Lucent Technologies
Bell Labs Innovations

3B21D Computer
Trouble Clearing Tasks

254-303-102
Issue 3.00
May 2001

Notice

Every effort was made to ensure that the information in this IP was complete and accurate at the time of publication. However, information is subject to change.

This IP describes certain hardware, software, features, and capabilities of Lucent Technologies products. This IP is for information purposes; therefore, caution is advised that this IP may differ from any configuration currently installed.

Lucent Technologies is the successor to the business and assets of AT&T Network Systems business unit.

Mandatory Customer Information

Interference Information: Part 15 of FCC Rules - Refer to the *5ESS*® Switch Product Specification IP.

Trademarks

4ESS is a trademark of Lucent Technologies in the United States and other countries.
5ESS is a registered trademark of Lucent Technologies in the United States and other countries.
ANSI is a registered trademark of American National Standards Institute, Inc.
HP is a registered trademark of Hewlett-Packard Company.
MIPS is a registered trademark of MIPS Technologies, Inc.
Styrofoam is a registered trademark of Dow Chemical Company.
UNIX is a registered trademark of The Open Group in the United States and other countries.

Warranty

Warranty information applicable to the *5ESS*® switch may be obtained from the Lucent Technologies Account Management organization. Customer-modified hardware and/or software is not covered by this warranty.

Ordering Information

This IP is distributed by the Lucent Technologies Customer Information Center in Indianapolis, Indiana.

The order number for this IP is 254-303-102. To order, call:

1-888-LUCENT8 (1-888-582-3688) or fax to 1-800-566-9568 (from inside the continental United States)

1-317-322-6847 or fax to 1-317-322-6699 (from outside the continental United States).

Support Telephone Numbers

Information Product Support Telephone Number: To report errors or ask nontechnical questions about this or other IPs produced by Lucent Technologies, call 1-800-645-6759.

Technical Support Telephone Numbers: For initial technical assistance, call the North American Regional Technical Assistance Center (NARTAC) at 1-800-225-RTAC (1-800-225-7822). For further assistance, call the Customer Technical Assistance Management (CTAM) center:

1-800-225-4672 (from inside the continental United States)

1-630-224-4672 (from outside the continental United States).

Both centers are staffed 24 hours a day, 7 days a week.

Acknowledgment

Developed by Lucent Technologies Customer Training and Information Products.

Lucent Technologies values your comments!

Lucent Technologies
Bell Labs Innovations

3B21D Computer Trouble Clearing Tasks

254-303-102 3.00 May 2001

Lucent Technologies welcomes your comments on this information product. Your opinion is of great value and helps us to improve.

1. Was the information product:

	Yes	*No*	*Not applicable*
In the language of your choice?	☐	☐	☐
In the desired media (paper, CD-ROM, etc.)?	☐	☐	☐
Available when you needed it?	☐	☐	☐

Please provide any additional comments:

_____

_____

2. Please rate the effectiveness of this information product:

	Excellent	*More than satisfactory*	*Satisfactory*	*Less than satisfactory*	*Unsatisfactory*	*Not applicable*
Ease of use	☐	☐	☐	☐	☐	☐
Level of detail	☐	☐	☐	☐	☐	☐
Readability and clarity	☐	☐	☐	☐	☐	☐
Organization	☐	☐	☐	☐	☐	☐
Completeness	☐	☐	☐	☐	☐	☐
Technical accuracy	☐	☐	☐	☐	☐	☐
Quality of translation	☐	☐	☐	☐	☐	☐
Appearance	☐	☐	☐	☐	☐	☐

If your response to any of the above questions is "*Less than satisfactory*" or "*Unsatisfactory,*" please explain your rating.

_____

_____

3. If you could change one thing about this information product, what would it be?

_____

_____

4. Please write any other comments about this information product:

_____

_____

Please complete the following if we may contact you for clarification or to address your concerns:

Name: _____ Date: _____

Company/organization: _____ Telephone number: _____

Address: _____

Email address: _____ Job function: _____

If you choose to complete this form online, go to http://www.lucent-info.com/comments
Otherwise fax to 407 767 2760 (U.S.) or +1 407 767 2760 (outside the U.S.) or email comments to ctiphotline@lucent.com

Lucent Technologies values your comments!

Lucent Technologies
Bell Labs Innovations

3B21D Computer Trouble Clearing Tasks

254-303-102 3.00 May 2001

Lucent Technologies welcomes your comments on this information product. Your opinion is of great value and helps us to improve.

1. Was the information product:

	Yes	*No*	*Not applicable*
In the language of your choice?	☐	☐	☐
In the desired media (paper, CD-ROM, etc.)?	☐	☐	☐
Available when you needed it?	☐	☐	☐

Please provide any additional comments:

_____

_____

2. Please rate the effectiveness of this information product:

	Excellent	*More than satisfactory*	*Satisfactory*	*Less than satisfactory*	*Unsatisfactory*	*Not applicable*
Ease of use	☐	☐	☐	☐	☐	☐
Level of detail	☐	☐	☐	☐	☐	☐
Readability and clarity	☐	☐	☐	☐	☐	☐
Organization	☐	☐	☐	☐	☐	☐
Completeness	☐	☐	☐	☐	☐	☐
Technical accuracy	☐	☐	☐	☐	☐	☐
Quality of translation	☐	☐	☐	☐	☐	☐
Appearance	☐	☐	☐	☐	☐	☐

If your response to any of the above questions is "*Less than satisfactory*" or "*Unsatisfactory,*" please explain your rating.

_____

_____

3. If you could change one thing about this information product, what would it be?

_____

_____

4. Please write any other comments about this information product:

_____

_____

Please complete the following if we may contact you for clarification or to address your concerns:

Name: _____ Date: _____

Company/organization: _____ Telephone number: _____

Address: _____

Email address: _____ Job function: _____

If you choose to complete this form online, go to http://www.lucent-info.com/comments
Otherwise fax to 407 767 2760 (U.S.) or +1 407 767 2760 (outside the U.S.) or email comments to ctiphotline@lucent.com

Trouble Clearing Tasks

CONTENTS PAGE

Trouble Clearing Tasks

CONTENTS PAGE

LIST OF TABLES

1. INTRODUCTION

1.1 PURPOSE

This information product provides the trouble clearing procedures used to maintain the Lucent Technologies 3B21D computer. The procedures range from clearing cooling unit fan alarms to setting maintenance terminal (MTTY) options. The maintenance philosophy is also provided.

This information product is for the use of craft personnel as well as anyone interested in the *UNIX*[1] Real-Time Reliable (RTR) operating system and the 3B21D computer. The audience for this information product includes the following:

- Software developers
- Hardware developers
- Training course developers
- System administrators
- 3B21D computer documentation users.

1.2 UPDATE INFORMATION

1.2.1 REASON FOR UPDATE

This information product is being updated to include the following:

- Reorganize information and incorporate editorial changes.
- Provide information concerning the Discontinued Availability (DA) of the 9-track magnetic tape (MT) drive and associated peripheral cabinet. See Note in Procedure 4.1, Replace Cabinet Mounted SCSI 9-Track Tape Drive.

1.2.2 SUPPORTED SOFTWARE RELEASES

Documentation software releases for North American Region (NAR), international, and the RTR operating system non-*5ESS*® switch environment are as follows:

- For NAR, this information product supports 5E13 and later software releases.
- For international, this information product supports 5EE10 and later software releases.
- For the RTR operating system non-*5ESS* switch environment, this information product supports software release 21.0 and later.

1.3 ORGANIZATION

1.3.1 GENERAL

This information product is composed of sections and procedures and reference information (Table of Contents, Glossary, and Index). Each section contains procedures for clearing a particular trouble and may also contain subprocedures for clearing faults uncovered while clearing the primary fault. In such cases, these subprocedures are referenced from the main procedure as appropriate.

The remaining sections in this information product are organized as follows:

- Section 2 — *MAINTENANCE PHILOSOPHY AND ACCESSING PROCEDURES*

1. UNIX is a registered trademark of The Open Group in the United States and other countries.

- Section 3 — *CLEAR FAULTS*
- Section 4 — *REPLACE FAULTY UNIT OR CIRCUIT PACK*
- Section 5 — *VIDEO TERMINAL*
- Section 6 — *GENERAL PROCEDURE TO REPLACE CIRCUIT PACK*
- *GLOSSARY:* This section includes a listing of all the abbreviations/acronyms and their significant meanings.
- *INDEX:* This section includes an alphabetical listing (cross-referenced to applicable page numbers) for all procedures and subprocedures in the information product.

1.3.2 USING PROCEDURES

The procedures in this information product are easy to use for the experienced user. Steps requiring a more complicated action have "substeps" [(a), (b), (c),...] that provide detailed instructions.

1.3.3 USING SUPPLEMENTARY PROCEDURES

Some information products contain subprocedures that are used multiple times in the overall main procedure. Rather than repeating, these subprocedures are provided in a specific section; for example, Section 5.2, Supplementary Procedures.

1.3.4 CONVENTIONS USED

1.3.4.1 Command, Filename, and Display Notation

The input messages contained in this information product are listed in both Program Documentation Standard (PDS) and Man-Machine Language (MML) format. For example, a step instructing the user to enter an input message to the system would include both formats as follows:

- If MML, **VFY:MHD=***b***;**
- If PDS, **VFY:MHD** *b***!**

The *5ESS* switch uses MML and the *4ESS*™ switch uses PDS.

The following notations are used to show commands and filenames in the text and displays.

Note: System filenames and command names are case-sensitive; therefore, enter exactly as shown.

- Command names in text appear in **bold** type; for example, the **/bin/ls** command. Command names in headings appear in **bold** type.
- Filenames and form names in text appear in *italic* type; for example, the */bin/mount* file or the *scsdbody* form. Filenames and form names in headings appear in ***bold-italic*** type.
- Text that you enter, such as a command or response to a prompt, appears in **bold** type; for example, the **ls -la** command. The convention of making text that you enter **bold** overrides other conventions; for example, enter **scsdbody** for the form name.
- Variables that appear in a command line or file appear in *italic* type; for example, **grep** *username***/etc/passwd**. In this example, *username* is a variable indicating a user's name is required.

- Screen displays and system messages appear in **bold** type; for example, **Please enter your password.** Program code listings, file listings, and input messages are also shown in **bold** type.
- Comments and explanations within a display are indented and shown in *italic* type. These are for information only and will not appear on your screen.
- A line in a file or on the computer screen that is too long to be shown as it actually appears in this information product will be shown with a backslash (\) at the end of the first line. This indicates the next line should be read as a continuation of the current line.
- Square brackets around an argument on a command line indicate that the argument is optional; for example, the **lpstat** [**-t**] command. In this example, the **-t** argument is optional and can be omitted.
- A vertical bar (|) between words in an argument on a command line indicates that one of the arguments is to be selected.
- The key identified on your keyboard as Return, Enter, or a bent arrow is referred to as the Return key. Occasionally, representations of this Return key will be within brackets; for example, [Return].
- There is an implied Return at the end of each command and menu response that you enter. Some examples do not explicitly show the Return. Where you may be expected to enter a Return (as in the case where you are accepting a menu default), the symbol <CR> is shown to indicate that you are to press the Return key.
- Key combinations appear in a hyphenated format; for example, Ctrl-d. Press and hold down the first key of a key combination while pressing the second key.
- Ellipses (three dots) on a command line indicate that the previous argument can be repeated; for example, **ls** [*file* ...]. In this example, multiple files can be listed after the command.
- References to manual pages are followed by their manual page location number in parentheses; for example, **mount**(1M).

1.3.4.2 Hexadecimal Notation

Hexadecimal (base 16) numbers are denoted with a **0x** prefix; for example, 0x00A is decimal 10.

1.3.4.3 Equipment Locations

A coordinate numbering system is used to identify the equipment location (EQL) in units and cabinets. The origin is the lower left front of the cabinet or unit. Vertical increments are measured in inches. Horizontal increments are measured in eighths of an inch. The coordinate location of a circuit pack is expressed as the horizontal and vertical location of the center lines of the connector into which the circuit pack is inserted. The location of a unit in a cabinet is identified by the placement of the lower left corner of the unit in the cabinet. For example, a connector at EQL 004-080 is located 4 inches above the origin and 10 inches to the right of the origin (80 by 0.125 = 10.0).

1.3.4.4 Safety Labels

Safety labels are reminders used to assure the safety of personnel and to minimize service interruptions, loss of data, and damage to equipment, products, and software. Three types of safety labels are used in Lucent Technologies documentation. The three types, in descending order of priority, are as follows:

1. **DANGER** indicates the presence of a hazard that **will** cause death or severe personal injury if the hazard is not avoided.
2. **WARNING** indicates the presence of a hazard that **can** cause death or severe personal injury if the hazard is not avoided.
3. **CAUTION** indicates the presence of a hazard that **will** or **can** cause minor personal injury or property damage if the hazard is not avoided.

This information product contains safety labels in the form of WARNING and CAUTION statements.

1.4 USER FEEDBACK

We are constantly striving to improve the quality and usability of this information product (IP). Please use one of the following options to provide us with your comments:

- You may use the online comment form at: **http://www.lucent-info.com/comments**
- You may send your comments to **ctiphotline@lucent.com** via e-mail.
- You may use the enclosed feedback form to send us your comments.
- You may fax your comments to **1-407-767-2760**.
- You may mail your comments to the following address:

  Lucent Technologies
  Documentation Services Coordinator
  240 E. Central Parkway
  Altamonte Springs, FL 32701-9928

- You may call the HOTLINE with your comments. The telephone number is **1-800-645-6759**. The HOTLINE is staffed Monday through Friday from 8:30 a.m. to 6:00 p.m. Eastern time.

Please include with your comments the title, ordering number, issue number, and issue date of the IP, your complete mailing address, and your telephone number.

If you have questions or comments about the distribution of our IPs, see Section 1.5, Distribution.

1.5 DISTRIBUTION

For distribution comments or questions, either contact your local Lucent Technologies Account Representative or send them directly to the Lucent Technologies Customer Information Center (CIC) in Indianapolis, Indiana.

A documentation coordinator has authorization from Lucent Technologies to purchase our IPs at discounted prices. To find out whether your company has this authorization through a documentation coordinator, call **1-888-LUCENT8 (1-888-582-3688)**.

Customers who are not represented by a documentation coordinator and employees of Lucent Technologies should order *5ESS* switch IPs directly from CIC.

To order, call the following telephone number:

- **1-888-LUCENT8 (1-888-582-3688)** or fax to **1-800-566-9568** (from inside the continental United States)
- **1-317-322-6847** or fax to **1-317-322-6699** (from outside the continental United States).

1.6 TECHNICAL ASSISTANCE

For initial technical assistance, call the North American Regional Technical Assistance Center (NARTAC) at **1-800-225-RTAC (1-800-225-7822)**.

For further assistance, call the Customer Technical Assistance Management (CTAM) center at the following number:

- **1-800-225-4672** (from inside the continental United States)
- **1-630-224-4672** (from outside the continental United States).

Both centers are staffed 24 hours a day, 7 days a week.

1.7 REFERENCES

Table 1-1 lists by information product number the Lucent Technologies information products supporting the 3B21D computer.

Table 1-1 — Information Products Supporting 3B21D Computer

INFORMATION PRODUCT NUMBER	TITLE
254-303-100	3B21D Computer Growth/Retrofit Tasks
254-303-101	3B21D Computer Routine Maintenance Tasks
254-303-102	3B21D Computer Trouble Clearing Tasks
254-303-103	3B20D and 3B21D Computers *UNIX* RTR Operating System Processor Recovery Messages Guide
254-303-104	3B20D and 3B21D Computers *UNIX* RTR Operating System Recent Change and Verify Manual
254-303-105	3B21D Computer Hardware Reference Manual
254-303-106	3B20D and 3B21D Computers *UNIX* RTR Operating System System Maintenance Manual
254-303-107	3B20D and 3B21D Computers *UNIX* RTR Operating System Software Troubleshooting Guide
254-303-110	3B20D and 3B21D Computers *UNIX* RTR Operating System PDS Input Messages Manual
254-303-111	3B20D and 3B21D Computers *UNIX* RTR Operating System PDS Output Messages Manual
254-303-112	3B20D and 3B21D Computers *UNIX* RTR Operating System MML Input Messages Manual
254-303-113	3B20D and 3B21D Computers *UNIX* RTR Operating System MML Output Messages Manual

Information product references will not include full titles; for example, "Refer to 254-303-105, *Hardware Reference Manual*, for more information."

Trouble Clearing Tasks

CONTENTS PAGE

LIST OF FIGURES

LIST OF TABLES

2. MAINTENANCE PHILOSOPHY AND ACCESSING PROCEDURES

2.1 INTRODUCTION

The basic philosophy is to identify a fault as soon as possible, isolate the fault, and restore operations in a minimum amount of time. Emphasis is on corrective maintenance. Failures in the 3B21D computer are software or hardware detected, isolated to a frame, and reported to the craftsperson with sufficient detail to locate and remove the malfunction. Thus, most failures are detected and reported with minimal manual effort.

2.2 FAULT INDICATIONS

The following indicators report 3B21D computer failures to the craftsperson:

- Major audible alarm
- Visual alarm on all terminal display pages
- Circuit pack alarm light-emitting diodes (LEDs)
- Output messages at terminal and printer.

2.3 DIAGNOSTIC TESTS

The diagnostic test is the primary tool to verify that a fault exists and to verify that corrective action was effective. Diagnostic test results are output messages that indicate all tests pass (ATP), conditional all tests pass (CATP), no tests run (NTR), or some tests fail (STF). CATP and NTR indicate that a system resource was not available to the system to complete the diagnostic. The STF response provides the failing diagnostic phase and the failing test.

2.4 ASSUMPTIONS

It is assumed that the craft is familiar with the following subjects and activities which may arise during 3B21D computer trouble clearing.

- Once a fault is detected by observing an alarm or an output message, diagnostics must be performed. See Procedure 3.2, Clear Diagnostic Failures Using TLPs and Supplementary Diagnostic Procedures, for details. The TLP diagnostic option produces a list of suspected faulty equipment. Using Table 2-1 and the TLP list, locate a procedure for correcting the trouble. Perform the procedure. The procedure may direct you to perform diagnostics that have already been done. If you have already performed the same diagnostics before starting the procedure, skip to the next appropriate step and use the diagnostic results previously obtained. After replacing suspected faulty equipment, the diagnostics must be performed as requested in the procedure.
- When clearing a trouble, if several circuit packs are suspect, replace one circuit pack at a time according to the weight (WT) column in the trouble locating procedure (TLP) printout. The WT column will have a number from one to ten, with the equipment most likely to be faulty having the highest number. To replace a circuit pack, remove the unit from service, power down the unit, replace the circuit pack, power up the unit, and then rediagnose the unit. If diagnostic failure results are the same after replacing a circuit pack, reinstall the original circuit pack before replacing the next circuit pack. If diagnostic failure results are different, flag the removed circuit pack as faulty, and leave the replacement in the unit.

- The circuit pack code indicated on the TLP should match the pack code on the unit designation strip. If the TLP code does not agree with the designation strip code, contact the Lucent Technologies Customer Technical Support organization for assistance.
- Circuit packs with later letter suffix codes **can** be used as replacements for circuit pack codes identified by the TLP or the designation strip on the unit. Circuit packs with earlier letter suffix codes **cannot** be used as replacements for circuit pack codes identified by the TLP or designation strip. For example, if the TLP or designation strip identifies a TN1820 circuit pack, a TN1820 or TN1820B circuit pack can be used to replace it. However, a TN1820 circuit pack cannot be used to replace a TN1820B circuit pack.
- Always contact the next level of support before replacing online control unit circuit packs.
- Operations of the terminal to include mode changing, page manipulation, and message conventions.
- Tagging faulty circuit packs with office location, 3B21D computer number, mounting location, diagnostic phase and test that failed, other failure information such as receive-only printer (ROP) output and log files, and date removed.
- All test equipment is known to be functioning properly.
- A replacement unit or circuit pack is known to be good.
- Burned out lamps or LEDs are replaced without instruction.
- Audible alarms are retired without instruction.

2.5 ACCESSING PROCEDURES

All users need to be able to locate trouble clearing tasks in this information product by procedure title. However, the contents and titles of many procedures were originally created for experienced craft personnel and may not make sense to less experienced users. The following information is provided as an aid to assist all users in finding procedures in this information product.

In Table 2-1, find the circuit pack, unit, or task associated with the 3B21D computer procedure. Then, go to the procedure that is referenced.

Note: If replacing a 3B21D computer circuit pack that is not listed in Table 2-1, contact the Lucent Technologies Customer Technical Support organization for assistance.

Table 2-1 — Locating 3B21D Computer Trouble Clearing Procedures

FIND CIRCUIT PACK, UNIT, OR TASK LISTED BELOW	THEN, GO TO THE REFERENCED PROCEDURE IN THIS IP
Control Unit (CU)	
Fan Alarms (J5D003FH-2) in CU	Procedure 3.1
KBN15 Direct Memory Access (DMA 0 or 1)	Procedure 4.6
KLW31 Central Control	Procedure 4.6
KLW32, KLW40, KLW48, KLW64, or KLW128 Main Memory	Procedure 4.6
Central Control KLW31	Procedure 4.6
Clear failure using trouble locating procedure (TLP) diagnostic option to produce a list of suspected faulty equipment	Procedure 3.2
Clear Hardware Alarm Circuit faults that prevent a hardware major alarm from being reported or cause alarms to be falsely reported	Procedure 3.3
Clear power faults associated with TN1821, TN1820, UN375, UN376, UN377, UN580, and UN373	Procedure 3.5
Direct Memory Access (DMA 0 or 1) KBN15	Procedure 4.6
Disk File Controller (DFC) (Three versions of SCSI DFC)	Procedure 4.5
Version 1 — UN373, TN2116, and 410AA (DFC 0-3)	
Version 2 — UN580 and 410AA (DFC 0-3)	Procedure 4.5
Version 3 — UN580B (DFC 0-3)	Procedure 4.5
Fan Alarms (J5D003FH-2) in CU	Procedure 3.1
Fan Assembly - Replace KS-23912,L2 Fan Assembly on J5D003FH-2 Unit	Procedure 4.9
Fan Filter - Replace Cooling Fan Air Filter on J5D003FH-2 Unit	Procedure 4.10
Fuse/Filter Unit (FFU) Alarm Board	Procedure 4.7
Fuse/Filter Unit Fuse	Procedure 4.8
Input/Output Processor (IOP)	
KBN10 IOP 0-3	Procedure 4.4
TN1820 Input/Output Processor Power Switch	Procedures 3.5 and 4.4
IOP Peripheral Controller (PC) Community	
TN983, UN583, or UN597 Maintenance TTY Controller	Procedures 3.4 and 4.4
UN33D or UN933 Scanner and Signal Distributor Point PC	Procedure 3.8
TN74B Terminal Controller (Asynchronous)	Procedure 4.4
TN75C Synchronous Data Link Controller	Procedure 4.4
TN82B X.25 Synchronous Data Link Controller	Procedure 4.4

Table 2-1 — Locating 3B21D Computer Trouble Clearing Procedures (Contd)

FIND CIRCUIT PACK, UNIT, OR TASK LISTED BELOW	THEN, GO TO THE REFERENCED PROCEDURE IN THIS IP
IOP Peripheral Controller (PC) Community (Contd)	Procedure 4.4
TN1839 Synchronous Data Link Controller (NET2 compliant)	
TN1420 Synchronous Data Link Controller	Procedure 4.4
UN582 Synchronous Data Link, High-Speed Synchronous, Data Link Peripheral Controller	Procedure 4.4
KBN15 Direct Memory Access (DMA 0 or 1)	Procedure 4.6
KLW31 Central Control	Procedure 4.6
KLW32, KLW40, KLW48, KLW64, or KLW128 Main Memory	Procedure 4.6
Main Memory	
KLW32, KLW40, KLW48, KLW64, or KLW128	Procedure 4.6
Maintenance Terminal (KS-23996)	Procedures 3.4, 4.13, and 5.3
Receive-Only Printer Model 577	Procedures 3.6 and 4.11
Receive-Only Printer Model 602	Procedures 3.7 and 4.12
Replace SCSI DFC	Procedure 4.5
Replace IOP or circuit pack in IOP	Procedure 4.4
Respond to and Restore a Locked-Up Video Terminal	Procedure 5.1
SCSI Peripheral Units	
UN375 SCSI Disk Drive Circuit Pack	Procedure 4.3
UN376 SCSI Digital Audio Tape Drive (SPU 54)	Procedure 4.2
9-Track Magnetic Tape Drive (SPU 56-59)	Procedure 4.1
Software Alarm Circuits - Clear Faults	Procedure 3.8
TN74B Terminal Controller (Asynchronous)	Procedure 4.4
TN75C Synchronous Data Link Controller	Procedure 4.4
TN1820 Input/Output Processor Power Switch	Procedures 3.5 and 4.4
TN1821 Control Unit Power Switch	Procedures 3.5 and 4.6
TN410AA Power Converter (DC to DC converter) in IOP	Procedure 4.4
TN410AA Power Converter (DC to DC converter) in SCSI DFC	Procedure 4.5
TN410AA Power Converter (DC to DC converter) in CU	Procedure 4.6
UN377 Port Switch and Scanner-Distributor Buffer	Procedure 3.4
Video Terminal - Respond to and restore a locked-up video terminal	Procedure 5.1

2.6 ELECTROSTATIC DISCHARGE CONSIDERATIONS

Caution: Industry experience has shown that all integrated circuit packs can be damaged by static electricity that builds up on work surfaces and personnel. The static charges are produced by various charging effects of movement and contact with other objects. Dry air allows greater static charges to accumulate. Higher potentials are measured in areas with low relative humidity, but potentials high enough to cause damage can occur anywhere.

Observe the following precautions when handling circuit packs to prevent damage by electrostatic discharge (ESD):

- Assume all circuit packs contain solid-state electronic components that can be damaged by ESD.
- When handling circuit packs (storing, installing, removing, etc.) or when working on the backplane, always wear a grounded wrist strap or wear a heel strap and stand on a grounded, static-dissipating floor mat.
- Handle all circuit packs by the faceplate or latch and by the top and bottom outermost edges. Never touch the components, conductors, or connector pins.
- Observe all warning labels on bags and cartons. Whenever possible, do not remove circuit packs from antistatic packaging until ready to insert them into slots.
- If possible, open all circuit packs at a static-safe work position, using properly grounded wrist straps and static-dissipating table mats.
- Always store and transport circuit packs in static-safe packaging. Shielding is not required unless specified.
- Keep all static-generating materials such as food wrappers, plastics, and *Styrofoam*[1] containers away from all circuit packs. When removing circuit packs from a cabinet, immediately place the circuit packs in static-safe packages.
- Whenever possible, maintain relative humidity above 20 percent.
- Always keep the electromagnetic interference (EMI)/ESD protective front covers on the shelves except during an upgrade or maintenance procedure. Once a circuit pack is replaced in the shelf, immediately close the front cover.

Any connectors on the shelf interconnection panel that are not cabled should be fitted with a plastic dust cap to provide ESD protection.

To reduce the possibility of ESD damage, shelves are equipped with grounding jacks to enable personnel to ground themselves using wrist straps (Figure 2-1), while handling circuit packs/units or working on a shelf. The jacks for connection of wrist straps are located on each fuse panel and user panel and the upper left corner of the equipment cabinet. These jacks are labeled "ESD Wrist Strap Grounding Point." The wrist straps should also be checked periodically with a wrist strap tester to ensure that they are working properly.

1. Registered trademark of Dow Chemical Company.

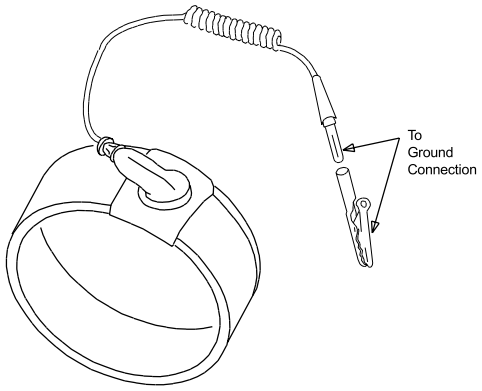


Figure 2-1 — Static Control Wrist Strap

IMPORTANT SAFETY INSTRUCTIONS

READ, UNDERSTAND, AND SAVE ALL INSTRUCTIONS.

When using this telecommunication equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

1. Follow all warnings and instructions marked on the product.
2. Slots and openings and the back or bottom of this product are provided for ventilation. To protect it from overheating, these openings must not be blocked or covered.
3. Opening or removing rear covers or sheet-metal parts may present exposure to high current or electrical energy levels, or to other risks. Refer all servicing in those areas to qualified service personnel.
4. Never push objects of any kind into this product through slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock. Never spill liquid of any kind on the product.
5. Refer servicing to qualified service personnel.

IMPORTANT INSTALLATION SAFETY INSTRUCTIONS

READ, UNDERSTAND, AND SAVE ALL INSTRUCTIONS.

1. Use caution when installing and modifying telecommunications lines.
2. Never install telecommunication wiring during a lightning storm.
3. Never install telecommunication jacks in wet locations unless the jack is specifically designed for wet locations.
4. Never touch uninsulated telecommunication wires or terminals unless the telecommunication line has been disconnected at the network interface.
5. Installation must include an independent frame ground conductor to building ground. Grounding/bonding circuit continuity is vital for safe operation of this equipment. Never operate with grounding/bonding conductor disconnected.
6. This product has two -48 V DC input power feeders. Disconnecting one power feeder will not de-energize the product. To reduce the risk of injury, disconnect both power supply cables when removing power from the system.

7. Metallic telecommunication interfaces should not leave the building premises unless connected to telecommunication devices providing primary and secondary protection, as applicable.
8. For continued protection against risk of fire, replace only with same type and rating of fuse.
9. Use only Lucent Technologies manufactured, recognized circuit packs.

2.7 SECURITY

Lucent Technologies has designed the maintenance terminal (MTTY) so that, when properly administered, it will minimize the ability of unauthorized persons to gain access to the network. Each authorized user should be instructed about the proper use of the MTTY.

2.8 REFERENCES

The following references may be useful in troubleshooting. See Table 1-1 for additional references.

- SD-3T011-01, *3B21D Computer Processor Unit Circuit*
- SD-3T012-01, *3B21D Computer Growth Unit Circuit*
- SD-3T015-01, *3B21D Computer Systems Circuit*.

Trouble Clearing Tasks

CONTENTS PAGE

LIST OF FIGURES

LIST OF TABLES

3. CLEAR FAULTS

OVERVIEW OF TROUBLE CLEARING PROCESS

This information product assumes the craftsperson already knows how to respond to an alarm. If additional information is required on the overall process, refer to 254-303-106, *System Maintenance Manual*, Chapter 2, "Maintenance Plan," paying special attention to the "Responding to Alarms" section.

Refer to 254-303-106, *System Maintenance Manual*, Chapter 6, "Diagnostics," paying special attention to the "Performing Diagnostics" section.

When combined with hands-on maintenance training like ES5555, the 254-303-106, *System Maintenance Manual*, provides the craftsperson with the proper background to perform routine maintenance and corrective action. It is imperative that you know how to respond to alarms before they occur by getting the proper training and being familiar with the available information products (documentation).

Diagnostic Tests

Diagnostic tests are run using the **DGN** input command or the menu/poke commands on the Master Control Center (MCC) page. The trouble locating procedure (TLP) option must be used with the **DGN** input command to generate a list of suspected faulty equipment if failures are detected. For example, if you enter poke command **501;** to diagnose administrative module (AM) 1 from the 111, 112 MCC Page, a list of suspected faulty equipment will not be generated by default. Since it takes approximately 20 minutes to diagnose the AM, always use the TLP option. For example, enter **501,TLP;** from the 111, 112 MCC Page to diagnose AM 1 with a TLP list.

If a note number appears in the last column on the suspected faulty equipment list, obtain the text for the TLP note prior to replacing the circuit pack to see what precautions or additional procedures are required. The text for the note can be obtained by entering **OP:TLPNOTE n** command, where **n** is the TLP note number. Refer to 254-303-106, *System Maintenance Manual*, Chapter 6, "Diagnostics," the "How to Interpret Output from TLP Option" section for additional information.

Diagnostic test results are output messages that indicate all tests pass (ATP), conditional all tests pass (CATP), no tests run (NTR), or some tests fail (STF). CATP and NTR indicate that some system resource was not available to the system to complete the diagnostic. The STF response provides the failing diagnostic phase and the failing test.

Sometimes it is necessary to compare two or more diagnostic failure printouts to determine if a problem is inconsistent/intermittent or the same failure. Be sure to examine the phase, segment, test, and mismatch information.

Trouble Clearing Stimuli

Failures are reported to the craftsperson by one or more of the following fault indications:

- Audible alarm
- Visual alarm or labels on the MCC pages
- Circuit pack alarm light-emitting diodes (such as ALM LEDs)
- Output messages on the MCC or receive-only printer (ROP).

These fault indicators are designed to get the craftsperson attention so that a fault can be cleared in a minimum amount of time. The first response to a failure is to retire any audible alarm and determine the level and severity of the alarm as follows:

- Critical – An immediate response is required.
- Major – The craftsperson responds with less urgency than required for a critical alarm.
- Minor – The craftsperson should note the alarm but immediate corrective action is not required.

Determine What to Diagnose?

Even though a diagnostic test is the primary tool to identify and isolate a fault, the craftsperson cannot start randomly running diagnostics hoping to find the fault. The craftsperson must evaluate the entire situation and begin narrowing down the cause of the alarm by examining the following:

- Labels on MCC pages
- Circuit pack ALM LEDs indicating out of service (OOS)
- Output messages on the MCC or ROP
- Other sources like another craftsperson taking a unit OOS while performing corrective action or growth.

When an automatically scheduled diagnostic fails, the appropriate alarm is activated, the affected unit is taken out of service, and a some test failed (STF) message is printed. The STF response provides the failing diagnostic phase, failing test, and a printout of suspected faulty equipment. This list and the OOS equipment shown on the MCC pages are used to narrow down the cause of an alarm.

When a unit is removed from service, a minor alarm will sound and an output message will be received similar to one of the following:

```
RMV DFC a COMPLETED
RMV DUI a COMPLETED
RMV DUIC a COMPLETED
RMV HSD a COMPLETED
RMV HSDC a COMPLETED
RMV IOP a COMPLETED
RMV SCSDC a COMPLETED
RMV SDL a COMPLETED
RMV SDLC a COMPLETED
RMV MHD a COMPLETED
RMV MT a COMPLETED
RMV MTC a COMPLETED
RMV MTTY a COMPLETED
RMV MTTYC a COMPLETED
RMV ROP a COMPLETED
RMV SBUS a COMPLETED
RMV SCC a COMPLETED
RMV TTY a COMPLETED
RMV TTYC a COMPLETED
```

Where: a = Member number.

Running Diagnostic Tests

Once a faulty unit is identified as possibly causing a failure, manually run diagnostic tests on the unit to isolate the problem down to a circuit pack level by performing Procedure 3.2, Clear Diagnostic Failures Using TLPs and Supplementary Diagnostic Procedures.

Accessing Procedures to Clear Faults

The diagnostic results obtained by performing Procedure 3.2 will result in a TLP weighted list of suspected faulty circuit packs. As part of Procedure 3.2, the craftsperson will be asked to replace the first or next circuit pack on this TLP list. Next, the craftsperson is given a choice for locating a procedure to replace the listed circuit pack or unit to be replaced as follows:

- Locate replacement procedure in Table 2-1.
- Go to Procedure 6.1, General Procedure to Replace Circuit Pack.

This choice accommodates different levels of experience by the craftsperson. Only the most experienced users should go to Procedure 6.1 to replace a circuit pack. Procedure 6.1 does not contain overviews and the necessary background information needed by less experienced craftspersons. Where possible, most craftspersons should use Table 2-1 to access the appropriate procedure for replacing a circuit pack or unit. The procedures referenced in Table 2-1 will always have more detailed information than Procedure 6.1.

Performing Procedure 3.2 and the referenced procedure in Table 2-1 or Procedure 6.1 should solve up to 80 percent of the problems requiring corrective action.

Sometimes faults cannot be detected by diagnostics or diagnostics cannot be run when this occurs; consider the following:

- When a unit appears faulty and corrective action proves the unit is not faulty, the alarm circuit for the unit may be faulty. To fix faults with the hardware alarm and power alarm circuits, see Procedure 3.3, Clear Hardware Alarm Circuit Faults. To clear software alarm faults, see Procedure 3.8, Clear Software Alarm Circuit Faults.
- To clear MCC faults like no MCC pages, see Procedure 3.4, Clear KS-23996, L1 MTTY Faults.
- To respond to and restore a locked-up video terminal, see Procedure 5.1, Video Terminal.
- See Table 2-1 to find an appropriate task.
- Refer to the appropriate recovery documentation for your application; for example, *5ESS*® switch information products refer to 235-105-250, *System Recovery*, and 235-600-601, *Processor Recovery Messages*. Other applications may refer to 254-303-106, *System Maintenance Manual*, Chapter 3, “Recovery,” and 254-303-103, *Processor Recovery Messages Guide*.
- Escalate to next level of support.

3.1 CLEAR CU FAN ALARMS

OVERVIEW

This procedure provides instructions to clear CU fan alarms. The bidirectional cooling unit, J5D003FH-2, is equipped in the processor cabinet at vertical equipment location (EQL) 36. The unit contains two groups of fans and an alarm circuit. Three fans are in each group. One group blows air upward to cool control unit 1 (CU 1), disk file controller 1 (DFC 1), the input/output processor 1 (IOP 1), and small computer system interface (SCSI) peripheral units (SPUs) associated with DFC 1. Also, IOP 3 and SPUs in the upper growth unit are cooled. The other group blows air downward to cool CU 0, DFC 0, IOP 0, and SPUs associated with DFC 0. Also, IOP 2 and SPUs in the lower growth unit are cooled.

The fan motors operate on -48 V DC. Fan groups 0 and 1 are powered from fuse/filter unit (FFU) side 0 and 1, respectively. The alarm circuit is powered by N48VFANC and N48VFANG that are ORed with the alarm circuit board.

Each fan includes an integral fan performance sensor (FPS) that operates from +5 V DC obtained from the board mounted power module (BMPM) in the alarm circuit. If one or more fans fail, the circuit latches an alarm state on its scan point output. Signal distributor point 08 or a switch on the cooling unit fan tray controller (FTC) can be used to manually retire the alarm.

PROCEDURE

1. At the FTC EQL 036-006 in the rear of the 3B21D computer processor cabinet, is a **FAN FAIL** light-emitting diode (LED) lit for fan A, B, C, E, F, or G?

   If **YES**, continue to Step 2.

   If **NO**, go to Step 12.

2. Retire the control unit (CU) fan alarm by operating the fan alarm **T/R** (test/reset) switch on the FTC to the **R** position.

3. Is the **FAN FAIL** LED still lit?

   If **YES**, continue to Step 4.

   If **NO**, go to Step 12.

4. From the **FAN FAIL** LED, determine which fan (A, B, C, E, F, or G) has failed.

5. Is the failed fan unit operating?

   If **YES**, go to Step 13.

   If **NO**, continue to Step 6.

6. Is the fuse blown that is associated with the failed fan unit?

   Note: Reference the Fuse Label Flip Panel at the top front of the processor cabinet.

   If **YES**, continue to Step 7.

   If **NO**, go to Step 9.

7. Replace the fuse associated with the failed fan unit with a new fuse. See Procedure 4.8.

Note: Reference the Fuse Label Flip Panel at the top front of the processor cabinet.

8. Is the fuse associated with the failed fan unit still blown?

   Note: Reference the Fuse Label Flip Panel at the top front of the processor cabinet.

   If **YES**, continue to Step 9.

   If **NO**, go to Step 11.

9. Has the failed fan unit been changed?

   If **YES**, go to Step 14.

   If **NO**, continue to Step 10.

10. Replace the failed fan unit, and return to Step 2. See Procedure 4.9.

11. Retire the CU fan alarm by operating the fan alarm **T/R** switch on the FTC to the **R** position.

12. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

13. Replace the fan filter, and return to Step 2. See Procedure 4.10.

14. Reference SD-3T015-11 and SD-5D168-01 to correct wiring fault, or escalate to next level support.

15. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

3.2 CLEAR DIAGNOSTIC FAILURES USING TLPs AND SUPPLEMENTARY DIAGNOSTIC PROCEDURES

OVERVIEW

This procedure is divided into two subprocedures. It contains the trouble locating procedure (TLP) for clearing 3B21D computer diagnostic failures and supplementary procedures for running demand diagnostics on the control unit (CU) and the disk file controller (DFC). Users may want to refer to 254-303-106, *System Maintenance Manual*, Chapter 6, "Diagnostics," and Appendix B, "Remove Unit from Service," before trying to clear diagnostic failures.

The TLP diagnostic option produces a list of suspected faulty equipment when the diagnostic fails. An equipment list is output after the diagnostic is completed. The equipment most likely to be faulty is listed first, followed by other suspected equipment in descending order. For each TLP entry, the following information may be given:

Code	Equipment code
EQL	Equipment location
SD	Schematic drawing number
FS	Functional schematic within the SD
SYM	Symbol number within the SD
UNIT	Unit in which the equipment resides (if not in the unit under diagnosis)
WT	Weight, on a scale from one to ten, with the equipment most likely to be faulty having the highest number.
NOTE	If nonzero, refer to 254-303-106, *System Maintenance Manual*, Chapter 6, "Diagnostics," for further information.

Note: Record the failing test data (phase, tests, and mismatches) in response to a diagnostic failure. Then, replace suspected faulty circuit packs in weighted order. If the test data does not change when diagnostics are run again, the original circuit pack is not faulty and needs to be reinstalled.

PROCEDURE

1. Have routine diagnostics been run on the failing unit?

   If **YES**, routine diagnostics did not detect a failure and the CU or DFC is suspected of being faulty, go to Procedure 3.2.2 and run supplementary diagnostics.

   If **NO**, go to Procedure 3.2.1 and run diagnostics using the TLP option.

2. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

3.2.1 TROUBLE-LOCATING DIAGNOSTIC PROCEDURE

PROCEDURE

This subprocedure provides instructions for clearing 3B21D computer diagnostic failures using the trouble locating procedure (TLP) diagnostic option.

1. At terminal, enter the appropriate input command.

   - If MML,
     - — **DGN:***unit=a***:RAW,DEX:TLP;**
     - — **DGN:***unit=a*,*subunit=b***:RAW,DEX:TLP;**
     - — **DGN:***unit=a*,*subunit=b***:RAW:PH=***d***,TLP;**
     - — **DGN:***unit=a***:RAW:PH=***d***,TLP,***helper_unit=f***;**
   - If PDS,
     - — **DGN:***unit a***;RAW,DEX:TLP!**
     - — **DGN:***unit a*,*subunit b***;RAW,DEX:TLP!**
     - — **DGN:***unit a*,*subunit b***;RAW:PH** *d***,TLP!**
     - — **DGN:***unit a***;RAW:PH** *d***,TLP,***helper_unit f* **!**

   Where: *unit* = Unit name (see Table 3.2.1-1).
   a = Unit number.
   subunit = Subunit name (see Table 3.2.1-1).
   b = Subunit number.
   d = Begin phase number.
   helper_unit = helper_unit name (see Table 3.2.1-1).
   f = helper_unit number.

Table 3.2.1-1 — Unit, Subunit, and Helper Unit Names

UNIT NAME	SUBUNIT NAME	HELPER UNIT NAME
CU	CC	(NONE)
CU	MASC	(NONE)
CU	DMA	(NONE)
CU	CH	(NONE)
CU	UC	(NONE)
DFC	(NONE)	OOS_CU
MHD	(NONE)	(NONE)
IOP	(NONE)	OOS_CU
DUIC	(NONE)	(NONE)
MT	(NONE)	(NONE)
MTTYC	(NONE)	(NONE)
SCSDC	(NONE)	(NONE)
SDLC	(NONE)	(NONE)
TTYC	(NONE)	(NONE)

2. Is the diagnostic result all tests pass (ATP)?

   If **YES**, continue to Step 3.

   If **NO**, go to Step 6.

3. Restore the unit to service. See Procedure 6.6.

4. Did the unit restore to service?

   If **YES**, continue to Step 5.

   If **NO**, escalate to the next level of support.

5. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

6. Record the failing test data, replace the first or next circuit pack on the TLP list not previously replaced, and manually run diagnostics on the failing unit if automatic diagnostics are not invoked. For the circuit pack being replaced, use Table 2-1 to locate a replacement procedure. If an experienced user, see Procedure 6.1.

   Note: If the next item on the TLP list is an online circuit pack or a main store controller (MASC) update cable, notify the next level of support before replacing.

7. Is the diagnostic result ATP?

   If **YES**, return to Step 4.

   If **NO**, continue to Step 8.

8. Have all the circuit packs on the TLP list been replaced?

   If **YES**, continue to Step 9.

   If **NO**, return to Step 6.

9. Escalate to the next level of support or see Table 3.2.1-2 and the system diagnostic output to clear the fault.

10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Table 3.2.1-2 — Schematic Drawings, Functional Schematics (FS), and FS Name Relationships

DRAWING	FS	FS NAME
SD-3T011-01	1	Control Unit (CU) Power and Power Control CU Power Converters
	2	Processor Control
	3	Main Memory Circuit
	4	Direct Memory Access (DMA) Interface Dual Serial Channel (DSCH) Interface
	5	Input/Output Processor (IOP) (Basic) Power
	6	Dual Serial Channel Interface, IOP Controller IOP Positions - PCs 00-03, 10-13, 20-23, and 30-32
	7	Disk File Controller A (DFCA), DFCB, and DFC Power
	8	Expansion Slots
	9	Small Computer System Interface (SCSI) Peripheral, SCSI Bus, and SCSI Disk 0 SCSI Peripheral, SCSI Bus, and SCSI Disk 1
	10	SCSI Tape Peripheral Port Switch and Scan Distribution Spare Port Switch Slot
	11	Terminal Fields for SCSI Bus A and Bus B
SD-3T012-01	1	IOP Power
	2	DFC
	3	DFC Power
	4	Dual Serial Channel Interface and IOP Controller
	5	Growth IOP Positions - PCs 00-03 and 10-13
	6	Growth IOP Positions - PCs 20-23 and 30-33
	7	Terminal Fields for SCSI Bus X and Bus Y
SD-3T015-01	1	3B21D Computer System Fixed Floor Plan
	2	3B21D Computer Processor Cabinet DFC DSCH Interconnection IOP DSCH Interconnection Growth IOP DSCH and Scan Interconnection Growth DFC 2 DSCH and Scan Interconnections Port Switch Interconnections Emergency Action Interface (EAI) Interconnections Boundary Scan Interconnection Maintenance Channel (MCH) Interconnection IOP Scan, Fuse and Fan Memory Update Interconnection
	3	3B21D Computer System Growth Cabinet

3.2.2 SUPPLEMENTARY DIAGNOSTIC PROCEDURES

OVERVIEW

This subprocedure contains instructions for running demand diagnostic phases on the CU and the DFC. Generally, these phases exercise the hardware in cases where hardware problems are expected, but routine diagnostics do not indicate failures. Demand phases typically provide internal repeat capabilities and extended time limits. Although not normally used, these diagnostic phases can be used on an individual basis to investigate intermittent and data-dependent faults.

Note 1: For information on IOP Phase 16, DFC Phase 14, and DFC Phase 15 diagnostics, refer to 254-303-101, *Routine Maintenance Tasks*, Chapter 12, "Perform System Demand Diagnostics."

Note 2: The system diagnostic phases provided in 254-303-101, *Routine Maintenance Tasks*, are run on a routine basis. The demand phases in Tables 3.2.2-1 and 3.2.2-2 are run only as required for the following reasons:

- Require long run time
- Require manual operation
- Require manual interpretation of results
- Require special procedures
- Require an out-of-service (OOS) helper unit.

PROCEDURE

1. On which unit do you want to run demand diagnostics?

   If CU, continue to Step 2.

   If DFC, go to Step 6.

2. At terminal, enter the requested commands from Table 3.2.2-1 [Man-Machine Language (MML)] or Table 3.2.2-2 [Program Documentation Standard (PDS)], one at a time. After entering the requested commands for the CU, continue to Step 3. The CU being diagnosed must be standby and the other CU must be active prior to beginning this procedure. To switch the active/standby status of the CUs, enter the appropriate input command.

   - If MML, **SW:CU;**
   - If PDS, **SW:CU!**

   Response: **SW CU** *a* **COMPLETED**

   Where: a = Unit number.

Table 3.2.2-1 — CU Supplementary Diagnostic Phases (MML)

ITEM NO.	SUBUNIT	UNIT	PHASE	DIAGNOSTIC TYPE	FREQUENCY	COMMAND
1	CU 0	CC 0	34	REX, DEX, DEMAND	As required (5-minute test)	DGN:CU=0,CC=0:PH=34;
2	CU 0	CC 0	89	REX, DEX, DEMAND	As required[a] (40-second test)	DGN:CU=0,CC=0:PH=89;
3	CU 0	DMA 0	10	DEMAND	As required	DGN:CU=0,DMA=0:PH=10;
4	CU 0	MASC 0	96	REX, DEX, DEMAND	As required	DGN:CU=0,MASC=0:PH=96;
5	CU 0	UC 0	90	DEMAND	As required[b]	DGN:CU=0,UC=0:PH=90;
6	CU 0	UC 0	91	DEMAND	As required[b]	DGN:CU=0,UC=0:PH=91;
7	CU 0	UC 0	92	DEMAND	As required[b]	DGN:CU=0,UC=0:PH=92;
8	CU 0	UC 0	93	DEMAND	As required[b]	DGN:CU=0,UC=0:PH=93;
9	CU 1	CC 0	34	REX, DEX, DEMAND	As required (5-minute test)	DGN:CU=1,CC=0:PH=34;
10	CU 1	CC 0	89	REX, DEX, DEMAND	As required[a] (40-second test)	DGN:CU=1,CC=0:PH=89;
11	CU 1	DMA 0	10	DEMAND	As required	DGN:CU=1,DMA=0:PH=10;
12	CU 1	MASC 0	96	REX, DEX, DEMAND	As required	DGN:CU=1,MASC=0:PH=96;
13	CU 1	UC 0	90	DEMAND	As required[b]	DGN:CU=1,UC=0:PH=90;
14	CU 1	UC 0	91	DEMAND	As required[b]	DGN:CU=1,UC=0:PH=91;
15	CU 1	UC 0	92	DEMAND	As required[b]	DGN:CU=1,UC=0:PH=92;
16	CU 1	UC 0	93	DEMAND	As required[b]	DGN:CU=1,UC=0:PH=93;

Note(s):

a. Indicates these phases run during routine exercise (REX); use for troubleshooting only.

b. Indicates manual action is required; use extreme caution before running. Refer to 254-303-106, *System Maintenance Manual*, Chapter 6, "Diagnostics."

Table 3.2.2-2 — CU Supplementary Diagnostic Phases (PDS)

ITEM NO.	SUBUNIT	UNIT	PHASE	DIAGNOSTIC TYPE	FREQUENCY	COMMAND
1	CU 0	CC 0	34	REX, DEX, DEMAND	As required[a] (5-minute test)	DGN:CU0,CC0:PH34!
2	CU 0	CC 0	89	REX, DEX, DEMAND	As required[a] (40-second test)	DGN:CU0,CC0:PH89!
3	CU 0	DMA 0	10	DEMAND	As required	DGN:CU0,DMA0:PH10!
4	CU 0	MASC 0	96	REX, DEX, DEMAND	As required	DGN:CU0,MASC0:PH96!
5	CU 0	UC 0	90	DEMAND	As required[b]	DGN:CU 0,UC0:PH90!
6	CU 0	UC 0	91	DEMAND	As required[b]	DGN:CU0,UC0:PH91!
7	CU 0	UC 0	92	DEMAND	As required[b]	DGN:CU0,UC0:PH92!
8	CU 0	UC 0	93	DEMAND	As required[b]	DGN:CU0,UC0:PH93!
9	CU 1	CC 0	34	REX, DEX, DEMAND	As required (5-minute test)	DGN:CU1,CC0:PH34!
10	CU 1	CC 0	89	REX, DEX, DEMAND	As required[a] (40-second test)	DGN:CU1,CC0:PH89!
11	CU 1	DMA 0	10	DEMAND	As required	DGN:CU1,DMA0:PH10!
12	CU 1	MASC 0	96	REX, DEX, DEMAND	As required	DGN:CU1,MASC0:PH96!
13	CU 1	UC 0	90	DEMAND	As required[b]	DGN:CU1,UC0:PH90!
14	CU 1	UC 0	91	DEMAND	As required[b]	DGN:CU1,UC0:PH91!
15	CU 1	UC 0	92	DEMAND	As required[b]	DGN:CU1,UC0:PH92!
16	CU 1	UC 0	93	DEMAND	As required[b]	DGN:CU1,UC0:PH93!

Note(s):

a. Indicates these phases run during routine exercise (REX); use for troubleshooting only.

b. Indicates manual action is required; use extreme caution before running. Refer to 254-303-106, *System Maintenance Manual*, Chapter 6, "Diagnostics."

3. Is all tests passed (ATP) **MESSAGE COMPLETE** output message received?

   If **YES**, continue to Step 4.

   If **NO**, see Procedure 3.2.1.

4. Have all requested demand diagnostics in Table 3.2.2-1 or Table 3.2.2-2 been completed for the CU being tested?

   If **YES**, continue to Step 5.

   If **NO**, return to Step 2.

5. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

6. The 3B21D computer supports three versions of the DFC as follows:

   DFC Version 1 Consists of circuit packs UN373 and TN2116 and a 410AA power converter. The UN373 circuit pack provides the SCSI bus interface. The TN2116 SCSI Host Adapter (HA) circuit pack supports SCSI-1 and controls the SCSI bus. The 410AA power converter supplies power to the DFC.

   DFC Version 2 Consists of a UN580 circuit pack and a 410AA power converter. The 410AA power converter supplies power to the DFC.

DFC Version 3 Consists of a UN580B circuit pack. The UN580B has an onboard power supply that replaces the need for a 410AA power converter.

This procedure will run demand diagnostics for all DFC versions.

Requirement 1: All DFCs must be active with all moving head disks (MHDs) in service prior to beginning this procedure.

Requirement 2: CU 1 must be active and CU 0 must be standby prior to beginning this procedure. If CU 1 is not active, enter the appropriate input command.

- If MML, **SW:CU;**
- If PDS, **SW:CU!**

Response: **SW CU 1 COMPLETED**

7. At terminal, enter the first (or next) requested command from Table 3.2.2-3 (MML) or Table 3.2.2-4 (PDS), one at a time. After entering each requested command for the DFC unit, continue to Step 8.

Table 3.2.2-3 — DFC Supplementary Diagnostic Phases (MML)

ITEM NO.	UNIT	PHASE	DIAGNOSTIC TYPE	FREQUENCY	COMMAND
1	DFC 0	90	DEMAND	As required[a]	DGN:DFC=0:PH=90;
2	DFC 0	90	DEMAND	As required[a]	DGN:DFC=0:PH=90;
3	DFC 1	90	DEMAND	As required[a]	DGN:DFC=1:PH=90;
4	DFC 1	90	DEMAND	As required[a]	DGN:DFC=1:PH=90;

Note(s):

a. Indicates manual action is required; use extreme caution before running. Refer to 254-303-106, *System Maintenance Manual*, Chapter 6, "Diagnostics."

Table 3.2.2-4 — DFC Supplementary Diagnostic Phases (PDS)

ITEM NO.	UNIT	PHASE	DIAGNOSTIC TYPE	FREQUENCY	COMMAND
1	DFC 0	90	DEMAND	As required[a]	DGN:DFC 0:PH 90!
2	DFC 0	90	DEMAND	As required[a]	DGN:DFC 0:PH 90!
3	DFC 1	90	DEMAND	As required[a]	DGN:DFC 1:PH 90!
4	DFC 1	90	DEMAND	As required[a]	DGN:DFC 1:PH 90!

Note(s):

a. Indicates manual action is required; use extreme caution before running. Refer to 254-303-106, *System Maintenance Manual*, Chapter 6, "Diagnostics."

8. Is ATP **MESSAGE COMPLETE** output message received?

   If **YES**, continue to Step 9.

   If **NO**, see Procedure 3.2.1.

9. Have all requested demand diagnostics in Table 3.2.2-3 or Table 3.2.2-4 been completed for the DFC being tested?

   If **YES**, continue to Step 10.

   If **NO**, return to Step 7.

10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

3.3 CLEAR HARDWARE ALARM CIRCUIT FAULTS

OVERVIEW

This procedure provides instructions to clear hardware alarm faults. The 3B21D computer has three alarm reporting mechanisms: a hardware alarm circuit, a power alarm circuit, and a software alarm. This procedure is used to fix faults with the hardware alarm and power alarm circuits. See Procedure 3.8, Clear Software Alarm Circuit Faults, to clear software alarm faults.

The hardware major alarm circuit (Figure 3.3-1) consists of a duplicated pair of parallel hardwired multiple connections. Each pair is labeled major (MJ)/major return (MJR). One pair is used for the upper half (processor 1 hardware) and the other pair is used for the lower half (processor 0 hardware) going to physical connection points on each processor. These connection points may or may not be used by the particular application. When used, the application assigns the terminating equipment; for example, aisle alarms.

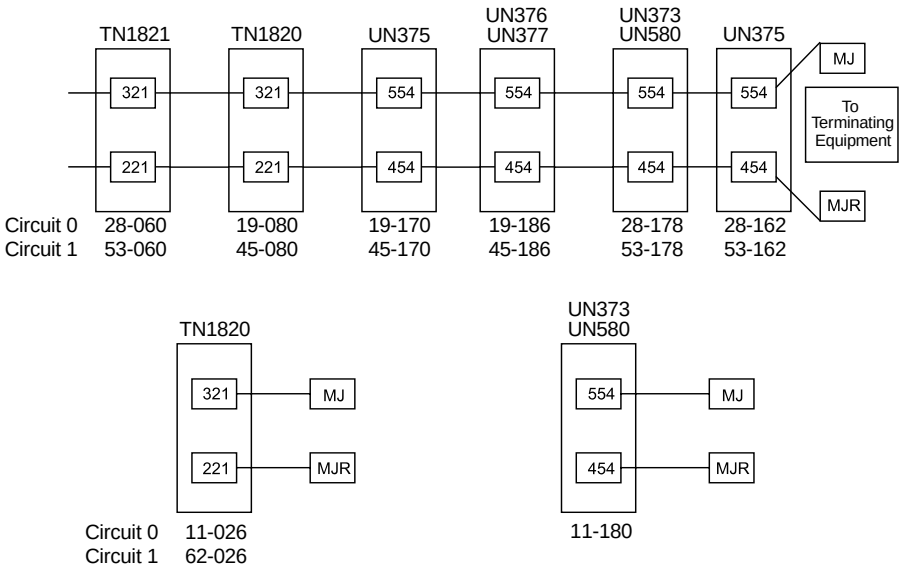
Hardware alarm circuit faults are those faults that prevent a hardware major alarm from being reported or that cause alarms to be falsely reported. This procedure is not intended to fix actual power unit faults. (See Procedure 3.5, Clear CU, DFC, IOP, SPU, and Port Switch Power Faults, to clear power unit faults.) It is intended to fix faults with the hardware alarm circuit which is used to report major alarm conditions with the 3B21D computer hardware.

The power alarm circuit (Figure 3.3-2) consists of a duplicated pair of parallel hardwired multiple connections. Each pair is labeled power alarm (PA)/power alarm return (PAR). One pair is used for the upper half (processor 1 hardware) and the other pair is used for the lower half (processor 0 hardware) going to physical connection points on each control unit (CU). These connection points may or may not be used by the particular application. When used, the application assigns the terminating equipment; for example, aisle alarms.

Power alarm circuit faults are those faults that prevent a hardware power alarm from being reported or that cause a power alarm to be falsely reported. This procedure is not intended to fix actual power alarm faults. It is intended to fix faults with the power alarm circuit which is used to report 3B21D computer hardware power alarm conditions. See Figure 3.3-1.

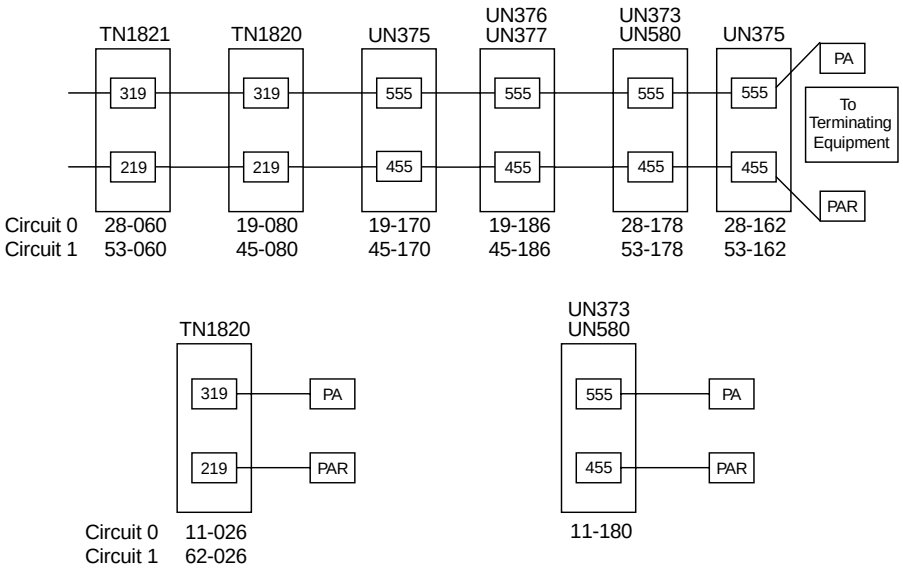
The following is a list of hardware that can cause hardware alarm circuit faults. The hardware is listed in order from the most likely to the least likely cause of a fault.

- Defective power switch or equivalent in the faulty equipment
- Defective or loose alarm cable from the hardware alarm connection point to the terminating equipment
- Defective terminating equipment
- Backplane problem in the hardware alarm circuit.



Legend:
TN1820 - Input/Output Processor Power Switch (IOPPS)
TN1821 - Control Unit Power Switch (CUPS)
UN373 - Disk File Controller (DFC)
UN375 - Small Computer System Interface (SCSI) Moving Head Disk (MHD) Circuit Pack
UN376 - SCSI Digital Audio Tape (DAT) Circuit Pack
UN377 - Port Switch and Scanner Distributor Buffer (PSSDB)
UN580 - DFC

Figure 3.3-1 — Hardware Major Alarm Circuit



Legend:
TN1820 - Input/Output Processor Power Switch (IOPPS)
TN1821 - Control Unit Power Switch (CUPS)
UN373 - Disk File Controller (DFC)
UN375 - Small Computer System Interface (SCSI) Moving Head Disk (MHD) Circuit Pack
UN376 - SCSI Digital Audio Tape (DAT) Circuit Pack
UN377 - Port Switch and Scanner Distributor Buffer (PSSDB)
UN580 - DFC

Figure 3.3-2 — Power Alarm Circuit

PROCEDURE

1. At the maintenance terminal (MTTY), enter the appropriate input command.

   - If MML, **OP:SCSD:UNIT=*a*;**
   - If PDS, **OP:SCSD;UNIT *a*!**

   Where: *a* = Scanner and signal distributor controller (SCSDC) unit number (0, 1, etc.) to be displayed. See Table 3.3-1.

Table 3.3-1 — Scanner and Signal Distributor Controller Information

	SCSDC0 AT 19-110			SCSDC1 AT 45-110			SCSDC *x* AT 28-130[a]	
SCSD POINT	UNIT	SC FUNCTION	SCSD POINT	UNIT	SC FUNCTION	SCSD POINT	UNIT	SC FUNCTION
17	SPU 54	power				11	SPU 18	power
19	SPU 04	power	19	SPU 05	power	01	SPU 19	power
20	IOP 2	power	20	IOP 3	power	13	SPU 20	power
22	IOP 1	power	22	IOP 0	power	03	SPU 21	power
25	SPU 02	power	25	SPU 03	power	15	SPU 22	power
27	SPU 00	power	27	SPU 01	power	05	SPU 23	power
29	DFC 0	power	29	DFC 1	power	17	SPU 24	power
30	CU 0	power	30	CU 1	power	07	SPU 25	power
						19	SPU 26	power
						09	SPU 27	power
						21	DFC 2	power

Note(s):
a. Where *x* equals the scanner and signal distributor controller (SCSDC) number assigned by the application.

The following response output example is for illustration purposes only and shows scan (SC) point 39 inhibited and SC point 17 set, indicating a power fault with small computer system interface (SCSI) peripheral unit (SPU) 54:

OP SCSD UNIT *a*
INHIBIT: 00000000 00000000 00000000 00000000 00000001 00000000
SCAN POINT: 00000000 00000000 01000000 00000000 00000000 00000000
OP SCSD UNIT *a* **COMPLETED**

(SC point numbering: 00-07, 08-15, 16-23, 24-31, 32-39, and 40-47.)

Note: A scan point status of 0 is said to be clear (or open), and a scan point status of 1 is said to be set (or closed). An inhibit status of 0 is said to be not inhibited, and an inhibit status of 1 is said to be inhibited. A power scan point will be set if a unit is powered down.

2. Does the output message indicate any set of SC points associated with faulty equipment? See Table 3.3-1.

   If **YES**, continue to Step 3.

   If **NO**, go to Step 7.

3. Have you removed/restored the associated SCSDC from/to service?

   If **YES**, go to Step 7.

   If **NO**, continue to Step 4.

4. At the MTTY, enter the appropriate input command to remove the associated SCSDC from service.

   - If MML, **RMV:SCSDC=*x*;**
   - If PDS, **RMV:SCSDC *x*!**

   Response: **RMV SCSDC *x* COMPLETED**

   Where: *x* = SCSDC number. See Table 3.3-1.

5. At the MTTY, enter the appropriate input command to restore the associated SCSDC to active.

   - If MML, **RST:SCSDC**=*x*;
   - If PDS, **RST:SCSDC *x*!**

   Response: **RST SCSDC *x* COMPLETED**

   Where: *x* = SCSDC number. See Table 3.3-1.

6. Return to Step 1.

7. Is the hardware or power alarm still being reported?

   If **YES**, continue to Step 8.

   If **NO**, go to Step 31.

8. Have you already performed Steps 9 through 13?

   If **YES**, go to Step 14.

   If **NO**, continue to Step 9.

9. Remove the associated units (circuit 0 or 1) shown in Figure 3.3-1 or 3.3-2 from service. See Procedure 6.2.

10. Remove power from the associated units (circuit 0 or 1) shown in Figure 3.3-1 or 3.3-2. See Procedure 6.3.

11. Unseat the circuit packs (circuit 0 or 1) shown in Figure 3.3-1 or 3.3-2.

12. Restore power to the associated units (circuit 0 or 1) shown in Figure 3.3-1 or 3.3-2. See Procedure 6.5.

13. Is the hardware or power alarm still being reported?

    If **YES**, go to Step 20 (circuit packs unseated).

    If **NO**, continue to Step 14.

14. Have all circuit packs unseated in Step 11 been reseated?

    If **YES**, go to Step 20.

    If **NO**, continue to Step 15.

15. Remove power from the associated units (circuit 0 or 1) shown in Figure 3.3-1 or 3.3-2. See Procedure 6.3.

16. Reseat the first or next circuit pack unseated in Step 11 in an attempt to isolate the fault.

17. Restore power to the associated units (circuit 0 or 1) shown in Figure 3.3-1 or 3.3-2. See Procedure 6.5.

18. Is the hardware or power alarm being reported?

    If **YES**, continue to Step 19 (faulty circuit pack).

    If **NO**, return to Step 14.

19. Have you isolated the fault to a single circuit pack?

    If **YES**, go to Step 25.

    If **NO**, continue to Step 20.

20. Is a fault suspected with the software alarm?

    If **YES**, go to Procedure 3.8, clear fault, and return to Step 1.

    If **NO**, continue to Step 21.

21. Is a fault suspected with a power unit?

    If **YES**, go to Procedure 3.5, clear fault, and return to Step 1.

    If **NO**, continue to Step 22.

22. Are **ALM** or **OFF** light-emitting diodes (LEDs) lit on any power control circuit pack or power unit?

    If **YES**, go to Step 24.

    If **NO**, continue to Step 23.

23. Is the faulty equipment known?

    If **YES**, continue to Step 24.

    If **NO**, go to Step 33.

24. Has the power control circuit pack or power unit associated with the faulty equipment been replaced during this procedure? See Table 3.3-2.

    If **YES**, go to Step 26.

    If **NO**, continue to Step 25.

25. At the faulty equipment, replace the associated power control circuit pack. See Procedure 6.1.

26. Is the hardware or power alarm being reported correctly?

    If **YES**, continue to Step 27.

    If **NO**, go to Step 32.

27. Have all circuit packs unseated in Step 11 been reseated?

    If **YES**, go to Step 31.

    If **NO**, continue to Step 28.

28. Remove power from the associated units (circuit 0 or 1) shown in Figure 3.3-1 or 3.3-2. See Procedure 6.3.

29. Reseat any circuit packs unseated in Step 11.

30. Restore power to the associated units (circuit 0 or 1) shown in Figure 3.3-1 or 3.3-2. See Procedure 6.5.

31. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

32. Is a fault suspected with a power unit?

    If **YES**, go to Procedure 3.5, clear fault, and return to Step 1.

    If **NO**, continue to Step 33.

33. Choose one of the following options:

    - Refer to the power control circuit pack schematics (CPS), Figures 3.3-1 and 3.3-2, SD-3T011-01, SD-3T012-01, and SD-3T015-01 to correct the wiring fault between the faulty equipment and the terminating equipment, and repeat this procedure from Step 1.
    - Escalate to the next level of support.

34. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Table 3.3-2 — Power Control Circuit Pack Information

UNIT	POWER CONTROL CIRCUIT PACK	POWER CONTROL CIRCUIT PACK EQL	UNIT	POWER CONTROL CIRCUIT PACK	POWER CONTROL CIRCUIT PACK EQL
CU 0	TN121	28-060	SPU 02		19-170
CU 1	TN121	53-060	SPU 03		45-170
IOP 0	TN120	19-080	SPU 04		28-146
IOP 1	TN120	45-080	SPU 05		53-146
IOP 2	TN120	11-026	SPU 18		11-180
IOP 3	TN120	62-026	SPU 19		62-180
DFC 0	UN580	28-178	SPU 20		11-164
	or		SPU 21		62-164
	UN373	28-178	SPU 22		11-148
DFC 1	UN580	53-178	SPU 23		62-148
	or		SPU 24		11-132
	UN373	53-178	SPU 25		62-132
DFC 2	UN580	11-180	SPU 26		11-116
	or		SPU 27		62-116
	UN373	11-180	SPU 54	UN376	19-186

3.4 CLEAR KS-23996,L1 MTTY FAULTS

OVERVIEW

This procedure provides instructions to aid maintenance personnel when clearing faults with the maintenance terminal (MTTY) Model KS-23996,L1 used in the craft interface. The 3B21D computer currently supports three hardware versions of the maintenance terminal controller (MTTYC) which utilize one of the following circuit packs: TN983, UN583, or UN597. Figures 3.4-1 and 3.4-2 represent the configuration of these three versions.

The following is a list of hardware conditions that can cause MTTY Model KS-23996,L1 faults. The conditions are listed in order from the most likely to the least likely cause of a fault.

- Any type of "black box" connected in the signal path (see Note)
- No power to MTTY
- A loose cable
- Faulty MTTYC
- Faulty central control emergency action interface (CC/EAI) faulty MTTY.

Note: This procedure does not support usage of any "black box" configurations; for example, a printer splitter. If a "black box" is inserted in the signal path, please remove it and reconfigure the system before continuing with this procedure.

PROCEDURE

1. What is the problem indication?
   - No MTTY pages, continue to Step 2.
   - Single (one page) EAI or NORM PAGE fault, go to Step 34.
   - Double (both) EAI or NORM PAGE fault, go to Step 69.
2. Is the power cord seated securely in the protected 115 V outlet?

   If **YES**, go to Step 5.

   If **NO**, continue to Step 3.
3. Securely seat the power cord in the protected 115 V outlet.
4. Is the MTTY working properly?

   If **YES**, go to Step 90 (loose power cord).

   If **NO**, continue to Step 5.
5. Is the power switch in the **ON** position?

   If **YES**, go to Step 9.

   If **NO**, continue to Step 6.
6. Turn the power switch to the **ON** position.
7. Is the MTTY working properly?

   If **YES**, go to Step 90.

   If **NO**, continue to Step 8.

8. Remove the suspect input/output processor (IOP) from service, and remove power from the suspect IOP. See Procedures 6.2 and 6.3.
9. Is the cabling from the port switch to the MTTY securely connected?

   If **YES**, go to Step 11.

   If **NO**, continue to Step 10.
10. Securely connect the cable from the port switch to the MTTY. See Figure 3.4-1 or 3.4-2.
11. Is the cabling from the port switch to the MTTYC securely connected?

    If **YES**, go to Step 14.

    If **NO**, continue to Step 12.
12. Securely connect the cable from the port switch to the MTTYC. See Figure 3.4-1 or 3.4-2.
13. Is the EAI cabling from the MTTYC to the faulty EAI securely connected?

    If **YES**, go to Step 16.

    If **NO**, continue to Step 14.
14. Securely connect the EAI cables. See Figure 3.4-3 or 3.4-4.
15. Is the MTTY working properly?

    If **YES**, go to Step 90 (loose cable).

    If **NO**, continue to Step 16.
16. Restore power to the suspect IOP, and restore the suspect IOP to active. See Procedures 6.5 and 6.6.
17. Are the correct options set on the MTTY? See Procedure 5.3.

    If **YES**, go to Step 20.

    If **NO**, continue to Step 18.
18. Set correct options. See Procedure 5.3.
19. Is the MTTY working properly?

    If **YES**, go to Step 90.

    If **NO**, continue to Step 20.
20. Remove the suspect input/output processor (IOP) from service, and remove power from the suspect IOP. See Procedure 4.4 or Procedures 6.2 and 6.3.
21. Replace MTTYC 0 (UN597, UN583, or TN983). See Procedure 4.4 or 6.4.
22. Restore power to the suspect IOP, and restore the suspect IOP to active. See Procedure 4.4 or Procedures 6.5 and 6.6.
23. Is the MTTY working properly?

    If **YES**, go to Step 90 (faulty MTTYC 0).

    If **NO**, continue to Step 24.

24. Remove the control unit (CU) from service that contains the central control (CC) (KLW31) associated with the EAI_OOS display on the EAI page, and remove power from the same CU. See Procedure 4.6 or Procedures 6.2 and 6.3.

25. Replace the CC (KLW31) associated with the EAI_OOS display on the EAI page. See Procedure 4.6 or 6.4.

26. Restore power to the CU, and restore the CU to standby. See Procedure 4.6 or Procedures 6.5 and 6.6.

27. Is the MTTY working properly?

    If **YES**, go to Step 90 (faulty KLW31).

    If **NO**, continue to Step 28.

28. Replace the port switch (UN377). See Procedure 6.1.

29. Is the MTTY working properly?

    If **YES**, go to Step 90 (faulty UN377).

    If **NO**, continue to Step 30.

30. Perform a level 1 Craft Init (poke **15**) from the EAI page.

31. Is the MTTY working properly?

    If **YES**, go to Step 90 (needed Craft Init).

    If **NO**, continue to Step 32.

32. Has the MTTY been replaced earlier in this procedure?

    If **YES**, go to Step 89.

    If **NO**, continue to Step 33.

33. Replace the MTTY, and repeat from Step 1. See Procedure 4.13.

34. Use the **403** poke command (or manually switch at the port switch) to switch the MTTY to the other IOP.

    Note: On the *5ESS*® switch, the **403** poke command is located on the 111, 112 - AM, AM Peripheral MCC page.

35. Is the MTTY working properly?

    If **YES**, continue to Step 36 (only one IOP is faulty).

    If **NO**, go to Step 89 (both IOPs are faulty).

36. Remove the suspect input/output processor (IOP) from service, and remove power from the suspect IOP. See Procedures 6.2 and 6.3.

37. Is the EAI cabling from the MTTYC to the faulty EAI securely connected?

    If **YES**, go to Step 39.

    If **NO**, continue to Step 38.

38. Securely connect the EAI cables. See Figure 3.4-3 or 3.4-4.

39. Is the cabling from the port switch to the MTTY securely connected?

    If **YES**, go to Step 41.

    If **NO**, continue to Step 40.

40. Securely connect the cable from the port switch to the MTTY. See Figure 3.4-1 or 3.4-2.

41. Is the cabling from the port switch to the MTTYC securely connected?

    If **YES**, go to Step 43.

    If **NO**, continue to Step 42.

42. Securely connect the cable from the port switch to the MTTYC. See Figure 3.4-1 or 3.4-2.

43. Restore power to the suspect IOP, and restore the suspect IOP to active. See Procedures 6.5 and 6.6.

44. Use the **403** poke command (or manually switch at the port switch) to switch the MTTY to the suspect IOP.

45. Is the MTTY working properly?

    If **YES**, go to Step 90 (loose cable).

    If **NO**, continue to Step 46.

46. Use the **403** poke command (or manually switch at the port switch) to switch the MTTY to the IOP that is not faulty.

47. Remove the suspect IOP from service, and remove power from the suspect IOP. See Procedure 4.4 or Procedures 6.2 and 6.3.

48. Replace MTTYC 0 (UN597, UN583, or TN983). See Procedure 4.4 or 6.4.

49. Restore power to the suspect IOP, and restore the suspect IOP to active. See Procedure 4.4 or Procedures 6.5 and 6.6.

50. Use the **403** poke command (or manually switch at the port switch) to switch the MTTY to the suspect IOP.

51. Is the MTTY working properly?

    If **YES**, go to Step 90 (faulty MTTYC 0).

    If **NO**, continue to Step 52.

52. Use the **403** poke command (or manually switch at the port switch) to switch the MTTY to the IOP that is not faulty.

53. Is the faulty page the EAI page?

    If **YES**, continue to Step 54. (If EAI is not functioning, replace EAI circuitry.)

    If **NO**, go to Step 89.

54. Remove the CU from service that contains the CC (KLW31) associated with the EAI_OOS display on the EAI page, and remove power from the same CU. See Procedure 4.6 or Procedures 6.2 and 6.3.

55. Replace the CC (KLW31) associated with the EAI_OOS display on the EAI page. See Procedure 4.6 or 6.4.

56. Restore power to the CU, and restore the CU to standby. See Procedure 4.6 or Procedures 6.5 and 6.6.

57. Use the **403** poke command (or manually switch at the port switch) to switch the MTTY to the suspect IOP.

58. Is the MTTY working properly?

    If **YES**, go to Step 90 (faulty KLW31).

    If **NO**, continue to Step 59.

59. Replace the port switch (UN377). See Procedure 6.1.

60. Is the MTTY working properly?

    If **YES**, go to Step 90 (faulty UN377).

    If **NO**, continue to Step 61.

61. Perform a level 1 Craft Init (poke **15**) from the EAI page.

62. Is the MTTY working properly?

    If **YES**, go to Step 90 (needed Craft Init).

    If **NO**, continue to Step 63.

63. Has the MTTY been replaced earlier in this procedure?

    If **YES**, go to Step 89.

    If **NO**, continue to Step 64.

64. Replace the MTTY, and repeat from Step 1. See Procedure 4.13.

65. Is the EAI cabling from the MTTYC to the faulty EAI securely connected?

    If **YES**, go to Step 68.

    If **NO**, continue to Step 67.

66. Remove the suspect input/output processor (IOP) from service, and remove power from the suspect IOP. See Procedures 6.2 and 6.3.

67. Securely connect the EAI cables. See Figure 3.4-3 or 3.4-4.

68. Is the cabling from the port switch to the MTTY securely connected?

    If **YES**, go to Step 70.

    If **NO**, continue to Step 69.

69. Securely connect the cable from the port switch to the MTTY. See Figure 3.4-1 or 3.4-2.

70. Is the cabling from the port switch to the MTTYC securely connected?

    If **YES**, go to Step 73.

    If **NO**, continue to Step 71.

71. Securely connect the cable from the port switch to the MTTYC. See Figure 3.4-1 or 3.4-2.

72. Restore power to the suspect IOP, and restore the suspect IOP to active. See Procedures 6.5 and 6.6.

73. Is the MTTY working properly?

    If **YES**, return to Step 34 (loose cable).

    If **NO**, continue to Step 74.

74. Remove the suspect IOP from service, and remove power from the suspect IOP. See Procedure 4.4 or Procedures 6.2 and 6.3.

75. Replace MTTYC 0 (UN597, UN583, or TN983). See Procedure 4.4 or 6.4.

76. Restore power to the suspect IOP, and restore the suspect IOP to active. See Procedure 4.4 or Procedures 6.5 and 6.6.

77. Is the MTTY working properly?

    If **YES**, return to Step 34 (faulty MTTYC 0).

    If **NO**, continue to Step 78.

78. Is the faulty page the EAI page?

    If **YES**, continue to Step 79. (If EAI is not functioning, replace EAI circuitry.)

    If **NO**, go to Step 89.

79. Remove the CU from service that contains the CC (KLW31) associated with the EAI_OOS display on the EAI page, and remove power from the same CU. See Procedure 4.6 or Procedures 6.2 and 6.3.

80. Replace the CC (KLW31) associated with the EAI_OOS display on the EAI page. See Procedure 4.6 or 6.4.

81. Restore power to the CU, and restore the CU to standby. See Procedure 4.6 or Procedures 6.5 and 6.6.

82. Is the MTTY working properly?

    If **YES**, return to Step 34 (faulty KLW31).

    If **NO**, continue to Step 83.

83. Replace the port switch (UN377). See Procedure 6.1.

84. Is the MTTY working properly?

    If **YES**, return to Step 34 (faulty UN377).

    If **NO**, continue to Step 85.

85. Perform a level 1 Craft Init (poke **15**) from the EAI page.

86. Is the MTTY working properly?

    If **YES**, return to Step 34 (needed Craft Init).

    If **NO**, continue to Step 87.

87. Has the MTTY been replaced earlier in this procedure?

    If **YES**, go to Step 89.

    If **NO**, continue to Step 88.

88. Replace the MTTY, and repeat from Step 1. See Procedure 4.13.

89. Escalate to the next level of support to clear the fault.

90. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

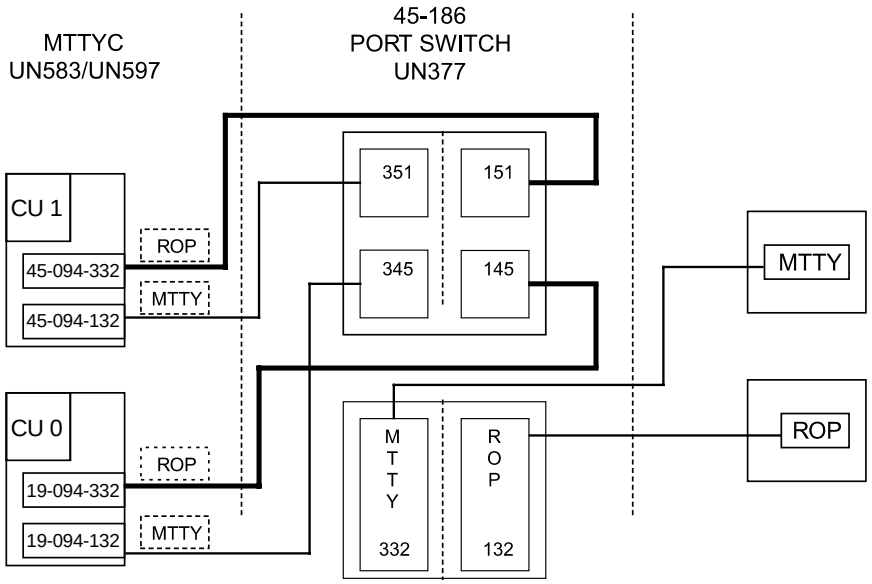


Figure 3.4-1 — MTTY/ROP Connection for UN583 or UN597

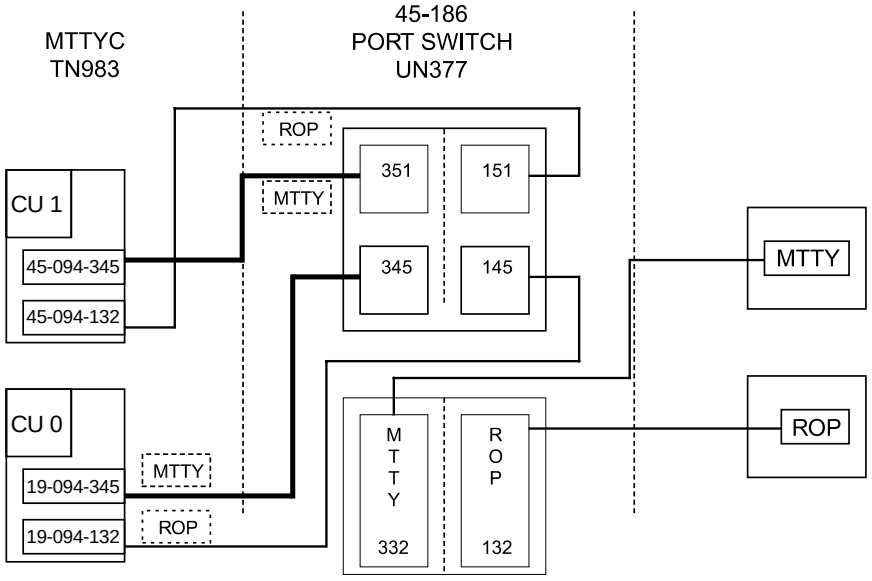


Figure 3.4-2 — MTTY/ROP Connection for TN983

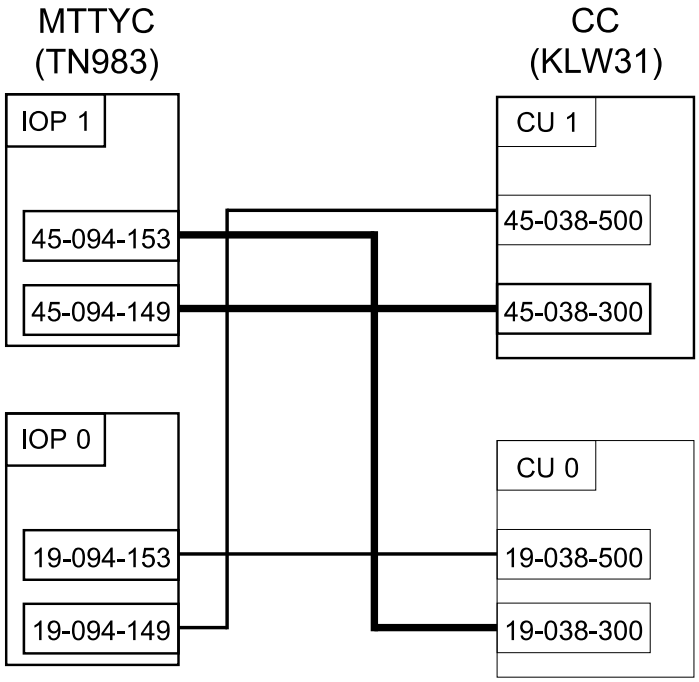


Figure 3.4-3 — EAI Connection for TN983

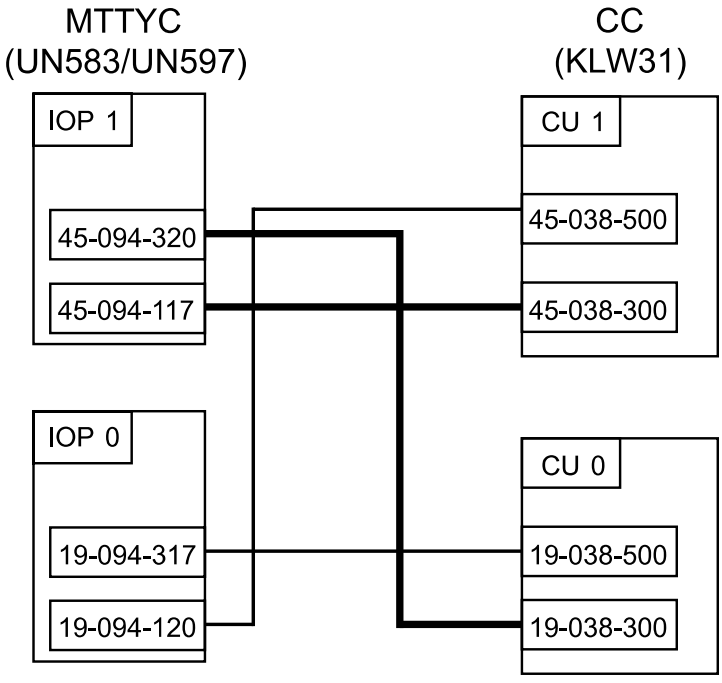


Figure 3.4-4 — EAI Connection for UN583 or UN597

3.5 CLEAR CU, DFC, IOP, SPU, AND PORT SWITCH POWER FAULTS

OVERVIEW

This procedure provides information to identify the source of power faults in a control unit (CU), disk file controller (DFC), input/output processor (IOP), small computer system interface (SCSI) peripheral unit (SPU), or port switch. See Procedure 3.3, Clear Hardware Alarm Circuit Faults, to fix a power alarm circuit fault.

General information on the 3B21D computer processor and growth units is provided at the beginning of this section to assist with the location and identification of circuit packs. Figures 3.5-1 and 3.5-3 illustrate the equipment locations (EQLs) of circuit packs in the CU, DFC, and IOP. Locations for SPUs and the port switch (UN377) are also shown. Users should refer to 254-303-105, *Hardware Reference Manual*, Chapter 3, "3B21D Computer Physical Description," for additional assistance with locating fuses or circuit packs.

Prior to performing this procedure, read and understand all notes, cautions, background information, and instructions.

Caution: A properly grounded wrist strap (R-4987 or equivalent) must be worn when inserting, removing, unlatching, or handling a plug-in circuit pack. This applies to circuit packs in shipping containers as well as to those installed in cabinets.

Note 1: Use antistatic bags (R-5158 or equivalent) or the original shipping container to store circuit packs that are removed from the unit.

Note 2: See Procedure 3.2, Clear Diagnostic Failures Using TLPs and Supplementary Diagnostic Procedures, for the trouble locating procedure (TLP) and for reinstalling original circuit packs when they are not faulty.

Note 3: Only experienced craft personnel should attempt the troubleshooting procedures in this section. **IF YOU DO NOT FEEL COMFORTABLE EXECUTING THESE PROCEDURES, DO NOT ATTEMPT THEM.** Escalate to the next level of support for assistance.

The following is a list of hardware that can cause power faults. The hardware is listed in order from the most likely to the least likely cause of a fault.

- Blown or defective fuse
- Damaged power switch or equivalent in the faulty equipment
- Defective, loose, or improperly connected alarm cable from the hardware alarm connection point to the terminating equipment
- Defective terminating equipment
- Backplane problem.

Processor Cabinet Arrangement

The processor unit, J3T060AA-1, includes the central control (CC), direct memory access (DMA), main memory (MM), DFC, SPUs, DC to DC power conversion, power control, port switch, and IOP peripheral controller (PC) functions. The SPUs include the UN375 through UN375F circuit packs, UN376 through UN376E circuit packs, and 9-track tape. The MM can be a KLW32, KLW64, or KLW128 circuit pack. The processor unit also provides KLW-size slots (EX0 and EX1) for future expansion

capability. Figure 3.5-1 shows the general equipment layout for processor units 0 and 1 in the processor cabinet.

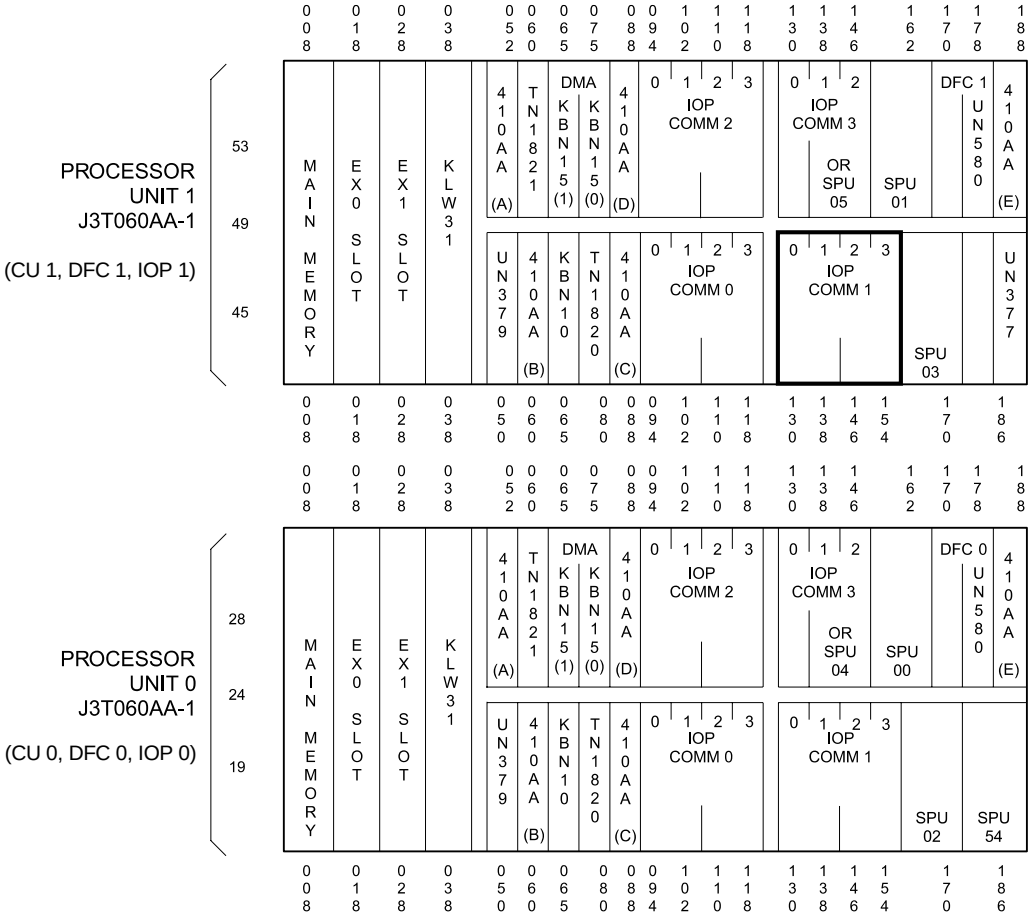


Figure 3.5-1 — Processor Unit Equipment Layout

The PC circuit pack number is derived from the IOP community number and specific slot number within the community. For example, Figure 3.5-2 shows the general layout for IOP community 1 in processor unit 1 (also highlighted in Figure 3.5-1).

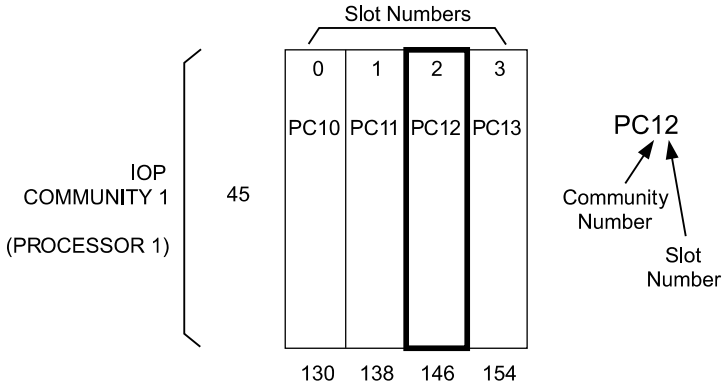


Figure 3.5-2 — IOP Community 1, Processor 1 Layout

The growth unit, J3T060AB-1, provides the equipage of additional SPUs and IOP/PC circuit packs for a system growth capability. Two growth units can be equipped in the processor cabinet. Figure 3.5-3 shows the general equipment layout for the IOP 2-SPU and IOP 3-SPU growth units in the processor cabinet.

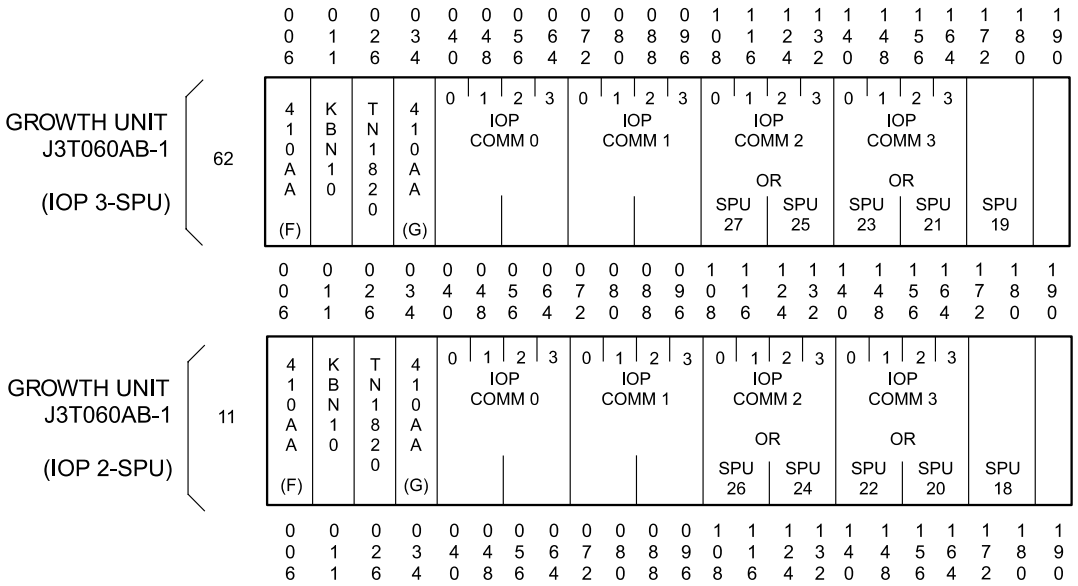


Figure 3.5-3 — Growth Unit Equipment Layout

PROCEDURE

Caution: Removing circuit packs or fuses from an active or standby unit will cause a system outage or cause other active units to be removed from service. Be sure the correct unit and location are identified before removing any fuse or circuit pack.

1. Can you identify the unit involved by observing the audible, visual, and message indicators reporting the alarm (for example, CU, DFC, or IOP)?

   If **YES**, continue to Step 2.

   If **NO**, escalate to the next level of support to determine the source of the alarm.

2. Is the unit identified in Step 1 **OOS** or unavailable? Check the unit **OOS** light-emitting diode (LED) on the power control circuit pack, Master Control Center (MCC) page, and **OOS** list.

   If **YES**, continue to Step 3.

   If **NO**, the alarm is false. See Procedure 3.3 or 3.8.

3. Is the unit powered down? Check the **unit off** or **alarm** LEDs on the power control circuit pack and associated power supplies. Red LEDs indicate the unit is powered down or in alarm.

   If **YES**, continue to Step 4.

   If **NO**, go to Step 16.

4. Is a fuse alarm being reported?

   If **YES**, continue to Step 5.

   If **NO**, go to Step 9.

5. Is a fuse blown for the unit?

   If **YES**, continue to Step 6.

   If **NO**, escalate to the next level of support for assistance.

6. Replace the blown fuse. See Procedure 4.8.

   Caution: If the blown fuse is associated with a 410AA, UN373, UN377, UN580, TN1820, or TN1821 circuit pack, unseat the pack before replacing the blown fuse.

7. Did the fuse blow again?

   If **YES**, continue to the appropriate step as follows:

   — If CU, go to Step 11.

   — If DFC, go to Step 12.

   — If IOP, go to Step 13.

   — If SPU, go to Step 14.

   — If port switch, go to Step 15.

   If **NO**, continue to Step 8.

8. Set the **ROS/RST** switch on the unit power control circuit pack to the **ROS** position.

9. Power up the unit. See Procedure 6.5.

10. Did the power stay up?

    If **YES**, go to Step 16.

    If **NO**, go to the appropriate step as follows:

    — If CU, go to Substep 11(i).

    — If DFC, go to Substep 12(i).

    — If IOP, go to Substep 13(i).

— If SPU, go to Substep 14(h).

— If port switch, go to Substep 15(e).

11. Clear the CU power fault.

Caution: Removing circuit packs or fuses from an active or standby unit will cause a system outage or cause other active units to be removed from service. Be sure the correct unit and location are identified before removing any fuse or circuit pack.

(a) Verify that the faulty CU is **OOS** and powered down.
Then unseat, but **DO NOT REMOVE** the circuit packs for the faulty CU (CU 0 or CU 1) as listed in Table 3.5-1, and continue to Substep 11(b). See Procedure 6.2.

Table 3.5-1 — CU Circuit Packs

CP CODE	CP SYMBOL	CU 0 EQL	CU 1 EQL
TN1821	CUPS	28-060	53-060
410AA	PWR A	28-052	53-052
410AA	PWR B	19-060	45-060
KLW31	CC	24-038	49-038
KLW128	MM	24-008	49-008
KBN15	DMA 0	28-075	53-075
KBN15	DMA 1	28-065	53-065
EX0	Empty Slot		
EX1	Empty Slot		

(b) Replace the blown fuse. See Procedure 4.8.

Caution: If the blown fuse is associated with a 410AA or TN1821 circuit pack, unseat the pack before replacing the blown fuse.

(c) Did the fuse blow again?

If **YES**, escalate to the next level of support for assistance.

If **NO**, continue to Substep 11(d).

(d) Reseat the first or next original circuit pack in the faulty CU according to the sequence listed in Table 3.5-2, and continue to Substep 11(e). See Procedure 4.6.

Note: Before reseating the TN1821 circuit pack, toggle the **ROS/RST** switch to the **ROS** position.

Table 3.5-2 — CU Circuit Pack Installation Sequence

SEQUENCE NO.	CP CODE	CP SYMBOL
1.	TN1821	CUPS
2.	410AA	PWR A
3.	410AA	PWR B
4.	KLW31	CC
5.	KLW128	MM
6.	KBN15	DMA 0
7.	KBN15	DMA 1
	EX0	Empty Slot
	EX1	Empty Slot

(e) Did the fuse blow again?

If **YES**, replace the circuit pack reseated with a new circuit pack and return to Substep 11(b).

If **NO**, continue to Substep 11(f).

(f) Have all circuit packs been reseated in the faulty CU?

If **YES**, continue to Substep 11(g).

If **NO**, return to Substep 11(d).

(g) Power up the CU. See Procedure 6.5.

(h) Did the CU power stay up?

If **YES**, go to Step 16.

If **NO**, continue to Substep 11(i).

(i) Using Table 3.5-1, identify and obtain all of the replacement circuit packs for the faulty CU (CU 0 or CU 1).

(j) Verify that the faulty CU is **OOS** and powered down. Then, replace the first or next suspect circuit pack according to the sequence listed in Table 3.5-2. See Procedure 4.6.

Note: Before replacing the TN1821 circuit pack, toggle the **ROS/RST** switch on the replacement pack to the **ROS** position.

(k) Power up the CU. See Procedure 6.5.

(l) Did the CU power stay up?

If **YES**, go to Step 16. (You have identified a faulty circuit pack.)

If **NO**, continue to Substep 11(m).

(m) Have all CU circuit packs been replaced?

If **YES**, escalate to the next level of support.

If **NO**, return to Substep 11(j).

12. Clear the DFC power fault.

Caution: Removing circuit packs or fuses from an active or standby unit will cause a system outage or cause other active units to be removed from service. Be sure the correct unit and location are identified before removing any fuse or circuit pack.

(a) Verify that the faulty DFC is **OOS** and powered down.
Then unseat, but **DO NOT REMOVE** the circuit packs for the faulty DFC (DFC 0 or DFC 1) as listed in Table 3.5-3, and continue to Substep 12(b). See Procedure 6.2.

Table 3.5-3 — DFC Circuit Packs

CP CODE	CP SYMBOL	DFC 0 EQL	DFC 1 EQL
UN580[a]/UN373[b]	DFC A	28-178	53-178
410AA[c]	PWR E	28-188	53-188
TN2116[b]	DFC B	28-170	53-170

Note(s):
a. The UN580 is used for the single circuit pack DFC.
b. The UN373 and TN2116 are used for the multiple circuit pack DFC.
c. When using a UN580B or later DFC, the 410AA PWR E will not be equipped.

(b) Replace the blown fuse. See Procedure 4.8.

Caution: If the blown fuse is associated with a 410AA, UN373, or UN580 circuit pack, unseat the pack before replacing the blown fuse.

(c) Did the fuse blow again?

If **YES**, escalate to the next level of support for assistance.

If **NO**, continue to Substep 12(d).

(d) Reseat the first or next original circuit pack in the faulty DFC unit according to the sequence listed in Table 3.5-4, and continue to Substep 12(e). See Procedure 4.5.

Note: Before reseating the UN580 or UN373 circuit packs, toggle the **ROS/RST** switch to the **ROS** position.

Table 3.5-4 — DFC Circuit Pack Installation Sequence

SEQUENCE NO.	CP CODE	CP SYMBOL
1.	UN580[a]/UN373[b]	DFC A
2.	410AA[c]	PWR E
3.	TN2116[b]	DFC B

Note(s):
a. The UN580 is used for the single circuit pack DFC.
b. The UN373 and TN2116 are used for the multiple circuit pack DFC.
c. When using a UN580B or later DFC, the 410AA PWR E will not be equipped.

(e) Did the fuse blow again?

If **YES**, replace the circuit pack that was reseated with a new circuit pack and return to Substep 12(b).

If **NO**, continue to Substep 12(f).

(f) Have all circuit packs been reseated in the faulty DFC unit?

If **YES**, continue to Substep 12(g).

If **NO**, return to Substep 12(d).

(g) Power up the DFC unit. See Procedure 6.5.

(h) Did the DFC unit power stay up?

If **YES**, go to Step 16.

If **NO**, continue to Substep 12(i).

(i) Using Table 3.5-3, identify and obtain all of the replacement circuit packs for the faulty DFC (DFC 0 or DFC 1).

(j) Verify that the faulty DFC is **OOS** and powered down. Then, replace the first or next suspect circuit pack according to the sequence listed in Table 3.5-4. See Procedure 4.5.

Note: Before replacing the UN580 or UN373 circuit pack, toggle the **ROS/RST** switch on the replacement pack to the **ROS** position.

(k) Power up the DFC unit. See Procedure 6.5.

(l) Did the DFC unit power stay up?

If **YES**, go to Step 16. (You have identified a faulty circuit pack.)

If **NO**, continue to Substep 12(m).

(m) Have all DFC circuit packs been replaced?

If **YES**, escalate to the next level of support.

If **NO**, return to Substep 12(i).

13. Clear the IOP power fault.

Caution: Removing circuit packs or fuses from an active or standby unit will cause a system outage or cause other active units to be removed from service. Be sure the correct unit and location are identified before removing any fuse or circuit pack.

(a) Verify that the faulty IOP is **OOS** and powered down. Then unseat, but **DO NOT REMOVE** the circuit packs for the faulty IOP (IOP 0, IOP 1, IOP 2, or IOP 3) as listed in Table 3.5-5 or 3.5-6, and continue to Substep 13(b). See Procedure 6.2.

Note: PC slots 20-23 and 30-33 may be equipped with SPUs. **DO NOT** unseat or remove any SPU that is equipped in a PC circuit pack slot. These SPUs are not part of the IOP. All SPUs are connected to a DFC unit.

Table 3.5-5 — IOP Processor Circuit Packs

CP CODE	CP SYMBOL	IOP 0 EQL	IOP 1 EQL	CP CODE	CP SYMBOL	IOP 0 EQL	IOP 1 EQL
TN1820	IOPPS	19-080	45-080	[a]	PC13	19-154	45-154
410AA	PWR C	19-088	45-088	[ab]	PC20	28-094	53-094
KBN10	IOP C	19-065	45-065	[ab]	PC21	28-102	53-102
UN597	PC00	19-094	45-094	[ab]	PC22	28-110	53-110
[a]	PC01	19-102	45-102	[ab]	PC23	28-118	53-118
UN933	PC02	19-110	45-110	[ab]	PC30	28-130	53-130
[a]	PC03	19-118	45-118	[ab]	PC31	28-138	53-138
[a]	PC10	19-130	45-130	[ab]	PC32	28-146	53-146
[a]	PC11	19-138	45-133				
[a]	PC12	19-146	45-146				

Note(s):
a. PC slots may not be populated.
b. These PC slots may contain SPUs (UN375 or UN376 circuit packs).

Table 3.5-6 — IOP Growth Unit Circuit Packs

CP CODE	CP SYMBOL	IOP 2 EQL	IOP 3 EQL	CP CODE	CP SYMBOL	IOP 2 EQL	IOP 3 EQL
TN1820	IOPPS	11-026	62-026	[a]	PC13	11-096	62-096
410AA	PWR F	11-006	62-006	[ab]	PC20	11-108	62-108
KBN10	IOP C	11-110	62-110	[ab]	PC21	11-116	62-116
[a]	PC00	11-040	62-040	[ab]	PC22	11-124	62-124
[a]	PC01	11-048	62-048	[ab]	PC23	11-132	62-132
[a]	PC02	11-056	62-056	[ab]	PC30	11-140	62-140
[a]	PC03	11-064	62-064	[ab]	PC31	11-148	62-148
[a]	PC10	11-072	62-072	[ab]	PC32	11-156	62-156
[a]	PC11	11-080	62-080	[ab]	PC33	11-164	62-164
[a]	PC12	11-088	62-088				

Note(s):
a. PC slots may not be populated.
b. These PC slots may contain SPUs (UN375 or UN376 circuit packs).

(b) Replace the blown fuse. See Procedure 4.8.

Caution: If the blown fuse is associated with a 410AA or TN1820 circuit pack, unseat the pack before replacing the blown fuse.

(c) Did the fuse blow again?

If **YES**, escalate to the next level of support for assistance.

If **NO**, continue to Substep 13(d).

(d) Reseat the first or next original circuit pack in IOP unit according to the sequence listed in Table 3.5-7 or 3.5-8, and continue to Substep 13(e). See Procedure 4.4.

Note: Before reseating the TN1820 circuit pack, toggle the **ROS/RST** switch to the **ROS** position.

Caution: DO NOT reseat or remove any SPU that is equipped in a PC circuit pack slot. Removing an SPU will cause a system outage or service interruption. These SPUs are not part of the IOP. All SPUs are connected to a DFC unit.

Table 3.5-7 — IOP Processor Circuit Pack Installation Sequence

SEQUENCE NO.	CP CODE	CP SYMBOL	SEQUENCE NO.	CP CODE	CP SYMBOL
1.	TN1820	IOPPS	11.	[a]	PC13
2.	410AA	PWR C	12.	[ab]	PC20
3.	KBN10	IOP C	13.	[ab]	PC21
4.	UN597	PC00	14.	[ab]	PC22
5.	[a]	PC01	15.	[ab]	PC23
6.	UN933	PC02	16.	[ab]	PC30
7.	[a]	PC03	17.	[ab]	PC31
8.	[a]	PC10	18.	[ab]	PC32
9.	[a]	PC11			
10.	[a]	PC12			

Note(s):
a. PC slots may not be populated.
b. These PC slots may contain SPUs (UN375 or UN376 circuit packs).

Table 3.5-8 — IOP Growth Unit Circuit Pack Installation Sequence

SEQUENCE NO.	CP CODE	CP SYMBOL	SEQUENCE NO.	CP CODE	CP SYMBOL
1.	TN1820	IOPPS	11.	[a]	PC13
2.	410AA	PWR F	12.	[ab]	PC20
3.	KBN10	IOP C	13.	[ab]	PC21
4.	[a]	PC00	14.	[ab]	PC22
5.	[a]	PC01	15.	[ab]	PC23
6.	[a]	PC02	16.	[ab]	PC30
7.	[a]	PC03	17.	[ab]	PC31
8.	[a]	PC10	18.	[ab]	PC32
9.	[a]	PC11	19.	[ab]	PC33
10.	[a]	PC12			

Note(s):
a. PC slots may not be populated.
b. These PC slots may contain SPUs (UN375 or UN376 circuit packs).

(e) Did the fuse blow again?

If **YES**, replace the circuit pack that was reseated with a new circuit pack and return to Substep 13(b).

If **NO**, continue to Substep 13(f).

(f) Have all circuit packs been reseated in the faulty IOP unit?

If **YES**, continue to Substep 13(g).

If **NO**, return to Substep 13(d).

(g) Power up the IOP unit. See Procedure 6.5.

(h) Did the IOP unit power stay up?

If **YES**, go to Step 16.

If **NO**, continue to Substep 13(i).

(i) Verify that the faulty IOP is **OOS** and powered down. Then, remove all PC circuit packs in the faulty IOP (IOP 0, IOP 1, IOP 2, or IOP 3) according to the sequence listed in Table 3.5-7 or 3.5-8. Place all circuit packs in an antistatic bag (R-5158 or equivalent) while they are removed from the processor cabinet. See Procedure 4.4.

Note: Before removing the TN1820 circuit pack, toggle the **ROS/RST** switch on the replacement pack to the **ROS** position.

Caution: DO NOT reseat or remove any SPU that is equipped in a PC circuit pack slot. Removing an SPU will cause a system outage or service interruption. These SPUs are not part of the IOP. All SPUs are connected to a DFC unit.

(j) Inspect for bent or broken pins inside the card cage.

(k) Inspect for bent or broken pins at the rear of the cabinet on the backplane.

Note: Other critical units may be located on this frame shelf (for example, CU, DFC, or MHD). Be sure to inspect **ONLY** the PC circuit pack locations for this IOP unit.

(l) Were there any bent or broken pins inside the card cage or on the backplane?

If **YES**, repair the bent or broken pins and continue to Substep 13(m).

Note: If repairs are necessary, repair kit KS-22676,L2, "Backplane Pin Repair Kit and Instructions," is available. If ordering a new pin repair kit, specify KS-22876,L6.

If **NO**, continue to Substep 13(m).

(m) Power up the IOP unit. See Procedure 6.5.

(n) Did the power stay up on this IOP unit?

If **YES**, one of the PC circuit packs removed in Substep 13(i) may be faulty. Continue to Substep 13(o).

If **NO**, go to Substep 13(w).

(o) Have all the PC circuit packs removed in Substep 13(i) for the **OOS** IOP been reinstalled?

If **YES**, go to Step 16.

If **NO**, continue to Substep 13(p).

(p) Take the first or next circuit pack removed in Substep 13(i) out of the antistatic bag. Then, reinstall the circuit pack and continue to Substep 13(q). See Procedure 4.4.

(q) Power up the IOP unit. See Procedure 6.5.

(r) Did the unit power stay up?

If **YES**, one of the remaining circuit packs not yet reinstalled may be faulty. Continue to Substep 13(s).

If **NO**, go to Substep 13(u). (You have identified a faulty circuit pack.)

(s) Have all the PC circuit packs removed in Substep 13(i) been reinstalled?

If **YES**, go to Step 16.

If **NO**, continue to Substep 13(t).

(t) Power down the IOP unit, then return to Substep 13(o).

(u) Using Table 3.5-5 or 3.5-6, identify and obtain the appropriate PC replacement circuit pack for the faulty IOP.

(v) Replace the faulty PC circuit pack, then return to Substep 13(o). See Procedure 4.4.

(w) Using Table 3.5-5 or 3.5-6, identify and obtain all of the IOP controller replacement circuit packs (the first three packs listed in each table) for the faulty IOP.

(x) Verify that the IOP is **OOS** and powered down. Then, replace the first or next suspect IOP controller circuit pack according to the sequence listed in Table 3.5-7 or 3.5-8. See Procedure 4.4.

Note: Before replacing the TN1820 circuit pack, toggle the **ROS/RST** switch on the replacement pack to the **ROS** position.

(y) Power up the IOP unit.

(z) Did the unit power stay up?

If **YES**, go to Step 16. (You have identified a faulty circuit pack.)

If **NO**, replace the original circuit pack and continue to Substep 13(aa).

(aa) Have all IOP controller circuit packs listed in Substep 13(x) been replaced?

If **YES**, escalate to the next level of support for assistance.

If **NO**, return to Substep 13(x).

14. Clear the SPU power fault.

Caution: Removing circuit packs or fuses from an active or standby unit will cause a system outage or cause other active units to be removed from service. Be sure the correct unit and location are identified before removing any fuse or circuit pack.

(a) Verify that the SBUS associated with the faulty SPU (MHD or DAT) is **OOS** and powered down. Then, unseat **ONLY** the faulty SPU (UN375 or UN376) circuit pack and continue to Substep 14(b). See Procedure 4.2 or 4.3.

(b) Replace the blown fuse. See Procedure 4.8.

(c) Did the fuse blow again?

If **YES**, escalate to the next level of support for assistance.

If **NO**, continue to Substep 14(d).

(d) Reseat **ONLY** the faulty SPU circuit pack (UN375 or UN376) unseated in Substep 14(a), and continue to Substep 14(e).

Note: Before reseating the SPU, set the **ROS/RST** switch to the **ROS** position.

(e) Did the fuse blow again?

If **YES**, replace the circuit pack that was reseated with a new circuit pack and return to Substep 14(b).

If **NO**, continue to Substep 14(f).

(f) Power up the SPU. See Procedure 6.5.

(g) Did the SPU power stay up?

If **YES**, go to Step 16.

If **NO**, continue to Substep 14(h).

(h) Identify and obtain the replacement circuit pack for the faulty SPU (UN375 or UN376).

(i) ***Caution: Unseating or removing a circuit pack or SPU connected to an in-service SCSI bus (SBUS) may cause a service interruption or corrupt disk data.***

Verify that the SBUS associated with the faulty SPU (MHD or DAT) is **OOS** and powered down. Then, replace **ONLY** the faulty SPU (UN375 or UN376) circuit pack and continue to Substep 14(j). See Procedure 4.2 or 4.3.

Note: Before replacing the SPU, set the **ROS/RST** switch to the **ROS** position.

(j) Power up the SPU.

(k) Did the SPU power stay up?

If **YES**, go to Step 16. (You have identified a faulty circuit pack.)

If **NO**, escalate to the next level of support for assistance.

15. Clear the port switch power fault.

Caution: Removing circuit packs or fuses from an active or standby unit will cause a system outage or cause other active units to be removed from service. Be sure the correct unit and location are identified before removing any fuse or circuit pack.

(a) Unseat the port switch circuit pack (UN377, EQL 45-186) and continue to Substep 15(b).

(b) Replace the blown fuse. See Procedure 4.8.

(c) Did the fuse blow again?

If **YES**, seek technical assistance.

If **NO**, continue to Substep 15(d).

(d) Reseat the suspect UN377 port switch circuit pack in EQL 45-186 and continue to Substep 15(e).

(e) Did the fuse blow again?

If **YES**, replace the port switch circuit pack that was reseated with a new circuit pack and return to Substep 15(b).

If **NO**, go to Step 16.

16. Operate the [Alm Rls] key at the MCC.

17. Is the alarm still being reported?

If **YES**, escalate to the next level of support for assistance.

If **NO**, continue to Step 18.

18. Set the **ROS/RST** switch on the unit power control circuit pack to **RST** to restore the unit to service.

19. Is the unit still **OOS**?

If **YES**, escalate to the next level of support for assistance.

If **NO**, continue to Step 20.

20. Is the system back to normal?

If **YES**, continue to Step 21.

If **NO**, escalate to the next level of support for assistance.

21. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

3.6 CLEAR MODEL 577 ROP FAULTS

OVERVIEW

This procedure provides instructions to aid maintenance personnel when clearing faults with the Model 577 receive-only printer (ROP) used in the craft interface. The 3B21D computer currently supports three hardware versions of the maintenance terminal controller (MTTYC) which uses one of the following circuit packs: TN983, UN583, or UN597. Figures 3.6-1 and 3.6-2 represent the configuration of these three versions.

The following list of hardware can cause Model 577 ROP faults. The hardware is listed in order from the most likely to the least likely cause of a fault.

- Any type of "black box" connected in the signal path (see Note)
- A loose power cord
- No power to printer
- A loose cable
- Printer not online
- Faulty MTTYC.

Note: This procedure does not support usage of any "black box" configurations; for example, a printer splitter. If a "black box" is inserted in the signal path, remove it and reconfigure the system before continuing with this procedure.

PROCEDURE

1. Is the power cord seated securely in the protected 115 V outlet?

   If **YES**, go to Step 4.

   If **NO**, continue to Step 2.

2. Securely seat the power cord in the protected 115 V outlet.

3. Is the ROP working properly?

   If **YES**, go to Step 47 (loose power cord).

   If **NO**, continue to Step 4.

4. Is the power switch in the **ON** position?

   If **YES**, go to Step 7.

   If **NO**, continue to Step 5.

5. Operate the power switch to the **ON** position.

6. Is the ROP working properly?

   If **YES**, go to Step 47 (power switch off).

   If **NO**, continue to Step 7.

7. Is the cabling from the port switch to the ROP securely connected?

   If **YES**, go to Step 10.

   If **NO**, continue to Step 8.

8. Securely connect the cable from the port switch to the ROP.

9. Is the ROP working properly?

   If **YES**, go to Step 47 (loose cable).

   If **NO**, continue to Step 10.

10. Is the **ON LINE** lamp lit, and does **ON LINE** appear in the display window?

    If **YES**, go to Step 14.

    If **NO**, continue to Step 11.

11. Operate the **ON LINE** key.

12. Is the **ON LINE** lamp lit, and does **ON LINE** appear in the display window?

    If **YES**, go to Step 15.

    If **NO**, continue to Step 13.

13. Has the printer been replaced earlier in this procedure?

    If **YES**, go to Step 46.

    If **NO**, continue to Step 14.

14. Replace the printer, and repeat from Step 1. See Procedure 4.11.

15. Is the ROP working properly?

    If **YES**, go to Step 47 (printer offline).

    If **NO**, continue to Step 16.

16. Is the maintenance terminal (MTTY) displaying the common processor display page (CPDP)?

    If **YES**, go to Step 18.

    If **NO**, continue to Step 17.

17. Display the CPDP by momentarily pressing the **NORM** key or using the correct poke command, with cursor at top, on the MTTY.

18. Are both IOP 0 and IOP 1 active?

    If **YES**, go to Step 20.

    If **NO**, continue to Step 19.

19. Restore IOP 0 and/or IOP 1 to active. See Procedure 6.6.

20. Are both MTTYC 0 and MTTYC 1 active?

    If **YES**, go to Step 22.

    If **NO**, continue to Step 21.

21. Restore MTTYC 0 and/or MTTYC 1 to active. See Procedure 6.6.

22. Is the ROP linkage connected to an active IOP?

    If **YES**, go to Step 31.

    If **NO**, continue to Step 23. (If the ROP is not connected to IOP 0, the appropriate TN983, UN583, or UN597 MTTYC 0 needs to be replaced.)

23. Remove IOP 0 from service, remove power from IOP 0, and replace MTTYC 0. See Procedure 4.4 or Procedures 6.1, 6.2, and 6.3.

24. Restore power to IOP 0, and restore IOP 0 to active. See Procedure 4.4 or Procedures 6.5 and 6.6.

25. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 0.

26. Is the ROP linkage connected to active IOP 0?

    If **YES**, go to Step 31 (fixed faulty MTTYC 0).

    If **NO**, continue to Step 27. (If ROP is not connected to IOP 0, the appropriate TN983, UN583, or UN597 MTTYC 1 needs to be replaced.)

27. Remove IOP 1 from service, remove power from IOP 1, and replace MTTYC 1. See Procedure 4.4 or Procedures 6.1, 6.2, and 6.3.

28. Restore power to IOP 1, and restore IOP 1 to active. See Procedure 4.4 or Procedures 6.5 and 6.6.

29. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 1.

30. Is the ROP linkage connected to active IOP 1?

    If **YES**, continue to Step 31 (fixed faulty MTTYC 1).

    If **NO**, go to Step 46. (The ROP is not connected to either IOP 0 or IOP 1.)

31. Which IOP is the ROP connected to?

    If IOP 0, continue to Step 32.

    If IOP 1, go to Step 34.

32. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 1.

33. Is the ROP working properly?

    If **YES**, go to Step 36 (faulty printer path to MTTYC 0).

    If **NO**, go to Step 46 (faulty printer path to both MTTYCs).

34. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 0.

35. Is the ROP working properly?

    If **YES**, go to Step 41 (faulty printer path to MTTYC 1).

    If **NO**, go to Step 46 (faulty path to both MTTYCs).

36. Has MTTYC 0 been replaced earlier in this procedure?

    If **YES**, go to Step 39.

    If **NO**, continue to Step 37.

37. Remove IOP 0 from service, remove power from IOP 0, and replace MTTYC 0. See Procedure 4.4 or Procedures 6.1, 6.2, and 6.3.

38. Restore power to IOP 0, and restore IOP 0 to active. See Procedure 4.4 or Procedures 6.5 and 6.6.

39. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 0.

40. Is the ROP working properly?

    If **YES**, go to Step 47 (fixed faulty MTTYC 0).

    If **NO**, go to Step 46 (faulty printer path to MTTYC 0).

41. Has MTTYC 1 been replaced earlier in this procedure?

    If **YES**, go to Step 44.

    If **NO**, continue to Step 42.

42. Remove IOP 1 from service, remove power from IOP 1, and replace MTTYC 1. See Procedure 4.4 or Procedures 6.1, 6.2, and 6.3.

43. Restore power to IOP 1, and restore IOP 1 to active. See Procedure 4.4 or Procedures 6.5 and 6.6.

44. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 1.

45. Is the ROP working properly?

    If **YES**, go to Step 47 (fixed faulty MTTYC 1).

    If **NO**, continue to Step 46 (faulty printer path to MTTYC 1).

46. Escalate to the next level of support to clear the fault.

47. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

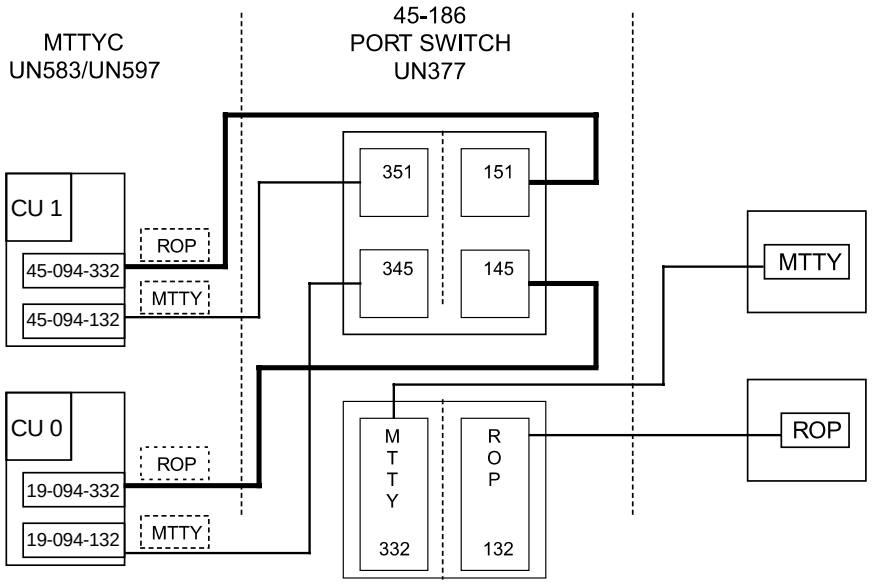


Figure 3.6-1 — MTTY/ROP Connection for UN583 or UN597

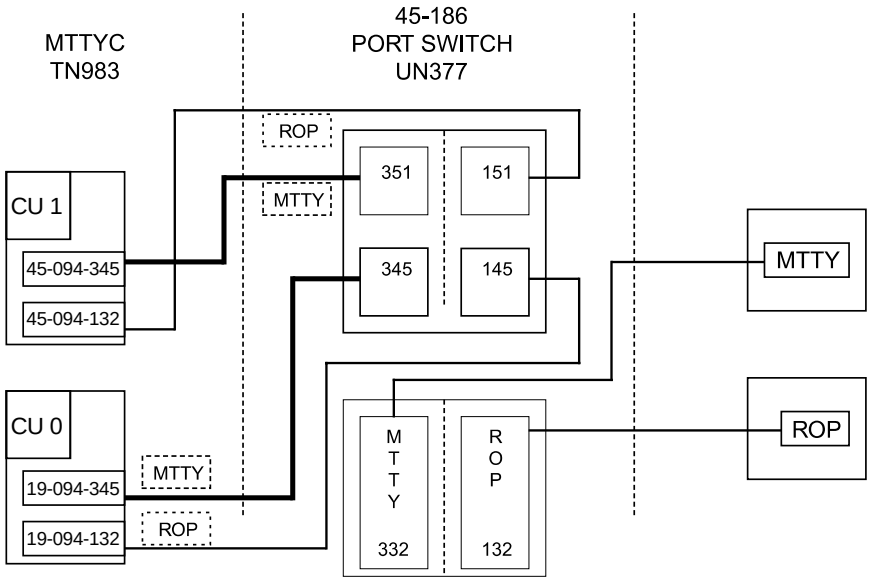


Figure 3.6-2 — MTTY/ROP Connection for TN983

3.7 CLEAR MODEL 602 ROP FAULTS

OVERVIEW

This procedure provides instructions to aid maintenance personnel when clearing faults with the Model 602 receive-only printer (ROP) used in the craft interface. The 3B21D computer currently supports three hardware versions of the maintenance terminal controller (MTTYC) which uses one of the following circuit packs: TN983, UN583, or UN597. Figures 3.7-1 and 3.7-2 represent the configuration of these three versions.

The following list of hardware can cause Model 602 ROP faults. The hardware is listed in order from the most likely to the least likely cause of a fault.

- Any type of "black box" connected in the signal path (see Note)
- A loose power cord
- No power to printer
- A loose cable
- Printer not online
- Faulty MTTYC.

Note: This procedure does not support usage of any "black box" configurations; for example, a printer splitter. If a "black box" is inserted in the signal path, remove it and reconfigure the system before continuing with this procedure.

PROCEDURE

1. Is the power cord seated securely in the protected 115 V outlet?

   If **YES**, go to Step 4.

   If **NO**, continue to Step 2.

2. Securely seat the power cord in the protected 115 V outlet.

3. Is the ROP working properly?

   If **YES**, go to Step 47 (loose power cord).

   If **NO**, continue to Step 4.

4. Is the power switch in the **ON** position?

   If **YES**, go to Step 7.

   If **NO**, continue to Step 5.

5. Operate the power switch to the **ON** position.

6. Is the ROP working properly?

   If **YES**, go to Step 47 (power switch off).

   If **NO**, continue to Step 7.

7. Is the cabling from the port switch to the ROP securely connected?

   If **YES**, go to Step 10.

   If **NO**, continue to Step 8.

8. Securely connect the cable from the port switch to the ROP.

9. Is the ROP working properly?

   If **YES**, go to Step 47 (loose cable).

   If **NO**, continue to Step 10.

10. Is the **SEL** lamp lit?

    If **YES**, go to Step 14.

    If **NO**, continue to Step 11.

11. Press the **SEL** button.

12. Is the **SEL** lamp lit?

    If **YES**, go to Step 15.

    If **NO**, continue to Step 13.

13. Has the printer been replaced earlier in this procedure?

    If **YES**, go to Step 46.

    If **NO**, continue to Step 14.

14. Replace the printer, and repeat from Step 1. See Procedure 4.12.

15. Is the ROP working properly?

    If **YES**, go to Step 47 (printer offline).

    If **NO**, continue to Step 16.

16. Is the maintenance terminal (MTTY) displaying the common processor display page (CPDP)?

    If **YES**, go to Step 18.

    If **NO**, continue to Step 17.

17. Display the CPDP by momentarily pressing the **NORM** key or using the correct poke command, with cursor at top, on the MTTY.

18. Are both IOP 0 and IOP 1 active?

    If **YES**, go to Step 20.

    If **NO**, continue to Step 19.

19. Restore IOP 0 and/or IOP 1 to active. See Procedure 6.6.

20. Are both MTTYC 0 and MTTYC 1 active?

    If **YES**, go to Step 22.

    If **NO**, continue to Step 21.

21. Restore MTTYC 0 and/or MTTYC 1 to active. See Procedure 6.6.

22. Is the ROP linkage connected to an active IOP?

    If **YES**, go to Step 31.

    If **NO**, continue to Step 23. (If the ROP is not connected to IOP 0, MTTYC 0 needs to be replaced.)

23. Remove IOP 0 from service, remove power from IOP 0, and replace MTTYC 0. See Procedure 4.4 or Procedures 6.1, 6.2, and 6.3.

24. Restore power to IOP 0, and restore IOP 0 to active. See Procedure 4.4 or Procedures 6.5 and 6.6.

25. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 0.

26. Is the ROP linkage connected to active IOP 0?

    If **YES**, go to Step 31 (fixed faulty MTTYC 0).

    If **NO**, continue to Step 27. (If ROP is not connected to IOP 0, MTTYC 1 needs to replaced.)

27. Remove IOP 1 from service, remove power from IOP 1, and replace MTTYC 1. See Procedure 4.4 or Procedures 6.1, 6.2, and 6.3.

28. Restore power to IOP 1, and restore IOP 1 to active. See Procedure 4.4 or Procedures 6.5 and 6.6.

29. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 1.

30. Is the ROP linkage connected to active IOP 1?

    If **YES**, continue to Step 31 (fixed faulty MTTYC 1).

    If **NO**, go to Step 46. (The ROP is not connected to either IOP 0 or IOP 1.)

31. Which IOP is the ROP connected to?

    If IOP 0, continue to Step 32.

    If IOP 1, go to Step 34.

32. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 1.

33. Is the ROP working properly?

    If **YES**, go to Step 36 (faulty printer path to MTTYC 0).

    If **NO**, go to Step 46 (faulty printer path to both MTTYCs).

34. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 0.

35. Is the ROP working properly?

    If **YES**, go to Step 41 (faulty printer path to MTTYC 1).

    If **NO**, go to Step 46 (faulty printer path to both MTTYCs).

36. Has MTTYC 0 been replaced earlier in this procedure?

    If **YES**, go to Step 39.

    If **NO**, continue to Step 37.

37. Remove IOP 0 from service, remove power from IOP 0, and MTTYC 0 needs to be replaced. See Procedure 4.4 or Procedures 6.1, 6.2, and 6.3.

38. Restore power to IOP 0, and restore IOP 0 to active. See Procedure 4.4 or Procedures 6.5 and 6.6.

39. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 0.

40. Is the ROP working properly?

    If **YES**, go to Step 47 (fixed faulty MTTYC 0).

    If **NO**, go to Step 46 (faulty printer path to MTTYC 0).

41. Has MTTYC 1 been replaced earlier in this procedure?

    If **YES**, go to Step 44.

    If **NO**, continue to Step 42.

42. Remove IOP 1 from service, remove power from IOP 1, and replace MTTYC 1. See Procedure 4.4 or Procedures 6.1, 6.2, and 6.3.

43. Restore power to IOP 1, and restore IOP 1 to active. See Procedure 4.4 or Procedures 6.5 and 6.6.

44. Use the **402** poke command (or manually switch at the port switch) to switch the ROP to active IOP 1.

45. Is the ROP working properly?

    If **YES**, go to Step 47 (fixed faulty MTTYC 1).

    If **NO**, continue to Step 46 (faulty printer path to MTTYC 1).

46. Escalate to the next level of support to clear the fault.

47. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

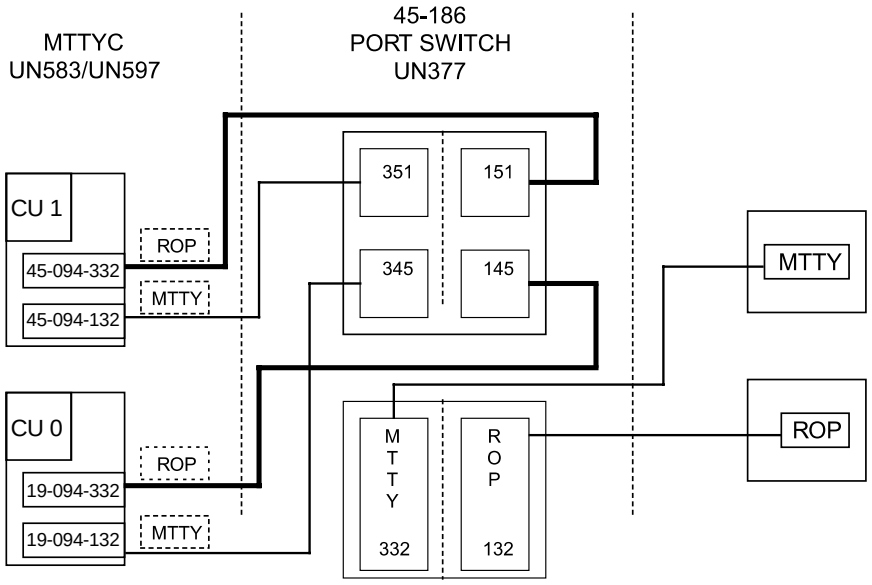


Figure 3.7-1 — MTTY/ROP Connection for UN583 or UN597

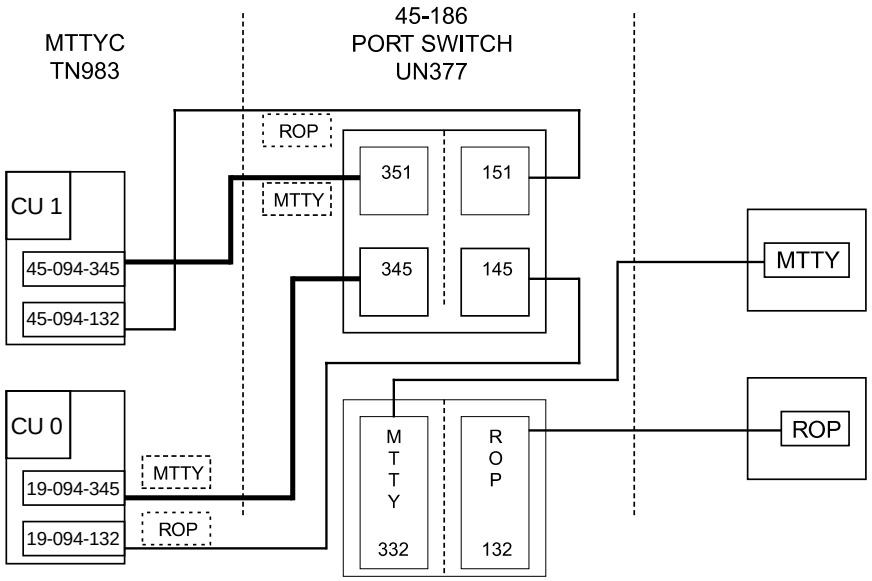


Figure 3.7-2 — MTTY/ROP Connection for TN983

3.8 CLEAR SOFTWARE ALARM CIRCUIT FAULTS

OVERVIEW

This procedure provides instructions to clear software alarm circuit faults. The 3B21D computer has three alarm reporting mechanisms: a hardware alarm circuit, a power alarm circuit, and a software alarm. This procedure is used to fix faults with the software alarm circuit.

The software alarm circuit (Figure 3.8-1) uses the UN933 or UN33 scanner and signal distributor controller(s) (SCSDCs) at equipment locations (EQLs) 19-110, 45-110, and 28-130 and associated software to detect and report alarm conditions with 3B21D computer hardware. It reports those alarm conditions to the system and the office alarm unit (OAU).

Software alarm circuit faults are those faults that prevent a software major (MJ) or minor (MN) alarm from being reported or that cause alarms to be falsely reported. This procedure is not intended to fix actual power unit faults. See Procedure 3.5, Clear CU, DFC, IOP, SPU, and Port Switch Power Faults, to clear power unit faults. This procedure is intended to fix faults with the software alarm circuit which is used to report software major and minor alarm conditions with the 3B21D computer hardware.

The following is a list of hardware that can cause power alarm faults. The hardware is listed in order from the most likely to the least likely cause of a fault.

- Defective SCSDC (UN933 or UN33)
- Defective power unit circuit pack or equivalent in the faulty equipment
- Defective or loose scan cable from the faulty equipment to the SCSDC
- Defective or loose alarm cable from the SCSDC to the OAU
- Defective circuit pack in the OAU
- Defective OAU
- Backplane problem in the faulty equipment, SCSDC unit, or OAU.

Faulty equipment referred to in this procedure may be any 3B21D computer or application equipment connecting into any SCSDC circuit pack on the 3B21D computer.

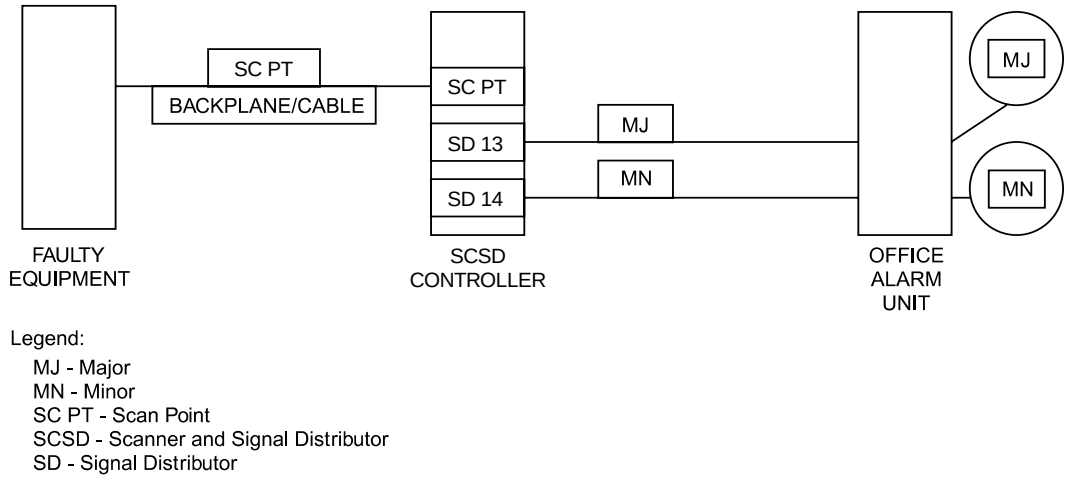


Figure 3.8-1 — Software Major/Minor Alarm Circuit

PROCEDURE

1. At the maintenance terminal (MTTY), enter the appropriate input command.

   - If MML, **OP:SCSD:UNIT=*a*;**
   - If PDS, **OP:SCSD;UNIT *a*!**

   Where: *a* = SCSDC unit number (0, 1, etc.) to be displayed. See Table 3.8-1.

Table 3.8-1 — Scanner and Signal Distributor Controller Information

	SCSDC 0 AT 19-110			SCSDC 1 AT 45-110			SCSDC *x* AT 28-130[a]	
SCSD POINT	UNIT	SC FUNCTION	SCSD POINT	UNIT	SC FUNCTION	SCSD POINT	UNIT	SC FUNCTION
17	SPU 54	power				11	SPU 18	power
19	SPU 04	power	19	SPU 05	power	01	SPU 19	power
20	IOP 2	power	20	IOP 3	power	13	SPU 20	power
22	IOP 1	power	22	IOP 0	power	03	SPU 21	power
25	SPU 02	power	25	SPU 03	power	15	SPU 22	power
27	SPU 00	power	27	SPU 01	power	05	SPU 23	power
29	DFC 0	power	29	DFC 1	power	17	SPU 24	power
30	CU 0	power	30	CU 1	power	07	SPU 25	power
						19	SPU 26	power
						09	SPU 27	power
						21	DFC 2	power

Note(s):
a. Where *x* equals the scanner and signal distributor controller (SCSDC) number assigned by the application.

The following response output example is for illustration purposes only and shows scan (SC) point 39 inhibited and SC point 17 set, indicating a power fault with small computer system interface (SCSI) peripheral unit (SPU) 54:

OP SCSD UNIT *a*
INHIBIT: 00000000 00000000 00000000 00000000 00000001 00000000
SCAN POINT: 00000000 00000000 01000000 00000000 00000000 00000000
OP SCSD UNIT *a* **COMPLETED**

(SC point numbering: 00-07, 08-15, 16-23, 24-31, 32-39, and 40-47.)

Note: A scan point status of 0 is said to be clear (or open), and a scan point status of 1 is said to be set (or closed). An inhibit status of 0 is said to be not inhibited, and an inhibit status of 1 is said to be inhibited. A power scan point will be set if a unit is powered down.

2. Does the output message indicate any set of SC points associated with the faulty equipment? See Table 3.8-1.

   If **YES**, continue to Step 3 (scanning is occurring - cable from unit to scanner is ok).

   If **NO**, go to Step 7 (scanning is not occurring).

3. Have you removed/restored the associated SCSDC from/to service?

   If **YES**, go to Step 7.

   If **NO**, continue to Step 4.

4. At the MTTY, enter the appropriate input command to remove the associated SCSDC from service.

   - If MML, **RMV:SCSDC=*x*;**
   - If PDS, **RMV:SCSDC *x*!**

   Response: **RMV SCSDC *x* COMPLETED**

   Where: *x* = SCSDC number. See Table 3.8-1.

5. At the MTTY, enter the appropriate input command to restore the associated SCSDC to active.

   - If MML, **RST:SCSDC=*x*;**
   - If PDS, **RST:SCSDC *x*!**

   Response: **RST SCSDC *x* COMPLETED**

   Where: *x* = SCSDC number. See Table 3.8-1.

6. Return to Step 1.

7. At the input/output processor (IOP) unit (0 or 1), replace the SCSDC (UN933 or UN33) circuit pack (suspect faulty SCSDC). See Procedure 4.4 or 6.1.

8. At the MTTY, enter the appropriate input command.

   - If MML, **OP:SCSD:UNIT=*a*;**
   - If PDS, **OP:SCSD;UNIT *a*!**

   Where: *a* = SCSDC unit number (0, 1, etc.) to be displayed. See Table 3.8-1.

9. Does the output message indicate setting the power SC points associated with the faulty equipment? See Table 3.8-1.

   If **YES**, continue to Step 10 (scanning is occurring).

   If **NO**, go to Step 17.

10. Are major or minor alarms being reported correctly?

    If **YES**, continue to Step 11 (scanning is occurring).

    If **NO**, go to Step 12 (using SC point, suspect faulty power control circuit pack).

11. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

12. Has the power control circuit pack associated with the faulty equipment been replaced during this procedure?

    If **YES**, go to Step 15.

    If **NO**, continue to Step 13 (suspect faulty power control circuit pack).

13. At the faulty equipment, replace the associated power control circuit pack. See Table 3.8-2 and one of the following circuit packs:

    For TN1821, see Procedure 4.6.
    For TN1820, see Procedure 4.4.
    For UN580, see Procedure 4.5.
    For UN373, see Procedure 4.5.
    For all packs, experienced users see Procedure 6.1.

Table 3.8-2 — Power Control Circuit Pack Information

UNIT	POWER CONTROL CIRCUIT PACK	POWER CONTROL CIRCUIT PACK EQL	UNIT	POWER CONTROL CIRCUIT PACK	POWER CONTROL CIRCUIT PACK EQL
CU 0	TN1821	28-060	SPU 02		19-170
CU 1	TN1821	53-060	SPU 03		45-170
IOP 0	TN1820	19-080	SPU 04		28-146
IOP 1	TN1820	45-080	SPU 05		53-146
IOP 2	TN1820	11-026	SPU 18		11-180
IOP 3	TN1820	62-026	SPU 19		62-180
DFC 0	UN580	28-178	SPU 20		11-164
	or		SPU 21		62-164
	UN73	28-178	SPU 22		11-148
DFC 1	UN580	53-178	SPU 23		62-148
	or		SPU 24		11-132
	UN73	53-178	SPU 25		62-132
DFC 2	UN580	11-180	SPU 26		11-116
	or		SPU 27		62-116
	UN373	11-180	SPU 54	UN376	19-186

14. Repeat from Step 1.
15. Clear the wiring fault between the faulty equipment and the SCSDC (UN933 or UN33) circuit pack. See SD-3T011-01, SD-3T012-01, and SD-3T015-01.
16. Repeat from Step 1.
17. Was a major or minor alarm expected?

    If major, continue to Step 18.

    If minor, go to Step 27.
18. Has the associated SCSDC (UN933 or UN33) circuit pack been replaced in IOP (0 or 1) during this procedure?

    If **YES**, go to Step 21.

    If **NO**, continue to Step 19.
19. At IOP (0 or 1), replace UN933 or UN33 circuit pack. See Procedure 4.4 or 6.1.
20. Repeat from Step 1.
21. At the MTTY, enter the appropriate input command.
    - If MML, **ORD:SCSD:UNIT=0,PT=13:OPERATE;**
    - If PDS, **ORD:SCSD;UNIT 0:PT 13,OPR OPERATE!**

22. Does the audible major alarm sound?

    If **YES**, go to Step 25.

    If **NO**, continue to Step 23.

23. Escalate to the next level of support, or repair the OAU circuit from the SCSDC (cable and unit) per the local system application documentation and procedures.

24. Repeat from Step 21.

25. At the MTTY, enter the appropriate input command.

    - If MML, **ORD:SCSD:UNIT=0,PT=13:RELEASE;**
    - If PDS, **ORD:SCSD;UNIT 0:PT 13,OPR RELEASE!**

26. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

27. Has the associated SCSDC (UN933 or UN33) circuit pack been replaced in IOP (0 or 1) during this procedure?

    If **YES**, go to Step 30.

    If **NO**, continue to Step 28.

28. At IOP (0 or 1), replace UN933 or UN33 circuit pack. See Procedure 4.4 or 6.1.

29. Repeat from Step 1.

30. At the MTTY, enter the appropriate input command.

    - If MML, **ORD:SCSD:UNIT=0,PT=14:OPERATE;**
    - If PDS, **ORD:SCSD;UNIT 0:PT 14,OPR OPERATE!**

31. Does the audible minor alarm sound?

    If **YES**, go to Step 34.

    If **NO**, continue to Step 32.

32. Escalate to the next level of support, or repair the OAU circuit from the SCSDC (cable and unit) per the local system application documentation and procedures.

33. Repeat from Step 1.

34. At the MTTY, enter the appropriate input command.

    - If MML, **ORD:SCSD:UNIT=0,PT=14:RELEASE;**
    - If PDS, **ORD:SCSD;UNIT 0:PT 14,OPR RELEASE!**

35. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Trouble Clearing Tasks

CONTENTS PAGE

LIST OF FIGURES

LIST OF TABLES

4. REPLACE FAULTY UNIT OR CIRCUIT PACK

OVERVIEW

The procedures in this section are used to replace a faulty unit or circuit pack.

4.1 REPLACE CABINET MOUNTED SCSI 9-TRACK TAPE DRIVE

OVERVIEW

This procedure provides instructions to replace the small computer system interface (SCSI) 9-track magnetic tape (MT) drive. For additional information on the 9-track MT drive, refer to 254-303-105, *Hardware Reference Manual*, Chapter 7, "Storage and Peripheral Devices."

Note: The 9-track MT drive and associated peripheral growth cabinet will be rated Discontinued Availability (DA) as of September 30, 2001. If a spare 9-track MT drive is available, that spare can be used to replace a drive. If a spare is **not** available, it will be necessary to degrow the 9-track MT drive and grow a digital audio tape (DAT) drive as a replacement. Refer to 254-303-100, *Growth/Retrofit Tasks*, for the appropriate degrowth and growth procedures.

All 9-track drives are shipped with customer documentation. Refer to the appropriate vendor manual in the following list before continuing this procedure. In particular, users should be familiar with the internal diagnostics and installation sections of the vendor manual.

- For Hewlett Packard: *HP88781A Tape Drive User's Guide*
- For StorageTek (STK): *9914 Streamer User/Diagnostic Manual*.

Prior to performing this procedure, read and understand all notes, cautions, background information, and instructions.

Caution: Replacing the 9-track MT unit requires two people. One person should not attempt to replace this unit. Depending on the vendor, the 9-track MT unit weighs either 95 or 101 pounds. For additional information on handling the 9-track MT unit, contact the next level of technical support.

Note: See Procedure 3.2, Clear Diagnostic Failures Using TLPs and Supplementary Diagnostic Procedures, for information on the trouble locating procedure (TLP) and reinstalling original circuit packs when they are not faulty.

PREREQUISITE CONDITIONS

A SCSI 9-track tape drive is difficult to replace because of its size and weight. Also, it is not cost effective to replace a SCSI 9-track tape drive because of a bad tape or an unclean tape drive that could be causing diagnostics to fail. Therefore, the following conditions must exist before starting the SCSI 9-track tape drive replacement procedure:

- A clean 9-track tape drive.
- A properly working write-enabled tape loaded in the 9-track tape drive.
- An internal diagnostics failure that occurs after the 9-track tape drive has been cleaned and a new tape has been loaded.

Perform the following steps to meet prerequisite conditions, and determine the necessity of replacement.

1. Clean the tape drive. For the detailed procedure, refer to the appropriate chapter in 254-303-101, *Routine Maintenance Tasks*, as follows:
   - For the StorageTek (STK) (KS-23909,L10) unit, refer to Chapter 3, "Clean KS-23909,L10 9-Track Tape Drive."

- For the *HP*[1] Model 88781A (KS-23909,L21) unit, refer to Chapter 4, "Clean KS-23909,L21 9-Track Tape Drive."

2. Replace the current tape with a new tape. For the detailed procedures, refer to the appropriate chapters in 254-303-101, *Routine Maintenance Tasks*, as follows:

   - For the StorageTek (STK) (KS-23909,L10) unit, refer to Chapter 13, "Remove 9-Track Tape from KS-23909,L10 Tape Drive," to remove the tape and Chapter 10, "Load 9-Track Tape into KS-23909,L10 Tape Drive," to load the tape.
   - For the *HP* Model 88781A (KS-23909,L21) unit, refer to Chapter 14, "Remove 9-Track Tape from KS-23909,L21 Tape Drive," to remove the tape and Chapter 11, "Load 9-Track Tape into KS-23909,L21 Tape Drive," to load the tape.

3. Run internal diagnostics on the tape drive unit. Refer to the appropriate vendor manual as indicated in the OVERVIEW section of this procedure for the detailed diagnostics procedure. Also, refer to 254-303-101, *Routine Maintenance Tasks*, "Run Demand Diagnostics on MT Procedure" section in Chapter 12.

4. Did the 9-track tape drive unit pass internal and demand diagnostics?

   If **YES**, DO NOT replace the SCSI 9-track tape drive unit.

   If **NO**, go to Step 1 of the procedure to replace a 9-track MT unit.

PROCEDURE

1. Obtain the appropriate replacement 9-track MT unit.

2. Enter the appropriate input command to verify all mate moving head disk(s) [MHD(s)] on the mate small computer system interface (SCSI) bus(es) [SBUS(es)].

   Note: Verifying MHD(s) will take between 15 and 60 minutes depending on the number and capacity of the MHD(s). Do not continue with Step 3 until verification is complete.

   - If MML, **VFY:MHD=***a***;**
   - If PDS, **VFY:MHD** *a***!** (poke **601**,*a*)

   Where: *a* = Mate MHD member number.

   Response: **VFY MHD** *a* **COMPLETED**

   After verifying all mate SBUS MHDs, continue to Step 3.

3. At the maintenance terminal (MTTY), enter the appropriate input command to remove the associated SCSI bus (SBUS) from service.

   - If MML, **RMV:SBUS=***b***;**
   - If PDS, **RMV:SBUS** *b***!** (poke **604**,*b*,**RMV**)

   Where: *b* = SBUS member number.

   Response: The following messages will be sent to the receive-only printer (ROP) and MTTY:

---

1. Registered trademark of Hewlett-Packard Company.

RMV *c b* **COMPLETED** (subunits only).

RMV SBUS *b* **COMPLETED**

REPT DIOP SIMPLEX PROCESSING
COMPLETED [optional DISK for the disk independent operation (DIOP) feature].

At the MTTY on the common processor display page (CPDP), the unit indicator displays in reverse video and flashes **CU PERPH** alarm indicator. SBUS *b* unit status and SBUS *b* subunit status indicate **OOS** or **OOS MAN**.

SBUS *b* subunit power switch(es) **OOS** light-emitting diode (LED) lights.

Where: *b* = Target SBUS.
c = Subunit name.

4. Locate the faulty 9-track MT unit. It will be mounted in one of the peripheral growth cabinets.

5. Record and save the setting of the 9-track SCSI device identification (**ID**) switch for the MT unit being replaced. This setting is sometimes referred to as the SCSI ID. Refer to 254-303-106, *System Maintenance Manual*, Chapter 19, "SCSI Peripheral System," for the MT unit settings.

6. Remove power to the 9-track MT unit by performing the following functions:

   (a) Toggle the power switches on the front and rear of the unit (if present) to 0.

   Note: The 9-track MT unit (KS-23909,L10 or KS-23909,L21) does not have an **ST/ON/OFF** switch. The KS-23909,L10 has a power switch only on the front of the unit. The KS-23909,L21 has a power switch on both the front and rear of the unit.

   (b) Unplug the power cord at the rear end of the unit.

   Response: At the MTTY on the CPDP, the disk file controller (DFC) status display page unit indicator displays **OOS**.

7. Disconnect the SBUS cable at the rear end of the 9-track MT unit.

8. Remove the faulty 9-track MT unit from the cabinet.

   Caution: Removing or installing a 9-track MT unit requires two people; therefore, even an experienced person should not attempt this operation alone.

9. Place the faulty 9-track MT unit in the antistatic bag or original shipping container, and set aside for disposition according to local policy.

10. Remove the replacement 9-track MT unit from the shipping container (circuit packs are included in the MT unit), and install the new 9-track MT unit in the cabinet.

    Note: Refer to the installation or setup section of the appropriate vendor manual for the detailed procedure to install the 9-track MT unit.

11. Reconnect the SBUS cable at the rear end of the unit.

12. Restore power to the new 9-track MT unit by performing the following functions:

    (a) Plug in the power cord at the rear of the unit.

(b) Toggle the power switches on the front and rear of the unit (if present) to 1.

13. Set the **ID** switch on the new 9-track MT to the number recorded in Step 5.

14. At the MTTY, enter the appropriate input command to restore the 9-track MT unit associated SBUS to service.

    - If MML, **RST:SBUS=***b*,**CONT;**
    - If PDS, **RST:SBUS** *b* **CONT!**

    Where: *b* = SBUS member number.

    Response: **RST SBUS** *b* **COMPLETED**

15. At the MTTY, enter the appropriate input command to diagnose the 9-track MT unit.

    - If MML, **DGN:MT=***b***;**
    - If PDS, **DGN:MT** *b***!**

    Where: *b* = Member number.

    Response: **DGN MT** *b* **ATP MESSAGE COMPLETE**

16. At the MTTY, enter the appropriate input command to restore the 9-track MT unit to service.

    - If MML, **RST:MT=***b***;**
    - If PDS, **RST:MT** *b***!**

    Where: *b* = Member number.

    Response: **RST MT** *b* **COMPLETED**

17. Load a write-enabled tape reel on the 9-track MT unit. Refer to 254-303-101, *Routine Maintenance Tasks,* for detailed information.

18. At the MTTY, enter the appropriate input command to write a file to the 9-track MT unit.

    - If MML, **COPY:TAPE:OUT,TD="/dev/mt***xx***", FN="cudiagc",BSDIR="/diag/dgnc";**
    - If PDS, **COPY:TAPE:OUT,TD "dev/mt***xx***", FN="cudiagc",BSIR "/diag/dgnc"!**

    Where: *xx* = MT unit special device filename (for example, */dev/mt00*).

    Response: **COPY TAPE OUT COMPLETED**
    (number of blocks)

19. At the MTTY, enter the appropriate input command to read a file from the 9-track MT unit.

    - If MML, **COPY:TAPE:IN,TD="/dev/mt***xx***", BSDIR="/tmp";**
    - If PDS, **COPY:TAPE:IN,TD "/dev/mt***xx***", BSDIR "/tmp"!**

    Where: *xx* = MT unit special device filename (for example, */dev/mt00*).

    Response: **COPY TAPE IN COMPLETED**
    (number of blocks)

20. At the MTTY, enter the appropriate input command to verify that the file is written to and read from the 9-track MT unit.

    - If MML, **OP:STATUS:SUM,FN="/diag/dgnc/cudiagc";**
      If MML, **OP:STATUS:SUM,FN="/tmp/cudiagc";**
    - If PDS, **OP:STATUS:SUM,FN "/diag/dgnc/cudiagc"!**
      If PDS, **OP:STATUS:SUM,FN "/tmp/cudiagc"!**

    The numbers output from each command should match.

    Response: **OP STATUS SUM COMPLETED**
    a b **/diag/dgnc/cudiagc**
    a b **/tmp/cudiagc**

    Where: *a* = 16-bit decimal checksum of file.
    b = Decimal number of blocks.

    Both checksum values and both blocks values should match in the output response.

21. Unload the tape reel mounted on the 9-track MT unit. Refer to 254-303-101, *Routine Maintenance Tasks*.

22. At the MTTY, enter the appropriate input command to restore the 9-track MT unit associated SBUS to service (takes approximately 20 to 30 minutes per MHD subunit).

    - If MML, **RST:SBUS=***b***;**
    - If PDS, **RST:SBUS** *b***!**

    Where: *b* = Member number.

    Response: The following messages will be sent to the ROP and MTTY:

    RST SBUS *b* **COMPLETED**

    RST *c b* **COMPLETED**

    REPT DIOP DUPLEX PROCESSING COMPLETED (optional DISK for the DIOP feature).

    At the MTTY on the DFC status display page, the SBUS *b* unit status and SBUS *b* subunit status indicate **ACT**.

    At the MTTY, observe a return to normal of the **CU PERPH** indicator.

    SBUS *b* subunit power switch(es) **OOS** LED lights.

    Where: *b* = Member number.
    c = Subunit name.

23. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.2 REPLACE SCSI DAT DRIVE

OVERVIEW

This procedure provides instructions to replace a UN376, UN376B, UN376C, or UN376E 3.5-inch small computer system interface (SCSI) digital audio tape (DAT) drive circuit pack. The DAT unit (UN376) should be replaced if the unit has been identified as a defective unit during a diagnostic test.

Prior to performing this procedure, read and understand all notes, cautions, background information, and instructions.

Note: Use antistatic bags (R-5158 or equivalent) or the original shipping container to store circuit packs that are removed from the unit.

Caution: A properly grounded wrist strap (R-4987 or equivalent) must be worn when inserting, removing, unlatching, or handling a plug-in circuit pack. This applies to circuit packs in shipping containers as well as to those installed in cabinets.

Note: See Procedure 3.2, Clear Diagnostic Failures Using TLPs and Supplementary Diagnostic Procedures, for information on the trouble locating procedure (TLP) and reinstalling original circuit packs when they are not faulty.

The DAT is a circuit pack tape drive that is connected to a SCSI bus (SBUS). The SBUS must be removed from service before removing or inserting the UN376 circuit pack. At the maintenance terminal (MTTY), enter the appropriate input command to identify the SBUS of the defective magnetic tape (MT) drive.

- If MML, **OP:MT**=*a*:**INFO;**
- If PDS, **OP:MT** *a*;**INFO!**

  Where: *a* = Tape drive number (for example, 0).

The terminal display lists the KS number and product revision number in the PRODUCT IDENTIFICATION field.

Caution: While writing to tape, if the tape drive is removed from service or powered down, the tape operation is considered a failure.

Background Information

Before continuing to the procedure, the craftsperson should know how to perform the following:

- Locate the UN376 circuit pack.
- Remove the UN376 from service.
- Remove power from the UN376.
- Restore power to the UN376.
- Restore the UN376 to service.

For information on the UN376 circuit pack series, refer to 254-303-105, *Hardware Reference Manual*, Chapter 7, "Storage and Peripheral Devices." Users should be familiar with the UN376 circuit pack faceplate, circuit pack latch switch, and the **ROS/RST**, **ACO-T**, and DAT SCSI device identification (**ID**) switch settings before

proceeding. To locate the UN376 circuit pack, refer to 254-303-105, *Hardware Reference Manual*, Chapter 3, "3B21D Computer Physical Description," or office records.

Figure 4.2-1 shows the UN376 circuit pack faceplate controls and indicators.

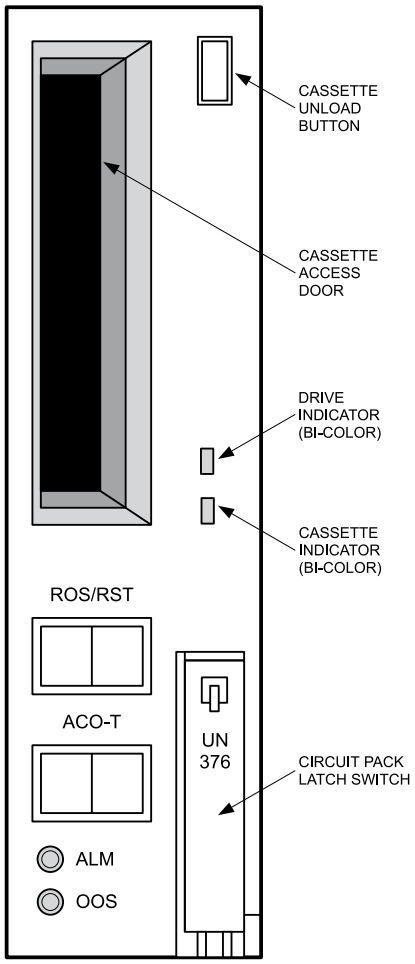


Figure 4.2-1 — SCSI DAT Drive — Front View

PROCEDURE

1. Run diagnostics on the magnetic tape (MT) using the trouble locating procedure (TLP) diagnostic option to determine what circuit pack to replace. See Procedure 3.2.

2. Obtain a replacement UN376 circuit pack DAT unit.

3. At the MTTY, enter the appropriate input command to inhibit the automatic diagnostic process (ADP). The ADP, which is run when a unit is powered up, is not necessary for this procedure.

   - If MML, **INH:DMQ:SRC=ADP;**
   - If PDS, **INH;DMQ;SRC ADP!**

   Response: **INH DMQ COMPLETED**

4. Enter the appropriate input command to verify all mate moving head disk(s) [MHD(s)] on the mate small computer system interface (SCSI) bus(es) [SBUS(es)].

   Note: This procedure will take 10 to 60 minutes depending on the capacity of the MHD and the application.

   - If MML, **VFY:MHD=***a***;**
   - If PDS, **VFY:MHD** *a***!** (poke **601**,*a*)

   Where: *a* = Mate MHD member number.

   Response: **VFY MHD** *a* **COMPLETED**

   After verifying all mate SBUS MHDs, continue to Step 5.

   Caution: Be sure to remove the SBUS from service prior to unlatching and removing the circuit pack to prevent the possibility of corrupting data located on disks that remain active and that are on the target SBUS.

5. At the MTTY, enter the appropriate input command to remove the SBUS associated with the faulty DAT drive from service.

   - If MML, **RMV:SBUS=***a***;**
   - If PDS, **RMV:SBUS** *a***!** (poke **604**,*a*,**RMV**)

   Where: *a* = SBUS member number.

   Response: The following messages will be sent to the receive-only printer (ROP) and MTTY:

   RMV *b a* **COMPLETED** (subunits only).

   RMV SBUS *a* **COMPLETED**

   REPT DIOP SIMPLEX PROCESSING COMPLETED [optional DISK for the disk independent operation (DIOP) feature].

   At the MTTY on the common processor display page (CPDP), the unit indicator displays in reverse video and flashes the **CU PERPH** alarm indicator.

   SBUS *a* unit status and SBUS *a* subunit status indicate **OOS** or **OOS MAN**.

On the SBUS *a* subunit power switch(es) associated with the SCSI DAT drive being replaced, the **OOS** light-emitting diode (LED) lights.

Where: *a* = SBUS member number.
b = Status of request.

Note: All subunits are removed from service before unit **RMV COMPLETED** message is received.

6. Locate the UN376 SCSI DAT drive circuit pack to be replaced. If necessary, use the TLP list, Table 4.2-1, or office records to assist in locating the DAT.

Table 4.2-1 — Locating the UN376 Circuit Pack

UNIT	CIRCUIT PACK	EQL
DAT 0	UN376[a]	19-186
DAT 1	UN376[a]	[b]
Note(s): a. The power switch **ST/ON/OFF** function is built into the latch of the UN376. b. The equipment location (EQL) is specified by the application.		

7. ***Note:*** The DAT UN376 circuit pack does not have an **ST/ON/OFF** switch.

   Remove power to the faulty DAT drive by pulling out the circuit pack latch switch on the UN376 circuit pack faceplate.

   Response: The following message will be sent to the ROP and MTTY:

   REPT POWER REMOVED MT *a*

   The **OOS** LED extinguishes on the UN376 SCSI DAT drive.

   At the MTTY on the disk file controller (DFC) status display page, the unit indicator continues to display **OOS** or **OOS MAN**.

   Where: *a* = Subunit number.

8. Remove the faulty UN376 DAT circuit pack.

9. The **ID** switch number, sometimes referred to as the SCSI ID, is determined by the settings for SW6, SW7, and SW8. For example, Figure 4.2-2 shows the switch settings for a SCSI ID of "6." SW6, SW7, and SW8 are located on the side of the UN376 circuit pack. Record and save the settings (open or closed) for the faulty DAT circuit pack being replaced.

   Note: Figure 4.2-2 illustrates the SCSI device identification switches as they appear on UN376B Series 3, UN376C, and UN376E circuit packs. Refer to 254-303-105, *Hardware Reference Manual*, Chapter 7, "Storage and Peripheral Devices," and 254-303-106, *System Maintenance Manual*, Chapter 19, "SCSI Peripheral System," for additional information on all UN376 circuit packs.

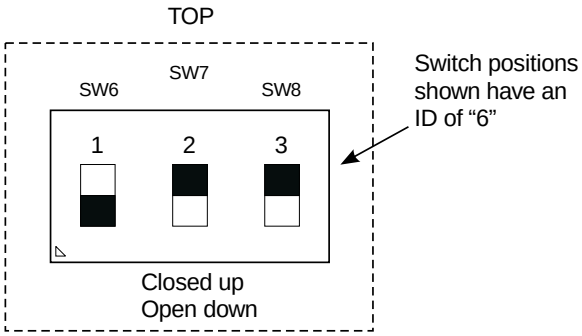


Figure 4.2-2 — DAT Drive Switch Positions for UN376B Series 3 and Later Models

Table 4.2-2 identifies switch settings and associated SCSI ID numbers.

Table 4.2-2 — Possible DAT SCSI Device Identification Switch Settings

SCSI ID	SW8	SW7	SW6
0	Open (0)	Open (0)	Open (0)
1	Open (0)	Open (0)	Closed (1)
2	Open (0)	Closed (1)	Open (0)
3	Open (0)	Closed (1)	Closed (1)
4	Closed (1)	Open (0)	Open (0)
5	Closed (1)	Open (0)	Closed (1)
6	Closed (1)	Closed (1)	Open (0)
7[a]	Closed (1)	Closed (1)	Closed (1)
Note(s): a. SCSI device ID number 7 is not allowed.			

10. Place the faulty UN376 circuit pack into an antistatic bag (R-5158 or equivalent) or the original shipping container, and set aside for disposition according to local policy.
11. Remove the replacement UN376 DAT circuit pack from the antistatic bag or the original shipping container, and adjust SW6, SW7, and SW8 to match the settings just recorded from the faulty circuit pack.
12. Install the replacement circuit pack into the empty cabinet slot created in Step 8. Seat the circuit pack in the backplane with care to prevent connector and backplane damage.
13. Make sure the UN376 circuit pack latch switch has been latched to restore power.

    Response: The **OOS** LED on the UN376 faceplate lights.
14. At the MTTY, enter the appropriate input command to restore the DAT drive associated SBUS to service.

Note: This command restores the SBUS, but not its associated SCSI peripheral units.

- If MML, **RST:SBUS=*a* CONT;**
- If PDS, **RST:SBUS *a* CONT!**

Where: *a* = SBUS number (for example, 0).

Response: The following messages will be sent to the ROP and MTTY:

RST SBUS *a* COMPLETED

At the MTTY on the DFC status display page, the SBUS *a* unit status indicates **ACT**.

On the SBUS *a* subunit power switch(es) associated with the SCSI DAT drive being replaced, the **OOS** LED will remain lit.

Where: *a* = SBUS member number (for example, 0).

15. At the MTTY, enter the appropriate input command to diagnose the DAT drive.

    - If MML, **DGN:MT=*a*;**
    - If PDS, **DGN:MT *a*!**

    Where: *a* = SBUS member number (for example, 0).

    Response: **DGN MT *a* ATP MESSAGE COMPLETE**

16. At the MTTY, enter the appropriate input command to restore all **OOS** subunits associated with the SBUS to service.

    - If MML, **RST:SBUS=*a*;**
    - If PDS, **RST:SBUS *a*!**

    Where: *a* = SBUS member number.

    Response: The following messages will be sent to the ROP and MTTY:

    RST SBUS *a* IN PROGRESS

    RST SBUS *a* COMPLETED

17. At the MTTY on the DFC status display page, verify that the status for all previously **OOS** subunits is **ACT**.

18. At the MTTY, enter the appropriate input command to return the ADP to the allowed state.

    - If MML, **ALW:DMQ:SRC=ADP;**
    - If PDS, **ALW:DMQ:SRC ADP!**

    Response: **ALW DMQ ENABLED ADP**

19. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.3 REPLACE SCSI DISK DRIVE CIRCUIT PACK

OVERVIEW

This procedure provides instructions for replacing a small computer system interface (SCSI) disk drive circuit pack. The UN375 circuit pack provides a board-mounted 3.5-inch, differential SCSI hard disk drive with various formatted capacities depending on which version of the UN375 circuit pack is used.

Prior to performing this procedure, read and understand all notes, cautions, background information, and instructions.

Note: Use antistatic bags (R-5158 or equivalent) or the original shipping container to store circuit packs that are removed from the unit.

Caution: A properly grounded wrist strap (R-4987 or equivalent) must be worn when inserting, removing, unlatching, or handling a plug-in circuit pack. This applies to circuit packs in shipping containers as well as to those installed in cabinets.

Note: See Procedure 3.2, "Clear Diagnostic Failures Using TLPs and Supplementary Diagnostic Procedures," for the trouble locating procedure (TLP) and reinstalling original circuit packs when they are not faulty.

Background Information

Before continuing to the procedure, the craftsperson should know how to perform the following:

- Locate the UN375 circuit pack.
- Remove the UN375 from service.
- Remove power from the UN375.
- Restore the UN375 to service.
- Restore power to the UN375.

For information on the UN375 circuit pack series, refer to 254-303-105, *Hardware Reference Manual*, Chapter 7, "Storage and Peripheral Devices." Users should be familiar with the UN375 circuit pack faceplate switch functions (**ST/ON/OFF**, **ROS/RST**, and **ACO-T**), light-emitting diode (LED) functions, and SCSI device identification (**ID**) switch settings before proceeding. To locate the UN375 circuit pack, refer to 254-303-105, *Hardware Reference Manual*, Chapter 3, "3B21D Computer Physical Description," or office records.

Figure 4.3-1 shows the UN375/UN375F circuit pack faceplate.

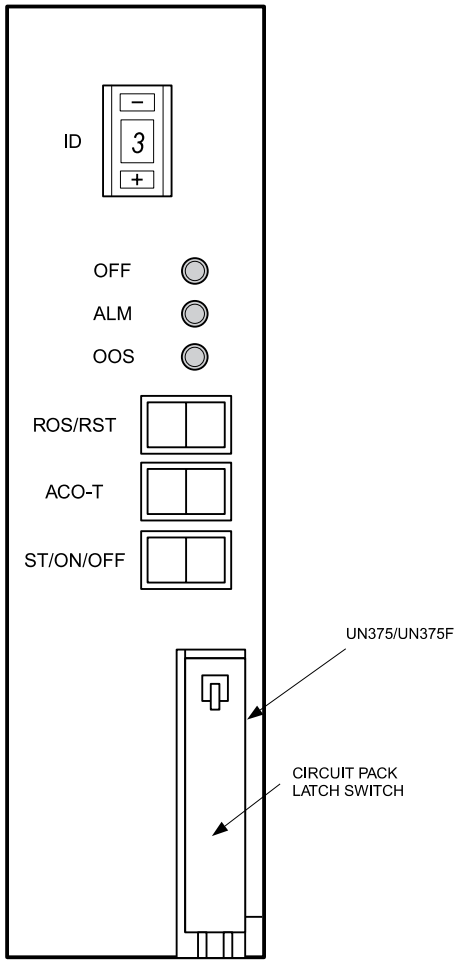


Figure 4.3-1 — UN375/UN375F Circuit Pack Faceplate

PROCEDURE

Before installing the new disk drive, verify that an instruction manual is provided with the drive.

Caution: To avoid possible service interruptions, use extreme care when making repairs, replacing, or powering down units in the SCSI drives.

1. Run diagnostics on the moving head disk (MHD) using the trouble locating procedure (TLP) diagnostic option to determine what circuit pack to replace. See Procedure 3.2.
2. Using the TLP list, Table 4.3-1, or office records, locate the unit power switch on the faulty disk drive circuit pack (UN375).

Table 4.3-1 — Unit Power Switches

UNIT	POWER SWITCH	LOCATION
MHD 0	UN375	28-162
MHD 1	UN375	53-162
MHD 2	UN375	19-170
MHD 3	UN375	45-170
MHD *a*[a]	UN375	[b]
Note(s): a. The *a* is member number(s) above number 3. b. Position specified by application.		

3. At the front of the circuit pack, carefully read and record the **ID** switch setting.

   Caution: Disk access problems will result if an incorrect ID setting is used on the replacement disk drive.

4. At the maintenance terminal (MTTY), enter the appropriate input command to inhibit the automatic diagnostic process (ADP). The ADP, which is run when a unit is powered up, is not necessary for this procedure.

   - If MML, **INH:DMQ:SRC=ADP;**
   - If PDS, **INH;DMQ;SRC ADP!**

   Response: **INH DMQ COMPLETED**

5. At the MTTY, enter the appropriate input command to verify all mate MHDs on the mate SCSI bus(es) [SBUS(es)].

   Note: This procedure will take 10 to 60 minutes depending on the capacity of the MHD and the application.

   - If MML, **VFY:MHD=***a***;**
   - If PDS, **VFY:MHD** *a***!** (poke **601**,*a*)

   Where: *a* = Mate MHD member number.

   Response: **VFY MHD** *a* **COMPLETED**

6. At the MTTY, access the appropriate disk file controller (DFC) status page.

   - If *5ESS*® switch, access Page 123, the Master Control Center/Supplementary Trunk and Line Work Station (MCC/STLWS) maintenance page.
   - For all other applications, access Page 120.

7. On Page 120 or 123, make a note of the SBUS associated with the faulty disk drive.

   Caution: The following command will remove the associated SBUS from service as well as all other SCSI peripherals located on the same SBUS.

8. At the MTTY, enter the appropriate input command to remove the SBUS associated with the faulty disk drive from service.

   - If MML, **RMV:SBUS=***a***;**

- If PDS, **RMV:SBUS** *a***!** (poke **604**,*a*,**RMV**)

Where: *a* = SBUS member number (0-7) noted in Step 7.

Response: **RMV** *c b* **COMPLETED** (subunits only).

At the MTTY, observe reverse video and flashing **CU PERPH** indicator.

RMV SBUS *b* **COMPLETED**

REPT DIOP SIMPLEX PROCESSING COMPLETED [optional DISK for the disk independent operation (DIOP) feature].

SBUS *b* unit status and SBUS *b* subunit status indicate **OOS** or **OOS MAN**.

SBUS *b* subunit power switch(es) **OOS** light-emitting diode (LED) lights.

Where: *b* = Target SBUS member number.
c = Subunit name.

9. At the disk drive, toggle the **ST/ON/OFF** switch to **OFF (0)**.

   Response: **REPT POWER REMOVED** *a b* message received.

   At the MTTY on the common processor display page (CPDP), the unit indicator displays **UNAV**, **OOS**, or **OOS MAN**.

   At unit power switch (disk drive), the **OFF** LED lights.

   Where: *a* = Unit name.
   b = Member number.

10. Unlatch the UN375 disk drive circuit pack, but do not remove the circuit pack at this time.

11. Wait 1 minute to allow the UN375 MHD disk drive to spin down.

    Note: For newer disk drives, like the UN375F, wait 30 seconds for the disk to spin down.

12. Remove the disk drive.

13. Place the faulty circuit pack into an antistatic bag (R-5158 or equivalent) or the original shipping container, and set aside for disposition according to local policy.

14. On the replacement MHD circuit pack, carefully set the **ID** switch to the number recorded earlier from Step 3.

15. On the replacement MHD circuit pack, ensure the **ROS/RST** switch is set to the **ROS** position, the **ST/ON/OFF** switch is in the **OFF** position, and the **ACO-T** switch is in the **OFF** position (blank position).

16. Install the UN375 MHD circuit pack into the open slot of the cabinet with care where the faulty circuit pack was previously removed to prevent connector and backplane damage.

17. At the UN375 MHD circuit pack, press the **ON (1)** button and momentarily toggle the **ST/ON/OFF** switch to **ST**.

    Response: **REPT POWER RESTORED** *a b* message received.

    At the MHD circuit pack, **OFF** LED extinguishes and **OOS** LED lights.

At the MTTY on the CPDP, the unit indicator displays **OOS** or **OOS MAN**.

Where: *a* = Unit name.
b = Member number.

18. Wait 30 seconds for drive to spin up.

19. At the MTTY, type the appropriate input command to restore the SBUS.

Note: This command restores the SBUS, but not its associated SCSI peripheral units.

- If MML, **RST:SBUS=***a***:CONT;**
- If PDS, **RST:SBUS** *a***:CONT!**

Where: *a* = Member number (0-7) of controlling SBUS.

Response: **RST SBUS** *a* **COMPLETED**

20. At the MTTY, enter the appropriate input command to initialize the MHD.

Note: This procedure will take 20 to 60 minutes depending on the capacity of the MHD and the application.

- If MML, **INIT:MHD=***a***;**
- If PDS, **INIT:MHD** *a!*

Where: *a* = Member number of replaced disk.

Response: **INIT MHD** *a* **IN PROGRESS** message received every 2 minutes.
INIT MHD *a* **COMPLETED**

21. At the MTTY, enter the appropriate input command to verify the MHD.

Note: This procedure will take 20 to 30 minutes.

- If MML, **VFY:MHD=***a***;**
- If PDS, **VFY:MHD** *a***!**

Where: *a* = Member number of replaced disk.

Response: **VFY MHD** *a* **IN PROGRESS** message received every 2 minutes.
VFY MHD *a* **COMPLETED**

22. At the MTTY, enter the appropriate input command to diagnose the MHD.

- If MML, **DGN:MHD=***a***;**
- If PDS, **DGN:MHD** *a***!**

Where: *a* = Member number of replaced disk.

Response: **DGN MHD** *a* **ATP MESSAGE COMPLETE**

23. Toggle the **ROS/RST** switch to **RST** on the disk drive.

Response: **DGN MHD** *a* **ATP MESSAGE COMPLETE**
RST MHD *a* **COMPLETED**
DGN *b a* **COMPLETED** (subunits only).
RST *b a* **COMPLETED** (subunits only).

REPT DIOP DUPLEX PROCESSING COMPLETED (optional DISK for the DIOP feature).

At unit power switch, **OOS** LED extinguishes.

At subunit power switch, **OOS** LED extinguishes (subunits only).

At the MTTY on the CPDP, the unit status indicates **ACT** or **STBY**.

At the MTTY on the CPDP, the subunit(s) status indicates **ACT** or **STBY**.

At the MTTY, if DFC, observe a return to normal of the **CU PERPH** indicator (if no other peripherals are **OOS**).

At the MTTY, if CU, observe a return to normal of the **CU** indicator.

At the MTTY, if input/output processor (IOP), observe a return to normal of the **CU PERPH** and **OS LINKS** indicators (if no other peripherals are **OOS**).

Where: *a* = Member number of replaced disk drive.
b = Subunit name.

24. Is the unit replaced due to alarm testing?

    If **YES**, go to Step 28.

    If **NO**, continue to Step 25.

25. At the MTTY, enter the appropriate input command to create the Defect Table listing of the replaced disk drive.

    - If MML, **DUMP:MHD=***a***:DEFECT,ALL;**
    - If PDS, **DUMP:MHD** *a***:DEFECT,ALL!**

    Where: *a* = Member number of replaced disk drive.

    Response: **DUMP MHD** *a* **DEFECT TABLE COMPLETED**
    The **GROWN** Defect List is output as the **COMBINED** Defect Table.
    SCSI DEFECT COUNT CHECK COMPLETED

    Where: *a* = Member number of replaced disk drive.

26. Is the system response **DUMP MHD** *a* **DEFECT TABLE COMPLETED** followed by the **COMBINED** Defect Table received in Step 25?

    If **YES**, continue to Step 27.

    If **NO**, contact the next level of technical support.

27. Save the Defect Table listing for future reference.

28. At the MTTY, enter the appropriate input command to restore all the subunits to service.

    - If MML, **RST:MHD=***b***;**
      If MML, **RST:MT=***b***;**
    - If PDS, **RST:MHD** *b***!**
      If PDS, **RST:MT** *b***!**

    Where: *b* = Subunit name.

    Note: Do not continue until all **OOS** subunits are restored to service.

29. At the MTTY, enter the appropriate input command to return the ADP to the allowed state.

    - If MML, **ALW:DMQ:SRC=ADP;**
    - If PDS, **ALW:DMQ:SRC ADP!**

    Response: **ALW DMQ ENABLED ADP**

30. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.4 REPLACE IOP OR CIRCUIT PACK IN IOP

OVERVIEW

This procedure provides instructions to replace an input/output processor (IOP) or a circuit pack located in an IOP. Specifically, replacement of the following circuit packs is covered in this procedure:

KBN10 IOP circuit pack that contains the dual serial channel (DSCH) and input/output microprocessor interface (IOMI) functions.

410AA Power unit C (PWR C), power unit D (PWR D), and power unit G (PWR G) are DC-to-DC converter circuit packs that provide +5 V DC from −48 V DC.

TN74B Asynchronous terminal controller that provides two EIA RS-232C channels operating at 300, 1200, 2400, 4800, and 9600 bps. It is used to provide data communication between the computer and a wide variety of asynchronous serial communications equipment.

TN75C Synchronous data link controller (SDLC) that provides two independent X.25 level 2 interfaces (channel 0 and channel 1) with automatic dial out on channel 0. It is used to provide interfaces to packet switching networks, personal computers, or machine-to-machine links by dialup, private, or leased lines.

TN82B SDLC that provides a single, high-speed serial data link that implements the X.25 level 2 protocol. It is used to provide a high-performance interface to packet switching networks or machine-to-machine links by dialup, private, or leased lines. The TN82B is compatible with EIA RS-232C, EIA RS-449, and CCITT V.35 modems.

TN1420 Provides a single, high-speed serial data link that implements the X.25 level 2 protocol. It is used to provide a high-performance interface to packet switching networks or machine-to-machine links by dialup, private, or leased lines. The TN1420 is compatible with EIA G.703 and CCITT V.36 modems.

TN1839 Similar to the TN75 circuit pack, but meets the NET2 requirements. The TN1839 circuit pack provides two independent X.25 level 2 interfaces (channel 0 and channel 1) with automatic dial out on channel 0. It is used to provide interfaces to packet switching networks, personal computers, or machine-to-machine links by dialup, private, or leased lines. The TN1839 is compatible with EIA RS-232C and EIA RS-449 modems.

UN582 SDLC, high-speed synchronous data link controller (HSDC), or an asynchronous data link controller which is a terminal controller (TTYC). The UN582 can be used to replace the TN82B and TN1839 circuit packs at a reduced cost per port.

TN1820 Input/output processor power switch (IOPPS) circuit pack is similar to the control unit power switch (CUPS) circuit pack with additional onboard DC-to-DC (±12 V and −5 V) power converters. Also, see Procedure 3.5, Clear CU, DFC, IOP, SPU, and Port Switch Power Faults, for replacing the TN1820 IOPPS circuit pack when associated with a power fault.

TN983	Maintenance terminal controller (MTTYC) circuit pack. See Procedure 3.4, Clear KS-23996,L1 MTTY Faults, for emergency action interface (EAI), port switch, or other cabling faults.
UN583	MTTYC circuit pack that replaces the TN983. See Procedure 3.4, Clear KS-23996,L1 MTTY Faults, for EAI, port switch, or other cabling faults.
UN597	MTTYC circuit pack that replaces the UN583. See Procedure 3.4, Clear KS-23996,L1 MTTY Faults, for EAI, port switch, or other cabling faults.
UN33 or UN933	Scanner and signal distributor (SCSD) circuit pack. The UN33 or UN933 consists of circuitry for monitoring 48 scan (SC) points and controlling 32 signal distributor (SD) points. A scan point is defined as an open pair of leads connected to a monitored current source on the UN33 or UN933. See Procedure 3.8, Clear Software Alarm Circuit Faults, for replacing a UN33 or UN933 circuit pack.

Prior to performing this procedure, read and understand all notes, cautions, background information, and instructions.

Note: Use antistatic bags (R-5158 or equivalent) or the original shipping container to store circuit packs that are removed from the unit.

Caution: A properly grounded wrist strap (R-4987 or equivalent) must be worn when inserting, removing, unlatching, or handling a plug-in circuit pack. This applies to circuit packs in shipping containers as well as to those installed in cabinets.

Note: See Procedure 3.2, Clear Diagnostic Failures Using TLPs and Supplementary Diagnostic Procedures, for information on the trouble locating procedure (TLP) and reinstalling original circuit packs when they are not faulty.

Background Information

For more information on IOPs, TN1820 IOPPS circuit packs, other circuit packs associated with an IOP, and how to locate any of these circuit packs, refer to 254-303-105, *Hardware Reference Manual*, Chapter 3, "3B21D Computer Physical Description," and Chapter 6, "Peripheral Device Functional Descriptions DFC, IOP, PC, and PSSDB."

Before continuing to the procedure, the craftsperson should understand the following for the suspected faulty circuit pack to be replaced:

- Know how to remove from service and restore to service the IOP that is associated with the suspected faulty circuit pack to be replaced. This may be the IOP (KBN10) itself, the TN1820 IOPPS, or a peripheral controller in the IOP.
- Know how to locate the TN1820 IOPPS circuit pack used to remove power from or restore power to the IOP unit and the suspected faulty circuit pack being replaced.

Determine the IOP to be removed from service. Use Table 4.4-1 to locate the TN1820 IOPPS circuit pack.

Table 4.4-1 — Locating TN1820 IOPPS Circuit Pack

PROCESSOR CABINET LOCATION	IOP UNIT	TN1820 CIRCUIT PACK EQL
Processor Unit 0	IOP 0	19-080
Processor Unit 1	IOP 1	45-080
Growth Unit	IOP 2	11-026
Growth Unit	IOP 3	62-026

The TN1820 IOPPS circuit pack is shown in Figure 4.4-1.

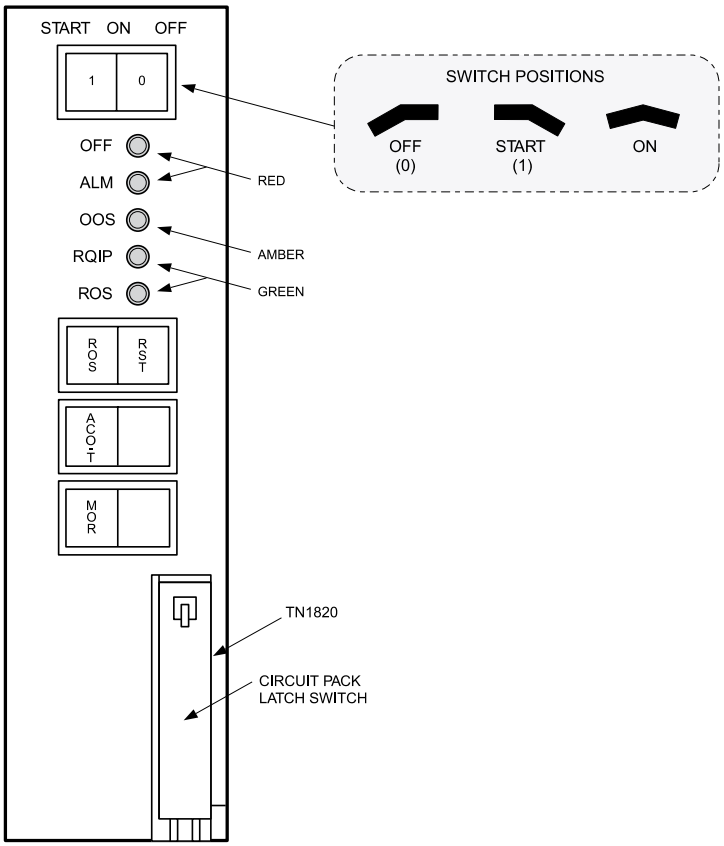


Figure 4.4-1 — TN1820 IOPPS Faceplate

The TN1820 IOPPS circuit pack faceplate is identical in arrangement to the TN1821 CUPS and UN373/UN580/UN580B disk file controller (DFC) except for the width of the packs. Ensure that the intended IOPPS circuit pack is correctly identified and located to prevent powering down the wrong equipment.

This procedure includes replacing the 410AA power converters associated with the IOP as shown in Table 4.4-2.

Table 4.4-2 — Locating 410AA Power Converters Associated with IOPs

PROCESSOR AND IOP LOCATION	410AA PANEL DESIGNATION	410AA CIRCUIT PACK EQL
Processor Unit 0/IOP 0	PWR D (GREEN) 410AA	28-088
Processor Unit 0/IOP 0	PWR C (BLACK) 410AA	19-088
Processor Unit 1/IOP 1	PWR D (GREEN) 410AA	53-088
Processor Unit 1/IOP 1	PWR C (BLACK) 410AA	45-088
Growth Unit/IOP 2	PWR G (BLACK) 410AA	11-034
Growth Unit/IOP 3	PWR G (BLACK) 410AA	62-034

Other 410AA power converters not found in Table 4.4-2 are not associated with the IOP. This procedure should not be used to replace 410AA power converters not associated with the IOP.

PROCEDURE

1. Run diagnostics on the IOP and subunits using the trouble locating procedure (TLP) diagnostic option to determine what IOP circuit pack to replace. See Procedure 3.2.

   - If the circuit pack listed on the TLP list is located in the IOP or is the IOP (KBN10) itself, continue to Step 2.
   - If the circuit pack listed on the TLP list is **not** located in the IOP or is **not** the IOP (KBN10) itself, **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.

2. For the circuit pack to be replaced, obtain a correct spare circuit pack or TN1820 IOPPS power unit.

3. At the maintenance terminal (MTTY), enter the appropriate input command to inhibit the automatic diagnostic process (ADP).

   - If MML, **INH:DMQ:SRC=ADP;**
   - If PDS, **INH;DMQ;SRC ADP!**

4. Determine the IOP (IOP 0, 1, 2, or 3) to be removed from service that is associated with the circuit pack to be replaced.

5. Are the active MTTY and receive-only printer (ROP) connected to an IOP that is not to be removed from service? See the common processor display page (CPDP).

   - If **YES**, continue to Step 6.
   - If **NO**, switch the port switch to an IOP not being removed from service. At the MTTY, enter the appropriate poke command **401**, **402**, or **403**.

     Response: At the CPDP, the MTTY and the ROP are shown connected to the other IOP.

     Then, continue to Step 6.

6. ***Note:*** IOP units may be equipped with simplex peripheral controllers (PCs). If necessary, notify the simplex PC users before removing any IOP.

   Using Table 4.4-1, go to the appropriate TN1820 IOPPS circuit pack.

7. ***Note:*** All subunits are removed from service before unit **RMV COMPLETED** message is received.

   Remove the IOP (IOP 0, 1, 2, or 3) from service that is associated with the circuit pack to be replaced by toggling the **ROS/RST** switch to **ROS** on the *a b* TN1820 IOPPS circuit pack faceplate. See Table 4.4-1.

   Response: At TN1820 IOPPS, the **OOS** light-emitting diode (LED) flashes and then lights.

   The following messages will be sent to the ROP and MTTY:

   RMV *c b* **COMPLETED** message received (for example, TTYC, TTY, SDLC, SDL).

   RMV IOP *b* **COMPLETED** message received.

   Reverse video and flashing **CU PERPH** and **OS LINKS** indicators (not observable on ROP).

   IOP *b* unit status indicates **OOS** or **OOS MAN**.
   c b unit status indicates **OOS** or **OOS MAN**.

   Where: *a* = Unit name.
   b = Member number.
   c = Subunit name.

8. ***Caution: The IOP unit associated with the circuit pack being replaced must be out of service (OOS), and the IOP must be powered down before replacing a circuit pack.***

   Connect the wrist strap to the 3B21D computer frame. Then, remove power from the IOP using the same TN1820 IOPPS previously located and used in Step 6 to remove the IOP from service. Do not continue with this procedure without understanding these conditions.

   At the TN1820 IOPPS, toggle the **ST/ON/OFF** switch to **OFF** to remove power from the IOP.

   Response: At TN1820 IOPPS, the **OFF** LED lights.
   At associated unit power converters, the **OFF** LED lights.

   The following message will be sent to the ROP and MTTY:

   REPT POWER REMOVED *a b* message received.

   At the MTTY on the CPDP, the unit indicator displays **UNAV**, **OOS**, or **OOS MAN**.

   Where: *a* = Unit name.
   b = Member number.

9. Using the wrist strap, remove the faulty or suspected circuit pack or power unit.

10. Place the faulty circuit pack or power unit in an antistatic bag (R-5158 or equivalent) or the original shipping container, and set aside for disposition according to local policy.

    Note: Local policy may include tagging the faulty circuit pack with office location, equipment location (EQL), diagnostic failure (phase and test), and date removed. For nondiagnostic failures, include a printout of the failure indication. For intermittent faults, monitor for 2 times the longest interval.

11. Remove the replacement circuit pack or power unit from the antistatic bag or the original shipping container. If a TN1820 IOPPS, verify that the **ST/ON/OFF**

switch is in the **OFF** position, the **ACO-T** switch is in the normal position, and the **ROS/RST** switch is in the **ROS** position.

12. Install the new replacement circuit pack or power unit into the slot where the faulty circuit pack was previously removed.

13. At the IOPPS, restore power to suspect IOP by toggling **ST/ON/OFF** switch to **ST** (start) and release to **ON**.

    Response: At TN1820 IOPPS, **OFF** LED extinguishes and **OOS** LED lights. At associated unit power converters, **OFF** LED extinguishes.

    After these responses are received at the TN1820 IOPPS, the following message will be sent to the ROP and MTTY:

    REPT POWER RESTORED *a b* message received.

    At the MTTY on the CPDP, the unit indicator displays **OOS** or **OOS MAN**.

    Where: *a* = Unit name.
    b = Member number.

14. At the MTTY, enter the appropriate input command to restore the IOP with "controller only."

    - If MML, **RST:IOP=***a***,RAW,TLP:CONT;**
    - If PDS, **RST:IOP** *a***,RAW,TLP:CONT!**

    Where: *a* = IOP number (0-4).

    Response: **RST IOP** *a* **COMPLETED**

15. After replacing a PC circuit pack, diagnose the new PC. At the MTTY, enter the appropriate input command to diagnose the new PC.

    - If MML, **DGN:***pc*=*b***;**
    - If PDS, **DGN:***pc b***!**

    Where: *b* = PC number.
    pc = Peripheral controller.

    Response: **DGN** *PC b* **ATP MESSAGE COMPLETE**
    DGN *PC b* **COMPLETED**

16. Restore IOP unit to service by toggling the **ROS/RST** switch to **RST** on the TN1820 IOPPS faceplate.

    Response: At subunit power switch, **OOS** LED extinguishes (subunits only). At TN1820 IOPPS, **OOS** LED extinguishes.

    The following messages will be sent to the ROP and MTTY:

    DGN *a b* **ATP MESSAGE COMPLETE**

    RST *a b* **COMPLETED**

    DGN *c b* **COMPLETED** (subunits only).

    RST *c b* **COMPLETED** (subunits only).

    At the MTTY on the CPDP, the unit status indicates **ACT** or **STBY**.

    At the MTTY on the CPDP, the subunit(s) status indicates **ACT** or **STBY**.

    At the MTTY, observe a return to normal of the **CU PERPH** and **OS LINKS** indicators.

Where: *a* = Unit name.
b = Member number.
c = Subunit name.

17. At the MTTY, enter the appropriate input command to return the ADP to the allowed state.
    - If MML, **ALW:DMQ:SRC=ADP;**
    - If PDS, **ALW:DMQ:SRC ADP!**
18. Notify all affected simplex PC users that IOP unit has been restored to service.
19. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.5 REPLACE SCSI DFC

OVERVIEW

This procedure provides instructions to replace a small computer system interface (SCSI) disk file controller (DFC). The DFC connects peripherals that use SCSI with the direct memory access (DMA) dual serial channels (DSCHs). The SCSI peripherals connected by the DFC are as follows:

- Cabinet Mounted SCSI 9-Track Tape Drive — See Procedure 4.1, Replace Cabinet Mounted SCSI 9-Track Tape Drive.
- SCSI DAT Drive — See Procedure 4.2, Replace SCSI DAT Drive.
- SCSI Disk Drive — See Procedure 4.3, Replace SCSI Disk Drive Circuit Pack.

The DFC unit consists of a disk file controller (DFC) and a power supply that is contained on the UN580B circuit pack or supplied by a 410AA power converter for the UN373 and UN580 circuit packs. The 3B21D computer supports three versions of the DFC as follows:

DFC Version 1 Consists of circuit packs UN373 and TN2116 and a 410AA power converter. The UN373 circuit pack provides the SCSI bus interface. The TN2116 SCSI Host Adapter (HA) circuit pack supports SCSI-1 and controls the SCSI bus. The 410AA power converter supplies power to the DFC.

DFC Version 2 Consists of a UN580 circuit pack and a 410AA power converter. The 410AA power converter supplies power to the DFC.

DFC Version 3 Consists of a UN580B circuit pack. The UN580B has an onboard power supply that replaces the need for a 410AA power converter.

Depending on the version of the DFC being replaced, one to three circuit packs may be involved.

Prior to performing this procedure, read and understand all notes, cautions, background information, and instructions.

Note: Use antistatic bags (R-5158 or equivalent) or the original shipping container to store circuit packs that are removed from the unit.

Caution: A properly grounded wrist strap (R-4987 or equivalent) must be worn when inserting, removing, unlatching, or handling a plug-in circuit pack. This applies to circuit packs in shipping containers as well as to those installed in cabinets.

Note: See Procedure 3.2, Clear Diagnostic Failures Using TLPs and Supplementary Diagnostic Procedures, for the trouble locating procedure (TLP) and reinstalling original circuit packs when they are not faulty.

Background Information

For more information on DFCs, SCSI peripherals, 410AA power converters associated with a DFC, and how to locate any of these circuit packs, refer to 254-303-105, *Hardware Reference Manual*, Chapter 3, "3B21D Computer Physical Description," and Chapter 6, "Peripheral Device Functional Descriptions DFC, IOP, PC, and PSSDB."

Before continuing to the procedure, the craftsperson should know how to perform the following:

- Locate the DFC circuit pack(s).

- Remove the DFC from service.
- Remove power from the DFC.
- Restore the DFC to service.
- Restore power to the DFC.

Once the DFC to be removed from service is determined, use Table 4.5-1, 4.5-2, or 4.5-3 to locate the DFC circuit pack(s).

Table 4.5-1 — Locating DFC Version 1 (UN373, TN2116, and 410AA) Circuit Packs

PROCESSOR AND DFC LOCATION	UN373 EQL	POWER UNIT PANEL DESIGNATION	TN2116 EQL	410AA EQL
Processor Unit 0/DFC 0	28-178	PWR E (PURPLE)	28-170	28-188
Processor Unit 1/DFC 1	53-178	PWR E (PURPLE)	53-170	53-188
Growth Unit/DFC 2	11-180	PWR H (BLUE)	11-172	11-190
Growth Unit/DFC 3	62-180	PWR H (BLUE)	62-172	62-190

Table 4.5-2 — Locating DFC Version 2 (UN580 and 410AA) Circuit Packs

PROCESSOR AND DFC LOCATION	UN580 EQL	POWER UNIT PANEL DESIGNATION	410AA EQL
Processor Unit 0/DFC 0	28-178	PWR E (PURPLE)	28-188
Processor Unit 1/DFC 1	53-178	PWR E (PURPLE)	53-188
Growth Unit/DFC 2	11-180	PWR H (BLUE)	11-190
Growth Unit/DFC 3	62-180	PWR H (BLUE)	62-190

Table 4.5-3 — Locating DFC Version 3 (UN580B) Circuit Pack

PROCESSOR AND DFC LOCATION	UN580B EQL	POWER UNIT PANEL DESIGNATION
Processor Unit 0/DFC 0	28-178	[a]
Processor Unit 1/DFC 1	53-178	[a]
Growth Unit/DFC 2	11-180	[a]
Growth Unit/DFC 3	62-180	[a]

Note(s):
a. The 410AA power converters associated with the PWR E and PWR H positions are not needed (blank/empty) for systems shipped with UN580B DFC.

This procedure includes replacing the 410AA power converters associated with the DFC as shown in Tables 4.5-1 and 4.5-2.

Other 410AA power converters not found in Table 4.5-1 or 4.5-2 are not associated with the DFC. This procedure should not be used to replace 410AA power converters not associated with the DFC.

Power for the DFC is controlled by the DFC power switch functions shown in Figure 4.5-1. A description of the power switches and light-emitting diodes (LEDs) is given in 254-303-105, *Hardware Reference Manual*, Chapter 8, "Power Distribution and Control."

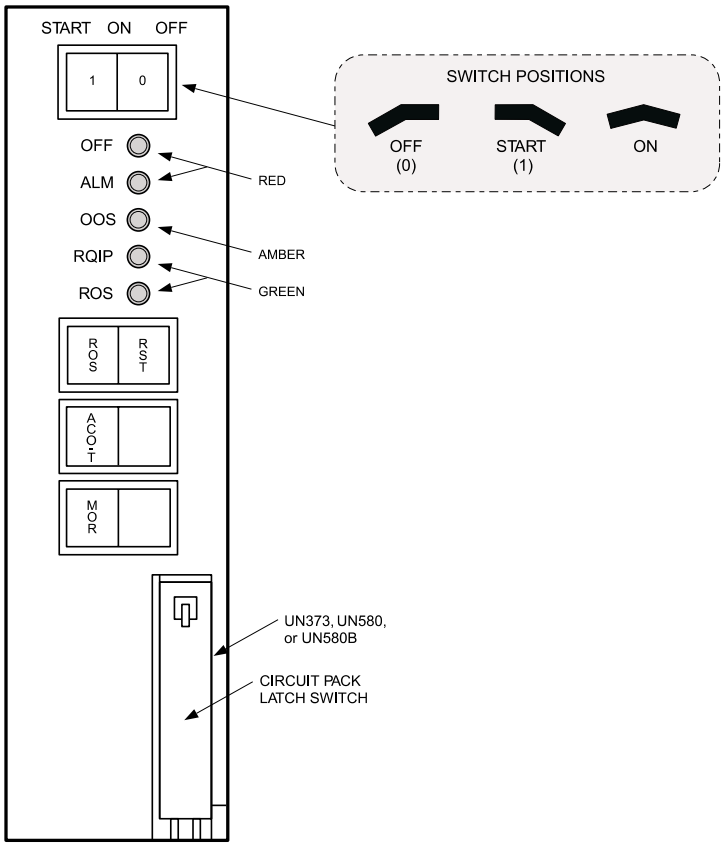


Figure 4.5-1 — UN373, UN580, or UN580B DFC Power Switch Faceplate

PROCEDURE

1. Run diagnostics on the DFC using the trouble locating procedure (TLP) diagnostic option to determine what DFC circuit pack to replace. See Procedure 3.2.

   - If the circuit pack on the TLP list is a DFC circuit pack, continue to Step 2.
   - If the circuit pack on the TLP list is **not** a DFC circuit pack, **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.

2. For the circuit pack to be replaced, obtain a correct spare circuit pack and an antistatic bag (R-5158 or equivalent) or the original shipping container.

3. At the maintenance terminal (MTTY), enter the appropriate input command to inhibit the automatic diagnostic process (ADP).

   - If MML, **INH:DMQ:SRC=ADP;**
   - If PDS, **INH;DMQ;SRC ADP!**

4. Has regularly scheduled disk verification by routine maintenance completed successfully within the last 48 hours?

   If **YES**, skip to Step 6.

   If **NO**, continue to Step 5 to verify all mate moving head disks (MHDs).

5. At the MTTY, enter the appropriate input command to verify each mate MHD on the mate DFC.

   - If MML, **VFY:MHD=***a***;**
   - If PDS, **VFY:MHD** *a***!** (poke **601**,*a*)

   Where: *a* = Mate MHD member number.

   Response: **VFY MHD** *a* **COMPLETED**

   Repeat this step until all mate MHDs have been successfully verified.

6. Using the TLP list, determine the DFC to be removed from service. Using Table 4.5-1, 4.5-2, or 4.5-3 or office records, locate and identify the DFC circuit pack to be replaced (UN373, UN580, or UN580B).

7. ***Note:*** All subunits are removed from service before unit **RMV COMPLETED** message is received.

   Remove the DFC from service that is associated with the circuit pack to be replaced by toggling the **ROS/RST** switch to **ROS** on the appropriate Disk File Controller A (DFC A) circuit pack faceplate. See Table 4.5-1, 4.5-2, or 4.5-3.

   Response: At the DFC circuit pack identified in Step 5, the **OOS** LED flashes, and then lights on the **DFC** *b* unit power switch. Also, the **OOS** LED lights on all subunit MHDs and magnetic tapes (MTs).

   The following messages will be sent to the receive-only printer (ROP) and MTTY:

   RMV *c b* **COMPLETED** (for example, MHD or MT).

   RMV DFC *b* **COMPLETED**

   At the MTTY on the common processor display page (CPDP), the unit indicator displays in reverse video and flashes **CU PERPH**, **OS LINKS**, and **CRITICAL** alarm indicators.

   DFC *b* unit status indicates **OOS** or **OOS MAN**.
   c b unit status indicates **OOS** or **OOS MAN**.

   Where: *b* = Member number.
   c = Subunit name.

8. ***Caution: The DFC unit associated with the circuit pack being replaced must be out of service (OOS) and the DFC must be powered down before replacing a circuit pack.***

   Connect the wrist strap to the 3B21D computer frame. Remove power from the DFC previously located and used in Step 7 to remove the DFC from service.

   At the DFC circuit pack, toggle the **ST/ON/OFF** switch to **OFF** to remove power from the DFC.

   Response: At the DFC circuit pack, the **OFF** LED lights.
   At associated unit power converters, the **OFF** LED lights.

   The following message will be sent to the ROP and MTTY:

   REPT POWER REMOVED *a b* message received.

   At the MTTY on the common processor display page (CPDP), the unit indicator displays **UNAV**, **OOS**, or **OOS MAN**.

Where: *a* = Unit name.
b = Member number.

9. Using the wrist strap, remove the faulty or suspected UN373, UN580, UN580B, or 410AA circuit pack.

10. Place the faulty circuit pack in an antistatic bag (R-5158 or equivalent) or the original shipping container, and set aside for disposition according to local policy.

    Note: Local policy may include tagging the faulty circuit pack with office location, equipment location (EQL), diagnostic failure (phase and test), and date removed. For nondiagnostic failures, include a printout of the failure indication. For intermittent faults, monitor for 2 times the longest interval.

11. Remove the replacement circuit pack from the antistatic bag or the original shipping container. If the circuit pack is a UN373, UN580, or UN580B, verify that the **ST/ON/OFF** switch is in the **OFF** position, the **ACO-T** switch is in the normal position, and the **ROS/RST** switch is in the **ROS** position.

12. Install the new replacement circuit pack or power unit into the open slot where the suspected faulty circuit pack was previously removed.

13. Restore power to the DFC by toggling the **ST/ON/OFF** switch to **ST** (start) and releasing to **ON**.

    Response: At DFC circuit pack, **OFF** LED extinguishes and **OOS** LED lights. At associated unit power converters, **OFF** LED extinguishes.

    After these responses are received at the DFC, the following messages will be sent to the ROP and MTTY:

    REPT POWER RESTORED *a b* message received.

    At the MTTY on the CPDP, the unit indicator displays **OOS** or **OOS MAN**.

    Where: *a* = Unit name.
    b = Member number.

14. At the MTTY, enter the appropriate input command to diagnose the DFC with "controller only."

    - If MML, **DGN:DFC=***a***,RAW,TLP:CONT;**
    - If PDS, **DGN:DFC** *a***,RAW,TLP:CONT!**

    Where: *a* = DFC number.

    Response: **DGN** *DFC a* **ATP MESSAGE COMPLETE**
    DGN *DFC a* **COMPLETED**

15. Restore the DFC and all of its subunits to service by toggling the **ROS/RST** switch to **RST** on the DFC A faceplate.

    Response: At subunit power switch, **OOS** LED extinguishes (subunits only). At DFC A, **OOS** LED extinguishes.

    The following messages will be sent to the ROP and MTTY:

    DGN *a b* **ATP MESSAGE COMPLETE**

    RST *a b* **COMPLETED**

    DGN *c b* **COMPLETED** (subunits only).

    RST *c b* **COMPLETED** (subunits only).

    At the MTTY on the CPDP, the unit status indicates **ACT** or **STBY**.

    At the MTTY on the CPDP, the subunit(s) status indicates **ACT** or **STBY**.

    At the MTTY, observe a return to normal of the **CU PERPH** indicator.

    Where: *a* = Unit name.
    b = Member number.
    c = Subunit name.

16. At the MTTY, enter the appropriate input command to return the ADP to the allowed state.

    - If MML, **ALW:DMQ:SRC=ADP;**
    - If PDS, **ALW:DMQ:SRC ADP!**

17. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.6 REPLACE CIRCUIT PACK IN CU

OVERVIEW

This procedure provides instructions to replace a circuit pack located in a control unit (CU). Specifically, replacement of the following circuit packs is covered in this procedure:

KBN15 Direct memory access (DMA) circuit pack that contains the DMA controller (DMAC) and channel functions.

KLW31 Central control (CC) circuit pack that contains the CC and cache storage unit (CSU).

KLW32, KLW40, KLW48, KLW64, or KLW128
The main memory (MM) circuit pack contains the main store (MAS) and update functions. The KLW32 is initially equipped with 32 MB; KLW40 is initially equipped with 40 MB; KLW48 is initially equipped with 48 MB. KLW64 is initially equipped with 64 MB. KLW128 is initially equipped with 128 MB.

TN1821 The control unit power switch (CUPS) circuit pack contains power and control for the Central Control fault group. Also, see Procedure 3.5, Clear CU, DFC, IOP, SPU, and Port Switch Power Faults, for replacing the TN1821 CUPS circuit pack when associated with a power fault.

410AA Power unit A (PWR A) and power unit B (PWR B) are DC-to-DC converter circuit packs that provide +5 V DC from -48 V DC.

UN379 Utility circuit pack that contains the utility circuit function. The procedure to replace a UN379 circuit pack is similar to this procedure. If the UN379 circuit pack is equipped, contact the Lucent Technologies Customer Technical Support (CTS) organization instead of using this procedure.

Prior to performing this procedure, read and understand all notes, cautions, background information, and instructions.

Note: Use antistatic bags (R-5158 or equivalent) or the original shipping container to store circuit packs that are removed from the unit.

Caution: A properly grounded wrist strap (R-4987 or equivalent) must be worn when inserting, removing, unlatching, or handling a plug-in circuit pack. This applies to circuit packs in shipping containers as well as to those installed in cabinets.

Background Information

For more information on CUs, TN1821 CUPS circuit packs, other circuit packs associated with a CU, and how to locate any of these circuit packs, refer to 254-303-105, *Hardware Reference Manual*. Refer to Chapter 3, "3B21D Computer Physical Description," Chapter 4, "System Overview and Control Unit Functional Description CC," and Chapter 5, "Control Unit Functional Descriptions MAS, MASU, DMA, DSCH, UC, and PSSDB."

Before continuing to the procedure, the craftsperson should understand the following for the suspected faulty circuit pack to be replaced:

- Know how to remove from service and restore to service the CU that is associated with the suspected faulty circuit pack to be replaced.

- Know how to locate the TN1821 CUPS circuit pack used to remove power from or restore power to the CU unit and the suspected faulty circuit pack being replaced.

A standby CU failing diagnostics should automatically be taken out of service (OOS) by diagnostic/recovery software without any action required by the craftsperson to make the CU out of service. A circuit pack in an OOS CU can be replaced by performing this procedure.

Caution: If the circuit pack that needs to be replaced is in an active CU, escalate the problem immediately as detailed in this procedure. Contact the Lucent Technologies support organization before replacing a circuit pack in an active CU.

Once the already OOS CU is identified, use Table 4.6-1 to locate the TN1821 CUPS circuit pack.

Table 4.6-1 — Locating TN1821 CUPS Circuit Pack

PROCESSOR CABINET LOCATION	CU UNIT	TN1821 CIRCUIT PACK EQL
Processor Unit 0	CU 0	028-060
Processor Unit 1	CU 1	053-060

The TN1821 CUPS circuit pack is shown in Figure 4.6-1.

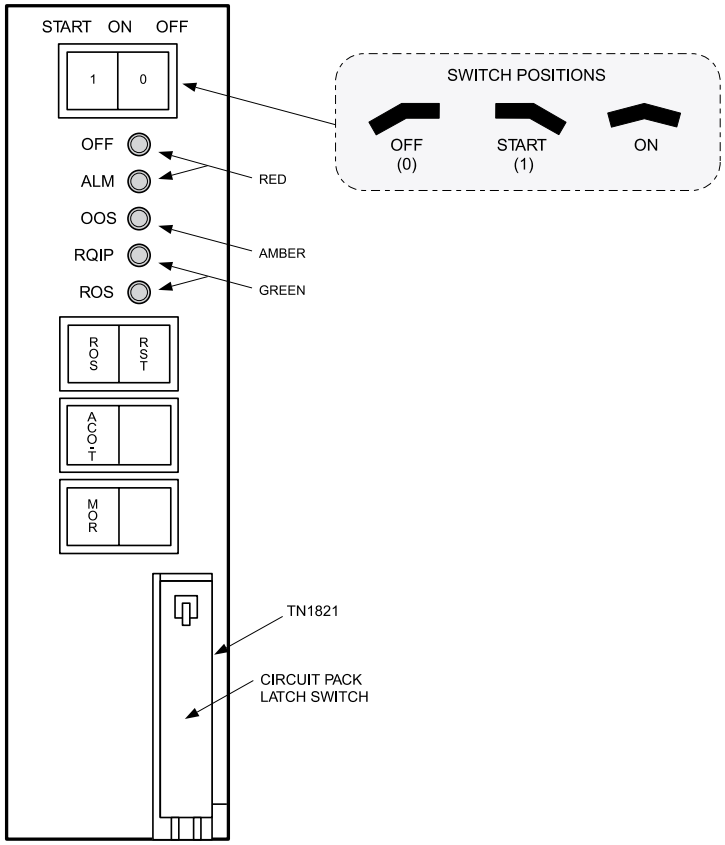


Figure 4.6-1 — TN1821 CUPS Faceplate

The faceplate of the TN1821 CUPS circuit pack is identical to the faceplate of the TN1820 circuit pack. Craft personnel should make sure that they are working with the TN1821 CUPS circuit pack, and that it is associated with the OOS CU.

This procedure includes replacing the 410AA power converters associated with the CU as shown in Table 4.6-2.

Table 4.6-2 — Locating 410AA Power Converters Associated with CUs

PROCESSOR AND CU LOCATION	410AA PANEL DESIGNATION	410AA CIRCUIT PACK EQL
Processor Unit 0/CU 0	PWR A (RED) 410AA	28-052
Processor Unit 1/CU 1	PWR A (RED) 410AA	53-052
Processor Unit 0/CU 0	PWR B (BLUE) 410AA	19-060 (if DMA 1)
Processor Unit 1/CU 1	PWR B (BLUE) 410AA	45-060 (if DMA 1)

Other 410AA power converters not found in Table 4.6-2 are not associated with the CU. This procedure should not be used to replace 410AA power converters not associated with the CU.

PROCEDURE

1. Run diagnostics on the CU using the trouble locating procedure (TLP) diagnostic option to determine what circuit pack in the CU to replace. See Procedure 3.2.

   Note: Record the failing test data (phase, tests, and mismatches) in response to a diagnostic failure. Then, replace suspected faulty circuit packs in weighted order. If the test does not change when diagnostics are run again, the original circuit pack is not faulty and needs to be reinstalled.

   If the circuit pack on the TLP list is located in the CU, continue to Step 2.

   If the circuit pack on the TLP list is **not** located in the CU, **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.

2. Is the circuit pack being replaced in an **OOS CU**?

   If **YES**, continue to Step 3.

   If **NO**, the circuit pack is in the **ACT CU**. Take no replacement actions and escalate the problem to the Lucent Technologies field support organization who may contact 3B21D computer Customer Technical Support (CTS) or review the 3B21D computer CTS Web site for the current replacement procedure. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

3. For the first or next circuit pack to be replaced, obtain a correct spare circuit pack, TN1821 CUPS, or 410AA power unit.

4. At the maintenance terminal (MTTY) [or Switching Control Center (SCC) terminal], display the emergency action interface (EAI) page by pressing the [EA] key.

5. Enter the EAI poke command **12** to force the active CU online.

6. Using Table 4.6-1, go to the appropriate TN1821 CUPS circuit pack.

7. Is the TN1821 CUPS circuit pack associated with the **OOS CU** already **OOS**?

   If **YES**, continue to Step 8.

   If **NO**, recheck the equipment location (EQL) using Table 4.6-1. Then, if TN1821 CUPS with **OOS** light-emitting diode (LED) is located, continue to Step 8. Otherwise, this procedure cannot be used on an **ACT CU**. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

8. After connecting the wrist strap to the 3B21D computer frame, toggle the **ROS/RST** switch to **ROS** on the TN1821 CUPS circuit pack faceplate. See Figure 4.6-1.

9. At the TN1821 CUPS circuit pack, toggle the **ST/ON/OFF** switch to **OFF** to remove power from the CU.

   Response: At TN1821 CUPS, the **OFF** LED lights.
   At associated unit power converters, the **OFF** LED lights.
   The following message will be sent to the receive-only printer (ROP) and MTTY:
   REPT POWER REMOVED CU *b* message received.
   At the MTTY on the CPDP, the unit indicator displays **UNAV**, **OOS**, or **OOS MAN**.

   Where: *b* = CU member number (0 or 1).

10. While continuing to use the wrist strap, remove the faulty or suspected circuit pack or power unit.

11. Place the faulty circuit pack or power unit in an antistatic bag (R-5158 or equivalent) or the original shipping container, and set aside for disposition according to local policy.

    Note: Local policy may include tagging the faulty circuit pack with office location, EQL, diagnostic failure (phase and test), and date removed. For nondiagnostic failures, include a printout of the failure indication. For intermittent faults, monitor for 2 times the longest interval.

12. Remove the replacement circuit pack or power unit from the antistatic bag or the original shipping container. If a TN1821 CUPS circuit pack, verify that the **ST/ON/OFF** switch is in the **OFF** position, the **ACO-T** switch is in the normal position, and the **ROS/RST** switch is in the **ROS** position.

13. Install the new replacement circuit pack or power unit into the open slot where the faulty circuit pack was previously removed.

14. Reinstall any previously replaced circuit packs that did not repair the problem. See the note in Step 1 for a detailed explanation.

15. At the appropriate TN1821 CUPS circuit pack, restore power to the CU by toggling the **ST/ON/OFF** switch to **ST** (start) and release to **ON**.

    Response: At TN1821 CUPS, **OFF** LED extinguishes and **OOS** LED lights.
    At associated unit power converters, **OFF** LED extinguishes.
    After these responses are received at the TN1821 CUPS circuit pack, the following message will be sent to the ROP and MTTY:
    REPT POWER RESTORED CU *b* message received.
    At the MTTY on the CPDP, the unit indicator displays **OOS** or **OOS MAN**.

    Where: *b* = CU member number (0 or 1).

    Wait for these responses to be received before continuing.

16. At the MTTY, enter the appropriate input command to diagnose the CU.

    - If MML, **DGN:CU=***b***,subunit=***c***,RAW,DEX,TLP;**

- If PDS, **DGN:CU** *b*,**subunit** *c*,**RAW,DEX,TLP!**

Where: *b* = CU member number 0 or 1.
c = Subunit name (CC, DMA, or MM) (refer to previous failure or notes on circuit pack being replaced).

Response: **DGN** *CU b* **subunit** *c* **ATP MESSAGE COMPLETE**
DGN *CU b* **subunit** *c* **COMPLETED**

17. Are diagnostic results all tests pass (**ATP**) or conditional **ATP** (**CATP**)?

If **YES**, continue to Step 18.

If **NO** and results are some tests fail (**STF**) followed by a CU circuit pack on the TLP list, return to Step 2 and repeat this procedure.

18. Enter the EAI poke command **13** to clear the CU force online.

19. Restore the CU unit to service by toggling the **ROS/RST** switch to **RST** on the TN1821 CUPS circuit pack faceplate.

Response: At subunit power switch, **OOS** LED extinguishes (subunits only).
At TN1821 CUPS, **OOS** LED extinguishes.

The following messages will be sent to the ROP and MTTY:

DGN *a b* **ATP MESSAGE COMPLETE**

RST *a b* **COMPLETED**

DGN *c b* **COMPLETED** (subunits only).

RST CU *b* **IN PROGRESS** (multiple).

RST *b* **COMPLETED**

At the MTTY on the CPDP, the unit status indicates **ACT** or **STBY**.

At the MTTY on the CPDP, the subunit(s) status indicates **ACT** or **STBY**.

At the MTTY, observe a return to normal of the **CU PERPH** and **OS LINKS** indicators.

Where: *a* = Unit name (CU).
b = CU member number (0 or 1).
c = Subunit name (CC, DMA, or MM).

20. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.7 REPLACE FUSE/FILTER UNIT ALARM BOARD

PROCEDURE

Note: Use antistatic bags (R-5158 or equivalent) or the original shipping container for any circuit packs that are to be removed from the cabinet.

Caution: A wrist strap (R-4987 or equivalent) must be worn when inserting, removing, or handling a plug-in circuit pack. This applies to circuit packs in shipping containers as well as to those installed in cabinets.

1. Loosen the locking bracket screw. (Use a standard flat blade screwdriver, blade tip 3/16", 6" long, 9 1/2" overall length, or equivalent.)
2. Slide the locking bracket left until the slot aligns with the alarm board.
3. Remove the fuse/filter unit (FFU) alarm board.
4. Place the faulty FFU alarm board in an antistatic bag or the original shipping container, and set aside for disposition according to local policy.
5. Remove the replacement FFU alarm board from the antistatic bag or shipping container.
6. Replace the FFU alarm board.
7. Slide the locking bracket to the rightmost position.
8. Tighten the locking bracket screw.
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.8 REPLACE FUSE/FILTER UNIT FUSE

PROCEDURE

1. Are you replacing a fuse/filter unit (FFU) fuse that provides power to a 410AA, TN1820, TN1821, or UN377 circuit pack?

   If **YES**, continue to Step 2.

   If **NO**, go to Step 20.

2. If necessary, remove unit from service. See Procedure 6.2.

3. If necessary, remove power from unit. See Procedure 6.3.

4. Unseat the circuit pack(s) previously listed from unit. See Procedure 6.4.

   Note: Reference SD-3T015-01.

   Caution: Fuse failure will result if the FFU fuse is installed without first unseating the previously listed circuit packs.

5. Replace the blown FFU fuse.

   Note: Reference the Fuse Label Flip Panel at equipment location (EQL) 69.

6. Reinstall the circuit pack in unit. See Procedure 6.4.

7. Restore power to unit. See Procedure 6.5.

8. Did the fuse blow?

   If **YES**, continue to Step 9.

   If **NO**, go to Step 18.

9. Remove the original circuit pack, replace the blown fuse, and replace original circuit pack with a new circuit pack. See Procedure 6.4.

10. Did the fuse blow?

    If **YES**, continue to Step 11.

    If **NO**, go to Step 18.

11. Remove the circuit pack fuse load. See Procedure 6.4.

    Note: Reference the Fuse Label Flip Panel at EQL 69.

12. Reference SD-3T011-01, SD-3T012-01, or SD-3T015-01 to correct the wiring fault, or escalate to the next level of support.

13. Replace the blown FFU fuse.

    Note: Reference the Fuse Label Flip Panel at EQL 69.

14. Replace the circuit pack fuse load. See Procedure 6.4.

    Note: Reference the Fuse Label Flip Panel at EQL 69.

15. Restore power to unit. See Procedure 6.5.

16. Did the fuse blow?

    If **YES**, continue to Step 17.

    If **NO**, go to Step 18.

17. Escalate to the next level of support.
18. Restore unit to service. See Procedure 6.6.
19. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
20. If necessary, remove unit from service. See Procedure 6.2.
21. If necessary, remove power from unit. See Procedure 6.3.
22. Replace the blown FFU fuse.
23. Restore power to unit. See Procedure 6.5.
24. Did the fuse blow?

    If **YES**, continue to Step 25.

    If **NO**, go to Step 34.
25. Replace original circuit pack with a new circuit pack. See Procedure 6.4.
26. Did the fuse blow?

    If **YES**, continue to Step 27.

    If **NO**, go to Step 34.
27. Remove the circuit pack(s) fuse load. See Procedure 6.4.

    Note: Reference the Fuse Label Flip Panel at EQL 69.
28. Reference SD-3T011-01, SD-3T012-01, or SD-3T015-01 to correct the wiring fault, or escalate to the next level of support.
29. Replace the circuit pack fuse load. See Procedure 6.4.

    Note: Reference the Fuse Label Flip Panel at EQL 69.
30. Replace the blown FFU fuse.

    Note: Reference the Fuse Label Flip Panel at EQL 69.
31. Restore power to unit. See Procedure 6.5.
32. Did the fuse blow?

    If **YES**, continue to Step 33.

    If **NO**, go to Step 34.
33. Escalate to the next level of support.
34. Restore unit to service. See Procedure 6.6.
35. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.9 REPLACE KS-23912,L2 FAN ASSEMBLY ON J5D003FH-2 UNIT

PROCEDURE

1. Remove the associated fuse/filter unit (FFU) fuse for the fan to be replaced. See Procedure 4.8.

   Note: The other fans will speed up when you remove the FFU fuse.

   If not already present, a **CU FAN ALARM** will be generated and the following indications will be present:

   - The fan light-emitting diode (LED) will light on the FFU fuse indicator strip.
   - The fan tray controller (FTC) LED will light on the FTC at equipment location (EQL) 36.
   - The fan alarm box will be highlighted on the common processor display page (CPDP) at the maintenance terminal (MTTY).

2. Wait for the fan to stop spinning before continuing.
3. Unplug the connector that connects the cooling fan to the wiring harness.
4. Remove the two shoulder thumb screws holding the cooling fan and fan guard to the mounting unit.
5. Remove the fan guard from the cooling fan.
6. Remove the cooling fan from the mounting unit.

   Note: Observe the cooling fan position in reference to the alignment pins.

7. Install new cooling fan by aligning on alignment pins.
8. Replace fan guard on cooling fan.
9. Install and securely tighten the two shoulder thumb screws through the fan guard and cooling fan into the mounting unit.
10. Reconnect the connector that links the cooling fan to the wiring harness.
11. Install the FFU fuse removed in Step 1.

    Response: The replaced fan starts operating.

12. Retire alarm at the MTTY.
13. Reset the **FAN LED** on the FTC at EQL 036-006 by operating the fan alarm **T/R** (test/reset) switch to the **R** position.
14. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.10 REPLACE COOLING FAN AIR FILTER ON J5D003FH-2 UNIT

PROCEDURE

Note: The processor cabinet contains two air filters in the J5D003FH-2 cooling fan unit, one directly above the fan unit and one directly below the fan unit. The following instructions are for replacing both filters.

Caution: Do not vacuum the used air filters. The used air filters should be replaced with new air filters to prevent metal filings from getting into the circuit pack area.

1. Obtain the following apparatus or equivalent (filters and retainers can be ordered from Universal Air Filter Company, P.O. Box 853, East St. Louis, IL 60203):
   - Two Model UAF 252A1 replacement air filters (comcode 407277193).
   - Two label type air filter retainers (comcode 407580513).
2. Open the processor cabinet front door to expose two fan unit air filters and four filter retainers.

   Note: Two types (a reusable plastic-loop type or single-use label type) of filter retainers may be used on your unit. Four plastic-loop type (two per filter) or two label type (one per filter) retainers hold the filters in place.
3. If equipped with the plastic-loop type filter retainers, remove the old air filter by firmly pulling on both filter retainers and sliding filter forward until it clears the filter mounting channels. (Use the same procedure for the upper and lower filters.)

   If equipped with the label type filter retainers, remove the old air filter by loosening the filter retainer from the unit and then sliding the filter forward until it clears the filter mounting channels. (Use the same procedure for the upper and lower filters.)
4. Insert the new air filter with filter retainer(s) into the filter mounting channel.

   Note: If using the label type retainer, write the current date on the label and secure the label around the frame of the filter with the sticky side facing down.
5. If using the plastic-loop type retainers, slide the filter backward into the channels until the filter retainers clip into the two slotted areas on the filter unit housing. (Use the same procedure for the upper and lower filters.)

   If using the label type retainer, slide the filter backward into the channels completely and then secure the label type retainer to the unit. (Use the same procedure for the upper and lower filters.)
6. Repeat Steps 3, 4, and 5 for the second filter.
7. Close rear cabinet door(s).
8. Close front cabinet door(s).
9. Dispose of the old air filters per local procedures.
10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.11 REPLACE MODEL 577 ROP

PROCEDURE

1. Set the **POWER** switch to **OFF**.
2. Unplug the power cord from the 115 V AC outlet.
3. Remove the data cable connector screws and remove the connector.
4. Remove the printer.
5. If the new printer requires assembly, refer to the User's Guide.
6. Place the new printer in position.
7. Connect and secure the data cable connector with screws.
8. Plug the power cord into a 115 V AC outlet.
9. Set the **POWER** switch to **ON**.
10. Install the paper. If you do not know how to install paper in the Model 577 printer, refer to 254-303-101, *Routine Maintenance Tasks*.
11. Set printer attributes (options) and perform printer self-tests. Refer to 254-303-101, *Routine Maintenance Tasks*, and perform only those steps of the procedure that relate to printer attributes and printer self-tests.
12. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.12 REPLACE MODEL 602 ROP

PROCEDURE

1. Set the **POWER** switch to **OFF**.
2. Unplug the power cord from the 115 V AC outlet.
3. Remove the data cable connector screws and remove the connector.
4. Remove the printer.
5. If the new printer requires assembly, refer to the User's Guide.
6. Place the new printer in position.
7. Connect and secure the data cable connector with screws.
8. Plug the power cord into a 115 V AC outlet.
9. Set the **POWER** switch to **ON**.
10. Install the paper. If you do not know how to install paper in the Model 602 printer, refer to 254-303-101, *Routine Maintenance Tasks*.
11. Set printer attributes (options) and perform printer self-tests. Refer to 254-303-101, *Routine Maintenance Tasks*, and perform only those steps of the procedure that relate to printer attributes and printer self-tests.
12. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4.13 REPLACE MTTY

PROCEDURE

1. Set the maintenance terminal (MTTY) **ON/OFF** power switch to **OFF**.
2. Unplug the power cord from the AC outlet.
   - 115 V AC outlet for the KS-23996,L1 terminal
   - 230 V AC outlet for the KS-23996,L5 terminal.
3. Disconnect the data cable connector plug from the terminal.
4. Remove the terminal.
5. Observe any and all CAUTION and WARNING labels on the new KS-23996,L1 or KS-23996,L5 terminal cartons.

   Caution: To avoid condensation, allow time for all components to assume room temperature before unpacking.
6. Unpack and assemble the components (controller/base, monitor, keyboard, and power cords) of the KS-23996,L1 or L5 terminal.
7. Place the new terminal in position.
8. Connect the data cable plug at the connector marked **EIA** at the rear of the terminal logic controller box.

   Caution: Make sure the power switch is in the* OFF *position before plugging in the power cord to the power source.
9. Plug the power cord into an appropriate AC outlet.
   - 115 V AC outlet for the KS-23996,L1 terminal
   - 230 V AC outlet for the KS-23996,L5 terminal.
10. Set the **ON/OFF** power switch to **ON**.

    Response: The green light-emitting diode (LED) to the left of the **ON/OFF** switch lights, and the terminal performs a self-test.
11. Adjust the brightness and contrast by rotating the appropriate control located under the front of the monitor.
12. Set the MTTY (KS-23996,L1 or L5) options. See Procedure 5.3.
13. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Trouble Clearing Tasks

CONTENTS PAGE

LIST OF FIGURES

LIST OF TABLES

5. VIDEO TERMINAL

OVERVIEW

The following procedures in this section are used to correct video terminal faults:

- Procedure 5.1 to respond to and restore a locked-up video terminal.
- Procedure 5.2 to self-diagnose a video terminal.
- Procedure 5.3 to set maintenance terminal (MTTY) options.

Note: On the *5ESS*® switch, the term MCC is used instead of MTTY.

5.1 RESPOND TO AND RESTORE A LOCKED-UP VIDEO TERMINAL

OVERVIEW

This procedure provides instructions to restore a video terminal or terminals not responding to keystrokes. To perform these procedures, a trained craftsperson needs to have an understanding of terminal configurations. Also, the craftsperson should know how to use the maintenance terminal (MTTY) to locate the display pages(s) that can be helpful in restoring the locked-up video terminal. For additional information on restoring video terminals, refer to 254-303-106, *System Maintenance Manual*, Chapter 3, "Recovery."

The following is a list of hardware conditions that can cause terminal faults. The hardware conditions are listed in order from the most likely to the least likely cause of a fault.

- Any type of "black box" connected in the signal path (see Note).
- No power to terminal.
- A loose cable.
- A faulty peripheral controller:
  - — If non-MTTY, the terminal controller (TTYC) may be faulty.
  - — If MTTY, the maintenance terminal controller (MTTYC) may be faulty.
- If MTTY, a faulty central control emergency action interface (CC/EAI) or cables.

Note: These procedures do not support usage of any "black box" configurations; for example, a printer splitter. If a "black box" is inserted in the signal path, remove it and reconfigure the system before continuing with these procedures.

Prerequisite Conditions

The following initial conditions must exist before starting these procedures:

- The power cord is securely connected to the power outlet.
- The power switch is in the **ON** position.
- Any cabling is securely connected to the terminal.

Peripheral Controllers

The 3B21D computer supports TTYCs and MTTYCs [peripheral controllers (PCs)] that may be faulty and causing the terminal to lockup. The TTYCs supported are as follows:

- TN82B X.25 Synchronous Data Link Peripheral Controller.
- TN1420 X.25 Synchronous Data Link Peripheral Controller.
- TN1839 Synchronous Data Link Peripheral Controller - NET2.
- UN582 multipurpose peripheral controller (MPC) — Used to replace the TN82B and TN1839 circuit packs at a reduced cost per port.

Note: A procedure to replace faulty TTYCs is provided as part of Procedure 5.1.2, One or More Terminals (Not MTTYs) Faulty.

The MTTYCs supported are as follows:

- TN983 MTTYC circuit pack.
- UN583 MTTYC circuit pack that replaces the TN983.
- UN597 MTTYC circuit pack that replaces the UN583.

Note: A procedure to replace faulty MTTYCs is provided as part of Procedure 3.4, Clear KS-23996,L1 MTTY Faults. The UN583 or UN597 is a multipurpose peripheral controller (MPC) that can be used to replace the TN983 peripheral controller. For more information on PCs, refer to 254-303-105, *Hardware Reference Manual*, Chapter 6, "Peripheral Device Functional Descriptions DFC, IOP, PC, and PSSDB."

PROCEDURE

1. For resolving terminal problems, choose one of the following procedures by determining which attributes describe the problem:

   - To resolve problems when all terminals attached to the system are failing to function, see Procedure 5.1.1.
   - To resolve problems having the following attributes, see Procedure 5.1.2.
     - — All video terminals attached to the same system are **not** failing.
     - — A single terminal or multiple terminals are failing to function.
     - — The failing terminal is **not** the MTTY.
   - To resolve problems having the following attributes, see Procedure 5.1.3.
     - — All video terminals attached to the same system are **not** failing.
     - — The failing terminal is the MTTY.

   Note 1: An additional procedure to repair a faulty MTTY can be found in Procedure 3.4. However, Procedure 5.1.3 provides tasks that may restore a locked-up MTTY and should be performed before referring to Procedure 3.4.

   Note 2: See Procedure 3.2 for the trouble locating procedure (TLP) and reinstalling original circuit packs when they are not faulty.

5.1.1 ALL TERMINALS DO NOT FUNCTION

OVERVIEW

If all terminals fail to function, perform a craft initialization [emergency action interface (EAI) 42,3,15]. If this fails to recover terminal functionality, a system initialization will be required. The following precautions should be exercised when attempting a system recovery from a total terminal suspend.

- Be prepared to perform a system reload if all boot combinations fail to restore system sanity. Since access to the system is unavailable, the source of the suspend is difficult to determine. Obtain the latest office backup tapes.
- Perform the initialization during low traffic periods, if possible.
- Ensure that the proper support organizations are available and are ready to help in case a failure does occur.
- Know what kind of data will be needed/collected before engaging a system initialization.
- Know how to create an off-line memory dump and the procedures required to collect valid data from this fault.

Note: To effectively investigate the loss of the craft interface, a snapshot of the 3B21D computer incore memory must be taken while the problem exists. If an investigation is required, Step 2 must be performed. The snapshot taken in Step 2 preserves a copy of the incore memory until the data can be written to tape in Step 6.

See Figure 5.1.1-1 for a flowchart on the loss of the craft interface on all terminals.

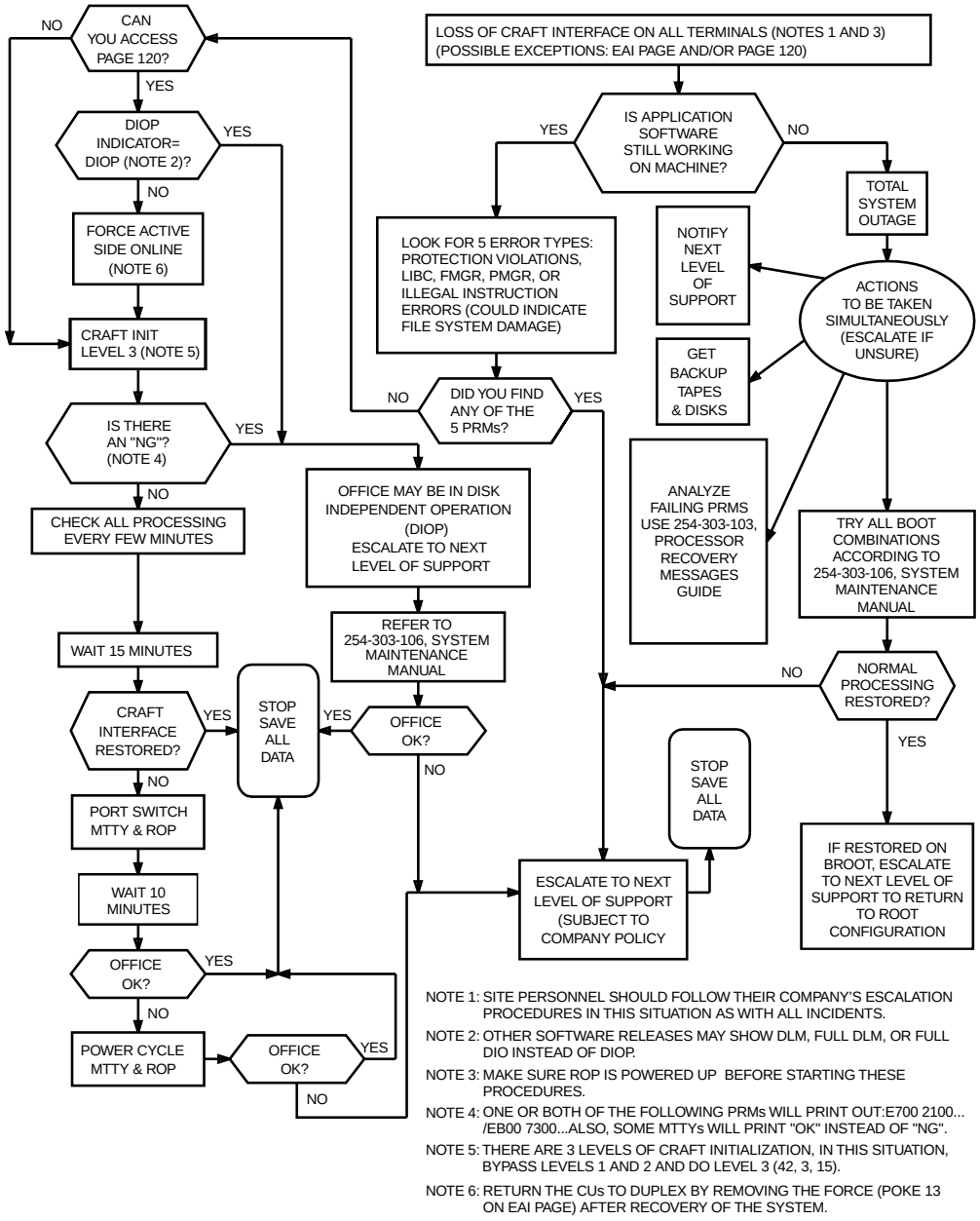


Figure 5.1.1-1 — Loss of Craft Interface on All Terminals

PROCEDURE

The intent of this procedure is to assist with the recovery from the loss of all craft interface terminals. This procedure restarts the essential processes needed to provide a craft terminal interface.

1. At the MTTY [or Switching Control Center (SCC)] terminal, display the EAI page by pressing the [EA] key.

2. Is an investigation of the loss of the craft interface required?

   If **YES**, preserve a copy of the incore memory by entering the EAI poke command **12** to force the active control unit (CU) online.

   If **NO**, continue to Step 3.

3. Enter the following EAI poke commands in the exact order specified to set up the craft initialization request.

   Note: When selecting the parameter type, the value of *n* represents the craft initialization level (level 1, 2, or 3).

   a. Set application parameter by entering poke command **42**.

   b. Select the type of parameter by entering poke command *n* (where n=**3**).

   c. Request craft initialization by entering poke command **15**.

4. Do you really want the **craft initialized**?

   If **YES**, enter **y**. The system should respond with the following craft initialization processor recovery message (PRM).

   Response: **PRM_p EBda 7400 xxyy zzzz hh hh hh** or
   PRM_p FBda 7400 xxyy zzzz hh hh hh

   Where: *xx* = Craft initialization level (01 to 03).
   yy = Craft initialization phase (01 to 04).
   zzzz = 0000 - Current phase proceeds normally.
   0001 - Phase timed out.
   0002 - Craft initialization aborted.
   0003 - Craft initialization failed.
   0004 - Craft initialization completed successfully.

   Note: Refer to 254-303-103, *Processor Recovery Messages Guide*, Chapter 15, "Identifiers B and C — SIM PRMs," concerning **PRM_p EBda 7400 xxyy zzzz hh hh hh** and possible corrective action.

   If **NO**, enter **n**. The craft initialization is not performed.

5. Was the craft terminal initialization successful?

   If **YES**, continue to Step 6.

   If **NO**, escalate to the next level of support.

6. Is an investigation of the craft lockout needed?

   If **YES** and a copy of the 3B21D computer incore memory was preserved in Step 2, use the following substeps to create an off-line dump tape. It takes approximately 40 minutes to create the off-line dump tape.

   (a) Mount the tape and place the tape drive online.

   For detailed procedures, refer to the appropriate chapters in 254-303-101, *Routine Maintenance Tasks*, as follows:

   - For the StorageTek (STK) (KS-23909,L10) unit, refer to Chapter 13, "Remove 9-Track Tape from KS-23909,L10 Tape Drive," to remove the currently loaded tape and Chapter 10, "Load 9-Track Tape into KS-23909,L10 Tape Drive," to load the tape.

- For the *HP*[1] Model 88781A (KS-23909,L21) unit, refer to Chapter 14, "Remove 9-Track Tape from KS-23909,L21 Tape Drive," to remove the currently loaded tape and Chapter 11, "Load 9-Track Tape into KS-23909,L21 Tape Drive," to load the tape.

(b) Enter the appropriate input command.

- If MML, **exc:envir:uproc,fn="/bin/sh",args="-c"-"pio dd if=/dev/ofln of=/dev/mt00 bs=6144";**
- If PDS, **exc:envir:uproc,fn "/bin/sh",args "-c"-"pio dd if /dev/ofln of /dev/mt00 bs 6144"!**

(c) Send the off-line dump tape and a tape of the critical log files to Customer Technical Support (CTS) for analysis.

If **NO** investigation is required, continue to Step 7.

7. The craft terminal interface capability has been restored. Go to the EAI display page and enter poke command **14** to clear all EAI parameters.
8. Once the EAI page has been cleared (no parameters set), press the [NORM DISP] key.
9. Restore any out-of-service (OOS) units to the operational state. See Procedure 6.6.
10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

1. Registered trademark of Hewlett-Packard Company.

5.1.2 ONE OR MORE TERMINALS (NOT MTTYs) FAULTY

OVERVIEW

This procedure provides instructions to restore one or more locked-up video terminals that are not the maintenance terminal (MTTY). A system problem is probable and the following checks need to be performed before taking any other action.

Note: DO NOT PERFORM A CRAFT INITIALIZATION for this type of problem.

PROCEDURE

1. Identify the locked-up terminal (TTY) member number.

   Note: In this procedure, the TTY member number and the video terminal number are synonymous. The video terminal number is usually displayed at the top of the status indicator on the MTTY or the other terminal.

2. Can the TTY member number be identified on the screen of the faulty terminal?

   If **YES**, record the TTY member number and skip to Step 6.

   If **NO**, continue to Step 3.

3. Locate another operational video terminal that is assigned to the same switch as the locked-up video terminal.

   Note: If all terminals are locked up including the MTTY, go to Procedure 5.1.1 to resolve the problem.

4. At the operational video terminal, enter the appropriate input command to identify the out-of-service (OOS) TTY.

   - If MML, **OP:OOS:DATA,TTY;**
   - If PDS, **OP:OOS:TTY!**

5. Record the locked-up TTY member number.

6. Enter the appropriate input command to determine that at least one input/output processor (IOP) and one terminal controller (TTYC) are in service.

   - If MML, **OP:OOS;**
   - If PDS, **OP:OOS!**

   Note: At least one IOP and one TTYC must both be in service before the TTY can be restored.

7. Are at least one IOP and one TTYC in service?

   If **YES**, continue to Step 8.

   If **NO**, restore the OOS IOP or TTYC to service and then continue to Step 8.

8. At the operational video terminal, enter the appropriate input command to attempt to restore the faulty video terminal to service.

   - If MML, **RST:TTY=***a***[,UCL];**
   - If PDS, **RST:TTY** ***a*****[,UCL]!**

   Where: *a* = TTY member number (0-255).

   Response: A **PF** entry (on the same line as the input message) followed by an **RST TTY** output message.

9. Does the restored video terminal display a **CFTSHL TERMINAL IN SERVICE** output message, and does the **RST TTY** output message contain the TTY member number (0-255) followed by **COMPLETED**?

   If **YES** and the terminal is no longer locked up, **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.

   If **NO** and either one of these two response conditions are not received, continue to Step 10.

10. Power cycle the faulty terminal, run self-diagnostics, and verify terminal options. See Section 5.2.

11. Did power cycling the faulty terminal correct the problem?

    If **YES** and the terminal is no longer locked up, power cycle any other terminals that are also faulty, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.

    If **NO**, continue to Step 12.

12. Identify the TTYC that is assigned to the locked-up terminal and identify other terminals that are using this TTYC.

13. Enter the appropriate input command to determine if one of the TTYs assigned to the TTYC is OOS.

    - If MML, **OP:OOS;**
    - If PDS, **OP:OOS!**

14. Are any TTYs assigned to the TTYC OOS?

    If **YES**, observe the following Caution. Then, at the operational video terminal, enter the appropriate input command to restore the TTYC assigned to the locked-up terminal.

    Caution: Notify office personnel that the other terminals using the same TTYC will be OOS when the TTYC is being restored. Do not use these terminals until the locked-up terminal and the TTYC have been restored to service.

    Note: The unconditional (UCL) option only works if one of the TTYs assigned to the TTYC is OOS.

    - If MML, **RST:TTYC=***a***[,UCL];**
    - If PDS, **RST:TTYC** *a***[,UCL]!**

    Where: *a* = TTYC member number (0-255).

    Response: A **PF** entry (on the same line as the input message) followed by an **RST TTYC** output message.

    If **NO**, continue to Step 15.

15. Does the restored video terminal display a **CFTSHL TERMINAL IN SERVICE** output message, and does the **RST TTYC** output message contain the TTYC member number (0-255) followed by **COMPLETED**?

    If **YES** and the terminal is no longer locked up, **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.

    If **NO** and either one of these two response conditions are not received, continue to Step 16.

16. Has a faulty terminal been replaced earlier in this procedure?

    If **YES**, skip to Step 17.

    If **NO**, replace the faulty terminal as follows:

    (a) Set the **ON/OFF** power switch of the faulty terminal to **OFF**.

    (b) Unplug the power cord of the faulty terminal from the AC outlet.

    (c) Disconnect the data cable connector plug from the faulty terminal.

    (d) Remove the faulty terminal.

    (e) Observe any and all CAUTION and WARNING labels on the new terminal cartons.

    Caution: To avoid condensation, allow time for all components to assume room temperature before unpacking.

    (f) Unpack and assemble the components (controller/base, monitor, keyboard, and power cords) of the new terminal.

    (g) Place the new terminal in position.

    Caution: Make sure the power switch on the new terminal is in the* OFF *position before plugging in the power cord to the power source.

    (h) Plug the new terminal's power cord into an appropriate AC outlet.

    (i) Set the **ON/OFF** power switch to **ON**.

    Response: The green LED to the left of the **ON/OFF** switch lights, and the terminal performs a self-test.

    (j) Adjust the brightness and contrast by rotating the appropriate control located under the front of the monitor.

    (k) Set the terminal options.

    (l) Repeat this procedure from Step 1.

17. ***Note:*** When using the procedures for replacing a TTYC, follow the logic for the IOP unit and use the TN1820 Input/Output Processor Power Switch (IOPPS) circuit pack to remove power.

    Also, when removing power, make sure the TTYC being replaced is associated with the IOP removed from service and TN1820 circuit pack where power is removed. There is one TN1820 IOPPS circuit pack per IOP. For the TTYC to be replaced, locate the associated IOP that contains the TTYC. Then, use Table 5.1.2-1 to locate the TN1820 IOPPS circuit pack used to remove power from the IOP and the TTYC.

Table 5.1.2-1 — Locating TN1820 IOPPS Circuit Pack

PROCESSOR CABINET LOCATION	UNIT	TN1820 CIRCUIT PACK EQL
Processor Unit 0	IOP 0	19-080
Processor Unit 1	IOP 1	45-080
Growth Unit	IOP 2	11-026
Growth Unit	IOP 3	62-026

Run diagnostics on IOP using the trouble locating procedure (TLP) diagnostic option. See Procedure 3.2.

The TTYCs supported are TN82B, TN1420, TN1839, and UN582.

If a TTYC is listed on the TLP list, perform the following substeps. See Procedure 4.4.

(a) Remove a suspect IOP (IOP 0, 1, 2, or 3) from service.

(b) Remove power from suspect IOP and replace TTYC.

(c) Restore power to suspect IOP and restore IOP to active.

(d) After replacing TTYC and restoring IOP unit to service, run diagnostics on IOP using the TLP diagnostic option.

Replace any other possible failing circuit packs listed on the TLP list. See Procedure 3.2 for detailed information.

18. Is terminal working properly?

If **YES**, diagnostics pass [all tests pass (ATP)]. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, continue to Step 19.

19. Using a terminal that functions, verify the integrity of all mounted file systems with the **AUD:FSBLK** and **AUD:FSLINK** file system audits. If any of the file system checks fail, escalate the problem immediately to someone knowledgeable who deals with file system corruption by seeking technical assistance. Any further action at this point may result in the loss of all terminals and access to the system.

20. Dump the *ERLOG* log file to verify that the system did not encounter any C Library (LIBC) faults. Check the receive-only printer (ROP) for any Process Manager (PMGR) or File Manager (FMGR) errors which may have preceded the terminal suspends. If any of these fault types were observed, suspect file corruption and/or file system damage. Do not take further recovery actions. Seek technical assistance.

21. **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.

5.1.3 CLEAR LOCKED-UP MTTY

OVERVIEW

This procedure provides instructions to restore a locked-up maintenance terminal (MTTY). A system problem is probable and the following checks need to be performed before taking any other action.

Note: DO NOT PERFORM A CRAFT INITIALIZATION for this type of problem.

PROCEDURE

1. Identify the locked-up MTTY member number.

   Note: In this procedure, the MTTY member number and the video terminal number are synonymous. The video terminal number is usually displayed at the top of the status indicator on the MTTY.

2. Can the MTTY member number be identified on the screen of the faulty terminal?

   If **YES**, record the MTTY member number and skip to Step 6.

   If **NO**, continue to Step 3.

3. Locate another operational video terminal that is assigned to the same switch as the locked-up MTTY.

   Note: If all terminals are locked up including the MTTY, see Procedure 5.1.1.

4. At the operational video terminal, enter the appropriate input command to identify the out-of-service (OOS) MTTY.

   - If MML, **OP:OOS:DATA,MTTY;**
   - If PDS, **OP:OOS:MTTY!**

5. Record the locked-up MTTY member number.

6. Enter the appropriate input command to determine that at least one IOP and one maintenance terminal controller (MTTYC) are in service.

   - If MML, **OP:OOS;**
   - If PDS, **OP:OOS!**

   Note: At least one IOP and one maintenance terminal controller (MTTYC) must both be in service before the MTTY can be restored.

7. Are at least one input/output processor (IOP) and one MTTYC in service?

   If **YES**, continue to Step 8.

   If **NO**, restore the OOS IOP or MTTYC to service and then continue to Step 8.

8. Determine if the MTTYC is operating properly and data is being transmitted to the MTTY by observing the sanity indicator-number that increments from 0 to 7 on the MTTY screen. Does the sanity indicator-number increment?

   If **YES**, continue to Step 9.

   If **NO**, perform the following:

   (a) Make sure the MTTY that is not faulty is in the standby mode.

(b) At the port switch and scanner distributor buffer (PSSDB) [the UN377 circuit pack at equipment location (EQL) 45-186], observe which light-emitting diode (LED), **0** or **1**, is lighted on the "A" switch. See Figure 5.1.3-1.

(c) Manually switch the port switch to the other MTTY.

— If LED **0** of the "A" switch is lit, operate the "A" switch to the **1** position.

— If LED **1** of the "A" switch is lit, operate the "A" switch to the **0** position.

(d) Did the LEDs on the "A" switch of the PSSDB change states?

If **YES**, continue to Step 9.

If **NO**, see Procedure 6.1 to replace the PSSDB and repeat from Step 8 of this procedure.

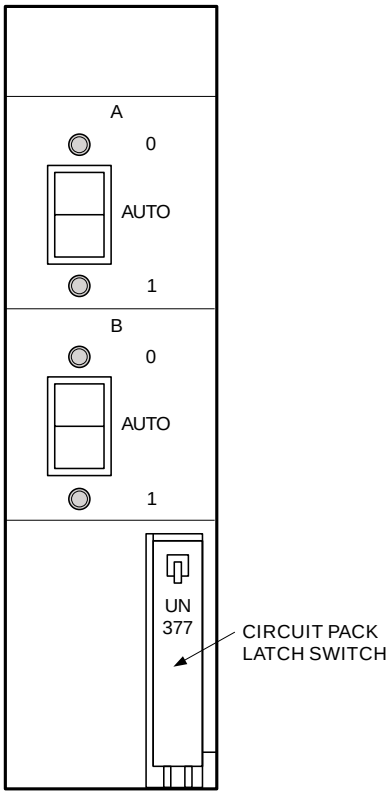


Figure 5.1.3-1 — Port Switch and Scanner Distributor Buffer Unit

9. At the operational video terminal, enter the appropriate input command to attempt to restore the faulty MTTY to service.

- If MML, **RST:MTTY=*a*[,UCL];**
- If PDS, **RST:MTTY *a*[,UCL]!**

Where: *a* = MTTY member number (0-255).

Response: A **PF** entry (on the same line as the input message) followed by an **RST MTTY** output message.

10. Does the restored MTTY display a **CFTSHL TERMINAL IN SERVICE** output message, and does the **RST MTTY** output message contain the MTTY member number (0-255) followed by **COMPLETED**? An example of the output message is as follows:

    RST MTTY 101 COMPLETED

    If **YES** and the terminal is no longer locked up, **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.

    If **NO** and either one of these two response conditions are not received, continue to Step 11.

11. Power cycle the faulty terminal, run self-diagnostics, and verify terminal options. See Section 5.2.

12. Did power cycling the faulty terminal correct the problem?

    If **YES** and the terminal is no longer locked up, power cycle any other terminals that are also faulty. **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.

    If **NO**, continue to Step 13.

13. Does the power interrupt cause the MTTY or receive-only printer (ROP) to lock up when power is applied?

    If **YES** and the MTTY is locked up, perform the MTTY Power Interrupt Recovery procedure:

    (a) Turn the MTTY power switch on.

    (b) Press the [EA DISP] key.

    (c) Press the [NORM DISP] key.

    If **YES** and the ROP is locked up and in LOCAL mode, perform the LOCAL Mode ROP Power Interrupt Recovery procedure.

    (a) Press the [LINE] key.

    (b) Press the [LOCAL] key.

    If **YES** and the ROP is locked up and in LINE mode, perform the LINE Mode ROP Power Interrupt Recovery procedure.

    (a) Press the [LOCAL] key.

    (b) Press the [LINE] key.

    If **NO**, continue to Step 14.

14. See Procedure 3.4 to repair the faulty MTTY.

15. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

5.2 SUPPLEMENTARY PROCEDURES

OVERVIEW

The following supplementary procedures are provided to self-diagnose the faulty terminal.

PROCEDURE

1. For KS-23554,L5 and L6 Video Terminal, see Procedure 5.2.1.
2. For KS-23996,L1 and L5 Video Terminal, see Procedure 5.2.2.
3. For KS-22921 Video Terminal, see Procedure 5.2.3.

5.2.1 KS-23554,L5 AND L6 VIDEO TERMINAL

PROCEDURE

1. The terminal can be self-diagnosed by power cycling the terminal. Refer to the *KS-23554,L5 and L6 Video Terminal Manual.*
2. Reset the terminal to a known, usable mode by pressing the [Ctrl]+ [Alt]+ [F3] keys to enter setup.
3. Move the cursor to the **Factory-Defaults** function, and press the [RETURN] key.

   The **Factory-Defaults** function will display a menu with **NO** and **YES** responses.
4. Move the cursor to the **YES** menu item and press the [RETURN] key.
5. After the terminal returns to the function selection menu, move the cursor to the **Save** function and press the [RETURN] key.
6. The **Save** function will display a menu with **NO** and **YES** responses. Move the cursor to the **YES** menu item and press the [RETURN] key.
7. After the terminal returns to the function selection menu, move the cursor to the **Exit** function and press the [RETURN] key. The terminal will return to operation as the maintenance terminal (MTTY) in the "Terminal Only (1 session)" mode.

5.2.2 KS-23996,L1 AND L5 VIDEO TERMINAL

PROCEDURE

1. The terminal can be self-diagnosed by power cycling the terminal. Refer to *KS-23996,L1 and L5 Guide to Operations*.
2. Reset the terminal to a known, usable mode by pressing the [Ctrl]+ [Alt]+ [F3] keys to enter setup.
3. Press the [F13] key.
4. Move the cursor to the **Default Terminal** function, and press the [RETURN] key.
5. Press the [F14] key, and enter **y** when prompted. The terminal will return to operation as the maintenance terminal (MTTY).

5.2.3 KS-22921 VIDEO TERMINAL

PROCEDURE

1. The terminal can be self-diagnosed by power cycling the terminal. Refer to *KS-22921, Video Terminal Manual*.
2. The terminal can be reset by pressing the [SET-UP] key; then press the [RESET] key to restart the terminal and reset the options to their preprogrammed values.
3. Check the options by pressing the [SET-UP] key; then press the [SET-UP A-B] key.

   Note: The options should be set to 1000 0011 0000 0X10 XXXX, parity equal to **7E**.
4. To change the options, move the cursor to the position over the element to be changed and press the [TOGGLE I/O] key.
5. To change the speed setting, use the [TRANSMIT SPEED] and [RECEIVE SPEED] keys (both should be set to 9600).
6. When the options are correctly set, press the [SHIFT] and [S] keys simultaneously to store the new options.

5.3 SET MTTY (KS-23996,L1 OR L5) TERMINAL OPTIONS

PROCEDURE

1. Press the **Norm Disp** key.
2. Adjust the brightness and contrast on the maintenance terminal (MTTY) by rotating the appropriate control located under the front of the monitor.
3. Enter the **SET-UP** mode by pressing the **Ctrl**, **Alt**, and **F3** keys simultaneously.

   Response: The system displays the **SET-UP** page. See Figure 5.3-1.

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
Quick	Genrl	Displ	Kybd	Keys	Ports	Hosts	Print	Emul	Tabs	AnsBk	Prog	Exec

Figure 5.3-1 — KS-23996,L1 or L5 Terminal Setup Display

4. Press the **F13** function key.
5. Using the default terminal settings, set the options to their default values.
   (a) Use the arrow keys to highlight the *Default Terminal* item.
   (b) Press the **ENTER** key to set options.
   (c) Press **F14** to exit setup.
   (d) Enter **Y** to save the options.
6. Using the values shown in Table 5.3-1, verify that the options are set to their default values.
7. Press the **EA DISP** key.

   Response: The system displays the **EMERGENCY ACTION** page.
8. If the cursor is not on line 4, press the **CMD/MSG** key.
9. Enter **15**.

   Response: The system displays a **REPT TERMINAL IN SERVICE** output message.
10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Table 5.3-1 — KS-23996,L1 or L5 Terminal Default Option Settings

F KEY	PARAMETERS		
F1	Emulation=VT100 Aux Baud Rate=9600 Aux Data Format=7/1/E	Comm Mode=Full Duplex Enhanced=Off Sessions=One	EIA Baud Rate=9600 EIA Data Format=7/1/E Host/Printer=EIA/None
F2	Emulation=VT100 Auto Font Load=On Monitor Mode=Off Warning Bell=On Color Mode=Direct	Enhanced=Off Auto Page=Off Screen Saver=Off Host/Printer=EIA/None	Auto Wrap=Off Auto Scroll=On Bell Volume=09 Sessions=One
F3	Page Length=24 Display Cursor=On Columns=80 Scroll=Jump	Screen Length=26 Cursor=Steady Block With Change Clear=Off	Screen Video=Normal Auto Adjust Cursor=On Speed=Normal
F4	Char Set Mode=ANSI Key Repeat=Off	Key Mode=ASCII Margin Bell=Off	Keyclick=On Key Lock=Caps
F5	Enter Key=<CR> Alt Key=Alt ‘and Key=‘and	Return Key=<CR> ,<and .>=,<and .> F1 to F5 keys=Fkey	Backspace=<BS>/<BS> Esc=Esc Pound Key=U.S.
F6	EIA Baud Rate=9600 Aux Baud Rate=9600 EIA Xmt=Xon-Xoff Aux Xmt=Xon=Xoff EIA Break=250 ms Aux Break=250 ms	EIA Data Format=7/1/E Aux Data Format=7/1/E EIA Recv=Xon-Xoff(XPC) Aux Recv=Xon-Xoff(XPC) EIA Modem Control=Off Aux Modem Control=Off	EIA Parity Check=Off Aux Parity Check=Off EIA Xmt Pace=Baud Aux Xmt Pace=Baud EIA Disconnect=60 ms Aux Disconnect=60 ms
F7	Comm Mode=Full Duplex Recv <DEL>=Destruct BS Send Region=Screen	Local=Off Send ACK=Off Send End=Region	Recv <CR>=<CR> Send Block Term=None Null Suppress=On
F8	Prnt Mode=Normal Secondary Recv=Off	Prnt Region=Screen	Prnt Block Term=None
F9	Numeric Kpd=Numeric Print=Multinational UPSS=ANSI-Supplemental	Cursor Kpd=Cursor ANSI-ID=VT100 Feature Lock=Off	Send Data=All Function Key Lock=On Status Line=Off
F10	Auto Init Tabs=Off		
F11	Answerback Mode=Off		
F12	Key=F1	Program=F/Key	Key Dir=Comm Dependent
F13	Save Terminal Save Session Reset Terminal Clear Screen	Recall Terminal Recall Session Reset Session Default Session UDKS	Default Terminal Default Session Reset Ports

Trouble Clearing Tasks

CONTENTS PAGE

LIST OF TABLES

6. GENERAL PROCEDURE TO REPLACE CIRCUIT PACK

OVERVIEW

The procedures in this section provide instructions to replace a circuit pack in the 3B21D computer that is designed specifically for an experienced craftsperson. The background information and many of the detailed instructions are intentionally left out to help the experienced craftsperson go directly to performing the required procedure.

The procedures should only be performed by an experienced craftsperson who understands how to perform the following:

- Remove a unit from service
- Remove power from a unit
- Locate, remove, and install a circuit pack
- Restore power to a unit
- Restore a unit to service.

If you have not been trained to replace a circuit pack or do not have sufficient experience, see Table 2-1 to locate an equivalent procedure or escalate to the next level of support for assistance.

Note: Based on the craftsperson's experience, Procedures 6.1, 6.2, 6.3, 6.4, 6.5, and 6.6 may be difficult to perform. In most cases, Table 2-1 contains an equivalent procedure for replacing a circuit pack or unit that has an overview and more detailed instructions for the less experienced craftsperson.

6.1 REPLACE CIRCUIT PACK

PROCEDURE

Note: Use antistatic bags (R-5158 or equivalent) or the original shipping container to store circuit packs that are removed from the unit.

Caution: A wrist strap (R-4987 or equivalent) must be worn when inserting, removing, unlatching, or handling a plug-in circuit pack. This applies to circuit packs in shipping containers as well as to those installed in cabinets.

1. Obtain a replacement circuit pack or power unit.
2. Remove unit from service. See Procedure 6.2.
3. Is unit a digital audio tape (DAT) magnetic tape (MT)?

   Note: The DAT (currently a UN376 circuit pack) does not have an **ST/ON/OFF** switch.

   If **YES**, remove power by unlatching the circuit pack.

   Response: At the maintenance terminal (MTTY) on the disk file controller (DFC) status display page, the unit indicator displays **OOS** or **OOS MAN**.

   Then, go to Step 5.

   If **NO**, continue to Step 4.
4. Remove power from unit. See Procedure 6.3.
5. Remove and install the circuit pack. See Procedure 6.4.

   Note: See the vendor's manual for replacing circuit packs in the 9-track MT unit.
6. Is unit a DAT magnetic tape?

   Note: The DAT (currently a UN376 circuit pack) does not have an **ST/ON/OFF** switch.

   If **YES**, power was restored when you latched the circuit pack. See Procedure 6.4.

   Response: At the MTTY on the DFC status display page, the unit indicator displays **OOS** or **OOS MAN**.
   At unit power switch, the **OOS** light-emitting diode (LED) lights.

   If **YES**, power was restored when you latched the circuit pack. See Procedure 6.4.

   Then, go to Step 8.

   If **NO**, continue to Step 7.
7. Restore power to unit. See Procedure 6.5.
8. Restore unit to service. See Procedure 6.6.
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

6.2 REMOVE UNIT FROM SERVICE

PROCEDURE

Note: All subunits are removed from service before unit **RMV COMPLETED** message is received.

1. Is unit a disk file controller (DFC), a moving head disk (MHD), or a magnetic tape (MT)?

   If **YES**, at the maintenance terminal (MTTY), enter the appropriate input command to verify all mate MHD(s) on the mate small computer system interface (SCSI) bus(es) [SBUS(es)].

   - If MML, **VFY:MHD=***a***;**
   - If PDS, **VFY:MHD** *a***!** (poke **601**,*a*)

   Where: *a* = Mate MHD member number.

   Response: **VFY MHD** *a* **COMPLETED**

   After verifying all mates and if DFC, go to Step 7. After verifying all mates and if MHD or MT (DAT or 9-track), go to Step 5.

   If **NO**, continue to Step 2.

2. Is unit an input/output processor (IOP)?

   Note: The receive-only printer (ROP) and MTTY must be connected to the other IOP [see the common processor display page (CPDP)].

   If **YES**, if necessary, enter the appropriate poke command (**401**, **402**, or **403**) at the MTTY to switch the port switch to the other IOP. Also, notify all affected simplex peripheral controller (PC) users on this IOP.

   Response: At the CPDP, the ROP and MTTY are shown connected to the other IOP.

   Then, go to Step 7.

   If **NO**, continue to Step 3.

3. Is unit that is to be replaced in a control unit (CU)?

   If **YES**, continue to Step 4.

   If **NO**, the unit is not in a CU. Go to Step 8.

4. At MTTY CPDP 102, determine whether the CU containing the unit to be replaced (like TN1821) is in a standby, out-of-service, or active CU.

   - If the circuit pack that needs to be replaced is in an active CU, escalate the problem immediately to the Lucent Technologies field support organization. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   - If the circuit pack that needs to be replaced is in a standby or out-of-service CU, go to Step 7.

5. Is unit a DAT or 9-track MT?

   Caution: Be sure to remove the SBUS from service prior to removing the circuit pack to prevent the possibility of corrupting data located on disks that remain active and that are on the target SBUS.

If **YES**, at the MTTY, enter the appropriate input command to remove the associated SBUS from service.

- If MML, **RMV:SBUS=***b***;**
- If PDS, **RMV:SBUS** *b***!** (poke **604**,*b*,**RMV**)

Where: *b* = Member number.

Response: The following messages will be sent to the ROP and MTTY:

RMV *c b* **COMPLETED** (subunits only).

RMV SBUS *b* **COMPLETED**

REPT DIOP SIMPLEX PROCESSING COMPLETED [optional DISK for the disk independent operation (DIOP) feature].

At the MTTY on the CPDP, the unit indicator displays in reverse video and flashes **CU PERPH** alarm indicator.

SBUS *b* unit status and SBUS *c* subunit status indicate **OOS** or **OOS MAN**.

SBUS *b* subunit power switch(es) **OOS** light-emitting diode (LED) lights.

Where: *b* = Target SBUS.
c = Subunit name.

Then, go to Step 7.

If **NO**, continue to Step 6.

6. Is unit an MHD?

Caution: Be sure to remove the SBUS from service prior to removing the circuit pack to prevent the possibility of corrupting data located on disks that remain active and that are on the target SBUS.

If **YES**, at the MTTY, enter the appropriate input command to remove the associated SBUS from service.

- If MML, **RMV:SBUS=***b***;**
- If PDS, **RMV:SBUS** *b***!** (poke **604**,*b*,**RMV**)

Where: *b* = Member number.

Response: The following messages will be sent to the ROP and MTTY:

RMV *c b* **COMPLETED** (subunits only).

RMV SBUS *b* **COMPLETED**

REPT DIOP SIMPLEX PROCESSING COMPLETED (optional DISK for the DIOP feature).

At the MTTY, the unit indicator displays in reverse video and flashes **CU PERPH** alarm indicator.

SBUS *b* unit status and SBUS *c* subunit status indicate **OOS** or **OOS MAN**.

SBUS *b* subunit power switch(es) **OOS** LED lights.

Where: *b* = Target SBUS.
c = Subunit name.
Then, continue to Step 7.

If **NO**, go to Step 8.

7. Toggle the **ROS/RST** switch to **ROS** on the *a b* unit power switch, the UN375 hard disk drive, or the UN376 SCSI DAT drive circuit pack faceplate. See Table 6.2-1.

Response: If **CU**, the **OOS** LED lights on the **CU** *b* unit power switch.
The following message will be sent to the ROP and MTTY:
RMV CU *b* **COMPLETED**
At the MTTY, the unit indicator displays in reverse video and flashes **CU** alarm indicator.
CU *b* status indicates **OOS** or **OOS MAN**.
If **IOP**, the **OOS** LED lights on the **IOP** *b* unit power switch.
The following messages will be sent to the ROP and MTTY:
RMV *c b* **COMPLETED** (for example, TTYC, TTY, SDLC, or SDL).
RMV IOP *b* **COMPLETED**
At the MTTY, the unit indicator displays in reverse video and flashes **CU PERPH** and **OS LINKS** alarm indicators.
IOP *b* status indicates **OOS** or **OOS MAN**.
c b status indicates **OOS** or **OOS MAN**.
If **DFC**, the **OOS** LED lights on the **DFC** *b* unit power switch.
The following messages will be sent to the ROP and MTTY:
RMV *c b* **COMPLETED** (for example, MHD or MT).
RMV DFC *b* **COMPLETED**
REPT DIOP SIMPLEX PROCESSING COMPLETED
(reported only if the optional DISK DIOP feature is available).
At the MTTY, the unit indicator displays in reverse video and flashes **CU PERPH** alarm indicator.
DFC *b* status indicates **OOS** or **OOS MAN**.
c b status indicates **OOS** or **OOS MAN**.
If **MHD**, the **OOS** LED lights on the UN375 SCSI hard disk drive.
The following messages will be sent to the ROP and MTTY:
RMV MHD *b* **COMPLETED** (for *b* = 0 or 1).
REPT DIOP SIMPLEX PROCESSING COMPLETED
(reported only if the optional DISK DIOP feature is available).
MHD *b* status indicates **OOS** or **OOS MAN**.
If **DAT**, the **OOS** LED lights on the UN376 SCSI DAT drive.
The following message will be sent to the ROP and MTTY:
RMV MT *b* **COMPLETED** (for *b* = 0 or 1).
MHD *b* status indicates **OOS** or **OOS MAN**.

Where: *b* = Member number.
c = Subunit name.

8. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Table 6.2-1 — Unit Power Switches

UNIT	POWER SWITCH	LOCATION
CU 0	TN1821	28-060
CU 1	TN1821	53-060
DFC 0	UN373/UN580	28-178
DFC 1	UN373/UN580	53-178
IOP 0	TN1820	19-080
IOP 1	TN1820	45-080
IOP 2	TN1820	11-026
IOP 3	TN1820	62-026
MHD 0	UN375	28-162
MHD 1	UN375	53-162
MHD 2	UN375	19-170
MHD 3	UN375	45-170
MHD *a*[a]	UN375	[b]
DAT 0	UN376[c]	19-186
DAT 1	UN376[c]	[b]

Note(s):
a. The *a* is member number(s) above number 3.
b. Position specified by application.
c. The power switch **ST/ON/OFF** function is built into the latch of the UN376.

6.3 REMOVE POWER FROM UNIT

PROCEDURE

1. Is unit a digital audio tape (DAT) magnetic tape (MT)?

   Note: The DAT MT (currently a UN376 circuit pack) does not have an **ST/ON/OFF** switch.

   Caution: A wrist strap (R-4987 or equivalent) must be worn when inserting, removing, unlatching, or handling a plug-in circuit pack. This applies to circuit packs in shipping containers as well as to those installed in cabinets.

   If **YES**, remove power by unlatching the circuit pack. See Procedure 6.1. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

   If **NO**, continue to Step 2.

2. Is unit a 9-track MT?

   Note: The 9-track MT (currently KS-23909,L10 and KS-23909,L21) does not have an **ST/ON/OFF** switch. The KS-23909,L10 has a power switch only on the front of the unit. The KS-23909,L21 has a power switch on the front and rear of the unit.

   If **YES**, perform the following substeps to remove power:

   (a) Toggling the power switch(es) on the front and rear of the unit (if present) to 0.

   (b) Unplugging the power cord at the rear of the unit.

   Response: At the maintenance terminal (MTTY) on the disk file controller (DFC) status display page, the unit indicator displays **OOS**.

   (c) **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

   If **NO**, continue to Step 3.

3. Locate unit power switch. See Table 6.3-1.

4. Toggle **ST/ON/OFF** switch to **OFF**.

   Response: At unit power switch, the **OFF** light-emitting diode (LED) lights.
   At associated unit power converters, the **OFF** LED lights.
   The following message will be sent to the receive-only printer (ROP) and MTTY:
   REPT POWER REMOVED *a b* message received.
   At the MTTY on the common processor display page (CPDP), the unit indicator displays **UNAV**, **OOS**, or **OOS MAN**.

   Where: *a* = Unit name.
   b = Member number.

5. Is unit a moving head disk (MHD)?

   If **YES**, perform the following substeps:

   (a) Unlatch the UN375 MHD circuit pack, but do not remove the pack at this time.

(b) Wait 1 minute to allow the UN375 MHD drive to spin down.

(c) **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, continue to Step 6.

6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Table 6.3-1 — Unit Power Switches

UNIT	POWER SWITCH	LOCATION
CU 0	TN1821	28-060
CU 1	TN1821	53-060
DFC 0	UN373/UN580	28-178
DFC 1	UN373/UN580	53-178
IOP 0	TN1820	19-080
IOP 1	TN1820	45-080
IOP 2	TN1820	11-026
IOP 3	TN1820	62-026
MHD 0	UN375	28-162
MHD 1	UN375	53-162
MHD 2	UN375	19-170
MHD 3	UN375	45-170
MHD *a*[a]	UN375	[b]
Note(s): a. The *a* is member number(s) above number 3. b. Position specified by application.		

6.4 REMOVE AND INSTALL CIRCUIT PACK

PROCEDURE

Note: Use antistatic bags (R-5158 or equivalent) or the original shipping container to store circuit packs that are removed from the unit.

If replacing an online control unit (CU) circuit pack, notify the next level of support before replacing.

Caution: A wrist strap (R-4987 or equivalent) must be worn when inserting, removing, or handling a plug-in circuit pack. This applies to circuit packs in shipping containers as well as to those installed in cabinets.

1. Are you replacing a 9-track magnetic tape (MT), digital audio tape (DAT), or moving head disk (MHD)?

   If **NO**, continue to Step 2.

   If **YES** and replacing an MHD, go to Step 7.

   If **YES** and replacing a 9-track MT, go to Step 8.

   If **YES** and replacing DAT, go to Step 9.

2. Remove circuit pack or power unit.

3. Place the faulty circuit pack or power unit in an antistatic bag (R-5158 or equivalent) or the original shipping container, and set aside for disposition according to local policy.

4. Remove the replacement circuit pack or power unit from the antistatic bag or the original shipping container, and verify that the **ST/ON/OFF** switch is in the **OFF** position and the **ACO-T** switch is in the normal position.

5. Are you replacing a CU, disk file controller (DFC), or input/output processor (IOP) power switch circuit pack or a circuit pack located in the CU, DFC, or IOP?

   If **YES** and a power switch is being replaced, toggle the **ROS/RST** switch on the replacement circuit pack to **ROS** and continue to Step 6.

   If **YES** and a circuit pack located in the CU, DFC, or CU is being replaced, continue to Step 6.

   If **NO**, go to Step 7.

6. Install new circuit pack or power unit, and then go to Step 10.

7. Are you replacing an MHD circuit pack?

   If **YES**, perform the following substeps:

   (a) Record and save the setting of the **ID** switch from the circuit pack being replaced. The **ID** switch [sometimes referred to as the small computer system interface (SCSI) identification (ID)] is located on the front of the MHD circuit pack.

   (b) Remove the replacement MHD circuit pack from the antistatic bag or the original shipping container, and set the **ID** switch on the replacement circuit pack to the number just recorded.

   (c) On the replacement circuit pack, verify the **ROS/RST** switch is set to **ROS**, the **ST/ON/OFF** switch is in the **OFF** position, and the **ACO-T** switch is in the **OFF** position (blank position).

(d) Wait 30 seconds to allow the UN375 MHD to spin down before removing the circuit pack.

(e) Remove the UN375 MHD circuit pack being replaced.

(f) Place the faulty MHD circuit pack in an antistatic bag (R-5158 or equivalent) or the original shipping container, and set aside for disposition according to local policy.

(g) Install the UN375 MHD circuit pack in the cabinet with care to prevent connector and backplane damage.

(h) Toggle the **ST/ON/OFF** switch to the **ST** position.

(i) Wait 30 seconds to allow the UN375 MHD drive to spin up.

(j) Toggle the **ROS/RST** switch to **RST**.

(k) **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, continue to Step 8.

8. Are you replacing a 9-track MT circuit pack?

If **YES**, perform the following substeps:

(a) Record and save the setting of the **ID** switch of the MT circuit pack being replaced. The **ID** switch is sometimes referred to as the SCSI ID. Refer to 254-303-106, *System Maintenance Manual*, for the MT settings.

(b) Remove the replacement MT circuit pack from the antistatic bag or the original shipping container, and set the **ID** switch on the replacement circuit pack to the number just recorded. Refer to 254-303-106, *System Maintenance Manual,* for the MT settings.

(c) Remove the MT circuit pack being replaced.

(d) Place the faulty MT circuit pack in an antistatic bag (R-5158 or equivalent) or the original shipping container, and set aside for disposition according to local policy.

(e) Install the MT in the cabinet.

Note: See the vendor's manual for replacing circuit packs in the 9-track MT.

(f) **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, continue to Step 9.

9. Are you replacing a DAT circuit pack?

If **YES**, perform the following substeps:

(a) Record and save the setting of the **ID** switch of the DAT circuit pack being replaced. The **ID** switch is sometimes referred to as the SCSI ID. Refer to 254-303-106, *System Maintenance Manual*, for the DAT settings.

(b) Remove the replacement DAT circuit pack from the antistatic bag or the original shipping container, and set the **ID** switch on the replacement circuit pack to the number just recorded. Refer to 254-303-106, *System Maintenance Manual,* for the DAT settings.

(c) Remove the UN376 DAT circuit pack being replaced.

(d) Place the faulty DAT circuit pack in an antistatic bag (R-5158 or equivalent) or the original shipping container, and set aside for disposition according to local policy.

(e) Install the UN376 DAT circuit pack in the cabinet with care to prevent connector and backplane damage.

(f) Make sure the UN376 DAT circuit pack latch switch has been latched to restore power.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

If **NO**, continue to Step 10.

10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

6.5 RESTORE POWER TO UNIT

PROCEDURE

1. Is unit a digital audio tape (DAT) magnetic tape (MT)?

   Note: The DAT (currently a UN376 circuit pack) does not have an **ST/ON/OFF** switch.

   If **YES**, perform the following substeps:

   (a) Power was restored when you latched the newly installed circuit pack. See Procedure 6.4.

   (b) **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

   If **NO**, continue to Step 2.

2. Is unit a 9-track MT?

   Note: The 9-track MT (currently KS-23909,L10 and KS-23909,L21) does not have an **ST/ON/OFF** switch. The KS-23909,L10 has a power switch only on the front of the unit. The KS-23909,L21 has a power switch on the front and rear of the unit.

   If **YES**, perform the following substeps to restore power:

   (a) Plugging in the power cord at the rear of the unit.

   (b) Toggling the power switch(es) on the rear of the unit (if present) and the front of the unit to 1.

   Response: At the maintenance terminal (MTTY), **CU PERPH** indicator flashes.

   At the MTTY on the disk file controller (DFC) status display page, the unit status indicates **OOS** or **OOS MAN**.

   (c) **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

   If **NO**, continue to Step 3.

3. Locate unit power switch. See Table 6.5-1.

4. Toggle the **ST/ON/OFF** switch to **ST** and release to **ON**.

   Response: **REPT POWER RESTORED** *a b* message received.

   At unit power switch, **OFF** light-emitting diode (LED) extinguishes and **OOS** LED lights.

   At associated unit power converters, **OFF** LED extinguishes.

   At the MTTY on the common processor display page (CPDP), the unit indicator displays **OOS** or **OOS MAN**.

   Where: *a* = Unit name.
   b = Member number.

   Note: Wait for these responses to be received before operating the **ROS/RST** switch to the **RST** position.

5. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Table 6.5-1 — Unit Power Switches

UNIT	POWER SWITCH	LOCATION
CU 0	TN1821	28-060
CU 1	TN1821	53-060
DFC 0	UN373/UN580	28-178
DFC 1	UN373/UN580	53-178
IOP 0	TN1820	19-080
IOP 1	TN1820	45-080
IOP 2	TN1820	11-026
IOP 3	TN1820	62-026
MHD 0	UN375	28-162
MHD 1	UN375	53-162
MHD 2	UN375	19-170
MHD 3	UN375	45-170
MHD *a*[a]	UN375	[b]

Note(s):
a. The *a* is member number(s) above number 3.
b. Position specified by application.

6.6 RESTORE UNIT TO SERVICE

PROCEDURE

Note: All subunits are restored to service after unit **RST COMPLETED** message is received.

1. Is unit a moving head disk (MHD)?

   If **YES**, continue to Step 2.

   If **NO**, go to Step 8.

2. At the maintenance terminal (MTTY), enter the appropriate input command to restore the MHD associated small computer system interface (SCSI) bus (SBUS) to service.

   - If MML, **RST:SBUS=***b***,CONT;**
   - If PDS, **RST:SBUS** *b***,CONT!**

   Where: *b* = Member number.

   Response: The following message will be sent to the receive-only printer (ROP) and MTTY:
   RST SBUS *b* **COMPLETED**

3. At the MTTY, enter the appropriate input command to initialize the MHD (takes approximately 20 to 30 minutes).

   - If MML, **INIT:MHD=***b***;**
   - If PDS, **INIT:MHD** *b!*

   Where: *b* = Member number.

   Response: The following messages will be sent to the ROP and MTTY:
   INIT MHD *b* **IN PROGRESS** (message every 2 minutes).
   INIT MHD *b* **COMPLETED**

4. At the MTTY, enter the appropriate input command to verify the MHD (takes approximately 20 to 30 minutes).

   - If MML, **VFY:MHD=***b***;**
   - If PDS, **VFY:MHD** *b***!**

   Where: *b* = Member number.

   Response: The following messages will be sent to the ROP and MTTY:
   VFY MHD *b* **IN PROGRESS** (message every 2 minutes).
   VFY MHD *b* **COMPLETED**

5. At the MTTY, enter the appropriate input command to diagnose the MHD.

   - If MML, **DGN:MHD=***b***;**
   - If PDS, **DGN:MHD** *b***!**

   Where: *b* = Member number.

   Response: The following message will be sent to the ROP and MTTY:
   DGN MHD *b* **ATP COMPLETED**

6. At the MTTY, enter the appropriate input command to restore the MHD associated SBUS to service.

   - If MML, **RST:SBUS=***b;*
   - If PDS, **RST:SBUS** *b!*

   Where: *b* = Member number.

   Response: The following messages will be sent to the ROP and MTTY:

   RST SBUS *b* **COMPLETED**

   DGN *c b* **COMPLETED ATP** for each subunit.

   RST *c b* **IN PROGRESS** message received every 2 minutes for each MHD subunit.

   RST *c b* **COMPLETED** message received for each subunit.

   At the MTTY on the disk file controller (DFC) status display page, the SBUS *b* unit status and SBUS *b* subunit status indicate **ACT**.

   SBUS *b* subunit power switch(es) **OOS** light-emitting diode (LED) extinguishes.

   REPT DIOP DUPLEX PROCESSING COMPLETED [optional DISK for the disk independent operation (DIOP) feature].

   At the MTTY, observe a return to normal of the **CU PERPH** indicator.

   Where: *b* = Member number.
   c = Subunit name.

7. Go to Step 22.

8. Is unit a 9-track or digital audio tape (DAT) magnetic tape (MT)?

   If **YES**, continue to Step 9.

   If **NO**, go to Step 19.

9. At the MTTY, enter the appropriate input command to restore the MT associated SBUS to service.

   - If MML, **RST:SBUS=***b*,**CONT;**
   - If PDS, **RST:SBUS** *b* **CONT!**

   Where: *b* = Member number.

   Response: The following message will be sent to the ROP and MTTY:

   RST SBUS *b* **COMPLETED**

10. At the MTTY, enter the appropriate input command to diagnose the 9-track MT.

    - If MML, **DGN:MT=***b***;**
    - If PDS, **DGN:MT** *b***!**

    Where: *b* = Member number.

    Response: The following message will be sent to the ROP and MTTY:

    DGN MT *b* **ATP COMPLETED**

11. At the MTTY, enter the appropriate input command to restore the 9-track MT to service.

    - If MML, **RST:MT=***b***;**

- If PDS, **RST:MT** *b***!**

Where: *b* = Member number.

Response: The following message will be sent to the ROP and MTTY:
RST MT *b* **COMPLETED**

12. Load a write-enabled 9-track tape reel or DAT cartridge on or into the MT. Refer to 254-303-101, *Routine Maintenance Tasks*.

13. At the MTTY, enter the appropriate input command to write a file to the 9-track MT.

- If MML, **COPY:TAPE:OUT,TD="/dev/mt***xx***", FN="cudiagc",BSDIR="/diag/dgnc";**
- If PDS, **COPY:TAPE:OUT,TD "dev/mt***xx***", FN="cudiagc",BSIR="/diag/dgnc"!**

Where: *xx* = MT special device filename (for example, */dev/mt00*).

Response: The following message will be sent to the ROP and MTTY:
COPY TAPE OUT COMPLETED
(number of blocks)

14. At the MTTY, enter the appropriate input command to read a file from the 9-track MT.

- If MML, **COPY:TAPE:IN,TD="/dev/mt***xx***", BSDIR="/tmp";**
- If PDS, **COPY:TAPE:IN,TD "/dev/mt***xx***", BSDIR "/tmp"!**

Where: *xx* = MT special device filename (for example, */dev/mt00*).

Response: The following message will be sent to the ROP and MTTY:
COPY TAPE IN COMPLETED
(number of blocks)

15. At the MTTY, enter the appropriate input command to verify that the file is written to and read from the 9-track MT.

- If MML, **OP:STATUS:SUM,FN="/diag/dgnc/cudiagc";**
- If MML, **OP:STATUS:SUM,FN="/tmp/cudiagc";**
- If PDS, **OP:STATUS:SUM,FN "/diag/dgnc/cudiagc"!**
- If PDS, **OP:STATUS:SUM,FN "/tmp/cudiagc"!**

The numbers output from each command should match.

Response: The following messages will be sent to the ROP and MTTY:
OP STATUS SUM COMPLETED
a b **/diag/dgnc/cudiagc**
a b **/tmp/cudiagc**

Where: *a* = 16-bit decimal checksum of file.
b = Decimal number of blocks.

Both checksum values and both blocks values should match in the output response.

16. Unload the tape reel mounted on the 9-track MT. Refer to 254-303-101, *Routine Maintenance Tasks*.

17. At the MTTY, enter the appropriate input command to restore the 9-track MT associated SBUS to service (takes approximately 20 to 30 minutes per MHD subunit).

    - If MML, **RST:SBUS=***b***;**
    - If PDS, **RST:SBUS** *b***!**

    Where: *b* = Member number.

    Response: The following messages will be sent to the ROP and MTTY:

    RST SBUS *b* **COMPLETED**

    RST *c b* **COMPLETED**

    At the MTTY on the DFC status display page, the SBUS *b* unit status and SBUS *b* subunit status indicate **ACT**.

    SBUS *b* subunit power switch(es) **OOS** LED lights.

    REPT DIOP DUPLEX PROCESSING COMPLETED (optional DISK for the DIOP feature).

    At the MTTY, observe a return to normal of the **CU PERPH** indicator.

    Where: *b* = Member number.
    c = Subunit name.

18. Go to Step 22.

19. Is unit a control unit (CU) or DFC?

    If **YES**, go to Step 21.

    If **NO**, continue to Step 20.

20. Is unit an input/output processor (IOP)?

    If **YES**, perform the following substeps:

    (a) Notify all affected simplex peripheral controller (PC) users.

    (b) Continue to Step 21.

    If **NO**, go to Step 22.

21. Toggle the **ROS/RST** switch to **RST** on unit power switch. See Table 6.6-1.

    Response: The following messages will be sent to the ROP and MTTY:

    DGN *a b* **ATP MESSAGE COMPLETE**

    RST *a b* **COMPLETED**

    DGN *c b* **COMPLETED** (subunits only).

    RST *c b* **COMPLETED** (subunits only).

    REPT DIOP DUPLEX PROCESSING COMPLETED (optional DISK for the DIOP feature).

    At unit power switch, **OOS** LED extinguishes.

    At subunit power switch, **OOS** LED extinguishes (subunits only).

    At the MTTY on the common processor display page (CPDP), the unit status indicates **ACT** or **STBY**.

At the MTTY on the CPDP, the subunit(s) status indicates **ACT** or **STBY**.

At the MTTY, if DFC, observe a return to normal of the **CU PERPH** indicator.

At the MTTY, if CU, observe a return to normal of the **CU** indicator.

At the MTTY, if IOP, observe a return to normal of the **CU PERPH** and **OS LINKS** indicators.

Where: *a* = Unit name.
b = Member number.
c = Subunit name.

22. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Table 6.6-1 — Unit Power Switches

UNIT	POWER SWITCH	LOCATION
CU 0	TN1821	28-060
CU 1	TN1821	53-060
DFC 0	UN373/UN580	28-178
DFC 1	UN373/UN580	53-178
IOP 0	TN1820	19-080
IOP 1	TN1820	45-080
IOP 2	TN1820	11-026
IOP 3	TN1820	62-026
MHD 0	UN375	28-162
MHD 1	UN375	53-162
MHD 2	UN375	19-170
MHD 3	UN375	45-170
MHD *a*[a]	UN375	[b]
DAT 0	UN376[c]	19-186
DAT 1	UN376[c]	[b]

Note(s):
a. The *a* is member number(s) above number 3.
b. Position specified by application.
c. The power switch ST/ON/OFF function is built into the latch of the UN376.

GLOSSARY

ACO-T	Alarm Cutoff-Test. A two-position rocker switch.
ACT	Active. A unit is currently in service.
ADP	Automatic Diagnostic Process.
AM	Administrative Module.
ASCII	American Standard Code for Information Interchange.
Asynchronous	A communications method in which time intervals between transmitted characters may be of unequal length and no clock is included with the transmission. Transmission is controlled by start and stop bits at the beginning and end of each character.
ATP	All Tests Pass.
Backplane	A large printed wiring assembly (PWA) that distributes DC power and logic signals between hardware modules. Most circuit pack modules plug into the backplane.
Baud Rate	A measure of the speed of data transfer from a computer to a peripheral device (such as a terminal) or from one device to another. Common baud rates are 300, 1200, 4800, and 9600. As a general guide, divide a baud rate by 10 to get the approximate number of English characters transmitted each second.
BMPM	Board Mounted Power Module.
Bus	One or more conductors that transmit control signals, data, or power. A bus usually acts as a common connection between several locations.
C/D	Control/Display.
CATP	Conditional All Tests Pass.
CC	Central Control. The control circuitry arithmetic logic unit, rotate and mask unit, general and special registers, maintenance channel, store address translator circuit, and optional cache memory unit that compose the CC.
CCITT	Consultative Committee for International Telegraph and Telephone.
CH	Channel.
CIC	Customer Information Center.
Command	An instruction to the *UNIX*[1] system shell program ended by a carriage return. By entering a command, the computer system performs one or more tasks.
CPDP	Common Processor Display Page.
CPS	Circuit Pack Schematic.

1. UNIX is a registered trademark of The Open Group in the United States and other countries.

CPU	Central Processing Unit. A 32-bit *MIPS*[2] R2000A Reduced Instruction Set Computer (RISC) microprocessor clocked at 16.67 MHz. The term CPU also refers to the logical processor consisting of the three CPU modules.
CR	Carriage Return.
Craft Interface	The hardware, firmware, and software that allow the user access to the 3B21D computers and provide information about the status of the machine.
CRT	Cathode Ray Tube. A tube that uses a phosphor coating to display data.
CTAM	Customer Technical Assistance Management.
CTS	Customer Technical Support.
CU	Control Unit. That portion of the computer which is switched in and out of service as a unit. A CU includes a CC, a main store (MAS), a direct memory access (DMA) unit (when equipped), the input/output (IO) channels, and the power control unit.
CUPS	Control Unit Power Switch.
DA	Discontinued Availability.
DAT	Digital Audio Tape.
DEX	Demand Exercise.
DFC	Disk File Controller. A unit that controls the operation of a portion of the disk storage facility of the *UNIX* Real-Time Reliable (RTR) operating system. This unit interfaces to an input/output (IO) channel and to a moving head disk (MHD) drive.
DFCA	Disk File Controller A (UN373, UN580, or UN580B circuit pack).
DFCB	Disk File Controller B (TN2116 circuit pack).
DGN	Diagnostic.
DIOP	Disk Independent Operation.
DMA	Direct Memory Access. A method used to perform high-speed data transfers between memory locations without CPU involvement.
DMAC	Direct Memory Access Controller. The system unit that provides main store (MAS) access control for input/output devices without requiring direct control from the CC.
DMQ	Deferred Maintenance Queue.
DSCH	Dual Serial Channel. A system component that provides serial interfaces for up to 16 devices.
DUIC	Direct User Interface Controller.
DUP	Disk Unit Package.

2. Registered trademark of MIPS Technologies, Inc.

EAI	Emergency Action Interface. The EAI provides an interface between a CU and a serial data link for effecting various manual override functions such as “force online,” “stop and switch,” and so forth. The EAI is part of the maintenance interface.
ECD	Equipment Configuration Database. A database that describes the physical and logical configurations of the 3B21D computers and peripheral hardware. It also contains configuration and control information for the audit and operator interface software systems.
ECDFUNC	Equipment Configuration Database Common Access Functions.
EIA	Electronic Industries Association.
EMI	Electromagnetic Interference.
EQL	Equipment Location.
ESD	Electrostatic Discharge.
FA	Fuse Alarm.
FFU	Fuse/Filter Unit.
FMGR	File Manager.
FPS	Fan Performance Sensor.
FTC	Fan Tray Controller.
Generic	A release of hardware or software.
Grow	The state of a unit while it is being added to the system (grown).
HA	Host Adapter.
Host	A computer system that is configured to share resources, such as disks and printers, in a networked environment.
HSD	High-Speed Data Link.
HSDC	High-Speed Data Link Controller.
ID	Identification.
IM/OM	Input Messages/Output Messages.
IMR	Initial Modification Request.
Incore Database	A database read from a disk that is resident (incore) in the machine.
Initialization	An action taken to provide the system with an operating configuration.
Initialization Level	A value of initialization level counter. The severity of the action taken to recover the system integrity is dependent on the counter value. The higher the value, the more drastic the action taken to recover the system.
Interrupt	A signal, caused by a break or an interrupt character, that normally terminates a process. It is also a signal generated by a hardware condition or a peripheral device.

IO Input/Output.

IOMI Input/Output Microprocessor Interface.

IOP Input/Output Processor. A front-end processor that permits the connection of a variety of data terminals utilizing a variety of line protocols. The IOP contains a peripheral interface controller, an IOP interface, and two microprocessor communities. Each microprocessor community connects to a number of data terminals.

IOPPS Input/Output Processor Power Switch. The TN1820 IOPPS circuit pack is used to remove power from an IOP.

IP Information Product.

LED Light-Emitting Diode. A semiconductor that emits visible light.

LIBC C Language Library.

Link An entry for an existing file to a directory.

LLA Low-Level Access.

Maintenance Terminal
The terminal that is used for exchange of maintenance information/commands between the maintenance person and the computer. It is also referred to as maintenance cathode ray tube (MCRT) or maintenance terminal (MTTY).

MAN Manual.

Manual Input Commands
Program Documentation Standards (PDS) and Man-Machine Language (MML) format input commands that allow the user to query and request system services.

MAS Main Store. The system unit that provides storage for program instructions and data. It is composed of solid-state memory devices and provides up to 4 megabytes of storage.

MASC Main Store Controller. The circuit that provides control interface between the main store bus (MASB) and the memory devices.

MB Megabyte. When referring to disk drives, a megabyte is 1 million bytes. When referring to main store memory, a megabyte is 2^{20} bytes (1,048,576 bytes).

MC Microcontrol or Microcontroller. The portion of the CC that controls the sequencing of microstore and decoding of microinstructions. MC provides control signals for the CC circuitry.

MCC Master Control Center.

MCH Maintenance Channel. The CC component that provides a serial access between CUs.

Message The mechanism that transfers data from one process to another.

MHD Moving Head Disk.

MHDC Moving Head Disk Controller.

MJ Major.

MJR	Major Return.
MML	Man-Machine Language.
MOR	Manual Override.
MPC	Multipurpose Peripheral Controller.
MT	Magnetic Tape.
MTC	Magnetic Tape Controller.
MTTY	Maintenance Terminal.
MTTYC	Maintenance Terminal Controller.
N/A	Not Applicable.
NAR	North American Region.
NARTAC	North American Regional Technical Assistance Center.
Network	The hardware and software that connect computer systems, permitting electronic communications between the systems and associated peripherals.
NTR	No Tests Run.
OAU	Office Alarm Unit.
Online	The unit that is in active control of the system configuration and execution. Its mate, the off-line CU, may be active (executing diagnostics) but is not in control.
Operating system	A set of programs (or software) that controls the computer system. The nucleus of the *UNIX* Real-Time Reliable (RTR) operating system is the kernel, which manages the resources of the computer. The operating system takes care of such things as IO procedures, process scheduling, and the file system which relieves user programs of these tasks.
OOS	Out of Service.
PA	Power Alarm.
PAR	Power Alarm Return.
PC	Peripheral Controller.
PDS	Program Documentation Standard.
PMGR	Process Manager.
PPC	Primary Point Code.
PRM	Processor Recovery Message.
Process	An executing program with its own input, output, and "parent" program that initiated the program.
PROM	Programmable Read-Only Memory.
PSSDB	Port Switch and Scanner Distributor Buffer.
PU	Peripheral Unit.
PWA	Printed Wiring Assembly. A flat board made of multiple layers that holds chips and other electronic components and contains the conductive pathways between them.

Queue	A waiting list usually consisting of processes or tasks waiting for processor time to execute.
RAM	Random Access Memory. A type of memory that can be written to or read from in any address location in any order. The contents of RAM are lost when power is removed.
RC/V	Recent Change and Verify. A procedure used for creating or modifying records in the ECD.
ROM	Read-Only Memory. A type of memory in which data is stored permanently. Data can be read from but not written to ROM.
Real-Time	Pertains to computation performed while the related physical process is taking place. Results of the computation can be used in guiding the physical process.
REX	Routine Exercise.
RISC	Reduced Instruction Set Computer. A microprocessor architecture that implements a smaller instruction set and, thereby, turns much of the low-level control of the machine over to software. A RISC processor, by using only the simplest instructions that predominate in system kernels and object modules, improves performance by reducing cycles per instruction and time per cycle.
Root	The directory that constitutes the origin of the directory hierarchy in a file system. Specifically, the origin for the file system with the pathname.
ROP	Receive-Only Printer. Output device printer.
ROS	Request Out of Service.
ROS/RST	Request Out of Service/Restore. A two-position rocker switch that sends a request by scan points to remove the associated unit from service or to restore the associated unit to service.
RST	Restore.
RTR	Real-Time Reliable.
RV	Reverse Video.
SBUS	Small Computer System Interface (SCSI) Bus.
SC	Scanner.
SCC	Switching Control Center.
SCCS	Switching Control Center System.
SCSD	Scanner and Signal Distributor.
SCSDC	Scanner and Signal Distributor Controller.

SCSI	Small Computer System Interface. An interface standard (*ANSI*[3] standard X3.131-1986) for an input/output bus used to connect peripheral devices and processors (SCSI devices). A SCSI device requests access to (and gains control of) the SBUS in order to perform data transfers with other SCSI devices using a well-defined set of commands.
SCSI ID	The bit representation of the SCSI address referring to one of the signal lines DB(7-0).
SD	Signal Distributor.
SDC	Store Data Control.
SDL	Synchronous Data Link.
SDLC	Synchronous Data Link Controller.
Segment	A logically related portion of main memory with consecutive virtual addresses.
Serial Channel	A system component that provides a 16- or 32-bit serial data interface to input/output devices.
SG	System Generation.
SPU	SCSI Peripheral Unit.
SRC	Source (bus).
STBY	Standby. The state of a unit that is operational and available for immediate service. It is either not communicating or is not the active half of a duplex pair of devices.
STF	Some Tests Fail.
STK	Storage Tek.
STLWS	Supplementary Trunk and Line Work Station.
ST/ON/OFF	Start/On/Off. A three-position rocker switch.
SU	Software Update.
Synchronous	A communications method in which there is a constant time between successive bits, characters, or events. The timing is achieved by the sharing of a clock signal between the transmitter and receiver.
System Console	A terminal connected to the system console port on the system PPC and typically is used for administrative, control, and maintenance functions for the system.
System Memory	The combination of main store memory and all other memory for the system.
System Update	The procedure used to introduce an entire new generic, as opposed to selected fixes, on the 3B21D computers.
TLP	Trouble Locating Procedure.
TTY	Terminal.

3. Registered trademark of American National Standards Institute, Inc.

TTYC	Terminal Controller. The control circuit that interfaces to an IOP and provides communication to two TTYs.
UCL	Unconditional.
UNAV	Unavailable.
VCDX	Very Compact Digital Exchange.
VOM	Volt-Ohmmeter.
VTOC	Volume Table of Contents.
WT	Weight.

A

C

D

E

F

G

H

I

J

K

L

M

N

O

P

R

S

T

U

W