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VT18X

UPGRADE AND SYSTEM TEST GUIDE

VT18X

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PREFACE

This manual provides the procedures to upgrade your VT100 video terminal to a VT180 personal office computer. You already have most of the hardware necessary to build the VT180. The VT18X upgrade kit adds a dual mini-floppy disk unit and a control module to your VT100. You are asked to format two diskettes and to run a diagnostic diskette to test the installation.

Chapter 1 lists the parts included in the upgrade kit and the tools necessary for its installation.

Chapter 2 provides the hardware installation procedure.

Chapter 3 lists some special procedures to upgrade your VT100 if it already includes the printer port option or a word processing option.

Chapter 4 provides the system test procedure used to make sure the installation is correct and the diskette formatting procedure.

Chapter 5 provides some basic troubleshooting procedures to help you isolate and solve problems encountered during installation.

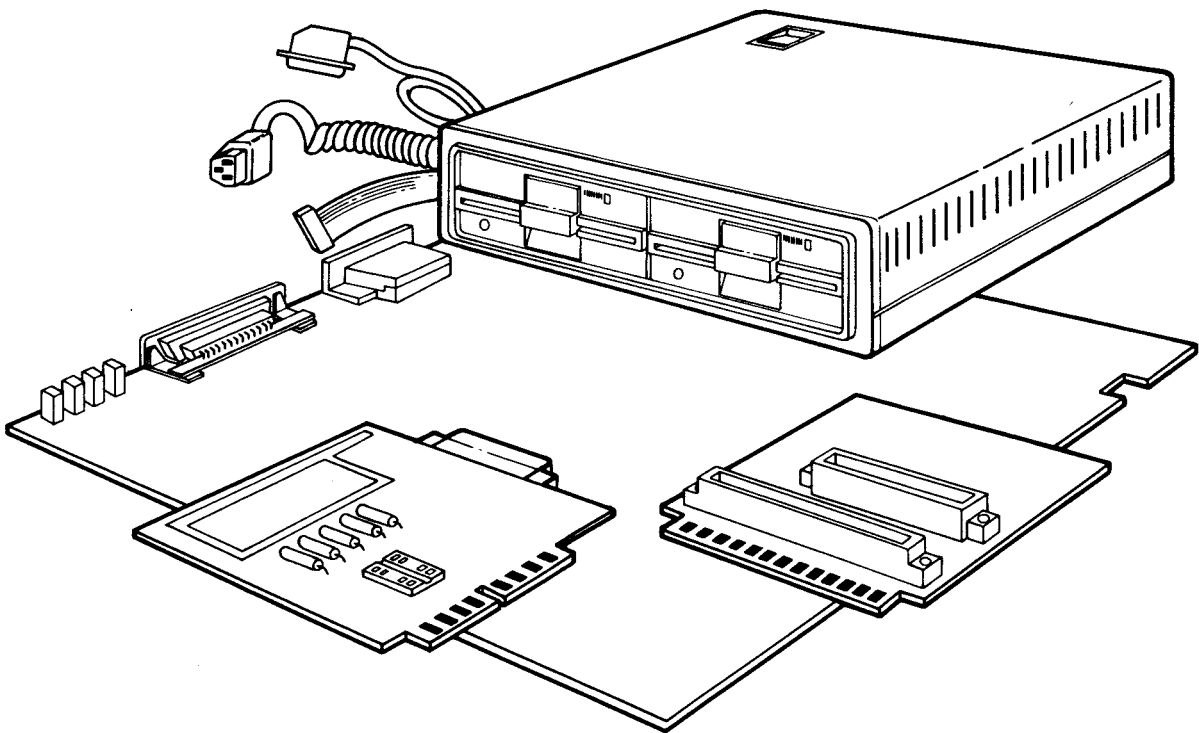
Some of the dialog in this manual requires your response. That response is printed in color. The terms "disk" and "diskette" are used interchangeably in the computer dialog.

After completing this manual, refer to the *VT180 User's Guide* (AA-M044B-TV) for information on how to use the CP/M[®] software.

CHAPTER 1 INTRODUCTION

OVERVIEW

The VT18X Personal Office Computing Option Upgrade Kit, illustrated in Figure 1-1, adds the capability to run CP/M application software to the VT100 video terminal. This kit adds a VT18X control module and one or two dual disk drives to the VT100. The CP/M compatible software and diagnostics come on 13.3 cm (5 1/4 in) diskettes.



MR 7862

Figure 1-1 VT18X Upgrade Kit

This upgrade and system test guide provides the installation procedures to upgrade your VT100 to a VT180 personal office computer. This guide also provides a test procedure to make sure that the installation is correct. Table 1-1 lists the VT100 series models that can and cannot use the VT18X upgrade kit.

NOTE: Before attempting this installation, make sure your VT100 is operating correctly. Specific set-up features are also required and must be "saved" in the VT100 on power-up so that each feature's setting is like that listed in Table 1-2.

**Table 1-1 VT100 Series Terminals
that Can and Cannot Use the VT18X Option***

Model	Can Use VT18X Option	Cannot Use VT18X Option	Reason
VT100-AA, -AB	X		
VT100-L, -N	X		
VT100-WA, -WB	X		
VT100-WC - WZ		X	Foreign character set
VT100-X	X		
VT101		X	Nonexpandable
VT102		X	Nonexpandable
VT103		X	LSI-11 backplane
VT105 (VT1X5)		X	Lose graphics capability
VT125		X	Lose graphics capability
VT131		X	Nonexpandable
VT132**		X	Lose block mode and local edit capability

* The VT180 does not support the 20 mA (VT1XX-AA) or the printer port option (VT1XX-AL, -AM, -AU, -AV). See Chapter 3 for special procedures.

** The terminal can use the VT18X option if it is reconfigured to a basic VT100, but it loses the feature(s) mentioned.

Table 1-2 VT100 Set-Up Features for VT180 Compatibility

Set-Up Feature	Selection	Setting
ON-LINE/LOCAL	ON-LINE	ON-LINE light should be on
ANSI/VT52*	ANSI	1
AUTO XON/XOFF	ON	1
Wraparound	OFF	0
New Line	OFF	0
Power	60 Hz or 50 Hz	0 = 60 Hz; 1 = 50 Hz (set to match power line frequency)

*The VT180 supports both ANSI and VT52 modes, however, the terminal must power up in ANSI mode.

PARTS AND TOOLS REQUIRED

The VT18X upgrade kit includes the following parts.

Parts Kit		Part Number
1	VT18X control module	54-15152-AA
1	VT180 paddle board	54-15150
1	VT100 expansion backplane	54-13384-01
1	Shield, card cage	74-25604-01
1	Shield, rear (module access cover)	74-26146
1	Cable access cover (wort cover)	74-26145
2	Card guides*	12-12405
1	Cable, 16-conductor *	70-08612-OM
1	RX180 dual disk unit (drives A and B)	RX180-AB
1	BC26K cable, terminal-to-disk	17-00297
1	Line cord	17-00150-01
1	Box of small miscellaneous mounting hardware	

The following parts are included with a second disk unit (order number RX180-AE).

Part		Part Number
1	RX180-AD dual disk unit (drives C and D)	RX180-AD
1	BC26Z cable, disk-to-disk	17-00298
1	Line cord	17-00150-02

The tools needed for installing the VT18X upgrade kit are as follows.

1	1/4 inch nut driver
1	Phillips screwdriver, no. 1
1	Flat blade screwdriver
1	Needlenose pliers
1	Scriber (pointed tool)
1	Wire cutter (if ROMs must be changed)

*Included in mounting hardware box

CHAPTER 2 VT18X UPGRADE KIT INSTALLATION

INTRODUCTION

This chapter provides the procedure for adding the VT18X upgrade kit to the VT100 video terminal. The kit also adds an RF shield to the VT100. New government rules require shielding electronic equipment to avoid interference with television and radio equipment.

NOTE: Before installing this kit, make sure your VT100 is operating correctly and is set up for the features given in Table 1-2.

Use the following procedure to install the VT18X personal office computer option upgrade kit.

REMOVE MODULE ACCESS COVER ON BACK OF THE VT100

Use the following procedure.

1. Remove ac power from the VT100 by setting the I/O switch on the back of the VT100 to 0 (Figure 2-1). Remove the ac line cord from the wall receptacle and from the back of the VT100.
2. Unplug the keyboard and the communication cables if attached to the back of the terminal. Unplug any video-in or video-out cables. See Figure 2-1.
3. With a screwdriver, loosen the four captive screws from the module access cover at the back of the terminal. Remove this cover; it will not be used with the VT180. See Figure 2-1.

REMOVE TOP AND BOTTOM COVERS ON THE VT100

Use the following procedure.

1. Remove the top cover on the video terminal as follows:
 - a. With a scribe, release the two front pop fasteners found under the video screen. Refer to Figure 2-2.
 - b. With a scribe or a small flat blade screwdriver, release the two rear pop fasteners found under the lower back edge of the bottom cover. See Figure 2-2.
 - c. Remove the top cover by lifting it straight up.

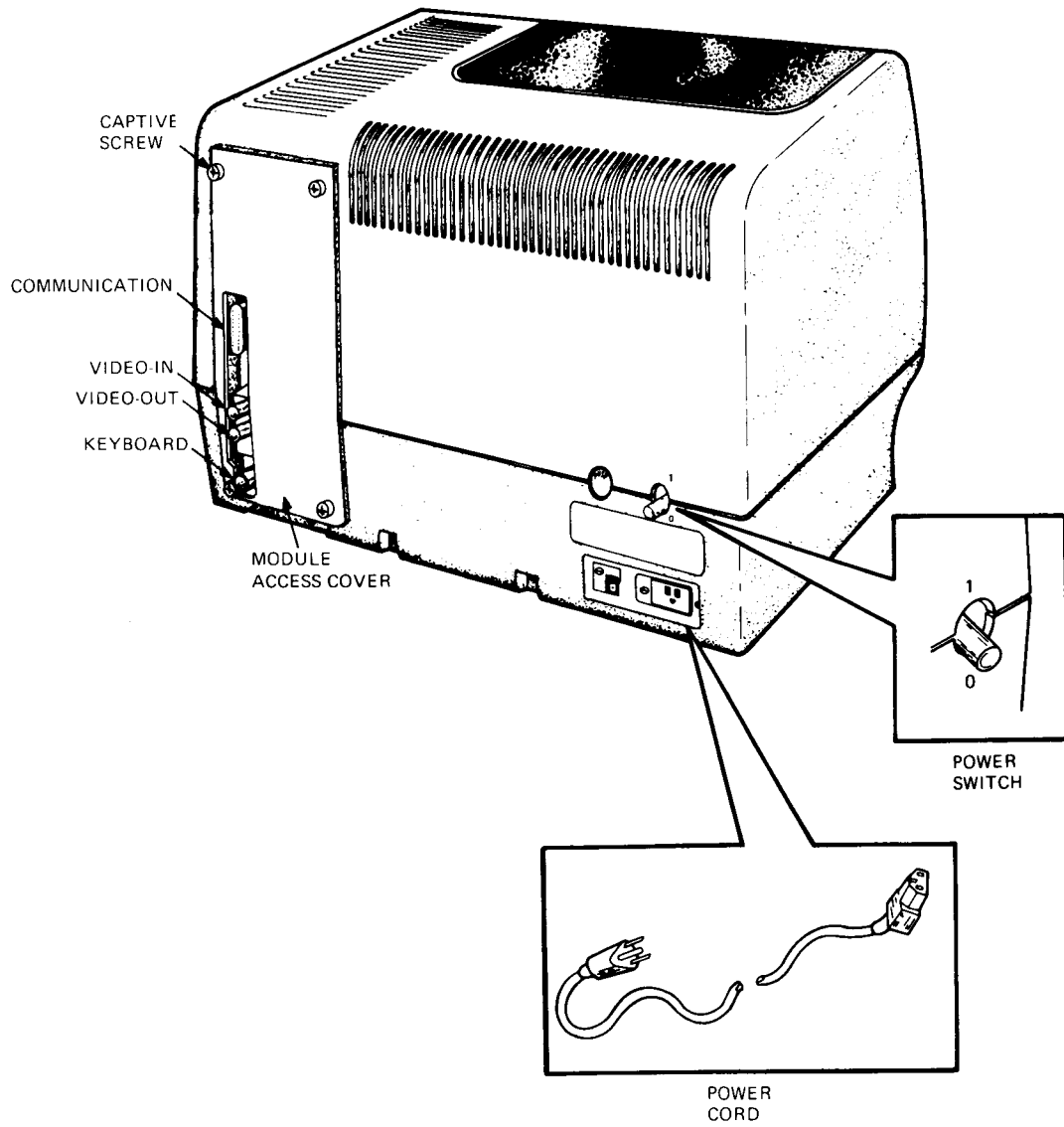
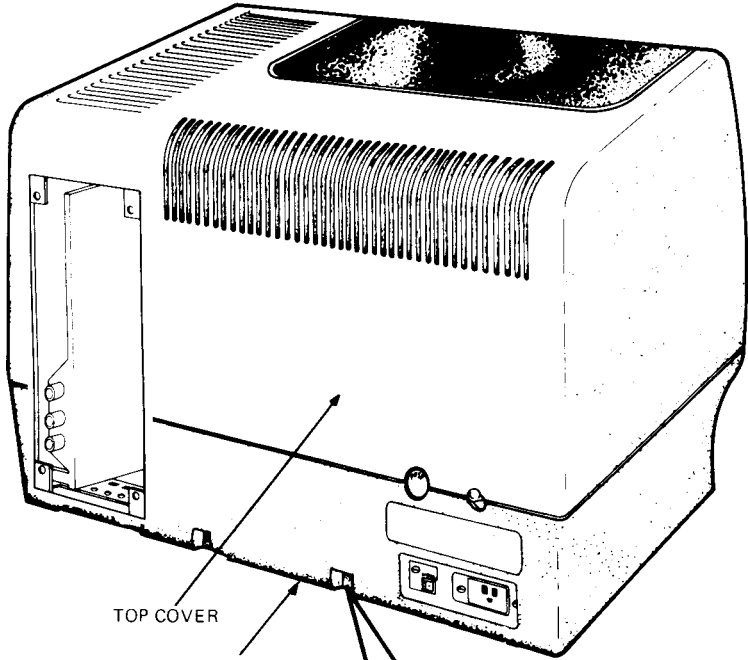
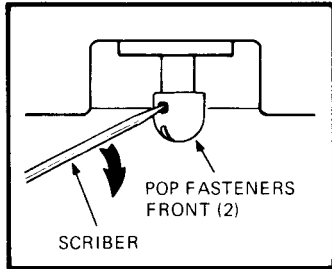
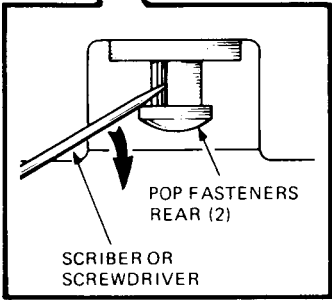


Figure 2-1 VT100 Video Terminal (Rear View)

MR-7863



TOP COVER
BOTTOM COVER



MR-7248

Figure 2-2 Removing Top Cover

2. Remove the bottom cover on the video terminal as follows:
 - a. Face the front of the terminal, turn it on its left side, and remove the four screws (if present) fastening the bottom cover to the chassis during shipment (Figure 2-3). Save these screws if the terminal is to be sent to another location, otherwise, discard them. Turn the terminal upright.
 - b. Find the four pop fasteners holding the chassis to the bottom cover. Pull the fasteners up until they click.
 - c. With two hands, lift the chassis by its center support bar up and out of the bottom cover.

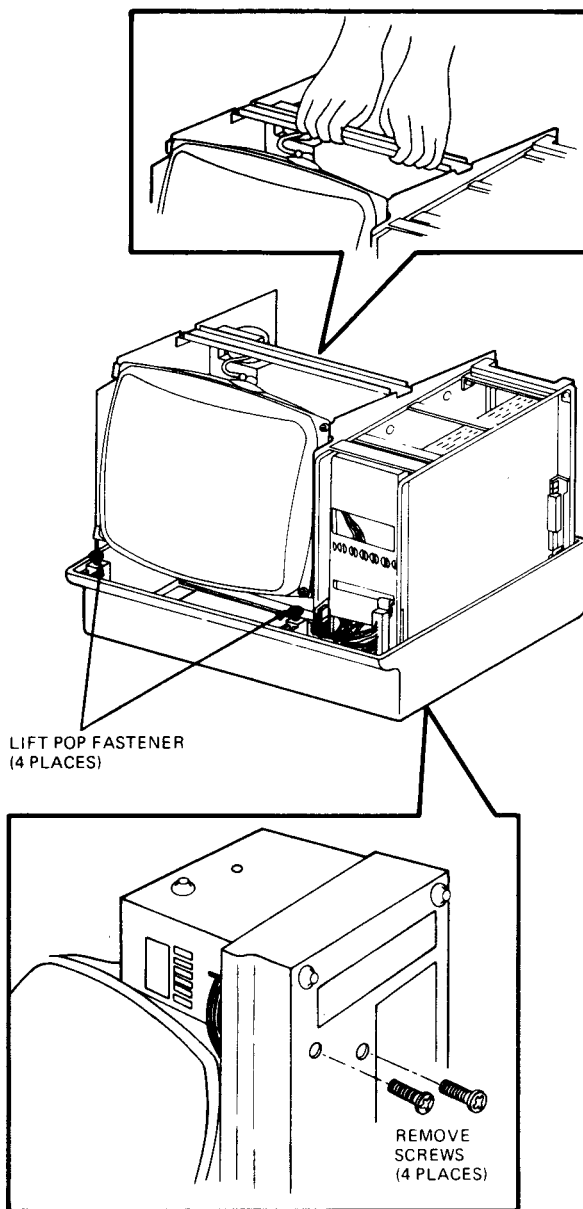
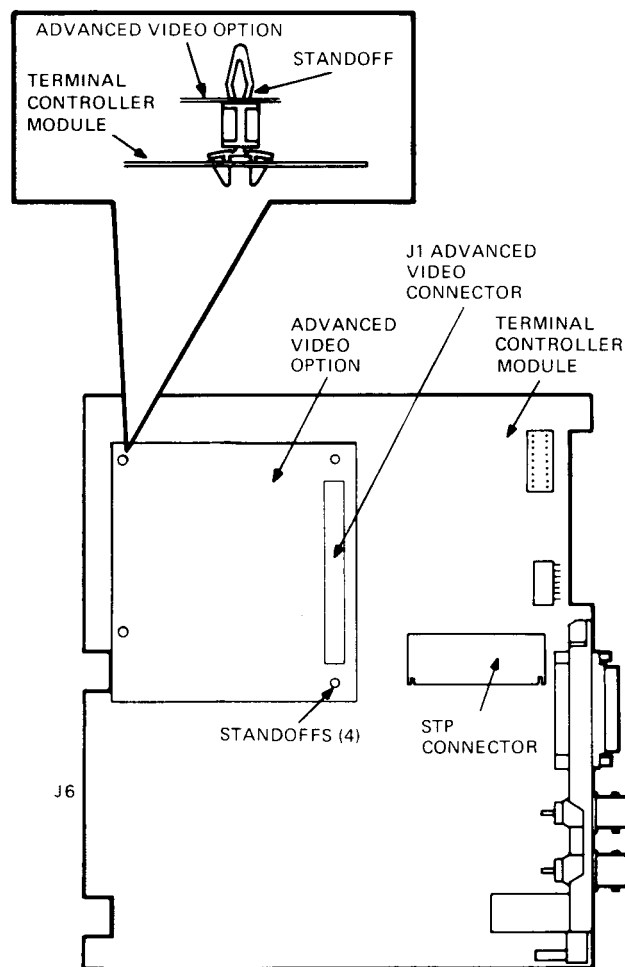


Figure 2-3 Removing Bottom Cover

REMOVE TERMINAL CONTROLLER MODULE FROM INSIDE VT100

Use the following procedure.

1. Remove the terminal controller module (Figure 2-4) from the card cage. Disconnect the ground wire, if present, from the module and pull the module out of its connector.
2. If present, remove the advanced video option (AVO) shown in Figure 2-4 from the terminal controller module. With needlenose pliers, press each standoff together while lifting up on the AVO.
3. Remove any module installed in the STP connector on the terminal controller module (Figure 2-4). The printer port option (VT1XX-AC) is not used in this computer. If a printer port option is removed, go to Chapter 3 for special instructions; if not, continue with the next step.



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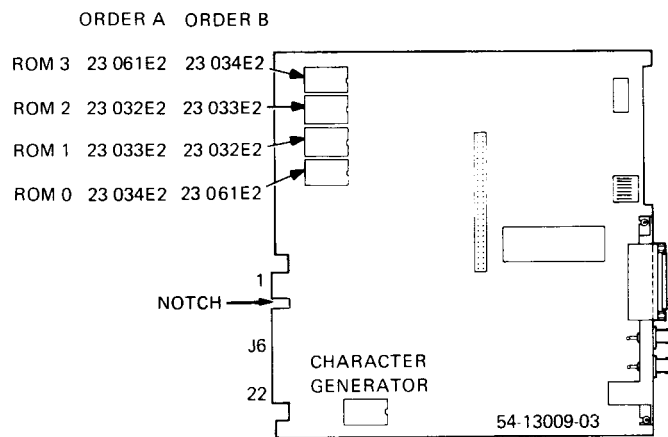
Figure 2-4 Advanced Video Option Removal and Installation

CHECK ROMS ON TERMINAL CONTROLLER MODULE

To use the VT18X on the VT100, the ROMs on the terminal controller module must be the same as for a standard VT100. The ROMs are the memory chips that plug into the sockets on the terminal controller module. The ROMs contain the program for the terminal operation. If the ROMs are not the same as those for the VT100, they may cause an error message or an unexpected halt. Use the following procedure to check these ROMs.

1. Check the ROMs on the terminal controller module and compare the numbers on the module with the numbers in Figure 2-5. They should be the same; if not, go to Chapter 3 for ROM removal and replacement instructions.

NOTE: The ROMs on the terminal controller module may be installed in either order illustrated in Figure 2-5.



NOTE:
ROMS MAY BE INSTALLED
IN EITHER ORDER A OR B
ON TERMINAL CONTROLLER
MODULE.

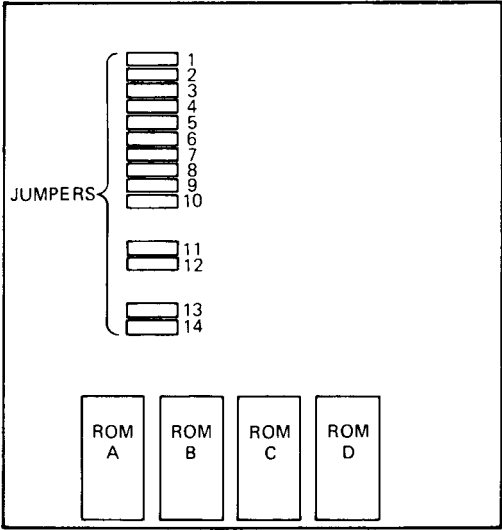
MR 7064

Figure 2-5 Checking ROM Numbers on Terminal Controller Module

2. If previously removed, check for the presence of ROMs and jumpers (or switches) on the advanced video option. Except for a VT100 with a word processing option, the VT180 uses no ROMs or jumpers on the AVO. The ROMs and jumpers should be removed (Figure 2-6). If the AVO has switches instead of jumpers, they should be set to off. See Figure 2-7.

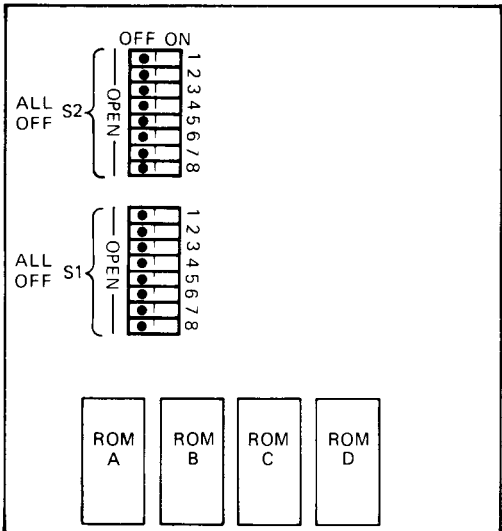
NOTE: For an AVO on a VT100 terminal with a word processing option installed (VT100-WA, -WB), refer to Chapter 3 for special configuration instructions.

3. If previously removed, install the AVO on the terminal controller module. See Figure 2-4.



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Figure 2-6 Advanced Video Option with Jumpers



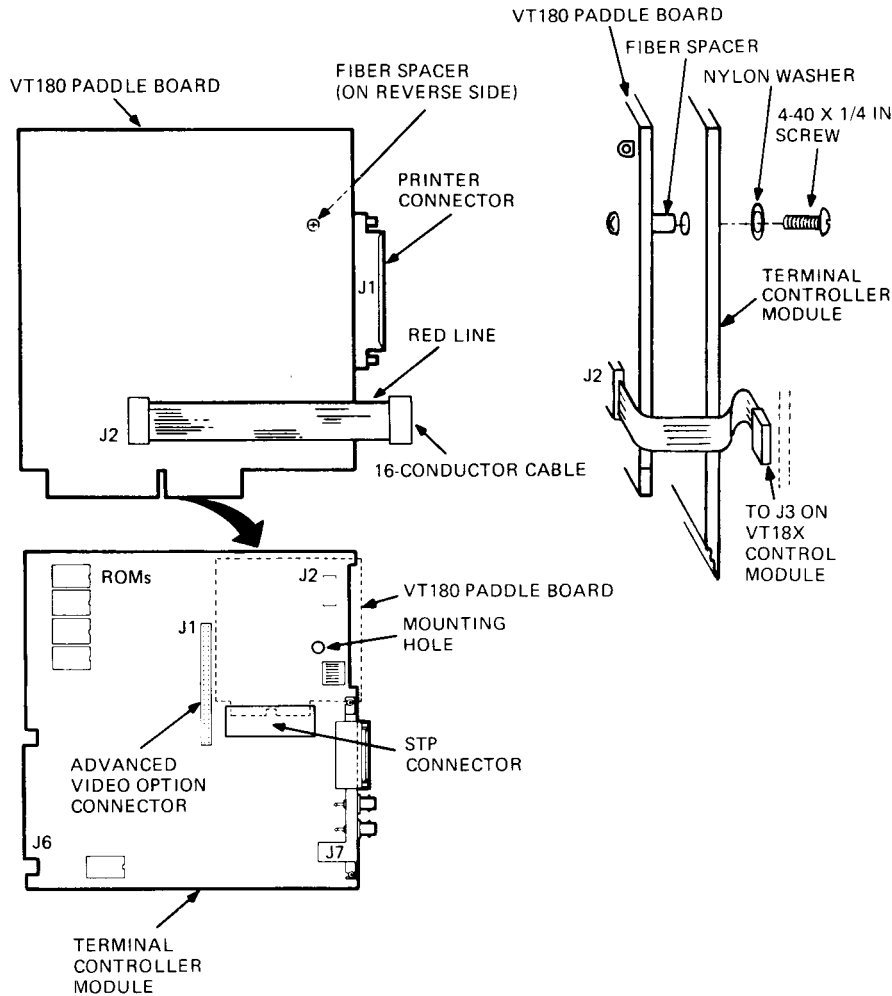
MR 7074

Figure 2-7 Advanced Video Option with Switches

INSTALL THE VT180 PADDLE BOARD

Use the following procedure.

1. Insert the VT180 paddle board (54-15150) in the STP connector on the terminal controller module (Figure 2-8). Fasten this paddle board to the terminal controller module with a 4-40 X 1/4 inch Phillips head screw and nylon flat washer through the fiber spacer.
2. Place one end of the 16-conductor ribbon cable in connector J2 on the VT180 paddle board observing the red line on the cable, as shown in Figure 2-8. Extend the cable to the right of the module.

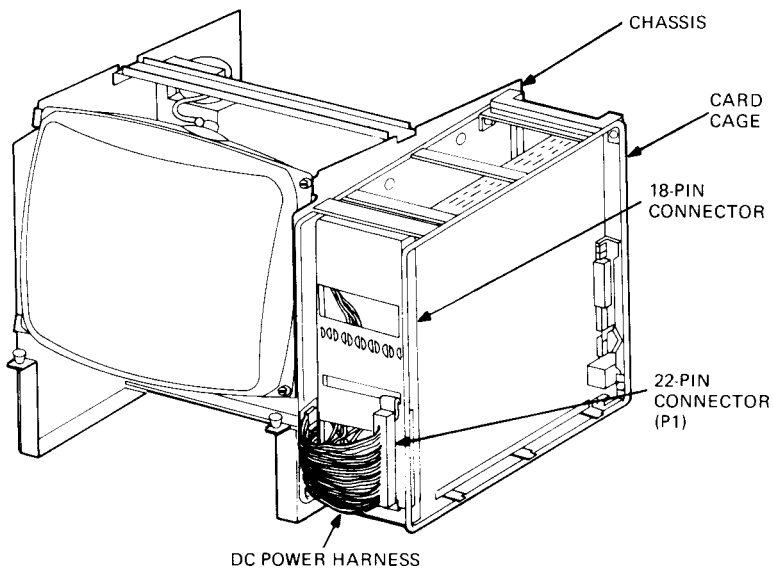


MR-7114

Figure 2-8 Installing VT180 Paddle Board

DISCONNECT DC POWER HARNESS FROM FRONT OF CHASSIS

Remove the 22-pin connector (Figure 2-9) from the front, right chassis by releasing the two retaining rings from its edge with needlenose pliers, or lift the clips off the top and bottom of the connector and discard.



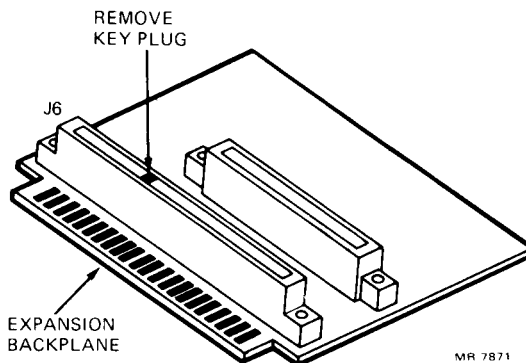
MR 7875

Figure 2-9 Disconnecting DC Power Harness

IF NECESSARY REMOVE KEY PLUG FROM EXPANSION BACKPLANE

The expansion backplane, shipped with the VT18X, has a key plug in connector J6 on the backplane (Figure 2-10). This key plug is for the new VT100 terminal controller module (54-13009-03), which has a slot in its connector J6 between pins 5 and 6.

When installing the VT18X, inspect your terminal controller board for a notch in connector J6 (Figure 2-5). If the notch is not present, you will have to remove the key plug from J6 of the expansion backplane to insert the module into the backplane. Use needlenose pliers to pull the key plug out of the connector on the backplane.



MR 7871

Figure 2-10 Remove Key Plug from Expansion Backplane

IF NECESSARY REMOVE KEY PLUG FROM DC POWER HARNESS

When installing the VT18X into an early VT100, you must remove the key plug from connector P1 of the dc power harness or it will not fit on the edge of the new expansion backplane. Use needle-nose pliers to pull the key plug out of the connector. See Figure 2-11.

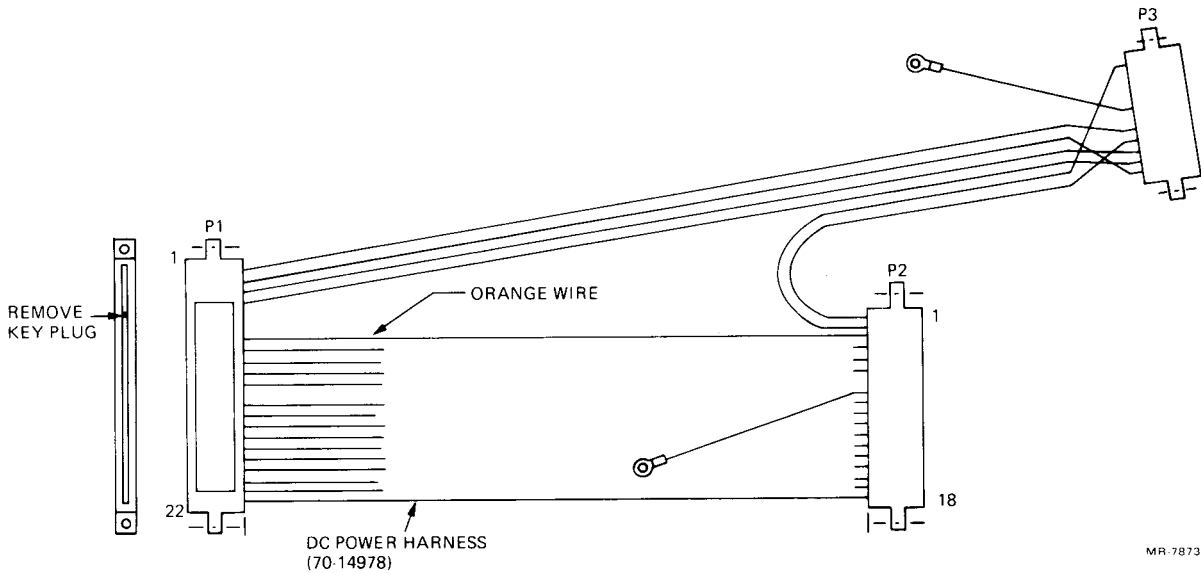


Figure 2-11 Remove Key Plug from DC Power Harness (on Early VT100 Terminals)

INSTALL VT100 EXPANSION BACKPLANE ON CARD CAGE

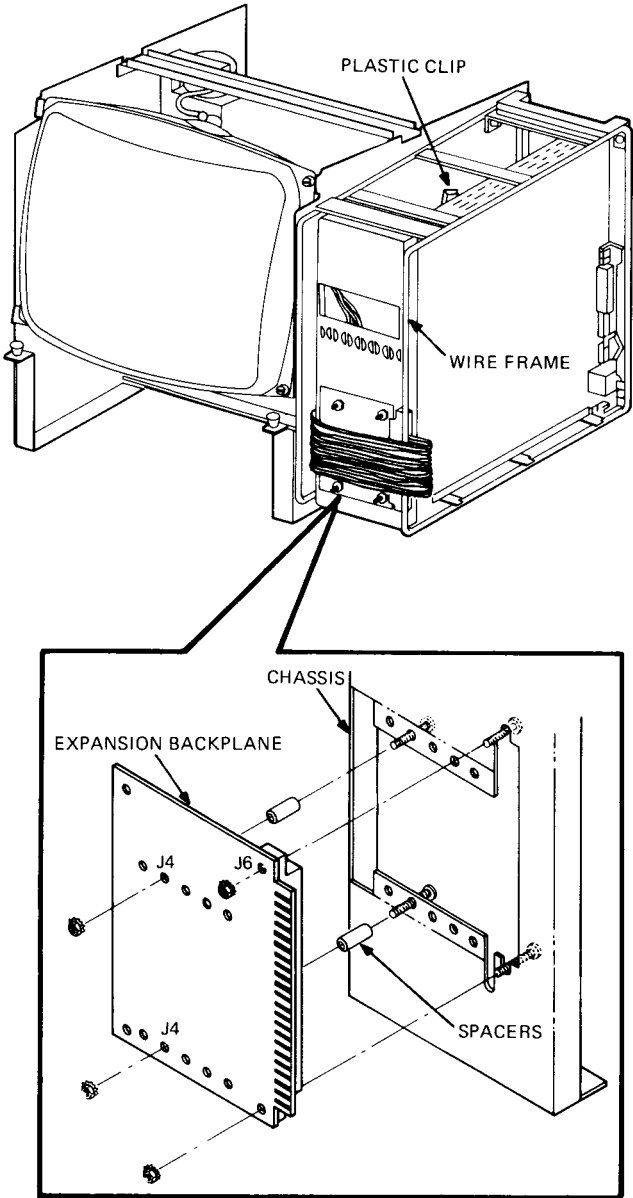
Install the VT100 expansion backplane (54-13384-01) on the front, right chassis on the terminal as follows.

1. Find four 4-40 × 1/2 inch screws, two round fiber spacers, and four kep nuts in the small parts box.
2. Install two screws from the inside of the chassis so they line up with the top and bottom holes of connector J6 on the expansion backplane. See Figure 2-12.
3. Fasten the backplane to the card cage with kep nuts.
4. Install the other two screws at location J4 of the backplane using a spacer between the card cage and the backplane. Secure these screws with kep nuts.

FASTEN DC POWER HARNESS TO BACKPLANE

Bend the dc power harness around the card cage wire frame and fasten this harness to the expansion backplane module fingers. To do this, you may have to remove the shorter wires from the plastic clip on the chassis and replace them later.

NOTE: The dc power cable must be flat against the chassis or the RF shield will not fit on it.



MR 7876

Figure 2-12 Installing Expansion Backplane

INSTALL CARD GUIDES

Install card guides at the top and at the bottom of the card cage so they line up with connector J2 on the expansion backplane. See Figure 2-13.

NOTE: The tabs on the card guides break easily; apply steady vertical pressure at the tab locations to compress and lock them in place.

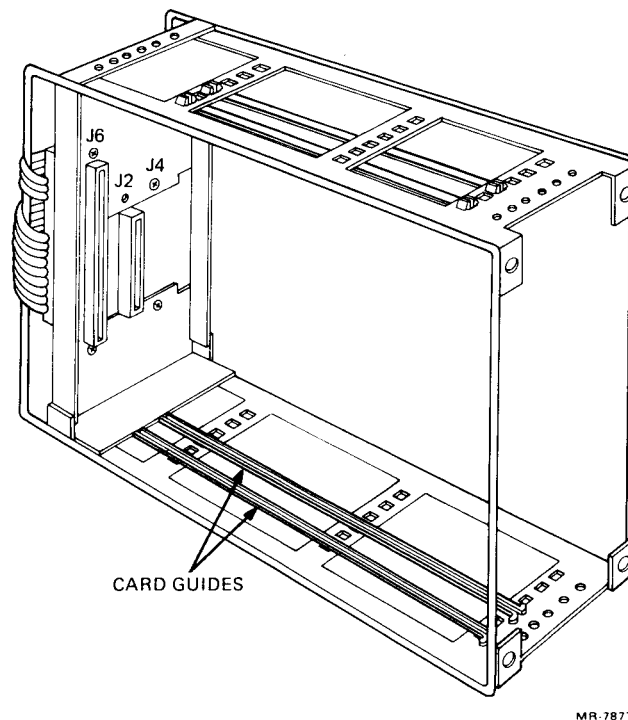


Figure 2-13 Installing Card Guides

INSTALL RF SHIELD

Use the following procedure to add the RF shield to the video terminal.

NOTE: Set the chassis on a protective material to protect the terminal's parts as well as the surface you are working on.

1. Set the chassis on end with the card cage up.
2. Remove the four 1/4 inch hex-head screws from the card cage - two on the top and two on the bottom.
3. Slide the RF shield on the card cage as shown in Figure 2-14. Be careful not to scrape power harness wires.
4. Using a scribe, line up the screw holes and install the same four hex-head screws. Holding the metal shield firmly in place, tighten the screws.

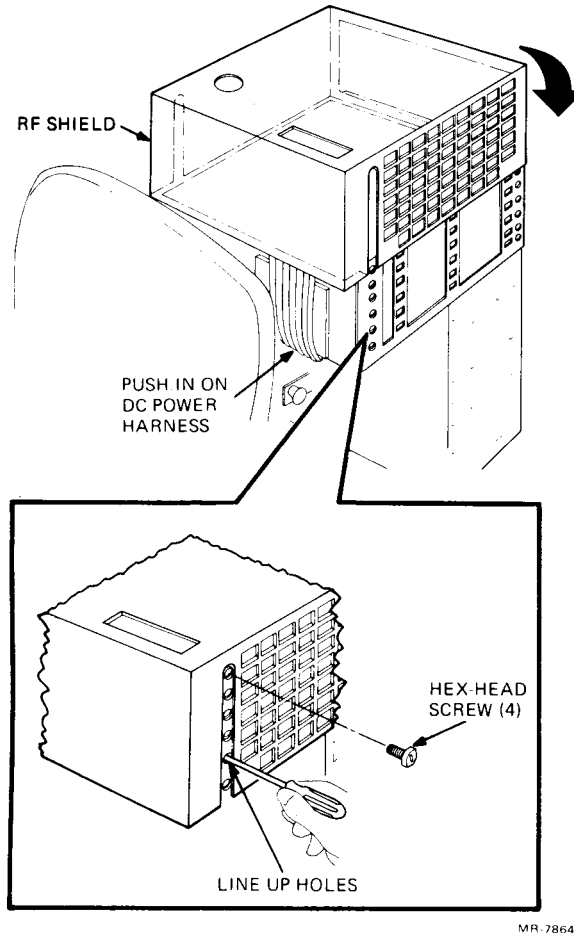


Figure 2-14 Installing RF Shield

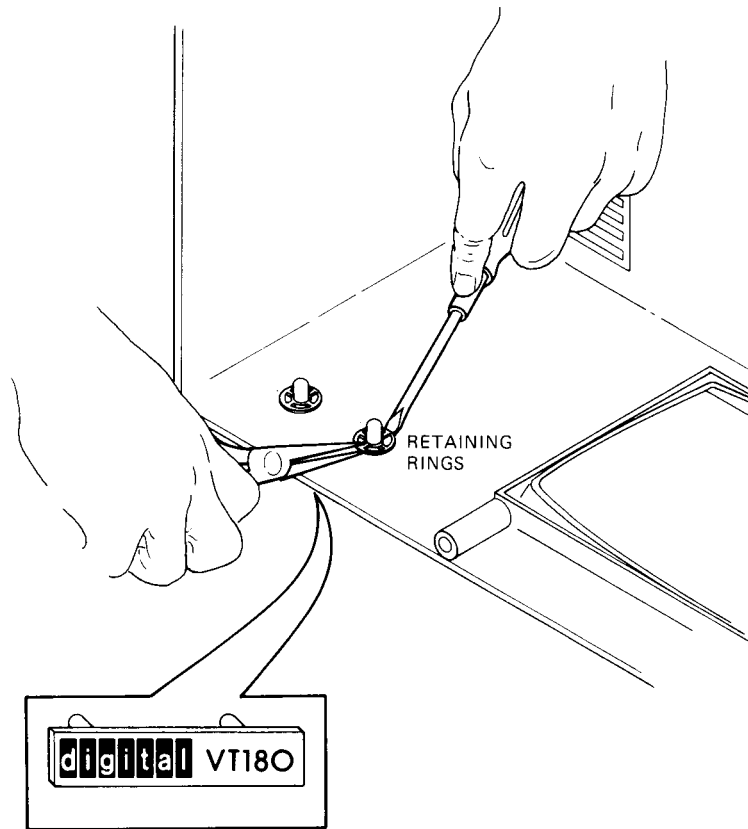
INSTALL BOTTOM COVER

Place the chassis in the bottom cover and fasten the bottom cover with four pop fasteners. If the terminal is to be sent to another location, turn the terminal on its left side and install the screws previously removed from the bottom.

CHANGE LOGO

Use the following procedure.

1. With a small screwdriver and pliers, remove the two retaining rings that hold the VT100 logo to the inside of the top cover.
2. Remove the VT100 logo and replace it with the VT180 logo. See Figure 2-15.
3. Secure the VT180 logo with the two retaining rings found in the small parts box.



MR 7865

Figure 2-15 Removing VT100 Logo and Installing VT180 Logo

INSTALL TOP COVER

Place the top cover on the chassis and fasten it to the bottom cover with four pop fasteners. Press up on the fasteners until they click.

INSTALL TERMINAL CONTROLLER MODULE

Install the terminal controller module in its original slot in the left side of the card cage. Use care when sliding the ribbon cable past the edge of the RF shield so it will not pull the cable's connector out of its socket.

INSTALL THE VT18X CONTROL MODULE

Use the following procedure.

1. Check the communications switches on the VT18X control module (Figure 2-16) for the correct positions listed in Table 2-1. The switches allow you to set the VT180 to run on most full- and half-duplex communications modems with application software. Switches 2 and 6 must be "on" for the communications port to function. The other switches may be enabled for the type of modem you are using. Table 2-1 shows the common configuration and the function enabled by each switch.

NOTE: When installing the VT18X control module, check ROM 0 (location E14) for the latest revision. Remove ROM part number 23-016E3 and install part number 23-021E3. This change affects the 54-15152 modules, etc revisions B and C.

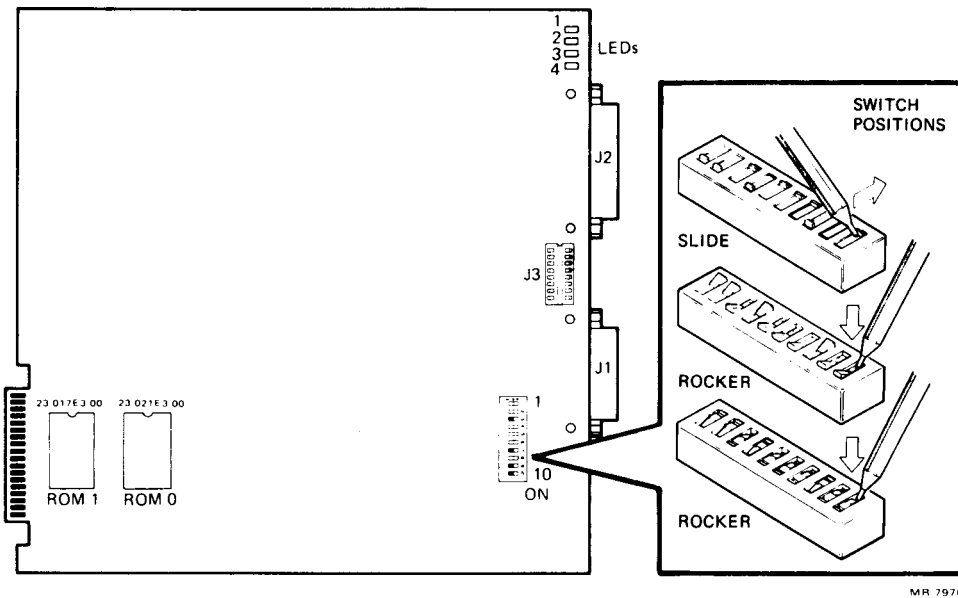


Figure 2-16 Check Switches on VT18X Control Module

Table 2-1 VT18X Control Module Communication Switches

Switch	Standard Setting	Name	Function Enabled	Source	Communications Port (J1) Pin Assignment	Circuit CCITT /EIA
1	On	RTS	Request to Send	From VT180	4	105/CA
2	On	CTS	Clear to Send	To VT180	5	106/CB
3	Off	SCTS	Secondary Clear to Send	To VT180	13	-
4	On	SPDI (SRLSD)	Speed Indicator (FDX) (Secondary Carrier Detect) (HDX)	To VT180	12	-
5	On	SRTS	Secondary Request to Send	From VT180	11	-
6	On	TXD	Transmitted Data	From VT180	2	103/BA
7	Off	STXD	Secondary Transmitted Data	From VT180	14	-
8	On	SRTS	Secondary Request to Send	From VT180	19	-
9	Off	-	Not used	-	-	-
10	Off	SPDS	Speed Select (HDX)	From VT180	23	CH

The open side of the switch is off.

VT18X UPGRADE KIT INSTALLATION

2. Slide the VT18X control module partially in the card guides for J2 of the backplane.
3. Attach the 16-conductor ribbon cable from the VT180 paddle board to the IC connector J3 on the VT18X control module. Do not twist or invert the cable; the red line on the cable should be up as shown in Figure 2-17.
4. Place the VT18X control module in connector J2 of the backplane.

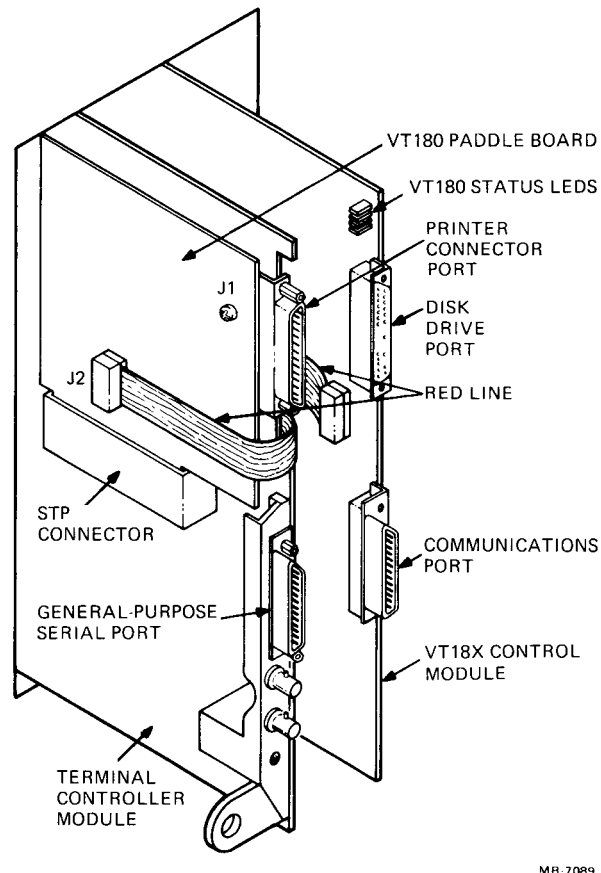
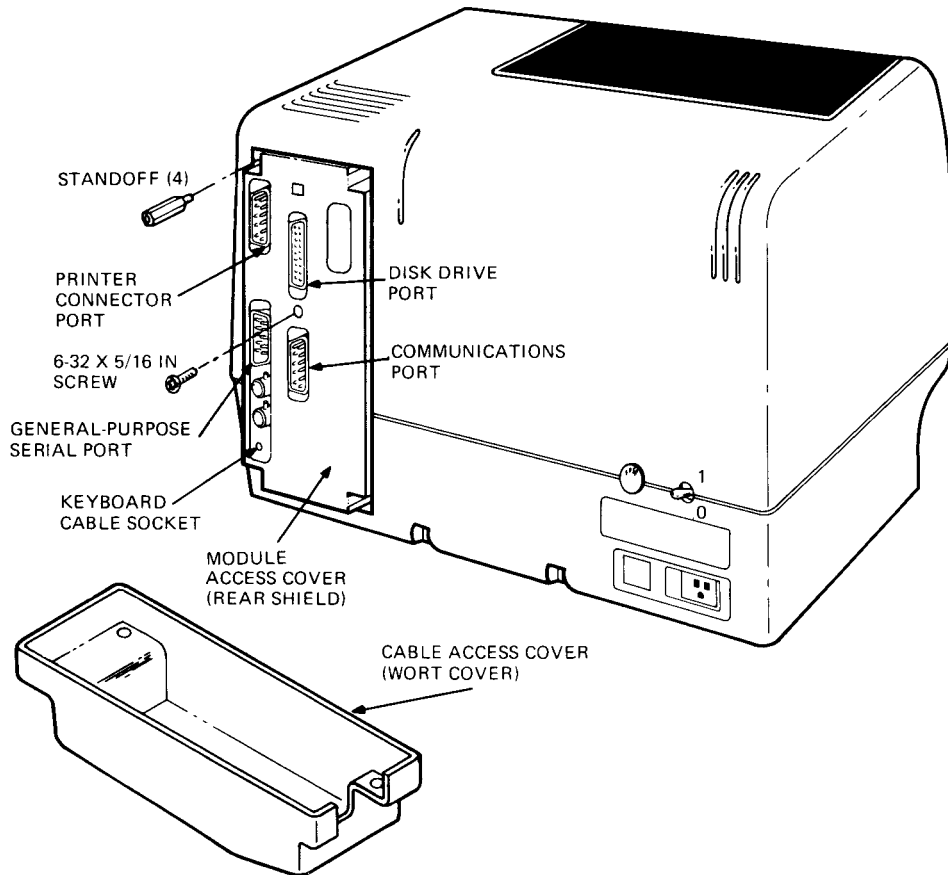


Figure 2-17 Installing VT18X Control Module

INSTALL NEW METAL MODULE ACCESS COVER (REAR SHIELD)

Install the new metal module access cover over the module access opening aligning its holes with the connectors on the module. Install this cover as follows.

1. Place one 1-1/8 inch hex standoff (90-00001-12) in each of the four corners of the cover. Do not tighten these standoffs yet. See Figure 2-18.
2. Place one 6-32 \times 5/16 inch screw in the center of the cover, grounding the VT18X control module to the cover.
3. Tighten the hex standoffs. Do not use excessive force: they break and bend easily.



MR 7241

Figure 2-18 Installing Module Access Cover (Rear Shield)

INSTALL RX180 DISK UNIT

Use the following procedure to install one or two dual disk units.

CAUTION: *If you have two dual disk units, they are not interchangeable. RX180-AB includes drives A and B; RX180-AD includes drives C and D.*

1. Check the voltage selector on the back of each disk unit; it should match your power requirements. See Figure 2-19.

CAUTION: *If you connect 220 V to a disk unit that is set for 115 V, you will blow its fuse and may damage its power supply.*

2. If you have one disk unit, you can place it on top or on either side of the video terminal. See Figure 2-20.

NOTE: *If you place the disk unit on top of the video terminal, do not cover the ventilation openings on top of the terminal.*

3. If you have two disk units, you should place RX180-AB (drives A and B) on top of RX180-AD (drives C and D).

VT18X UPGRADE KIT INSTALLATION

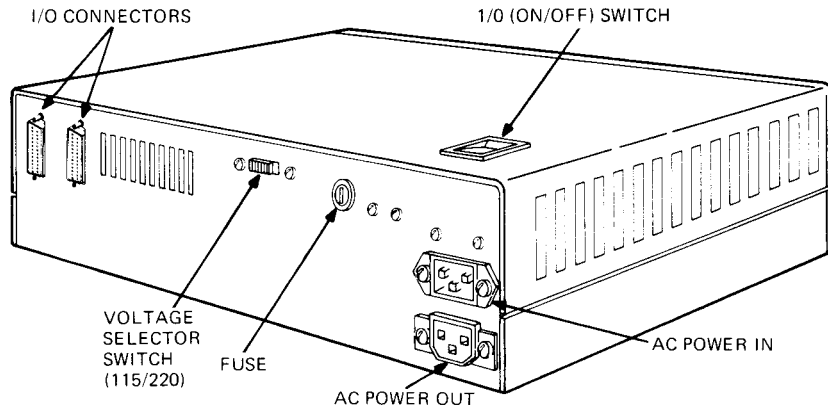


Figure 2-19 RX180 Dual Disk Unit (Rear View)

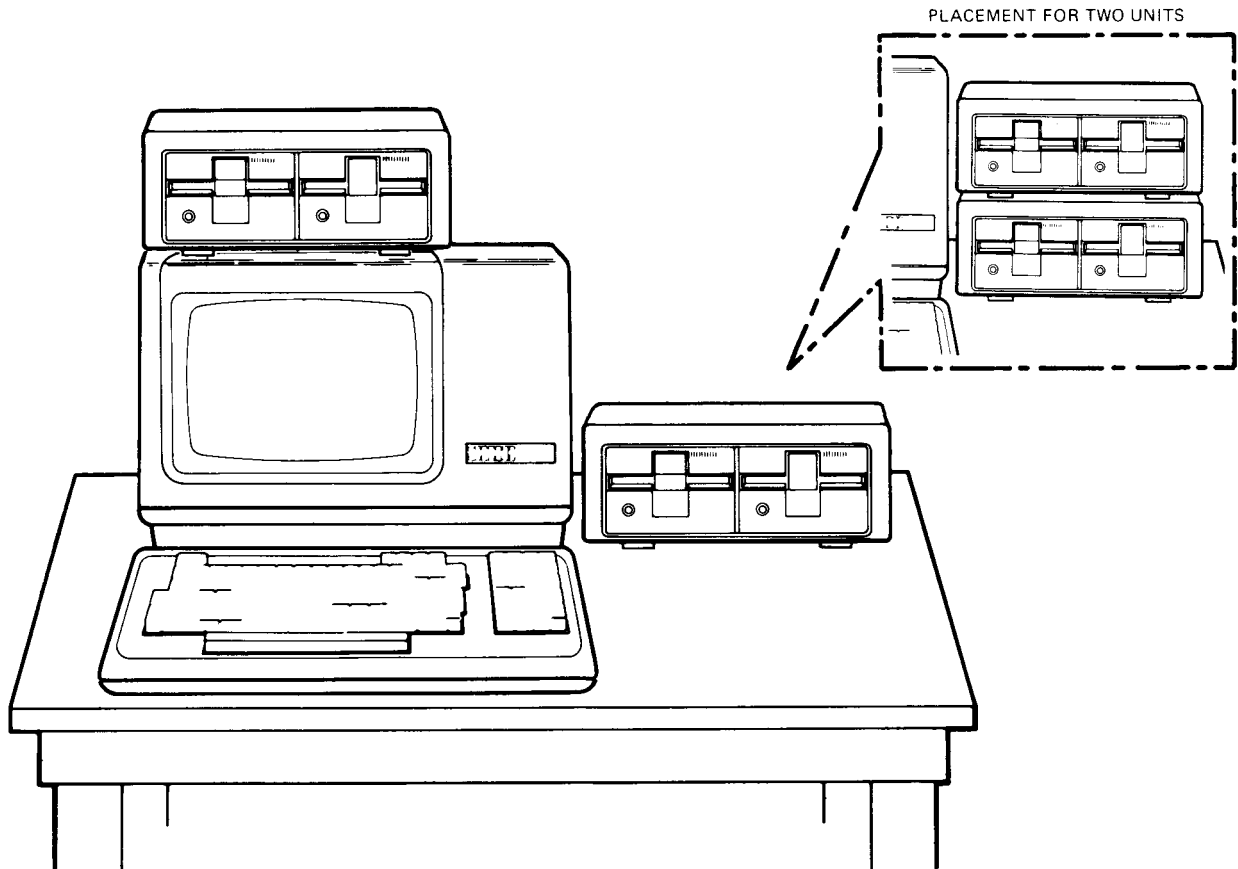
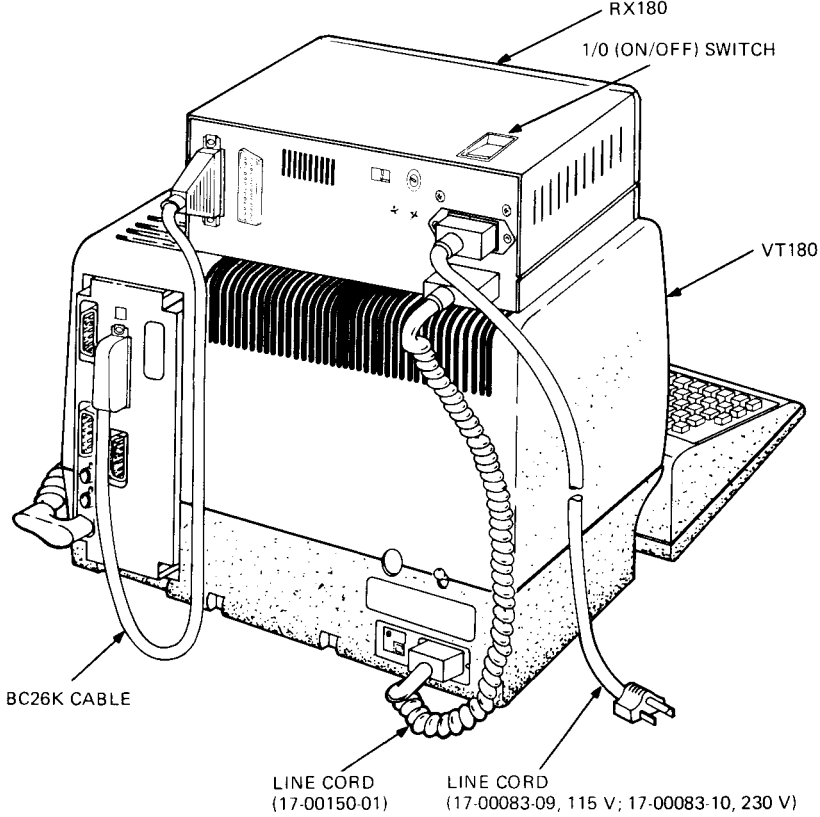


Figure 2-20 Alternatives for Placement of RX180 Disk Units

- 4. Attach the BC26K terminal-to-disk cable to the disk drive port on the back of the terminal. Attach the other end to the left connector (as viewed from the back) of the bottom (or only) disk unit. See Figures 2-21 and 2-22.
- 5. If you have two dual disk units, attach the BC26Z, 20 cm (8 in) disk-to-disk I/O cable from the right connector on the bottom disk unit (drives C and D) to the left connector on the top disk unit (drives A and B).
- 6. Find the ac line cord previously removed from the video terminal and attach this ac line cord to the ac input of the top (or only) disk unit (Figures 2-21 and 2-22). Do not plug the other end of this cable into an ac wall receptacle at this time.
- 7. If you have two disk units, plug the end of a coiled line cord with prongs into the ac output of the top disk unit and plug the end without prongs into the ac input of the bottom disk unit.
- 8. Plug the end of a coiled line cord with prongs into the ac output of the bottom (or only) disk unit; plug the end without prongs into the ac input of the video terminal.



MR-7252

Figure 2-21 VT180 Cable Connections with One Disk Unit

VT18X UPGRADE KIT INSTALLATION

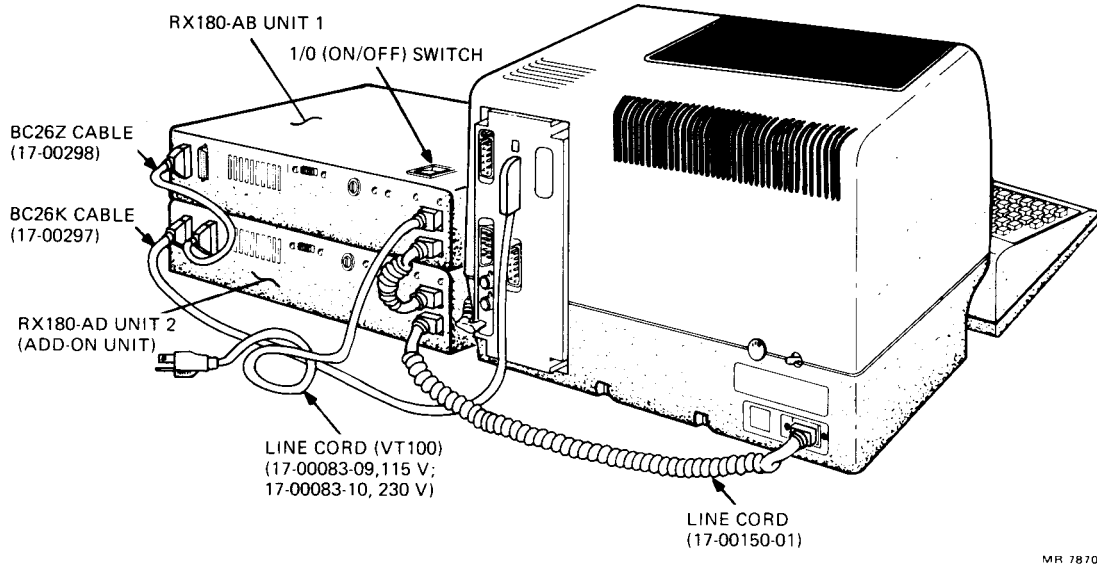


Figure 2-22 VT180 Cable Connections with Two Disk Units

INSTALL PRINTER (IF AVAILABLE)

To connect printers such as DIGITAL's LA120 or LA34, you must use null modem cables which terminate at both ends with RS232 female connectors.

Use the following procedure to attach a printer to the VT180. DIGITAL recommends using a BC26U-15 null modem cable. If you use another cable, make sure it has a right-angled female connector (to attach to the VT180) and is wired as follows.

Connector 1	Connector 2
Pin 1	Pin 1
Pin 2	Pin 3
Pin 3	Pin 2
Pin 6	Pin 20
Pin 7	Pin 7
Pin 20	Pin 6

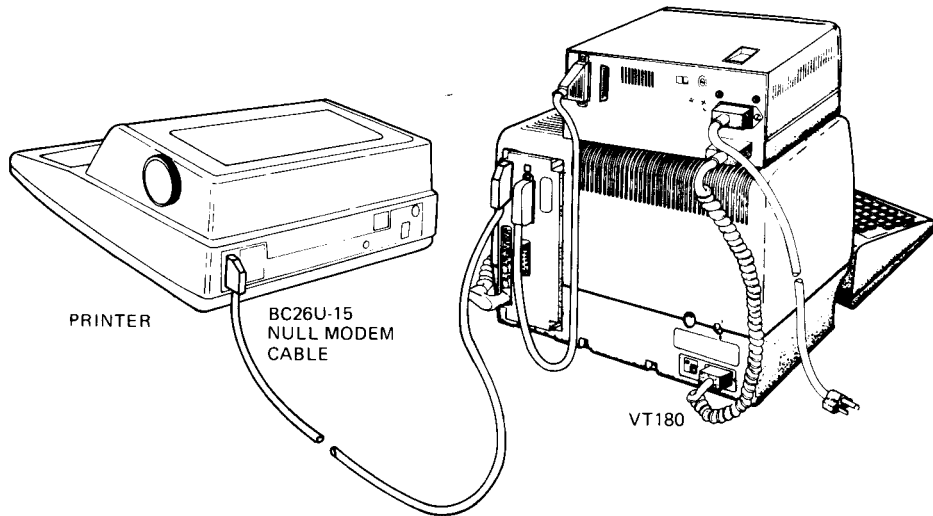
1. Attach the right-angled female connector of the null modem cable to the 25-pin printer connector on the top left side of the module access cover. See Figure 2-23.
2. Attach the other end of this cable to the printer.

INSTALL COMMUNICATIONS CABLE

If desired, attach a communications cable to the communications port on the back of the terminal. Use a BC22B cable for asynchronous modems or a BC22C cable for synchronous modems.

RECONNECT KEYBOARD

Plug the keyboard cable into the back of the terminal.

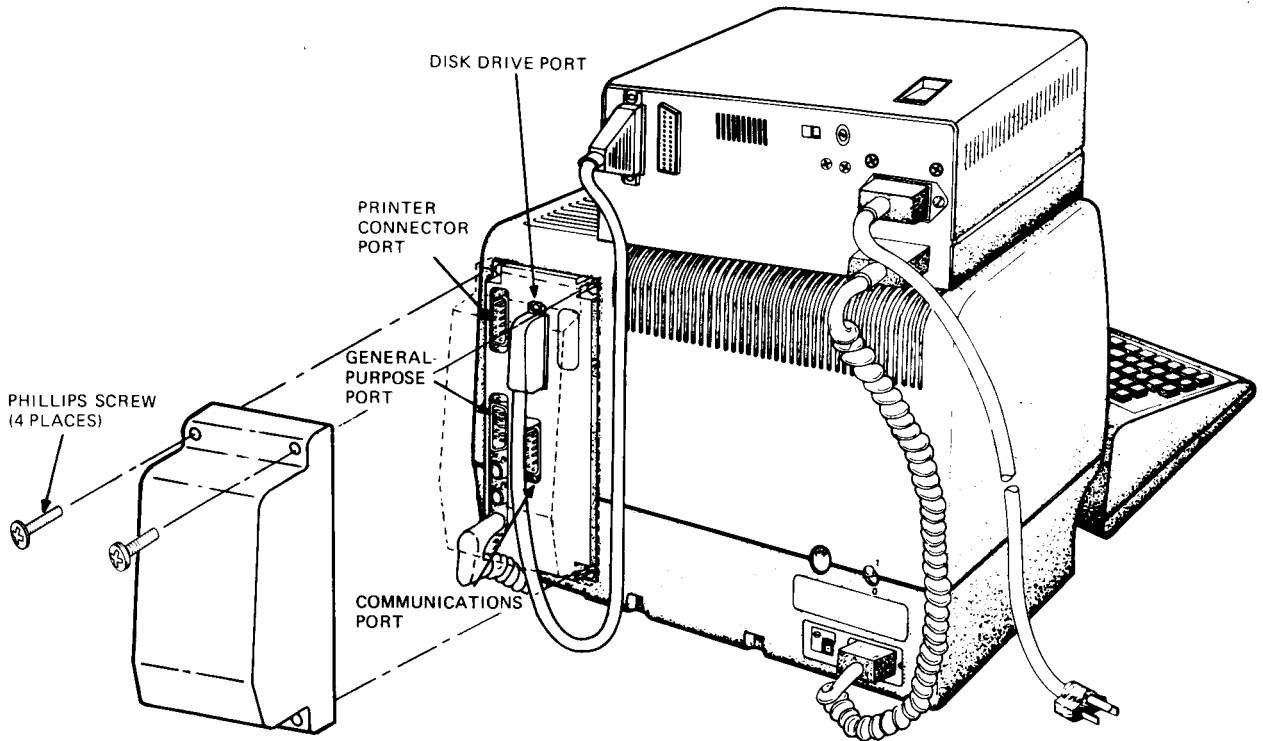


MR-7834

Figure 2-23 Connecting a Printer to the VT180

INSTALL CABLE ACCESS COVER (WORT COVER)

Align all the cables within the opening at the bottom of the cable access cover and fasten this cover to the standoffs on the rear shield with four 6-32 × 5/16 inch Phillips head screws. See Figure 2-24.



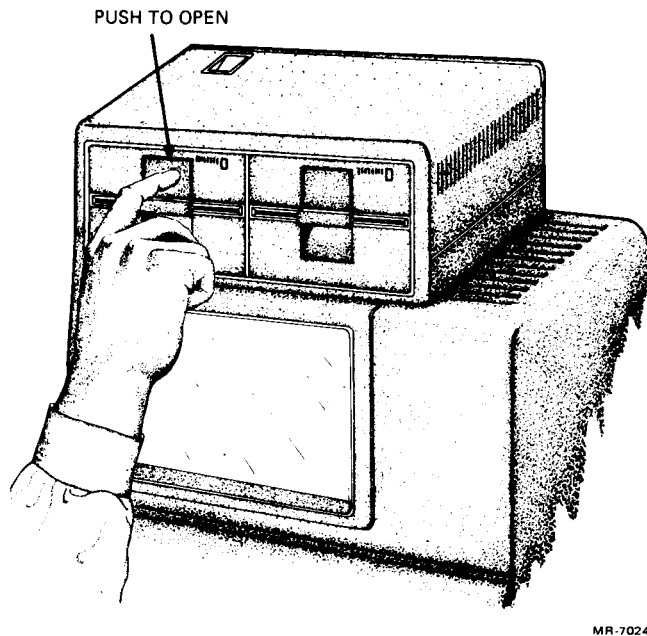
MR-7887

Figure 2-24 Installing Cable Access Cover (Wort Cover)

TURN POWER ON

You are now ready to turn the power on. Use the following procedure.

1. Make sure that the power is off by setting the 1/0 switch on the top disk unit to 0 (off). See Figure 2-22.
2. Plug the ac line cord from the back of the top disk unit into a wall receptacle.
3. Remove warning sticker from each disk drive. Open the door on the front of each disk drive (Figure 2-25) and remove the cardboard that was inserted for protection during shipment.



MR-7024

Figure 2-25 Opening Drive A

4. Set the 1/0 switch on the back of the video terminal to 1.
5. If two disk units are installed, set the 1/0 switch on the bottom disk unit to 1.

NOTE: If two disk units are installed, the 1/0 switch on the bottom disk unit should stay at 1 (on). Power for the entire system is turned on and off by the 1/0 switch on the top disk unit.

6. Set the 1/0 switch on the top disk unit to 1 (on).

The system takes approximately 15 seconds to warm up. You should hear two beeps and see the start-up message shown in Figure 2-26 on the video screen.

```
T+
  VT18X  Version  2.1  28-JUN-82
  Copyright 1982 Digital Equipment Corp

  Press A, B, C, D, S, or T

  A = Start System (drive A)
  B = Start System (drive B)
  C = Start System (drive C)
  D = Start System (drive D)
  S = Execute Self-test
  T = Enter Terminal Mode
```

MR-7880

Figure 2-26 VT180 Start-Up Message

The drive select red light on the front of the top (or only) disk unit should come on. This is disk drive A. The 1/0 switch for each disk unit should light up.

NOTE: *If these power indications do not occur, refer to Table 5-1 to find and correct the problem.*

Continue with the system test procedure in Chapter 4.

NOTE: *To turn the system's power off, simply set the 1/0 switch on the top disk drive to 0.*

CHAPTER 3 SPECIAL PROCEDURES

INTRODUCTION

The information in this chapter is usually not needed for installing the VT18X upgrade kit. However, in a few special installations, you may need to change ROMs on the terminal controller module. This procedure is given in this chapter.

ROM REMOVAL AND INSTALLATION

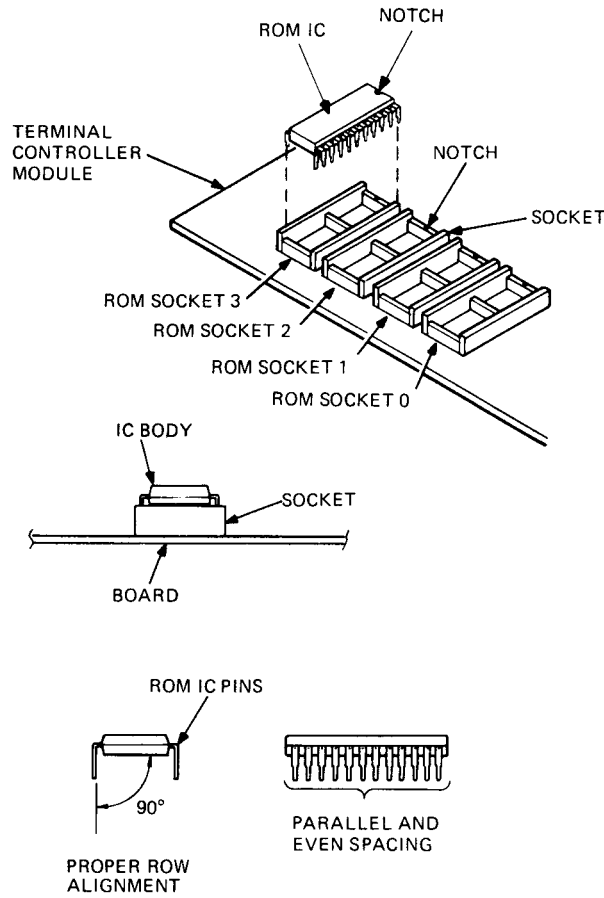
If you need to replace one ROM to update your terminal, or if you need to replace all four ROMs on the terminal controller module (when removing a printer port option), use the following procedure to replace them.

1. Locate ROM part numbers on the terminal controller module. See Figure 2-5.
2. If a printer port option is removed, remove the ROMs on the terminal controller module and replace them with the ROMs you saved when you installed the printer port option.

ROM Socket	Remove ROMs	Install ROMs
ROM 0	23-095E2	23-061E2
ROM 1	23-096E2	23-032E2
ROM 2	23-139E2	23-033E2
ROM 3	23-140E2	23-034E2

You can order new ROMs using the part numbers listed above by contacting your local DIGITAL sales office.

3. Unpack the ROM from its container but do not remove it from the conductive foam. Press the foam against the surface of the terminal controller module to remove static charges, then remove the ROM from the conductive foam.
4. Referring to Figure 3-1, align the ROM so the notch on the end of the ROM is on the same side as the notch on the IC socket. Check that all ROM pins are evenly spaced and straight before inserting the ROM into the IC socket.
5. Using even pressure, press the top of the ROM until it is completely in the socket. If you notice friction, remove the ROM and check for correct pin alignment.
6. After the ROM is inserted, check to see that all ROM pins are properly seated into the socket.



NOTE:
CHECK ALIGNMENT BEFORE INSTALLING.

MR-7052

Figure 3-1 ROM Installation

WORD PROCESSING OPTION

A VT100 word processing terminal (VT100-WA or -WB) can be upgraded to a VT180. A word processing terminal has one ROM installed in the ROM A position on the advanced video option (AVO) (Figure 2-6 or 2-7). The ROM part number and the jumpers installed (or the switches set) on the AVO are as follows.

ROM A Part Number	Jumpers Installed	Switches Set
23-069E2	1 and 7, all others removed. See Figure 2-6.	2 and 8 in switch pack number 2, all others off. See Figure 2-7.

CHAPTER 4 SYSTEM TEST

INTRODUCTION

This chapter provides the system test procedure. After installing the VT18X upgrade kit, the diagnostic diskette is used to run the system test. When the system passes the test successfully, the VT18X installation is complete.

VT18X SYSTEM INSTALLATION TEST

Two types of VT180 diagnostic tests are run during installation.

1. A ROM-based diagnostic that is run automatically on power-up or optionally on reset (pressing 0 while in SET-UP A).
2. A VT18X diskette diagnostic that you run by booting the diskette in disk drive A. Before you can run this diagnostic successfully, you must learn how to format a diskette. This procedure is provided in this chapter.

ROM-BASED DIAGNOSTIC

The ROM-based diagnostic runs automatically on power-up and checks the internal logic of the VT180 modules. This diagnostic assumes no diskette is loaded. If the ROM-based diagnostic runs successfully, the Main System menu prints on the video terminal as shown in Figure 4-1.

```
T+
  VT18X Version 2.1 28-JUN-82
  Copyright 1982 Digital Equipment Corp

  Press A, B, C, D, S, or T

  A = Start System (drive A)
  B = Start System (drive B)
  C = Start System (drive C)
  D = Start System (drive D)
  S = Execute Self-test
  T = Enter Terminal Mode
```

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Figure 4-1 VT180 Main System Menu

SYSTEM TEST

CAUTION: If version 2.1 appears on your Main System menu, the disk drive motors will run continuously as long as the menu appears on the screen, allowing you to boot the diskette from any disk drive. If you intend to leave your terminal on for an extended time (i.e., overnight), press T to enter terminal mode. The disk drive motors will shut off automatically, and their lives will be extended.

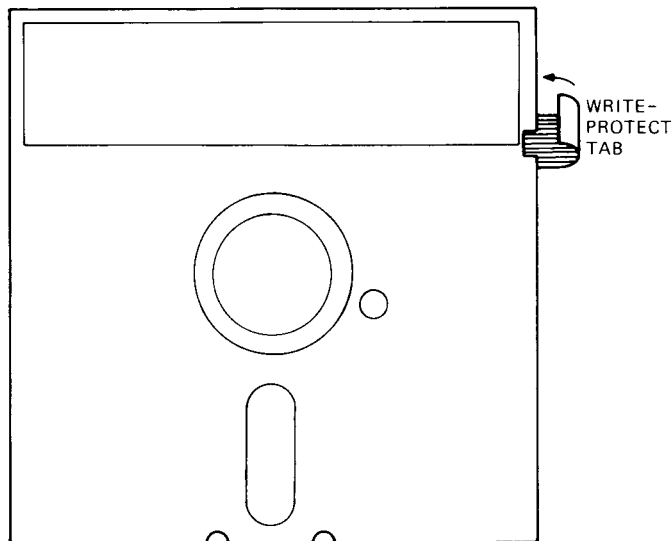
If an error occurs and the video terminal is working, the error will be reported by a written message on the video terminal that points to the location of the failure. See Chapter 5 for a list of common error messages that may occur during installation.

All the ROM diagnostic error messages are listed in the appendix.

FORMATTING DISKETTES

Before you can run the VT18X diskette diagnostic, you need two formatted diskettes. Formatting a diskette sets up the track pattern on a new diskette, erases the data on the diskette, and leaves it blank. When formatting, you should be careful not to mistakenly erase the wrong diskette. Do not format the system diskette or the diagnostic diskette. The formatting procedure takes about 45 seconds per diskette.

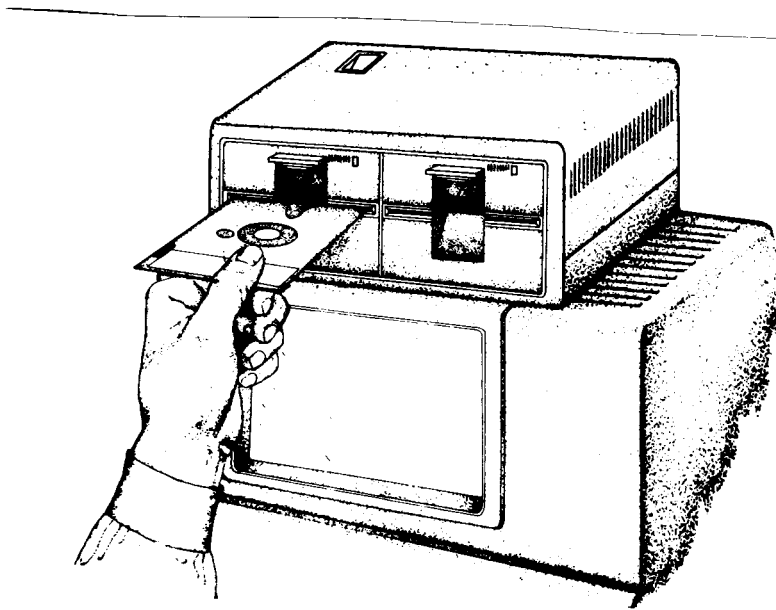
1. Make sure the system diskette is write protected. A metallic tape, called a write-protect tab, should be placed over the notch on the edge of the diskette. See Figure 4-2.



MR 7874

Figure 4-2 Applying a Write-Protect Tab

2. Find two diskettes with blank labels. Do not write protect these diskettes or you will not be able to format them. Do not insert them in the disk drives yet.
3. Load the system diskette in drive A as shown in Figure 4-3. (Make sure the door is closed.)



MR-7878

Figure 4-3 Loading the Diskette



Figure 4-4 CP/M System Program Start-Up Message

5. After the **A>** prompt, type: **DDFMT** and press **RETURN**. The diskette formatting program message (Figure 4-5) appears on the video screen. Follow the instructions printed on the screen.

```
SELECT DRIVE (A, B, C OR D) OR RETURN TO EXIT: B
INSERT (OR REINSERT) NEW DISK IN DRIVE B
TYPE RETURN TO CONTINUE, E TO EXIT:RETURN
```

A message on the left side of the screen informs you which track is being formatted (F) and verified (V). The message is as follows.

```
F (V) TRACK 0-39
```

After formatting the last track, the program displays a completion message as follows.

```
V TRACK 39 - DISK FORMAT/VERIFY COMPLETE
```

6. Place a new diskette in drive B to format a second diskette.

```
INSERT NEW DISK IN DRIVE B
TYPE RETURN TO CONTINUE, E TO EXIT:RETURN
```

7. After formatting the second diskette, type **E** to exit the program.

```

A>DDFMT
DISK DDEN FORMAT/VERIFY PROGRAM
 4 /B2 REV A.1

SELECT DRIVE (A,B,C OR D) OR RETURN TO EXIT : B

INSERT (OR REINSERT) NEW DISK IN DRIVE B
TYPE RETURN TO CONTINUE, E TO EXIT :
V TRACK 39 - DISK FORMAT/VERIFY COMPLETED

INSERT (OR REINSERT) NEW DISK IN DRIVE B
TYPE RETURN TO CONTINUE, E TO EXIT :

```

MR-7882

Figure 4-5 Diskette Formatting Program Message

8. When the A> prompt appears, you can verify that the diskette in drive B is properly formatted by commanding the operating system to access drive B as follows.

A>B:RETURN

Drive B should now become the current drive, and the screen should display the following prompt.

B>

If the prompt appears, the diskette in drive B is properly formatted.

9. Verify that the other blank diskette is properly formatted as follows.
- Remove the system diskette from drive A.
 - Load the other blank diskette in drive A.
 - Type **A:RETURN**
 - The screen should display the following prompt.

A>

If the diskette in the selected drive (x) is not formatted, the system will issue the following error message.

```

READ ERROR - DRIVE X TRACK 2 SECTOR 1
Bdos Err on X: Bad Sector

```

If you get this error message, try to format the diskette again or format a different diskette.

VT18X DISKETTE DIAGNOSTIC

The VT18X diskette diagnostic resides on one diskette (BJ-T040B-MV) from which it is loaded. The diagnostic requires two formatted diskettes to perform the read/write tests on each disk drive. During testing, the contents of the formatted diskettes are destroyed.

You select the diagnostic to run in one of the following three modes.

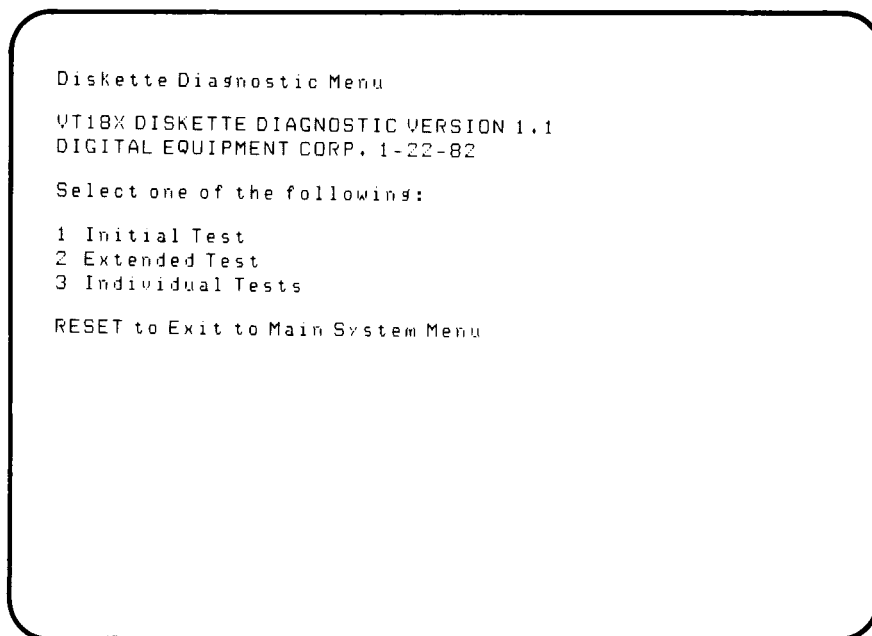
1. Initial Test This is the floppy test that checks out each disk drive. The test takes 5 1/2 minutes for a dual disk drive system and 11 minutes for a four disk drive system.
2. Extended Test This selection runs the initial floppy test described above, a RAM test, and the basic communications test. This extended test takes 10 minutes for each dual disk unit.
3. Individual Tests This selection allows you to run all the tests described previously one at a time on the drive you select. In addition, there are tests to check the communication ports, a printer (if installed), and synchronous communication. Run time for these tests depends on the tests you select.

The error messages for this diagnostic are listed in the appendix.

Booting the VT18X Diskette Diagnostic

Turn the system on and insert the diagnostic diskette in drive A or reset the terminal by pressing **SET-UP 0**. Type **A** to start the diagnostic diskette. The Diskette Diagnostic menu shown in Figure 4-6 appears on the video screen.

Make sure the diagnostic diskette is in drive A and its door is closed.



MR-7883

Figure 4-6 Diskette Diagnostic Menu

Initial Test

Select the initial test by typing 1. The following dialog prints on the video screen. Type the responses printed here in color.

1 Initial Test

Number of disk drives? (2 or 4)

2

Remove system disk and install FORMATTED diskettes in (A and B) drives.

WARNING: Contents of diskettes will be destroyed.

Type (P) to proceed with test

Type (E) to Exit to Diskette Diagnostic Menu

Remove the diagnostic diskette from drive A and install formatted diskettes in drives A and B. Make sure that both doors are closed. Type:

P

1 FLOPPY TEST

FLOPPY DISK DIAGNOSTIC TEST, rev (1.1)

Drive A Selected

End of part n

The subtests run automatically, incrementing the subtest number n. When the 13 subtests run successfully (after about 2 minutes, 45 seconds), the program automatically switches to drive B. If you selected a four drive system, the program will halt after testing drive B and instruct you to move the formatted diskettes to drives C and D.

If you forgot to install a diskette in the drive or if you left its door open, the following error message appears on the video screen.

ERROR: No index pulse, no disk, or drive not connected

If you installed an unformatted diskette in the drive or had a write-protect tab on the diskette, the test will fail after part 8 and print the following error message.

End of part 8

ERROR: Seek error (with verify), disk,?

WAITING ON ERROR, TYPE (P) TO PROCEED, (L) TO LOOP

Refer to the appendix for other diagnostic error messages, their causes, and their solutions. On successful completion of the initial test, the program returns to the Diskette Diagnostic menu. See Figure 4-6.

SYSTEM TEST

Extended Test

Select the extended test by typing 2. The following dialog prints on the video screen. Type the responses printed here in color.

2 Extended Test

Number of disk drives? (2 or 4)

2

Remove system disk and install FORMATTED diskettes in (A and B) drives.

WARNING: Contents of diskettes will be destroyed.

Type (P) to proceed with test

Type (E) to Exit to Diskette Diagnostic Menu

P

"1 FLOPPY TEST" briefly appears on the video screen followed by the other messages shown in Figure 4-7.

```
FLOPPY DISK DIAGNOSTIC TESTS, rev (1.1)

          Drive A Selected
          End of part 13

          Drive B Selected
          End of Part 13

TEST PASSED

2 Ram Test

          REFRESH TEST
          ADDRESSING TEST
          DATA INTEGRITY TEST (TIME TO COMPLETE 0192)
          CODE EXECUTION TEST
          GALLOP TEST
          ALPHA TEST (TIME TO COMPLETE 0060)

TEST PASSED

3 Basic Comm. Test (No Loop-Back Plug)
          RTC TEST
          PRINTER-GENERAL PURPOSE PORT TEST
          COMM PORT TEST
```

MR-7886

Figure 4-7 Extended Test Messages

The tests that take the most time to complete follow.

Test	Time
Data Integrity Test	4 minutes, 45 seconds
Alpha Test	1 minute
Printer - General-Purpose Port Test	2 minutes, 15 seconds

Upon successful completion of the extended test (about 10 minutes), the program prints TEST PASSED and displays the Diskette Diagnostic menu as shown in Figure 4-8.

```

TEST PASSED
Diskette Diagnostic Menu

VT18X DISKETTE DIAGNOSTIC VERSION 1.1
DIGITAL EQUIPMENT CORP. 1-22- 82

Select one of the following:

1 Initial Test
2 Extended Test
3 Individual Tests

RESET to Exit to Main System Menu

```

MR-7884

Figure 4-8 A Successful Pass of the Extended Test

If you have a printer installed on your terminal or you wish to test the communications ports, continue with the individual tests. If not, reset the terminal by pressing **SET-UP 0** to exit to the Main System menu.

Individual Tests

To test a printer or to test a specific communications port, use the individual tests. Select these tests by typing **3**. The Individual Test menu prints on the video screen as shown in Figure 4-9.

Type the number of the test you want to run and follow the instructions printed on the video screen for that test.

The terminal echoes the number of the test selected and prints:

Type (P) to proceed with test

You can run a selected test in one of three ways.

1. Type **P** to run the test once.
2. Type **,np** to run the test n number of times, where n = 1 to 9.
3. Type **—P** to run the test continuously. To stop a continuously running test, reset the terminal by pressing **SET-UP 0**. Boot the diagnostic diskette again to get the menu.

When the selected test starts, it displays the test name followed by any required dialog.

```
3 Individual Test Menu

1 Floppy Test
2 Ram Test
3 Basic Comm. Test (No Loop-Back Plus)
4 Comm. Test - Printer Port with Loop-Back Plus
5 Comm. Test - General Purpose Port with Loop-Back Plus
6 Comm. Test - Comm. Port with Loop-Back Plus
7 Printer Confidence Test on General Purpose Port
8 Printer Confidence Test on Printer Port
9 Synchronous Comm. Test

Type (E) to Exit to Diskette Diagnostic Menu
```

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Figure 4-9 Individual Test Menu

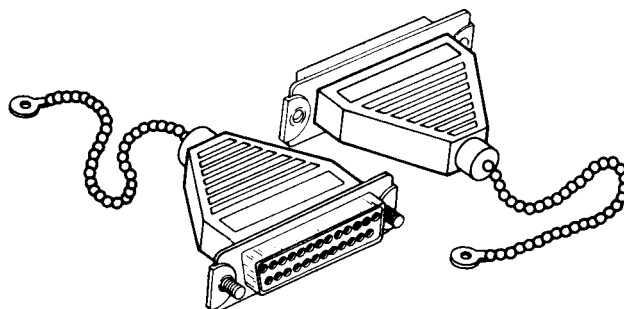
NOTES:

1. *An external loopback connector, Figure 4-10, (DIGITAL part number 12-15336) must be attached to the terminal to run tests 4, 5, and 6. These tests detect failures in the EIA line drivers and receivers which are not checked on power-up or during self-test. The transmit and receive baud rates for the terminal must also be identical.*
2. *The printer confidence tests (7 and 8) send a line of text that you type to the printer. The printer must be set up for these parameters.*

Baud rate:1200
Bits/character:8
Parity:None
Stop bits:1*

3. *The synchronous communications test (9) requires that the terminal's transmit and receive speeds be identical and be at 2,400 baud or less. The communications port is tested in loop-back mode; however, no loopback connector is required for this test. Enter SET-UP B and change the baud rate if you desire to run this test.*

*A later revision ROM allows the baud rate to be either 300 or 1,200. This is established using the SET-UP P command. Refer to the *VT180 User's Guide* to use this command.



MR-7975

Figure 4-10 Loopback Connectors

HARDWARE INSTALLATION COMPLETE

When the initial test and the extended test of the VT18X diskette diagnostic run successfully one time, the VT18X hardware installation is complete. If you have a printer on your system, the printer confidence test should also run successfully.

As a final task, make sure the VT180 communicates with the customer's host computer.

1. Reset the VT180 by pressing **SET-UP 0**.
2. The VT180 prints the Main System menu.
3. Ask the customer to check the terminal mode by pressing **T** and to communicate with the host computer. This ensures that the communications features of the VT180 are set up correctly for the host computer.
4. If you cannot communicate with the host computer, you may have to change the communications switches on the VT18X control module (Table 2-1). Check with the system programmer to find out which communications lines are being used.

Refer to the *VT180 User's Guide* to copy diskettes and run the CP/M software.

CHAPTER 5 TROUBLESHOOTING

INTRODUCTION

This chapter includes troubleshooting information that may help you isolate a problem that occurs as a result of installing the VT18X upgrade kit. If your terminal does not respond correctly after installing the upgrade kit, use the following procedure to find the problem.

TROUBLESHOOTING PROCEDURE

Refer to Table 5-1 to find the symptom of the problem or the error message. Listed with each symptom or error message are one or more causes of the problem that you can check to find the source of the problem and the corrective action you should take once you discover the cause.

Table 5-1 Installation Troubleshooting Procedure

Symptom or Error Message	Probable Cause	Corrective Action
No response when power switch is set to the on position. The on/off (1/0) switches on the disk units are not on. The lights on the keyboard are not on.	Not plugged in; no power at wall socket	Plug in VT180; use different wall socket if possible.
	Main power fuse	Replace fuse. (If fuse blows again there is a possible shorting problem. Use the appropriate troubleshooting methods.)
	Disk unit fuse	Replace fuse.
	AC line cord	Check for open or short circuit. If needed, replace line cord.
Disk unit on/off (1/0) switch light is off. Terminal is on.	Power cable is incorrectly installed.	Check for correct daisy chain of ac line cords through each disk unit to the terminal.
	Disk drive or power supply	Replace disk unit.

Table 5-1 Installation Troubleshooting Procedure (Cont)

Symptom or Error Message	Probable Cause	Corrective Action
Disk drive select light is on, but terminal has no response to power.	Power cable from disk unit to terminal is unplugged or switches are off.	Check for correct daisy chain of power through each disk unit to the terminal. Check setting of on/off (1/0) switches on each disk unit and on back of terminal.
	Power harness is not attached to expansion backplane.	Check power harness.
	Terminal power supply	Replace.
	Expansion backplane	Replace backplane.
On a system with two disk units, the bottom left drive select light comes on when power is turned on. Diskette may have read errors.	The two disk units are installed in reverse order.	See Chapter 2 for correct installation of disk units.
No messages; only cursor and keys typed on keyboard appear on video screen.	Terminal powers up in local mode.	Enter SET-UP A and place terminal on-line. Save this setting by pressing SHIFT and S at the same time.
5n5n5n5n5n . . .	Terminal is set up for VT52 format.	Enter SET-UP B and change the ANSI/VT52 feature to ANSI format. Save this feature by pressing SHIFT and S at the same time.
After resetting terminal and selecting a drive with a diskette correctly loaded, nothing happens (no error message appears).	The diskette installed in the disk drive is blank.	Remove the diskette and load the system diskette in disk drive A.

Table 5-1 Installation Troubleshooting Procedure (Cont)

Symptom or Error Message	Probable Cause	Corrective Action
DISKETTE BOOT FAILURE <i>or</i> ROM DISK LOADER FAILURE	No diskette is in drive, disk drive door is open, no system diskette is loaded, diskette is not fully in drive, or diskette is upside down.	Place system diskette fully in drive and make sure the door is closed. Reset terminal and reboot diskette.
	You selected a nonexistent drive, or the disk unit is not cabled correctly.	With two disk units, RX180-AB contains drives A and B; RX180-AD contains drives C and D. Make sure their I/O cables are installed correctly. (See Chapter 2.)
	Diskette is tight on hub, or the center hole is bent from not being inserted fully in drive or from extensive use.	With your index finger, check center hole on diskette for imperfection. Make sure that the center hole is not bent. Use a new diskette.
ILLEGAL INTERRUPT	The diskette in drive selected is formatted, however, it is not the system diskette.	Find the system diskette, load it in drive A, reset terminal, and reboot diskette.
DRIVE A NOT READY - TYPE ANY KEY TO RETRY - CONTROL C TO REBOOT	You tried to boot the system disk in a drive other than drive A, but door is open on drive A or no diskette is loaded in drive A.	Insert a formatted diskette in drive A, close the disk drive door, and type any key to continue.
SEEK ERROR - DRIVE A TRACK 2 Bdos Err on A: Bad Sector	You tried to boot the system disk in a drive other than drive A, but you did not have a formatted diskette loaded in drive A.	Reboot system diskette in drive A, or insert a formatted diskette in drive A and reboot the system diskette in selected drive.
DISK IS WRITE PROTECTED	The diskette you tried to format has a write-protect tab on it, or it is loaded upside down in drive.	Remove the tab from the diskette and try again.

Table 5-1 Installation Troubleshooting Procedure (Cont)

Symptom or Error Message	Probable Cause	Corrective Action
READ ERROR - DRIVE B TRACK 2 SECTOR 1 Bdos Err on B: Bad Sector	The diskette in drive B is unformatted.	Format the diskette and try again.
FLOPPY ERROR, INDEX PULSE FAILURE, DRIVE A	Self-test selected with no diskette in drive A.	Place a formatted diskette in drive A before selecting self-test.
FLOPPY ERROR, SEEK FAILURE, DRIVE x	Diskette in drive x is unformatted.	Place a formatted diskette in drive x before selecting self-test.
FLOPPY ERROR, READ SECTOR FAILURE, DRIVE x	Diskette in drive x is bad.	Place a new formatted diskette in drive x and try self-test again.
FLOPPY ERROR, STEP FAILURE, DRIVE A (One drive select light is lit on each disk unit.)	Both disk units are configured for drives A and B.	Refer to the <i>VT180 Series Pocket Service Guide</i> to change the drive selection or call your local DIGITAL Field Service representative.
ERROR: No index pulse, no disk, or drive not connected	Door on selected drive is open, no diskette is in drive, or drive is not connected.	Make sure a formatted diskette is installed in the disk drive and its door is closed.
ERROR: Seek error (with verify), disk,?	The diskette in the drive is unformatted or write protected.	If installed, remove the write-protect tab; format the diskette.
ERROR: Seek not complete in time (with verify), disk,?	Unformatted diskette in drive.	Format the diskette and try again.
One disk drive fails; the other drive functions okay.	EMI static from video terminal or disk drive failure.	Place disk unit on side of terminal and test drive again. If same drive still fails, replace entire disk unit.

Table 5-1 Installation Troubleshooting Procedure (Cont)

Symptom or Error Message	Probable Cause	Corrective Action
Diagnostic diskette will not boot in either disk drive.	Diskette media	Try booting another diskette. Repeat test procedure in Chapter 4 using another diagnostic diskette.
	Disk controller on VT18X control module.	Check LEDs on VT18X control module; this may point to the location of the problem. See the appendix and Figure 2-16.
Flashing 2 appears on screen.	You have just changed ROMs on the terminal controller module, and the NVM needs to be reset.	Enter SET-UP A and press 0 to reset terminal.
Flashing 4 appears on screen, but no audible alarm sounds when the terminal is turned on and no keyboard light comes on.	Keyboard is disconnected.	Connect.
	Keyboard	Replace.
Any other flashing character	Terminal controller module, advanced video module, or keyboard	Isolate problem to failing module and replace.
Audible tone has sounded and keyboard on-line light is on, but start-up message does not appear on screen 30 seconds after terminal is turned on or it is very dim.	Screen brightness is too low.	Increase (and save) screen brightness. Enter SET-UP A and press ↑ key. Press SHIFT and S at the same time to save brightness setting.
Wrong character appears on screen when typed in local mode.	ROMs on controller may need to be changed.	Check ROM part numbers; replace if necessary. See Chapter 3.

Table 5-1 Installation Troubleshooting Procedure (Cont)

Symptom or Error Message	Probable Cause	Corrective Action
Wrong character appears on screen when typed in on-line mode. Terminal is functional in local mode.	Set-up features may be set incorrectly.	Enter SET-UP B and check features. (See Table 1-1 for VT100/VT180 compatible features.)
	Transmit or receive speed is set incorrectly.	Set transmit or receive speed to match computer.
	Bits-per-character feature is set incorrectly.	Set feature to match computer.
	Parity feature is set incorrectly to match computer.	Set parity and/or parity sense feature.
	Communications switches on VT18X control module may be set incorrectly.	Check communications switches. See Chapter 2.
	Controller ROMs	Check ROMs and replace if necessary. See Chapter 3.
Checkerboard character appears on screen instead of character typed on-line with computer.	Parity feature is set incorrectly.	Set features to match computer.
	XON/XOFF not supported by host or turned on. Transmit or receive speed is set incorrectly.	

APPENDIX VT18X ERROR MESSAGES

A.1 ROM DIAGNOSTIC ERROR MESSAGES

Table A-1 lists the ROM diagnostic error messages that may occur on power-on, reset, or self-test.

Table A-1 ROM Diagnostic Error Messages and Tests

Error Message	Test that Failed	Power-On		Tested During		Possible Source of Problem	LEDs ON	Fatal
		Reset	Self-Test	Reset	Self-Test			
ROM FAILURE	ROM CRC test	y	y	y	y	VT18X control module	1,2,3,4	yes
CPU FAILURE	CPU instruction test	y	p	no	no	VT18X control module	1,2,3	yes
RAM FAILURE 8KB TO 64KB	RAM memory test	y	y	y	y	VT18X control module	1,3,4	yes
RAM FAILURE 0KB TO 8KB	RAM memory test	y	p	y	y	VT18X control module	3,4	yes
RTC FAILURE	Real-time clock test	y	y	y	y	VT18X control module	1,2,4	yes
TERMINAL-PRINTER FAILURE	General-purpose & printer ports	y	y	y	y	VT18X control module	2,4	no
CONSOLE FAILURE	Console port test	c	no	c	c	VT18X control module	1,4	yes
COMM PORT FAILURE	Communications port test	c	no	c	c	VT18X control module	4	yes, for terminal mode; no, for diskette boot mode.
FLOPPY ERROR, INTERNAL REGISTERS	Floppy controller/drive test 1	y	y	y	y	VT18X control module	1,2,3	no, for terminal mode; yes, for diskette boot mode.
FLOPPY ERROR, RESTORE FAILURE, DRIVE x	Floppy controller/drive test 2	y	y	y	y	RX180 disk drive	2,3	no
FLOPPY ERROR, STEP FAILURE, DRIVE x	Floppy controller/drive test 3	y	no	y	y	RX180 disk drive	1,3	no

Table A-1 ROM Diagnostic Error Messages and Tests (Cont)

Error Message	Test that Failed	Power-On	Tested During Reset	Self-Test	Possible Source of Problem	LEDs ON	Fatal
FLOPPY ERROR, INDEX PULSE FAILURE, DRIVE x	Floppy controller/ drive test 4a	no	no	y	No diskette in drive x during self-test, disk drive, cable, or VT18X control module	3	no
FLOPPY ERROR, MOTOR SPEED FAILURE, DRIVE x	Floppy controller/ drive test 4b	y	no	y	RX180 disk drive, cable, or VT18X control module	3	no
FLOPPY ERROR, SEEK FAILURE, DRIVE x	Floppy controller/ drive test 5	no	no	y	Unformatted diskette in drive x during self- test, disk drive, cable, or VT18X control module	1,2	no
FLOPPY ERROR, READ SECTOR FAILURE, DRIVE x	Floppy controller/ drive test 6	no	no	y	Faulty diskette, disk drive, cable, or VT18X control module	2	no
DISKETTE BOOT FAILURE or ROM DISK LOADER FAILURE	System loader on diskette could not transfer to system memory.	no	no	no	No diskette in drive; disk 1 drive door is open; no system diskette loaded, wrong drive selected; disk I/O cable disconnected; diskette not fully in drive, diskette center hole bent.	1	no
SYSTEM DISK LOADER FAILURE	ROM loader failed to boot system diskette.	no	no	no	Check diskette, reset terminal, and reboot system diskette in drive A.		Faulty system diskette

y = yes, p = partial test, c = conditional (test is run if connection is made).

x = disk drive (A, B, C, or D)

A.2 VT18X DISKETTE DIAGNOSTIC ERROR MESSAGES

Table A-2 lists the error messages that could occur while running the VT18X diskette diagnostic and the possible source of the problem. If the exact source of the error cannot be determined, the error message prints a ? after the message.

Table A-2 Diagnostic Diskette Error Messages

Error Message	Possible Source
Disk Error Messages	
ERROR: No index pulse, no disk, or drive not connected.	Door open or no diskette
ERROR: Disk rotation too slow, drive bad.	RX180 disk drive
ERROR: Disk rotation too fast, drive bad.	RX180 disk drive
ERROR: No track 0, controller module bad.	VT18X control module
ERROR: No track 0, ?	RX180, VT18X, or cable
ERROR: No track 0, drive A bad.	RX180 disk drive A
ERROR: No track 0, drive B bad.	RX180 disk drive B
ERROR: No track 0, drive C bad.	RX180 disk drive C
ERROR: No track 0, drive D bad.	RX180 disk drive D
ERROR: No track 0, not drive related.	RX180 or VT18X
ERROR: Track register value wrong, controller module bad.	VT18X control module
ERROR: Step in error, controller module bad.	VT18X control module
ERROR: Direction output low, controller module bad.	VT18X control module
ERROR: Direction output high, controller module bad.	VT18X control module
ERROR: Step-in error, ?	VT18X, RX180, or cable
ERROR: Timing wrong for single track move, too fast?	RX180 disk drive
ERROR: Timing wrong for single track move, too slow?	RX180 disk drive
ERROR: Seek not completed in time, (with no verify), controller module bad.	VT18X control module
ERROR: Seek not completed in time, (with verify), disk, ?	Unformatted diskette, RX180 disk drive, or VT18X control module
ERROR: Track 0 bit set, ?	RX180 or VT18X
ERROR: Step-out error, controller module bad.	VT18X control module
ERROR: Step-out error, ?	VT18X, RX180, or cable

Table A-2 Diagnostic Diskette Error Messages (Cont)

Error Message	Possible Source
Disk Error Messages	
ERROR: Step error, controller module bad.	VT18X control module
ERROR: Step error, ?	VT18X, RX180, or cable
ERROR: Timing wrong for multi-track move, too fast, ?	RX180 disk drive
ERROR: Timing wrong for multi-track move, too slow, ?	RX180 disk drive
ERROR: No seek error, controller module bad.	VT18X control module
ERROR: Seek error (with no verify), controller module bad.	VT18X control module
ERROR: Seek error (with verify), disk, ?	Diskette unformatted or write protected
ERROR: CRC error on header, disk or controller module bad.	Diskette bad or VT18X control module bad
ERROR: No CRC error on header, controller module bad.	VT18X control module
ERROR: No CRC error on data, controller module bad.	VT18X control module
ERROR: CRC error on data, ?	Diskette, RX180, or VT18X
ERROR: Write gate high on write, controller module bad.	VT18X control module
ERROR: Write gate low on read, controller module bad.	VT18X control module
ERROR: No record not found, controller module bad.	VT18X control module
ERROR: No lost data, controller module bad.	VT18X control module
ERROR: Record not found error, disk, ?	Diskette, RX180, or VT18X
ERROR: Write fault, controller module bad.	VT18X control module
ERROR: Write protected.	Write-protect tab on disk
ERROR: Bad data ?	Diskette, RX180, or VT18X
ERROR: Ready Set, controller module bad.	VT18X control module
ERROR: Busy Set, ?	Nonexistent drive selected
ERROR: Lost data, controller module bad.	VT18X control module
ERROR: Timing wrong for motor shut off, controller module bad.	VT18X control module
ERROR: Motor select bit high, controller module bad.	VT18X control module
ERROR: One shot too fast, controller module bad.	VT18X control module

Table A-2 Diagnostic Diskette Error Messages (Cont)

Error Message	Possible Source
Disk Error Messages	
ERROR: One shot too slow, controller module bad.	VT18X control module
ERROR: Motor bit high, controller module bad.	VT18X control module
RAM Test Error Messages	
CPU FAILURE	VT18X control module
RAM FAILURE BIT ?	
RAM FAILURE BIT 0	
RAM FAILURE BIT 1	
RAM FAILURE BIT 2	
RAM FAILURE BIT 3	
RAM FAILURE BIT 4	
RAM FAILURE BIT 5	
RAM FAILURE BIT 6	
RAM FAILURE BIT 7	
ADDRESS FAILURE	
Communications Test Error Messages	
INCORRECT VECTOR	VT18X control module
UNSOLICITED INTERRUPT	
RTC FAILURE	
CONSOLE FAILURE	
COMM FAILURE	
PRINTER FAILURE	
GENERAL PURPOSE FAILURE	
PRINTER-GENERAL PURPOSE FAILURE	

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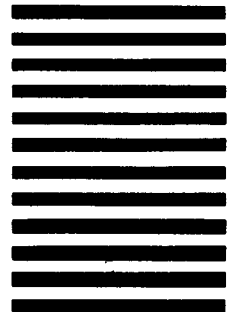


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