DHT80 Option
Installation Manual

Order Number EK–DECDT–IN–001

Digital Equipment Corporation
Maynard, Massachusetts

First Printing, September 1991

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This document was prepared using VAX DOCUMENT, Version 1.2.

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Preface

This manual provides information for Digital service representatives on installing the DHT80 Asynchronous Communications option. This manual also provides customers and Digital service representatives with information on DHT80 diagnostics.

NOTE: *The DHT80 option must be installed and serviced by Digital service personnel or qualified self-maintenance customers only.*

- Chapter 1 is an introduction to the DHT80 option.
- Chapter 2 describes the installation procedures for the DHT80 option.
- Chapter 3 describes the testing of the DHT80 option.
- Appendix A lists field-replaceable units of the DHT80 and their part numbers.

Conventions

The following typeface and character conventions are used in this manual:

Convention	Meaning
Return	A key name is shown enclosed to indicate that you press a named key on the keyboard.
Ctrl/x	A sequence such as Ctrl/x indicates that you must hold down the key labeled Ctrl while you press another key.
bold	Boldface type indicates user input. For example: >> **boot**
NOTE	Notes provide general information about the current topic.
CAUTION	Cautions provide information to prevent damage to equipment or software. Read these carefully.
WARNING	Warnings provide information to prevent personal injury. Read these carefully.

Chapter 1
Introduction to the DHT80 Option

The DHT80 option adds eight asynchronous lines to the four asynchronous lines in the DECsystem 5100. Seven of these additional lines are DEC–423 and have MMJ–type connectors. One RS–232 connector is mounted remotely to the back of the system enclosure. This port offers full modem control.

The DHT80 may be factory-installed (DHT80–AA) or field-installed (DHT80–AF). This guide provides instruction for field-installation of the DHT80 option and other information.

CAUTION: *Use grounding mat or wriststrap to protect against damage caused by electrostatic discharge.*

Figure 1–1 shows the DHT80 option. Figure 1–2 shows the rear view of a DECsystem 5100 that has a DHT80 option installed.

Figure 1–1: DHT80 Option

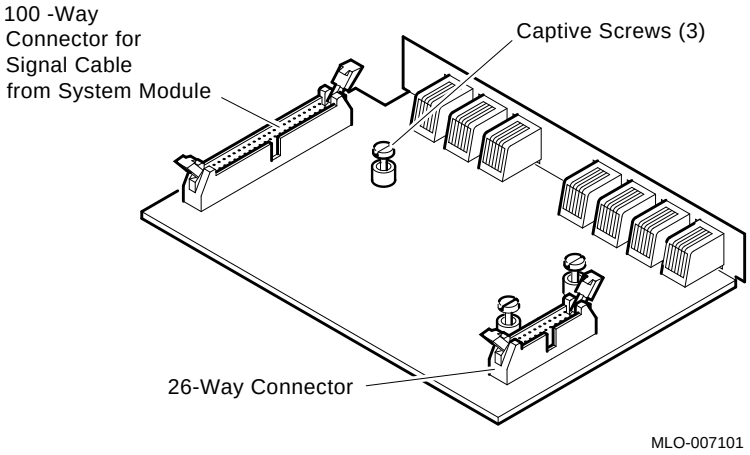
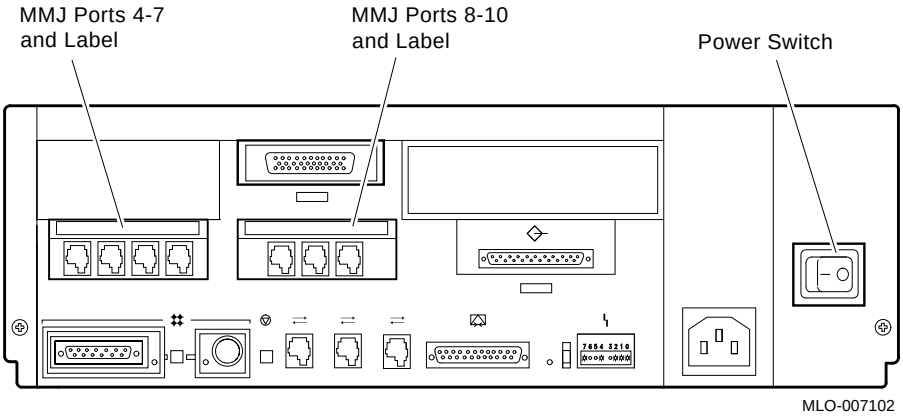


Figure 1–2: DECsystem 5100 with DHT80 Option Installed



Chapter 2
Installing the DHT80 Option

NOTE: *Installation is to be done only by Digital service representatives or by qualified self-maintenance personnel.*

The sequence for installing the DHT80 option depends on whether any other option is already installed in the DECsystem 5100. If so, it must be removed and the DHT80 option mounted in its place. The installation procedure that follows assumes that no other option is present when the DHT80 is installed. The following are the steps covered in this chapter:

1. Shutting down the system and removing the DECsystem 5100 cover
2. Removing the blank cover plates (if present)
3. Removing the upper and lower drive shelves
4. Adding standoffs and the 100-way cable
5. Installing the DHT80 option
6. Reconnecting cables, drive shelves, and tightening cover
7. Replacing the DHT80 option

2.1 Shutting Down the System and Removing the DECsystem 5100 Cover

1. Perform an orderly system shutdown of the ULTRIX operating system from the console. Assure there are no system problems with the command

   ```
   >>test 0x0
   ```

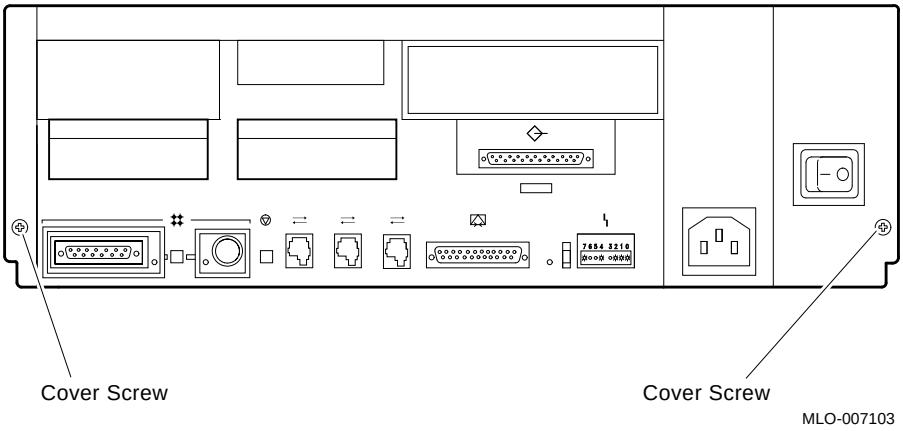
   Reference the *DECsystem 5100 Maintenance* guide for further information.

2. Set the Power switch to off (0) on the DECsystem 5100 and all expansion enclosures that are connected to it.

3. Mark and disconnect all cables to the DECsystem 5100.

4. Loosen the two Phillips screws holding the cover. (See Figure 2–1.) From the rear of the DECsystem 5100, slide the cover forward and lift it away from the system.

Figure 2–1: Cover Screw Locations

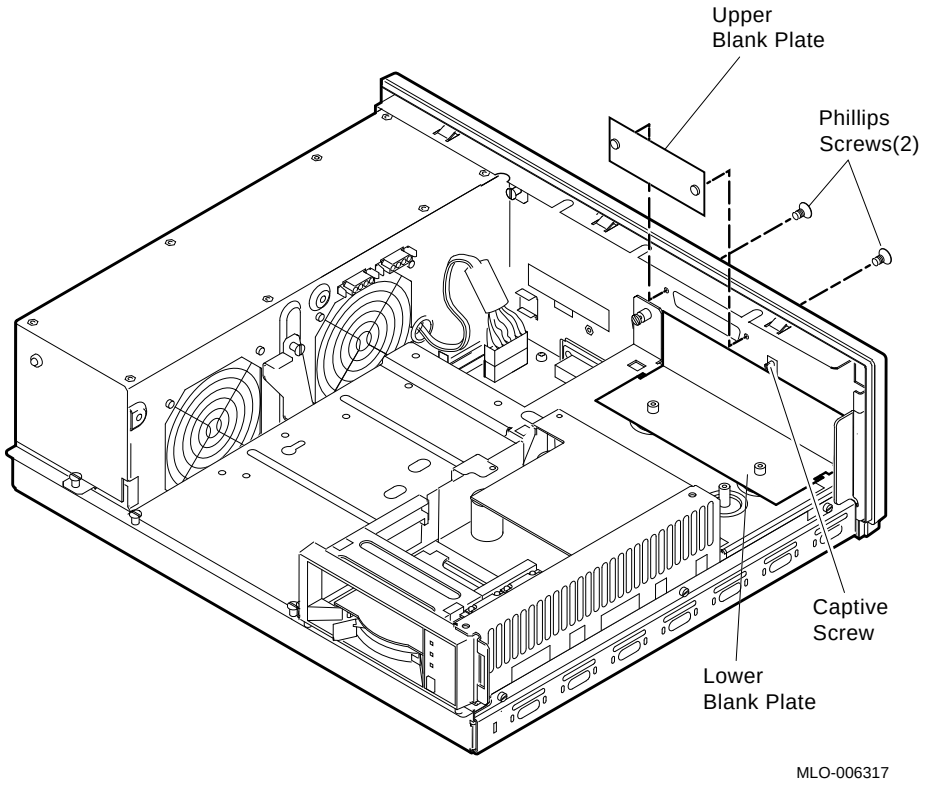


2.2 Removing Blank Cover Plates

If the system has no other option installed, then it has blank cover plates. Remove the plates as shown in Figure 2–2.

1. Remove the two Phillips screws on the upper blank plate (74–38986–01), and remove the upper blank plate, as shown in Figure 2–2. Save the screws.
2. Loosen the captive screw on the lower blank plate (74–41590–01) and remove.

Figure 2–2: Removing Blank Cover Plates

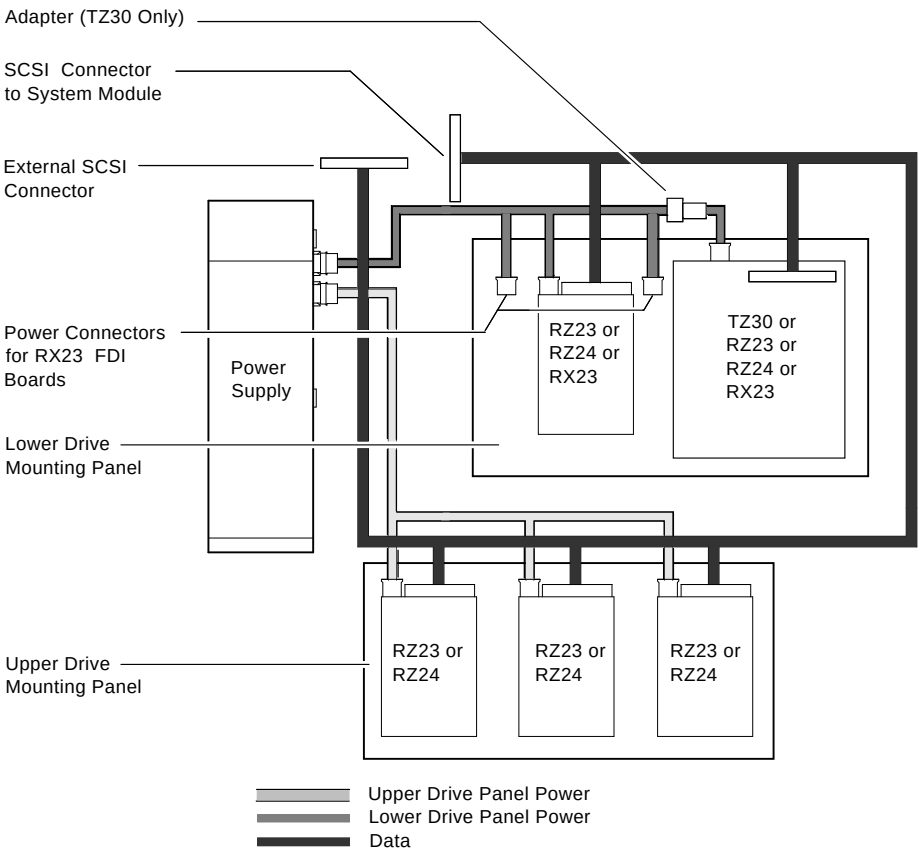


2.3 Removing Upper and Lower Drive Shelves

Removal of upper and lower drive shelves is detailed below.

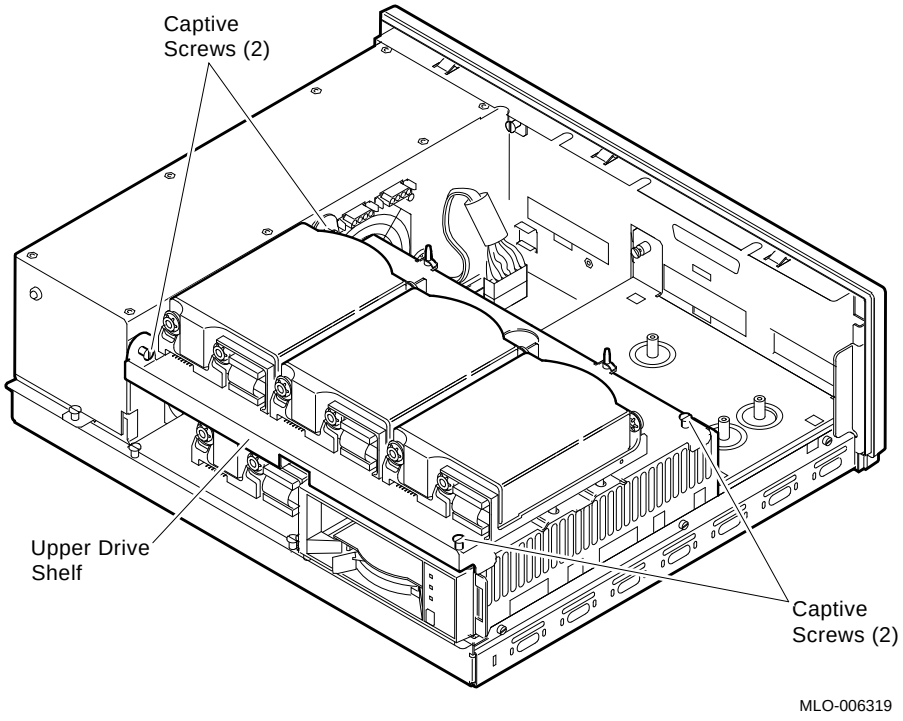
1. Note the position of the mass storage drives on the upper drive shelf, and mark the cables accordingly. Disconnect the power cables and SCSI bus cable(s) from the drives on the upper drive shelf. (See Figure 2–3 for a symbolic wiring diagram.)

Figure 2–3: Wiring Diagram of Upper Drive Shelf



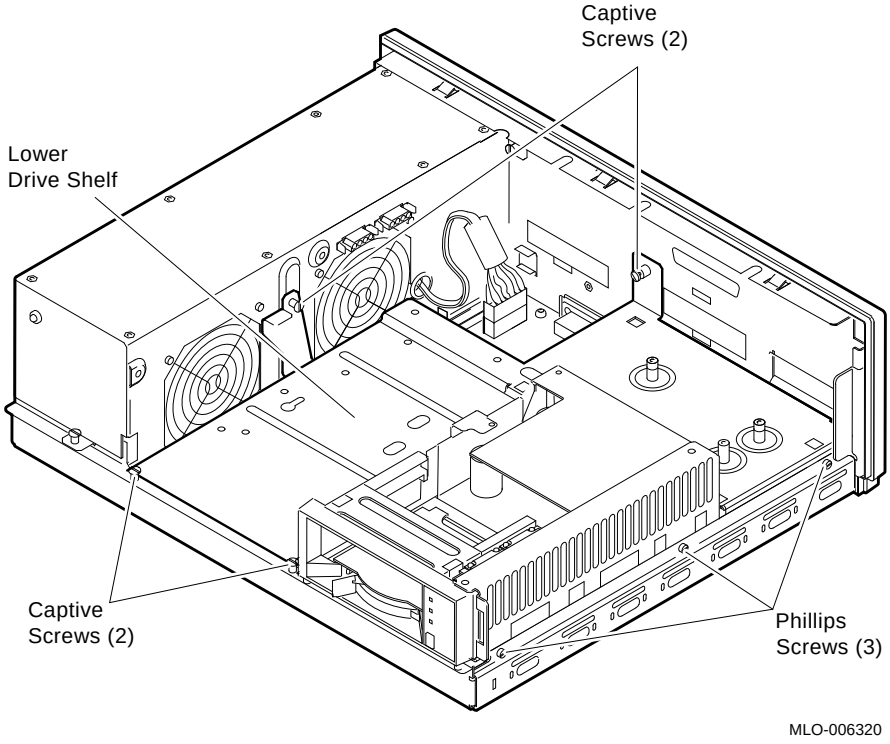
2. Loosen the four captive screws on the upper drive shelf. (See Figure 2–4.)
3. Lift the upper drive shelf away from the lower drive shelf and gently set it aside.
4. Mark and disconnect the SCSI cable(s) and the power cable connected to the drives on the lower drive shelf. (See Figure 2–3.)

Figure 2–4: Removing Upper Drive Shelf



5. Loosen the four captive screws and remove the three Phillips screws and store safely. (See Figure 2–5.)
6. Slide the lower drive shelf toward you and lift it from the unit.

Figure 2–5: Removing Lower Drive Shelf



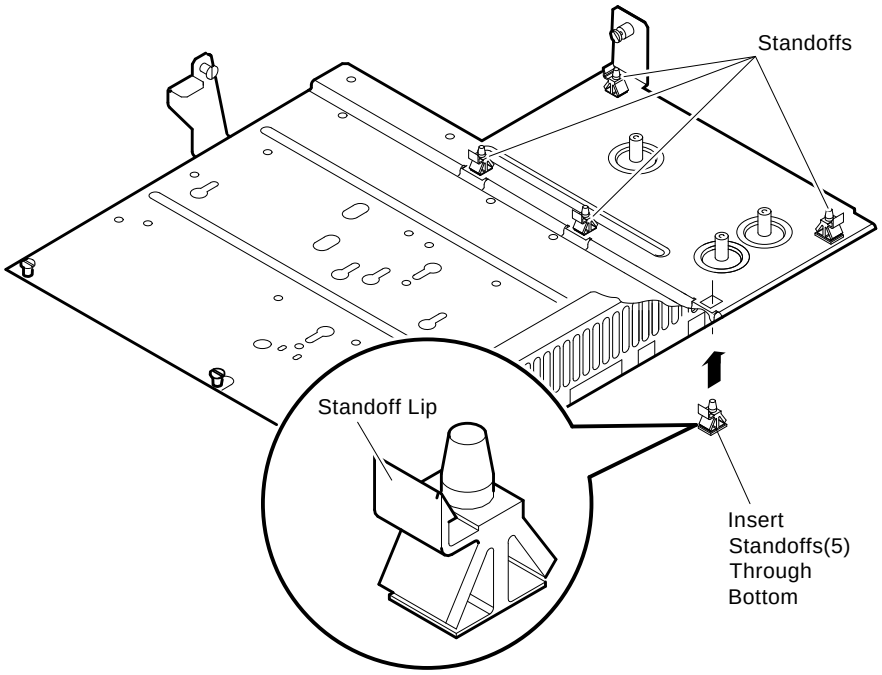
2.4 Adding Standoffs and 100-Way Cable

NOTE: *If another option was present, go to Section 2.5.*

After removing the upper and lower drive shelves, add standoffs to the lower drive mounting panel as follows:

1. Through the bottom of the lower drive mounting panel, snap in five standoffs shown in Figure 2–6. The lip of each standoff is to face the outside edge of the DHT80 module.

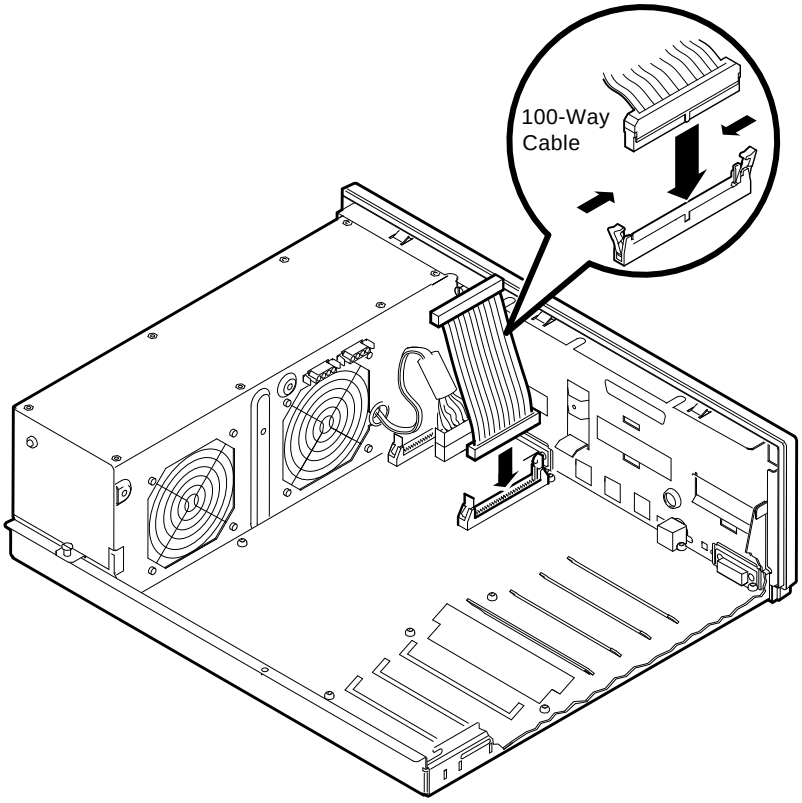
Figure 2–6: Inserting Five Standoffs on Lower Drive Shelf



2. Connect the 100-way ribbon cable (17–02295–02) to the system board, as shown in Figure 2–7. Make sure the cable connector key is fitted to the slot on the system board connector.
3. Push until the cable connector locks into place.

CAUTION: *Failure to fit the key of the ribbon cable connector into the slot on the system connector can later cause damage to the components.*

Figure 2–7: Connecting 100-Way Connector to System Board

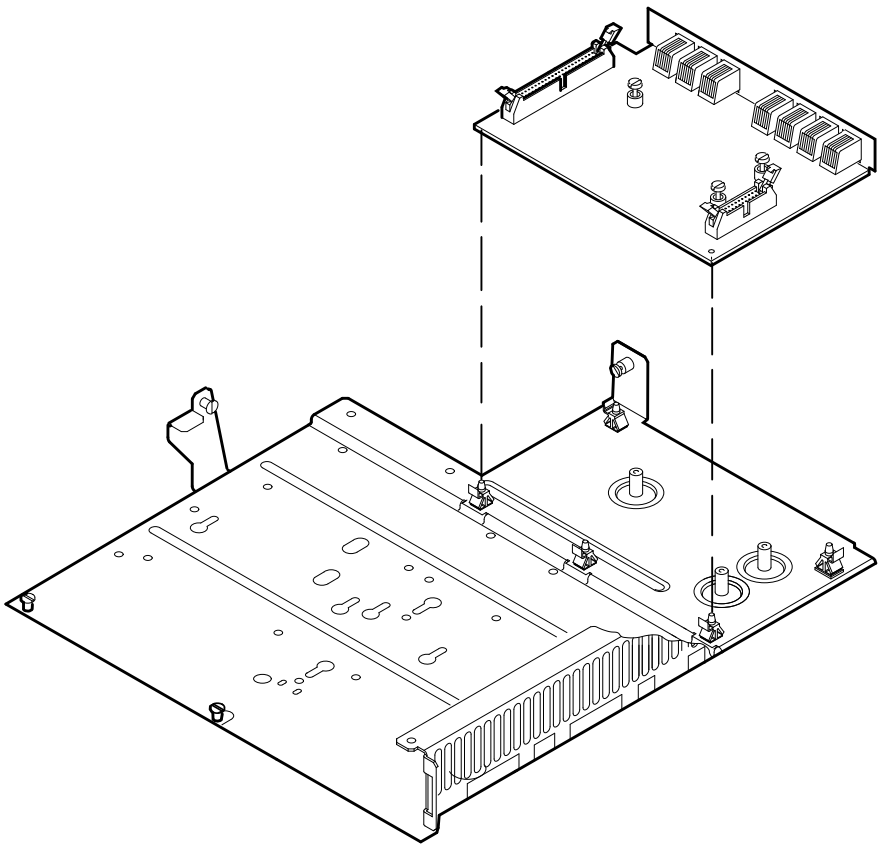


2.5 Installing the DHT80 Option

Install the DHT80 option on the lower drive shelf as follows:

1. Snap the DHT80 module onto the five standoffs and secure with the three captive screws mounted on the DHT80 option. (See Figure 2–8.)

Figure 2–8: Snapping DHT80 into Place



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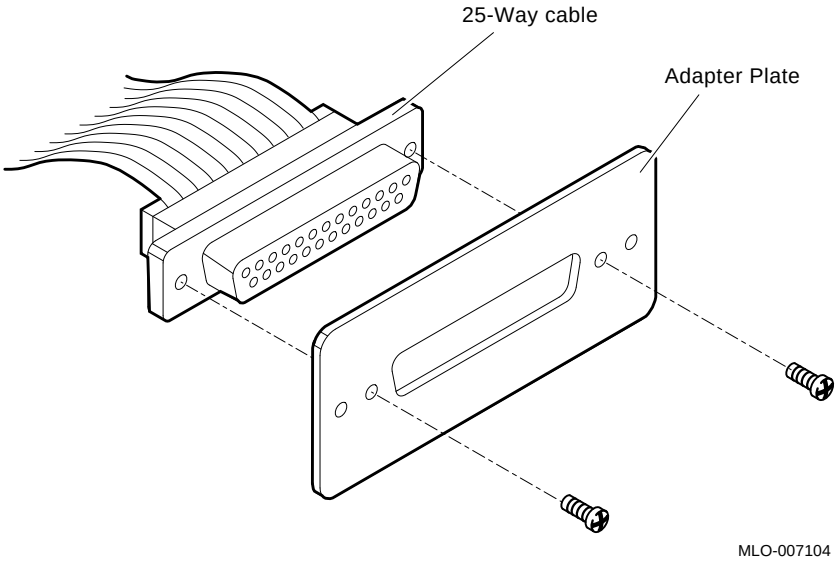
2. Reinstall the lower drive shelf. Push back on the shelf and align the screws. Tighten the screws after all are started.

3. Fit the end of the modem cable (17–02908–01, with the 25-pin D-sub connector) through the cutout on the adapter plate (17–41591–01). Use the two hex screws (90–08451–12) to hold the cable onto the adapter plate. (See Figure 2–9.)

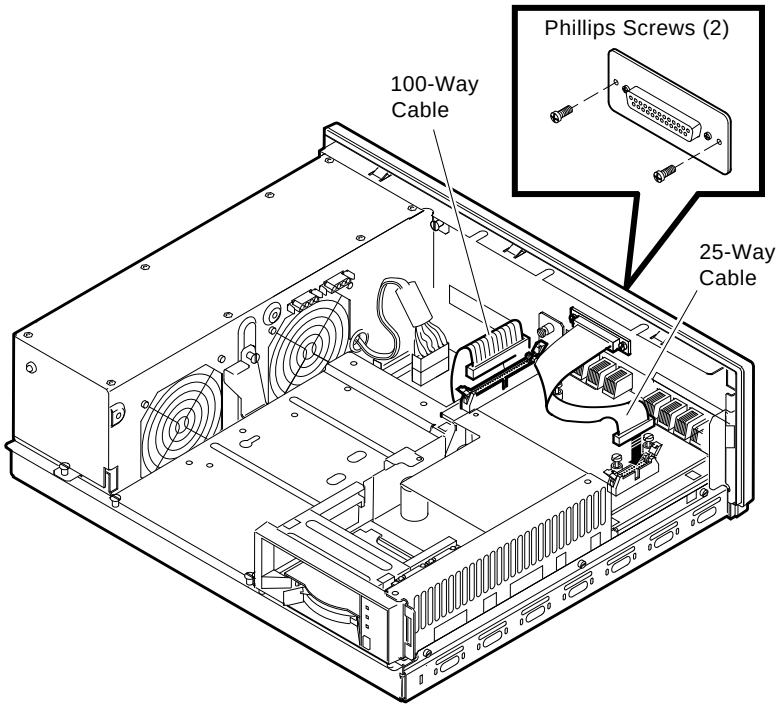
Figure 2–9: Attaching Modem Cable to Adapter Plate



4. Mount the modem connector assembly to the rear of the system using the screws saved from removing the blank plate. The adapter plate is then mounted where the upper blank plate used to be. (See Figure 2–10.)

5. Connect the other end of the modem assembly cable to the small keyed connector on the DHT80 module. See Figure 2–10.
6. Insert the other end of the 100-way cable in the DHT80, as shown in Figure 2–10, and push until it locks in place.

Figure 2–10: Connecting the Modem Cable and Port



2.6 Reconnecting Cables, Drive Shelves, and Tightening Cover

1. Reconnect the SCSI cables and power cable connected to the drives on the lower drive shelf, following the markings you made on the cables earlier. Reverse steps 5 and 6 in Section 2.3.
2. Slide the upper drive shelf over the lower drive shelf, and tighten the four captive screws.
3. Reconnect the SCSI cables and power cable connected to the drives on the upper drive shelf, following the markings you made on the cables earlier.
4. Slide the DECsystem 5100 cover back on, and tighten the two Phillips cover screws.
5. Reconnect all cables to the DECsystem 5100, following the markings you made on the cables earlier.
6. If necessary, add the MMJ labels shown in Figure 1–2.

2.7 Replacing the DHT80 Option

If after testing the option, or when replacing the option for any reason, you need to take the DHT80 option out of the system, use the following procedure:

1. Follow the steps in Section 2.1.
2. Disconnect the two connectors to the DHT80 module that is being removed.
3. Loosen and remove the three Phillips screws holding the module to the lower drive tray.
4. Remove the DHT80 module. The standoffs remain in place to be used again.
5. Follow the steps in Section 2.5 to install the replacement module. Step 2 is unnecessary since the lower drive shelf is already in place.
6. Follow steps 4 and 5 in Section 2.6.

Chapter 3
Testing the DHT80 Option

NOTE: *Troubleshooting and module replacement is to be done only by Digital service representatives or by qualified self-maintenance personnel.*

To ready the system for booting, you must turn it on, connect the DECsystem 5100 to a terminal via port 3. At power-up, the terminal displays a countdown and begins the self-test.

3.1 Diagnose by Checking the iooption

Enter the command `printenv` to see if the iooption is equal to 1. If the iooption does not=1, enter

```
>>setenv iooption 1
```

Until this is done, the DHT80 will not be recognized by the system. Once done, the system will remember the setting. If the system module is changed, this step must be done again. The following example shows the iooption equal to 1:

```
>>printenv
bootp=
bootmode=*
console=0
scsiid=7
baud0=9600
systype=0x820c0401
inetaddr=0
baud=9600
baud2=9600
baud3=9600
bitmap=0xa07ff800
bitmapen=0x200
iooption=0x1
```

3.2 Verifying That the System Sees the DHT80

Enter `conf -f` to verify that the system can see the DHT80 and other installed devices. The following is an example of the output, showing that the system recognizes the DHT80:

```
>>conf -f
hardware: revision 1
firmware: revision 4
cpu: revision 2.32
fpu: revision 3.32
security switch: secure mode
password: clear
eeprom: valid
ethernet hardre address: 08-00-2b-19-28-1d
option board: DHT80 - Async Comm, 8 ports
memory: total size   8MBs
    bank0   4 MB    SIMMS  size   8MBs       0 bad pages
scsi peripherals
    unit type    product              removable/fixed     capacity

    0    disk    RZ24     (C) DEC     fixed               200 MBs
    3    disk    RZ24     (C) DEC     fixed               200 MBs
    5    tape    TZK10        removable
```

If the system does *not* recognize the DHT80 option, perform Section 3.1 again.

3.3 Testing the DHT80 Internal Mode

Test the DHT80 internal mode by entering the command

```
>>test -v 0x5
```

All the lines in the system will be tested. The first four lines are on the system module.

3.4 Testing the DHT80 External Mode

Test the DHT80 external mode by using the H3103 (12–25083–01) loopbacks on the MMJ ports and the RS232 loopbacks (H3248) for the modem port. In testing the DHT80, you will also see the system ports on the list. Use the following table to determine the MMJ line number.

Refer to Table 3–1 and the example that follows to select and test the asynchronous lines. When you have successfully tested all the DHT80 lines, the system can be handed over to the customer.

Table 3–1: MMJ Connectors

Port Name on Bezel	Line Number	Module
MMJ 1	3	System
MMJ 2	1	System
MMJ 3	0	System
Modem	2	System
MMJ 4	10	DHT80
MMJ 5	9	DHT80
MMJ 6	8	DHT80
MMJ 7	11	DHT80
MMJ 8	7	DHT80
MMJ 9	5	DHT80
MMJ 10	4	DHT80
B2 Modem	6	DHT80

For example, to test MMJ 8 (line 7) in external mode, enter

```
>>test -v 0x5 1 7
```

The 1 selects external mode, the 7 selects the line number.

Remember to install a loopback on the MMJ number corresponding to the line number that you select (MMJ 8 in this example). The following shows a successful completion of the external tests on line 7 (MMJ 8).

```
>>test -v 0x5 1 7
-005-03 dz ln 07 ext rx/tx lpback tst
-005-03 dz ln 07 ext sngle ln silo tst
-005-03 dz ln 07 ext silo ovrflow tst
-005-03 dz ln 07 ext mul line silo tst
-005-03 dz ln 07 ext silo alarm tst
>>
```

Appendix A
FRUs and Cables for the DHT80 Option

Appendix A lists the the field-replaceable units of the DHT80 and their part numbers.

Table A–1: FRUs and Cables for the DHT80 Option

Part	Part Number
DHT80 option	54–20428–01
100-way cable	17–02295–02
Upper blank plate	74–38986–01
Lower blank plate	74–41590–01
Modem cable	17–02908–01
Adapter plate	17–41591–01
Hex screws	90–08451–12
H3103 loopback	12–25083–01
RS–232 loopback	00–H3248–00
Modem cable	BC22F-xx
Null modem, 6-wire	BC22-D-xx
Null modem, 10-wire	BC17D-xx
Label, MMJs 4, 5, 6, 7	36–33715–03
Label, MMJs 8, 9, 10	36–33716–01