    10     |          |    10     |
RECEIVED|    10     |          |    10     |
D/QLNK SELECTED|    5      |    5     |    5      |    5      |
CLNK0 SELECTED: 0
CLNK1 SELECTED: 0
SEQUENCE ERRORS: 0
HASHING ERRORS: 0
MSG. TIMEOUTS: 0

LINK0    LINK1    LINK2    LINK3    LINK4    LINK5
CANDIDATE n        n        y        y        y        y

TERMINATING PCR: OKP
SENT    |    0      |          |    0      |
RECEIVED|    0      |          |    0      |
D/QLNK SELECTED|    5      |    5     |    5      |    5      |
CLNK0 SELECTED: 0
CLNK1 SELECTED: 0
SEQUENCE ERRORS: 0
HASHING ERRORS: 0
MSG. TIMEOUTS: 0

LINK0    LINK1    LINK2    LINK3    LINK4    LINK5
CANDIDATE n        n        n        n        n        n

```

Figure 3-108 Quad Link Packet Switch Network Verifier (QNETVER) Test Example 3

3.35 J1 PATH TRACE (5E13 and later)

3.35.1 DESCRIPTION

The J1 Path Trace allows a path receiving Path Terminating Equipment (PTE) (for example 5ESS[®] DNU-S) to verify its continued connection to the intended transmitting PTE.

3.35.2 I/O COMMANDS

The Input/Output command is OP:PTRC. See the I/O Manual for additional information.

3.35.3 EXAMPLE OF J1 PATH TRACE USE

Assume you want to do a path trace for a string "Chicago North Branch Central Office". You would put the string "Chicago North Branch Central Office" in the J1 Path Trace for a particular Synchronous Transport Signal Level 1 (STS-1). At the path terminating office you would provision that expected J1 Path Trace from that STS-1 to be "Chicago North Branch Central Office". At the terminating end you would use the new input command OP:PTRC to verify they match. If they do not match the two offices or PTEs are not connected properly for that STS-1.

3.36 CCS PROTOCOL MONITOR

The CCS Protocol Monitor provides the capability to monitor the following protocols for both PSU and CNI platforms.

- ISUP - Craft are able to capture ISUP messages that pertain to a specific called or calling party number.
- TCAP - Craft are able to capture TCAP QRY messages that pertain to a particular transaction. Craft will also be able to capture UNIDIRECTIONAL messages that are global title routed. The messages captured will be based on the values set for input criteria called/calling party number, and one of the following: called party translation type and/or called/calling party subsystem number. The location of the called/calling party number that is matched will be based on the value of the layer parameter in the input request. The layer parameter can be set to SCCP (for inbound and outbound messages) or TCAP (for outbound messages only). When layer = SCCP, the called/calling party numbers are matched in the header of the TCAP message. When layer = TCAP, the called/calling party numbers will be matched in the TCAP data.

Three new input messages are used to implement the CCS Protocol Monitoring Capability.

- EXC:PMCCS - Used to initiate CCS protocol monitoring requests.
- OP:PMCCS - Used to retrieve information about active CCS protocol monitoring sessions.
- STP:PMCCS - Used to stop a currently active protocol monitoring session.

For additional information see the *Input Message Manual* .

4. MASTER CONTROL CENTER PAGE DISPLAYS INTRODUCTION TO MCC PAGES

4.1 INTRODUCTION TO MCC PAGES

4.1.1 GENERAL

This section provides detailed descriptions of the page displays of the 5ESS®-2000 switch master control center (MCC) video terminal.

The following information is provided for each page display covered in Section 5 (5E12), Section 6 (5E13) and Section 7 (5E14):

- (1) Statement of purpose.
- (2) General information about the display, including the chain of events in the hierarchy generated by off-normal conditions, if applicable.
- (3) Detailed descriptions of complex or unusual indicators.
- (4) Illustration of the display with an explanation of abbreviations used.
- (5) Maintenance menu commands available from the display, including any available options which are shown in brackets, such as [UCL] (unconditional).

4.1.2 DISPLAY PAGES NOT COVERED

Only the maintenance displays are covered in this document. The following page displays are either not covered in the following **sections** or not covered in this **manual**:

- **EMERGENCY ACTION PAGE:** Information on the emergency action interface (EAI) page can be found in Section 3.2.4 of this manual.
- **MCC page displays specifically for the Very Compact Digital Exchange (VCDX):** Information on VCDX-specific MCC pages can be found in 235-120-110, *Very Compact Digital Exchange (VCDX) Reference Guide*. The VCDX-specific MCC pages are identified in Table 4-1 .
- **1980, 1985, and 1989 - RETROFIT CONTROL LANGUAGE:** The 1980, 1985, and 1989 pages, Retrofit Control Language (RCL) provides a new craft interface with steps of the implementation stage being run primarily from the 1980, 1985, and 1989 MCC pages.

Refer to the following manuals for detailed description of the GENERIC RETROFIT page and procedures for its use:

- 235-106-101, *Software Release Retrofit Procedures*
- 235-106-201, *Software Release Update Procedures*
- 235-106-301, *Large Terminal Growth Procedures*.

- **160-168, 160,Z, 161,X, and 162,Z - TRUNK AND LINE MAINTENANCE:** Information on the TLWS, a subsystem of the MCC, can be found in Section 3.4 of this manual.
- **193 - VERIFY TEXT:** Information on the VFYTXT page can be found in 235-105-210, *Routine Operations and Maintenance Procedures*.

- **194 - SCREEN PROGRAM USER'S GUIDE:** Information on the Screen Program User's Guide can be found in Section 3.13 of this manual.
- **195 - GENERIC BACKUP:** Information on the GENBACKUP page can be found in 235-105-210, *Routine Operations and Maintenance Procedures*.
- **196 - ODD RC/V:** Information on office dependent data (ODD) can be found in 235-600-100, *Translations Data Manual*. Also, all recent change/verify (RC/V) views are described in 235-118-2XX (XX = manual number associated to the applicable software release), Recent Change Procedural Manuals. Refer to 235-000-000, Numerical Index - Division 235 and Associated Documents, for the complete list of RC/V manuals.
- **198 - SG RC/V and 199 - ECD RC/V:** Information on equipment configuration data/system generation (ECD/SG) RC/V can be found in 235-600-30X (X = manual number associated to the applicable software release), ECD/SG Data Base Manual. Refer to 235-000-000, Numerical Index - Division 235 and Associated Documents, for the complete list of ECD/SG manuals.

4.1.3 ORGANIZATION

Table 4-1, MCC Page Location Guide, can be used for locating information on specific MCC pages for specific 5E12 and later software releases. All MCC page displays included in this document are listed in the page location guide in numerical order by page poke number.

Table 4-1 MCC Page Location Guide

CONTROL/ DISPLAY PAGE NUMBER	CONTROL/DISPLAY PAGE TITLE	SOFTWARE RELEASE(S)	SECTION
SSA a	SUMMARY STATUS AREA	5E12 and Later	5.2
100 a	PAGE INDEX	5E12 and Later	5.3
105/106	BLDG/POWER AND ALARM CNTRLs	5E12 and Later	5.4
107	CIRCUIT LIMIT	5E12 and Later	5.5
109 a	OVERLOAD	5E12 and Later	5.6
110 a	SYSTEM INHIBITS	5E12 and Later	5.7
111/112 a	AM, AM PERIPHERALS	5E12 Only	5.8
113 a	OPERATIONS SYSTEMS LINKS	5E12 and Later	5.9
114 a	EQUIPPED SM STATUS SUMMARY	5E12 and Later	5.10
115	COMMUNICATION MODULE SUMMARY	5E12 and Later	5.11
116 a	MISCELLANEOUS	5E12 and Later	5.12
117	IOP AP DATA LINKS	5E12 and Later	5.13
118	CNI RING STATUS	5E12 and Later	5.14
119	MISCELLANEOUS ALARMS	5E12 and Later	5.15
120	MESSAGES	5E12 and Later	5.16
121/122	IOP 0 & 1, 2 & 3	5E12 and Later	5.17
123	DFC 0 & 1 STATUS	5E12 and Later	5.18
124	DCI/ASM Status	5E13 and Later	6.3
125	DFC 2 & 3 STATUS	5E12 and Later	5.19
126	DFC 0 & 1 PERFORMANCE	5E12 and Later	5.20
127	MTIB STATUS	5E12 and Later	5.21
128	DFC 2 & 3 PERFORMANCE	5E12 and Later	5.22
129	DSN NM EXCEPTION	5E12 and Later	5.23
130	NM EXCEPTION	5E12 and Later	5.24
131	CALL TRACE MENU	5E12 Only 5E13 and Later	5.25 6.4
132	CALL TRACE MENU CONT.	5E12 and Later	5.26
133-138 a	HARDWARE CALL TRACE	5E12 Only 5E13 and Later	5.27 6.5
139	ISDN PKT CALL TRACE	5E12 and Later	5.28

140 a	HARDWARE CALL TRACE	5E12 Only	5.29
		5E13 and Later	6.6
141-144 a	SM 1-192 STATUS SUMMARY	5E12 and Later	5.30
150	TRACEABLE CALL STATUS	5E12 and Later	5.31
151 a	CONFERENCE CIRCUIT TRACE	5E12 and Later	5.32
160-168 160, 160,Z, and 161,X 162,Z	TRUNK AND LINE MAINTENANCE	5E12 and Later	4.1.2 b
170	OVERLOAD DETAIL	5E12 and Later	5.33
178	AUTO SPARE DISK	5E12 and Later	5.34
179	DISK CONFIGURATION	5E12 and Later	5.35
180	DISK CONFIGURATION	5E12 and Later	5.36
181-184	OFF-LINE SM 1-192 STATUS	5E12 and Later	5.37
190	C/D UPDATE	5E12 and Later	5.38
191	OPERATING SYSTEM STATUS	5E12 and Later	5.39
193	VFYTEXT		4.1.2 b
194	SCREEN	5E12 and Later	4.1.2 b
195	GENBACKUP		4.1.2 b
196	ODD RCV		4.1.2 b
197	CUTOVER	5E12 and Later	5.40
198	SG RCV		4.1.2 b
199	ECD RCV		4.1.2 b
1000 a	SM PAGE INDEX	5E12 and 5E13 Only	5.41
		5E14 and Later	7.2
1001	REMOTE SM/PERPH PG IDX	5E12 and Later	5.42
1005	CM PAGE INDEX	5E12 and Later	5.43
1010,X a	SM X STATUS	5E12 and 5E13 Only	5.44
		5E14 and Later	7.3
101Y,X	SM X UNIT STATUS	5E12 and Later	5.45
1020,Y,X	SM X LU Y CONCENTRATOR	5E12 and Later	5.46
1030/1040,Y,X	SM X LU Y SG 0 & 1	5E12 and Later	5.47
1050/1060,Y,X	SM X TU Y SG 0 & 1	5E12 and Later	5.48
1070,Y,X	SM X DCTU Y	5E12 and Later	5.49
1080,Y,X	SM X LDSU/LDSF Y SG 0 & 1	5E12 and Later	5.50
1090,Y,X	RAF/SAS Y; SM X RAF/SAS Y	5E12 and Later	5.51
1100,Y,X	SM X GDSU Y SG 0 & 1	5E12 and Later	5.52
1110	ISTF	5E12 and Later	5.53
1115,Y,X	SM X GDSF Y	5E12 and Later	5.54
1120-1122,Y,X	SM X DLTU Y	5E12 Only	5.67
		5E13 and Later	6.7
1130/1140,Y,X	SM X MSU Y SG 0 & 1	5E12 and Later	5.56
1135/1145,Y,Z,X	MSU Y MAZ SM X SG 0/1	5E12 and Later	5.57
1150,Y,X	SM X DCLU Y	5E12 and Later	5.58
1160	MISC UNITS	5E12 and Later	5.59
1170	RCLK	5E12 and Later	5.60
118Y	PSU Y SHELF	5E12 and 5E13 Only	5.61
		5E14 and Later	7.4
1186	PSU NETWORK	5E12 and 5E13 Only	5.62
		5E14 and Later	7.5
1187 c	PSU LINKS	5E12 and Later	5.63
1190 a c	SM X MCTSI	5E12 and Later	5.64
1200	DLI/NLI SUMMARY	5E12 and Later	5.65
1201,Y,X	DLI/NLI/TMSLNK	5E12 Only	5.66
		5E13 and Later	6.8
1204	SM X MELNK STATUS	5E12 Only	5.67
		5E13 and Later	6.9
1209 c	ONTC 0 & 1	5E12 and Later	5.68
1210 c	MI/NC 0 & 1	5E12 and Later	5.69
1211	NETWORK CLOCK	5E12 and Later	5.70
1220 c	TMS 0 & 1 SUMMARY	5E12 and Later	5.71
1221-1228/ 1231-1238	TMS LINKS	5E12 and Later	5.72
1240/1250 c	MSGs 0 & 1 SUMMARY	5E12 and Later	5.73
1241/1251	MSGs 0 & 1 COMMUNITIES	5E12 and Later	5.74

1242-1243/ 1252-1253	MSGs 0 & 1 COMMUNITIES	5E12 and Later	5.75
1260	CLNK SUMMARY	5E12 and Later	5.76
1261-1264	LOGICAL LINK MAP 1 - 4	5E12 and Later	5.77
1271-1274 a	SM 1-192 CM REX SUMMARY	5E12 and Later	5.78
1280	SM X REX STATUS	5E12 and Later	5.79
1290	CM REX STATUS	5E12 and Later	5.80
1310,Y,Z,X	SM X DCLU Y RT Z	5E12 and Later	5.81
1320	AIU/EIU SUMMARY DISPLAY	5E12 and Later	5.82
1321	TIME SLOT GROUP (TSGRP) STATUS	5E12 Only 5E13 and Later	5.83 6.10
1322	RING GENERATOR (RG) STATUS	5E12 and Later	5.84
1323	APPLICATION PACK (AP) STATUS	5E12 and Later	5.85
1380/1381	QLPS NETWORK 0 AND 1 STATUS	5E12 and Later	5.86
1400 a	SM X BLDG/PWR ALARMS	5E12 and Later	5.87
1420,SZ	SITE Z RAS ALARMS	5E12 and Later	5.88
1450,Y,X	SM X RISLU DLTU Y	5E12 and Later	5.89
1460	SM X DATA LINK DSLS	5E12 and Later	5.90
147Z,Y,X	SM X DATA LINKS	5E12 and Later	5.91
1480/1481	AP DATA LINK DSLS	5E12 and Later	5.92
1510,Y,X	SM X DNUS Y	5E12 Only 5E13 and Later	5.93 6.11
1511,Y,Z,X	SM X DNUS Y STS Z	5E12 Only 5E13 and Later	5.94 6.12
1512,Y,Z,X	SM X DNUS Y STS Z	5E12 Only 5E13 and Later	5.95 6.13
1520	RING NODE STATUS	5E12 and Later	5.96
1521	SIGNALING LINK SUMMARY GROUP XX	5E12 and Later	5.97
1522,XX,Y	SIGNALING LINK GROUP XX-Y	5E12 and Later	5.98
1523	LOCAL SUBSYSTEM STATUS	5E12 and Later	5.99
1530,X	CCS MESSAGE DELIVERY STATUS	5E12 and 5E13	5.100
1532,X	CCS LINK SET SUMMARY	5E12 and 5E13 Only 5E14 and Later	5.101 7.6
1533,Y,X	CCS LINK SET MEMBERS	5E12 Only 5E13 Only 5E14 and Later	5.102 6.14 7.7
1540,X	GSM CMT STATUS	5E14 and Later	7.8
1541,X	NGSM CMT STATUS	5E14 and Later	7.9
1600,SZ	SITE Z STATUS	5E12 and Later	5.103
1605,X	SM X HSM-RSM SITE INDEX	5E12 and Later	5.104
1610	REMOTE SITE INDEX	5E12 and Later	5.105
1611,X	REMOTE PERIPHERAL SITE SUMMARY	5E12 and Later	5.106
1615	ORM/TRM SITE INDEX	5E12 and Later	5.107
1620,SZ	REMOTE PERPH SITE Z STATUS	5E12 and Later	5.108
1630	REMOTE PERPH SITE INDEX	5E12 and Later	5.109
1640,SZ	REMOTE PERPH SITE MISC ALARMS	5E12 and Later	5.110
1660,YYYY,X	SM X SID YYYY	5E12 Only 5E13 and Later	5.111 6.15
1700,Y,X	SM X ISLU/RISLU Y NETWORK	5E12 and Later	5.112
1710,Y,X	SM X ISLU Y SG 0 AND 1	5E12 and Later	5.113
1720,Y,Z,X	SM X ISLU Y LG Z	5E12 and Later	5.114
1730,Y,Z,X	SM X ISLU Y LG Z	5E12 and Later	5.115
1740/1741,XXX,YYY	REMOTE SM X HOST SM Y	5E13 and Later	6.16
1800 c	SM X INH & RCVRY CNTL	5E12 and Later	5.116
1850 c	CMP 0 PRIMARY INHIBIT AND RECOVERY CONTROL	5E12 and Later	5.117
1851	CMP 0 MATE INHIBIT AND RECOVERY CONTROL	5E12 and Later	5.118
1860,Y,X	SM X IDCU Y CIRCUIT	5E12 and Later	5.119
1870,Y,X	SM X IDCU Y FACILITY	5E12 and Later	5.120
1880,Y,Z,X	SM X IDCU Y RT Z	5E12 and Later	5.121
1900	CLNK STATUS & CONTROL	5E12 and Later	5.122
1940	EASY BWM INSTALLATION	5E12 and Later	5.123
1941	BWM AUTOMATION SCHEDULING	5E12 and Later	5.124
1942	BWM AUTOMATION OFFICE PROFILE	5E12 and Later	5.125
1943	BWM AUTOMATION HEALTH CHECK	5E12 and Later	5.126
1950 c	PROGRAM UPDATE MAINTENANCE	5E12 and Later	5.127
1960	BWM INSTALLATION	5E12 and Later	5.128
1980	PROCEDURE SUMMARY	5E12 and Later	4.1.2 b

1985	PROCEDURE STATUS	5E12 and Later	4.1.2 b
1989	PROCEDURE OPTIONS	5E12 and Later	4.1.2 b
1999	SWITCH STATE DEFINITIONS	5E12 and Later	5.129
Notes: a. This page is also used with the Very Compact Digital Exchange (VCDX). Refer to 235-120-110, <i>Very Compact Digital Exchange (VCDX) Reference Guide</i> for information on the VCDX-specific version. b. This page is either not covered in Section 4 or not covered in this manual. Section 4.1.2 gives documentation references. c. This page supports Enhanced Confirmation Prompts. See Section 4.1.6 for details.			

4.1.4 DISPLAY DESIGN CONCEPTS

General

The following describes several sections that comprise each MCC page display.

Office Data (Line 1)

The top line contains the office name and type (from the equipment configuration data base), the software release and issue, terminal ID, the current date, and a 24-hour clock. This information is present on all MCC displays.

Summary Status Area (Lines 2 and 3)

Lines 2 and 3 contain the SUMMARY STATUS indicators, which are present on all MCC displays. These indicators provide summary status of hardware units and software actions in the system.

The first indicator, **SYS EMER** (system emergency), flashes when the AM loses sanity. The craft should use the **EAI** (emergency action interface) display if this occurs, which is obtained by depressing the **EA DISP** function key on the auxiliary keypad of the MCC.

The next three indicators, **CRITICAL**, **MAJOR**, and **MINOR**, are used to show the level of an alarm. When an alarm occurs, the indicator for the alarm (for example, **BLDG/PWR**) starts flashing. At the same time, the alarm level indicator backlights to show the level, but does not flash. When an alarm is retired, the alarm-level indicator returns to normal video; the alarm indicator stops flashing, but still remains backlit.

The eighth indicator, **SYS NORM** (system normal), is backlit when there are no off-normal conditions in the system.

There is a direct correlation between the other indicators and the associated display page number. For example, the associated page display for the 10th indicator, **SYS INH** (system inhibits), is **110 - SYSTEM INHIBITS**. Information on the other indicators is provided in the descriptions of the associated page displays.

Command and Page Identifier

The fourth line has five sections. When the MCC is in the command mode, **CMD** appears at the left-hand margin and the cursor is positioned immediately after it for command input. Following the command input area is an acknowledgment area. The acknowledgments that appear here only show whether the input command is valid. The next area is used to give execution status of the request. The last area on this line contains the page number and title; if not, enter **100** for page index.

Display Region

Lines 5 through 22 usually contain the text and graphics for the display. There are exceptions to this rule. For example, displaying **120 - MESSAGES** page allows input and output messages to scroll into this region.

Maintenance and paging commands, if any, are usually along the left-hand margin. On a few displays, they are across the top because of space restrictions. The first digit of the maintenance commands implies the action to be taken, as follows:

First Digit of Command	Type of Action
1	Display a page
2	Remove a unit from service
3	Restore a unit to service
4	Switch units or set software control
5	Diagnose a unit or clear software control
6	Inhibit software control
7	Allow software control
8	Control/display commands
9	Output or initialization control

Input/Output Message Region

Line 23 to the bottom of the screen is a normal input/output message region. Input messages are entered from the bottom line. Input and output messages scroll up from the bottom line of this region.

An example of the MCC page display design is shown in Figure 4-1 .

OFFICE NAME	TYPE	GENERIC & ISSUE		(EAI SANITY)		DATE & 24-HOUR CLOCK	
SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: INPUT ACK		HM ACK		PAGE NUMBER & TITLE			
DISPLAY REGION							
INPUT/OUTPUT MESSAGE SCROLLING REGION							
INPUT MESSAGE LINE							

Figure 4-1 Master Control Center Page Display Design

Abbreviations:

ACK	Acknowledgment	HM	Human Machine
AM	Administrative Module	MISC	Miscellaneous
AM PERPH	AM Peripherals	OS LINKS	Operating System Links
BLDG/PWR	Building/Power	SM	Switching Module/
BLDG INH	Building Inhibits		Switching Module-2000

CKT LIM Circuit Limit
 CM Communication Module
 CMD Command

SYS EMER System Emergency
 SYS INH System Inhibit
 SYS NORM System Normal

4.1.5 MCC VIDEO DISPLAY OF SWITCH STATES

A 5ESS®-2000 switch office can be supplied with an MCC video terminal that has a black and white display or an optional 5-color (plus black and white) display. The most commonly used states in the 5ESS®-2000 switch and their video characteristics are listed in Table 4-2.

Black and White Terminals

On black and white terminals, the general guidelines used in selecting the states are as follows:

- **White on black:** Normal conditions (for example, active or unequipped)
- **Black on white (reverse video):** Off-normal conditions and acknowledged alarms (for example, out of service or unavailable)
- **Flashing black on white:** Unacknowledged alarms and severe off-normal conditions (for example, critical major and minor alarms in the summary status area, a fire alarm or isolated SM/SM-2000).

Color Terminals

For color terminals, the guidelines used are as follows:

- **White on black:** Normal conditions (for summary or informational indicators)
- **Green background:** Used for active or predominately active units
- **Cyan background:** Off-normal unalarmed conditions (for summary indicators)
- **White background:** Minor acknowledged alarms, low-severity off-normal conditions, and standby units
- **Yellow background:** Major acknowledged alarms and medium-severity off-normal conditions
- **Red background:** Critical acknowledged alarms and high-severity off-normal conditions
- **Flashing:** Unacknowledged alarms and extremely severe off-normal conditions.

Table 4-2 MCC Video Terminal Display of Switch States

STATE	TEXT DISPLAYED	COLOR TERMINAL	BLACK AND WHITE TERMINAL
Critical Alarm	none	Steady or flashing white on red	Steady or flashing black on white
Deferred	DEFR	Steady yellow on red	Steady black on white
Major Alarm	none	Steady or flashing red on yellow	Steady or flashing black on white
Minor Alarm	none	Steady or flashing black on white	Steady or flashing black on white
Active	ACT	Steady black on green	Steady white on black
Active Forced	ACTF	Steady	Steady

		red on green	white on black
Degrade	DGR	Steady	Steady
Degrade Forced	DGRF	red on green	black on white
		Steady	Steady
Growth	GROW	red on green	white on black
		Steady	Steady
Idle	IDLE	black on cyan	white on black
		Steady	Steady
Inhibit	INH	black on white	black on white
		Steady	Steady
Initialization	INIT	blue on yellow	black on white
		Steady	Steady
Limited	LMTD	black on yellow	white on black
		Steady	Steady
Normal (default)	none	red on white	white on black
		Steady	Steady
Out of Service	OOS	white on black	white on black
		Steady	Steady
Out-of-Service Power	OOSP	white on red	black on white
		Steady	Steady
Out-of-Service Transient	OOST	white on red	black on white
		Steady	Steady
Out-of-Service Family	OOSF	blue on white	white on black
		Steady	Steady
Special Growth	SGRO	red on white	white on black
		Steady	Steady
Standby	STBY	black on cyan	white on black
		Steady	Steady
Test	TEST	black on white	white on black
		Steady	Steady
Trouble	none	blue on white	white on black
		Steady	Steady
Unavailable	UNV	white on red	black on white
		Steady	Steady
Unavailable Power	UNVP	red on yellow	black on white
		Steady	Steady
Unavailable Transient	UNVT	red on yellow	black on white
		Steady	Steady
Unequipped	UNEQ	blue on yellow	black on white
		Steady	Steady
Updated	UPD	white on black	white on black
		Steady	Steady
Customer Denied	CDNY	black on white	white on black
		Steady	Steady
Camp On	CAMP	red on yellow	black on white
		Steady	Steady
		red on green	white on black

4.1.6 ENHANCED CONFIRMATION PROMPTS

Certain MCC pages have action pokes with confirmation prompts. A confirmation prompt asks the user to reaffirm their intention to execute a poke with a "Y" or "N" answer (e.g., "FORCE 0? (Y/N)"). These confirmation prompts are system-defined and cannot be modified by the user.

All of the pokes with confirmation prompts also support enhanced confirmation prompts. An enhanced confirmation prompt is user-definable, and allows the user to provide additional information to the maintenance technician before they reply to the system-defined confirmation prompt. This additional information will appear in a page which will overlay and blank out the current display page (with the exception of the page title) until the technician responds to the prompt or enters another poke request. This page can have up to three lines of user-definable text. The technician will still have to respond to the system-defined confirmation prompt as they currently do; the purpose of the enhanced confirmation prompt page is to provide more information about possible consequences that their impending action may have on the switch.

The user will be able to add an enhanced confirmation prompt to all confirmation prompts except those on the Emergency Action Interface (EAI) page. If the user chooses not to add an enhanced confirmation prompt to a particular confirmation prompt, only the system-defined confirmation prompt will be used. An enhanced

confirmation prompt cannot be assigned where there is not already a system-defined confirmation prompt.

When a poke with an enhanced confirmation prompt is entered, the underlying page is blanked out, the page for the enhanced confirmation prompt is displayed, and the system-defined confirmation prompt is displayed in its usual position. When the technician responds to the confirmation prompt with a "Y" or "N", or enters another poke request, the enhanced confirmation prompt page will disappear and the underlying page will be redrawn (if "Y" or "N" response) or new page will be drawn (if new poke request).

The SET:CONFIRM input message is used to assign or update an enhanced confirmation prompt. The OP:CONFIRM input message is used to display the status and text of an enhanced confirmation prompt. See 235-600-700, *5ESS® Switch Input Messages*, and 235-600-750, *5ESS® Switch Output Messages*, for details about SET:CONFIRM and OP:CONFIRM. Enhanced Confirmation Prompts are available.

5. MASTER CONTROL CENTER PAGE DISPLAYS 5E12 SOFTWARE RELEASE

5.1 GENERAL

This subsection contains descriptions and examples of the master control center (MCC) page displays that were added with or changed with the 5E12 software release.

Information in this subsection which applies **only** to the SM or **only** to the SM-2000 is identified. Please assume that all other references to the SM also apply to the SM-2000.

The new SM-2000 name has not been carried forward into all 5E12 software influenced items such as MCC screens, input and output messages, Recent Change/Verify screens, etc. Unless indicated otherwise in associated text, please assume that all references to the SM in these areas also apply to the SM-2000.

Refer to Table 4-1 for a complete listing of MCC page displays.

5.2 SUMMARY STATUS AREA (SSA) [5E12 and Later]

5.2.1 Purpose

The purpose of the SSA page is to provide the summary status of hardware units and software actions in the system.

5.2.2 General

The first indicator, system emergency (SYS EMER), flashes when the AM loses sanity or when the system initializes. Under either of these conditions, the craft should use the Emergency Action Interface (EAI) display. The Emergency Action Interface can be accessed by depressing the EA DISP function key on the auxiliary keypad of the master control center (MCC).

The next three indicators, CRITICAL, MAJOR, and MINOR are used to show the level of an alarm. When an alarm occurs, the indicator for the alarm (for example, BLDG/PWR) starts flashing. At the same time, CRITICAL, MAJOR, or MINOR backlight to show the level, but these indicators do not flash. When an alarm is retired, the CRITICAL, MAJOR, or MINOR indicators return to normal video; the alarm indicator stops flashing but is still backlit in the color of the alarm level. When the appropriate MCC page is displayed (for example, 105 for BLDG/PWR), the alarm indicator backlights in cyan.

The fifth and sixth indicators, BLDG/PWR and BLDG INH are driven by the combined Page 105/106 (see Figure 5-3). Notice the direct correlation between the indicator position and the associated display page number.

For CKT LIM, see MCC Page 107 - CIRCUIT LIMIT (Figures 5-4 and 5-5).

The system normal (SYS NORM) indicator is backlit when there are no off-normal conditions in the system.

For Overload, see MCC Page 109 - Overload (Figure 5-6).

For SYS INH, see MCC Page 110 - System Inhibit (Figure 5-7).

For AM and AM PERPH, see MCC Page 111/112 - AM, AM Peripherals (Figures 5-8 and 5-9).

For OS Links, see MCC Page 113 - Operations Systems Links (Figure 5-10).

For SM, see MCC Page 114 - Equipped SM Status Summary (Figure 5-11).

For CM, see MCC Page 115 - CM Summary (Figures 5-12 and 5-13).

For MISC, see MCC Page 116 - Miscellaneous (Figure 5-15).

Figure 5-1 shows the SUMMARY STATUS AREA. These system indicators are presented on all MCC displays. In this example, there are no off-normal conditions, which is shown by the SYS NORM indicator.

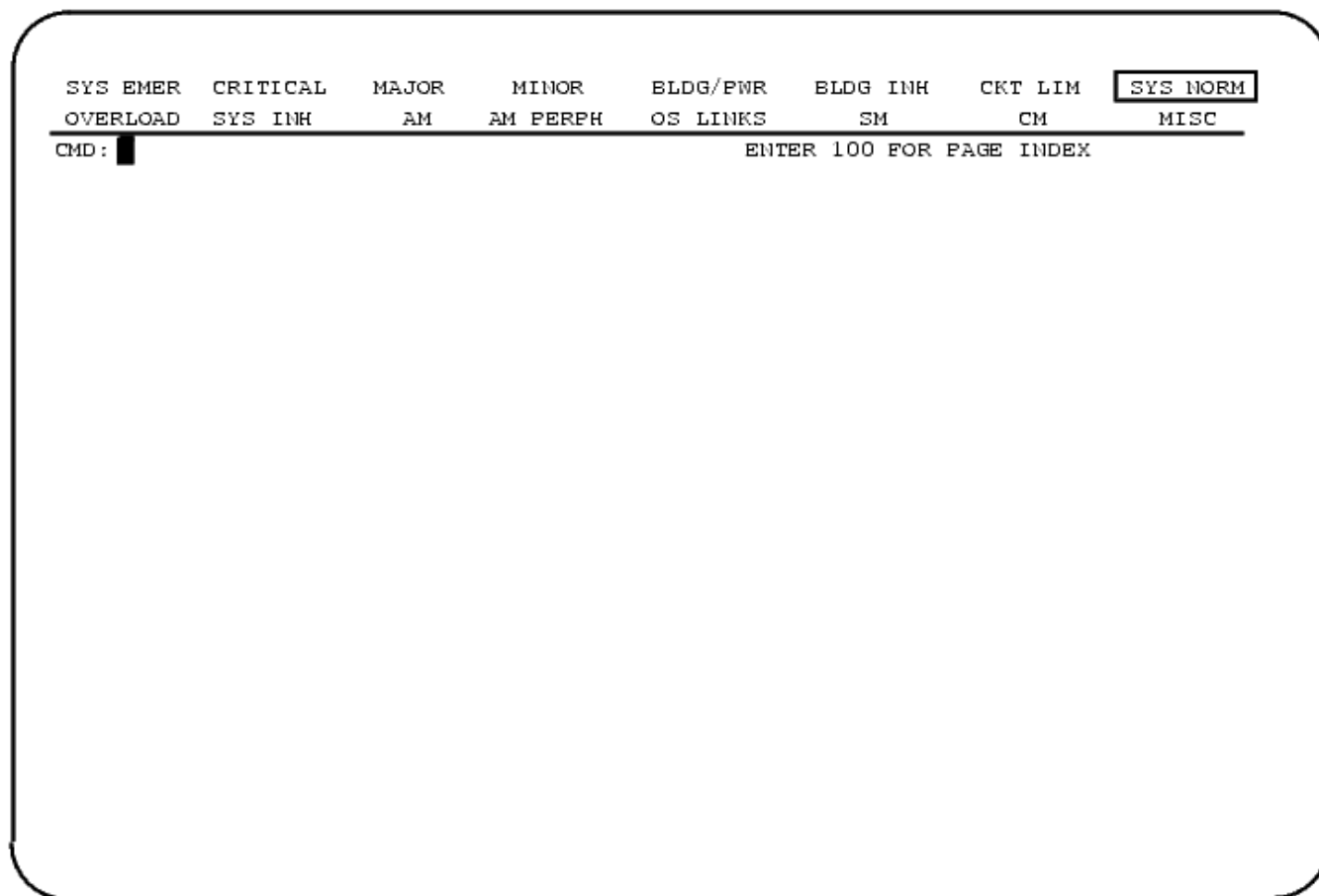


Figure 5-1 Summary Status Area [5E12 and Later]

Abbreviations:

AM	Administrative Module	MISC	Miscellaneous
AM PERPH	AM Peripherals	OS LINKS	Operations Systems Links
BLDG/PWR	Building/Power	SM	Switching Module
BLDG INH	Building Inhibit	SYS EMER	System Emergency
CKT LIM	Circuit Limit	SYS INH	System Inhibit
CM	Communication Module	SYS NORM	System Normal
CMD	Command		

5.3 100 - PAGE INDEX (5E12 and Later)

5.3.1 Purpose

The purpose of the 100 page index is to provide an index of main system pages.

5.3.2 General

This index is a listing of primary maintenance displays and is also an entry point into other subsystem displays, such as trunk and line maintenance, equipment configuration data (ECD), and office dependent data recent change and

verify (ODD RC/V).

The per-switching module (SM) pages and communication module (CM) pages are not shown on this display. The SMs have their own index (1000 - SM PAGE INDEX), and the CM has its own index (1001 - CM PAGE INDEX).

There is a direct correlation between the page numbers of Pages 105 through 116 (except 108) and the physical position of the status summary indicators in the SUMMARY STATUS AREA. For example, the fifth status summary indicator in the SUMMARY STATUS AREA (from left to right) is BLDG/PWR. Its associated display is 105 - BLDG/PWR & ALARM CONTROLS. Some of the status summary indicators do not have an associated display page. This is a built-in trouble-locating shortcut. The page number for an alarm can be derived from the alarmed indicator's position without going to this display, although this display is always available.

Information on ODD can be found in 235-600-105, *Translations Data Manual*. Also, all RC/V views are described in 235-118-2XX (XX = manual number associated to the applicable software release), *Recent Change Procedural Manuals*. Refer to 235-000-000, Numerical Index - Division 235 and Associated Documents, for the complete list of RC/V manuals.

Information on equipment configuration data/system generation (ECD/SG) RC/V can be found in 235-600-30X (X = manual number associated to the applicable software release), *ECD/SG Data Base Manual*. Refer to 235-000-000, Numerical Index - Division 235 and Associated Documents, for the complete list of ECD/SG manuals.

Some pages appearing in the 100 page index are assigned a command group which is used to control access to the pages. This is part of "authority management" which is described in detail in 235-105-210, *Routine Operations and Maintenance Procedures*. The command group name for affected pages is shown in Section 5.3.3, following.

Figure 5-2 shows an example of the 100 page index.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

100 - PAGE INDEX

USE EA DISP FUNCTION KEY TO DISPLAY EAI PAGE

105-106 BLDG/PWR & ALARM CNTLS	125 DFC 2 & 3 STATUS	197 CUTOVER
107 CIRCUIT LIMIT	126 DFC 0 & 1 PERF	198 SG RCV
109 OVERLOAD	127 MTIB STATUS	199 ECD RCV
110 SYSTEM INHIBITS	128 DFC 2 & 3 PERF	1000 SM PAGE INDEX
111-112 AM, AM PERIPHERALS	129 DSN NM EXCEPTION	1001 CM PAGE INDEX
113 OS LINKS	130 NM EXCEPTION	1271 REX SUMMARY
114 EQUIPPED SM STATUS SUMMARY	131 HARDWARE CALL TRACE	1940 EASY BWM INST
115 CM SUMMARY	160 TRUNK & LINE MAINT	1941 BWM AUTOMATION
116 MISCELLANEOUS	178 AUTO SPARE DISK	1950 PROG UPD MAINT
117 IOP AP DATA LINKS	179-180 DISK CONFIG	1960 INSTALL BWM
119 MISC ALARMS	181-184 OFL SM STATUS	1980 RCL PROC
120 MESSAGES	190 C/D UPDATE	1999 STATE DEFINITIONS
121 IOP 0 & 1	191 OS STATUS PAGE	
122 IOP 2 & 3	193 VFYTXT	
123 DFC 0 & 1 STATUS	194 SCREEN	
124 GENERIC RETROFIT	195 GENBACKUP	
	196 ODD RCV	

Figure 5-2 100 - Page Index (5E12 and Later)

Abbreviations:

AM	Administrative Module	MAINT	Maintenance
AP	Application Processor	MISC	Miscellaneous
AUTO	Automatic	MTIB	Metallic Test Interface Bus
BLDG/PWR	Building Power	NM	Network Management
BWM	Broadcast Warning Message	ODD	Office Dependent Data
CCS	Common Channel Signaling	OFL	Off-line
C/D	Control/Display	OS	Operations Systems
CM	Communication Module	PERF	Performance
CNI	Common Network Interface	PROC	Procedure
CNTLS	Controls	PROG	Program
CONFIG	Configuration	RCL	Retrofit Control Language
DFC	Disk File Controller	RCV	Recent Change and Verify
DSN	Defense Services Network	REX	Routine Exercise
ECD	Equipment Configuration Data	SG	System Generation
GENBACKUP	Generic Backup	SM	Switching Module
INST	Installation	UPD	Update
IOP	Input/Output Processor	VFYTXT	Verify Text

5.3.3 Commands

The commands on this page can be entered from any display page, under normal operation. Also, any available CM display can be accessed. See 1001 - CM PAGE INDEX (Figure 5-61) for details.

The command group name, if applicable, is shown in parentheses at the end of the description (RESULT) of each command. Command group descriptions can be found in 235-600-700, *Input Messages Manual*, Command Group Index.

CMD	RESULT
100	PAGE INDEX is displayed.
105/106	BUILDING/POWER AND ALARM CONTROLS page is displayed.
107	CIRCUIT LIMIT page is displayed.
109	OVERLOAD page is displayed.
110	SYSTEM INHIBITS page is displayed.
111/112	AM, AM PERIPHERALS page is displayed.
113	OPERATIONS SYSTEMS LINKS page is displayed.
114	EQUIPPED SM STATUS SUMMARY page is displayed.
115	COMMUNICATION MODULE SUMMARY page is displayed.
116	MISCELLANEOUS page is displayed.
117	IOP APPLICATION PROCESSOR DATA LINKS page is displayed.
119	MISCELLANEOUS ALARMS page is displayed.
120	MESSAGES page is displayed.
121	IOP 0 & 1 page is displayed.
122	IOP 2 & 3 page is displayed.
123	DFC 0 & 1 STATUS page is displayed.
124	GENERIC (SOFTWARE RELEASE) RETROFIT page is displayed.
125	DFC 2 & 3 STATUS page is displayed.
126	DFC 0 & 1 PERFORMANCE page is displayed.
127	MTIB STATUS page is displayed.
128	DFC 2 & 3 PERFORMANCE page is displayed.
129	DEFENSE SERVICES NETWORK NM EXCEPTION page is displayed.
130	NM EXCEPTION page is displayed.
131	HARDWARE CALL TRACE page is displayed.
160	TRUNK AND LINE MAINTENANCE INDEX is displayed.
178	AUTO SPARE DISK page is displayed.
179	DISK CONFIGURATION page is displayed.
180	DISK CONFIGURATION page is displayed.
181	OFFLINE SM 1-48 STATUS SUMMARY page is displayed.
182	OFFLINE SM 49-96 STATUS SUMMARY page is displayed.
183	OFFLINE SM 97-144 STATUS SUMMARY page is displayed.
184	OFFLINE SM 145-192 STATUS SUMMARY page is displayed.
190	C/D UPDATE page is displayed.
191	OS STATUS page is displayed.
193	VERIFY TEXT page is displayed (FHADM).
194	SCREEN page is displayed (SPECRCV).
195	GENBACKUP page is displayed (FHADM).
196	ODD RC/V is started. NOT FOR USE FROM SCC (RCV).
197	CUTOVER page is displayed.
198	SG RC/V is started. NOT FOR USE FROM SCC (SPECRCV).
199	ECD RC/V is started. NOT FOR USE FROM SCC (SPECRCV).
1000	SM PAGE INDEX page is displayed.
1001	CM PAGE INDEX page is displayed.
1271	REX SUMMARY page is displayed.
1940	EASY BWM INSTALLATION page is displayed.
1941	BWM AUTOMATION page is displayed.
1950	PROGRAM UPDATE MAINTENANCE page is displayed.
1960	INSTALL BWM page is displayed.
1980	PROCEDURE SUMMARY page is displayed.
1999	STATE DEFINITIONS page is displayed.

5.4 105/106 BUILDING/POWER AND ALARM CONTROLS [5E12 and Later]

5.4.1 Purpose

The purpose of the 105/106 display page is to summarize building/power alarm status and assignment, to provide inhibit/allow controls for building alarms, and to provide controls for alarm retire mode.

5.4.2 General

Building Alarms 02-27 are office assignable. Doors, windows, humidity, etc., are typical types of applications. The alarm level, text, and repeatability status in these indicators are initially filled in using a TTY input message [CHG:ALM,BPSC=building alarm number (2 through 27), TAG=text to be filled in, LVL=CR, MJ, MN, or IF, REPEAT=Y or N]. Once these indicators are filled in, they are protected from loss if the system is booted.

When an alarm indicator is normal, it is displayed in normal video (white on black).

When an alarm condition is present and it is not inhibited, the respective display indicator backlights, except for the FIRE indicator. The FIRE indicator flashes in addition to being backlighted. In the SUMMARY STATUS AREA, the associated alarm level (CRITICAL, MAJOR, or MINOR) backlights, and BLDG/PWR starts flashing. Also, an audible alarm is sounded.

When an alarm is inhibited, the respective indicator displays ``INH" and is backlighted; BLDG INH in the SUMMARY STATUS AREA also backlights.

If any of the alarms 02-27 is activated when it is marked as repeating (``+" shown next to the alarm level), it will repeat every fifteen minutes until the stimulus for the alarm is cleared or the alarm is inhibited.

The 105/106 Page is accessed by either 105 which maps to the fifth critical indicator (BLDG/PWR) of the SUMMARY STATUS AREA, or 106 which maps to the sixth critical indicator (BLDG INH).

Building alarms 02-27 are the only alarms on this page which can be inhibited by the craft. Any other inhibit present would be the result of a system inhibit.

The indicator near the top right-hand portion of the display shows the retire mode (MANUAL or AUTOMATIC). Manual mode requires craft action (depressing the ALM/RLS key on the MCC or using the **CLR:ALARMS** input message) to stop CRITICAL, MAJOR, and MINOR alarms from flashing and to shut off the audible alarms. Automatic mode shuts off the CRITICAL and MAJOR audible alarms after eight seconds. The MINOR audible alarm always shuts off after eight seconds.

Figure 5-3 is an example of the 105/106 display page which shows off-normal building and power conditions. The indicator PDF FUSE shows a system inhibit, indicator 05 shows a major alarm caused by a failure in the air-conditioning system, indicator 06 shows a repeating alarm, and indicator 09 shows the door is inhibited from triggering a building alarm. The office is in the automatic retire mode, as shown in the top right-hand area of the display.

SYS EMER		CRITICAL		MAJOR		MINOR		BLDG/PWR		BLDG INH		CKT LIM		SYS NORM	
OVERLOAD		SYS INH		AM		AM PERPH		OS LINKS		SM		CM		MISC	
CMD: 105/106 - BLDG/POWER & ALARM CNTRLs															
6XX INHIBIT ALARM XX (XX=02 TO 27)								800 AUTO ALARM RETIRE				RETIRE MODE			
7XX ALLOW ALARM XX (XX=02 TO 27)								801 MANUAL ALARM RETIRE				AUTOMATIC			
POWER ALARMS															
COM PWR		HIGH VLTG		STBY PLNT		RECT FAIL		PDF FUSE INH		BAT DSCHG		ALM BAT		MISC PWR	
BUILDING ALARMS (+ = REPEATING FOR 02 TO 27)															
00 CR FIRE		01 MJ FIRE ALARM TROUBLE		02 MJ HI TEMP		03 MJ LO TEMP		04 MJ AIR DRYER		05 MJ AIR COND		06 +MJ LOW VOLT2			
07 MJ LO HUMID		08 MJ HI HUMID		09 INH MJ DOOR		10 MJ WINDOWS		11 MJ CARRIER		12 MJ		13 MJ			
14 MJ		15 MJ		16 MJ		17 MJ		18 MJ		19 MJ		20 MJ			
21 MJ		22 MJ		23 MJ		24 MJ		25 MJ		26 MJ		27 MJ			

Figure 5-3 105/106 - Building/Power and Alarm Controls [5E12 and Later]

Abbreviations:

AIR COND	Air Conditioning	MISC PWR	Miscellaneous Power
ALM BAT	Alarm Battery	MJ	Major
AUTO	Automatic	MN	Minor
BAT DSCHG	Battery Discharge	PDF	Power Distribution Frame
COM PWR	Commercial Power	RECT FAIL	Rectifier Failure
CR	Critical	STBY PLNT	Standby Plant
HI	High	TEMP	Temperature
HUMID	Humidity	VLTG	Voltage
INH	Inhibited	VOLT	Voltage
LO	Low		

5.4.3 Commands

Commands are provided to select retire mode and to inhibit/allow building alarms 02-27. Also, all available pages can be accessed from the 105/106 display page.

CMD	RESULT
6XX	Building Alarm XX is inhibited (INH:ALM,BPSC=XX)
7XX	Building Alarm XX is allowed (ALW:ALM,BPSC=XX)
800	Automatic Alarm Retire Mode is enabled (SET:ALMMDE=AUTO)
801	Manual Alarm Retire Mode is enabled (SET:ALMMDE=MAN)

5.5 107 - CIRCUIT LIMIT [5E12 and Later]

5.5.1 Purpose

The 107 display page provides a listing of trunk groups that have reached or exceeded their automatic maintenance limit (AML). The AML for each trunk group is set through Recent Change View 5.1.

5.5.2 General

Two counts are maintained by the 5ESS®-2000 switch for each trunk group in an office. These counts are as follows:

- **TG OOS:** Total number of out-of-service (OOS) members (individual trunks)
- **AML OOS:** Total number of OOS members (individual trunks) having OOS status due to AML reasons.

If a trunk group's AML OOS count has reached its automatic maintenance limit, its TG OOS count has also reached its automatic maintenance limit, but not vice versa.

When a trunk group's AML is reached or exceeded by either count, the trunk group number will be shown on the display. In the SUMMARY STATUS AREA, the CKT LIM indicator will be backlighted and flashing. The associated alarm level (CRITICAL, MAJOR, or MINOR) will also be backlighted, as applicable.

The 107 page display lists in numerical order the number(s) of the first 40 trunk groups that have reached or exceeded their AML. When more than 40 trunk groups have reached or exceeded their AML, the word ``EXCESSIVE" will be backlighted at the bottom of the listing. No trunk group numbers are shown on the page display if all trunk groups are normal.

NOTE: A trunk group with its AML set to zero will not be included on the page display until this limit is actually exceeded (that is, at least one member has to be OOS for a trunk group to be included on the display).

The PRI STATUS box is pertinent only if the office is equipped with PRIs. If the office has no PRIs, the PRI STATUS box will always indicate not applicable (NA) (see Figure 5-4). If the office has PRIs provisioned and all D-channels are in service (IS), the PRI STATUS box shows NORMAL. If any of the equipped PRI D-channels are OOS for any reason, the PRI STATUS box shows DCH OOS and is backlighted (white on red), and the CKT LIM indicator is backlighted and flashing.

The DCH OOS indicator is caused either by fault recovery actions of the switch or by craft action (RMV:TRK command). If it is caused by fault recovery, the associated alarm level (CRITICAL or MAJOR) will backlight. If it is caused by craft using the RMV:TRK command, there will be NO associated alarms.

Figure 5-4 is an example of the 107 display page for an office not equipped with PRIs. In this example, an excessive amount of trunk groups (more than 40) are OOS as reflected by the backlighted indicator ``EXCESSIVE". The PRI STATUS box shows NA which indicates that the office has no PRIs. A MAJOR alarm condition is shown, and CKT LIM is backlighted.

```

SYS EMER  CRITICAL  MAJOR  MINOR  BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH   AM    AM PERPH  OS LINKS   SM        CM      MISC
CMD:
----- 107 - CIRCUIT LIMIT

OUTPUT
900 OP:AML
901 OP:TGCNT
902 OP:OFFNORM,PRIGRP
PRI STATUS
NA

```

TRUNK GROUPS			
1 -	85	314 -	678
5	86	325 -	683
12	87	356 -	822
34 -	88	368 -	843
44 -	93	388 -	970
45	156 -	478 -	987 -
56	187 -	499 -	999
77	199	500	1234 -
82	233	528	1467
83 -	234	567 -	1587 -

```

EXCESSIVE +

- MAINTENANCE LIMIT EXCEEDED DUE TO AML STATUS
+ MORE THAN 40 TRUNK GROUPS -- ENTER 900 AND 901 FOR COMPLETE LIST

```

Figure 5-4 107 - Circuit Limit (PRI Unequipped Version) [5E12 and Later]

Abbreviations:

AML	Automatic Maintenance Limit	PRI	Primary Rate Interface
NA	Not Applicable	PRIGRP	PRI Group
OFFNORM	Off Normal	TGCNT	Trunk Group Count
OP	Output		

Figure 5-5 is an example of the 107 display page for an office equipped with PRIs. In this example, an excessive amount of trunk groups (more than 40) are OOS as reflected by the backlighted indicator "EXCESSIVE". The PRI STATUS box shows DCH OOS indicating that at least one PRI has lost a D-channel. A CRITICAL alarm condition is shown, and CKT LIM is backlighted.

```

SYS EMER  CRITICAL  MAJOR  MINOR  BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH   AM     AM PERPH  OS LINKS   SM       CM      MISC
CMD:
107 - CIRCUIT LIMIT

OUTPUT
900 OP:AML
901 OP:TGCNT
902 OP:OFFNORM,PRIGRP

PRI STATUS
DCH OOS

TRUNK GROUPS
1 - 85 314 - 678
5 86 325 - 683
12 87 356 - 822
34 - 88 368 - 843
44 - 93 388 - 970
45 156 - 478 - 987 -
56 187 - 499 - 999
77 199 500 1234 -
82 233 528 1467
83 - 234 567 - 1587 -

EXCESSIVE +

- MAINTENANCE LIMIT EXCEEDED DUE TO AML STATUS
+ MORE THAN 40 TRUNK GROUPS -- ENTER 900 AND 901 FOR COMPLETE LIST

```

Figure 5-5 107 - Circuit Limit (PRI Equipped Version) [5E12 and Later]

Abbreviations:

AML	Automatic Maintenance Limit	OP	Output
DCH	D-Channel	PRI	Primary Rate Interface
OFFNORM	Off Normal	PRIGRP	PRI Group
OOS	Out of Service	TGCNT	Trunk Group Count

5.5.3 Commands

Commands are provided to output listings of all trunk groups whose AML OOS count has reached or exceeded their respective AMLs, those having an OOS member(s), and those having an off-normal PRI D-channel.

All available paging commands can be entered from the 107 page.

CMD	RESULT
900	Listing of trunk groups whose AML OOS count has reached or exceeded their respective AMLs is printed at the ROP (OP:AML[,TG=a]) where "a" is a specific trunk group number.
901	Listing of trunk groups having any OOS member(s) is printed at the ROP (OP:TGCNT[,TG=a]) where "a" is a specific trunk group number.
902	Listing of trunk groups having any off-normal condition on a PRI D-channel is printed at the ROP (OP:OFFNORM,PRIGRP).

5.6 109 - OVERLOAD (5E12 and Later)**5.6.1 Purpose**

The 109 display page provides an indication of resource or real-time overloads in the administrative module (AM) and switching module(s) (SM), communication module processor (CMP), quad link packet switch gateway processor (QGP) (if equipped), and direct link nodes (DLN) (if equipped) and commands to inhibit or allow essential service protection (ESP).

5.6.2 General

Any AM, SM, CMP, QGP, or DLN overload conditions are shown on the 109 display page. If an SM overload occurs, the SM number and type is displayed in the indicator and backlighted. If more than 16 SMs are in overload, a note appears, partially backlighted, indicating how many SMs are overloaded. For a complete list of SMs in overload, enter the 900 command. If a CMP overload occurs, the CMP number and whether it is the primary (P) or mate (M) are shown. If a DLN overload occurs, the DLN number is shown. If a QGP overload occurs, the QGP number is shown.

Details on any of the overloads are shown on display page 170.

The REALTIME overload indicators contain NONE, MINOR, MAJOR, or CRIT to show the severity of the overload. NONE means no overload exists. MINOR and MAJOR are different levels of real-time overloads.

The only craft action which can be taken during overload conditions is to reduce or eliminate input messages/maintenance commands. All other actions are initiated by the system.

For AM RESOURCE overloads, either NONE or the name of the resource is displayed. The monitored resources are as follows:

- MCB - Message Control Block
- PCB - Process Control Block
- SCB - Stack Control Block
- TCB - Timer Control Block
- MSGS - Message Overflow (because of PIC overload).

Resources for the SMs, CMP, and DLN are shown on the 170 display page.

When Essential Service Protection (ESP) is allowed, it gives preferential treatment to designated lines (for example, hospitals, police, fire departments, etc.) during periods of overload. The normal mode of ESP is set to either YES or NO by each office on RC/V view 8.1 (ESP NORM ALW). If ESP NORM ALW is set to YES, the INHIBITED text is backlighted when inhibited. If ESP NORM ALW is set to NO, the ALLOWED text is backlighted when allowed.

If the network management control is on to prevent overloads in this office, the ``SEE PAGE 130" indicator appears and is backlighted.

An overload causes the OVERLOAD indicator at the top of the screen to backlight. The associated alarm level (CRITICAL, MAJOR, or MINOR) also backlights, if applicable. An overload also causes the ``SEE PAGE 170 FOR MORE OVERLOAD INFO" indicator in the upper right portion of the 109 page to backlight.

The AM information box contains information regarding real-time and resource overloads in the AM.

The SM, CMP, QGP, and DLN information provided on Page 109 is limited. For SM overloads, the SM number and type of SM in overload is displayed. For CMP overloads, the number of the overloaded CMP and the type of CMP (primary or mate) is displayed. For QGP overloads, the number of the QGP in overload is displayed. For DLN overloads, the group and member number of the overloaded DLN is displayed. Additional information on these

processors is available on Page 170.

NOTE: The DLN and QGP information boxes are displayed only if the office is equipped with those units.

Figure 5-6 shows an example of the 109 display page with specific AM overload information. It also shows up to 16 of the SMs, CMP00 primary, DLN00-2, and QGP0-0 that are in overload. The note EXCESSIVE is displayed and backlighted because there are greater than 16 SMs in overload. The actual number of SMs in overload (20) is displayed.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD<				109 - OVERLOAD			
600	INHIBIT ESP	SEE PAGE 130	ESSENTIAL SERVICE PROTECTION (ESP)				
700	ALLOW ESP						
900	OUTPUT OVERLOADED MODS	SEE PAGE 170 FOR MORE OVERLOAD INFO					
AM OVERLOAD INFORMATION							
REALTIME: NONE		RESOURCES: SCB					
DLN OVERLOADED							
DLN00-2							
SWITCHING MODS OVERLOADED							
002 LSM	006 LSM	007 LSM	008 LSM	012 RSM	020 RSM	024 RSM	048 RSM
083 RSM	109 RSM	117 HSM	120 HSM	122 LSM	123 LSM	150 LSM	180 RSM
EXCESSIVE		20 SM'S IN OVERLOAD - - ENTER 900 FOR COMPLETE LIST					
CMP OVERLOADED				QGP OVERLOADED			
CMP00P				QGP0-0			

Figure 5-6 109 - Overload (with SM Overload) (5E12 and Later)

Abbreviations:

AM	Administrative Module	LSM	Local Switching Module
CMP	Communication Module Processor	MODS	Modules
DLN	Direct Link Node	QGP	QLPS Gateway Processor
ESP	Essential Service Protection	RSM	Remote Switching Module
HSM	Host Switching Module	SCB	Stack Control Block
INFO	Information	SM'S	Switching Modules

5.6.3 Commands

Commands are provided to inhibit and allow ESP and to output a list of all SMs that are overloaded.

In addition to these commands, any available paging command can be entered from Page 109.

CMD	RESULT
600	Essential Service Protection is inhibited (INH:ESP)
700	Essential Service Protection is allowed (ALW:ESP)
900	Output list of SMs in overload on the ROP (OP:OVRD:ALL)

5.7 110 - SYSTEM INHIBITS [5E12 and Later]

5.7.1 Purpose

The 110 display page provides a list of system and AM inhibits and provides maintenance menu commands for selected inhibits.

5.7.2 General

A SYSTEM inhibit applies to the AM and all SMs. An AM inhibit applies only to the AM. Unless stated otherwise, all inhibit requests are assumed to be phase-protected.

Each inhibit indicator on this display has three distinct sections: the top line, the description, and the commands-available line.

The top line in each box shows the box number. This line is displayed in normal video, and the field to the right of the box number is blank unless an inhibit has been requested by the craft. If an inhibit has been requested, INH, SET, MON, or CHG is displayed to the right of the box number, as appropriate, and the top line is backlighted. (For the remainder of the 110 display page description, the result of any of these operations is referred to as an inhibit.) The presence of this text and backlighting combination means the system has recorded the inhibit request. It does not mean the inhibit is in effect.

Most of the inhibit/allow and set/clear commands are effective immediately after the request. For these cases, all areas of the indicator backlight together and one of the 3-character phrases (INH, SET, MON, or CHG) will appear. However, in a few cases, the status will change independent of the request. An example of this is shown in box 21. The behavior of each indicator is explained in the Indicators section on the next several paragraphs.

The middle two lines of the indicator is the inhibit description. These two lines show the name of the inhibit as well as whether or not an inhibit is in effect. Inhibits can be caused by system or craft-initiated actions. When an inhibit is in effect, this section will be backlighted. In the SUMMARY STATUS AREA, the SYS INH indicator will be backlighted.

The return of the top line to normal video means that a valid request to allow (or clear) an inhibit has been accepted. A valid allow request will also cause any text in the area to the right of the box number to be blanked.

The last line of each indicator shows which menu commands, if any, are available from the display. For example, at the bottom of box 17 the numbers ``6 7 9" appear. The ``6" means this item can be inhibited by entering **617**, the ``7" means it can be allowed by entering **717**, and the ``9" designates output is available with **917**. On color MCCs, there is also color mapping from the commands shown on the left of the display to the numbers in the boxes. Boxes without commands listed are inhibited only by the system or from manual action independent of this display page.

Following is the correspondence between the number key and the action taken:

Number	Action
4	Set
5	Clear
6	Inhibit
7	Allow
9	Output

5.7.3 Indicators

This paragraph describes the individual indicators and their behavior.

Box 00 - Box 00 is not currently used.

Box 01 - Message Class Brevity Control

This indicator shows whether or not the automatic output message class brevity control is inhibited. Brevity control is used to restrict the generation of certain application output messages for both the AM and equipped SMs. Inhibiting message class brevity control permits normally suppressed messages to go to the ROP or the log file.

The message class brevity control inhibit must be entered with the teletypewriter (TTY) input message **INH:BREVC,MSGCLS=a**. Since a named MSGCLS is required, a menu command is not provided. Inhibiting brevity control for one or more MSGCLSs may cause increased communication link traffic which can degrade call processing performance and capacity. (See 235-600-700, *Input Messages Manual*.) The request will display INH when recorded. This inhibit will take effect immediately with the request.

Entering allow command **701** generates the message **ALW:BREVC,MSGCLS=ALL**. The request will clear the text INH when recorded. This allow will take effect immediately with the request.

This inhibit is cleared by any high-level AM initialization.

Box 02 - Message Class Log/Print Status

The box 02 indicates that at least one message class has the log/print status that is different from the backup status.

To change the log/print status for one or all message classes, enter input message **CHG:LPS,MSGCLS={a|ALL}** with additional parameters. (See 235-600-700, *Input Messages Manual*.) The request will display CHG when recorded. This change will take effect immediately with the request.

Entering the menu command **902** generates the input message **OP:LPS,MSGCLS=ALL** and causes the status of the message classes to be printed at the ROP.

Box 03 - MDII Reporting

The machine-detected interoffice irregularity (MDII) indicator is backlighted when one or more MDIIs are inhibited. The inhibits are generated by the TTY input message **INH:MDII** with additional parameters. When the inhibit is invoked, it suppresses the printing of MDIIs for the trunk group(s) specified by the input message. The request will display INH when recorded. This inhibit will take effect immediately with the request.

Entering the **903** command generates the message **OP:MDII**, which causes a listing of all suppressed trunk MDIIs to be printed at the ROP.

Box 04 - Manual Recent Change

This indicator shows whether or not manual entering of recent changes is inhibited.

When the command **604** is entered, the message **INH:RC** is generated. The request will display INH when recorded. This inhibit will take effect immediately with the request.

The allow command **704** generates the message **ALW:RC**. The request will clear the text INH when recorded.

Since the Automatic Customer Station Rearrangement (ACSR) feature depends upon Recent Change, if Recent Change is inhibited, ACSR is also inhibited. During manual inhibits of Recent Change, the RC box (box 04) is lighted and the CORC box (box 05) is partially lighted.

Box 05 - Customer-Originated Recent Change (CORC)

The box 05 indicator shows whether CORCs are inhibited.

Box 05 is shared by CORCs and the ACSR feature. Since the ACSR feature depends upon Recent Change, if Recent Change is inhibited, ACSR is also inhibited. During manual inhibits of Recent Change, the RC box (box 04)

is lighted and the CORC box (box 05) is partially lighted.

When a **905** command is entered, ACSR queuing is inhibited and CORCs are allowed.

Box 06 - Recent Change Logging

The box 06 indicator shows whether or not the logging of manually entered recent changes for all processors is inhibited. This does not include customer-originated recent changes. Recent Change logging may be inhibited in the event logging is causing a problem, thereby allowing recent changes to be entered. Unlogged changes are lost after a boot.

Entering the command **606** generates the message **INH:RCLOG**. The request will display INH when recorded. This inhibit will take effect immediately with the request.

Entering the command **706** generates the message **ALW:RCLOG**. The request will clear the text INH when recorded.

Box 07 - Box 7 is not currently used.

Box 08 - Communication Link Normalization

If a fault occurs in one or more SM communication links, the system will automatically try to restore the link(s) on a periodic basis. This inhibit will suppress this action when active.

Entering command **608** will generate the message **INH:CLNORM**. The request will display INH when recorded. This inhibit will take effect immediately with the request.

When the command **708** is entered, it generates the message **ALW:CLNORM**. The request will clear the text INH when recorded.

Since attempts to restore CLNKS are periodic, there may be a delay from the time an allow or inhibit request is recorded until the allow or inhibit is recognized.

Box 09 - Centralized Automatic Message Accounting (CAMA) Suspension

The box 09 indicator shows whether or not calls are being routed through the CAMA operator number identification (ONI) process for billing. Since inhibiting this indicator causes lost revenue, a minor alarm is sounded when the inhibit is invoked.

Entering the command **609** generates the message **INH:CAMAONI**. The request will display INH when recorded. This inhibit will take effect immediately with the request.

Entering the command **709** generates the message **ALW:CAMAONI**. The request will clear the text INH when recorded.

Box 10 - Trunk Hold

The box 10 indicator shows whether or not one or more trunk groups are being monitored.

To monitor one or more trunk groups, the input message **MON:TRUNK** must be entered. The request will display MON when recorded. This monitoring will take effect immediately with the request.

The system looks for stop-go signaling failures in members of monitored group(s). If a failure occurs, the member is held off-hook and out of service for the craft to determine the nature of the failure.

The input message **CLR:TRUNK** is entered to remove the stop-go signaling.

CAUTION: This message will return all members back to service, even if they failed. The request will clear the text MON when recorded.

Entering the **910** command generates the input message **OP:TRUNK**, which causes a listing of all trunk groups and members being monitored to be printed at the ROP.

Boxes 11 Through 15 - Boxes 11 through 15 are not currently used.

Box 16 - Routine Audits

The box 16 indicator shows if the automatic routine execution of one or both AM application audit cycles (OKP or SMKP) are inhibited.

The only way to obtain a single audit inhibit is via a TTY input message in the message mode. (See **INH:AUD=a,ENV=b** in 235-600-700, *Input Messages Manual*.) Single inhibits are not phase-protected.

Entering the **616** command requests the inhibit of all audits and generates the message **INH:AUD=CYCLE,ENV**. The request will display INH when recorded. The request state does not necessarily imply that the inhibit is in effect. Normally, the status will follow the request within a short period of time.

If the **716** command is entered, the message **ALW:AUD=CYCLE,ENV** is sent. The request will clear the text INH when recorded. The request state does not necessarily imply that the inhibit has been cleared. Normally, the status will follow the request within a short period of time.

The command **916 (OP:AUD,STATUS=ALL,ENV=a)** can be entered to get the ROP listing of routine audit status for the application AM.

Box 17 - CM Routine Exercises

The box 17 indicator shows if any or all of the application routine hardware exercises are inhibited in the communication module (CM). Inhibits for routine exercises are effective for only one exercise session. If the tests are in progress when the message is received, the inhibit will not take place until the next session.

Routine exercises are scheduled to run at specific times (for example, daily at midnight). If inhibited exercises are allowed after the scheduled time, the exercises are not started until the next scheduled session.

When **617** is entered, the message **INH:REX,CM** is generated, which inhibits all application CM routine exercises. The request will display INH when recorded. This inhibit will take effect immediately with the request.

If the command **717** is entered, the message **ALW:REX,CM** is generated, which allows all application CM routine exercises. The request will clear the text INH when recorded.

Entering the command **917** sends the message **OP:REXINH,CM**, which generates a status listing at the ROP.

NOTE: These are application routine exercises and are different from the routine exercises for the AM, as shown on the EAI display.

Box 18 - Software Checks

The box 18 indicator reflects whether or not the AM application software checks have been inhibited. The AM software checks and the application software checks are different, but are controlled together from manual commands.

The box 18 indicator can only be controlled from the EAI or TTY input message **INH:SFTCHK**. This inhibit will prevent internal software checks from causing initializations.

Entering the **618** command requests the inhibit of internal software checks and generates the message **INH:SFTCHK**. The request will display INH when recorded. The request state does not necessarily imply that the inhibit is in effect. Normally the status will follow the request within a short period of time.

If the status is inhibited without being requested, the inhibit was automatically applied by the system.

If the **718** command is entered, the message **ALW:SFTCHK** is sent. The request will clear the text INH when recorded.

Box 19 - Min-Mode

The box 19 indicator shows the states of application min-mode. When this box is backlighted, no call processing functions are allowed in the AM. This is only used in extreme emergencies to prevent customer actions from interfering with machine operations.

Min-mode is invoked and deleted via EAI application pokes ``M" and ``N," respectively.

The request will display INH when recorded. This inhibit will take effect immediately with the request following the next major AM initialization.

The request will clear the text INH when recorded and take effect on the next major AM initialization.

Box 20 - Message Brevity Control

The box 20 indicator gives inhibit status of message brevity control for all messages originating from the application processes in the AM only.

Entering inhibit command **620** generates the message **INH:BREVC,AM**. The request will display INH when recorded. This inhibit will take effect immediately with the request.

Entering the allow command **720** generates **ALW:BREVC,AM**. The request will clear the text INH when recorded.

This inhibit is cleared by any high-level AM initialization.

Box 21 - Recent Change Backout

The box 21 indicator shows whether or not uncommitted (recently entered) AM recent changes are loaded or backed out. Backout can only occur as a result of an AM high-level initialization.

The description portion shows when the recent changes are actually backed out or loaded. If the backout is in progress, a number will appear on the third line of the box showing the progress of the backout. From 200 down to 100 is CORC backout; 200 meaning CORC is still fully backed out and 100 meaning CORC is fully rolled forward. From 100 down to 0 (zero) is RC backout; 100 meaning RC is still fully backed out and 0 (zero) meaning RC is fully rolled forward. Recent changes can be backed out only in conjunction with a high-level initialization.

Recent changes should be backed out if a recent change is suspected to be the cause of an AM performance problem.

When the command **421** is entered, the message **SET:BACKOUT,RC,AM** is generated. The request will display SET when recorded. The request state does not necessarily imply that the set is in effect.

When the command **521** is entered, the message **CLR:BACKOUT,RC,AM** is sent. The request will clear the text SET when recorded. The request state does not imply that the backout has been cleared.

Box 22 - Emergency Action Interface/Miscellaneous Checks

The box 22 indicator shows if Emergency Action Interface/Miscellaneous checks are inhibited. This box includes

hardware and error interrupts inhibits from the Emergency Action Interface page and also error source inhibits.

When one of the messages **INH:ERRINT** or **INH:ERRSRC** is input, it will cause the box to backlight. This box will also backlight if error interrupt is inhibited on the Emergency Action Interface page. Input messages **ALW:ERRINT** or **ALW:ERRSRC** will allow the respective inhibits. The lower portion of this box is lighted if any error interrupt inhibits have been inhibited or error source inhibits are inhibited. If error interrupt checks are allowed unit by unit, the indicator will not be cleared until the last unit is allowed.

When the command **922** is entered, the message **OP:ERRCHK** is sent. This generates a listing of the active inhibits.

Box 23 - Routine Maintenance

This indicator reflects whether or not a routine maintenance function is inhibited. Should routine maintenance functions be inhibited for an extended period of time, various system resource availability and consistency may be adversely affected.

This indicator monitors the AM's Generated Key Collection and Compression Routine inhibit status. If the routine is inhibited, the description is backlighted.

When the **623** command is entered, the message **INH:GKCCR,AM** is sent which requests that automatic executions of the Generated Key Collection and Compression Routine be inhibited.

Entering command **723** generates the command **ALW:GKCCR,AM** which requests that automatic periodic execution of the Generated Key Collection and Compression Routine be allowed.

Box 24 - Hardware Checks

The box 24 indicator shows whether or not the AM/CM application hardware checks have been inhibited. This indicator can only be controlled from the EAI or by TTY input message **INH:HDWCHK**. This inhibit will prevent maskable hardware faults from causing recovery.

Entering the **624** command requests the inhibit of maskable hardware faults and generates the message **INH:HDWCHK**. The request will display INH when recorded. The request state does not necessarily imply that the inhibit is in effect, since the status will follow the request within a short period of time.

If the status is inhibited without being requested, the inhibit was automatically applied to the system.

When the **724** command is entered, the message **ALW:HDWCHK** is sent. The request will clear the text INH when recorded.

Box 25 - AM Routine Exercises

The box 25 indicator shows if any or all of the application hardware routine exercises are temporarily inhibited in the AM.

Entering the **925** command sends the message **OP:REXINH,AM** which generates a status listing of temporary AM REX inhibits to be printed at the ROP. Temporary AM REX inhibits are not preserved after a level 3 or level 4 AM initialization.

Entering the **925,PERM** command sends the message **OP:REXINH,AM,PERM** which generates a status listing of permanent AM REX inhibits to be printed at the ROP. Permanent AM REX inhibits are preserved through any level (1-4) of AM initialization.

Boxes 26 and 27 - Boxes 26 and 27 are not currently used.

Figure 5-7 is an example of the 110 page display. The MANUAL RC (box 04), REX CM (box 17), and REX AM (box 25) are inhibited. The RC BACKOUT (box 21) is currently set and is partially backed out (80%). However, the top line is normal video, and there is no SET text after the 21. This indicates that the craft does not desire the recent changes to be kept out.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD: 110 - SYSTEM INHIBITS							
SYSTEM AM							
<u>INHIBIT (6)</u> 6XX	00 NOT USED	01 BREVC MSGCLS	02 MSGCLS LPS	03 MDII REPORT	16 ROUTINE AUDITS	17 INH REX CM	18 SOFTWARE CHECKS
		7	9	9	6 7 9	6 7 9	6 7
<u>ALLOW (7)</u> 7XX	04 INH MANUAL RC	05 CORC	06 RC LOG	07 NOT USED	19 MIN MODE	20 BREVC	21 RC BKOUT 80
	6 7	9	6 7			6 7	4 5
<u>SET (4)</u> 4XX	08 CLNK NORM	09 CAMA SUSP	10 TRUNK HOLD	11 NOT USED	22 EAI/MISC CHECKS	23 ROUTINE MTCE	24 HARDWARE CHECKS
	6 7	6 7	9		9	6 7	6 7
<u>CLEAR (5)</u> 5XX	12 NOT USED	13 NOT USED	14 NOT USED	15 NOT USED	25 INH REX AM	26 NOT USED	27 NOT USED
					9		
<u>OUTPUT (9)</u> 9XX							

XX=BOX NUMBER

Figure 5-7 110 - System Inhibits [5E12 and Later]

Abbreviations:

AM	Administrative Module	LOG	Logging
BKOUT	Backout	LPS	Log/Print Status
BREVC	Brevity Control	MDII	Machine Detected
CAMA	Centralized Automatic		Interoffice Irregularity
	Message Accounting	MISC	Miscellaneous
CLNK	Communication Link	MSGCLS	Message Class
CM	Communication Module	MTCE	Maintenance
CORC	Customer-Originated	NORM	Normalization
	Recent Change	RC	Recent Change
EAI	Emergency Action Interface	REX	Routine Exercises
INH	Inhibit	SUSP	Suspension

5.7.4 Commands

In addition to the following commands, all available display commands can be accessed from Display Page 110.

CMD	RESULT
421	RC Backout (AM) is set (SET:BACKOUT,RC,AM)
521	RC Backout (AM) is cleared (CLR:BACKOUT,RC,AM)
604	Manual RC is inhibited (INH:RC)

606	RC Logging is inhibited (INH:RCLOG)
608	CLNK Normalization is inhibited (INH:CLNORM)
609	CAMA is inhibited (suspended) (INH:CAMAONI)
616	Routine Audits (AM) are inhibited (INH:AUD=CYCLE,ENV)
617	Routine Exercises (CM) are inhibited (INH:REX,CM)
618	Internal Software Checks are inhibited (INH:SFTCHK)
620	Message Brevity Control (AM) is inhibited (INH:BREVC,AM)
623	Routine Maintenance (AM) is inhibited; specifically, Generated Key Collection and Compression Routine (INH:GKCCR,AM)
624	Internal Hardware Checks are inhibited (INH:HDWCHK)
701	Message Class Brevity Control is allowed (ALW:BREVC,MSGCLS=ALL)
704	Manual RC is allowed (ALW:RC)
706	RC Logging is allowed (ALW:RCLOG)
708	CLNK Normalization is allowed (ALW:CLNORM)
709	CAMA is allowed (no longer suspended) (ALW:CAMAONI)
716	Routine Audits (AM) are allowed (ALW:AUD=CYCLE,ENV)
717	Routine Exercises (CM) are allowed (ALW:REX,CM)
718	Internal Software Checks are allowed (ALW:SFTCHK)
720	Message Brevity Control (AM) is allowed (ALW:BREVC,AM)
723	Routine Maintenance (AM) is allowed; specifically, Generated Key Collection and Compression Routine (ALW:GKCCR,AM)
724	Internal Hardware Checks are allowed (ALW:HDWCHK)
902	Message Class Log/Print Status is output (OP:LPS<MSGCLS=ALL)
903	MDII Report is output (OP:MDII)
905	CORC Status is output (OP:STAT,CORC,ACSR)
910	Trunk Hold list is output (OP:TRUNK)
916	Routine Audits (AM) are output (OP:AUD,STATUS=ALL,ENV)
917	Routine Exercises (CM) are output (OP:REXINH,CM)
922	Listing of active inhibits is output (OP:ERRCHK)
925	Temporary Routine Exercises inhibits (AM) are output (OP:REXINH,AM)
925,PERM	Permanent Routine Exercises inhibits (AM) are output (OP:REXINH,AM,PERM)

5.8 111/112 - AM, AM PERIPHERALS [5E12 Only]

5.8.1 Purpose

The purpose of the 111/112 display page is to report status of the AM and its peripherals. An indicator shows if an AM off-line boot is in progress.

5.8.2 General

The AM is an 3B20 duplex computer. In addition to the AM and peripheral indicators on this display, there are additional indicators for Page 121 - IOP 0 & 1, Page 122 - IOP 2 & 3, Page 123 - DFC 0 - 1 STATUS, Page 125 - DFC 2 & 3 STATUS, and Page 113 - OPERATIONS SYSTEMS LINKS. If common network interface (CNI) is equipped, there is also an indicator pointing to Page 118 - CNI RING STATUS.

An off-normal condition on this page will cause the AM or AM PERPH indicator at the top of the screen to backlight. An off-normal condition in an MHD (Page 123) will backlight the ``SEE PAGE 123" indicator and the AM PERPH at the top of the screen. Also, an off-normal condition in an MHD (Page 125) will backlight the ``SEE PAGE 125" indicator and the AM PERPH at the top of the screen. An off-normal condition on Page 121 will backlight the ``SEE PAGE 121" indicator(s) and the AM PERPH at the top of the screen. An off-normal condition on Page 122 will backlight the ``SEE PAGE 122" indicator(s) and the AM PERPH at the top of the screen. An off-normal condition on Page 118 will backlight the ``SEE PAGE 118" indicator and the AM PERPH at the top of the screen if CNI is equipped. An off-normal condition in the SCCs will cause the ``TO SCC 0" or ``TO SCC 1" indicator to backlight, and the OS LINKS indicator at the top of the screen will backlight. In all these cases, the appropriate alarm level (CRITICAL, MAJOR, or MINOR) will also backlight, if applicable.

The ``OFLBOOT IP" indicator will appear and be backlit when the AM off-line boot is in progress. If this TTY is associated with the on-line side of the OFLBOOT procedure, the word ``ONLINE" will appear after the indicator. Conversely, if this TTY is associated with the off-line side, the word ``OFFLINE" will appear.

Figure 5-8 is an example of the regular version of the 111/112 page with various off-normal conditions in the AM and its peripherals. No off-line boot is in progress in this example.

The CSU 1 and AM 1 are unavailable. This caused the AM indicator at the top of the screen to backlight. An MHD on Page 123 is out of service, causing the SEE PAGE 123 to backlight, and there is a problem on Page 121 with some device or devices connected to IOP controller 0. These two conditions have caused the AM PERPH indicator at the top of the screen to backlight. Also, SCC 1 is either out of service, unavailable, or being initialized, which is shown by backlighting in the TO SCC 1 indicator at the bottom right-hand portion of the display. This off-normal SCC condition caused the OS LINKS indicator at the top of the screen to backlight.

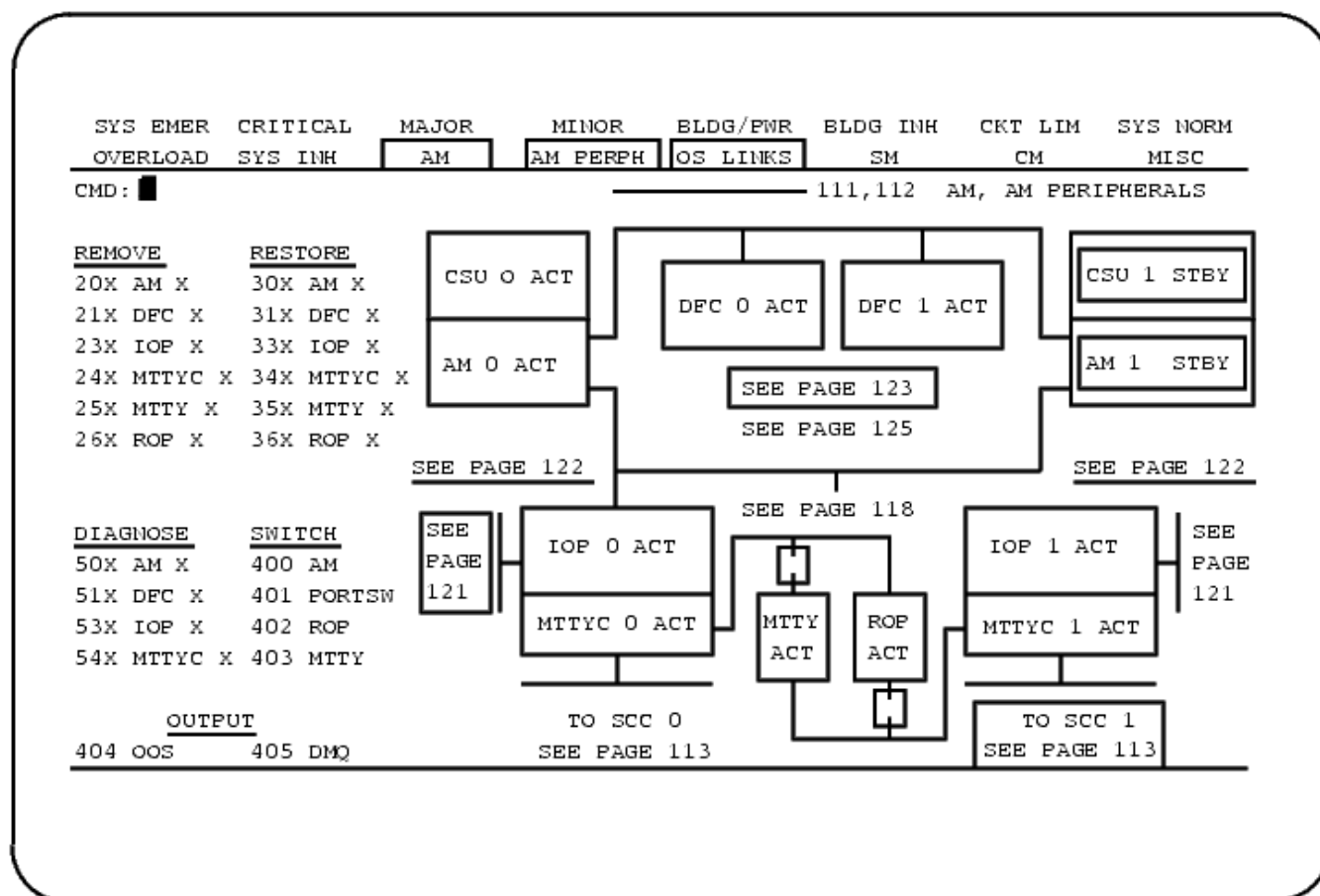


Figure 5-8 111/112 - AM, AM Peripherals (Regular Version) [5E12 Only]

Abbreviations:

ACT	Active	MTTYC	Maintenance Teletypewriter Controller
AM	Administrative Module	OOS	Out of Service
CSU	Cache Store Unit	PORTSW	Portswitch
DFC	Disk File Controller	ROP	Receive-Only Printer
DMQ	Diagnostic Message Queue	SCC	Switching Control Center
IOP	Input/Output Processor	STBY	Standby
MTTY	Maintenance Teletypewriter		

Figure 5-9 is an example of the off-line boot version of the 111/112 page with abnormal conditions in the AM and its peripherals.

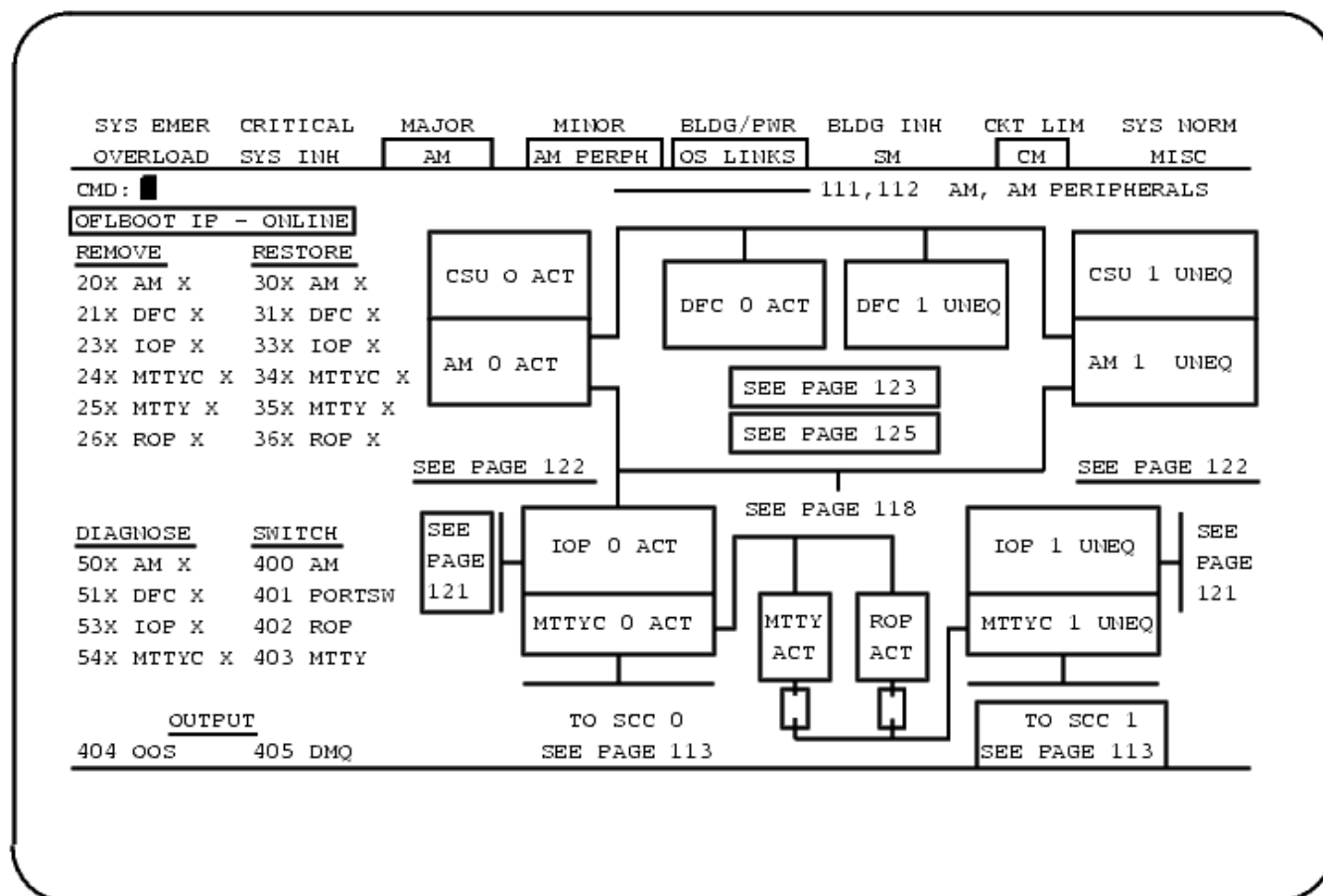


Figure 5-9 111/112 - AM, AM Peripherals (Off-Line Boot Version) [5E12 Only]

Abbreviations:

ACT	Active	MTTYC	Maintenance Teletypewriter Controller
AM	Administrative Module	OFLBOOT	Off-line Boot
CSU	Cache Store Unit	OOS	Out of Service
DFC	Disk File Controller	PORTSW	Portswitch
DMQ	Diagnostic Message Queue	ROP	Receive-Only Printer
IOP	Input/Output Processor	SCC	Switching Control Center
IP	In Progress	UNEQ	Unequipped
MTTY	Maintenance Teletypewriter		

5.8.3 Commands

The 111/112 page provides commands to remove, restore, diagnose, and switch the various units. Also, output commands are available for out-of-service and diagnostic listings.

All available displays can be accessed from the 111/112 page.

CMD	RESULT	CMD	RESULT
20X	AM X is removed (RMV:CU=X)	30X	AM X is restored (RST:CU=X)[,UCL]
21X	DFC X is removed (RMV:DFC=X)	31X	DFC X is restored (RST:DFC=X)[,UCL]
23X	IOP X is removed (RMV:IOP=X)	33X	IOP X is restored (RST:IOP=X)[,UCL]
24X	MTTYC X is removed (RMV:MTTYC=X)	34X	MTTYC X is restored (RST:MTTYC=X)[,UCL]
25X	MTTY X is removed	35X	MTTY X is restored

26X	(RMV:MTTY=X) ROP X is removed (RMV:ROP=X)	36X	(RST:MTTY=X)[,UCL] ROP X is restored (RST:ROP=X)[,UCL]
50X	AM X is diagnosed (DGN:CU=X)[,UCL]	400	AM is switched (SW:CU)
51X	DFC X is diagnosed (DGN:DFC=X)[,UCL][,CONT]	401	PORTSW is switched (SW:PORTSW)
53X	IOP X is diagnosed (DGN:IOP=X)[,CONT][,UCL]	402	ROP is switched (SW:PORTSW:ROP)
54X	MTTYC X is diagnosed (DGN:MTTYC=X)[,UCL][,CONT]	403	MTTY is switched (SW:PORTSW:MTTY)
404	OOS units are listed at ROP (OP:CFGSTAT,OOS)		
405	Diagnostic request queue is output at ROP, including restore/remove requests (OP:DMQ,AM)		

5.9 113 - OPERATIONS SYSTEMS LINKS (5E12 and Later)

5.9.1 Purpose

The 113 display page provides a listing of Operations Systems links and their status.

5.9.2 General

There are various types of Operations Systems which can be linked to an office. These systems provide additional services to an office. Some of the systems which may appear on this display are discussed in the following paragraphs.

The Automatic Message Accounting Data Link (AMADL) connects the Automatic Message Accounting Teleprocessing System (AMATPS) with a Revenue Accounting Office (RAO). The AMATPS assembles billing data.

The Centralized Automatic Reporting on Trunks (CAROT) automatically accesses and tests trunks.

The Centralized Trunk Test Unit (CTTU) is a test position for remote trunk and line testing.

The Engineering and Administration Data Acquisition System (EADAS) collects, stores, and analyzes the traffic data.

The Mechanized Loop Testing System Generation 2 (MLT2) is used for testing and analyzing the condition of customer loops for the Automated Repair Service Bureau (ARSB).

The No. 2 Service Evaluation System (NO2SES) provides large volume service evaluation and incorrect answer supervision identification.

The Operator Services Position System Recent Change (OSPSRC) link provides restricted recent change/verify access to OSPS data on the 5ESS[®]-2000 switch.

The Remote Memory Administration System (RMAS) provides standard recent change/verify access. It prints office records, provides on-line growth capability for many recent changes, and provides an on-line error-checking capability.

The Software Change Administration and Notification System (SCANS) is used to transmit Broadcast Warning Messages (BWMs) to both the office and the Switching Control Center (SCC).

The No. 2 SCC provides facilities to administer, monitor, control, and maintain the 5ESS[®]-2000 switch from a remote, centralized location.

The Testing, Operations, Provisioning, and Administration System (TOPAS) link provides centralized trunk

maintenance and administration for trunks terminating on 5ESS®-2000 switch toll configurations.

There are several columns of information shown for each system. The first column, OS, is the standard link abbreviation (for example, AMADL2). The next column, LINK, shows whether the link is primary or secondary. The TYPE column shows whether the link is dedicated or dial-up. The DEVICE column contains the abbreviation of the peripheral device and the status of the link. The PC NAME is the name of the peripheral controller for the assigned peripheral device. This column is for information only. It does not show status. Status for the peripheral controllers is found on 121 - IOP 0 and 1 or 122 - IOP 2 and 3. The last two columns, TIME BUFF and DATA BUFF are used to show time and data buffer overflows. These columns are not applicable (N/A) to many of the systems.

Any off-normal condition on this page causes the OS LINK indicator at the top of the screen to backlight. The appropriate alarm level indicator (CRITICAL, MAJOR, or MINOR) backlights, if applicable.

The operations systems links vary from one office to another. Figure 5-10 shows SCC 1 is unavailable, which can be determined from the backlighted indicator and accompanying status text (UNAV).

SYS EMER

CRITICAL

MAJOR

MINOR

BLDG/PWR

BLDG INH

CKT LIM

SYS NORM

OVERLOAD

SYS INH

AM

AM PERPH

OS LINKS

SM

CM

MISC

CMD:

113 - OPERATIONS SYSTEMS LINKS

DISPLAY

121 IOP 0 & 1

(PC STATUS)

122 IOP 2 & 3

(PC STATUS)

REMOVE

200 SCC0

201 SCC1

RESTORE UCL

300 SCC0

301 SCC1

SEE ALSO PAGE 117

OS	LINK	TYPE	DEVICE	PC NAME	TIME BUFF	DATA BUFF
SCC	PRIMARY	DEDICATED	SCC 0 ACT	MTTYC 0	N/A	N/A
SCC	SECONDARY	DEDICATED	SCC 1 UNAV	MTTYC 1	N/A	N/A
SCANS2	PRIMARY	DEDICATED	SDL 0 ACT	SDLC 0	N/A	N/A
MLT2	PRIMARY	DEDICATED	SDL 2 ACT	SDLC 0	N/A	N/A
CTTU	PRIMARY	DIAL-UP	SDL 4 ACT	SDLC 2	N/A	N/A
AMADL2	PRIMARY	DEDICATED	SDL 8 ACT	SDLC 4	N/A	N/A
EADAS	PRIMARY	DEDICATED	SDL 3 ACT	SDLC 2		
TOPAS	PRIMARY	DEDICATED	SDL 7 ACT	SDLC 4	N/A	N/A
OSPSRC	PRIMARY	DEDICATED	SDL 18 ACT	SDLC 5	N/A	N/A

Figure 5-10 113 - Operations Systems Links (5E12 and Later)

Abbreviations:

AMADL2	Automatic Message Accounting Data Link	OSPSRC	Operator Services Position System Recent Change
CTTU	Centralized Trunk Test Unit	RMAS	Remote Memory Admin. System
EADAS	Engineering and Administrative Data Acquisition System	SCANS	Software Change Admin. and Notification System
IOP	Input/Output Processor	SCC	Switching Control Center
MLT2	Mechanized Loop Testing		

MTTYC	System Generation 2 Maintenance Teletypewriter Controller	SDLC	Synchronous Data Link Controller
OS	Operations Systems	TOPAS	Testing, Operations, Provisioning, and Administration System
PC	Peripheral Controller		

5.9.3 Commands

Commands are available to remove and restore the SCCs.

All available displays are also accessible from the 113 display page.

CMD	RESULT
200	SCC 0 is removed (RMV:SCC=0)
201	SCC 1 is removed (RMV:SCC=1)
300	SCC 0 is restored (RST:SCC=0,UCL)
301	SCC 1 is restored (RST:SCC=1,UCL)

5.10 114 - EQUIPPED SM STATUS SUMMARY [5E12 and Later]

5.10.1 Purpose

The purpose of the 114 page is to provide a summary of all equipped switching modules (SM) and their operational states.

5.10.2 General

Each equipped SM has a unique indicator on the 114 display. The indicator has two distinct sections:

- **SM NUMBER:** There may be gaps in SM numbering for a particular office. To provide flexibility in office numbering schemes, the SM numbers are not necessarily assigned sequentially. If an SM is not equipped, it is not listed. An example of this is shown in the 114 page example (Figure 5-11) by the blank indicators between SM 12 and SM 20, SM 20 and SM 24, etc.
- **SM TYPE:** This is a 1-character designation to show how an SM is being used. For example, an L is an LSM which is a local switching module.

When a new alarm condition on an SM happens, the SM indicator begins flashing. The ALM RLS key will not stop the flashing. The color of the flashing may not reflect the new alarm if the previously recorded condition is of higher priority. To stop the flashing, the craft should display the 1010 Page for that SM. There is also a command to retire the flashing (999). This is mainly provided for situations such as during installation when SMs are being grown in and many SMs are displaying recurrent error conditions. For further details on any SM recovery related activity or SM inhibits, the craft would enter 1800,X to display the SM X INHIBIT AND RECOVERY CONTROL page. This is the SM control page for emergency action.

A lower level summary page for observing up to 48 SMs simultaneously can be requested by entering 141 (SMs 1 - 48), 142 (SMs 49 - 96), 143 (SMs 97 - 144), or 144 (SMs 145 - 192).

For details on any backlighted SM, the craft should enter 1010,X to display the SM X STATUS page. This page can be accessed during SM X initialization or if SM X is isolated, but the only status that fills in are the SM STAT and RELATED PAGES boxes.

In Figure 5-11 , LSMs 1, 3, and 6 and HSM 10 and RSMs 48 and 120 are backlighted due to an off-normal condition in each.

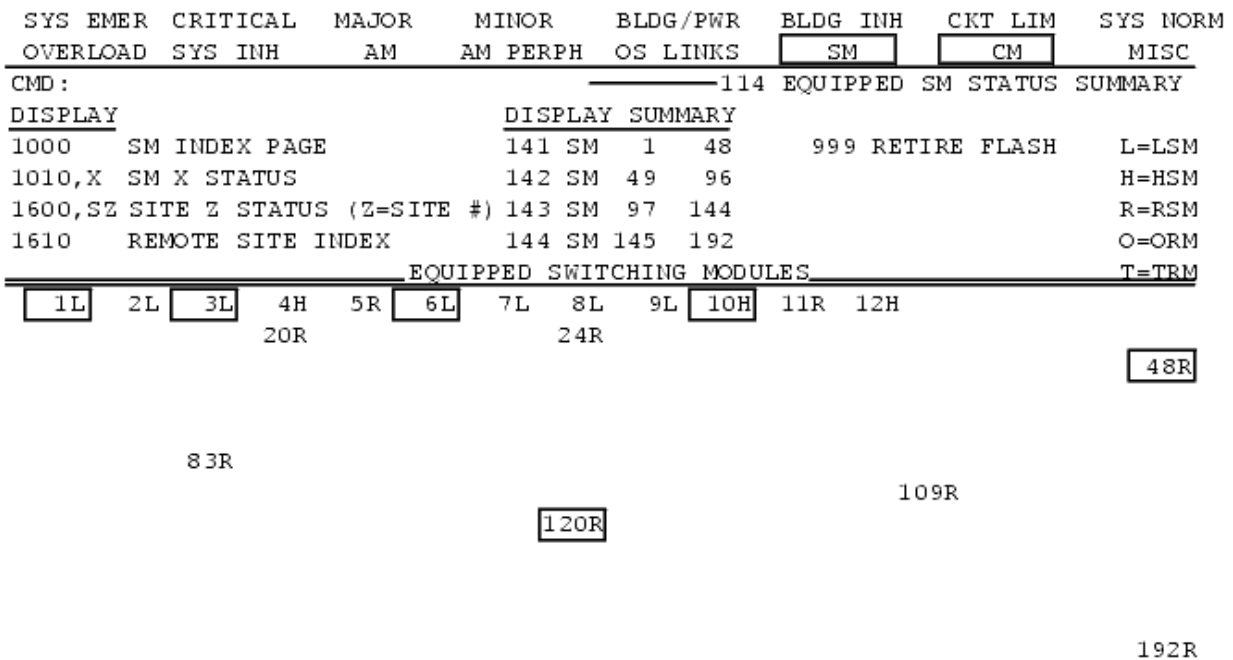


Figure 5-11 114 - Equipped SM Status Summary [5E12 and Later]

Abbreviations:

HSM	Host Switching Module	RSM	Remote Switching Module
LSM	Local Switching Module	SM	Switching Module
ORM	Optically Remoted Module	TRM	Two-Mile Optically Remoted Module

5.10.3 Commands

All available paging commands can be entered from the 114 display page.

CMD	RESULT
141	SM 1 - 48 page is displayed
142	SM 49 - 96 page is displayed
143	SM 97 - 144 page is displayed
144	SM 145 - 192 page is displayed
999	SM flashing is retired
1000	SM INDEX page is displayed
1010,X	SM X STATUS page is displayed
1600,SZ	SITE Z STATUS page is displayed
1610	REMOTE SITE INDEX page is displayed

5.11 115 - COMMUNICATION MODULE SUMMARY [5E12 and Later]

5.11.1 Purpose

The purpose of the 115 display page is to provide a summary of off-normal status for the hardware units and links which support AM to SM(s) communication and provide paths for all circuit switched calls.

5.11.2 General

The 115 display page has two separate and distinct versions. The first version (Figures 5-12 and 5-13) is for offices with communication module model 2 (CM2) hardware.

NOTE: Figure 5-12 is present only for CM2 offices equipped with QLPS.

The second version (Figure 5-14) is for offices with CM1 hardware.

The 115 page provides overall status for MSGS 0 and MSGS 1, MI/NC 0 and MI/NC 1 (MI/LI/NC 0/1 for CM1), QLPS NETWORK 0 and QLPS NETWORK 1 (for CM2 only), TMS 0 and TMS 1, communication links for the SMs, fan and fan fuse alarms for the ONTCs (for the MSGSs and TMSs for CM1), the status of the hardware check inhibit request bit, and the status of the MI/NC/TMSs (MI/LI/NC/TMSs for CM1) functioning as a group (ONTCCOM).

The ONTCCOM 0 includes MI 0 (and LI 0 in CM1), NC 0, and TMS 0. The ONTC 0 includes ONTCCOM 0, all DLIs and NLIs on side 0, and QLPS. The ONTCCOM 1 includes MI 1 (and LI 1 in CM1), NC 1, and TMS 1. The ONTC 1 includes ONTCCOM 1, all DLIs and NLIs on side 1, and QLPS.

If an MSGS, QLPS NETWORK, MI/NC (MI/LI/NC in CM1), or TMSLNK has an off-normal condition such as out-of-service (not family of equipment), unavailable, hardware checks inhibited, etc., the appropriate indicator giving the MCC page to see for detailed information is backlighted. The phrase "SEE PAGE XXXX IF BACKLIT" is backlighted when any of the boxes are backlighted to point out that the numbers in the boxes are the page numbers to request.

NOTE: The 1210 boxes are backlighted only for NC reference or oscillator problems.

The CLNKS indicator is a summary of the equipped SM communication links status which is detailed on Page 1260.

The CLNKs are not TMSLNKs. A CLNK is a communication path between the AM and an SM which passes through an MSCU, MMP, TMS, TMSLNK, and DLI. The TMSLNKs connect the TMS to the DLI.

The backlighted indicator identifies the page necessary for acting on the problem. As an example, the box with 1242 indicated is backlighted in Figures 5-12 and 5-13 because a module message processor (MMP) on Display Page 1242 is shown as out of service (OOS). The MMP out of service is also reflected on the MSGS 0 Page 1240, but going to 1240 would not be the final step to see and act on the problem so the MSGS 0 box with 1240 indicated is not backlighted. If a foundation peripheral controller (FPC) or pump peripheral controller (PPC) was out of service also, then the MSGS 0 box would backlight as shown in Figure 5-14. The purpose of this strategy is to get the craft directly to the problem with minimum paging. Therefore, if the 1240 (MSGS 0) box and the 1241 (or 1242) were both backlighted, an out of service (not family of equipment), an unavailable, an out-of-service power, or an unavailable power condition would exist in an MMP and an FPC, PPC, or MSCU.

The TMS 0 and 1 boxes (indicating Page 1220) never backlight. If a TMS is OOS, it would be due to the whole ONTC being OOS or UNV; therefore, 1209 is the appropriate page to display.

AM and CM hardware check inhibits have been separated. The system does not implicitly set CM hardware check inhibits when AM hardware check inhibits are requested. The indicator CM HDWCHK INH REQ only appears on the page display if the data delivery request automatic CM hardware check bit is set due to automatic escalation or manual request. Presence of the indicator means that there is a global inhibit request for all CM hardware checks. This bit can be set manually by entering the input message **INH:HDWCHK,CM** or by setting the application parameter to "f" (or "F") on the EAI page. The bit can be cleared by entering input message **ALW:HDWCHK,CM** or by resetting the application parameter to "g" (or "G") on the EAI page. Allowing hardware checks on all CM units individually does not clear the bit, and the global indicator remains on the page. This means that at the next CM

initialization, all CM application hardware checks are inhibited.

The CM isolation is available only in the CM2 version of Page 115. The indicator REQ CM ISOL appears on the page display to signal that manual CM isolation has been requested. A separate indicator, CM ISOL, is displayed when CM isolation is in effect.

The quad link packet switch (QLPS) network can be equipped in the CM2 configuration. On Page 115, boxes 1380 and 1381 summarize QLPS network 0 and network 1, respectively. An off-normal condition within a QLPS network causes the 1380 and/or the 1381 boxes to become backlighted, and the craft is directed to the 1380 and/or 1381 page for QLPS network related maintenance tasks. Also, since the QLPS units are within the ONTC, an off-normal condition of a QLPS with the particular ONTC causes the corresponding 1209 ONTC box to backlight.

Figure 5-12 shows an example of the CM2 QLPS equipped version with problems in MI/NC 1, MSGS 0, QLPS NETWORK 1, TMS 0, CLNKS, ONTC 0, and ONTC 1. Further information on these problems would be found on display 1210 - MI/NC 0 & 1, 1242 - MSGS 0 - COMMUNITIES 2 - 7, 1381 - QLPS NETWORK 1 STATUS, 1221 - TMS 0 TMS LINKS 002 - 063, 1260 - CLNK SUMMARY, and 1209 - ONTC 0 & 1. There is a fan alarm on ONTC 0 and the ONTC 1 fan fuse alarm is inhibited. The CM ISOL indicator shows that CM isolation is in effect. Also, CM HDWCHK INH REQ appears which signals that CM hardware check inhibits have been requested.

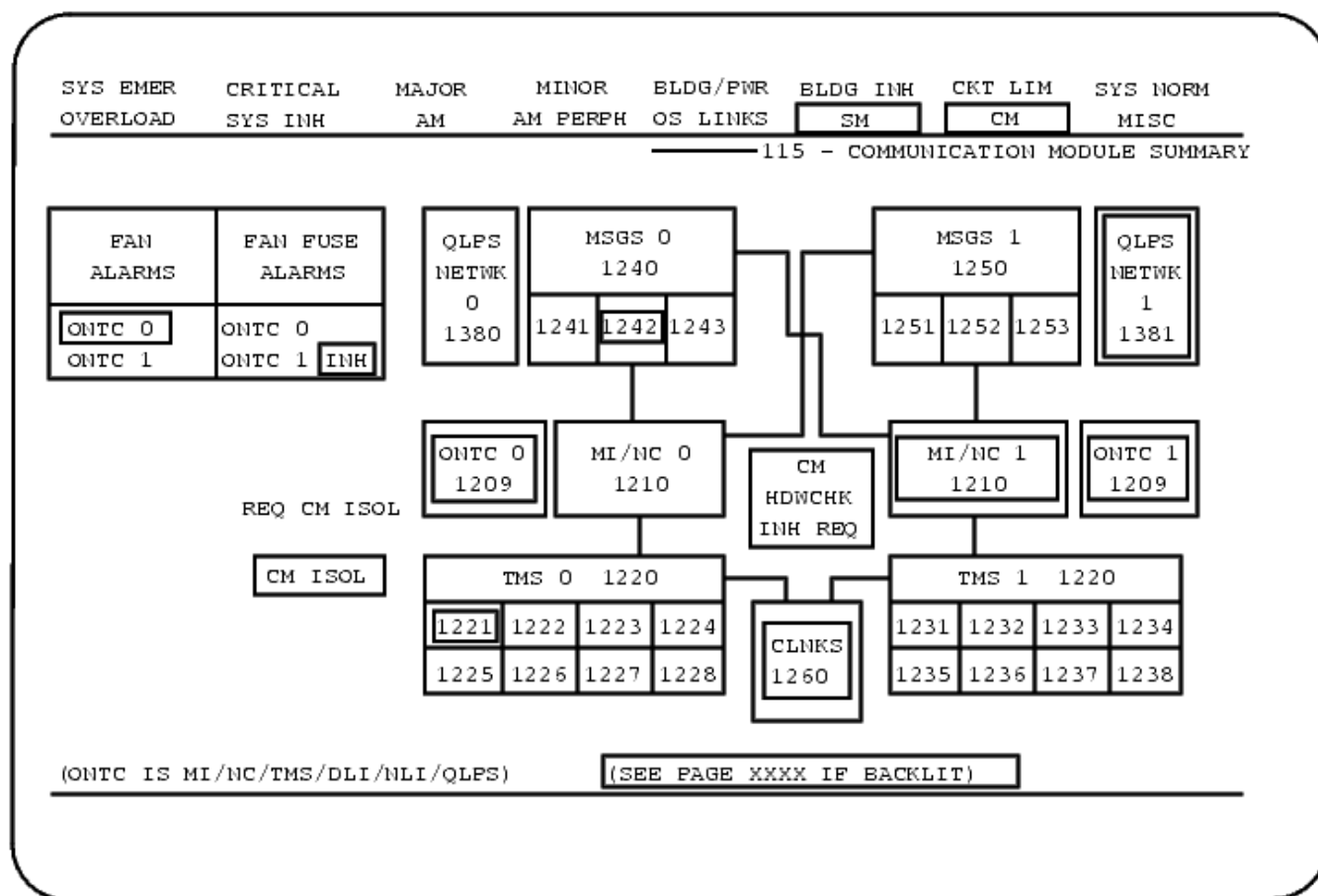


Figure 5-12 115 - Communication Module Summary (CM2 Version with QLPS) [5E12 and Later]

Abbreviations:

CLNKS	Communication Links	NC	Network Clock
CM	Communication Module	NETWK	Network
DLI	Dual Link Interface	NLI	Network Link Interface
HDWCHK	Hardware Check	ONTC	Office Network Timing Complex

INH Inhibit
ISOL Isolation
MI Message Interface
MSGS Message Switch

QLPS Quad Link Packet Switch
REQ Request
TMS Time-Multiplexed Switch

Figure 5-13 is an example of the CM2 version without QLPS equipped. This example is the same as Figure 5-12 except the QLPS NETWK information boxes are not present, and QLPS does not appear in the ONTC line at the left bottom of the screen.

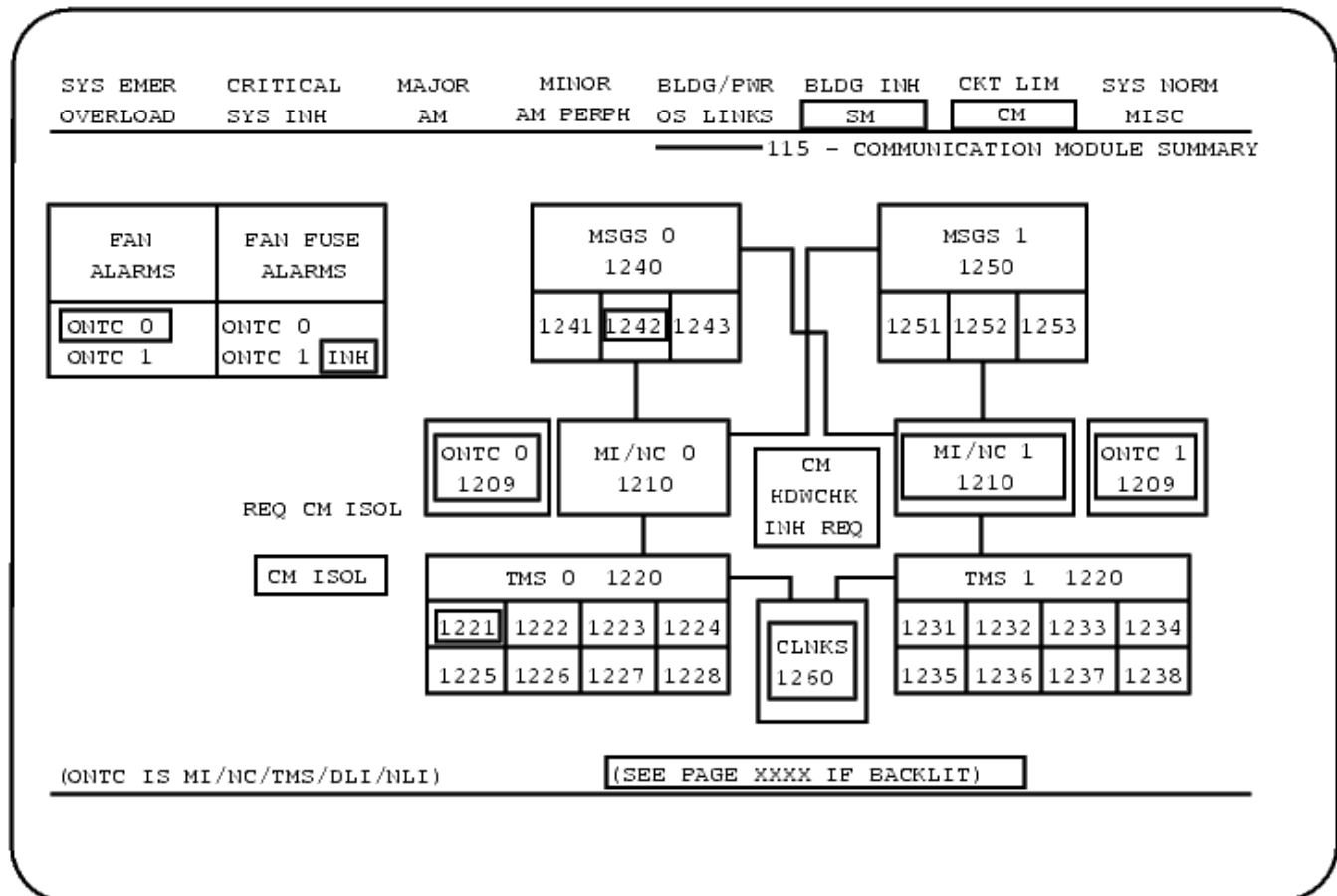
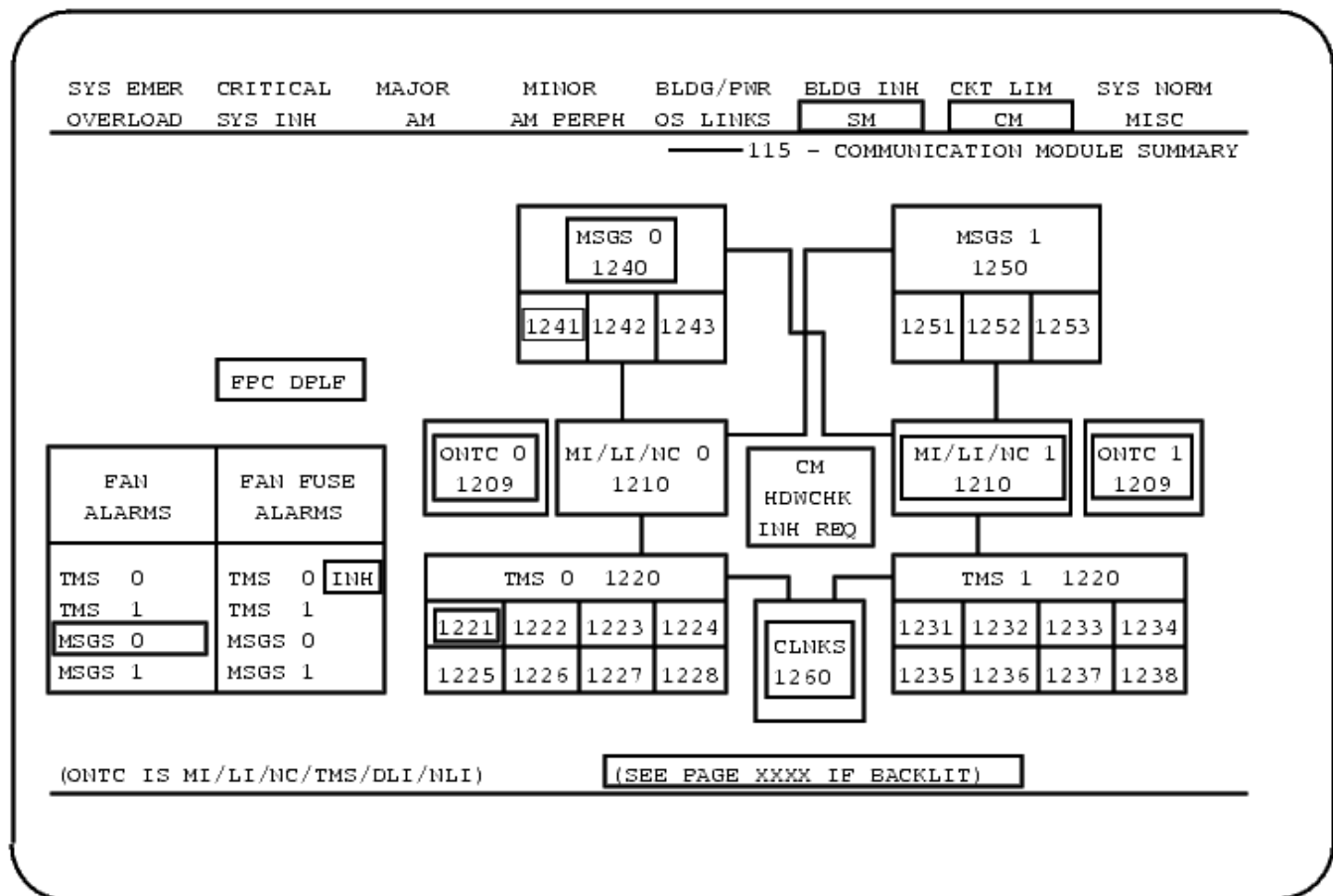


Figure 5-13 115 - Communication Module Summary (CM2 Version without QLPS) [5E12 and Later]

Abbreviations:

CLNKS	Communication Links	MSGS	Message Switch
CM	Communication Module	NC	Network Clock
DLI	Dual Link Interface	NLI	Network Link Interface
HDWCHK	Hardware Check	ONTC	Office Network Timing Complex
INH	Inhibit	REQ	Request
ISOL	Isolation	TMS	Time-Multiplexed Switch
MI	Message Interface		

Figure 5-14 shows an example of the CM1 Version with problems in MI/LI/NC 1, MSGS 0, TMS 0, CLNKS, ONTC 0, and ONTC 1. Further information on these problems would be found on displays 1210 - MI/LI/NC 0 & 1, 1240 - MSGS 0 SUMMARY, 1221 - TMS 0 - TMS LINKS 002 - 063, 1260 - CLNK SUMMARY, and 1209 - ONTC 0 & 1. Also, there is a fan alarm on MSGS 0, and the TMS 0 fan fuse alarm is inhibited. The FPC DPLF indicator shows that duplex failure is in effect.



pa 82167601

Figure 5-14 115 - Communication Module Summary (CM1 Version) [5E12 and Later]

Abbreviations:

CLNKS	Communication Links	MI	Message Interface
CM	Communication Module	MSG	Message Switch
DLI	Dual Link Interface	NC	Network Clock
DPLF	Duplex Failure	NLI	Network Link Interface
FPC	Foundation Peripheral	ONTC	Office Network Timing
	Controller		Complex
HDWCHK	Hardware Check	REQ	Request
INH	Inhibit	TMS	Time-Multiplexed Switch
LI	Link Interface		

5.11.3 Commands

There are no menu commands on the 115 display page. Commands for removing, restoring, diagnosing, etc., are listed on the related pages. There are no menu commands on the displays for fans or fan fuses. For fans or fan fuses, see CLR:FANALM in 235-600-700, *Input Messages Manual*.

All available display commands can be entered from the 115 display page.

5.12 116 - MISCELLANEOUS [5E12 and Later]

5.12.1 Purpose

The 116 display page provides status for various units/activities which do not fall under any other grouping.

5.12.2 General

The External Sanity Monitor (ESM) has indicators for alarm, inhibit, and power. If an alarm or an inhibit is present, the appropriate indicator will backlight. If power is off, the POWER indicator will backlight and the word OFF will be displayed.

The CALL MONITOR indicator shows whether the Call Monitor is inhibited or allowed. Entering the command **601** generates the message **INH:CALLMON** which will inhibit the monitor from making test calls and performing call completion analysis. This also clears the monitor's history data. The command **701** generates the message **ALW:CALLMON** which allows the monitor to start the cycle of making test calls and performing call completion analysis. Command **801** generates the message **RTR:CALLMON,ALARM** which retires the alarm indicator in the Call Monitor box. Command **901** generates the message **OP:CALLMON** which generates the OP CALLMON PAST 15 MINUTE REPORT on the ROP.

The indicators FRAME FUSE and FRAME FAN are for the miscellaneous frame. If a fuse or fan alarm is present on the miscellaneous frame, the corresponding indicator will backlight. The fuse must be replaced to correct the frame fuse alarm. The fan must be restored to operating condition to correct the frame fan alarm. The input command **CLR:FANALM,MFFAN** can be entered to clear the frame fan alarm after the alarm condition is fixed. If a system inhibit is present, the word INH will be displayed and backlighted to the right of the indicator label. The fuse and fan alarms can only be inhibited by the system. An inhibit means a scan point is chattering. The input command **ALW:ALM,MFFAN** can be entered to allow the scan point after the chattering problem is fixed.

The indicator GENERIC RETROFIT will backlight and change to GENERIC RETROFIT ACTIVE when software release (generic) retrofit is in progress.

The indicator ODD EVOL will backlight and change to ODD EVOL ACT when ODD Evolution is in progress. ODD Evolution is initiated by the command **BKUP:ODD,ODDEVOL** and stays in effect until the actual software release cutover takes place.

The indicator OSPS EVOL will backlight and change to OSPS EVOL ACT when OSPS Evolution is in progress. The OSPS Evolution is initiated by the command **BKUP:ODD,ODDEVOL** if the office has an OSPS configuration active. It stays in effect until the actual software release cutover takes place.

The indicator ODD WARNING will backlight when either the amount of ODD space being used has exceeded the engineering recommendations for the AM or the automatic relation engineering reorganization process has failed on one or more relations in the AM. Entering the command **902** generates the input message **OP:ODDWARN,AM** which will generate the OP ODDWARN output message on the ROP.

The RC BACKUP indicator normally shows NORMAL on the right part of the indicator. If RC Backup fails in the AM, the text NORMAL changes to FAILURE and the entire indicator backlights.

The MISCELLANEOUS ALARMS indicator has two subindicators: ALARM and INHIBIT. These subindicators are backlighted for any alarm and/or inhibit conditions present on the MISCELLANEOUS ALARMS display. For additional information, enter command **119**.

The next indicator, MTIB, will backlight if an off-normal condition exists on the MTIB display. Enter command **127** for further details.

In the CUTOVER indicator, the word ACTIVE will backlight if an off-normal condition exists on the CUTOVER display (cutover enabled, for example). Further information can be found on display 197 - CUTOVER.

The indicator BWM AUTOMATION will backlight when the BWM automation process is halted for any reason.

The indicator SM/CMP FILE shows NORMAL (in the right portion of the indicator) while the system is operating normally. If the UPD:HSCHK audit finds hashsum errors on any of the SM/SM peripheral/CMP text images, the indicator will backlight and NORMAL changes to HASHERR. For more information, analyze the last output message from the UPD:HSCHK command (on the ROP) or request a summary report of the errors via the UPD:HSCHK,REPT option of the command. The indicator is cleared when the cause of the disk hashsum error has been corrected and the UPD:HSCHK audit is re-run.

Any off-normal condition will cause the MISC indicator in the SUMMARY STATUS AREA at the top of the screen to backlight.

Figure 5-15 is an example of the 116 display page which shows an alarm and an inhibit present on 119 - MISCELLANEOUS ALARMS. Also, something is off-normal on Page 127 - MTIB STATUS and Page 1941 - BWM Automation. There are hashsum errors on the SM or CMP. These conditions have caused the MISC status summary indicator at the top of the screen to backlight.

In 5E12 software update an RC Log Warning indicator is provided on the 116 page. A major alarm occurs and this indicator is backlit when the RC log files approach full capacity. The new 903 poke provides additional information.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: █				116 - MISCELLANEOUS			
INHIBIT							
600 ESM							
601 CALL MONITOR							
				ESM		INHIBIT	
				ALARM			
				POWER			
ALLOW							
700 ESM							
701 CALL MONITOR							
				FRAME FUSE		FRAME FAN	
				GENERIC RETROFIT			
RETIRE							
800 EXIT PILOT LAMPS							
801 CALL MONITOR ALM							
				ODD EVOL		OSPS EVOL	
				ODD WARNING		RCLOG WARNING	
OUTPUT							
901 CALL MONITOR							
902 ODD WARNING							
				RC BACKUP		NORMAL	
				MISCELLANEOUS ALARMS			
				ALARM		INHIBIT	
				SEE PAGE 119			
				SM/CMP FILE HASHERR			
				MTIB SEE PAGE 127			
				CUTOVER			
				SEE PAGE 197			
				BWM AUTOMATION			
				SEE PAGE 1941			

Figure 5-15 116 - Miscellaneous [5E12 and Later]

Abbreviations:

ALM	Alarm	MTIB	Metallic Test Interface Bus
CMP	Communication Module Processor	ODD	Office Dependent Data
ESM	External Sanity Monitor	OSPS	Operator Services Position System
HASHERR	Hashsum Error	RC	Recent Change

5.12.3 Commands

Commands are provided on the 116 page to inhibit, allow, retire, and output as follows:

CMD	RESULT
600	External Sanity Monitor is inhibited (INH:ALM,ESM)
601	Call Monitor is inhibited (INH:CALLMON)
700	External Sanity Monitor is allowed (ALW:ALM,ESM)
701	Call Monitor is allowed (ALW:CALLMON)
800	Exit Pilot Lamps are cleared (retired) (CLR:LAMPS)
801	Call Monitor alarm is retired (RTR:CALLMON,ALARM)
901	Call Monitor history is output (OP:CALLMON)
902	ODD WARNING information is output (OP:ODDWARN,AM)
903	LOG WARNING information is output (OP:RCSTAT,AM)

5.13 117 - IOP AP DATA LINKS [5E12 and Later]

5.13.1 Purpose

The purpose of the 117 page display is to provide a summary of information associated with the application processor data links (APDL).

5.13.2 General

The 113 page indicates that maintenance personnel can display the 117 page, if desired.

The following items contain detailed information concerning each field in the 117 page display:

- **LINK:** This field identifies the link by name (for example, APDL01). The 01 attached to the APDL is the link number of the link that is added to tuple relation RLCMAPDATA. The link number is between 1 and 6 that corresponds to the number assigned to that link via the RC/V view 24.1.
- **PORT:** This field indicates the data link connected to the administrative module-input/output processor (AM-IOP).
- **MODULE:** This field indicates the data link is connected to the AM-IOP.
- **DEVICE:** This field identifies the PC port and the hardware status. The possible states are as follows: active (ACT), out-of-service (OOS), initialization (INIT), or growth (GROW). Also, the UCB of the SDL is indicated. For example, in **SDL 42 OOS**, 42 is the UCB of the SDL.
- **PC NAME:** This field identifies the PC on which the port is located. For application processor (AP) data links, there is only one port per PC.
- **SITE_ID:** This field identifies the AP to which the link is connected (also known as the AP). The SITE_ID number matches the key field on RC/V view 24.1.
- **SESSION:** This field indicates the BX.25 session status over a given link. The possible states are as follows: connected (CONN), disconnected (DISC), or initialization (INIT).

Figure 5-16 shows an example of the 117 page display.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: — 117 - IOP AP DATA LINKS							
DISPLAY							
121 IOP 0 & 1 (PC STATUS)	LINK	PORT	MODULE	DEVICE	PC NAME	SITE — ID	SESSION
122 IOP 2 & 3 (PC STATUS)	APDL 01	IOP	0	SDL 32 ACT	SDLC 32	10	CONN
	APDL 02	IOP	0	SDL 34 ACT	SDLC 34	10	CONN
1480,X - SM X AP DATALINK DSLs	APDL 03	IOP	0	SDL 36 ACT	SDLC 36	20	CONN

Figure 5-16 117 - IOP AP Data Links [5E12 and Later]

Abbreviations:

ACT	Active	IOP	Input/Output Processor
AP	Application Processor	PC	Peripheral Controller
APDL	Application Processor Data Link	SDL	Synchronous Data Link
CONN	Connected	SDLC	SDL Controller
DSLs	Digital Subscriber Lines		

5.13.3 Commands

Any of the available page displays can be accessed from the 117 page display.

CMD	RESULT
121	Peripheral controller status is displayed — IOP 0 & 1
122	Peripheral controller status is displayed — IOP 2 & 3

5.14 118 - COMMON NETWORK INTERFACE (CNI) RING STATUS [5E12 and Later]**5.14.1 Purpose**

The purpose of the 118 page is to give the status of the 5ESS®-2000 switch CNI hardware and CCS signaling links by providing information on the individual ring nodes and signaling link states.

5.14.2 General

The 118 page is divided into five basic areas: upper left, upper center, upper right, lower left, and lower right. The upper left area (RING STAT) shows the CNI ring status and automatic ring recovery (ARR) information. The upper center area (STATUS) shows office signaling status. The upper right area (ALARMS) shows the fan and fuse alarm status for CNI hardware. The lower left area (GRP/MEM) shows the status of each CNI group with its associated ring nodes and signaling links. The lower right area shows a listing of up to 10 INACCESSIBLE POINT CODES.

Following are descriptions of the upper left area indicators:

RING STAT Indicator

The purpose of this indicator is to show the state of the CNI ring. Following is a list of the possible states and their meanings:

- **ACTIVE:** The CNI ring has all nodes active.
- **DOWN:** The CNI ring has a critical problem; CCS call processing cannot be completed.
- **ISOLATED SEGMENT:** The ring has one or more nodes under diagnostics which requires a quarantine or isolation of the node.
- **RESTORING:** The node is being pumped and should go ACTIVE soon.
- **CONFIGURING:** The ring has just RESTORED a node and is propagating the token to allow the node back into service with the rest of the ring.

ARR Indicators

The ARR indicators are not seen on the 118 page until a node is faulted. Once a node is down and ARR attempts to recover the node, the appropriate indicator is displayed and lighted. The ARR has three indicators which appear at the upper left corner of the 118 page just under RING STAT. The ARR indicators show the type of recovery being done and the group/member number of the node currently being worked on. If more than one node is down, an **OP:DMQ** may be performed at the bottom of the MCC to see if the node has been queued for restoral by ARR.

Critical Node Recovery (CNR) is a higher automatic level of node recovery than ARR. The CNR is invoked when there is a duplex failure of CCS link nodes. Automatic Critical Node Recovery (ACNR) is also a higher automatic level of node recovery than ARR. The ACNR is invoked when there is a duplex failure of the Direct Link Nodes (DLN).

Following are possible outputs of the three indicators.

- ***First Indicator***

- **ARR UCL:** The ARR attempts to restore the node without running diagnostics.
- **ARR COND:** The ARR attempts to restore the node but runs diagnostics first.
- **CNR UCL:** The ARR detects a duplex failure, and restoration of the node is done without running diagnostics.
- **CNR COND:** The ARR detects a duplex failure, and the node undergoes diagnostics before restoration.

- ***Second Indicator***

- **ARR RSTRT:** The ARR is restarting the node.

— **CNR RSTRT:** The ARR detects a duplex failure and is restarting the node.

- **Third Indicator**

— **ACNR UCL:** The ARR detects a duplex failure of the DLNs, and an unconditional restoral is performed on the DLN listed.

— **ACNR COND:** The ARR detects a duplex failure of the DLNs, and diagnostics is run before restoring the node.

— **ACNR RSTRT:** The ARR detects a duplex failure of the DLNs and is restarting the DLN listed.

The upper center area of the display contains information on the status of direct signaling (DSIG), trunk signaling (TSIG), and transaction capability (TCAP). The STATUS box includes the following:

- **DSIG Status:** Following are the DSIG states:

— **DSIG ACT:** If the GLDSSPEED is 48 and office is equipped with 4.8 kbps links, or if the GLDSSPEED is 560 and office is equipped with 56 kbps links, the status indicator block contains ``DSIG ACT" (indicating the appropriate links are active).

— **DSIG OOS:** If the GLDSSPEED is 48 and the office is equipped with 4.8 kbps links, or if the GLDSSPEED is 560 and the office is equipped with 56 kbps links, and the link (4.8 kbps or 56 kbps) is OOS, the status indicator block contains ``DSIG OOS".

— **DSIG UNEQ:** If the GLDSSPEED is 48 and the office is only equipped with 56 kbps links, or if the GLDSSPEED is 560 and the office is only equipped with 4.8 kbps, the status indicator block contains ``DSIG UNEQ".

— **DSIG INIT:** If the CNI hardware is performing an initialization, the status indicator block contains ``INIT". During CNI software initializations, CCS call processing is not available, and no other information on the display page can be considered accurate until the initialization has completed.

— **DSIG DGR:** If signaling is equipped and active, but a problem exists (such as signaling link or DLN congestion) that may prevent some messages from being routed, the status indicator block contains ``DSIG DGR".

- **TSIG Status:** Following are the TSIG states:

— **TSIG ACT:** If the RLPCIPRT relation has tuples populated and one of the available links is active, the status indicator block contains ``TSIG ACT".

— **TSIG OOS:** If the RLPCIPRT relation has tuples populated and all available links are OOS, the status indicator block contains ``TSIG OOS".

— **TSIG UNEQ:** If the RLPCIPRT relation has no tuples populated, the status indicator block contains ``TSIG UNEQ".

— **TSIG INIT:** If the CNI hardware is performing an initialization, the status indicator block contains ``INIT". During CNI software initializations, CCS call processing is not available, and no other information on the display page can be considered accurate until the initialization has completed.

— **TSIG DGR:** If signaling is equipped and active, but a problem exists (such as signaling link or DLN

congestion) that may prevent some messages from being routed, the status indicator block contains ``TSIG DGR".

- **TCAP Status:** Following are the TCAP states:

- **TCAP ACT:** If the RLDS_APP relation has tuples populated and the 56 kbps links are active, the status indicator block contains ``TCAP ACT".
- **TCAP OOS:** If the RLDS_APP relation has tuples populated and the 56 kbps links are OOS, the status indicator block contains ``TCAP OOS".
- **TCAP UNEQ:** If the RLDS_APP relation has no tuples populated, the status indicator block contains ``TCAP UNEQ".
- **TCAP INIT:** If the CNI hardware is performing an initialization, the status indicator block contains ``INIT". During CNI software initializations, CCS call processing is not available, and no other information on the display page can be considered accurate until the initialization has completed.
- **TCAP DGR:** If signaling is equipped and active, but a problem exists [such as signaling link or DLN congestion, some (but not all) local subsystems OOS, or a pair (but not all pairs) of Global STPs inaccessible] that may prevent some messages from being routed, the status indicator block contains ``TCAP DGR".

The upper right area of the display contains the ALARMS box which shows the status of fan, fuse, and power alarms on CNI, Digital Facility Access (DFA), and Analog Facility Access (AFA) frames. The ALARMS box also indicates if an alarm is inhibited. The three alarm (ALM) indicators are as follows:

- **FAN ALM:** The CNI frame has three fans located at the bottom of the frame cabinet. When either of the fans stops operating at normal RPM frequency, the alarm sounds. Normally, this condition is caused by power interruption to the fan. After corrective action has been taken, the manual reset button located on the lower right corner of the backplane is used to reset the fan alarm circuitry.
- **FUSE ALM:** The fuse alarm is triggered when a fuse in the CNI equipment blows. The blown fuse can be in either the Ring Node cabinet that furnishes power to nonconverter circuits, the AFA cabinet, or the DFA cabinet. An indicator fuse is used to identify the location of the blown power fuse. To replace the power fuse, follow guidelines in 235-105-220, *Corrective Maintenance Procedures*.
- **PWR ALM:** The power alarm indicates that one of the 495FA power converters has lost the ability to furnish power because a blown fuse removes power from the converter or the converter itself fails. When this occurs, the node(s) associated with that particular converter goes OOS. If a blown power fuse is the cause of the problem, a smaller indicator fuse also blows to help identify the bad power fuse. To replace the power fuse, follow guidelines in 235-105-220, *Corrective Maintenance Procedures*.

The upper right area also contains a DISPLAY section that lists pages to access for more information.

The lower left area of the page contains a multicolumned box that shows the major state of the nodes and the minor state of the links for each group and member supported. There are two indicators within each member box; the upper is the node major state, and the lower is the link minor state. The major and minor states are as follows:

Node Major States

- **ACT:** Indicates node is active

- **OOS:** Indicates node is out of service
- **STBY:** Indicates node is in standby mode
- **GROW:** Indicates node is in the growth state
- **UNEQ:** Indicates node is unequipped.

Link Minor States

- **IS:** Indicates link is in service
- **OOS:** Indicates link is out of service
- **MOOS:** Indicates link is manual out of service
- **GROW:** Indicates link is in the growth state
- **TEST:** Indicates link is being tested
- **UNAV:** Indicates link is not available.

When DLNs are equipped, they are assigned to link member 2 in the group and are identified by the asterisk (*). In this case, the AP state is displayed in the bottom portion of the box. Possible AP states are as follows:

AP States

- **ACT:** Indicates AP is active
- **INIT:** Indicates AP is initializing
- **OOS:** Indicates AP is out of service
- **STBY:** Indicates AP is in standby mode.

The lower right area of the 118 page contains a listing of up to 10 point codes to which an office has trunking but are inaccessible. All inaccessible point codes are printed on the ROP. If the number of inaccessible point codes exceeds 10, the message

EXCEEDS LIMIT
SEE ROP

appears under the listing.

Any off-normal condition of the nodes or links causes the "SEE PAGE 118" indicator on the 111/112 page to backlight along with the respective node or link indicators on the 118 page. In the SUMMARY STATUS AREA, the AM PERPH critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, backlights.

Figure 5-17 shows an example of the 118 page. In this example, the number of inaccessible point codes exceeds 10, and the user is directed to see the ROP.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

118 - CNI RING STATUS									
RING STAT: ISOLATED SEGMENT MINMODE				STATUS		ALARMS		DISPLAY	
ARR	UCL	LN00	01	DSIG	UNEQ	FAN	ALM	INH	1520 NODE STATUS
ARR	RSTRT	LN00	02	TSIG	OOS	FUSE	ALM	INH	1521, GRP LINK STAT
ACNR	RSTRT	LN00	03	TCAP	DGR	PWR	ALM	INH	1523 SUBSYSTEM STAT
GRP / MEM	0	1	2	3	4	5	6	7	8
34 NODE									
LINK									
33 NODE									
LINK									
32 NODE	+ACT	OOS	*STBY	GROW	UNEQ	OOS	OOS		
LINK		IS	OOS	MOOS	GROW	TEST	UNAV		
02 NODE									
LINK									
01 NODE									
LINK									
00 NODE	+OOS	OOS	*OOS	OOS	OOS	OOS	OOS		
LINK		MOOS	MOOS	MOOS	MOOS	MOOS	MOOS		
+ RPCN	* DLN								

INACCESSIBLE
POINT CODES
123456780
123456781
123456782
123456783
123456784
123456785
123456786
123456787
123456788
123456789
EXCEEDS LIMIT
SEE ROP

Figure 5-17 118 - CNI Ring Status [5E12 and Later]

Abbreviations:

ACNR	Automatic Critical Node Recovery	MINMODE	Minimum Configuration Mode
ACT	Active	MOOS	Manual Out of Service
ALM	Alarm	OOS	Out of Service
ARR	Automatic Ring Recovery	PWR	Power
DLN	Direct Link Node	RPCN	Ring Peripheral Controller Node
DSIG	Direct Signaling	RSTRT	Restart
GROW	Growth	STAT	Status
GRP	Group	STBY	Standby
INH	Inhibit	TCAP	Transaction Capability
IS	In Service	TSIG	Trunk Signaling
LNxx	Link Node (Number)	UCL	Unconditional
MEM	Member	UNAV	Unavailable
		UNEQ	Unequipped

5.14.3 Commands

There are no commands on the 118 page.

All available displays can be accessed from the 118 page.

5.15 119 - MISCELLANEOUS ALARMS [5E12 and Later]**5.15.1 Purpose**

The 119 display page summarizes status and assignment and provides inhibit/allow controls for miscellaneous alarms.

5.15.2 General

Miscellaneous Alarms are office assignable. The alarm level, text, and repeatability status in these indicators are initially filled in using a TTY input message (**CHG:ALM,MISC**=miscellaneous alarm number, **TAG**=text to be filled in, **LVL**=CR, MJ, MN, or IF, **REPEAT**= Y or N). Once these indicators are filled in, they are protected from loss if the system is booted.

When an alarm condition occurs and is not inhibited, the respective display indicator backlights to the TROUBLE state. This in turn causes ALARM to backlight in the Miscellaneous Alarms Indicator on Page 116. In the SUMMARY STATUS AREA, the associated alarm level (CRITICAL, MAJOR, or MINOR) backlights, MISC starts flashing, and an audible alarm is sounded.

When an alarm is inhibited, the respective indicator shows INH backlighted. On Page 116, INHIBIT in the Miscellaneous Alarms Indicator also backlights. The MISC indicator at the top of the screen backlights to the TROUBLE state.

If any alarm is activated when it is marked as repeating (``+" shown next to the alarm level), it will repeat every fifteen minutes until the stimulus for the alarm is cleared or the alarm is inhibited.

Figure 5-18 is an example of the 119 display page in which indicator 00 shows a repeating alarm, indicator 03 shows a major alarm caused by a failure in the MFT bay, and indicator 06 shows the SLC[®] P/M 1 is inhibited from triggering an alarm.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD: 119 - MISCELLANEOUS ALARMS

6XX INHIBIT ALARM XX 7XX ALLOW ALARM XX (XX = 00 TO 47)

MISCELLANEOUS ALARMS (+ = REPEATING)

00	D4 CXR	+MJ	12		MJ	24		MJ	36		MJ
01	RING PLNT	MJ	13		MJ	25		MJ	37		MJ
02	F SIG BAY	MJ	14		MJ	26		MJ	38		MJ
03	MFT BAY	MJ	15		MJ	27		MJ	39		MJ
04	SLC 96	MN	16		MJ	28		MJ	40		MJ
05	SLC PGTC	MN	17		MJ	29		MJ	41		MJ
06	INH SLC P/M 1	MJ	18		MJ	30		MJ	42		MJ
07	SLC P/M 2	MN	19		MJ	31		MJ	43		MJ
08	FSIG	MN	20		MJ	32		MJ	44		MJ
09	MFT	MN	21		MJ	33		MJ	45		MJ
10	MISC	MN	22		MJ	34		MJ	46		MJ
11	MISC	MN	23		MJ	35		MJ	47		MJ

Figure 5-18 119 - Miscellaneous Alarms [5E12 and Later]

Abbreviations:

D4 CXR	D4 Carrier	MJ	Major
F SIG	F-Signaling	MN	Minor
INH	Inhibited	PGTC	Pair Gain Test Controller
MFT	Metallic Facility Terminal	PLNT	Plant
MISC	Miscellaneous		

5.15.3 Commands

Commands are provided to inhibit and allow the miscellaneous alarms.

All available displays are accessible from the 119 display page.

CMD	RESULT
6XX	Miscellaneous Alarm XX is inhibited (INH:ALM,MISC=XX)
7XX	Miscellaneous Alarm XX is allowed (ALW:ALM,MISC=XX)

5.16 120 - MESSAGES [5E12 and Later]**5.16.1 Purpose**

Display Page 120 provides full-page TTY message viewing.

5.16.2 General

When Page 120 is displayed, TTY messages scroll into the region normally used for displays.

Figure 5-19 is an example of the 120 display page.

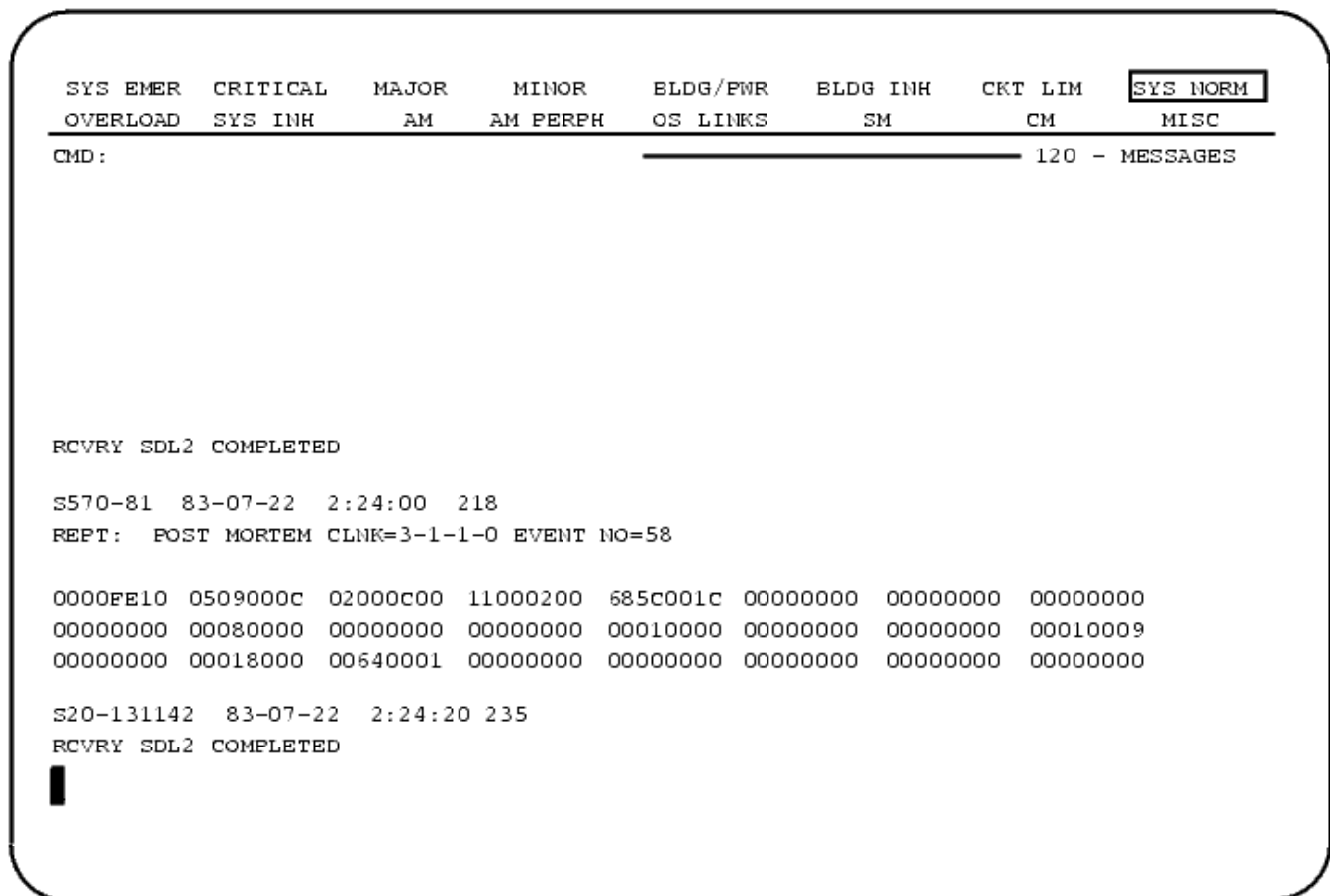


Figure 5-19 120 - Messages [5E12 and Later]

5.16.3 Commands

There are no commands for the 120 page.

5.17 121 - IOP 0 AND 1 AND 122 - IOP 2 AND 3 [5E12 and Later]

5.17.1 Purpose

The purpose of the 121 and 122 pages is to provide status and assignment of all input/output processor (IOP) peripheral control devices.

5.17.2 General

The displays for IOP 0 and 1 and IOP 2 and 3 are very similar.

Each IOP has 16 slots for peripheral control devices. Any or all of these slots can be assigned.

In the example shown in Figure 5-20, scanner and signal distributor controller (SCSDC) 4 and SCSDC 6 are out of service. This causes the SEE PAGE 121 indicator on Page 111/112 to backlight, which in turn backlights the AM

PERPH indicator at the top of the display.

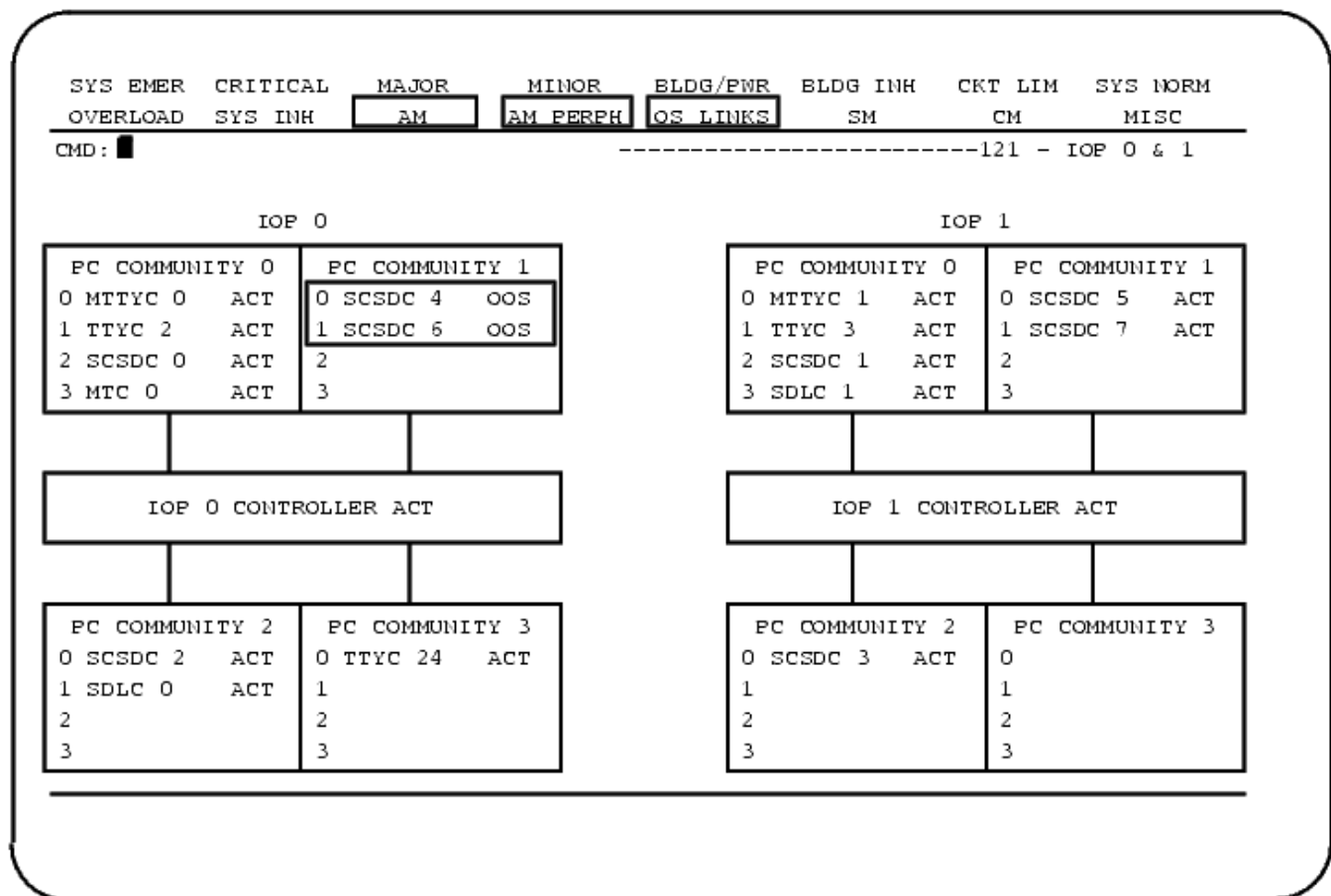


Figure 5-20 121 - IOP 0 and 1 [5E12 and Later]

Abbreviations:

IOP	Input/Output Processor	SDLC	Synchronous Data Link Controller
MTC	Magnetic Tape Controller	SCSDC	Scanner and Signal Distributor Controller
MTTYC	Maintenance Teletypewriter Controller	TTYC	Teletypewriter Controller
PC	Peripheral Controller		

5.17.3 Commands

There are no maintenance commands available from the display for the IOP PC devices. To remove, restore, or diagnose a device, the appropriate TTY input message must be entered instead.

Remove messages have the form RMV:dev=a, where a is the device number. For example, to remove MTTYC 0, the input message is **RMV:MTTYC=0**.

Restore and diagnose messages are the same, except for the verb. For example, to diagnose SCSDC 4, the input message is **DGN:SCSDC=4**.

All available page commands can be entered from the 121 and 122 display pages.

5.18 123 - DISK FILE CONTROLLER STATUS (5E12 and Later)

5.18.1 Purpose

The purpose of the 123 display page is to provide status and maintenance commands for two disk file controllers (DFC) and up to 16 moving head disks (MHD). It also provides status and commands for disk independent operation when both essential disks are lost and status of the **Auto MHD Configuration** feature.

If there are more than two DFCs in the system, a second DFC Status page (Page 125) is used. The format of the 125 page is the same as the 123 except the AUTO MHD CONFIGURATION status is not shown; it appears only on Page 123.

5.18.2 General

The 123 page has three separate and distinct functions.

The first function of this page is to provide status and maintenance commands for DFCs 0 and 1 and associated MHDs (up to 16). If the system is equipped with SCSI, this page also provides status and maintenance commands for SBUSes (up to four).

The second function is to provide status and commands during disk independent operation (DIOP). When both of the MHDs that are marked E (essential) go out of service, this page is automatically displayed. This is called full DIOP. The appropriate menu commands to use under these circumstances are the 600 series of commands. When in full DIOP, the 607 and 620 commands will appear. The 607 command allows the contents of a digital audio tape (DAT) for multi-volume format tapes to be displayed.

NOTE: The 607 command is displayed and functional only if a DAT is equipped and only in conjunction with a 3B21D computer.

The 620 command allows the MHD to be reloaded from tape without bringing down call processing during the reading of the tape. When the MHD has been reloaded, a minimum of a 52 boot is required. The other 600 series commands, with the exception of the 699 poke, may be used also when not in DIOP. The 699 poke works only in full DIOP. Both the 602 poke to restore the DFC controller and the 604 poke to restore the SBUS controller require UCL when the system is in full DIOP. These pokes (602/604) will not restore associated subunits (MHDs) to prevent accidental disk restoral during disk maintenance.

If only one of the essential MHDs goes out of service, the MHDs are in simplex operation (Figure 5-21), but the page is not automatically displayed.

During full DIOP, the area at the bottom of the page between the two horizontal lines will display output messages for the 600 series menu commands.

The third function of the 123 page is to provide for the display of the Automatic MHD Configuration feature. The AUTO MHD CONFIGURATION data displayed on 123 page is a summary status of information from Pages 178, Auto Spare Disk, and 179, Disk Configuration.

Possible values of the Automatic MHD Configuration feature are as follows:

- (a) **AUTO MHD CONFIGURATION READY:** The feature is armed and ready to run if needed.
- (b) **SEE PAGE 179, CONFIG MHDs ...:** The listed MHDs have been reconfigured; see Page 179 for more data.
- (c) **AUTO MHD CONFIGURATION OFF:** The feature is turned off.
- (d) **MHD CONFIG INHIBITED, SEE PAGE 178:** The feature is blocked on one or more MHDs or the entire office; see Page 178 for more data.
- (e) **MHD CONFIG IN PROGRESS, SEE PAGE 178:** An MHD configuration is in progress; see Page 178 for

more data.

There are two columns of notations on the right side of each of the MHD status columns. The first of the two columns contains one of the following two letters:

- **Y** - (Yes): This means the MHD was diagnosed or restored since the last system initialization and appears to be usable.
- **N** - (No): This means the MHD was not diagnosed or restored since the last system initialization and does not appear to be usable.

The second column contains the letter **E** which signifies that the associated MHD is essential.

The upper two display fields, **OPTION LEVEL** and **CURRENT LEVEL**, inform the user of the optional disk independent operation feature level selected for the operating system and the current disk independent operation state the operating system is in.

The **OPTION LEVEL** displayed will be one of the following:

- **NODIOP**: Disk independent operation feature is not selected.
- **UCLDIOP**: Unconditional disk independent operation is selected.

The **CURRENT LEVEL** displayed will be one of the following:

- **NORMAL**: Normal operating system without disk independent operation mode.
- **SIMPLEX**: Operating system running with at least one essential MHD out of service.
- **DUPLEX**: Operating system is running with all duplex essential MHDs active.
- **CONDITIONAL DIOP**: Operating system is in conditional disk independent operation mode with the last remaining duplex essential MHD about to be removed from service.
- **FULL DIOP**: Operating system is running with a duplex essential pair of MHDs out of service.

For each unit displayed, the following information is shown:

- Major state of the unit
- Minor state of the unit (if available)
- Usability of the unit (Y = usable, N = unusable)
- Essential status of the unit (E = essential, M = manually nonremovable, blank = nonessential)
- Microcode status (FIRMWARE or PUMPCODE) for the DFC (FIRMWARE indicates that there is a problem on PUMPCODE)
- Overload status of a DFC.

Figure 5-21 shows the simplex version of the DFC status page for an office with SMD only. In this example, one of the essential MHDs (MHD 1) is OOS, so the current level is marked as **SIMPLEX**. The OOS MHD caused the AM

PERPH indicator at the top of the page to be backlighted. The automatic MHD configuration feature is ready.

When the simplex mode is entered, the system begins to lock essential, nonswappable processes from disk into core (AM memory). Upon completion of the locking process, the system will print the message, **REPT DIOP SIMPLEX PROCESSING COMPLETED**. If the system has problems in locking the essential processes into core, it will print the message, **REPT DIOP SIMPLEX UNSWAP FAILURE PID=xx** (xx = utility ID of process that failed to lock into memory). This message will reprint every five minutes until the locking process is completed.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
123 - DFC 0 & 1 STATUS							
2XX RMV MHD XX	600 INIT MHD					677 SET MSG LVL	
5XX DGN MHD XX	601 VFY MHD		605 RST MHD			688 CLEAR BUFF	
	602 RST DFC						
	603 DUMP DEFECT					6XX,h HELP	
AUTO MHD CONFIGURATION READY							
OPTION LEVEL = UCLDIOP				CURRENT LEVEL = SIMPLEX			
DFC-0	ACT	Y	FIRMWARE	DFC-1	ACT	Y	FIRMWARE
MHD-0	ACT	Y E		MHD-1	OOS	N E	
MHD-2	ACT	Y M		MHD-3	OOS	N M	
MHD-14	ACT	Y		MHD-15	ACT	Y	

Figure 5-21 123 - Disk File Controller Status SMD (Simplex Version) (5E12 and Later)

Abbreviations:

ACT	Active	MHD	Moving Head Disk
AUTO	Automatic	MSG	Message
BUFF	Buffer	N	No (Disk does not appear to be usable)
DEFECT	Defective	OOS	Out of Service
DFC	Disk File Controller	RMV	Remove
DGN	Diagnose	RST	Restore
E	Essential	UCLDIOP	Unconditional DIOP
INIT	Initialize	VFY	Verify
LVL	Level	Y	Yes (Disk appears to be usable)
M	Manually Nonremovable		

Figure 5-22 shows the SMD FULL DIOP version.


```

SYS EMER  CRITICAL  MAJOR  MINOR  BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH   AM     AM PERPH OS LINKS  SM       CM       MISC
----- 123 - DFC 0 & 1 STATUS

        600 INIT MHD
        601 VFY MHD
        602 RST DFC
        603 DUMP DEFECT
        AUTO MHD CONFIGURATION OFF
        OPTION LEVEL = UCLDIOP
        DFC-0  ACT  Y      PUMPCODE
        MHD-0  OOS  N E
        MHD-2  ACT  Y M
        MHD-4  ACT  Y M
        MHD-6  ACT  Y M
        MHD-8  ACT  Y M
        MHD-10 GROW N M
        MHD-12 GROW N M
        MHD-14 GROW N

        605 RST MHD
        620 LOAD MHD
        CURRENT LEVEL = FULL DIOP
        DFC-1  ACT  Y      FIRMWARE
        MHD-1  OOS  N E
        MHD-3  OOS  N M
        MHD-5  OOS  N M
        MHD-7  ACT  Y M
        MHD-9  OOS  N M
        MHD-11 GROW N M
        MHD-13 GROW N M
        MHD-15 GROW N

```

Figure 5-22 123 - Disk File Controller Status SMD (Full DIOP Version) (5E12 and Later)

Abbreviations:

ACT	Active	LVL	Level
AUTO	Automatic	M	Manually Nonremovable
BUFF	Buffer	MHD	Moving Head Disk
CMD	Command	MSG	Message
CMP	Completed Jobs	N	No (Disk does not appear to be usable)
DEFECT	Defective	OOS	Out of Service
DFC	Disk File Controller	RMV	Remove
DGN	Diagnose	RST	Restore
E	Essential	UCLDIOP	Unconditional DIOP
INIT	Initialize	VFY	Verify
IP	In Progress	Y	Yes (Disk appears to be usable)

Figure 5-23 shows the duplex version of the DFC status page for a 3B21D office with SCSI only or with both SMD and SCSI. The only difference between the SCSI and SMD versions of the 123 page is the addition of ``SBUS 0 SBUS 2" under DFC 0, ``SBUS 1 SBUS 3" under DFC 1 on the SCSI version, and command 604 for RST/RMV SBUS.

```

SYS EMER  CRITICAL  MAJOR      MINOR      BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH   AM        AM PERPH  OS LINKS  SM        CM        MISC

123 - DFC 0 & 1 STATUS

2XX RMV MHD XX    600 INIT MHD          604 RST/RMV SBUS    677 SET MSG LVL
5XX DGN MHD XX    601 VFY MHD          606 RST MT        688 CLEAR BUFF
                  602 RST DFC
                  603 DUMP DEFECT
                  6XX,h HELP

AUTO MHD CONFIGURATION OFF

OPTION LEVEL = UCLDIOP          CURRENT LEVEL = DUPLEX

DFC-0  ACT  Y      PUMPCODE      DFC-1  ACT  Y      PUMPCODE
SBUS-0  ACT  Y  SBUS-2  ACT  Y  SBUS-1  ACT  Y  SBUS-3  ACT  Y
MHD-0  ACT  Y E  MHD-2  ACT  Y  MHD-1  ACT  Y E  MHD-3  INIT RST N
MHD-4  GROW  N  MHD-6  ACT  Y  MHD-5  GROW  N  MHD-7  ACT  Y
MHD-8  ACT  Y  MHD-10 ACT  N  MHD-9  GROW  N  MHD-11 GROW  N
MHD-14 GROW  N  MHD-12 ACT  N  MHD-15 GROW  N  MHD-13 GROW  N
MT-0   ACT  Y

```

Figure 5-23 123 - Disk File Controller Status SCSI (3B21D Duplex Version) (5E12 and Later)

Abbreviations:

ACT	Active	MSG	Message
AUTO	Automatic	MT	Magnetic Tape
BUFF	Buffer	N	No (Disk does not appear to be usable)
CMP	Completed Jobs	OOS	Out of Service
DEFECT	Defective	RMV	Remove
DFC	Disk File Controller	RST	Restore
DGN	Diagnose	SBUS	SCSI Bus
E	Essential	UCLDIOP	Unconditional DIOP
INIT	Initialize	VFY	Verify
LVL	Level	Y	Yes (Disk appears to be usable)
M	Manually Nonremovable		
MHD	Moving Head Disk		

Figure 5-24 shows the full DIOP version of the DFC status page for a 3B21D office with SCSI only or with both SMD and SCSI. The only difference between the SCSI and SMD versions of the 123 page is the addition of ``SBUS 0 SBUS 2" under DFC 0, ``SBUS 1 SBUS 3" under DFC 1 on the SCSI version, and command 604 for RST/RMV SBUS.

```

SYS EMER  CRITICAL  MAJOR  MINOR  BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH   AM     AM PERPH  OS LINKS   SM        CM        MISC

123 - DFC 0 & 1 STATUS

        600 INIT MHD                      677 SET MSG LVL
        601 VFY MHD                      688 CLEAR BUFF
        602 RST DFC                      699 ABORT CMD IP
        603 DUMP DEFECT                  6XX,h HELP
        620 LOAD MHD

AUTO MHD  CONFIGURATION OFF
OPTION LEVEL = UCLDIOP
CURRENT LEVEL = FULL DIOP

DFC-0  ACT  Y      PUMPCODE  DFC-1  ACT  Y      PUMPCODE
SBUS-0  ACT  Y      SBUS-2  ACT  Y      SBUS-1  ACT  Y      SBUS-3  ACT  Y
MHD-0  OOS  ERR  N E  MHD-2  ACT  Y      MHD-1  OOS  FDIO N E  MHD-3  INIT RST N
MHD-4  GROW  N      MHD-6  ACT  Y      MHD-5  GROW  N      MHD-7  ACT  Y
MHD-8  ACT  Y      MHD-10 GROW  N      MHD-9  GROW  N      MHD-11 GROW  N
MHD-14 GROW  N      MHD-12 GROW  N      MHD-15 GROW  N      MHD-13 GROW  N
MT-0   ACT  Y

```

Figure 5-24 123 - Disk File Controller Status SCSI (3B21D Full DIOP Version) (5E12 and Later)

Abbreviations:

ACT	Active	MSG	Message
AUTO	Automatic	MT	Magnetic Tape
BUFF	Buffer	N	No (Disk does not appear to be usable)
CMP	Completed Jobs	OOS	Out of Service
DEFECT	Defective	RMV	Remove
DFC	Disk File Controller	RST	Restore
DGN	Diagnose	SBUS	SCSI Bus
E	Essential	UCLDIOP	Unconditional DIOP
INIT	Initialize	VFY	Verify
LVL	Level	Y	Yes (Disk appears to be usable)
M	Manually Nonremovable		
MHD	Moving Head Disk		

5.18.3 Commands

Commands are provided to remove, restore, and diagnose the MHDs and to take appropriate actions on the MHDs when one or more essential MHDs are out of service.

All available displays can be accessed from the 123 page.

CMD	RESULT
2XX	MHD XX is removed from service (RMV:MHD=XX)
3XX	MHD XX is restored (RST:MHD=XX)

5XX	MHD XX is diagnosed (DGN:MHD=XX)
600,n [v] [s][d]	MHD n is formatted (initialized) (INIT:MHD=n) v=VFY. Verify option to be used (default=no verify option). s=Track number or range of tracks to be initialized (default=all tracks). d=New. The track number or range of tracks and the "d" option can only be used for SMD
601,n [s]	MHD. MHD n is verified (VFY:MHD=n) where s represents either: t=XX (XX is track number or range of tracks to be verified) (default=all tracks for SMD MHD) or b=XX (XX is block number or range of blocks to be verified) (default=all blocks for SCSI MHD) (For example: 601,0 b=80&&100 will cause the VFY MHD function to be invoked for MHD 0 and will verify blocks 80 through 100 for SCSI MHD.)
602,n [u]	DFC n controller only is restored u=UCL (RST:DFC=n,CONT)
603,n [t][fn]	Dump MHD n defect table t=Defect table to be dumped:MFGR,COMB,TEMP, ALL,(default=COMB). fn=Full pathname of a file, in double quotes, that the MFGR defect table is to be written to (DUMP:MHD=n:DEFECT)
604,n a [u]	RESTORE or REMOVE SBUS a="RST" or "RMV" (RST:SBUS=n,CONT) (RMV:SBUS=n) u=UCL NOTE: For SBUS RST, UCL option is required in full DIOP.
605 (RST MHD)	Restore an MHD. When the system is in FULL DIOP, a restore will only be allowed if the MHD does not have an active mate and is not marked essential (E).
or	
605,n [u]	n=MHD number u=UCL
606 (RST MT)	(3B21D only) Restore a SCSI magnetic tape (MT). This command is displayed only if a SCSI DFC that supports MT devices is equipped, and it is functionally equivalent to the RST:MT input message.
or	
606,n [u]	n=MT number u=UCL
607 (DUMP BKTAPE)	(3B21D only) Dump header information from a multi-volume Digital Audio Tape (DAT). This command is displayed and functional only if a DAT is equipped and the system is in full DIOP.
677,n f	Enhanced Information Report (EIR) PRINT n=DFC unit number f=EIR format. Valid values are "n"=turn off EIR PRINT, "l"=long EIR report format, "s"=short EIR report format
6XX,h	HELP Gives help for 600 series commands
688	Clears the buffer
699	Aborts the menu command that is presently in progress NOTE: The 699 poke appears only while the system disk is in full DIOP. It is not effective in normal or simplex modes.
620,n td a	Loads MHD n from tape drive td using sequence a td=Tape device name a=BOTH,GEN,DBONLY or CONT. NOTE: The 620 poke appears only while the system disk is in full DIOP. It is not effective in normal or simplex modes.

NOTE: The 600 series commands work while the system is in full DIOP except pokes 602 (DFC controller only restore), 604 (SBUS controller only restore), 605 (MHD restore), and 606 SCSI MT restore) require UCL.

5.19 125 - DISK FILE CONTROLLER STATUS [5E12 and Later]

5.19.1 Purpose

The purpose of the 125 display page is to provide status and maintenance commands for two DFCs and up to 16 moving head disks (MHD). It also provides status and commands for disk independent operation when both essential disks are lost.

This page exists only when there are more than two DFCs in the system.

The format of the 125 page is the same as the 123 except the AUTO MHD CONFIGURATION status is not shown; it appears only on Page 123.

5.19.2 General

The 125 page has two separate and distinct functions.

The first function of this page is to provide status and maintenance commands for DFCs 2 and 3 and associated MHDs (up to 16).

The second function is to provide status and commands during disk independent operation (DIOP). When in full DIOP, the 125 page will be accessible. The 620 poke (reload from tape option) will only work on the 123 page. The other 600 series commands, with the exception of the 699 poke, may be used also when not in DIOP. The 699 poke works only in full DIOP. Effective in 5E7, both the 602 poke to restore the DFC controller and the 604 poke to restore the SBUS controller require UCL when the system is in full DIOP. These pokes (602/604) will not restore associated subunits (MHDs) to prevent accidental disk restoral during disk maintenance.

If only one of the essential MHDs goes out of service, the MHDs are in simplex operation (Figure 5-25), but the page is not automatically displayed.

During full DIOP the area at the bottom of the page between the two horizontal lines will display output messages for the 600 series menu commands.

There are two columns of notations on the right side of each of the MHD status columns. The first of the two columns contains one of the following two letters:

- **Y** (Yes): This means the MHD was diagnosed or restored since the last system initialization and appears to be usable.
- **N** (No): This means the MHD was not diagnosed or restored since the last system initialization and does not appear to be usable.

The second column contains the letter **E** which signifies that the associated MHD is essential.

Figure 5-25 shows the simplex version of the disk file controller status page for an office with SMD only. In this example, one of the essential MHDs (MHD 17) has gone out of service, so the current level is marked as SIMPLEX. The OOS MHD caused the AM PERPH indicator at the top of the page to be backlighted.

When the simplex mode is entered, the system begins to lock essential, nonswappable processes from disk into core (AM memory). Upon completion of the locking process, the system will print the message, **REPT DIOP SIMPLEX PROCESSING COMPLETED**. If the system has problems in locking the essential processes into core, it will print the message, **REPT DIOP SIMPLEX UNSWAP FAILURE PID=xx** (xx = utility ID of process that failed to lock into memory). This message will reprint every five minutes until the locking process is completed.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
					125 - DFC 2 & 3 STATUS		
2XX RMV MHD XX	600 INIT MHD					677 SET MSG LVL	
5XX DGN MHD XX	601 VFY MHD	605 RST MHD				688 CLEAR BUFF	
	602 RST DFC						
	603 DUMP DEFECT					6XX,h HELP	
OPTION LEVEL = UCLDIOP				CURRENT LEVEL = SIMPLEX			
DFC-2	ACT	Y	FIRMWARE	DFC-3	ACT	Y	FIRMWARE
MHD-16	ACT	Y M		MHD-17	OOS	N M	
MHD-18	ACT	Y M		MHD-19	OOS	N M	

Figure 5-25 125 - Disk File Controller Status SMD (Simplex Version) [5E12 and Later]

Abbreviations:

AUTO	Automatic	MHD	Moving Head Disk
BUFF	Buffer	N	No (Disk does not appear to be usable)
DFC	Disk File Controller	RST	Restore
E	Essential	VFY	Verify
INIT	Initialize	Y	Yes (Disk appears to be usable)
M	Manually Nonremovable		

5.19.3 Commands

Commands are provided to remove, restore, and diagnose the MHDs and to take appropriate actions on the MHDs when one or more essential MHDs are out of service.

All available displays can be accessed from the 125 page.

CMD	RESULT
2XX	MHD XX is removed from service (RMV:MHD=XX)
3XX	MHD XX is restored (RST:MHD=XX)
5XX	MHD XX is diagnosed (DGN:MHD=XX)
600,n [v] [s[d]	MHD n is formatted (initialized) (INIT:MHD=n) v=VFY. Verify option to be used (default=no verify option). s=Track number or range of tracks to be initialized (default=all tracks). d=New. The track number or range of tracks and the "d" option

601,n [s]	can only be used for SMD MHD. MHD n is verified (VFY:MHD=n) where s represents either: t=XX (XX is track number or range of tracks to be verified) (default=all tracks for SMD MHD) or b=XX (XX is block number or range of blocks to be verified) (default=all blocks for SCSI MHD) (For example: 601,0 b=80&&100 will cause the VFY MHD function to be invoked for MHD 0 and will verify blocks 80 through 100 for SCSI MHD.)
602,n [u]	DFC n controller only is restored u=UCL (RST:DFC=n,CONT)
603,n [t|fn]	Dump MHD n defect table t=Defect table to be dumped:MFGR,COMB,TEMP, ALL,(default=COMB). fn=Full pathname of a file, in double quotes, that the MFGR defect table is to be written to (DUMP:MHD=n:DEFECT) RESTORE or REMOVE SBUS a="RST" or "RMV" (RST:SBUS=n,CONT) (RMV:SBUS=n) u=UCL
605 (RST MHD)	Note: For SBUS RST, UCL option is required in full DIOP. Restore an MHD. When the system is in FULL DIOP, a restore will only be allowed if the MHD does not have an active mate and is not marked essential (E).
or 605,n [u]	n=MHD number u=UCL
606 (RST MT)	(3B21D only) Restore a SCSI MT. This command is displayed only if a SCSI DFC that supports MT devices is equipped, and it is functionally equivalent to the RST:MT input message.
or 606,n [u]	n=MT number u=UCL
677,n f	Enhanced Information Report (EIR) PRINT n=DFC unit number f=EIR format. Valid values are "n"=turn off EIR PRINT, "l"=long EIR report format, "s"=short EIR report format
6XX,h	HELP Gives help for 600 series commands
688	Clears the buffer Aborts the menu command that is presently in progress
	Note: The 699 poke appears only while the system disk is in full DIOP. It is not effective in normal or simplex modes. Loads MHD n from tape drive td using sequence a td=Tape device name a=BOTH,GEN,DBONLY or CONT.
	Note: The 620 poke appears only while the system disk is in full DIOP. It is not effective in normal or simplex modes.
	Note: The 600 series commands work while the system disk is in full DIOP except that pokes 602 (DFC controller only restore), 604 (SBUS controlleronly restore), 605 (MHD restore), and 606 (SCSI MT restore) require UCL.

5.20 126 - DISK FILE PERFORMANCE [5E12 and Later]

5.20.1 Purpose

The 126 display page provides the optional disk file controller performance data.

5.20.2 General

Page 126,the DFC performance page, shows data for a maximum of two DFCs. If there are more than two DFCs in

the system, a second DFC performance page (Page 128) is used.

The 126 page can show either SMD or SCSI, depending on the feature option of the operational office.

With the SCSI feature, the DFC performance data is not available when the operating system is in disk independent operation (DIOP) mode.

Meanings of the performance fields displayed are as follows:

- **CMP:** Jobs completed by the DFC for the unit. This field is normalized to show the number of jobs that were completed per second.
- **AVG:** The average size of the jobs completed for a unit (number of disk blocks).
- **MAX:** The maximum size of a job completed in a time interval (number of disk blocks).

Figure 5-26 shows an example of the 126 display page for an office with SMD only.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
126 - DFC 0 & 1 PERFORMANCE							
622 PERFORMANCE 688 CLEAR BUFF							
6XX,h HELP							
CMP AVG MAX				CMP AVG MAX			
DFC-0	2	12	25	DFC-1	3	17	35
MHD-0	2	12	25	MHD-1	3	17	35
MHD-2	2	12	25	MHD-3	3	17	35
MHD-4	0	0	0	MHD-5	0	0	0
MHD-6	0	0	0	MHD-7	0	0	0
MHD-8	0	0	0	MHD-9	0	0	0
MHD-10	0	0	0	MHD-11	0	0	0
MHD-12	0	0	0	MHD-13	0	0	0
MHD-14	0	0	0	MHD-15	0	0	0
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX							

Figure 5-26 126 - Disk File Controller Performance SMD [5E12 and Later]

Abbreviations:

AVG	Average Size of Jobs Completed
BUFF	Buffer
CMP	Completed Jobs
DFC	Disk File Controller
MAX	Maximum Size of Job Completed

MHD Moving Head Disk

Figure 5-27 shows an example of the 126 page with mixed SMD and SCSI DFCs for a 3B21D office.

The DFC fields are the sum of the individual MHD fields associated with the DFC. For SCSI DFC, the SBUS fields are the sum of all the MHD fields associated with this SBUS.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
126 - DFC 0 & 1 PERFORMANCE							
				622 PERFORMANCE		688 CLEAR BUFF	
				6XX,h HELP			

Figure 5-27 126 - Disk File Controller Performance 3B21D Mixed SMD and SCSI DFCs [5E12 and Later]

Abbreviations:

AVG	Average Size of Jobs Completed	MAX	Maximum Size of Job Completed
BUFF	Buffer	MHD	Moving Head Disk
CMP	Completed Jobs	MT	Magnetic Tape
DFC	Disk File Controller	SBUS	SCSI Bus

5.20.3 Commands

CMD	RESULT
622[,s [t]]	Performance updates are displayed s = number of seconds between performance updates. Valid number of seconds is between 1 and 60. Performance updates will occur 20 times, then will be automatically turned off. If s is zero or is defaulted, then performance updates are turned off. t = number of times to repeat the performance updates.
688	The 3-line communication area at the bottom of the page is cleared.
6XX,h	HELP

Gives help for 600 series commands

5.21 127 - MTIB STATUS [5E12 and Later]

5.21.1 Purpose

Page 127 shows status and connections for the metallic test interconnect bus (MTIB).

5.21.2 General

The MTIB is used for multiple metallic service units (MSU). Any SM which is equipped with the multiple MSU has all the MTIB connections. The MTIB CONNECTIONS indicator shows which SMs are equipped with this unit.

When an off-normal condition occurs, the MTIB XX indicator backlights and the MTIB indicator on Page 116 - MISCELLANEOUS backlights. In the SUMMARY STATUS AREA, the critical indicator MISC backlights, as well as the alarm level (CRITICAL, MAJOR, or MINOR) if applicable.

In the example shown in Figure 5-28, MTIB 5 is out of service. The MTIB CONNECTIONS indicator shows SM 120 uses the MTIBs for the multiple Metallic Service Unit capability. Any SMs shown have all the MTIBs.

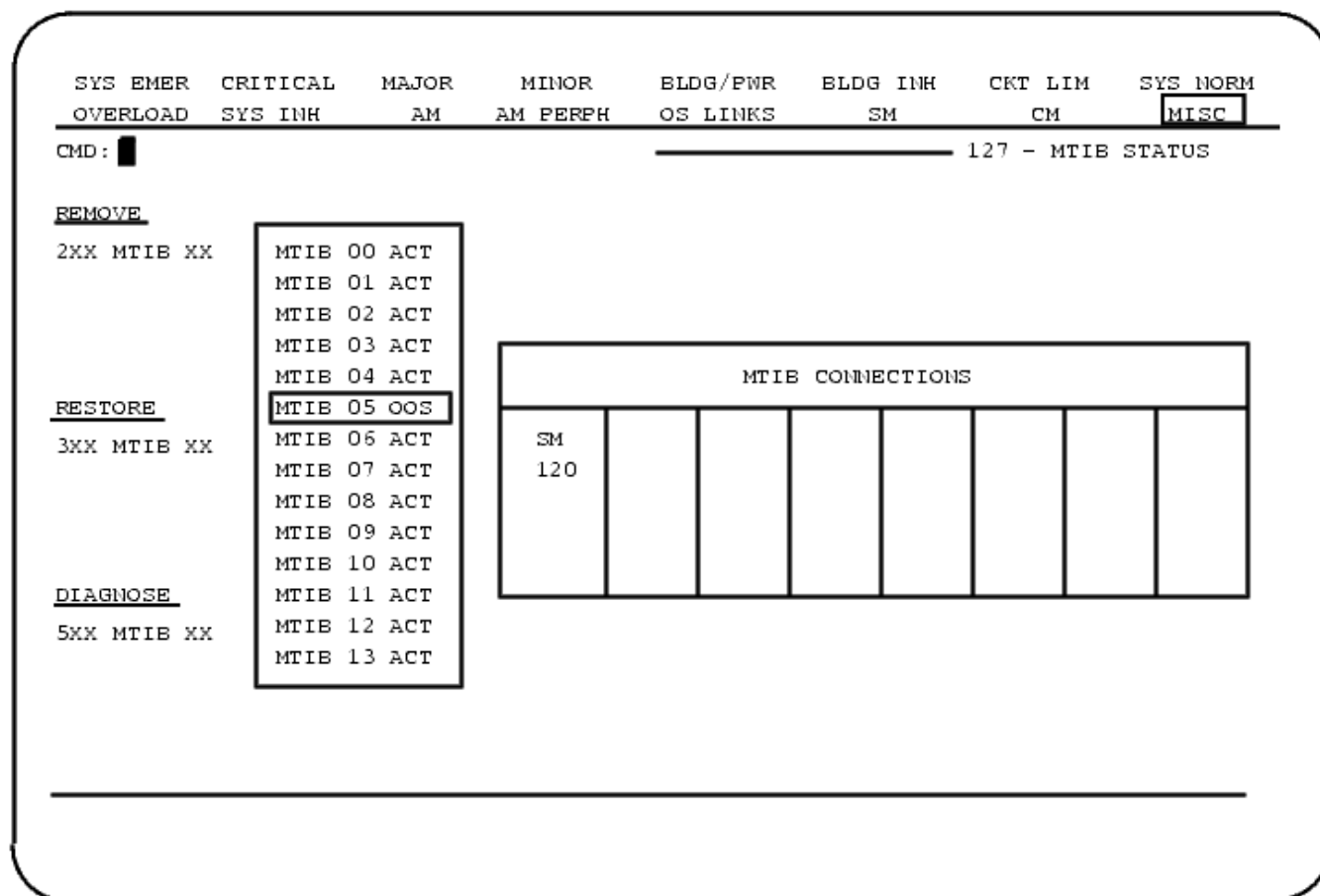


Figure 5-28 127 - MTIB Status [5E12 and Later]

Abbreviations:

ACT	Active	OOS	Out of Service
MTIB	Metallic Test Interconnect Bus	SM	Switching Module

5.21.3 Commands

Commands are provided to remove, restore, and diagnose the MTIB connections.

All available displays can be accessed from Display Page 127.

CMD	RESULT
2XX	MTIB XX is removed (RMV:MTIB=XX) [,UCL]
3XX	MTIB XX is restored (RST:MTIB=XX) [,UCL]
5XX	MTIB XX is diagnosed (DGN:MTIB=XX,RAW,TLP) [,UCL] [,RPT] test is repeated 32,767 times [,RPT=a] a is the number of times the test is to be repeated (1-32,767) [,PH=b|b&&c] b is the diagnostic phase or b&&c is the range of phases to be performed

5.22 128 - DISK FILE CONTROLLER PERFORMANCE [5E12 and Later]

5.22.1 Purpose

The 128 display page provides the optional disk file controller performance data.

5.22.2 General

Page 126, the DFC performance page, shows data for a maximum of two DFCs. If there are more than two DFCs in the system, a second DFC performance page (Page 128) is used. The 128 page is used only when there are more than two DFCs in the system.

The 128 page can show either SMD or SCSI, depending on the feature option of the operational office.

With SCSI feature, the DFC performance data is not available when the operating system is in disk independent operation (DIOP) mode.

Meanings of the performance fields displayed are as follows:

- **CMP:** Jobs completed by the DFC for the unit. This field is normalized to show the number of jobs that were completed per second.
- **AVG:** The average size of the jobs completed for a unit (number of disk blocks).
- **MAX:** The maximum size of a job completed in a time interval (number of disk blocks).

Figure 5-29 shows an example of the 128 display page with full SCSI DFCs.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
128 - DFC 2 & 3 PERFORMANCE							
522 PERFORMANCE				588 CLEAR BUFF			
				6XX,h HELP			

Figure 5-29 128 - Disk File Controller Performance SCSI DFCs [5E12 and Later]

Abbreviations:

AVG	Average Size of Jobs Completed	MAX	Maximum Size of Job Completed
BUFF	Buffer	MHD	Moving Head Disk
CMP	Completed Jobs	SBUS	SCSI Bus
DFC	Disk File Controller		

5.22.3 Commands

CMD	RESULT
622[s,t]	Performance updates are displayed s = number of seconds between performance updates. Valid number of seconds is between 1 and 60. Performance updates will occur 20 times, then will be automatically turned off. If s is zero or is defaulted, then performance updates are turned off. t = number of times to repeat the performance updates.
688	The 3-line communication area at the bottom of the page is cleared.
6XX,h	HELP Gives help for 600 series commands

5.23 129 - DSN NM EXCEPTION [5E12 and Later]**5.23.1 Purpose**

The 129 page is a network management (NM) status page for a 5ESS®-2000 switch with the AUTOVON capability.

5.23.2 General

The 129 page display consists of indicators and data for the AUTOVON capability. An indicator is similar to a LED, the state is either "ON" or "OFF." The "ON" state identifies the corresponding event has occurred and it is indicated by reverse video. The "OFF" state identifies the absence of corresponding event and it is indicated on by normal video. The indicators are updated every 30 seconds.

The data items on the 129 page display are the traffic measurements consisting of peg counts, usage counts, and overflow counts. These counts are a portion of the NM 5-minute surveillance data and reflect the traffic measurements in the most recent 5-minute interval. They are updated every five minutes.

The summary blocks marked as **NM** and **OPERATION** consist of the following indicators:

- **DCCR** is turned on when one or more destination code cancellations (DCC) have been initiated for routine level traffic. If no DCC is applied at the 5ESS[®]-2000 switch, the DCC indicator is off.
- **DCCA** is turned on when one or more DCCs are applied for all traffic. After all DCCs are removed at all precedence levels, the DCCA indicator goes off. Both DCCR and DCCA may be turned on, indicating at least one DCC is applied to all traffic and at least one for routine traffic.
- **ARCR** is turned on when one or more alternate route cancellations (ARC) are activated at the switch for routine level traffic. When all ARCs are removed, the ARCR indicator is turned off.
- **ARCA** is turned on when one or more ARCs are activated at the switch for routine level traffic. When all ARCs at all precedence levels are removed, the ARCA indicator is turned off.
- **ESP** is turned on if the essential service protection (ESP) is triggered at the switch; otherwise, the ESP indicator stays off.
- **MC1** is turned on when the switching system is in a machine congestion level 1 (MC1) condition. The MC1 is an indication of system overload.
- **MC2** is turned on when the switching system is in a machine congestion level 2 (MC2) condition. The MC2 is an indication of **severe** system overload.
- **RSM** is turned on when one or more remote switching module (RSM) outages exist.

The **NM** and **OPERATION** status indicators represent occurrence of events related to network management and system operation. When an indicator is seen in reverse video (that is, in the **ON** state), detailed information may be obtained by entering the appropriate TTY messages and reviewing related MCC page displays. Indicators in these two blocks are updated every 30 seconds.

The **CIRCUIT** block area indicates the traffic data for universal tone decoders (UTD).

- **UTDMU** illustrates the maintenance-usage of UTDs. The UTDs are scanned for maintenance busy every 10 seconds. The count is incremented by one on busy condition.
- **UTDTU** represents the total traffic usage of UTDs. The UTDs are also scanned every 10 seconds to accumulate the usage count.
- **UTDTO** illustrates the total number of attempts to UTDs equipped for the switch.

The data in the **CIRCUIT** block area illustrates the traffic load to common circuits. It suggests the level of load on

tone decoders. These counts are used in conjunction with the operation indicators to signal the event of overload. These counts are the first indication of network congestion.

The **TRAFFIC** block area displays the peg counts of eight types of traffic. In terms of direction, calls are of four types: incoming, originating, outgoing, and terminating calls. In terms of call connections, they are divided into four types: tandem (trunk to trunk), intrasystem (line to line), inbound (trunk to line), and outbound (line to trunk).

- **INC** illustrates the number of incoming calls.
- **OUT** illustrates the number of outgoing calls.
- **ORG** illustrates the number of originations.
- **TRM** illustrates the number of calls that terminate in this switch.
- **TT** (trunk to trunk) illustrates the number of tandem calls. The value in this field indicates the level of pressure of through-switched traffic. If tandem traffic peaks, ARC may be applied at the distant switch to get relief.
- **TL** (trunk to line) illustrates the number of inbound calls.
- **LL** (line to line) illustrates the number of intrasystem calls.
- **LT** (line to trunk) illustrates the number of outbound calls.

The **DELAY** block area contains information concerning service response felt by distant switches and subscribers. These counts suggest the performance of the system and the severity of overload.

- **TRK** indicates the percentage of the total sample of the start dial delay (that is, receiver attached delay) exceeding the 3-second threshold. A high number in this field means that other offices are experiencing slow response from this office. This delay increases the time necessary to establish a talking path through the network.
- **LINE** indicates the percentage of total sample of dial tone delay exceeding the threshold. When this field peaks, subscribers are experiencing delays in originating calls.

The **TRUNK** block area provides the NM managers with outgoing attempts per circuit per hour (ACH), outgoing connections per circuit per hour (CCH), and maintenance usage (MU) of trunk groups selected by the NM managers. Each display box within the **TRUNK** block area illustrates the traffic and maintenance status for a trunk group. The box consists of a display field (trunk group number) and three indicators (ACH, CCH, MU). The trunk group number is displayed on the upper portion of the box. The indicators are located in the lower portion of the box. The video state of the indicators identify the level of MU, ACH, and CCH of the trunk group number identified in the display field (upper portion of the box). The five possible states of an indicator are as follows:

STATE	VIDEO DISPLAY	RANGE
1	Blank Display	Below threshold 1
2	Green Steady	Between threshold 1 and threshold 2
3	Yellow Steady	Between threshold 2 and threshold 3
4	Red Steady	Between threshold 3 and threshold 4
5	Red Wink	Above threshold 4

Default value for all thresholds are reset by the software controlling the display at each system initialization. However, all of the threshold values can be examined and modified by TTY command. The following display illustrates the default values:

	THRESHOLD 1	THRESHOLD 2	THRESHOLD 3	THRESHOLD 4
MU	40%	50%	85%	99%
ACH	4	8	12	16

CCH	4	8	12	16

Indicators on the **TRUNK** block area are updated every five minutes. During the course of an update, only those indicators that have changed to a new state since the last update are refreshed. A trunk group can be brought up in the display box and removed from the display via a TTY command. Refer to 235-600-700, *Input Messages Manual*, for details of the input message.

The **OFFICE** display area identifies the name of the 5ESS®-2000 switch (with AUTOVON) being monitored.

The **TIME** display area identifies the local time at the 5ESS®-2000 switch being monitored.

Figure 5-30 shows an example of the 129 page display.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC

CMD: _

129 - DSN NM EXCEPTION

OFFICE:		TIME:	
TRAFFIC			
INC		OUT	
ORG		TRM	
TT		LT	
LL		TL	

NM		OPERATION	
DCCR	DCCA	MC1	MC2
ARCR	ARCA		
ESP		RSM	

TRUNK					

CIRCUIT	
UTDMU	
UTDTU	
UTDTO	

DELAY	
TRK	LINE

SEE PAGE 109 FOR OVRLD INFORMATION

Figure 5-30 129 - DSN NM Exception [5E12 and Later]

Abbreviations: The abbreviations shown on the 129 page display are explained in the text describing this page.

5.23.3 Commands

Any of the available page displays can be accessed from the 129 page display.

5.24 130 - NETWORK MANAGEMENT EXCEPTION [5E12 and Later]

5.24.1 Purpose

The 130 display page provides status of the manual and automatic NM system controls and status of NM circuit

conditions. Also, it provides a command to get a listing of any NM controls that are YES.

5.24.2 General

When there is an overload in the system there are manual or automatic controls that can be put on the system by Network Management. The 130 page shows the status of these controls, either YES or NO.

Any controls on this page that are YES will cause an indicator that refers to this page to appear and be backlighted on Page 109 - OVERLOAD. In the STATUS SUMMARY AREA at the top of the screen, the OVERLOAD status summary indicator will be backlighted. This page also has a reference back to Page 109 that is displayed all the time.

Figure 5-31 shows there is a manual control on the CALL GAP and transmit (XMT) of dynamic overload control (DOC) and direct link node (DLN) are allowed (ALW).

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
130 - NM EXCEPTION							
<u>OUTPUT</u> 900 NM EXCEPTION LIST				ACTIVE CONTROLS			
				MANUAL		AUTOMATIC	
						DLN	DOC
						XMT	RCV XMT
CALL GAP				YES	MC1, 2	NO	NO
TRUNK GROUP				NO	MC3	NO	NO
					STATUS	ALW	ALW
						SSTR	TR
					INH OVRD	NO	NO
					TRIGGERED	NO	NO
					ASSIGNED	NO	
SEE ALSO PAGE 109							

Figure 5-31 130 - Network Management Exception [5E12 and Later]

Abbreviations:

ALW	Allow	OVRD	Override
DLN	Direct Link Node	RCV	Receive
DOC	Dynamic Overload Control	SILC	Selective Incoming Overload Control
INH	Inhibit	SSTR	Service Selective Trunk Reservation
MC	Machine Congestion	TR	Trunk Reservation
NM	Network Management	XMT	Transmit

5.24.3 Commands

The command on this page is provided to print a listing of any NM controls that are YES. Also, any available paging commands can be entered from this display.

CMD	RESULT
900	Any YES NM controls are output (OP:NMPGE)

5.25 131 - CALL TRACE MENU (5E12 Only)

5.25.1 Purpose

The 131 page display is a menu page that contains a list of call trace poke commands.

5.25.2 General

A "SEE PAGE" indicator on the 131 menu page shows the maintenance personnel which hardware call trace page (133 through 140, 150, or 151) to access for the details of the call trace.

The 131 menu page gives the user the ability to invoke a trace by simply entering a poke value followed by a number or a set of numbers. For example, 401,2220001 where 401 is the poke for a utility hardware call trace with a directory number (DN), 2220001, being the input option.

When tracing an Integrated Services Digital Network (ISDN) circuit switched lines, the channel to be traced should be included in the input. If no channel is specified, then the default action is to trace the D-channel. See pokes 401, 404, 405, 406, and 409 for input requirements.

The subaddress (SA) option is used to specify which subaddress of a DN/MLHG with multiple call appearances to trace. Specifying SA=ALL results in Page 150 being populated with the status of all valid subaddresses for the given input. If the SA option is used, the channel (CH) option must be omitted. The SA option is valid for voice calls on terminals which use subaddresses. This includes most custom digital subscriber lines (DSL) and also standard Electronic Key Telephone Service (EKTS) lines. To trace packet switched calls, the **PKT** variable is included in poke commands 401, 404, 405, 406, 409 and 410.

The call ID number (CID) option is used to specify which call on a standard non-EKTS DSL to trace, or to trace circuit switched data calls on any type terminal. Specifying CID=ALL results in Page 150 being populated with the status of all calls for the given input. If the CID option is used, the channel (CH) option must be omitted.

The CID and SA options are mutually exclusive. If an incorrect option is used for the call type of the given input, an error message is generated, and the 150 page is populated with the correct information for the input DN/MLHG. Refer to the 150 page for more detailed information.

Figure 5-32 shows an example of the 131 page display for 5E12.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
							131 - CALL TRACE MENU
31-2 CALL TRACE MENU				140 D-CH/PKT CALL TRACE		SEE PAGE 133	
33-8 CALL TRACE VIEWS 1-6				150 TRACEABLE CALL STATUS			
39 ISDN PKT CALL TRACE				151 CONFERENCE CIRCUIT TRACE			
01,X TRACE DN X (X=DN), { [CH=D|B1|B2], [PKT] | [SA=SUBADD|ALL] | [CID=ID(ALL)] }							
02,X TRACE LEN X (X=SM, LU, GR, BD, SW, LV)							
03,X TRACE SLEN X (X=SM, DCLU, RT, LINE)							
04,X TRACE MLHG X (X=GRP, MEM), { [CH=D|B1|B2], [PKT] | [SA=SUBADD|ALL] | [CID=ID|ALL] }							
05,X TRACE LCEN X (X=SM, ISLU, LG, LC), [CH=D|B1|B2], [PKT]							
06,X TRACE ILEN X (X=SM, IDCU, RT|DS1, LINE|DS0), [CH=D|B1|B2], [PKT]							
07,X TRACE NEN X (X=SM, DNU, DG, STS, VT, DS0)							
08,X TRACE PSUEN X (X=SM, PSU, SHLF, CHGRP, MEM)							
09,X TRACE LCKEN X (X=SM, ISLU, LG, LP, LC), [CH=D|B1|B2], [PKT]							
10,X TRACE PORT X (X=PORT NAME, SM), [PKT]							
11,X TRACE CKT X (X=CKT NAME, SM)							
12,X TRACE TKGMM X (X=GRP, MEM)							
13,X TRACE TEN X (X=SM, TU, SG, BD, CKT)							
14,X TRACE DEN X (X=SM, DLTU, DFI, CH)							

Figure 5-32 131 - Call Trace Menu (5E12 Only)

Abbreviations:

BD	Board	GR	Grid
CH	Channel	GRP	Group
CHGRP	Channel Group	IDCU	Integrated Digital Carrier Unit
CID	Call ID Number	ILEN	IDCU Line Equipment Number
CKT	Circuit	ISLU	Integrated Services Line Unit
CKTNUM	Circuit Number	LEN	Line Equipment Number
DCLU	Digital Carrier Line Unit	LC	Line Card
DEN	Digital Equipment Number	LCEN	Line Card Equipment Number
DFI	Digital Facility Interface	LCKEN	Line Circuit Equipment Number
DG	Data Group	LG	Line Group
DLTU	Digital Line and Trunk Unit	LP	Line Pack
DN	Directory Number	LU	Line Unit
DNU	Digital Networking Unit	SLEN	SLC [®] LEN
DS0	Digital Signal Level 0 Number	SM	Switching Module
DS1	Digital Signal Level 1 Number	STS	Synchronous Transport Signal
LV	Level	SUBADD	Subaddress
MEM	Channel Group Member	SW	Switch
MLHG	Multiline Hunt Group	TEN	Trunk Equipment Number
PKT	Packet	TKGMN	Trunk Group and Member Number
PSU	Packet Switching Unit	TS	Time Slot
PSUEN	Packet Switching Unit Equipment Number	TU	Trunk Unit
RT	Remote Terminal	VT	Virtual Tributary
SA	Subaddress		
SG	Service Group		
SHLF	Shelf		

5.25.3 Commands

All poke commands that appear on the 131 display page can be invoked by maintenance personnel, and they can also be invoked from any of the call trace display pages (131-140, 150, and 151). Refer to Page 132 - Call Trace Menu Cont. (Figure 5-33) for more call trace poke commands.

5.26 132 - CALL TRACE MENU CONT. (5E12 and Later)

5.26.1 Purpose

The 132 page is a continuation of the 131 menu page listing of call trace poke commands.

5.26.2 General

A **"SEE PAGE"** indicator on the 132 menu page shows the maintenance personnel which hardware call trace page (133-140, 150, or 151) to access for the details of the call trace.

The 132 menu page gives the user the ability to invoke a trace by simply entering a poke value followed by an option or a set of numbers. For example, to trace the active loop of the B1 channel of the operator position terminal 1-135, the poke would be **418,1,135,loop=0,ch=B1**.

When the 440 poke is used to trace a process id, the process id to trace must be for either a circuit switched voice call or a circuit switched data call.

Figure 5-33 shows an example of the 132 page display for 5E12.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG	INH	CKT LIN	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS		SM	CM	MISC
CMD<				----- 132 - CALL TRACE MENU CONT.				
131-2	CALL TRACE MENU		140	D-CH/PKT CALL TRACE				
133-8	CALL TRACE VIEWS 1-6		150	TRACEABLE CALL STATUS				
139	ISDN PKT CALL TRACE		151	CONFERENCE CIRCUIT TRACE				
415,X	TRACE TS X (X=SM,TSDBKEY)							
416,X	TRACE LUCHAN X (X=SM,LU,SG,CHBD,CH-CKTNUM)							
417,X	TRACE BST X (X=OSC,POS), [CH=D|B1]							
418,X	TRACE OPT X (X=OSC,POS), [LOOP=0|1|2|3], [CH=D|B1]							
419,X	TRACE RAF X (X=SM,RAF,CH)							
420,X	TRACE SAS X (X=SM,SAS,CH)							
421,X	TRACE AIUEN X (X=SM,AIU,LP,LC), [CH=D|B1|B2], [PKT]							
424,X	TRACE INEN X (X=SM,DNU,RDT,LINE), [CH=D|B1|B2], [PKT]							
440,X	TRACE PID X (X=PN,SM,UNIQ)							
450,X	TRACE DUMP X (X=[PID=PN-SM-UNIQ], [STRUCTS=TYPE])							

Figure 5-33 132 - Call Trace Menu Cont. (5E12 and Later)

Abbreviations:

BST	Basic Services Terminal	OSC	Operator Service Center
CHBD	Channel Board	PID	Process Identification
CH	Channel	PKT	Packet
CKT	Circuit	PN	Process Number - OSDS
CKTNUM	Circuit Number	POS	Position
CONT.	Continued	RAF	Recorded Announcement Facility
D-CH	D-Channel	SAS	Service Announcement System
ISDN	Integrated Services Digital Network	SG	Service Group
LU	Line Unit	SM	Switching Module
LUCHAN	Line Unit Channel Circuit	STRUCTS	Structures
OPT	Operator Position Terminal	TSDBKEY	Time Slot Data Block Key
		UNIQ	Uniqueness Field-OSDS

5.26.3 Commands

All 132 page poke commands can be invoked by maintenance personnel. They also can be invoked from any of the call trace display pages (131-140, 150, and 151). Refer to Page 131 - Call Trace Menu (Figure 5-32) for more call trace poke commands. Also, any call trace display page can be accessed from the 132 display page.

5.27 133 THROUGH 138 - HARDWARE CALL TRACE (5E12 Only)**5.27.1 Purpose**

The hardware call trace page displays show the hardware paths of calls requested to be traced.

5.27.2 General

Call Trace Pages provide a "snapshot" of the hardware and software path(s) involved with a call. Some calls require several displays, for example, a 3-way call. A "SEE PAGE" indicator appears if more displays are involved in a particular call.

Information collected about dynamic data structures and hardware paths can aid in trouble-shooting a failed call. The software state, external identifier, peripheral path, and network path are shown for each connection of the call and are described as follows:

- **Software state:** The software state represents the state of the call (ringing, talking, transient, etc.) as stored in the process control block link area (PCBLA).
- **External identifier:** The external identifier is the representation of the customer and can include the following:
 - Intercom (ICOM) Group
 - Directory Number (DN)
 - Multiline Hunt Group (MLHG) group and member
 - Trunk (TRK) group and member
 - Equipment Number (EN).
- **Peripheral path:** The peripheral path displays the hardware path taken by the call from the peripheral unit through the service units to the TSI.
- **Network path:** The network path is represented by the Network Control and Timing (NCT) time slot connecting the TSI to the TMS. The connection from the NCT to the TMS is shown as either a solid line, representing an inter-SM call, or a dotted line, representing an intra-SM call.

If an ISDN call is traced, the type of circuit switched service (voice or data) and a B-channel identifier (CH B1, CH B2, or NO CH) are displayed. The NO CH means that no B-channel is allocated for the call.

Analog and ISDN calls that have been parked display ``PARKED". Peripheral path information may not be available for parked calls.

For calls through a remote ISLU (RISLU), the connection via a T1 carrier between the RISLU and the DLTU host (DLUTH) in the switch is shown. Additionally, if business and residence custom services (BRCS) features are assigned to a DSL, the primary directory number (PDN), subaddress (SA), and call appearance (CA) is displayed.

Call Trace supports standard ISDN DSLs. If a standard EKTS DSL is traced, the SA and CA are displayed as for a custom DSL. If a standard non-EKTS is traced, SA and CA do not apply.

Call Trace displays the SM and IDCU numbers for an IDCU.

The IDCU peripheral unit contains a time slot interchange unit (TSIU) which offers the ability to make connections without using the TSI in the SM, thus saving SM time slot resources. A trace of this hairpin connection only shows the RT and the IDCU.

The IDCU also supports the PUB43801 interface format used for interfacing to D4 and D5 channel banks and to Digital Access Cross Connect Systems (DACs). Since these connections do not use an RT, RT is not shown on the trace. The FAC field in an IDCU display contains the IDCU facility (IFAC) number.

The ICOM group number is included in the call trace output. A call appearance (CA) ICOM call does not have a DN associated with it. A trace of this type of call displays the ICOM group number where the DN is normally displayed. A ``feature button" ICOM call has an associated DN which is displayed at the MCC. The ICOM group number is printed on the ROP output message for both types of ICOM calls.

A wideband indicator (WB) is displayed when a call using more than one time slot is traced. The **OP:CHANMAP** command can be used to determine the other time slots active on the call.

When a Service Announcement System (SAS) unit is connected to a call, a call trace displays the SM number, unit number, and channel for the SAS.

Peripheral to peripheral connections are supported on an SM-2000. Because these types of calls are connected at the TSI, network path is not displayed.

The digital networking unit (DNU) - synchronous optical network (SONET) (DNU-S) is supported. (DNU-S is displayed on the screen as DNUS.) Call trace displays the DNU-S, STSX-1 facility interface (SFI), and common data (CD) numbers for a DNU-S. The facility (FAC) field in a DNU-S display contains the DNU-S facility which consists of the data group (DG) number and the synchronous transport signal (STS) number. The peripheral control and timing (PCT) link number and PCT time slot number are also displayed. The Speech Handler call trace is also supported.

Examples of Hardware Call Trace displays are as follows:

- Figure 5-34 - TR-303 on DNU-S Analog Call Trace
- Figure 5-35 - TR-303 on DNU-S Circuit-Switched B-Channel Call Trace

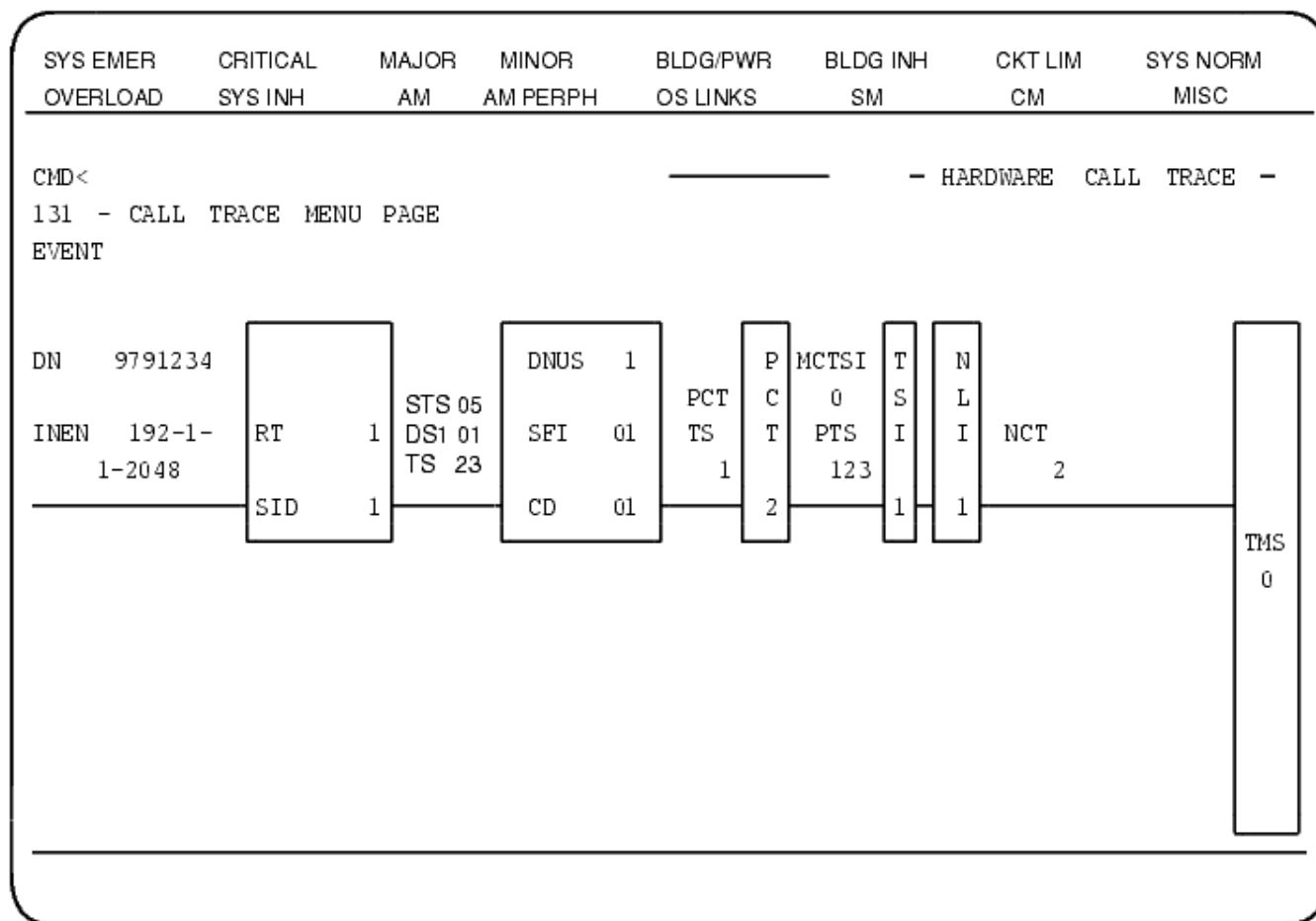


Figure 5-34 133 - TR-303 on DNU-S Analog Call Trace (5E12 Only)

Abbreviations:

CD	Common Data	RT	Remote Terminal
DN	Directory Number	SFI	STX-1 Facility Interface
DNUS	Digital Network Unit-SONET	STS	Synchronous Transport Signal
DS1	Digital Signal Level 1	TS	Time Slot
DLI	Dual Link Interface	NLI	Network Link Interface
MCTSI	Module Controller/Time Slot Interchanger	TSI	Time Slot Interchanger

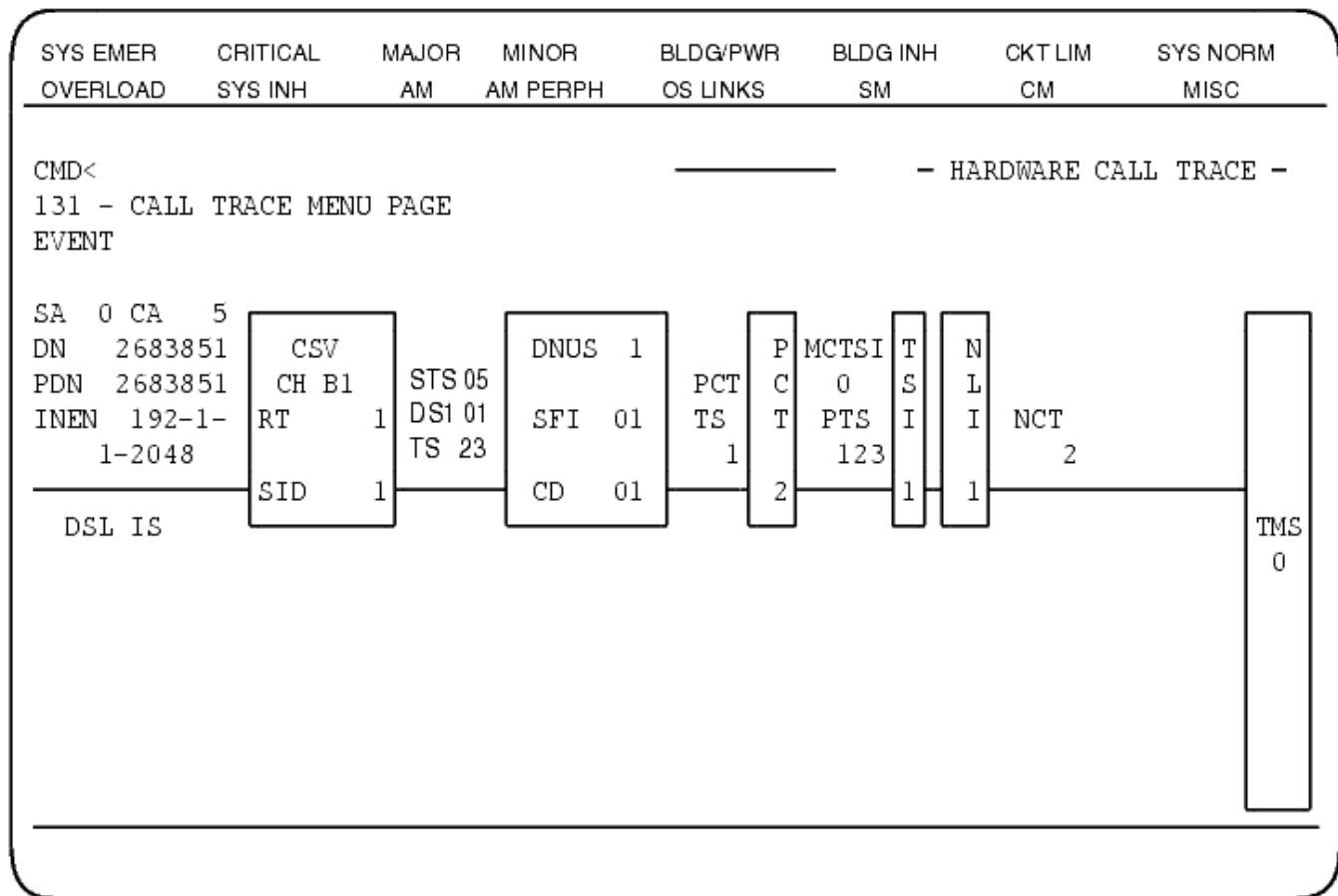


Figure 5-35 133 - TR-303 on DNU-S Circuit-Switched Call Trace (5E12 Only)

Abbreviations:

CD	Common Data	RT	Remote Terminal
DN	Directory Number	SFI	STX-1 Facility Interface
DNUS	Digital Network Unit-SONET	STS	Synchronous Transport Signal
DS1	Digital Signal Level 1	TS	Time Slot
DLI	Dual Link Interface	NLI	Network Link Interface
MCTSI	Module Controller/Time Slot Interchanger	TSI	Time Slot Interchanger

5.28 139 - ISDN PACKET SWITCH CALL TRACE [5E12 and Later]

5.28.1 Purpose

The ISDN packet switched call trace page displays the active calls on a specified packet switched digital service line (DSL) or trunk.

5.28.2 General

Poke commands are provided on this page display to allow the user to observe the following:

- Return to the utility call trace menu page (131). An indicator in the upper left-hand corner of the 139 page display (Figure 5-36) directs the user to the 131 menu page.
- View the active logical channels associated with the particular port. There are 16 views of this page display.

Each view displays eight active logical channels for the trace. The poke 9XX allows the user to specify which view is to be displayed. An indicator in the upper right-hand corner of the 139 page display identifies the total active logical channel numbers (LCN) to view. The summary information is filled in starting with view 1 of the 139 page display.

- Print the entire summary to the ROP. Poke 920 is provided to allow the user to dump the entire trace summary to the ROP.
- Hex dump to the ROP of a specific access line control block (ALCB) or the logical channel control blocks (LCCB) associated with the LCN. Poke 930 allows the user to dump two data structures to the ROP (depending on the value of X).
 - (a) If X = ALCB, the ALCB associated with the packet call trace is printed on the ROP.
 - (b) If X = 1-127 (specific LCN), the LCCB associated with the LCN is printed on the ROP.
- Hex dump to the ROP of all collected data associated with the trace. Poke 940 allows the user to print the following data on the ROP:
 - (a) DCCB — D-Channel Control Block
 - (b) LLCB — Logical Link Control Block
 - (c) ALCB — Access Link Control Block
 - (d) LCCB — Logical Channel Control Block
 - (e) PTSB — PIDB Time Slot Block
 - (f) DPB — D-Channel Port Block
 - (g) PORTLA — Port Linkage Area.
- View the hardware connection of the port. An indicator in the upper right-hand corner of the 139 page display directs the user to the 140 page display where the hardware connection of the trace can be viewed.

Figure 5-36 shows an example of the 139 page display.


```

SYS EMER  CRITICAL  MAJOR  MINOR  BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH   AM     AM PERPH  OS LINKS   SM         CM         MISC

139 ✓ ISDN PKT CALL TRACE

SEE PAGE 131 - CALL TRACE MENU
9XX      (X=01-16) NEXT VIEW IN SETS OF 8 LCNS
920      PRINT ENTIRE SUMMARY TO THE ROP
930,X    (X=LCN#|ALCB), [DN=TELEPHONE NUMBER] OF LCCB (X=LCN#) OR ALCB
940,X    (X=[DN=TELEPHONE NUMBER]) HEX DUMP OF ALL DATA

SM: 24      PORT_NAME: h'9b03      CHANNEL_TYPE: D

LOCAL_DN   LCN      REMOTE_DN   CTYPE   LOC_CONN  DESTSM  PORT/TGN
3129792000 001      7087131212   VC      INTER-SW  25      999

```

Figure 5-36 139 - ISDN Packet Switched Call Trace [5E12 and Later]

Abbreviations:

ALCB	Access Link Control Block	LCCB	Logical Channel Control Block
CTYPE	Call Type	LCN	Logical Channel Number
DN	Directory Number	PKT	Packet
DST	Destination	PVC	Permanent Virtual Circuit
DESTSM	Destination Switch Module	ROP	Receive-Only Printer
HEX	Hexadecimal	TGN	Trunk Group Number
ISDN	Integrated Services Digital Network	VC	Virtual Circuit

5.28.3 Commands

CMD	RESULT
9XX	(X=00-08) Next view in sets of 8 LCNs
920	Print entire summary to ROP
930,X	(X=LCN|ALCB) Hex dump of specific LCCB (X=LCN) or ALCB
940	Hex dump of all collected data to ROP

5.29 140 - HARDWARE CALL TRACE (5E12 Only)**5.29.1 Purpose**

The purpose of the 140 page display is to provide the hardware connections for the packet call trace and circuit switched D-channel call trace.

5.29.2 General

When "MULTIPT" instead of a DN number appears on the 140 screen display, a custom interface with multiple users was traced (see Figure 5-37). If "STANDARD" instead of a DN number appears on the screen display, a standard interface with multiple users was traced. When an out-of-service (OOS) interface is traced, parts of the peripheral and network paths might not be displayed. This is an indication that these parts of the path(s) are not currently up.

NOTE: The PDB abbreviation on the 140 page display actually means protocol handler data bus (PHDB). The PDB abbreviation appears on the page display because an internal software process is also named PHDB.

Call Trace supports tracing packet pipe trunks. Only one of the DS0s associated with a packet pipe can be traced and displayed a time. If the trace is triggered on the packet pipe trunk group port, the trace will default to the first path linked off the DPB on the PSU side and the corresponding packet pipe trunk group member on the DFI side. In order to view other packet pipe paths, the call trace must be triggered off the packet pipe trunk group member rather than the trunk group port. Hardware call trace is available for the DNU-S primary rate interface (PRI) D-Channel.

Examples of packet and circuit switched D-Channel call trace displays are as follows:

- Figure 5-37 - TR-303 on DNU-S Circuit-Switched D-channel Call Trace
- Figure 5-38 - TR-303 on DNU-S Packet-Switched B-channel Call Trace

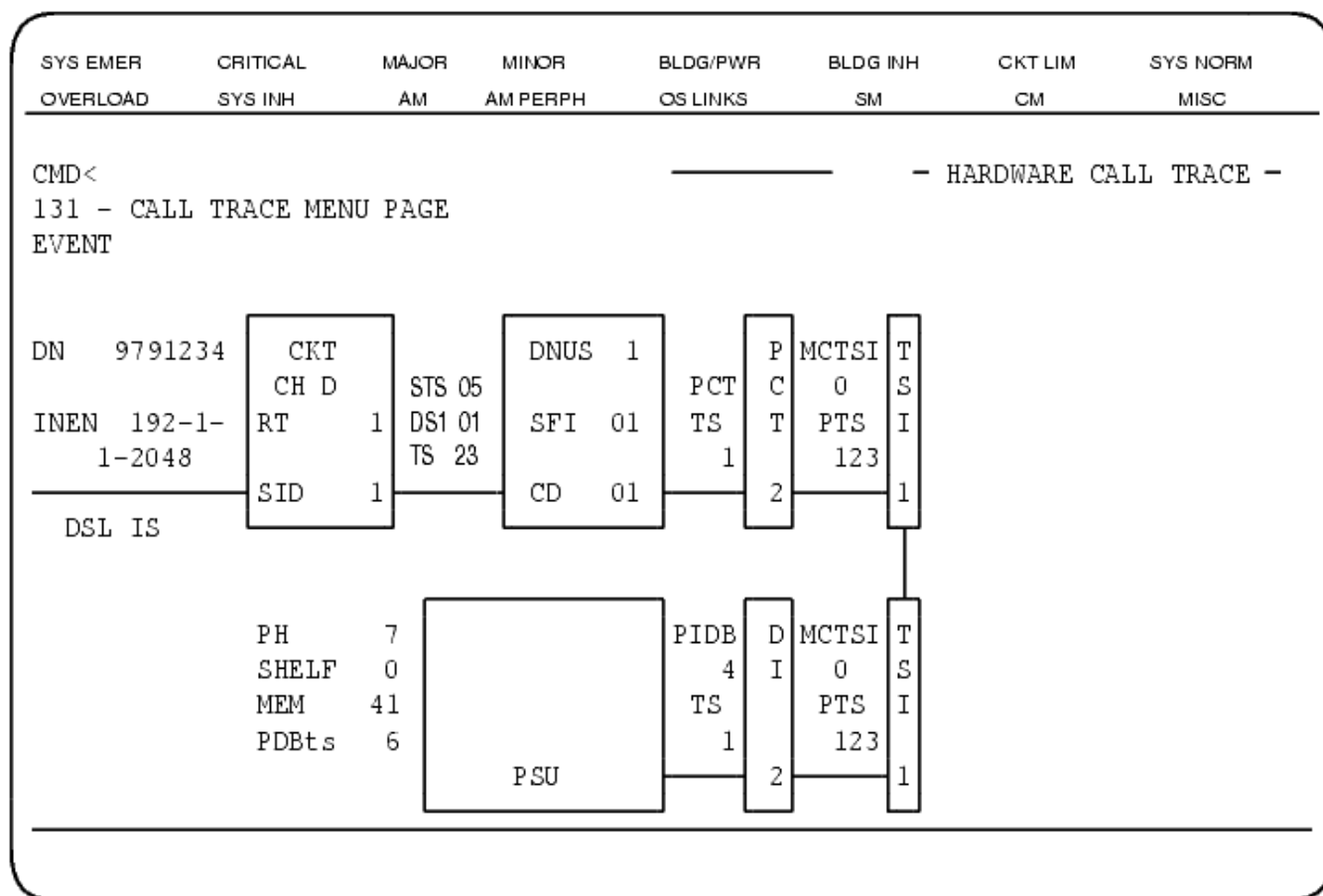


Figure 5-37 140 - TR-303 on DNU-S Circuit-Switched D-channel Call Trace (5E12 Only)

Abbreviations:

CD	Common Data	RT	Remote Terminal
DN	Directory Number	SFI	STSX-1 Facility Interface
DNUS	Digital Network Unit-SONET	STS	Synchronous Transport Signal
DS1	Digital Signal Level 1	TS	Time Slot
DLI	Dual Link Interface	NLI	Network Link Interface
MCTSI	Module Controller/Time Slot Interchanger	TSI	Time Slot Interchanger

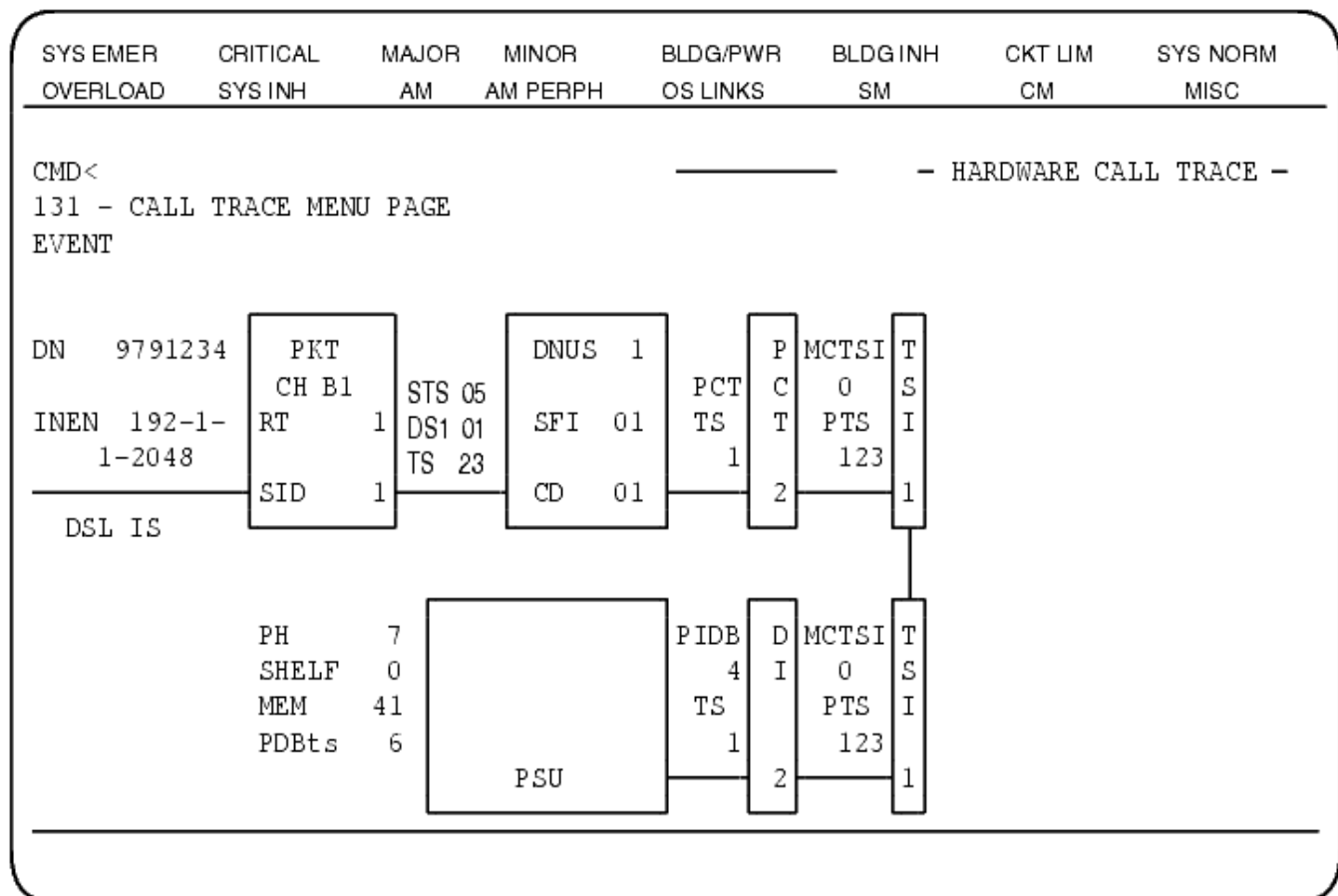


Figure 5-38 140 - TR-303 on DNU-S Packet-Switched B-channel Call Trace (5E12 Only)

Abbreviations:

CD	Common Data	RT	Remote Terminal
DN	Directory Number	SFI	STSX-1 Facility Interface
DNUS	Digital Network Unit-SONET	STS	Synchronous Transport Signal
DS1	Digital Signal Level 1	TS	Time Slot
DLI	Dual Link Interface	NLI	Network Link Interface
MCTSI	Module Controller/Time Slot Interchanger	TSI	Time Slot Interchanger

5.30 141 THROUGH 144 - SM 1 THROUGH SM 192 STATUS SUMMARY (5E12 and Later)

5.30.1 Purpose

The purpose of the 141 through 144 display pages is to provide a more detailed summary status of groups of 48 SMs on one display.

5.30.2 General

Displays 141, 142, 143, and 144 are very similar. Each one can display summary status of up to 48 SMs. Page 141 displays status for SMs 1 through 48, Page 142 displays summary status for SMs 49 through 96, Page 143 displays status for SMs 97 through 144, and Page 144 displays summary status for SMs 145 through 192.

Each equipped SM has a unique indicator on these displays. Each indicator has the following three distinct sections:

- **SM NUMBER:** There may be gaps in SM numbering for a particular office. To provide flexibility in office numbering schemes, the SM numbers are not necessarily assigned sequentially. If an SM is not equipped, it is not shown. An example of this is shown in the 141 page example (Figure 5-39) by the blank indicators between SM 12 and SM 20, SM 20 and SM 24, etc.
- **SM TYPE:** There is a 3-character acronym to show the usage of an SM. For example, an LSM is a local switching module and an RSM is a remote switching module. There can also be a 4-character acronym with a "G" prefix; the prefix denotes global switching module functionality, specifically that the SM is equipped with PSU-terminal common channel signaling (CCS) signaling links.
- **SM STATUS PHRASE:** This is a 10-character, maximum, phrase which describes the most significant off-normal condition in the SM. During initialization, the status phrase gives the current initialization progress type. Table 5-1 lists status phrases in order of priority and gives the color and an explanation for each phrase. For detailed information on SM progress markers, see 235-105-250, *System Recovery*.

If more than one off-normal condition exists in an SM, a ``+" appears to the right of the status phrase (SMs 1, 5, and 48 in Figure 5-39). A complete list of active off-normal conditions can be output via menu command 900.

In addition to this page, the status phrase is shown on all per-SM pages.

When a new alarm condition on an SM occurs, the SM indicator begins flashing. The ALM RLS key does not stop the flashing. The color of the flashing indicator reflects the new alarm only if the newly recorded condition is of higher or equal priority to the previous condition. To stop the flashing, the craft should display Page 1010 for that SM. There is also a command to retire the flashing for the range of SMs associated with the page being displayed - 999; mainly utilized for situations, such as during installation, when SMs are being grown and many SMs are displaying recurrent error conditions.

The backlighted note about Time-Multiplexed Switch Links (TMSLNK) appears whenever an ONTC is out of service or unavailable. The TMSLNKs are under the maintenance control of the ONTCs, thus all TMSLNKs on a side are affected when the ONTC of that side is off-normal.

For further details on any SM recovery-related activity or SM inhibits, the craft would enter 1800,X to display the SM X INHIBIT AND RECOVERY CONTROL page. This is the SMs control page for emergency action.

For details on circuits out of service or hardware in a particular SM, the craft should enter 1010,X to display the SM X STATUS page. This page can be accessed during the initialization of SM X or if SM X is isolated. The only status shown appears in the SM STAT and RELATED PAGES boxes.

For details on ONTC circuits out of service, the craft should enter 115 to display the COMMUNICATION MODULE SUMMARY page.

In the example of the 141 page shown in Figure 5-39, SM 1, which is a GLSM, has several off-normal conditions. The ``+" indicates that there is more than one off-normal condition; the most critical condition (inhibits being set) is displayed. Both SM 3 and 10 have circuits out of service. The SM 5, an RSM, has a hash error plus other off-normal conditions. The SM 6, another LSM, is isolated. This indicator would be flashing in the display, which cannot be shown here. The SM 48, another RSM, has a building power alarm plus other off-normal conditions. There is an off-normal condition in ONTC 1 causing all the TMSLNKs on Side 1 to be off-normal.

[illegible]

Figure 5-39 141 - SM 1 - 48 Status Summary (5E12 and later)

Abbreviations:

BLDG	Building	OOS	Out of Service
CKT	Circuit	OP	Output
CNTL	Control	PWR	Power
DLI	Dual Link Interface	RCVRY	Recovery
ERR	Error	REX	Routine Exercise
GLSM	Global Local Switching Module	RSM	Remote Switching Module
HSM	Host Switching Module	SM	Switching Module
INH	Inhibit	SYSSTAT	System Status
ISOL	Isolation	TMSLNKS	Time-Multiplexed
LSM	Local Switching Module		Switch Links

5.30.3 Commands

All available displays can be accessed from the 141 through 144 display pages.

CMD	RESULT
900	The off-normal report is output for the SMs associated with the page. (OP:SYSSTAT,SM=a&b) [,LSM] [,HSM] [,RSM] [,UCL] where "a&b" is the range of SMs associated with the page being displayed
999	SM flashing is retired for the range of SMs associated with the page.
1010,X	SM X STATUS page is displayed.
1271	SM 1 - 48 REX SUMMARY page is displayed.
1600,SZ	SITE Z STATUS page is displayed.
1800,X	SM X INHIBIT AND RECOVERY CONTROL page is displayed

Table 5-1 Pages 141 Through 144 - SM Off-Normal Status Phrases - 5E12

PRIORITY	PHRASE	COLOR	EXPLANATION

1	CRIT ALM	white/red flash	Critical building alarm (fire)
2	init state	black/yellow	Initialization progress types
3	PRECUT	black/cyan	Pre-cutover state
	POSTCUT	black/cyan	Post-cutover state
4	SPEC GROW	black/cyan	Special growth
5	COMM LOST	white/red	Communication lost (transitional)
	INIT ISOL	white/red flash	Initialization pending on isolated SM
	INIT PEND	black/yellow	Initialization pending
	MAN ISOL	white/red flash	SM isolated manually
	ISOLATED	white/red flash	SM isolated automatically (no stand-alone call processing)
	STNDALONE	red/yellow	SM isolated with stand-alone call processing
6	MHDGRD	red/yellow	MH0 running in degraded mode
7	GEN DIFF	yellow/red	AM/SM on different software releases
8	SCANON	black/white	Analog line & trunk scanning being restored
	TMCRT	black/white	IDCU RT TMC restore in progress
	ISDNRT	black/white	ISDN line & trunk restore in progress
	EOCRST	black/white	IDCU RT EOC restore in progress
9	MIN MODE	white/red	Minimum mode (no call processing)
10	HSM STALN	red/yellow	RSM in stand-alone call processing (HSM in trouble)
	CMP STALN	red/yellow	SM in stand-alone call processing (CMP in trouble)
	CMP ISOL	white/red flash	SM service interruption (CMP in trouble)
	HSM ISOL	white/red flash	RSM service interruption (HSM in trouble)
11	SVC INTR	white/red flash	Service interruption (no call processing)
12	DATA SYNC	black/yellow	Interprocessor data sync in progress
13	SVC DGRD	white/red flash	Service degraded (see MCC Page 115)
	NOINTERCP	white/red flash	Service degraded mode, ACT Major DLI is OOS
14	QMAN ISOL	white/red flash	SM-2000 manually isolated from QLPS
	QLPS ISOL	red/white	Isolated from QLPS networks due to OOS MH QPIPEs
	QLNK LOST	black/cyan	QLPS connectivity has been lost
15	MATE PUMP	blue/white	Mate memory pumped
16	PTL STALN	red/yellow	RSM partial stand-alone call processing
17	HASH ERR	red/white	Hashsum check error
18	D/C HASH	red/white	DISK/CORE hash check mismatch
19	BACKOUT	blue/white	RC and/or program update backout(s)
20	OVERLOAD	red/white	Overload (see MCC Page 109)
21	E911 CRIT	red/white	All application processor links to the Enhanced 911 Service Adjunct on this module are OOS
22	FORCED	red/green	MCTSIs forced active/unavailable
23	INHIBITS	blue/yellow	Inhibit(s) are on
24	CLNK LOST	black/cyan	All CLNKs off-normal to a SM-2000
25	QPIPE OOS	black/cyan	SM-2000 lost MH QPIPE to a single QLPS network
26	QLNK OFFN	black/cyan	Some but not all QLPS connectivity has been lost to SM-2000 for one or both networks
27	CLNK OFFN	black/cyan	Communication link off-norm (see MCC Page 115)
28	POSTINIT	black/white	Post-initialization escalation interval
29	CPE SYNC	black/white	Customer premises equipment resync
30	BLDG/PWR	black/white	Off-normal condition (fan/fuse/bldg alarm)
31	FAN/FUSE	black/white	Fan/fuse alarm
32	MATE OOD	black/white	Mate memory out of date
	MATE UPD	black/white	Mate memory updating (transitional)
33	DSL MAJOR	black/white	>30% DSLs out of service
34	CKT OOS	black/white	Circuit(s) out of service
	CKT LIMIT	black/white	Circuits to their limit
35	RT PLS	black/white	Remote terminal protection line switching active
36	CGA	black/white	Carrier group alarm
37	DSL MINOR	black/white	DSL(s) out of service
38	MSG CNTL	blue/white	Output message verbose or discard mode set
39	BKUP FAIL	black/white	ODD backup failure
40	ODD WARN	black/white	Either ODD space has exceeded engineering recommendations or the automatic relation engineering reorganization process has failed
	REQ PEND	black/white	Set/inhibit request pending
41	NIPUMP	black/white	Non-interfering pump active
42	NORMAL	normal video	Normal operation

5.31 150 - TRACEABLE CALL STATUS [5E12 and Later]

5.31.1 Purpose

The 150 page display provides status information on all circuit-switched calls of a particular directory number (DN) or multiline hunt group (MLHG) member.

5.31.2 General

The 150 page was enhanced to display call ID (CID) information in addition to the subaddress (SA) information displayed. Accordingly, the title of the page was changed from SUBADDRESS STATUS to TRACEABLE CALL STATUS.

A "SEE PAGE" indicator in the upper right corner of the 150 page identifies associated page displays to access for additional call trace information.

Subaddress Displays

For custom DSLs and standard Electronic Key Telephone service (EKTS) DSLs, information is provided on each subaddress of the given DN/MLHG. The SA number corresponds to button location on the terminal; it is not the same as call appearance (CA) number, but they are related values. The first CA of a DN/MLHG at the terminal is SA 0. The SA values are then incremented for each subsequent appearance of the same DN/MLHG at the terminal. A maximum of 16 SAs can be assigned per DN/MLHG.

The SA information is shown in four columns on the 150 page and includes the following:

- **SA:** Subaddress number
- **PDN:** Primary DN of the port controlling the SA
- **CH:** Channel used
- **T:** Type of call (V for voice or D for data).

This information is displayed in response to a DN/MLHG trace where SA=ALL was specified, or when an attempt is made to trace an invalid (that is, unassigned) SA number. A valid SA can be traced by using the SA option in the trace request.

The status of SAs is indicated by color: "ACTIVE" SAs are backlighted in green, "ON HOLD" SAs are backlighted in blue, and "IDLE" SAs are backlighted in white. Unassigned SAs are not backlighted. At least one SA will appear to be assigned even if no voice channels are subscribed to. If an SA is ON HOLD, no B channel will be allocated for the call. If an SA is IDLE, only the SA number will appear.

Shared analog lines only use SA 0. Analog controllers are marked by an asterisk (*) in the channel information fields.

If the given DN/MLHG is permitted to make circuit-switched data (CSD) calls, this information will also be provided in the 150 page display. The information provided is the same as for circuit-switched voice (CSV) calls with the exception of SA information. Since CSD calls do not use SAs, they are assigned a call ID number instead. This ID number will always be 16. Only one CSD call is permitted on these DSLs. A data call can be traced by specifying CID=16 in the input command or poke.

The SA options are not supported for PODS (ISDN equivalent of POTS) lines.

Figures 5-40 and 5-41 are examples of the 150 page subaddress displays.

Call ID Display

For standard non-EKTS DSLs, information is provided based on the subscribed-to call reference busy limits (CRBL) for the DN/MLHG. The combined value of the CSV CRBL and the CSD CRBL determines the number of call positions shown as assigned. Up to 16 CSV calls and 16 CSD calls per DN can be present on standard interfaces.

When the 150 page is populated, each call is given a CID number based on the age of the call; the most recent call will be CID 00, the next will be CID 01, and so on. This CID number does not correspond in any way to button locations on the terminal; its only use is to indicate chronological order and to provide a means of specifying which of the calls displayed the user wishes to trace.

The CID information is shown in four columns on the 150 page and includes the following for each call:

- **ID**: Identification number
- **PDN**: Primary DN of the port controlling the call
- **CH**: Channel used
- **T**: Type of call (V for voice or D for data).

Since DNs on non-EKTS cannot be shared, the PDN will be the same for each call displayed.

The status of active calls is indicated by color: ``ACTIVE" calls are backlighted in green, ``ON HOLD" calls are backlighted in blue, and ``IDLE" call positions are backlighted in white. Call positions that exceed the total of the CRBLs are not backlighted. If a call is ON HOLD, no B-channel will be allocated for the call. If a call position is IDLE, only the ID number will appear.

The CID information is displayed on the 150 page by specifying CID=ALL in the input command or by attempting to trace an invalid CID value. The call corresponding to a valid CID number can be traced by specifying the CID value in the input command. If the 150 page is already populated, then the call shown in the corresponding ID box will be traced; if not, then the ``Xth" oldest call will be traced where X is the CID value specified.

An example of the CID version of the 150 page display is shown in Figure 5-42 .

Figure 5-40 is an example of the SA version of the 150 page display which shows the status of calls on an MLHG.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

404,MLHG,SA=SUBADD (0 to 15) SEE PAGE 131
 MLHG = 7- 1
 A SUBADDRESS IDENTIFIES THE CALL APPEARANCE BUTTON

SA	PDN	CH	T	SA	PDN	CH	T	SA	PDN	CH	T	SA	PDN	CH	T
00	2201000		V	01	2201000	E1	V	02							

ACTIVE CALLS ARE DISPLAYED IN SUBADDRESS ORDER
 ON HOLD V=CIRCUIT-SWITCHED VOICE D=CIRCUIT-SWITCHED DATA
 IDLE

Figure 5-40 150 - Traceable Call Status (SA Version) [5E12 and Later]

Abbreviations:

CH	Channel (B1, B2, or None)	SA	Subaddress
MLHG	Multiline Hunt Group	T	Type of Call (Voice or Data)
PDN	Primary Directory Number		

Figure 5-41 is an example of the SA version of the 150 page display which shows the status of calls of a DN. In this example, CSD information is also displayed in the left column near the bottom.

[illegible]

Figure 5-41 150 - Traceable Call Status (SA Version with CSD Information) [5E12 and Later]

Abbreviations:

CH	Channel (B1, B2, or None)	PDN	Primary Directory Number
CID	Call ID Number	SA	Subaddress
ID	Identification Number	T	Type of Call (Voice or Data)

Figure 5-42 is an example of the CID version of the 150 page display which shows the status of calls for a DN.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

401,DN,CID=ID (0 to 31) 150 - TRACEABLE CALL STATUS

SEE PAGE 131

DN = 2201200

AN ID DOES NOT IDENTIFY THE CALL APPEARANCE BUTTON

ID	PDN	CH	T	ID	PDN	CH	T	ID	PDN	CH	T	ID	PDN	CH	T
00	2201200		V	01	2201200		D	02	2201200		V	03	2201200		V
04	2201200		V	05	2201200		V	06	2201200		V	07	2201200	B1	V
08	2201200	B2	D	09											

ACTIVE CALLS ARE DISPLAYED IN CHRONOLOGICAL ORDER

ON HOLD V=CIRCUIT-SWITCHED VOICE D=CIRCUIT-SWITCHED DATA

IDLE

Figure 5-42 150 - Traceable Call Status (CID Version) [5E12 and Later]

Abbreviations:

CH	Channel (B1, B2, or None)	PDN	Primary Directory Number
CID	Call ID Number	SA	Subaddress
DN	Directory Number	T	Type of Call (Voice or Data)
ID	Identification Number		

5.32 151 - CONFERENCE CIRCUIT TRACE (5E12 and Later)**5.32.1 Purpose**

The 151 page display shows the hardware paths to the conference circuit when a conference call is traced.

5.32.2 General

Conference circuits are located in the global digital service unit (GDSU) or the global digital services function (GDSF) and provide 3-port or 6-port customer service conferencing capabilities for an office. The maximum number of hardware paths for 3-port and 6-port conference circuits is 3 and 6, respectively.

When calls involving more than one conference circuit are traced, only the first conference circuit found is displayed. A multiple-conference circuit call is identified by the existence of an associate conference controller, or an associate floating conference controller, in the TRC UTIL LINE or TRC UTIL PID output message on the ROP. To view the connections of the other conference circuits on the call, trace the associate conference controllers found in the TRC UTIL LINE or TRC UTIL PID output message, using the PID option on the TRC UTIL input message.

Multiple-conference circuit calls can also be the result of an ACD/BRCS Service Observe connection set up on a multiway call. Again, only the first conference circuit found is displayed. To view the connections of the other conference circuits on the call, trace the associate conference controller or the monitoring PID found in the TRC UTIL LINE output message. Tracing the monitoring PID ensures that the conference circuit used to set up the Service Observe connection is displayed.

The NCT time slot numbers are printed consecutively for an *intramodule* path on the conference circuit SM. For an *intermodule* path, one time slot is printed followed by the far-party SM. The letter ``A" next to the SM number indicates that automatic time slot switching (AUTISSING) has occurred. AUTISSING is a failure with the E-bit data on the major side of the TMS. Therefore, the time slot number represented in this situation is from the minor side of the TMS.

Peripheral-to-peripheral connections are supported on an SM-2000. Because these types of calls are connected at the TSI, no network path will be displayed for that connection.

For ACD/BRCS Service Observe connections, the NCT time slot numbers displayed on the 151 page may not match the NCT time slot numbers displayed on the 133-138 pages. This is due to the TSI channel looping used to set up Service Observe calls. Information on the looped channels can be obtained by using the **450** poke to dump the dynamic data associated with the Monitoring Bridge.

All of the dynamic data associated with the traced conference circuit can be dumped to the ROP from any call trace page by using the **450** poke and the PID of the conference circuit process or STRUCTS=confckt.

A ``SEE PAGE" indicator in the upper right corner of the 151 page identifies associated page displays to access for additional call trace information.

Figure 5-43 shows an example of the 151 page display used to trace calls on a GDSU conference circuit. In this example, the indicator "SEE PAGES 133, 134, 135" directs the user to those pages for more details.

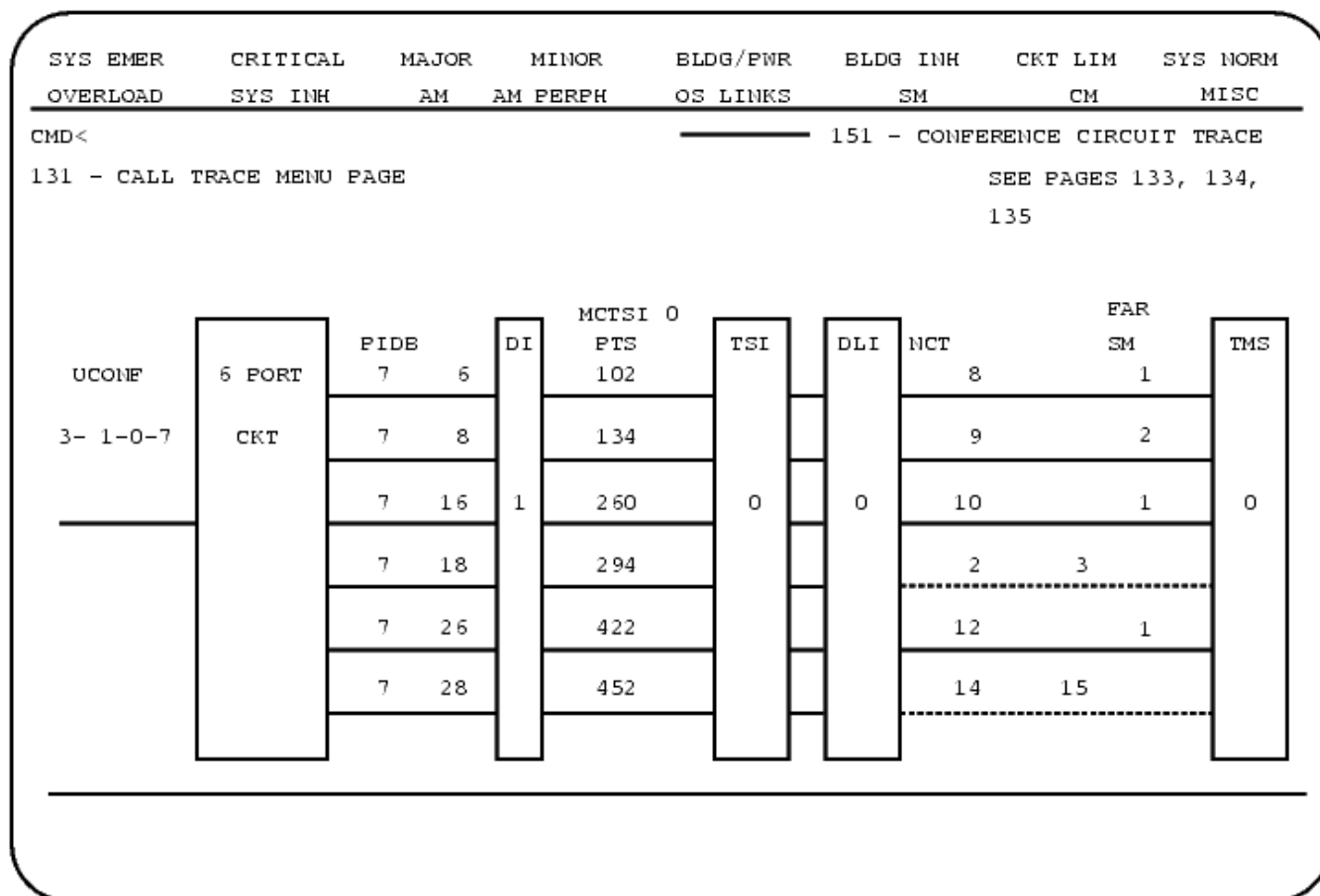


Figure 5-43 151 - GDSU Conference Circuit Trace (5E12 and Later)

Abbreviations:

CKT	Circuit	PTS	Peripheral Time Slot
DI	Data Interface	SM	Switching Module
DLI	Dual Link Interface	TMS	Time Multiplexed Switch
MCTSI	Module Controller/Time Slot Interchanger	TSI	Time Slot Interchanger
NCT	Network Control and Timing	UCONF	Universal Conference Circuit Number
PIDB	Peripheral Interface Data Bus		

Figure 5-44 shows an example of the 151 page display used to trace calls on a GDSF conference circuit.

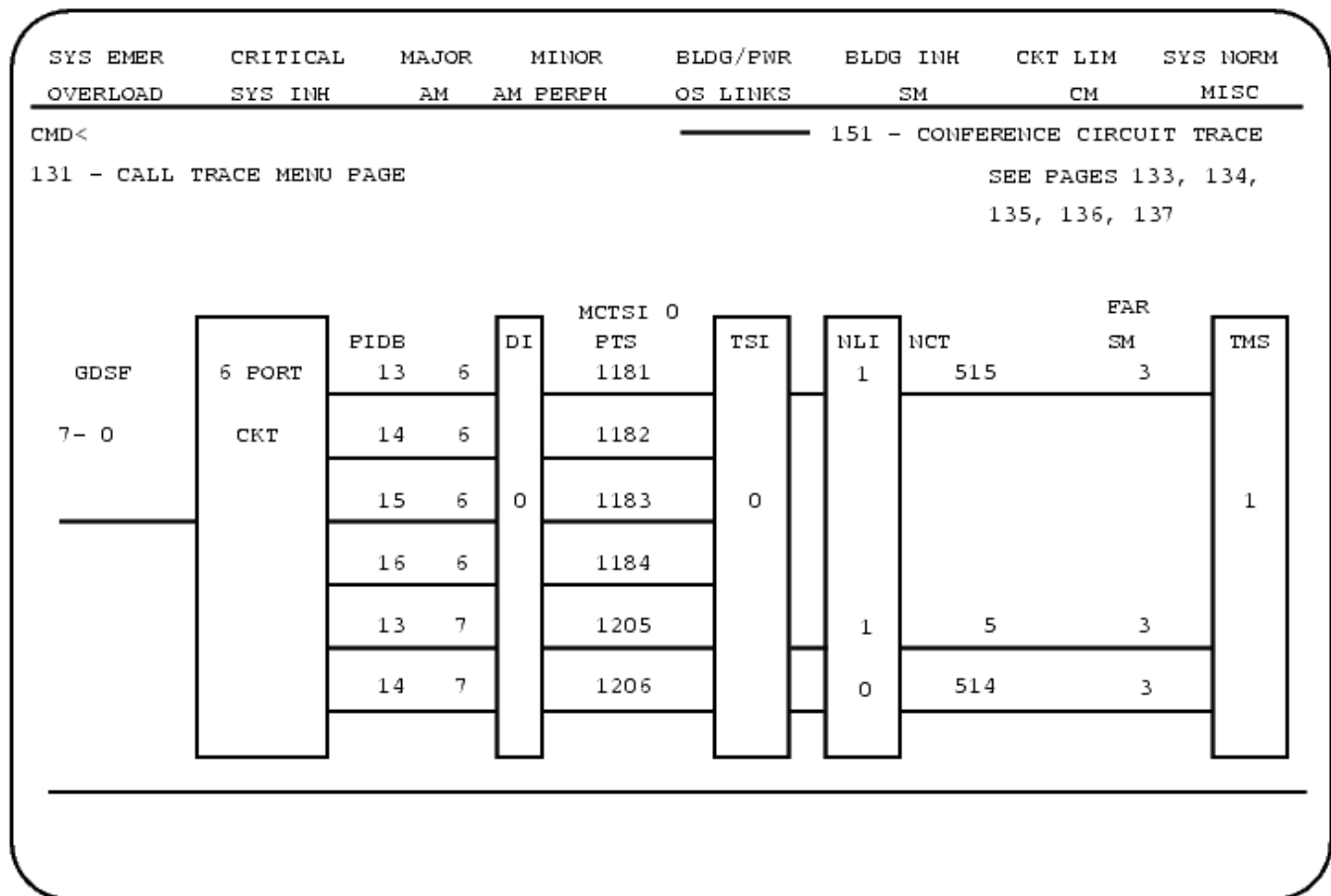


Figure 5-44 151 - GDSF Conference Circuit Trace (5E12 and Later)

Abbreviations:

CKT	Circuit	NLI	Network Link Interface
DI	Data Interface	PIDB	Peripheral Interface Data Bus
GDSF	Global Digital Services Function	PTS	Peripheral Time Slot
MCTSI	Module Controller/Time Slot Interchanger	SM	Switching Module
NCT	Network Control and Timing	TMS	Time Multiplexed Switch
		TSI	Time Slot Interchanger

5.32.3 Commands

Refer to Page 131 - Call Trace Menu (Figure 5-32) and Page 132 - Call Trace Menu Cont. (Figure 5-33) for the complete list of call trace poke commands that can be invoked. Also, any call trace display page can be accessed from the 151 display page.

5.33 170 - OVERLOAD DETAIL (5E12 and Later)**5.33.1 Purpose**

The 170 display page provides detailed overload information for the AM, CMP, DLN, QGP(s) and SM(s).

5.33.2 General

Any AM or DLN overload conditions are shown on the 170 display page. If a DLN overload occurs, the DLN group

and member number is shown as well as the type of overload.

Details of an SM overload can be obtained by entering poke 1300,X, where X is the SM number. Details on a CMP overload can be obtained by entering poke 1370,X for PRIM CMP X or poke 1371,X for MATE CMP X, where X in both commands = CMP number.

Likewise, details on a QGP overload can be obtained by entering poke 1372,X,Y, where X is the MSGS side and Y is the QGP number.

The REALTIME overload indicators contain NONE, MINOR, MAJOR, or CRIT to show the severity of the overload. NONE means no overload exists. MINOR and MAJOR are different levels of real-time overloads. Critical (CRIT) is only used for DLNs and SMs and is the most severe type of overload.

For RESOURCE overloads, either NONE or the name of the resource is displayed. Refer to 235-600-750, *Output Messages Manual*, (OP:OVRD) for a complete listing of the resource overload names.

The AM and DLN information boxes contain information regarding real-time and resource overloads in the AM and DLN, respectively.

Figure 5-45 shows an example of the 170 display page with the AM in SCB resource overload and DLN 00-2 in RRB resource overload. Poke 1300,5 is used to display overload information for SM 5 which is shown in MINOR real-time overload and EDIB resource overload.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
170 - OVERLOAD DETAIL							
1300,X DISPLAY SM X OVERLOAD INFO				1370,X DISPLAY PRIM CMP X OVERLOAD INFO			
1372,X,Y DISPLAY QGP X-Y OVERLOAD INFO				1371,X DISPLAY MATE CMP X OVERLOAD INFO			
AM OVERLOAD INFORMATION							
REALTIME: NONE		RESOURCES: SCB					
DLN 00-2 OVERLOAD INFORMATION							
REALTIME: NONE		RESOURCES: RRB					
SM 005 OVERLOAD INFORMATION							
REALTIME: MINOR		RESOURCES: EDIB				STAT: OVERLOAD	

Figure 5-45 170 - Overload Detail (with SM Overload Detail) (5E12 and Later)

Abbreviations:

AM Administrative Module
CMP Communication Module Processor

PRIM Primary (CMP)
RRB Ring Receive Buffer

DLN	Direct Link Node
EDIB	Extended DSL Input Buffer
INFO	Information

SCB	Stack Control Block
SM	Switching Module
STAT	Status

Similarly, CMP information is displayed on request by poke 1370,X for the primary CMP and poke 1371,X for the mate CMP (where X = CMP number).

Figure 5-46 shows an example of the 170 page where poke 1370,0 is used to display overload information on primary CMP 000. In this example, primary CMP 000 is in MAJOR real-time overload and PCB resource overload. Also shown is the AM in SCB resource overload and DLN 00-2 in RRB resource overload.

```

SYS EMER  CRITICAL  MAJOR  MINOR  BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH   AM     AM PERPH  OS LINKS   SM        CM        MISC
-----
170 - OVERLOAD DETAIL
1300,X DISPLAY SM X OVERLOAD INFO      1370,X DISPLAY PRIM CMP X OVERLOAD INFO
1372,X,Y DISPLAY QGP X-Y OVERLOAD INFO  1371,X DISPLAY MATE CMP X OVERLOAD INFO

----- AM OVERLOAD INFORMATION -----
REALTIME: NONE    RESOURCES: SCB

----- DLN 00-2 OVERLOAD INFORMATION -----
REALTIME: NONE    RESOURCES: RRB

----- PRIM CMP 000 OVERLOAD INFORMATION -----
REALTIME: MAJOR    RESOURCES: PCB          STAT: OVERLOAD

```

Figure 5-46 170 - Overload Detail (with Primary CMP Overload Detail) (5E12 and Later)

Abbreviations:

AM	Administrative Module
CMP	Communication Module Processor
DLN	Direct Link Node
INFO	Information
PCB	Process Stack Block

PRIM	Primary (CMP)
RRB	Ring Receive Buffer
SCB	Stack Control Block
SM	Switching Module
STAT	Status

Information on QGP X-Y is displayed on request by poke 1372,X,Y.

Figure 5-47 shows an example of the 170 page where poke 1372,0,0 is used to display overload information on QGP 0-0. In this example, QGP 0-0 is in QPIPE resource overload, the AM is in SCB resource overload and DLN 00-2 is in RRB resource overload.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD<				170 - OVERLOAD DETAIL			
1300,X DISPLAY SM X OVERLOAD INFO				1370,X DISPLAY PRIM CMP X OVERLOAD INFO			
1372,X,Y DISPLAY QGP X-Y OVERLOAD INFO				1371,X DISPLAY MATE CMP X OVERLOAD INFO			

AM OVERLOAD INFORMATION

REALTIME: NONE RESOURCES: **SCB**

DLN 00-2 OVERLOAD INFORMATION

REALTIME: NONE RESOURCES: **RRE**

QGP 0-0 OVERLOAD INFORMATION

REALTIME: NONE RESOURCES: **QPIPE**

Figure 5-47 170 - Overload Detail (with QGP 0-0 Overload Detail) (5E12 and Later)

Abbreviations:

AM	Administrative Module	QGP	QLPS Gateway Processor
CMP	Communication Module Processor	QPIPE	QLPS Pipe
DLN	Direct Link Node	RRB	Ring Receive Buffer
INFO	Information	SM	Switching Module
PRIM	Primary (CMP)	SCB	Stack Control Block

5.33.3 Commands

Commands are provided to obtain detailed information on SM, Primary and Mate CMP, and QGP overload conditions.

In addition to these commands, any available paging command can be entered from Display Page 170.

CMD	RESULT
1300,X	SM X overload information is displayed.
1370,X	Primary CMP X overload information is displayed.
1371,X	Mate CMP X overload information is displayed.
1372,X,Y	QGP X-Y overload information is displayed.

5.34 178 - AUTO SPARE DISK [5E12 and Later]

5.34.1 Purpose

The purpose of the 178 page display is to provide pokes for the disk reconfiguration feature and to show any reconfiguration actions that are in-progress.

5.34.2 General

Commands and information provided on the 178 page are useful in the recovery of one or more failed MHDs. Certain automatic disk configuration data from this page is displayed on the 123 page, Disk File System Access.

Figure 5-48 shows an example of the 178 page in the normal state.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD:_____ 178 - AUTO SPARE DISK							
AUTO SPARE DISK IS <u>ALLOWED</u> FOR THIS OFFICE AUTO SPARE DISK IS CURRENTLY INHIBITED ON MHDs: <u>NONE</u>							
6xx ALLOW AUTO SPARE DISK ON MHD xx 699 ALLOW AUTO SPARE DISK IN THE OFFICE 7xx INHIBIT AUTO SPARE DISK ON MHD xx 799 INHIBIT AUTO SPARE DISK IN THE OFFICE 900 OUTPUT SPARE DISK CONFIGURATION							
4xx CONFIGURE REPLACEMENT FOR MHD xx 8xx NORMALIZE MHD xx 899 NORMALIZE ENTIRE MHD CONFIGURATION							

Figure 5-48 178 - Auto Spare Disk (Normal) [5E12 and Later]

Abbreviations:

AUTO	Automatic	MHD	Moving Head Disk

Figure 5-49 shows an example of the 178 page when a replacement (MHD 14) is being configured for MHD 0.

```

SYS EMER  CRITICAL  MAJOR    MINOR    BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH   AM      AM PERPH  OS LINKS   SM       CM      MISC

```

```

CMD: _ 178 - AUTO SPARE DISK

```

```

AUTO SPARE DISK IS ALLOWED FOR THIS OFFICE

```

```

AUTO SPARE DISK IS CURRENTLY INHIBITED ON MHDs: NONE

```

```

6xx  ALLOW AUTO SPARE DISK ON MHD xx
699  ALLOW AUTO SPARE DISK IN THE OFFICE
7xx  INHIBIT AUTO SPARE DISK ON MHD xx
799  INHIBIT AUTO SPARE DISK IN THE OFFICE
900  OUTPUT SPARE DISK CONFIGURATION

```

```

SW:MHD=0, REPLACE IN PROGRESS

```

```

EXECUTING:RESTORE MHD 14

```

```

4xx  CONFIGURE REPLACEMENT FOR MHD xx
8xx  NORMALIZE MHD xx
899  NORMALIZE ENTIRE MHD CONFIGURATION

```

Figure 5-49 178 - Auto Spare Disk (Replacement MHD Being Configured) [5E12 and Later]

5.34.3 Commands

The 178 page provides commands to allow or inhibit automatic disk configuration on one or more MHDs or on the entire office.

Commands are also provided to generate a printout of the current configuration, configure a replacement MHD for one that is defective, and normalize the configuration on a per-MHD basis or on the entire office.

CMD	RESULT
4XX	Replacement for MHD XX is configured
6XX	Automatic disk configuration is allowed on MHD XX
699	Automatic disk configuration is allowed on entire office
7XX	Automatic disk configuration is inhibited on MHD XX
799	Automatic disk configuration is inhibited on entire office
8XX	MHD XX is normalized
899	Entire MHD configuration is normalized
900	Spare disk configuration is output

5.35 179 - DISK CONFIGURATION [5E12 and Later]

5.35.1 Purpose

The purpose of the 179 page display is to show configuration relations of physical MHDs to logical MHD sets. Also displayed on this page are the MHDs that have been reconfigured, MHDs that are the active system disks, and

MHDs that are the spare disks. A list of reconfigured MHDs also appears on 123 page, Disk File System Access.

5.35.2 General

Page 179 shows related MHD(s) for each logical MHD set (for example, **duplmhd**) defined in the equipment configuration data (ECD).

Figure 5-50 shows the normal state of Page 179.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD:_____ 179 - DISK CONFIGURATION							
ALSO SEE PAGE 180				POKES ON PAGE 178			
LOGICAL MHD SET				PHYSICAL MHDS			
duplmhd				MHD 0		MHD 1	
duplmhd1				MHD 2		MHD 3	
duplmhd2				MHD 4		MHD 5	
duplmhd3				MHD 6		MHD 7	
duplmhd4				MHD 8		MHD 9	
duplmhd5				MHD 10		MHD 11	
duplmhd6				MHD 12		MHD 13	
mhd14				MHD 14			
mhd15				MHD 15			

Figure 5-50 179 - Disk Configuration (Normal) [5E12 and Later]

Abbreviations:

dupmhd	Duplicate MHD Pair (double-digit pair number)
duplmhd	Duplicate MHD Pair (single-digit pair number)
MHD	Moving Head Disk

Figure 5-51 shows that MHDs 0 and 14 have been reconfigured. At this time, MHDs 1 and 14 are the system disks and MHDs 0 and 15 are the spare disks.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD: _ 179 - DISK CONFIGURATION

ALSO SEE PAGE 180

POKES ON PAGE 178

LOGICAL MHD SET

PHYSICAL MHDS

duplmhd	MHD 14 *	MHD 1
duplmhd1	MHD 2	MHD 3
duplmhd2	MHD 4	MHD 5
duplmhd3	MHD 6	MHD 7
duplmhd4	MHD 8	MHD 9
duplmhd5	MHD 10	MHD 11
duplmhd6	MHD 12	MHD 13
mhd14	MHD 0 *	
mhd15	MHD 15	

* INDICATES RECONFIGURED MHD

Figure 5-51 179 - Disk Configuration (MHDs Reconfigured) [5E12 and Later]

Abbreviations:

dupmhd	Duplicate MHD Pair (double-digit pair number)
duplmhd	Duplicate MHD Pair (single-digit pair number)
MHD	Moving Head Disk

5.35.3 Commands

There are no menu commands on the 179 page display.

5.36 180 - DISK CONFIGURATION [5E12 and Later]

5.36.1 Purpose

The purpose of the 180 page display is to show configuration relations of physical MHDs to logical MHD sets.

5.36.2 General

Display Page 180 shows related MHD(s) for each logical MHD set (for example, **duplmhd** or **dupmhd**) defined in the equipment configuration data (ECD).

Figure 5-52 shows the normal state of Display Page 180.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: _				180 - DISK CONFIGURATION			

LOGICAL MHD SET	POKES ON PAGE 178 PHYSICAL MHDS	
duplmhd8	MHD 16	MHD 17
duplmhd9	MHD 18	MHD 19
duplmhd10	MHD 20	MHD 21
duplmhd11	MHD 22	MHD 23
duplmhd12	MHD 24	MHD 25
duplmhd13	MHD 26	MHD 27
duplmhd14	MHD 28	MHD 29
duplmhd15	MHD 30	MHD 31

Figure 5-52 180 - Disk Configuration [5E12 and Later]

Abbreviations:

dupmhd	Duplicate MHD Pair (double-digit pair number)
duplmhd	Duplicate MHD Pair (single-digit pair number)
MHD	Moving Head Disk

5.36.3 Commands

There are no menu commands on the 180 display page.

5.37 181 THROUGH 184 - OFF-LINE SM STATUS SUMMARY [5E12 and Later]

5.37.1 Purpose

The 181 through 184 page displays provide off-line switch module processor (SMP) and peripheral pump status plus off-line pump commands for software releases and translations.

The off-line status for each equipped (see the following SM number range for each page) is contained in four fields. The ``aaa" field is the SM type, the ``bbb" field is the SM number, the ``c" field is the active side of the SM, and the ``ddddddddd" field is the off-line SM status phrase.

5.37.2 General

Each 181 - 184 page is divided into two basic areas. The top area contains commands to control off-line pumping

and restore peripherals. The area at the bottom provides off-line pump status on up to 48 SMs or peripherals.

The off-line SM status pages consist of four different screens to display the status for up to 192 SMs. These pages are numbered as MCC Page 181, 182, 183, and 184. Each page can display off-line SM status for up to 48 SMs. Page 181 (Figure 5-53) displays status for SMs 1-48, Page 182 (Figure 5-54) displays status for SMs 49-96, Page 183 (Figure 5-55) displays status for SMs 97-144, and Page 184 (Figure 5-56) displays status for SMs 145-192.

Each equipped SM has a unique status indicator block on these display pages. Each indicator block has four distinct fields, SM type, SM number, active side of SM, and off-line SM status phrase. Status is indicated in the following form, aaabbb,cddddddddd

where:

aaa	=	SM type
bbb	=	SM number
c	=	Active side of SM
ddddddddd	=	Off-line SM status phrase.

SM type is as follows:

LSM (local SM)
RSM (remote SM)
HSM (host SM)
ORM (optically remoted SM)
TRM (2-mile optically remoted SM) blank (unknown, default).

SM number on page:

181	=	Any number in the range 1-48
182	=	Any number in the range 49-96
183	=	Any number in the range 97-144
184	=	Any number in the range 145-192.

Active side of SM = 0 or 1.

Off-line SM status phrase is one of the following:

- **OPUMPHLDn**: Indicates an off-line pump hold, nth attempt.
- **OPUMPn**: Indicates off-line pumping, nth attempt.
- **OHASHCKn**: Indicates off-line pump hashsum check, nth attempt.
- **OPUMPFAIL**: Indicates failure to pump an off-line SM.
- **OVRFYn**: Indicates off-line verifying nth check for completion.
- **OVRFIED**: Indicates off-line verification is complete.
- **OVFYFAIL**: Indicates that off-line verification failed.
- **MATE PUMP**: Indicates a successful pump or verify.
- **OPUMPERFn**: Indicates off-line pump of peripheral n.
- **OPERFFAIL**: Indicates failure of an off-line peripheral pump.
- **OPERF OOD**: Indicates off-line peripheral is out of date.

- **ORST:** Indicates that a duplex peripheral is restoring.
- **ORSTFAIL:** Indicates failure to restore a peripheral.
- **STANDBY:** Indicates mate is in standby.
- **MATE OOD:** Indicates mate is out of date.
- **UPDATING:** Indicates mate is off-line pumping.

During non-off-line pump intervals, these pages display the status of SM mate memory. The mate memory indications, which are also shown on Page 1800, are **STANDBY**, **MATE OOD**, or **MATE PUMP**.

When an SM is being pumped, the status of mate memory on Page 1800 shows **UPDATING** when the pumping starts. If the pump is successful, the next status indicated is **MATE PUMPED** or, if it fails, status of the mate memory shows **OOD** (out of date).

If failure occurs during off-line pumping, the SM Off-line Pump System Process retries a maximum of three partial pumps.

Examples of MCC Pages 181, 182, 183, and 184 are shown respectively in Figures 5-53, 5-54, 5-55, and 5-56.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD: _

181 - OFFLINE SM 1-48 STATUS

<u>OFL PUMP</u>	<u>STOP OPUMP</u>	<u>RETRY PERF</u>	<u>RST PERF</u>	<u>OP OPUMP</u>
2000 ALL SMS	3000 ALL SMS	4000 ALL SMS	5000 ALL SMS	600X SM X
200X SM X	300X SM X	400X SM X	500X SM X	60XX SM XX
20XX SM XX	30XX SM XX	40XX SM XX	50XX SM XX	

LEGEND: SMTYPE SMNUM, ACT SIDE MATE SM STATUS

LSM 1,0 OPUMPHLD	RSM 2,0 OHASHCK		LSM 4,0 OPUMPHLD
LSM 5,0 OVREFY			HSM 8,0 OVREFY
LSM 45,0 OPUMPHLD			ORM 48,0 OPUMPHLD

Figure 5-53 181 - Off-line SM 1-48 Status Summary [5E12 and Later]

Abbreviations: Abbreviations for Page 181 are shown following Figure 5-56.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD: _

182 - OFFLINE SM 49-96 STATUS

<u>OFL PUMP</u>	<u>STOP OPUMP</u>	<u>RETRY PERF</u>	<u>RST PERF</u>	<u>OP OPUMP</u>
2000 ALL SMS	3000 ALL SMS	4000 ALL SMS	5000 ALLSMS	60XX SM XX
20XX SM XX	30XX SM XX	40XX SM XX	50XX SM XX	

LEGEND: SMTYPE SMNUM, ACT SIDE MATE SM STATUS

LSM 49,0 OPUMPHLD	RSM 50,0 OHASHCK		LSM 52,0 OPUMPHLD
LSM 53,0 OVREFY			HSM 56,0 OVREFY
LSM 93,0 OPUMPHLD			ORM 96,0 OPUMPHLD

Figure 5-54 182 - Off-line SM 49-96 Status Summary [5E12 and Later]

Abbreviations:

Abbreviations for Page 182 are shown following Figure 5-56 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD: _

183 - OFFLINE SM 97-144 STATUS

<u>OFL PUMP</u>	<u>STOP OPUMP</u>	<u>RETRY PERF</u>	<u>RST PERF</u>	<u>OP OPUMP</u>
2000 ALL SMS	3000 ALL SMS	4000 ALL SMS	5000 ALLSMS	60XX SM XX
20XX SM XX	30XX SM XX	40XX SM XX	50XX SM XX	6XXX SM XXX
2XXX SM XXX	3XXX SM XXX	4XXX SM XXX	5XXX SM XXX	

LEGEND: SMTYPE SMNUM, ACT SIDE MATE SM STATUS

LSM 97,0 OPUMPHLD	RSM 98,0 OHASHCK		LSM100,0 OPUMPHLD
LSM101,0 OVRFY			HSM104,0 OVRFY
LSM141,0 OPUMPHLD			ORM144,0 OPUMPHLD

Figure 5-55 183 - Off-line SM 97-144 Status Summary [5E12 and Later]

Abbreviations:

Abbreviations for Page 183 are shown following Figure 5-56 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD: _ 184 - OFFLINE SM 145-192 STATUS

<u>OFL PUMP</u>	<u>STOP OPUMP</u>	<u>RETRY PERF</u>	<u>RST PERF</u>	<u>OP OPUMP</u>
2000 ALL SMS	3000 ALL SMS	4000 ALL SMS	5000 ALL SMS	6XXX SM XXX
2XXX SM XXX	3XXX SM XXX	4XXX SM XXX	5XXX SM XXX	

LEGEND: SMTYPE SMNUM, ACT SIDE MATE SM STATUS

LSM145,0 OPUMPHLD	RSM146,0 OHASHCK		LSM148,0 OPUMPHLD
LSM149,0 OVRFY			HSM152,0 OVRFY
LSM189,0 OPUMPHLD			ORM192,0 OPUMPHLD

Figure 5-56 184 - Off-line SM 145-192 Status Summary [5E12 and Later]

Abbreviations (Pages 181-184):

ACT	Active	ORM	Optically Remote Module
HSM	Host Switching Module	OVRFY	Off-line Verifying
LSM	Local Switching Module	PERF	Peripheral
MATE SM	Mate SM	RSM	Remote Switching Module
OFL	Off Line	RST	Restore
OHASHCK	Off-line Pump Hashsum Check	SM	Switching Module
OP OPUMP	Output Off-line Pump	SMNUM	SM Number
OPUMP	Off-line Pump	SMTYPE	SM Type
OPUMPHLD	Off-line Pump Hold		

5.37.3 Commands

Pages 181 through 184 provide commands to start pumping SMs, stop pumping SMs, start pumping peripherals, restore peripherals, and output off-line pump.

All available displays can be accessed from Pages 181 through 184.

CMD	RESULT
2000	Start off-line pump on equipped SMs = 1-192 (ST:OPUMP,SM=1&&192,OFLDISK,VFY,PERF)
200X	Start off-line pump on SM = X (ST:OPUMP,SM=X,OFLDISK,VFY,PERF)
20XX	Start off-line pump on SM = XX (ST:OPUMP,SM=XX,OFLDISK,VFY,PERF)
2XXX	Start off-line pump on SM = XXX (ST:OPUMP,SM=XXX,OFLDISK,VFY,PERF)
3000	Stop off-line pump on SMs = 1-192 (STP:OPUMP,SM=1&&192)
300X	Stop off-line pump on SM = X (STP:OPUMP,SM=X)
30XX	Stop off-line pump on SM = XX (STP:OPUMP,SM=XX)
3XXX	Stop off-line pump on SM = XXX (STP:OPUMP,SM=XXX)

4000	Start off-line pump on peripherals of SMs = 1-192 (ST:OPUMP,SM=1&&192,PERF)
400X	Start off-line pump on peripherals of SM = X (ST:OPUMP,SM=X,PERF)
40XX	Start off-line pump on peripherals of SM = XX (ST:OPUMP,SM=XX,PERF)
4XXX	Start off-line pump on peripherals of SM = XXX (ST:OPUMP,SM=XXX,PERF)
5000	Restore peripherals on SMs = 1-192 (RST:PERF,SM=1&&192)
500X	Restore peripherals on SM = X (RST:PERF,SM=X)
50XX	Restore peripherals on SM = XX (RST:PERF,SM=XX)
5XXX	Restore peripherals on SM = XXX (RST:PERF,SM=XXX)
600X	OP OPUMP on SM = X (OP:OPUMP,SM=X)
60XX	OP OPUMP on SM = XX (OP:OPUMP,SM=XX)
6XXX	OP OPUMP on SM = XXX (OP:OPUMP,SM=XXX)

NOTE: X = SMs 1-9 (Page 181), XX = SMs 10-48 (Page 181), XX = SMs 49-96 (Page 182), XX = SMs 97-99 (Page 183), XXX = SMs 100-144 (Page 183), and XXX = SMs 145-192 (Page 184).

5.38 190 - C/D UPDATE [5E12 and Later]

5.38.1 Purpose

The 190 display page provides commands to update/restart individual craft processes in lieu of a craft init (15 on the EAI display), which would update/restart all the craft processes.

5.38.2 General

The entire 190 display page consists of commands as follows:

- **800** - UPDATE C/D GLOBAL MENU command is used to activate a new menu of the displays and maintenance commands (menu.x).
- **801** - UPDATE C/D STATE TRANSLATION command is used to activate a new table of states available for the displays (trantab.x and trantab.xc).
- **802** - RESTART ULARP restarts the *UNIX*[®] system Level Automatic Restart Process. This process controls the order in which *UNIX*[®] system level processes are started/restarted.
- **803** - RESTART CSOP restarts the Coordinator of Spooler Output Processes. This handles the flow of the TTY messages. It directs the messages to the appropriate devices, sorts them, and generates other actions resulting from the messages.
- **804** - RESTART RTS restarts the Real Time Status process. This process monitors the status of the units shown on 111/112 - AM/AM PERPH and the SCC, if equipped. It can be used if there is a suspected problem with status updates to Page 111/112.
- **805** - RESTART DAP restarts the Display Administration Process. DAP controls the displays.
- **806** - RESTART CIA restarts the Critical Indicator Administrator. The CIA interfaces the SUMMARY STATUS INDICATORS on the displays to the Critical Indicator Panel at the SCC, if the SCC is hooked up.
- **807** - RESTART POKER(S) causes a new poker to be created for each maintenance display terminal. The poker is the interface from the display terminal to DAP. This command could be used if a single maintenance display terminal is locked out.
- **808** - RESTART CFTSHL(S) restarts the craft shell. This can be used if TTY input messages cannot be entered.
- **810** - SCC COLOR sets the SCC terminal to color. This command only works from the SCC. If entered from any other terminal, a no good (NG) is returned.

- **811** - SCC B/W sets the SCC terminal to black and white. This command, like 810, only works from the SCC.

Figure 5-57 is an example of the Control/Display page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: _____						190 ✓ C/D UPDATE	
<u>CMD</u> <u>FUNCTION</u>				<u>CMD</u> <u>FUNCTION</u>			
800 ✓ UPDATE C/D GLOBAL MENU				806 ✓ RESTART CIA			
801 ✓ UPDATE C/D STATE TRANSLATION				807 ✓ RESTART POKER(S)			
802 ✓ RESTART ULARP				808 ✓ RESTART CFTSHL(S)			
803 ✓ RESTART CSOP				810 ✓ SCC COLOR (FROM SCC ONLY)			
804 ✓ RESTART RTS				811 ✓ SCC B/W (FROM SCC ONLY)			
805 ✓ RESTART DAP							

Figure 5-57 190 - C/D Update [5E12 and Later]

Abbreviations:

C/D	Control/Display	CSOP	Coordinator of Spooler Output Processes
CFTSHL	Craft Shell	DAP	Display Administration Process
CIA	Critical Indicator Administrator	RTS	Real-Time Status
		ULARP	UNIX® (system) Level Automatic Restart Process

5.38.3 Commands

The entire display is commands. In addition to these, any available paging command can be entered from the 190 display page.

CMD	RESULT
800	C/D Global Menu is updated
801	C/D State Translation is updated
802	ACP is restarted
803	CSOP is restarted
804	RTS is restarted
805	DAP is restarted
806	CIA is restarted
807	POKER(S) is (are) restarted
808	CFTSHL(S) is (are) restarted

810	SCC terminal is set to color
811	SCC terminal is set to black and white

5.39 191 - OPERATING SYSTEM STATUS [5E12 and Later]

5.39.1 Purpose

The 191 display page shows operating system resource usage.

5.39.2 General

The 191 display page shows AM resource usage. This page is not updated unless one of the refresh rate menu commands is entered from the master control center (MCC). After a refresh rate is selected, the display is updated according to the rate and then will time out or can be halted by entering the FREEZE command.

The data on the 191 display page can be used to find what real time impact a process has on the system as it is activated. It also shows any resource approaching or at overload. If any overload occurs and requires craft action, there are corresponding output messages detailing the action to be taken. On color MCCs, the bar graphs on the graphic portion of the page are color coded to show the utilization.

The level of utilization colors used on the bar graphs are as follows:

- **GREEN:** For normal utilization
- **MAGENTA:** For heavy, but not overloaded utilization
- **RED:** For any resource approaching overload or at overload.

There are four refresh rates available for monitoring resource usage as follows:

- **FREEZE:** No refresh (halt refresh)
- **1 SECOND:** Refreshes once per second for 20 seconds
- **5 SECONDS:** Refreshes once every five seconds for a maximum of 10 minutes
- **30 SECONDS:** Refreshes once every 30 seconds for a maximum of two hours.

Indicators shown under the DISPLAY RATE are as follows:

- **SPN:** Process number (hexadecimal) of the last supervisor process dispatched
- **SWAPI:** Number of segments swapped in since last refresh [0 (zero) unless page or page table utilization goes to 100 percent]
- **SWAPO:** Number of segments swapped out since last refresh [0 (zero) unless page or page table utilization goes to 100 percent]
- **STIME:** Number of 10-millisecond timer intervals accrued to supervisor processes since last refresh (should be approximately 100 times the display rate)
- **KTIME:** Number of 10-millisecond timer intervals accrued to kernel and special processes since last refresh
- **KPTIME:** Number of 10-millisecond timer intervals accrued to all kernel processes since last refresh.

The following resource types are used on the 191 page:

- **MSG:** Message blocks in use
- **DCT:** Number of active processes in the system
- **SDT:** Number of segments in use (must be at least three times the number of active processes)
- **PDT:** Physical pages in use (swapping occurs when all physical pages are in use)
- **PDT1:** Physical pages in use in memory module 1 (These pages are never swapped out and are free only when the process which owns the pages terminates. This field is only displayed on 3B20 machines equipped with the EMM feature.)
- **PGT:** Page tables in use
- **SSZ:** Swappable memory utilization (shows amount of available swap space used)
- **SDK:** Disk swap block utilization (shows amount of available disk swap blocks used).

The screen in Figure 5-58 is not currently being updated (shown by FREEZE in reverse video). The data in the numeric and graphic indicators shows usage from an earlier display refresh request.

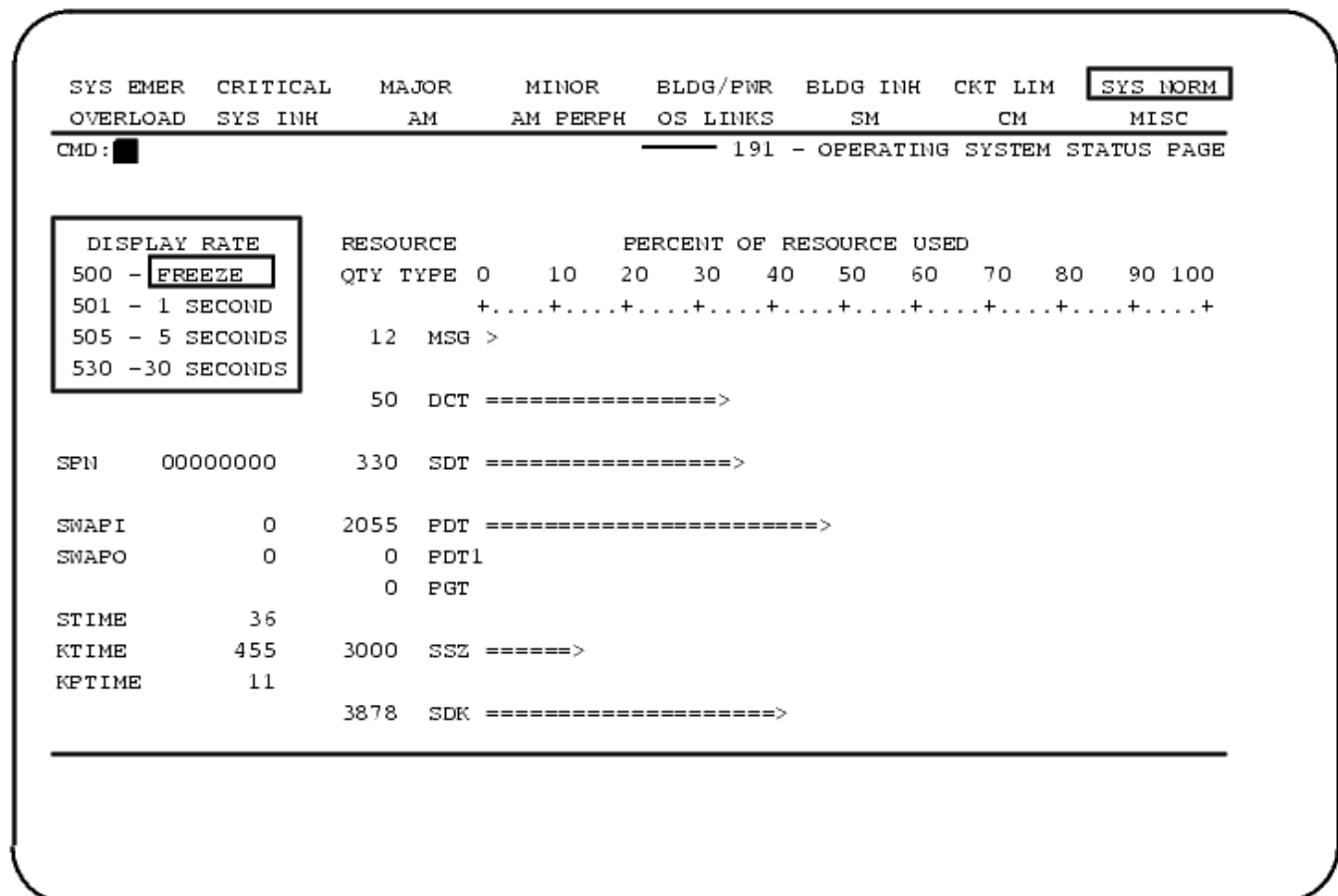


Figure 5-58 191 - Operating System Status [5E12 and Later]

Abbreviations:

NOTE: Abbreviations appearing on the 191 page are defined previously in Section 5.39.2 .

5.39.3 Commands

CMD	RESULT
500	Display refresh is halted
501	Display is refreshed every second for 20 seconds
505	Display is refreshed every five seconds for a maximum of 10 minutes
530	Display is refreshed every 30 seconds for a maximum of two hours

5.40 197 - CUTOVER [5E12 and Later]**5.40.1 Purpose**

The 197 display page provides status and commands for cutover.

5.40.2 General

Cutover/cutback is the transfer of lines from one switching system to another. When cutover is active, an indicator to the right of the OFFICE STATE indicator shows CUTOVER ACTIVE and is backlighted. On Page 116 - MISCELLANEOUS, the CUTOVER ACTIVE indicator is backlighted. In the SUMMARY STATUS AREA, the MISC critical indicator is backlighted.

The ENABLE STATE indicator contains one of the following phrases:

- NONE
- PRECUT
- POSTCUT.

The OFFICE STATE indicator contains one of the following phrases:

- PRECUT
- POSTCUT.

The CUTOVER/CUTBACK EXECUTION STATUS indicator has the following possibilities:

- MIGRATION COMPLETE
- ENABLE CUTOVER FIRST
- ENABLE CUTBACK FIRST
- ACTIVATE CUTOVER PROGRAM
- NO SM'S READY TO MIGRATE
- NOT ALL SM'S MIGRATING.

Refer to 235-105-200 for specifics in using this display page.

Figure 5-59 shows cutover/cutback has been completed.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD:						197 - CUTOVER	
CUTOVER 600 ENABLE CUTOVER 601 CUTOVER 602 ABORT CUTOVER ENABLE STATE POSTCUT OFFICE STATE POSTCUT CUTOVER ACTIVE							
CUTBACK 700 ENABLE CUTBACK 701 CUTBACK CUTOVER/CUTBACK EXECUTION STATUS MIGRATION COMPLETE							

Figure 5-59 197 - Cutover [5E12 and Later]

5.40.3 Commands

In addition to the following commands, any available paging command can be entered from this display.

CMD	RESULT
600	Cutover is enabled (EXC:CO:CMD=ENCUT)
601	Cutover is executed (EXC:CO:CMD=CUT)
602	Cutover is aborted (EXC:CO:CMD=ABORT)
700	Cutback is enabled (EXC:CO:CMD=ENCBK)
701	Cutback is executed (EXC:CO:CMD=CUTBK)

5.41 1000 - SM PAGE INDEX (5E12 and 5E13 Only)

5.41.1 Purpose

The SM Page Index page provides an index to the SM.

5.41.2 General

The 1000 page is an index to the primary SM pages that have status reflected on the 1010 - SM X STATUS page. No status is displayed on the 1000 page.

The page displays all the pages that are valid for local switching modules (LSM), host switching modules (HSM),

and RSMs/RISLUs.

Some pages shown on the 1000 page reference additional pages that provide more detailed information. These additional pages may not appear on the 1000 page.

Most SM pages are specified by using the SM number and/or unit.

For all pages, once an SM page has been displayed for a particular SM, any other page for that SM may be requested without respecifying the SM number.

The page index shown in Figure 5-60 is a listing of the primary SM and SITE maintenance displays.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD< _____ 1000 - SM PAGE INDEX							
SM PAGES							
1010,X SM STATUS		1186,X PSU		1900,X CLNKS			
1020,Y,X LU Y CONCEN		1190,X MCTSI					
1030,Y,X LU Y SG 0		1200,X DLI/NLI SUMMARY					
1040,Y,X LU Y SG 1		1204,X MELNK STATUS					
1050,Y,X TU Y SG 0		1280,X SM REX STATUS					
1060,Y,X TU Y SG 1		1320,Y,X SM X AIU Y SUMMARY					
1070,Y,X DCTU Y		1460,X DATA LINK DSLS					
1080,Y,X LDSU/LDSF Y		1510,Y,X DNUS Y					
1090,Y,X RAF/SAS Y		1530,X MSG DELIVERY STATUS					
1100,Y,X GDSU Y		1532,X CCS LINK SET SUM					
1110,X ISTF		1660,Y,X SID Y					
1115,Y,X GDSF Y		1700,Y,X ISLU Y NETWORK					
1120,Y,X DLTU Y		1800,X INH & RCVY CNTL					
1130,Y,X MSU Y SG 0		1860,Y,X IDCU Y CIRCUIT					
1140,Y,X MSU Y SG 1		1870,Y,X IDCU Y FACILITY					
1150,Y,X DCLU Y		1880,Y,Z IDCU Y RT Z					
(X=SM #	OMIT ,X FOR SAME SM		Y=UNIT #				

Figure 5-60 1000 - SM Page Index (5E12 and 5E13 Only)

Abbreviations:

AIU	Access Interface Unit	LDSU	Local Digital Service Unit
BLDG	Building	LU	Line Unit
CLNKS	Communication Links	MCTSI	Module Controller/Time Slot Interchanger
CNTL	Control	MISC	Miscellaneous
CONCEN	Concentrator	MSU	Metallic Service Unit
DCLU	Digital Carrier Line Unit	NLI	Network Link Interface
DCTU	Directly-Connected Test Unit	PSU	Packet Switching Unit
DLI	Dual Link Interface	PWR	Power
DLTU	Digital Line Trunk Unit	RAF	Recorded Announcement Function
DNUS	Digital Networking Unit - SONET	RCVY	Recovery
DSLS	Digital Subscriber Lines	REX	Routine Exercise
GDSF	Global Digital Services Function		

GDSU	Global Digital Service Unit		Function
HSM	Host Switching Module	RLI	Remote Link Interface
IDCU	Integrated Digital Carrier Unit	SAS	Service Announcement System
INH	Inhibit	SG	Service Group
ISLU	Integrated Services Line Unit	SM	Switching Module
ISTF	Integrated Services Test Function	TMSLNK	Time-Multiplexed
LDSF	Local Digital Service Function		Switch Links
		TU	Trunk Unit

5.41.3 Commands

All available paging commands can be entered from this display.

CMD	RESULT
1010,X	SM X - STATUS page is displayed.
1020,Y,X	SM X - LU Y CONCENTRATOR page is displayed, if equipped.
1030,Y,X	SM X - LU Y SG 0 page is displayed, if equipped.
1040,Y,X	SM X - LU Y SG 1 page is displayed, if equipped.
1050,Y,X	SM X - TU Y SG 0 page is displayed, if equipped.
1060,Y,X	SM X - TU Y SG 1 page is displayed, if equipped.
1070,Y,X	SM X - DCTU Y page is displayed, if equipped.
1080,Y,X	SM X - LDSU/LDSF Y SG 0 AND 1 page is displayed, if equipped.
1090,Y,X	SM X - RAF/SAS Y page is displayed.
1100,Y,X	SM X - GDSU Y SG 0 AND 1 page is displayed, if equipped.
1110,X	SM X - ISTF page is displayed.
1115,Y,X	SM X - GDSF Y page is displayed.
1120,Y,X	SM X - DLTU Y page is displayed, if equipped.
1130,Y,X	SM X - MSU Y SG 0 page is displayed, if equipped.
1140,Y,X	SM X - MSU Y SG 1 page is displayed, if equipped.
1150,Y,X	SM X - DCLU Y page is displayed, if equipped.
1186,X	SM X - PSU NETWORK page is displayed.
1200,X	SM X - DLI/NLI SUMMARY page is displayed.
1280,X	SM X - REX STATUS page is displayed.
1320,Y,X	SM X - AIU Y SUMMARY page is displayed.
1460,X	SM X - DATA LINK DSLS page is displayed.
1510,Y,X	SM X - DNUS Y STATUS page is displayed.
1530,X	MSG DELIVERY STATUS page is displayed, where X is Global SM.
1532,X	CCS LINK SET SUM page is displayed, where X is Global SM.
1660,Y,X	SID Y page is displayed.
1800,X	SM X - INHIBIT AND RECOVERY CONTROL page is displayed.
1860,Y,X	SM X - IDCU Y Circuit page is displayed, if equipped.
1870,Y,X	SM X - IDCU Y Facility page is displayed, if equipped.
1880,Y,Z	IDCU Y RT Z page is displayed
1900,X	SM X - CLNKS page is displayed.

5.42 1001 - REMOTE SM/PERPH PAGE INDEX (5E12 and Later)

5.42.1 Purpose

The SM Page Index page provides an index to the SM and remote switching module and remote peripheral unit pages.

5.42.2 General

The 1001 page is an index to the primary RSM remote peripheral pages that have status reflected on the 1010 - SM X STATUS page. No status is displayed on the 1001 page.

The SM Page Index page displays an index to the SM and remote switching module and remote peripheral unit pages. The pages are only valid for RSM and remote sites.

Some pages shown on the 1001 page reference additional pages that provide more detailed information. These additional pages may not appear on the 1001 page.

Most SM pages are specified by using the SM number. Some pages, however, are referenced by the remote site

number. For these pages (such as the 1600,SZ page), the "S" that appears on the 1001 page is actually entered as part of the menu command. For example, entering "1600,S3" displays the status of RSMs/HSMs at Site 3.

For all pages, once an SM page has been displayed for a particular SM, any other page for that SM may be requested without respecifying the SM number.

The page index shown in Figure 5-61 is a listing of the primary SM and SITE maintenance displays.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD< 1001 - REMOTE SM/PERPH PAGE INDEX REMOTE SM/RISLU PAGES							
1160,X MISC UNITS 1170,X RSM RCLK 1190,X REMOTE MCTSI/RLI 1400,X REMOTE BLDG/PWR ALARMS 1420,SZ RISLU BLDG/PWR ALARMS 1450,Y,X RISLU DLTU Y 1600,X RSM SITE STATUS 1600,SZ RSM SITE STATUS 1605,X HSM-RSM SITE INDEX 1610 RSM SITE INDEX 1615 ORM SITE INDEX 1620,SZ RISLU SITE STATUS 1630 RISLU SITE INDEX 1700,Y,X RISLU Y NETWORK							
(X=SM # OMIT ,X FOR SAME SM Y=UNIT # Z=RSM/RISLU SITE #)							

Figure 5-61 1001 - Remote SM/Perph Page Index (5E12 and later)

Abbreviations:

BLDG	Building	RCLK	Remote Clock
DLTU	Digital Line Trunk Unit	RISLU	Remote Intergrated Services Line Unit
HSM	Host Switching Module	RLI	Remote Link Interface
MISC	Miscellaneous	RSM	Remote Switching Module
ORM	Optically Remoted Module	SM	Switching Module
PWR	Power		

5.42.3 Commands

All available paging commands can be entered from this display.

CMD	RESULT
1160,X	SM X - MISC UNITS page is displayed, if equipped.
1170,X	SM X - RCLK page is displayed, if equipped.
1190,X	SM X - MCTSI/RLI page is displayed.
1400,X	SM X - RSM BLDG/PWR ALARMS page is displayed, if equipped.
1420,SZ	RAS Alarms page is displayed.

1450,Y,X	SM X - RISLU DLTU Y page is displayed.
1600,X	SM X - SITE STATUS page is displayed via SM number, if equipped.
1600,SZ	RSM/RISLU SITE STATUS page is displayed.
1605,X	SM X - HSM-RSM SITE INDEX page is displayed.
1610	RSM SITE INDEX page is displayed.
1615	ORM SITE INDEX page is displayed.
1620,SZ	RISLU SITE STATUS page is displayed.
1630	REMOTE PERIPHERAL SITE INDEX page is displayed.
1700,Y,X	SM X - RISLU Y NETWORK page is displayed.

5.43 1005 - CM PAGE INDEX (5E12 and Later)

5.43.1 Purpose

The CM Page Index page provides an index to the Communication Module (CM) and Communication Module Processor (CMP) pages.

5.43.2 General

The 1005 page is an index to the primary CM subunit pages that have status reflected on the 115 - COMMUNICATION MODULE SUMMARY page. The index also includes Pages 1850, CMP Inhibit and Recovery Control, and 1851, CMP Mate Inhibit and Recovery Control. No status is displayed on the 1001 page.

Some pages shown on the 1005 page reference additional pages that provide more detailed information. These additional pages may not appear on the 1005 page.

An example of the 1005 - CM Page Index is shown in Figure 5-62 .

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD< _____ 1005 - CM PAGE INDEX							
115	CM SUMMARY						
1209	ONTC 0 & 1						
1210	MI/NC 0 & 1						
1220	TMS 0 & 1 SUMMARY						
1240	MSGs 0 SUMMARY						
1250	MSGs 1 SUMMARY						
1260	CLNK SUMMARY						
1380-1381	QLPS NETWORK STATUS						
1850-1851	CMP INH & RCVRY CNTL						

Figure 5-62 1005 - CM Page Index (5E12 and later)

Abbreviations:

CLNK	Communication Link
CNTL	Control
CM	Communication Module
CMP	Communication Module Processor
INH	Inhibit
MI/NC	Message Interface/Network Clock
MSGs	Message Switch
ONTC	Office Network Timing Complex
QLPS	Quad Link Packet Switch
RCVY	Recovery
TMS	Time-Multiplexed Switch

5.43.3 Commands

Under normal operation, the commands on the 1005 page can be entered from any display page.

CMD	RESULT
115	COMMUNICATION MODULE SUMMARY page is displayed.
1209	ONTC 0 & 1 page is displayed.
1210	MI/NC 0 & 1 page is displayed.
1220	TMS 0 & 1 SUMMARY page is displayed.
1240	MSGs 0 SUMMARY page is displayed.
1250	MSGs 1 SUMMARY page is displayed.
1260	CLNK SUMMARY page is displayed.
1380	QLPS NETWORK 0 STATUS page is displayed.
1381	QLPS NETWORK 1 STATUS page is displayed.
1850	CMP PRIM INHIBIT AND RECOVERY CONTROL page is displayed.

5.44 1010,X - SM X STATUS (5E12 and 5E13 Only)

5.44.1 Purpose

The 1010,X display page provides a summary and status of equipped hardware unit types in the SM and a summary of any miscellaneous activities in the SM.

5.44.2 General

There are five separate versions of the 1010,X page as follows:

- **Local Switching Module (LSM):** The LSM version has an MCTSI summary indicator and indicators for the Operating Service Position System (OSPS) terminal equipment and the RISLU circuits. (See Figure 5-63 for an example of the LSM version.)
- **Host Switching Module (HSM):** The HSM version has an MCTSI summary indicator. No status is given for the RSMs on this page.
- **Remote Switching Module (RSM):** The RSM version has an MCTSI/RLI summary indicator, a BLDG/PWR ALARMS indicator (if equipped), the name of the SITE where the RSM is located, and the number of the HSM hosting the RSM.

Each RSM has a SITE number from 001 through 174 associated with it. Both LSMs and HSMs are always SITE 000. The SITE number is indicated on every SM page just under the SM Status box. (See Figures 5-64 and 5-65 for examples of the RSM version.)

- **Position Switching Module (PSM):** The PSM version has an MCTSI summary indicator and a RISLU indicator box for displaying all RISLUs that the PSM is responsible for and the SITE where the RISLUs are located. No RISLU status is given on this page. (Figure 5-66 is an example of the PSM version.)
- **Optically Remoted Module (ORM):** The ORM version has an MCTSI summary indicator, a BLDG/PWR ALARMS indicator (if equipped), and the name of the SITE at which the ORM is located.

Each ORM has a SITE number from 001 through 174 associated with it. Both LSMs and HSMs are always SITE 000. The SITE number is indicated on every SM page just below the SM Status box.

Every equipped SM has its highest priority status displayed in its SM STAT indicator. This corresponds to the status shown on Pages 141 - 144.

The RELATED PAGES box is blank unless there is an off-normal condition in the SM that is not otherwise indicated elsewhere on this page. In some cases, this box shows a page(s) that gives more detailed information about the off-normal condition.

Each equipped peripheral unit type, such as LU for a line unit, is displayed in a status box along with an associated page number to enter for more detailed information.

The equipped hardware units vary from one SM to the next. The only unit in every SM is the MCTSI. Any equipped unit type is listed in the graphic boxes on the right-hand portion of the display.

When an off-normal condition occurs, the indicator for the fault backlights. On Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for the SM is backlighted; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted, and a descriptive phrase of the condition is written. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or

MINOR), if applicable, are backlighted.

If this page is displayed for an RSM/ORM that is at a site that does not have the BLDG/PWR ALARMS equipped, or the BLDG/PWR ALARMS are associated with a different RSM/ORM at the same site, the 1010 page for that RSM/ORM does not show the BLDG/PWR ALARMS box.

If the RSM/ORM has the BLDG/PWR ALARMS equipped and if any RSM/ORM alarm is inhibited, the INHIBIT indicator is backlighted. If there is an RSM/ORM BLDG/PWR alarm active, the ALARM indicator is backlighted. Further information can be found on display 1400 - SM X RSM/ORM BLDG/PWR ALARMS.

The PSM is limited by real-time capacity to a maximum of 60 operator positions. A PSM can host up to five RISLUs (loaded to a collective total of 60 operator positions) with one active and one spare T1 span each. This corresponds to 10 PIDBs for RISLUs, plus two PIDBs for the PSU shelf, and three PIDBs for announcements, for a total of less than 16 PIDBs per TSI. The PSM is not time slot limited. Note that a PSM is a dedicated SM and cannot contain any lines, trunks, service circuits, or test ports. The following hardware items are engineered for the PSM:

- PSU
- DSU2-RAF
- SAS
- DLTU-RH.

A DSL_MAJOR or DSL_MINOR alarm indication is present in the SM STATUS box, and SEE 1460 is present in the RELATED PAGES box when the OSPS terminal equipment is OOS. The 1460-DATA LINK DSLS page display provides the status of the OSPS terminal equipment.

The following indicators are applicable to the RISLU equipment on the SM:

- The CKT_OOS SM STATUS phrase can refer to the OOS RISLU circuits.
- The RISLU unit type indicator backlights when RISLU circuits are OOS or RISLU fan/fuse alarms are present.
- The DLTU unit type indicator backlights when RISLU digital facility interfaces (DFI) are OOS or carrier group alarms (CGA) are present.
- The RISLU SITE BLDG/PWR ALARM indicators backlight if the alarms are off-normal at one or more RISLU sites hosted by a specific SM that monitors RISLU site alarms.

If the SM is isolated or initializing, this display is available, but the only status that fills in reliably is the SM STAT box and the RELATED PAGES box. The only per-SM displays available during these conditions are 1800,X - SM X INHIBITED & RECOVERY CONTROL, 1200,X - SM X DLI/NLI SUMMARY, and 1900,X - SM X CLNKS. Also, 1600,X or 1600,SZ - SITE Z STATUS is available if at least one of the RSMs at the site is not isolated.

Figure 5-63 is an example of the LSM version. In this example, SM 5 is in CKT OOS. The ``+" (following CKT OOS) indicates the presence of additional (less important) off-normal conditions. A complete list can be generated and output via the 900 command. The equipped hardware unit types are listed in the graphic portion (lower right) of the display. At least one LU in the SM is off-normal.

NOTE: A CCS Links indicator will appear in the lower half corner of the 1010 Pages when the SM supports Common Channel Signaling (CCS) on a PSU. Refer to document 235-190-120, Chapter 14 for additional information.

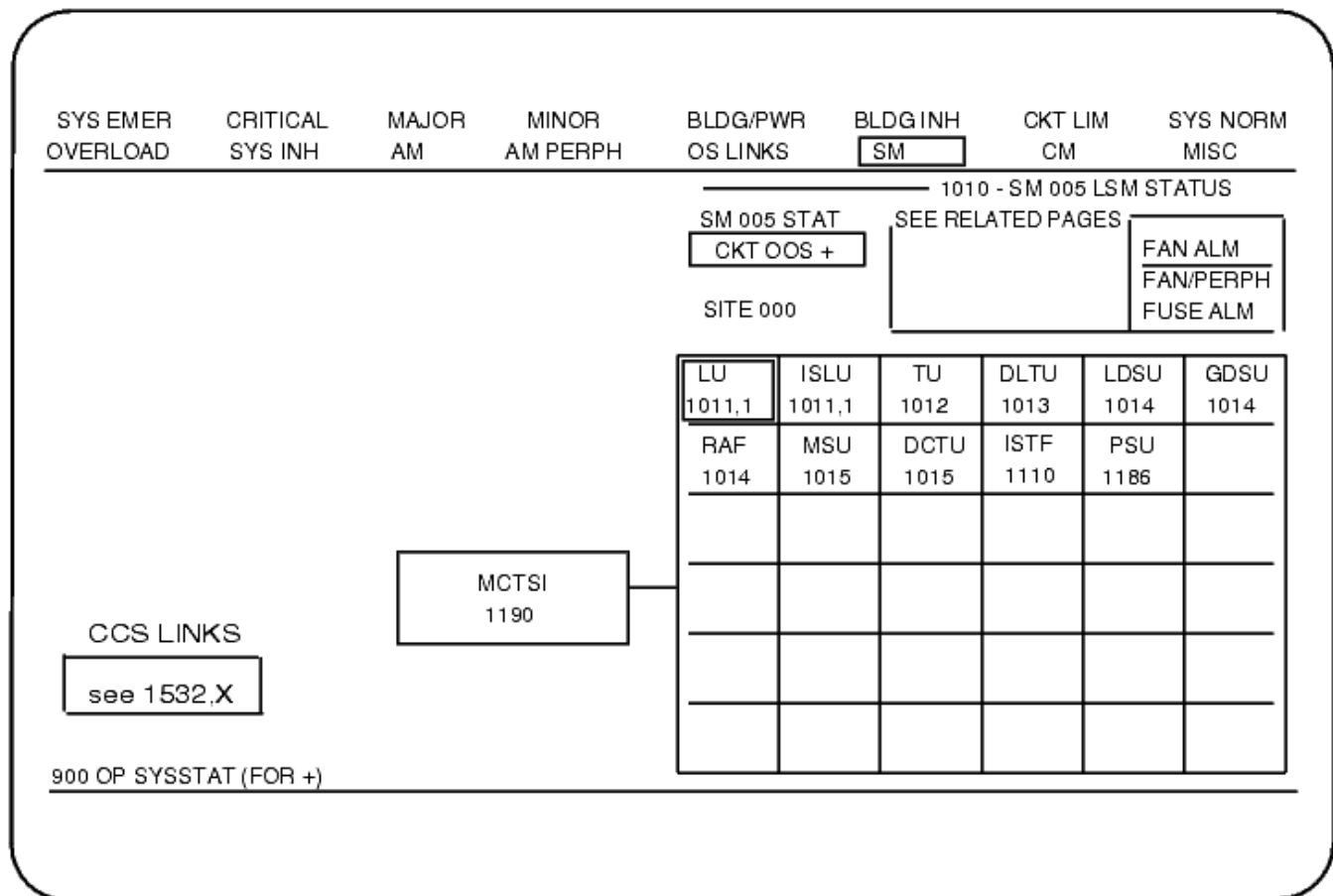


Figure 5-63 1010,X - SM X Status (LSM Version) (5E12 and 5E13 Only)

Abbreviations:

ALM	Alarm	MSU	Metallic Service Unit
CCS	Common Channel Signaling	OP	Output
CKT	Circuit	OOS	Out of Service
DCTU	Directly Connected Test Unit	PERPH	Peripheral
DLTU	Digital Line Trunk Unit	PSU	Packet Switching Unit
GDSU	Global Digital Service Unit	RAF	Recorded Announcement Function
ISLU	Integrated Services Line Unit	SM	Switching Module
ISTF	Integrated Services Test Function	STAT	Status
LDSU	Local Digital Service Unit	SYSSTAT	System Status
LSM	Local Switching Module	TU	Trunk Unit
LU	Line Unit		
MCTSI	Module Controller Time Slot Interchanger		

Figure 5-64 is the RSM version with BLDG/PWR alarms equipped. In this example, 048 RSM status (DSL_MAJOR) indicates the DSL data link is OOS. Pages 1460 and 1800 are referenced for additional information.

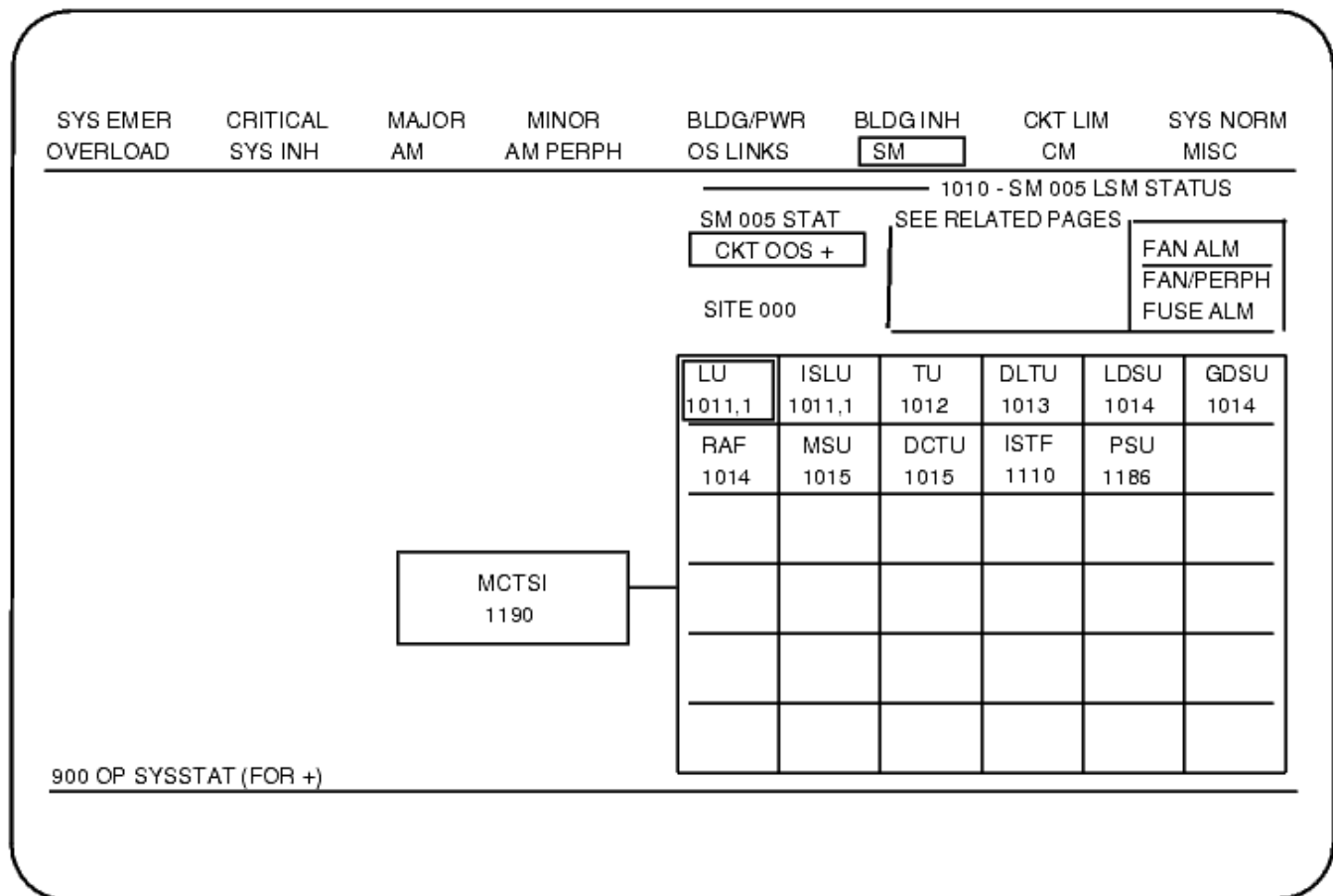


Figure 5-64 1010,X - SM X Status (RSM Version with BLDG/PWR Alarms) (5E12 and later)

Abbreviations:

ALM	Alarm	OP	Output
BLDG	Building	PERPH	Peripheral
DCTU	Directly Connected Test Unit	PSU	Packet Switching Unit
DLTU	Digital Line Trunk Unit	PWR	Power
DSL	Digital Subscriber Line	RAF	Recorded Announcement Function
HSM	Host Switching Module	RCLK	Remote Clock
ISLU	Integrated Services Line Unit	RLI	Remote Link Interface
ISTF	Integrated Services Test Function	RSM	Remote Switching Module
LDSU	Local Digital Service Unit	SM	Switching Module
LU	Line Unit	STAT	Status
MCTSI	Module Controller	SYSSTAT	System Status
MISC	Miscellaneous	TU	Trunk Unit
MSU	Metallic Service Unit		

Figure 5-65 shows the RSM version of the SM status display with no building/power alarms equipped. This SM has an off-normal condition in a DLTU and, one or more inhibits are set. The "+" in the SM STAT box indicates the presence of additional (less important) off-normal conditions. The user is directed to see Page 1800 for additional information. A complete list can be generated and output via the 900 menu command.

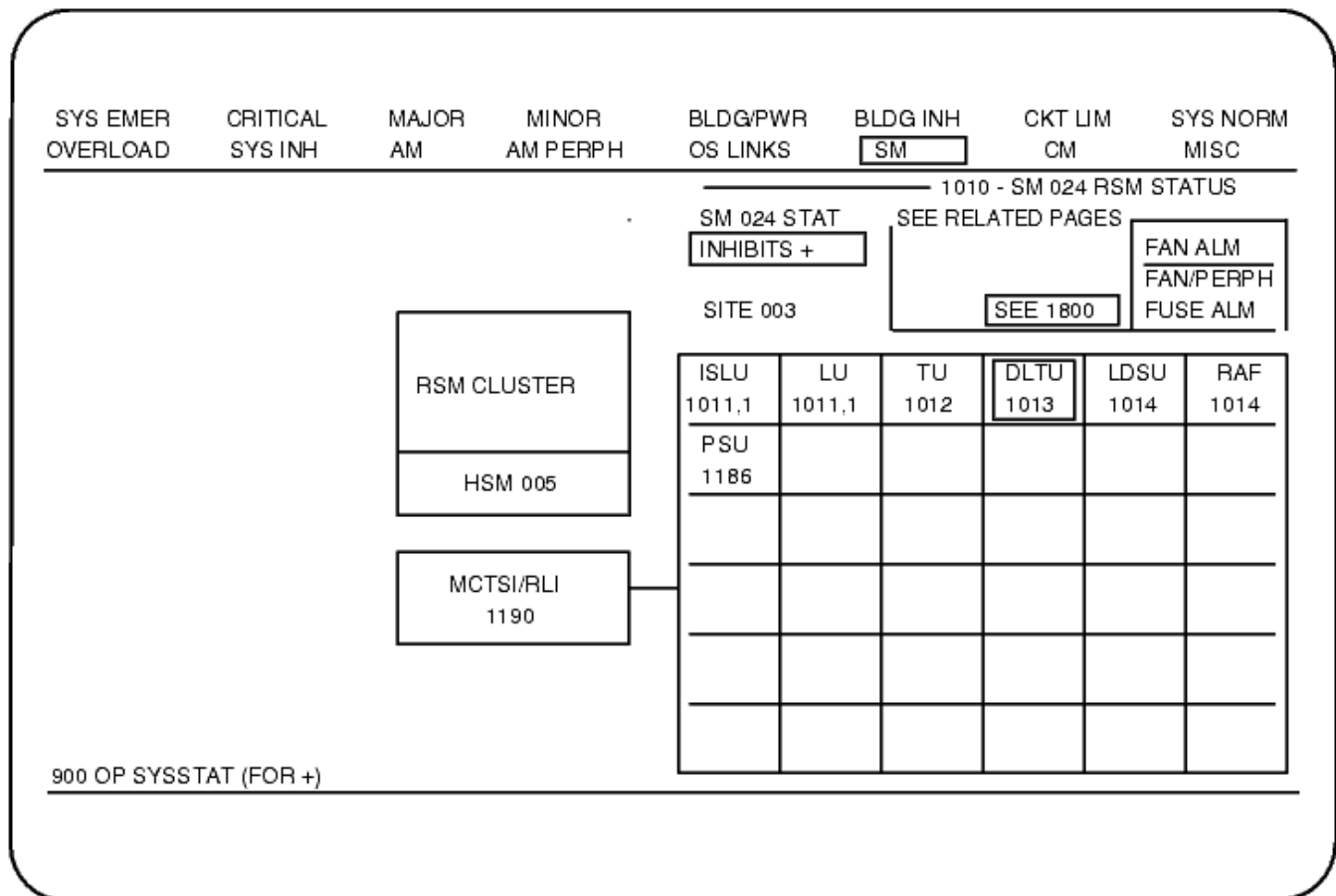


Figure 5-65 1010,X - SM X Status (RSM Version without BLDG/PWR Alarms) (5E12 and later)

Abbreviations:

ALM	Alarm	PERPH	Peripheral
DCTU	Directly Connected Test Unit	PSU	Packet Switching Unit
HSM	Host Switching Module	RAF	Recorded Announcement Function
ISLU	Integrated Services Line Unit	RLI	Remote Link Interface
LDSU	Local Digital Service Unit	RSM	Remote Switching Module
LU	Line Unit	SM	Switching Module
MCTSI	Module Controller	STAT	Status
	Time Slot Interchanger	SYSSTAT	System Status
OP	Output	TU	Trunk Unit

Figure 5-66 shows the PSM version of the SM status display. The PSM has a RISLU which is equipped with building/power alarms and has a building/power alarm off normal. Also, there is an off-normal state at RISLU site 502.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC																																																
CMD < _____ 1010 - SM 007 LSM STATUS																																																							
REMOTE PERPH SITE ALARMS SEE PAGE 1611,1 1611,2 1611,3 1611,4 1611,5				SM 007 STAT		SEE RELATED PAGES																																																	
				SITE 000		FAN ALM FAN/PERPH FUSE ALM																																																	
				MCTSI 1190																																																			
				<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>																																																			
900 OP SYSSTAT (FOR +)																																																							

Figure 5-66 1010,X - SM X Status (LSM Version - REMOTE PERPH BLDG/PWR Alarms Equipped) (5E12 and later)

Abbreviations:

ALM	Alarm	PERPH	Peripheral
BLDG/PWR	Building/Power	PSM	Position Switching Module
DLTU	Digital Line Trunk Unit	RISLU	Remote Integrated Services
INH	Inhibit		Line Unit
MCTSI	Modular Controller	SM	Switching Module
	Time Slot Interchanger	STAT	Status
OP	Output	SYSSTAT	System Status

5.44.3 Commands

The 900 command outputs the off-normal report for the SM the 1010,X page is displayed for. All available paging commands can be entered from this page.

CMD	RESULT
900	Output the off-normal report for the SM. (OP:SYSSTAT,SM=SM#)

5.45 101Y,X - SM X UNIT STATUS (5E12 and Later)

5.45.1 Purpose

The 1011, 1012, 1013, 1014, and 1015 display pages show the status of equipped hardware units in an SM.

5.45.2 General

The SM peripheral units are assigned to Pages 1011-1015 as follows:

- **1011:** DCLU, IDCU, ISLU, LU, AIU, and EAIU
- **1012:** TU
- **1013:** DLTU, RISLU DLTU, and DNU-S
- **1014:** GDSU, LDSF, LDSU, RAF, and SAS
- **1015:** DCTU and MSU.

The appropriate page numbers are displayed beneath associated unit type summary indicators on Page 1010,X. Thus, it is not necessary to refer to documentation to determine the correct page.

Figure 5-67 is an example of the 1011 page. In this example, an off-normal condition is shown for LU 7 CONC. Page 1020,7,11 should be accessed for more detailed information about the problem.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
1011 - SM 011 UNIT STATUS (1 OF 6)							
SM 011 STAT INHIBITS + SITE 000				LU 0 SG 0 SG 1 CONC	LU 6 SG 0 SG 1 CONC	LU 7 SG 0 SG 1 CONC	LU 8 SG 0 SG 1 CONC
LU 15 SG 0 SG 1 CONC				LU 21 SG 0 SG 1 CONC			
LU 37 SG 0 SG 1 CONC				LU 41 SG 0 SG 1 CONC	LU 42 SG 0 SG 1 CONC		

DETAIL PAGES

1020,Y,X LU Y CONCEN

1030,Y,X LU Y SG 0

1040,Y,X LU Y SG 1

1150,Y,X DCLU Y

1320,Y,X AIU X SUMMARY

1700,Y,X ISLU Y

1860,Y,X IDCU Y

(Y=UNIT #, X=SM #)

tpe82168512.cdr

Figure 5-67 1011,X - SM X Unit Status (5E12 and later)

Abbreviations:

CONC	Concentrator	LU	Line Unit
CONCEN	Concentrator	SG	Service Group
DCLU	Digital Carrier Line Unit	SM	Switching Module
IDCU	Integrated Digital Carrier Unit	STAT	Status

ISLU Integrated Services Line Unit

Figure 5-68 is an example of the 1012 page showing a single TU.

SYS EMBR	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
1012 - SM 002 UNIT STATUS (1 OF 1)							
SM 002 STAT							
NORMAL							
SITE 001							
TU 0							
SG 0							
SG 1							

DETAIL PAGES
 1050,Y,X TU Y SG 0
 1060,Y,X TU Y SG 1
 (Y=UNIT #, X=SM #)

Figure 5-68 1012,X - SM X Unit Status (5E12 and later)

Abbreviations:

SG	Service Group
SM	Switching Module
STAT	Status
TU	Trunk Unit

Figure 5-69 is an example of the 1013 page showing a single DLTU.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM																														
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC																														
1013 - SM 038 UNIT STATUS (1 OF 2)																																					
SM 038 STAT NORMAL SITE 000				<table border="1"> <tr> <td>DLTU 0</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>				DLTU 0																													
DLTU 0																																					
DETAIL PAGES 1120,Y,X DLTU Y 1450,Y,X RISLU DLTU Y 1510,Y,X DNUS Y (Y=UNIT #, X=SM #)																																					

Figure 5-69 1013,X - SM X Unit Status (5E12 and later)

Abbreviations:

DLTU	Digital Line Trunk Unit
DNUS	Digital Networking Unit - SONET
RISLU	Remote Integrated Services Line Unit
SM	Switching Module
STAT	Status

Figure 5-70 is an example of the 1014 page. SM 020 is equipped with an LDSU, three RAFs, and a GDSU. The RAF 2 has an of-normal condition which should be investigated further on Page 1090,2,20.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
1014- SM 020 UNIT STATUS (1 OF 6)							
SM 020 STAT INHIBITS + SITE 000		LDSU 0	RAF 1	RAF 2	RAF 3	GDSU 1	

DETAIL PAGES
 1080,Y,X LDSU/LDSF Y
 1090,Y,X RAF/SAS Y
 1100,Y,X GDSU Y

 (Y=UNIT #, X=SM #)

Figure 5-70 1014,X - SM X Unit Status (5E12 and later)

Abbreviations:

GGDSU	Global Digital Service Unit
LDSF	Local Digital Service Function
LDSU	Local Digital Service Unit
RAF	Recorded Announcement Function
SAS	Service Announcement System
SM	Switching Module
STAT	Status

Figure 5-71 is an example of the 1015 page showing a DCTU and an MSU.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
1015 - SM 002 UNIT STATUS (1 OF 1)							
SM 002 STAT NORMAL SITE 001		MSU 0	DCTU 0				
		SG 0					
		SG 1					

DETAIL PAGES
 1070,Y,X DCTU Y
 1130,Y,X MSU Y SG 0
 1140,Y,X MSU Y SG 1
 (Y=UNIT #, X=SM #)

Figure 5-71 1015,X - SM X Unit Status (5E12 and later)

Abbreviations:

DCTU	Directly Connected Test Unit	SM	Switching Module
MSU	Metallic Service Unit	STAT	Status
SG	Service Group		

5.45.3 Commands

All available paging commands can be entered from the 101Y,X display page.

5.46 1020,Y,X — SM X - LU Y CONCENTRATOR [5E12 and Later]**5.46.1 Purpose**

The purpose of the 1020,Y,X page display is to illustrate the status of the equipped line unit (LU) concentrators and A-LINKs.

5.46.2 General

The 1020,Y,X page has four distinct versions. In each version, ``Y" equals the line unit number, and ``X" equals the switching module number. Each LU (models 1, 2, 3, and 4) has an associated version of the display page. The first version, for LU model 1, is for the regular LU concentrator. The second and third versions, illustrates that each grid is divided into two boards. The fourth version for LU model 4 is similar to the first with the grids on a single board. In the first and fourth versions, the status and maintenance commands operate on full grid boards. In the second and

third versions, these commands operate on individual boards within the grids.

The A-LINK indicator is a summary of any out-of-service A-LINKs. This indicator contains either the term OOS and is backlighted (if an A-LINK is OOS) or the term NORM and is not backlighted (all A-LINKs normal).

The SM STAT box indicates the presence of an INHIBIT condition. The "+" in the SM STAT box indicates the presence of additional (less important) off-normal conditions. A complete list can be generated and output via the 900 menu command.

Figure 5-72 is an example of the LU model 1 version of the LU concentrator display.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: — 1020 - SM 001 LSM LU 0 CONCEN							
SM 001 STAT							
REMOVE	INHIBITS +				ALINKS		
20X GRID X	SITE 000				NORM		
RESTORE							
30X GRID X	GROUP 0	GROUP 1	GROUP 2	GROUP 3			
DIAGNOSE	GRID 1	GRID 3	GRID 5	GRID 7			
50X GRID X	ACT	ACT	ACT	ACT			
TEST	GRID 0	GRID 2	GRID 4	GRID 6			
51X GRID X	ACT	ACT	ACT	ACT			
OP CFGSTAT							
900 ALINKS							

Figure 5-72 1020,Y,X - SM X - LU Y Concentrator (Model 1 Version) [5E12 and Later]

Abbreviations:

ACT	Active
CFGSTAT	Configuration Status
CONCEN	Concentrator
LU	Line Unit
LSM	Local Switching Module
NORM	Normal
OP	Output
SM	Switching Module
STAT	Status

Figure 5-73 is an example of the LU model 2 version of the LU concentrator display.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC																								
CMD: 1020 - SM 001 LSM LU 0 CONCEN																															
SM 001 STAT																															
<u>REMOVE</u> 200X BD 0 OF GRID X 201X BD 1 OF GRID X		INHIBITS + SITE 000		ALINKS NORM																											
<u>RESTORE</u> 300X BD 0 OF GRID X 301X BD 1 OF GRID X		GROUP 0 <table border="1" style="margin: auto;"> <tr><td colspan="2">GRID 1</td></tr> <tr><td>BD 0</td><td>BD 1</td></tr> <tr><td>ACT</td><td>ACT</td></tr> </table> GROUP 1 <table border="1" style="margin: auto;"> <tr><td colspan="2">GRID 3</td></tr> <tr><td>BD 0</td><td>BD 1</td></tr> <tr><td>ACT</td><td>ACT</td></tr> </table> GROUP 2 <table border="1" style="margin: auto;"> <tr><td colspan="2">GRID 5</td></tr> <tr><td>BD 0</td><td>BD 1</td></tr> <tr><td>ACT</td><td>ACT</td></tr> </table> GROUP 3 <table border="1" style="margin: auto;"> <tr><td colspan="2">GRID 7</td></tr> <tr><td>BD 0</td><td>BD 1</td></tr> <tr><td>ACT</td><td>ACT</td></tr> </table>						GRID 1		BD 0	BD 1	ACT	ACT	GRID 3		BD 0	BD 1	ACT	ACT	GRID 5		BD 0	BD 1	ACT	ACT	GRID 7		BD 0	BD 1	ACT	ACT
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ACT	ACT																														
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ACT	ACT																														
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<u>TEST</u> 502X BD 0 OF GRID X 503X BD 1 OF GRID X		GRID 0 <table border="1" style="margin: auto;"> <tr><td>BD 0</td><td>BD 1</td></tr> <tr><td>ACT</td><td>ACT</td></tr> </table> GRID 2 <table border="1" style="margin: auto;"> <tr><td>BD 0</td><td>BD 1</td></tr> <tr><td>ACT</td><td>ACT</td></tr> </table> GRID 4 <table border="1" style="margin: auto;"> <tr><td>BD 0</td><td>BD 1</td></tr> <tr><td>ACT</td><td>ACT</td></tr> </table> GRID 6 <table border="1" style="margin: auto;"> <tr><td>BD 0</td><td>BD 1</td></tr> <tr><td>ACT</td><td>ACT</td></tr> </table>						BD 0	BD 1	ACT	ACT	BD 0	BD 1	ACT	ACT	BD 0	BD 1	ACT	ACT	BD 0	BD 1	ACT	ACT								
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<u>OP CFGSTAT</u> 900 ALINKS																															

Figure 5-73 1020,Y,X - SM X - LU Y Concentrator (Model 2 Version) [5E12 and Later]

Abbreviations:

ACT	Active
BD	Board
CFGSTAT	Configuration Status
CONCEN	Concentrator
LU	Line Unit
LSM	Local Switching Module
NORM	Normal
OP	Output
SM	Switching Module
STAT	Status

Figure 5-74 is an example of the LU model 3 version.

```

SYS EMER      CRITICAL  MAJOR   MINOR   BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD     SYS INH    AM     AM PERPH  OS LINKS  SM        CM      MISC
CMD:  _      _      _      _      1020  -SM 001 LSM LU 0 CONCEN

      SM 001 STAT
REMOVE
200X BD 0 OF GRID X
201X BD 1 OF GRID X
      SITE 000
      ALINKS
      NORM

RESTORE
300X BD 0 OF GRID X
301X BD 1 OF GRID X

DIAGNOSE
500X BD 0 OF GRID X
501X BD 1 OF GRID X

TEST
502X BD 0 OF GRID X
503X BD 1 OF GRID X

OP CFGSTAT
900 ALINKS

```

Figure 5-74 1020,Y,X - SM X - LU Y Concentrator (Model 3 Version) [5E12 and Later]

Abbreviations:

ACT	Active
BD	Board
CFGSTAT	Configuration Status
CONCEN	Concentrator
LU	Line Unit
LSM	Local Switching Module
NORM	Normal
OP	Output
SM	Switching Module
STAT	Status

5.46.3 Commands

Commands are provided to remove, restore, diagnose, and test (fabric exercise) the LU concentrator grids/grid boards. Also, a command is provided to output a list of all out-of-service A-LINKs. All available page display commands can be entered from the 1020.Y,X page display.

Model 1 Version

CMD	RESULT
20X	Grid X is removed. (RMV:GRID=SM#-LU#-X) [,UCL]
30X	Grid X is restored. (RST:GRID=SM#-LU#-X) [,UCL]

50X	Grid X is diagnosed. (DGN:GRID=SM#-LU#-X,RAW,TLP) [,UCL] [,GROW] [,RPT] Test is repeated 32,767 times. [,RPT=a] The ``a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The ``b" is the diagnostic phase or ``b&&c" is the range of phases to be performed.
51X	Grid X is tested. (TST:GRID=SM#-LU#-X,RAW,TLP) [,UCL] [,AUD] [,PH=a|a&&b] The ``a" is the diagnostic phase or ``a&&b" is the range of phases to be performed.
900	Out-of-service ALINKs are output. (OP:CFGSTAT,SM=SM#,ALINKS)

Model 2 and Model 3 Versions

CMD	RESULT
200X	Board 0 of Grid X is removed. (RMV:GRIDBD=SM#-LU#-X-0) [,UCL]
201X	Board 1 of Grid X is removed. (RMV:GRIDBD=SM#-LU#-X-1) [,UCL]
300X	Board 0 of Grid X is restored. (RST:GRIDBD=SM#-LU#-X-0) [,UCL]
301X	Board 1 of Grid X is restored. (RST:GRIDBD=SM#-LU#-X-1) [,UCL]
500X	Board 0 of Grid X is diagnosed. (DGN:GRIDBD=SM#-LU#-X-0,RAW,TLP) [,UCL] [,GROW] [,RPT] Test is repeated 32,767 times. [,RPT=a] The ``a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The ``b" is the diagnostic phase or ``b&&c" is the range of phases to be performed.
501X	Board 1 of Grid X is diagnosed. (DGN:GRIDBD=SM#-LU#-X-1,RAW,TLP) same options as 500X
502X	Board 0 of Grid X is tested. (TST:GRIDBD=SM#-LU#-X-0,RAW,TLP)
503X	Board 1 of Grid X is tested. (TST:GRIDBD=SM#-LU#-X-1,RAW,TLP)
900	Out-of-service ALINKs are output. (OP:CFGSTAT,SM=SM#,ALINKS)

5.47 1030,Y,X AND 1040,Y,X - SM X - LU Y [5E12 and Later]

5.47.1 Purpose

The purpose of the 1030,Y,X and 1040,Y,X display pages is to show status and commands for the equipped line units.

5.47.2 General

The 1030,Y,X and 1040,Y,X displays are graphically identical. The differences are page numbers and titles.

There are two separate versions of this page. The particular version (depending on the hardware configuration) is selected by software. The first (Regular) version (Figure 5-75) is for the regular line unit. This version has GDXCON and its associated maintenance commands. The second (C1LU) version (Figure 5-76) does not have GDXCON commands.

When an off-normal condition occurs, the indicator for the condition backlights. On page 1011,Y,X - SM X UNIT STATUS (screen Y), the indicator for the line unit service group backlights. On Page 1010,X - SM X STATUS , the LU unit type indicator backlights. On Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for that SM is backlighted; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted and a descriptive phrase of the condition is written unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, are backlighted.

Figure 5-75 is an example of the regular version of the line unit display. This example shows GDXCON and its associated maintenance commands.

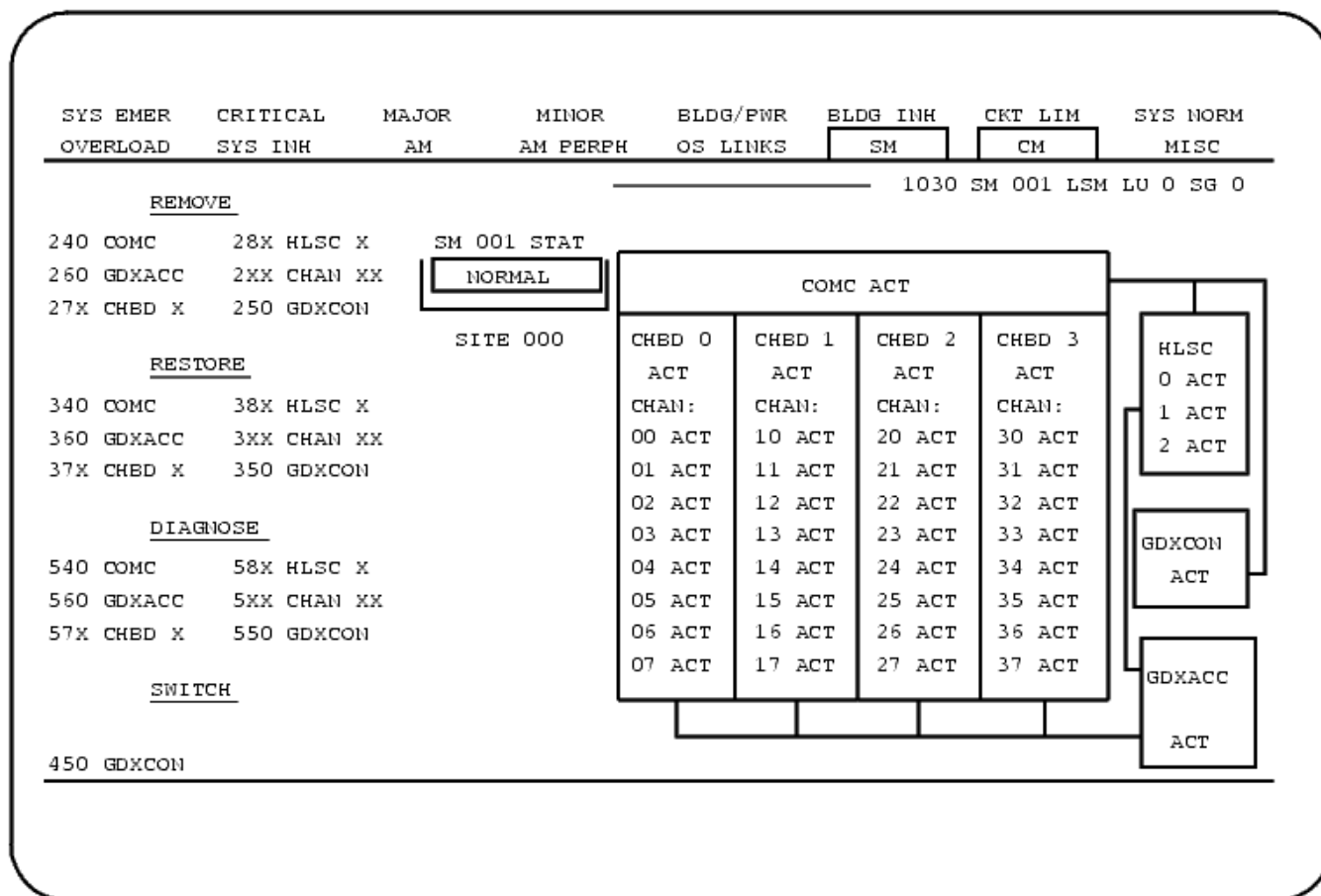


Figure 5-75 1030/1040,Y,X - SM X - LU Y SG 0/SG 1 (Regular Version) [5E12 and Later]

Abbreviations:

ACT	Active	HLSC	High-Level Service Circuit
CHAN	Channel	LSM	Local Switching Module
CHBD	Channel Board	LU	Line Unit
COMC	Common Control	SG	Service Group
GDXCON	Gated Diode Crosspoint Control	SM	Switching Module
GDXACC	Gated Diode Crosspoint Access	STAT	Status

Figure 5-76 is the C1LU version of the line unit.

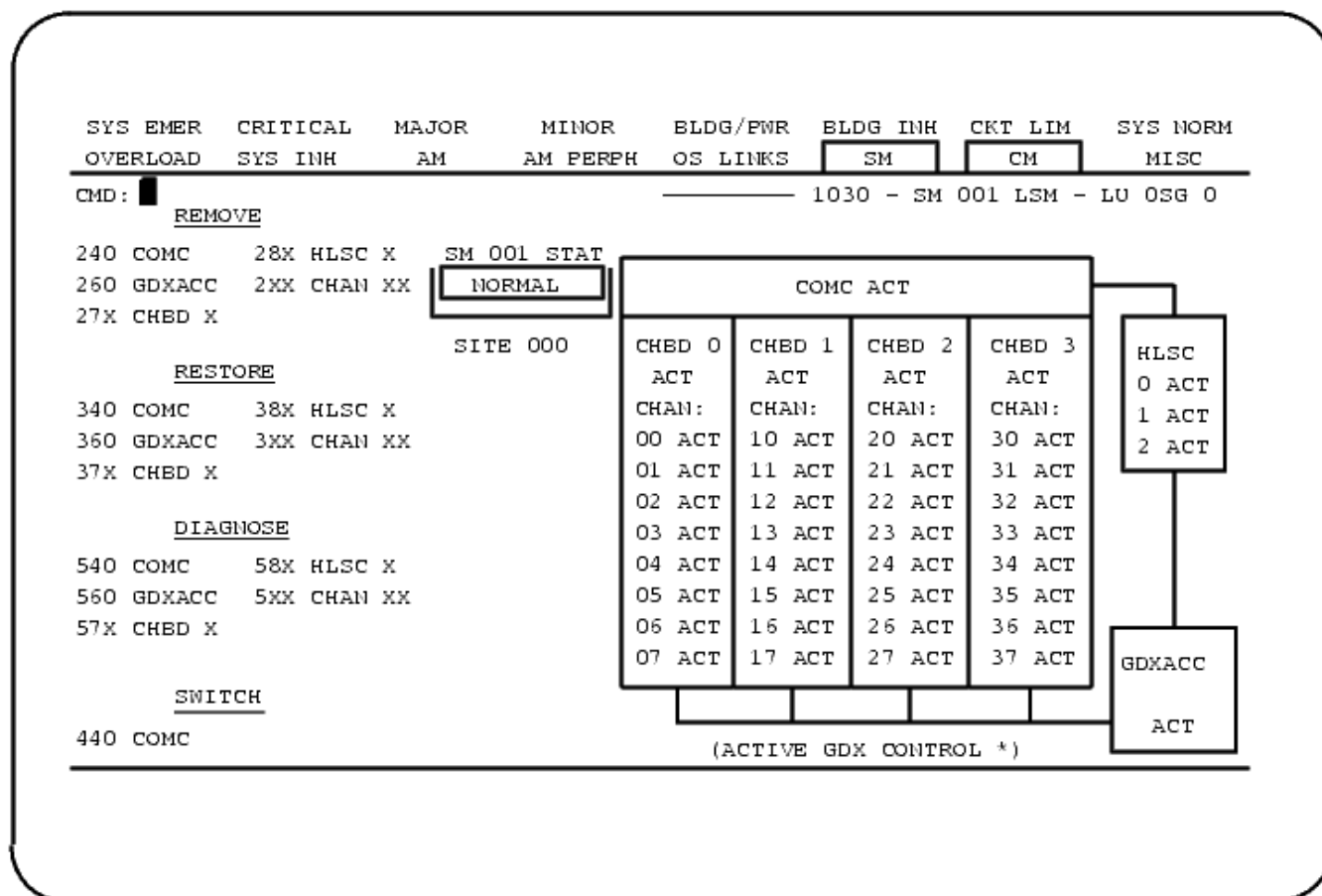


Figure 5-76 1030/1040,Y,X - SM X - LU Y SG 0/SG 1 (C1LU Version) [5E12 and Later]

Abbreviations:

ACT	Active	HLSC	High-Level Service Circuit
CHAN	Channel	LSM	Local Switching Module
CHBD	Channel Board	LU	Line Unit
COMC	Common Control	SG	Service Group
GDX	Gated Diode Crosspoint	SM	Switching Module
GDXACC	Gated Diode Crosspoint Access	STAT	Status

5.47.3 Commands

Commands are provided to remove, restore, and diagnose the line unit circuits. On the regular version, there is a switch command for the GDXCON. The C1LU version has a switch command for the COMC.

All available displays can be accessed from this page.

All Versions

CMD	RESULT
2XX	Channel XX is removed. (RMV:LUCHAN=SM#-LU#-SG#-XX) [UCL]
240	COMC is removed. (RMV:LUCOMC=SM#-LU#-SG#) [UCL]
260	GDXACC is removed. (RMV:GDXACC=SM#-LU#-SG#) [UCL]
27X	CHBD X is removed. (RMV:LUCHBD=SM#-LU#-SG#-X) [UCL]

28X	HLSC X is removed. (RMV:LUHLSC=SM#-LU#-SG#-X) [,UCL]
3XX	Channel XX is restored. (RST:LUCHAN=SM#-LU#-SG#-XX) [,UCL]
340	COMC is restored. (RST:LUCOMC=SM#-LU#-SG#) [,UCL]
360	GDXACC is restored. (RST:GDXACC=SM#-LU#-SG#) [,UCL]
37X	CHBD X is restored. (RST:LUCHBD=SM#-LU#-SG#-X) [,UCL]
38X	HLSC X is restored. (RST:LUHLSC=SM#-LU#-SG#-X) [,UCL]
5XX	Channel XX is diagnosed. (DGN:LUCHAN=SM#-LU#-SG#-XX,RAW,TLP) [,UCL] [,GROW] [,RPT] Test is repeated 32,767 times. [,RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.
540	COMC is diagnosed. (DGN:LUCOMC=SM#-LU#-SG#,RAW,TLP) same options as 5XX
560	GDXACC is diagnosed. (DGN:GDXACC=SM#-LU#-SG#,RAW,TLP) same options as 5XX
57X	CHBD X is diagnosed. (DGN:LUCHBD=SM#-LU#-SG#-X,RAW,TLP) same options as 5XX
58X	HLSC X is diagnosed. (DGN:LUHLSC=SM#-LU#-SG#-X,RAW,TLP) same options as 5XX

Regular Version Only

CMD	RESULT
250	GDXCON is removed. (RMV:GDXCON=SM#-LU#-SG#) [,UCL]
350	GDXCON is restored. (RST:GDXCON=SM#-LU#-SG#) [,UCL] [,STBY]
450	GDXCON is switched. (SW:GDXCON=SM#-LU#)
550	GDXCON is diagnosed. (DGN:GDXCON=SM#-LU#-SG#) same options as 5XX

C1LU Version Only

CMD	RESULT
440	COMC is switched. (SW:LUCOMC=SM#-LU#)

5.48 1050,Y,X AND 1060,Y,X - SM X, TU Y [5E12 and Later]

5.48.1 Purpose

The purpose of the 1050,Y,X and 1060,Y,X displays is to show status and commands for the equipped trunk units.

5.48.2 General

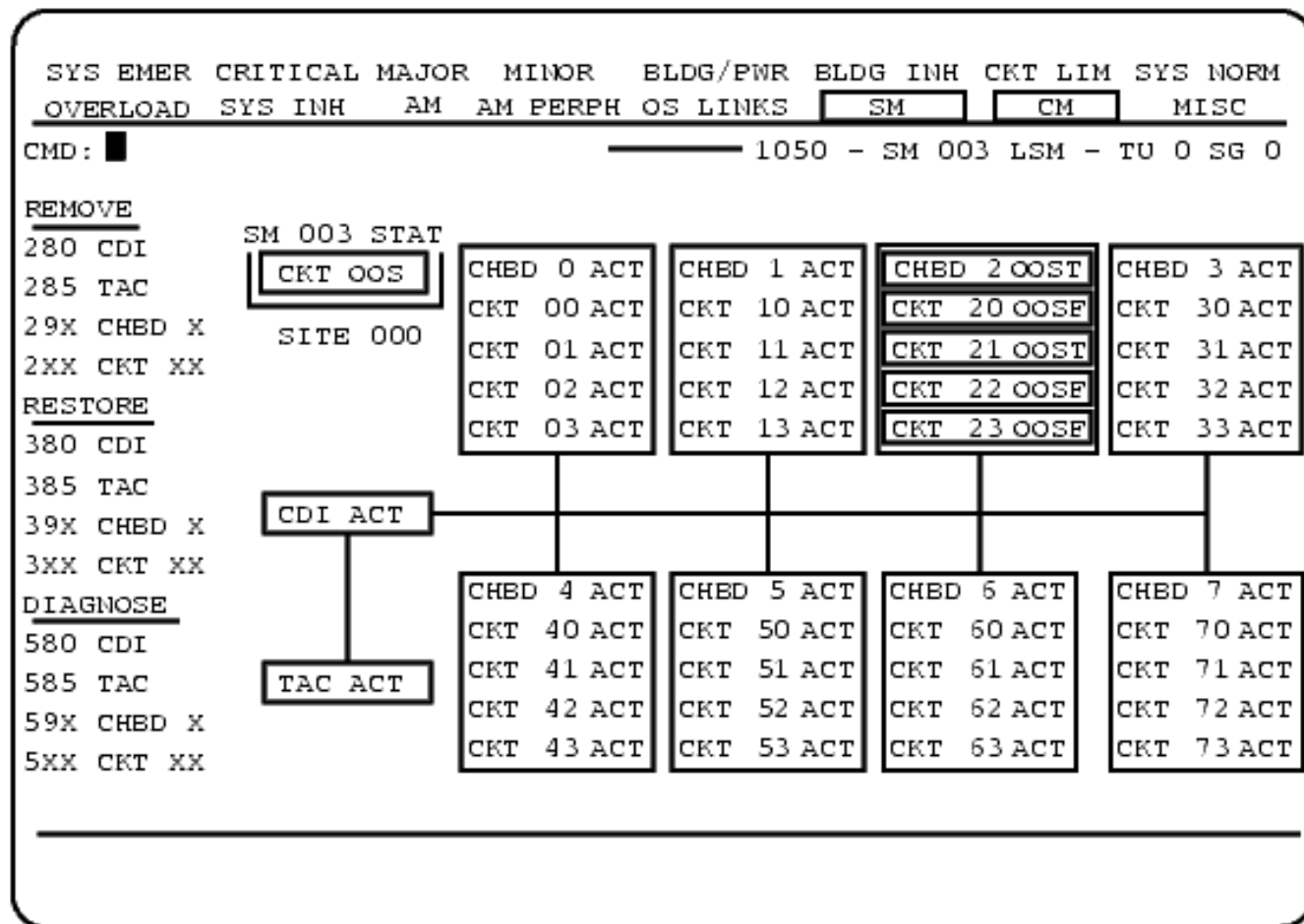
The 1050,Y,X and 1060,Y,X displays are graphically identical. The differences are page numbers and titles.

When an off-normal condition occurs, the indicator for the condition backlights. On Page 1012,Y,X - SM X UNIT STATUS, (screen Y) the indicator for the trunk unit service group backlights. On Page 1010,X - SM X Status, the TU unit type indicator backlights. On Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for that SM backlights; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM backlights and a descriptive phrase of the condition is written unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, backlights.

Figure 5-77 shows the trunk unit display for service group 0. The CHBD 2 is currently being diagnosed, which can be determined by the out-of-service transient (OOST). The diagnostic has already been completed on circuits 23

and 22, and they passed (they remain out-of-service family until the entire CHBD is finished). The diagnostic is currently up to circuit 21. Circuit 20 was out-of-service family of equipment (OOSF) before the diagnostics were started.

Also, the SM STAT box shows that a circuit in this SM is out of service (CKT OOS).



tpa 821748/01

Figure 5-77 1050/1060, Y, X - SM X - TU Y SG 0/SG 1 [5E12 and Later]

Abbreviations:

ACT	Active	OOST	Out-of-Service Transient
CDI	Control Data Interface	SG	Service Group
CHBD	Channel Board	SM	Switching Module
CKT	Circuit	STAT	Status
LSM	Local Switching Module	TAC	Test and Access Controller
OOS	Out of Service	TU	Trunk Unit
OOSF	Out-of-Service Family of Equipment		

5.48.3 Commands

Commands are provided to remove, restore, and diagnose the trunk unit circuits.

All available displays can be accessed from this page.

CMD	RESULT
2XX	Circuit XX is removed. (RMV:TEN=SM#-TU#-SG#-X-X) [,UCL]
280	CDI is removed. (RMV:CDI=SM#-TU#-SG#) [,UCL]
285	TAC is removed. (RMV:TAC=SM#-TU#-SG#) [,UCL]
29X	CHBD X is removed. (RMV:TUCHBD=SM#-TU#-SG#-X) [,UCL]
3XX	Circuit XX is restored. (RST:TEN=SM#-TU#-SG#-X-X) [,UCL]
380	CDI is restored. (RST:CDI=SM#-TU#-SG#) [,UCL]
385	TAC is restored. (RST:TAC=SM#-TU#-SG#) [,UCL]
39X	CHBD X is restored. (RST:TUCHBD=SM#-TU#-SG#-X) [,UCL]
5XX	Circuit XX is diagnosed. (DGN:TEN=SM#-TU#-SG#-X-X,RAW,TLP) [,UCL] [,GROW] [,RPT] Test is repeated 32,767 times. [,RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.
580	CDI is diagnosed. (DGN:CDI=SM#-TU#-SG#,RAW,TLP) same options as 5XX
585	TAC is diagnosed. (DGN:TAC=SM#-TU#-SG#,RAW,TLP) same options as 5XX
59X	CHBD X is diagnosed. (DGN:TUCHBD=SM#-TU#-SG#-X,RAW,TLP) same options as 5XX

5.49 1070,Y,X - SM X - DCTU Y [5E12 and Later]

5.49.1 Purpose

The purpose of the 1070,Y,X display page is to show status and maintenance commands for the directly connected test unit (DCTU), if equipped.

5.49.2 General

If an off-normal condition occurs in any of the DCTU circuits, the circuit indicator backlights and has text explaining the nature of the off-normal condition. On Page 1015,Y,X - SM X UNIT STATUS (screen Y), the indicator for directly connected test unit (DCTU) backlights. On Page 1010,X - SM X STATUS, the DCTU unit type indicator backlights. On Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for that SM is backlighted; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted, and a descriptive phrase of the condition is written, unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR) if applicable, are backlighted.

Figure 5-78 shows all the units in the DCTU are active.

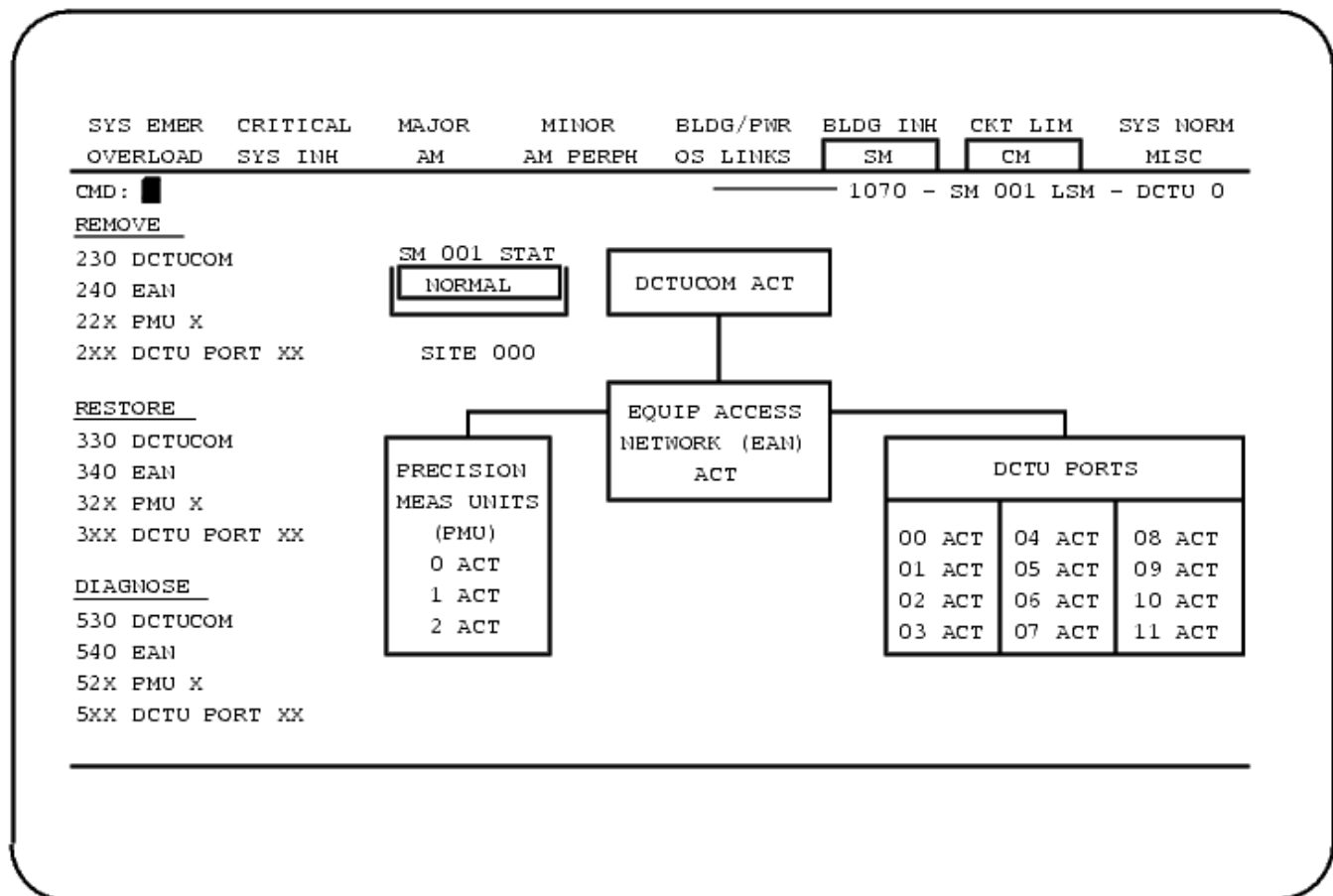


Figure 5-78 1070,Y,X - SM X - DCTU Y [5E12 and Later]

Abbreviations:

ACT	Active	LSM	Local Switching Module
DCTU	Directly Connected Test Unit	PMU	Precision Measurement Units
DCTUCOM	DCTU Common Control	SM	Switching Module
EAN	Equipment Access Network	STAT	Status

5.49.3 Commands

Commands are provided to remove, restore, and diagnose the units on the display.

All available displays can be accessed from this page.

CMD	RESULT
2XX	DCTU Port XX is removed. (RMV:DCTUPORT=SM#-DCTU#-XX) [UCL]
22X	PMU X is removed. (RMV:PMU=SM#-DCTU#-X) [UCL]
230	DCTUCOM is removed. (RMV:DCTUCOM=SM#-DCTU#) [UCL]
240	EAN is removed. (RMV:EAN=SM#-DCTU#) [UCL]
3XX	DCTU Port XX is restored. (RST:DCTUPORT=SM#-DCTU#-XX) [UCL]
32X	PMU X is restored. (RST:PMU=SM#-DCTU#-X) [UCL]
330	DCTUCOM is restored. (RST:DCTUCOM=SM#-DCTU#) [UCL]

340	EAN is restored. (RST:EAN=SM#-DCTU#) [UCL]
5XX	DCTU Port XX is diagnosed. (DGN:DCTUPORT=SM#-DCTU#-XX,RAW,TLP) [UCL] [RPT] Test is repeated 32,767 times. [RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [PH=b|b&&c] The "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.
52X	PMU X is diagnosed. (DGN:PMU=SM#-DCTU#-X,RAW,TLP) same options as 5XX
530	DCTUCOM is diagnosed. (DGN:DCTUCOM=SM#-DCTU#,RAW,TLP) same options as 5XX and [SVG] runs diagnostics on the entire service group, including the demand phases.
540	EAN is diagnosed. (DGN:EAN=SM#-DCTU#,RAW,TLP) same options as 5XX

5.50 1080,Y,X - SM X - LDSU/LDSF Y [5E12 and Later]

5.50.1 Purpose

The purpose of the 1080,Y,X display is to show status and commands for the equipped LDSUs or LDSFs on an SM.

5.50.2 General

There are three separate and distinct versions of the 1080,Y,X - LDSU/LDSF Y page.

The first version is the model 1 version (Figure 5-79). The model 1 version has LDSUCOMs in each service group and up to eight DSCs in each service group.

The second version is the model 2 version (Figure 5-80) which displays status for the LDSUs in each service group (no LDSUCOMs), displays which slot where each is located, and lists up to seven types of circuits and how many there are (no status is displayed) for each service group.

The third version (Figure 5-81) displays the status of an LDSF, displays the slot where it is located, and lists up to seven types of circuits and how many there are (no status is displayed).

The LDSUs cannot coexist with LDSFs on the same SM. Either one of the LDSU versions is displayed, or if the SM is an SM-2000, the LDSF version is displayed.

When an off-normal condition occurs, the indicator for the condition backlights. On Page 1014,Y,X - SM X UNIT STATUS (screen Y), the indicator for the LDSU service group or LDSF (for SM-2000) backlights. On Page 1010,X - SM X STATUS, the LDSU or LDSF unit type indicator backlights. On Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for that SM is backlighted; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted and a descriptive phrase of the condition is written, unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, will be backlighted.

Figure 5-79 is the display for the model 1 version of the LDSU/LDSF Y page. In this example, everything is active.

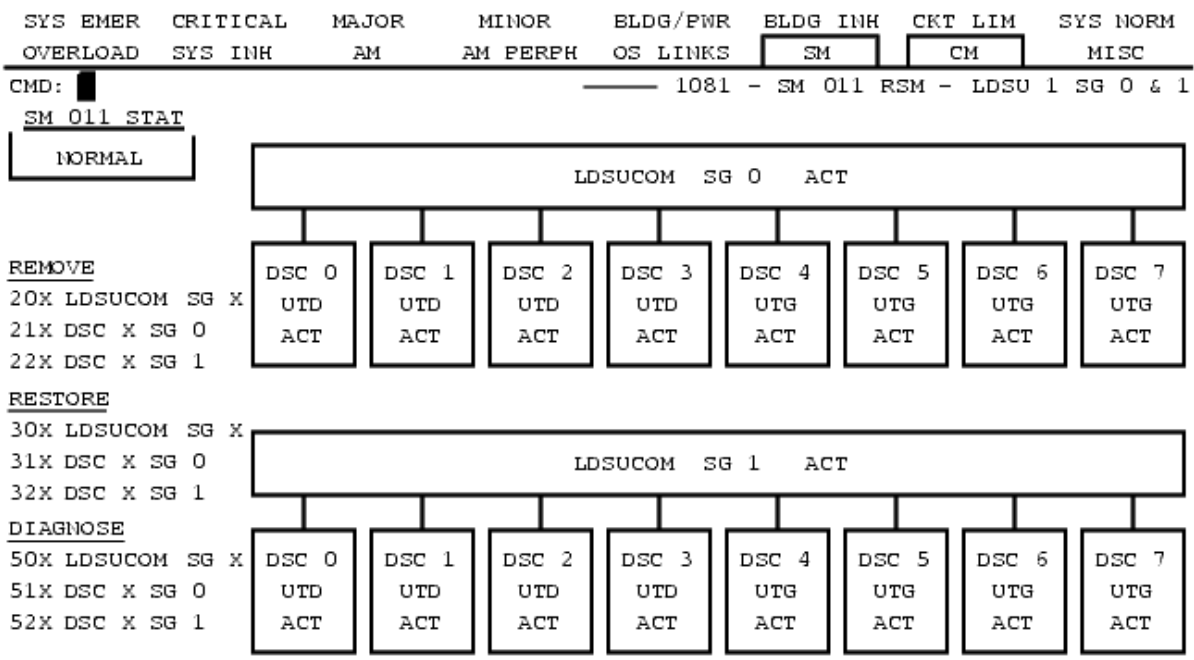


Figure 5-79 1080,Y,X - SM X - LDSU Y SG 0 and 1 (Model 1 Version) [5E12 and Later]

Abbreviations:

ACT	Active	SG	Service Group
DSC	Digital Service Circuit	SM	Switching Module
LDSU	Local Digital Service Unit	STAT	Status
LDSUCOM	LDSU Common Control	UTD	Universal Tone Decoder
RSM	Remote Switching Module	UTG	Universal Tone Generator

Figure 5-80 shows the model 2 version of the LDSU/LDSF Y page. In this example, both service groups are active and both are located in slot 0. They each have 31 tone generators and 30 tone decoders.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: ☐				1080 - SM 011 RSM - LDSU 0			
SM 011 STAT							
NORMAL							
SITE 002							
REMOVE							
23X LDSU SG X							
RESTORE							
33X LDSU SG X							
DIAGNOSE							
53X LDSU SG X							

LDSU	SG0	ACT	SLOT 0
TONE GENERATORS		31	
TONE DECODERS		30	

LDSU	SG1	ACT	SLOT 0
TONE GENERATORS		31	
TONE DECODERS		30	

Figure 5-80 1080,Y,X - SM X - LDSU Y - SG 0 and 1 (Model 2 Version) [5E12 and Later]

Abbreviations:

ACT	Active
LDSU	Local Digital Service Unit
RSM	Remote Switching Module
SG	Service Group
SM	Switching Module
STAT	Status

Figure 5-81 shows the third version of the LDSU/LDSF Y page. In this example, the LDSF is located in slot 00. The LDSF has 12 tone generators, four tone decoders, four tone transceivers, two voice band signaling (VBS) transceivers, and two centralized automatic message accounting (CAMA) tone decoders.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
1080 - SM 012 LSM - LDSF 0							
<u>SM 012 STAT</u>							
NORMAL							
SITE 000							
<u>REMOVE</u>							
240 LDSF							
<u>RESTORE</u>							
340 LDSF							
<u>DIAGNOSE</u>							
540 LDSF							

LDSF	ACT	SLOT 00
TONE GENERATORS	12	
TONE DECODERS	4	
TONE TRANSCEIVER	4	
VBS TRANSCEIVERS	2	
CAMA TONE DECS	2	

tpa 821656/01

Figure 5-81 1080,Y,X - SM X - LDSF Y (LDSF Version) [5E12 and Later]

Abbreviations:

ACT	Active
CAMA	Centralized Automatic Message Accounting
LDSF	Local Digital Service Function
LSM	Local Switching Module
SM	Switching Module
STAT	Status
VBS	Voice band Signaling

5.50.3 Commands

Commands are provided to remove, restore, and diagnose the LDSU or LDSF circuits. All available displays can be accessed from this page.

Model 1 Version

CMD	RESULT
20X	LDSUCOM SG X is removed. (RMV:LDSUCOM=SM#-X) [UCL]
21X	DSC X SG 0 is removed. (RMV:DSC=SM#-DSU#-0-X) [UCL]
22X	DSC X SG 1 is removed. (RMV:DSC=SM#-DSU#-1-X) [UCL]
30X	LDSUCOM SG X is restored.

31X	(RST:LDSUCOM=SM#-X) [,UCL] DSC X SG 0 is restored. (RST:DSC=SM#-DSU#-0-X) [,UCL]
32X	DSC X SG 1 is restored. (RST:DSC=SM#-DSU#-1-X) [,UCL]
50X	LDSUCOM SG X is diagnosed. (DGN:LDSUCOM=SM#,SG#,RAW,TLP) [,UCL] [,GROW] [,SVG] [,RPT] Test is repeated 32,767 times. [,RPT=a] The "a/" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.
51X	DSC X is diagnosed. (DGN:DSC=SM#-DSU#-SG#-X,RAW,TLP) same options as 50X except SVG

Model 2 Version

CMD	RESULT
23X	LDSU SG X is removed from service. (RMV:LDSU=SM#-DSU#-X) [,UCL]
33X	LDSU SG X is restored to service. (RST:LDSU=SM#-DSU#-X) [,UCL]
53X	LDSU SG X is diagnosed. (DGN:LDSU=SM#-DSU#-X,RAW,TLP) [,UCL] [,RPT] Test is repeated 32,767 times. [,RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.

LDSF Version

CMD	RESULT
240	LDSF is removed from service. (RMV:LDSF=SM#-LDSF#) [,UCL]
340	LDSF is restored to service. (RST:LDSF=SM#-LDSF#) [,UCL]
540	LDSF is diagnosed. (DGN:LDSF=SM#-LDSF#,RAW,TLP) [,UCL]

5.51 1090,Y,X - SM X RAF/SAS Y (5E12 and Later)

5.51.1 Purpose

The 1090,Y,X display page shows the status and maintenance commands for either the Recorded Announcement Function (RAF) or the Service Announcement System (SAS). The page also indicates the associated memory board(s) and its application.

5.51.2 General

There are three types of RAF and three types of SAS as follows:

RAF Types

- Announcement (ANN)
- Dial-through announcement (DTA)
- Coin-detecting dial-through announcement (COIN).

SAS Types

- Announcement (ANN)
- Dial-through announcement (DTA)

- Tone detection (TDEC)

The types associated with the RAF/SAS are listed on the page display.

The RAF/SAS has at least one memory board (but not more than four). Each memory board, along with its RAF/SAS application, is shown on the page display.

Figure 5-82 is an example of the 1090,Y,X page that shows an RAF with two types; DTA and ANN, and three memory boards.

Figure 5-83 is an example of the 1090,X,Y page that shows an SAS with one DTA type and one memory board.

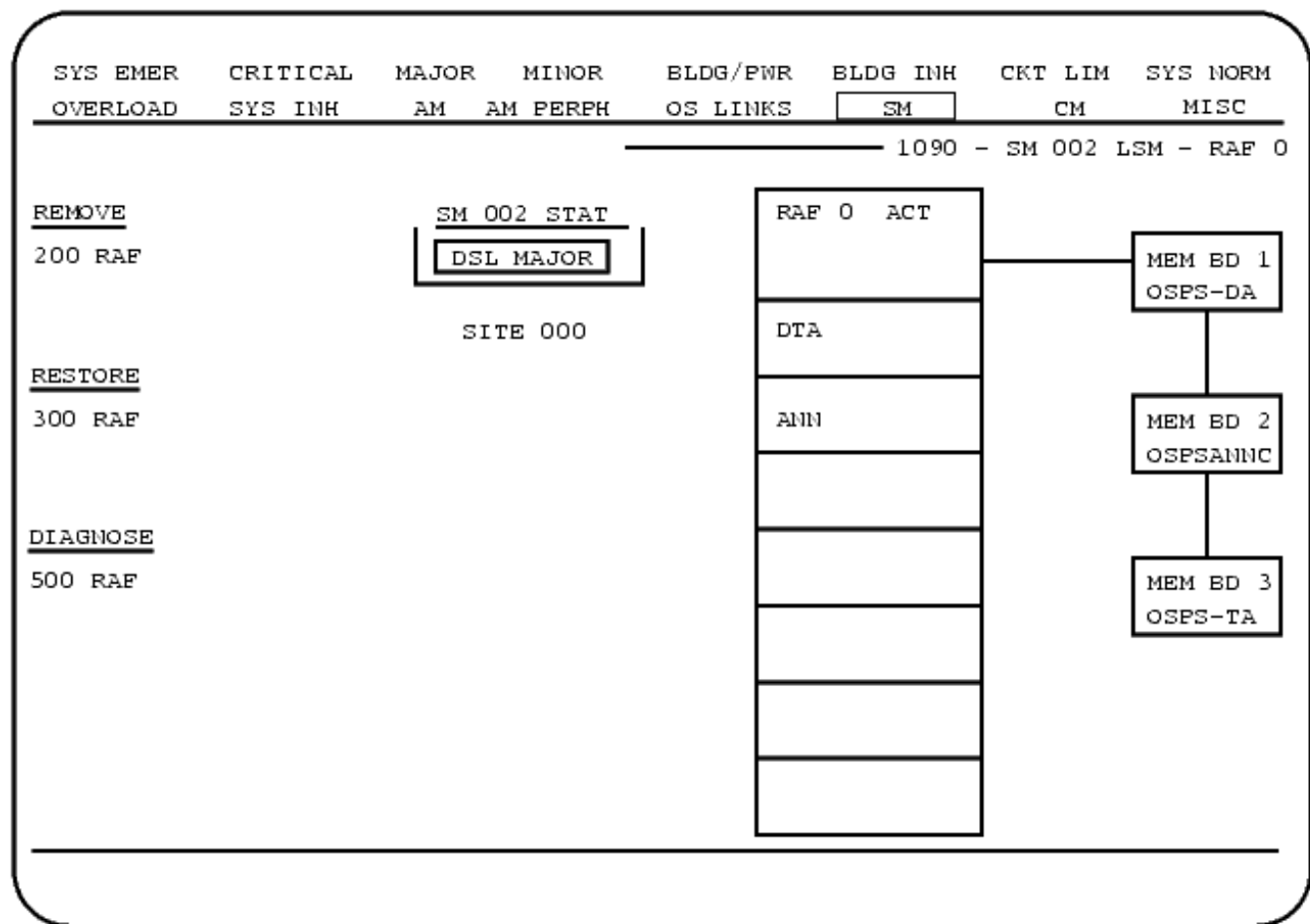


Figure 5-82 1090,Y,X - SM X RAF Y (5E12 and Later)

Abbreviations:

ACT	Active	LSM	Local Switching Module
ANN	Announcement	MEM	Memory
ANNC	Announcement	OSPS	Operator Services Position System
BD	Board	RAF	Recorded Announcement Function
DA	Directory Assistance	SM	Switching Module
DSL	Digital Subscriber Line	STAT	Status
DTA	Dial-Through Announcement	TA	Toll and Assist

Figure 5-83 is an example of the 1090,Y,X page that shows an SAS with three types; DTA, ANN, and TDEC, and

four memory boards.

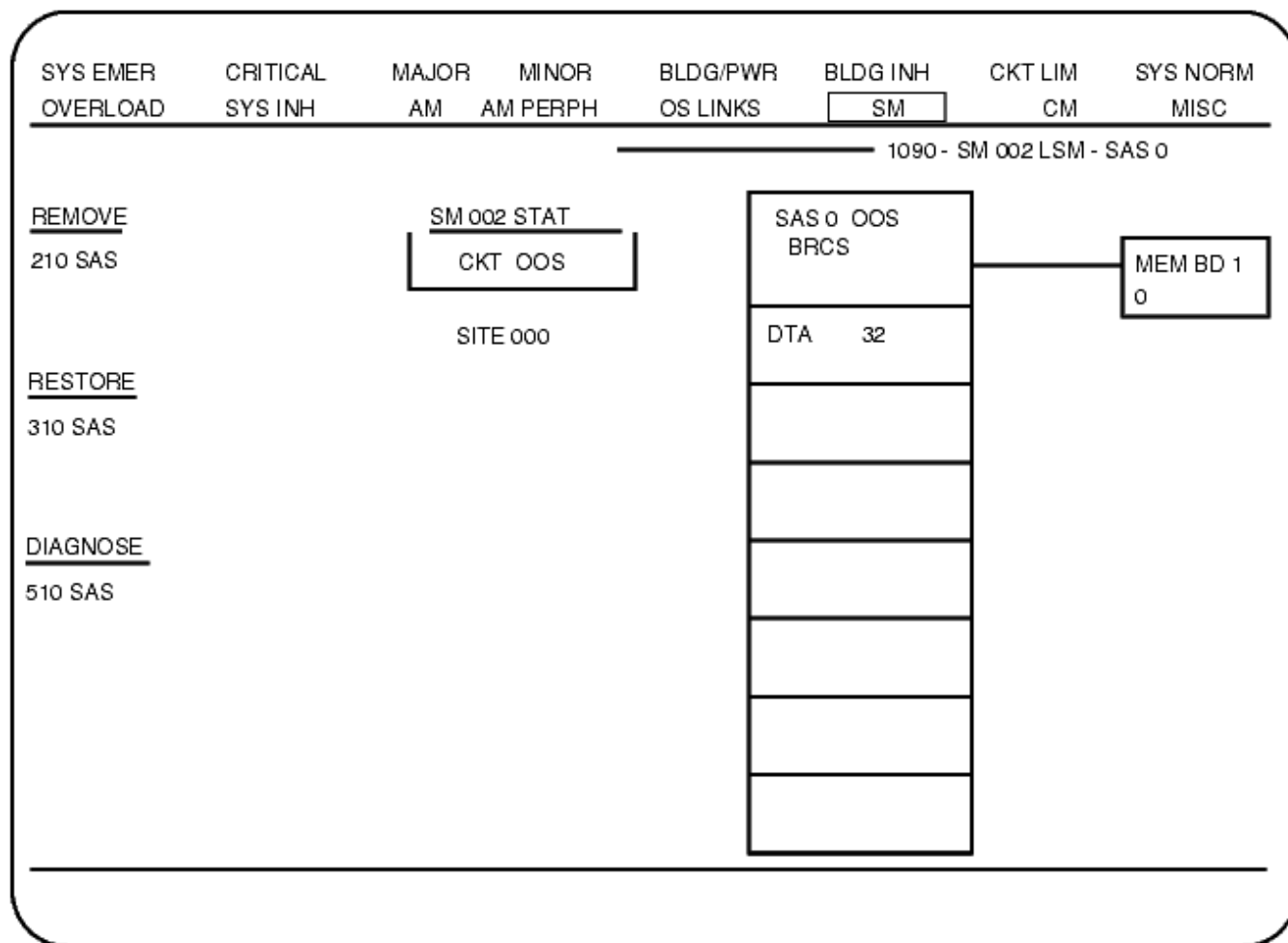


Figure 5-83 1090,Y,X - SM X SAS Y (5E12 and Later)

Abbreviations:

ACT	Active	MEM	Memory
ANN	Announcement	OSPS	Operator Services Position System
ANNC	Announcement	SAS	Service Announcement System
BD	Board	SLE	Screen List Editing
BRCS	Business and Residential Customer Services	SM	Switching Module
DSL	Digital Subscriber Line	STAT	Status
DTA	Dial-Through Announcement	TA	Toll and Assist
LSM	Local Switching Module	TDEC	Tone Detection

5.51.3 Commands

Commands are provided to remove, restore, and diagnose the RAF/SAS connections. Any available paging commands can be entered from the 1090,Y,X page.

CMD	RESULT
200	RAF is removed (RMV:RAF=a-b)
210	SAS is removed (RMV:SAS=a-b)
300	RAF is restored (RST:RAF=a-b)
310	SAS is restored (RST:SAS=a-b)
500	RAF is diagnosed (DGN:RAF=a-b,RAW,TLP)

5.52 1100,Y,X - SM X - GDSU Y SG 0 and 1 [5E12 and Later]

5.52.1 Purpose

The purpose of the 1100,Y,X display page is to show status and commands for the equipped global digital service units (GDSU) on an SM.

5.52.2 General

The 1100,Y,X page displays status for both GDSU service groups (SG).

When an off-normal condition occurs, the indicator for the condition backlights. On Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for that SM is backlighted; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted and a descriptive phrase of the condition is written, unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, are backlighted.

Figure 5-84 is the display for GDSU SG 0 and GDSU SG 1. In this example, SG 0, DSC 0 (a universal conference circuit), is OOS. Also, the SM STAT box shows that one circuit of this SM is OOS (CKT OOS).

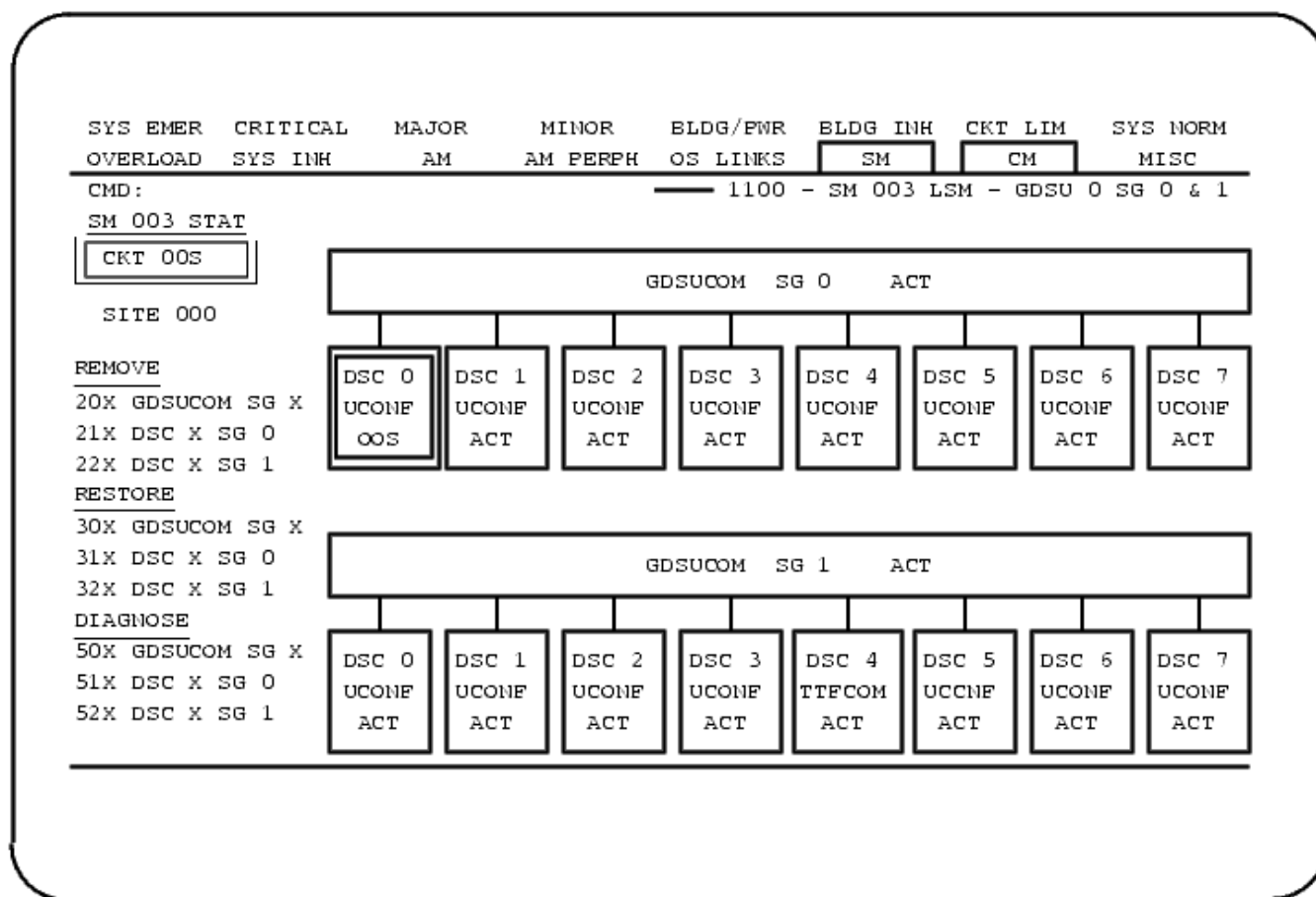


Figure 5-84 1100,Y,X - SM X - GDSU Y [5E12 and Later]

Abbreviations:

ACT	Active	OOS	Out of Service
CKT	Circuit	SM	Switching Module
DSC	Digital Service Circuit	STAT	Status
GDSU	Global Digital Service Unit	TTFCOM	Transmission Test Facility Common
GDSUCOM	GDSU Common Control	UCONF	Universal Conference
LSM	Local Switching Module		
SG	Service Group		

5.52.3 Commands

Commands are provided to remove, restore, and diagnose the GDSU circuits.

All available displays can be accessed from the 1100,Y,X page.

CMD	RESULT
20X	GDSUCOM SG X is removed. (RMV:GDSUCOM=SM#-GDSU#-X) [,UCL]
21X	DSC X SG 0 is removed. (RMV:DSC=SM#-GDSU#-0-X) [,UCL]
22X	DSC X SG 1 is removed. (RMV:DSC=SM#-GDSU#-1-X) [,UCL]
30X	GDSUCOM SG X is restored. (RST:GDSUCOM=SM#-GDSU#-X) [,UCL]
31X	DSC X SG 0 is restored. (RST:DSC=SM#-GDSU#-0-X) [,UCL]
32X	DSC X SG 1 is restored. (RST:DSC=SM#-GDSU#-1-X) [,UCL]
50X	GDSUCOM SG X is diagnosed. (DGN:GDSUCOM=SM#-GDSU#-X,RAW,TLP) [,UCL] [,GROW] [,SVG] [,RPT] Test is repeated 32,767 times. [,RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.
51X	DSC X SG 0 is diagnosed. (DGN:DSC=SG#-GDSU#-0-X,RAW,TLP) same options as 50X except SVG
52X	DSC X SG 1 is diagnosed. (DGN:DSC=SM#-GDSU#-1-X,RAW,TLP) same options as 50X except SVG

5.53 1110,X SM X ISTF [5E12 and Later]

5.53.1 Purpose

The purpose of the 1110,X display page is to show status and commands for the integrated services test functions (ISTF).

5.53.2 General

Page 1110 displays status for all ISTF 0-3 peripheral units in the given SM and shows status of the services and channels serving each unit.

When an off-normal condition occurs, the indicator for the condition backlights. On Page 1010,X, SM X STATUS, there is exactly one box for an SM that has ISTF units. As a result, the indicator for the ISTF backlights, and SM X STAT shows CKT OOS.

On Page 114, EQUIPPED SM STATUS SUMMARY, the indicator for the SM backlights, for example, SM 1 shows 1L OUT (if X=1). On the appropriate Page 141, 142, 143, or 144, the indicator for that SM backlights and a descriptive phrase of the condition is written unless a more critical condition exists. An example of a descriptive phrase is 1 LSM CKT OOS (if X=1). In the SUMMARY STATUS AREA, the SM critical indicator and the appropriate alarm level (CRITICAL, MAJOR, or MINOR), if applicable, backlights.

Figure 5-85 is an example of the 1110,X page. In this example, ISTF 2 is out of service, 0 (zero) channel is in use and 10 channels are available for LOOPBACK, 0 (zero) channel is in use and three channels are available for XMIT, and 0 (zero) channel is in use and 13 channels are available for ISTF 2. The SM 001 STAT shows circuit out of service (CKT OOS) and the SM indicator is backlighted.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD:					1110 - SM 001 LSM - ISTF		
SM 001 STAT		SERVICES - CHANNELS: IN USE / AVAILABLE					
CKT OOS		LOOPBACK		XMIT		CHANNELS	
SITE 000		ISTF 0 SGRD		0/31		0/31	
		ISTF 1 ACT		12/23		2/2	
REMOVE 20X ISTF X		ISTF 2 OOS		0/10		0/3	
RESTORE 30X ISTF X		ISTF 3 UNEQ		0/0		0/0	
DIAGNOSE 50X ISTF X							

Figure 5-85 1110,X - SM X - ISTF [5E12 and Later]

Abbreviations:

ACT	Active	SGRO	Special Growth
CKT	Circuit	SM	Switching Module
ISTF	Integrated Services Test Function	STAT	Status
LOOPBACK	Digital Loopback	UNEQ	Unequipped
LSM	Local Switching Module	XMIT	Transmission Test
OOS	Out of Service		

5.53.3 Commands

Commands are provided to remove, restore, and diagnose ISTF circuits.

All available page displays can be accessed from Page 1110.

CMD	RESULT
20X	ISTF unit X is removed (RMV:ISTF=SM#-X) [.UCL]
30X	ISTF unit X is restored (RST:ISTF=SM#-X) [.UCL]
50X	ISTF unit X is diagnosed (DGN:ISTF=SM#-X,RAW,TLP) [.UCL] [.GROW] [.RPT] test is repeated 32,767 times [.RPT=a] "a" is the number of times test is to be repeated (1-32,767) [.PH-d[&e]] "d" is the diagnostic phase or "d&e" is the range of phases to be performed.

5.54 1115,Y,X - SM X - GDSF Y (5E12 and Later)

5.54.1 Purpose

The purpose of the 1115,Y,X page is to show status and commands for the equipped global digital services function (GDSF).

5.54.2 General

The 1115,Y,X page shows status of a GDSF unit equipped on an SM. The page displays the number of circuits for the following:

- ***3-Way Conferences***
- ***6-Way Conferences***
- ***Digital Test Loopbacks***
- ***Digital Test Transmits***
- ***GDG Tone Transceivers***
- ***Tone Generators***
- ***Tone Transceivers***

When an off-normal condition occurs, the indicator for the condition backlights. On Page 1010,X, - SM X STATUS, and Page 1014,X, - SM X STATUS, the indicator for the GDSF backlights. On Page 114 - EQUIPPED SM STATUS SUMMARY, and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM will be backlighted.

Figure 5-86 is an example of the 1115,Y,X page display. In this example, the GDSF unit is active.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD<				1115 - SM 123 LSM - GDSF 0			
SM 123 STAT							
NORMAL							
SITE 000							
REMOVE							
200 GDSF							
RESTORE							
300 GDSF							
DIAGNOSE							
500 GDSF							

GDSF		ACT
3-WAY CONFERENCES	40	TONE GENERATORS 2
6-WAY CONFERENCES	20	
TONE TRANSCEIVERS	3	
DIGITAL TEST LOOPBACK	4	
DIGITAL TEST TRANSMIT	5	
GDG TONE TRANSCEIVERS	9	

Figure 5-86 1115,Y,X - SM X - GDSF Y (5E12 and Later)

Abbreviations:

ACT	Active	LSM	Local Service Module
GDG	Guard Data Guard	SM	Switching Module
GDSF	Global Digital Services Function	STAT	Status

5.54.3 Commands

Commands are provided to remove, restore, and diagnose GDSF circuits. All available paging commands can be entered from this display.

CMD	RESULT
200	GDSF unit is removed from service. (RMV:GDSF=SM#-UNIT#)
300	GDSF unit is restored to service. (RST:GDSF=SM#-UNIT#)
500	GDSF unit is diagnosed. (DGN:GDSF=SM#-UNIT#,RAW,TLP)

5.55 1120/1121/1122,Y,X - SM X - DLTU Y (5E12 Only)**5.55.1 Purpose**

The purpose of the 1120/1121/1122,Y,X display page is to show status and provide maintenance controls for DLTU Y and to report local, remote, and Alarm Indication Signal (AIS) Carrier Group Alarms (CGA) for SM X. The pages are organized as follows:

- **1120:** Shows status for DFIs 01 - 04
- **1121:** Shows status for DFIs 05 - 08
- **1122:** Shows status for DFIs 09 - 10.

5.55.2 General

The 1120/1121/1122,Y,X display page has three separate versions. The first version is for local switching modules (LSM). The second version and is for host switching modules (HSM). The third version is for remote switching modules (RSM).

All three versions have commands to remove, restore, and diagnose digital facility interfaces (DFI) and to remove, restore, and test T1 facilities (FAC). If the RSM is equipped with any inter-RSM communication link digital facilities interfaces (CDFI), commands to remove and restore remote communication links (RCL) are added.

A software update created a new APP column. A expansion EAIU is indicated by AIU in the APP column. The far end will display the appropriate MCC page that can display that application. See Figure 5-87 .

The expanded FAR END field for the 1120, 1121 and 1122 pages can now take on two different values depending on the host unit for facilities terminating to the host SM. If the host unit is DLTU then it will display "FAC: SM#-DLTU#-DFI#-FAC#". If the host unit is DNU-S then it will display "DS1: SM#-DNU#-DG#-STE#-STS#-VTG#-VTM#". The application field of the pages only applies from the host end.

The DLTU provides direct interfaces to T1 lines.

If an echo canceler is equipped on a facility, the associated echo canceler service unit (ECSU) and position of the echo canceler will be displayed. Since the echo canceler is maintained as part of the facility, there are no pokes specifically for it.

When an off-normal condition occurs in a DFI, the DFI indicator backlights. When a CGA occurs, an indicator appears in the CGA column associated with the DFI. The indicator contains the letter L, R, or A (for local, remote, or AIS, respectively). If one or more off-normal condition(s) is present on this display, the DLTU Y indicator on Page 1010,X - SM X STATUS is backlighted. On Page 1013,X - SM X UNIT STATUS, the indicator for the DLTU service group backlights. On Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for that SM backlights; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM backlights and a descriptive phrase of the condition is written, unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, are backlighted.

The HSM and RSM versions have information on the DFI displayed in the FAR END column which shows the connection at the "other" end. Included are the SM number, the DLTU number, the DFI number, and the FAC number within the DLTU.

The HSM version also references Page 1605 - HSM-RSM SITE INDEX for a list of all RSMs hosted by the HSM.

In the HSM and RSM versions, the DFI(s) carrying the control time slot is shown by an (*). In the RSM version, the DFI receiving reference timing is shown by an (&). The LSM version shows neither control time slot nor receive reference timing.


```

SYS EMER CRITICAL MAJOR MINOR BLDG/PWR BLDG INH CKT LIM SYS NORM
OVERLOAD SYS INH AM AM PERPH OS LINKS SM CM MISC
CMD < _____ 112 - SM - DLTU

      SM  STAT
REMOVE  [ ]
20XX DFI
21XXY FAC      SITE 000

      SEE 1121,Z/1122,Z FOR OTHER DFI STATUS (Z=DLTU#)

RESTORE
30XX DFI
31XXY FAC

DIAGNOSE
50XX DFI

TEST
51XXY FAC

XX=DFI Y=FAC
(L=LOCAL R=REMOTE A=AIS)

```

DFI	FAC	TYP	APP	FAR END	RCL	CGA	ECSU	EC
			AIU	SEE 1321, #				

Figure 5-87 1120 Page HSM Version (5E12 Only)

Abbreviations:

ACT	Active	HSM	Host Switching Module
AIS	Alarm Indication Signal	OOS	Out of Service
CGA	Carrier Group Alarm	OOSF	Out of Service of Equipment
CKT	Circuit	RCL	Remote Communication Link
DFI	Digital Facility Interface	RSM	Remote Switch Module
DLTU	Digital Line Trunk Unit	SM	Switching Module
EC	Echo Canceler Position	STAT	Status
ECSU	Echo Canceler Service Unit	T	Trunk DFI
FAC	T1 Facility	TYP	Type

5.55.3 Commands

All three versions, LSM, HSM, and RSM, have commands to remove, restore, and diagnose DFIs and to remove, restore, and test FACs. In addition, any available paging command can be entered from this display.

LSM and HSM Versions

CMD	RESULT
20XX	DFI XX is removed. (RMV:DFI=SM#-DLTU#-XX) [UCL]
21XXY	T1FAC Y of DFI XX is removed. (RMV:FAC=SM#-DLTU#-XX-Y) [UCL]
30XX	DFI XX is restored. (RST:DFI=SM#-DLTU#-XX) [UCL]
31XXY	T1FAC Y of DFI XX is restored. (RST:FAC=SM#-DLTU#-XX-Y) [UCL]
50XX	DFI XX is diagnosed. (DGN:DFI=SM#-DLTU#-XX,RAW,TLP) [UCL] [GROW] [RPT] Test is repeated 32,767 times. [RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [PH=b|b&c] The "b" is the diagnostic phase or "b&c" is the range of phases to be performed.
51XXY	T1FAC Y of DFI XX is tested. (TST:FAC=SM#-DLTU#-XX-Y) [RPT] Test is repeated 32,767 times. [RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [PH=b|b&c] The "b" is the diagnostic phase or "b&c" is the range of phases to be performed.

RSM Version

CMD	RESULT
20XX	DFI XX is removed. (RMV:DFI=SM#-DLTU#-XX) [,UCL]
21XXY	T1FAC Y of DFI XX is removed. (RMV:FAC=SM#-DLTU#-XX-Y) [,UCL]
22XXY	RCL XX of FAC Y is removed. (RMV:RCL=SM#-DLTU#-XX-Y) [,UCL]
30XX	DFI XX is restored. (RST:DFI=SM#-DLTU#-XX) [,UCL]
31XXY	T1FAC Y of DFI XX is restored. (RST:FAC=SM#-DLTU#-XX-Y) [,UCL]
32XXY	RCL XX of FAC Y is restored. (RST:RCL=SM#-DLTU#-XX-Y [,UCL]
50XX	DFI XX is diagnosed. (DGN:DFI=SM#-DLTU#-XX,RAW,TLP) [,UCL] [,GROW] [,RPT] Test is repeated 32,767 times. [,RPT=a] The ``a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The ``b" is the diagnostic phase or ``b&&c" is the range of phases to be performed.
51XXY	T1FAC Y of DFI XX is tested. (TST:FAC=SM#-DLTU#-XX-Y) [,RPT] Test is repeated 32,767 times. [,RPT=a] The ``a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The ``b" is the diagnostic phase or ``b&&c" is the range of phases to be performed.

5.56 1130/1140,Y,X - SM X - MSU Y - SG 0/1 [5E12 and Later]**5.56.1 Purpose**

The purpose of the 1130/1140,Y,X page is to show units equipped, to show status, and to provide maintenance commands for MSU X.

5.56.2 General

The 113Y/114Y,X page shows status for four metallic test interface bus access (MTIBAX), 16 metallic access buses (MAB), and up to 32 metallic service circuits.

When an off-normal condition occurs in any MSU circuit, the circuit indicator backlights. On Page 1015,X - SM X UNIT STATUS, the MSU Y SG 0 or SG 1 indicator backlights, and on Page 1010,X - SM X STATUS, the MSU unit type indicator backlights. On Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for that SM backlights; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM backlights and a descriptive phrase of the condition is written, unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, are backlighted.

A software update created a new MSU MA status page (1135/1145). The 1130/1140 page was changed to reference this new page.

Figure 5-88 shows an example of the 1130/1140,Y,X display page. There are no off-normal conditions reflected in this example.

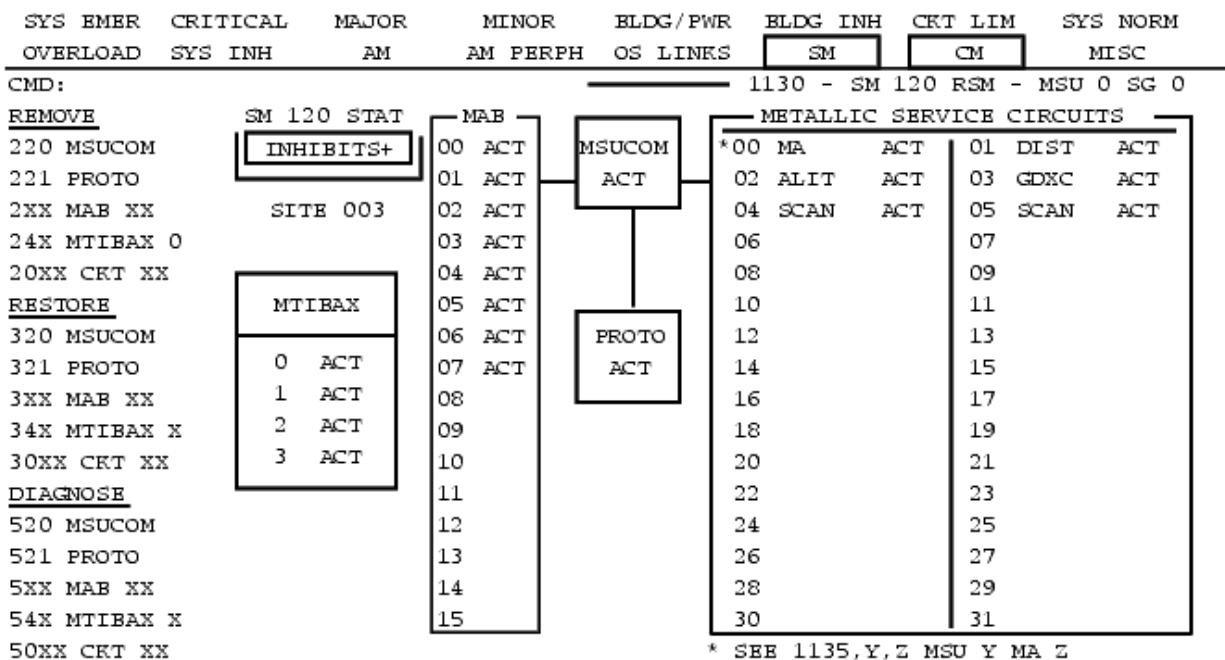


Figure 5-88 1130/1140,Y,X - SM X - MSU Y SG 0/SG 1 [5E12 and Later]

Abbreviations:

ACT	Active	MSU	Metallic Service Unit
ALIT	Automatic Line Insulation Test	MSUCOM	MSU Common Controller
CKT	Metallic Service Circuit	MTIBAX	Metallic Test Interface Bus Access
DIST	Distribute	PROTO	Protocol Bus
GDXC	Gated Diode Crosspoint	RSM	Remote Switching Module
	Compensator	SCAN	Scanner
MA	Metallic Access	SM	Switching Module
MAB	Metallic Access Bus		

5.56.3 Commands

Commands are provided to remove, restore, and diagnose various MSU circuits.

All available displays can be accessed from the 1130/1140,Y,X page.

CMD	RESULT
2XX	MAB XX is removed. (RMV:MAB=SM#-MSU#-SG#-XX) [UCL]
20XX	Circuit XX is removed. (RMV:CKT=SM#-MSU#-SG#-XX) [UCL]
220	MSUCOM is removed. (RMV:MSUCOM=SM#-MSU#-SG#) [UCL]
221	PROTO is removed. (RMV:PROTO=SM#-MSU#-SG#) [UCL]
24X	MTIBAX X is removed. (RMV:MTIBAX=SM#-MSU#-SG#-X) [UCL]

3XX	MAB XX is restored. (RST:MAB=SM#-MSU#-SG#-XX) [.UCL]
30XX	Circuit XX is restored. (RST:CKT=SM#-MSU#-SG#-XX) [.UCL]
320	MSUCOM is restored. (RST:MSUCOM=SM#-MSU#-SG#) [.UCL]
321	PROTO is restored. (RST:PROTO=SM#-MSU#-SG#) [.UCL]
34X	MTIBAX X is restored. (RST:MTIBAX=SM#-MSU#-SG#-X) [.UCL]
5XX	MAB XX is diagnosed. (DGN:MAB=SM#-MSU#-SG#-XX,RAW,TLP) [.UCL] [.GROW] [.RPT] Test is repeated 32,767 times. [.RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [.PH=b|b&&c] The "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.
50XX	Circuit XX is diagnosed. (DGN:CKT=SM#-MSU#-SG#-XX,RAW,TLP) Same options as 5XX, except GROW
520	MSUCOM is diagnosed. (DGN:MSUCOM=SM#-MSU#-SG#,RAW,TLP) Same options as 5XX
521	PROTO is diagnosed. (DGN:PROTO=SM#-MSU#-SG#,RAW,TLP) Same options as 5XX, except GROW
54X	MTIBAX X is diagnosed. (DGN:MTIBAX=SM#-MSU#-SG#-X,RAW,TLP) Same options as 5XX, except GROW

5.57 1135/1145,Y,Z,X - MSU Y- MA Z- SM X-SG 0/1 [5E12 and Later]

5.57.1 Purpose

The purpose of the 1135/1145,Y,Z,X page is to show the status of up to 16 MTBs per MA pack.

5.57.2 General

The page shows the far end type and far end equipment number. The page includes pokes to remove, restore, and diagnose MTB and MA. The 1135 page is for SG0 and 1145 for SG1.

Figure 5-89 shows an example of the 1135/1145,Y,X display page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: 1135 - SM 007 HSM MSU 23 SG 0 MA 31							
<u>REMOVE</u>		SM 000 STAT	MA STAT				
2XX MTB XX							
250 MA		SITE 000					
<u>RESTORE</u>							
3XX MTB XX							
350 MA							
<u>DIAGNOSE</u>							
5XX MTB XX							
550 MA							
<u>DISPLAY</u>							
1130,X MSU X SG 0							

METALLIC ACCESS STATUS			
MTB	FAR END	MTB	FAR END
00	NTT-TEN 7-7-0-4-0	01	NTT-TEN 7-7-0-4-1
02		03	
04		05	
06		07	
08		09	
10		11	
12		13	
14		15	

tpa852566.cdr

Figure 5-89 1135/1145,Y,Z,X - MSU Y- MA Z - MA Z - SG 0/SG 1 [5E12 and Later]

Abbreviations:

ACT	Active	MSU	Metallic Service Unit
ALIT	Automatic Line Insulation Test	MSUCOM	MSU Common Controller
CKT	Metallic Service Circuit	MTIBAX	Metallic Test Interface Bus Access
DIST	Distribute	PROTO	Protocol Bus
GDXC	Gated Diode Crosspoint	RSM	Remote Switching Module
	Compensator	SCAN	Scanner
MA	Metallic Access	SM	Switching Module
MAB	Metallic Access Bus		

5.57.3 Commands

Commands are provided to remove, restore, and diagnose MTBs.

All available displays can be accessed from the 1135/1145,Y,Z,X page.

CMD	RESULT
2XX	MTB XX is removed. (RMV:MTB=SM#-MSU#-SG#-MA#-XX) [UCL]
250	Circuit is removed. (RMV:CKT=SM#-MSU#-SG#-MA#) [UCL]
3XX	MTB XX is restored. (RST:MTB=SM#-MSU#-SG#-MA#-XX) [UCL]

350	Circuit is restored. (RST:CKT=SM#-MSU#-SG#-MA#) [,UCL]
5XX	MTB XX is diagnosed. (DGN:MTB=SM#-MSU#-SG#-MA#-XX,RAW,TLP) [,UCL] [,GROW] [,RPT] Test is repeated 32,767 times. [,RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.
550	Circuit is diagnosed. (DGN:CKT=SM#-MSU#-SG#-MA#,RAW,TLP) Same options as 5XX

5.58 1150,Y,X - SM X - DCLU Y [5E12 and Later]

5.58.1 Purpose

The purpose of the 1150,Y,X page is to show status summary and provide commands for the SLC[®] Carrier DCLU SG 0 and 1 SDFIs, if equipped.

5.58.2 General

If an off-normal condition occurs in any of the DCLU SDFI circuits, the circuit indicator backlights and has text explaining the nature of the off-normal condition. The DCLU indicator on Page 1010 is backlighted. On Page 114, the indicator for that SM is backlighted; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted, and a descriptive phrase of the condition is written, unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (for example, MINOR) backlight. There are summary indicators for each of the associated RTs.

Figure 5-90 shows all the SDFI units in SG 1 are active. The SG 0 has two OOS SDFIs (4 and 6). These are both connected to RT 1, and the RT 1 indicator reflects the OOS condition.

The second number in the RT box (4768) is the subscriber loop carrier identification (SID).

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERFH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD: █					1150 - SM 003 LSM - DCLU 0		
		SM 003 STAT					
		CKT OOS					
REMOVE 23X SG X 2XX SDFI XX RESTORE 33X SG X 3XX SDFI XX DIAGNOSE 53X SG X 5XX SDFI XX DISPLAY 131X RT 1 DCLU X 132X RT 2 DCLU X 133X RT 3 DCLU X 134X RT 4 DCLU X 135X RT 5 DCLU X 136X RT 6 DCLU X		SITE 000		SG 0 ACT		SG 1 ACT	
				SDFI RT		SDFI RT	
				00 ACT 1 08		15 ACT 5 23	
				01 ACT 3 09		16 ACT 6 24	
				02 ACT 1 10		17 ACT 4 25	
				03 ACT 2 11		18 ACT 6 26	
				04 OOS L 12		19 27	
				05 ACT 2 13		20 28	
				06 OOS L 14		21 29	
				07		22	
				RT 1 RT 2 RT 3 RT 4 RT 5 RT 6			
				4768 9374 2973 8374 4875 9834			

Figure 5-90 1150,Y,X - SM X - DCLU Y [5E12 and Later]

Abbreviations:

ACT	Active	SDFI	SLC®
CKT	Circuit		Digital Facility Interface
DCLU	Digital Carrier Line Unit	SG	Service Group
LSM	Local Switching Module	SM	Switching Module
OOS	Out of Service	STAT	Status
RT	Remote Terminal		

5.58.3 Commands

Commands are provided to remove, restore, and diagnose the equipped units. Also provided are paging commands for the associated RTs.

CMD	RESULT
2XX	DCLU SDFI XX is removed (RMV:SDFI=SM#-DCLU#-XX) [UCL]
23X	DCLU SG X is removed (RMV:DCLU=SM#-DCLU#-X) [UCL]
3XX	DCLU SDFI XX is restored (RST:SDFI=SM#-DCLU#-XX) [UCL]
33X	DCLU SG X is restored (RST:DCLU=SM#-DCLU#-X) [UCL]
5XX	DCLU SDFI XX is diagnosed (DGN:SDFI=SM#-DCLU#-XX,RAW,TLP) [UCL] [RPT] test is repeated 32,767 times [RPT=a] "a" is the number of times the test is to be repeated (1-32,767) [PH =b|b&&c] "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.

53X	DCLU SG X is diagnosed (DGN:DCLU=SG#-DCLU#-X,RAW,TLP) same options as 5XX
1310,Y,Z	DCLU Y RT Z page is displayed

5.59 1160,X - MISC UNITS [5E12 and Later]

5.59.1 Purpose

The purpose of the 1160,X page display is to provide status and menu commands for miscellaneous hardware units in the remote switching module (RSM) and optically remoted module (ORM).

5.59.2 General

The 1160,X page display (Figure 5-91) contains any miscellaneous units in an RSM/ORM which do not belong on any other per-SM page. Presently, the only unit contained on this page is the alarm and status circuit (ASC). If the RSM has been retrofitted, the indicator and commands refer to the Remote Alarm Unit instead of the ASC.

When an off-normal condition occurs, the indicator for the fault backlights. The MISC indicator on Page 1010,X - SM X RSM/ORM STATUS backlights. On

Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for that SM is backlighted and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted, and a descriptive phrase of the condition is written, unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, backlight.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD: _				1160 - SM 011 ORM - MISC UNITS			
<u>REMOVE</u>		<u>SM 011 STAT</u>		ASC ACT			
200 ASC		HASH ERR +					
<u>RESTORE</u>		SITE 002					
300 ASC							
<u>DIAGNOSE</u>							
500 ASC							

Figure 5-91 1160,X - SM X ORM - MISC Units [5E12 and Later]

Abbreviations:

ACT	Active	ORM	Optically Remoted Module
ASC	Alarm and Status Circuit	SM	Switching Module
ERR	Error	STAT	Status
MISC	Miscellaneous		

5.59.3 Commands

Commands are provided to remove, restore, and diagnose any miscellaneous units which appear on the 1160,X page.

CMD	RESULT
200	Remove the Alarm and Status Circuit from service (RMV:ASC=SM#) [UCL]
300	Restore the Alarm and Status Circuit to service (RST:ASC=SM#) [UCL]
500	Diagnose the Alarm and Status Circuit (DGN:ASC=SM#,RAW,TLP)

5.60 1170,X - SM X RSM - RCLK [5E12 and Later]

5.60.1 Purpose

The purpose of the 1170,X display page is to show status and provide maintenance commands for the remote clock, remote clock oscillator, remote clock cross-couples, remote clock oscillator cross-couples, and remote clock references.

5.60.2 General

The 1170,X page is only available on remote switching modules (RSM) and only on RSMs that are equipped with a remote clock (RCLK).

The remote clock cross-couples (RCXC) show the link status between the two RCLKs.

The remote clock oscillator cross-couples (RCOXC) show the link status between the remote clock oscillators (RCOSC) and the RCLKs.

Only one reference per side can be in the active state at one time. The rest of the equipped references on that side are in the standby state if they are not OOS.

The RCLK mode is displayed in the RCLK indicators. There are four RCLK modes:

- **FAST:** This is used to obtain initial synchronization with the reference signal. The RCLK is scanning the incoming synchronization signal from the HSM at an accelerated rate.
- **NORM:** This mode means the T1 umbilical to the host SM (HSM) is up and the RCLK has obtained synchronization from the HSM.
- **HOLD:** The holdover mode is used when synchronization is lost. This is an off-normal mode.
- **FREE:** The free mode indicates initialization of an RCLK with no good reference signal. This is an off-normal mode.

Figure 5-92 shows an example of the 1170,X display page in which RCLK 1 is out of service. This caused RCXC 0, RCXC 1, RCOXC 1, and RCREF 1 and 2 on SIDE 1 to be out-of-service family of equipment (OOSF). It also caused RCOSC 1 to go to standby (STBY) (if not already standby).

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD: █					1150 - SM 003 LSM - DCLU 0		
		SM 003 STAT					
		CKT OOS					
REMOVE 23X SG X 2XX SDFI XX RESTORE 33X SG X 3XX SDFI XX DIAGNOSE 53X SG X 5XX SDFI XX DISPLAY 1310,Y,Z DCLU Y RT Z		SITE 000		SG 0 ACT		SG 1 ACT	
				SDFI	RT	SDFI	RT
				00 ACT 1	08	15 ACT 5	23
				01 ACT 3	09	16 ACT 6	24
				02 ACT 1	10	17 ACT 4	25
				03 ACT 2	11	18 ACT 6	26
				04 OOS 1	12	19	27
				05 ACT 2	13	20	28
				06 OOS 1	14	21	29
				07		22	
				RT 1	RT 2	RT 3	RT 4
				4768	9374	2973	8374
				RT 5	RT 6		
				4875	9834		

Figure 5-92 1170,X - SM X RSM - RCLK [5E12 and Later]

Abbreviations:

RCLK	Remote Clock	RCREF	Remote Clock Reference
RCOSC	Remote Clock Oscillator	RCXC	Remote Clock Cross-Couple
RCOXC	Remote Clock Oscillator Cross-Couple	STAT	Status

5.60.3 Commands

Commands are provided to remove and restore the RCLK, RCOSC, RCXC, RCOXC, and RCREF, to diagnose the RCLKs, and to switch the RCLKs and the RCOSCs.

All available displays can be accessed from the 1170X page.

CMD	RESULT
20X	RCLK X is removed from service (RMV:RCLK=SM#-X) [,UCL]
21X	RCOSC X is removed from service (RMV:RCOSC=SM#-X) [,UCL]
22X	RCXC X is removed from service (RMV:RCXC=SM#-X) [,UCL]
23X	RCOXC X is removed from service (RMV:RCOXC=SM#-X) [,UCL]
24X	RCREF X is removed from service (RMV:RCREF=SM#-X) [,UCL]
30X	RCLK X is restored to service (RST:RCLK=SM#-X) [,UCL] [,STBY]
31X	RCOSC X is restored to service (RST:RCOSC=SM#-X) [,STBY]

32X	RCXC X is restored to service (RST:RCXC=SM#-X)
33X	RCOXC X is restored to service (RST:RCOXC=SM#-X) [.STBY]
34X	RCREF X is restored to service (RST:RCREF=SM#-X) [.ACT | STBY]
403	RCLK is switched (SW:RCLK=SM#)
41X	RCOSC X is switched (SW:RCOSC=SM#-X)
50X	RCLK X is diagnosed (DGN:RCLK=SM#-X,RAW,TLP) [.UCL] [.GROW] [.RPT] test is repeated 32,767 times [.RPT=a] "a" is the number of times the test is to be repeated (1-32,767) [.PH=b|b&&c] "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.

5.61 118Y,X - SM X PSU SHELF Y (5E12 and 5E13 Only)

5.61.1 Purpose

The purpose of Page 118Y,X (Y = shelf 0-5) is to provide status and maintenance commands for protocol handlers (PH), hardware type of PHs, status of channel groups, type of channel groups, and assignment of channel groups to PHs.

5.61.2 General

The PSU Shelf MCC page display (one per PSU shelf) provides two tables. The first table (PSUPH ASSIGNMENT STATUS) contains the 16 individual PHs with their hardware type and status. The second table (CHANNEL GROUP SUMMARY) contains the corresponding channel group type and hardware PH type (2, 3, 4, 22, A1, V1 or V2). The PH status data of each of the PSU Shelf pages supplies the PH status summary of the PSU Network display, Page 1186. The PHs serving channel groups are marked active (ACT). The PHs that are able to provide service but are not serving a channel group are marked standby (STBY). The PHs that are removed from service are not available as spares and are marked out of service (OOS). The PHs that are partially faulty may be marked degraded (DGRD) (when there are no standby PHs) rather than being removed. This allows the PH to be of partial service to its channel group. For PHs that are out of service or degraded, the PH shelf summary is marked DGRD on the 1186 page. If possible, the channel groups of OOS PHs are moved to serviceable PHs. When the supply of spare PHs is exhausted, a channel group associated with the OOS PH is removed from the PSUPH ASSIGNMENT STATUS table, and the channel group number and type on the CHANNEL GROUP SUMMARY table is backlighted. The shelf of that PH, in the PSUPH STATUS SUMMARY box (on the PSU Network page), is marked DGRD and the entry of how many channel groups are not being serviced is incremented. Any other state displayed in PH status locations is required for a removable, diagnosable, growable, and inhibitible individual unit.

The appropriate peripheral status block of the SM on the SM Status page is marked with PSU. When any portion of the PSU is OOS, the block is backlighted. If the status reported on the SM STATUS page or on any of the PSU display pages changes while being displayed, the appropriate indicators are updated with changed status.

When a PSU ATM link channel is OOS, an asterisk "*" is displayed and backlighted at the end of the PH STATUS column. This is applicable only for protocol handlers for asynchronous transfer mode (ATM) (PHA). Also, when one or more PHAs have OOS link channels, "*" = PSU LINK CHANNEL OOS, SEE PAGE 1187" is displayed at the bottom of the page.

The 118Y,X page (Figure 5-93) is divided into three basic areas. The "CHANNEL GROUP SUMMARY" block at the right side of the display indicates the channel group number, PH hardware type required by the channel group, and channel group type which can be one of the following:

- **DSL** - Used for all basic digital subscriber line (DSL) and extended DSL (EDSL) applications
- **ISM** - Inter-SM packet

- **IPTRK** - Interswitch packet trunks
- **X75P** - X.75 trunks pump
- **PHACG** - PHA channel group
- **X75** - X.75 trunks
- **SHCG** - Code Division Multiple Access (CDMA) speech handler channel group
- **PPCG** - CDMA packet pipe channel group.

The "PSUPH ASSIGNMENT STATUS" block in the middle of the page indicates the PH status, PH hardware type, and channel group assignment to each PH. The hardware equipage in a given PSU is designated by PH type. When equipped, a PH is either active (ACT), standby (STBY), out of service (OOS), or degraded (DGRD). The third area of this display contains the "SM STAT" indicator block (with SITE number). Also, below the SM status block, a list of commands exists for management of the PSUPH maintenance.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD< 1180 - SM 024 LSM - PSU 0 SHELF 0							
SM 024 STAT							
PSLNKOOS							
SITE 000							
REMOVE							
2XX PSUPH XX							
RESTORE							
3XX PSUPH XX							
SWITCH							
4XX PSUPH XX							
DIAGNOSE							
5XX PSUPH XX							

PSUPH ASSIGNMENT STATUS						CHANNEL GROUP SUMMARY					
PSUPH	PH	CH	PSUPH	PH	CH	CH	GRP	PH	CH	GRP	PH
STATUS	TYP	GRP	STATUS	TYP	GRP	GRP	TYP	TYP	GRP	TYP	TYP
PH00 ACT	2	00	PH08 ACT	2	07	00	DSL	2	08	ISM	2
PH01			PH09 ACT	2	08	01	SHCG	V1	09	DSL	2
PH02 ACT	V1	01	PH10 ACT	2	09	02	IPTRK	3	10	IPTRK	2
PH03 ACT	3	02	PH11 ACT	2	10	03	DSL	4	11	SHCG	V1
PH04 ACT	4	03	PH12 ACT	V1	11	04	PHACG	A1	12	DSL	2
PH05 ACT *	A1	04	PH13			05	DSL	2			
PH06 ACT	2	05	PH14 ACT	2	12	06	PPCG	4			
PH07 ACT	4	06	PH15 STBY	2		07	DSL	2			

(* = PSU LINK CHANNEL OOS, SEE PAGE 1187)

Figure 5-93 118Y,X - SM X PSU Shelf Y (5E12 and 5E13 Only)

Abbreviations:

A1	PH for ATM, Version 1	PPCG	Packet Pipe Channel Group
ACT	Active	PSLNKOOS	PSU Link OOS
CH	Channel	PSUPH	Packet Switching Unit
DSL	Digital Subscriber Line Group	PSU	Packet Switching Unit

GRP	Group		Protocol Handler
IPTRK	Interswitch Packet Trunk	SHCG	Speech Handler
ISM	Inter-SM Packet		Channel Group
LSM	Local Switching Module	SM	Switching Module
MIXED	Multiple Applications	STAT	Status
OOS	Out of Service	STBY	Standby
PH	Protocol Handler	TYP	Type
PHACG	PH for ATM Channel Group	V1	PH for Voice, Version 1

5.61.3 Commands

Commands are provided to remove, restore, diagnose, and switch PHs shown on this page.

The restore and switch commands also have a group (GRP) option that allows assignment of a specified channel group. The GRP option is only allowed with the switch command when switching from a standby (STBY) PH to an active (ACT) PH. The STBY PH is the one specified in the switch command, and the channel group of the ACT PH is specified in the GRP option (for example, **SW:PSUPH=24-0-0-15,GRP=12**, where PH number 15 is a STBY PH and GRP 12 is assigned to an ACT PH).

When restoring PHs, the GRP option can be used to assign a specified channel group to the PH being restored (for example, **RST:PSUPH=24-0-0-15,GRP=12**, where PH number 15 is STBY and GRP 12 is a channel group). If the channel group specified cannot be switched or restored to PH, the command will fail and a message will print indicating why the command failed.

Commands available for control of the multiple protocol handlers are as follows:

CMD	RESULT
2XX	Remove PSUPH XX (RMV:PSUPH=SM#-PSU#-SHELF#-XX)
3XX	Restore PSUPH XX (RST:PSUPH=SM#-PSU#-SHELF#-XX)
4XX	Switch PSUPH XX (SW:PSUPH=SM#-PSU#-SHELF#-XX)
5XX	Diagnose PSUPH XX (DGN:PSUPH=SM#-PSU#-SHELF#-XX,RAW,TLP)

5.62 1186,X - SM X PSU NETWORK (5E12 and 5E13 Only)

5.62.1 Purpose

The 1186,X page display shows the current packet switch unit (PSU) status, the PSU common controller (PSUCOM) status, and the protocol handler (PH) shelf status summary.

5.62.2 General

The PSU Network page display simultaneously shows the state of both PSUCOMs and a status summary of the PHs per PSU shelf. The PSUCOM is composed of the control fanout (CF), and each data fanout (DF) and protocol fanout (PF) of the equipped shelves of the same side. The PSUCOM can be removed, restored, or switched as a single entity, and the status is noted on the MCC as a duplex SM peripheral controller. The status summary of the PHs on this page is on a shelf basis, because any sparing of the PHs is performed on a shelf basis. When any PH is removed from service or degraded, this page has the shelf of its residence marked degraded. If the shelf should have more PHs removed than the shelf has spares to take the place of the PHs that are serving channel groups, the shelf is marked degraded and the count of channel groups not being serviced is displayed. The possible states of the PH shelves can be "normal" (all equipped PHs in service when the shelf is equipped), "degraded," "unequipped," and "growth."

The PSUPH SUMMARY indicator box provides status for a maximum of 16 PHs/shelves (indicating 1 spare PH/shelf).

If a PHA is equipped, "1187 PSU LINKS" appears under DISPLAY (bottom left of the screen). This command allows the user to get additional information from the PSU Link Status page.

When a PSU ATM link is in off-normal state (one channel OOS) or trouble state (both channels OOS), the "SEE 1187" box is displayed and backlighted. This is necessary because it is possible for a channel to be OOS even though the PHA itself is active (ACT). When this happens, none of the shelf summaries will show degraded (DGRD). The technician would refer to the 1187 PSU Links page to determine which PHA links or channels are impacted.

Figure 5-94 shows an example of the 1186,X page display.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM																						
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC																						
CMD<				1186 - SM 192 LSM - PSU NETWORK																									
<u>REMOVE</u> 200 PSUCOM 0 201 PSUCOM 1 <u>RESTORE</u> 300 PSUCOM 0 301 PSUCOM 1 <u>DIAGNOSE</u> 500 PSUCOM 0 501 PSUCOM 1 <u>SWITCH</u> 400 PSUCOM <u>DISPLAY</u> 118X SHELF X 1187 PSU LINKS		SM 192 STAT CKT OOS SITE 000		<table border="1"> <thead> <tr> <th>PSUCOM 0</th> <th>PSUCOM 1</th> </tr> </thead> <tbody> <tr> <td>STBY</td> <td>ACT</td> </tr> <tr> <td colspan="2">PSUPH SUMMARY</td> </tr> <tr> <td colspan="2">STATUS</td> </tr> <tr> <td>SHELF 0 NORM</td> <td>NONE</td> </tr> <tr> <td>SHELF 1 NORM</td> <td>NONE</td> </tr> <tr> <td>SHELF 2 UNEQ</td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table> PSU LINKS OFF-NORMAL SEE 1187				PSUCOM 0	PSUCOM 1	STBY	ACT	PSUPH SUMMARY		STATUS		SHELF 0 NORM	NONE	SHELF 1 NORM	NONE	SHELF 2 UNEQ									
PSUCOM 0	PSUCOM 1																												
STBY	ACT																												
PSUPH SUMMARY																													
STATUS																													
SHELF 0 NORM	NONE																												
SHELF 1 NORM	NONE																												
SHELF 2 UNEQ																													

Figure 5-94 1186,X - SM X PSU Network (5E12 and 5E13 Only)

Abbreviations:

ACT	Active	PSU	Packet Switch Unit
CKT	Circuit	PSUCOM	PSU Common Controller
GRP	Group	SM	Switching Module
LSM	Local Switching Module	STAT	Status
NORM	Normal	STBY	Standby
OOS	Out of Service	UNEQ	Unequipped

5.62.3 Commands

Commands are provided to remove, restore, diagnose, and switch PSUCOMs. Also any PSU shelf and any available paging commands can be accessed from this page.

CMD	RESULT
200	Removes PSUCOM 0 (RMV:PSUCOM=SM#-0-0)
201	Removes PSUCOM 1 (RMV:PSUCOM=SM#-0-1)
300	Restore PSUCOM 0 (RST:PSUCOM=SM#-0-0)

301	Restore PSUCOM 1 (RST:PSUCOM=SM#-0-1)
500	Diagnose PSUCOM 0 (DGN:PSUCOM=SM#-0-0,RAW,TLP)
501	Diagnose PSUCOM 1 (DGN:PSUCOM=SM#-0-1,RAW,TLP)
400	Switch control and state of active and standby PSUCOM (SW:PSUCOM=SM#-0)
118X	Display PSU shelf X (X=0-5)
1187	Display PSU links status

5.63 1187,X - SM X PSU LINKS (5E12 and Later)

5.63.1 Purpose

The purpose of the 1187,X page display is to show status of PSU links and channels.

5.63.2 General

The PSU Links page shows information for up to 10 links. For each link, the PHA number and the PHA status for both channel 0 and channel 1 are shown. The channel group alarm type is displayed when a channel is OOS.

The links themselves also have their own state. Links may be configured either as simplex (one channel) or duplex (two channels). If all channels are in service, the link state is active. If all channels are OOS, the link state is OOS. If one channel in a duplex link is OOS, then the link state is off normal.

Figure 5-95 shows an example of the 1187,X page display.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD<				1187 - SM 192 LSM - PSU LINKS			
SM 192 STAT							
CGA							
SITE 000							
SWITCH							
4XXX LINK TO							
FAR CA XXX							
OUTPUT							
900 PSLNK STATUS							
DISPLAY							
1186 PSU NETWORK							
(CA=COMMUNITY ADDR)							

LINK NAME NEAR-FAR CA	CHANNEL 0			CHANNEL 1		
	PHA	STATUS	ALM	PHA	STATUS	ALM
024-001	192-0-0-0	STBY		192-0-1-0	ACT	
024-003	192-0-0-2	STBY		192-0-1-2	ACT	
024-020	192-0-0-1	STBY		192-0-1-1	ACT	
024-021	192-0-0-3	STBY		192-0-1-3	ACT	
024-022	192-0-0-4	STBY		192-0-1-4	ACT	
024-100	192-0-0-5	ACT		192-0-1-5	STBY	
024-101	192-0-2-0	OOS	FE	192-0-3-0	ACT	
024-102	192-0-2-1	ACT		192-0-3-1	OOS	AIS
024-103	192-0-2-2	OOS	RMT	192-0-3-2	OOS	LCL

Figure 5-95 1187,X - SM X PSU Links (5E12 and Later)

Abbreviations:

ACT	Active	OOS	Out of Service
ADDR	Address	PHA	Protocol Handler for Asynchronous Transfer Mode (ATM)
AIS	Alarm Indication Signal	PSLNK	PSU Link
ALM	Alarm	PSU	Packet Switch Unit
CA	Community Address	RMT	Remote
CGA	Channel Group Alarm	SM	Switching Module
FE	Family of Equipment	STAT	Status
LCL	Local	STBY	Standby
LSM	Local Switching Module		

5.63.3 Commands

Commands are provided to switch PSU links and output PSU links status. Any PSU shelf, PSU network, and all paging commands can be accessed from the 1187,X page.

CMD	RESULT
4XXX	Switches the PSU link to far-end community address XXX (SW:PSLNK=0-a,SM=b) where a = far-end community address (1-254) and b = SM number
900	Outputs PSU links status (OP:STATUS,PSLNK,SM=b) where b = SM number
1186	Display PSU Network status.

5.64 1190,X - SM X - MCTSI (5E12 and Later)**5.64.1 Purpose**

The purpose of the 1190 page display is to show status and provide maintenance commands for the module controller time slot interchanger (MCTSI), dual link interface (DLI), remote link interface (RLI), network link interface (NLI), transmission rate converter unit (TRCU), bootstrapper (BTSR), and the external references (EXT REF).

5.64.2 General

The 1190 page has five versions. The first version shows DLIs for SMs. The second version shows NLIs for SM-2000s. The third version shows NLIs/TRCUs with REF for EXM-2000. The fourth version shows RLIs for RSMs. The fifth version shows DLIs/TRCUs/EXT REF for ORMs.

When an off-normal condition occurs, the indicator for the condition backlights. On Page 1010,X, the MCTSI indicator backlights. On Page 114, the indicator for the SM backlights; and on the appropriate 141, 142, 143, or 144 page, the indicator for the SM backlights, and a phrase describing the problem is written, unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, are backlighted.

If the SM is isolated or initializing and this display is requested, it displays, but only the status of the DLIs/NLIs fills in, and the SM X STAT indicator shows ISOLATED. The DLI/NLI status data is maintained in the AM and is available for display. The MCTSI, RLI, and bootstrapper (BTSR) status data is stored in the SM; and since it is isolated, the data cannot be accessed.

The DLI/NLI status indicator block is divided into two sections: one for DLI/NLI status and the other is used to identify the presence of transmission rate converter unit (TRCU) hardware. The TRCU portion of the indicator block does not indicate alarm status.

Bootstrapper Information

Poke commands for BTSR (for example, 202 BTSR) are available if the SMs are equipped with the MCTSI unit (MCTU).

The BTSR status indicator block is only displayed on the 1190 page when the SM is equipped with the MCTU.

Figure 5-96 is an example of the SM version of the MCTSI display which shows DLI 1 OOSF due to ONTC 1 being unavailable.

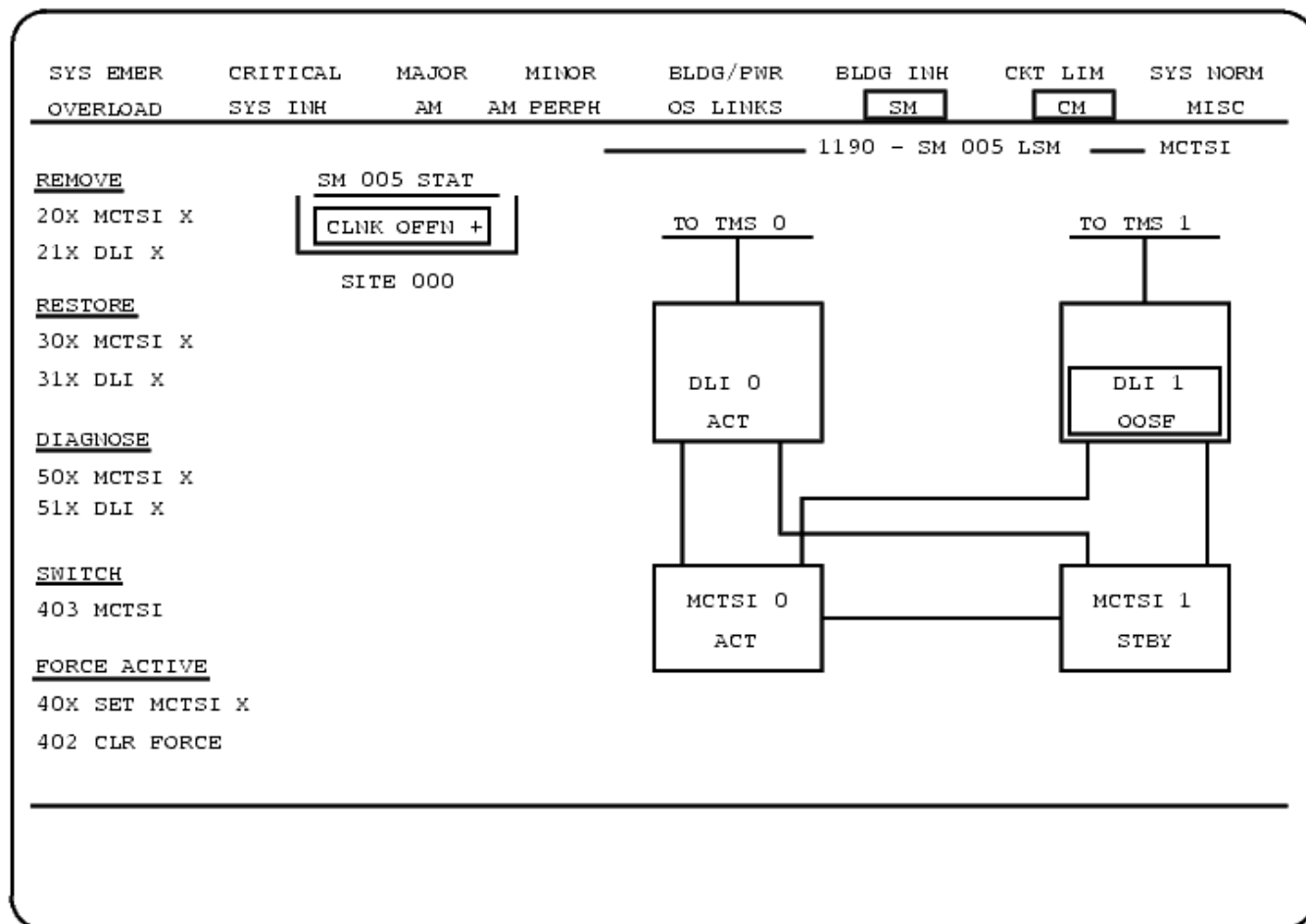


Figure 5-96 1190,X - SM X - MCTSI (SM Version) (5E12 and Later)

Abbreviations:

ACT	Active	OFFN	Off Normal
CLNK	Communication Link	OOSF	Out-of-Service Family of Equipment
CLR	Clear	SM	Switching Module
DLI	Dual Link Interface	STAT	Status
LSM	Local Switching Module	STBY	Standby
MCTSI	Module Controller/Time Slot Interchanger	TMS	Time Multiplexed Switch

Figure 5-97 is an example of the SM-2000 version of the MCTSI display.

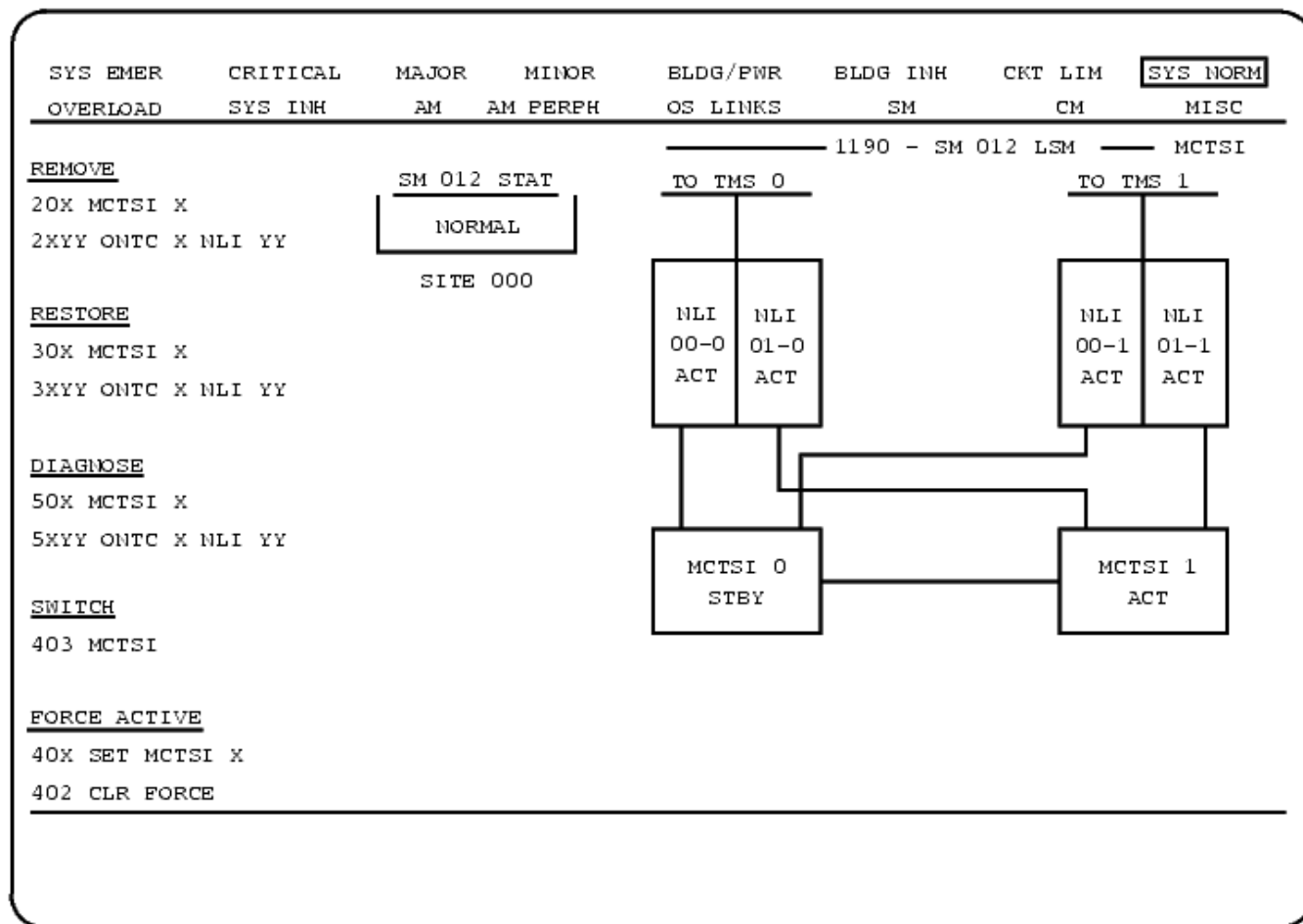


Figure 5-97 1190,X - SM X - MCTSI - (SM-2000 Version) (5E12 and Later)

Abbreviations:

ACT	Active	ONTC	Office Network Timing Complex
CLR	Clear	SM	Switching Module
LSM	Local Switching Module	STAT	Status
MCTSI	Module Controller/Time Slot Interchanger	STBY	Standby
NLI	Network Link Interface	TMS	Time Multiplexed Switch

Figure 5-98 is an example of the EXM-2000 with REF version of the 1900,X page with NLIs/TRCUs.

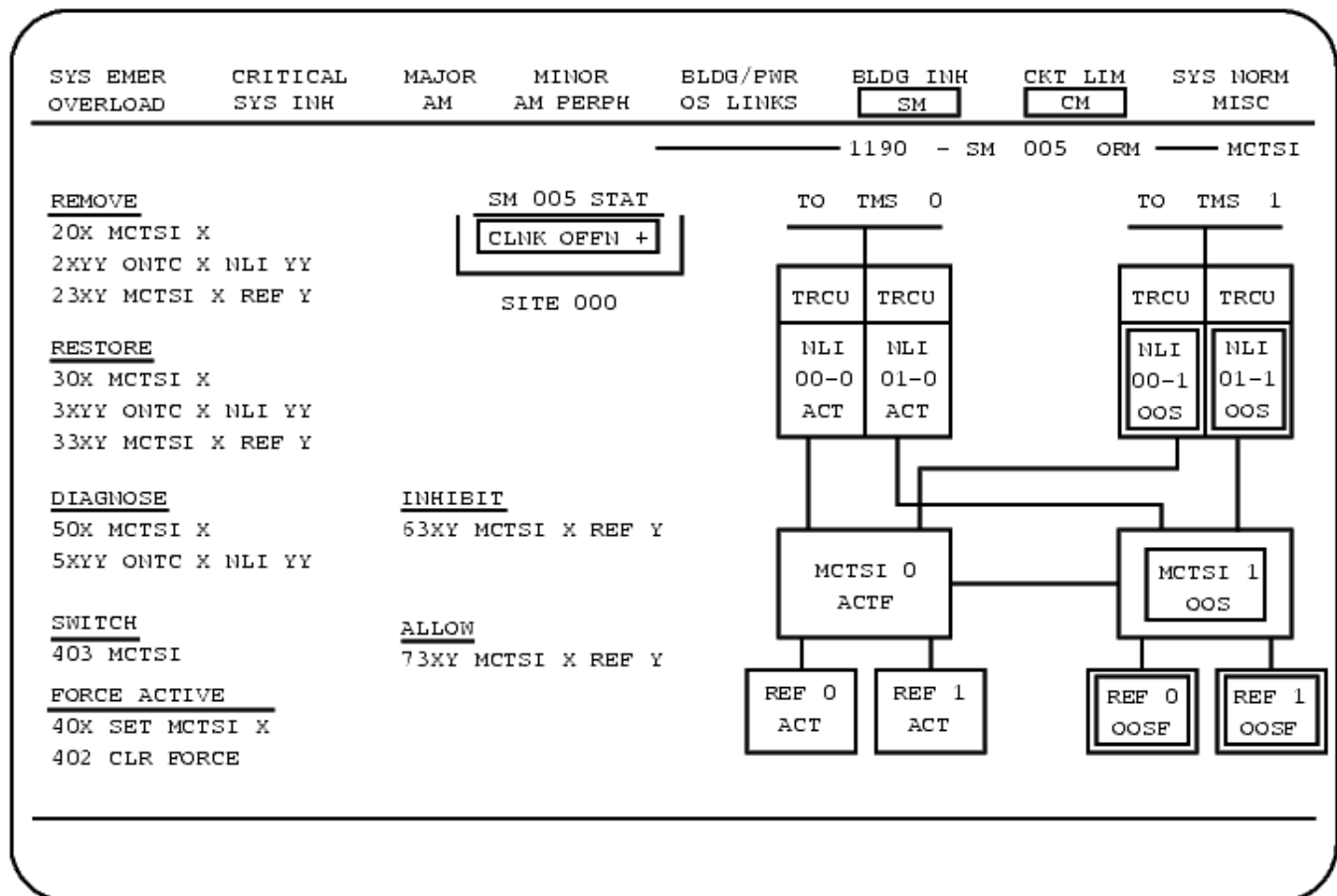


Figure 5-98 1190,X - SM X - MCTSI - (EXM-2000 with REF Version) (5E12 and Later)

Abbreviations:

ACT	Active	OOS	Out of Service
ACTF	Active Forced	OOSF	Out-of Service Family of Equipment
CLNK	Communication Link	ORM	Optically Remoted Module
CLR	Clear	REF	External Timing Reference
MCTSI	Module Controller/Time Slot Interchanger	SM	Switching Module
NLI	Network Link Interface	STAT	Status
OFFN	Off Normal	TMS	Time Multiplexed Switch
ONTC	Office Network Timing Complex	TRCU	Transmission Rate Converter Unit

Figure 5-99 is an example of the RSM version of the MCTSI display.

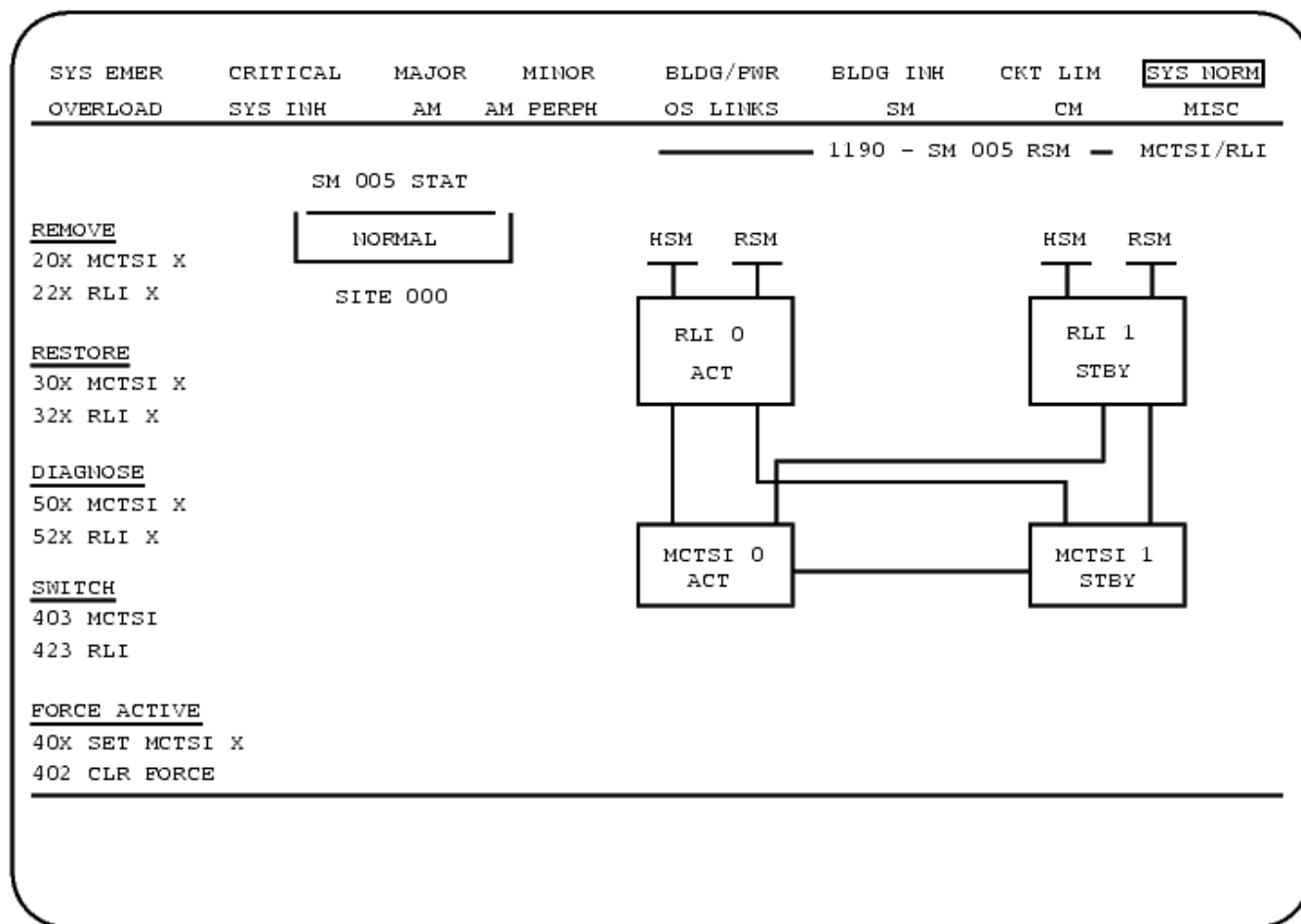


Figure 5-99 1190,X - SM X - MCTSI - (RSM Version) (5E12 and Later)

Abbreviations:

ACT	Active	RLI	Remote Link Interface
CLR	Clear	RSM	Remote Switching Module
HSM	Host Switching Module	SM	Switching Module
MCTSI	Module Controller/Time Slot Interchanger	STAT	Status
		STBY	Standby

Figure 5-100 is an example of the ORM with EXT REF and TRCU version of the MCTSI display.

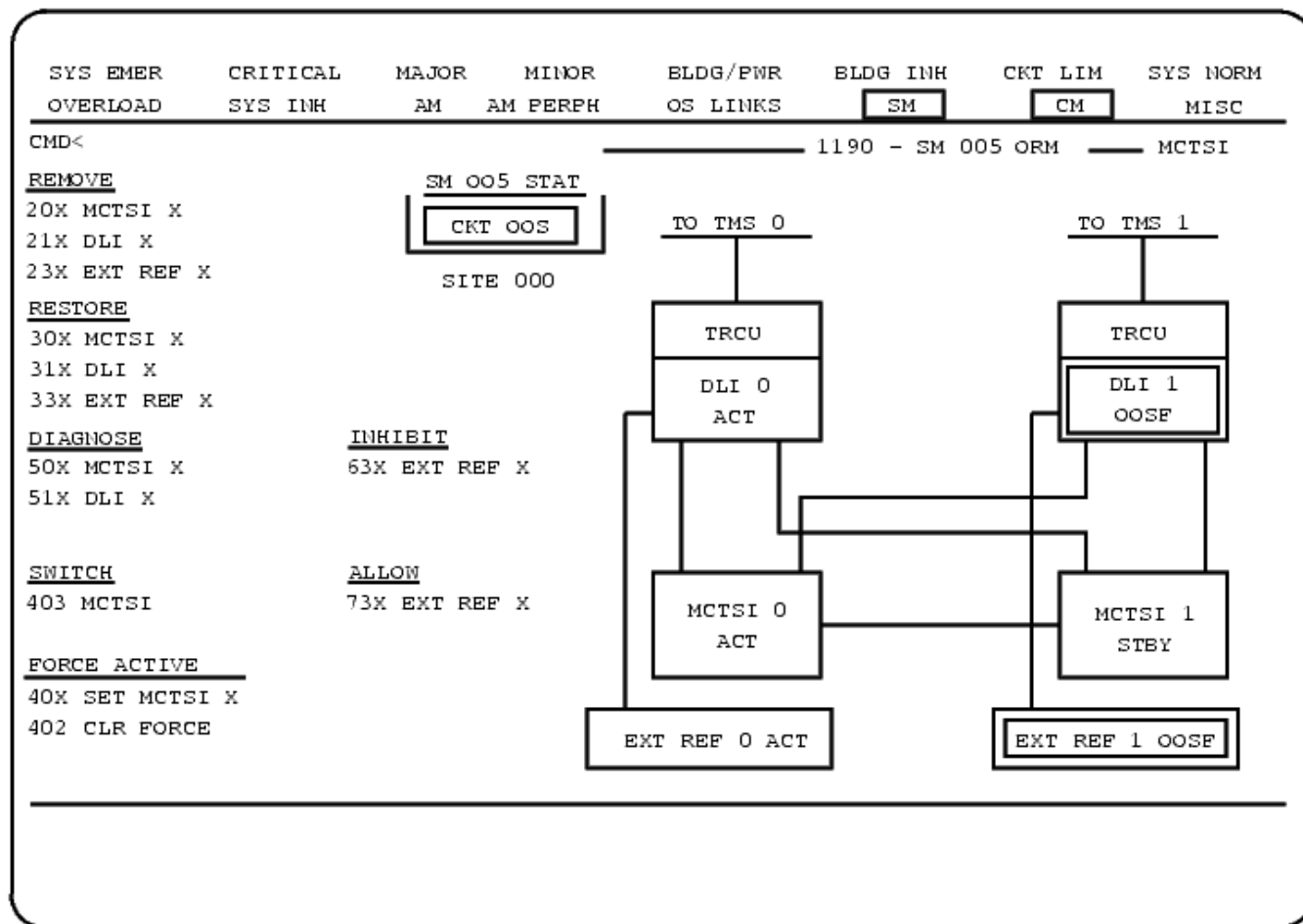


Figure 5-100 1190,X - SM X - MCTSI - (ORM with EXT REF/TRCU Version) (5E12 and Later)

Abbreviations:

ACT	Active	ORM	Optically Remoted Module
CLR	Clear	SM	Switching Module
DLI	Dual Link Interface	STAT	Status
EXT REF	External Timing Reference	STBY	Standby
MCTSI	Module Controller/Time Slot Interchanger	TMS	Time-Multiplexed Switch
OOSF	Out-of-Service Family of Equipment	TRCU	Transmission Rate Converter Unit

5.64.3 Commands

Commands are given to remove, restore, and diagnose the MCTSI, BTR, DLIs, NLIs, and RLIs, to switch the MCTSI and RLI, to force active the MCTSI, and to remove, restore, inhibit, and allow EXT REF. Any available paging commands can be entered from the 1190 page.

CMD	RESULT
20X	MCTSI X is removed. (RMV:MCTSI=SM#-X) [UCL]
2XYY	ONTC X NLI YY is removed. (RMV:NLI=SM#-YY-X)
202	BTSR is removed. (RMV:BTSR=SM#) [UCL]
21X	DLI X is removed. (RMV:DLI=SM#-X) [UCL]
21XX	ONTC 1 NLI XX is removed. (RMV:NLI=SM#-XX-1)
23X	EXT REF X is removed. (RMV:SMREF=SM#-X)
23XY	MCTSI X EXT REF Y is removed. (RMV:SMREF=SM#-X-Y)
30X	MCTSI X is restored. (RST:MCTSI=SM#-X) [UCL] [STBY]

3XYY	ONTC X NLI YY is restored. (RST:NLI=SM#-YY-X)
302	BTSR is restored. (RST:BTSR=SM#) [,UCL]
31X	DLI X is restored. (RST:DLI=SM#-X) [,UCL]
33X	EXT REF X is restored. (RST:SMREF=SM#-X)
33XY	MCTSI X EXT REF Y is restored. (RST:SMREF=SM#-X-Y)
40X	MCTSI X is forced active. (SET:MCTSI=SM#-X,FRC)
402	MCTSI force is cleared. (CLR:MCTSI=SM#,FRC)
403	MCTSI is switched. (SW:MCTSI=SM#)
50X	MCTSI X is diagnosed. (DGN:MCTSI=SM#-X,RAW,TLP) [,UCL] [,GROW] [,RPT] Test is repeated 32,767 times. [,RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [,PH=b]b&&c] The "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.
5XYY	ONTC X NLI YY is diagnosed. (DGN:NLI=SM#-YY-X)
502	BTSR is diagnosed. (DGN:BTSR=SM#,RAW,TLP) Same options as 50X
51X	DLI X is diagnosed. (DGN:DLI=SM#-X,RAW,TLP) [,UCL] RLI X is diagnosed. (DGN:RLI=SM#-X,RAW,TLP) [,UCL] Same options as 50X
63X	EXT REF X is inhibited. (INH:HDWCHK,SMREF=SM#-X)
63XY	MCTSI X EXT REF Y is inhibited. (INH:HDWCHK,SMREF=SM#-X-Y)
73X	EXT REF X is allowed. (ALW:HDWCHK,SMREF=SM#-X)
73XY	MCTSI X EXT REF Y is allowed. (ALW:HDWCHK,SMREF=SM#-X-Y)

5.65 1200,X - SM X - DLI/NLI SUMMARY [5E12 and Later]

5.65.1 Purpose

The purpose of the 1200 page display is to show status and provide maintenance commands for dual link interfaces (DLI) or network link interfaces (NLI) connected to an SM.

5.65.2 General

The 1200 page displays status of DLIs for the SM. If the SM is an SM-2000, the status for NLIs is shown.

Since only one pair of DLIs is equipped on an SM, only the first row of the screen table ever shows status information. The user is referred to Page 1201,1 for more detailed information.

For NLIs, one or more link sets (each link set contains four NLIs, two per ONTC side) may be equipped. The user is referred to Page 1201,Y for more information on link set Y.

Figure 5-101 is an example of the 1200 page display showing DLIs for an SM.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
1200 - SM 013 LSM - DLI/NLI SUMMARY							

<u>REMOVE</u>	<u>RESTORE</u>	<u>DIAGNOSE</u>	<u>OUTPUT</u>
200 ONTC 0 DLI	300 ONTC 0 DLI	500 ONTC 0 DLI	900 ONTC 0 DLI
201 ONTC 1 DLI	301 ONTC 1 DLI	501 ONTC 1 DLI	901 ONTC 1 DLI

[illegible]

Figure 5-101 1200,X - SM X - DLI/NLI SUMMARY - (DLIs with SM) [5E12 and Later]

Abbreviations:

ACT	Active
DLI	Dual Link Interface
LSM	Local Switching Module
NLI	Network Link Interface
ONTC	Office Network Timing Complex
SM	Switching Module

Figure 5-102 is an example of the 1200 page display showing NLIs for an SM-2000.

	(RST:NLI=SM#-XX-0)
31XX	ONTC 1 NLI XX is restored. (RST:NLI=SM#-XX-1)
50XX	ONTC 0 NLI XX is diagnosed. (DGN:NLI=SM#-XX-0,RAW,TLP)
51XX	ONTC 1 NLI XX is diagnosed. (DGN:NLI=SM#-XX-1,RAW,TLP)
90XX	Status of ONTC 0 NLI XX is output. (OP:CFGSTAT,NLI=SM#-XX-0)
91XX	Status of ONTC 1 NLI XX is output. (OP:CFGSTAT,NLI=SM#-XX-1)

5.66 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y [5E12 Only]

5.66.1 Purpose

The purpose of the 1201 page is to show status for the DLIs, NLIs, and the TMSLNKs that are connected to each ONTCCOM on a per-SM basis and to provide maintenance commands for the DLIs/NLIs.

5.66.2 General

The 1201 page has three separate and distinct versions. The first version is for SMs with DLI hardware. The second version is for SM-2000s with NLI hardware. The third version is for EXM-2000s with NLI hardware.

Each link set is shown on a separate page. For SMs with DLIs, only one set is used.

Also provided on the 1201 page is a view of the DLIs/NLIs and the TMSLNKs connecting a particular SM/SM-2000 to the ONTCs. It shows the status of ONTCCOMs 0 & 1, the TMSLNKs for the particular SM/SM-2000 and their status, and the status of the DLIs/NLIs for the SM.

The 1201 page indicates the presence of the transmission rate converter unit (TRCU) for ORM. Alarm status of the TRCU hardware is not indicated on the 1201 page. However, if a DLI/NLI goes OOS, the TRCU hardware may be faulty. Look on the ROP to see if the TRCU hardware appears on the suspected faulty equipment list.

Figures 5-103, 5-104, and 5-105 are examples of the CM2 version of the DLI/NLI/TMSLNK display. (The lack of "LI" in the definition of ONTCCOM in the lower left corner of the display indicates that this is the CM2 version.)

Figure 5-103 is the example for SMs. In this example, ONTCCOM 1 is unavailable forced removed (UNV) resulting in DLI 1 and TMSLNKs 14 and 15 for side 1 being OOSF. The ONTCCOM 0 is degraded-forced (DGRF).

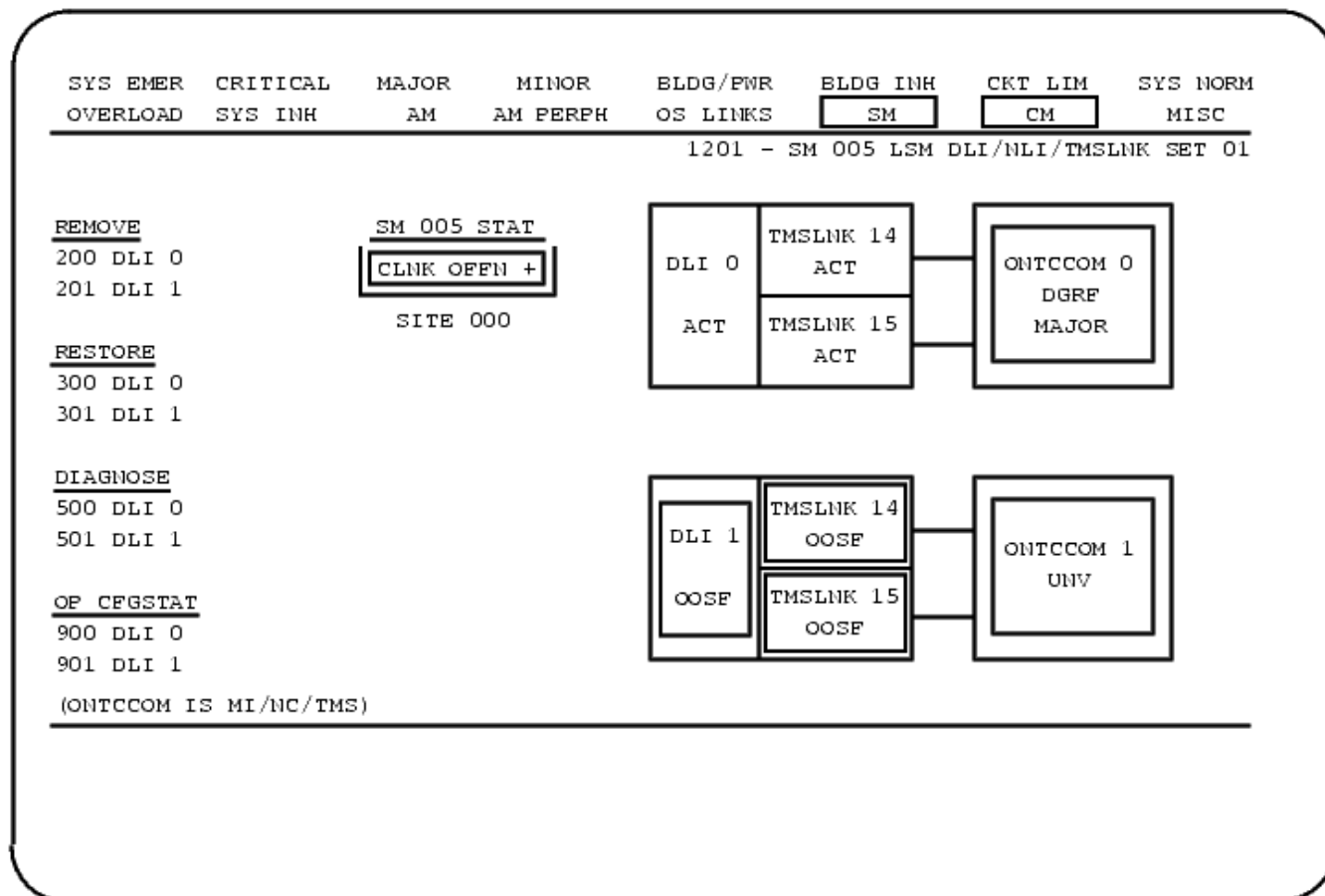


Figure 5-103 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y (CM2 Version with SM) [5E12 Only]

Abbreviations:

ACT	Active	ONTCCOM	Office Network Timing
CFGSTAT	Configuration Status		Complex Common
CLNK	Communication Link	OOSF	Out-of-Service Family
DGRF	Degraded-Forced		of Equipment
LSM	Local Switching Module	OP	Output
DLI	Dual Link Interface	STAT	Status
MI	Message Interface	SM	Switching Module
NC	Network Clock	TMS	Time-Multiplexed Switch
NLI	Network Link Interface	TMSLNK	TMS Link
OFFN	Off Normal	UNV	Unavailable (Forced Removed)

Figure 5-104 is the example for SM-2000s.

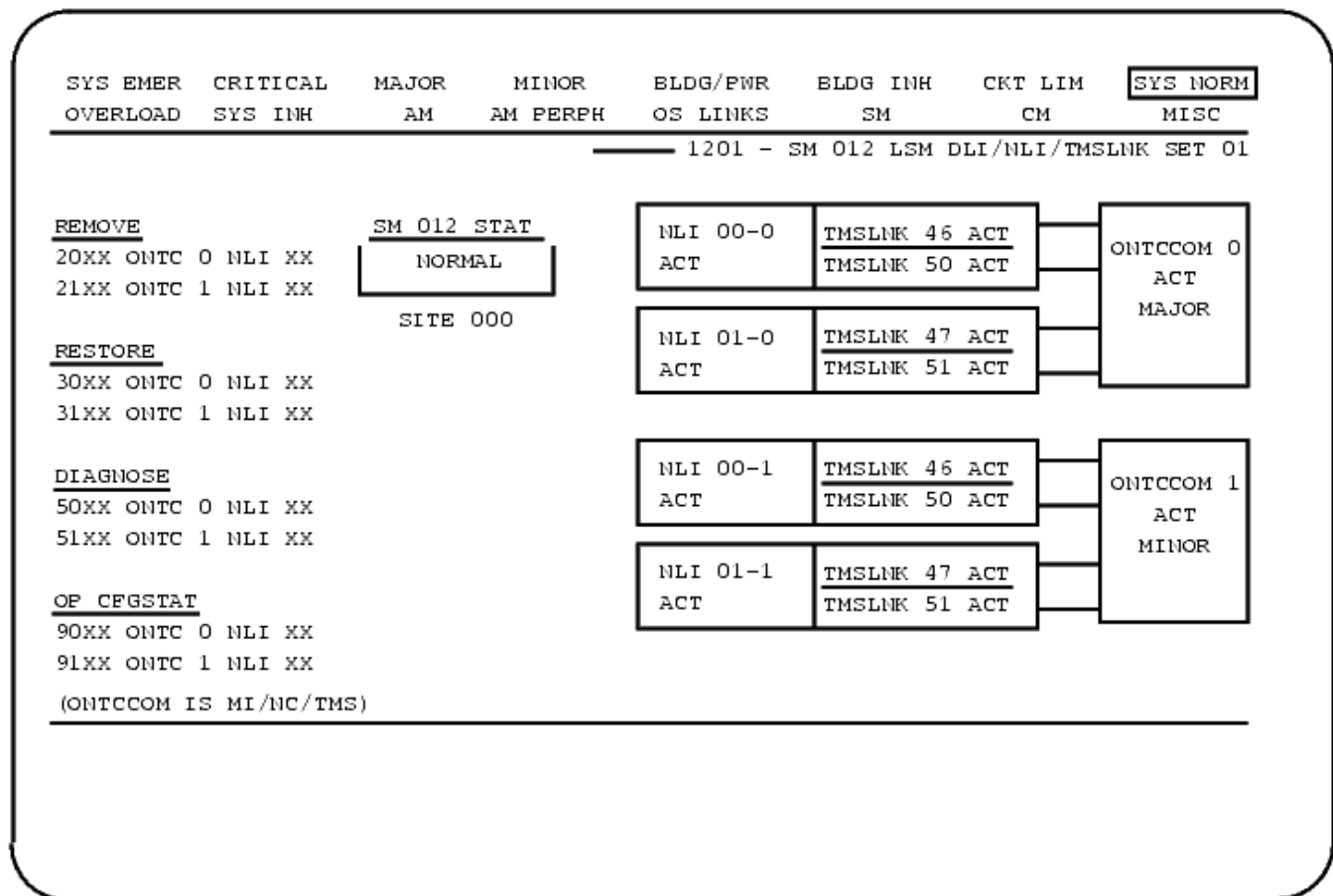


Figure 5-104 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y (CM2 Version with SM-2000) [5E12 Only]

Abbreviations:

ACT	Active	ONTCCOM	Office Network Timing Complex Common
CFGSTAT	Configuration Status	OP	Output
LSM	Local Switching Module	STAT	Status
DLI	Dual Link Interface	SM	Switching Module
MI	Message Interface	TMS	Time-Multiplexed Switch
NC	Network Clock	TMSLNK	TMS Link
NLI	Network Link Interface		

Figure 5-105 is the example for EXM-2000s.

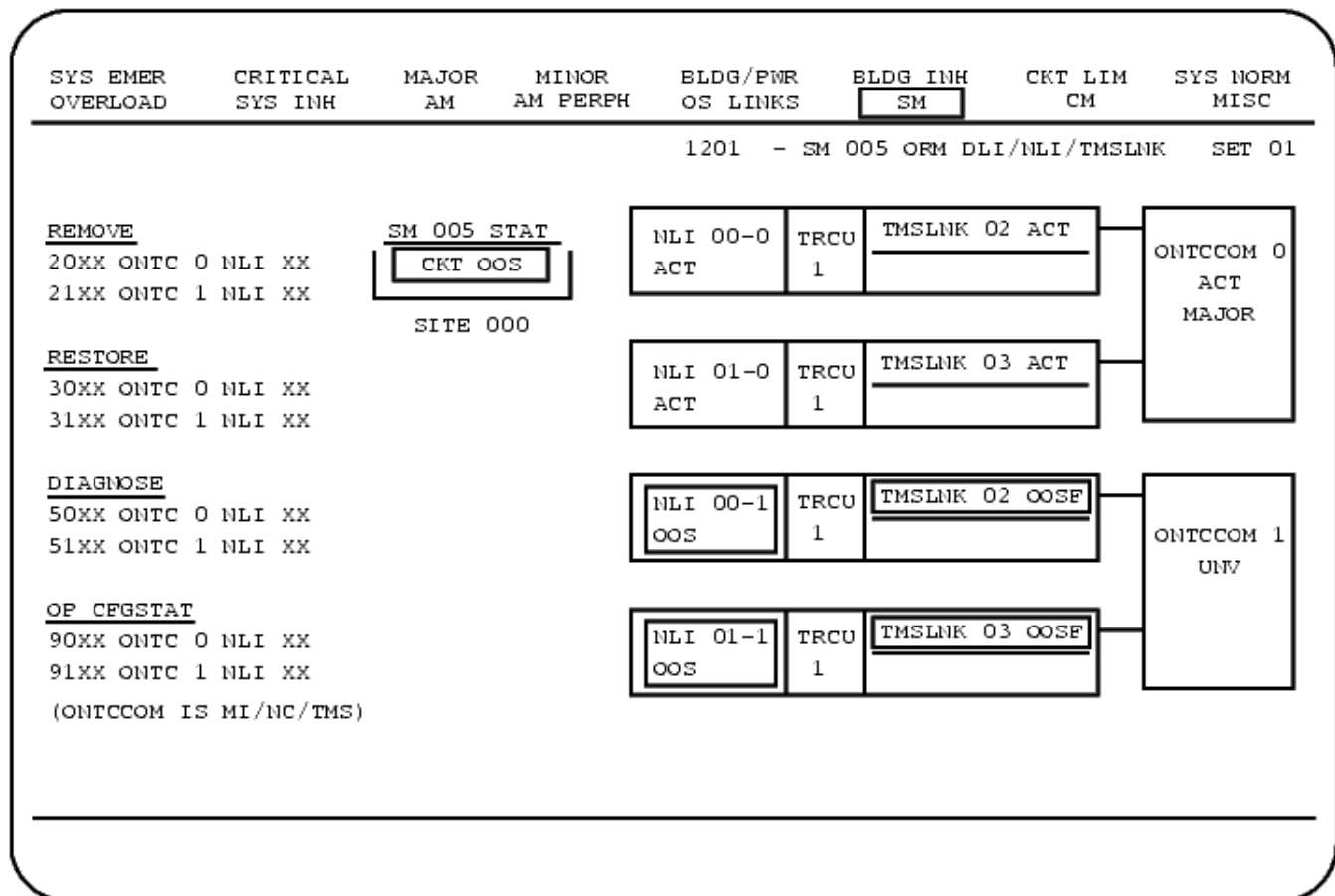


Figure 5-105 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y (CM2 Version with EXM-2000) [5E12 Only]

Abbreviations:

ACT	Active	OOSF	Out-of-Service Family of Equipment
CKT	Circuit	OP	Output
CFGSTAT	Configuration Status	STAT	Status
DLI	Dual Link Interface	SM	Switching Module
MI	Message Interface	TMS	Time-Multiplexed Switch
NC	Network Clock	TMSLNK	TMS Link
NLI	Network Link Interface	TRCU	Transmission Rate Converter Unit
ONTC	Office Network Timing Complex	UNV	Unavailable
ONTCCOM	Office Network Timing Complex Common		
OOS	Out of Service		

Figure 5-106 is the CM1 version of the DLI/NLI/TMSLNK display. In this example, ONTCCOM 0 is degraded (DGR) minor and ONTCCOM 1 is active (ACT) major. The DLI 0 is unavailable power (UNVP) causing the 0 (zero) side TMSLNKs 14 and 15 to be OOSF. The SM 6 is isolated.

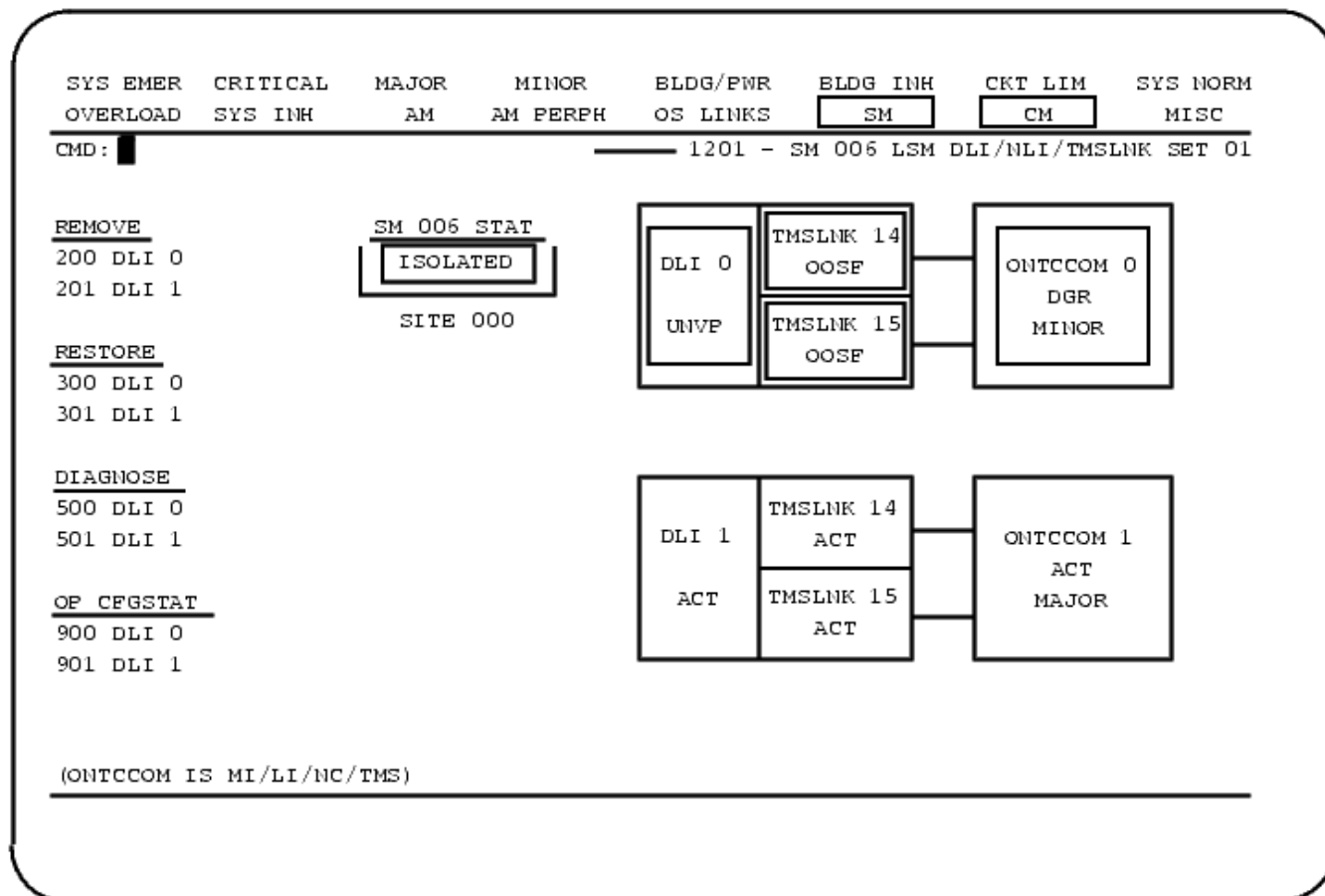


Figure 5-106 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y (CM1 Version) [5E12 Only]

Abbreviations:

ACT	Active	OOSF	Out-of-Service Family of Equipment
CFGSTAT	Configuration Status	OP	Output
DGR	Degraded	SM	Switching Module
DLI	Dual Link Interface	STAT	Status
LI	Link Interface	TMS	Time-Multiplexed Switch
LSM	Local Switching Module	TMSLNK	Time-Multiplexed Switch Link
MI	Message Interface	UNVP	Unavailable Power
NC	Network Clock		
NLI	Network Link Interface		
ONTCCOM	Office Network Timing Complex Common		

Figure 5-107 is an example of the CM1 version of the 1200,X page that shows the TRCU.

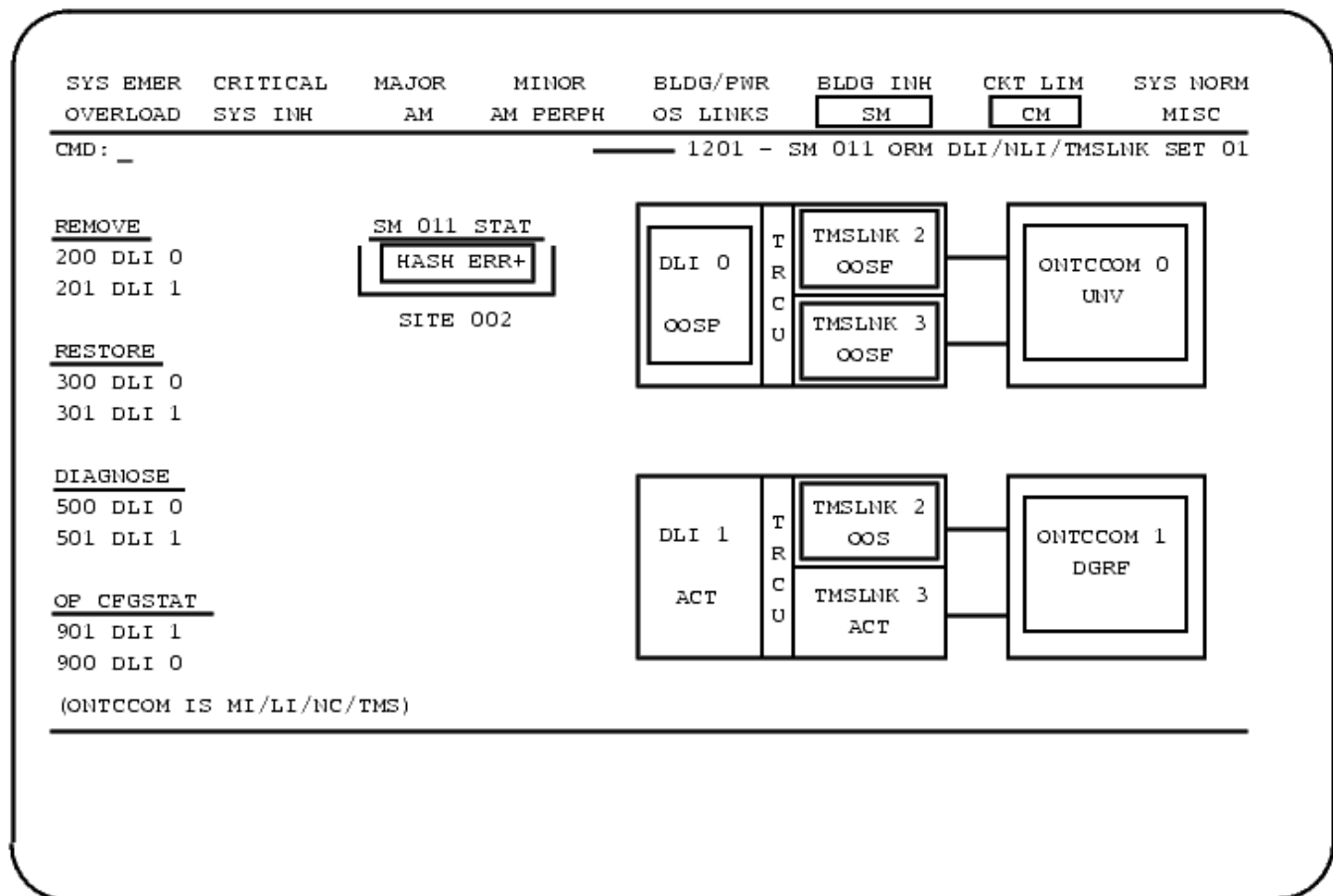


Figure 5-107 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y (CM1 Version with TRCU) [5E12 Only]

Abbreviations:

ACT	Active	OOSF	Out-of-Service Family of Equipment
DGRF	Degraded Forced	OOSP	Out-of-Service Power
DLI	Dual Link Interface	OP	Output
ERR	Error	SM	Switching Module
LI	Link Interface	STAT	Status
MI	Message Interface	TMS	Time Multiplexed Switch
NC	Network Clock	TMSLNK	TMS Link
NLI	Network Link Interface	TRCU	Transmission Rate Converter Unit
ONTCCOM	Office Network and Timing Complex Common	UNV	Unavailable (Forced Removed)
OOS	Out of Service		

5.66.3 Commands

Commands are provided for removing, restoring, diagnosing, and outputting the configuration status for the DLIs/NLIs for the SM/SM-2000 this page is being displayed for.

All available display commands can be entered from the 1201 page display.

CMD	RESULT
200	DLI 0 is removed. (RMV:DLI=SM#-0)
201	DLI 1 is removed. (RMV:DLI=SM#-1)
300	DLI 0 is restored. (RST:DLI=SM#-0)
301	DLI 1 is restored. (RST:DLI=SM#-1)
500	DLI 0 is diagnosed. (DGN:DLI=SM#-0,RAW,TLP)
501	DLI 1 is diagnosed. (DGN:DLI=SM#-1,RAW,TLP)

900	Status of DLI 0 is output. (OP:CFGSTAT,DLI=SM#-0)
901	Status of DLI 1 is output. (OP:CFGSTAT,DLI=SM#-1)
20XX	ONTC 0 NLI XX is removed. (RMV:NLI=SM#-XX-0)
21XX	ONTC 1 NLI XX is removed. (RMV:NLI=SM#-XX-1)
30XX	ONTC 0 NLI XX is restored. (RST:NLI=SM#-XX-0)
31XX	ONTC 1 NLI XX is restored. (RST:NLI=SM#-XX-1)
50XX	ONTC 0 NLI XX is diagnosed. (DGN:NLI=SM#-XX-0,RAW,TLP)
51XX	ONTC 1 NLI XX is diagnosed. (DGN:NLI=SM#-XX-1,RAW,TLP)
90XX	ONTC 0 NLI XX is output. (OP:CFGSTAT,NLI=SM#-XX-0)
91XX	ONTC 1 NLI XX is output. (OP:CFGSTAT,NLI=SM#-XX-1)

5.67 1204 - SM X MELNK STATUS (5E12 Only)

5.67.1 Purpose

The purpose of the 1204 page is to show the status of the MELNKs and to provide maintenance commands for the MELNKs. The page title is SM MELNK STATUS.

5.67.2 General

This page displays the MCTSI Pipe (MEPIPE) and the MELNK states and includes pokes to remove and restore the MELNKs. There is no direct control over the MEPIPE and for the RTCD feature, the MEPIPE will always be zero as shown in Figure 5-108.

Figure 5-108 is an example of the 1204 Page.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC

CMD<

1204-SM 005 LSM — MELNK STATUS

REMOVE

2XX MELNK XX

SM 005 STAT

RESTORE

3XX MELNK XX

SITE 000

MEPIPE 0

OOS-MAN

MELNK	LINK TYPE	STATE
00	RTCD	OOS-MAN

Figure 5-108 1204 - SM X MELNK STATUS (5E12 Only)

Abbreviations:

ACT	Active	LSM	Local Switching Module
ANN	Announcement	MEM	Memory

5.68 1209 - ONTC 0 AND 1 [5E12 and Later]**5.68.1 Purpose**

The purpose of the 1209 display page is to show maintenance states for ONTC 0 and 1 and provide maintenance commands for the ONTCs and ONTCCOMs and hardware check status for ONTC 0 and 1.

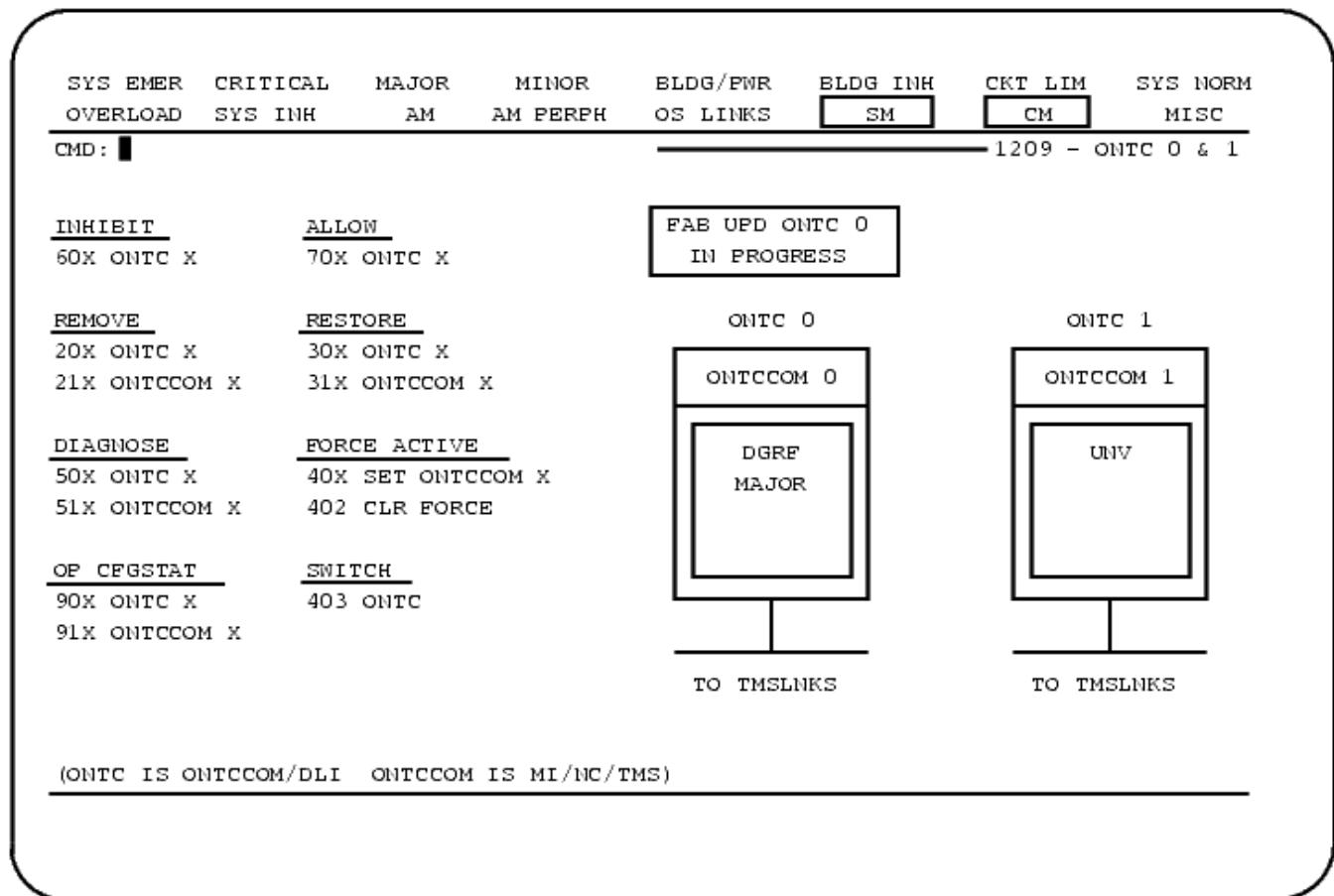
5.68.2 General

The 1209 display page has two separate versions. The first version (Figures 5-109) and 5-110) is for offices with CM2 hardware. The second version (Figure 5-111) is for offices with CM1 hardware. The difference between the two versions is the note at the lower left of the display defining ONTCCOM. In CM2, an ONTCCOM does not have a link interface (LI) as part of its hardware.

Fabric update is the updating of the intermodule communication paths between TMS links. This is accomplished by writing in the fabric (FAB) random access memories (RAM) of the TMS, on a per time slot basis, information stored in AM memory. When the FAB update is in progress, the FAB update indicator for the side that is being updated appears backlighted above the appropriate ONTC.

Quad link packet switch (QLPS) networks can be equipped in the CM2 configuration. The QLPS units are part of the ONTC and, if equipped, are shown on the 1209 page.

Figure 5-109 is the CM2 version of the ONTC display. This example shows ONTC 1 unavailable, ONTC 0 is degrade forced, and FAB update is in progress on ONTC 0.



tpa 821679/01

Figure 5-109 1209 - ONTC 0 and 1 (CM2 Version) [5E12 and Later]

Abbreviations:

DGRF	Degraded Forced	ONTC	Office Network Timing Complex
DLI	Dual Link Interface	ONTCCOM	Office Network Timing Complex Common
FAB	Fabric	UNV	Unavailable
MI	Message Interface	UPD	Update
NC	Network Clock		
TMS	Time-Multiplexed Switch		

Figure 5-110 is the CM2 QLPS equipped version of the ONTC display. This example shows QLPS 0-1 OOS and all other units normal.

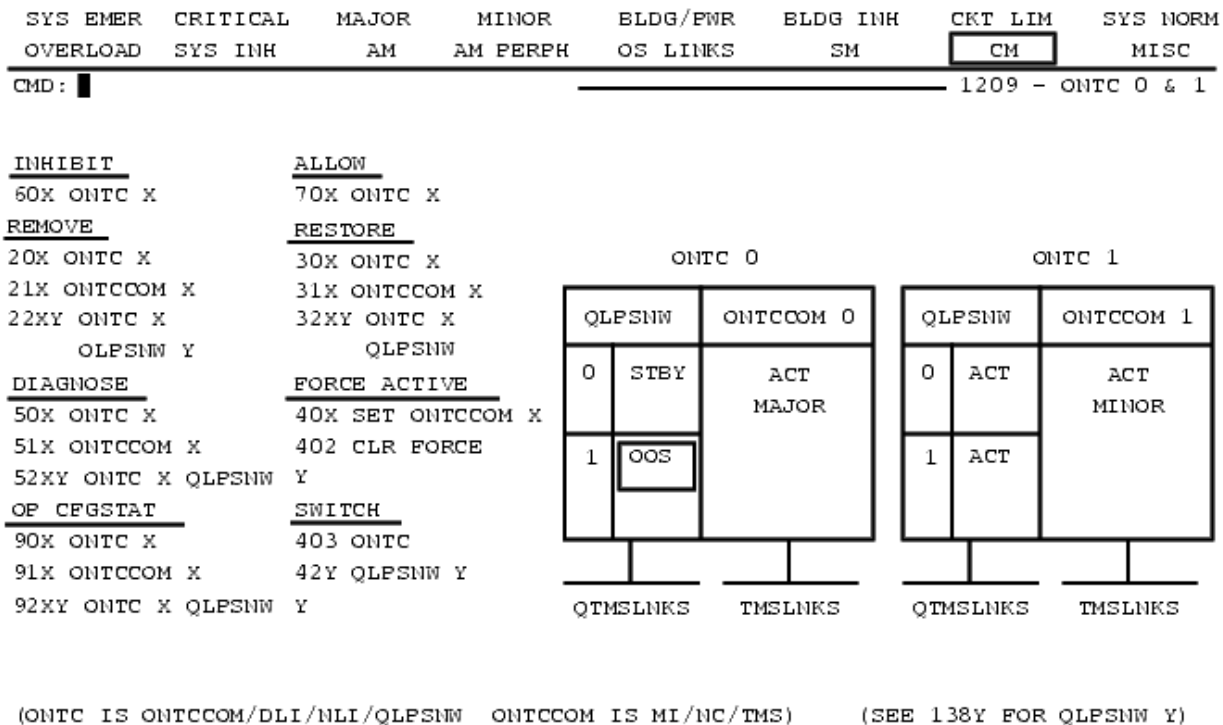


Figure 5-110 1209 - ONTC 0 and 1 (CM2 QLPS Equipped Version) [5E12 and Later]

Abbreviations:

ACT	Active	ONTC	Office Network Timing Complex
CLR	Clear	ONTCCOM	ONTC Common
DLI	Dual Link Interface	QLPSNW	QLPS Network
MI	Message Interface	QTMSLNKS	QLPS Pseudo TMS Links
NC	Network Clock	STBY	Standby
NLI	Network Link Interface	TMS	Time-Multiplexed Switch
OOS	Out of Service	TMSLNKS	TMS Links

Figure 5-111 is the CM1 version of the ONTC display. In this display, ONTC 0 is degraded minor and ONTC 1 is active major. The ONTC 0 has its hardware checks inhibited and FAB update is in progress on ONTC 0.

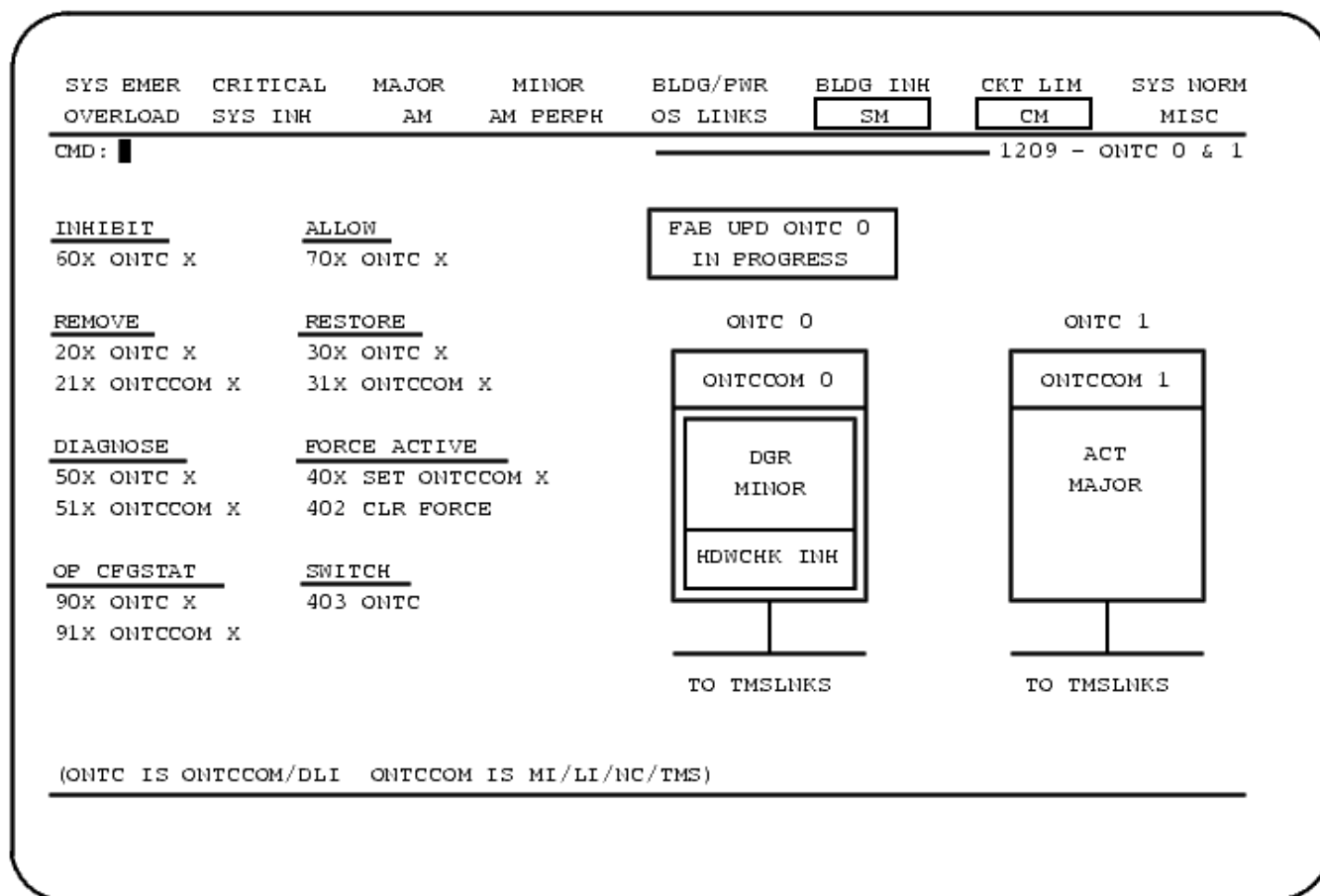


Figure 5-111 1209 - ONTC 0 and 1 (CM1 Version) [5E12 and Later]

Abbreviations:

ACT	Active	MI	Message Interface
CFGSTAT	Configuration Status	NC	Network Clock
CLR	Clear	ONTC	Office Network Timing Complex
DGR	Degraded	ONTCCOM	ONTC Common
DLI	Dual Link Interface	OP	Output
FAB	Fabric	TMS	Time-Multiplexed Switch
HDWCHK	Hardware Checks	TMSLNKS	TMS Links
INH	Inhibit	UNV	Unavailable
LI	Link Interface	UPD	Update

5.68.3 Commands

Commands are provided for removing, restoring, diagnosing, and outputting the configuration status for the ONTCs and the ONTCCOMs; for inhibiting, allowing, and switching the ONTCs; and for forcing the ONTCCOMs.

Commands are also provided for removing, restoring, diagnosing, switching, and outputting the configuration status for the QLPS, if equipped.

All available display commands can be entered from the 1209 display page.

CMD	RESULT
60X	Hardware Checks are inhibited for ONTC X. (INH:HDWCHK,ONTC=X)
70X	Hardware Checks are allowed for ONTC X. (ALW:HDWCHK,ONTC=X)

20X	ONTC X is removed. (RMV:ONTC=X) [,UCL]
21X	ONTCCOM X is removed. (RMV:ONTCCOM=X) [,UCL]
22XY	ONTC X QLPSNW Y is removed. (RMV:QLPS=X-Y)
30X	ONTC X is restored. (RST:ONTC=X) [,UCL]
31X	ONTCCOM X is restored. (RST:ONTCCOM=X) [,UCL]
	Note: If UCL option is used on an in-service ONTCCOM that has any child units (DLIs, TMSLNKs) OOS, those OOS child units are restored.
32XY	ONTC X QLPSNW Y is restored. (RST:QLPS=X-Y) [,UCL]
40X	ONTCCOM X is forced active. (SET:FRC,ONTCCOM=X)
402	ONTCCOM force is cleared. (CLR:FRC,ONTCCOM)
403	ONTCS are switched. (SW:ONTC)
42Y	QLPSNW Y is switched. (SW:QLPS=0-Y)
50X	ONTC X is diagnosed. (DGN:ONTC=X,RAW,TLP) [,UCL] [,RPT] Test is repeated 32,767 times. [,RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The "b" is the diagnostic phase or "b&&c" is the range of phases to be performed.
51X	ONTCCOM X is diagnosed. (DGN:ONTCCOM=X,RAW,TLP) [,UCL] Same options as 50X Note: Implicitly provides status output for all child DLIs/TMSLINKs.
52XY	ONTC X QLPSNW is diagnosed. (DGN:QLPS=X-Y,RAW,TLP) [,UCL] [,RPT] Test is repeated 32,767 times. [,RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The "b" is the diagnostic phase or "b&&c" is the range of phases to be performed. [,GROW] Diagnose growth hardware.
90X	Status of ONTC X is output. (OP:CFGSTAT,ONTC=X)
91X	Status of ONTCCOM X is output. (OP:CFGSTAT,ONTCCOM=X)
92XY	Status of ONTC X QLPSNW Y is output. (OP:CFGSTAT,QLPS=X-Y)

5.69 1210 - MI/NC 0 AND 1 AND MI/LI/NC 0 AND 1 [5E12 and Later]

5.69.1 Purpose

The purpose of the 1210 display page is to show cross-couples between MI/NC 0 and 1, to show the network clock mode, and to provide maintenance commands.

5.69.2 General

The 1210 display page has two separate versions. The first version (Figure 5-112) is for offices with CM2 hardware. The second version (Figure 5-113) is for offices with CM1 hardware. Status shown for an MI/NC is actually the status of the ONTCCOM (MI/NC/TMS - CM2 or MI/LI/NC/TMS - CM1), side 0 or 1. There is no separate status for the MI/NC (MI/LI/NC - CM1).

In the CM2 version, the NC XCs (network clock cross-couples) show the link status between the two NCs. There is a note at the lower left of the display defining ONTCCOM as MI/NC/TMS (no LI). The CM1 can be equipped with a network clock model 1 (NC1) or network clock model 2 (NC2). The NC1 version shows the PRIMARY and SECONDARY T1 carriers and the reference status. Also, there is an indicator showing the status of the LI and

showing connections from LI 0 to LI 1 and there is a note at the lower left of the display defining ONTCCOM which includes the LI (MI/LI/NC/TMS).

The NC2 version shows a summary status of the network clock references, the network clock oscillators, and oscillator cross-couples with the SEE PAGE 1211 indicator.

In the CM2 version, only the NC2 version can be used and the network clock cross-couples show the link status between the two NCs.

Below the MI/NC indicators on the display, there are indicators which show the network clock modes. The modes which can be shown are as follows:

- **FAST:** The fast mode is used to obtain initial sync with the reference signal. This would be considered a normal mode.
- **NORM:** After synchronization is obtained, the network clock goes into the norm mode. The norm mode is almost the same as fast, except the tolerance for deviation from the reference signal is narrowed to reduce error.
- **HOLD:** The holdover mode is used when synchronization is lost. This is an off-normal mode.
- **FREE:** The free mode indicates initialization of the NC with no good reference signal. This is also an off-normal mode.
- **OOS:** The OOS (out-of-service) mode is also an off-normal mode. The mode is OOS whenever and only whenever the NC is OOS.

When an off-normal condition occurs with the T1 carriers or NC XCs, the MI/NC 0 (MI/LI/NC 0 - CM1) or MI/NC 1 (MI/LI/NC 1 - CM1) indicator backlights on Page 115. This in turn causes the CM indicator in the SUMMARY STATUS AREA to backlight. The alarm level (CRITICAL, MAJOR, or MINOR) also backlights, if applicable.

Figure 5-112 is the CM2 version which shows MI/NC 1 out of service. The MI/NC status is actually the ONTCCOM status. No separate status is maintained for the MI/NCs. The SEE PAGE 1211 is also backlighted to indicate something off-normal on the 1211 page and indicates that this office has a network clock model 2.

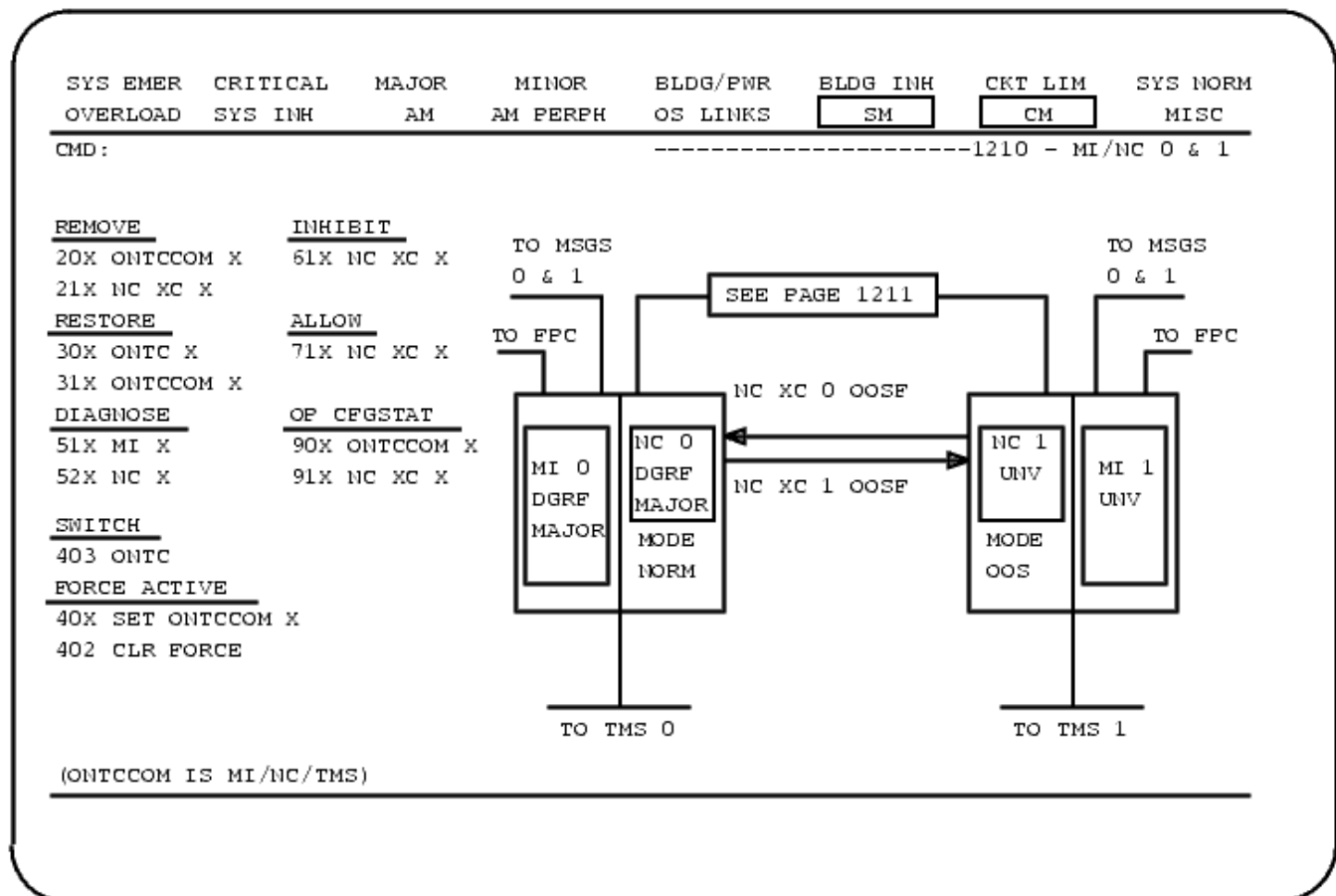


Figure 5-112 1210 - MI/NC 0 and 1 (CM2 Version) [5E12 and Later]

Abbreviations:

DGRF Degraded Forced
 FPC Foundation Peripheral Controller
 MI Message Interface
 MSGS Message Switch
 NC Network Clock

ONTC Office Network Timing Complex
 ONTCCOM ONTC Common
 TMS Time-Multiplexed Switch
 UNV Unavailable
 XC Cross-Couple

Figure 5-113 shows the CM1 version with MI/LI/NC 0 degraded. The MI/LI/NC status is actually the ONTCCOM status. No separate status is maintained for the MI/LI/NCs. This office is equipped with an NC 1, indicated by the PRIMARY/SECONDARY references on the display.

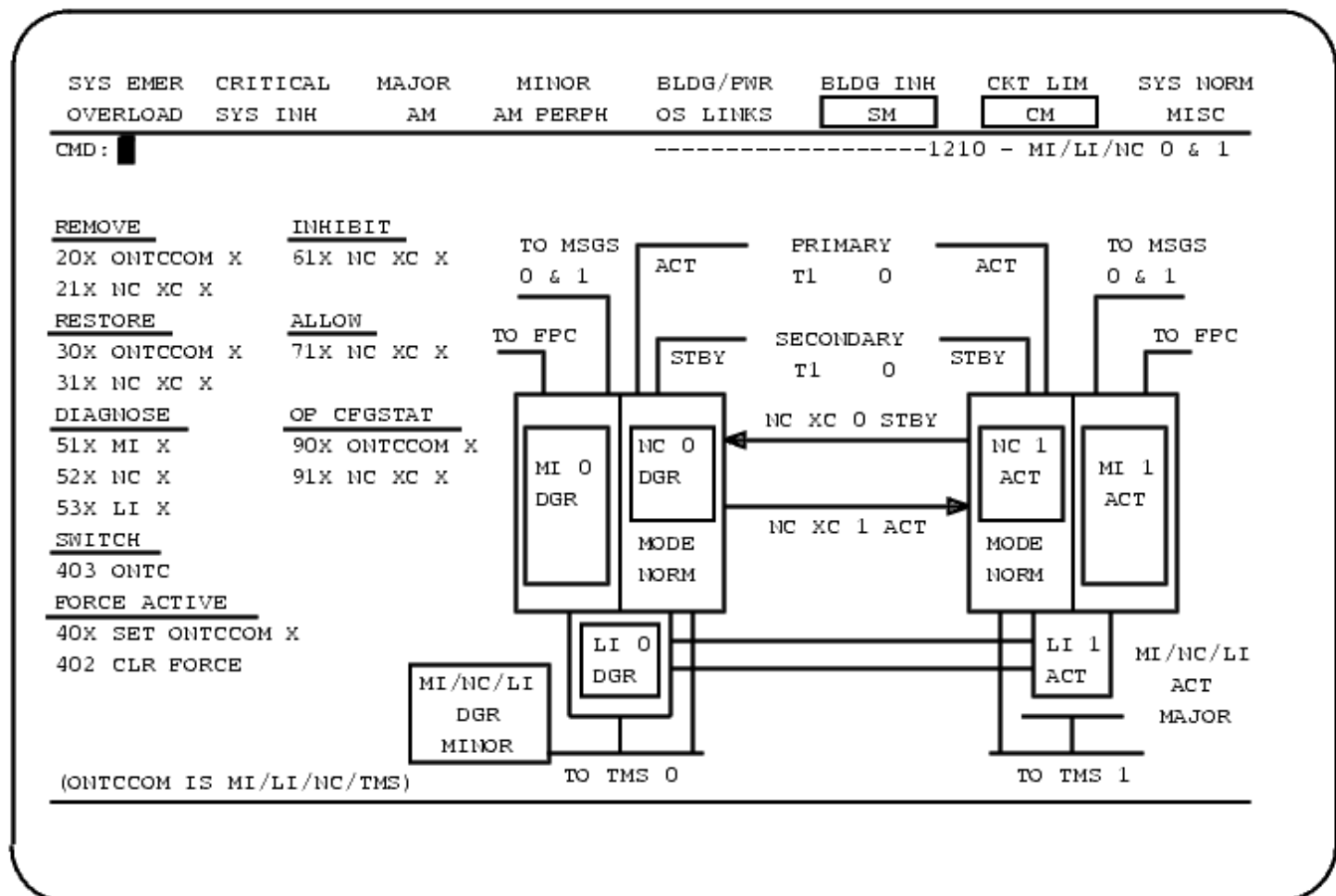


Figure 5-113 1210 - MI/LI/NC 0 and 1 (CM1 Version) [5E12 and Later]

Abbreviations:

DGR	Degraded	ONTC	Office Network Timing Complex
FPC	Foundation Peripheral Controller	ONTCCOM	ONTC Common
LI	Link Interface	TMS	Time-Multiplexed Switch
MI	Message Interface	UNV	Unavailable
MSGS	Message Switch	XC	Cross-Couple
NC	Network Clock		

5.69.3 Commands

Since the MI/NC (MI/LI/NC - CM1), and TMSs function as a group (ONTCCOM), maintenance commands on this display (remove, restore, force active, and configuration status output) are for the ONTCCOM with the exception of the diagnose commands for the MIs and NCs (and LIs for CM1). Also, there are remove, restore, configuration status output, inhibit, and allow commands for the NC XCs, and a switch command for the ONTC. All available page commands can be entered from the 1210 display page.

CM2 Version

CMD	RESULT
20X	ONTCCOM X is removed (RMV:ONTCCOM=X) [.UCL]
21X	Network Clock Cross-Couple X is removed (RMV:NCREF,XC=X)
30X	ONTCCOM X is restored (RST:ONTCCOM=X) [.UCL] [.MAJOR/MINOR]
31X	Network clock Cross-Couple X is restored (RST:NCREF,XC=X)
40X	ONTCCOM X is forced active (RST:ONTCCOM=X,FRC)

402	ONTCCOM force is cleared (CLR:FRC,ONTCCOM)
403	ONTC is switched (SW:ONTC)
51X	MI X is diagnosed (DGN:MI=X,RAW,TLP) [,UCL] [,RPT] test is repeated 32,767 times [,RPT=a] "a" is the number of times the test is to be repeated (1-32,767) [,PH=b|b&&c] "b" is the diagnostic phase or "b&&c" is the range of phases to be performed
52X	NC X is diagnosed (DGN:NC=X,RAW,TLP) Same options as 51X
61X	Network Clock Cross-Couple X hardware checks are inhibited (INH:HDWCHK,NCREF,XC=X)
71X	Network Clock Cross-Couple X hardware checks are allowed (ALW:HDWCHK,NCFEF,XC=X)
90X	Output the configuration status of ONTCCOM X (OP:CFGSTAT,ONTCCOM=X)
91X	Output the configuration status of NC XC X (OP:CFGSTAT,NCREF,XC=X)

CM1 Version

53X	LI X is diagnosed (DGN:LI=X,RAW,TLP) [,UCL] [,RPT] test is repeated 32,767 times [,RPT=a] "a" is the number of times the test is to be repeated (1-32,767) [,PH=b|b&&c] "b" is the diagnostic phase or "b&&c" is the range of phases to be performed

5.70 1211 - NETWORK CLOCK [5E12 and Later]

5.70.1 Purpose

The purpose of the 1211 display page is to show cross-couples between network clock oscillator (NCOSC) 0 & 1. It also shows the status of the NCOSCs, the oscillator cross-couples, and the network clock references.

5.70.2 General

The 1211 display page has two separate versions. The first version (Figure 5-114) is the 24-channel version. The second version (Figure 5-115) is the 30-channel version.

The 1211 page is only available in offices with the network clock model 2 hardware.

The oscillator cross-couples (OSCXC) show the link status between the NCOSCs.

If anything on the 1211 page is off-normal and backlighted, the SEE PAGE 1211 indicator on the 1210 page and the MI/NC (MI/LI/NC CM1) 0 or 1 indicator on Page 115 are backlighted cyan.

The NCOSC type is displayed in the NCOSC indicators. There are two oscillator types. They are medium stability (MED STAB) and high stability (HIGH STAB).

The 24-channel version only allows three references per side. Only one reference per side can be in the active state at one time. The rest of the equipped references on that side are in the standby state if they are not off-normal (that is, OOS, OOSF, etc.).

The 30-channel version allows eight references per side. Again, only one reference per side can be active at one time. Also, there is a column between the reference columns titled LOCATION. The information in the LOCATION column is made up of three columns of information, colon (:) separated.

These are the SMs which the reference comes from, the DLTU unit number in the SM, and the DFI number which provides the clock reference. This order is spelled out in the note which resides under the LOCATION box.

The 24-channel version does not have the LOCATION column because the references in a 24-channel office are bridged off of a D-4 channel bank, whereas, in a 30-channel office, the references are bridged off of SMs. This LOCATION information is the only way the craft has of knowing which SM, DLTU, and DFI to go to when there is a reference problem.

Figure 5-114 shows the 24-channel version of the network clock page for network clock model 2 (NC2). This display shows the NCOSC 1 out of service. The NCOSC 1 being OOS causes OSCXC 0 to be out-of-service family of equipment (OOSF). The OSCXC 1 and all of the equipped references on side 1 are OOSF due to ONTC 1 being OOS.

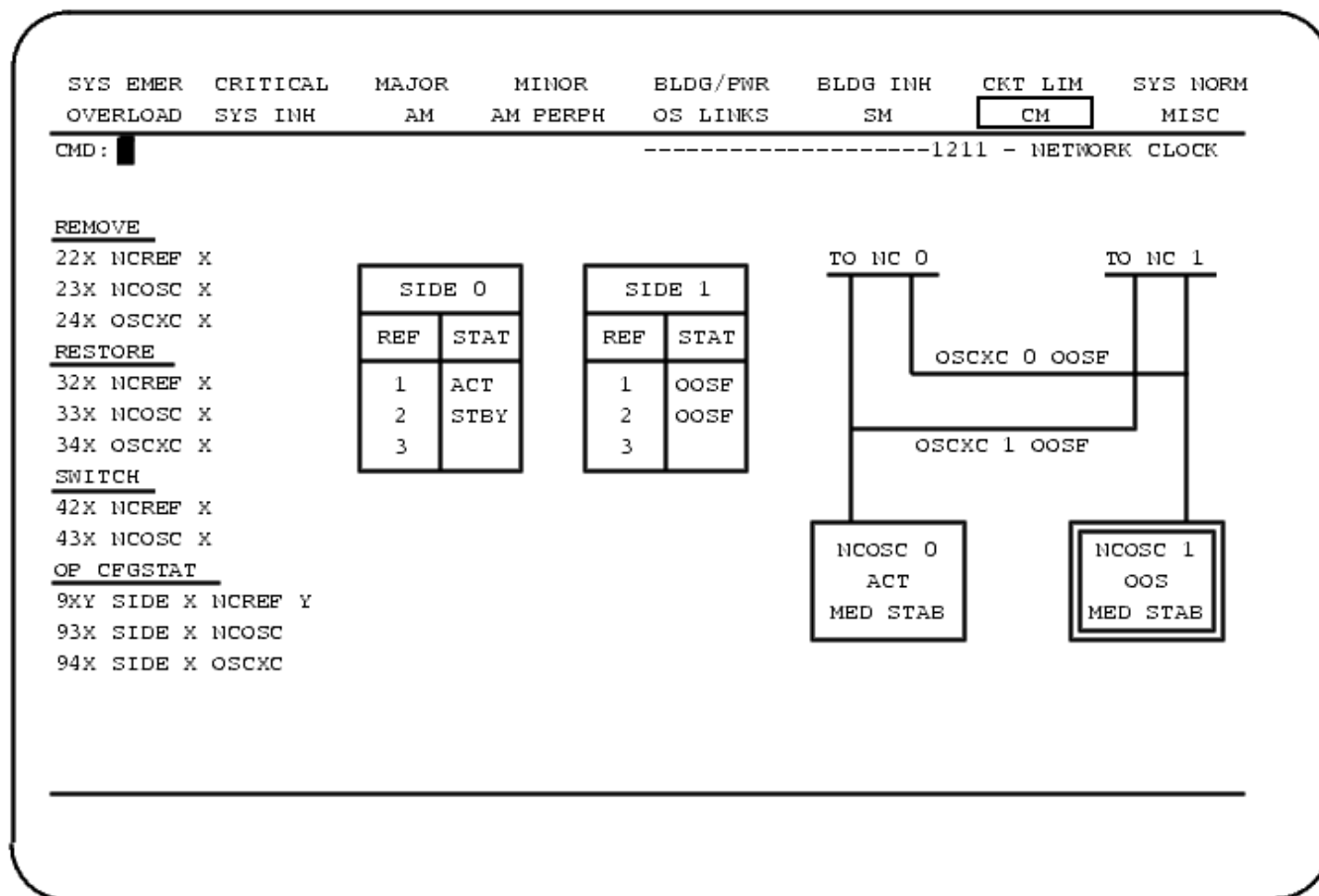


Figure 5-114 1211 - Network Clock (24-Channel Version) [5E12 and Later]

Abbreviations:

ACT	Active	OSCXC	Oscillator Cross-Couple
MED	Medium	REF	Reference
NC	Network Clock	STAB	Stability
NCOSC	NC Oscillator	STAT	Status
NCREF	NC Reference	STBY	Standby

Figure 5-115 shows the 30-channel version on the network clock page. In this example, reference 3, side 1 is out of service because of a fault.

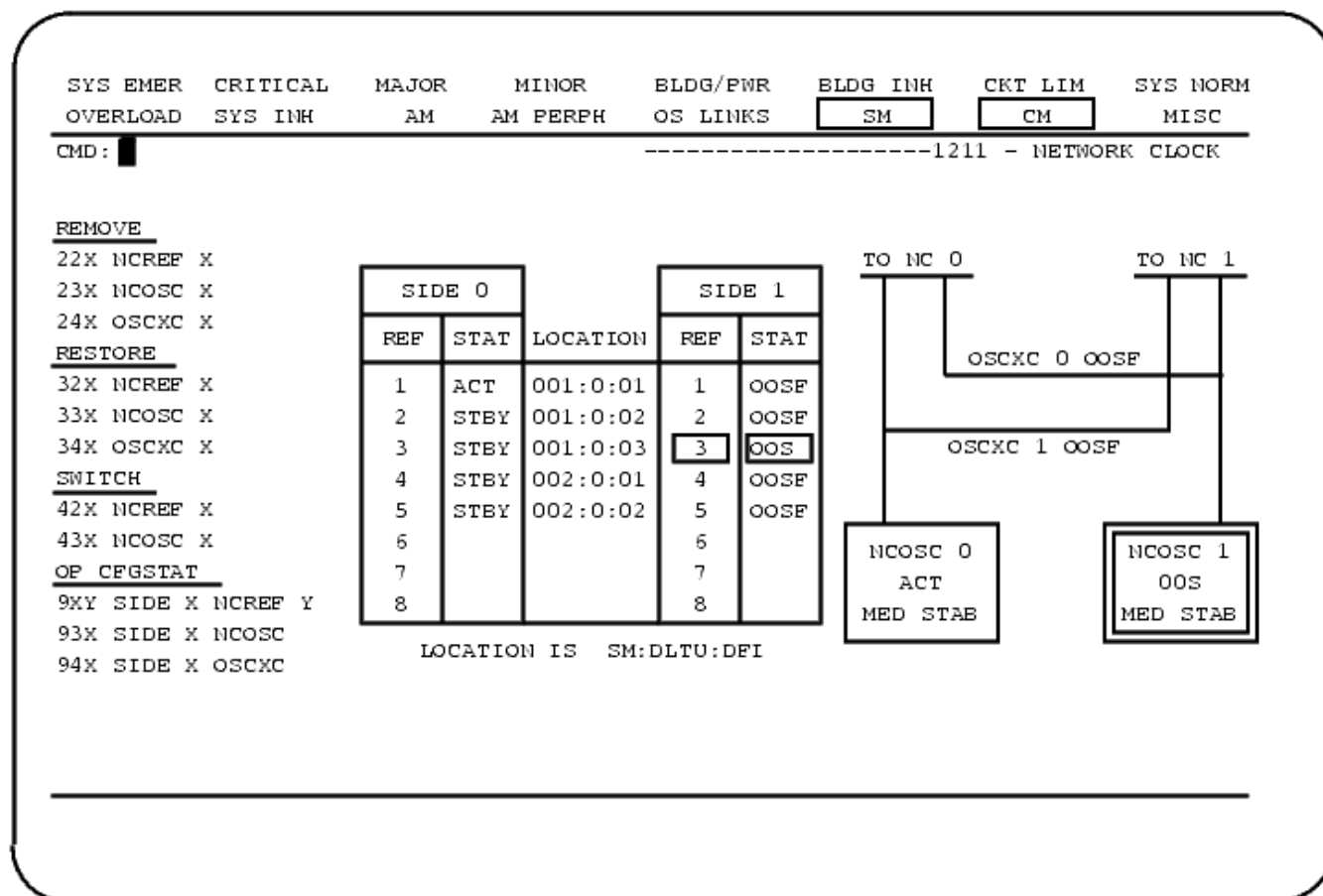


Figure 5-115 1211 - Network Clock (30-Channel Version) [5E12 and Later]

Abbreviations:

ACT	Active	NCREF	NC Reference
DFI	Digital Facility Interface	OSCXC	Oscillator Cross-Couple
DLTU	Digital Line Trunk Unit	REF	Reference
MED	Medium	SM	Switching Module
NC	Network Clock	STAB	Stability
NCOSC	NC Oscillator	STAT	Status

5.70.3 Commands

The 1211 display page provides commands to remove, restore, and output the configuration status of the NCREFs, NCOSCs, and OSCXCs and to switch the NCREFs and the NCOSCs.

All available display commands can be entered from the 1211 display page.

CMD	RESULT
22X	NCREF X (both sides) is removed (X=1 - 3 for 24-Chan.; X=1 - 8 for 30-Chan.) (RMV:NCREF,X)
23X	NCOSC X is removed (RMV:NCOSC=X)
24X	OSCXC X is removed (RMV:OSCXC=X)
32X	NCREF X (both sides) is restored (X=1 - 3 for 24-Chan.; X=1 - 8 for 30-Chan.) (RST:NCREF,X)
33X	NCOSC X is restored

34X	(RST:NCOSC=X) OSCXC X is restored (RST:OSCXC=X)
42X	NCREF X (both sides) is switched (X=1 - 3 for 24-Chan.; X=1 - 8 for 30-Chan.) (SW:NCREF,X)
43X	Side X NCOSC is switched (SW:NCOSC=X)
9XY	Output the configuration status of Side X NCREF Y (1 - 3 for 24-Chan.; 1 - 8 for 30-Chan.) (OP:CFGSTAT,NCREF,Y=X)
93X	Output the configuration status of Side X NCOSC (OP:CFGSTAT,NCOSC=X)
94X	Output the configuration status of Side X OSCXC (OP:CFGSTAT,OSCXC=X)

5.71 1220 - TMS 0 AND 1 SUMMARY [5E12 and Later]

5.71.1 Purpose

The purpose of the 1220 display page is to show status, to provide an index to the TMS LINK pages, and to provide maintenance commands for the TMSs.

5.71.2 General

The 1220 page has two separate and distinct versions. The first version (Figure 5-116) is for offices with CM2 hardware. The second version (Figure 5-117) is for offices with CM1 hardware. The difference between the two versions is the note at the lower left of the display defining ONTCCOM (CM2 does not have a LI), the CM2 version shows a cross-couple between TMS 0 and TMS 1 that the CM1 version does not have, and the CM1 version has TMS 0 and 1 fan and fan fuse alarms and CM2 does not.

Status shown for a TMS is actually the status of the ONTCCOM (MI/NC/TMS - CM2; MI/LI/NC/TMS - CM1), side 0 or 1. There is no separate status for the TMS.

When an off-normal condition occurs in the ONTCs, the indicator on the 1220 page for the respective TMS backlights and CM backlights in the SUMMARY STATUS AREA. The associated alarm level (CRITICAL, MAJOR, or MINOR) also backlights, if applicable.

The TMS indicators on Display Page 115 are never backlighted because there is no maintenance to be done from this page when something is off-normal.

The index indicators on Display Page 1220 do not backlight when a TMS link goes off-normal because the craft is not directed to this page. The craft would be directed to the appropriate TMS LINK page from Page 115.

Figure 5-116 shows the CM2 version of the TMS 0 and 1 SUMMARY page. This display example shows TMS 1 unavailable due to ONTCCOM 1 being unavailable, and TMS 0 is degraded forced due to ONTCCOM 0 being degraded forced.

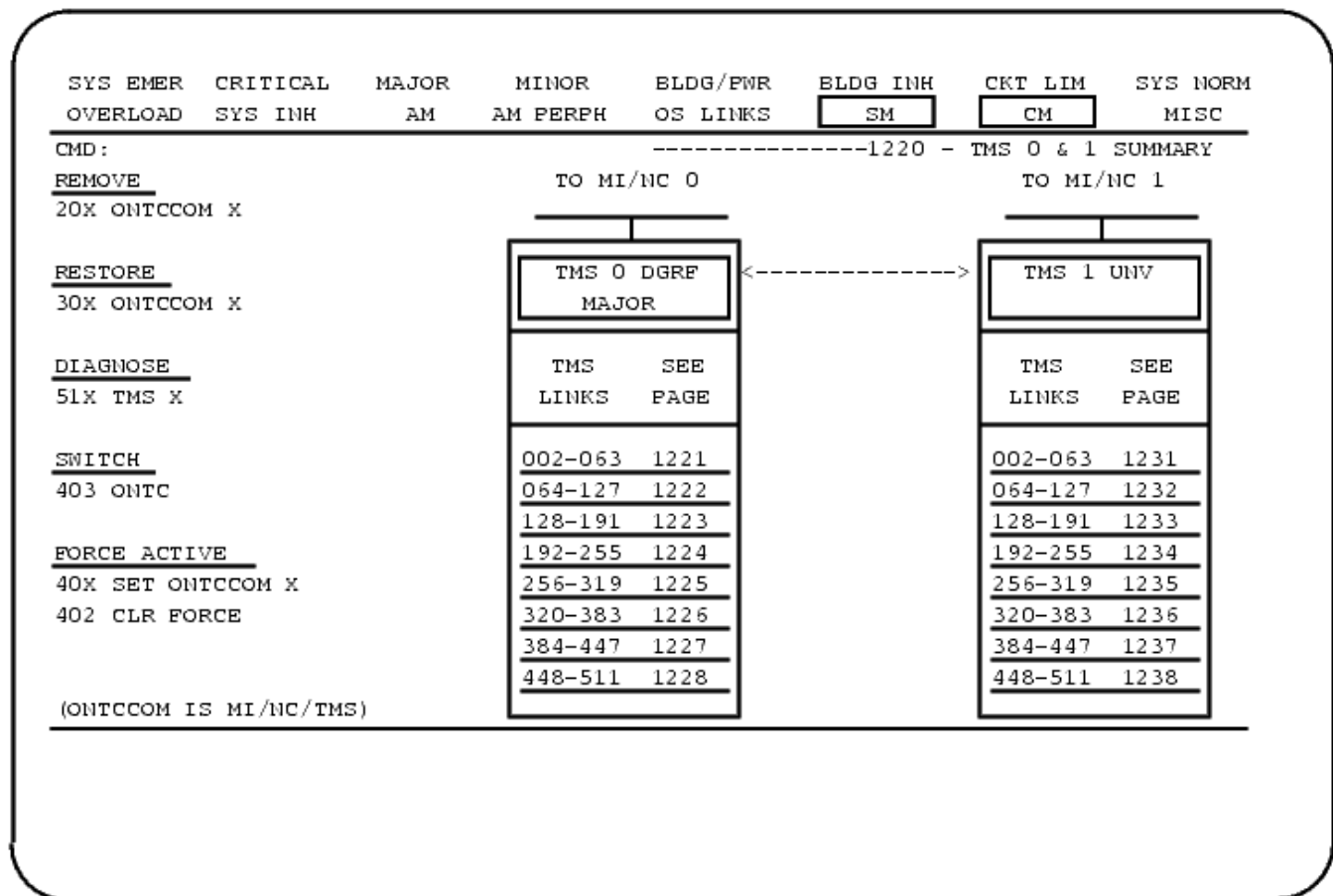


Figure 5-116 1220 - TMS 0 and 1 Summary (CM2 Version) [5E12 and Later]

Abbreviations:

MI	Message Interface	ONTCCOM	ONTC Common
NC	Network Clock	TMS	Time-Multiplexed Switch
ONTC	Office Network Timing Complex		

Figure 5-117 shows the CM1 version of the TMS 0 and 1 SUMMARY page. This display example shows the fan fuse alarm for TMS 0 is inhibited and TMS 0 is degraded.

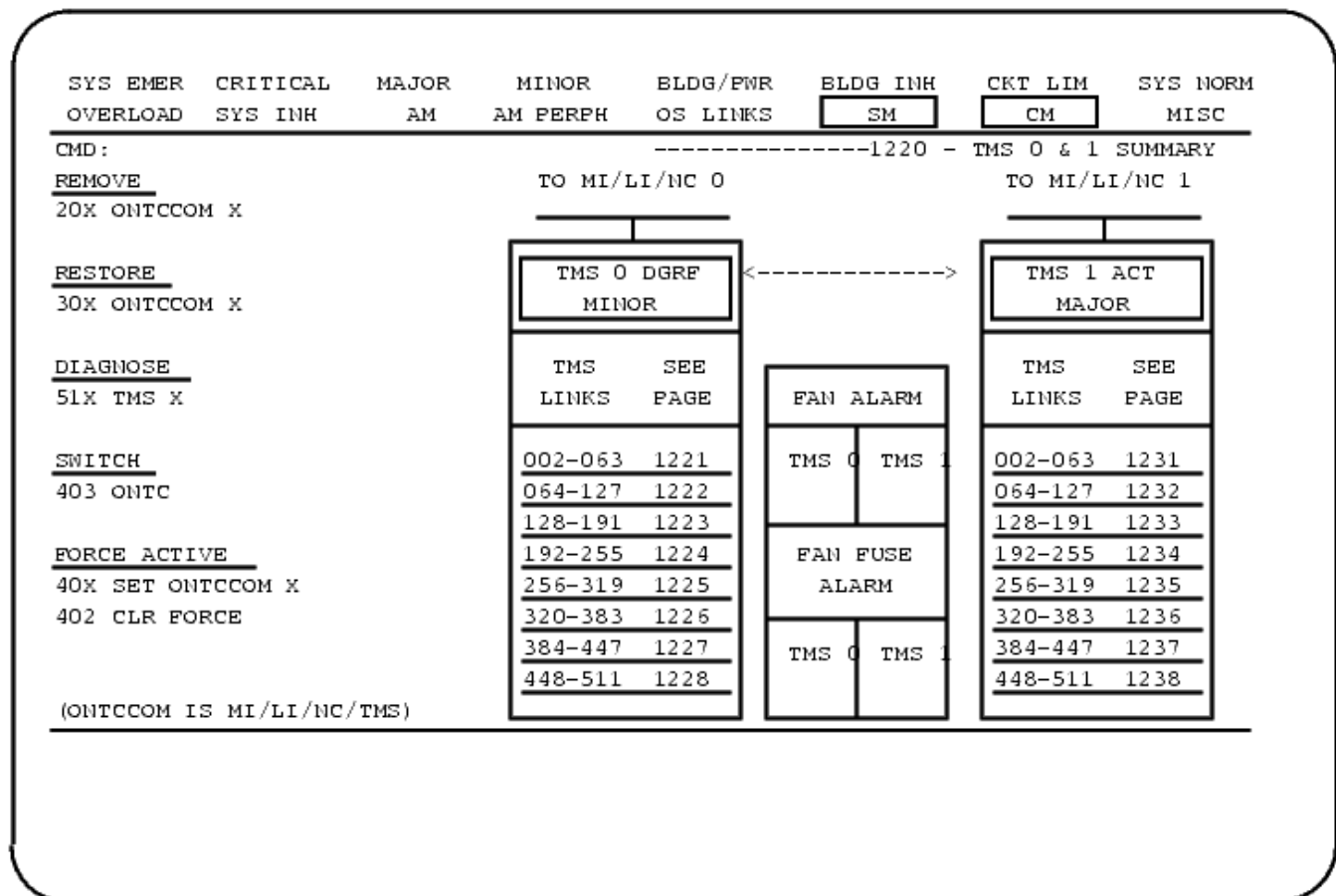


Figure 5-117 1220 - TMS 0 and 1 Summary (CM1 Version) [5E12 and Later]

Abbreviations:

LI	Link Interface	ONTC	Office Network Timing Complex
MI	Message Interface	ONTCCOM	ONTC Common
NC	Network Clock	TMS	Time-Multiplexed Switch

5.71.3 Commands

The maintenance commands shown are for the ONTCCOM, except for the diagnose commands which are provided for TMS.

All available paging commands can be entered from the 1220 display page.

CMD	RESULT
20X	ONTCCOM X is removed (RMV:ONTCCOM=X) [UCL]
30X	ONTCCOM X is restored (RST:ONTCCOM=X) [UCL] [MAJOR/MINOR]
40X	ONTCCOM X is forced active (SET:FRC,ONTCCOM=X)
402	ONTCCOM force is cleared (CLR:FRC,ONTCCOM)
403	ONTC is switched (SW:ONTC)
51X	TMS X is diagnosed (DGN:TMS=X,RAW,TLP) [UCL] [RPT] test is repeated 32,767 times [RPT=a] "a" is the number of times the test is to be repeated (1-32,767)

[,PH=b|b&&c] "b" is the diagnostic phase or "b&&c" is the range of phases to be performed

5.72 1221-1228, 1231-1238 - TMS LINKS [5E12 and Later]

5.72.1 Purpose

The purpose of the 1221 display page is to show status and maintenance commands for the TMS links.

5.72.2 General

The 1221 through 1228 and 1231 through 1238 group of displays are very similar. The 1221 through 1228 group is for TMS 0, and the 1231 through 1238 group is for TMS 1. Displays 1221 and 1231 show status for 60 links; displays 1228 and 1238 show status for 66 links; and the remaining displays show status for 64 links each.

When an off-normal condition occurs for a TMSLINK, the indicator for the link backlights, the appropriate page number indicator on Page 115 backlights, and CM backlights in the SUMMARY STATUS AREA. The associated alarm level (CRITICAL, MAJOR, or MINOR) also backlights, if applicable. If a DLI/NLI is out of service, the SM number backlights, and the TMSLNKS to that SM are out-of-service family of equipment (OOSF).

Figure 5-118 is an example of the 1221 page which shows TMS link 18 out of service. This causes the CM indicator at the top of the screen to backlight.

NOTE: The TMS links are part of the communication links (CLNKS), but the two types of links are not the same.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM						
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC						
CMD:				1221 - TMS 0 - TMS LINKS 002 - 061									
<u>RESTORE</u>		<u>DISPLAY</u>											
3XXX LINK XXX		1200,X SM X DLI/NLI SUMMARY											
(IF BOTH TMSLNKS FOR AN SM ARE OOS)													
TMSLNKS			SM	TMSLNKS			TMSLNKS			SM	TMSLNKS		
002 ACT			01	003 ACT			024 ACT			12	025 ACT		
004 ACT			02	005 ACT			026				027		
006 ACT			03	007 ACT			028				029		
008 ACT			04	009 ACT			030				031		
010 ACT			05	011 ACT			032				033		
012 ACT			06	013 ACT			034				035		
014 ACT			07	015 ACT			036				037		
016 ACT			08	017 ACT			038				039		
018 OOS			09	019 ACT			040 ACT			20	041 ACT		
020 ACT			10	021 ACT			042				043		
022 ACT			11	023 ACT			044				045		

Figure 5-118 1221 - TMS 0 - TMS Links 002 - 061 [5E12 and Later]

Abbreviations:

DLI	Dual Link Interface	ONTC	Office Network Timing Complex
SM	Switching Module	TMS	Time-Multiplexed Switch
NLI	Network Link Interface	TMSLNK	TMS Link

5.72.3 Commands

The restore maintenance commands for the TMS links are provided. The display command shown on the 1221 page example is of a related page. If both TMS links for an SM are out of service, action should be taken from the 1200 page for that SM, not from the TMS page.

All available paging commands can be entered from the 1221 display page.

Pages 1221 Through 1228

CMD	RESULT
3XXX	TMS Link XXX on TMS 0 is restored. (RST:TMSLNK=0-XXX)

Pages 1231 Through 1238

CMD	RESULT
3XXX	TMS Link XXX on TMS 1 is restored. (RST:TMSLNK=1-XXX)

5.73 1240 AND 1250 - MSGS 0 AND 1 SUMMARY [5E12 and Later]**5.73.1 Purpose**

The purpose of the 1240 and 1250 Pages is to show status and provide maintenance commands for the message switches (MSGS). The 1240 Page is for MSGS 0, and the 1250 Page is for MSGS 1.

5.73.2 General

The 1240 and 1250 pages have two separate and distinct versions. The first version (Figure 5-119) is for offices with CM2 hardware. The second version (Figure 5-120) is for offices with CM1 hardware. One difference between the two versions is the reference to a connection to the MI/NC for the CM2 version versus to the MI/LI/NC for the CM1 version. The CM2 has no LI. Another difference is the CM1 version has MSGS fan and fan fuse alarms and the CM2 version does not. The last difference is the CM2 version has inhibit and allow hardware checks for the MSCUs and the CM1 version does not.

The displays for MSGS 0 and MSGS 1 are very similar.

When an off-normal condition occurs in the CMP, FPC, or PPC (Pages 1241/1251), the SEE PAGE indicator backlights on Pages 1240/1250, the 1241 or 1251 indicator on Page 115 backlights, and CM backlights in the SUMMARY STATUS AREA. The associated alarm level (CRITICAL, MAJOR, or MINOR) also backlights, if applicable.

When an off-normal condition occurs in an MMP (Pages 1242/1252 and 1243/1253), the SEE PAGE indicator backlights on 1240/1250, the 1242, 1252, 1243, or 1253 indicator on the 115 Page backlights, and CM backlights in the SUMMARY STATUS AREA. The associated alarm level (CRITICAL, MAJOR, or MINOR) also backlights, if applicable.

Figure 5-119 is the CM2 version of the 1240/1250 page. The SEE PAGE 1242 indicator is backlighted because an MMP on 1242 is out of service. This causes the 1242 indicator under the MSGS 0 indicator to backlight on Page 115 - COMMUNICATION MODULE SUMMARY, which in turn causes the CM summary status indicator at the top of the

screen to backlight.

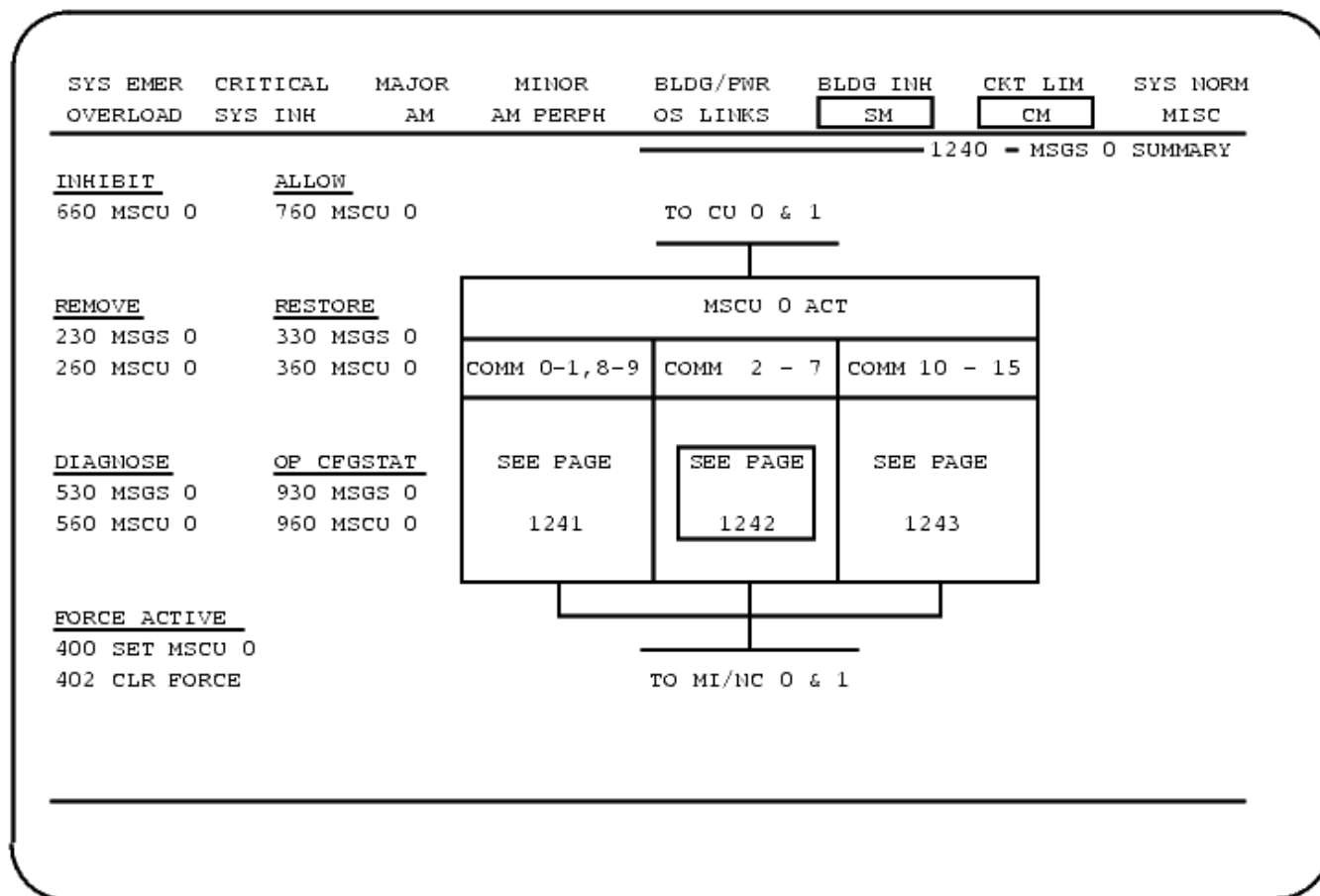


Figure 5-119 1240/1250 - MSGS 0 Summary/MSGS 1 Summary (CM2 Version) [5E12 and Later]

Abbreviations:

ACT	Active	MSCU	Message Switch Control Unit
COMM	Community	MSGS	Message Switch
MI	Message Interface	NC	Network Clock

Figure 5-120 is the CM1 version of the 1240/1250 page.

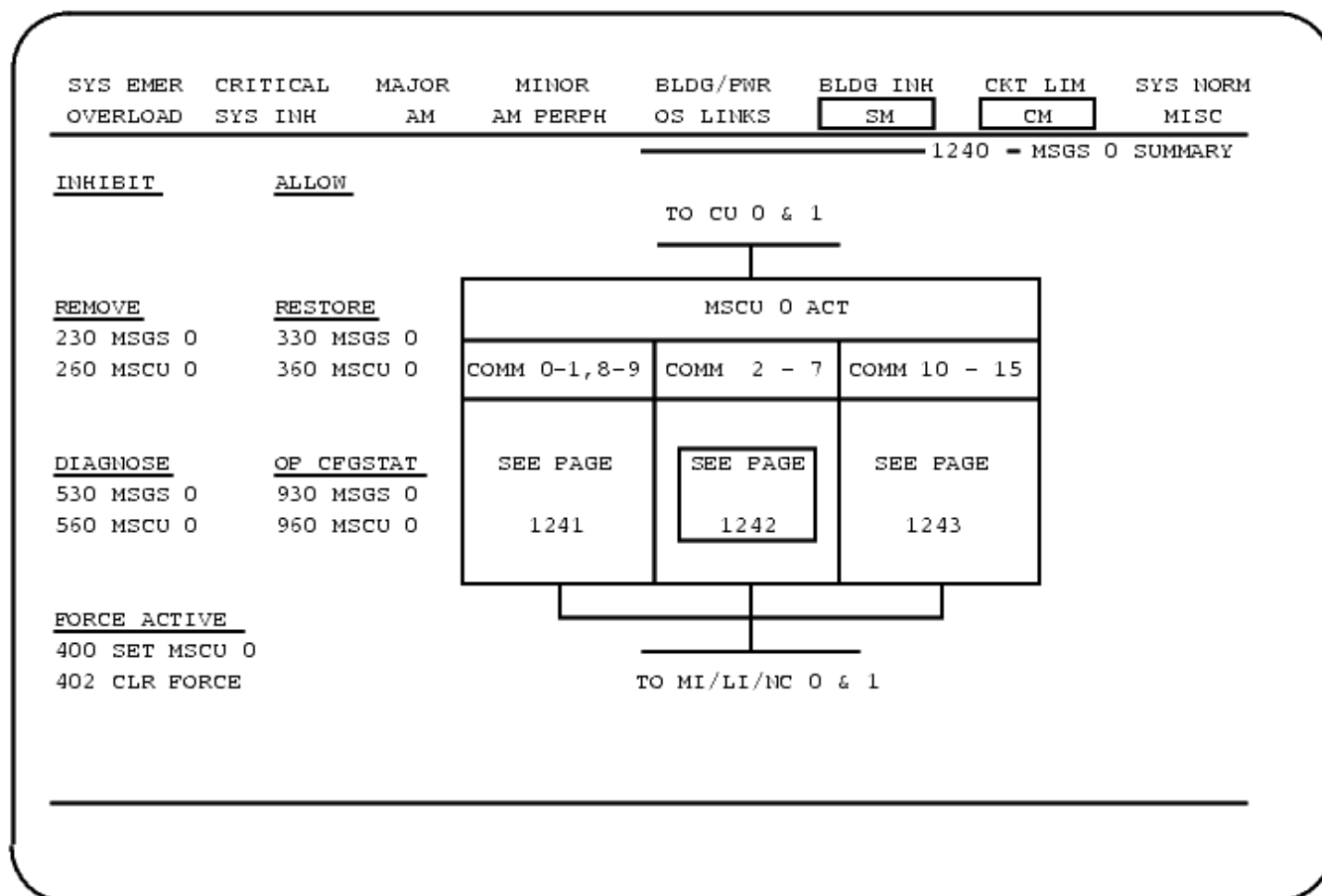


Figure 5-120 1240/1250 - MSGS 0 Summary/MSGS 1 Summary (CM1 Version) [5E12 and Later]

Abbreviations:

ACT	Active	MSCU	Message Switch Control Unit
COMM	Community	MSGS	Message Switch
LI	Link Interface	NC	Network Clock
MI	Message Interface		

5.73.3 Commands

Commands are provided to remove, restore, diagnose, inhibit hardware checks, allow hardware checks, force, switch, and output the configuration status of the MSGS and its units. In addition, all available displays can be accessed from the 1240 or 1250 display pages.

MSGS 0		MSGS 1	
CMD	RESULT	CMD	RESULT
230	MSGS 0 is removed (RMV:MSGS=0 [,UCL])	231	MSGS 1 is removed (RMV:MSGS=1 [,UCL])
260	MSCU 0 is removed (RMV:MSCU=0 [,UCL])	261	MSCU 1 is removed (RMV:MSCU=1 [,UCL])
330	MSGS 0 is restored (RST:MSGS=0 [,UCL])	331	MSGS 1 is restored (RST:MSGS=1 [,UCL])
360	MSCU 0 is restored (RST:MSCU=0)	361	MSCU 1 is restored (RST:MSCU=1)
400	MSCU 0 is forced active (SET:FRC, MSCU=0)	401	MSCU 1 is forced active (SET:FRC, MSCU=1)
402	MSCU force is cleared (CLR:FRC, MSCU)	402	MSCU force is cleared (CLR:FRC, MSCU)
530	MSGS 0 is diagnosed	531	MSGS 1 is diagnosed

	(DGN:MSG=0,RAW,TLP)		(DGN:MSG=1,RAW,TLP)
	[,UCL]		[,UCL]
	[,RPT] test is run 32,767 times		[,RPT] test is run 32,767 times
	[,RPT=a] where "a" is the number of times the test is to be repeated (1-32,767)		[,RPT=a] where "a" is the number of times the test is to be repeated (1-32,767)
	[,PH=b|b&&c] where "b" is the phase or "b&&c" is the range of phases to be performed		[,PH=b|b&&c] where "b" is the phase or "b&&c" is the range of phases to be performed
560	MSCU 0 is diagnosed (DGN:MSCU=0,RAW,TLP) Same options as 530 plus [,GROW] diagnose growth hardware	561	MSCU 1 is diagnosed (DGN:MSCU=1,RAW,TLP) Same options as 531 plus [,GROW] diagnose growth hardware
660	Inhibit hardware checks for MSCU 0 (INH:HDWCHK,MSCU=0)	661	Inhibit hardware checks for MSCU 1 (INH:HDWCHK,MSCU=1)
760	Allow hardware checks for MSCU 0 (ALW:HDWCHK,MSCU=0)	761	Allow hardware checks for MSCU 1 (ALW:HDWCHK,MSCU=1)
930	Configuration status for MSGS 0 is output (OP:CFGSTAT,MSG=0)	931	Configuration status for MSGS 1 is output (OP:CFGSTAT,MSG=1)
960	Configuration status for MSCU 0 is output (OP:CFGSTAT,MSCU=0)	961	Configuration status for MSCU 1 is output (OP:CFGSTAT,MSCU=1)

5.74 1241 AND 1251 MSGS 0 AND 1 COMMUNITIES [5E12 and Later]

5.74.1 Purpose

The purpose of the 1241 and 1251 pages is to show status and provide maintenance commands for CMPs, PPCs, FPCs, and QLPS Gateway Processors (QGP). The 1241 page is for MSGS 0 communities 0, 1, 8, and 9. The 1251 page is for MSGS 1 communities 0, 1, 8, and 9.

5.74.2 General

The 1241 and 1251 pages have two separate and distinct versions. The first version (Figures 5-121 and 5-122) are for offices with CM2 hardware. The second version (Figure 5-123) is for offices with CM1 hardware. The difference between the two versions is the location of the CMP. The CMP is equipped in community 0 in the CM2 version and in community 1 in the CM1 version.

The displays for MSGS 0 and MSGS 1 are very similar.

When an off-normal condition occurs in the FPC, PPC, or QGP, the indicator for the circuit backlights, the SEE PAGE 1241 (or 1251) on 1240 (or 1250) backlights, the 1241 or 1251 indicator on Page 115 backlights, and the CM backlights in the SUMMARY STATUS AREA. The associated alarm level (CRITICAL, MAJOR, or MINOR) also backlights, if applicable.

When an off-normal condition occurs in a CMP, the indicator for the circuit backlights, the SEE PAGE 1850 indicator backlights, the SEE PAGE 1241/1251 indicators backlight on Page 1240/1250, the 1241 or 1251 indicator on the 115 page backlights, and the CM backlights in the SUMMARY STATUS AREA. The associated alarm level (CRITICAL, MAJOR, or MINOR) also backlights if applicable.

When QGP(s) is equipped, the 1241/1251 displays the QGP with its circuit number under community 8. The QGP-related commands are also shown. When an off-normal condition occurs in a QGP, the indicator for the circuit backlights, the 1241 or 1251 and 1380 or 1381 indicators on Page 115 backlight, and CM backlights in the SUMMARY STATUS AREA. The associated alarm level (CRITICAL, MAJOR, or MINOR) also backlights, if applicable.

Figure 5-121 is the CM2 version of the 1241/1251 page.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
1241 - MSGS 0 - COMMUNITIES 0-1, 8-9							
<u>INHIBIT</u>	<u>ALLOW</u>						
640 FPC 0	740 FPC 0						
650 FPC 0	750 FPC 0						
6XX CMP XX	7XX CMP XX						
<u>REMOVE</u>	<u>RESTORE</u>						
240 FPC 0	340 FPC 0						
250 FPC 0	350 FPC 0						
2XX CMP XX	3XX CMP XX						
<u>DIAGNOSE</u>	<u>SWITCH</u>						
540 FPC 0	440 FPC						
550 FPC 0	450 FPC						
5XX CMP XX	4XX CMP XX						
<u>OP CFGSTAT</u>							
940 FPC 0							
950 FPC 0							
9XX CMP XX							

COMM 0	COMM 1	COMM 8	COMM 9
CMP 00 ACT	FPC 0 STBY		
	FPC 0 ACT		

(SEE PAGE 1850, XX CMP XX PRIM INH & RCVRY CNTL)

Figure 5-121 1241/1251 - MSGS 0/MSGS 1 - Communities 0-1, 8-9 (CM2 Version) [5E12 and Later]

Abbreviations:

ACT	Active	MSGS	Message Switch
CFGSTAT	Configuration Status	OP	Outout
CMP	Communication Module Processor	PPC	Pump Peripheral Controller
CNTL	Control	PRIM	Primary
COMM	Community	RCVRY	Recovery
FPC	Foundation Peripheral Controller	STBY	Standby
INH	Inhibit		

Figure 5-122 is the CM2 with QGP version of the 1241/1251 page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
— 1241 — MSGS 0 — COMMUNITIES 0-1 , 8-9							
<u>INHIBIT</u>	<u>ALLOW</u>						
640 FPC 0	740 FPC 0						
650 FPC 0	750 FPC 0						
6XX CMP XX	7XX CMP XX						
670Y QGP Y	770Y QGP Y						
<u>REMOVE</u>	<u>RESTORE</u>						
240 FPC 0	340 FPC 0						
250 FPC 0	350 FPC 0						
2XX CMP XX	3XX CMP XX						
270Y QGP Y	370Y QGP Y						
<u>DIAGNOSE</u>	<u>OP CFGSTAT</u>						
540 FPC 0	940 FPC 0						
550 FPC 0	950 FPC 0						
5XX CMP XX	9XX CMP XX						
570Y QGP Y	970Y QGP Y						
<u>SWITCH</u>	<u>SWITCH</u>						
440 FPC	450 FPC						
4XX CMP XX							

(SEE PAGE 1850, XX CMP XX PRIM INH & RCVRY CNTL)

pa 82167801

Figure 5-122 1241/1251 - MSGS 0/MSGS 1 - Communities 0-1, 8-9 (CM2 with QGP Version) [5E12 and Later]

Abbreviations:

ACT	Active	MSGS	Message Switch
CMP	Communication Module Processor	PPC	Pump Peripheral Controller
CNTL	Control	PRIM	Primary
COMM	Community	QGP	QLPS Gateway Processor
FPC	Foundation Peripheral Controller	RCVRY	Recovery
INH	Inhibit	STBY	Standby

Figure 5-123 is the CM1 version of the 1241/1251 page.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC																
1241 - MSGS 0 - COMMUNITIES 0-1, 8-9																							
<u>INHIBIT</u> 640 FPC 0 650 FPC 0 6XX CMP XX <u>REMOVE</u> 240 FPC 0 250 FPC 0 2XX CMP XX <u>DIAGNOSE</u> 540 FPC 0 550 FPC 0 5XX CMP XX <u>OP CFGSTAT</u> 940 FPC 0 950 FPC 0 9XX CMP XX		<u>ALLOW</u> 740 FPC 0 750 FPC 0 7XX CMP XX <u>RESTORE</u> 340 FPC 0 350 FPC 0 3XX CMP XX <u>SWITCH</u> 440 FPC 450 FPC 4XX CMP XX		<table border="1"> <thead> <tr> <th>COMM 0</th> <th>COMM 1</th> <th>COMM 8</th> <th>COMM 9</th> </tr> </thead> <tbody> <tr> <td></td> <td>FPC 0 STBY</td> <td></td> <td></td> </tr> <tr> <td></td> <td>FPC 0 ACT</td> <td></td> <td></td> </tr> <tr> <td></td> <td>CMP 00 ACT</td> <td></td> <td></td> </tr> </tbody> </table>				COMM 0	COMM 1	COMM 8	COMM 9		FPC 0 STBY				FPC 0 ACT				CMP 00 ACT		
COMM 0	COMM 1	COMM 8	COMM 9																				
	FPC 0 STBY																						
	FPC 0 ACT																						
	CMP 00 ACT																						

(SEE PAGE 1850, XX CMP XX PRIM INH & RCVRY CNTL)

Figure 5-123 1241/1251 - MSGS 0/MSG 1 - Communities 0-1, 8-9 (CM1 Version) [5E12 and Later]

Abbreviations:

ACT	Active	MSGS	Message Switch
CFGSTAT	Configuration Status	OP	Outout
CMP	Communication Module Processor	PPC	Pump Peripheral Controller
CNTL	Control	PRIM	Primary
COMM	Community	RCVRY	Recovery
FPC	Foundation Peripheral Controller	STBY	Standby
INH	Inhibit		

5.74.3 Commands

Commands are provided to remove, restore, diagnose, inhibit hardware checks, allow hardware checks, switch, and output the configuration status of the CMPs, FPCs, or PPCs.

Commands are also provided to remove, restore, diagnose, inhibit hardware checks, allow hardware checks, and output the configuration status of the QGPs, if equipped.

In addition, all available displays can be accessed from the 1241 or 1251 display pages.

MSGS 0		MSGS 1	
CMD	RESULT	CMD	RESULT
2XX	CMP XX is removed. (RMV:CMP=0-XX) [UCL]	2XX	CMP XX is removed. (RMV:CMP=1-XX) [UCL]
240	FPC 0 is removed. (RMV:FPC=0)	241	FPC 1 is removed. (RMV:FPC=1)
250	PPC 0 is removed.	251	PPC 1 is removed.

	(RMV:PPC=0)		(RMV:PPC=1)
270Y	QGP Y is removed. (RMV:QGP=0-Y)	271Y	QGP Y is removed. (RMV:QGP=1-Y)
3XX	CMP XX is restored. (RST:CMP=0-XX) [,UCL][,STBY]	3XX	CMP XX is restored. (RST:CMP=1-XX) [,UCL][,STBY]
340	FPC 0 is restored. (RST:FPC=0) [,UCL] [,STBY]	341	FPC 1 is restored. (RST:FPC=1) [,UCL] [,STBY]
350	PPC 0 is restored. (RST:PPC=0) [,UCL] [,STBY]	351	PPC 1 is restored. (RST:PPC=1) [,UCL] [,STBY]
370Y	QGP Y is restored. (RST:QGP=0-Y) [,UCL]	371Y	QGP Y is restored. (RST:QGP=1-Y) [,UCL]
4XX	CMP XXs are switched. (SW:CMP=0-XX) [,UCL]	4XX	CMP XXs are switched. (SW:CMP=1-XX) [,UCL]
440	FPCs are switched. (SW:FPC)	441	FPCs are switched. (SW:FPC)
450	PPCs are switched. (SW:PPC)	451	PPCs are switched. (SW:PPC)
5XX	CMP XX is diagnosed. (DGN:CMP=0-XX,RAW,TLP) [,UCL] [,RPT] Test is run 32,767 times. [,RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The "b" is the phase or "b&&c" is the range of phases to be performed. [,GROW] Diagnose growth hardware.	5XX	CMP XX is diagnosed. (DGN:CMP=1-XX,RAW,TLP) [,UCL] [,RPT] Test is run 32,767 times. [,RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The "b" is the phase or "b&&c" is the range of phases to be performed. [,GROW] Diagnose growth hardware.
540	FPC 0 is diagnosed. (DGN:FPC=0,RAW,TLP) Same options as 5XX except GROW	541	FPC 1 is diagnosed. (DGN:FPC=1,RAW,TLP) Same options as 5XX except GROW
550	PPC 0 is diagnosed. (DGN:PPC=0,RAW,TLP) Same options as 5XX except GROW	551	PPC 1 is diagnosed. (DGN:PPC=1,RAW,TLP) Same options as 5XX except GROW
570Y	QGP Y is diagnosed. (DGN:QGP=0-Y,RAW,TLP) Same options as 5XX	571Y	QGP Y is diagnosed. (DGN:QGP=1-Y,RAW,TLP) Same options as 5XX
6XX	Inhibit hardware checks for CMP XX. (INH:HDWCHK,CMP=0-XX)	6XX	Inhibit hardware checks for CMP XX. (INH:HDWCHK,CMP=1-XX)
640	Inhibit hardware checks for FPC 0. (INH:HDWCHK,FPC=0)	641	Inhibit hardware checks for FPC 1. (INH:HDWCHK,FPC=1)
650	Inhibit hardware checks for PPC 0. (INH:HDWCHK,PPC=0)	651	Inhibit hardware checks for PPC 1. (INH:HDWCHK,PPC=1)
670Y	Inhibit hardware checks for QGP Y. (INH:HDWCHK,QGP=0-Y)	671Y	Inhibit hardware checks for QGP Y. (INH:HDWCHK,QGP=1-Y)
7XX	Allow hardware checks for CMP XX. (ALW:HDWCHK,CMP=0-XX)	7XX	Allow hardware checks for CMP XX. (ALW:HDWCHK,CMP=1-XX)
740	Allow hardware checks for FPC 0. (ALW:HDWCHK,FPC=0)	741	Allow hardware checks for FPC 1. (ALW:HDWCHK,FPC=1)
750	Allow hardware checks for PPC 0. (ALW:HDWCHK,PPC=0)	751	Allow hardware checks for PPC 1. (ALW:HDWCHK,PPC=1)
770Y	Allow hardware checks for QGP Y. (ALW:HDWCHK,QGP=0-Y)	771Y	Allow hardware checks for QGP Y. (ALW:HDWCHK,QGP=1-Y)
9XX	Configuration status for CMP XX is output. (OP:CFGSTAT,CMP=0-XX)	9XX	Configuration status for CMP XX is output. (OP:CFGSTAT,CMP=1-XX)
940	Configuration status for FPC 0 is output. (OP:CFGSTAT,FPC=0)	941	Configuration status for FPC 1 is output. (OP:CFGSTAT,FPC=1)
950	Configuration status for PPC 0 is output.	951	Configuration status for PPC 1 is output.

970Y	(OP:CFGSTAT,PPC=0) Configuration status for QGP Y is output. (OP:CFGSTAT,QGP=0-Y)	971Y	(OP:CFGSTAT,PPC=1) Configuration status for QGP Y is output. (OP:CFGSTAT,QGP=1-Y)

5.75 1242, 1243, 1252, 1253 SGS 0 AND 1 COMMUNITIES [5E12 and Later]

5.75.1 Purpose

The purpose of the 1242, 1243, 1252, and 1253 pages is to show status and provide maintenance commands for the MSGS 0 and MSGS 1 MMPs. The 1242 page is for MSGS 0 communities 2 through 7. The 1243 page is for MSGS 0 communities 10 through 15. The 1252 page is for MSGS 1 communities 2 through 7. The 1253 page is for MSGS 1 communities 10 through 15.

5.75.2 General

Although the 1242, 1243, 1252, and 1253 pages have two separate versions (CM1 and CM2), they are very similar in appearance and function. The 1242 example shown in Figure 5-124 is for offices with CM2 hardware. The second version of the 1242 page is shown in Figure 5-125 and is for offices with CM1 hardware. The difference between the two versions is the way the communities are equipped.

The displays for COMMUNITIES 10 - 15 for MSGS 0 and MSGS 1 are very similar to the examples shown for COMMUNITIES 2 - 7.

There are up to 48 MMPs across the 12 communities in each MSGS. The MMPs only appear on the displays if they are equipped.

When an off-normal condition occurs, the indicator for the MMP backlights, the SEE PAGE 1242 (1243, 1252, or 1253) on 1240 (or 1250) backlights, the 1242 (1243, 1252, or 1253) indicator on Page 115 backlights, and CM backlights in the SUMMARY STATUS AREA. The associated alarm level (CRITICAL, MAJOR, or MINOR) also backlights, if applicable.

Figure 5-124 is an example of the CM2 version of Page 1242, MSGS 0 - COMMUNITIES 2 - 7. In this example, MMP 02 is shown out-of-service power. This causes the **SEE PAGE 1242** indicator on 1240 to backlight and the 1242 indicator on Page 115 - COMMUNICATION MODULE SUMMARY to backlight which in turn causes the CM status summary indicator at the top of the screen to backlight.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD: 1242 - MSGS 0 - COMMUNITIES 2 - 7							
<u>INHIBIT</u>							
6XX MMP XX							
<u>ALLOW</u>							
7XX MMP XX							
<u>REMOVE</u>							
2XX MMP XX							
<u>RESTORE</u>							
3XX MMP XX							
<u>DIAGNOSE</u>							
5XX MMP XX							
<u>OP CFGSTAT</u>							
9XX MMP XX							

COMM 2	COMM 3	COMM 4	COMM 5	COMM 6	COMM 7
MMP: 00 ACT					
02 OOSP					
04 ACT					

Figure 5-124 1242 - MSGS 0 - Communities 2 - 7 (CM2 Version) [5E12 and Later]

Abbreviations:

ACT	Active	MSGS	Message Switch
CFGSTAT	Configuration Status	OOSP	Out-of-Service Power
COMM	Community	OP	Output
MMP	Module Message Processor		

Figure 5-125 shows an example of the CM1 version of the MSGS 0 - COMMUNITIES 2 - 7 Page. The MMP 2 is unavailable power. The MMP 3 is active but has its hardware checks inhibited.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: 1242 - MSGS 0 - COMMUNITIES 2 - 7							
<u>INHIBIT</u>							
6XX MMP XX		COMM 2	COMM 3	COMM 4	COMM 5	COMM 6	COMM 7
<u>ALLOW</u>		MMP: 00 ACT	MMP: 01 ACT				
7XX MMP XX							
<u>REMOVE</u>		02 UNVP	03 ACT				
2XX MMP XX			HDWCHK INH				
<u>RESTORE</u>		04 ACT	05 ACT				
3XX MMP XX							
<u>DIAGNOSE</u>							
5XX MMP XX							
<u>OP CFGSTAT</u>							
9XX MMP XX							

Figure 5-125 1242 - MSGS 0 - Communities 2 - 7 (CM1 Version) [5E12 and Later]

Abbreviations:

ACT	Active	MMP	Module Message Processor
CFGSTAT	Configuration Status	MSGS	Message Switch
COMM	Community	OP	Output
HDWCHK	Hardware Checks	UNVP	Unavailable Power
INH	Inhibit		

5.75.3 Commands

Commands are provided to remove, restore, diagnose, inhibit hardware checks, allow hardware checks, and output the configuration status of the MMPs. In addition, all available displays can be accessed from the 1241, 1242, 1251, and 1252 pages.

MSGS 0		MSGS 1	
CMD	RESULT	CMD	RESULT
2XX	MMP XX is removed (RMV:MMP=0-XX)	2XX	MMP XX is removed (RMV:MMP=1-XX)
3XX	MMP XX is restored (RST:MMP=0-XX) [UCL]	3XX	MMP XX is restored (RST:MMP=1-XX) [UCL]
5XX	MMP XX is diagnosed (DGN:MMP=0-XX,RAW,TLP) [UCL] [RPT] test is run 32,767 times [RPT=a] where "a" is the number of times the test is to be repeated (1-32,767)	5XX	MMP XX is diagnosed (DGN:MMP=1-XX,RAW,TLP) [UCL] [RPT] test is run 32,767 times [RPT=a] where "a" is the number of times the test is to be repeated (1-32,767)

[,PH=b|b&&c] where "b" is the phase or "b&&c" is the range of phases to be performed
 [,GROW] diagnose growth hardware
 6XX Inhibit hardware checks for MMP XX
 (INH:HDWCHK,MMP=0-XX)
 7XX Allow hardware checks for MMP XX
 (ALW:HDWCHK,MMP=0-XX)
 9XX Configuration status for MMP XX is output
 (OP:CFGSTAT,MMP=0-XX)

[,PH=b|b&&c] where "b" is the phase or "b&&c" is the range of phases to be performed
 [,GROW] diagnose growth hardware
 6XX Inhibit hardware checks for MMP XX
 (INH:HDWCHK,MMP=1-XX)
 7XX Allow hardware checks for MMP XX
 (ALW:HDWCHK,MMP=1-XX)
 9XX Configuration status for MMP XX is output
 (OP:CFGSTAT,MMP=1-XX)

5.76 1260 - CLNK SUMMARY [5E12 and Later]

5.76.1 Purpose

The 1260 page shows a summary status of the CLNKs for all equipped SMs (up to 192).

5.76.2 General

If a CLNK is off normal, the appropriate SM number is backlighted. If an SM is isolated, the SM number is backlighted and flashing (Figure 5-126). For further information, enter 1900,X to display the SM CLNK STATUS AND CONTROL page. Pages 1261-1264 are information only pages and should not be used for problem solving if an SM is backlighted.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD:

1260 - CLNK SUMMARY

DISPLAY

1900,X SM X CLNKS1263 LOGICAL LINK MAP 31261 LOGICAL LINK MAP 11264 LOGICAL LINK MAP 41262 LOGICAL LINK MAP 2

SEE PAGE 1900,X	001 002 003 004 005006007 008 009 010 011 012	048
SEE PAGE 1900,X	083	
SEE PAGE 1900,X	109120	
SEE PAGE 1900,X		192

Figure 5-126 1260 - CLNK Summary [5E12 and Later]**Abbreviations:**

CLNKS	Communication Links	SM	Switching Module

5.76.3 Commands

All available display commands can be entered from the 1260 display page.

5.77 1261 THROUGH 1264 - LOGICAL LINK MAP 1 THROUGH 4 [5E12 and Later]**5.77.1 Purpose**

The 1261 through 1264 display pages summarize all logical communication links to the SMs.

5.77.2 General

The 1261 through 1264 displays for LOGICAL LINK MAPs 1 through 4 are very similar. Page 1261 summarizes all logical communication links to SMs 1 through 48. Page 1262 summarizes all logical communication links to SMs 49 through 96. Page 1263 summarizes all logical communication links to SMs 97 through 144. Page 1264 summarizes all logical communication links to SMs 145 through 192.

These pages (1261 through 1264) are information-only type pages.

The links shown on the 1261 through 1264 pages are the logical communication links which 1900,X - SM X CLNKS displays the status of on a per-SM basis. The ONTC column is the ONTC the link is routed through, the MSGS column is the MSGS the link is routed through, and the MMP column shows the MMP type the link is routed through. A 0 (zero) in the MMP column means the MMP used works through the even time slots and a 1 (one) in the MMP column means the MMP works through the odd time slots.

In the Figure 5-127 Display Page 1261 example, no paths are shown for SM 6 which is isolated. Further information and maintenance commands for the links are found on the SM 6 CLNKS display.

SYS EMER			CRITICAL			MAJOR			MINOR			BLDG/PWR			BLDG INH			CKT LIM			SYS NORM			
OVERLOAD			SYS INH			AM			AM PERPH			OS LINKS			SM			CM			MISC			
CMD: █												-----1261 - LOGICAL LINK MAP 1												
PATH 0			PATH 1			PATH 0			PATH 1			PATH 0			PATH 1			PATH 0			PATH 1			
O	M		O	M		O	M		O	M		O	M		O	M		O	M		O	M		
N	M	S	N	M	S	N	M	S	N	M	S	N	M	S	N	M	S	N	M	S	N	M	S	
T	M	G	T	M	G	T	M	G	T	M	G	T	M	G	T	M	G	T	M	G	T	M	G	
C	P	S	C	P	S	C	P	S	C	P	S	C	P	S	C	P	S	C	P	S	C	P	S	
0	0	0	001	0	1	1																		
0	0	0	002	0	1	1																		
0	1	0	003	0	0	1																		
0	0	0	004	0	1	1																		
0	0	0	005	0	1	1																		
			006																					
0	0	0	007	0	1	1																		
0	1	0	008	0	0	1			0	0	0	020	0	1	0									
0	1	0	009	0	0	1																		
0	1	0	010	0	0	1																		
0	0	0	011	0	1	1																		
0	0	0	012	0	1	1																		
									0	1	0	024	0	0	1						0	0	0	048

Figure 5-127 1261 - Logical Link Map 1 [5E12 and Later]

Abbreviations:

MMP	Message Module Processor
MSGS	Message Switch
ONTC	Office Network Timing Complex

5.77.3 Commands

All available displays can be accessed from the 1261 through 1264 pages.

5.78 1271, 1272, 1273, 1274 - REX SUMMARY [5E12 and Later]**5.78.1 Purpose**

The 1271, 1272, 1273, and 1274 page displays provide summary status for routine exercises for the CM and the SMs as follow:

- 1271 - SM 1 - 48 and CM REX SUMMARY
- 1272 - SM 49 - 96 REX SUMMARY
- 1273 - SM 97 - 144 REX SUMMARY
- 1274 - SM 145 - 192 REX SUMMARY.

5.78.2 General

The four REX SUMMARY pages are very similar. The first page, 1271, provides REX summary status for the CM and for the first 48 SMs. The second page, 1272, provides REX summary status for the next group of 48 SMs, SM 49 through 96. The third page, 1273, provides REX summary status for SMs 97 through 144. The fourth page, 1274, provides REX summary status for SMs 145 through 192.

If an SM is equipped, the number for the SM appears on the appropriate REX SUMMARY page. If REX is not in progress or inhibited for one or more units or the entire SM, nothing more than the number is displayed. If REX is running on an SM, the status of IP is shown immediately to the right of the SM number; and further to the right, the type(s) of REX test(s) is displayed. On color terminals, the indicator is black on green. If REX is inhibited for an SM, the status of INH appears immediately to the right of the SM number and the indicator for the SM is backlighted, black on white for black and white terminals, and blue on yellow for color terminals. The status of inhibit can mean that one or more units in the SM have been inhibited from running REX or that the whole SM is inhibited from running REX. Also, on Page 1010,X, the phrase SEE 1800 appears (backlighted) in the RELATED PAGES box. On Page 114, the indicator for that SM is backlighted; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted, and the phrase INHIBITS is written, unless a more critical condition exists.

The three REX test types for an SM are as follows:

- **DGN:** Full diagnostics. This results in a conditional restore request including the trouble location procedure (TLP) option.
- **ELS:** Electric loop segregation. This tests customer lines to determine a suitable network balance necessary to reduce the amount of potential echoing in the transmission path.
- **FAB:** Fabric exercise. This tests the operation of the gated diode crosspoints (GDX) in the line unit (LU) concentrator grid or grid board.

For detailed status of SM REX schedules and any in progress units, 1280,X should be entered, where X is the SM number desired.

For the CM, the appropriate REX types are as follows:

- **DGN:** This is the same as for the SM.
- **SWITCH:** Partial Diagnostic. This results in a soft switch of the PPC, the FPC, the CMP, and the ONTC. No diagnostics are executed.

For detailed status of the CM REX schedule and any in progress units, enter 1290.

The 1271 display page is the first of four REX Summary pages. In Figure 5-128, the summary for the CM shows that REX is in progress on some unit in the CM. The SM 2 has ELS and FAB in progress; SM 4 has DGN and FAB inhibited; SM 7 has DGN in progress; SM 11 has DGN, ELS, and FAB inhibited; SM 20 has DGN inhibited, SM 24 has DGN and ELS in progress; and SM 48 has nothing inhibited or no test in progress.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD: 1271 SM 1 - 48 & CM REX SUMMARY

DISPLAY REX SUMMARY

1272 SM 49 - 96	1280,X SM X REX STATUS	CM REX STATUS IP
1273 SM 97 - 144	1290 CM REX STATUS	
1274 SM 145 - 192		

REX STATUS FOR OPERATIONAL SWITCHING MODULES

001			
002 IP	ELS FAB		
003			
004 INH DGN	FAB		
005			
006			
007 IP DGN			
008	020 INH DGN		
009			
010			
011 INH DGN ELS FAB			
012	024 IP DGN ELS		048

Figure 5-128 1271 - SM 1 - 48 and CM REX Summary [5E12 and Later]

Abbreviations:

CM	Communication Module	INH	Inhibited
DGN	Diagnostics	IP	In Progress
ELS	Electronic Loop Segregation	REX	Routine Exercise
FAB	Fabric Exercise	SM	Switching Module

5.78.3 Commands

All available displays can be accessed from the 1271 through 1274 display pages.

5.79 1280,X - SM X - REX STATUS [5E12 and Later]**5.79.1 Purpose**

The purpose of the 1280 page is to provide the status of REX in an SM on a per unit basis and to display the REX schedule for the SM.

5.79.2 General

The 1280 page shows the SM X units on which REX is to be performed. If the SM is equipped with more units than will fit on one page, additional units are shown on Pages 1281 or 1282. The MCTSI status box is displayed on Page 1280.

In an SM, only one unit at a time may have REX in progress (IP) while any number of units at a time may have REX inhibited (INH). An SM-2000 can have up to eight concurrent LUs or ISLUs with REX IP (as displayed on Page 1280-1289), and any number of units at a time may have REX INH.

If a unit shows the state of IP or INH, it reflects the state of diagnostics (DGN). Electronic loop segregation (ELS) and fabric exercise (FAB) do not specifically show up because they apply to the SM as a whole.

The REX schedule displays the start time in hours and minutes and the duration of DGN, ELS, and FAB in hours. It shows the setting of REX Verbose; Y if verbose is turned on, N if verbose is turned off. For each day of the week, the schedule displays whether DGN, ELS, and FAB are scheduled to run for that day; F means full tests are scheduled and N means REX is not scheduled for that day on that SM.

If REX is inhibited for the entire SM due to the input message **INH:REX,SM=SM#**, REX INHIBITED - SEE 1800 appears backlighted in the upper right area of the page

NOTE: If the module controller is an **SMP20**, the bootstrapper status is **not** displayed. The SMP20 processor is also referred to as the module controller/time slot interchange model 2 (MCTU2). For non-SMP20 SMs, the bootstrapper status is displayed on the 1280 page display.

Figure 5-129 is an example of the SM REX STATUS page. In this display for SM 7, DGN starts at 12:30 a.m. (HRS=0, MINS=30) and runs for two hours. The ELS starts at 2:30 a.m. (HRS=2, MINS=30) and runs for two hours. FAB starts at 4:30 a.m. (HRS=4, MINS=30) and runs for two hours. REX on line unit 0 is in progress and is inhibited on line unit 1.

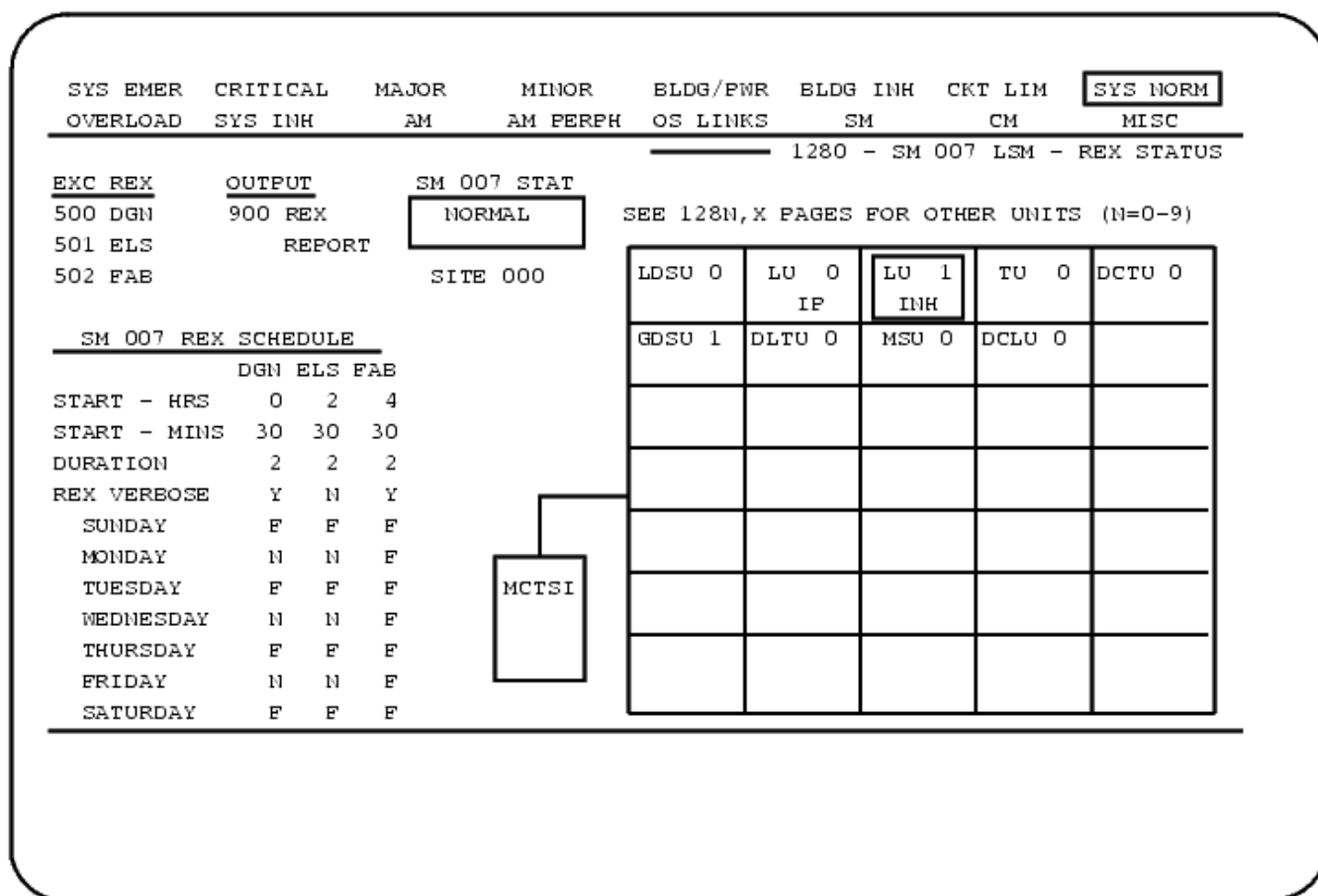


Figure 5-129 1280,X - SM X - REX Status [5E12 and Later]

Abbreviations:

DCLU	Digital Carrier Line Unit	LDSU	Local Digital Service Unit
DCTU	Digital Carrier Trunk Unit	LU	Line Unit
DGN	Diagnostics	MCTSI	Module Controller Time Slot Interchanger
DLTU	Digital Line Trunk Unit	MINS	Minutes
ELS	Electronic Loop Segregation	MSU	Metallic Service Unit
EXC	Execute	N	No
F	Full Test	REX	Routine Exercise
FAB	Fabric Exercise	SM	Switching Module
GDSU	Global Digital Service Unit	STAT	Status
HRS	Hours	TU	Trunk Unit
INH	Inhibit	Y	Yes
IP	In Progress		

5.79.3 Commands

Commands are provided for executing DGN, ELS, or FAB REX and for outputting the status of REX for the SM for which the page is displayed.

All available display commands can be entered from the 1280,X page.

CMD	RESULT
500	Execute (start) REX DGN. (EXC:REX,SM=SM#,DGN)
501	Execute (start) REX ELS. (EXC:REX,SM=SM#,ELS)
502	Execute (start) REX FAB. (EXC:REX,SM=SM#,FAB)
900	Output status of REX for the SM. (OP:REX,SM=SM#)

5.80 1290 - CM REX STATUS [5E12 and Later]**5.80.1 Purpose**

The purpose of the 1290 display page is to provide the status of REX for the CM and to display the REX schedule for the CM.

5.80.2 General

The 1290 page shows the REX status for the ONTCs and the MSGSs. Only one unit may have REX in progress at a time, while any number of them may have REX inhibited.

If a unit shows the state of in progress (IP), it reflects the state of DGN. The 5ESS[®]-2000 switch causes the FPC, PPC, CMP, and ONTC to be soft switched but does not run any tests and does not cause any status to be displayed on the page.

The REX schedule displays the start time in hours and minutes and the duration in hours. It shows the setting of REX Verbose, Y if verbose is turned on, N if verbose is turned off. For each day of the week, the schedule displays whether DGN is scheduled to run for that day; F means full diagnostic tests are scheduled, N means not scheduled, and P means partial test are scheduled (switch).

If REX is inhibited for the entire CM due to the input message INH:REX,CM, a backlighted note appears at the upper right area of the page that shows REX INHIBITED - SEE 110.

Figure 5-130 shows REX in progress on MSGS 1. The schedule indicates that DGN is scheduled at half past midnight (HRS=0, MINS=30) and runs for three hours on Mondays, Wednesdays, and Fridays. The REX verbose is turned on. On Saturday, a partial switch will be done.

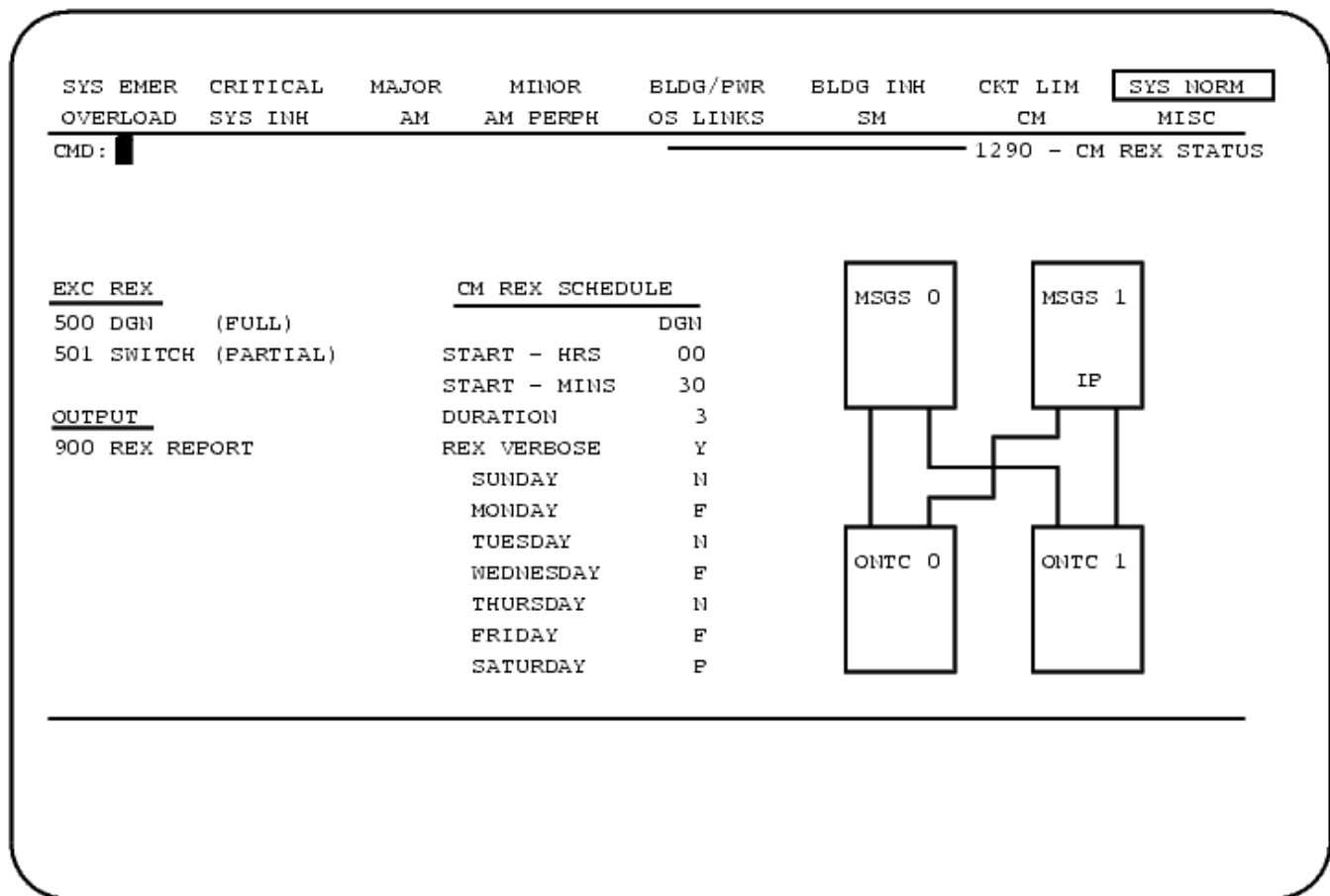


Figure 5-130 1290 - CM REX Status [5E12 and Later]

Abbreviations:

CM	Communication Module	MSGS	Message Switch
DGN	Diagnostics	N	No
EXC	Execute	ONTC	Office Network Timing Complex
F	Full Test	P	Partial
HRS	Hours	REX	Routine Exercise
IP	In Progress	Y	Yes
MINS	Minutes		

5.80.3 Commands

Commands are provided for executing full DGN exercises or partial DGN exercises (SWITCH) and for outputting the status of REX for the CM.

All available displays can be accessed from the 1290 display page.

CMD	RESULT
500	Execute (start) full REX DGN. (EXC:REX,CM,DGN)
501	Execute (start) partial REX DGN. (EXC:REX,CM,SWITCH)
900	Output status of REX for the CM. (OP:REX,CM)

5.81 1310,Y,Z,X - SM X - DCLU Y - RT Z [5E12 and Later]

5.81.1 Purpose

The purpose of the 1310,Y,Z,X page is to show status for SLC[®] 96 Carrier RTs, if equipped.

5.81.2 General

The 1310 page displays for RT1 through RT6 are very similar.

There are several possible configurations for the RT pages. A typical configuration is shown in Figure 5-131 .

If an off-normal condition occurs in any of the SDFIs, the corresponding SDFI indicator is backlighted and text is written in. To the right of SDFI in the SDFI indicators is the SDFI number that indicator represents. Its associated facility is below the SDFI indicator box and is backlighted if off-normal.

Each facility (A, B, C, or D) has an associated SHELF indicator. If there is an off-normal condition in a shelf, the SHELF indicator is backlighted.

If a SHELF or SHELF GROUP is in an off-normal state, the RT indicator on the 1150 page is backlighted, as will the DCLU indicator on the 1010 page, and the SM indicator on the 114 page. On the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted and CKT OOS is written. In the SUMMARY STATUS AREA, the SM indicator and the alarm level backlight.

Facilities A and C each have a SHELF GROUP indicator. They can be configured with either their SHELF or SHELF GROUP, unless facility B or D are equipped. If B is equipped, facility A must be configured with a shelf. If facility D is equipped, facility C must be configured with a shelf.

If a facility is off-normal (and all SDFI and SHELF indicators are normal), the RT indicator on the 1150 page is backlighted, as is the DCLU indicator on the 1010 page. If the FACOFFN option is turned off (**CLR:S96,FACOFFN**), the SM indicator on the 114 page remains normal, as does the SM indicator on the 141, 142, 143, or 144 page.

When facility P is replacing a facility, the RT indicator on the 1150 page is backlighted, as is the DCLU indicator on the 1010 page. If the FACOFFN option is turned off (**CLR:S96,FACOFFN**), the SM indicator on the 114 page remains normal, as does the SM indicator on the 141, 142, 143, or 144 page.

If the FACOFFN option is turned on (**SET:S96,FACOFFN**) and either an FAC is off-normal or facility P is replacing a facility, the SM indicator on the 114 page is backlighted, as is the SM indicator on the 141, 142, 143, or 144 page with an appropriate descriptive phrase (CKT OOS or SLC[®] PLS). In the SUMMARY STATUS AREA, the SM indicator and the alarm level backlight.

Facility P is a protection facility. If one of the equipped facilities is OOS but the shelf or shelf group is ACT, facility P replaces the OOS facility. It may also replace a facility that is ACT (if there is a manual request or a problem at the RT). Facility P is optional.

To the left of shelf A is the PWR/MISC alarm indicator. If there is a Power/Miscellaneous alarm at the RT, the indicator is backlighted and either major (MJ) or minor (MN) appears in the indicator. The RT indicator on the 1150 page is backlighted, as is the DCLU indicator on the 1010 page and the SM indicator on the 114 page. On the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted, and BLDG/PWR is written. In the SUMMARY STATUS AREA, the SM indicator and the alarm level backlight.

The subscriber loop carrier identification number (SID) is displayed beneath the SHELF A indicator.

Figure 5-131 shows RT1 has SDFI 4 out of service (OOS). It is associated with facility B which is out-of-service family (OOSF) of equipment. The SDFI 6 is OOS and its associated facility (C) and shelf group (CD) are OOSF. The protection facility (P) has taken over for facility B.

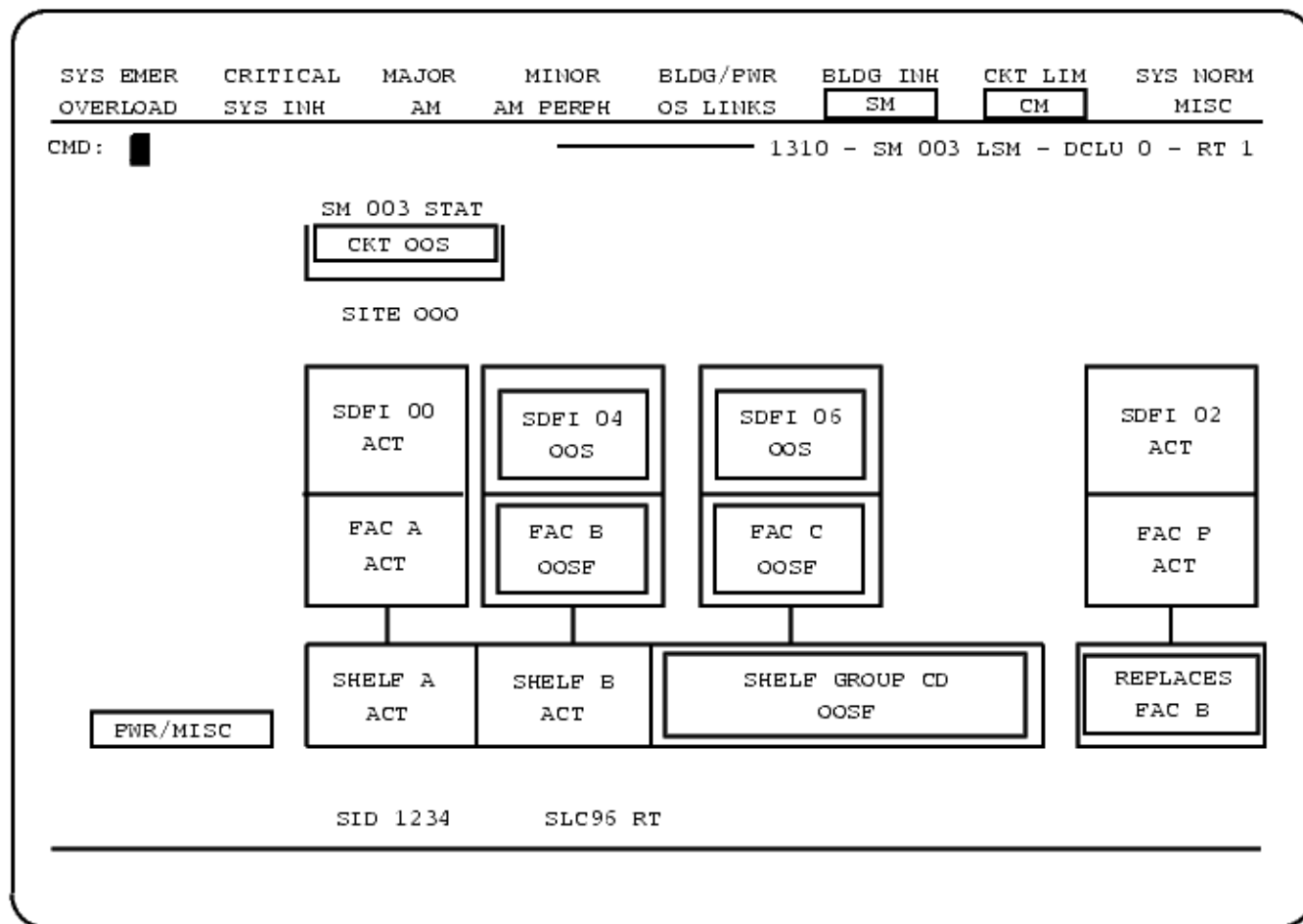


Figure 5-131 1310,Y,Z,X - SM X - DCLU Y - RT Z [5E12 and Later]

Abbreviations:

ACT	Active	PWR	Power
DCLU	Digital Carrier Line Unit	RT	Remote Terminal
FAC	Facility	SID	SLC®
LSM	Local Switching Module		Identification Number
MISC	Miscellaneous	SDFI	SLC®
OOS	Out of Service		Digital Facility Interface
OOSF	Out-of-Service Family of Equipment	SM	Switching Module
		STAT	Status

5.81.3 Commands

There are no commands on the 1310,Y,Z,X page. All available displays can be accessed from this page.

5.82 1320 - AIU/EAIU SUMMARY DISPLAY PAGE (5E12 and Later)

5.82.1 Purpose

The 1320 display page contains the high level summary of the Access Interface Units (AIUs) or Expansion AIUs.

5.82.2 General

The AIU summary display page simultaneously shows the state of both Comman Data and Controls (COMDACs), the summary status for the TSGRPs for each service group, the summary status of each AP, and if the AIU is served by RGs, the summary status of the RG pair. The status of the COMDACs is noted on the MCC display as duplex SM peripheral controllers. The COMDACs run in a load shared configuration where the MCC display is active-major or active-minor. If a request is made to conditionally remove a COMDAC, CAMP is displayed until all calls routed through the COMDAC are terminated. Generally, the active-minor COMDAC will have few or no calls routed through it. When any TSGRP for a particular COMDAC is removed, the MCC displays the trouble by backlighting the associated service group. When any AP or associated circuit is removed from service, the MCC displays the trouble by backlighting the AP summary box which also displays the AP application.

The following units are displayed:

- Both the COMDAC status is displayed with possible MINOR/MAJOR state.
- The Time Slot Group (TSGRP) summary is displayed.
- The Application Pack (AP) Type (ie. LP,Z is Line Pack Z).
- Possibly an information summary box will appear if the current AIU is supported by Ring Generators (RGs) located on another AIU.
- BROADBAND CAPABLE will be displayed if the high-speed broadband backplane is equipped for the (E)AIU.

The following units specific to the EAIU are displayed:

- The Fan and Fuse status.
- The External Reference summary is displayed.
- The TSGRP/FAC Service Group summary is displayed.

The display pokes show how to reach related sub-pages:

- The Time Slot Group page - 1321.
- The Ring Generator page - 1322.
- The Application page - 1323.

Figure 5-132 shows an example of the 1320 AIU and EAIU display pages.

Figure 5-133 shows AFM, ADSL Packs, and broadband capability.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC																				
CMD< 1320 - SM 007 LSM EAIU 001 SUMMARY																											
REMOVE 20X COMDAC X	SM 007 STAT [] SITE 000		FAN INH FUSE ALM		COMDAC 0 ACT MAJOR TSGRP/FAC SG 0 EXTERNAL REF 0		COMDAC 1 ACT MINOR TSGRP/FAC SG 1 EXTERNAL REF 1																				
RESTORE 30X COMDAC X																											
DIAGNOSE 50X COMDAC X																											
SWITCH 400 COMDAC	SERVED BY RGS ASSIGNED TO RAIU 003		<table border="1"> <thead> <tr> <th>APPLICATION</th> <th>PACK</th> <th>SUMMARY</th> <th>STATUS</th> </tr> </thead> <tbody> <tr> <td>00 LP, Z</td> <td>04 LP, Z</td> <td>08</td> <td>12</td> </tr> <tr> <td>01 LP, Z</td> <td>05</td> <td>09</td> <td>13</td> </tr> <tr> <td>02 LP, Z</td> <td>06</td> <td>10</td> <td>14</td> </tr> <tr> <td>03 LP, Z</td> <td>07 LP, U</td> <td>11</td> <td>15</td> </tr> </tbody> </table>					APPLICATION	PACK	SUMMARY	STATUS	00 LP, Z	04 LP, Z	08	12	01 LP, Z	05	09	13	02 LP, Z	06	10	14	03 LP, Z	07 LP, U	11	15
APPLICATION	PACK	SUMMARY	STATUS																								
00 LP, Z	04 LP, Z	08	12																								
01 LP, Z	05	09	13																								
02 LP, Z	06	10	14																								
03 LP, Z	07 LP, U	11	15																								
DISPLAY 1321,Y TSGRP PAGE 1322,W RG PAGE 1323,Y,Z AP PAGE (W=RESIDING/ASSIGNED AIU#, Y=AIU#, Z=AP#)																											

Figure 5-132 1320 -EAIU Summary Page (5E12 and later)

Abbreviations:

AIU	Access Interface Unit	LSM	Local Switching Module
AM	Administrative Module	RG	Ring Generators
AP	Application Pack	SG	Service Group
C	Coin	TSGRP	Time Slot Group
COMDAC	Common Data and Control	U	ISDN U-Interface Line Pack
LP	Line Pack	Z	Line Pack of Analog

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD<				1320 - SM 007 LSM EAIU 001 SUMMARY			
REMOVE		SM 007 STAT		COMDAC 0 ACT		COMDAC 1 ACT	
20X COMDAC X		SITE 000		MAJOR		MINOR	
RESTORE		BROADBAND CAPABLE		TSGRP SG 0		TSGRP SG 1	
30X COMDAC X							
DIAGNOSE							
50X COMDAC X							
DISPLAY							
1321,Y TSGRP PAGE							
1322,W RG PAGE							
1323,Y,Z AP PAGE							
(W=RESIDING AIU#, Y=AIU#, Z=AP#)							

APPLICATION PACK SUMMARY STATUS				
00 AFM	04 LP,Z	08	12	16
01 LP,Z	05	09	13	17
02 ADSL	06	10	14	18
03 ADSL	07	11	15	19

SERVED BY RGS ASSIGNED TO AIU 007	

Figure 5-133 1320 -EAIU Summary Page, ADSL/AFM Packs, and Broadband Capability (5E12 and later)

Abbreviations:

ADSL	Asymmetric Digital Subscriber Line	COMDAC	Common Data and Control
AFM	ATM Feeder Multiplexer	LSM	Local Switching Module
AIU	Access Interface Unit	RG	Ring Generators
AM	Administrative Module	SG	Service Group
AP	Application Pack	TSGRP	Time Slot Group
ATM	Asynchronous Transfer Mode	U	ISDN U-Interface Line Pack
C	Coin	Z	Line Pack of Analog
LP	Line Pack		

5.82.3 Commands

Commands are provided to allow removal, restoral, and diagnosis of the COMDAC units.

In addition to these commands, any available paging command can be entered from Page 1320.

CMD	RESULT
20X	RMV:AIUCOMDAC=\$S-\$U-X
30X	RST:AIUCOMDAC=\$S-\$U-X
400	SW:AIUCOMDAC=\$S-\$U
50X	DGN:AIUCOMDAC=\$S-\$U-X
where:	
\$S is the SM number	
\$U is the AIU number	
X is the COMDAC number (0-1)	

5.83 1321 - TIME SLOT GROUP (TSGRP) STATUS PAGE (5E12 Only)

5.83.1 Purpose

The 1321 display page is the Time Slot Group status page of an Access Interface Unit (AIU) or Expansion AIU. The EAIU shows whole FAC type and equipment number.

5.83.2 General

The AIU TSGRP display page simultaneously shows the state of each TSGRP on the AIU. The TSGRPs are listed by service group, and the physical host of the TSGRP is displayed (e.g., PIDB). If a request is made to conditionally remove a TSGRP, CAMP is displayed until all calls routed through the TSGRP are terminated.

TSGRPs which carry D-channel data or packetized data for ISDN cannot be removed via commands from this page as long as there are ports still assigned to these TSGRPs. These types of TSGRPs can be removed via the 1320 page by removing the corresponding COMDAC.

The status of all equipped TSGRPs and their Physical Name are displayed on this page. The Physical Name is located in the second and fourth columns in the table displayed on this page.

Figure 5-134 shows an example of the 1321 EAIU page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD<				1321 - SM 007 LSM EAIU 001 TSGRP			
SM 007 STAT							
				COMDAC 0		COMDAC 1	
REMOVE		SITE 000		TSGRP	HOST FACILITY	TSGRP	HOST FACILITY
20X	COMDAC 0	TSGRP	X	0 ACT	DNUS:001-12-34-56	0 ACT	DNUS:001-12-34-56
21X	COMDAC 1	TSGRP	X	1 ACT	DNUS:001-12-34-56	1 ACT	DNUS:001-12-34-56
RESTORE				2 ACT	DNUS:001-12-34-56	2 ACT	DNUS:001-12-34-56
30X	COMDAC 0	TSGRP	X	3 ACT	DNUS:001-12-34-56	3 ACT	DNUS:001-12-34-56
31X	COMDAC 1	TSGRP	X	4 ACT	DNUS:001-12-34-56	4 ACT	DNUS:001-12-34-56
DIAGNOSE				5 ACT	DNUS:001-12-34-56	5 ACT	DNUS:001-12-34-56
50X	COMDAC 0	TSGRP	X				
51X	COMDAC 1	TSGRP	X				
DISPLAY							
1120,Y		DLTU Y					
1512,Y,Z		DNUS Y FAC Z					

Figure 5-134 1321 - EAIU Time Slot Group Status Page (5E12 Only)

Abbreviations:

AIU	Access Interface Unit	LSM	Local Switching Module
AM	Administrative Module	PIDB	Peripheral Interface Data Bus
COMDAC	Common Data and Control	TSGRP	Time Slot Group

5.83.3 Commands

Commands are provided to allow removal, restoral, and diagnosis of each COMDAC'S TSGRP units.

In addition to these commands, any available paging command can be entered from Page 1321.

CMD	RESULT
20X	RMV:AIUTSGRP=\$S-\$U-0-X
21X	RMV:AIUTSGRP=\$S-\$U-1-X
30X	RST:AIUTSGRP=\$S-\$U-0-X
31X	RST:AIUTSGRP=\$S-\$U-1-X
50X	DGN:AIUTSGRP=\$S-\$U-0-X
51X	DGN:AIUTSGRP=\$S-\$U-1-X
where:	
\$S is the SM number	
\$U is the AIU number	
0/1 is the COMDAC number	
X is the TSGRP number (0-5)	

5.84 1322 - RING GENERATOR (RG) STATUS PAGE (5E12 and Later)

5.84.1 Purpose

The 1322 display page is the Ring Generator status page of an Access Interface Unit (AIU) or Expansion AIU.

5.84.2 General

The AIU/EAIU RG display page simultaneously shows the state of both RGs hosted by the AIU/EAIU. If the RG is internal, the COMDAC controlling the RG and its summary status is displayed for each RG. If the RG is external, the text is displayed EXTERNAL. The list of AIUs/EAIUs served by the RG pair is also displayed. When the controlling COMDAC is removed from service, the MCC displays the trouble by backlighting the COMDAC text.

Figure 5-135 shows an example of the 1322 EAIU display page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD <				1322 - SM 007 LSM EAIU 001 RG STATUS			
		SM 007 STAT					
REMOVE							
20X RG X		SITE 000					
RESTORE							
30X RG X							
DIAGNOSE							
50X RG X							

RG 0	ACT	RG PAIR SUPPORTS	
EXTERNAL		EAIU	1
		AIU	2
		AIU	3
RG 1	ACT		
EXTERNAL			

Figure 5-135 1322 - Ring Generator (RG) Status Page (5E12and later)

Abbreviations:

AIU	Access Interface Unit	LSM	Local Switching Module
AM	Administrative Module	RG	Ring Generators
COMDAC	Common Data and Control		

5.84.3 Commands

Commands are provided to allow removal, restoral, and diagnosis of each RG.

In addition to these commands, any available paging command can be entered from Page 1322.

CMD	RESULT
20X	RMV:AIURG=\$S-\$U-X
30X	RST:AIURG=\$S-\$U-X
50X	DGN:AIURG=\$S-\$U-X
where:	
\$S is the SM number	
\$U is the AIU number	
X is the RG number (0-1)	

5.85 1323 - APPLICATION PACK (AP) STATUS PAGE (5E12 and Later)**5.85.1 Purpose**

The 1323 display page is the Application Pack (AP) status page of an Access Interface Unit (AIU) or Expansion AIU (EAIU).

5.85.2 General

The AIU/EAIU AP display page simultaneously shows the state of the AP and all associated circuits, in addition to the AP application type. The COMDAC controlling the AP and its summary status is displayed for the AP. If a request is made to conditionally remove an AP or associated circuit that has a call routed over it, CAMP will be displayed until the call is terminated. When the controlling COMDAC is removed from service, the MCC displays the trouble by backlighting the COMDAC text.

The status of the Line Pack (LP), the LP's type, and the associated LP's COMDACs are displayed on this page. Also displayed is the status of all the equipped Line Circuits (LCs) supported by the LP. The 1323 page will support Line Pack (LP) C and LP U. Figure 5-136 shows an example of the 1323 EAIU display page for Line Packs.

The status of the Test Pack, the control COMDAC, the supported EAIU's, and the SM where the EAIU's reside is displayed on the 1323 page. Figure 5-137 shows an example of the 1323 MCC page for the Test Pack.

Figure 5-138 shows the 1323 MCC page for ADSL Application Packs. As indicated, Maintenance for these packs is outside the 5ESS and is available via the 5E Element Manager.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD<				1323 - SM 007 LSM EAIU 001 AP 11			
REMOVE		SM 007 STAT					
2000 LP							
21XX LC XX		SITE 000					
RESTORE							
3000 LP							
31XX LC XX							
DIAGNOSE							
5000 LP							
51XX LC XX							

LINE PACK:			
STATE:		CONTROL: COMDAC	
00 ACT	08 ACT	16 ACT	24 ACT
01 ACT	09 ACT	17 ACT	25 ACT
02 ACT	10 ACT	18 ACT	26 ACT
03 ACT	11 ACT	19 ACT	27 ACT
04 ACT	12 ACT	20 ACT	28 ACT
05 ACT	13 ACT	21 ACT	29 ACT
06 ACT	14 ACT	22 ACT	30 ACT
07 ACT	15 ACT	23 ACT	31 ACT

Figure 5-136 1323 - Application Pack (AP) Status Page for Line Packs (5E12 and Later)

Abbreviations:

AIU	Access Interface Unit	LC	Line Circuit
AM	Administrative Module	LP	Line Pack
AP	Application Pack	LSM	Local Switching Module
COMDAC	Common Data and Control	Z	Type of Line Pack

```

SYS EMER CRITICAL MAJOR MINOR BLDG/PWR BLDG INH CKT LIM SYS NORM
OVERLOAD SYS INH AM AM PERPH OS LINKS SM CM MISC
CMD< 1323 - SM 007 LSM EAIU AIU AP 02

```

```

SM 007 STAT
REMOVE
200 TEST PACK
SITE 000

```

```

RESTORE
300 TEST PACK

```

```

DIAGNOSE
500 TEST PACK

```

TEST PACK	
STATE: ACT	CONTROL: COMDAC 1
TSTP SUPPORTS EAIU	EAIU RESIDES ON SM
1	40
2	55
3	31
5	39
9	192
10	151
12	120
19	9

Figure 5-137 1323 - Application Pack (AP) Status Page for Test Packs (5E12 and later)

Abbreviations:

AIU	Access Interface Unit	LC	Line Circuit
AM	Administrative Module	TSTP	Test Pack
AP	Application Pack	LSM	Local Switching Module
COMDAC	Common Data and Control		

```

SYS EMER CRITICAL MAJOR MINOR BLDG/PWR BLDG INH CKT LIM SYS NORM
OVERLOAD SYS INH AM AM PERPH OS LINKS SM CM MISC
CMD<
SM 007 STAT
SITE 000

```

```

ADSL PACK IS PROVISIONED
MAINTENANCE OPERATIONS PERFORMED
THROUGH THE ELEMENT MANAGER

```

Figure 5-138 1323 - Application Pack (AP) Status Page for ADSL/AFM Packs (5E12 and Later)

Abbreviations:

AIU Access Interface Unit

LSM Local Switch Module

5.85.3 Commands

Commands are provided to allow removal, restoral, and diagnosis of the LP and each LC. These commands do not apply to the ADSL and AFM Application Packs.

In addition to these commands, any available paging command can be entered from Page 1323.

CMD	RESULT
200	RMV:AIUTSTP=\$S-\$U-\$Z
2000	RMV:AIULP=\$S-\$U-\$Z
21XX	RMV:AIULC=\$S-\$U-\$Z-X
300	RST:AIUTSTP=\$S-\$U-\$Z
3000	RST:AIULP=\$S-\$U-\$Z
31XX	RST:AIULC=\$S-\$U-\$Z-X
500	DGN:AIUTSTP=\$S-\$U-\$Z
5000	DGN:AIULP=\$S-\$U-\$Z
51XX	DGN:AIULC=\$S-\$U-\$Z-X

where:

\$S is the SM number
 \$U is the AIU number
 \$Z is the AP number
 X is the LC number (00-63)

where XX is LC 00 through 31.

5.86 1380 and 1381 QLPS NETWORK 0 and 1 STATUS [5E12 and Later]

5.86.1 Purpose

The purpose of the 1380 and 1381 pages is to show status and provide maintenance commands for the quad link packet switch (QLPS) network 0 and network 1, respectively. For each network, status of the QLPS, QLPS gateway processor (QGP), QLPS-QGP link (QGL), QLPS pipe (QPIPE), and QLPS pseudo TMS link (QTMSLNK) are provided.

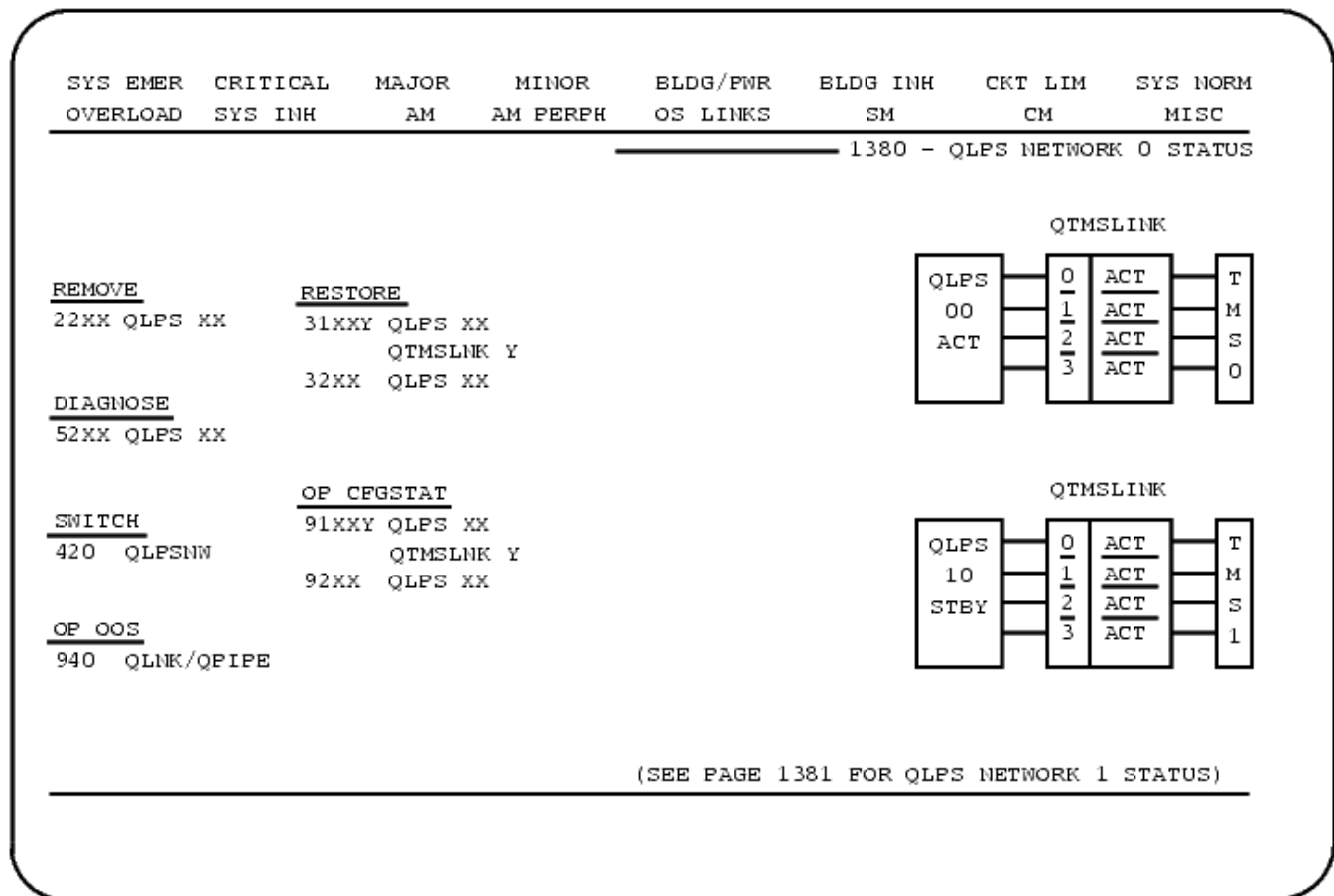
Pages 1380 and 1381 cannot be accessed unless the office is equipped with QLPSs.

5.86.2 General

The 1380 and 1381 are QLPS network display pages that show various QLPS configurations. With only the QLPS units equipped, the 1380 and 1381 pages display only the QLPS and QTMSLNK status and related poke commands. With two- or four-QGP configuration, the 1380 and 1381 pages display status of QGP, QGL, QPIPE, QLPS, and QTMSLNK for network 0 and network 1, respectively.

When an off-normal condition occurs in the QGP, QGL, QLPS, or QTMSLNK, the indicator for the circuit backlights, the 1380 or 1381 indicator on Page 115 backlights, and the CM backlights in the SUMMARY STATUS AREA. The associated alarm level (CRITICAL, MAJOR, or MINOR) also backlights, if applicable. Also, if the QGP is off-normal, the QGP indicator on Page 1241 or 1251 backlights, the SEE PAGE 1241 or 1251 on Page 1240 or 1250 backlights, and the 1241 or 1251 indicator on Page 115 backlights. If the QLPS is off-normal, the QLPSNW indicator on Page 1209 backlights, and the 1209 indicator on Page 115 backlights.

Figure 5-139 is an example of the 1380 QLPS Network 0 Status page with no QGP equipped.



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Figure 5-139 1380 - QLPS Network 0 Status (No QGP Equipped) [5E12 and Later]

Abbreviations:

ACT	Active	QLPSNW	QLPS Network
CFGSTAT	Configuration Status	QPIPE	QLPS Pipe
OOS	Out of Service	QTMSLNK	QLPS Pseudo TMS Link
OP	Output	STBY	Standby
QLNK	QLPS Link	TMS	Time-Multiplexed Switch
QLPS	Quad Link Packet Switch		

Figure 5-140 is an example of the 1381 QLPS Network 1 Status page showing a two-QGP configuration with QGL 0-0-3 OOS, QPIPE 0-0-1 OOS, QGL 1-0-1 OOSF, QTMSLNK 0-1-2 and 1-1-0 OOS.

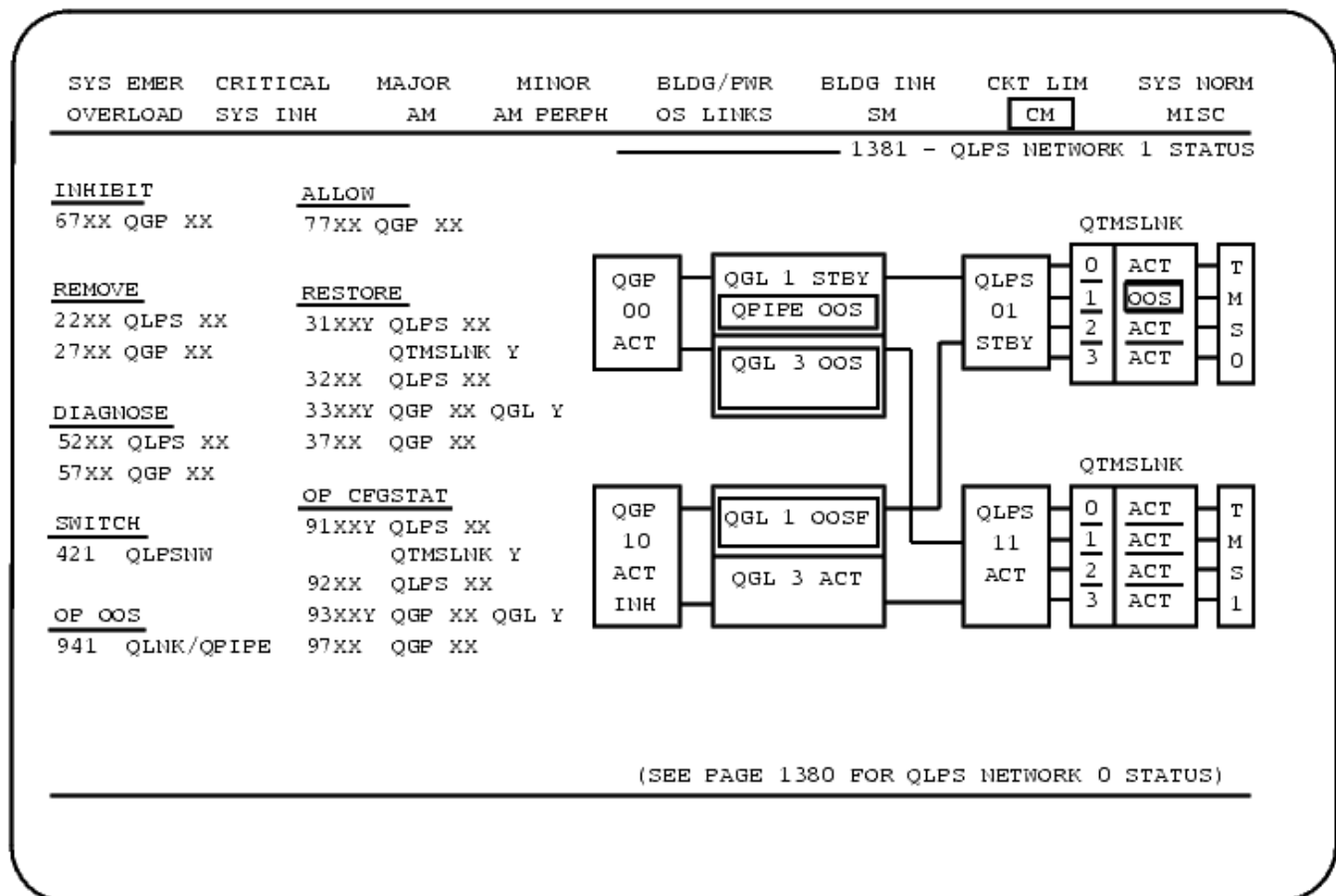
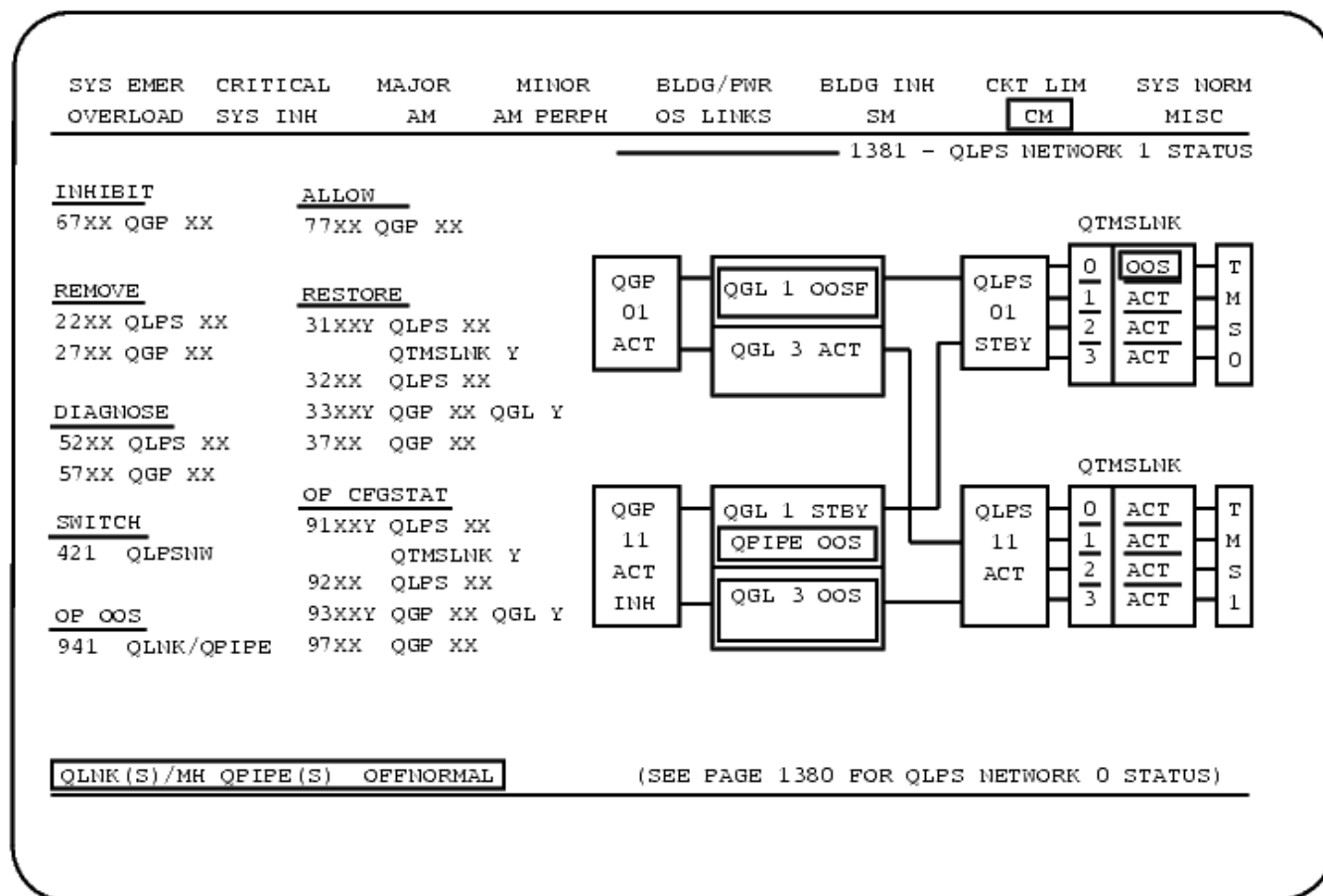


Figure 5-140 1381 - QLPS Network 1 Status (Two QGPs Equipped) [5E12 and Later]

Abbreviations:

ACT	Active	QGP	QLPS Gateway Processor
CFGSTAT	Configuration Status	QLNK	QLPS Link
INH	Inhibit	QLPS	Quad Link Packet Switch
OOS	Out of Service	QLPSNW	QLPS Network
OOSF	Out-of-Service Family of Equipment	QPIPE	QLPS Pipe
OP	Output	QTMSLNK	QLPS Pseudo TMS Link
QGL	QLPS-QGP Link	STBY	Standby
		TMS	Time-Multiplexed Switch

Figure 5-141 is an example of the 1381 QLPS Network 1 Status page showing a four-QGP configuration with QGL 0-1-1 OOSF, QPIPE 1-1-1 OOS, QGL 1-1-3 OOS, QTMSLNK 0-1-0 OOS, and QLNM/MH QPIPE off-normal.



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Figure 5-141 1381 - QLPS Network 1 Status (Four QGPs Equipped) [5E12 and Later]

Abbreviations:

ACT	Active	QGP	QLPS Gateway Processor
CFGSTAT	Configuration Status	QLNK	QLPS Link
INH	Inhibit	QLPS	Quad Link Packet Switch
MH	Message Handler	QLPSNW	QLPS Network
OOS	Out of Service	QPIPE	QLPS Pipe
OOSF	Out-of-Service Family of Equipment	QTMSLNK	QLPS Pseudo TMS Link
OP	Output	STBY	Standby
QGL	QLPS-QGP Link	TMS	Time-Multiplexed Switch

5.86.3 Commands

Commands are provided to remove, restore, diagnose, switch, and output the configuration status of the QLPSs; to restore and output the configuration status of the QTMSLNKs; and to output the configuration status of Network 0 and Network 1 QLNK/QPIPE.

If QGPs are equipped, commands are also provided to remove, restore, diagnose, allow hardware checks, inhibit hardware checks, and output the configuration status of the QGPs and to restore and output the configuration status of QGLs.

CMD	RESULT
22XX	QLPS XX is removed. (RMV:QLPS=X-X) [UCL]

27XX	[,DEGROW] QGP XX is removed. (RMV:QGP=X-X) [,UCL] [,DEGROW]
31XXY	QLPS XX QTMSLNK Y is restored. (RST:QTMSLNK=X-X-Y) [,UCL]
32XX	QLPS XX is restored. (RST:QLPS=X-X) [,UCL]
33XXY	QGP XX QGL Y is restored. (RST:QGL=X-X-Y) [,UCL]
37XX	QGP XX is restored. (RST:QGP=X-X) [,UCL]
420	QLPSNW 0 is switched. (SW:QLPS=0-0) [,UCL]
421	QLPSNW 1 is switched. (SW:QLPS=0-1) [,UCL]
52XX	QLPS XX is diagnosed. (DGN:QLPS=X-X,RAW,TLP) [,UCL] [,RPT] Test is run 32,767 times. [,RPT=a] The "a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The "b" is the phase or "b&&c" is the range of phases to be performed. [,GROW] Diagnose growth hardware.
57XX	QGP XX is diagnosed. (DGN:QGP=X-X,RAW,TLP) Same options as 52XX
67XX	Hardware checks for QGP XX is inhibited. (INH:HDWCHK,QGP=X-X)
77XX	Hardware checks for QGP XX is allowed. (ALW:HDWCHK,QGP=X-X)
91XXY	Configuration status for QLPS XX QTMSLNK Y is output. (OP:CFGSTAT,QTMSLNK=X-X-Y)
92XX	Configuration status for QLPS XX is output. (OP:CFGSTAT,QLPS=X-X)
93XXY	Configuration status for QGP XX QGL Y is output. (OP:CFGSTAT,QGL=X-X-Y)
940	Configuration status for Network 0 QLNK/QPIPE is output. (OP:QNETSTAT,QLPSNW=0,NOFE) [,OOS][,ALL]
941	Configuration status for Network 1 QLNK/QPIPE is output. (OP:QNETSTAT,QLPSNW=1,NOFE) [,OOS][,ALL]
97XX	Configuration status for QGP X-X is output. (OP:CFGSTAT,QGP=X-X)

5.87 1400,X - SM X RSM/ORM BLDG/PWR ALARMS [5E12 and Later]

5.87.1 Purpose

The purpose of the 1400,X page is to display building/power alarm status and assignment and the alarm retire mode. It also provides inhibit/allow controls for building alarms and sets the alarm retire mode in the remote switching module (RSM). In addition, the 1400,X page displays status and provides controls in the optically remoted module (ORM).

5.87.2 General

When 1400,X is poked, the page display reflects either RSM data or ORM data. If ``X" is the number of an RSM, then RSM data is shown. Conversely, if ``X" is the number of an ORM, then ORM data is shown.

The 1400,X page has three separate and distinct versions, depending on the hardware equipage in the RSM/ORM. Version one (Figure 5-142) is displayed if 1400 is requested for an RSM/ORM equipped with both scan and distribute boards for the BLDG/PWR alarms and the alarm and status circuit (ASC).

Version two (Figure 5-143) is displayed if 1400 is requested for an RSM/ORM equipped with a remote alarm unit and a metallic service unit or modular metallic service unit. Version two is also displayed if 1400 is requested for an RSM/ORM equipped with scan boards for the BLDG/PWR Alarms but not the ASC.

Version three (Figure 5-144) is displayed if 1400 is requested for an RSM/ORM equipped with an ASC but not the scan boards for the BLDG/PWR Alarms.

If none of these hardware requirements are met, the page is not displayed if requested, and no BLDG/PWR ALARM indicators are displayed on the 1010 page. If no RSM/ORM at the site meets these hardware requirements, no BLDG/PWR Alarm indicator appear on the 1600 page.

Building alarms 02-31 and their alarm levels are office assignable. Doors, windows, humidity, etc., are typical types of applications. The alarm level and text in these indicators are initially filled in using recent change and verify. Once these indicators are filled in, they are protected from loss if the system is booted.

A normal alarm indicator is displayed in normal video (white on black).

Except for the FIRE indicator, when an alarm condition is present and not inhibited, the respective display indicator backlights. The FIRE indicator flashes and backlights. On Display Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for that SM backlights and flashes. On the appropriate 141, 142, 143, or 144 page, the indicator for that SM backlights and flashes, and the phrase CRIT ALM is written. In the SUMMARY STATUS AREA, the SM critical indicator starts flashing, and the alarm level indicator CRITICAL backlights. Also, an audible alarm is sounded. For alarm indicators other than FIRE, on Page 114 the indicator for that SM is backlighted; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted, and a descriptive phrase of the condition is written unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, backlight.

When an alarm is inhibited, the respective indicator has ``INH" written in and is backlighted; SM in the SUMMARY STATUS AREA also backlights. Building alarms 02-31 are the only alarms on the 1400 page that can be inhibited by the craft.

The alarm retire mode indicator, if present, reflects the mode of the alarm retire function of the alarm lights and audibles at the RSM/ORM sites. If set to automatic, the audible alarms at the RSM site and alarm lights on the alarm and status panel retire automatically after a certain time period specified by an office definable parameter in the ODD for that RSM/ORM. If set to manual, the craft is required to manually retire the alarms by pressing the ALM RETIRE button on the RSM/ORM alarm and status panel.

Figure 5-142 is an example of version one where an ORM is equipped with both scan and distribute boards for the BLDG/PWR alarms and the alarm and status circuit (ASC).

In this example, indicator 05 shows a major alarm caused by a failure in the air conditioning system. Indicator COM PWR shows that there is a commercial power failure.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD: 1400 - SM 048 RSM BLDG/PWR ALARMS

SM 048 STAT

6XX INHIBIT ALARM XX	BLDG PWR +	800 AUTO ALARM RETIRE	RETIRE MODE
7XX ALLOW ALARM XX		801 MANUAL ALARM RETIRE	AUTOMATIC
(XX=02 TO 31)	SITE 001		

RSM POWER ALARMS

COM PWR	HIGH VLTG	STBY PLNT	RECT FAIL	PDF FUSE	BAT DSCHG	ALM BAT	MISC PWR

RSM BUILDING ALARMS

00 FIRE	08 HI HUMID MJ	16	24
01 FIRE ALM TRBL	09 DOOR MN	17	25
02 HI TEMP MJ	10 WINDOWS MN	18	26
03 LO TEMP MJ	11 CARRIER MN	19	27
04 AIR DRYER MJ	12	20	28
05 AIR COND MJ	13	21	29
06 LOW VOLT2 MJ	14	22	30
07 LO HUMID MJ	15	23	31

Figure 5-142 1400,X - SM X ORM Alarms and Controls (Version 1 - Building/Power Alarms and ASC Equipped) [5E12 and Later]

Abbreviations:

AUTO	Automatic	ORM	Optically Remoted Module
ALM	Alarm	PDF	Power Distribution Frame
BAT	Battery	PWR	Power
BLDG	Building	RECT	Rectifier
COM PWR	Commercial Power	SM	Switching Module
COND	Conditioner	STAT	Status
DSCHG	Discharge	STBY PLNT	Standby Plant
HUMID	Humidity	TEMP	Temperature
MISC	Miscellaneous	TRBL	Trouble
MJ	Major	VLTG	Voltage
MN	Minor		

Figure 5-143 shows an example of version two in which an RSM is equipped only with the Building/Power Alarms (or the RSM is an earlier vintage equipped with a Remote Alarm Unit). In this example, building alarm 9 is inhibited.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD: 1400 - SM 120 RSM BLDG/PWR ALARMS

SM 120 STAT

INHIBITS +

6XX INHIBIT ALARM XX
7XX ALLOW ALARM XX
(XX=02 TO 31)

SITE 003

RSM POWER ALARMS							
COM PWR	HIGH VLTG	STBY PLNT	RECT FAIL	PDF FUSE	BAT DSCHG	ALM BAT	MISC PWR

RSM BUILDING ALARMS			
00 FIRE	08 HI HUMID MJ	16	24
01 FIRE ALM TRBL	09 INH DOOR MN	17	25
02 HI TEMP MJ	10 WINDOWS MN	18	26
03 LO TEMP MJ	11 CARRIER MN	19	27
04 AIR DRYER MJ	12	20	28
05 AIR COND MJ	13	21	29
06 LOW VOLT2 MJ	14	22	30
07 LO HUMID MJ	15	23	31

Figure 5-143 1400,X - SM X RSM BLDG/PWR Alarms (Version 2 - Building/Power Alarms Only) [5E12 and Later]

Abbreviations:

ALM	Alarm	PDF	Power Distribution Frame
BAT	Battery	PWR	Power
COM PWR	Commercial Power	RECT	Rectifier
COND	Conditioner	RSM	Remote Switching Module
DSCHG	Discharge	STAT	Status
HUMID	Humidity	STBY PLNT	Standby Plant
INH	Inhibit	SM	Switching Module
MISC	Miscellaneous	TEMP	Temperature
MJ	Major	TRBL	Trouble
MN	Minor	VLTG	Voltage

Figure 5-144 is an example of version three where an RSM is equipped with the alarm and status panel but not equipped with scan boards for building/power alarms. In this example, the alarm retire mode is set to automatic.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: 				1400 - SM 109 RSM BLDG/PWR ALARMS			
SM 109 STAT							
NORMAL				800 AUTO ALARM RETIRE		RETIRE MODE	
				801 MANUAL ALARM RETIRE		AUTOMATIC	
SITE 004							
NOT AVAILABLE IN THIS RSM							
NOT AVAILABLE IN THIS RSM							
00	08	16	24				
01	09	17	25				
02	10	18	26				
03	11	19	27				
04	12	20	28				
05	13	21	29				
06	14	22	30				
07	15	23	31				

Figure 5-144 1400,X - SM X RSM BLDG/PWR Alarms (Version 3 - Alarm Retire Only) [5E12 and Later]

Abbreviations:

AUTO	Automatic
RSM	Remote Switching Module
SM	Switching Module
STAT	Status

5.87.3 Commands

Commands are provided to inhibit/allow building alarms 02-31 and to set the ALARM RETIRE mode to automatic or manual.

Also, all available pages can be accessed from the 1400 display page.

CMD	RESULT
6XX	RSM/ORM Building Alarm XX is inhibited (INH:ALM,RBPSC=XX,SM=SM#)
7XX	RSM/ORM Building Alarm XX is allowed (ALW:ALM,RBPSC=XX,SM=SM#)
800	Sets the Alarm Retire Mode to automatic (SET:ALMMDE=AUTO, RBPSC,SM=SM#)
801	Sets the Alarm Retire Mode to manual (SET:ALMMDE=MAN,RBPSC,SM=SM#)

5.88 1420,SZ - SITE Z RAS ALARMS (5E12 and Later)

5.88.1 Purpose

The 1420,SZ - SITE Z RAS ALARMS page shows the status of remote alarm section (RAS) alarms and alarm retire mode at a remote peripheral site.

5.88.2 General

32 alarm scan points are available on a RAS. Scan point 0 (FIRE) and 1 (FIRE ALM TRBL) are fixed, and scan points 2-31 are office-assignable. For each scan point, the scan point number, alarm label, alarm level (for office-assignable points), and state are shown.

NOTE: This MCC page and RAS available to OSPS only.

The page shows the SM and RISLU which host the RAS.

If communication to the host RISLU is lost, the text "COMM LOST - LAST STATUS SHOWN" is displayed and is backlighted.

Figure 5-145 shows an example of the 1420 page display.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD<				1420 SITE 500 RAS ALARMS			
SM 007 STAT				HOSTED BY RISLU 05			
SITE 000							
6XX INHIBIT ALARM XX				800 AUTO ALARM RETIRE RETIRE MODE			
7YY ALLOW ALARM YY				801 MANUAL ALARM RETIRE			
(XX=02-31, YY=00-31)				COMM LOST-LAST STATUS SHOWN			
00 FIRE	08	16	24				
01 FIRE ALM TRBL	09	17	25				
02	10	18	26				
03	11	19	27				
04	12	20	28				
05	13	21	29				
06	14	22	30				
07	15	23	31				

Figure 5-145 1420,SZ - Site Z RAS Alarms (5E12 and later)

Abbreviations:

ALM Alarm
 AUTO Automatic
 BLDG Building
 COND Conditioner

PWR Power
 RISLU Remote Integrated Services Line Unit
 SM Switching Module
 STAT Status

INH	Inhibit	TRBL	Trouble
MISC	Miscellaneous	VOLT0	Voltage 0
MJ	Major	VOLT1	Voltage 1
MN	Minor		

5.88.3 Commands

Commands are provided to inhibit and allow scan points and to change the RAS alarm retire mode.

CMD	RESULT
6XX	Inhibit scan point XX (INH:ALM,RAS,SCPT=XX,SITE=a)
7YY	Inhibit scan point YY (INH:ALM,RAS,SCPT=YY,SITE=a)
800	Scan point alarms retire automatically (SET:ALMMDE=AUTO,RAS,SITE=a)
801	Scan point alarms require manual action to be retired (SET:ALMMDE=MAN,RAS,SITE=a)

5.89 1450,Y,X - SM X - RISLU DLTU Y [5E12 and Later]

5.89.1 Purpose

The 1450,Y,X page display shows the status of remote and host digital facility interfaces (DFI) and the status of remote clocks for a RISLU DLTU on an SM.

5.89.2 General

On Page 1450,Y,X, "Y" equals the DLTU number (0 or 1), and "X" equals the SM number. One RISLU DLTU can host two RISLUs.

The "*" (located to the left of the first and third lines of data in the box on the right half of this page face) indicates these host DFIs are controlling the active RRCLK on the RISLU. In Figure 5-146, SM 115 is hosting two RISLUs; therefore, two control facilities are indicated.

A maximum of 16 host/remote RISLU DFI pairs can be equipped per RISLU DLTU.

The 1450,Y,X and 1700,Y display pages can be accessed from the 1000 SM PAGE INDEX display.

Figure 5-146 shows an example of the 1450,Y,X display page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: _					1450 - SM 115 LSM - RISLU DLTU 1		
<u>REMOVE</u>							
2YX RRCLK Y RISLU X		SM 115 STAT					
22XX DFIH XX		CKT_OOS					
<u>RESTORE</u>							
3YX RRCLK Y RISLU X		SITE 000					
32XX DFIH XX		RISLU 0					
<u>DIAGNOSE</u>							
5YX RRCLK Y RISLU X		SITE 501					
52XX DFIH XX		RRCLK 0 ACT					
		RRCLK 1 STBY					
<u>SWITCH</u>							
40X RRCLK RISLU X							
<u>DISPLAY</u>							
1700,Y ISLU NETWORK Y							
(* CONTROL RFAC)							

*DFIH 00	RISLU 0	DFIR 00	ACT
DFIH 01	RISLU 0	DFIR 03	OOS
*DFIH 02	RISLU 0	DFIR 02	ACT
DFIH 03	RISLU 0	DFIR 03	ACT
DFIH 04	RISLU 0	DFIR 04	ACT

Figure 5-146 1450,Y,X - SM X LSM - RISLU DLTU Y [5E12 and Later]

Abbreviations:

ACT	Active	OOS	Out of Service
CKT	Circuit	RFAC	Remote Facility
DFIH	Digital Facility Interface Host	RISLU	Remote ISLU
DFIR	Digital Facility Interface Remote	RRCLK	RISLU Remote Clock
DLTU	Digital Line Trunk Unit	SM	Switching Modul
ISLU	Integrated Services Line Unit	STAT	Status
LSM	Local Switching Module	STBY	Standby

5.89.3 Commands

The following commands can be used to remove, restore, and diagnose the RISLU clock and the host DFI. All available displays can be accessed from this page.

CMD	RESULT
2YX	Remove RRCLK Y RISLU X. (RMV:RRCLK=a-x-y, SCREEN=b)
22XX	Remove DFIH XX. (RMV:DFIH=a-b-XX)
3YX	Restore RRCLK Y RISLU X. (RST=RRCLK=a-x-y, SCREEN=b)
32XX	Restore DFIH XX. (RST=DFIH=a-b-xx)
5YX	Diagnose RRCLK Y RISLU X. (DGN=RRCLK=a-x-y,RAW,TLP)
52XX	Diagnose DFIH XX. (DGN=DFIH=a-b-y,RAW,TLP)
40X	Switch RRCLK RISLU X. (SW=RRCLK=a-x, SCREEN=b)
1700,Y	Display ISLU NETWORK Y.

5.90 1460 - SM DATA LINK DSLS [5E12 and Later]**5.90.1 Purpose**

NOTE: The term basic rate interface (BRI) means the same thing as digital subscriber line (DSL). This document uses DSL, because the 1460 page display does not identify BRI.

The 1460 page display provides summary status of the Operator Services Position System (OSPS) data links on a per-SM basis.

5.90.2 General

The 1460 page display is not normally accessed when DSLs are IN SERVICE. Usually the 1460 page is accessed because of the following:

- DSL MAJOR or DSL MINOR alarm is indicated in the SM X STATUS indicator box on the 1010-SM X LSM STATUS page display.
- SEE 1460 is present in the RELATED PAGES box on the 1010-SM X LSM STATUS page.

The 1460 page display provides the following information:

- Which data link types are equipped in an SM.

NOTE: If no ports are equipped for a specific data link in the SM, then no data link block appears on the 1460 page display.

- Which data link types have ports OOS and the relative seriousness of the fault. Each data link type has an associated indicator block. If a block is backlighted red, a minor alarm is indicated; also, the term DSL_MINOR is displayed in the SM XXX STATUS indicator block. If a block is flashing from red to white, a major alarm is indicated; also, the term DSL_MAJOR is displayed in the SM XXX STATUS indicator block.
- Which page display gives more details (for example, equipment numbers or states) concerning each data link type equipped in an SM. On the 1460 page display (Figure 5-147), one of the data links represented is DAS/C with the associated page to see for more details (for example, SEE 1470,0), where the first zero is the screen number of the specific service class, and the second zero is the data link type (service class).

NOTE: Figure 5-147 is an example of the XDB data link page display (**1470,7,17 - SM 017 LSM - XDB DATA LINKS**). This page identifies the global port names, external names, and port status for the data links of a specific type equipped on the SM.

There are two types of data links (service classes) - simplex and duplex. The following are simplex data links:

NOTE: The XDB data link is the only link that can be equipped with more than 16 ports.

- HOBICV
- HOBIS
- HOBICR
- AQ
- XDB
- OAP.

The following are duplex data links:

- DAS/C
- RAS
- RTRS
- MISLNK.

The external information system (EIS) data link is an N+K data link group, where N+K is defined in the alarms section.

See the abbreviation listing associated with Figure 5-147 for the definition of each data link.

Major and Minor Alarms

For **simplex** data links, if more than 50 percent of the ports associated to a specific data link (per-SM) are OOS (out of service), a major alarm occurs.

For **simplex** data links, if one but no more than 50 percent of the ports associated to the data link are OOS, a minor alarm occurs.

NOTE: If exactly 50 percent of the ports associated to a specific data link are OOS, a **major alarm** occurs.

For the **duplex** DAS/C and RTRS data links, the DAS/C and RTRS data links can be equipped with a maximum of two ports each. If only one port is assigned to DAS/C or RTRS and the port is OOS, a major alarm occurs. If two ports are assigned to DAS/C or RTRS and one or both ports are OOS, a major alarm occurs.

For the **duplex** RAS data link, a maximum of eight RISLU sites can be equipped with RAS (that is, on a per-SM basis). Each RISLU site can be assigned up to a maximum of two RAS data links, therefore, providing a maximum of 16 data links per SM. A minor alarm occurs when at least one RAS data link is OOS, but all of the RISLU sites have at least one RAS link in service. A major alarm occurs when at least one site has all RAS links OOS. Some RISLU sites may only be equipped with one RAS link; when or if this link is OOS, a major alarm occurs.

For the **OAP** data links, if one of the data links is OOS or transitions from IS to IS/INIT, a major alarm occurs. Minor alarms do not apply to the OAP.

EIS Alarm Strategy

The following terminology is used to define EIS data link alarm strategy for an SM:

The set of EIS data links equipped on a specific SM and connected to a specific EIS is referred to as an "EIS Call Processing Data link (CPDL) group." Each EIS CPDL group consists of (N+K) data links, where N and K are specified independently for each EIS CPDL group as follows:

- (1) **N**, indicating the minimum number of CPDLs that are needed to support the message traffic during the busy hour for the EIS CPDL group.
- (2) **K**, the number of CPDLs providing surplus traffic capacity for the EIS CPDL group.

The EIS data link summary status for an SM is defined as follows:

- **DSL_NORMAL:** All EIS data links on the SM are in service.
- **DSL_MINOR:** At least one EIS data link equipped on the SM is out of service, but each EIS CPDL group has at least N EIS data links in service.

- **DSL_MAJOR:** At least one EIS CPDL group has fewer than N EIS data links in service.

Figure 5-147 shows an example of the 1460 page display.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD: _				1460 SM 017 LSM DATA LINK DSLS			
SM 017 STAT							
DSL_MAJOR							
SITE 000		DAS/C		RAS		RTRS	
		SEE 1470,0		SEE 1470,1		SEE 1470,2	
HOBIS		HOBICV		HOBICR		AQ	
SEE 1470,3		SEE 1470,4		SEE 1470,5		SEE 1470,6	
XDB		MISLNK		EIS		OAP	
SEE 1470,7		SEE 1470,8		SEE 1470,9		SEE 1470,10	

Figure 5-147 1460 - Data Link DSLS [5E12 and Later]

Abbreviations:

AP	Application Processor	HOBIS	Hotel Billing Information System
AQ	Auto Quote	LSM	Local Switching Module
DAS/C	Directory Assistance System/Computer	MISLNK	Management Information System Link
DSLS	Digital Subscriber Lines	OAP	OSPS Administrative Processor
EIS	External Information System	RAS	Remote Alarm Section
HOBIC	Hotel Billing Information Center	RTRS	Real-Time Rating System
HOBICR	HOBIC Record-Quote Data Link	SM	Switching Module
HOBICV	HOBIC Voice-Quote Data Link	STAT	Sta4us
		XDB	External Data Base

5.90.3 Commands

Any available paging commands can be entered from this display.

5.91 147Z,Y,X - SM X DATA LINKS [5E12 and Later]

5.91.1 Purpose

The 147Z,Y,X page display provides the global port names, the DSL names, and the DSL status for all of the ports assigned the data link type (for example, XDB) on an SM.

5.91.2 General

On Page 147Z,Y,X, "Z" equals the screen number, "Y" equals the data link type, and "X" equals the SM number.

The 1460 page display has information associated with the 147Z,Y,X page display (such as a list of data link types). Refer to Section 5.90 for information on the 1460 page.

The **GLOBAL PORT NAME** field contains the channel type (B1 or D) followed by the LCEN. The LCEN (for example, 17-4-07-02) represents the following: 17 = SM, 4 = ISLU or RISLU, 07 = line group controller, and 02 = line card.

The **DSL NAME** field contains the data link type (for example, XDB), external name identifiers, and associated link numbers.

The **DSL STATUS** field contains the status of the DSLs.

The **SM X STAT** indicator block provides the relative seriousness of the fault (major or minor alarm).

The **SCREEN Z SUMMARY** indicator block identifies the number of screens available to be displayed. More importantly, if any of the screen numbers are backlighted red, this means that one or more of the ports on that specific screen are OOS.

The user can identify which screen of the data link is being reviewed by looking at the left side of the page display under the **SCREEN Z SUMMARY** indicator.

Figure 5-148 illustrates the XDB data link version of the 147Z,Y,X page display. The XDB data link type is the only type that can be equipped with more than 16 ports.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM																																																																						
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC																																																																						
CMD: _ 1470 - SM 017 LSM - XDB DATALINKS																																																																													
SM 017 STAT DSL_MINOR SITE 000 THIS SCREEN - 0 SCREEN Z SUMMARY 0 1 2 3 4 5 6 7 8 9 DISPLAY 147Z,7 XDB DATALINKS (SCREEN Z) <table border="1"> <thead> <tr> <th colspan="3">GLOBAL PORT NAME</th> <th>DSL NAME</th> <th>DSL STATUS</th> </tr> </thead> <tbody> <tr> <td>B1</td> <td>LCEN</td> <td>17-4-07-02</td> <td>XDB 1001-0002</td> <td>IN-SERVICE</td> </tr> <tr> <td>B1</td> <td>LCEN</td> <td>17-4-07-05</td> <td>XDB 910-0012</td> <td>OOS/L3ERR</td> </tr> <tr> <td>B1</td> <td>LCEN</td> <td>17-4-07-03</td> <td>XDB 910-0004</td> <td>IN-SERVICE</td> </tr> <tr> <td>B1</td> <td>LCEN</td> <td>17-4-07-11</td> <td>XDB 910-0016</td> <td>OOS/L3ERR</td> </tr> <tr><td colspan="5"> </td></tr> <tr><td colspan="5"> </td></tr> <tr><td colspan="5"> </td></tr> <tr><td colspan="5"> </td></tr> <tr><td colspan="5"> </td></tr> <tr><td colspan="5"> </td></tr> <tr><td colspan="5"> </td></tr> <tr><td colspan="5"> </td></tr> <tr><td colspan="5"> </td></tr> </tbody> </table>								GLOBAL PORT NAME			DSL NAME	DSL STATUS	B1	LCEN	17-4-07-02	XDB 1001-0002	IN-SERVICE	B1	LCEN	17-4-07-05	XDB 910-0012	OOS/L3ERR	B1	LCEN	17-4-07-03	XDB 910-0004	IN-SERVICE	B1	LCEN	17-4-07-11	XDB 910-0016	OOS/L3ERR																																													
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B1	LCEN	17-4-07-11	XDB 910-0016	OOS/L3ERR																																																																									

Figure 5-148 1470,7,17 - SM 017 LSM - XDB Data Links [5E12 and Later]

Abbreviations:

B1	Channel Type	OOS	Out of Service
DSL	Digital Subscriber Line	SM	Switching Module
LCEN	Line Card Equipment Number	STAT	Status
LSM	Local Switching Module	XDB	External Data Base

5.91.3 Commands

The **147Z,7** poke command gives the user the ability to choose the screen to be displayed (where "Z" = the screen number). Also, any poke command can be entered from this display.

5.92 1480/1481,X - SM X - AP DATA LINK DSLS (5E12 and Later)**5.92.1 Purpose**

The 1480,X and 1481,X page displays provide status of application processor (AP) digital subscriber lines (DSL) and associated sessions. Each screen displays status for up to 15 DSLs. The layout of two pages is identical; the 1481,X page is used when the number of DSLs exceeds 15 (the DSL status display capacity of the 1480,X page).

5.92.2 General

The AP LINK indicator field shows the AP index number and AP link number, for example, AP 04-01 (where 04 = AP index number and 01 = AP link number).

The DSL OE indicator field shows the office equipment (OE) Type (either I or K) and the numbers for associated equipment. For OE Type I [line card equipment number (LCEN) for ISLU/RISLU], the DSL OE indicator field shows numbers for the following: switching module (SM), line unit (LU), line group controller (LGC), and line circuit (LCKT). An example of OE Type I is, **00101224** (where 001 = SM number, 0 = LU number, 12 = LGC number, and 24 = LCKT number). For OE Type K [line circuit equipment number (LCKEN) for ISLU/RISLU Model 2], the DSL OE indicator field shows numbers for the following: SM, LU, LGC, line pack (LP), and LCKT. An example of OE Type K is, **1920200206** (where 192 = SM number, 02 = LU number, 00 = LGC number, 2 = LP number, and 06 = LCKT number). Both OE Type I and OE Type K are shown in the 1480 screen example, Figure 5-149 .

If all of the data links associated to an AP are out of service (OOS), the term DSL MAJOR appears in the SM XXX STATUS indicator block. This means a major alarm has occurred, provided that the alarm request for the AP has been set to Y (YES) via RC/V view 24.7. If one or more but not all data links for an AP are OOS, the term DSL MINOR appears in the SM XXX STATUS indicator block. This means a minor alarm has occurred, provided that the alarm request for the AP has been set to Y (YES) via RC/V view 24.7.

If the SM is attached to an E911 AP, the CRITICAL alarm level is functional and the AP data link alarm is elevated one level higher for the E911 AP links. If all links for a given AP are OOS and the AP is an E911 AP, the term E911_CRIT appears in the SM XXX STATUS box. If at least one but not all links for a given AP are OOS and the AP is E911 AP, the term DSL MAJOR appears in the SM XXX STATUS box.

The SESSION indicator field illustrates the chain of events that occur when the AP data links are being assigned. When this field contains DISC, the DSL is OOS, or the AP data link is not assigned. When INIT appears in the SESSION field, level 3 implementation has been completed; and when the implementation of the data link is complete (that is, level 4), the SESSION field contains the term CONN. Also, the SESSION field can contain the term MAINT. This occurs when the AP has requested a maintenance exercise.

Figure 5-149 shows an example of the 1480/1481,X page display.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD< _____ 1480 SM 123 LSM - AP DATALINK DSLS

SM 123 STAT

AP LINK	DSL OE	DSL PORT STATUS	SESSION
AP 04-01	I 00101224	IN-SERVICE	CONN
AP 04-02	I 00101223	OOS/L2 ERR	DISC
AP 05-01	K 1920200206	IN-SERVICE	CONN

SITE 000

REMOVE
200,X,Y DATALINK

RESTORE
300,X,Y DATALINK

X=AP Y=LINK

NOTE: SESSION IS
CONTROLLED BY AP

SEE PAGE 1481

Figure 5-149 1480/1481,X - SM X - AP Data Link DSLS (5E12 and Later)

Abbreviations:

AP	Application Processor	K	Line Circuit Equipment
CONN	Connected		Number for ISLU/RISLU Model 2
DISC	Disconnected	LSM	Local Switching Module
DSL	Digital Subscriber Line	OE	Office Equipment
ERR	Error	OOS	Out of Service
I	Line Card Equipment	SM	Switching Module
	Number for ISLU/RISLU	STAT	Status

5.92.3 Commands

All available page display commands can be entered from the 1480 and 1481 pages.

CMD	RESULT
200,X,Y	AP X DATA LINK Y is removed (RMV:DATALINK,AP=a-b)
300,X,Y	AP X DATALINK Y is restored (RST:DATALINK,AP=a-b)

5.93 1510,Y,X - SM X DNUS Y (5E12 Only)**5.93.1 Purpose**

The purpose of the 1510,Y,X display page is to show status information and to provide maintenance controls for the digital networking unit - SONET (DNU-S) Y. (DNU-S is displayed on the screen as DNUS.) The 1510,Y,X page provides commands to remove, restore, switch, and diagnose circuits. It also reports local, remote, and AIS CGAs.

5.93.2 General

The 1510,Y,X page shows the status of the DNU-S circuits. The common control (CC) circuit packs are displayed with their status, the common data (CD) packs and the STSX-1 facility interface (SFI) packs are displayed for each data group along with their status. Each of the seven transmission multiplexer (TMUX) packs (six service plus one spare) in each data group interfaces with the two CDs in the same data group. The service TMUXs normally transmit identical information to both CDs while listening to one. The TMUX packs in each data group have an interface with each of the SFI packs in the same data group. All in-service TMUXs normally transmit identical information to both SFIs while listening to one side. A path is displayed between one CC and a CD in data group zero to represent the active control link to the CC.

When an off-normal condition occurs in any CC, CD or SFI, the indicator for that component backlights. Each TMUX is displayed along with its status. An off-normal condition backlights the TMUX indicator. Each SONET terminating equipment (STE) is displayed along with its status and FAC number. When an off-normal condition occurs in an STE, the STE indicator backlights. When a CGA occurs, an indicator appears in the CGA column associated with the STE. The indicator for CGA contains the letter L or A (for local or AIS, respectively). If one or more off-normal condition is present on this display, the DNUS indicator on Page 1010,X - SM X STATUS is backlighted as well as the DNUS Y indicator on Page 1013,X - SM X UNIT STATUS.

The string "SEE PAGE 1511,Y,Z FOR DNUS Y STS Z STATUS" will be backlit if any of the summary indicators (in the 'STS' column) are off-normal (i.e. backlit). "STS" column is used for (i.e.) summary status of subtending STS, VT1, DS1 circuits on 1511 Page. Figure 5-150 shows an example of the 1510,Y,X display page.

Figure 5-150 shows an example of the 1510, Y, X, display page.

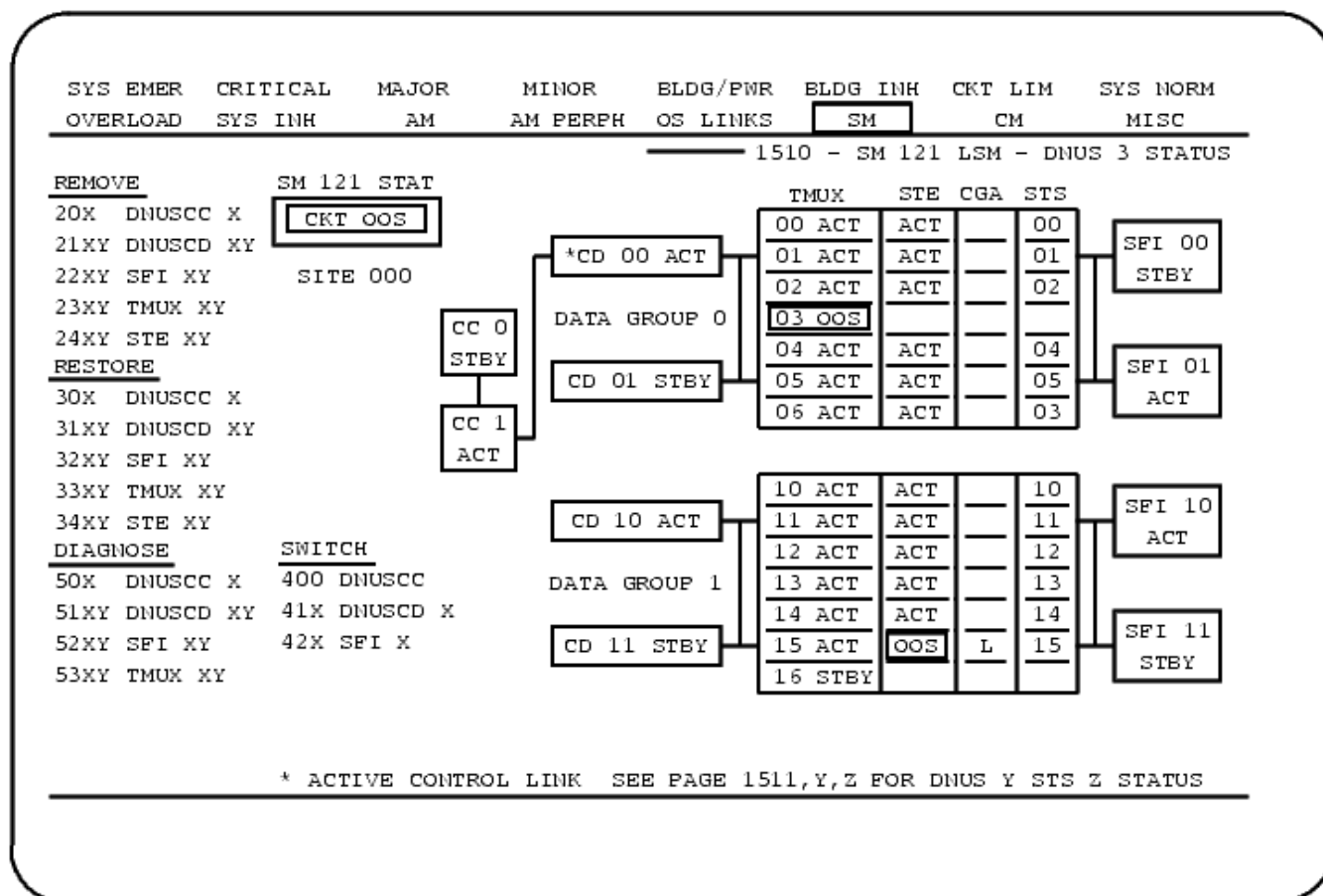


Figure 5-150 1510,Y,X - SM X - DNUS Y (5E12 Only)

Abbreviations:

ACT	Active	OOS	Out of Service
CC	Common Control	SFI	STSX-1 Facility Interface
CD	Common Data	SM	Switching Module
CGA	Carrier Group Alarm	STAT	Status
CKT	Circuit	STBY	Standby
DNUS	Digital Networking Unit - SONET	STE	Sonet Terminating Equipment
DNUSCC	DNU-S Common Control	STS	Synchronous Transport Signal
DNUSCD	DNU-S Common Data	TMUX	Transmission Multiplexer
LSM	Local Switching Module		

5.93.3 Commands

The 1510,Y,X page provides commands to remove and restore CCs, CDs, SFIs, TMUXs, and STEFACs; diagnose CCs, CDs, SFIs, and TMUXs; and switch CCs, CDs, and SFIs. All available displays can be accessed from the 1510,Y,X page.

CMD	RESULT
20X	DNUSCC X is removed. (RMV:DNUSCC=SM#-DNU#-X) [UCL]
21XY	DNUSCD Y of Data Group X is removed. (RMV:DNUSCD=SM#-DNU#-X-Y) [UCL]
22XY	SFI Y of Data Group X is removed. (RMV:SFI=SM#-DNU#-X-Y) [UCL]
23XY	TMUX Y of Data Group X is removed. (RMV:TMUX=SM#-DNU#-X-Y) [UCL]

24XY	STEFAC Y of Data Group X is removed. (RMV:STEFAC=SM#-DNU#-X-Y) [UCL]
30X	DNUSCC X is restored. (RST:DNUSCC=SM#-DNU#-X) [UCL]
31XY	DNUSCD Y of Data Group X is restored. (RST:DNUSCD=SM#-DNU#-X-Y) [UCL]
32XY	SFI Y of Data Group X is restored. (RST:SFI=SM#-DNU#-X-Y) [UCL]
33XY	TMUX Y of Data Group X is restored. (RST:TMUX=SM#-DNU#-X-Y) [UCL]
34XY	STEFAC Y of Data Group X is restored. (RST:STEFAC=SM#-DNU#-X-Y) [UCL][ALL]
400	DNUSCC is switched. (SW:DNUSCC=SM#-DNU#)
41X	DNUSCD in data group X is switched. (SW:DNUSCD=SM#-DNU#-X)
42X	SFI in data group X is switched. (SW:SFI=SM#-DNU#-X)[UCL]
50X	DNUSCC X is diagnosed. (DGN:DNUSCC=SM#-DNU#-X) [UCL]
51XY	DNUSCD Y of Data Group X is diagnosed. (DGN:DNUSCD=SM#-DNU#-X-Y) [UCL]
52XY	SFI Y of Data Group X is diagnosed. (DGN:SFI=SM#-DNU#-X-Y) [UCL]
53XY	TMUX Y of Data Group X is diagnosed. (DGN:TMUX=SM#-DNU#-X-Y) [UCL]

5.94 1511,Y,Z,X - SM X DNUS Y STS Z (5E12 Only)

5.94.1 Purpose

The purpose of the 1511 display page is to show status and provide maintenance controls for the DNU-S synchronous transport signal (STS) facilities and to report local, remote, and AIS CGAs.

5.94.2 General

The 1511,Y,Z,X display page shows status for the DNU-S (displayed as DNUS) STS-1, VT, and digital signal level 1 (DS1) facilities. It includes the commands to remove and restore STS-1, VT and DS1 facilities.

When an off-normal condition is detected in a VT or DS1, the VT or DS1 indicator backlights. When a CGA occurs, an indicator appears in the CGA column associated with the STS-1, VT or DS1. The CGA indicator contains the letter L, R, or A (for local, remote, or AIS, respectively). The column between the CGA and the DS1 indicators displays the application field; the choices for this field in the 5E12 software release is Trunk "TRK", "303" or "AIU".

If one or more off-normal condition(s) is present on this display, the STS indicators on Page 1510,Y,X - SM X - DNUS Y are backlighted, the DNUS Y indicator on Page 1013,X - SM X UNIT STATUS is backlighted, and the DNUS indicator on Page 1010,X - SM X STATUS is backlighted.

Figure 5-151 shows an example of the 1511,Y,Z,X page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD<

SM 014 STAT

SITE 000

REMOVE

2000 STS

21XX VT XX

22XX DS1 XX

DISPLAY

1512,Y,Z DNUS Y STS Z

APPLICATION

L=LOCAL

R=REMOTE

A=AIS

B=BER

RESTORE

3000 STS

31XX VT XX

32XX DS1 XX

STS-1 0											
	VT	CGA	DS1	CGA	APP		VT	CGA	DS1	CGA	APP
01						15					
02						16					
03						17					
04						18					
05						19					
06						20					
07						21					
08						22					
09						23					
10						24					
11						25					
12						26					
13						27					
14						28					

Figure 5-151 1511,Y,Z,X - SM X - DNUS Y - STS - Z (5E12 Only)

Abbreviations:

ACT	Active	OOSF	Out-of-Service Family of Equipment
AIS	Alarm Indication Signal	STS	Synchronous Transport Signal
DS1	Digital Signal Level 1	STE	Sonet Terminating Equipment
DNUS	Digital Networking Unit - SONET	SM	Switching Module
CGA	Carrier Group Alarm	T	Trunk
LSM	Local Switching Module	VT	Virtual Tributary
OOS	Out of Service		

5.94.3 Commands

The 1511,Y,Z,X page provides commands to remove and restore STSs, VTs, and DS1s. All available displays can be accessed from the 1511,Y,Z,X page.

CMD	RESULT
2000	STSFAC is removed. (RMV:STSFAC=SM#-DNU#-DG#-STS#) [,UCL]
21XX	VT1FAC XX is removed. (RMV:VT1FAC=SM#-DNU#-DG#-STS#-XX) [,UCL]
22XX	DS1SFAC XX is removed. (RMV:DS1SFAC=SM#-DNU#-DG#-STS#-XX) [,UCL]
3000	STSFAC is restored. (RST:STSFAC=SM#-DNU#-DG#-STS#) [,UCL] [,ALL]
31XX	VT1FAC XX is restored. (RST:VT1FAC=SM#-DNU#-DG#-STS#-XX) [,UCL]
32XX	DS1SFAC XX is restored.

(RST:DS1SFAC=SM#-DNU#-DG#-STS#-XX[,UCL])

5.95 1512,Y,Z,X - SM X DNUS Y STS Z DS1 APPLICATION (5E12 Only)**5.95.1 Purpose**

The purpose of the 1512 display page is to show application information for the DNU-S Synchronous Transport Signal (STS) Digital Signal level 1 (DS1).

5.95.2 General

The 1512,Y,Z,X display page shows application information for the DNU-S Digital Signal level 1 (DS1) facilities.

When a DS1 is off-normal, the first column which contains the DS1 number backlights as a summary indicator. The next column over is the FAC column. This column indicates the corresponding facility number on the application where this DS1 terminates. The APP column indicates the type of application the DS1 is connected to, for example in software release 5E12, 303 indicates a TR303 RT and AIU indicates an EAIU. This column backlights if there is something off-normal at the application end. However, it only backlights for the primary facility on the application and not all the facilities. The FAR END column indicates the page poke necessary to get to the MCC page designated for the specific application.

Figure 5-152 shows an example of the 1512 page display for 5E12.

SYS EMER CRITICAL MAJOR MINOR BLDG/PWR BLDG INH CKT LIM SYS NORM
OVERLOAD SYS INH AM AM PERPH OS LINKS SM CM MISC

CMD< - 1512 - SM 014 LSM DNUS 2 STS 03 DSIAPP

SM 014 STAT

QLPS ISOL+

SITE 000	DS1	FAC	APP	FAR END	DS1	FAC	APP	FAR END
	01	*RTFAC=01	303	SEE 1660,9999	15	*RTFAC=03	303	SEE 1660,9999
	02	*RTFAC=01	303	SEE 1660,500	16	*RTFAC=03	303	SEE 1660,500
	03	*RTFAC=01	303	SEE 1660,8	17	*RTFAC=03	303	SEE 1660,8
	04	*RTFAC=01	303	SEE 1660,22	18	*RTFAC=03	303	SEE 1660,22
	05	*RTFAC=01	303	SEE 1660,34	19	*RTFAC=03	303	SEE 1660,34
	06	*RTFAC=01	303	SEE 1660,5010	20	*RTFAC=03	303	SEE 1660,5010
	07	*RTFAC=01	303	SEE 1660,2222	21	*RTFAC=03	303	SEE 1660,2222
	08	RTFAC=02	303	SEE 1660,9999	22	RTFAC=04	303	SEE 1660,9999
	09	RTFAC=02	303	SEE 1660,500	23	RTFAC=04	303	SEE 1660,500
	10	RTFAC=02	303	SEE 1660,8	24	RTFAC=04	303	SEE 1660,8
	11	RTFAC=02	303	SEE 1660,22	25	RTFAC=04	303	SEE 1660,22
	12	RTFAC=02	303	SEE 1660,34	26	RTFAC=04	303	SEE 1660,34
	13	RTFAC=02	303	SEE 1660,5010	27	RTFAC=04	303	SEE 1660,5010
14	RTFAC=02	303	SEE 1660,2222	28	RTFAC=04	303	SEE 1660,2222	

DISPLAY

1511,W,X

DNUS W

STS X

MAINT

* = CONTROL

Figure 5-152 1512,Y,Z,X - SM X DNUS Y STS Z DS1 Application (5E12 Only)

Abbreviations:

APP	Application	FAC	Facility
DNUS	Digital Network Unit - SONET	LSM	Local Switching Module
DS1	Digital Signal Level 1	SM	Switching Module

5.95.3 Commands

There are no commands on this page.

5.96 1520 - RING NODE STATUS (5E12 and Later)

5.96.1 Purpose

The 1520 display page provides information about the Common Network Interface (CNI) nodes, groups, and members.

5.96.2 General

The 1520 page reflects information taken by reading the equipment configuration data (ECD) to find the state of all equipped nodes after the Interprocess Message Switch (IMS) has finished initialization. The page should not be displayed until after the IMS has finished initializing. Although the display exists, it does not show valid information while the IMS driver is not running or is in the process of initializing. Page 118 status indicates when CNI is in initialization.

Only the RING STAT indicator, MAJOR STATE indicator, and the function that was executed are backlighted.

The page is dynamic in that the page is updated and redrawn each time the ring configures to a new major stable state.

Nodes are displayed in one of four modes determined by commands. The commands and their respective modes are as follows:

- **400: *BISO-EISO*** (beginning isolation-ending isolation) (Display an isolated segment)
- **401/402: *ALL NON-ACT NEXT/PREV*** (Display all nonactive nodes)
- **403/404: *ALL EQUIPPED NEXT/PREV*** (Display all equipped nodes)
- **6NN: *DISPLAY GROUP NN*** (Display group number NN).

The ALL NON-ACT and ALL EQUIPPED displays may be oriented to begin at any equipped starting node by using the up/down cursor to go to the NODE< prompt where a starting node can be entered. Also, manual nodes may be entered on the ALL NON-ACT and ALL EQUIPPED pages by using the up/down cursor to go to the list of nodes where a node name may be entered on any line. The line number for these manual entries are then highlighted to distinguish them from the regular nodes of the display.

The 1520 page is divided into two basic areas: left side and right side.

Left-side indicators show the ring major state and restore activity of the ARR subsystem of IMS. Also listed on the left side are commands and their functions.

The ring status indicator displays the state of the CNI ring. Possible RING STAT states are as follows:

- ***ACTIVE***: Indicates all nodes are active.
- ***DOWN***: Indicates a critical problem; no CCS call processing can be completed.

- **RESTORE:** Indicates node is being pumped and should soon go ACTIVE.
- **CONFIGURING:** Indicates ring has just RESTORED a node, and the ring is propagating the token to allow the node back into service with the rest of the ring.
- **ISOLATED SEGMENT:** Indicates ring has one or more nodes under diagnostics; requires a quarantine or isolation of the node.

The ARR has three indicators which appear in the top left of the 1520 page under RING STAT. The ARR indicators show the type of recovery being done and which node is currently being worked on. Following are possible outputs of the three ARR indicators.

- **First Indicator**

- **ARR UCL:** The ARR attempts to restore the node without running diagnostics.
- **ARR COND:** The ARR attempts to restore the node but runs diagnostics first.
- **CNR UCL:** The ARR detects a duplex failure and restoration of the node is done without running diagnostics.
- **CNR COND:** The ARR detects a duplex failure and the node undergoes diagnostics before restoration.

- **Second Indicator**

- **ARR RSTRT:** The ARR is restarting the node.
- **CNR RSTRT:** The ARR detects a duplex failure and is restarting the node.

- **Third Indicator**

- **ACNR UCL:** The ARR detects a duplex failure of the DLNs, and an unconditional restoral is performed on the DLN listed.
- **ACNR COND:** The ARR detects a duplex failure of the DLNs, and diagnostics are run before restoring the node.
- **ACNR RSTRT:** The ARR detects a duplex failure of the DLNs and is restarting the DLN listed.

Information shown on the right side of the page is in the form of a tabular listing of nodes with indicators for node name, ring position, major state, ring interface state, node processor state, and maintenance mode. Possible values for these indicators are as follows:

- **RING POS**

- **ISO:** Indicates node is isolated.
- **BISO:** Indicates node is beginning isolation.
- **EISO:** Indicates node is ending isolation.
- **NORM:** Indicates node is normal.

— **"blank"**: Indicates unequipped.

- **MAJOR STATE**

- **ACT**: Indicates node is active.
- **OOS**: Indicates node is out of service.
- **STBY**: Indicates node is in standby mode.
- **GROW**: Indicates node is in the growth state.
- **UNEQ**: Indicates node is unequipped.
- **UNAV**: Indicates node is unavailable.
- **INIT**: Indicates node is initializing.
- **OFL**: Indicates node is off-line.

- **RI STATE**

- **FLTY**: Indicates node is faulty.
- **USBL**: Indicates node is usable.
- **QUSBL**: Indicates node is quarantine usable.
- **UNTSTD**: Indicates the node is untested.

- **NP STATE**

- **FLTY**: Indicates node is faulty.
- **USBL**: Indicates node is usable.
- **UNTSTD**: Indicates node is untested.

- **MAINT MODE**

- **AUTO**: Indicates node is automatic.
- **MAN**: Indicates node is manual.
- **FLTY**: Indicates node is faulty.
- **XTHD**: Indicates node is threshold exceeded.

Figure 5-153 shows an example of the 1520 page. In this example, the RING STAT is ISOLATED SEGMENT, LN00 1's MAJOR STATE is OOS and backlighted, the MAJOR STATE for RPCN00 0, LN00 2, and LN00 3 are ACT, and the function is DISPLAY GROUP NN. (Although RING STAT, MAJOR STATE(s), and FUNCTION executed are backlighted, only the abnormal MAJOR STATE condition (OOS) is backlighted in the example.)

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
1520 - RING NODE STATUS							
RING STAT:	ISOLATED SEGMENT	NODE<			RING MAJOR RI	NP	MAINT
ARR UCL LN00 01			NODE NAME	POS	STATE	STATE	STATE
ARR RSTRT LN00 02		01	RPCN00 0	NORM	ACT	USBL	AUTO
ACNR RSTRT LN00 03		02	LN00 1	NORM	OOS	USBL	AUTO
		03	LN00 2	NORM	ACT	USBL	AUTO
		04	LN00 3	NORM	ACT	FLTY	AUTO
CMD	FUNCTION						
2XX	RMV LN XX	05					
3XX	RST LN XX UCL	06					
400	BISO-EISO	07					
401/402	ALL NON-ACT (NEXT/PREV)	08					
403/404	ALL EQUIPPED (NEXT/PREV)	09					
500	DGN ISOLATED SEGMENT	10					
5XX	DGN LN XX	11					
6NN	DISPLAY GROUP NN	12					
7XX	RST LN XX COND	13					
(XX=LINE, NN=GROUP)		14					
		15					
		16					

Figure 5-153 1520 - Ring Node Status [5E12 and Later]

Abbreviations:

ACNR	Automatic Critical Node Recovery	NORM	Normal
ACT	Active	NP	Node processor
ARR	Automatic Ring Recovery	OOS	Out of Service
AUTO	Automatic	POS	Position
BISO	Beginning of Isolation	PREV	Previous
COND	Conditionally	RI	Ring Interface
DGN	Diagnostic	RMV	Remove
EISO	Ending of Isolation	RPCN	Ring Peripheral Control Node
FLTY	Faulty	RST	Restore
GRP	Group	RSTRT	Restart
LN	Link Node	STAT	Status
MAINT	Maintenance	UCL	Unconditional
NON-ACT	Nonactive	USBL	Usable

5.96.3 Commands

CMD	RESULT
2XX	Remove the node listed at line XX.
3XX	Restore unconditionally the node listed at line XX.
400	Display a listing of up to 16 nodes of an isolated segment beginning with the BISO node and ending with the EISO node. If the isolated segment is greater than 16 nodes, the display shows the BISO node and the seven nodes following it plus the eight nodes leading up to and including the EISO node. The missing portion of the isolated segment can be accounted for under the TOTAL BISO-EISO NODES listed at the bottom left-hand corner of the page.
401/402 (NEXT/PREV)	Display all nonactive nodes (up to 16). The missing portion of the list can be accounted for under the TOTAL NON ACTIVE NODES:nn. The count nn is updated as any node changes between the active and nonactive

403/404 (NEXT/PREV)	states. Display all equipped nodes (up to 16). The missing portion of the list can be accounted for under the TOTAL EQUIPPED NODES:nn. The count nn is updated as any node changes between the equipped and unequipped states.
500	Diagnose the existing isolated segment.
5XX	Diagnose the node listed at line XX.
6NN	Display ring group NN, including nonequipped nodes (up to 16). The missing portion of the list can be accounted for under the TOTAL EQUIPPED NODES:nn. The count nn is updated as any node changes between the equipped and unequipped states.
7XX	Restore conditionally the node listed at line XX.

5.97 1521,XX - SIGNALING LINK SUMMARY PAGE GROUP XX (5E12 and Later)

5.97.1 Purpose

The 1521,XX display page provides information on an individual ``group" of signaling links, where XX is the group member. The ``group" in these descriptions refers to the set of (up to) eight links displayed on the page.

5.97.2 General

The following link group status information is provided on the 1521,XX display page:

- **NODE NAME (GRP MEM):** Group and member number. (The NODE NAME indicator backlighting reflects the node major state for that group and member as it appears on Pages 118 and 1520.)
- **FAR END CLLITM:** Far-end CLLI code. (Backlighting is the same as that of the MINOR STATE indicator.)
- **PROT TYPE:** CCS protocol type (6 or 7). (Backlighting is the same as that of the MINOR STATE indicator.)
- **LINK TYPE:** (Backlighting is the same as that of the MINOR STATE indicator.)
- **MATE NODE:** For mated links, the group and member of the banded mate. (Backlighting is the same as that of the MINOR STATE indicator.)
- **MAJOR STATE:** MAJOR STATE can be one of the following: (Backlighting is the same as that of the MINOR STATE indicator.)
 - **AVAL:** Indicates link is available
 - **UNAV:** Indicates link is not available
 - **UNEQ:** Indicates link is unequipped.
- **MINOR STATE:** Minor state can be one of the following:
 - **IS:** Indicates link is in service
 - **OOS:** Indicates link is out of service
 - **MOOS:** Indicates link is manual out of service
 - **GROW:** Indicates link is in the growth state
 - **TEST:** Indicates link is being tested
 - **UNAV:** Indicates link is not available.

- **PRO RCVD:** The processor outage received from the signal transfer point is either YES or NO. (Backlighting is the same as that of the MINOR STATE indicator.)

Figure 5-154 shows an example of the 1521 page. In this example, LN00 1 and LN00 3 have a MAJOR STATE of AVAL and a MINOR STATE of MOOS. All link group status information is backlighted to reflect the MINOR STATE condition.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM	
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC	
— 1521 - SIGNALING LINK SUMMARY GROUP 00								
<u>CMD</u>	<u>FUNCTION</u>	<u>OUTPUTS</u>						
2XXY	RMV LN XXY	900 RING	POKE 1522,GRP,MEM FOR LINK SPECIFIC INFORMATION					
3XXY	RST LN XXY	901 LINKS						
5XXY	DGN LN XXY							
(XX=GRP, Y=MEM)								
	NODE NAME	FAR END CLLI	PROT	LINK	MATE	MAJOR	MINOR	PRO
	(GRP MEM)		TYPE	TYPE	NODE	STATE	STATE	RCVD
1	LN00 1	WASHDCSN77W	7	A	32-01	AVAL	MOOS	YES
2								
3	LN00 3	WASHDCSN77W	7	A	32-03	AVAL	MOOS	YES
4								
5								
6								
7								
8								

Figure 5-154 1521 - Signaling Link Summary Group 00 [5E12 and Later]

Abbreviations:

AVAL	Available	MOOS	Manual Out of Service
CLLI	See footnote, Section 5.97.2	PRO	Processor Outage
DGN	Diagnose	PROT	Protocol
GRP	Group	RCVD	Received
LN	Link Node	RMV	Remove
MEM	Member	RST	Restore

5.97.3 Commands

The 1521 page provides commands to remove, restore, and diagnose the links nodes (LN).

CMD	RESULT
2XXY	LN XXY is removed. (RMV:LNXX=Y) (where XX=group being displayed, Y=member)
3XXY	LN XXY is restored. (RST:LNXX=Y,RAW,TLP)[,UCL] (where XX=group being displayed, Y=member)

5XXY	LN XXY is diagnosed. (DGN:LNXX=Y,RAW,TLP)[,RPT=a][PH=b[&&c]] (where XX=group being displayed, Y=member) "a" is the number of times the diagnostic is to be repeated. "b" is the phase. "b&&c" is the range of the phases to be performed.
900	Status of the RING is printed. (OP:RING:DETD)
901	Status of all signaling links is printed. (OP:SLK=ALL,DEST=1)

5.98 1522,XX,Y - SIGNALING LINK GROUP XX-Y (5E12 and Later)

5.98.1 Purpose

The purpose of the 1522,XX,Y page is to provide information on a specific CNI signaling link (SLK) (where XX is the group number, and Y is the member number).

5.98.2 General

Information shown on the 1522,XX,Y page includes the following:

- (A) **LOCAL STATES:** Refers to the link member status which can be MAJOR, MINOR, or HDWR. (Only the LOCAL STATES indicators are backlighted.)
- **MAJOR STATE:** Major state indicators are as follows:
 - **AVAL:** Indicates link is available
 - **UNAV:** Indicates link is not available
 - **UNEQ:** Indicates link is unequipped.
 - **MINOR STATE:** Minor state indicators are as follows:
 - **IS:** Indicates link is in service
 - **OOS:** Indicates link is out of service
 - **MOOS:** Indicates link is manual out of service
 - **GROW:** Indicates link is in the growth state
 - **TEST:** Indicates link is being tested
 - **UNAV:** Indicates link is unavailable.
 - **HDWR:** The hardware state is displayed as follows:
 - **IS:** Indicates link is in service
 - **OOS:** Indicates link is out of service.
- (B) **NODE NAME:** Group and member number. (The NODE NAME indicator backlighting reflects the node major state for that group and member as it appears on Pages 118 and 1520.)
- (C) **LINK PROTOCOL:** Link Protocol is either "6" for CCS6 or "7" for CCS7.

(D) **RECENT CHANGEABLE INFORMATION:** The following recent change information is displayed:

- **ENCRYPTED:** Encryption type for link is NOTENC (not encrypted) or ENC (encrypted).
- **LINK TYPE:** Link type A for A-links and E for E-links.
- **SPEED:** Speed of the link (48 for 4.8 kbps or 560 for 56 kbps).
- **FACILITY:** Facility is ONLY for CCS7 (MODEM).
- **MATE:** Mate SLK is displayed by group and member.
- **DIRECT LS:** Direct link set numbers for CCS7.
- **COMBINE LS:** Combined link set numbers for CCS7.
- **DIRECT POOL:** Direct pool numbers for CCS6.
- **COMBINE POOL:** Combined pool numbers for CCS6.
- **EC_MODE:** Error correction mode is ONLY for CCS7 (BASIC).
- **TRANS MEDIUM:** Transmission medium is ONLY for CCS7 (TERRESTRIAL for cable connected).
- **FAR END CLLI CODE:** An 11-character identifier containing various office-specific information such as city, state, and machine type.
- **FAR END FUNCTION NO:** A 5-digit number uniquely identifying the far-end node in the network.
- **FAR END POINT CODE:** A 9-digit number that identifies the far-end STP.
- **FAR END REGION NO:** A 2-digit number that identifies the far-end region.

Figure 5-155 is an example of the 1522 page showing that link node 00-1 has a MAJOR state of AVAL, a MINOR state of MOOS, and a HDWR state of OOS. Although all LOCAL STATES are backlighted, only the indicators showing abnormal conditions (OOS and MOOS) are backlighted in this example.

```

SYS EMER  CRITICAL  MAJOR      MINOR      BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH   AM         AM PERPH  OS LINKS  SM        CM        MISC

----- 1522 - SIGNALING LINK GROUP 00-1

CMD  FUNCTION      LOCAL STATES
2XXY  RMV LN XXY    MAJOR: AVAL
3XXY  RST LN XXY    MINOR: MOOS
5XXY  DGN LN XXY    HDWR : OOS
41XXY MONITOR ON
42XXY MONITOR OFF
(XX=GROUP, Y=MEMBER)

LINK PROTOCOL: 7

----- RECENT CHANGEABLE INFORMATION -----
ENCRYPTED: NOTENC  MATE       : 32-01      FAR END CLLI CODE : WASHDCSW77W
LINK TYPE: A      DIRECT LS   : 001      FAR END FUNCTION NO: 0
SPEED   : 560     COMBINE LS  : 002      FAR END POINT CODE : 232210089
FACILITY : MODEM  EC_MODE    : BASIC     FAR END REGION NO  : 32
                                TRANS MEDIUM: TERRESTRIAL

```

Figure 5-155 1522,XX,Y - Signaling Link Group 00-1 [5E12 and Later]

Abbreviations:

AVAL	Available	MOOS	Manual Out of Service
CLLI	See footnote, Section 5.97.2	NO	Number
DGN	Diagnose	NOTENC	Not Encrypted
EC_MODE	Error Correction Mode	OOS	Out of Service
HDWR	Hardware	RMV	Remove
LN	Link Node	RST	Restore
LS	Link Set	TRANS	Transmission

5.98.3 Commands

The 1522 page provides commands to remove, restore, and diagnose the links.

CMD	RESULT
2XXY	LN XXY is removed. (RMV:LNXX=Y) (where XX=group being displayed, Y=member being displayed)
3XXY	LN XXY is restored. (RST:LNXX=Y,RAW,TLP)[,UCL] (where XX=group being displayed, Y=member being displayed)
5XXY	LN XXY is diagnosed. (DGN:LNXX=Y,RAW,TLP)[,RPT=a][PH=b[&&c]] (where XX=group being displayed, Y=member being displayed) "a" is the number of times the diagnostic is to be repeated. "b" is the phase. "b&&c" is the range of the phases to be performed.
41XXY	Monitor ON (MON:SLK=XX-Y,ON) (where XX=group being displayed, Y=member being displayed)
42XXY	Monitor OFF (MON:SLK=XX-Y,OFF) (where XX=group being displayed, Y=member being displayed)

5.99 1523 - LOCAL SUBSYSTEM STATUS (5E12 and Later)

5.99.1 Purpose

The 1523 page provides the status of all local subsystems of the 5ESS[®]-2000 switch.

5.99.2 General

Subsystem status information provided on the 1523 page is as follows:

- **POINT CODE:** The point code number of the local switch.
- **STATUS:** Status of the local point code. State will be AVAILABLE or UNAVAILABLE.
- **SUBSYSTEM NUMBER AND STATUS:** Subsystem number and status information are derived via normal subsystem allowed (SSA) and subsystem prohibited (SSP) network management messages. Status is indicated by backlighting colors as follows:
 - **Allowed:** Green background with black lettering
 - **Prohibited:** Red background with white lettering
 - **Unequipped:** Yellow background with red lettering.

Figure 5-156 shows an example of the 1523 page. In this example, subsystem 246 is backlighted. Its status is determined by coloration of the backlighting.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM	
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC	
1523 - LOCAL SUBSYSTEM STATUS								
POINT CODE: 232210089				SUBSYSTEM NUMBER AND STATUS				
STATUS: AVAILABLE								
				0	1	2	3	4
				5	6	7	232	233
				234	235	236	237	238
				239	240	241	242	243
				244	245	246	247	248
				249	250	251	252	253
				254	255			

Figure 5-156 1523 - Local Subsystem Status [5E12 and Later]

5.99.3 Commands

There are no commands on the 1523 page.

5.100 1530,X - CCS MESSAGE DELIVERY STATUS (5E12 and 5E13 Only)

5.100.1 Purpose

The purpose of the 1530 page is to display the status of the Intra-SM Message Delivery (MD) Link on a Global SM (GSM). It also provides menu commands to remove, restore or obtain the status of the link. Where "X" denotes the GSM number.

Initially, "X" is required in order to access this page for a particular GSM, but it is not required to reaccess the page for the last GSM used to access the 1530, 1532, or 1533 MCC Pages.

5.100.2 General

For more information about Common Channel Signaling (CCS) on a GSM, refer to document 235-190-120, *Common Channel Signaling Services*, Chapter 14.

SYS EMER	CRITICAL	MAJOR	MINOR	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM
					MISC
CMD< _____ 1530 — SM 007 LSM MSG DELIVERY STATUS					
SM 007 STAT					
SITE 000					
<u>REMOVE UCL</u>					
2000 MDLINK					
<u>RESTORE</u>					
3000 MDLINK					
<u>OUTPUT</u>					
9000 MDLINK					

INTRA-SM MD
 STATUS: DACT

PSUPH : 007-0-1-05
 SH-CG-MR: 0-01-02

Figure 5-157 1530,X - CCS Message Delivery Status (5E12 and 5E13 Only)

The 2000 poke command will ask for confirmation before you can remove the MD link.

CAUTION: REMOVING THE MD LINK WILL STOP ALL CCS CALL PROCESSING ON THE PSU PLATFORM IN THE SPECIFIED GSM. USE CAUTION.

Abbreviations:

CG	Channel Group
DACT	Deactivated
MD	Message Delivery
MDLINK	Message Delivery Link
MR	Member
PSUPH	Packet Service Unit Protocol Handler
SH	Shelf
SM	Switching Module
UCL	Unconditional

5.100.3 Commands

The following commands are available to remove, restore, or obtain the status of the link.

CMD	RESULT
2000	Remove MD (RMV:MD,SM=U,UCL)
3000	Restore MD (RST:MD,SM=U)
9000	Output MD Status (OP:STATUS,MD,SM=U)

where: "U" is the GSM associated with the display page.

5.101 1532,X - CCS LINK SET SUMMARY (5E12 and 5E13)

5.101.1 Purpose

The purpose of the 1532 page is to display the summary status of all the link sets on a specific Global SM (GSM) and provide menu commands for activating, deactivating, and outputting the status of a link set. Where "X" denotes the GSM number.

Initially, "X" is required in order to access this page for a particular GSM, but it is not required to reaccess the page for the last GSM used to access the 1530, 1532, or 1533 MCC Pages.

5.101.2 General

For more information about Common Channel Signaling (CCS) on a GSM, refer to document 235-190-120, *Common Channel Signaling Services*, Chapter 14.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	OS LINKS	SM	CKT LIM	SYS NORM MISC																				
CMD< _____ 1532 - SM 007 LSM LINK SET SUMMARY SM 007 STAT OPC 254 060 000 SITE 000																											
DEACT UCL		<table border="1"> <thead> <tr> <th colspan="2">LINK SET GROUP</th> <th colspan="2">SUMMARY STATUS</th> </tr> </thead> <tbody> <tr> <td>2XXX</td> <td>001 ACT C7 NATL</td> <td></td> <td></td> </tr> <tr> <td></td> <td>002 DACT C7 NATL</td> <td></td> <td></td> </tr> <tr> <td>ACTIVATE</td> <td>003 DACT C7 NATL</td> <td></td> <td></td> </tr> <tr> <td>3XXX</td> <td>004 ACT C7 NATL</td> <td></td> <td></td> </tr> </tbody> </table>						LINK SET GROUP		SUMMARY STATUS		2XXX	001 ACT C7 NATL				002 DACT C7 NATL			ACTIVATE	003 DACT C7 NATL			3XXX	004 ACT C7 NATL		
LINK SET GROUP		SUMMARY STATUS																									
2XXX	001 ACT C7 NATL																										
	002 DACT C7 NATL																										
ACTIVATE	003 DACT C7 NATL																										
3XXX	004 ACT C7 NATL																										
OUTPUT		<table border="1"> <thead> <tr> <th colspan="2">LINK SET MEMBER SUMMARY</th> </tr> </thead> <tbody> <tr> <td>9XXX LS STATUS</td> <td>1533,XXX[,SM]</td> </tr> <tr> <td>990 GSM STATUS</td> <td></td> </tr> </tbody> </table>						LINK SET MEMBER SUMMARY		9XXX LS STATUS	1533,XXX[,SM]	990 GSM STATUS															
LINK SET MEMBER SUMMARY																											
9XXX LS STATUS	1533,XXX[,SM]																										
990 GSM STATUS																											
XXX = LINK SET #																											

Figure 5-158 1532,X - CCS Link Set Summary (5E12 and 5E13)

Up to 16 link sets may be displayed, and each link set can contain up to 8 members. Each link set is displayed with link set number, status, and CCS type. Also, the Originator Point Code (OPC) associated with the GSM is displayed. The 2XXX poke command will ask for confirmation before you can remove the link set.

CAUTION: REMOVING A LINK SET MAY STOP CCS CALL PROCESSING ON THE PSU PLATFORM IN THE SPECIFIED GSM TO CERTAIN DESTINATION POINT CODES. USE CAUTION.

Abbreviations:

DEACT	Deactivate
GSM	Global Switching Module
LS	Link Set
SM	Switching Module
UCL	Unconditional

5.101.3 Commands

The following commands are available to activate or deactivate all CCS Signaling Link numbers (CCSLKs) in a specific link set, output link set member status of a specific link set or output the displayed GSM's status.

CMD	RESULT
2XXX	Deactivate all CCSLKs in a link set (RMV:CCSLK, SET=XXX, MEMBER=0&&7, STATE=DACT, SM=U, UCL)
3XXX	Activate all CCSLKs in a link set (RST:CCSLK, SET=XXX, MEMBER=0&&7, STATE=DACT, SM=U)
9XXX	Output status of all CCSLKs in a link set (OP:STATUS, CCSLK, SET=XXX, MEMBER=0&&7, SM=U)
990	Output GSM Status (OP:CCS, GSM, SM=U)

where "U" is the GSM associated with the display page, and "XXX" is a display link set.

5.102 1533,Y,X - CCS LINK SET MEMBERS (5E12 Only)

5.102.1 Purpose

The 1533 page shows the adjacent point code (APC) and the status of all members (MR) in a link set on the Global SM (GSM). Where "X" denotes the GSM number and Y denotes Link Set number.

Initially, "X" is required in order to access this page for a particular GSM, but it is not required to reaccess the page for the last GSM used to access the 1530, 1532, or 1533 MCC Pages.

5.102.2 General

For more information about Common Channel Signaling (CCS) on a GSM, refer to document 235-190-120, *Common Channel Signaling Services*, Chapter 14.

SYS EMER	CRITICAL	MAJOR	MINOR	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM
CMD< 1533 SM 001 LSM LINKSET 001 MEMBERS					
SM 001 STAT					
APC					
123-456-789					
SITE 000					
DEACTIVATE		ACTIVATE			
2XX MR XX		3XX MR XX			
INHIBIT		UNINHIBIT			
6XX MR XX		7XX MR XX			
BLOCK		UNBLOCK			
62XX MR XX		72XX MR XX			
TEST		OUTPUT			
5XX MR XX		9XX MR XX			

MR	STATE	INH	BLK	SLS	EN	SH-CG-MR
01	ACT	L R	R L	N N	001-1-2-3-12-24	1-02-01
02	OOSF			N D	001-0-9-31	1-03-02
03	ACT			Y D	001-0-9-33	1-04-01

Figure 5-159 1533,Y,X - CCS Link Set Members (5E12 Only)

For each valid member of the link set, the state of the link, the Inhibited (INH) and Blocked (BLK) status, SLS (signaling link selectors) status, the EN (equipment number), and the signaling terminal-protocol handler Shelf number (SH), Channel Group number (CG), and Member (MR) are displayed.

Local or remote inhibited and local or remote blocked, states can exist simultaneously with many other link states. These states are shown as L (local) and R (remote) marked under the INH and the BLK status fields. The SLS (signaling link selectors) status is "Y" for yes and "N" for no, indicating whether or not the link is carrying traffic.

Abbreviations:

APC	Adjacent Point Code
BLK	Blocked Status
CG	Channel Group Number
EN	Equipment Number
	D - DFI EN number
	N - DNUS EN number
INH	Inhibited Status
L	Local
MR	Members
R	Remote
SH	Shelf Number
SLS	Signaling Link Selectors
Y	Yes

5.102.3 Commands

The following commands are available to deactivate, activate, inhibit, uninhibit, block, unblock, test and output the status of an individual CCS link set member (CCSLK). (Where XX is a valid link set member and V is the link set

number displayed on the page.)

CMD	RESULT
2XX	Deactivate MR XX (RMV:CCSLK,SET=U, MEMBER=XX,STATE=DACT,SM=V)
3XX	Activate MR XX (RST:CCSLK,SET=U, MEMBER=XX,STATE=DACT,SM=V)
5XX	Test MR XX (TST:CCSLK,SET=U, MEMBER=XX,SM=V)
6XX	Inhibit MR XX (RMV:CCSLK,SET=U, MEMBER=XX, STATE=INH,SM=V)
7XX	Uninhibit MR XX (RST:CCSLK,SET=U, MEMBER=XX, STATE=INH,SM=V)
62XX	Block MR XX (RMV:CCSLK,SET=U, MEMBER=XX, STATE=BLK,SM=V)
72XX	Unblock MR XX (RST:CCSLK,SET=U, MEMBER=XX, STATE=BLK,SM=V)
9XX	Output Status MR XX (OP:STATUS, CCSLK,SET=U, MEMBER=XX, SM=V)

where: "U" is the GSM associated with the display page.

5.103 1600,SZ - SITE Z STATUS (5E12 and Later)

5.103.1 Purpose

The purpose of the 1600,SZ page is to show the status of all of the RSMs at a site and their associated HSMs and interconnections.

5.103.2 General

The 1600,SZ page shows the RSMs that are located at a particular site. A site may have from one to four RSMs located at it. Each RSM may have a separate HSM hosting it or one HSM may host more than one of the RSMs up to hosting all four RSMs.

The SITE STATUS page can be requested by craft using the SM number of any RSM at the site or by using the corresponding site number in 1600,SZ (where "S" is actually typed as part of the command and "Z" = site number). The integrity of craft access to the page is enhanced since the page is available if craft can communicate to any of the RSMs at the site. The accuracy of the information shown on the page is not affected by failures in the T1 communication links unless, in addition, the RSMs become separated from each other. If all T1 communication links to the site fail, the page is not available.

This display graphically shows the intercommunication link (ICL) groups between the RSMs; and on the right side of the page, the status of the ICL groups is displayed.

The title of this page contains the number assigned to a site and the actual name of the site.

An ICL is a single link between a pair of RSMs. The status displayed on the right, therefore, is a summary of each link group. The possible states a link group may have are as follows:

- **ACT** (Active): All ICLs of the link group are in service.
- **DGR** (Degraded): At least one, but not all ICLs of the link group is out of service.
- **MSEP** (Manually Separated): All ICLs of the link group are out of service due to a manual craft request.
- **SEP** (Separated): All ICLs of the link group are out of service for any reason other than a craft request.

Next to each RSM indicator is the timing mode indicator for that RSM. This indicator displays the means by which the RSM derives its timing. The RSMs take their timing from whichever mode is the most stable. The possible timing modes are as follows:

- **T1**: The RSM is getting its timing over the T1 umbilical from the HSM.
- **RCLK**: This is the normal mode for the RSM which has the RCLK equipped as long as the RCLK is the most

stable of the modes.

- **ICL:** This means that the RSM is getting its timing from another RSM over the ICL.
- **FI:** The RSM is isolated and separated (no T1 and no ICLs) and is generating its timing internally.

If a site is equipped with building and power alarms, an indicator is displayed on the left side of the page showing the BLDG/PWR ALARM status and to which RSM it is connected (Figure 5-161).

If a site is equipped with a remote clock unit, an indicator is displayed on the left side of the page showing the RCLK mode and to which RSM it is connected (Figure 5-161).

Figure 5-160 is an example of the 1600,SZ page which shows status of SITE 2. SITE 2 has three RSMs which are hosted by two different HSMs. The Inter-Communication Links are all active. The RSM 192 is getting its timing from HSM 12 over the T1 umbilical, and RSM 5 and 11 are getting their timing from RSM 192.

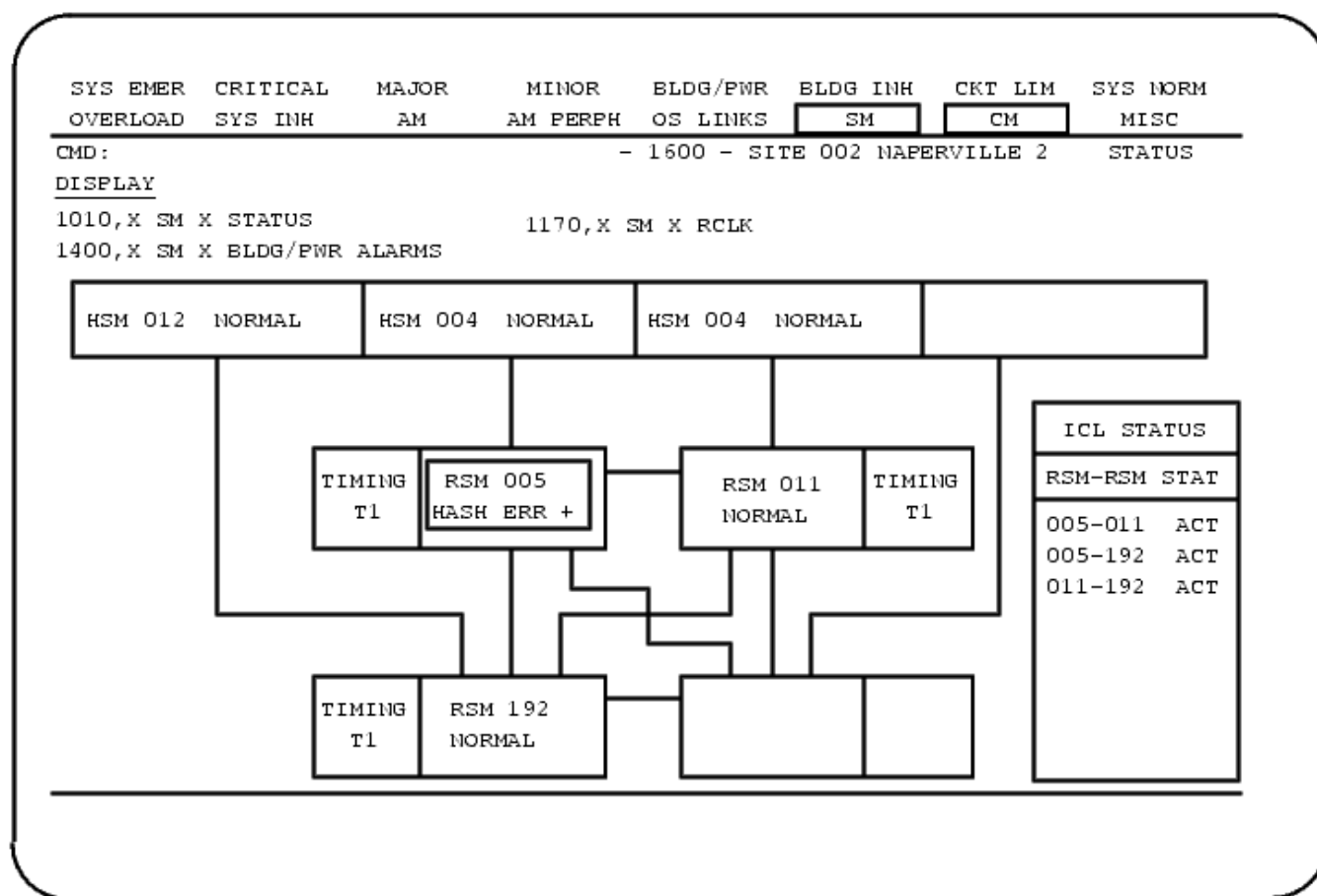


Figure 5-160 1600,SZ - Site Z Status (Regular Version - No Remote Clock or Building/Power Alarms Equipped) (5E12 and Later)

Abbreviations:

BLDG/PWR	Building/Power	RCLK	Remote Clock
HSM	Host Switching Module	RSM	Remote Switching Module
ICL	Inter-Communication Links	STAT	Status

Figure 5-161 is an example of the SITE STATUS page which shows a site with both the remote clock and

building/power alarms equipped. In this example, there is a building/power alarm active. Also, RSM 48 has an RCL circuit out of service, which caused the three ICL groups to it to be degraded. The RSM 48 is getting its timing from the remote clock which is in normal mode and the other three RSMs are ICL based, getting their timing from RSM 48 over the ICLs.

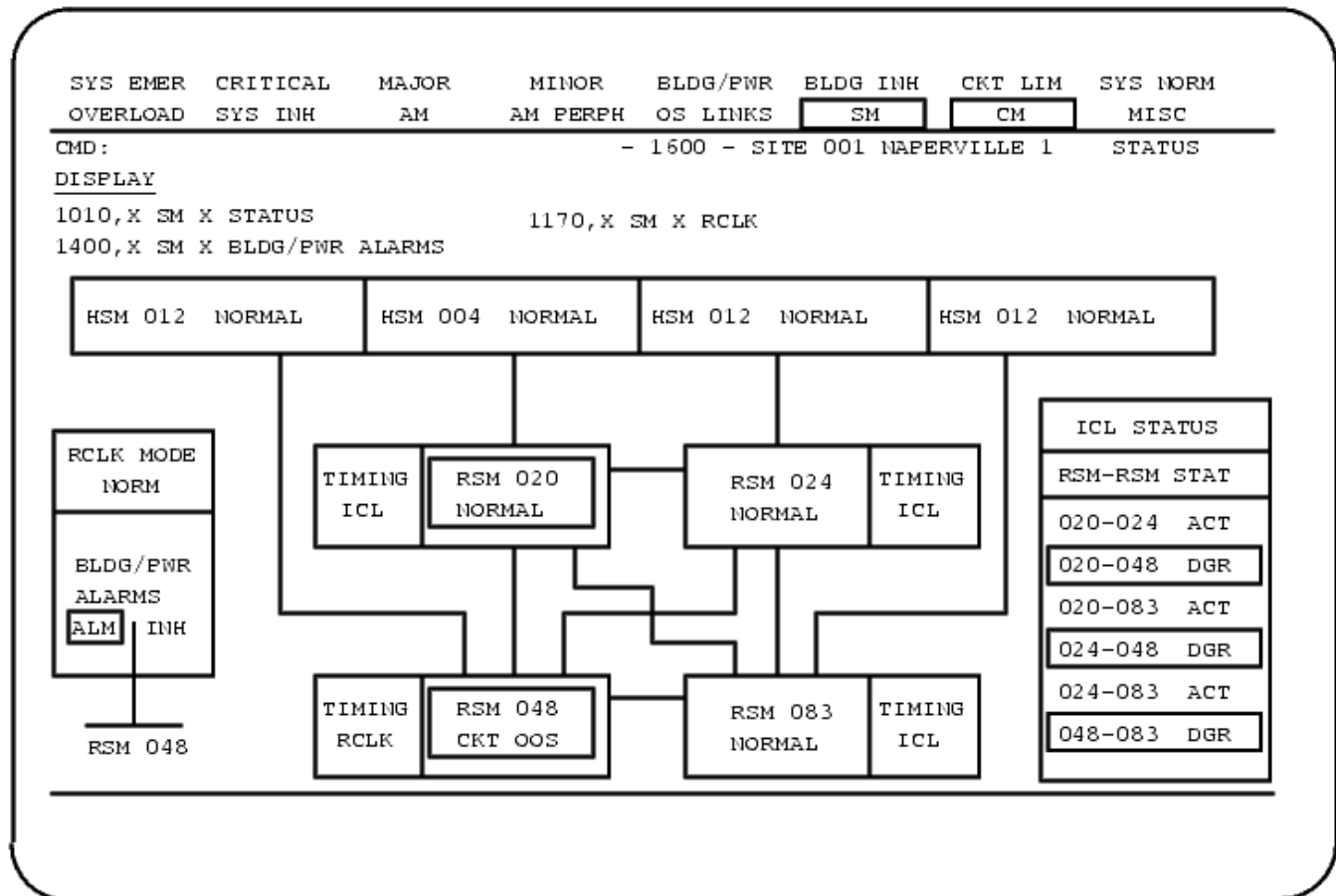


Figure 5-161 1600,SZ - Site Z Status (Remote Clock and Building/Power Alarms Equipped) (5E12 and Later)

Abbreviations:

ALM	Alarm	INH	Inhibit
CKT	Circuit	OOS	Out of Service
DGR	Degrade	RCLK	Remote Clock

5.103.3 Commands

All available displays can be accessed from the 1600 display page.

5.104 1605,X - SM X HSM-RSM SITE INDEX (5E12 and Later)

5.104.1 Purpose

The 1605,X page lists all RSMs for which the HSM is responsible.

5.104.2 General

The 1605,X page is an index of all RSMs subtending from HSM X. The RSM number, site number, and site name

for each RSM is shown. The status for the RSMs is not given on the 1605,X page (see Page 1600,SZ for RSM status information).

Figure 5-162 is an example of the 1605,X page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
1605 - SM 012 HSM-RSM SITE INDEX							
SEE 1010,X FOR SM X STATUS							
RSM	SITE	SITE NAME					
024	001	NAPERVILLE	RSM	SITE	SITE NAME		
046	001	NAPERVILLE					
083	001	NAPERVILLE					

Figure 5-162 1605,X - SM X HSM-RSM Site Index (5E12 and Later)

Abbreviations:

HSM	Host Switching Module	SM	Switching Module
RSM	Remote Switching Module		

5.104.3 Commands

All available MCC page display commands can be entered from the 1605,X page.

5.105 1610 - REMOTE SITE INDEX (5E12 and Later)

5.105.1 Purpose

The 1610 page display provides a list of remote switching modules and associated site numbers.

5.105.2 General

The 1610 is an information only page which shows all remote sites associated with an office.

The status of remote switching modules can be verified by typing **1600,SZ** (the "S" is actually typed as part of the command and "Z" = site number).

Figure 5-163 is an example of the 1610 page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
1610—RSM SITE INDEX							
DISPLAY RSM SITE STATUS - 1600,SZ (Z=SITE NUMBER)							
SITE	SITE NAME	SITE	SITE NAME	SITE	SITE NAME		
001	NAPERVILLE 1						
002	NAPERVILLE 2						
003	NAPERVILLE 3						

Figure 5-163 1610 - Remote Site Index (5E12 and Later)

Abbreviation:

RSM	Remote Switching Module

5.105.3 Commands

All available MCC page display commands can be entered from the 1610 page display.

5.106 1611,X - REMOTE PERIPHERAL SITE SUMMARY (5E12 and Later)

5.106.1 Purpose

The 1611,X - Remote Peripheral Site Summary page (Figure 5-164) displays the sites where an SM hosts at least one remote peripheral. The page displays sites, together with activated or inhibited alarms at those sites.

5.106.2 General

Five screens are possible for each SM; each screen shows 100 sites. Screen 1 (referred to on the 1010 page as "1611,1") displays sites 500-599; higher-numbered sites display on later screens, up to sites 900-999 on screen 5.

If a remote peripheral alarm at a site is activated, the text "ALM" appears to the right of the site number and is backlighted in red. Similarly, if a remote peripheral alarm at a site is inhibited, the text "INH" appears backlighted in yellow.

If no remote peripheral sites exist for the site range of the screen, the text "NO REMOTE PERPH HOSTED FOR SITE RANGE nnn TO mmm", where nnn-mmm is the site range, appears backlighted in the middle of the page.

Figure 5-164 shows an example of the 1611 display page.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD< — 1611 - SM 192 LSM RMT PERPH SITE SUM							
DISPLAY				SM 192 STAT			
1620,SZ REMOTE PERPH SITE Z STATUS				SITE 000		SCREEN 1 OF 5	
1611,Y RMT PERPH SITE SUM SCREEN Y				(100 SITES/SCREEN)			
500 ALMINH	515 ALMINH	530 ALMINH	545 ALMINH	560 ALMINH	575 ALMINH	590 ALMINH	
							599 ALMINH
514 ALMINH	529 ALMINH	544 ALMINH	559 ALMINH	574 ALMINH	589 ALMINH		

Figure 5-164 1611,X - REMOTE PERIPHERAL SITE SUMMARY (5E12 and later)

Abbreviations:

AIU	Access Interface Unit	INH	Inhibit
ALM	Alarm	LSM	Local Switching Module
AM	Administrative Module	PIDB	Peripheral Interface Data Bus
COMDAC	Common Data and Control	TSGRP	Time Slot Group

5.106.3 Commands

Menu commands to display remote peripheral site status and other remote peripheral site summary screens are listed in Table below. Any available paging menu command is entered from this display.

CMD	RESULT
1611,X,Y	SM X RMT PERPH SITE SUM SCREEN Y page is displayed.
1620,SZ	REMOTE PERPH SITE Z STATUS page is displayed.

5.107 1615 - OPTICALLY REMOTED SWITCHING MODULES (ORM) SITE INDEX [5E12 and Later]

5.107.1 Purpose

The 1615 page display provides a list of the ORMs and their associated site numbers.

5.107.2 General

The status of the ORMs can be verified by typing **1010,SM** (where SM = SM number).

Figure 5-165 is an example of the 1615 page.

In the message **002 011 SITE 2 - ORM11** shown, **002:** is the ORM site number, **011:** is the SM number, and **SITE 2 - ORM11:** is the site name.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
					1615 - ORM/TRM SITE INDEX		
DISPLAY ORM/TRM REMOTE SITE STATUS - 1010,SM #							

Figure 5-165 1615 - ORM Site Index [5E12 and Later]

Abbreviations:

ORM	Optically Remoted Switching Module	TRM	Two-mile Remoted Module
SM	Switching Module		

5.107.3 Commands

All available MCC page display commands can be entered from the 1615 page display.

5.108 1620,SZ - REMOTE PERPH SITE Z STATUS (5E12 and Later)

5.108.1 Purpose

5.108.3 Commands

Menu commands to display remote peripheral site status and other remote peripheral site summary screens are listed in Table below. Any available paging menu command is entered from this display.

CMD	RESULT
1320,Y,X	SM X EAIU Y SUMMARY is displayed.
1420,SZ	SITE Z RAS ALARMS is displayed.
1640,SZ	SITE Z REMOTE PERPH MISC ALARMS is displayed.
1700,Y,X	SM X ISLU Y NETWORK is displayed.

5.109 1630 - REMOTE PERPH SITE INDEX (5E12 and Later)

5.109.1 Purpose

The 1630 page display provides the list of RISLU sites on the SM.

5.109.2 General

The 1630 page lists the number and name of each RISLU site. The status of each RISLU site can be displayed from the 1630 page display, by entering 1620,SZ (where Z=RISLU site number) (the "S" is actually typed as part of the command). The 1630 page display can be accessed from the 1000 SM PAGE INDEX display page.

Figure 5-167 shows an example of the 1630 page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD< _____ 1630 - REMOTE PERPH SITE INDEX DISPLAY REMOTE PERPH SITE Z STATUS - 1620,SZ (Z=SITE NUMBER) SCREEN 1 OF 9 DISPLAY REMOTE PERPH SITE INDEX - 1630,Y (Y=SCREEN NUMBER)							
SITE	SITE-NAME	SITE	SITE-NAME	SITE	SITE-NAME	SITE	SITE-NAME
500	PANAMA CITY						
501	PENSACOLA						
502	ORLANDO						

Figure 5-167 1630 - Remote Perph Site Index (5E12 and Later)

5.109.3 Commands

Any available paging commands can be entered from this display.

5.110 1640,SZ - REMOTE PERPH SITE MISC ALARMS (5E12 and Later)

5.110.1 Purpose

The 1640 - REMOTE PERPH SITE MISC ALARMS page displays the status of remote peripheral miscellaneous alarm scan points.

5.110.2 General

The 1640 page may be accessed from any display page. Type and enter the 1640,SZ menu command. Where: Z = Remote Peripheral Site Number.

The site number is obtained from the 1630 -- REMOTE PERPH SITE INDEX page and must be preceded by an s.

For each SM/Remote Peripheral combination the Scan Point status is displayed. The status includes the scan point number, the alarm label, the alarm level (MJ-major, MN-minor, or CR-critical), and state. If the alarm is inhibited the alarm text is backlighted yellow; if the alarm is activated, the alarm is backlighted red. If the alarm is normal, no color appears.

If communication to any unit is lost, the text string "COMM LOST - LAST STATUS SHOWN" displays above the boxes at the right, the corresponding SM XXX UNIT YYY box header is backlighted.

Figure 5-168 shows an example of the 1640 display page.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD<							
INHIBIT ALARM: 600,X,Y,P EAIU Y							
ALLOW ALARM: 700,X,Y,P EAIU Y							
X=SM#, P=SCAN POINT#							
SM 001 EAIU 01	SM	SM	SM				
1 AIR COND CR ALW							
2 HI TEMP MJ INH							
3 LO TEMP MN INH							
SM	SM	SM	SM				

Figure 5-168 1640,SZ- REMOTE PERPH SITE MISC ALARMS (5E12 and Later)

Abbreviations:

ALW	Allow	LO	Low
COND	Conditioner	MJ	Major
CR	Critical	MN	Minor
HI	High	TEMP	Temperature
INH	Inhibit		

5.110.3 Commands

Menu commands to inhibit or allow Remote Peripherals are listed below: Table 105: 1640,SZ -- RISLU Site Misc Alarms Menu Commands

In addition to these commands, any available paging command can be entered from Page 1611.

CMD	RESULT
600,X,Y,P	ALARM on scan point P, SM X, and EAIU is inhibited (INH:ALM,EAIU=X-Y,SCPT=P).
700,X,Y,P	ALARM on scan point P, SM X, and EAIU Y is allowed (ALW:ALM,EAIU=X-Y,SCPT=P;).

5.111 1660,YYYY,X - SM X SID YYYY (5E12 Only)**5.111.1 Purpose**

The purpose of the 1660,YYYY,X display pages is to show the TR303 Remote Terminal (RT) circuit status and facility connections to a host peripheral, (example: in 5E12, the Digital Network Unit - SONET (DNU-S)).

5.111.2 General

The 1660,YYYY,X display page shows the RT number, Host unit number, the RTFACs and associated Host facilities, Embedded Operations Channels/Time Slot Management Channels (EOC/TMC), and alarms for the RT.

Information for each of the 28 RTFACs (maximum) that can terminate on the TR303 RT is shown in table format in the center of the page with the appropriate host facility information beside the RTFAC number and status. An asterisk (*) in the table beside the RTFAC number means the facility has the EOC/TMC.

The TR303 RT has two EOCs and two TMCs. The first facility, RTFAC 1, always has the primary EOC/TMC. The EOC/TMC circuits and their status are shown at the top right of the page display.

The TR303 RT can display the following alarms:

PWR: Power

CRIT: Critical

MAJ: Major

MIN: Minor

ENV1[14]: Environmental 1 through 14

The display string appropriate to the specific host is used to inform the craft to go to the correct page for facility information.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD<

SM 014 STAT

QLPS ISOL+

SITE 000

REMOVE

2XX RTFAC XX

24X EOC CKT X

25X TMC CKT X

SWITCH

400 EOC

401 TMC

DISPLAY

1511,Y,Z DNUS Y STS Z MAINT

(* = EOC/TMC) HOST FAC = STS-DS1

RESTORE

3XX RTFAC XX

34X EOC CKT X

35X TMC CKT X

OUTPUT

900 TEI STATUS

— 1660 — SM 014 — LSM SID 9999 TR303 RT

TR303 DNUS 02 RT 003

RT	HOST	RT	HOST
FAC	FAC	FAC	FAC
01*	ACT	03-01	15
02	ACT	03-08	16
03*	ACT	03-15	17
04	ACT	03-22	18
05			19
06			20
07			21
08			22
09			23
10			24
11			25
12			26
13			27
14			28

CKT	EOC	TMC
0	ACT	ACT
1	STBY	STBY

Figure 5-169 1660,YYYY,X - SM X SID YYYY (5E12 Only)

Abbreviations:

ACT	Active	LSM	Local Switching Module
CKT	Circuit	SM	Switching Module
DS1	Digital Signal Level 1	STBY	Standby
FAC	Facility	STS	Synchronous Transport Signal

5.111.3 Commands

The Commands on the 1660,YYYY,X page allow a user to remove and restore RTFACs, EOCs, and TMCs, and to output the TEI status.

CMD	RESULT
2XX	RTFAC XX is removed. (RMV:RTFAC=SID#-XX) [UCL]
24X	EOC X is removed. (RMV:EOC=SID#-X) [UCL]
25X	TMC X is removed. (RMV:TMC=SID#-X) [UCL]
3XX	RTFAC XX is restored. (RST:RTFAC=SID#-XX) [UCL]
34X	EOC X is restored. (RST:EOC=SID#-X) [UCL]
35X	TMC X is restored. (RST:TMC=SID#-X) [UCL]
400	EOCs are switched. (SW:EOC=SID#) [UCL]
401	TMCs are switched.

900

(SW:TMC=SID#) [,UCL]
TEI status is output.
(OP:RT,CHAN,SID=SID#)

5.112 1700,Y,X - SM X ISLU/RISLU Y NETWORK (5E12 and Later)

5.112.1 Purpose

There are two versions of the 1700,Y,X page; the ISLU version and the RISLU version.

On the ISLU version, the 1700,Y,X page display provides the ISLU common control (ISLUCC) and ISLU Common data (ISLUCD) status and a summary status for the line group (LG) on an SM.

On the RISLU version, information is shown concerning the ISLU network and status of DFIs on the DLTU of an SM.

5.112.2 General

On Page 1700,Y,X, "Y" equals the ISLU/RISLU number, and "X" equals the SM number.

The 1700,Y,X page display can be accessed from the 1000-SM page index, the 1620,SZ RISLU SITE STATUS pages, or the 1450,Y,X - SM X RISLU DLTU Y page.

ISLU Version

The ISLU version of the 1700,Y,X page (Figure 5-170) simultaneously shows the state of ISLUCCs 0 and 1, ISLUCDs 0 and 1, and a status summary of the LGs. The status of the ISLUCCs is noted on the MCC as duplex SM peripheral controllers. When the ISLUCDs are running in a load shared configuration, the status indication for the CDs on the MCC display is ACTIVE-MAJOR/ACTIVE-MINOR. If the CDs are not to run in a load-shared configuration, the status indication for the CDs is ACTIVE/STANDBY. When load sharing is run, a request to conditionally remove a CD is displayed as "CAMP" until all calls routed through the CD are terminated. Then the CD is marked "OOS." If the remove should time out or be stopped before all calls are terminated, the CD is marked "ACT" with no call loss. For ISLU model 1, when any line card (LC) or line group controller (LGC) is removed from service, the LG status summary displays the trouble by backlighting the unit number of the LG in which the OOS unit resides. For ISLU model 2, when the LG or any LBD or LCKT is OOS, the unit number is backlighted in the LG SUMMARY area of the ISLU Network display.

RISLU Version

The RISLU version of the 1700,Y,X page (Figure 5-171) indicates where the ISLU is located. In this example, the ISLU is remoted to SITE 500. This means that the ISLU is really a RISLU because the ISLU is **remote**. The SITE number is shown just below the SM STATUS box.

NOTE: SITE is the site of the SM hosting the RISLU, not the RISLU site.

A fan and fuse alarms indicator box gives the status of the alarms for the RISLU network.

A duplex configuration exists for ISLUCC and ISLUCD. That is, when ISLUCC 0 is active then ISLUCC 1 is on standby (backup), and the same is true for ISLUCD 0 and 1. Each LG (maximum of 16) can be connected to an ISLUCD circuit that is controlled by the ISLUCC.

The 1450,Y command to display DLTU Y appears on the RISLU version.

Figure 5-170 shows an example of the ISLU version of the 1700,Y,X page display.

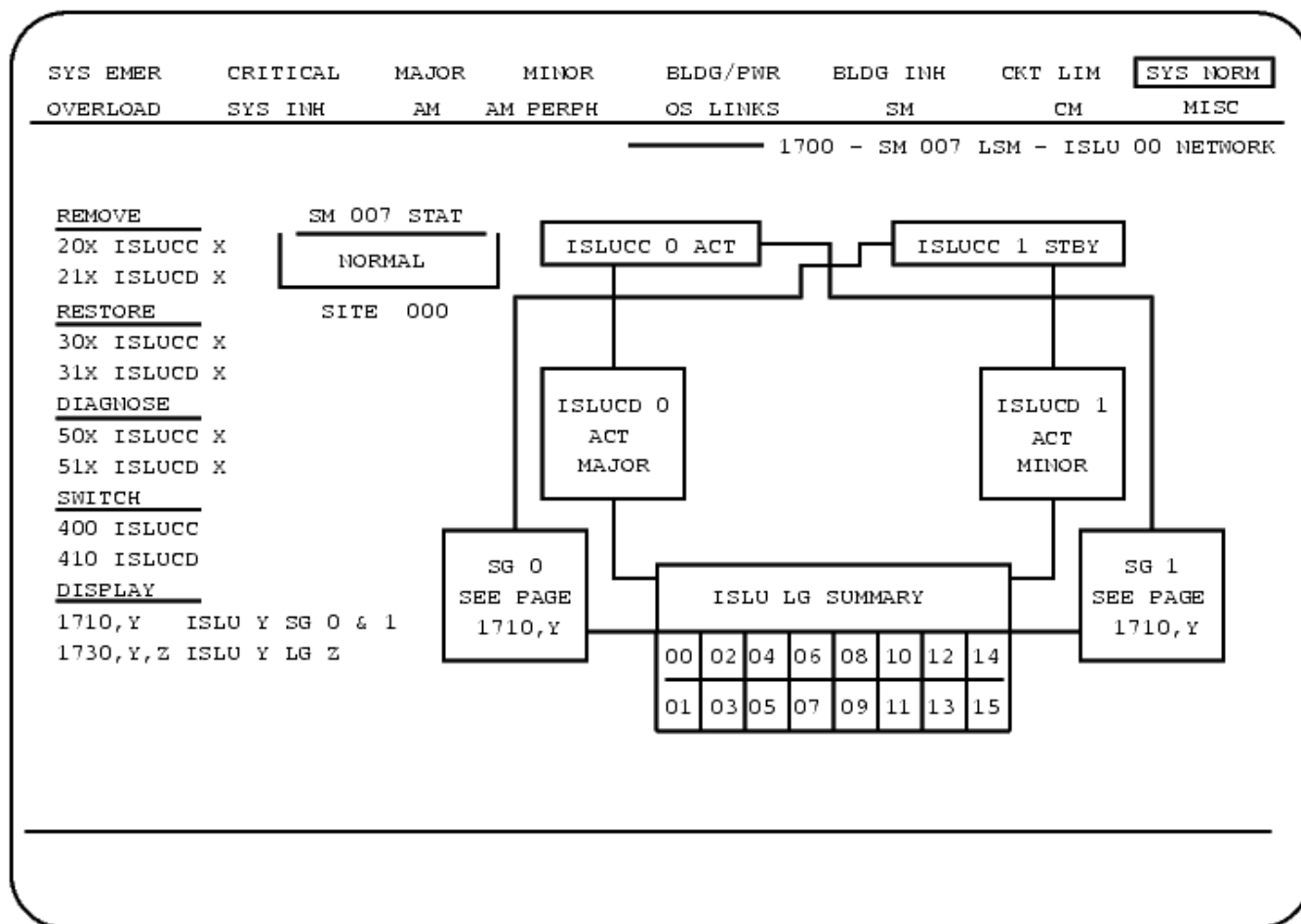


Figure 5-170 1700,Y,X - SM X ISLU Y Network (5E12 and Later)

Abbreviations:

ACT	Active	LGC	Line Group Controller
ISLU	Integrated Services Line Unit	LSM	Local Switching Module
ISLUCC	ISLU Common Control	SG	Service Group
ISLUCD	ISLU Common Data	SM	Switching Module
LC	Line Card	STAT	Status
LG	Line Group	STBY	Standby

Figure 5-171 shows an example of the RISLU version of the 1700,Y,X page display.

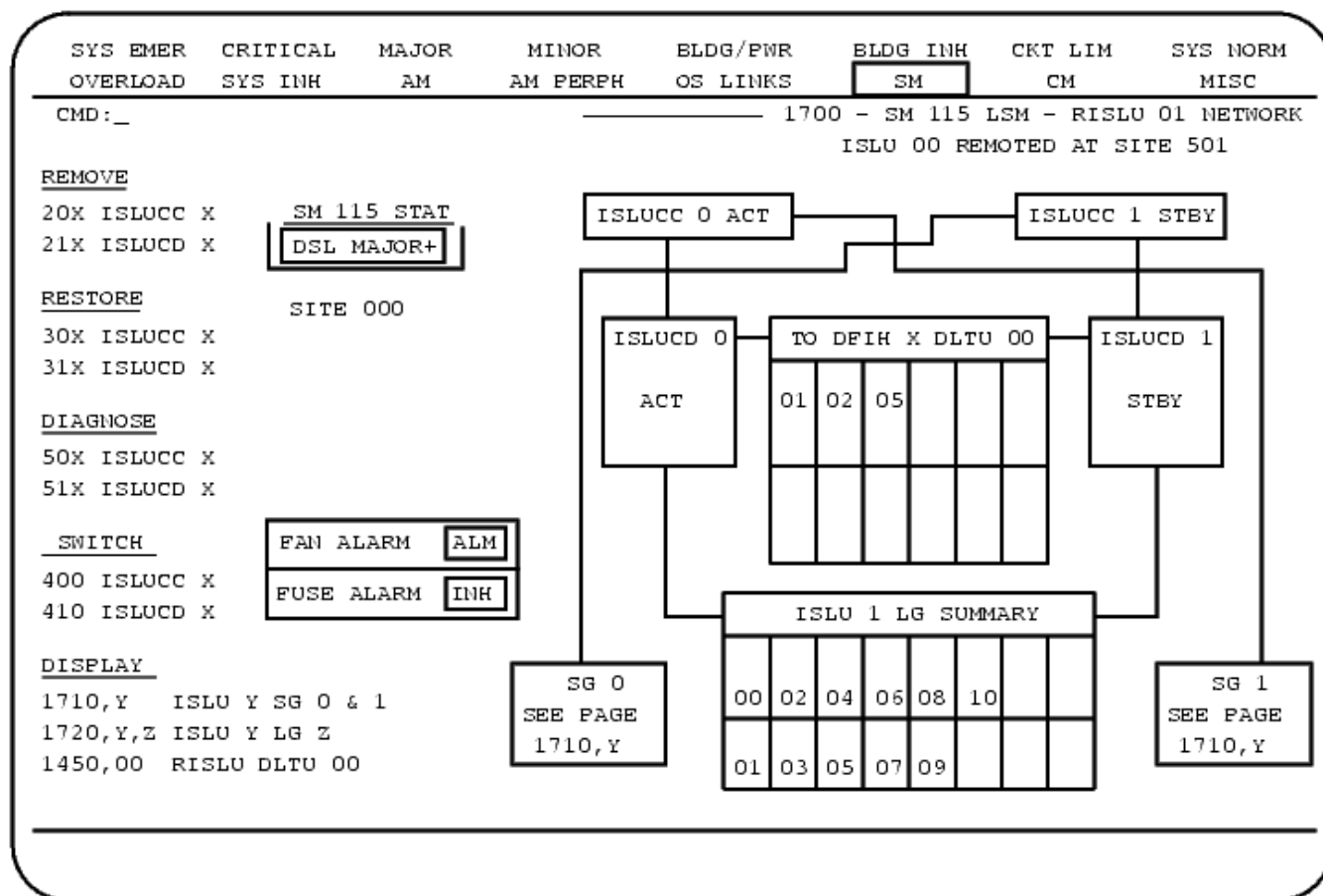


Figure 5-171 1700,Y,X - SM X - RISLU Y Network (5E12 and Later)

Abbreviations:

ACT	Active	ISLUCC	ISLU Common Data
ALM	Alarm	LG	Line Group
DFIH	Digital Facilities Interface/Host	LSM	Local Switching Module
DLTU	Digital Line Trunk Unit	SG	Service Group
DSL	Digital Subscriber Line	SM	Switching Module
ISLU	Integrated Services Line Unit	STAT	Status
ISLUCC	ISLU Common Controller	STBY	Standby

5.112.3 Commands

Commands are provided to remove, restore, switch the clock, and diagnose the ISLU CC and CD circuits and to display ISLU LGs, SGs (0&1), and RISLU DLTUs. Any available paging commands can be entered from this page.

CMD	RESULT
20X	ISLUCC X is removed. (RMV:ISLUCC=SM#-ISLU#-X)
21X	ISLUCC X is removed. (RMV:ISLUCC=SM#-ISLU#-X)
30X	ISLUCC X is restored. (RST:ISLUCC=SM#-ISLU#-X)
31X	ISLUCC X is restored. (RST:ISLUCC=SM#-ISLU#-X)
400	ISLUCC X is switched. (SW:ISLUCC=SM#-ISLU#-X)
410	ISLUCC X is switched. (SW:ISLUCC=SM#-ISLU#-X)
50X	ISLUCC X is diagnosed. (DGN:ISLUCC=SM#-ISLU#-X,RAW,TLP)
51X	ISLUCC X is diagnosed. (DGN:ISLUCC=SM#-ISLU#-X,RAW,TLP)
1450,Y	RISLU DLTU Y is displayed (on RISLU version only).
1710,Y	ISLU Y SG 0 & 1 is displayed.
1720,Y,Z	ISLU Y LG Z is displayed.
1730,Y,Z	ISLU Y LG Z is displayed.

5.113 1710,Y,X - SM X ISLU Y SG 0 AND 1 (5E12 and Later)

5.113.1 Purpose

The 1710,Y,X page display provides status and menu selection for the maintenance actions of the ISLU metallic access network (ISLUMAN), ISLU ringing generator (ISLURG), and ISLU high-level service circuit (ISLUHLSC) on an SM.

NOTE: The ISLURG is not supported on ISLU model 2.

5.113.2 General

On Page 1710,Y,X, "Y" equals the ISLU number, and "X" equals the SM number.

This page displays the status of each ISLUHLSC, ISLUMAN, and ISLURG in both SGs 0 and 1. The possible states of these indicators are "ACT," "CAMP," "OOS," "OOSFE," "DGR," "GROW," and "UNEQ." When any of the circuits in an ISLU SG are in an off-normal state, the associated SG summary status indicator for that SG is backlighted.

The 1710,Y,X page can be accessed from the 1700,Y,X - SM X ISLU/RISLU NETWORK page display.

Figure 5-172 shows an example of the 1710,Y,X page display.

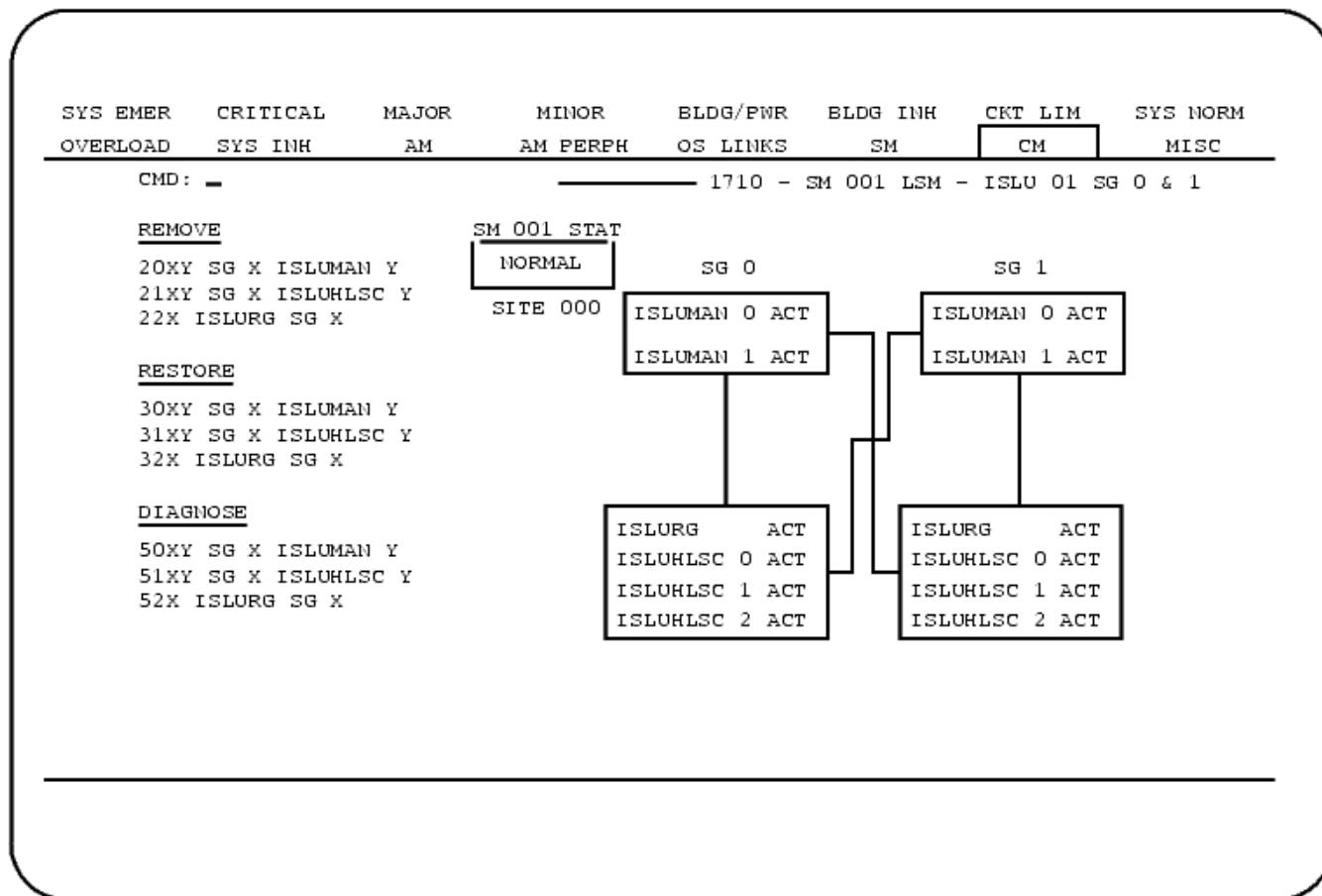


Figure 5-172 1710,Y,X - SM X ISLU Y SG 0 and 1 (5E12 and Later)

Abbreviations:

ACT	Active	LG	Line Group
ISLU	Integrated Services Line Unit	LSM	Local Switching Module
ISLUHLSC	ISLU High-Level Service Circuit	SG	Service Group
ISLUMAN	ISLU Metallic Access Network	SM	Switching Module
ISLURG	ISLU Ringing Generator	STAT	Status

5.113.3 Commands

The 1710,Y,X page provides commands to remove, restore, and diagnose the ISLUMAN, ISLUHLSC, and ISLURG of the SG. Also, the ISLU Line Group page display can be requested. Any available paging commands can be entered from this page.

CMD	RESULT
20XY	SG X ISLUMAN Y is removed. (RMV:ISLUMAN=SM#-ISLU#-X-Y)
21XY	SG X ISLUHLSC Y is removed. (RMV:ISLUHLSC=SM#-ISLU#-X-Y)
22X	RISLURG SG X is removed. (RMV:ISLURG=SM#-ISLU#-X)
30XY	SG X ISLUMAN Y is restored. (RST:ISLUMAN=SM#-ISLU#-X-Y)
31XY	SG X ISLUHLSC Y is restored. (RST:ISLUHLSC=SM#-ISLU#-X-Y)
32X	RISLURG SG X is restored. (RST:ISLURG=SM#-ISLU#-X)
50XY	SG X ISLUMAN Y is diagnosed. (DGN:ISLUMAN=SM#-ISLU#-X-Y,RAW,TLP)
51XY	SG X ISLUHLSC Y is diagnosed. (DGN:ISLUHLSC=SM#-ISLU#-X-Y,RAW,TLP)
52X	ISLURG SG X is diagnosed. (DGN:ISLURG=SM#-ISLU#-X)

5.114 1720,Y,Z,X - SM X ISLU Y LG Z (5E12 and Later)

5.114.1 Purpose

The 1720,Y,Z,X page display provides the LGC status and the status and type of each LC for the LG of the ISLU network on an SM.

5.114.2 General

On Page 1720,Y,Z,X, "Y" equals the ISLU number, "Z" equals the LG number, and "X" equals the SM number.

The ISLU LG display pages (one per LG) show the LGC status and individual LC status and type. The data of each of the ISLU LG pages supplies the LG status entry in the summary of the ISLU Network display. The possible states of the LGC and LCs are ACT, CAMP, OOS, OOSFE, GROW, and UNEQ. The state customer deny (CDNY) applies for the LGC. States spare (SPR) and designated spare (DSPR) apply for the LC. When the LGC is unequipped, growing, or OOS, the LCs can be of the same state or OOSFE. A request to conditionally remove an LGC is displayed as CAMP until all LCs can terminate and be marked OOS. Once all the LCs are removed and marked OOSFE, the LGC is removed as well and marked OOS. If the remove should time out or be stopped before all the LCs and LGC are removed, the LGC is marked CDNY. A request to conditionally remove an LC is displayed as CAMP until the LC call is terminated, upon which, the LC is marked OOS. If the remove should time out or be stopped before the call is terminated, the LC is marked as before the remove request, active. If any portion of the LCs or the LGC is OOS, the trouble is reflected on the LG status summary of the ISLU Network display by backlighting the unit number of the LG.

The appropriate peripheral status block of the SM on the SM STATUS page is marked with the ISLU. When any portion of the ISLU is OOS, the block is backlighted. If the status reported on the SM status page or on any of the ISLU MCC display pages change while being displayed, the appropriate indicators are updated with the changed status.

The 1720,Y,Z,X page display can be accessed from the 1700,Y ISLU/RISLU NETWORK page display. An example of the 1720,Y,Z,X page is shown in Figure 5-173. Included in this example are the ANS[®] U-Line Cards (AULC) and AULC spare (AUSP).

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD: 1720 - SM 007 RSM ISLU 01 LG 15

SM 007 STAT

CKT OOS

SITE 000

REMOVE

200 ISLULGC

21XX ISLULC XX

RESTORE

300 ISLULGC

31XX ISLULC XX

DIAGNOSE

500 ISLULGC

51XX ISLULC XX

ISLULGC 15 ACT							
ISLULC	TYPE	ISLULC	TYPE	ISLULC	TYPE	ISLULC	TYPE
00 ACT	TLC	08 ACT	ZLC	16 ACT	ULC	24 ACT	TLC
01 ACT	TLC	09 OOS	ZLC	17 ACT	ULC	25 ACT	TLC
02 OOS	TLC	10 ACT	ZLC	18 ACT	ULC	26 ACT	TLC
03 ACT	TLC	11 SPR	ZLC	19 ACT	ULC	27 ACT	AULC
04 ACT	TLC	12 ACT	ZLC	20 ACT	ULC	28 ACT	AULC
05 ACT	TLC	13 ACT	ZLC	21 ACT	TLC	29 ACT	AULC
06 ACT	TLC	14 ACT	ZLC	22 ACT	TLC	30 ACT	AULC
07 ACT	TLC	15 STBY	AUSP	23 ACT	TLC	31 DSPR	ZSP

Figure 5-173 1720,Y,Z,X - SM X ISLU Y LG Z (5E12 and Later)

Abbreviations:

ACT	Active	RSM	Remote Switching Module
AULC	ANS [®] U-Line Card	SM	Switching Module
AUSP	ANS [®] U-Line Card Spare	SPR	Spare
DSPR	Designated Spare	STAT	Status
ISLU	Integrated Services Line Unit	STBY	Standby
ISLULC	ISLU Line Card	TLC	T-Line Card
ISLULGC	ISLU Line Group Controller	ULC	U-Line Card
LG	Line Group	ZLC	Z-Line Card
OOS	Out of Service	ZSP	Z-Line Card Spare

5.114.3 Commands

The 1720,Y,Z,X page provides commands to remove, restore, and diagnose the ISLULGCs and ISLULCs. Any available paging commands can be entered from this page.

CMD	RESULT
200	ISLULGC is removed. (RMV:ISLULGC=SM#-ISLU#-LG#)
21XX	ISLULC XX is removed. (RMV:ISLULC=SM#-ISLU#-LG#-XX)
300	ISLULGC is restored. (RST:ISLULGC=SM#-ISLU#-LG#)
31XX	ISLULC XX is restored. (RST:ISLULC=SM#-ISLU#-LG#-XX)
500	ISLULGC is diagnosed. (DGN:ISLULGC=SM#-ISLU#-LG#-RAW,TLP)
51XX	ISLULC XX is diagnosed. (DGN:ISLULC=SM#-ISLU#-LG#-XX,RAW,TLP)

5.115 1730,Y,Z,X - SM X ISLU Y LG Z (5E12 and Later)

5.115.1 Purpose

The 1730,Y,Z,X page provides the line board (LBD) and line circuit (LCKT) status for a line group (LG) of the ISLU model 2 network.

5.115.2 General

On Page 1730,Y,Z,X, "Y" equals the ISLU number, "Z" equals the LG number, and "X" equals the SM number.

The data of each of the ISLU LG pages supplies the LG status entry in the summary of the ISLU Network display. Possible states of the LG are ACT, CAMP, OOS, OOSF, OOST, GROW, UNEQ, and CDNY. Possible states of the LBD are ACT, CAMP, OOS, OOSF, OOST, GROW, UNEQ, and CDNY. Possible states of the LCKT are ACT, CAMP, OOS, OOSF, GROW, OOST, STBY, SPR, and DSPR.

When the LG is unequipped, growing, or OOS, the LBD can be of the same state or OOSF. When a request is made to conditionally remove an LG, the LG and all LCKTs with active calls are displayed as CAMP. As calls terminate, the LCKTs are displayed as OOSF. If all LCKTs are removed, the LG is displayed as OOS. If the remove should time out or be stopped before all LBDs and LCKTs are removed, the LG is marked CDNY and LCKTs with active calls are displayed as ACT.

When a request is made to conditionally remove an LBD, the LBD and all LCKTs with active calls are displayed as CAMP. As calls terminate, the LCKTs are displayed as OOSF. If all LCKTs are removed, the LBD is displayed as OOS. If the remove should time out or be stopped before all LCKTs are removed, the LBD is marked CDNY and LCKTs with active calls are displayed as ACT.

When the LG or any LBD or LCKT is OOS, the unit number is backlighted in the LG SUMMARY area of the ISLU Network display.

Figure 5-174 shows an example of the 1730,Y,Z,X page display.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC

CMD< _____ 1730 - SM 005 LSM ISLU 01 LG 15

REMOVE

200 LG

21X LBD

22X,Y LCKT

RESTORE

300 LG

31X LBD

32X,Y LCKT

DIAGNOSE

500 LG

51X LBD

52X,Y LCKT

X = LINE BOARD 0-7

Y = LINE CIRCUIT 0-7

SM 005 STAT

CKT OOS

SITE 000

ISLU LG 15 ACT							
LBD 0 TYPE U ACT	LBD 1 TYPE U ACT	LBD 2 TYPE T ACT	LBD 3 TYPE T ACT	LBD 4 TYPE U ACT	LBD 5 TYPE T ACT	LBD 6 TYPE U ACT	LBD 7 TYPE T ACT
LCKT:	LCKT:	LCKT:	LCKT:	LCKT:	LCKT:	LCKT:	LCKT:
0 STBY	0 ACT	0 ACT	0 ACT	0 ACT	0 ACT	0 ACT	0 ACT
1 ACT	1 ACT	1 ACT	1 ACT	1 ACT	1 ACT	1 ACT	1 ACT
2 ACT	2 ACT	2 ACT	2 ACT	2 ACT	2 ACT	2 ACT	2 ACT
3 ACT	3 ACT	3 ACT	3 ACT	3 ACT	3 ACT	3 ACT	3 OOS
4 ACT	4 ACT	4 ACT	4 ACT	4 ACT	4 ACT	4 ACT	4 ACT
5 ACT	5 ACT	5 ACT	5 ACT	5 ACT	5 ACT	5 ACT	5 ACT
6 ACT	6 ACT	6 ACT	6 ACT	6 ACT	6 ACT	6 ACT	6 ACT
7 ACT	7 ACT	7 ACT	7 ACT	7 ACT	7 ACT	7 ACT	7 ACT

Figure 5-174 1730,Y,Z,X - SM X ISLU Y LG Z (5E12 and Later)

Abbreviations:

ACT	Active
CKT	Circuit
ISLU	Integrated Services Line Unit
LBD	Line Board
LCKT	Line Circuit
LG	Line Group
LSM	Local Switching Module
OOS	Out of Service
SM	Switching Module
STAT	Status
STBY	Standby
T	T-Line Card
U	U-Line Card

5.115.3 Commands

The 1730,Y,Z,X page provides commands to remove, restore, and diagnose an LG, LBD, and LCKT of an ISLU network. Any available paging commands can an entered from this page.

CMD	RESULT
200	ISLULG is removed. (RMV:ISLULG=SM#-ISLU#-LG#)
21X	ISLULBD X is removed. (RMV:ISLULBD=SM#-ISLU#-LG#-X)

22X,Y	ISLULCKT Y at ISLULBD X is removed. (RMV:ISLULCKT=SM#-ISLU#-LG#-X-Y)
300	ISLULG is restored. (RST:ISLULG=SM#-ISLU#-LG#)
31X	ISLULBD X is restored. (RST:ISLULBD=SM#-ISLU#-LG#-X)
32X,Y	ISLULCKT Y at ISLULBD X is restored. (RST:ISLULCKT=SM#-ISLU#-LG#-X-Y)
500	ISLULG is diagnosed. (DGN:ISLULG=SM#-ISLU#-LG#,RAW,TLP)
51X	ISLULBD X is diagnosed. (DGN:ISLULBD=SM#-ISLU#-LG#-X,RAW,TLP)
52X,Y	ISLULCKT Y at ISLULBD X is diagnosed. (DGN:ISLULCKT=SM#-ISLU#-LG#-X-Y,RAW,TLP)

5.116 1800,X - SM X INHIBIT AND RECOVERY CONTROL (5E12 and Later)

5.116.1 Purpose

The 1800,X page provides inhibit and recovery status and control information for SM X. It functions like an emergency action interface for the SM.

5.116.2 General

When an inhibit is requested, the top third of the associated indicator is backlighted to the INHIBIT state and the text INH appears in the corresponding box. When the inhibit is actually activated, the rest of the associated indicator is backlighted to the INHIBIT state. On Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for that SM is backlighted; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM backlights, and the phrase INHIBITS is written, unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator backlights.

Some of the boxes on the 1800,X page have numbers at the bottom of the box. These numbers show what commands are available from the display. For example, at the bottom of Box 02 the numbers ``6 7 9" appear. The ``6" means this item can be inhibited by entering **602**, the ``7" means it can be allowed by entering **702**, and the ``9" means output is available with **902**. On color MCC terminals, there is also color mapping from the commands shown on the left of the display to the numbers in the boxes.

In addition to the inhibit status indicators, there are indicators for the status of the module controller time slot interchangers (MCTSI) 0 and 1. When the MCTSIs are functioning normally, the active MCTSI is marked active (ACT). If an MCTSI is active forced, it is shown as ACTF and the other MCTSI is marked unavailable (UNAV). The conditions standby and out of service also apply to this display. During an initialization, the status of the inactive MCTSI cannot be precisely determined and the display is blanked.

There is also an indicator for the state of the mate memory. The possible states for the mate memory indicator are as follows:

- **STANDBY:** Mate memory has been updated
- **UPDATING:** Mate memory update is in progress
- **OOD:** Mate memory is out of date
- **PUMPED:** Mate memory has been off-line pumped.

During an initialization, the status of the mate memory cannot be precisely determined and the display is blanked. The lower area of the SM STAT indicator is for listing special abnormal conditions in the SM. The possible conditions shown in this area are as follows: GEN DIFF, ISOLATED, COMMLOST, SPEC GROW, STNDALONE, INIT PEND, and HASH ERR.

5.116.3 Indicators

This section describes the individual indicators and their behavior.

Box 00 Routine Audits

This indicator shows if the automatic execution of the SM audit cycle is inhibited.

Entering the **600** command generates the command **INH:AUD=CYCLE,SM=X** and causes the top line of the indicator to be backlighted and the text INH to be written. This request is phase-protected. Single audits can also be inhibited via input messages, but they are not phase-protected.

When the request is recorded, the description area of the box is backlighted. This area is backlighted if one or more of the SM audits are inhibited.

Entering the command **700** generates the command **ALW:AUD=CYCLE,SM=X** and causes the indicator to return to normal video.

The command **900** can be entered to get a ROP listing of routine audit status for the SM. This command generates the message **OP:STATUS=ALL,AUD,SM=X**.

Box 01 Auto Pump

When the **601** command is entered, it generates the command **INH:PUMP,SM=X**. This inhibits the automatic pump of the SM on a major initialization (except *UNIX*[®] RTR system level D4). This inhibit is phase-protected.

The **701** command generates **ALW:PUMP,SM=X**. This command must be entered to cancel the inhibit.

Box 02 Routine Exercises

This indicator shows if any or all of the routine exercises (other than unit exercises) in the SM are inhibited.

Entering the command **602** generates the message **INH:REX,SM=X**. Entering the command **702** generates the message **ALW:REX,SM=X**. To print a status listing of routine exercises at the ROP, enter the **902** command (**OP:REXINH,SM=X**).

Box 03 Manually Isolate

This indicator shows if the SM is manually isolated. If the box is backlighted, the SM has been manually isolated. If the SM is an RSM in a cluster and has been separated from its cluster as well as the HSM, "SEP" appears on the third line in the box. If the SM is of another type or the RSM is still linked to the cluster, the third line shows "NOSEP".

When the **403** command is entered, it generates the message **SET:ISOL,SM=X**. This configures CLNK hardware to remove any level 2 protocol or active links from service. The removal is unconditional, and the SM remains isolated until the **503** command is entered which generates the message **CLR:ISOL,SM=X**.

Box 04 Software Checks

This indicator reflects whether or not the AM application software checks are inhibited. If any software checks have been inhibited, the description section is backlighted.

The command **604** generates the message **INH:SFTCHK,SM=X** and **704** generates **ALW:SFTCHK,SM=X**.

Box 05 Sanity Timer

This box provides commands to inhibit and allow the sanity timer.

The command **605** generates the message **ORD:CPI=X,CMD=INH** and **705** generates **ORD:CPI=X,CMD=ALW**.

Box 06 Customer-Originated Recent Change (CORC) Logging

The command **606** generates the message **INH:CORCLOG,SM=X** which causes the CORC logging to be inhibited.

Inhibiting customer-originated recent change logging should only be used when recent change logging is suspected to be causing a problem in the system.

The command **706** generates the message **ALW:CORCLOG,SM=X**.

Box 07 Recent Change Backout

This indicator shows the status of recent change (RC) backout. If set, RCs are not reentered following a high-level initialization.

The description portion shows when the recent changes are actually backed out or loaded. If the backout is in progress, a number appears on the third line of the box showing the progress of the backout. From 200 down to 100 is CORC backout; 200 meaning CORC is still fully backed out and 100 meaning CORC is fully rolled forward. From 100 down to 0 is RC backout; 100 meaning RC is still fully backed out and 0 meaning RC is fully rolled forward. Recent changes can be backed out only in conjunction with a high-level initialization.

The command **407** generates the message **SET:BACKOUT,RC,SM=X** and **507** generates **CLR:BACKOUT,RC,SM=X**.

Box 08 Hardware Checks

The command **608 (INH:HDWCHK,SM=X)** causes all SM hardware checks to be inhibited. **Note:** The lower portion of this box is lighted only if all hardware checks have been inhibited.

If hardware checks are allowed circuit by circuit, the indicator is not cleared.

The command **708 (ALW:HDWCHK,SM=X)** allows all SM hardware checks. This clears the backlighting of the box.

Box 09 SM Brevity Controls

Certain messages are normally suppressed from printing at the ROP. By inhibiting the controls, all SM output messages would be sent to the AM regardless of past message counts. Using this command can increase link traffic to the AM, and thus, can be service affecting.

Inhibiting the brevity controls is achieved by entering command **609 (INH:BREVC,SM=X)**. The controls can be returned to normal by entering the command **709 (ALW:BREVC,SM=X)**.

Box 10 UPD Backout

This indicator shows whether or not recently applied SM program updates are currently loaded or backed out.

The description portion shows when the program updates are actually backed out or loaded. Program updates can be backed out or loaded only in conjunction with a high-level initialization.

There are no menu commands for this box.

Box 11 Min Mode (Full Init)

This inhibit causes the SM to enter minimum mode and ignore all call processing. This inhibit should only be used in extreme emergencies, when all other normal recovery procedures have failed.

When the **411** command is entered, the message **SET:MINMODE,SM=X,FI** is sent. This initiates a high-level init and inhibits software checks, hardware checks, routine exercises, and routine audits. In addition, output message brevity control is allowed.

The only way to exit min mode is to enter the clear command or message. The **511** command generates the message **CLR:MINMODE,SM=X,FI** and causes a high-level init.

Box 12 Peripheral Fault Recovery Message Verbose

The command **412 (SET:PERPH,SM=X, VERBOSE)** causes peripheral fault recovery (PFR) to send to the AM peripheral error messages that indicate that no recovery action has occurred in addition to messages that indicate that a peripheral error has caused recovery actions.

The command **512 (CLR:PERPH,SM=X, VERBOSE)** causes PFR to suppress the output of error reports. In the normal state, only output messages which indicate that a peripheral error has caused recovery actions on a circuit are output.

The messages are logged or printed, depending on the state of the message class for each peripheral unit type.

Box 13 Alarmed Message Discard

This indicator shows if any output messages for this SM are being discarded. Output messages of CRITICAL, MAJOR, MINOR, or MANUAL can be discarded by the input message **CHG:MSGCNTL**. When this input message is entered, the box backlights.

Box 14 - Routine Maintenance

This indicator reflects whether or not a routine maintenance function is inhibited. Should routine maintenance functions be inhibited for an extended period of time, various system resource availability and consi

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: 							
1800 - SM 001 LSM INH & RCVRY CNTL							

INHIBIT (6) 6XX SET (4) 4XX OUTPUT (9) 9XX FORCE ACTIVE 420 SET MCTSI 0 421 SET MCTSI 1 422 CLEAR FORCE INITIALIZE 920 SELECTIVE INIT (SI) 921 SELECTIVE INIT W/PUMP 922 FULL INIT (FI) 923 FULL INIT W/PUMP 924 MP RESET (FI)	ALLOW (7) 7XX CLEAR (5) 5XX	SM 001 STAT INHIBITS +	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">00 ROUTINE AUDITS 6 7 9</td> <td style="width: 25%;">01 AUTO PUMP 6 7</td> <td style="width: 25%;">02 ROUTINE EXERCISE 6 7 9</td> <td style="width: 25%;">03 MANUALLY ISOLATE 4 5</td> </tr> <tr> <td>04 SFTCHK 6 7</td> <td style="border: 2px solid black;">05 INH SANITY TIMER 6 7</td> <td>06 CORC LOGGING 6 7</td> <td>07 RC BKOUT 50% 4 5</td> </tr> <tr> <td>08 ALL HDWCHK 6 7</td> <td>09 BREVC SM 6 7</td> <td>10 UPD BACKOUT 6 7</td> <td>11 MIN MODE (FI) 4 5</td> </tr> <tr> <td>12 PFR MSG VERBOSE 4 5</td> <td>13 ALARMED MSG DSCD 6 7</td> <td>14 ROUTINE MTCE 6 7</td> <td>15 NOT USED</td> </tr> </table>	00 ROUTINE AUDITS 6 7 9	01 AUTO PUMP 6 7	02 ROUTINE EXERCISE 6 7 9	03 MANUALLY ISOLATE 4 5	04 SFTCHK 6 7	05 INH SANITY TIMER 6 7	06 CORC LOGGING 6 7	07 RC BKOUT 50% 4 5	08 ALL HDWCHK 6 7	09 BREVC SM 6 7	10 UPD BACKOUT 6 7	11 MIN MODE (FI) 4 5	12 PFR MSG VERBOSE 4 5	13 ALARMED MSG DSCD 6 7	14 ROUTINE MTCE 6 7	15 NOT USED
00 ROUTINE AUDITS 6 7 9	01 AUTO PUMP 6 7	02 ROUTINE EXERCISE 6 7 9	03 MANUALLY ISOLATE 4 5																
04 SFTCHK 6 7	05 INH SANITY TIMER 6 7	06 CORC LOGGING 6 7	07 RC BKOUT 50% 4 5																
08 ALL HDWCHK 6 7	09 BREVC SM 6 7	10 UPD BACKOUT 6 7	11 MIN MODE (FI) 4 5																
12 PFR MSG VERBOSE 4 5	13 ALARMED MSG DSCD 6 7	14 ROUTINE MTCE 6 7	15 NOT USED																

SITE 000 MCTSI <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">0 ACT</td> <td style="width: 50%; text-align: center;">1 STBY</td> </tr> </table> MATE MEMORY OOD	0 ACT	1 STBY	
0 ACT	1 STBY		

XX=BOX NUMBER

Figure 5-175 1800,X - SM X Inhibit and Recovery Control (5E12 and Later)stency may be adversely affected.

This box monitors the SM's Generated Key Collection and Compression Routine inhibit status. If the routine is inhibited, the description section is backlighted.

When the **614** command is entered, the message **INH:GKCCR,SM=X** is sent which requests that automatic executions of the Generated Key Collection and Compression Routine be inhibited.

Entering command **714** generates the command **ALW:GKCCR,SM=X** which requests that automatic periodic execution of the Generated Key Collection and Compression Routine be allowed.

Box 15 - Box 15 is currently not used. Figure 5-175 is an example of the 1800,X page which shows the SM 1 sanity timer inhibited; MCTSI 0 is active and MCTSI 1 is in standby. The mate memory is out of date and 50 percent of the recent change has been backed out.

Abbreviations:

BKOUT	Backout	MP	Module Processor
BREVC	Brevity Control	MSG	Message
CORC	Customer- Originated RC	MTCE	Maintenance
DSCD	Discard	NOSEP	Not Separated
FI	Full Initialization	PFR	Peripheral Fault Recovery
HDWCHK	Hardware Checks	RC	Recent Change
INIT	Initialization	SEP	Separated
MAN ISOL	Manually Isolated	SFTCHK	Software Checks
MCTSI	Module Controller Time Slot Interchanger	SI	Selective Initialization
		UPD	Update

5.116.4 Commands

Any available paging command can be entered from the 1800,X display page.

Input messages for commands shown in boxes on the display are also described previously under the subheading, Indicators.

CMD	RESULT
403	Manual Isolation of SM is set. (SET:ISOL,SM=X)
407	RC Backout is set. (SET:BACKOUT,RC,SM=X)
411	Min Mode (FI) is set. (SET:MINMODE,SM=X,FI)
412	Peripheral fault recovery message verbose is set. (SET:PERPH,SM=X,VERBOSE)
420	MCTSI 0 is forced active. (SET:MCTSI=X-0,FRC)
421	MCTSI 1 is forced active. (SET:MCTSI=X-1,FRC)
422	Force of MCTSI is cleared. (CLR:MCTSI=X,FRC)
503	Manual Isolation of SM is cleared. (CLR:ISOL,SM=X)
507	RC Backout is cleared. (CLR:BACKOUT,RC,SM=X)
511	Min Mode (FI) is cleared. (CLR:MINMODE,SM=X,FI)
512	Peripheral fault recovery message verbose is cleared. (CLR:PERPH,SM=X,VERBOSE)
600	Routine Audits are inhibited. (INH:AUD=CYCLE,SM=X)
601	Auto Pump is inhibited. (INH:PUMP,SM=X)
602	Routine Exercises are inhibited. (INH:REX,SM=X)
604	Software Checks are inhibited. (INH:SFTCHK,SM=X)
605	Sanity Timer is inhibited. (ORD:CPI=X,CMD=INH)
606	CORC Logging is inhibited. (INH:CORCLOG,SM=X)
608	All Hardware Checks are inhibited. (INH:HDWCHK,SM=X)
609	Brevity Control for the SM is inhibited. (INH:BREVC,SM=X)
614	Routine Maintenance function is inhibited; specifically, Generated Key Collection and Compression Routine. (INH:GKCCR,SM=X)
700	Routine Audits are allowed. (ALW:AUD=CYCLE,SM=X)
701	Auto Pump is allowed. (ALW:PUMP,SM=X)
702	Routine Exercises are allowed. (ALW:REX,SM=X)
704	Software Checks are allowed. (ALW:SFTCHK,SM=X)
705	Sanity Timer is allowed. (ORD:CPI=X,CMD=ALW)
706	CORC Logging is allowed. (ALW:CORCLOG,SM=X)
708	All Hardware Checks are allowed. (ALW:HDWCHK,SM=X)
709	Brevity Control for the SM is allowed. (ALW:BREVC,SM=X)
714	Routine Maintenance function is allowed; specifically, Generated Key Collection and Compression Routine. (ALW:GKCCR,SM=X)
900	Routine Audits are output. (OP:STATUS=ALL,AUD,SM=X)
902	Routine Exercises are output. (OP:REXINH,SM=X)
920	Selective initialization is requested. (INIT:SM=X,SI)
921	Selective initialization with pump is requested. (INIT:SM=X,SI,PUMP)
922	Full Initialization is requested. (INIT:SM=X,FI)
923	Full Initialization with pump is requested. (INIT:SM=X,FI,PUMP)
924	Reset counter is forced to level 12 or greater (guaranteeing a high level init). This poke does not require software sanity in the SM. Poke 924 uses central processor intervention (CPI) to force the SM to reset, and the ROM reset handler forces the reset count to level 12 or greater. The remainder of the init occurs normally. (ORD:CPI=X,CMD=RESET) Note: If the SM fails to respond to the FI PUMP and the SM appears to have lost sanity, use MP RESET (924 poke). Also, if the SM is attempting to pump and is failing, then MP RESET may not help.

5.117 1850 - CMP 0 PRIMARY INHIBIT AND RECOVERY CONTROL (5E12 and Later)

5.117.1 Purpose

The 1850 page provides status displays for both the primary and mate CMPs of the pair. Also provided are menu commands to inhibit or allow hardware and software checks, routine audits, automatic pump, brevity control, and set and clear for recent change backout. Requests for high-level initialization can be poked from the 1850 page.

5.117.2 General

On the 1850 page display, each processor is identified by its CMP pair number and by its physical representation

which includes the message switch side. There is only one primary/mate CMP pair (0).

During CMP initialization, the initialization status phrase progress marks are displayed in the PRIM STAT portion of the screen along with the progress counter which shows the progress within a particular phase of the initialization. The set of progress marks used is different from the set used for the SMs pump and initialization sequences on MCC Page 1800,X.

Table 5-2 shows the CMP Off-Normal Status Phrases along with the priority, color, and an explanation of each.

Table 5-2 Page 1850 - CMP Off-Normal Status Phrases - 5E12 and Later

PRIORITY	PHRASE	COLOR	EXPLANATION
1	SFT SWITCH	black/white	Soft switch in progress
2	init state	black/yellow	Initialization progress types
3	PRECUT	black/cyan	Pre-cutover state
	POSTCUT	black/cyan	Post-cutover state
4	COMM LOST	white/red	Communication lost
	INIT PEND	black/yellow	Manually requested initialization is pending
5	GEN DIFF	yellow/red	AM/CMP on different generics (software releases)
6	MIN MODE	white/red	Minimum mode (no call processing)
7	HASH ERR	red/white	Hashsum check error
8	BACKOUT	blue/white	Recent change and/or update backout
9	OVERLOAD	red/white	Overload (See MCC Page 109)
10	INHIBITS	blue/yellow	Inhibit(s) are on
11	POSTINIT	black/white	Post-initialization (escalation interval)
12	MSG CNTL	blue/white	Output message discard mode set
13	BKUP FAIL	black/white	ODD backup failure
14	ODD WARN	black/white	Either ODD space exceeded recommendations or the automatic relation engineering reorganization process has failed
15	REQ PEND	black/white	Set/inhibit request pending
16	NORMAL	normal video	Normal operation

After initialization has completed, the current (highest) level CMP status is displayed (just as with the SMs on the 1800,X page). A ``+" sign at the end of the status phrase indicates that more than one off-normal status exists. The **OP:SYSTAT** input message or **800** poke command can be used to obtain additional off-normal status information. Also, the current (highest) status of the MATE CMP is displayed. Additional status phrases are displayed in the other PRIM STAT and MATE STAT boxes along with the peripheral control data (PCD) status.

Some of the boxes on the 1850 page have numbers at the bottom. These numbers show what commands are available from the display. For example, at the bottom of Box 00 the numbers ``6 7 9" appear. The ``6" means this item can be inhibited by entering **600**, the ``7" means it can be allowed by entering **700**, and the ``9" means output is available with **900**. On color MCC terminals, there is also color mapping from the commands shown on the left of the display to the numbers in the boxes.

5.117.3 Status Indicators

This section describes the individual indicators and their behavior.

Box 00 - Routine Audits

This indicator shows if the automatic execution of the CMP audit cycle is inhibited.

Entering the **600** command generates the command **INH:AUD[=a],CMP=b** and causes the top line of the indicator to be backlighted and the text INH to be written. This request is phase-protected. Single audits can also be inhibited via input messages, but they are not phase-protected.

When the request is recorded, the description area of the box is backlighted. This area is backlighted if one or more of the CMP audits are inhibited.

Entering the command **700** generates the command **ALW:AUD[=a],CMP=b** and causes the indicator to return to normal video.

The command **900** can be entered to get a ROP listing of routine audit status for the CMP. This command generates the message **OP:STATUS[=a],AUD[=b],CMP=c**.

Box 01 - Auto Pump

When the **601** command is entered, it generates the command **INH:PUMP,CMP=a**. This inhibits the automatic pump of the CMP on a major initialization (except *UNIX*® RTR system level D4). This inhibit is phase-protected.

The **701** command generates **ALW:PUMP,CMP=a**. This command must be entered to cancel the inhibit.

Box 02 - Routine Maintenance

This indicator reflects whether or not a routine maintenance function is inhibited. Should routine maintenance functions be inhibited for an extended period of time, various system resource availability and consistency may be adversely affected.

This box monitors the CMP's Generated Key Collection and Compression Routine inhibit status. If the routine is inhibited, the description section is backlighted.

When the **602** command is entered, the message **INH:GKCCR,CMP=a** is sent which requests that automatic executions of the Generated Key Collection and Compression Routine be inhibited.

Entering command **702** generates the command **ALW:GKCCR,CMP=a** which requests that automatic periodic execution of the Generated Key Collection and Compression Routine be allowed.

Box 04 - Software Checks

This indicator reflects whether or not the AM application software checks are inhibited. If any software checks have been inhibited, the description section is backlighted.

The command **604** generates the message **INH:SFTCHK,CMP=a** and **704** generates **ALW:SFTCHK,CMP=a**.

Box 05 - Alarmed Messages Discarded

The input message **CHG:MSGCNTL,CMP=a** (where a is the CMP pair number) is associated with box 05. This box also backlights to indicate some type of alarmed messages (CRITICAL, MAJOR, MINOR, or MANUAL) are being discarded.

Box 06 - Box 06 is currently not used.

Box 07 - Recent Change Backout

This indicator shows the status of RC backout. If set, RCs are not reapplied following a full initialization.

The description portion shows when the recent changes are actually backed out or applied. A number indicating the status of a backout in progress appears on the third line of the box. From 200 down to 100 is CORC backout; 200 meaning CORC is still fully backed out and 100 meaning CORC is fully rolled forward. From 100 down to 0 (zero) is RC backout; 100 meaning RC is still fully backed out and 0 (zero) meaning RC is fully rolled forward. Recent changes can be backed out only in conjunction with a full initialization.

The command **407** generates the message **SET:BACKOUT,RC,CMP=a** and **507** generates **CLR:BACKOUT,RC,CMP=a**.

Box 08 - Hardware Checks

The command **208 (INH:HDWCHK,CMP=a)** causes all CMP hardware checks to be inhibited. The lower portion of this box is lighted only if all hardware checks have been inhibited.

If hardware checks are allowed circuit by circuit, the indicator is not cleared.

The command **308 (ALW:HDWCHK,CMP=a)** allows all CMP hardware checks. This clears the backlighting of the box.

Box 09 - CMP Brevity Controls

Certain messages are normally suppressed from printing at the ROP. By inhibiting the controls, all CMP output messages would be sent to the AM regardless of past message counts. Using this command can increase link traffic to the AM, and thus, can be service affecting.

Inhibiting the brevity controls is achieved by entering command **609 (INH:BREVC,CMP=a)**. The controls can be returned to normal by entering the command **709 (ALW:BREVC,CMP=a)**.

Box 10 - UPD Backout

This indicator shows whether or not recently applied CMP program updates are currently applied or backed out.

The description portion shows when the program updates are actually backed out or applied. Program updates can be backed out or applied only in conjunction with a full initialization.

There are no menu commands for this box.

Box 11 - Min Mode

This box is used to display whether or not the AM/CMPs are in minimum mode.

5.117.4 Additional Status Indicators

The **CMP 0 PRIM STAT** box located in the top-middle portion of the screen can be updated with vartext for internal indicators. This box contains the following three subboxes:

- (1) **Top PRIM STAT box:** Left half is logical link map designation (0-0 or 1-0) and right half is PCD status.
- (2) **Middle PRIM STAT box:** Contains the following three lines of information:
 - Initialization phrases and highest priority status phrases for PRIM CMP
 - Initialization progress counter
 - Initialization phrase trigger.
- (3) **Bottom PRIM STAT box:** Contains the following four lines:
 - HASH ERR
 - GEN DIFF

- SPEC GROW (Not Used)
- COMM LOST.

The **MATE STAT** box, located in the lower middle portion of the screen, contains the following two subboxes:

- (1) **Top MATE STAT box:** The left half contains the logical link map designation (0-0 or 1-0) for the MATE CMP. The right half displays the PCD status of the MATE CMP.
- (2) **Bottom MATE STAT box:** Contains initialization and status phrases for the MATE CMP.

Figure 5-176 shows an example of the 1850 display page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM												
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC												
1850 - CMP 0 PRIM INH & RCVRY CNTL																			
2XX INHIBIT CMP 0 PRIM 3XX ALLOW CMP 0 PRIM 4XX SET CMP 0 PRIM 5XX CLEAR CMP 0 PRIM 6XX INHIBIT CMP 0 7XX ALLOW CMP 0 9XX OUTPUT CMP 0 PRIM 800 OUTPUT CMP 0 STATUS				CMP 0 PRIM STAT 0-0 ACT POSTINIT 31 <table border="1"> <tr> <td>00 ROUTINE AUDITS 6 7 9</td> <td>01 AUTO PUMP 6 7</td> <td>02 ROUTINE MTCE 6 7</td> <td>03 NOT USED</td> </tr> <tr> <td>04 SFTCHK 6 7</td> <td>05 ALARMED MSG DSCD</td> <td>06 NOT USED</td> <td>07 RC BKOUT 4 5</td> </tr> <tr> <td>08 ALL HDWCHK 2 3</td> <td>09 BREVITY CONTROL 6 7</td> <td>10 UPD BACKOUT</td> <td>11 MIN MODE</td> </tr> </table>				00 ROUTINE AUDITS 6 7 9	01 AUTO PUMP 6 7	02 ROUTINE MTCE 6 7	03 NOT USED	04 SFTCHK 6 7	05 ALARMED MSG DSCD	06 NOT USED	07 RC BKOUT 4 5	08 ALL HDWCHK 2 3	09 BREVITY CONTROL 6 7	10 UPD BACKOUT	11 MIN MODE
00 ROUTINE AUDITS 6 7 9	01 AUTO PUMP 6 7	02 ROUTINE MTCE 6 7	03 NOT USED																
04 SFTCHK 6 7	05 ALARMED MSG DSCD	06 NOT USED	07 RC BKOUT 4 5																
08 ALL HDWCHK 2 3	09 BREVITY CONTROL 6 7	10 UPD BACKOUT	11 MIN MODE																
INITIALIZE CMP 0 PRIM 919 PURGING INIT (PGI) 920 SELECTIVE INIT (SI) 922 FULL INIT (FI) 923 FULL INIT W/PUMP				MATE STAT (SEE NOTE) 1-0 STBY INHIBITS + USE PAGE 1241 TO RMV/RST/SW CMP 0-0 USE PAGE 1251 TO RMV/RST/SW CMP 1-0															
XX=BOX NUMBER				NOTE: SEE PAGE 1851,0 CMP 0 MATE INH & RCVRY CNTL															

Figure 5-176 1850 - CMP 0 Primary Inhibit and Recovery Control (5E12 and Later)

Abbreviations:

ACT	Active	MTCE	Maintenance
AUTO	Automatic	PRIM	Primary
BKOUT	Backout	RC	Recent Change
CMP	Communication Module Processor	RMV	Remove
CNTL	Control	RST	Restore
DSCD	Discarded	SFTCHK	Software Check
HDWCHK	Hardware Check	STAT	Status
INH	Inhibit	STBY	Standby
INIT	Initialization	SW	Switch
MIN	Minimum	UPD	Update

MSG Message

5.117.5 Commands

Any available paging command can be entered from the 1850 display page.

All 600 and 700 level pokes are duplex commands which can only be entered from the primary (PRIM) CMP page (1850).

CMD	RESULT
208	Inhibits hardware checks of CMP (INH:HDWCHK,CMP=a,PRIM)
308	Allows hardware checks of CMP (ALW:HDWCHK,CMP=a,PRIM)
407	Backout uncommitted recent changes of CMP (SET:BACKOUT,RC,CMP=a,PRIM)
507	Clears recent changes from a CMP (CLR:BACKOUT,RC,CMP=a,PRIM)
600	Audit cycle inhibited for CMPs (INH:AUD[=a],CMP=b)
601	Inhibits automatic pump of CMPs on full initialization (INH:PUMP,CMP=a)
602	Routine maintenance is inhibited; specifically, Generated Key Collection and Compression Routine for CMPs (INH:GKCCR,CMP=a)
604	Inhibits software error checks of CMPs (INH:SFTCHK,CMP=a)
609	Inhibits automatic brevity control for CMPs (INH:BREVC,CMP=a)
700	Audit cycle allowed for CMPs (ALW:AUD[=a],CMP=b)
701	Allows automatic pump of CMPs (ALW:PUMP,CMP=a)
702	Routine maintenance is allowed; specifically, Generated Key Collection and Compression Routine for CMPs (ALW:GKCCR,CMP=a)
704	Allows software error checks in CMPs (ALW:SFTCHK,CMP=a)
709	Allows automatic brevity control for CMPs (ALW:BREVC,CMP=a)
800	Requests off-normal reports for CMP status (OP:SYSSTAT,CMP=a)
900	Requests audit status for CMP (OP:STATUS[=a],AUD[=b],CMP=c,PRIM)
919	Requests purging initialization of selected CMP (INIT:CMPI=a,PRIM,PGI)
920	Requests selective initialization of selected CMP (INIT:CMPI=a,PRIM,SI)
922	Requests full initialization of selected CMP (INIT:CMPI=a,PRIM,FI)
923	Requests full initialization and pump of selected CMP (INIT:CMPI=a,PRIM,FI,PUMP)

5.118 1851 - CMP 0 MATE INHIBIT AND RECOVERY CONTROL (5E12 and Later)

5.118.1 Purpose

The 1851 page is similar to the 1850 except that 600 and 700 level pokes cannot be entered from the 1851 page. Also, the 1851 page has the 930 and 931 commands that the 1850 does not have.

The 1851 page provides status displays for both the primary and mate CMP pair. Also provided are menu commands to inhibit or allow hardware and software checks, routine audits, automatic pump, brevity control, and set and clear for recent change backout. Requests for full initialization can be poked from the 1851 page.

5.118.2 General

On the 1851 page display, each processor is identified by its CMP pair number and by its physical representation

which includes the message switch side. There is only one primary/mate CMP pair (0).

During CMP initialization, the initialization status phrase progress marks are displayed in the PRIM STAT portion of the screen along with the progress counter which shows the progress within a particular phase of the initialization. The set of progress marks used is different from the set used for the SMs pump and initialization sequences on MCC Page 1800,X.

Table 5-3 shows the CMP Off-Normal Status Phrases along with the priority, color, and an explanation of each.

Table 5-3 Page 1851 - CMP Off-Normal Status Phrases - 5E12 and Later

PRIORITY	PHRASE	COLOR	EXPLANATION
1	SFT SWITCH	black/white	Soft switch in progress
2	init state	black/yellow	Initialization progress types
3	PRECUT POSTCUT	black/cyan black/cyan	Pre-cutover state Post-cutover state
4	COMM LOST INIT PEND	white/red black/yellow	Communication lost Manually requested initialization is pending
5	GEN DIFF	yellow/red	AM/CMP on different generics (software releases)
6	MIN MODE	white/red	Minimum mode (no call processing)
7	HASH ERR	red/white	Hashsum check error
8	BACKOUT	blue/white	Recent change and/or update backout
9	OVERLOAD	red/white	Overload (See MCC Page 109)
10	INHIBITS	blue/yellow	Inhibit(s) are on
11	POSTINIT	black/white	Post-initialization (escalation interval)
12	MSG CNTL	blue/white	Output message discard mode set
13	BKUP FAIL	black/white	ODD backup failure
14	ODD WARN	black/white	Either ODD space is critical or automatic relation engineering reorganization process failed
15	REQ PEND	black/white	Set/inhibit request pending
16	NORMAL	normal video	Normal operation

After initialization has completed, the current (highest) level CMP status is displayed (just as with the SMs on the 1800,X page). A ``+' sign at the end of the status phrase indicates that more than one off-normal status exists. The **OP:SYSTAT** input message or 800 poke command can be used to obtain additional off-normal status information. Also, the current (highest) status of the primary CMP is displayed. Additional status phrases are displayed in the other PRIM STAT and MATE STAT boxes along with the PCD status.

Some of the boxes on the 1851 page have numbers at the bottom. These numbers show what commands are available from the display. For example, at the bottom of Box 00 the number ``9" appears. The ``9" means output is available by entering **900**. On color MCC terminals, there is also color mapping from the commands shown on the left of the display to the numbers in the boxes.

5.118.3 Status Indicators

This section describes the individual indicators and their behavior.

Box 00 - Routine Audits

This indicator shows if the automatic execution of the CMP audit cycle is inhibited.

The command **900** can be entered to get a ROP listing of routine audit status for the CMP. This command generates the message **OP:STATUS[=a],AUD[=b],CMP=c**.

Box 01 - Auto Pump

Commands to allow or inhibit automatic pump of the CMP must be entered from

Page 1850.

Box 02 - Routine Maintenance

This indicator reflects whether or not a routine maintenance function is inhibited. Should routine maintenance functions be inhibited for an extended period of time, various system resource availability and consistency may be adversely affected.

This box monitors the CMP's Generated Key Collection and Compression Routine inhibit status. If the routine is inhibited, the description section is backlighted.

Commands to allow or inhibit routine maintenance functions of the CMP must be entered from Page 1850.

Box 03 - Box 03 currently is not used.

Box 04 - Software Checks

Commands to allow or inhibit software checks of the CMP must be entered from Page 1850.

Box 05 - Alarmed Messages Discarded

The input message **CHG:MSGCNTL,CMP=a** (where a is the CMP pair number) is associated with box 05. This box also backlights to indicate some type of alarmed messages (CRITICAL, MAJOR, MINOR, or MANUAL) are being discarded.

Box 06 - Box 06 is currently not used.

Box 07 - Recent Change Backout

This indicator shows the status of RC backout. If set, RCs are not reapplied following a full initialization.

The description portion shows when the recent changes are actually backed out or applied. If the backout is in progress, a number appears on the third line of the box showing the progress of the backout. From 200 down to 100 is CORC backout; 200 meaning CORC is still fully backed out and 100 meaning CORC is fully rolled forward. From 100 down to 0 (zero) is RC backout; 100 meaning RC is still fully backed out and 0 (zero) meaning RC is fully rolled forward. The RCs can be backed out only in conjunction with a full initialization.

The command **407** generates the message **SET:BACKOUT,RC,CMP=a** and **507** generates **CLR:BACKOUT,RC,CMP=a**.

Box 08 - Hardware Checks

The command **208 (INH:HDWCHK,CMP=a)** causes all CMP hardware checks to be inhibited.

NOTE: The lower portion of this box is lighted only if all hardware checks have been inhibited.

If hardware checks are allowed circuit by circuit, the indicator is not cleared.

The command **308 (ALW:HDWCHK,CMP=a)** allows all CMP hardware checks. This clears the backlighting of the box.

Box 09 - CMP Brevity Controls

Commands to allow or inhibit brevity control must be entered from Page 1850.

Box 10 - UPD Backout

This indicator shows whether or not recently applied CMP program updates are currently applied or backed out.

The description portion shows when the program updates are actually backed out or applied. Program updates can be backed out or applied only in conjunction with a full initialization.

There are no menu commands for this box.

Box 11 - Min Mode

This box is used to display whether or not the AM/CMPs are in minimum mode.

5.118.4 Additional Status Indicators

The **MATE STAT** box located in the top-middle portion of the screen can be updated with vartext for internal indicators. This box contains the following three subboxes:

- (1) **Top MATE STAT box:** Left half is logical link map designation (0-0 or 1-0) and right half is PCD status.
- (2) **Middle MATE STAT box:** Contains the following three lines of information:
 - Initialization phrases and highest priority status phrases for MATE CMP
 - Initialization progress counter
 - Initialization phrase trigger.
- (3) **Bottom MATE STAT box:** Contains the following five lines:
 - HASH ERR
 - GEN DIFF
 - SPEC GROW (Not Used)
 - COMM LOST
 - INIT PEND.

The **PRIM STAT** box, located in the lower middle portion of the screen, contains the following two subboxes:

- (1) **Top PRIM STAT box:** The left half contains the logical link map designation (0-0 or 1-0) for the PRIM CMP. The right half displays the PCD status of the PRIM CMP.
- (2) **Bottom PRIM STAT box:** Contains initialization and status phrases for the PRIM CMP.

Figure 5-177 shows an example of the 1851 display page.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC																
1851 - CMP 0 MATE INH & RCVR Y CNTL																							
2XX INHIBIT CMP 0 MATE 3XX ALLOW CMP 0 MATE 4XX SET CMP 0 MATE 5XX CLEAR CMP 0 MATE 9XX OUTPUT CMP 0 MATE 800 OUTPUT CMP 0 STATUS <u>INITIALIZE CMP 0 MATE</u> 919 PURGING INIT (PGI) 920 SELECTIVE INIT (SI) 922 FULL INIT (FI) 923 FULL INIT W/PUMP <u>OFFLINE PUMP CMP 0 MATE</u> 930 START 931 STOP				MATE STAT 1-0 STBY INHIBITS + SW-REQ CMP 0 PRIM STAT (SEE NOTE) 0-0 ACT POSTINIT				<table border="1"> <tr> <td>00 ROUTINE AUDITS 9</td> <td>01 AUTO PUMP SEE NOTE</td> <td>02 ROUTINE MTCE SEE NOTE</td> <td>03 NOT USED</td> </tr> <tr> <td>04 SFTCHK SEE NOTE</td> <td>05 ALARMED MSG DSCD</td> <td>06 NOT USED</td> <td>07 RC BKOUT 4 5</td> </tr> <tr> <td>08 ALL HDWCHK 2 3</td> <td>09 BREVITY CONTROL SEE NOTE</td> <td>10 UPD BACKOUT</td> <td>11 MIN MODE</td> </tr> </table> USE PAGE 1241 TO RMV/RST/SW CMP 0-0 USE PAGE 1251 TO RMV/RST/SW CMP 1-0				00 ROUTINE AUDITS 9	01 AUTO PUMP SEE NOTE	02 ROUTINE MTCE SEE NOTE	03 NOT USED	04 SFTCHK SEE NOTE	05 ALARMED MSG DSCD	06 NOT USED	07 RC BKOUT 4 5	08 ALL HDWCHK 2 3	09 BREVITY CONTROL SEE NOTE	10 UPD BACKOUT	11 MIN MODE
00 ROUTINE AUDITS 9	01 AUTO PUMP SEE NOTE	02 ROUTINE MTCE SEE NOTE	03 NOT USED																				
04 SFTCHK SEE NOTE	05 ALARMED MSG DSCD	06 NOT USED	07 RC BKOUT 4 5																				
08 ALL HDWCHK 2 3	09 BREVITY CONTROL SEE NOTE	10 UPD BACKOUT	11 MIN MODE																				
XX=BOX NUMBER				NOTE: SEE PAGE 1850,0 CMP 0 PRIM INH & RCVR Y CNTL																			

Figure 5-177 1851 - CMP 0 Mate Inhibit and Recovery Control (5E12 and Later)

Abbreviations:

ACT	Active	MTCE	Maintenance
AUTO	Automatic	PRIM	Primary
BKOUT	Backout	RC	Recent Change
CMP	Communication Module	RMV	Remove
	Processor		
CNTL	Control	RST	Restore
DSCD	Discarded	SFTCHK	Software Check
HDWCHK	Hardware Check	STAT	Status
INH	Inhibit	STBY	Standby
INIT	Initialization	SW	Switch
MIN	Minimum	UPD	Update
MSG	Message		

5.118.5 Commands

Any available paging command can be entered from the 1851 display page.

CMD	RESULT
208	Inhibits hardware checks of CMP (INH:HDWCHK,CMP=a,MATE)
308	Allows hardware checks of CMP (ALW:HDWCHK,CMP=a,MATE)
407	Backout uncommitted recent changes of CMP (SET:BACKOUT,RC,CMP=a,MATE)
507	Clears recent changes from CMP (CLR:BACKOUT,RC,CMP=a,MATE)

800	Requests off-normal reports for CMP status (OP:SYSTAT,CMP=a)
900	Requests audit status for CMP (OP:STATUS[=a],AUD[=b],CMP=c,MATE)
919	Requests purging initialization of selected CMP (INIT:CMP=a,MATE,PGI)
920	Requests selective initialization of selected CMP (INIT:CMP=a,MATE,SI)
922	Requests full initialization of selected CMP (INIT:CMP=a,MATE,FI)
923	Requests full initialization and pump of selected CMP (INIT:CMP=a,MATE,FI,PUMP)
930	Start off-line pump for specified mate CMP (ST:OPUMP,CMP=a,MATE)
931	Stop off-line pump for specified mate CMP (STP:OPUMP,CMP=a,MATE)

5.119 1860,Y,X - SM X IDCU Y CIRCUIT (5E12 and Later)

5.119.1 Purpose

The purpose of the 1860,Y,X display page is to show the status of SGs for an Integrated Digital Carrier Unit (IDCU) on an SM.

5.119.2 General

On Page 1860,Y,X, "Y" equals the IDCU number and "X" equals the SM number.

Each IDCU has two SGs, both of which are shown on the 1860,Y,X display page. Each SG has a common board (IDCU COM) and up to a maximum of two loop side interfaces (LSI). The IDCU COM actually consists of two boards: a common control processor (CCP) board and a PIDB time slot interchanger (PTI) board. An IDCU also can have up to two electrical line interfaces (ELI). The LSIs and ELIs are shown on the 1860,Y,X display page only if their circuits exist.

The status of LSIs is the same as that of the host SG unless the LSIs are in growth or unequipped, in which case they have their own status and display GROW or UNEQ, as appropriate (see Figure 5-178). The status of ELIs is always displayed.

Information on IDCU facilities and IDCU remote terminals is not displayed on the 1860,Y,X page. When the text string SEE PAGE 1870,Y FOR IDCU Y FAC INFO is backlighted (see Figure 5-179), there are off-normal conditions with either the IDCU facilities and/or the IDCU remote terminals. A user would then go to Page 1870,Y,X for additional information about the trouble.

Figure 5-178 is an example of the 1860,Y,X page equipped with three LSIs and one ELI. The status shown for two of the LSIs is UNEQ, and GROW. No text status is shown for the third LSI which means that its status is the same as SG 0 (ACT).

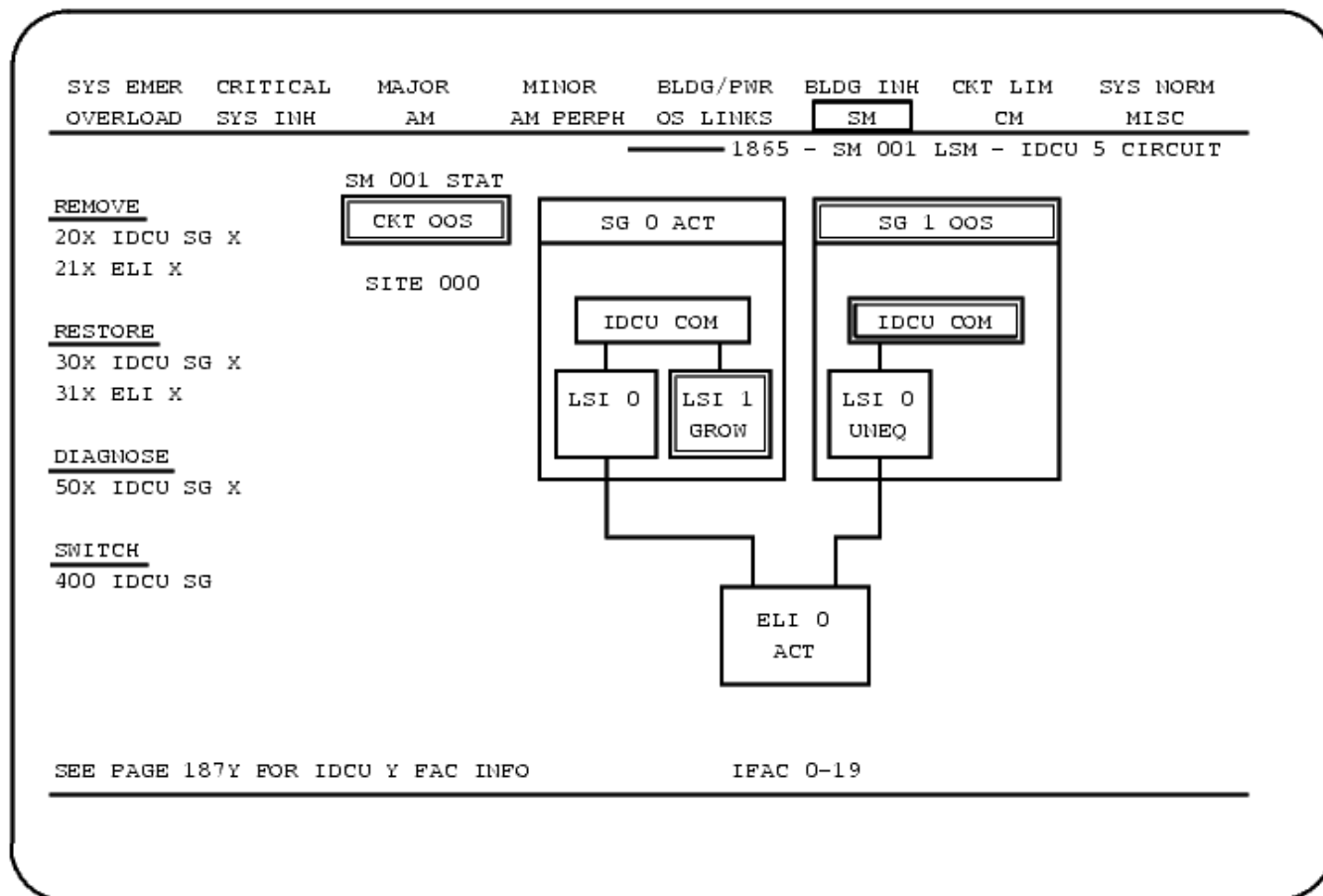


Figure 5-178 1860,Y,X - SM X IDCU Y Circuit Page (with 1 ELI) (5E12 and Later)

Abbreviations:

ACT	Active	INFO	Information
CKT	Circuit	LSI	Loop Side Interface
ELI	Electrical Line Interface	LSM	Local Switching Module
FAC	Facility	OOS	Out of Service
GROW	Growth	SG	Service Group
IDCU	Integrated Digital Carrier Unit	SM	Switching Module
IDCU COM	IDCU Common Board	STAT	Status
IFAC	IDCU Facility	UNEQ	Unequipped

Figure 5-179 is an example of the 1860,Y,X page equipped with two ELIs. No text status is shown for any of the LSIs which means their status is the same as that of their respective SGs. The text string SEE PAGE 1870,Y FOR IDCU Y FAC INFO is backlit indicating trouble with the IDCU facilities and/or the IDCU remote terminal.

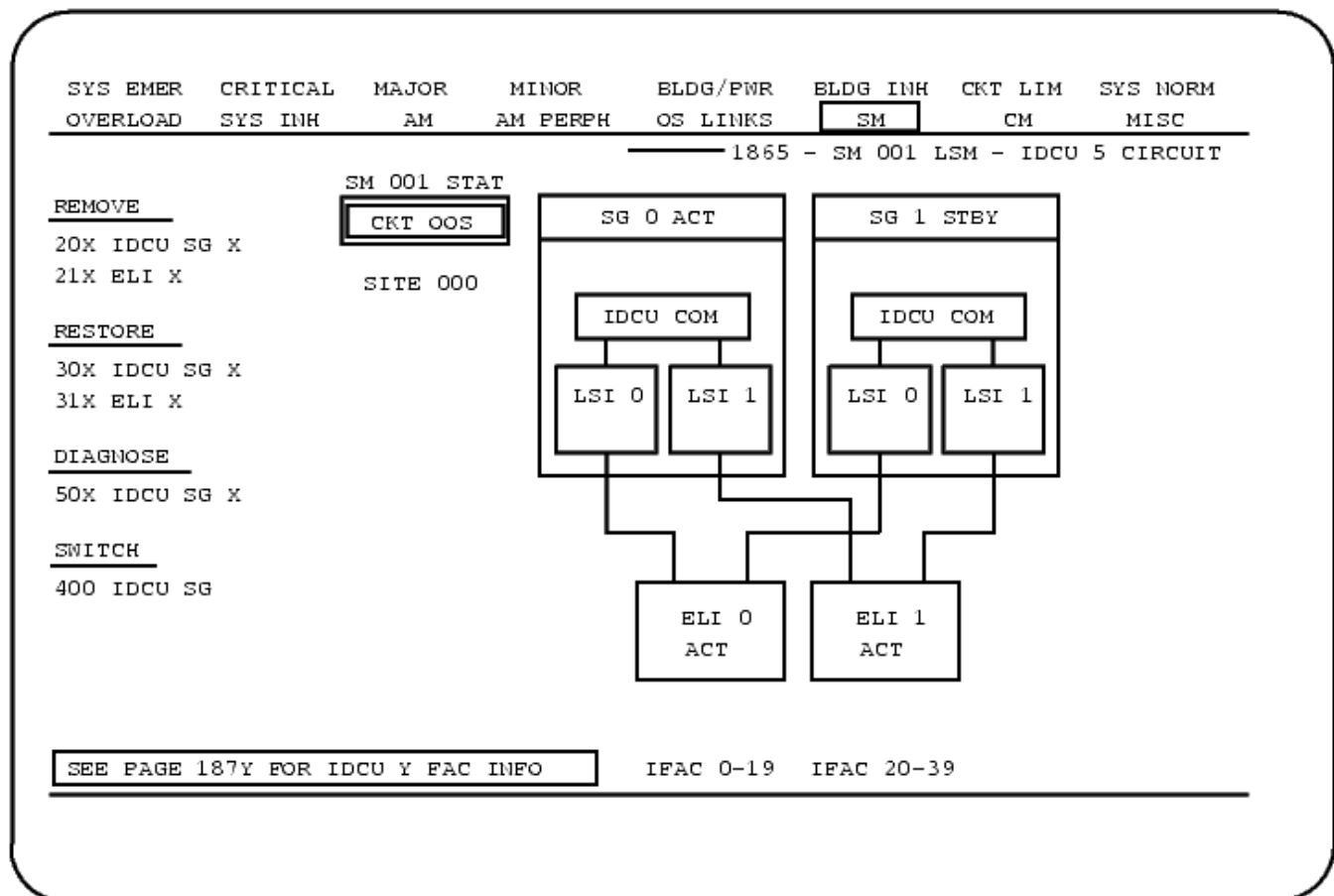


Figure 5-179 1860,Y,X - SM X IDCU Y Circuit Page (with 2 ELIs) (5E12 and Later)

Abbreviations:

ACT	Active	LSI	Loop Side Interface
CKT	Circuit	LSM	Local Switching Module
ELI	Electrical Line Interface	OOS	Out of Service
FAC	Facility	SG	Service Group
IDCU	Integrated Digital Carrier Unit	SM	Switching Module
IDCU COM	IDCU Common Board	STAT	Status
IFAC	IDCU Facility	STBY	Standby
INFO	Information		

5.119.3 Commands

Commands on the 1860,Y,X page allow a user to remove, restore, diagnose, and switch IDCU service groups and to remove and restore ELIs.

CMD	RESULT
20X	IDCU service group X is removed. (RMV:IDCU=SM#-IDCU#-X)[,UCL]
21X	ELI X is removed. (RMV:IDCUELI=SM#-IDCU#-X)[,UCL]
30X	IDCU service group X is restored. (RST:IDCU=SM#-IDCU#-X)[,UCL][,STBY]
31X	ELI X is restored. (RST:IDCUELI=SM#-IDCU#-X)[,UCL]
400	IDCU service group is switched. (SW:IDCU=SM#-IDCU#)
50X	IDCU X is diagnosed.

(DGN:IDCU=SM#-IDCU#-X,RAW,TLP)[,UCL]
 [,RPT] Test is repeated 32,767 times.
 [,RPT=a] The "a" represents the number of times the test
 is to be repeated (1-32,767).
 [,PH=b]b&c] The "b" represents the diagnostic phase or
 "b&c" is the range of diagnostic phases.

5.120 1870,Y,X - SM X IDCU Y FACILITY (5E12 and Later)

5.120.1 Purpose

The purpose of the 1870,Y,X display page is to show the status and far-end connections of IDCU facility (IFAC) circuits on an SM.

5.120.2 General

On Page 1870,Y,X, "Y" equals the IDCU number and "X" equals the SM number.

Each IDCU can have up to 40 (maximum) IFACs. Information on the IFACs is shown in table format on the 1870,Y,X display page. Four 3-column tables are used; each table displays information for up to 10 IFACs.

An IFAC may or may not terminate on a remote terminal (RT). If it terminates on an RT, the RT number is shown in the RT column of the status table. If it does not terminate on an RT, NR (Not To RT) appears in the RT column. An ampersand (&) beside the RT number means the facility is a protection line; an asterisk (*) means the facility has the Embedded Operation Channel/Time Slot Management Channel (EOC/TMC). Red backlighting of the RT number indicates an off-normal condition in the RT. For additional information on the off-normal RT, the user should go to the 1880,Y,Z,X page (Y=IDCU #, Z=RT #, and X=SM #). For example, with the screen display shown in Figure 5-180, the user would go to Pages 1880,5,11 and 1880,5,3 for off-normal conditions of RT 11 and RT 3, respectively.

The IFACs on protection (meaning traffic of the facility is going through the protection line) is shown as being in either the PROT or FELP state. The reason for an IFAC being on protection can be determined by distinctive display colors as explained in Table 5-4.

Table 5-4 IFAC Protection States for Page 1870,Y,X

STATE	COLOR	REASON FACILITY IS ON PROTECTION
PROT	green with black lettering	Manual request
PROT	red with white lettering	Manually removed or OOS
PROT	white with red lettering	Parent removed
FELP	green with black lettering	Far end looped, manual request
FELP	red with white lettering	Far end looped, manually removed
FELP	white with red lettering	Far end looped, parent removed

When an IFAC has an alarm, the alarm is indicated in the alarm column (ALM) of the status table. Possible alarms are as follows:

Carrier Group Alarms (CGA):

- **CA:** CGA Alarm Indication Signal (AIS)
- **CL:** CGA Local
- **CR:** CGA Remote.

Carrier Failure Alarm (CFA):

- **A:** AIS CFA

- **B**: Bit Error Rate
- **L**: Local CFA
- **R**: Remote CFA.

Figure 5-180 is an example of the 1870,Y,X display page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

1875 - SM 001 LSM - IDCU 5 FACILITY

DISPLAY

186Y IDCU Y CIRCUIT

188YZZ IDCU Y RT ZZ

REMOVE

2XX IFAC XX

RESTORE

2XX IFAC XX

C=CGA
A=AIS
L=LOCAL
R=REMOTE
B=BIT ERROR RATE

SM 001 STAT

CKT OOS

IFAC 0-19 TO ELI 0

IFAC 20-39 TO ELI 1

SITE 000

IFAC	RT	ALM	IFAC	RT	ALM	IFAC	RT	ALM	IFAC	RT	ALM
00 ACT	11		10 PROT	12	B	20 OOS	NR	R	30		
01 PROT	11	CL	11 ACT	12		21			31		
02 ACT	11		12 ACT	12		22			32		
03 ACT	11		13 ACT	13		23			33		
04 ACT	11		14 OOS	13	A	24			34		
05 FELP	03*		15 ACT	13		25			35		
06 ACT	03		16			26			36		
07 OOS	03*	CR	17			27			37		
08 ACT	03		18			28			38		
09 ACT	03		19			29			39		

(&=PROTECTION LINE) (*=EOC/TMC) (NR=NOT TO RT)

Figure 5-180 1870,Y,X - SM X IDCU Y Facility Page (5E12 and Later)

Abbreviations:

ACT	Active	IFAC	IDCU Facility
AIS	Alarm Indication Signal	LSM	Local Switching Module
ALM	Alarm	OOS	Out of Service
CGA	Carrier Group Alarm	PROT	On Protection
CKT	Circuit	RT	Remote Terminal
ELI	Electrical Line Interface	SM	Switching Module
EOC	Embedded Operation Channel	STAT	Status
FELP	Far End Looped	TMC	Time Slot Management Channel
IDCU	Integrated Digital Carrier Unit		

5.120.3 Commands

Commands on the 1870,Y,X page allow a user to remove and restore IFACs.

CMD	RESULT

2XX	IFAC XX is removed. (RMV:IFAC=SM#-IDCU#-XX)[,UCL]
3XX	IFAC XX is restored. (RST:IFAC=SM#-IDCU#-XX)[,UCL]

5.121 1880,Y,Z,X - SM X IDCU Y RT Z (5E12 and Later)

5.121.1 Purpose

The purpose of the 1880,Y,Z,X display page is to show the RT circuit status and facility connections for an IDCU on an SM.

5.121.2 General

On Page 1880,Y,Z,X, ``Y" equals the IDCU number, ``Z" equals the RT number, and ``X" equals the SM number.

The 1880,Y,Z,X page has two versions: the TR008 RT and the TR303 RT. Only one version can be displayed at a time.

TR008 RT Version

The TR008 RT version of the 1880,Y,Z,X page shows the site identification (SID) number, facility connections, digroups, and alarm for the RT.

The TR008 RT can be Mode I, Mode II, or a combination of the two modes. Mode I (Figure 5-181) is equipped with digroups. Mode II (Figure 5-182) is equipped with dual digroups. A combination of Mode I and Mode II (Figure 5-183) has both digroups and dual digroups. A facility can terminate on either of the three configurations. The 1880,Y,Z,X display page shows facilities from two points of view: IDCU (IFAC) and RT (RTFAC). Although the two views are shown in separate boxes, they are physically the same entity.

The TR008 RT can have one protection line facility. The protection line facility is shown on the display as RTFAC P. When the protection line is in use by a facility, the REPLACES box backlights white, and the name of the facility on protection is displayed in the box beneath the RTFAC P indicator. The status of the RTFAC on protection is shown as either PROT or FELP.

The TR008 RT is equipped with a power/miscellaneous (PWR/MISC) alarm which shows major or minor alarm conditions.

TR303 RT Version

The TR303 RT version of the 1880,Y,Z,X page shows the SID number, the RTFACs and associated IFACs, Embedded Operations Channels/Time Slot Management Channels (EOC/TMC) facilities, protection facility, and alarms for the RT.

Information for each of the 28 RTFACs (maximum) that can terminate on the TR303 RT is shown in table format in the center of the page. An ampersand (&) in the table beside the RTFAC number means the facility is a protection line; an asterisk (*) means the facility has the EOC/TMC.

Information on the protection facility is shown on the right center of the page under the EOC/TMC indicator. The TR303 RT can have one protection line facility. When the protection line is in use by a facility, the facility number of the protection line and the facility it replaces are shown. The status of the RTFAC on protection is shown as either PROT or FELP.

The TR303 RT has 2 EOCs and 2 TMCs. The first facility, RTFAC 1, always has one EOC/TMC. The EOC/TMC circuits and their status are shown at the top right of the page display.

The TR303 RT can display the following six alarms:

- **PWR**: Power
- **ENV1**: Environmental 1
- **ENV2**: Environmental 2
- **CRIT**: Critical
- **MAJ**: Major
- **MIN**: Minor.

The text string SEE PAGE 1870,Y FOR IDCU Y FAC INFO is used in both versions to inform the craft to go to the IDCU Facility page for facility information.

An example of the TR303 RT version is shown in Figure 5-184 .

Figure 5-181 is an example of the TR008 RT version in Mode I, the digroup configuration mode. In this example, RTFAC B is on protection as indicated by its PROT status and being named with REPLACES in the box beneath the protection line facility (RTFAC P).

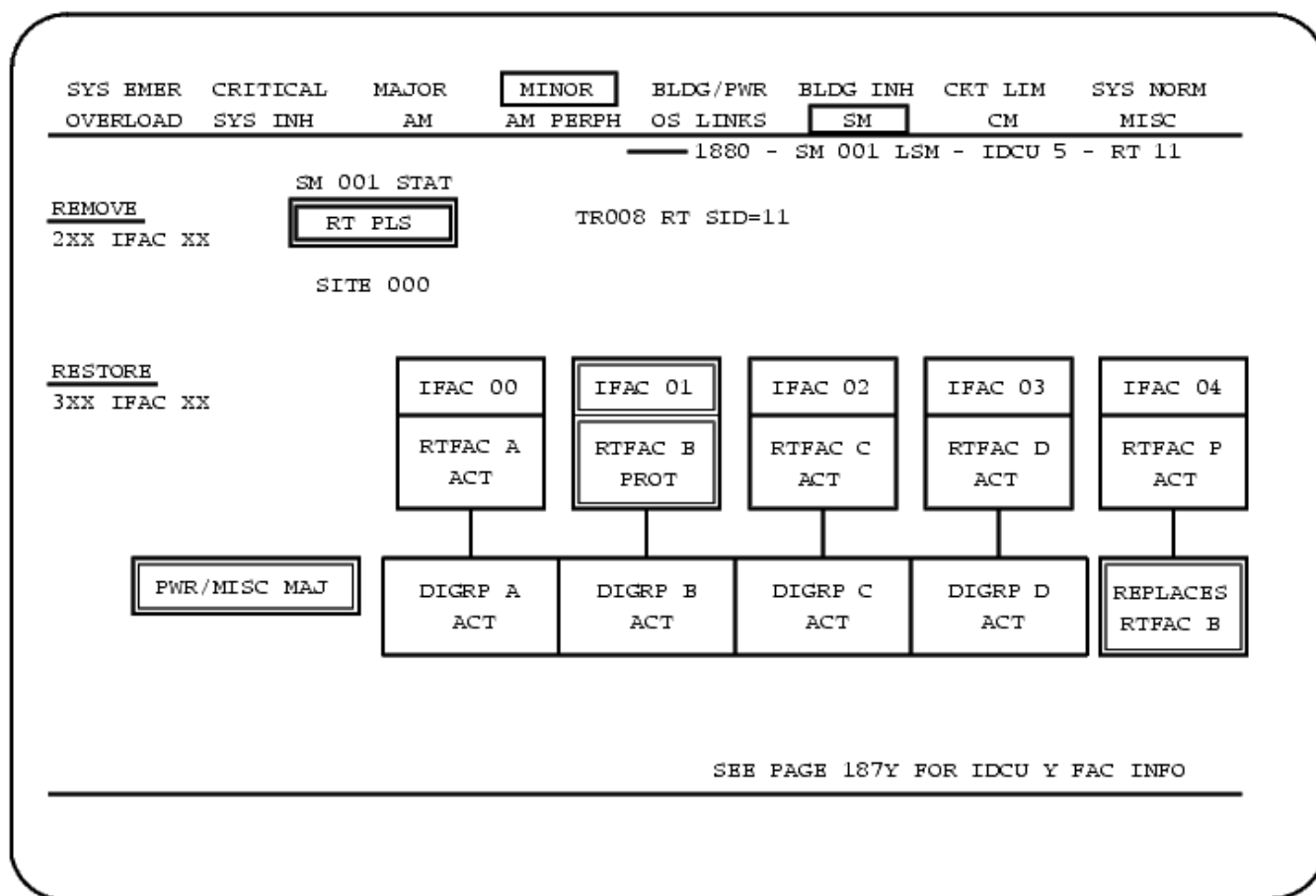


Figure 5-181 1880,Y,Z,X - SM X IDCU Y RT Z (TR008 RT Version - Mode I) (5E12 and Later)

Abbreviations:

ACT Active

PROT On Protection

DIGRP Digroup
IDCU Integrated Digital Carrier Unit
IFAC IDCU Facility
INFO Information
LSM Local Switching Module
MAJ Major Alarm
PLS Protection Line Switch

PWR/MISC Power/Miscellaneous
RT Remote Terminal
RTFAC Remote Terminal Facility
SID Site Identification Number
SM Switching Module
STAT Status

Figure 5-182 is an example of the TR008 RT version in Mode II, the dual digroup configuration mode. In this example, RTFAC AB is on protection and IFAC 12 is the protection line.

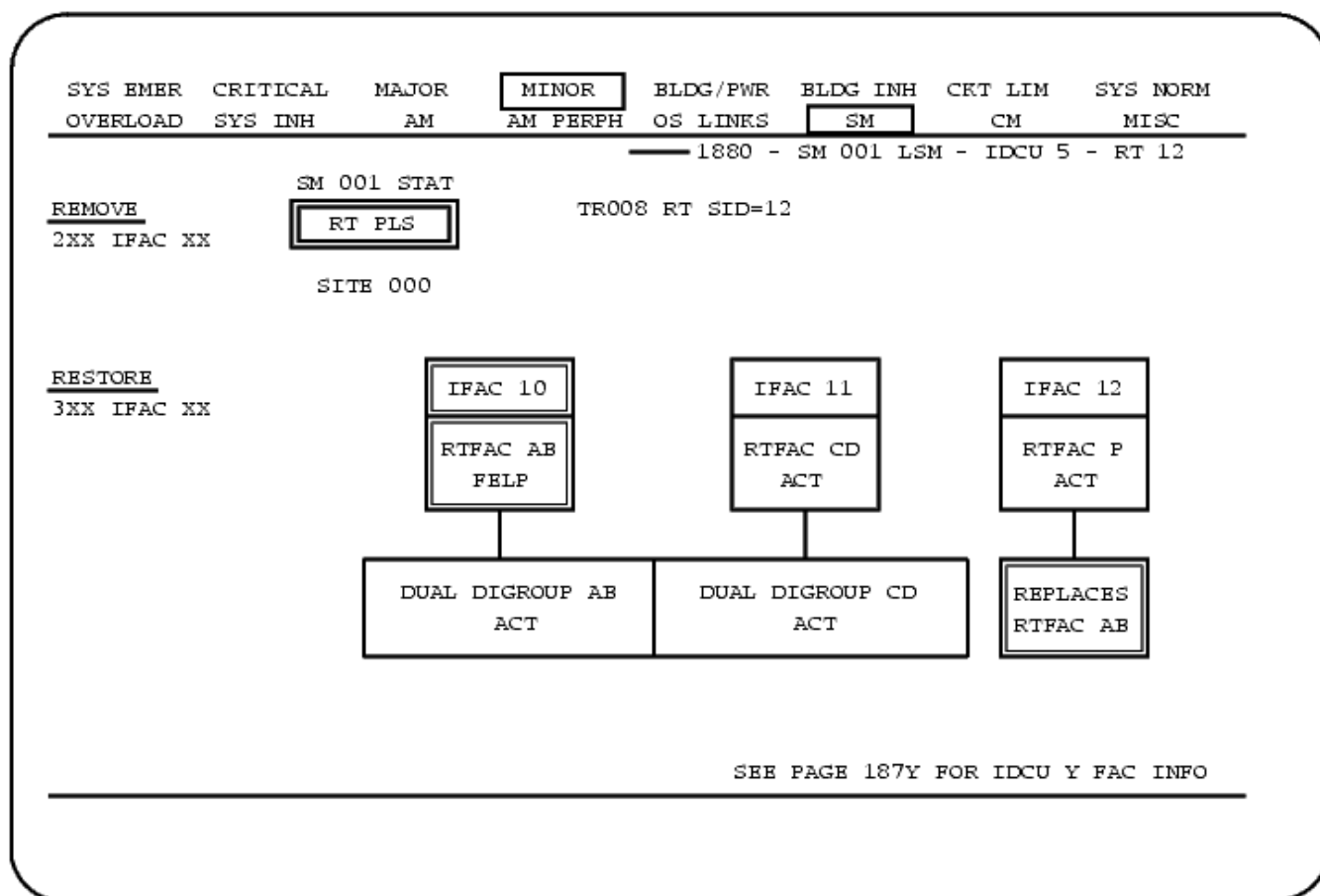


Figure 5-182 1880,Y,Z,X - SM X IDCU Y RT Z (TR008 RT Version - Mode II) (5E12 and Later)

Abbreviations:

ACT Active
FELP Far End Looped (On Protection)
IDCU Integrated Digital Carrier Unit
IFAC IDCU Facility
INFO Information
LSM Local Switching Module
PLS Protection Line Switch

PROT On Protection
RT Remote Terminal
RTFAC RT Facility
SID Site Identification Number
SM Switching Module
STAT Status

Figure 5-183 is an example of the TR008 RT version in a combination Mode I and Mode II configuration. In this example, RT 13 does not have a protection line.

SYS EMBR	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

1880 - SM 001 LSM - IDCU 5 - RT 13

SM 001 STAT

REMOVE
2XX IFAC XX

CKT OOS

TR008 RT SID=13

SITE 000

RESTORE
3XX IFAC XX

IFAC 13	IFAC 14	IFAC 15
RTFAC AB	RTFAC C	RTFAC D
ACT	OOS	ACT

DUAL DIGROUP AB	DIGRUP C	DIGRUP D
ACT	ACT	ACT

SEE PAGE 187Y FOR IDCU Y FAC INFO

Figure 5-183 1880,Y,Z,X - SM X IDCU Y RT Z (TR008 RT Version - Combination Mode I and Mode II) (5E12 and Later)

Abbreviations:

ACT	Active	OOS	Out of Service
CKT	Circuit	RT	Remote Terminal
DIGRUP	Digroup	RTFAC	Remote Terminal Facility
IDCU	Integrated Digital Carrier Unit	SID	Site Identification Number
IFAC	IDCU Facility	SM	Switching Module
INFO	Information	STAT	Status
LSM	Local Switching Module		

Figure 5-184 is an example of the TR303 RT version of the 1880,Y,Z,X page which shows RTFAC 05 is a protection line facility that replaces RTFAC 01 which is in FELP.

NOTE: A facility is on protection when it is FELP.

The RTFACs 01 and 03 have the EOC/TMC facilities. Alarms ENV1 and ENV2 are displayed.

SYS EMBR	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CRT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

1880 - SM 001 LSM - IDCU 5 - RT 03

SM 001 STAT

CRT OOS

REMOVE

2XX IFAC XX

24X EOC CRT X

25X TMC CRT X

RESTORE

3XX IFAC XX

34X EOC CRT X

35X TMC CRT X

SWITCH

400 EOC

401 TMC

OUTPUT

900 TEI STATUS

TR303 RT SID=3

RT	FAC	IFAC	RT	FAC	IFAC	RT	FAC	IFAC
01*		05 FELP	11			21		
02		06 ACT	12			22		
03*		07 OOS	13			23		
04		08 ACT	14			24		
05&		09 ACT	15			25		
06			16			26		
07			17			27		
08			18			28		
09			19					
10			20					

CRT	EOC	TMC
0	ACT	STBY
1	STBY	ACT

RT	FAC	REPLACES
05		RTFAC 01

(*=EOC/TMC) (&=PROTECTION LINE) SEE PAGE 187Y FOR IDCU Y FAC INFO

Figure 5-184 1880,Y,Z,X - SM X IDCU Y RT Z (TR303 RT Version) (5E12 and Later)

Abbreviations:

ACT	Active	OOS	Out of Service
CKT	Circuit	PROT	On Protection
ENV1	Environmental 1 TR303 RT Alarm	RT	Remote Terminal
ENV2	Environmental 2 TR303 RT Alarm	RTFAC	Remote Terminal Facility
EOC	Embedded Operations Channels	SID	Site Identification Number
FAC	Facility	SM	Switching Module
FELP	Far End Looped (On Protection)	STAT	Status
IDCU	Integrated Digital Carrier Unit	STBY	Standby
IFAC	IDCU Facility	TEI	Terminal Endpoint Identifier
INFO	Information	TMC	Time Slot Management Channel
LSM	Local Switching Module		

5.121.3 Commands

Commands on the 1880,Y,Z,X page allow a user to remove and restore IFACs, EOCs, and TMCs, to switch EOCs and TMCs, and to output TEI status.

CMD	RESULT
2XX	IFAC XX is removed. (RMV:IFAC=SM#-IDCU#-XX,SCREEN=RT#)[,UCL]
24X	EOC X is removed. (RMV:EOC=SM#-IDCU#-RT#-X)[,UCL]
25X	TMC X is removed. (RMV:TMC=SM#-IDCU#-RT#-X)[,UCL]
3XX	IFAC XX is restored. (RST:IFAC=SM#-IDCU#-XX,SCREEN=RT#)[,UCL]

34X	EOC X is restored. (RST:EOC=SM#-IDCU#-RT#-X)[,STBY]
35X	TMC X is restored. (RST:TMC=SM#-IDCU#-RT#-X)[,STBY]
400	EOC is switched. (SW:EOC=SM#-IDCU#-RT#)
401	TMC is switched. (SW:TMC=SM#-IDCU#-RT#)
900	TEI status is output. (OP:RT,CHAN,LRT=SM#-IDCU#-RT#)

5.122 1900,X - SM X CLNK STATUS AND CONTROL (5E12 and Later)

5.122.1 Purpose

The purpose of the 1900,X page is to show status and to provide maintenance controls for SM X communication links (CLNKs).

5.122.2 General

The 1900,X page shows the status of each CLNK to SM X and the status of the supporting hardware. A CLNK path includes ONTC **0** or **1**, MMP **0** or **1**, and the MSGS **0** or **1**. The CLNK numbers are derived from the hardware path. The first digit is the ONTC number, the second is the MMP, and the third is the MSGS. Figures 5-185 and 5-186 are examples of the CM2 version of the 1900,X page. Figure 5-185 is for an SM and Figure 5-186 is for the SM-2000.

The status of the SM's DLIs or NLIs is also displayed. For an RSM, the HSM number and the status of the HSM's DLIs/NLIs are displayed. Figure 5-187 is an example of the RSM version of Page 1900,X.

If the SM is an ORM, the TRCU hardware is identified in the ONTCCOM/DLI/NLI indicator block. This indicator does not show the status of the TRCU hardware. Figure 5-188 is an example of the ORM version of Page 1900,X. Figure 5-189 is an example of the EXM-2000 version.

Two logical communication paths (0 and 1) are assigned dynamically to in-service physical links. Physical CLNKs that are supporting a logical link are shown as active (ACT). The logical to physical link assignments are displayed, along with the state of each physical link.

The CLNKs that are not active are usually in the IDLE state. This means that they are available if an active CLNK goes OOS, but would need to be configured before becoming active. The RSM CLNKs may be in the standby (STBY) state. A STBY CLNK has already been configured and will be made active if an ONTC switch occurs. Active RSM CLNKs must pass through the major ONTC.

The SM X STAT indicator on the display contains one of the SM summary status phases, as listed in the table following the description of Page 114 - EQUIPPED SM STATUS SUMMARY. The CLNK-related off-normal conditions (OOS, simplex, or inhibited links) can cause the SM status to become "CLNK OFFN." When such an off-normal condition exists, indicators for the affected units backlight. On Page 115 - COMMUNICATION MODULE SUMMARY, the CLNK indicator backlights. On Page 1260 - CLNK SUMMARY, the appropriate SM indicator backlights. If the SM is isolated, the CLNK indicator on Page 1260 flashes. In the SUMMARY STATUS AREA, the SM and CM critical indicators and the alarm level (CRITICAL, MAJOR, or MINOR), if any, backlight.

The 1900,X page differs slightly based on the communication module hardware vintage (CM1 or CM2). For CM1, the note at the lower left of the display defining ONTCCOM includes the link interface (LI). This unit does not exist in CM2 offices. The status of eight CLNKs and four MMPs (two per MSGS side) is displayed in offices equipped with dual MMPs. Otherwise, only four CLNKs and two MMPs are shown. Figure 5-190 is an example of the CM1 version of Page 1900,X.

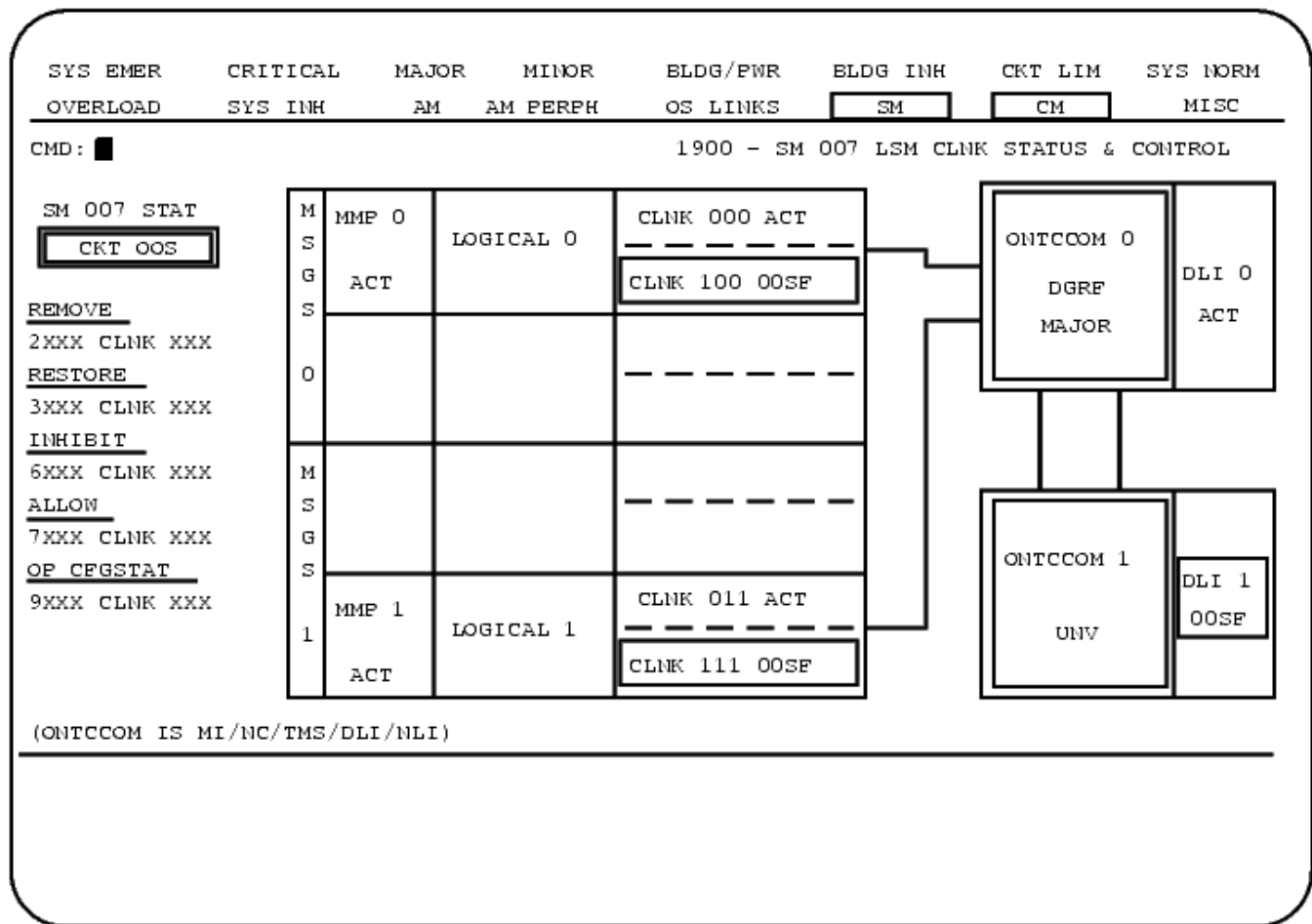


Figure 5-185 1900,X - SM X CLNK Status and Control (CM2 Version for SM) (5E12 and Later)

Abbreviations:

ACT	Active	NLI	Network Link Interface
CFGSTAT	Configuration Status	ONTCCOM	Office Network Timing Complex Common
CKT	Circuit	OOS	Out of Service
CLNK	Communication Link	OOSF	Out-of-Service Family of Equipment
DGRF	Degraded Forced	OP	Output
DLI	Dual Link Interface	SM	Switching Module
LSM	Local Switching Module	STAT	Status
MI	Message Interface	TMS	Time Multiplexed Switch
MMP	Module Message Processor	UNV	Unavailable
MSGs	Message Switch		
NC	Network Clock		

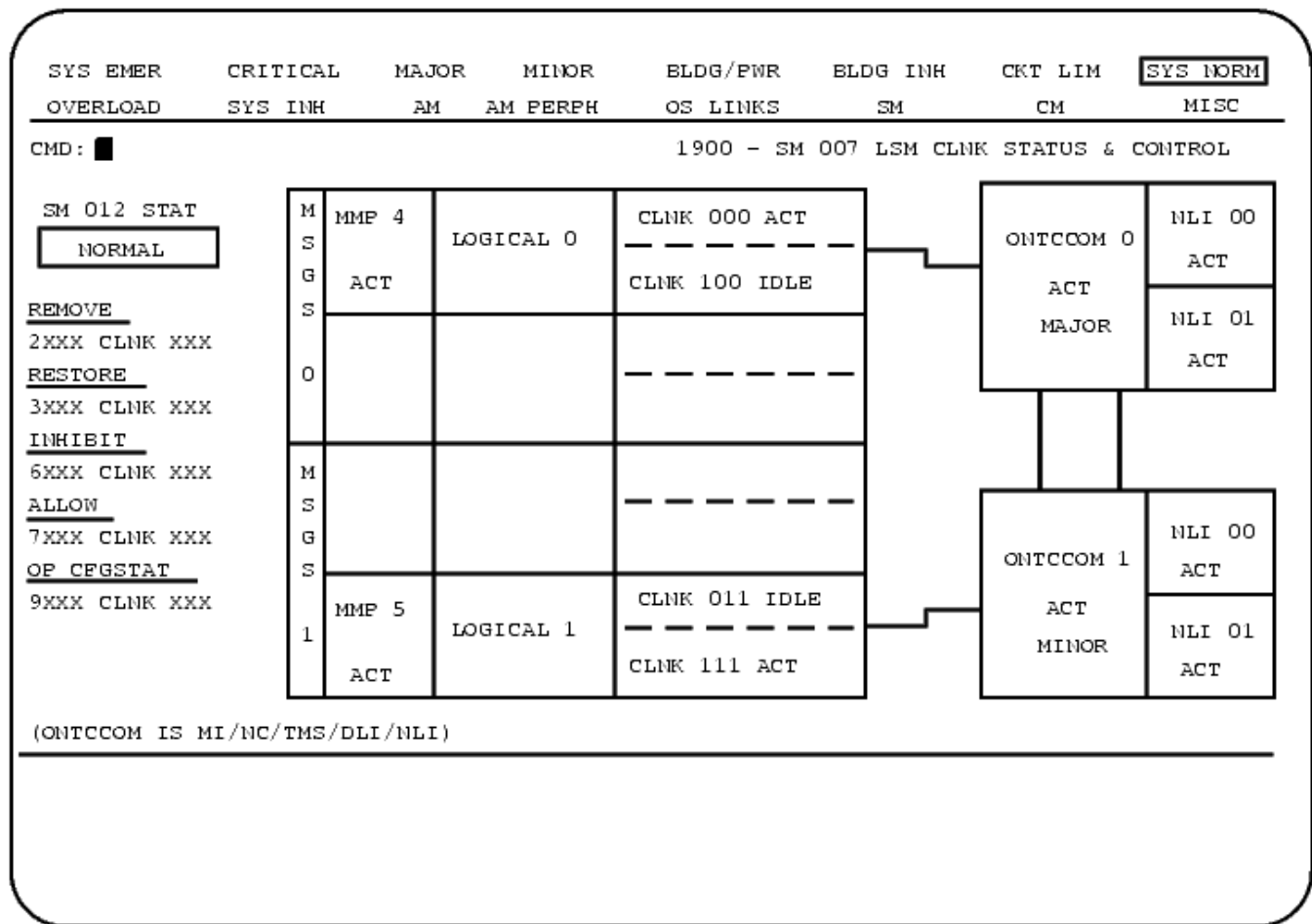


Figure 5-186 1900,X - SM X CLNK Status and Control (CM2 Version for SM-2000) [5E12 and Later]

Abbreviations:

ACT	Active	NC	Network Clock
CFGSTAT	Configuration Status	NLI	Network Link Interface
CLNK	Communication Link	ONTCCOM	Office Network Timing
DLI	Dual Link Interface		Complex Common
LSM	Local Switching Module	OP	Output
MI	Message Interface	SM	Switching Module
MMP	Module Message Processor	STAT	Status
MSGS	Message Switch	TMS	Time Multiplexed Switch

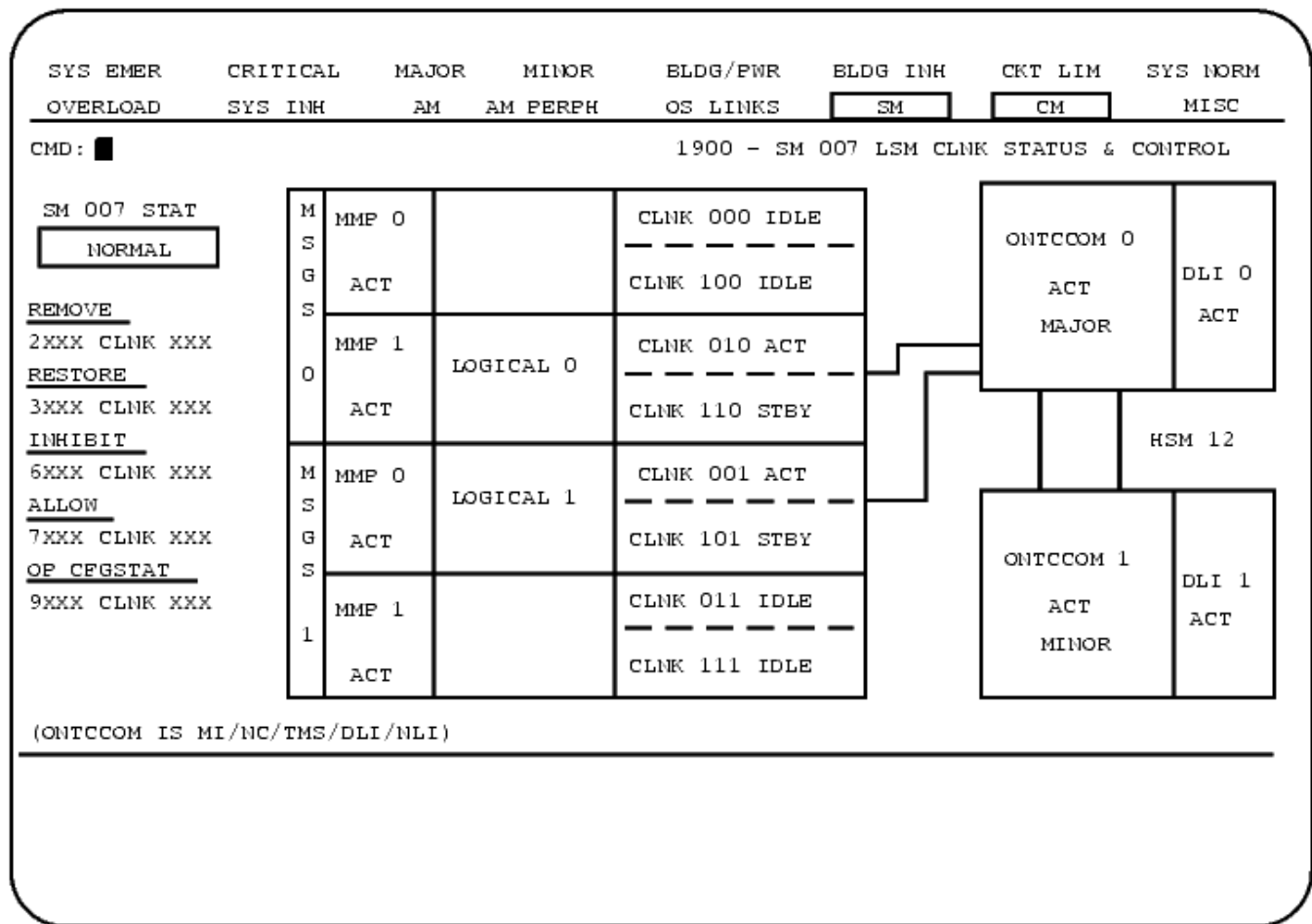


Figure 5-187 1900,X - SM X CLNK Status and Control (RSM Version) [5E12 and Later]

Abbreviations:

ACT	Active	NC	Network Clock
CFGSTAT	Configuration Status	NLI	Network Link Interface
CLNK	Communication Link	ONTCCOM	Office Network Timing
DLI	Dual Link Interface		Complex Common
LI	Link Interface	OP	Output
LSM	Local Switching Module	SM	Switching Module
MI	Message Interface	STAT	Status
MMP	Module Message Processor	STBY	Standby
MSG	Message Switch	TMS	Time Multiplexed Switch

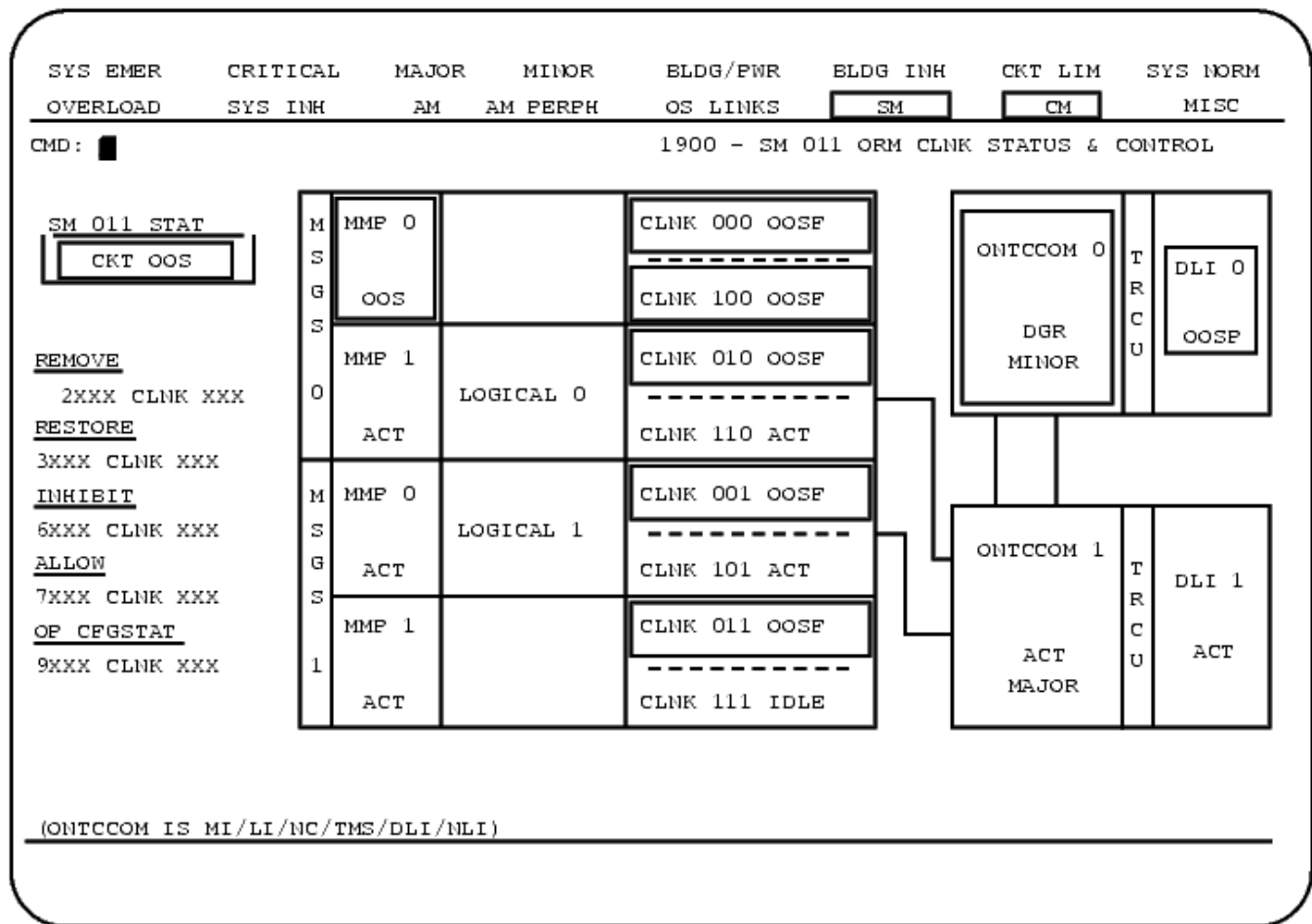


Figure 5-188 1900,X - SM X ORM CLNK Status and Control [5E12 and Later]

Abbreviations:

ACT Active
CFGSTAT Configuration Status
CKT Circuit
CLNK Communication Link
DGR Degraded
DLI Dual Link Interface
LI Link Interface
MI Message Interface
MMP Module Message Processor
MSGS Message Switch
NC Network Clock
NLI Network Link Interface

ONTCCOM Office Network Timing
Complex Common
OOSF Out-of-Service Family
of Equipment
OOSP Out-of-Service Power
ORM Optically Remoted Module
SM Switching Module
STAT Status
TRCU Transmission Rate Converter
Unit
TMS Time Multiplexed Switch

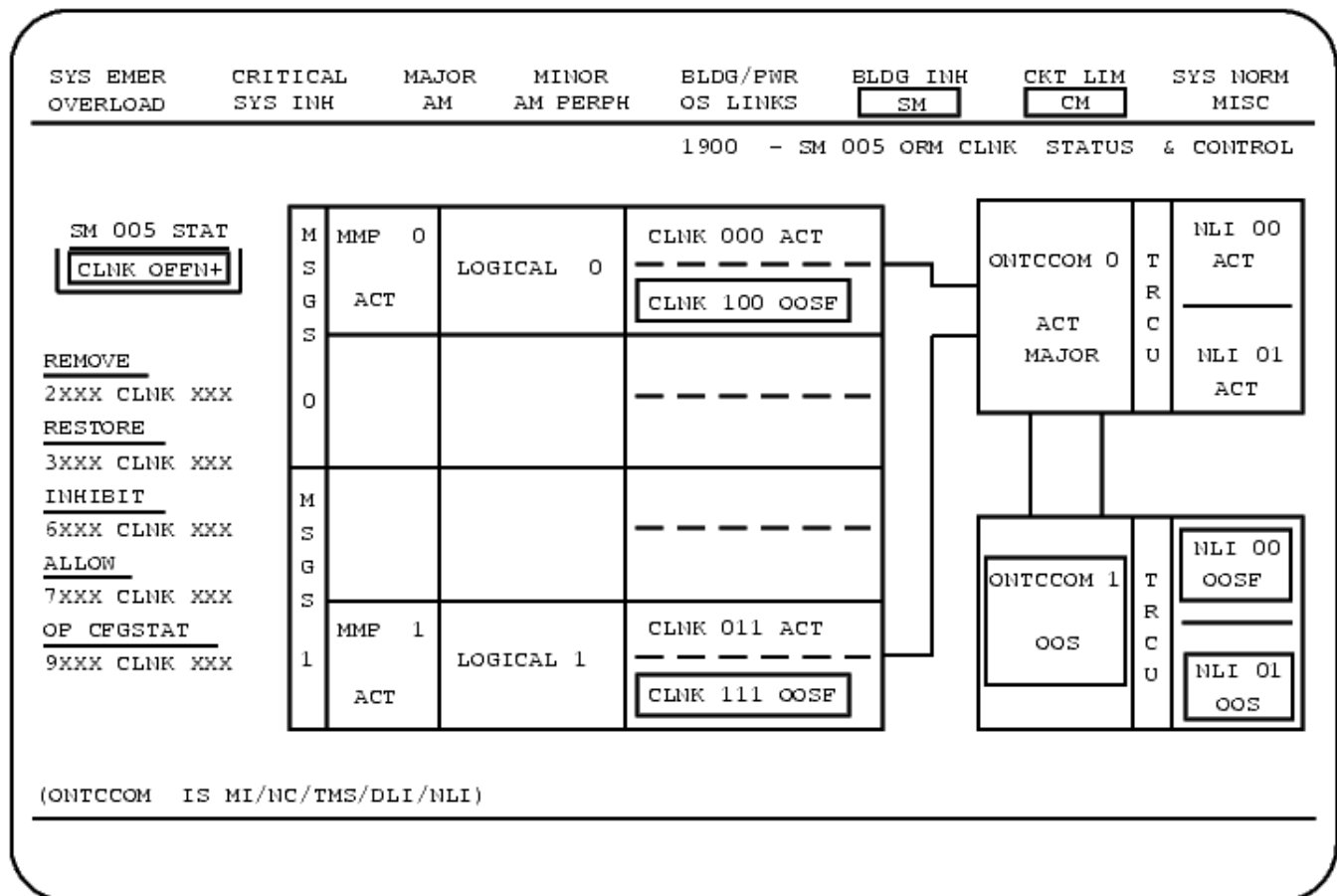


Figure 5-189 1900,X - SM X EXM-2000 CLNK Status and Control [5E12 and Later]

Abbreviations:

ACT	Active	OFFN	Off Normal
CFGSTAT	Configuration Status	OOS	Out of Service
CLNK	Communication Link	OOSF	Out-of-Service Family of Equipment
DLI	Dual Link Interface	OP	Output
MI	Message Interface	ORM	Optically Remoted Module
MMP	Module Message Processor	SM	Switching Module
MSGs	Message Switch	STAT	Status
NC	Network Clock	TRCU	Transmission Rate Converter Unit
NLI	Network Link Interface	TMS	Time Multiplexed Switch
ONTCCOM	Office Network Timing Complex Common		

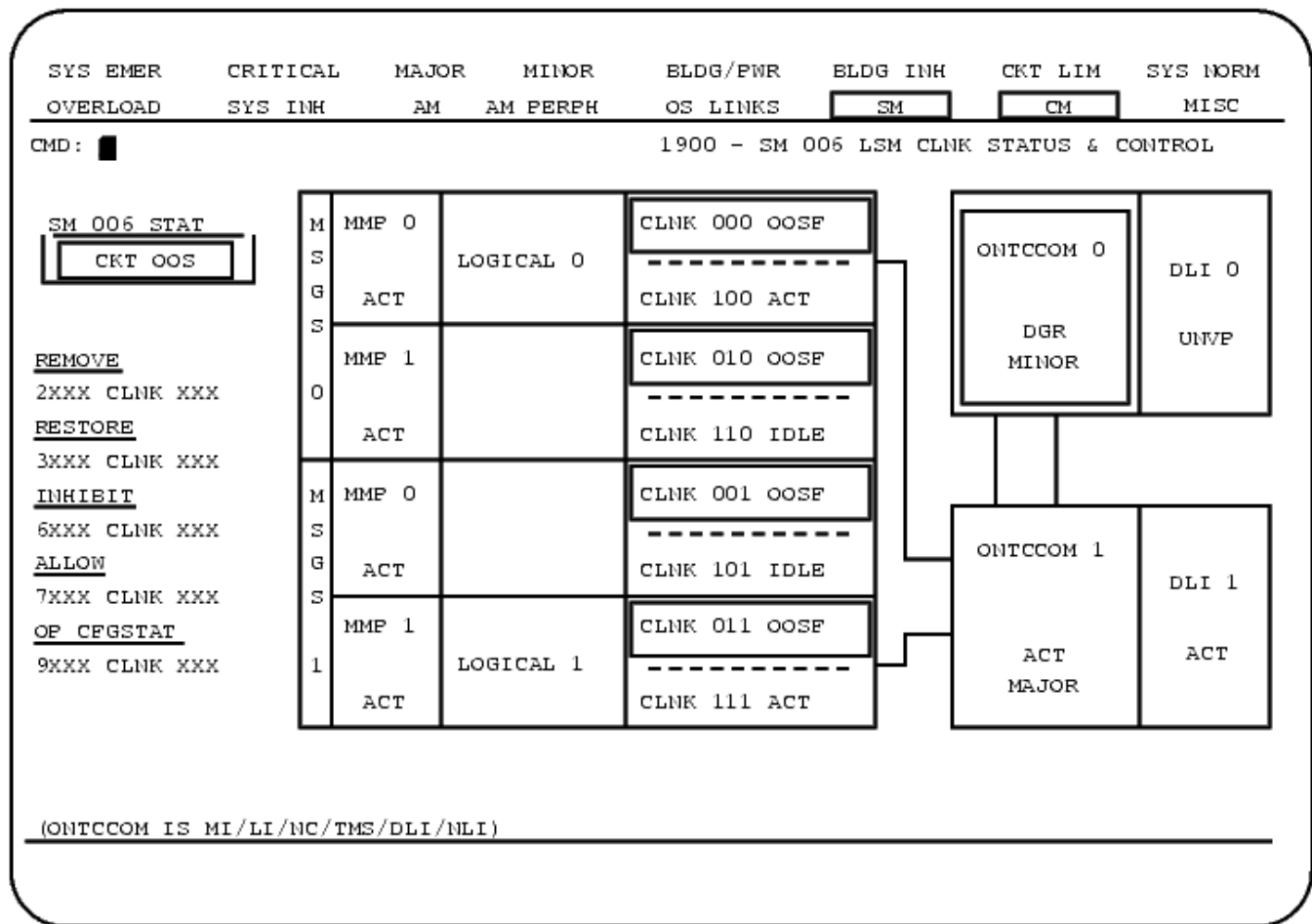


Figure 5-190 1900,X - SM X CLNK Status and Control (CM1 Version) [5E12 and Later]

Abbreviations:

ACT	Active	NC	Network Clock
CFGSTAT	Configuration Status	NLI	Network Link Interface
CKT	Circuit	ONTCCOM	Office Network Timing Complex Common
CLNK	Communication Link	OOS	Out of Service
DGR	Degraded	OOSF	Out-of-Service Family of Equipment
LSM	Local Switching Module	SM	Switching Module
DLI	Dual Link Interface	STAT	Status
LI	Link Interface	TMS	Time Multiplexed Switch
MI	Message Interface	UNVP	Unavailable Power
MMP	Module Message Processor		
MSG	Message Switch		

5.122.3 Commands

The 1900,X page provides commands to remove, restore, inhibit, allow, and output the configuration status of the communication links. In addition, any available paging command can be entered from this display.

CMD	RESULT
2XXX	CLNK XXX is removed. (RMV:CLNK=SM#-X-X-X)
3XXX	CLNK XXX is restored. (RST:CLNK=SM#-X-X-X) (If a conflicting CLNK is already active, the restore leaves the designated CLNK in the IDLE or STBY state, not ACT.)

	If the designated CLNK is already OOSF, the restore request leaves it in the OOSF state.)
6XXX	CLNK XXX hardware checks are inhibited. (INH:HDWCHK,CLNK=SM#-X-X-X)
7XXX	CLNK XXX hardware checks are allowed. (ALW:HDWCHK,CLNK=SM#-X-X-X)
9XXX	Configuration status for CLNK XXX is output. (OP:CFGSTAT,CLNK=SM#-X-X-X)

5.123 1940 - EASY BWM INSTALLATION (5E12 and Later)

5.123.1 Purpose

The purpose of Page 1940 is to provide a simplified procedure for installing Broadcast Warning Messages (BWM) into the 5ESS®-2000 switch. The EASY BWM feature simplifies the BWM application process by freeing the user from entering commands and constantly having to monitor the progress of the BWM.

5.123.2 General

The Easy BWM Installation page can be used to back out, install, or apply BWMs with a single command. The page also provides control of the soak interval timer. This user specified time will override the 24-hour default value.

Several terms used in the commands which may be confusing are described as follows:

- **Install:** To take an official BWM from the start command to the official command. The TEMP BWMs cannot be made official.
- **Back Out:** To take a TEMP or craft BWM that is soaking and back it out of the system.
- **Apply:** To take a TEMP or craft BWM from the start command to the soak command.
- **Soak:** To leave a BWM in the system for a certain period of time so as to allow the update to have a chance to interact with other pieces of software in the system.
- **Official:** To make a BWM permanent in the system.

The 1940 page (Figure 5-191) is divided into two basic areas, upper and lower. The upper area of the page contains the poke commands used to control the BWM processes. (The poke commands are discussed in the "Commands" section, following.) The lower area of the page provides a response indicating the progress of a BWM procedure or a summary of an error message if an error occurs during the execution of a command. Also found in the bottom area are the names of the Install, Back Out, and Apply BWMs in addition to the value of the BWM Soak Interval Timer.

Whenever Page 1940 is displayed, the values for Install BWM Name, Back Out BWM Name, Apply BWM Name, and BWM Soak Interval Timer will be populated with default information. The following describes each of these fields in detail.

The Install BWM Name is the name of the BWM that should be inputted into the switch. The Install BWM Name can be changed with the 9810 poke command.

The Back Out BWM Name is the name of the TEMP/craft BWM to be backed out before the next BWM is to be installed/applied. If no BWM is in the soak state, the default value NONE will be displayed. To change the name of the BWM to be backed out, use the 9820 poke command.

The Apply BWM Name is the name of the TEMP/craft BWM to be applied after the Install BWM is in the official state. This field always defaults to the value NONE. To change the name of the BWM to be applied, use the 9830

poke command.

The BWM Soak Interval Timer is defaulted to 24 hours and 00 minutes. This field will always be displayed. If the value needs to be changed, use the 9840 poke command.

```

SYS EMER  CRITICAL  MAJOR      MINOR      BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH    AM        AM PERPH  OS LINKS  SM        CM        MISC
CMD:  _                               1940 - Easy BWM Installation

9800          Start Execution          9850,F Dump Inst BWM File
9810,(Y)      Change Install BWM Name  9860      Stop Execution
9820,{Y|NONE} Change Back Out BWM Name  9870      Stop After Soak
9830,{Y|NONE} Change Apply BWM Name
9840,HH,MM    Change BWM Soak Interval Timer

(Y = 10 Character BWM Name, NONE = no BWM, HH = Hours, MM = Minutes,
F = Filename)

RESPONSE: Easy BWM Is Idle

Install BWM Name          TMP88-0050
Back out BWM Name        TMP88-6082
Apply BWM Name           NONE
BWM Soak Interval Timer   24-00

```

Figure 5-191 1940 - Easy BWM Installation (5E12 and Later)

Abbreviations:

BWM Broadcast Warning Message
INST Install

5.123.3 Commands

The middle of Page 1940 provides commands used to process BWMs. These commands are as follows:

CMD	RESULT
9800	Start Execution
9810,(Y)	Change Install BWM Name
9820,(Y)	Change Back Out BWM Name
9830,(Y)	Change Apply BWM Name
9840,HH,MM	Change BWM Soak Interval Timer
9850,F	Dump Inst BWM File
9860	Stop Execution
9870	Stop After Soak

The 9800 poke command starts the execution of the EASY BWM process. If the back out BWM is populated with a BWM name, it backs out that BWM, then it installs the install BWM, and if appropriate, applies the apply BWM. This poke command must not be entered before the install BWM name is populated (9810 poke command) with a valid

BWM name.

After execution is started on the 1940 page and its response line states that EASY BWM IS IN PROGRESS, the page is not updated until it completes successfully or runs into a failure. To find out the current status of BWMs look on Page 1960. The 1960 page is kept up to date while the EASY BWM process is executing.

The 9810 poke command populates the Install BWM Name. This BWM is the one which will be used as the install BWM. This field can contain any valid 6- or 10-character BWM name. This field MUST be populated for the EASY BWM process to work. If this BWM name is a TEMP BWM, then this BWM will not be made official and the Apply BWM will NOT be applied to the 5ESS®-2000 switch.

The 9810 poke command should always be the first poke command entered on the page. This is needed since this poke command initializes the page with default information, except for the data just entered. If the page is set up and this is the last poke command executed, the page will be initialized and the previous input will have to be reentered.

The 9820 poke command will populate the Back Out BWM Name. This BWM is the one which will be backed out of the 5ESS®-2000 switch when execution is started. This field is populated for the user and should never have to be changed by the user. This field can contain all valid BWM names except official BWMs (BWMs that start with BWM).

The 9830 poke command will populate the Apply BWM Name. This BWM is the one that will be applied after the Install BWM is finished. This will NOT happen if the Install BWM is a TEMP BWM. In that case, the Apply BWM will NOT be applied to the 5ESS®-2000 switch. This field can contain all valid BWM names except official BWMs (BWMs that start with BWM).

The 9840 poke command will allow the user to change the soak interval timer for the Install BWM. Default value for the timer is 24 hours and 00 minutes. The timer does not change until the soak section has been executed and the timer set. At that time the EASY BWM process resets the soak interval timer to the value the user entered.

The 9850 poke command will print (on the ROP) any American standard code for information interchange (ASCII) file associated with the Install BWM. This includes the MSGS and SCANS files. To print the MSGS file for the Install BWM with this command, you would enter 9850,MSGS.

The 9860 poke command will stop the execution of all commands on Page 1940 (see example outlined as follows). Execution will be stopped only after the current step in the current state is completed. This command is the same as the 9560 poke command on Page 1960.

The 9870 poke command allows the user to stop the execution of the EASY BWM process after the Install BWM has started its soak section. If this option is selected, the 9870 poke must have been entered causing the STOP AFTER SOAK status field to show ON, and the execution of EASY BWM will stop awaiting user input. To restart the EASY BWM process, reenter the 9800 poke. If the 9870 poke was not entered, the STOP AFTER SOAK status field will show OFF, and the EASY BWM process will not stop until execution has completed in full. Note that the 9870 poke toggles the STOP AFTER SOAK option, so that if it was ON, entering the 9870 poke will cause it to turn OFF. Also, if it was OFF, entering the 9870 poke will cause it to turn ON.

An example using the 1940 page follows. For this example, assume:

- TEMP BWM TMP88-6082 is soaking.
- Official BWM BWM88-0050 is to be installed.
- TEMP BWM TMP88-6089 is to be applied after the install BWM has finished.
- A soak time of two hours and zero minutes is wanted for the Install BWM.

The following is a list of steps that the user would take to accomplish this example:

ACTION	RESULT
1. Enter the 1940 poke command.	The 1940 page is displayed. The Back Out BWM field is populated with TMP88-6082, the rest of the page contains default information.
2. Enter the 9810,880050 poke command.	The Install BWM field is populated with BWM88-0050.
3. Enter the 9830,886089 poke command.	The Apply BWM field is populated with TMP88-6089.
4. Enter the 9840,2,0 poke command.	This will populate the soak interval timer with 2-00.
5. Enter the 9800 poke command.	This will start execution of the EASY BWM process.

5.124 1941 - BROADCAST WARNING MESSAGE (BWM) AUTOMATION SCHEDULING (5E12 and Later)

5.124.1 Purpose

The purpose of the 1941 page is to provide a simplified procedure to schedule BWM for automatic installation into the 5ESS®-2000 switch. The BWM automation feature simplifies the BWM installation process by allowing the user to schedule a BWM to be automatically installed at a later date and time, thus freeing the user from entering commands and constantly monitoring progress of the BWM.

5.124.2 General

The BWM Automation Scheduling page can be used to perform the following:

- Schedule or reschedule (start time, start date, and/or install state) a BWM for automatic installation
- Resume a stopped automatic installation
- Toggle BWM automation ON (allowed) or OFF (inhibited)
- Execute an office healthcheck
- Query BWM automation status
- Show the results of the last office healthcheck
- Cancel the current BWM scheduled.

The 1941 page is divided into three areas. The area at the top of the page contains the poke commands used to control BWM automation process. The area in the middle of the page shows the current scheduled BWM name, the date and time the BWM is scheduled to be installed, the installation state (VERIFY, SOAK, or OFFICIAL), the current BWM automation status (ALLOWED or INHIBITED), and the date, time, and status of the last office healthcheck. The area at the bottom of the page provides responses indicating the progress of the BWM automation procedures.

The following describes each of these fields in detail:

- **BWM SCHEDULED:** Name of BWM currently scheduled for automatic installation, or NONE.
- **STATE:** Current state of automation, for example, IDLE, SCHEDULED DATE/TIME, STOPPED, IN PROGRESS, etc.
- **BWM INSTALL STATE:** Application stage that currently scheduled BWM will be installed to. Application stages are verify (VFY), soak (SOAK), or official (OFC).

- **BWM AUTOMATION:** Current status [on (ALLOWED) or off (INHIBITED)]. If BWM Automation is inhibited, BWMs cannot be scheduled for automatic installation.
- **LAST HEALTHCHECK STATUS:** Date and time that the last office healthcheck was run and its result, or it will indicate that a healthcheck is currently in progress.
- **RESPONSE:** Information relative to BWM automation activity.

Figure 5-192 shows that BWM93-0001 is scheduled to be installed officially on 10/15/93 starting at 19:30. The BWM automation is allowed, and the status of the last healthcheck (run on 10/12/93 15:46) is PASSED.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
1941 - BWM AUTOMATION SCHEDULING							
9920,X	Schedule BWM For Automation			9925 Resume Stopped BWM Automation			
9921,X	Reschedule BWM Name			9926 Inhibit BWM Automation			
9922,MMDDYY	Reschedule BWM Start Date			9927 Allow BWM Automation			
9923,HHMM	Reschedule BWM Start Time			9928 Execute Office Healthcheck			
9924,Z	Reschedule BWM Install State			9929 Query BWM Automation Status			
				9930 Show Last Healthcheck Results			
				9931 Cancel Scheduled BWM Automation			
1942	BWM Automation Office Profile						
1943	BWM Automation Health Check						
(X=10 Char BWM Name, MMDDYY=Month,Day,Year, HHMM=Hours,Minutes, Z=VFY|SOAK|OFC)							
BWM SCHEDULED	BWM93-0001	START DATE/TIME		10/15/93 19:30	BWM INSTALL STATE		OFC
BWM AUTOMATION	ALLOWED	LAST HEALTHCHECK STATUS		10/12/93 15:46	PASSED		
RESPONSE	BWM93-0001 SCHEDULED FOR AUTOMATIC INSTALLATION						

Figure 5-192 1941 - BWM Automation Scheduling (5E12 and Later)

Abbreviations:

BWM	Broadcast Warning Message
Char	Character
OFC	Official
VFY	Verify

5.124.3 Commands

CMD	RESULT
9920,X	Schedules a BWM for automatic installation. The BWM name specified will be scheduled for automatic installation. The start day, time, and install state will be derived from the default values listed in the BWM Automation Office Profile (see Page 1942). Note that for the start date/time, the BWM will be scheduled for the very next time slot that is NOT off, as listed in the office profile. After this command is successfully accepted, the indicators which show the current BWM name, start day/time, and install state will be updated accordingly.

9921,X	Reschedules a BWM name for automatic installation. This command is used when a scheduled BWM name needs to be changed. This command will only modify the BWM name, not the start day, time, or install state.
9922,MMDDYY	Reschedules the start date for automatic BWM installation. This command is used when the start date of a scheduled BWM needs to be changed. The valid argument is MMDDYY, where MM is a 2-digit month (01-12), DD is a 2-digit day (01-31), and YY is a 2-digit year (00-99).
9923,HHMM	Reschedules the start time for automatic installation. This command is used when the start time of a scheduled BWM needs to be changed.
9924,Z	Reschedules the install state for automatic installation. This command is used when install state for a scheduled BWM needs to be changed. The valid install states are VFY (verify), SOAK, and OFC (official).
9925	Resumes an automatic BWM installation that was previously stopped or aborted.
9926	Inhibits (turns off) BWM automation. A BWM cannot be scheduled for automatic installation when BWM automation is INHIBITED.
9927	Allows (turns on) BWM automation. A BWM can be scheduled for automatic installation only when BWM automation is ALLOWED.
9928	Requests that an office healthcheck be executed. The final result (PASSED or FAILED) will show on this page, while the detailed results of this command will be sent to the ROP.
9929	Reports the status of BWM automation (ALLOWED or INHIBITED), and the reason for it being inhibited, if a reason exists.
9930	Reports to the ROP the detailed results of the last healthcheck that was run.
9931	Cancels a BWM that is currently SCHEDULED for automatic installing but has not yet started installation.

5.125 1942 - BWM AUTOMATION OFFICE PROFILE (5E12 and Later)

5.125.1 Purpose

The purpose of the 1942 page is to provide current status and a simplified procedure for modifying the BWM automation office profile. The office profile is used when scheduling a BWM for automatic installation, when executing an office healthcheck, and when determining if the Customer Service Computer Access Network System (CSCANS) is allowed to update the BWM Automation Office Profile.

5.125.2 General

The 1942 page lists all valid fields of the office profile for BWM automation except for the BWM automation healthcheck conditions which are listed on Page 1943. It shows the value that is currently set up for each field and provides the commands to reset the value.

At the bottom of the page, the result for each command request is displayed.

Figure 5-193 is an example of the 1942 page showing an office profile.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

1942 - BWM AUTOMATION OFFICE PROFILE

99YY,Z Modify Office Profile

YY

01	Install BWM Up To (VFY|SOAK|OFC)	OFC
02	Soak Time (HHMM)	24:00
03	Alarm Level (MAJOR|MINOR)	MAJOR
04	Allow CSCANS Control (Y|N)	Y
05	Advance Warning Message (HHMM)	00:30
06	Time Since Last Processor Init (HH)	48
07	Clear BWM After BWM Is Official (Y|N)	Y

Time Interval Automation Is Not Allowed Each Day (HHMM,HHMM)

08 Sun 12:00 - 18:30 09 Mon 07:00 - 18:00 10 Tue 07:00 - 18:00 11 Wed 07:00 - 18:00
12 Thu 07:00 - 18:00 13 Fri 07:00 - 18:00 14 Sat 12:00 - 17:00

(HH=Hours, MM=Minutes)

RESPONSE: ALARM LEVEL IS NOW MAJOR

Figure 5-193 1942 - BWM Automation Office Profile (5E12 and Later)

Abbreviations:

BWM	Broadcast Warning Message
CSCANS	Customer Service Computer Access Network System
Init	Initialized
OFC	Official
VFY	Verify
Y|N	Yes|No

5.125.3 Commands

CMD	RESULT
9901,{VFY|SOAK|OFC}	Modifies the default BWM automation install state.
9902,HHMM	Modifies the default soak time (HH = hours; MM = minutes) that will be used during the soak stage of a BWM that is automatically installed.
9903,{MAJOR|MINOR}	Modifies the alarm level that will be used when an office alarm is fired during a BWM automation process. The valid values are MAJOR and MINOR.
9904,{Y|N}	Modifies the CSCANS control field. "Y" indicates that CSCANS is allowed to send commands to modify this to office profile. "N" means CSCANS is not allowed send commands to modify this profile.
9905,HHMM	Before BWM automation starts, a warning message is printed to the ROP to inform office personnel. This command sets the amount of time prior to starting BWM automation to send this warning message out.
9906,HH	During the execution of a healthcheck, the elapsed time since the last processor (AM, SM, or CMP) initialization is checked. When the elapsed time is greater than the time set up in this field, the healthcheck will PASS. This command is used to reset a desired elapsed time.
9907,{Y|N}	Indicates whether a BWM should be automatically cleared (CLR:BWM) after it is automatically installed and made official. If set to "Y", the BWM will be cleared; if set to

	"N", it will not.
9908,HHMM,HHMM	Modifies the time interval that BWM automation will not be scheduled for, by default, on Sunday.
9909,HHMM,HHMM	Modifies the time interval that BWM automation will not be scheduled for, by default, on Monday.
9910,HHMM,HHMM	Modifies the time interval that BWM automation will not be scheduled for, by default, on Tuesday.
9911,HHMM,HHMM	Modifies the time interval that BWM automation will not be scheduled for, by default, on Wednesday.
9912,HHMM,HHMM	Modifies the time interval that BWM automation will not be scheduled for, by default, on Thursday.
9913,HHMM,HHMM	Modifies the time interval that BWM automation will not be scheduled for, by default, on Friday.
9914,HHMM,HHMM	Modifies the time interval that BWM automation will not be scheduled for, by default, on Saturday.

5.126 1943 - BWM AUTOMATION HEALTH CHECK (5E12 and Later)

5.126.1 Purpose

The purpose of the 1943 page is to provide a simplified procedure for setting (turning ON) and clearing (turning OFF) 25 predefined BWM automation healthcheck conditions. This page also provides help commands to request further information on a given condition.

5.126.2 General

The 1943 page allows users to set or clear each BWM automation healthcheck condition by using the 4XX and 5XX commands, respectively. Detailed information explaining each condition can be retrieved via the 9XX help command. Conditions that are SET on this page are checked during an office healthcheck. Each SET condition is backlighted on the display. The result of each SET or CLR request is show on the bottom of the page in the RESPONSE area.

Each of the 25 predefined conditions is described in the following listing.

NUMBER (XX=)	CONDITION	DESCRIPTION
00	AM BREAKPOINTS	Breakpoints in the AM
01	AM SIMPLEX	AM in simplex mode
02	BWM IS TEMP	Temporary BWM updates on switch
03	BWM INCONSISTNT	BWM inconsistencies
04	SCC LINK	Is SCC link active
05	AM OVERLOAD	AM in overload
06	SM OVERLOAD	SM(s) in overload
07	CMP OVERLOAD	CMP(s) in overload
08	SM HASHERR	SM(s) in hashsum error
09	CMP HASHERR	CMP(s) in hashsum error
10	SM ISOLATED	SM(s) in isolation
11	SM BREAKPOINTS	Breakpoints in the SM(s)
12	CMP BREAKPOINTS	Breakpoints in the CMP(s)
13	LAST AM INIT	Time of last AM initialization
14	LAST SM INIT	Time of last SM initialization
15	LAST CMP INIT	Time of last CMP initialization
16	RC INHIBIT	Recent change inhibited
17	DBREORG INHIBIT	Automatic data base reorganization inhibited
18	CORCS INHIBIT	Customer-originated recent changes inhibited
19	RETR GNUMPD LTG	Retrofit, software release update, or large terminal growth in progress
20	ODD BACKUP	ODD backup in progress
21	RC IN PROGRESS	Recent change in progress
22	GEN BACKUP	GEN backup in progress
23	PERIPHERALS	Are there an insufficient number of peripheral units such that automatic application of the SU would not be successful
24	FILESPLACE	Is there enough file space for BWM to be installed;

only run when a healthcheck is done as part of an automated BWM installation.

Figure 5-194 shows an example of the 1943 page. In this example, all conditions except 09 and 15 are SET and will be checked during the office healthcheck.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
1943 - BWM AUTOMATION HEALTHCHECK							
4XX SET		4XX CLEAR		9XX HELP			
00 AM OVERLOAD	01 SM OVERLOAD	02 CMP OVERLOAD	03 SM HASHERR				
04 CMP HASHERR	05 SM ISOLATED	06 AM BREAKPOINTS	07 SM BREAKPOINTS				
08 CMP BREAKPOINTS	09 LAST AM INIT	10 LAST SM INIT	11 LAST CMP INIT				
12 AM SIMPLEX	13 RC INHIBIT	14 DBREORG INHIBIT	15 CORCS INHIBIT				
16 RETR GNUFD LTG	17 ODD BACKUP	18 RC IN PROGRESS	19 GEN BACKUP				
20 BWM IS TEMP	21 BWM INCONSISTNT	22 PERIPHRALS	23 SCC LINK				
24 FILESPACE							
RESPONSE: RETR GNUFD LTE CHECK IS NOW ON							
CHECKPHS - ARE THERE AN INSUFFICIENT NUMBER OF PERIPHERAL UNITS SUCH THAT AUTOMATIC APPLICATION OF THE SU WOULD NOT BE SUCCESSFUL							

Figure 5-194 1943 - BWM Automation Healthcheck (5E12 and Later)

Abbreviation:

BWM Broadcast Warning Message

NOTE: See Section 5.126.2 for descriptions of conditions 00 through 24.

5.126.3 Commands

The commands provided on this page are as follows (where XX = 00 - 24):

CMD	RESULT
4XX	Sets healthcheck condition XX (turns it ON).
5XX	Clears healthcheck condition XX (turns it OFF).
9XX	Requests further information on healthcheck condition XX.

5.127 1950 - PROGRAM UPDATE MAINTENANCE (5E12 AND LATER)

5.127.1 Purpose

The 1950 display page provides commands to display BWM history, to recover backward and forward, to clear the BWM, and to back out the last official BWM. The soak period for a BWM can be set/changed by the craft (poke

9700); the poke 9710 can be used to check the status of a specific BWM soak period; the poke 9720 can be used to abort soak timer. The 5E12 SU feature 97-5E-3451 added poke 9690 which can be used to compact fragmented patch space into a large continuous patch space.

5.127.2 General

PROGRAM UPDATE keeps an on-line log of the history of all BWMs installed against the current software release issue in a 5ESS®-2000 switch office.

The 9101,Y - BWM Y command causes the history of the specified BWM (Y = BWM name) to be printed at the ROP.

9102 - OFC causes a history of all the BWMs, which have been made official, to be printed at the ROP.

9103 - TEMP causes a history of all of the BWMs, which are in the temporary state, to be printed at the ROP.

9104 - ALL causes the history of all BWMs in the active log to be printed at the ROP. This command can also accept the COMMAND,DATA! format. This is provided for 9104,BACKLOG which would print the history of all the BWMs in an archive log and 9104, SUM which prints a short summary of the BWMs.

9200 - VERIFY INCONSISTENCY causes any update inconsistencies to be detected and printed at the ROP.

9300 - RECOVER FORWARD reapplies all the temporary updates which are in the table of inconsistencies.

9400 - RECOVER BACKWARD removes all the temporary updates causing inconsistencies starting from the very last one in the system to the first.

9600,Y - CLEAR BWM Y causes the files in the specified BWM package (Y = BWM name) to be removed. (Used to free up disk space after the BWM is made official.)

9650,X - EXPAND BWM causes the compressed files in the specified BWM package (X=BWM name) to be expanded. (Used to expand a compressed BWM when the automatic expansion during a BWM download through SCANS or CSCANS was manually stopped or aborted.)

9690,Z,W - PATCH COMPACTION causes the fragmented patch space to be compacted into a large continuous patch space. After "apply" is performed, compacting is completed. This SU should then be made "official".

9700,HH,MM - RESET TIMER to ``HH" HOURS and ``MM" MINUTES has two applications as follows:

- (a) **Make BWM official immediately:** The craft can make the BWM official immediately by entering the **9700,0,0** poke command after all of the commands have been executed via the soak poke command (9320 or 9420 on Page 1960). This command allows the craft to bypass the soak period.
- (b) **Change time period of the soak:** After the craft has initialized the BWM soak period (via poke 9320 or 9420 on Page 1960), the time period of the soak can be changed by entering the **9700,HH,MM** poke command. The time period of the soak can only be changed after the soak period has been initialized. If this occurs, the craft receives an error message indicating the soak has not been initialized. Only one BWM can have its soak period set/changed at a time.

9710 - PRINT TIMER INFORMATION (including completion time, start time, and if applicable, the time the soak period was changed) on the ROP.

9720 - ABORT SOAK TIMER aborts the time that was reset previously.

9900 - BACKOUT OFC backs out the last official BWM. The name of the last official BWM is displayed on this

display page in the "LAST OFC BWM" field.

Figure 5-195 is an example of the 1950 page.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD<				———— 1950 — PROGRAM UPDATE MAINTENANCE			
<u>DISPLAY BWM HISTORY</u>				—————			
9101,Y BWM Y				9200	VERIFY INCONSISTENCY		
9102 OFC				9300	RECOVER FORWARD		
9103 TEMP				9400	RECOVER BACKWARD		
9104 ALL				9600,Y	CLEAR BWM Y		
				9650,X	EXPAND BWM		
				9690,Z,W	PATCH COMPACTION		
LAST OFC BWM				<u>SOAK TIMER FOR BWM =</u>			
2nd FROM TOP				9700,HH,MM	RESET TIMER		
3rd FROM TOP				9710	PRINT TIMER INFO		
9900 BACKOUT OFC				9720	ABORT SOAK TIMER		
(X = Y OR STOP) (Y = 10 CHAR BWM NAME) (HH = HOURS) (MM = MINUTES) (Z = SM, SM2K or CMP) (W = APPLY, OFC or BKOUT)							

Figure 5-195 1950 - Program Update Maintenance (5E12 and Later)

Abbreviations:

BWM	Broadcast Warning Message	OFC	Official
BOLO	Back Out Last Official SU	SU	Software Update
CHAR	Character	TEMP	Temporary

5.127.3 Commands

The entire 1950 display page is commands. In addition to these, any available paging commands can be entered from the 1950 display page.

CMD	RESULT
9101,Y	Displays the history of BWM Y (UPD:UPDDSPPLY:BWM=Y)
9102	Displays the history of all official BWMs (UPD:UPDDSPPLY,OFC)
9103	Displays the history of all BWMs in the temporary state (UPD:UPDDSPPLY,TEMP)
9104	Displays the history of all BWMs in the active log or archive log (UPD:UPDDSPPLY,ALL) [BACKLOG] this displays the archive log BWM history [SUM] this displays a summary consisting of the last official software update (BWMyy-nnnn), a list of

	active craft software updates (CFTyy-nnnn), and the temporary software update (TMPyy-nnnn), if one exists, and their respective status
9200	Displays any update inconsistencies (UPD:VFYCON)
9300	Reapplies all the temporary updates considered causing inconsistencies (UPD:RECOVERY,FRWD)
9400	Removes all the temporary updates causing inconsistencies (UPD:RECOVERY,BKWD)
9600,Y	Removes the files in the specified BWM (or ALL for all BWMs) (UPD:CLRBWM:BWM=Y | ALL)
9650,X	Expands the compressed files in the specified BWM (or STOP to stop automatic expansion for the BWM that is currently being downloaded through SCANS or CSCANS) (UPD:EXPAND:UPNM=Y | STOP)
9690,Z,W	Compacts fragmented patch space. (UPD:PATCH:TARGET=Z,ACTION=W)
9700,HH,MM	Resets timer for soak period to HH (HH = hour) and MM (MM = minutes) (UPD:RESET:TM=HH-MM)
9710	Prints timer information (completion time, start time, and if applicable, the time the soak period was changed is printed on the ROP) (UPD:PRINT:SKTM)
9720	Aborts soak timer (UPD:RESET:ABORT)
9900	Backs out last BWM that was made official (UPD:BOLO).

5.128 1960 - BWM INSTALLATION (5E12 and Later)

5.128.1 Purpose

The purpose of the 1960 display page is to provide commands for installing BWMs and to provide the status of the installation.

5.128.2 General

The 1960 display consists of two parts. The upper part consists entirely of commands. The commands provide the ability to verify a BWM, display or print the contents of the message file in the BWM, or execute commands in the message file. The lower part of the display is the message file display area. The message file is a file in a BWM package which contains a set of craft input messages grouped in sections describing how to install the BWM. There are up to ten numbered lines for displaying the command lines of the message file.

The craft can select and print the American standard code for information interchange (ASCII) files [via poke command 9260,F (F = Filename in BWM)] that are associated with a particular BWM on the ROP. If the requested file is not an ASCII file, an error message is printed on the ROP.

The 9010 - VERIFY command has a status indicator to its right which shows the status of the verification if 9010 has been entered. The three possible phrases for the status indicator are in progress (INPG), complete (CMPL), and abort (ABRT). If verifying the BWM fails, further information prints on the ROP.

The SECTION EXECUTION STATUS area provides status indicators for each of the execution sections, except FILE, (that is, APPLY, SOAK, OFC, and BKOUT). If there is an error, the status indicator of the section which was executing shows the status ABRT and be backlighted. The error causing command line in the message file display area is also backlighted (black on red for color terminals).

An additional indicator — timer in progress (TMPG) is displayed in the SOAK indicator block after soak timer is set.

If all the command lines in the section being executed are successful, the status CMPL is displayed in the appropriate status indicator (that is, APPLY=CMPL, SOAK=CMPL, and OFC=INPG) in the SECTION EXECUTION STATUS area.

The RESPONSE indicator is used to display a summary of an error message if an error occurs during the execution of a command line.

Further information can always be found printed at the ROP.

Figure 5-196 is an example of the 1960 page display which shows that a BWM is being made official (name of the BWM is in the upper right-hand corner).

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD: —				1960 - BWM INSTALLATION			
				BWM = BWM83-0001			
9000,Y	START BWM Y	9570	NEXT WINDOW	91XX	DISPLAY (XX=	10	APPLY
9010	VERIFY CMPL	9575	PREV WINDOW	92XX	PRINT 20	SOAK	30 OFC
9560	STOP EXC	(Y = 10 CHAR BWM NAME)		93XX	EXEC ALL 40	BKOUT	50 FILE)
9565,Z	RESET LINE Z	(Z = 3 DIGIT LINE NO)		94XX	EXEC NEXT		
				(F = FILENAME IN BWM)		9260 , F PRINT FILE F	
SECTION EXECUTION STATUS							
APPLY	CMPL	SOAK	CMPL	OFC	INPG	BKOUT	
RESPONSE:							
11	"						
12	" OFFICIAL	-----					
13	"						
14	" To make the update applied in this BWM official, wait the						
15	" prescribed SOAK interval and then enter sequentially the						
16	" following command(s):						
17	"						
18	UPD:UPNM="BWM83-0001":OFC;						
19	"						
20	UPD:AUD;						

Figure 5-196 1960 - BWM Installation (5E12 and Later)

Abbreviations:

BKOUT	Backout	EXEC	Execute
BWM	Broadcast Warning	INPG	In Progress
	Message	NO	Number
CMPL	Complete	OFC	Official
EXC	Execute	PREV	Previous

5.128.3 Commands

In addition to the BWM installation commands, any available paging command may be entered from the 1960 display page.

CMD	RESULT
9000,Y	Starts the updating software session using BWM Y (UPD:UPNAME:BWM=Y)
9010	Verifies the BWM (UPD:VFYBWM)
9560	Stops the execution of the BWM (STP:EXC,UPD)
9565,Z	Resets the execution pointer in the message file to command line Z (UPD:RESET:LINE=Z)
9570	Scrolls the message display area forward to the next window

	(UPD:NXTWNDW)
9575	Scrolls the message display area backward to the previous window (UPD:PRVWNDW)
9110	Displays the APPLY section of the BWM in the message display area (UPD:DISPLYUPD,APPLY)
9120	Displays the SOAK section of the BWM in the message display area (UPD:DISPLYUPD,SOAK)
9130	Displays the OFC section of the BWM in the message display area (UPD:DISPLYUPD,OFC)
9140	Displays the BKOUT section of the BWM in the message display area (UPD:DISPLYUPD,BKOUT)
9150	Displays the FILE section of the BWM in the message display area (UPD:DISPLYUPD,FILE)
9210	Prints the APPLY section of the BWM at the ROP (UPD:PRINT,APPLY)
9220	Prints the SOAK section of the BWM at the ROP (UPD:PRINT,SOAK)
9230	Prints the OFC section of the BWM at the ROP (UPD:PRINT,OFC)
9240	Prints the BKOUT section of the BWM at the ROP (UPD:PRINT,BKOUT)
9250	Prints the whole sections of the BWM at the ROP (UPD:PRINT,FILE)
9260,F	Prints the ASCII files that are associated with a particular BWM on the ROP (UPD:PRINT:BWMFILE,FN=F) where F = filename in BWM
9310	Executes all APPLY command lines one by one (UPD:EXALL,APPLY)[,UCL]
9320	Executes all SOAK command lines one by one (UPD:EXALL,SOAK)
9330	Executes all OFC command lines one by one to make a BWM official (UPD:EXALL,OFC)[,UCL]
9340	Executes all BKOUT command lines one by one to back out the BWM (used if the BWM fails) (UPD:EXALL,BKOUT)
9410	Execute current APPLY command line (UPD:EXNXT,APPLY)
9420	Execute current SOAK command line (UPD:EXNXT,SOAK)
9430	Execute current OFC command line (UPD:EXNXT,OFC)
9440	Execute current BKOUT command line (UPD:EXNXT,BKOUT)

5.129 1999 - SWITCH STATE DEFINITIONS [5E12 and Later]

5.129.1 Purpose

The 1999 page provides a reference for the use of video attributes for various maintenance states.

5.129.2 General

The 1999 page is for information only. It does not indicate any existing conditions and it does not have any commands.

The display is divided into sections for the SUMMARY STATUS AREA STATES, CIRCUIT STATES, and OTHER STATES.

The SUMMARY STATUS AREA STATES are only used in the SUMMARY STATUS AREA.

The CIRCUIT STATES are used for actual circuit status. These states always have accompanying text describing the condition.

The OTHER STATES are used for summary-type indicators and for alarm unit indicators.

Although different states are used in different areas, the guidelines listed in this section are followed in each area.

5.129.3 Indicators

The meanings of the states are as follow:

Summary Status Area States

- **CRITICAL FLASH** is used for unacknowledged (not yet retired) severe, service-affecting conditions. These alarms require immediate corrective action.
- **CRITICAL STEADY** is used for acknowledged (retired) CRITICAL ALARMS.
- **MAJOR FLASH** is used for unacknowledged serious disruptions to service or failure of important circuits. These alarms require immediate corrective action but are less urgent than critical alarms.
- **MAJOR STEADY** is used for acknowledged major alarms.
- **MINOR FLASH** is used for unacknowledged troubles that do not have a serious effect on service or for troubles in circuits which are not essential for call processing.
- **MINOR STEADY** is used for acknowledged minor alarms.

NOTE: The indicators CRITICAL, MAJOR, and MINOR do not flash. Only the actual area of the alarm flashes. For example, the SM indicator flashes if the alarm is due to a trouble or an off-normal condition in an SM.

- **UNALARMED OFF-NORMAL** is used for unalarmed troubles.
- **SYSTEM NORMAL** is only used for the SYS NORM indicator and only when there are no off-normal conditions in the system.
- **NORMAL** is used for all the SUMMARY STATUS AREA indicators, except the SYS NORM indicator, when their respective area has no off-normal or trouble conditions. Such as, if the CM hardware has no trouble conditions or off-normal conditions, the CM indicator is NORMAL.

Circuit States

- **ACT:** Active means the circuit is in service and available for normal use by the system.
- **STBY:** Standby means a unit is ready and waiting to perform its intended function.
- **OOS:** Out of service is used for units which have been removed from service and are no longer to be used by the system.
- **UNV:** Unavailable (UNV) is used for units which the system is prevented from using. This condition is initiated by a craft action.
- **UNEQ:** Unequipped is used to show units which are not installed.
- **IDLE:** Idle is used for units that are available for service, if needed, but would need to be configured first.
- **INIT:** Initialization is used when a unit is being initialized.
- **INH:** Inhibit means the action which would normally occur is inhibited.
- **ACTF:** Active forced is used when one side of a duplex unit is forced to active, regardless. The other side of the duplex unit automatically becomes UNV. The ACTF state can only be initiated by a craft action. There may or may not be a fault in the ACTF unit.
- **DGR:** Degraded is used for circuit groupings in which the overall circuitry is functioning normally, although one or more of the noncritical circuits in the grouping is out of service. (For example, this state is used for ONTC X, which includes MI/NC X, TMS X, and all DLIs on side X. If one of the DLIs fails, the ONTC becomes degraded.)

- **DGRF:** Degraded forced is similar to ACTF, but there definitely is a noncritical fault.
- **LMTD:** Limited is used when a circuit is currently active, but a nonservice-affecting request to remove the circuit has been camped on. The circuit goes out of service as soon as it is idle. This would normally appear on line unit and trunk unit circuits.
- **TEST:** This state is used when an operational or functional test other than a diagnostic is being run on a unit. This is a form of testing which can run while a unit is in use (most frequently used for line unit concentrators).
- **UNVP:** Unavailable power is used when a unit is unavailable due to no power to the unit as a result of a manual action by the craft (such as turning the power off).
- **UNVT:** Unavailable transient is a transient state shown only to keep the craft informed as to what is happening. No action is required on the part of the craft.
- **OOSP:** Out-of-service power is used when a unit is out of service due to no power to the unit because of faulty hardware (such as a blown fuse or converter failure).
- **OOST:** Out-of-service transient is a transient state shown only to keep the craft informed as to what is happening. No action is required by the craft.
- **OOSF:** Out-of-service family is used when a circuit goes out of service because its "parent" unit has gone out of service. For example, the MMPs in an MSGS would be OOSF if the control unit (MSCU) was out of service.
- **DEFR:** Deferred is used to indicate an out-of-service unit whose return to service has intentionally been deferred. This state can only be entered by a craft action.
- **GROW:** Growth is used while a new unit or capability is being added to the system.
- **SGRO:** Special growth is a semioperational state used when an SM is being added to the system.
- **CAMP:** Camp on is used when a unit is waiting for ownership of some resources.
- **CDNY:** Customer denied is used for circuit groupings in which the overall circuiting is functioning normally, but some customers are denied service.
- **UPD:** Circuit is in service but being updated.

Other States

- **SEVERE TROUBLE:** Flashes and is used for fire alarms and isolated SMs.
- **TROUBLE:** Used for off-normal alarm unit indicators (except fire) and for off-normal summary indicators.
- **INHIBITS ON:** Used for summary-type indicators.
- **OFF-NORMAL:** Used for least-significant off-normal conditions on Page 114.
- **NORMAL:** Used for normal alarm unit and summary indicators.

Figure 5-197 shows an example of the 1999 page.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC

CMD: _____ 1999 - STATE DEFINITIONS

SUMMARY STATUS AREA STATES

TEXT CRITICAL FLASH/STEADY	TEXT MAJOR FLASH/STEADY	TEXT MINOR FLASH/STEADY	TEXT UNALARMED OFF-NORMAL	TEXT SYSTEM NORMAL	TEXT NORMAL

CIRCUIT STATES

ACT	STBY	OOS	UNV	UNEQ	IDLE	INIT	INH	ACTF	DGR	
DGRF	LMTD	TEST	UNVP	UNVT	* OOSP	OOST *	OOSF	DEFR	GROW	SGRO
CAMP	CDNY	UPD	* T=TRANSIENT (FOR DGN, UPD, TEST, TMP, EX)							

OTHER STATES

TEXT SEVERE TROUBLE	TEXT TROUBLE	TEXT INHIBITS ON	TEXT OFF-NORMAL	TEXT NORMAL

Figure 5-197 1999 - Switch State Definitions [5E12 and Later]

Abbreviations:

ACT	Active	OOS	Out of Service
ACTF	Active Forced	OOSF	Out-of-Service Family of Equipment
CAMP	Camp On	OOSP	Out-of-Service Power
CDNY	Customer Denied	OOST	Out-of-Service Transient
DEFR	Deferred	SGRO	Special Grow
DGN	Diagnose	STBY	Standby
DGR	Degraded	TMP	Temporary
DGRF	Degraded Forced	UNEQ	Unequipped
EX	Exercise	UNV	Unavailable
GROW	Growth	UNVP	Unavailable Power
IDLE	Idle	UNVT	Unavailable Transient
INH	Inhibit	UPD	Update
INIT	Initialization		
LMTD	Limited		

5.129.4 Commands

Any available paging command can be entered from the 1999 display page.

6. MASTER CONTROL CENTER PAGE DISPLAYS 5E13 SOFTWARE RELEASE

6.1 GENERAL

This subsection contains descriptions and examples of the master control center (MCC) page displays that were added with or changed with the 5E13 software release.

Refer to Table 4-1 for a complete listing of MCC page displays.

6.2 111/112 - AM, AM PERIPHERALS [5E13 and Later]

6.2.1 Purpose

The purpose of the 111/112 display page is to report status of the AM and its peripherals. An indicator shows if an AM off-line boot is in progress.

6.2.2 General

The AM is a 3B20 or 3B21 duplex computer. In addition to the AM and peripheral indicators on this display, there are additional indicators for Page 121 - IOP 0 & 1, Page 122 - IOP 2 & 3, Page 123 - DFC 0 - 1 STATUS, Page 125 - DFC 2 & 3 STATUS, and Page 113 - OPERATIONS SYSTEMS LINKS. If common network interface (CNI) is equipped, there is also an indicator pointing to Page 118 - CNI RING STATUS.

An off-normal condition on this page will cause the AM or AM PERPH indicator at the top of the screen to backlight. An off-normal condition in an MHD (Page 123) will backlight the ``SEE PAGE 123" indicator and the AM PERPH at the top of the screen. Also, an off-normal condition in an MHD (Page 125) will backlight the ``SEE PAGE 125" indicator and the AM PERPH at the top of the screen. An off-normal condition on Page 121 will backlight the ``SEE PAGE 121" indicator(s) and the AM PERPH at the top of the screen. An off-normal condition on Page 122 will backlight the ``SEE PAGE 122" indicator(s) and the AM PERPH at the top of the screen. An off-normal condition on Page 118 will backlight the ``SEE PAGE 118" indicator and the AM PERPH at the top of the screen if CNI is equipped. An off-normal condition in the SCCs will cause the ``TO SCC 0" or ``TO SCC 1" indicator to backlight, and the OS LINKS indicator at the top of the screen will backlight. In all these cases, the appropriate alarm level (CRITICAL, MAJOR, or MINOR) will also backlight, if applicable.

Figure 6-1 is an example of the 111/112 page for a 3B20 AM and Figure 6-2 is a 3B21 AM example.

The ``OFLBOOT IP" indicator will appear and be backlit when the AM off-line boot is in progress. If this TTY is associated with the on-line side of the OFLBOOT procedure, the word ``ONLINE" will appear after the indicator. Conversely, if this TTY is associated with the off-line side, the word ``OFFLINE" will appear. See Figure 6-3.

A software update made the Alternate Boot Disk Feature available through a separate purchase. This feature is only available for a 3B21 AM. Figure 6-4 shows the EAI STATUS box that will appear when this feature is purchased. This box backlights red if Alternate Boot Disk has been selected from the EAI page.

The Alternate Boot Disk feature requires the UN597 MTTYC circuit board. The feature needs to be activated (feature bit set) to be able to access the feature's capabilities.

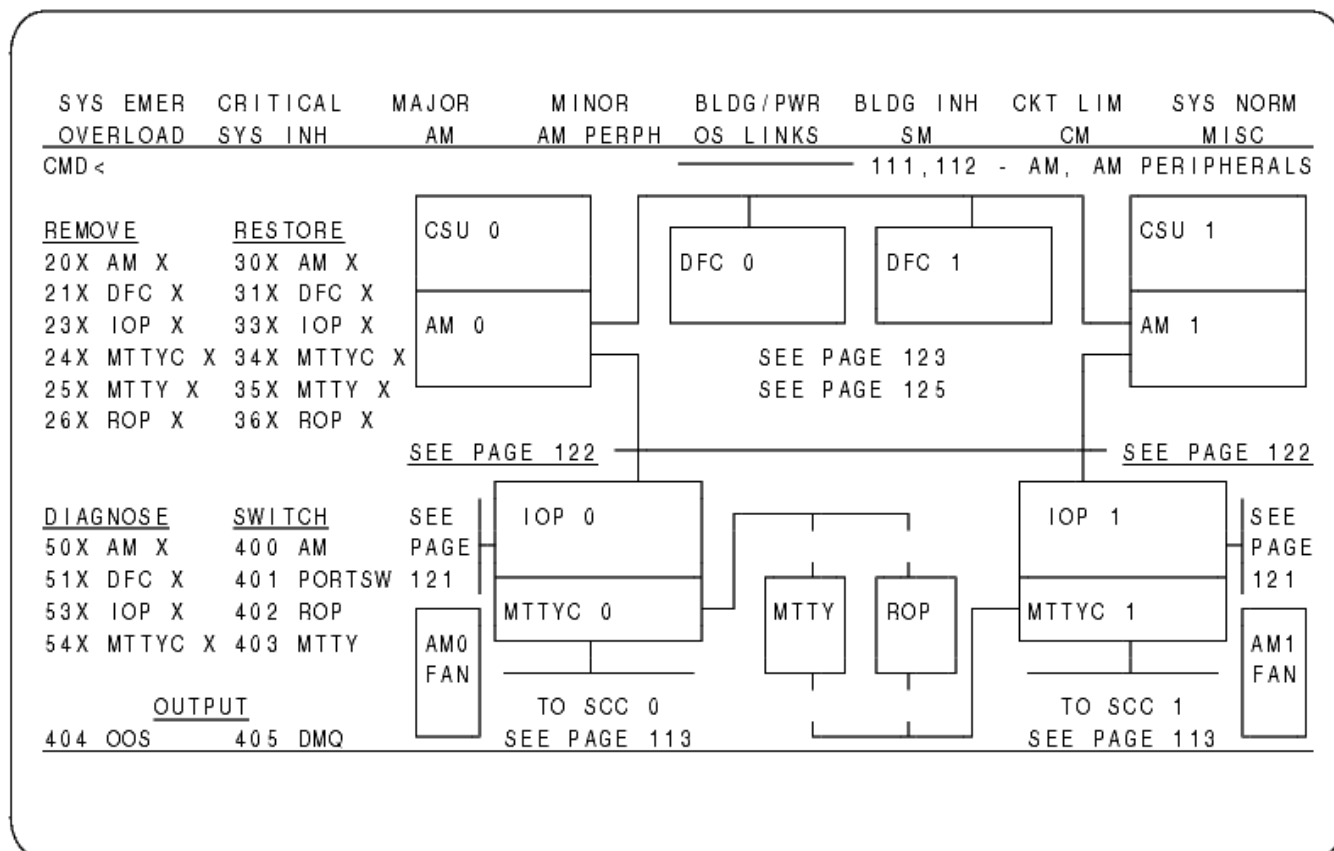


Figure 6-1 111/112 - AM, AM Peripherals for 3B20 AM (5E13 and later)

Abbreviations:

ACT	Active	MTTYC	Maintenance Teletypewriter Controller
AM	Administrative Module	OOS	Out of Service
CSU	Cache Store Unit	PORTSW	Portswitch
DFC	Disk File Controller	ROP	Receive-Only Printer
DMQ	Diagnostic Message Queue	SCC	Switching Control Center
IOP	Input/Output Processor	STBY	Standby
MTTY	Maintenance Teletypewriter		

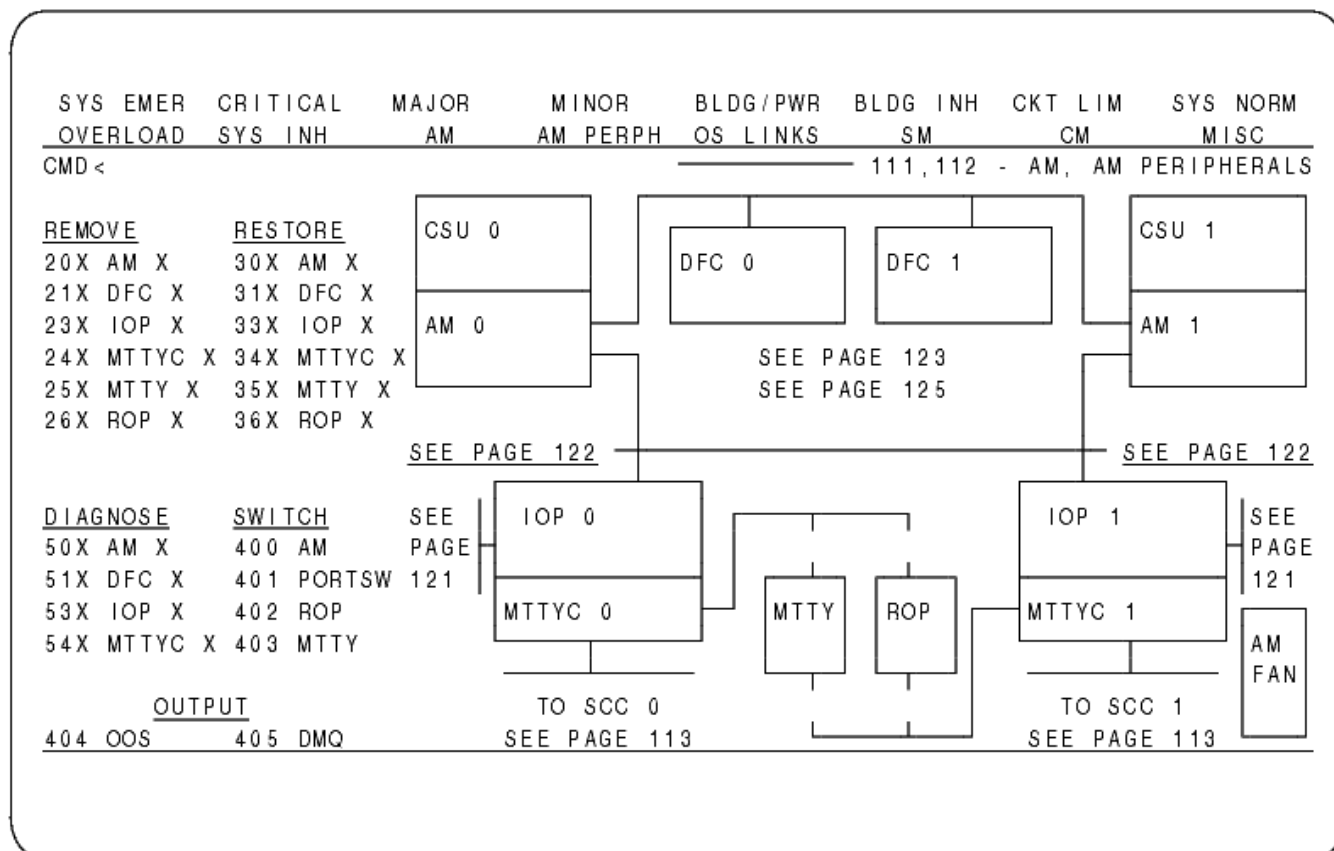


Figure 6-2 111/112 - AM, AM Peripherals for 3B21 AM (5E13 and later)

Abbreviations:

ACT	Active	MTTYC	Maintenance Teletypewriter Controller
AM	Administrative Module	OOS	Out of Service
CSU	Cache Store Unit	PORTSW	Portswitch
DFC	Disk File Controller	ROP	Receive-Only Printer
DMQ	Diagnostic Message Queue	SCC	Switching Control Center
IOP	Input/Output Processor	STBY	Standby
MTTY	Maintenance Teletypewriter		

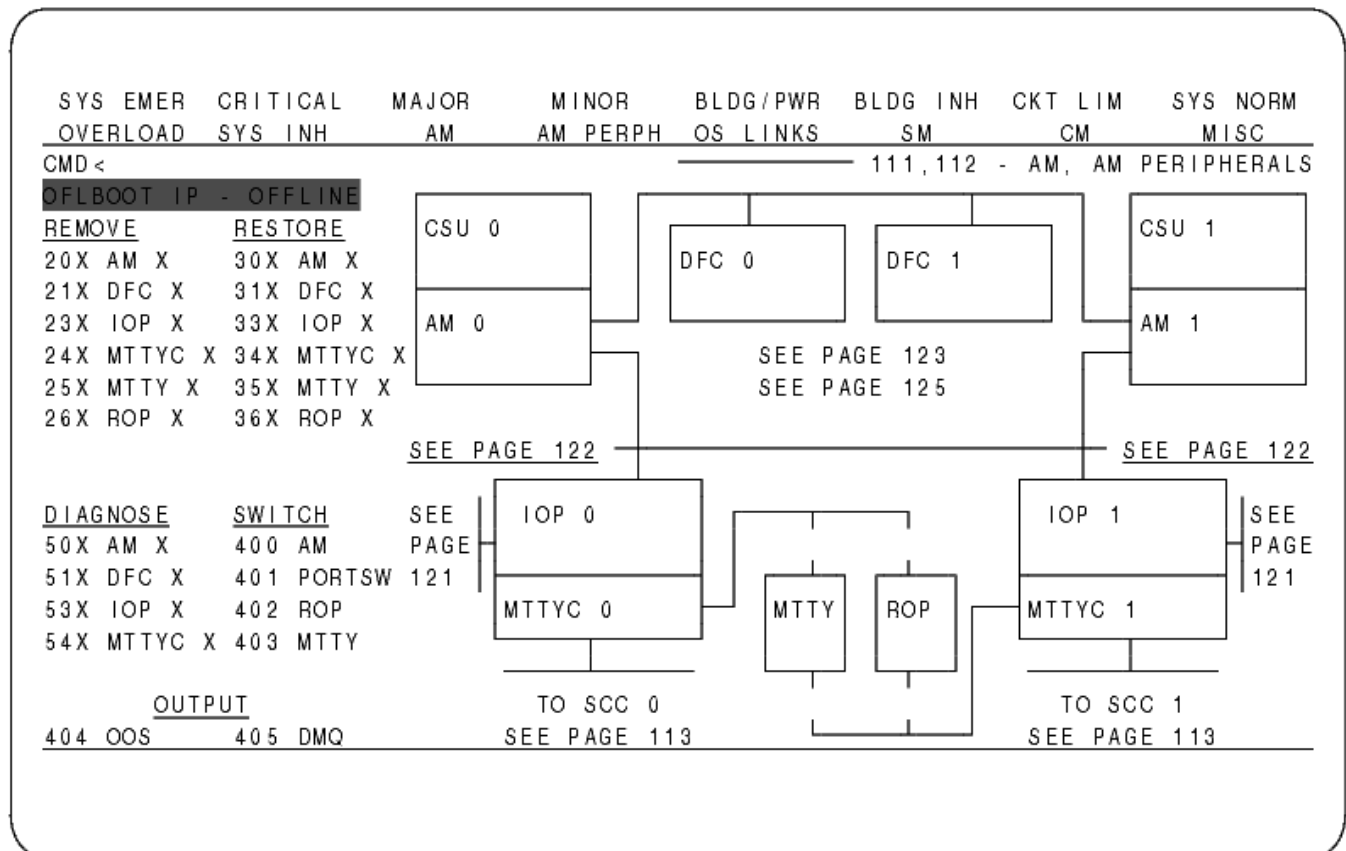


Figure 6-3 111/112 - AM, AM Peripherals Off-line Boot (5E13 and later)

Abbreviations:

ACT	Active	MTTYC	Maintenance Teletypewriter Controller
AM	Administrative Module	OFLBOOT	Off-line Boot
CSU	Cache Store Unit	OOS	Out of Service
DFC	Disk File Controller	PORTSW	Portswitch
DMQ	Diagnostic Message Queue	ROP	Receive-Only Printer
IOP	Input/Output Processor	SCC	Switching Control Center
IP	In Progress	UNEQ	Unequipped
MTTY	Maintenance Teletypewriter		

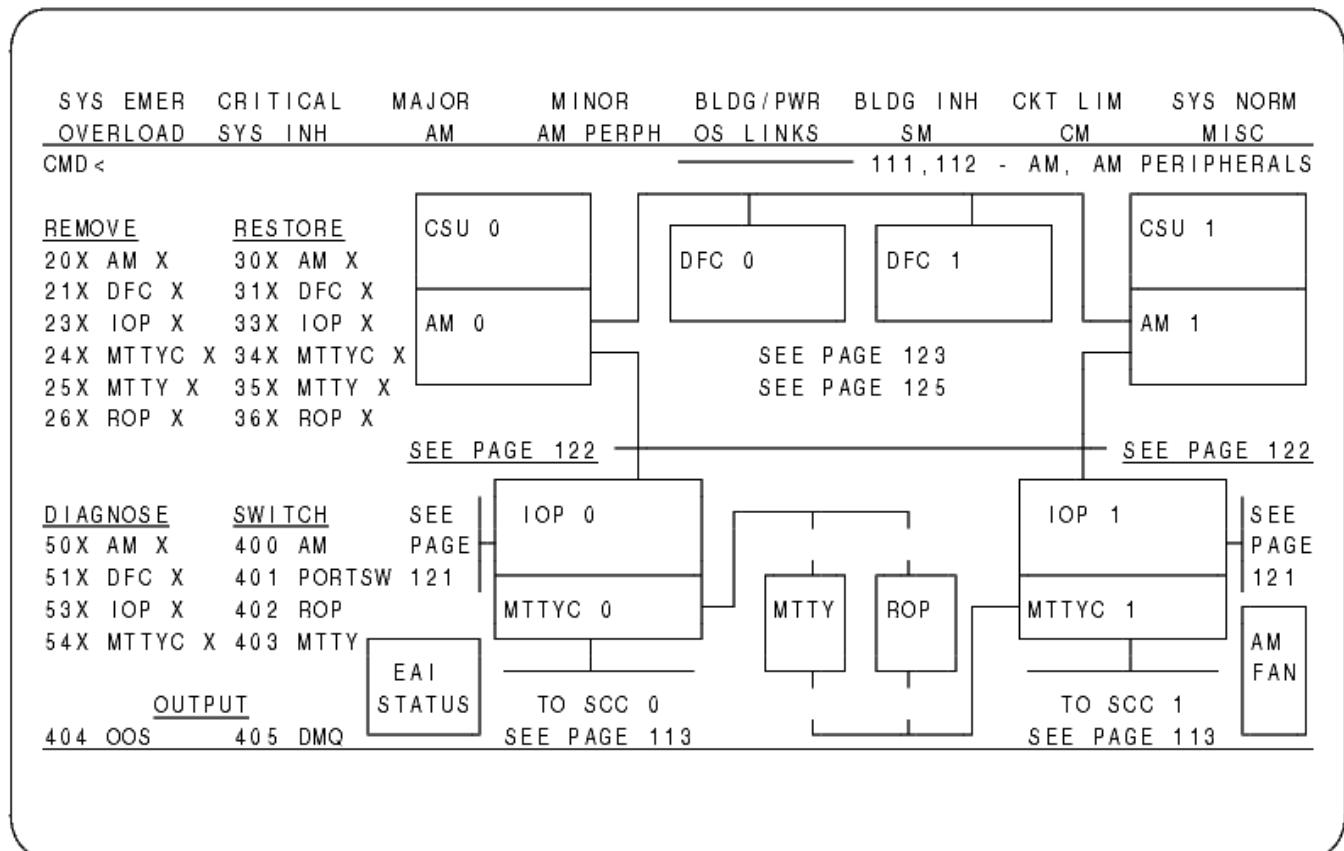


Figure 6-4 111/112 - AM, AM Peripherals Alternate Boot Feature (5E13 and later)

Abbreviations:

ACT	Active	MTTY	Maintenance Teletypewriter
AM	Administrative Module	MTTYC	Maintenance Teletypewriter Controller
CSU	Cache Store Unit	OOS	Out of Service
DFC	Disk File Controller	PORTSW	Portswitch
DMQ	Diagnostic Message Queue	ROP	Receive-Only Printer
EAI	Emergency Action Interface	SCC	Switching Control Center
IOP	Input/Output	UNEQ	Unequipped
IP	In Progress		

6.2.3 Commands

The 111/112 page provides commands to remove, restore, diagnose, and switch the various units. Also, output commands are available for out-of-service and diagnostic listings.

All available displays can be accessed from the 111/112 page.

CMD	RESULT	CMD	RESULT
20X	AM X is removed (RMV:CU=X)	30X	AM X is restored (RST:CU=X)[,UCL]
21X	DFC X is removed (RMV:DFC=X)	31X	DFC X is restored (RST:DFC=X)[,UCL]
23X	IOP X is removed (RMV:IOP=X)	33X	IOP X is restored (RST:IOP=X)[,UCL]
24X	MTTYC X is removed (RMV:MTTYC=X)	34X	MTTYC X is restored (RST:MTTYC=X)[,UCL]
25X	MTTY X is removed (RMV:MTTY=X)	35X	MTTY X is restored (RST:MTTY=X)[,UCL]
26X	ROP X is removed	36X	ROP X is restored

50X	(RMV:ROP=X) AM X is diagnosed (DGN:CU=X)[,UCL]	400	(RST:ROP=X)[,UCL] AM is switched (SW:CU)
51X	DFC X is diagnosed (DGN:DFC=X)[,UCL][,CONT]	401	PORTSW is switched (SW:PORTSW)
53X	IOP X is diagnosed (DGN:IOP=X)[,CONT][,UCL]	402	ROP is switched (SW:PORTSW:ROP)
54X	MTTYC X is diagnosed (DGN:MTTYC=X)[,UCL][,CONT]	403	MTTY is switched (SW:PORTSW:MTTY)
404	OOS units are listed at ROP (OP:CFGSTAT,OOS)		
405	Diagnostic request queue is output at ROP, including restore/remove requests (OP:DMQ,AM)		

6.3 124 - DCI/ASM Status Page (5E13 and later)

6.3.1 Purpose

The purpose of the 124 DCI/ASM Status Page is to provide information about ASM(s), DCI link(s), and the ASM console.

6.3.2 General

NOTE: The 124 page is not applicable unless the ASM feature has been purchased.

The 124 page displays the status of the DCI link between the 3B and the ASM, the ASM status, and the status of the ASM console via the 3B TTY.

The ASM is an adjunct processor in the 3B that communicates with the 5ESS over a high speed DSCH computer interface (DCI). The ASM base is an optional feature that provides a platform for switch applications.

Figure 6-5 shows an example of the 124 DCI/ASM Status Page.

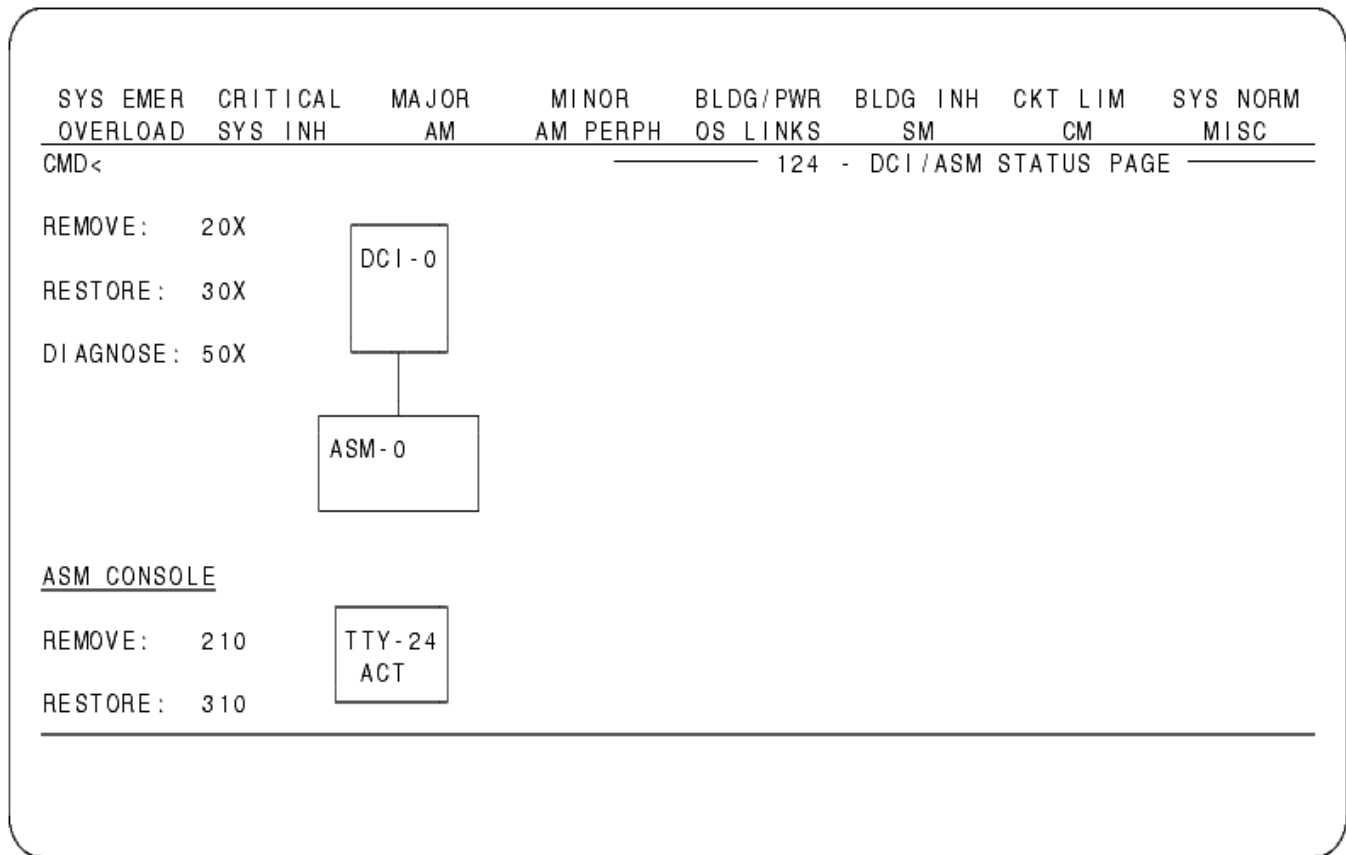


Figure 6-5 DCI/ASM Status Page (5E13 and later)

Abbreviations:

ASM	Administrative Services Module	DSCH	Dual Serial Channel
DCI	DSCH Computer Interface		

6.3.3 Commands

The 124 DCI/ASM Status page provides commands to remove, restore, and diagnose the DCI link(s). Commands are also available to remove and restore the ASM console.

CMD	RESULT
20X	DCI X is removed. (RMV:DCI X)
30X	DCI is restored. (RST:DCI X)
50X	DCI X is diagnosed. (DGN:DCI X)
210	Remove ASM console
310	Restore ASM console

6.4 131 - CALL TRACE MENU (5E13 and Later)**6.4.1 Purpose**

The 131 page display is a menu page that contains a list of call trace poke commands.

6.4.2 General

A "SEE PAGE" indicator on the 131 menu page shows the maintenance personnel which hardware call trace page (133 through 140, 150, or 151) to access for the details of the call trace.

The 131 menu page gives the user the ability to invoke a trace by simply entering a poke value followed by a number or a set of numbers. For example, 401,2220001 where 401 is the poke for a utility hardware call trace with a directory number (DN), 2220001, being the input option.

When tracing an Integrated Services Digital Network (ISDN) circuit switched lines, the channel to be traced should be included in the input. If no channel is specified, then the default action is to trace the D-channel. See pokes 401, 404, 405, 406, and 409 for input requirements.

The subaddress (SA) option is used to specify which subaddress of a DN/MLHG with multiple call appearances to trace. Specifying SA=ALL results in Page 150 being populated with the status of all valid subaddresses for the given input. If the SA option is used, the channel (CH) option must be omitted. The SA option is valid for voice calls on terminals which use subaddresses. This includes most custom digital subscriber lines (DSL) and also standard Electronic Key Telephone Service (EKTS) lines. To trace packet switched calls, the **PKT** variable is included in poke commands 401, 404, 405, 406, 409 and 410.

The call ID number (CID) option is used to specify which call on a standard non-EKTS DSL to trace, or to trace circuit switched data calls on any type terminal. Specifying CID=ALL results in Page 150 being populated with the status of all calls for the given input. If the CID option is used, the channel (CH) option must be omitted.

The CID and SA options are mutually exclusive. If an incorrect option is used for the call type of the given input, an error message is generated, and the 150 page is populated with the correct information for the input DN/MLHG. Refer to the 150 page for more detailed information.

A software release added STE to poke 407 and VT has been replaced by VTG and VTM as result of the DNU-S VT Group Number change.

Figure 6-6 shows an example of the 131 page display.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
131 - CALL TRACE MENU							
131-2 CALL TRACE MENU				140 D-CH/PKT CALL TRACE			SEE PAGE 133
133-8 CALL TRACE VIEWS 1-6				150 TRACEABLE CALL STATUS			
139 ISDN PKT CALL TRACE				151 CONFERENCE CIRCUIT TRACE			
401,X TRACE DN X (X=DN), {[CH=D|B1|B2], [PKT] | [SA=SUBADD|ALL] | [CID=ID(ALL)] }							
402,X TRACE LEN X (X=SM,LU,GR,BD,SW,LV)							
403,X TRACE SLEN X (X=SM,DCLU,RT,LINE)							
404,X TRACE MLHG X (X=GRP,MEM), {[CH=D|B1|B2], [PKT] | [SA=SUBADD|ALL] | [CID=ID|ALL] }							
405,X TRACE LCEN X (X=SM,ISLU,LG,LC), [CH=D|B1|B2], [PKT]							
406,X TRACE ILEN X (X=SM,IDCU,RT|DS1,LINE|DS0), [CH=D|B1|B2], [PKT]							
407,X TRACE NEN X (X=SM,DNU,DG,STE,STS,VTG,VTM,DS0)							
408,X TRACE PSUEN X (X=SM,PSU,SHLF,CHGRP,MEM)							
409,X TRACE LCKEN X (X=SM,ISLU,LG,LP,LC), [CH=D|B1|B2], [PKT]							
410,X TRACE PORT X (X=SM), [PKT]							
411,X TRACE CKT X (X=SM,CKT NAME)							
412,X TRACE TKGMM X (X=GRP,MEM)							
413,X TRACE TEN X (X=SM,TU,SG,BD,CKT)							
414,X TRACE DEN X (X=SM,DLTU,DFI,CH)							

Figure 6-6 131 - Call Trace Menu (5E13 and later)

Abbreviations:	
BD	Board
CH	Channel
CHGRP	Channel Group
CID	Call ID Number
CKT	Circuit
CKTNUM	Circuit Number
DCLU	Digital Carrier Line Unit
DEN	Digital Equipment Number
DFI	Digital Facility Interface
DG	Data Group
DLTU	Digital Line and Trunk Unit
DN	Directory Number
DNU	Digital Networking Unit
DS0	Digital Signal Level 0 Number
LV	Level
MEM	Channel Group Member
MLHG	Multiline Hunt Group
NEN	DNU-S Network Equipment Number
PKT	Packet
PSU	Packet Switching Unit
PSUEN	Packet Switching Unit Equipment Number
RT	Remote Terminal
SA	Subaddress
SG	Service Group
SHLF	Shelf
SLEN	Subscriber Loop Carrier LEN
DS1	Digital Signal Level 1 Number
GR	Grid
GRP	Group
IDCU	Integrated Digital Carrier Unit
ILEN	IDCU Line Equipment Number
ISLU	Integrated Services Line Unit
LEN	Line Equipment Number
LC	Line Card
LCEN	Line Card Equipment Number
LCKEN	Line Circuit Equipment Number
LG	Line Group
LP	Line Pack
LU	Line Unit
SM	Switching Module
STE	Signaling Terminal Equipment (X'75) or SONET Termination Equipment
STS	Synchronous Transport Signal
SUBADD	Subaddress
SW	Switch
TEN	Trunk Equipment Number
TKGMN	Trunk Group and Member Number
TS	Time Slot
TU	Trunk Unit
VTG	Virtual Tributary Group
VTM	Virtual Tributary Member

6.4.3 Commands

All poke commands that appear on the 131 display page can be invoked by maintenance personnel, and they can also be invoked from any of the call trace display pages (131-140, 150, and 151). Refer to Page 132 - Call Trace Menu Cont. (Figure 5-33) for more call trace poke commands.

6.5 133 THROUGH 138 - HARDWARE CALL TRACE (5E13 and Later)

6.5.1 Purpose

The hardware call trace page displays show the hardware paths of calls requested to be traced.

6.5.2 General

Call Trace Pages provide a ``snapshot" of the hardware and software path(s) involved with a call. Some calls require several displays, for example, a 3-way call. A ``SEE PAGE" indicator appears if more displays are involved in a particular call.

Information collected about dynamic data structures and hardware paths can aid in trouble-shooting a failed call. The software state, external identifier, peripheral path, and network path are shown for each connection of the call and are described as follows:

- **Software state:** The software state represents the state of the call (ringing, talking, transient, etc.) as stored in the process control block link area (PCBLA).
- **External identifier:** The external identifier is the representation of the customer and can include the following:
 - Intercom (ICOM) Group
 - Directory Number (DN)
 - Multiline Hunt Group (MLHG) group and member
 - Trunk (TRK) group and member
 - Equipment Number (EN).
- **Peripheral path:** The peripheral path displays the hardware path taken by the call from the peripheral unit through the service units to the TSI.
- **Network path:** The network path is represented by the Network Control and Timing (NCT) time slot connecting the TSI to the TMS. The connection from the NCT to the TMS is shown as either a solid line, representing an inter-SM call, or a dotted line, representing an intra-SM call.

If an ISDN call is traced, the type of circuit switched service (voice or data) and a B-channel identifier (CH B1, CH B2, or NO CH) are displayed. The NO CH means that no B-channel is allocated for the call.

Analog and ISDN calls that have been parked display ``PARKED". Peripheral path information may not be available for parked calls.

For calls through a remote ISLU (RISLU), the connection via a T1 carrier between the RISLU and the DLTU host (DLUTH) in the switch is shown. Additionally, if business and residence custom services (BRCS) features are assigned to a DSL, the primary directory number (PDN), subaddress (SA), and call appearance (CA) is displayed.

Call Trace supports standard ISDN DSLs. If a standard EKTS DSL is traced, the SA and CA are displayed as for a custom DSL. If a standard non-EKTS is traced, SA and CA do not apply.

Call Trace displays the SM and IDCU numbers for an IDCU.

The IDCU peripheral unit contains a time slot interchange unit (TSIU) which offers the ability to make connections without using the TSI in the SM, thus saving SM time slot resources. A trace of this hairpin connection only shows the RT and the IDCU.

The IDCU also supports the PUB43801 interface format used for interfacing to D4 and D5 channel banks and to Digital Access Cross Connect Systems (DACs). Since these connections do not use an RT, RT is not shown on the trace. The FAC field in an IDCU display contains the IDCU facility (IFAC) number.

The ICOM group number is included in the call trace output. A call appearance (CA) ICOM call does not have a DN associated with it. A trace of this type of call displays the ICOM group number where the DN is normally displayed. A "feature button" ICOM call has an associated DN which is displayed at the MCC. The ICOM group number is printed on the ROP output message for both types of ICOM calls.

A wideband indicator (WB) is displayed when a call using more than one time slot is traced. The **OP:CHANMAP** command can be used to determine the other time slots active on the call.

When a Service Announcement System (SAS) unit is connected to a call, a call trace displays the SM number, unit number, and channel for the SAS.

Peripheral to peripheral connections are supported on an SM-2000. Because these types of calls are connected at the TSI, network path is not displayed.

The digital networking unit (DNU) - synchronous optical network (SONET) (DNU-S) is supported. (DNU-S is displayed on the screen as DNUS.) Call trace displays the DNU-S, STSX-1 facility interface (SFI), and common data (CD) numbers for a DNU-S. The facility (FAC) field in a DNU-S display contains the DNU-S facility which consists of the SONET Termination Equipment (STE) number and the synchronous transport signal (STS) number. The peripheral control and timing (PCT) link number and PCT time slot number are also displayed. The Speech Handler call trace is also supported.

A software update changed the NEN to the following fields: SM-DNU-DG-STE-STS-VTG-VTM-DS0 (see Figure 6-7).

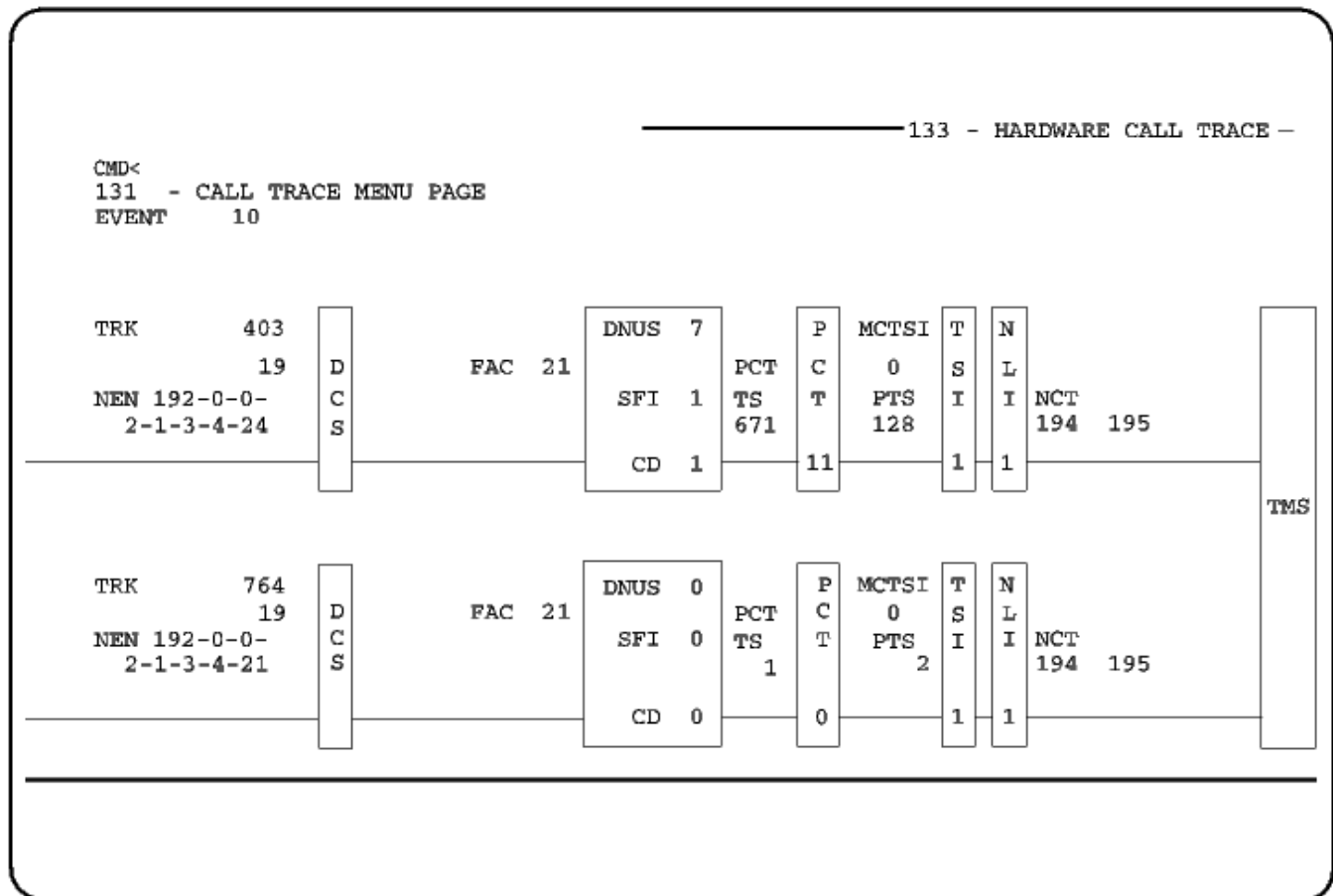


Figure 6-7 133 - Call Trace Showing Trunk to Trunk NENs (5E13 and later)

Abbreviations:

CD	Common Data	RT	Remote Terminal
DN	Directory Number	SFI	STSX-1 Facility Interface
DNUS	Digital Network Unit-SONET	STE	SONET Termination Equipment
DS0	Digital Signal Level 0	STS	Synchronous Transport Signal
DS1	Digital Signal Level 1	TRK	Trunk
DLI	Dual Link Interface	TS	Time Slot
FAC	Facility	NLI	Network Link Interface
MCTSI	Module Controller/Time Slot Interchanger	TSI	Time Slot Interchange
NCT	Network Control and Timing	TMS	Time Multiplex Switch
NEN	DNU-S Network Equipment Number	VTG	Virtual Tributary Group
PCT	Peripheral Control and Timing	VTM	Virtual Tributary Member

6.6 140 - HARDWARE CALL TRACE (5E13 and Later)

6.6.1 Purpose

The purpose of the 140 page display is to provide the hardware connections for the packet call trace and circuit switched D-channel call trace.

6.6.2 General

When "MULTIPT" instead of a DN number appears on the 140 screen display, a custom interface with multiple users was traced (see Figure 6-8). If "STANDARD" instead of a DN number appears on the screen display, a standard interface with multiple users was traced. When an out-of-service (OOS) interface is traced, parts of the

peripheral and network paths might not be displayed. This is an indication that these parts of the path(s) are not currently up.

NOTE: The PDB abbreviation on the 140 page display actually means protocol handler data bus (PHDB). The PDB abbreviation appears on the page display because an internal software process is also named PHDB.

Call Trace supports tracing packet pipe trunks. Only one of the DS0s associated with a packet pipe can be traced and displayed a time. If the trace is triggered on the packet pipe trunk group port, the trace will default to the first path linked off the DPB on the PSU side and the corresponding packet pipe trunk group member on the DFI side. In order to view other packet pipe paths, the call trace must be triggered off the packet pipe trunk group member rather than the trunk group port. Also supported is a hardware call trace for the DNU-S primary rate interface (PRI) D-Channel.

A software update changed the NEN to the following fields: SM-DNU-DG-STE-STS-VTG-VTM-DS0 (see Figure 6-8).

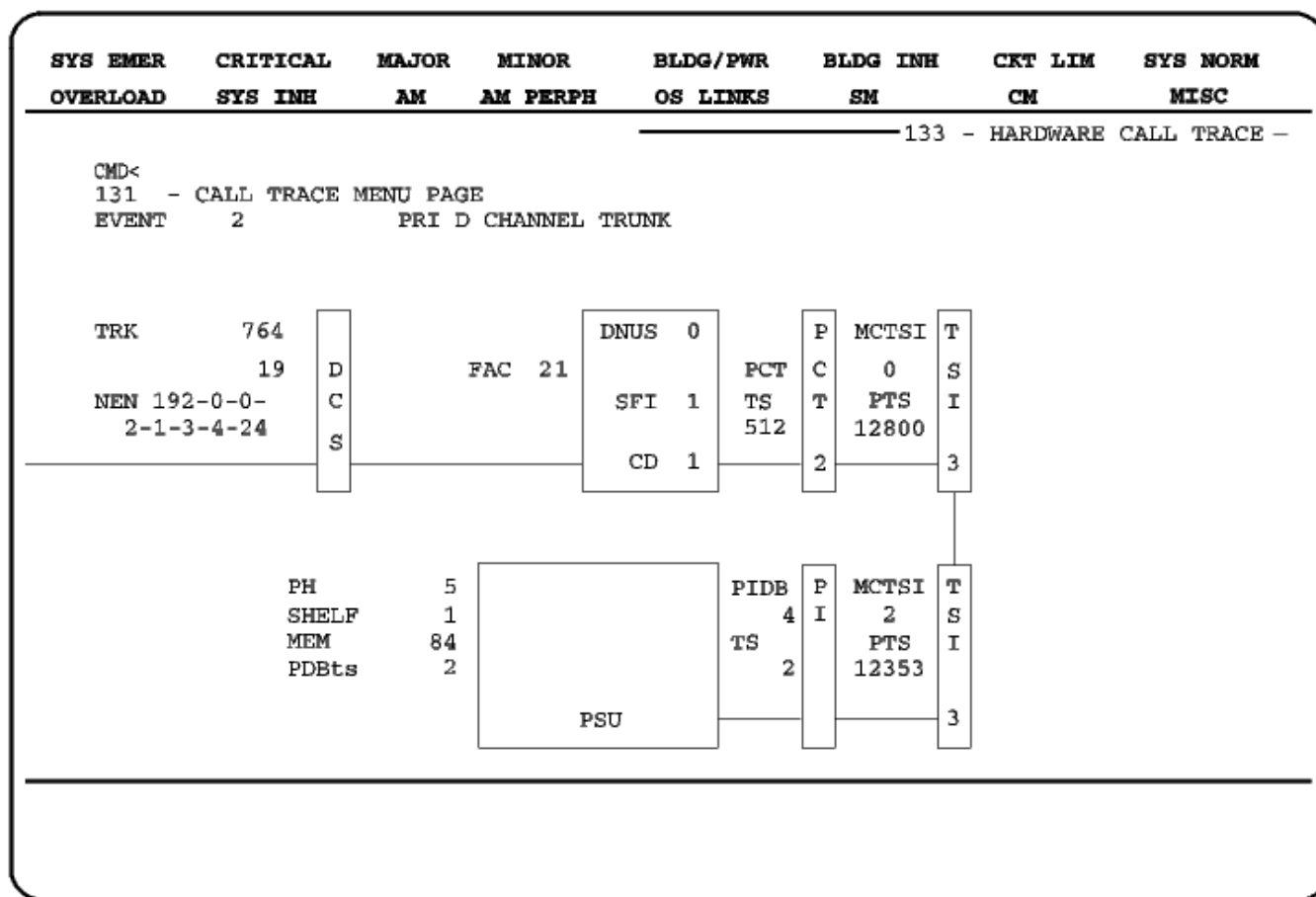


Figure 6-8 140 - Trunk NEN DNU-S Call Trace (5E13 and later)

Abbreviations:

CD	Common Data	SFI	STSX-1 Facility Interface
DN	Directory Number	STE	SONET Termination Equipment
DNUS	Digital Network Unit-SONET	STS	Synchronous Transport Signal
DS0	Digital Signal Level 0	TS	Time Slot
DS1	Digital Signal Level 1	NLI	Network Link Interface
DLI	Dual Link Interface	TSI	Time Slot Interchanger
MCTSI	Module Controller/Time Slot Interchanger	VTG	Virtual Tributary Group
NEN	DNU-S Network Equipment Number	VTM	Virtual Tributary Member
RT	Remote Terminal		

6.7 1120/1121/1122,Y,X - SM X - DLTU Y (5E13 and Later)

6.7.1 Purpose

The purpose of the 1120/1121/1122,Y,X display page is to show status and provide maintenance controls for DLTU Y and to report local, remote, and Alarm Indication Signal (AIS) Carrier Group Alarms (CGA) for SM X. The pages are organized as follows:

- **1120:** Shows status for DFIs 01 - 04
- **1121:** Shows status for DFIs 05 - 08
- **1122:** Shows status for DFIs 09 - 10.

6.7.2 General

The 1120/1121/1122,Y,X display page has three separate versions. The first version is for local switching modules (LSM). The second version is for host switching modules (HSM). The third version is for remote switching modules (RSM).

All three versions have commands to remove, restore, and diagnose digital facility interfaces (DFI) and to remove, restore, and test T1 facilities (FAC). If the RSM is equipped with any inter-RSM communication link digital facilities interfaces (CDFI), commands to remove and restore remote communication links (RCL) are added.

Several changes have been made to the 1120, 1121, and 1122 pages as a result of a software update. The far end field was expanded to 20 characters. The far end field for pages 1120 and 1121 can display "SEE 174X,YYY where X is either 0 or 1 for 1740 or 1741 page and YYY is the RSM number. The new application field will display "RSM" for facilities terminating to RSM or "TRK" for trunk facilities.

The expanded FAR END field for the 1120, 1121 and 1122 pages can now take on two different values depending on the host unit for facilities terminating to the host SM. If the host unit is DLTU then it will display "FAC: SM#-DLTU#-DFI#-FAC#". If the host unit is DNU-S then it will display "DS1: SM#-DNU#-DG#-STE#-STS#-VTG#-VTM#". The application field of the pages only applies from the host end.

The DLTU provides direct interfaces to T1 lines.

If an echo canceler is equipped on a facility, the associated echo canceler service unit (ECSU) and position of the echo canceler will be displayed. Since the echo canceler is maintained as part of the facility, there are no pokes specifically for it.

When an off-normal condition occurs in a DFI, the DFI indicator backlights. When a CGA occurs, an indicator appears in the CGA column associated with the DFI. The indicator contains the letter L, R, or A (for local, remote, or AIS, respectively). If one or more off-normal condition(s) is present on this display, the DLTU Y indicator on Page 1010,X - SM X STATUS is backlighted. On Page 1013,X - SM X UNIT STATUS, the indicator for the DLTU service group backlights. On Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for that SM backlights; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM backlights and a descriptive phrase of the condition is written, unless a more critical condition exists. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, are backlighted.

The HSM and RSM versions have information on the DFI displayed in the FAR END column which shows the connection at the "other" end. Included are the SM number, the DLTU number, the DFI number, and the FAC number within the DLTU.

The HSM version also references Page 1605 - HSM-RSM SITE INDEX for a list of all RSMs hosted by the HSM.

In the HSM and RSM versions, the DFI(s) carrying the control time slot is shown by an (*). In the RSM version, the DFI receiving reference timing is shown by an (&). The LSM version shows neither control time slot nor receive reference timing.

Figure 6-9 shows the HSM version of the 1120 page. The 1121 and 1122 pages are similar.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD <				1120 - SM 001 HSM - DLTU 0			
SM 001 STAT							
<u>REMOVE</u>							
20XX DFI				SEE 1121,Z/1122,Z FOR OTHER DFI STATUS (Z=DLTU#)			
21XXY FAC				SITE 000			
<u>RESTORE</u>							
30XX DFI							
31XXY FAC							
<u>DIAGNOSE</u>							
50XX DFI							
<u>TEST</u>							
51XXY FAC							
XX=DFI Y=FAC				(L=LOCAL R=REMOTE A=AIS)			

Figure 6-9 1120 Page HSM Version (5E13 and Later)

Abbreviations:

ACT	Active	HSM	Host Switching Module
AIS	Alarm Indication Signal	OOS	Out of Service
CGA	Carrier Group Alarm	OOSF	Out of Service of Equipment
CKT	Circuit	RCL	Remote Communication Link
DFI	Digital Facility Interface	RSM	Remote Switch Module
DLTU	Digital Line Trunk Unit	SM	Switching Module
EC	Echo Canceler Position	STAT	Status
ECSU	Echo Canceler Service Unit	T	Trunk DFI
FAC	T1 Facility	TYP	Type

6.7.3 Commands

All three versions, LSM, HSM, and RSM, have commands to remove, restore, and diagnose DFIs and to remove, restore, and test FACs. In addition, any available paging command can be entered from this display.

LSM and HSM Versions

CMD	RESULT
20XX	DFI XX is removed. (RMV:DFI=SM#-DLTU#-XX) [UCL]
21XXY	T1FAC Y of DFI XX is removed. (RMV:FAC=SM#-DLTU#-XX-Y) [UCL]

30XX	DFI XX is restored. (RST:DFI=SM#-DLTU#-XX) [,UCL]
31XXY	T1FAC Y of DFI XX is restored. (RST:FAC=SM#-DLTU#-XX-Y) [,UCL]
50XX	DFI XX is diagnosed. (DGN:DFI=SM#-DLTU#-XX,RAW,TLP) [,UCL] [,GROW] [,RPT] Test is repeated 32,767 times. [,RPT=a] The ``a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The ``b" is the diagnostic phase or ``b&&c" is the range of phases to be performed.
51XXY	T1FAC Y of DFI XX is tested. (TST:FAC=SM#-DLTU#-XX-Y) [,RPT] Test is repeated 32,767 times. [,RPT=a] The ``a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The ``b" is the diagnostic phase or ``b&&c" is the range of phases to be performed.

RSM Version	
CMD	RESULT
20XX	DFI XX is removed. (RMV:DFI=SM#-DLTU#-XX) [,UCL]
21XXY	T1FAC Y of DFI XX is removed. (RMV:FAC=SM#-DLTU#-XX-Y) [,UCL]
22XXY	RCL XX of FAC Y is removed. (RMV:RCL=SM#-DLTU#-XX-Y) [,UCL]
30XX	DFI XX is restored. (RST:DFI=SM#-DLTU#-XX) [,UCL]
31XXY	T1FAC Y of DFI XX is restored. (RST:FAC=SM#-DLTU#-XX-Y) [,UCL]
32XXY	RCL XX of FAC Y is restored. (RST:RCL=SM#-DLTU#-XX-Y) [,UCL]
50XX	DFI XX is diagnosed. (DGN:DFI=SM#-DLTU#-XX,RAW,TLP) [,UCL] [,GROW] [,RPT] Test is repeated 32,767 times. [,RPT=a] The ``a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The ``b" is the diagnostic phase or ``b&&c" is the range of phases to be performed.
51XXY	T1FAC Y of DFI XX is tested. (TST:FAC=SM#-DLTU#-XX-Y) [,RPT] Test is repeated 32,767 times. [,RPT=a] The ``a" is the number of times the test is to be repeated (1-32,767). [,PH=b|b&&c] The ``b" is the diagnostic phase or ``b&&c" is the range of phases to be performed.

6.8 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y [5E13 and Later]

6.8.1 Purpose

The purpose of the 1201 page is to show status for the DLIs, NLIs, and the TMSLNKs that are connected to each ONTCCOM on a per-SM basis and to provide maintenance commands for the DLIs/NLIs.

6.8.2 General

The 1201 page has four separate and distinct versions. The first version is for SMs with DLI hardware. The second version is for SM-2000s with NLI hardware. The third version is for EXM-2000s with NLI hardware. The fourth version is for ORM with DLI hardware.

Each link set is shown on a separate page. For SMs with DLIs, only one set is used.

Also provided on the 1201 page is a view of the DLIs/NLIs and the TMSLNKs connecting a particular SM/SM-2000 to the ONTCs. It shows the status of ONTCCOMs 0 & 1, the TMSLNKs for the particular SM/SM-2000 and their status, and the status of the DLIs/NLIs for the SM.

The 1201 page indicates the presence of the transmission rate converter unit (TRCU) for ORM. Alarm status of the TRCU hardware is not indicated on the 1201 page. However, if a DLI/NLI goes OOS, the TRCU hardware may be faulty. Look on the ROP to see if the TRCU hardware appears on the suspected faulty equipment list.

The TRCP shown is the path assigned connecting the host TRCU circuit to the remote TRCU circuit. See 95XX poke command for detailed information about the TRCP.

Figures 6-10 , 6-11 , and 6-12 are examples of the CM2 version of the 1201 page display. (The lack of "LI" in the definition of ONTCCOM in the lower left corner of the display indicates that this is the CM2 version.)

Figure 6-10 is the example for SMs. In this example, ONTCCOM 1 is unavailable forced removed (UNV)resulting in DLI 1 and TMSLNKs 14 and 15 for side 1 being OOSF. The ONTCCOM 0 is degraded-forced (DGRF).

Figure 6-11 is the example for SM-2000s.

Figure 6-12 is the example for EXM-2000s.

Figure 6-13 is the CM1 version of the 1201 page display. In this example, ONTCCOM 0 is degraded (DGR) minor and ONTCCOM 1 is active (ACT) major. The DLI 0 is unavailable power (UNVP) causing the 0 (zero) side TMSLNKs 14 and 15 to be OOSF. The SM 6 is isolated.

Figure 6-14 is an example of the CM2 version of the 1200,X page that shows the TRCP.

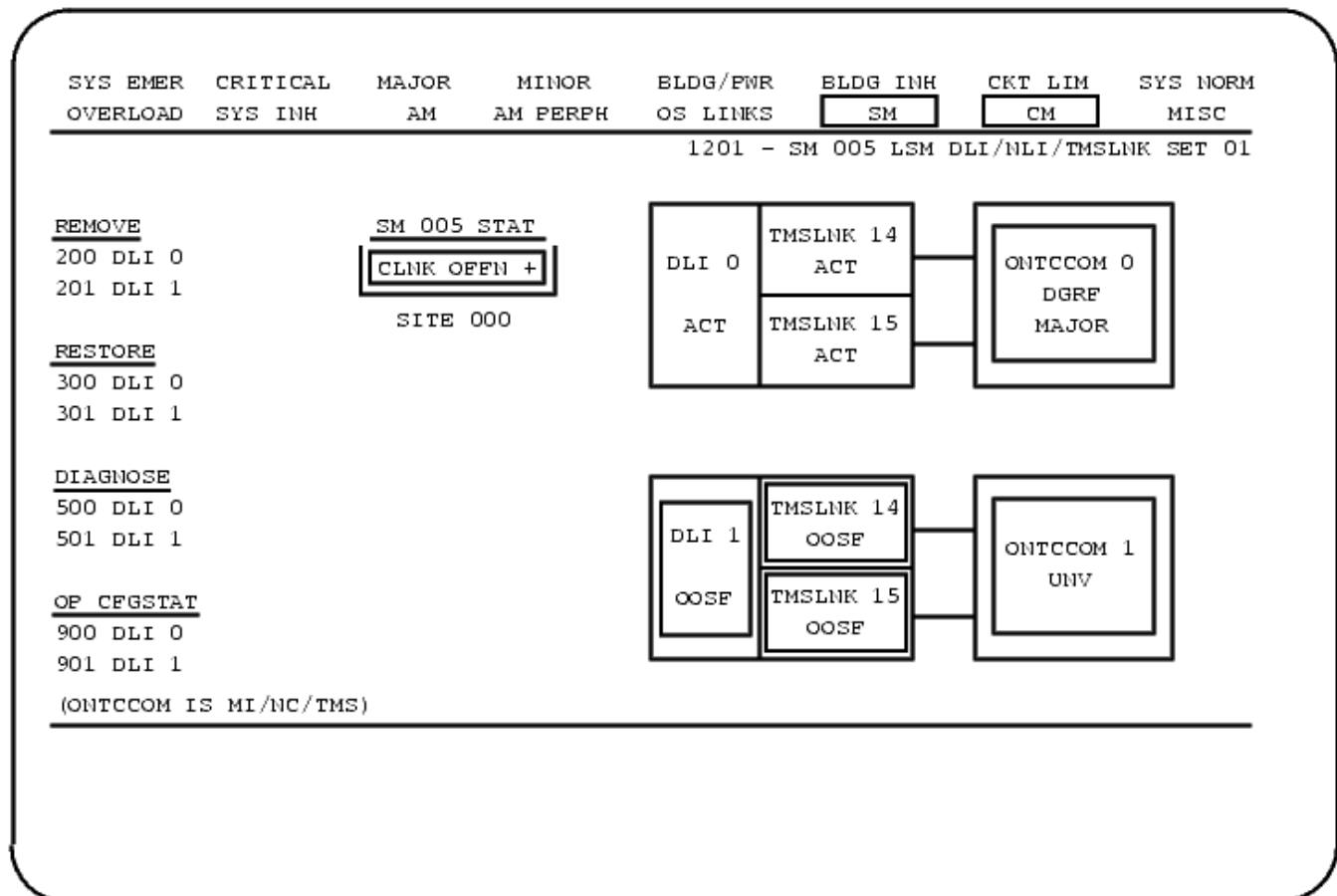


Figure 6-10 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y (CM2 Version with SM) [5E13 and Later]

Abbreviations:

ACT	Active	ONTCCOM	Office Network Timing
CFGSTAT	Configuration Status		Complex Common
CLNK	Communication Link	OOSF	Out-of-Service Family
DGRF	Degraded-Forced		of Equipment
LSM	Local Switching Module	OP	Output
DLI	Dual Link Interface	STAT	Status
MI	Message Interface	SM	Switching Module
NC	Network Clock	TMS	Time-Multiplexed Switch
NLI	Network Link Interface	TMSLNK	TMS Link
OFFN	Off Normal	UNV	Unavailable (Forced Removed)

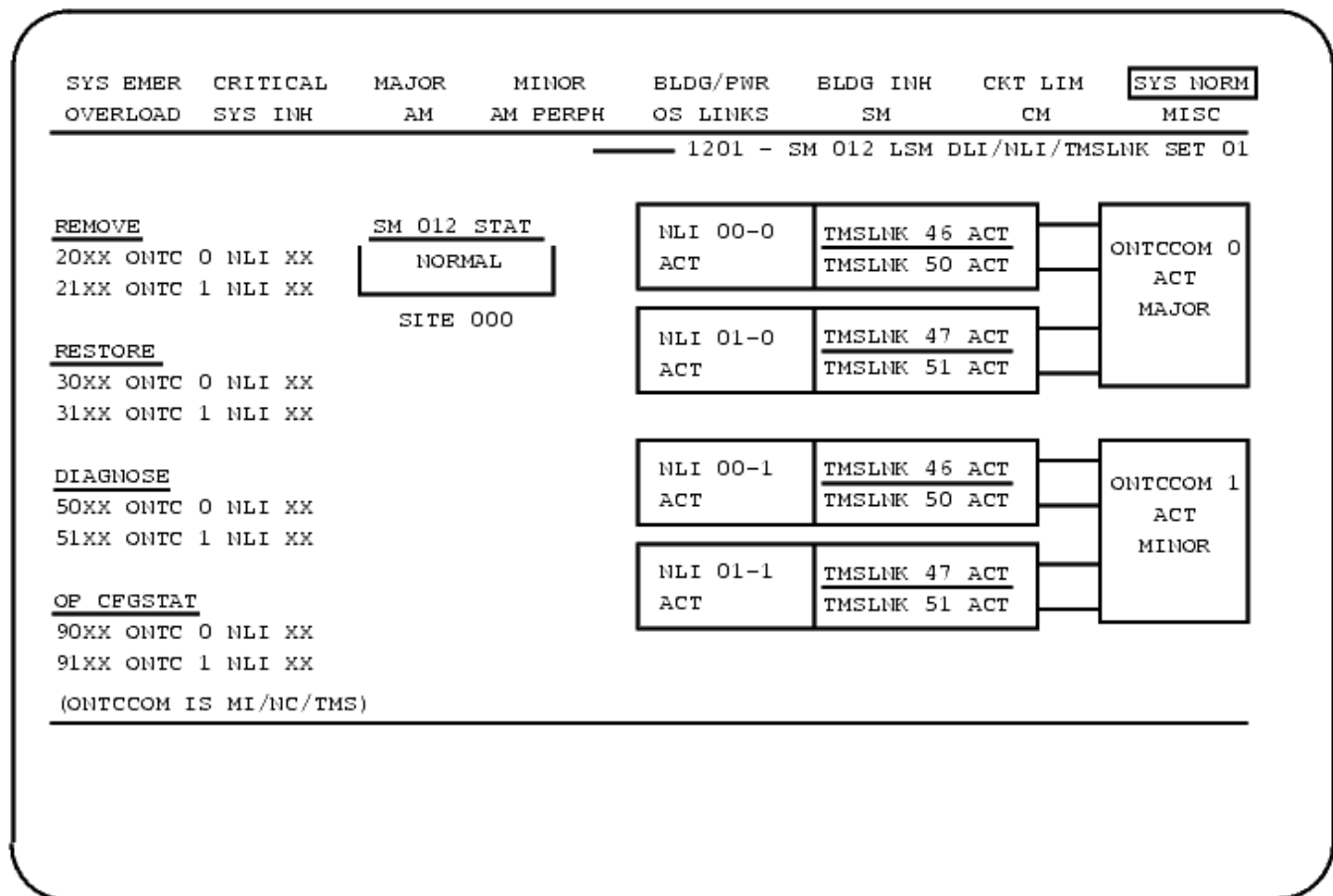


Figure 6-11 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y (CM2 Version with SM-2000) [5E13 and Later]

Abbreviations:

ACT	Active	ONTCCOM	Office Network Timing Complex Common
CFGSTAT	Configuration Status	OP	Output
LSM	Local Switching Module	STAT	Status
DLI	Dual Link Interface	SM	Switching Module
MI	Message Interface	TMS	Time-Multiplexed Switch
NC	Network Clock	TMSLNK	TMS Link
NLI	Network Link Interface		

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD <				1201 - SM 002 ORM DLI/NLI/TMSLNK SET 01			
<u>REMOVE</u>							
20XX ONTC 0	NLI XX	SM 002 STAT					
21XX ONTC 1	NLI XX						
<u>RESTORE</u>							
SITE 000							
30XX ONTC 0	NLI XX						
31XX ONTC 1	NLI XX						
<u>DIAGNOSE</u>							
50XX ONTC 0	NLI XX						
51XX ONTC 1	NLI XX						
<u>OUTPUT</u>							
90XX ONTC 0	NLI XX						
91XX ONTC 1	NLI XX						
95XX TRCP XX							
(ONTCCOM IS MI/NC/TMS)							

NLI 00-0 ACT	TRCP 00	TMSLNK 08 ACT	ONTCCOM 0 ACT MINOR
NLI 01-0 ACT	TRCP 00	TMSLNK 09 ACT	
NLI 00-1 ACT	TRCP 01	TMSLNK 08 ACT	ONTCCOM 1 ACT MAJOR
NLI 01-1 ACT	TRCP 01	TMSLNK 09 ACT	

Figure 6-12 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y (CM2 Version with EXM-2000) [5E13 and Later]

Abbreviations:

ACT	Active	OOS	Out of Service
CKT	Circuit	OOSF	Out-of-Service Family
CFGSTAT	Configuration Status		of Equipment
DLI	Dual Link Interface	OP	Output
MI	Message Interface	STAT	Status
NC	Network Clock	SM	Switching Module
NLI	Network Link Interface	TMS	Time-Multiplexed Switch
ONTC	Office Network Timing Complex	TMSLNK	TMS Link
ONTCCOM	Office Network Timing	TRCP	Transmission Rate Converter Unit Path
	Complex Common	UNV	Unavailable

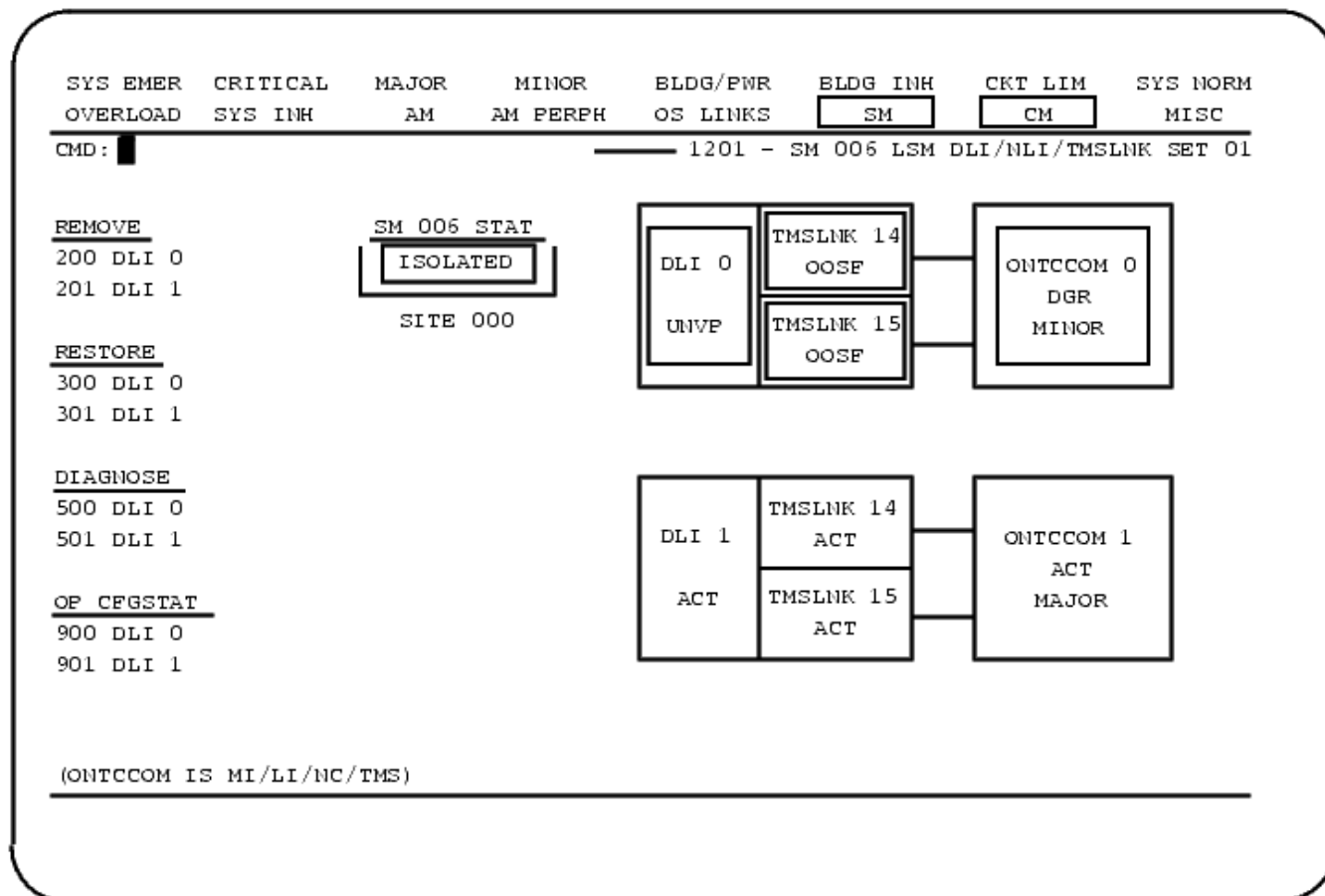


Figure 6-13 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y (CM1 Version) [5E13 and Later]

Abbreviations:

ACT	Active	OOSF	Out-of-Service Family of Equipment
CFGSTAT	Configuration Status	OP	Output
DGR	Degraded	SM	Switching Module
DLI	Dual Link Interface	STAT	Status
LI	Link Interface	TMS	Time-Multiplexed Switch
LSM	Local Switching Module	TMSLNK	Time-Multiplexed Switch Link
MI	Message Interface	UNVP	Unavailable Power
NC	Network Clock		
NLI	Network Link Interface		
ONTCCOM	Office Network Timing Complex Common		

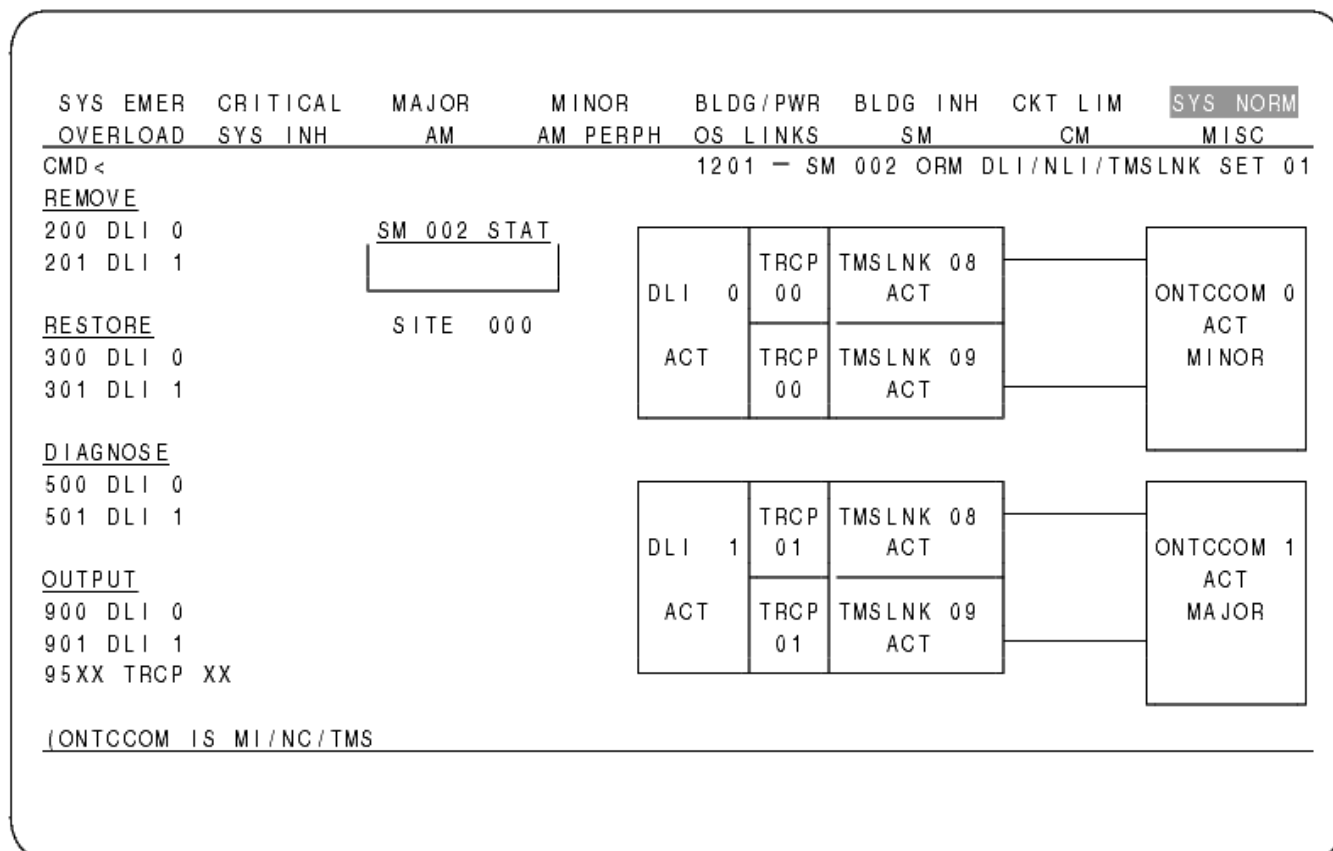


Figure 6-14 1201,Y,X - SM X - DLI/NLI/TMSLNK SET Y (CM2 Version with TRCP) [5E13 and Later]

Abbreviations:

ACT	Active	OOSF	Out-of-Service Family of Equipment
DGRF	Degraded Forced	OOSP	Out-of-Service Power
DLI	Dual Link Interface	OP	Output
ERR	Error	SM	Switching Module
LI	Link Interface	STAT	Status
MI	Message Interface	TMS	Time Multiplexed Switch
NC	Network Clock	TMSLNK	TMS Link
NLI	Network Link Interface	TRCP	Transmission Rate Converter Unit Path
ONTCCOM	Office Network and Timing Complex Common	UNV	Unavailable (Forced Removed)
OOS	Out of Service		

6.8.3 Commands

Commands are provided for removing, restoring, diagnosing, and outputting the configuration status for the DLIs/NLIs for the SM/SM-2000 this page is being displayed for.

All available display commands can be entered from the 1201 page display.

CMD	RESULT
200	DLI 0 is removed. (RMV:DLI=SM#-0)
201	DLI 1 is removed. (RMV:DLI=SM#-1)
300	DLI 0 is restored. (RST:DLI=SM#-0)
301	DLI 1 is restored. (RST:DLI=SM#-1)
500	DLI 0 is diagnosed. (DGN:DLI=SM#-0,RAW,TLP)
501	DLI 1 is diagnosed. (DGN:DLI=SM#-1,RAW,TLP)
900	Status of DLI 0 is output. (OP:CFGSTAT,DLI=SM#-0)
901	Status of DLI 1 is output. (OP:CFGSTAT,DLI=SM#-1)

20XX	ONTC 0 NLI XX is removed. (RMV:NLI=SM#-XX-0)
21XX	ONTC 1 NLI XX is removed. (RMV:NLI=SM#-XX-1)
30XX	ONTC 0 NLI XX is restored. (RST:NLI=SM#-XX-0)
31XX	ONTC 1 NLI XX is restored. (RST:NLI=SM#-XX-1)
50XX	ONTC 0 NLI XX is diagnosed. (DGN:NLI=SM#-XX-0,RAW,TLP)
51XX	ONTC 1 NLI XX is diagnosed. (DGN:NLI=SM#-XX-1,RAW,TLP)
90XX	Status of ONTC 0 NLI XX is output. (OP:CFGSTAT,NLI=SM#-XX-0)
91XX	Status of ONTC 1 NLI XX is output. (OP:CFGSTAT,NLI=SM#-XX-1)
95XX	TRCP XX is information output. (OP:TRCU,TRCP=SM#-XX)

6.9 1204 - SM X MELNK STATUS (5E13 and Later)

6.9.1 Purpose

The purpose of the 1204 page is to show the status of the MELNKs and to provide maintenance commands for the MELNKs. The page title is SM MELNK STATUS.

6.9.2 General

This page displays the MCTSI Pipe (MEPIPE) and the MELNK states and includes pokes to remove and restore the MELNKs. There is no direct control over the MEPIPE and for the RTCD feature, the MEPIPE will always be zero as shown in Figure 6-15 .

A Software update allows this page to support up to 70 links as indicated. Also, the 1204 page displays MELNK Number and State, MEPIPE Status, and MEPIPE Service. The remove and restore pokes have been changed to allow a two digit link to be entered.

Figure 6-15 is an example of the 1204 Page.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM																																																																														
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC																																																																														
CMD <				1204 - SM 001 LSM - MELNK STATUS																																																																																	
SM 001 STAT				MEPIPE 0																																																																																	
REMOVE 2XX MELNK XX				STATE SERVICE TYPE																																																																																	
SITE 000																																																																																					
RESTORE 3XX MELNK XX																																																																																					
<table border="1"> <thead> <tr> <th colspan="6">MELNK STATUS</th> </tr> </thead> <tbody> <tr><td>00</td><td>12</td><td>24</td><td>36</td><td>48</td><td>60</td></tr> <tr><td>01</td><td>13</td><td>25</td><td>37</td><td>49</td><td>61</td></tr> <tr><td>02</td><td>14</td><td>26</td><td>38</td><td>50</td><td>62</td></tr> <tr><td>03</td><td>15</td><td>27</td><td>39</td><td>51</td><td>63</td></tr> <tr><td>04</td><td>16</td><td>28</td><td>40</td><td>52</td><td>64</td></tr> <tr><td>05</td><td>17</td><td>29</td><td>41</td><td>53</td><td>65</td></tr> <tr><td>06</td><td>18</td><td>30</td><td>42</td><td>54</td><td>66</td></tr> <tr><td>07</td><td>19</td><td>31</td><td>43</td><td>55</td><td>67</td></tr> <tr><td>08</td><td>20</td><td>32</td><td>44</td><td>56</td><td>68</td></tr> <tr><td>09</td><td>21</td><td>33</td><td>45</td><td>57</td><td>69</td></tr> <tr><td>10</td><td>22</td><td>34</td><td>46</td><td>58</td><td></td></tr> <tr><td>11</td><td>23</td><td>35</td><td>47</td><td>59</td><td></td></tr> </tbody> </table>								MELNK STATUS						00	12	24	36	48	60	01	13	25	37	49	61	02	14	26	38	50	62	03	15	27	39	51	63	04	16	28	40	52	64	05	17	29	41	53	65	06	18	30	42	54	66	07	19	31	43	55	67	08	20	32	44	56	68	09	21	33	45	57	69	10	22	34	46	58		11	23	35	47	59	
MELNK STATUS																																																																																					
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02	14	26	38	50	62																																																																																
03	15	27	39	51	63																																																																																
04	16	28	40	52	64																																																																																
05	17	29	41	53	65																																																																																
06	18	30	42	54	66																																																																																
07	19	31	43	55	67																																																																																
08	20	32	44	56	68																																																																																
09	21	33	45	57	69																																																																																
10	22	34	46	58																																																																																	
11	23	35	47	59																																																																																	

Figure 6-15 1204 - SM X MELNK STATUS (5E13 and later)

Abbreviations:

ACT	Active	MELNK	MCTSI-based Ethernet Link
ANN	Announcement	MEM	Memory
LSM	Local Switching Module	MEPIPE	MCTSI-based Ethernet Pipe
MCTSI	Module Controller and Time Slot Interchanger		

6.10 1321 - TIME SLOT GROUP (TSGRP) STATUS PAGE (5E13 and Later)**6.10.1 Purpose**

The 1321 display page is the Time Slot Group status page of an Access Interface Unit (AIU) or Expansion AIU. The EAIU shows the whole FAC type and equipment number.

6.10.2 General

The AIU TSGRP display page simultaneously shows the state of each TSGRP on the AIU. The TSGRPs are listed by service group, and the physical host of the TSGRP is displayed (e.g., PIDB). A software update expanded the host facility indicator to 16 characters to display the extra digits required by the DNU-S VT Group Numbering change. If a request is made to conditionally remove a TSGRP, CAMP is displayed until all calls routed through the TSGRP are terminated.

TSGRPs which carry D-channel data or packetized data for ISDN cannot be removed via commands from this page as long as there are ports still assigned to these TSGRPs. These types of TSGRPs can be removed via the 1320 page by removing the corresponding COMDAC.

The status of all equipped TSGRPs and their Physical Name are displayed on this page. The Physical Name is located in the second and fourth columns in the table displayed on this page.

Figures 5-134 and 6-16 show examples of the 1321 EAIU, and RAIU display pages, respectively.

SYS EMER CRITICAL MAJOR MINOR BLDG/PWR BLDG INH CKT LIM SYS NORM
OVERLOAD SYS INH AM AM PERPH OS LINKS SM CM MISC
CMD< 1321 - SM 001 LSM EAIU TSGRP

SM 001 STAT

COMDAC 0		COMDAC 1	
TSGRP	HOST FACILITY	TSGRP	HOST FACILITY
0	DS1: 001-0-0-1-1-5-3	0	DS1: 001-0-0-1-1-5-2
1		1	
2		2	
3		3	
4		4	
5		5	

REMOVE SITE 000
20X COMDAC 0 TSGRP X
21X COMDAC 1 TSGRP X
RESTORE
30X COMDAC 0 TSGRP X
31X COMDAC 1 TSGRP X
DIAGNOSE
50X COMDAC 0 TSGRP X
51X COMDAC 1 TSGRP X
DISPLAY
1120,Y DLTU Y
1512,Y,Z DNUS Y FAC Z

Figure 6-16 1321 - RAIU Time Slot Group Status Page (5E13 and later)

Abbreviations:

AIU	Access Interface Unit	LSM	Local Switching Module
AM	Administrative Module	PIDB	Peripheral Interface Data Bus
COMDAC	Common Data and Control	TSGRP	Time Slot Group

6.10.3 Commands

Commands are provided to allow removal, restoral, and diagnosis of each COMDAC'S TSGRP units.

In addition to these commands, any available paging command can be entered from Page 1321.

CMD	RESULT
20X	RMV:AIUTSGRP=\$S-\$U-0-X
21X	RMV:AIUTSGRP=\$S-\$U-1-X
30X	RST:AIUTSGRP=\$S-\$U-0-X
31X	RST:AIUTSGRP=\$S-\$U-1-X
50X	DGN:AIUTSGRP=\$S-\$U-0-X
51X	DGN:AIUTSGRP=\$S-\$U-1-X

where:
 \$S is the SM number
 \$U is the AIU number
 0/1 is the COMDAC number

X is the TSGRP number (0-5)

6.11 1510,Y,X - SM X DNUS Y (5E13 and Later)

6.11.1 Purpose

The purpose of the 1510,Y,X display page is to show status information and to provide maintenance controls for the digital networking unit - SONET (DNU-S) Y. (DNU-S is displayed on the screen as DNUS.) The 1510,Y,X page provides commands to remove, restore, switch, and diagnose circuits. It also reports local, remote, and AIS CGAs.

6.11.2 General

The 1510,Y,X page shows the status of the DNU-S circuits. The common control (CC) circuit packs are displayed with their status, the common data (CD) packs and the STSX-1 facility interface (SFI) packs are displayed for each data group along with their status. Each of the seven transmission multiplexer (TMUX) packs (six service plus one spare) in each data group interfaces with the two CDs in the same data group. The service TMUXs normally transmit identical information to both CDs while listening to one. The TMUX packs in each data group have an interface with each of the SFI packs in the same data group. All in-service TMUXs normally transmit identical information to both SFIs while listening to one side. A path is displayed between one CC and a CD in data group zero to represent the active control link to the CC.

When an off-normal condition occurs in any CC, CD or SFI, the indicator for that component backlights. Each TMUX is displayed along with its status. An off-normal condition backlights the TMUX indicator. Each SONET terminating equipment (STE) is displayed along with its status and FAC number. When an off-normal condition occurs in an STE, the STE indicator backlights. As a result of a software update the STS column will contain a 3 digit STS identifier. The first digit is the data group number, the second digit is the STE number, and the third digit is the STS number. When a CGA occurs, an indicator appears in the CGA column associated with the STE. The indicator for CGA contains the letter L or A (for local or AIS, respectively). If one or more off-normal condition is present on this display, the DNUS indicator on Page 1010,X - SM X STATUS is backlighted as well as the DNUS Y indicator on Page 1013,X - SM X UNIT STATUS.

The string "SEE PAGE 1511,Y,Z FOR DNUS Y STS Z STATUS" will be backlit if any of the summary indicators (in the 'STS'column) are off-normal (i.e. backlit). "STS" column is used for (i.e.) summary status of subtending STS, VT1, DS1 circuits on 1511 Page.

Figure 6-17 shows an example of the 1510,Y,X display page.

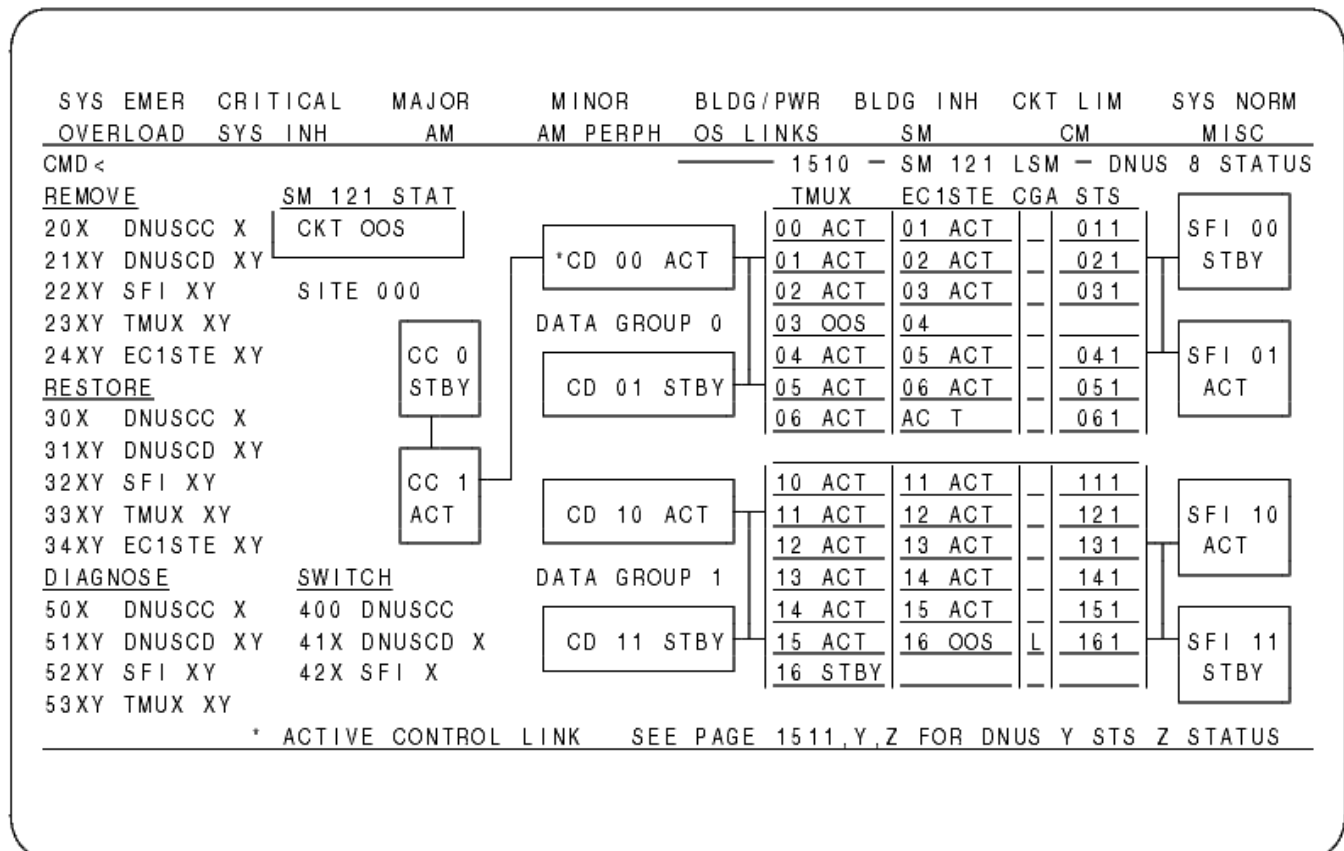


Figure 6-17 1510,Y,X - SM X - DNUS Y (5E13 and later)

Abbreviations:

ACT	Active	LSM	Local Switching Module
CC	Common Control	OOS	Out of Service
CD	Common Data	SFI	STX-1 Facility Interface
CGA	Carrier Group Alarm	SM	Switching Module
CKT	Circuit	STAT	Status
DNUS	Digital Networking Unit - SONET	STBY	Standby
DNUSCC	DNU-S Common Control	STE	SONET Terminating Equipment
DNUSCD	DNU-S Common Data	STS	Synchronous Transport Signal
EC1STE	Electrical Carrier Level 1 STE	TMUX	Transmission Multiplexer

6.11.3 Commands

The 1510,Y,X page provides commands to remove and restore CCs, CDs, SFIs, TMUXs, and STEFACs; diagnose CCs, CDs, SFIs, and TMUXs; and switch CCs, CDs, and SFIs. All available displays can be accessed from the 1510,Y,X page.

CMD	RESULT
20X	DNUSCC X is removed. (RMV:DNUSCC=SM#-DNU#-X) [UCL]
21XY	DNUSCD Y of Data Group X is removed. (RMV:DNUSCD=SM#-DNU#-X-Y) [UCL]
22XY	SFI Y of Data Group X is removed. (RMV:SFI=SM#-DNU#-X-Y) [UCL]
23XY	TMUX Y of Data Group X is removed. (RMV:TMUX=SM#-DNU#-X-Y) [UCL]
24XY	EC1STE Y of Data Group X is removed. (RMV:EC1STE=SM#-DNU#-X-Y) [UCL]
30X	DNUSCC X is restored.

31XY	(RST:DNUSCC=SM#-DNU#-X) [,UCL] DNUSCD Y of Data Group X is restored. (RST:DNUSCD=SM#-DNU#-X-Y) [,UCL]
32XY	SFI Y of Data Group X is restored. (RST:SFI=SM#-DNU#-X-Y) [,UCL]
33XY	TMUX Y of Data Group X is restored. (RST:TMUX=SM#-DNU#-X-Y) [,UCL]
34XY	EC1STE Y of Data Group X is restored. (RST:EC1STE=SM#-DNU#-X-Y) [,UCL][,ALL]
400	DNUSCC is switched. (SW:DNUSCC=SM#-DNU#)
41X	DNUSCD in data group X is switched. (SW:DNUSCD=SM#-DNU#-X)
42X	SFI in data group X is switched. (SW:SFI=SM#-DNU#-X)[,UCL]
50X	DNUSCC X is diagnosed. (DGN:DNUSCC=SM#-DNU#-X) [,UCL]
51XY	DNUSCD Y of Data Group X is diagnosed. (DGN:DNUSCD=SM#-DNU#-X-Y) [,UCL]
52XY	SFI Y of Data Group X is diagnosed. (DGN:SFI=SM#-DNU#-X-Y) [,UCL]
53XY	TMUX Y of Data Group X is diagnosed. (DGN:TMUX=SM#-DNU#-X-Y) [,UCL]

6.12 1511,Y,Z,X - SM X DNUS Y STS Z (5E13 and later)

6.12.1 Purpose

The purpose of the 1511 display page is to show status and provide maintenance controls for the DNU-S synchronous transport signal (STS) facilities and to report local, remote, and AIS CGAs.

6.12.2 General

The 1511,Y,Z,X display page shows status for the DNU-S (displayed as DNUS) STS-1, VT, and digital signal level 1 (DS1) facilities. It includes the commands to remove and restore STS-1, VT and DS1 facilities.

The poke command for display page 1511 changed in a software update to 1511,x,yyy,zzz where x is the DNU-S number, yyy is the new STS number, and zzz is the SM number. The new STS number consists of the Data Group number as the first digit, the STE number as the second digit, and the STS number as the third digit.

Also in the software update, the display page 1511 will no longer indicate sequential VT numbers 1 through 28. It now consists of a group number as the first digit and the member number as the second digit.

When an off-normal condition is detected in a VT or DS1, the VT or DS1 indicator backlights. When a CGA occurs, an indicator appears in the CGA column associated with the STS-1, VT or DS1. The CGA indicator contains the letter L, R, or A (for local, remote, or AIS, respectively). The column between the CGA and the DS1 indicators displays the application field. The choices for this field are Trunk "TRK", "303" or "AIU".

If one or more off-normal condition(s) is present on this display, the STS indicators on Page 1510,Y,X - SM X - DNUS Y are backlighted, the DNUS Y indicator on Page 1013,X - SM X UNIT STATUS is backlighted, and the DNUS indicator on Page 1010,X - SM X STATUS is backlighted.

Figure 6-18 shows an example of the 1511,Y,Z,X page.

```

SYS EMER CRITICAL MAJOR MINOR BLDG/PWR BLDG INH CKT LIM SYS NORM
OVERLOAD SYS INH AM AM PERPH OS LINKS SM CM MISC
CMD < - 1511 - SM 001 LSM DNUS 4 STS 051 MAINT
SM 001 STAT
[ ]
SITE 000

REMOVE RESTORE
2000 STS 3000 STS
21XX VT XX 31XX VT XX
22XX DS1 XX 32XX DS1 XX

DISPLAY
1512,Y,Z DNUS Y STS Z
DS1 APPLICATION

L=LOCAL
R=REMOTE
A=AIS
B=BER

```

DG-0 STE-5 STS-1											
	VT	CGA	DS1	CGA	APP		VT	CGA	DS1	CGA	APP
11	ACT		ACT		303	13					
21						23					
31						33					
41						43					
51						53					
61						63					
71						73					
12						14					
22						24					
32						34					
42						44					
52						54					
62						64					
72						74					

Figure 6-18 1511,Y,Z,X - SM X - DNUS Y - STS - Z (5E13 and later)

Abbreviations:

ACT	Active	OOS	Out-Of-Service
AIS	Alarm Indication Signal	OOSF	Out-Of-Service Family of Equipment
CGA	Carrier Group Alarm	STS	Synchronous Transport Signal
DS1	Digital Signal Level 1	STE	SONET Terminating Equipment
DNUS	Digital Networking Unit - SONET	SM	Switching Module
EC1STE	Electrical Carrier Level 1 STE	T	Trunk
LSM	Local Switching Module	VT	Virtual Tributary

6.12.3 Commands

The 1511,Y,Z,X page provides commands to remove and restore STSs, VTs, and DS1s. All available displays can be accessed from the 1511,Y,Z,X page.

CMD	RESULT
2000	STS FAC is removed. (RMV:STS FAC=SM#-DNU#-DG#-STE#-STS#) [UCL]
21XX	VT1 FAC XX is removed. (RMV:VT1 FAC=SM#-DNU#-DG#-STE#-STS#-VTG#-VTM#-XX) [UCL]
22XX	DS1 FAC XX is removed. (RMV:DS1 FAC=SM#-DNU#-DG#-STE#-STS#-VTG#-VTM#-XX) [UCL]
3000	STS FAC is restored. (RST:STS FAC=SM#-DNU#-DG#-STE#-STS#) [UCL] [ALL]
31XX	VT1 FAC XX is restored. (RST:VT1 FAC=SM#-DNU#-DG#-STE#-STS#-VTG#-VTM#-XX) [UCL]
32XX	DS1 FAC XX is restored. (RST:DS1 FAC=SM#-DNU#-DG#-STE#-STS#-VTG#-VTM#-XX) [UCL]

6.13 1512,Y,Z,X - SM X DNUS Y STS Z DS1 APPLICATION (5E13 and Later)

6.13.1 Purpose

The purpose of the 1512 display page is to show application information for the DNU-S Synchronous Transport Signal (STS) Digital Signal level 1 (DS1).

6.13.2 General

The 1512,Y,Z,X display page shows application information for the DNU-S Digital Signal level 1 (DS1) facilities.

The poke command for display page 1512 changed in a software update to 1511,x,yyy,zzz where x is the DNU-S number, yyy is the new STS number, and zzz is the SM number. The new STS identifier consists of the Data Group number as the first digit, the STE number as the second digit, and the STS number as the third digit.

Also in the software update, the display page 1512 will no longer indicate sequential VT numbers 1 through 28. The DS1 column now consists of a group number as the first digit and the member number as the second digit. The "FAR END" field for DS1s terminating to RSM will display "SEE 174X,yyy" where X is 0 or 1 for 1740 page or 1741 page and yyy is the RSMnumber. The APP column displays RSM for DS1s terminating to RSM (available during 1999 as a software update). The HOSTFAC number is from 01 through 20 and is unique to each RSM.

When a DS1 is off-normal, the first column which contains the DS1 number backlights as a summary indicator. The next column over is the FAC column. This column indicates the corresponding facility number on the application where this DS1 terminates. The APP column indicates the type of application the DS1 is connected to, for example 303 indicates a TR303 RT and AIU indicates an EAIU. This column backlights if there is something off-normal at the application end. However, it only backlights for the primary facility on the application and not all the facilities. The FAR END column indicates the page poke necessary to get to the MCC page designated for the specific application.

Figure 6-19 shows an example of the 1512 page display for 5E13.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC
CMD <				- 1512 - SM 001 HSM DNUS 4 STS 051 APPL			
SM 001 STAT		DISPLAY					
		1511,Y,Z DNUS Y STS Z MAINT * = CONTROL					

SITE 000	DS1	FAC	APP	FAR END	DS1	FAC	APP	FAR END
	11				13			
	21	RTFAC=15	303	SEE 1660,7721	23			
	31				33			
	41				43			
	51				53			
	61				63			
	71				73			
	12				14			
	22				24			
	32				34			
	42				44			
	52				54			
	62				64			
72				74				

Figure 6-19 1512,Y,Z,X - SM X DNUS Y STS Z DS1 Application (5E13 and later)

Abbreviations:

APP	Application	FAC	Facility
DNUS	Digital Network Unit - SONET	LSM	Local Switching Module
DS1	Digital Signal Level 1	SM	Switching Module

6.13.3 Commands

There are no commands on this page.

6.14 1533,Y,X - CCS LINK SET MEMBERS (5E13 Only)**6.14.1 Purpose**

The 1533 page shows the adjacent point code (APC) and the status of all members (MR) in a link set on the Global SM (GSM). Where "X" denotes the GSM number and Y denotes Link Set number.

Initially, "X" is required in order to access this page for a particular GSM, but it is not required to reaccess the page for the last GSM used to access the 1530, 1532, or 1533 MCC Pages.

6.14.2 General

For more information about Common Channel Signaling (CCS) on a GSM, refer to document 235-190-120, *Common Channel Signaling Services*, Chapter 14.

```

SYS EMER  CRITICAL  MAJOR  MINOR  BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH  AM  AM PERPH  OS LINKS  SM  CM  MISC
CMD < — 1533 — SM 007 LSM LINKSET 01 MEMBERS
SM 007 STAT
[ ] APC
123-456-789
SITE 000

DEACTIVATE  ACTIVATE
2XX MR XX  3XX MR XX

INHIBIT  UNINHIBIT
6XX MR XX  7XX MR XX

BLOCK  UNBLOCK
62XX MR XX  72XX MR XX

TEST  OUTPUT
5XX MR XX  9XX MR XX

```

MR	STATE	INH	BLK	SLS	EN	SH-CG-MR
01	SH-CG-M	2	2	3	3	Y N 001-1-1-6-1-7-4-12 1-02-01
01	SH-CG-M	2	2	3	3	Y D 001-0-9-31 1-02-01

Figure 6-20 1533,Y,X - CCS Link Set Members (5E13 Only)

For each valid member of the link set, the state of the link, the Inhibited (INH) and Blocked (BLK) status, SLS (signaling link selectors) status, the EN (equipment number), and the signaling terminal-protocol handler Shelf number (SH), Channel Group number (CG), and Member (MR) are displayed.

Local or remote inhibited and local or remote blocked, states can exist simultaneously with many other link states. These states are shown as L (local) and R (remote) marked under the INH and the BLK status fields. The SLS (signaling link selectors) status is "Y" for yes and "N" for no, indicating whether or not the link is carrying traffic.

A software update increased the EN indicator field to display the VT group and VT member numbers.

Abbreviations:

APC	Adjacent Point Code
BLK	Blocked Status
CG	Channel Group Number
EN	Equipment Number
	D - DFI EN number
	N - DNUS EN number
INH	Inhibited Status
L	Local
MR	Members
R	Remote
SH	Shelf Number
SLS	Signaling Link Selectors
Y	Yes

6.14.3 Commands

The following commands are available to deactivate, activate, inhibit, uninhibit, block, unblock, test and output the

status of an individual CCS link set member (CCSLK). (Where XX is a valid link set member and V is the link set number displayed on the page.)

CMD	RESULT
2XX	Deactivate MR XX (RMV:CCSLK,SET=U, MEMBER=XX,STATE=DACT,SM=V)
3XX	Activate MR XX (RST:CCSLK,SET=U, MEMBER=XX,STATE=DACT,SM=V)
5XX	Test MR XX (TST:CCSLK,SET=U, MEMBER=XX,SM=V)
6XX	Inhibit MR XX (RMV:CCSLK,SET=U, MEMBER=XX, STATE=INH,SM=V)
7XX	Uninhibit MR XX (RST:CCSLK,SET=U, MEMBER=XX, STATE=INH,SM=V)
62XX	Block MR XX (RMV:CCSLK,SET=U, MEMBER=XX, STATE=BLK,SM=V)
72XX	Unblock MR XX (RST:CCSLK,SET=U, MEMBER=XX, STATE=BLK,SM=V)
9XX	Output Status MR XX (OP:STATUS, CCSLK,SET=U, MEMBER=XX, SM=V)

where: "U" is the GSM associated with the display page.

6.15 1660,YYYY,X - SM X SID YYYY (5E13 and Later)

6.15.1 Purpose

The purpose of the 1660,YYYY,X display pages is to show the TR303 Remote Terminal (RT) circuit status and facility connections to a host peripheral.

6.15.2 General

The 1660,YYYY,X display page shows the RT number, Host unit number, the RTFACs and associated Host facilities, Embedded Operations Channels/Time Slot Management Channels (EOC/TMC), and alarms for the RT.

Information for each of the 28 RTFACs (maximum) that can terminate on the TR303 RT is shown in table format in the center of the page with the appropriate host facility information beside the RTFAC number and status. The host facility (HOST FAC) number has changed in a software update to an xxx-y-z format, where xxx is the three digit STS number that is needed to poke the 1511 and 1512 pages, y is the VT group number, and z is the VT member number. An asterisk (*) in the table beside the RTFAC number means the facility has the EOC/TMC.

The TR303 RT has two EOCs and two TMCs. The first facility, RTFAC 1, always has the primary EOC/TMC. The EOC/TMC circuits and their status are shown at the top right of the page display.

The TR303 RT can display the following alarms:

PWR: Power
 CRIT: Critical
 MAJ: Major
 MIN: Minor
 ENV1[14]: Environmental 1 through 14

The display string appropriate to the specific host is used to inform the craft to go to the correct page for facility information.


```

SYS EMER CRITICAL MAJOR MINOR BLDG/PWR BLDG INH CKT LIM SYS NORM
OVERLOAD SYS INH AM AM PERPH OS LINKS SM CM MISC
CMD< — 1660 — SM 001 — LSM SID 9993 TR303 RT
SM 001 STAT
TR303 RT

```

RT FAC	HOST FAC	RT FAC	HOST FAC
01 *	041-0-1	15	
02		16	
03		17	
04		18	
05		19	
06		20	
07		21	
08		22	
09		23	
10		24	
11		25	
12		26	
13		27	
14		28	

```

SITE 000
REMOVE SWITCH
2XX RTFAC XX 400 EOC
24X EOC CKT X 401 TMC
25X TMC CKT X
RESTORE (* = EOC / TMC)
3XX RTFAC XX
34X EOC CKT X
35X TMC CKT X
OUTPUT
900 TEI STATUS
DISPLAY
1511,Y,Z DNUS Y STS Z MAINT
HOST FAC = STS-VTG-VTM

```

CKT	EOC	TMC
0		
1		

Figure 6-21 1660,YYYY,X - SM X SID YYYY (5E13 and later)

Abbreviations:

ACT	Active	LSM	Local Switching Module
CKT	Circuit	SM	Switching Module
DS1	Digital Signal Level 1	STBY	Standby
FAC	Facility	STS	Synchronous Transport Signal

6.15.3 Commands

The Commands on the 1660,YYYY,X page allow a user to remove and restore RTFACs, EOCs, and TMCs, and to output the TEI status.

CMD	RESULT
2XX	RTFAC XX is removed. (RMV:RTFAC=SID#-XX) [,UCL]
24X	EOC X is removed. (RMV:EOC=SID#-X) [,UCL]
25X	TMC X is removed. (RMV:TMC=SID#-X) [,UCL]
3XX	RTFAC XX is restored. (RST:RTFAC=SID#-XX) [,UCL]
34X	EOC X is restored. (RST:EOC=SID#-X) [,UCL]
35X	TMC X is restored. (RST:TMC=SID#-X) [,UCL]
400	EOCs are switched. (SW:EOC=SID#) [,UCL]
401	TMCs are switched. (SW:TMC=SID#) [,UCL]
900	TEI status is output.

(OP:RT,CHAN,SID=SID#)

6.16 1740/1741,XXX,YYY - REMOTE SM X HOST SM Y (5E13 and later)**6.16.1 Purpose**

The purpose of the 1740 display page is to provide information about host SM umbicals.

6.16.2 General

The 1740 page is the host view of the umbicals and is referenced from the host SM. It displays the status of umbicals as well as HOST FACILITY and REMOTE FACILITY information.

The HOST FACILITY field displays the low level facility of the host unit which is either the FAC of the DLTU or the DS1SFAC of the DNU-S. For DLTU, the host facility displays "FAC:DLTU#-DFI#-FAC#". For DNU-S, the host facility displays "DS1:DNU#-DG#-STE#-STS#-VTG#-VTM#".

The REMOTE FACILITY field displays the low level facility of the remote unit which is the FAC of the DLTU. The remote facility displays "FAC:DLTU#-DFI#-FAC#".

The 1740 page displays "*" for umbicals carrying control channel(s). The "*" is the representation of the host SM's view of CLNK path.

Figure 6-22 shows the 1740 page. The 1741 page is similar, however, it covers umbicals 11 through 20.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD< — 1740 — SM 001 HSM - RSM 002 UMBILICAL							
SM 001 STAT							
SITE 000							
SEE 1741 FOR UMBIL 11-20							
REMOVE 2XX UMBIL XX		RESTORE 3XX UMBIL XX		TEST 5XX UMBIL XX			
* = CONTROL CHANNEL(s)							

UMBIL	HOST FACILITY	REMOTE FACILITY
01		
02		
03		
04		
05		
06		
07		
08		
09		
10		

Figure 6-22 1740, XXX,YYY - REMOTE SM X - HOST SM Y (5E13 and later)

Abbreviations:

HSM	Host Switch Module	RSM	Remote Switch Module
SM	Switch Module		

6.16.3 Commands

The 1740/1741 page provides commands to remove, restore, and test umbicals. All available displays can be accessed from the 1740/1741 page.

CMD	RESULT
2XX	Umbilical XX is removed. (RMV:UMBIL=HSM#-RSM#-XX)[,UCL|REMAP]
3XX	Umbilical XX is restored. (RST:UMBIL=HSM#-RSM#-XX)[,UCL]
5XX	Umbilical XX is tested. (TST:UMBIL=HSM#-RSM#-XX)

7. MASTER CONTROL CENTER PAGE DISPLAYS 5E14 SOFTWARE RELEASE

7.1 GENERAL

This subsection contains descriptions and examples of the master control center (MCC) page displays that were added with or changed with the 5E14 software release.

Refer to Table 4-1 for a complete listing of MCC page displays.

7.2 1000 - SM PAGE INDEX (5E14 Only)

7.2.1 Purpose

The SM Page Index page provides an index to the SM.

7.2.2 General

The 1000 page is an index to the primary SM pages that have status reflected on the 1010 - SM X STATUS page. No status is displayed on the 1000 page.

The page displays all the pages that are valid for local switching modules (LSM), host switching modules (HSM), and RSMs/RISLUs.

Some pages shown on the 1000 page reference additional pages that provide more detailed information. These additional pages may not appear on the 1000 page.

Most SM pages are specified by using the SM number and/or unit.

For all pages, once an SM page has been displayed for a particular SM, any other page for that SM may be requested without respecifying the SM number.

The page index shown in Figure 7-1 is a listing of the primary SM and SITE maintenance displays. In 5E14 the 1530 page has been deleted and the 1533, 1540, and 1541 page has been added.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD<				1000 - SM PAGE INDEX			
SM PAGES							
1010,X SM STATUS		1186,X PSU				1870,Y,X IDCU Y FACILITY	
1020,Y,X LU Y CONCEN		1190,X MCTSI				1880,Y,Z IDCU Y RT Z	
1030,Y,X LU Y SG 0		1200,X DLI/NLI SUMMARY				1900,X CLNKS	
1040,Y,X LU Y SG 1		1204,X MELNK STATUS					
1050,Y,X TU Y SG 0		1280,X SM REX STATUS					
1060,Y,X TU Y SG 1		1320,Y,X SM X AIU Y SUMMARY					
1070,Y,X DCTU Y		1460,X DATA LINK DSLS					
1080,Y,X LDSU/LDSF Y		1510,Y,X DNUS Y					
1090,Y,X RAF/SAS Y		1532,X CCS LINK SET SUM					
1100,Y,X GDSU Y		1533,Y,X CCS LINK SET MEMBERS					
1110,X ISTF		1540,X GSM CMT STATUS					
1115,Y,X GDSF Y		1541,Y NGSM CMT STATUS					
1120,Y,X DLTU Y		1660,Y,X SID Y					
1130,Y,X MSU Y SG 0		1700,Y,X ISLU Y NETWORK					
1140,Y,X MSU Y SG 1		1800,X INH & RCVY CNTL					
1150,Y,X DCLU Y		1860,Y,X IDCU Y CIRCUIT					
(X=SM #	OMIT ,X FOR	SAME SM		Y=UNIT #			

Figure 7-1 1000 SM Page Index (5E14 and Later)

Abbreviations:

AIU	Access Interface Unit	LDSU	Local Digital Service Unit
BLDG	Building	LU	Line Unit
CLNKS	Communication Links	MCTSI	Module Controller/Time Slot Interchanger
CNTL	Control	MISC	Miscellaneous
CONCEN	Concentrator	MSU	Metallic Service Unit
DCLU	Digital Carrier Line Unit	NLI	Network Link Interface
DCTU	Directly-Connected Test Unit	PSU	Packet Switching Unit
DLI	Dual Link Interface	PWR	Power
DLTU	Digital Line Trunk Unit	RAF	Recorded Announcement Function
DNUS	Digital Networking Unit - SONET	RCVY	Recovery
DSL	Digital Subscriber Lines	REX	Routine Exercise Function
GDSF	Global Digital Services Function	RLI	Remote Link Interface
GDSU	Global Digital Service Unit	SAS	Service Announcement System
HSM	Host Switching Module	SG	Service Group
IDCU	Integrated Digital Carrier Unit	SM	Switching Module
INH	Inhibit	TMSLNK	Time-Multiplexed Switch Links
ISLU	Integrated Services Line Unit	TU	Trunk Unit
ISTF	Integrated Services Test Function		
LDSF	Local Digital Service Function		

7.2.3 Commands

All available paging commands can be entered from this display.

CMD	RESULT

1010,X	SM X - STATUS page is displayed.
1020,Y,X	SM X - LU Y CONCENTRATOR page is displayed, if equipped.
1030,Y,X	SM X - LU Y SG 0 page is displayed, if equipped.
1040,Y,X	SM X - LU Y SG 1 page is displayed, if equipped.
1050,Y,X	SM X - TU Y SG 0 page is displayed, if equipped.
1060,Y,X	SM X - TU Y SG 1 page is displayed, if equipped.
1070,Y,X	SM X - DCTU Y page is displayed, if equipped.
1080,Y,X	SM X - LDSU/LDSF Y SG 0 AND 1 page is displayed, if equipped.
1090,Y,X	SM X - RAF/SAS Y page is displayed.
1100,Y,X	SM X - GDSU Y SG 0 AND 1 page is displayed, if equipped.
1110,X	SM X - ISTF page is displayed.
1115,Y,X	SM X - GDSF Y page is displayed.
1120,Y,X	SM X - DLTU Y page is displayed, if equipped.
1130,Y,X	SM X - MSU Y SG 0 page is displayed, if equipped.
1140,Y,X	SM X - MSU Y SG 1 page is displayed, if equipped.
1150,Y,X	SM X - DCLU Y page is displayed, if equipped.
1186,X	SM X - PSU NETWORK page is displayed.
1200,X	SM X - DLI/NLI SUMMARY page is displayed.
1280,X	SM X - REX STATUS page is displayed.
1320,Y,X	SM X - AIU Y SUMMARY page is displayed.
1460,X	SM X - DATA LINK DSLS page is displayed.
1510,Y,X	SM X - DNUS Y STATUS page is displayed.
1532,X	CCS LINK SET SUM page is displayed, where X is Global SM.
1533,Y,X	CCS Link Set Members page is displayed, where X is Global SM.
1540,X	GSM CMT Status page is displayed, where X is the Global SM.
1541,X	NGSM CMT Status page is displayed, where X is the Global SM.
1660,Y,X	SID Y page is displayed.
1800,X	SM X - INHIBIT AND RECOVERY CONTROL page is displayed.
1860,Y,X	SM X - IDCY Y Circuit page is displayed, if equipped.
1870,Y,X	SM X - IDCY Y Facility page is displayed, if equipped.
1880,Y,Z	IDCU Y RT Z page is displayed0
1900,X	SM X - CLNKS page is displayed.

7.3 1010,X - SM X STATUS (5E14 and Later)

7.3.1 Purpose

The 1010,X display page provides a summary and status of equipped hardware unit types in the SM and a summary of any miscellaneous activities in the SM.

7.3.2 General

There are five separate versions of the 1010,X page as follows:

- **Local Switching Module (LSM):** The LSM version has an MCTSI summary indicator and indicators for the Operating Service Position System (OSPS) terminal equipment and the RISLU circuits. A CCS Links indicator will NOT appear in the lower half corner of the 1010 Pages when the SM supports Common Channel Signaling (CCS) on a PSU. The CCS links box has been deleted in 5E14. See Figure 7-2 for a 5E14 example of the LSM version.)
- **Host Switching Module (HSM):** The HSM version has an MCTSI summary indicator. No status is given for the RSMs on this page.
- **Remote Switching Module (RSM):** The RSM version has an MCTSI/RLI summary indicator, a BLDG/PWR ALARMS indicator (if equipped), the name of the SITE where the RSM is located, and the number of the HSM hosting the RSM.

Each RSM has a SITE number from 001 through 174 associated with it. Both LSMs and HSMs are always SITE 000. The SITE number is indicated on every SM page just under the SM Status box. (See Figures 7-3 and 7-4 for examples of the RSM version.)

- **Position Switching Module (PSM):** The PSM version has an MCTSI summary indicator and a RISLU indicator

box for displaying all RISLUs that the PSM is responsible for and the SITE where the RISLUs are located. No RISLU status is given on this page. (Figure 7-5 is an example of the PSM version.)

- **Optically Remoted Module (ORM):** The ORM version has an MCTSI summary indicator, a BLDG/PWR ALARMS indicator (if equipped), and the name of the SITE at which the ORM is located.

Each ORM has a SITE number from 001 through 174 associated with it. Both LSMs and HSMs are always SITE 000. The SITE number is indicated on every SM page just below the SM Status box.

Every equipped SM has its highest priority status displayed in its SM STAT indicator. This corresponds to the status shown on Pages 141 - 144.

The RELATED PAGES box is blank unless there is an off-normal condition in the SM that is not otherwise indicated elsewhere on this page. In some cases, this box shows a page(s) that gives more detailed information about the off-normal condition.

Each equipped peripheral unit type, such as LU for a line unit, is displayed in a status box along with an associated page number to enter for more detailed information.

The equipped hardware units vary from one SM to the next. The only unit in every SM is the MCTSI. Any equipped unit type is listed in the graphic boxes on the right-hand portion of the display.

When an off-normal condition occurs, the indicator for the fault backlights. On Page 114 - EQUIPPED SM STATUS SUMMARY, the indicator for the SM is backlighted; and on the appropriate 141, 142, 143, or 144 page, the indicator for that SM is backlighted, and a descriptive phrase of the condition is written. In the SUMMARY STATUS AREA, the SM critical indicator and the alarm level (CRITICAL, MAJOR, or MINOR), if applicable, are backlighted.

If this page is displayed for an RSM/ORM that is at a site that does not have the BLDG/PWR ALARMS equipped, or the BLDG/PWR ALARMS are associated with a different RSM/ORM at the same site, the 1010 page for that RSM/ORM does not show the BLDG/PWR ALARMS box.

If the RSM/ORM has the BLDG/PWR ALARMS equipped and if any RSM/ORM alarm is inhibited, the INHIBIT indicator is backlighted. If there is an RSM/ORM BLDG/PWR alarm active, the ALARM indicator is backlighted. Further information can be found on display 1400 - SM X RSM/ORM BLDG/PWR ALARMS.

The PSM is limited by real-time capacity to a maximum of 60 operator positions. A PSM can host up to five RISLUs (loaded to a collective total of 60 operator positions) with one active and one spare T1 span each. This corresponds to 10 PIDBs for RISLUs, plus two PIDBs for the PSU shelf, and three PIDBs for announcements, for a total of less than 16 PIDBs per TSI. The PSM is not time slot limited. Note that a PSM is a dedicated SM and cannot contain any lines, trunks, service circuits, or test ports. The following hardware items are engineered for the PSM:

- PSU
- DSU2-RAF
- SAS
- DLTU-RH.

A DSL_MAJOR or DSL_MINOR alarm indication is present in the SM STATUS box, and SEE 1460 is present in the RELATED PAGES box when the OSPS terminal equipment is OOS. The 1460-DATA LINK DSLS page display provides the status of the OSPS terminal equipment.

The following indicators are applicable to the RISLU equipment on the SM:

- The CKT_OOS SM STATUS phrase can refer to the OOS RISLU circuits.
- The RISLU unit type indicator backlights when RISLU circuits are OOS or RISLU fan/fuse alarms are present.
- The DLTU unit type indicator backlights when RISLU digital facility interfaces (DFI) are OOS or carrier group alarms (CGA) are present.
- The RISLU SITE BLDG/PWR ALARM indicators backlight if the alarms are off-normal at one or more RISLU sites hosted by a specific SM that monitors RISLU site alarms.

If the SM is isolated or initializing, this display is available, but the only status that fills in reliably is the SM STAT box and the RELATED PAGES box. The only per-SM displays available during these conditions are 1800,X - SM X INHIBITED & RECOVERY CONTROL, 1200,X - SM X DLI/NLI SUMMARY, and 1900,X - SM X CLNKS. Also, 1600,X or 1600,SZ - SITE Z STATUS is available if at least one of the RSMs at the site is not isolated.

Figure 7-2 is an example of the LSM version. In this example, SM 5 is in CKT OOS. The ``+" (following CKT OOS) indicates the presence of additional (less important) off-normal conditions. A complete list can be generated and output via the 900 command. The equipped hardware unit types are listed in the graphic portion (lower right) of the display. At least one LU in the SM is off-normal.

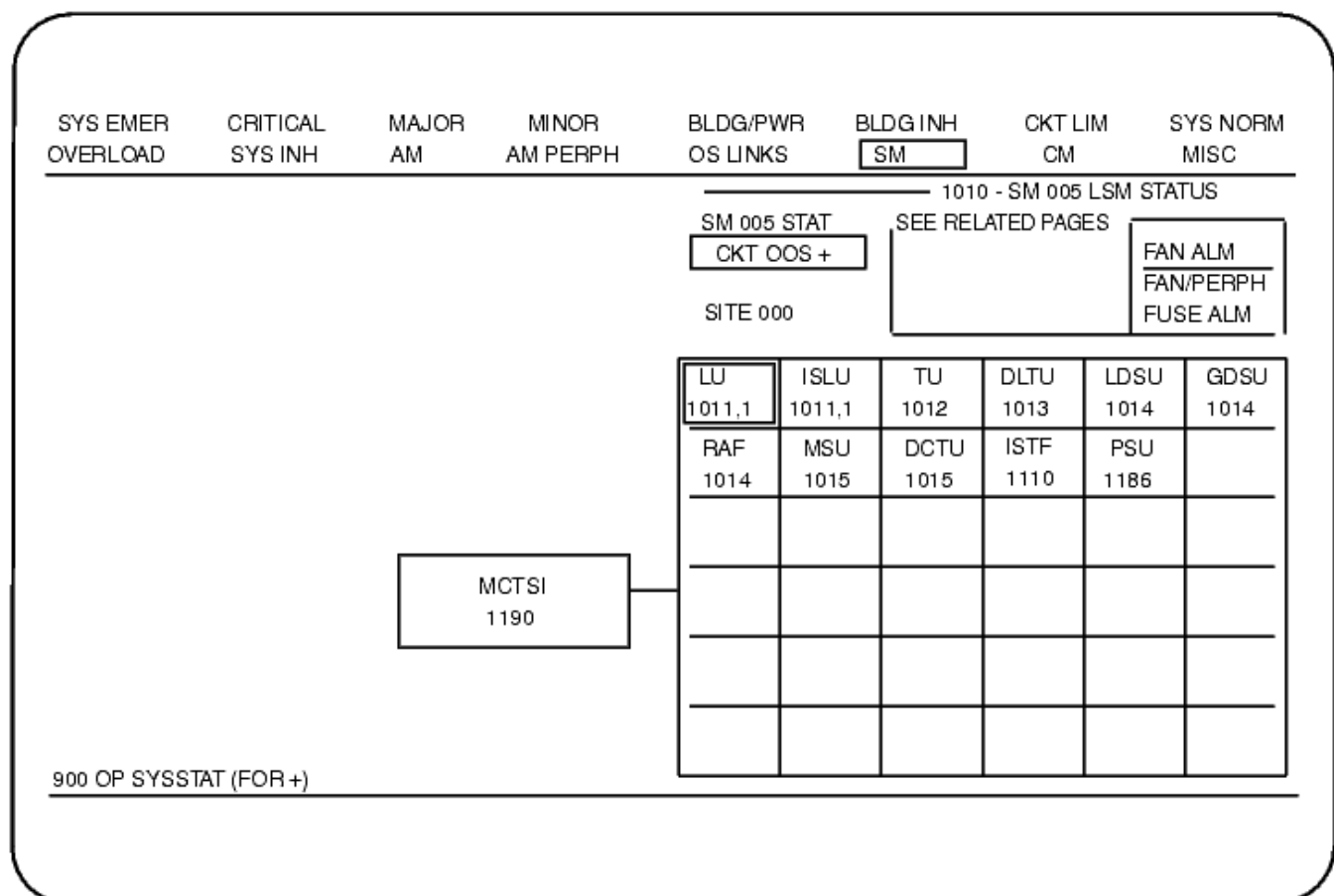


Figure 7-2 1010,X - SM X Status (LSM Version) (5E14 and later)

Abbreviations:

ALM	Alarm	MSU	Metallic Service Unit
CCS	Common Channel Signaling	OP	Output
CKT	Circuit	OOS	Out of Service
DCTU	Directly Connected Test Unit	PERPH	Peripheral
DLTU	Digital Line Trunk Unit	PSU	Packet Switching Unit
GDSU	Global Digital Service Unit	RAF	Recorded Announcement Function
ISLU	Integrated Services Line Unit	SM	Switching Module
ISTF	Integrated Services Test Function	STAT	Status
LDSU	Local Digital Service Unit	SYSSTAT	System Status
LSM	Local Switching Module	TU	Trunk Unit
LU	Line Unit		
MCTSI	Module Controller Time Slot Interchanger		

Figure 7-3 is the RSM version with BLDG/PWR alarms equipped. In this example, 048 RSM status (DSL_MAJOR) indicates the DSL data link is OOS. Pages 1460 and 1800 are referenced for additional information.

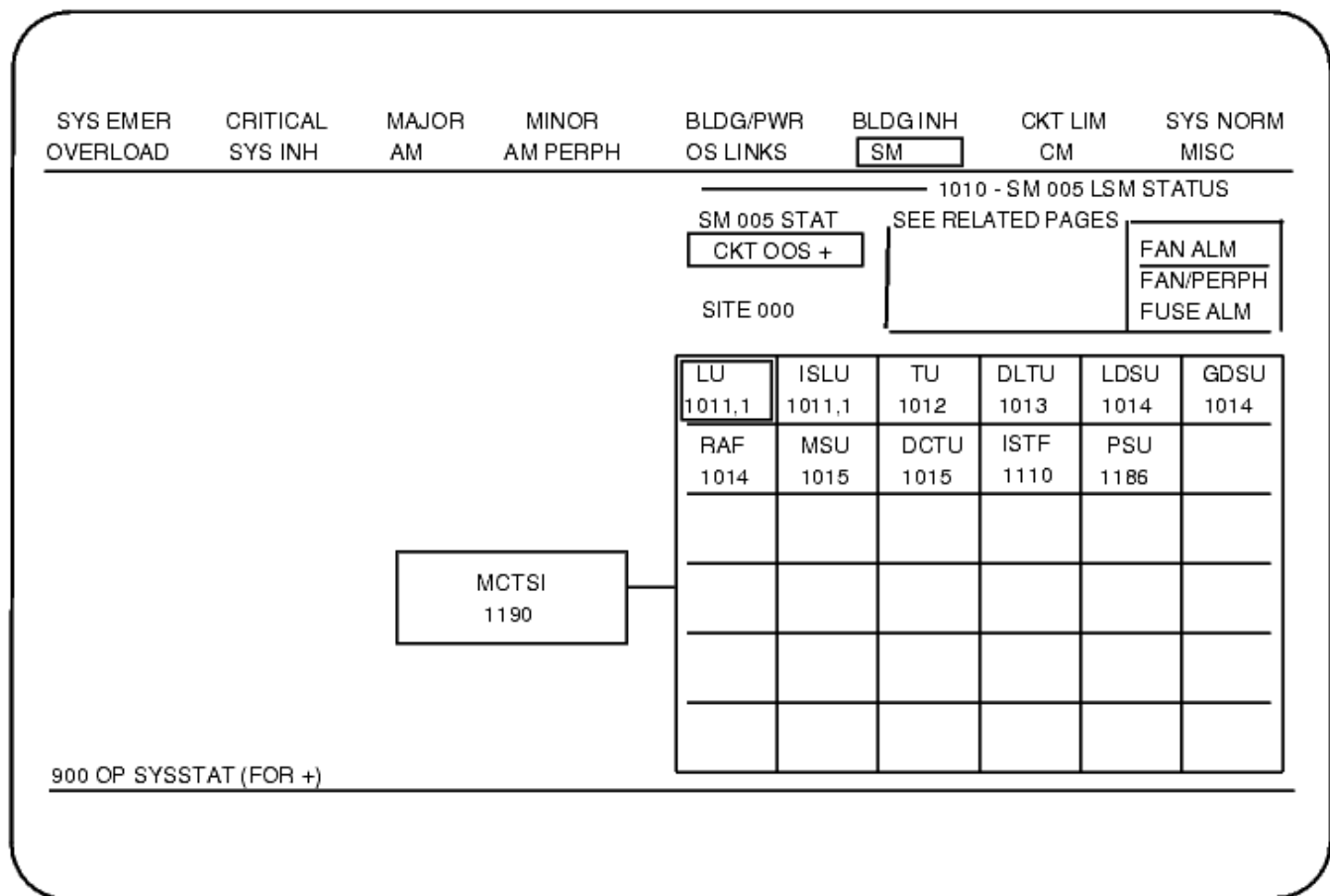


Figure 7-3 1010,X - SM X Status (RSM Version with BLDG/PWR Alarms) (5E12 and later)

Abbreviations:

ALM	Alarm	OP	Output
BLDG	Building	PERPH	Peripheral
DCTU	Directly Connected Test Unit	PSU	Packet Switching Unit
DLTU	Digital Line Trunk Unit	PWR	Power
DSL	Digital Subscriber Line	RAF	Recorded Announcement Function
HSM	Host Switching Module	RCLK	Remote Clock
ISLU	Integrated Services Line Unit	RLI	Remote Link Interface
ISTF	Integrated Services Test Function	RSM	Remote Switching Module
LDSU	Local Digital Service Unit	SM	Switching Module
LU	Line Unit		

MCTSI Module Controller
 MISC Miscellaneous
 MSU Metallic Service Unit

STAT Status
 SYSSTAT System Status
 TU Trunk Unit

Figure 7-4 shows the RSM version of the SM status display with no building/power alarms equipped. This SM has an off-normal condition in a DLTU and, one or more inhibits are set. The ``+'' in the SM STAT box indicates the presence of additional (less important) off-normal conditions. The user is directed to see Page 1800 for additional information. A complete list can be generated and output via the 900 menu command.

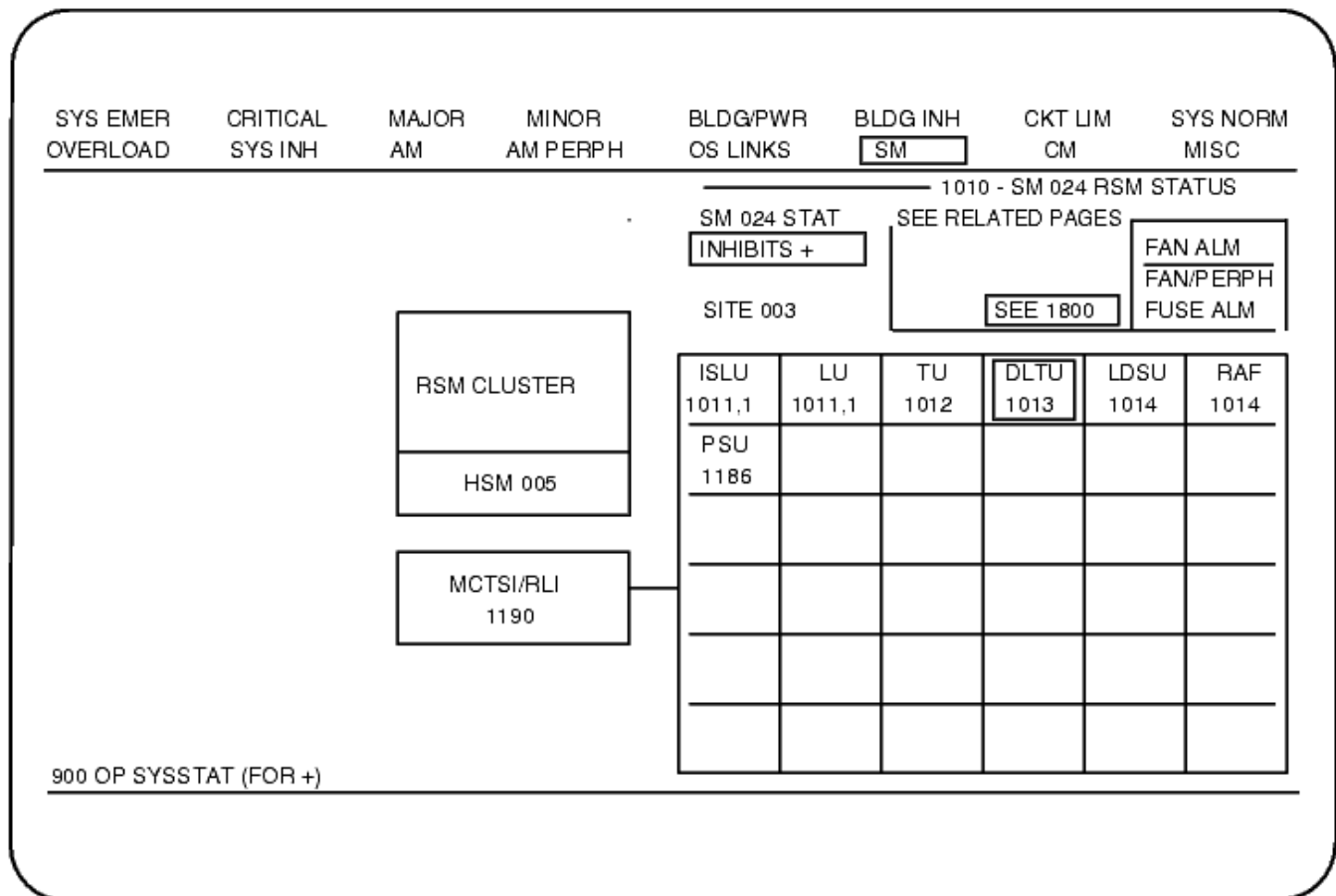


Figure 7-4 1010,X - SM X Status (RSM Version without BLDG/PWR Alarms) (5E12 and later)

Abbreviations:

ALM	Alarm	PERPH	Peripheral
DCTU	Directly Connected Test Unit	PSU	Packet Switching Unit
HSM	Host Switching Module	RAF	Recorded Announcement Function
ISLU	Integrated Services Line Unit	RLI	Remote Link Interface
LDSU	Local Digital Service Unit	RSM	Remote Switching Module
LU	Line Unit	SM	Switching Module
MCTSI	Module Controller	STAT	Status
	Time Slot Interchanger	SYSSTAT	System Status
OP	Output	TU	Trunk Unit

Figure 7-5 shows the PSM version of the SM status display. The PSM has a RISLU which is equipped with building/power alarms and has a building/power alarm off normal. Also, there is an off-normal state at RISLU site 502.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC																																				
CMD < 1010 - SM 007 LSM STATUS																																											
REMOTE PERPH SITE ALARMS				SM 007 STAT		SEE RELATED PAGES																																					
				SITE 000		FAN ALM FAN/PERPH FUSE ALM																																					
SEE PAGE 1611,1 1611,2 1611,3 1611,4 1611,5				MCTSI 1190		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>																																					

900 OP SYSSTAT (FOR +)

Figure 7-5 1010,X - SM X Status (LSM Version - REMOTE PERPH BLDG/PWR Alarms Equipped) (5E12 and later)

Abbreviations:

ALM	Alarm	PERPH	Peripheral
BLDG/PWR	Building/Power	PSM	Position Switching Module
DLTU	Digital Line Trunk Unit	RISLU	Remote Integrated Services Line Unit
INH	Inhibit	SM	Switching Module
MCTSI	Modular Controller Time Slot Interchanger	STAT	Status
OP	Output	SYSSTAT	System Status

7.3.3 Commands

The 900 command outputs the off-normal report for the SM the 1010,X page is displayed for. All available paging commands can be entered from this page.

CMD	RESULT
900	Output the off-normal report for the SM. (OP:SYSSTAT,SM=SM#)

7.4 118Y,X - SM X PSU SHELF Y (5E14 and Later)

7.4.1 Purpose

The purpose of Page 118Y,X (Y = shelf 0-5) is to provide status and maintenance commands for protocol handlers (PH), hardware type of PHs, status of channel groups, type of channel groups, and assignment of channel groups to PHs.

7.4.2 General

The PSU Shelf MCC page display (one per PSU shelf) provides two tables. The first table (PSUPH ASSIGNMENT STATUS) contains the 16 individual PHs with their hardware type and status. The second table (CHANNEL GROUP SUMMARY) contains the corresponding channel group type and hardware PH type (2, 3, 4, 22, A1, V1 or V2). The PH status data of each of the PSU Shelf pages supplies the PH status summary of the PSU Network display, Page 1186. The PHs serving channel groups are marked active (ACT). The PHs that are able to provide service but are not serving a channel group are marked standby (STBY). The PHs that are removed from service are not available as spares and are marked out of service (OOS). The PHs that are partially faulty may be marked degraded (DGRD) (when there are no standby PHs) rather than being removed. This allows the PH to be of partial service to its channel group. For PHs that are out of service or degraded, the PH shelf summary is marked DGRD on the 1186 page. If possible, the channel groups of OOS PHs are moved to serviceable PHs. When the supply of spare PHs is exhausted, a channel group associated with the OOS PH is removed from the PSUPH ASSIGNMENT STATUS table, and the channel group number and type on the CHANNEL GROUP SUMMARY table is backlighted. The shelf of that PH, in the PSUPH STATUS SUMMARY box (on the PSU Network page), is marked DGRD and the entry of how many channel groups are not being serviced is incremented. Any other state displayed in PH status locations is required for a removable, diagnosable, growable, and inhibitible individual unit.

The appropriate peripheral status block of the SM on the SM Status page is marked with PSU. When any portion of the PSU is OOS, the block is backlighted. If the status reported on the SM STATUS page or on any of the PSU display pages changes while being displayed, the appropriate indicators are updated with changed status.

When a PSU ATM link channel is OOS, an asterisk "*" is displayed and backlighted at the end of the PH STATUS column. This is applicable only for protocol handlers for asynchronous transfer mode (ATM) (PHA). Also, when one or more PHAs have OOS link channels, "*" = PSU LINK CHANNEL OOS, SEE PAGE 1187" is displayed at the bottom of the page.

The 118Y,X page (Figure 7-6) is divided into three basic areas. The "CHANNEL GROUP SUMMARY" block at the right side of the display indicates the channel group number, PH hardware type required by the channel group, and channel group type which can be one of the following:

- **DSL** - Used for all basic digital subscriber line (DSL) and extended DSL (EDSL) applications
- **ISM** - Inter-SM packet
- **IPTRK** - Interswitch packet trunks
- **X75P** - X.75 trunks pump
- **PHACG** - PHA channel group
- **X75** - X.75 trunks
- **SHCG** - Code Division Multiple Access (CDMA) speech handler channel group
- **PPCG** - CDMA packet pipe channel group.

The "PSUPH ASSIGNMENT STATUS" block in the middle of the page indicates the PH status, PH hardware type, and channel group assignment to each PH. The hardware equipage in a given PSU is designated by PH type. When equipped, a PH is either active (ACT), standby (STBY), out of service (OOS), or degraded (DGRD). The third area of this display contains the "SM STAT" indicator block (with SITE number). Also, below the SM status block, a list of commands exists for management of the PSUPH maintenance.

```

ER  CRITICAL  MAJOR  MINOR  BLDG/PWR  BLDG INH  CRT LIM  SYS NORM
AD  SYS INH    AM    AM PERPH  OS LINKS  SM        CM        MISC
----- 1180 - SM 024 LSM - PSU 0 SHELF 0

```

STAT		PSUPH ASSIGNMENT STATUS						CHANNEL GROUP SUMMARY					
OOOS		PSUPH	PH	CH	PSUPH	PH	CH	CH	GRP	PH	CH	GRP	PH
000		STATUS	TYP	GRP	STATUS	TYP	GRP	GRP	TYP	TYP	GRP	TYP	TYP
PH XX		PH00 ACT	2	00	PH08 ACT	2	07	00	DSL	2	08	ISM	2
		PH01			PH09 ACT	2	08	01	SHCG	V1	09	DSL	2
		PH02 ACT	V1	01	PH10 ACT	2	09	02	ST7	22	10	IPTRK	2
PH XX		PH03 ACT	22	02	PH11 ACT	2	10	03	DSL	4	11	SHCG	V1
		PH04 ACT	4	03	PH12 ACT	V1	11	04	PHACG	A1	12	DSL	2
		PH05 ACT *	A1	04	PH13			05	DSL	2			
PH XX		PH06 ACT	2	05	PH14 ACT	2	12	06	PFCG	4			
		PH07 ACT	4	06	PH15 STBY	2		07	DSL	2			
PH XX		(* = PSU LINK CHANNEL OOS, SEE PAGE 1187)											

Figure 7-6 118Y,X - SM X PSU Shelf Y (5E14 and Later)

Abbreviations:

A1	PH for ATM, Version 1	PPCG	Packet Pipe Channel Group
ACT	Active	PSLNKOOS	PSU Link OOS
CH	Channel	PSUPH	Packet Switching Unit
DSL	Digital Subscriber Line Group	PSU	Packet Switching Unit
GRP	Group		Protocol Handler
IPTRK	Interswitch Packet Trunk	SHCG	Speech Handler
ISM	Inter-SM Packet		Channel Group
LSM	Local Switching Module	SM	Switching Module
MIXED	Multiple Applications	STAT	Status
OOS	Out of Service	STBY	Standby
PH	Protocol Handler	TYP	Type
PHACG	PH for ATM Channel Group	V1	PH for Voice, Version 1

7.4.3 Commands

Commands are provided to remove, restore, diagnose, and switch PHs shown on this page.

The restore and switch commands also have a group (GRP) option that allows assignment of a specified channel group. The GRP option is only allowed with the switch command when switching from a standby (STBY) PH to an active (ACT) PH. The STBY PH is the one specified in the switch command, and the channel group of the ACT PH

is specified in the GRP option (for example, **SW:PSUPH=24-0-0-15,GRP=12**, where PH number 15 is a STBY PH and GRP 12 is assigned to an ACT PH).

When restoring PHs, the GRP option can be used to assign a specified channel group to the PH being restored (for example, **RST:PSUPH=24-0-0-15,GRP=12**, where PH number 15 is STBY and GRP 12 is a channel group). If the channel group specified cannot be switched or restored to PH, the command will fail and a message will print indicating why the command failed.

Commands available for control of the multiple protocol handlers are as follows:

CMD	RESULT
2XX	Remove PSUPH XX (RMV:PSUPH=SM#-PSU#-SHELF#-XX)
3XX	Restore PSUPH XX (RST:PSUPH=SM#-PSU#-SHELF#-XX)
4XX	Switch PSUPH XX (SW:PSUPH=SM#-PSU#-SHELF#-XX)
5XX	Diagnose PSUPH XX (DGN:PSUPH=SM#-PSU#-SHELF#-XX,RAW,TLP)

7.5 1186,X - SM X PSU NETWORK (5E14 and Later)

7.5.1 Purpose

The 1186,X page display shows the current packet switch unit (PSU) status, the PSU common controller (PSUCOM) status, and the Protocol Handler (PH) shelf status summary.

7.5.2 General

The PSU Network page display simultaneously shows the state of both PSUCOMs and a status summary of the PHs per PSU shelf. The PSUCOM is composed of the control fanout (CF), and each data fanout (DF) and protocol fanout (PF) of the equipped shelves of the same side. The PSUCOM can be removed, restored, or switched as a single entity, and the status is noted on the MCC as a duplex SM peripheral controller. The status summary of the PHs on this page is on a shelf basis, because any sparing of the PHs is performed on a shelf basis. When any PH is removed from service or degraded, this page has the shelf of its residence marked degraded. If the shelf should have more PHs removed than the shelf has spares to take the place of the PHs that are serving channel groups, the shelf is marked degraded and the count of channel groups not being serviced is displayed. The possible states of the PH shelves can be "normal" (all equipped PHs in service when the shelf is equipped), "degraded," "unequipped," and "growth."

The PSUPH SUMMARY indicator box provides status for a maximum of 16 PHs/shelves (indicating 1 spare PH/shelf).

If a PHA is equipped, "1187 PSU LINKS" appears under DISPLAY (bottom left of the screen). This command allows the user to get additional information from the PSU Link Status page.

When a PSU ATM link is in off-normal state (one channel OOS) or trouble state (both channels OOS), the "SEE 1187" box is displayed and backlighted. This is necessary because it is possible for a channel to be OOS even though the PHA itself is active (ACT). When this happens, none of the shelf summaries will show degraded (DGRD). The technician would refer to the 1187 PSU Links page to determine which PHA links or channels are impacted.

The PSU Reliability Enhancement feature added two new force active commands and a new critical unit indicator box (Figure 7-7). This box appears when you have designated via recent change that a PSU will be a critical unit.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC

CMD< _____ 1186 - SM 192 LSM - PSU NETWORK

REMOVE

200 PSUCOM 0

201 PSUCOM 1

RESTORE

300 PSUCOM 0

301 PSUCOM 1

DIAGNOSE

500 PSUCOM 0

501 PSUCOM 1

SWITCH

400 PSUCOM

FORCE ACTIVE

42X PSUCOM X

422 CLEAR FORCE

DISPLAY

118X SHELF X

1187 PSU LINKS

SM 192 STAT

NORMAL

SITE 000

PSU DUPLEX
FAILURE WILL
INITIATE SM
RECOVERY

PSU LINKS
OFF-NORMAL

SEE 1187

PSUCOM 0		PSUCOM 1	
ACTF		UNV	
PSUPH SUMMARY			
STATUS		GRP LOSS	
SHELF 0	NORM	NONE	
SHELF 1	NORM	NONE	
SHELF 2	UNEQ		

tpa852488.cdr

Figure 7-7 1186,X - SM X PSU Network (5E14 and Later)

Abbreviations:

ACT	Active	PSU	Packet Switch Unit
CKT	Circuit	PSUCOM	PSU Common Controller
GRP	Group	SM	Switching Module
LSM	Local Switching Module	STAT	Status
NORM	Normal	STBY	Standby
OOS	Out of Service	UNEQ	Unequipped

7.5.3 Commands

Commands are provided to remove, restore, diagnose, switch, and force PSUCOMs. Also any PSU shelf and any available paging commands can be accessed from this page.

CMD	RESULT
200	Removes PSUCOM 0 (RMV:PSUCOM=SM#-0-0)
201	Removes PSUCOM 1 (RMV:PSUCOM=SM#-0-1)
300	Restore PSUCOM 0 (RST:PSUCOM=SM#-0-0)
301	Restore PSUCOM 1 (RST:PSUCOM=SM#-0-1)
500	Diagnose PSUCOM 0 (DGN:PSUCOM=SM#-0-0,RAW,TLP)
501	Diagnose PSUCOM 1 (DGN:PSUCOM=SM#-0-1,RAW,TLP)
400	Switch control and state of active and standby PSUCOM (SW:PSUCOM=SM#-0)
420	Force PSUCOM Side 0

421	(SET:PSUCOM=SM#-0,FRC) Force PSUCOM Side 1
422	(SET:PSUCOM=SM#-1,FRC) Clear any PSUCOM forces
118X	(CLR:PSUCOM=SM#-0,FRC) Display PSU shelf X (X=0-5)
1187	Display PSU links status

7.6 1532,X - CCS LINK SET SUMMARY (5E14 and Later)

7.6.1 Purpose

The purpose of the 1532 page is to display the summary status of all the link sets on a specific Global SM (GSM) and provide menu commands for activating, deactivating, and outputting the status of a link set.

Initially, "X" (denotes GSM number) is required in order to access this page for a particular GSM, but it is not required to reaccess the page for the last GSM used to access the 1532, 1533, or 1540 MCC Pages.

7.6.2 General

For more information about Common Channel Signaling (CCS) on a GSM, refer to document 235-190-120, *Common Channel Signaling Services*, Chapter 14.


```

SYS EMER  CRITICAL  MAJOR  MINOR  BLDG/PWR  BLDG INH  CKT LIM  SYS NORM
OVERLOAD  SYS INH   AM     AM PERPH  OS LINKS   SM        CM        MISC
CMD<
SM 007 STAT
[ ]

SITE 000
DEACT UCL
2XXX
ACTIVATE
3XXX
OUTPUT
9XXX LS STATUS
990 GSM STATUS

LINK SET GROUP SUMMARY STATUS
001 LKER+ C7N A 009 LKER+ C7N A 017 LKER+ C7N A 025 LKER+ C7N A
002 LKER+ C7N A 010 LKER+ C7N A 018 LKER+ C7N A 026 LKER+ C7N A
003 LKER+ C7N A 011 LKER+ C7N A 019 LKER+ C7N A 027 LKER+ C7N A
004 LKER+ C7N A 012 LKER+ C7N A 020 LKER+ C7N A 028 LKER+ C7N A
005 LKER+ C7N A 013 LKER+ C7N A 021 LKER+ C7N A 029 LKER+ C7N A
006 LKER+ C7N A 014 LKER+ C7N A 022 LKER+ C7N A 030 LKER+ C7N A
007 LKER+ C7N A 015 LKER+ C7N A 023 LKER+ C7N A 031 LKER+ C7N A
008 LKER+ C7N A 016 LKER+ C7N A 024 LKER+ C7N A 032 LKER+ C7N A

LINK SET MEMBER SUMMARY
1533, XXX [, SM]

XXX = LINK SET #

```

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Figure 7-8 1532,X - CCS Link Set Summary (5E14 and Later)

Up to 32 link sets may be displayed, and each link set can contain up to 16 members. Each link set is displayed with link set number, status, CCS protocol, and link type. Also, the Originator Point Code (OPC) associated with the GSM is displayed. The 2XXX poke command will ask for confirmation before you can remove the link set.

A software update shortened the CCS Protocol type from 6 to 3 characters. Also, a new column was added to display the the Link type. See Figure 7-8 .

CAUTION: REMOVING A LINK SET MAY STOP CCS CALL PROCESSING ON THE PSU PLATFORM IN THE SPECIFIED GSM TO CERTAIN DESTINATION POINT CODES. USE CAUTION.

Abbreviations:

DEACT	Deactivate
GSM	Global Switching Module
LS	Link Set
SM	Switching Module
UCL	Unconditional

7.6.3 Commands

The following commands are available to activate or deactivate all CCS Signaling Link numbers (CCSLKs) in a specific link set, output link set member status of a specific link set or output the displayed GSM's status.

CMD	RESULT
2XXX	Deactivate all CCSLKs in a link set (RMV:CCSLK, SET=XXX, MEMBER=0&&15, STATE=DACT, SM=U, UCL)
3XXX	Activate all CCSLKs in a link set (RST:CCSLK, SET=XXX, MEMBER=0&&15, STATE=DACT, SM=U)
9XXX	Output status of all CCSLKs in a link set (OP:STATUS,CCSLK,SET=XXX, MEMBER=0&&15, SM=U)
990	Output GSM Status (OP:CCS,GSM,SM=U)

where "U" is the GSM associated with the display page, and "XXX" is a display link set.

7.7 1533,Y,X - CCS LINK SET MEMBERS (5E14 and Later)

7.7.1 Purpose

The 1533 page shows the adjacent point code (APC) and the status of all members (MR) in a link set on the Global SM (GSM). Where "X" denotes the GSM number and Y denotes Link Set number.

Initially, "X" is required in order to access this page for a particular GSM, but it is not required to reaccess the page for the last GSM used to access the 1532, 1533 or 1540 MCC Pages.

7.7.2 General

For more information about Common Channel Signaling (CCS) on a GSM, refer to document 235-190-120, *Common Channel Signaling Services*, Chapter 14.

SYS EMER	CRITICAL	MAJOR	MINOR	BLDG/PWR	BLDG INH	CKT LIM	SYS NORM	
OVERLOAD	SYS INH	AM	AM PERPH	OS LINKS	SM	CM	MISC	
CMD< — 1533 - SM 007 LSM LINKSET 01 MEMBERS								
SM 007 STAT								
APC		MR	STATE	INH	BLK	SLS	EN	SH-CG-MR
123-456-789		00	ACT	L R		Y	N 12-3-0-2-1-3-1-07	1-02-00
SITE 000		01	DACT		L R	N	N 12-3-0-2-1-3-1-08	1-02-01
<u>DEACTIVATE</u>		<u>ACTIVATE</u>						
2XX MR XX		2XX MR XX						
<u>INHIBIT</u>		<u>UNINHIBIT</u>						
6XX MR XX		7XX MR XX						
<u>BLOCK</u>		<u>UNBLOCK</u>						
62XX MR XX		72XX MR XX						
<u>TEST</u>		<u>OUTPUT</u>						
5XX MR XX		9XX MR XX						

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Figure 7-9 1533,Y,X - CCS Link Set Members (5E14 and Later)

For each valid member of the link set, the state of the link, the Inhibited (INH) and Blocked (BLK) status, SLS (signaling link selectors) status, the EN (equipment number), and the signaling terminal-protocol handler Shelf number (SH), Channel Group number (CG), and Member (MR) are displayed.

Local or remote inhibited and local or remote blocked, states can exist simultaneously with many other link states. These states are shown as L (local) and R (remote) marked under the INH and the BLK status fields. The SLS (signaling link selectors) status is "Y" for yes and "N" for no, indicating whether or not the link is carrying traffic.

A software update increased the EN indicator field to display the VT group and VT member numbers. A software update also expanded the number of linkset members that can be displayed from 8 to 16 as indicated in Figure 7-9

Abbreviations:

APC	Adjacent Point Code
BLK	Blocked Status
CG	Channel Group Number
EN	Equipment Number
	D - DFI EN number
	N - DNUS EN number
INH	Inhibited Status
L	Local
MR	Members
R	Remote

SH	Shelf Number
SLS	Signaling Link Selectors
Y	Yes

7.7.3 Commands

The following commands are available to deactivate, activate, inhibit, uninhibit, block, unblock, test and output the status of an individual CCS link set member (CCSLK). (Where XX is a valid link set member and V is the link set number displayed on the page.)

CMD	RESULT
2XX	Deactivate MR XX (RMV:CCSLK,SET=U, MEMBER=XX,STATE=DACT,SM=V)
3XX	Activate MR XX (RST:CCSLK,SET=U, MEMBER=XX,STATE=DACT,SM=V)
5XX	Test MR XX (TST:CCSLK,SET=U, MEMBER=XX,SM=V)
6XX	Inhibit MR XX (RMV:CCSLK,SET=U, MEMBER=XX, STATE=INH,SM=V)
7XX	Uninhibit MR XX (RST:CCSLK,SET=U, MEMBER=XX, STATE=INH,SM=V)
62XX	Block MR XX (RMV:CCSLK,SET=U, MEMBER=XX, STATE=BLK,SM=V)
72XX	Unblock MR XX (RST:CCSLK,SET=U, MEMBER=XX, STATE=BLK,SM=V)
9XX	Output Status MR XX (OP:STATUS, CCSLK,SET=U, MEMBER=XX, SM=V)

where: "U" is the GSM associated with the display page.

7.8 1540,X - GSM CMT STATUS (5E14 and Later)

7.8.1 Purpose

The 1540 page provides an overview of CCS Message Transport (CMT) connectivity where "X" denotes the GSM number. If the SM number is not specified, the command will track the last "GSM-related page" referenced including the 1532, 1533, and 1540 pages.

7.8.2 General

Data is shown for overall accessibility to each provisioned NGSM which is only GSM itself in 5E14. This is a series of boxes containing the NGSM number. The boxes will be white on green if the NGSM is only accessible via an intra-SM MD link. The boxes will be white on red if the NGSM is inaccessible.

There is an NGSM box that represents the GSM itself. That NGSM can only be provisioned with an intra-SM MD link. The intra-SM MD link, though provisioned, can not be used for transport.

If an SM is not provisioned NGSM associated with the target SM, no "status box" corresponding to that SM number will be shown. During growth of a GSM it is possible no intra-SM MD link is yet provisioned. In this case no NGSM boxes will be displayed. See Figure 7-10 .

For more information refer to document 235-190-120.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD<				1540 - SM 005 LSM GSM CMT STATUS			
SM 005 STAT		OPC 230-005-000					
NORMAL		5					
SITE 000							
910 GSMNET OFN							
91XXX GSMNET							
930 OP MD							
94XXX DETAIL							
XXX = NGSM							

Figure 7-10 1540 Island GSM with Intra-MD (5E14 and Later)

Abbreviations:

CMT	CCS Message Transport
GSM	Global Switching Module
MD	Message Delivery Link
NGSM	Non-Global Switching Module
OFN	Off Normal
OPC	Originating Point Code

7.8.3 Commands

CMD	RESULT
910	Provides detailed accessibility status all to off-normal NGSMs.
91XXX	(OP:STATUS,GSMNET,GSM=a) Provides detailed accessibility status for a specific NGSM. This command will send output to the ROP.
930	(OP:STATUS,GSMNET,GSM=a,NGSM=XXX) Provides "real" status of the intra-SM MD link rather than the more general CMT accessibility/inaccessibility statuses.
94XXX	(OP:STATUS,MD,SM=a) Same as 91XXX command above except status information is displayed at the bottom of the MCC page. (OP:STATUS,GSMNET,GSM=a,NGSM=XXX)

7.9 1541,X - NGSM CMT STATUS (5E14 and Later)

7.9.1 Purpose

The 1541 page provides an overview of NGSM/NGSM-2000 CCS Message Transport (CMT) connectivity. If the SM is not specified, the command will track the last "SM related" page referenced.

7.9.2 General

Data is shown for overall accessibility to each provisioned GSM which is only NGSM itself in 5E14. This is a series of boxes containing the NGSM number. The boxes will be white on green if the GSM is only accessible via an intra-SM MD link. The boxes will be white on red if the GSM is inaccessible.

There is an GSM box that represents the NGSM itself. That NGSM can only be provisioned with an intra-SM MD link. The intra-SM MD link, though provisioned, can not be used for transport.

If an SM is not provisioned GSM associated with the target SM, no "status box" corresponding to that SM number will be shown. During growth of a NGSM it is possible that no intra-SM MD link is yet provisioned. In this case no GSM boxes will be displayed. See Figure 7-11 .

For more information refer to document 235-190-120.

SYS EMER OVERLOAD	CRITICAL SYS INH	MAJOR AM	MINOR AM PERPH	BLDG/PWR OS LINKS	BLDG INH SM	CKT LIM CM	SYS NORM MISC
CMD<				1541 - SM 005 LSM NGSM CMT STATUS			
SM 005 STAT							
NORMAL							
SITE 000							
910 NGSMNET OFN							
91XXX NGSMNET							
930 OP MD							
94XXX DETAIL							
XXX = NGSM							

Figure 7-11 1541 Island GSM with Intra-MD (5E14 and Later)

Abbreviations:

CMT CCS Message Transport

GSM	Global Switching Module
MD	Message Delivery Link
NGSM	Non-Global Switching Module
OFN	Off Normal

7.9.3 Commands

CMD	RESULT
910	Provides detailed accessibility status all to off-normal GSM-2000s.
91XXX	(OP:STATUS,NGSMNET,NGSM=a) Provides detailed accessibility status for a specific GSM. This command will send output to the ROP.
930	(OP:STATUS,NGSMNET,NGSM=a,GSM=XXX) Provides "real" status of the intra-SM MD link rather than the more general CMT accessibility/inaccessibility statuses.
94XXX	(OP:STATUS,MD,SM=a) Same as 91XXX command above except status information is displayed at the bottom of the MCC page.
	(OP:STATUS,NGSMNET,NGSM=a,GSM=XXX)

GLOSSARY

The following is a list of abbreviations, acronyms, and terms found in this manual.

ABD

Alternate Boot Disk

ABER

Acceptable Bit Error Rate

ACCED

Access Editor

ACP

Alarm Control Process

ACNR

Automatic Critical Node Recovery

ACSR

Automatic Customer Station Rearrangement

ACT

Active Grid State

ADP

Automatic Diagnostics Process

AIS

Alarm Indication Signal

AIU

Access Interface Unit

ALCB

Access Link Control Block

ALE

Automatic Line Evaluation

ALIT

Automatic Line Insulation Test

AM

Administrative Module

AMADL

Automatic Message Accounting Data Link

AMARC

Automatic Message Accounting Recording Center

AMATPS

Automatic Message Teleprocessing System

AP

Application Pack

APT

Automatic Progression Testing

ARR

Automatic Ring Recovery

ATM

Asynchronous Transfer Mode

ATP

All Tests Passed

ATTS

Automatic Trunk Test Scheduler

AUTISSING

Automatic Time-Slot Switching

BI

Batch Insert

BLKSZ

Block Size

BOLO

Back Out Last Official

BR

Batch Review

BRI

Basic Rate Interface

BST

Basic Services Terminal

BTSR

Bootstrapper

BUD

Backup Update Data Base

BWM

Broadcast Warning Message

CA

Call Appearance

CAICOM

Call Appearance ICOM

CAMA

Centralized Automatic Message Accounting

CAROT

Centralized Automatic Reporting on Trunks

CATP

Conditional All Tests Passed

CCP

Common Control Processor

CCS

Common Channel Signaling

C/D

Control and Display

CDMA

Code Division Multiple Access

CDX

Compact Digital Exchange

CFGSTAT

Configuration Status

CGA

Carrier Group Alarm

CH

Channel

CHAN

Channel

CI

Control Interface

CKT

Circuit

CKTNUM

Circuit Number

CLNK

Communication Link

CLR

Clear

CM

Communication Module

CMP

Communication Module Processor

CMT

CCS Message Transport

CN

Change Notice

CNI

Common Network Interface

CNIDBOC

Common Network Interface Data Base Consolidator

CNR

Critical Node Recovery

CNTL

Control

COMDAC

Common Data and Control

CONCEN

Concentrator

CONT

Controller

CORC

Customer-Originated Recent Change

CP

Central Processor

CPE

Customer Premises Equipment

CRC

Cyclic Redundancy Check

CSCANS

Customer Service Computer Access Network System

CSD

Circuit Switched Data

CSOP

Craft Spooler Output Process

CSU

Cache Store Unit

CSV

Circuit Switched Voice

CTTU

Centralized Trunk Test Unit

CU

Channel Unit

CUD

Current Update Data Base

DACS

Digital Access Cross Connect System

DAP

Display Administration Process

DAS/C

Directory Assistance System/Computer

DBM

Data Base Manager

DCLU

Digital Carrier Line Unit

DCMS

Design Change Management System

DCS

Digital Cross Connect System

DCTU

Directly Connected Test Unit

DCTUCOM

DCTU Common Control

DEN

Digital Equipment Number

DFC

Disk File Controller

DFI

Digital Facility Interface

DFIH

Digital Facility Interface Host

DFIR

Digital Facility Interface Remote

DFSA

Disk File System Access

DGN

Diagnostic

DGR

Degraded Grid State

DGRF

Degraded Forced

DI

Data Interface

DIGRP

Digroup

DIOP

Disk Independent Operation

DLC

Digital Loop Carrier

DLI

Dual Link Interface

DLM

Disk Limp Mode

DLN

Direct Link Node

DLTU

Digital Line Trunk Unit

DLTUH

DLTU Host

DLTUR

DLTU Remote

DMA

Direct Memory Access

DMI

Dual Message Interface

DNU-S

Digital Networking Unit - SONET

DNUSCC

Digital Networking Unit - SONET Common Control

DNUSCD

Digital Networking Unit - SONET Common Data

DMQ

Diagnostic Message Queue

DN

Directory Number

DOC

Dynamic Overload Control

DSC

Digital Service Circuit

DS0

Digital Signal Level 0

DS1SFAC

Digital Signal Level 1 SONET Facility

DSIG

Direct Signaling

DSL

Digital Subscriber Line

DSLG

Digital Subscriber Lines Group

DSN

Defense Services Network

DSU

Digital Service Unit

DTA

Dial-Through Announcement

DUC

Dual Access Utility Circuit

EADAS

Engineering and Administration Data Acquisition System

EAI

Emergency Action Interface

EAN

Equipment Access Network

EC

Echo Canceler

EC1STE

Electrical Carrier Level 1 SONET Termination Equipment

ECD

Equipment Configuration Data

ECD/SG

Equipment Configuration Data/System Generation

ECSU

Echo Canceler Service Unit

EIS

External Information System

EKTS

Electric Key Telephone Service

ELI

Electrical Line Interface

ELS

Electronics Loop Segregation

EOC

Embedded Operations Channels

ERL

Echo-Return Loss

ESAC

Electronic Switching Assistance Center

ESM

External Sanity Monitor

ESP

Essential Service Protection

ETL

Equipment Test List

FAB

Fabric Exercise

FAC

Facility

FEX

Feature Execution

FI

Facility Interface

FIDB

Facility Interface Data Bus

FMGR

File Manager

FPC

Foundation Peripheral Controller

FSDB

File System Debugger

FTS

Field Test Set

GDG

Guard Data Guard

GDSF

Global Digital Services Function

GDSU

Global Digital Service Unit

GDSUCOM

GDSU Common Control

GDY

Gated Diode Crosspoint

GDYACC

Gated Diode Crosspoint Access

GDYC

Gated Diode Crosspoint Compensator

GDYCON

Gated Diode Crosspoint Control

GRASP

Generic Access Package

GSM

Global Switching Module

HDFI

Host Digital Facility Interface

HLSC

High-Level Service Circuit

HOBIC

Hotel Billing Information Center

HOBICR

HOBIC Record-Quote Data Link

HOBICV

HOBIC Voice-Quote Data Link

HOBIS

Hotel Billing Information System

HSM

Host Switching Module

Hz

Hertz (Unit of Frequency)

I/O

Input/Output

ICOM

Intercom

IDCU

Integrated Digital Carrier Unit

IDCU COM

IDCU Common Board

IDUMP

Interactive Dump Utility

IFAC

IDCU Facility

ILEN

IDCU Line Equipment Number

IM

Interface Module

IMS

Interprocess Message Switch

IOP

Input/Output Processor

ISDN

Integrated Services Digital Network

ISLU

Integrated Services Line Unit

ISLU2

ISLU Model 2

ISLUCC

ISLU Common Controller

ISLUCD

ISLU Common Data

ISLULC

ISLU Line Card

ISLULGC

ISLU Line Group Controller

ISLUMAN

ISLU Metallic Access Network

ISLURG

ISLU Ringing Generator

ISM

Integrated Services Module

ISTF

Integrated Services Test Function

ISUP

Integrated Services Digital Network User Part

LASS

Local Area Signaling Service

LBD

Line Board

LC

Line Card

LCCB

Logical Channel Control Block

LCEN

Line Card Equipment Number

LCKEN

Line Circuit Equipment Number

LCKT

Line Circuit

LCN

Line Card Number

LDFT

Load Disk From Tape

LDSF

Local Digital Service Function

LDSU

Local Digital Service Unit

LDSUCOM

LDSU Common Control

LEN

Line Equipment Number

LG

Line Group

LGC

Line Group Controller

LI

Line Interface

LIM

Local Interface Module

LLA

Low-Level Access

LN

Link Node

LNGRP

Line Group

LP

Line Pack

LSI

Loop Side Interface

LSM

Local Switching Module

LTP

Logical Test Port

LU

Line Unit

LUCHAN

Line Unit Channel Circuit

MA

Metallic Access

MAB

Metallic Access Bus

MCC

Master Control Center

MCRT

Maintenance Cathode Ray Terminal

MCTSI

Module Controller/Time Slot Interchanger

MCTSI

Module Controller/Time Slot Interchanger

MD

Message Delivery Link

MDF

Main Distributing Frame

MDII

Machine Detected Interoffice Irregularity

MEM

Member

MF

Multifrequency

MHD

Moving Head Disk

MI

Message Interface

MI/NC

Message Interface/Network Clock

MINMODE

Minimum Configuration Mode

MLHG

Multiline Hunt Group

MLT2

Mechanized Loop Testing System Generation 2

MML

Man-Machine Language

MMP

Module Message Processor

MOOS

Manual Out of Service

MP

Module Processor

MSCU

Message Switch Control Unit

MSGCLS

Message Class

MSGs

Message Switch

MSPU

Message Switch Peripheral Unit

MSU

Message Signal Unit

MSU

Metallic Service Unit

MSUCOM

MSU Common Controller

MT

Magnetic Tape

MTIB

Metallic Test Interface Bus

MTIBAC

Metallic Test Interface Bus Access

MTTY

Maintenance Teletypewriter

MTTYC

Maintenance Teletypewriter Controller

NC

Network Clock

NCT

Network Control and Timing

NEN

DNU-S Networking Equipment Number

NGSM

Non-Global Switching Module

NLI

Network Link Interface

NM

Network Management

NO2SES

No. 2 Service Evaluation System

OAP

OSPS Administrative Processor

ODBE

Office Data Base Editor

ODD

Office Dependent Data

OFN

Off Normal

OFFN

Off Normal

ONTC

Office Network Timing Complex

OOD

Out of Date

OOS

Out of Service

OOSF

Out-of-Service Family

OOSP

Out-of-Service Power

OOST

Out-of-Service Transient

OPC

Originating Point Code

OPD

Outpulse Digits

OPT

Operator Position Terminal

ORM

Optically Remote Module

OS

Operating System

OSC

Operator Service Center

OSDS

Operating System for Distributed Switching

OSPS

Operator Services Position System

OSPSDA

OSPS Directory Assistance

OSPSRC

OSPS Recent Change

OSPSTA

OSPS Toll and Assistance

OTC

Operating Telephone Company

OTF

Operational Test Failure

PC

Peripheral Controller

PCM

Pulse Code Modulation

PCN

Product Change Notice

PCT

Peripheral Control and Timing

PDB

Packet Data Bus

PDBTS

PDB Time Slot

PDF

Power Distribution Frame

PECC

Product Engineering Control Center

PER

Protocol Error Records

PFR

Peripheral Fault Recovery

PGTC

Pair Gain Test Controller

PH

Protocol Handler

PHA

Protocol Handler for ATM

PHACG

Protocol Handler for ATM Channel Group

PHDB

Protocol Handler Data Bus

PICB

Peripheral Interface Control Bus

PID

Process Identification

PIDB

Peripheral Interface Data Bus

PKT

Packet

PLS

Protection Line Switch

PMU

Precision Measurement Units

PN

Private Network

PP

Packet Pipe

PPC

Pump Peripheral Controller

PPCG

Packet Pipe Channel Group

PP MEM

Packet Pipe Trunk Group Member

PR

Program Record

PSM

Position Switching Module

PSS

Programmer Support System

PSU

Packet Switch Unit

PSUCOM

PSU Common Controller

PSUEN

PSU Equipment Number

PSUPH

PSU Protocol Handler

PTI

PIDB Time Slot Interchanger

PTS

Peripheral Time Slot

PVC

Permanent Virtual Circuit

PVN

Private Virtual Network

QGL

QLPS - QGP Link

QGP

QLPS Gateway Processor

QLNK

QLPS Link

QLPS

Quad Link Packet Switch

QLPSNW

QLPS Network

QNETVER

Quad Link Packet Switch Network Verifier

QPHLNK

QLPS Protocol Handler Link

QPIPE

QLPS Pipe

QRY

Query

QTMSLNKS

QLPS Pseudo TMS Links

RAF

Recorded Announcement Function

RAS

Remote Alarm Section

RC

Recent Change

RCL

Remote Communication Link

RCLK

Remote Clock

RC/V

Recent Change/Verify

RDFI

Remote Digital Facility Interface

REX

Routine Exercise

RFAC

Remote Facility

RG

Ring Generators

RISLU

Remote Integrated Services Line Unit

RLI

Remote Link Interface

RMAS

Remote Memory Administration System

ROH

Receiver Off Hook

ROP

Receive-Only Printer

ROS

Request Out of Service

ROTL

Remote Office Test Line

RPCN

Ring Peripheral Control Node

RSM

Remote Switching Module

RT

Remote Terminal

RTAC

Regional Technical Assistance Center

RTFAC

Remote Terminal Facility

RTR

Real-Time Reliable

RTRS

Real-Time Rating System

RTTU

Remote Trunk Test Unit

RT&M

Remote T&M

SAS

Service Announcement System

SBUS

SCSI Bus

SCANS

Software Change Administration and Notification System

SCB

Stack Control Block

SCC

Switching Control Center

SCCP

Signaling Connection Control Part

SCCS

Switching Control Center System

SCSI

Small Computer System Interface

SDFI

SLC[®] Digital Facility Interface

SDL

Synchronous Data Link

SDLC

Synchronous Data Link Controller

SFI

STXS-1 Facility Interface

SG

Service Group

SHCG

Speech Handler Channel Group

SID

Site Identification Number

SLEN

SLC[®] Line Equipment Number

SLIM

Subscriber Line and Instrument Measurement

SM

Switching Module

SM-2000

Switching Module-2000

SMD

Storage Module Device

SODD

Static ODD

SONET

Synchronous Optical Network

SPID

Service Profile Identifier

SSA

Summary Status Area

STE

SONET Terminating Equipment

STEFAC

SONET Terminating Equipment Facility

STF

Some Tests Failed

STS

Synchronous Transport Signal

STLWS

Supplementary Trunk and Line Work Station

STS

Synchronous Transport System

STSFAC

Synchronous Transport Signal Facility

SXS

Step-by-Step

SYSSTAT

System Status

T&M

Talk and Monitor

TAU

Test Access Unit

TCAP

Transaction Capability

TEI

Terminal Endpoint Identifier

TEN

Trunk Equipment Number

TID

Terminal Identifier

TKGMN

Trunk Group and Member Number

TLWS

Trunk and Line Work Station

TM

Terminal Maintenance

TMC

Time Slot Management Channel

TMP

Transmission Measurement Plan

TMS

Time Multiplexed Switch

TMSLNK

TMS Link

TMUX

Transmission Multiplexer

TOPAS

Testing, Operations, Provisioning, and Administration System

TP

Test Position

TRM

Two-Mile Optically Remoted Module

TSDBKEY

Time Slot Data Block Key

TS

Time Slot

TSGRP

Time Slot Group

TSI

Time Slot Interchanger

TSIG

Trunk Signaling

TTF

Transmission Test Facility

TTYC

Teletypewriter Controller

TU

Trunk Unit

UC

Utility Circuit

UCB

Unit Control Block

UCONF

Universal Conference Circuit

UID

Utility Identification

UNEQ

Unequipped

UNIQ

Uniqueness Field - OSDS

UNVP

Unavailable Power

UPEDCUD

Current Update Data Base and History File Editor

USPID

User Service Profile Identifier

UTD

Universal Tone Decoder

UTG

Universal Tone Generator

VBS

Voiceband Signaling

VCDX

Very Compact Digital Exchange

VDT

Video Display Terminal

VT

Virtual Tributary

VT1FAC

Virtual Tributary Level 1 Facility

VTG

Virtual Tributary Group

VTM

Virtual Tributary Member

WB

Wideband

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