

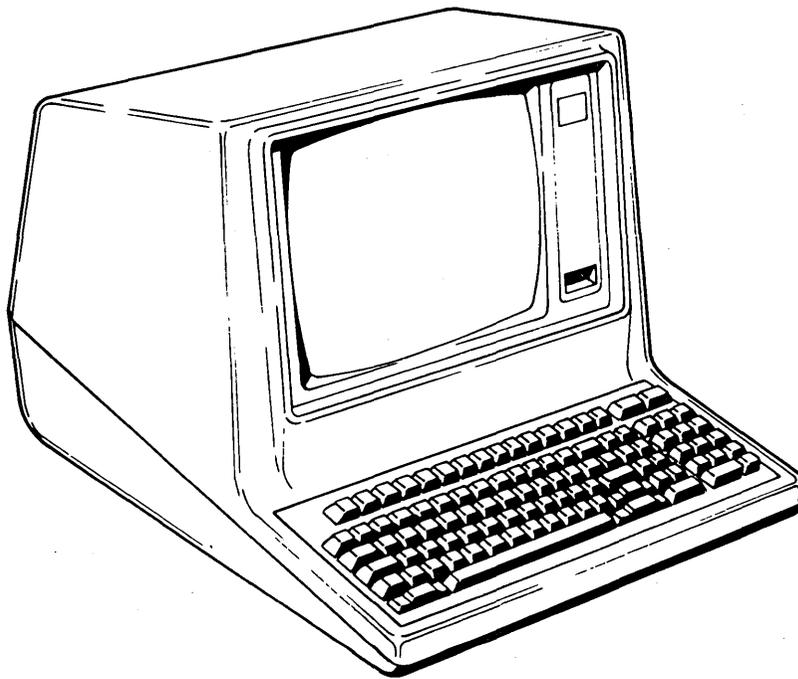
**Certainty® 610 Series
Display Station Subsystems**



62947918

**CDC® 80610-10, 80610-11, 80610-12, 80610-14,
80610-15, AND 80610-16
DISPLAY STATION SUBSYSTEM**

**HARDWARE MAINTENANCE MANUAL
(Site Information)**



80610-10,-11,-12,-14,-15, AND -16 HARDWARE MAINTENANCE

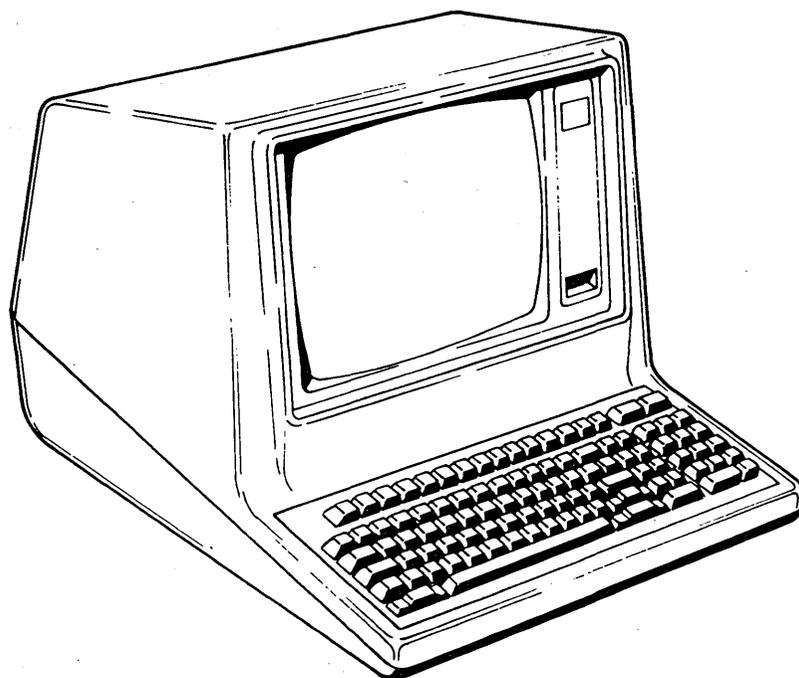
**Certainty® 610 Series
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**HARDWARE MAINTENANCE MANUAL
(Site Information)**



80610-10,-11,-12,-14,-15, AND -16 HARDWARE MAINTENANCE

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 ECO or 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. This correlation sheet also corresponds to the following manual(s) at their indicated revision levels:

Pub. No. _____ Rev. _____ Pub. No. _____ Rev. _____

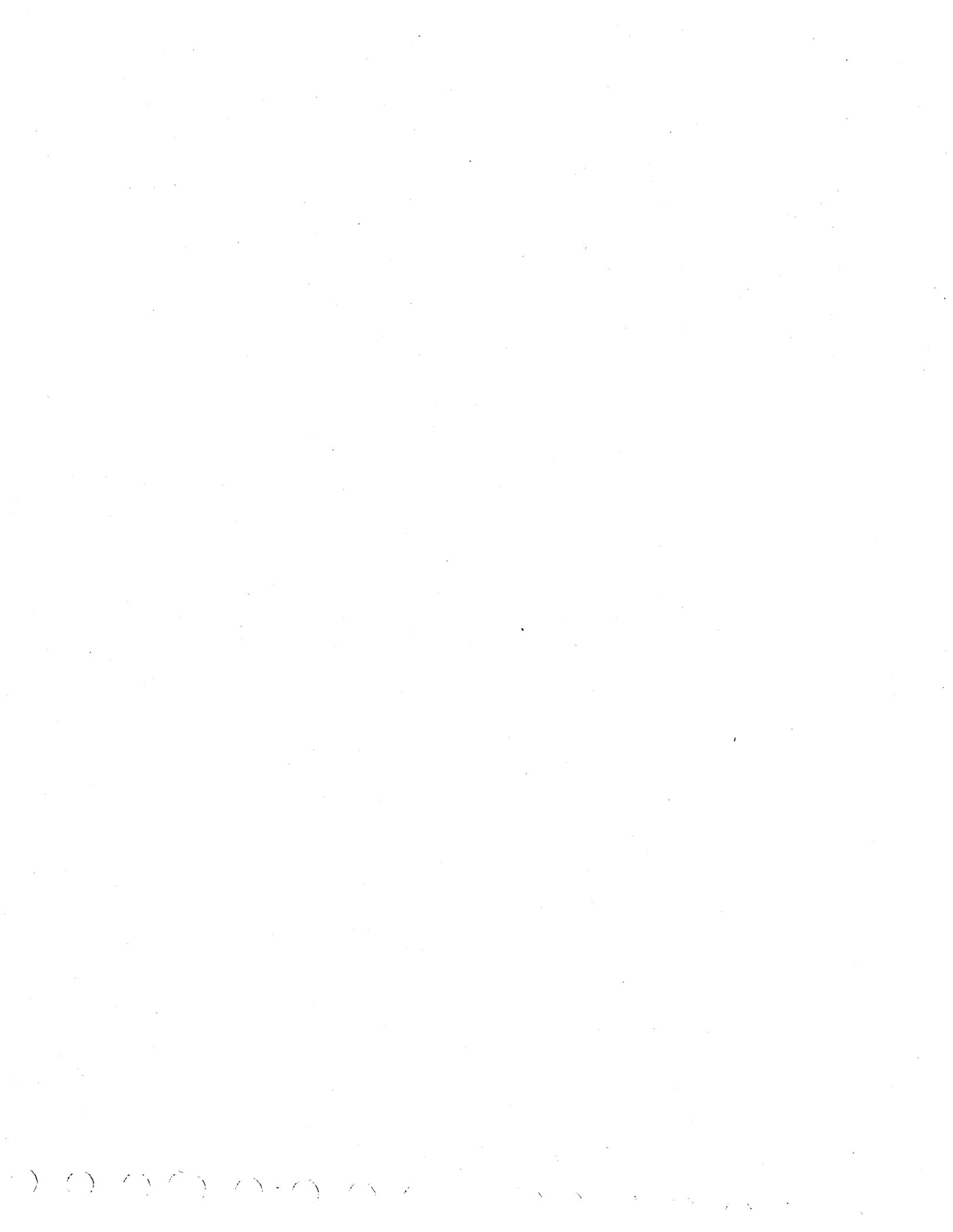
EQUIPMENT TYPE	SERIES	WITH FCO'S	COMMENTS
CC626-A	01	13611	13811 (ECO inacted update)
	02		
	03	14013	
	04	14327	
	05		
CC626-B	01		
CC626-C	01	13611	13811 (ECO inacted update)
	02		
	03	14013	
	04	14327	
	05		
CC626-D	01		
CC626-E	01		
CC626-G	01		
FH501-A	01	13584	FCO 0973 is common to ECOS 00973, 01094, and 01141, and updates the field units to series 03. FCO 01424 is a selective FCO.
	02	00973	
	03	00973	
	04	01424	
	05		

EQUIPMENT TYPE	SERIES	WITH FCO'S	COMMENTS
FH501-B	01		
MA452-H	01 06 07	--- ---	01213 (ECO inacted update) 01448 (ECO inacted update)
SPO 89610-1			

LIST OF EFFECTIVE PAGES

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1-2	B	3-27	A	SAM 4210-3	A	E-16	E		
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2-2	A	3-29	A	SAM 4210-5	A	Comment			
2-3	A	3-30	A	SAM 4220-1	A	Sheet	E		
2-4	A	3-31	A	SAM 4220-2	A				
2-5	D	3-32	A	SAM 4220-3	D	Mailer	-		
2-6	C	3-33	A	SAM 4220-5	A				
2-6.1/2-6.2	C	3-34	D	SAM 4220-6	D	Cover	-		
2-7	C	3-35	B	SAM 4220-7	D				
2-8	D	3-36	B	SAM 4230-1	B				
2-9	D	3-37	B	SAM 4230-2	B				
2-10	B	3-38	B	SAM 4230-3	A				
2-11	B	3-39	B	SAM 4230-4	D				
2-12	B	3-40	B	SAM 4230-5	A				
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3-3	A	4-2	D						
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3-5	A	4-4	D	C-2	E				
3-6	A	4-5	D	C-3	D				
3-7	A	4-6	E	C-4	D				
3-8	A	4-7	D	C-5	D				
3-9	A	4-8	D	C-6	D				
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				D-4	D				



PREFACE

This manual provides information to aid in the installation, checkout, and on-site maintenance of the CDC 80610-10, 80610-11, 80610-12, 80610-14, 80610-15, and 80610-16 Display Station Subsystems. Product and associated equipment number correlation is as follows:

<u>Product Number</u>	<u>Equipment Number</u>	<u>Description</u>
80610-10	CC626-A	60-Hz display station with data entry keyboard
	FH501-A	Attachment card assembly
80610-11	CC626-B	50-Hz display station with data entry keyboard
	FH501-A	Attachment card assembly
80610-12	CC626-E	Upgraded 60-Hz display station with data entry keyboard
	FH501-B	Upgraded attachment card assembly
80610-14	CC626-C	60-Hz display station with typewriter keyboard
	FH501-A	Attachment card assembly
80610-15	CC626-D	50-Hz display station with typewriter keyboard
	FH501-A	Attachment card assembly
80610-16	CC626-G	Upgraded 60-Hz display station with typewriter keyboard
	FH501-B	Upgraded attachment card assembly
	MA452-H	CDC BASIC diagnostic diskette (P/N 663088XX)

The nonglare filter screen (video filter CDC P/N 51918291) is a customer installed item and is not stocked at CEM. Installation and ordering information for the filter screen is contained in the display station subsystem reference manual.

Organization of this manual is divided into four major sections plus appendixes:

Section 1 - General Description

Section 2 - Installation and Checkout

Section 3 - Maintenance

Section 4 - Spare Parts Lists/Interconnect Diagrams

Appendix A - Diagnostic Aids

Appendix B - 80610-12 and 80160-16 Display Station Subsystem Upgrades

Appendix C - Remote Terminal Assistance (RTA)

Appendix D - Diagnostic Aids for 80610-12 and 80610-16 Display Station Subsystem, With RTA Established

Appendix E - Special Character Highlight Option for 80610-16 Display Station Subsystem

The structured analysis method (SAM) listings contained in appendix A may be removed from this manual and inserted in the left hand side of the associated IBM MAP/MIM maintenance logic manual (MLM) binder. The remaining sections of this manual may then be inserted in the right side of the same MLM. This allows for easy cross-referencing between the SAMs and associated procedures contained in section 3 of this manual when performing maintenance tasks.

Additional manuals providing reference, and component level hardware maintenance on the display station (including attachment card) are listed as follows: All manuals may be ordered from:

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

<u>Title</u>	<u>Publication Number</u>
80610-10, 80610-11, 80610-12, 80610-14, 80610-15, 80610-16 Display Station Subsystem Reference Manual	62947917
80610-10, 80610-11, 80610-12, 80610-14, 80610-15, 80610-16 Display Station Subsystem Hardware Maintenance Manual (Support Information)	62947919
Display Attachment Feature, (FH501A and FH501B), Hardware Maintenance Manual (Support Information)	62947921
Certainty Series System Test and Freelance Reference Manual	62947920

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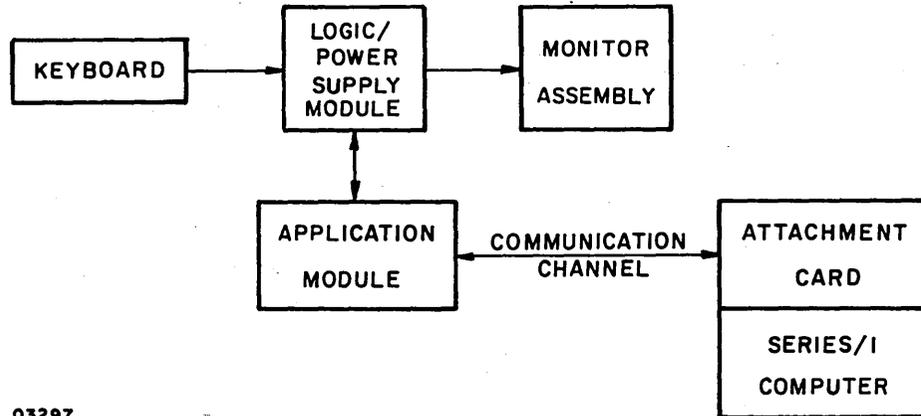
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The display station subsystem (hereafter called display station) is shown in block diagram form in figure 1-1. The display station is a locally controlled input/output device that interfaces to an IBM Series/1 computer via an associated attachment card (controller). The major elements of the display station are:

- Monitor Assembly - a crt video display device that uses a raster scan technique. Presents a horizontal scan of 300/360 lines in a noninterlaced mode at a vertical refresh rate of 50/60 Hz.
- Keyboard - Either a typewriter or data entry type keyboard using a nonencoded contact-closure key-array organized in an X-Y matrix configuration.
- Logic/Power Supply Module - A microprocessor controlled module that provides the internal timing for processing and display raster generation, control, refresh memory, character generation, and keyboard encoder logic. Also contains the power supply, rectifiers and regulators for the various internal dc voltages.
- Application Module - A microprocessor controlled module that provides a serial synchronous communication interface between the display station and the attachment card. All data transfers are in response to query commands from the attachment card.
- Attachment Card - Controls all data transfers on the communication channel and provides the interface to the Series/1 computer. The attachment card mounts in the Series/1 mainframe and communicates with the display station via I/O cable lengths up to 1000 ft (304.8 m), or 4000 ft (1219.2 m) at data rates of 125, or 62.5 kilobaud respectively.

Equipment specifications for the display station, excluding the attachment card, are listed in table 1-1. Refer to the display station subsystem reference manual for related specifications on the attachment card (see preface for publication number).



03297

Figure 1-1. Display Station Simplified Block Diagram

TABLE 1-1. EQUIPMENT SPECIFICATIONS

Characteristic	Specification
<u>Power Requirements (Nominal)</u> CC626-A/C CC626-B/D	120 V ac,* 60 Hz, at 0.82 A (82 W) max. 220 V ac,* 50 Hz, at 0.625 A (82 W) max. 240 V ac,* 50 Hz, at 0.625 A (82 W) max.
<u>Size/Mass</u> Height Width Depth Mass	14.65 in (372.1 mm) 16.65 in (422.9 mm) 21.0 in (533.4 mm) 37.5 lb (17.0 kg) uncrated 44.5 lb (20.2 kg) crated for shipment
<u>Temperature</u> Operating Nonoperating Change/Hr	50°F (10°C) to 105°F (40°C) -40°F (-40.4°C) to 158°F (70°C) 18°F (10°C)
<u>Relative Humidity</u> Operating Nonoperating Change/Hr	8% to 80% 5% to 100% No Condensation 10%
<u>Altitude</u> Operating/Nonoperating	-983 ft (-300 m) to 9850 ft (3000 m)
<u>Heat Dissipation</u> Air	79 W (270 Btu/h) max. Convection cooled.

*The following low primary voltage conditions may cause degradation of display quality, but the unit will remain operational.

- 96 to 104 V for 120 V units
- 176 to 190 V for 220 V units
- 192 to 208 V for 240 V units

This section provides information on packaging, installation, and checkout of the display station and associated attachment card.

PACKAGING

CAUTION

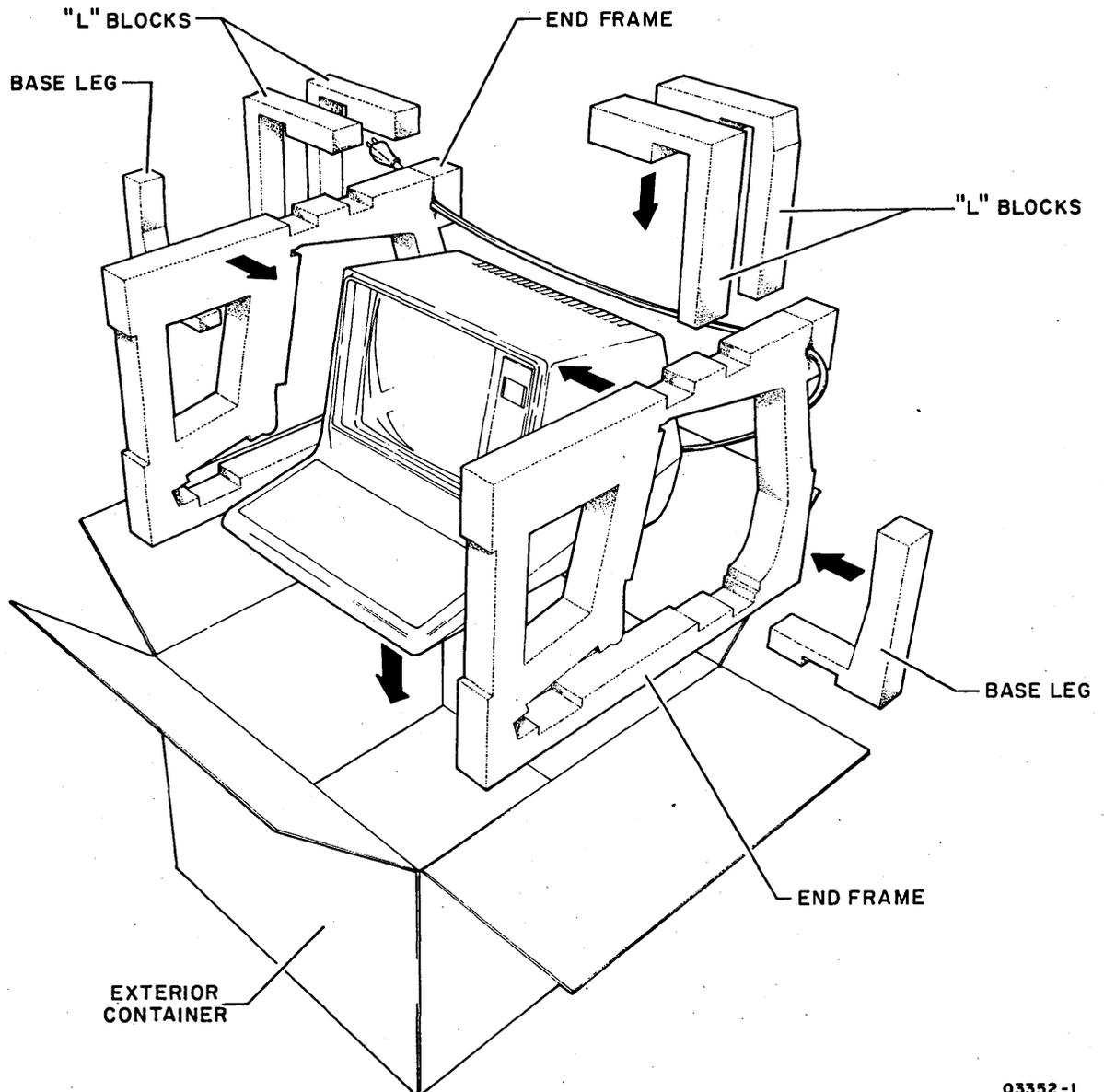
Observe MOS circuit handling precautions (para 3.0.1 section 3 of this manual) when packaging logic/power supply board, applications module, and/or attachment card.

The display station is packaged for shipment as shown in figure 2-1. The attachment card and I/O cable are packaged separately. If the display station is to be reshipped, it must be packaged as it was originally received from the factory. If the basic logic module is to be returned for repair, use the materials specified in the packaging instructions of figure 2-2. The applications module should be wrapped in metal foil to ensure static protection for the circuit elements and then packaged in the special padded envelopes designed for shipping circuit cards. The attachment card should be sealed in a moisture-proof bag, inserted in the special padded envelope, and then packaged in a cardboard container using packing material to cushion the card.

If the display station is to be configured using the special character highlight option, refer to appendix E for applicable installation instructions. Note that this option is only available on the 80610-16 Display Station Subsystem.

NOTES

1. USE PREFABRICATED SHIPPING MATERIALS (CDC P/N 41037500) FOR PACKAGING.
2. INTERLOCK FOAM BASE LEGS WITH END FRAMES.
3. PLACE END FRAMES WITH BASE LEGS ON DISPLAY STATION.
4. PLACE DISPLAY STATION WITH END FRAME CUSHIONING INTO EXTERIOR CONTAINER.
5. LOCK "L" BLOCKS IN POSITION (DONT LET PLUG DANGLE).
6. SECURE POWER CABLE IN SLITS OF END FRAMES.
7. CLOSE AND SEAL EXTERIOR CONTAINER WITH 3-in REINFORCED BOX SEALING TAPE.



03352-1

Figure 2-1. Display Station Packaging Instructions

NOTES

1. USE PREFABRICATED SHIPPING CONTAINER AND ANTI-STATIC BAG (CDC P/N 5912620) FOR PACKAGING.
2. PLACE LOGIC/POWER SUPPLY MODULE IN ANTI-STATIC BAG WITH MODULE HEAT SINK AT OPEN END OF BAG. SEAL BAG WITH TAPE.
3. PLACE BAG CONTAINING MODULE INTO CONTAINER WITH HEAT SINK FACING UP AND LOCATED AT HINGED END OF CONTAINER.
4. CLOSE CONTAINER AND SEAL WITH 3/4-in FILAMENT TAPE.

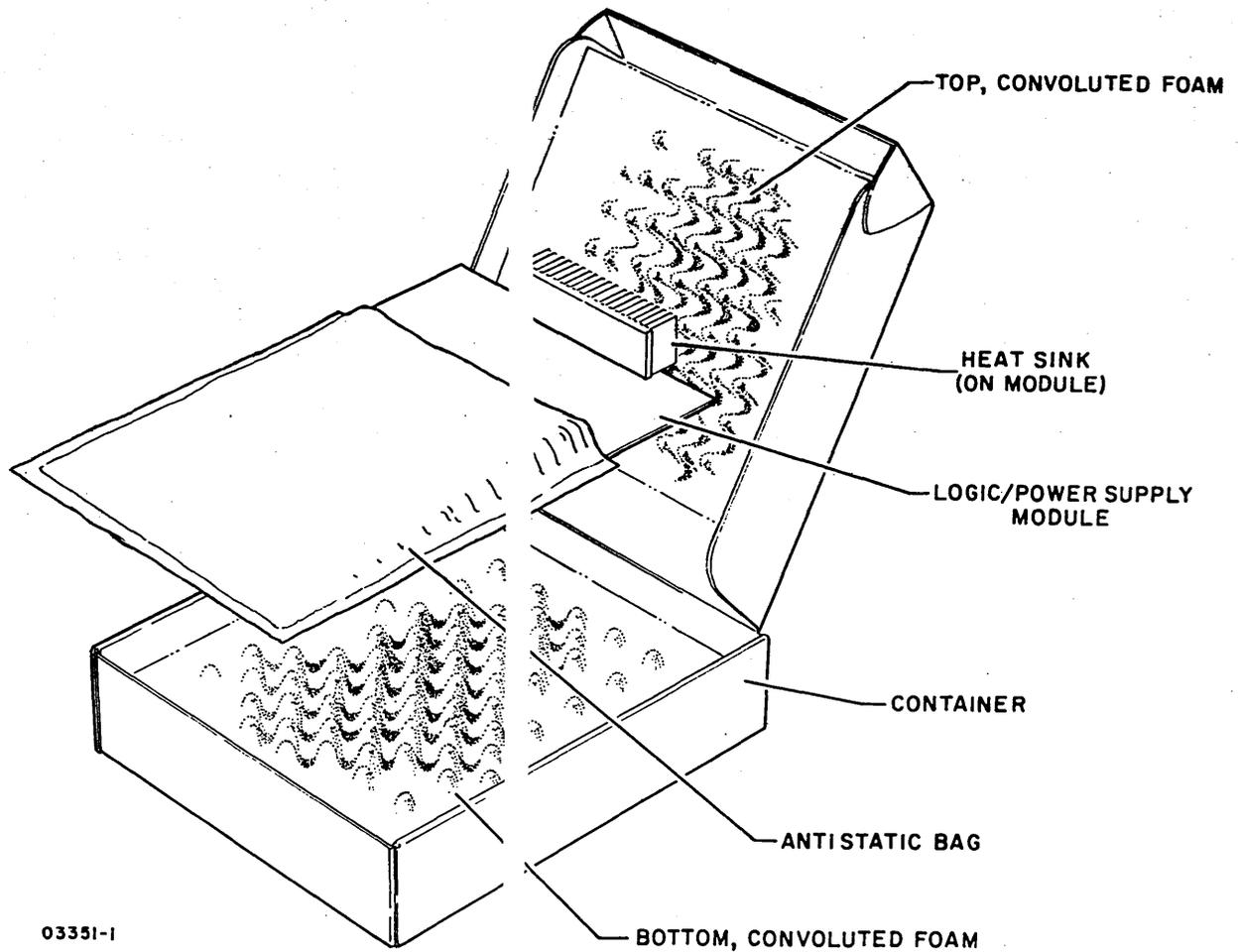


Figure 2-2. Logic/Power Supply Module Packaging Instructions

INSTALLATION

The following procedures describe installation of the display station, attachment card, and I/O cable. Paragraph numbers used in the steps refer to specific procedures contained in section 3 of this manual. Observe the following installation requirements:

- Check that enough cable slack is provided to allow moving the display station approximately 3 feet (1 meter) to permit servicing.
- Avoid direct sunlight on the display screen.
- Allow a 4-in (101.6 mm) minimum air space at top and sides of display station to provide adequate cooling.
- Avoid installing display station in areas of high electromagnetic interference. Such areas may exist near a radio-frequency source such as, radio transmitting antennas (AM, FM, TV, and two-way radio), radar (FAA and military), certain industrial machines (rf induction heaters, rf arc welders, and insulation testers), time clocks, certain electrical heating systems, and high-energy power lines.
- Avoid installing display station where particulate, liquid, and gaseous atmospheric contaminants exist (such as found in some process industries). Such environments can cause corrosion of copper and other metals that may result in electrical short circuits or contact failures.
- I/O cable should be separated from other electrical wiring (100 or 235 volts, 50 or 60 Hz) by a minimum of 2 in (50.8 mm). Unshielded, high-power, or high-energy wiring may require a larger separation. Cabling can be run in the same conduit as telephone lines.
- I/O cable runs, both horizontal and vertical, must be supported every 10 ft (3.05 m).
- To obtain I/O cables in excess of 50 ft (15.2 m), have customer contact the CDC marketing representative. Reference I/O cable assembly (CDC P/N 61408224) and I/O cable parts kit (CDC P/N 66307668).

DISPLAY STATION

Install the display station per the following:

1. Unpackage display station (refer to figure 2-1) and move to desired location.

2. Inspect for any shipping damage.
3. Observe the following note applicable to CC626-B/D display stations before plugging ac power cord into site outlet.

NOTE

Display stations configured for 195 to 268 V ac primary power operation (CC626-B/D) contain a voltage range selection jumper located on the transformer primary winding. If line voltage may vary between 195 and 246 V ac, the jumper must be placed in the LOW position. If the line voltage is between 216 and 268 V ac, the jumper must be in the NORMAL position. Refer to para 3.2 for hood removal.

Plug ac power cord into site outlet and apply power to display station (para 3.1). This causes execution of the self test feature (refer to para 3.0.5). The upper left corner of display should show a 20 followed by an underline (cursor). It may be necessary to adjust INTENSITY and CONTRAST controls (located at right front of unit) in order to view the characters.

NOTE

A 20 code is the normal stop when attachment card is not present. A display of 10, or 30, or no data, or no cursor indicates a detected error. Refer to SAM 4271 (appendix A of this manual) for corrective action.

4. Verify correct operation of keyboard by typing in characters and observing display on those displays supporting a 64 character set. Be sure to check for correct jumper position (on logic card) by attempting to display a lower case letter. If a letter can be displayed, then the display is jumpered for 96 characters and must be changed to the 64 character position before continuing. See figure 2-3 for location of jumpers.
5. Adjust INTENSITY and CONTRAST controls for optimum display quality.
6. Turn display station power off.

7. If customer desires inverse video (black characters on a light background) instead of normal video (light characters on a dark background) do the following:
 - a. Power off display station (para 3.1).
 - b. Remove display cabinet hood (para 3.2).
 - c. Remove monitor assembly hold-down screws and tilt monitor assembly to gain access to logic/power supply board (see figure 2-3.1).
 - d. Change position of Normal/Inverse jumper on logic/power supply board to select inverse video. Refer to figure 2-3.1 for jumper location.
 - e. Reinstall monitor assembly hold-down screws and replace cabinet hood.
 - f. Power on display station and adjust INTENSITY and CONTRAST controls for optimum display quality.

ATTACHMENT CARD AND I/O CABLE

Install the attachment card and I/O cable per the following:

1. Unpackage attachment card and I/O cable and visually inspect for any shipping damage.
2. Connect I/O cable to rear of display station and route to Series/1 computer.

NOTE

Installation of cables exceeding the following conditions are the responsibility of the customer as part of site preparation.

Cables up to 50 ft (15.24 m) in length are to be installed by the customer engineer as part of the normal display station installation provided:

- a. The cable is to be laid in one room under existing false flooring, or via an easily accessible cable route above the floor.
- b. No special modifications to the cable are required, this includes removal/installation of cable connectors.

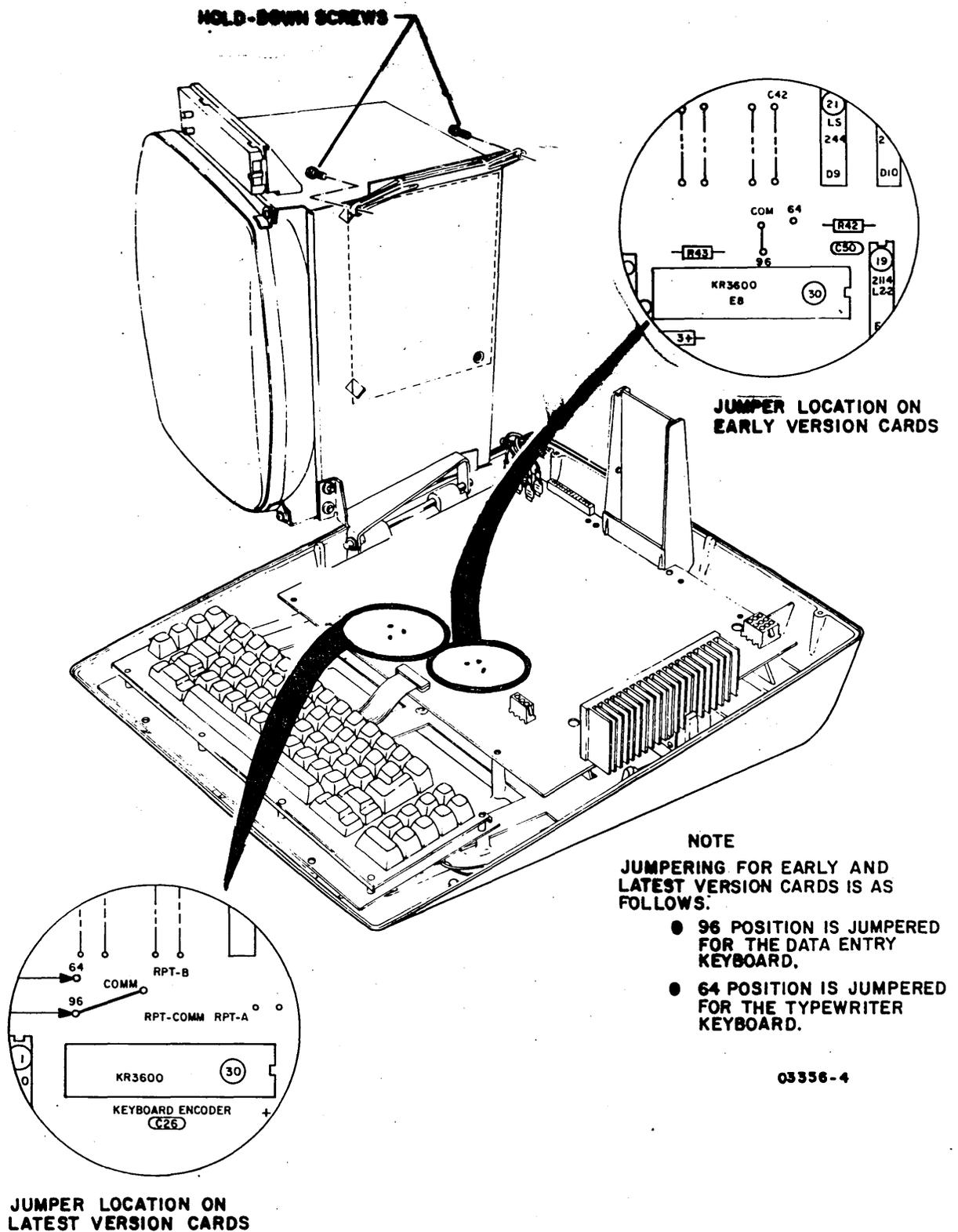


Figure 2-3. Character Set Jumper Locations



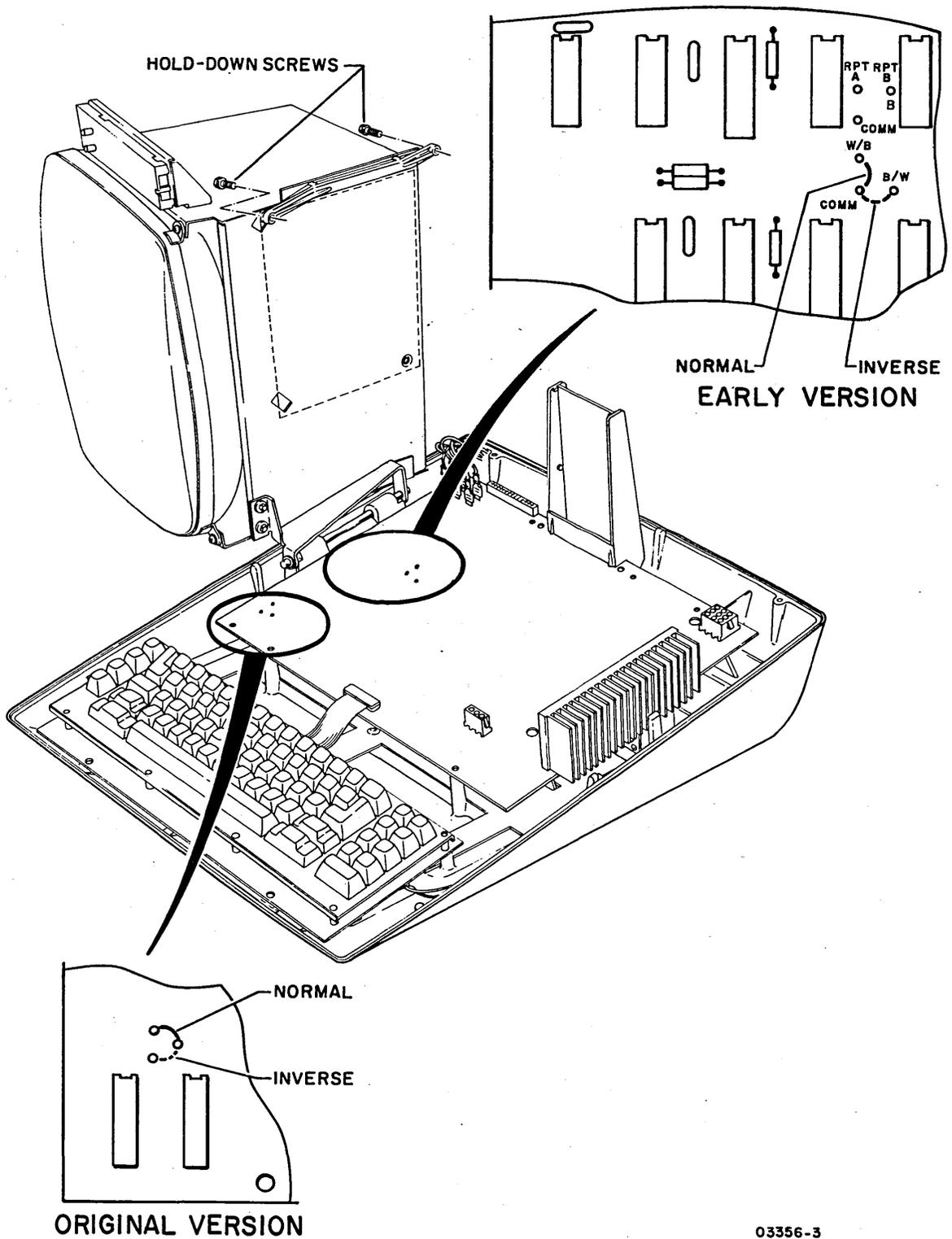


Figure 2-3.1 Normal/Inverse Video Jumper Locations

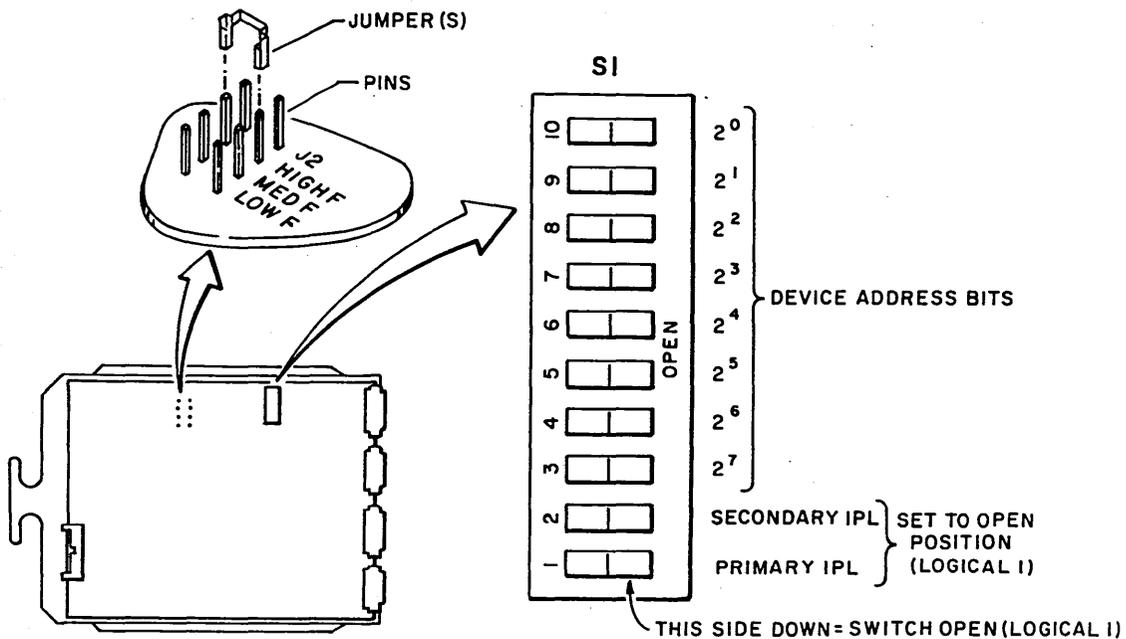
3. Determine from customer the required location of attachment card in the Series/1 (either Processor unit or Input/Output Expansion Unit) and required display station device address.

NOTE

Priority is established in order of placement from right to left within each chassis as viewed from the front. The Processor unit has higher priority than the I/O Expansion unit.

The attachment card requires -5 V for operation. This voltage is not present at card slot A of the Series/1 CPU (an exception is the 4952A which does have -5 V at this card location).

4. Set Primary and Secondary IPL switches (S1-1 and S1-2) to the open (logical 1) position as shown in figure 2-4.
5. Select required device address of display station by setting switches on the attachment card as shown in figure 2-4. For example, to select device address 04, set S1-8 (bit 2²) so that the open side of switch is pressed down (logical 1) and set switches S1-3 through S1-7 and S1-9 and S1-10 so that the closed sides are pressed down (logical 0).
6. Verify that attachment card is jumpered correctly for special PF keys and I/O cable length being used as follows:
 - J2 -- Normally not jumpered to disable PF7 through PF24 special program function keys on typewriter keyboard. Jumper to enable these key functions only if customer so requests. It is then customer's responsibility to contact a Control Data Corporation Marketing representative for support documentation.
 - HIGH F -- For up to 1000 ft (304.8 m) cable length
 - MED F -- For up to 4000 ft (1219.2 m) cable length
 - LOW F -- Not used
7. If Series/1 is currently being used for system operations, check with customer before turning off power. Then, power off Processor unit or I/O Expansion unit, as applicable, by pressing the associated Power On/Off switch.



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Figure 2-4. Device Address Selection Switches, Program Function Key and I/O Cable Length Jumpers (For 80610-10, 80610-11, 80610-14, and 80610-15 models. See appendix B for 80610-12 and 80610-16 models.)

8. Remove snap-on cover from front of Processor unit or I/O Expansion unit as applicable.
9. Open rear access door of Series/1 cabinet.
10. Route I/O cable through rear bottom of cabinet and clamp shield of cable to vertical side bracket of Series/1 frame using metal cable clamp provided. Clamp must firmly contact cable shield to provide proper grounding.
11. Install ground strap at end of I/O cable to ground terminal on top side of logic chassis.
12. From front of cabinet, loosen I/O cable retaining bracket located at top of Processor unit or I/O Expansion unit as applicable and route I/O cable connector to front of chassis. Retighten retaining bracket screws.
13. Install attachment card in logic chassis not more than two card locations away from any existing card.

NOTE

If installing attachment card between existing cards in either the processor or I/O expansion chassis that are separated by more than one open card slot, remove the Poll Propagate jumper (backpanel pins M11 and M12) from the location where the attachment card is to be installed. In some units, Poll Propagate jumpers may be installed even though an expansion chassis is not present. Refer to Poll Propagate Wiring in the applicable processor theory manual for additional information.

14. Attach I/O cable to front of attachment card.
15. Refer to figure 2-5 and perform overcurrent protection adjustment per the following as applicable:

NOTE

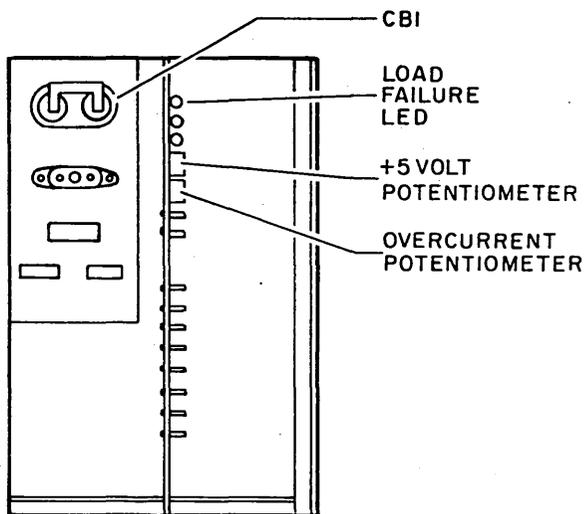
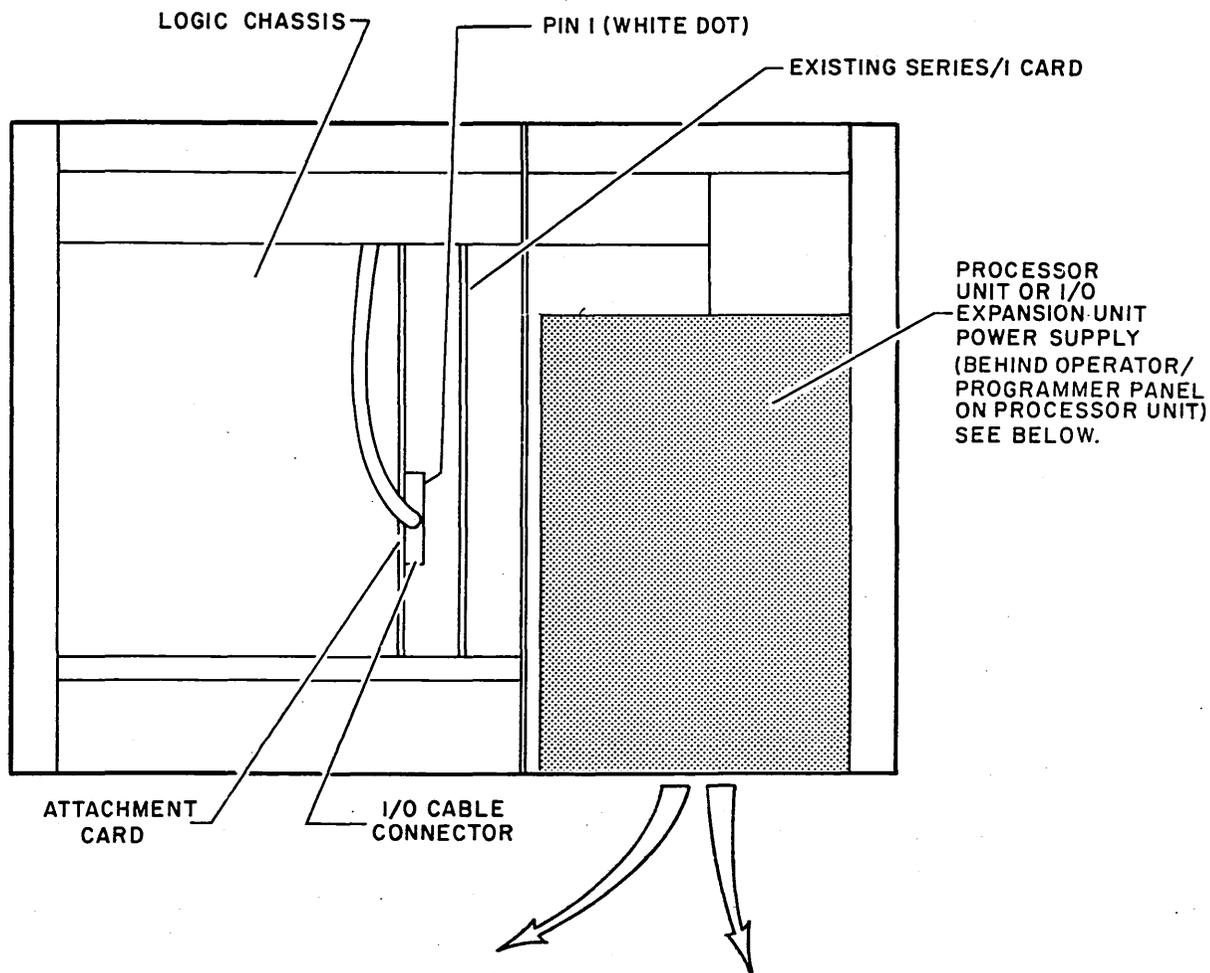
No overcurrent adjustment is required when installing attachment card in an IBM 4952-A.

- a. Apply power to Series/1 Processor unit or Input/Output Expansion unit (whichever unit attachment card was added).

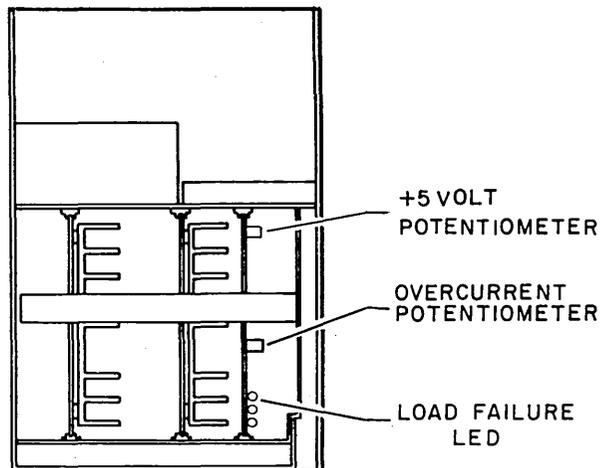
NOTE

If power does not come up; turn overcurrent adjustment potentiometer clockwise one full turn, press unit Power On/Off switch to Off position then to On position. Keep repeating the clockwise adjustment and power sequencing until power comes up. When power is up, proceed to step b.

- b. Turn overcurrent potentiometer slowly counterclockwise until power goes off. Then turn overcurrent potentiometer clockwise as follows:
 - 4953-A/C (125 watt supply) - Eight full turns clockwise.
 - 4953-B/D, 4955-A/B/Cd, and 4959 (300 watt supply) - Four full turns clockwise.
 - 4952-B, 4955-E (400 watt supply) - Seven full turns clockwise.



**400 WATT
POWER SUPPLY**



**125 OR 300 WATT
POWER SUPPLY**

02979-7

Figure 2-5. Overcurrent Potentiometer and Attachment Card Cable Locations

- c. Press Power On/Off switch to Off position, then to On position. This completes the overcurrent protection adjustment.

NOTE

If Check indicator on Series/1 operator/programmer panel lights following power application, it indicates that an error condition exists on the attachment card or a problem has developed in the Series/1. Replace attachment card and retry. If error persists, remove attachment card and retry to determine if problem is in the Series/1.

16. Verify correct setting of Minimum Load switch (4952-A units only) per the following:
 - a. Remove rear cover of power supply and lower hinged transformer box to view switch (see figure 2-6).
 - b. If four PC cards or less are installed in logic chassis, switch must be set to On (up) position.
 - c. If five or more PC cards are installed, switch must be set to Off (down) position.

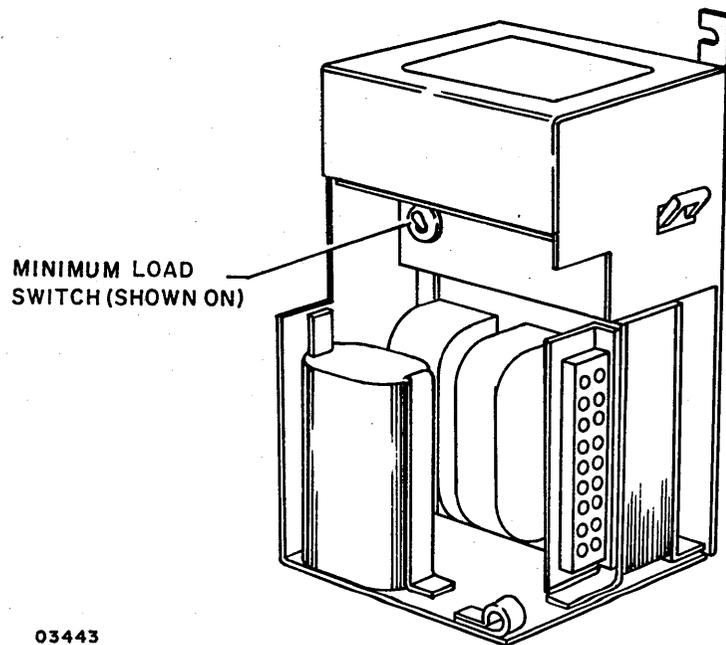


Figure 2-6. Minimum Load Switch Location (4952-A)

17. Check and adjust +5 V potentiometer on 4952, 4953, 4955, and 4959 units as follows (no adjustment is required on a 4952-A):

CAUTION

If probe tip touches a signal and voltage pin at the same time with power applied, a logic card will be damaged.

- a. Turn Series/1 power off and remove backpanel cover.
- b. Connect voltmeter to backpanel pins as follows (see figure 2-7 for backpanel pin configuration):
 - +5 V at A2D03
 - Ground at A2D08
- c. Apply power to Series/1 and adjust +5 V potentiometer (figure 2-5) for +5 \pm 0.5 V. Adjust as close to nominal as possible.
- d. Turn Series/1 power off, disconnect voltmeter, and replace backpanel cover.
- e. Reapply Series/1 power.

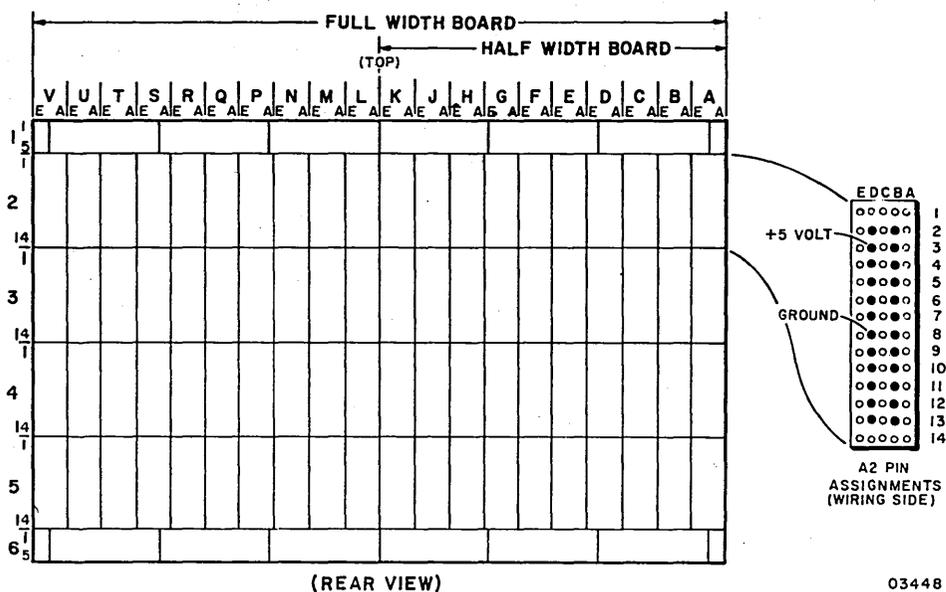
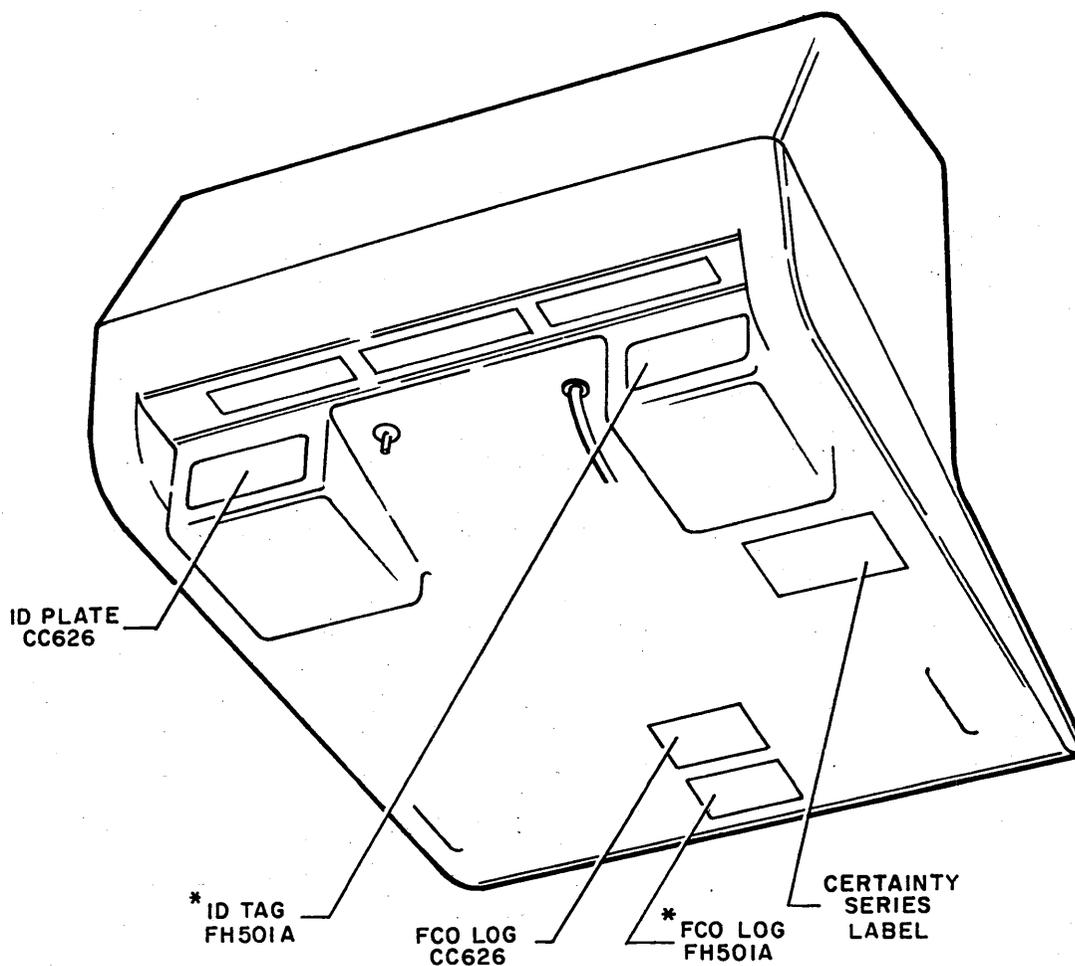


Figure 2-7. Backpanel Pin Configuration

18. Verify that red LED on attachment card is not lit (indicator stays on if power-on diagnostic error occurs). Replace attachment card if indicator remains lit.

19. Replace front snap-on panel on Series/1 cabinet and close rear access door.
20. Attach equipment identification plate and FCO log to display station per figure 2-8.
21. Replace display station hood.



* THE ATTACHMENT FCO LOG AND ID PLATE ADDED BY CE AT TIME OF INSTALLATION.

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Figure 2-8. Equipment Identification Plate and FCO Log Placement

CHECKOUT

When installation is complete, perform the following BASIC diskette configuration and display station/attachment card check-out procedures.

CDC BASIC DISKETTE CONFIGURATION

The display station must be added to the system configurator table on the applicable CDC BASIC diagnostic diskette. The configurator table on each diskette must as a minimum contain the configuration information for all devices to be tested by that diskette. The following procedure describes the steps to be used for updating the configurator table by either adding the devices individually, or by performing the configure system option (0C).

NOTE

The configurators on IBM diskettes do not recognize CDC devices. Therefore, do not attempt to use an IBM configurator to construct the configurator table on a CDC BASIC diskette. All CDC devices will be configured wrong in the table.

1. Apply power to flexible disk drive unit and install CDC BASIC diagnostic diskette CDC P/N 663088XX.

NOTE

The CDC BASIC diagnostic diskette has a preassigned alternate console selected for either a CDC 80610 display or an IBM 4979 display (AATT = 0442). The 80610 being installed should not be used as alternate console until checkout is complete.

2. Place IPL Source switch on Series/1 operator/programmer panel to Alternate or Primary position as applicable to enable loading from diskette.
3. Place Mode switch on Series/1 operator/programmer panel to Diagnostic position.
4. Press Load switch on Series/1 operator/programmer panel. This causes execution of IPL diagnostic residing on diagnostic diskette (execution time is approximately ten seconds). Go to step 4a, 4b, 4c, or 4d as applicable.
 - a. If an alternate console is assigned per the pre-configured diskette (see note of step 1), all messages should appear on assigned alternate console and on operator/programmer panel if present.

- If a configurator error message appears on screen of crt (3822 on operator/programmer panel), this signifies that configurator table does not match system configuration. Go to step 5 to update table.
 - If a secure customer interface message appears on screen of crt (382A on operator/programmer panel), go to step 11.
 - If any other message appears on crt screen (38XX on operator/programmer panel), this error must be corrected before continuing. Refer to para 3.18 for list of error halt codes.
- b. If an alternate console display device is present, but no message appears on crt screen, and an operator/programmer panel is not available, do the following to assign an alternate console:
- Install an existing diskette (IBM or CDC) that has an alternate console assigned correctly.
 - Press Load switch to IPL diskette.
 - When IPL is complete, message appears on crt screen. Remove diskette and install new diskette to be configured.
 - Enter B38F9 (menu will appear on screen).
 - Enter F02 to select the change program option.
 - Enter F38F1 (data set name).
 - Enter F3008 (start address).
 - Enter F0001 (word count).
 - Enter device address and device type of desired alternate console using format of FAATT where:
AA = device address.
TT = device type of alternate console as follows:
40 for a TTY device.
42 for either a CDC 80610 or an IBM 4979 display.
45 for an IBM 4978 display.

```

81  DISPLAY
E6  1310 MULTIFUNCTION
E8  1610 ACCA SL
E9  2092 ACCA ML
EA  2096 FPMLC

```

Switch settings for IBMs 3101 when installed to run diagnostics on alternate console

```

-----+
A SUPPORTED ALTERNATE
CONSOLE IS:                                AATT**
-----+-----+
1310 MULTIFUNCTION      @           AAE6
3101 DISPLAY            @           AA81
3101 DISPLAY ACCA SL   $           AA88
3101 DISPLAY ACCA ML   $           AA89
3101 DISPLAY FPMLC    @ &          AA8A
-----+-----+
TTY ATTACHMENT          %           AA40
-----+-----+

```

```

-----
** AA = CONSOLE DEVICE ADDRESS
** TT = CONSOLE DEVICE TYPE
-----

```

```

@ 3101 SWITCH SETTING CHECKLIST WHEN
  SUPPORTED BY FPMLC CURRENT INTERFACE,
  RFQ DQ2350 AND 1310 MULTI FUNCTION.
12345678 12345678 12345678 12345678
  X       X       X X      X X
X X      X

```

```

& 3101 SWITCH SETTING CHECKLIST WHEN
  SUPPORTED BY FPMLC WITH RS232C.
12345678 12345678 12345678 12345678
  XXX      X       X X      X X
X          X

```


- c. If a display or TTY is present, and a 3801 halt code appears in the register indicators of operator/programmer panel, but no message appears on crt screen, do the following to assign an alternate console:
- Enter (B),6,(I),(I) to continue.
 - Next halt code will be a 382A (secure customer interface), a 3822 (configuration errors on system), or a 382E (option table available for entry).
 - If a 382A halt code, secure customer interface and enter:
(B),6,(I),(I) to advance to 3822 or 382E.
 - If a 3822 halt code, enter:
(B),1F,(I),(B),0300,(I),(I) to advance to 382E.
 - If a 382E halt code, enter:
(B),1F,(I),(B),0400,(I),(I) to select alternate console option.
 - Next halt code will be a 3821 (enter alternate console device address and device type), enter:
(B),1F,(I),(B),AATT,(I),(I) where: AA = device address, and TT = device type. If a 3829 (no device) halt occurs, an entry error has been made. Enter: (B),6,(I),(I) to continue and reselect alternate console option.
 - Next halt code will be a 382E (option table is available for entry), enter:
(B),1F,(I),(B),0D00,(I),(I) to write new alternate console assignment on diskette.
 - Next halt code will be a 382C (copy configurator table to another diskette?), enter:
(B),1F,(I),(B),0500,(I),(I) to terminate.
 - A 3800 or 3805 halt code indicates completion of program terminate function.
 - Press Load switch to re-IPL. All messages should now appear on crt screen of assigned alternate console. Go to step 5 to update configurator table.
- d. If no alternate display or TTY console is present, and a 3801 halt code appears in indicators of operator/programmer panel, perform the following steps to change configurator table manually or through use of configure system option (0C) via the operator/programmer panel:

- Enter (B),6,(I),(I) to continue.
 - Next halt code will be a 382A (secure customer interface), a 3822 (configuration errors on system) or a 382E (option table available for entry).
 - If a 382A halt code, secure customer interface and enter:
(B),6,(I),(I) to advance to 3822 or 382E.
 - If a 3822 halt code, enter:
(B),1F,(I),(B),0300,(I),(I) to advance to 382E.
 - If a 382E halt code, enter:
(B),1F,(I),(B),0400,(I),(I) to select assign alternate console option.
 - Next halt code will be a 3821 (enter alternate console device address and device type), enter:
(B),1F,(I),(B),0000,(I),(I) to assign operator/programmer panel as alternate console.
 - Next halt code will be a 3832 (operator/programmer panel is the assigned alternate console).
 - Enter (B),6,(I),(I) to continue.
 - Next halt code will be a 382E (option table is available for entry), enter:
(B),1F,(I),(B),0D00,(I),(I) to write new alternate console assignment on diskette.
 - Next halt code will be a 382C (copy configurator table to another diskette?), enter:
(B),1F,(I),(B),0500,(I),(I) to terminate.
 - A 3800 (ready) halt code indicates system is ready for any valid input. Go to para 3.17.1 to update configurator table manually, or to para 3.17.2 to perform configure system option (0C).
5. Enter F03 and press ENTER key on keyboard of assigned alternate console to display option table.
 6. Enter F0B to bypass option table display.
 7. Skip steps 8 through 15 if configurator table is to be updated manually and go directly to step 16.
 8. Enter F0C to select configure system option and follow series of prompts on alternate console display. The new configurator table will automatically be written onto the diskette.

9. An option to write the configurator table on another diskette or to terminate then appears on the crt screen. Terminate by entering F05. A PT RDY ENTER then displays on the crt screen.
10. Enter B38F0 to display option table.
11. Enter FOB to bypass option table display.

NOTE

Some CDC and IBM devices have the same device read ID codes assigned. The configure system option assigns CDC device types to all IBM devices that have the same read ID code as the CDC devices. These IBM devices must be manually changed in the configurator table. Also, if a CDC 80230 or 80240 mini module drive having a read ID of 3007 is present in the configurator table, the device type must be changed from 70 to 72. To determine which device types in the table require changing, enter F09 (Print System Equipment) to display all system devices contained. Compare this listing with customer equipment list to determine which device types to change.

12. Enter F01 to display configurator table.
13. Enter F03 to select modify option.
14. Enter correct device type for each table entry to be modified by following the prompts on alternate console. Refer to table 2-1 for device type assignments.
15. Go to step 19.
16. Enter F01 to display configurator table.
17. Enter FOA (add option), F02 (delete option), F03 (change option), or any other desired option from option table as applicable to make changes or additions to configurator table.

TABLE 2-1. IBM/CDC DEVICE TYPE ASSIGNMENTS

READ ID	IBM PRODUCT/DEVICE TYPE		CDC PRODUCT/DEVICE TYPE	
0406	4979	44	80610	42
0206	4974	64	80420	62
0106	4964	48	80210	46
00AA	4962	78	80230	72
00CA	4962	78	80230	72
0306	4973	68	80450	66
3X06	4963	7A	80280	73

18. Enter display station device parameters per the following format as applicable and press ENTER key.

F XX42 0000 0406 0000 0000 0000 0000 0406

Device Type

Device Address (use address that was established during display attachment card installation)

Read ID

Response to preceding input is:

FUNCTION
ENTER

NOTE

Configuration information for all other CDC devices contained in the system may be entered at this time. Refer to the applicable site maintenance information manual for individual device entry parameters.

19. Enter F01 and press ENTER key to display configuration table. Verify that these parameters were correctly entered.

20. Enter F0D and press ENTER key to write the new configuration information on diskette. If additional diskettes are to be written, install diskette and repeat this step for each diskette.
21. Enter F05 to terminate program. A PT ENTER message indicates that terminate function has completed.

DISPLAY STATION/ATTACHMENT CARD CHECKOUT

Perform the following steps to checkout the display station and attachment card.

NOTE

This procedure assumes that a flexible disk drive and Series/1 operator/programmer panel are attached to the system. It also assumes that the system configuration information including the display station has been written on to the BASIC diagnostic diskette.

1. Apply power to display station (para 3.1). Screen should clear except for a cursor in the upper left corner. This indicates successful completion of the self-test routine (para 3.0.5). If a 20 followed by the cursor appears instead, press Reset switch (if present) otherwise press Load switch on operator/programmer panel. If the 20 code remains, refer to SAM 4271 (appendix A of this manual) for corrective action.
2. Apply power to flexible disk drive unit and install CDC BASIC diagnostic diskette.
3. Place IPL Source switch on Series/1 operator/programmer panel to Alternate or Primary position as applicable to enable loading from diskette.
4. Place Mode switch on Series/1 operator/programmer panel to Diagnostic position.
5. Press Load switch on Series/1 operator/programmer panel.

NOTE

This causes execution of the IPL diagnostic residing on the diagnostic diskette. Assuming no errors are detected, IPL completes in approximately 10 seconds. This is indicated by a RDY ENTER message being displayed on the crt screen of the alternate console (if used) and by a 3800₁₆ halt code being displayed in the register indicators of the operator/programmer panel. If the computer stops with any other code displayed, refer to para 3.18 (section 3 of this manual) for corrective action.

If a combination of both IBM and CDC devices having identical ID codes are configured on the same BASIC diagnostic diskette (either an IBM or CDC diskette), the following configuration error will occur:

- On display screen: CONFIG ERROR -
TABLE DEVICE TYPE VS TABLE READ ID
- On operator/programmer panel: Halt
code 3842 (configuration error)

This error should be ignored. It is the result of both the IBM and CDC devices having the same read ID code.

6. After successful completion of the IPL diagnostic, enter test number B4200 to select and execute display station auto diagnostics per the following as applicable.
 - a. Using alternate console display station, enter B4200 and press ENTER key (or CR key on TTY).
 - b. Using operator/programmers panel.
 - Press Data Buffer switch
 - Enter B via register input switches
 - Press Console Interrupt switch
 - Press Data Buffer switch

- Enter 4200 via register input switches to select display station auto diagnostics
- Press Console Interrupt switch twice (this executes all display station auto diagnostics in succession).

NOTE

Execution time is approximately 1/2 minute. During test execution, Run indicator lights, test number displays on alternate console crt and in alternate console register indicators of operator/programmer panel. Successful completion is indicated by code 3805 being displayed in the indicators and PT ENTER on the alternate console crt. If diagnostics stop with any other code being displayed, refer to failing step number of applicable SAM (same as test number) indicated in error message (or indicators*) for corrective action.

If diagnostics end abnormally with no message or a meaningless abort message, retry the auto tests. If the problem persists, reseal/replace attachment card. Verify switch settings and jumper placement per attachment card installation procedure, this section.

7. Enter and execute the following manual display station diagnostic test per accompanying procedure.

4230 Keyboard Test

- a. Using alternate console display/keyboard, enter B4230 and press ENTER key (message on crt indicates test number in progress, successful completion, detected error, or that display station input is required to exercise the test).

*Indicators show test number. If using operator/programmer panel, press Stop switch, Level 3 switch, then R0 register switch to display step number in indicators.

- b. Using operator/programmers panel (refer to para 3.19 in section 3 of this manual for additional information).
 - Press Data Buffer switch.
 - Enter B via register input switches.
 - Press Console Interrupt switch.
 - Press Data Buffer switch.
 - Enter manual test number 4230 via register input switches.
 - Press Console Interrupt switch twice (initiates test execution and generates prompts for operator input at display station necessary to exercise test).
8. Run CDC System Test and Freelance (diskette P/N 663092XX) to verify correct system operation.
9. Leave display station reference manual for use by customer.

This section of the manual provides information necessary to perform on-site maintenance of the display station. The maintenance information covers location, adjustment, repair, and replacement of FRUs (Field Replaceable Units) as directed by the associated SAMS (Structured Analysis Method of troubleshooting) for the display station. The major paragraph groups are:

- 3.0 General Maintenance Information -- Contains information that maintenance personnel should be familiar with before doing maintenance.
- 3.1 through 3.15 and 3.20 -- Contain specific remove/replace/adjust/repair procedures for each FRU.
- 3.16 and groups thereafter -- Provide a summary of pertinent MAP10 Diagnostic Service Guide information as it applies to the display station.

3.0 GENERAL MAINTENANCE INFORMATION

3.0.1 MOS Circuit Handling Precautions

The logic/power supply board, applications module, and attachment card contain MOS (metal-oxide semiconductor) integrated circuits. The MOS circuits are susceptible to irreparable damage if they are exposed to excessive static electricity, and therefore require special handling. The following precautions should be followed at all times when handling the PC boards.

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

WARNING

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

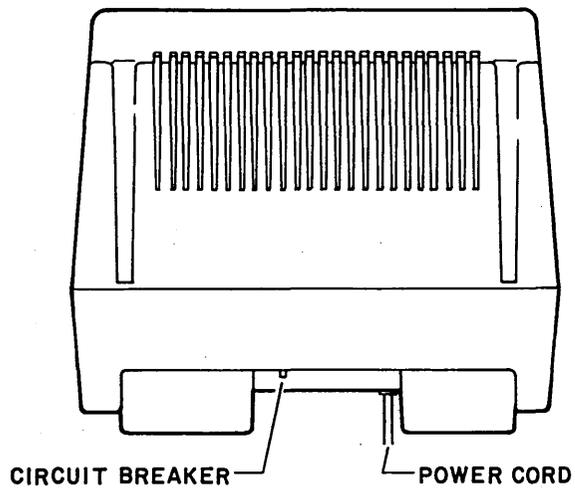
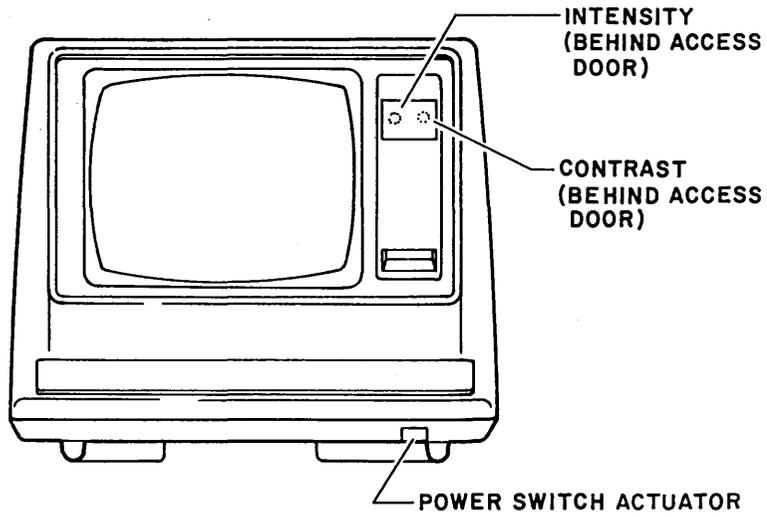
- Before touching (with hands and/or tool), or handling any circuit, always touch hand(s) and/or tool to an exposed portion of the associated chassis frame to equalize potentials (bleed off any possible static charge from your hands and/or tool onto the ground level chassis).

- Especially in dry ambient air, any movement may cause static electricity buildup due to friction. In the case of shuffling one's feet across a dry carpet, such static buildup can be quite high and may easily jump from a cable connector being held onto the pins being mated. This could damage the MOS circuits within the equipment. Therefore, the chassis frame must always be touched immediately before connecting any cable to it.
- When removing, replacing, or otherwise handling any assembly/module that contains MOS circuits, do not touch circuit paths or conductors if at all possible. Do not carry a MOS circuit assembly across a room while touching its circuits.
- When a module is removed and placed where it may be touched, carried to some other location, or if it is to be shipped, the module should be wrapped in static protective material, such as aluminum foil or conductive foam.

3.0.2 External Controls

The function of the external controls is as follows. Refer to the accompanying illustration for location of these controls.

- Power On/Off actuator - controls application of ac input power to the display station. Power is applied by pulling the switch lever forward (orange marker visible). Power is removed by pushing the switch lever in. Power application automatically initiates the self-test feature (para 3.0.5).
- Circuit breaker - provides overload protection for the display station. The circuit breaker is thermally actuated and when tripped (circuit open) a red plunger is extended. The circuit breaker is reset by pressing the plunger.
- INTENSITY control - provides for video intensity adjustment to compensate for various ambient lighting conditions.
- CONTRAST control - provides for adjustment of intensity variation between normal displayed characters, reduced intensity characters, and the background raster.



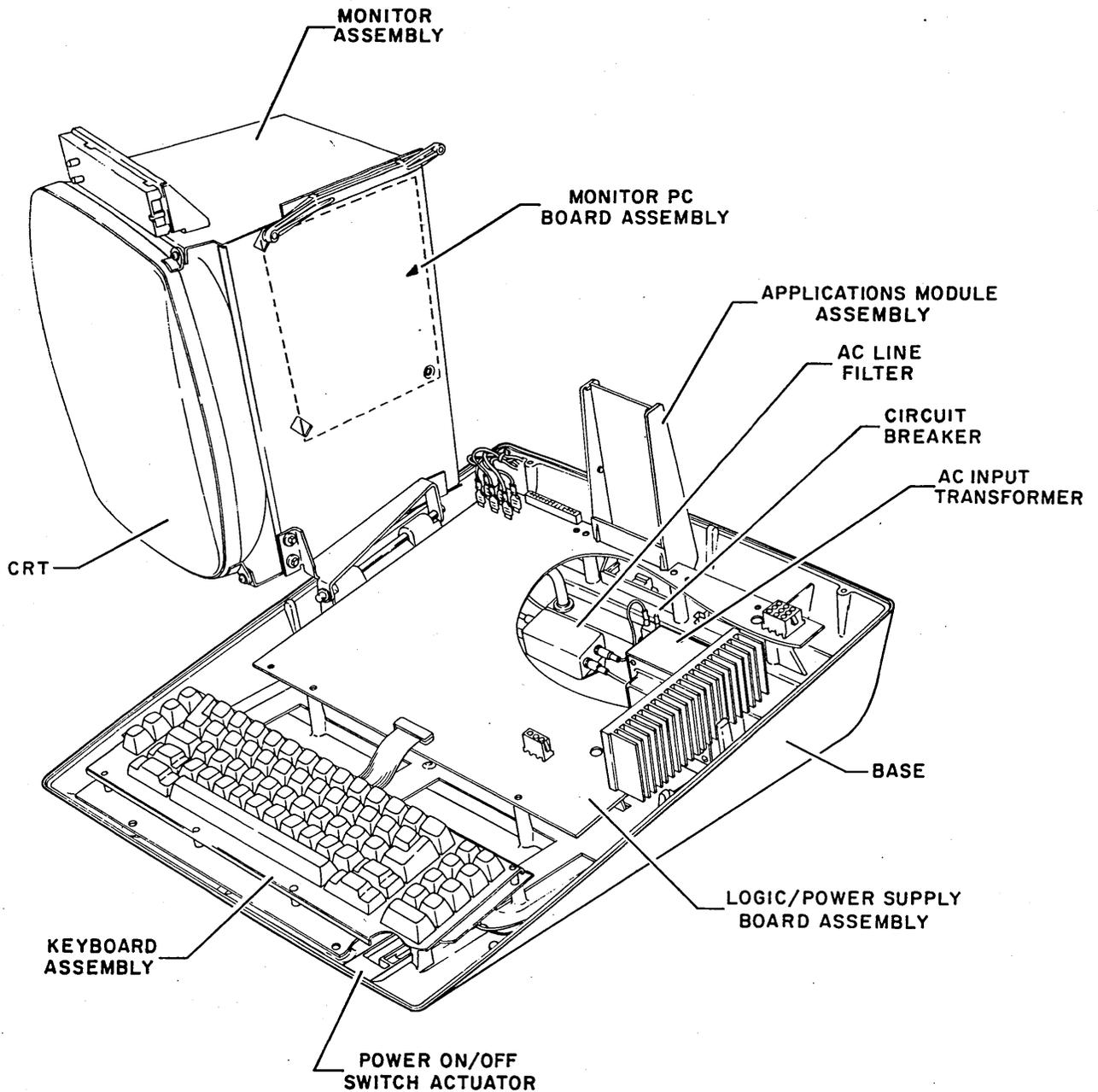
03299-1

External Control Locations

INTENTIONALLY BLANK

3.0.3 Internal Location of Major Assemblies

The accompanying illustration shows the location of the major assemblies within the display station.



03356-1

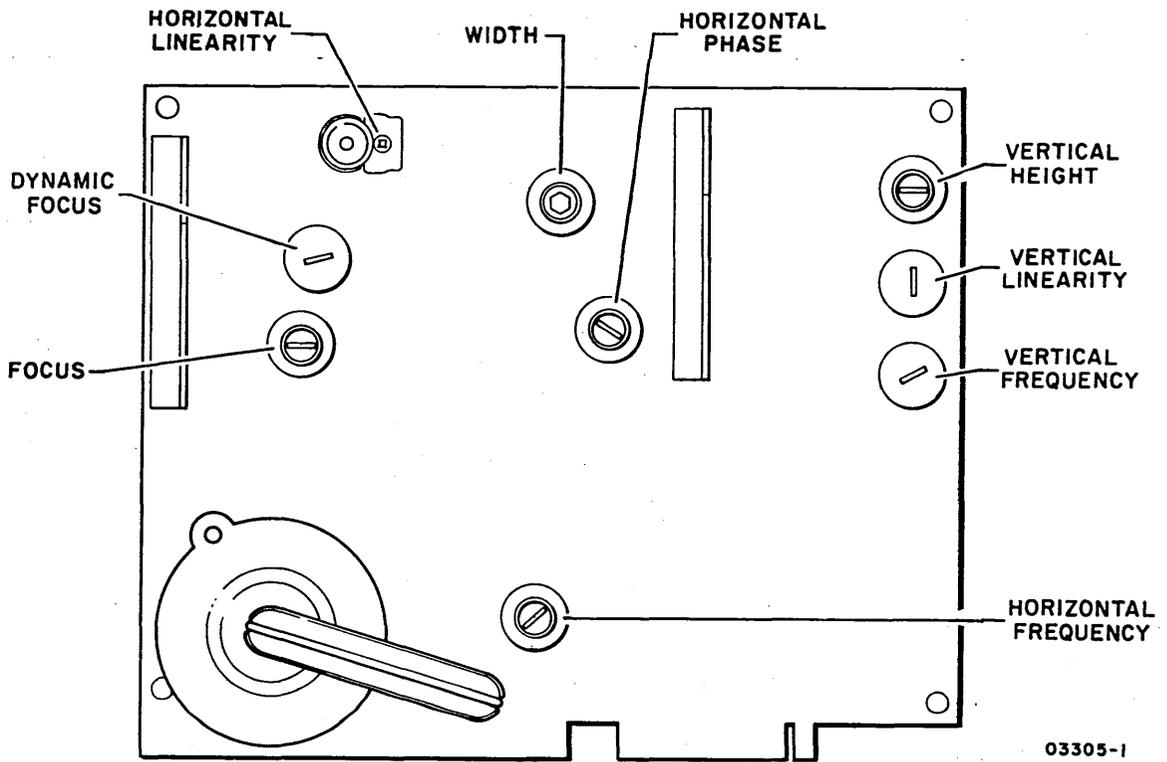
Location of Major Assemblies

3.0.4 Internal Controls and Fuses

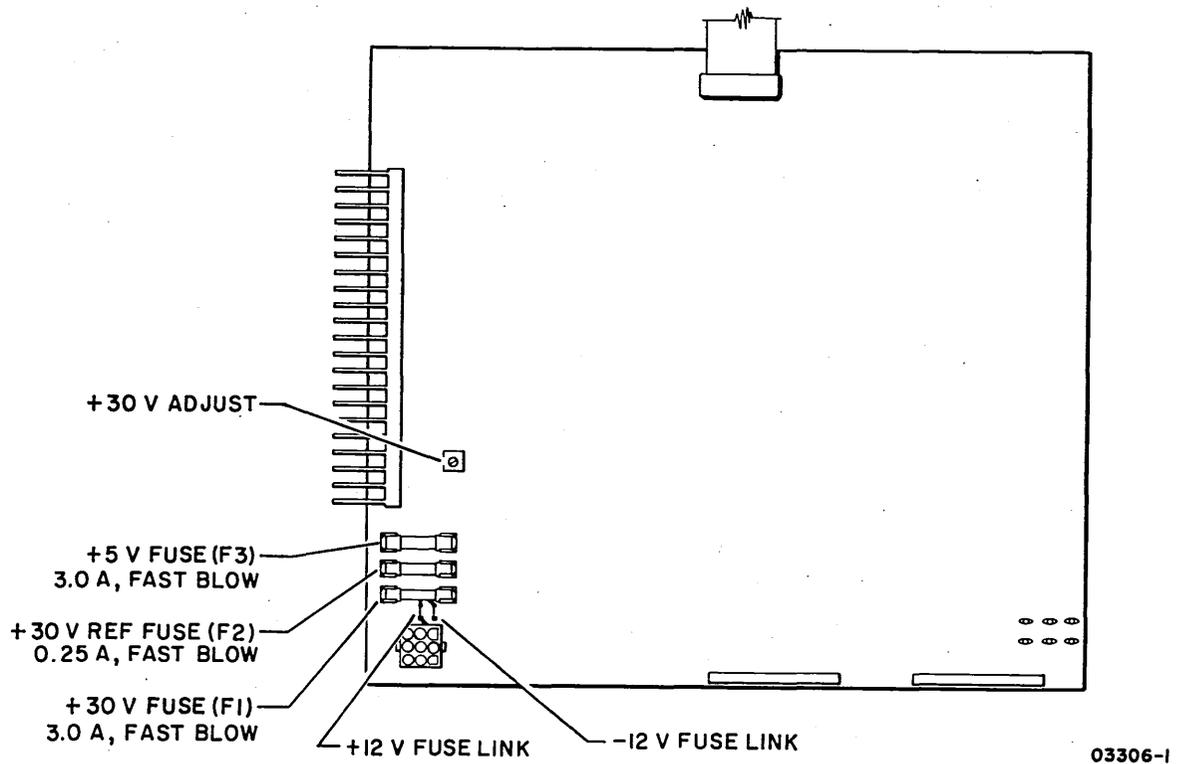
Internal controls are located on the monitor PC board for maintenance adjustments of the video display. A voltage adjust potentiometer, fuses, and fuseable links are located on the basic logic/power supply board. The following paragraphs describe the functions of the controls and identify the power supply circuits associated with each fuse. Refer to the accompanying illustration for location of the controls and fuses.

- Horizontal Phase control - provides a means of centering the video information within the raster.
- Horizontal Frequency control - provides adjustment to accommodate the 18 KHz horizontal sync pulse.
- Horizontal Linearity coil - provides adjustment for optimum character-width ratio.
- Vertical Height control - provides for vertical display adjustment of $\pm 5\%$ of the nominal height of 6 in (152 mm).
- Vertical Linearity control - provides for adjustment of optimum character height ratio of displayed data.
- Vertical Frequency control - provides for synchronization of the vertical oscillator frequency with the incoming vertical sync pulses.
- Focus control - provides for optimum center focus adjustment of displayed data.
- Dynamic Focus control - provides for optimum corner focus of displayed data.
- Width coil - provides for horizontal width adjustment of $\pm 3\%$ of the nominal display width of 8.5 in (216 mm).
- Fuse F1 (3.0 A Fast Blow) - provides overload protection for the 36-V ac transformer output feeding the +30-V power supply.
- Fuse F2 (0.25 A Fast Blow) - provides overload protection for the 16-V ac transformer output feeding the +30-V power supply.
- Fuse F3 (3.0 A Fast Blow) - provides overload protection for the 9-V ac transformer output feeding the +5-V power supplies.
- Fuse links (2) - provide overload protection for the 16-V ac transformer outputs feeding the +12-V and -12-V power supplies.
- 30 V ADJUST control - provides for adjustment of the +30-V power supply output to the monitor assembly.

MONITOR PC BOARD



LOGIC/POWER SUPPLY BOARD



Internal Control and Fuse Locations

3.0.5 Self-Test Feature

The display station contains a self-test feature that checks the basic operating capabilities of the logic circuits. The test initiates immediately following a power-on application of the display station and runs to completion unless an error is detected*. Descriptions of the various test routines are as follows:

- Basic Logic Initialization - this test segment clears the keyboard encoder, establishes the scan and character counts, clears the display memory, and sets the cursor to the home position. When this test segment executes successfully, the cursor is displayed as a steady underline character in the upper left corner of the crt.
- Automatic Data Entry - this test uses entry routines common to keyboard activity to enter and display two data characters on the crt. Successful completion of this test is indicated by a 10 being displayed in the upper left corner of the crt followed by the cursor.
- Communication Interface Initialization - this test clears the internal registers and establishes the communication parameters. The basic logic then transfers a PFl (Program Function 1) code to the communication interface, repositions the cursor to the home position, and transfers a 20 to the basic logic. Successful completion of this test causes a 20 followed by an underline cursor to be displayed in the upper left corner of the crt. An incorrect code being transferred causes a 30 to be displayed in the upper left corner of the crt.
- Status Request Check - the communication interface is conditioned to respond to the first status request received with bit 4 set in the status response. After responding, bit 4 is cleared and remains clear until primary power is again cycled. Successful completion of this test segment is indicated by the screen being cleared and the cursor displayed in the upper left corner of the crt.

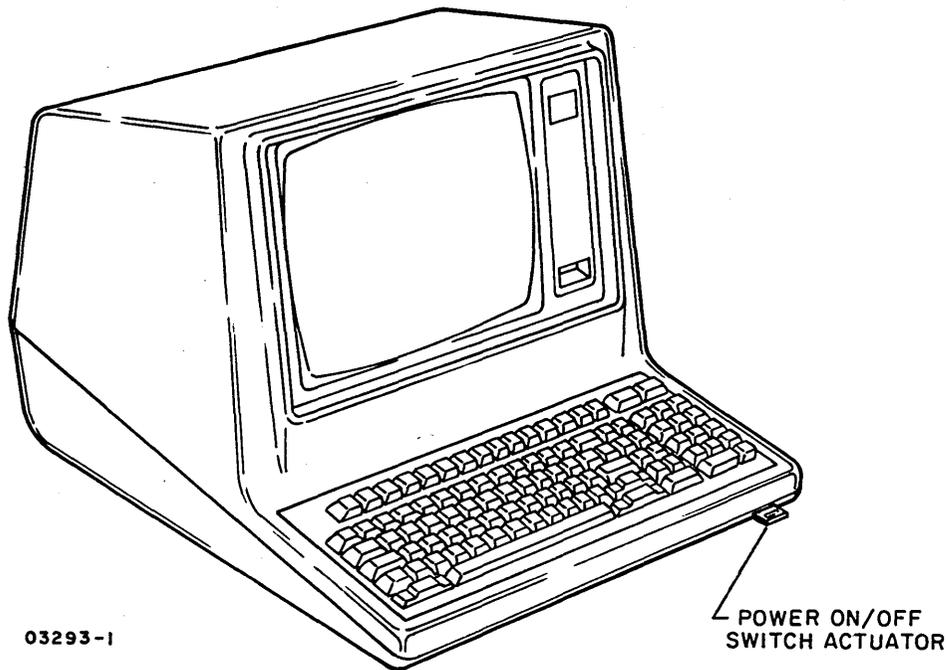
*The status request portion of the self-test feature is executed only under the following conditions:

- a. The attachment card power is on before applying power to the display station for the first time.
- b. The display station is powered on before the attachment card

3.1 POWER ON/OFF PROCEDURE

This procedure assumes that the display station is plugged into the site ac outlet.

1. Apply power by pulling forward on power on/off switch actuator. A visible orange stripe on top of switch lever indicates power on.
2. Remove power by pushing power on/off switch actuator back in. Orange stripe on top of switch lever is not visible with power off.



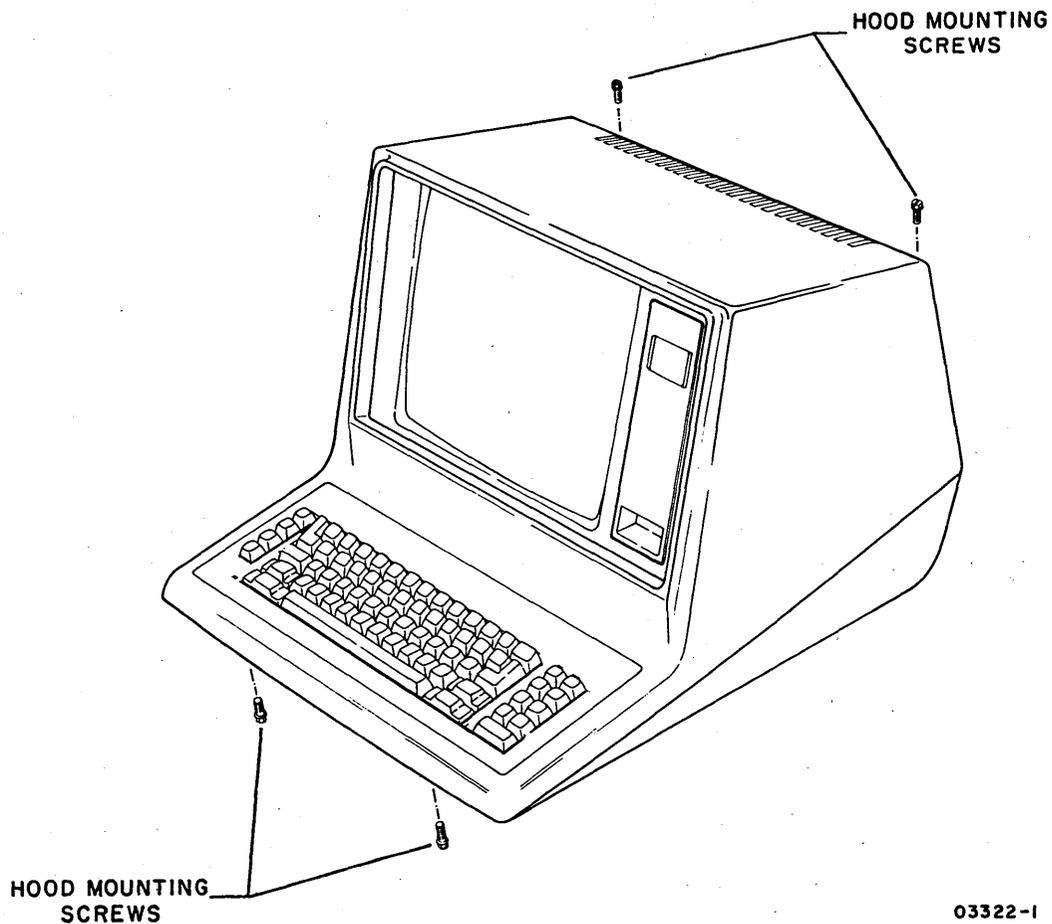
Power On/Off Switch Location

3.2 HOOD REMOVAL - REPLACEMENT

1. Slide display station forward on table until two front screws can be accessed.
2. Remove two mounting screws from bottom front of unit.
3. Reposition display station on table and remove two screws from top rear of unit.
4. Lift hood off of display station.
5. Observe the following precaution during hood replacement.

CAUTION

Snap bezels for crt and keyboard into hood before replacing hood to prevent the possibility of breaking retainer tangs. Keyboard bezel self aligns to keyboard by two positioning pegs.



Hood Mounting Screws

03322-1

3.3 APPLICATIONS MODULE

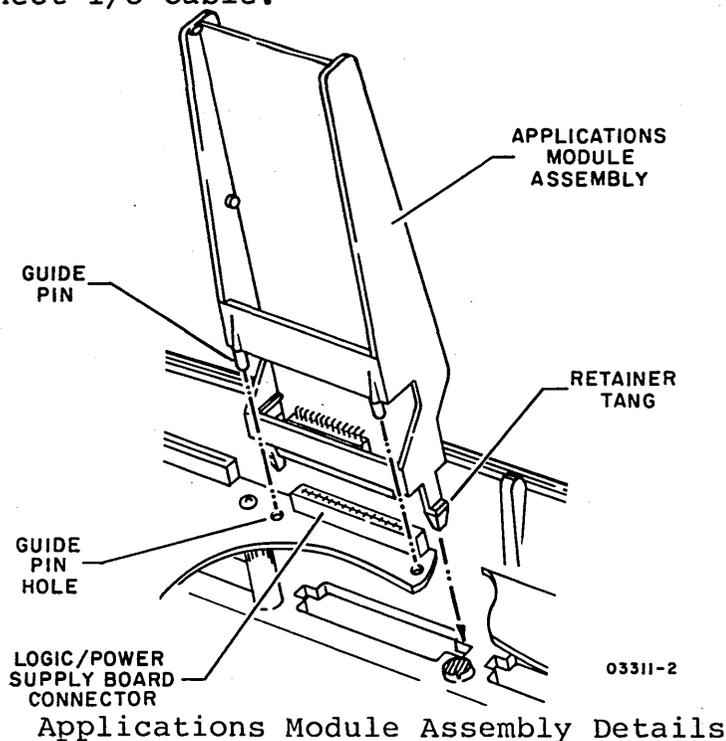
3.3.1 Removal-Replacement

1. Power off display station (para 3.1).
2. Remove hood (para 3.2).
3. Disconnect I/O cable from connector at rear of cabinet.
4. Squeeze both tangs at bottom of applications module slightly toward center and lift up to remove.
5. To install a replacement module, line up the guide holes and connector pins and plug module in until tangs engage.

NOTE

Verify that connector pins are properly aligned before attempting to seat applications module.

6. Reconnect I/O cable.



3.3.2 Repair - Adjustment

No repair or adjustment of application module assembly is applicable; replace if faulty. Package faulty module using packaging materials of replacement module and return for repair.

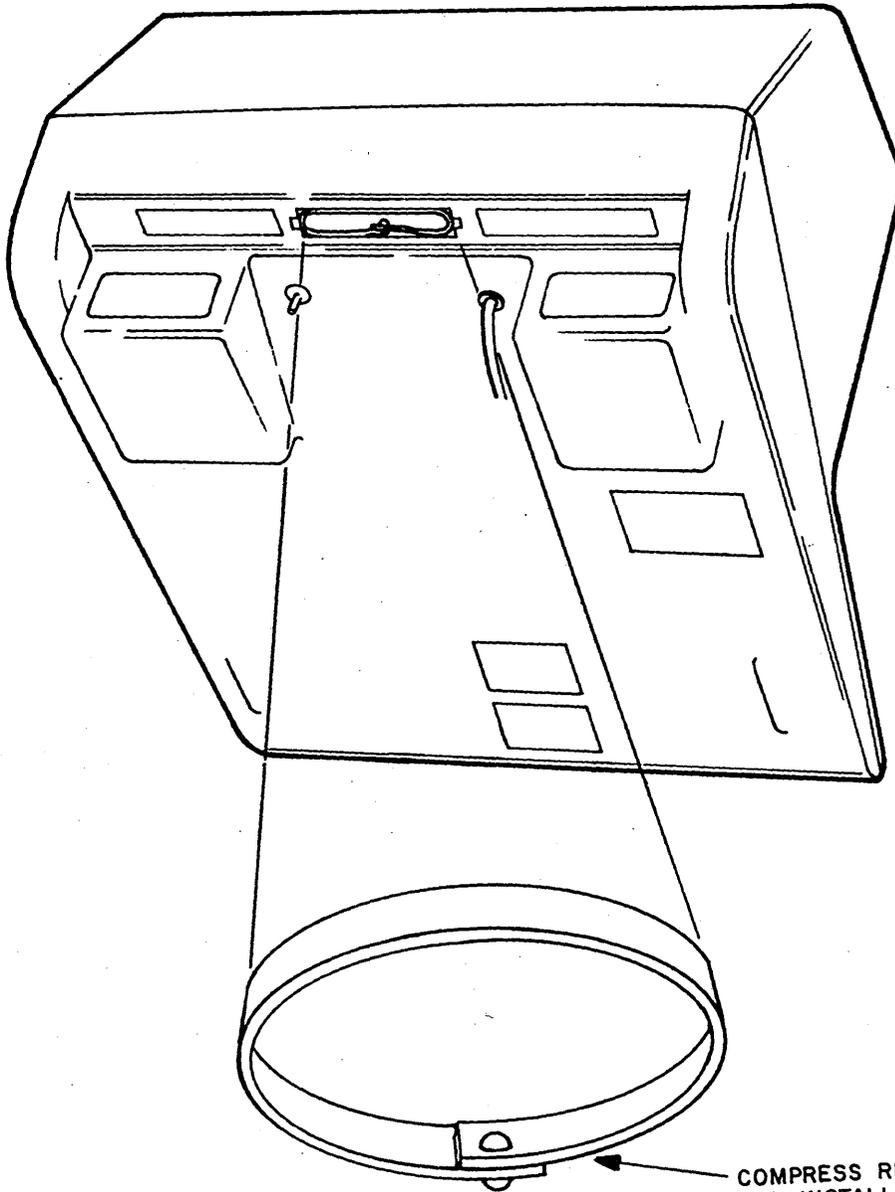
Install a special retainer spring in the display base to secure a module that continually pops loose from its mounting. Once installed, the spring places pressure against both retainer tangs of the module. This will cause them to catch and lock securely to the base of the display. Use the following procedure and illustration to install the retainer spring.

1. Power off display station (para 3.1).
2. Remove hood (para 3.2).
3. If applicable, disconnect I/O cable from connector at rear of cabinet.
4. Squeeze both tangs at bottom of applications module slightly toward center and lift module up to remove.

CAUTION

Working with the retainer spring
requires careful handling because of
its spring action and sharp edges.

5. Hold the spring firmly in both hands (fastened portion held away from you) while compressing the spring to an elongated shape that will fit the center cavity in the base of the display.
6. Insert one end of compressed spring into the cavity opening. Make sure fastened portion of spring is against cavity wall facing front of base unit. Installing spring in this manner assures proper clearance for mating connector residing in the same cavity opening. Continue pressing until the elongated spring is in place inside the cavity. Make sure the full width of the spring fits smoothly against cavity walls all around.
7. After the spring is installed, check both retainer tangs of application module to see if they are locked securely in place by spring pressure. The spring should stay in place without interference to other parts in cavity opening (i.e., plugs, cables).
8. To remove spring, use small needle nose pliers and grasp the spring near one end of the cavity opening. Pull down gently on spring until it pops out of the cavity opening.



03717

COMPRESS RETAINER SPRING
AND INSTALL IN CAVITY
WITH FASTENED PORTION
AS SHOWN.

Installing Application Module Retainer Spring

3.4 LOGIC/POWER SUPPLY BOARD

3.4.1 Removal-Replacement

1. Power off display station (para 3.1) and unplug ac power cord from site outlet.
2. Remove hood (para 3.2).
3. Remove application module (para 3.3).
4. Remove two monitor assembly hold-down screws and tilt monitor assembly to gain access to logic/power supply board.
5. Disconnect cable between logic/power supply board and monitor PC board.
6. Disconnect flat ribbon cable from keyboard assembly.

CAUTION

To prevent pc board damage, support corner of logic board by grasping firmly when removing/installing connector J4/P4.

7. Disconnect connector J4/P4 from logic/power supply board.
8. Remove four screws mounting logic/power supply board to cabinet.
9. Lift logic/power supply board out of unit and install replacement.
10. Reconnect all connectors removed in preceding steps.
11. Return faulty module for repair using packaging material that spared assembly was shipped in. Refer to section 2 of this manual for packaging instructions.

3.4.2 Adjustment

1. With power off, connect a digital voltmeter between J5-1 (positive) and J5-2 (negative) on logic/power supply board.

2. Reapply power to unit and adjust 30 V ADJUST potentiometer (R11) to obtain +30 volts (± 0.2).

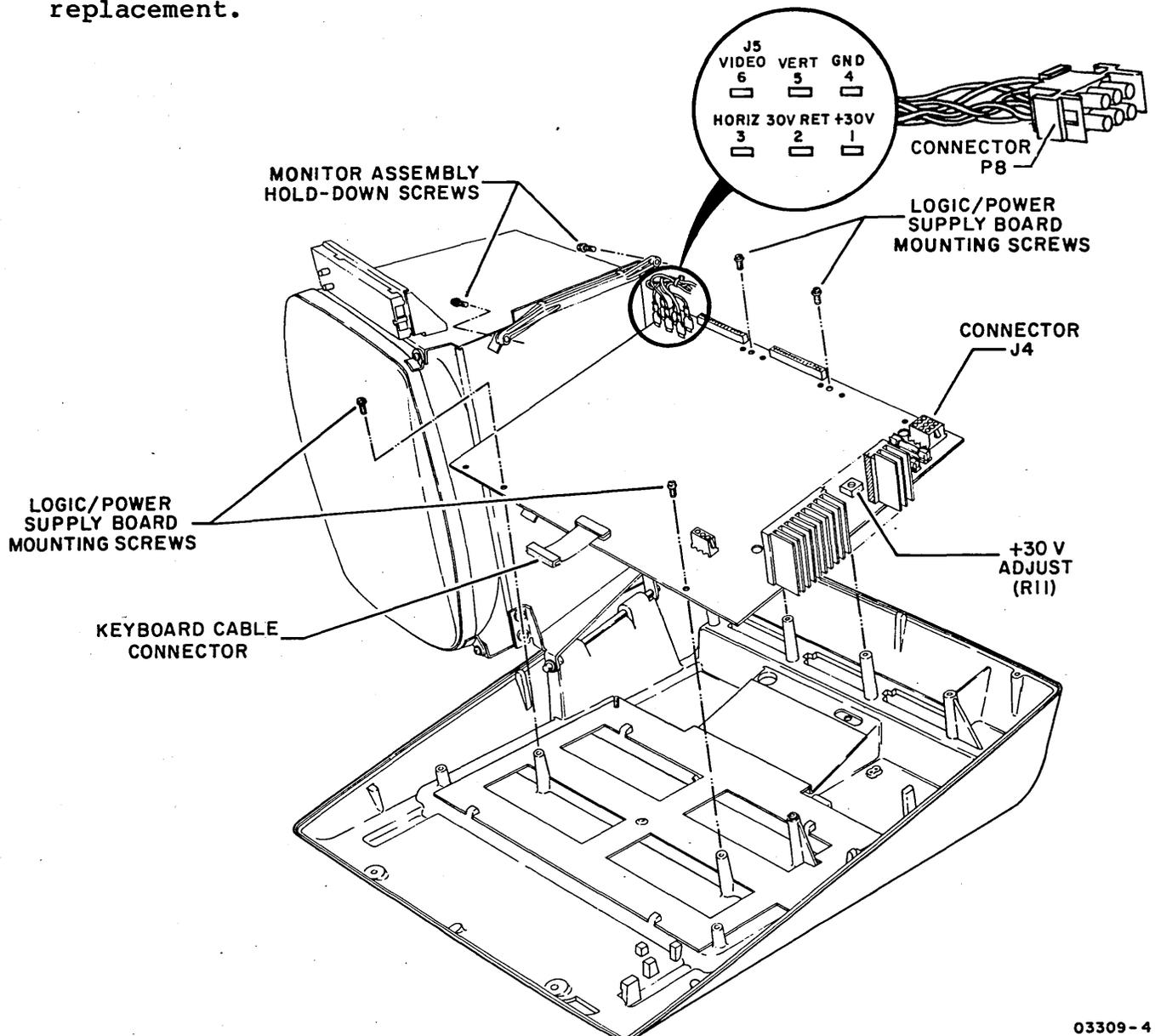
NOTE

Counterclockwise rotation of R11 increases voltage.

3. Turn power off and disconnect voltmeter.

3.4.3 Repair

On-site repair of the logic/power supply board is limited to fuse replacement.



03309-4

Logic/Power Supply Board Assembly Details

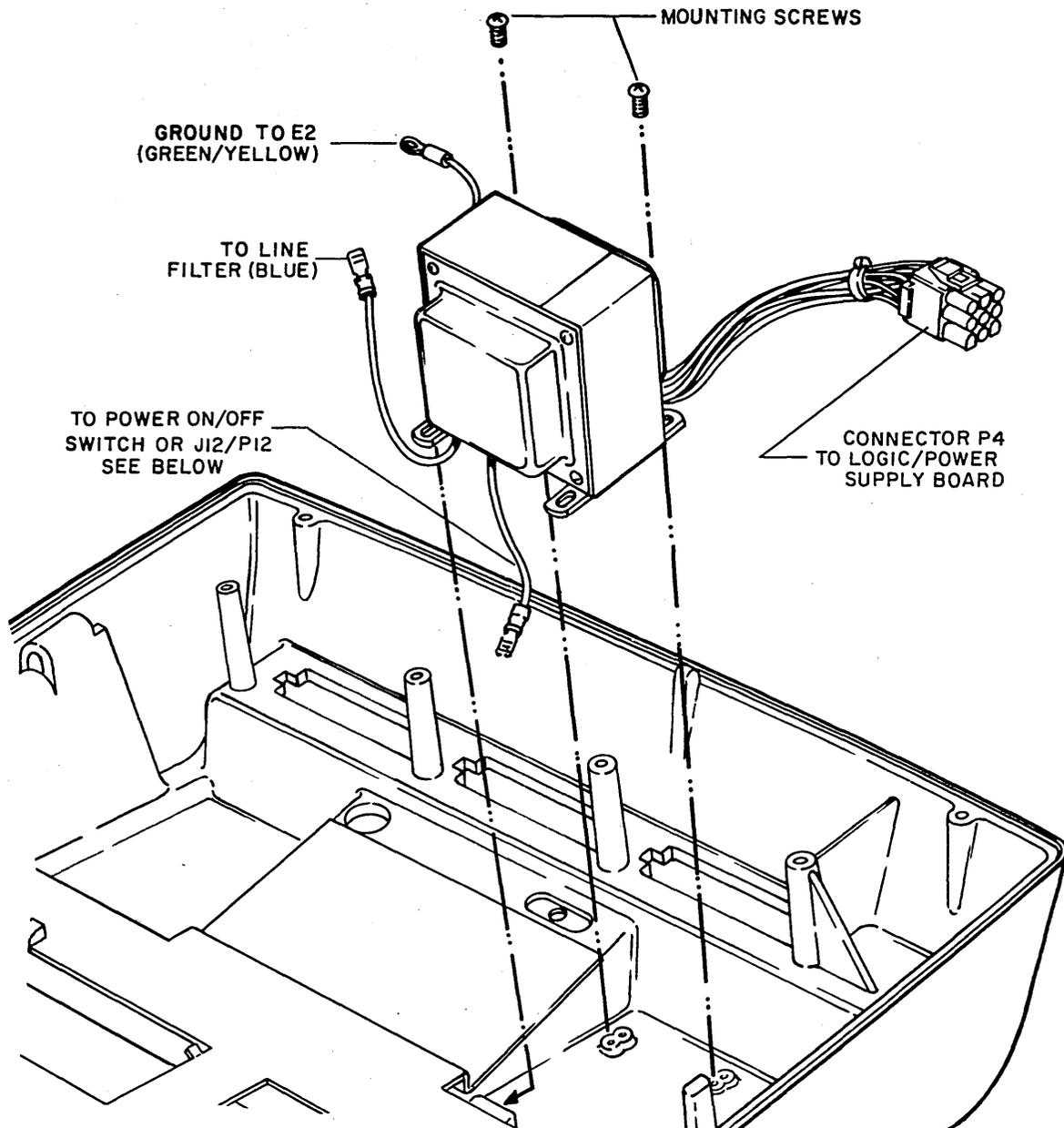
3.5 INPUT TRANSFORMER

3.5.1 Removal-Replacement

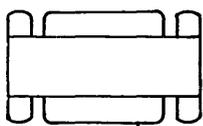
1. Power off display station (para 3.1) and unplug ac power cord from site outlet.
2. Remove hood (para 3.2).
3. Remove applications module (para 3.3) and logic/power supply board (para 3.4).
4. Remove keyboard assembly (para 3.11).
5. Disconnect blue wire of transformer primary from ac line filter (FL1-5).
6. Disconnect applicable wire/connector for 120-V, 60 Hz; 220-V, 50 Hz; or 240-V, 50 Hz units as follows:
 - a. 120-V, 60 Hz unit - disconnect brown wire of transformer primary from center terminal of power on/off switch.
 - b. 220-V, 50 Hz unit - disconnect black wire of transformer primary from connector J12/P12 going to power on/off switch.
 - c. 240-V, 50 Hz unit - disconnect brown wire of transformer primary from connector J12/P12 going to power on/off switch.
7. Disconnect green/yellow ground wire of transformer from E2 ground stud.
8. Remove two screws mounting transformer to cabinet.
9. Pull transformer slightly to rear to free it from mounting slots and lift out.
10. Install replacement transformer and connect wires as shown in accompanying illustration.

3.5.2 Repair - Adjustment

No repair or adjustment of transformer is applicable, replace if faulty. Dispose of faulty transformer.



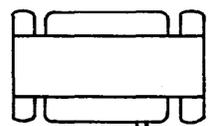
120 V, 60 Hz



BROWN (120 V)

TO ON/OFF SWITCH

220 V, 50 Hz

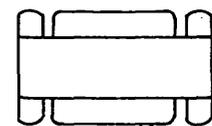


BROWN NOT USED

BLACK (220 V) J12/P12

TO ON/OFF SWITCH

240 V, 50 Hz



BLACK NOT USED

BROWN (240 V) J12/P12

TO ON/OFF SWITCH

Input Transformer Assembly Details

03308-1

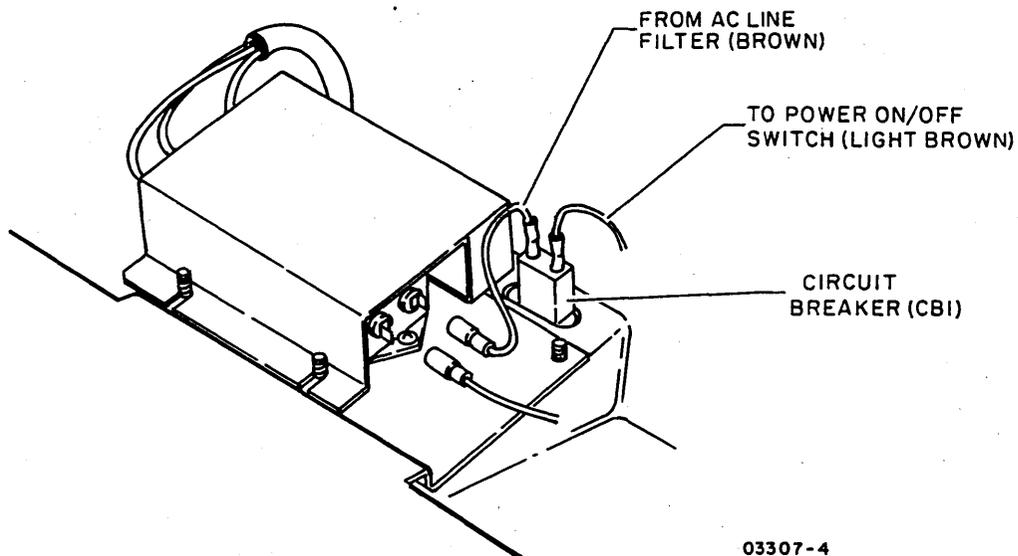
3.6 CIRCUIT BREAKER

3.6.1 Removal-Replacement

1. Power off display station (para 3.1) and unplug ac power cord from site outlet.
2. Remove hood (para 3.2).
3. Remove applications module (para 3.3) and logic/power supply board (para 3.4).
4. Disconnect two brown wires from circuit breaker.
5. Remove hex nut and lockwasher mounting circuit breaker to cabinet (bottom rear of unit).
6. Install replacement circuit breaker and connect wires as shown in accompanying illustration.

3.6.2 Repair-Adjustment

No repair or adjustment is applicable, replace if faulty.
Dispose of faulty circuit breaker.



Circuit Breaker Assembly Details

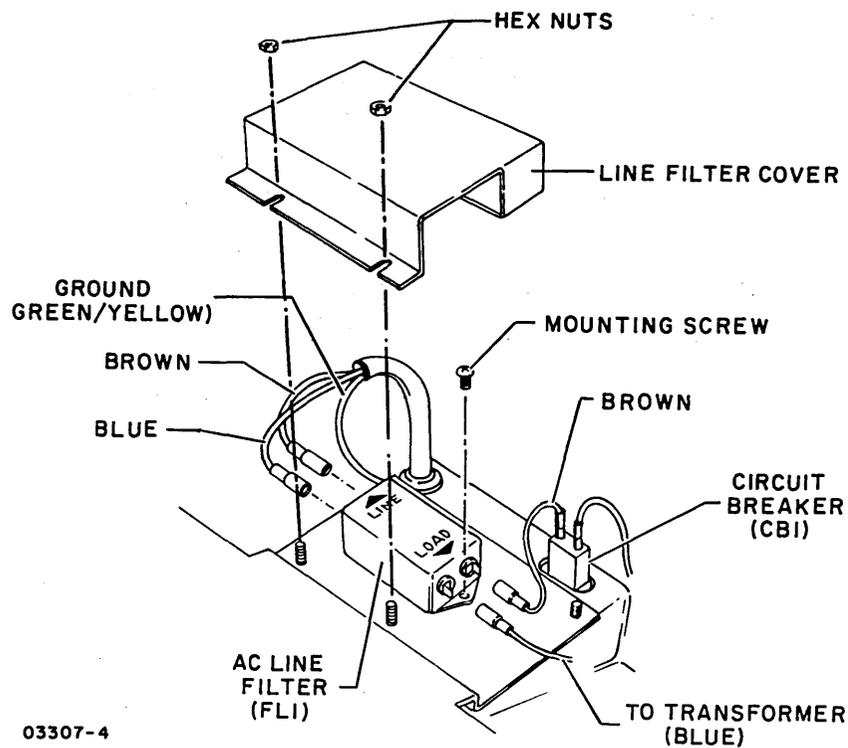
3.7 AC LINE FILTER

3.7.1 Removal-Replacement

1. Power off display station (para 3.1) and unplug ac power cord from site outlet.
2. Remove hood (para 3.2).
3. Remove applications module (para 3.3) and logic/power supply board (para 3.4).
4. Loosen two hex nuts and remove line filter cover.
5. Disconnect four wires from ac line filter.
6. Remove screw mounting ac line filter to frame.
7. Install replacement line filter and connect wires as shown in accompanying illustration.

3.7.2 Repair-Adjustment

No repair or adjustment is applicable, replace if faulty. Dispose of faulty ac line filter.



AC Line Filter Assembly Details

3.8 CRT MONITOR PC BOARD

3.8.1 Removal-Replacement

1. Power off display station (para 3.1) and unplug ac power cord from site outlet.
2. Remove hood (para 3.2).
3. Remove applications module (para 3.3) to gain full access to monitor PC board.

WARNING

Complete discharge of high voltage does not occur until approximately 30 seconds after powering off display station.

4. Remove high voltage lead from high voltage assembly mounted on side panel (refer to illustration at end of this procedure).

CAUTION

When reconnecting high voltage lead make certain that lead does not contact adjacent components or chassis frame.

5. Remove connector socket from crt .
6. Remove INTENSITY cable connector from S03 of monitor PC board.
7. Remove CONTRAST cable connector from S04 of monitor PC board.
8. Disconnect cable between logic/power supply board and monitor PC board.
9. Remove two screws mounting monitor PC board to chassis and pull slightly to rear to gain access to yoke connector.
10. Disconnect yoke connector from S01 of monitor pc board and remove PC board.
11. When installing replacement, be sure that front corners of PC board engage retaining slots of chassis frame.

NOTE

Mounting screws must be tightly seated in order to provide frame ground to monitor PC board.

12. Perform monitor adjustments (para 3.8.2).

3.8.2 Adjustment

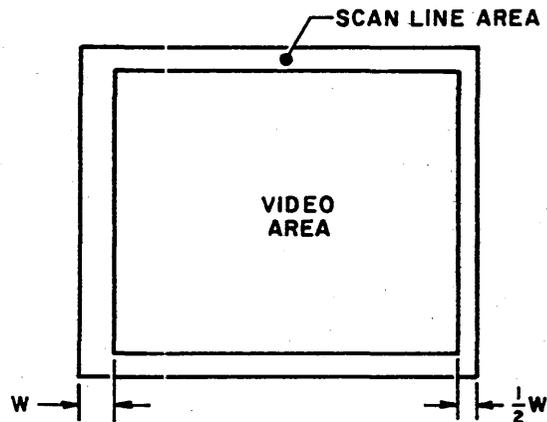
1. Apply power to display station (para 3.1) and allow a 15 minute warm-up period before performing adjustments.
2. Adjust front panel INTENSITY and CONTRAST controls to view raster.
3. Enter a couple lines of characters.
4. Adjust Vertical Frequency control (VR3) on monitor PC board to lock raster vertically.
5. Power off display station (para 3.1).
6. Ground TP6 on monitor PC board (see accompanying assembly drawing for TP6 location).
7. Apply power to display station (para 3.1).
8. Fill half of crt screen with characters. Displayed data may be distorted and in motion at this time. CONTRAST control adjustment may have to be increased to view video.
9. Adjust Horizontal Frequency control (VR6) on monitor PC board until video locks in and a vertical bar moves slowly left to right (or right to left). Slow bar movement to a minimum.

NOTE

Vertical Frequency control (VR3) may have to be readjusted (step 4) before Horizontal Frequency can be adjusted correctly.

10. Power off display station and remove ground from TP6.
11. Apply power to display station and fill crt screen with H characters.

12. Rotate Vertical Frequency control (VR3) both CW and CCW to the point where vertical synchronization is lost. Position this control midway in the rotation range.
13. Increase setting of front panel INTENSITY control until raster scan lines are visible.
14. Adjust Horizontal Phase control (VR7) on monitor PC board until the no video space between right column of characters and right scan line raster edge is approximately one-half the width of the no video scan space at left side of crt.



15. Adjust Width coil (L3) on monitor PC board to obtain a nominal character display width of 8.5 in (216 mm).
16. Adjust Vertical Height control (VR4) on monitor PC board to obtain a nominal character display height of 6 in (152 mm).
17. Correct for tilt of raster by rotating yoke.
18. Adjust yoke centering rings (para 3.9.2) to position raster correctly on crt screen. Perform this adjustment only if yoke or crt is replaced.
19. Adjust Vertical Linearity control (VR5) on monitor PC board to obtain optimum height ratio of displayed characters.
20. Adjust Horizontal Linearity coil (L2) on monitor PC board to obtain optimum character width ratio of displayed characters.
21. Turn front panel CONTRAST control fully counterclockwise.
22. Turn front panel INTENSITY control clockwise until raster appears and then turn counterclockwise until raster first disappears.

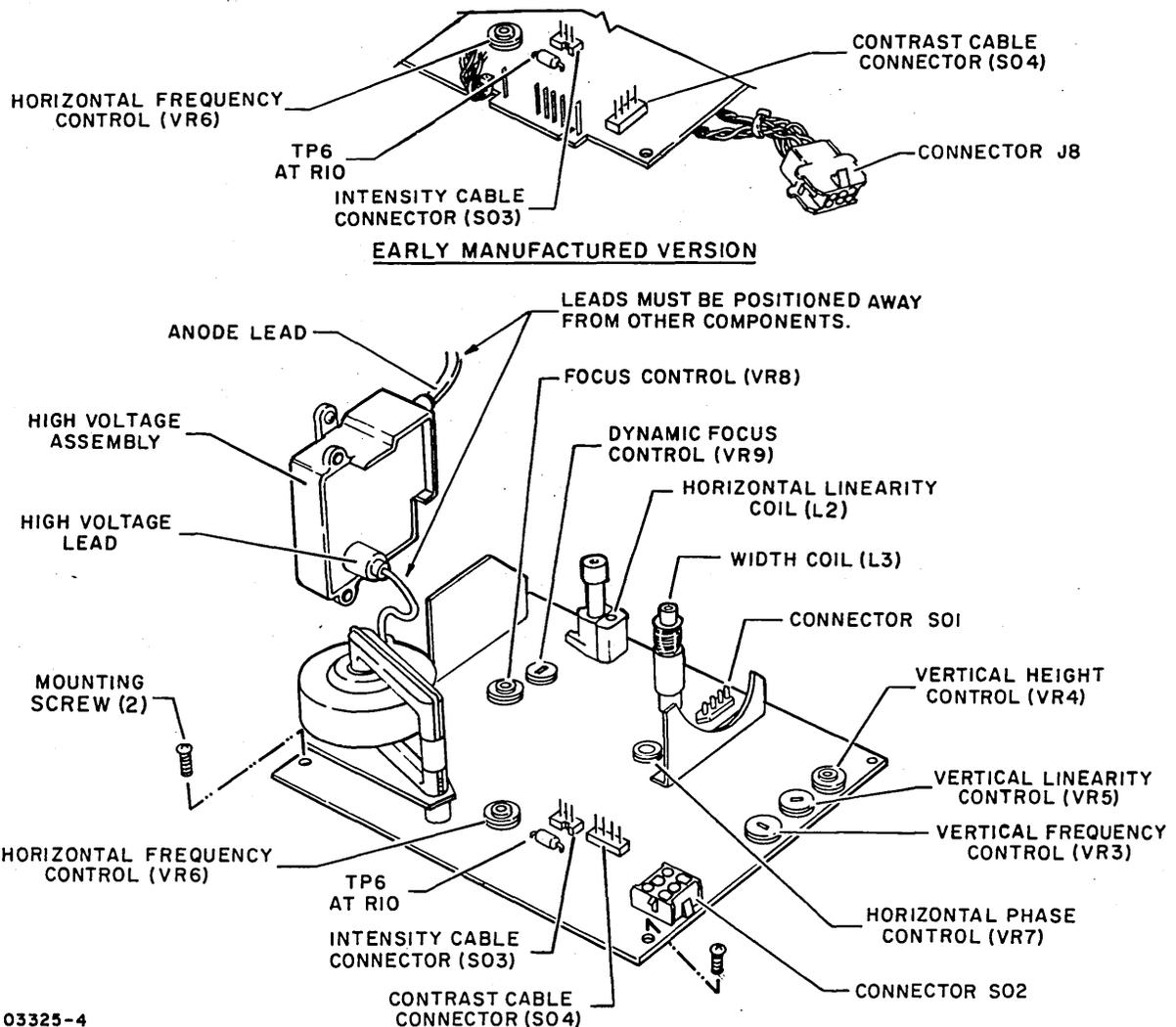
23. Adjust CONTRAST control for normal viewing of displayed data.
24. Adjust Focus control (VR8) on monitor PC board to obtain best center screen focus of displayed characters.
25. Adjust Dynamic focus control (VR9) for best corner focus of displayed data.

NOTE

Focus adjustments of steps 24 and 25 may have to be compromised to obtain best overall screen focus.

3.8.3 Repair

No on-site repair of monitor PC board is applicable, replace if faulty.



Monitor PC Board Assembly Details

3.9 YOKE ASSEMBLY

3.9.1 Removal-Replacement

1. Power off display station (para 3.1) and unplug ac power cord from site outlet.
2. Remove hood (para 3.2).
3. Remove applications module (para 3.3) to gain full access to yoke assembly.
4. Remove connector socket from crt.
5. Disconnect yoke connector from S01 on monitor PC board.

WARNING

Cathode-ray tubes contain a high vacuum and are subject to implosion if damaged. Such an implosion can propel flying glass causing personal injury. Do not nick or scratch glass or subject crt to any undue pressure during yoke removal/replacement. Wear safety glasses for eye protection.

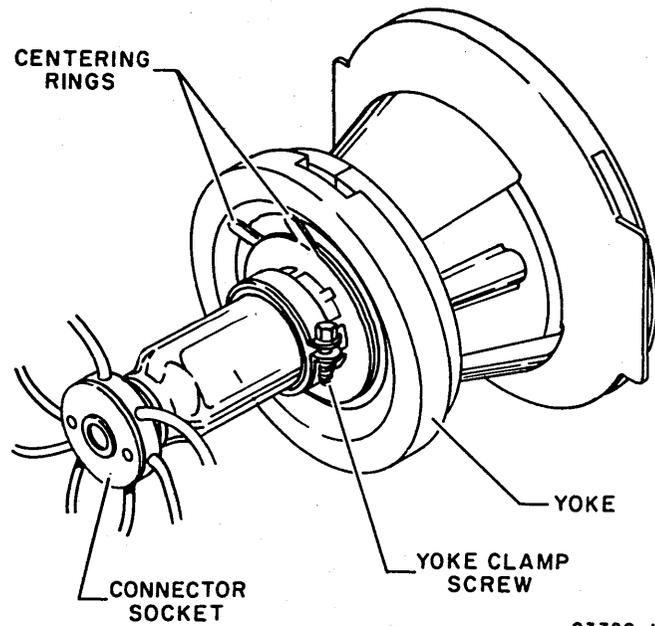
6. Loosen yoke clamp screw and remove yoke from crt neck.

3.9.2 Adjustment

1. Apply power to display station (para 3.1).
2. Adjust front panel INTENSITY and CONTRAST controls to view raster.
3. Adjust centering rings on yoke assembly to position raster evenly within crt screen. If raster is tilted, loosen yoke clamp screw and turn yoke assembly slightly until level. Retighten yoke clamp screw.
4. Perform monitor adjustments as necessary per para 3.8.2.

3.9.3 Repair

No on-site repair of yoke assembly is applicable, replace if faulty. Dispose of faulty yoke assembly.

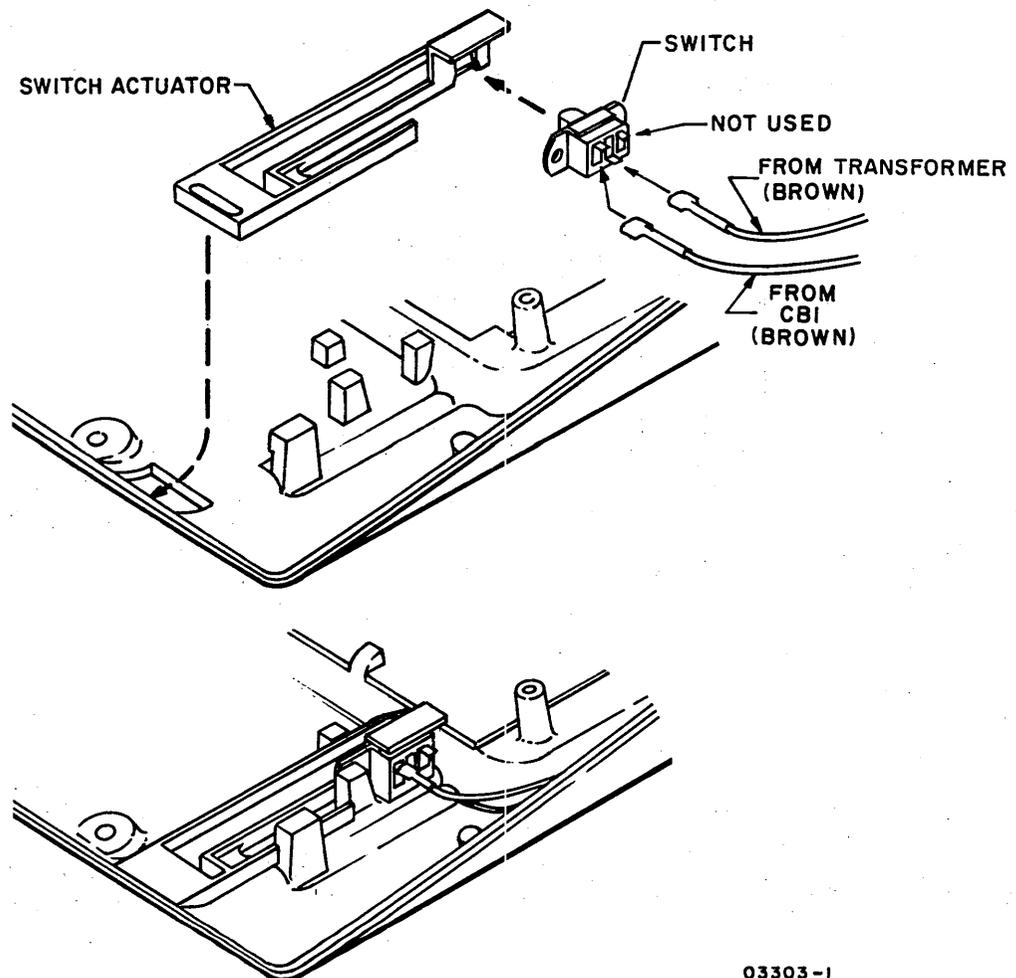


03320-1

Yoke Assembly Details

3.10 POWER ON/OFF SWITCH

1. Power off display station (para 3.1) and unplug ac power cord from site outlet.
2. Remove hood (para 3.2).
3. Remove keyboard assembly (para 3.11).
4. Lift switch lever and switch free of retaining studs.
5. Remove Faston connectors from switch.
6. Connect Fastons to replacement switch and install as shown in accompanying illustration. Check that switch is wired such that power is applied when switch actuator is pulled forward.
7. Dispose of faulty switch.



03303-1

Power On/Off Switch Assembly Details

3.11 KEYBOARD ASSEMBLY

3.11.1 Removal-Replacement

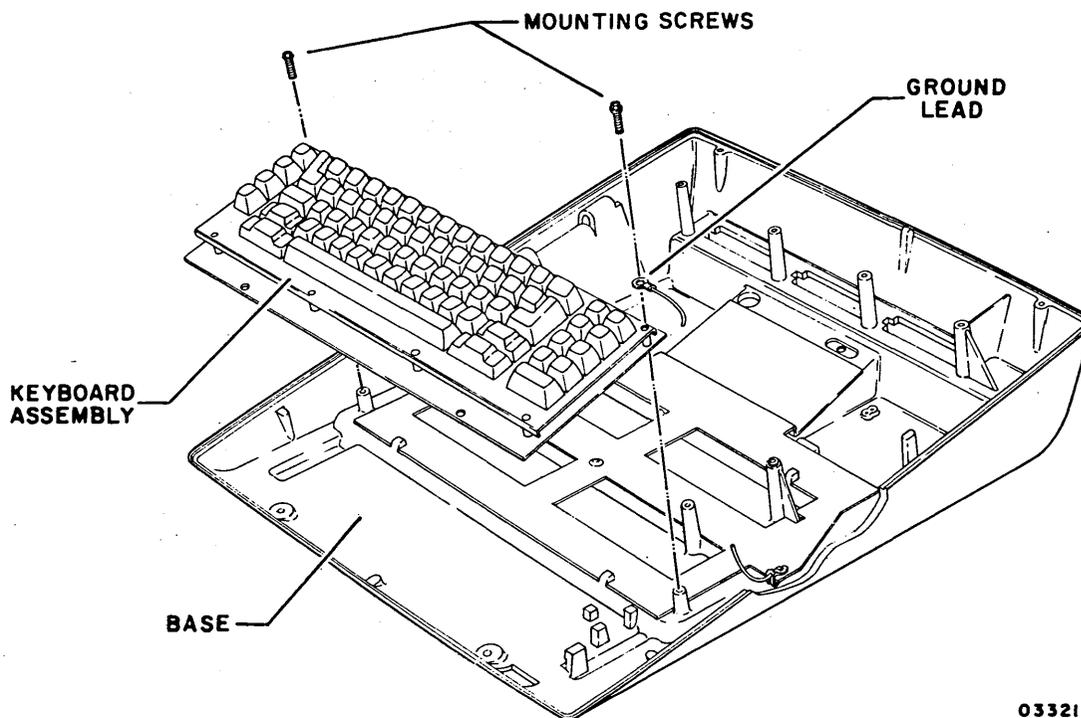
1. Power off display station (para 3.1) and unplug ac power cord from site outlet.
2. Remove hood (para 3.2).
3. Disconnect keyboard cable from keyboard assembly.
4. Remove two screws mounting keyboard assembly to cabinet.

NOTE

Reattach ground lead to keyboard mounting screw when installing replacement.

3.11.2 Repair-Adjustment

No on-site repair or adjustment of keyboard assembly is applicable, replace if faulty. Return faulty keyboard assembly for repair using packaging material that spared assembly was shipped in.



03321-1

Keyboard Assembly Details

3.12 CRT

3.12.1 Removal-Replacement

1. Power off display station (para 3.1) and unplug ac power cord from site outlet.
2. Remove hood (para 3.2).
3. Remove applications module (para 3.3) and yoke assembly (para 3.9).

WARNING

Complete discharge of high voltage does not occur until approximately 30 seconds following power off.

4. Disconnect anode lead from crt.

WARNING

Cathode-ray tubes contain a high vacuum and are subject to implosion if damaged. Such an implosion can propel flying glass causing personal injury. Do not nick or scratch glass or subject crt to any undue pressure during removal or installation. Wear safety glasses for eye protection.

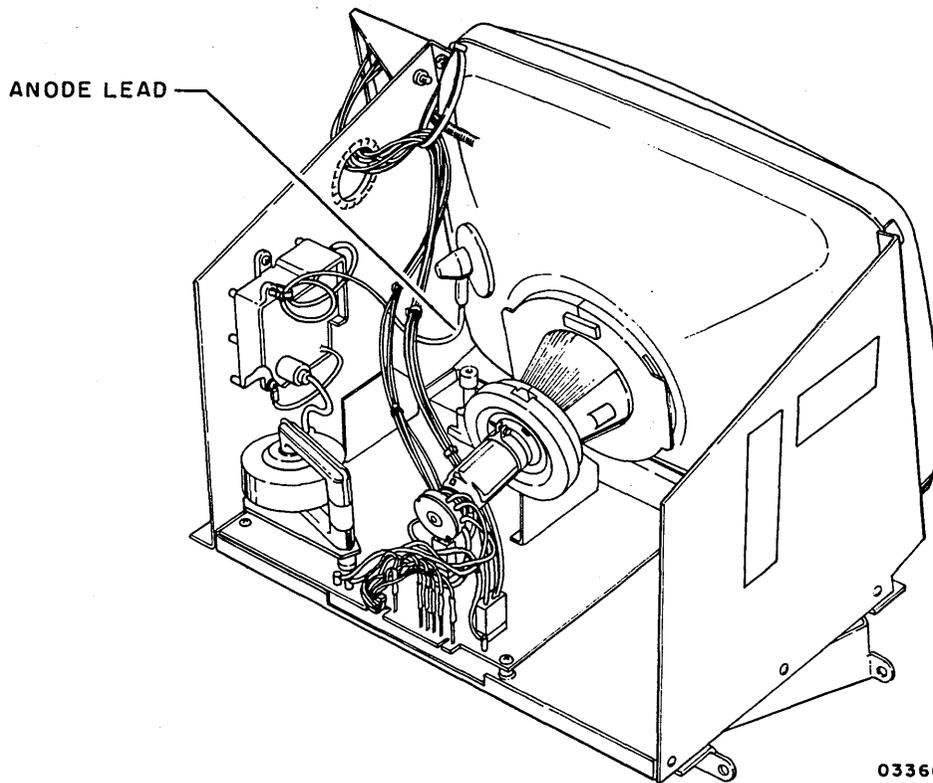
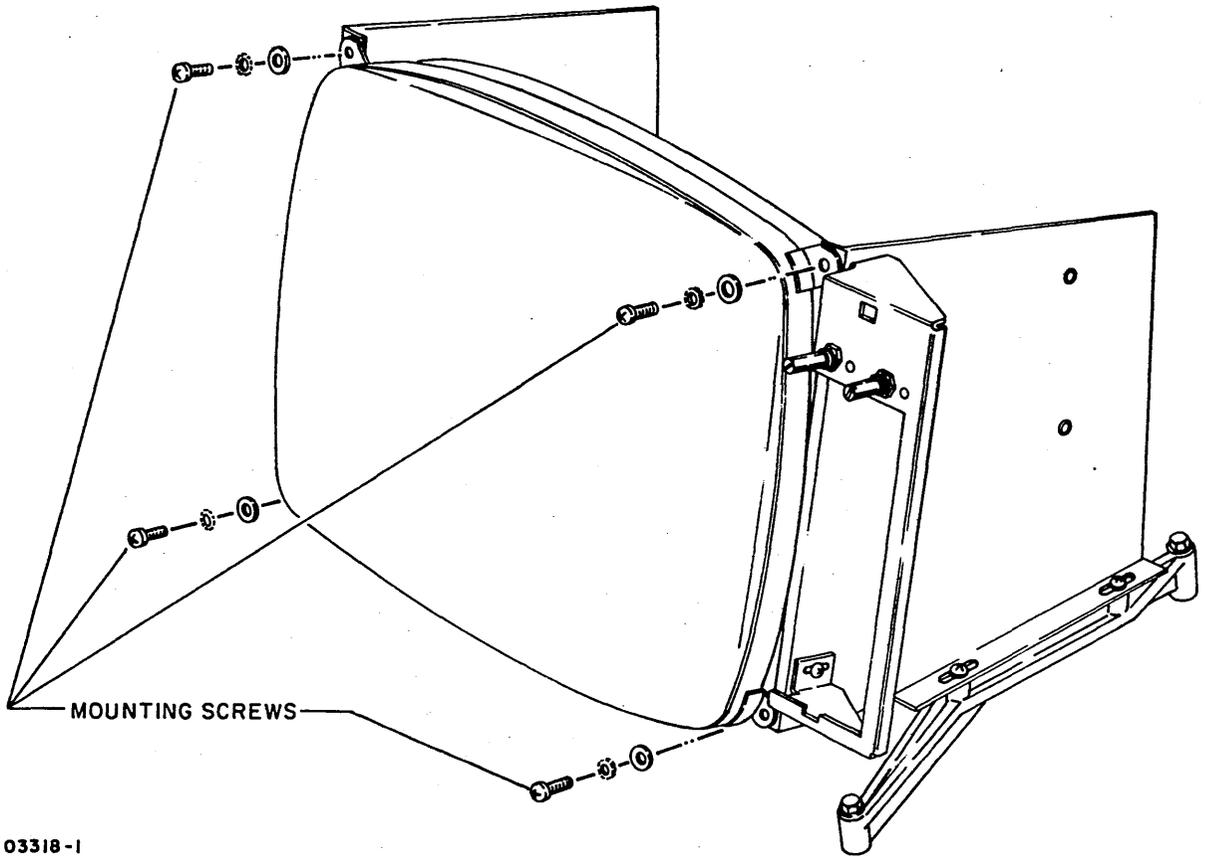
5. Support neck of crt and remove four screws mounting crt to chassis.

3.12.2 Adjustment

Perform monitor adjustments per para 3.8.2.

3.12.3 Repair

No repair of crt is applicable, replace if faulty. Package defective crt for normal disposition using packaging materials that spared crt was shipped in.



CRT Assembly Details

3.13 INTENSITY AND CONTRAST CONTROLS

3.13.1 Removal-Replacement

1. Power off display station (para 3.1) and unplug ac power cord from site outlet.
2. Remove hood (para 3.2).
3. Cut cable tie holding leads of INTENSITY and CONTRAST control cables to monitor assembly chassis.

CAUTION

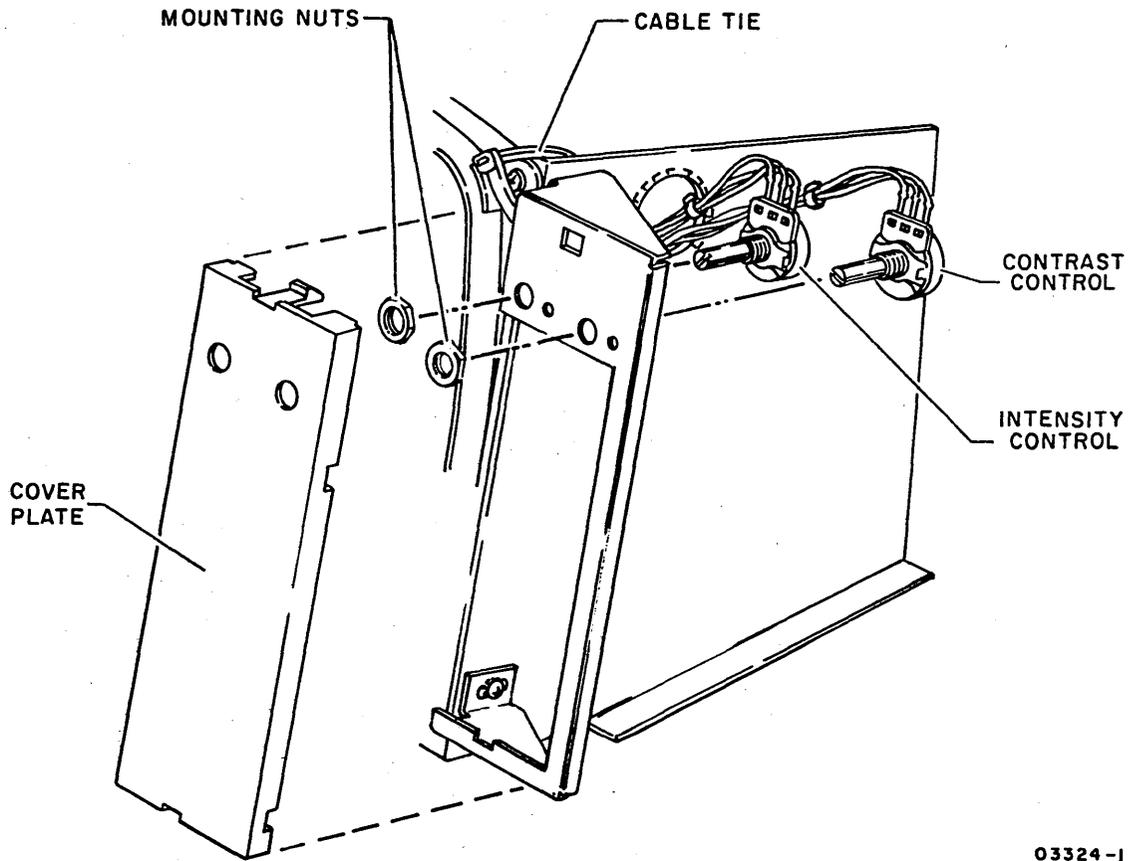
Cables must be positioned and TIED AWAY from high voltage assembly and fly-back transformer during reassembly.

4. Disconnect INTENSITY (S03) or CONTRAST (S04) cable connector, as applicable, from monitor PC board. Refer to para 3.8 for illustration.
5. Remove snap-on plastic cover plate to gain access to front of control and remove the mounting nut.

3.13.2 Repair-Test

No repair of control assemblies is applicable, replace if faulty. Dispose of faulty control assembly. Control assemblies may be tested by performing resistance measurements as follows:

- Determine resistance of potentiometer (stamped on case).
- Disconnect connector and measure for total potentiometer resistance between outer pins of connector.
- Measure resistance between center pin of connector and one outer pin while rotating control shaft. Resistance value should change linearly as control shaft is rotated through its range.



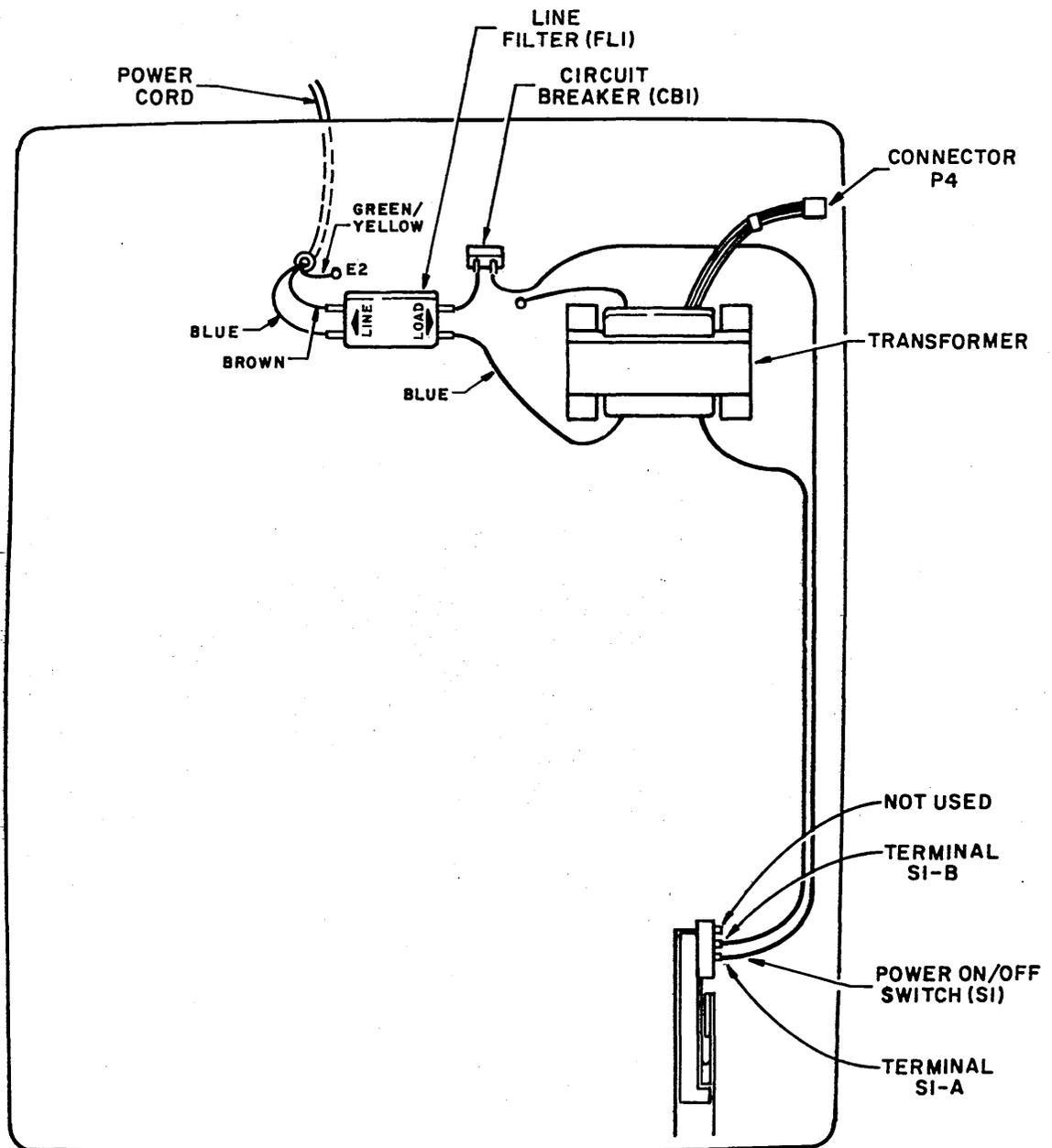
03324-1

Intensity Control and Contrast Control Assembly Details

3.14 AC SHORT CIRCUIT ISOLATION

This procedure isolates short circuits causing CBI to trip.

1. Remove hood (para 3.2).
2. Disconnect cable between logic/power supply board and monitor PC board.
3. Allow time for circuit breaker (CBI) to cool, then reset CBI and power on display station. If CBI no longer trips, replace monitor PC board (para 3.8). If CBI still trips, continue with the following steps until fault is isolated.
4. Disconnect J4/P4 from logic/power supply board.
5. Allow time for circuit breaker (CBI) to cool, then reset CBI and power on display station. If circuit breaker no longer trips, replace logic/power supply board (para 3.4). If circuit breaker still trips, continue with the following steps until fault is isolated.
6. Unplug ac power cord from site outlet.
7. Remove applications module (para 3.3) and logic/power supply board (para 3.4).
8. Remove keyboard assembly (para 3.11).
9. Inspect ac wiring for electrical shorts.
10. Disconnect blue wire of transformer primary from ac line filter (FL1-5).
11. With Power On/Off switch in off position, use VOM to check for short between center terminal (S1-B) of Power On/Off switch and blue transformer primary lead. If shorted, replace transformer (para 3.5).
12. Check for transformer secondary shorts between all pins of connector P4 and each pin to ground. If shorted, replace transformer (para 3.5).
13. The only remaining item is CBI which must be faulty. Replace per para 3.6. Reconnect all wires and connectors before reapplying power.



03354

AC Power Wiring Details

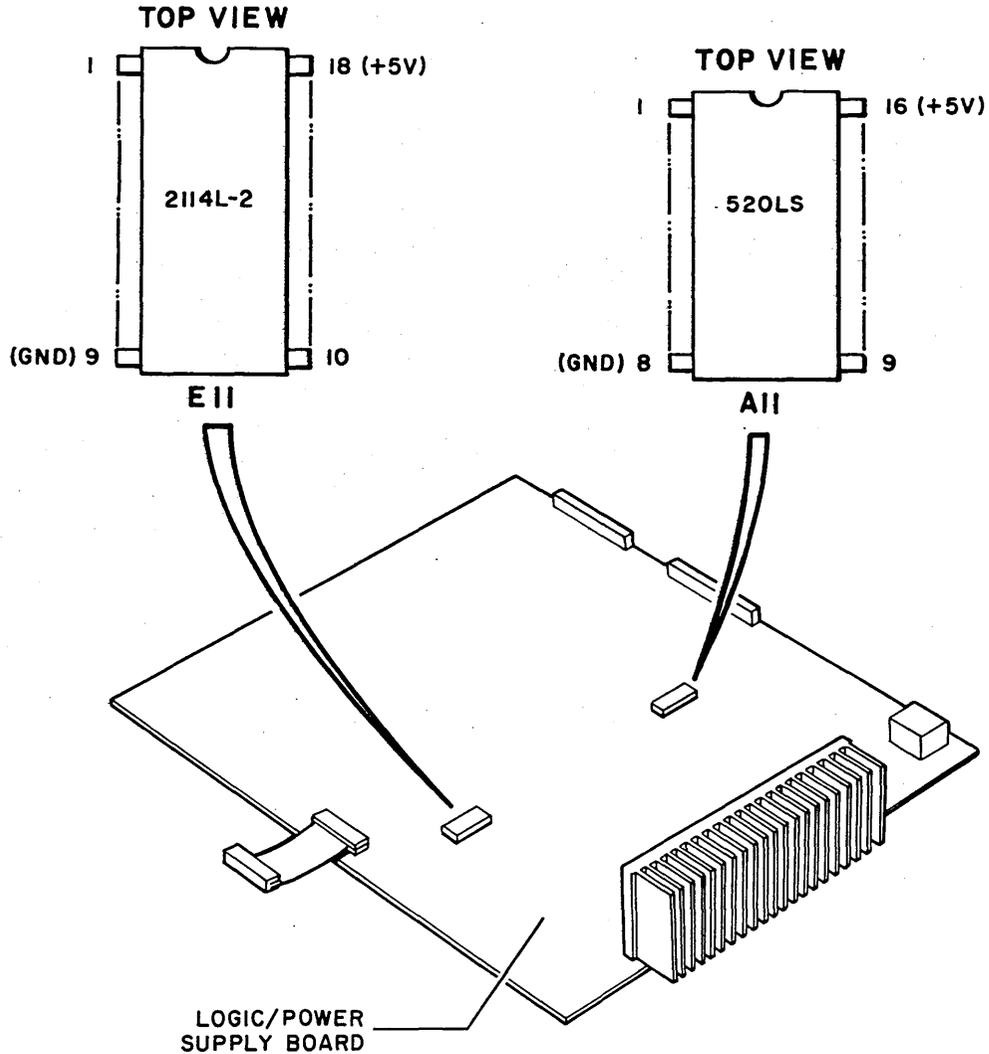
INTENTIONALLY BLANK

3.15 INTEGRATED CIRCUIT PIN CONFIGURATIONS

The following outline drawings show the IC pin configurations for testing +5 volts used internally on the logic/power supply board.

NOTE

Three separate +5-volt supplies are used for the internal logic. One supply also provides +5 volts to the applications module and therefore can be checked at connector J10 (pin 5 is +5 V, pin 3 is ground). The remaining two supplies should be checked at the ICs as shown.



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Pin Configuration of Integrated Circuits

3.16 ERROR ABORT MESSAGE

When a diagnostic is aborted, an error abort message is generated. If a display station is assigned as the alternate console, the abort message is displayed in the following format:

ABORT TEST							
TEST	EXIT	DEV	CC	ISB	STEP	CSFAIL ^①	SIWL ^②
42A2	309E	0024	0703	0024	0001	0000	0000
DCB0	DCB1	DCB2	DCB3	DCB4	DCB5	DCB6	DCB7
0000	0000	0000	0000	0000	0000	0000	3694
CSS0	CSS1	CSS2	CSS3	CSS4	CSS5	CSS6	CSS7
36E3	0000	0000	0000	0000	0000	0000	0000
CSS8	CSS9	CSSA	CSSB	CSSC	CSSD	CSSE	CSSF
4040	4040	4040	4040	4040	4040	4040	4040
I3C00	MAP=4220	STEP=0001					

Where:

TEST = Test unit ID of the routine executing at time of abort.

EXIT = Exit address (last address entered in R6 by a Branch and Link instruction).

DEV = Device address.

CC = Condition code.

ISB = Interrupt status byte returned, if any.

STEP = Step number being executed at time of abort.

DCB0 - DCB7 = Diagnostic control bytes.

CSS0 - CSSF = Cycle steal status bytes if available (refer to Cycle Steal Status, Appendix A of this manual for significance of the various cycle steal status words).

NOTE

If diagnostics end abnormally with no message or a meaningless abort message, retry the auto tests. If the problem persists, reseat/replace attachment card. Verify switch and jumper placement per attachment card installation procedure, section 2 of this manual

① CSFAIL = 1 if cycle steal status failed (invalid) (T4240 only)

② SIWL = Stray interrupt/wrong level (T4240 only)

If using the operator/programmer panel as the assigned alternate console, an error abort is indicated by 42FE being displayed in the LED indicators. The error abort message can be read from memory as follows:

NOTE

Level 3 registers R0 through R3 contain the following information:

R0 = step number
R1 = diagnostic test number
R2 = device address
R3 = starting address of abort message block

1. Press Stop switch; Stop indicator lights.
2. Press Level 3 switch.
3. Press R3 register switch. LED indicators will contain starting memory address of the error abort message.

NOTE

The first word at this address contains the test unit ID. The remaining words shown in the error abort message example follow in sequence.

4. Press SAR switch.
5. Enter memory address via input switches.
6. Press Store switch.
7. Press Main Storage switch. Contents of first memory address displays in indicators.
8. Continue pressing Main Storage switch to view each word in sequence.

3.17 CONFIGURATOR TABLE INFORMATION

NOTE

The following conventions are used for operator/programmer panel input:

- (B) = Data Buffer switch
- (I) = Console Interrupt switch

3.17.1 Changing Configurator Table Using Operator/Programmer Panel

To change the configurator table through use of the operator/programmer panel, perform the following steps:

1. Press Load switch to load configurator program.
2. View and record contents of configurator table per the following:
 - Press Stop switch.
 - Press SAR (Storage Address Register) switch.
 - Enter 3000 via data register input switches.
 - Press Store switch.
 - Press Main Storage switch to display first word of entry 00 in configurator table. Record contents.
 - Continue pressing Main Storage switch to view and record each word of entry.

NOTE

Each configurator table entry consists of eight words. Refer to para 3.17.3 for entry format. Entry 00 is the system entry and entries 01 through XX are the device entries. The last entry in the table will contain a 1 bit in the bit 2 position of byte 0203 as follows:

02	03
┌───────────┐	┌───────────┐
0010 0000	0000 0000

- Continue logging information from configurator table until complete.

3. Press Load switch. Either a 382A (secure customer interface), a 3822 (configuration errors on system), or a 382E (option table available for entry) halt will occur.
 - If a 382A halt code, enter:
(B),6,(I),(I) to advance to halt 3822 or 382E.
 - If a 3822 halt code, enter:
(B),1F,(I),(B),0300,(I),(I) to advance to halt 382E.
 - If a 382E halt code, go to step 4.
4. Enter one of the following options as applicable:
 - (B),1F,(I),(B),0200,(I),(I) to delete entire entry from configurator table.
 - (B),1F,(I),(B),0300,(I),(I) to change any portion of an entry in configurator table.
 - (B),1F,(I),(B),0A00,(I),(I) to add a new entry in configurator table.
5. If a 383A halt code occurs (signifying that an 02 or 03 option was selected), enter table number as follows:
(B),1F,(I),(B),XX00,(I),(I) where XX = entry number.
6. If a 383B or 3846 halt code occurs (signifying that an 03 or 0A option was selected), enter new configurator table data for table entries 01 through XX as follows:
(B),8F,(I),(B),AATT,(I),(B),0000,(I),(B),IDID,(I),(B),0000,(I),(B),0000,(I),(B),0000,(I),(B),0000,(I),(B),IDID,(I),(I)
where: AA = device address
TT = device type
IDID = device read ID
7. Repeat steps 4 through 6 until all additions, deletions, and corrections are complete.
8. Write new configurator table on diskette when complete (halt code 382E), enter:
(B),1F,(I),(B),0D00,(I),(I)
9. Next halt code will be a 382C (copy table to another diskette?). Terminate program by entering:
(B),1F,(I),(B),0500,(I),(I)
10. Successful termination of configurator program is indicated by a 3800 (ready) halt code.
11. Diskette is now configured and ready for diagnostic checkout.

3.17.2 Configure System (Option 0C) Using Operator/Programmer Panel

To configure the system automatically (using option 0C) from the operator/programmer panel, perform the following steps:

1. Enter (B),B,(I),(B),38F0,(I),(I) to load configurator program. When loaded, a 38XX halt code displays in output indicators of operator/programmer panel. If a 382A halt code occurs, enter: (B),6,(I),(I)
2. If a 3822 halt code occurs, enter:
(B),1F,(I),(B),0300,(I),(I)
A 382E halt will then occur to allow option selection.
3. Enter (B),1F,(I),(B),0C00,(I),(I) to select configure system option 0C. Refer to para 3.18 for specific instructions pertaining to halt codes being displayed.
4. Continue entering appropriate parameters until a 3800 or 3805 halt code displays. This indicates that diskette configuration is complete. Diagnostic checkout can now be performed.

NOTE

Some IBM and CDC devices have the same ID codes. These IBM devices are all assigned CDC device types in the configurator table and must be manually changed to the correct device ID before executing diagnostic tests. Also, if a CDC 80230 or 80240 mini module drive having a read ID of 3007 is present in the configurator table, the device type must be changed from 70 to 72. Refer to table 2-1, section 2 of this manual for a listing of device types that have the same IDs. To make changes, follow instructions in para 3.17.1.

3.17.3 Configurator Table Entries

The configurator record contains system information (Entry 00), and one entry for each device address used (Entries 01-XX). The formats used for the system entry and the device entries are as follows:

NOTE

The configurators on IBM diskettes do not recognize CDC devices. Therefore, do not attempt to use an IBM configurator to construct the configuration table on a CDC BASIC diskette. All CDC devices will be configured wrong in the table.

3.17.3.1 Entry 00 (System Entry)

Change only Entry 00 bytes 05 through 09 (functions 04, 06, 08) all other information is entered by the configurator program.

<u>Byte</u>	<u>Definition</u>
00 and 01	Constant 00
02	Entry number of last entry in table
03	Configurator flags Bit 00 through 06 are reserved Bit 07 a 1 = diskette has been configured Bit 07 a 0 = diskette has not been configured
04	Not used
05	Processor type ① 22 = 4952 23 = 4953 25 = 4955
06 and 07	Storage word X Y Y Y ABBBBBBBBBBB A binary number indicating the number of 16K units of outer storage installed A=0 No address translator A=1 Address translator installed 3=16K of inner storage installed 7=32K of inner storage installed B=48K of inner storage installed F=64K of inner storage installed

NOTES

1. Storage word = F803 indicates 112K of total storage installed.
2. If BBBBBBBBBBBB is greater than 0, then A must equal 1 and address translator feature must be installed.

① Several device MAPs measure time. Instruction execution time is indicated to the MAPs by processor type. The wrong processor type code will cause MAP failures.

3.17.3.1 Entry 00 (System Entry) Contd

<u>Byte</u>	<u>Definition</u>
	3. Inner storage can be addressed only by the storage address register.
	4. Outer storage can be addressed only by the address translator feature.
	5. Storage word = 7802 indicates one 32K card or two 16K cards installed as inner storage, one 32K card or two 16K cards installed as outer storage, and the address translator installed.
08 and 09	Alternate console address and type (AATT)
0A through 0E	Not used
0F	Release level of this configuration record

3.17.3.2 Entries 01-XX (Device Entries)

<u>Byte</u>	<u>Definition</u>
00	Device address
01	Device type
02	Flag byte Bit 0 Used by DCP (in storage). Always 0 on disk. Bit 1=1 Indicates this entry chained to next entry. Bit 2=1 Indicates last entry in configurator table. Bit 3=1 Indicates last entry in this sector Bit 4 through 6 Reserved Bit 7 Last available entry in configurator table.

NOTES

1. Ignore bits 2, 3, and 7 when making adds or changes. The configurator program will set/reset them at sort time.
2. Chain bit (byte 02 bit 1) is used to pass two or more entries to a MAP program or diagnostic. Wrong use of the chain bit can cause MAP failures. For example: a missing chain bit causes needed information not to be available to the MAP. Extra chain bits can cause MAPs to be bypassed during an auto run.

03 through 09	Device - dependent data. Describes the device to its associated MAPs/diagnostics. If it is wrong, failures will occur. The auto verify performed when the configurator loads does not check device-dependent data.
0A through 0D	Reserved
0E through 0F	Device ID word

3.17.4 Alternate Console Devices

TTY Console

DA 40 00 00 00 00 00 00 00 00 00 00 00 00 00 00 10

4979 Display Station *

DA 42 00 00 00 00 00 00 00 00 00 00 00 00 00 04 06

4978 Display Station

DA 45 00 00 00 00 00 00 00 00 00 00 00 00 00 04 0E

4974 Matrix Printer**

DA 62 00 00 00 00 00 00 00 00 00 00 00 00 00 02 06

80610 Display Station *

DA 42 00 00 00 00 00 00 00 00 00 00 00 00 00 04 06

80420 Matrix Printer**

DA 62 00 00 00 00 00 00 00 00 00 00 00 00 00 02 06

80450 Band Printer

DA 66 00 00 00 00 00 00 00 00 00 00 00 00 00 03 06

3101 Communication Attachment Board

DA 81 00 00 00 00 00 00 00 00 00 00 00 00 00 2X 36

DA E6 00 00 00 00 00 00 00 00 00 00 00 00 00 3X 36

DA E8 00 00 00 00 00 00 00 00 00 00 00 00 00 10 0E

DA E9 00 00 00 00 00 00 00 00 00 00 00 00 00 2X 0E

DA EA 00 00 00 00 00 00 00 00 00 00 00 00 00 2X 16

3.17.5 Load Devices

4964 Diskette

DA 48 00 00 00 00 00 00 00 00 00 00 00 00 00 01 06

80210 Flexible Disk Drive***

DA 46 00 00 00 00 00 00 00 00 00 00 00 00 00 01 06

4966 Diskette Magazine

DA 4A 00 00 00 00 00 00 00 00 00 00 00 00 00 01 26

4965 Dual Density Diskette

DA 4B 00 00 00 00 00 00 00 00 00 00 00 00 00 52 12

*Device type 44 must be used when configuring an IBM diskette.
 **Device type 64 must be used when configuring an IBM diskette.
 ***Format also applies to 80240 series MMDs (contains an FDD packaged in the MMD enclosure).

3.18 COMMON HALT LIST

Halts are identified by the Wait indicator on the operator/programmer panel being lit.

3.18.1 Diagnostic Control Program (DCP) Halts

- 3800 Ready -- enter any valid command.
- 3801 Bad condition code received from alternate console.
Enter continue command (B),6,(I),(I)
- 3802 Program check -- see MAP 3871.
- 3803 Machine check -- see MAP 3871.
- 3804 Power thermal warning.
- 3805 Program terminated -- enter any valid command.
- 3806 Invalid request -- enter any valid command.
- 3807 Alternate console is off during testing.
- 3808 Alternate console is on and test is complete.
- 3809 Unexpected interrupt -- R0 level 3 contains the interrupt status byte. Location 180A contains the MAP number.
- 380A Start -- the program has started.
- 380B Diskette error -- IPL and try again. If it still fails, try a different diskette.
- 380C Program not found -- there is no VTOC entry for the requested program.
- 3810 Was not expecting reply (F command) data.
- 3813 Received a command sequence -- to execute, press the console Interrupt switch.
To delete the command, change the buffer contents and press the console Interrupt switch. Halt 3814 will be displayed and the command can be entered again.
- 3814 Enter data.
- 3815 Cannot continue execution -- IPL and try again. If it still fails call for assistance.

- 3816 Change keyboard definition for 4978 display. Press any key within 15 seconds and halt 3817 will be displayed.
- 3817 Press the key requested for keyboard definition.
- FFFF Command or reply has been accepted.

3.18.2 Configurator Halts

- 3820 This diskette has not been configured before. Enter continue command. (B),6,(I),(I)
- 3821 Enter alternate console device address and device type.
Example:
(B),1F,(I),(B),0040,(I),(I) to assign TTY as alternate console or:
(B),1F,(I),(B),0000,(I),(I) to assign programmer panel as alternate console
- 3822 Configuration Error(s) on System. Reply with one of the following:
01 = Terminate
02 = Print all errors
03 = Print options
04 = Bypass TCS errors
(B),1F,(I),(B),XX00,(I),(I) where XX = chosen option.
- 3823 Invalid Entry. Enter the correct entry.
- 3826 Changes Not Saved. Enter 0D to save the configuration table: (B),1F,(I),0D00,(I),(I) Enter 05 to terminate (changes made will be lost): (B),1F,(I),0500,(I),(I)
- 3827 Enter Correct Processor Type.
22 = 4952 processor
23 = 4953 processor
25 = 4955 processor
(B),1F,(I),(B),XX00,(I),(I) where XX = processor type.
- 3828 Device Address or Type incorrectly entered. Enter correct parameter.
- 3829 Alternate console not found. This is a warning message. If the console is a printer or a programmer's console, enter a 6 to continue.
- 382A Secure the Customer Interface. Enter continue command when customer interface is secure. (B),6,(I),(I)
- 382B Is an OEMI Card Installed? Reply 00 = no, 01 = yes.
(B),1F,(I),(B),0000 or 0100,(I),(I)
- 382C Copy Configuration Table to Another Diskette? Reply 0D to copy table or 05 to terminate.
(B),1F,(I),(B),0D00 or 0500,(I),(I)

- 382D Is Floating Point Feature Installed? Reply 00 = no,
01 = yes. (B),1F,(I),(B),0000 or 0100,(I),(I)
- 382E Option Table is Available for Entry. Enter option
table information per the following:
01 = Print table
02 = Delete
03 = Change
04 = Alternate console*
05 = Terminate
06 = Processor type
07 = Two channel switch
08 = Storage size
09 = Print system equipment
0A = Add
0B = Bypass option table
0C = Configure system*
0D = Diskette write*
0E = OEMI
0F = Floating point
10 = Combine
(B),1F,(I),(B),XX00,(I),(I) where XX = chosen option.
- 382F Initial Auto Configuration. The diskette has an alter-
nate console assigned. The initial auto configuration
must be completed. Enter 6 to continue. (B),6,(I),(I)
- 3831 Enter Station Address ID = XY. X = cable address
(0 - 3), Y = station address (0 - 3).
- 3832 Programmer or CE Console is the Assigned Alternate
Console. Enter 6 to continue. (B),6,(I),(I)
- 3833 OIO (Operator I/O) Condition Code. R3 = condition code,
R4 = AATT where: AA = device address and TT = device
type
- 3834 Error - More than one two-channel switch disappeared
after a select switch was changed. If there is no
alternate console, enter 6 to continue.
(B),6,(I),(I)
- 3835 Interrupt Condition Code. R3 = interrupt condition
code, R4 = AATT where: AA = device address and
TT = Device type
- 3836 Is Customer Using Common I/O? Reply 00 = no, 01 = yes.
(B),1F,(I),(B),0000 or 0100,(I),(I)
- 3837 Error - A two-channel switch did not disappear after a
select switch was changed. If there is no alternate
console, enter 6 to continue. (B),6,(I),(I)

*A new alternate console definition or system configuration must
be followed by a diskette write to save the new information on
the diskette.

- 3838 RPQ Diagnostics are Installed on System.
- 383A Select Entry Number in Configurator Table to be Altered. Enter (B),1F,(I),(B),XX00,(I),(I) where: XX = table entry number.
- 383B Enter the Desired Entry. Format is:
AATT,(I),(B),0000,(I),(B),IDID,(I),(B),0000(I),(B),0000,
(I),(B),0000,(I),(B),0000,(I),(B),IDID
where: AA = device address, TT = device type, IDID =
device read ID code.
(B),8F,(I),(B),entry per above,(I),(I)
- 383C Error - Cant find reflected two-channel switch. If there is no alternate console, enter 6 to continue.
(B),6,(I),(I)
- 383D Insert the FROM Diskette. Used with the merge function (10) and the print configuration function (20). Insert the FROM diskette in the disk unit and answer 01 when complete. (B),1F,(I),(B),0100,(I),(I)
- 383E Insert the BASIC Diskette. Used with the merge function (10) and the print configuration function (20). Remove the FROM diskette, insert the BASIC diskette and answer 01 when complete. (B),1F,(I),(B),0100,(I),(I)
- 3840 Error - A device is in the hardware, but not in the configuration table. Level 3, R3 contains the address (AA00). Level 3, R4 contains the ID word. Record the contents of R3 and R4. Enter the continue command.
(B),6,(I),(I).
- 3841 Error - A device is in the table, but not in the hardware. Level 3, R3 contains the device address and configuration table entry number (AAEE). Record the contents of R3 and enter the continue command.
(B),6,(I),(I).
- 3842 Error - The ID word received does not match the ID word stored in the configurator table for this address. Level 3, R3 contains the device address and configuration table entry number (AAEE). Level 3, R4 contains the ID word received. Record the contents of R3 and R4. Enter continue command. (B),6,(I),(I).
- 3843 Error - An entry in the configurator table has a device type and device ID that do not match. Level 3, R3 contains the device address and configuration table entry number (AAEE). Record the contents of R3 and enter continue command.
(B),6,(I),(I).

- 3844 Error - Received a bad condition code in response to a Read ID command.
Level 3, R3 contains the device address and condition code (AACC).
Record the contents of R3 and enter continue command:
(B),6,(I),(I).
- 3845 Error - Two-channel switch was in the wrong position.
If there is no alternate console, enter 6 to continue.
(B),6,(I),(I)
- 3846 Enter New Configurator Table Data:
(B),8F,(I),(B),0001,(I),(B),0203,(I),(B),0405,(I),(B),0607,(I),(B),0809,(I),(B),0A0B,(I),(B),0C0D,(I),(B),0E0F,(I),(I)
- 3848 Error - Entries do not agree. R1 = entry address of FROM table, R2 = Entry address of TO table.
- 3849 Alternate Console Error. The response from the alternate console to a Read ID command does not match that of a supported console device.
Level 3, R3 contains the device address and type read from the configurator table (AATT).
R4 contains the response from the read ID command.
Record R3 and R4.
Enter continue command: (B),6,(I),(I)
Halt 382E will be displayed.
If R3 has the correct device address and type for the alternate console, the console is returning a bad ID.
Enter: (B),1F,(I),(B),0500,(I),(I), the configurator then terminates at halt 3800.
Enter the assign programmer console command:
(B),0005,(I),(I), this disables the alternate console.
If R3 does not contain the correct information, change the alternate console bytes at address 3008 and 3009 to the address and type for the console device.
To write the record to the diskette, enter:
(B),1F,(I),(B),0100,(I),(I)
- 384A Configuration Table is Full.
- 384B Configurator Chain (Byte 02 Bit 1) is Too Long. See MAP 3880.
- 384C Configuration Display Message. See alternate console display for message.
- 384D The VTOC Does Not Contain a Configurator Table (U38F1).
Load the general utility program (38F9) and copy 38F1 from another diskette.

- 384F Duplicate Address AA, Entry EE and EE. There is a duplicate address in the configuration table. If there is no alternate console assigned, Level 3 R2 has the device address, R3 and R4 have the table entry numbers. Enter 6 to continue. (B),6,(I),(I)
- 3850 Enter Inner Storage Size.
03 = 16K
07 = 32K
0B = 48K
0F = 64K
(B),1F,(I),(B),XX00,(I),(I) where XX = 03,07,0B, or 0F
- 3851 Is Address Translator Installed? Reply 01 = yes,
00 = no. (B),1F,(I),(B),0000 or 0100,(I),(I)
- 3852 Enter Outer Storage Size. OXXX = decimal number of 16K
outer storage blocks.
(B),1F,(I),(B),OXXX,(I),(I)
- 3853 ACCA SL Installed (Async Control Comm Adapter, Single
Line). See MAP 13.
- 3854 AACA ML Installed (Async Control Comm Adapter, Multi-
line) See MAP 13
- 3855 BSCA SL Installed (Bi-Sync Comm Adapter, Single
Line). See MAP 13.
- 3856 BSCA ML Installed (Bi-Sync Comm Adapter, Multi-
line). See MAP 13.
- 3857 SDLC Installed (Synchronous Data Link Control).
See MAP 13.
- 3858 Error - The specify code entered is not correct.
- 3859 Error - The specify code entered is correct but does
not match the card.
- 385A Remote IPL? Reply 00 = no, 01 = yes.
(B),1F,(I),(B),0000 or 0100,(I),(I)
- 385B Error - A multiline controller has an address domain.
See MAP 13.
- 385C Error - No interrupt. See MAP 13.
- 385D Two-Channel Switch Console Message. Change the select
switch to the processor you are using. See MAP 13.
- 385E Two-Channel Switch Console Message. There is more than
one two-channel switch console installed. See MAP 13.

- 385F Two-Channel Switch Console Message. There is at least one two-channel switch console installed. See MAP 13.
- 3860 Programmable Communications Subsystem Error Message. See MAP 13.
- 3861 Programmable Communications Subsystem Error Message. See MAP 13.
- 3862 Programmable Communications Subsystem Entry. See MAP 13.
- 3863 Is Alternate Console Being Used Installed as Common I/O? Reply 00 = no, 01 = yes.
(B),1F,(I),(B),0000 or 0100,(I),(I)
- 3864 Is a Programmer or CE Console Installed on the Processor Being Used? Reply 00 = no, 01 = yes.
(B),1F,(I),(B),0000 or 0100,(I),(I)
- 3865 Is Alternate Console Being Used Installed in Farthest Common I/O? Reply 00 = no, 01 = yes.
(B),1F,(I),(B),0000 or 0100,(I),(I)
- 3866 The Alternate Console Disappeared After the Two-Channel Switch was Changed. See MAP 13.
- 3867 The Alternate Console Did Not Appear After the Two-Channel Switch was Changed. See MAP 13.
- 3868 The Alternate Console Did Not Disappear After the Two-Channel Switch was Changed. See MAP 13.
- 3869 Obtain a Programmer or CE Console. The configuration program needs a programmer or CE console to continue. The configuration program has been terminated.
- 386A ML COMM Installed (Multiline Communication). See MAP 13.
- 386B Tape Drive Device Address. 00=NRZI, 01=Dual, FF=PE.
- 386C Multifunction Attachment Installed. See MAP 13.

3.18.3 MAP Diagnostic Integration (MDI) Halts

3C01 Enter address of device to be tested.

- From operator/programmer panel:
(B),1F,(I),(B),XX00,(I),(I)
- From alternate console: FXX

- 3C05 Enter starting step number for loop
- From operator/programmer panel:
(B), lF, (I), (B), XXXX, (I), (I)
 - From alternate console: FXXXX
- 3C06 Enter ending step number for loop
- Same procedure as halt 3C05
- 3C08 Device at address entered in halt 3C01 is not the type address tested by the requested program. Enter the correct address.
- 3C0E No device of that type was found in the configurator table, or the MAP executed and attempted to load a MAP not in VTOC.

3.19 COMMANDS

The commands are described here as they would be entered from the operator/programmer panel. These same commands can be entered from an alternate console by keying in the command character followed by data, where applicable, and pressing the ENTER key (Carriage Return key on TTY). No commas are required.

3.19.1 Single Character Commands (No Data)

Enter as follows: (B) = Data Buffer key, (I) = Console Interrupt key.

NOTE

Commands must be entered in bits 12 through 15 of the data buffer.

<u>Command</u>	<u>Key Sequence</u>	<u>Result</u>
5	(B),5,(I),(I)	Disable alternate console and assign operator/programmer panel
6	(B),6,(I),(I)	Continue program execution
9	(B),9,(I),(I)	Terminate program
A	(B),A,(I),(I)	Start execution
0*	(B),0,(I),(I)	Answer question 'no'
1*	(B),1,(I),(I)	Answer question 'yes'

*Commands "0" and "1" apply to test program responses only. Use the "F" Command to answer yes and no to a question in a utility program, for example: F1 = yes, F0 = no.

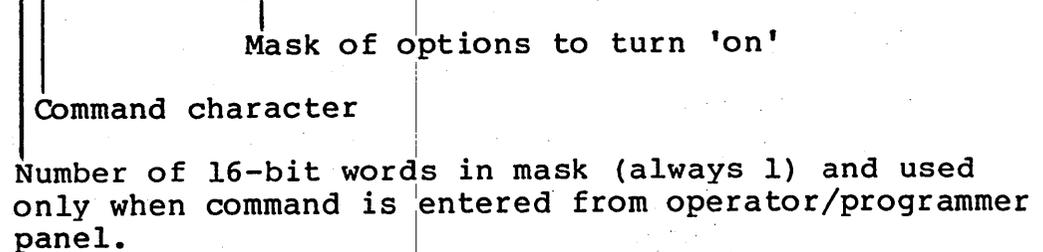
3.19.2 Commands that use a Program ID (Commands B and C).

These commands load a program. The program ID (XXXX) must be entered with one of the following commands:

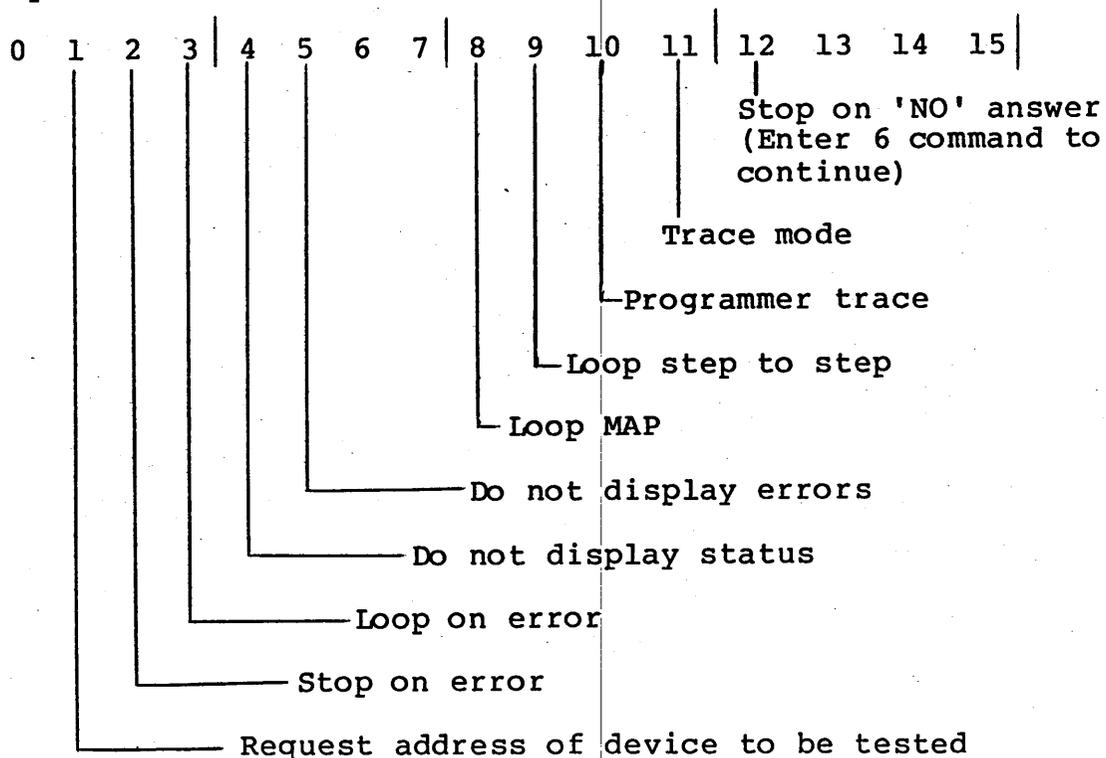
<u>Command</u>	<u>Key Sequence</u>	<u>Result</u>
B	(B), B, (I), (B), XXXX, (I), (I)	Program XXXX loads and goes
C	(B), C, (I), (B), XXXX, (I), (I)	Program XXXX loads and waits for option selection command 'D'.

3.19.3 Command to set Option Bits 'On' (Command D).

Enter: (B), 1D, (I), (B), XXXX, (I), (I)



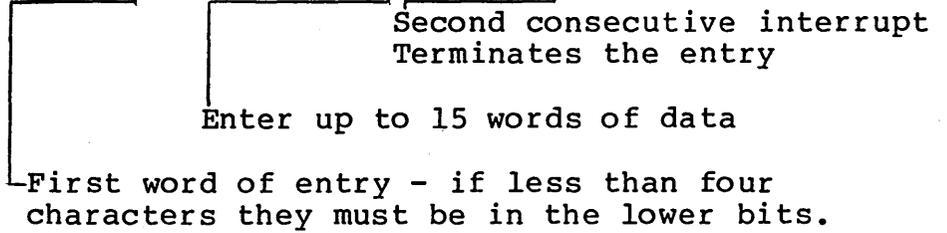
Option bits are as follows:



This command must be followed by the 'A' command to start the execution of the program.

3.19.4 Command to Enter Variable Data (Reply to a Program),
(Command F).

Enter: (B),XF,(I),(B),XXXX,(I),(B),XXXX,(I),(I)



Number of 16-bit words in this entry must use a value
between 1 and F. Used only when F command is entered
from the operator/programmer panel.

3.20 HIGH VOLTAGE ASSEMBLY (RECTIFIER/BLEEDER ASSEMBLY)

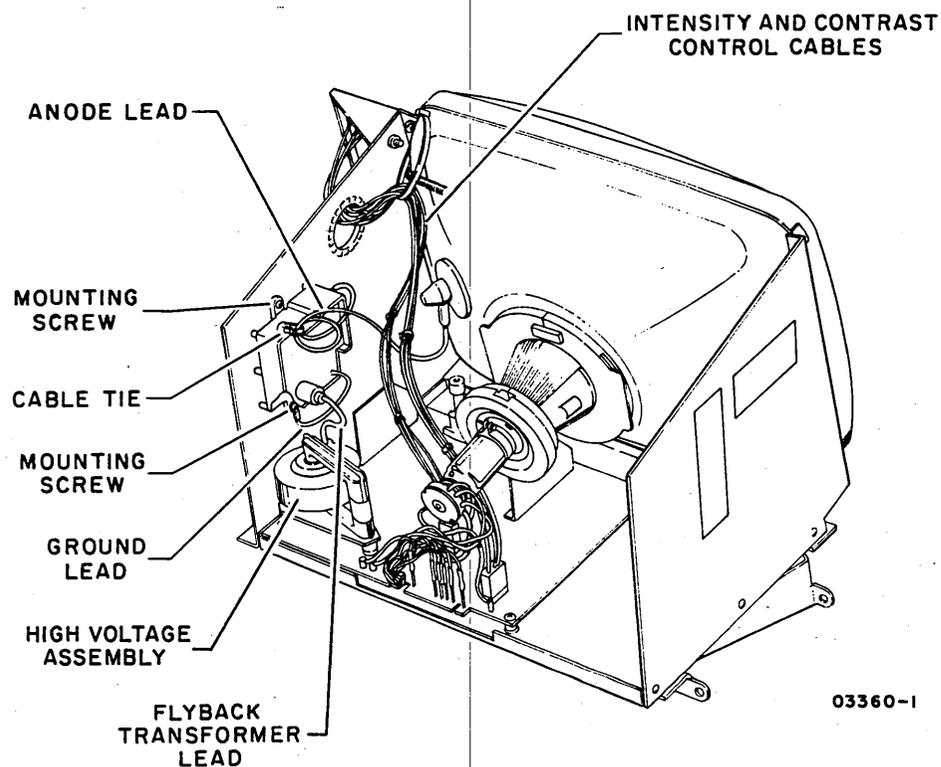
3.20.1 Removal-Replacement

1. Power off display station (para 3.1) and unplug ac power cord from site outlet.
2. Remove hood (para 3.2).

WARNING

Complete discharge of high voltage does not occur until approximately 30 seconds after powering off display station.

3. Disconnect anode lead from crt.
4. Disconnect flyback transformer lead from high voltage assembly.
5. Remove two screws mounting high voltage assembly to chassis frame.
6. When reinstalling; make sure that ground lead is connected to lower mounting screw, anode lead is tied off at high voltage assembly, and that anode lead is routed beneath intensity and contrast control cables.

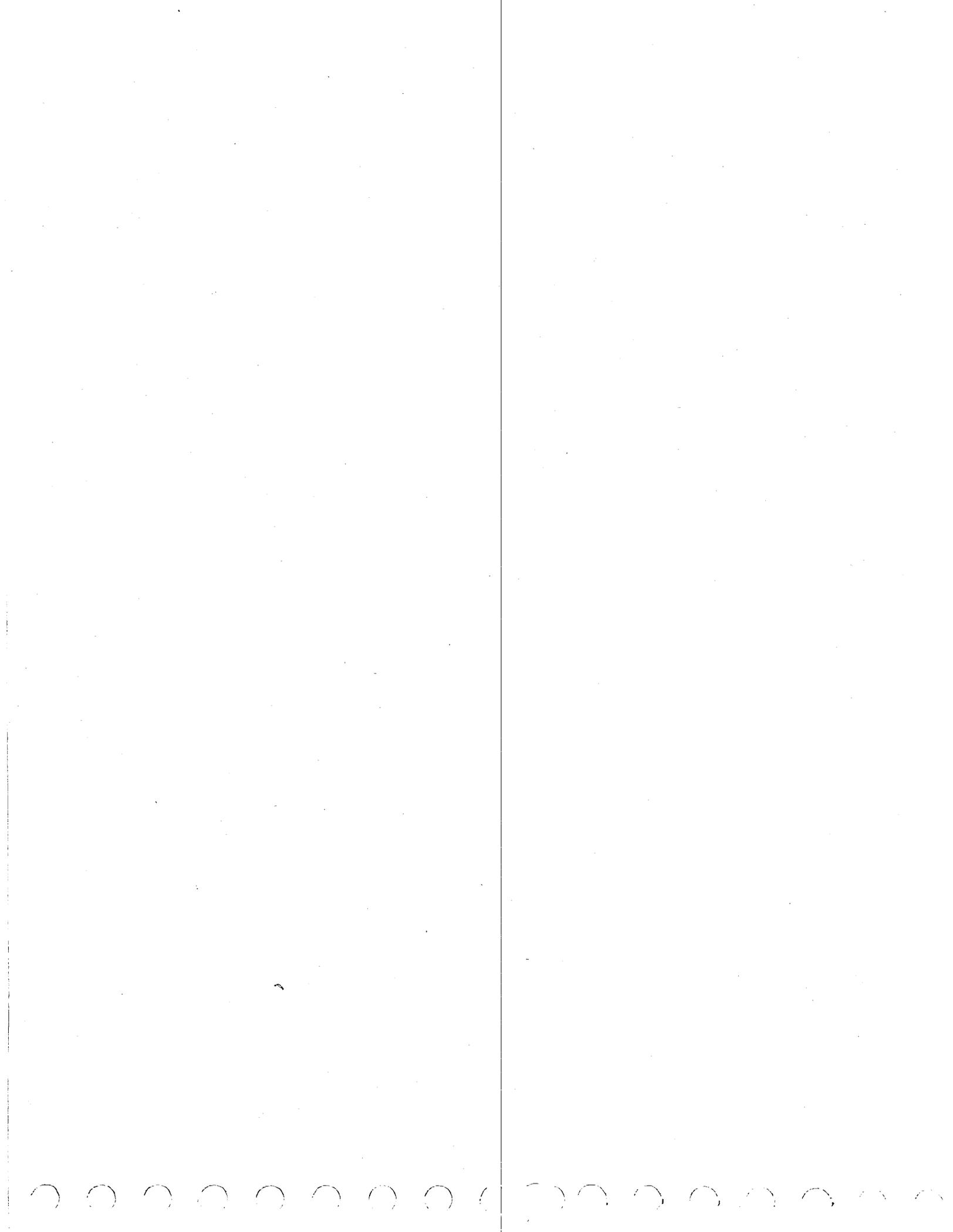


03360-1

High Voltage Assembly Details

3.20.2 Repair-Replacement

No repair or adjustment is applicable, replace if faulty. Dispose of faulty high voltage assembly.



This section contains spare parts lists and interconnect diagrams for the display station and attachment cards.

DWN	R. Trautman	6/78	CONTROL DATA	TITLE	VIKING DISPLAY TERMINAL	PREFIX	DOCUMENT NO.	REV
CHKD	E. Trautman	6-28-78		FIRST USED ON	CC626A/B/C/D	SPL	66305700 THRU 66305709	K
ENG	J. P. ...	6-21-78		CODE IDENT				
MFG								
APPR							SHEET 1 of 4	

SHEET REVISION STATUS					REVISION RECORD				
4	3	2	1	REV	ECO	DESCRIPTION	DRFT	DATE	APP
					50001-87	RELEASED CLASS B		6/2/78	J.P.
				01	50275	ADDED CC626C			
		01	02	02	50309	ADDED CC626D	WJG	7-4-78	J.P.
		A	A	A	13002-83	RELEASED CLASS A		12/1/78	WJG
		B	A	B	13282	FIN 11 WAS 90445854 ADD FIN'S 16-19	WJG	4-11-79	WJG
		C	A	C	13518	FIN 11 WAS 90446050	WJG	6-28-79	WJG
		D	A	D	13474	FIN 12 WAS 61408061	WJG	7-11-79	WJG
		E	A	E	13585	FIN 10 WAS 90446118	BR	7/3/79	WJG
		F	F	F	13819	ADD FIN 20, 21, & PG 4	BR	11/2/79	WJG
		F	G	G	13863	FIN 11 WAS 90446135	WJG	2-8-80	WJG
		H	G	H	14013	MOVED FIN 22 71472151	WJG	5-22-80	WJG
		J	J	J	14327	CHG FIN 11, ADD FIN 23, 24	WJG	11-11-80	WJG
		K	K	K	14732	REVISED PER ECO	WJG	11-4-80	WJG

NOTES:

- See sheet two {2} for equipment/tab cross reference.
- On sheet three {3} where REF is used, there is one in each equipment, but, it is a warehouse spare only.

DETACHED LISTS

AA3180 REV. 8-77

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CONTROL DATA		CODE IDENT	SHEET 2	SPL	DOCUMENT NO.	REV.
		15920			66305700	A
EQUIPMENT	SPL P/N	EQUIPMENT CONFIG.		TLA		
CC626A	66305700	15631281		15631282		
CC626B	66305701	15631283		15631284		
CC626C	66305702	15631285		15631286		
CC626D	66305703	15631287		15631288		

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DWN	U. Glaser	1/81	CONTROL DATA	TITLE	VIKING DISPLAY TERMINAL	PREFIX	DOCUMENT NO.	REV.					
CHKD	<i>W. H. Hare</i>	1/71		FIRST USED ON	CC626-E/G	SPL	66314154 THRU 66314163	A					
ENG	<i>W. H. Hare</i>	1/71		CODE IDENT	15920	SHEET 1 of 4							
MFG	<i>W. H. Hare</i>	3-2-8											
APPR	<i>W. H. Hare</i>	2-2-81											
SHEET REVISION STATUS				REVISION RECORD									
				4	3	2	1	REV	ECO	DESCRIPTION	DRFT	DATE	APP
				A	A	A	A	A	13489-33	RELEASED CLASS "A"	/	3/6/81	Mch
NOTES: <ol style="list-style-type: none"> See sheet two (2) for equipment/tab cross reference. Where REF is used, there is one in each equipment, but, it is a warehouse space only. 													
											DETACHED LISTS		

AA3180 REV. 6/71

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 CONTROL DATA CORPORATION		CODE IDENT	15920	SHEET	2	PREFIX	SPL	DOCUMENT NO.	66314154/63	REV.	A
EQUIPMENT	SPL P/N	EQUIPMENT CONFIG.		TLA							
CC626E	66314154	15632651		15632652							
CC626G	66314155	15632653		15632654							

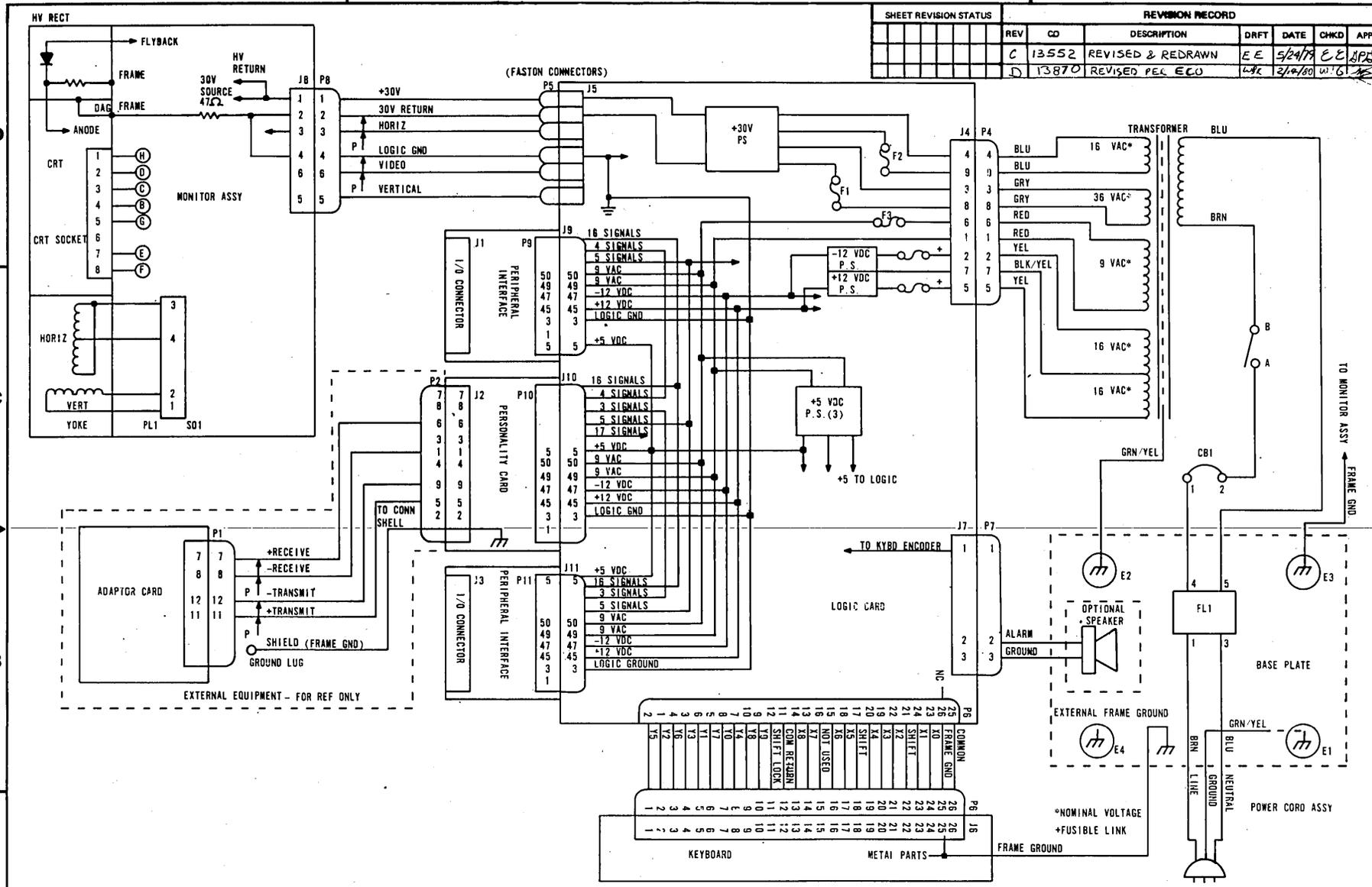
AA3185

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SHEET REVISION STATUS		REVISION RECORD				
REV	CD	DESCRIPTION	DRFT	DATE	CHKD	APP
C	13552	REVISED & REDRAWN	EE	5/24/78	E.E.	J.P.D.
D	13870	REVISED PER E.C.O.	L.R.	2/2/80	W.L.G.	J.P.D.

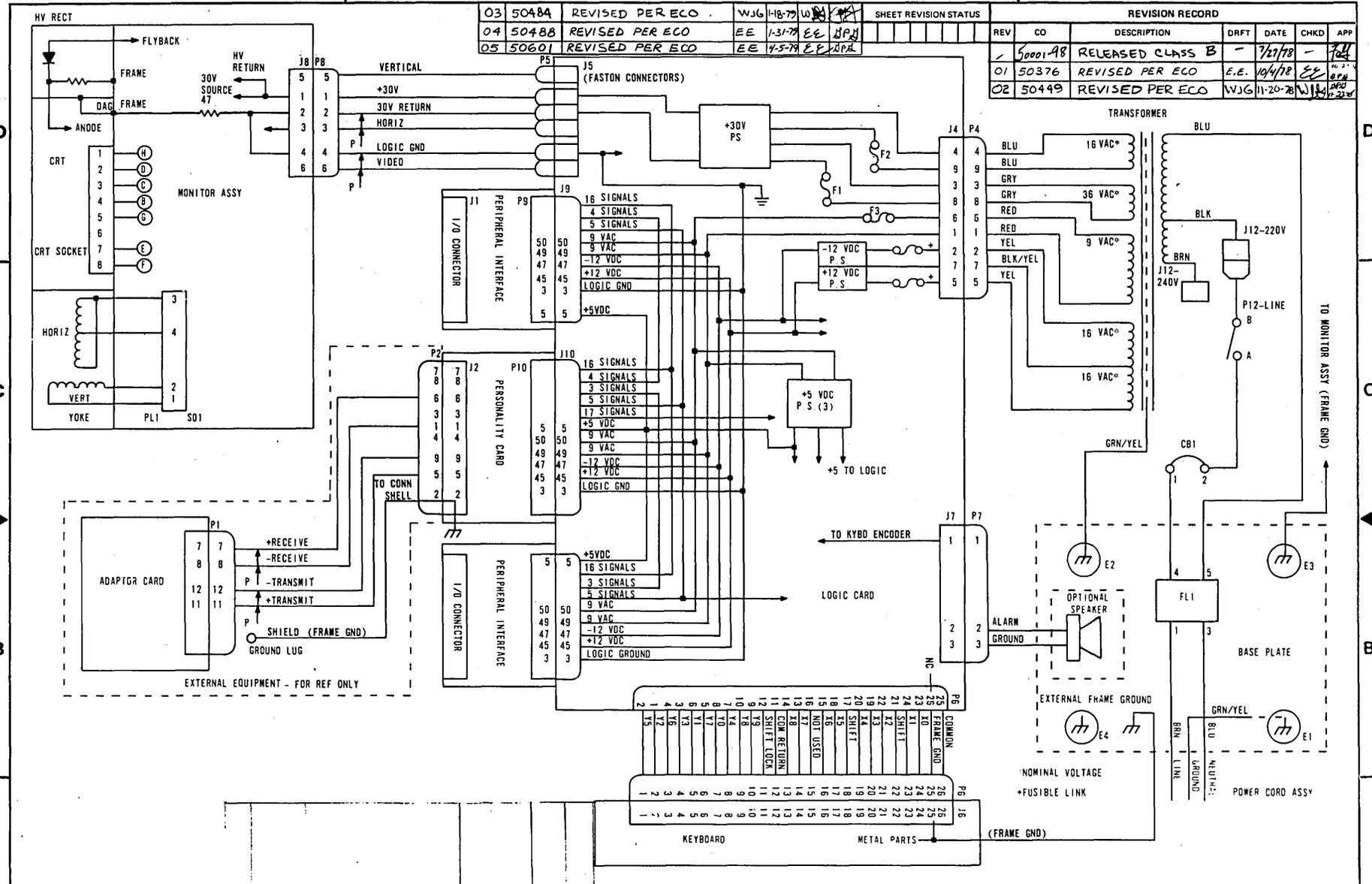


REFERENCE DRAWING		TITLE	
		AC/DC AND SIGNAL INTERCONNECTION DIAGRAM DISPLAY STATION, 120V	
FIRST USED ON	CC626A	CODE IDENT	15920
DWN	Mary Dietz 7/5/78	DRAWING NO	62201018
CHKD	7/18/78	SCALE	CROSS REF NO
ENGR	J.P.D. 7/18/78	SHEET	OF
MFG	4/30/79		
APPR	11.30.79		

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SHEET REVISION STATUS				REVISION RECORD			
REV	CO	DESCRIPTION	DRFT	DATE	CHKD	APP	
03	50484	REVISED PER ECO					
04	50488	REVISED PER ECO					
05	50601	REVISED PER ECO					
01	5001-98	RELEASED CLASS B		7/27/78			
01	50376	REVISED PER ECO		10/4/78			
02	50449	REVISED PER ECO		11-20-78			



REV	CO	DESCRIPTION	DATE	CHKD	APP
B	13904	REVISED PER ECO	1/20/80		
A	13471-29	RELEASED CLASS A	9-4-79		

REFERENCE DRAWING		CONTROL DATA	TITLE	
		CC626B	AC/DC AND SIGNAL INTERCONNECTION DIAGRAM DISPLAY STATION, 220V/240V	
FIRST USED ON				
DWN	Mary Dietz 7-21-78			
CHKD	E. J. Hill 7-25-78			
ENGR	J. P. Hill 7-25-78			
MFG	7-25-78			
APPR	E. J. Hill 8-23-77			
COMPONENTS, EXCEPT AS NOTED			CODE IDENT	DRAWING NO
RES	TOLERANCE	VALUE	15920	C 62201022
CAP	TOLERANCE	VALUE		
SCALE			CROSS REF NO	SHEET / OF /

This appendix contains troubleshooting information for the display station. A Structured Analysis Method (SAM) format is used to document the diagnostic tests and associated paper-only maintenance activities. SAM listings numbered 4200, 4210, 4220, and 4230 cover the display station diagnostic tests residing on the CDC BASIC diagnostic diskette. SAMs 4270 and 4271 are paper-only listings that provide supplemental maintenance troubleshooting information.

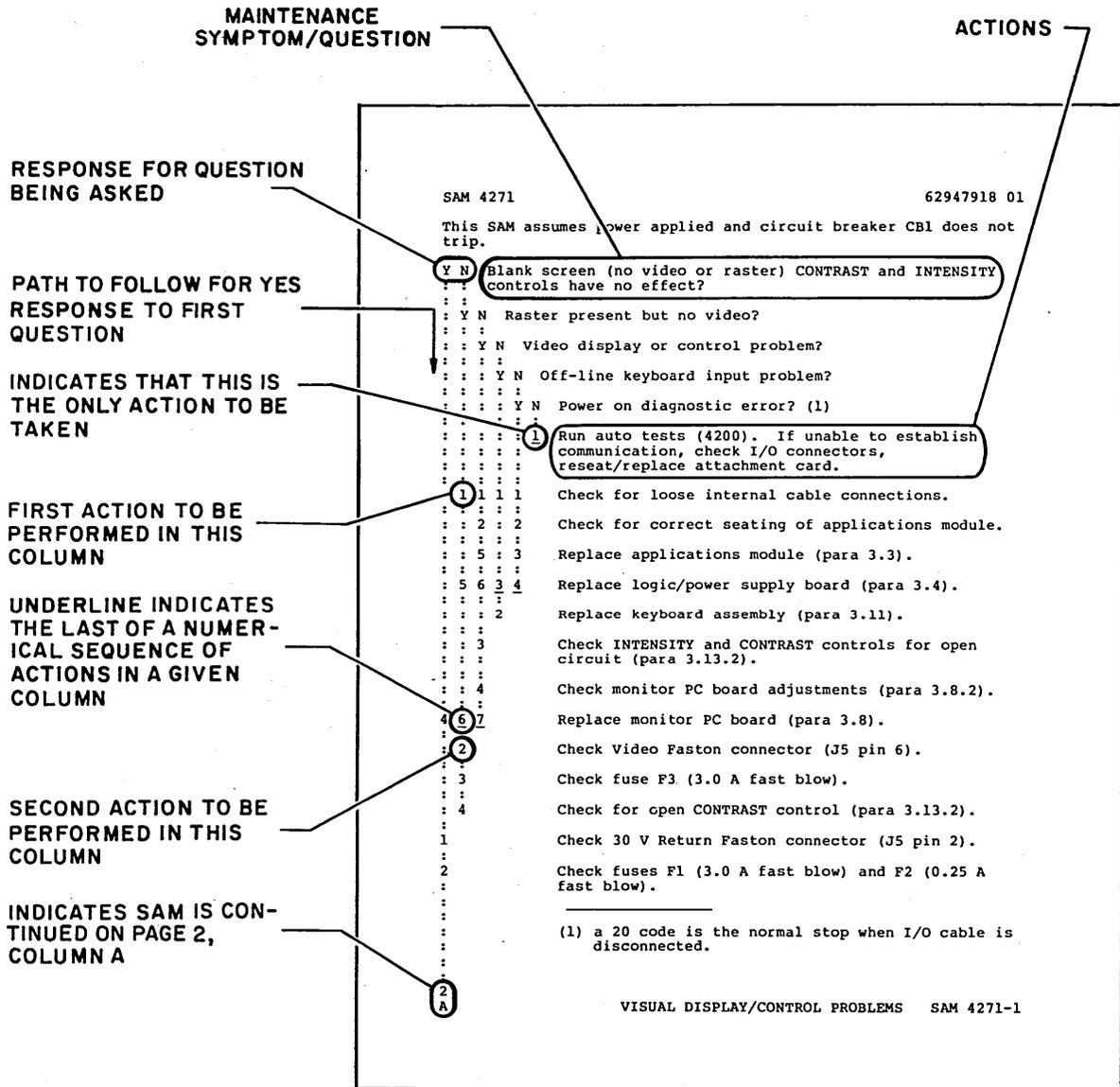
This appendix also contains an explanation of the SAM format, a description of the display station diagnostic tests, and cycle steal status words.

Information is organized as follows:

- Explanation of SAM format -- Describes the format and method of reading the SAMs.
- Diagnostic Test Descriptions -- Describes briefly each of the display station diagnostic tests contained on the CDC BASIC diskette.
- Cycle Steal Status Words -- Describes the significance of each cycle steal status word.
- SAM Listings -- A tabulation of SAMs covering the diagnostic tests and paper-only troubleshooting information.

EXPLANATION OF SAM FORMAT

A SAM listing is a specialized format used to document the flow of a diagnostic program and to present troubleshooting information in a logical manner. Each SAM provides a sequential listing of statements and/or questions that can be answered with a yes or no response. The response made to a particular question leads the user to either the next question to be answered, or to a specific action (or numerical sequence of actions) to be taken for maintenance purposes.



03388

Figure A-2. Paper-Only SAM Example

DIAGNOSTIC TEST DESCRIPTIONS

The following paragraphs provide a brief description of the CDC display station diagnostic tests residing on the CDC BASIC diskette. The first three tests are automatically linked together (auto tests) and the fourth test requires operator interaction (manual test). The auto tests execute consecutively beginning with the test number entered and progressing until the last auto test has been executed or until the first test error is detected. The manual test requires a separate entry to be executed.

NOTE

Tests are initiated by entering a B followed by the appropriate test number. Refer to the heading Display Station and Attachment Card Checkout in section 2 of this manual for test initiation procedure.

AUTO TESTS

4200 Attachment Card Test, Part 1

This diagnostic tests the operation of the attachment card under direct program control (DPC) using all legal DPC commands and various illegal command codes. The condition codes returned are verified in each case. The Start Diagnostic commands are also used under cycle steal mode to verify the read only memory (ROM) and random access memory (RAM) located on the attachment card, and to verify that the applications module is operating. Cycle steal status is used, but only to determine if the display station is ready. This test is automatically linked to test 4210.

4210 Attachment Card Test, Part 2

This diagnostic test is executed in cycle steal mode and is a negative test. For each Start command, an incorrect parameter exists in the DCB. The returned condition code and ISB are verified for the correct information as to the DCB specification check. This test is automatically linked to test 4220.

4220 Display Station Test

This diagnostic test is executed in cycle steal mode and tests the results of various settings of DCB control words 0 and 4. The program also tests all locations on the display screen by writing bit patterns to the display, reading the data back and comparing the write and read data buffers. If the attachment board under test is a FH501-B, lowercase characters and graphics will be run. This test completes the sequence of automatically linked tests.

MANUAL TEST

4230 Keyboard Input Test

This is a manual diagnostic test that verifies correct operation of the keyboard and provides a test pattern of all H characters for crt adjustments. The test is initiated at the CPU, but after the test module begins execution, prompts then appear on the display screen of the device being tested. The customer engineer is asked to enter data on the keyboard and to verify the results by observing the response appearing on the display screen.

PAPER-ONLY SAM LISTINGS

Two paper-only SAMs (4270 and 4271) provide supplemental maintenance troubleshooting information. These SAMs should be used for basic display station problems dealing with power faults and visual display/control problems, self-test errors, etc.

CYCLE STEAL STATUS WORDS

A Start Cycle Steal Status command transfers status information to the Series/1 processor. Significance of the various status words is described in the following paragraphs. Refer to para 3.16 for the procedure to be used to obtain the cycle steal status words during an error abort when using the operator/programmer panel as the alternate console.

CYCLE STEAL STATUS WORD 0

The residual address of the last attempted cycle steal operation (not a Start Cycle Status command) resides in the two bytes of cycle steal status word 0. If the last cycle steal attempted was at an even byte address, the residual address is even. In all other cases, the residual address is odd.

CYCLE STEAL STATUS WORD 1

The two bytes of cycle steal status word 1 contain display control status bits and the address of the display cursor per the following format.

R	K	B	Cursor Address													
0	X	X	X	0	X	X	X	X	X	X	X	X	X	X	X	X
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

Bits 0 and 4 of word 1 are not used and must be zeros.

Bit 1 is a ready status bit. When the display station is off or not in an operable state, this bit is set to 1.

Bit 2 is a keyboard status bit. When the keyboard is in a lock out condition, this bit is set to 1. The lock out condition may be the result of the display going from not ready to ready, the operator keying an interrupt request key, or a previous Start command. The condition is indicated by a blanked cursor. During a keyboard lock out, the cursor address, keyboard status, and display blank status are static until altered by an appropriate Start command.

Bit 3 is the display blank status bit. The bit is set to 1 to indicate the display screen, including the cursor, is blanked.

Bits 5 through 15 contain the cursor address as a binary value. The address represents the screen address of the cursor. Bit 15 is the least significant bit.

TABLE A-1. START DCB CHECKS (CONTD)

Bits				DCB Parameter Error
8	9	10	11	
1	0	0	1	The shift count is greater than the total number of character lines contained in the shift parameter window range, low address and high address.
1	0	1	0	The DCB chaining address is odd.
1	0	1	1	The byte count is greater than 1920, the maximum allowed for a Start command.
*	1	0	1	The byte count is greater than 1920 (0780 hexadecimal) or the byte count is too large with a pre-cursor address set in line 25.
1	1	0	0	} Not defined.
1	1	1	1	
*Applies only to 80160-12 and 80610-16 models.				

Bits 12 through 15 of cycle steal status word 2 contain a hexadecimally coded number associated with operation checks that cause an exception interrupt with only the device-dependent status available bit (0) set in the ISB. See table A-2.

TABLE A-2. OPERATION CHECKS

Bits				Operational Error
12	13	14	15	
0	0	0	0	No operational error occurred.
0	0	0	1	End of field (EOF) was detected prior to byte count reaching zero during an operation with EOF indicator set to 1 in control word.
0	0	1	0	End of line (EOL) was detected prior to byte count reaching zero during an operation with EOL indicator set to 1 in control word.
0	0	1	1	End of screen was detected prior to the byte count reaching zero during an operation.
0	1	0	0	} Not defined.
1	1	1	1	

NOTICE

Before executing diagnostic tests, read and understand the following:

- Diagnostic test execution assumes that correct voltages are present within the display station and Series/1. Refer to paper-only SAM 4270 to troubleshoot power faults in the display station. Refer to Installation and Check-out, section 2 of this manual, to verify correct Series/1 I/O bus voltage.
- If diagnostic tests end abnormally with no message or a meaningless abort message, reseal/replace attachment card and rerun tests. Attachment card replacement requires setting switches to select device address and jumpering for I/O cable length being used (refer to attachment card installation instructions, section 2 of this manual for the 80610-10, 80610-11, 80610-14, and 80610-15 models. Refer to appendix B for 80610-12 and 80610-16 models).
- Diagnostic test halts -- When the halt code is a diagnostic test number, the Level 3 registers contain the following (see exceptions listed under Deficiencies heading below):

R0 = Step number
R1 = Device address and type code (AATT)
R2 = Unit address (if used)
- Rerun auto diagnostics (enter B4200) to verify correct operation after performing maintenance on the display station.
- Always power down equipment before performing removal/replacement of logic cards and modules. Turn off Series/1 power before reseating or replacing attachment card.

0


```

A B C
4 4 4
: : :
059 : : 1 Incorrect condition code for diagnostic RAM test.
      : : Reseat/replace attachment card. Refer to section 2
      : : of this manual for correct switch settings and
      : : jumpering.
      : :
060 : 1 RAM test failed, incorrect data returned.
      : Reseat/replace attachment card. Refer to section 2
      : of this manual for correct switch settings and
      : jumpering.
      :
061 Y N Execute RAM test using bit pattern 4F16. Data
      : : correct?
      : :
062 : Y N CC=7, 3?
      : : :
063 : : 1 Incorrect condition code for diagnostic RAM test.
      : : Reseat/replace attachment card. Refer to section 2
      : : of this manual for correct switch settings and
      : : jumpering.
      : :
064 : 1 RAM test failed, incorrect data returned.
      : Reseat/replace attachment card. Refer to section 2
      : of this manual for correct switch settings and
      : jumpering.
      :
065 Y N Output data. CC=7, 3?
      : :
066 : Y N Input cycle steal status. CSS ready?
      : : :
067 : : 1 Incorrect condition code or cycle steal status.
      : : Reseat/replace attachment card. Refer to section 2
      : : of this manual for correct switch settings and
      : : jumpering.
      : :
068 : 1 Not ready status returned for display. Verify that
      : Power on/off switch of display station is in the on
      : position. Check I/O cable connections. Check for
      : power faults (SAM 4270). Reseat/replace attachment
      : card, reseat/replace application module (para 3.3).
      :
069 Y N Execute applications module test. Test result OK?
      : :
070 : 1 Applications module diagnostic failed.
      : Reseat/replace applications module (para 3.3).
      :
071 1 Branch to test 4210 (SAM 4210).

```



This diagnostic is automatically linked from test 4200.

```

001 Y N CS output. Write to clear CSS bits. CC=7, 3?
    : :
002 : 1 Incorrect condition code after CS write.
    : Reseat/replace attachment card. Refer to section 2
    : of this manual for correct jumpering and switch
    : settings.
    :
003 Y N Input CSS word 2. CC=7, 3?
    : :
004 : 1 Incorrect condition code for CSS after reset.
    : Reseat/replace attachment card. Refer to section 2
    : of this manual for correct jumpering and switch
    : settings.
    :
005 Y N Interrupt status byte = 000016?
    : :
006 : 1 Incorrect interrupt status byte. Reseat/replace
    : attachment card. Refer to section 2 of this manual
    : for correct jumpering and switch settings.
    :
007 Y N CSS word 2 = 000016?
    : :
008 : 1 Incorrect CSS word 2. Reseat/replace attachment
    : card. Refer to section 2 of this manual for correct
    : jumpering and switch settings.
    :
009 Y N Set post-cursor address greater than 1920. CC=2
    : : and interrupt status byte = 9016?
    : :
010 : 1 Incorrect condition code or interrupt status byte on
    : DCB test. Reseat/replace attachment card. Refer to
    : section 2 of this manual for correct jumpering and
    : switch settings.
    :
011 Y N Input CSS word 2. CSS word 2 = 002016?
    : :
012 : 1 Incorrect CSS word 2 on DCB test. Reseat/replace
    : attachment card. Refer to section 2 of this manual
    : for correct jumpering and switch settings.
    :
013 Y N Test if shift window is greater than last line
    : : address. CC=2 and interrupt status byte = 9016?
    : :
014 : 1 Incorrect condition code or interrupt status byte on
    : DCB test. Reseat/replace attachment card. Refer to
    : section 2 of this manual for correct jumpering and
    : switch settings.
    :
    2
A

```


A
2
:
:
029 Y N Test if high window address = low window address.
: : CC=2 and interrupt status byte = 90₁₆?
:
:
030 : 1 Incorrect condition code or interrupt status byte on
: DCB test. Reseat/replace attachment card. Refer to
: section 2 of this manual for correct jumpering and
: switch settings.
:
:
031 Y N Input CSS word 2. CSS word 2 = 0060₁₆?
: :
:
032 : 1 Incorrect CSS word 2 on DCB test. Reseat/replace
: attachment card. Refer to section 2 of this manual
: for correct jumpering and switch settings.
:
:
033 Y N Test if shift count = 00. CC=2 and interrupt status
: : byte = 90₁₆?
:
:
034 : 1 Incorrect condition code or interrupt status byte on
: DCB test. Reseat/replace attachment card. Refer to
: section 2 of this manual for correct jumpering and
: switch settings.
:
:
035 Y N Input CSS word 2. CSS word 2 = 0070₁₆?
: :
:
036 : 1 Incorrect CSS word 2 on DCB test. Reseat/replace
: attachment card. Refer to section 2 of this manual
: for correct jumpering and switch settings.
:
:
037 Y N Test if shift count greater than 23. CC=2 and
: : interrupt status byte = 90₁₆?
:
:
038 : 1 Incorrect condition code or interrupt status byte on
: DCB test. Reseat/replace attachment card. Refer to
: section 2 of this manual for correct jumpering and
: switch settings.
:
:
039 Y N Input CSS word 2. CSS word 2 = 0080₁₆?
: :
:
040 : 1 Incorrect CSS word 2 on DCB test. Reseat/replace
: attachment card. Refer to section 2 of this manual
: for correct jumpering and switch settings.
:
:
041 Y N Test if shift count greater than window address.
: : CC=2 and interrupt status byte = 90₁₆?
:
:
042 : 1 Incorrect condition code or interrupt status byte on
: DCB test. Reseat/replace attachment card. Refer to
: section 2 of this manual for correct jumpering and
: switch settings.
:
:
:
4
A

- A
3
:
:
043 Y N Input CSS word 2. CC=7, 3, and interrupt status
: : byte = 0000, and CSS word 2 = 90₁₆?
: :
044 : 1 Incorrect CSS word 2 on DCB test. Reseat/replace
: attachment card. Refer to section 2 of this manual
: for correct jumpering and switch settings.
:
045 Y N Start CSS with odd chain address in DCB. CC=2 and
: : interrupt status byte = 90₁₆?
: :
046 : 1 Incorrect condition code or interrupt status byte on
: DCB test. Reseat/replace attachment card. Refer to
: section 2 of this manual for correct jumpering and
: switch settings.
:
047 Y N Input CSS word 2. CSS word 2 = 00A0₁₆?
: :
048 : 1 Incorrect CSS word 2 on DCB test. Reseat/replace
: attachment card. Refer to section 2 of this manual
: for correct jumpering and switch settings.
:
049 Y N Test if byte count is greater than 1920. CC=2 and
: : interrupt status byte = 90₁₆?
: :
050 : 1 Incorrect condition code or interrupt status byte on
: DCB test. Reseat/replace attachment card. Refer to
: section 2 of this manual for correct jumpering and
: switch settings.
:
051 Y N Input CSS word 2. CSS word 2 = 00B0₁₆?
: :
052 : 1 Incorrect CSS word 2 on DCB test. Reseat/replace
: attachment card. Refer to section 2 of this manual
: for correct jumpering and switch settings.
:
053 Y N CSS input. Read past end of line. CC=2 and
: : interrupt status byte = 80₁₆?
: :
054 : 1 Incorrect condition code or interrupt status byte on
: DCB test. Reseat/replace attachment card. Refer to
: section 2 of this manual for correct jumpering and
: switch settings.
:
055 Y N Input CSS word 2. CSS word 2 = 0002₁₆?
: :
056 : 1 Incorrect CSS word 2 on DCB test. Reseat/replace
: attachment card. Refer to section 2 of this manual
: for correct jumpering and switch settings.
:
:
:
:
5

A
4
:
057 Y N CSS output. Write protected data field. CC=3?
:
:
058 : 1 Incorrect condition code after CS write.
: Reseat/replace attachment card. Refer to section 2
: of this manual for correct jumpering and switch
: settings.
:
059 Y N CSS input. Read past end of field. CC=2 and
: interrupt status byte = 80₁₆?
:
:
060 : 1 Incorrect condition code or interrupt status byte on
: DCB test. Reseat/replace attachment card. Refer to
: section 2 of this manual for correct jumpering and
: switch settings.
:
061 Y N Input CSS word 2. CSS word 2 = 0001₁₆?
:
:
062 : 1 Incorrect CSS word 2 on DCB test. Reseat/replace
: attachment card. Refer to section 2 of this manual
: for correct jumpering and switch settings.
:
063 Y N CSS input. Read past end of screen. CC=2 and
: interrupt status byte = 80₁₆?
:
:
064 : 1 Incorrect condition code or interrupt status byte on
: DCB test. Reseat/replace attachment card. Refer to
: section 2 of this manual for correct jumpering and
: switch settings.
:
065 Y N Input CSS word 2. CSS word 2 = 0003₁₆?
:
:
066 : 1 Incorrect CSS word 2 on DCB test. Reseat/replace
: attachment card. Refer to section 2 of this manual
: for correct jumpering and switch settings.
:
:
067 1 Branch to test 4220 (SAM 4220).



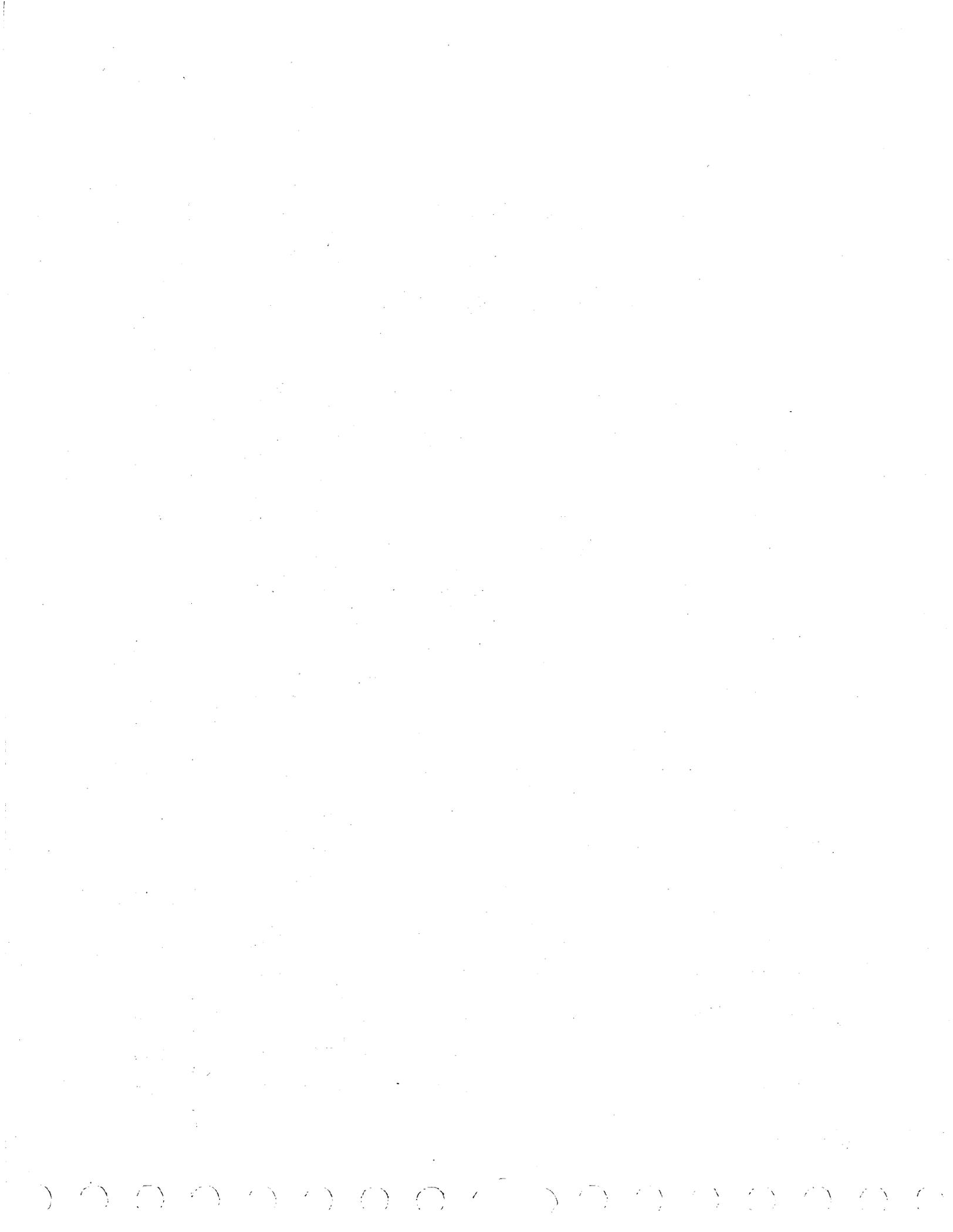


A
5
:
071 Y N Read line 1. CC=7,3?
:
:
072 : 1 Incorrect condition code after CS read. Reseat/
: replace attachment card. Refer to section 2 of this
: manual for correct jumpering and switch settings.
:
073 Y N Compare data read from line 1 for nulls. Compare
: : correct?
:
:
074 : 1 Compare data failed. Replace display logic/power
: supply board (para 3.4).
:
075 Y N Clear the entire screen. CC=7,3?
:
:
076 : 1 Incorrect CC after CS write. Replace attachment card.
:
077 Y N Insure electronic wrap diagnostic, determine if
: : attachment card is old or new version. Is attachment
: : card new version?
: 1 Go to step 116 end of test.
078 Y N Display graphic characters. CC=7,3?
:
:
079 : 1 Incorrect CC after CS write. Replace attachment card.
:
080 Y N Read graphics characters. CC=7,3?
:
:
081 : 1 Incorrect CC after CS read. Replace attachment card.
:
082 Y N Compare graphic character read against buffer.
: : Compare correct?
083 : 1 Compare data failed. Replace display logic/power
: supply board.
084 Y N Display lowercase characters. CC=7,3?
:
:
085 : 1 Incorrect CC after CS write. Replace attachment card.
:
086 Y N Read lowercase characters. CC=7,3?
:
:
087 : 1 Incorrect CC after CS read. Replace attachment card.
:
088 Y N Compare lowercase characters read against buffer.
: : Compare correct?
089 : 1 Compare data failed. Replace display logic/power
: supply board
:
090 Y N Read and save RTA mode message from display. CC=7,3?
:
:
091 : 1 Incorrect CC after CS read. Replace attachment card.
092 Y N Write '*'s (SC) protected to line 25. CC=7,3?
:
:
7
A

```

A
6
:
093 : 1 Incorrect CC after CS write.  Replace attachment card.
:
094 Y N Read line 25.  CC=7,3?
:
:
095 : 1 Incorrect CC after CS read.  Replace attachment card.
:
096 Y N Compare data read against buffer.  Compare correct?
:
:
097 : 1 Compare data failed.  Replace display logic/power
: supply board.
:
098 Y N Write U's (E4) unprotected to line 25.  CC=7,3?
:
:
099 : 1 Incorrect CC after CS write.  Replace attachment card.
:
100 Y N Read line 25.  CC=7,3?
:
:
101 : 1 Incorrect CC after CS read.  Replace attachment card.
:
102 Y N Compare data read against buffer.  Compare correct?
:
:
103 : 1 Compare data failed.  Replace display logic/power
: supply board.
:
104 Y N Force DCB spec check on line 25 by exceeding the byte
: : count.  CC=7,2 ISB=9,0?
:
:
105 : 1 Incorrect CC or ISB on line 25.  Replace attachment
: card.
106 Y N Read CS status word 2  CSS=0,B?
:
:
107 : 1 Incorrect parameter error code returned for DCB spec
: check.  Replace attachment card.
:
108 Y N Force DCB spec check by setting post cursor to line
: : 25 adr CC=7,2 IBM=9,0?
:
:
109 : 1 Incorrect CC or ISB on line 25.  Replace attachment
: card.
:
110 Y N Read CS status word 2.  CSS=0,2?
:
:
111 : 1 Incorrect parameter error code returned for DCB spec
: check.  Replace attachment board.
:
112 Y N Clear line 25.  CC=7,3
:
:
113 : 1 Incorrect CC after CS write.  Replace attachment card.
:
114 Y N Write RTA mode back to line 25.  CC=7,3?
:
:
115 : 1 Incorrect CC after SC write.  Replace attachment card.
:
116 Y N Auto tests complete.  Run manual test (enter B4230).

```



NOTE

Program Function keys PF7 through PF24 are normally disabled and need not be tested unless enabled.

This is a manual test requiring operator interaction to verify correct keyboard input operation. Initiate test by entering B4230. If there is no response when requested keys are pressed; check keyboard cable connector, replace keyboard, (para 3.11) replace display logic/power supply board (para 3.4).

```

001  Y N  Erase entire screen.  CC=7,3?
      :  :
002  :  1  Incorrect condition code for cycle steal erase.
      :  Run auto tests (enter B4200).
      :
003  Y N  Output "Press ENTER key" to screen.  CC=7,3?
      :  :
004  :  1  Incorrect condition code after cycle steal write.
      :  Run auto tests (enter B4200).
      :
005  Y N  Wait for interrupt.  CC=7,4?
      :  :
006  :  1  Incorrect condition code from keyboard interrupt.
      :  Replace logic/power supply board in display station
      :  (para 3.4).
      :
007  Y N  Keycode = 0000?
      :  :
008  :  1  Incorrect keycode returned.  Check keyboard cable,
      :  replace keyboard (para 3.11), or replace logic/power
      :  supply board (para 3.4).
      :
009  Y N  Output "Press ATTN key" to screen.  CC=7,3?
      :  :
010  :  1  Incorrect condition code after cycle steal write.
      :  Run auto tests (enter B4200).
      :
011  Y N  Wait for interrupt.  CC=7,4?
      :  :
012  :  1  Incorrect condition code from keyboard interrupt.
      :  Replace logic/power supply board in display station
      :  (para 3.4).
      :
013  Y N  Keycode = 01?
      :  :
014  :  1  Incorrect keycode returned.  Check keyboard cable,
      :  replace keyboard (para 3.11), or replace logic/power
      :  supply board (para 3.4).
      :
      2
      A

```

A
 1
 :
 015 Y N Output "Press PF keys" to screen. CC=7,3?
 :
 :
 016 : 1 Incorrect condition code after cycle steal write.
 : Run auto tests (enter B4200).
 :
 :
 017 Y N Output "Press ENTER to continue, ATTN to exit" to
 : screen. CC=7,3?
 :
 :
 018 : 1 Incorrect condition code after cycle steal write.
 : Run auto tests (enter B4200).
 :
 :
 019 Y N Wait for interrupt. CC=7, 4? Keycode = ENTER key?
 :
 :
 020 : Y N CC=7,4? Keycode = ATTN key?
 :
 :
 021 : : 1 Incorrect condition code from keyboard interrupt
 : : Replace logic/power supply board in display station
 : : (para 3.4).
 : :
 : :
 022 : 1 Manual test terminated. Run auto tests (enter B4200).
 :
 :
 023 Y N Output H characters to fill screen. CC=7,3?
 :
 :
 024 : 1 Incorrect condition code after cycle steal write.
 : Run auto tests (enter B4200).
 :
 :
 025 Y N Output "check size, focus, etc." to screen. CC=7,3?
 :
 :
 026 : 1 Incorrect condition code after cycle steal write.
 : Run auto tests (enter B4200).
 :
 :
 027 Y N Output "Press ENTER to continue, ATTN to exit" to
 : screen. CC=7,3?
 :
 :
 028 : 1 Incorrect condition code after cycle steal write.
 : Run auto tests (enter B4200).
 :
 :
 029 Y N Wait for interrupt. CC=7,4? Keycode = ENTER key?
 :
 :
 030 : Y N CC=7,4? Keycode = ATTN key?
 :
 :
 031 : : 1 Incorrect condition code from keyboard interrupt.
 : : Replace logic/power supply board in display station
 : : (para 3.4).
 : :
 : :
 032 : 1 Manual test terminated. Run auto tests (enter B4200).
 :
 :
 033 Y N Erase screen. CC=7,3?
 :
 :
 034 : 1 Incorrect condition code for cycle steal erase.
 : Rerun auto tests (enter B4200).
 :
 :
 3

A

A
4
:
069 Y N Wait for interrupt. Does interrupt keycode = ENTER
: : key? CC=7,4?
:
070 : Y N Interrupt keycode = ATTN key? CC=7,4?
: : :
071 : : 1 Incorrect condition code from keyboard interrupt.
: : Replace logic/power supply board in display station
: : (para 3.4).
:
072 : 1 Manual test terminated. Run auto tests (enter B4200).
:
073 Y N Input cycle steal status. Is cursor address correct?
: : :
074 : 1 Cursor address incorrect. Replace logic/power supply
: board in display station (para 3.4).
:
075 Y N Output "Press Back Tab" to screen. CC=7,3?
: : :
076 : 1 Incorrect condition code after cycle steal write.
: Run auto tests (enter B4200).
:
077 Y N Wait for interrupt. Does interrupt keycode = ENTER
: : key? CC=7,4?
:
078 : Y N Interrupt keycode = ATTN key? CC=7,4?
: : :
079 : : 1 Incorrect condition code from keyboard interrupt.
: : Replace logic/power supply board in display station
: : (para 3.4).
:
080 : 1 Manual test terminated. Run auto tests (enter B4200).
:
081 Y N Input cycle steal status. Is cursor address correct?
: : :
082 : 1 Cursor address incorrect. Replace logic/power supply
: board in display station (para 3.4).
:
083 Y N Erase screen. CC=7,3?
: : :
084 : 1 Incorrect condition code for cycle steal erase.
: Rerun auto tests (enter B4200).
:
085 Y N Output "Press Forward Tab" to screen as protected
: : data. CC=7,3?
: : :
086 : 1 Incorrect condition code after cycle steal write.
: Run auto tests (enter B4200).
:
:
:
:
:
6
A

A
5
:
087 Y N Wait for interrupt. Does interrupt = ENTER key?
: : CC=7,4?
:
:
088 : Y N Interrupt keycode = ATTN key? CC=7,4?
:
:
089 : : 1 Incorrect condition code from keyboard interrupt.
: : Replace logic/power supply board in display station
: : (para 3.4).
:
:
090 : 1 Manual test terminated. Run auto tests (enter B4200).
:
091 Y N Input cycle steal status. Is cursor address correct?
:
:
092 : 1 Cursor address incorrect. Replace logic/power supply
: board in display station (para 3.4).
:
:
093 Y N Output "Press Back Tab" to screen as protected data.
: : CC=7,3?
:
:
094 : 1 Incorrect condition code after cycle steal write.
: Run auto tests (enter B4200).
:
:
095 Y N Output H characters to screen as unprotected data.
: : CC=7,3?
:
:
096 : 1 Incorrect condition code after cycle steal write.
: Run auto tests (enter B4200).
:
:
097 Y N Wait for interrupt. Does interrupt keycode = ENTER
: : key? CC=7,4?
:
:
198 : Y N Interrupt keycode = ATTN key?
:
:
199 : : 1 Incorrect condition code from keyboard interrupt.
: : Replace logic/power supply board in display station
: : (para 3.4).
:
:
100 : 1 Manual test terminated. Run auto tests (enter B4200).
:
101 Y N Input cycle steal status. Is cursor address correct?
:
:
102 : 1 Cursor address incorrect. Replace logic/power supply
: board in display station (para 3.4).
:
:
103 Y N Erase screen. CC=7,3?
:
:
104 : 1 Incorrect condition code for cycle steal erase.
: Rerun auto tests (enter B4200).
:
:
:
7

A

A
6
:
105 Y N Output "Do you want to run the auto skip test" to the
: : screen? CC=7,3?
: :
106 : 1 Incorrect condition code after cycle steal write. Run
: auto test (enter B4200)
:
107 Y N Wait for interrupt. CC=7,4 and enter depressed?
: 1 Go to step 118 end of test.
: :
108 Y N Output "Press space bar two times, then press enter.
: : CC=7,3?
: :
109 : 1 Incorrect condition code after cycle steal write.
: Run auto tests (enter B4200)
:
110 Y N Output two fields of unprotected X's. CC=7,3?
: :
111 : 1 Incorrect condition code after cycle steal write.
: Run auto tests (B4200).
:
112 Y N Fill space between X fields with protected Y's.
: : CC=7,3?
: :
113 : 1 Incorrect condition code at cycle steal write. Run
: auto tests (enter B4200).
:
114 Y N Wait keyboard interrupt. CC=7,4 and Enter?
: :
115 : 1 Incorrect condition code on keyboard interrupt.
: Replace display logic/power supply board.
:
116 Y N Read cursor position. Position equal to 334H?
: :
117 : 1 Cursor address incorrect. (Cursor should have
: skipped over protected field and stopped at first
: unprotected character following that field.) Verify
: unit is a CC626 E or CC626 G, and also verify upgrade
: Viking switch is on. Replace display logic/power
: supply board.
:
118 Y N Output "End of test message" to screen.



	A	B	C	D	
	1	1	1	1	
	:	:	:	:	
013	:	:	:	<u>1</u>	If voltage is slightly low, adjust 30 V ADJUST potentiometer, otherwise disconnect J8/P8 from monitor assembly and recheck voltage. If now OK, isolate monitor fault per para 3.16. If still low or missing, replace logic/power supply board (para 3.4).
	:	:	:	:	
	:	:	:	:	
014	:	:	<u>1</u>	:	Replace transformer (para 3.5) or if all secondary voltages are missing, check ac input components for open circuit (refer to interconnection diagrams).
	:	:	:	:	
	:	:	:	:	
015	:	1	:	:	Replace fuse with same value and retry. If +12 V, or -12 V fuse link is blown, replace using a size 30 AWG wire or a single strand of 24 AWG stranded wire
	:	:	:	:	
	:	:	:	:	
016	1	:	:	:	Press circuit breaker to reset and retry.
	:	:	:	:	
017	:	<u>2</u>	:	:	Replace logic/power supply board.
	:	:	:	:	
018	<u>2</u>	:	:	:	Isolate electrical short per para 3.14.

- A
1
:
:
019 2 Check fuses F1 (3.0 A fast blow) and F2 (0.25 A fast
: blow).
:
020 3 Check for lit crt filament. Replace crt (para 3.12) if
: filament burned out.
:
021 5 Replace high voltage assembly (para 3.20).
:
022 6 Replace yoke assembly (para 3.9).

Appendix B contains information to aid in the installation, checkout, and on-site maintenance of the CDC® 80610-12 and 80610-16 Display Station Subsystems. These subsystems consist of an upgraded version (CC626-E/G) of the existing 80610 Display Station (CC626-A/B/C/D) and an upgraded attachment card feature (FH501-B) that supports the entire character set available on the display (96-character character set and 28 business graphic symbols), allows the host processor the use of the 25th displayable line on the display screen, and the interface feature functions for remote terminal assistance (RTA) to a remote TTY (Teletypewriter) display terminal.

NOTE

When the RTA section of the FH501-B is going to be used, ± 12 Vdc is required in addition to the other voltages that are required by the other functions on the attachment card.

The information contained in this appendix directly parallels the sections of the main manual. Only the information that is different from the original version of the 80610 Display Station Subsystem is mentioned; therefore, the base portion of the manual is used in conjunction with this appendix. Refer to appendix E for information on the special character highlight option available on the 80610-16 Display Station.

GENERAL DESCRIPTION

The 80610-12 and 80610-16 Display Station Subsystem (hereafter called display station) is shown in block diagram of figure B-1.

The major elements of the 80610-12 and 80610-16 Display Stations are the same as the previous 80610 version with the following substitutions or additions:

- Keyboard - The typewriter keyboard for the upgraded display station is physically different from the original 80610 version. The upgraded typewriter keyboard display station is designed with backward compatibility; that is, it can be used as equipment for the original 80610 Display Station Subsystem (64 characters), or it can be used with the upgraded version (96 characters). Also, the upgraded typewriter keyboard contains three key changes (see reference manual). Finally, auto tab and a different space bar operation are features unique to the upgraded typewriter keyboard.
- Logic/power supply module - The upgraded logic/power supply module contains an upgrade switch to

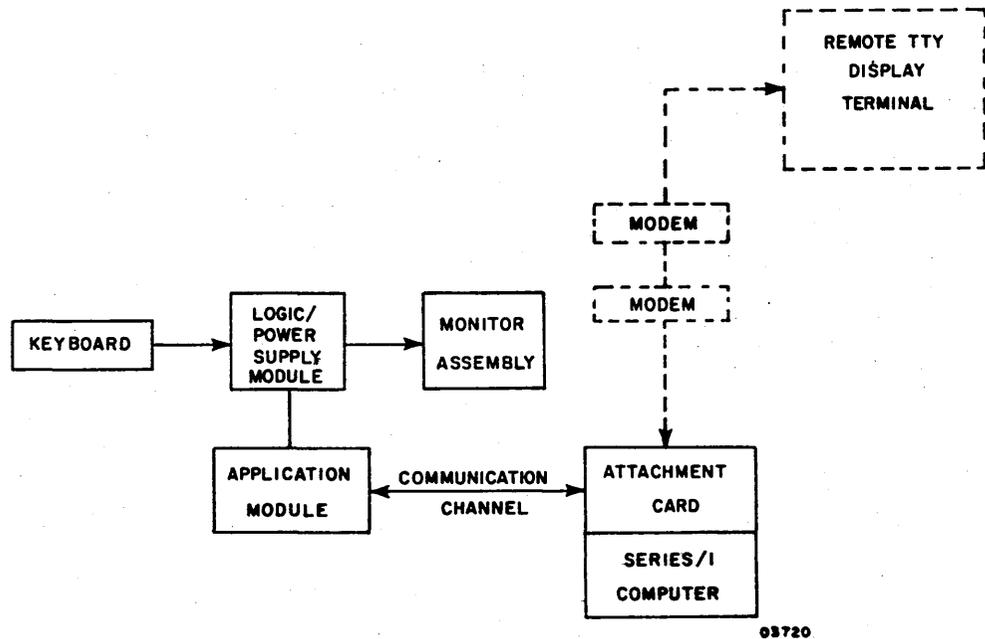


Figure B-1. 80610-12 or 80610-16 Display Station
Simplified Block Diagram With Optional RTA

enable/disable the upgraded firmware features for the keyboard features of auto tab and space bar coding. When disabled (open/logical 1), the unit reacts as a nonupgraded CC626 version. When enabled (closed/logical 0), the features are enabled.

The upgraded logic/power supply module also contains a jumper which allows the typewriter keyboard to be used for 64-character or 96-character display. For upgrade operation, the jumper must be in the 96-character position.

- Attachment card - The upgraded attachment card provides the host with access to a full 96-character set and a 28-character business and graphics set. It also allows host access to the 25th line of the display. Finally, the upgraded attachment card provides interface between the Series/1 processor and a remote TTY display terminal via a modem connection when the RTA mode is active. The attachment card communicates with the RTA modem via I/O cable lengths of 25 feet (76.2 m) or 50 feet (152.4 m) at data rates of 300, 600, or 1,200 baud. A switch bank on the attachment card selects the transmission speed required.

Additional equipment specifications for the 80610-12 and 80610-16 Display Stations, excluding the attachment card, are listed in table B-1. Refer to the display station subsystem reference manual for related specifications on the upgraded attachment card (see preface for publication number).

TABLE B-1. EQUIPMENT SPECIFICATIONS

Characteristics	Specification
Power requirements (nominal) CC626-E/G	120 Vac, 60 Hz, at 0.82 A (82 W) maximum

INSTALLATION AND CHECKOUT

This section provides information on the packaging, installation, and checkout of the 80610-12 and 80610-16 Display Stations and associated upgrade attachment card. Refer to appendix C for information relevant to RTA installation and checkout.

PACKAGING

The 80610-12 and 80610-16 Display Stations are packaged for shipment the same as the original 80610 version (refer to figure 2-1).

INSTALLATION

The following procedures describe installation of the 80610-12 and 80610-16 Display Stations, upgraded attachment card, and I/O cable.

Display Station

Installation of the 80610-12 or 80610-16 Display Stations is the same as the original 80610 version. Refer to page 2-4, steps 1 through 7, with the following exception to step 4. On a 80610-16, the jumper must be in the 96 character position and inputting keyboard data in lower case should display lower case characters.

Attachment Card and I/O Cable Checkout

Installation of the upgraded attachment card is the same as the original version (described in Attachment Card and I/O Cable in section 2) except for the following substitutions or additions Refer to page 2-6, steps 1 through 20.

NOTE

Refer to appendix D for installation information relevant to RTA.

- Substitute step 6 with the following information:

The upgrade attachment feature uses a switch bank (S2, an example of which is shown in figure B-2) to select the transmission rate and to enable or disable the function keys PF7 through PF24 on the 80610-16 terminal.

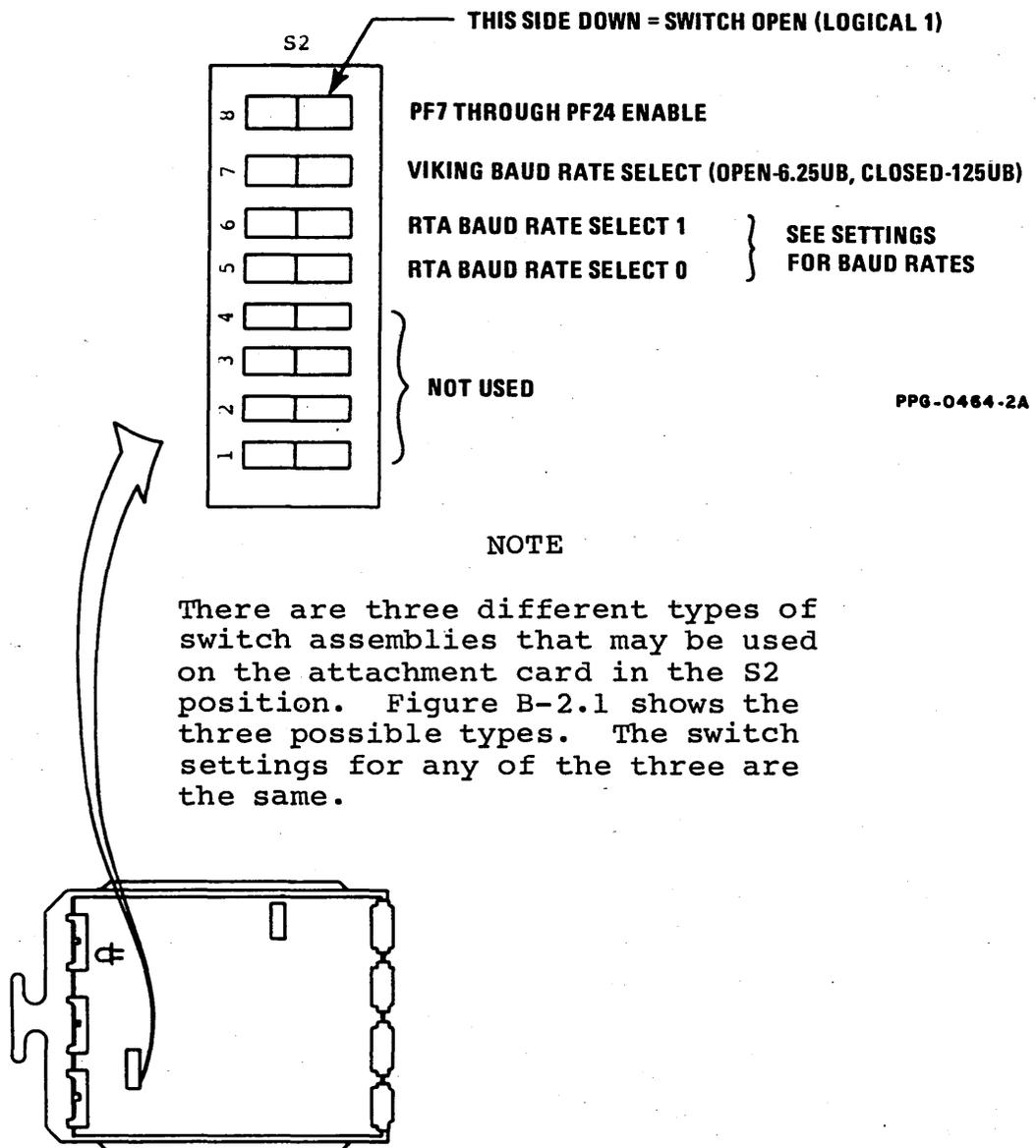


Figure B-2. Device Address Selection Switches, Program Function Key, and I/O Cable Length Jumpers

ATTACHMENT CARD SWITCHES

The following describes the function switches of switch assembly S2 shown in figure B-2. There are three different types of switch assemblies that may be used in S2 positions on the attachment card. Figure B-2.1 shows the three switch types that may be encountered. To set the function switches on the S2 switch assembly, proceed as follows:

- Switch OPEN or OFF = logical 0 on data bus
- Switch CLOSED or ON = logical 1 on data bus

S2-8:

- Open/OFF =Disable PF7 to PF24
- CLOSED/ON =Enable PF7 to PF24

S2-7:

- OPEN/OFF =Viking baud rate is 125K BAUD
- CLOSED/ON =Viking baud rate is 62.5 KBAUD

S2-6 and S2-5: used together to form a 2 bit code used to select different baud rates for RTA.

S2-6	S2-5	CODE	BAUD RATE
OPEN/OFF	OPEN/OFF	00	300 BAUD
OPEN/OFF	CLOSED/ON	01	600 BAUD
CLOSED/ON	OPEN/OFF	10	1200 BAUD
CLOSED/ON	CLOSED/ON	11	1200 BAUD

S2-4:

Not Used

S2-3:

Not Used

S2-2:

Not Used

S2-1:

Not Used

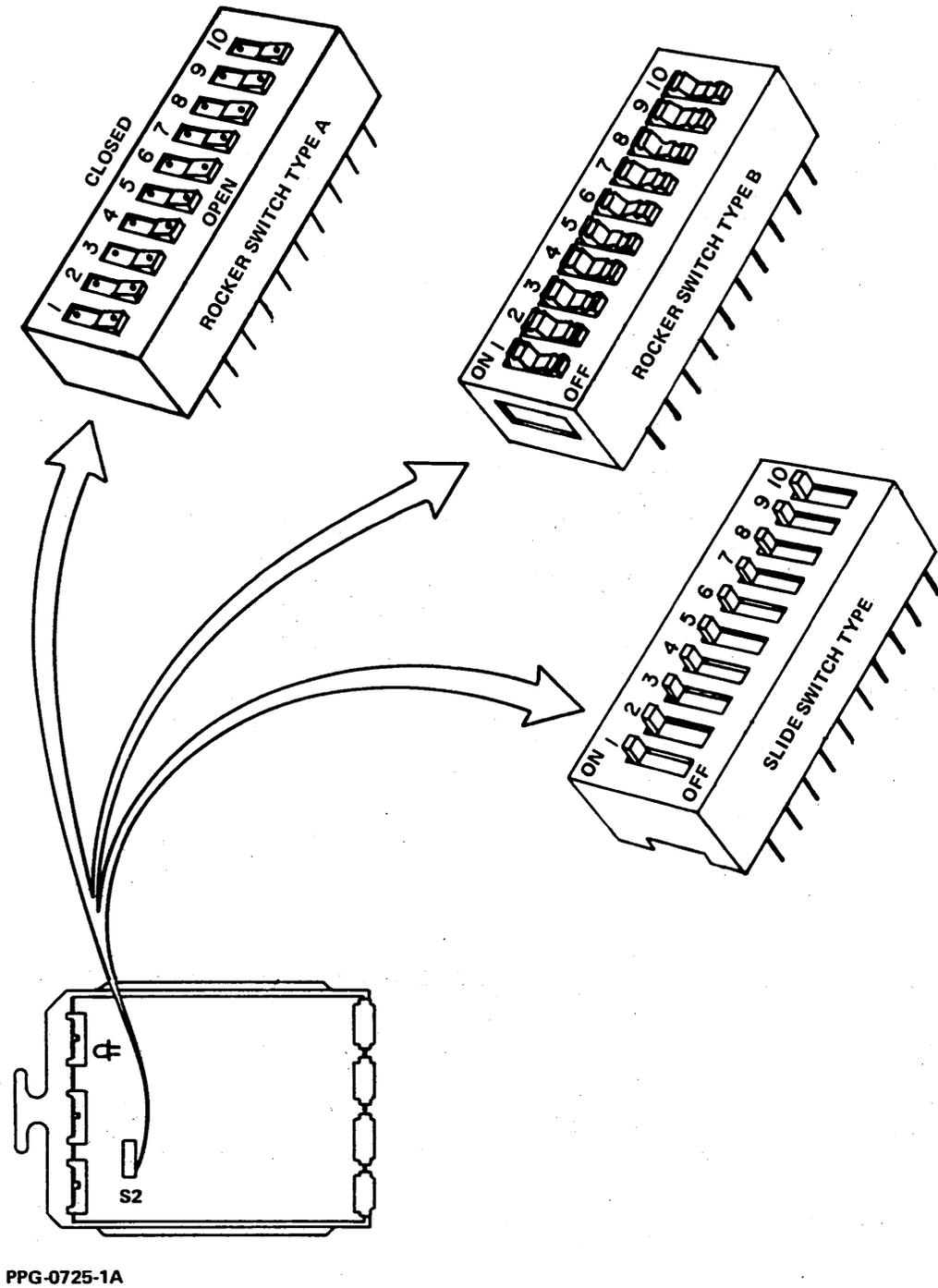


Figure B-2.1 Attachment Feature and Three Alternate Switch Assembly Types Used in S2 Positions

- Replace figure 2-5 (Overcurrent Potentiometer and Attachment Card Cable Locations) with figure B-3.
- Replace figure 2-8 (Equipment Identification Plate and FCO Log Placement) with figure B-4.

CHECKOUT

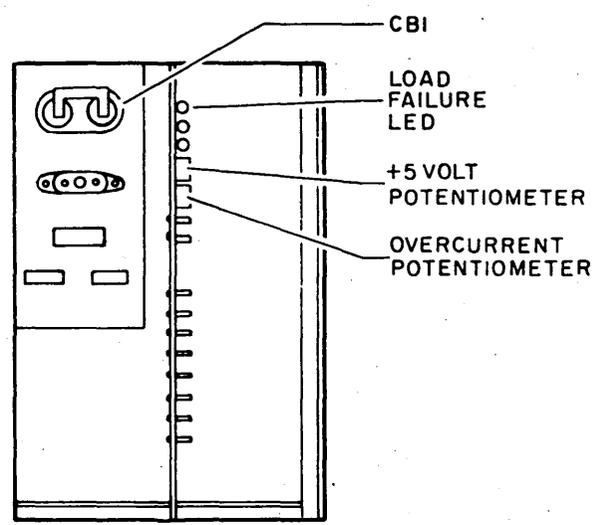
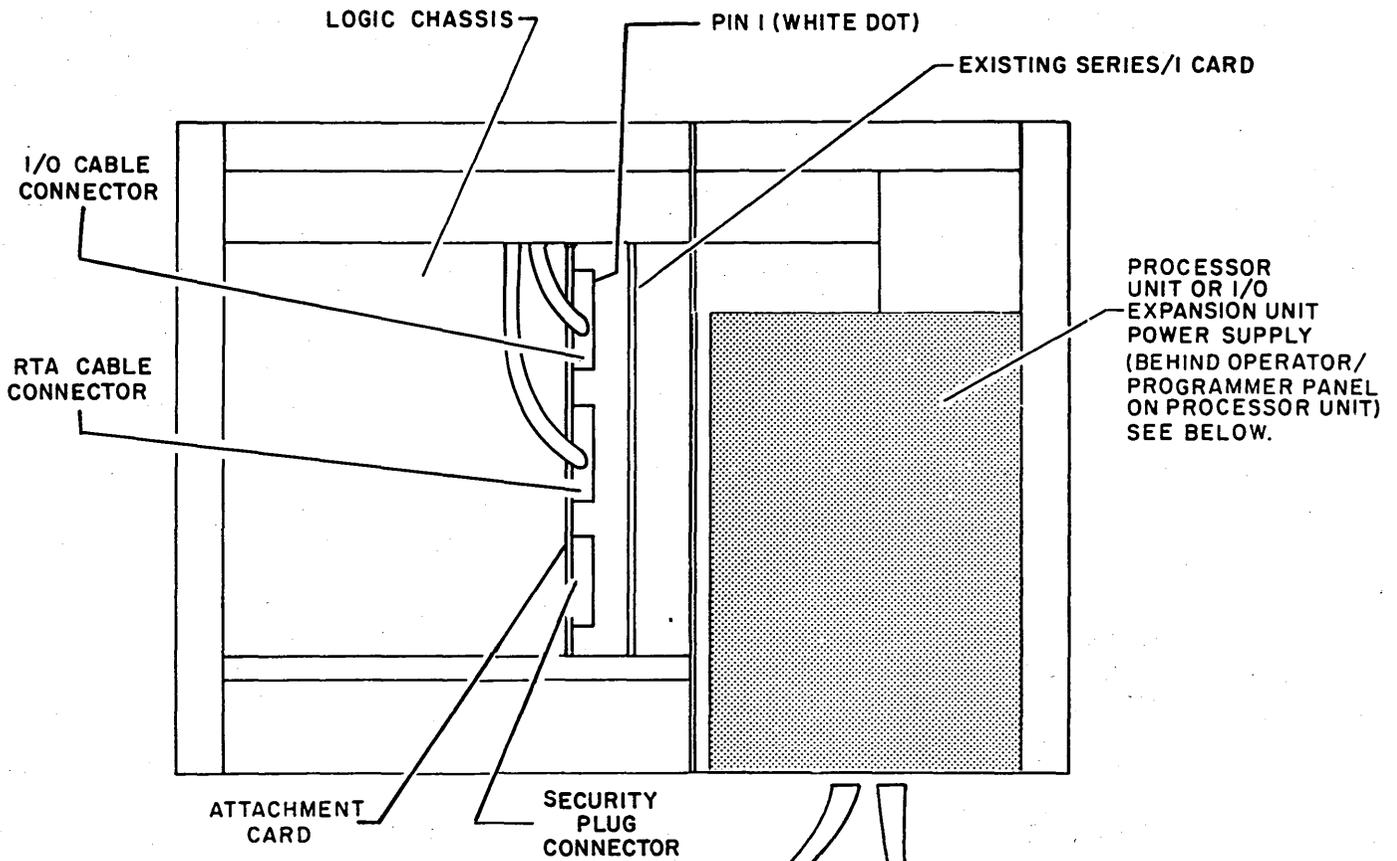
When installation is completed, perform the same BASIC diskette configuration procedure for the 80610-12 and 80610-16 Display Stations (hereafter referred to as local Viking console) as was performed for the original 80610 version (refer to steps 1 through 21 in CDC BASIC Diskette Configuration, section 2). The checkout for the display station/attachment card, however, will contain additions to the original 80610 version, and if the RTA feature is used will also contain additions for the incorporation of RTA Checkout (refer to appendix C, Display Station/Attachment Card Checkout for RTA, and appendix D, Diagnostic Aids for 80610-12 and 80610-16 Display Station Subsystem with RTA Established, for detailed information).

DISPLAY STATION/ATTACHMENT CARD CHECKOUT

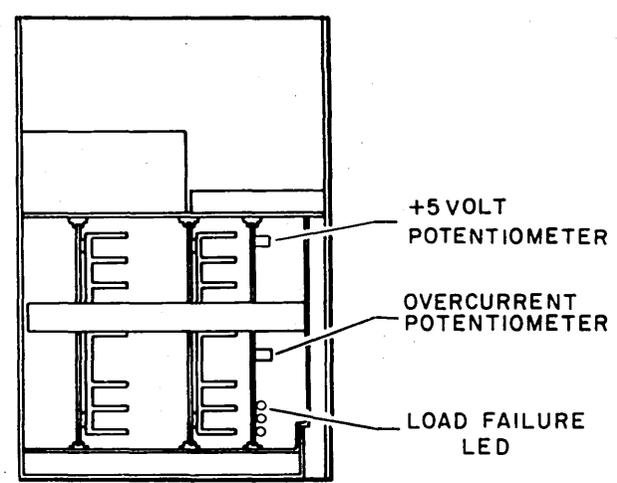
Refer to steps 1 through 9 in section 2, Display Station/Attachment Card Checkout and make the following additions:

- Step 8.1

Enter and execute the following manual display station diagnostic test per the accompanying procedure (refer to appendix C, Display Station/Attachment Card Checkout for RTA).

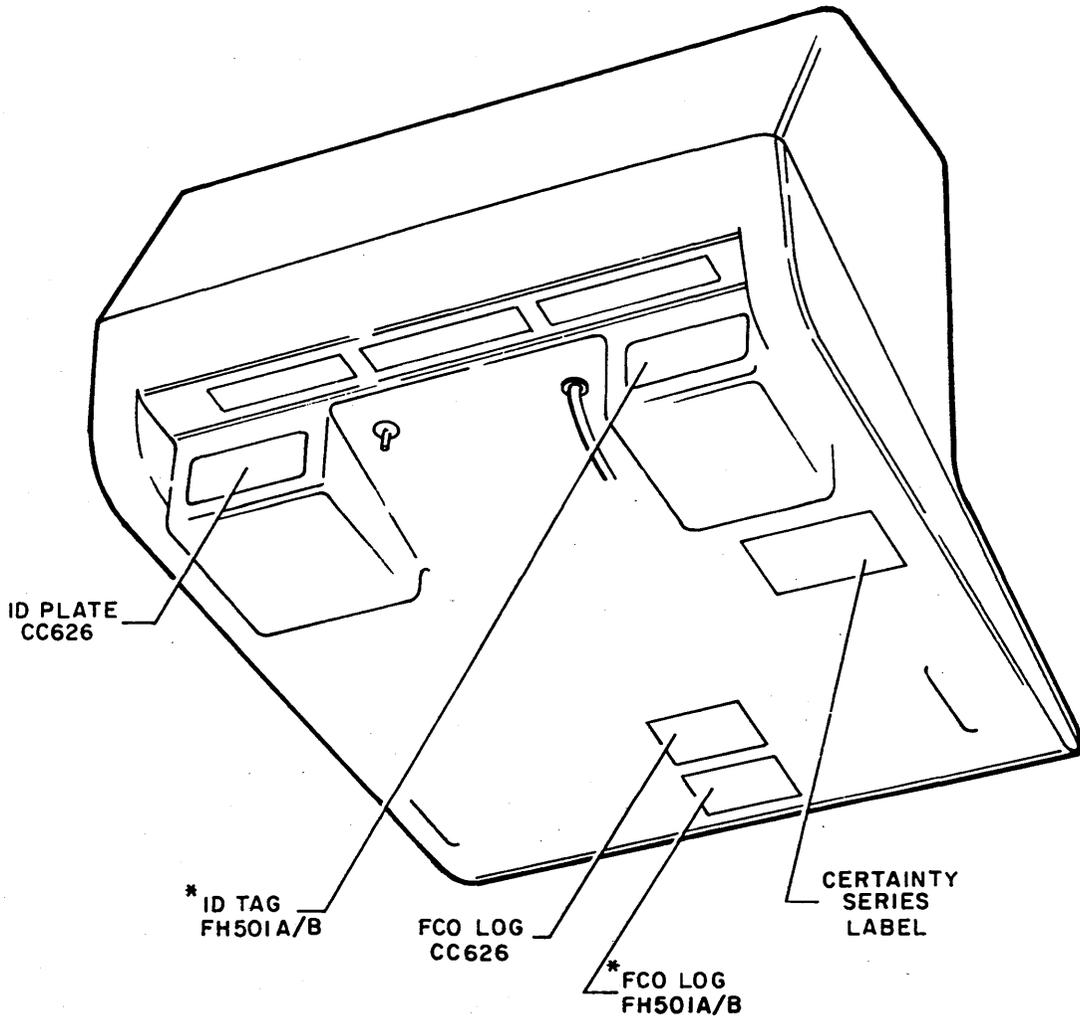


400 WATT POWER SUPPLY



125 OR 300 WATT POWER SUPPLY

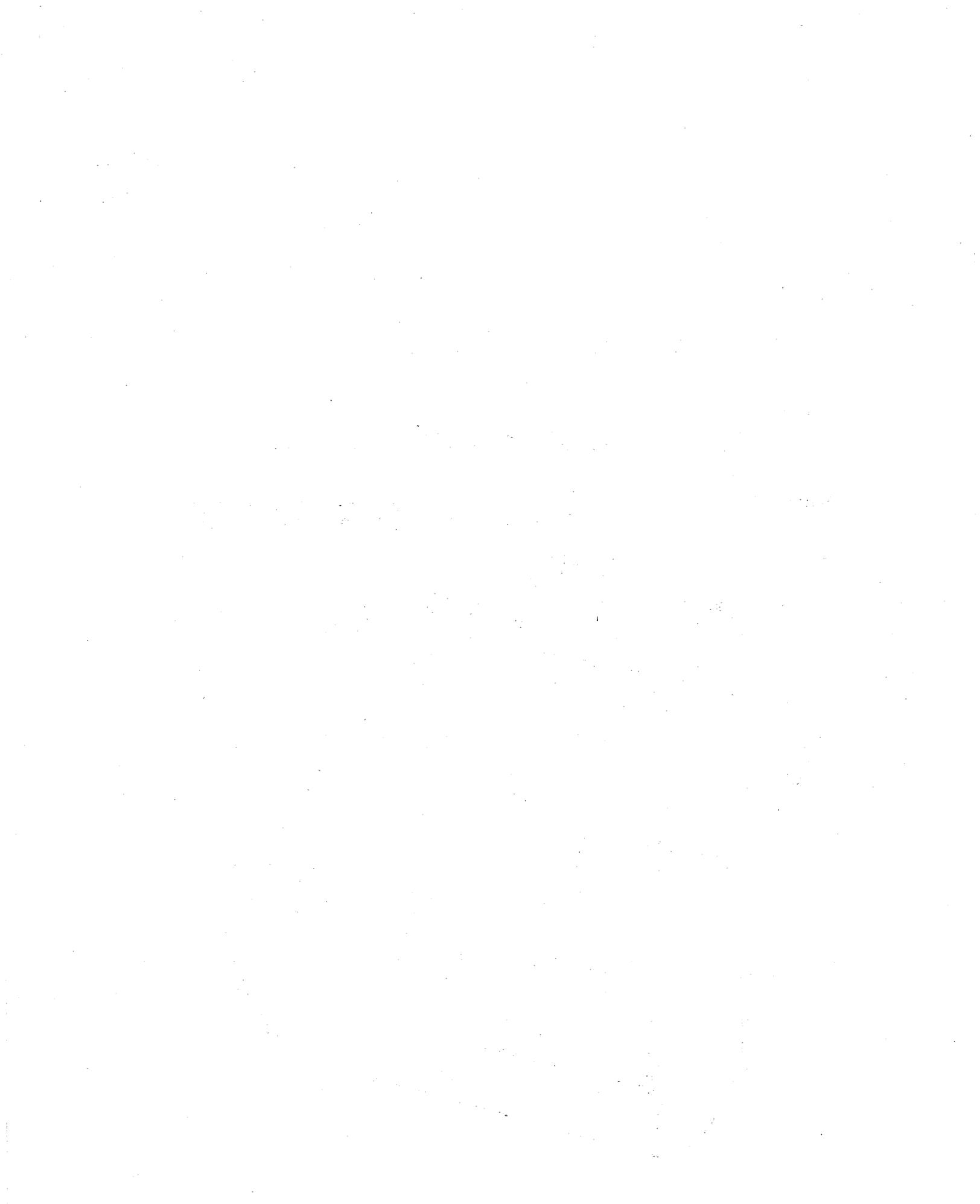
Figure B-3. Overcurrent Potentiometer and Upgrade Attachment Card Locations



* THE ATTACHMENT FCO LOG AND ID PLATE ADDED BY
CE AT TIME OF INSTALLATION.

03328-1

Figure B-4. Equipment Identification Plate and
FCO Log Placement



Appendix C contains information to aid in the installation, check-out, and on-site maintenance of the CDC® 80610-12 and 80610-16 Display Station Subsystems when using the Remote Terminal Assistance (RTA) feature.

The information contained in this appendix directly parallels the sections of the main manual. It also parallels appendix B (80610-12 and 80610-16 Display Station Subsystem Upgrade) and should be used in conjunction with appendix B. Only the information that is different from the original version of the 80610 Display Station Subsystem is mentioned; therefore, the base portion of the manual is used in conjunction with appendix C.

GENERAL DESCRIPTION

The RTA operation allows data transmitted to the Series/1 host from either the 80610 Display Station or a TTY display terminal to be viewed at both locations. It also allows any data written from the Series/1 processor to the 80610 Display Station to be displayed on the remote TTY display terminal. Refer to figure C-1, Simplified Block Diagram of RTA Operation.

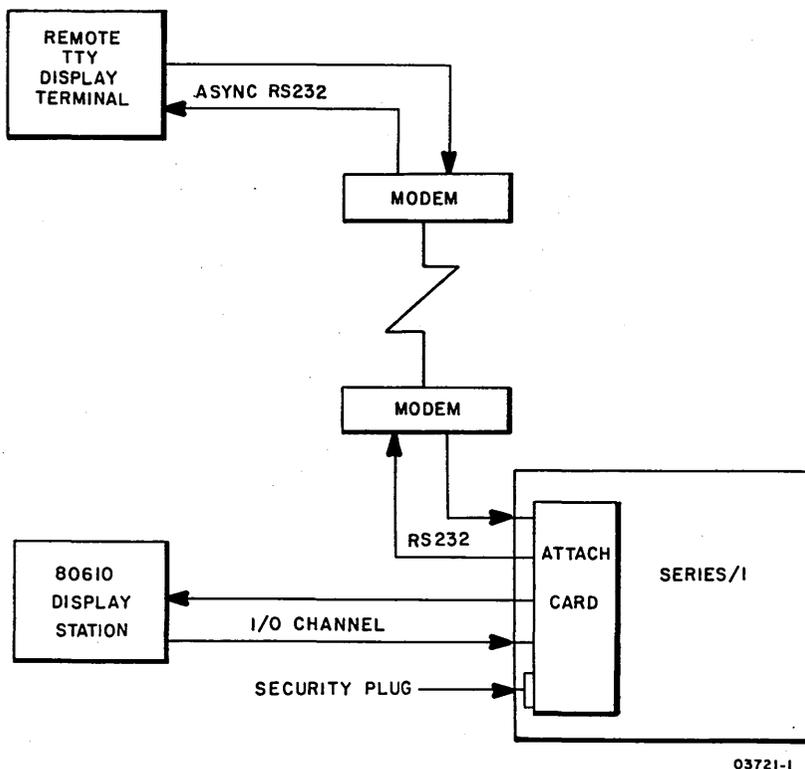


Figure C-1. Simplified Block Diagram of RTA Operation

The attachment card provides the interface between the 80610-12 or 80610-16 Display Station and the IBM Series/1 I/O channel. It also provides an asynchronous, ASCII-coded, RS232 interface to the remote TTY display terminal. This interface feature supports RTA. The RTA interface is only active in the RTA mode. This mode is enabled by a security plug.

The security plug, which plugs into the attachment feature, provides a code to the RTA firmware which only enables the RTA mode if this code is detected. The security plug allows the customer to control remote access to the Series/1 processor.

RTA INSTALLATION AND CHECKOUT

This section provides information on the installation, checkout, and protocol procedure for establishing the RTA operation.

INSTALLATION (RTA)

The following procedures describe the installation necessary for establishing RTA. Involved in this installation are the following parts of the system: display station, attachment card, security plug, and I/O cable.

In addition to observing the installation requirements listed in the base manual, observe the following:

- If the RTA feature is to be used, make sure a telephone is located nearby for convenient connection to a modem (maximum of 50 feet from attachment card).
- If the RTA feature is to be used, the chassis that the attachment is plugged into must have 12 Vdc.

Display Station (RTA)

Installation of the display station is the same for RTA as for the original 80610 version. Refer to appendix B, Display Station installation.

Attachment Card and I/O Cable Using RTA

Installation of the upgraded attachment card supporting the RTA feature is the same as the upgrade installation without RTA except for the following substitutions or additions (refer to section 2, Attachment Card and I/O Cable, steps 1 through 20, and figure B-2 of appendix B).

In addition to steps 1 through 20 of Attachment Card and I/O Cable installation, the following steps are incorporated for RTA:

- Step 5.1

Verify that attachment card switch bank S2 is set correctly for PF keys and baud rates used in RTA operation. Refer to appendix B, figure B-2 for instructions of switch settings.

- Step 14.1

Attach RTA RS232 cable to the RTA connector on the attachment card. Refer to figure B-3, Overcurrent Potentiometer and Attachment Card Cable locations.

- Step 14.2

Install the ground strap at the end of the RTA cable to the ground terminal on the top side of the logic chassis.

- Step 14.3

Attach the modem side of the RTA cable to the modem unit.

RTA CHECKOUT

The checkout for the display station/attachment card contains additions to the original 80610 version when incorporating the RTA feature.

Display Station/Attachment Card Checkout for RTA

Refer to section 2, Display Station/Attachment Card Checkout, steps 1 through 9, and make the following additions:

- Step 8.1

Enter and execute the manual display station diagnostic (see SAM 4240 in appendix D).

RTA PROTOCOL PROCEDURE

The RTA protocol procedure involves the steps that are necessary for establishing RTA communications between the local Viking console and the remote TTY terminal.

Before continuing with this procedure, it is assumed that:

- Series/1 processor power is on
- FDD unit power is on
- Local Viking console power is on

Check also to see if the following items have been completed during installation and checkout:

- An upgraded attachment card is already installed in the Series/1 logic module.
- The RTA RS232 cable is connected from the attachment card to the modem.
- The local Viking console is assigned as an alternate console (refer to page 2-15, CDC BASIC Diskette Configuration).

If these items have been checked, perform the following steps:

1. Place the required modem by the nearest phone* (maximum of 50 feet).
2. Plug the modem power plug into the nearest 110-V receptacle.
3. Install the RTA security plug into the security plug connector on the attachment card. Refer to figure B-3 for the connector location.
4. With modem power on, check that the modem is set for answer mode and full duplex.
5. After voice contact has been established with remote product specialist (RPS), the problem has been described, and any miscellaneous instructions from RPS have been given, insert the telephone into the modem cradle.
6. Check to see that the modem is ready.

*Refer to Installation in section 2, for installation requirements during cabling procedures.

NOTE

The customer engineer at the local Viking console should not perform any operation at the keyboard other than monitoring the displayed information or responding to displayed commands.

When the security plug has been installed, the modem connection established, and a Data Set Ready signal detected, the following message will be displayed on the 25th line of the local Viking display:

RTA IDLE MODE

7. Install CDC BASIC Diagnostic Diskette CDC P/N 663088XX.
8. On instruction from the RPS, place the IPL Source switch on the Series/1 operator/programmer panel to the Alternate or Primary position, as applicable, to enable loading from the diskette.
9. Place the Mode switch on the Series/1 operator/programmer panel to the Diagnostic position.
10. Press the Load switch on the Series/1 operator/programmer panel. This causes execution of the IPL diagnostic that resides on the diagnostic diskette (execution time is approximately 30 seconds).

After IPL is completed, any of three modes of operation is available under RTA. These are: RTA mode, RTA KYBD (Keyboard) mode, and RTA Idle mode.

NOTE

The following explanatory assumes that the remote TTY Terminal used is a CDC Model 752.

RTA MODE

RTA mode allows an operator at the remote TTY display terminal to send commands to the Series/1 and to receive any data that is normally output to the 80610 terminal. Any command that would be input to the system via the 80610 keyboard can be entered from the remote TTY Display Terminal keyboard. See table C-1 for description of which keys to use on the remote TTY Display Terminal keyboard to simulate entries from the 80610 keyboard.

To select RTA MODE, hold down the control key and press the S key twice (this is a control function DC3). This combination causes an octal code of 023 (13H) to be sent to the attachment card two times. Upon sensing this action, the attachment card firmware will put the system in RTA MODE.

RTA KYBD MODE

The RTA KYBD mode allows communication between the remote TTY Display Terminal and the local console via their respective screens. When in this mode, any messages sent between terminals will not interrupt operating the Series/1 processor, and therefore, any diagnostic or operating system that is loaded will not be affected. Any data sent by the processor while the system is in RTA KYBD MODE will be sent to both screens.

While in RTA KYBD MODE, the remote TTY Display Terminal is the dominant terminal. This dominance is illustrated for example, when the local operator attempts to send a message to the remote operator at the same time the remote operator is typing in a message to send to the local operator. To establish transmission priority, the message from the remote terminal will dominate and the message from the local terminal will be lost. An indication of a local terminals message being lost will be that message being erased and replaced by the message sent by the remote terminal.

To select RTA KYBD (Keyboard) MODE: hold down the control key and press the T key twice. (This is a control function DC4.) This combination causes an octal code of 024 (14H) to be sent to the attachment card two times causing the system to switch to RTA KYBD MODE.

RTA IDLE MODE

RTA IDLE MODE allows either of the other RTA functions to be selected when conditions are correct. In RTA IDLE MODE, the only key codes that will be recognized by the attachment card are those used to select the different RTA modes of operation. Also while operating in this mode, operators from the remote and local sites may pick up the phones from their respective modems and establish voice communications without causing any problems to the system. During this time, the DATA SET READY signal will no longer be detected by the attachment card, and the system will revert to a non-RTA mode and line 25 on the 80610 screen will indicate this by being cleared. After completing voice communications, and after the telephone receivers are inserted back in the modem cradles, the system will again establish RTA IDLE MODE. This will be indicated on line 25 on the 80610 and on the bottom line of the remote TTY Display Terminal. The system may now be changed back to RTA MODE and any diagnostic or operating system that has been loaded will not have been affected.

When the DATA SET READY signal disappears or when the security key is removed from the attachment card while in any of the RTA modes, the system will revert to a non-RTA operating mode. If the DATA CARRIER DETECT signal disappears while in either RTA MODE or RTA KYBD MODE, all communication with the remote TTY Display Terminal will stop. The local operator will not have any indication this has occurred. If the DATA CARRIER DETECT signal disappears while the remote TTY Terminal operator is keying in a command or message, this will cause the system to revert to RTA IDLE MODE. This will be indicated on line 25 at the local 80610 Terminal and the remote operator will find that it is no longer possible to key in any data characters. But, if this was a temporary or intermittent loss of signal, the message could also appear on the remote TTY Terminal Display. When this occurs, the remote terminal operator could again select the RTA operating mode desired and continue but would have to type in the command or message from the beginning.

To select RTA IDLE MODE: hold down the control key and press the X key twice (this is a control function CAN). This causes an octal code of 030 (18H) to be sent to the attachment card two times and cause the system to switch to RTA IDLE MODE.

The cross reference chart in table C-1 lists the keys that must be pressed on a CDC 752 Display keyboard (used as a remote TTY Display) to simulate the interrupt keys on a 80610 Display. Also, if the remote TTY Display Station being used is not a CDC 752 and the control keys listed do not generate the codes that are listed, then the keys that do generate those codes must be found on your particular display in order to simulate the interrupt keys.

The columns of the cross reference chart are explained as follows:

- 1 Interrupt keys on the 80610 Display keyboard
- 2 Control keys used on a CDC 752 Display keyboard to simulate the 80610 interrupt keys
- 3 ASCII MNEMONICS of the control keys used in column 2
- 4 Octal representation of the control code generated by pressing the control keys in column 2
- 5 Hexadecimal equivalent of the octal code in column 4 and this is the code the attachment card looks for to simulate the interrupt key in column 1

Table C-1. 80610 Display Keyboard and Remote TTY Display Keyboard Cross Reference Chart for Interrupt Keys

1	2	3	4	5
Enter	CR	CR	015	0D
ATTN	ESC	ESC	033	1B
ATTN	CNTRL/A	SOH	001	01
PF1	CNTRL/E	ENQ	005	05
PF2	CNTRL/R	DC2	022	12
PF3	CNTRL/D	EOT	004	04
PF4	CNTRL/F	ACK	006	06
PF5	CNTRL/C	ETX	003	03
PF6	CNTRL/V	SYN	026	16

To ensure that the RTA protocol procedure is completely understood, the following general information is presented:

- All initiation of RTA functions have to be performed at the remote TTY display terminal. The on-site operator should not attempt any action unless instructed to do so by the RPS.
- Messages have to be restricted to a single line transfer; otherwise, subsequent lines will be lost.
- If at any time through the RTA procedure, the remote TTY operator is unsure of what mode he/she is in (due to the message being scrolled off the screen), he/she should reinsert the RTA function key sequence that is necessary.
- When in RTA mode, RTA KBYD mode, or RTA Idle mode, the local Viking display will be operating at a baud rate selected for the RTA link. When data set ready is lost or the security plug is removed, the Viking will function at normal speeds.

DIAGNOSTIC AIDS FOR 80610-12 AND 80610-16 DISPLAY
STATION SUBSYSTEM WITH RTA ESTABLISHED

D

DIAGNOSTIC TEST DESCRIPTION

The following provides a brief description of the CDC® 80610-12 and 80610-16 Display Station diagnostic tests residing on the CDC BASIC diskette for RTA. All other tests (auto and manual) not pertaining to RTA are unchanged from the original 80610 version as shown in appendix A. A manual test, however, has been added to the diagnostic diskette for testing of RTA.

AUTO TESTS

Refer to Auto Tests in appendix A for descriptions.

MANUAL TESTS

4240 Viking/RTA Test

This diagnostic test verifies the correct operation of the Viking RTA feature. This test assumes the local Viking console is fully operational. All communication after program load will be via the Viking console.

If unexpected error conditions occur during communication with the local Viking (for example, wrong condition code, interrupt timeout, stray interrupts, or interrupts on wrong levels), an abort error code (42FE) will be displayed on the operator/programmer panel indicator lights. Level 3 (r3) contains the starting address of the abort information block. The standard Viking diagnostics should be run to isolate the failure.

This test performs the following checks:

- Security plug code
- RTA interface signals
- RTA mode
- Electronic wrap of the RTA port
- RTA plug wrap at attachment level
- RTA plug wrap at local signal cable

When all the necessary conditions have been satisfied, an echo test may be performed on the remote TTY display terminal.

RTA Plug Wrap Test Jumpers

The following jumper descriptions provide the pin number and data line descriptions necessary for performing the wrap tests used in conjunction with SAM manual test 4240. The wrap tests are referenced in the SAM 4240 format.

- Attachment Card Connector End
(Use diagnostic wrap plug, CDC P/N 22245612)
 - Transmit to Receive Data - pin 5 to pin 10
 - Request-to-Send to Data Set Ready - pin 1 to pin 8
 - Data Terminal Ready to Carrier Detect - pin 6 to pin 4

- Modem Cable Connector End
(No assembly has been documented for this test)
 - Transmit to Receive Data - pin 2 to pin 3
 - Request to Send to Data Set Ready - pin 4 to pin 6
 - Data Terminal Ready to Carrier Detect - pin 20 to pin 8

SAM 4240

This is a manual test requiring operator interaction to verify operation of the RTA feature. Ensure proper installation of the complete RTA subsystem before beginning this test. This includes:

- Security plug
- RS232 I/O cable
- Local modem with power on
- Remote modem with power on
- Remote TTY terminal with power on

Abnormal conditions encountered during this test will be displayed at the programmer's panel via an abort block. In the abort block codes, 07FF indicates an interrupt timeout has occurred. Interrupt timeouts will not occur while waiting for an operator response to a question except during the remote terminal echo routine.

Initiate test by using the local Viking console display/keyboard, enter B4240 and press the ENTER key (message on the CRT indicates the test number in progress, successful completion, detected error, or that display station input is required to exercise test). Use of the operator/programmer panel is not required.

Viking RTA Test

001 Y N Clear Viking and TTY screens.
: :
002 : N Display start diagnostic message.
: :
003 Y N Verify RTA security plug code. Plug code correct?
: :
004 : 1 Display incorrect plug code received. Check for
: presence of security plug. Insert/reseat/replace
: plug, replace attachment board.
:
005 Y N Issue electronic wrap command to RTA port. CC=0703?
: :
006 : 1 Electronic wrap failed. Replace attachment board.
:
007 Y N Read RTA interface status.
: :
008 Y N Do you want the interface signals displayed?
: : Response PF2?
: :
: 1 Go to step 10 and read RTA mode.
:
009 Y N Display RTA interface status.
: :
010 Y N Read RTA mode flag. Flag 93 (RTA mode)?
: :
011 : Y N Display start echo test message. Enter alpha-
: : : numeric via the remote TTY terminated by a carriage
: : : return. (An attention interrupt will terminate the
: : : test.)
: : :
012 : Y N Echo test. Wait for interrupt. Read inputted line
: : : and echo line back out. Verify data entered
: : : matches data echoed. If the echo test fails and
: : : all the plug wrap tests have been run, suspect a
: : : faulty remote terminal.
: : :
: 1 1 Exit to end of test step.
:
013 Y N Display RTA mode status. If an attempt at invoking
: : RTA mode has been made, or if you want to proceed
: : to the wrap test, respond with PF1 at the Viking,
: : or press control and DC-3 twice at the remote
: : console and replay - PF2 -. Was response PF1?
: :
: 1 Loop back and reread RTA mode status step 009.
:
014 Y N Do you want to run the plug wrap test? If yes,
: : replace modem signal connector with wrap plug on
: : attachment board. Reply YES=PF1 NO=PF2. Was reply
: : PF1?
: :
2 2
A B

SAM 4240-2

Viking/RTA Test (Cont)

```

A B
1 1
015 Y 1 Execute RTA wrap at attachment board.   CC=0703?
      : :
016 Y N Wrap test failed.  Reseat/replace attachment board.
      :
017 Y N Request wrap plug be placed on the end of the signals
      : : cable at the local end.  Replay PF1 when ready.
      : :
018 Y N Execute RTA plug wrap at local cable end.  CC=0703?
      : :
019 : 1 Wrap test failed at modem end.  Reseat/replace modem
      : signal cable.
      :
020 Y N Do you want to run the echo test now?  YES=PF1.  PF1
      : : pressed?
      : :
      : 1 Exit to end of test.
      :
021 Y N Display start echo test message.  Enter alpha/numeric
      : : via the TTY.
      : :
022 Y N Echo test.  Wait for an interrupt.  Read received
      : : line, echo data back to displays.  Exit to end of
      : : test.
      : :
023 1 1 END OF TEST MESSAGE.
024 1 1 END OF TEST.

```

NOTE

A condition code that is not equal to 0703 during a read or write to the local Viking display causes an abort.

CHARACTER HIGHLIGHT OPTION FOR 80610-16
DISPLAY STATION SUBSYSTEM

E

Appendix E contains information to aid in the installation, checkout, and on-site maintenance of the CDC® 80610-16 Display Station Subsystem when configured using the special character highlight option (CDC option number 60146-1). Use of the character highlight option does not prohibit the display station from employing other upgrade features such as use of the 25th displayable line on the display screen or remote terminal assistance (RTA) operations.

The information contained in this appendix directly parallels the sections of the main manual and appendix B (80610-16 Display Station Subsystem Upgrade). Only the information that is different from the upgrade version of the 80610-16 Display Station is mentioned herein; therefore, the base portion of the manual and appendix B must be used in conjunction with this appendix.

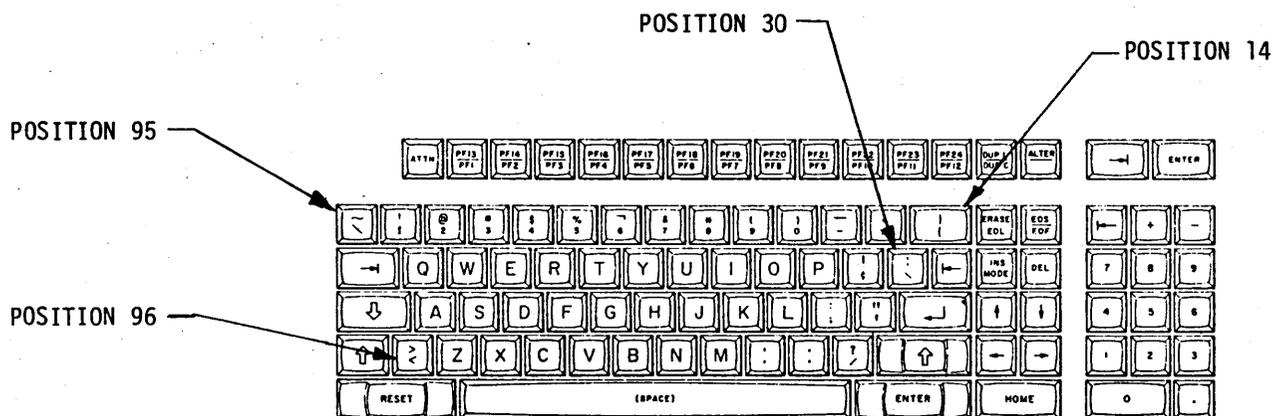
GENERAL DESCRIPTION

The special character highlight option is used on the 80610-16 Display Station, equipment number CC626-G. The purpose of this option is to provide reasonability checking of data entered by the operator from the display station keyboard. For example, if numeric data only was required in response to a particular program prompt, the entry of any other character, such as an alpha, would result in that character being highlighted, under program control, on the display screen. Each highlighted character is a duplicate of the character generated from the keyboard, except that the highlighted character would appear having a double underline and would be vertically offset (elevated one row in the dot matrix).

When installed in the 80610-16 Display Station, the character highlight option enables the host software to send the codes used to produce the highlight effect to the display screen. Highlighted characters are produced by the host software; they cannot be generated directly from the display station keyboard. A total of 61 alpha, numeric, and special characters are displayable on the display station CRT via the typewriter-style keyboard. These same 61 characters, plus the 61 highlighted characters, are displayed on the display screen via the host software.

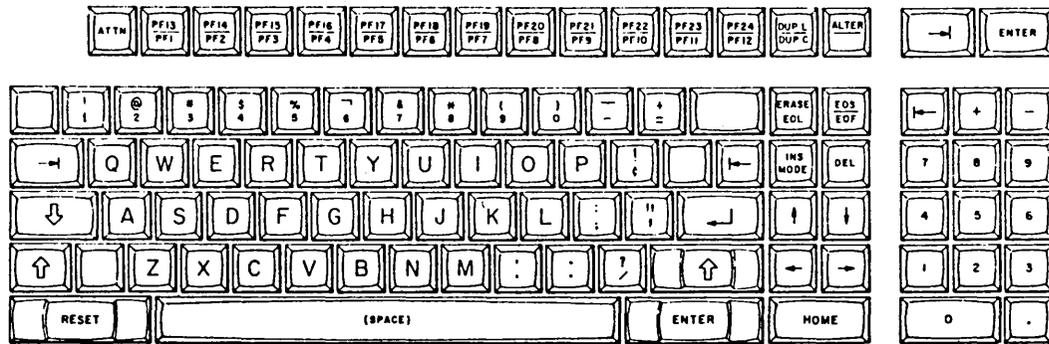
Except for the changes noted in the following paragraphs, the major elements of the 80610-16 Display Station configured with the character highlight option are identical to those of the 80610-16 Display Station when configured without this option.

- Keyboard - The typewriter keyboard for the display station having the character highlight option is similar to an 80610-16 Display Station keyboard not using this option. However, four keys on the standard version keyboard have been blocked and reconfigured with blank keycaps to enable character highlight option functions. This configuration change occurs due to the limitations of character generator memory. The key positions not used with the character highlight option are: 95 (~, \), 14 ({, }), 30 (\, |), and 96 (>, <). Note that these characters will not be displayable from either the keyboard or the software. Figure E-1 illustrates the standard 80610-16 Display Station keyboard, and figure E-2 illustrates the same keyboard when configured with the character highlight option.
- Logic/Power Supply Module - When used on a display station configured with the character highlight option, a special erasable read-only memory (EROM) character generator replaces the ROM character generator normally used on the logic/power supply module. Also, the 64/96 character jumper on the logic/power supply module is set to the 64-character position to enable proper operation of the highlight option. Note that with this setting, lower case alpha and graphic characters are not displayable from either the keyboard or via the host software. Figure E-3 illustrates the logic/power supply module when configured with the character highlight option.



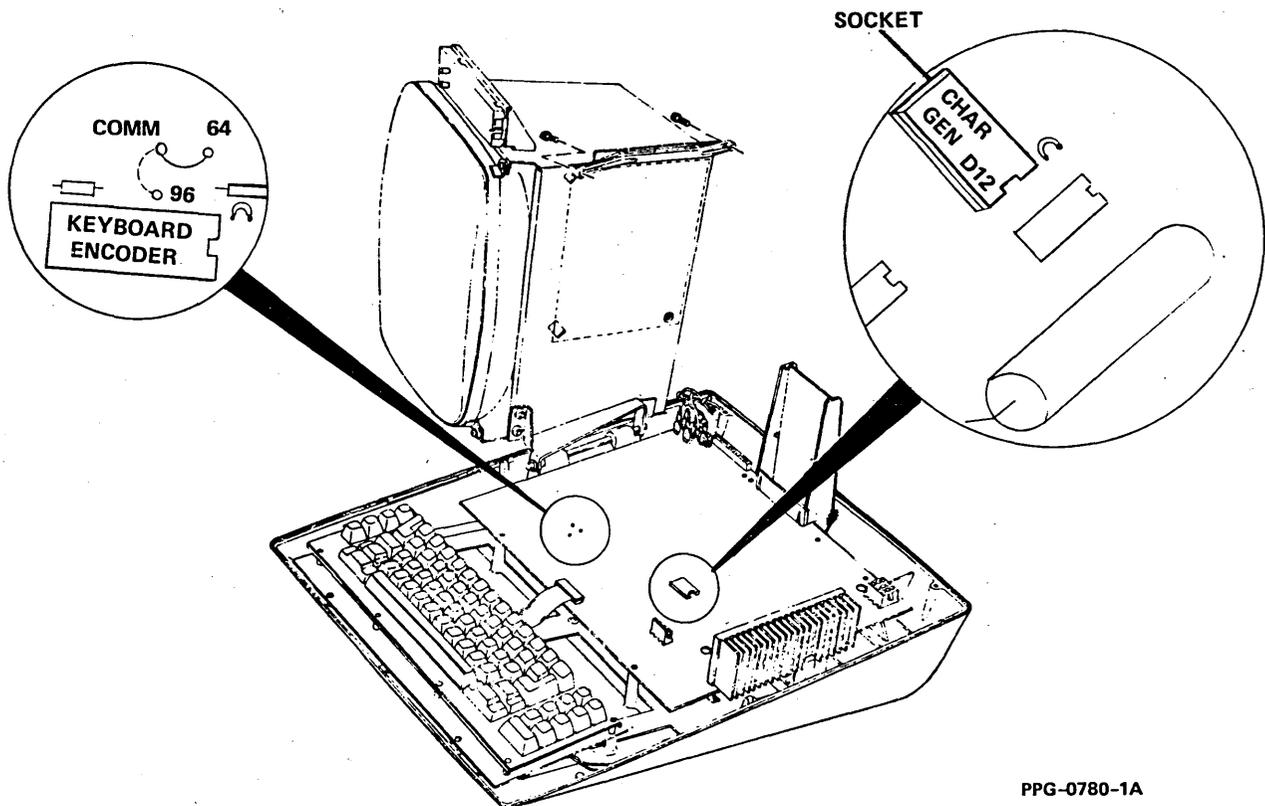
PPG-0778-1A

Figure E-1. Standard 80610-16 Display Station Keyboard



PPG-0779-1A

Figure E-2. 80610-16 Display Station Keyboard Configured with the Character Highlight Option



PPG-0780-1A

Figure E-3. Logic/Power Supply Module When Configured with the Character Highlight Option

NOTE

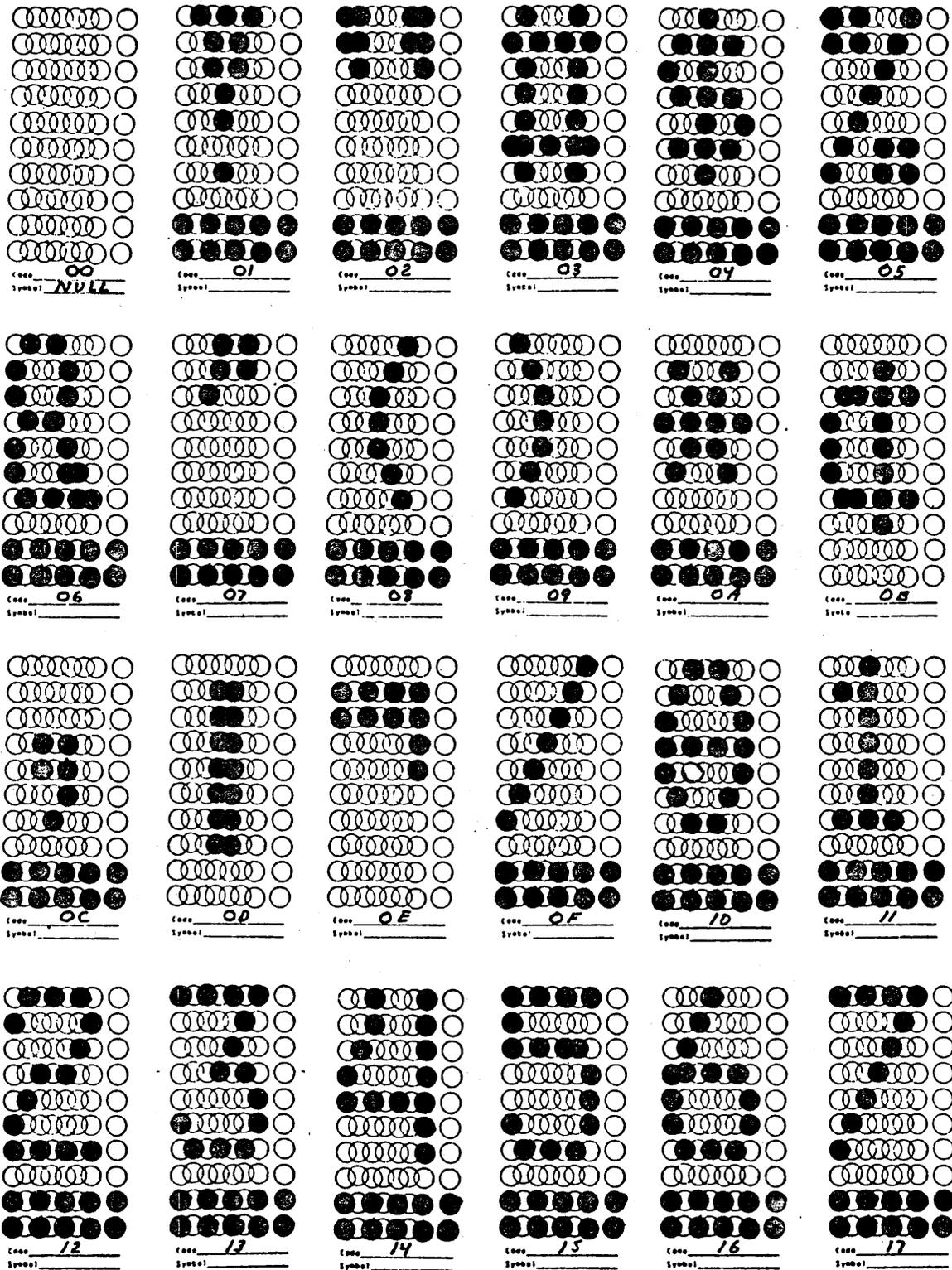
Since the 80610-16 Display Station has been designed with backward capability, the same keyboard and logic/power supply module used for character highlight applications can be easily reconfigured for standard display station operations. See the installation section of this appendix for details on installing the character highlight option.

Additional equipment specifications for the 80610-16 Display Station are listed in appendix B of this manual. Refer to the display station subsystem reference manual for related specifications on the 80610-16 Display Station when it is configured with the character highlight option (see preface for publication number). Note that table E-1 provides a complete summary of character coding applicable to the character highlight option. Also, a complete listing of the code and keyboard display character sets (for all character highlight option characters) is provided in figure E-4.

TABLE E-1. SPECIAL CHARACTER HIGHLIGHT OPTION CODING

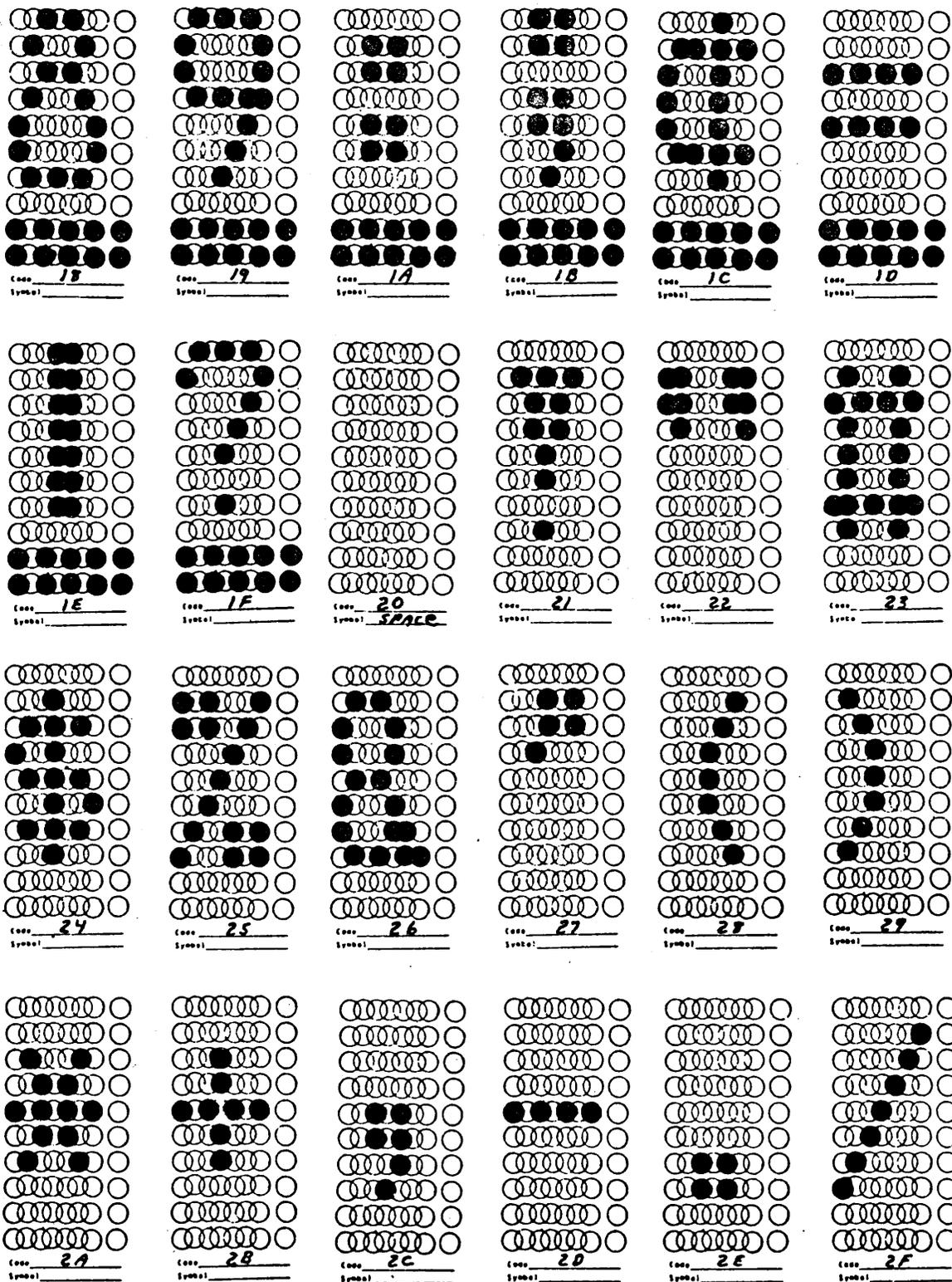
Character Displayed	A	E	Character Displayed	A	E	Character Displayed	A	E	Character Displayed	A	E	
	S	C		S	C		S	C		S	C	S	C
	I	I		I	I		I	I		I	I	
NULL	00		(SPACE)	20	40	@	40	7C	*	@	60	79
* !	01	21	!	21	5A	A	41	C1	*	A	61	81
* "	02	22	"	22	7F	B	42	C2	*	B	62	82
* #	03	23	#	23	7B	C	43	C3	*	C	63	83
* \$	04	24	\$	24	5B	D	44	C4	*	D	64	84
* %	05	25	%	25	6C	E	45	C5	*	E	65	85
* &	06	26	&	26	50	F	46	C6	*	F	66	86
* '	07	27	'	27	7D	G	47	C7	*	G	67	87
* (	08	28	(	28	4D	H	48	C8	*	H	68	88
*)	09	29	)	29	5D	I	49	C9	*	I	69	89
* *	0A	2A	*	2A	5C	J	4A	D1	*	J	6A	91
* +	0B	4A	+	2B	4E	K	4B	D2	*	K	6B	92
* ,	0C	2C	,	2C	6B	L	4C	D3	*	L	6C	93
* -	0D	4F	-	2D	60	M	4D	D4	*	M	6D	94
* .	0E	5F	.	2E	4B	N	4E	D5	*	N	6E	95
* /	0F	2F	/	2F	61	O	4F	D6	*	O	6F	96
* 0	10	30	0	30	F0	P	50	D7	*	P	70	97
* 1	11	31	1	31	F1	Q	51	D8	*	Q	71	98
* 2	12	32	2	32	F2	R	52	D9	*	R	72	99
* 3	13	33	3	33	F3	S	53	E2	*	S	73	A2
* 4	14	34	4	34	F4	T	54	E3	*	T	74	A3
* 5	15	35	5	35	F5	U	55	E4	*	U	75	A4
* 6	16	36	6	36	F6	V	56	E5	*	V	76	A5
* 7	17	37	7	37	F7	W	57	E6	*	W	77	A6
* 8	18	38	8	38	F8	X	58	E7	*	X	78	A7
* 9	19	39	9	39	F9	Y	59	E8	*	Y	79	A8
* :	1A	3A	:	3A	7A	Z	5A	E9	*	Z	7A	A9
* ;	1B	3B	;	3B	5E	(Note 1)	5B		*	+	7B	C0
* *	1C	3C	*	3C	4C	(Space)	5C	E0	(Note 2)		7C	6A
* =	1D	3D	=	3D	7E	(Note 1)	5D		*	-	7D	D0
* ?	1E	3E	?	3E	6E	(Note 1)	5E		*	.	7E	A1
	1F	3F		3F	6F	-	5F	6D	(Note 1)		7F	

* An asterisk in the Character Displayed column indicates that character is a highlighted character (contains a double line beneath the character).
 1 No EBCDIC code exists for this character.
 2 This code not used; however, a space will be displayed if the code is received by the display.



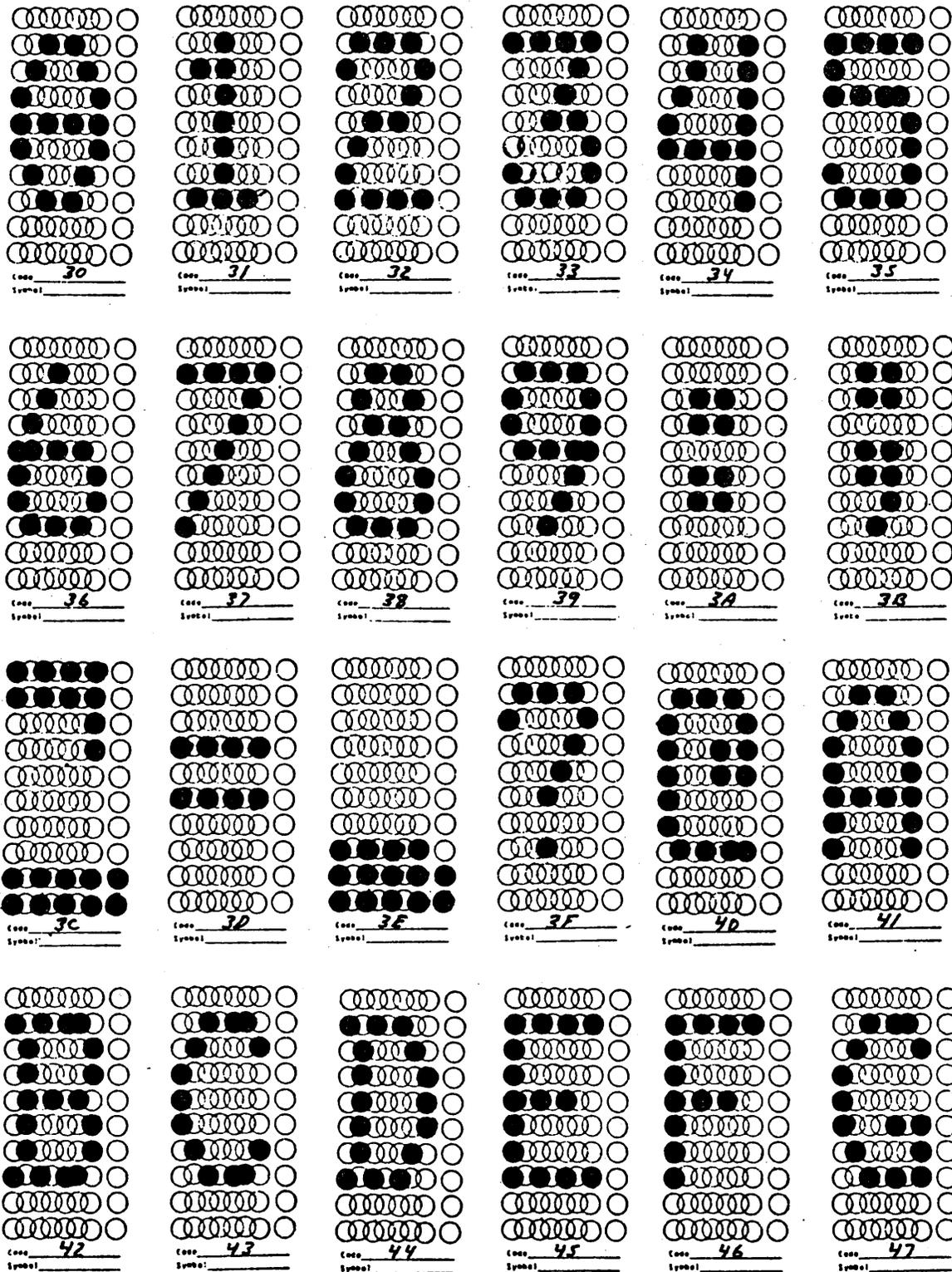
PPG-0781-1A

Figure E-4. Code and Keyboard Display Character Sets
(Sheet 1 of 6)



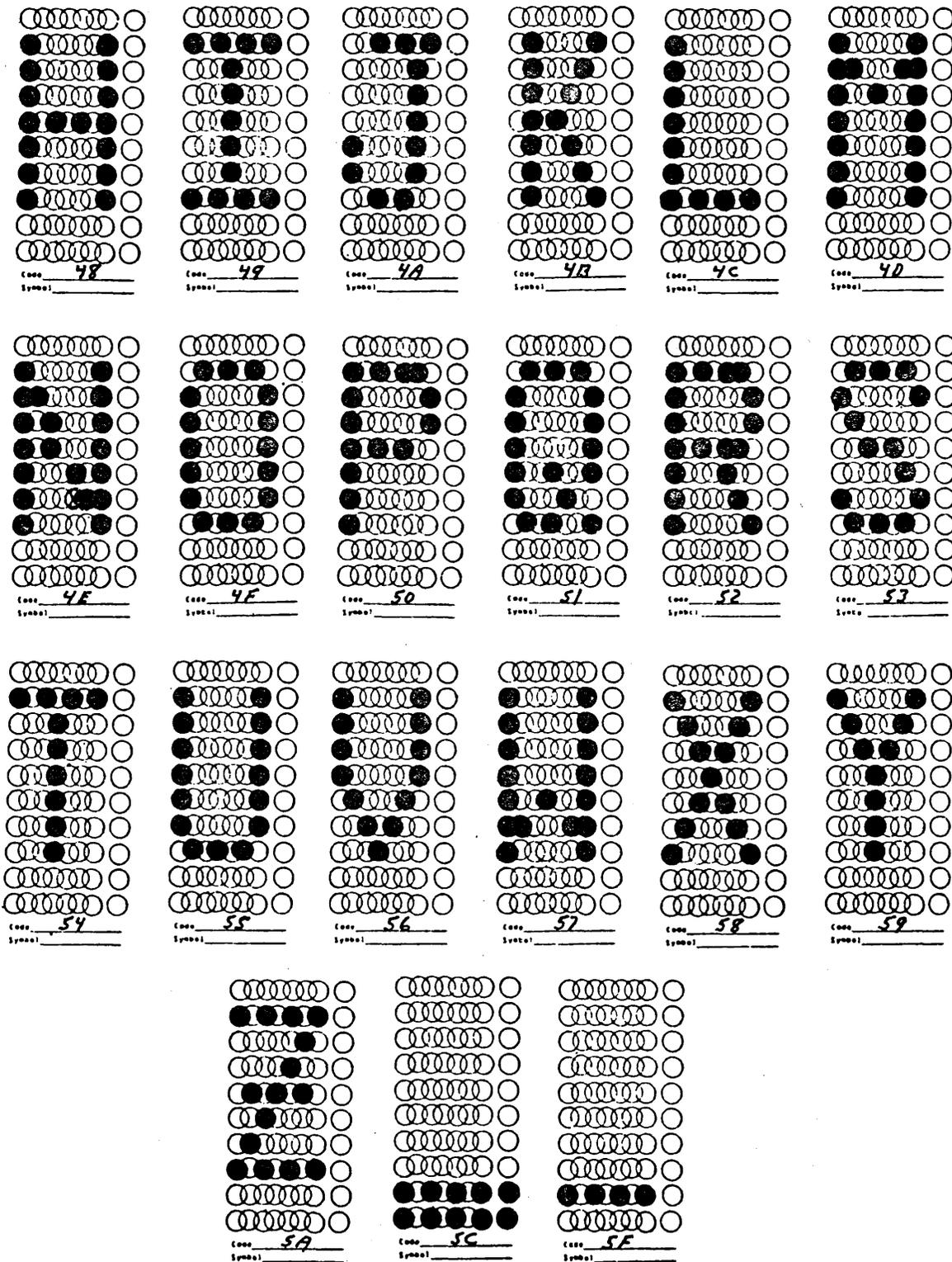
PPG-0782-1A

Figure E-4. Code and Keyboard Display Character Sets
(Sheet 2 of 6)



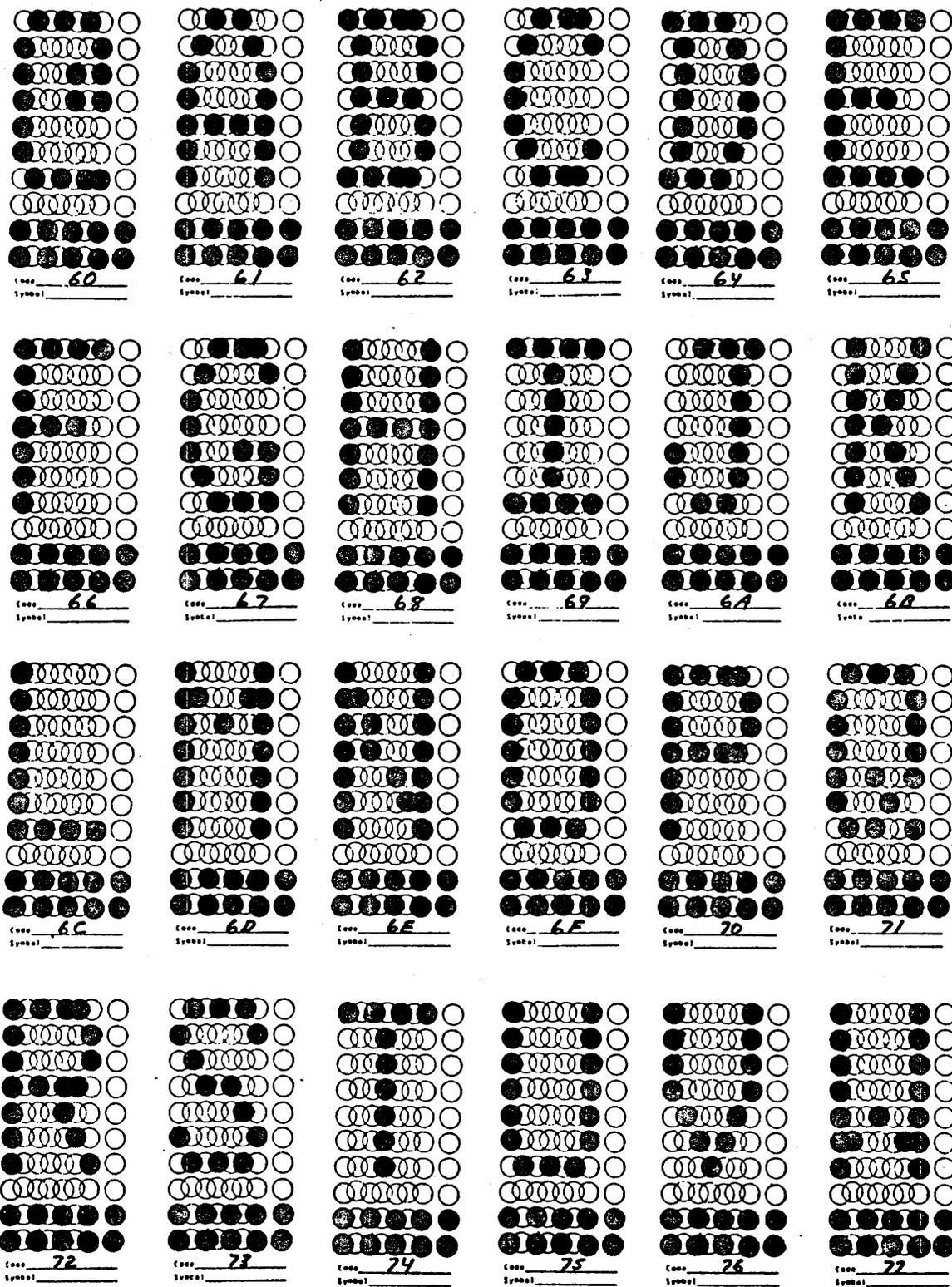
PPG-0783-1A

Figure E-4. Code and Keyboard Display Character Sets
(Sheet 3 of 6)



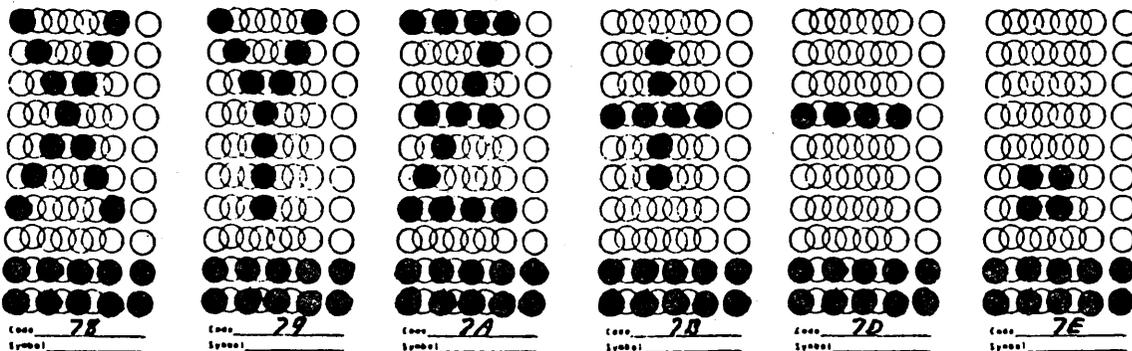
PPG-0784-1A

Figure E-4. Code and Keyboard Display Character Sets
(Sheet 4 of 6)



PPG-0785-1A

Figure E-4. Code and Keyboard Display Character Sets
(Sheet 5 of 6)



PPG-0786-1A

Figure E-4. Code and Keyboard Display Character Sets
(Sheet 6 of 6)

INSTALLATION AND CHECKOUT

This section provides information on the packaging, installation, and checkout of the 80610-16 Display Station Subsystem when it is configured for character highlight operations. Standard display station installation and checkout procedures are provided in section 2 of this manual.

PACKAGING

The 80610-16 Display Station character highlight option retrofit kit is packaged in a single container for shipment. The retrofit kit includes four blank keycaps, four keycap stops, one EROM character generator integrated circuit (IC), and applicable identification tag and labels.

INSTALLATION

The following procedures describe installation of the character highlight option. Note that installation of the 80610-16 Display Station itself is covered in section 2 and appendix B of this manual. Applicable assembly and component removal instructions contained in section 3 of this manual are noted in the procedures below. If in doubt as to how a procedure is performed, refer back to the referenced paragraph.

1. Perform installation and checkout of a standard 80610-16 Display Station (if necessary).
2. Remove all character highlight option parts from the shipping container, and visually inspect for any shipping damage.
3. Power off the display station, and disconnect the ac power cord from the site power source (see paragraph 3.1).
4. Remove the display station cabinet hood (see paragraph 3.2).
5. Remove the two monitor assembly hold-down screws, and tilt the monitor assembly to gain access to the logic/power supply circuit card assembly.
6. Carefully remove the character generator IC from its socket (see figure E-3). When removing the IC, do not bend the pins or, in any other way, damage the chip. Install the new special character generator IC (part number 22241847) from the parts kits. Make sure that the new IC is installed with the same pin orientation as the removed IC and that no pins are bent during installation.
7. Change the 64/96 character jumper to the 64-character position (see figure E-3).

8. Position the monitor assembly back to its normal position and reinstall the two hold-down screws.
9. Remove the keycap in position 14 (see figure E-1), and replace it with the equivalent blank keycap from the parts kit. Press the blank keycap firmly onto the keystem. Perform the same procedure, in turn, for keycaps in positions 30, 95, and 96. The resultant keyboard should look the same as shown in figure E-2.
10. Remove the keycap of the key immediately to the right of each blank keycap. Note the location of each keycap removed to facilitate reinstallation.
11. Install a keycap stop (part number 22241848) under each of the blank keycaps (see figure E-5). Once installed, these four keys will be inoperable. Check to make sure that these keys do not move when they are pressed.
12. Reinstall the keycaps removed in step 10.
13. Reinstall the display cabinet hood (see paragraph 3.2).
14. Open the small door located to the right of the display screen, exposing the intensity and contrast control knobs.
15. Attach the character highlight special option label shown below (part number 22213405) to the exposed back panel. Position the label below the intensity and contrast control knobs. The label should be completely visible whenever the door is open.

NOTICE!

**SPECIAL OPTION
60146-1 IS
INSTALLED
INVOLVING
SPECIAL CHAR.
ROM AND KEY
CAPS.**

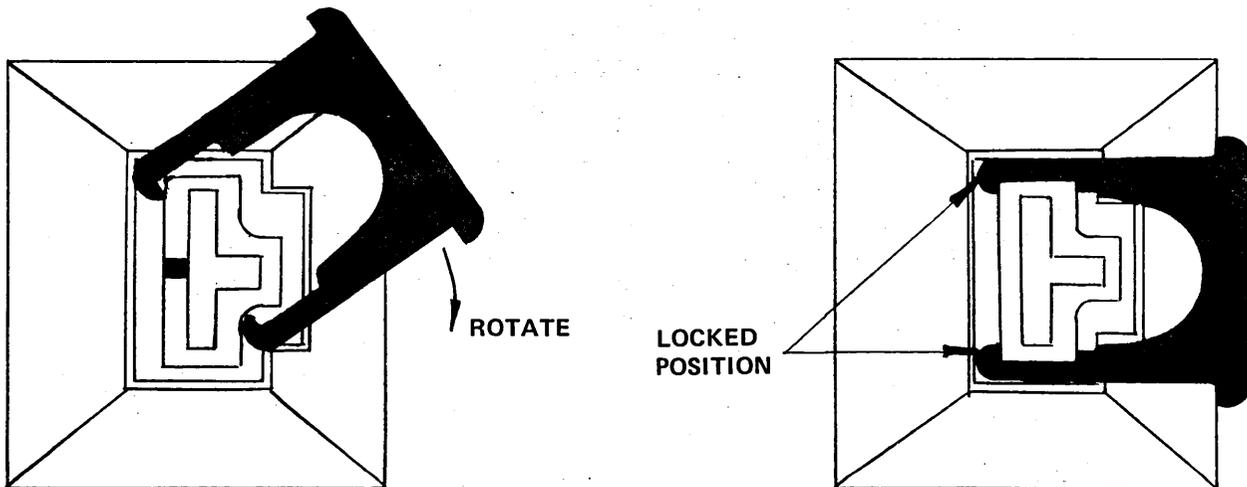
**REFER TO MANUAL
62947918 BEFORE
PERFORMING
MAINTENANCE.**

16. Attach the identification tag and the FCO log to the bottom of the display station as shown in figure E-6.

NOTE

This completes the installation of the character highlight special option. All of the removed parts should be kept together in a secure area near the display station. This will facilitate reconversion of the display station to its standard operating configuration (should this become necessary).

TOP VIEW WITH KEY CAP REMOVED



PPG-0787-1A

- Notes:
- 1) Keycap must be installed prior to installing the keycap stop.
 - 2) Insert keycap stop under the keycap as shown.
 - 3) Rotate stop downward until it locks into position on keystem as shown.

Figure E-5. Keycap Stop Installation

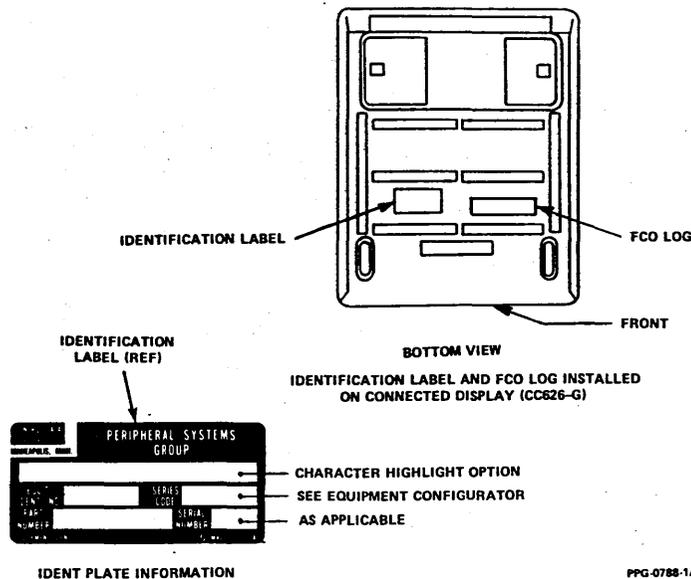


Figure E-6. ID Label and FCO Log Installation

CHECKOUT

When installation is complete, apply power to the display station and rerun diagnostic tests 4200 and 4230 to verify that the display station is still operating properly. Procedures for running these diagnostics are contained in appendix A of this manual.

NOTE

The only difference between testing of a display station configured with the character highlight option and a display station not having this option is that some of the highlighted characters will be displayed on the screen at the end of diagnostic test 4230.

MAINTENANCE

Maintenance of an 80610-16 Display Station configured with the character highlight option is the same as for a standard 80610-16 Display Station. Refer to section 3 of this manual for complete maintenance details.

SPARE PARTS LIST

Complete spare parts and other information relevant to the special character highlight option are provided on the following pages. Note that individual parts are not stocked. If a spare part(s) is required, the complete character highlight option kit must be ordered. Order the kit by using CDC part number 22241844.

COMMENT SHEET

CDC® 80610-10, 80610-11, 80610-12, 80610-14,
MANUAL TITLE: 80610-15, and 80610-16 Display Station Subsystem
Hardware Maintenance Manual, (Site Information)

PUBLICATION NO.: 62947918

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