NO. 2 SWITCHING CONTROL CENTER SYSTEM

NO. 1 ELECTRONIC SWITCHING SYSTEM APPLICATION

DESCRIPTION AND OPERATION

NOTICE

CONTENTS PAGE

1. GENERAL

1.01 This section describes No. 2 Switching Control
Center System (SCCS) equipment, programs,
and capabilities that are used with No. 1 Electronic
Switching Systems (ESS) but are not common to
the other No. 2 SCCS applications.

1.02 This section is reissued to include SCCS
control console No. 1A (CC1A).

Since this reissue covers a general revision, arrows
ordinarily used to indicate changes have been
omitted.

1.03 The No. 2 SCCS uses the following equipment
to interface with a No. 1 ESS:

(a) Critical indicator panel (CIP)

(b) CC1A and/or No. 1 ESS SCC Console

(c) Trunk test voltmeter

(d) Common application equipment

The common applications equipment is explained in
Section 190-110-110.

1.04 Abbreviations used in this section are explained
in Part 15.

2. CRITICAL INDICATOR PANEL (CIP)

2.01 Real-time status information for central offices
(COs) is displayed at the No. 2 SCCS on a
critical indicator panel. The twenty indications
displayed for a No. 1 ESS office are shown in
Fig. 1. Seven of the indications, being common
to the other No. 2 SCCS applications, are explained
in Section 190-110-110. Seven of the lamps, although
common to all served offices, are lighted by different
conditions as described in paragraph 2.03. The
remaining six indicators (CC through PERIPH B)
are explained below. The color red is used for all
six indicators to denote a trouble condition in the
CO. Any one of the six indicators will remain
lighted as long as the associated trouble condition
exists in the CO.
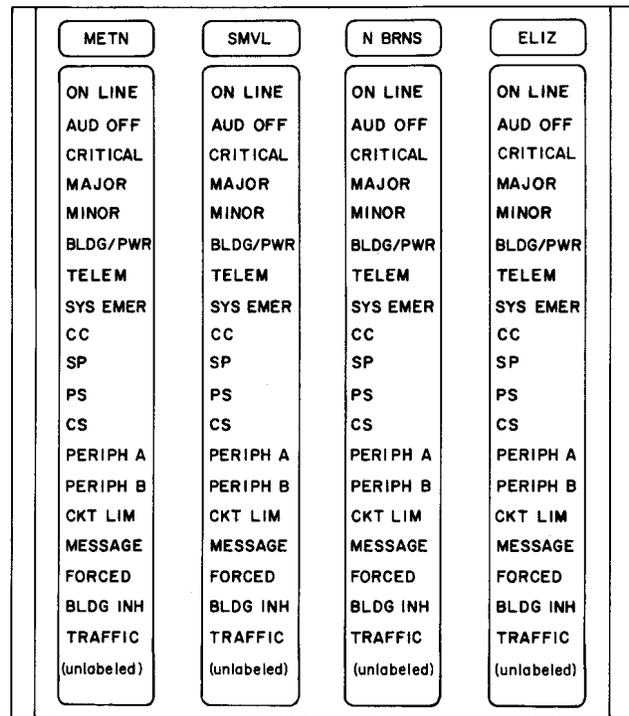
NOTE:
   THE INDICATOR AT THE BOTTOM OF THE CIP IS AN UNLABELED
   GREEN LAMP.

**Fig. 1—Critical Indicator Panel (CIP) Module for No.
1 ESS**

LAMP DESIGNATION	INDICATION
CC	One or both central controls are out of service. The master control center (MCC) interface circuit scans the central control trouble lamps and power lamps and sends the results to No. 2 SCCS by telemetry. If a trouble lamp the CC indicator will be lighted.
SP	One or both signal processors are out of service. The MCC interface circuit scans the SP trouble lamps and sends the result to the No. 2 SCCS via the telemetry.
PS	One or more program stores or program store buses are out of service. The MCC E2A interface circuit scans the state of the PS trouble lamps and sends the results to the No. 2 SCCS via the telemetry. The PS indicator also receives an input for bus status. The MCC interface circuit scans the indication sent by the SCCS lamp administration routines for the bus status.
CS	One or more call stores or call store buses are out of service. The MCC E2A interface circuit records the state of the signal processor (SP) and central control (CC) primary and secondary trouble lamps and sends the results via telemetry. The CS indicator also receives an input for bus status. The MCC interface circuit scans the indication sent by the SCCS lamp administration routines for the call store bus status.
PERIPH A	A trouble has been detected in a group of hardware units called peripheral group A. The MCC E2A interface circuitry scans the state of the MCC trouble lamps of these units and sends the result to the No. 2 SCCS via the telemetry.
	The following hardware controlled conditions light the PERIPH A indicator:
	(1) Master scanner primary or secondary trouble
	(2) Central pulse distributor primary or secondary trouble

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INDICATION

(3) Ringing and tone plant primary or secondary trouble

(4) Local or remote maintenance teletypewriter (TTY) trouble

(5) System timer power alarm (4A timer has either a power failure or an open circuit to the input of the timer)

(6) Miscellaneous trouble automatic message accounting (AMA) equipment out of service or automatic identifier outward dialing (AIOD) receivers in trouble).

For CTX-7 Issue 8, 1E3 and later generic offices, the MCC interface circuit scans a software-controlled flip-flop and adds the following software-controlled conditions as inputs to the PERIPH A indicator:

(1) PU bus trouble

(2) Central pulse distributor (CPD) bus trouble

(3) Scanner answer bus trouble.

PERIPH B

A trouble has been detected in a group of hardware units called peripheral group B. Group B consists of line switch frames, junctor switch frames, trunk switch frames, junctor frames, and trunk frames. The MCC E2A interface circuitry scans the state of the MCC trouble lamps of these units and sends the result to the No. 2 SCCS via the telemetry.

Hardware conditions which light the PERIPH B indicator are primary or secondary troubles in any of the group B equipment frames.

The MCC interface circuit scans a software-controlled flip-flop and adds the following software-controlled conditions as inputs to the PERIPH B indicator:

(1) Centrex data link trouble

(2) Recorded announcement frame trouble.

2.02 Information for the preceding six indicators is sent from the No. 1 ESS office to the No. 2 SCCS by E2A telemetry. The PS, CS, PERIPH A, and PERIPH B indications are controlled by both hardware and software. Since software control is dependent upon ability of the system to

cycle, the CC and SP indications are made more reliable by being just hardware controlled (ie, important MCC lamps in the CO are summarized and sent to No. 2 SCCS by telemetry).

2.03 Although the remaining lamps on the CIP are common to all served offices, the conditions in the offices that light the lamps may differ. The following lamps are listed to include explanations of No. 1 ESS conditions.

LAMP DESIGNATION	INDICATION
CRITICAL (red)	A critical alarm condition exists at the central office. This indicator is lighted and an audible alarm sounded to alert the switching control center (SCC) personnel of a critical service-affecting condition that requires immediate attention. An accompanying TTY output message should appear to identify the problem.
	If the CRITICAL alarm lamp or the dial tone delay alarm circuit alarm (Vaughan box alarm) at the MCC is activated, the condition is detected by the MCC interface circuitry, and CRITICAL is lighted.
	If the heartbeat timer times out (ie, not pulsed for 4 seconds), CRITICAL lights. The DT DEL ALM indicator is also an input to the CRITICAL lamp.
MAJOR (red)	A major alarm condition exists at the central office. This lamp is lighted and an audible alarm is sounded to alert the SCC personnel of a severe malfunction that requires attention. An accompanying TTY output message should appear to identify the problem. The occurrence of a major hardware-initiated alarm, such as a fuse alarm, also lights this lamp.
MINOR (amber)	A minor alarm condition exists at the central office. This indicator is lighted and an audible alarm is sounded to inform the SCC personnel of a trouble of less severe consequence than the other alarms. The occurrence of a minor hardware-initiated alarm (power room failure) activates this indicator.
SYS EMER (red)	A service-affecting emergency-action phase, either manual or automatic, has occurred.
	This lamp also lights when the system is experiencing the loss of call processing ability or cannot find a working configuration. If the EA PHASE IN PROGRESS lamp or the REPEATED TIMEOUT lamp is lighted, or

LAMP DESIGNATION	INDICATION
	the dial tone delay alarm circuit alarm (Vaughan box alarm) at the MCC is activated, the condition is detected by the MCC interface circuitry, and SYS EMER is lighted.
	If the heartbeat timer times out (ie, not pulsed for 4 seconds), SYS EMER lights.
	The dial tone delay circuit alarm is also an input to the SYS EMER lamp.
FORCED (white)	An off-normal configuration has been forced by a manual key operation either from the SCC or in the No. 1 ESS office. The off-normal configuration is detected by the MCC interface circuitry from the MCC off-normal lamp, relays in the MCC interface circuitry that are controlled by SCC commands, and a software-controlled CPD point. The CPD point indicates that one or more buffer bus keys or a program interrupt request key (A through F) is operated.
TRAFFIC (amber)	The system cycle time is excessive, as could be caused by heavy traffic. This indicator lights if the No. 1 ESS office software detects any one of the following conditions:
	(a) A heavy load condition exists in the processor (ie, and E-E rate is 1250 cycles/15 minutes or less, which is not quite minor CC overload).
	(b) Line load control is in effect.
	(c) Three successive dial tone speed tests have failed.
	(d) Incoming or outgoing network management is in effect.
(Unlabeled lamp) (green)	The No. 1 ESS central office appears to be operating normally. If this indication is not present, the SCC personnel should analyze the other critical indicators and TTY output messages and, if necessary, connect the No. 1 ESS SCC console to determine if the office is in trouble.
	This lamp is extinguished if one or more of the following conditions exist.

LAMP DESIGNATION

INDICATION

(1) A system-generated diagnostic (as opposed to a routine or manually requested diagnostic) is in progress. System-generated diagnostics may be performed on the following units: program store, program store bus, call store, call store bus, scanner, scanner answer bus, central control, central pulse distributor, signal processor, network and signal distributor frames, automatic message accounting, automatic identified outward dialing (AIOD), and centrex data link.

(2) A dial tone delay alarm (Vaughan box alarm) has occurred.

(3) One or both central controls are in trouble.

(4) One or more program stores are in trouble.

(5) One or both signal processors are in trouble.

(6) A primary call store trouble exists (ie, adjacent call store failure).

(7) An emergency action phase is in progress.

(8) The lamp administration program has failed to pulse the heartbeat timer for 4 seconds. In normal operation, a pulse is generated every second. If the system stops functioning, a timing circuit times out after 4 seconds, and this indicator is extinguished.

(9) A primary fault exists on any of the following peripheral units: line switches, trunk switches, junctor switches, trunks, junctors, master scanners, central pulse distributors, or ringing and tone plant.

(10) One or more heavy traffic conditions exists. Indication of a heavy traffic condition is derived from the traffic critical indicator circuitry in the No. 1 ESS SCC interface. This unlabeled indicator will be extinguished if any of the conditions that light the TRAFFIC indicator exist.

3. SCCS CONTROL CONSOLE NO. 1A

Description

3.01 The No. 2 SCCS can control a No. 1 ESS by means of a control console No. 1A (CC1A) acting as a partial remote MCC. The CC1A is used to:

(a) Display the status of selected No. 1 ESS MCC lamps remotely at the SCC.

(b) Allow the SCC to remotely control selected No. 1 ESS MCC keys.

3.02 Physically, the console consists of a cathode-ray tube (CRT) terminal mounted on top of a rolling cart which contains the microcomputer and a computer interface unit. (See Section 190-110-110 for CC1A common information.)

CC1A Displays

3.03 In the No. 1 ESS end office, the MCC is used with the teletypewriter to monitor and control the signal processors, central controls, call stores, program stores, peripheral units, PS bus power, etc.

3.04 The control console does not display the entire MCC at one time. Instead, it displays its equivalent of the MCC on two separate CRT screen displays called pages. The two pages are:

(a) Recovery

(b) System performance.

A third page, the summary status page, expands on the SCC wall mounted critical indicator panel (CIP) for the connected office.

3.05 In all, there are nine total pages which can be displayed. Three have already been mentioned. The six remaining are expansions of the interrupt control keys and the program control keys. More information about a particular key or function is provided for these keys than is available on the MCC.

3.06 When a control console is connected to a No. 1 ESS office, the first page displayed is the recovery page. It contains the major display and command functions needed to execute recovery

and update tasks. Fig. 2 shows a typical recovery page display.

3.07 The page names, along with abbreviations given in parenthesis, are:

(a) Recovery page (recov)

(b) System performance page (sys_per)

(c) Summary status page (sum)

(d) Program control keys expansion page (pc_exp)

(e) Interrupt request A or B page (int_a/b)

(f) Interrupt request C page (int_c)

(g) Interrupt request D page (int_d)

(h) Interrupt request E page (int_e)

(i) Program control keys with BLK key (pc_blk).

3.08 A brief explaination of each page display is given below.

(1) *Recovery Page:* The recovery page is shown in Fig. 2 with all lamps and keys lighted except for some mutually exclusive ones which are listed at the bottom of the page. The recovery page is the first page displayed when the console is switched to monitor a No. 1 ESS office. It includes all the lamps and keys needed to execute system recovery. The only lamps and keys on the MCC which are not displayed on the recovery page are:

(a) Program display lamps

(b) Peripheral unit status lamps.

However, these lamps are displayed on other pages.

(2) *System Performance Page:* The system performance page is shown in Fig. 3. The performance indicators on the page indicate:

(a) E-E rate

(b) Traffic control

(c) Line service request unload rate

(d) Jobs inhibited due to overload

(e) Transmitters busy

(f) Receivers queues active

(g) Registers queues active.

Additional status information is provided by the peripheral units, central control, and signal processor indicators.

(3) **Summary Status Page:** The summary status page is shown in Fig. 4. This page duplicates the critical indicators on the critical indicator panel under the title SUMMARY STATUS. In addition, the status points that are combined to produce critical indicator points are displayed under the title STATUS POINTS. Every item under the title STATUS POINTS that is shown in lower case letters is an actual lamp-status point. However, words in capital letters have no status points of their own and indicate only additional information.

(4) **Program Control Keys Expansion Page:** The program control keys expansion page is shown in Fig. 5. This page is used to provide a convenient means to read:

(a) Contents of memory

(b) Various types of scanner states

(c) Trunk network numbers.

The results of these operations are displayed on the program display lamps at the top of the page.

(5) **Interrupt Request Pages:** There are four interrupt request pages, A/B, C, D, and E. These are shown in Figures 6, 7 8, and 9 with all lamps on. These pages contain specific operational information. The sequence of key operations required to produce interrupts is given inside the brackets [ ] under each heading, while the individual PC key meanings are shown after each key. Comments are provided to aid the user and are contained in parentheses ( ).

(6) **Program Control Keys With BLK Key Page:** The program control keys with block key (PC BLK) page is shown in Fig.

10 with all lamps on. This page, like the interrupt request pages, provides the user with specific operational information normally found in a BSP. The sequence of key operations required to set inhibits or controls is shown in the brackets [ ] at the top of the display page. Individual PC key meanings are shown after each key. Comments are provided to aid the user and are contained in parentheses ( ).

Data Entry

3.09 Data entry involves entering of data by maintenance personnel at the console, converting the data into E2A relay commands, transmitting the commands to the end office, and observing the results. Data may be entered in either of the following MCC key buffers:

(a) The data insert (DATA_INS) buffer on the recovery page is used to indicate the order number or the number of orders for which rollback is requested. On the system display page, the DATA_INS key buffer is modified for various utility functions such as contents of memory, MAC (maintenance control) client, or scan point display options.

(b) The direct data insert (DIR_DATA_INS) key buffer, shown on the recovery page, is used to inhibit interrupts and to enter data for modified recovery actions.

3.10 Briefly, data is entered as follows.

(1) Move the cursor to the asterisk (*) preceding the selected data field and type the execute character (!).

(2) After the prompt message ENTER DATA: is displayed, enter the desired data and termination character. The next to last line on the display is the data entry line.

(3) The selected key buffer will update.

Menus

3.11 A menu is a group of lamps and keys displayed on the next to last line of the page when selected. The control console uses three menus: telephone company (TELCO) alarm menu, page menu, and application function menu.

(a) *TELCO Alarm Menu:* TELCO alarms are displayed on all pages by default if no other menu is selected. TELCO alarms are alarms which are assigned by the operating telephone company at the end office. Six alarm points are available in the E2A message structure for this purpose. They are normally used to monitor physical building conditions.

(b) *Page Menu:* The page menu can be made to appear on any page by the "*page" key. Figure 11 shows the recovery page with the page menu at the bottom. Another page can be selected when the cursor is positioned to the asterisk (*) preceding the selected key name in the menu and the execute command (!) is typed. After several pages have been called, they can be recalled one at a time in reverse order by simultaneously entering CTRL and A.

E2A Telemetry Remote Unit

3.12 The E2A telemetry remote unit provides the status monitoring and control mechanism in the No. 1 ESS office. This unit connects to the remote access interface (RAI) circuit on the processor peripheral interface (PPI) frame to access the MCC.

CC1A Lamps and Keys

3.13 The lamps and keys on the CC1A recovery and system performance pages are given below. For the remaining pages, see PA-5P160-01, Section 18.

LAMP OR KEY DESIGNATION	INDICATION
crit	This lamp, accompanied by an audible critical alarm, is lighted to alert No. 2 SCCS personnel to a critical service-affecting condition. An accompanying TTY output message should appear to identify the problem and to indicate the action to be taken.
mj	This lamp, accompanied by an audible major alarm, is lighted to alert No. 2 SCCS personnel to a severe malfunction requiring immediate attention. In most instances, some responsive action will be necessary. An accompanying TTY output message should appear to identify the problem and to indicate the action to be taken.
mn	This light, when lighted, indicates a trouble of less severe consequence. The lighting of this lamp is accompanied by an audible minor alarm.
mcc_pwr	A fuse has blown on the alarm, display, and control panel or power has been removed manually.

Note: The mcc_pwr is normally displayed on the top line; however, the next three indicators can be selected to be displayed in the place of mcc_pwr.

cont_inh	Commands are inhibited on MCC by powering down relays.

Note: Only one display from the line below can be displayed at one time.

(a) mcc_pwr   cont_inh   dt_del_alm   4a_tmr_pwr

Fig. 2—Recovery Page (All Lamps On)

Note: Only one display from the line below can be displayed at one time.

(a) mcc_pwr   cont_inh   dt_del_alm   4a_tmr_pwr

Fig. 3—System Performance Page (All Lamps On)

Note: Only one display from the line below can be displayed at one time.

(a) mcc_pwr   cont_inh   dt_del_alm   4a_tmr_pwr

Fig. 4—Summary Status Page (All Lamps On)

```
CB LAB (08)- 1 ESS- crit mj mn   mcc_pwr        #page +lamps_on +lamps_off

                                                #OCTAL
                   *** *** *** *** *** *** *** *** PROGRAM DISPLAY LAMPS
                data  21  18  15  12  9   6   3   0
[RELEASE blk KEY] +blk  11 111 111 111 111 111 111 111  #PROGRAM CONTROL KEYS

------ MCC-BEGIN-1 REQUEST ------        ----- MCC-BEGIN-2 REQUEST -----
#contents_of_memory(MAX=7777777)         #trunk_network_number(ferreed)
#junctor_scanner                         #trunk_network_number(remreed)
#line_scanner(ferreed_4_to_1)
#line_scanner(ferreed_2_to_1)
#line_scanner(remreed_4_to_1)
#line_scanner(remreed_2_to_1)
#master,combined_misc_trunk,or_hilo_misc_trunk_scanner
#universal,mini_universal,or_hilo_universal_trunk_scanner

                        +timed_display

------------ TO TERMINATE MCC-BEGIN-1 or -2 REQUEST, USE MCC-BEGIN-3 -----------


TELCO ALARMS  coml_pwr  a  b  c  d  e  f           -PC EXPANSION PAGE-
ANA 300 E2A test and lamps_on test passed
```

Note: Only one display from the line below can be displayed at one time.

(a) mcc_pwr   cont_inh   dt_del_alm   4a_tmr_pwr

Fig. 5—Program Control Keys Expansion Page (All Lamps On)

```
CB LAB  (08)- 1 ESS-  crit  mj  mn      mcc_pwr          #page +lamps_on +lamps_off

-INTERRUPT REQUEST "A" (REQUEST ONE OF 5 PROGRAM FUNCTIONS) (blk KEY RELEASED)-
+enable  +blk    [RLS blk KEY,OPER enable,a,ONLY ONE PC,THEN OPER clear_execute]
+a       both
PC KEY      (SELECT ONLY ONE PC KEY 0-4)
 +00    delete_all_nontemporary_recent_changes
 +01    delete_all_temporary_recent_changes
 +02    zero_the_primary_recent_change_area
 +03    deactivate_and_save_all_recent_changes
 +04    reactivate_all_recent_changes
5-22    UNASSIGNED
+clear_execute  (WAIT FOR RC01 MSG ON TTY CHANNEL,THE 'a' LAMP SHOULD TURN OFF)

---------INTERRUPT REQUEST "B" (INITIALIZE TTY MEMORY) (blk KEY IGNORED)-------
+enable      [OPER enable,b,AND EITHER clear_execute OR PC 22 THEN clear_execute]
+b    both
PC KEY
0-21    UNASSIGNED
 +22    tty_buffer_reinitialized_&_tty_audit_will_run
         (WITH PC KEY 22 RELEASED - TTY AUDIT WILL RUN,BUT BUFFER WON'T BE REINIT)
+clear_execute  (WAIT FOR SA03 MSG ON TTY CHANNEL,THE 'b' LAMP SHOULD TURN OFF)
TELCO ALARMS    coml_pwr   a   b   c   d   e   f         -INTER REQ A,B PAGE-
ANA 300 E2A test and lamps_on test passed
```

Note: Only one display from the line below can be displayed at one time.
(a) mcc_pwr   cont_inh   dt_del_alm   4a_tmr_pwr

Fig. 6—Interrupt Request A/B Page (All Lamps On)

```
CB LAB  (08)- 1 ESS- crit  mj  mn      mcc_pur        #page  lamps_on +lamps_off

---INTERRUPT REQUEST "C" (INHIBIT MAINTENANCE INTERRUPTS) (blk KEY IGNORED)----
+enable            [OPER enable,c,PC KEY(S),THEN OPER clear_execute]
+c   both
PC KEY               INHIBITS
 +00   sp_errors(INHE),sp_mismatches(IMS),sp_periph_errors(INHPE)
 +01   sp_periph_errors(INHPE)
 +02   sp_asw_scanner_fails(INASWS)
3-10   UNASSIGNED
 +11   h_level_interpt_on_j_level(IH5)
 +12   5_millisecond_interpt_j_level(IJ5)
 +13   cc_source_interpt_k_level(ICCC)
 +14   call_store_reread_fails_d_level(ICSF)
 +15   pgm_store_reread_fails_e_level(IPSF)
16     UNASSIGNED
 +17   pi_tbl(IPIT)
 +18   periph_unit_error_external(IPUEE)
 +19   periph_unit_error_internal(IPUEI)
20-22  UNASSIGNED

+clear_execute      (THE 'c' LAMP SHOULD TURN OFF)
TELCO ALARMS    coml_pur   a    b    c    d    e    f          -INTER REQ C PAGE-
ANA 300 E2A test and lamps_on test passed
```

Note: Only one display from the line below can be displayed at one time.
   (a) mcc_pwr   cont_inh   dt_del_alm   4a_tmr_pwr

Fig. 7—Interrupt Request C Page (All Lamps ON)

CB LAB (08)- 1 ESS- crit mj mn mcc_pwr #page +lamps_on +lamps_off

--INTERRUPT REQUEST "D" (XFER MSGS FROM LOC TTY TO REM TTY) (blk KEY IGNORED)--
[OPER enable d THEN clear_execute]

+enable
+d both
PC KEY
00-22 UNASSIGNED

+clear_execute   (THE d LAMP SHOULD TURN OFF)

TELCO ALARMS coml_pwr a b c d e f   -INTER REQ D PAGE-
ANA 300 E2A test and lamps_on test passed

Note: Only one display from the line below can be displayed at one time.

(a) mcc_pwr   cont_inh   dt_del_alm   4a_tmr_pwr

Fig. 8—Interrupt Request D Page (All Lamps On)

CB LAB (08)- 1 ESS- crit mj mn   mcc_pwr   #page +lamps_on +lamps_off

---INTERRUPT REQUEST "E" (CAUSE VARIOUS PHASES OF REINIT) (blk KEY IGNORED)----

[OPER enable,e,PC KEY(S),THEN OPER clear_execute]

+enable
+e   both
PC KEY   (NO PC KEYS OPERATED IS THE SAME AS IF PC KEY 1 IS OPERATED)
00   UNASSIGNED
+01   sp_&_cc_phase_1
+02   phase_2
+03   phase_4 (SHOULD USE PC KEY 04. FOR A PHASE 4)
+04   phase_4(cs_selectively_zeroed,calls_not_in_talking_state_terminated)
+05   phase_5(phase_4_plus_inhib_d,e_&_f_interpts)
+06   phase_6(all_cs_zeroed_except_recent_chg_&_all_net_connections_released)
+07   phase_7(phase_6_plus_inhib_d,e_&_f_interpts)
+08   recent_change_area_zeroed(use_with_pc_key_03,04,05,06,_or_07)
09-22   UNASSIGNED

+clear_execute   (THE 'e' LAMP SHOULD TURN OFF)

TELCO ALARMS coml_pwr a b c d e f   -INTER REQ E PAGE-
ANA 300 E2A test and lamps_on test passed

Note: Only one display from the line below can be displayed at one time.
(a) mcc_pwr   cont_inh   dt_del_alm   4a_tmr_pwr

Fig. 9—Interrupt Request E Page (All Lamps On)

```
CB LAB  (08)- 1 ESS-  crit   mj   mn      mcc_pwr          #page +lamps_on  +lamps_off

-------------[OPERATE blk KEY AND THEN PC KEY(S) FOR DESIRED TASK]-------------
+blk            (PC KEYS IN [ ] MUST ALL BE OPERATED TO PERFORM INDICATED TASK)
PC KEY
[ +00  +01  +02  +03 ] init_memory_on_auto_ph4_man_ph5_&_xfer_tty_msgs_to_rem_tty
04-08  UNASSIGNED
+09  inhib_crit_data_cks_outside_of_a_phase_when_ea_pgm_cks_pointers
+10  inhib_TW02_ending_12345670_during_a_phase
+11  terminate_trk_grp_diagnosis
+12  inhib_TN01_TN02_TN08_&_JN05_msgs
13   UNASSIGNED
+14  inhib_SA03_audit_msg_with_audit_code_34-2_and_34-3
+15  (PC 16 not oper)inhib_MN02_ERR,SA01,SA02_&_SA03_msgs
+16  (PC 15 not oper)prt_audit_msgs_unasgn_LENs_&_SA01,elev_prior_SA02_&_SA03
[ +15  +16 ] print_audit_msgs_unasgn_LENs,inhib_MN02_ERR_&_SA01_msgs,
             elev_prior_SA02_&_SA03_msgs
17   UNASSIGNED
+18  inhib_maint_interpt_msgs_after_a-t_or_k_level_interr_if_req_by_M-DUMP
+19  inhib_maint_interpt_msgs_after_maint_interpt
+20  term_AIOD_comp-on,network_sd_order_&_burst_tst,network_matrix_exercise
+21  inhib_cc_routine_hourly_jobs
TELCO ALARMS   coml_pwr   a   b   c   d   e   f          -PC BLK PAGE-
ANA 300 E2A test and lamps_on test passed
```

Note: Only one display from the line below can be displayed at one time.
(a) mcc_pwr   cont_inh   dt_del_alm   4a_tmr_pwr

Fig. 10—Program Control Keys with BLK Key (All Lamps On)

```
CB LAB  (08)- 1 ESS- crit          #page +lamps_on +lamps_off
------------SIGNAL PROCESSOR---------  --CPD--  ---------CENTRAL CONTROL------
          --CS--                            --CS--  --PI- -PROGRAM STORES OS-
SPØ                  SP1
  +stop                +stop
-----------TRAFFIC CONTROL----------       ----------------STATUS------------
+enab  +emer_man_srv

                                           --PS STATE CONTROL--
         ------------CENTRAL CONTROLS-----------      +sel_psb0 + + + + + + + +
CCØ                               +sel    +set_man +sel_psb1 1 2 3 4 5 6 7 8
CC1                               +sel

                                                    +dis_tmout +pgm_sync_a_lvl

-----CCØ----        -----CC1----  -POWER OFF-
             PS_BUS                +psb0 +psb1       --EMERGENCY MODE CONTROL--
SEND RCV PWR        PWR RCV SEND                      DPLX_FAIL +enable
             CS_BUS                +csb0 +csb1           +1       +inh_ea_phase

-----INTERRUPT CONTROL-----  ------ #PROGRAM CONTROL KEYS ------  ----ALARM----
+enable          +clear_exec     21  18  15  12  9   6   3   0  +release
+a  +b  +c  +d  +e  +f    +blk  00 000 000 000 000 000 000 000
reco #sys_per #sum #pc_exp #int_a/b #int_c #int_d #int_e #pc_blk #esc
MON 005 CC1A set to 1E6    Office Profile=003707
```

Note: Only one display from the line below can be displayed at one time.
(a) mcc_pwr   cont_inh   dt_del_alm   4a_tmr_pwr

Fig. 11—Recovery Page With Page Menu Displayed

LAMP OR KEY DESIGNATION	INDICATION
dt_del_aim	A dial tone delay has been detected by the dial tone delay alarm circuit and its audible alarm is sounding in the CC.
4a_tmr_pwr	The 4A timer has failed because of either a power failure or an open circuit to the input of the timer.
e2a	The e2a lamp lights whenever a communication failure between the telemetry computer translator (TCT) and E2A remote is detected.
+lamps_on	Depressing this key causes the console E2A telemetry circuit to send a command to the E2A telemetry remote circuit in the MCC frame making all scan points busy. Returned data causes all console lamps to light until this key is released.
+lamps_off	Depressing this key causes the E2A telemetry circuit to send a command to the E2A telemetry remote circuit in the MCC frame making all scan points idle. Returned data causes all console lamps to extinguish until this key is released.
CPD - p	One or more pairs of central pulse distributors are in trouble.
CPD - s	One of a pair of central pulse distributors is out of service or a minor malfunction has occurred, but service is not being adversely affected at this time.

Signal Processor

SP0 act	Signal processor 0 is the active unit.
SP0 pwr	Power is on signal processor 0.
SP0 +stop	This key, when operated in conjunction with the set manual key, removes power from signal processor 0.
SP1 tbl	Signal processor 1 is in trouble.
SP1 stop	Signal processor 1 has been stopped manually.
SP1 act	Signal processor 1 is the active unit.
SP1 pwr	Power is on signal processor 1.

LAMP OR KEY DESIGNATION	INDICATION
SP1 +stop	This key, when operated in conjunction with the set manual key, removes power from signal processor 1. It is interlocked with STOP SP0 so that both keys cannot be in an operated condition at the same time.
CS - p	Both copies of a duplicated information block in SP call store memory are no longer available.
CS - s	One copy of a duplicated information block in SP call store memory is no longer available.

Central Control

CS - p	Both copies of a duplicated information block in CC call store memory are no longer available.
CS - s	One copy of a duplicated information block in CC call store memory is no longer available.
PI - p	One or more pairs of peripheral processor (PI) circuits are out of service.
PI - s	One or more PI circuits are considered by the system to be unavailable for service.
PROGRAM STORES OS- 0 through 11 lamps	The program store associated with a lighted lamp is out of service.

Traffic Control

+enab	This key enables other traffic control keys permitting them to be effective.
+emer_man_srv	This key initiates emergency manual line service (if provided in the SPCS).
emer_man_srv	This lamp lights when the emergency manual line service is in affect.
og_load_cont	Network management control is active on one or more outgoing trunk groups.
inc_load_cont	The office is sending a dynamic overload control signal to one or more connected offices.
llc_enab (or line_load_cont_enab)	Line load control is in effect.
dt_del	A dial tone speed test fails or the line load control program is denying originating service to one or more groups of nonessential lines.

LAMP OR KEY DESIGNATION	INDICATION
cc_ovld	The system central control main program exceeds a predetermined time required to cycle through all classes of base level work.
rcvr_ovld	The system has automatically recognized an overflow condition in a receiver queue.

Status

mult_tbl	More than one serious trouble exists in the system concurrently. The following three conditions cause the lamp to light: (1) A trouble exists in both central controls. (2) A condition arises in which the network and signal distributor frames must use a peripheral bus or central pulse distributor which has been marked in trouble. (3) An essential part of the peripheral unit system (such as duplicate central pulse distributors or both peripheral unit buses) is in trouble.
diag_in_prog	The system has started an automatic diagnosis of some unit that is in trouble. The diagnostic program is attempting to locate the trouble within the unit.
trunk_mb_ovf	A data-validation protected service circuit group has overflowed in the last 15 minutes and has more circuits out of service than the automatic maintenance limit allows.
ea_phase_in_prog	A data validation has been automatically initiated or an emergency action phase of reinitialization has been initiated automatically or manually.
misc_tbl	A trouble has developed within the automatic message accounting equipment, or an AIOD receiver is out of service. An audible major alarm is initiated and can be retired by operating ALM RLS key.
mcc_force	An off-normal configuration has been forced by a manual key operation either from the SCC or in the No. 1 ESS office. The off-normal configuration is detected by the MCC interface circuitry from the MCC off-normal lamp, relays in the MCC interface circuitry that are

LAMP OR KEY DESIGNATION	INDICATION

controlled by SCC commands, and a software-controlled central pulse distributor (CPD) point. The CPD point indicates that one or more buffer bus keys or a program interrupt request key (A through F) is operated.

ps_state_selected
: The rotating STATE SELECTOR switch at MCC is off NORMAL or one of the eight PS STATE CONTROL keys on the CC1A display has been operated.

Central Controls

CC0 offline
: Central control 0 is in the off-line mode.

Note: When a central control is in the off-line mode, it is functioning completely independent of the active central control. At the same time, the active CC program stores and call stores are inaccessible to the off-line central control. For off-line operation, see Section 231-117-301.

CC0 stp
: Central control 0 has been stopped.

CC0 clk
: Central control 0 has a major trouble in its clock circuit or a pulse missing in its timing chain.

CC0 pwr
: Power is on central control 0.

CC0 tbl
: Central control 0 is out of service.

CC0 +sel
: This key, when operated in conjunction with the set manual key, overrides the system selection of the active central control and forces central control 0 to be the active central control.

CC0 act
: Central control 0 is the active unit.

CC1 offline
: Central control 1 is in the off-line mode.

Note: When a central control is in the off-line mode, it is functioning completely independent of the active central control. At the same time, the active CC program stores and call stores are inaccessible to the off-line central control. For off-line operation, see Section 231-117-301.

CC1 stp
: Central control 1 has been stopped.

LAMP OR KEY DESIGNATION	INDICATION
CC1 clk	Central control 1 has a major trouble in its clock circuit or a pulse missing in its timing chain.
CC1 pwr	Power is on central control 1.
CC1 tbl	Central control 1 is out of service.
CC1 +sel	This key, when operated in conjunction with the set manual key, overrides the system selection of the active central control and forces central control 1 to be the active central control. It is interlocked with CC1 SEL ACT so that both keys cannot be in an operated condition at the same time.
CC1 act	Central control 1 is the active unit.

PS State Control

invalid	This lamp lights when an invalid program-store state-configuration selection has been made.
+set_man	This key, when depressed, causes a level A interrupt and makes the override selection effective.
+sel_psb0	Overrides the system selection of a program store bus (to be used with the active central control and the program store configuration selected by the PS STATE CONTROL switch) and forces program store bus 0 to be used. This override does not become effective until a PS STATE CONTROL switch selection has been made and the SET MANUAL key has been depressed.
+sel_psb1	Overrides the system selection of a program store bus (to be used with the active central control and the program store configuration selected by the PS STATE CONTROL switch) and forces program store bus 1 to be used. This override does not become effective until a PS STATE CONTROL switch selection has been made and the SET MANUAL key has been depressed.
rptd_tmout	The system has tried all configurations possible with its automatic emergency action facility without finding a working configuration. It may be necessary for the SCC to manually select different equipment configurations in

LAMP OR KEY DESIGNATION   **INDICATION**

an attempt to restore the system. (Refer to Section 190-113-311.)

+dis_tmout

This key inhibits the automatic emergency action circuitry in both central controls.

PS STATE CONTROL
Keys + through +
Keys 1 through 8

NORMAL Position: The program store configuration to be used is chosen by the system.

Positions (Keys) 1 through 8: These positions are used to force the system to use the stored memory in a fixed pattern of store half configurations. In order to make this selection effective, a program store (SELECT PS BUS 0 or 1) bus slection must be made and the SET MANUAL key must be depressed.

The number of states used is determined by the number of program stores in the office. The various combinations are shown in Section 231-125-302. Another method of selecting program store configurations is the use of PS-CONFIG input message. (Reference should be made to the input message manual.)

Note: This switch is equipped with an adjustable stop that is set to prevent the switch from being rotated beyond the valid number of program stores in the office. If the switch was rotated beyond a valid state, the system would lose sanity.

+pgm_sync_a_lvl

This nonemergency, recovery key allows the manual recovery A-level interrupt facilities to be *tested* in a manner that does not threaten the stability and sanity of the system.

CC0

PS_BUS SEND 0

Central control 0 is using program store bus 0 to send information to the program stores.

PS_BUS RCV 0

Central control 0 is using program store bus 0 to receive information from the program stores.

PS_BUS PWR 0

This lamp remains lighted while power is on program store bus 0.

PS_BUS SEND 1

Central control 0 is using program store bus 1 to send information to the program store.

LAMP OR KEY DESIGNATION	INDICATION
PS_BUS RCV 1	Central control 0 is using program store bus 1 to receive information from the program stores.
PS_BUS PWR 1	This lamp remains lighted while power is on program store bus 1.
CS_BUS SEND 0	Central control 0 is using call store bus 0 to send information to call stores and, if provided, to signal processors.
CS_BUS RCV 0	Central control 0 is using call store bus 0 to receive information from call stores and, if provided, from signal processors.
CS_BUS PWR 0	This lamp remains lighted while power is on call store bus 0.
CS_BUS SEND 1	Central control 0 is using call store bus 1 to send information to call stores and, if provided, to signal processors.
CS_BUS RCV 1	Central control 0 is using call store bus 1 to receive information from call stores and, if provided, from signal processors.
CS_BUS PWR 1	This lamp remains lighted while power is on call store bus 1.

CC1

PS_BUS SEND 0	Central control 1 is using program store bus 0 to send information to the program stores.
PS_BUS RCV 0	Central control 1 is using program store bus 0 to receive information from the program stores.
PS_BUS PWR 0	This lamp remains lighted while power is on program store bus 0.
PS_BUS SEND 1	Central control 1 is using program store bus 1 to send information to the program stores.
PS_BUS RCV 1	Central control 1 is using program store bus 1 to receive information from the program stores.
PS_BUS PWR 1	This lamp remains lighted while power is on program store bus 1.
CS_BUS SEND 0	Central control 1 is using call store bus 0 to send information to call stores and, if provided, to signal processors.

LAMP OR KEY DESIGNATION   **INDICATION**

CS_BUS RCV 0   Central control 1 is using call store bus 0 to
                                      receive information from call stores and, if
                                      provided, from signal processors.

CS_BUS PWR 0   This lamp remains lighted while power is on
                                      call store bus 0.

CS_BUS SEND 1   Central control 1 is using call store bus 1 to
                                      send information to call stores and, if provided,
                                      to signal processors.

CS_BUS RCV 1   Central control 1 is using call store bus 1 to
                                      receive information from call stores and, if
                                      provided, from signal processors.

CS_BUS PWR 1   This lamp remains lighted while power is on
                                      call store bus 1.

Power Off

+psb0   Power is applied to bus cable pulsers in central
                                      control 0 or 1 for program store bus 0.

+psb1   Power is applied to bus cable pulsers in central
                                      control 0 or 1 for program store bus 1.

+csb0   Power is applied to the bus cable pulsers in
                                      central control 0 or 1 for call store bus 0.

+csb1   Power is applied to the bus cable pulsers in
                                      central control 0 or 1 for call store bus 1.

Emergency Mode Control

DPLX_FAIL   *OFF Position:* Duplex failure modes are
(off position-   not being requested.
neither +1 or +2 operated)

DPLX_FAIL   This position requests the duplex failure
+1   printout mode for printout of CC registers.
                                      However, only if the EMC KEY 0—ENABLE
                                      key is in the operated state will BB24 EMC DFM13
                                      bit be a one, thus activating the duplex failure
                                      printout mode. See KEY 0—ENABLE.

DPLX_FAIL   This position requests the duplex failure
+2   printout mode for printout of CS or PS data.
                                      However, only if the EMC KEY 0—ENABLE
                                      key is in the operated state will BB24 EMC DFM23
                                      bit be a one, thus activating the duplex failure
                                      printout mode. See KEY 0—ENABLE.

LAMP OR KEY DESIGNATION	INDICATION
DPLX_FAIL +3	This position requests the duplex failure printout mode for printout of CC registers. However, only if the EMC KEY 0—ENABLE key is in the operated state will BB24 EMC DFM13 and DFM23 bits be a one, thus activating the duplex failure printout mode. See KEY 0—ENABLE.
+enable	When this key is in the operated state, all requested emergency mode control functions are enabled.
+inh_ea_phase	When this key is in the operated state, buffer bit 24 emergency mode control (EMC) EMCK1 bit is in the one state, thereby requesting all EA phase triggers to be inhibited except the manually initiated MCC phase requests.

Interrupt Control

+enable	This key allows activation of the control and request keys for the program interrupt control system. Normal operation of program interrupt control keys on the SCC console requires that the ENAB key be operated first, and that one of the PROGRAM INTERRUPT CONTROL A through F keys and the CLR EX key be operated within 45 to 60 seconds; otherwise, a timer in the CO times out and releases the relay associated with the ENAB key. The purpose of the timing out is to prevent the switching system from being enabled for an EA phase or any other interrupt request from the console because the program interrupt enable key was not released.
both	This lamp lights when both central controls are to be interrupted by a chosen interrupt key.
+clear_exec	Releases any active sequencing circuit which may be erroneously locked in the central control and executes the requested interrupt.
+a through +f keys	Each key requests the system to produce various software reactions with A interrupt activity level. (See Section 231-125-301.)

TELCO ALARMS

coml_pwr	A commercial power failure has occurred and the office is running on auxiliary power.

LAMP OR KEY DESIGNATION	INDICATION
a through f lamps	These lamps are operating company engineered and are intended to provide remote indication of any important office alarm or groups of alarms.
Program Control Keys	
data	This lamp lights indicating that program control keys are being used to input data.
+blk	+blk key represents bit position 23 in central control buffer bus register 17.
Program Control Keys 0 through 22	Program control keys control the state of flip-flops associated with central control buffer bus register 17. The program control keys are designated 0 through 22 and correspond directly to bit positions in central control buffer bus register 17. Some programs read these flip-flops before carrying out a function; consequently, the keys can provide control for various system program actions. The functions of program control keys are listed in Section 231-125-301. In addition, by displaying either 1s or 0s, the program control keys provide a means of displaying data registered in the system.
Alarm	
+release	This key, when depressed, retires the office alarms in the central office.
co_alm_inh	Audible alarms in the CO are inhibited, and alarm lamps in the CO persist only until the SCC equipment recognizes and reports the alarm condition.
Peripheral Units	
LINE_SW p	Both line scanner or network controllers of a line switch frame are in trouble or maintenance has been removed (fault recognition program inhibited) either automatically by the system (because both network controllers of a frame are in trouble) or manually via a TTY message.
LINE_SW s	One or more line switch frames have one line scanner or network controller (of a duplicate set of controllers) out of service or a minor malfunction has occurred. When one network controller of a given pair is out of service,

LAMP OR KEY DESIGNATION	INDICATION
	the frame can only process one order per network cycle instead of two orders.
JUNCTOR_SW p	Both network controllers of a line or trunk junctor switch frame are in trouble or maintenance has been removed (fault recognition program inhibited) either automatically or manually. If it has been removed automatically, a major alarm is sounded.
JUNCTOR_SW s	One or more line or trunk junctor switch frames have one controller out of service or a minor malfunction has occurred; when one controller of a given pair is out of service, the frame can only process one order per network cycle instead of two orders.
TRUNK_SW p	Both network controllers of a service link or trunk switch frame are in trouble or maintenance has been removed either automatically by the system or manually via a TTY message. If it was removed automatically, a major alarm is sounded.
TRUNK_SW s	One or more service link network (SLN) frames or trunk switch frames have one network controller out of service or a minor malfunction has occurred. When one controller of a given pair is out of service, the frame can only process one order per network cycle.
JUNCTOR p	Both scanner or signal distributor controllers of a junctor frame are in trouble or maintenance has been removed automatically by the system or manually via a TTY message. If it has been removed automatically, a major alarm is sounded.
JUNCTOR s	One or more junctor frames have one controller out of service, or a minor malfunction has occurred. When one controller in a frame is out of service, the frame can only process one order per network cycle.
TRUNKS p	Both signal distributor controllers in a supplementary signal distributor frame are in trouble or have been removed either automatically by the system or manually via TTY message. If it has been removed automatically, a major alarm is sounded.

LAMP OR KEY DESIGNATION	INDICATION
TRUNKS s	One or more supplementary signal distributor frames or universal trunk signal distributor frames have one signal distributor controller out of service, or one or more universal trunk frames have one scanner controller out of service. When one controller of a given pair is out of service, the frame can process only one order per network cycle instead of two orders (one per controller) per network cycle.
MSTR_SCAN p	One or more master scanner frames have both controllers in trouble.
MSTR_SCAN s	One or more master scanner frames have one controller out of service or a minor malfunction has occurred.
DATA_TERM p	One or more duplicate units in the CCIS data link complex are out of service.
DATA_TERM s	One or more units in the CCIS data link complex are out of service.
MTCE_TTY loc	This lamp is lighted when the local maintenance TTY channel is out of service.
MTCE_TTY rem	This lamp is lighted when the remote maintenance TTY channel is out of service.
R_&_T p	Troubles have developed in both of the duplicated ringing and tone supply circuits.
R_&_T s	Troubles have developed in one of the duplicated ringing and tone supply circuits. Service is not being adversely affected.

Line Service Request Hopper Unload Rate

Note: The rate at which the line service request hopper is unloaded varies in 16 steps from a nonzero minimum to a maximum. Three lamps indicate the current rate. The MIN lamp lights when the unloading rate is at the nonzero minimum value, and the MAX lamp lights when the rate is at the maximum value. The MID lamp indicates an unloading rate between the minimum and maximum. The minimum unloading rate represents a heavy traffic condition, and a maximum unloading rate represents a low traffic condition.

LAMP OR KEY DESIGNATION   **INDICATION**

The unloading rate varies with E-to-E time.
If the E-to-E cycle time is less than 1.0 second,
the unloading rate is increased one step every
5 seconds until the maximum rate is reached.

If the E-to-E cycle time is between 1.0 and
1.8 seconds (900 to 500 cycles in 15 minutes),
the unloading rate decreases one step every
3 seconds until the minimum rate is reached.
Average E-to-E times between 1.0 and
1.8 seconds, which cause a less-than-maximum
unloading rate, define minor CC overload.

If average E-to-E time exceeds 1.8 seconds,
the system enters major CC overload. During
major CC overload, hopper unloading is
suspended (ie, unloading rate is zero), and
the MIN, MID, and MAX lamps are extinguished.
After a corrective action, such as a phase,
the unloading rate returns to some middle
value.

max (normal_load)   The rate at which the line service request
                                     hopper is unloaded is at its maximum value
                                     (low traffic condition).

mid (heavy_load)   The rate at which the line service request
                                     hopper is unloaded falls between its maximum
                                     and minimum value.

min (overload)   The rate at which the line service request
                                     hopper is unloaded is at its minimum nonzero
                                     value (high traffic condition).

E-E RATE KC/15 MIN

.47 through 30 lamps   An E-to-E lamp displays the average number
                                     of entire base level cycles (E-to-E) that would
                                     be completed in 15 minutes at the current
                                     rate. Each lamp represents a value between
                                     the adjacent numbers. The leftmost lamp
                                     indicates a rate of 0 to 0.47 kilocycles per
                                     15 minutes. The rightmost lamp indicates a
                                     rate greater than 30 kilocycles per 15 minutes.
                                     The display is updated every 2 seconds. The
                                     E-to-E rate is an indication of system load.

Jobs Inhibited Due to Overload

restore_verify_test   The restore RST VFY test which is normally
                                     made after each call is terminated, is omitted
                                     during a heavy load state.

LAMP OR KEY DESIGNATION	INDICATION

false_cross_&_grd_test

The false cross and ground (FCG) tests are inhibited when the system is in the heavy load state.

alternate_routing

•

Blocked retrials (BLK RTY) for trunk hunts are omitted when the system is in a major CC overload state. In normal operation, if the system encounters a trunk group with no idle trunks during a trunk hunt, it will block the call and hunt for a trunk in another group. The second hunt is called a blocked retry.

Transmitters Busy

Note: The MIRV data validation routine checks the integrity of the multifrequency, trunk dial pulse, and revertive pulse transmitter service circuits once every 60 seconds. If all of one type of service circuits are busy, the corresponding lamp will light.

all_mf

All of the multifrequency (MF) service circuits are indicated busy at the time the integrity of the circuit is checked.

all_dp

All the trunk dial pulse (TDP) service circuits are indicated busy at the time that the integrity of the circuit is checked.

all_rp

All the revertive pulse (RP) service circuits are indicated busy at the time that the integrity of the circuit is checked.

Receivers Queue Active

Note: The queue activity bits for the customer TOUCH-TONE®, customer dial pulse, multifrequency, revertive pulse, and trunk dial pulse are checked every 2 seconds. If any of these queues are found active, the corresponding lamp will light.

att

The queue activity bits for the customer TOUCH-TONE receiver are found active. The lamp will remain lighted for 15 seconds.

cdp

The queue activity bits for the customer dial pulse (CDP) receiver are found active. This lamp will remain lighted for 15 seconds.

LAMP OR KEY DESIGNATION	INDICATION
mf	The queue activity bits for the multifrequency (MF) receiver are found active. This lamp will remain lighted for 15 seconds.
rp	The queue activity bits for the revertive receiver are found active. This lamp will remain lighted for 15 seconds.
trk_dp	The queue activity bits for the trunk dial pulse receiver are found active. This lamp will remain lighted for 15 seconds.

Registers Queue Active

Note: The MIRV data validation routine checks the integrity of the originating, ringing, AMA, and disconnect registers once every 60 seconds. If no registers of one type are idle, or if the queue bit is set for a type of register, the corresponding lamp will light.

orig	None of the originating registers are idle at the time that the integrity of the register is checked.
ring	None of the RING registers are idle at the time that the integrity of the register is checked.
disc	None of the disconnect registers are idle at the time that the integrity of the register is checked.
ama	None of the AMA registers are idle at the time the integrity of the register is checked.

4. NO. 1 ESS SCC CONSOLE

4.01 The No. 2 SCCS can control a No. 1 ESS by means of a No. 1 ESS SCC console acting as a remote, partial MCC alarm, display and control panel (Fig. 12). Lamps display CO status information such as trouble states and system configuration (Fig. 13). Console keys are used to phase and/or manually configure a No. 1 ESS to obtain a working system (Fig. 14).

4.02 The SCC console is mounted on a mobile cart and can be moved for use at different workstation positions. The unit is about two feet by two feet by one and one-half feet high and weighs approximately 100 pounds. The console is connected into the system by plugging its cord into a cable junction unit or into the back of a central office selector and junction unit (COSJU). The cable junction unit normally is mounted on the side of the workstation desk or nearby. The COSJU sits on top of the workstation desk.

4.03 The number of No. 1 ESS SCC consoles in a switching control center will vary. A practical ratio is one console for four central offices.

4.04 The switching that connects an SCC console to a CO is controlled by a COSJU or a central office selector unit (COSU). When a connection is desired, the indicators on the COSJU or COSU are set to a two-digit code representing
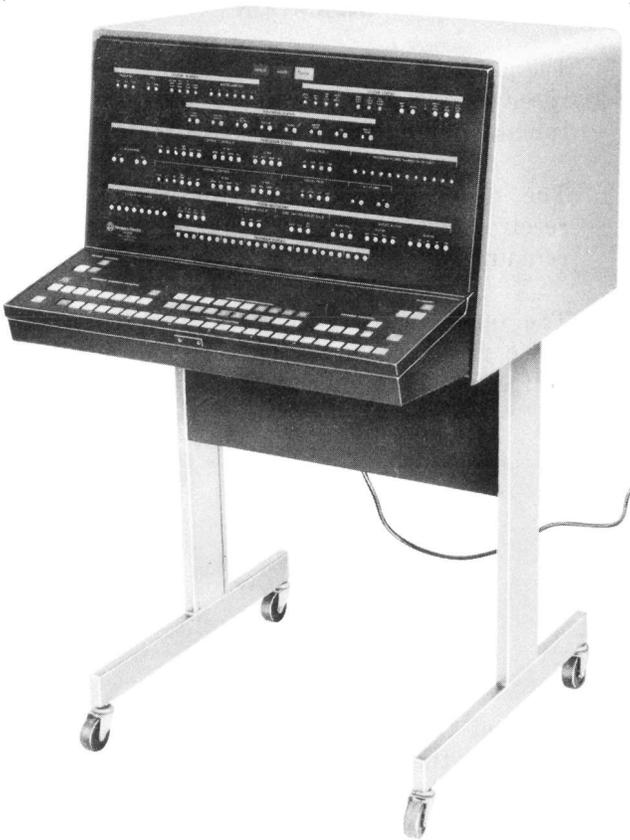
Fig. 12—No. 1 ESS SCC Console

the desired channel, and the full access (FA) button is pressed. When control of the CO is no longer desired, the CHAN RLS button is pressed to release the channel.

4.05 For COs not being controlled by a console, the E2A critical indicator (CI) central unit, which is located in an SCCS equipment cabinet, sends commands continuously to the remote telemetry unit in the CO. The remote unit returns information for audible alarms and 16 of the CO CIP indicators. When an audible alarm sounds in the SCC, the SCC personnel should examine the CIP or video alarm monitor to determine which office is causing the alarm. The CIP indicators or alarm summary messages on the video monitor and the TTY messages for that office should be examined to help identify the problem. If needed, the console can be connected to the No. 1 ESS in the office. When a console is connected to a No. 1 ESS, the telemetry central unit in the console sends commands continuously to the remote

telemetry unit in the CO. The remote unit, which monitors 224 status points in the CO, returns information for display on the console and 16 CIP indicators for the same CO. If it is necessary to control the No. 1 ESS, the console keyshelf has keys which can be depressed to order relay operation in the CO.

4.06 The SCC console contains four circuit control packs, the E2A telemetry central unit and associated circuitry, a data set, and power supplies, as described in Section 190-110-110.

4.07 The SCC console and MCC control and display panel have similar indicators but are not exact duplicates. Each has lamps and keys that do not exist on the other. The SCC console includes additional displays, called system indicators, to compensate for the loss of positive indications such as sounds that are present in the CO but not at the remote location. The SCC console display panel includes the following lamps that are not in the CO:

(a) System alarms: DT DEL ALM, COML PWR

(b) System status: CO ALM INH

(c) System indicators: E-E RATE (8 lamps), LSRV REQ HPR UNLD RT (3 lamps), JOBS OMITTED DUE TO OVLD (3 lamps), QUEUES ACTIVE (12 lamps). The lamps are routinely updated every 2 seconds by lamp administration routines that are similar to MCC lamp control routines. System indicators are aids for evaluating system problems rather than triggers for maintenance personnel to take manual corrective action. In most cases, the system detects problems that light system indicators and makes adjustments or corrections as required.

4.08 The keyshelf includes the following keys and lamps that are not in the CO:

(a) Console control: TLM ALM RLS, OPR OVRD, RLS OVRD, LOC LAMP TEST, CSL PWR ON

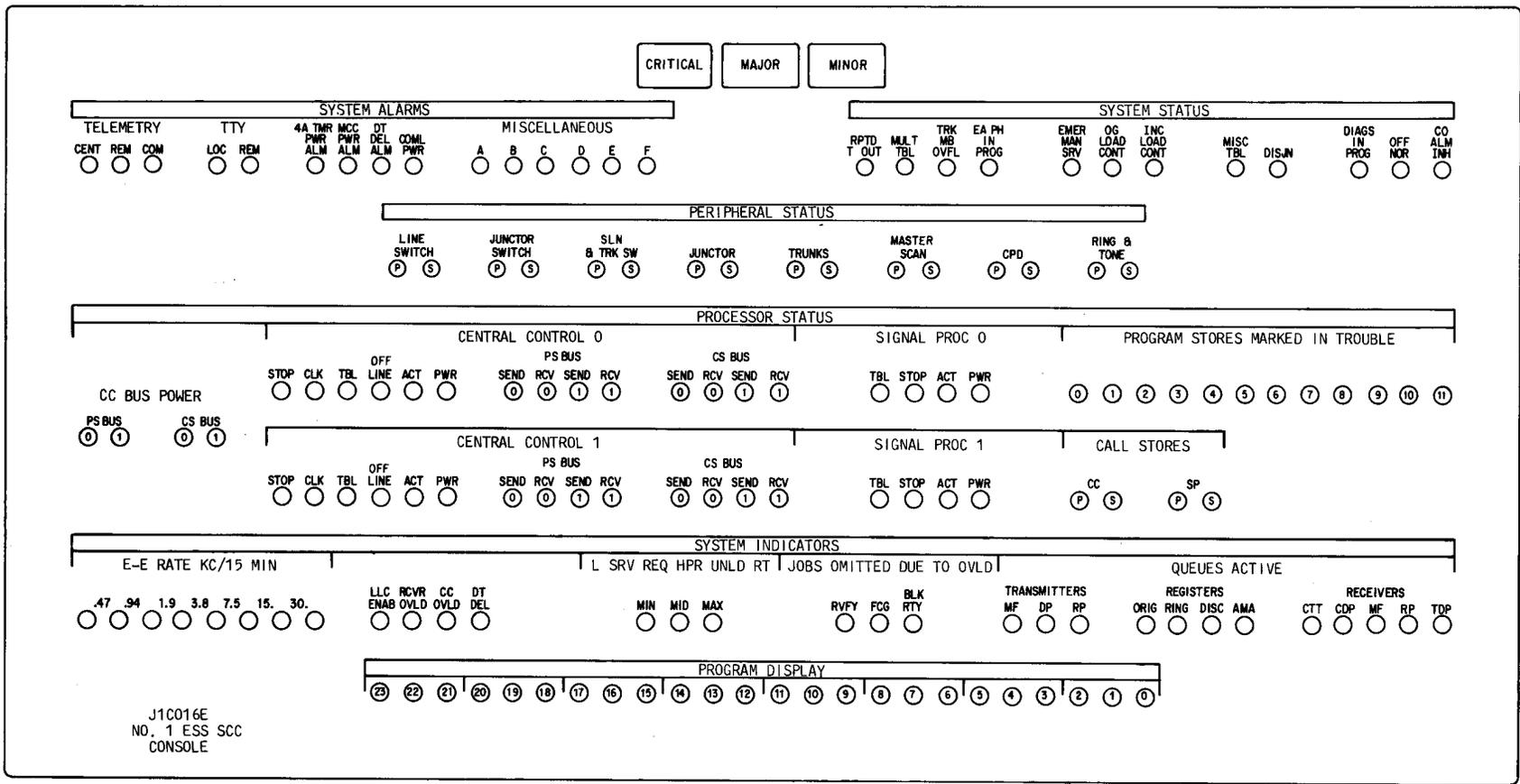(b) Telemetry: ALL LAMPS OFF, ALL LAMPS ON, REM PWR OFF.

CRITICAL   MAJOR   MINOR

SYSTEM ALARMS

TELEMETRY   TTY   4A TMR MCC DT   MISCELLANEOUS
                            PWR PWR DEL COML
CENT REM COM   LOC REM   ALM ALM ALM PWR   A   B   C   D   E   F
○ ○ ○   ○ ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○

SYSTEM STATUS

                                    RPTD MULT TRK EA PH   EMER OG   INC   DIAGS   CO
                                              MB   IN   MAN LOAD LOAD   MISC   IN   OFF   ALM
                                    T OUT TBL OVFL PROG   SRV CONT CONT   TBL DISJN   PROG NOR   INH
                                    ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○

PERIPHERAL STATUS

         LINE   JUNCTOR   SLN   JUNCTOR   TRUNKS   MASTER   RING &
        SWITCH   SWITCH   & TRK SW   SCAN   CPD   TONE
        Ⓟ Ⓢ   Ⓟ Ⓢ   Ⓟ Ⓢ   Ⓟ Ⓢ   Ⓟ Ⓢ   Ⓟ Ⓢ   Ⓟ Ⓢ   Ⓟ Ⓢ

PROCESSOR STATUS

                    CENTRAL CONTROL 0   SIGNAL PROC 0   PROGRAM STORES MARKED IN TROUBLE
                        OFF   PS BUS   CS BUS
CC BUS POWER   STOP CLK TBL LINE ACT PWR   SEND RCV SEND RCV   SEND RCV SEND RCV   TBL STOP ACT PWR
                ○   ○   ○   ○   ○   ○   ⓪   ⓪   ①   ①   ⓪   ⓪   ①   ①   ○   ○   ○   ○   ⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪
PS BUS   CS BUS
⓪ ①   ⓪ ①   CENTRAL CONTROL 1   SIGNAL PROC 1   CALL STORES
                        OFF   PS BUS   CS BUS
                STOP CLK TBL LINE ACT PWR   SEND RCV SEND RCV   SEND RCV SEND RCV   TBL STOP ACT PWR   CC   SP
                ○   ○   ○   ○   ○   ○   ⓪   ⓪   ①   ①   ⓪   ⓪   ①   ①   ○   ○   ○   ○   Ⓟ Ⓢ   Ⓟ Ⓢ

SYSTEM INDICATORS

  E-E RATE KC/15 MIN   L SRV REQ HPR UNLD RT JOBS OMITTED DUE TO OVLD   QUEUES ACTIVE

                            LLC RCVR CC DT   TRANSMITTERS   REGISTERS   RECEIVERS
.47 .94 1.9 3.8 7.5 15. 30. ENAB OVLD OVLD DEL   MIN MID MAX   RVFY FCG BLK MF DP RP   ORIG RING DISC AMA   CTT CDP MF RP TDP
                                                                              RTY
○ ○ ○ ○ ○ ○ ○ ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○   ○ ○ ○

PROGRAM DISPLAY

㉓ ㉒ ㉑ ⑳ ⑲ ⑱ ⑰ ⑯ ⑮ ⑭ ⑬ ⑫ ⑪ ⑩ ⑨ ⑧ ⑦ ⑥ ⑤ ④ ③ ② ① ⓪

J1C016E
NO. 1 ESS SCC
CONSOLE

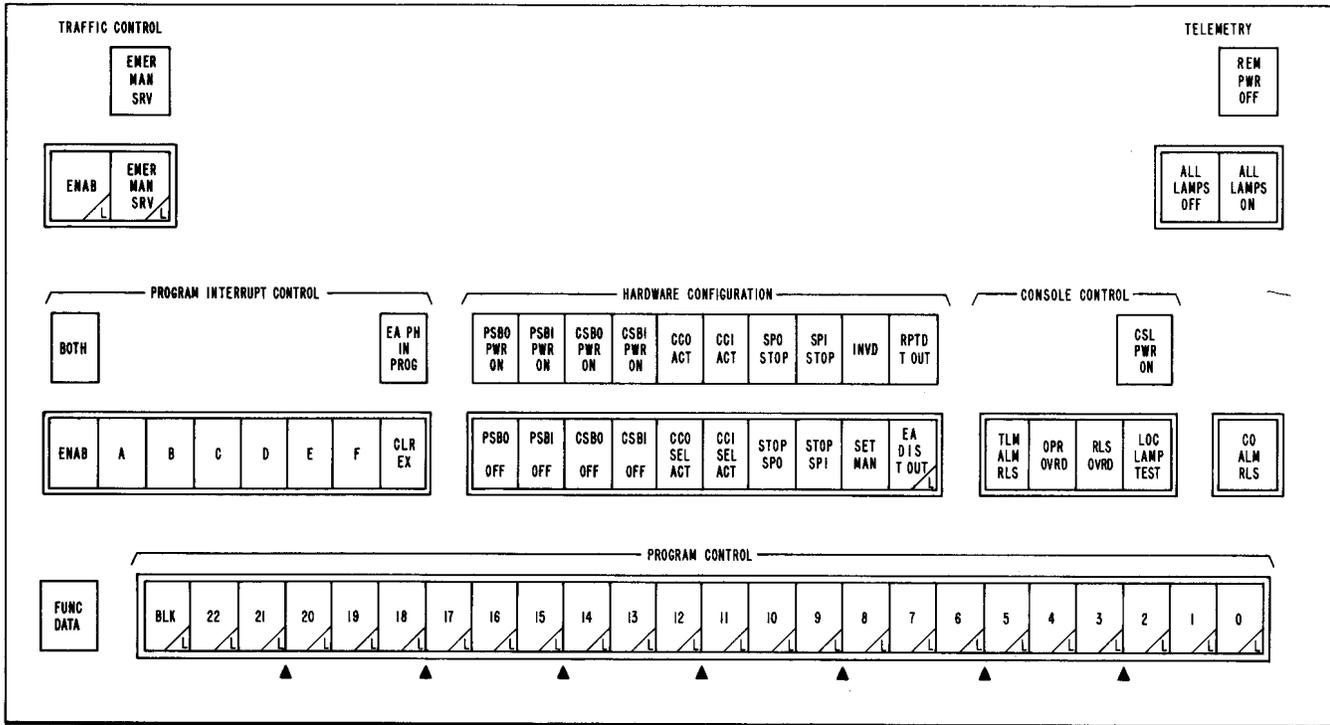**Fig. 13—No. 1 ESS SCC Console Display Panel**

Fig. 14—No. 1 ESS SCC Console Keyshelf

4.09 Console keys may be locking or nonlocking as indicated in Fig. 14 and explained in the following paragraphs.

4.10 For locking keys, an extinguished key will light when the key is pressed and remain lighted after the operator's finger is removed from the key. An operate command is sent and the key remains in an operated condition. A lighted locking key will extinguish when the key is pressed and remain extinguished when the operator's finger is removed from the key. A release command is sent and the key remains in a released condition.

4.11 For simple operaton of nonlocking keys, pressing an extinguished key sends an operate command and lights the key, while removing the finger from the key sends a release command and extinguishes the key. The CLR EX and SET

MAN keys are simple nonlocking keys. Other nonlocking keys vary as follows:

(a) Some nonlocking keys may not light when pressed because they are interlocked to prevent occurrences such as removing power from both buses, making both CCs active, or stopping both SPs.

(b) Some nonlocking keys may remain lighted after momentary depression because of signals from the MCC interface circuit. Such keys may be extinguished (released) by momentary depression of the same or another key, or by action of a timeout circuit.

4.12 Examples of variations are given in the following paragraphs.

4.13 *PIC Nonlocking Keys:* Normal use of the program interrupt control (PIC) keys

involves momentarily depressing three keys in this sequence: the ENAB key, an A, B, C, D, E, or F key, and the CLR EX key. The ENAB key extinguishes in 45 seconds or if momentarily depressed a second time. An A, B, C, D, E, or F key will extinguish when CLR EX is operated or, if CLR EX is not operated, will time out in 45 seconds. An A, B, C, D, E, or F key will be released if subsequently the ENAB key is released or a different A, B, C, D, E, or F key is operated. Operating an A, B, C, D, E, or F key renews the 45-second timeout interval for the ENAB key.

4.14   Hardware Configuration Nonlocking Keys: The following paragra₁ s describe use of the hardware configuration nonlocking keys. Normal use involves momentarily depressing either a PSB OFF, a CSB OFF, a CC SEL ACT, or a STOP SP key, followed by operation of the SET MAN key. The SET MAN key is a simple nonlocking key that lights when pressed and extinguishes when the finger is removed. The remaining keys are complicated by being affected by telemetry circuits and by being interlocked in pairs to prevent operation of both keys in a pair at the same time. Paired keys are PSB0 OFF and PSB1 OFF, CSB0 OFF and CSB1 OFF, CC0 SEL ACT and CC1 SEL ACT, and STOP SP0 and STOP SP1. An operated paired key will extinguish automatically after 45 seconds if the SET MAN is not pressed.

4.15   PSB and CSB Nonlocking Keys: Assume that both PS buses are powered, PSB0 and 1 PWR ON lamps are lighted, and PSB0 and 1 OFF keys are extinguished. To remove power from PSB 0, first operate PSB0 OFF, which lights when pressed. Next, momentarily depress SET MAN within 45 seconds or the PSB0 OFF key will time out. The PSB0 PWR ON lamp will extinguish to indicate power removed and the PSB0 OFF key will remain lighted to show status. While the PSB0 OFF key is lighted, momentarily depressing the PSB1 OFF key has no effect because of interlocking which prevents removing power from both buses. To remove power from PSB 1, power must first be restored to PSB 0 by momentarily depressing (releasing) the PSB0 OFF key, which will extinguish. The system will restore power to PSB 0 within a few minutes and light the PSB0 PWR ON LAMP. The system now is in the original condition. Power can now be removed from PSB1 by using the PSB1 OFF key in the same manner as described above for the PSB0 OFF key. The

CSB keys and lamps work in the same manner as the PSB keys and lamps.

4.16   CC Select Active Keys: Assume that both CCs are operating and CC 1 is active without being forced by a manual key. The CC1 ACT lamp is lighted and the CC0 ACT lamp, CC0 SEL ACT key, and CC1 SEL ACT key are extinguished. To make CC 0 active, operate the CC0 SEL ACT key, which lights when pressed. Next, momentarily depress the SET MAN key within 45 seconds or the CC0 SEL ACT key will time out. The system will switch CCs, extinguish the CC1 ACT lamp, and light the CC0 ACT lamp to indicate that CC 0 is active. The CC0 SEL ACT key will remain lighted to show that the system configuration is forced. In the forced condition, momentarily depressing the CC1 SEL ACT key has no effect because of interlocking which prevents both CCs from being active. To make CC 1 active, the forced condition must be removed by momentarily depressing the CC0 SEL ACT key. The CC0 SEL ACT key will extinguish to show that the system is not forced, but the CC0 ACT lamp will remain lighted to show that CC 0 is still active. CC 1 can be made active by using the CC1 SEL ACT key in the same manner as described for CC 0. The switching of CCs causes maintenance interrupt messages to occur.

4.17   Stop SP Keys: Assume that both SPs are operating and that both SP keys and lamps are extinguished. To stop SP 0, operate STOP SP0, which lights when pressed. Next, momentarily depress the SET MAN key within 45 seconds or STOP SP0 will time out. The SP0 STOP lamp will light to show that SP 0 is stopped, and the STOP SP0 key will remain lighted to show that the condition is forced. In the forced condition, momentarily depressing the STOP SP1 key has no effect because of interlocking which prevents stopping both SPs. To stop SP 1, the forced condition must be removed by momentarily depressing the STOP SP0 key, which will extinguish. The SP0 STOP lamp may extinguish or remain lighted for several minutes until the system starts SP 0. In either case, whether the SP0 STOP lamp is lighted or extinguished, SP 1 now can be stopped by using the STOP SP1 key in the same manner as described above for SP0. SP 0 will start if SP 1 is stopped.

4.18   Operating and diagnostic test procedures for the No. 1 ESS SCC console are included

in Section 190-113-310.   The MCC control and display panel is explained in Section 231-125-301. All of the lamps and keys on the No. 1 ESS SCC console display panel and keyshelf are listed and explained below.

Note: Power for the No. 1 ESS SCC console is controlled by an on-off switch on the left side of the console.

LAMP DESIGNATION	INDICATION
A. Display Panel	
CRITICAL alarm lamp (red)	This red lamp, accompanied by an audible critical alarm, is lighted to alert No. 2 SCCS personnel to a critical service-affecting condition. An accompanying TTY output message should appear to identify the problem and to indicate the action to be taken.
MAJOR alarm lamp (red)	This red lamp, accompanied by an audible major alarm, is lighted to alert No. 2 SCCS personnel to a severe malfunction requiring immediate attention. In most instances, some responsive action will be necessary. An accompanying TTY output message should appear to identify the problem and to indicate the action to be taken.
MINOR alarm lamp (amber)	This amber light, when lighted, indicates a trouble of less severe consequence. The lighting of this lamp is accompanied by an audible minor alarm.
System Alarms	
Telemetry CENT lamp (red)	The E2A telemetry central in the console has failed.
Telemetry REM lamp (red)	The E2A telemetry remote in No. 1 ESS MCC frame has failed or there has been a facility failure.
Telemetry COM lamp (red)	An attempt was made to send a command by depressing a key on the No. 1 ESS SCC console keyboard. This command was not received correctly by the E2A telemetry circuit in the No. 1 ESS MCC frame.
TTY LOC lamp (red)	This lamp is lighted when the local maintenance TTY channel is out of service.
TTY REM lamp (red)	This lamp is lighted when the remote maintenance TTY channel is out of service.

LAMP DESIGNATION	INDICATION
4A TMR PWR ALM lamp (red)	The 4A timer has failed because of either a power failure or an open circuit to the input of the timer.
MCC PWR ALM lamp (red)	A fuse has blown on the alarm, display, and control panel or power has been removed manually.
DT DEL ALM lamp (red)	A dial tone delay has been detected by the dial tone delay alarm circuit and its audible alarm is sounding in the central office.
COML PWR lamp (red)	A commercial power failure has occurred and the office is running on auxiliary power.
MISCELLANEOUS A through F lamps (red)	These lamps are operating company engineered and are intended to provide remote indication of any important office alarm or groups of alarms.

System Status

RPTD T OUT (repeated time-out) lamp (red)	The system has tried all configurations possible with its automatic emergency action facility without finding a working configuration. It may be necessary for the SCC to manually select different equipment configurations in an attempt to restore the system. (Refer to Section 190-113-311.)
MULT TBL (Multiple Trouble) lamp (red)	More than one serious trouble exists in the system concurrently. The following three conditions cause the lamp to light:

(a) A trouble exists in both central controls.

(b) A condition arises in which the network and signal distributor frames must use a peripheral bus or central pulse distributor which has been marked in trouble.

(c) An essential part of the peripheral unit system (such as duplicate central pulse distributors or both peripheral unit buses) is in trouble.

TRK MB OVFL lamp (red)	A data-validation protected-service circuit group has overflowed in the last 15 minutes and has more circuits out of service than the automatic maintenance limit allows.

LAMP DESIGNATION	INDICATION
	Data-validation protected-service circuit groups are office trunk groups that contain service circuits (transmitters, receivers, ringing circuits) rather than interoffice trunks.
EA PH IN PROG lamp (red)	A data validation has been automatically initiated or an emergency action phase of reinitialization has been initiated automatically or manually.
EMER MAN SRV lamp (red)	Lights when the emergency manual line service is in effect.
OG LOAD CONT lamp (red)	Network management control is active on one or more outgoing trunk groups.
INC LOAD CONT lamp (red)	The office is sending a dynamic overload control signal to one or more connected offices.
MISC TBL lamp (amber)	A trouble has developed within the automatic message accounting equipment, or an AIOD receiver is out of service. An audible major alarm is initiated and can be retired by operating ALM RLS key.
DISJN lamp (amber)	The central controls are in the disjoin mode of error detection (ie, not in matching mode). Each central control performs an error correction or a reread on the basis of its own error detection circuits only.
DIAGS IN PROG lamp (white)	The system has started an automatic diagnosis of some unit that is in trouble. The diagnostic program is attempting to locate the trouble within the unit.
OFF NOR lamp (white)	Some control key or switch on the alarm, display, and control panel has been operated to an off normal position.
CO ALM INH lamp (white)	Audible alarms in the CO are inhibited, and alarm lamps in the CO persist only until the SCC equipment recognizes and reports the alarm condition.

Peripheral Status

| LINE SWITCH-P lamp (red) | Both line scanner or network controllers of a line switch frame are in trouble or maintenance has been removed (fault recognition program |

LAMP DESIGNATION	INDICATION
	inhibited) either automatically by the system (because both network controllers of a frame are in trouble) or manually via a TTY message.
LINE SWITCH-S lamp (amber)	One or more line switch frames have one line scanner or network controller (of a duplicate set of controllers) out of service or a minor malfunction has occurred. When one network controller of a given pair is out of service, the frame can only process one order per network cycle instead of two orders.
JUNCTOR SWITCH-P lamp (red)	Both network controllers of a line or trunk junctor switch frame are in trouble, or maintenance has been removed (fault recognition program inhibited) either automatically or manually. If it has been removed automatically, a major alarm is sounded.
JUNCTOR SWITCH-S lamp (amber)	One or more line or trunk junctor switch frames have one controller out of service, or a minor malfunction has occurred; when one controller of a given pair is out of service, the frame can only process one order per network cycle instead of two orders.
SLN & TRK SW-P lamp (red)	Both network controllers of a service link or trunk switch frame are in trouble, or maintenance has been removed either automatically by the system or manually via a TTY message. If it was removed automatically, a major alarm is sounded.
SLN & TRK SW-S lamp (amber)	One or more service link network (SLN) frames or trunk switch frames have one network controller out of service or a minor malfunction has occurred. When one controller of a given pair is out of service, the frame can only process one order per network cycle.
JUNCTOR-P lamp (red)	Both scanner or signal distributor controllers of a junctor frame are in trouble, or maintenance has been removed automatically by the system or manually via a TTY message. If it has been removed automatically, a major alarm is sounded.
JUNCTOR-S lamp (amber)	One or more junctor frames have one controller out of service, or a minor malfunction has occurred. When one controller in a frame is out of service, the frame can only process one order per network cycle.

LAMP DESIGNATION	INDICATION
TRUNKS-P lamp (red)	Both signal distributor controllers in a supplementary signal distributor frame are in trouble or have been removed either automatically by the system or manually via a TTY message. If it has been removed automatically, a major alarm is sounded.
TRUNKS-S lamp (amber)	One or more supplementary signal distributor frames or universal trunk signal distributor frames have one signal distributor controller out of service, or one or more universal trunk frames have one scanner controller out of service. When one controller of a given pair is out of service, the frame can process only one order per network cycle instead of two orders (one per controller) per network cycle.
MASTER SCAN-P lamp (red)	One or more master scanner frames have both controllers in trouble.
MASTER SCAN-S lamp (amber)	One or more master scanner frames have one controller out of service or a minor malfunction has occurred.
CPD-P lamp (red)	One or more pairs of central pulse distributors are in trouble.
CPD-S lamp (amber)	One of a pair of central pulse distributors is out of service or a minor malfunction has occurred.
RING & TONE-P lamp (red)	Troubles have developed in both of the duplicated ringing and tone supply circuits.
RING & TONE-S lamp (amber)	Troubles have developed in one of the duplicated ringing and tone supply circuits. Service is not being adversely affected.

Processor Status

(a) CC Bus Power

PS BUS 0 lamp (white)	Power is applied to bus cable pulsers in central control 0 or 1 for program store bus 0.
PS BUS 1 lamp (white)	Power is applied to bus cable pulsers in central control 0 or 1 for program store bus 1.
CS BUS 0 lamp (white)	Power is applied to the bus cable pulsers in central control 0 or 1 for call store bus 0.

LAMP DESIGNATION	INDICATION
CS BUS 1 lamp (white)	Power is applied to the bus cable pulsers in central control 0 or 1 for call store bus 1.
(b) Central Control 0	
STOP lamp (red)	Central control 0 has been stopped.
CLK lamp (red)	Central control 0 has a major trouble in its clock circuit or a pulse missing in its timing chain.
TBL lamp (red)	Central control 0 is out of service.
OFF LINE lamp (white)	Central control 0 is in the off-line mode.
	Note: When a central control is in the off-line mode, it is functioning completely independent of the active central control. At the same time, the active CC program stores and call stores are inaccessible to the off-line central control. For off-line operation, see Section 231-117-301.
ACT lamp (white)	Central control 0 is the active unit.
PWR lamp (white)	Power is on central control 0.
PS BUS 0 SEND lamp (white)	Central control 0 is using program store bus 0 to send information to the program stores.
PS BUS 0 RCV lamp (white)	Central control 0 is using program store bus 0 to receive information from the program stores.
PS BUS 1 SEND lamp (white)	Central control 0 is using program store bus 1 to send information to the program store.
PS BUS 1 RCV lamp (white)	Central control 0 is using program store bus 1 to receive information from the program stores.
CS BUS 0 SEND lamp (white)	Central control 0 is using call store bus 0 to send information to call stores and, if provided, to signal processors.
CS BUS 0 RCV lamp (white)	Central control 0 is using call store bus 0 to receive information from call stores and, if provided, from signal processors.

LAMP DESIGNATION	INDICATION
CS BUS 1 SEND lamp (white)	Central control 0 is using call store bus 1 to send information to call stores and, if provided, to signal processors.
CS BUS 1 RCV lamp (white)	Central control 0 is using call store bus 1 to receive information from call stores and, if provided, from signal processors.

(c) Central Control 1

STOP lamp (red)	Central control 1 has been stopped.
CLK lamp (red)	Central control 1 has a major trouble in its clock circuit or a pulse missing in its timing chain.
TBL lamp (red)	Central control 1 is out of service.
OFF LINE lamp (white)	Central control 1 is in the off-line mode.
	Note: When a central control is in the off-line mode, it is functioning completely independent of the active central control. At the same time, the active CC program stores and call stores are inaccessible to the off-line central control. For off-line operation, see Section 231-117-301.
ACT lamp (white)	Central control 1 is the active unit.
PWR lamp (white)	Power is on central control 1.
PS BUS 0 SEND lamp (white)	Central control 1 is using program store bus 0 to send information to the program stores.
PS BUS 0 RCV lamp (white)	Central control 1 is using program store bus 0 to receive information from the program stores.
PS BUS 1 SEND lamp (white)	Central control 1 is using program store bus 1 to send information to the program stores.
PS BUS 1 RCV lamp (white)	Central control 1 is using program store bus 1 to receive information from the program stores.
CS BUS 0 SEND lamp (white)	Central control 1 is using call store bus 0 to send information to call stores and, if provided, to signal processors.

LAMP DESIGNATION	INDICATION
CS BUS 0 RCV lamp (white)	Central control 1 is using call store bus 0 to receive information from call stores and, if provided, from signal processors.
CS BUS 1 SEND lamp (white)	Central control 1 is using call store bus 1 to send information to call stores and, if provided, to signal processors.
CS BUS 1 RCV lamp (white)	Central control 1 is using call store bus 1 to receive information from call stores and, if provided, from signal processors.

(d) Signal Processor 0

TBL lamp (red)	Signal processor 0 is in trouble.
STOP lamp (red)	Signal processor 0 has been stopped manually.
ACT lamp (white)	Signal processor 0 is the active unit.
PWR lamp (white)	Power is on signal processor 0.

(e) Signal Processor 1

TBL lamp (red)	Signal processor 1 is in trouble.
STOP lamp (red)	Signal processor 1 has been stopped manually.
ACT lamp (white)	Signal processor 1 is the active unit.
PWR lamp (white)	Power is on signal processor 1.

(f) Program Stores Marked in Trouble

0 through 11 lamps (red)	The program store associated with a lighted lamp is out of service.

(g) Call Stores

CC-P lamp (red)	Both copies of a duplicated information block in CC call store memory are no longer available.
CC-S lamp (amber)	One copy of a duplicated information block in CC call store memory is no longer available.

LAMP DESIGNATION	INDICATION

SP-P lamp (red)

Both copies of a duplicated information block in SP call store memory are no longer available.

SP-S lamp (amber)

One copy of a duplicated information block in SP call store memory is no longer available.

System Indicators

(a) E-E Rate KC/15 MIN

.47 through 30 lamps (white)

An E-to-E lamp displays the average number of entire base level cycles (E-to-E) that would be completed in 15 minutes at the current rate. Each lamp represents a value between the adjacent numbers. The leftmost lamp indicates a rate of 0 to 0.47 kilocycles per 15 minutes. The rightmost lamp indicates a rate greater than 30 kilocycles per 15 minutes. The display is updated every 2 seconds. The E-to-E rate is an indication of system load.

(b) The four following indicators are called traffic control indicators on the MCC but are not labeled on the No. 1 ESS SCC console. They are not system indicators but were placed on the console with system indicators because no other space was available.

LLC ENAB lamp (white)

Line load control is in effect.

RCVR OVLD lamp (white)

The system has automatically recognized an overflow condition in a receiver queue.

CC OVLD lamp (white)

The system central control main program exceeds a predetermined time required to cycle through all classes of base level, work.

DT DEL lamp (white)

A dial tone speed test fails or the line load control program is denying originating service to one or more groups of nonessential lines.

(c) L SRV REQ HPR UNLD RT

Note: The rate at which the line service request hopper is unloaded varies in 16 steps from a nonzero minimum to a maximum. Three lamps indicate the current rate. The MIN lamp lights when the unloading rate is at the nonzero minimum value, and the MAX

LAMP DESIGNATION   **INDICATION**

lamp lights when the rate is at the maximum value. The MID lamp indicates an unloading rate between the minimum and maximum. The minimum unloading rate represents a heavy traffic condition, and a maximum unloading rate represents a low traffic condition.

The unloading rate varies with E-to-E time. If the E-to-E cycle time is less than 1.0 second, the unloading rate is increased one step every 5 seconds until the maximum rate is reached.

If the E-to-E cycle time is between 1.0 and 1.8 seconds (900 to 500 cycles in 15 minutes), the unloading rate decreases one step every 3 seconds until the minimum rate is reached. Average E-to-E times between 1.0 and 1.8 seconds, which cause a less-than-maximum unloading rate, define minor CC overload.

If average E-to-E time exceeds 1.8 seconds, the system enters major CC overload. During major CC overload, hopper unloading is suspended (ie, unloading rate is zero), and the MIN, MID, and MAX lamps are extinguished. After a corrective action, such as a phase, the unloading rate returns to some middle value.

MIN lamp (white)   The rate at which the line service request hopper is unloaded is at its minimum nonzero value (high traffic condition).

MID lamp (white)   The rate at which the line service request hopper is unloaded falls between its maximum and minimum value.

MAX lamp (white)   The rate at which the line service request hopper is unloaded is at its maximum value (low traffic condition).

(d) JOBS OMITTED DUE TO OVLD

Note: When the No. 1 ESS is overloaded, the RVFY, FCG, and BLK RTY jobs may be omitted to save time.

RVFY lamp (white)   The restore verify test (RST VFY), which is normally made after each call is terminated, is omitted during a heavy load state.

LAMP DESIGNATION	INDICATION
FCG lamp (white)	The false cross and ground tests (FCG) are inhibited when the system is in the heavy load state.
BLK RTY lamp (white)	Blocked retrials (BLK RTY) for trunk hunts are omitted when the system is in a major CC overload state. In normal operation, if the system encounters a trunk group with no idle trunks during a trunk hunt, it will block the call and hunt for a trunk in another group. The second hunt is called a blocked retry.

(e) QUEUES ACTIVE (TRANSMITTERS)

Note: The MIRV data validation routine checks the integrity of the multifrequency, trunk dial pulse, and revertive pulse transmitter service circuits once every 60 seconds. If all of one type of service circuits are busy , the corresponding lamp will light.

MF lamp (white)	All of the multifrequency (MF) service circuits are indicated busy at the time the integrity of the circuit is checked.
DP lamp (white)	All the trunk dial pulse (TDP) service circuits are indicated busy at the time that the integrity of the circuit is checked.
RP lamp (white)	All the revertive pulse (RP) service circuits are indicated busy at the time that the integrity of the circuit is checked.

(f) QUEUES ACTIVE (REGISTERS)

Note: The MIRV data validation routine checks the integrity of the originating, ringing, AMA, and disconnect registers once every 60 seconds If no registers of one type are idle, or if the queue bit is set for a type of register, the corresponding lamp will light.

ORIG lamp (white)	None of the originating registers are idle at the time that the integrity of the register is checked.
RING lamp (white)	None of the RING registers are idle at the time that the integrity of the register is checked.

LAMP DESIGNATION	INDICATION
DISC lamp (white)	None of the disconnect registers are idle at the time that the integrity of the register is checked.
AMA lamp (white)	None of the AMA registers are idle at the time the integrity of the register is checked.

(g) QUEUES ACTIVE (RECEIVERS)

Note: The queue activity bits for the customer TOUCH-TONE®, customer dial pulse, multifrequency, revertive pulse, and trunk dial pulse are checked every 2 seconds. If any of these queues are found active, the corresponding lamp will light.

CTT lamp (white)	The queue activity bits for the customer TOUCH-TONE receiver are found active. The lamp will remain lighted for 15 seconds.
CDP lamp (white)	The queue activity bits for the customer dial pulse (CDP) receiver are found active. This lamp will remain lighted for 15 seconds.
MF lamp (white)	The queue activity bits for the multifrequency (MF) receiver are found active. This lamp will remain lighted for 15 seconds.
RP lamp (white)	The queue activity bits for the revertive receiver are found active. This lamp will remain lighted for 15 seconds.
TDP lamp (white)	The queue activity bits for the trunk dial pulse receiver are found active. This lamp will remain lighted for 15 seconds.

Program Display

PROGRAM DISPLAY lamps 0 through 23	These 24 PROGRAM DISPLAY lamps (0 through 23) provide a means of displaying data registered in the system.

B. Keyshelf

Keys

(a) Program Control

LAMP DESIGNATION	INDICATION
Program Control 0 through 22 keys (white)	Program control keys control the state of flip-flops associated with central control buffer bus register 17. The program control keys are designated 0 through 22 and correspond directly to bit positions in central control buffer bus register 17. Some programs read these flip-flops before carrying out a function; consequently, the keys can provide control for various system program actions. The functions of program control keys are listed in Section 231-125-301.
BLK key (green)	BLK key represents bit position 23 in central control buffer bus register 17.

(b) Program Interrupt Control (PIC)

Note: See paragraph 4.13 for typical operation of PIC keys.

ENAB key (amber)	This key allows activation of the control and request keys for the program interrupt control system. Normal operation of program interrupt control keys on the SCC console requires that the ENAB key be operated first, and that one of the PROGRAM INTERRUPT CONTROL A through F keys and the CLR EX key be operated within 45 to 60 seconds; otherwise, a timer in the CO times out and releases the relay associated with the ENAB key. The purpose of the timing out is to prevent the switching system from being enabled for an EA phase or any other interrupt request from the console because the program interrupt enable key was not released.
A through F keys (white)	Each key requests the system to produce various software reactions with A interrupt activity level. (See Section 231-125-301.)
CLR EX key (white)	Releases any active sequencing circuit which may be erroneously locked in the central control and executes the requested interrupt.

(c) Hardware Configuration

Note: See paragraph 4.14 for typical operation of hardware configuration keys.

LAMP DESIGNATION	INDICATION
PSB0 OFF key (red)	This key, when operated in conjunction with the set manual key, removes power from PS bus 0.
PSB1 OFF key (red)	This key, when operated in conjunction with the set manual key, removes power from PS bus 1. It is interlocked with PSB0 OFF so that both keys cannot be in an operated condition at the same time.
CSB0 OFF key (red)	This key, when operated in conjunction with the set manual key, removes power from CS bus 0.
CSB1 OFF key (red)	This key, when operated in conjunction with the set manual key, removes power from CS bus 1. It is interlocked with CSB0 OFF so that both keys cannot be in an operated condition at the same time.
CC0 SEL ACT key (green)	This key, when operated in conjunction with the set manual key, overrides the system selection of the active central control and forces central control 0 to be the active central control.
CC1 SEL ACT key (green)	This key, when operated in conjunction with the set manual key, overrides the system selection of the active central control and forces central control 1 to be the active central control. It is interlocked with CC1 SEL ACT so that both keys cannot be in an operated condition at the same time.
STOP SP0 key (red)	This key, when operated in conjunction with the set manual key, removes power from SP 0.
STOP SP1 key (red)	This key, when operated in conjunction with the set manual key, removes power from SP1. It is interlocked with STOP SP0 so that both keys cannot be in an operated condition at the same time.
SET MAN key (white)	This key, when depressed, causes a level A interrupt and makes the override selection effective.
EA DIS T OUT key (amber)	This key inhibits the automatic emergency action circuitry in both central controls.

LAMP DESIGNATION	INDICATION
	Note: If emergency action circuits are unable to find a working equipment configuration, as indicated by the RPTD T OUT lamp being lighted, it may be necessary for maintenance personnel to restore the system by manually selecting a configuration. Before manual control can be exerted, the emergency action circuits must be inhibited. The EA DIS T OUT key is a locking key that inhibits emergency action circuits while it is in the operated (lighted) condition.

(d) Console Control

TLM ALM RLS key (white)	This key provides a ground to the E2A telemetry console circuit and clears the memory associated with the CENT, REM and COM lamps on the display panel.
OPR OVRD key (white)	Holding this key depressed while depressing another key forces a relay operate command to be sent to the E2A remote in the MCC frame regardless of the current state of the relay.
RLS OVRD key (white)	Holding this key depressed while depressing another key forces a relay release command to be sent to the E2A remote in the MCC frame regardless of the current state of the relay.
LOC LAMP TEST key (white)	This key, when depressed, tests the lamps in the display console.

(e) (No heading)

CO ALM RLS key (white)	This key, when depressed, retires the office alarms in the central office.

(f) Telemetry

ALL LAMPS ON key (white)	Depressing this key causes the console E2A telemetry circuit to send a command to the E2A telemetry remote circuit in the MCC frame making all scan points busy. Returned data causes all console lamps to light until this key is released.

LAMP DESIGNATION	INDICATION
ALL LAMPS OFF key (white)	Depressing this key causes the E2A telemetry circuit to send a command to the E2A telemetry remote circuit in the MCC frame making all scan points idle. Returned data causes all console lamps to extinguish until this key is released.

(g) Traffic Control

ENAB key (amber)	This key enables other traffic control keys permitting them to be effective.
EMER MAN SRV key (green)	This key initiates emergency manual line service (if provided in the SPCS).

Lamps

(a) Traffic Control

EMER MAN SRV lamp (red)	This lamp lights when the emergency manual line service is in effect. This lamp also appears on the SCC console display panel.

(b) Telemetry

REM PWR OFF lamp (red)	The power to relays which control the E2A remote has been removed.

(c) Program Interrupt Control

BOTH lamp (green)	This lamp lights when both central controls are to be interrupted by a chosen interrupt key.
EA PH IN PROG lamp (red)	A data validation has been automatically initiated or an emergency action phase of reinitialization has been initiated.

(d) Hardware Configuration

PSB0 PWR ON lamp (white)	This lamp remains lighted while power is on program store bus 0.

LAMP DESIGNATION	INDICATION
PSB1 PWR ON lamp (white)	This lamp remains lighted while power is on program store bus 1.
CSB0 PWR ON lamp (white)	This lamp remains lighted while power is on call store bus 0.
CSB1 PWR ON lamp (white)	This lamp remains lighted while power is on call store bus 1.
CC0 ACT lamp (white)	This lamp lights when central control 0 is the active CC.
CC1 ACT lamp (white)	This lamp lights when central control 1 is the active CC.
SP0 STOP lamp (red)	This lamp lights when signal processor 0 has been stopped manually
SP1 STOP lamp (red)	This lamp lights when signal processor 1 has been stopped manually.
INVD lamp (red)	This lamp lights when an invalid program-store state-configuration selection has been made.
RPTD T OUT lamp (red)	The system has tried all configurations possible with its automatic emergency action facility without finding a working configuration.

(e) Console Control

CSL PWR ON lamp (white)	This lamp lights when the +5 volt and ±15 volt power supplies located in the console are providing the correct voltage outputs.

(f) (No heading)

FUNC DATA lamp (white)	This lamp lights, indicating that program control keys are being used to input data for display on the program display lamps.

5. OPERATING AND DIAGNOSTIC TEST PROCEDURES

5.01 Section 190-113-310 describes operating and diagnostic test procedures used by No. 2 SCCS to remotely control No. 1 ESS offices. The tests have a dual purpose of determining if the master control center (MCC) in the central office can control the No. 1 ESS and if the CC1A can remotely control the MCC. Section 190-113-340 gives procedures for

(a) Inhibiting, restoring, and retiring audible alarms in a No. 1 ESS office

(b) Performing diagnostic tests at a CC1A to remotely control a No. 1 ESS

(c) Releasing power to relays that control commands from No. 2 SCCS in case of telemetry faults.

Note: If a No. 1 ESS SCC console is used, see Section 190-113-310 for operating and diagnostic test procedures.

6. NETWORK ANALYSIS AND TN08 MESSAGE ANALYSIS

6.01 The procedures used by the No. 2 SCCS to analyze No. 1 ESS line, trunk, and network troubles are described in Section 231-113-312. Selected messages that result from No. 1 ESS troubles are sent to the No. 2 SCCS for processing. Two methods of processing are used.

(a) In batch analysis, messages are accumulated during intervals of time. At scheduled times, analysis is automatically performed and summary reports of possible troubles are generated. It is also possible to perform analysis on demand by input messages. Generally, the batch analysis reports do not require immediate action of maintenance personnel but should be examined as an aid in reducing service degradation.

(b) In multiple message thresholding (MMT), selected messages are compared with a threshold as they are received at the No. 2 SCCS. If selected messages exceed the associated threshold, an SCC alarm is generated.

Section 231-113-312 discusses batch analysis.

Network Analysis

6.02 No. 1 ESS prints network trouble messages to identify the network paths that experience trouble. The messages, rather than specifying a faulty piece of equipment, specify an entire network path, including any lines and trunks. To identify the faulty piece of equipment, numerous messages must be searched to find a piece of equipment that appears repeatedly. No. 2 SCCS allows more efficient analysis by using computer programs to analyze the messages, report line and trunk troubles by LEN and TNN, and present network troubles

to SCC personnel in a pictorial format. Network analysis programs provide the following:

● Reports of external lines and trunks that have a number of messages that exceeds a predefined threshold

● Analysis and pictorial presentation of internal network crosspoints, switches, and links that are common to a number of failing paths exceeding a threshold

● Pictorial analysis of network messages gathered in SCCS user files

● Analysis of failing network or signal distributor orders (NN10 message summary).

TN08 Message Analysis

6.03 TN08 messages print on the No. 1 ESS maintenance TTY when an outgoing call has timed out because the machine cannot complete outpulsing a called number to a remote office or when an incoming call has failed for reasons other than network blockage. The No. 2 SCCS can assemble TN08 messages and output a report of suspected trunk troubles. The user may use the report to locate the fault in the trunk or service circuit in the No. 1 ESS machine or in the remote switching machine.

7. EMERGENCY ACTION

7.01 A No. 1 ESS experiencing severe system faults and requiring emergency action can be controlled by manual emergency action procedures from a remote No. 2 SCCS. The No. 2 SCCS has a No. 1 ESS SCC console and a cathode ray tube (CRT) and associated keyboard for performing the procedures. The console is effectively a remote, partial MCC alarm display and control panel. The CRT and keyboard are effectively a remote TTY. Emergency action procedures are in Section 190-113-311 and Section 190-113-341.

8. HOURLY SUMMARY

8.01 Each hour a group of ESS output messages, generally known as the hourly routine, is generated. These messages give status information, report various peg counts, and indicate abnormal conditions that are in the system or that have occurred in the previous hour. The computer

subsystem has the capability of sorting and inspecting these messages. Any significant abnormal conditions that exist, or did exist, in the system will be noted in an hourly exception summary report. The analysis program looks at the hourly summary messages to (1) emphasize important system conditions and to reduce the amount of output by printing only off-normal messages, (2) make the output more readable by breaking down, translating, and using English words and abbreviations to save time and eliminate translation errors, and (3) reduce the time required to print out and analyze data.

9. CONVERSIONS, MESSAGE EXPANSION AND PATTERNS—NO.1 ESS

9.01 Conversions, message expansions, and patterns are covered in Section 190-110-110 and in the No. 1 ESS application program application (PA) instruction.

10. SPARE AND ADJACENT MEMORY

10.01 In response to a No. 1 ESS VFY-SPACE command, TR13 output messages give translation information on the link list of available program store space. The information may appear in two forms depending on the input request. Either the addresses and block lengths are given, or the number of blocks of a specified length is given.

10.02 The No. 2 SCCS SORTADD program can filter all TR13 messages that have been generated by the VFY-SPACE command during a requested time period for a selected central office. The messages are processed to generate a report listing duplicated or adjacent blocks of spare memory on the No. 1 ESS linked list of available space. The list can be cleaned up to reclaim larger blocks of spare memory by No. 1 ESS input commands.

10.03 To initiate the SORTADD program, type the following message at the CRT keyboard:

ANAL:SORTADD <ofname>[.chl];PAT <time>!

<ofname> = Office name. Example DAY6I3

[chl] = TTY channel. If no channel is specified, the maintenance (MTC) channel is assumed.

<time> = Time period during which TR13 messages to be filtered occurred (eg, 0400,0800). If only a starting time is specified, data is filtered to the current time. Four examples of starting times are 1000, WED, "THU 1200", and "'090408'".

For example, the message

ANAL:SORTADD DAY6I3;PAT 1000!

examines messages from the 1000 hourmark to the current time. For details of time patterns, see the ANAL:SORTADD message in IM-1P131 or type

ANAL:SORTADD <ofname>;PAT "+"!

and the program will prompt for a pattern.

10.04 Fig. 15 is an example of a response and output for the SORTADD program.

11. ALARMING

12.01 No. 1 ESS output messages are scanned by the No. 2 SCCS alerter program for both trouble conditions and potential trouble conditions. For some messages, a single occurrence will generate an alarm showing a trouble condition. Other messages generate an alarm if they recur frequently enough within a time period to reach a threshold value. Alarm messages are displayed at the SCC on an alarm video monitor. For a list of No. 1 ESS messages that generate SCC alarms, see the applicable PA.

12. OPERATION WITHOUT A MINICOMPUTER (NO. 1 SCCS)

12.01 An inoperative minicomputer will disable the No. 2 SCCS alarm monitor and the CRT and keyboard. Without the minicomputer, the No. 2 SCCS can function as a No. 1 SCCS using the CIP, telemetry audible alarms, CC1A or No. 1 ESS SCC console, and SCC TTYs. The CIP continues to monitor and display the real-time status for each CO. Audible alarms remain operable with telemetry inputs unless the major and minor alarms are intentionally inhibited by the AUD OFF 1-16 switches in the "A" cabinet. Inhibited alarms light

ADJACENT BLOCKS OF SPARE MEMORY ON THE LINKED LISTS
==

MEMORY ADDRESS	SIZE OCTAL	DECIMAL	
2114271	3	3	
2114274	3	3	
2115371	3	3	
2115374	3	3	
2116141	3	3	
2116144	3	3	
2120234	3	3	
2120237	4	4	
2123014	3	3	
2123017	4	4	
2123033	3	3	
2123036	5	5	
2200000	15677	7103	DUPLICATED ENTRY
2200000	15620	7056	DUPLICATED ENTRY

Fig. 15—Example of Response and Output for SORTADD Program

the AUD OFF indicator on the CIP. If an office needs attention, a No. 1 ESS SCC console can be connected to the office as in 3.04 and act as a remote, partial MCC alarm, display and control panel. A TTY can be connected to the cable junction box at the work station desk and perform the same functions as the maintenance TTYs in the CO. Procedures for configuring from a No. 2 SCCS to a No. 1 SCCS are in Section 190-110-310.

13. REFERENCES

(a) Section 190-110-110, No. 2 SCCS—Common Application—Description

(b) Section 190-113-310, No. 2 SCCS—No. 1 ESS Application—Operating and Diagnostic Test Procedures

(c) Section 190-113-311, No. 2 SCCS—No. 1 ESS Application—Emergency Action Procedures

(d) Section 190-113-312, No. 2 SCCS—No. 1 ESS Application—Analysis of Network Failures and TN08 Messages

(e) Section 190-113-313, No. 2 SCCS—No. 1 ESS Application—Sectionalization of Trunk Troubles

(f) Section 201-653-102, E2A Telemetry— SCC Description

(g) Section 231-117-301, Off-Line Operations

(h) Section 231-125-301, Master Control Center—Alarm, Display, and Control Panel—Method of Operation

(i) PA-1P131, No. 2 SCCS Common Application

(j) PA-1P195, No. 2 SCCS No. 1 ESS Application

14. ABBREVIATIONS

14.01 The following abbreviations are used in this section:

AIOD	Automatic Identifier Outward Dialing
AMA	Automatic Message Accounting
BLK RTY	Blocked Retrial
CAROT	Centralized Automatic Reporting On Trunks
CC	Central Control
CCIS	Common Channel Interoffice Signaling
CC1A	Control Console No. 1A
CDP	Customer Dial Pulse
CI	Critical Indicator
CIP	Critical Indicator Panel
CO	Central Office
COSJU	Central Office Selector and Junction Unit
COSU	Central Office Selector Unit
CPD	Central Pulse Distributor
CRT	Cathode-Ray Tube
CS	Call Store
DS	Data Set
EMC	Emergency Mode Control
ESS	Electronic Switching System
FA	Full Access
FCG	False Cross and Ground
FSK	Frequency Shift Keying
JNN	Junctor Network Number
LEN	Line Equipment Number
MCC	Master Control Center
MF	Multifrequency
MMT	Multiple Message Thresholding
MTL	Master Test Line
NTWK	Network
PCI	Processor Controlled Interrogator
PA	Program Application
PI	Peripheral Processor
PPI	Processor Peripheral Interface
PS	Program Store
RAI	Remote Access Interface
ROTL	Remote Office Test Line
RP	Revertive Pulse
RST VFY	Restore Verify
SCC	Switching Control Center
SCCS	Switching Control Center System
SLN	Service Link Network
SP	Signal Processor
SPCS	Signal Processor Call Store
TCT	Telemetry Computer Translator
TDP	Trunk Dial Pulse
TELCO	Telephone Company
TNN	Trunk Network Number
TTY	Teletypewriter
TUT	Trunk Under Test