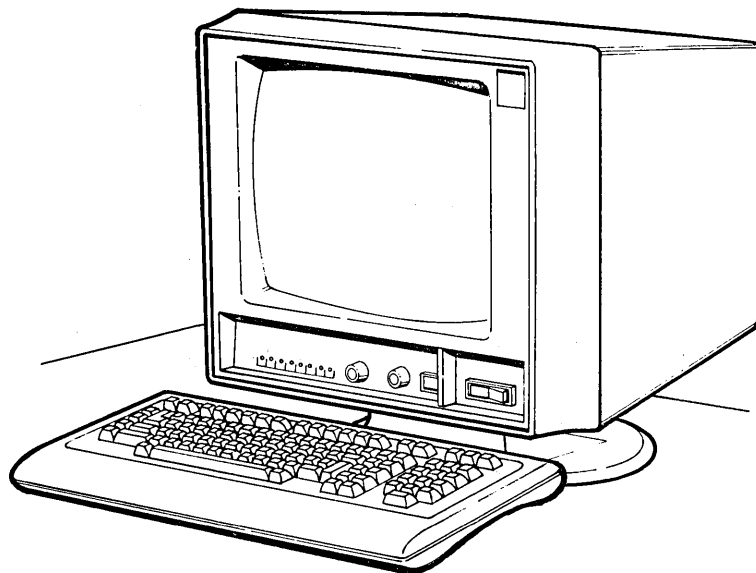




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## CDC<sup>®</sup> CC63X DISPLAY TERMINAL



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**HARDWARE MAINTENANCE MANUAL**  
**(SERVICE-CENTER AND ON-SITE INFORMATION)**

REVISION RECORD

REVISION	DESCRIPTION
A (05-03-82)	Manual released. Includes information from manual verification and product testing. This edition obsoletes all previous editions.
B Interim (07-30-82)	Incorporates ECO 15137, ECO 15166, and ECO/FCO 15337 plus various editorial corrections.
C (09-08-82)	Manual revised to incorporate ECOs 15167, 15251, 15259, 15344, 15345 and 15347. Incorporates ECO 15337 (B-Interim) in its final form and makes technical corrections/changes.
D (04-07-83)	Manual revised to incorporate ECOs 15553, 15659, 15679, 15705, and 15717. Makes technical corrections/additions to SAMs listings.
E (09-18-83)	Manual revised to include information on internal 1200/1200 baud modem option, 4.0 terminal firmware, and power-cord interlock. This revision also includes various technical and editorial corrections. This edition obsoletes all previous editions.
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or use Comment Sheet in  
 the back of this manual.

MANUAL TO EQUIPMENT LEVEL CORRELATION SHEET

This manual reflects the equipment configurations listed below.

EXPLANATION: Locate the equipment type and series number, as shown on the equipment FCO log, in the list below. Immediately to the right of the series number is an FCO number. If that number and all of the numbers underneath it match all of the numbers on the equipment FCO log, then this manual accurately reflects the equipment.

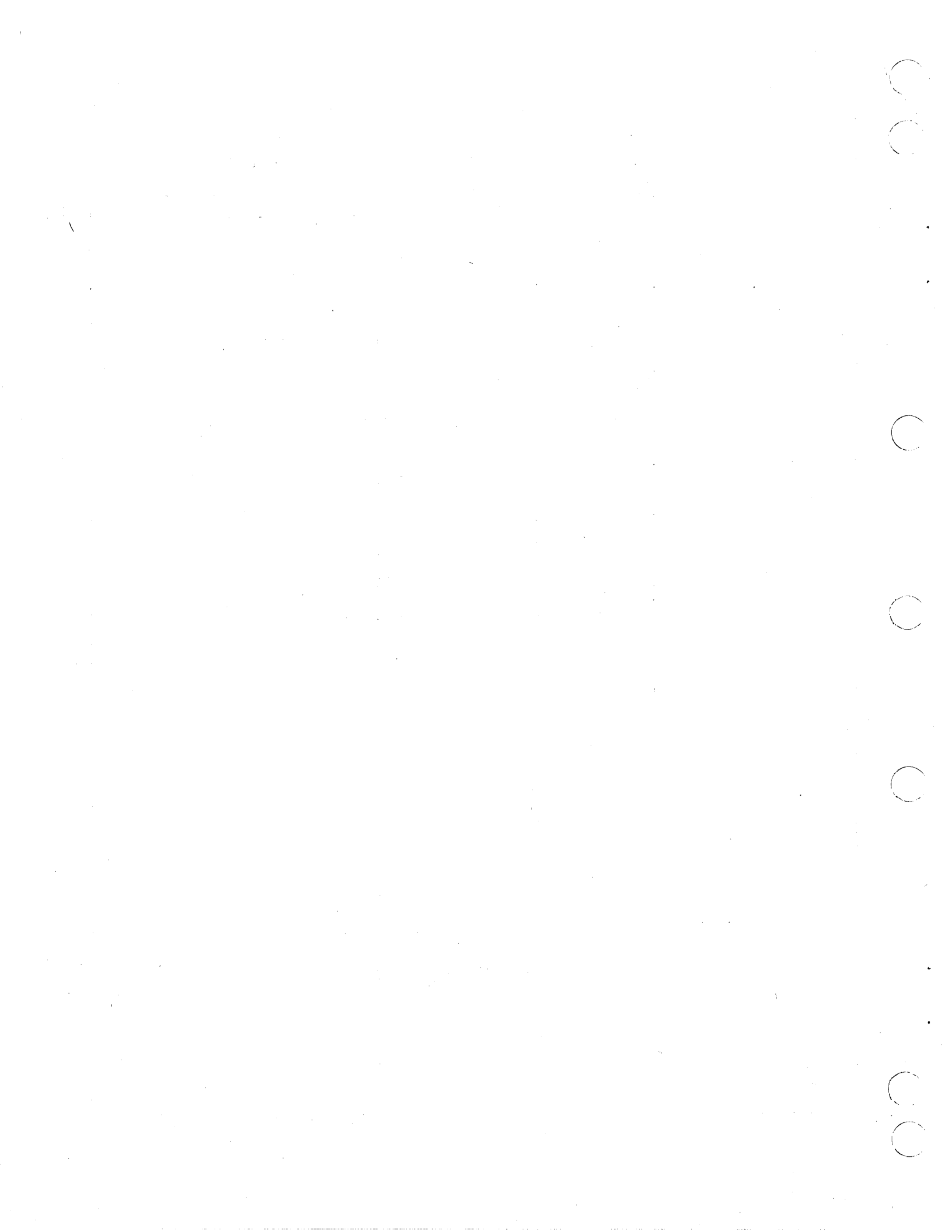
EQUIPMENT TYPE	SERIES	WITH FCO'S	COMMENTS
CC634-A	01		
	01	-	ECOs 15224 and 15236 (S/N 101)
	01	-	ECOs 15346 and 15259 S/N 138)
	02	-	ECO 15337 (S/N 163)
	03 04	-	ECO 15553 (S/N 426)
CC634-B	01		
CC638-A	01		
	01	-	ECOs 15224 and 15236 (S/N 101)
	01	-	ECO 15347 (S/N 207)
	02	-	ECOs 15346 and 15259 (S/N 226)
	03 04 05	-	ECO 15337 (S/N 232) ECO 15553 (S/N 1303)
CC638-B	01		

MANUAL TO EQUIPMENT LEVEL CORRELATION SHEET (CONTD)

EQUIPMENT TYPE	SERIES	WITH FCO'S	COMMENTS
XA358-A	01 02	-	ECO 15347 (S/N 106)
XA360-A	01		
XA368-A	01		
XA369-A	01		
YA274-A	01 02	-	ECO 16145
YA274-B	01 02	-	ECO 16145
YA274-C	01 02	-	ECO 16145
YA274-D	01 02	-	ECO 16145

MANUAL TO EQUIPMENT LEVEL CORRELATION SHEET (CONTD)

EQUIPMENT TYPE	SERIES	WITH FCO'S	COMMENTS
YA274-E	01 02	-	ECO 16145
YA274-F	01 02	-	ECO 16145
YA275-A	01		
YR101-A	01 02	-	ECO 15322
YR102-A	01		
YR109-A	01		



LIST OF EFFECTIVE PAGES

New features, as well as changes, deletions, and additions to information in this manual are indicated by bars in the margins or by a dot near the page number if the entire page is affected. A bar by the page number indicates pagination rather than content has changed.

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xi	F	6B-22.4	F		
xii	E	6B-23	F		
xiii/xiv	F	6B-24 thru 6B-52	E		
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2-2	B	Back Cover	-		
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2-4	F				
3-1	F				
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4-1	B				
4-2/4-3	E				
4-4	A				
4-5/4-6	E				
5-1	E				
5-2	F				
5-3/5-4	A				
5-5/5-6	E				
5-7	A				
5-8/5-9	E				
5-10	F				
6-1	E				
6-2	A				
6-3	B				
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6-11	F				
6-12 thru 6-14	E				
6A-1/6A-2	E				
6A-3/6A-4	B				
6A-5	E				
6A-6	D				
6A-7	A				
6A-8 thru 6A-18	E				
6B-1 thru 6B-9	E				

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## PREFACE

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This manual provides maintenance information for the display terminal hardware only. For the maintenance of any applications (hardware, software, or firmware) added to the terminal, refer to the applicable maintenance manual covering that application.

This manual is also the only training document. Due to few parts, self-contained diagnostics, and modular construction of the display terminal, no classroom instruction is offered. By carefully reading the information in this manual, the customer engineer (CE) will be prepared to isolate display terminal hardware problems.

Section 1 lists the self-study objectives, and section 6 lists the tasks to be performed before responding to a customer request for maintenance.

Reference to the following listed manuals may be necessary during maintenance. These manuals are divided into groups which cover the enhanced model terminals and the original model terminals. An enhanced model terminal is either a new production CC634-B/CC638-B unit or an earlier built CC634-A/CC638-A unit with the YR109-A enhanced firmware option installed. An original model terminal is a CC634-A/CC638-A unit without the YR109-A option installed.

### MANUALS COVERING ENHANCED MODEL TERMINALS:

<u>Title</u>	<u>Publication Number</u>
721 Enhanced Display Terminal Operator's Guide/Installation Instructions	62950101
721 Display Terminal Owner's Manual*	62940101
721 Enhanced Display Terminal Hardware Reference Manual	62940102

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\*The owner's manual is a replacement for the earlier Operator's Guide/Installation manual having the same publication number.

MANUALS COVERING ORIGINAL MODEL TERMINALS:

<u>Title</u>	<u>Publication Number</u>
721 Display Terminal Operator's Guide/ Installation Instructions	62940019
721-X0 Display Terminal Reference Manual	62940020

All manuals may be ordered from:

Control Data Corporation  
Literature and Distribution Services  
308 North Dale Street  
St. Paul, Minnesota 55103

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This section describes the functions, major assemblies, external interfaces, electrical requirements and physical specifications of the terminal.

### INTRODUCTION

The CDC CC63X Multifunction Display Terminal is a microprocessor-controlled input/output hardware device with a detached keyboard and loadable 64K memory.

The basic resident terminal mode supports CYBER (Advanced) Mode and Control Data Shared Network (CDSN) downline load capability. It will operate as an IST III terminal via the CDSN.

The major application of this terminal, however, is the versatility offered by the addition of hardware options and the capability for loading various operating programs. One of the available options is an internal 1200/1200-baud (bit-per-second or b/s) modem that enables terminal connection to CDSN via the telephone lines and incorporates user oriented features such as automatic dialing (call originate mode) and automatic answering (answer mode).\*

### TERMINAL APPLICATIONS AND BUILDING BLOCKS

The display terminal is a versatile input/output device that can be configured to operate in many modes by the addition of options and any number of pluggable ROM packs. The operational mode of the terminal is determined by the application of the user.

The memory is loadable through the communications line or an operator plug-in memory module (ROM pack). The terminal contains internal interfaces which allow the addition of several options, including a touchpanel and/or an internal 1200/1200 b/s modem. Refer to table 1-1 for display terminal features and options.

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\*The automatic answering feature of the internal modem is only available on enhanced model terminals.

TABLE 1-1. DISPLAY TERMINAL FEATURES AND OPTIONS

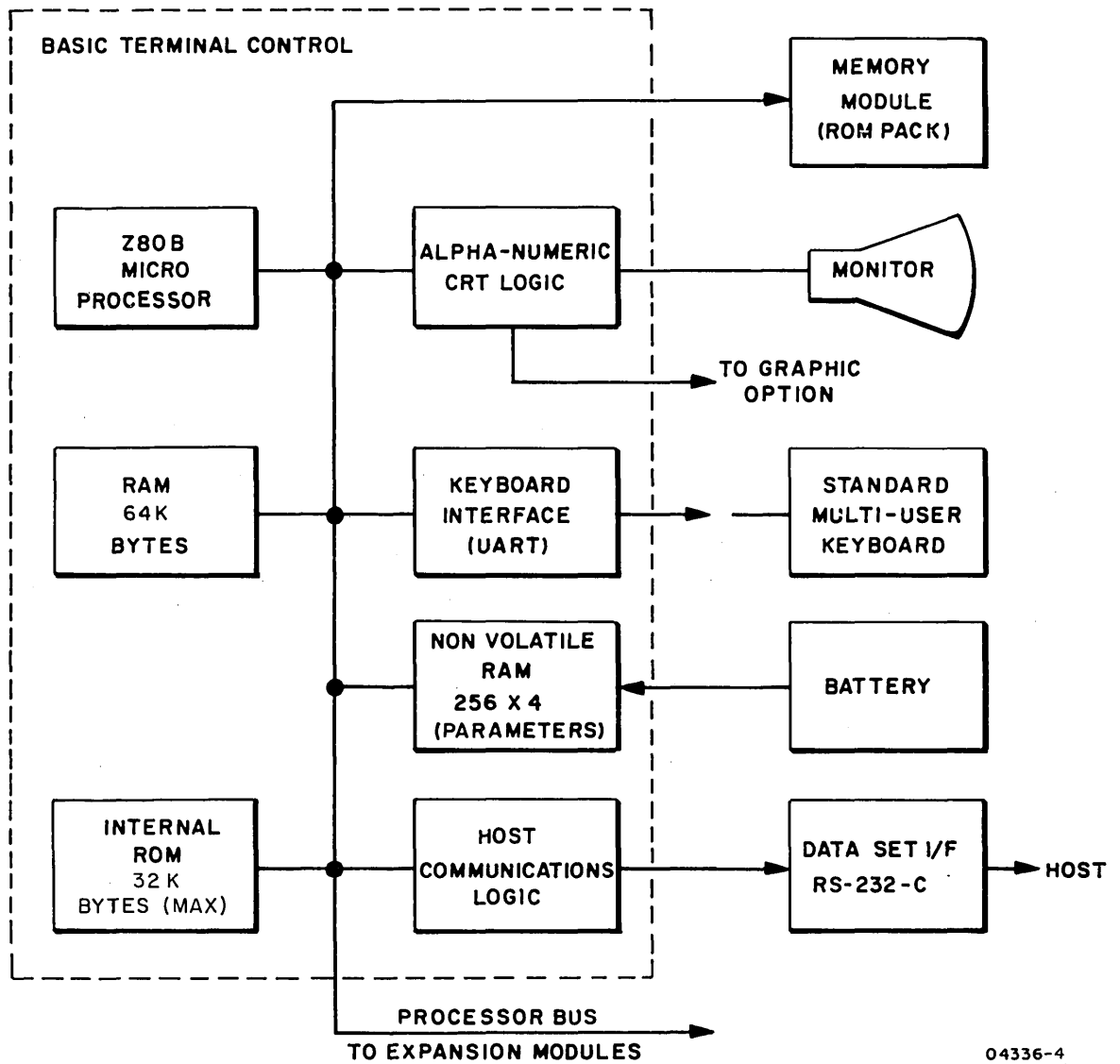
FACTORY-INSTALLED FEATURES	DISPLAY TERMINALS			
	CC634-A	CC634-B	CC638-A	CC638-B
64K RAM (main logic board)	X	X	X	X
Dot graphics board with touchpanel			X	X
Enhanced (revision 4) firmware		X		X
Power-cord interlock (enables internal 1200/1200 b/s modem and dot graphics board to be user installed)		X		X
120-V ac, 60-Hz operation	X	X	X	X

AVAILABLE OPTIONS THAT ARE SERVICE CENTER INSTALLED:

- XA358-A dot graphics board with touchpanel on CC634-A/B terminals.
- XA360-A internal 1200/1200 b/s modem on CC634-A/CC638-A terminals.
- XA368-A dot graphics board on CC634-A terminals.
- XA369-A touchpanel on CC634-A/B terminals with XA368-A dot graphics board installed.
- YA109-A enhanced (revision 4) firmware on CC634-A/CC638-A terminals.

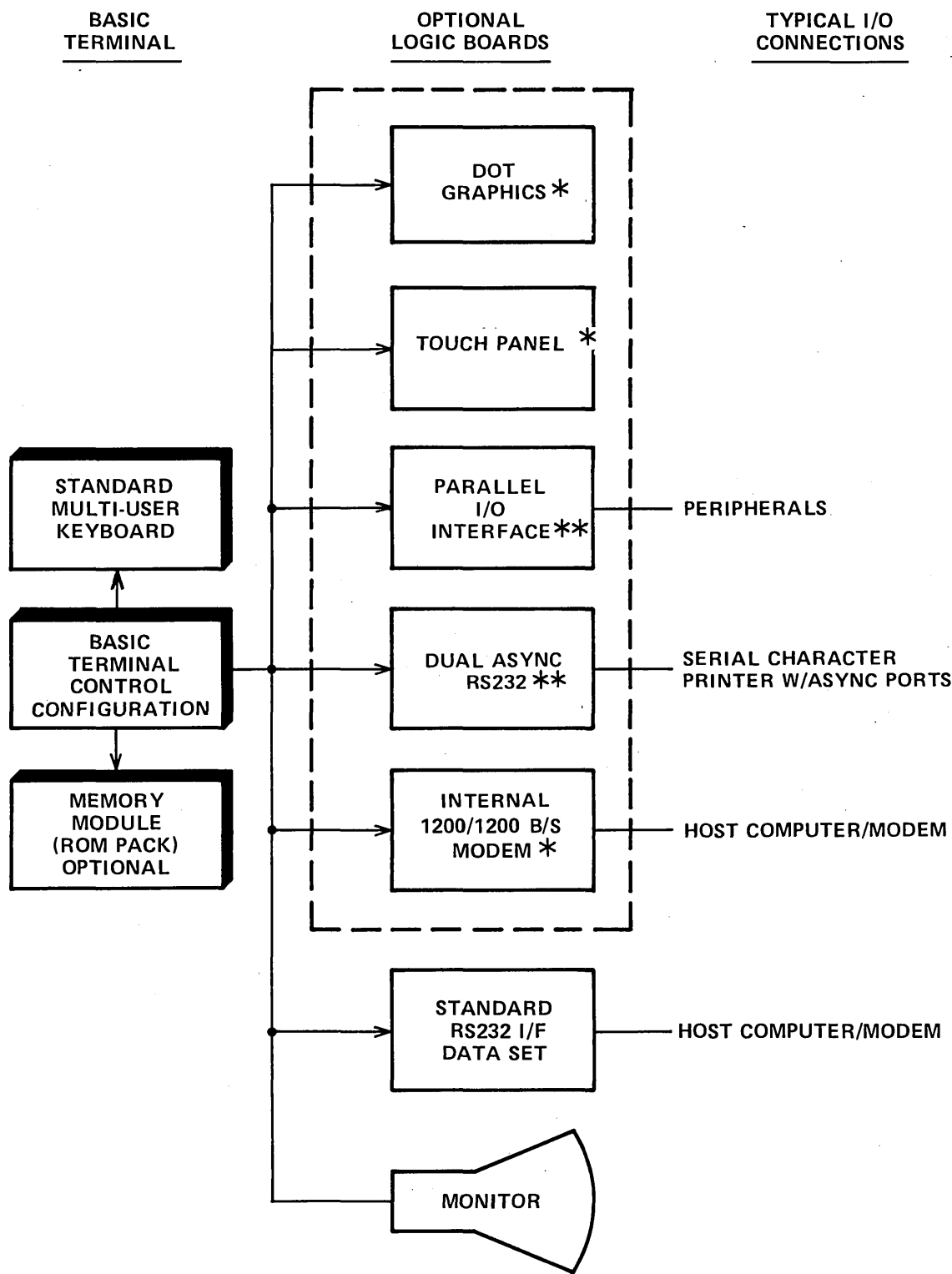
AVAILABLE OPTIONS THAT ARE CUSTOMER INSTALLED:

- XA360-A internal 1200/1200 b/s modem on CC634-B/CC638-B terminals.
- XA368-A dot graphics board on CC634-B terminals.
- YA274-A United Kingdom keycap kit.
- YA274-B Spanish keycap kit.
- YA274-C German keycap kit.
- YA274-D French keycap kit.
- YA274-E Swedish/Finnish keycap kit.
- YA274-F Danish/Norwegian keycap kit.
- YA275-A 220/240-V ac, 50-Hz power conversion kit.
- YR101-A dual asynchronous-interface board.
- YR102-A parallel-interface board.
- YR107-A/B graphics memory module (ROM pack).



04336-4

Figure 1-1. Basic Terminal Configuration



NOTES: \* DENOTES LARGE OPTION MODULES  
 \*\* DENOTES SMALL OPTION MODULES

04337

Figure 1-2. Expanded Terminal Configuration

Since it is difficult to determine all possible display terminal applications, this manual covers only on-site maintenance for the display terminal in its basic and expanded configurations as indicated in figures 1-1 and 1-2. That is, the maintenance information contained in this manual covers the basic terminal, the graphics board with touchpanel, and the internal modem. The maintenance of any other hardware, software, or firmware added to or used with the terminal is covered in their respective maintenance manuals.

The memory of the terminal includes 20K bytes of ROM and 64K bytes of RAM plus any ROM pack that may be inserted. The 20K bytes of ROM contains the resident CYBER mode as well as programs that perform self-testing of the terminal hardware by resident diagnostics. The ROM pack allows a program to be loaded into the terminal.

Operating parameters are loaded through the keyboard. The parameters are stored in a nonvolatile memory (NVM), which will retain this information after the terminal is turned off or unplugged (the NVM is battery-supported). The resident ROM contains subroutines that allow qualified personnel to change the stored parameters, when necessary.

#### CUSTOMER ENGINEERING TRAINING

In addition to providing display terminal maintenance information, this manual will also serve as the only maintenance training document. Due to a low piece-part count, internal diagnostics and modular construction, there is no display terminal classroom instruction offered. By reading and using this manual, the CE will acquire the expertise to isolate display terminal malfunctions. Section 6 lists the main tasks a CE must be able to perform before responding to a customer request for maintenance on the terminal.

The CC63X display terminal training course consists of reading this manual and taking a final test found on Engineering Services Educations PLM. This test covers the following objectives:

- Locate and list the function of all major assemblies, components and controls.
- List the steps necessary to initiate, execute and terminate the resident diagnostic tests.
- List the field-replaceable units (as specified by the SAM listings) for terminal malfunctions.

## EQUIPMENT SPECIFICATIONS

The following paragraphs describe the physical, electrical, and environmental specifications for the display terminal.

### PHYSICAL SPECIFICATIONS

The size and weight of the monitor and control module and detached keyboard module are as follows:

- Monitor and control logic module
  - Height: 440 mm (17.3 in) nominal position
  - Width: 430 mm (16.9 in) maximum
  - Depth: 430 mm (16.9 in) maximum
  - Weight: 19.5 kg (43 lb) maximum
  - Weight (packaged): 22.2 kg (49 lb) maximum
  
- Keyboard module
  - Height: 51 mm (2.0 in) maximum  
80 mm (3.1 in) maximum (raised position)
  - Width: 490 mm (19.3 in) maximum
  - Depth: 230 mm (9.0 in) maximum
  - Weight: 3.0 kg (8 lb)
  - Weight (packaged): 4.5 kg (10 lb) maximum

### ELECTRICAL SPECIFICATIONS

The display terminal has the following electrical power requirements:

<u>Basic Configuration</u>	<u>Full Configuration</u>
● 120V ac, 50/60 Hz, at 1.0 A, nominal;	1.30 A, maximum
● 220V ac, 50/60 Hz, at 0.5 A, nominal;	0.71 A, maximum
● 240V ac, 50/60 Hz, at 0.5 A, nominal;	0.65 A, maximum
● 85 W (290 Btu/hr), heat dissipation configuration without options	

#### ENVIRONMENTAL SPECIFICATIONS

The display terminal has the following environmental requirements:

- OPERATING:
  - Temperature range: 10°C(50°F) to 40°C(104°F)
  - Temperature change: 10°C(18°F)/60 minutes
  - Relative humidity range: 20 to 80 percent
  - Humidity change: 10 percent/60 minutes
  - Altitude: 3000m (9850 ft) maximum
  
- NONOPERATING:
  - Temperature range: -40°C(-40°F) to 60°C(140°F)
  - Temperature change: 20°C(36°F)/60 minutes
  - Relative humidity range: 5 to 100 percent
  - Humidity change: 10 percent/60 minutes

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This section describes the operator accessible controls and indicators on the display terminal.

### CONTROLS AND INDICATORS

Refer to table 2-1 for a description of controls and indicators mounted on the cabinet (figure 2-1).

TABLE 2-1. CONTROLS AND INDICATORS

CONTROL/INDICATOR	FUNCTION
POWER 0/1 (OFF/ON) Switch	Allows the operator to control primary power application to the terminal. This switch is located at the front of the terminal.
CB1 Circuit Breaker	Provides line circuit over-current protection for the terminal. CB1 is located at the rear of the terminal and can be reset when the over-current fault condition is cleared.
TEST Switch	This slide switch allows maintenance loopback of the resident host interface (RS232C) for fault isolation capability. It is in the TEST (looped) position when the actuator is pulled out. This switch is located at the rear of the terminal.
RESET Switch	Allows operator to reset the terminal to a normal restart condition (provides a clear function to the terminal). Terminal activity is program dependent. This switch is located on the front of the terminal.
BRIGHTNESS (Intensity) Control	Allows the operator to adjust the video intensity to the ambient lighting conditions. This control is located on the front of the terminal.

TABLE 2-1. CONTROLS AND INDICATORS (CONTD)

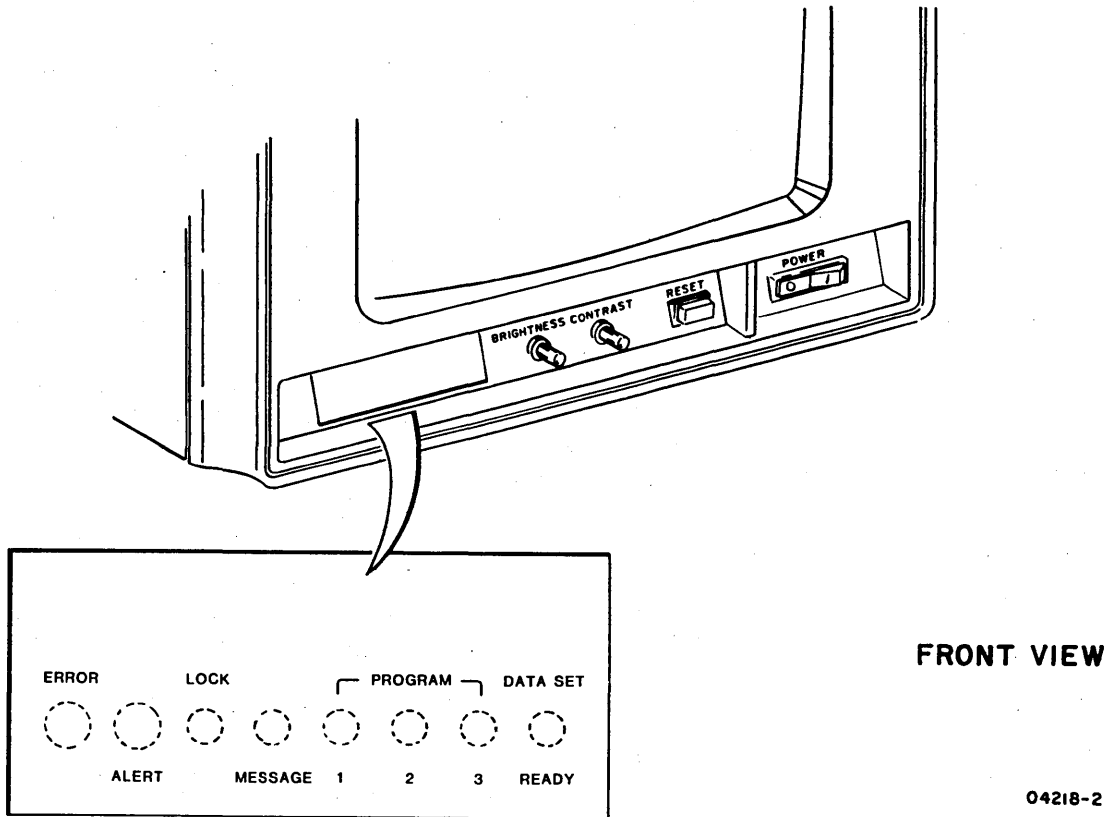
CONTROL/INDICATOR	FUNCTION
CONTRAST Control	Allows the operator to adjust the intensity variation between the normal characters and background. This control is located at the front of the terminal.
LINE VOLTAGE Switch	Allows for selection of the appropriate line voltage range (115/220 V ac) for terminal operation. This switch is located at the rear of the terminal. CAUTION: This switch must be set to agree with the line voltage.
DATA SET READY INDICATOR (Green)	Illuminates if the Data Set Ready signal at the modem (host) interface is present. The DSR indicator is located at the front of the terminal.
LOCK (Keyboard Locked) Indicator (Red)	Illuminates during a page print operation. The keyboard is also locked and the LOCK indicator is lit if the terminal is unable to transmit data due to loss of modem control signals such as CTS or DSR while the terminal is online and ready to send, or if the terminal is disabled by host command. Also, the keyboard is locked out during block mode communication with the host or when a disk operation is active. The LOCK indicator is located at the front of the terminal.
MESSAGE (Message Waiting) Indicator (Red)	This indicator is under program control. The MESSAGE indicator is located on the front of the terminal.
ALERT Indicator (Red)	Used as an alternate visible alert when the audible alarm is disabled or cannot be heard. It is controlled by a programmable bit. The Alert indicator is located at the front of the terminal.
M-REL (Manual Release)	This key will perform a firmware manual release. Any print or host operation is aborted.

TABLE 2-1. CONTROLS AND INDICATORS (CONTD)

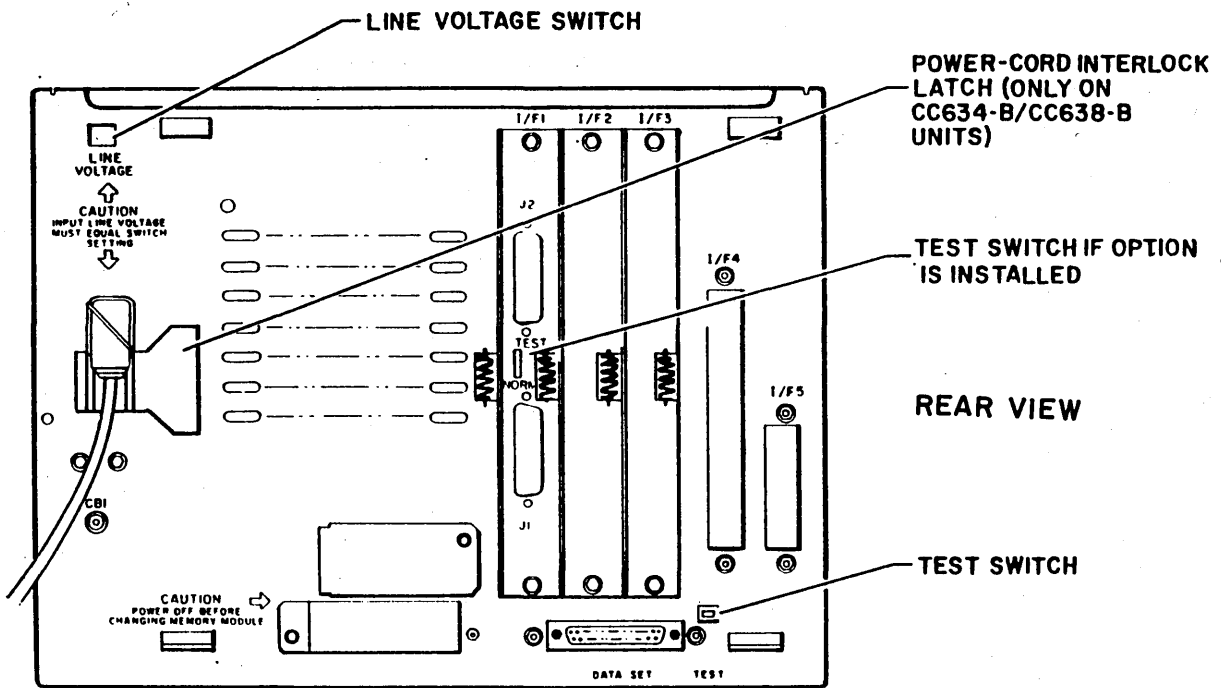
CONTROL/INDICATOR	FUNCTION
ERROR Indicator (Red)	Illuminates when a terminal subsystem or mode-dependent error condition is detected. It is controlled by a programmable bit. The ERROR indicator is located at the front of the terminal.
PROGRAM 1, 2, 3 Indicators (Red)	These three indicators are under program control, thus their functions are program dependent. The PROGRAM indicators are located at the front of the terminal.
Audible Alarm	<p>Provides a two-level (loud/soft intensity) audible alarm signal. Operation is under firmware control and is also operator-parameter-bit controlled. The following conditions cause an audible alarm to occur:</p> <ul style="list-style-type: none"> <li>● After power on or RESET has run test 1</li> <li>● Improper keyboard entries during mode selection or parameter selection</li> <li>● Host code sequence</li> <li>● Attempt to enter keyboard data while the cursor is in a protected position*</li> <li>● Entry on keyboard while the keyboard is locked</li> <li>● If margin alert has been selected in mode installation parameters, when keyboard entries advance the cursor to the 8th position from end of line or into the last line.</li> </ul>
<p>*With terminals having the enhanced firmware, the host can enable automatic tabbing in CYBER mode which will not sound the alarm for the above condition. Instead, the entered keyboard data is tabbed to the next unprotected position.</p>	

KEYBOARD CONFIGURATIONS

Refer to section 4 for keyboard configurations.



04218-2



05270-1

Figure 2-1. Location of Controls and Indicators

---

This section contains installation information.

### INTRODUCTION

The installation of the display terminal plus the installation of certain options are the responsibility of the customer. Therefore, this section only refers to the installation of those options that are the responsibility of CE personnel. For a breakdown of terminal features and available options, refer to table 1-1 in section 1. For information concerning the installation and checkout of the terminal, refer to the terminal operator's guide/installation instructions manual or the terminal owner's manual (preface lists publication numbers).

### OPTIONS INSTALLED BY CUSTOMER ENGINEERING PERSONNEL

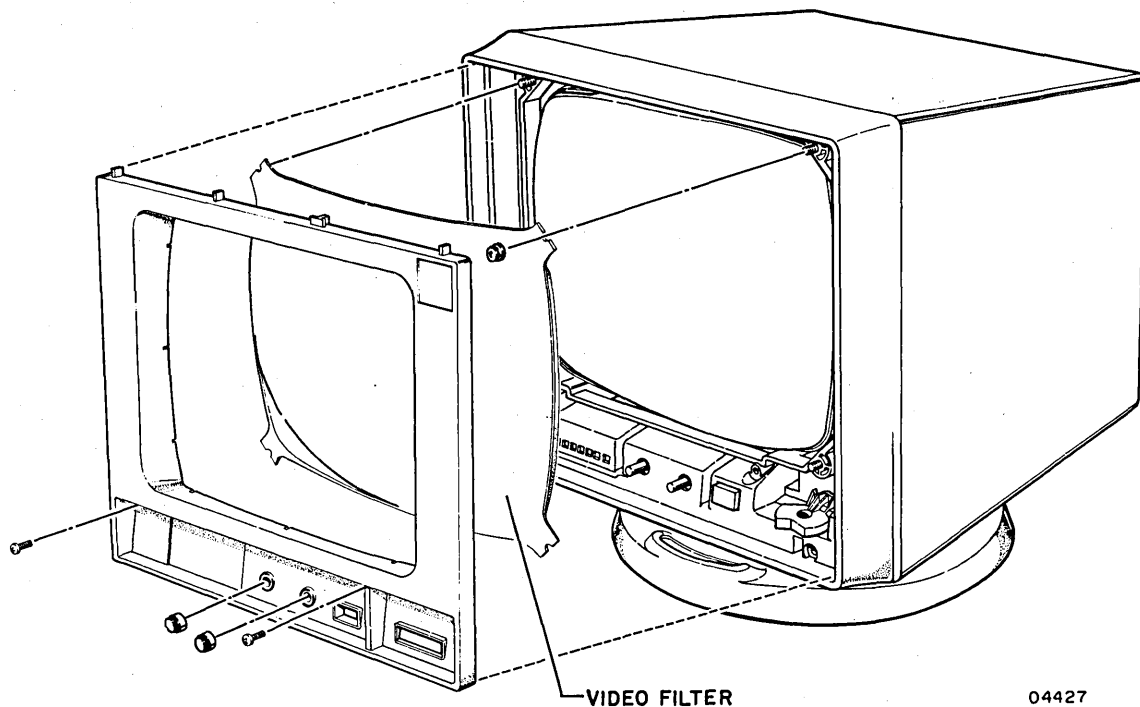
The options requiring installation by CE personnel include the:

- YR109-A enhanced firmware option that applies to a CC634-A/CC638-A terminal. For this installation, refer to the installation drawing in section 5.
- XA360-A 1200/1200 b/s internal modem if it is to be installed in a CC634-A/CC638-A terminal. For this installation, refer to procedure 23 in section 6B.
- XA369-A touchpanel, the XA368-A dot graphics board (customer installed in CC634-B terminals but not in CC634-A terminals), or the XA358-A touchpanel/dot graphics board combination. These options apply to a CC634-A/B terminal and their installation is described with the installation drawing, section 5.

### CAUTION

Make certain that battery is installed before removing power from terminal, and do not remove battery when power is off. If battery is not installed and power is removed, the terminal operating parameters will be forced to default values.

1. Turn terminal power off (procedure 1).
2. Remove top access lid (procedure 3).
3. Remove logic drawer assembly (procedure 4).
4. Remove the two allen head screws attaching the bezel assembly to the bezel adapter assembly. Pull off the BRIGHTNESS and CONTRAST knobs as shown in figure 3-1. Lift the bottom edge of the bezel assembly slightly, pull it down, and then lift it away from the terminal.
5. Remove video filter assembly (figure 3-1).



04427

Figure 3-1. Video Filter Placement

6. Mount touchpanel in place with hardware provided (figure 3-2), while observing the following substeps.
  - a. Ensure that the touchpanel is mounted snugly against the two top plastic holders.
  - b. Observe that the dots on each of the four edges (dots are at the center of each edge) of the touchpanel appear in the center notches of the bezel (figure 6B-3). If alignment is unsatisfactory, refer to procedure 19, step 7.

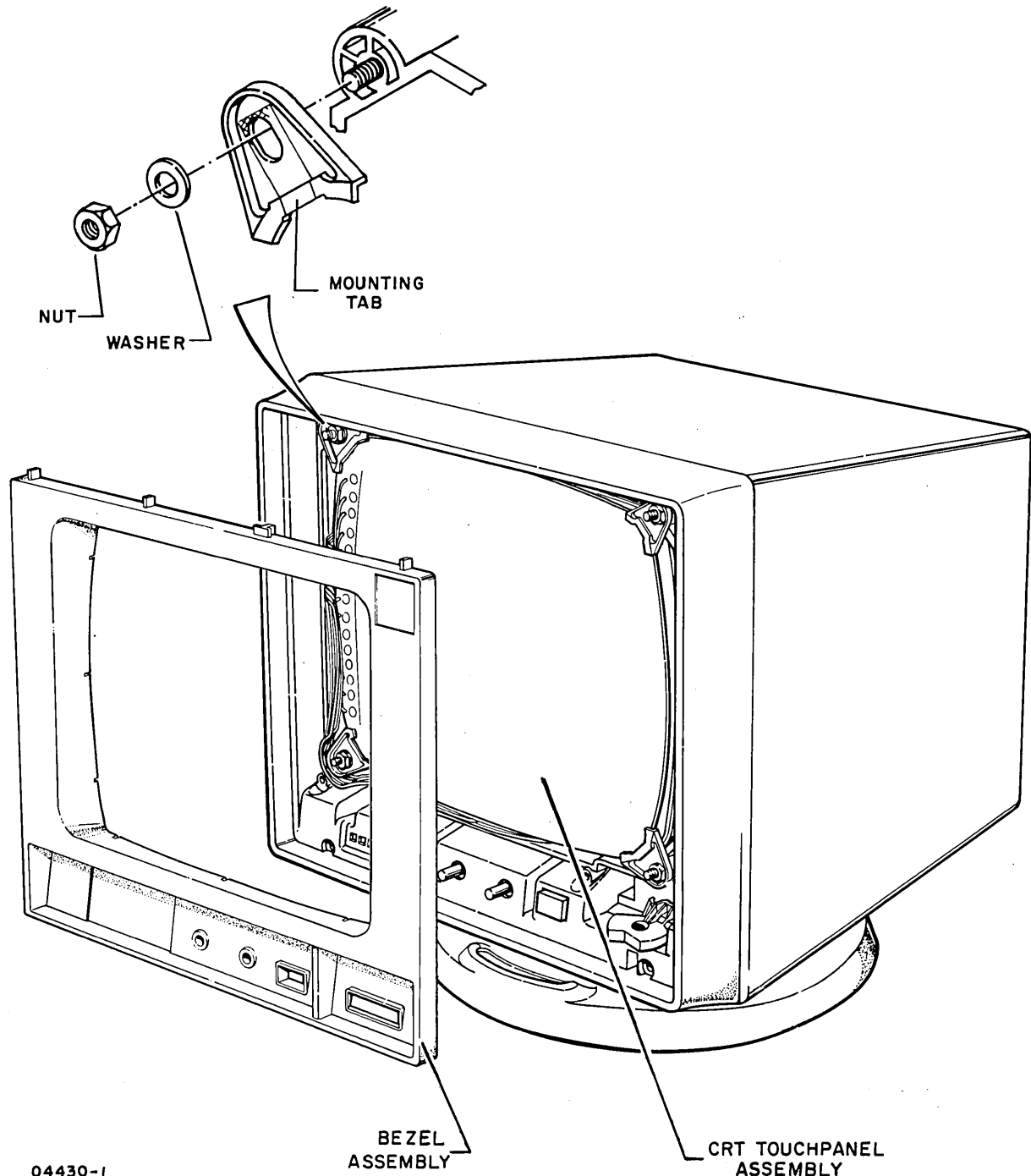
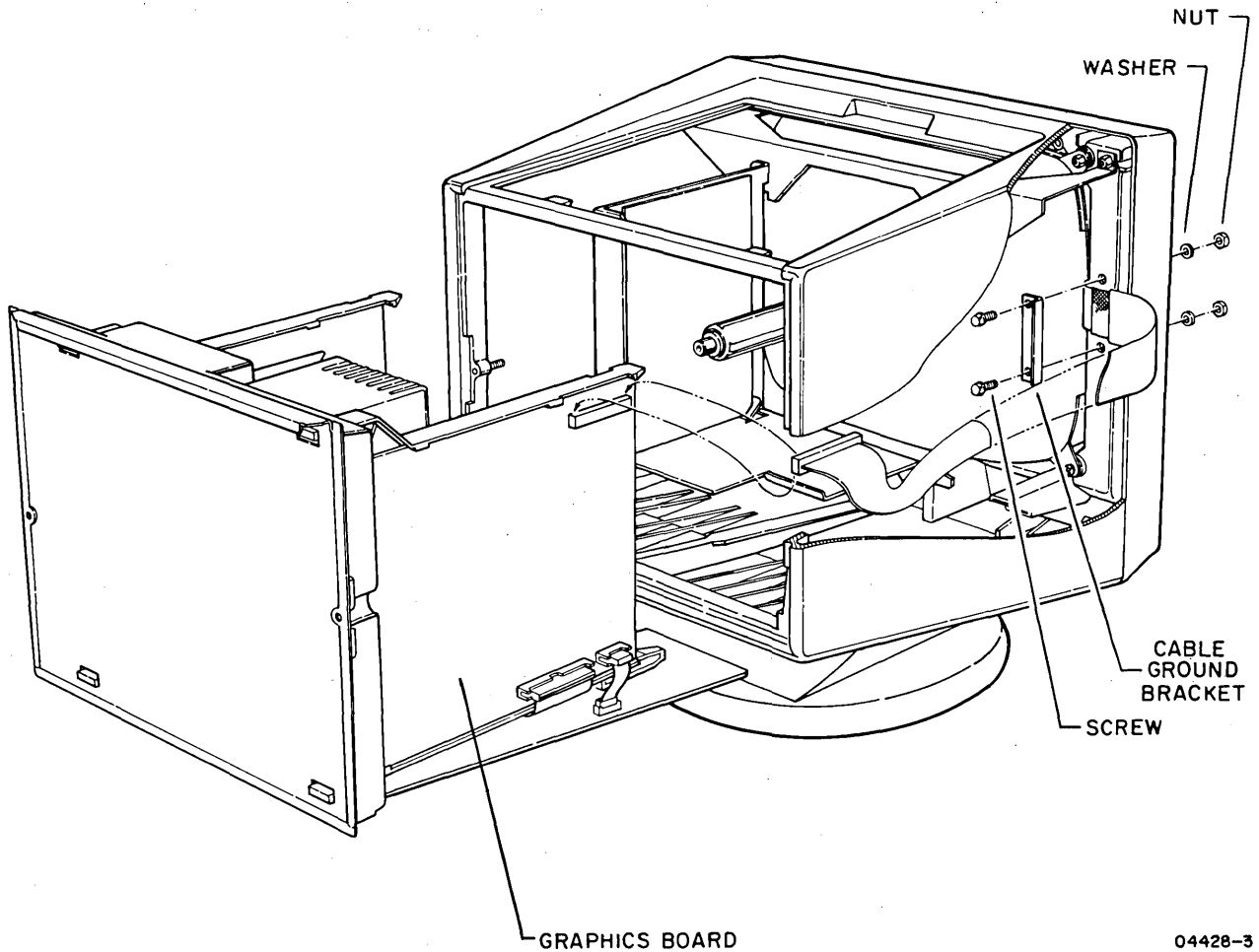


Figure 3-2. Touchpanel Installation

7. Install the cable ground bracket as shown in figure 3-3.
8. If the dot graphics board is not installed yet, go to the installation procedure for the dot graphics board. If the dot graphics board is already installed, reassemble the terminal as specified in the reassembly steps for procedures 4, 3, and 1.



04428-3

Figure 3-3. Installation of Touchpanel Cable Ground Bracket

#### INSTALLATION OF DOT GRAPHICS BOARD

The procedures referred to in the following steps are in section 6B. To install the dot graphics board, do as follows:



CAUTION

Make certain that battery is installed before removing power from terminal, and do not remove battery when power is off. If battery is not installed and power is removed, the terminal operating parameters will be forced to default values.

1. If the preceding procedure for installing the touchpanel has been just completed (touchpanel and dot graphics board being installed together), skip steps 2 through 4 and go to step 5.
2. Turn terminal power off (procedure 1).
3. Remove top access lid (procedure 3).
4. Remove logic drawer assembly (procedure 4).
5. Install the graphics board in the I/F 5 slot as shown in figure 3-4, placing board on card guides with component side facing out. Slide board towards backpanel until top card guide locks in place.
6. Connect the mating main-bus ribbon cable connector to the large receptacle on board.
7. Connect the small ribbon cable to the graphics receptacle on the main logic board.
8. Move jumper at location A-17 on main logic board from the NORMAL position to the GRAPHICS position (figure 3-4).
9. Reassemble the terminal as specified in the reassembly steps for procedures 4, 3, and 1.

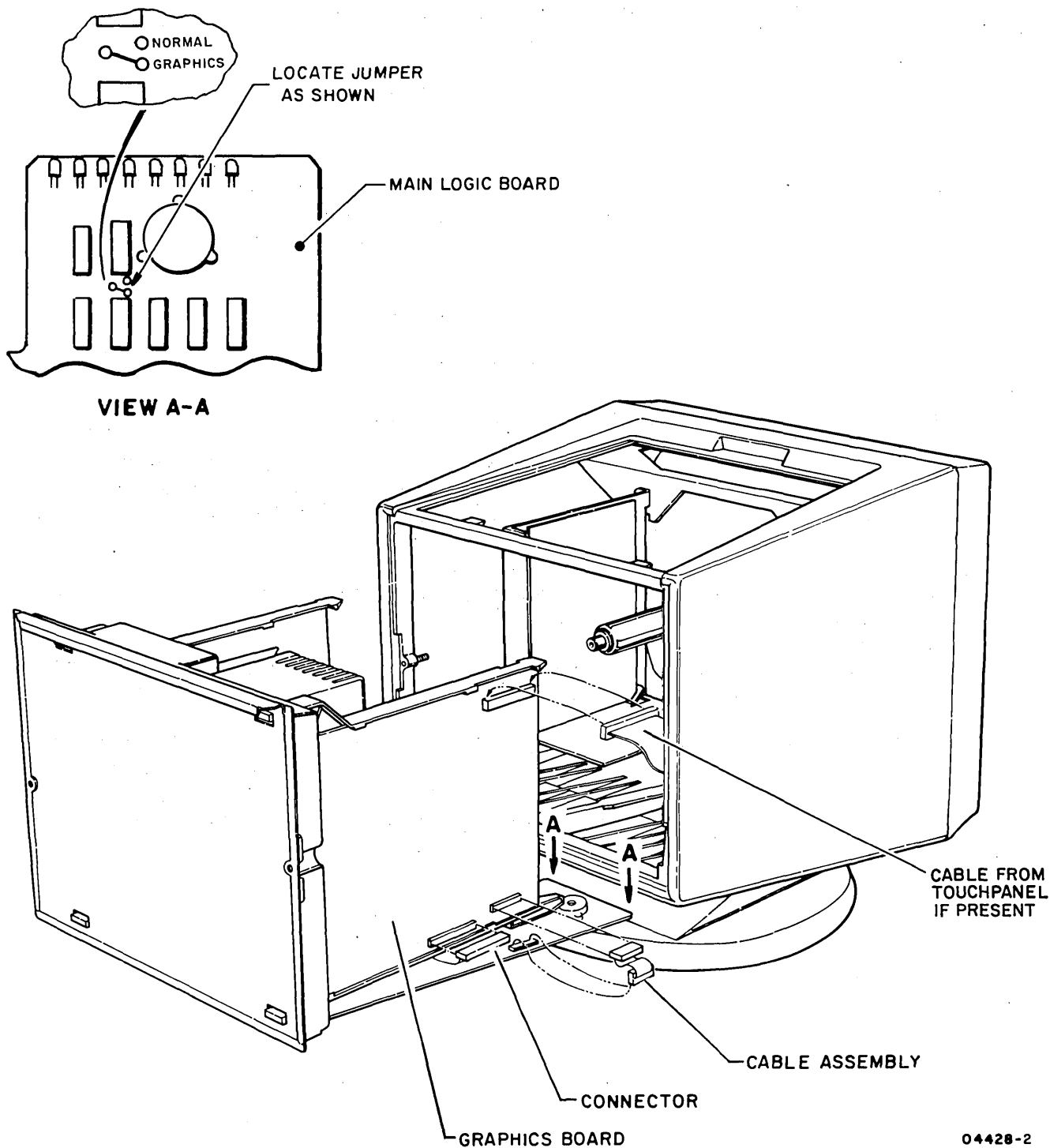


Figure 3-4. Dot Graphics Board Installation

GENERAL

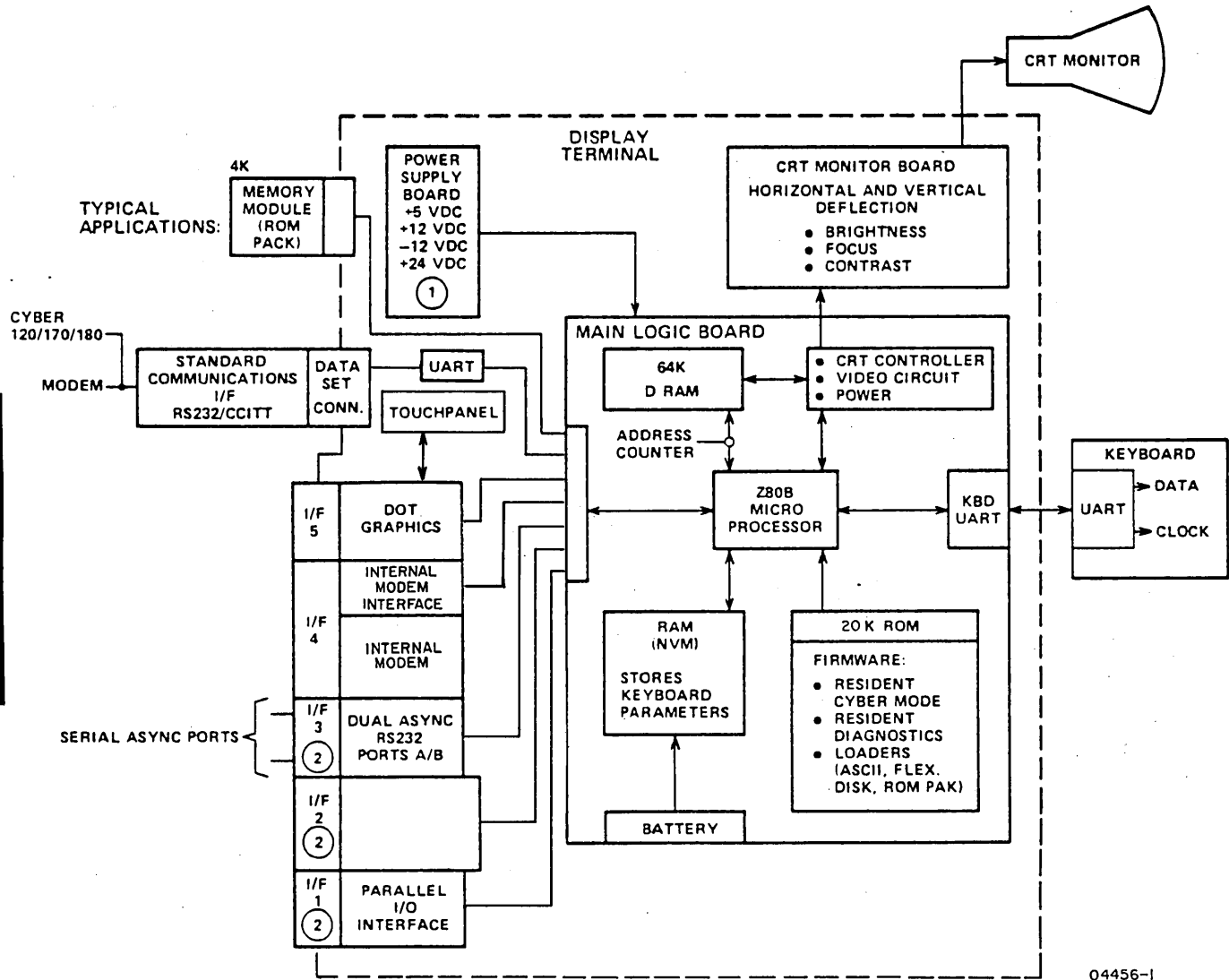
The operational mode of the display terminal is determined by parameters set in from the keyboard. Parameters may be selected to initiate the resident CYBER mode, or to load and initiate host programs. The terminal contains firmware for the resident CYBER mode; any other program must be downline-loaded from the host. The terminal also contains firmware for self tests and for loading host controlware.

Operations within the terminal are controlled by a microprocessor. It can interface asynchronously with a higher-level processor either directly or through a modem. The terminal is multifunctional with the base unit being an alphanumeric display. It contains interfaces for three small option boards and two large option boards. These boards provide interfaces to host computers, modems, and peripheral equipment. Refer to figure 4-1 for a block diagram of the display terminal.

The operator uses the keyboard to enter, change, or delete information and to select initial operating parameters. The terminal is multifunctional, having the capability for one standard and six foreign languages and a variety of graphics symbols. Terminal-operating parameters are entered from the keyboard into a nonvolatile RAM, and read by the microprocessor. There are three groups of operating parameters:

- Terminal installation parameters (select terminal-related conditions, such as interfaces, memory option, or type of peripheral to be used).
- Mode installation parameters (selects port rates and data rates of each operating mode, such as CYBER).
- Mode operator parameters (determines conditions within which selected mode will operate, i.e., on line, off line, 80/132, cursor type, alert, etc.).

The terminal uses a Z80B microprocessor which controls all operations inside the terminal. It directs the operations of associated peripherals such as printers and modems. The microprocessor uses 64K of dynamic RAM for instruction processing. This RAM is dedicated for program operations and CRT refresh.



04456-1

NOTES:

- ① POWER IS DISTRIBUTED THROUGHOUT THE TERMINAL VIA THE MAIN LOGIC BOARD
- ② OPTIONS SHOWN IN I/F1 AND I/F3 CAN BE IN ANY OF THE I/F-1 THROUGH I/F-3 SLOTS

Figure 4-1. Display Terminal Block Diagram

An internal ROM (figure 4-1) contains the resident CYBER mode, resident diagnostics, and controlware loaders. The diagnostics consist of self tests which are performed each time the terminal is activated for use. (POWER on or RESET.)

The nonvolatile memory (NVM) is a RAM device which stores keyboard-entered operating parameters for a selected operation. A battery maintains the stored data when terminal power is removed. If terminal power is ever turned off and the battery removed, default parameters are forced into the nonvolatile memory (default parameters are described in the manuals listed in the preface).

The pluggable memory module (ROM pack) is optional and can be used in a number of special operations. The terminal can checksum the ROM pack contents, and load operating firmware from the memory module.

#### MAJOR ASSEMBLIES

Figure 4-2 depicts the major assemblies comprising the display terminal and the following paragraphs describe those assemblies.

#### DISPLAY MONITOR

The display monitor consists of a cathode-ray tube (CRT) with yoke and a CRT monitor board. The CRT screen provides a display of alphanumeric and graphic symbols. A green phosphor screen and reduced-glare faceplate is used. The screen measures 380 mm (15 inches) diagonally with a 203 mm (8 inch) by 262 mm (10.3 inch) viewable area.

The CRT monitor board contains the horizontal and vertical deflection circuits, video circuits, and the high voltage power supply. These circuits are responsible for generating and deflecting the electronic beam in the CRT/yoke assembly. The video signal unblanks (illuminates) the screen dots at the proper times to present readable information. Vertical and horizontal sync pulses ensure a stable trace. The sync pulses and video signal originate on the main logic board.

Directly below the CRT are the operator controls. Refer to Section 2 for a description of these controls.

## KEYBOARD

The detached keyboard provides for operator entry of symbols and control codes. Each key, when depressed, sends an 8-bit serial code and parity to the keyboard's universal asynchronous receiver/transmitter (UART). A similar code is sent when the key is released. This allows the terminal program to monitor the state of the keyboard and assign and/or define a resultant activity. There are 104 keystations. Keyboard arrays are available to support foreign language transmission. When using a foreign language, the keyboard is modified by installing selected keycaps. The keyboard contains an adjustable leg for selecting one of two operating positions. There are three keyboard modes, shift, lock, and control. These modes are controlled by the terminal. The installation parameters allow the selection of character generation to match the key-cap set.

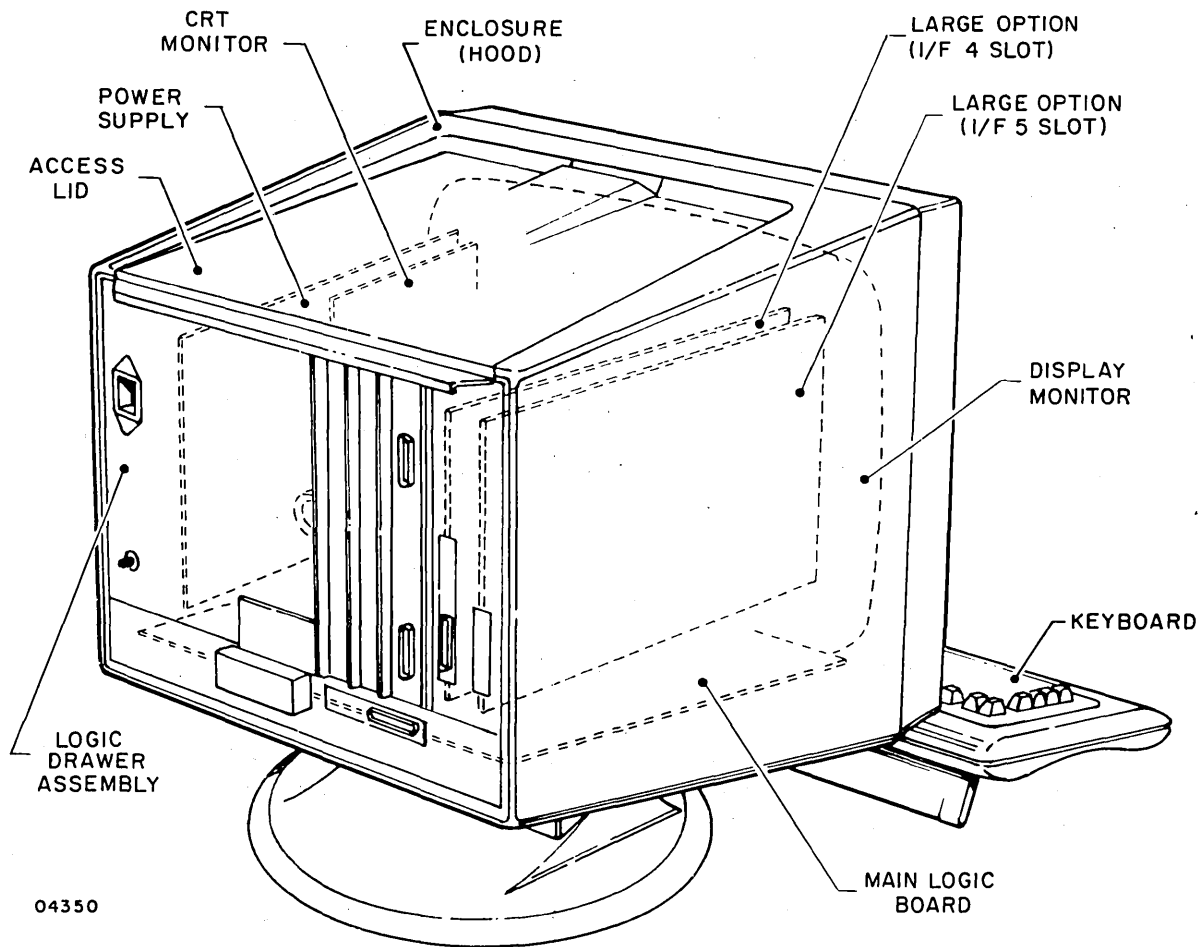


Figure 4-2. Major Assemblies

## LOGIC DRAWER ASSEMBLY

The logic drawer assembly consists of a removable rack on which the main logic assembly board, power supply board, memory module, small option boards (if any), and the large option boards (if used) are mounted. The logic drawer assembly contains an internal plug-in board for mounting the small option boards (if used). The rear of the logic drawer assembly forms the backpanel of the terminal. The backpanel contains input/output connectors (I/F 1 through I/F 5), switches, circuit breaker, and the terminal power cord. A battery is mounted in an enclosure accessible from the backpanel. (The battery is used to retain stored parameters in the event of power loss.)

- Main Logic Board - The main logic board is a large printed circuit board containing most of the display terminal logic. It contains a microprocessor that provides control of display operations as determined by preselected installation parameters. The main logic board also contains counters, control logic, ROMS, RAMS, UARTS, and external interfaces. It interfaces the CRT monitor, and installed option boards through a flat ribbon cable.
- Power Supply Board - The switcher power supply provides fully regulated dc power with minimal power loss. It supplies +5, +12, -12, and +24 V dc power.
- Large Option Boards - These options, if installed, enable additional functions of the terminal. Currently available large option boards include the dot-graphics board and the internal 1200/1200 b/s modem board (refer to figure 4-2).

## ENCLOSURE

All the internal parts of the terminal are housed in the enclosure or hood. The enclosure (figure 4-2) attaches to the CRT bezel adapter assembly, which contains the CRT, yoke, and CRT monitor board. The bezel assembly is attached to the CRT/bezel adapter assembly. If the graphics option is installed the touchpanel is mounted in back of the bezel assembly.

## EXTERNAL INTERFACES

The internal and external interfaces used in the terminal connect to the main logic board as shown in figure 4-3. The terminal may be connected to a host either through the RS232-C interface (connector J1) or through the internal modem interface (I/F-4 slot). The main bus interface (connector J4) can accommodate up to three small option modules and two large option modules. A small option mother board (internal to the terminal) provides a fanout of the bus to accommodate the three small options. These small options plug into I/F 1, I/F 2, and I/F 3 slots in the rear of the terminal (connect to mother-board J2, J3, and J4 connectors respectively). If installed, the memory module connects to main logic board connector J3. The main logic board connectors J2, J5, J6 and J8 contain internal interfaces. A diagram of these interfaces is shown in figure 5-1.

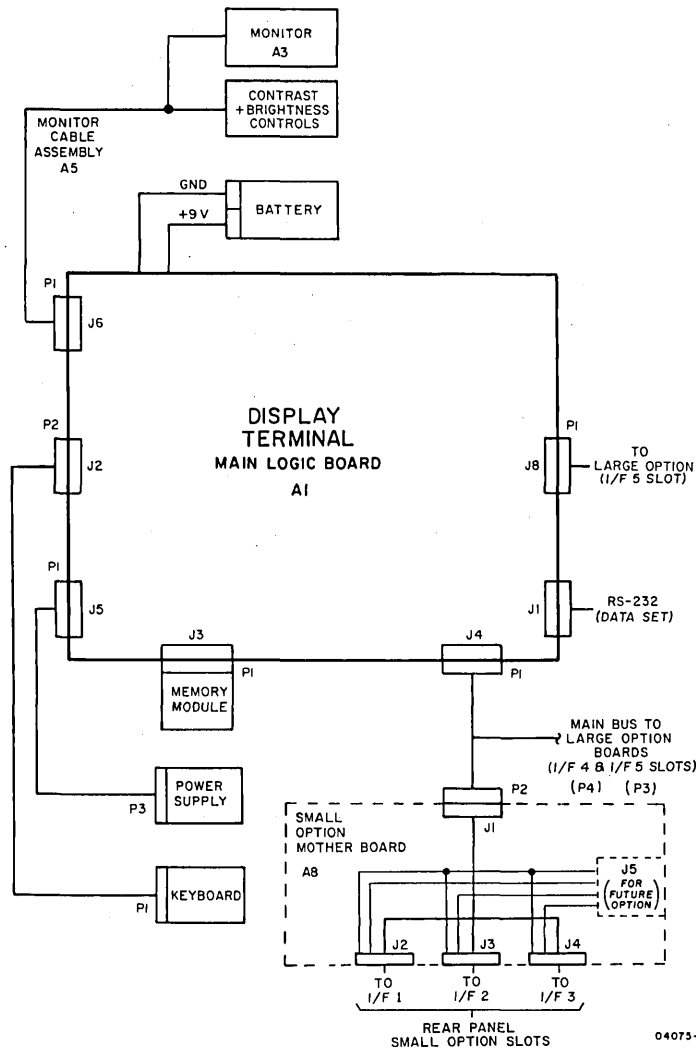


Figure 4-3. Display Terminal Interfaces



This section contains an interconnection diagram for the display terminal (figure 5-1) plus installation drawings for the large option boards.

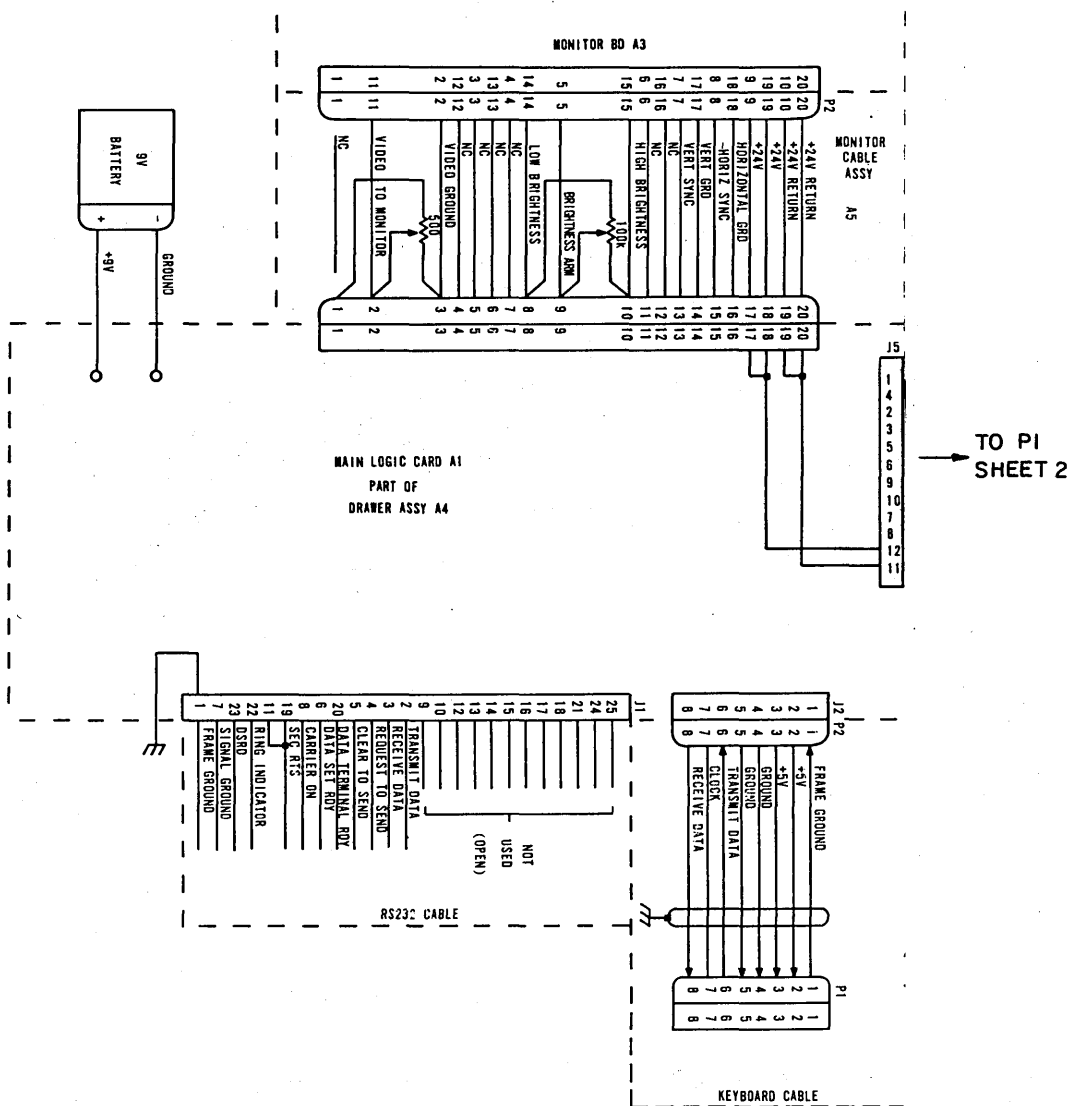
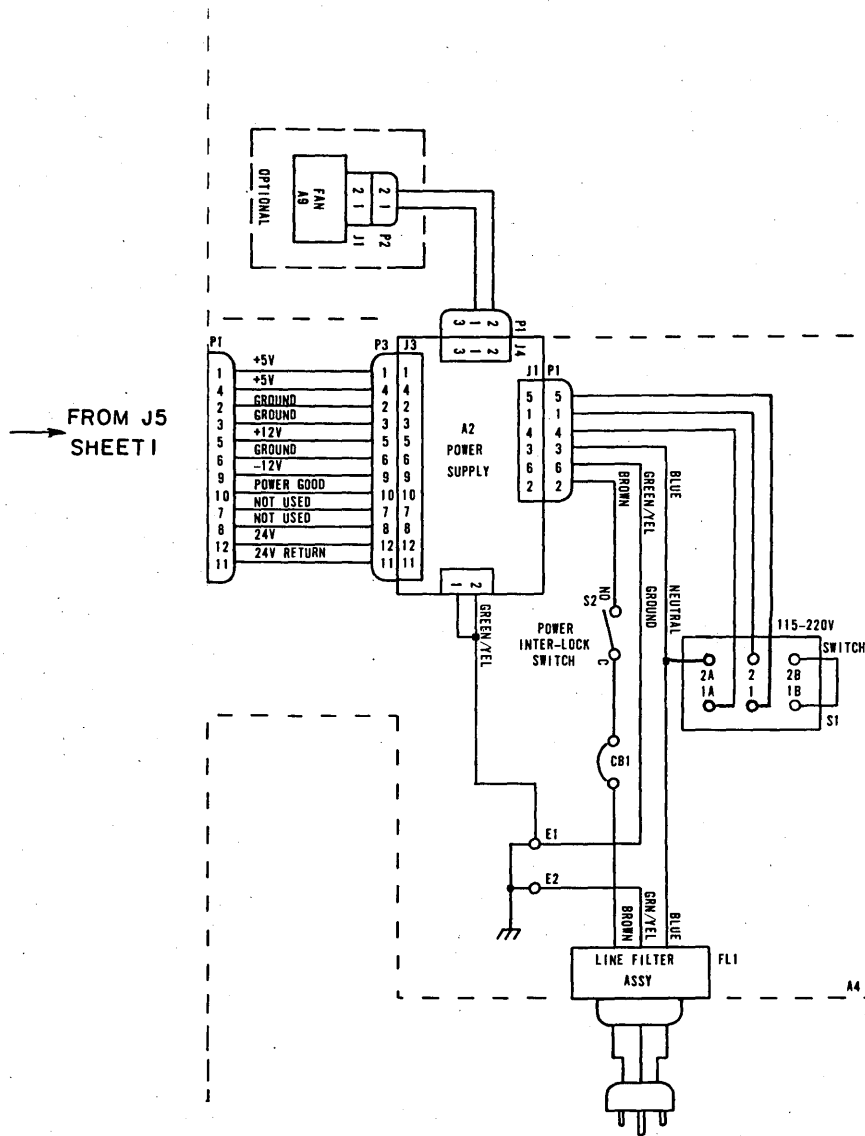


Figure 5-1. Interconnection Diagram (Sheet 1 of 4)



FROM J5  
SHEET 1

NOTE: Switch S1 (115-220 V) is numbered as viewed from inside the terminal.

Figure 5-1. Interconnection Diagram (Sheet 2 of 4)

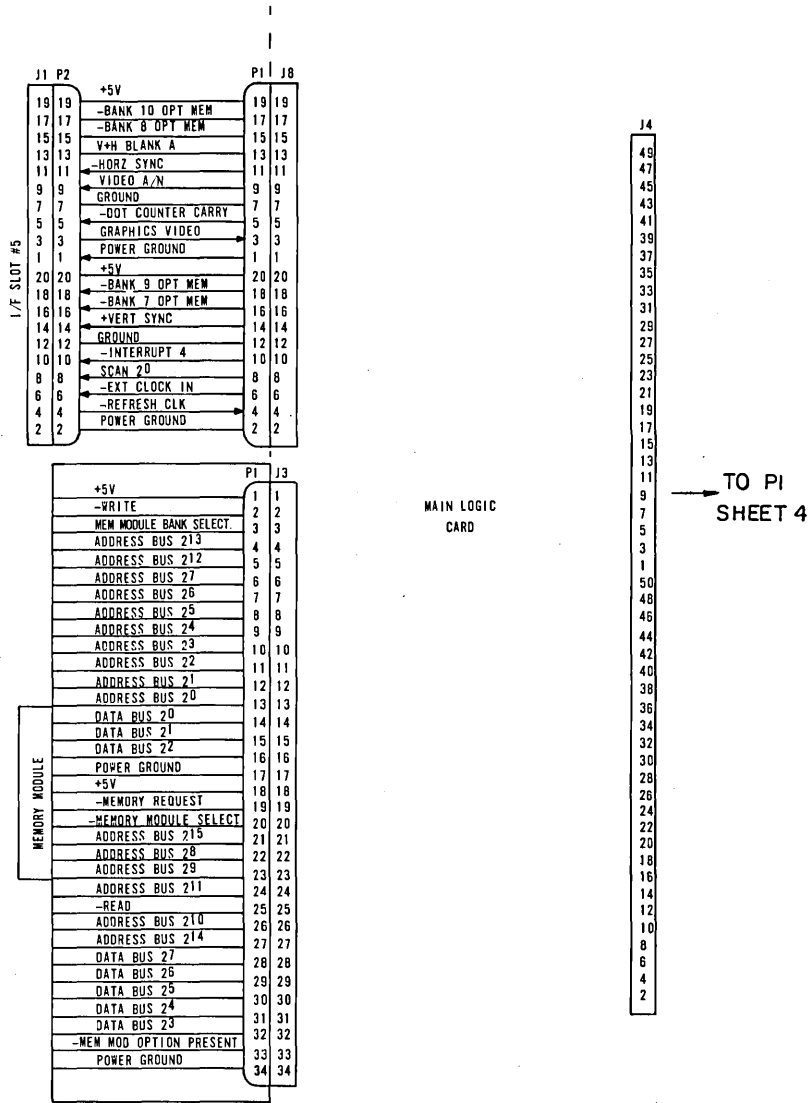


Figure 5-1. Interconnection Diagram (Sheet 3 of 4)

FROM J4  
SHEET 3

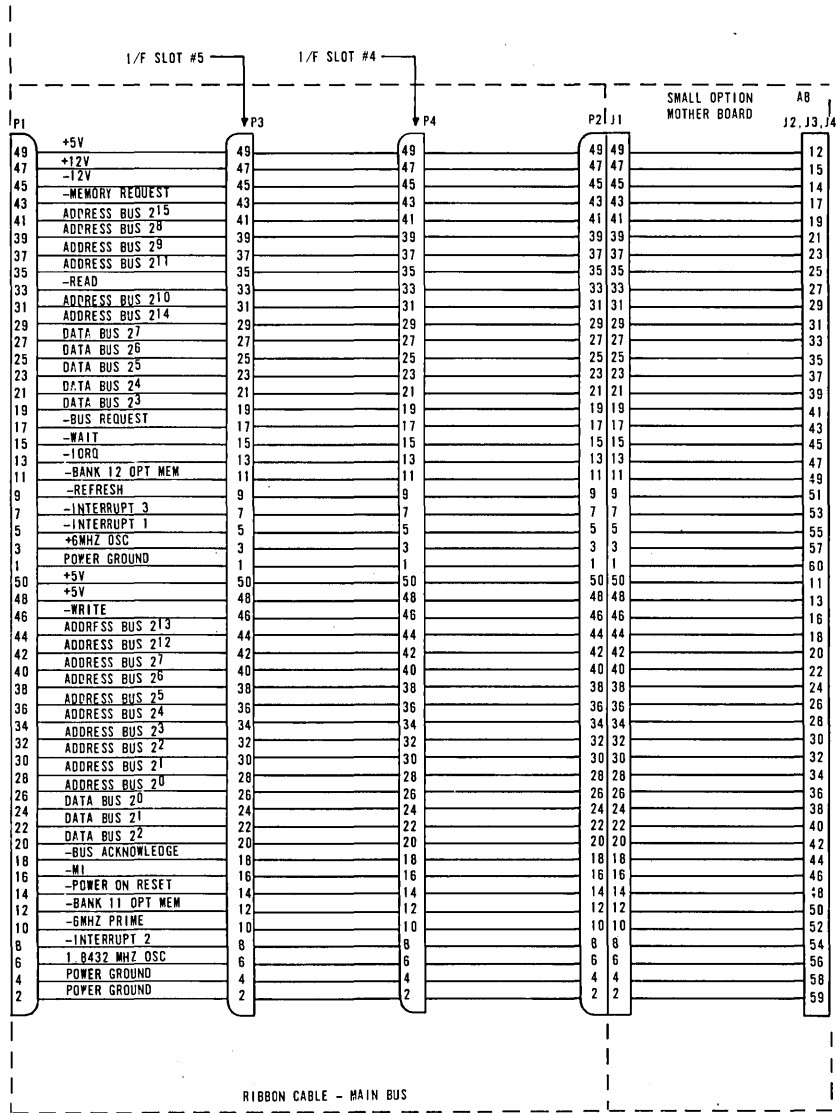


Figure 5-1. Interconnection Diagram (Sheet 4 of 4)

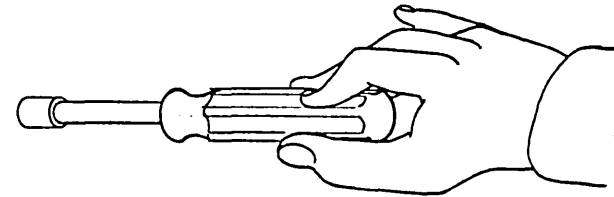
62940034 E

USED ON	INSTALLATION DESCRIPTION	FIGURE	APPLICABLE NOTES
CC634-A	VIDEO FILTER	3,4	
CC635-A	VIDEO FILTER AND 1200/1200 MODEM	3,4,5	
CC636-A	DOT GRAPHICS AND 1200/1200 MODEM	1,2,4,5	
CC638-A	DOT GRAPHICS	1,2,4	
XA 358-A	DOT GRAPHICS (FIELD INSTALL)	1,2	TABLE 1
XA 360-A	1200/1200 MODEM (FIELD INSTALL)	5	TABLE 2
XA 368-A	GRAPHICS OPTION (FIELD INSTALL)	2,4	TABLE 3
XA 369-A	TOUCH PANEL (FIELD INSTALL)	1,2,3	TABLE 4
YR 109-A	4.0 FIRMWARE OPTION (FIELD INSTALL)	5,6	TABLE 5

SHEET REV STATUS							REVISION RECORD					
6	5	4	3	2	1	REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	APVD
A	A	A	A	A	A	A	14232-95	RELEASED CLASS A	-	4-16-82	-	1024
A	B	A	A	A	A	B	15337	ADDED VIEW B-B	EC	8/27/82	42	1024
H	C	A	A	C	C	C	15642	REVISED PER ECO	WJG	1-8-82	WJG	219
A	C	D	A	D	D	D	15659	REVISED PER ECO	DC	1-12-85	WJG	218
E	C	D	A	E	E	E	16044	REVISED PER ECO	M2	7-27-83	WJG	218
F	F	F	F	F	F	F	16133	REVISED PER ECO	EC	7/27/83	42	218

NOTES

⚠ TORQUE M6 NUTS 12.7-16.1 CM-KG (11-14 IN-LB) FOR FACTORY INSTALL. FOR FIELD INSTALLATION M6 NUTS SHOULD BE HAND TIGHTENED USING 3 FINGERS AND THUMB TO GRASP TOOL PER ILLUSTRATION:



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN TOLERANCES PLACE PLACE ANGLES ± ± ±	DWN	<i>[Signature]</i>	1/8/82	CONTROL DATA CORPORATION
	CHKD	<i>[Signature]</i>	1/5/82	
MATERIAL	ENGR	<i>[Signature]</i>	4/5/82	TITLE
	MFG	<i>[Signature]</i>	1/1/82	INSTALLATION DRAWING, LARGE OPTION
FINISH	APVD	<i>[Signature]</i>	1/1/82	SIZE
	EQUIP. NO.	CC634-A		FSCM NO.
	THIRD ANGLE PROJECTION			DWG NO.
				66315803
				SCALE
				SHEET 1 OF 6

DETACHED LISTS

5-5

REVISION RECORD						
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	APP

TABLE 1 XA358-A FIELD INSTALLATION NOTES

1. REMOVE TOP ACCESS COVER PER HMM (HARDWARE MAINTENANCE MANUAL) (62940034).
2. REMOVE LOGIC DRAWER ASSEMBLY PER PROCEDURE DESCRIBED IN THE DISPLAY TERMINAL HMM.
3. REMOVE BEZEL ASSEMBLY AS SHOWN IN FIGURE 1.
4. REMOVE VIDEO FILTER ASSEMBLY (REFER TO FIGURE 3).
5. MOUNT TOUCH PANEL ASSEMBLY WITH HARDWARE AS SHOWN IN FIGURE 1. PASS CABLE BETWEEN ADAPTER AND CRT AS PANEL IS INSTALLED. SEE NOTE 1 (SHEET 1) FOR TORQUE SPECIFICATION.
6. SECURE TOUCH PANEL CABLE (SHIELDED PORTION) WITH BRACKET (71493833) AS SHOWN IN FIGURE 2.
- 6A. REMOVE AND DISCARD CHANNEL (51942185 SHOWN IN FIGURE 4) TO RELEASE END OF 50 PIN RIBBON CABLE.
7. INSTALL CARD ASSEMBLY (1ALD) AND CABLE ASSEMBLY (61409183) AS SHOWN IN FIGURE 2.
8. POSITION JUMPER ON CARD ASSEMBLY 1AJD AS SHOWN IN FIGURE 2 VIEW A-A.
9. CONNECT 50 PIN RIBBON CABLE AS SHOWN IN FIGURE 2.
10. REPLACE LOGIC DRAWER ASSEMBLY PER PROCEDURE IN HMM.
11. ATTACH TOUCH PANEL CABLE TO CARD ASSEMBLY (1ALD).
12. REPLACE BEZEL AND ACCESS COVER PER PROCEDURE IN HMM.
13. ADD THE EQUIPMENT IDENTIFICATION NUMBER, SERIES CODE, PART NUMBER AND SERIAL NUMBER TO THE EQUIPMENT CONFIGURATION LOG. INFORMATION IS CONTAINED ON QUALITY ASSURANCE TAG OF THIS OPTION.
14. ADJUST VIDEO ALIGNMENT WITH GRAPHICS TOUCH PANEL PER PROCEDURE IN HMM.
15. SET TERMINAL INSTALLATION PARAMETERS (CONFIGURATION F2-2 AND F3-3 SET TO 1) AND CHECKOUT PER OPERATORS GUIDE (62940019 FOR CC634A/CC638A) OR (62950101 FOR CC634B/CC638B).

TABLE 2 XA360-A FIELD INSTALLATION NOTES

1. REMOVE LOGIC DRAWER ASSEMBLY AND TOP ACCESS COVER PER PROCEDURE DESCRIBED IN THE DISPLAY TERMINAL HMM (HARDWARE MAINTENANCE MANUAL) (62940034).
2. REMOVE COVER PLATE AT 1/F 4 POSITION. REFER TO FIGURE 4.
3. SLIDE MODEM CARD ASSEMBLY INTO 1/F 4 SLOT. SECURE WITH THE 2 NUTS PROVIDED.
4. CONNECT THE 50 PIN RIBBON CABLE (REFER TO FIGURE 5). THE SHORT 50 PIN EXTENSION CABLE MUST BE USED ON ALL CC634A/CC638A TERMINALS. ON CC634B/CC638B MODELS, DISCARD JUMPER CABLE.
5. REPLACE LOGIC DRAWER ASSEMBLY AND TOP ACCESS COVER PER PROCEDURE IN HMM.
6. ADD THE EQUIPMENT IDENTIFICATION NUMBER, SERIES CODE, PART NUMBER AND SERIAL NUMBER TO THE EQUIPMENT CONFIGURATION LOG. INFORMATION IS CONTAINED ON QUALITY ASSURANCE TAG OF THIS OPTION.
7. REMOVE ANY TELEPHONE CABLE FROM THE WALL MOUNTED JACK. FOR THE TELEPHONE TO BE USED WITH THE MODEM, INSERT THE DUPLEX PLUG (P/N 51917818) INTO THE WALL JACK, REINSERT THE TELEPHONE CABLE INTO THE DUPLEX PLUG. PLUG ONE END OF THE MODEM CABLE INTO THE DUPLEX PLUG. PLUG THE OTHER END OF THE MODEM CABLE INTO THE 1/F 4, RJ-11 JACK OF THE MODEM.
8. SET TERMINAL INSTALLATION PARAMETERS (CONFIGURATION F3-1 EQUAL TO 1), SET MODE INSTALLATION PARAMETERS AS APPLICABLE AND CHECKOUT PER OPERATORS GUIDE (62940019 FOR CC634A/CC638A) OR (62950101 FOR CC634B/CC638B).

TABLE 3 XA 368-A FIELD INSTALLATION NOTES

1. REMOVE LOGIC DRAWER ASSEMBLY PER PROCEDURE DESCRIBED IN THE DISPLAY TERMINAL HMM (HARDWARE MAINTENANCE MANUAL) (62940034).
2. REMOVE AND DISCARD CHANNEL (51942185 SHOWN IN FIGURE 4) TO RELEASE END OF 50 PIN RIBBON CABLE.
3. INSTALL CARD ASSEMBLY (1ALD) AND CABLE ASSEMBLY (61409183) AS SHOWN IN FIGURE 2.
4. POSITION JUMPER ON CARD ASSEMBLY 1AJD AS SHOWN IN FIGURE 2 VIEW A-A.
5. CONNECT 50 PIN RIBBON CABLE AS SHOWN IN FIGURE 2.
6. REPLACE LOGIC DRAWER ASSEMBLY PER PROCEDURE IN HMM.
7. ADD THE EQUIPMENT IDENTIFICATION NUMBER, SERIES CODE, PART NUMBER AND SERIAL NUMBER TO THE EQUIPMENT CONFIGURATION LOG. INFORMATION IS CONTAINED ON QUALITY ASSURANCE TAG OF THIS OPTION.
8. SET TERMINAL INSTALLATION PARAMETER (CONFIGURATION F3-3 SET TO 1) AND CHECKOUT PER OPERATORS GUIDE (62940019 FOR CC634A/CC638A) OR (62950101 FOR CC634B/CC638B).

TABLE 4 XA 369-A FIELD INSTALLATION NOTES

1. REMOVE LOGIC DRAWER ASSEMBLY AND TOP ACCESS COVER PER PROCEDURE DESCRIBED IN THE DISPLAY TERMINAL HMM (HARDWARE MAINTENANCE MANUAL) (62940034).
2. REMOVE BEZEL ASSEMBLY AS SHOWN IN FIGURE 1.
3. REMOVE VIDEO FILTER ASSEMBLY (REFER TO FIGURE 3).
4. MOUNT TOUCH PANEL ASSEMBLY WITH HARDWARE AS SHOWN IN FIGURE 1. PASS CABLE BETWEEN ADAPTER AND CRT AS PANEL IS INSTALLED. SEE NOTE 1 (SHEET 1) FOR TORQUE SPECIFICATION.
5. SECURE TOUCH PANEL CABLE (SHIELDED PORTION) WITH BRACKET (71493833) AS SHOWN IN FIGURE 2.
6. ATTACH TOUCH PANEL CABLE TO CARD ASSEMBLY (1ALD).
7. REPLACE BEZEL AND ACCESS COVER PER PROCEDURE IN HMM.
8. ADD THE EQUIPMENT IDENTIFICATION NUMBER, SERIES CODE, PART NUMBER AND SERIAL NUMBER TO THE EQUIPMENT CONFIGURATION LOG. INFORMATION IS CONTAINED ON QUALITY ASSURANCE TAG OF THIS OPTION.
9. ADJUST VIDEO ALIGNMENT WITH GRAPHICS TOUCH PANEL PER PROCEDURE IN HMM.
10. SET TERMINAL INSTALLATION PARAMETER (CONFIGURATION F2-2 SET TO 1) AND CHECKOUT PER OPERATORS GUIDE (62940019 FOR CC634A/CC638A) OR (62950101 FOR CC634B/CC638B).

TABLE 5 YR 109 FIELD INSTALLATION NOTES

1. REMOVE LOGIC DRAWER ASSEMBLY AND TOP ACCESS COVER PER PROCEDURE DESCRIBED IN THE DISPLAY TERMINAL HMM (HARDWARE MAINTENANCE MANUAL) (62940034).
2. REMOVE "MAIN LOGIC PCB" PER PROCEDURE IN HMM. DO NOT DISCONNECT THE BATTERY.
3. REMOVE FIRMWARE CHIPS FROM LOCATIONS K1, K2 AND K5 ON MAIN LOGIC BOARD (SEE FIGURE 5 & 6 NOTE CHIP ORIENTATION AS REPLACEMENT CHIPS WILL BE ORIENTATED THE SAME).
4. INSTALL CHIP P/N 68315365 IN LOCATION K1, 66315366 AT K2 AND 86315367 AT K5.
5. REPLACE "MAIN LOGIC PCB" PER PROCEDURE IN HMM.
6. REPLACE LOGIC DRAWER ASSEMBLY AND TOP ACCESS COVER PER PROCEDURE IN HMM.
7. ADD THE EQUIPMENT IDENTIFICATION NUMBER, SERIES CODE AND PART NUMBER TO THE EQUIPMENT CONFIGURATION LOG. INFORMATION IS CONTAINED ON QUALITY ASSURANCE TAG OF THIS OPTION.
8. CHECKOUT PER OPERATORS GUIDE (62940019 FOR CC634A/CC638A) OR (62950101 FOR CC634B/CC638B).

CONTROL DATA CORPORATION	INSTALLATION DRAWING, LARGE OPTION		CODE IDENT 15920	DWG NO C 66315803	REV F
			SHEET 2		

62940034

5-7

REVISION RECORD					
REV	ECO	DESCRIPTION	DEFT	DATE	CHKD APP

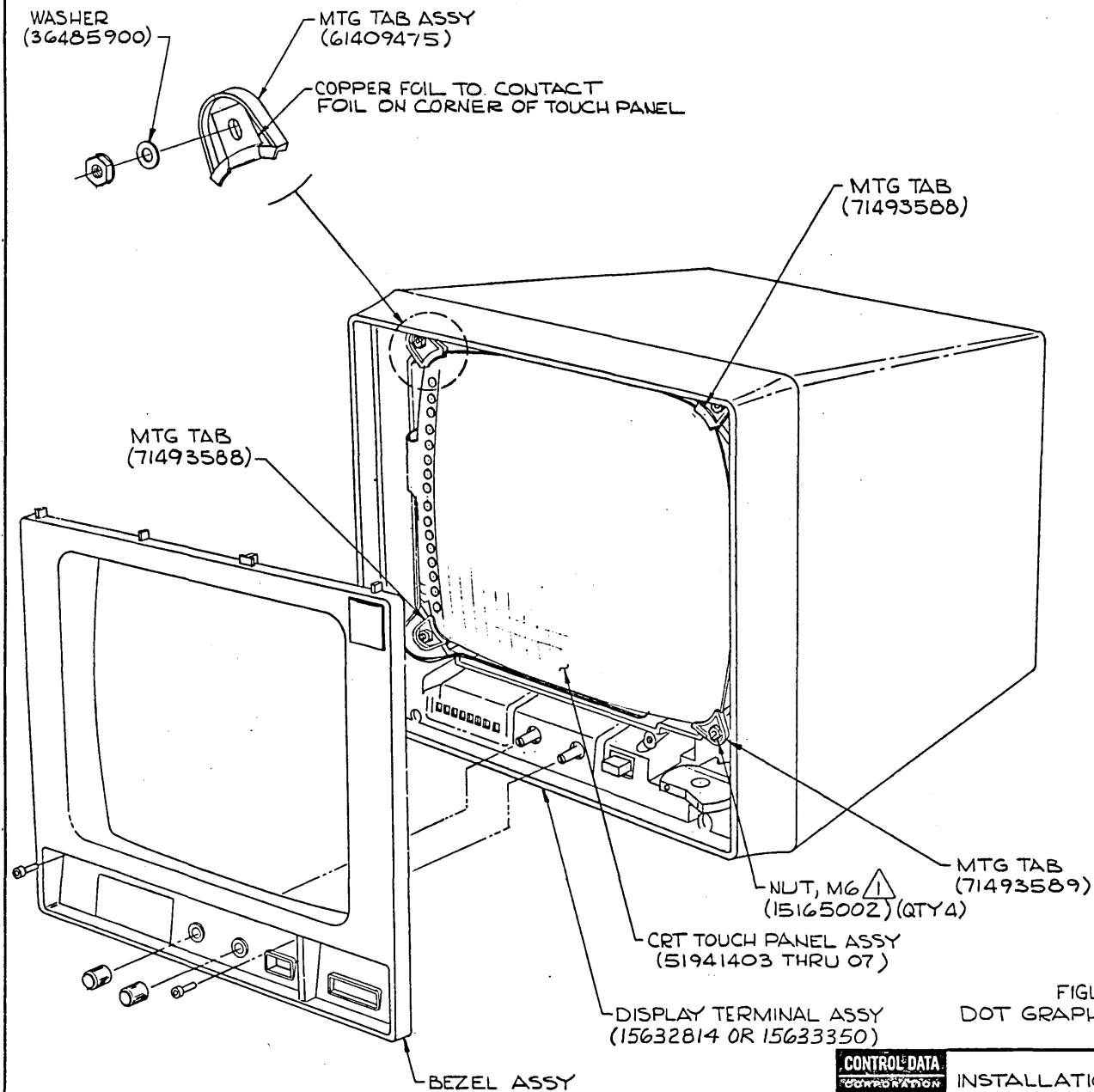
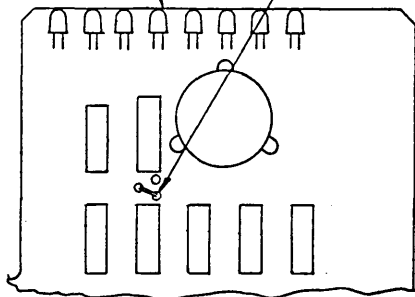


FIGURE 1  
DOT GRAPHICS INSTALLATION

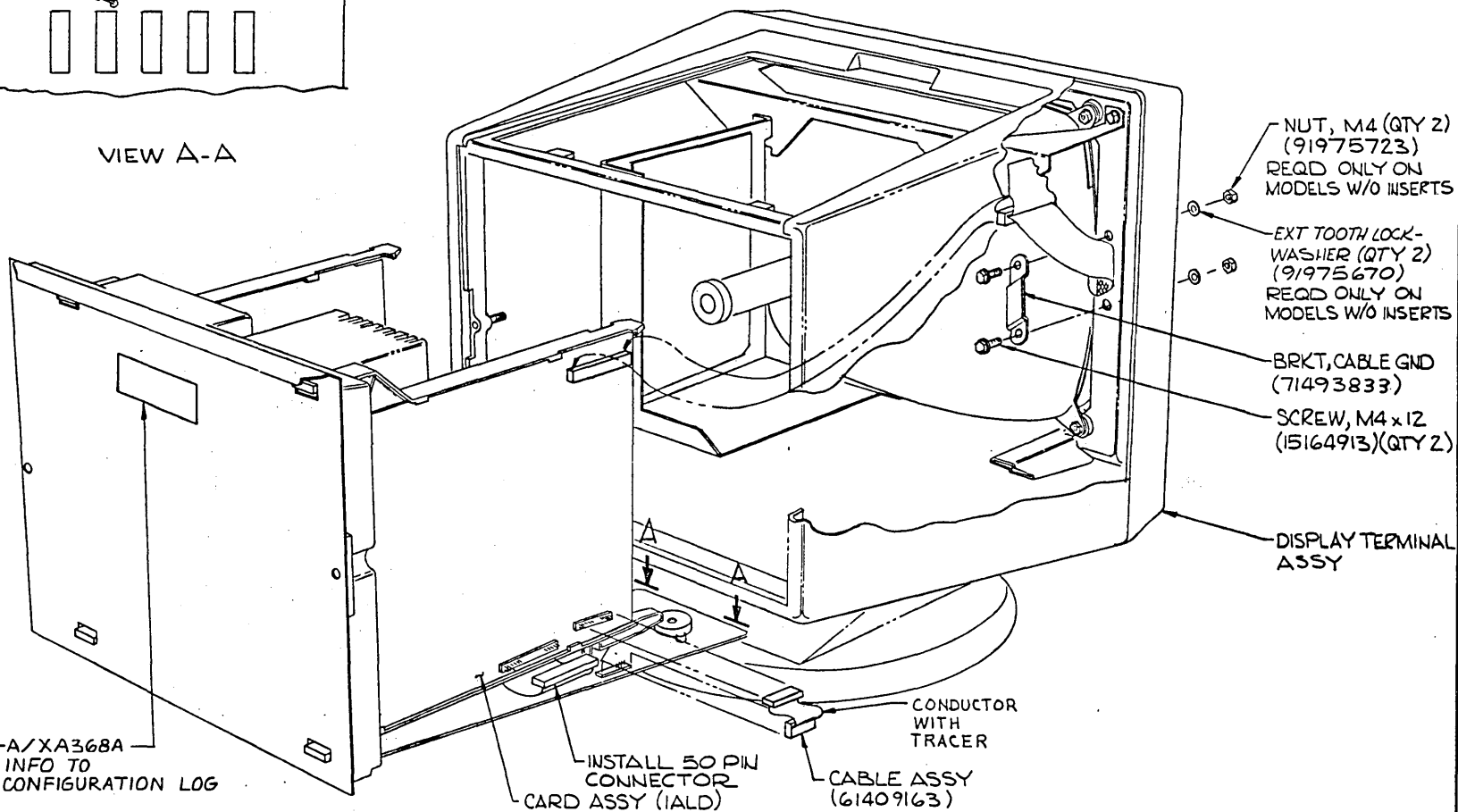
CONTROL DATA CORPORATION	INSTALLATION DRAWING, LARGE OPTION	CODE IDENT 15920	C	DWG NO 66315803	REV F
				SHEET 3	

REVISION RECORD						
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	APP

CARD ASSY IAJD      LOCATE JUMPER AS SHOWN



VIEW A-A



NUT, M4 (QTY 2)  
(91975723)  
REQD ONLY ON  
MODELS W/O INSERTS

EXT TOOTH LOCK-  
WASHER (QTY 2)  
(91975670)  
REQD ONLY ON  
MODELS W/O INSERTS

BRKT, CABLE GND  
(71493833)

SCREW, M4 x 12  
(15164913)(QTY 2)

DISPLAY TERMINAL  
ASSY

FOR XA358-A/XA368A  
ADD IDENT INFO TO  
EQUIPMENT CONFIGURATION LOG

INSTALL 50 PIN  
CONNECTOR  
CARD ASSY (IAJD)

CONDUCTOR  
WITH  
TRACER

CABLE ASSY  
(61409163)

FIGURE 2  
DOT GRAPHICS INSTALLATION

CONTROL DATA CORPORATION	INSTALLATION DRAWING, LARGE OPTION	CODE IDENT 15920	DWG NO C 66315803	REV F
			SHEET 4	



62940034 E

REVISION RECORD					
REV	ECO	DESCRIPTION	DRAFT	DATE	CHKD APP

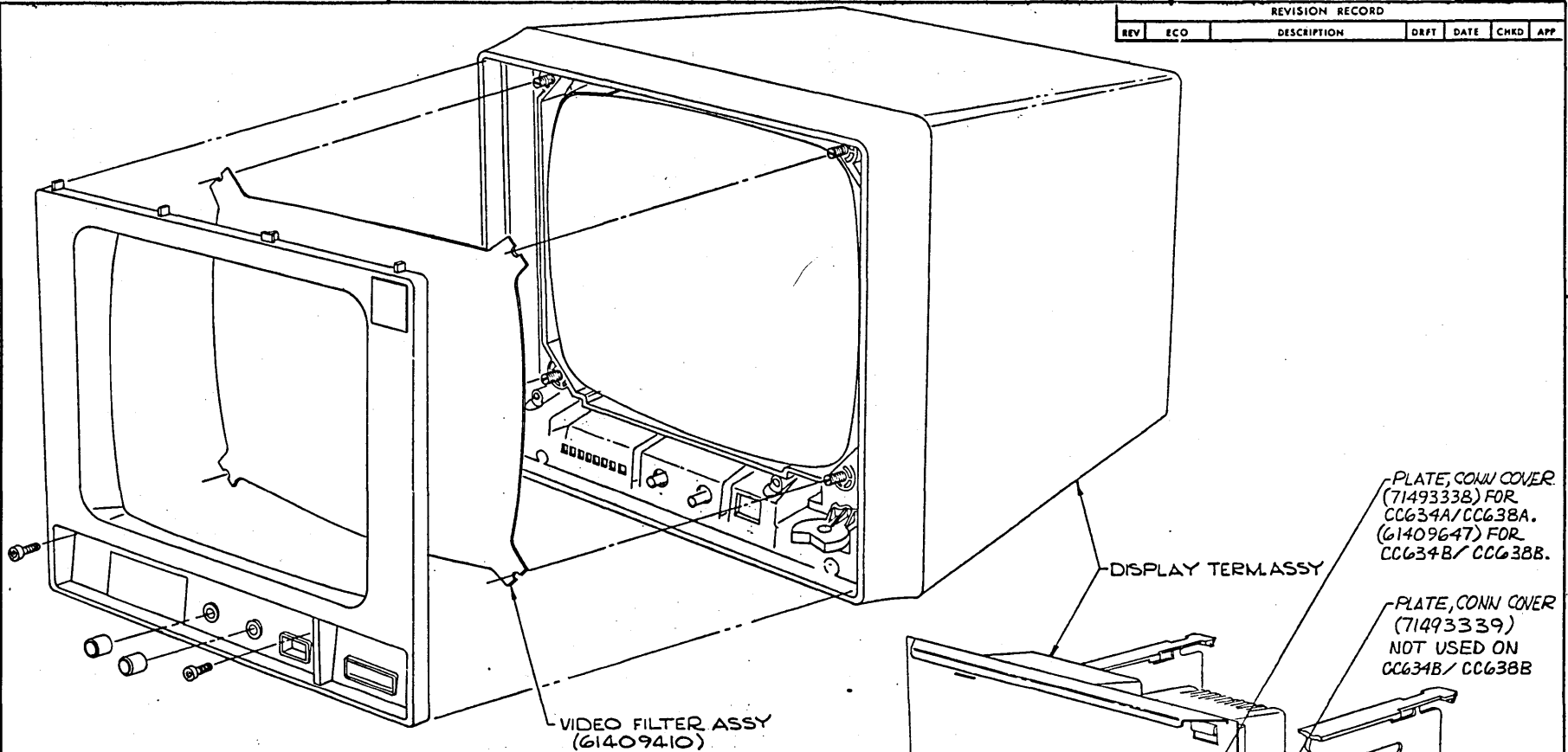
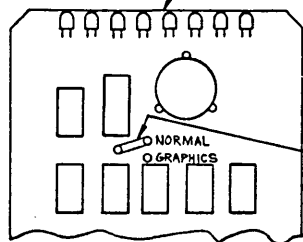


FIGURE 3  
VIDEO FILTER INSTALLATION.

CARD ASSY 1AJD



VIEW B-B

LOCATE JUMPER AS SHOWN

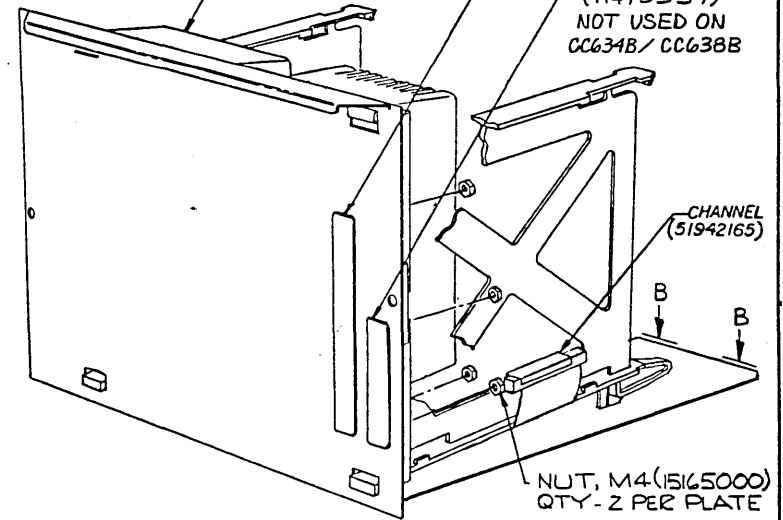


FIGURE 4. CONNECTOR COVER PLATE INSTALLATION

5-9

CONTROL DATA CORPORATION	INSTALLATION DRAWING LARGE OPTION		CODE IDENT 15920	DWG NO C 66315803	REV F
				SHEET 5	

REVISION RECORD					
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD APP

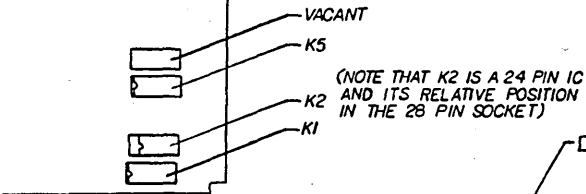


FIGURE 6  
4.0 FIRMWARE INSTALLATION

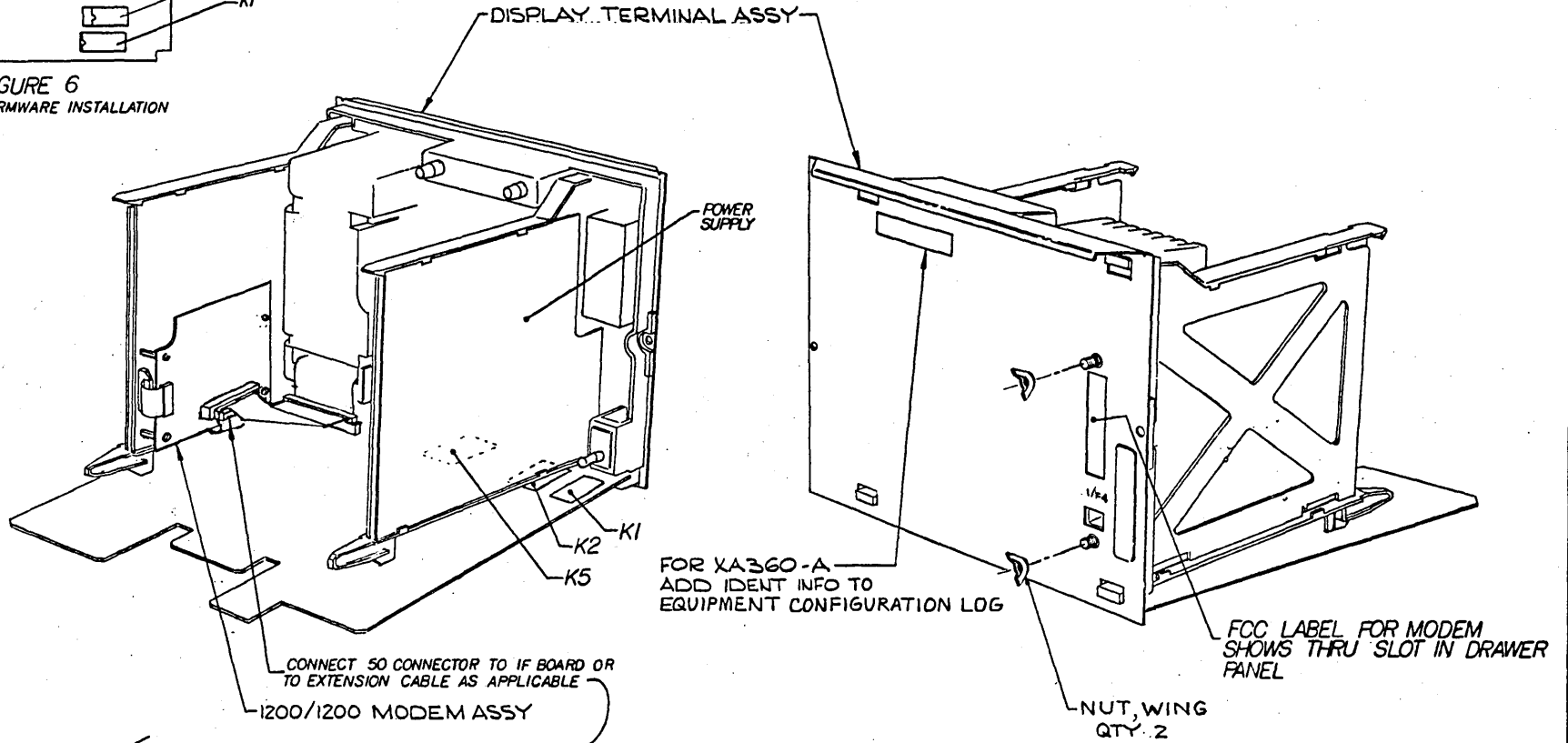


FIGURE 5  
1200/1200 MODEM INSTALLATION

CONTROL DATA CORPORATION	INSTALLATION DRAWING, LARGE OPTION	CODE IDENT	DWG NO	REV
		15920	C 66315803	F
		SHEET 6		

---

INTRODUCTION

As stated in section 1, this manual deals only with display terminal problems. As a customer engineer (CE), the internal resident diagnostics and visual indications are the only maintenance tools available. If the diagnostics execute correctly, it is assumed that the terminal is not the source of the customer's maintenance request. If the diagnostic tests indicate an error, the SAM listings in section 6A should be used to isolate the failing field replaceable unit. To use these listings, you must be able to do the following:

- Initiate and execute resident diagnostic test 1 and interpret the test results (see procedure 2, section 6B).
- Initiate, execute and terminate resident diagnostic test 3 and interpret the test results (see procedure 2, section 6B).
- Locate the SAM listings and state the major symptom covered by each listing (see listings in section 6A).
- Locate the major assemblies and components found in the display terminal (see figures in all sections of the manual).

In addition to the SAM listings, this section provides information necessary to perform site maintenance on the terminal. Information is organized under the following major headings:

- Suggested Emergency Maintenance Procedure - describes the suggested approach to emergency maintenance.
- Maintenance Aids - describes the diagnostics available to troubleshoot the terminal.
- Customer Performed Maintenance - describes the follow-up tasks to be done when a terminal requires repair.
- Special Tools - describes special tools required for terminal maintenance.

- MOS Circuit Board Handling Precautions - describes special procedures to be used when replacing MOS circuit boards.
- Diagnostic and Corrective Maintenance Procedures - contain SAM (structured analysis method) listings that provide information for troubleshooting terminal malfunctions and associated corrective maintenance procedures. Preceding the listings and procedures is a description of the format and use of the SAMs.

#### SUGGESTED EMERGENCY MAINTENANCE PROCEDURE

The following procedure provides suggested steps for the CE to follow when responding to a customer request for maintenance on the terminal.

#### BEFORE LEAVING FOR CUSTOMER SITE

Before leaving for the customer site, contact the person operating the terminal at the time the malfunction occurred, and then:

1. Determine the following:
  - a. The type of maintenance coverage on the customers equipment; i.e., on-call or carry-in. (Check warranty and shipping tag.)
  - b. Specific configuration of terminal; for example, does it have an internal modem, additional RAM, and/or interfaces?
  - c. Type of symptoms terminal exhibited to indicate that a malfunction occurred.
  - d. Whether terminal is operating and what symptoms, if any, are present when an attempt is made to operate. (Analyze diagnostics, loopbacks, etc.)
2. Determine a course of action, considering the following suggestions:
  - a. If it becomes apparent that the terminal itself is not at fault and, for example, it becomes likely that the cause of problem is either communication lines or a power loss, direct the customer to contact appropriate maintenance personnel.

- b. Determine that an error in operating procedure rather than an equipment failure is probable cause of problem, and notify customer of correct operating procedure.
  - c. If appropriate, suggest that the terminal be brought into a repair center.
  - d. Go to customer site and begin troubleshooting.
3. If a site maintenance trip is required, determine a probable cause for failure and gather necessary tools, manuals, and spare parts that may be needed.

#### UPON ARRIVING AT CUSTOMER SITE

Upon arriving at the customer site, locate the appropriate supervisory personnel and again discuss the malfunction with the terminal operator. Then proceed as follows:

1. Visually inspect terminal to ensure that correct input/output cable connections exist.
2. Verify that a malfunction does exist, and then begin troubleshooting the terminal, as follows:
  - a. Run the diagnostics described later in this section.
  - b. Refer to the SAM in this section that covers the malfunction and perform the prescribed corrective actions.
3. After malfunction has been corrected, proceed as follows:
  - a. Rerun diagnostics to ensure that terminal is operational.
  - b. Perform follow-up maintenance tasks listed in this section.
  - c. Inform or demonstrate to customer that terminal is now operating properly.
  - d. Complete all administrative paperwork (MAFs and defective tags, etc.).

#### MAINTENANCE AIDS

Resident diagnostics provide error indications of basic hardware faults in the display terminal. The successful completion of the diagnostic routine indicates that the terminal is operational.

## RESIDENT DIAGNOSTICS

The resident diagnostics contain three terminal self-testing routines, listed as follows:

- Test 1 (Quicklook)
- Test 2, RAM test
- Test 3, CRT alignment, touchpanel, ROM, LED, and keyboard tests

Test 1 runs without operator intervention whenever the POWER or RESET switch is pressed. Test 2 also runs without operator intervention and is initiated upon receiving the Initial Test Command from the host while running in CYBER mode. It can also be initiated from the keyboard. Test 3 diagnostic routines require operator intervention and are described in this section. Refer to procedure 2 in section 6B for the initiation, execution and termination for each resident diagnostic.

### Test 1 (Quicklook)

Test 1 checks the overall operation of the terminal. It checks the microprocessor, the program memory, communications element, the programmable timer, and the audible alarm. The test does not display the status of its testing unless a failure occurs. The test consists of the following sections:

- Character RAM Test - A 55 hexadecimal and an AA hexadecimal is written, read and compared throughout the RAM character generator memory. A failure of this test will display CHARACTER RAM FAIL on the next line of the CRT.
- RAM Test - A 55 hexadecimal and a AA hexadecimal is written, read, and compared throughout the 64K resident RAM. A failure of this test causes a display of RAM FAIL XXXX AA EE on the next line of the CRT (assuming a failure mode does not prevent display) where: XXXX = failing address; AA = actual data read; EE = expected data read. Nothing will be displayed if there are no failures. Parity error interrupts are enabled during the RAM test, and a failure will be reported if a parity error is detected.
- Graphics, Option RAM - If this option is present, the graphics RAM will be selected and a 55 hexadecimal and AA hexadecimal pattern will be stored and tested. A failure of the test will be displayed on the next line saying GRAPHICS RAM FAIL XXXX, AA EE.

- Graphics Bulk Write - If this option is present, a bulk write of zeros will be output to the graphics RAM. If the bulk write busy status does not set and clear, the message GRAPHICS FAIL will be displayed. If the graphics RAM does not contain all zeros, the message GRAPHIC FAIL will be displayed.
- ROM Test - A checksum is run on each memory chip of the resident ROM. A failure of this test displays ROM FAIL XX XX XX. The first value is ROM 1, the second is ROM 2, and the third is ROM 3. A value other than 00 indicates the failure location.
- NVM Test - A checksum is run on the nonvolatile memory (NVM), and if an error occurs, either NVM ALTERED or NVM FAIL displays. The NVM ALTERED message applies to terminals having the enhanced firmware and the message NVM FAIL applies to terminals that do not have the enhanced firmware.
- Loopback Test - The test is comprised of transferring 128 characters from the processor to the communications UART, which is conditioned to echo rather than transmit all data. The data is tested as it is received. Transmitter speed is fixed at 9600 baud. A failure of the test will display COMM FAIL on the next line of the CRT. The same test is conducted on the UART to the keyboard. A failure of this test will display the message KEYBOARD FAIL on the next line of the CRT.
- Timer Test - The timer will be started for a 5-millisecond delay with the timer interrupt enabled. If a timer interrupt does not occur before 6 milliseconds, interrupts will be disabled and the message TIMER FAIL displayed.
- Battery Test - This test will sample the battery low status. If the battery voltage level is low, BATTERY LOW will be displayed. This is not an error condition, but indicates battery should be replaced before NVM is lost.
- Serial Ports - If this option is present, this test will test both ports A and B which are conditioned to echo rather than transmit all data. The data is tested as it is received. Transmission speed is fixed at 9600 baud. A failure of the test will cause a display of PORT A or PORT B FAIL.
- Test Switch - The position of the TEST switch on the rear panel will be tested. If enabled, the message TEST SWITCH ENABLED is displayed. In addition, the keyboard clock is tested and the message KBD CLOCK FAIL displays if it is defective. Also, the keyboard loopback test is run in external mode and the message EXT KBD LOOPBACK FAIL displays if a failure occurs.

- Internal Modem - This test checks the modem assembly ROM, UART, and modem board (modem loopback section) and displays an appropriate error message plus the revision level of the modem if a failure occurs (see figure 6-1). The modem loopback section takes approximately 10 seconds and is enabled/disabled by the third bit in the F4 field of terminal installation parameters. If the loopback section is to run with the rest of the internal modem test, that parameter bit must be a 1.
- Serial Port Test Switch - If the TEST/NORMAL switch on the dual serial interface board is in the TEST position, the message SERIAL PORT TEST SWITCH ENABLED will be displayed.
- Diagnostic ROM Pack - If a ROM PACK containing a diagnostic is installed, a call will be made to the ROM PACK diagnostic input. The ROM PACK diagnostic should perform a ROM checksum, test any additional hardware used, display any error messages, and display the ROM PACK name and revision level.
- Revision Level and Copyright - On terminals having the enhanced firmware, this section displays the revision level of the firmware plus a Control Data copyright message (see figure 6-1). This occurs at the end of the test when the mode selection menu appears (the message and menu do not appear if automatic mode selection is in effect). On terminals that do not have the enhanced firmware, this section displays only the revision level of the firmware when a failure occurs.
- Completion of test 1 is signaled by the audible alarm sounding at a soft, loud, then soft level. See Figure 6-1 for internal diagnostic failure format after test.

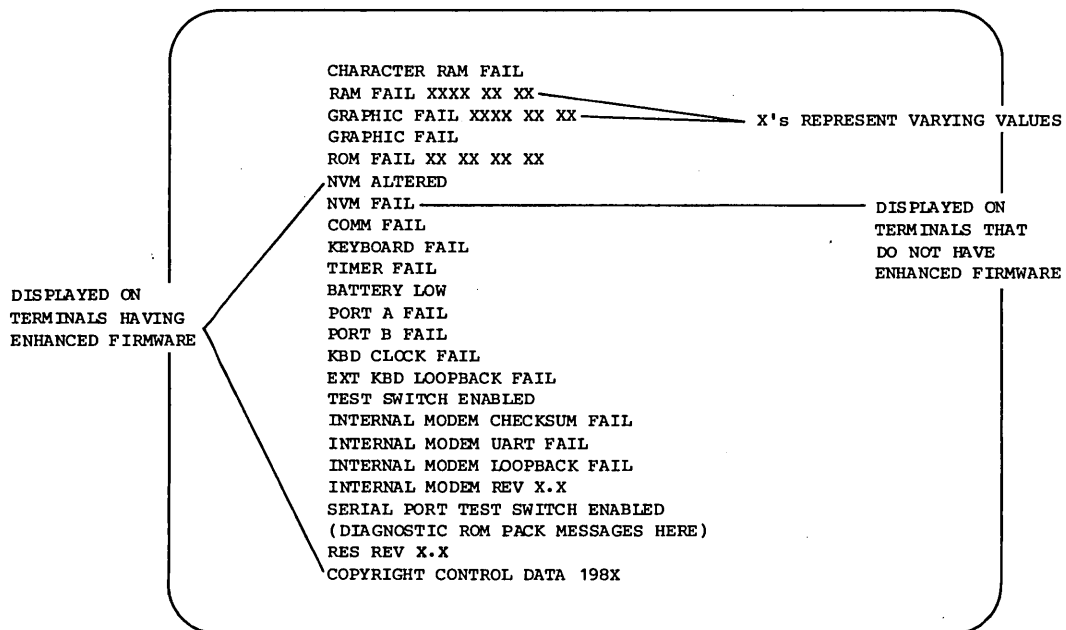


Figure 6-1. Display After Test 1 If Everything Failed



## Test 2, RAM Test

Test 2 is similar to test 1, but test 2 does not perform the internal modem UART or loopback checks if the terminal is online. If an error occurs in test 2, an error flag is set.

### NOTE

This test can be initiated from the keyboard in local CYBER mode or upon receipt of the Initiate Test Command from the host during online operations in CYBER mode. The test can be used to aid in the isolation of intermittent terminal problems. Refer to procedure 2 for initiation.

- Host-initiated - At the completion of the test, if the error flag is set, an error response is sent to the host. The error message will not remain on the screen. If the error flag is not set, a positive response is sent to the host and the screen is cleared.
- Locally-initiated - If the operator holds down the CTRL key and presses the = key and the V key while in local CYBER mode, the test will be run. As long as no errors are detected, the test will loop and keep running. It can be cleared by pressing RESET. If an error occurs, the test is halted, displaying the failure, and the RESET switch must be pressed to exit.

## Test 3, CRT Alignment, Touchpanel, ROM, LED, and Keyboard Tests

Test 3 is initiated if the operator presses the F8 key while the mode selection menu is displayed. This test performs the following checks:

- Graphics Option - If this option is present, the graphics video will be enabled and a pattern of every other dot will be displayed. This pattern will alternate between a 480 and 512 vertical line display. Pressing any key will exit the graphics display and continue the test.
- Alignment Raster - This test clears the display and enters an alignment pattern around the outer edge of the display area.

- ROM Character Generator - Seven lines will be displayed as follows:
  - 32 Control codes
  - 33 Numeric and special characters
  - 32 Uppercase alpha and special characters
  - 31 Lowercase and special characters
  - 32 Foreign character symbols
  - 32 Line drawing characters
  - 64 PLATO characters

NOTE

If a foreign character set is selected, they will appear in their assigned locations.

NOTE

The external RAM characters will not be displayed since they cannot be displayed simultaneously with PLATO characters.

- Attribute Test - A line (BLINK DIM UNDERSCORE INVERSE BLANK) will be displayed with each word having the associated bit set in background. If BLANK is seen on the CRT, the function is not working.
- Keyboard Test - This test displays KEYBOARD TEST on one line on the CRT. As the operator presses a key, the hexadecimal code received from the key will be displayed after the words KEYBOARD TEST. For the hexadecimal code corresponding to each key, refer to Appendix A.

NOTE

The keyboard sends a code with  $2^7$  clear whenever a key is pressed and the same code with  $2^7$  set when the key is released. The codes sent by the keyboard are not ASCII codes, for example:

KEYBOARD TEST 55 (when the u key is pressed)  
KEYBOARD TEST D5 (when the u key is released)

- Indicator Test - The eight indicators that are controlled by the firmware will be stepped on and off at the rate of one-half second. After the first indicator is lit, every one-half second it will be shifted right. After the last indicator has been lit one-half second, the first will again be lit.
- Touch-Panel Test - The touch-panel interrupt will be enabled. When the screen is touched, an interrupt occurs and the cursor will be moved to the area touched.
- External Loopback - A message displays near the bottom of the screen describing how to run external loopback. It displays: TO RUN EXTERNAL LOOPBACK - ENABLE TEST SWITCH.

When the TEST switch on the rear panel is pulled out:

- The UART clock for the keyboard I/F will be tested and the message KBD CLOCK OK or KBD CLOCK FAIL will be displayed.
- PARALLEL PORT - If a parallel-interface graphics printer is installed, a 55 hexadecimal and AA hexadecimal are sent to the printer, which is conditioned to echo the data. If incorrect data or no response is received, the error message PARALLEL PORT FAIL is displayed and no further testing occurs on the port. If no error is detected, the message PARALLEL PORT OK is displayed. The graphics printer must be powered on (terminator power also on) for approximately 20 seconds before pulling out the TEST switch or an invalid error will occur.
- If a parallel-interface graphics printer is not installed, a test is made for the presence of a flexible disk drive. The test consists of sending a read ID to the disk drive. If an improper status is received, the message PARALLEL PORT FAIL is displayed. If proper status is received, the message PARALLEL PORT OK is displayed. The primary disk drive involved in the test must have a disk installed or an invalid error will occur.
- KEYBOARD LOOPBACK - The message KEYBOARD RUNNING will be displayed. A total of 128 characters from 00 hexadecimal to 7F hexadecimal will continuously be looped back. If an error occurs, the word RUNNING will change to FAIL.
- COMMUNICATIONS LOOPBACK - The message COMM RUNNING will be displayed. A total of 128 characters from 00 hexadecimal to 7F hexadecimal will continuously be looped back. If an error occurs, the word RUNNING will change to FAIL.

- SERIAL PORT A and B - If the dual serial port board is installed, the message PORT A (or B) RUNNING will be displayed. A total of 128 characters from 00 hexadecimal to 7F hexadecimal will continuously be looped back. However, these actions require that the TEST/NORMAL switch on the dual serial port board be set to TEST prior to enabling the rear-panel TEST switch. Otherwise, an invalid error will occur. If an error occurs, the word RUNNING changes to FAIL.

To exit test 3, the operator must position the TEST and TEST/NORMAL switches for normal operation and press the RESET switch.

### CUSTOMER-PERFORMED MAINTENANCE

The following suggested customer-performed maintenance steps should help to minimize field trips by verifying correct CRT alignment and related operations of the terminal. General inspection of the terminal, including proper seating of cable connectors, should also be made.

Remove power from terminal (procedure 1) and clean as follows:

#### CAUTION

Do not use solvents to clean keyboard. Solvents can cause defective keyswitch operation and damage keycaps.

The following agents may be used for exterior cleaning surfaces including keytops. Only these cleaning agents are recommended; any others should not be used. Place agent on cloth before application to avoid discoloring runs.

Bafix Germicidal Cleaner (Hysan)  
Tide Detergent (2% in H<sub>2</sub>O solution)  
Joy Detergent (1% in H<sub>2</sub>O solution)  
Formula 409 Household cleaner  
Windex with Ammonia

1. Dust keyboard with soft-bristled brush.
2. Clean touchpanel or glare filter in front of CRT screen using a soft cloth dampened with a mild soap and water solution. Apply cleaning solution to cloth to prevent solution from entering behind the bezel. Move keyboard away from area before cleaning touchpanel.
3. Wipe exterior of the terminal using a damp lint-free cloth.

Reapply terminal power and verify correct display alignment.

### SPECIAL TOOLS

In addition to common hand tools for metric hardware and electronic test equipment, a drawer extender cable (part number 66315789) is required. An alignment tool kit (part number 12263463) is recommended for making adjustments on the CRT monitor board, if required.

### NOTE

All hardware is metric.

### MOS CIRCUIT BOARD HANDLING PRECAUTIONS

The display terminal circuit boards contain a number of MOS (metal oxide semiconductor) integrated circuits. The MOS circuits are susceptible to irreparable damage if they are exposed to excessive static electricity and thus require special handling. Follow the precautions listed here at all times when handling these boards.

- Never insert, remove, or otherwise connect/disconnect any circuit(s) while power is applied.

### CAUTION

To prevent accidental shock when observing static-grounding precautions, do not touch powered-on electrical equipment and chassis frame at the same time.

- Before handling any circuit, cable connector, or board, always touch hands or tools to an exposed portion of the associated chassis frame to discharge any buildup of static electricity. This is especially true when dry ambient atmospheric conditions prevail.
- When removing, replacing, or otherwise handling any board that contains MOS circuits, do not touch circuit paths or conductors. Do not carry a MOS circuit board across a room while touching its circuits. Ordinary static charges present in a room environment have the potential to damage sensitive memory chips.
- All spare circuit boards come in a conductive envelope. Do not remove a board from its envelope until ready for replacement. Upon replacement, store the replaced board in the envelope.

#### CAUTION

If main logic board is removed, avoid shorting bottom of board to any metal. If this is not done, NVM standby power can be lost.

### DIAGNOSTIC AND CORRECTIVE MAINTENANCE PROCEDURES

This remainder of this section contains the SAMs (6A) and corrective maintenance PROCEDURES (6B) for the terminal. The SAM listings provide information for isolating a malfunction and refer to the applicable corrective maintenance procedure for correcting it. The corrective maintenance procedures cover the available terminal adjustments and the replacement of field-replaceable components.

The next paragraphs describe the format and use of SAMs and explain the organization of the SAMs and procedures that follow in the section.

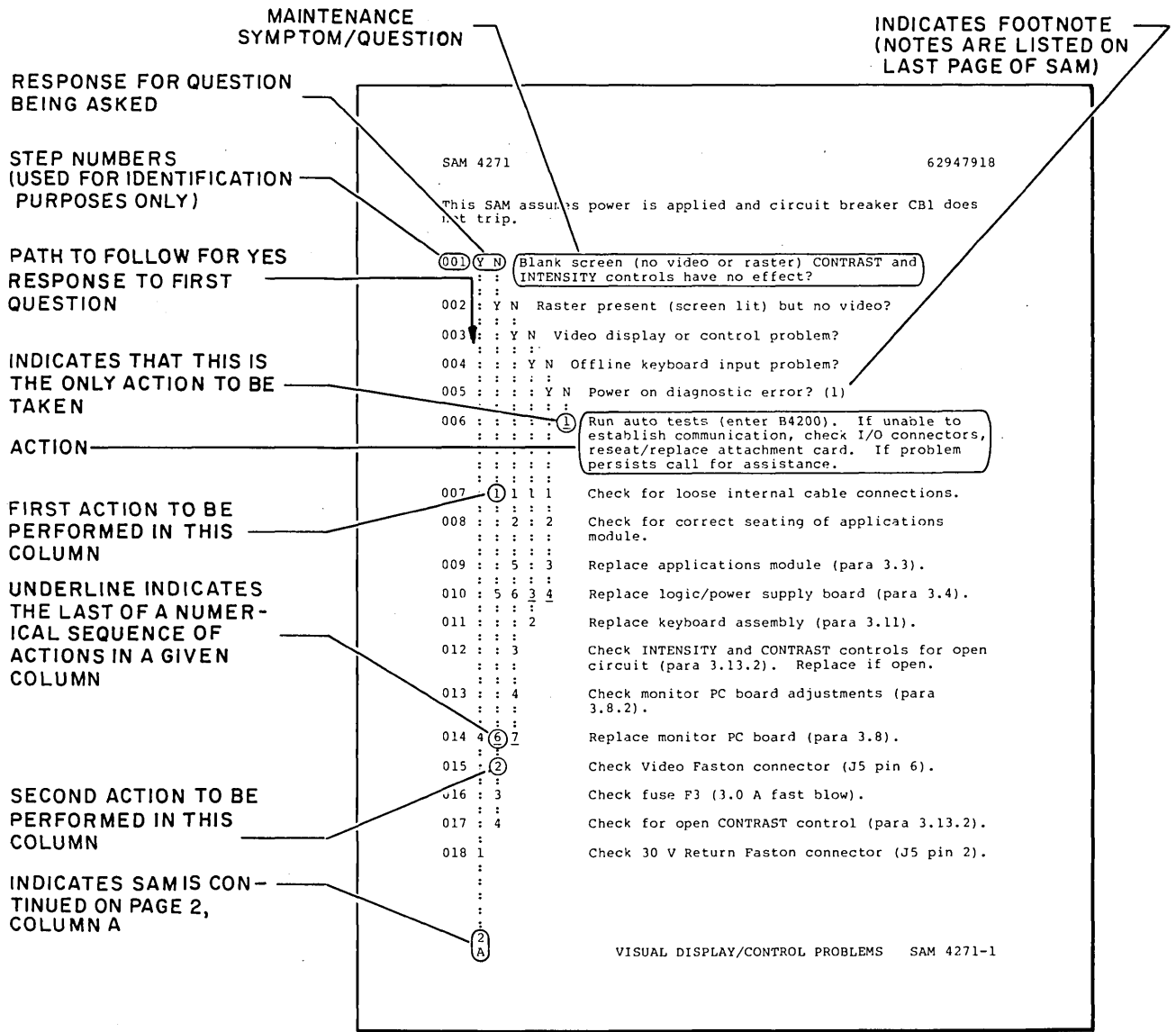
#### SAM FORMAT

An example SAM showing the basic SAM format appears in figure 6-2. A SAM is a formatted listing that presents troubleshooting information in a logical manner. Each SAM contains a sequential listing of questions that can be answered yes or no. The response made to a particular question either leads to the next question or to the specific action (or numerical sequence of actions) that is to be taken to correct the problem.

Each SAM listing is identified by a SAM number and a title that denotes the type of problems that it covers. A hyphen and number following the SAM number identifies the pages within the listing.

### USE OF SAMs

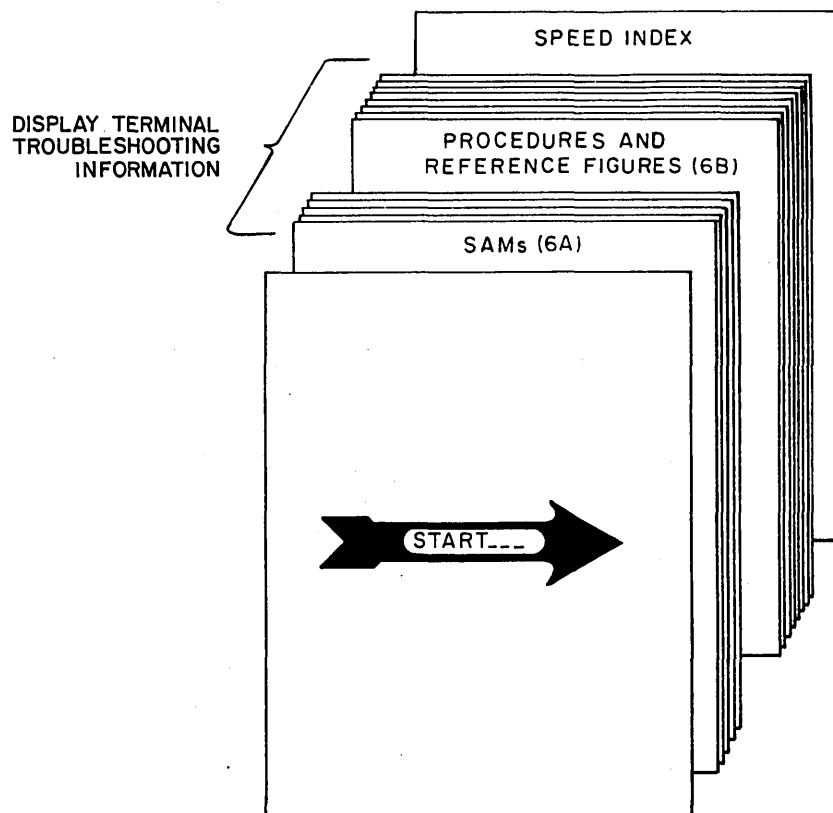
The SAMs are to be used in conjunction with the diagnostics described earlier in this section. After diagnostics are run, or if they cannot be run, refer to the SAM that covers the existing problem. Verify that all assumed conditions stated at the beginning of the SAM are present and observe any preliminary instructions. Enter listing and answer yes (Y) or no (N) to the question asked or the condition being tested. Follow down the appropriate Y or N column and when column leads to action numbers, perform the corresponding actions in numerical order to correct the problem.



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## ORGANIZATION OF SAMs AND PROCEDURES

The organization of the following SAMs (subsection 6A) and corrective maintenance PROCEDURES (subsection 6B) is shown in figure 6-3.



01642-6

Figure 6-3. Organization of SAMs and Corrective Maintenance Procedures



SAM 1 INITIAL PROBLEM DEFINITION

NOTE

This SAM should be used if you do not have a symptom defined. The steps in this SAM provide a quick visual method to locate a symptom. If you already have an initial symptom use table 6A-1 to select your next action.

TABLE 6A-1. SYMPTOMS/SAMS CORRELATION

SYMPTOM	SAM
Power (AC or DC) Problems	2
No Raster	3
Power-Up (Test 1) Test Fails	4
Video Problem	5
Operator Verification (Test 3) Test Fails	6
Keyboard Problem Isolation	7
Internal Modem Problems	8

Prerequisite: To use this SAM, you must be able to:

A. Locate the following: (Refer to figure 6A-1).

- CB1
- Four power supply LED's (remove access lid, procedure 3)
- TEST switch
- G2 pot on monitor board (remove access lid, procedure 3)

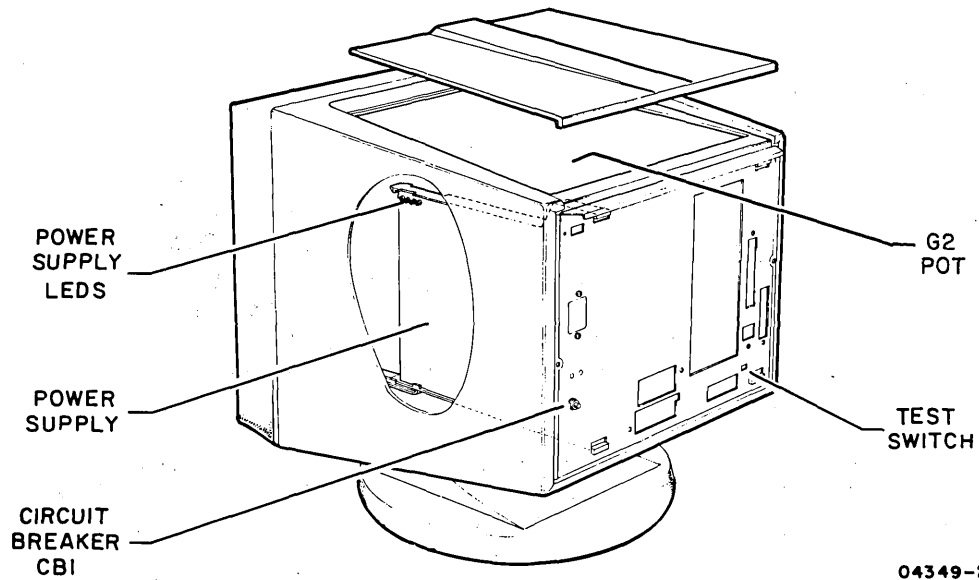
B. Power on terminal.

C. Interpret results of power up test.

Assumptions: Terminal power cord is connected to line power outlet. The TEST switch has been pulled out. Power switch has been pressed to ON or 1.

```

001 N Y Building CB remain set?
      | |
002  | N Y Terminal CB remain set?
      | | |
      2 2 2
      A B C
    
```



04349-2

Figure 6A-1. Location of Controls for Use in SAMs

	A	B	C	
	1	1	1	
003			N Y	All four power supply LEDs lit? Allow 30 seconds warmup.
004			N Y	Turn BRIGHTNESS control and G2 pot fully clockwise. Does a full raster appear?
005			1	Readjust G2 per procedure 16 to prevent damage to screen and do the following as applicable. <ul style="list-style-type: none"> <li>● If no message (screen blank) appears, go to SAM 4.</li> <li>● If a constant alarm sounds, go to SAM 4.</li> <li>● If a message appears, but is difficult to read due to video problems, go to SAM 5.</li> <li>● If following message appears, power on test occurred successfully. X's in message indicate varying values. If terminal has a internal modem, its revision level is included in message. Go to procedure 2 to run test 3.                             <p style="margin-left: 40px;">TEST SWITCH ENABLED INTERNAL MODEM REV X.X (only if internal modem) RES REV X.X COPYRIGHT CONTROL DATA 198X (only with enhanced firmware)</p> </li> <li>● If the message indicates an error, turn to SAM 4.</li> </ul>
006			1	Go to SAM 3.
007	1	1	1	Go to SAM 2.

SAM 2 POWER (AC/DC) PROBLEM ISOLATION

Prerequisite: To use this SAM you must be able to:

A. LOCATE the following components

- CB1
- line filter
- plugs on power supply board (P1, P1, P3)
- power interlock switch
- voltage select switch

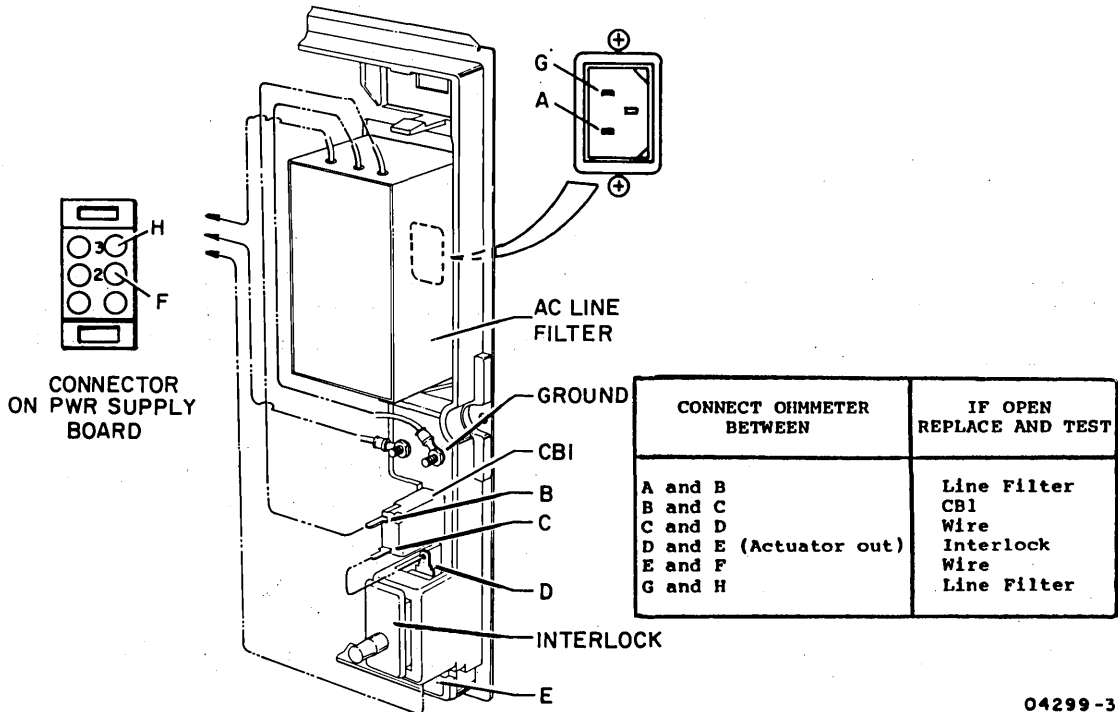
B. Operate power interlock switch

Assumptions: Voltage select switch set in correct position. Logic drawer has been removed (procedure 4) and extender cable has been connected between main logic board and BRIGHTNESS/ CONTRAST control assembly.

001	N Y	Did building circuit breaker for power outlet remain set when terminal was connected to outlet?
002	N Y	Did terminal circuit breaker CB1 remain set when power interlock actuator is pulled out?
003	N Y	Did all four power supply LEDs light?
004	<u>1</u>	Your symptom is not covered in this SAM. Recheck terminal symptom or return to SAM 1 for additional checkout steps.
005	N Y	Are all four power supply LEDs out?
006	<u>1</u>	Isolate open in ac entry circuits as follows: <ul style="list-style-type: none"> <li>a. Place power interlock actuator to center position and disconnect power cord from ac outlet.</li> <li>b. Check blue and brown ac entry wiring for a loose connection or damage. The wiring path is: brown wire from line filter to CB1, CB1 to S2 (power interlock) and S2 to pin 2 of P1 (ac entry plug on power supply board); blue wire from line filter to pin 3 of P1, and then to voltage select switch (ac entry plug on power supply board). Correct any fault and retest.</li> </ul>
	2 2 2	
	A B C	

A B C  
1 1 1

- c. Replace power cord with a known good power cord and test.
- d. Power off (interlock to center position) disconnect power cord from ac entry panel receptacle at rear of terminal. Check continuity of entry components as follows:



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- e. Replace power supply board (procedure 8) and retest.

007 1 Measure power supply output (procedure 7) to ensure voltage is missing.

Y N Is voltage missing?

2 1 Disconnect extender cable and power on the logic drawer. If all four LEDs light, go to step 011 of this SAM. If all four LEDs are not lit, go to step 008 of this SAM.

008 3 Replace power supply board (procedure 8).

009 4 Replace main logic board (procedure 10).

3 3 3  
A B C

- |     |   |   |   |  |
|-----|---|---|---|--|
|     | A | B | C |  |
|     | 2 | 2 | 2 |  |
| 010 |   |   |   | 5 Replace option boards if options are installed. (1)  |
| 011 |   |   |   | <u>6</u> Replace monitor board (procedure 13).   |
| 012 |   |   |   | 1 Disconnect power cord from ac outlet and check brown ac-entry wire for a short. The wire path is CB1 to S2 (power interlock switch), S2 to pin 1 of P1 (ac entry to power supply board). Repair or replace any shorted wires and retest. |
| 013 |   |   |   | 2 With power cord still disconnected from ac outlet, disconnect all plugs to power supply board.   |
| 014 |   |   |   | 3 Connect power cord to ac outlet and pull out power interlock actuator. If circuit breaker trips, replace CB.   |
| 015 |   |   |   | <u>4</u> Place actuator to center position. Reconnect power supply plugs one at a time as follows to determine which plug causes CB1 to trip. Pull out actuator to test, then return actuator to center position for next connection.      |

RECONNECT	IF BREAKER TRIPS REPLACE
P1 (AC IN)	Power supply board
P3 (DC OUT)	Main logic board, any options (1), and then monitor board.

- |     |  |  |  |   |
|-----|--|--|--|---|
| 016 |  |  |  | 1 Ensure customers power is correct.  |
| 017 |  |  |  | 2 Disconnect power cord from ac outlet and check blue and brown ac entry wires for a possible short. The wiring path is: brown from line filter to CB1; and blue from line filter to pin 3 of plug 1 to voltage select switch on power supply board. Repair or place any damaged wire and/or components and retest. |
| 018 |  |  |  | 3 Replace power cord with known good power cord and retest.   |
| 019 |  |  |  | 4 Replace line filter (procedure 17).   |
| 020 |  |  |  | <u>5</u> Replace power supply (procedure 8).  |

(1) Installation/removal of option boards in I/F-1 through I/F-3 slots is covered in the manuals listed in preface.

## SAM 3 RASTER PROBLEM ISOLATION

Prerequisite: To use this SAM you must be able to:

## A. LOCATE the following components

- crt/yoke
- crt socket
- anode lead
- yoke inline connector
- monitor board and plug from control assembly
- BRIGHTNESS/CONTRAST control assembly
- J3 on power supply board
- J5 on main logic board
- monitor box shield assembly
- G2 pot on monitor board (remove access lid, procedure 3)

Assumptions: No raster observed after turning G2 pot and BRIGHTNESS control fully clockwise. (G2 must be readjusted per procedure 16 at completion of testing.) Remove option boards installed in I/F 1 through I/F 3. If raster can be obtained after I/F 1 through I/F 3 boards are removed, reinstall one at a time to determine which one causes the problem. All four power supply LED's are lit. If no 24 V LED go to step 001 of this SAM, if no +5, +12 or -12 V LED is lit go to SAM 2, step 003.

## NOTE

The corrective actions in this SAM assume that cables are good. Before replacing an item, check all associated cables for damage or shorts. Before starting this SAM, verify the following connections are properly seated: (check only after terminal has been disconnected from the outlet for 60 seconds).

- anode lead from crt to monitor board
- yoke inline connector
- socket at end of crt
- monitor cable from BRIGHTNESS/CONTRAST control to monitor board connector
- DC power cable from J3 power supply board to P5 main logic board
- jumper for alpha/graphics is installed correctly on main logic board

001 N Y Remove access lid (procedure 3) and turn on power  
(procedure 1). Is 24 V LED lit?

002 N Y Crt filament lit?

003 2 Replace the BRIGHTNESS control (procedure 6).

004 1 1 1 Replace monitor board (procedure 13).

005 2 3 Replace CRT Bezel adapter assembly (procedure 14).

006 4 Replace large graphic option board (procedure 9)

007 5 Replace main logic board (procedure 10)

008 6 Your symptom is not covered in this SAM. Recheck  
terminal symptom or return to SAM 1 for additional  
checkout steps.

009 2 Replace power supply board (procedure 8).

SAM 4 POWER UP (TEST 1 RESIDENT DIAGNOSTIC) PROBLEM ISOLATION

Prerequisite: None

Assumptions: All four power supply LEDs are lit. Raster appeared as BRIGHTNESS and G2 were turned fully clockwise. TEST switch was enabled (pulled out) before resident diagnostic test 1 was initiated.

- 001 Y N Is the screen blank (no message or cursor)?
- 002 Y N Did more than one failure message appear with one of the messages being SERIAL PORT A and/or B FAIL?
- 003 Y N Did any of the following messages appear?
  - CHARACTER RAM FAIL
  - RAM FAIL
  - ROM FAIL
  - COMM FAIL
  - KEYBOARD FAIL
  - TIMER FAIL
  - KBD CLOCK FAIL
  - EXT KBD LOOPBACK FAIL
- 004 Y N Did either a NVM ALTERED message or NVM FAIL message appear?
- 005 Y N Did BATTERY LOW message appear?
- 006 Y N Did GRAPHIC FAIL message appear?
- 007 Y N Did SERIAL PORT A or B FAIL message appear?
- 008 Y N Did SERIAL PORT TEST SWITCH ENABLED appear?
- 009 Y N If terminal has internal modem installed, do any of the following messages appear? INTERNAL MODEM CHECKSUM FAIL, INTERNAL MODEM UART FAIL, or INTERNAL MODEM LOOPBACK FAIL
- 010 Y N Does TEST SWITCH ENABLED appear along with RES REV X.X and COPYRIGHT CONTROL DATA 198X (copyright message only applies if terminal has enhanced firmware); does alarm sound correctly and do two op panel LEDs light does (left = red, right = green)?

2 2 2 2 2 2 2 2 2 2 2  
 A B C D E F G H I J K



	A	B	C	D	E	F	G	H	I	J	K	
	1	1	1	1	1	1	1	1	1	1	1	
011			1								1	Replace main logic board (procedure 10).
012											2	Replace large graphic option board with small ribbon cable (procedure 9).
013											3	Replace parallel I/O board. (1)
014											4	Replace modem assembly.
015											5	Note RES REV level (if shown on screen) and call for assistance.
016									Y	N		If terminal has internal modem installed, does INTERNAL MODEM REV X.X message appear on display screen?
017											1	Check internal cable connections from main logic board to modem and ensure all modem cabling is secure.
018											2	Replace internal modem (procedure 23).
019											1	Normal end of test 1 messages. If initial symptoms persist, call for assistance; otherwise, continue testing with next SAM.
020											1	Replace internal modem (procedure 23).
021									1			Place TEST/NORMAL switch on dual serial interface board to NORMAL position.
022				1								Re-enter terminal and mode installation parameters into NVM. Refer to parameters recorded by customer in their terminal operator's guide/ installation instructions manual or owner's manual (preface lists publication numbers).
023		1	5	6			1				2	Replace dual serial interface board. (1)
024			2	3		1						Replace graphic board (procedure 9).
025					1							With power on, replace battery. Refer to instructions in terminal operator's guide/ installation instructions manual or terminal owner's manual (preface lists publication numbers).
026	4		3	4								Replace power supply board (procedure 8).
	3	3	3	3	3	3	3					
	A	B	C	D	E	F	G					

	A	B	C	D	E	F	G	
	2	2	2	2	2	2	2	
027	2	4		2	<u>2</u>	<u>2</u>	2	Replace main logic board (procedure 10).
028						<u>3</u>		Replace internal modem (procedure 23).
029	5	3	4	5				Replace parallel I/O board. (1)
030				<u>7</u>				Replace internal modem (procedure 23).
031	3	5						Replace large graphic option board (procedure 9).
032	1	2						Remove any option boards from I/F 1 thru I/F 3 slots. If screen now has a message or cursor, reinstall boards one at a time to determine which one is causing problem.
033		6						Replace small 20 pin ribbon cable from large graphic option board to main logic board.
034		7						Replace main 50 pin shielded ribbon cable from main logic board to mother board.
035	6	8						Replace internal modem (procedure 23).
036	<u>7</u>	<u>9</u>						Note RES REV level (if shown on screen) and call for assistance.

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(1) Installation/removal of option boards in I/F-1 through I/F-3 slots is covered in the manuals listed in preface.

SAM 5 VIDEO PROBLEM ISOLATION

Prerequisite: To use this SAM you must be able to:

- A. INITIATE resident diagnostic test 3.
- B. LOCATE the alignment notches in the bezel assembly.

Assumptions: Terminal passed resident diagnostic test 1 (power up). Resident diagnostic test 3 has been initiated and the screen is displaying the proper test 3 message (see procedure 2).

001	Y	N	Alignment pattern tilted or noticeably undersize?		
002	Y	N	Alignment pattern does not align with notches cut in bezel at all 4 corners? (See figure 6B-3)		
003	Y	N	Test 3 display jittering?		
004	Y	N	Test 3 display rolls vertically?		
005	Y	N	Test 3 display rolls horizontally.		
006	Y	N	Test 3 display characters are out of focus, to dim, or to bright?		
007	Y	N	Test 3 display has extra characters or video?		
008	Y	N	Did video problem appear when changing from 80/132 characters to opposite of what was selected or when selecting 24/30 lines opposite of what was selected.		
009			<u>1</u>	Problem not covered. Call for assistance.	
010			<u>1</u>	<u>1</u>	Replace main logic board (procedure 10).
011			<u>1</u>	<u>2</u>	Replace large graphics option board (procedure 9).
012			<u>1</u>	Adjust FOCUS potentiometer (procedure 16). If FOCUS and BRIGHTNESS have little affect, adjust VIDEO GAIN potentiometer per procedure 16 to ensure it is set correctly.	
	2	2	2	2	2
	A	B	C	D	E

	A	B	C	D	E	
	1	1	1	1	1	
013	3	2	2	2	2	Replace monitor board (procedure 13).
014	4	3	4	4	3	Replace crt/bezel adapter assembly (procedure 14).
015			3	3		Replace main logic board (procedure 10).
016				1		Adjust VERTICAL FREQ potentiometer (procedure 16).
017	2	1	1			Perform video adjustment (procedure 16).
018	1					Perform yoke adjustment (procedure 15).

## SAM 7 KEYBOARD PROBLEM ISOLATION

Prerequisite: None

Assumptions: TEST switch was pulled out before running Resident Diagnostic test 1.

001	Y	N	Did test switch enabled message appear?
002		<u>1</u>	Resident diagnostic has failed test, go to SAM 4.
003	Y	N	Did KEYBOARD FAIL message or KBD CLOCK FAIL message appear for test 1 (procedure 2)?
004		Y N	Does Resident Diagnostic Test 3 run correctly (procedure 2)?
005		Y N	Does keyboard have several or all keys with no response? (Alarm beep or indication on screen.)
006		Y N	Does keyboard have only one key with no response?
007		<u>1</u>	Y N Does shift lock key indicator light when lock key is pressed while in mode operation?
008			<u>1</u> Go to procedure 20.
009		1	<u>1</u> Replace keyboard assembly.
010		<u>2</u>	<u>2</u> Replace main logic board (procedure 10).
011			<u>1</u> Re-verify symptom.

SAM 8 INTERNAL MODEM PROBLEMS

Prerequisites: SAM 4 (Test 1 Resident Diagnostic) runs okay. Terminal is connected to telephone line using a T connector and a telephone handset is connected to the second jack of the T connector.

Assumptions: Terminal is unable to connect or communicate with a remotely located terminal or computer system by using its internal modem. A second telephone handset with a different phone number is located nearby and is available for test purposes.

NOTE

Some terminal installations never use the auto-answer mode of operation. If the terminal under test is such a terminal, skip the first eight line items of this SAM and begin testing with line item 009.

	A	B	
001	Y	N	Does the modem work properly in auto-answer mode? Answer to this question assumes dialogue with someone at a remote site who can call your terminal and verify proper or faulty answer function of your modem.
002	Y	N	Using the second telephone handset, call the modem. Does the modem's telephone ring?
003		<u>1</u>	Refer to line item 012 for appropriate action.
004	Y	N	Does the modem answer the call (go off hook), and does it generate an answer tone?
005		<u>1</u>	Refer to line item 017 for appropriate action.
006	Y	N	Verify suspected auto-answer mode failure of your modem via a second (different than one used in line item 001) remote terminal or computer system. Does auto-answer mode of your modem now work okay?
007		<u>1</u>	Refer to line item 017 for appropriate action.
008		<u>1</u>	Refer to line item 011 for appropriate action.
	2		
	A		

A  
1

009 Y N Use terminal associated handset (one connected to same phone line as terminal via T connector) to dial desired remote telephone number manually. Does telephone ring or is busy signal heard?

010 N Y Possible problem with telephone system either at this end or remote end. Repeat line item 001, but this time dial phone number of second proximate phone. Assuming second phone is properly on hook, does it start to ring after its number is dialed.

011 1 Problem appears to be with remote portion of telephone line or communications equipment. If possible, notify personnel at remote location of difficulty and have them verify that either phone line or communications equipment is at fault. They then can take the appropriate action (that is, notify phone company or communications equipment supplier).

012 1 Problem appears to be with proximate portion of telephone line or communications equipment. If possible, verify source of problem and take appropriate action (that is, notify either telephone company or communications equipment supplier).

013 Y N Use procedure 24 to set up terminal and mode installation parameters of the terminal for performing an external load using the phone number (or extension) of the proximate telephone handset (second handset). Then reset terminal using RESET pushbutton on its front panel. Monitor terminal display screen as it proceeds through the autodial sequence. Does second proximate telephone begin ringing after a time (about time that ringing condition is indicated as occurring on the display screen)?

014 1 Modem probably faulty. Verify setup of preceding step (procedure 24) and repeat that step one time. If proximate handset does not ring, replace modem (procedure 23).

3  
A

- A  
2
- 015 Y N Try establishing connection to a different remote terminal or computer system than one on which initial failure occurred. Or, as an alternative, use a different phone number for the same site. To do either, refer to procedure 24 to change auto-dial default phone number in F7 and F8 fields of Mode Installation Parameters to desired phone number. Is connection made?
- 016 N Y Use a voice line to call remote site dialed by modem and verify that remote system (or terminal) is functioning properly. Is it?
- 017 1 Replace modem assembly in your terminal (procedure 23).
- 018 1 Wait for notification that remote equipment is fixed before reattempting connection.
- 019 Y N Is modem able to send/receive data to/from different remote terminal or computer system than one on which initial failure occurred? Refer to line items 015 and 016.
- 020 1 Replace modem assembly in your terminal (procedure 23).
- 021 1 Modem is functioning okay, but possible fault with communications line to or remote equipment at site that your terminal is unable to connect/communicate with.



**PROCEDURES**

33

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C

C

C

C

C

## Procedure 1 - Turning Terminal Power On/Off

Apply power to all connected peripherals before powering on the terminal.

To apply power to terminal, proceed as follows:

1. Verify that power cord is plugged into site outlet and that opposite end is firmly seated in terminal receptacle (CC634-B/CC638-B terminals have an interlock latch that must be pushed down to access receptacle). Also verify that circuit breaker CBI and the TEST switch on rear of terminal are both pushed in. Check switches on any options. Verify that LINE VOLTAGE switch is set correctly.
2. Press 1(on) side of POWER switch on lower-right front of terminal.
3. After warmup, adjust BRIGHTNESS control for desired viewing intensity.

To remove power from the terminal:

1. Press 0(off) side of terminal POWER switch.
2. If making parts replacement, disconnect power cord from rear of terminal.

## Procedure 2 - Executing Resident Diagnostics

The resident diagnostics contain three tests, designated 1, 2, and 3. This procedure will present the following for each test:

- Initiate
- Execute
- Terminate

### NOTE

This procedure regards the terminal as a standalone unit. The steps that follow may not be the same as those used by a customer. These steps allow the unit to be taken out of its normal operating environment and to perform only the resident diagnostics.

Test 1 - This test (also called quicklook or Power Up test) uses various subtests to check basic hardware and some options.

Initiate 1. Pull TEST switch (rear panel) out. This will generate a false error, but it is the only positive method of ensuring that terminal firmware allows mode selection.

2. Actuate POWER on or RESET switch.

Execute Test operates automatically and needs no operator intervention (terminal installation parameter F4P3 must be set to 1 to execute internal modem loopback test).

Terminate The audible alarm sounds soft, loud, then soft and two operator panel LEDs light (left = red, right = green) when the test ends. One of the following displays will be seen on the screen:

Normal Message - With TEST switch out, the normal response to test 1 is shown in figure 6B-1. The X's in the figure indicate firmware revision levels and are not the same in all versions of the terminal.

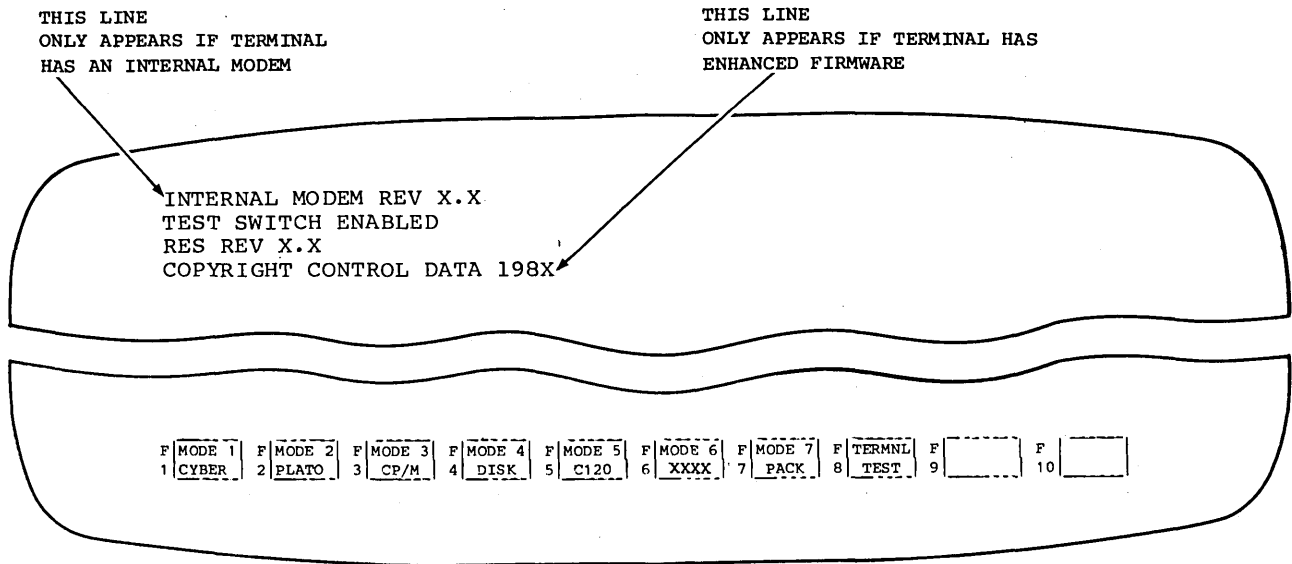


Figure 6B-1. Power On Test with TEST Switch Enabled and Default Mode Names Displayed

Error Message - When a failure occurs, a failure message is displayed with the mode selection menu. Only the failure message for the test that failed is displayed. The possible failure messages are:

CHARACTER RAM FAIL  
RAM FAIL XXXX XX XX  
GRAPHIC FAIL XXXX XX XX  
GRAPHIC FAIL  
ROM FAIL XX XX XX  
NVM ALTERED (applicable to terminals with  
enhanced firmware) or  
NVM FAIL (applicable to terminals without  
enhanced firmware)  
COMM FAIL  
KEYBOARD FAIL  
TIMER FAIL  
BATTERY LOW  
PORT A FAIL  
PORT B FAIL  
KBD CLOCK FAIL  
EXT KBD LOOPBACK FAIL  
INTERNAL MODEM CHECKSUM FAIL  
INTERNAL MODEM UART FAIL  
INTERNAL MODEM LOOPBACK FAIL  
SERIAL PORT TEST SWITCH ENABLED  
TEST SWITCH ENABLED

Test 2 - Either the host or the terminal operator can initiate test 2 while the terminal is in CYBER mode. If host initiated, the test, upon completion, returns a response (positive or error) to the host. This test is similar to test 1, but it does not perform the internal modem UART or loopback checks if the terminal is online. When locally-initiated (keyboard), the test loops as long as no errors occur or the operator stops it; THIS PROVIDES AN EXCELLENT METHOD OF ISOLATING INTERMITTANT PROBLEMS. Locally-initiated testing is performed offline, and in this case, all internal modem tests are run (if modem present).

Initiate For local mode only. (Unit is powered on.)

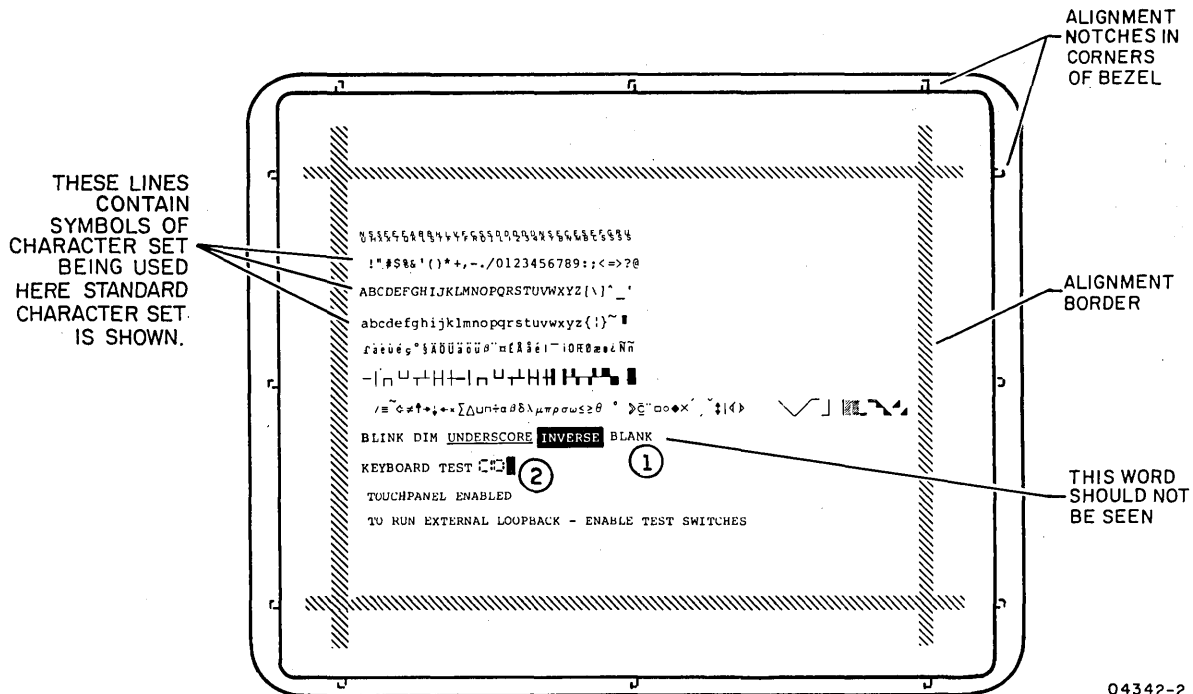
1. Pull out TEST switch and press RESET.
2. When test 1 indicates a successful completion, push TEST switch in.
3. Press F1 key (CYBER mode). (If access code is asked for, enter after pressing F1.)
4. Press SETUP key.
5. Verify second box from left (F2) indicates terminal is OFF LINE. If terminal is ON LINE, press F2 key to place it OFF LINE.
6. Press and release F1 key. Press and hold CTRL key while pressing the = key and then V key.

Execute Test operates automatically and needs no operator intervention.

Terminate If no error is detected, test will loop and continue to run until RESET is pressed. If an error occurs, test will halt displaying the failure message (same as for test 1) and RESET must be pressed to exit.

Test 3 - This test provides for checkout of raster alignment, touchpanel, indicators, and keyboard. For complete terminal checkout, operator or CE intervention is required. These instructions are presented in the execute steps that follow.

- Initiate
1. Pull TEST switch out and actuate POWER or RESET switch.
  2. After test 1 indicates a normal end-of-test message, push TEST switch in.
  3. Press F8 on keyboard. If terminal has graphics option, a pattern of every other dot will be displayed; this pattern will alternate between a 480 and 512 vertical line display. Pressing any key will show the display shown in figure 6B-2; verify that it is correct.



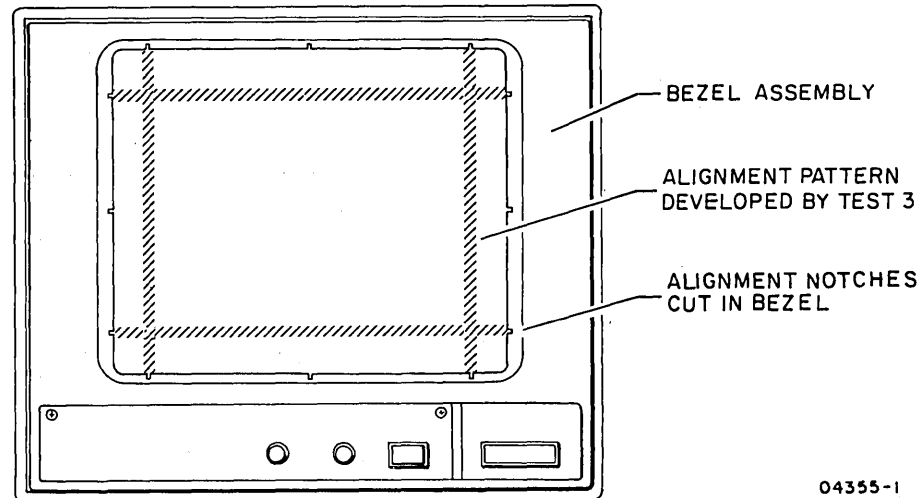
- ① THIS SPACE SHOULD BE EMPTY. IF THE WORD BLANK, OR ANY OTHER DATA APPEARS, AN ERROR HAS OCCURRED.
- ② THE CURSOR WILL INITIALLY APPEAR HERE.

Figure 6B-2. Operator Intervention Test Display

## Execution

All seven subtests of test 3 require operator or CE intervention. This includes subtest execution steps and/or subtest result evaluation. The steps that follow provide the intervention needed to successfully execute test 3. Use SAM 6 to isolate the failing component for any incorrect subtest result.

1. Alignment Raster - Verify the alignment pattern aligns with notches in the bezel assembly (all 4 corners) as shown in figure 6B-3.



04355-1

Figure 6B-3. Alignment Raster

2. ROM Character Generator - Verify the seven lines of code and characters match display shown in figure 6B-2.
3. Attribute Test - Verify the following for each word in this line:
  - BLINK is blinking.
  - DIM is dim.
  - UNDERSCORE is underscored.
  - INVERSE appears in reverse video.
  - BLANK does NOT appear.
4. Keyboard Test - As key is pressed, a hex code received from the key will be displayed after the words KEYBOARD TEST. Two codes will be displayed, one when the key is pressed (27 clear) and one when the key is released (27 set) - the codes are not ASCII. The following is an example for the upper left most (PRINT) key:
  - When pressed - 10
  - When released - 90

Using the information in Appendix A, verify that other keys produce the correct code when pressed and released.

5. Verify the eight indicators are being stepped on and off by the firmware. Ensure that each indicator does light.
6. If the terminal has a touchpanel option installed, verify the cursor moves to the area touched on the screen. Cursor movement will check all electrical connections to the panel.
7. To run external loopback test do the following:
  - Power on equipment connected to parallel port (either printer and/or disk unit). Primary disk unit must have disk installed. (Without disk installed, an erroneous parallel port fail message will occur.) If a graphics printer is on the parallel port, wait approximately 20 seconds after powering it on before proceeding and make sure its PRINT switch is lit.
  - If the serial port board is installed, place its loopback switch to the up position.
  - Pull out TEST switch.

The external loopback test are now running. The screen will display the test name and the word RUNNING or if an error is found FAIL.

Terminate To exit test 3 press RESET switch. Remember, if test 3 indicated any errors, use SAM 6 for fault isolation. Return test switches to normal.

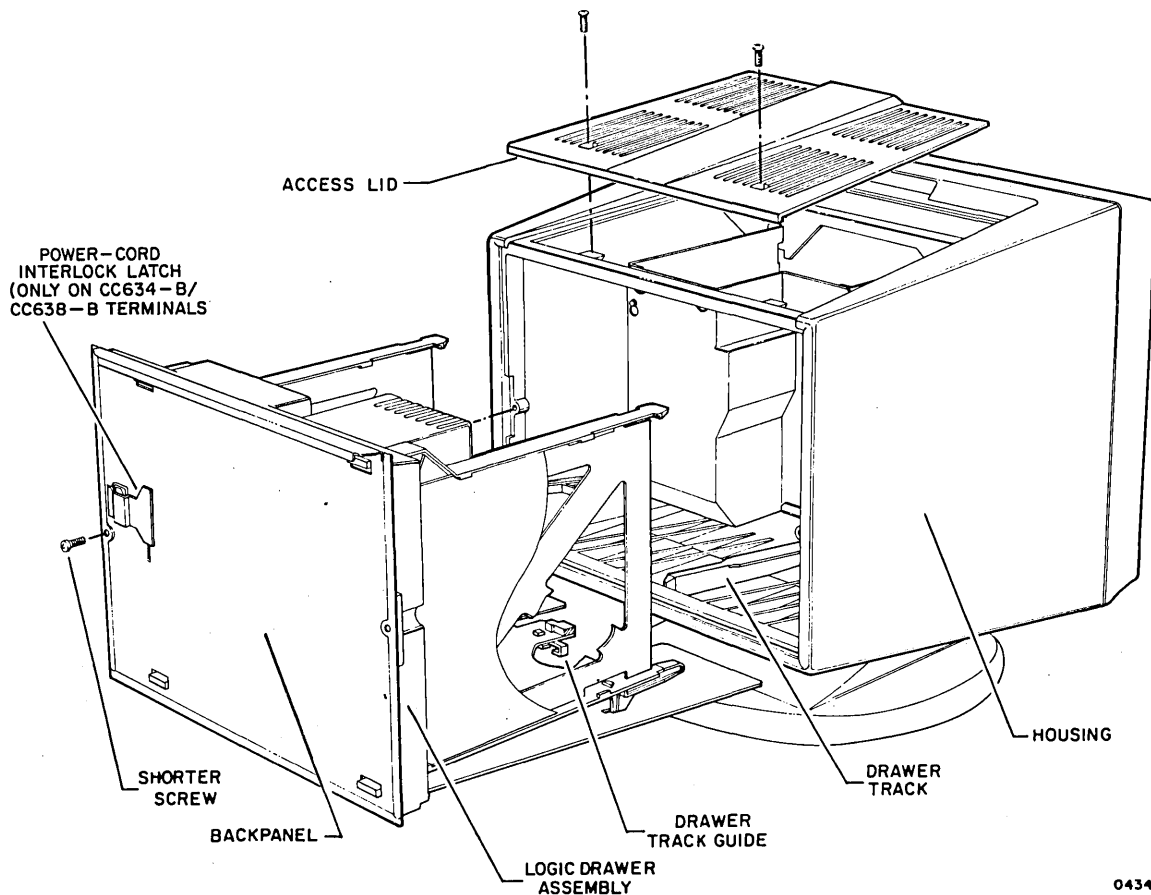
### Procedure 3 - Removing and Replacing Access Lid

Remove and replace the access lid from the display terminal as follows. Refer to figure 6B-4.

1. Remove the two screws attaching the lid to the terminal.
2. If the terminal is a CC634-B/CC638-B unit, disconnect the power cord from rear of terminal and push up the power-cord interlock latch.



3. Lift up slightly on the rear of the lid and then pull back to free it from the terminal.
4. To reinstall the access lid, reverse the procedure of the preceding steps.



04343-1

Figure 6B-4. Cabinet Access

#### Procedure 4 - Removing and Replacing the Logic Drawer Assembly

The logic drawer assembly consists of a rear connector panel, mounting rack, and several printed circuit boards. It slides out of terminal housing (hood) as a unit. Steps 1 through 5 describe removal, and steps 6 through 13 describe replacement. Turn off power switch and proceed as follows.

1. Disconnect power cord from rear of terminal and unplug the keyboard cord from the bottom of the logic drawer assembly. Terminal may be gently placed on one side to facilitate removing/replacing keyboard cord.

2. If the terminal is a CC634-B/CC638-B unit, push up the power-cord interlock latch (figure 6B-4).
3. Remove the access lid (procedure 3). (Removing access lid is necessary if touchpanel is present.)

NOTE

If a graphics board and touchpanel are installed, disconnect the flat cable between the graphics board and touchpanel before proceeding to step 4. Use pull-tab to remove connector.

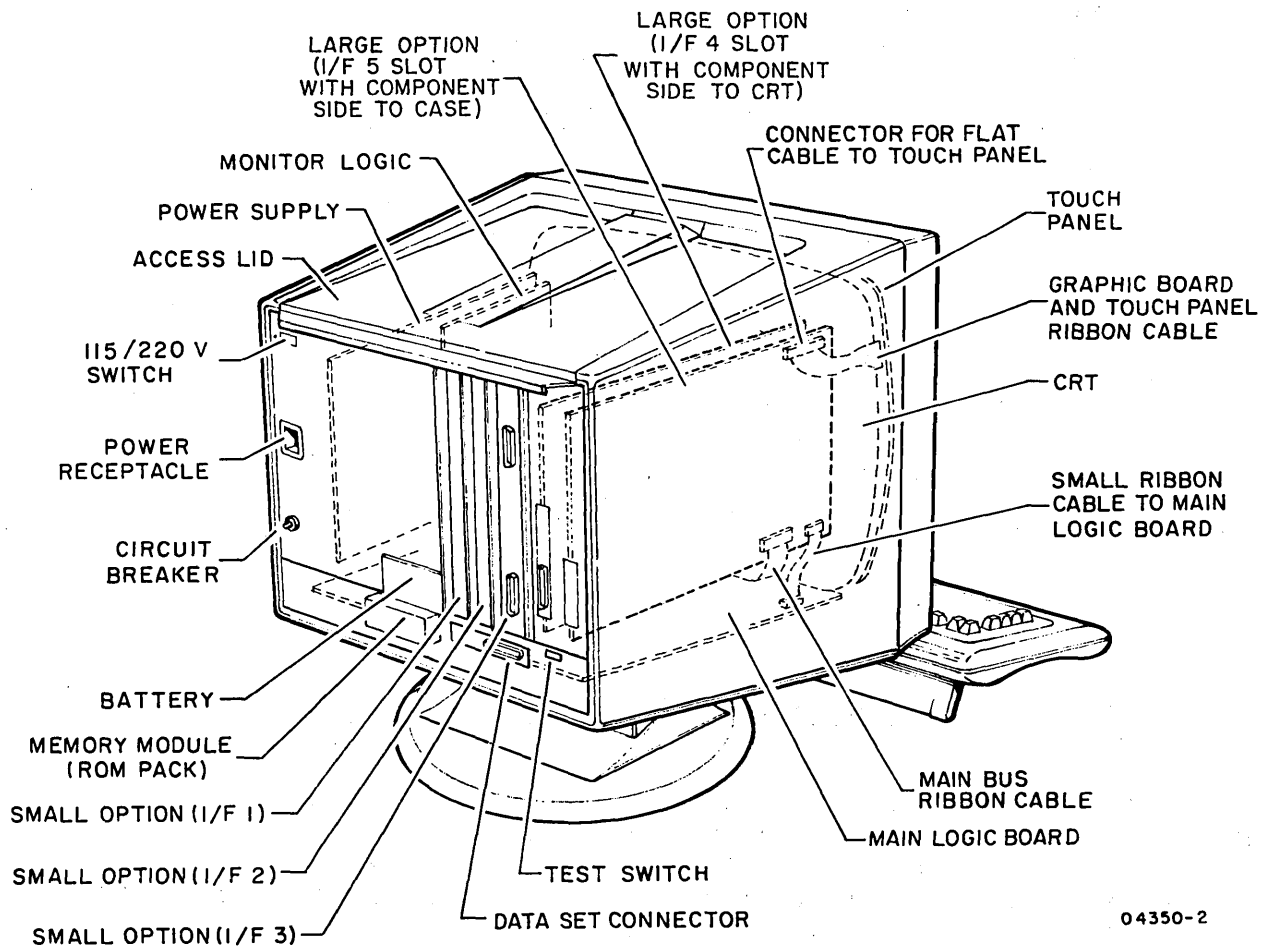


Figure 6B-5. Terminal Parts Identification

4. Remove the two 7 mm (9/32) screws from the rear connector panel as shown in figure 6B-4.
5. Grasp the flange at the top of the backpanel and pull it straight back, sliding the logic drawer assembly out of the display terminal housing, while holding it steady. Ensure that no cables interfere with removal.
6. To reinstall the logic drawer assembly, position the drawer track as shown in figure 6B-4.
7. Slide the drawer assembly partially into the terminal enclosure (hood) while pushing down on the back of the drawer. This will pull up the drawer track guide enabling it to be seated in the notch provided in the bezel adapter assembly (figure 6B-4).
8. When the drawer track guide is fully engaged, raise the back of drawer up to clear ground wire from hood to CRT chassis, and also to prevent catching the LEDs in base of option card holder.

NOTE

If a graphics board and touchpanel are installed, ensure that connection between them can be made when drawer is in place.

9. Continue sliding the logic drawer assembly until it is fully in place while ensuring that the RESET button aligns with its bezel assembly cutout. Ensure that no cables are stressed as drawer is inserted.
10. Replace screws removed in step 3. Ensure shorter screw is installed as shown in figure 6B-4. Connect touchpanel ribbon cable; press connector firmly in place to seat it properly. Plug in keyboard cord removed in step 1.
11. Replace access lid if removed (procedure 3).
12. If the terminal is a CC634-B/CC638-B unit, push down the power-cord interlock latch.
13. Reconnect power cord to rear of terminal.

Procedure 5 - Removing and Replacing CRT/Bezel Adapter Assembly

Remove and replace the CRT/bezel adapter assembly as follows:

1. Remove the logic drawer assembly (procedure 4, steps 1 through 5). Remove ground wire at rear of monitor shield.

### NOTE

Observe the positioning of the actuator bar in the terminal housing. Note the orientation of the dog leg with respect to the interlock switch mounted near the rear panel.

2. Remove the two Allen head screws attaching the bezel assembly to the bezel adapter assembly. Pull off the BRIGHTNESS and CONTRAST knobs as shown in figure 6B-6. Lift the bottom edge of the bezel assembly slightly, pull it down, and then lift it away from the terminal.
3. Remove touchpanel if installed (procedure 19).
4. Remove the POWER switch rocker from its socket as follows:
  - a. With right hand pull back and hold power actuator bar toward rear of cabinet enclosure.
  - b. Then, with left hand, pull rocker straight up while rotating it 180° while pulling.

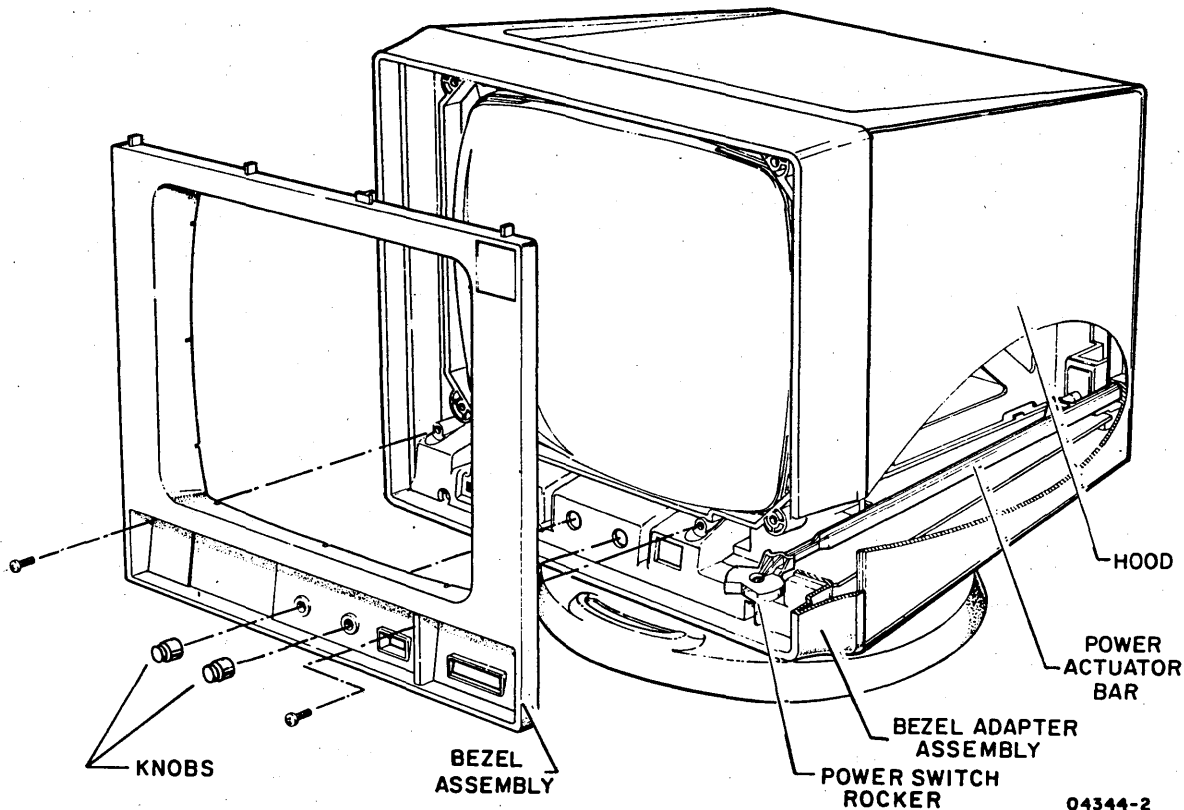


Figure 6B-6. Removing the Bezel Assembly

5. Position the terminal so that it rests on the rear frame with the glass screen facing upward.
6. Remove the four screws securing the bezel adapter assembly to the hood (figure 6B-7). Early units were built with two short screws at the top and two longer screws at the bottom, discard the two shorter screws (if applicable) as two longer screws are provided with the replacement bezel adapter assembly.
7. Remove the assembly from the display terminal hood and set it face (screen side) down.

NOTE

The power actuator bar should fall loose inside hood. Remove the bar together with small return spring located at rear of bar. Set the bar and spring aside for reassembly later. The drawer track might now be loose inside the enclosure, or still in place on the bezel adapter assembly.

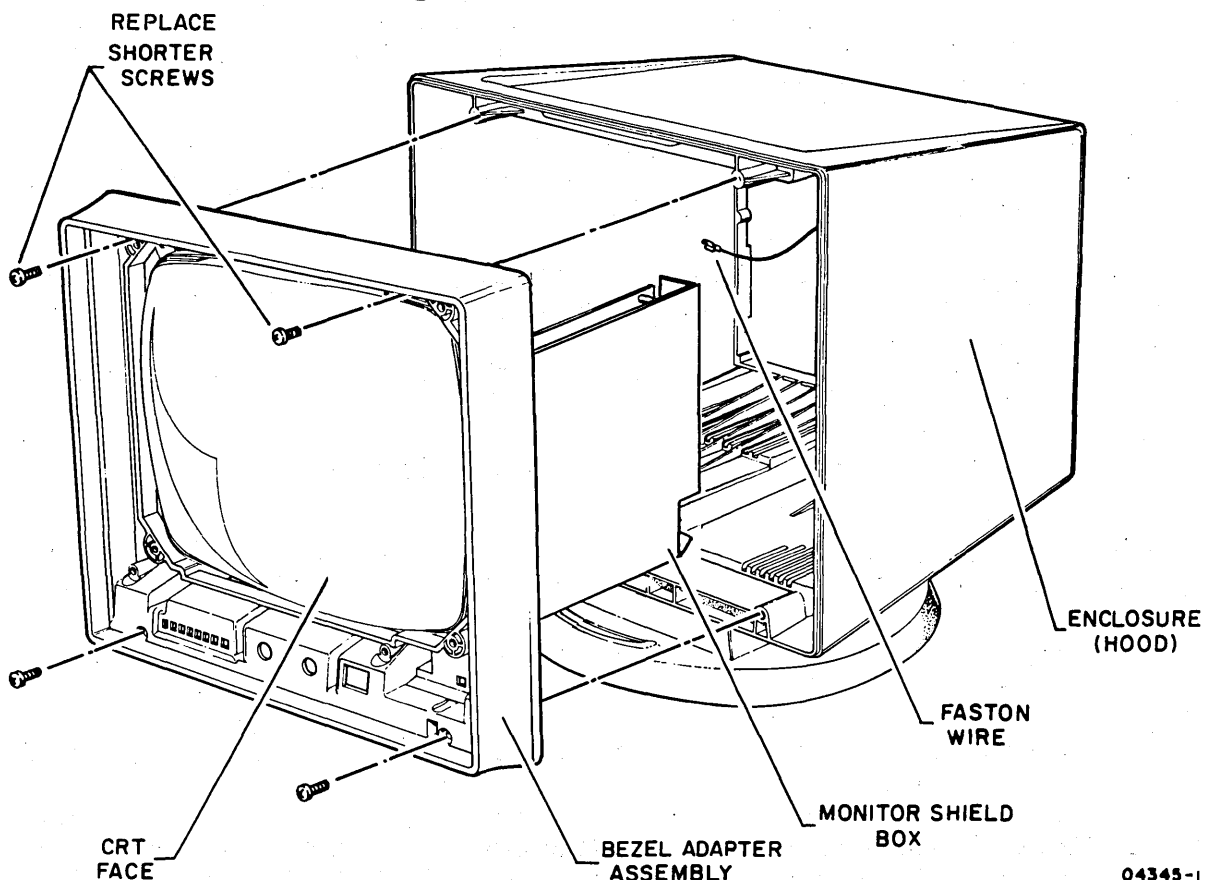


Figure 6B-7. Removing the Bezel Adapter Assembly

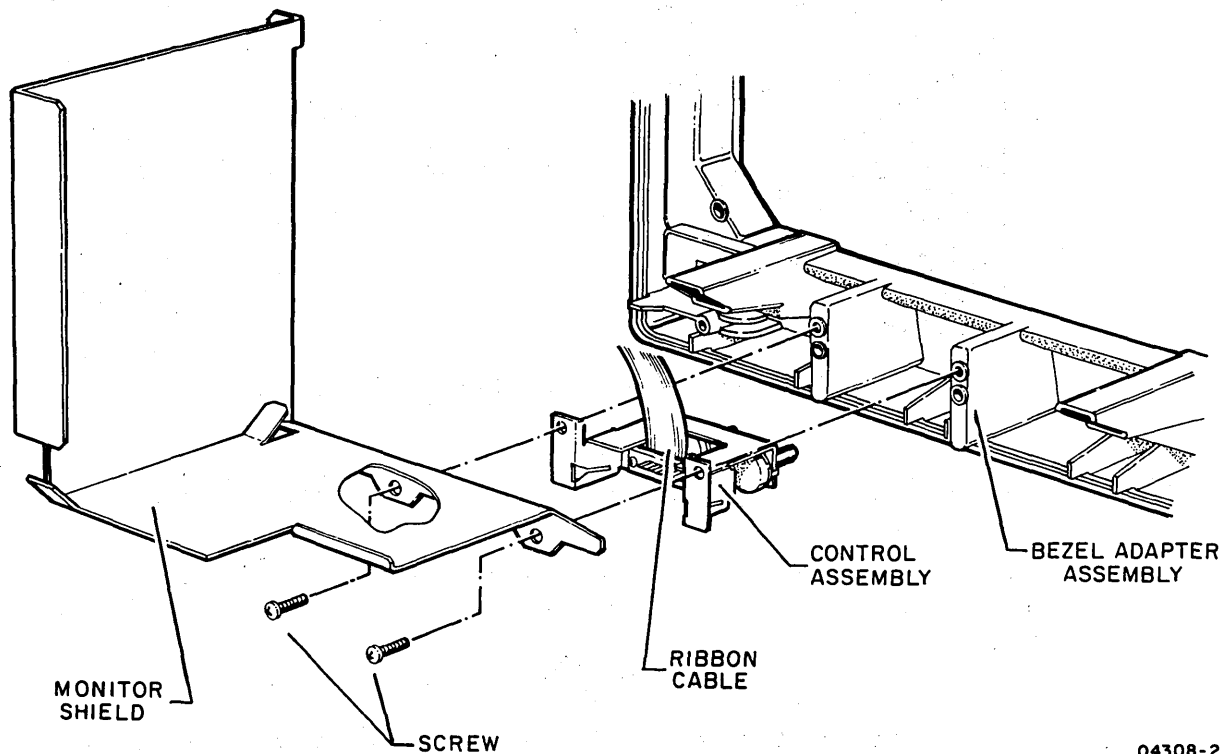
8. To reinstall, after removing the plastic bag (taped to the bezel adapter assembly) containing the replacement screws fit the bezel adapter assembly in place. Install the two top screws (using the replacement screws) that secure the bezel assembly to the hood, but do not compress the washers.
9. Lift terminal up and place it on its pedestal.
10. Insert the power actuator bar from the rear of the terminal into the bezel adapter guide hole. Position the bar as observed in step 1.
11. Place the return spring (removed in step 7) in the guide hole in the rear flange of the hood. Then slide bar into the guide hole. Once the bar is in guide hole, keep pressure on bar to ensure that spring does not fly free and proceed to step 13.
12. While holding back the actuator bar, replace the POWER switch rocker.
13. Replace the touchpanel (procedure 19).
14. If the drawer track is not in place, slide it toward the front of the terminal until it clears the back lip of the hood, and push it down. Then snap the drawer track in place by pulling it toward the rear.
15. Replace the remaining two screws in the bezel adapter assembly and tighten two top screws. Replace the bezel assembly on the terminal.
16. Replace the BRIGHTNESS and CONTRAST knobs. Replace the ground wire from monitor shield to stud.
17. Replace the logic drawer assembly (procedure 4, steps 6 through 13).
18. Perform video alignment procedure (procedure 16).

Procedure 6 - Removing and Replacing the BRIGHTNESS/CONTRAST Control Assembly

Remove and replace the BRIGHTNESS/CONTRAST control assembly as follows.

1. Remove the CRT/bezel adapter assembly (procedure 5, steps 1 through 6).
2. Loosen the three screws securing the monitor shield (figure 6B-8) and slide the monitor shield off.
3. Disconnect ribbon cable coming from BRIGHTNESS/CONTRAST control assembly at the CRT monitor board assembly.

4. Remove the two screws holding the BRIGHTNESS/CONTRAST control assembly and lift it out (figure 6B-8).
5. Install a new control assembly and replace the attaching screws.
6. Replace the assemblies removed in steps 1 through 5 (of this procedure) beginning with steps 7 through 17, procedure 5.



04308-2

Figure 6B-8. BRIGHTNESS/CONTRAST Control Assembly Mounting

## Procedure 7 - Checking Power Supply Voltages

Check the power supply voltages as follows:

1. Remove access lid (procedure 3).
2. Determine if the LEDs on the power supply are lighted.
3. Check for the presence of 5-volt and 12-volt power on the appropriate test points near the power supply LEDs (figure 6B-9). These voltages should be  $5.10 \pm 0.14$  (4.96 to 5.24) volts dc,  $12 \pm 0.2$  (11.8 to 12.2) volts dc, and  $-12 \pm 0.2$  (-12.2 to -11.8) volts dc respectively. Measure 24-volt power on the video monitor board (see figure 6B-15). This voltage should be  $24 \pm 2.4$  (21.6 to 26.4) volts dc.
4. Replace access lid (procedure 3).

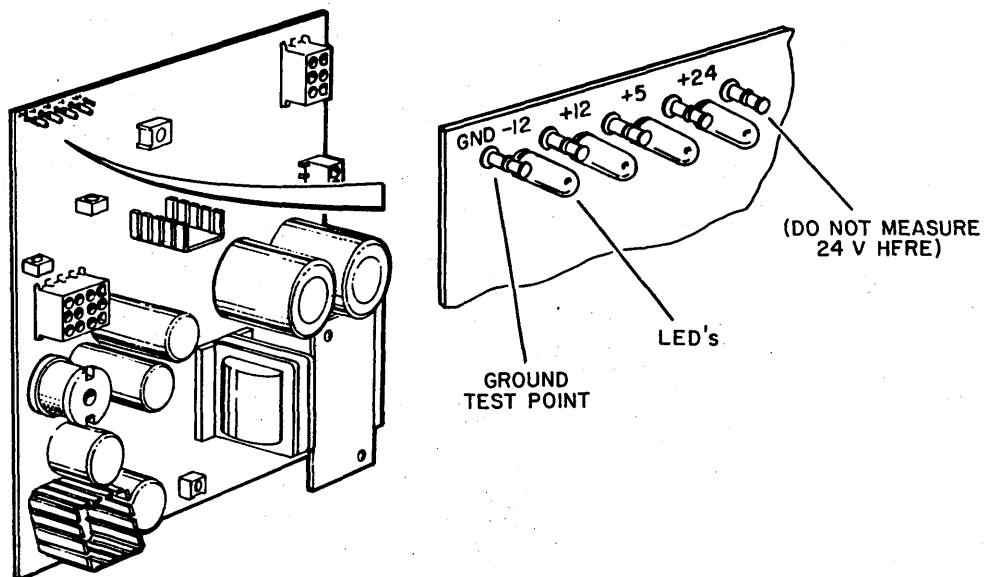


Figure 6B-9. Power Supply Board Test Points

04031-2

## Procedure 8 - Removing and Replacing the Power Supply Board

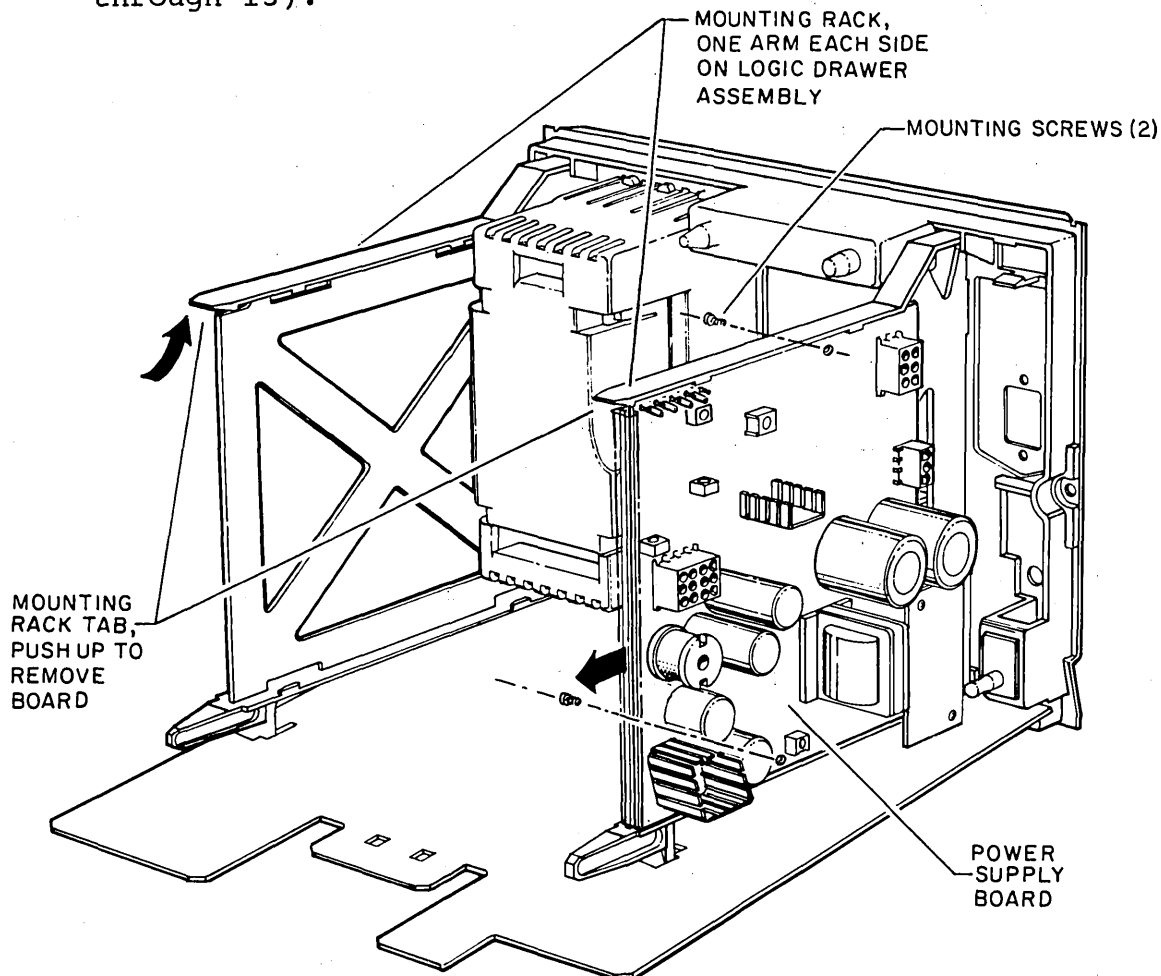
Remove and install a new power supply board as follows.

### WARNING

Line voltage may be present on the power supply board before step 1 is performed.



1. Remove logic drawer assembly (procedure 4, steps 1 through 5).
2. Remove cable between power supply and the main logic board. Set cable aside for later reconnection.
3. Disconnect AC power-input connector to power supply board. Disconnect green ground wire from two spade lugs on power supply.
4. Remove two screws which secure power supply to mounting rack.
5. Lift tab on end of mounting rack and slide out power supply board (figure 6B-10).
6. Install a new power supply board and reconnect connectors in the reverse order of disassembly.
7. Replace mounting screws holding power supply board to mounting rack.
8. Replace the logic drawer assembly (procedure 4, steps 6 through 13).



04031-5

Figure 6B-10. Power Supply Board Mounting Detail

## Procedure 9 - Removing and Replacing the Large Graphics Option Board

The large graphics option board is mounted internally on the logic drawer assembly (external connectors are exposed in the back).

Remove and replace the graphics option board as follows.

### CAUTION

Make certain that battery is installed before removing power from terminal, and do not remove battery when power is off. If battery is not installed and power is removed, the terminal operating parameters will be forced to default values.

1. Remove logic drawer assembly (procedure 4, steps 1 through 5).
2. Disconnect input/output ribbon cable(s) to the graphics option board. Note placement of cable connections for reconnection later. The 20-pin ribbon cable connecting the main-logic and graphics boards has its red stripe toward front of terminal when properly installed. Pull up tab on upper card guide and slide out board to be replaced.
3. Install replacement board and reconnect the cables.
4. Reassemble the terminal as specified in procedure 4, steps 6 through 13.

## Procedure 10 - Removing and Replacing the Main Logic Board

Remove the main logic board as described in steps 1 through 7.

### NOTE

Ensure that parameter information is recorded or available from the user.

1. Remove logic drawer assembly (procedure 4, steps 1 through 5).

2. Remove the memory module (ROM pack) and battery from the rear of the logic drawer assembly, if applicable. Refer to figure 6B-5 for location.
3. Remove nuts that secure the data set connector to the rear panel.
4. Unplug the ribbon cable at the main logic board to the small option mother board and the cable from the power supply. Remove 20-pin ribbon cable to graphics option.
5. Place the logic drawer assembly so that it is resting on its rear panel.
6. Release the interlock tabs holding the main logic board to the logic drawer assembly as follows:
  - a. Pull bottom tabs toward each other and lift board approximately one-fourth inch (figure 6B-11).
  - b. Grasp board and push up with hands. Then release top tabs.
  - c. Slide main logic board upward and pull it out.
7. Slide new main logic board into the two slots on each end of the logic drawer assembly, and observe the following:
  - a. Ensure that the data set connector is lined up with the mating rear panel screw holes.
  - b. The TEST switch on the rear panel should be lined up with its cutout.
  - c. Check the position of the graphics jumper in the area around the LEDs. Match the new board to the removed board.
8. Snap release interlock tabs back into the main logic board.
9. Replace screws on data set connector.
10. Reinsert the memory module ROM pack (if applicable), and also reinsert the battery.
11. Reconnect ribbon cables and power cable to main logic board. After installing each cable connector press it firmly in place to ensure proper seating.

12. Replace logic drawer assembly (procedure 4, steps 6 through 13).
13. Re-enter terminal and mode installation parameters into NVM (information on entering parameters is contained in the manuals listed in preface).

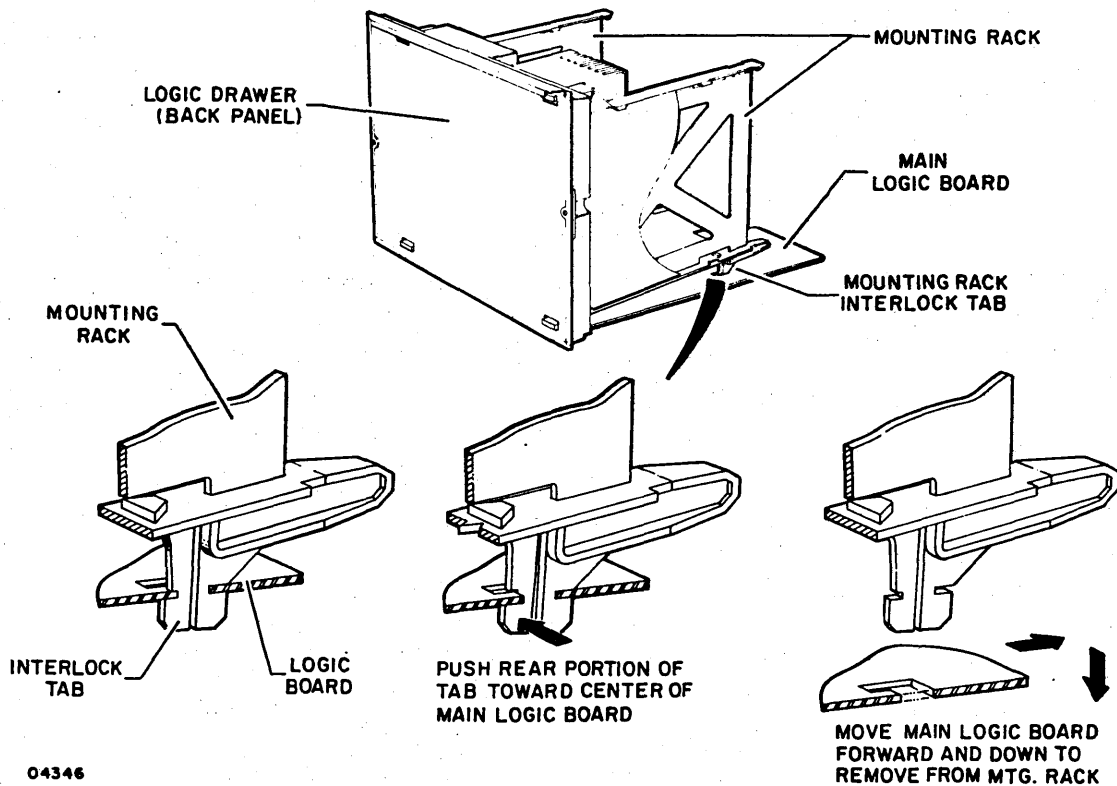


Figure 6B-11. Removing Main Logic Board

### Procedure 11 - Removing and Replacing Power Actuator Bar

Remove and replace the power actuator bar as follows:

1. Remove the bezel adapter assembly (procedure 5, steps 1 through 4).
2. Remove the actuator bar and spring from its socket.
3. Install a replacement actuator bar in position.
4. Reassemble the terminal with instructions in procedure 5, steps 13 through 17.

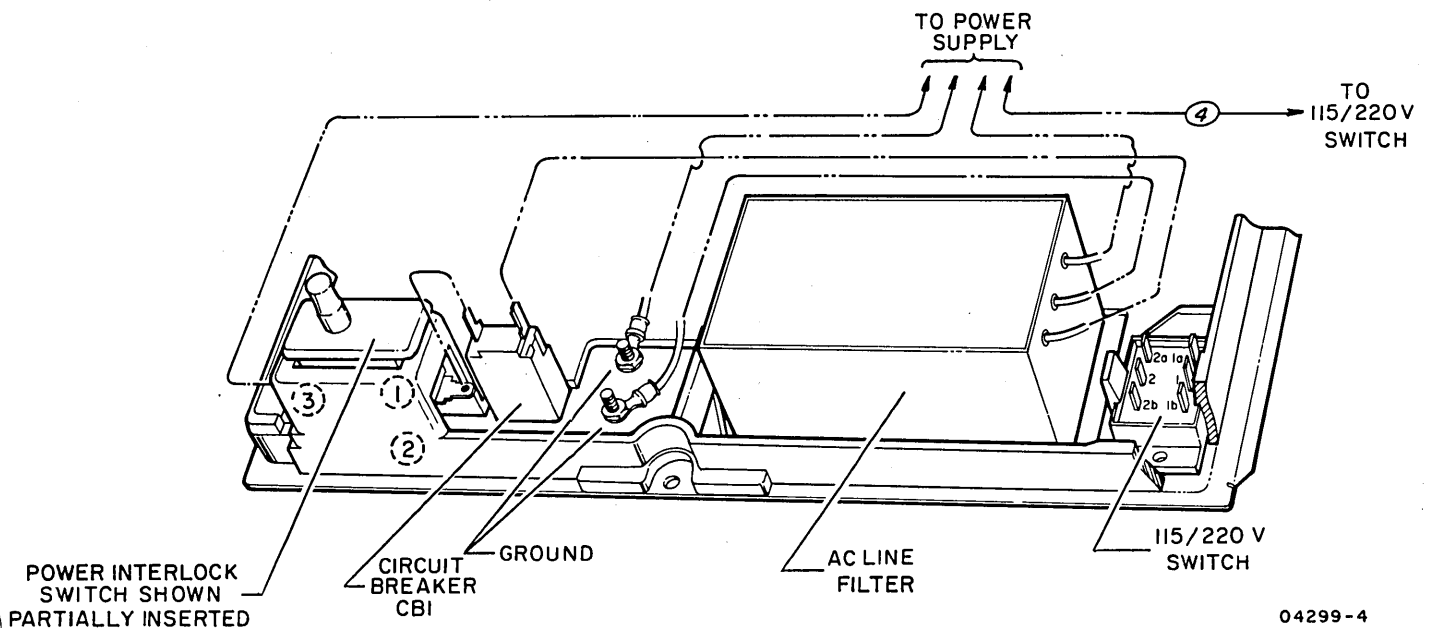
## Procedure 12 - Removing and Replacing the Power Interlock Switch

Remove the power interlock switch assembly as follows:

### WARNING

Line voltage may be present on power supply board before step 1 is performed. Unplug power cord from terminal.

1. Remove logic drawer assembly (procedure 4, steps 1 through 5).
2. Remove main logic assembly (procedure 10, steps 2 through 6).
3. Push detents on both sides of switch and partially remove it by prying.
4. Disconnect the two leadwire clips to the interlock switch and remove it entirely.
5. Partially insert a new switch as shown in figure 6B-12. Reattach the wire clips using No. 1 and No. 3 lugs on switch as shown and seat switch fully in place.
6. Reassemble the terminal according to instructions in procedure 10, steps 7 through 13.



04299-4

Figure 6B-12. Power Wiring Detail

Procedure 13 - Removing and Replacing the CRT Monitor Board Assembly

Replace the CRT monitor board assembly as follows.

1. Remove the logic drawer assembly (procedure 4).
2. Disconnect the CRT socket connector.
3. Disconnect the in-line connector to the yoke.
4. Remove ribbon cable connector on bottom inside corner of CRT monitor board.
5. Remove the high voltage lead from the side of the CRT.

NOTE

When doing the next step, note which grounding tab on the bezel adapter assembly the ground strap is removed from. The ground strap must be reconnected to the same tab during reassembly.

6. Remove the ground strap from bezel adapter assembly going to CRT socket connector.
7. Remove the two screws at the top of the CRT monitor board and lift it upwards to clear the shield (figure 6B-13).
8. Replace CRT monitor board by performing steps 1-8 in the reverse order.

CAUTION

Ensure that ribbon-cable connector (removed in step 4) is not misaligned. It should fit squarely in the receptacle after installation. After installing connector, check for correct alignment by looking down through top of terminal and in from rear of terminal before replacing access lid and logic drawer (procedures 3 and 4).

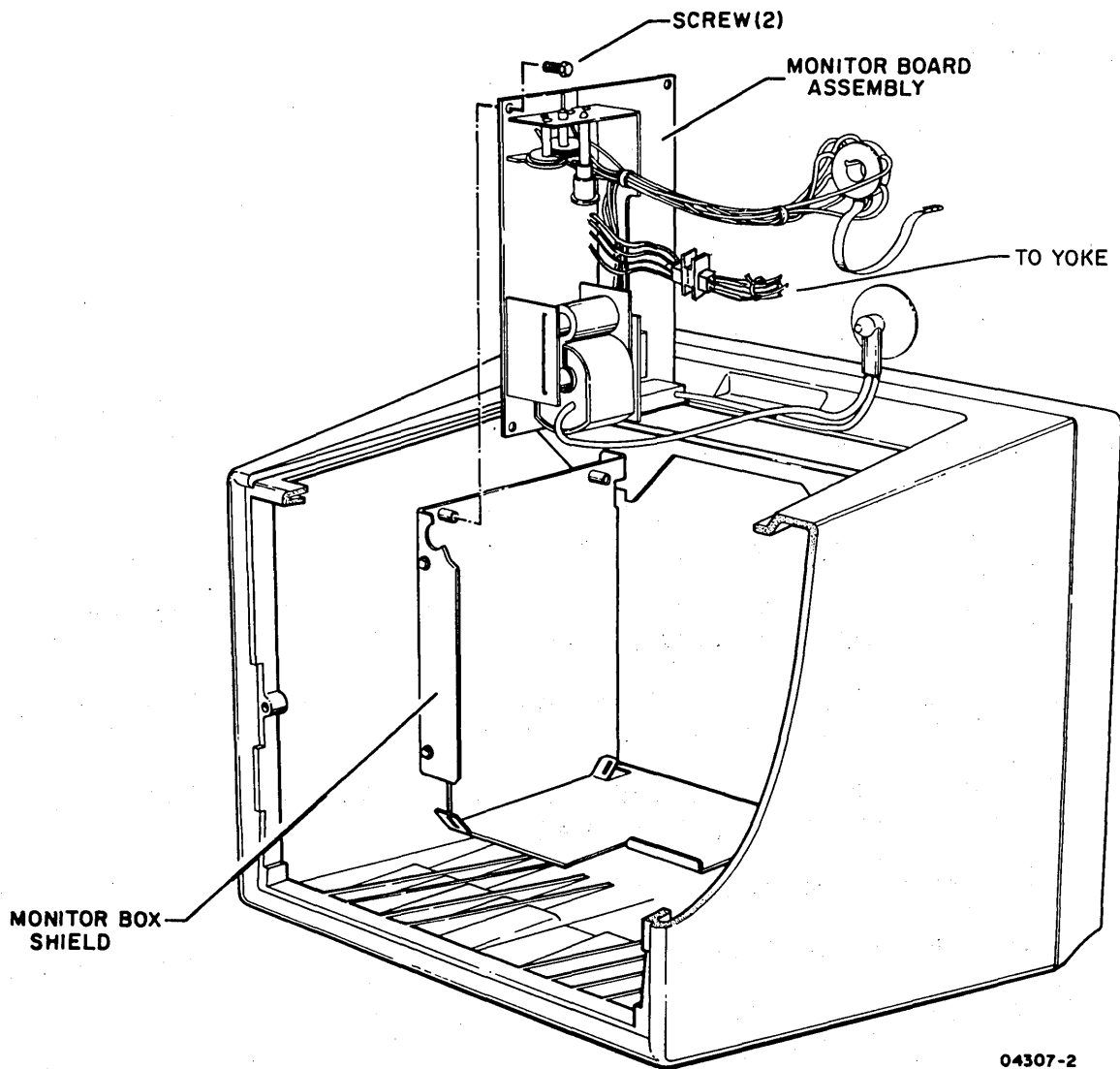


Figure 6B-13. Removing CRT Monitor Board Assembly

Procedure 14 - Adjustment/Touchup of Video Alignment with Touchpanel and Graphics Option

To determine if adjustment is necessary, do the following:  
(Allow 15 minutes of warmup before making any adjustments.)

1. Power on and press RESET to present mode menu on the screen.
2. Select CYBER mode by pressing F1.

3. Press the SETUP key to obtain operator parameters selection near the bottom of the screen.
4. Select the following conditions on the operator parameters selection display:
  - LINE (OFF) - use F2 of first operator display to select terminal offline.
  - SCREEN (PAGE) - use F8 of first operator display to select page mode.
  - MORE SELECT - use F10 of first operator display to select the second operator display.
  - BACKGD (LIGHT) - use F2 of second operator display to select inverse video (dark characters on a light background).
  - CURSOR (BLOCK) - use F3 of second operator display to select the block type of cursor.
  - CURSOR (SOLID) - use F4 of second operator display to select the unblinking type of cursor.
  - CHR/LN (80) - use F7 of the second operator display to select 80 characters per line.
  - LINES (30) - use F8 of the second operator display to select 30 lines per screen.
5. Press F1 key to return to CYBER mode.
6. Enable touchpanel by pressing:  
CTRL + Shift and +/-  
CTRL + Shift and R  
Shift and R
7. Turn the brightness and contrast controls to maximum and determine if the touchpanel has both vertical and horizontal grid lines visible. If only horizontal lines are visible, perform steps 16 through 22 of this procedure for aligning the screen. If both horizontal and vertical grid lines are visible, perform steps 8 through 15 of this procedure.
8. Press touchpanel in all 4 corners and center grids. The cursor should be inside the grid area. It does not have to be centered.



9. If the cursor touches any grid boundary, press the H key. If the dots on the H character are outside the grid area by more than 1 dot vertically or 1 dot horizontally, touchup/alignment is necessary. Do not proceed or make adjustments if they are not required.
10. Starting with the cursor in the upper left home position, advance the cursor to the top line position directly above the 1st column of touchpanel grids, and enter a 1 (one).
11. Using the numeric-pad and cursor control keys, enter a column of sequential numbers under the 1 on the top line. The bottom line number will be 30.
12. Reposition the cursor to the beginning of line 15 and enter sequential numbers starting with 1 across the screen ( 1 2 3 4 5 6 7 8 9 0 1 2 3 . . . etc.).
13. Compare the screen image to figure 6B-14.
  - Line 1 is in top grid
  - Line 30 is in bottom grid
  - All other lines are 2 per grid
  - 8 characters are to left of grid area
  - 8 characters are to right of grid area
  - 4 characters per grid
14. If adjustment is necessary, use the horizontal/vertical size, center, and linearity adjustments in Procedure 16 to position the video correctly.
15. Repeat steps 8 and 9 to check alignment. Repeat procedure if necessary.

When only the horizontal grid lines are visible after performing step 7:

16. Starting with the cursor in the upper left home position, enter sequential numbers starting with 1 (one) across the screen ( 1 2 3 4 5 6 7 8 9 0 1 2 3 . . . etc.). Repeat this step on lines 15 and 30.
17. Using the numeric-pad and cursor control keys, enter a column of sequential numbers from lines 1 through 30. The screen should now look like figure 6B-14

## Horizontal Alignment Check

18. Move the cursor to the left or right margin. Refer to figure 6B-14. Use the eraser-end of a pencil or similar blunt instrument to touch the following areas on the touchpanel:
- Touch characters at random in columns designated "A" in the figure. The cursor should not move.
  - Touch characters at random in columns designated "B" in the figure. The cursor should move to the number 1 (one) on the left side, or the number 0 (zero) on the right side, depending on which side you touch. After each cursor movement, touch an area away from the test area. Any of the four characters in the columns designated "B" in the figure should cause the cursor to move to the 1 or 0.
  - Touch characters at random in columns designated "C" in the figure. The cursor should move to the number 5 on the left side, or the number 6 on the right side, depending on which side you touch. After each cursor movement, touch an area away from the test area. Any of the four characters in the columns designated "C" in the figure should cause the cursor to move to the 5 or 6.
  - Touch characters at random in columns designated "D" in the figure. The cursor should move to the number 9. After each cursor movement, touch an area away from the test area. Any of the four characters in the columns designated "D" in the figure should cause the cursor to move to the 9.
19. Place a straight-edge from the top center to the bottom center alignment notches on the bezel. The straight-edge should fall between the 0 and 1 on the horizontal sequences of numbers, as shown in figure 6B-14. These numbers correspond to screen positions 40 and 41.

## Vertical Alignment Check

20. Compare the screen image to figure 6B-14.
- Top to bottom measures 8 inches
  - Line 1 is in top grid
  - Line 30 is in bottom grid
  - All other lines are evenly spaced and 2 per grid

21. If adjustment is necessary, use the horizontal/vertical size, center and linearity adjustments in Procedure 16 to position the video correctly.
22. Repeat steps 18 and 19 to check alignment. Repeat procedure if necessary.



16 X 16 TOUCHPANEL GRID, VISIBLE WHEN IN INVERSE VIDEO

VIDEO AREA  
APPROX. 8 X 10 INCHES

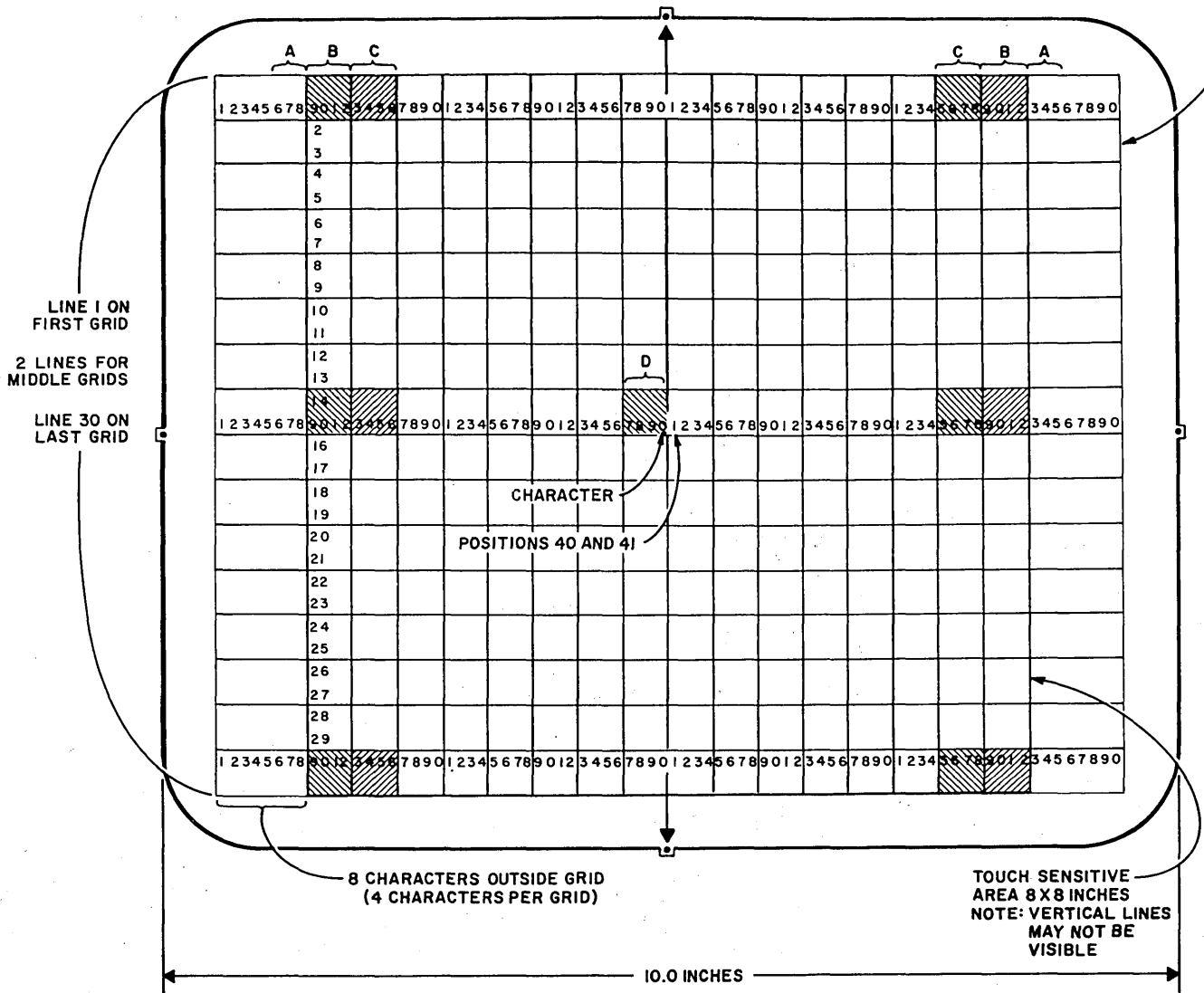


Figure 6B-14. Display Screen Touchpanel Video Alignment

Procedure 15 - Adjusting the Yoke Ring Tabs

After the bezel adapter assembly has been replaced, adjust the yoke ring magnets (figure 6B-15) only if necessary.

1. Apply power to the display terminal (procedure 1).
2. Remove access lid (procedure 3).
3. Allow a 15 minute warm up period and then adjust potentiometer G2 on the CRT monitor board (see figure 6B-16) for a brightly visible raster.

4. Check for a square appearing raster. If necessary, adjust the yoke ring tabs (figure 6B-15) to obtain a square raster with equal space on all four sides.
5. Readjust potentiometer G2 on the CRT monitor board for the proper setting (see table 6B-1).
6. Replace the access lid (procedure 3).

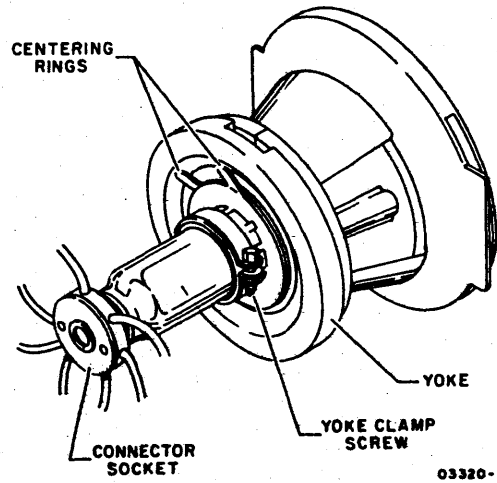


Figure 6B-15. Yoke Ring Tabs

#### Procedure 16 - Adjusting the Video Display

This procedure consists of two parts. Part 1 contains normal operation or touch-up video alignment steps. Part 2 contains complete monitor board alignment steps to be used after the crt/yoke assembly or monitor board is replaced. Select the part that correctly matches your needs.

All video adjustment controls are accessible at the top of the CRT monitor board. Removing the access lid (procedure 3) will expose the monitor board (figure 6B-16). A TV alignment tool and ruler are required for completing this procedure.

Table 6B-1 lists the video display controls and their functions. The table also describes optimum conditions indicating a correct adjustment. To perform the video adjustments, follow the steps listed in either Part 1 or 2. These steps give the correct adjustment sequence, and also provide additional setup information.

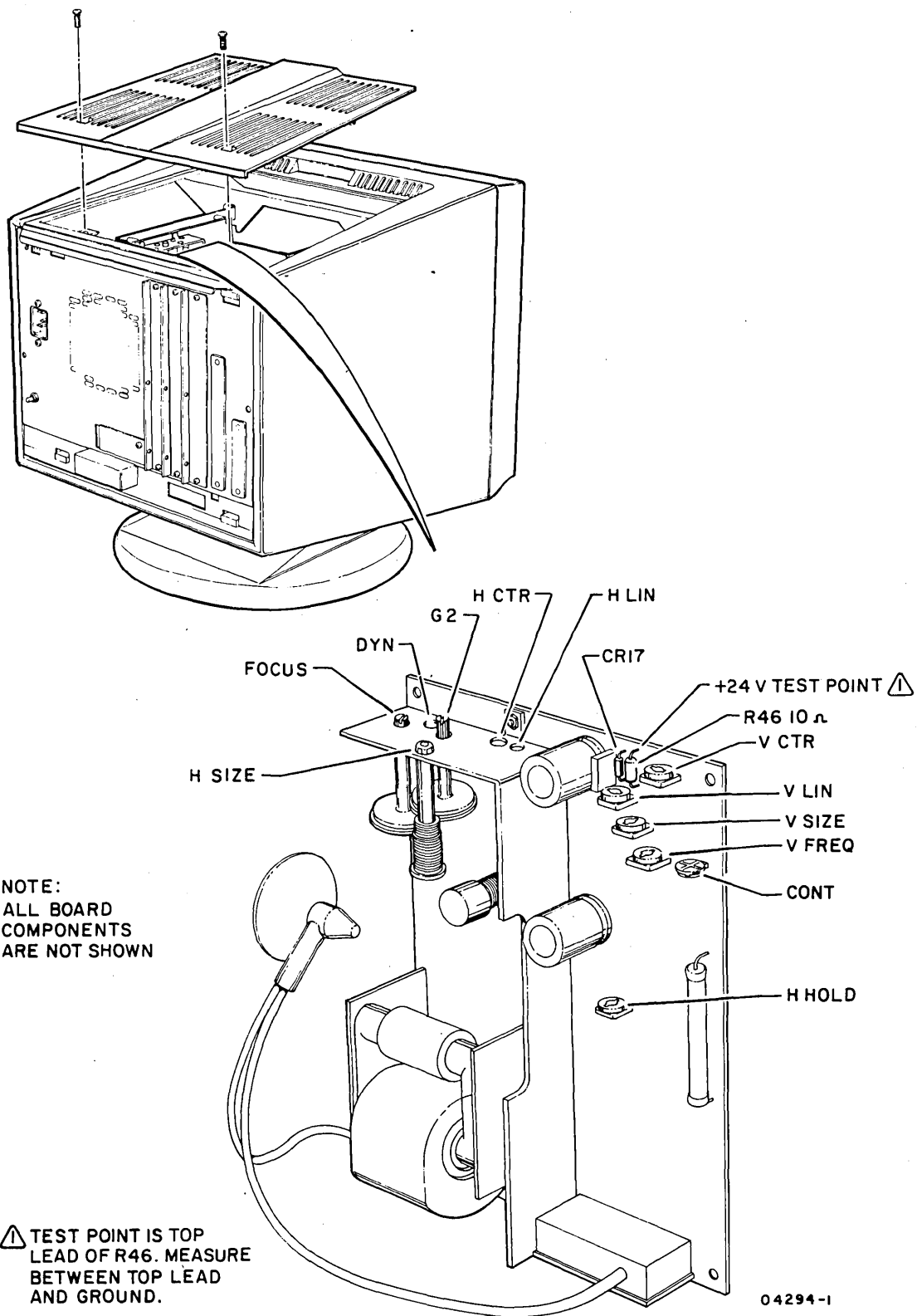


Figure 6B-16. Video Adjustment Controls Identification

TABLE 6B-1. VIDEO ADJUSTMENT CONTROLS

CONTROL	PURPOSE	ADJUSTMENT
<u>SYNC CONTROLS</u>		
V FREQ (Vertical frequency potentiometer)	Adjusts vertical synchronization or raster steadiness.	Adjust so screen information is not rolling or is stable and locked in.
H HOLD (Horizontal hold potentiometer)	Adjust horizontal stability.	Adjust so that screen information is stable and locked in.
<u>FOCUS CONTROLS</u>		
FOCUS (Potentiometer)	Adjust clarity or sharpness of center screen area.	Adjust for best resolution or sharpness of character in center of display.
DYN (Dynamic focus potentiometer)	Adjusts clarity or sharpness of screen edges.	Adjust for best resolution or sharpness of characters on screen edges.
G2 (Video gain potentiometer)	Adjusts screen brightness (both foreground and background).	Adjust so that screen is just dark enough to lose all background after turning BRIGHTNESS control on front of terminal to maximum brightness.
CONT (Contrast control potentiometer)	Adjusts brightness characters (foreground) without changing background brightness.	Adjust for desired brightness with front panel CONTRAST control fully on.
<u>VERTICAL CONTROLS</u>		
V CTR (Vertical centering potentiometer)	Controls vertical centering of raster on screen; or moves both vertical lines of alignment raster up or down.	Adjust raster so that it is centered vertically on screen or vertical lines of alignment raster align with bezel notches.



TABLE 6B-1. VIDEO ADJUSTMENT CONTROLS (CONTD)

CONTROL	PURPOSE	ADJUSTMENT
V SIZE (Vertical size potentiometer)	Adjusts height of raster or moves top and bottom vertical lines of alignment raster closer together or further apart.	Adjust until vertical lines of alignment raster align with bezel notches.
V LIN (Vertical linearity potentiometer)	Adjusts size ratio between top and bottom halves of screen, or makes the bottom vertical line higher than the top vertical line of the alignment raster or vice versa.  Affects overall height.	Adjust until both the top and bottom vertical lines of the alignment raster are of equal height.
	<u>HORIZONTAL CONTROLS</u>	
H CTR (Horizontal centering coil)	Controls horizontal centering of raster on screen, or moves both horizontal lines of the alignment raster left or right	Adjust raster so that it is centered horizontally on screen, or until horizontal lines of the alignment raster align with bezel notches.
H SIZE (Horizontal size coil)	Adjusts width of raster, or moves the left and right horizontal lines of the alignment raster closer together or further apart.	Adjust until horizontal lines of the alignment raster align with bezel notches.
H LIN (Horizontal linearity coil)	Adjusts size ration of left to right half of screen, or makes the left horizontal line of the alignment raster wider than the right line or vice versa.  Affects overall width.	Adjust until both horizontal lines of alignment raster are equal width.

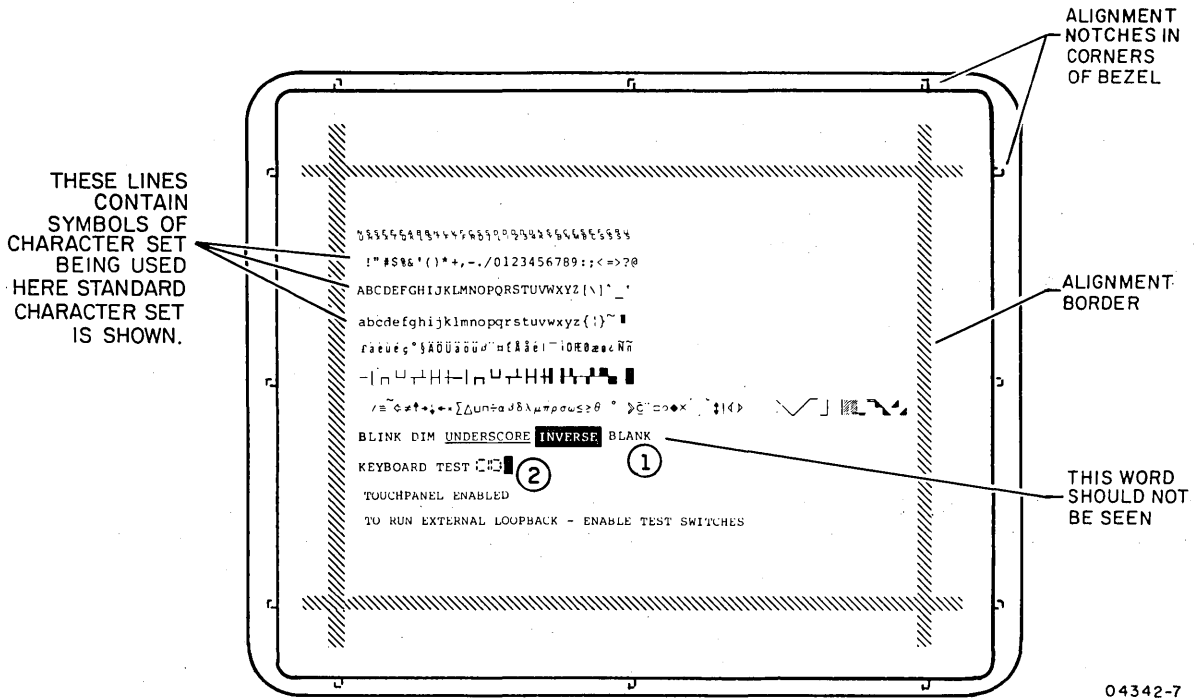
## Part 1 - Normal Operation or Touch-up Alignment

During normal operation, centering and focus are the only recommended adjustments. These adjustments can be quickly made by using the resident diagnostic alignment pattern. If additional adjustments are needed, (size and linearity), perform the steps given in Part 2.

### NOTE

Allow a warm-up period of 15 to 20 minutes before performing these adjustments.

1. Display resident-diagnostic alignment pattern by referring to the initiation paragraph in test 3 of procedure 2. The display in figure 6B-17 should appear on the screen.



- ① THIS SPACE SHOULD BE EMPTY. IF THE WORD BLANK APPEARS HERE, OR ANY OTHER DATA, AN ERROR HAS OCCURRED.
- ② THE CURSOR WILL INITIALLY BE IN THIS LOCATION.

Figure 6B-17. Video Alignment and Test Pattern

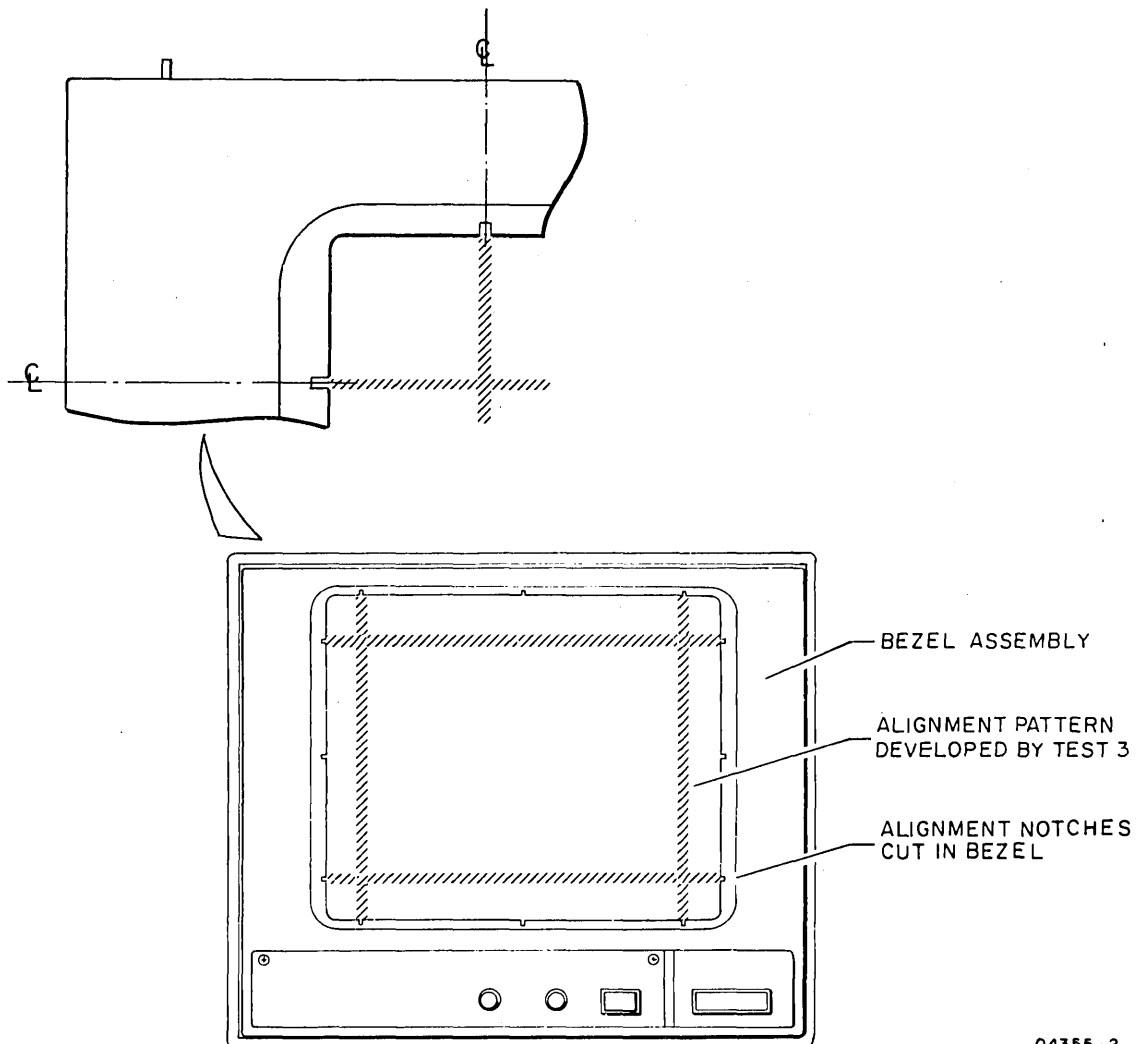
2. Adjust FOCUS control (figure 6B-16) for best character resolution in center of screen.

3. Adjust DYN control (figure 6B-16) for best character resolution on screen edges.

NOTE

After steps 2 and 3, all test 3 characters should appear sharp, clear, and readable.

4. Adjust H CTR and V CTR (figure 6B-16) controls until alignment pattern lines and bezel notches align in all four corners (figure 6B-18). If this alignment cannot be obtained, go to full alignment steps given in after bezel adapter assembly or monitor board replacement alignment.



04355-2

Figure 6B-18. Correct Pattern Alignment

## Part 2 - Complete Monitor Board Alignment

This part contains the proper sequence and setup steps to adjust all monitor board controls. These adjustments should be checked if the bezel adapter assembly or monitor board is replaced.

Use figure 6B-16 to locate all controls referenced by the following paragraphs.

### NOTE

Allow a warm-up period of 15 to 30 minutes before performing these adjustments.

### Vertical and Horizontal Sync:

Set the V FREQ and H HOLD controls as follows.

1. Turn BRIGHTNESS (front panel) control maximum clockwise.
2. Turn V FREQ control clockwise until the display starts to roll. Note position of control.
3. Turn V FREQ control counterclockwise until the display starts to roll. Note position of control.
4. Place V FREQ control half way between position noted in step 3 and 4.
5. Adjust potentiometer G2 on CRT monitor board for a brightly visible raster.
6. Adjust H HOLD until the alignment pattern is horizontal centered on the visible raster.
7. Push master reset and F8 key and verify that alignment pattern is both vertically and horizontally stable.

### Focus and Brightness:

1. Execute the steps to display alignment pattern.
2. Turn BRIGHTNESS and CONTRAST (front panel) control knobs fully clockwise.

3. Adjust G2 control until scan lines disappear.
4. Turn CONT control fully clockwise; then reduce (turn CONT control counterclockwise) brightness until area between dots (background) becomes dark.
5. Adjust BRIGHTNESS and CONTRAST (front panel) controls for most eye pleasing display.
6. Adjust FOCUS control for best resolution in center of display.
7. Adjust DYN control for best resolution on edges of display.

NOTE

After completing steps 6 and 7, all test characters should appear sharp and clear.

Vertical Alignment:

1. Fill the screen with H's as follows:
  - a. Pull out TEST switch.
  - b. Press RESET.
  - c. After test 1 complete, push TEST switch in.
  - d. Press F1 key. (If access code is asked for after pressing F1, enter it.)
  - e. Press SETUP key.
  - f. Check second box from left.

If OFF LINE - go to next step. Otherwise, press F2 key to obtain OFF LINE indication (F2 key may have to be pressed several times to step through HANGUP, ANSWER, DIAL, and ON if terminal has enhanced firmware and an internal modem).

- g. Press F10 key (more parameters).
    - h. Check seventh box from left.

If 132 character/line - press F7 key.  
If 80 character/line - go to next step.

- i. Check eighth box from left.  
If 24 lines - press F8 key.  
If 30 lines - press F1 key and go to next step.
- j. Press Lock ( ⊕ ) key.
- k. Press and hold H key until screen is full.
2. Adjust V LIN until H's at top of screen are the same height as those at the bottom.
3. Adjust V SIZE until overall pattern height is 191 mm (7.5 inches).

NOTE

SIZE and LIN controls interact with each other. It may be necessary to go back and forth between these controls to achieve best results (correct size and linearity of Hs at top and bottom of screen).

4. Adjust V CTR until the alignment of the bezel notches and Hs is as shown in figure 6B-19 in all four corners of the bezel.

Horizontal Alignment:

1. If screen is not full of H's, perform step 1 of vertical alignment steps.
2. Adjust H LIN control until H's at right side of screen are the same width as those at the left side.
3. Adjust H SIZE control until overall pattern width is 254 mm (10 inches). (80 characters are 10 inches wide; 132 characters are 10.3 inches wide.)

NOTE

SIZE and LIN controls interact with each other. It may be necessary to go back and forth between these controls to achieve best results (correct size and linearity of H's at left and right of screen).

4. Adjust H CTR control so the alignment of the bezel notches and Hs is as shown in figure 6B-20 in all four bezel corners.

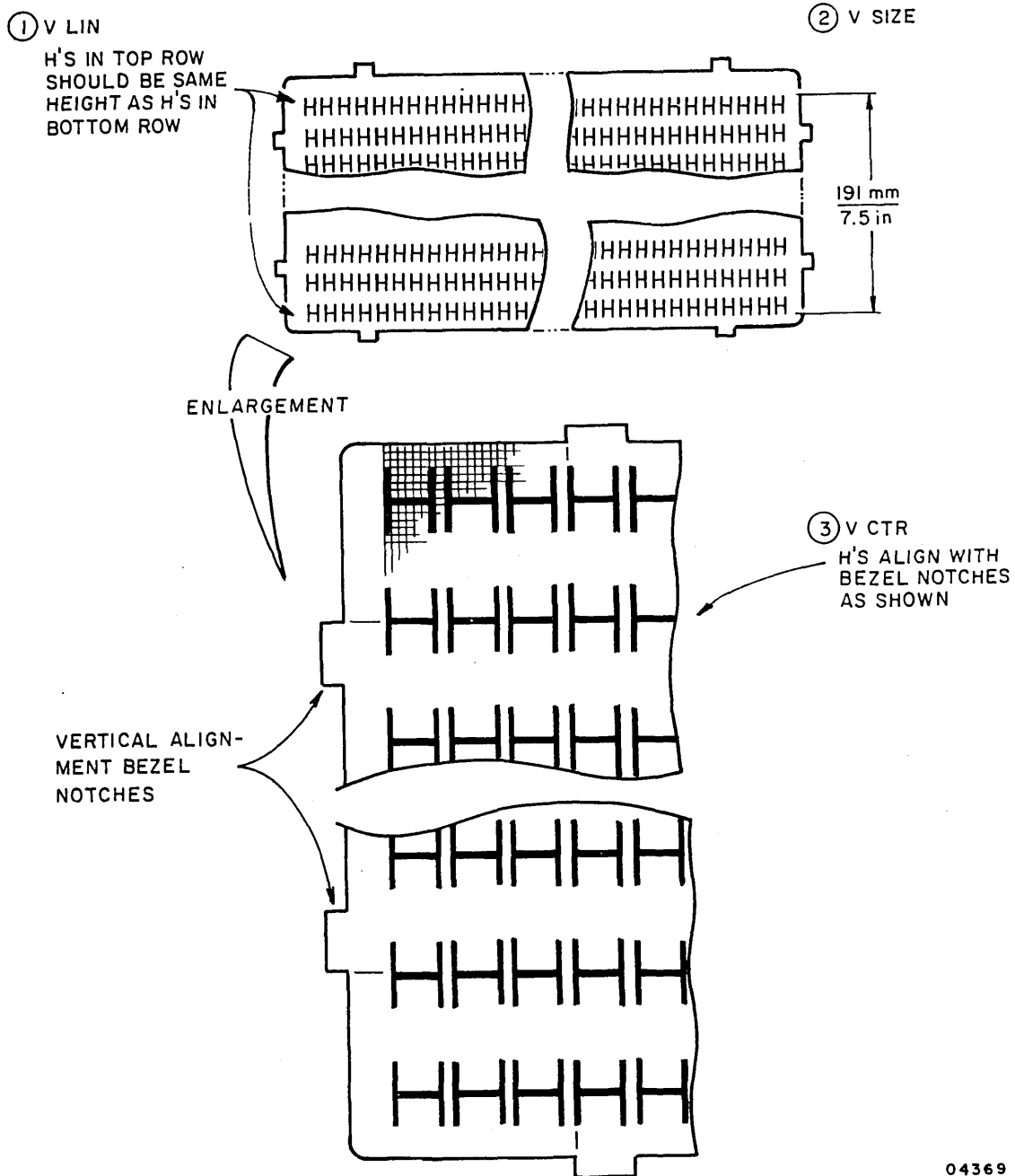
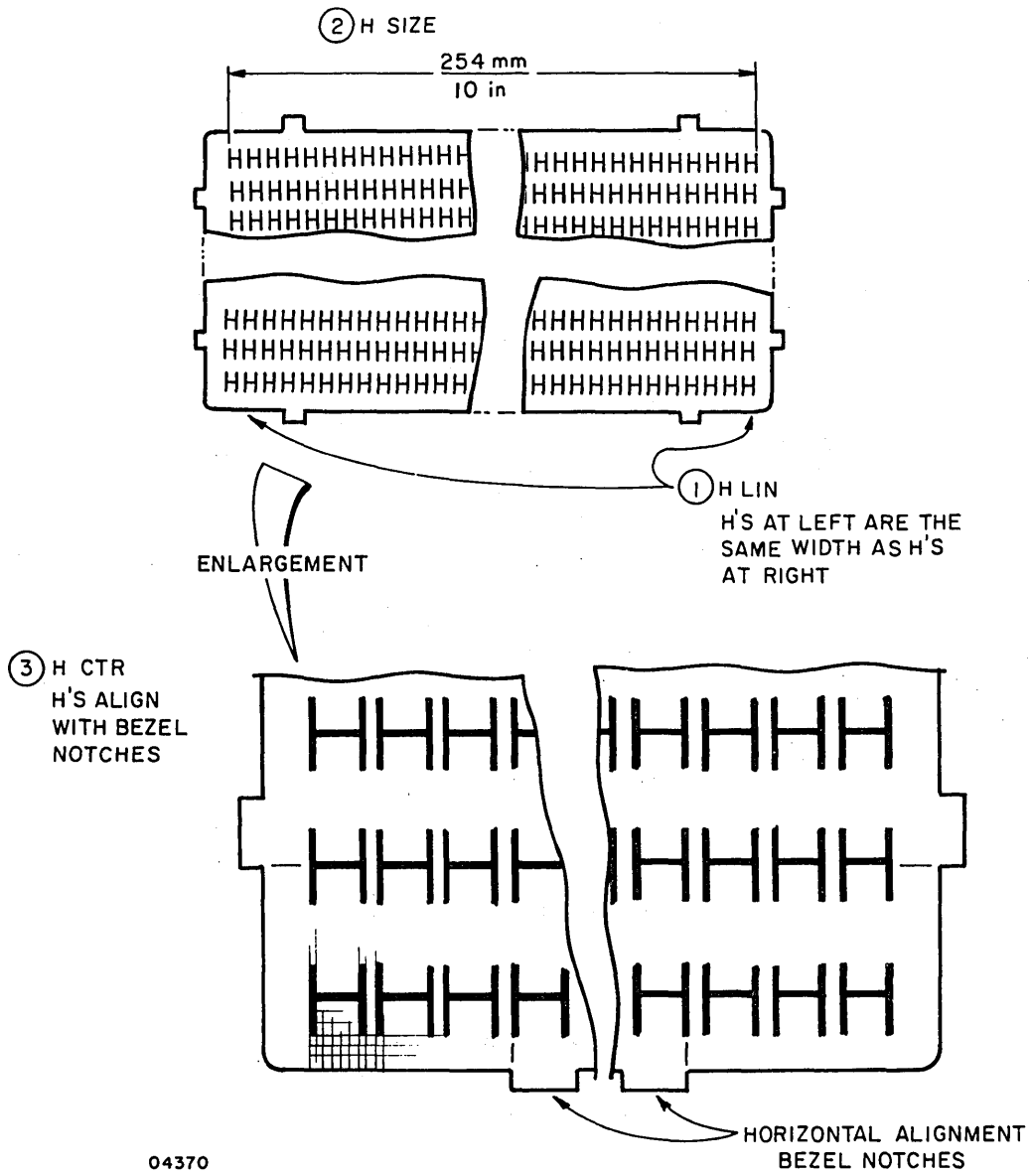


Figure 6B-19. Vertical Centering Alignment



04370

Figure 6B-20. Horizontal Centering Alignment



## Procedure 17 - Removing and Replacing AC Line Filter

Remove and replace the AC line filter as follows.

### WARNING

Line voltage may be present on power supply board before step 1 is performed.

1. Remove the power supply board (procedure 8, steps 1 through 4). (Ensure that power cord is removed from the terminal.)
2. Disconnect the brown wire attached from the line filter to circuit breaker. CBl, and green wire to grounding stud.
3. Remove the four wires attached to the voltage select switch.
4. Remove main logic board (procedure 10 steps 3 through 6).
5. Remove brown wire from connector to power interlock switch.
6. Remove the green wire from connector to grounding stud.
7. Remove the two screws attaching the line filter to the backpanel. (Power cord retainer on CC634-A/CC638-A terminals will be loose when line filter is removed.)

### NOTE

Refer to figure 5-1 for wiring diagram.  
Wires to the voltage select switch are marked.

8. Install a replacement filter and perform steps 1 through 7 in the reverse order of disassembly.

## Procedure 18 - Removing and Replacing Circuit Breaker

Remove and replace circuit breaker CB1 as follows.

1. Remove the logic drawer assembly (procedure 4, steps 1 through 5).
2. Detach the two wires from the circuit breaker.
3. Remove the attaching nut from the circuit breaker and remove it from the backpanel.
4. Install a replacement circuit breaker in place and reassemble the remaining parts in the reverse order of disassembly.

## Procedure 19 - Removing and Replacing the Touchpanel Assembly

Remove and replace the touchpanel as follows. Refer to figure 3-2 for placement of hardware. Disassemble according to steps 1 through 4, and reassemble according to steps 5 through 9.

1. Remove logic drawer assembly (procedure 4, steps 1 through 5).
2. Remove bezel assembly according to step 2 of procedure 5.
3. Remove the cable ground bracket (figure 3-3).
4. Remove the two bottom screws securing touchpanel to bezel adapter assembly. Carefully pull out the touchpanel from two upper clips.
5. Insert the new flat cable and ground wire between CRT and bezel adapter assembly.

### NOTE

If a new touchpanel is being installed for the first time, attach the panel to the bezel adapter assembly with the four screws supplied with it.

6. Mount new touchpanel in place and replace the two screws removed in step 4, while observing the following substeps.
  - a. Ensure that the touchpanel is mounted snugly against the two top plastic holders (figure 3-2).
  - b. Observe that the dots on each of the four edges (dots are at the center of each edge) of the touchpanel appear in the center notches of the bezel (figure 6B-3).
7. If the dots cannot be seen in the notches, or if a new touchpanel is being installed on the terminal for the first time, perform the following:
  - a. Install the two bottom holders for the touchpanel, but do not fully tighten in place.
  - b. Place the touchpanel on the bottom holders and install one of the top holders, but do not fully tighten.
  - c. Snap the bezel in place, and carefully move the touchpanel (if required) so that the alignment in step 6b is obtained.
  - d. Then remove the bezel and tighten the mounting screws. Install the remaining top plastic holder.
8. Reconnect flat cable to graphics board and ground wire to bezel adapter assembly.
9. Replace access lid (procedure 3).
10. Replace bezel assembly and BRIGHTNESS and CONTRAST knobs.

#### Procedure 20 - Removing and Replacing Keyboard Switch Module

Some keyswitch modules have retaining screws. These keyswitches are shaded in figure 6B-21. If a shaded keyswitch fails, replace the keyboard. If a keyswitch fails, replace the keyswitch module (part number 66312532) as follows.

To replace keyboard switch modules, refer to figure 6B-22 and perform the following:

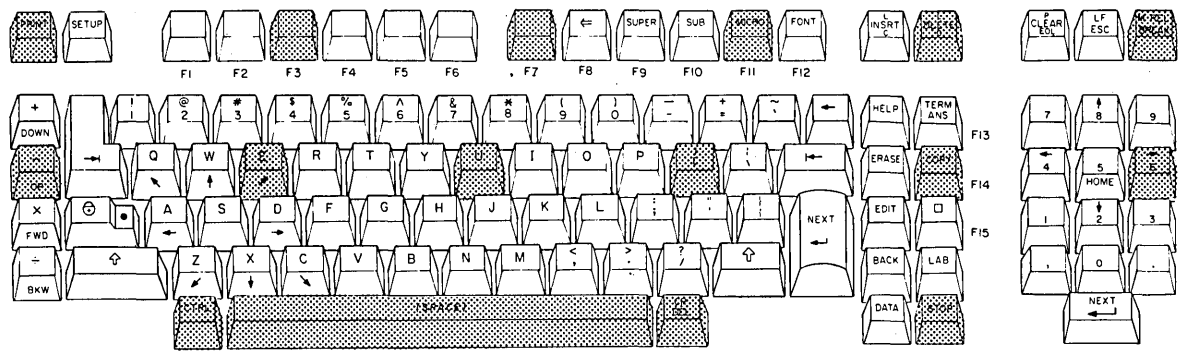


Figure 6B-21 Keyboard Showing Non-Removable Keyswitch Modules

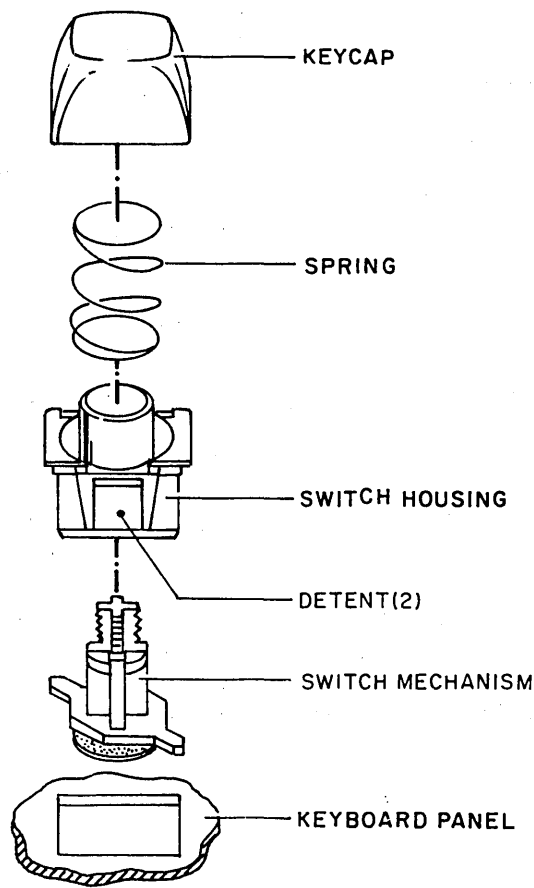


Figure 6B-22. Keyboard Switch Module Mounting Details

1. Remove power from terminal (procedure 1).
2. Remove keycap by prying it up, or use keycaps removal tool, part number 71493510.
3. Lift spring out of switch housing.
4. Pry switch housing loose from keyboard by pressing detent on each side of switch housing. It may be necessary to remove keycaps and springs from adjacent switch modules to provide sufficient clearance. Also note that PC board of keyboard assembly has retaining screws attached to some switch modules, which are indicated by shaded keys in figure 6B-21. If any of these switches are to be replaced, or if detents are not accessible from top, replace the complete keyboard.
5. Install replacement switch module in the reverse order of preceding steps. Replacement switch module will have a blank keycap. Discard blank keycap and use existing one.

#### Procedure 21 - Removing and Replacing Line Voltage Switch

Remove line voltage switch as follows:

1. Remove the logic drawer assembly (procedure 4, steps 1 through 5).
2. Disconnect the yellow wires noting the position of each wire (see figure 5-1).
3. Remove the screw on the left of the switch.
4. Remove the metal backpanel from the logic drawer assembly and remove the switch.
5. Install a replacement line voltage switch in place (when positioning the switch, 115 V should be on the left as viewed from the rear) and reassemble the remaining parts in the reverse order of disassembly. (Make sure switch is set to proper voltage setting prior to installing the screw on the left of the switch.)

#### NOTE

The wires are marked as to switch position they connect to (refer to figure 6B-12).

## Procedure 22 - Check and Adjustment of the Tilt Tension

The terminal should be capable of holding any position within its tiltable range. To test, tilt the terminal to a variety of positions. If it does not hold its position, do the following:

### NOTE

Consider that cable drag may affect the ability to hold a position. If so, relieve the cable strain before testing.

1. If the terminal has no cotter pins in its tilt mechanism, use a 1/2-inch wrench to slightly tighten the hinge hex bolt. Do not overtighten.
2. If terminal does have cotter pins in its tilt mechanism, do the following:
  - a. Remove cotter pin from the hinge hex nut.
  - b. Use a 17 mm (11/16th) wrench to hold the hex head and turn the hex nut 1/6th of a turn. Do not adjust more than 1/6th of a turn (one notch).
  - c. Realign the pin hole and hex nut for ease of cotter pin insertion.
  - d. Replace the cotter pin.
3. Repeat the process for the other hinge.

## Procedure 23 - Removing and Replacing Internal 1200/1200 B/S Modem

This procedure is for removing and replacing the internal modem option in the field during troubleshooting and problem isolation procedures. It may also be used for the initial installation of the modem in CC634-A/CC638-A. For this latter purpose, refer also to the large option installation drawings in section 5 of this manual.

#### NOTE

The following paragraph contains some useful information for installing a modem board in the terminal. Read it through before replacing or installing a modem assembly to ensure the procedure is accomplished as efficiently as possible.

The cable harness that carries the terminal processor bus signals from J4 of the main logic board to the option boards is shielded and is therefore quite stiff. This makes the cable difficult to position properly for connecting it to the interface board (small board) of the modem assembly. To make this connection easier, an extension cable is provided with the modem for use on CC634-A/CC638-A terminals and the cable harness on CC634-B/CC638-B terminals has been lengthened. If difficulty is still encountered in making this connection and the terminal has the dot graphic option board installed, remove the cable harness from the graphics board to provide more slack for connecting the harness to the modem board. Once the harness is connected to the modem assembly, reattach the harness to the graphic board whose connector is much easier to reach than that of the modem assembly.

To remove and replace the internal modem board, perform the following actions. Refer to figures 6B-23 and 6B-24 while performing this procedure.

#### CAUTION

Before proceeding with the following step, be sure that the ac power cord is removed from the rear of the terminal and that all units connected to the terminal have had their input power turned off. It is not necessary to remove any of the data cable connectors from the rear panel of the terminal.

1. Remove replacement modem assembly from packing material (CDC P/N 90534500) and set assembly aside until ready to install it in terminal.
2. Remove phone cord from rear of modem assembly. A small flat-bladed screwdriver may be used to compress the clipped off release tab on the RJ-11 phone plug while the plug is withdrawn from the modem jack.
3. Remove access lid and logic-drawer assembly from terminal as described in procedures 3 and 4, respectively.

4. Remove two wing nuts securing modem assembly to rear panel of drawer assembly in I/F-4 slot position.
5. Grasp ribbon cable running to bottom of modem-assembly interface board and rock cable back and forth while applying light pressure until cable connector is free of board connector. On CC634-A/CC638-A terminals, disconnecting the extension ribbon cable from the main ribbon cable may be easier.
6. Lift retaining tab at front end of left-hand board rack with one hand, while grasping front edge of modem assembly with the other hand and withdrawing assembly straight out from front of rack.

NOTE

Before installing replacement modem in terminal, check that all jumper straps on modem are in "factory set" positions. Refer to figure 6B-25.

7. Install new modem assembly (unpacked in step 1) by performing the preceding steps in reverse order and sequence of action.
8. Place replaced modem assembly in packaging material (CDC P/N 90534500) of replacement assembly for transporting or shipping the faulty unit to the service or repair center.

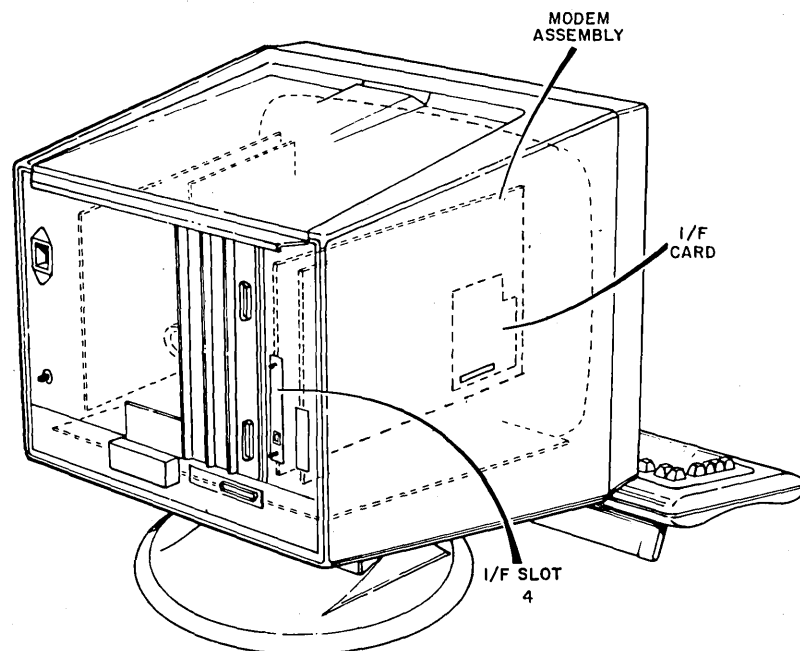
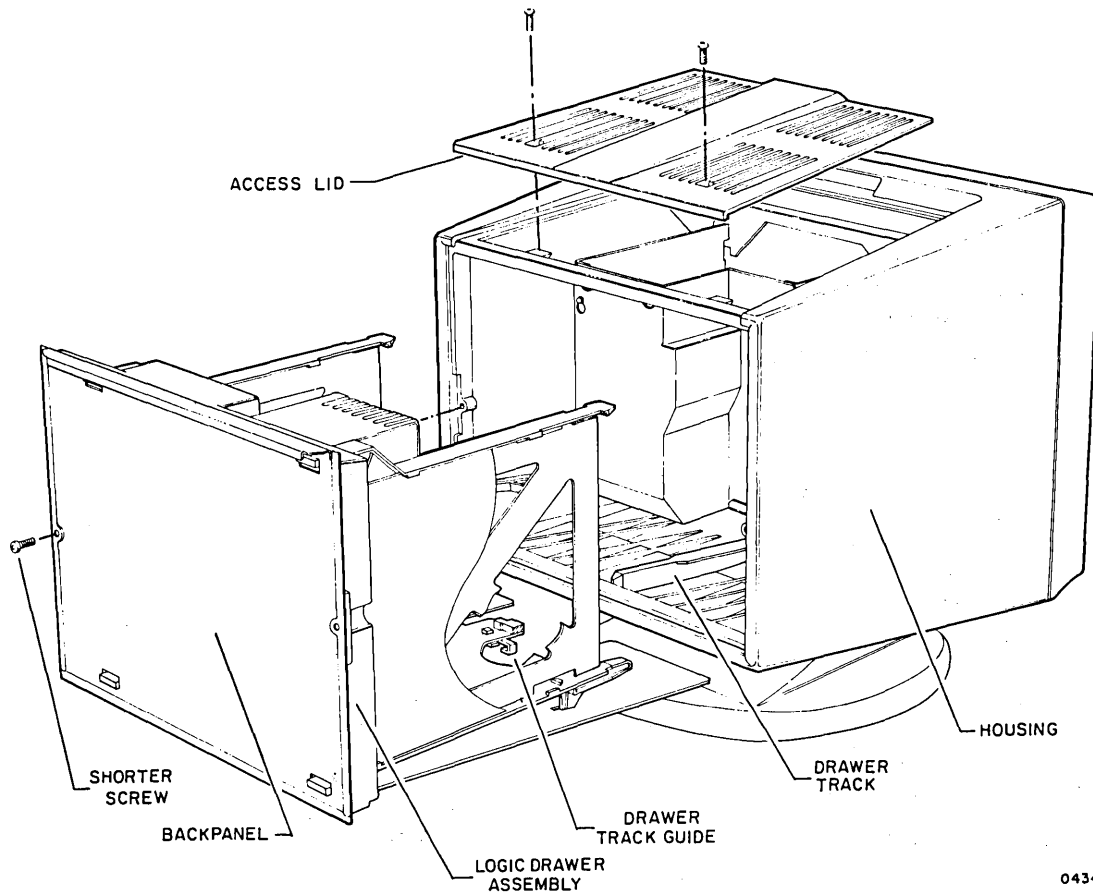


Figure 6B-23. Location of Internal Modem in Terminal





04343-1

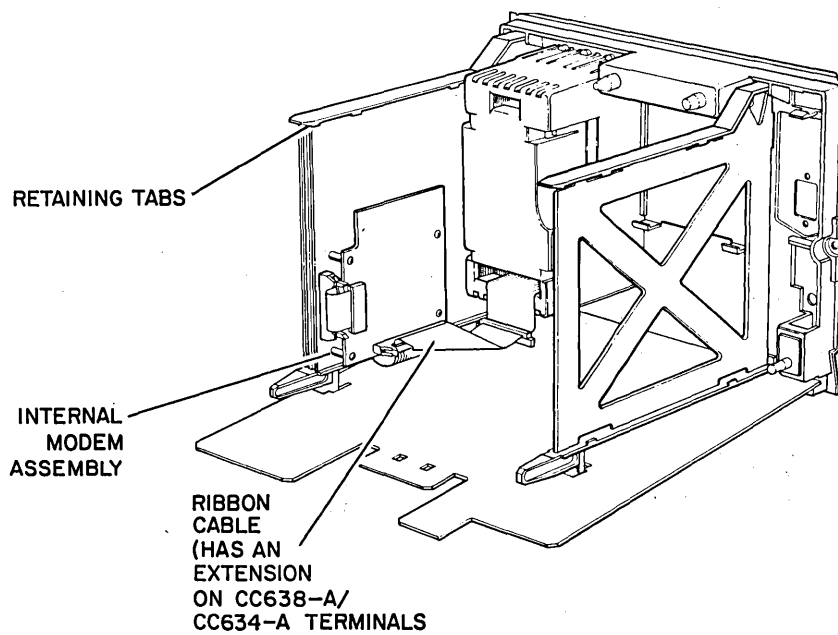


Figure 6B-24. Removal/Replacement of Internal Modem Assembly

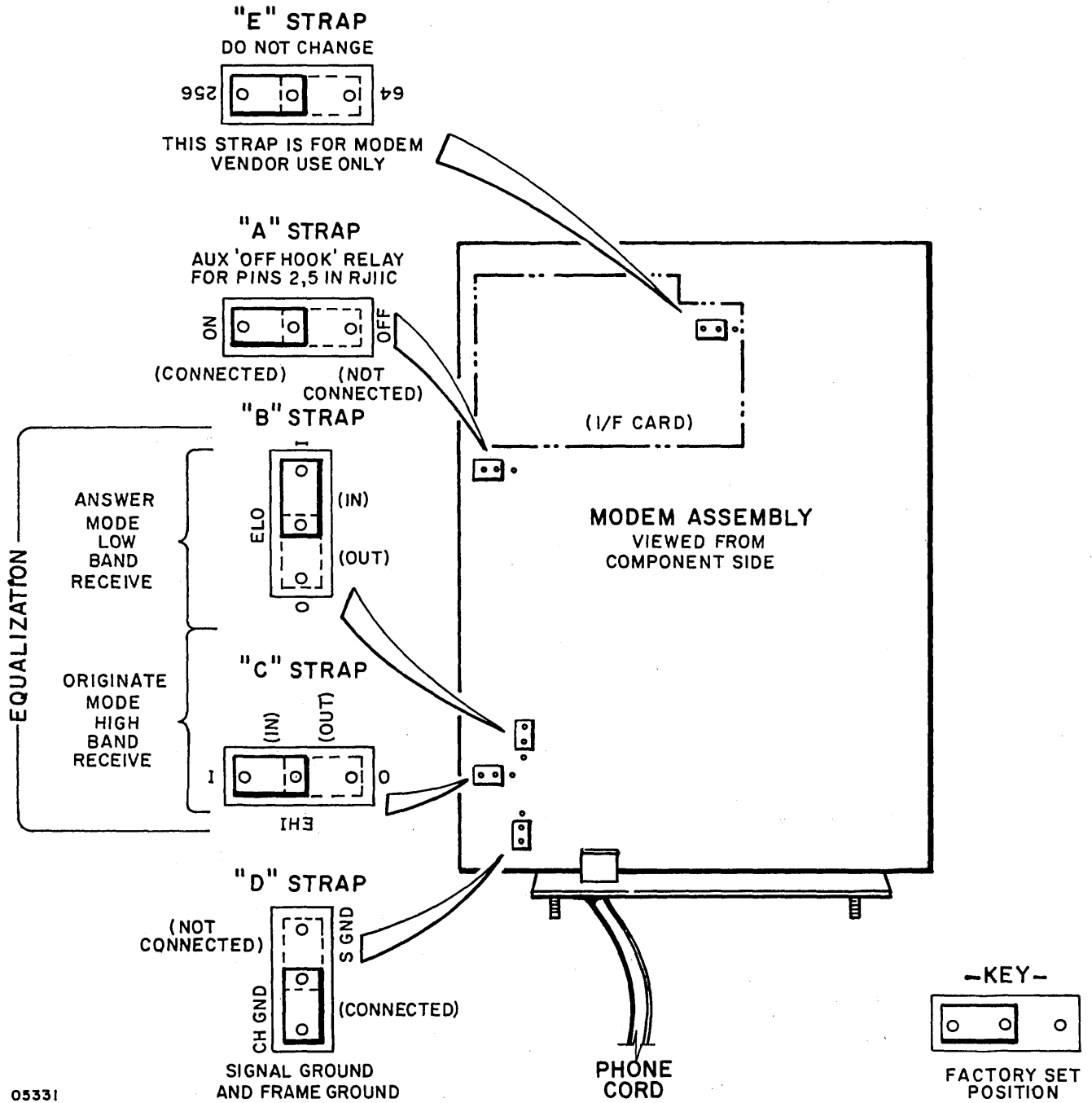


Figure 6B-25. Factory-Set Positions of Modem Jumper Straps

## Procedure 24 - Internal Modem Function Check

The purpose of this procedure is to check the ability of the internal modem to connect a remote terminal or computer system. That is, it checks the proper operation of the modem on-line rather than in a self-test mode.

### NOTE

If starting this procedure from within a terminal operating mode, start with the first step. If starting from the Mode Selection Menu, skip the first three steps and start with step 4.

1. Press SETUP key on terminal to obtain first part of operator parameter display.
2. Press F10 key to move to second part of operator parameter display.
3. Press F10 key again to obtain mode-selection-menu display.
4. Hold CTRL key down and then press SETUP key to cause Terminal Installation Parameters (TIPs) display to appear on screen.
5. Record values in fields F2 through F9 of TIPs display.
6. Verify that TIP F3P1 (read as field 3, position 1, with positions running from left to right) is set to 1 and TIP F4P4 is set to 0. If not, set it to a 1. Keyboard space bar or FX keys may be used to move cursor to desired entry position. Numeric keys are used to make entries.
7. Press COPY key on keyboard.
8. Press F10 key on keyboard. This causes ENTER MODE n (1-6) display to appear on terminal screen.
9. Press 2 key to obtain Mode Installation Parameters (MIPs) display for Mode 2.
10. Record the values in F2 through F10 fields of MIPs display.

11. Set following MIP entries to values indicated below:

F2P3 = 0  
F2P4 = 1  
F2P5 = 0  
F2P6 = 1  
F3P2 = 1

12. Enter the desired phone number for proximate handset (or remote terminal or system) in F7 and F8 fields of MIPs. Use numerics 0 to 9 for number entries; use D character in the sequence to insert a pause until tone is heard; and use E character in sequence to insert 3 second pause with no tone detected. The last character entry for a phone number that does not entirely fill all 12 spaces of the F7 and F8 fields must be an F character.
13. Press the COPY key on the terminal keyboard, and then press the F1 key to return to the mode selection menu.
14. Press the F2 key to select an auto-dial function of terminal operating Mode 2. A proximate handset should start ringing in a short time or a remote terminal (or system) should be connected. Monitor the dialing sequence as it appears on the display screen of the terminal. Operating Mode 2 of the terminal was selected strictly for purposes of testing the modem. The important thing is whether the modem reaches the desired phone number or makes the desired connection; not whether an operating mode download actually occurs.
15. When checkout of the modem is completed, re-enter the correct Mode 2 terminal and mode installation parameters (those recorded during this procedure). Use terminal operator's guide or reference manual to ensure all parameters entered make sense for customer's application.

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This section contains spare parts lists, spare parts kit list, and a genealogy chart for the display terminal.

OWN	W GLASER	3-82	CONTROL DATA CORPORATION	TITLE	SPARE PARTS KIT 721 DISPLAY TERMINAL	PREFIX	DOCUMENT NO.	REV.
CHKD	D. Dond	3-82		FIRST USED ON	CC634, & 38	SPK	66315799	K
ENG	R. Church	3/82						
MFG	W. L. ...		CODE IDENT				SHEET	1 of 1
APPR	W. L. ...	3/82	15920					

SHEET REVISION STATUS					REVISION RECORD						
REV	ECO	DESCRIPTION	DRFT	DATE	APP	REV	ECO	DESCRIPTION	DRFT	DATE	APP
						A	14232-44	RELEASED CLASS A	--	4-12-82	M/F
						B	15251	F/N 3 WAS 51941403	ML	8/4/82	ERD
						C	15347	F/N 9 WAS 90446305	ML	9/10/82	DW
						D	15344	F/N 10 WAS 90146453	ML	8-10-82	DW
						E	15337	CHANGED F/N 10	EE	1/27/82	DW
						F	15553	F/N 8 WAS 90146476	MLD	12-1-82	AM
						G	15705	CHANGED F/N 6	EE	3/11/82	W
						H	16044	INDEX NAIL - CHANGED PER ECO	MLD	7-27-83	NLS
						J	16125	CHANGED F/N 8	EE	9/27/83	WSP
						K	16602	DELETE F/N 11	WJG 3-21-84	3-21-84	WSP

NOTES: SPK Number 66315799 is identical to SPK Number 66329384 with the exception of the main logic PCB. CC63XA uses main logic PCB PN. 90446515, CC63XB uses main logic PCB PN. 90446597.

APL 66315799  
DETACHED LISTS

A42100 REV. 0/71

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BUILD ARC 430										ASSEMBLY PARTS LIST				PRINT DATE	PAGE	FILE CHANGE NO.
														03-19-84	1	00016602
DIV.	ASSEMBLY NUMBER	CD	REV.	DWG.	DESCRIPTION	MC	STATUS	STATUS DATE	ENG. RESP.	FILE DATE						
0860	66315799	B	K	A	SPARE PARTS KIT 721 DUSPLY	A	RFL	04-12-82	CC634A	03-19-84						
TPIND NO	LI	PART NUMBER	CD	QUANTITY	U/M	PART DESCRIPTION	MC	TLB	ECO. NO. IN	ECO. NO. OUT	S/N	WK IN	WK OUT			
001	01	15632914	6	1		PC OPT, VX DUAL RS232C I/F (EC)	G									
002	01	15632916	1	1		PC OPT, VX PARALLEL I/F (EC)	G									
003	02	51941404	9	1		PC TOUCH PANEL, CRT ANTIGLAKE	P		15251			8232				
004	01	61409246	8	1		PC REPLACED BY 61409656 16296	G			16044	16044	8338	8338			
004	02	61409556	8	1		PC KEYBOARD ASSY	G		16044			8338				
005	01	66312532	6	20		PC CHERRY-M03-0001 KEY SWITCH	P									
006	02	66327773	5	1		PC PTD BD ASSY 185107-00	P		15705			8308				
007	01	66315789	9	1		PC CABLE ASSY DRAWER EXTENDER	A									
008	04	90446556	4	1		PC PCA 81AHD-3 (POWER SUPPLY)	A		16125			8401				
009	02	90446516	8	1		PC PCA 1A1D-1 (VX GRAPHIC LOGIC)	S		15347			8232				
010	03	90446515	0	1		PC PCA 1A1D-2 (VX LOGIC BOARD)	A		15347			8233				
011	01	15633914	4	1		PC VX 1200/1200 MODEM TA	A		16044	16602		8338	8412			
012	01	75446270	3	1		PC CASE	P		16044			8338				
013	01	75446271	1	1		PC FOAM SET	P		16044			8338				
0014 TOTAL LINES																



DWN	V. GLASER	3/82	CONTROL DATA CORPORATION	TITLE	721 DISPLAY TERMINAL	PREFIX	DOCUMENT NO.	REV.
CHKD	D. SAND	3/82		SPL.	66315008	T		
ENG	A. BROWN	3/82		FIRST USED ON	CC634, CC638	SHEET 1 of 6		
MFG				CODE IDENT	15920			
APPR	V. GLASER	3/82						

SHEET REVISION STATUS										REVISION RECORD					
1A	6	5	4	3	2	1	REV	ECO	DESCRIPTION	DRFT	DATE	APP			
							A	14232-44	RELEASED CLASS 'A'		5-12-81				
							B	15137	ADDED F/N 31 & 44	EE	5/6/82				
							C	15166	F/N 25 WAS 71493321	EE	5/24/82				
							D	15224	REVISED PER ECO	RH	7/10/82				
							E	15251	REVISED PER ECO	MIC	8/4/82				
							F	15347	REVISED PER ECO	MIC	8/31/82				
							G	15344	CHANGED F/N 41	WDL	8-10-82				
							H	15337	CHANGED F/N 41	EE	1/2/83				
							J	15457	CHANGED F/N 27	EE	1/14/83				
							K	15550	F/N 38 WAS 61409137	MW	1/1/83				
							L	15679	MIC F/N 21, CHG F/N 37	EE	3/4/83				
							M	15705	CHANGED F/N 20	EE	3/10/83				
							N	16044	REVISED PER ECO	MW	7-21-83				
							P	16125	CHANGED F/N 38, ADD 50	EE	9/2/83				
							R	16450	F/N 12 WAS 61409173	DS	1-24-84				

NOTES:

- See Sheet 2 and 3 for Equipment Listing.
- If replacing PWR supply 1AHD-2 P.N 90446543 use 90446543 as a replacement.
- If replacing PWR supply 1AHD-3 P.N 90446556 use 90446556 or 90446543 as a replacement.
- D.C Power cable (61409137) to be returned with PWR supply when P.S is sent back for repair.

DETACHED LISTS

DWN	D. SAND	3/84	CONTROL DATA CORPORATION	TITLE	721 DISPLAY TERMINAL	PREFIX	DOCUMENT NO.	REV.
CHKD				SPL.	66315008	T		
ENG				FIRST USED ON	CC634, CC638	SHEET 1A		
MFG				CODE IDENT	15920			
APPR								

SHEET REVISION STATUS										REVISION RECORD					
1A	6	5	4	3	2	1	REV	ECO	DESCRIPTION	DRFT	DATE	APP			
							T	16564	ADDED NOTE 2,3,& 4.	DS	3-17-84				

CONTROL DATA CORPORATION	CODE IDENT	15920	SHEET 2	SPL.	DOCUMENT NO.	66315008	REV	N
--------------------------	------------	-------	---------	------	--------------	----------	-----	---

DISPLAY EC	SPL	DESCRIPTION
CC634-A (15632910)	Chart Column 1	Display Terminal
CC638-A (15633009)	Chart Column 2	Display Terminal
CC634-B (15633349)	Chart Column 3	Display Terminal
CC638-B (15633351)	Chart Column 4	Display Terminal

FIELD INSTALLABLE OPTIONS	SPARED PARTS	DESCRIPTION
XA358-A (15632920)	{ 90446516 51941404	PWR Assy 15LD-1 (Dot Graphics) Touch Panel Assy
XA369-A (15633355)	51941404	Touch Panel Option*
YA275-A (15633093)	15165426	Power Cord 50 HZ
XA360-A (15633013)	{ 15633014 61409589 51917918 61409165	1200/1200 Modem Cable Assy, Modem-Phone Duplex Adapter 10 Bus Ext. Cable

\* Must have XA368A (Graphics) installed.

CONTROL DATA CORPORATION		CODE IDENT	SHEET	SPL	DOCUMENT NO.	REV
		15920	3		66315008	N
<u>CUSTOMER INSTALLED OPTIONS</u>		<u>SPARED PARTS</u>	<u>DESCRIPTION</u>			
YR101-A (15632914)		15632914	Dual Asyn I/F - Spared at the EC level			
YR102-A (15632916)		15632916	Parallel I/F - Spared at the EC level			
* XA368-A (15633353)		90446516	Graphics Option			
* XA360-A (15633013)		15633014	1200/1200 Modem			
<u>KEYBOARD CONVERSION KITS</u>		<u>SPL</u>	<u>DESCRIPTION</u>			
YA274-A (15633078)		66315936	SPL for U.K.			
YA274-B (15633079)		66315937	SPL for Spanish			
YA274-C (15633080)		66315938	SPL for German			
YA274-D (15633081)		66315939	SPL for French			
YA274-E (15633082)		66315940	SPL for Swedish/Finnish			
YA274-F (15633083)		66315941	SPL for Danish/Norwegian			
* Customer installable on the CC634B/638B only. Customer Engineer installable on the CC634A/638A Terminal.						

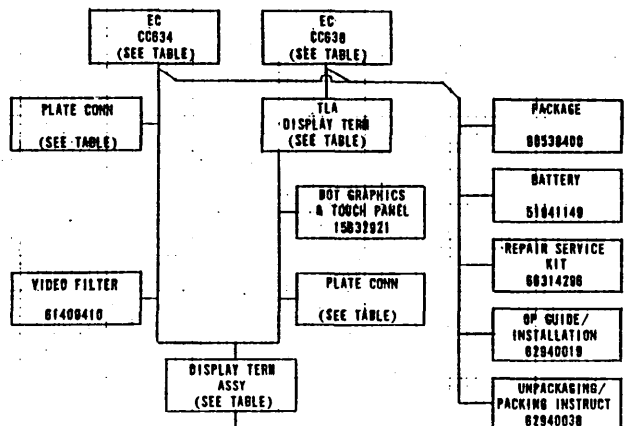
CONTROL DATA CORPORATION		CODE IDENT	SHEET	SPL	DOCUMENT NO.	REV		
		15920	4		66315008	T		
FIND NO.	PART IDENTIFICATION	QUANTITY REQUIRED				UNIT OF MEAS	NOMENCLATURE OR DESCRIPTION	SPECIFICATIONS, NOTES, OR MATERIAL
		1	2	3	4			
1	10128318	2	2	2	2		SCR M4 X 8MM, BEZEL	
2	15002342	1	1	1	1		SWITCH, INTERLOCK	
3	15002347	1	1	1	1		SWITCH, VOLTAGE SELECT	
4	15165425	1	1	1	1		POWER CORD 60 HZ	
5								
6	51782149	1	1	1	1		CIRCKIT BREAKER THRM	2.5 AMP
7	51941442	1	1	1	1		EMBLEM CDC ID	
8	51941404	0	1	0	1		TOUCH PANEL ASSY	
9	61409137	1	1	1	1		CABLE ASSY (PWR TO LOGIC)	USED ON IAH-2 PWR SUPPLY(90446543) ONLY
10	61409163	0	1	0	1		CABLE ASSY (20P)	
11	61409164	1	1	1	1		CABLE ASSY, SHIELD 50P	
12	61409756	1	1	1	1		DISPLAY/BEZEL ADAPTER ASSY	
13	61409208	1	1	1	1		LINE FILTER ASSY	TO REPLACE, REQUIRES P/N 61409210 ALSO
14	61409210	1	1	1	1		WIRE ASSY PWR CONN	TO REPLACE REQUIRES P/N 61409208 ALSO
15	61409244	1	1	1	1		CABLE ASSY MONITOR	
16	61409656	1	1	1	1		KEYBOARD ASSY	
17	61409240	1	1	1	1		GND WIRE ASSY	
18	61409410	1	0	1	0		VIDEO FILTER ASSY	
19	66312532	104	104	104	104		KEY SWITCH MODULE	
20	66327973	1	1	1	1		MONITOR PCB ASSY	

AA2131 REV. 8/71

PRINTED IN U.S.A.



	CC634A	CC634B	CC638A	CC638B
EC	15632910	15633349	15633009	15633351
TLA	15632814	15633350	15632914	15633350
DISPLAY TERM ASSY				
ELECTRONICS DRAWER ASSY	61409170	61409644	61409170	61409644
PWB ASSY 1A1D-2	90446515		90446515	
PWB ASSY 1A1D-3		90446597		90446597
BACKPANEL ASSY	61409447	61409657	61409447	61409657
PLATE CONN	71493338	61409647	71493338	61409647
	71493339		71493339	



REV	ECO	DESCRIPTION	DATE	DATE	CHKD	APVD
521						
-AA	A	RELEASED CLASS A				
-AB	B	REVISED PER ECO				
-CC	C	REVISED PER ECO				
-DD	D	REVISED PER ECO				
-EE	E	REVISED PER ECO				
-FF	F	REVISED PER ECO				
-GG	G	CHK 1A1D BRD UG				
-HH	H	CHK REPERAL & PARTS IN PRO				
-IJ	I	REVISED PER ECO				
-JK	J	REVISED PER ECO				
-KL	K	REVISED PER ECO				
-LM	L	REVISED PER ECO				
-MN	M	REVISED PER ECO				
-NO	N	REVISED PER ECO				
-PQ	P	REVISED PER ECO				
-R	R	REVISED PER ECO				
-S	S	REVISED PER ECO				
-T	T	REVISED PER ECO				

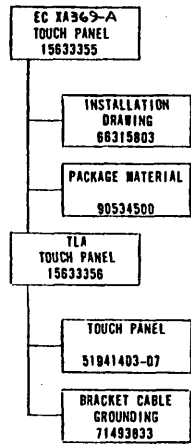
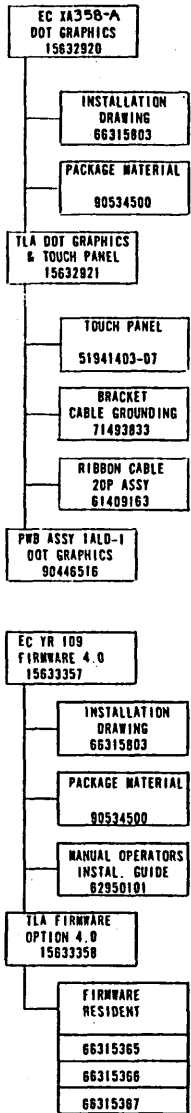
REFERENCE DOCUMENTS

DOCUMENT	NO.	DOCUMENT	NO.
EQUIPMENT SPEC	16042886	SPARE PARTS KIT CC 63XB	66329384
BASIC ENS CC634,38A	16042888	MANUAL-OP GUIDE/INSTALLATION (FOR CC634B/CC638B)	62950101
BASIC ENS CC634,38B	16042970	MANUAL-REFERENCE (FOR CC634B/CC638B)	62950102
GRAPHICS SPEC	16042930	GRAPHICS/FIRMWARE OPTION 4.0 FIRMWARE SPEC	62950118
INSTALLATION DWG-SMALL OPTION 1200/1200 MODEM SPEC	66316553	RIGID DISK INTERFACE OPTION	66328395
DUAL ASYM SPEC	16042890	GENEALOGY CHART	
PARALLEL CHANNEL SPEC	16042889		
INTERCONNECTION DIAGRAM	16042920		
LOGIC SUPPORT DOCUMENT	62201067		
INSTALLATION DWG, OPTIONS	62201072		
TEST PLAN AND REPORT (DVT)	66315803		
POWER SUPPLY SPEC	66315654		
HIGH RESOLUTION DISPLAY SPEC	16042893		
KEYBOARD SPEC	51941006		
SPARE PARTS LIST	51941115		
TOUCH PANEL SPEC	66315008		
SPARE PARTS KIT CC63XA	51941403-07		
SCHEMATIC DIAGRAM 1A1D-1 (MAIN)	66315799		
SCHEMATIC DIAGRAM 1A1D (P.S.)	90446483		
SCHEMATIC DIAGRAM 1A1D (GRAPHICS)	90446294		
SCHEMATIC DIAGRAM 1BLD (PARALLEL)	90446303		
SCHEMATIC DIAGRAM 1A1D (DUAL)	90446382		
SCHEMATIC DIAGRAM 1A1D (MTR BD)	90446333		
VIDEO FILTER PANEL	90446326		
LOGIC DRAWER EXTENDER	51941156		
UNPACK/PACKING INSTRUCTION	66315789		
MANUAL-OP GUIDE/INSTALLATION (FOR CC634A/CC638A)	62940038		
MANUAL-REFERENCE (FOR CC634A/CC638A)	62940010		
MANUAL-SERVICE CENTER, ON SITE	82940020		
MANUAL-REPAIR CENTER MAINTENANCE	82940034		
INSTALLATION INST GRAPHICS BOARD	82940037		
INSTALLATION INST-1200/1200 MODEM	62950118		
	62950119		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN TOLERANCES PLACE PLACE ANGLES ± / ± / ± / MATERIAL FINISH	DWN	D. SAND	8-82	CONTROL DATA CORPORATION TITLE <b>GENEALOGY CHART</b> <b>721 DISPLAY TERMINAL</b>
	CHKD	(WJ) ass	3-71-82	
	ENGR	WJ	4/18/82	
	MFG			
	APVD			EQUIP. NO. CC634-A
	THIRD ANGLE PROJECTION			SIZE C
				FSCM NO. 15920
				DWG. NO. 66315009
				SCALE
				SHEET 1 OF 3

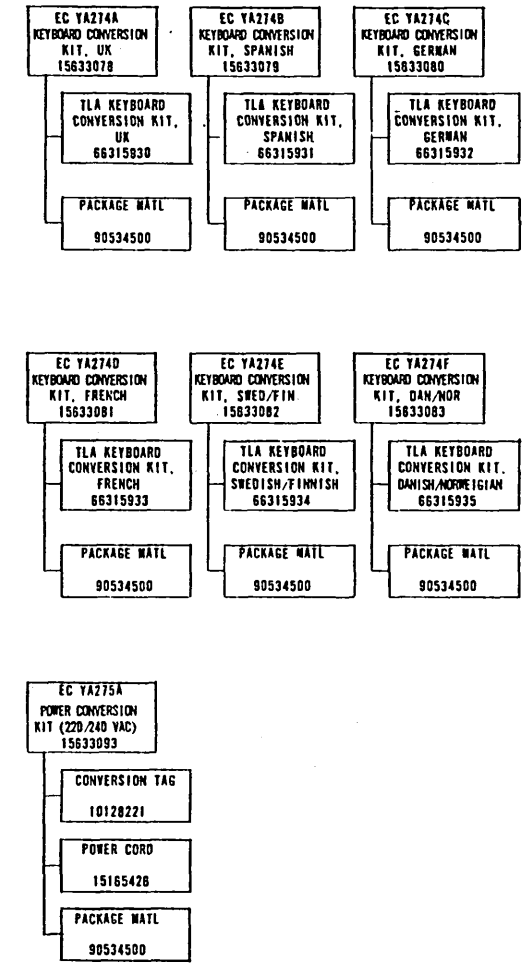
DETACHED LISTS

OPTIONS INSTALLED BY SERVICE CENTER ONLY



REVISION RECORD						
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	APVD

FIELD INSTALLED OPTIONS



\* FACTORY INSTALLED IN C66348/388

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN TOLERANCES			BWN	
PLACE	PLACE	ANGLES	CHRD	
±	±	±	ENGR	
MATERIAL			MFG	
			APVD	
FINISH			EQUIP. NO.	
			THIRD ANGLE PROJECTION	

**CONTROL DATA CORPORATION**

TITLE: **GENEALOGY CHART 721 DISPLAY TERMINAL**

SIZE: **C** FSCM NO: **15920** DWG NO: **663150097**

SCALE: SHEET **2** OF **3**

DETACHED LISTS

62940034 G

7-7

D

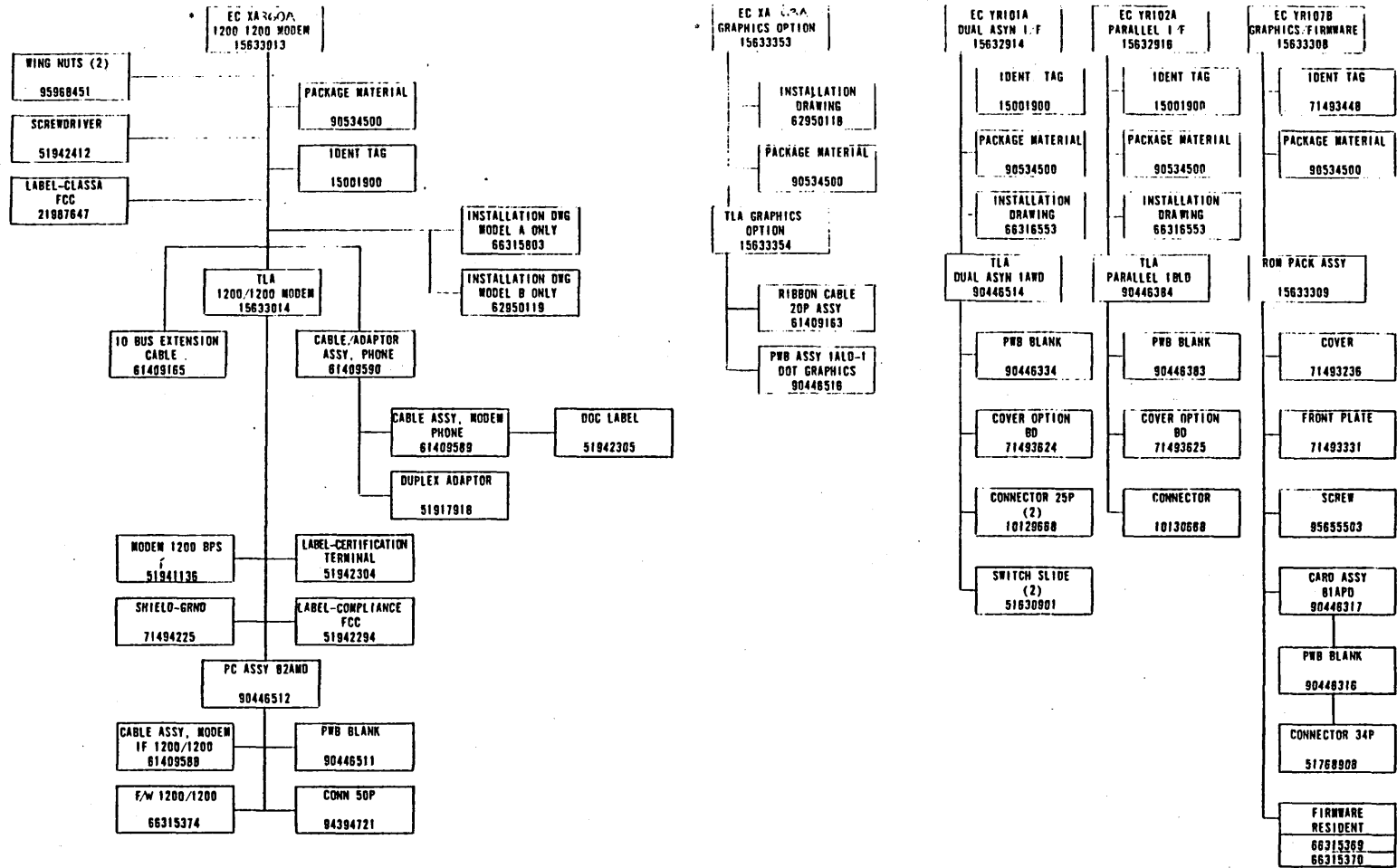
C

B

A


OPTIONS INSTALLED BY CUSTOMER ONLY

REVISION RECORD					
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD APP



\* EC XA360A AND EC XA360B WILL BE INSTALLED BY CUSTOMER ONLY IN THE CC634 AND CC638 B MODEL TERMINALS. THEY WILL BE INSTALLED BY THE SERVICE CENTER FOR THE A MODEL TERMINALS.

CONTROL DATA		GENEALOGY CHART		CODE IDENT	DWG NO	REV
		721 DISPLAY TERMINAL		15920	66315009	R
				SHEET 3		

DWN	W. Glaser	6/83	 CONTROL DATA CORPORATION	TITLE	SPARE PARTS KIT 721 DISPLAY TERMINAL	PREFIX	DOCUMENT NO.	REV.
CHKD	<i>W. D. Dwyer</i>	6-8-83		FIRST USED ON	CC634B, CC630B	SPK	66329384	C
ENG	<i>R. J. Rasmussen</i>	6-8-83		CODE IDENT	15920	SHEET 1 OF 1		
NFG	<i>P. M. Moore</i>	6/8/83						
APPR	<i>P. M. Moore</i>	7-22-83						

SHEET REVISION STATUS					REVISION RECORD						
REV	ECO	DESCRIPTION	DRFT	DATE	APP	REV	ECO	DESCRIPTION	DRFT	DATE	APP
	CD										
	50010-95	RELEASED CLASS B	-	6/8/83	EJ						
A	15153-54	RELEASED CLASS B	1	7-21-83	<i>WJC</i>						
B	16125	CHANGED F/N 8	EE	8/27/83	WJC						
C	16602	DELETE F/N 11	WJC	3-21-84	WJC						

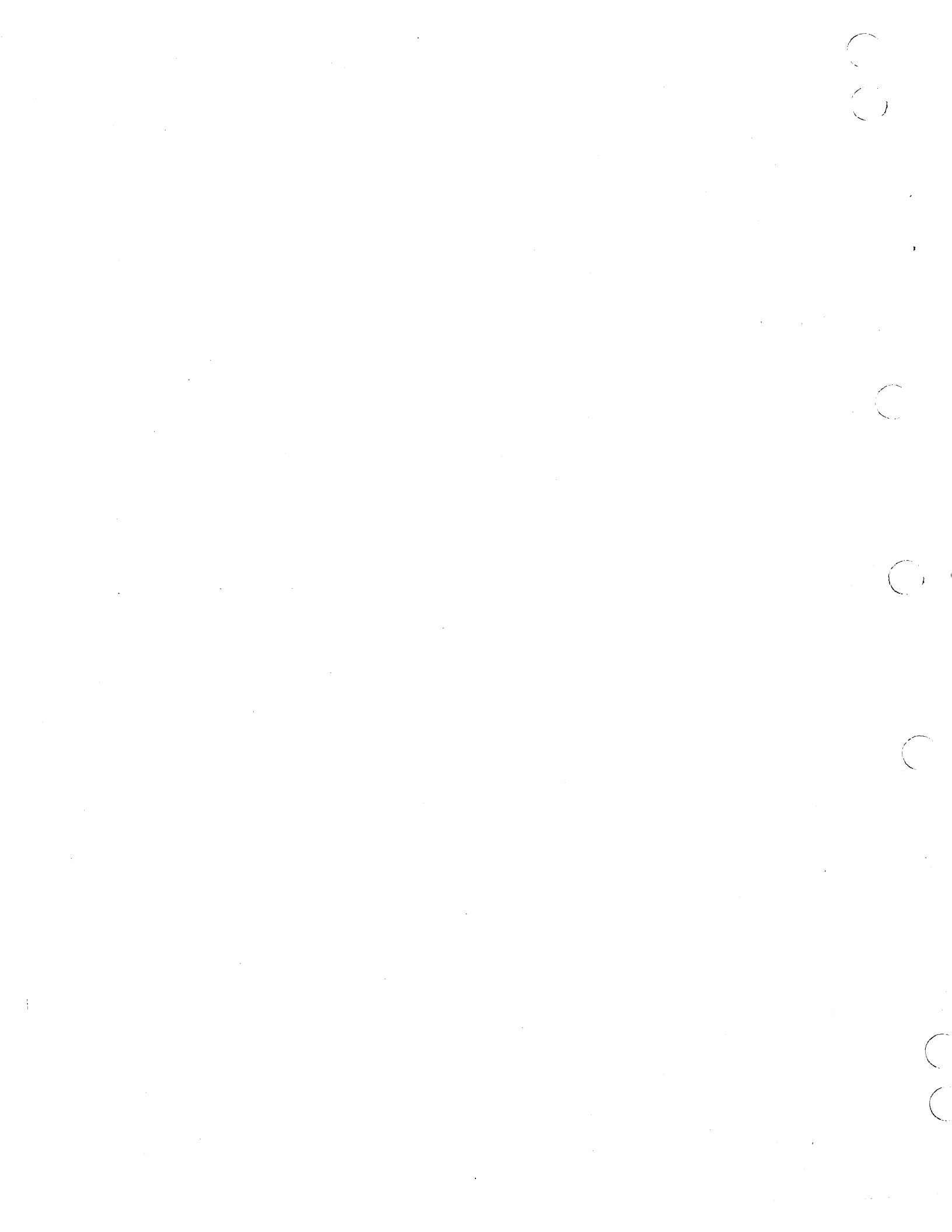
NOTES: SPK Number 66315799 is identical to SPK Number 66329384 with the exception of Main Logic PCB. CC63XA uses P.N. 90446515, CC63XB uses P.N. 90446597.

APL 66329384  
DETACHED LISTS

AA3180 REV. 8-71

PRINTED IN U.S.A.

BUILD ARC 439										ASSEMBLY PARTS LIST										PRINT DATE	PAGE	FILE CHANGE NO.
																				03-19-84	1	00016602
DIV.	ASSEMBLY NUMBER	CD	REV.	DWG.	DESCRIPTION	MC	STATUS	STATUS DATE	ENG. DESP.	FILE DATE	DIV.	ASSEMBLY NUMBER	CD	REV.	DWG.	DESCRIPTION	MC	STATUS	STATUS DATE	ENG. DESP.	FILE DATE	
0860	66329334	G	A		KIT SPARE PARTS 721 TRM USP Y	A	KFL	07-29-83		03-19-84												
LINE NO.	LI	PART NUMBER	CD	QUANTITY	U/M	PART DESCRIPTION	MC	YLD	ECO. NO. IN	ECO. NO. OUT	E/M	WE IN	WE OUT									
001	01	15632914	6	1		PC UPT. VX DUAL RS232C I/F (EC)	G															
002	01	15632916	1	1		PC UPT. VX PARALLEL I/F (EC)	G															
003	01	51941404	9	1		PC TOUCH PANEL, CRT ANTIGLARE	P															
004	01	61409656	6	1		PC KEYBOARD ASSY	G															
005	01	66312532	6	20		PC CHERRY-M03-0001 KEY SWITCH	P															
006	01	66327973	5	1		PC PTD BD ASSY 105107-03	P															
007	01	66315789	9	1		PC CABLE ASSY DRAWER EXTENDER	A															
008	02	90446556	4	1		PC PCA 81AHU-3 (POWER SUPPLY)	A	16125				8401										
009	01	90446516	8	1		PC PCA 1ALD-1 (VX GRAPHIC LOGIC)	S															
010	01	90446597	8	1		PC CD ASSY 1AJD-3 LOGIC BD	S															
011	01	15633314	4	1		PL VX 1200/1200 MODEM TA	A		16602				8412									
012	01	75446270	3	1		PC CASE	P															
013	01	75446271	1	1		PC FOAM SET	P															
0013 TOTAL LINES																						





The basic keyboard consists of 106 keyswitches or keystations (figure A-1). Each keyswitch outputs a code when the switch is pressed and when it is released. The code is unique to the keyboard and is not an ASCII code. These codes can be displayed during the resident diagnostic TEST 3 keyboard test. Table A-1 lists the codes for all keystations.

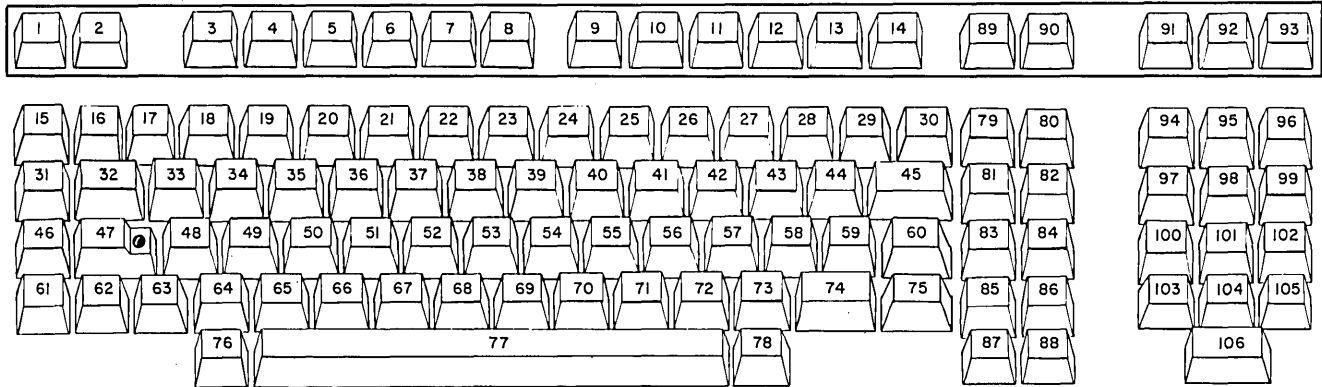


Figure A-1. Keystation Assignments

03942-II

On some keyboards, a keycap will cover more than one switch. In this case the code for both is generated (figure A-2) when the keycap is pressed (the last received is shown).

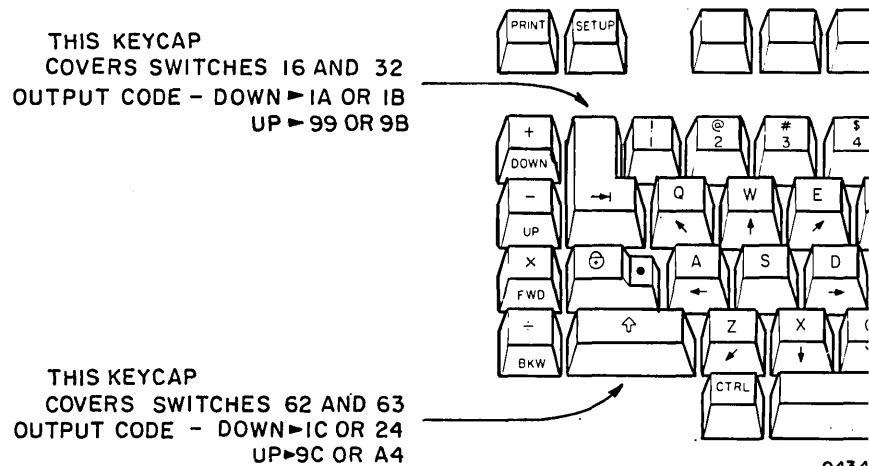


Figure A-2. Keycap, Keyswitch and Output Code Relationship

TABLE A-1. KEYSTATION OUTPUT CODES

KEY STATION NUMBER	OUTPUT CODE	
	DOWN	UP
1	10	90
2	18	98
3	20	A0
4	28	A8
5	30	B0
6	38	B8
7	40	C0
8	48	C8
9	50	D0
10	58	D8
11	60	E0
12	68	E8
13	70	F0
14	78	F8
15	11	91
16	19	99
17	21	A1
18	29	A9
19	31	B1
20	39	B9
21	41	C1
22	49	C9
23	51	D1
24	59	D9
25	61	E1
26	69	E9
27	71	F1
28	79	F9
29	7E	FE
30	76	F6
31	13	93
32	1B	9B
33	23	A3
34	2B	AB
35	33	B3
36	3B	BB
37	43	C3
38	4B	CB
39	53	D3
40	5B	DB
41	63	E3
42	6B	EB
43	73	F3
44	7B	FB
45	7F	FF
46	12	92
47	1A	9A
48	22	A2
49	2A	AA
50	32	B2
51	3A	BA
52	42	C2
53	4A	CA
54	52	D2
55	5A	DA

KEY STATION NUMBER	OUTPUT CODE	
	DOWN	UP
56	62	E2
57	6A	EA
58	72	F2
59	7A	FA
60	67	E7
61	14	94
62	1C	9C
63	24	A4
64	2C	AC
65	34	B4
66	3C	BC
67	44	C4
68	4C	CC
69	54	D4
70	5C	DC
71	64	E4
72	6C	EC
73	74	F4
74	7C	FC
75	66	E6
76	25	A5
77	2D	AD
78	35	B5
79	6E	EE
80	36	B6
81	77	F7
82	6F	EF
83	5F	DF
84	55	D5
85	5D	DD
86	56	D6
87	45	C5
88	4D	CD
89	7D	FD
90	75	F5
91	6D	ED
92	37	B7
93	1D	9D
94	16	96
95	1E	9E
96	26	A6
97	17	97
98	1F	9F
99	27	A7
100	4F	CF
101	47	C7
102	3F	BF
103	4E	CE
104	46	C6
105	3E	BE
106	3D	BD

The CC63X display terminal has a terminal installation parameter that allows the installer or operator to move the raster left or right and/or up or down. This allows for correction of raster drift due to CRT aging. At the factory, the parameter values are set at zero (no displacement) before the vertical and horizontal centering alignments are made to the monitor board. As the CRT ages, the customer or operator can use this parameter to center a raster that has started to drift.

Before any monitor board adjustments are made in the field, the parameter values or displacement values must be set at zero. Proceed as follows to check the present parameter values and zero if necessary.

1. Power on the terminal (procedure 1), if not already power on.
2. Pull out the TEST switch.
3. Press RESET switch (initiate TEST1).
4. When the MODE SELECTION MENU appears on the screen, push the TEST switch in.
5. Press CTRL and SETUP keys. This will display terminal installation parameters. (See figure B-1.)

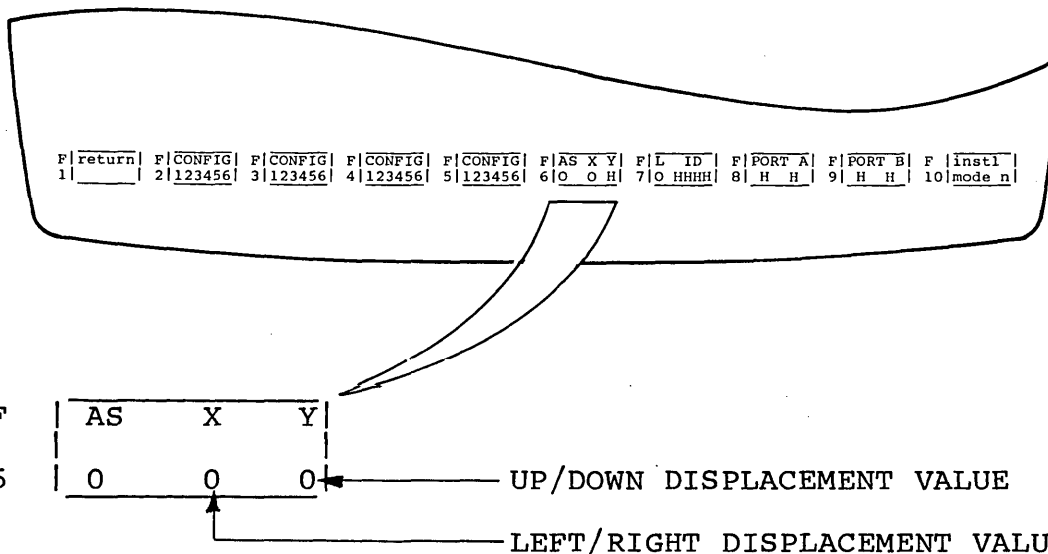


Figure B-1. Terminal Installation Parameters

6. Locate the sixth block (F6) from the left. Note the entry directly under the letter X and Y and do the following as applicable.
  - If entry in X = 0 or 4 AND Y = 0 or 8, press F1 key and return to alignment procedure.
  - If entry in X  $\neq$  0 or 4 OR Y  $\neq$  0 or 8, proceed with the next step.
7. Press F6 key to advance cursor into block 6. Then use the space bar to advance cursor under X. If cursor is advanced too far, backspace cursor with Backspace key ( $\leftarrow$ ).
8. Press 0 (zero) key.
9. Use the space bar to advance cursor under Y. Then, press 0 (zero) key.

NOTE

At this point, both X and Y displacement value should be 0 (zero).  
If they are not, repeat steps 7-9.

10. Press COPY key. This writes the entry into a nonvolatile memory and changes alignment.
11. Press F1 key and return to alignment procedure.

COMMENT SHEET

MANUAL TITLE: CC63X Display Terminal Hardware Maintenance  
Manual (Service Center and On-site Information)

PUBLICATION NO.: 62940034

REVISION: G

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COMPANY: \_\_\_\_\_

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