CONTROL AND DISPLAY PROCEDURES
NO. 2B ELECTRONIC SWITCHING SYSTEM

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1. GENERAL

1.01 This section describes the significance of the visual indications provided at the 3A central control (3A CC) control panels and the system status panel (SSP) in the No. 2B Electronic Switching System (ESS). It also provides the procedures to be followed in the operation of the various keys and switches associated with the 3A CC control panels and SSP. The system emergency manual control portion of the SSP is not covered in this section. (The system emergency manual control is covered in Section 232-313-301).

1.02 This section is reissued to include the compare procedures from the 3A CC panel. Since this reissue is a general revision, no revision arrows have been used.

1.03 The control and display equipment includes the following:

(a) Lamp and light-emitting diode (LED) displays which show the status of the system, including alarm conditions, CU status, and certain peripheral equipment conditions.

(b) Keys and switches providing direct access to various registers for use during routine tests and a backup means of testing if programmed diagnostics fail.

(c) LEDs for displaying memory or scanner readings as aids for manual tests. The proper message, when entered on the maintenance TTY, causes certain memory words or scanner rows to be read and displayed on the display panels.

(d) Keys for controlling the 3A CC and SSP power.

1.04 The keys on the control and display equipment may be either momentary-action or alternate-action keys. The alternate-action key is depressed once to activate and depressed again to deactivate.

1.05 Major and minor trouble conditions in the system are indicated by LED displays accompanied by audible alarms. Lamps and LEDs of appropriate colors are used to indicate:

(a) which modes of operation certain units are in,

(b) trouble conditions, and

(c) certain selections that have been made by operating various keys and switches.

1.06 ***Red*** lamps and LEDs indicate a primary trouble. This signifies that a trouble of a major consequence exists and that immediate attention should be given to this condition.

1.07 ***Amber*** lamps and LEDs generally indicate a special condition or display.

1.08 ***Green*** lamps and LEDs are used to indicate the normal status of the equipment and to indicate whether requested tests have passed.

1.09 ***White*** lamps indicate an active condition or the selection of a particular key. When the key is operated (or activated), the lamp is lighted.

1.10 ***Lettered Steps:*** A letter a, b, c, etc, added to step numbers of this section indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step, or series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. PHYSICAL DESCRIPTION

3A CC CONTROL PANEL

2.01 The 3A CC is located in the upper midsection of each bay of the processor frame (Fig. 1). The position on the frame provides the operator convenient access to the keys and switches of the 3A CC control panel.

2.02 The lower right section (STATUS) of each 3A CC control panel (Fig. 2) provides for removing and restoring power to that 3A CC. The 3A CC must be in the MANUAL mode of operation to remove or restore power. The POWER key is an alternate-action key and depending on the power state, operation causes a sequential removal of power from the 3A CC or a sequential restoral of power to the 3A CC.

2.03 The STATUS section of each 3A CC control panel (Fig. 2) provides immediate indication of whether that 3A CC is active or not active. One of the 3A CCs should be active and the other one should not be active. At no time should both 3A CCs be active.

2.04 The 3A CC control panel is subdivided into the following sections:

- LOAD AND DISPLAY
- REGISTER SELECT
- REGISTER
- COMPARE
- MEMORY
- MODE
- COMMAND
- STATUS

SYSTEM STATUS PANEL

2.05 The system status panel is housed in the upper midsection of the maintenance frame (Fig. 3). The system status panel is hinged to the side brackets of the system status panel controller and a magnetic latch on the panel keeps it securely closed.

2.06 The upper left section of the SYSTEM STATUS AND CONTROL section of the system status panel (Fig. 4) provides for removing and restoring power in the system status panel and controller. Because of telemetry requirements, +24 Vdc power is not completely removed. The voltage is reduced to a level that will not light lamps and LEDs.

2.07 The upper center section of the SYSTEM STATUS AND CONTROL section of the system status panel (Fig. 4) provides immediate indication of the system status. The displays indicate alarm conditions and CU status, and denote which CU is active. Provisions are also made for locking either CU 0 or CU 1 in the active condition and controlling alarms.

2.08 The upper right section of the SYSTEM STATUS AND CONTROL section of the system status panel (Fig. 4) is used when a diagnostic test sequence is requested by a TTY input message to be run in either the "step" or "repeat" mode. The results of the test are indicated by lighting either the PASS and/or FAIL lamp. The EXECUTE key is depressed to step or repeat the diagnostic.

2.09 The lower section of the system status panel (Fig. 4) includes the following areas:

- Equipment Unit Status Display
- Display Buffer
- Load and display registers
- Store and display data
- Halt and step machine through program segments

3. LAMP, LED, KEY, AND SWITCH INDICATIONS AND FUNCTIONS

3A CC CONTROL PANEL

3.01 The 3A CC control panel (Fig. 2) provides maintenance personnel with a means to accomplish the following functions:

- Monitor status of 3A CC

A. LOAD AND DISPLAY Section

3.02 The LOAD AND DISPLAY section of the 3A CC control panel is made up of switches used to load registers and memory and LEDs used to display data. Table A describes the LOAD AND DISPLAY indications and functions.

TABLE A

LOAD AND DISPLAY INDICATIONS AND FUNCTIONS

LED OR SWITCH DESIGNATION	LED OR SWITCH COLOR	INDICATION OR FUNCTION
0-19, PH, PL (LEDs)	Green	Visual indication of the contents of the display buffer. The LEDs are divided into groups of three or four for easy conversion to either octal or hexadecimal.
0-19 (SWITCHES)	Blue and White	Manual input to the display buffer. Switches are divided into groups of three by blue and white colors for easy conversion to octal. Switches are also divided into groups of four for easy conversion to hexadecimal.
PH, PL (SWITCHES)	Gray	PH (parity high) and PL (parity low) are used only when the ENABLE MANUAL PAR switch is operated. Used as a manual input to the display buffer.
ENABLE MANUAL PAR (SWITCH)	Gray	Allows the manual setting of the parity switches (PH, PL). Unless the switch is operated, the 3A CC automatically generates parity for the input switches 0 through 19.
ENABLE MANUAL PAR (LED)	Green	Visual indication that parity is being generated manually.

B. REGISTER SELECT Section

3.03 The REGISTER SELECT section of the 3A CC control panel is made up of switches and LEDs. Five of the switches and eighteen of the LEDs are used to select both general or special registers depending on the position of the SPECIAL/GENERAL switch. The indications and functions of the REGISTER SELECT section are described in Table B.

TABLE B

REGISTER SELECT INDICATIONS AND FUNCTIONS

LED OR SWITCH DESIGNATION	LED OR SWITCH COLOR	INDICATION OR FUNCTION
1, 2, 4, 8 (SWITCHES)	White	Selects one of the 16 general or 16 special (addressable) registers depending upon the setting of the SPECIAL/GENERAL switch.
SPECIAL/GENERAL (SWITCH)	White	If the switch is in the SPECIAL position, one of the special registers will be selected. The special register selected depends on the position of the 1, 2, 4, 8 switches. If the switch is in the GENERAL position, one of the general or extended registers will be selected depending on the position of the 1, 2, 4, 8 switches.The register is considered a general register if processing common system program and a extended register if processing No. 2B program.
SPECIAL (LED)	Green	Indicates that a special register has been selected.
GENERAL (LED)	Green	Indicates that a general or extended register has been selected.

TABLE B (Contd)

REGISTER SELECT INDICATIONS AND FUNCTIONS

LED OR SWITCH DESIGNATION	LED COLOR	SWITCH POSITION				INDICATION OR FUNCTION		
						SPECIAL/GENERAL Switch Position		
		8	4	2	1	SPECIAL	GENERAL	
							COMMON SYSTEM PROGRAM	NO. 2B PROGRAM
MCTL STAT/0 (LED)	Green	down	down	down	down	MCTL STAT — microcontrol status register (read only)* has been selected.	General register 0 has been selected.	Not used.
TIM/1 (LED)	Green	down	down	down	up	TIM — timing counter (read only) has been selected.	General register 1 has been selected.	Not used.
SYS STAT/2/LW (LED)	Green	down	down	up	down	SYS STAT — system status register (read only) has been selected.	General register 2 has been selected.	LW — logic work register has been selected.
ST ADRS/3/LR (LED)	Green	down	down	up	up	ST ADRS — store address register has been selected.	General register 3 has been selected.	LR — logic register has been selected.
PROG ADRS/4/ LM (LED)	Green	down	up	down	down	PROG ADRS — program address register has been selected.	General register 4 has been selected.	LM — logic mask register has been selected.
MTCE STA/5/ LF/RF (LED)	Green	down	up	down	up	MTCE STA — maintenance state register has been selected.	General register 5 has been selected.	LF — logic function register (bits 4 thru 7) and RF — rotate find register (bits 0 thru 3) have been selected. Bits 8 thru 15 have no intelligence.

* The CF (duplicated bits 0 and 1) can be written.

TABLE B (Contd)

REGISTER SELECT INDICATIONS AND FUNCTIONS

LED OR SWITCH DESIGNATION	LED COLOR	SWITCH POSITION				INDICATION OR FUNCTION		
						SPECIAL/GENERAL Switch Position		
		8	4	2	1	SPECIAL	GENERAL	
							GENERAL	EXTENDED
							COMMON SYSTEM PROGRAM	NO. 2B PROGRAM
M.MEM STAT/6/ KM (LED)	Green	down	up	up	down	M.MEM STAT — main memory status register has been selected.	General register 6 has been selected.	KR — kall record counter (bits 8 thru 15) and MC — mode counter (bits 0 thru 7) have been selected.
MCH BUFR/7/ GR (LED)	Green	down	up	up	up	MCH BUFR — maintenance channel buffer has been selected.	General register 7 has been selected.	GR — general register has been selected.
INT SET/8/EA (LED)	Green	up	down	down	down	INT SET — interrupt set register has been selected.	General register 8 has been selected.	EA — enable address register has been selected.
INT MASK/9 (LED)	Green	up	down	down	up	INT MASK — interrupt mask register has been selected.	General register 9 has been selected.	Same as general register 9.
HOLD GET/10 (LED)	Green	up	down	up	down	HOLD GET — hold get register has been selected.	General register 10 has been selected.	Same as general register 10.
ERR/11 (LED)	Green	up	down	up	up	ERR — error register has been selected.	General register 11 has been selected.	Same as general register 11.
DATA MASK/ 12/PFM (LED)	Green	up	up	down	down	DATA MASK — data mask register has been selected.	General register 12 has been selected.	PFM — program fil middle (bits 5 thru 15) has been selected.

TABLE B (Contd)

REGISTER SELECT INDICATIONS AND FUNCTIONS

LED OR SWITCH DESIGNATION	LED COLOR	SWITCH POSITION				INDICATIONS OR FUNCTION		
						SPECIAL/GENERAL Switch Position		
		8	4	2	1	SPECIAL	GENERAL	
							GENERAL	EXTENDED
							COMMON SYSTEM PROGRAM	NO. 2B PROGRAM
DATA IN/13/ CA (LED)	Green	up	up	down	up	DATA IN — data input register has been selected.	General register 13 has been selected.	CA — call address register has been selected.
ADR MASK/ 14/DFH (LED)	Green	up	up	up	down	ADR MASK — address mask register has been selected.	General register 14 has been selected.	DFH — data fil high (bits 0 thru 3) has been selected.
ADR IN/15/ AA (LED)	Green	up	up	up	up	ADR IN — address input register has been selected.	General register 15 has been selected.	AA — addition address register has been selected.

C. REGISTER Section

3.04 Table C describes the switches in the REGISTER section of the 3A CC control panel. The LOAD and DISPLAY switches work in conjunction with the switches and LEDs in the LOAD AND DISPLAY and REGISTER SELECT sections to load and/or display any of the special or general registers.

TABLE C

REGISTER FUNCTIONS

SWITCH DESIGNATION	SWITCH COLOR	FUNCTION
LOAD (SWITCH)	White	Allows the contents of the LOAD AND DISPLAY switches via the display buffer to be loaded into the designated register selected by the REGISTER SELECT switches.
DISPLAY (SWITCH)	White	Allows the appearance on the LOAD AND DISPLAY LEDs of the contents of the designated register selected by the REGISTER SELECT switches.

D. COMPARE Section

3.05 The COMPARE section of the 3A CC control panel is made up of two switches and a LED described in Table D. The 3A CC has the capability of comparing both address and data. When a match occurs, a level 3 interrupt occurs and the 3A CC is halted. A match can also be performed using TTY messages which is the preferred way to perform a match in a working office. A manual method of performing a compare is shown in paragraphs 5.09 through 5.11.

TABLE D

COMPARE INDICATIONS AND FUNCTIONS

LED OR SWITCH DESIGNATION	LED OR SWITCH COLOR	INDICATION OR FUNCTION
ADR (Switch)	White	Enables the match between the contents of the store address register with the contents of the address input register.
ENABLE (LED)	Green	Indicates that a COMPARE function is active.
DATA (Switch)	White	Enables the match between the contents of the store data register and the data input register.

E. MEMORY Section

3.06 Table E describes the switches in the MEMORY section of the 3A CC control panel. The STORE and DISPLAY switches work in conjunction with the switches and LEDs in the LOAD AND DISPLAY section, the EXTENDED/BASIC key in the MODE section, and the INCR ADR and HIGH BITS/LOW BITS keys in the MEMORY section to store and/or display any addressable memory.

TABLE E

MEMORY FUNCTIONS

SWITCH DESIGNATION	SWITCH COLOR	FUNCTION
INCR ADR (Switch)	White	Increments the contents of the store address register by one. When a store and/or display function is performed, the increment occurs after the other function.
STORE (Switch)	White	Allows the contents of the LOAD AND DISPLAY switches to be written via the display buffer and store data register into the main store at the address in the store address register. The address in the store address register must be in a nonwrite protected area.
DISPLAY (Switch)	White	Allows the appearance on the LOAD AND DISPLAY LEDs of the contents of the main store at the address in the store address register.
HIGH BITS/LOW BITS (Switch)	White	The switch in the LOW BITS position allows the display or storing of bits 0 through 15 of the data in a main store location. The switch in the HIGH BITS position allows the display or storing of bits 16 through 23 of the data in a main store location. The switch is only effective if the basic/extended switch is in the extended position.

F. MODE Section

3.07 The MODE section of the 3A CC control panel is made up of three switches and one LED. Table F describes the indications and functions of the LED and switches.

TABLE F

MODE INDICATIONS AND FUNCTIONS

LED OR SWITCH DESIGNATION	LED OR SWITCH COLOR	INDICATION OR FUNCTION
HALT (Switch)	White	Places the 3A CC in a microstore loop that does not execute program code but will execute interrupts.
HALTED (LED)	Green	Indicates that the 3A CC is not executing program code.
STEP (Switch)	White	Allows the execution of program word, one at a time, when the EXECUTE key in the COMMAND section is operated momentarily.
EXTENDED/BASIC (Switch)	White	This switch when in the EXTENDED position allows the HIGH BITS/LOW BITS switch in the MEMORY area to operate properly in the HIGH BITS position.

G. COMMAND Section

3.08 Table G describes the switches in the COMMAND section of the 3A CC control panel.

TABLE G

COMMAND INDICATIONS AND FUNCTIONS

LED OR SWITCH DESIGNATION	LED OR SWITCH COLOR	INDICATION OR FUNCTION
REJECT (LED)	Green	Indicates that the last manual function attempted was not performed. This may be due to incorrect combination of panel keys.
EXECUTE (Switch)	Gray	Executes a microprogram interrupt that results in performance of the selected manual panel function.

H. STATUS Section

3.09 The STATUS keys and lamps shown in Table H are provided to monitor and control various conditions or modes of operation that the 3A CC may be in.

TABLE H

STATUS INDICATIONS AND FUNCTIONS

KEY/LAMP DESIGNATION	LAMP COLOR	INDICATION OR FUNCTION
POWER (Key/Lamp)	Green	Depending on the power state, operation causes a sequential removal of power from the 3A CC or a sequential restoral of power to the 3A CC.
ACTIVE (Lamp)	Green	Indicates that the status of the 3A CC is actively controlling the system.
NOT ACTIVE (Lamp)	White	Indicates that the status of the 3A CC is not actively controlling the system.
MANUAL (Key/Lamp)	White	Operation enables manual function to take place in the 3A CC. This function cannot be performed if the 3A CC is the active 3A CC.
ERROR STOPPED	Red	Indicates the status of the STOP flip-flop. This flip-flop is set by error detection circuits of the other 3A CC and is cleared by initialization hardware or the other 3A CC. When this lamp is lighted, the 3A CC is in the STOP state.
RESET CIRCUITS (Key)		Active only in the MANUAL mode. Initializes the critical flip-flops and puts the 3A CC in the HALT state. The HALTED LED lights.
TEST MODE (Lamp)	Red	Lights only when the test mode switch (located on inside of panel) is active. Test mode switch enables panel functions in an active 3A CC.
LAMP & PWR TEST (Key)		Utilized to ensure that all lamps within STATUS area will light and to perform a test of the power alarm circuits in the power converters. The power converters are located within other units of the frame. When the key is operated, the converter LEDs will light. When the key is released the converter LEDs extinguish.

SYSTEM STATUS PANEL

3.10 The system status panel provides maintenance personnel with the means to monitor the status of the entire system and to control tests, alarms, and status of 3A CCs. Figure 4 shows the lamps, LEDs, and switches of the system status panel.

A. PANEL POWER Section

3.11 Table I describes the key/lamp functions of the PANEL POWER circuitry. The PANEL POWER circuitry provides a means in which to monitor and control power removal and restoration to the system status panel.

TABLE I

PANEL POWER KEY/LAMP FUNCTIONS

KEY/LAMP DESIGNATION	LAMP COLOR	FUNCTION
ALT BUS (Key/Lamp)	Red	The ALT BUS key provides a means of testing the operation of the alternate power bus. The test is described in Section 232-306-501 and 232-309-104.
CIRCUIT POWER (Key/Lamp)	Green	Power (+3V) is applied to logic packs associated with the system status panel.
LAMP POWER (Key/Lamp)	Green	Controls the +24 Vdc to system status panel. Because of telemetry requirements, +24 Vdc power is not completely removed. The voltage is reduced to a level that will not light lamps and LEDs.
LAMP & POWER TEST (Key/Lamp)	White	When operated, causes all lamps and LEDs on the system status panel to light.

B. CU 0 and CU 1 Status

3.12 The function of the CU 0 and CU 1 LED indicators is to give a visual indication of the status of both CU 0 and CU 1. Each CU has associated with it four LEDs representing the four possible CU statuses. Table J describes each CU status and the LOCK function. A manual method of performing a compare is shown in 5.09 through 5.11.

TABLE J

CU 0 AND CU 1 STATUS

LED OR KEY/LAMP DESIGNATION	LED OR LAMP COLOR	INDICATION OR FUNCTION
ACTIVE (LED)	Green	Gives visual indication that the associated CU is active and processing.
STANDBY (LED)	Green	Gives visual indication that the associated CU is inactive and capable of being switched active (circuits working and call store up to date).
OUT OF SERVICE (LED)	Red	Gives visual indication that the associated CU is inactive for some maintenance or diagnostic purpose. The CU can be switched active, but only under emergency conditions. (Call store may not be up to date.)
UNAVAILABLE (LED)	Red	Gives visual indication that the CU is inactive and cannot be switched active without manual intervention (LOCK or FORCE is active).
LOCK (Key/Lamp)	Red	The LOCK function is used to prevent the inactive CU from placing itself active or the active CU from placing itself inactive.

C. ALARMS Section

3.13 ALARMS indications are based on a 2-level alarm structure composed of MAJOR and MINOR alarms. All alarm reports will activate one of these alarm levels. Table K describes each of the alarms.

TABLE K
ALARMS LED AND LAMP INDICATIONS

LED OR LAMP DESIGNATION	LED OR LAMP COLOR	INDICATION
CRITICAL (LED)	Red	Not used.
MAJOR (LED)	Red	Partial loss of system capability. ***Immediate response required.***
MINOR (LED)	Red	Minor loss or system capability. ***Attention required.***
MAJOR POWER (LED)	Red	Major failure in power equipment. ***Immediate response required.***
MINOR POWER (LED)	Red	Minor failure in power equipment. ***Attention required.***
FUSE (LED)	Red	Blown fuse. ***Attention required.***
ALARM CIRCUIT (LED)	Red	Power failure in the alarm circuit. ***Attention required.***
SERVICE LOSS (LED)	Red	Initialization sequence — flashes during initialization and remains lighted after MRF, if the level is emergency audit or higher. The lamp is extinguished by using input message M SY RSL!
PANEL TIME-OUT (LAMP)	Red	Indicates the panel timer has timed out. A time-out results in a major alarm because the 3A CC did not reset the timer.
SYSTEM NORMAL (LAMP)	Green	Indicates no system trouble indicators are active.

D. TEST CONTROL Section

3.14 The system status panel lamps associated with the TEST CONTROL section are PASS, FAIL, and EXECUTE. Table L describes the TEST CONTROL circuitry. Paragraphs 5.10 through 5.12 describe the function of the TEST CONTROL.

TABLE L
TEST CONTROL KEY/LAMP FUNCTIONS

KEY/LAMP DESIGNATION	LAMP COLOR	FUNCTION
EXECUTE (Key/Lamp)	White	Used to control the execution of repetitive or step functions entered via a TTY input message.
PASS (Lamp)	Green	Indicates a test pass condition.
FAIL (Lamp)	Red	Indicates a test failure condition.

E. ALARM CONTROL Section

3.15 The system status panel key/lamps associated with ALARM CONTROL are the following:

- INHIBIT BUILDING ALARM
- ALARM RELEASE
- ALARM TRFR

Table M describes the ALARM CONTROL key/lamps.

TABLE M

ALARM CONTROL KEY/LAMP FUNCTIONS

KEY/LAMP DESIGNATION	LAMP COLOR	FUNCTION
INHIBIT BUILDING ALARM (Key/Lamp	Red	Used as per local option.
ALARM RELEASE (Key/Lamp)	Red	Set via software whenever a critical, major, minor, and panel time-out alarm occurs. When reset manually from the system status panel, the alarm release requests that the critical, major, minor and panel time-out alarms, both visual and audible be released.
ALARM TRFR (Key/Lamp)	White	Set and reset manually from the system status panel. When the ALARM TRFR key is operated, the critical, major, and minor audible alarms will be automatically released thirty seconds after the alarm occurs. When the ALARM TRFR key is operated, the alarms are assumed to be monitored remotely. A TTY output message will follow the operation of the ALARM TRFR key to indicate whether alarms are transferred or not. The ALARM TRFR lamp can also be set or reset via TTY input messages.

F. Equipment Unit Status Display and Display Buffer

3.16 Equipment status is monitored at the system status panel using LEDs. Seven of these indicators are considered a major equipment status. This includes MAS, NET, SCAN, AMA, RT, RA, and MISC. When any of these LEDs are lighted, the MAJOR EQPT LOSS lamp will light. The remaining peripheral unit status is monitored by nine additional LEDs. Table N describes the peripheral unit status display and display buffer.

TABLE N

EQUIPMENT UNIT STATUS DISPLAY AND DISPLAY BUFFER LED AND LAMP INDICATIONS

LED OR LAMP DESIGNATION	LED OR LAMP COLOR	INDICATION
MAS (LED)	Red	Indicates the active control unit does not have access to the inactive control unit's memory or that an uncorrectable memory element fault has been detected.
NET (LED)	Red	Indicates that a switching network trouble exists.
SCAN (LED)	Red	Indicates that at least one master scanner, trunk scanner, or line scanner has malfunctioned.
AMA (LED)	Red	Indicates that an automatic message accounting trouble exists.
RT (LED)	Red	Indicates that a ringing or tone source has malfunctioned.
RA (LED)	Red	Indicates that one or more recorded announcement voice channels are not operating properly.
MISC (LED)	Red	Indicates that a miscellaneous trouble exists somewhere in the system such as a trouble in the centrex data link frame, input/output control circuit (including central pulse distributor troubles), supplementary central pulse distributor frame, and automatic identify outward dial frame.
MAJOR EQPT LOSS (Lamp)	Red	Indicates that either a MAS, NET, SCAN, AMA, RT, RA, or MISC indicator is active.
TTYC (LED)	Red	Indicates that a least one maintenance TTY controller is out of service.
BLDG (LED)	Red	Indicates that a building alarm in the miscellaneous alarm field is active.
CKT LIM (LED)	Red	Indicates that the number of trunks or service circuits removed from service in any group has reached or surpassed the number which may be removed automatically from that group.
TDC (LED)	Red	Indicates that at least one tape data controller is out of service.

TABLE N (Contd)
EQUIPMENT UNIT STATUS DISPLAY AND DISPLAY BUFFER
LED AND LAMP INDICATIONS

LED OR LAMP DESIGNATION	LED OR LAMP COLOR	INDICATION
MANUAL FORCE (LED)	Amber	Indicates that the maintenance personnel has ***manually*** forced an abnormal condition such as: either control units, power or test mode key operated, or the on-line control units manual key operated, or the off-line control unit locked or forced unavailable via the system status panel.
TRAFFIC (LED)	Amber	Indicates that an office traffic overload condition exists.
DSP (LED)	Amber	Indicates that dynamic service protection has been invoked.
TOLL NET (LED)	Amber	Indicates that toll network protection has been manually invoked.
ATI (LED)	Amber	Automatic test inhibit indicates that the time monitor is inhibited, scanner detection test is not allowed, an MRF sequence has occurred, a long-term periodic exercise is not allowed, certain error printouts are inhibited, or a multiscan function is inhibited via TTY request. This LED is controlled by program only.
0-23 (LEDs)	Green	These LEDs can be used in conjunction with troubleshooting by means of utility TTY input messages. This function is performed by monitoring on the DISPLAY BUFFER a store word, register, or row of ferrod sensors.

4. OPERATIONAL FEATURES

4.01 The features provided by the 3A CC control panels and SSP fall into three categories:

- Routine operations
- Special purpose operations
- Test mode operations.

4.02 The inactive 3A CC may be placed in two operational modes: NORMAL and MANUAL. The MANUAL mode is required in most cases of human intervention. This mode disables certain automatic features which are performed when the center is in the NORMAL mode. Use of the MANUAL mode does not necessarily imply an abnormal or emergency situation, since several day-to-day operations which require the MANUAL mode make use of some of the same circuitry used in the NORMAL mode. However, the inactive 3A CC should be in the NORMAL mode whenever manual intervention is not necessary so the inactive main store will remain updated and features such as the Double Store Read will be available if needed.

A. Routine Operations

4.03 Features that are used during routine operations are the system status displays and control of the active/inactive status of the 3A

CCs. These features are available at the system status panel regardless of whether the inactive 3A CC has been placed in the MANUAL or NORMAL mode.

4.04 As can be seen in Fig. 4, system status displays include the current alarm status and CU status. A line of 16 LEDs at the bottom of the system status panel are used to indicate the state of major equipment. The indications are intended to point the craftsperson to trouble areas. If a LED is lighted, a craftsperson can determine the reason by requesting status information for the particular unit in question via a TTY input message.

4.05 The active/inactive status of the 3A CC is normally determined by program. In emergency situations, the active 3A CC can be controlled by maintenance personnel from the system status panel.

B. Special Purpose Operations

4.06 The special purpose operations include most of the manually operated functions and require the inactive 3A CC to be in the MANUAL mode. These operations are used mainly for installation, program debugging and troubleshooting. The most useful of these operations are the ***REGISTER LOAD and DISPLAY, STEP,*** and ***MEMORY STORE and DISPLAY*** features.

4.07 When the inactive 3A CC is stopped, several avenues of investigation are open to the maintenance personnel. The first of these is the ability to load or display many registers in the stopped inactive 3A CC. This is accomplished by first selecting a ***LOAD*** or ***DISPLAY*** function, then selecting the appropriate register from the REGISTER SELECT section of the 3A CC control panel (Fig. 2). Registers are displayed on the LEDs in the LOAD AND DISPLAY section of the 3A CC control panel. Memory can be written in the nonwrite protected areas or read out of any area of the store using the same mechanism, if the appropriate address is loaded into the store address register first.

C. Test Mode Operations

4.08 Operation of the TEST MODE switch puts the 3A CC in the test mode, which allows certain operations that would not otherwise be permitted on an active 3A CC. These operations include power removal, panel operation, and disabling the on-line timer. Operation of the TEST MODE switch is not normally required, and should be avoided because the system is in a vulnerable state while the key is operated. Consequently, the TEST MODE key is a safety type (pull before operate) key and is mounted behind the control panel (Fig. 5). One contact on the TEST MODE switch lights the TEST MODE lamp in the STATUS section to call attention to the test mode whenever the switch is operated.

5. CONTROL AND DISPLAY OPERATIONS

LOAD REGISTER

5.01 The load feature is used to load one of several registers in the inactive 3A CC. For the load feature to function properly, the inactive 3A CC must be halted. This means that the 3A CC must be inactive and in the MANUAL mode. Some of the special registers are protected and cannot be loaded. They include the Microcontrol Status Register (except bits 0 and 1), the Timing Counter, and the System Status Register. If an attempt is made to load these registers, the REJECT lamp in the COMMAND section will light and the registers will retain the original data.

STEP	ACTION	VERIFICATION
1a	If ACTIVE lamp at STATUS section of 3A CC being tested is lighted— At TTY— Type in: SW:CU!	At STATUS section of 3A CC being tested— NOT ACTIVE lamp lighted. At STATUS section of 3A CC not being tested— ACTIVE lamp lighted.
2	At SYSTEM STATUS AND CONTROL section of SSP— Depress LOCK key.	At SYSTEM STATUS AND CONTROL section of SSP— LOCK lamp lighted.

STEP	ACTION	VERIFICATION
		UNAVAILABLE LED of CU being tested. MANUAL FORCE LED lighted. At FORCE CU ACTIVE section— FORCE and SELECT ( ) lamps lighted. ( ) - 0 or 1—active CU. At TTY— System response: REPT CU STAT UAV
3	At STATUS section of 3A CC control panel— Depress MANUAL key.	At STATUS section of 3A CC control panel— MANUAL lamp lighted. At TTY— System response: REPT CU STAT MAN
4	At MODE section— Set HALT switch to the up position.	
5	At COMMAND section— Momentarily set EXECUTE switch to the up position.	
6	At REGISTER section— Set LOAD and DISPLAY switches to the up position.	
7	At REGISTER SELECT section— Set 1, 2, 4, 8, and SPECIAL/GENERAL switches to the appropriate position as shown in Table B to select the register being loaded.	At REGISTER SELECT section— LED(s) associated with register being loaded lighted. If the register being loaded is a special register— SPECIAL LED lighted. If the register being loaded is a general register— GENERAL LED lighted.
8	At LOAD AND DISPLAY section— Set switches to appropriate position of desired data to be loaded into selected register (up for 1; down for 0). ***Note:*** The parity can be computed automatically or manually. If manual parity is desired, operate ENABLE MANUAL PAR switch and set PH and PL switches to appropriate positions.	
9	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At LOAD AND DISPLAY section— Contents of selected register displayed on LEDs.

STEP	ACTION	VERIFICATION
10	At LOAD AND DISPLAY section— Set all switches to the down position.	
11	At REGISTER section— Set LOAD and DISPLAY switches to the down position.	
12	At MODE section— Set HALT switch to the down position.	
13	At STATUS section— Depress MANUAL key.	At STATUS section— MANUAL lamp extinguished.
14	At SYSTEM STATUS AND CONTROL section of SSP— Depress LOCK key.	At SYSTEM STATUS AND CONTROL section of SSP— UNAVAILABLE LED extinguished. OUT OF SERVICE LED lighted. LOCK lamp extinguished. MANUAL FORCE LED extinguished. At FORCE CU ACTIVE section— FORCE, SELECT 0, and SELECT 1 lamps extinguished. At TTY— System response: REPT CU STAT AVL When main store is updated— At TTY— System response: UPD OMAS COMPL At SYSTEM STATUS AND CONTROL section— OUT OF SERVICE LED extinguished. STANDBY LED lighted.

DISPLAY REGISTER

5.02 The display feature is used to display the contents of one of several registers in the inactive 3A CC. For the display feature to function properly, the inactive 3A CC must be halted. This means that the 3A CC must be inactive and in the MANUAL mode.

STEP	ACTION	VERIFICATION
1a	If ACTIVE lamp at STATUS section of 3A CC being tested is lighted— At TTY— Type in: SW:CU!	At STATUS section of 3A CC being tested— NOT ACTIVE lamp lighted. At STATUS section of 3A CC not being tested— ACTIVE lamp lighted.
2	At SYSTEM STATUS AND CONTROL section of SSP— Depress LOCK key.	At SYSTEM STATUS AND CONTROL section of SSP— LOCK lamp lighted. UNAVAILABLE LED of CU being tested. MANUAL FORCE LED lighted. At FORCE CU ACTIVE section—

STEP	ACTION	VERIFICATION
		FORCE AND SELECT ( ) lamps lighted. ( ) - 0 or 1—active CU. At TTY— System response: REPT CU STAT UAV
3	At STATUS section of 3A CC control panel— Depress MANUAL key.	At STATUS section of 3A CC control panel— MANUAL lamp lighted. At TTY— System response: REPT CU STAT MAN
4	At MODE section— Set HALT switch to the up position.	
5	At COMMAND section— Momentarily set EXECUTE switch to the up position.	
6	At REGISTER section— Set DISPLAY switch to the up position.	
7	At REGISTER SELECT section— Set 1, 2, 4, 8, and SPECIAL/GENERAL switches to the appropriate position as shown in Table B to select the register being displayed.	At REGISTER SELECT section— LED(s) associated with registers being displayed lighted. If the register being displayed is a special register— SPECIAL LED lighted. If the register being displayed is a general register— GENERAL LED lighted.
8	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At LOAD AND DISPLAY section— Contents of selected register displayed on LEDs.
9	At REGISTER section— Set DISPLAY switch to the down position.	
10	At MODE section— Set HALT switch to the down position.	
11	At STATUS section— Depress MANUAL key.	At STATUS section— MANUAL lamp extinguished.
12	At SYSTEM STATUS AND CONTROL section of SSP— Depress LOCK key.	At SYSTEM STATUS AND CONTROL section of SSP— UNAVAILABLE LED extinguished. OUT OF SERVICE LED lighted. LOCK lamp extinguished. MANUAL FORCE LED extinguished. At FORCE CU ACTIVE section—

STEP	ACTION	VERIFICATION
		FORCE, SELECT 0, and SELECT 1 lamps extinguished. At TTY— System response: REPT CU STAT AVL When main store is updated— At TTY— System response: UPD OMAS COMPL At SYSTEM STATUS AND CONTROL section— OUT OF SERVICE LED extinguished. STANDBY LED lighted.

MEMORY STORE

5.03 The memory store feature is used to store data in one address of the main memory associated with the inactive 3A CC. For the memory store feature to function properly, the inactive 3A CC must be halted. This means that the 3A CC must be inactive and in the MANUAL mode. Some of the memory is write protected and cannot be rewritten. If an attempt is made to store data in these areas, the 3A CC may hang and the RESET CIRCUITS key in the STATUS section must be depressed before continuing to perform operations from the 3A CC control panel. If a write protected area is accessed, determine why it was accessed before continuing.

STEP	ACTION	VERIFICATION
1a	If ACTIVE lamp at STATUS section of 3A CC being tested is lighted— At TTY— Type in: SW:CU!	At STATUS section of 3A CC being tested— NOT ACTIVE lamp lighted. At STATUS section of 3A CC not being tested— ACTIVE lamp lighted.
2	At SYSTEM STATUS AND CONTROL section of SSP— Depress LOCK key.	At SYSTEM STATUS AND CONTROL section of SSP— LOCK lamp lighted. UNAVAILABLE LED of CU being tested. MANUAL FORCE LED lighted. At FORCE CU ACTIVE section— FORCE and SELECT ( ) lamps lighted. ( ) - 0 or 1—active CU. At TTY— System response: REPT CU STAT UAV
3	At STATUS section of 3A CC control panel— Depress MANUAL key.	At STATUS section of 3A CC control panel— MANUAL lamp lighted. At TTY— System response: REPT CU STAT MAN
4	At MODE section— Set HALT switch to the up position.	

STEP	ACTION	VERIFICATION
5	At COMMAND section— Momentarily set EXECUTE switch to the up position.	
6	At REGISTER section— Set LOAD and DISPLAY switches to the up position.	
7	At REGISTER SELECT section— Set SPECIAL, 1, and 2 switches to the up position.	At REGISTER SELECT section— SPECIAL and ST ADRS LEDs lighted.
8	At LOAD AND DISPLAY section— Set switches to appropriate position of desired address to be stored. ***Note:*** This address must be in a nonwrite protected area.	
9	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At LOAD AND DISPLAY section— Desired address displayed on LEDs.
10	Set all switches except the HALT switch to the down position.	
11	At MODE section— Set BASIC/EXTENDED switch to the EXTENDED (up) position.	
12	At MEMORY section— Set the STORE and DISPLAY switches to the up position. Set the LOW BITS/HIGH BITS switch to the LOW BITS (down) position. Set the INCR ADR switch to the down position.	
13	At LOAD AND DISPLAY section— Set switches to appropriate position of desired data to be stored in the low 16 bits at memory address (up for 1; down for 0). ***Note:*** The parity can be computed automatically or manually. Automatic parity should always be used for memory access.	
14	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At LOAD AND DISPLAY section— Desired data display on 0 through 15 LEDs.

STEP	ACTION	VERIFICATION
15	At MEMORY section— Set the LOW BITS/HIGH BITS switch to the HIGH BITS (up) position.	
16a	If a store operation is desired in the next address location— At MEMORY section— Set INCR ADR switch to the up position.	
17	At LOAD AND DISPLAY section— Set switches 0 through 7 to the appropriate position of desired data to be stored in the high 8 bits at memory address (up for 1; down for 0).	
18	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At LOAD AND DISPLAY section— Desired data displayed on 0 through 7 LEDs.
19a	If a store operation is desired in the next address location— Repeat Steps 12 through 18.	
20	At MEMORY section— Set the STORE and DISPLAY switches to the down position. Set the LOW BITS/HIGH BITS to the LOW BITS (down) position.	
21	At LOAD AND DISPLAY section— Set all switches to the down position.	
22	At MODE section— Set the BASIC/EXTENDED switch to the BASIC (down) position. Set the HALT switch to the down position.	
23	At STATUS section— Depress MANUAL key.	At STATUS section— MANUAL lamp extinguished.
24	At SYSTEM STATUS AND CONTROL section of SSP— Depress LOCK key.	At SYSTEM STATUS AND CONTROL section of SSP— UNAVAILABLE LED extinguished. OUT OF SERVICE LED lighted. LOCK lamp extinguished. MANUAL FORCE LED extinguished. At FORCE CU ACTIVE section— FORCE, SELECT 0, and SELECT 1 lamps extinguished. At TTY— System response: REPT CU STAT AVL

STEP	ACTION	VERIFICATION
		When main store is updated— At TTY— System response: UPD OMAS COMPL At SYSTEM STATUS AND CONTROL section— OUT OF SERVICE LED extinguished. STANDBY LED lighted.

MEMORY DISPLAY

5.04 The memory display feature is used to display data in one address of the main memory associated with the inactive 3A CC. For the memory display feature to function properly, the inactive 3A CC must be halted. This means that the 3A CC must be inactive and in the MANUAL mode.

STEP	ACTION	VERIFICATION
1a	If ACTIVE lamp at STATUS section of 3A CC being tested is lighted— At TTY— Type in: SW:CU!	At STATUS section of 3A CC being tested— NOT ACTIVE lamp lighted. At STATUS section of 3A CC not being tested— ACTIVE lamp lighted.
2	At SYSTEM STATUS AND CONTROL section of SSP— Depress LOCK key.	At SYSTEM STATUS AND CONTROL section of SSP— LOCK lamp lighted. UNAVAILABLE LED of CU being tested. MANUAL FORCE LED lighted. At FORCE CU ACTIVE section— FORCE and SELECT ( ) lamps lighted. ( ) - 0 or 1—active CU. At TTY— System response: REPT CU STAT UAV
3	At STATUS section of 3A CC control panel— Depress MANUAL key.	At STATUS section of 3A CC control panel— MANUAL lamp lighted. At TTY— System response: REPT CU STAT MAN
4	At MODE section— Set HALT switch to the up position.	
5	At COMMAND section— Momentarily set EXECUTE switch to the up position.	
6	At REGISTER section— Set LOAD and DISPLAY switches to the up position.	

STEP	ACTION	VERIFICATION
7	At REGISTER SELECT section— Set SPECIAL, 1, and 2 switches to the up position.	At REGISTER SELECT section— SPECIAL and ST ADRS LEDs lighted.
8	At LOAD AND DISPLAY section— Set switches to appropriate position of desired address to be displayed.	
9	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At LOAD AND DISPLAY section— Desired address displayed on LEDs.
10	Set all switches except the HALT switch to the down position.	
11	At MODE section— Set the BASIC/EXTENDED switch to the EXTENDED (up) position.	
12	At MEMORY section— Set the DISPLAY switch to the up position. Set the LOW BITS/HIGH BITS switch to the LOW BITS (down) position. Set the INCR ADR switch to the down position.	
13	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At LOAD AND DISPLAY section— Contents of the low 16 bits of data displays on 0-15 LEDs (lighted for 1; extinguished for 0). The parity of the data is also displayed (PH over bits 8 through 15 and PL over bits 0 through 7).
14	At MEMORY section— Set the LOW BITS/HIGH BITS switch to the HIGH BITS (up position).	
15a	If a display operation is desired of the next address location— At MEMORY section— Set INCR ADR switch to the up position.	
16	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At LOAD AND DISPLAY section— Contents of the high 8 bits of data displayed on 0-7 LEDs (lighted for 1; extinguished for 0). The parity on the data is also displayed on PL LED.
17a	If a display operation is desired in the next address location— Repeat Steps 12 through 16.	

STEP	ACTION	VERIFICATION
18	At MEMORY section— Set the DISPLAY switch to the down position. Set the LOW BITS/HIGH BITS to the LOW BITS (down) position.	
19	At MODE section— Set the BASIC/EXTENDED switch to the BASIC (down) position. Set the HALT switch to the down position.	
20	At STATUS section— Depress MANUAL key.	At STATUS section— MANUAL lamp extinguished.
21	At SYSTEM STATUS AND CONTROL section of SSP— Depress LOCK key.	At SYSTEM STATUS AND CONTROL section of SSP— UNAVAILABLE LED extinguished. OUT OF SERVICE LED lighted. LOCK lamp extinguished. MANUAL FORCE LED extinguished. At FORCE CU ACTIVE section— FORCE, SELECT 0, and SELECT 1 lamps extinguished. At TTY— System response: REPT CU STAT AVL When main store is updated— At TTY— System response: UPD OMAS COMPL At SYSTEM STATUS AND CONTROL section— OUT OF SERVICE LED extinguished. STANDBY LED lighted.

STEP FUNCTION

5.05 The following procedure describes a method which manually advances the program one word at a time. The 3A CC must be inactive and must be in the MANUAL mode.

STEP	ACTION	VERIFICATION
1a	If ACTIVE lamp at STATUS section of 3A CC being tested is lighted— At TTY— Type in: SW:CU!	At STATUS section of 3A CC being tested— NOT ACTIVE lamp lighted. At STATUS section of 3A CC not being tested— ACTIVE lamp lighted.
2	At SYSTEM STATUS AND CONTROL section of SSP— Depress LOCK key.	At SYSTEM STATUS AND CONTROL section of SSP— LOCK lamp lighted. UNAVAILABLE LED of CU being tested. MANUAL FORCE LED lighted. At FORCE CU ACTIVE section—

STEP	ACTION	VERIFICATION
		FORCE and SELECT ( ) lamps lighted. ( ) - 0 or 1—active CU. At TTY— System response: REPT CU STAT UAV
3	At STATUS section of 3A CC control panel— Depress MANUAL key.	At STATUS section of 3A CC control panel— MANUAL lamp lighted. At TTY— System response: REPT CU STAT MAN
4	At MODE section— Set HALT switch to the up position.	
5	At COMMAND section— Momentarily set EXECUTE switch to the up position.	
6	At REGISTER section— Set LOAD and DISPLAY switches to the up position.	
7	At REGISTER SELECT section— Set SPECIAL and 4 switches to the up position.	At REGISTER SELECT section— SPECIAL and PROG ADRS LEDs lighted.
8	At LOAD AND DISPLAY section— Set switches to appropriate position of first instruction to be executed.	
9	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At LOAD AND DISPLAY section— Desired address displayed on LEDs.
10	Set all switches except the HALT switch to the down position.	
11	At MODE section— Set the STEP switch to the up position.	
12	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At MODE section— 3A CC manually advances the program one word.
13a	If a step operation is desired to display additional data at successive address locations— Repeat Steps 12 through 13a.	At LOAD AND DISPLAY section— Address of the program location to be executed is displayed on LEDs.
14	At MODE section— Set the STEP switch to the down position.	

STEP	ACTION	VERIFICATION
15	At MODE section— Set the HALT switch to the down position.	
16	At STATUS section— Depress MANUAL key.	At STATUS section— MANUAL lamp extinguished.
17	At SYSTEM STATUS AND CONTROL section of SSP— Depress LOCK key.	At SYSTEM STATUS AND CONTROL section of SSP— UNAVAILABLE LED extinguished. OUT OF SERVICE LED lighted. LOCK lamp extinguished. MANUAL FORCE LED extinguished. At FORCE CU ACTIVE section— FORCE, SELECT 0, and SELECT 1 lamps extinguished. At TTY— System response: REPT CU STAT AVL When main store is updated— At TTY— System response: UPD OMAS COMPL At SYSTEM STATUS AND CONTROL section— OUT OF SERVICE LED extinguished. STANDBY LED lighted.

PASS/FAIL OPERATION

5.06 The PASS lamp and FAIL lamp are used to display the results of peripheral unit or CU diagnostic tests which have been requested in either the step or repetitive mode. These lamps and the EXECUTE key perform the same function as the remote execute (PF key) button on the individual peripheral unit frames. The tests can be controlled from either the system status panel or peripheral unit frame.

5.07 When a TTY message is entered requesting a test in the step mode, there will be a TTY printout of the results of the test and either the PASS lamp or FAIL lamp will light. The EXECUTE key or the PF key button can be used to reinitiate the test until the problem has been isolated and repaired. If the test is reinitiated and fails in the same manner, the FAIL lamp stays lighted; but, if the test fails because of a different problem, both the PASS and FAIL lamps will light, and there will be a new TTY printout, after which the PASS lamp will again extinguish. When the problem has been cleared and the EXECUTE key is operated, only the PASS lamp will light and a TTY printout indicating ATP (all tests pass) will be received.

5.08 For the repetitive mode, the input request is executed continuously. The EXECUTE key is depressed to stop the execution. When the EXECUTE key is depressed again, the request is once again repetitively executed. The lamp display is the same as it was in the step mode.

COMPARE ADDRESS

5.09 The compare address feature is used to match the contents of the store address register with the contents in the address input register. The address mask register can be loaded to allow the match to pertain to all or any combination of bits in the registers. When the match occurs, the 3A CC will be halted. A match can be used in the inactive 3A CC when diagnostics are active in that 3A CC. The 3A CC must be in the MANUAL mode.

STEP	ACTION	VERIFICATION
1a	If ACTIVE lamp at STATUS section of 3A CC being tested is lighted— At TTY— Type in: SW:CU!	At STATUS section of 3A CC being tested— NOT ACTIVE lamp lighted. At STATUS section of 3A CC not being tested— ACTIVE lamp lighted.
2	At STATUS section of 3A CC control panel— Depress MANUAL key.	At STATUS section of 3A CC control panel— MANUAL lamp lighted. At TTY— System response: REPT CU STAT MAN
3	At REGISTER SELECT section of 3A CC control panel— Set SPECIAL/GENERAL switch to SPECIAL.	At REGISTER SELECT section— SPECIAL LED lighted.
4	At LOAD and DISPLAY section— Set switches to appropriate position of the desired match as described in paragraph 5.01.	
5	If all the address is not desired in match— Load the address mask register as described in 5.01. The bits not desired in match should be set to 1.	
6	At COMPARE SECTION— Set ADR switch to the up position.	
7	At COMMAND SECTION— Momentarily set EXECUTE switch to the up position.	At COMPARE SECTION— ENABLE LED lighted. When the match occurs— At MODE section— HALTED LED lighted.
8	Set ADR switch to the down position.	
9	Display the store address register as described in 5.02, Steps 4 through 8.	
10a	If a successive match is desired— At REGISTER section— Set DISPLAY section switch to the down position.	
11	At MODE section— Set HALT switch to the down position.	
12a	At COMPARE section— Set ADR switch to the up position.	
13a	At COMMAND section— Momentarily set EXECUTE switch to the up	At COMPARE section— ENABLE LED lighted.

STEP	ACTION	VERIFICATION
	position.	When the match occurs— At MODE section— HALTED LED lighted.
14a	Set ADR switch to the down position.	
15a	Display the store address register as described in 5.02, Steps 4 through 8.	
16a	Repeat Steps 8a through 13a of this paragraph for successive match operations.	
17	At REGISTER SELECT section— Set all switches to the down position.	
18	At REGISTER section— Set DISPLAY switch to the down position. ***Note:*** If a data stored operation at the matched address is desired, perform 5.03, Steps 4 through 22.	
19	At MODE section— Set HALT switch to the down position.	
20	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At MODE section— HALTED LED extinguished.
21	At STATUS section— Depress MANUAL key.	At STATUS section— MANUAL lamp extinguished. ***Note:*** Main store is updated when UPD OMAS COMPL message is printed.

COMPARE DATA

5.10 The compare data feature is used to match the contents of the store data register with the contents in the data input register. The data mask register can be loaded to allow the match to pertain to all or any combination of bits in the registers. When the match occurs, the 3A CC will be halted. A match can be used in the inactive 3A CC when diagnostics are active in that 3A CC. A match cannot be performed on 2B programs or translation data because only 16 bits can be matched. The 3A CC must be in the MANUAL mode.

STEP	ACTION	VERIFICATION
1a	If ACTIVE lamp at STATUS section of 3A CC being tested is lighted— At TTY— Type in: SW:CU!	At STATUS section of 3A CC being tested— NO ACTIVE lamp lighted. At STATUS section of 3A CC not being tested— ACTIVE lamp lighted.
2	At STATUS section of 3A CC control panel— Depress MANUAL key.	At STATUS section of 3A CC control panel— MANUAL lamp lighted.

STEP	ACTION	VERIFICATION
		At TTY— System response: REPT CU STAT MAN
3	At REGISTER SELECT section of 3A CC control panel— Set SPECIAL/GENERAL switch to SPECIAL.	At REGISTER SELECT section— SPECIAL LED lighted.
4	At LOAD AND DISPLAY section— Set switches to appropriate position of the desired match as described in 5.01.	
5	If all the bits of data are not desired in match— Load the data mask register as described in 5.01. The bits not desired in match should be set to 1.	
6	At COMPARE section— Set DATA switch to the up position.	
7	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At COMPARE section— ENABLE LED lighted. When the match occurs— At MODE section— HALTED LED lighted.
8	Set DATA switch to the down position.	
9	Display the memory contents as described in 5.04, Steps 11 through 16.	
10	If a successive match is desired— At MEMORY section— Set DISPLAY switch to the down position.	
11	At MODE section— Set HALT switch to the down position.	
12a	At COMPARE section— Set DATA switch to the up position.	
13a	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At COMPARE section— ENABLE LED lighted. When the match occurs— At MODE section— HALTED LED lighted.
14a	Set DATA switch to the down position.	
15a	Display the memory contents as described in 5.04, Step 11 through 16.	

STEP	ACTION	VERIFICATION
16a	Repeat Steps 8a through 13a for successive match operations.	
17	At MEMORY section— Set DISPLAY switch to the down position. Set the LOW BITS/HIGH BITS switch to the LOW BITS (down) position.	
18b	If a set operation is desired to display additional data at successive address locations— Perform procedure described in 5.05, Steps 2 through 15.	
19	At MODE section— Set HALT switch to the down position. Set the BASIC/EXTENDED switch to the BASIC (down) position.	
20	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At MODE section— HALTED LED extinguished.
21	At STATUS section— Depress MANUAL key.	At STATUS section— MANUAL lamp extinguished. ***Note:*** Main store is updated when UPD OMAS COMPL message is printed.

COMPARE ADDRESS AND DATA

5.11 The compare address and data feature is used to match the contents of both the store address register and store data register with the contents in both the address input register and data input register at the same time. The address mask register and data mask register can be loaded to allow the match to pertain to all or any combination of bits in the registers. The match will occur when the desired bits in both the store address register and store data register are the same as the bits in the address input register and data input register. At this time the 3A CC will be halted. A match can be used in the inactive 3A CC when diagnostics are active in that 3A CC. The 3A CC must be in the MANUAL mode.

STEP	ACTION	VERIFICATION
1a	If ACTIVE lamp at STATUS section of 3A CC being tested is lighted— At TTY— Type in: SW:CU!	At STATUS section of 3A CC being tested— NOT ACTIVE lamp lighted. At STATUS section of 3A CC not being tested— ACTIVE lamp lighted.
2	At STATUS section of 3A CC control panel— Depress MANUAL key.	At STATUS section of 3A CC control panel— MANUAL lamp lighted. At TTY— System response: REPT CU STAT MAN

STEP	ACTION	VERIFICATION
3	At REGISTER SELECT section of 3A CC control panel— Set SPECIAL/GENERAL switch to SPECIAL.	At REGISTER SELECT section— SPECIAL LED lighted.
4	At LOAD AND DISPLAY section— Set switches to appropriate position of the desired match as described in 5.01.	
5	If all the bits of the address and data are not desired in match— Load the address mask register and data mask register as described in 5.01. The bits not desired in match should be set to 1.	
6	At COMPARE section— Set ADR and DATA switches to the up position.	
7	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At COMPARE section— ENABLE LED lighted. When the match occurs— At MODE section— HALTED LED lighted.
8	Set ADR and DATA switches to the down position.	
9a	If a display of the address is desired— Display the store address register as described in 5.02, Steps 4 through 10.	
10b	If a display of the data is desired— Display the memory contents as described in 5.04, Steps 11 through 16.	
11c	If a successive match is desired— Set all switches in the MEMORY and MODE areas to the down position.	
12c	At COMPARE section— Set the ADR and DATA switches to the up position.	
13c	At COMMAND section— Momentarily set EXECUTE switch to the up position.	At COMPARE section— ENABLE LED lighted. When the match occurs— At MODE section— HALTED LED lighted.
14c	Set ADR and DATA switches to the down position.	

STEP	ACTION	VERIFICATION
15c	Display the store address register as described in 5.02 or the memory contents as described in 5.04, Steps 11 through 16.	
16c	Repeat Steps 9c through 13c for successive match operations.	
17	At MEMORY section— Set DISPLAY switch to the down position. Set the LOW BITS/HIGH BITS switch to the LOW BITS (down) position.	
18d	If a step operation is desired to display additional data as successive address locations— Perform procedure described in 5.05, Steps 2 through 15.	
19	At MODE section— Set HALT switch to down position. Set the BASIC/EXTEND switch to the BASIC (down) position.	
20	At STATUS section— Depress MANUAL key.	At STATUS section— MANUAL lamp extinguished. ***Note:*** Main store is updated when UPD OMAS COMPL message is printed.

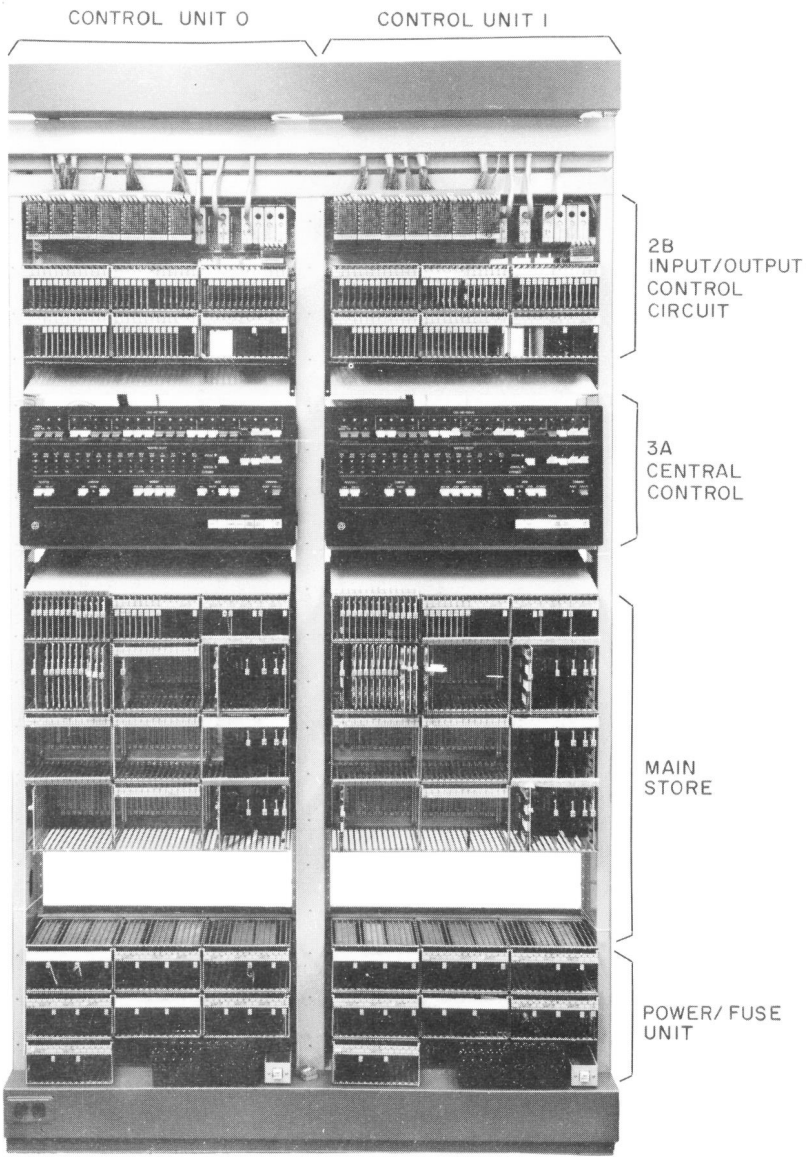

Fig. 1—No. 2B ESS Processor Frame

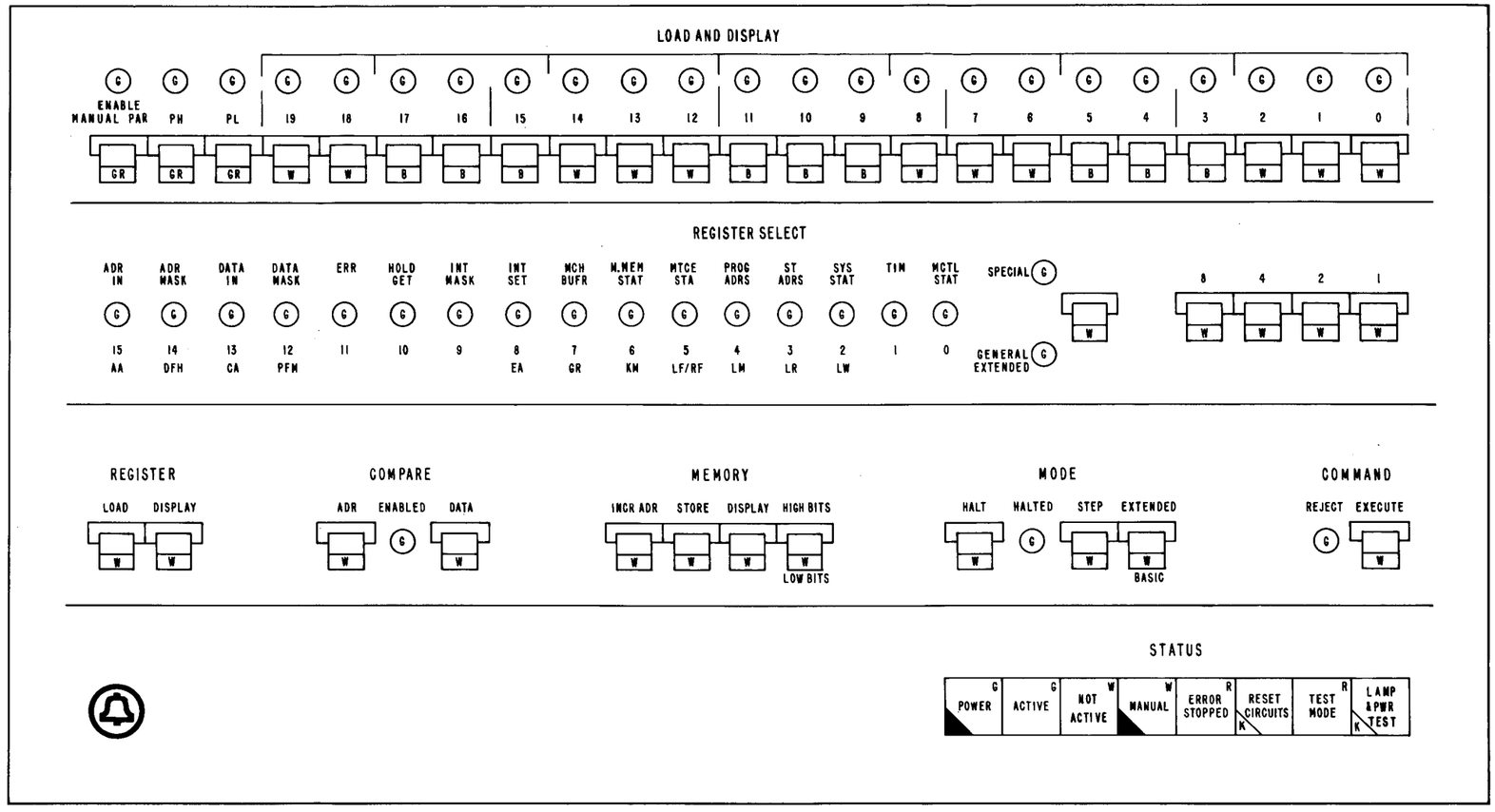

Fig. 2—3A CC Control Panel Keys, Lamps, and LEDs

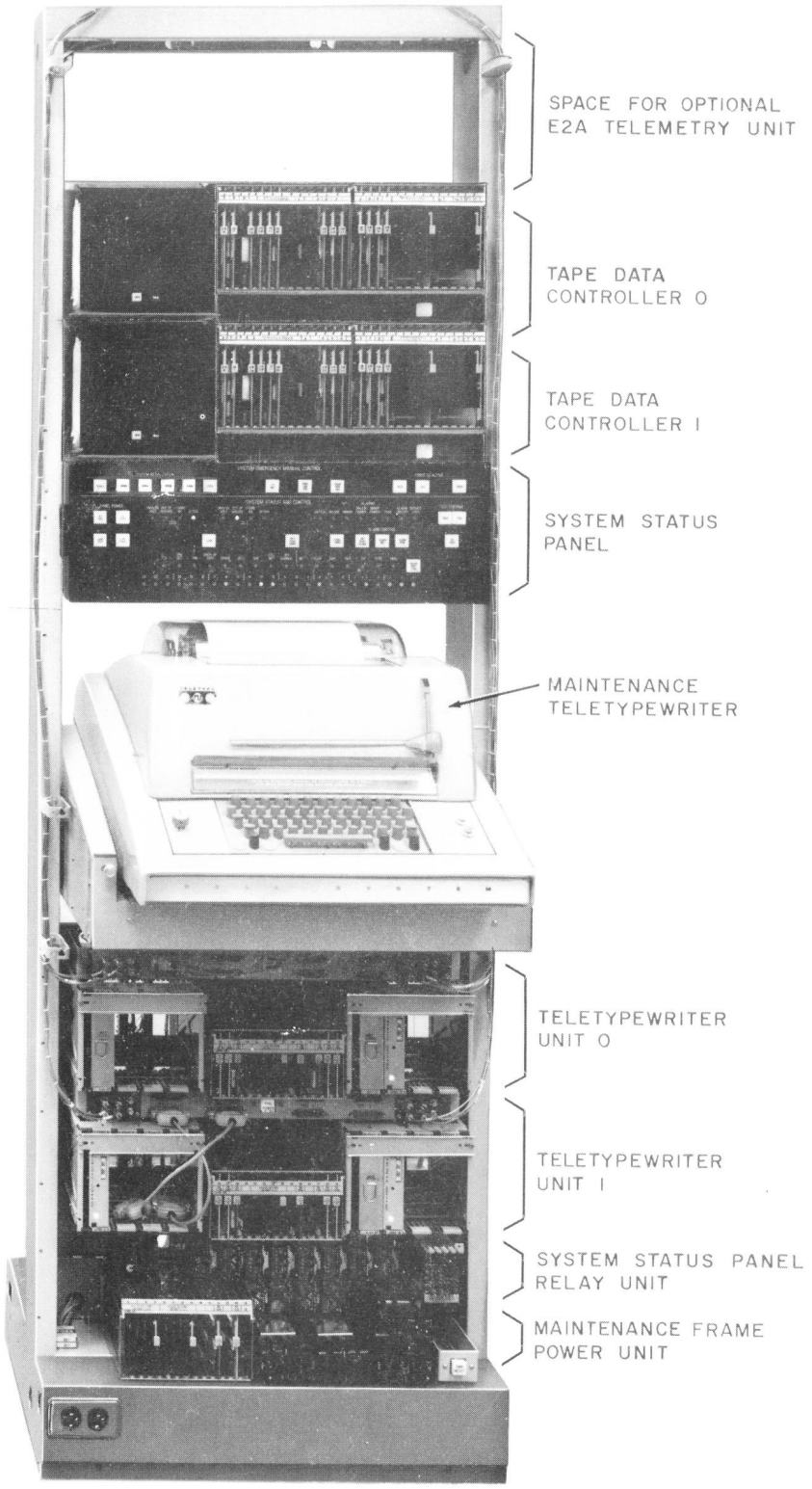

Fig. 3—No. 2B ESS Maintenance Frame

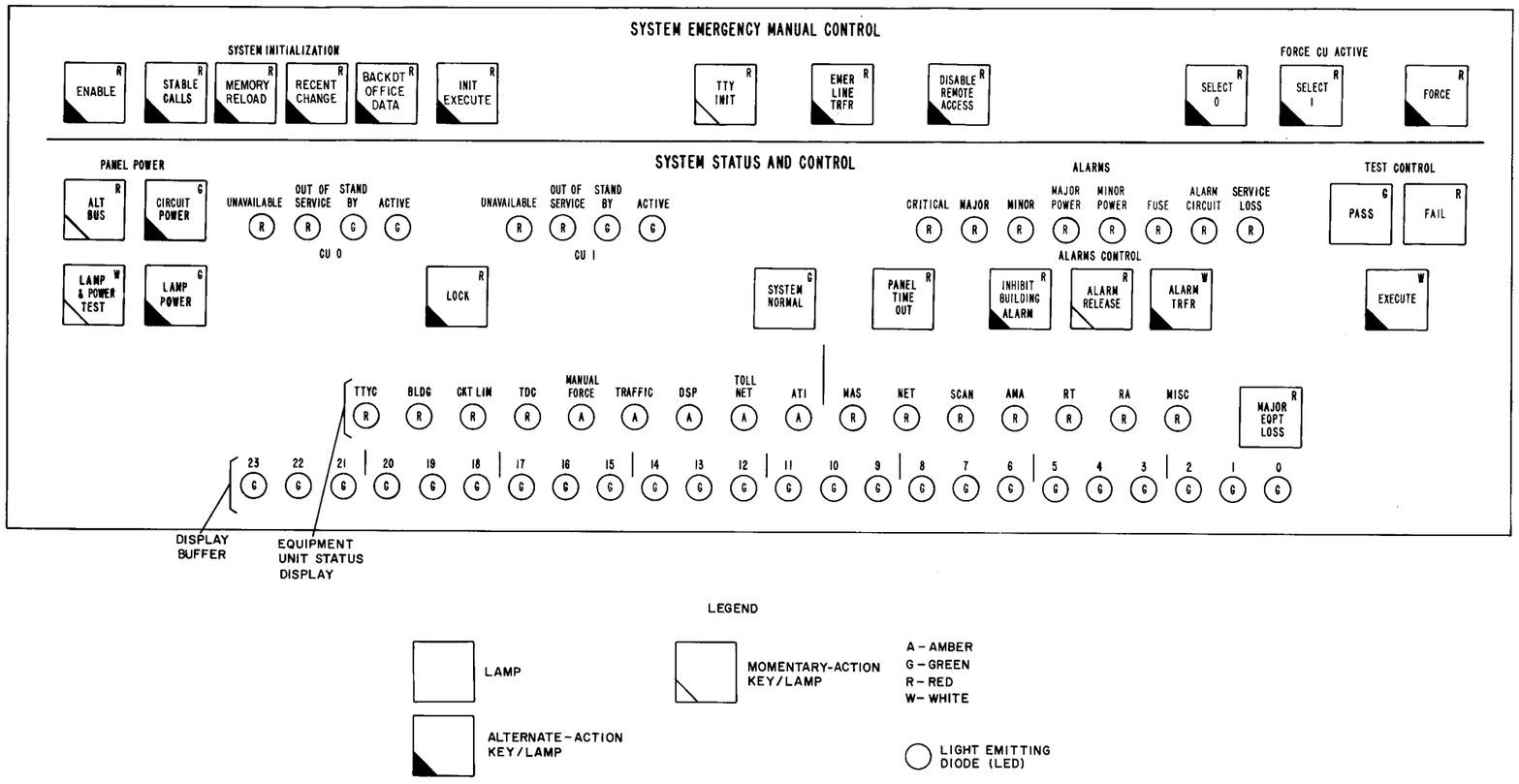

Fig. 4—System Status Panel Keys, Lamps and LEDs

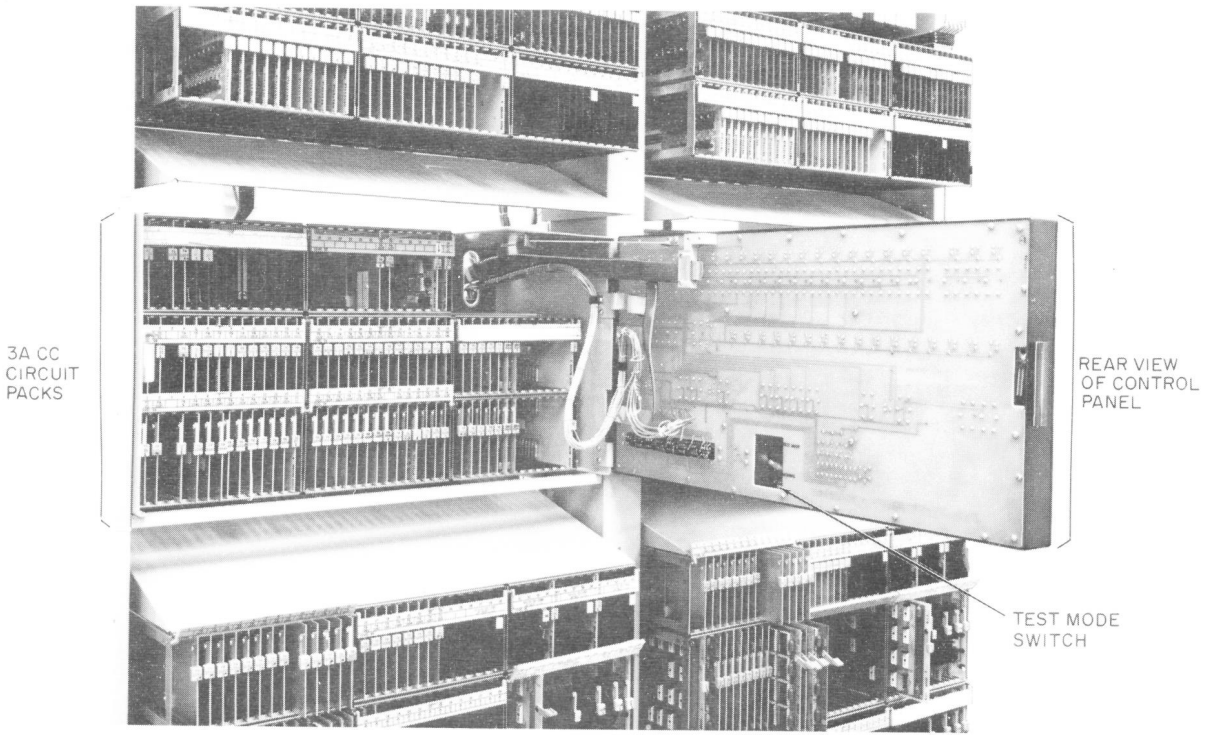

Fig. 5—3A CC Control Panel Open