EK-ORV20-IN-001

RV20
Optical Disk Subsystem

Installation Guide

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Optical Disk Subsystem

Installation Guide

Prepared by Educational Services
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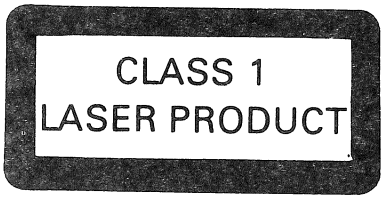

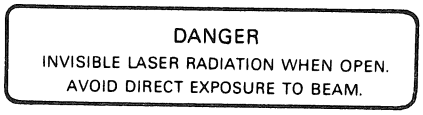

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DECsystem-10	PDP	RSX	VT
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Chapter 1
Introduction

1.1 Subsystem Overview

The RV20 subsystem is located in the H9643 cabinet (Figure 1–1). Up to four RV20 drives may reside in a single cabinet. The smallest RV20 subsystem consists of one master drive containing an internal drive subsystem controller module. As many as three RV20 slaves can be daisy-chained to one master.

Note that an entire subsystem can consist of one, two, three, or four RV20 drives. An H9643 cabinet with four drives installed (Figure 1–1) can be configured in any number of ways, ranging from one subsystem (one master and three slaves) to four subsystems (four master RV20s).

Figure 1–2 is a block diagram of an RV20 subsystem consisting of a master RV20 and three slaves. The RV20 uses its own internal bus, known as the ISI bus. The drive subsystem controller module in the master RV20 translates the ISI data into the format required by the LESI (Low-End Storage Interconnect) interface. The LESI bus is the path to the host. The RV20 data travels on the LESI to the host, where it enters a KLESI adapter module. The adapter converts the LESI-formatted data into the host bus format (BI or Q-Bus).

Each drive in the RV20 subsystem has an internal unit number. This is referred to as an ISI address or Control Module (CM) number. The number is internal to the RV20 drive. It is completely independent and unrelated to other numbers used by the host, such as the TMSCP unit numbers. The CM numbers generally used in an RV20 subsystem are shown in Figure 1-2 as ISI addresses 0, 1, 2, and 3.

Figure 1–1: RV20 Subsystem Cabinet

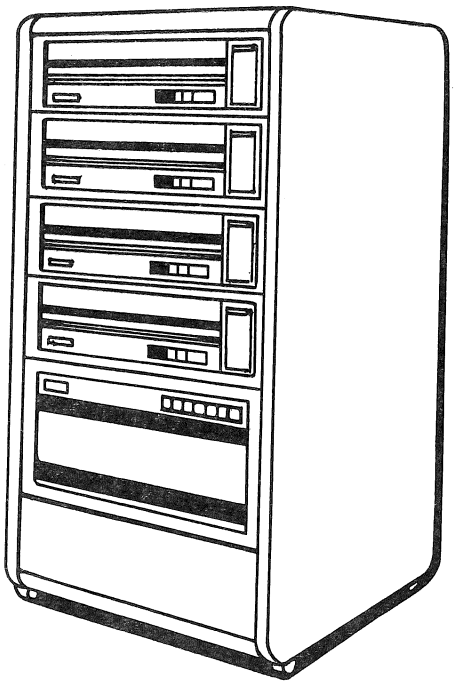

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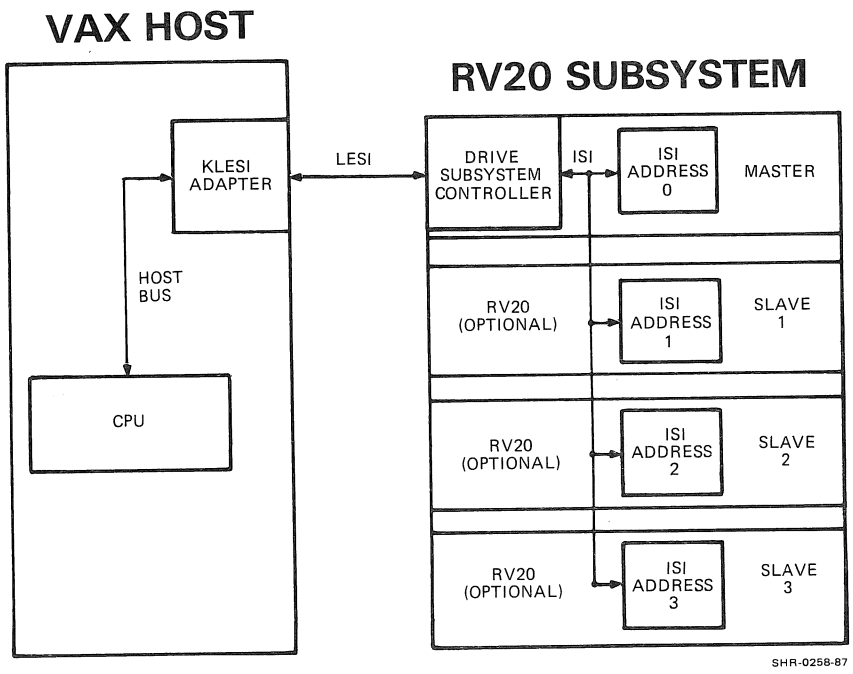
Figure 1–2: RV20 Subsystem Block Diagram



1.2 Installation Overview

This manual covers the complete installation of an RV20 subsystem, from unpacking through verification. This chapter lists the tools and equipment needed for installation, gives site preparation, unpacking, and inspection instructions, and lists related documentation.

Chapter 2 gives installation information for each of the host systems (VAX 8200 family, MicroVAX, and VAX 8800 family).

Chapter 3 provides verification procedures to be used after you intall an RV20 subsystem.

Chapter 4 gives instructions for installation of additional RV20 drives to an existing subsystem.

1.3 Tools and Equipment

No special tools are needed to install an RV20 subsystem, but an optical test disk is necessary for verification. If you do not have a test disk, this manual provides instructions for creating a test disk from a blank disk (Paragraph 3.5). If you have neither a test disk nor a blank disk, do not proceed with the installation.

1.4 Site Requirements

The following site considerations should be made before unpacking the RV20 subsystem.

1.4.1 Weight

The weight of one RV20 drive in an H9643 cabinet is 193 kg (425 lb). Each additional RV20 drive weighs 25 kg (55 lb). This weight should not place abnormal stress on a raised computer room floor. However, the weight of existing equipment should be considered before adding additional drives.

1.4.2 Temperature and Humidity

The operating temperature for the RV20 is from 10 to 40°C (50 to 104°F). The relative humidity range is from 10 to 90% with a wet bulb temperature of 28°C (82°F).

1.4.3 Space

The spatial requirements for the RV20 subsystem are as follows.

Height:	42 in
Width:	21.5 in
Depth:	36 in
Service Area	
In front of H9643 cabinet:	36 in
At rear of H9643 cabinet:	24 in

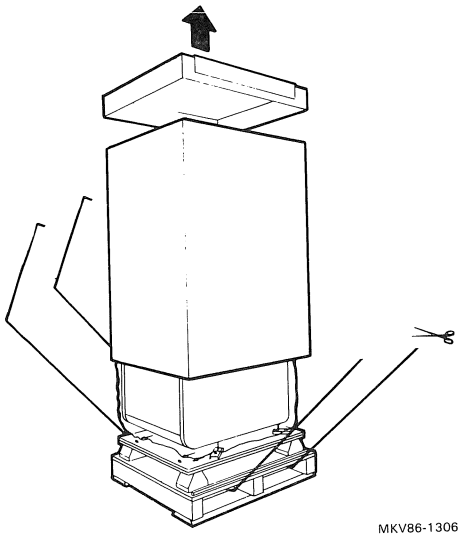
1.5 Unpacking and Inspection

Warning

At least two people are needed to remove the RV20 subsystem from the skid. Wear safety shoes when removing the RV20 cabinet from the skid.

1. Unpack the cabinet (Figure 1–3).
   a. Cut the banding from the carton.
   b. Remove the cap from the carton.
   c. Remove the packing material from the top of the cabinet.
   d. Remove the corrugated sleeve.

Figure 1–3: Removing the RV20 from its Skid - Step 1



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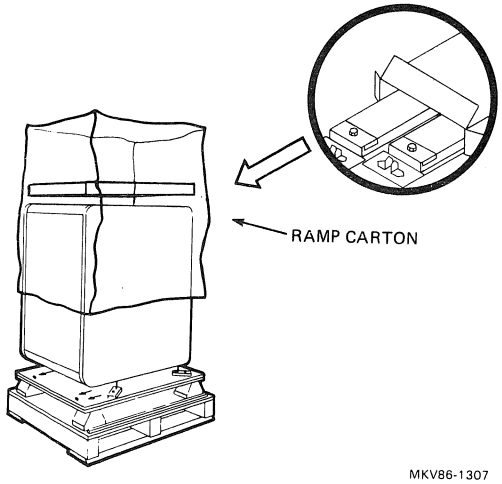
2. Unpack the ramps (Figure 1–4).
   a. Remove the plastic bag covering the carton.
   b. Remove the ramp carton.
   c. Remove the ramps from the carton.

Figure 1–4: Removing the RV20 from its Skid - Step 2



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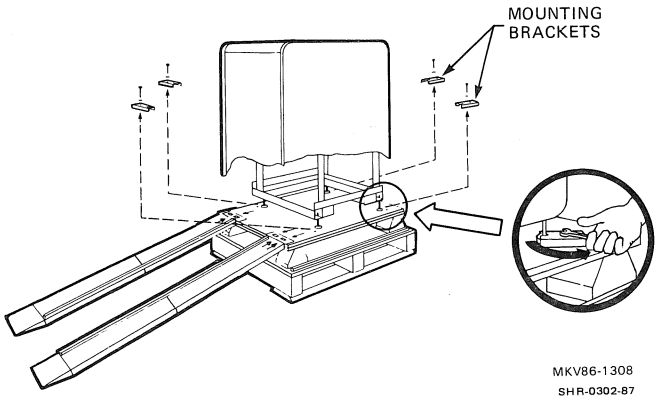
3. Prepare the skid for cabinet removal (Figure 1–5).

   a. Assemble the ramps. The ramps are folded and each one requires a securing pin (included in the ramp carton).

   b. Attach the ramps to the skid by fitting the metal prongs on the ramps into the holes on the skid. Place the ramps so that the runners are on the inside.

   c. Remove the bolts from the four mounting brackets (one at each leveler foot). Remove the brackets.

Figure 1–5: Removing the RV20 from its Skid - Step 3

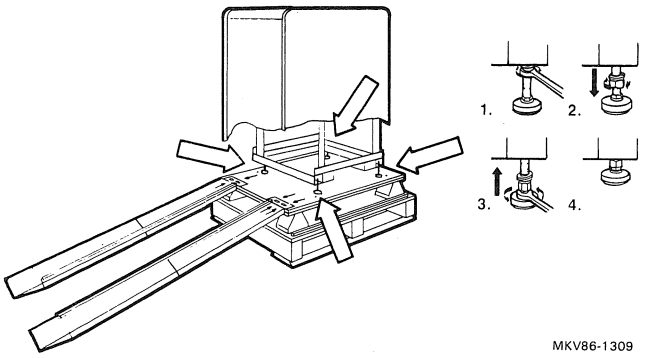


4. Prepare the cabinet for removal (Figure 1–6).

   a. For each leveler foot, screw the top hex nut down as close to the leveler foot as possible. Then use the hex nut that is attached to the leveler foot to raise the foot up as far as possible.

   b. If the cabinet has a stabilizer leg attached, make sure it is pushed in.

Figure 1–6: Removing the RV20 from its Skid - Step 4



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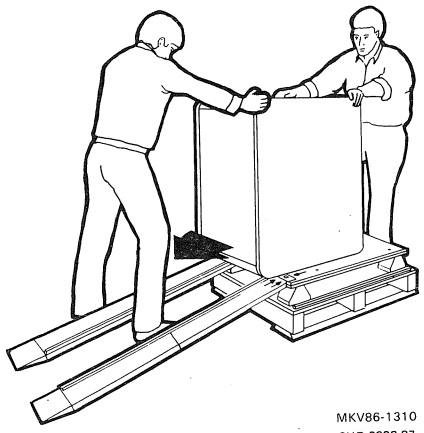
5. Slowly roll the cabinet off the skid (Figure 1–7).

Figure 1–7: Removing the RV20 from its Skid - Step 5



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6. Move the cabinet into place.
7. Unpack all the other equipment. Make sure all parts are included and are undamaged. The specific parts depend on the host system and also on the specific configuration of the RV20 subsystem. Table 1–1 is a general parts list you can use to take inventory of the parts.

Table 1–1: Parts List

Part	Part Number	Quantity
RV20 Optical Disk Subsystem Owner's Manual	EK-ORV20-OM	1
RV20 Optical Disk Subsystem Installation Guide	EK-ORV20-IG	1
Sheet of TMSCP unit number labels	36-18940-01	1
ISI terminator assembly	29-26458-00	2 per subsystem
ISI interface cable	29-26800-00	1 per slave RV20
KLESI module	KLESI-B: T1014 KLESI-Q: M7740	1 per VAXBI subsystem 1 per Q-Bus subsystem
Internal ribbon cable	LESI-B: 17-01098-XX LESI-Q: 70-19923-XX	1 per VAXBI subsystem 1 per Q-Bus subsystem
LESI interface cable	LESI-B: BC17Y-25 LESI-Q: BC17Y-05	1 per VAXBI subsystem 1 per Q-Bus subsystem
Bulkhead mounting plate (and hardware)	VAX 8XXX: 74-28370-01 MicroVAX: 74-28370-01	1 per subsystem

1.6 Related Documentation

Related documentation for the RV20 is listed in Table 1–2.

Table 1–2: Related Documentation

Document	Part Number	Description
RV20 Optical Disk Subsystem Owner's Manual	EK-ORV20-OM	Customer document containing operating procedures, maintenance and troubleshooting instructions.
RV20 Optical Disk Subsystem Service Guide	EK-ORV20-SV	Contains service information on the RV20 subsystem, including instructions on how to run diagnostics to isolate a problem to a Field Replaceable Unit (FRU). This guide contains the Recommended Spares List (RSL) and the removal and replacement procedures for all FRUs.

Chapter 2
Installation

2.1 General

This chapter explains how to install the RV20 subsystem to the point where diagnostic verification can be done. The four major steps in this process are as follows.

- Setting up and installing the LESI adapter module in the host (Paragraphs 2.2, 2.3, and 2.4)
- Cabling the subsystem (Paragraph 2.5)
- Powering up/self-testing all drives in the subsystem (Paragraph 2.6)
- Assigning and labeling each drive with a TMSCP unit number (Paragraph 2.7)

The RV20 subsystem can be installed in any BI-based VAX or Q-Bus based MicroVAX system.

In BI-based systems, the LESI adapter is the T1014 module. The T1014 module installation is described in Paragraphs 2.2 and 2.3. Paragraph 2.2 gives installation instructions for the VAX 8200 family. Paragraph 2.3 gives installation instructions for the VAX 8800 family. For VAX 8250 systems, refer to the LESI adapter installation instructions in the host installation manual. For VAX 8500 systems, use Paragraph 2.4 of this manual. (8500 installation instructions are essentially the same as those for 8800 systems.)

In MicroVAX systems, the LESI adapter is the M7740 module. The M7740 module installation is described in Paragraph 2.4.

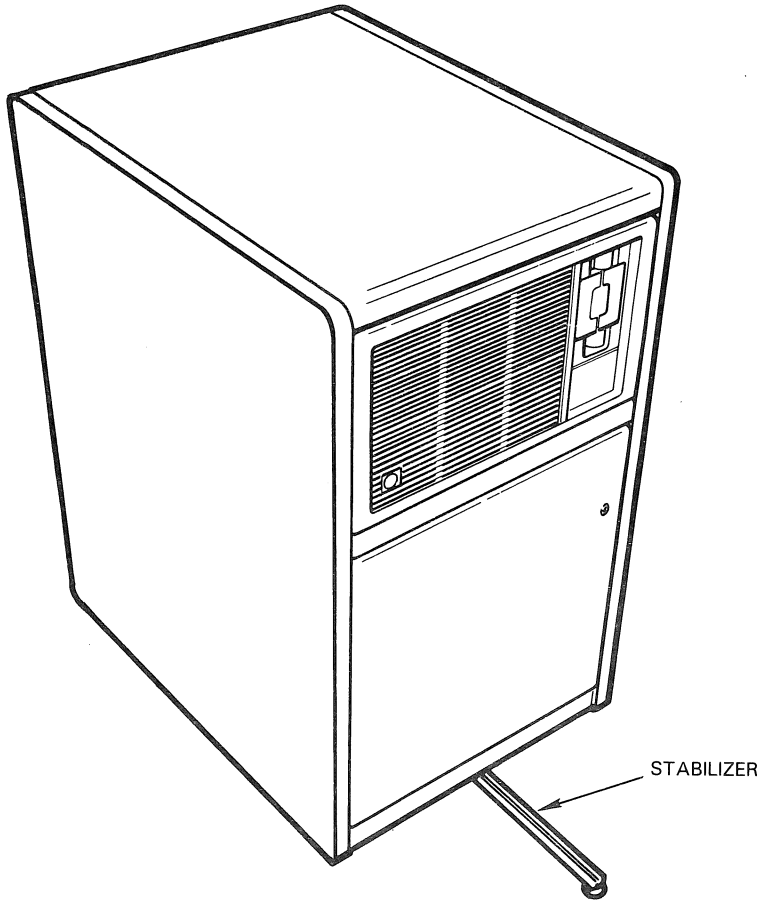
2.2 T1014 KLESI-B Adapter Module Installation—VAX 8200 Systems

In VAX 8200 family systems, the T1014 KLESI-B adapter module is installed in the BA32 box.

Warning

When working on any VAX 8200 family system, you must extend the stabilizer leg (Figure 2–1) before pulling the BA32 box from the cabinet. Failure to do so will cause the cabinet to tip forward when the BA32 box is pulled out.

Figure 2–1: Stabilizer Leg

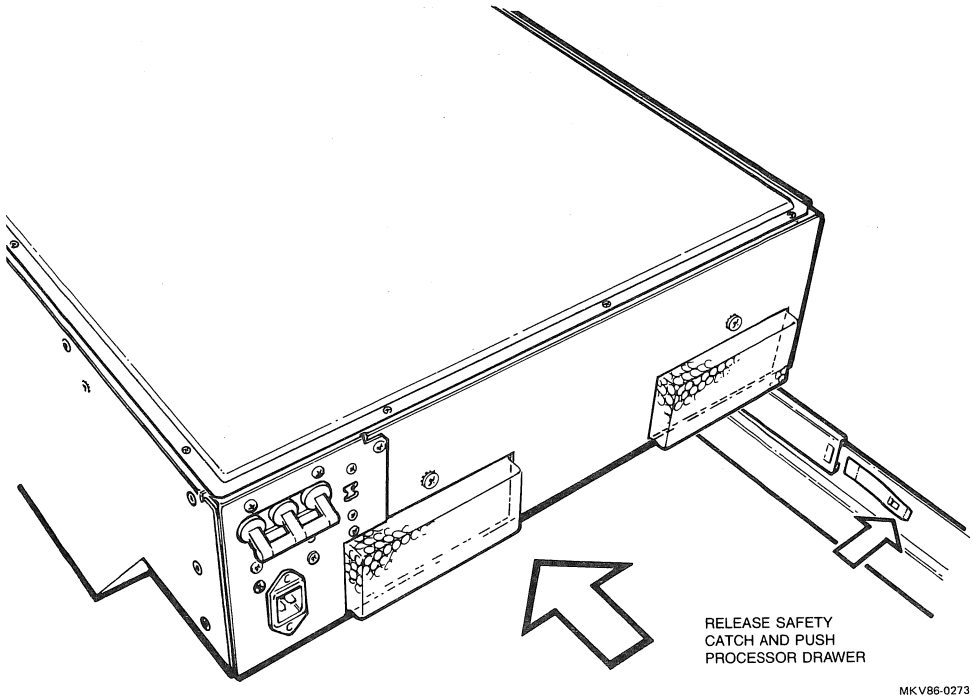


1. Power down the host using the proper system shutdown procedures. Remove the front and rear doors.
2. From the rear of the cabinet, release the BA32 box track lock safety catch (Figure 2–2).
3. Slide the BA32 box out of the cabinet.

Caution

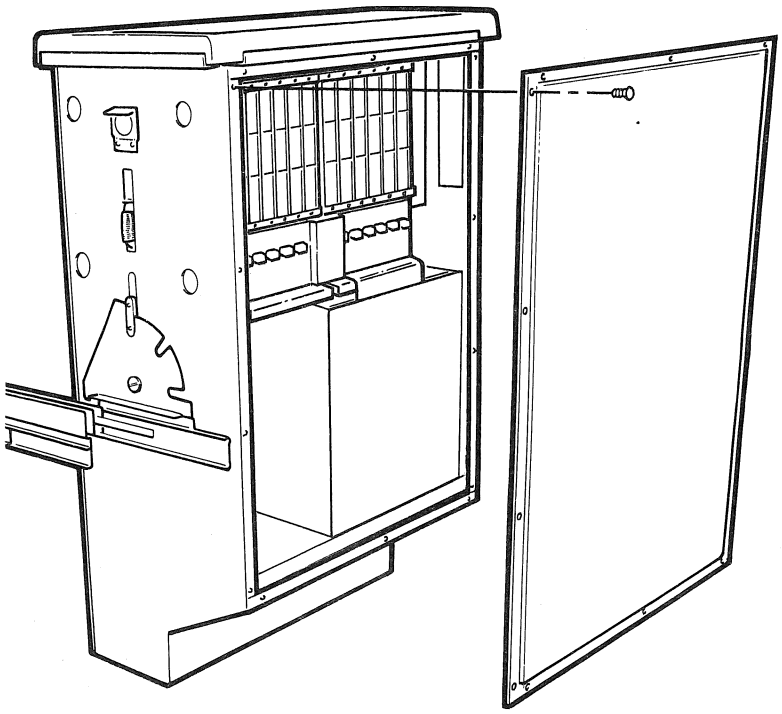
Always use an antistatic wrist strap connected to the processor cabinet when working inside the host.

Figure 2–2: BA32 Box Track Lock



4. Remove the BA32 box top cover.
5. Rotate the BA32 box up so it is in the position shown in Figure 2–3. Remove the bottom cover.

Figure 2–3: BA32 Bottom Cover Removal



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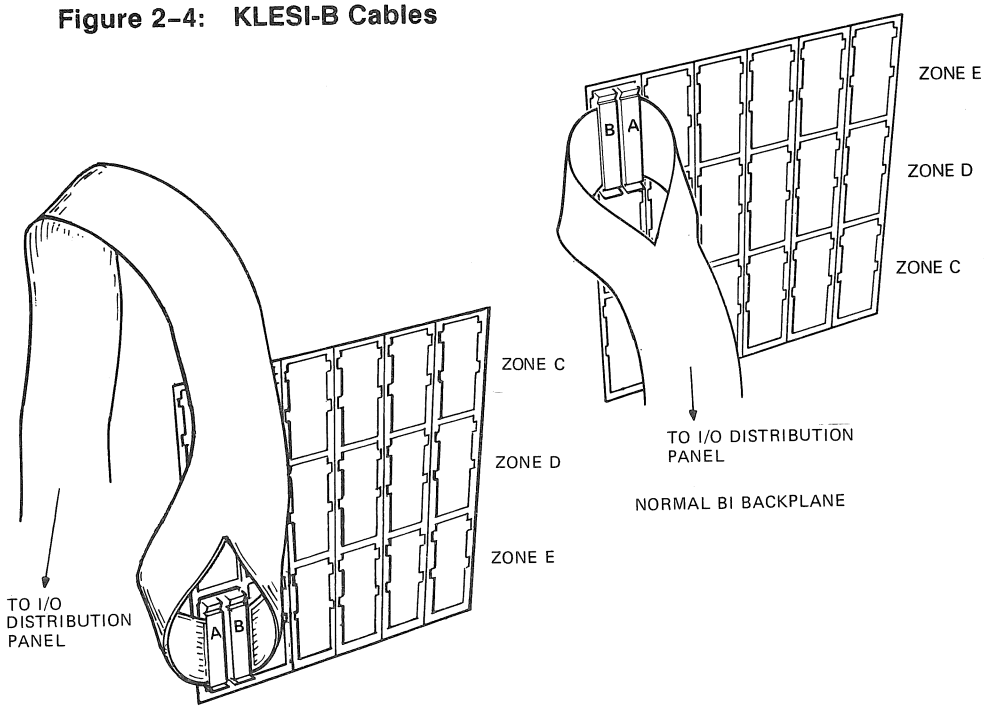
6. Select a slot for the T1014 KLESI-B adapter module. Make note of the slot identification (node ID).
7. If necessary, install a transition header in the slot that will hold the T1014 KLESI-B adapter module.
8. Feed the double-connector end of the KLESI-B internal ribbon cable through the cable slot at the bottom of the BA32 box. Make sure the cable does not scrape against the sheet metal edges of the slot.
9. Pull the cable out far enough to allow dual cable connectors to reach the top of the VAXBI backplane assembly with adequate slack.
10. Note the orientation of the BI backplane. In some systems, the backplane is inverted. Refer to Figure 2-4. It is important that you install the KLESI-B module into Zone E of the backplane.

    Using Figure 2-4 as a guide, insert the two cable connectors on the KLESI-B internal ribbon cable into Zone E of the backplane slot that will hold the T1014 module. Be sure the cable is properly oriented and the connectors are seated correctly.

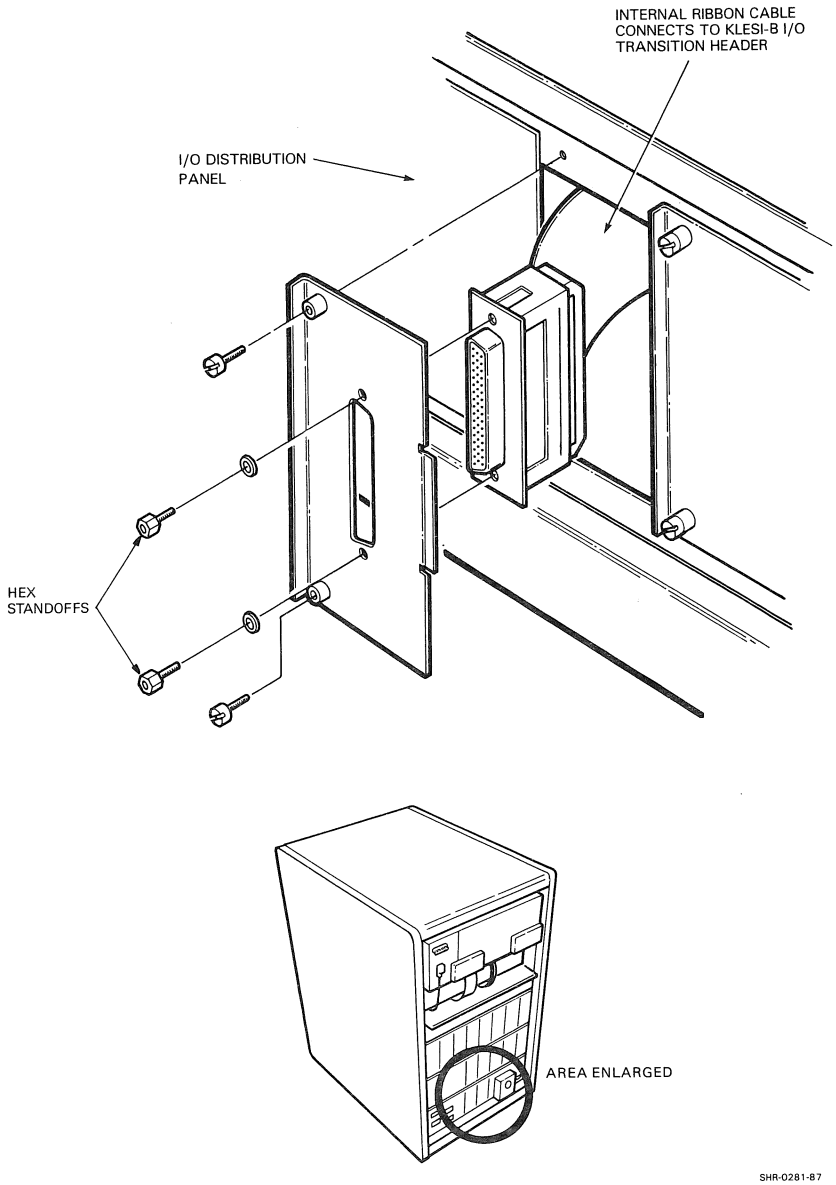
Figure 2–4: KLESI-B Cables



11. Replace the BA32 box bottom cover.
12. Route the free end of the T1014 module cable through the cabinet to the input/output (I/O) distribution panel at the rear of the cabinet.
13. Locate an available position for the KLESI-B connector on the I/O distribution panel (Figure 2–5).
14. Remove the blank insert for the KLESI-B cable connector.
15. Route the cable through the opening in the panel.
16. Attach the I/O bulkhead panel to the KLESI-B cable with the hex standoffs and helical lockwashers (Figure 2–5). Tighten the standoffs.
17. Install the I/O bulkhead panel on the I/O distribution panel with two screws (Figure 2–5).
18. Rotate the BA32 box down to its normal position.
19. Insert the T1014 KLESI-B adapter module into its slot in the VAXBI card cage.
20. Replace the BA32 box top cover, but do not tighten the screws.
21. Power up the system. Check to see that the yellow Light Emitting Diode (LED) on the T1014 module lights up after about 10 seconds. This indicates that the module is installed and is working properly.

    If the yellow LED does not light up, make sure that nothing is connected to the LESI cable on the I/O distribution panel. If nothing is connected to the cable and the yellow LED does not light up at power-up, then a module problem exists.
22. Upon successful completion of the module self-test, power down the system.
23. Tighten the BA32 box top cover screws.
24. Slide the BA32 box into the cabinet.
25. Replace the cabinet front and rear doors.

Figure 2–5: KLESI-B I/O Connector



2.3 T1014 KLESI-B Adapter Module Installation—VAX 8800 Systems

This installation procedure applies to all VAX 8800 family (8700 and 8800) systems. VAX 8700 and 8800 systems have different cabinets. Another difference between the two is that VAX 8700 systems have a single CPU, while 8800 systems are dual processors. The VAXBI cabinet is located in the same place in both systems, so the installation of the T1014 module is the same for either system.

1. Unlock and open the front doors to gain access to the front of the system.
2. Locate the VAXBI backplane on the right side of the system behind the module access gate (Figure 2–6). The T1014 module will be installed in an available slot. Select an available slot.
3. After you select a slot for the T1014 module, power down the system using the proper system shutdown procedures.
4. Unlock the back doors to gain access to the rear of the system (Figure 2–7). Examine the selected slot. Make sure there is a node ID plug in the slot and make note of the slot identification (node ID).
5. If necessary, install a transition header in the slot.
6. Examine the I/O distribution panel and cable path (Figure 2–7). You will need to use one of the small rectangular cutouts for the KLESI-B cable.
7. At the front of the system, install the T1014 module in the selected backplane slot.
8. At the rear of the system, open the I/O distribution panel. There are three captive screws securing the I/O panel to the frame (Figure 2–7). Loosen the three screws one-quarter turn each, and swing the I/O panel down.
9. At the rear of the system, install the KLESI-B cable into Zone E of the VAXBI backplane. Make sure the cable is oriented properly (refer to Figure 2–4, if necessary).

Figure 2-6: VAX 8800 Cabinet (Front View)

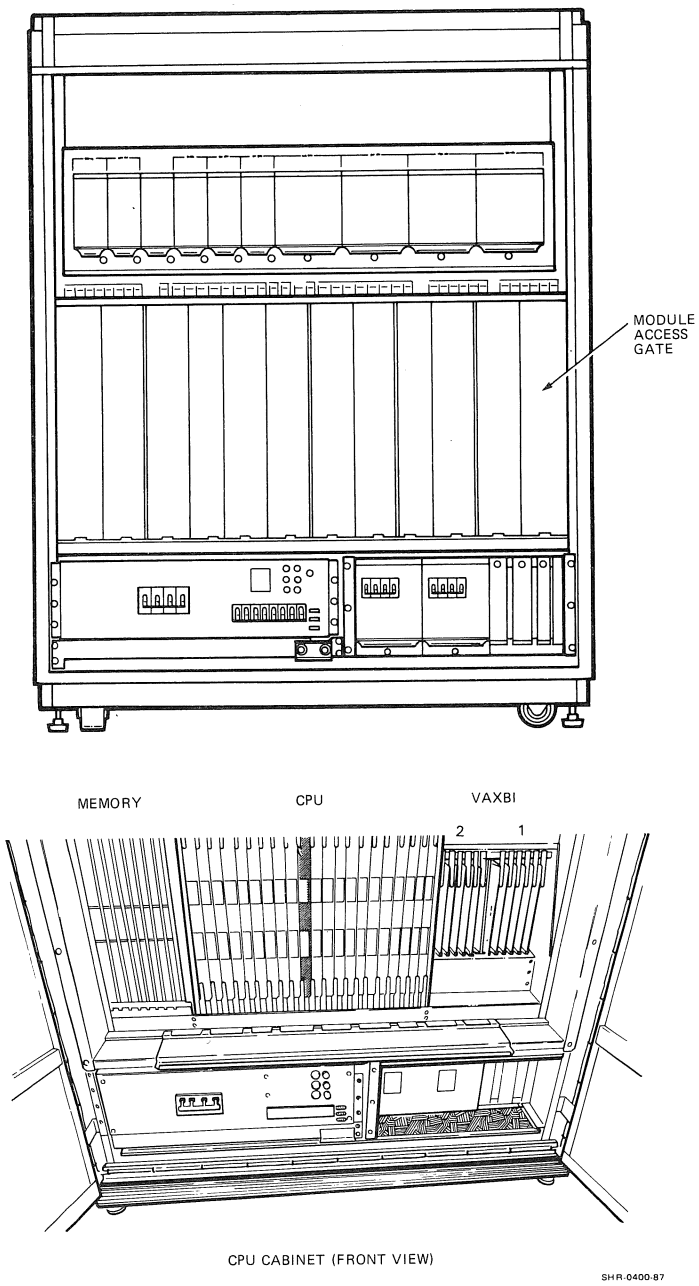
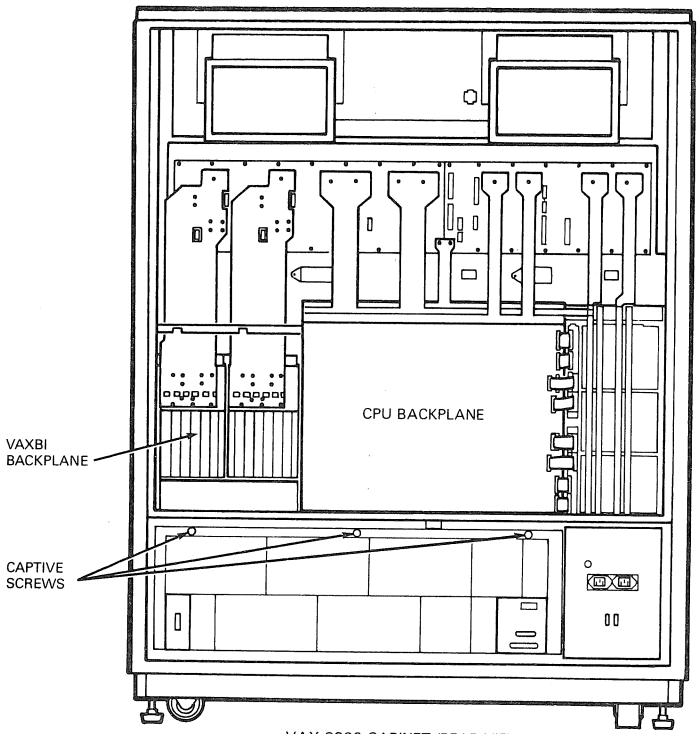


Figure 2–7: VAX 8800 Cabinet (Rear View)



VAX 8800 CABINET (REAR VIEW)

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10. Route the KLESI internal ribbon cable to the I/O distribution panel. Follow the same cable path as for the other VAXBI modules, through the opening to the left of the backplane and down.

11. Remove a blank insert on the I/O distribution panel for the KLESI-B cable connector.

12. Route the cable through the opening in the panel.

13. Attach the I/O bulkhead panel to the KLESI-B cable with the hex standoffs and helical lockwashers (use Figure 2–5, if necessary).

14. Attach the I/O bulkhead panel to the I/O distribution panel with 2 screws (use Figure 2–5, if necessary).

15. Swing the I/O distribution panel back into place and secure the three captive screws.

16. Power up the system. Check to see that the yellow LED on the T1014 module lights up within 10 seconds. This indicates that the module is installed and is working properly.

    If the yellow LED does not light up, make sure that nothing is connected to the LESI cable on the I/O distribution panel. If nothing is connected to the cable and the yellow LED does not light up at power-up, then a module problem exists.

Turn to Paragraph 2.5, Cabling the RV20 Subsystem.

2.4 M7740 KLESI-Q Adapter Module Installation—MicroVAX Systems

The M7740 KLESI-Q adapter module installation includes the following.

- Determining and assigning the address for the M7740 module
- Determining correct backplane location, and installing the M7740 module in the backplane
- Installing the I/O distribution panel bulkhead at the rear of the host, and connecting the cable from the bulkhead to the installed M7740

2.4.1 M7740 Address Setting

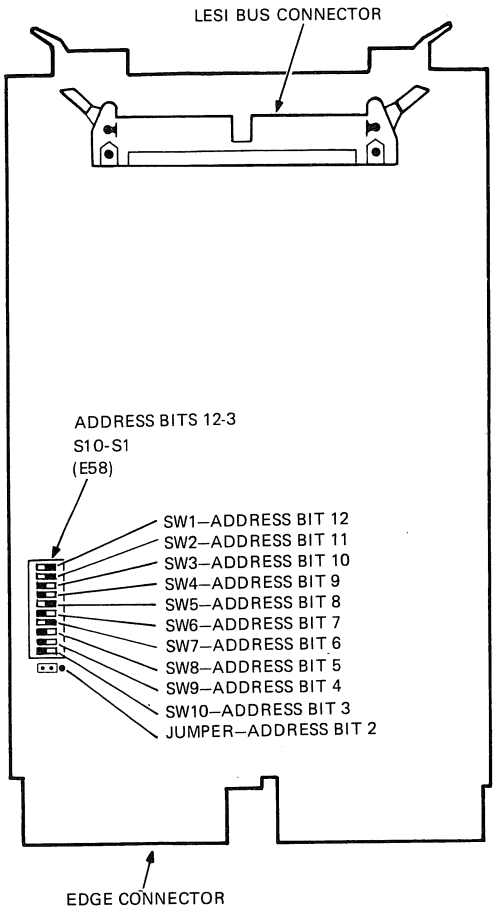
MicroVAX systems have two possible configurations: the standard BA23 box and the BA123 box ("world box"). Except where noted, the installation instructions given here apply to either of the two system boxes.

First, determine the software address for the M7740 module. The Q-Bus uses a 22-bit address structure (address bits 0 through 21). Address bits 3 to 12 are set on the M7740 switchpack. Address bit 2 is set on the jumper just below the M7740 switchpack. (Refer to Figure 2–8 for M7740 switchpack and jumper locations.) Address bits 0 and 1, and 13 to 21 are preset. They cannot be changed.

The specific address the M7740 is assigned depends on the present configuration of the system. Use the SYSGEN utility to find the present configuration of the system.

Enter SYSGEN by typing MC SYSGEN at the prompt ($). Entry into SYSGEN is indicated by the SYSGEN> prompt. At SYSGEN>, type SHOW/CONFIG and the current system configuration is displayed.

Figure 2–8: M7740 KLESI-Q Adapter Module



The M7740 module is preset to address 774500 (octal). Address 774500 is the first valid address for the M7740 module. If 774500 is not available, the switchpack and jumper must be configured to an available floating address. The floating addresses begin at 760404. Figure 2–9 shows how to set the jumper and switches to 1 or 0. Table 2–1 gives the bit settings for the first nine addresses.

Figure 2–9: M7740 Jumper and Switches

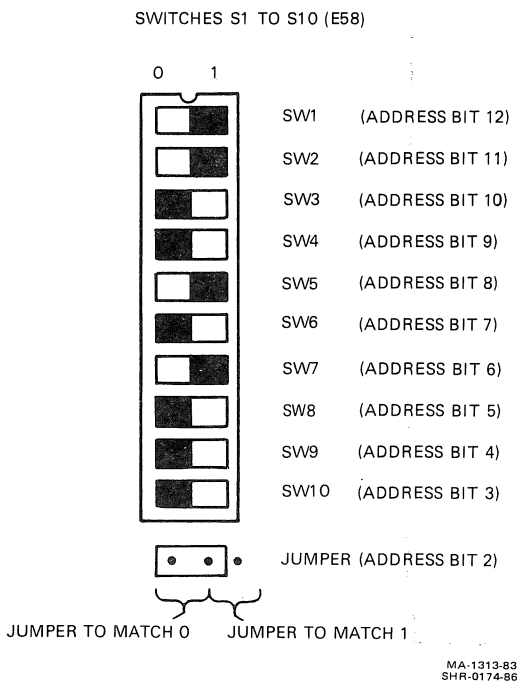


Table 2–1: M7740 Address Settings

	774500	760404	760410	760414	760420	760424	760430	760434	760440
SW 1	0	0	0	0	0	0	0	0	0
SW 2	1	0	0	0	0	0	0	0	0
SW 3	0	0	0	0	0	0	0	0	0
SW 4	0	0	0	0	0	0	0	0	0
SW 5	1	1	1	1	1	1	1	1	1
SW 6	0	0	0	0	0	0	0	0	0
SW 7	1	0	0	0	0	0	0	0	0
SW 8	0	0	0	0	0	0	0	0	1
SW 9	0	0	0	0	1	1	1	1	0
SW 10	0	0	1	1	0	0	1	1	0
Jumper	0	1	0	1	0	1	0	1	0

Set the address according to Table 2–1. To determine the correct backplane location for your M7740 module, proceed to Paragraph 2.4.2. The following discussion of the SYSGEN utility gives greater detail on its use in M7740 address setting.

SYSGEN Utility

Use the SYSGEN utility to aid in determining the correct address for a VMS-based system. The SYSGEN utility uses the same rules for address selection as the VMS operating system. To find the correct address for your RV20, first determine the existing system components.

If the present configuration of the system is not known, enter SYSGEN (follow step 1 below). Type SHOW/CONFIG at the SYSGEN> prompt, and the current system configuration is displayed. To determine the correct address for your RV20, follow these steps.

1. Enter the SYSGEN utility.

```
$ MC SYSGEN <CR>
SYSGEN>
```

2. Enter the configuration section of SYSGEN.

```
SYSGEN> CONFIGURE <CR>
DEVICE>
```

3. At the DEVICE> prompt, enter the options that are present on the system. Include the RV20 as one of the options.

For SYSGEN utility purposes, the RV20 is a TU81. To add an RV20 as a device on the system, increase the TU81 count by 1.

For example, your current system has one QNA, two TU81s, and two UDAs. You want to add an RV20 to the system. In SYSGEN, you enter three TU81s (the third one being the RV20).

The following illustrates this example. Remember, your system is probably configured differently.

```
DEVICE> QNA
DEVICE> TU81 3
DEVICE> UDA 2
```

4. When all the devices are listed, press Ctrl/Z to end the input session. SYSGEN calculates (and displays) the correct address for the RV20 and for all the other hardware you entered.

Once the correct address for the RV20 is known, you can then assign the M7740 module to its correct address in the system.

```
DEVICE> Ctrl/Z

DEVICE: UDA     NAME: PUA     CSR: 772150     Vector: 154     Support: yes
DEVICE: TU81    NAME: PTA     CSR: 774500     Vector: 260     Support: yes
DEVICE: QNA     NAME: XQA     CSR: 774440     Vector: 120     Support: yes
DEVICE: UDA     NAME: PUB     CSR: 760334*    Vector: 300     Support: yes
DEVICE: TU81    NAME: PTB     CSR: 760444*    Vector: 310     Support: yes
DEVICE: TU81    NAME: PTC     CSR: 760450*    Vector: 314     Support: yes

SYSGEN>
```

5. Type EXIT at the SYSGEN> prompt to exit from SYSGEN.

```
SYSGEN> EXIT
$
$
```

Note

Once you have entered an RV20 on the system with these procedures, subsequent SHOW/CONFIG commands recognize the subsystem as an RV20, not a TU81. The RV20 is a TU81 only during a CONFIGURE.

2.4.2 Determining M7740 Backplane Location

MicroVAX systems have two possible configurations: the standard BA23 box or the BA123 box ("world box"). The backplane restrictions for the BA23 (8-slot) and BA123 (12-slot) boxes are as follows. Refer to Figures 2–10 and 2–11, respectively.

1. The CPU module always occupies the first slot of the backplane.
2. Memory modules always occupy the next slots after the CPU module.
3. If an RQDX controller (M8639) is in the system, it must occupy the last **used** slot in the backplane.
4. When installing the M7740 module into an AB or CD row pair, the other half of the slot must be occupied. If no other module occupies that slot, an M9047 bus grant continuity card must be installed in the unused row pair. This passes the grant through the priority granting row of that slot. The priority granting rows are A for the AB side of the slot, and C for the CD side of the slot.
5. You cannot install an M7740 module or a grant card in the following CD rows.

BA23 (8-slot)	Slot 3
BA123 (12-slot)	Slots 3 and 4

Figure 2–10: BA23 Backplane: Bus Grant Path

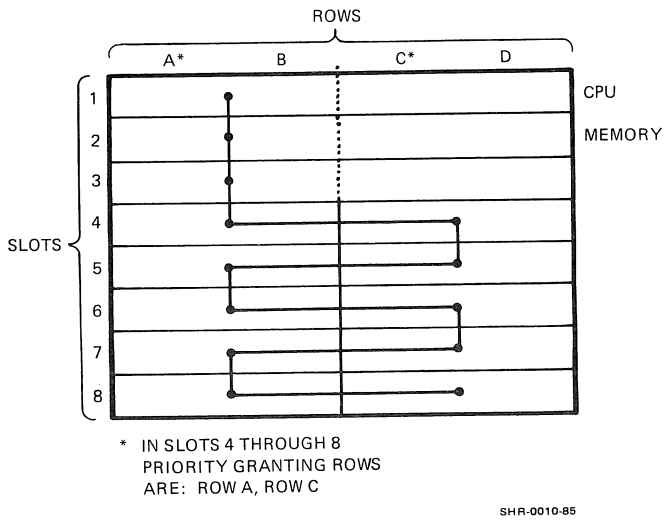
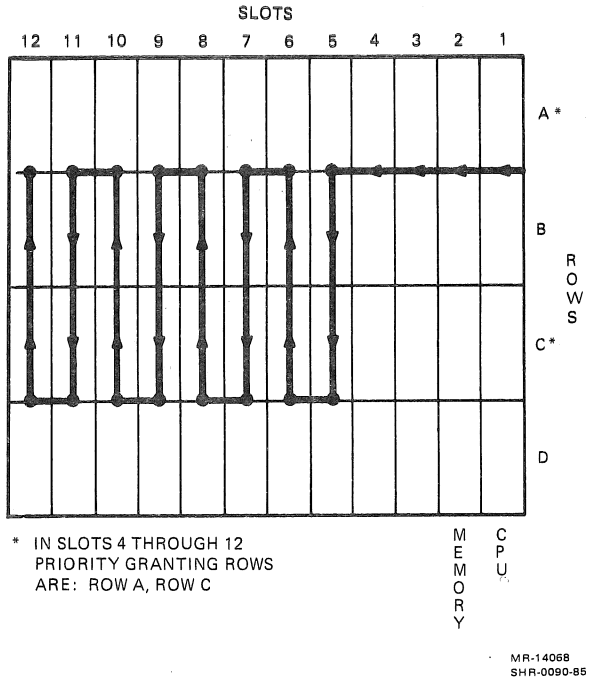


Figure 2-11: BA123 Backplane: Bus Grant Path



2.4.3 Completing M7740 Installation

Caution

Always use a static discharge kit with a grounded wrist strap when accessing the internal parts of the MicroVAX system.

To complete the installation of the M7740, the module must be installed in the backplane and connected to the patch panel at the rear of the MicroVAX system.

The I/O bulkhead panel must also be installed in the patch panel of the system. The BA23 and BA123 boxes use the same bulkhead mounting hardware. The bulkhead is mounted in any available rectangular cutout at the rear of the system.

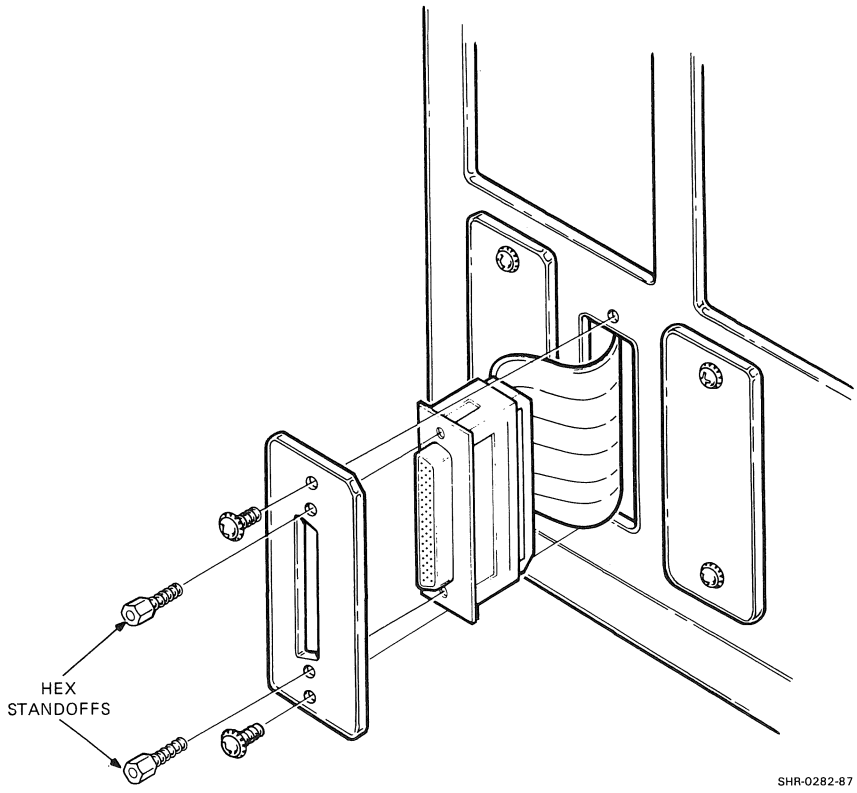
Proceed as follows.

1. Make sure that system power is off.
2. Install the M7740 module in the predetermined backplane slot.
3. If necessary, install an M9047 bus grant continuity card in the backplane.

4. Access the patch panel and remove an unused rectangular cutout having two screws.
5. Route the KLESI-Q internal ribbon cable through the opening in the panel.
6. Attach the I/O bulkhead panel to the KLESI-Q internal ribbon cable using the hex standoffs (Figure 2–12). Tighten the standoffs.
7. Install the I/O bulkhead panel on the patch panel using two screws.
8. Route the internal ribbon cable from the patch panel to the installed M7740 module.

Now proceed to Paragraph 2.5, Cabling the RV20 Subsystem.

Figure 2–12: KLESI-Q I/O Connector



2.5 Cabling the RV20 Subsystem

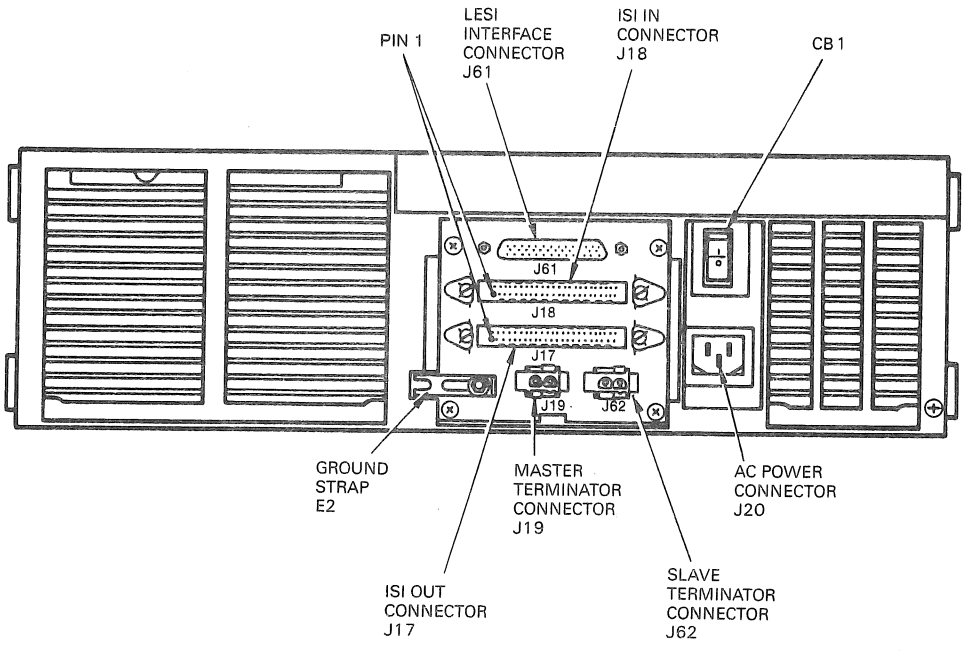
The RV20 subsystem is cabled prior to shipping. You should, however, verify that the cabling is correct. This paragraph gives some typical cabling examples.

A number of configurations are possible, ranging from one RV20 subsystem (one master drive with three slaves) to four separate RV20 subsystems (four RV20 master drives). The cabling for a specific subsystem depends on the configuration of that subsystem.

Figure 2-13 shows five connectors on the RV20 rear panel.

- J61 – LESI interface connector
- J18 – ISI in connector – ISI out connector
- J19 – Master terminator connector
- J62 – Slave terminator connector

Figure 2-13: RV20 Rear Panel



The following items are connected to the rear panel of a cabled RV20.

- LESI Interconnect Cable – The master RV20 in the subsystem connects to the host with the LESI interconnect cable. The cable is plugged into connector J61 at the rear of the RV20.
- Terminator Assembly – A terminator assembly plugs into two connectors on the RV20 rear panel. Separate terminator assemblies must be installed in the first and last drives in a subsystem. If a subsystem consists of only one master (no slaves), then two terminators must be installed in that master. The terminator in the master RV20 is connected to J18/J19 at the rear of the RV20. The terminator in the last slave RV20 is connected to J17/J62 at the rear of the RV20.
- ISI Interface Cable – In a multidrive subsystem, the drives are daisy-chained together with the ISI interface cable. No ISI interface cable is needed for a subsystem that consists of only one RV20.

Figure 2–14 shows five common subsystem cabling configurations. Verify that the cabling for your specific subsystem is correct.

After the subsystem cabling has been verified, route the LESI interconnect cable from J61 on the RV20 master drive to the bulkhead connector at the rear of the host system. Before connecting the cable, however, power up/self-test the subsystem (Paragraph 2.6) and assign TMSCP unit numbers to each drive (Paragraph 2.7).

Figure 2–14: RV20 Subsystem Cabling Block Diagrams

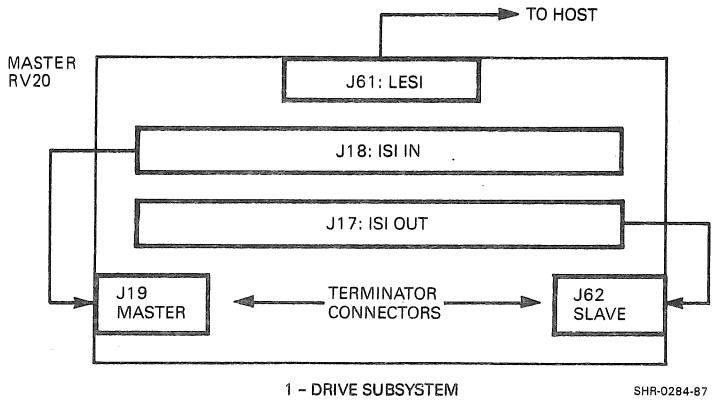


Figure 2–14 Cont'd. on next page

Figure 2–14 (Cont.): RV20 Subsystem Cabling Block Diagrams

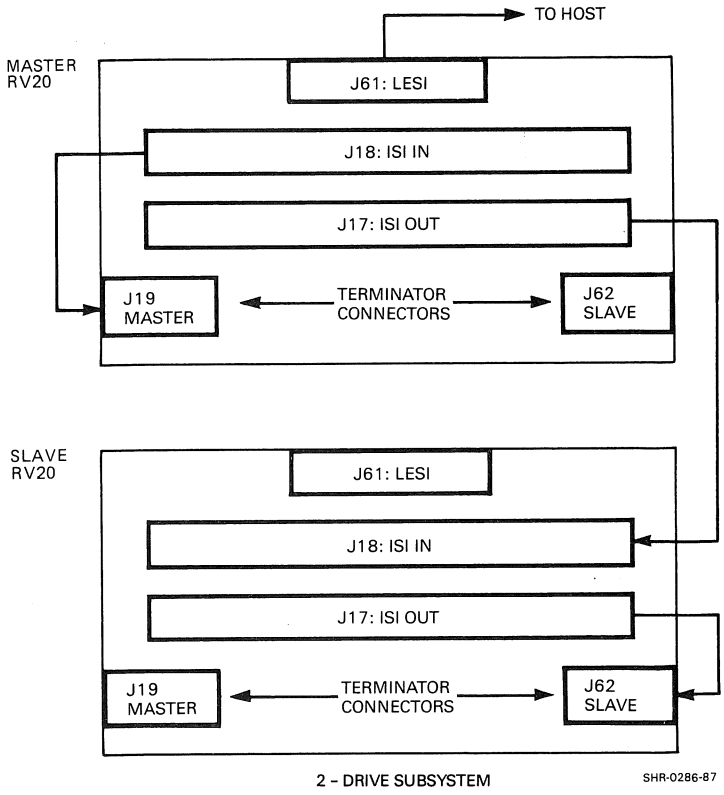


Figure 2–14 Cont'd. on next page

Figure 2–14 (Cont.): RV20 Subsystem Cabling Block Diagrams

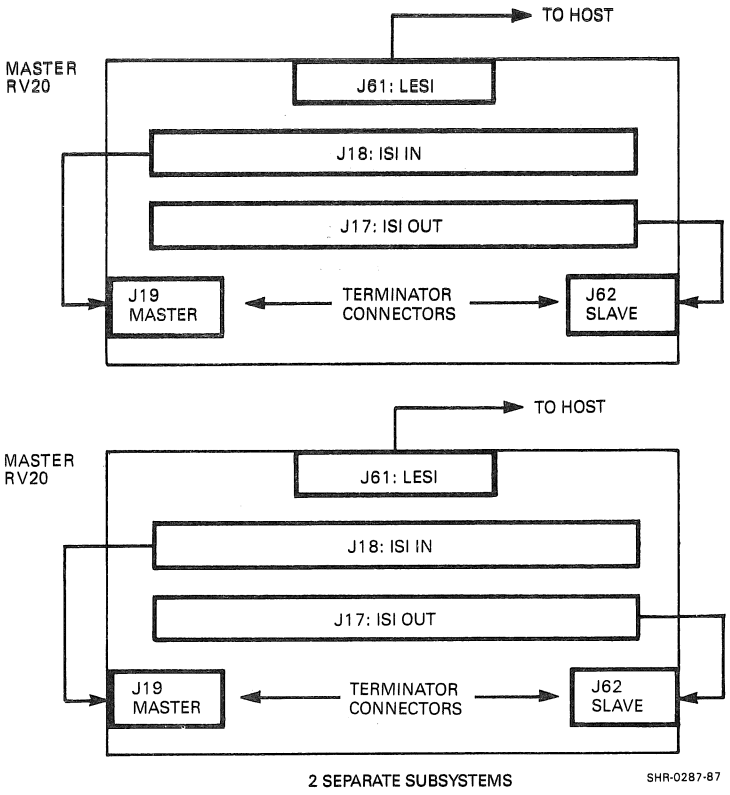


Figure 2–14 Cont'd. on next page

Figure 2–14 (Cont.): RV20 Subsystem Cabling Block Diagrams

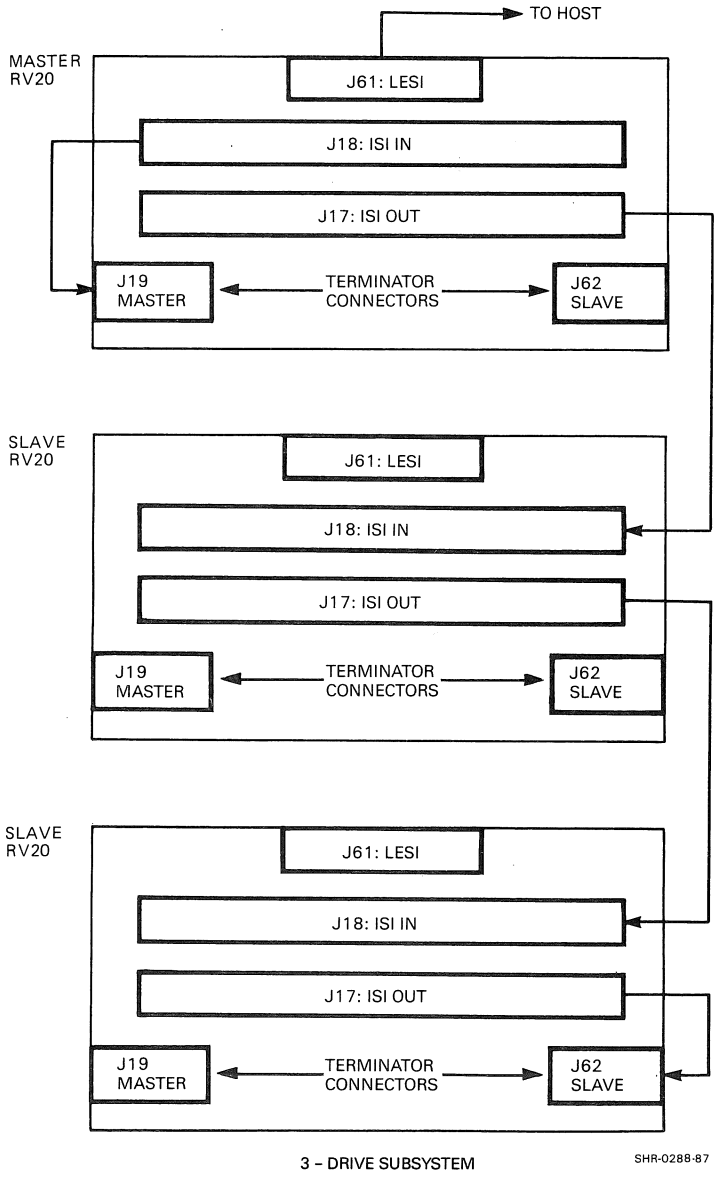
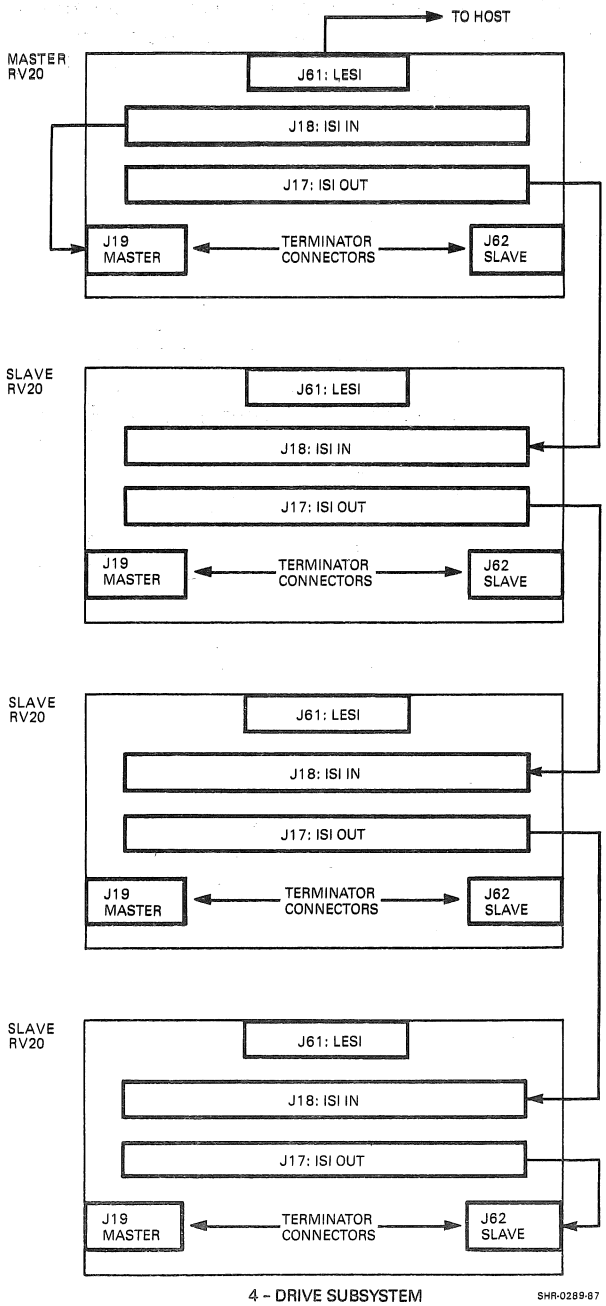


Figure 2–14 Cont'd. on next page

Figure 2–14 (Cont.): RV20 Subsystem Cabling Block Diagrams



2.6 Powering Up/Self-Testing

First, familiarize yourself with the RV20 maintenance panel. The maintenance panel is located on the right of the RV20 front panel behind an access door. Figure 2–15 shows the RV20 front panel. Figure 2–16 shows the maintenance panel controls and indicators.

Figure 2–15: RV20 Front Panel

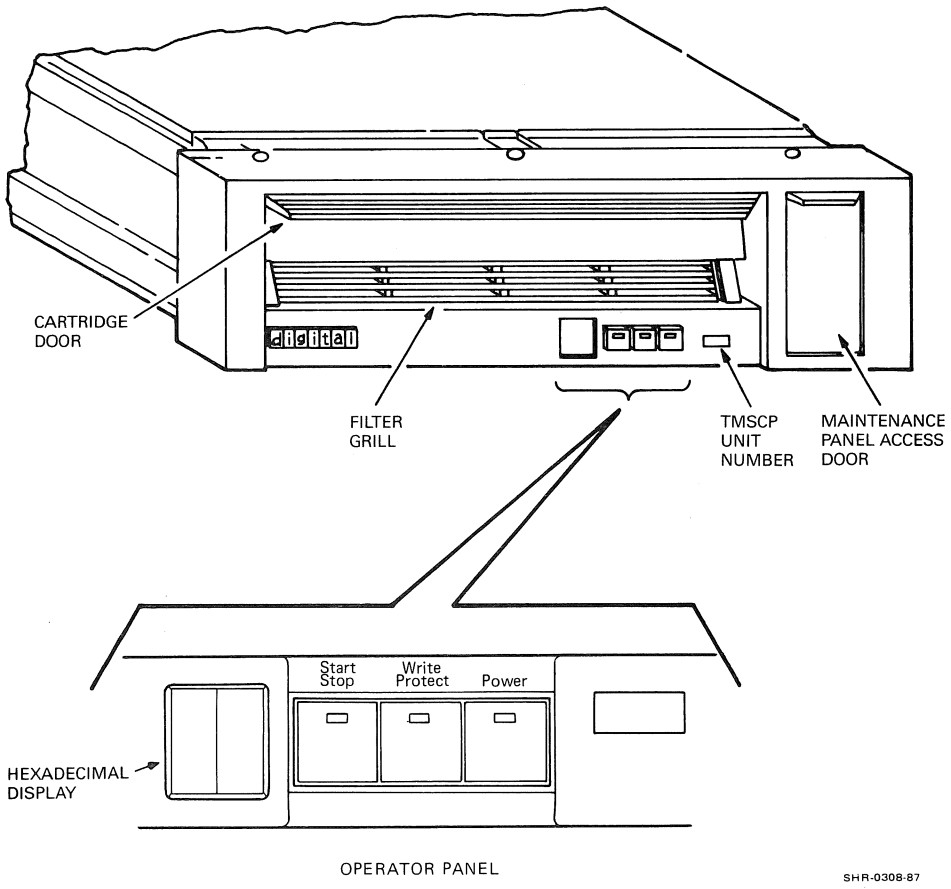
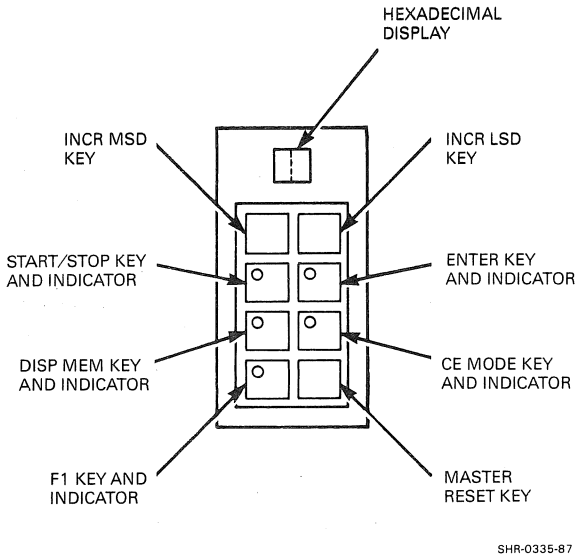


Figure 2–16: RV20 Maintenance Panel



To power up/self-test the drives in the subsystem, you must connect the main power cable coming from the power controller to a power outlet rated for the proper voltage.

1. Make sure the circuit breakers (CB1) at the rear of each RV20 in the subsystem are OFF.
2. Power up the power controller by switching the main breaker to ON.
3. Power up each drive in the subsystem individually. Set CB1 to ON and let the drive run through its power up/self-test. Upon successful completion of the power up/self-test, the maintenance panel display reads 00 and the CE mode indicator is on.

If the power up/self-test fails, refer to the *RV20 Optical Disk Subsystem Service Guide* (EK-ORV20-SV).

If the power up/self-test passes, proceed to Paragraph 2.7 and assign each drive a unique TMSCP unit number.

2.7 Assigning TMSCP Unit Numbers

Note

The RV20 subsystem is a disk drive, but the host operating system "sees" it as a tape device.

Each RV20 drive in the subsystem must be assigned a unique TMSCP unit number. For example, if an RV20 subsystem is MUA0 on the host system, 0 is the unit number, MU is the device identifier (tape drive), and A represents the device (the entire subsystem as a whole). Each drive within a subsystem must have a unit number unique to the device (MUA0, MUA1, and so on).

Any number from 0 to 251 can be used. The only restriction is that no two RV20 drives within a subsystem can have identical TMSCP unit numbers. You cannot have two RV20 drives that have device name MUA0. You can, however, have an MUA0 and an MUB0 because MUA is completely independent of MUB.

If you have four RV20 subsystems, and they have device names MUA, MUB, MUC, and MUD, it is valid to assign TMSCP unit number 0 to all four master drives (MUA0, MUB0, MUC0, and MUD0). However, it may be less confusing to a customer if you assign TMSCP unit numbers like MUA0, MUB1, MUC2, and MUD4. Also, if you assign unique TMSCP unit numbers, a customer who has multiple RV20 subsystems can swap the drives between subsystems without having to change the TMSCP unit numbers.

Before performing test A1 (to assign the unit number), decide what numbers each drive should have. After you assign the unit number, you need to label the drive with that number.

To assign a unit number to each RV20 drive, power up the drive, enter CE mode, and perform test A1. This test allows access to the EEPROM where the unit number is stored (EEPROM address 00H).

If the drive is not powered up, power up now and let the system cycle through its self-tests (3 to 4 minutes). If no error code is displayed, the drive is already in CE mode. The CE mode indicator lights up when you are in CE mode.

If the drive is already powered up, you can enter CE mode by pressing the CE mode switch on the maintenance panel (Figure 2-16). The Start/Stop switch on the front panel must be in the Stop (out) position, however.

1. Press the INCR LSD and INCR MSD keys. A1 appears on the maintenance panel hexadecimal display. Press ENTER.

2. Start the test by pressing the maintenance panel START/STOP key. If a 9D, 9E, or 9F appears on the operator panel display, a problem is present in the EEPROM. You cannot access the EEPROM until the problem is corrected. Follow the corrective procedures in Paragraph 3.7 of the *RV20 Optical Disk Subsystem Service Guide* (EK-ORV20-SV).

3. If no error code appears, press the INCR LSD and INCR MSD keys on the maintenance panel. When 00 appears on the maintenance panel display, press the ENTER key. Then the address 00 appears on the operator panel display, while the contents of that address shows on the maintenance panel display.

4. Use the INCR LSD and INCR MSD keys to enter the TMSCP unit number (hexadecimal). Table 2–2 is a decimal-to-hexadecimal conversion chart for numbers 0-251. Make sure you enter the unit number in hexadecimal. Also, be sure the unit number you assign the drive is unique to that controller. Two drives on the same controller cannot have the same unit number.

To exit the test and store the new values, press the START/STOP key or the CE mode key on the maintenance panel. This writes the new data into the EEPROM.

To quit the test without saving the changes, press the MASTER RESET key on the maintenance panel.

5. After you assign the unit number, label the drive in the recessed area on the front panel (Figure 2-15). Use the numbered labels supplied with this manual.

2.8 Completing the RV20 Installation

1. Make sure that the host power is off.

2. Connect the LESI cable to the patch panel at the rear of the host and secure it.

3. Replace the rear cover on the H9643 cabinet. Make sure the RV20 drives in the subsystem remain on.

4. Replace the host rear door.

5. Proceed to Chapter 3 and run verification tests on the subsystem. This completes the RV20 subsystem installation.

Table 2–2: Decimal-to-Hexadecimal Conversion

Decimal	Hex	Decimal	Hex	Decimal	Hex	Decimal	Hex
0	00	63	3F	126	7E	189	BD
1	01	64	40	127	7F	190	BE
2	02	65	41	128	80	191	BF
3	03	66	42	129	81	192	C0
4	04	67	43	130	82	193	C1
5	05	68	44	131	83	194	C2
6	06	69	45	132	84	195	C3
7	07	70	46	133	85	196	C4
8	08	71	47	134	86	197	C5
9	09	72	48	135	87	198	C6
10	0A	73	49	136	88	199	C7
11	0B	74	4A	137	89	200	C8
12	0C	75	4B	138	8A	201	C9
13	0D	76	4C	139	8B	202	CA
14	0E	77	4D	140	8C	203	CB
15	0F	78	4E	141	8D	204	CC
16	10	79	4F	142	8E	205	CD
17	11	80	50	143	8F	206	CE
18	12	81	51	144	90	207	CF
19	13	82	52	145	91	208	D0
20	14	83	53	146	92	209	D1
21	15	84	54	147	93	210	D2
22	16	85	55	148	94	211	D3
23	17	86	56	149	95	212	D4
24	18	87	57	150	96	213	D5
25	19	88	58	151	97	214	D6
27	1B	89	59	153	99	215	D7
28	1C	91	5B	154	9A	217	D9
29	1D	92	5C	155	9B	218	DA
30	1E	93	5D	156	9C	219	DB
31	1F	94	5E	157	9D	220	DC
32	20	95	5F	158	9E	221	DD
33	21	96	60	159	9F	222	DE
34	22	97	61	160	A0	223	DF
35	23	98	62	161	A1	224	E0
36	24	99	63	162	A2	225	E1
37	25	100	64	163	A3	226	E2
38	26	101	65	164	A4	227	E3
39	27	102	66	165	A5	228	E4
40	28	103	67	166	A6	229	E6
41	29	104	68	167	A7	230	E6
42	2A	105	69	168	A8	231	E7
43	2B	106	6A	169	A9	232	E8
44	2C	107	6B	170	AA	233	E9
45	2D	108	6C	171	AB	234	EA
46	2E	109	6D	172	AC	235	EB
47	2F	110	6E	173	AD	236	EC
48	30	111	6F	174	AE	237	ED
49	31	112	70	175	AF	238	EE
50	32	113	71	176	B0	239	EF
51	33	114	72	177	B1	240	F0
52	34	115	73	178	B2	241	F1
53	35	116	74	179	B3	242	F2
54	36	117	75	180	B4	243	F3
55	37	118	76	181	B5	244	F4
56	38	119	77	182	B6	245	F5
57	39	120	78	183	B7	246	F6
58	3A	121	79	184	B8	247	F7
59	3B	122	7A	185	B9	248	F8
69	3C	123	7B	186	BA	249	F9
61	3D	124	7C	187	BB	250	FA
62	3E	125	7D	188	BC	251	FB

Chapter 3
Verification

3.1 Overview

After the subsystem is installed, verify that all the drives are operational by performing three types of tests.

- Power up/self-tests on all the drives in the subsystem (Paragraph 3.2)
- Power-up test of the drive subsystem controller (Paragraph 3.3)
- Level III functional tests (Paragraph 3.4)

Paragraph 3.5 gives instructions on how to create a dedicated diagnostic test disk (should this be necessary).

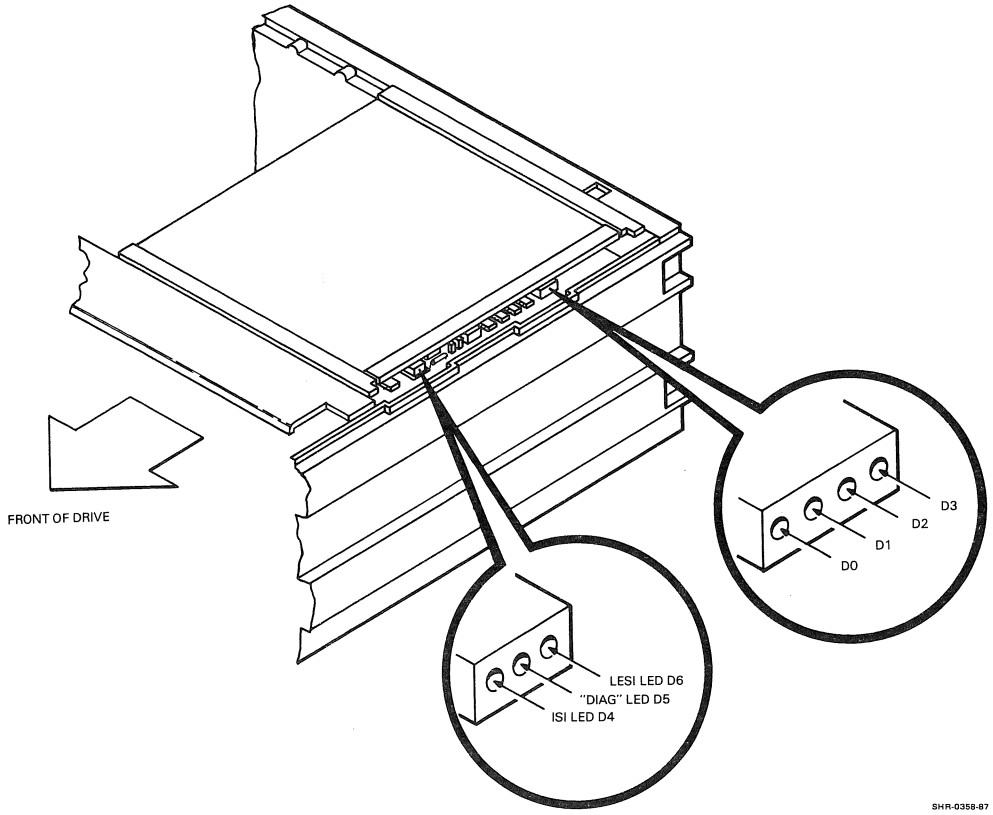
3.2 Internal Drive Power Up/Self-Testing

Paragraph 2.6 gives instructions on how to power up/self-test all the drives in the subsystem. This is done prior to assigning TMSCP unit numbers to each drive. Refer to Paragraph 2.6 for instructions on running these tests.

3.3 Power-Up Testing the Drive Subsystem Controller

The drive subsystem controller module has a set of power-up tests that run whenever power is applied to the master drive in an RV20 subsystem. The results of the tests are indicated on seven LEDs located on the module. These LEDs are numbered D0 through D6. Figure 3–1 shows the location of the LEDs on the drive subsystem controller.

Figure 3–1: Drive Subsystem Controller LEDs



The seven LEDs are divided into a group of three test LEDs (D4 to D6) and another group of four communications LEDs (D0 to D3). After all the power-up tests run (or when a failure occurs in one of the tests), the three test LEDs are updated as described below. Then, communication with the drives in the subsystem is attempted, and the communication LEDs are updated.

D6 – LESI LED

As with all seven LEDs, on power-up D6 lights up. The drive subsystem controller checks for the presence of the KLESI adapter. The adapter is assumed to be present if the CIP (Cable In Place) signal is asserted. If the CIP signal is not asserted, D6 is extinguished. If CIP is asserted, a handshake test is done. When the handshake test passes, D6 is extinguished.

It is important to remember the limitations of D6. D6 is extinguished if the test passes, but it is also extinguished if the CIP signal is not present. The meaning of this extinguished LED should not be misinterpreted to mean the test definitely passed. If the LED stays on, however, you can be sure that the CIP signal is present and the LESI handshake test did indeed fail.

D5 – "DIAG" LED

As with all seven LEDs, on power-up D5 lights up. Upon successful completion of the Level A microdiagnostics that do not require driving the ISI bus, D5 is extinguished.

D4 – ISI Bus LED

As with all seven LEDs, on power-up D4 lights up. After the power-up microdiagnostics pass, the remaining microdiagnostics run. These tests drive the data and control lines on the ISI bus. When these tests pass, D4 is extinguished.

D0 to D3 – Communications LEDs

The four communications LEDs correspond to the Control Module (CM) numbers (0 to 3) that each of the drives in the subsystem has been assigned. They are labeled as ISI addresses in Figure 1–2.

The master RV20 is always CM 0. The first slave in the daisy-chain is always CM 1, the second slave in the chain is always CM 2, and the third slave is always CM 3. The CM number for each drive is stamped on top of the power indicator/address plug on the RV20 front panel.

On power-up, all four of these LEDs light up. After successful completion of the Level A microdiagnostics, communication is attempted with each of the drives in the subsystem. As communication is established with each drive, the corresponding LED (D0 to D3) is extinguished. If all four LEDs stay on, it may be due to a faulty drive, Level A microdiagnostics failure, or a fatal error encountered by the drive subsystem controller.

3.3.1 Performing the Test

Make sure that the entire subsystem is cabled properly, including the cabling to the host from J61 on the master drive. Make sure that all the slave drives are powered up and have passed their internal power up/self-tests. The test is executed by powering up the master RV20.

Warning

Don't forget to extend the cabinet's stabilizer leg before pulling the drive from the cabinet (Figure 4-1).

1. Pull the master RV20 out of the cabinet to expose the top cover.
2. Remove the rear piece of the top cover on the RV20 master drive. Locate the drive subsystem controller module in the card cage (top PCA). Locate the seven LEDs on the outer edge of the PCA (Figure 3-1).
3. Begin the test by powering up the master drive.
4. Observe the three test LEDs.

All three test LEDs light up, and then the Level A microdiagnostics run. At the end of the microdiagnostics, all three test LEDs extinguish. If any of the three LEDs stays on, this indicates a test failure. (Refer to the descriptions of each LED above.)

A flashing sequence follows, indicating the results at the end of the Level A microdiagnostics. If all three LEDs extinguish and no flashing sequence occurs, it is likely that the drive subsystem controller encountered a fatal error. Refer to Paragraph 3.3.2 to determine the problem.

If only D5 flashes, this indicates that no CIP signal is present. This could be because the LESI cable from J61 to the host is not connected. It could also be because there is no LESI adapter in the host, a bad LESI adapter is in the host, or the LESI cable is bad.

If only D5 and D6 flash, this indicates that the CIP signal is present, and the potential for establishing communication with the host exists.

If all three LEDs flash successively, this indicates that the Level A microdiagnostics passed and communication with the host has been established.

5. Observe the four communications LEDs. The LEDs corresponding to the CM number of each drive in the subsystem extinguish. If the Level A microdiagnostics do not pass, this communication is never established and all four of these LEDs stay on.

3.3.2 Controller Fatal Error Indication

The LEDs are set to a unique state if the drive subsystem controller encounters a fatal error. Possible causes of a fatal error include the following.

- Power fail interrupt in the controller (the system still has power)
- Lost communication with the LESI adapter
- U/Q port fatal error

When a fatal error occurs, the seven LEDs are set to the following state.

- 3 test LEDs (D4, D5, and D6) – Off
- 4 communications LEDs – On

3.4 Level III Testing

After the drives and the drive subsystem controller have been verified (Paragraphs 3.2 and 3.3), run the functional portion of the Level III tests. When these tests pass, the installation is complete. This paragraph gives instructions for running the tests under the VAX Diagnostic Supervisor (3.4.1) and the MicroVAX Diagnostic Monitor (3.4.2). These instructions are for running the functional tests only. Test descriptions and more detailed instructions are found in the *RV20 Optical Disk Subsystem Service Guide* (EK-ORV20-SV).

It is a good idea to create dedicated diagnostic test disks for each drive in the subsystem. Paragraph 3.5 explains how to create a dedicated diagnostic test disk.

3.4.1 Running Level III Tests Under VDS

On BI-based systems, the Level III RV20 diagnostics are run through the VAX Diagnostic Supervisor (VDS). VDS can only be run in standalone mode. The system must be taken off-line to run VDS.

3.4.1.1 Equipment

To run RV20 diagnostics under VDS, you must have the RV20 diagnostics on-line. If your system has the latest version of VDS (which includes the RV20 diagnostic package, or EVRVA), you may simply implement it. If the system has not been updated with RV20 diagnostics, you must load the diagnostic package through removable media (tape or floppy diskette).

You must also use a diagnostic test disk to test drives. A test disk can be created with utility test 32. (Refer to Paragraph 3.5.) Never use customer media to do Level III testing. Make sure that the drive to be tested has a test disk installed and the Start/Stop switch is pressed in.

3.4.1.2 Bringing VDS Up and Loading the RV20 Diagnostics

Begin the test session by booting the diagnostic supervisor. Entry into the diagnostic supervisor is indicated by the DS> prompt.

Load the RV20 diagnostics with the following command and press the Return key (<CR>).

```
DS> LOAD EVRVA <CR>
DS>
```

When the diagnostics are loaded, the DS> prompt comes up.

3.4.1.3 ATTACH and SELECT

The ATTACH command is used to specify a device on the system under test. A device cannot be accessed by VDS unless it has first been ATTACHed.

Before the RV20 can be tested, its device type, location, and characteristics must be ATTACHed. The subsystem is connected to the drive subsystem controller in the master RV20. The master connects to the KLESI-B adapter in the host, which is connected to the processor. The complete path from processor to device must be established with two ATTACH sequences before testing can begin.

To ATTACH the subsystem using the standard ATTACH sequence for all VDS diagnostic packages, use the following command.

```
ATTACH DEVICE_TYPE DEVICE_LINK DEVICE_NAME BI NODE #
```

The ATTACH sequence can be entered on one line or, you will be prompted for each parameter in the command.

```
DS> ATTACH DWBLA HUB BLA0 4 <CR>
DS>
```

or

```
DS> ATTACH <CR>
Device Type? DWBLA <CR>
Device Link? HUB <CR>
Device Name? BLA0 <CR>
BI Node # (Hex)? 4
DS>
```

The first ATTACH sequence is successful when the DS> prompt reappears without any error messages. The next ATTACH sequence has the following format.

```
ATTACH DEVICE_TYPE DEVICE_NAME DEVICE CSR_ADDRESS VECTOR BR
```

Because the subsystem has been ATTACHed with the first ATTACH command string, the supervisor now recognizes the DEVICE_TYPE as RV20. The DEVICE is the logical name of the controller (MUXX). Further, you must know the CSR and vector addresses as well as the BR level.

Here is an example of the second ATTACH sequence. Remember, the addresses are probably different for your subsystem.

```
DS> ATTACH RV20 BLA0 MUA0 774500 300 5 <CR>
DS>
```

The second ATTACH sequence is successful when the DS> prompt reappears without any error messages.

The next step is to SELECT the drive subsystem controller.

```
DS> SELECT MUA0 <CR>
DS>
```

3.4.1.4 Running the Tests

When the controller is SELECTed, you may SELECT and SET the test parameters you want to use in this testing session.

The tests only run on drives that have disks installed and spinning. (This is the case if the Ready indicator, located on the drive's Start/Stop switch, is on.) When a set of tests is running on a multidrive subsystem, a test runs on each drive before the next test is performed.

Caution

Never use customer media when doing tests. Use a scratch disk or a dedicated test disk.

The following commands are used in VDS to run the functional tests.

The complete functional test set is the default testing mode. To run the complete functional test set (tests 1 through 19), type START with no qualifiers.

```
DS> START <CR>
```

To run a specific functional test, type START followed by the test number. For example, to run test 10, type the following.

```
DS> START/TEST=10:10 <CR>
```

To run a series of tests in sequence, type the starting and the ending test numbers in the test number field of the string. For example, to run tests 6 through 15, type the following.

```
DS> START/TEST=06:15 <CR>
```

SHOW TESTS lists all the RV20 tests. The functional tests are listed in Table 3-1. Table 3-1 also gives the duration (per drive in the subsystem) of each test.

SET TRACE traces the test and output status of each test as it runs.

Table 3–1: Level III Functional Tests

Number	Name	Duration
1	Register Existence	1-4 seconds
2	Power-Up Initialization	1-4 seconds
3	Steps 1-4 Initialization	1-4 seconds
4	Diagnostic SA Wrap	1-4 seconds
5	Vector and BR Level	1-4 seconds
6	Purge and Poll Test	1-4 seconds
7	Small Ring Buffer Initialization	1-4 seconds
8	Large Ring Buffer Initialization	1-4 seconds
9	Get DUST Status	1-4 seconds
10	CPU/Server Bus Data Test	1-4 seconds
11	Internal Drive Microdiagnostic Test	4 minutes per drive
12	Drive Spin-up Test	1 minute per drive
13	Drive Spin-down Test	1 minute per drive
14	Illegal Command and Function Test	1 minute per drive
15	Basic Seek Test	2 minutes per drive
16	Serpentine/Pump Seek Test	4 minutes per drive
17	Basic Read Test	2 minutes per drive
18	Basic Write Test	2 minutes per drive
19	CPU/Drive Bus Data Test	1 minute per drive

3.4.1.5 Error Reporting

When an error is detected, the diagnostic calls out one of the following failed items.

- an RV20 drive
- the communication path to the host (KLESI adapter, the drive subsystem controller, or LESI cable from subsystem to host)

When the RV20 drive is called out as a replaceable item, specific tests can be run on the RV20 in error. The procedures for running off-line tests on a specific RV20 drive are given in Chapter 3 of the *RV20 Optical Disk Subsystem Service Guide* (EK-ORV20-SV).

3.4.2 Running Level III Tests Under MDM

On the MicroVAX, the Level III diagnostics are run through the MicroVAX Diagnostic Monitor (MDM). MDM can only be run in standalone mode. The system must be taken off-line in order to run MDM.

3.4.2.1 Equipment

To run the RV20 diagnostics under MDM, you need the version of MDM that contains the RV20 diagnostics.

You must also use a diagnostic test disk to test drives. A test disk can be created with utility test 13. (Refer to Paragraph 3.5.) Never use customer media to do Level III testing. Make sure that the drive to be tested has a test disk installed and the Start/Stop switch is pressed in.

3.4.2.2 Bringing MDM Up

To start the tests, you must first boot MDM. Once MDM is booted, a disclaimer screen appears.

Input the date and time at the disclaimer screen. The display echoes the date and time you typed in and then asks if you want to enter menu mode.

Enter menu mode by typing 1 and pressing the Return key. The main menu appears. At the main menu, choose option 4 to display the service menu.

At the service menu, you have a number of options. If you choose option 1, the basic testing parameters currently SELECTed will be displayed. You may SET new parameters at this screen.

If you choose option 2, you will run the Service mode tests. These tests perform write operations on the diagnostic test disk. If you wish to run the Service mode tests without overwriting data on the diagnostic test disk, press in the Write Protect switch on the front panel of the RV20 being tested. Another way to write protect the diagnostic test disk is to slide the Write Protect tab on the disk to the WRITE PROTECT position.

Option 4 takes you out of Menu mode and brings you into Line mode, where you will be at the MDM> prompt. Refer to Paragraph 3.4.2.3, Running the Tests, for instructions on running tests in Line mode.

Option 3 brings you to the device menu, where you can select an RV20 controller from the devices available on the system. When an RV20 controller has been selected, you can run specific tests and series of tests.

3.4.2.3 Running the Tests

In Line mode, once the RV20 subsystem is SELECTed, you may SELECT and SET the test parameters you want to use in this testing session.

The tests only run on drives that have disks installed and spinning. (This is the case if the Ready indicator, located on the drive's Start/Stop switch, is on.) When a set of tests is running on a multidrive subsystem, a test runs on each drive before the next test is performed.

Caution

Never use customer media when doing tests. Use a scratch disk or a dedicated test disk.

There are 19 functional tests. Table 3-1 lists the tests and their durations. The following commands are used in MDM to run the functional tests.

SET DETAILED ON causes a detailed error report to be displayed whenever a test fails.

SET SECTION FUNCTIONAL enables only the functional tests (tests 1 through 19) in the specific mode. When the START command is issued in Verify mode, tests 1 to 11 run. When the START command is issued in Service mode, tests 12 to 19 run.

SET MODE VERIFY selects Verify mode (tests 1 to 11). These tests take four to five minutes (per drive) to run.

SET MODE SERVICE selects Service mode (tests 1 through 19). These tests take 20 to 25 minutes (per drive) to run.

SELECT PROGRESS BRIEF enables brief progress reports to display during the testing session. If you run a test 10 times, a message is displayed after the tenth pass of the test.

SET TEST NN selects a specific test. SET TEST 2 runs test 2. SET TEST 2-4 runs tests 2, 3, and 4. SET TEST 2,4-6,8 runs tests 2, 4, 5, 6, and 8.

SET PASSES NN selects the number of times a specific test runs. SET PASSES 10 runs each test that is set to run 10 times.

SHOW DEFAULT shows the current selected testing parameters.

3.4.2.4 Error Reporting

When an error is detected, the diagnostic calls out one of the failed items.

- an RV20 drive
- the communication path to the host (KLESI adapter, the drive subsystem controller, or LESI cable from subsystem to host)

When the RV20 drive is called out as a replaceable item, specific tests can be run on the RV20 in error. The procedures for running off-line tests on a specific RV20 drive are given in Chapter 3 of the *RV20 Optical Disk Subsystem Service Guide* (EK-ORV20-SV).

3.5 Creating a Dedicated Diagnostic Test Disk

You should use dedicated diagnostic test disks when verifying the installation of a subsystem with Level III testing.

Utility test 32 (utility test 13 in MDM) is called Initialize Diagnostic Test Disk. It creates a diagnostic test if there is a blank disk in the drive being tested.

Load a blank disk into the drive being tested and run utility test 32 (utility test 13 in MDM). You are prompted as to whether you want to create a dedicated diagnostic test disk. Typ YES and the diagnostic test disk is then created.

In MDM, type the following to run utility test 13.

```
MDM> SET SECTION UTILITY
MDM> SET TEST 13
MDM> START
```

In VDS, type the following to run utility test 32.

```
DS> START/SECTION:UTILITY/TEST=32:32
```

Chapter 4
Installing an RV20 Add-On Drive

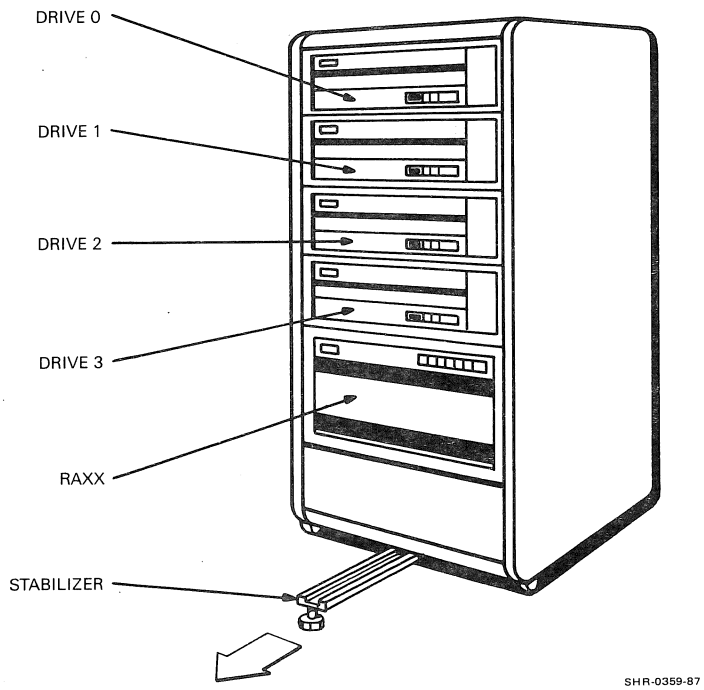
This chapter explains how to install and verify an RV20 add-on in an existing subsystem.

4.1 Overview

A typical add-on installation adds a slave RV20 (PN RV20-B) to an existing subsystem. However, this is not the only add-on configuration. For example, the RV20 you are adding on may be an RV20 master drive (PN RV20-A) that is being installed into an available slot in a customer's RV20 cabinet (H9643). Whatever the configuration, there can be no more than three RV20 add-ons in an H9643 cabinet (Figure 4-1).

More parts are needed when you add on a master RV20 (the KLESI adapter for the host, the LESI cable, an additional terminator assembly, and so on) than when you add on a slave. Therefore, it is very important that you know exactly how the add-on you are installing will sit relative to the present subsystem before attempting any installation. Check with the customer after unpacking and inspecting your add-on carton to make sure the add-on configuration you are installing is what the customer wants.

Figure 4–1: H9643 Cabinet



Installation of an RV20 add-on involves the following. Wherever possible, previous sections of this book are referenced.

- Unpacking and inspecting the add-on carton
- Installing RV20 in the H9643 cabinet
- Assigning a CM number and a TMSCP unit number to the drive
- Verifying the installation through testing

Warning

An RV20 drive weighs 55 lb. Digital safety standards require that two people install the RV20.

4.2 Unpacking and Inspecting

Unpack the add-on carton and inspect the contents. Make sure that you have the right parts for your add-on configuration. Make sure that all parts are included and are undamaged. Table 4–1 is an inventory list for an add-on carton.

Table 4–1: Add-On Carton Contents

Item	Part Number	Quantity
RV20 drive	Master drive: RV20-A Slave drive: RV20-B	1
KLESI adapter module	KLESI-B: T1014 KLESI-Q: M7740	1 per master drive (not included with slave add-on)
KLESI interface cable	BC17Y-20	1 per master drive (not included with slave add-on)
ISI internal cable	29-26800-00	1 per slave drive (not included with master add-on)
ISI terminator assembly	29-26458-00	2 per master add-on (RV20-A) 1 per slave add-on (RV20-B)
Slide assembly	–	2
Slide brackets	–	4 (2 per slide)
ESD brackets	70-23519	2
TMSCP unit number labels	36-18940-01	1 sheet
Package of CM number switch caps	–	1 bag (containing 4 switch caps)
Mounting hardware	–	1 bag

4.3 INSTALLATION

The instructions for installing an add-on drive in the H9643 cabinet are set up in the following order.

- System preparation (Paragraph 4.3.1)
- Assembling the two slide assemblies (Paragraph 4.3.2)
- Securing the drive to the slides (Paragraph 4.3.3)
- Installing the ESD brackets (Paragraph 4.3.4)
- Using shims (Paragraph 4.3.5)
- Cabling the drive and the subsystem (Paragraph 4.3.6)
- Assigning a CM number to the drive (Paragraph 4.3.7)
- Assigning a TMSCP unit number to the drive (Paragraph 4.3.8)
- Verifying the installation with host testing (Paragraph 4.3.8)

4.3.1 System Preparation

1. Gain access to the rear of the H9643 cabinet by removing the rear door (and the ground strap).
2. Make sure all drives in the cabinet are powered down and that the power switch on the power controller (on the bottom of the cabinet) is OFF.
3. Pull out and secure the H9643 stabilizer leg (Figure 4-1).

4.3.2 Assembling and Mounting the Two Slide Assemblies

Each slide assembly includes the following.

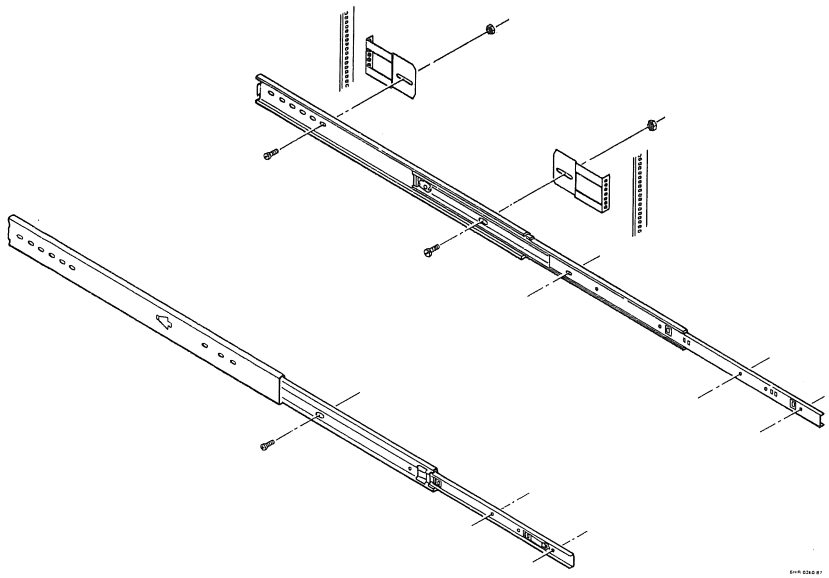
- Two brackets and six (three per bracket) screws for mounting the slide to the cabinet
- A slide and three philips screws for mounting the slide to the RV20 drive

1. Using Figure 4-2 as a guide, attach each slide to its two brackets. Do not completely tighten the screws that secure the slides to the brackets.

Note

Place mounting screws through holes exactly as shown.

Figure 4–2: Securing the Slides



2. Now mount the slide assembly to the vertical uprights in the H9643 cabinet. First, determine the correct H9643 mounting holes. Different holes are used for different RV20 drive positions (second, third or fourth spaces from the top). Figure 4-3 shows the correct holes to use for each drive position.

   a. Select a vertical upright. Start from the bottom and count up to the appropriate hole (50, 41, 32).

   b. Secure each pair of slide brackets to the vertical uprights. Use three philips screws. (Refer to Figure 4-2.) Do not completely tighten the screws yet!

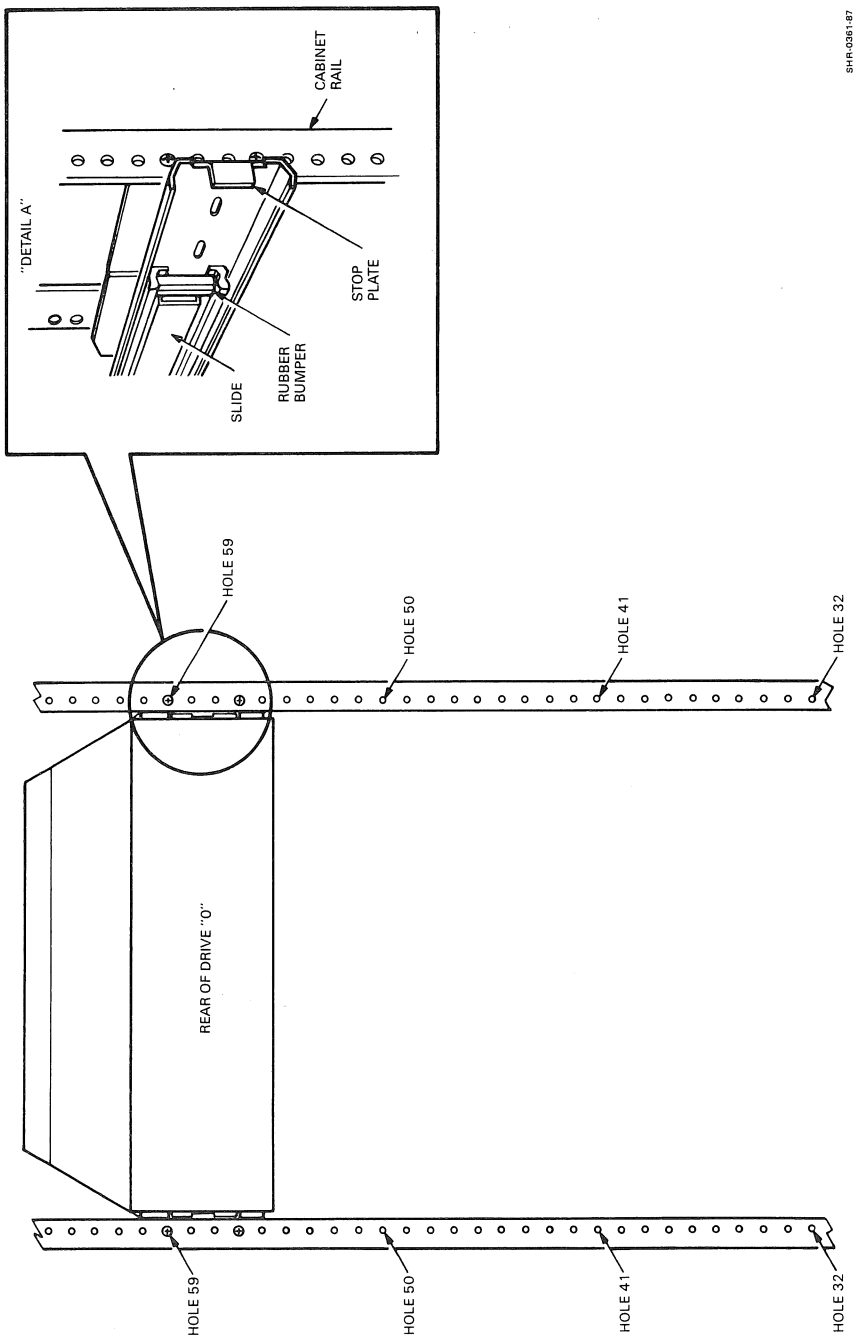


Figure 4–3: Mounting Holes

4.3.3 Securing the Drive to the Mounted Slides

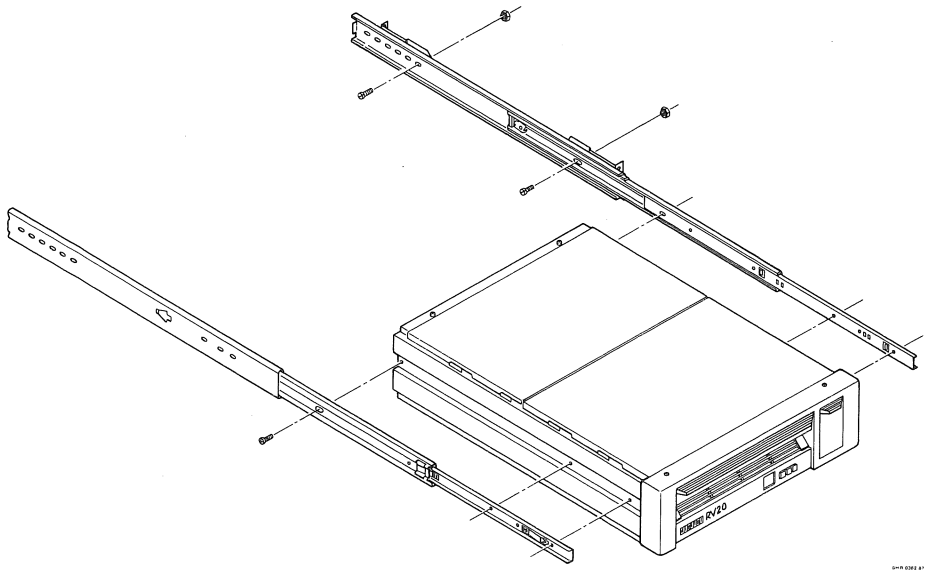
The next step is to mount the RV20 add-on drive to the slide assembly.

Warning

An RV20 drive weighs 55 lb. Digital safety standards require that two people install the RV20.

1. Extend each slide out as far as it will go.
2. Carefully mount the RV20 drive on the extended slide assembly. Using three philips screws per slide, secure the drive between the slides (Figure 4–4).
3. As you press the slide's service clips, push the drive into the cabinet.
4. Make sure the slide's rubber bumper touches the slide's stop plate at the rear. If it does not touch, move the stop plate toward the rubber bumper (Figure 4-3).
5. Once the stop plate meets the rubber bumper, extend the drive. Tighten the slide's mounting screws in the brackets.

Figure 4–4: Mounting the Drive to the Slides

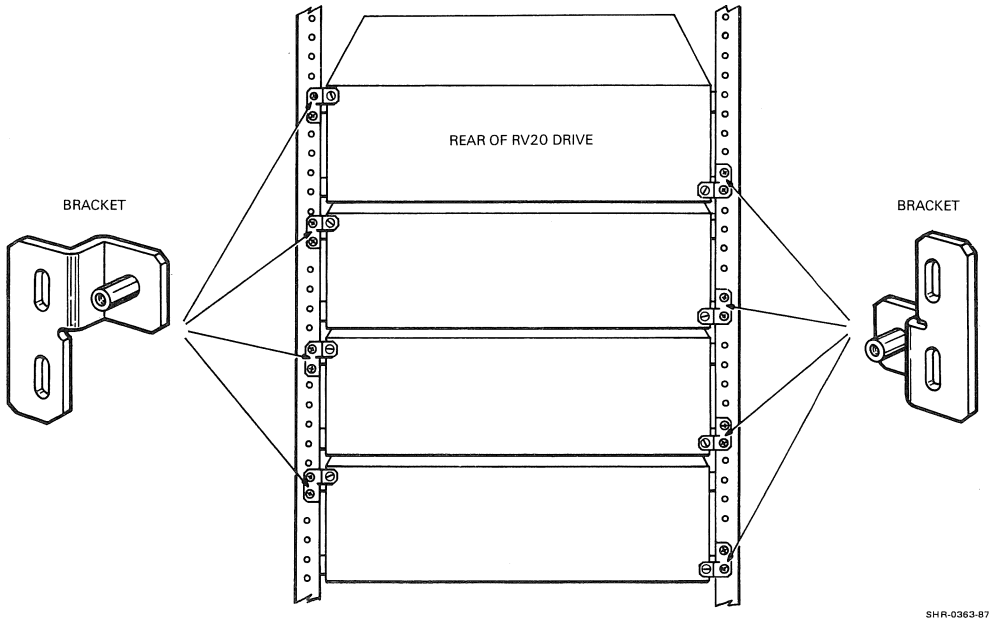


4.3.4 Installing the ESD Brackets

Install the ESD brackets for the drive. Each drive uses two ESD brackets. The brackets are mounted on different holes on either side.

1. Using Figure 4–5 as a guide, install the left ESD bracket in the correct hole. Make sure the bracket is oriented properly. Do not completely tighten the mounting screws.
2. Using Figure 4–5 as a guide, install the right ESD bracket in the correct hole. Make sure the bracket is oriented properly. Do not completely tighten the mounting screws.

Figure 4–5: ESD Bracket Installation

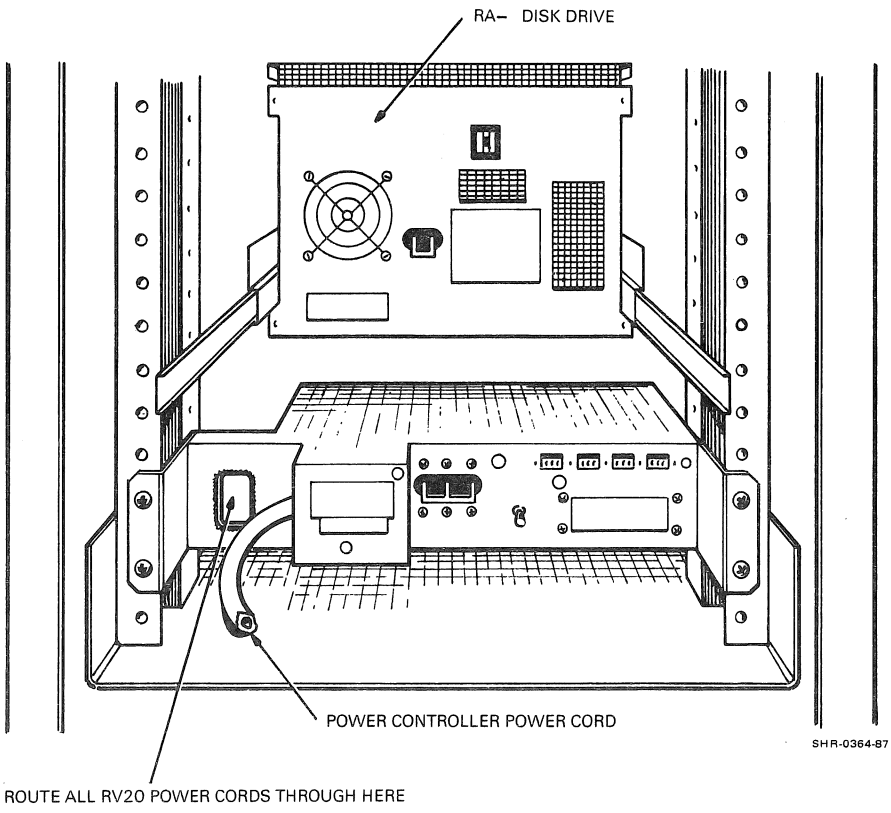


4.3.5 Cabling

Now cable the drive power cord to the power controller and also cable the subsystem.

1. If there is an RA- series disk drive in the cabinet, it has to be pushed out to access the rear of the 874-E power controller.
2. Route the power cord for the RV20 to the rear of the power controller (Figure 4–6).
3. Connect the cord to an available outlet on the power controller.
4. The subsystem cabling must be done next. The cabling depends on the configuration of the subsystem and also on whether you are installing an RV20-A (master drive) or an RV20-B (slave drive). Refer to Paragraph 2.5, Cabling the RV20 Subsystem.

Figure 4–6: Connecting to the Power Controller



4.3.6 Assigning a CM Number to the Drive

A CM number is now assigned to the drive. The CM number is independent of the TMSCP unit number. The CM number is an internal number used by the drive and has no impact on drive operation. The restrictions for CM numbers follow.

- The only valid CM numbers are 0, 1, 2, and 3.
- A drive must have a CM number that is unique to its subsystem (no two drives in a subsystem can have the same CM numbers).

The following guidelines should also be followed when assigning CM numbers.

- A master RV20 is always CM 0.
- The first RV20 slave in a subsystem (the drive that is daisy-chained from the master) is always CM 1.
- The second RV20 slave in a subsystem (the drive that is daisy-chained from the first slave) is always CM 2.
- The third RV20 slave in a subsystem (the drive that is daisy-chained from the second slave) is always CM 3.

To assign a CM number, select the correct switch cap from the package of switch caps and insert the cap into the available position on the RV20 front panel (the open portion next to the Start/Stop switch.

4.3.7 Completing the Installation

1. If you are installing an RV20-A (a master RV20), then at this point you must install the KLESI adapter in the host. Instructions for installing the KLESI adapter are given in Chapter 2 of this manual (Paragraphs 2.2, 2.3, and 2.4).
2. The drive must be assigned a unique TMSCP unit number. Instructions for assigning the TMSCP unit number are given in Paragraph 2.7.
3. Run tests to verify the installation.
   a. Power up/self-test the drive (Chapter 3) to verify that the drive is operational.
   b. Run Level III tests (Chapter 3) to verify that the drive is a working device on the system.
4. When the drive has been verified as operational and as a working device on the system, the installation is complete. Make sure that all drives in the subsystem are powered up and ready for use by the customer (not in CE mode).
5. Replace the rear door of the H9643 cabinet. Do not forget to connect the ground strap.

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