LOCAL MAINTENANCE POSITION DESCRIPTION NO. 1A AND 1B NETWORK CONTROL POINT COMMON CHANNEL SIGNALING

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1. GENERAL

A. Purpose

1.01 This section provides a general description of the craft/machine interface unit at a 1ANCP (No. 1A Network Control Point) or 1BNCP (No. 1B Network Control Point). For the remainder of this section, the 1ANCP or 1BNCP will be referred to as an NCP. This craft interface is re-

ferred to as a craft operating position and is also called a LMP (local maintenance position). For the remainder of this section, the craft interface will be called the LMP. It consists of a maintenance video terminal designated MCRT and a maintenance read-only line printer designated MROP. The LMP provides the primary man/machine interface with the NCP. It provides for the use of display pages, input messages, and output messages on the MCRT and hardcopy output messages on the MROP. The NCP is an entity in the CCS (common channel signaling) network and uses the 3B20D computer as its central processor.

1.02 This section is reissued to show differences between the NCP 3B20D Model 1 and Model 3 versions of the LMP and to generally bring the section up to date. Since this a general revision, arrows normally used to denote changes have been omitted.

B. Application

1.03 The primary function of the MCRT is to provide visual status displays and a means to initiate manual controls and TTY input messages. The MROP functions as a receive-only device to provide a hardcopy printout for TTY output messages. The LMP capabilities are as follows:

(a) Provides a continuous status summary display of the NCP processor

(b) Provides detailed status displays such as service configuration and units out of service

(c) Provides 2-stage status summary alarms for system-detected troubles

(d) Indicates troubles such as peripheral control failures and loss of power

(e) Displays a single data word or program action

(f) Provides the current state of various system inhibits and forced conditions.

1.04 Manual controls are provided so that craft personnel may perform various maintenance functions. The LMP capabilities in the manual control mode are as follows:

(a) Provides access to and monitoring of various displays as required due to trouble conditions

(b) Sets and invokes CC (central control) initializations that involve both the DMERT (duplex multi-environment real-time) operating system and NCP software (including application software)

(c) Provides manual control of the NCP equipment configuration

(d) Provides control over various NCP inhibits and forced conditions

(e) Retires alarms

(f) Inhibits program interrupts for specific purposes

(g) Inserts data to monitor NCP actions

(h) Reconfigures equipment and establishes an operational system in emergencies

(i) Requests status information and reports.

2. PHYSICAL DESCRIPTION

A. Local Maintenance Position Mounting

2.01 Normally, the MCRT and MROP are mounted on separate List 302 stand assemblies. Each stand assembly consists of a pedestal stand and a top which has to be mounted. The stand assembly for the printer has a basket mounted on the back to catch the paper printout and the top has a cutout for feeding paper up to the printer. Alternatively, these units may be desk-top mounted.

B. Maintenance Terminal

3B20D Model 1 LMP Terminal

2.02 The MCRT used with the Model 1 3B20D (Fig. 1) is a commercially supplied *VT** -100 video terminal which complies with requirements established for interfacing with the MTTYC (maintenance teletypewriter controller). The terminal consists of a black-and-white video monitor and a detachable keyboard. The keyboard is connected by a plug-in jack located on the back of the video monitor. The video display area is a 12-inch (diagonal measurement) screen with a capacity of 80 characters on each of 24

* Registered trademark of Digital Equipment Corporation.

lines. The detachable keyboard has 83 keys. There are 65 conventional terminal keys for upper and lower case, numeric, punctuation, and special characters. Separate but adjacent to the conventional keys are 18 additional keys which allow numbers to be entered in numeric fashion.

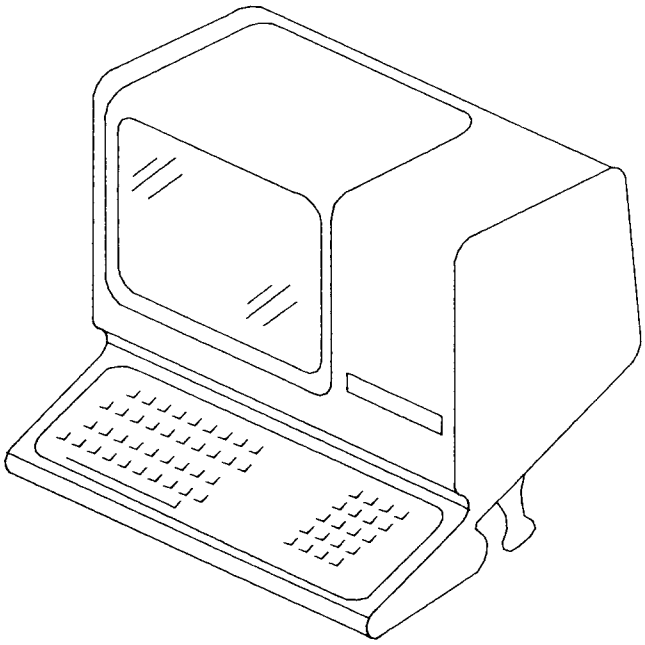


Fig. 1—Maintenance Terminal

TABLE A

MODEL 1 LMP TERMINAL INTERFACE PIN CONNECTIONS

PIN	SIGNAL
1	Terminal (*VT*-100) chassis ground
2	Transmit data
3	Receive data
4	Request to send (always asserted)
5	Clear to send (ignored)
6	Data set ready (ignored)
7	EIA signal ground (connected to chassis)
8	Carrier detect (ignored)
11, 19, 23	Speed select from *VT*-100; secondary request to send (unasserted)
12	Secondary carrier detect (ignored)
15	Transmit clock (ignored)
17	Receive clock (ignored)
20	Data terminal ready (always asserted)
22	Ring indicator (ignored)

2.03 Located on the back of the terminal is a 25-pin connector cable which interfaces the terminal to the MTTYC via a PSU (port switch unit) (see Table A). Communication between the terminal and MTTYC is at a 9600-baud rate. Below the connector cable are three female jack receptacles. One receptacle is provided for the keyboard connector, and the remaining two receptacles are provided for optional external video input and connectors.

2.04 The terminal operates on a 115 Vac supplied by protected office power via a 6-foot detachable power cord connected to the rear of the terminal. Fusing is provided by a 3A, 250V fuse. Power to the terminal may be controlled by an on-off toggle switch on the back of the terminal.

3B20D Model 3 LMP Terminal

2.05 The MCRT terminal used with the Model 3 3B20D is a KS-22921 L1 color video terminal and keyboard which complies with the requirements established for the interface with the MTTYC. Communication between the terminal and the MTTYC is at a 9600-baud rate. The terminal has the capabilities for primary rendition (black background and white foreground), negative (reverse) image, bold, blink, and underscore. In addition, this terminal is capable of producing red, green, yellow, blue, magenta, or cyan colors for a background or foreground. The screen has a capacity of 24 lines with each line containing a maximum of 80 characters.

2.06 The keyboard contains a total of 80 keys. There are 65 conventional keys for upper and lower case alpha, numeric, punctuation, and special characters. Adjacent but separate from the conventional keys are 18 additional keys used for numeric and special instruction entries.

2.07 The MCRT terminal operates on 115Vac, 60 Hz protected office power. A 25-pin female EIA communications connector is located on the rear of the terminal. See Table B for pertinent pin connections.

TABLE B

MODEL 3 LMP TERMINAL INTERFACE PIN CONNECTIONS (NOTE)

PIN	CONNECTIONS
1	Protective ground
2	Transmitted data
3	Received data
4	Request to send (always asserted)
7	Signal ground
9	Not connected
10	Not connected
20	Terminal ready (always asserted)

Note: The terminal must not drive pins 5, 6, or 8.

C. Maintenance Printer

2.08 The MROP (Fig. 2) is a *Teletype** Model 40 receive-only teleprinter. The printer is 20 inches wide, 13.2 inches high, and 21.4 inches deep; it weighs 41 pounds. Located on the front and top right panels of the printer are various keys/lamps.

2.09 Located on the back of the printer is a 25-pin connector cable which interfaces the printer with the MTTYC. Communication between the printer and the MTTYC is at 1200-baud rate. The printer operates on 115 Vac supplied by protected office power, and power is controlled by a toggle switch located above the power cord connection.

* Registered trademark of AT&T.

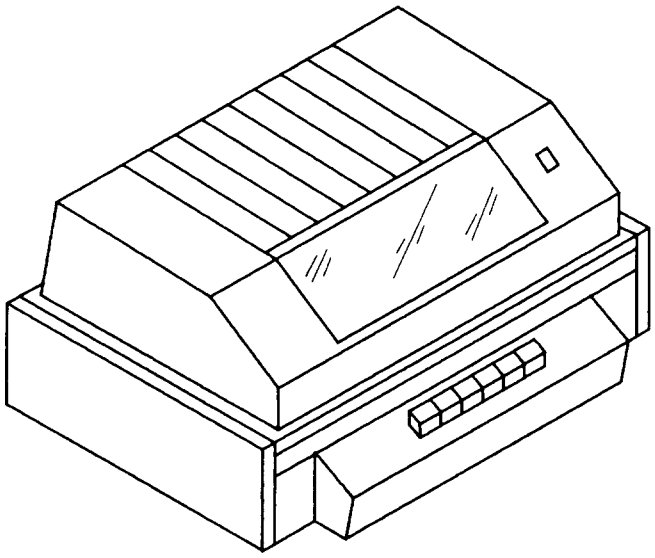


Fig. 2—Maintenance Printer

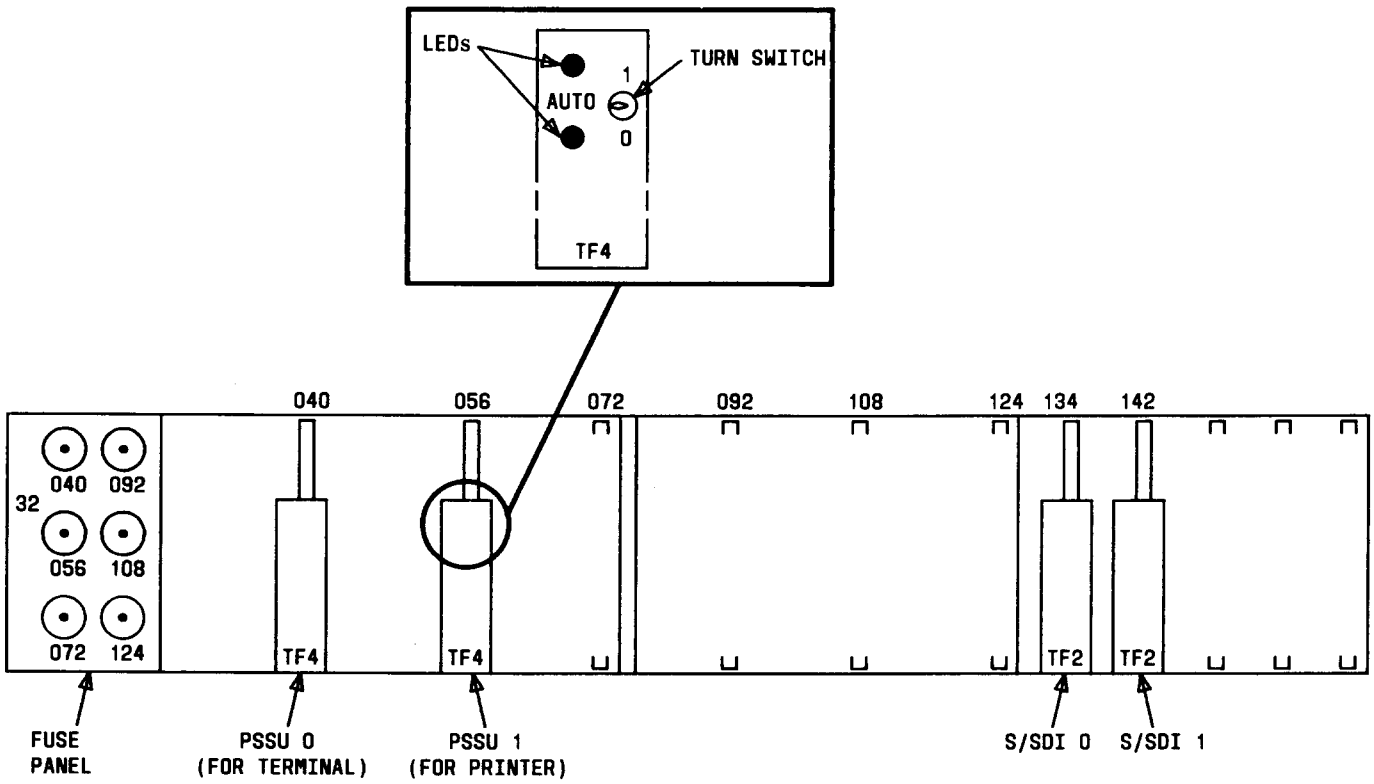
D. Port Switch Unit

2.10 For the 3B20D Model 1, the PSU is located above the disk file controller on the peripheral control frame. For the 3B20D Model 3, the PSU is located on the lower part of bay 0 of the processor cabinet. The PSU (Fig. 3) can have a maximum of six PSSU (port switch subunit) circuit packs and five S/SDI (scanner/signal distributor interface) circuit packs. Each PSSU is individually fused, with the fuses being located on the far left side of the PSU. The S/SDIs are buffer circuits which do not require fusing. The port switch contains a −48V to +5V converter which supplies power to logic circuits.

3. FUNCTIONAL DESCRIPTION

A. Interface

3.01 The interface between the LMP and the 3B20D computer is via the MTTYC. A block diagram of the interface is shown in Fig. 4. The MTTYC controls all communication between the LMP and 3B20D computer. The MTTYC is a circuit pack which is duplicated in IOP (input/output processor) 0 and 1. Each MTTYC has access to both 3B20D central control units through direct memory access via the IOP. Each MTTYC also has a direct link to the emergency action interface (EAI) circuit. Each MTTYC has five communication ports.



LEGEND:

PSSU = PORT SWITCH SUBUNIT
S/SDI = SCANNER/DISTRIBUTOR INTERFACE

Fig. 3—Port Switch Unit

(a) Port 0 is assigned to the MCRT and is used to transmit display information for the control and display area of the terminal screen and TTY output messages which appear in the scrolling area of the screen. It is also used for reception of TTY messages and control commands initiated at the terminal. The MTTYC directs the input stream to the appropriate destination, EAI circuit, or processor. Input directed to the EAI circuit includes commands initiated from the EAI display page.

(b) Port 1 is assigned to the MROP. This port is basically for 1-way communication in the sense that messages are sent to a receive-only device. The only input expected on the printer channel is a "break" signal which notifies the MTTYC that the receive input buffer is full. This port is selectively enabled by the 3B20D software for TTY output messages and by MTTYC firmware for EAI messages.

(c) Ports 2 and 3 are associated with the EAI circuits and are software switchable to avoid interference. Through these ports, the MTTYC interfaces directly with the EAI circuits which have low-level access to the processor system status register. The EAI commands allow craft personnel to control processor status and recovery or to switch on-line processors in failure situations.

(d) Port 4 is the remote 2SCCS (No. 2 switching control center system) port. The 2SCCS port provides for synchronous data link communication via 201C data sets and protocol converters with the

remote 2SCCS. This dedicated data link permits 2SCCS personnel to function in a manner similar to that of local craft personnel, allowing them to manually control, monitor, and configure NCP equipment, particularly during periods when the NCP office is unmanned. The link also allows 2SCCS personnel to interact with local craft personnel when troubles are encountered.

3.02 A block diagram of the MTTYC is shown in Fig. 5. The MTTYC is a microprocessor-based controller complete with its own processor, memory array, input-output ports, and self-diagnostic circuitry. The memory array consists of three sections: ROM (read-only memory), DRAM (dynamic random-access memory), and DPM (dual-port memory).

3.03 The ROM contains vital portions of the MTTYC operating code (firmware) since the MTTYC must remain functional when NCP sanity is nonexistent. This operating code performs memory and device initialization, parsing, and execution of input commands from the terminal and 2SCCS channels. The ROM firmware also provides support for terminal displays and IOP and 2SCCS interfaces. In addition, it stores the bootstrap program and tables supporting the EAI display page.

3.04 The 16K of DRAM contains code loaded from both the MTTYC ROM and the main store. Code loaded from the ROM includes support tables for the EAI display. Status information displayed on the EAI display page reflects the transient EAI data stored in DRAM. Operating code downloaded from the main store enables the processor to talk to devices (e.g., terminal, printer). The code provides additional memory initialization, support for communications, and additional display capabilities.

3.05 The 4K of DPM allows for data transfers between the MTTYC and the 3B20D computer. The dual port allows for data stored in DPM to be accessed by either unit. Transient data gated through the DPM includes TTY messages, display updates, and jobs to be performed.

3.06 The MCRT and MROP asynchronous channels use the standards of the EIA (Electronic Industries Association) RS-232C. Control signals are defined for communication with a data set. Appropriate adapter cables with cross-connections allow for connection to the terminal and printer. Terminal/printer control signals are identified in Table C. A synchronous input-output port is provided for communication with the 2SCCS using the BX.25 protocol, which employs the electrical interface specification of EIA RS-232C. The method of driving and receiving control signals is identical to that of terminal/printer interfaces. Communication with the EAI circuits is via a single universal asynchronous receiver-transmitter which is software switchable between either EAI circuit pack.

3.07 The electrical interface is RS-422, a 5V balanced system. In comparison to RS-232C, this interface permits greater tolerance of interference and differences in ground potential between transmitting and receiving ends. Cable length between the MTTYC and EAI circuits is limited to 100 feet. The EAI control signals are identified in Table D.

B. Maintenance Terminal

3.08 The MCRT is the primary on-site craft interface for the NCP. Through the MTTYC, the terminal has TTY, CD (control and display), and emergency action access to the 3B20D computer. Teletypewriter and CD access is provided via the IOP link to the TTY handler and user processes. Emergency action access is provided by direct links from the MTTYC to each EAI circuit.

3.09 The MTTYC software interfaces with the DAP (display administration process) in the 3B20D computer to generate video terminal displays. Display information from the DAP is transferred to the MTTYC as a job in the common high priority work queue. These jobs have an output priority higher than normal TTY output but lower than input echoing. As the MTTYC scans for pending output jobs, echo will be looked at first and then display updates and TTY outputs. However, no new jobs will interrupt a job already in progress. The MTTYC examines the display output stream and translates the information into terminal control sequences. This information includes cursor positioning information, character attributes, and line erase information. No other control sequences are passed to the video terminal. Display size parameters are down loaded into the MTTYC to prevent overwriting the message input and acknowledgment area.

3.10 Control input jobs found in the normal work queue are passed to DAP. Control inputs include predefined control character entries and menu selectable control sequences. The MCRT output

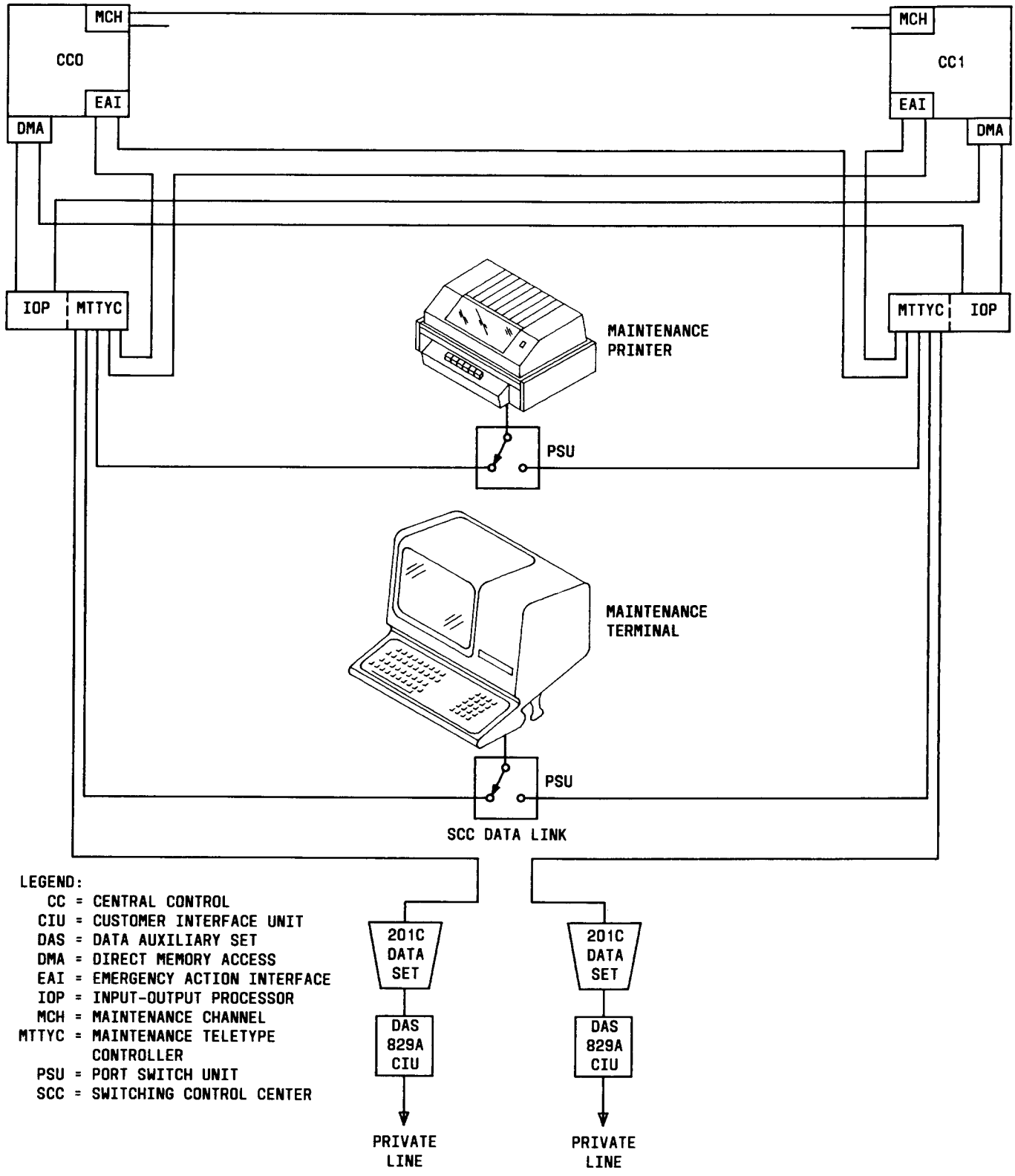
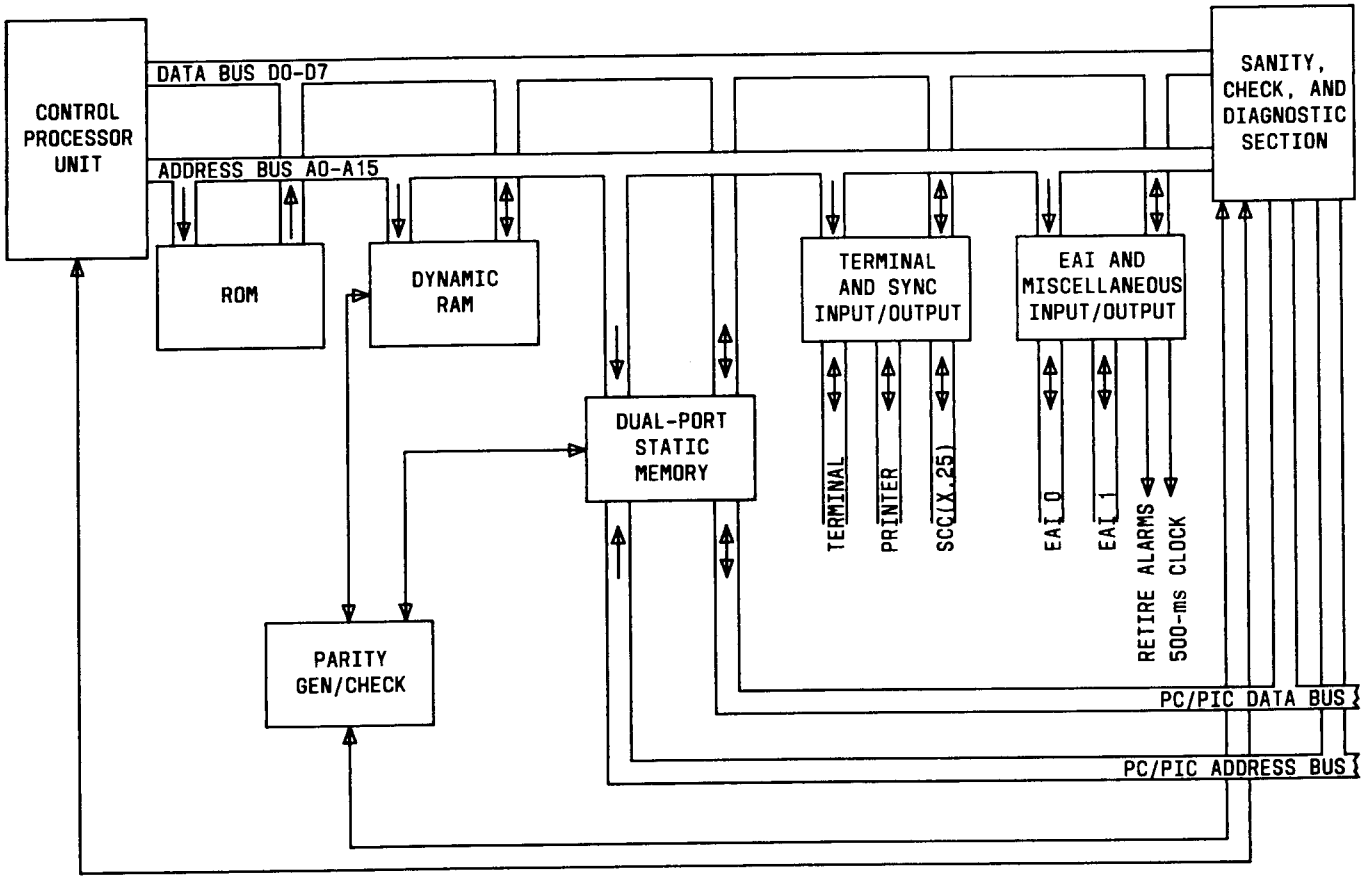


Fig. 4—Local Maintenance Position Interface



LEGEND:
EAI = EMERGENCY ACTION INTERFACE
PC = PERIPHERAL CONTROLLER
PIC = PERIPHERAL INTERFACE CONTROLLER
RAM = RANDOM-ACCESS MEMORY
ROM = READ-ONLY MEMORY

Fig. 5—Functional Block Diagram of MTTYC

stream is examined for control sequences which match sequences down loaded by processor software. These are translated using down-loaded tables and result in the action defined by the control input.

3.11 Teletypewriter input jobs are defined by the MTTYC as a sequence of noncontrol characters ending with a line terminator. The maximum job size is 256 characters. Input line editing is supported by editing characters and echo sequences. Character echo has a higher priority than display update. It does not interrupt other output already in progress. Once an input job begins and the inter-character timer is active, further TTY output is blocked until an unlocking acknowledgment is received or a timeout occurs. Inter-character timeout causes the input buffer to be flushed and an asynchronous report to be sent to the 3B20D computer. Successfully entered TTY messages result in an acknowledgment being printed.

3.12 Teletypewriter output jobs are received by the MTTYC as jobs in the subdevice transmit/miscellaneous work queue. These jobs have the lowest priority and are serviced only after display update, message acknowledgment, and input echo jobs are completed. However, once an output job has begun, no new job of higher priority will interrupt it. The maximum output job is 256 characters. The TTY output stream is examined by the MTTYC, and any

TABLE C

LMP TERMINAL/PRINTER INTERFACE SIGNALS (NOTE)

LEAD	TERMINAL SIGNAL
CRTTXD0	Transmit data to DCE
CRTDTR0	Data terminal ready to DCE
CRTRTS0	Request to send to DCE
CRTRXD0	Receive data from DCE
CRTDSR0	Data set ready from DCE
CRTCTS0	Clear to send from DCE
CRTDCD0	Data carrier detect from DCE
LEAD	**PRINTER SIGNAL**
PRTTXD0	Transmit data to DCE
PRTDTR0	Data terminal readyto DCE
PRTRTS0	Request to send to DCE
PRTRXD0	Receive data from DCE
PRTDSR0	Data set ready from DCE
PRTCTS0	Clear to send from DCE
PRTDCD0	Data carrier detect from DCE

Note: DCE = data communications equipment.

control codes encountered are mapped into an echo sequence. Teletypewriter output is directed to the bottom line of the message input and acknowledgment area of the terminal screen.

3.13 Acknowledgments to TTY input are received as jobs in the common high priority transmit work queue along with display updates. These acknowledgements are distinguished by the fact that all display updates begin with cursor positioning, while acknowledgments do not. Acknowledgment has the highest output priority, and thus input echo is disabled from the time a line terminator is received until an acknowledgment is received. If an acknowledgment is not received within a 5-second period, an asynchronous report is sent to the system software indicating an acknowledgment timeout.

TABLE D

EAI INTERFACE SIGNALS

EAI0 LEAD (NOTE)	SIGNAL
EAIOTDX0	Transmit data to EAI0
EAIOTDX1	Transmit data to EAI1 (mark = 1)
EAIORXD0	Receive data from EAI0
EAIORXD1	Receive data from EAI1 (mark = 1)
EAIOSRQ0	Service request from EAI0
EAIOSRQ1	Service request from EAI1 (mark =1)

Note: Six similarly labeled leads are provided for EAI1.

3B20D Model 1 LMP Terminal

3.14 There are seven lights located on the *VT*-100 terminal keyboard. The lights and their functions are as follows:

(a) ***ONLINE:*** When lighted, indicates that the terminal is on-line and is capable of communicating with the 3B20D computer.

(b) ***LOCAL:*** When lighted, indicates that the terminal is off-line an is not able to communicate with the 3B20D processor.

(c) ***KBD LOCKED:*** When lighted, indicates that the keyboard has been disabled due to buffer overflow. This condition may be overcome by entering and exiting the set-up mode.

(d) ***L1-L4:*** These lights are operational but have no special meaning.

3.15 Some special keys on the *VT*-100 terminal are designated PF1-PF4. Operation of these keys causes actions to occur as follows:

(a) ***PF1/EMER DISP:*** Operation of this key causes the EAI page to be displayed if previously displayed. Control of the EAI page is provided solely by the MTTYC.

(b) ***PF2/NORM DISP:*** Operation of this key causes the terminal to display a page controlled by the 3B20D computer or to repaint the page if previously displayed.

(c) ***PF3/CMD/MSG:*** Operation of this key causes the MCRT to toggle states between the command mode and the input message mode. In the command mode, the cursor is positioned on line 4 directly following the command prompt (CMD:). In the message mode, the cursor is positioned in the scrolling area of the screen.

(d) ***PF4/ALM RTR:*** Operation of this key retires all audible alarms and reduces visual alarms to a dormant state.

3.16 The *VT*-100 terminal is a general purpose input-output device designed to function in a variety of environments. Therefore, in order to function properly as the craft interface to the NCP, certain terminal characteristics must be set. In order to set these characteristics, the set-up mode of operation is provided. The set-up mode allows craft personnel to verify and alter certain video terminal functions and characteristics.

3.17 Two set-up pages are provided. These set-up pages are designated as set-up A and set-up B. Set-up A displays the column setting (80 or 132 columns) and indicates column positions where tabulations have been set. Set-up B displays four sets of bits containing four bits commonly known as nibbles. Each feature bit corresponds to other video terminal characteristic. Set-up B page also displays the speed at which the video terminal communicates with the 3B20D computer and indicates transmit and receive speeds measured in baud. Table E defines the set-up features and the desired states for set-up pages A and B.

TABLE E

MODEL 1 LMP TERMINAL SET-UP FEATURES

MODE	NIBBLE	OPTION FUNCTION	DESIRED STATE
Set-up A	—	Characters per line	80
		Tab stops	* (preferably every eighth character)
Set-up B	1	Jump/scroll	* (0 = jump, 1 = smooth)
		Auto repeat	0 (off)
		Screen	0 (dark background)
		Cursor	1 (block)
	2	Margin bell	1 (on)
		Key click	0 (off)
		ANSI	1
		Auto XON	1
	3	#	0 (shifted)
		Wraparound	0 (off)
		New line	0 (off)
		Interlace	0 (off)
	4	Parity sense	1 (even)
		Parity	1 (on)
		Bits per character	0 (seven)
		Power	0 (60 Hz)
	—	Transmit speed	9600 (†)
		Receive speed	9600 (†)

* A "don't care" condition exists.

† Depress appropriate keyuntil desired setting is displayed.

3.18 In the set-up mode, certain keys have special functions. These keys allow craft personnel to alter and verify video terminal features. Whenever video terminal power is removed and restored, the terminal is self-diagnosed. This is also true whenever the reset (0) key is operated while in the set-up mode. If a fault is detected, an error character appears in the top left corner of the video terminal screen. Table F lists the error characters and the suspected faulty section of the *VT*-100 terminal.

3B20D Model 3 LMP Terminal

3.19 The KS-22921 terminal has four private function keys (PF1-PF4) which are used for the following purposes:

(a) ***PF1/EMER DISP:*** Causes the EA1 display page to be displayed.

(b) ***PF2/NORM DISP:*** Causes the terminal to display a page controlled by the 3B20D computer or to display the page again if previously displayed.

(c) ***PF3/CMD/MSG:*** Causes the terminal to toggle states between the command mode and the input message mode.

(d) ***PF4/ALM RLS:*** Causes the silencing of audible alarms and the extinquishing of alarm lamps.

3.20 A terminal set-up display page is shown on the screen when the SET UP key is depressed. The set-up features allow the user to configure the terminal into various states which are saved in nonvolatile RAM memory. When the set-up display is on the screen, the cursor can be moved from item to item and changes made to the items where appropriate. Some of the items shown on the display are listed as follows:

(a) ***ANSWER BACK MESSAGE:*** When in effect, will send an identifying message on receipt of certain user-defined control characters.

(b) ***AUTO REPEAT:*** When in effect, will cause any key to automatically repeat when depressed for more than half a second.

(c) ***BITS PER CHARACTER/LINE:*** Enables the user to select 7- or 8-bit characters.

(d) ***CURSOR:*** Allows the user to select between underline or blinking block cursor.

TABLE F

MODEL 1 LMP TERMINAL ERROR CHARACTERS

ERROR CHARACTER (NOTE)	ADVANCED VIDEO OPTION	NONVOLATILE RAM	KEYBOARD
1	X		
2		X	
3	X	X	
4			X
5	X		X
6		X	X
7	X	X	X

Note: Error character appears in top left corner of terminal if fault is present.

(e) ***DATA RATE, RECEIVE:*** Allows the user to select terminal receive speeds of 300, 1200, 2400, 4800, 9600, or 19200 baud.

(f) ***DATA RATE, TRANSMIT:*** Allows the user to select terminal transmit speeds of 300, 1200, 2400, 4800, 9600, or 19200 baud.

(g) ***NEW LINE:*** When activated, the return key will generate two control characters: carriage return (CR) and line feed (LF). Upon receipt of a LF code, the terminal will interpret with a carriage return and a line feed.

(h) ***PARITY:*** This feature selects between odd and even parity or between parity or no parity.

(i) ***SCREEN BACKGROUND:*** Allows the user to select between normal screen display (displayed data is white and background is black) or reverse screen display (displayed data is black and background is white).

(j) ***TABS:*** Allows the user to preset the amount of spaces to move the cursor on a horizontal line when the TAB key is depressed.

(k) ***WRAPAROUND:*** When this feature is enabled, the next character after the final character (right-most) in a line is automatically placed in the first character position on the next line. If this feature is not enabled, the next and all subsequent characters after the final character in a line overwrite the final character.

C. Maintenance Printer

3.21 The MROP provides the craft with a hard-copy printout of TTY messages. The printer functions as an output device with one exception: the printer is capable of generating a break signal. This signal notifies the MTTYC that the receive input buffer of the printer is nearly full. When the printer is out of paper, the MTTYC sends a message to the 3B20D computer indicating the printer is out of service. Located on the front and right top panels of the printer are various keys/lamps whose functions are as follows:

(a) ***INTRPT:*** This control is not functional.

(b) ***TEST:*** Depression of this locking key causes the printer to continuously print a string of test characters provided the IN SERVICE key/lamp is off.

(c) ***IN SERVICE:*** When lighted, this locking key/lamp indicates that power is applied to the printer. Power may be applied or removed by depressing this key/lamp.

(d) ***DATA ERROR:*** When a parity error is received, this key/lamp lights. This key/lamp may be reset by depressing it.

(e) ***PAPER:*** This red translucent key/lamp lights and remains lighted when the printer is out of paper. Pressing this key/lamp causes paper to feed through the printer until the key/lamp is released.

(f) ***FORM ADVANCE:*** When momentarily depressed, this key advances the paper to the next home position. If held down, the paper will advance until the key is released causing the paper to stop at the next home position.

D. Port Switch Unit

3.22 The PSU (Fig. 3) performs the following functions:

(a) Connects external maintenance devices (e.g., terminal, printer) to one of two MTTYCs (Fig. 3)

(b) Provides a buffer between the scanner/signal distributor circuit pack and non-3B20D computer scan and distribute points (e.g., office alarm distribute points).

3.23 Connection of the terminal and printer to one of two MTTYCs is controlled by the PSSUs. One PSSU is provided for each device. The PSSU controls the device-MTTYC configuration automatically but also allows manual control. The PSSU controls and indicators are as follows:

(a) One 3-state turn switch labeled AUTO, 0, and 1. In the AUTO position, the device-MTTYC configuration control is provided by NCP control. In the 0 position, the attached device is forced into configuration with the MTTYC housed in IOP 0. In the 1 position, the attached device is forced into

configuration with the MTTYC housed in IOP 1. The switch should normally be in the AUTO position.

(b) Two green light-emitting diodes (LEDs) labeled 0 and 1. These indicators indicate the current device-MTTYC configuration.

3.24 The S/SDIs connect the 3B20D scanner/signal distributor to scan and distribute points exterior to the 3B20D (e.g., office alarm and port switch scan points). The S/SDIs provide signal distribute connections to office alarms (CRITICAL, MAJOR, MINOR, and SYSTEM) and alarm retire leads.

E. Display Format and Conventions

3.25 A display on the MCRT is commonly referred to as a page. However, a display may actually consist of several pages. All displays adhere to a common display format and video display conventions. The terminal screen consists of predesignated information. These areas and the information displayed in them are as follows:

(a) The header line (line 1) consists of office name, office type, software generic and issue, date, and time.

(b) The status summary area (lines 2 and 3) allows for 16 status summary indicators. These indicators provide visual alarms to alert craft personnel when trouble conditions exist at the NCP. The severity indicators (CRITICAL, MAJOR, MINOR) can be in one of two visual states: either in flashing bold reverse video when an alarm is set, or in normal video when there is no alarm or when the ALM RTR function key is pushed. Other severity indicators (except the "SYS NORM") can be in one of three states: flashing bold reverse video when an off normal condition is detected, steady bold reverse video when the ALM RTR function key is pushed but the off normal condition is not cleared, and normal video if the corresponding status is normal. These status summary indicators and the conditions they represent are shown in Table G.

(c) The command input and page title line (line 4) contains the command prompt (CMD:) and the page title. When in the command mode, the cursor appears on this line and 3-digit commands may be entered and executed in the area directly following the command prompt. The act of entering commands is commonly known as a "poke." An acknowledgment is automatically printed in response to the poke. When in the message mode, the cursor appears on line 24 and messages may be entered in the message input and acknowledgment area. The mode of operation is controlled by the CMD/MSG (PF-3) key.

(d) The control and display area (lines 5 through 22) is provided for displaying status and control information. Unlike most areas of the screen, this area varies in size and content. One display page may be shown which includes both NCP pages and pages common to all systems which use the 3B20D computer as a control unit. The information displayed in this area provides the craft personnel with status information and some poke definitions. The size of this area depends on the individual page. An example of a CD page is shown in Fig. 6.

(e) The message input and acknowledgment area (lines 23 and 24) is reserved for input messages and acknowledgments. Input messages are entered on line 24. After being executed, the message scrolls to line 23 and an acknowledgment is automatically printed. Most output messages are also printed in this area. However, the hard-copy printout on the MROP is the best source for output messages since all output is printed on the printer. The MCRT scrolling area may be expanded to encompass a maximum of lines 5 through 23 depending on the size of the area required by control and display.

3.26 Video modes indicate alarm conditions and the severity of these conditions. They also differentiate between the on/off states of certain system controls such as system inhibits and off-normal conditions. Graphic layouts representing status and configuration of equipment units are displayed in the CD area of the terminal screen. They are represented by boxes containing the unit name and status information. Major status information indicates whether the unit is active, standby, unavailable, unequipped, out of service, or being diagnosed. Status display modes are as follows:

(a) ***ACTIVE:*** The legend ACT appears in the unit status area.

TABLE G

STATUS SUMMARY INDICATORS

INDICATOR	CONDITION
SYS EMER	***System Emergency:*** Indicates that a service-affecting emergency condition is being experienced in the central processing community.
CRITICAL	***Critical:*** Indicates a system critical alarm. A condition exists which prevents call processing sanity and severely affects service.
MAJOR	***Major:*** Indicate a system major alarm. A condition exists which creates a high potential for serious service degradation.
MINOR	***Minor:*** Indicates a system minor alarm. A condition exists which requires attention of plant craft personnel but does not imply or cause a serious service degradation.
BLDG/PWR	***Building/Power:*** Indicate that a significant building or power alarm exists.
BLDG INH	***Building Inhibit:*** Indicate that a building alarm has been inhibited.
CKT LIM	***Circuit Limited:*** Indicates when a group of circuits such as service circuits, special circuits, or positions reach the limit beyond which these circuits cannot be automatically removed from service.
SYS NORM	***System Normal:*** This indicator is activated to normal video as a result of trouble conditions. When the system is normal, this indicator is in bold reverse video.
OVERLOAD	***Overload:*** Indicates that the system is experiencing a real time overload condition or shared overload. Real-time overload occurs when there is insufficient real-time to perform the work offered to the processing facility.
SYS INH	***System Inhibit:*** Indicates that a system process is not operational because a program-controlled inhibit has been activated (PESTS, inhibits of audits, fault detection/recovery turned off for a unit, inhibits of diagnostics, etc).
CC	***Central Control:*** Indicates when CC has a fault condition, is out of service, or is unavailable.
CC PERPH	***Central Control Peripheral:*** Indicates when a unit (IOP, DFC, MHD, etc) in the CC is out of service.
LINK	***Link:*** Indicates when a link is faulty or has been manually removed.
CCIS NET	***CCIS NET:*** Summarizes the status of the interprocessor link (I-link pool, the host No. 1 signal transfer point (1STP), the cross links (C-links) pool, and the mate 1STP.
FUNC ST	***Function Status:*** Summarizes the status of all the applications (and mate applications such as 800 Service or billing validation application. It also includes the status of the local and the mate 1ANCP software.

(b) ***STANDBY:*** The legend STBY appears in the unit status area.

(c) ***UNAVAILABLE:*** The legend UNAV appears in the unit status area. If "family equipment" affecting this unit is out of service, the unit is shown in normal video.

(d) ***UNEQUIPPED:*** The legend UNEQ appears in the unit status area.

(e) ***OUT OF SERVICE:*** The legend OOS appears in the unit status area, and the unit is lighted. If "family equipment" affecting this unit is out of service, the unit is shown in normal video.

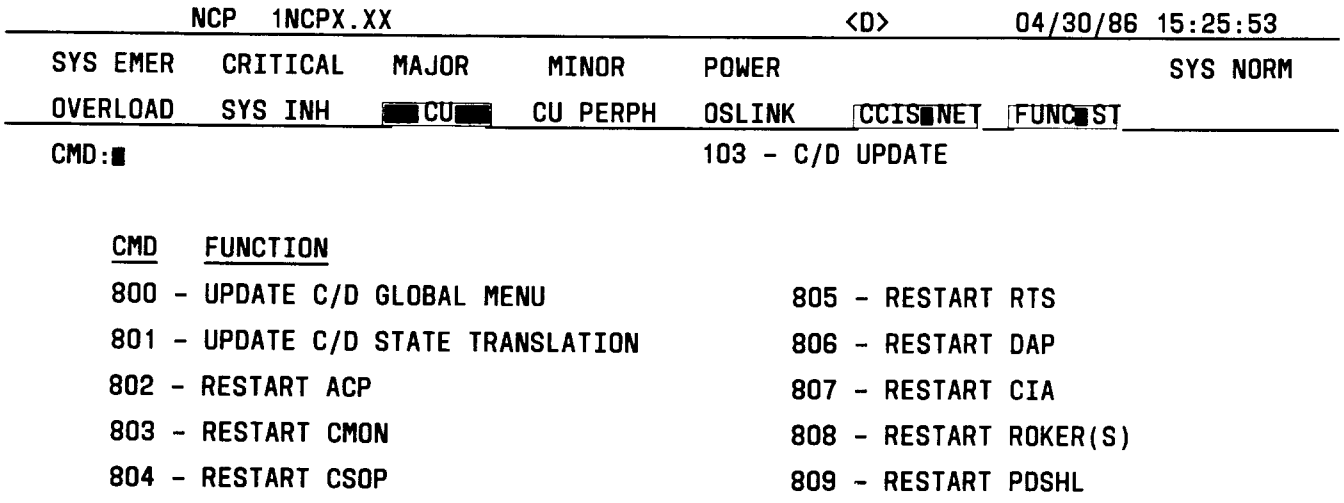


Fig. 6—Page Display Index

(f) ***DIAGNOSTIC:*** The legend DGN appears in the unit status area for units taken out of service due to running of routine diagnostics.

(g) ***UNSTABLE:*** The legend USTB appears in the unit status area. This condition indicates that the status of a unit is changing faster than can be related in a meaningful way to the craft personnel.

(h) ***GROWTH:*** This state, identifies equipment experiencing growth activity, has two qualifiers: normal and trouble.

(1) The normal growth state signifies equipment that is trouble free and functioning. The normal growth units appear with the legend GROW in the unit status area.

(2) The trouble growth state signifies equipment that is suspected of having a fault or that has been placed out of service by manual or automatic action. The trouble condition is signified by the legend GROW shown boldly in the unit status area.

3.27 There are two types of commands which may be entered and executed on the MCRT. The first type is designated as global commands. Global commands may be poked from any page except the EAI page. All commands used to display pages are global commands. All remaining commands are local commands. Local commands are those which must be poked from the page on which they appear. The commands which appear on the EAI page are also local commands.

3.28 Erase characters are provided for editing when entering commands or input messages. These erase characters perform the following functions:

(a) The _ (underscore) erases the previous character.

(b) The $ (dollar sign) erases the entire line.

3.29 Additional special characters are as follows:

(a) The ! (exclamation mark) executes commands and input messages.

(b) The / (slash) is the message continuation character. After typing this character, the input message may be continued on the following line.

(c) The & (ampersand) abandons a command.