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Networks . Communications

Communications Options Minireference Manual

Volume 5 **Ethernet Devices (Part 1)**

DIGITAL INTERNAL USE ONLY

Digital Equipment Corporation

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CHAPTER 1
INTRODUCTION

The Communications Options Minireference series of manuals provide Field Service personnel (trained in Digital Equipment Corporation's communications options, DEC modem products, and Ethernet products) with easy-to-use references that focus on essential installation and maintenance procedures.

This series of manuals is a replacement for and supersedes the *Communications Options Minireference Manual* (EK-CMINI-RM). All of the information contained in the *Communications Options Minireference Manual* is included. Information concerning most of Digital Equipment Corporation's new communication options, modem products, and Ethernet products has also been included. These manuals will be updated as new communications options, modem products, and Ethernet products are produced.

To effectively use these reference manuals and to quickly locate the desired information, it is important that the user be aware of the organization and content of the various manuals.

- Volume 1 contains generic communications information such as: cables, test connectors and terminators, special test programs, and special tools and equipment. Volume 1 also contains information concerning installation and maintenance of some of the communications options.
- Volume 2 contains only communications options. Communications options are presented in alphanumerical order beginning in Volume 1 and continuing into Volume 2.
- Volumes 3 and 4 contain information concerning Digital Equipment Corporation's modem products.
- Volumes 5, 6, and 7 contain information concerning installation and maintenance of Ethernet products. Chapters include Ethernet Devices, Cables, Special Tools and Test Equipment, Network Troubleshooting, and Ethernet Configuration. Provisions are made for adding information as it becomes available.

Option-specific data is located alphanumerically by option designation.

CHAPTER 2
ETHERNET DEVICES

2.1 INTRODUCTION

This chapter contains all information needed to configure, install, and test a variety of Digital Equipment Corporation's Ethernet devices.

The purpose of this chapter is to provide Field Service personnel (trained in servicing Ethernet devices) with a quick reference guide, highlighting important factors concerning installation and maintenance. The information contained in these sections is, therefore, short and to the point. If more detailed information is needed, reference should be made to microfiche, the technical manual, or other reference material concerning that particular device.

Each specific section contained in this chapter is organized in alphanumeric order.

DEBNA/DEBNK ETHERNET VAXBI CONTROLLER

General Description
The DEBNx model number describes a family of intelligent I/O controllers for the VAXBI bus.

- DEBNA is an IEEE 802.3-compatible, standard Ethernet interface for VAX 8000-series systems.
- DEBNK is identical to DEBNA, but has an on-board TK50 streaming tape-drive controller. DEBNK is an option for OEM applications.

DEBNA and DEBNK are both T1034 (410F) modules and the modules can be distinguished by their VAXBI device type (BIIC bb + 0).

Specific TK50 information for DEBNK and operational support for DEBNA can be found in the *VAX Systems and Options Catalog.*

Product Configuration
DEBNx enables the host system processor to communicate with other processors in an Ethernet LAN (as shown in Figure 1).

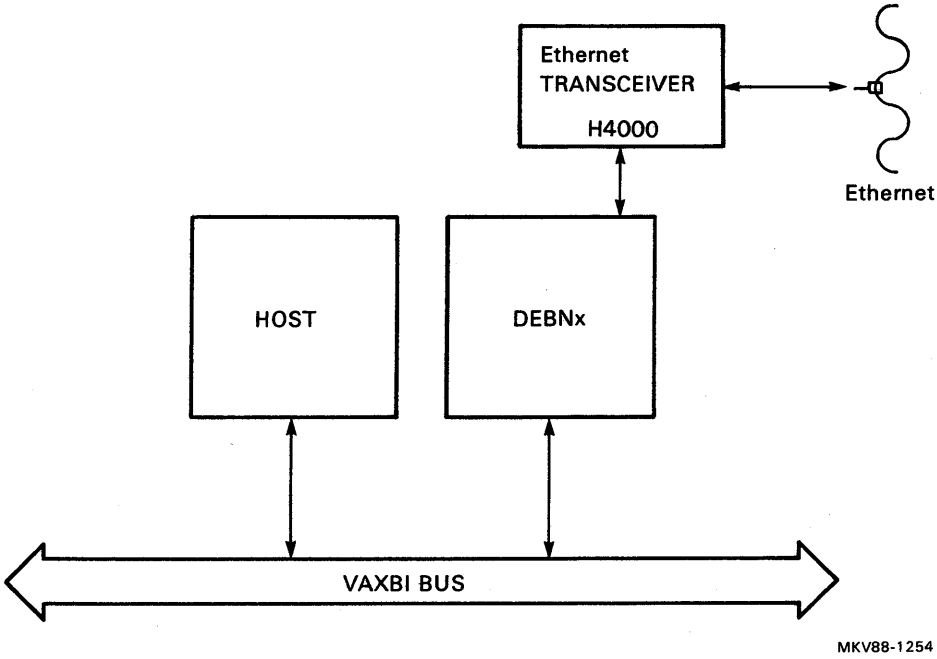

Figure 1 DEBNx in a VAXBI System

DEBNA/DEBNK INSTALLATION

Product Differences

The only DEBNK-exclusive feature is that it supports tape. Both DEBNA and DEBNK have the following basic components.

- VAXBI corner (interface): BIIC and BCI3 chips
- Central processor and memory:
  - MicroVAX processor chip and associated logic
  - MicroVAX RAM, patch RAM, and ROM
- Tape controller:
  - 80186 processor chip and associated logic
  - 80816 RAM, patch RAM, and ROM
  - MPSC (DIGITAL proprietary tape protocol) chip
  - AD16 bus for 80816 and 80816 memory
- Ethernet/802.3 controller: LANCE and SIA (Ethernet) chips
- II16 bus to provide access to the MicroVAX processor and MicroVAX memory for tape controller and Ethernet controller
- II32 bus to connect MicroVAX processor and VAXBI corner
- IEEE 802.3 compatibility
- MicroVAX buffer RAM of 128 Kbytes

Reference Documentation

The following related documentation is available to support servicing.

DEBNA/DEBNK Installation Guide	EK-DEBNX-IN
DEBNA/DEBNK Technical Manual	EK-DEBNX-TM
VAXBI Options Handbook	EB-27271-46
TK50D, TK50R Tape Drive Subsystem Owner's Manual	EK-LOP05-OM
Ethernet Installation Guide	EK-ETHER-IN

Hardware Components

DEBNx is made up of the following component groups (see Figure 2).

- MicroVAX processor and associated control logic
- MicroVAX memory and patch hardware
- MEM bus
- II32 bus
- VAXBI interface logic
- Ethernet controller
- Tape controller

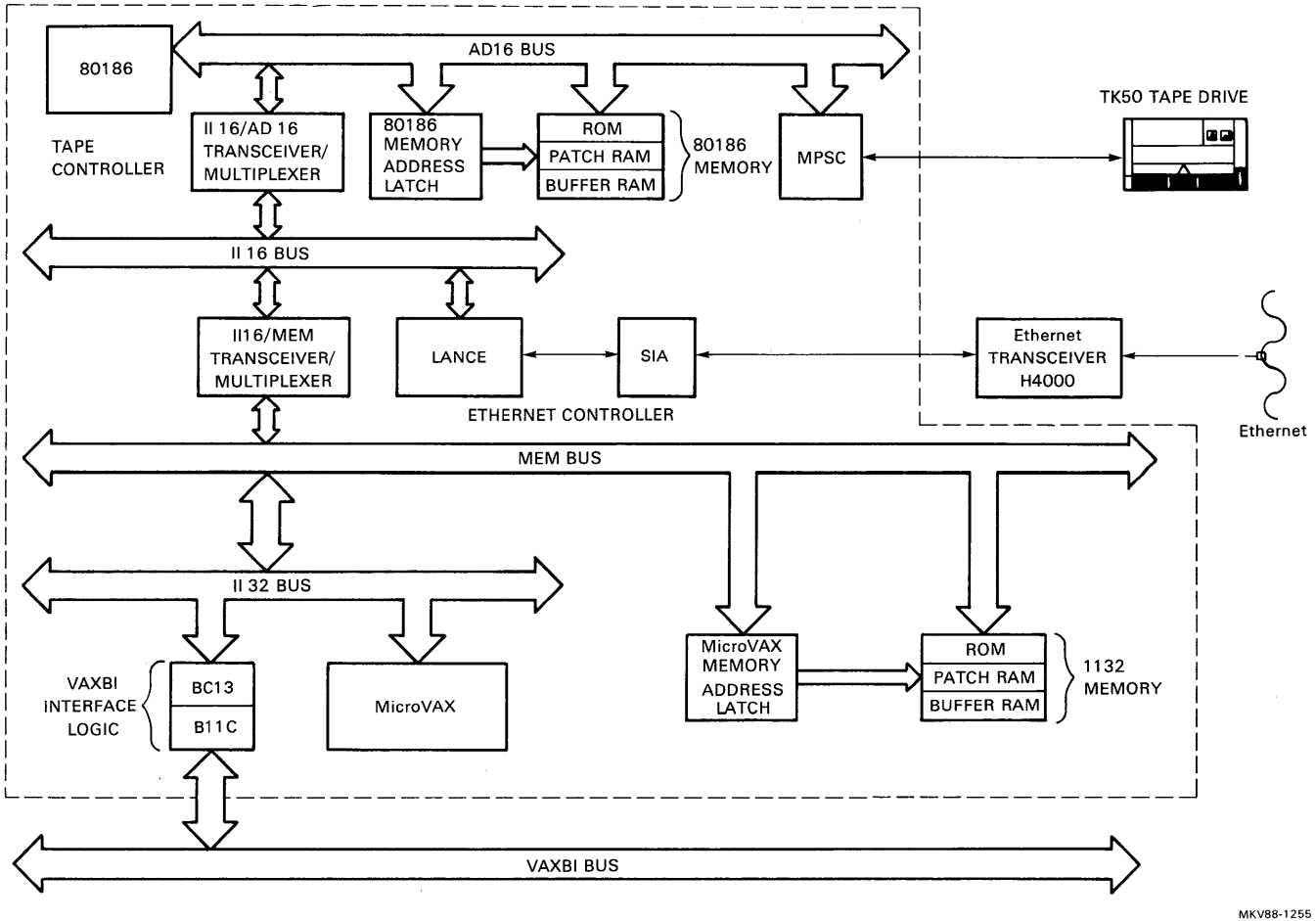

Figure 2 DEBNx Hardware Components

Software Components
Where DEBNA has only a network interconnect (NI) port, DEBNK is a multiport adapter. The NI port is the controller's interface to Ethernet. DEBNK has both an NI port and a tape/storage port.

The two ports are controlled by logically-distinct port drivers on the host. Port status will not affect one another except in the following situations.

- A hardware failure or several logical failures in DEBNx.
- DEBNx receives a VAXBI command that forces both ports to the "Stopped" state.
- A BVP (BIVAX Port) RESTART command forces both ports to the "Undefined" state.
- A VAXBI node reset to the DEBNx forces both ports to the "Undefined" state.

For more information on DEBNx software compoments, refer to the *DEBNA/DEBNK Technical Manual.*

Environmental Considerations
Table 1 describes the DEBNx operational and storage limitations.

Table 1 Operational and Storage Limitations

Specification	Operating	Storage
Temperature Degrees	5°C to 50°C (41°F to 122°F)	−40°C to 66°C (−40°F to 151°F)
Humidity Noncondensing	10% to 95%	Up to 95%
Maximum Altitude	2,400 m (8,000 ft)	9,000 m (30,000 ft)
Power Consumption	33.6 Watts Average	

Power Requirements
The power requirements for DEBNx are +5 Volts at 6.72 Amperes.

Installation Flow Diagram
Figure 3 is the DEBNx installation flow diagram.

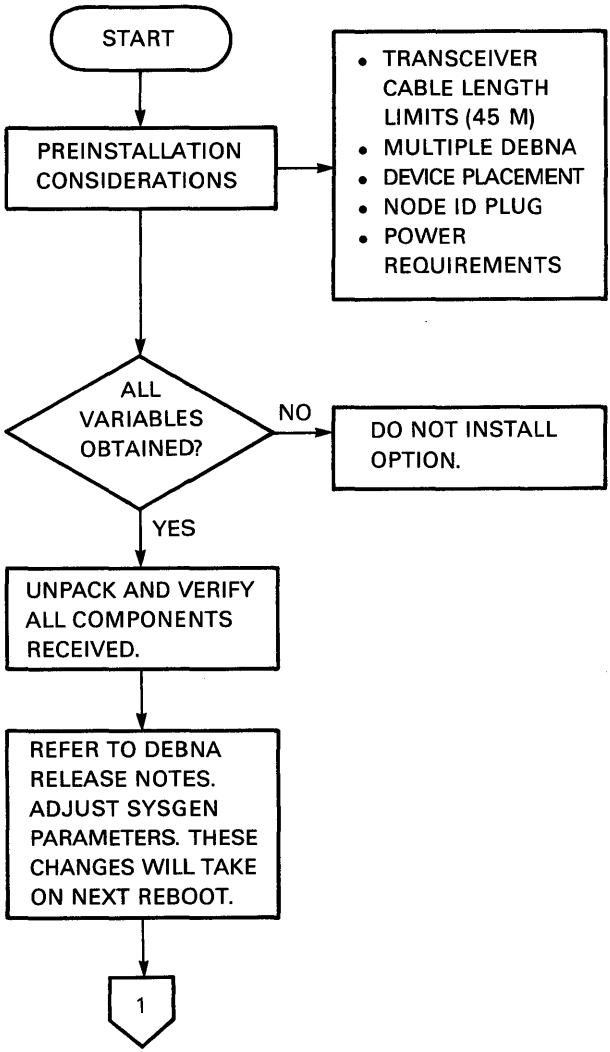

Figure 3 Installation Flow Diagram (Sheet 1 of 4)

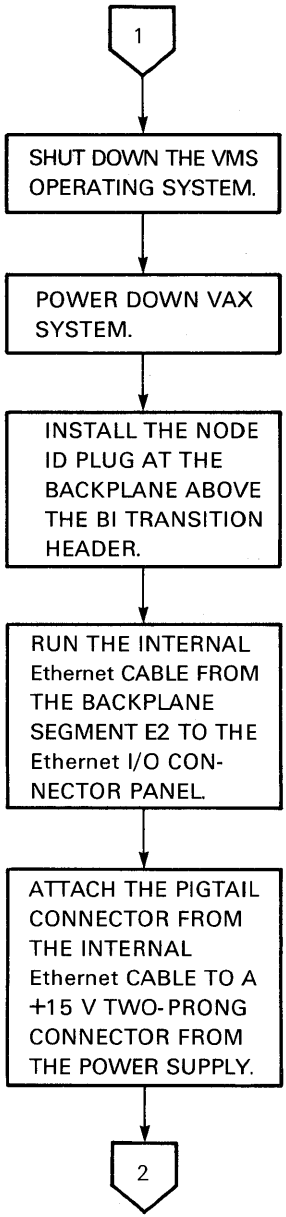

Figure 3 Installation Flow Diagram (Sheet 2 of 4)

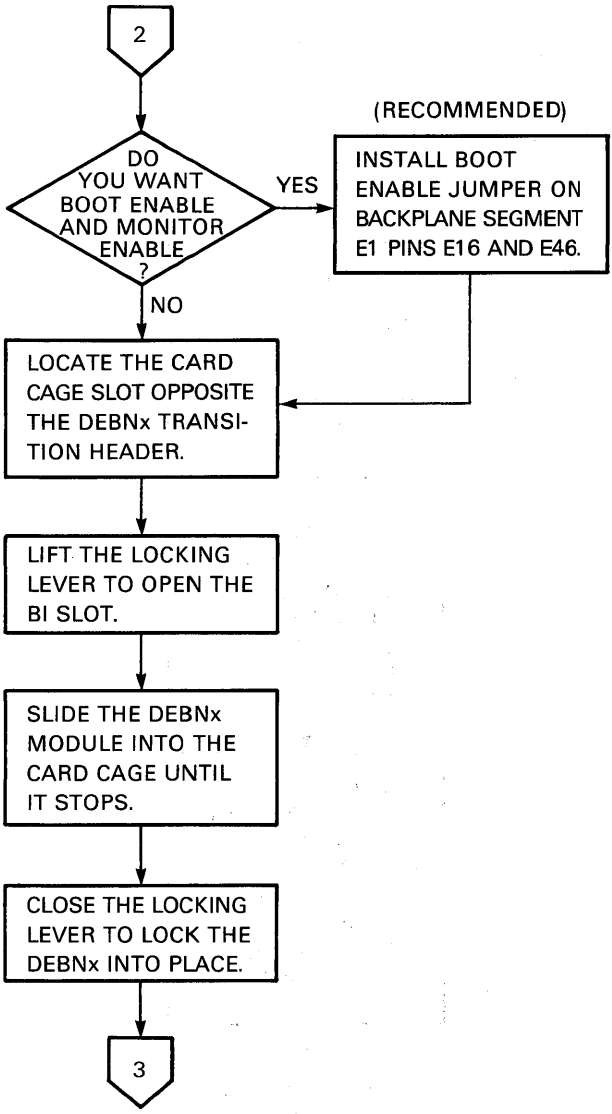

Figure 3 Installation Flow Diagram (Sheet 3 of 4)

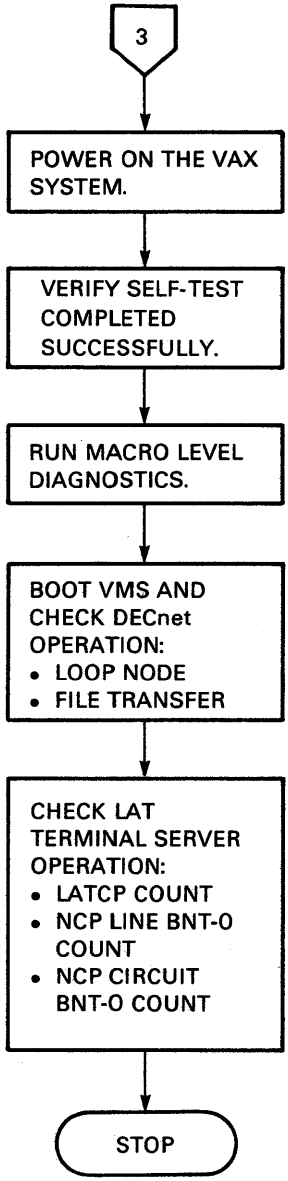

Figure 3 Installation Flow Diagram (Sheet 4 of 4)

Cables

DEBNx cabling, connectors, and jumpers are described in Figures 4 and 5.

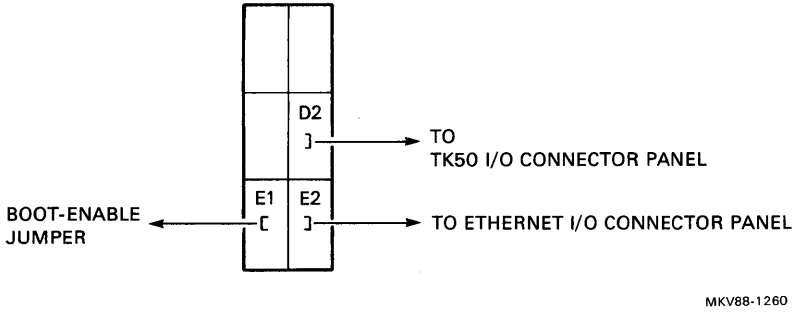

Figure 4 DEBNx Cabling at VAXBI Connector

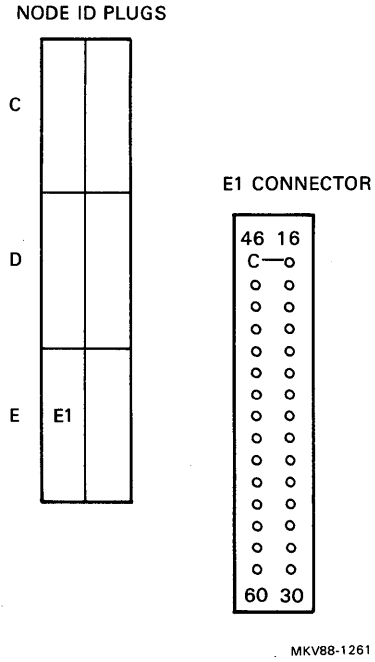

Figure 5 Ethernet Boot-Enable Jumper

DEBNA/DEBNK CABLING

Table 2 lists the TK50 cable connector pinouts at the VAXBI cage.

Table 2 Tape Drive Cable Connector Pinouts

Pin	Signal	Type	Description
D01	DRIVE PRESENT		
D31	UNCONNECTED		
D02	DRIVE WRITE CLOCK H	I	Differential WRITE CLOCK signals.
D32	DRIVE WRITE CLOCK L	I	
D03	DRIVE STATUS L	I	Differential serial drive status data signal (low).
D33	GROUND		
D04	GROUND		
D03	DRIVE STATUS H	I	Differential serial drive status data signal (high).
D05	DRIVE READ DATA L	I	Differential READ data signal.
D35	DRIVE READ DATA H	I	
D06	DRIVE READ CLOCK H	I	Differential READ CLOCK signal (high).
D36	GROUND		
D07	GROUND		
D37	DRIVE READ CLOCK L	I	Differential READ CLOCK signal (low).
D08	DRIVE ERASE ENABLE L	O	Differential signals from the Erase Enable
D38	DRIVE ERASE ENABLE H	O	Register.
D09	DRIVE WRITE GATE ENABLE L	O	Differential signal (low) from the Drive WRITE Gate Enable Register.
D39	GROUND		
D10	GROUND		
D40	DRIVE WRITE GATE ENABLE H	O	Differential signal (high) from the Drive WRITE Gate Enable Register.
D11	DRIVE DR COMMAND H	O	Differential serial drive command signals.
D41	DRIVE DR COMMAND L	O	
D12	DRIVE WRITE DATA L	O	Differential WRITE data signal (low).
D42	GROUND		
D13	GROUND		
D43	DRIVE WRITE DATA H	O	Differential WRITE data signal (high).

Self-Test Diagnostics

Self-Tests

DEBNx power-up self-tests are standalone ROM-based diagnostic routines that run automatically,

- When the host is powered up.
- When the host system is reset.

Self-testing can also be run from a VAX 8200/8300-series console using the D0 tests. Example, where DEBNx is on Node 5:

```
<CTRL/P>
>>> Z 5
    T/R
RBD5> D0
(tests run and results are displayed)
RBD5> QUIT
<CTRL/P>
>>>
```

BIIC performs its own self-test on power-up. The BIIC:

- Sets Broke, Initialization, and Self-Test status bits in its VAXBICSR.
- Sets STS bit to indicate that BIIC passed its internal self-test.
- Disables VAXBI bus drivers if self-test fails.

Self-Test Results

Pass/fail self-test results are reported in four ways:

- Node status (as a whole) is reported on the VAXBI bus:
  - BI BAD asserted = failure
- Status is reported on the module LEDs. Figure 6 shows the LED locations:
  - One yellow DEBNx OK indicator; ON = OK
  - One Tape OK indicator; green = tape present
- Status is shown by registers during testing:
  - VAXBICSR
  - Port Status (PS) Register
- Status is shown after testing:
  - Port Error (PE) Register contains an error message.
  - Port Data (PD) Register contains a copy of the Power-up Diagnostic Register (PUDR) which provides additional information.

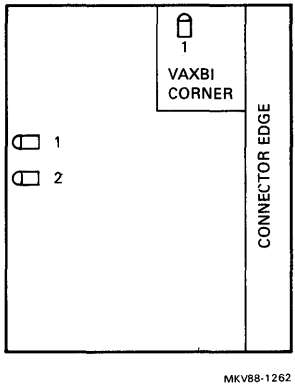

Figure 6 Self-Test LEDs

Table 3 shows how to use the VAXBICSR and PS Register to determine DEBNx status after self-testing. This table indicates when to read the PE and PD Registers for more information.

Table 3 State of DEBNx During and After Self-Test

VAXBICSR		PS Register			
STS	**Broke**	**STD**	**ACC**	**State of DEBNx**	**Additional Information**
1	1	0	0	The BIIC passed its self-test; self-test is still in progress.	None
0	1	1	0	The DEBNx failed self-test and is not minimally functional.	PD Register contains the PUDR. PE Register contains FF00 0003.
1	1	0	1	The DEBNx is minimally functional; self-test is still in progress.	PD Register contains a running count during self-test.
1	1	1	1	The DEBNx is minimally functional, but a noncritical component failed self-test.	PD Register contains the PUDR. PE Register contains FF00 0004.
1	0	1	1	The DEBNx node is fully functional; self-test has passed.	PD and PE Registers contain zero.

Self-test checks the following components.

DEBNx module components:

- MicroVAX
  - ROM
  - RAM
  - Patch hardware
- BIIC and BC13 chips
- LANCE chip
- MicroVAX 80186 communications

DEBNx tape controller chips:

- Multiprotocol serial controller
- 80186 microprocessor
- 80186 gap-detection hardware
- 80186 patch registers
- 80186 patch PAL
- 80186 buffer and patch RAM
- 80186 ROM
- 80186 tape-control registers

Self-Test Interpretation
After most self-test failures, system software can examine the VAXBICSR, PS, PE, and PD Registers to determine which components are usable. Based on this information, the system can decide that the node is still usable for certain tasks. If the BIIC chip fails its self-test, however, it disables its VAXBI drives. This puts the entire node off-line making the BVP registers inaccessible.

If the PD Register indicates that all the components have failed, the problem is probably the BIIC, MicroVAX, or MicroVAX ROM. If one of these components fails, the self-test routine stops, and the MicroVAX enters a WAIT state.

ROM-Based Diagnostics (RBDs)
The tests in each category are described in Tables 4 through 6. Individual tests, or test groups, can be invoked with commands from the operator's console or, for the D1 or D2 tests, executed through the VAX Diagnostic Supervisor (VDS).

D0 - DEBNx Self-Test – The DEBNx self-test, which is functionally equivalent to the DEBNx power-up self-test, performs a basic confidence check of the module. Table 4 describes the tests in the DEBNx self-test diagnostic. The test execution parameters and method of fault reporting can be selected with the appropriate run-time switches. With no test number, D0 executes all tests by default.

When any D0 test is selected, an internal self-check of the BIIC chip is executed. After a 250-millisecond delay, the self-test status (STS) bit in the VAXBI Control and Status Register is checked. If the BIIC failed the self-check, the STS bit is cleared and the VAXBI bus registers are disabled. This inhibits further communication with the DEBNx module.

Table 4 D0 DEBNx Self-Test

Diagnostic/ Test	Name	Description
D0/T1	ROM CRC	Calculates a longword CRC for each ROM section. Compares calculated CRC to corresponding stored CRC.
D0/T2	RAM	First verifies byte mask logic, then the nonstack area of RAM, then moves stack into verified RAM and verifies untested stack area. (Also verifies data and address lines.)
D0/T3	Patch	Disables patch function and toggles each patch register bit. Enables patch function and executes single patch operation.
D0/T4	MicroVAX Critical Path	Checks critical timing and principal microinstructions.
D0/T5	IRQ Lines	Steps through all IPLs (interrupt priority levels) to verify that no IRQ line is stuck asserted.
D0/T6	Interval Timer	Verifies interval time operation.
D0/T7	BI Corner	Performs seven subtests to verify BIIC and BC13 chips. Exits to next test if test fails.
D0/T8	NI LANCE Chip	Verifies LANCE chip and CRC logic in the Ethernet controller. (SIA chip not tested.)
D0/T9*	ROM CRC	Calculates a longword CRC for each ROM section. Compares calculated CRC to corresponding stored CRC.

Table 4 D0 DEBNx Self-Test (Cont)

Diagnostic/ Test	Name	Description
D0/T10*	RAM	First verifies byte mask logic, then the nonstack area of RAM, then moves stack into verified RAM and verifies untested stack area. (Also verifies data and address lines.)
D0/T11*	Patch	Disables patch function and toggles each patch register bit. Enables patch function and executes single patch operation.
D0/T12*	CPU/Timer	Verifies basic functionality of both the 80186 CPU and the programmable timers.
D0/T13*	Miscellaneous Registers	Enables and disables the WRITE Drive Gate, Driver Erase, and Patch Enable Registers.
D0/T14*	Gap Detect	Verifies gap detection logic in tape controller.
D0/T15*	MPSC	Verifies multiprotocol serial controller (MPSC) chip.
D0/T16*	CPU Communications	Verifies communication and interrupt operations between the 80186 and MicroVAX CPUs.
D0/T17	Drive Present	Checks that drive present bit is set in Tape Status Register.

*D0 tests 9 through 16 are 80186 tests.

D1 - Network Interconnect Diagnostic – The network interconnect (NI) diagnostic consists of the two test routines described in Table 5. These tests verify the operation of the Ethernet controller, cable, link, and transceiver. Test 2 is the default. Tests 1 and 2 should not be run at the same time because their run-time environments are different.

Typically, test 2 is run first to verify the entire Ethernet system. This test verifies that the Ethernet link from the Ethernet controller (LANCE/SIA subsystem), through the transceiver cable, to the transceiver is functioning properly. If test 2 passes, no further Ethernet testing is required.

Table 5 D1 Network Interconnect Tests

Diagnostic/Test	Name	Description
D1/T1	External Loopback (with connector)	Transmits data through the SIA chip and verifes that the same data is received through the loopback connector.
D1/T2	External Loopback (on live Ethernet)	Transmits data through the SIA chip and verifies that the same data is received from the Ethernet bus.

NOTE

For test 2 to execute properly, the DEBNx module must be connected to an operational Ethernet bus, a DELNI in loopback mode, or an H4000 transceiver. The test may fail if there is excessive traffic on the bus.

Test 2 retries automatically after detecting any of these errors:

- Loss of carrier
- Retry error
- CRC error
- Framing error
- Babble error
- Missed packet error
- Overflow error
- Buffer error

Test 2 fails when any of the following conditions occur:

- 32 retries
- Transmission error
- Descriptor ring error
- CRC error
- Memory error
- Underflow error

If test 2 fails, run test 1 to isolate the faulty field replaceable unit (FRU). Follow these steps:

1. Disconnect the external Ethernet transceiver cable (BNE3) at the transceiver end.
2. Install a loopback connector on the cable.
3. Run test 1 and observe one of the following:
   a. If test 1 passes, the transceiver is bad. Replace the transceiver, reconnect the cable to the new transceiver, and run test 2 to verify proper operation. No further action is required.
   b. If test 1 fails, one of the following is bad: transceiver cable, internal Ethernet cable, backplane, or DEBNx module. Go to the next step.
4. Disconnect the external transceiver cable at the I/O connector panel and install a loopback connector in its place.
5. Rerun test 1 and observe one of the following:
   a. If test 1 passes, the transceiver cable is bad. Replace the cable and run test 2 to verify proper operation. No further action is required.
   b. If test 1 fails, one of the following is bad: internal Ethernet cable, backplane, or DEBNx module. Replace the internal Ethernet cable. Go to the next step.
6. Rerun test 1 and observe one of the following:
   a. If test 1 passes, the removed cable is bad. Run test 2 to verify proper operation. No further action is required.
   b. If test 1 fails, either the DEBNx module or the backplane is bad. If the module passes self-test, it is probably good, but replace it and go to the next step.
7. Rerun test 1 and observe one of the following:
   a. If test 1 passes, the removed DEBNx module is bad. Run test 2 to verify proper operation. No further action is required.
   b. If test 1 fails, the backplane is bad. Install the DEBNx module in a different slot. Run test 2 to verify proper operation. Consider replacing the card cage.

D2 - Tape Drive Diagnostic – The tape drive diagnostic tests are described in Table 6. Tests 1 through 6 detect hard (nonintermittent) errors. Tests 7 through 9 detect hard and/or soft media errors.

Table 6 D2 Tape Drive Tests

Diagnostic/ Test	Name	Description
D2/T1	Initialization	Verifies drive initialization by resetting the drive then checking drive status, hardware, and software revision levels.
D2/T2	On-line and Calibration	Rewinds tape to BOT and verifies that drive READ/WRITE heads can be calibrated.
D2/T3	Tape Motion	Verifies that drive can move tape rapidly forward and backward.
D2/T4	WRITE (destructive)*	Verifies that drive can WRITE tape by rewinding to BOT and then WRITing a test pattern on track 0. Test fails with initialization error if tape cartridge is WRITE-protected or drive is powered down.
D2/T5	READ	(Requires Prewritten tape.) Verifies that drive can READ tape by rewinding to BOT and then READing track 0. Test fails if READ error occurs or tape does not contain fixed-length records.
D2/T6	WRITE/READ (destructive)*	Verifies that drive can WRITE, reposition, and then READ tape. READ data is compared byte-for-byte to WRITE data.
D2/T7	Thrashing WRITE (destructive)*	Verifies drive functionality by WRITing individual test pattern records to tracks 0 and 1. After each record is written, tape is stopped and repositioned before another record is written. Requires about 15 minutes to complete.
D2/T8	Thrashing READ	Verifies drive functionality. Requires approximately 25 minutes to READ a prerecorded tape.
D2/T9	Thrashing WRITE/READ (destructive)*	Verifies drive functionality by WRITing and READing individual test pattern records from tracks 0 and 1. With no parameter given, testing requires approximately 40 minutes. To test the entire tape takes about 8 hours.

*The command for these tests requires the /C (confirm) switch.

The tape drive diagnostic should be run when:

- DEBNx tests fail to isolate a malfunction
- Tape errors are intermittent
- Media integrity is questionable

Since some of the tape tests destroy user data, a confirm (/C) run-time switch is required to execute these tests. Use a scratch or blank tape for the destructive tests.

If no test numbers are specified, the diagnostic runs tests 1-6.

Software Diagnostics
Table 7 lists the diagnostics that support DEBNx modules. The EVDYC and EVMDD diagnostics can interface with the D1 and D2 ROM-based diagnostics using standard operating procedures under the VAX diagnostic supervisor (VDS).

Table 7 Down-line Loaded Diagnostic Programs

Program	Level	Description
EVDYC	3	Provides user interface to D1 RBDs
EVMDD	3	Provides user interface to D2 RBDs
EVDYD	2R	Tests NI port functions
EVDWC	2R	Tests installation of host Ethernet node and all local nodes supporting MOP protocol
EVMDA	2R	Tests TK50 tape drive

Run the Level 3 diagnostics and D1/D2 tests as follows:

- Boot VDS
- When the prompt DS> appears, enter:

  - ATTACH DEBNK HUB ETA n (where n = node to test)
  - ATTACH LANCE ETA ETA0
  - SELECT ETA0
  - RUN EVDYC

Shut down all protocol before running the Level 2R diagnostics from VMS as follows:

- Boot VMS
- Run the VDS
- Enter the commands, as shown above

Error Types
Three types of errors are possible:

Fatal	System error that stops diagnostic program.
Hard	Device error that prevents device from completing the current test.
Soft	Device error, usually intermittent, that probably will not repeat on the next pass.

Error Description
A sample error report is shown in Figure 7.

```
;  F       4        410F        000000002
;  SE      NI              00          T02
;  69 A5A5A5A5 00A5A5A5       000000000 00000010  1FF81020
```

LINE 1: F = FAIL
4 = VAXBI NODE NUMBER
410F = DEBNA MODULE
00000002 = PASS # (IN HEXADECIMAL)

LINE 2: SE = SOFT DEVICE ERROR
NI = NETWORK INTERCONNECT (ETHERNET LINK)
00 = UNIT NUMBER
T02 = TEST NUMBER

LINE 3: 69 = ERROR CODE NUMBER
A5A5A5A5 = EXPECTED DATA
00A5A5A5 = DATA RECEIVED
00000000 = SCB OFFSET (NOT APPLICABLE)
00000010 = RAM LOCATION OF RECEIVED DATA, EXPRESSED AS HEX OFFSET
1FF81020 = ROM PC VALUE AT WHICH ERROR WAS DETECTED

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Figure 7 Sample Error Report

Troubleshooting guidelines and additional diagnostic tests are included in the following Maintenance Aids section.

Troubleshooting

Use the Troubleshooting Flowchart (see Figure 8) to isolate hardware and software problems to the module level. Run the recommended diagnostic tests where indicated.

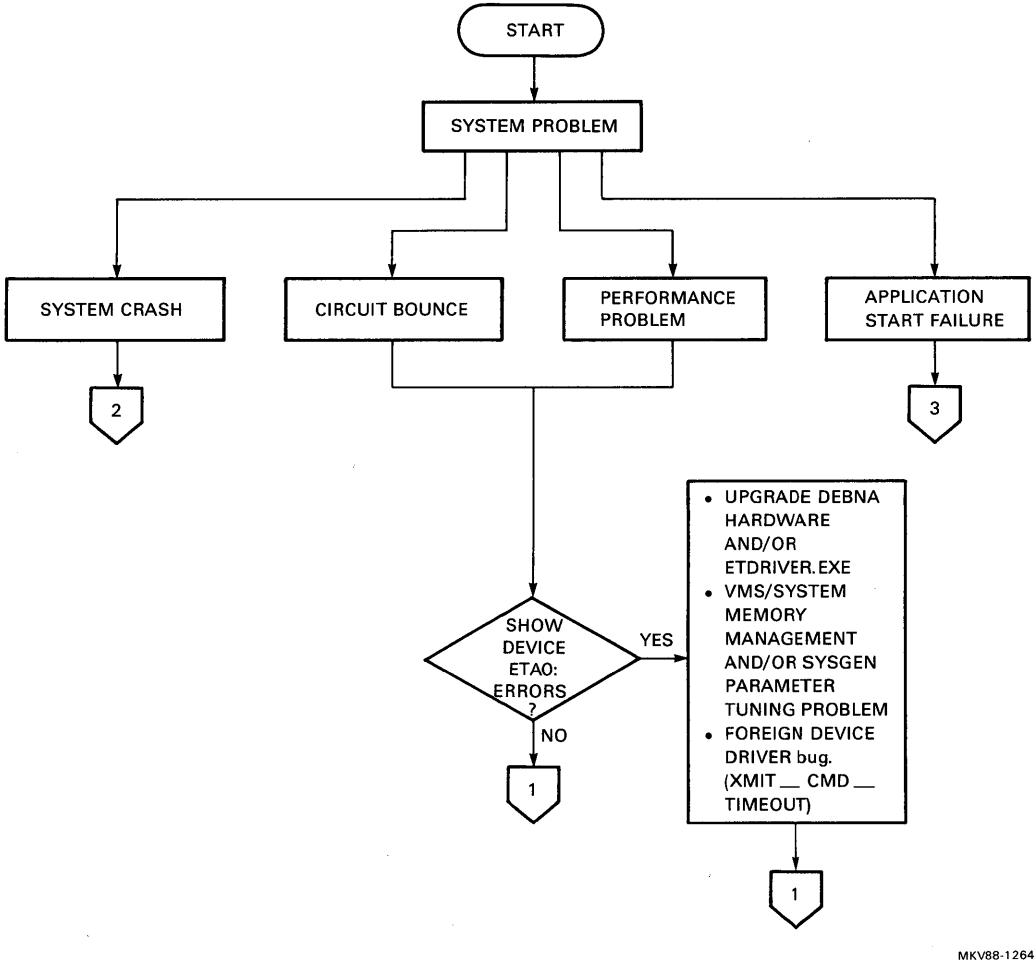

Figure 8 Troubleshooting Flowchart (Sheet 1 of 8)

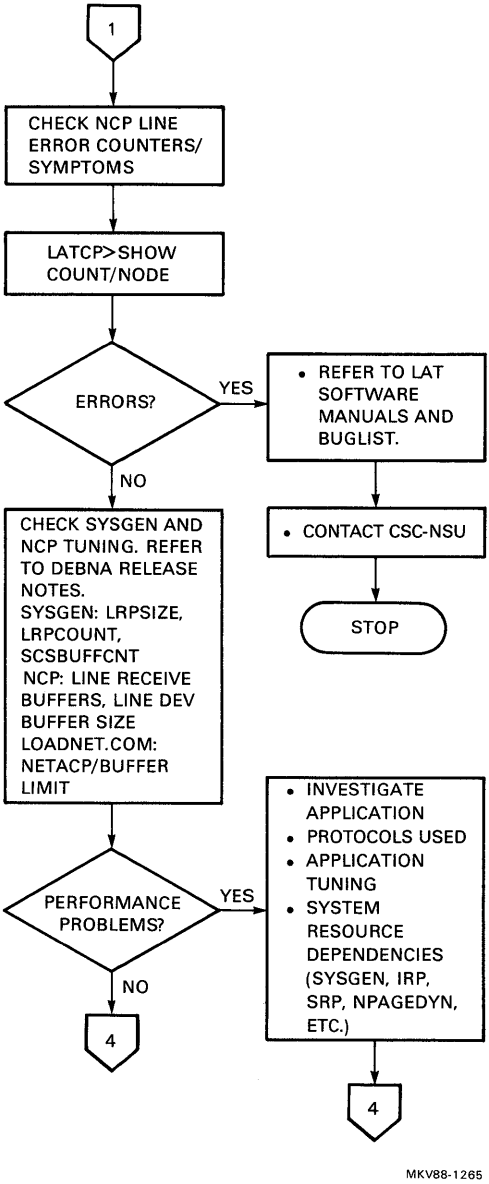

Figure 8 Troubleshooting Flowchart (Sheet 2 of 8)

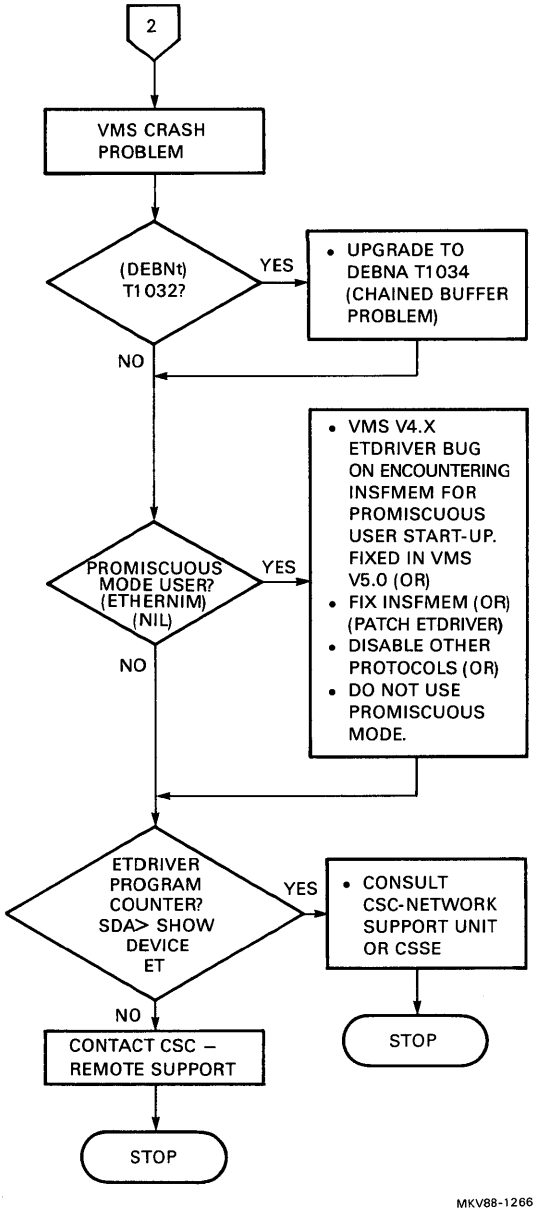

Figure 8 Troubleshooting Flowchart (Sheet 3 of 8)

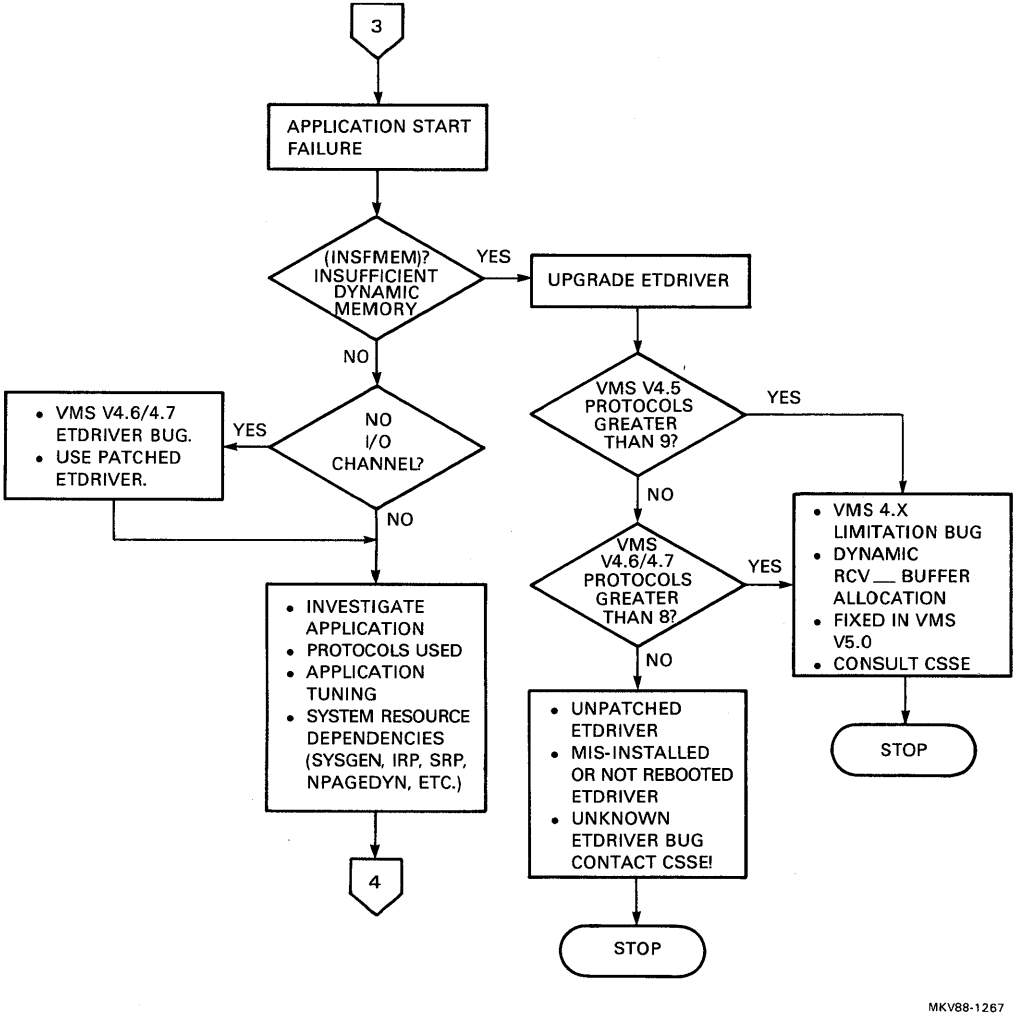

Figure 8 Troubleshooting Flowchart (Sheet 4 of 8)

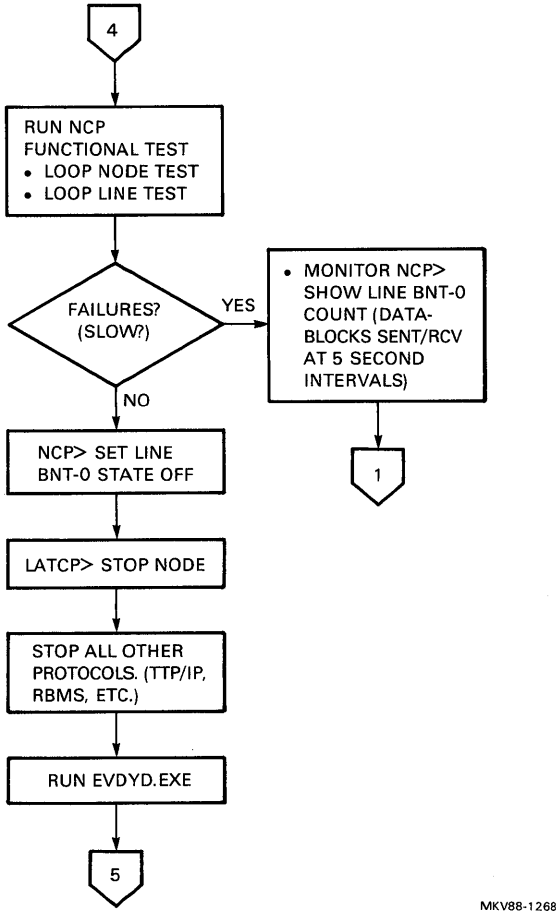

Figure 8 Troubleshooting Flowchart (Sheet 5 of 8)

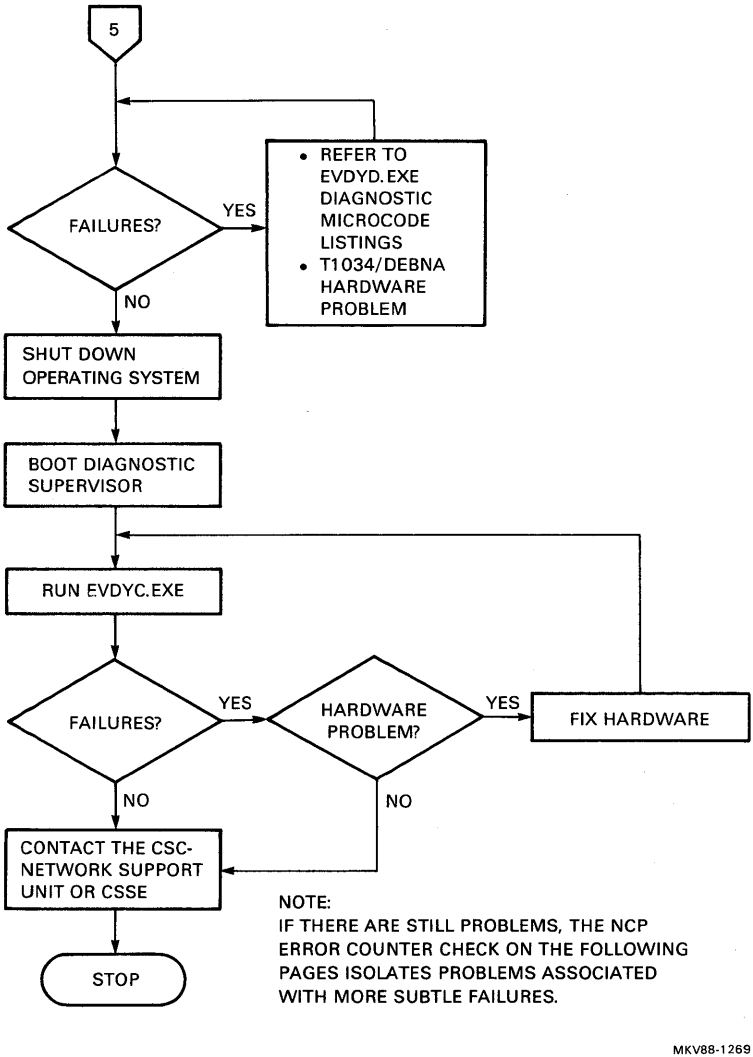

Figure 8 Troubleshooting Flowchart (Sheet 6 of 8)

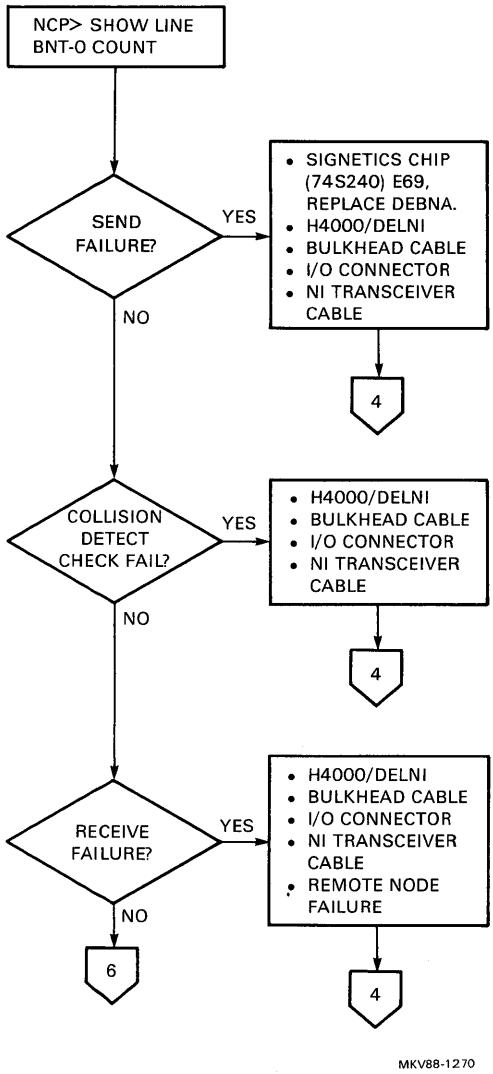

Figure 8 Troubleshooting Flowchart (Sheet 7 of 8)

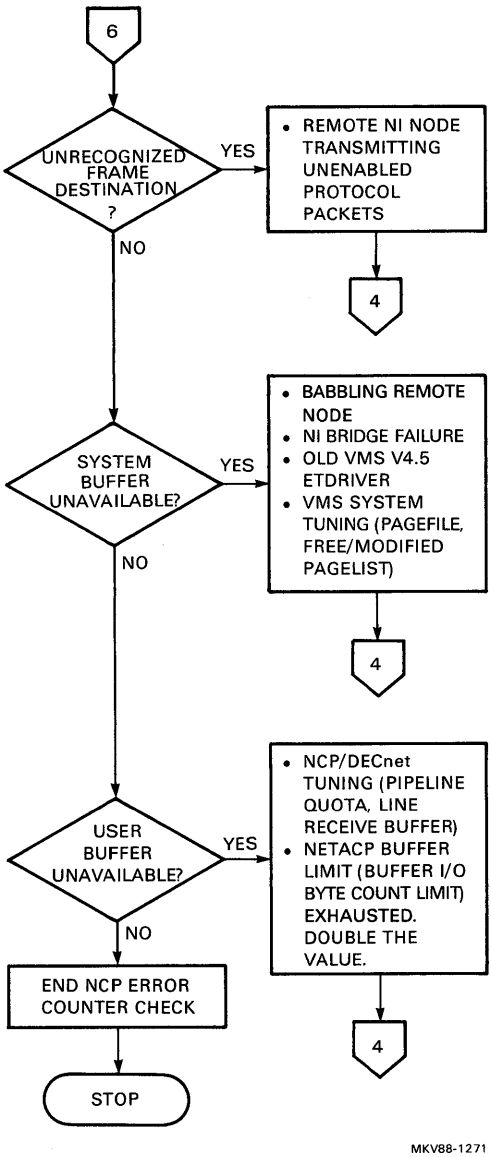

Figure 8 Troubleshooting Flowchart (Sheet 8 of 8)

Running ROM Diagnostics from the Console

The ROM-based diagnostics (RBDs) are standalone programs that can be controlled and executed from the VAX 8200/8300-series console. The D1 and D2 tests, along with the other diagnostics listed in the DIAGNOSTICS section of this option, can also be executed through the VAX diagnostic supervisor (VDS).

To run the RBDs from the operator's VAXBI console, perform the following:

1. Enter Console mode by typing the following characters at the system prompt:

   >>>Z n

   T/R

   RBDn>

   where n is the node ID (0-F hex) of the node under test.

2. Select the desired diagnostic test(s) by entering the appropriate EXECUTE command along with the applicable run-time switches.

3. Terminate the diagnostics by entering the QUIT command or one of the control characters described in Table 8.

Table 8 Console Mode Control Characters

Character	When RBD is Executing	When Parser is Executing
CTRL/C	Aborts test routine, rewinds to BOT, executes cleanup code, and returns to parser and reissues the RBDn> prompt.	Echoes "C", reissues RBDn> prompt.
CTRL/U	Ignored	Echoes "U", aborts current command line, and reissues RBDn> prompt.
CTRL/Y	Aborts test routine and returns to the diagnostic prompt. Does not execute cleanup code.	Echoes "C", reissues RBDn> prompt.
CTRL/Z	Aborts test routine, executes cleanup code, and returns to command-entry level.	Resets the DEBNx and executes power-up self-test; same as QUIT command.
CTRL/P	Terminates console mode and returns to system-level prompt (>>>)	Terminates console mode and returns to system-level prompt (>>>). CTRL/Z or QUIT must be used before CTRL/P to put adapter in a known state.

ROM Diagnostic Console Commands
The ROM diagnostic console commands are:

- D0, D1, D2 – the EXECUTE commands
- DEPOSIT
- EXAMINE
- QUIT

An illegal or invalid command sounds the keyboard alarm, displays a question mark, then displays the command-entry prompt.

EXECUTE Commands (D0, D1, D2)
The EXECUTE commands invoke a designated test or group of tests within a specified diagnostic. The command format is:

Dn[/Sw1/Sw2/...Sw9 pc]

where:

Dn Diagnostic number (n = 0, 1, or 2)

Sw Switch (see Table 9)

pc Parameter code. PC1 is the only parameter and it is supported only by test 9 of D2. PC1 tests the entire tape; no parameter tests two tracks of the tape.

NOTE

The /C (confirm) switch is required for all data-destructive tests. If /C is not included with the data-destructive command, the last command line is echoed on the screen. When this occurs, type /C to execute the command or press RETURN to abort the command.

Table 9 Execute Command Switches

Switch	Name	Default	Description
/BE	Bell on Error	No bell	Sounds keyboard alarm each time an error is detected.
/C	Confirm	No data destroyed	Confirms data-destructive test.
/DS	Disable Status	Status reports	Disables status reports.
/HE	Halt on Error	Continue on error	Diagnostic halts on test that detects first error and returns to command-entry prompt.
/IE	Inhibit Errors	Summary reports	Disables summary reports.
/IS	Inhibit Summary	Summary reports	Disables summary reports.
/LE	Loop on Error	Continue on error	Diagnostic loops on test that detects first error, even if error is intermittent. CTRL/C or CTRL/Y terminates and returns to command-entry prompt (RBDn>).
/P=n	Pass Count	One pass	Specifies number of diagnostic passes. (One pass includes all selected tests.) Pass count 0 selects infinite number of passes. CTRL/C or CTRL/Y terminates and returns to command-entry prompt.
/QV	Quick Verify	Normal test	Executes quick-verify version of specified test, when applicable; otherwise, is ignored.
/T=n[:m]	Test Number[s]	Unique to each diagnostic	Specifies test or group of tests to be executed. Groups are executed in ascending numerical order.
/TR	Enable Trace	No trace	Enables trace reports.

Error Reports
Table 10 describes the format for error reporting.

Table 10 Error Report Fields

Line	Field 1	Field 2	Field 3	Field 4	Field 5	Field 6
1	Status	Node No.	Device Type	Passes	–	–
2	Error Type	ASCII L	Unit No.	Test	–	–
3	Error Code	Expected	Received	SCB	Address	PC

Table 11 defines line-error field reporting.

Table 11 Error Report Field Definitions

Mnemonic	Name	Description
LINE 1		
–	Status	The report type. For error reports, P = passed, F = failed.
NODE NO.	Node Number	The node under test. The value may range from 0-F (hex).
–	Device Type	The type of module under test. 410F (hex) = DEBNx.
PASS	Pass Count	The execution pass at which the error was detected (hex).
LINE 2		
ERR TYPE	Error Type	The error type: FE = system fatal error HE = hard device error SE = soft device error
ASCII L	ASCII Logic	An ASCII code that indicates the failing logic: ROM = ROM UVAX = MicroVAX RAM = RAM BCI = BCI3 80186 = 80186 processor NI = Ethernet interface TKCTL = Tape controller TK = TK50 tape drive
UNIT	Unit Number	Number of the unit under test (always 0).
TEST	Test Number	Test that detected the error. A zero value indicates the initialization code for the test failed.
LINE 3		
ERR CODE	Error Code	The nature of the error. See Table 12 for a list of error codes.
EXPCT	Expected Data	The expected data for certain types of data comparison errors.
RCVD	Received Data	The incorrect data that was received for a data comparison.
SCB	System Control Block Offset	The system control block offset through which an interrupt was expected or received.
ADD	Address	The memory location or register address at which a data comparison error or register operation error was detected.
PC	Program Counter	The PC (program counter) value in ROM at which the error was detected.

Table 12 describes the D1 and D2 error codes.

Table 12 Error Codes

D1 Test Error Code	Description
55	No packet transmitted.
56	Incorrect destination or source address on transmitted packet.
57	No packet received.
58	Incorrect destination or source address on received packet.
59	No LANCE interrupt received after LANCE started.
60	The STOP bit was not set, or it was not the only bit set in LANCE CSRO when the LANCE was stopped.
61	LANCE initialization unsuccessful.
62	The low byte of LANCE CSR0 was not as expected after packet transmission.
63	The MISS bit set in LANCE CSR0; missed packet.
64	The BABL bit set in LANCE CSR0; transmitter timeout.
65	After 32 soft errors, another soft error occurs.
66	The UFLO bit set in LANCE transmit descriptor 3 indicating a truncated transmitted packet.
67	After 32 retries, another retry condition occurs.
68	The MERR bit is set in LANCE CSR0; memory error.
69	The CERR bit is set in LANCE CSR0; loss of heartbeat.
99	After eight (8) retries due to LANCE bugs, another retry condition occurs.
D2 Test Error Code	**Description**
70	Command aborted.
71	Controller error detected.
73	READ/WRITE data error detected.

Table 12 Error Codes (Cont)

D2 Test Error Code	Description
74	Invalid command detected.
75	Unit is off-line.
76	Position lost error.
77	Record data truncation error.
78	Serious exception detected.
79	Hardware WRITE-protect error.
80	Illegal interrupt from 80186.
81	Interrupt message from 80186 bad.
82	No cartridge detected in drive.
83	Tape not loaded into drive.
84	Unexpected interrupt exception.
85	Controller initialization error.
86	MicroVAX 80186 communication error.
87	Controller timeout error.
88	Data overrun error detected.
89	LEOT encountered unexpectedly.
90	BOT encountered unexpectedly.
91	Unexpected tape encountered.
92	No command echo received within required time.
93	Motion error: drive unable to perform motion test.
94	Tape load error: drive does not load and unload tape.
95	Drive sent an illegal, unsolicited byte.
96	Test timed out waiting for a drive response.
97	80186 did not request a new buffer.

Status Reporting
Figure 9 shows a typical line status report. Tables 13 and 14 describe status reporting format and define status fields.

Table 13 Status Report Fields

Line	Field 1	Field 2	Field 3	Field 4
1	Status	Node No.	Device Type	Passes
2	Error Type	ASCII L	Unit No.	Test

Table 14 Status Report Field Definitions

Mnemonic	Name	Description
LINE 1		
–	Status	The report type; S = status report.
NODE NO.	Node Number	The node under test. The value may range from 0-F (hex).
–	Device Type	The type of module under test. 410F (hex) = DEBNx.
PASS	Pass Count	The number of passes completed so far (hex).
LINE 2		
ERR TYPE	Error Type	The error type: FE = system fatal error HE = hard device error SE = soft device error
ASCII L	ASCII Logic	An ASCII code that indicates the logic currently being tested: TK50 = TK50 tape drive
UNIT	Unit Number	Number of the unit under test (always 0).
TEST	Test Number	The currently executing test.

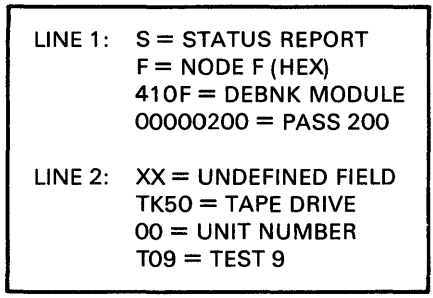

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Figure 9 Sample Status Report

For additional information on diagnostics and maintenance aids, consult related DIGITAL diagnostic and programming publications listed in the INSTALLATION section of this option.

DEClancontroller 200 NETWORK ADAPTER

General Description

The DEClancontroller 200 is also called the DEBNI network adapter. The DEClancontroller 200 network adapter is an intelligent I/O controller that serves as an interface between an Ethernet Local Area Network (LAN) and a VAXBI bus. The adapter is compatible with the Ethernet and IEEE 802 specifications and is the standard Ethernet interface for VAX 6000-xxx systems.

The DEClancontroller 200 adapter supports one Ethernet/IEEE 802 port, which provides the physical link layer and portions of the data link communication layer of the Ethernet and 802 protocols (as defined by the Ethernet and IEEE 802 specifications).

The DEClancontroller 200 adapter has its own on-board MicroVAX processor that can control operations independently of the host processor. As a result, Ethernet transactions are transparent to the host processor (Figure 1).

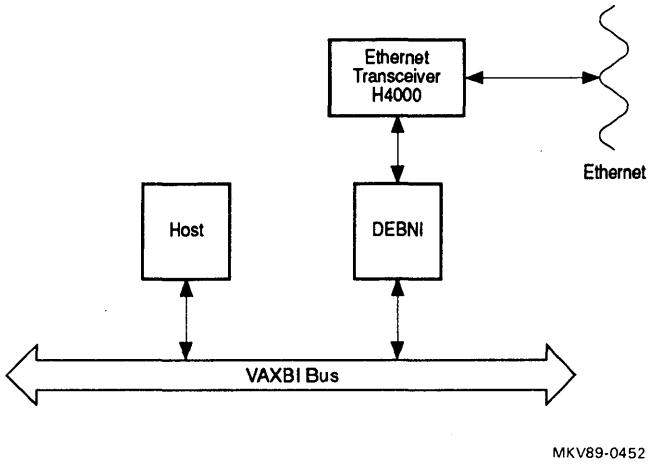


Figure 1 DEClancontroller 200 in a VAXBI System

Reference Documentation

The following related documentation is available to support the DEClancontroller 200 adapter.

- *DEBNI VAXBI Network Adapter Installation Guide* EK-DEBNI-IN
- *DEClancontroller 200 Programmer's Guide* EK-DEBNI-PG
- *DEClancontroller 200 Technical Manual* EK-DEBNI-TM
- *DEBNA-to-DEBNI Upgrade Instructions* EK-DEBNI-UP
- *Ethernet Installation Guide* EK-ETHER-IN

Hardware Components

The DEClancontroller 200 adapter is made up of the following components (see Figure 2).

- MicroVAX processor and associated control logic
- MicroVAX memory and patch hardware
- MEM bus
- II32 bus
- VAXBI interface logic
- Ethernet interface logic

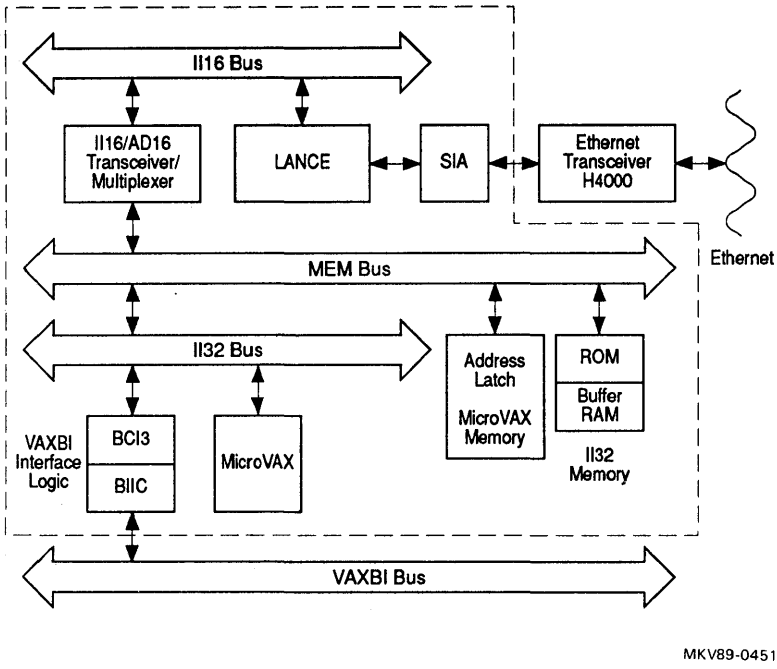


Figure 2 DEClancontroller 200 Hardware Components

Software Components

The associated host software must be VMS Version 5.2 which contains the port driver to handle transactions between the host system and the DEClancontroller 200 adapter.

Environmental Considerations
Table 1 provides the environmental considerations for both operational and storage requirements.

Table 1 Environmental and Power Requirements

Parameter	Operating	Storage
Temperature	5°C to 50°C (41°C to 122°F)	−40°C to 66°C (−40°C to 151°F)
Humidity (noncondensing)	10% to 95% with maximum wet bulb of 32°C (89.6°F) and minimum dewpoint of 2°C (36°F)	Up to 95%
Maximum altitude	2,400 m (8,000 ft)	9.1 km (30,000 ft)

Power Requirements
The power consumption requirement for the DEClancontroller 200 adapter is 33.6 Watts Average (+5 Volts at 6.72 Amperes).

Installation Flow Diagram

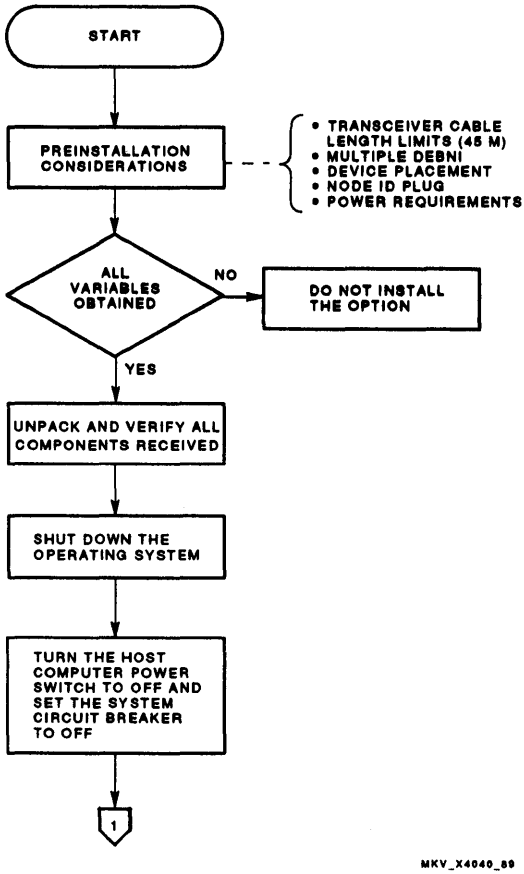


Figure 3 Installation Flow Diagram (Sheet 1 of 4)

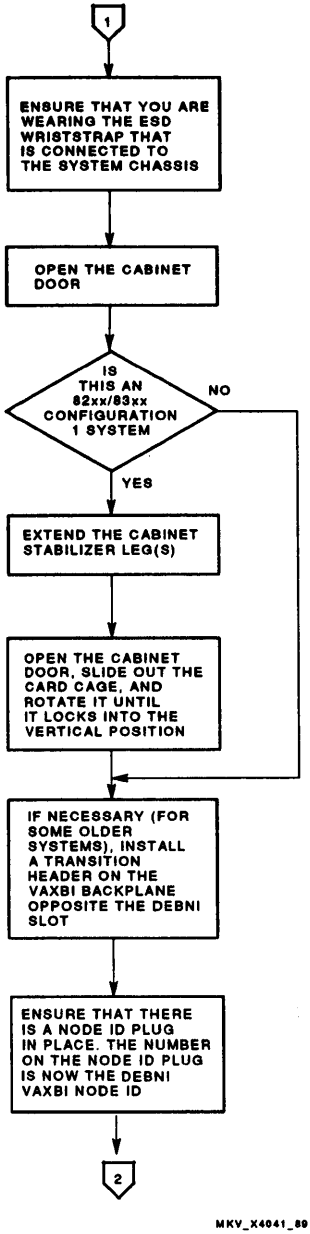


Figure 3 Installation Flow Diagram (Sheet 2 of 4)

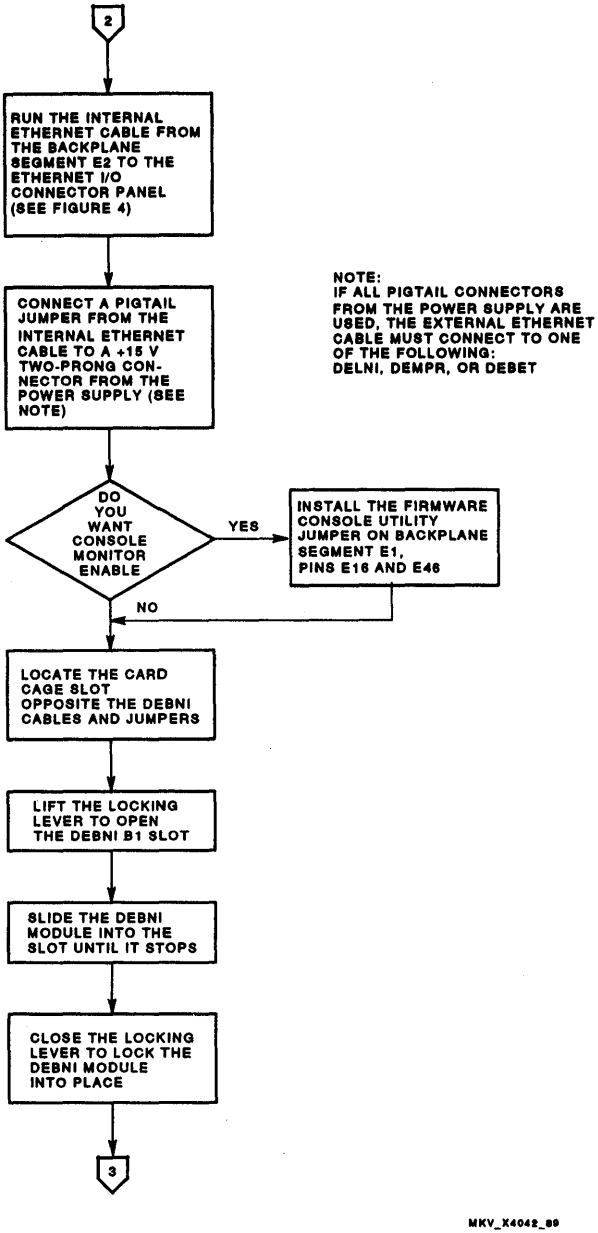


Figure 3 Installation Flow Diagram (Sheet 3 of 4)

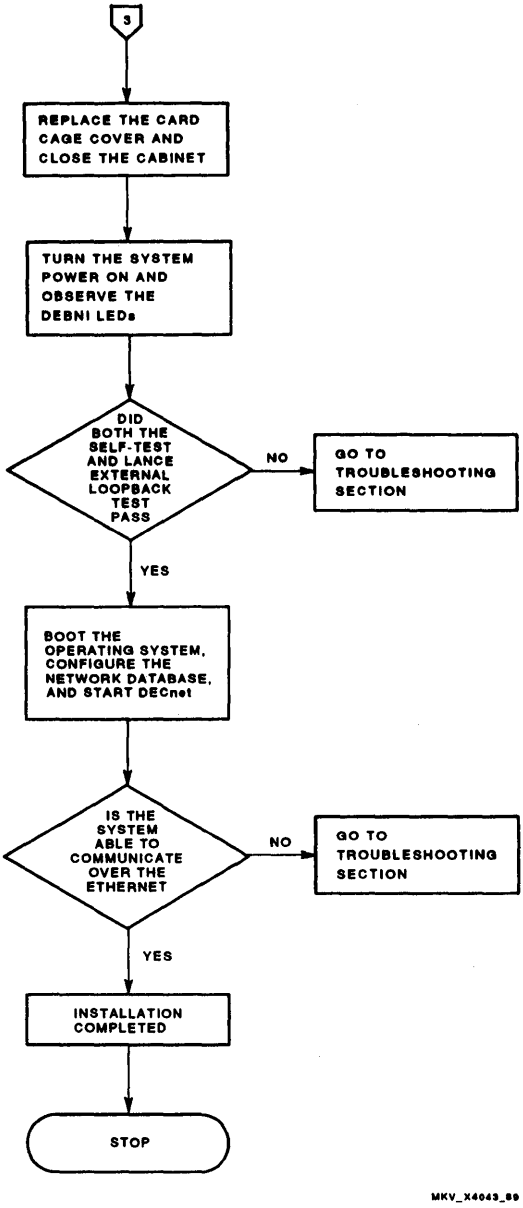


Figure 3 Installation Flow Diagram (Sheet 4 of 4)

Cabling

Cabling of the DEClancontroller 200 adapter involves connecting the internal Ethernet cable, the pigtail connection for power, the boot enable jumper, and the transceiver cable.

The internal Ethernet cable connects the VAXBI backplane (segment E2) to the I/O connector panel (Figure 4). The transceiver cable is not part of the DEClancontroller 200 option but is included in the cabinet kits for the DEClancontroller 200 (Table 2). The +15 V pigtail connector (Table 3) supplies power to the H4000 transceiver.

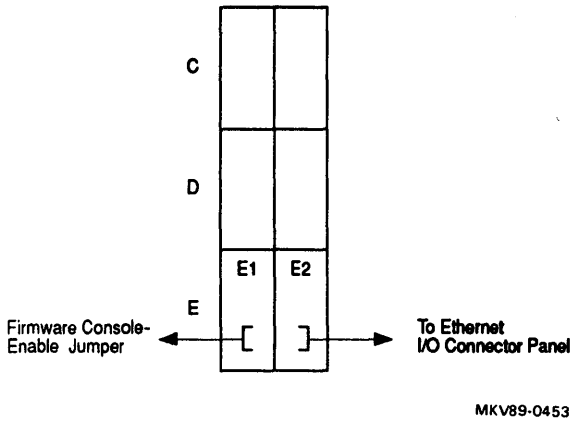


Figure 4 Cabling at the DEClancontroller 200 VAXBI Connector

Table 2 Cabinet Kits for DEClancontroller 200 Options

System/Enclosure	Kit Number	Contents
VAX 6000-xxx system cabinets	CK-DEBNA-LD	Ethernet I/O connector panel (74-26407-41); 3 foot internal Ethernet cable (17-01496-01); Firmware console-enable jumper (17-01149-01); Ethernet loopback connector (12-22196-02).
VAX 8800, 8810, 8550, and 8530 system cabinets; VAX 8840, 8830, and 8820 system and expansion cabinets; VAX 6000-xxx VAXBI expansion cabinets (new VAXBI expansion cabinet H9657)	CK-DEBNA-LJ	Ethernet I/O connector panel (74-26407-41); 3 foot internal Ethernet cable (17-01601-03); Firmware console-enable jumper (17-01149-01); Ethernet loopback connector (12-22196-02).
VAX 8350, 8250	CK-DEBNA-LM	Ethernet I/O connector panel (70-18799-00); 8 foot internal Ethernet cable (17-01601-02); Firmware console-enable jumper (17-01149-01); Ethernet loopback connector (12-22196-02).
VAX 8810, 8800, 8700, 8850, and 8530 expansion cabinets (old VAXBI expansion cabinet H9652)	CK-DEBNA-LN	Ethernet I/O connector panel (70-18799-00); 8 foot internal Ethernet cable (17-01601-04); Firmware console-enable jumper (17-01149-01); Ethernet loopback connector (12-22196-02).

Table 3 Power Connection for Internal Ethernet Cable

VAXBI System	Power Connection
VAX 6000-xxx	Any H7214 regulator plug (J2) in the rear of the cabinet.
VAX 82xx, 83xx Configuration 1 (12-slot VAXBI card cage) and VAXBI expansion box BA32-B	2-pin Mate-N-Lok™ pigtail connector located in the bottom of the box.
VAX 82xx, 83xx Configuration 2 (24-slot VAXBI card cage)	2-pin Mate-N-Lok™ pigtail connector located in the rear of the cabinet.
VAX 85xx, 87xx, and VAXBI expansion cabinet H9657	2-pin Mate-N-Lok™ pigtail connector labeled P3 or P4 and located in the rear of the cabinet.

Mate-N-Lok is a trademark of AMP, Inc.

Table 4 lists internal Ethernet cable connector pinouts at the VAXBI backplane.

Table 4 Internal Ethernet Cable Pinouts (On VAXBI Backplane)

Pin	Signal	Description
E01-E04	Not connected	
E05-E09	Logic Ground	
E10 E11	Ethernet Collision L Ethernet Collision H	Differential collision detect signals from the Ethernet bus.
E12 E13	Ethernet Receive L Ethernet Receive H	Differential receive signals from the Ethernet bus.
E14 E15	Ethernet Transmit L Ethernet Transmit H	Differential transmit signals to the Ethernet bus.
E16 E46	Firmware Console-Enable	Enables access to the DEClancontroller 200 console monitor program. The signal is asserted if there is a jumper connected between pins E16 and E46 in the DEClancontroller 200 section of the VAXBI backplane. The signal is sent to the DEClancontroller 200 internal status register.

Diagnostics
The following diagnostic aids are available in this section:

- Power-up self-test
- ROM-based diagnostics
- Level 3 diagnostics
- Level 2R diagnostics
- Console Monitor Program

Power-Up Self-Test
The power-up self-test consists of ROM-resident diagnostic routines that run automatically on powerup or reset. These routines verify that the hardware at the node is operational and that the DEClancontroller 200 adapter can transmit and receive a loopback packet over the network.

There are three ways of running self-test for the DEClancontroller 200 adapter:

1. On system powerup.

2. On processor reset. This occurs when the reset or restart button on the host system's front panel is pressed. The host system runs a system self-test, which causes each VAXBI node to run its own self-test.

3. From the console. The DEBNI D0 tests can be started from the system console of a VAX 6000-xxx, VAX 82xx, or VAX 83xx system.

Self-Test Results – Test results (pass or fail) are indicated by LEDs on the module and by the DEClancontroller 200 Power-Up Diagnostic (XPUD) register.

Self-Test Results in LEDs
There are three status-indicator LEDs on the module (Figure 5). They consist of:

- 2 yellow DEBNI OK LEDs
- 1 green External Loopback LED

The two yellow DEBNI OK LEDs show the status of the module after the node self-test. The green External Loopback LED indicates whether the DEClancontroller 200 adapter passed the LANCE external loopback self-test, which tests the adapter's ability to transmit and receive a loopback packet over the network.

At powerup or reset, all the LEDs are OFF. If the DEClancontroller 200 adapter passes all the executed tests (excluding the LANCE external loopback self-test), the two yellow DEBNI OK LEDs are turned ON; otherwise, these LEDs remain OFF. If the LANCE external loopback self-test passes, the green External Loopback LED is turned ON.

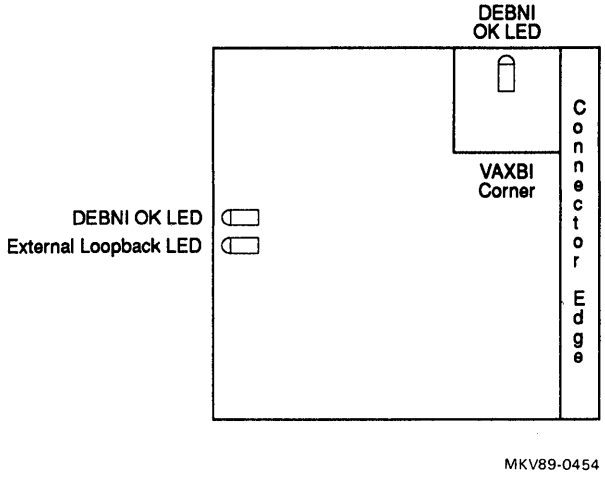


Figure 5 LED Locations

Self-Test Results in the Power-Up Diagnostic Register
The Power-Up Diagnostic (XPUD) register (Figure 6) indicates which tests in the self-test diagnostic passed, and when the self-test is completed. By monitoring the Self-Test Complete (STC) bit, the port driver can read the register after the test is complete and pass the information on to higher-level software. The higher-level software can determine which DEClancontroller 200 components passed or failed self-test.

The XPUD register is treated as follows:

- The DEClancontroller 200 adapter initializes the XPUD register to all zeros on powerup or reset.
- When a subtest in the self-test routine passes, its corresponding bit in the XPUD register is set.
- If a subtest fails, the corresponding bit remains cleared.

The XPUD register of a DEClancontroller 200 adapter that passes self-test contains a value of $FFFFXXXX_{(10)}$ where X = Don't Care.

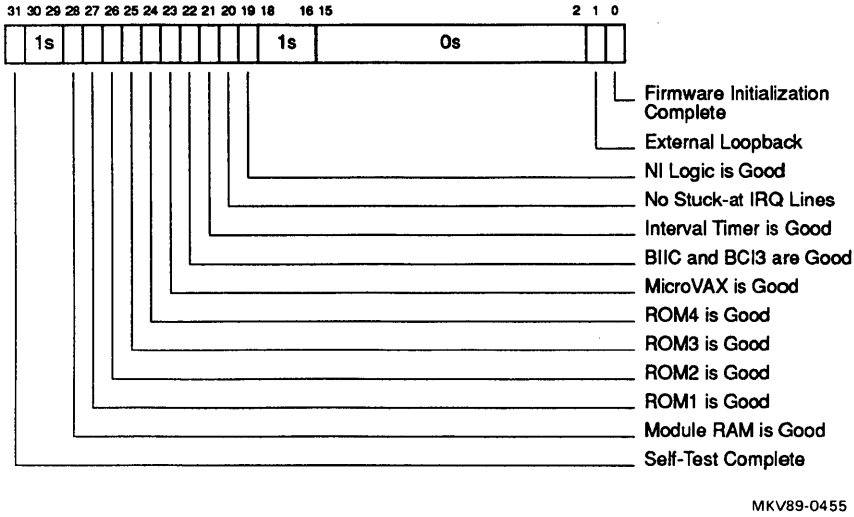


Figure 6 Power-Up Diagnostic Register (XPUD)

ROM-Based Diagnostics
There are two ROM-based diagnostics:

- D0 - DEBNI Self-Test Diagnostic
- D1 - Network Interconnect Diagnostic

The ROM-based diagnostics (RBD) are a standalone program that can be executed and controlled from the operator's console of a VAX 6000-xxx system or a VAX 82xx/83xx system.

To run RBD from the console of a VAX 6000-xxx system, do the following:

1. Enter the console mode by typing CTRL/P at the system prompt and then entering the following characters.

   ```
   >>>Z/BI:n m <Return>
   xxx connection successfully started.
   T/R <Return>
   RBDx>
   ```

   where:

   n is the hexadecimal VAXBI adapter number 0 - F

   m is the hexadecimal XMI node ID of the XMI-to-VAXBI adapter number 0 - F

2. Select the desired EXECUTE command along with the applicable run-time switch.

3. Terminate the diagnostics by entering the QUIT command.

EXAMPLE

```
$ CTRL/P
>>>Z/BI:6 D <Return>
T/R <Return>
RBD6> D0 <Return>
RBD6> D1/T=2 <Return>
```

where:

D0	Entered from the RBD6 prompt executes D0
D1/T=2	Entered from the RBD6 prompt executes D1 test 2

To run RBD from the console of a VAX 82xx/83xx system, do the following:

Enter the console mode by typing CTRL/P at the system prompt and then entering the following characters

```
>>>Z n <Return>
T/R <Return>
RBDx>
```

where:

n is the hexadecimal node ID (0 - F) of the node under test

EXAMPLE

```
$ CTRL/P
>>>Z 2 <Return>
T/R <Return>
RBD2>D0 <Return>
```

D0 DEBNI Self-Test Diagnostic – This self-test is functionally equivalent to the DEBNI power-up self-test. Table 5 describes the tests. Unless otherwise specified in the table, the test execution parameters and method of fault reporting can be selected with the appropriate run-time switches. If a test number is not specified with the D0 EXECUTE command, all tests are executed by default.

Table 5 D0 DEBNI Self-Test

Test	Name	Description
D0/T1	ROM CRC	Calculates a longword cyclic redundancy check (CRC) character for each ROM section. Compares the calculated CRC to the corresponding stored CRC.
D0/T2	RAM	Verifies byte mask logic and then verifies non-stack area of RAM. Moves the stack into verified RAM and verifies untested stack area. (Also verifies data and address lines as a result of RAM tests.)
D0/T3	MicroVAX Critical Path	Checks critical timing and principal microinstructions.
D0/T4	IRQ Lines	Steps through all Interrupt Priority Levels (IPLs) to verify that no Interrupt Request (IRQ) line is stuck asserted.
D0/T5	Interval Timer	Verifies interval timer operation.
D0/T6	BI Corner	Performs seven subtests to verify BIIC and BC13 chips. Exits to next test if this test fails.
D0/T7	NI LANCE Chip	Verifies LANCE chip and CRC logic in the Ethernet interface logic. (SIA chip is not tested.)
D0/T8	Lance External Loopback	Attempts to transmit and receive an Ethernet external loopback packet. If one packet is successfully transmitted and received, the firmware lights the external loopback LED. This test is the only test that can fail without causing the self-test as a whole to fail.

D1 Network Interconnect Diagnostic - The Network Interconnect (NI) diagnostic consists of the three test routines described in Table 6. These tests verify that the Ethernet interface logic, cable, link, and transceiver are operational. If a test number is not specified when D1 is selected, test 2 is executed by default. Test 1 should not be invoked at the same time as tests 2 and 3 because the run-time environments are different.

Typically, test 2 is run to verify that the Ethernet link is functioning properly. The Ethernet link consists of the Ethernet interface logic (LANCE/SIA subsystem), the transceiver cable, and the transceiver interface logic. If test 2 passes, further Ethernet testing is not required.

Table 6 D1 Network Interconnect Tests

Test	Name	Description
D1/T1	External Loopback (with connector)	Transmits data through the SIA chip and verifies that the same data is received back through the loopback connector.
D1/T2	External Loopback (on live Ethernet)	Transmits data through the SIA chip and verifies that the same data is received back from the Ethernet bus.
D1/T3	MOP Loopback (on live Ethernet)	Transmits a Maintenance Operations Protocol (MOP) loopback message to another node, which should transmit back the data contained in the message. For this test to execute correctly, another functional node must be present on the Ethernet.

NOTE:
For test 2 to execute properly, the DEClancontroller 200 module must be connected to an operational Ethernet bus, a DELNI in loopback mode, or an H4000 transceiver. The test may fail if there is excessive traffic on the bus.

Test 2 retries automatically if any of the following errors are detected:

- Loss of carrier
- Late collision
- Retry error
- CRC error
- Framing error
- Babble error
- Missed packet error
- Overflow error
- Buffer error
- Collision error

Test 2 fails if any of the following conditions occur:

- 32 soft errors
- Initialization error
- Memory error
- Underflow error

If test 2 fails, run test 1 as follows to isolate the faulty field replaceable unit (FRU).

1. Disconnect the external Ethernet transceiver cable (BNE3) at the transceiver end.

2. Install a loopback connector on the cable.

3. Run test 1 and observe whether it passes or fails.

   If test 1 passes, the transceiver is bad. Replace the transceiver, reconnect the cable to the new transceiver, and run test 2 to verify proper operation. No further action is required.

   If test 1 fails, one of the following is bad: transceiver cable, internal Ethernet cable, backplane, or DEClancontroller 200 module. Go to the next step.

4. Disconnect the external transceiver cable at the I/O connector panel and install a loopback connector in its place.

5. Rerun test 1 and observe whether it passes or fails.

   If test 1 passes, the transceiver cable is bad. Replace the cable and run test 2 to verify proper operation. No further action is required.

   If test 1 fails, one of the following is bad: internal Ethernet cable, backplane, or DEClancontroller 200 module. Replace the internal Ethernet cable and install the loopback connector on the new cable. Go to the next step.

6. Rerun test 1 and observe whether it passes or fails.

   If test 1 passes, the removed cable is bad. Run test 2 to verify proper operation. No further action is required.

   If test 1 fails, either the DEClancontroller 200 module or the backplane is bad. Replace the DEClancontroller 200 module and go to the next step.

7. Rerun test 1 and observe whether it passes or fails.

   If test 1 passes, the removed DEClancontroller 200 module is bad. Run test 2 to verify proper operation. No further action is required.

   If test 1 fails, the backplane is bad. Install the DEClancontroller 200 module in a different slot. Run test 2 to verify proper operation. Consider replacing the card cage.

Software Diagnostics

Table 7 lists the diagnostics that support the DEClancontroller 200 module. On VAX 85xx, 87xx, and 88xx systems, the EVDYF diagnostic must be used to interface with the D1 ROM-based diagnostic, using standard operating procedures under the VAX Diagnostic Supervisor (VDS).

Table 7 Down-Line Loaded Diagnostic Programs

Program	Level	Description
EVDYF	3	Provides user interface to D1 RBDs for VAX 85xx, VAX 87xx, and VAX 88xx systems.
EVDYD	2R	Tests the functioning of the DEClancontroller 200 Ethernet/802 port.
EVDWC	2R	Tests the installation of the host Ethernet node and all other nodes on the local Ethernet that support MOP protocol.

Running the Level 3 Diagnostic – The level 3 diagnostic in Table 7, EVDYF (the D1 test), is run as follows:

1. Invoke the console prompt by typing CTRL P on the system console.
2. Boot the VAX Diagnostic Supervisor by entering the following characters at the system prompt:

   >>>B/R5:10 device

3. On VAX 85xx/87xx/88xx systems, enter the following commands at the DS> prompt:

   ```
   DS> ATTACH NBIA HUB NBIA0 0
   DS> ATTACH NBIB HUB NBIA0 NBIB0 0 z
   DS> ATTACH DEBNI NBIB0 ETA0 n
   DS> SELECT ETA0
   DS> LOAD EVDYF
   DS> START /T=n:m
   ```

   where:

   z is the NBI node ID of the NBIB

   n is the VAXBI node ID of the DEBNI

   n:m is a range of test numbers. (If /T=n:m is not used, all tests are run.)

Running the Level 2R Diagnostics – The level 2R diagnostics in Table 7, EVDYD and EVDWC, are run as follows:

1. Boot VMS

2. Run the VAX Diagnostic Supervisor by entering the following at the system prompt:

   >RUN filename.EXE

   where filename is the executable VAX/DS file as follows:

VAX System	VAX/DS File
6000-2xx/6000-3xx	ELSAA
6000-4xx	ERSAA
82xx/83xx	EBSAA
85xx/87xx/88xx	EZSAA

3. On VAX 6000-xxx systems, enter the following commands at the DS> prompt:

   ```
   DS> ATTACH DWMBA HUB DWMBA0 a z
   DS> ATTACH DEBNI DWMBA0 ETA0 n
   DS> SELECT ETA0
   DS> LOAD diagnostic
   DS> START /T=n:m
   ```

   where:

   a is the XMI node ID of the DWMBA

   z is the VAXBI node of the DWMBA

   n is the VAXBI node ID of the DEBNI

   diagnostic is either EVDYD or EVDWC

   n:m is a range of test numbers. (If /T=n:m is not used, all tests are run.)

4. On VAX 82xx/83xx systems, enter the following commands at the DS> prompt:

   ```
   DS> ATTACH DEBIA HUB ETA n
   DS> ATTACH LANCE ETA ETA0
   DS> SELECT ETA0
   DS> LOAD diagnostic
   DS> START /T=n:m
   ```

   where:

   n is the VAXBI node ID of the DEBNI

   diagnostic is either EVDYD or EVDWC

   n:m is a range of test numbers. (If /T=n:m is not used, all tests are run.)

5. On VAX 85xx/87xx/88xx systems, enter the following commands at the DS> prompt:

```
DS> ATTACH NBIA HUB NBIA0 0
DS> ATTACH NBIB HUB NBIA0 NBIB0 0 z
DS> ATTACH DEBNI NBIB0 ETA0 n
DS> SELECT ETA0
DS> LOAD diagnostic
DS> START /T=n:m
```

where:

z is the NBI node ID of the NBIB

n is the VAXBI node ID of the DEBNI

diagnostic is either EVDYD or EVDWC

n:m is a range of test numbers. (If /T=n:m is not used, all tests are run.)

Console Monitor Program
The DEClancontroller 200 firmware includes a Console Monitor Program (CMP) that allows any user to monitor the DEClancontroller 200 operation. The CMP is accessible only if the DEClancontroller 200 firmware console monitor jumper is installed on the backplane (at segment E1, connect pins E16 and E46).

Console Monitor Remote Node Connect –

```
$MCR NCP
NCP> SET NODE node_name HARDWARE ADDRESS address
NCP> DEFINE NODE node_name HARDWARE ADDRESS address
NCP> SET NODE node_name SERVICE PASSWORD 424E4942F415244
NCP> DEFINE NODE node_name SERVICE PASSWORD 424E4942F415244
NCP> SET NODE node_name SERVICE CIRCUIT circuit_name
NCP> DEFINE NODE node_name SERVICE CIRCUIT circuit_name
```

where:

node_name is the name assigned to the DEClancontroller 200 Ethernet node.
address is the DEClancontroller 200 Ethernet default physical address.
circuit_name is the Ethernet circuit for the system from which you are sending the commands.

Console Monitor Remote Node Connect Example –

```
$MCR NCP
NCP> SET NODE NODE_B HARDWARE ADDRESS 08-00-3C-4F-22-22
NCP> DEFINE NODE NODE_B HARDWARE ADDRESS 08-00-3C-4F-22-22
NCP> SET NODE NODE_B SERVICE PASSWORD 424E4942F415244
NCP> DEFINE NODE NODE_B SERVICE PASSWORD 424E4942F415244
NCP> SET NODE NODE_B SERVICE CIRCUIT BNA-0
NCP> DEFINE NODE NODE_B SERVICE CIRCUIT BNA-0
```

Console Monitor Local Node Connect – If the DEClancontroller 200 to be connected is local, the user must first create a node name and assign it a valid DECnet address. That DECnet node name and address must be distinct from the other DECnet node names and addresses already defined to that system. Once a DECnet node name and address has been established, use the remote node connect procedure described in the above example. This is done because the NCP CONNECT command does not allow a node to connect to itself.

Invoking the Console – After entering the DEClancontroller 200 into the DECnet data base, (as a remote node) it can be remotely connected using NCP, as follows:

```
$MCR NCP
NCP> CONNECT NODE node_name
Console connected (press CTRL/D when finished)
BNI>
```

where:

node_name is the logical name you asigned to the DEClancontroller 200 Ethernet node.

Exiting the Console Monitor – To exit the console monitor type CTRL D

Table 8 Console Monitor Program Commands

Command	Parameter	Description
BLANK		Clears the screen and prints the console prompt (BNI>).
HELP		Displays the help screen.
HELP	BLANK	Displays the help screen for the BLANK command.
HELP	SHOW	Displays the help screen for the SHOW command.
HELP	CONTROLCHAR	Displays the help screen that provides definitions of all the console command language control characters.
SHOW	BIMAP	Displays the current configuration for the VAXBI bus.
SHOW	ERROR Hn	Displays the fatal error block n, where n is an integer from 1 through 5.
SHOW	ERROR Sn	Displays the nonfatal error block n, where n is an integer from 1 through 5.
SHOW	IMAGE	Displays the revision number and revision date of the DEClancontroller 200 firmware.
SHOW	STATUS	Displays continuous updated copies of the following: - DEClancontroller 200 data-link (NI) counters. - Statistics on the DEClancontroller 200 adapter's use of the Ethernet. - The percent of MicroVAX time used by each firmware process.
SHOW	STATUS/ERROR	Displays continuous updated copies of the DEClancontroller 200 transmit, receive, and LANCE counters.
SHOW	STATUS/TOTAL	Displays the same information as the STATUS/ERROR command with the addition of the statistical information for all NI traffic.
SHOW	PUB	Displays the contents of the DEClancontroller 200 power-up diagnostic (XPUD) register.
SHOW	USER	Displays information about the users currently defined to the DEClancontroller 200 port.

ROM Diagnostic Console Commands

Console Mode Control Characters -

At the RDB prompt:

CTRL C	Echoes "^C" and reissues the RBDn> prompt.
CTRL U	Echoes "^U", aborts the current command line, and reissues the RBDn> prompt.
CTRL Y	Same as CTRL C.
CTRL Z	Resets the DEClancontroller 200 and executes the power-up self-test (same as the RBD QUIT command. Use CTRL P to return to the system-level prompt (>>>).
CTRL P	Terminates console mode and returns to the system-level prompt (>>>). CTRL Z or the QUIT command must be used before CTRL P to put the adapter into a known state.

When RDB is executing:

CTRL C	Aborts the test routine, executes cleanup code, returns to PARSER, and reissues the RBDn> prompt. The enable message for the abort test are printed on the console.
CTRL U	Ignored.
CTRL Y	Aborts the test routine and returns to the diagnostic prompt.
CTRL Z	Same as CTRL C.
CTRL P	Terminates console mode and returns to the system-level prompt (>>>). If you re-enter the RDB test monitor on the same node, the enabled test messages of the aborted test are printed on the same console.

Execute Commands (D0, D1) - These commands invoke a test or group of tests within a specified diagnostic. The command format is:

Dn[/sw1/sw2/...sw9 pc1 pc2]

where:

Dn	Diagnostic number either 0 or 1
Sw	Switch (See Table 9)
pc1, pc2	Parameter codes. Test one and two of D2 both support the p1 parameter. Test 3 of D1 supports both p1 and p2 optional parameters. Parameter p1 is an 8-digit decimal number that specifies the number of packets to be transmitted and received on each pass of the test. Parameter p2 specifies the transmit packet size. Parameter p2 must be a decimal number between the default of 64 and the largest packet size of 1518 bytes.

Table 9 Execute Command Switches

Switch	Name	Default	Description
/BE	Bell on Error	No bell	Sounds the keyboard alarm each time an error is detected.
/DS	Disable Status	Status reports	Disables status reports.
/HE	Halt on Error	Continue on error	Diagnostic halts on the test that detects the first error and returns to the command-entry prompt.
/IE	Inhibit Error	Error reports	Disables error reporting.
/IS	Inhibit Summary	Summary report	Disables all reports including summary.
/LE	Loop on Error	Continue on error	Diagnostic loops on the test that detects the first error, even if the error is intermittent. Typing CTRL C or CTRL Y will terminate and return to the command-entry prompt (RBDn>).
/P=n	Pass Count	One pass	Specifies total number of diagnostic passes. One pass equals one iteration of all the tests selected. A pass count of 0 selects an infinite number of passes. Typing CTRL C or CTRL Y will terminate and return to the command-entry prompt (RBDn>).
/T=n[:m]	Test Number[s]	Unique to each diagnostic	Specifies the test or tests to be executed. If group is specified, tests are executed in ascending numerical order.
/TR	Enable Trace	No trace	Enables trace reports.

D0 Self-Test Execute Command Examples

D0 Executes one pass of all tests.

D0/P=0/T=4:6/BE

Executes tests 4 through 6 in the loop-forever mode with bell-on-error active and trace reports disabled by default. Summary, status, and error reports are enabled by default.

D1 Self-Test Execute Command Examples

D1 Executes one pass of D1 test 2 (which is the default test executed).

D1/T=1/P=0 Executes test 1 for infinite passes. Enter CTRL C to stop.

Error Reports – Three types of errors are reported: system fatal, device hard, and device soft errors. A system fatal error prevents the diagnostic from running to completion. A device hard error prevents the device being tested from completing the device test. A device soft error is a recoverable error. After reporting a device soft error, the diagnostic takes the action specified in the invoking command: halt on error, loop on error, or the default continue on error.

Error reports for D1 tests have three lines shown in the following example. Error reports for D0 tests have three lines plus the contents of the XPUD register.

EXAMPLE – SAMPLE ERROR REPORT

```
F          4        0118   000000002
SE         NI         00         T02
69   A5A5A5A5  00A5A5A5   000000000   00000010   1FF81020
```

Line 1 has four fields, that indicate:

F	A failure has occurred
4	The VAXBI node number
0118	The device type is a DEBNI module
000000002	The pass count in hexadecimal

Line 2 has four fields, that indicate:

SE	A soft device error
NI	The network interconnect (Ethernet link)
00	The unit number
T02	The test number

Line 3 has six fields, that indicate:

69	Error code (see Tables 10 and 11)
A5A5A5A5	Data expected
00A5A5A5	Data received
000000000	SCB offset (not applicable)
00000010	RAM location (expressed as the hexadecimal offset) of the data received
1FF81020	ROM PC (program counter) value at which the error was detected

Table 10 D0 Self-Test Error Codes

Code	Description
02	Expected device interrupt did not occur
03	Expected interrupt occurred at wrong IPL
04	Expected interrupt did not occur within the expected time interval
05	CRC computed is not equal to the CRC stored in ROM
06	Memory data comparison error
10	BIIC on-chip self-test failed
11	User Interrupt Control Register not expected after INTR
12	Inter-processor interrupt source node ID not expected after IPINTR occurred
13	IPINTR/STOP FORCE bit was not cleared after IPINTR occurred
14	Error Interrupt Control Register not as expected after INTR
15	Datamove Data Register 0 contents corrupted during BI/II windowing operation
16	RAM data was corrupted by an operation using the node's BI address range
17	Datamove Data Register contents are invalid after data move
18	RAM Destination contents are invalid after data move
19	BCI3 CSR Register Datamove flags indicate error after data move
20	MBOX test failure
21	Data comparison error on exception stack
22	PSL condition codes validation failure
23	Result of GPR/CSR/IPR operation not expected
30	LANCE register compare error
31	LANCE RAP compare error
32	LANCE RDP compare error
33	ENET PROM error
34	LANCE Transmit Descriptor 0 (TMD0) compare error
36	LANCE Transmit Descriptor 2 (TMD2) compare error
38	LANCE Receive Descriptor 0 (RMD0) compare error
40	LANCE Receive Descriptor 2 (RMD2) compare error
43	LANCE CRC compare error
44	LANCE interrupt count error

Table 11 D1 Self-Test Error Codes

Code	Description
01	Applicable for tests 1, 2, and 3 Unexpected exception or machine check
35	Applicable for test 1 LANCE transmit descriptor 1 (TMD1) compare error
37	Applicable for tests 1, 2, and 3 LANCE transmit descriptor 3 (TMD3) compare error
39	Applicable for test 1 LANCE receive descriptor 1 (RMD1) compare error
41	Applicable for test 1 LANCE receive descriptor 3 (RMD3) compare error
42	Applicable for test 1 Transmit/receive buffer compare error
45	Applicable for tests 2 and 3 Too many consecutive LANCE-reported RTRY (retry) errors
46	Applicable for tests 2 and 3 Too many consecutive LANCE-reported LCAR (loss-of-carrier) errors
47	Applicable for tests 2 and 3 Too many consecutive LANCE-reported LCOL (late collision) errors
48	Applicable for tests 2 and 3 Too many consecutive LANCE-reported OLFO (receiver overflow) errors
49	Applicable for tests 2 and 3 Too many consecutive LANCE-reported CRC errors
50	Applicable for tests 2 and 3 Too many consecutive LANCE-reported FRAM (framing) errors
51	Applicable for tests 2 and 3 Too many consecutive LANCE-reported BUFF (receive buffer) errors
52	Applicable for tests 2 and 3 Too many consecutive LANCE silo-pointer misalignment bug errors
53	Applicable for test 2 Too many consecutive LANCE transmit hang bug errors
54	Applicable for test 3 No node responded to MOP packets (setup error)

Table 11 D1 Self-Test Error Codes (Cont)

Code	Description
55	Applicable for tests 1 and 3 No packets transmitted
57	Applicable for test 1 No packets received
61	Applicable for tests 1, 2, and 3 LANCE failed initialization
63	Applicable for tests 1, 2, and 3 The MISS bit was set in the LANCE CSR0 indicating a missing packet
64	Applicable for tests 1, 2, and 3 The BABL bit was set in the LANCE CSR0 indicating a transmitter timeout
66	Applicable for tests 1, 2, and 3 The UFLO bit was set in LANCE transmit descriptor 3, indicating a truncated transmitted packet
68	Applicable for tests 1, 2, and 3 The MERR bit is set in LANCE CSR0, indicating a memory error
69	Applicable for tests 1, 2, and 3 The CERR bit is set in LANCE CSR0, indicating a loss of heartbeat

DECmux II STATISTICAL MULTIPLEXER

General Description

The DECmux II provides remote terminals with the ability to communicate with the MUXserver 100 through a statistically multiplexed synchronous communications link provided by RS-232-C synchronous modems and the public data network. (This link is referred to throughout this section as the COMPOSITE LINK). The composite links may be either RS-232-C modem or RS-422 long-line drive connections.

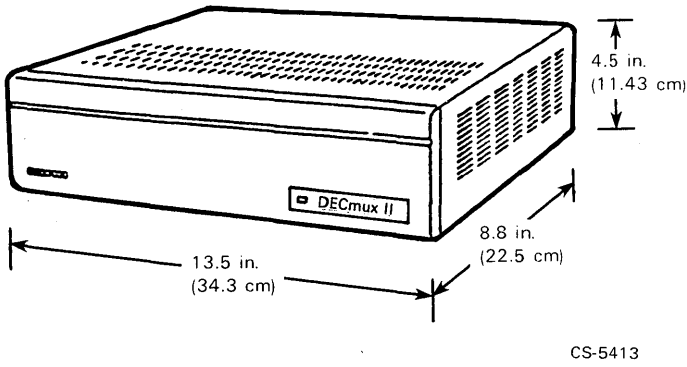


Figure 1 DECmux II Statistical Multiplexer

Product Configuration
There are two default configurations available on the MUXserver 100 and DECmux II. The MUXserver 100 determines the configuration selected based on the composite link connection.

Configuration Number 1 –

- All composite links are factory preset to 9600 baud, RS-232-C, full-duplex modem.
- All asynchronous lines are factory preset to 9600 baud, eight bits, no parity, and one stop bit.
- A partial configuration consisting of either DECmux II is also quite acceptable.

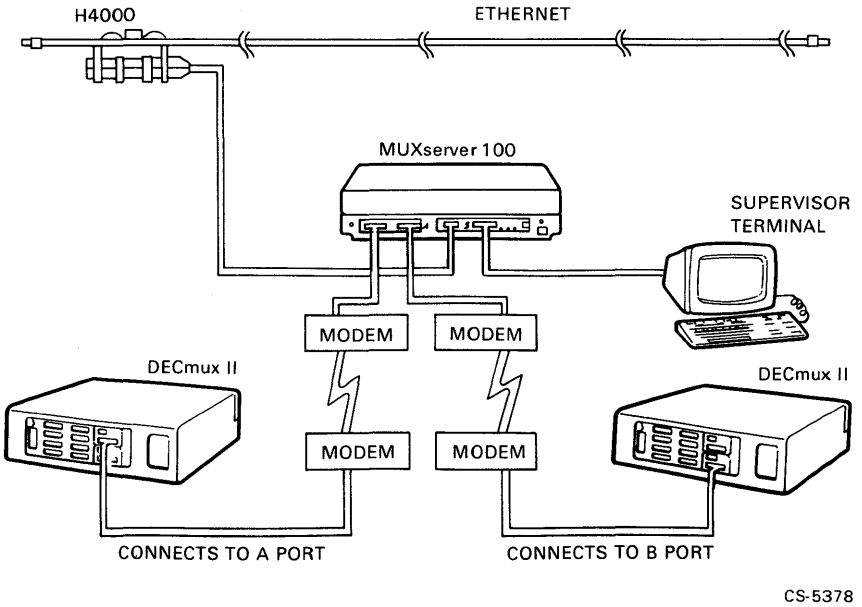


Figure 2 Default Multiplexer Configuration Number 1

Configuration Number 2 –

- All composite links are factory preset to 9600 baud, RS-232-C, full-duplex modem.
- All asynchronous lines are factory preset to 9600 baud, eight bits, no parity, and one stop bit.

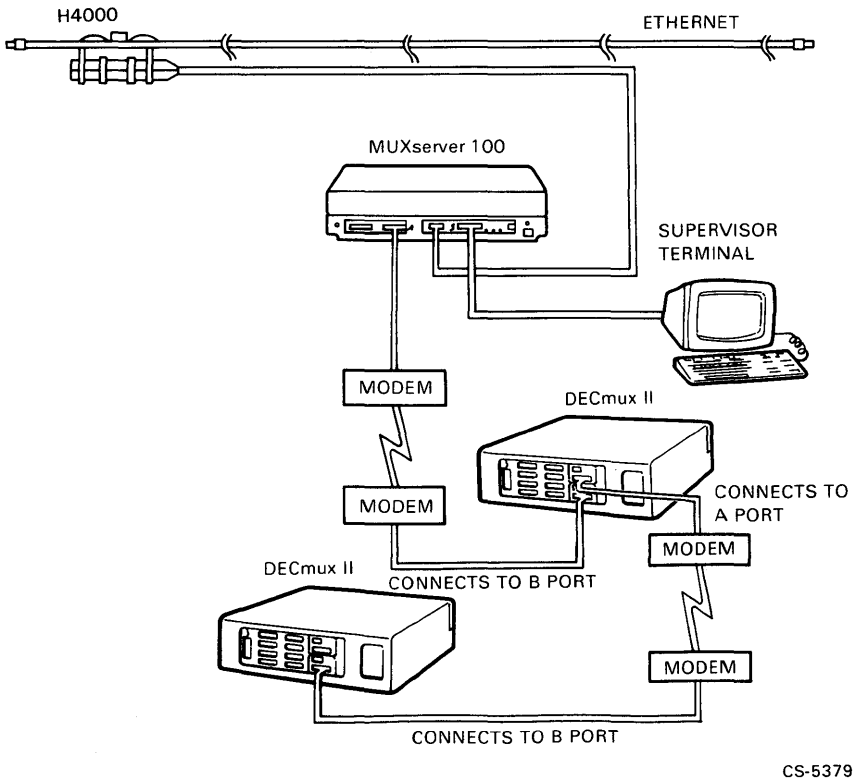


Figure 3 Default Multiplexer Configuration Number 2

DECmux II Versions

The DECmux II is available in two versions (DFMZA-BA and DFMZA-BB). Each version has different power requirements.

Model	Input Voltage
DFMZA-BA	100 - 120 Vac
DFMZA-BB	220 - 240 Vac

Reference Documentation

Refer to the following documents for more information on the DECmux II statistical multiplexer.

- *MUXserver 100 Remote Terminal Server Software Installation Guide (VMS/MicroVMS)* AA-JC20A-TE
- *MUXserver 100 Remote Terminal Server Software Installation Guide (RSX-11M-PLUS)* AA-JC19A-TC
- *MUXserver 100 Remote Terminal Server Software Installation Guide (Micro/RSX)* AA-JS34A-TY
- *MUXserver 100 Remote Terminal Server Software Installation Guide (ULTRIX-32/32m)* AA-JQ09A-TE
- *MUXserver 100 Network Reference Manual* EK-DSRZA-RM
- *MUXserver 100 Network Installation Manual* EK-DSRZA-IN
- *MUXserver 100 User's Pocket Guide* EK-DSRZA-PG
- *MUXserver 100 Network Identification Card* EK-DSRZA-ID
- *LAT Network Manager's Guide* AA-DJ18A-TK

Component List

The following parts are supplied with each DECmux II statistical multiplexer.

- One DECmux II statistical multiplexer
- Eight MUXserver 100 user's pocket guide
- One MUXserver 100 network reference manual
- One MUXserver 100 network installation manual
- Power cord set (DFMZA-BA only)
- One RS-422 test cable (P/N 70-20984-01)

Equipment Placement
The DECmux II can be located in a variety of environments, including offices and computer rooms, and can be stacked in multiple installations. Always allow 15 cm (6 in) of airspace around air vents, and place the DECmux II at least 45 cm (18 in) above the floor surface.

Environmental Requirements

Temperature	5° to 50°C (41° to 122°F)
Relative Humidity	10% to 95% (noncondensing)

Physical Description

Length	34.3 cm (13.5 in)
Width	22.5 cm (8.8 in)
Height	11.43 cm (4.5 in)
Weight	2.95 kg (6.5 lbs)

Power Requirements
The operating power range of the DFMZA system is contained in the following table.

Table 1 DFMZA Power Requirements

Version	Nominal Voltage Required	Voltage Range	Current	Frequency
-BA	120 Vac	100 – 120	0.5 A	47 to 63 Hz
-BB	240 Vac	220 – 240	0.3 A	47 to 63 Hz

Installation Flow Diagram

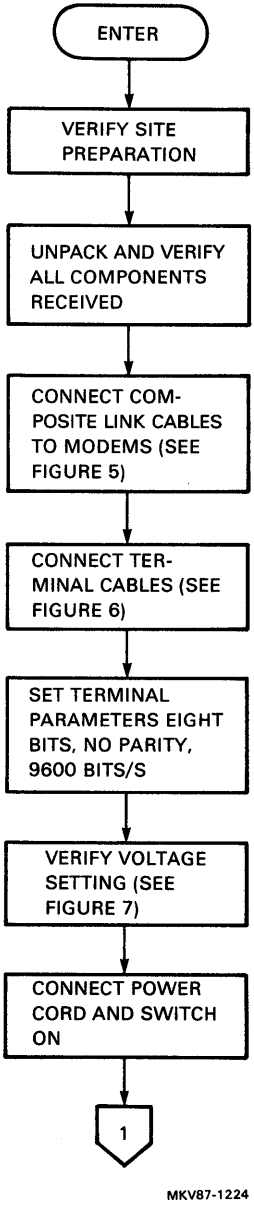


Figure 4 Installation Flow Diagram (Sheet 1 of 2)

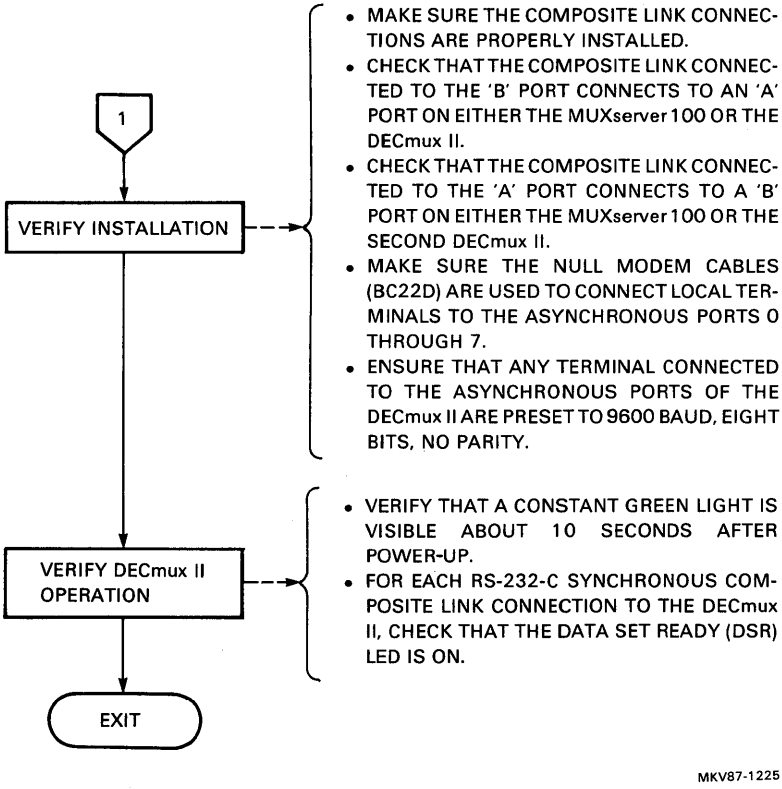


Figure 4 Installation Flow Diagram (Sheet 2 of 2)

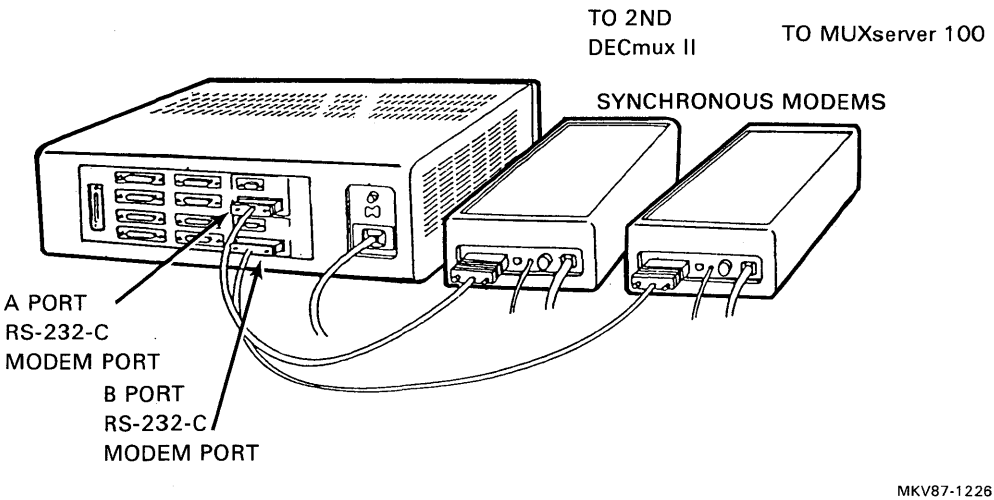


Figure 5 Connecting Composite Link Cable – Series Drop Configuration at Two Sites

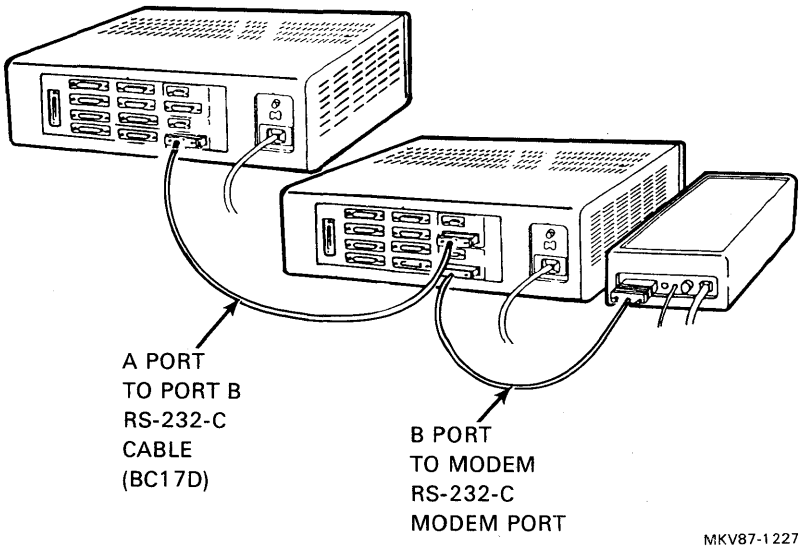
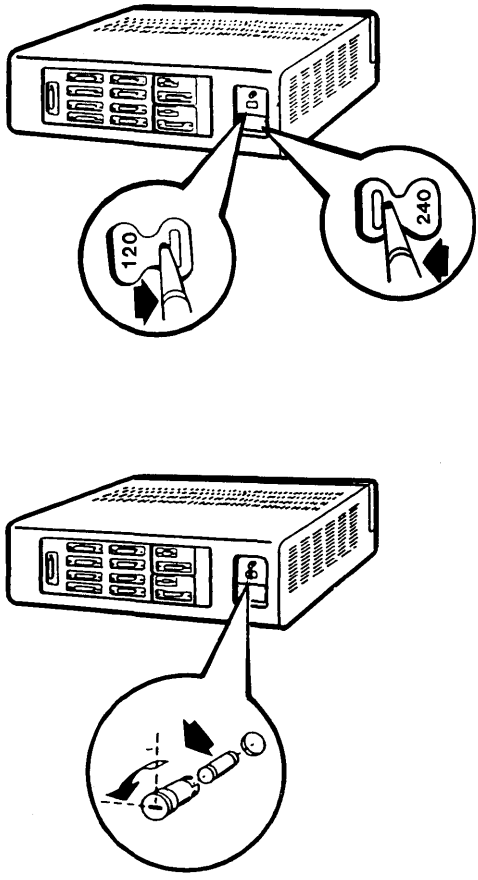


Figure 6 Connecting Composite Link Cable – Series Drop Configuration at One Site



NOTE
IF THE VOLTAGE SELECT SWITCH POSITION IS CHANGED, THE FUSE AND FUSE CARRIER MUST ALSO BE CHANGED.

MKV87-1228

Figure 7 Voltage Selection Switch and Fuse Carrier

Table 2 LED Indicators/Status

LED	State	Indication
POWER	ON	This (green) LED indicates that the power supply is OK.
	Blinking	Flashes briefly during power-up indicating that the start-up diagnostic is running. Goes OFF upon completion and turns ON permanently indicating the DFMZA is operational.
	OFF	When OFF, this may indicate that the power supply is not operational or malfunctioning.
DSR	ON	Indicates successful connection to a modem on the respective composite port.
	OFF	Indicates that the modem is either in the process of connecting or not connected.

Cabling

Figure 8 illustrates how the DECmux II is connected. There are three cable connections to consider:

- Synchronous composite link cable(s) (BC22F-xx)
- Data terminal cable(s) (BC22D-xx)
- Power cord (the electrical outlet must be within 1.8 m (6 ft) of the DECmux II.)

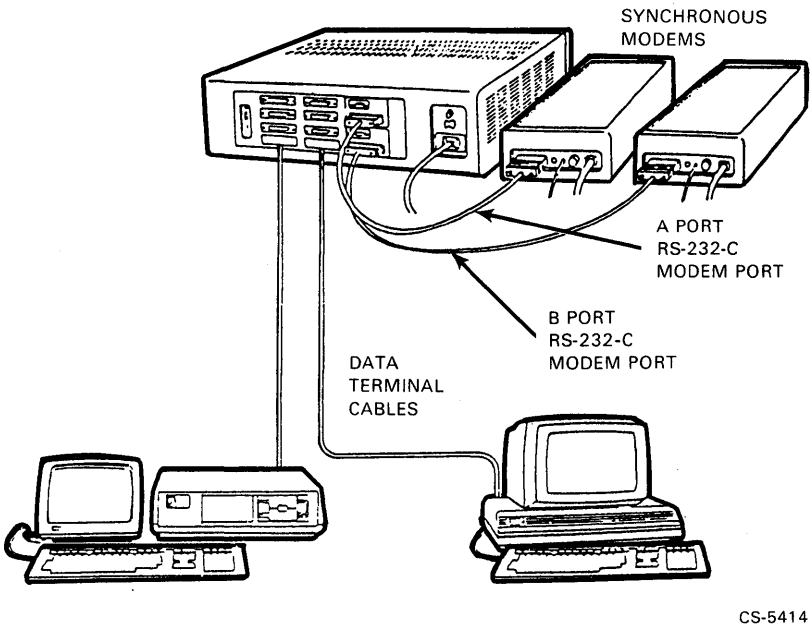


Figure 8 DECmux II Cabling

Diagnostics

There are no loadable diagnostics designed specifically for the DECmux II. There are extensive internal tests designed to check the operation of the DECmux II unit, the synchronous links, and the asynchronous line terminals.

The phases of testing are:

- Self-test of the DECmux II unit executed at power-up.
- Local loopback testing using turnaround connectors.
- Remote loopback testing using a DECmux II unit or MUXserver 100 (see Figure 9).

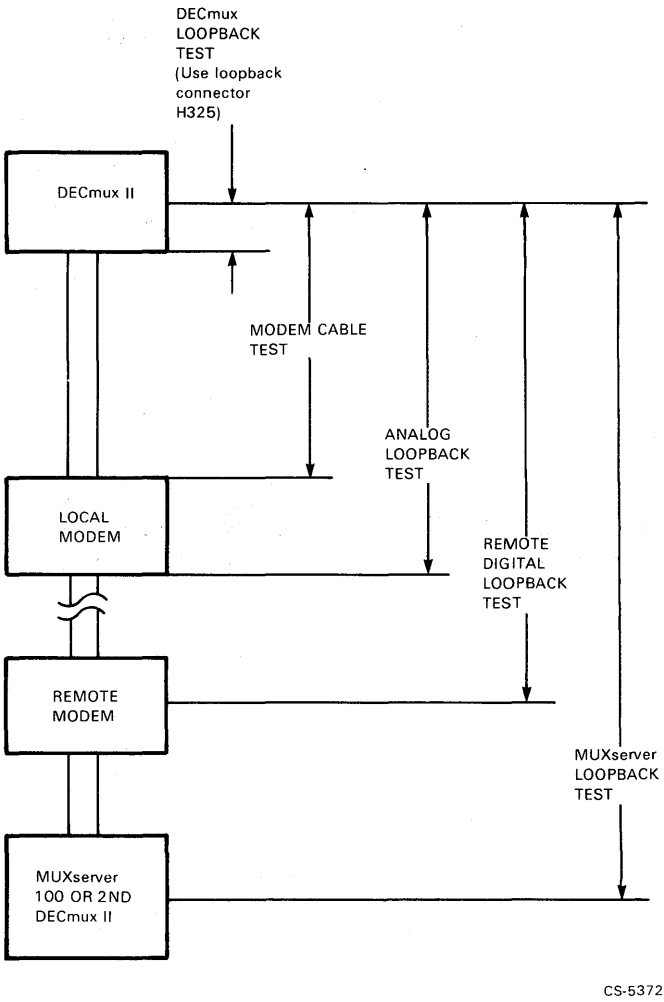


Figure 9 DECmux II Loopback Points

DECmux II Diagnostic Summary
The DECmux II diagnostics are evoked through the supervisor terminal by first entering the command processor and then typing TEST following the SYS> prompt.

NOTE
Evoking the Test mode in a DECmux II terminates operation at the multiplexer.

Off-line Test 1 – Basic Option Test – The Basic Option test is a repeat of the DECmux II power-up self-test. When started from the Test Menu, it continuously loops through the test until the HALT (CTRL C) command is given. Each test cycle prints a single line of characters, "012345678*" (refer to Table 3).

Table 3 Basic Option Subtest

Completion Code	Test Completed
0	Processor running
1	RAM pattern test
2	1st firmware ROM checksum
3	2nd firmware ROM checksum
4	Composite ROM checksum
5	Clock test
6	Silo test
7	Asynchronous internal loopback
8	Synchronous internal loopback
*	Nonvolatile memory checksum

Off-line Test 2 – Asynchronous Port External Test – It is necessary to fit a loopback connector (P/N H325) to each of the asynchronous ports being tested.

When the Asynchronous Port External test is selected, the operator will be prompted for details of the ports to be tested and their parameters. Enter each parameter followed by a RETURN. This test exercises each port by sending out serial data, which is received immediately on the same port due to the presence of the loopback connector.

The test loops continuously until the HALT (CTRL C) command is executed.

Off-line Test 3 – Asynchronous Internal Logic Test – The Asynchronous Internal Logic test runs immediately after being selected. The number of successful passes of the test are displayed. The test loops continuously until the HALT (CTRL C) command is executed.

The test transmits data over all eight asynchronous ports. The data is looped back internally to the port input and read from the input SILO by the microprocessor. The test can take up to 30 seconds to complete.

Off-line Test 4 – Composite External Port Test – This test requests the operator to select the composite port to be tested: A, B, or both. Before typing A, B, or RETURN (both), the loopback connector for the system configuration currently in use must be installed.

Long-Line Drive (RS-422)

1. Attach test cable (P/N 70-20984-01) between the Port A and Port B long-line drive 9-pin connectors.

2. At a remote DECmux II unit, if the remote connection is to a B port, then insert the test cable (70-20984-01) between the B port and the cable end. (Note that the second DECmux II unit must have its B port set to the same speed). If the remote connection is to an A port, then simply connect the test cable to the cable end. This difference is caused by the fact that B ports are the clock source and A ports receive the clock transmitted by the other port.

3. Use autoloopback through the remote MUXserver 100 or DECmux II unit. The remote multiplexer automatically detects that the loopback test is running and echoes all data being sent to it. It also prevents spurious messages from being sent to the unit under test.

RS-232-C

1. Insert loopback connector H325 directly into the RS-232-C composite port,

   or

2. Insert loopback connector H325 into the modem cable at the modem end,

   or

3. Switch modem to local loopback mode,

   or

4. Switch modem to remote loopback mode,

   or

5. Use autoloopback through the remote MUXserver 100 or DECmux II unit. The remote multiplexer automatically detects that the loopback test is running and echoes all data being sent to it. It also prevents spurious messages from being sent to the unit under test.

The test runs continuously until the HALT (CTRL C) command is executed.

Off-line Test 5 – Composite Internal Logic Test – This test is the same as Off-line Test 4, except that both channels are always tested and the loopback is internal.

Off-line Test 6 – Broadcast Test/Off-line Test 7 – Echo Test – These tests request the operator to enter details of the ports to be tested and their parameters. After the first asynchronous port details have been entered, RETURN is typed in response to the prompt for the port number. The test then starts immediately. The message is broadcast continuously until the HALT command (CTRL C) is executed.

Off-line Test 8 – Modem Control Test – This test exercises the modem control signals of the eight asynchronous ports and the two composite ports.

Ensure that a loopback connector (P/N H325) is inserted in all eight asynchronous ports and the two composite RS-232-C ports. The DSR A and B indicators should be ON. When selected, the test runs immediately and the cumulative number of passes is displayed. The test continues until the HALT command (CTRL C) is executed.

Identifying Problems with the DECmux II
This section lists two possible hardware installation problems, probable causes, and what to do to correct the problems. The problems are:

1. No GREEN light.
2. DSR indicators not visible.

SYMPTOM: NO GREEN LIGHT

The GREEN LED start-up indicator located on the front bezel is a three-stage indicator. It indicates power supply OK, start-up diagnostics running, and start-up diagnostics complete.

Following power-up, the LED flashes briefly, indicating that the power supply is OK. The indicator then turns OFF for several seconds indicating that the start-up diagnostic is being run. On successful completion of the start-up diagnostic, the indicator turns ON permanently, indicating the DFMZA is now operational.

If the start-up indicator follows any pattern other than the one described above, turn the DECmux II main power OFF, wait 20 seconds, and reapply the main power. If the second attempt is not successful, the unit is faulty and requires service.

Table 4 No GREEN Light

Probable Cause	What To Do
DECmux II power cable is not connected securely	Check power cable at both ends.
No power in wall outlet	Check outlet with a working device (such as a lamp).
Incorrect voltage switch setting	Check that the voltage select switch on the back of the DECmux II is set at the correct voltage setting. Unplug the power cord before changing it.
DECmux II fuse is defective	Unplug the power cord and replace fuse.

SYMPTOM: NO DSR LIGHT

The two RED LED indicators on the rear connector indicate the status of the composite port Data Set Ready (DSR) conductors. The ON state indicates successful connection to a modem on the respective composite port. The OFF state indicates that the modem is either in the process of connecting or not connected.

Table 5 No DSR Light

Probable Cause	What to Do
Modem cable not connected properly	Check that the modem cable BC22F is connected between the composite port (A or B) and the synchronous modem.
Modem faulty	Check modem.

Identifying Problems with the Composite Link

For verification of a failure on the link, use the MAP command from the supervisor port of the MUXserver 100 or DECmux II. If a DECmux II unit is not shown on the MAP, or the link to a particular DECmux II is shown as DOWN, then the composite link communications has failed. Refer to Chapter 2, Section 2.6 and Chapter 4, Section 4.3 of the *MUXserver 100 Network Reference Manual.*

On a normal composite link, the link speed is determined by the speed of the external modems. The link speed for RS-232-C links must be set up to be compatible with that of the modems used, with a maximum of 19.2K baud. For RS-422 links, a speed setting of 19.2K baud or 38.4K baud is recommended.

Changing composite link parameters requires access to the supervisor ports of the DECmux II units; however, once set at installation time, will not require further changes.

Table 6 Composite Port Parameters

Parameter	Default	Options
Speed	9600 baud	1200, 2400, 4800, 9600, 19200, 38400 baud
Modem Control	Enabled	Enable, Disable
Line Type	RS-232-C	RS-232-C, RS-422 Long-line drive

Resetting the DECmux II Unit to Factory Settings

The software reset feature permits a change of data in the permanent database to DIGITAL factory specifications. The DECmux II has a RESET switch which is inside the unit. To reset to factory settings proceed as follows.

NOTE

It is recommended that reset factory settings on a DECmux II unit only be performed by a qualified service technician.

WARNING

This procedure requires power to be applied with the protective cover removed. Damage to the hardware/user could result if not done correctly.

1. Turn OFF the power and remove the power cord.
2. Remove the top cover from the DECmux II unit.
3. Locate the RED RESET switch beside the fan.
4. Press the RED RESET switch and, while holding it down, reconnect power to the unit; that is, power up the unit with the RESET switch ON. Hold the RESET switch down until internal diagnostics complete.
5. After the DECmux II unit has completed its diagnostic test (indicated by the GREEN indicator on the front of the unit), remove power and replace the top cover.

The unit has been reset to factory default values.

DECmux 300 REMOTE TERMINAL MULTIPLEXER

General Description

The DECmux 300 provides connections between the MUXserver 300 and remote terminals or computer ports. Each DECmux 300 can serve up to 32 remote terminals. The DECmux 300 serves terminals through either EIA-232-D terminal ports (Figure 1) or DEC423 terminal ports (Figure 2).

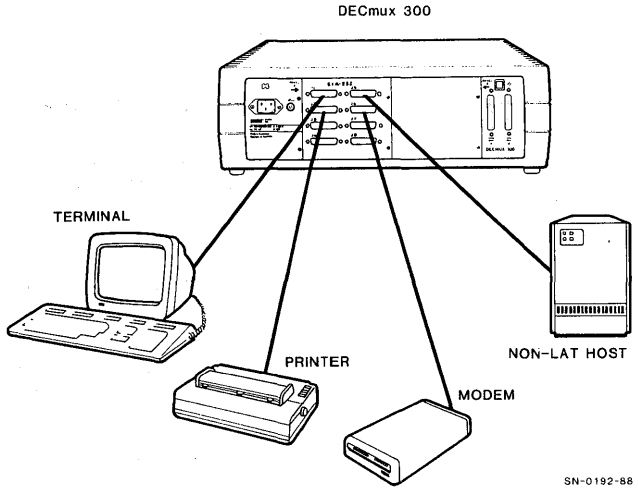


Figure 1 EIA-232-D Terminal Port Connections

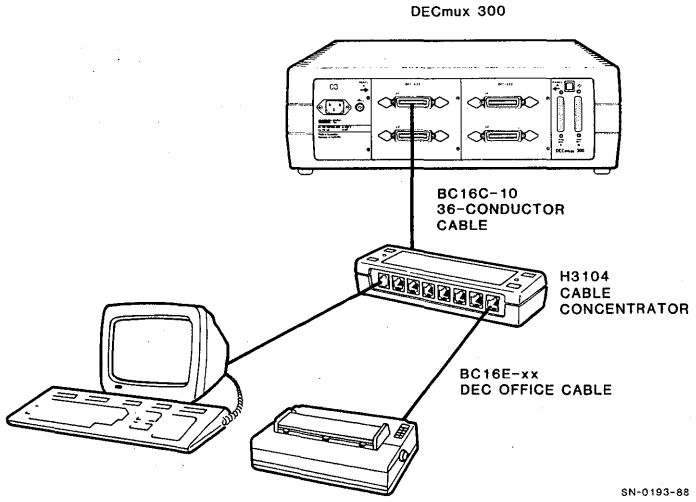


Figure 2 DEC423 Terminal Port Connections

Product Configurations

Many different configurations of MUXserver/DECmux 300 networks are possible with the following constraints.

- There can be only one MUXserver 300 in a MUXserver/DECmux 300 network.
- The maximum number of DECmux 300 units in a MUXserver/ DECmux 300 network is six.
- The DECmux 300 units must be connected to the MUXserver 300 by composite links either directly or indirectly (by daisy-chaining the DECmux 300 units).
- A maximum of three DECmux 300 units can be daisy-chained together.
- The MUXserver/DECmux 300 network must be a linear network; that is, it must not contain circular composite link paths. As a result, there can be only one composite link path between any DECmux 300 and the MUXserver 300, and there can be only one composite link path between any two DECmux 300 units.

Refer to the *MUXserver/DECmux 300 Network Reference Manual* for more details on network configurations.

Two typical MUXserver/DECmux 300 configurations are shown in Figures 3 and 4.

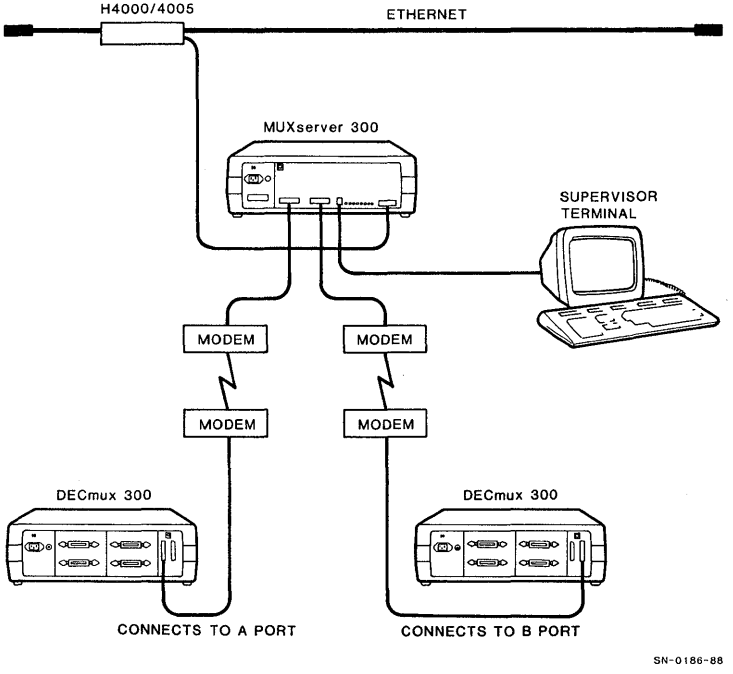


Figure 3 MUXserver/DECmux 300 Network Configuration 1

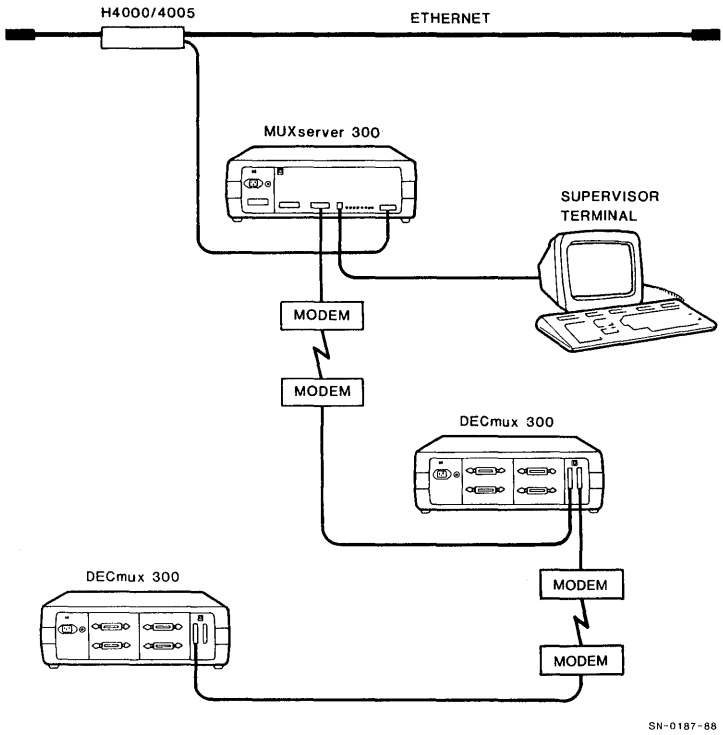


Figure 4 MUXserver/DECmux 300 Network Configuration 2

DECmux 300 Versions

Table 1 shows the available versions of the DECmux 300, and Table 2 shows upgrade kits that can be used to expand the number of ports.

Table 1 DECmux 300 Versions

Model	Description	Voltage
DM308-AA	8 EIA-232-D ports	100 to 120 Vac
DM308-AB	8 EIA-232-D ports	220 to 240 Vac
DM316-AA	16 EIA-232-D ports	100 to 120 Vac
DM316-AB	16 EIA-232-D ports	220 to 240 Vac
DM316-BA	16 DEC423, type III ports	100 to 120 Vac
DM316-BB	16 DEC423, type III ports	220 to 240 Vac
DM332-BA	32 DEC423, type III ports	100 to 120 Vac
DM332-BB	32 DEC423, type III ports	220 to 240 Vac

Table 2 DECmux 300 Upgrade Kits

Part Number	Description
CK-DM308-A7	8-line EIA-232-D upgrade kit
CK-DM316-W7	16-line DEC423 upgrade kit

Reference Documentation

Refer to the following documents for more information on the DECmux 300 remote terminal multiplexer.

- *MUXserver/DECmux 300 Network Installation Manual* EK-DSRZC-IM
- MUXserver 300 Software Installation Guides:

  Software Installation Guide for VMS AA-MJ87A-TE
  Software Installation Guide for ULTRIX/ULTRIX-32m AA-MJ92A-TE
- *MUXserver/DECmux 300 Network Reference Manual* EK-DSRZC-RM
- *MUXserver/DECmux 300 Network Identification Card* EK-DSRZC-IC
- *MUXserver/DECmux 300 User's Guide* EK-DSRZC-UG
- *MUXserver 300 Technical Manual* EK-DSRZC-TM
- *DECmux 300 Technical Manual* EK-DSRZC-TD

Component List

The following items are required for each DECmux 300 installation.

- 1 DECmux 300 remote terminal multiplexer unit
- 1 synchronous port loopback connector (H3199)
- 1 EIA-232-D loopback connector (12-15336-08) or 1 DEC423 36-pin loopback connector (H3101)
- 1 rack mounting kit (H041-AC)
- 1 *MUXserver/DECmux 300 Network Installation Manual*
- 1 *MUXserver/DECmux 300 User's Guide*
- 1 country kit
- 1 adapter cable and extension cable for each synchronous port to be connected.
- 1 BC22x-xx device cable for each device to be connected to the EIA-232-D ports
- 1 set of the following cables for each 36-pin connector on the DECmux 300
  - H3104-B DEC423 adapter kit and extension cable
  - BC16E-xx DEC OFFICE cable with appropriate adapter connector (H8571-x), if necessary, for each port device to be connected.

Equipment Placement

The DECmux 300 can be located in a variety of environments, including offices and computer rooms. The DECmux 300 can be rack or wall mounted or placed on a desk or shelf. The following environmental conditions must be met.

Environmental Requirements

Temperature	5° to 50°C (41° to 122°F)
Relative Humidity	10% to 90% (noncondensing)

Physical Description

Length	49.4 cm (19.4 in)
Height	16.2 cm (6.4 in)
Depth	31.3 cm (12.3 in)
Weight (unpacked)	6.0 kg (13.2 lb)

Power Requirements

The operating power range of the DECmux 300 is provided in Table 3.

Table 3 DECmux 300 Power Requirements

Version	Voltage Range	Current	Frequency	Power (Maximum)
DM3xx-XA	100 to 120 Vac	3.0 A	60 Hz	180 W
DM3xx-XB	200 to 240 Vac	1.5 A	50 Hz	180 W

Installation Flow Diagram

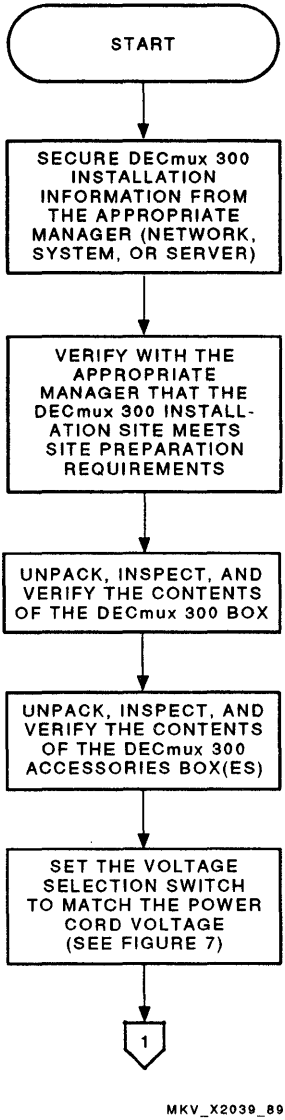


Figure 5 Installation Flow Diagram (Sheet 1 of 4)

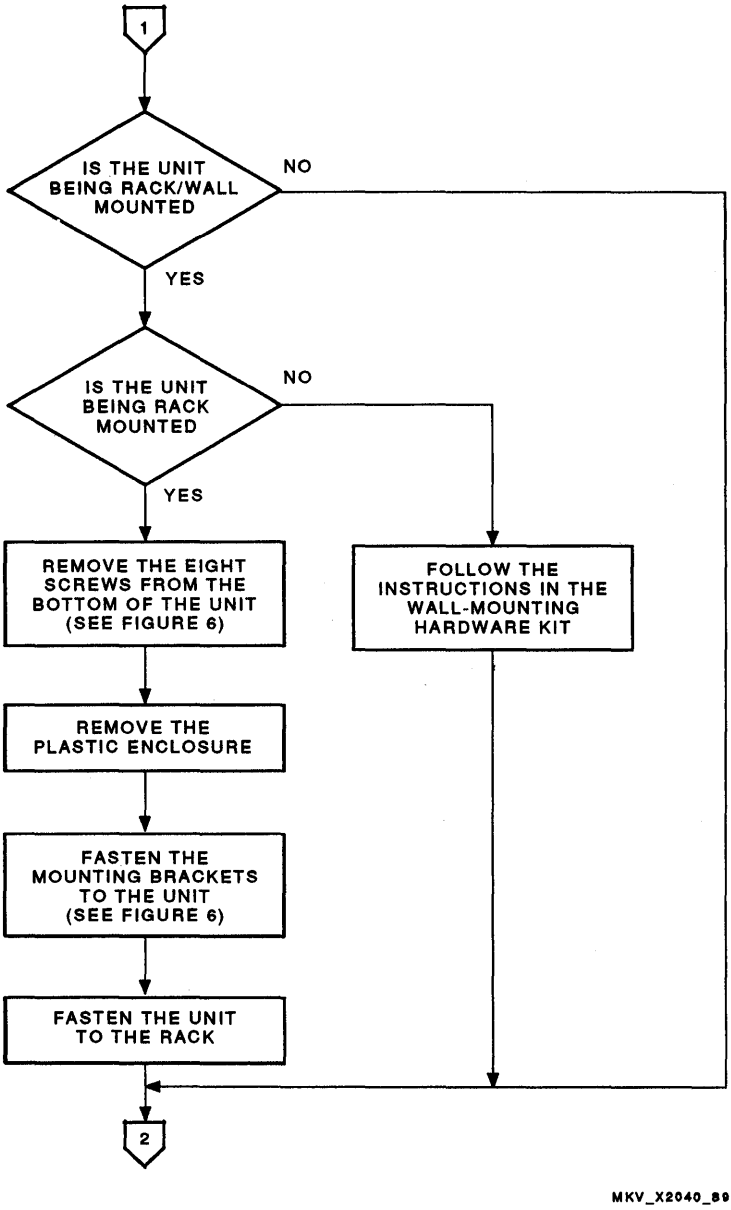


Figure 5 Installation Flow Diagram (Sheet 2 of 4)

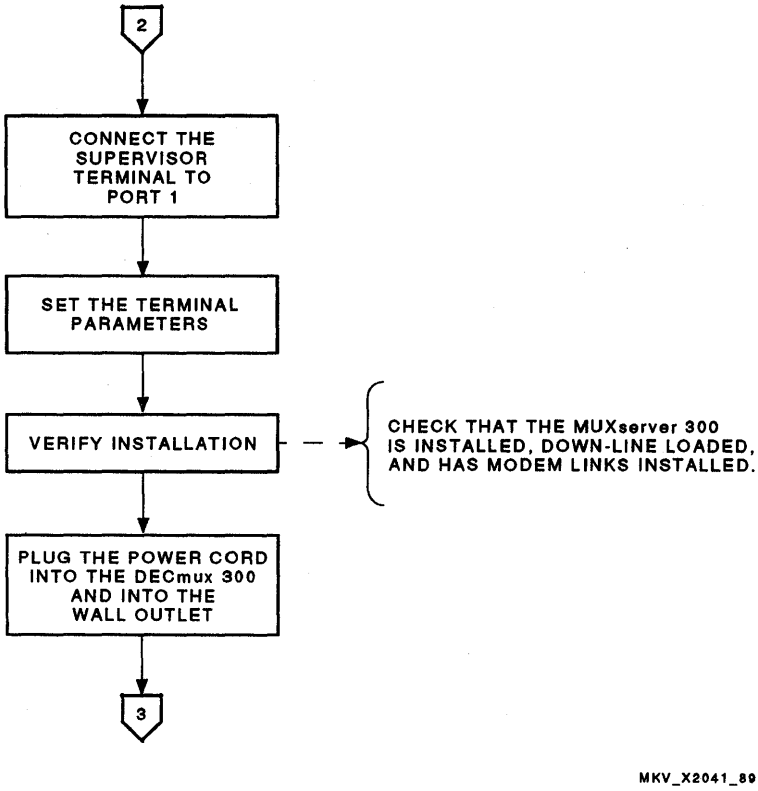


Figure 5 Installation Flow Diagram (Sheet 3 of 4)

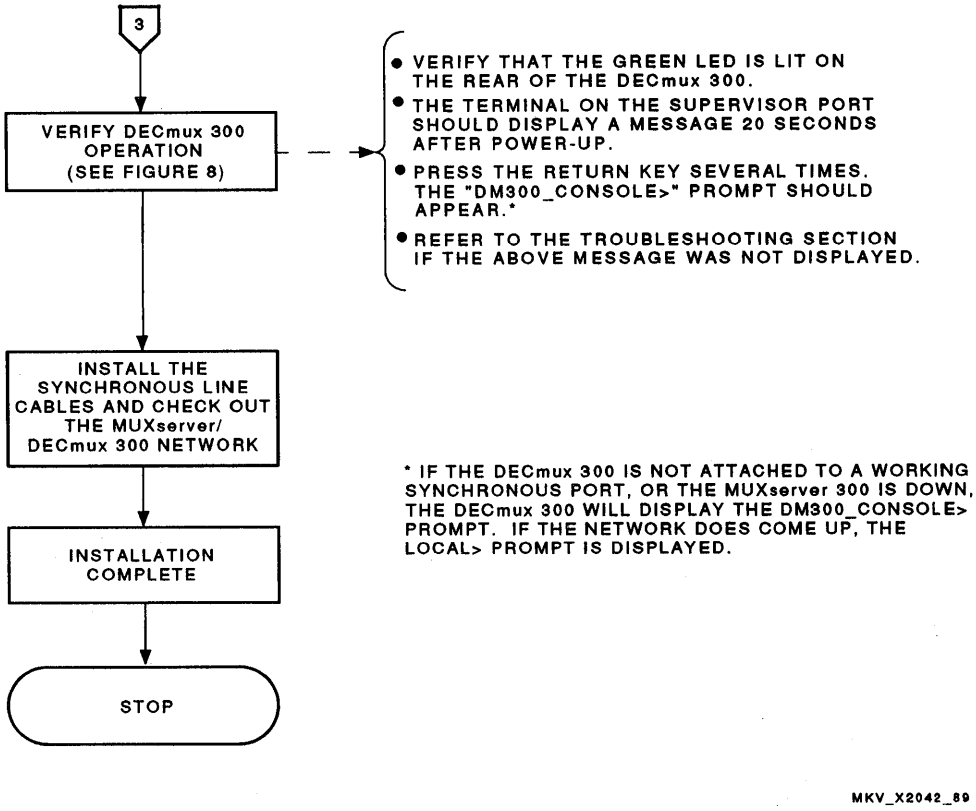


Figure 5 Installation Flow Diagram (Sheet 4 of 4)

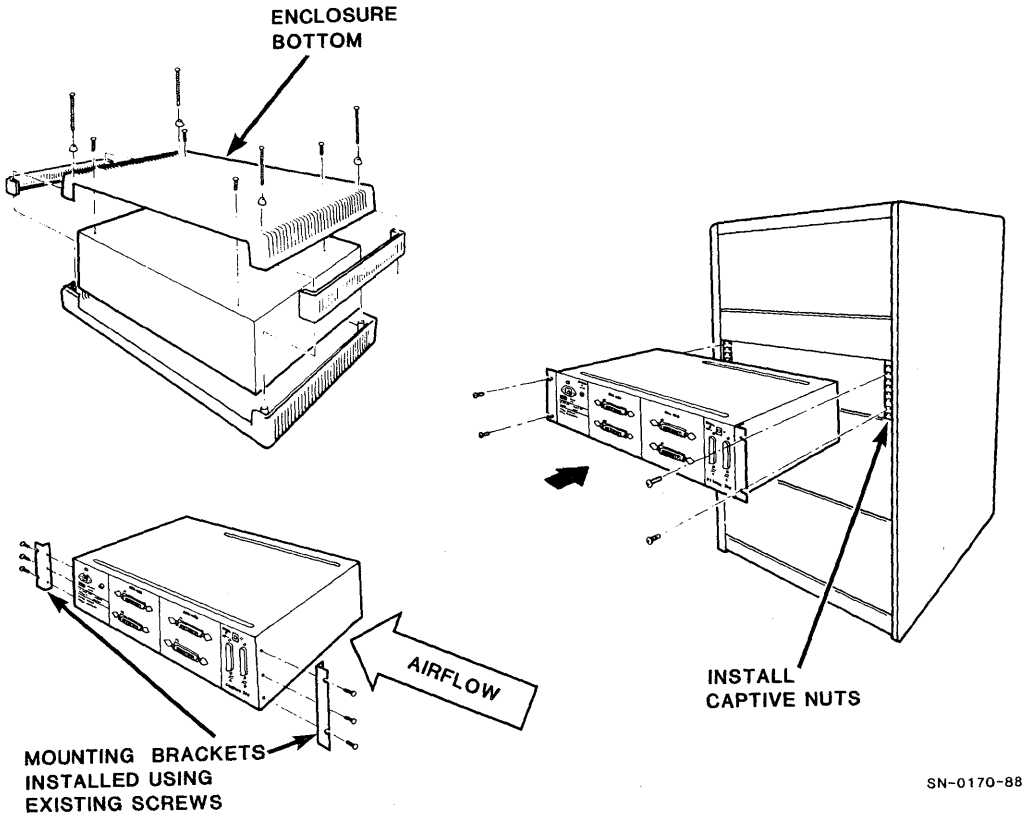


Figure 6 Rack Mounting the DECmux 300

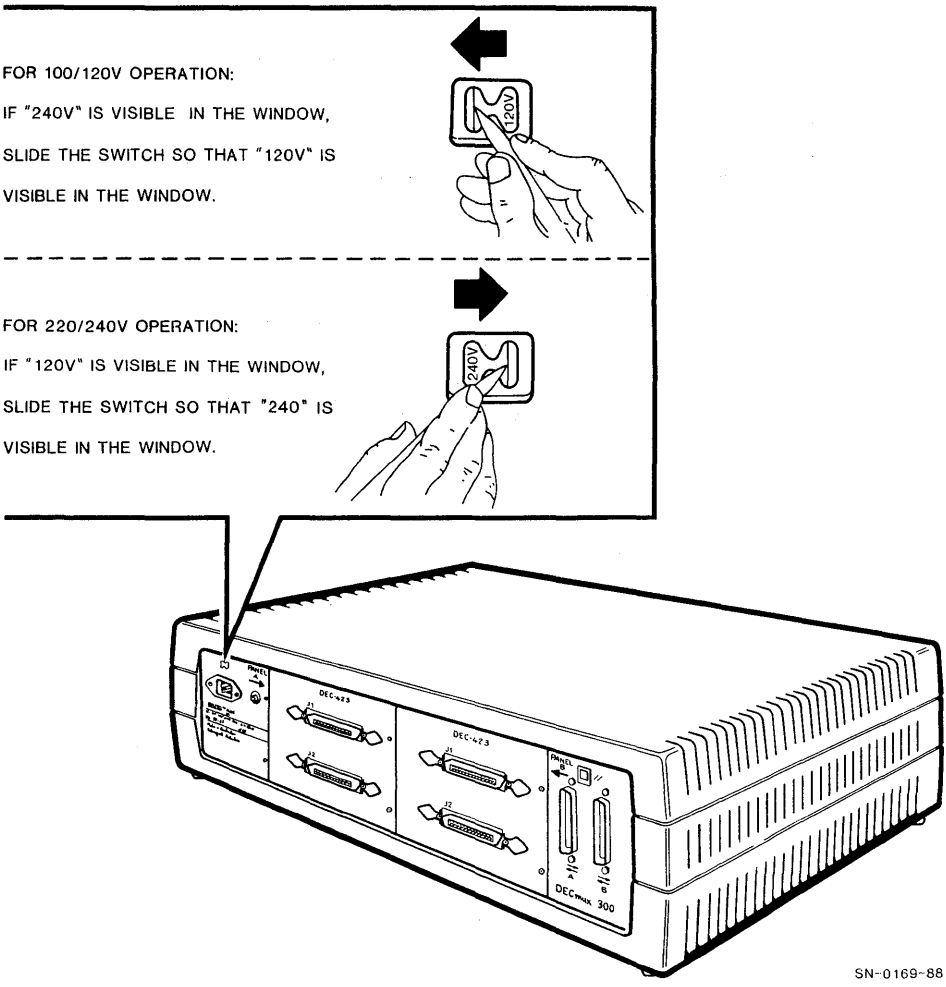


Figure 7 Selecting Operating Voltage

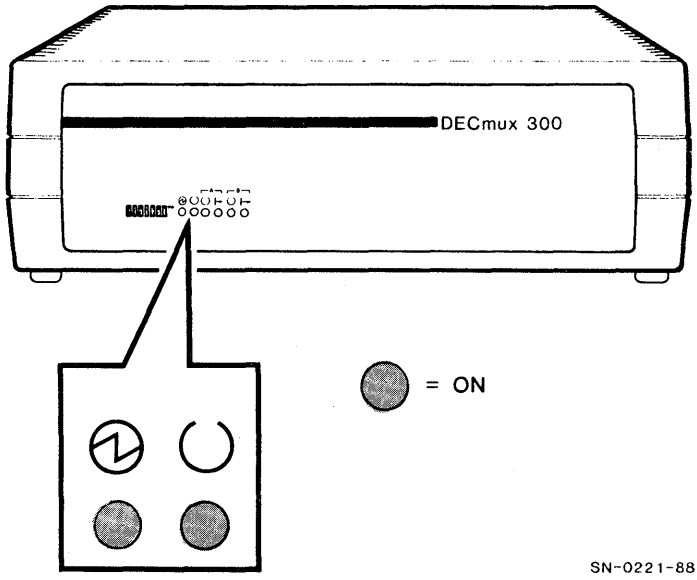


Figure 8 Proper LED Indication for Successful Installation

Configuring the DECmux 300 into the Network
In order for the DECmux 300 to form a part of the MUXserver/DECmux 300 network, it must have station and composite link parameters set up.

NOTE
The DECmux 300 will operate with factory default parameters. Configuring the DECmux 300 is optional.

Configuring the Station Parameters – Each station must be set up so that it has a unique identity in the MUXserver/DECmux 300 network. This requires a station name and may also include a station identification character string.

The station name will be assigned by the MUXserver 300 if none is specified before it is first connected into the MUXserver/DECmux 300 network. This default name is in the form "Station_xy" where x is the number of the MUXserver 300 port to which the station is attached, and y is the number of hops from the MUXserver 300 to the station.

To define the station name to something other than the default value enter the following command.

DM300_Console> DEFINE STATION NAME "station_name"

Where station_name is the name chosen to identify the station.

To define the station identification string enter the following command.

DM300_Console> DEFINE STATION IDENTIFICATION "identification string"

Where identification string is the character string chosen as the station identification.

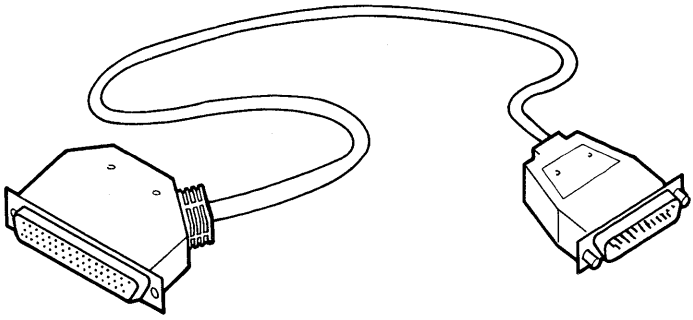
To enter these values into the operational data base, use the SET command or initialize the station. Verify the station parameters by using the SHOW STATION CHARACTERISTICS command.

Configuring the Composite Link – The various link parameters, along with their possible values and default values, are listed in the *MUXserver/DECmux 300 Network Reference Manual.* A working link can be established by using the factory default values.

Connecting Synchronous Composite Link Cables

1. Ensure that the synchronous modems have been set up with the appropriate operating parameters and are powered ON. In particular, the modems must be set to supply both transmit and receive clocks to the DECmux 300.

2. Locate the appropriate composite port adapter cable and the extension cable (if required) in one of the accessories boxes.



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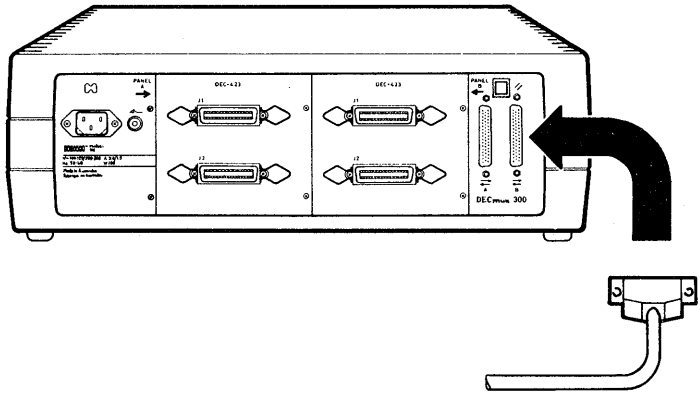
3. Connect the 50-pin connector to either port A or port B and tighten the connector screws.



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4. Connect the other end of the adapter cable to one end of the appropriate extension cable.

5. Connect the other end of the extension cable or the adapter cable to the synchronous modem.

   The yellow Composite Link Ready LEDs for each composite port will illuminate if that port is connected to a synchronous modem and the modem is powered ON and functioning correctly.

6. Repeat steps 1 through 5 for the other composite port if required.

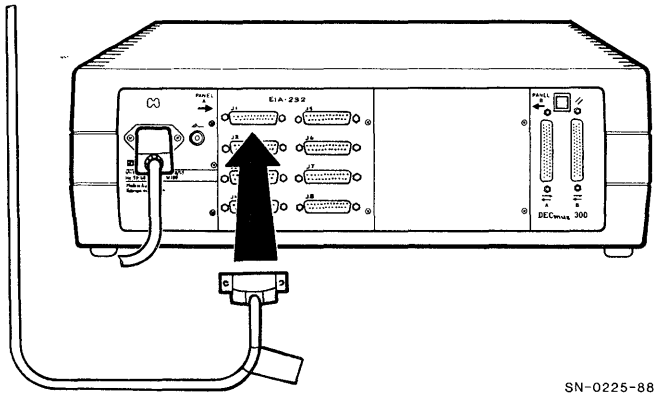
NOTE

If using the RS-422-A null-modem cable (BC19Y-10) to connect the DECmux 300 with a local DECmux 300 or MUXserver 300, connect one end of the cable to the composite port on the DECmux 300 and the other end of the cable to the composite port on the DECmux 300 or MUXserver 300.

For interface specific guidelines refer to the *MUXserver/DECmux 300 Network Installation Manual.*

Connecting EIA-232-D Device Cables

1. Disconnect the power cord from the DECmux 300.
2. Contact the Server Manager to determine if certain devices were allocated to specific DECmux 300 ports.
3. Determine which DECmux 300 port to use for each device.
4. Make two labels for each cable, marking each label with source and destination information.
5. Attach one label at each end of each device cable.
6. Connect one end of the cable to the appropriate device as marked on the label.
7. Connect the other end of the cable to the DECmux 300 connector marked on the cable.



8. Install all other device cables in the same way.
9. When all device cables are installed, go to the **DECmux 300 DIAGNOSTICS** section.

Connecting DEC423 Device Cables

1. Disconnect the power cord from the DECmux 300.
2. Contact the Server Manager to determine if certain devices were allocated to specific DECmux 300 ports.
3. Ensure that all required accessories are available.
4. Locate (if required) the H8571-x DEC423 to EIA-232-D passive adapter. They are:

   H8571-A used with 25-pin D-type connectors

   H8571-B used with 9-pin D-type connectors

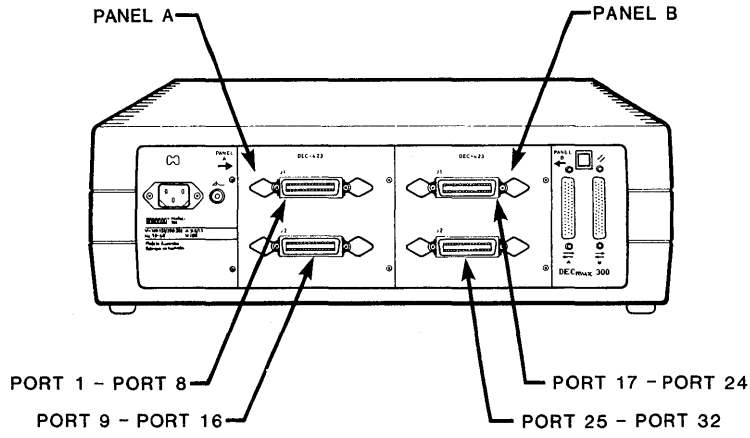
5. Connect the H8571-x adapter (if required) to the communications port of the devices that use the associated connector.
6. Determine which DECmux 300 36-way connector (J1 or J2) on each panel to use for each device.

   Ports 1 to 8 appear on J1 of Panel A

   Ports 9 to 16 appear on J2 of Panel A

   Ports 17 to 24 appear on J1 of Panel B

   Ports 25 to 32 appear on J2 of Panel B



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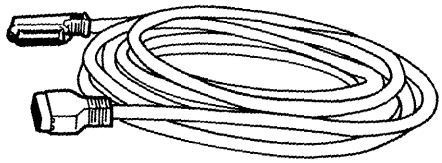
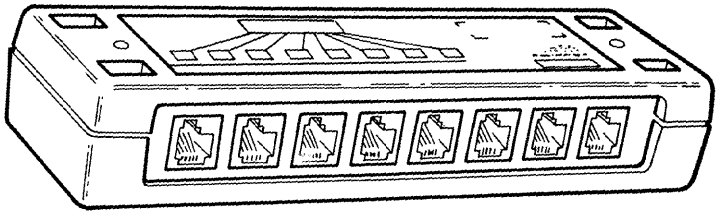
7. Locate the H3104-B DEC423 adapter kit. The kit includes:

BC16C-10 36-Conductor Cable



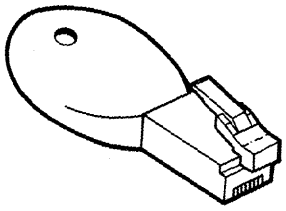
H3104 Cable Concentrator

SN-0227-88



H3103 MMJ Loopback Connector

SN-0228-88



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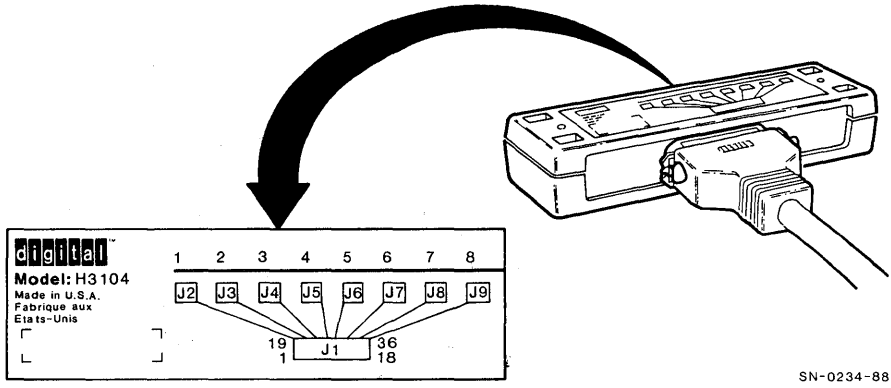
8. Install the H3104 cable concentrator in one of the following.

   Satellite Equipment Room rack

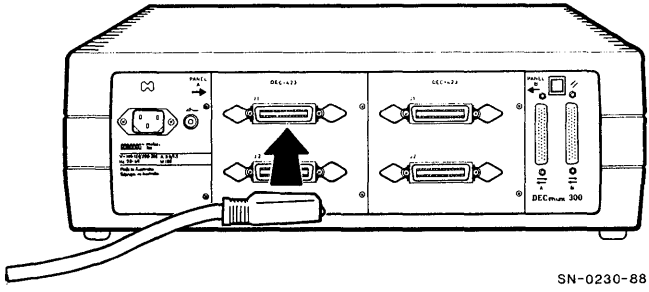
   A wall or faceplate

   Desk or table

The decal on the cable concentrator represents the order of the ports on the concentrator. That is, MMJ1 on the concentrator corresponds to port 1 for J1 of Panel A and corresponds to port 17 for J1 of Panel B and so forth.



9. Connect one end of the BC16C-10 36-conductor cable to the appropriate connector on the DECmux 300. The cable can have a straight or right-angle end connector.



10. Lock the cable plug to the connector using the spring latches provided on the DECmux 300 connector.

11. Connect the other end of the BC16C-10 36-conductor cable to connector J1 on the H3104 cable concentrator.

12. Lock the cable plug to connector J1 with the spring latches provided on the J1 connector.

13. Determine which DECmux 300 port to use for each device.

14. Locate the BC16E-xx 6-conductor cable (DEC OFFICE cable).

15. Make two labels for each cable, marking each label with source and destination information.

16. Attach one label to each end of each BC16E-xx cable.

17. Connect one end of the cable to the cable concentrator MMJ that corresponds to the DECmux 300 port marked on the label.

18. Connect the other end of the cable to the H8571-x adapter, or to the appropriate device connector, as marked on the label.

19. Repeat steps 14 through 18 for each device to be connected to the same 36-way connector.

20. Repeat steps 6 through 13 to connect cable concentrators to each 36-way connector on the DECmux 300.

21. When all device cables are installed, go to the **DECmux 300 DIAGNOSTICS** section.

Self-Test Diagnostics
The DECmux 300 self-test can run in one of the following modes.

- Normal mode
- Manufacturing mode
- Fatal Error mode

Normal Mode – This is the mode under which the self-test diagnostic typically runs. If no errors are detected in Normal mode, the test runs for about 33 seconds, lights the Ready LED, and transfers control to the DECmux 300 firmware. If a fatal error is detected, self-test enters the Fatal Error mode.

Manufacturing Mode – Self-test runs in this mode when the manufacturing mode jumper is connected. In this mode, the self-test program loops continually through all the individual tests.

NOTE
The READY LED flashes at the completion of each test. If a fatal error is detected, the READY LED is ON permanently. When a complete cycle of tests is completed, the yellow LEDs and the Ready LED flash together.

Manufacturing mode tests dynamic memory more extensively and runs for about 55 seconds. All errors are fatal and cause the Ready LED to light and halt the test.

To terminate the Manufacturing mode, remove the jumper and recycle power.

Fatal Error Mode – Self-test enters the Fatal Error mode when a fatal error is detected. All errors are fatal in Manufacturing mode.

The error routine WRITEs the name of the test that failed to a byte in the EEPROM.

In Manufacturing mode, a test restart is disabled until the error code in EEPROM is cleared by the power-up reset procedure.

Self-Test Program Tests
There are two groups of tests that are run during the self-test program; the asynchronous side tests and the synchronous side tests. Refer to the *DECmux 300 Technical Manual* for details.

Status Indicator LEDs

The status of the DECmux 300 is indicated by the Status Indicator LEDs on the control/indicator panel of the DECmux 300. The six indicators and their descriptions are provided in Table 4.

Table 4 DECmux 300 Status Indicator LEDs

LED Name	Symbol	Color	State	Symptom
Power		Green	ON	Internal dc supply voltages are correct
			OFF	1. No power connected 2. Internal dc supply voltages are not correct
Ready		Green	ON	Self-test passed
			OFF	1. Self-test in progress 2. Fatal error detected
			Flash	Nonfatal error detected
Chn A Ready		Yellow	ON	Modem connected to Composite Link A is ready
			OFF	Modem connected to Composite Link A is not ready
Chn A On-Line		Yellow	ON	Communications via Composite Link A to the associated MUXserver 300 or DECmux 300 is established
			OFF	Communications via Composite Link A to the associated MUXserver 300 or DECmux 300 is not established
Chn B Ready		Yellow	ON	Modem connected to Composite Link B is ready
			OFF	Modem connected to Composite Link B is not ready
Chn B On-Line		Yellow	ON	Communications via Composite Link B to the associated MUXserver 300 or DECmux 300 is established
			OFF	Communications via Composite Link B to the associated MUXserver 300 or DECmux 300 is not established

The meaning of the Ready LED is expanded as follows.

- Normal mode
  - Ready LED ON – Self-test has completed without detecting any errors.
  - Ready LED blinking (250 ms ON/250 ms OFF) – Indicates a nonfatal hardware error and an error message is displayed on the console terminal. Refer to the *MUXserver/ DECmux 300 Network Reference Manual* for a complete description of the diagnostic error messages.
- Manufacturing mode
  - Ready LED ON – A fatal hardware error was detected.
  - Ready LED ON (for 25 ms periodically) – Self test is executing successfully.
  - Ready LED blinking (250 ms ON/250 ms OFF) – The EEPROM error byte is not cleared.

Troubleshooting

What to do First –

1. Check the DECmux 300 Status LEDs.
   a. Table 5 will help in interpreting these LEDs.
2. Check the console error messages.
   a. Examples 1 through 2 list the console error messages.
   b. Configure the console terminal for 9600 bits/s, no parity, and 8-bit characters.

Table 5 DECmux 300 LED Indications

Symptom	Problem	Correction
Power indicator LED OFF	No dc voltage	Verify that ac power is applied to the unit. Ensure that the voltage select switch is set to the correct country voltage. Reset the circuit breaker. Replace the power supply.
Ready LED remains OFF for more than 60 seconds	Fatal hardware error	Replace the logic module.
Ready LED blinking	Nonfatal hardware error	See Example 1.

Example 1: Error Messages

Local -920- Parameter checksum error on port n
Local -921- Factory-set parameters applied to port n

Local -922- Port hardware error on port n
Local -923- Port n has been disabled

Local -930- Server parameters checksum error
Local -931- Factory-set server parameters applied

Local -932- Hardware revision level checksum error

Local -933- Station parameter checksum error
Local -934- Factory-set station parameters applied

Local -935- Service parameter checksum error
Local -936- Service has been disabled

Local -937- Link characteristics checksum error
Local -938- Factory-set link parameters applied

Local -950- Troubleshooting procedures should be followed

Example 2: Fatal Bugcheck

Local -913- Fatal Bugcheck PC=n, SP=n, SR=n, MEM=n, CODE=n

3. Use the SHOW LINK COUNTERS command to view the link counters for both link A and link B. The line statistics might indicate a problem area. Example 3 provides a sample of the link A counters obtained by using the SHOW LINK A COUNTERS command. A definition of the counters is also provided.

Example 3: SHOW LINK A COUNTERS

Link A: HDLC/LAPB Station: NSG__SYDNEY

Seconds Since Zeroed:	1234567890	Receive Failures:	1234567890
Bytes Received:	1234567890	Receive__CRC Errors:	1234567890
Bytes Sent:	1234567890	Receive__Size Errors:	1234567890
Frames Received:	1234567890	Receive__Sequence Errors:	1234567890
Frames Sent:	1234567890	Send Failures (REJ Rcv'd):	1234567890
Invalid Frames Rcv'd:	1234567890	Polls Received:	1234567890
FRMR Frames Rcv'd:	1234567890	Remote Reply Timeouts:	1234567890
Receive Overrun:	1234567890	RNR Frames Received:	1234567890
Transmit Underrun:	1234567890	Local Buffer Errors:	1234567890

Counter Definitions:

Seconds Since Zeroed:	Seconds since counts last zeroed.
Bytes Received:	Total number of bytes received.
Bytes Sent:	Total number of bytes transmitted successfully.
Frames Received:	Total number of I frames received.
Frames Sent:	Total number of I frames transmitted successfully.
Invalid Frames Rcv'd:	Count of frames received with invalid address or control field.
FRMR Frames Rcv'd:	Count of FRMR frames received. A frame with a nonrecoverable error has been received at the other end. The link is reset on receiving an FRMR frame.
Receive Overrun:	Count of USART Rx overrun errors.
Transmit Underrun:	Count of Tx underrun errors during DMA.
Receive Failures:	Sum of Receive_CRC/Size/Sequence error counts.
Receive_CRC Errors:	Count of CRC errors in frames received.
Receive_Size Errors:	Count of frames that are too long or too short.
Receive_Sequence Errors:	Count of sequence errors in frames received. Frames have been corrupted and discarded.
Send Failures (REJ Rcv'd):	Count of REJ frames received. Frames transmitted have been corrupted and discarded. The receiver is requesting retransmission of frames.
Polls Received:	Count of frames received with the 'P' bit set. Start link requests or idle messages are received when count is incrementing.
Remote Reply Timeouts:	Count of number of T1 timeouts. Receiver has not acknowledged the transmitted frames within the period of the retransmit timeout.
RNR Frames Received:	Count of RNR frames received. The receiver is not ready to receive because the number of frames for forwarding increases above limit.
Local Buffer Errors:	This station has temporarily run out of buffer.

Problems with the Composite Link – Use the following procedure when troubleshooting the composite link from either the MUXserver 300 or DECmux 300.

1. Connect a console terminal to the local unit.

2. Press the <RETURN> key a few times and log into the Local mode. If the DECmux 300 has not established communications with the MUXserver 300, the Standalone mode will be entered instead of the Normal mode. Under the Standalone mode, only the following commands are allowed.

   SET/DEFINE/SHOW/LIST [LINK | PORT | STATION]
   TEST [LINK | PORT]
   SET/DEFINE PRIVILEGED PASSWORD
   SET PRIVILEGED

3. Use the SET PRIVILEGED command, then continue with the next step.

4. Enable broadcast on the console port by using the SET PORT BROADCAST ENABLED command. It may be necessary to reset the unit parameters to the factory defaults. If so, press and hold the Reset button while removing and reinserting the ac power cord.

After verifying the power and interface connections to the MUXserver 300, DECmux 300, and modems, proceed with Table 6.

Table 6 Composite Link Problem Checklist

Item	Action
Communication line incorrect	Verify that the leased line has been arranged with the common carrier or Public Telephone & Telegraph (PTT) authorities.
Network incorrectly configured	Verify that the network is correctly installed.
Link state OFF	Use the SHOW LINK command to verify that the link state is ON. If the link state is OFF, use the SET/DEFINE LINK command to set the link state ON.
Link address incorrect	Use the SHOW LINK CHARACTERISTICS command to verify the link address. Use the SET/DEFINE LINK ADDRESS command to set the link address to DTE, DCE, or DYNAMIC. When one end of the composite link is addressed DTE, then the other end must be addressed DCE. Both ends of the link can be addressed DYNAMIC. **NOTE: DYNAMIC is the recommended setting.**
Synchronous modem speeds and interface standards incompatible	Check speeds and interface standards on both sides of the composite link. The two ends of the composite link will normally use the same standard, but not always. The speed will almost always be the same at each end.
Interface type and link speed incorrect	If the parameters stored in the dynamic link database are different from those detected at link start-up time: • A warning message will be generated when the cable type detected is different from the cable type stored. • A warning message will be generated when the modem clock speed detected is different from the modem clock speed stored. **NOTE: This will not prevent proper operation of the MUXserver/DECmux 300 network.**
Link status disconnecting or connecting	Use the SHOW LINK command to verify that the modem is providing the correct modem signals.
Station cannot transmit frames	Ensure that the modem is providing transmit and receive clock signals. Use the SHOW LINK CHARACTERISTICS command and compare the actual values stored with the modem speed and interface cable type.

Table 7 Composite Link Status LEDs

Ready	On-Line	Problem and Correction
ON	OFF	**Problem:** Modem not on-line **Correction:** Use the SHOW LINK command to display the link status. If the link status is Running, and the On-Line LED is OFF, replace the logic module or internal synchronous cable. If the link status is other then Running, verify that the link state is ON and the output signals are DTR and RTS. Use the SET LINK STATE ON command if the link state is OFF. If the output signals are not DTR and RTS, wait a few seconds and then try again. If the input signals are not DSR, DCD, and CTS, go to the **Fault Isolation Procedure for Composite Link Problems** section that immediately follows this table. **Problem:** Composite link not ready (on the other end of the link). **Correction:** Check the composite link ready at the other end of the link. Using this table, perform the indicated corrective action on the other end of the link.
OFF	N/A	**Problem:** Modem is not activating the carrier detect circuit **Correction:** Check the modems on both ends of the link. Some modems like to see data terminal ready (CCITT 108/2) ON before asserting data carrier detect (DCD). Use the SHOW LINK command to check that the link state is ON and that the DTR status is ON. **Problem:** Network terminating unit (NTU) is not activating the indicate (I) circuit. **Correction:** Check the NTU at both ends of the link. Some NTUs like to see CTRL C before asserting the indicate (I) signal. Use the SHOW LINK command to check that the link state is ON.

Table 7 Composite Link Status LEDs (Cont)

Ready	On-Line	Problem and Correction
		Problem: Receive clock is not detected when the RS-422-A/null-modem interconnect cable is used. **Correction:** Check the units at both ends of the link. Use the SHOW LINK command to check that the link state is ON. Check that the composite link cable is properly connected.

Fault Isolation Procedure for Composite Link Problems – The procedure below is used to test the composite link.

1. Use the SET LINK STATE SERVICE command to set the link into the Service state.
2. Use the SET LINK command to set the interface type and link speed.
3. Use the TEST LINK LOOPBACK INTERNAL command to execute an internal loopback test.
4. When the test completes, if an error is found, the hardware is faulty. Replace the logic module or internal synchronous cable.
5. Disconnect the adapter cable from the composite link and connect the H3199 loopback connector to the unit under test.
6. Use the TEST LINK LOOPBACK EXTERNAL command to execute an external loopback test. If an error occurs, replace the unit under test.
7. When the test completes, if an error is found, the hardware is faulty. Replace the unit under test.
8. If the RS-422-A/null-modem interconnect cable is not used, skip the next step.
9. Repeat all of the above steps for the unit at the other end of the RS-422-A/null-modem interconnect cable. If the other unit is not faulty, replace the interconnect cable.
10. Connect and secure the adapter cable to the composite port.
11. Disconnect the extension cable (or modem) from the other end of the adapter cable.
12. Connect a loopback connector to the extension cable. Refer to Appendix D of the *MUXserver/DECmux 300 Network Installation Manual* for more information on loopback connectors.
13. Use the TEST LINK LOOPBACK EXTERNAL command to execute an external loopback test. If an error occurs, replace the cable under test.

14. Connect the extension cable back to the adapter at the local end.

15. Disconnect the extension cable at the remote (far) end. Connect an appropriate loopback connector to the remote end.

16. Use the TEST LINK LOOPBACK EXTERNAL command to execute an external loopback test. If an error occurs, replace the cable under test.

17. Repeat the above steps to test other extension cable segments if more then one is used.

18. Put the modem into the Local Loopback mode.

19. Use the TEST LINK LOOPBACK EXTERNAL MODEM LOCAL command to execute an external loopback test. If an error occurs, replace the modem under test.

21. Put the local modem into the Normal Operation mode, and the remote modem into the Remote Loopback mode.

22. Use the TEST LINK LOOPBACK EXTERNAL MODEM REMOTE command to execute an external loopback test. If an error occurs, repeat this procedure at the remote end of the composite link. The remote site would then become the local site. Ask the PTT authorities or common carrier to verify the telephone data link between modems.

23. Return the modems to the normal modes after fault isolation.

FRU Removal and Replacement Procedures

Figure 9 shows the field replaceable units (FRU) of the DECmux 300.

WARNING

The procedures indicated should be performed by qualified service personnel only. DO NOT attempt to remove any FRUs while the DECmux 300 is connected to a power source.

CAUTION

Static electricity can damage electrical components. Use a grounded wriststrap (29-11762-00) and a grounded work surface when accessing any internal components of the DECmux 300.

The FRUs for the DECmux 300 unit are:

FRU	Part Number
Logic Board	54-18590-01
Power Supply	H7859-A
Asynchronous Communications Cable	17-01944-01
Synchronous Communications Cable	17-02132-01
Power Supply Unit (PSU) Cable	17-01843-01
Fan Assembly	70-25518-01
DEC423 Distribution Panel	H3055
EIA-232-D Distribution Panel	H3056

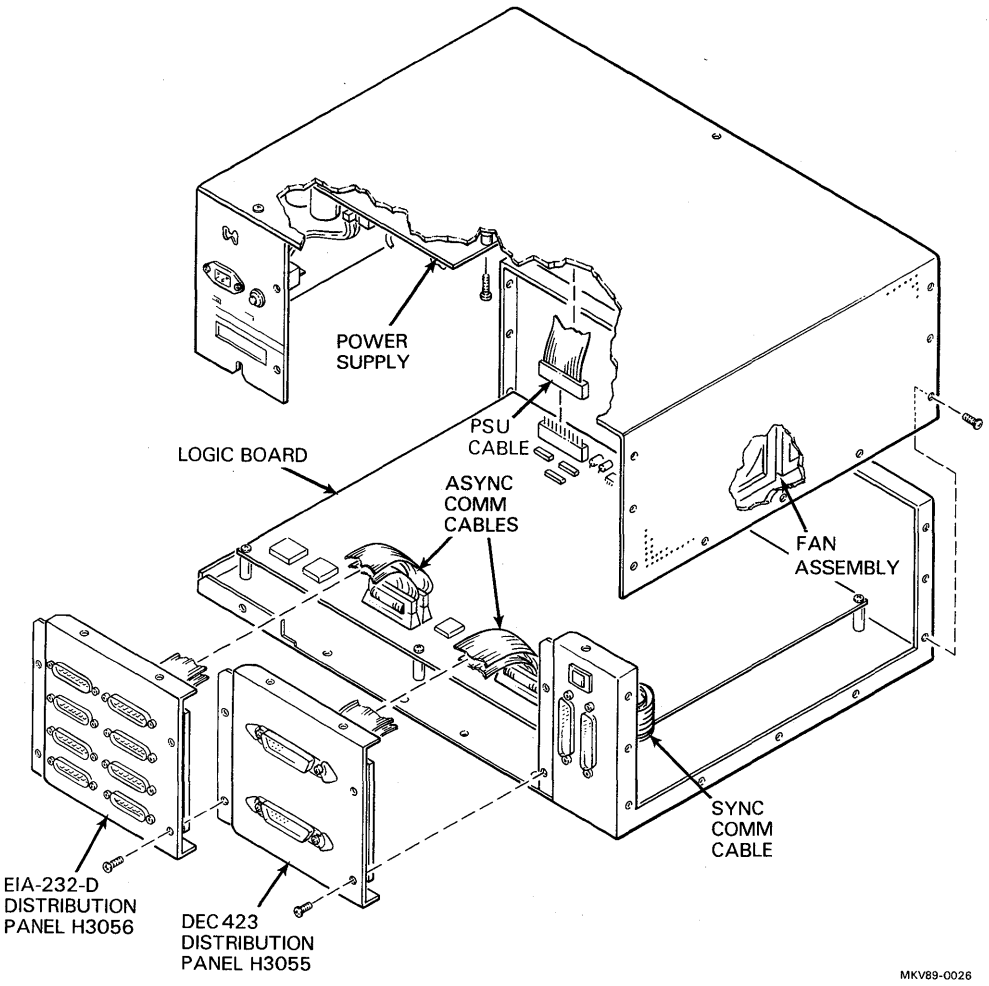


Figure 9 FRU Removal and Replacement

DECNA ETHERNET COMMUNICATIONS CONTROLLER

General Description
The DECNA (DIGITAL Ethernet CTI Bus Network Adapter) module is the Ethernet communications controller for the Professional 300 series computer. The DECNA controller allows the computer to:

- Exchange data with other computers and workstations on a local area network that has PRO/DECnet, and
- Exchange data with other network software that use the Ethernet communications systems.

The DECNA controller module is installed in the card cage inside the Professional computer. The computer is connected to the Ethernet network by the transceiver cable that comes with the DECNA controller.

Features

- Data transfer rate of 10M bits/s.
- Performs Direct Memory Access (DMA) transfers to and from CPU memory.
- Contains a built-in test program that tests the controller when the Professional computer is first turned on.
- Performs internal and external loopback of data and can assist with the loopback of data from other stations.

Reference Documentation

• *PRO/DECnet User's Guide*	AA-V445A-TH
• *Introduction to Local Area Networks*	EB-22714-18
• *DELNI Installation/Owner's Manual*	EK-DELNI-IN
• *Ethernet Installation Guide*	EK-ETHER-IN
• *The Professional 300 Series Communications Handbook*	EB-26165-55
• *Professional 300 Series Owner's Manual*	AZ-N597A-TH
• *Professional 300 Series Pocket Service Guide*	EK-PC350-PS

Hardware Components (Figure 1)

- DECNA option module (P/N 54-15987-01)
- PVC transceiver cable 5 m (16.4 ft) (P/N 17-00612-01)
- Loopback connector (P/N 12-22196-01)

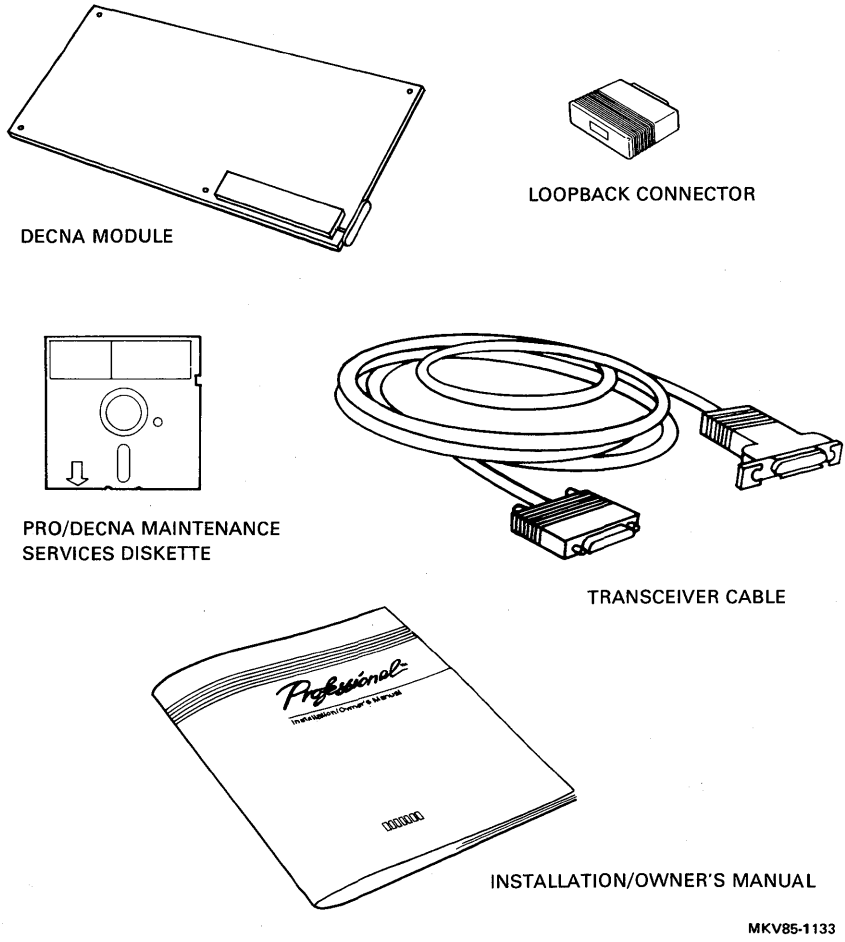


Figure 1 Contents of DECNA Shipping Container

The DECNA option module is a standard size printed circuit board that installs into one option slot on a Professional 300 series computer. The module has a single 90-pin ZIF connector (J1) and connects via the bus and system module to connector (NET1) (mounted at the rear of the Professional 300 series computer).

Software Component (Figure 1)

PRO/DECNA Maintenance Services Diskette

The communications software can be installed from the above diskette or down-line loaded from the host computer.

Installation Flow Diagram

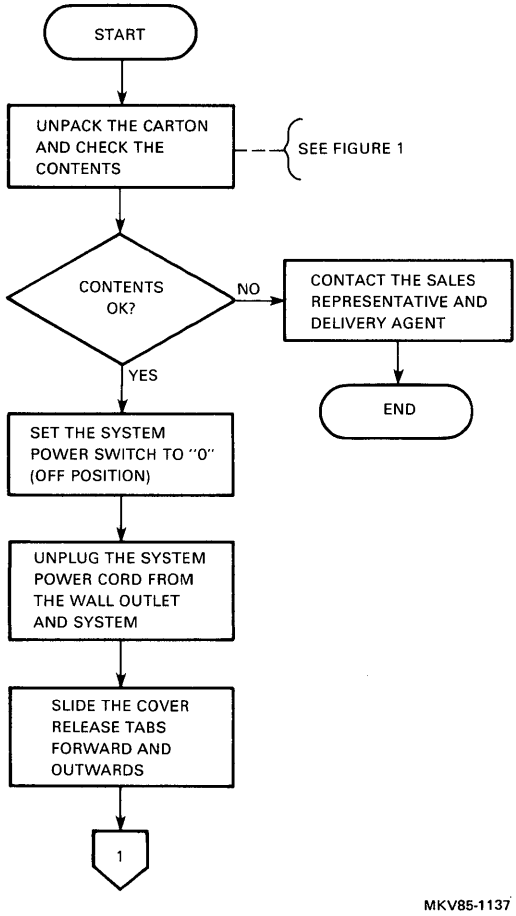


Figure 2 Installation Flow Diagram (Sheet 1 of 5)

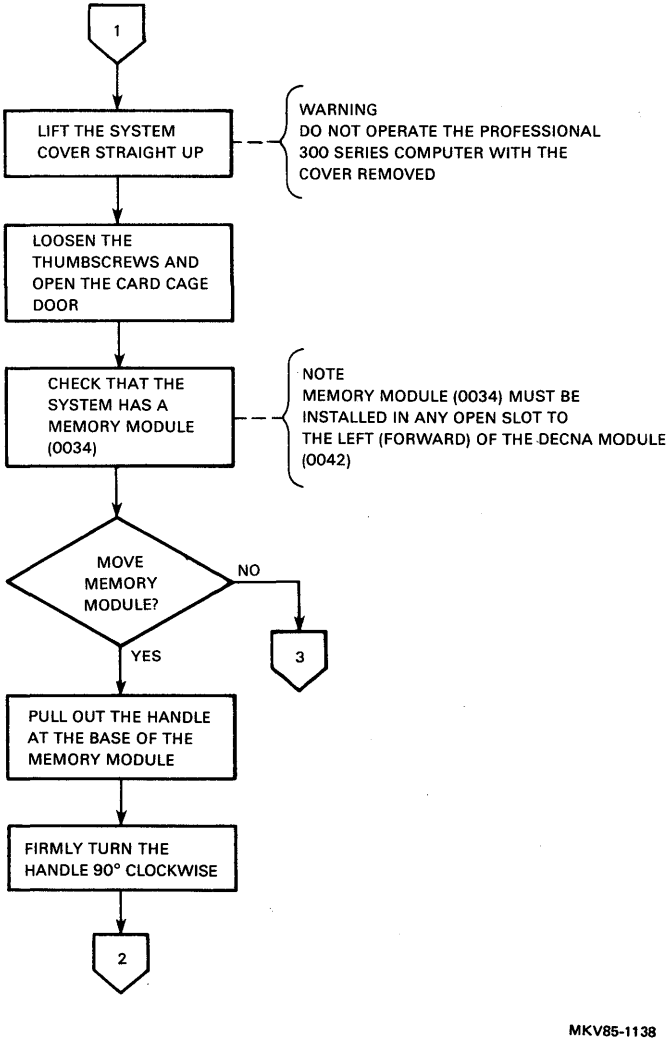


Figure 2 Installation Flow Diagram (Sheet 2 of 5)

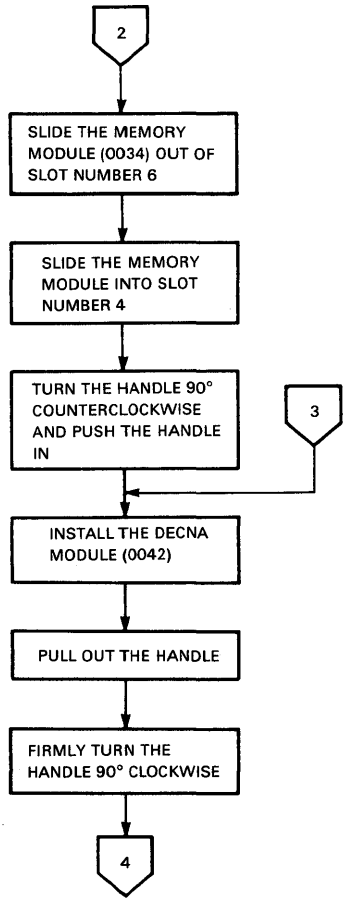


Figure 2 Installation Flow Diagram (Sheet 3 of 5)

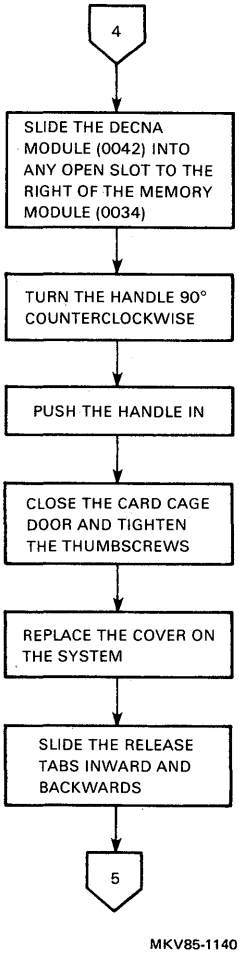


Figure 2 Installation Flow Diagram (Sheet 4 of 5)

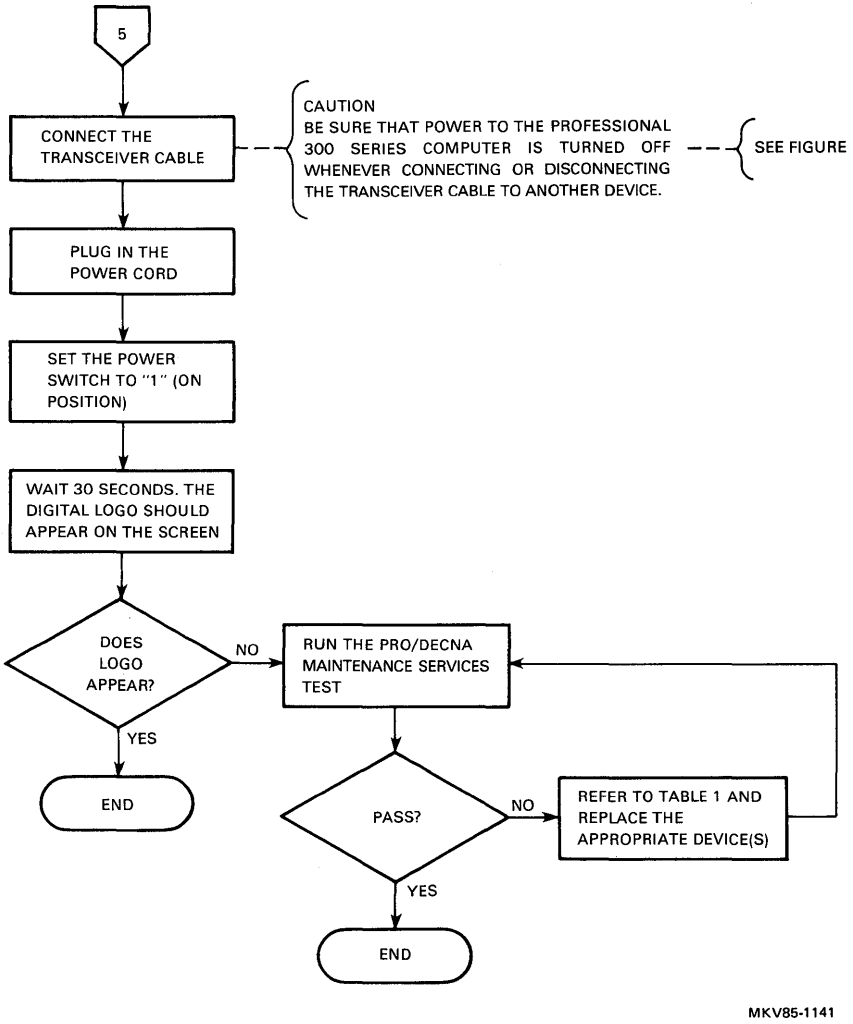


Figure 2 Installation Flow Diagram (Sheet 5 of 5)

Cabling

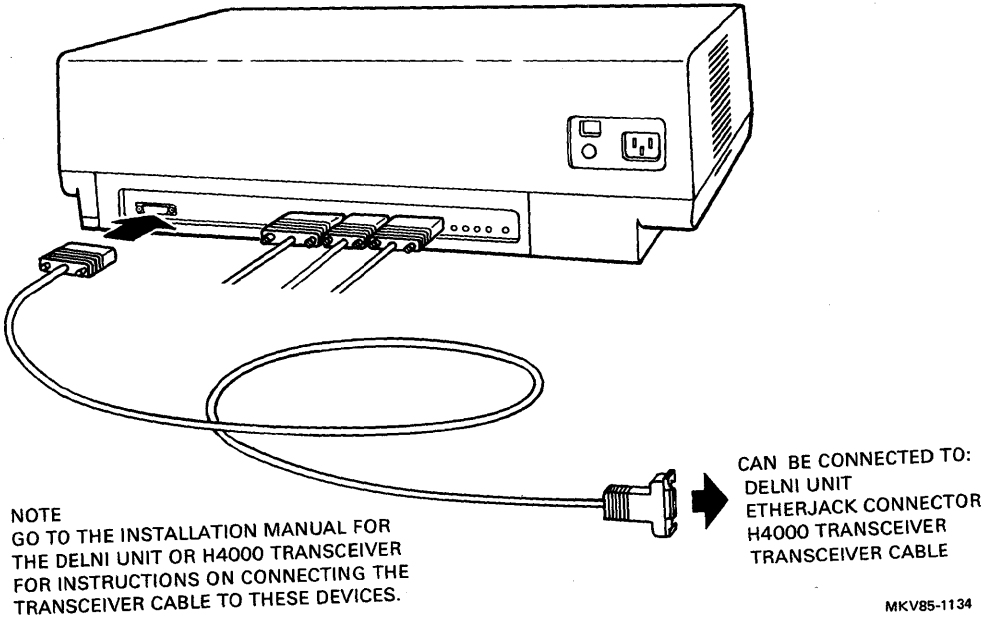
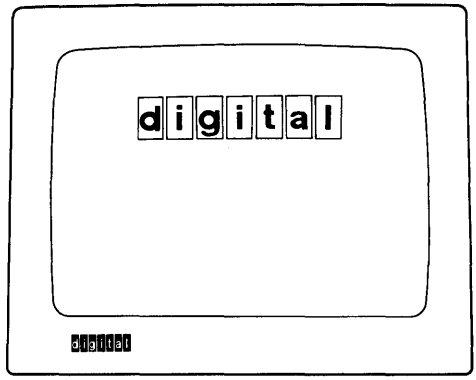


Figure 3 Connecting the Transceiver Cable

Power-Up Self-Test

- Tests entire system each time the Professional system is turned ON.
- Successful test is indicated by the DIGITAL logo appearing on the screen (refer to Figure 4).



MKV84-2353

Figure 4 Successful Power-Up Self-Test

- If the logo does *not* appear on the screen:
  - Leave the system ON and wait at least two minutes.
  - Turn the system OFF and then ON.
  - If the system fails the Power-Up Self-Test again, replace the DECNA controller and repeat the test.
- If the Power-Up Self-Test detects a problem, a picture appears on the screen highlighting the defective module (refer to Figure 5). When the screen shows this kind of picture, determine which component to replace.
  - The DECNA controller
  - The transceiver cable
  - The DELNI unit
  - The transceiver

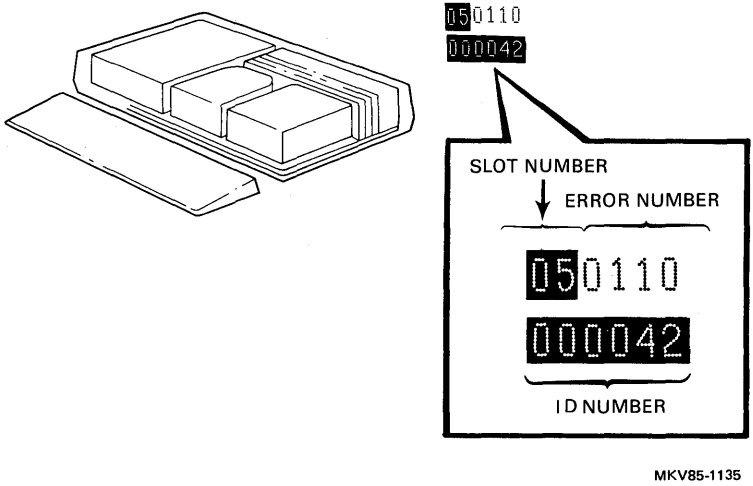


Figure 5 Error Indication on the Power-Up Self-Test

- Type RESUME on the keyboard when an error is indicated. The computer will finish its loading but cannot be used with the network. If the error number is:
  - 110 or lower, replace the DECNA module only.
  - 111 or greater, the error may be with the transceiver cable, the DECNA controller, or some other part of the network. Continue testing the network.

Maintenance Services Program

The DECNA controller comes with a diskette labeled PRO/DECNA Maintenance Services (DECNA diagnostic). This diskette works only on the diskette-based operating system that is provided in the Maintenance and Installation slipcase. This slipcase comes with the Professional 300 computer (refer to the *Professional 300 Series Owner's Manual* and the P/OS System, Maintenance Application, and Test diskettes in the Maintenance and Installation slipcase).

Update the System Unit test (part of the Maintenance Services Program) to include the DECNA controller diagnostic program. This update is described as follows.

Installing the DECNA Diagnostic – This procedure installs the DECNA diagnostic test on the Maintenance Application diskette for maintenance and testing. Perform this procedure after successfully installing the DECNA controller.

1. Turn the computer OFF.
2. Insert the P/OS system diskette in drive 1 and close the diskette drive door.
3. Once the P/OS system diskette has been successfully loaded, a message appears on the screen. Now, remove the P/OS diskette and insert the Maintenance Application diskette in drive 1. Press RESUME.
4. Select the Update Program. Press DO.
5. When prompted, insert the PRO/DECNA Maintenance Services diskette in drive 2. Press RESUME.
6. When finished, remove both diskettes from the drives and return them to the Maintenance and Installation slipcase.

Running the Maintenance Services Program – The Power-Up Self-Test runs each time the Professional computer is turned ON. Run the Maintenance Services test along with the other system tests from the Maintenance Services Menu when the system test is selected.

To run the test for the DECNA controller, follow the instructions in the *Professional 300 Series Owner's Manual* (Maintenance Application Test Programs section). These instructions are summarized as follows:

1. Place the P/OS diskette in drive 1 and close the diskette drive door.
2. Turn the system power OFF and then ON.
3. Follow the instructions that appear on the monitor.
   a. Remove the P/OS diskette.
   b. Place the Maintenance Application diskette in drive 1 and close the diskette drive door.
   c. Place test diskette in drive 2 and close the diskette drive door.
   d. Press RESUME on the keyboard.
4. Select the desired test.

The DECNA diagnostic test runs as part of the System Unit test. If the test detects an error, the test places a system unit test summary on the screen. Press the HELP key for information and corrective action.

See the *Professional 300 Series Pocket Service Guide* for information on running the individual option tests in the field service mode.

Testing the Network

The network can be tested by using the loopback connector that comes with the DECNA controller. This loopback connector is placed at the end of cables and other devices to verify their operation. After the loopback connector has been installed, run the Power-Up Self-Test to check each piece of added equipment. If the DIGITAL logo appears, the new piece of equipment is good. Continue testing other parts of the network.

The loopback connector is attached to the Professional series computer at connector NET1 (refer to Figure 6). A green light at the rear of the connector indicates that the computer is supplying power to the H4000 transceiver. If the light does not turn ON, the system is not supplying power to the transceiver and the system will not be able to communicate over the network. This condition indicates a problem with the system module. Contact a service technician.

If the Professional computer is operated with a DELNI unit only, the lack of power will not affect the DELNI unit's operation. If the DELNI unit is connected to an H4000 transceiver, however, check that the DELNI unit is supplying power to the transceiver. Do this by connecting the loopback connector to connector 9 on the DELNI panel. The green light on the loopback connector should turn ON. If the green light does not turn ON, replace the DELNI unit.

Use the following procedure for the tests listed in Table 1. For each test listed, move the loopback connector to the position indicated and run the Power-Up Self-Test. Table 1 indicates the maximum lengths of cables.

NOTE

Be sure the transceiver cable lengths are within the length restrictions listed in Table 1.

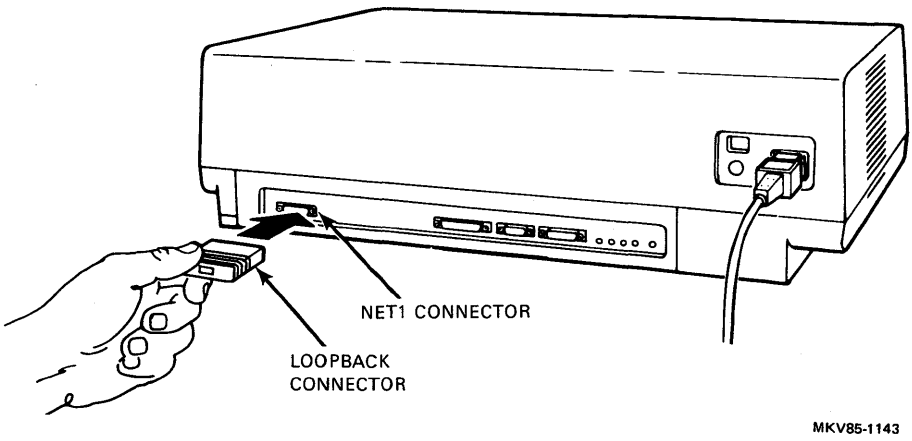


Figure 6 Connecting the Loopback Connector to NET1 Connector

Table 1 Testing Network Devices

Test Description	Position of Loopback Connector	Good Logo	Error Indicator
DECNA Test	Rear of Professional (NET1 connector)	Professional computer with DECNA controller good	Failure in DECNA controller*
Transceiver Cable Test	At end of 5 m (16.4 ft) transceiver cable (cable lengths are maximum)	Professional computer with transceiver cable good	Failure in transceiver cable
A Second Transceiver Cable Test	At end of two transceiver cables connected together (Do not test more than 25 m (82 ft) of cable at a time (total). Exchange different lengths until all are tested	Professonal computer, 5 m (16.4 ft) cable, other cable good	Failure in other cable†
DELNI Test	On connector 9 of the DELNI unit	Professional computer, 5 m (16.4 ft) cable, 40 m (131.2 ft) cable, DELNI unit good	Failure in DELNI unit
DELNI and Transceiver Cable Test	At end of cable connected to connector 9 on the DELNI unit	Professional computer, 5 m (16.4 ft) cable, 40 m (131.2 ft) cable, DELNI unit, 20 m (65.6 ft) cable good	Failure in next cable connected to connector 9 on DELNI unit

* If the Professional computer (or DELNI unit) is attached to an H4000 transceiver, be sure the green light on the end of the loopback connector lights. If it does not light, power is not reaching the transceiver and the transceiver will not operate.

† If the error indication is still present, then the transceiver or some other part of the network is not working correctly. Notify the system manager or service technician.

Table 1 Testing Network Devices (Cont)

Test Description	Position of Loopback Connector	Good Logo	Error Indicator
Two-Tier DELNI Test	Loopback connector Not used	Professional computer, 5 m (16.4 ft) cable, 40 m (131.2 ft) cable, 45 m (147.6 ft) cable, second DELNI unit good	Failure in second DELNI connected
DELNI and Transceiver Cable Test	Loopback Connector Not used	Professional computer, 5 m (16.4 ft) cable, second cable, DELNI unit, third cable good‡	Failure in third cable tested

‡ Second and third cables must not exceed 35 m (114.8 ft) in length.

Test Procedure –

1. Turn OFF the Professional computer.

   CAUTION
   Always turn the power OFF before connecting or disconnecting any network cables, otherwise, the system may be damaged.

2. Disconnect the network transceiver cable from the rear of the computer (NET1 connector).

3. Connect the loopback connector to the network connector (NET1) on the rear of the Professional computer (Figure 6).

4. Turn the computer ON. Wait for the DIGITAL logo or error indicator.

   If the logo appears, then the DECNA controller is operating correctly.

   If the error indicator appears, the DECNA controller is defective and needs to be replaced. If the error continues after replacing the DECNA controller, then the system board must be replaced.

5. Turn the Professional computer OFF.

6. Disconnect the loopback connector from the computer and connect the transceiver cable to the computer (NET1).

7. Attach the loopback connector to the other end of the transceiver cable.

8. Turn the computer ON. Wait for the DIGITAL logo or error indicator to appear.

   If the logo appears, the last device added is operating correctly.

   If the error indicator appears, the last device added is defective and needs to be replaced.

Repeat Steps 5 through 8, adding the next components for the network one at a time.

DECOM BROADBAND ETHERNET TRANSCEIVER

PLEASE READ THESE TWO PAGES BEFORE INSTALLING THE DECOM TRANSCEIVER. THESE PAGES CONTAIN IMPORTANT INFORMATION FOR THE SUCCESSFUL INSTALLATION AND CHECKOUT OF THE DECOM TRANSCEIVER.

Certain Ethernet controller to DECOM broadband transceiver configurations may affect timing differences that can occur between baseband and broadband operations. The timing differences place restrictions and/or constraints on certain operating systems and some DECnet Network Control Protocol (NCP) functions.

The DECOM transceiver is currently targeted to support the same DIGITAL networking products that are being used with the following baseband technology:

- DECnet Phase IV for the VMS, MicroVMS, RSX, and P/OS operating systems.
- UNIBUS (DEUNA), Q-bus (DEQNA), and Professional 350-bus (DECNA) Ethernet controllers.
- Local Network Interconnect (DELNI) and Communications Servers (Routers, Terminal Servers, and Gateways)

NOTE: The DEREP Ethernet repeater is not supported in configurations with the DECOM transceiver.

It is suggested that the following actions be taken before installing and checking out the DECOM transceiver:

1. Verify that the following or later versions of software are used:

   VMS V4.2 ..... DECnet VAX V4.0
   RSX 11S V4.1 ..... DECnet 11S V4.0 *
   RSX 11M V4.1 ..... DECnet 11M V4.0 *
   RSX 11M-Plus V4.1 ..... DECnet 11M Plus V2.0 *
   P/OS V3.0 ..... PRO/DECnet V2.0

   *Install all patches for DECnet – 11S, 11M, or 11M-Plus system through Update E.

2. If connecting the DECOM transceiver to a DEQNA controller on a MicroVMS system running DECnet software, install a patch to the DEQNA driver (XQDRIVER.EXE) on MicroVMS systems before V4.2.

   The Software Services (SWS) group of the local field service branch can obtain the driver patch by calling the Software Hot Line (NCSS) at DTN 223-5911 or 617-493-5911. Customers receiving the DECOM product will be informed of the timing difference and need for the patch. THE CUSTOMER WILL BE INFORMED THAT THE PATCH CAN BE OBTAINED BY CALLING THEIR LOCAL FIELD SERVICE BRANCH OFFICE. Requests for the driver patch that come directly from the customer will not be honored. The customer must go through the local contacts.

   The above patch procedure will remain in effect until VMS V4.2 shipments have been made. Phone requests to obtain the patch after V4.2 shipments have been made will not be accepted.

3. If using the DECOM transceiver with a DEQNA controller on an RSX-11 system running DECnet software, issue the following NCP command or commands from a privileged terminal/account.

```
NCP> CLEAR LOGGING CONSOLE EVENT 5.14
NCP> CLEAR LOGGING FILE EVENT 5.14
NCP> CLEAR LOGGING MONITOR EVENT 5.14
```

Page DECOM-22 contains a reference to an "Ethernet Controller Self-Test" as "NI Exerciser". This reference is not true in all cases. When the DECOM transceiver is to be tested in a network environment, use the "NI Exerciser" when the flow diagram reads "Run Ethernet Controller Self-Test". This test is called for on pages DECOM-24, -28, -29, -31, -35, and -36.

When the DECOM transceiver is to be tested in a standalone loopback configuration ("RF Loopback" with the variable attenuator or "Digital Loopback" using the DECOM loopback switch), use the "Controller's Functional Diagnostic" when the flow diagram reads "Run Ethernet Controller Self-Test". This occurs on pages DECOM-25, -26, -27, -32, -33, and -37.

NOTE: In all cases of "Run Ethernet Controller Self-Test" using the H4000-T Ethernet transceiver tester, its testing functions may be substituted for a station with an Ethernet controller utilizing NI Exerciser or functional diagnostics.

DECOM BROADBAND ETHERNET TRANSCEIVER

General Description
The DECOM broadband Ethernet transceiver models are used in conjunction with DIGITAL Ethernet controllers like the DEUNA, DEQNA, and DECNA and with other DIGITAL Ethernet devices such as DELNI and communications servers.

The transceivers connect the Ethernet controllers or devices to either a single- or dual-cable broadband system.

DECOM Versions (Figure 1)

- Model DECOM-AX* is a dual-cable transceiver.
- Model DECOM-BX* is a single-cable transceiver.

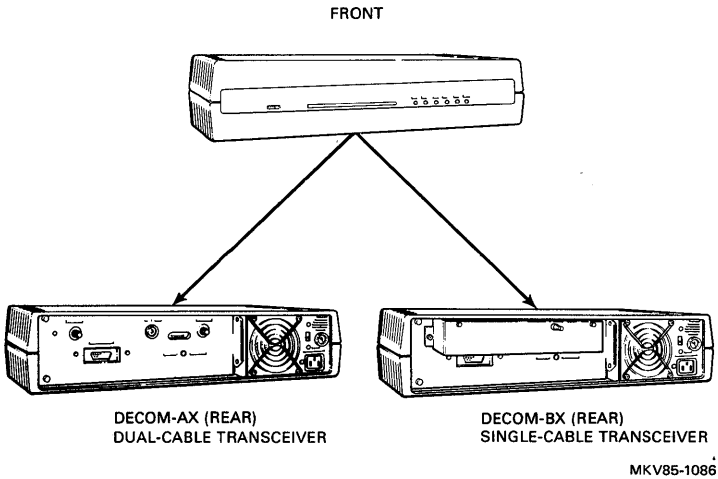


Figure 1 Dual- and Single-Cable Transceivers

*The letter "A" or "B" will appear in place of the "X" in the model designation to signify the following transceiver input voltages:

Model	Input Voltage
Dual-cable DECOM-AA	115 Vac
Dual-cable DECOM-AB	230 Vac
Single-cable DECOM-BA	115 Vac
Single-cable DECOM-BB	230 Vac

DECOM INSTALLATION

Components

The following parts are supplied with each DECOM transceiver.

Table 1 Transceiver Components

Model	Owner's Manual	Power Cord	Country Kit
DECOM-AA	X	X	
DECOM-AB	X		X*
DECOM-BA	X	X	
DECOM-BB	X		X*

*Power cord for DECOM-AB and -BB units comes in accompanying country kit DEBBK-AX, where "X" identifies the country.

Country Kits

Appropriate power cords are shipped in country kits that must be ordered separately with each DECOM transceiver. The following table indicates the country kit for each particular country.

Table 2 Country Kits

Country Used In	Country Kit Designation
Australia	DEBBK-AZ
Belgium	DEBBK-AB
Canada – English	DEBBK-AQ
Canada – French	DEBBK-AC
Denmark	DEBBK-AD
Finland	DEBBK-AF
France	DEBBK-AN
Germany	DEBBK-AG
Holland	DEBBK-AH
Italy	DEBBK-AI
Norway	DEBBK-AN
Spain	DEBBK-AS
Sweden	DEBBK-AM
Switzerland – French	DEBBK-AK
Switzerland – German	DEBBK-AL
United Kingdom	DEBBK-AE

Reference Documentation

Title	Document Number
DECOM Broadband Ethernet Transceiver Owner's Manual	EK-OOBET-OM
DECOM Broadband Ethernet Transceiver Technical Manual	EK-OOBET-TM
DEFTR Broadband Ethernet Frequency Translator Owner's Manual	EK-FRETR-OM
Broadband Ethernet Channel Specification and Certification Guide	EK-OOBEC-SM
The Ethernet Specifications	AA-K759X*-TK
Ethernet Installation Guide	EK-ETHER-IN
Ethernet Communications Server Site Preparation and Planning Guide	EK-DECSA-SP
Ethernet Communications Server Installation Guide	EK-DECSA-IN
Ethernet Communications Server Operations and Maintenance Guide	EK-DECSA-OP
DEUNA User's Guide	EK-DEUNA-UG
DEQNA User's Guide	EK-DEQNA-UG
DECNA Installation/Owner's Manual	EK-DECNA-IN
DELNI Installation/Owner's Manual	EK-DELNI-IN

*The letter "X" indicates the version of the document.

Device Placement

- Place the transceiver within 1.2 meters (4 feet) of the electrical power socket to accommodate the power cord.
- Do not block the airflow for the cooling fan.

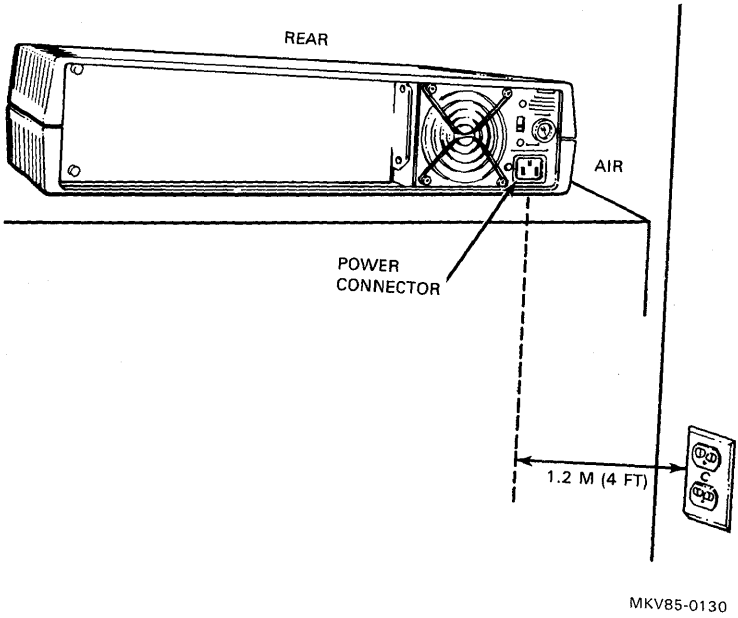


Figure 2 Transceiver Placement

Power Requirements
AC input power is switch selectable.

115 Vac, 60 Hz, 0.8 A, 90 W

or

230 Vac, 50 Hz, 0.4 A, 90 W

Preinstallation Steps

1. Check that the network in which the transceiver is being installed has been certified according to the *Broadband Ethernet Channel Specification and Certification Guide* (EK-OOBEC-SM).

2. Check that all Ethernet controllers or devices are operating correctly. Refer to the manuals that come with the devices for their checkout procedures.

3. Make sure that the other end of the transceiver cable is connected to the controller and that the RF drop cable(s) is connected to the appropriate coaxial wall outlet(s) or tap(s).

4. For the dual-cable system, mark the receive and transmit RF drop cables and coaxial wall outlets or taps RECEIVE and TRANSMIT, respectively. (If the cables are reversed during installation, no damage will be caused to the equipment; however, the DECOM unit will not work.)

Installation Flow Diagram

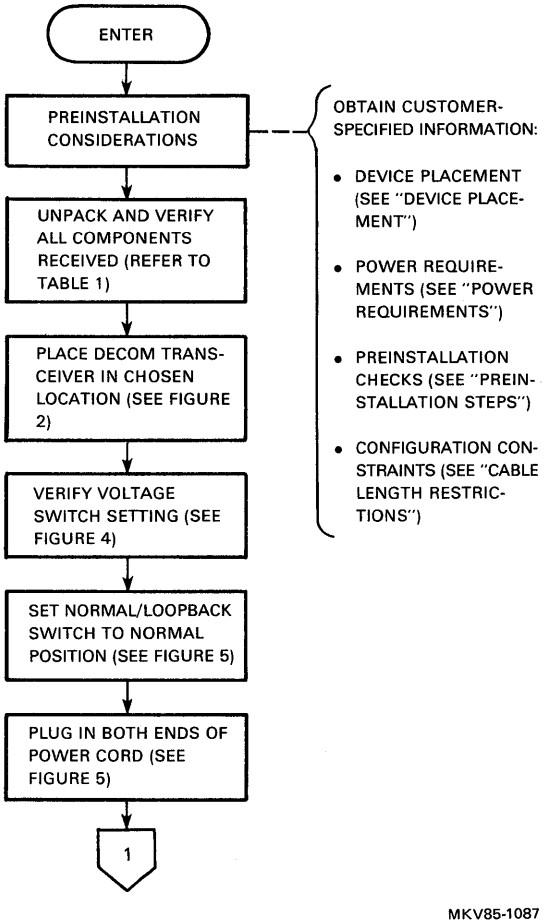


Figure 3 DECOM Installation Flow Diagram (Sheet 1 of 3)

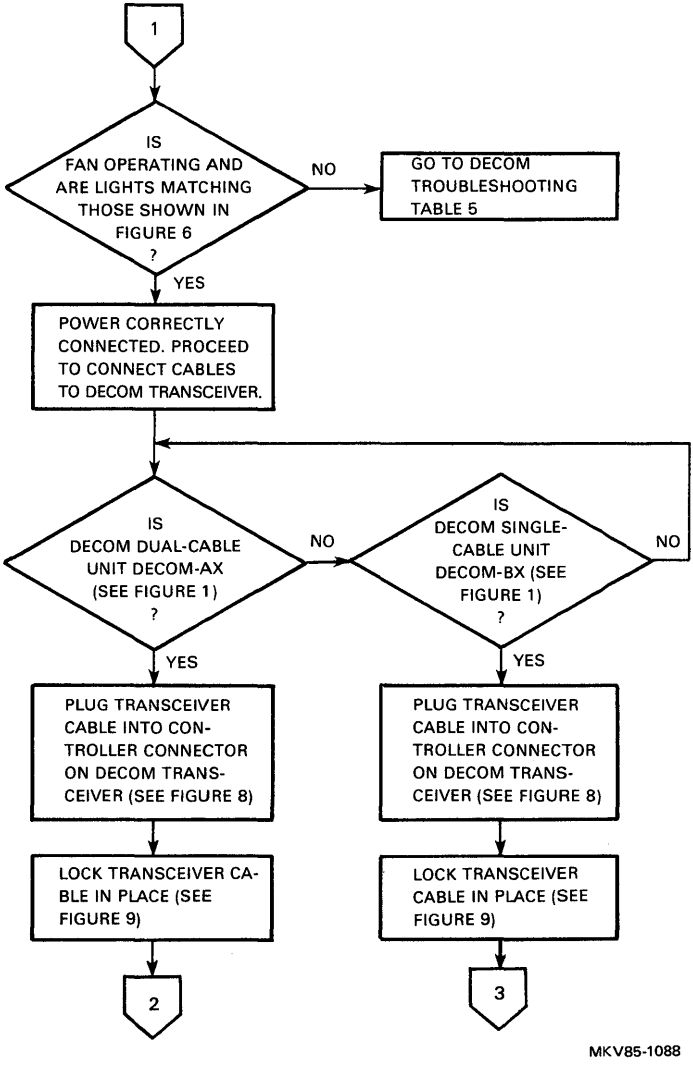


Figure 3 DECOM Installation Flow Diagram (Sheet 2 of 3)

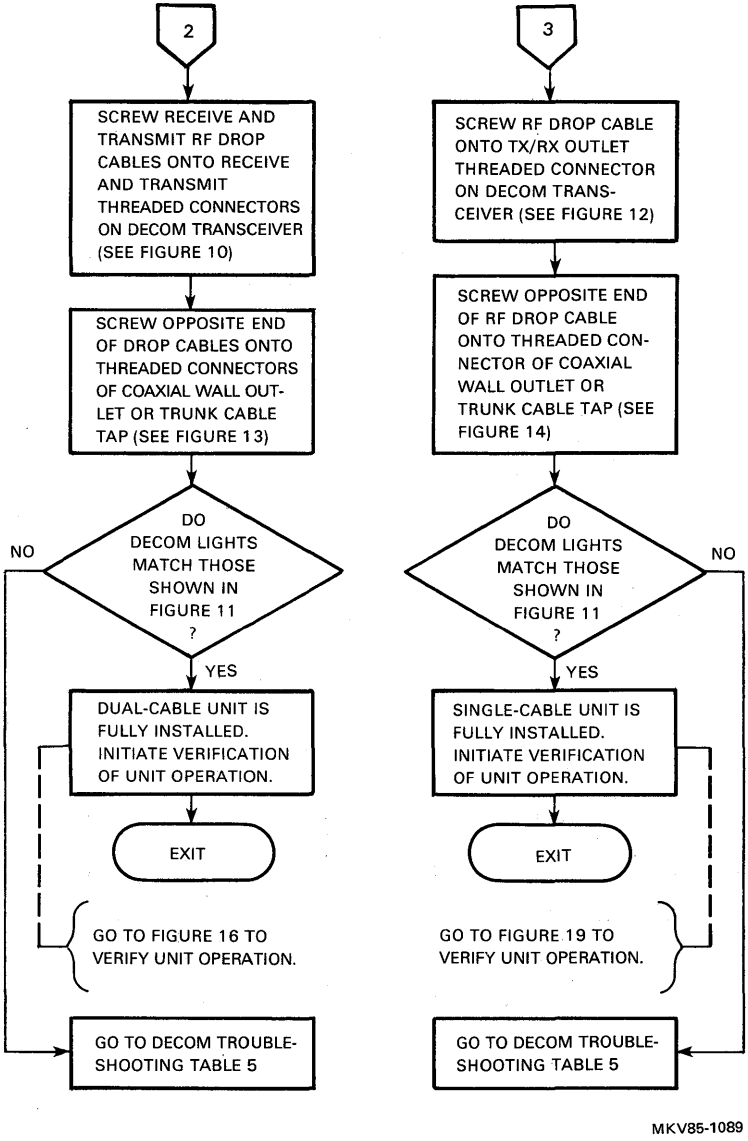


Figure 3 DECOM Installation Flow Diagram (Sheet 3 of 3)

CAUTION
INCORRECT VOLTAGE SETTING CAN DAMAGE THE SYSTEM.

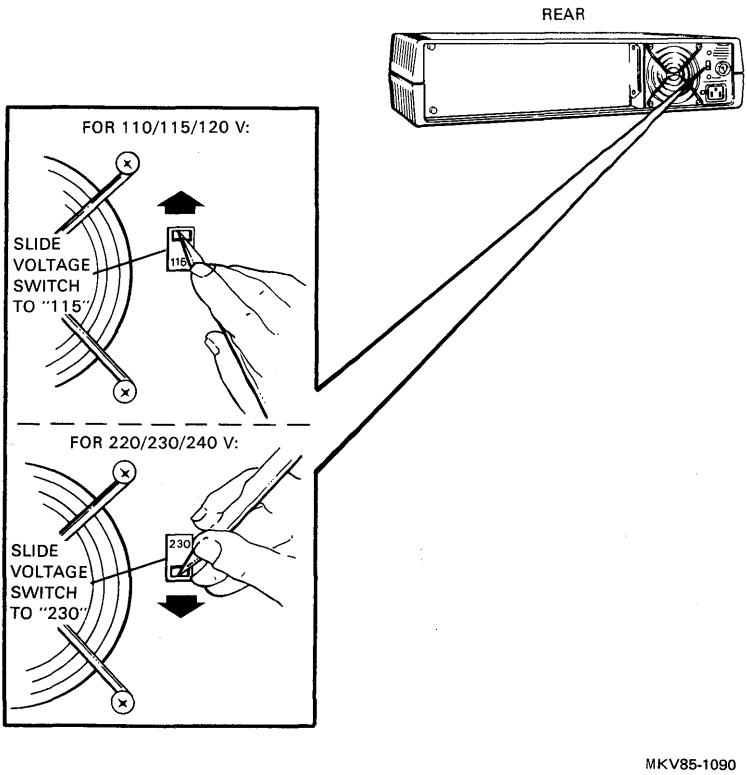


Figure 4 Diagram for Setting Voltage Switch

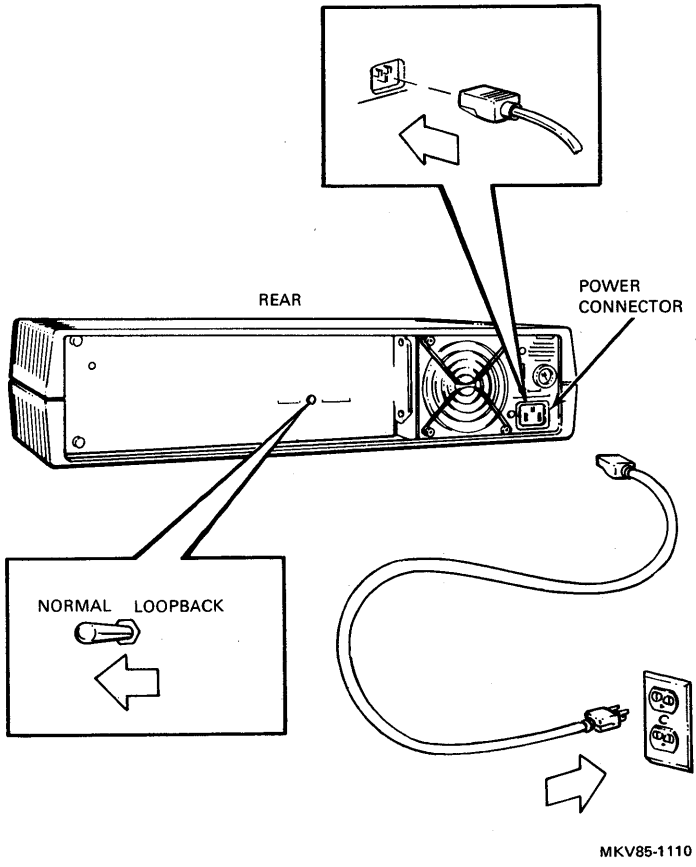
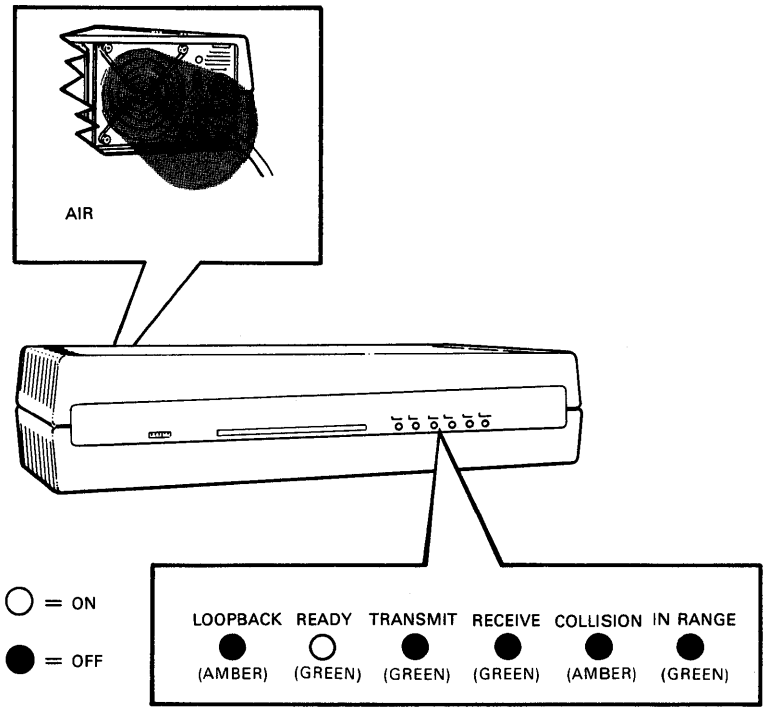


Figure 5 Diagram for Setting NORMAL/LOOPBACK Switch and Connecting Power Cord



NOTE
FOR DEFINITIONS OF THE LIGHTS ON THE FRONT PANEL, SEE TABLE 3.

MKV85-1091

Figure 6 Diagram Indicating Power Correctly Connected

Table 3 Description of Indicators (See Figure 7)

Light	Color	Condition	On	Blinking
LOOPBACK	AMBER	NORMAL/LOOPBACK switch is in LOOPBACK position	X	
READY	GREEN	Power is ON and NORMAL/ LOOPBACK switch is in NORMAL position.	X	
TRANSMIT	GREEN	Transceiver is transmitting data.	X	X
RECEIVE	GREEN	Transceiver is receiving data.	X	X
COLLISION	AMBER	Collisions are detected.	X	X
IN RANGE	GREEN	Transceiver sends a data packet that is received with no errors within the specified time. This indicates that the transceiver is located within the proper distance from the headend.	X	X

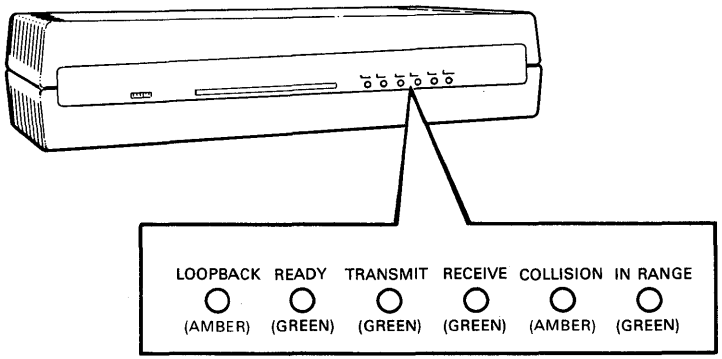


Figure 7 Front Panel Indicators

NOTE
IT IS RECOMMENDED THAT THE TRANSCEIVER CABLE HAVE A STRAIGHT CONNECTOR INSTEAD OF A RIGHT-ANGLE CONNECTOR BECAUSE THE RIGHT-ANGLE CONNECTOR IS MORE DIFFICULT TO CONNECT TO THE TRANSCEIVER.

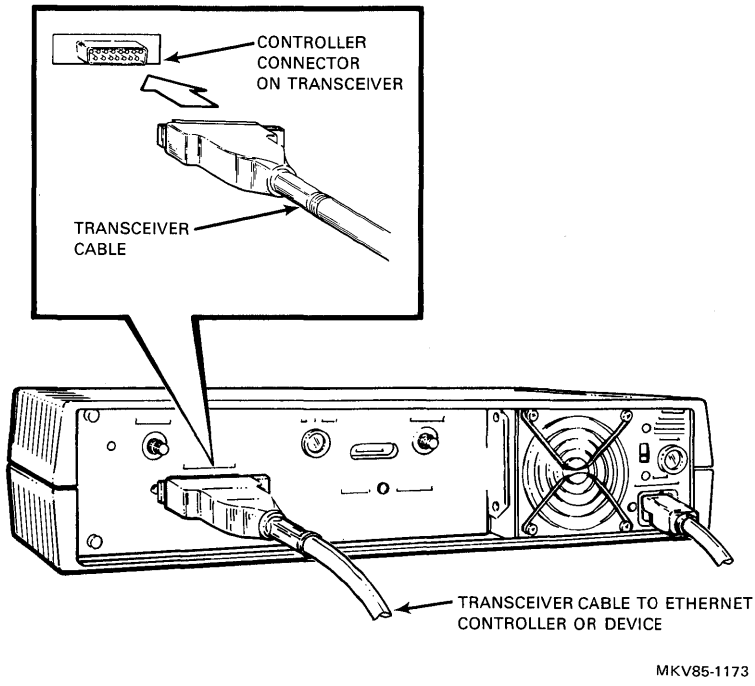


Figure 8 Diagram for Connecting Transceiver Cable to Transceiver

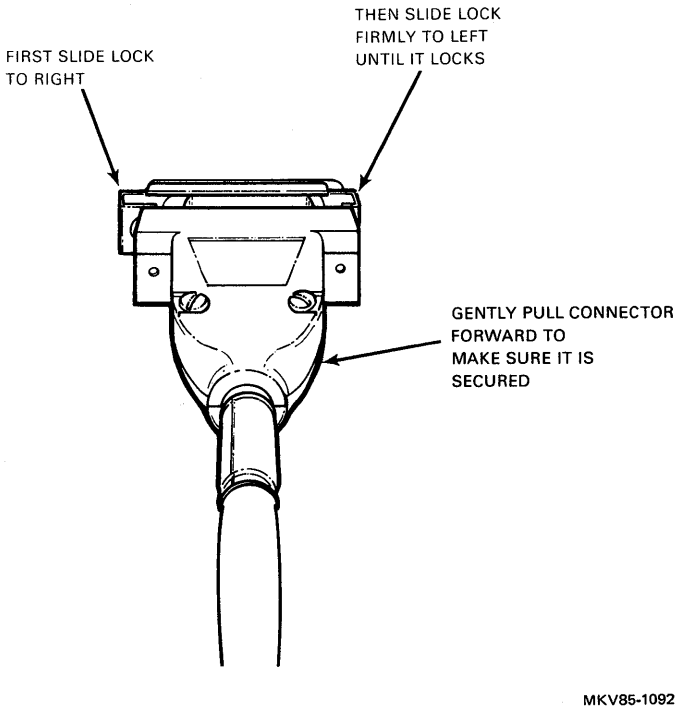


Figure 9 Diagram for Locking Transceiver Cable

CAUTION
DO NO OVERTIGHTEN THE HEX-NUTS. FINGER TIGHTEN ONLY.

NOTE
THESE CABLES SHOULD BE MARKED TRANSMIT AND RECEIVE.

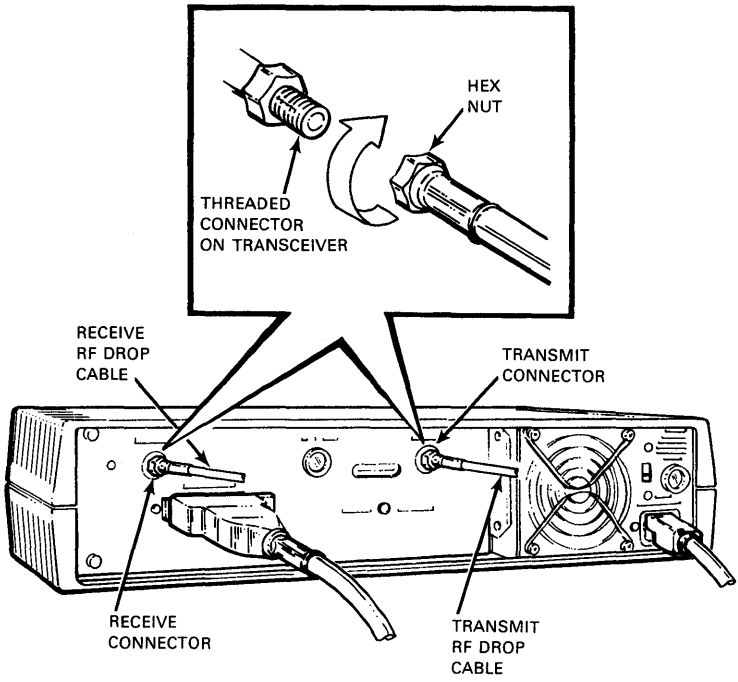


Figure 10 Diagram for Connecting RF Drop Cables to Dual-Cable Transceiver

NOTE
FOR DEFINITIONS OF THE LIGHTS ON THE FRONT PANEL, SEE TABLE 3.

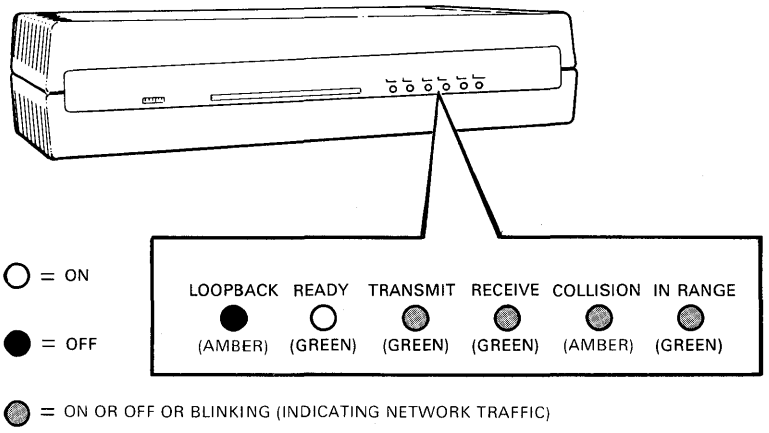


Figure 11 Diagram Indicating Transceiver is Fully Installed

CAUTION
DO NOT OVERTIGHTEN THE HEX-NUT. FINGER TIGHTEN ONLY.

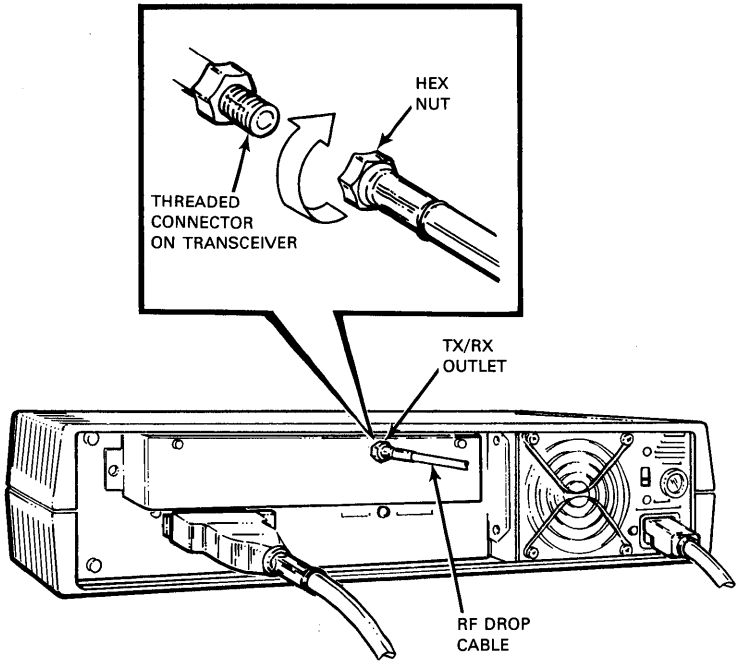


Figure 12 Diagram for Connecting RF Drop Cable to Single-Cable Transceiver

Cable Length Restrictions
Make sure that the transceiver cable and RF drop cable(s) reach the transceiver using the guidelines in Table 4.

Table 4 Cable Length Guidelines

From	To	Cable Length NOT to Exceed	Cable Type
Controller	Transceiver	40 meters (131 feet)	BNE3X-XX. Available from Digital Equipment Corporation.
Transceiver	Tap(s)	25 meters (82 feet)	RG6 triple-shielded with male F-type connector and extended sleeves.
Transceiver	Tap(s) via coaxial wall outlet(s)	25 meters (82 feet)	Can be ready-made by DIGITAL Field Service.

Cable Connections

Figures 13 and 14 show the cable connections for the dual-cable and single-cable systems.

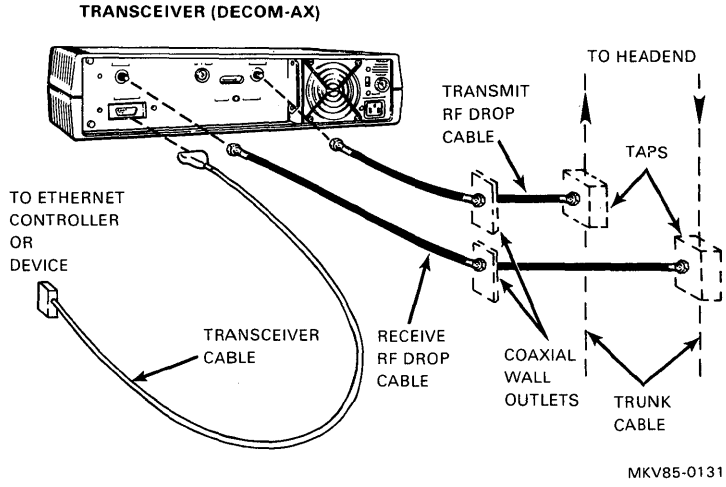


Figure 13 Dual-Cable System

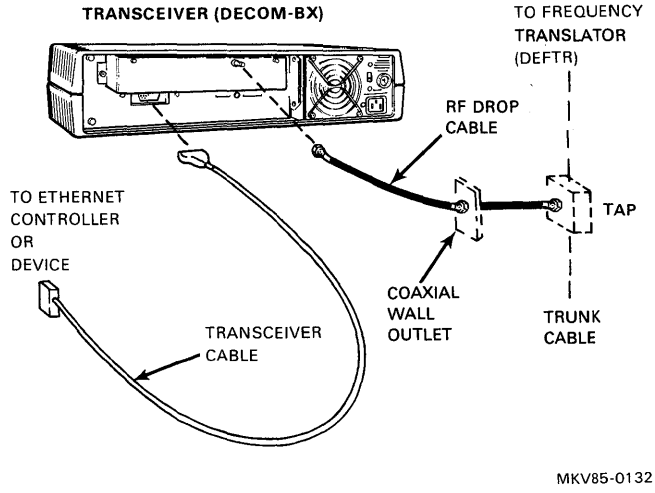


Figure 14 Single-Cable System

Diagnostics

There are no diagnostics designed specifically for the DECOM transceiver. The NIE (Network Exerciser) diagnostic, however, can be helpful in isolating faults to the transceiver as discussed in the Maintenance Aids section.

DECOM Troubleshooting Table

Table 5 helps to identify problems in the transceiver and suggests simple procedures to fix them.

Table 5 DECOM Troubleshooting

Problem	Probable Cause	Remedy
READY light is ON and fan is OFF.	Fan is bad	Call service for transceiver.
READY light is OFF and fan is OFF.	Blown fuse	Check fuse. (See Figure 15).
	No power at the socket	If fuse is good, check main power circuit breaker and make sure that there is power at the socket. If power is at the socket and through the power cord to the transceiver, call service for transceiver.
LOOPBACK light is ON.	LOOPBACK SWITCH in LOOPBACK mode	Switch to NORMAL mode.
	Transceiver faulty	Call service for transceiver.
READY light turns OFF when transceiver cable is connected to the transceiver.	Controller faulty	Disconnect and reconnect the power cord. If the READY light still does not turn ON, disconnect the transceiver cable. If the READY light turns ON, call service for controller.
	Transceiver faulty	If the READY light still does not turn ON, call service for transceiver.

CHECK THE FUSE.

1. UNPLUG THE TRANSCEIVER.

2. CHECK THE LINE FUSE AND REPLACE IT, IF BLOWN.

WARNING
FOR CONTINUED PROTECTION AGAINST FIRE, REPLACE ONLY WITH FUSES OF THE SAME TYPE AND RATING.

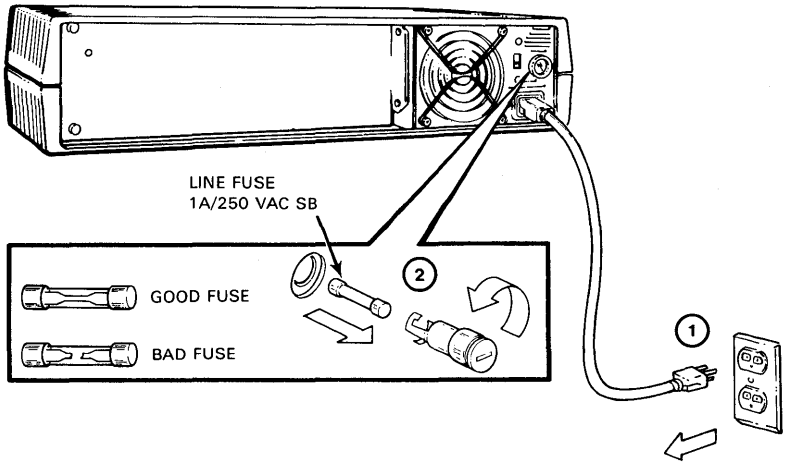


Figure 15 Diagram for Checking Fuse

Precheck
Before using Table 6 and the flow diagrams in Figures 16 and 19, test the transceiver cable and make sure that it works properly, as described in the user documentation for the Ethernet controller.

Ethernet Controller Self-Test
Both flow diagrams in Figures 16 and 19 (for single-cable and dual-cable transceivers) assume that the Ethernet controller has a loopback test capability (that is, NI Exerciser), which can be used to test the transceiver. When the flow diagrams indicate "RUN ETHERNET CONTROLLER SELF-TEST," run this test on the transceiver by using the Ethernet controller self-test or functional level testing software. Refer to the user and software documentation for the particular Ethernet controller being used.

Network Troubleshooting Table
Use Table 6 for a simple method of isolating a network problem to a DECOM, DEFTR, or network cable facility.

Table 6 Network Troubleshooting

Problem	Probable Cause	Remedy
All DECOM transceivers are NOT working and other applications* are NOT working.	Network cable facility	Get service for network cable facility.
All DECOM transceivers are NOT working and other applications* are working.	Frequency translator (DEFTR) – single-cable only	Get service for DEFTR frequency translator.
Some DECOM transceivers are NOT working.	Network cable facility section	Get service for network cable facility.
One DECOM transceiver is NOT working.	DECOM transceiver	Use DECOM checkout flow diagrams for a more thorough isolation procedure or get service for DECOM transceiver.

*"Other applications" means other datamodems, video equipment, T1 type modems, and so forth, that use the network cable facility as their transmission medium.

DECOM-AX Checkout Flow Diagram

Use the flow diagram in Figure 16 to check the operation of the dual-cable transceiver (DECOM-AX) or for a more thorough fault isolation guide for the dual-cable unit.

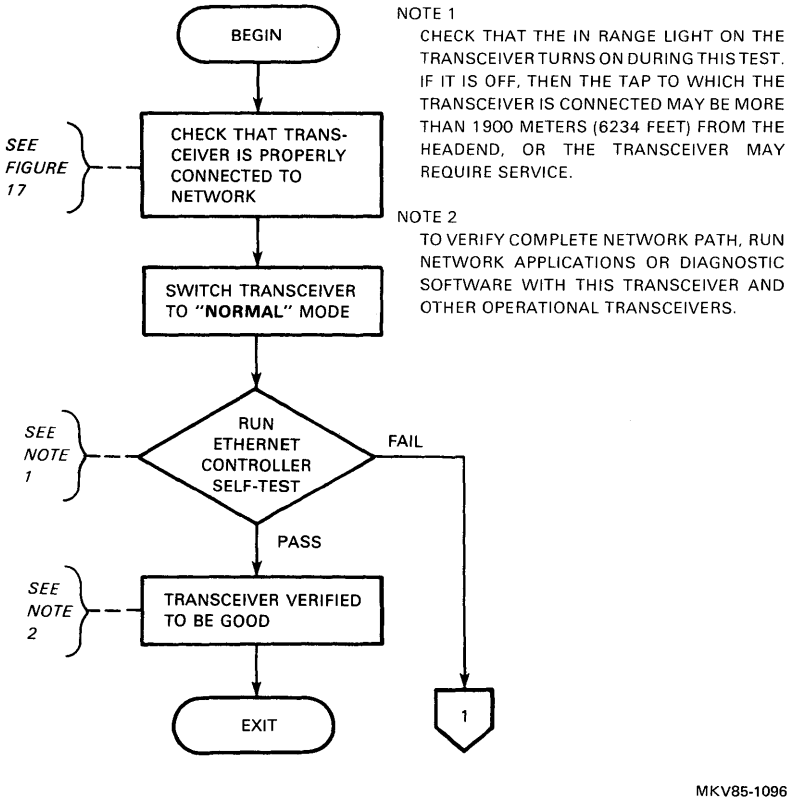


Figure 16 Checkout Flow Diagram for Dual-Cable Transceiver (Sheet 1 of 6)

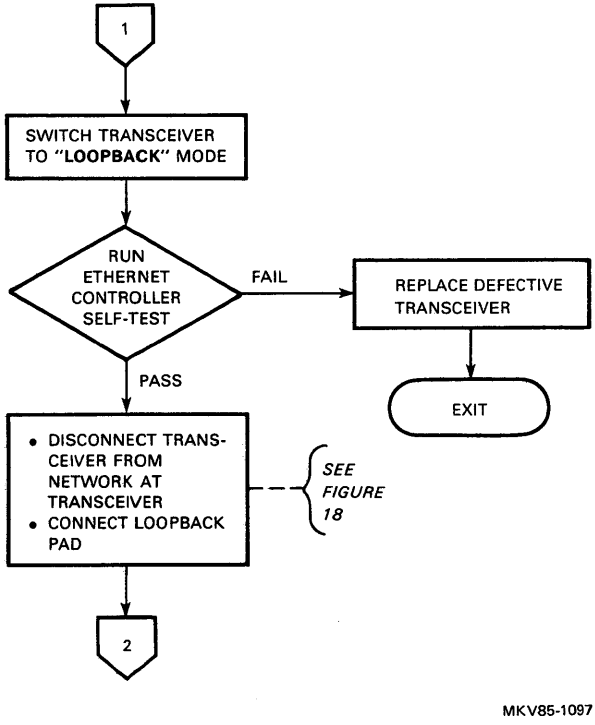


Figure 16 Checkout Flow Diagram for Dual-Cable Transceiver (Sheet 2 of 6)

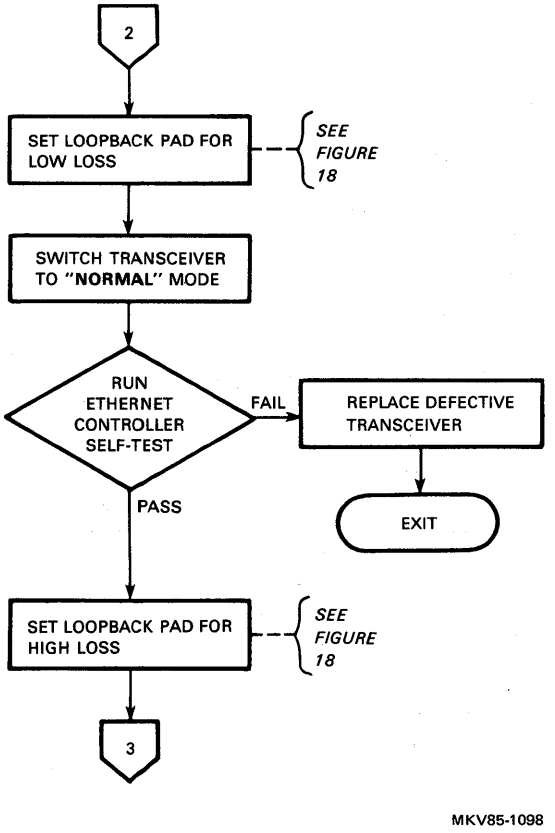


Figure 16 Checkout Flow Diagram for Dual-Cable Transceiver (Sheet 3 of 6)

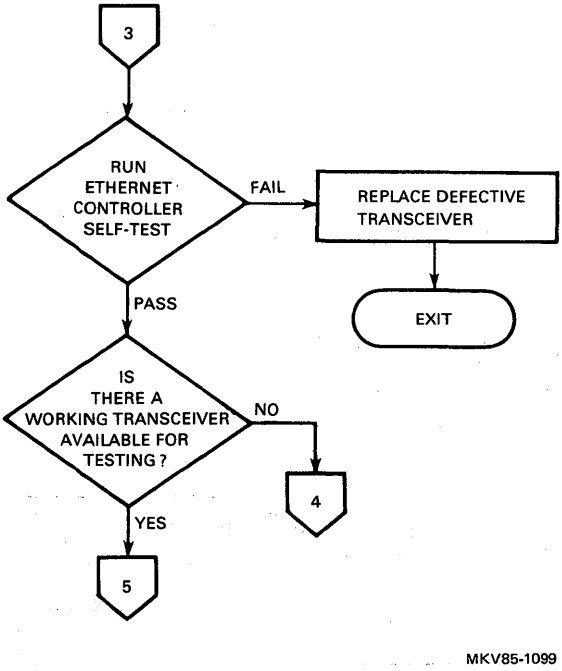


Figure 16 Checkout Flow Diagram for Dual-Cable Transceiver (Sheet 4 of 6)

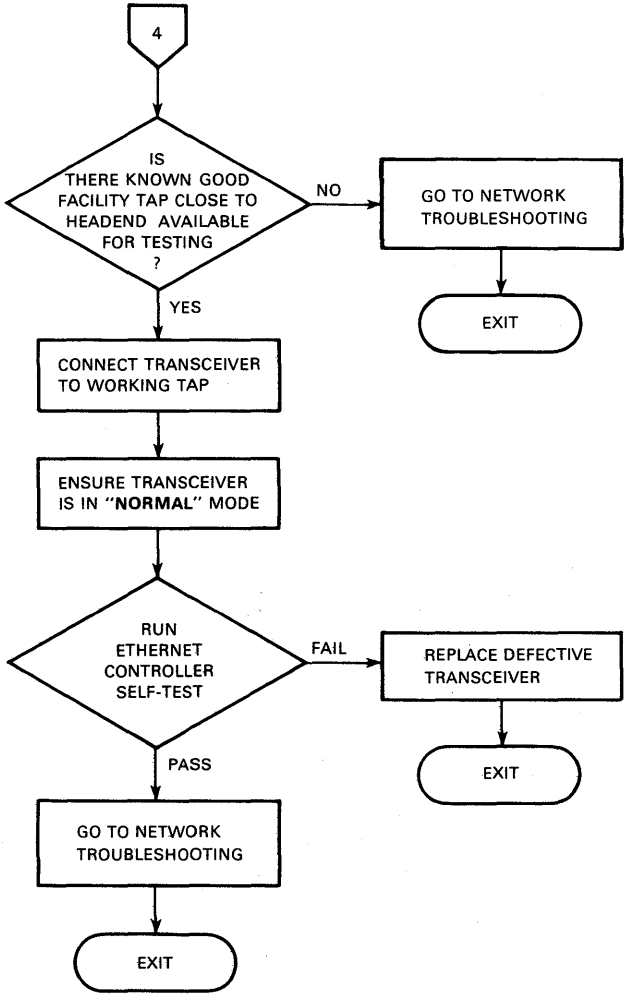


Figure 16 Checkout Flow Diagram for Dual-Cable Transceiver (Sheet 5 of 6)

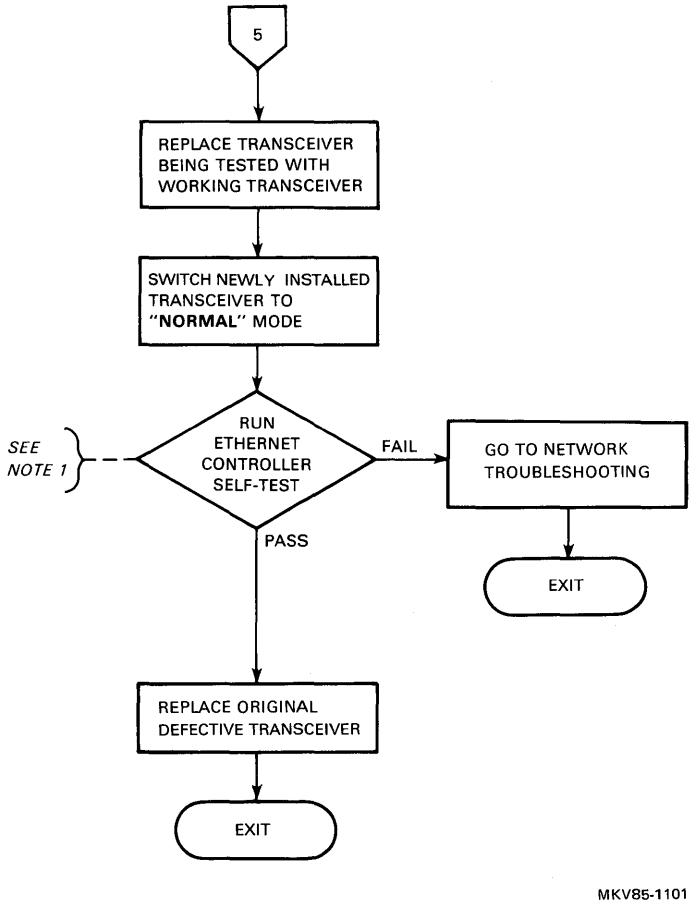


Figure 16 Checkout Flow Diagram for Dual-Cable Transceiver (Sheet 6 of 6)

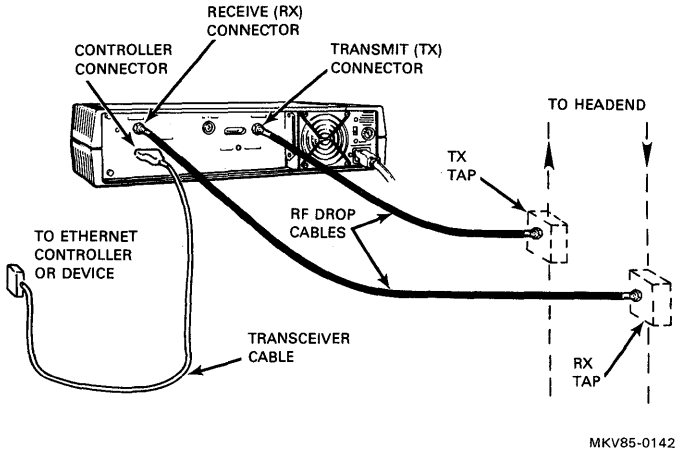


Figure 17 Network Connection Diagram for Dual-Cable Transceiver

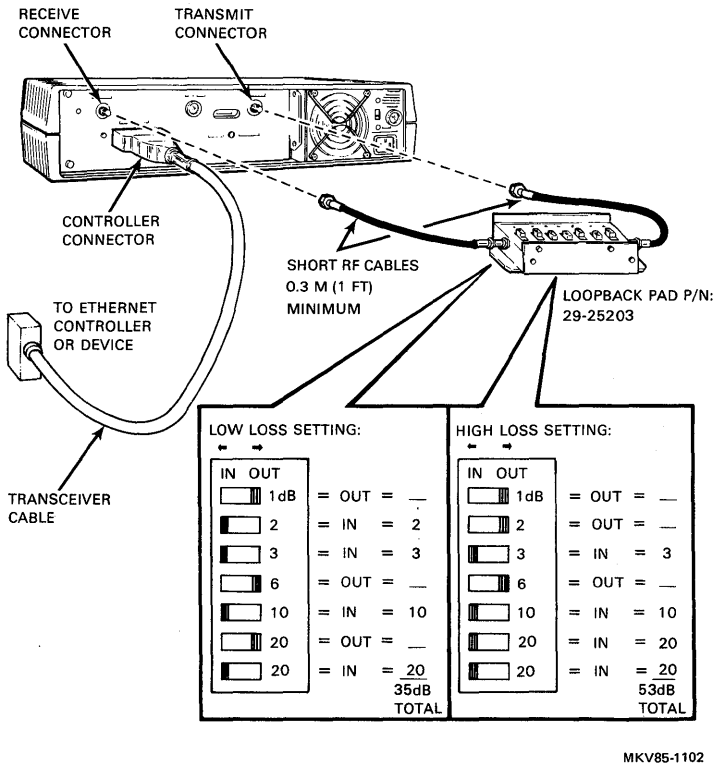


Figure 18 Loopback Pad Connection and Settings Diagram

DECOM-BX Checkout Flow Diagram

Use the flow diagram in Figure 19 to check the operation of the single-cable transceiver (DECOM-BX) or for a more thorough fault isolation guide for the single-cable unit. For the single-cable transceiver, it is possible to isolate a problem to the transceiver or to the downconverter.

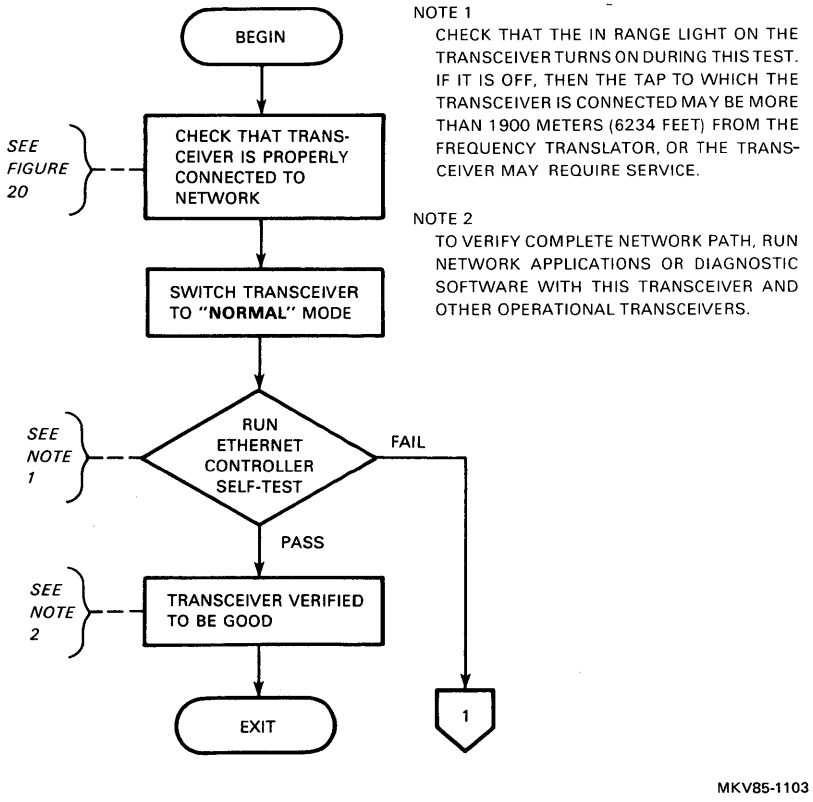


Figure 19 Checkout Flow Diagram for Single-Cable Transceiver (Sheet 1 of 6)

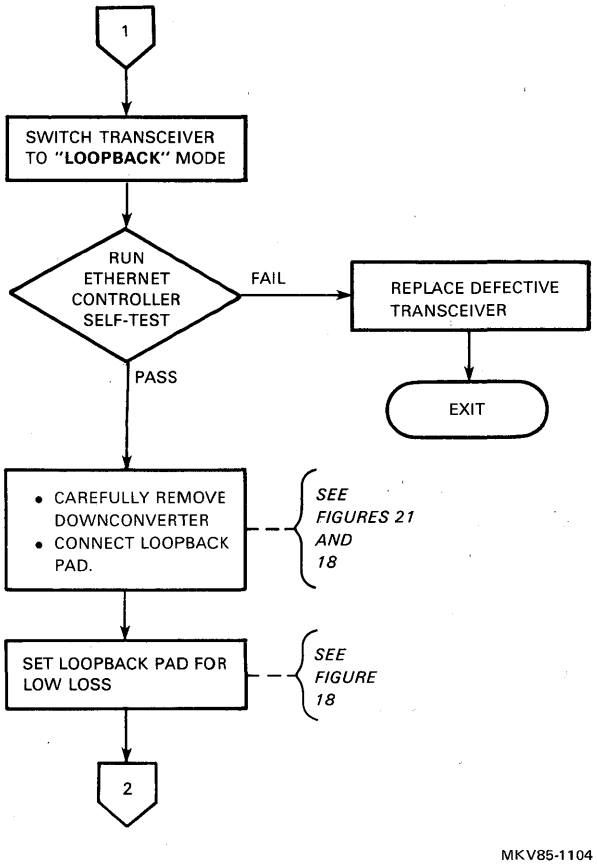


Figure 19 Checkout Flow Diagram for Single-Cable Transceiver (Sheet 2 of 6)

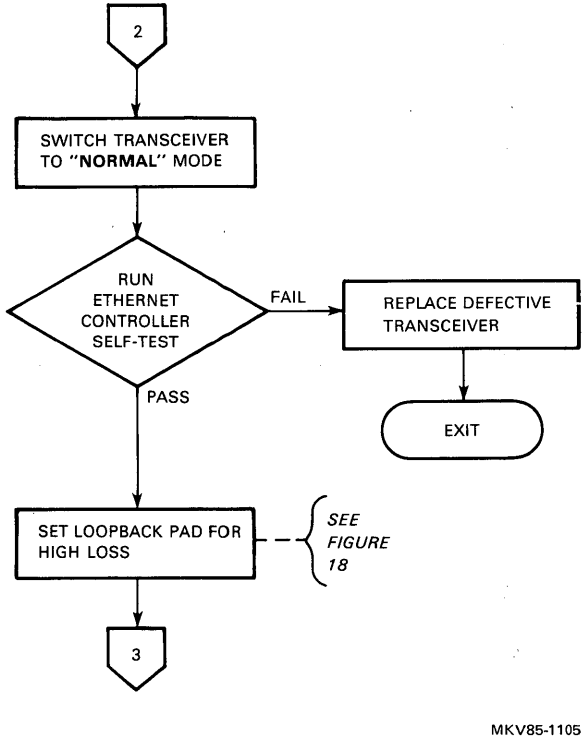


Figure 19 Checkout Flow Diagram for Single-Cable Transceiver (Sheet 3 of 6)

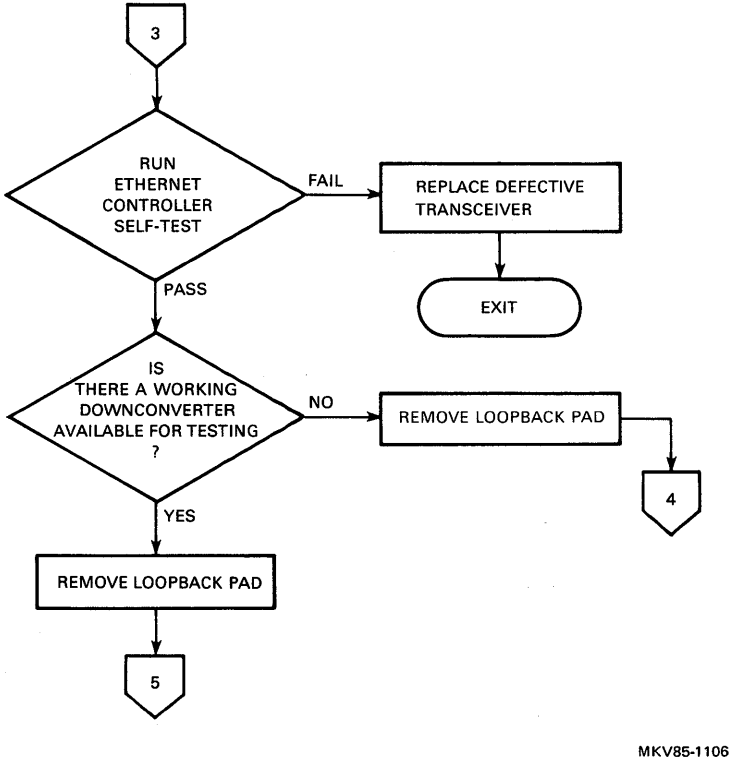


Figure 19 Checkout Flow Diagram for Single-Cable Transceiver (Sheet 4 of 6)

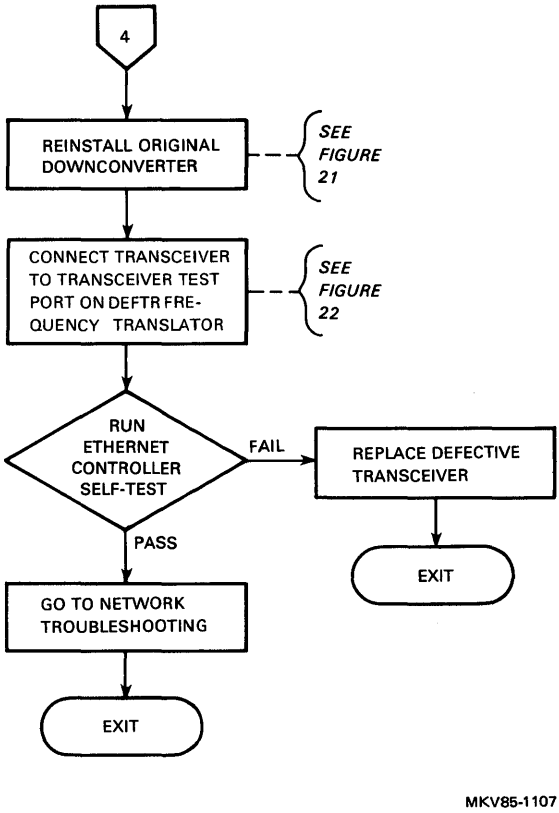


Figure 19 Checkout Flow Diagram for Single-Cable Transceiver (Sheet 5 of 6)

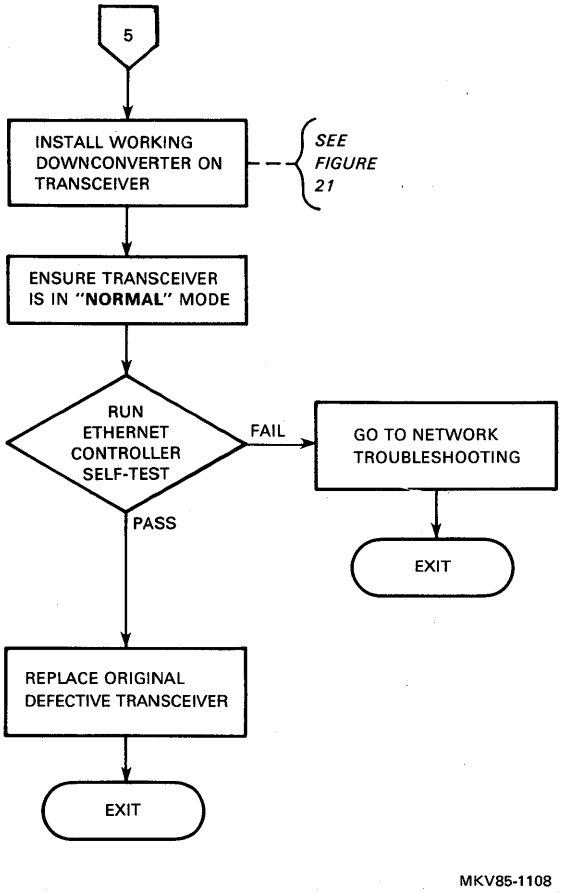


Figure 19 Checkout Flow Diagram for Single-Cable Transceiver (Sheet 6 of 6)

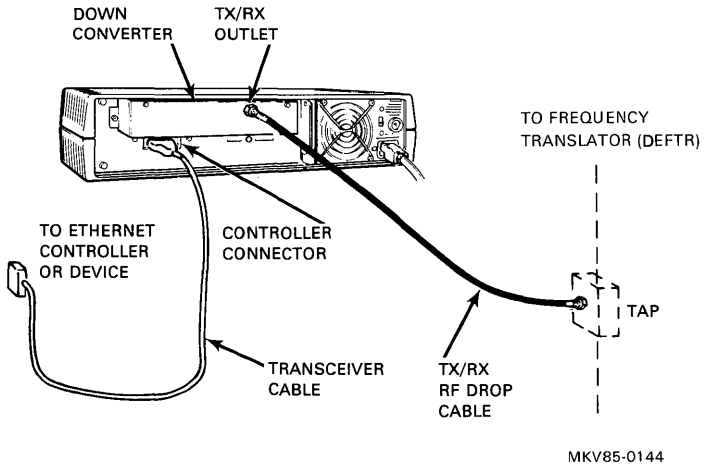


Figure 20 Network Connection Diagram for Single-Cable Transceiver

CAUTION
WHEN REMOVING AND REPLACING THE DOWNCONVERTER, KEEP THE THREE CONNECTORS CAREFULLY LINED UP SO THAT THE CONNECTOR PINS DO NOT GET BENT.

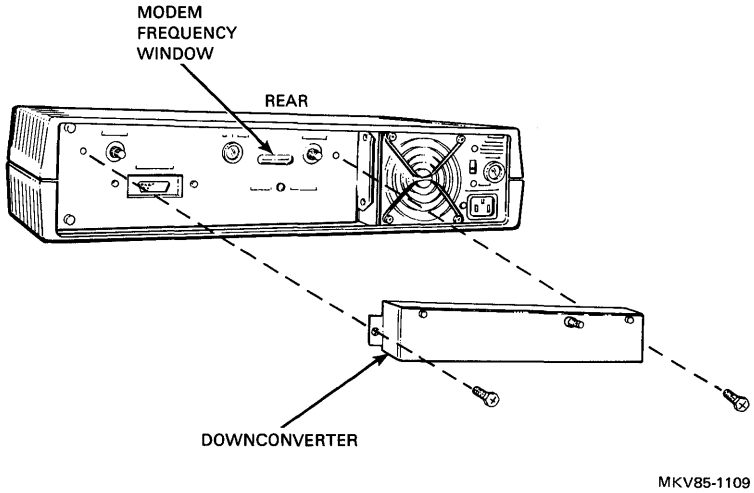


Figure 21 Downconverter Removal/Replacement Diagram

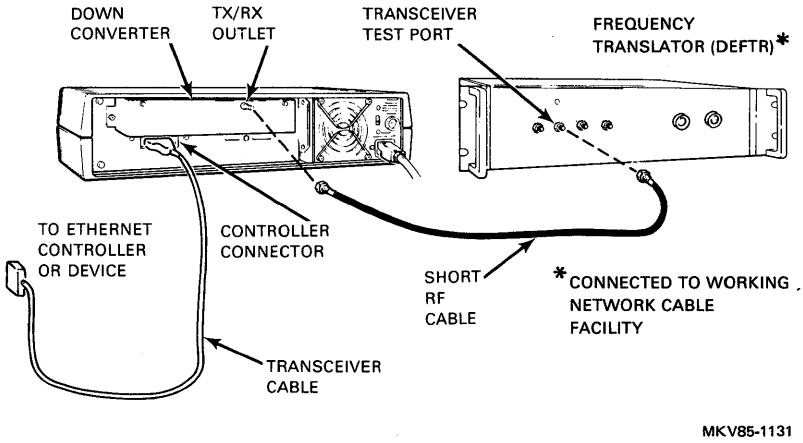


Figure 22 Transceiver to DEFTR Frequency Translator Connection Diagram

DECrepeater 200 ETHERNET REPEATER

The DECrepeater 200 retimes, reshapes, and repeats all signals it receives from one segment of a Local Area Network (LAN) and passes these signals to the next segment. This has the effect of extending the network beyond the limit of a single cable segment.

The DECrepeater 200 is designed to comply with the IEEE 802.3 specification and is compatible with the Ethernet V2.0 specification.

DECrepeater 200 Versions

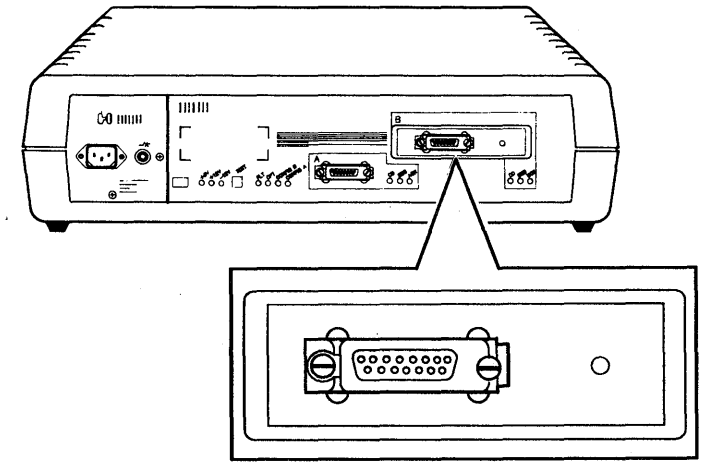
There are two versions of the DECrepeater 200. They are:

- DEREN-AA/AB, local repeater – Used to connect two standard Thickwire Ethernet, or two IEEE 802.3 10base5 coaxial cable LAN segments.

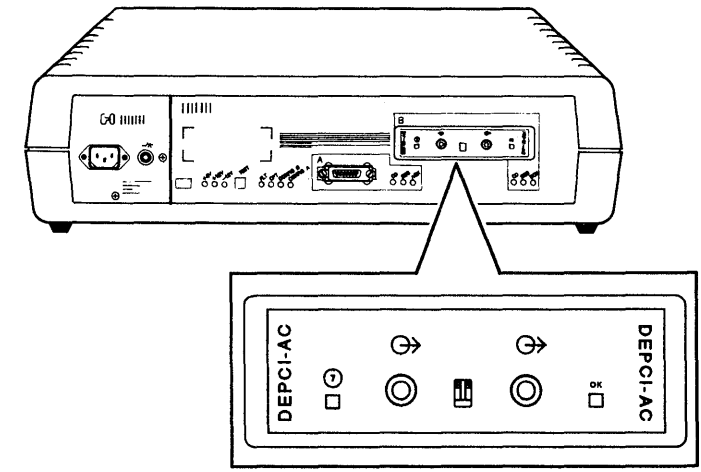
- DEREN-RC/RD, remote repeater – Used to connect two remote Ethernet or IEEE 802.3 LAN segments. This repeater connects to a coaxial cable on one side and a fiber optic cable on the other side. The coaxial cable connects to a standard Ethernet or IEEE 802.3 LAN segment, and the fiber optic cable can connect to another repeater or to a bridge. The fiber optic cable is an IEEE 802.3 fiber optic interrepeater link (FOIRL) cable.

The two versions of the repeater are shown in Figure 1.

LOCAL REPEATER



REMOTE REPEATER



MKV89-0039

Figure 1 DECrepeater 200 Local and Remote Repeaters

DECrepeater 200 Configuration Considerations

In a 10base5 to 10base5 configuration, the repeater has two Attachment Unit Interface (AUI) ports. The AUI port is Ethernet compatible and is designed to comply with IEEE 802.3. DECrepeater 200 units can connect 10base5 LAN segments with a maximum of 500 m (1640 ft) per segment.

In a 10base5 to FOIRL configuration, the repeater has two different interface ports. Port A is an AUI port and port B is a fiber optic interface port. The fiber optic interface is compatible with the IEEE 802.3 FOIRL specification and offers multifiber support.

A maximum of four DECrepeater 200 units can be used to connect five segments of a LAN. Of the five segments, a maximum of three can be 10base5 coaxial segments. This rule applies to both local and remote repeaters.

Basic Configuration Rules

1. If the repeater connects to an IEEE 802.3 transceiver, such as the H4005, the transceiver cable must be an IEEE 802.3 compliant transceiver cable (BNE3H/K/L/M or BNE4C/D). If an H4005 is used, it must have heartbeat disabled.

2. If the repeater connects to an Ethernet transceiver, such as the H4000, the transceiver cable can be either Ethernet or IEEE 802.3 compliant.

3. IEEE 802.3 transceiver cables and Ethernet transceiver cables cannot be interconnected.

4. Maximum length for the transceiver cable cannot exceed 50 m (164 ft).

5. Remote (fiber optic) repeaters can be used in one of two ways:

   a. Repeater-to-repeater application: Two remote repeaters are joined by a fiber optic link. Each repeater is connected to a separate standard baseband Ethernet segment via a transceiver and a transceiver cable.

   b. Bridge-to-repeater application: One remote repeater is connected to a LAN Bridge by a fiber optic link. The repeater and the bridge are connected to separate standard Ethernet segments via a transceiver and a transceiver cable. The maximum length of a single fiber optic link between the bridge and repeater is 1.5 kilometers.

6. The attenuating spacer provided must be used on the transmitter ST connector when 100/140 micron cable is used if:

   a. The measured loss of the 100/140 fiber optic cable is less than 4 dB, or

   b. The 100/140 micron cable length of less than 1 kilometer is used.

Figure 2 shows a local DECrepeater 200 connecting two LANs that are separated by fewer than 100 m (328 ft). This is the maximum combined length of the local repeater's transceiver cables.

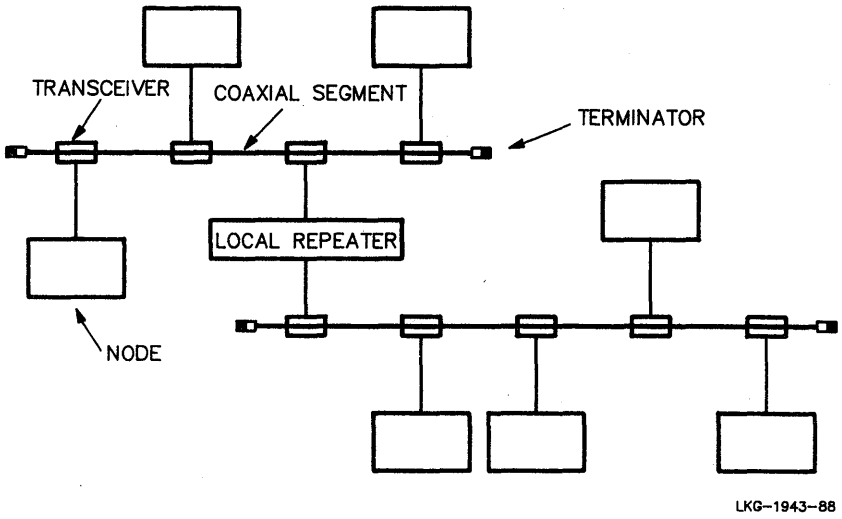


Figure 2 Local Repeater Configuration

Figure 3 shows a remote DECrepeater 200 connecting two LANs by means of a transceiver cable and a fiber optic cable. The fiber optic cable connects one remote repeater to another remote repeater.

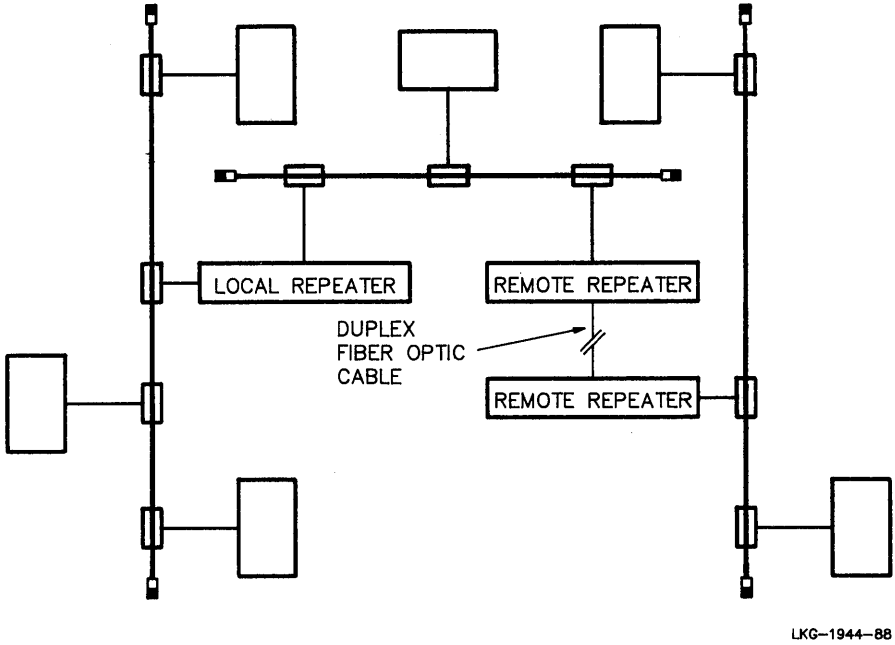


Figure 3 Remote Repeater Configuration

The DECrepeater 200 cannot be used in the following situations.

- As a standby repeater in any repeater configuration
- As a replacement for a remote DEREP unless both ends of the fiber optic cable connection use DECrepeater 200 repeaters
- With a remote LAN Bridge 100

DECrepeater 200 Components

DECrepeater 200 components are shown in Figure 4. Note that the power cord is only supplied for the U.S. and Canada. Power cords for other countries must be ordered separately. Table 1 is a list of order codes for country-specific power cords.

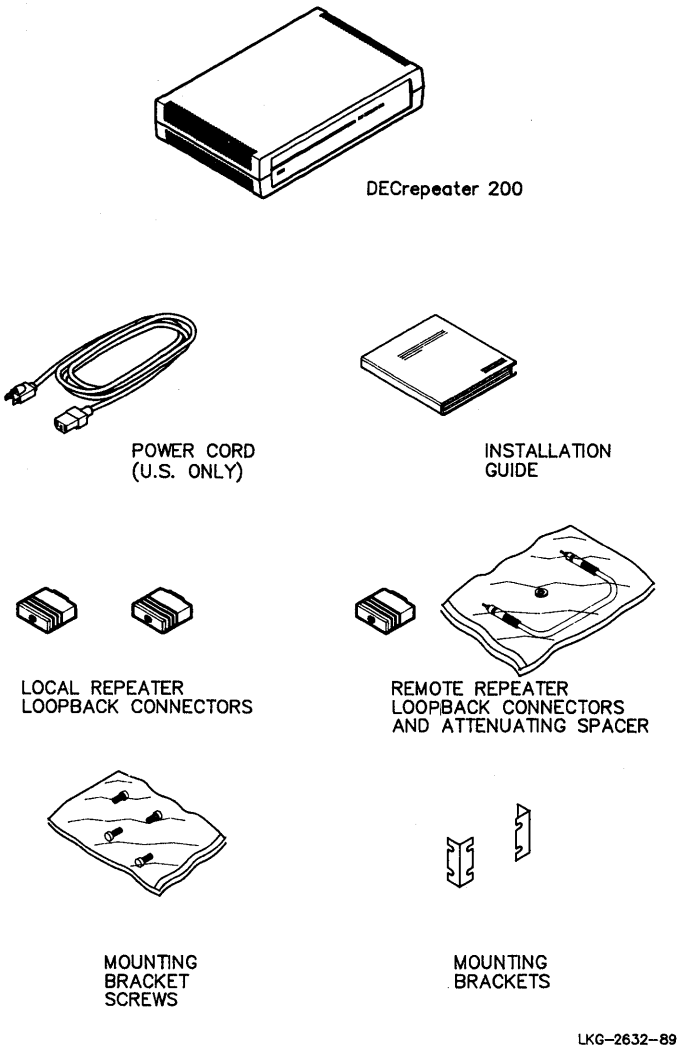


Figure 4 DECrepeater 200 Components

Table 1 DECrepeater 200 Power Cord Order Codes

Option	Order Code
United States, Canada	BN20A-2E
Japan	BN20B-2E
Australia, New Zealand	BN20C-2E
Belgium, Finland, France, Norway, Spain Sweden, West Germany, Holland	BN20D-2E
Ireland, United Kingdom	BN20E-2E
Switzerland	BN20F-2E
Denmark	BN20H-2E
Italy	BN20J-2E
India, South Africa	BN20K-2E
Israel	BN20L-2E

Reference Documentation

Refer to the following manuals for more information on the DECrepeater 200 Ethernet repeater.

Title	Document Number
DECrepeater 200 Problem Solving	EK-DEREN-PS
DECrepeater 200 Installation Guide	EK-DEREN-IN
DECconnect System Planning and Configuration Guide	EK-DECSY-CG
DECconnect System Facilities Cabling Installation Guide	EK-DECSY-FC
Networks and Communications Publications Document	EK-NACPD-RE
DECrepeater 200 Technical Manual	EK-DEREN-TM
DECreperter 200 Maintenance Print Set	MP-02625-01

Device Placement

The DECrepeater 200 can be installed in a variety of environments, including offices and computer rooms, as long as the environmental requirements are met. The unit can be placed on a desk, or a table, or it can be mounted in a standard 19-inch Radio Electronics Television Manufacturers Association (RETMA) rack or Satellite Equipment Room rack. For rack mounting see Figure 5. A wall/partition mounting kit is available that allows the repeater to be suspended from a partitioned office wall. Installation instructions are provided with the installation kit (P/N: H039).

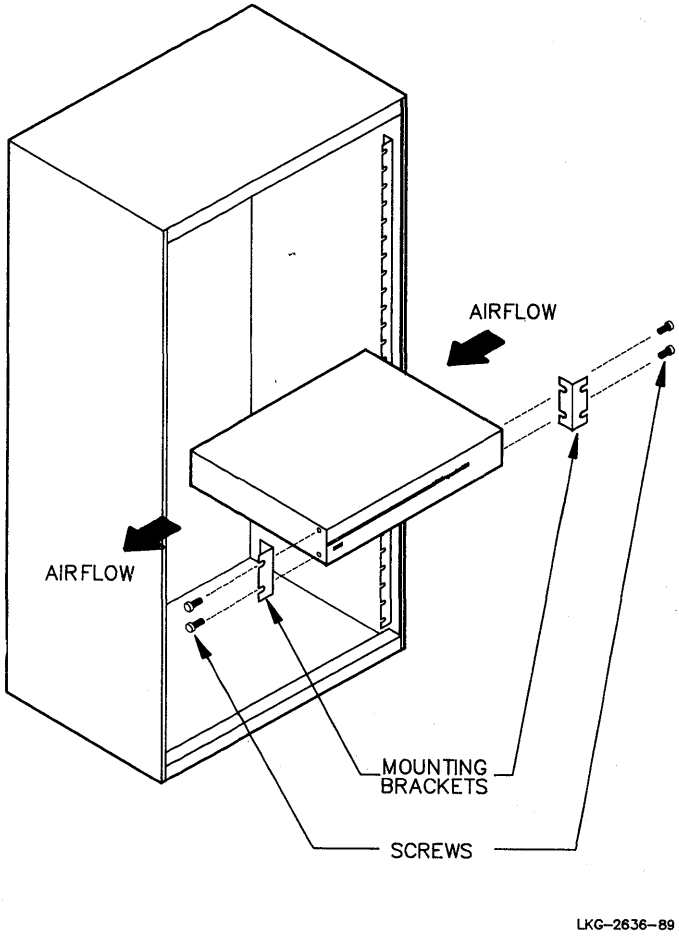


Figure 5 Rackmounting the DECrepeater 200

Power Requirements

Power requirements for each DECrepeater 200 model are shown in Table 2.

Table 2 Power Requirements

Model	Version	Power Requirements
DEREN-AA	Local Repeater	120 Vac Nominal
DEREN-AB	Local Repeater	240 Vac Nominal
DEREN-RC	Remote Repeater	120 Vac Nominal
DEREN-RD	Remote Repeater	240 Vac Nominal

Figure 6 shows how to verify the voltage select switch setting for the repeater being installed.

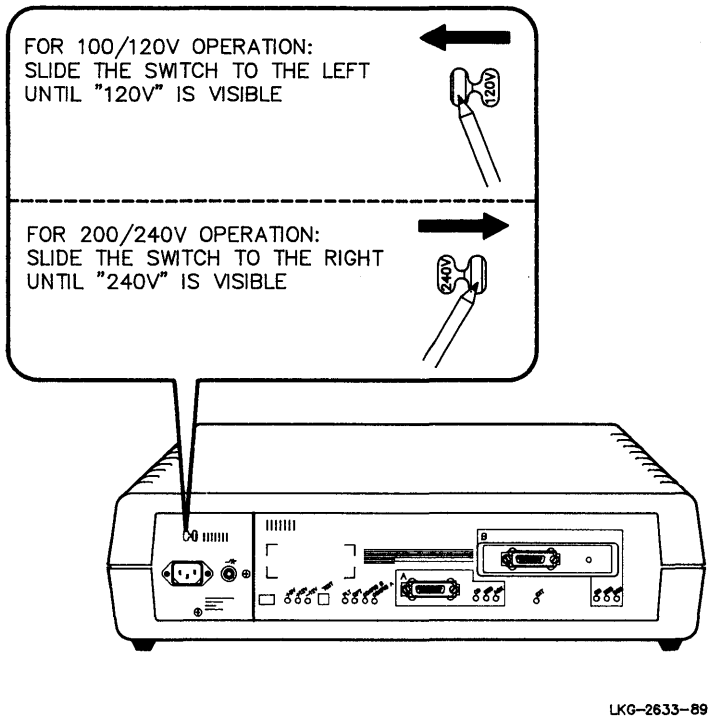


Figure 6 Verifying the Voltage Select Switch Setting.

Preinstallation Steps

Before installing the DECrepeater 200, use the following checklist to ensure that site preparation is complete.

1. Verify access to ac power.
2. Ensure that the appropriate baseband network interface is installed; that is, the H4005 and the required transceiver cabling is in place, tested, and tagged.
3. Ensure that the fiber optic cables (if required) are installed, certified, and tagged.
4. Ensure that the wall/partition mounting bracket kit is installed (if required).
5. Ensure that the power outlet matches the power requirements of the repeater and is within 1.8 m (6 ft) of the installation location.
6. Ensure that the environmental requirements are met.
7. Ensure that there is adequate space for ventilation and for maintenance access.

Installation Flow Diagrams

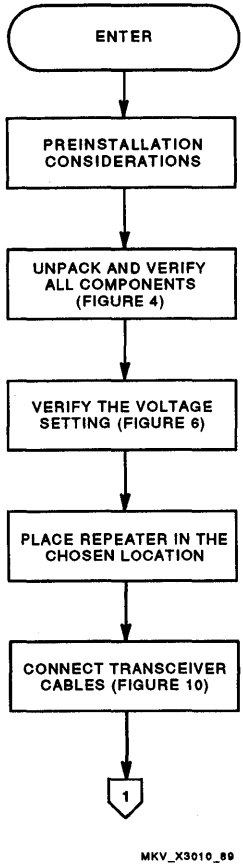


Figure 7 Local Repeater Installation Flow Diagram (Sheet 1 of 2)

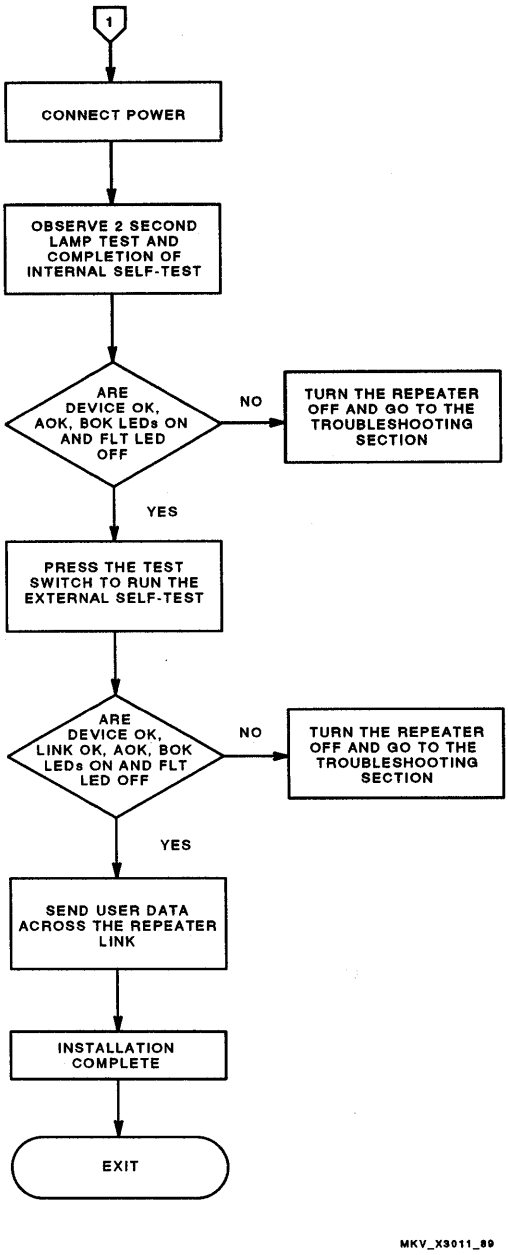


Figure 7 Local Repeater Installation Flow Diagram (Sheet 2 of 2)

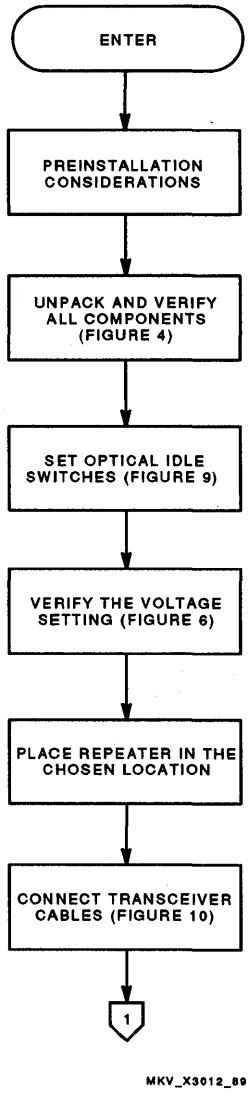


Figure 8 Remote Repeater Installation Flow Diagram (Sheet 1 of 4)

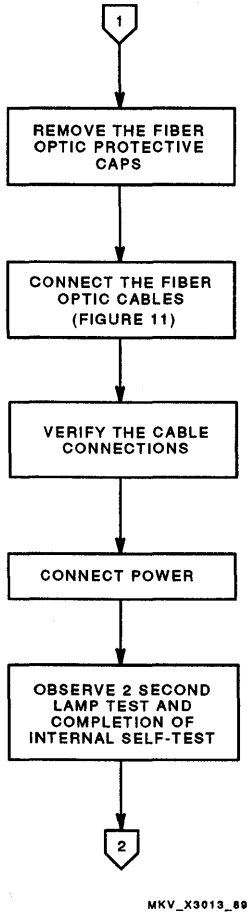


Figure 8 Remote Repeater Installation Flow Diagram (Sheet 2 of 4)

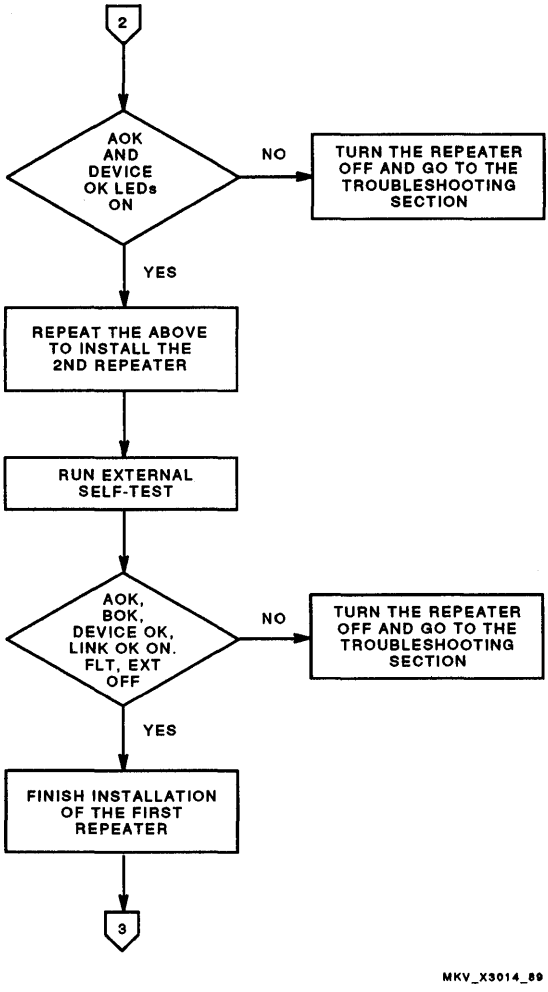


Figure 8 Remote Repeater Installation Flow Diagram (Sheet 3 of 4)

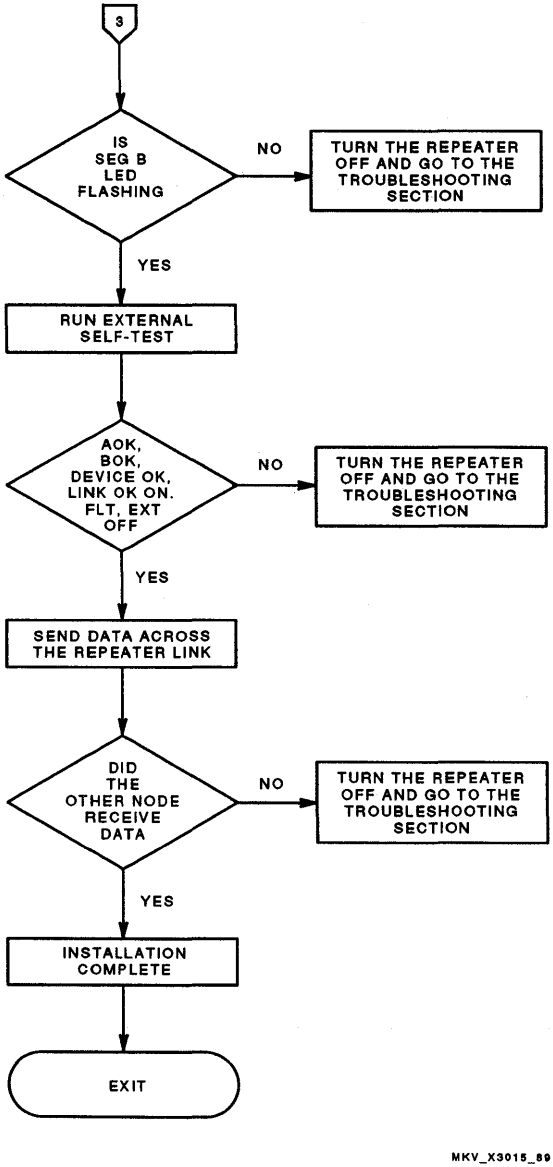


Figure 8 Remote Repeater Installation Flow Diagram (Sheet 4 of 4)

Switch Settings

NOTE
Repeaters are shipped with both optical idle switches set to OFF (UP).

A ballpoint pen can be used to move the switches up or down.

In a remote repeater configuration, set the optical idle switches on port B of a DECrepeater 200 (see Figure 9) as follows:

1. In a DECrepeater 200-to-DECrepeater 200 configuration, set both switches OFF (up). The LINK OK LED on both repeaters lights when power is applied to the unit.

2. In a DECrepeater 200-to-non-DEC 802.3 FOIRL (repeater or bridge) compatible configuration, set switch 1 OFF (up) and switch 2 ON (down). The LINK OK LED on the DECrepeater 200 lights.

NOTE
Other switch settings are reserved for Digital use only.

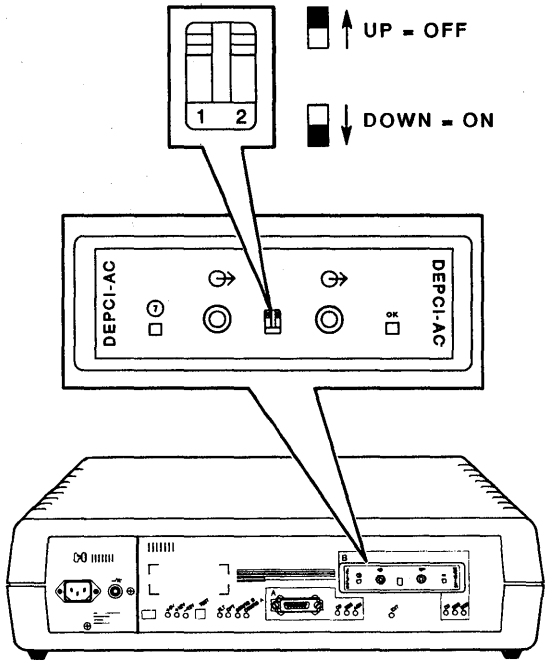


Figure 9 Setting Optical Idle Switches

Cabling

This section deals with the cabling considerations for the DECrepeater 200.

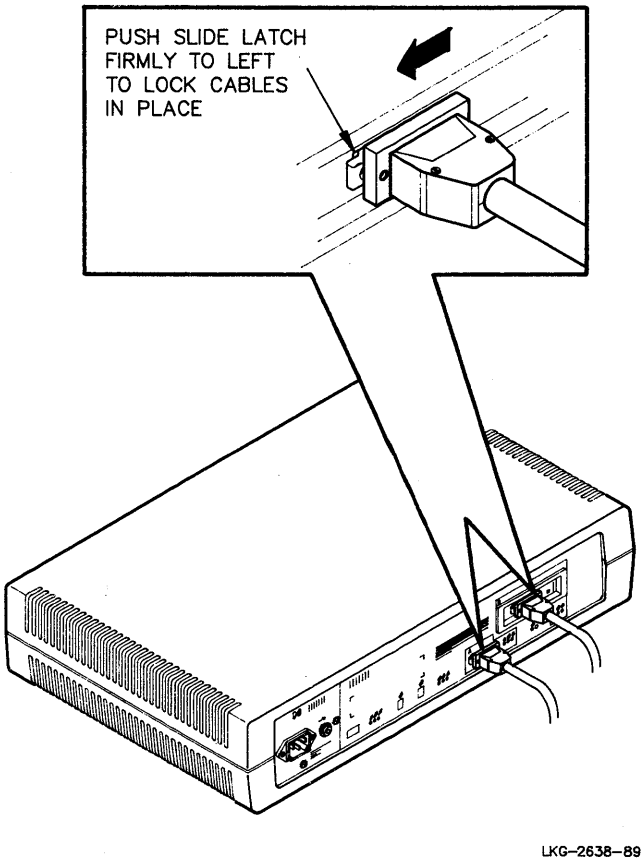


Figure 10 Connecting Transceiver Cables

NOTE

Install the attenuating spacer on the transmitter ST connector when 100/140 micron cable is used if:

- **The measured fiber optic cable loss of the 100/140 micron cable is less than 4 dB.**
- **The 100/140 micron cable is used for installations of less than 1 kilometer.**

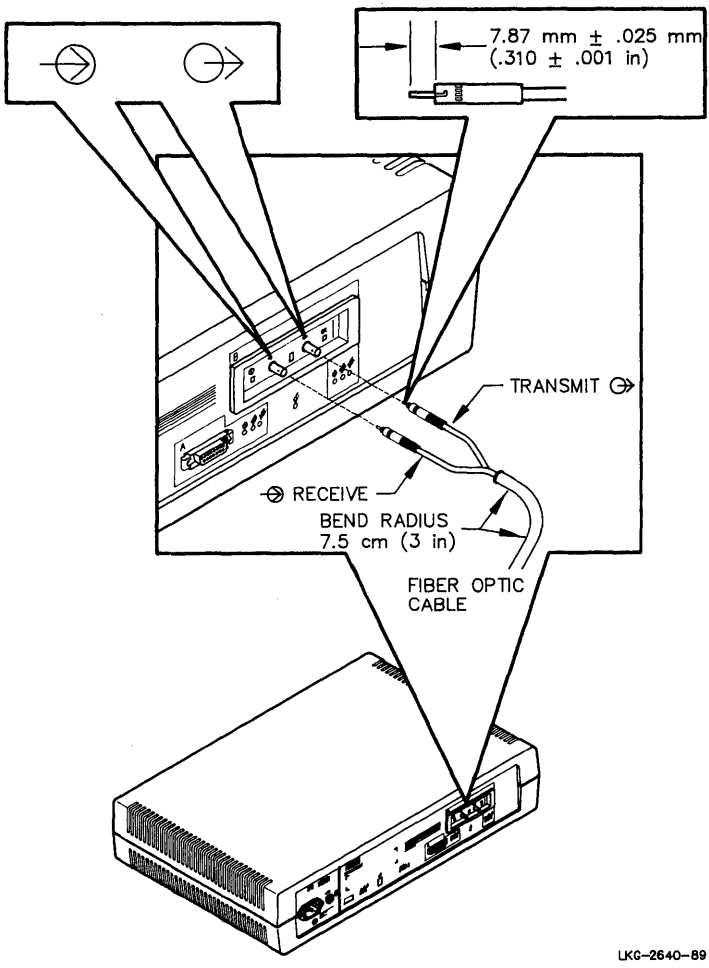


Figure 11 Connecting Fiber Optic Cables

Diagnostics

Testing the DECrepeater 200 consists of running the self-test. Self-test consists of two separate tests; *internal* and *external*. The internal test is run automatically when power is applied to the repeater, but only the internal test is run in this case. Both the internal and external tests are run when the TEST switch is pressed. No special test equipment is required to verify repeater operations.

Internal Self-Test – Tests the internal logic including the port B interface logic. It does not test the cable connections to both ports. Internal self-test does not require loopback connectors or connection to a working media.

NOTE
Self-test has no effect on LEDs on port B.

External Self-Test – Includes loopback and encoded data on both ports A and B. The external self-test includes the testing of cable connections to both ports. In a local repeater, the loopback is provided by a loopback connector or by the transceiver connected to the port. In a remote repeater, loopback on port B is provided by a fiber loopback connector or by the fiber optic cable connected to another remote repeater.

When the TEST switch is pressed and released, the following sequence should occur.

1. All LEDs (except the LEDs on port B of a remote repeater) light for approximately 2 seconds.
2. Internal self-test for the logic module runs.
3. External self-test runs.
4. The LED in the TEST switch and the FLT LED (Figure 12) go out after approximately 5 seconds.

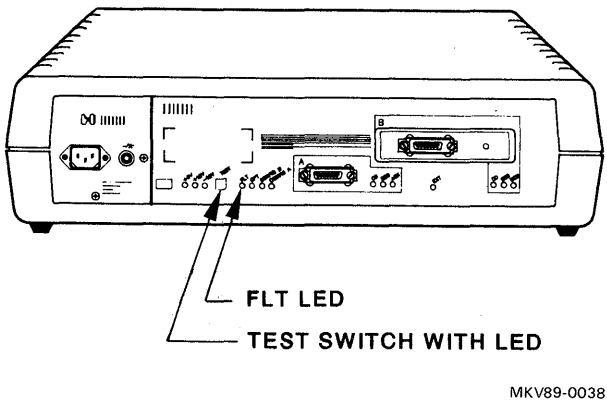


Figure 12 TEST Switch and FLT LED

If a fault is detected, the FLT LED lights, the TEST LED remains ON, and the repeater does not go on-line. If either of these LEDs remain ON, go to the **Troubleshooting** section.

NOTE

Remote repeaters do not pass external self-test unless both repeaters are fully connected and operating. The self-test must be performed individually on each unit.

Troubleshooting

Troubleshooting the DECrepeater 200 is a matter of interpreting the status LED indications. This section helps interpret the indications by describing the status LEDs and providing a troubleshooting table that relates symptoms to their possible causes and corrective actions. Table 3 describes the status LEDs of Figure 13 and Tables 4 through 7 provide more detailed troubleshooting information.

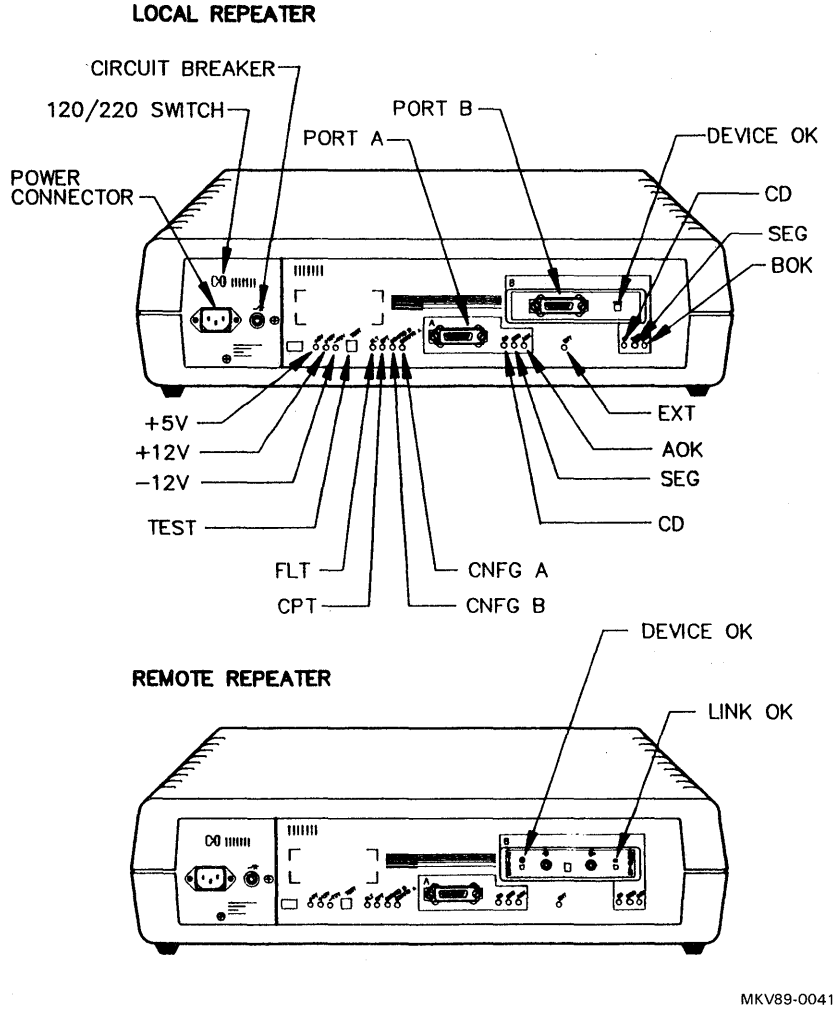


Figure 13 Repeater Back Panel

Table 3 Status LEDs

LED	Description
+5V	Indicates that +5 V is present.
+12V	Indicates that +12 V is present.
−12V	Indicates that −12 V is present.
TEST	ON when self-test is running or has failed.
FLT	Shows status of self-test. ON if self-test failed.
CPT*	ON if SQE TEST is received.
CNFG B*	Indicates a configuration error on port B when ON.
CNFG A*	Indicates a configuration error on port A when ON.
CD A	Flashing when carrier received on port A is transmitted to port B.
SEG A	ON when repeater is segmented on port A. Blinks when a fault was detected on port A but was corrected.
CD B	Flashing when carrier received on port B is transmitted to port A.
SEG B	ON when repeater is segmented on port B. Blinks when a fault was detected on port B but was corrected.
AOK/BOK	Ports A and B are operational.
EXT*	If self-test fails, EXT may be ON along with FLT indicating a subsystem failure.
DEVICE OK	OFF indicates port B module failure.
LINK OK	OFF indicates a broken fiber optic link or incompatible optical idle switch settings.

* These LEDs have more detailed diagnostic functions. See Table 4.

Table 4 Expansion of Failure Indicators

EXT	CPT	CNFG B	CNFG A	Possible Cause
OFF	–	–	–	Logic module (motherboard)
ON	OFF	ON	OFF	Logic module (motherboard)
ON	ON	OFF	ON	Logic module (motherboard)
ON	ON	OFF	OFF	PCI module, Ext cable, or motherboard
ON	ON	ON	ON	PCI module

– Indicates that the state of this LED does not matter.

Tables 5 and 6 help to isolate the repeater from the link and indicate which side has what problem.

Table 5 Repeater Isolating for DEC Mode

Operation	DEREN 1 BOK	DEREN 1 SEG	DEPCI-AC 1 LinkOK	DEPCI-AC 1 DevOK	DEREN 2 BOK	DEREN 2 SEG	DEPCI-AC 2 LinkOK	DEPCI-AC 2 DevOK
Normal	ON	No	ON	ON	ON	No	ON	ON
Wrong * Idle Signal	ON	No	OFF	ON	ON	No	OFF	ON
1 → 2 Link Broken	ON	No	OFF	ON	OFF	Yes	OFF	ON
2 → 1 Link Broken	OFF	Yes	OFF	ON	ON	No	OFF	ON
Both ** Links Broken	OFF	Yes	OFF	ON	OFF	Yes	OFF	ON
DEPCI	OFF	Yes	ON	OFF	OFF	Yes	ON	OFF

* Incompatible switch settings
** Most likely bad or disconnected fiber

Table 6 Repeater Isolating for IEEE 802.3 Mode

Operation	DEREN 1 BOK	DEREN 1 SEG	DEPCI-AC 1 LinkOK	DEPCI-AC 1 DevOK	DEREN 2 BOK	DEREN 2 SEG	DEPCI-AC 2 LinkOK	DEPCI-AC 2 DevOK
Normal	ON	No	ON	ON	ON	No	ON	ON
Wrong * Idle Signal	ON	No	OFF	ON	ON	No	OFF	ON
1 → 2 Link Broken	ON	No	ON	ON	OFF	Yes	OFF	ON
2 → 1 Link Broken	OFF	Yes	OFF	ON	ON	No	ON	ON
Both ** Links Broken	OFF	Yes	OFF	ON	OFF	Yes	OFF	ON
DEPCI	OFF	Yes	ON	OFF	OFF	Yes	ON	OFF

* Incompatible switch settings
** Most likely bad or disconnected fiber

Table 7 Troubleshooting

Indication	Suggested Corrective Action
All repeater lights are OFF	Check the power cord, power outlet, and circuit breaker.
CD A LED OFF continuously. This could indicate:	
• There is no traffic on port A	Check the +5V and +12V LEDs.
• The transceiver on port A is not functioning	Check transceiver power.
• The CD A LED is not functioning	Press the TEST switch. If the CD A LED fails to light, it is defective.
• Port A is short circuited or not connected	Run self-test with the loopback connector installed. **For local repeaters:** Swap the transceiver cable inputs to see if the indication moves to port B. This could indicate inactivity on that segment or a problem with the transceiver and/or cable. **For remote repeaters:** Replace the transceiver or transceiver cable. If this does not correct the problem, suspect inactivity on port B or a faulty logic module.
CD B LED OFF continuously. This could indicate:	
• There is no traffic on port B	Check the +5V and +12V LEDs.
• The transceiver on port B is not functioning	Check transceiver power.
• The CD B LED is not functioning	Press the TEST switch. If the CD B LED fails to light, it is defective.

Table 7 Troubleshooting (Cont)

Indication	Suggested Corrective Action
• Port B is short circuited or not connected	Run self-test with the loopback connector installed.
Fiber optic datapath is open	**For local repeaters:** Swap the transceiver cable inputs to see if the indication moves to port A. This could indicate inactivity on that segment or a problem with the transceiver and/or cable. **For remote repeaters:** Install the loopback connector on port B and press the TEST switch. If the repeater passes self-test, check the fiber optic cable or the other repeater for failure.
The SEG A LED lights	Install the loopback connector on port A and press the TEST switch. This will reset the LED and verify that the repeater is operating. **For local repeaters:** Swap transceiver cable inputs to see if the indication moves to port B. If so, suspect a problem outside the repeater such as a transceiver, transceiver cable, or coaxial segment. **For remote repeaters:** Check the setting of the optical idle switches.
The SEG B LED lights	Install the loopback connector on port B and press the TEST switch. This will reset the LED and verify that the repeater is operating. **For local repeaters:** Swap transceiver cable inputs to see if the indication moves to port A. If so, suspect a problem outside the repeater such as a transceiver, transceiver cable, or coaxial segment. **For remote repeaters:** Check the setting of the optical idle switches.

Table 7 Troubleshooting (Cont)

Indication	Suggested Corrective Action
The +12V LED is OFF	Verify that the power cord is connected. Check the AOK LED. If AOK is OFF, suspect the power supply. If AOK is ON, the +12V LED may be faulty.
The −12V LED is OFF	Verify that the power cord is connected.
The TEST LED remains ON	Replace the repeater.
The FLT LED is ON	Replace the repeater.
The +5V LED is OFF	Check the +12V and −12V LEDs. If they are ON, suspect the +5V LED. If they are OFF, suspect the power supply. Verify that the power cord is connected.
The EXT, TEST, and FLT LEDs remain ON	Install a loopback connector and press the TEST switch. If the self-test fails, replace the repeater.
The AOK/BOK LEDs do not light	Replace the repeater.
The DEVICE OK LED on port B PCI module remains OFF	Replace the port B module.
The LINK OK LED on port B PCI module remains OFF	Check the fiber optic link between remote repeaters.

FRU Removal and Replacement Procedures

Figure 14 shows the FRUs for the DECrepeater 200. The FRUs and their part numbers are listed below.

FRU	Part Number
Logic Module	54-18363-01
Power Supply	30-27484-01
Fan Assembly	70-23165-01
Port Connector Interface (PCI) Module (Local)	54-18359-01
Port Connector Interface (PCI) Module (Remote)	54-18377-01

WARNING

The procedures described should be performed by qualified service personnel only. DO NOT attempt to remove any FRUs while the DECrepeater 200 is connected to a power source.

CAUTION

Static electricity can damage electrical components. Use a grounded wriststrap (29-11762-00) and a grounded work surface when accessing any internal components of the DECrepeater 200.

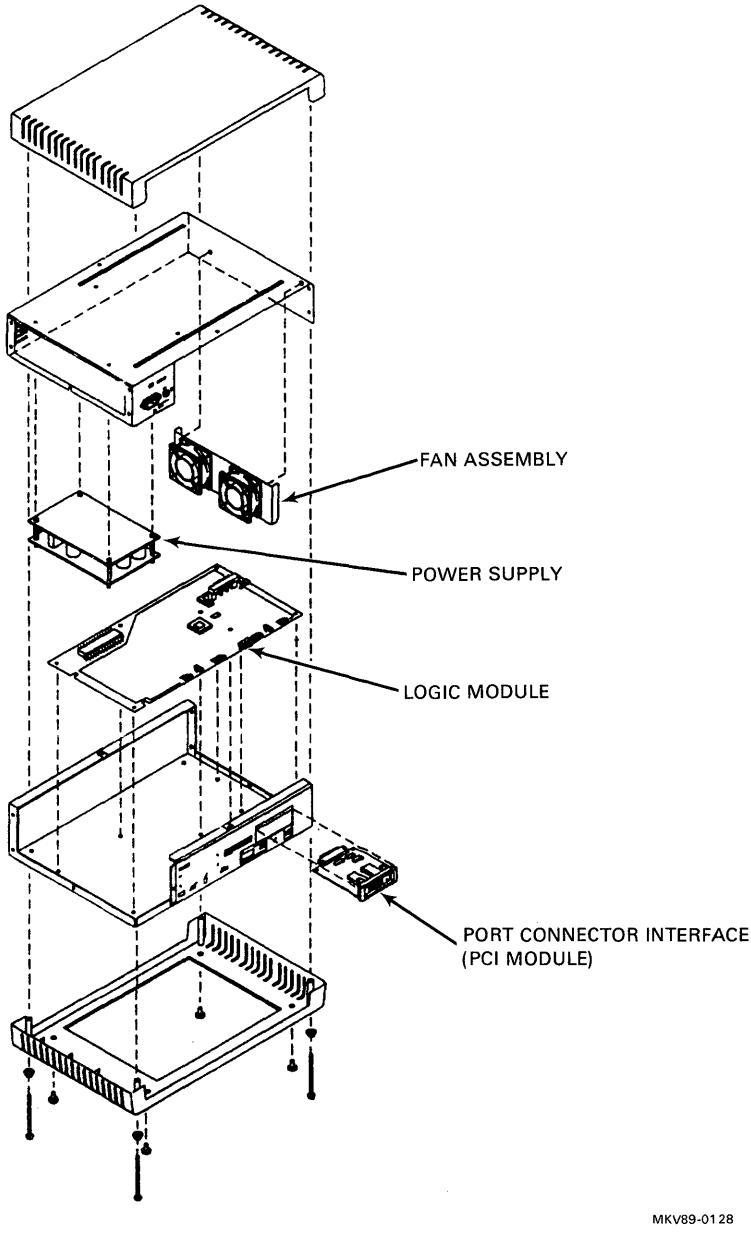


Figure 14 FRU Removal and Replacement

DECrouter 200 ASYNCHRONOUS ROUTER

General Description

The DECrouter 200 is a high-performance, low-cost asynchronous router (see Figure 1) for use on Ethernet or IEEE 802.3 local area networks.

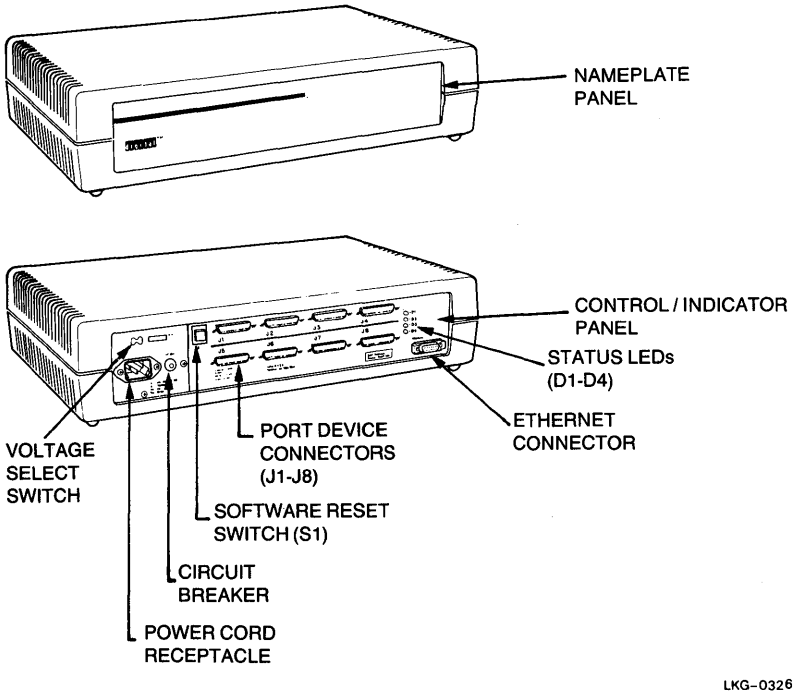


Figure 1 DECrouter 200 Asynchronous Router

DECrouter 200 Versions

The router is available in two versions (DSRVC-AA and DSRVC-AB). Each version has a different input voltage.

Model	Input Voltage
DSRVC-AA	100 - 120 Vac
DSRVC-AB	220 - 240 Vac

DECrouter 200 INSTALLATION

Reference Documentation

Refer to the following documents for more information on the DECrouter 200 asynchronous router:

- *DECrouter 200 Hardware Installation/Owner's Guide*
- *DECrouter 200 Technical Manual*
- *DECrouter 200 Management Guide*
- *DECrouter 200 Identification Card*
- *DECrouter 200 Software Installation Guide (VMS/MicroVMS)*
- *DECrouter 200 ULTRIX-32/32m Installation Guide*
- *DECrouter 200 RSX-11M-Plus Installation Guide*

Hardware Components

The DECrouter 200 package consists of:

- DECrouter 200 hardware unit – DSRVC-AA or DSRVC-AB
- Country kit – Correct power cord and hardware installation/owner's guide
- Software – DECrouter 200 software and software installation guide

Terminal cables for the DECrouter 200 are ordered separately.

Software Components

The basic software that is required for the installation and operation of the DECrouter 200 includes:

- DECrouter 200 distribution software (installed on each DECrouter 200 load host)
- DECnet Phase IV software (installed on each DECrouter 200 load host – not required for ULTRIX systems)

Equipment Placement

The router can be placed in various locations, including offices and computer rooms, as long as the environmental requirements are met.

Environmental Requirements

Temperature	5° to 50°C (41° to 122°F)
Relative Humidity	10% to 95% (noncondensing)

Physical Description

Length	31.2 cm (12.3 in)
Width	49.3 cm (19.4 in)
Height	11.7 cm (4.6 in)
Weight	5.9 kg (13.0 lb)

Power Requirements

The operating range of the DSRVC system is contained in the following table.

Table 1 DSRVC Power Requirements

Version	Nominal Voltage Required	Voltage Range	Current	Frequency
-AA	120 Vac	100 – 200	1.0	47-63 Hz
-AB	240 Vac	220 – 240	0.5	47-63 Hz

Installation Flow Diagram

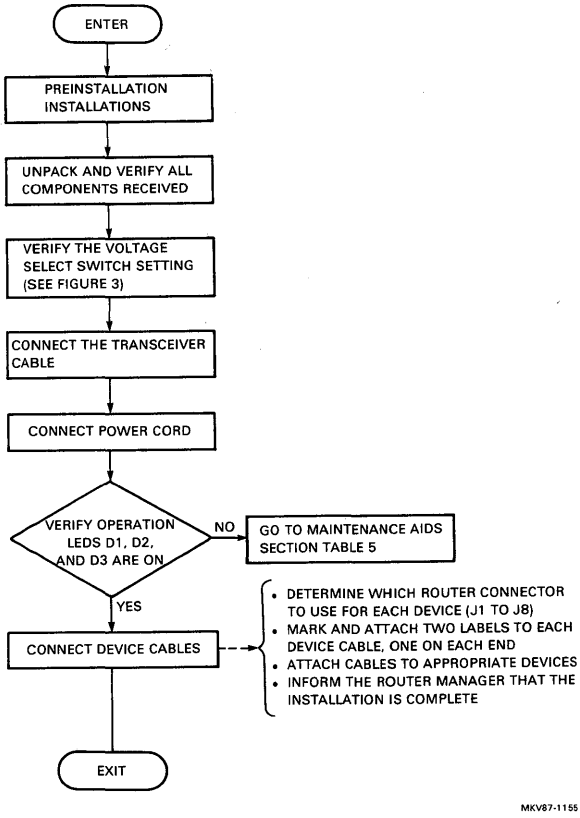


Figure 2 DECrouter 200 Installation Flow Diagram

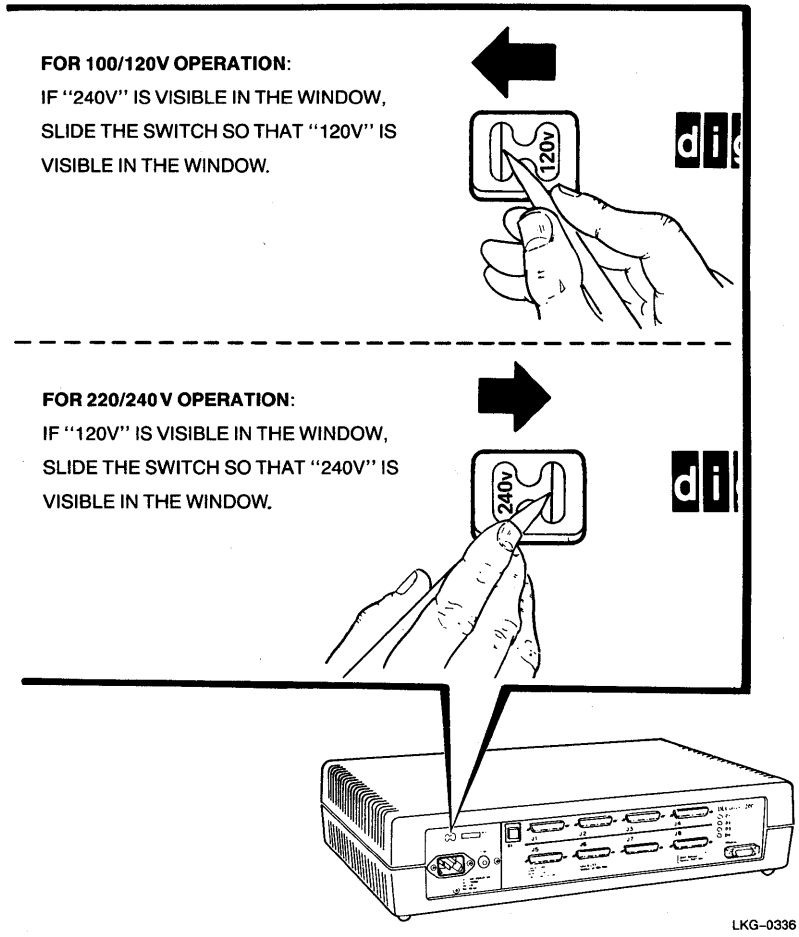


Figure 3 DECrouter 200 Voltage Selection

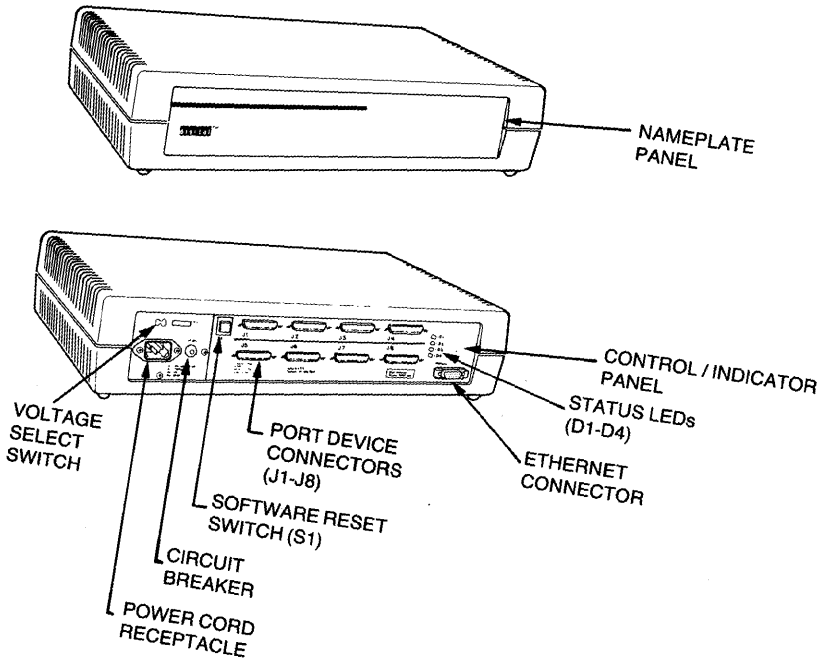


Figure 4 DECrouter 200 Front and Rear Panel

LKG-0326

Cabling

Ensure that the transceiver cables, the device cables, and the router power cable do not exceed the maximum lengths as described in Table 2 and in the Basic Configuration Rules below.

Table 2 Maximum Cable Lengths

From	To	Maximum Length	Cable Type
Transceiver	Router	50 m (164 ft) See Rules 2 and 3	BNE3x-xx transceiver cable
Transceiver	Router	12.5 m (41 ft) See Rules 2 and 3	BNE4x-xx office transceiver cable
Device	Router	See Rule 4	Depends on specific device
Wall Outlet	Router	1.8 m (6 ft)	Router power cable (included in DSRVC-xx country kit)

Basic Configuration Rules

1. When an H4005 transceiver is used to provide the connection point for the transceiver cable, the transceiver cable must be an IEEE 802.3 compliant transceiver cable (BNE3H/L/M or BNE4C/D).

2. Maximum length for the transceiver cable cannot exceed 50 m (164 ft). This maximum length may be reduced due to the internal cabling equivalency of a device or due to the use of office transceiver cable.

   a. Cabling equivalency is a measure of the internal timing delay of a device (expressed in meters of transceiver cable.) This cabling equivalency must be subtracted from the 50 M (164 ft) maximum.

   b. Office transceiver cable (BNE4x-xx), due to its smaller diameter, has a signal loss that is four times that of the (BNE3x-xx) transceiver cable. Therefore, if office transceiver cable is used, the maximum transceiver cable distance must be divided by 4. This means the maximum office transceiver cable length allowed is 12.5 m (41 ft).

      If the configuration includes a device, and the device has an internal cabling equivalency, this should be subtracted from the 50 m (164 ft) maximum before dividing by 4.

3. When connecting the router to a configuration that includes a DELNI, allow 5 m (16 ft) cabling equivalency loss for the DELNI.

4. Maximum allowable lengths for device cables should not exceed guidelines set by RS-232-C (EIA232) specifications.

Connecting Port Devices to the DECrouter 200

Only one device cable for each port device needs to be connected to the router (see Figure 5).

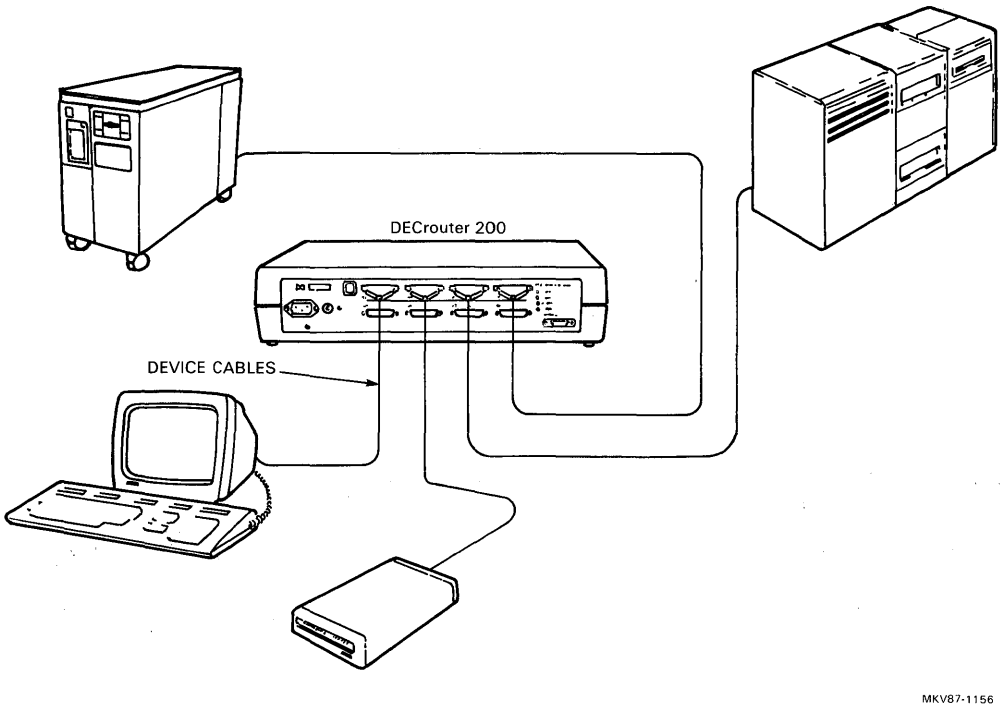


Figure 5 Connecting Port Devices

Table 3 Device Cables

Cable	Type Description	For Connecting
BC22D	Null modem cable	Nodes that are *not* using modem control signals for operation.
BC22R*	Null modem cable	Nodes that are using modem control signals for operation.
BC22E or BC22F	Modem cable	Dial-in or dial-out modems.

*Recommended for devices that use full modem control.

Diagnostics

The DECrouter 200 provides the following maintenance features.

- Hardware self-test
- Loopback tests
- Up-line crash dumps

The four status LEDs, located on the router's control/indicator panel, indicate the status of the router and are also used for diagnosing router problems. Compare the state of the status LEDs on the router with those shown in Table 5, then go to the section that follows.

NOTE

All four LEDs illuminate for 1 second when the power is first applied to the router. After powering up the router, allow up to 2 minutes to elapse before determining the state of the status LEDs.

Table 4 Problem Analysis Tools

Tool	Problems	Components Tested
Hardware self-test	Suspected problems in hardware.	All hardware components including Ethernet connections.
Circuit-level loopback test	The DECrouter and a node on the same Ethernet are not communicating properly.	Ethernet cable and components. Checks physical links between components.
	The DECrouter and an adjacent node on one of the asynchronous circuits are not communicating properly.	Asynchronous circuits. Checks physical links between hardware components.
Node-level loopback test	Higher-level problems and logical link problems between two nonadjacent nodes or between two adjacent nodes on Ethernet.	Logical link capabilities (network software).
Up-line crash dump	System crashes.	None

Table 5 Status Indicator LEDs

LED Name	LED Definition	State	Indications
D1	Power ON/OFF	ON	The router's dc voltages are correct.
		OFF	The router's dc voltages are not correct.
D2	Diagnostic	ON	Self-test passed.
		OFF	Fatal error or test-in-progress.
		Blinking	Nonfatal error.
D3	Software	ON	Software successfully loaded.
		OFF	Down-line load in progress.
		Blinking	Multiple load failure.
D4	Network activity	ON	Indicates activity on the network.

DECrouter 200 Fault Conditions

D1 LED OFF – Power is not reaching the DECrouter 200.

- Ensure that the voltage select switch is set to the correct voltage.
- Secure the power cable at the router and at the wall outlet.
- Check the wall outlet using another appliance or light, or plug the router power cord into another outlet. If no power is available, check the wall outlet's circuit breaker.
- Determine if the router circuit breaker has tripped. If it has, reset the circuit breaker. If the circuit breaker trips more than once, replace the router.
- Replace a defective power cord with a new cord.

D2 LED OFF – A hardware error has occurred that makes the DECrouter 200 nonoperational. There is no corrective procedure for this problem.

D2 LED Blinking – If the D2 LED is blinking after power-up, it indicates that the router has a nonfatal problem during self-test. To isolate the problem, connect a console terminal to port (J1) of the router. The primary problem indicator in this case is the error message that appears on the console terminal.

To isolate and diagnose the problem, perform the following:

- Connect a console terminal to Port 1 (J1) of the router, then power up the terminal.
- Configure the terminal to operate at a speed of 9600 bits/s with a character size of 8 bits with no parity (refer to the specific terminal user's guide for help in setting up the terminal parameters).
- Unplug the router power cord at the wall outlet, then reinsert it.
- Read the error message that appears on the terminal display (if no message appears on the terminal display, refer to the **No Messages on Console Terminal** section that follows).

The following sections list the error messages that occur in conjunction with the D2 LED blinking on your display.

Error Messages 922 and 923

Local -922- port hardware error on port n
Local -923- port n has been disabled

These messages indicate a port hardware error. There is no corrective procedure for this problem.

Error Message 932

Local -932- hardware revision level checksum error

The router's nonvolatile memory is faulty. There is no corrective procedure for this problem.

Error Messages 941, 942, and 950

Local -941- transceiver loopback error
Local -942- image load not attempted
Local -950- troubleshooting procedures should be followed

There is a fault in the transceiver cabling between the router and the coaxial cable.

1. Check the transceiver cable that runs from the router to the transceiver, to the DELNI, or to the Etherjack. Be sure the connection is secure at both ends. Check the cable for any signs of damage. If the cable appears damaged, replace it.
2. If the above action does not correct the problem:
   a. Disconnect the transceiver cable from the router.
   b. Plug the Ethernet turnaround connector into the Ethernet connector on the router.
   c. Initialize the router by pressing <CTRL/P> on the console terminal, or by unplugging and then reinserting the router's power cord.

d. Wait 20 seconds for the diagnostic test to complete, then observe the status of the D2 LED:

(1) If the D2 LED continues to blink and the error messages reappear after the self-test (within 10 or 15 seconds), the router is faulty and must be replaced.

(2) If the D2 LED glows steadily, proceed to the next step to isolate and determine the faulty unit.

NOTE

When using the Ethernet loopback connector to troubleshoot the DECrouter 200, note that if the results cause the D2 LED to glow steadily, the router attempts to down-line load the router image. Since the router is disconnected from the network, the down-line load fails and the router responds by causing the D3 LED to blink and issues messages 902 and 912 to the console terminal.

e. Unplug the Ethernet turnaround connector from the Ethernet connector on the router.

f. Reconnect the transceiver cable to the Ethernet connector on the router.

g. Disconnect the other end of the transceiver cable from the DELNI, from the Etherjack, or from the transceiver on the Ethernet coaxial cable.

h. Plug the Ethernet turnaround connector into the transceiver cable.

i. Initialize the router by pressing <CTRL/P> on the console terminal, or by unplugging and then reinserting the router's power cord.

(1) If the D2 LED continues to blink, the transceiver cable is faulty and must be replaced.

(2) If the D2 LED glows steadily, the faulty unit is the device the transceiver cable was connected to (the DELNI, the Etherjack extension, or the transceiver).

No Messages on Console Terminal

- The port to which the console terminal is physically connected is not defined as the console port.
- The console terminal is faulty.
- The internal characteristics for the console terminal are not set up correctly.

D3 LED Blinking – If the D3 LED is blinking after power-up, it indicates the router has a down-line loading problem.

To isolate and diagnose the problem, perform the following:

- Connect a console terminal to Port 1 (J1) of the router, then power up the terminal.
- Configure the terminal to operate at a speed of 9600 bits/s with a character size of 8 bits with no parity (refer to the specific terminal user's guide for help in setting up the terminal parameters).
- Press <CTRL/P> on the console terminal keyboard. (Pressing <CTRL/P> restarts the router self-test and starts the down-line loading of the router image from a load host.)
- Read the message that appears on the terminal display.

NOTE

If the down-line load succeeds, the terminal displays a message indicating the load is complete, followed by a series of coded alphabetic characters. This is normal. The characters represent DDCMP protocol messages from Port 1 of the DECrouter 200.

Down-Line Load Starts and Then Fails

The following messages appear on the console terminal at various intervals:

Local -902- waiting for image to load
Local -903- loading from host *host-address*
Local -912- load failure, timeout

The host system (address in error message) fails to complete the down-line load to the DECrouter 200.

Copy the error message exactly as it appears on the console terminal display and notify the router manager.

Down-Line Load Does Not Start

The following messages appear on the console terminal at various intervals:

Local -902- waiting for image to load
Local -912- load failure, timeout

The load host system is not responding to the router's down-line load request within the allotted timeout period.

Copy the error message exactly as it appears on the console terminal display and notify the router manager.

DECrouter 250 SYNCHRONOUS/ASYNCHRONOUS ROUTER

General Description

The DECrouter 250 is an Ethernet communications routing server. It can connect any combination of up to eight DECnet devices to each other, to the local area network (LAN), and to larger DECnet networks. The DECrouter 250 has ten ports: one Ethernet port, one console port, two 50-pin device ports, and six 25-pin (EIA-232-D) device ports. All eight device ports can be for either synchronous or asynchronous devices that use DECnet Phase III, Phase IV, or Phase V protocols with Digital Data Communications Message Protocol (DDCMP). The DECrouter 250 supports the following standards:

- EIA-232-D/V.24/V.28
- RS-449, RS-423-A/V.10
- RS-449, RS-422-A/V.10
- V.35
- V.36

DECrouter 250 Versions

The DECrouter 250 is available in two versions with each having a different input voltage. The versions and input voltages are listed below.

Model	Input Voltage
DSRVR-AA	100–120 Vac
DSRVR-AB	220–240 Vac
DSRVR-A3 (see NOTE)	220–240 Vac

NOTE

This is a field service spare that is shipped without a country kit or manuals. It is set to 240 Vac but can be reset to 120 Vac.

Reference Documentation

Refer to the following documentation for more information on the DECrouter 250 synchronous/asynchronous router.

• *DECrouter 250 Hardware Installation Manual*	EK-A0460-IN
• *DECrouter 250 VMS Software Installation Guide*	AA-PAX6A-TE
• *DECrouter 250 ULTRIX Software Installation Guide*	AA-PAX8A-TE
• *DECrouter 250 MS-DOS Software Installation Guide*	AA-PAX7A-TE
• *DECrouter 250 Management Guide Volume I*	AA-PAX4A-TE
• *DECrouter 250 Management Guide Volume II*	AA-PAX5A-TE
• *DECrouter 250 Maintenance Card*	AV-PAX9A-TE

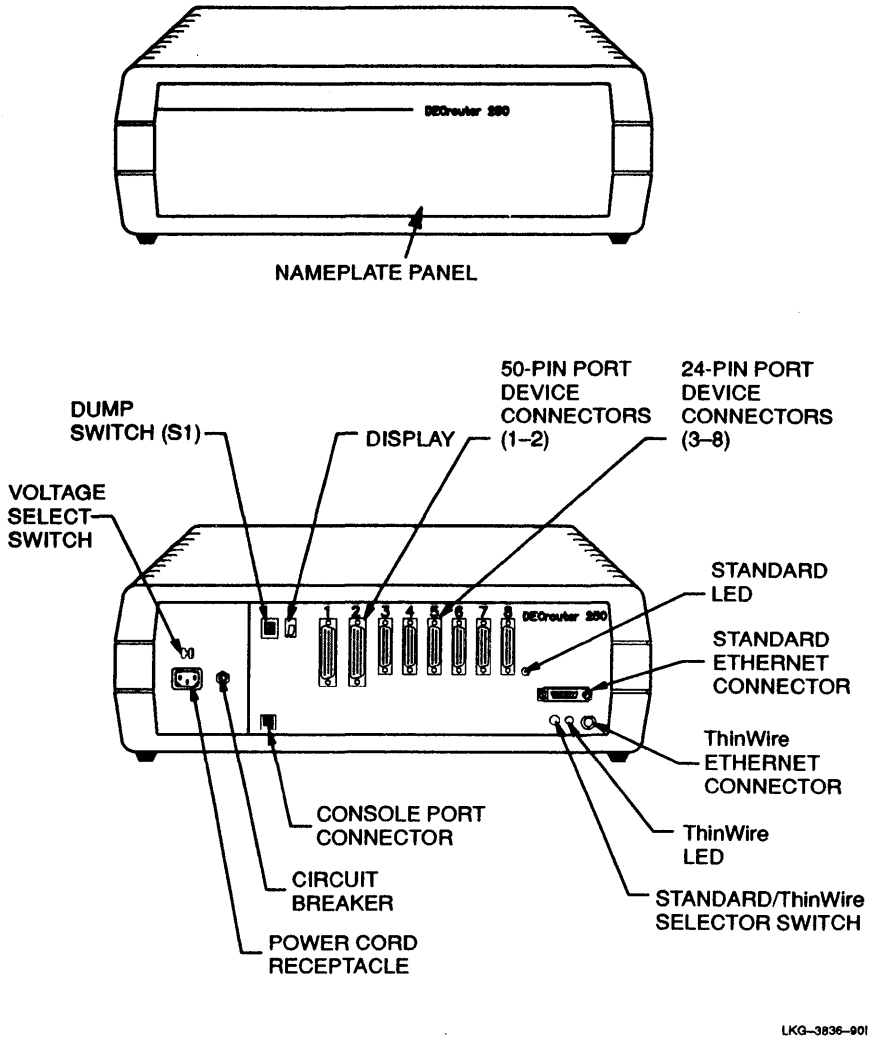


Figure 1 DECrouter 250 Synchronous/Asynchronous Router

Hardware Components
The DECrouter 250 package consists of:

- DECrouter 250 hardware unit – DSRVR-AA or DSRVR-AB
- Country Kit – Power cord and hardware installation manual
- Software – DECrouter software and installation manual

Software Components
The following software is required for the DECserver 250 installation and operation.

- DECrouter 250 distribution software (installed on each load host)
- DECnet Phase IV software (installed on each load host)

Equipment Placement
The DECrouter 250 can be placed in various locations, including offices and computer rooms, as long as the environmental requirements are met.

Environmental Requirements

Temperature	5° to 50°C (41° to 122°F)
Relative Humidity	10% to 90% (noncondensing)

Physical Dimensions

Width	49.3 cm (19.4 in.)
Height	16.1 cm (6.3 in.)
Depth	31.2 cm (12.3 in.)
Weight	8.1 kg (17.1 lbs)

Power Requirements

Model Version	Input Voltage
DSRVR-AA	100–120 Vac
DSRVR-AB	220–240 Vac

Installation Flow Diagram

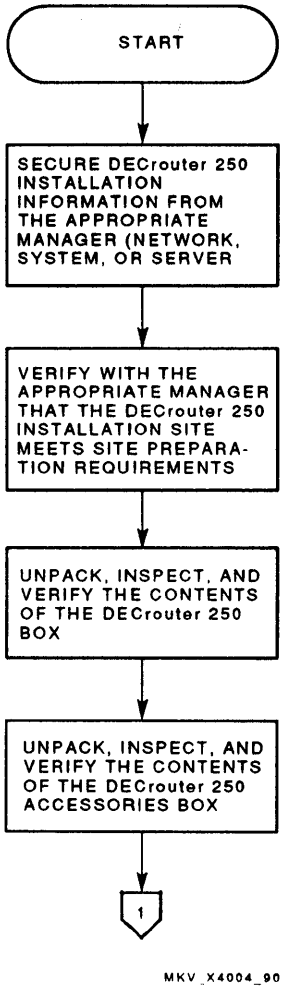


Figure 2 DECrouter 250 Installation Flow Diagram (Sheet 1 of 4)

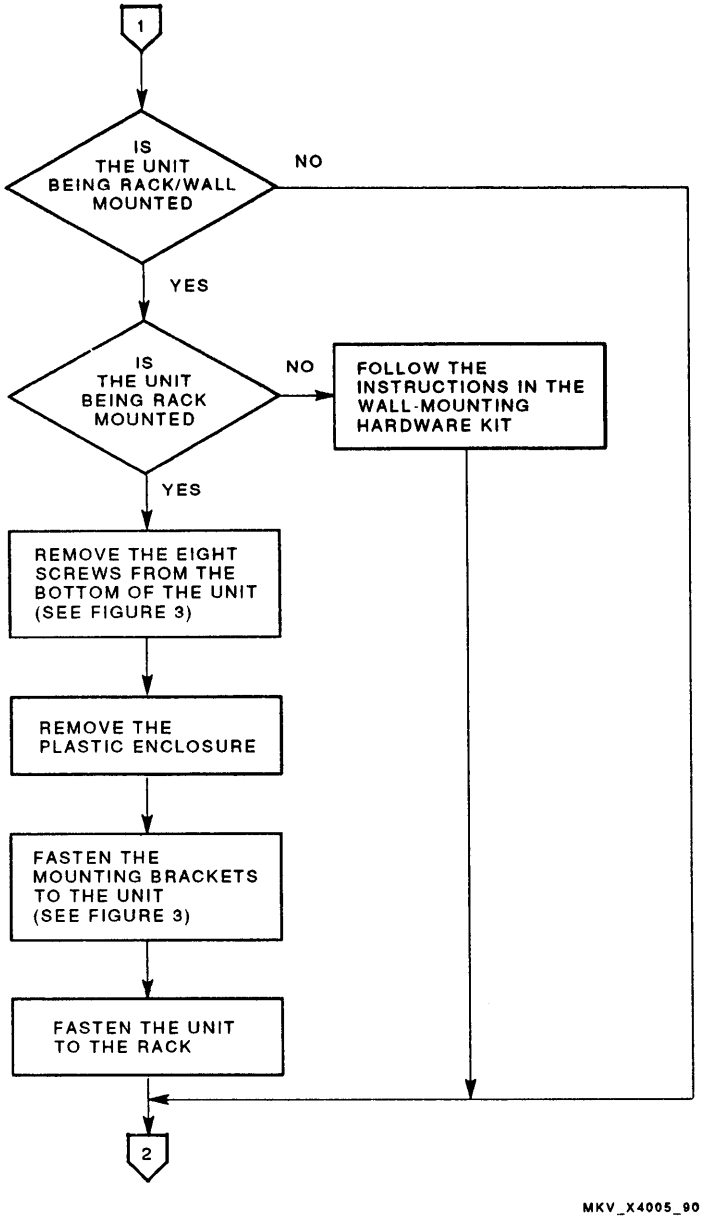


Figure 2 DECrouter 250 Installation Flow Diagram (Sheet 2 of 4)

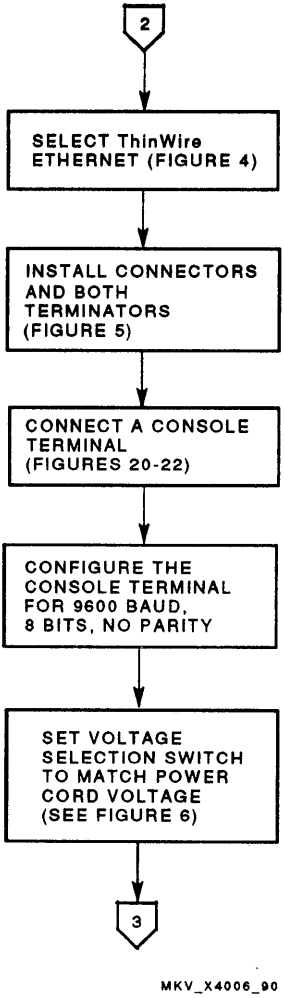


Figure 2 DECrouter 250 Installation Flow Diagram (Sheet 3 of 4)

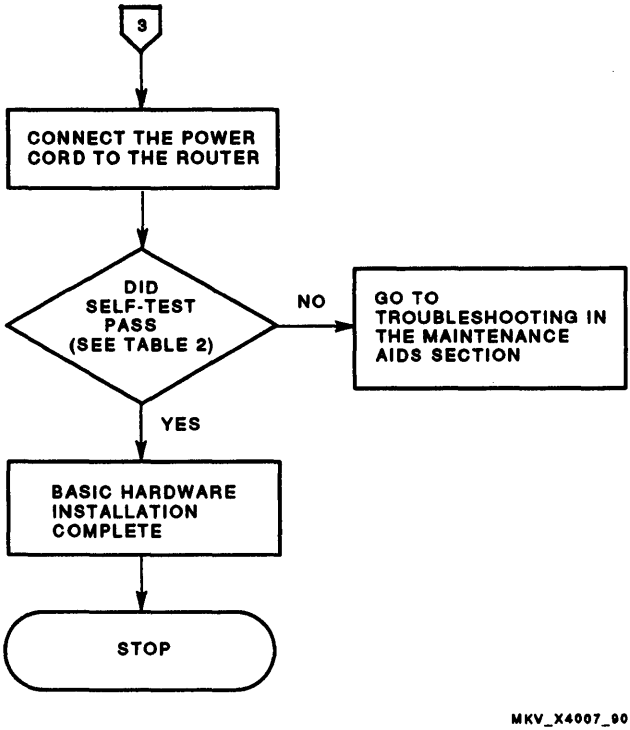


Figure 2 DECrouter 250 Installation Flow Diagram (Sheet 4 of 4)

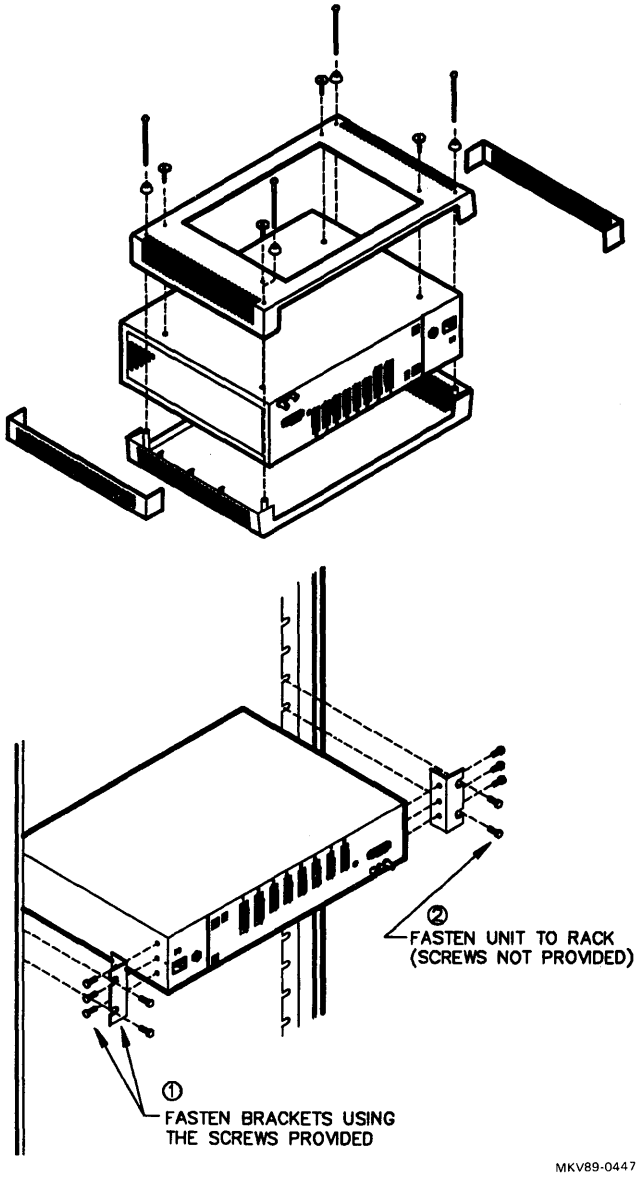


Figure 3 Rack Mounting the DECrouter 250

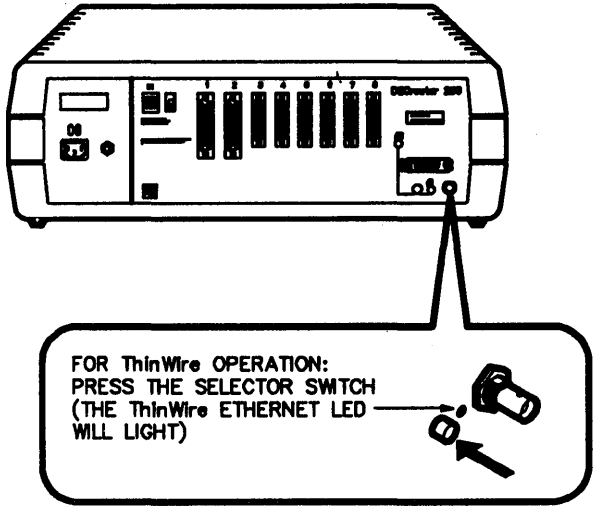


Figure 4 Selecting ThinWire Ethernet

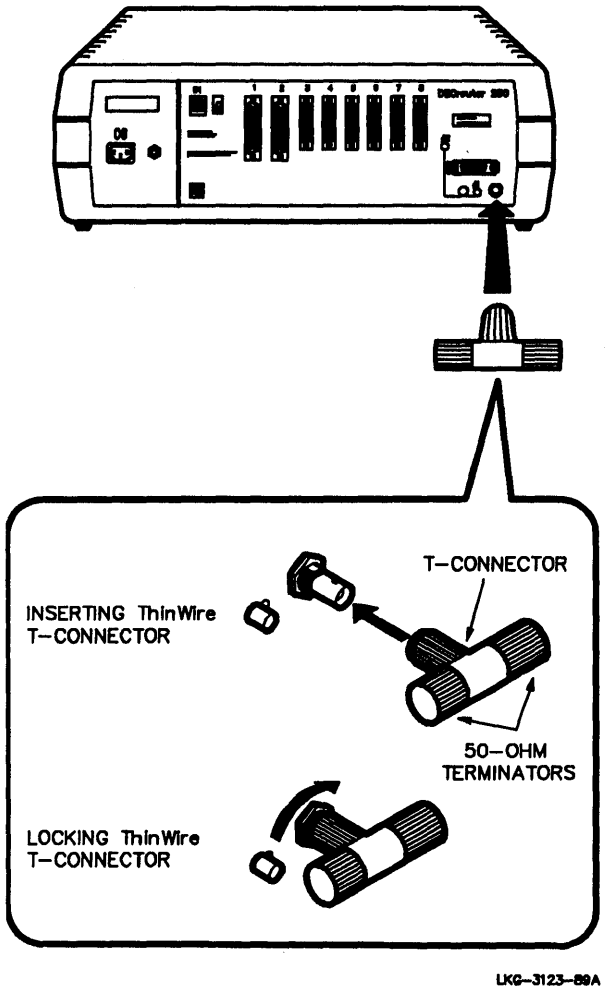


Figure 5 Connecting the ThinWire T-Connector and Terminators

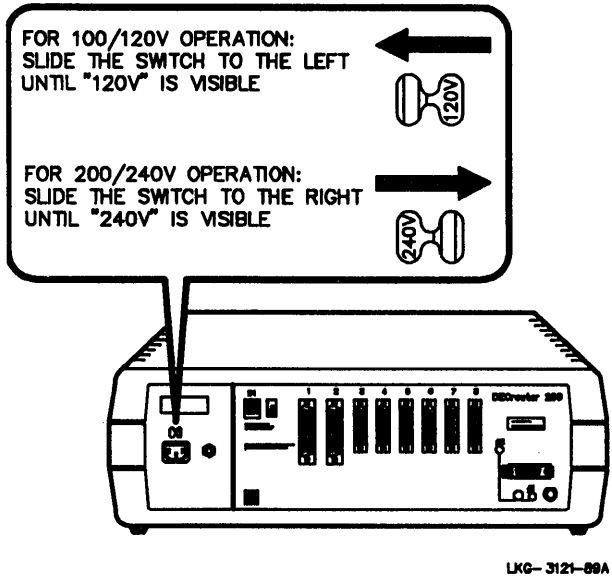


Figure 6 DECrouter 250 Voltage Selection

Cabling

The DECrouter 250 can connect to either standard Ethernet or to ThinWire Ethernet. To select ThinWire Ethernet, press the selector switch (Figure 7) and then apply power to the router. The ThinWire Ethernet LED lights when the router is powered up.

To select standard Ethernet, release the selector switch and then apply power to the router. The standard Ethernet LED lights.

CAUTION

Do not press the selector switch when the router is running. Doing so will cause the router to drop links.

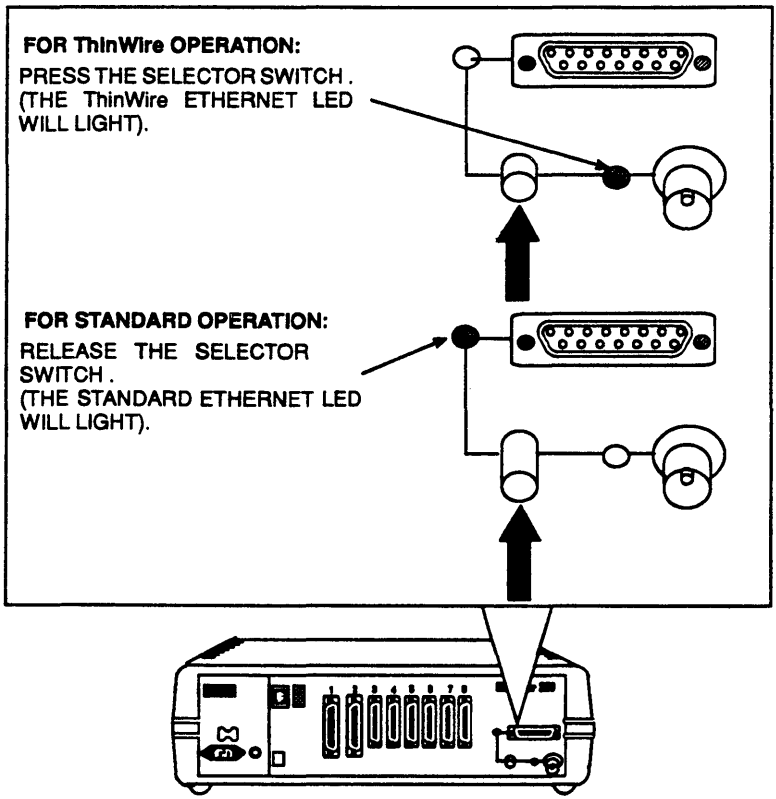


Figure 7 Selecting Standard or ThinWire Ethernet

Connecting to Standard Ethernet – Proceed as follows:

1. Power down the router.
2. Unlock the slide latch on the router's standard Ethernet connector by pushing it in the direction shown in Figure 8.

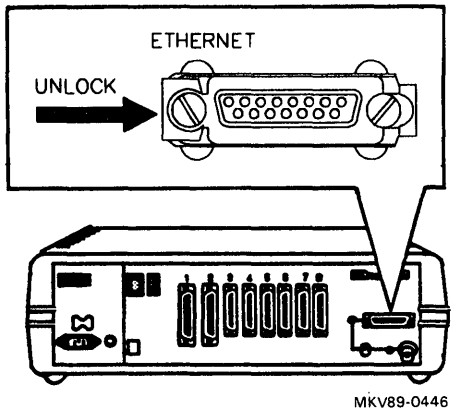


Figure 8 Unlocking the Slide Latch

3. Connect the transceiver cable (Figure 9).

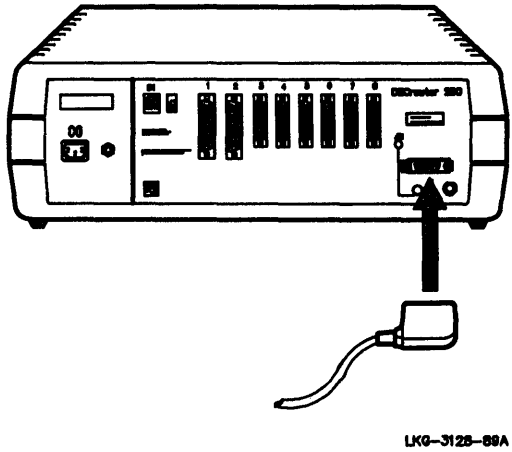


Figure 9 Connecting the Transceiver Cable

4. Lock the slide latch by pushing it in the direction shown in Figure 10.

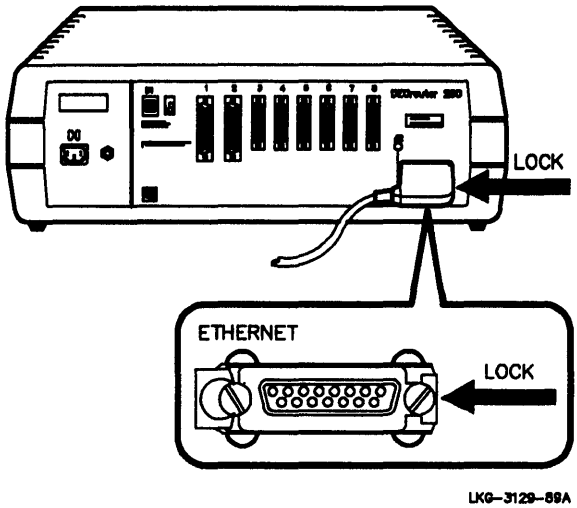


Figure 10 Locking the Slide Latch

5. Power up the router.

6. Verify that the standard/ThinWire Ethernet selector switch is in the OUT position and the standard Ethernet LED is ON.

Connecting to ThinWire Ethernet – Proceed as follows:

1. Insert the T-connector into the BNC connector (Figure 11) at the rear of the router.
2. Turn the barrel of the connector clockwise to lock it.
3. Verify that the standard/ThinWire Ethernet selector switch is in the IN position and the ThinWire Ethernet LED is ON.

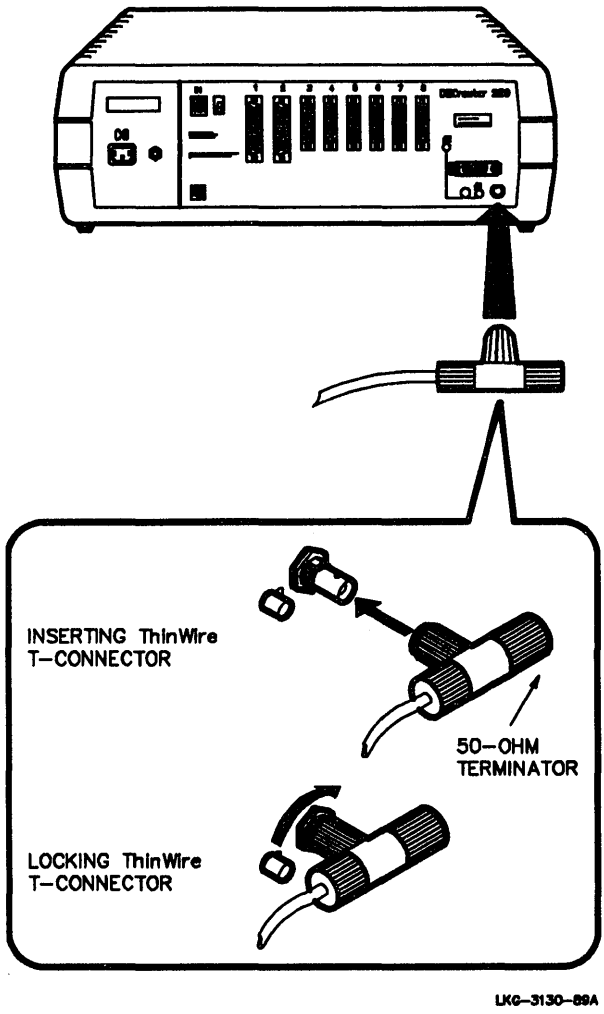


Figure 11 Connecting to ThinWire Ethernet

Connecting to the Device Ports
There are two device ports that use 50-pin D-connectors (ports 1 and 2) and six device ports that use 25-pin D-connectors (ports 3 through 8). This section describes how to connect devices to either the 25-pin or 50-pin D-connector.

Connecting to a 25-Pin Device Port – Proceed as follows:

1. Connect the 25-pin female D-connector of the cable to the 25-pin male D-connector on the device port (Figure 12).

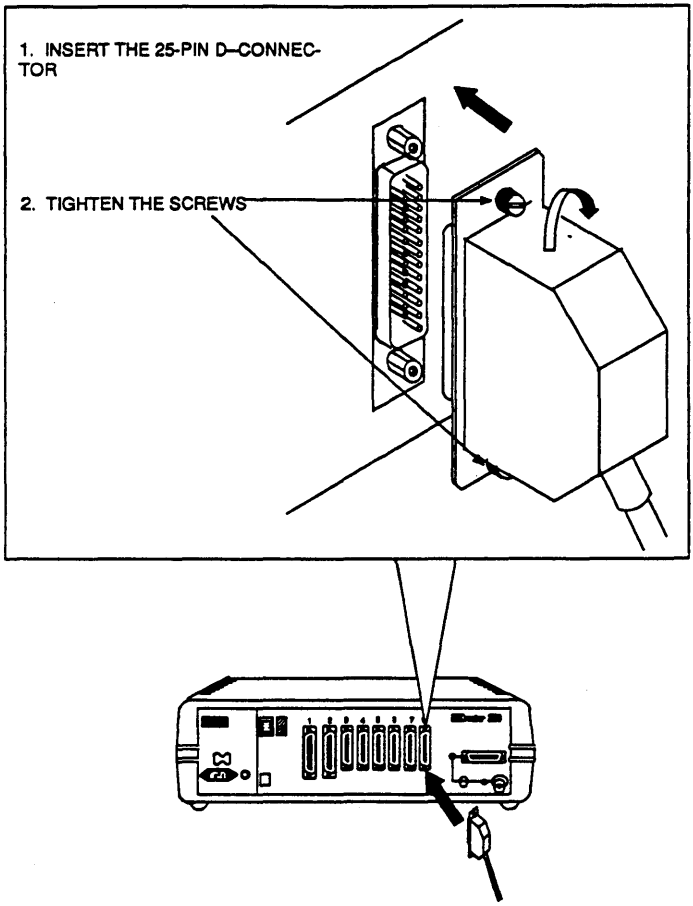


Figure 12 Connecting to the 25-Pin D-Connector

2. Connect the 25-pin male connector of the cable to the 25-pin female connector on the device (Figure 13).

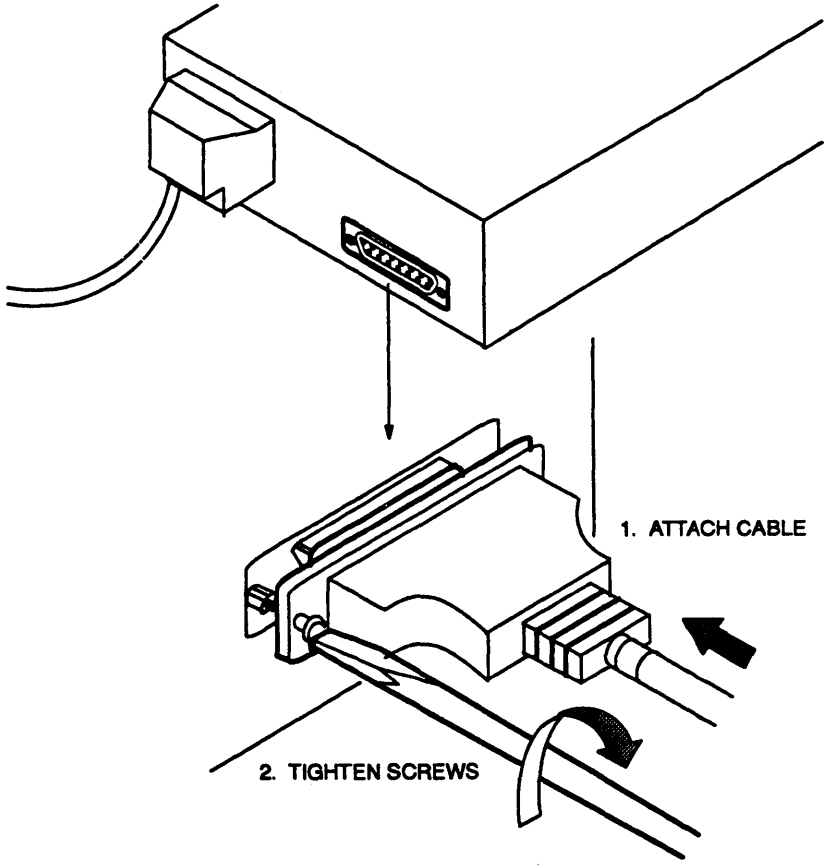


Figure 13 Connecting the 25-Pin Connector to the Device

CAUTION

The V24/RS-232-C adapter (12-27591-01) must be fitted between the device cable and the router (Figures 14 and 15) if the modem or modem eliminator has any of the following:

- **A DCE-sourced signal on pin 18**
- **Signal quality implemented on pin 21**
- **Data Signal Rate Selector (DCE) on pin 23**

Failure to comply with this requirement could result in damage to the interface module and modem, or modem eliminator. If you are not sure what signals the modem or eliminator provides, install the adapter.

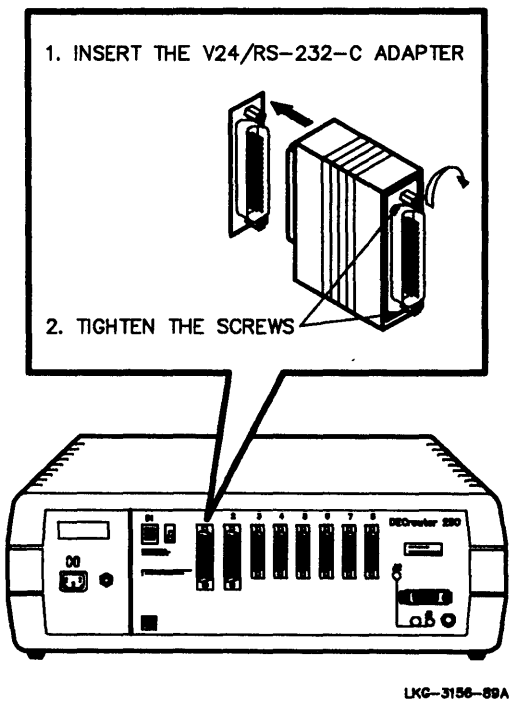


Figure 14 Connecting the V24/RS-232-C Adapter to the 25-Pin D-Connector

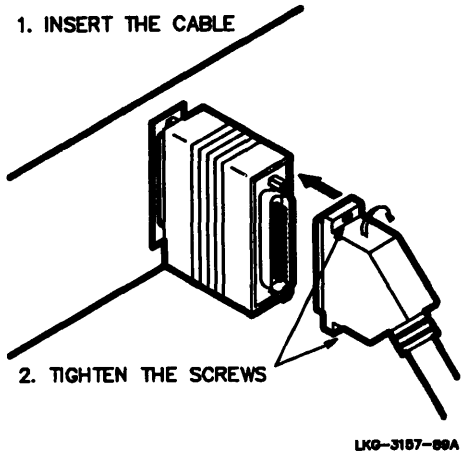


Figure 15 Connecting the Cable to the V24/RS-232-C Adapter

Connecting to a 50-Pin Device Port – Proceed as follows:

1. Connect the 50-pin female D-connector of the adapter cable to a 50-pin male D-connector on the router (Figure 16).

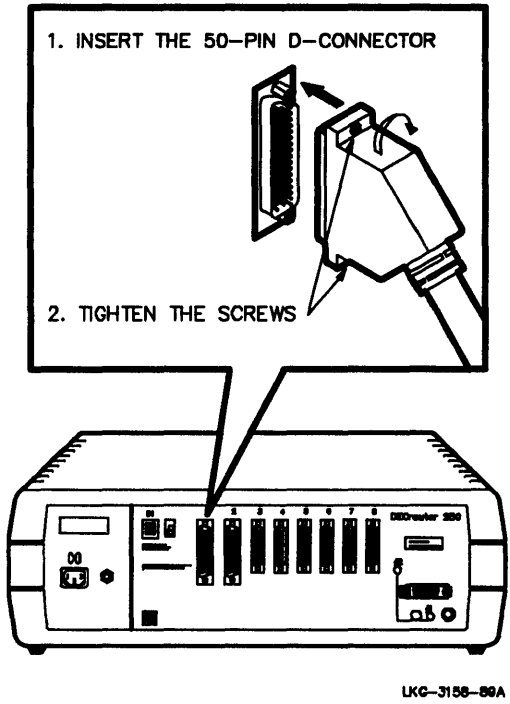


Figure 16 Connecting to the 50-Pin D-Connector

2. Connect the adapter cable to an extension cable (Figure 17).

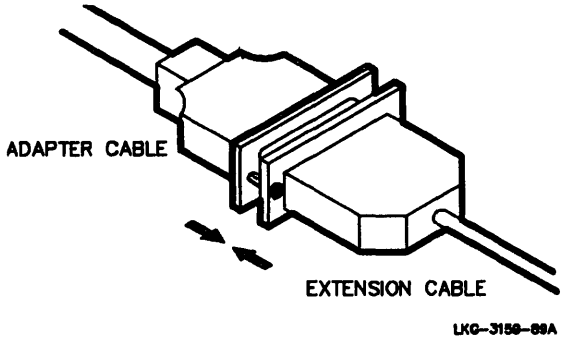


Figure 17 Connecting an Adapter Cable to an Extension Cable

3. Connect the extension cable to the device (Figure 18).

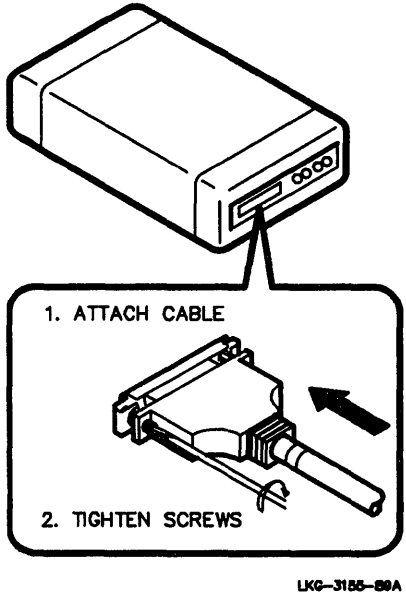


Figure 18 Connecting the Extension Cable to the Device

CAUTION

The V24/RS-232-C adapter (12-27591-01) must be fitted between the device cable and the router (Figure 19) if the modem or modem eliminator has any of the following:

- **A DCE-sourced signal on pin 18**
- **Signal quality implemented on pin 21**
- **Data Signal Rate Selector (DCE) on pin 23**

Failure to comply with this requirement could result in damage to the interface module and modem, or modem eliminator. If you are not sure what signals the modem or eliminator provides, install the adapter.

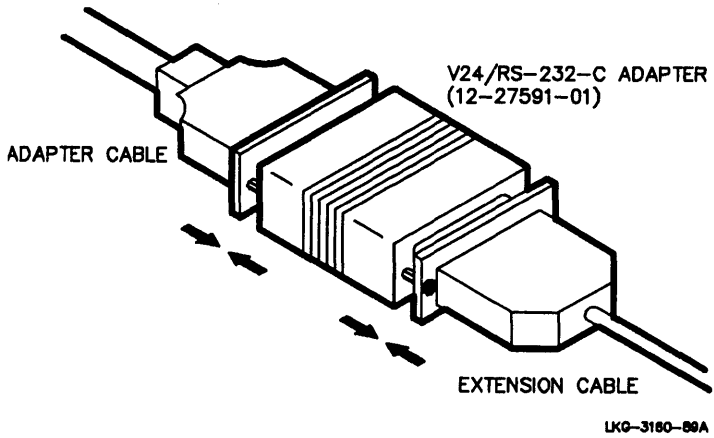


Figure 19 Connecting an Adapter Cable, V24/RS-232-C Adapter, and Extension Cable

Connecting a Terminal to the Console Port Connector
Proceed as follows:

1. Insert the modified modular plug (MMP) on the cable into the female modified modular jack (MMJ) connector of the console port (Figure 20).

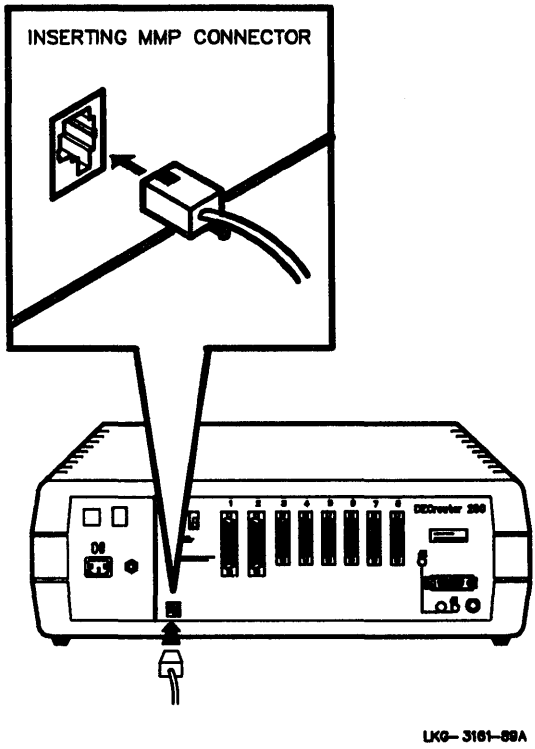


Figure 20 Connecting to the Console Port Connector

2. Insert the MMP on the cable into the female MMJ connector on the terminal (Figure 21). If the terminal has a 25-pin male, D-connector, use an H8571-A adapter as shown in Figure 22.

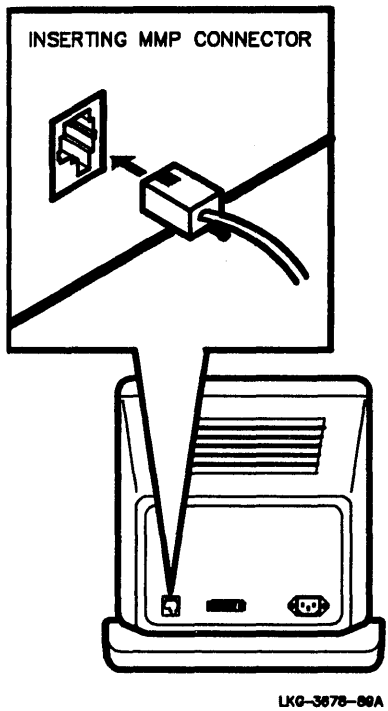


Figure 21 Connecting to the Terminal

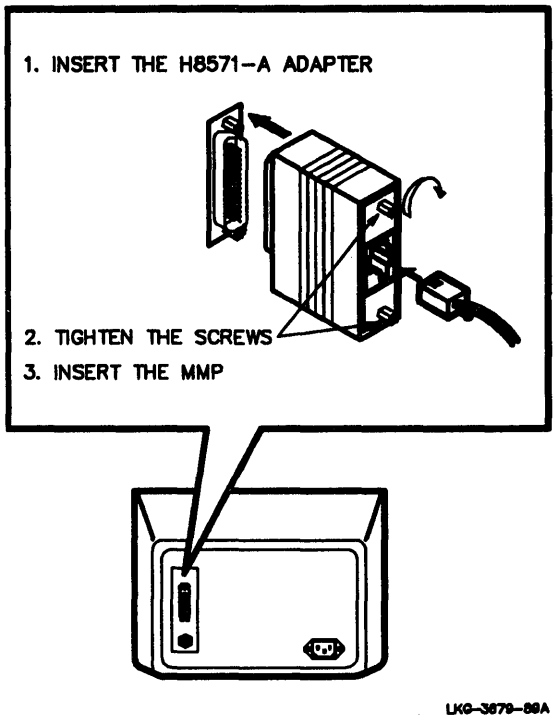


Figure 22 Connecting to the Terminal with a 25-Pin D-Connector

Configurations

There are many possible LAN configurations for the DECrouter 250. Some of the possible configurations are shown in Figures 23 through 27.

Table 1 lists the LAN configurations to which the DECrouter 250 can be connected. This table includes the hardware components needed, the number of nodes that can be configured, and any restrictions on the position of the nodes.

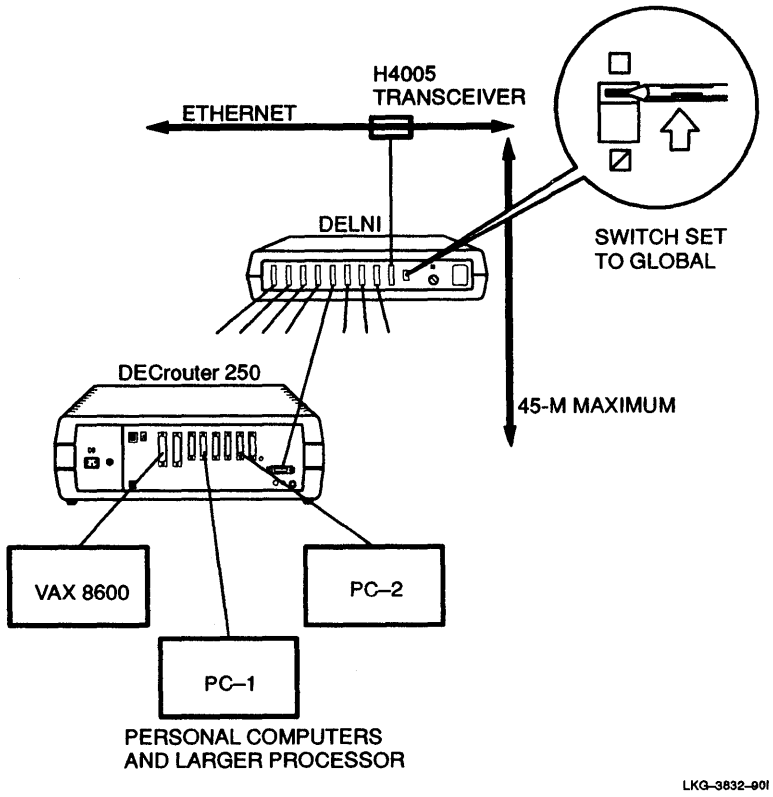


Figure 23 DECrouter 250 Connected to a Standard Ethernet Through a DELNI

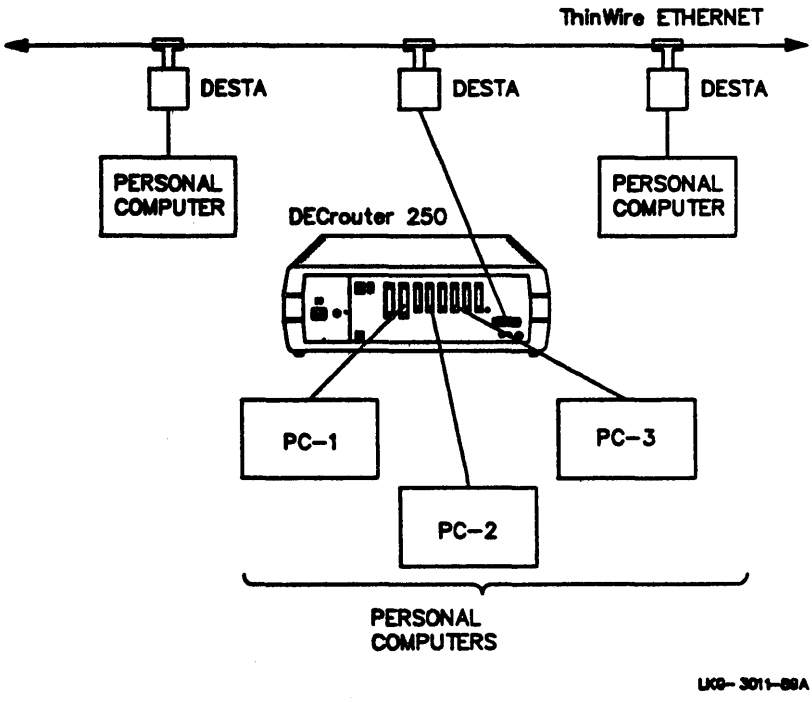


Figure 24 DECrouter 250 Connected to ThinWire Ethernet Through a DESTA

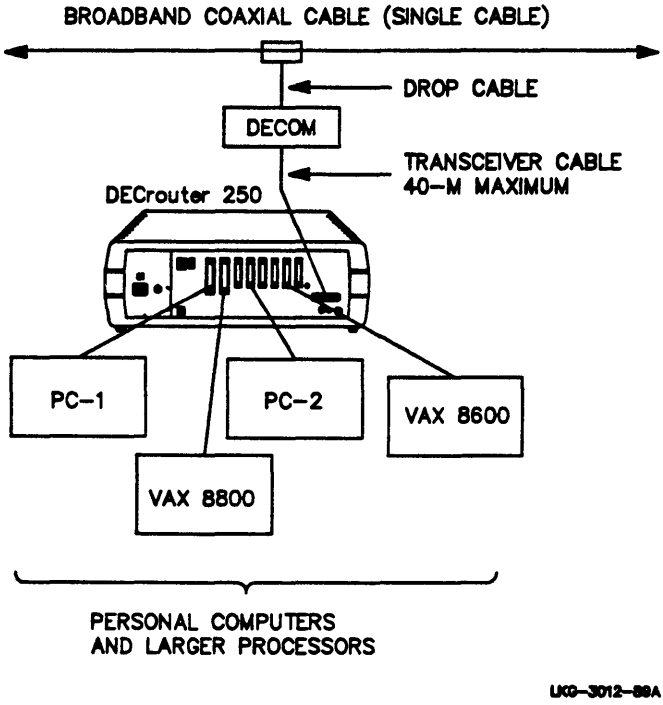


Figure 25 DECrouter 250 Connected to a Broadband Ethernet

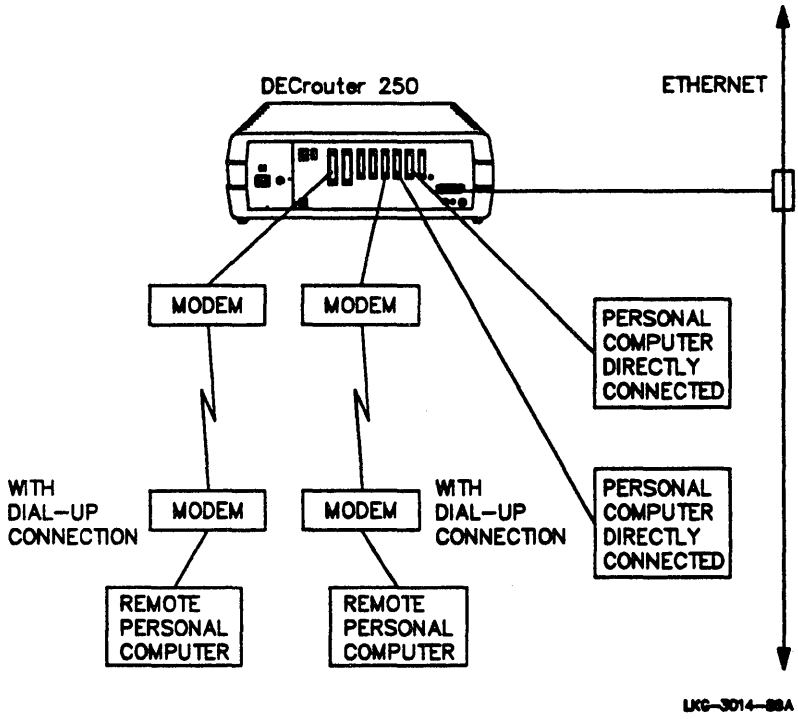


Figure 26 DECrouter 250 with Modem Connections

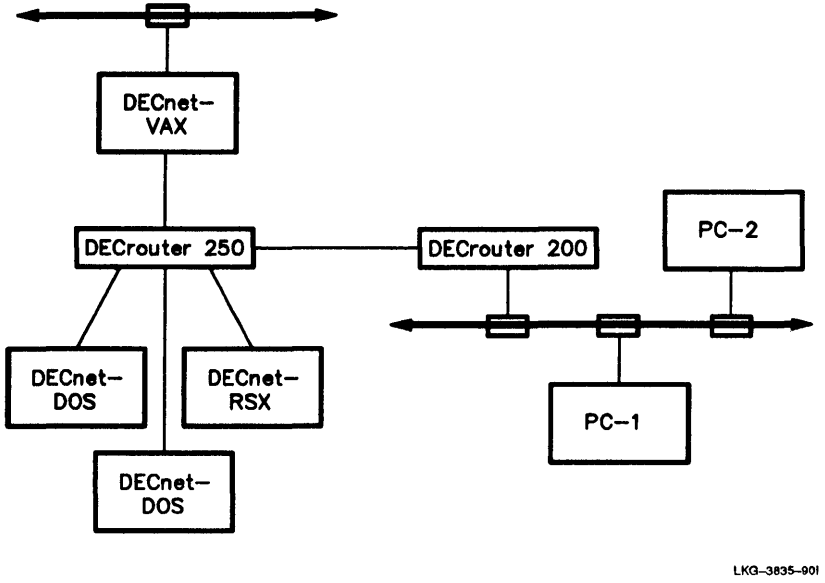


Figure 27 DECrouter 250 as a Standalone LAN Router

Table 1 LAN Configurations Applicable to the DECrouter 250

Broadcast	Components	Size Limit	Distance Restriction
BASEBAND			
Direct connect to Ethernet	H4005 transceiver	N/A	Transceiver cable connecting DECrouter to Ethernet must be from 5 to 50 meters in length
DELNI standalone (single-tier)	DELNI (directly connected)	8 nodes	DECrouter connected to DELNI must be within 50 m (147.6 ft) of the DELNI
DELNI standalone (two-tier)	DELNI (directly connected)	64 nodes	DECrouter connected to DELNI must be within 50 m (147.6 ft) of the DELNI
Connected DELNI	DELNI plus H4005 transceiver for connecting DELNI to Ethernet	DECrouter and seven other nodes directly connected to DELNI	DECrouter must be within 40 m (131.2 ft) of the Ethernet cable
BROADBAND			
Direct connect to Ethernet	DECOM, drop cable, transceiver cable	N/A	Drop cable: 25 meter maximum Transceiver cable: 5 to 40 meters
Connected DELNI	DELNI, DECOM, and cables for DELNI connection to Ethernet	DECrouter and seven other nodes directly connected to DELNI	Maximum cable length from DECrouter to DECOM is 35 meters
ThinWire			
Work-area configuration	DESTA	30 nodes directly connected to ThinWire	50 m (147.6 ft) between DECrouter and DESTA

Diagnostics

The seven-segment display, located at the rear of the router, indicates the status of the router and helps diagnose router problems (Figure 28). The Diagnostic Dot of the display also provides diagnostic information and, if a terminal is connected to the console port connector, additional information can be obtained through error messages.

Diagnosing Router Problems

Compare the state of the seven-segment display and the Diagnostic Dot with Table 2, and refer to the troubleshooting table for corrective action.

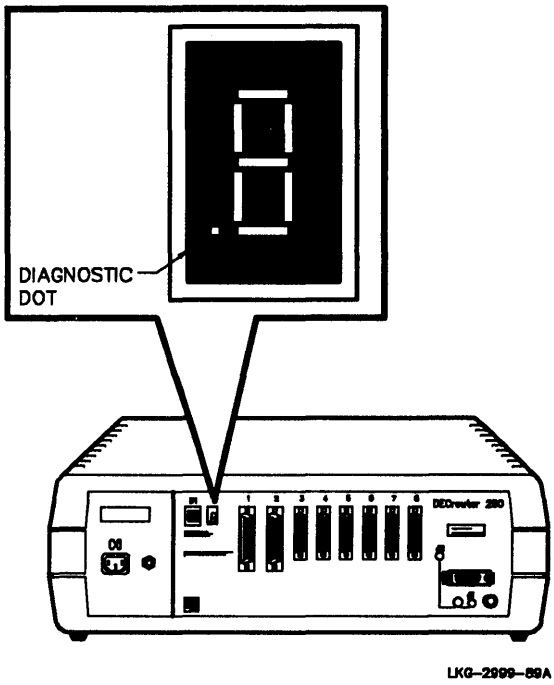


Figure 28 The Seven-Segment Display

Table 2 DECrouter 250 Seven-Segment Display Codes

Display	System Status
F	Bootstrap test executing
E	RAM subsystem test executing
d	Interrupt subsystem test executing
C	Timer test executing
b	ROM subsystem test executing
A	Ethernet subsystem test executing in the internal loopback mode
9	Ethernet subsystem external loopback test executing
7	Asynchronous subsystem test executing in the internal loopback mode
6	Reserved
5	System exerciser test executing
4	Requesting load
3	Requesting load backoff
2	Loading
1	Requesting a dump
0	Dumping
Rotating Figure 8 Pattern*	Server software is executing
■	Diagnostic Dot** (Status as follows)
	ON — No fatal errors OFF — Fatal errors or self-test in progress BLINKING — Nonfatal error detected

* The rotating figure 8 pattern indicates normal operation.
** The Diagnostic Dot is part of the seven-segment display.

Troubleshooting

Table 3 DECrouter 250 Troubleshooting Table

Symptom	Possible Cause	Corrective Action
Seven-segment display is OFF	No power to the the DECrouter 250	Ensure that the voltage select switch is set to the correct voltage for your country. Secure the power cord at the router and at the wall outlet. Check the wall outlet for power. Ensure that the router circuit breaker has not tripped. If it has tripped, disconnect the power and reset the circuit breaker. If the circuit breaker trips again, replace the DECrouter 250 unit. Check the power cord by substituting another one. Replace the cord if it is found to be defective.
	The DECrouter 250 is defective	Replace the DECrouter 250 unit.
Diagnostic Dot off/seven-segment display flashing	Fatal error	Replace the DECrouter 250 unit.
Diagnostic Dot blinking	Nonfatal error	Record the error message on the console terminal and refer to the **Error Messages** section for instructions on correcting the problem.
Seven-segment display has a "3"	Down-line loading problem	Record the error message on the console terminal and refer to the **Error Messages** section for instructions on correcting the problem.

Error Messages

Error Message 1003, 1005, and 1007

Corrective Action – Replace the DECrouter 250 unit.

Error Message 1004

Corrective Action – Use the boot configuration program (BCP) to configure a suitable port (refer to Appendix E of the *DECrouter 250 Hardware Installation/Owner's Guide* for information on using BCP).

Error Message Sequences

Init -1101- Attempting to locate load host, [format]
Init -1100- Requesting load from host xx-xx-xx-xx-xx [format]
Init -1102- Load failure, timeout

Corrective Action – Copy the error message exactly as it appears on the console terminal and notify the network manager.

Init -1101- Attempting to locate load host, [ISO8802]
Init -1102- Attempting to locate load host, [ETHERNET]
Init -1103- Router will retry operation in x seconds

Corrective Action – Copy the error message exactly as it appears on the console terminal and notify the network manager.

DECSA COMMUNICATIONS SERVER

General Description
The DECSA communications server is an Ethernet-based communication subsystem for local area networks. The four basic versions of the communications server are:

- DECSA-CA Terminal server – supports up to 16 lines for VT100-like asynchronous terminals (see note).
- DECSA-DA Terminal server – supports up to 32 lines for VT100-like asynchronous terminals (see note).
- DECSA-EA DECnet router/X.25 gateway – supports up to 8 lines for interconnection between DECnet and X.25 networks.
- DECSA-FA DECnet/SNA gateway – supports up to 2 lines for interconnection between DECnet networks as well as between DECnet and SNA networks.

NOTE
The terminal server configurations provide the following features.

- **Asynchronous terminal support**
- **Modem control**
- **Auto baud detection**
- **Split-speed terminal operation (up to 19.2K bits/s full-duplex)**

Reference Documentation
Refer to the following documents for more information on the DECSA communications server.

• *Ethernet Communications Server Operations and Maintenance Guide*	EK-DECSA-OP
• *Ethernet Communications Server Site Preparation and Planning Guide*	EK-DECSA-SP
• *Ethernet Communications Server Installation Guide*	EK-DECSA-IN
• *Ethernet Communications Server Technical Description*	EK-DECSA-TD
• DECSA Print Set	MP01385
• DECSA Microfiche	EP-DECSA-OP

DECSA Communications Server Hardware Components
The following hardware components make up the DECSA communications server.

- PDP-11/24 processor
- Memory module (512K bytes or 1M byte)
- DEUNA Ethernet to UNIBUS adaptor

- Console/bootstrap/terminator (CBT)
- Protocol assist modules (PAM) set
- Line cards (see the following table)
- H7200 and H7211 power supply modules

The following table describes the line cards and data types supported by the different versions of the DECSA communications server.

Table 1 Line-Card Description

DECSA Version	Line Card Supported	Module Number	Recommended Cable	Module Description
DECSA-CA DECSA-DA	DCSAX-LC	M3102	BC22D BC22E	Two line asynchronous up to 19.2K bits/s each full-duplex, RS-232-C/CCITT V.24.
DECSA-EA DECSA-FA	DCSAX-LA	M3100	BC17C BC17D	One line synchronous up to 19.2K bits/s full- or half-duplex, RS-232-C/CCITT V.24.
DECSA-EA DECSA-FA	DCSAX-LB	M3101	BC17E	One line synchronous up to 500K bits/s full- or half-duplex, CCITT V.35.

NOTE

The following cables are recommended for use with RS-232-C/V.24 configurations.

- **BC22D – Asynchronous null modem cable**
- **BC22E – Asynchronous modem extension cable**
- **BC17D – Synchronous null modem cable**
- **BC17C – Synchronous modem extension cable**

The BC17E synchronous modem cable is recommended for use with V.35 configurations.

DECSA Communications Server Software Components

The following software components are included with any DECSA configuration.

- RSX-11S operating system
- NS: QIO$ interface (logical link facility)
- NX: QIO$ interface (direct line access facility)
- System level interface
- Initialization task
- PAM device driver
- DEUNA device driver
- Network management
- Down-line load/up-line dump across the Ethernet

- Remote console support (console carrier only)
- Loadable diagnostic image (LDI)

The following table indicates which additional software is required for DECSA-EA and DECSA-FA DECnet routers and/or gateways.

Table 2 Additional Software Requirements for DECnet Routers

Software Package	Configuration DECSA-EA	DECSA-FA
Looper/mirror	X	X
Line watcher	X	X
RSX extension package (XEP)	X	X
VAX X.25/X.29 extension package (XEP)	X	
DECnet/SNA gateway software		X

System Placement
The DECSA system should be placed on a table that supports at least 57.0 kg (125.7 lbs).

CAUTION
The DECSA system weighs approximately 50 kg (110.25 lbs). Three people are required to lift or move the system.

Power Requirements
The operating range of the DECSA system is contained in the following table.

Table 3 DECSA Power Requirements

Nominal Voltage Required	Voltage Range	Current*	Frequency
120 Vac	90-128 (rms)	7.0	47-63 Hz
240 Vac	180-256 (rms)	3.5	47-63 Hz

*When operating at nominal voltage specified.

Installation Flow Diagram

The following flow diagram illustrates the procedures for installing and testing the DECSA communications server.

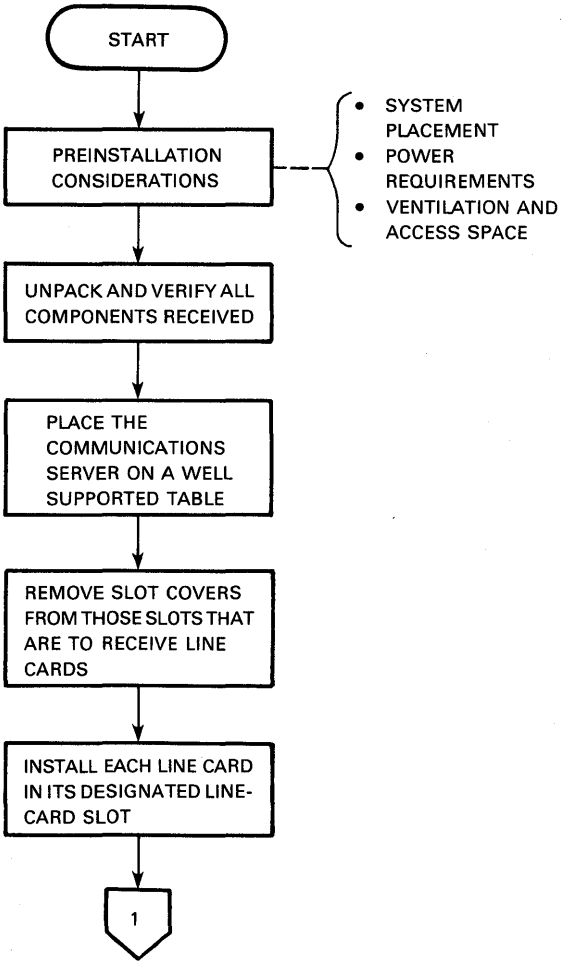


Figure 1 Installation Flow Diagram (Sheet 1 of 5)

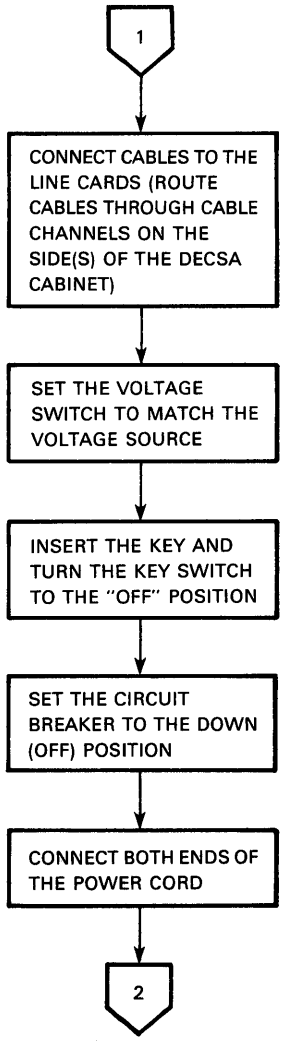


Figure 1 Installation Flow Diagram (Sheet 2 of 5)

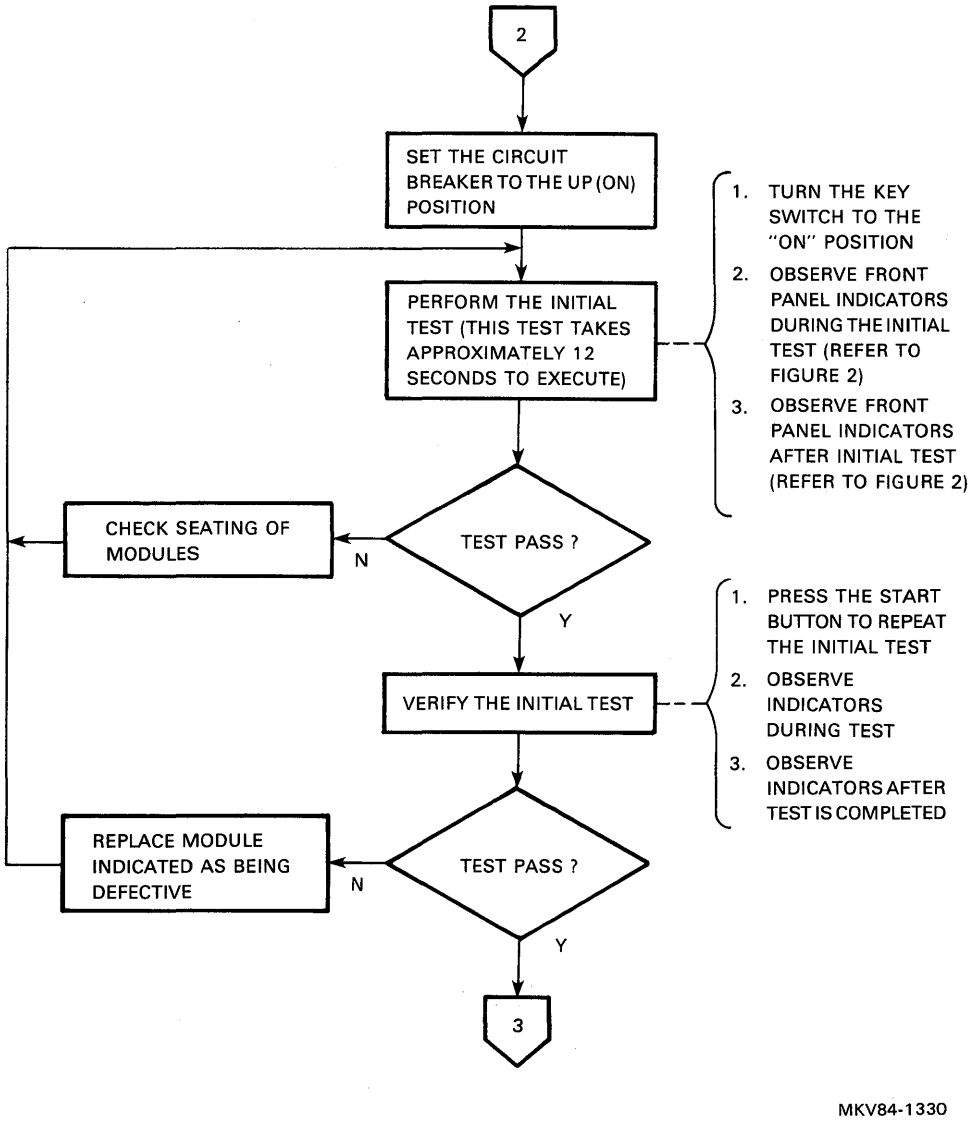


Figure 1 Installation Flow Diagram (Sheet 3 of 5)

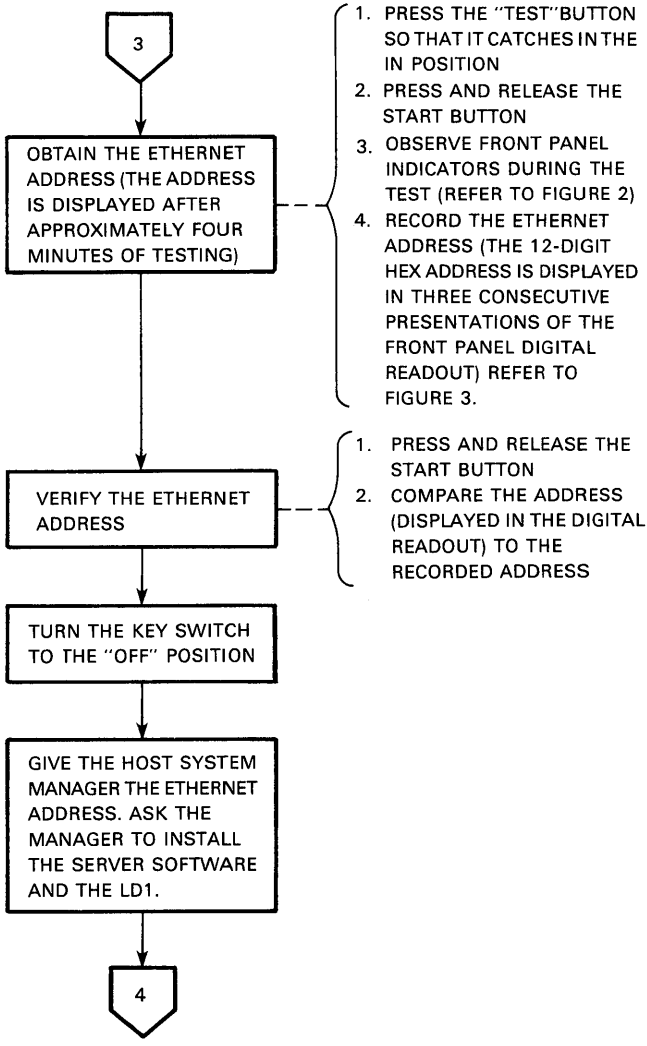


Figure 1 Installation Flow Diagram (Sheet 4 of 5)

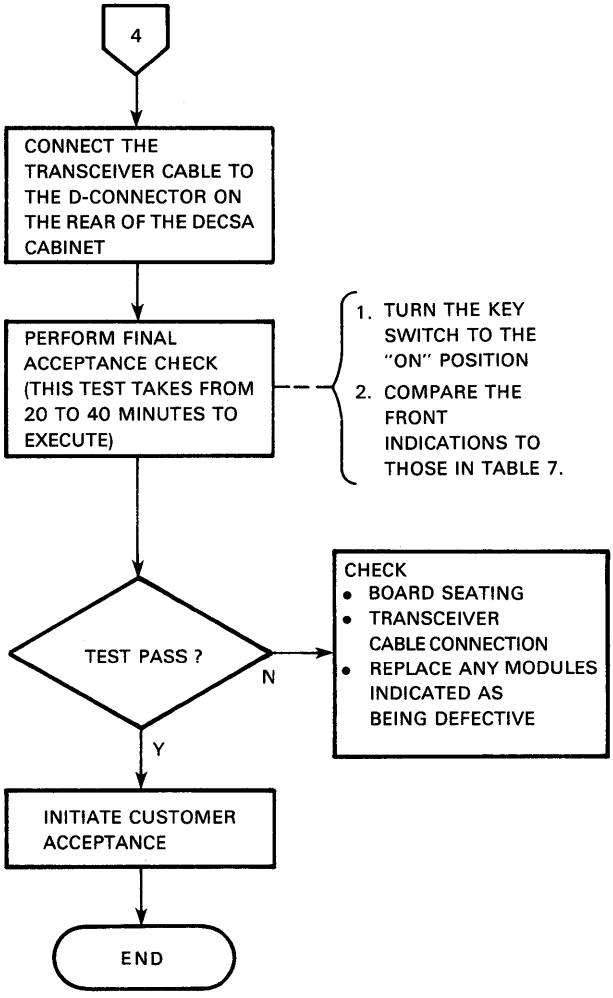
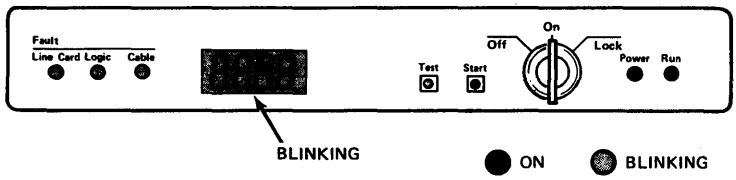


Figure 1 Installation Flow Diagram (Sheet 5 of 5)

Initial Test Indications

The following figure describes the expected initial test indications that are displayed by the front panel indicators.



(1) Indicator	(2) Color	(3) While Test Is Running *	(4) After Test Completion
Line Card Fault	Red	Blinks	Off
Logic Fault	Red	Blinks	On†
Cable Fault	Red	Blinks	Off
Segment Display 1	Red	Blinking 8.	_ Underscore On
Segment Display 2	Red	Blinking 8.	_ Underscore On
Segment Display 3	Red	Blinking 8.	0
Segment Display 4	Red	Blinking 8.	2
Test	Red	Blinks	Off
Start	Red	On	On
Power	Green	On	On
Run	Green	On	Off
Line Card Light(s)▲	Red	On	On

* Blinking rates: 3 per second for short version of Initial Test; 1 per second for long version of Initial Test.

▲ Located on the individual line cards.

† Expected indication: Communications Server NOT connected to Ethernet yet.

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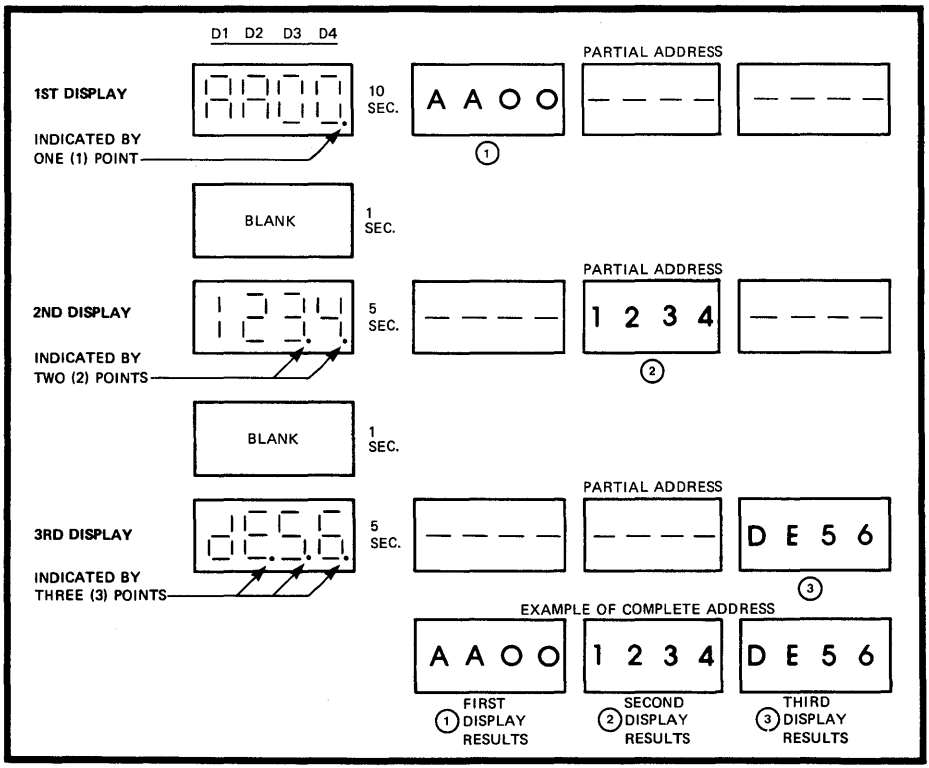
Figure 2 Expected Initial Test Front Panel Indications

Ethernet Address Display

The following figure provides an example of an Ethernet address display.

1. The first display (lasting ten seconds) provides the first four characters of the address.
2. The second display (lasting five seconds) provides the second four characters of the address.
3. The first display (lasting five seconds) provides the last four characters of the address.



NOTE:

THE CHARACTERS SHOWN HERE ARE EXAMPLES ONLY.

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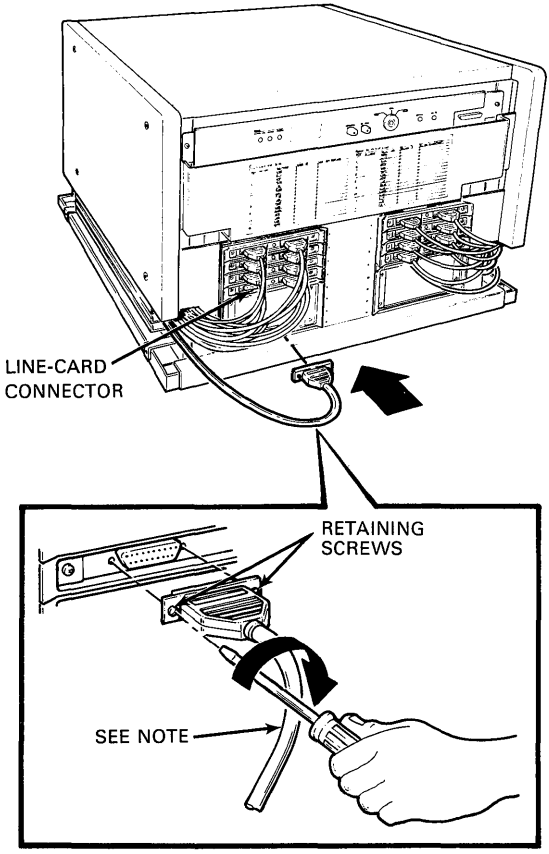
Figure 3 Example of an Ethernet Address Display

DECSA Cabling

This section provides information for connecting cables to the communications server.

The following figure illustrates connecting a cable to a line card.



NOTE:
USE CABLES LISTED IN TABLE 1. OTHER CABLES (THOSE WITH TWO-PIECE CONNECTOR HOUSINGS) USE MORE SPACE AND MAY REQUIRE A BC17L ADAPTOR CABLE.

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Figure 4 Connecting Cables to Line Cards

DECSA CABLING

The following figure illustrates connecting and locking a transceiver cable to the Ethernet connector on the rear of the server.

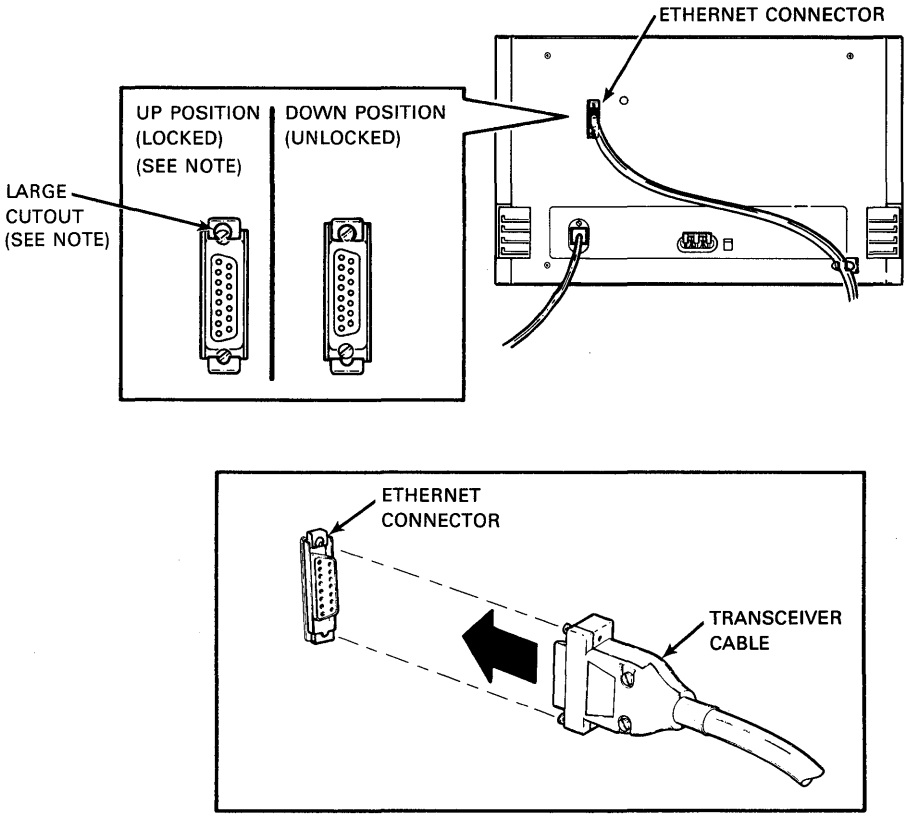

Figure 5 Connecting a Transceiver Cable to the Server

DECSA Diagnostics

This section contains the following tables.

- Self-Test and Diagnostics Descriptions
- Locally Initiating Diagnostics
- Remote Execution of Diagnostics
- Successful Initial Test (Short and Long Versions) Indications
- Successful Loadable Diagnostic Image (LDI) Indications
- Initial Test (Short and Long Versions) Fault Indications
- LDI Fault Indications
- Logic Module Slot Numbers

Diagnostic Descriptions

The following table briefly describes the diagnostics for the DECSA communications server. The diagnostics are:

- Initial test (short version)
- Initial test (long version)
- Loadable diagnostic image (LDI)

Table 4 Self-Test and Diagnostics Descriptions

Hardware or Function Tested	Initial Test Short Version (12 seconds)	Initial Long Version (4 or 8 minutes)*	LDI (Loadable Diagnostic Image) (20 or 40 minutes)*
Lamps and displays	X	X	
PDP-11/24 processor		X	X
Memory		X	X
Console/bootstrap/ terminator (CBT)		X	X†
Protocol assist modules (PAMs)			X†
DEUNA port module		X	X†
DEUNA link module		X	X†
Display Ethernet address		X	
Line cards			X
External loopback‡			X

* The longer time is for testing the DECSA-FA (with 1M byte memory). The shorter time is for testing other DECSA versions that have 512K bytes of memory.

† The LDI runs a more extensive test than the initial test.

‡ Loopback is via line-card test connectors.

Running Initial Tests and Diagnostics
Initial tests and diagnostics may be initiated:

1. Locally by using the front panel controls as shown in the following table.
2. Remotely (from a DECnet host on the same Ethernet network):
   a. By sending an INIT signal over the Ethernet, or
   b. By starting a down-line load of software.

Table 5 Locally Initiating Diagnostics

	Front Panel Controls			What the Server Does			
Desired Operation	**Key**	**"TEST" Button**	**"START" Button**	**Initial Test Short Version**	**Initial Test Long Version**	**Load and Execute LDI**	**Load and Run Server Software**
Run Initial Test*	Turn ON †	OUT	–	X			X
Restart/ Rerun Initial Test*	ON	OUT	Press and Release †	X			X
Run Full Diagnostics	Turn ON †	IN ††	–		X	X	X
Restart/ Rerun Full Diagnostics	ON	IN ††	Press and Release †		X	X	X

* These procedures are also used to "start" the DECSA server.
† Set the other controls if necessary, then perform this action.
†† Return "TEST" button to OUT position after test completes.

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Running DECSA Diagnostics from a Remote Host
The DECSA LDI may be run from a remote host. The following steps represent a typical sequence from an RSX host.

NOTE
The <CR> symbol used in the following examples denotes typing a carriage return.

1. Load the "target" DECSA system with the LDI.

   The image is found in the NETUIC on the system volume (LB:) and is named as follows:

   a. Terminal server/router/SNA configurations – CSVLDI.SYS
   b. X.25 configurations – CSVDIAG.SYS

The following is an example of the commands needed to load a DECSA node "xxx" with a service password of "yyy".

>SET /NETUIC [100,54]<CR> ; netuic for this system is [100,54]

>NCP LOAD NODE xxx FROM LB:[100,54]CSVLDI.SYS SERVICE PASS yyy<CR>

NOTE

After approximately one minute the > prompt should be displayed indicating that the LDI is loaded. Otherwise a timeout error message is displayed.

2. Connect the remote console (CONSOLE CARRIER) with the following command.

   >CCR NODE xxx<CR>

   The system should respond with:

   [REMOTE CONSOLE RESERVED · · ·]

   NOTE

   If the [REMOTE CONSOLE RESERVED· · ·] prompt does not appear, a possible problem exists in making the connection. The connection attempt eventually aborts (after several minutes) and control of the terminal is returned to the host system.

3. Type <CR> in response to the [REMOTE CONSOLE RESERVED · · ·] prompt. The system should respond with "PLU>" (Plumon prompt).

4. Enter any of the commands from the following table.

Table 6 Remote Execution of Diagnostics

Command	Diagnostic
RUN CIDSAA	Runs PAM Repair Diagnostic 1
RUN CIDSBA	Runs PAM Repair Diagnostic 2
RUN CIDSCA	Runs LINE CARD Repair Diagnostic 1
RUN CIDSDA	Runs LINE CARD Repair Diagnostic 2
RUN CIDSEA	Runs the CBT Repair Diagnostic
RUN SYSEXE	Runs the DECSA systems exerciser
AUTO	Starts/restarts the default script
HELP	Lists the valid commands

Any DRS (diagnostic runtime services) commands may be entered in response to the DR> prompt with the following exceptions.

- PRINT
- ^ Z (Control Z)
- ^ C (Control C)

The following commands control the console carrier.

- ^D (Control D) – disconnects the link.
- ^B (Control B) – halts the DECSA PDP-11/24 CPU and enters MICRO ODT.

NOTE

If a DRS start command (STA to the DR> prompt) is given after repair-level diagnostics finish executing, the remote console may UN-LOAD. The following sequence may be used to reconnect the remote console.

1. **Enter ^D (Control D) which disconnects the console carrier.**

2. **Enter the "CCR NODE· · ·" command to reconnect the console (the CCR command previously described in Step 2 of this procedure).**

Diagnostic Results

The results of all DECSA diagnostics are indicated by the front panel display and lights of the CBT (console/bootstrap/terminator).

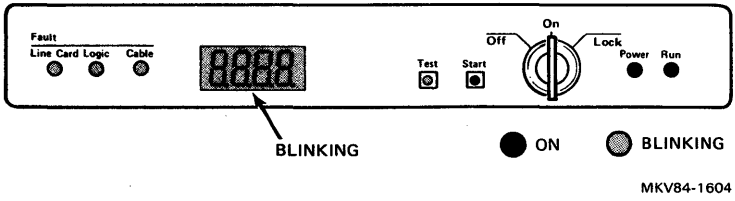


Figure 6 CBT Display During Test

Successful Initial Test Indications
The following table describes the front panel LED and digital readout indications during and after both versions of the initial test.

Table 7 Successful Initial Test (Short and Long Versions) Indications

DECSA State	Line Card	Logic	Cable	D1	D2	D3	D4	Test	Start	Power	Run
During Initial Test	*	*	*	8*	8*	8*	8*	ON	ON	ON	ON
After Initial Test†	OFF	OFF	OFF	‡	‡	‡	‡	ON	ON	ON	OFF

* Blinking rates = 3 per second for short version of initial test; 1 per second for long version of initial test.

† In the long (4 – 8 minute) version of the initial test, this display occurs after the Ethernet address is displayed.

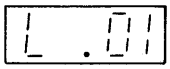
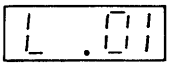
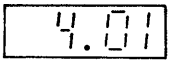
‡ After either version of the initial test these displays are blank. An "L" is displayed when the LDI and/or server software load process begins.

Successful LDI Indications

The following table describes the front panel digital readout indications during loading and running of the LDI and server software.

Note that line-card lights (located on each line card) should always be ON prior to initialization by the server software.

Table 8 Successful LDI Indications

Event	Approximate Duration	Indication
Loading LDI	2 minutes	 *
Running LDI	20 to 40 minutes	A series of changing numbers is displayed. †
Loading Server Software	2 minutes	 *
Running Server Software	Until server is turned OFF	A regular repeating light pattern in the digital readout. Alternating with  node address † †

* The 3rd and 4th digits of the digital readout change as the LDI is loaded.

† The number of the test being run is displayed. More information on the test being run may be obtained by connecting a 1200 baud / RS-232-C terminal to the maintenance panel connector of the DECSA communications server.

† † A node address is not displayed by the LAT terminal server. Otherwise, the node address is indicated by three consecutive displays. An example of a displayed node address (40125) is:

1. 1st display (5 seconds) 4.01
2. 2nd display (3 seconds) 4.012
3. 3rd display (2 seconds) 0125

Individual node addresses vary.

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Fault Indications
If the DECSA communications server fails any diagnostic (including the short or long version of the initial test), the fault indications are displayed until:

- The DECSA server is restarted, or
- The power is turned OFF.

Initial Test Fault Indications – The following table shows front panel indications for faults found during either version of the initial test.

Table 9 Initial Test (Short and Long Versions) Fault Indications

Line Card	Logic	Cable	D1	D2	D3	D4	Indication
ON			____*	____*	(01 to 16)		Line-card slot number
	ON		____*	____*	(01 to 10)		Logic module slot number
		ON	____*		(001 to 999)		Cable fault†

*Underscores (____) in the digital readout indicate that the displayed results are from the initial test.

†A cable fault was detected. Normal troubleshooting equipment such as a TDR (time domain reflectometer) should be used to locate the fault. The numbers displayed in the digital readout reflect internal logic and should be disregarded.

LDI Fault Indications – The following table shows front panel indications for faults found during execution of the LDI.

NOTE

When a failure is detected by the LDI, the slot number of the defective module is displayed. Three module choices are given because the DECSA architecture does not allow the LDI to isolate the failure to a single module. The "1st choice" module should be swapped first, the "2nd choice" module swapped second, and so on.

Table 10 LDI Fault Indications

Line Card	Logic	Cable	D1	D2	D3	D4	Indication
ON			1		(01 to 16)		Line-card slot number* 1st choice
ON			2		(01 to 16)		Line-card slot number* 2nd choice
ON			3		(01 to 16)		Line-card slot number* 3rd choice
	ON		1		(01 to 10)		Logic module slot number† 1st choice
	ON		2		(01 to 10)		Logic module slot number† 2nd choice
	ON		3		(01 to 10)		Logic module slot number† 3rd choice
		ON			(001 to 999)		Cable fault‡

*Line-card slot numbers are located on the front panel of the DECSA system. The (red) LED on a defective line card should be ON.

†Logic module slot numbers are listed in Table 11.

‡A cable fault was detected. Normal troubleshooting equipment such as a TDR (time domain reflectometer) should be used to locate the fault. The numbers displayed in the digital readout reflect internal logic and should be disregarded.

Logic Module Slot Numbers – The following table shows logic module slot numbers referred to by the initial test and the LDI.

Table 11 Logic Module Slot Numbers

Slot Number	Module
1	M3112 CBT
2	M7793 Ethernet-to-UNIBUS adaptor (LINK module)
3	M7792 Ethernet-to-UNIBUS adaptor (PORT module)
4	G7273 grant card
5	M8743-AA or M8743-BA memory
6	M3110 PAM 1 module 1
7	M3111 PAM 1 module 2
8*	M3110 PAM 2 module 1 (optional)
9*	M3111 PAM 2 module 2 or G7273 grant card
10	M7133 PDP-11/24 CPU

*For a 32-line terminal server, slots 8 and 9 contain M3110 and M3111 PAM modules respectively. For a 16-line terminal server, a DECnet router server, a DECnet router/X.25 gateway, and a DECnet/SNA gateway, slot 8 is unused and slot 9 contains a G7273 grant card.

DECSA MAINTENANCE AIDS

Required Equipment
The following extender modules may be required to perform some maintenance procedures described in this manual.

- W900 – Dual-height extender module
- W987 – Quad-height extender module
- W904 – Hex-height extender module

The DECSA controlled distribution (CD) repair kit contains only those modules that are unique to the DECSA server. Those modules include:

- Line cards
- PAM modules
- CBT modules
- 512K byte memory modules

The following modules are not included in the DECSA CD repair kit. However, these modules should be available at the DIGITAL Field Service Office.

- DEUNA modules
- CPU module
- 1M byte memory module
- +5 V regulator
- ±15 V regulator

Troubleshooting
The following flow diagram provides a typical troubleshooting sequence.

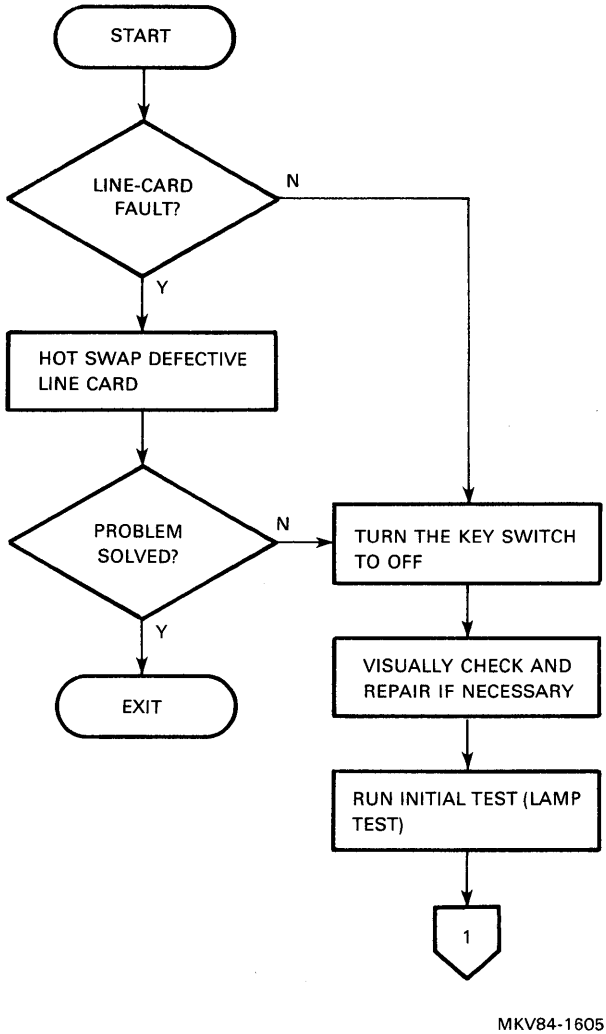

Figure 7 Troubleshooting Flow Diagram (Sheet 1 of 5)

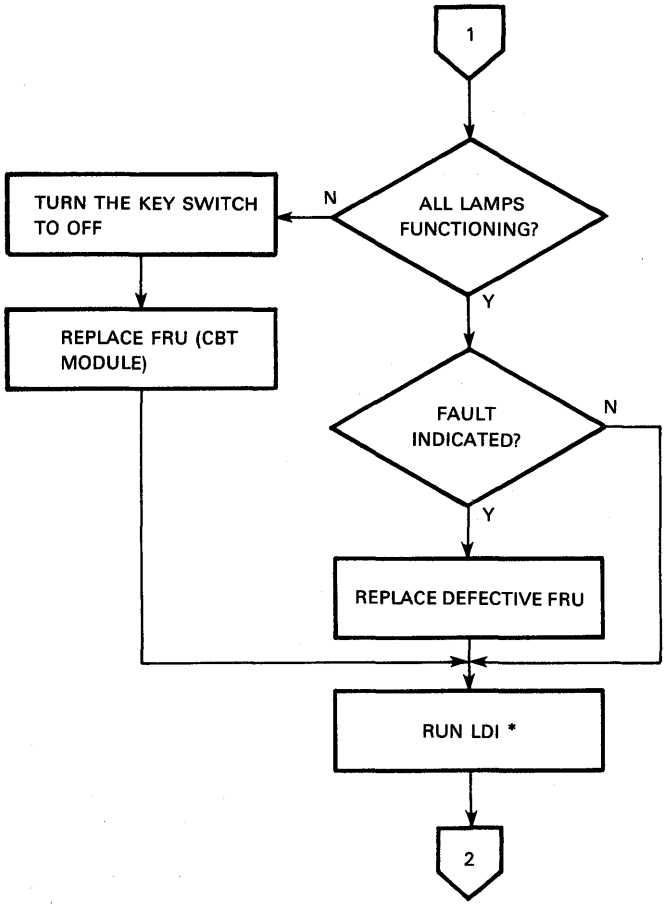

Figure 7 Troubleshooting Flow Diagram (Sheet 2 of 5)

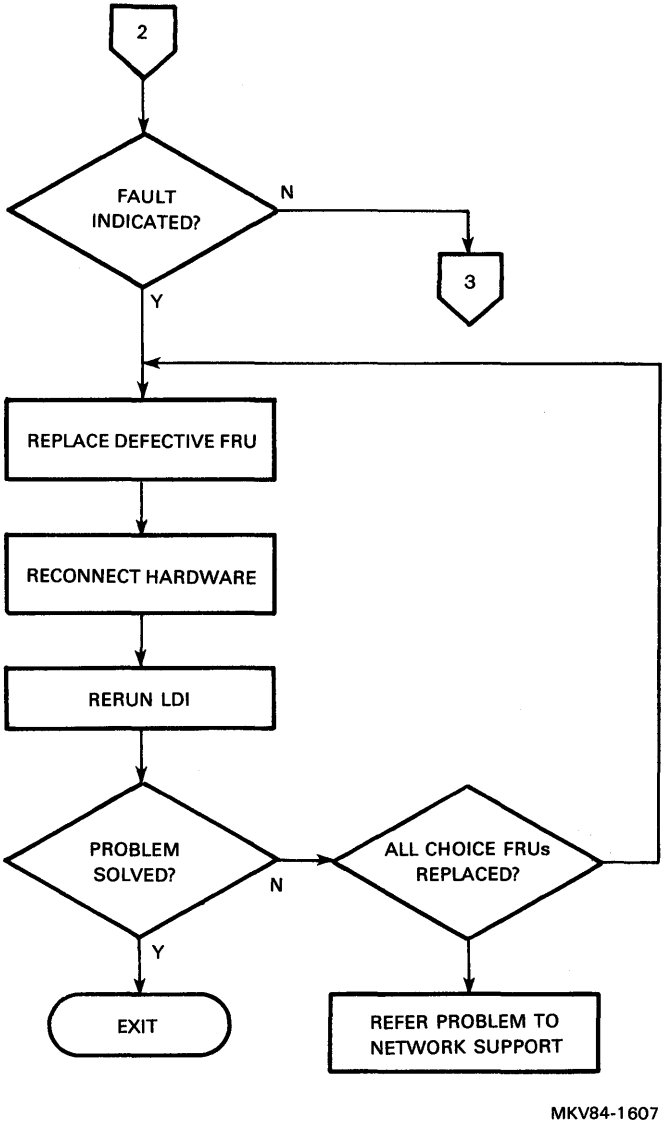

Figure 7 Troubleshooting Flow Diagram (Sheet 3 of 5)

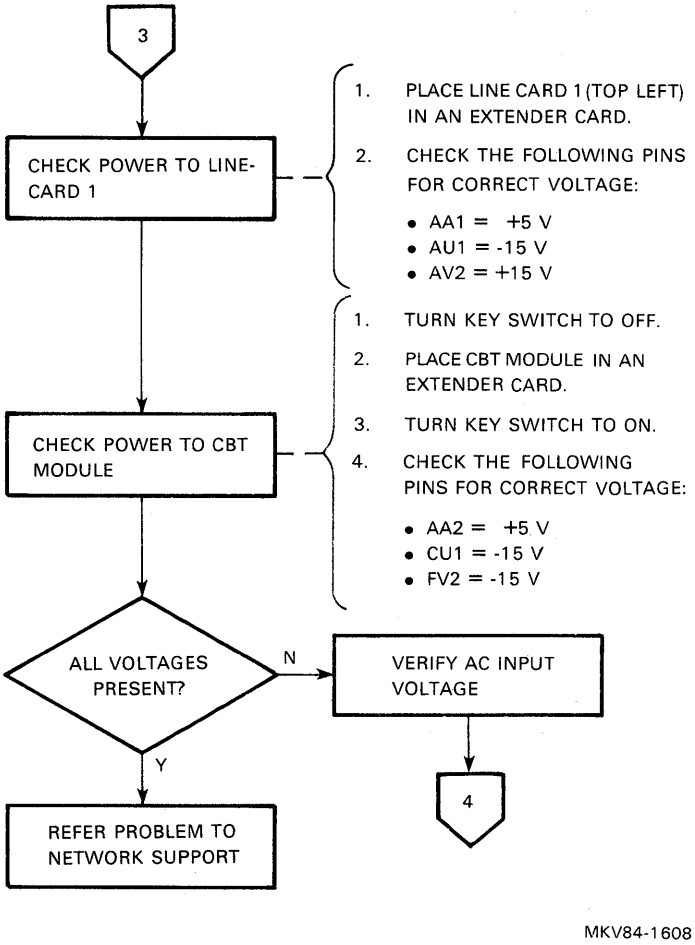

Figure 7 Troubleshooting Flow Diagram (Sheet 4 of 5)

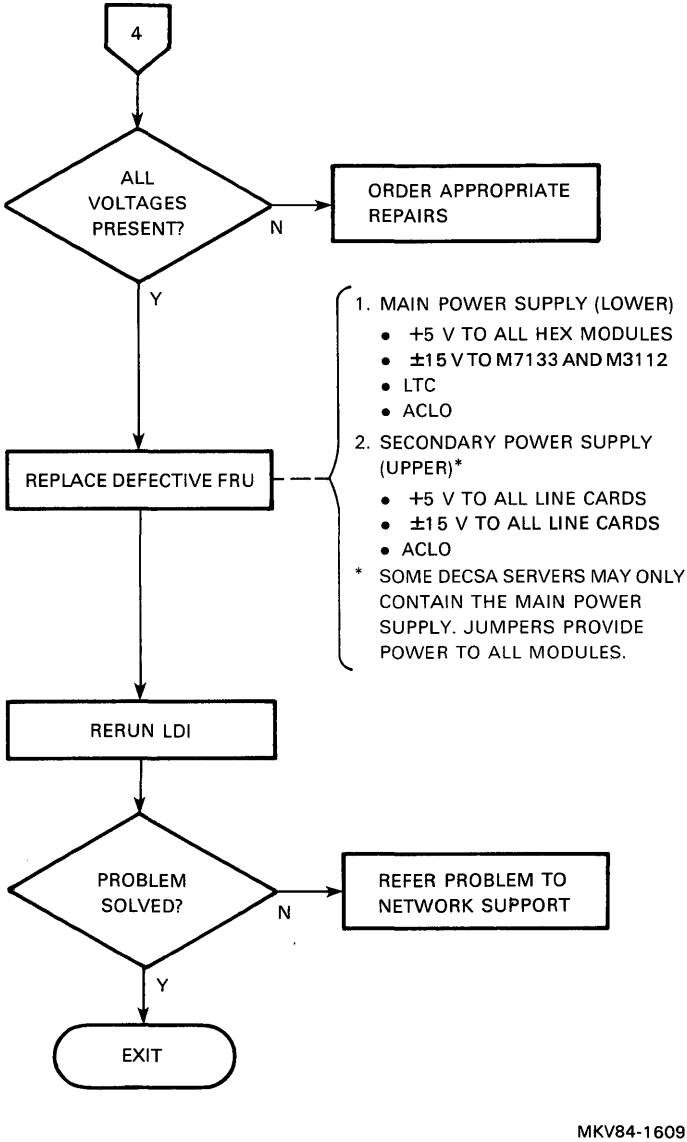

Figure 7 Troubleshooting Flow Diagram (Sheet 5 of 5)

Module Replacement and Upgrades
The following modules may require setting DIP switches, checking/setting jumper configurations, or changing a PROM.

- M7133 – PDP-11/24 CPU
- M7792 – DEUNA (port module)
- M7793 – DEUNA (link module)
- M8743-AA – 512K byte memory
- M8743-BA – 1M byte memory

M7133 PDP-11/24 CPU Module Replacement – The switch and jumper configurations are outlined in the following table and figure.

Table 12 M7133 (PDP-11/24) CPU Switch and Jumper Configurations

Switchpack or Jumper	OFF Jumper IN	ON Jumper OUT
E135	1,5	All others
E124	1,3,5,7,8	2,4,6
Jumpers W1 – W14	W1,W2,W3, W10,W12	W4,W5,W6,W7,W8 W9,W11,W13,W14

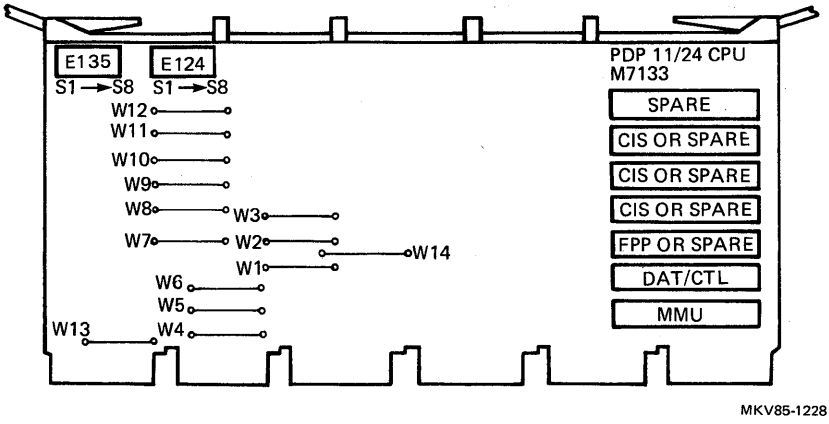

Figure 8 M7133 (PDP-11/24) CPU Switch and Jumper Locations

M7792 DEUNA Port Module Replacement – The switch settings for Revision Etch B and Revision Etch C of the port module are shown in the following figure and table.

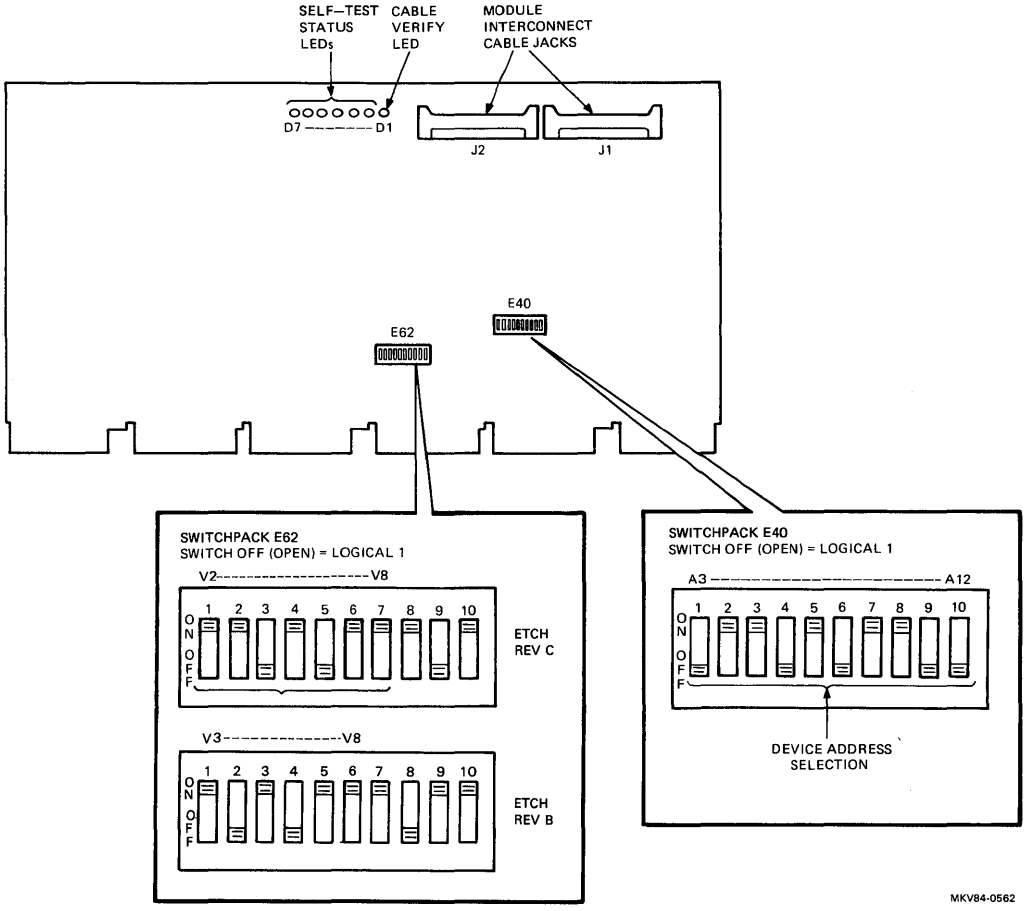

Figure 9 M7792 Port Module Switch Settings

Table 13 M7792 Switch Settings

Switchpack	OFF	ON
E40	1,4,6,9,10	2,3,5,7,8
E62 (REV B)	2,4,8	1,3,5,6,7,9,10
E62 (REV C)	3,5,9	1,2,4,6,7,8,10

M7793 DEUNA Link Module Replacement – The PROM in the M7793 link module contains the Ethernet address. When replacing a DEUNA link module adhere to the following conditions:

1. If possible, move the PROM from the defective module to the new module being installed.
2. If the PROM must be changed, report the new Ethernet address to the system or network manager.

M8743-xA Memory Module Replacement – All address switches on a replacement M8743 module must be set to ON.

Verify the following jumper configuration.

IN:	OUT:
W1,W2,W3,W4	W5

System Upgrade
When it is necessary to upgrade a terminal server from 16 to 32 lines, an additional (secondary) power supply and PAM set is required.

The following flow diagram provides the steps for adding a secondary power supply and PAM set.

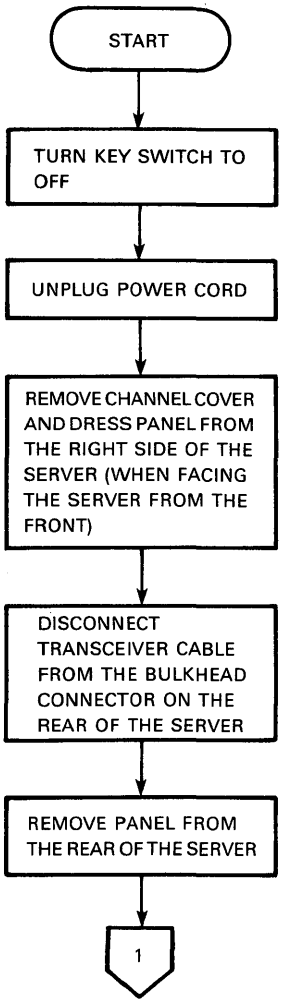

Figure 10 Upgrade: Adding a Second PAM Set and Power Supply (Sheet 1 of 5)

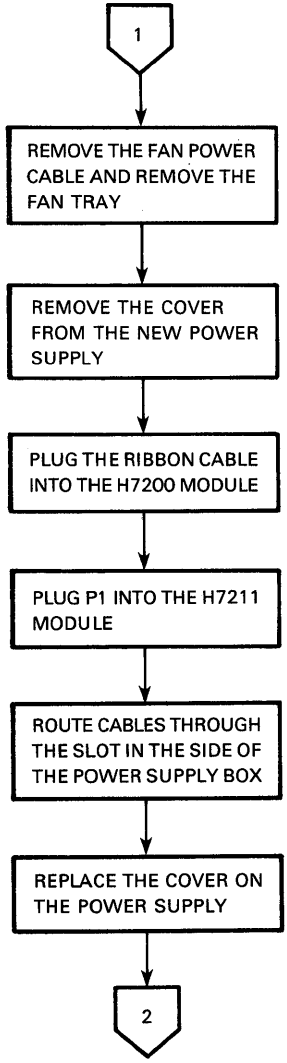

Figure 10 Upgrade: Adding a Second PAM Set and Power Supply (Sheet 2 of 5)

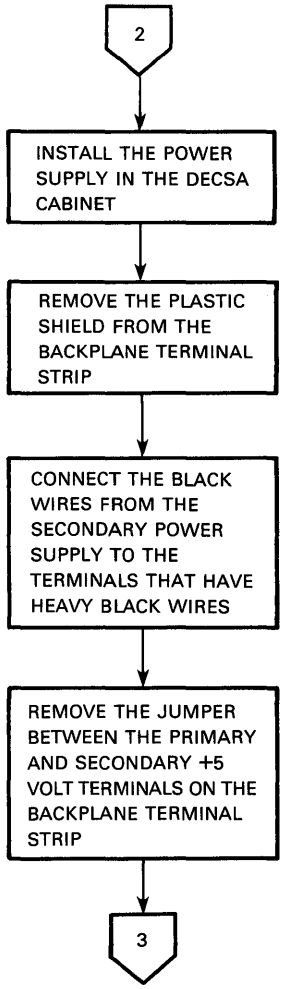

Figure 10 Upgrade: Adding a Second PAM Set and Power Supply (Sheet 3 of 5)

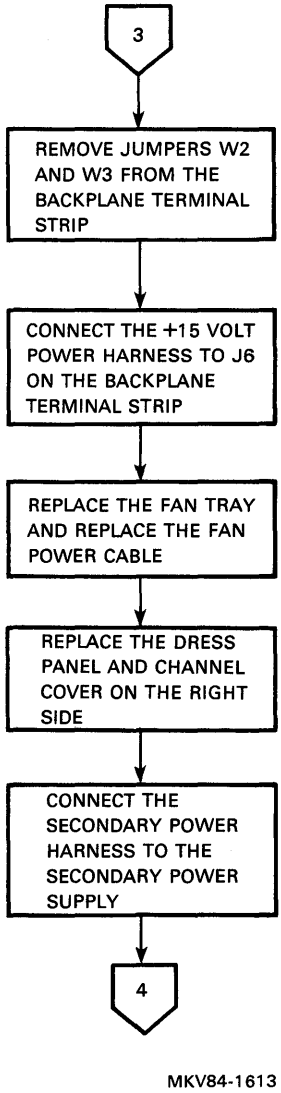

Figure 10 Upgrade: Adding a Second PAM Set and Power Supply (Sheet 4 of 5)

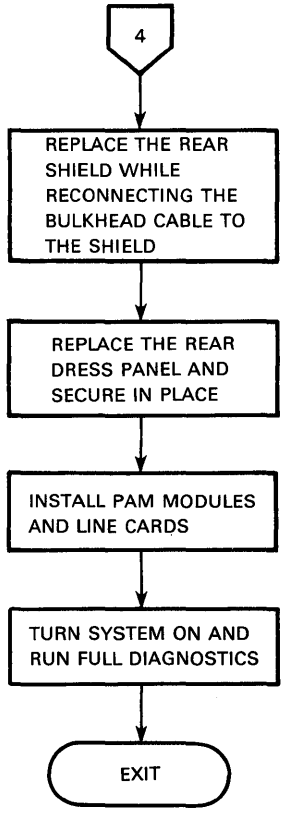

Figure 10 Upgrade: Adding a Second PAM Set and Power Supply (Sheet 5 of 5)

Backplane Terminal Strip Wiring

The following figure shows the location and wiring of the backplane terminal strip. Also shown are the jumpers that must be removed when adding a second PAM set and power supply.

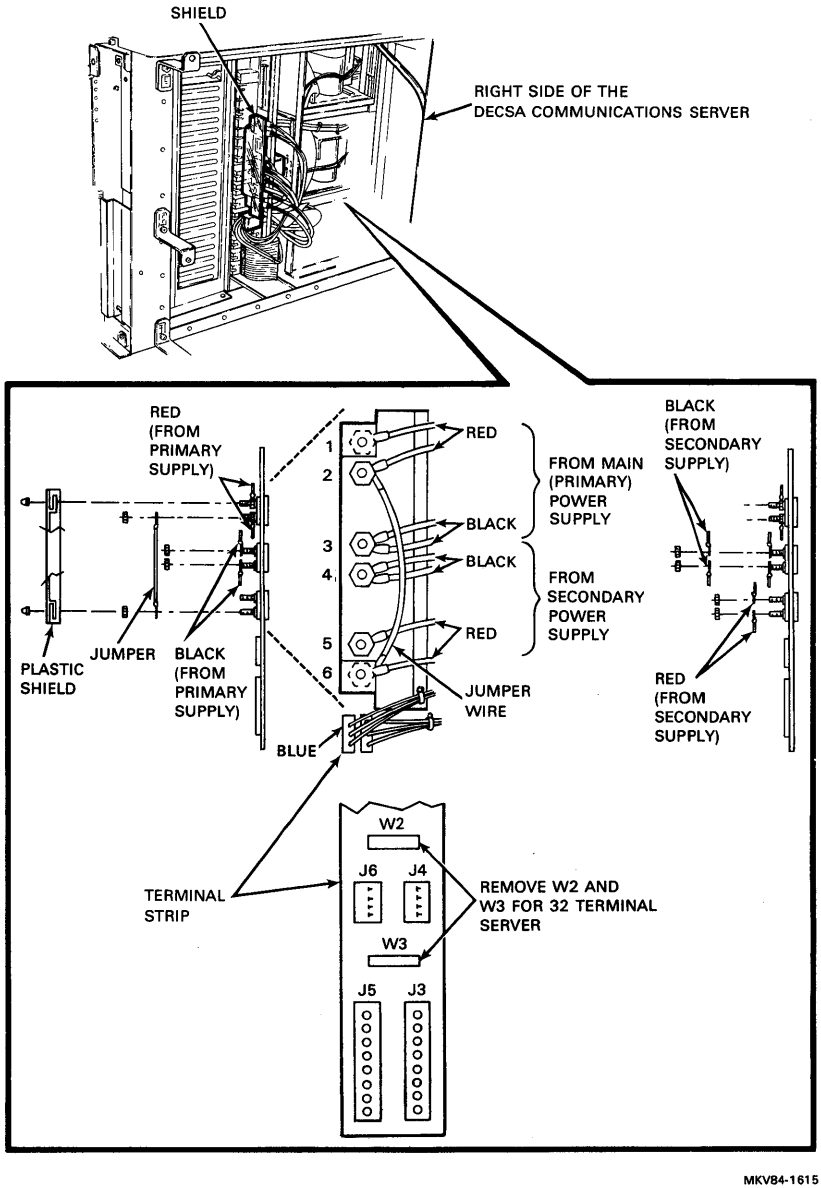

Figure 11 Backplane Terminal Strip Location and Connections

Secondary Power Supply Cabling

The following figure shows the relative locations for the main and secondary power supplies. The cablin for both power supplies and the fan is also shown.

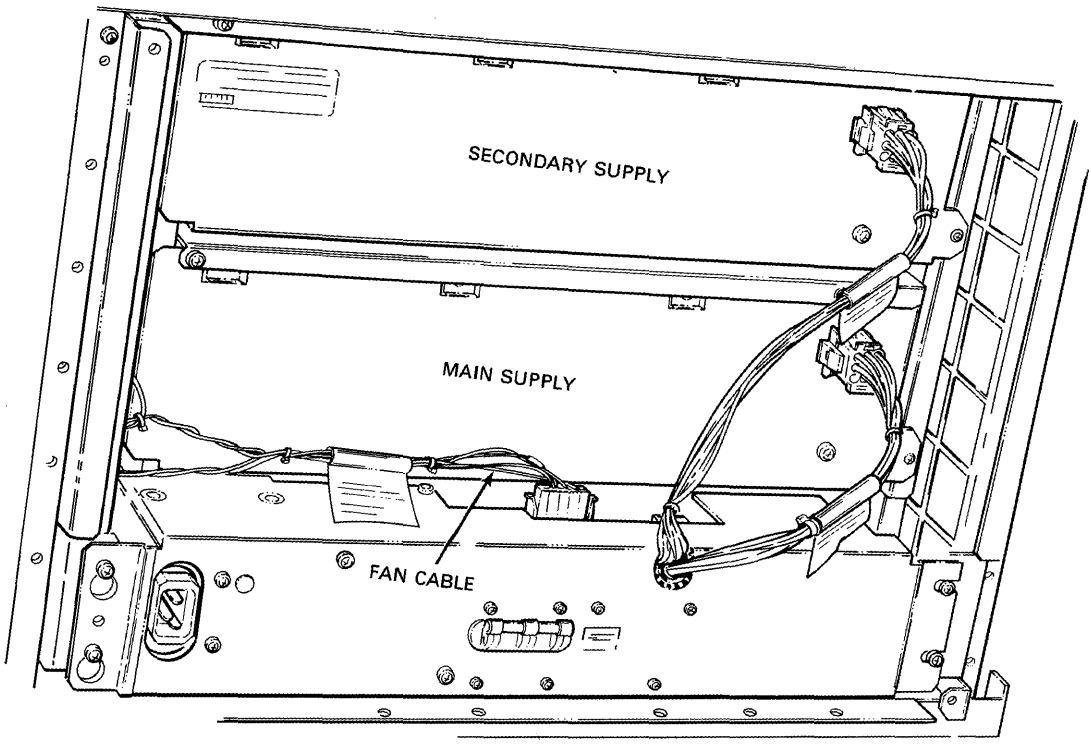

Figure 12 Secondary Power Supply Cabling

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DECSA Tech Tips/FCO Index

The following table lists Tech Tips and FCOs that pertain to the DECSA Communications Server. Space is provided for adding new information.

Table 14 DECSA Tech Tips/FCO Index

Tech Tip No.	Title	Speed Bulletin
	DEUNA-AA Revised DC Power Requirements	293
	M7792 Switchpack E-62 Switch Assignments	293
	M8743-BA FCO-R0007	315
	M8743-BA DEC-O-LOG	315
TT01A	DECSA Diagnostic CSVLDI.SYS	382
TT02A	DECSA Logistic Information	449

DECserver 100 TERMINAL SERVER

General Description

The DECserver 100 (Figure 1) is a high performance terminal server for use on an Ethernet Local Area Network (LAN).

The server allows up to eight terminal users to access any of a set of computer systems on the Ethernet network. It also offers an extensive command set for efficient communication among terminals, server, and nodes. The terminal user's response time and throughput are similar to that for terminals directly connected to a system.

The Ethernet LAN used must employ the Local Area Transport (LAT) network architecture. The LAT architecture makes use of the unique features of the Ethernet network to provide a low-overhead, highly efficient means of logically connecting any terminal to one or more nodes on the same Ethernet network.

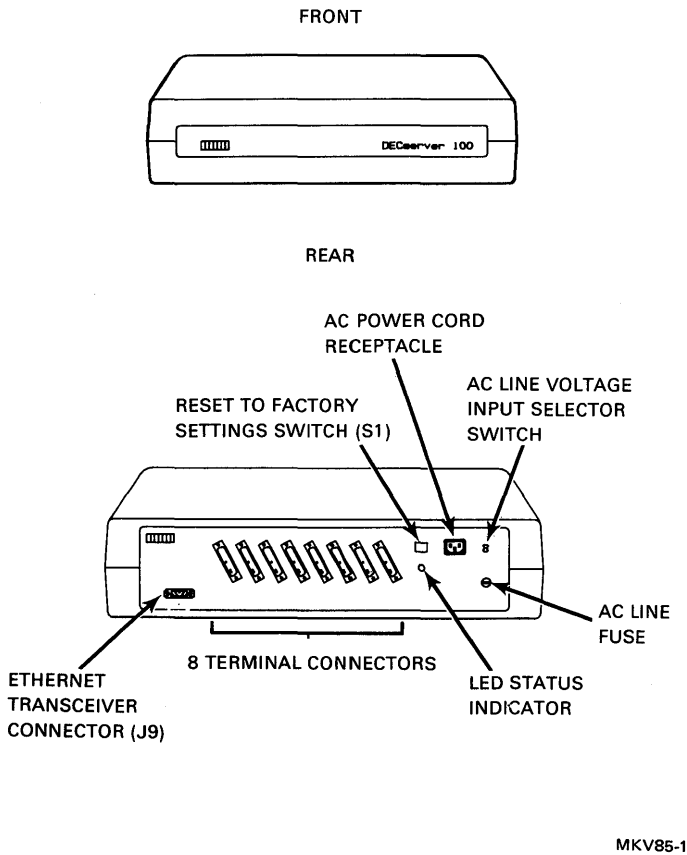

Figure 1 DECserver 100 Terminal Server

Product Configurations

The DECserver 100 terminal server can be connected directly to the Ethernet network via an H4000 Ethernet transceiver or it can be connected to either a DELNI unit or an Etherjack connector box.

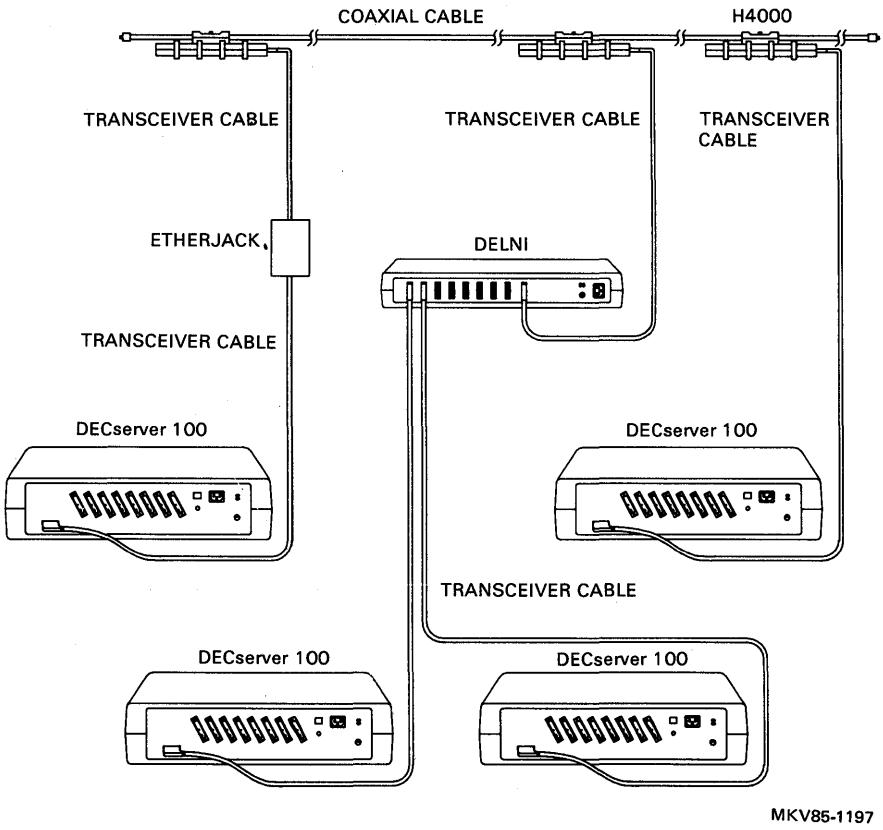

Figure 2 DECserver 100 Ethernet Connections

DECserver 100 Versions

The server is available in two versions (DSRVA-AA and DSRVA-AB). Each version has a different input voltage.

Model	Input Voltage
DSRVA-AA	120 Vac
DSRVA-AB	240 Vac

Hardware Components
The DECserver 100 package consists of:

- DECserver 100 hardware unit – DSRVA-AA or DSRVA-AB
- Country kit – Correct power cord, site preparation/installation guide, and operations guide
- Software – DECserver 100 software and software installation guide

Terminal cables for the DECserver 100 terminal server are ordered separately. There are two types of terminal cables used with the DECserver 100 terminal server:

- BC22D-XX null modem cable
- BC22E data terminal cable

Software Components

DECserver 100 Software – Server software implements the LAT architecture at the terminal server. This software supports the LAT protocols, provides access to the server command language, and provides maintenance and testing functions for the server.

Host Software – One module used to implement LAT resides on the VMS or RSX node and is called LTDRIVER. LTDRIVER is analogous to the terminal driver module of any operating system. Terminal drivers control the system's local terminals. LTDRIVER provides the instruction set to control remote terminals through the DECserver 100 terminal server.

The LAT virtual circuit software is another module used to implement LAT. This module constitutes the interface between the terminal users' data transmissions and the lines that make up the circuit.

Server Software Operation (Figure 3) – The server software is installed on an Ethernet node which implements Phase IV of DECnet software. When the software is installed on a node, that node becomes the Load Host.

The following software files should be found on the Load Host. VMSINSTAL copies the following files into SYS$SYSROOT[DECSERVER].

***DSVxxxRNT.DOC –	A file that contains the DECserver release notes.
***DSVCONFIG.COM –	A file that contains a program which has the command procedure for building the configuration file.
***PS0801ENG.SYS –	The distributed DECserver 100 image file.

Other files in this directory are:

***DSVCONFIG.DAT –	A configuration file containing the configuration information for the DECserver 100 terminal server. This file is the configuration file created by running DSVCONFIG.COM.
***PSDMPyyyy.SYS –	The up-line DECserver 100 dump file. This file is copied to SYS$SYSROOT[DECSERVER] when an up-line dump occurs.

NOTE
xxx will change with revision of the software. yyyy equals last four digits of the server Ethernet address.

When the server (DSRVA-XX) is powered on or given the Initialize command, it runs its internal self-test. If the self-test passes, the server then broadcasts a "Request for Down-Line Load" message on the Ethernet network. The Load Host receives the broadcast message and down-line loads the server software to the DECserver 100 terminal server.

Once the server software is loaded, terminal users are able to access other nodes on the Ethernet network. The users are not restricted to the Load Host. Any node that implements the LTDRIVER software is available to the users.

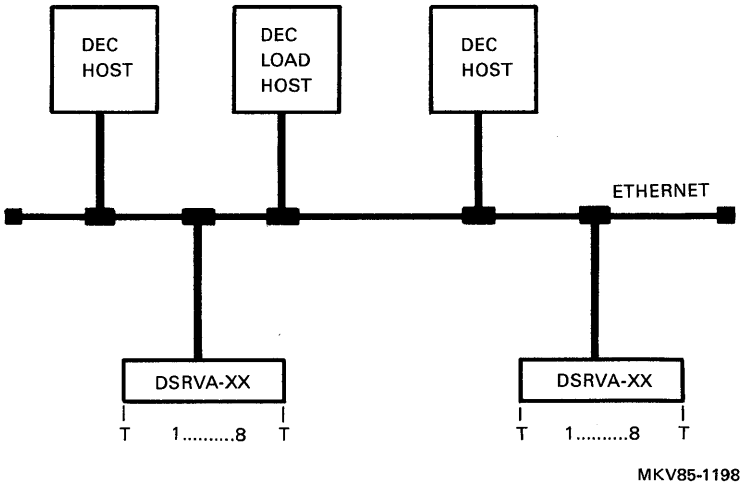

Figure 3 DECserver 100 Topology

Terminal Connector Pin Assignments

Table 1 lists the pin assignments for each of the 25-pin D-subminiature (D-SUB) terminal connectors on the back of the terminal server.

Table 1 Terminal Connector Pin Assignments

Pin No.	Signal	Function
7	Ground	Signal Ground
2	PJL TX L	Transmit Data
3	PJL RX H	Receive Data

Application Modes
When a user logs in on the terminal server, the terminal-to-service node operating mode may be set by command or determined dynamically by preset characteristics.

The terminal server supports the following operating modes and speed ranges.

- Interactive terminal mode – 75 to 19,200 bits/s
- Flow-controlled block mode or file-transfer mode – 75 to 9,600 bits/s

Block mode applications supporting XOFF/XON flow control are supported. The main use of this mode is by intelligent video terminals that support screen editing and send an entire screen of characters to the service node.

File transfer operations are supported for the following DIGITAL personal computers at speeds of up to 9,600 bits/s:

- Professional 350/380 series
- Rainbow 100, 100+
- DECmate II

Terminals
The DIGITAL terminals listed in Table 2 are supported by the terminal server at transfer speeds up to 19,200 baud in the interactive terminal mode and up to 9,600 baud in flow-controlled block mode or file-transfer mode.

Table 2 Approved DIGITAL Terminals

Hardcopy Terminals
LA12, LA50, LA100; LA120, LA180; LA34, LA36, LA38
Video Display Terminals
VT50, VT52, VT5x/VT6x in VT52 mode; VT100, VT101, VT102, VT125, VT131; VT220, VT240, VT241
Intelligent Terminals/Personal Computers
GIGI or VT180 in VT100 mode; RAINBOW 100, DECmate II; PRO-325/350/380 in VT100 emulation mode

Reference Documentation

Title	Document Number
DECserver 100 Terminal Server Technical Manual	EK-DSRVA-TM
DECserver 100 Terminal Server User's Pocket Guide	AV-Z084A-TK
DECserver 100 Terminal Server Operations Guide	AA-Z085A-TK
DECserver 100 Terminal Server Identification Card	AV-DJ35A-TK
DECserver 100 Terminal Server Software Installation Guide (VAX/VMS)	AA-DJ17A-TE
DECserver 100 Terminal Server Site Preparation/Hardware Installation Guide	AA-CK93A-TK
LAT Terminal Server Network Manager's Guide	AA-DJ18A-TK
LAT-11 Server Manager's Guide	AA-BT77A-TC
The Ethernet - A Local Area Network - Data Link Layer and Physical Layer Specifications (Version 2.0, November 1982)	AA-K759B-TK
Ethernet Installation Guide	EK-ETHER-IN
H4000 DIGITAL Ethernet Transceiver Installation Manual	EK-H4000-IN
H4000 DIGITAL Ethernet Transceiver with Removable Tap Assembly Installation Card	EK-H4TAP-IN
Installing Etherjack	EK-DEXJK-IN
DELNI Installation/Owner's Manual	EK-DELNI-IN

Device Placement
The DECserver 100 terminal server can be placed either in an office or a computer room environment, provided the location conforms to the environmental specifications listed in the installation flow diagram of Figure 4.

Installation Flow Diagram

NOTE

Some flow diagram symbols have roman numerals next to them. These roman numerals refer to supplementary information.

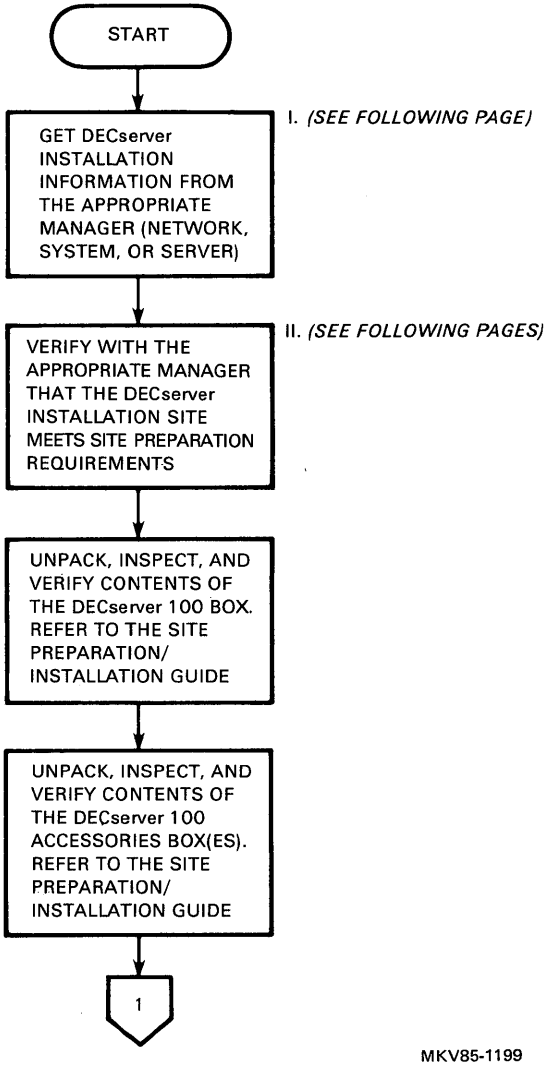

Figure 4 DECserver 100 Installation Flow Diagram (Sheet 1 of 9)

I. INSTALLATION INFORMATION

A. LOCATION WHERE DECserver IS TO BE INSTALLED
B. TYPE OF CONNECTING DEVICE AND ITS LOCATION (H4000, DELNI, AND/OR ETHERJACK)
C. TYPE(S) OF TRANSCEIVER CABLE (BNE3X AND/OR BNE4X)
D. LOCATION OF TERMINALS

II. SITE PREPARATION REQUIREMENTS

A. CONNECTING DEVICE (H4000, DELNI, ETHERJACK) ALREADY INSTALLED
B. TRANSCEIVER CABLE FROM CONNECTING DEVICE ALREADY INSTALLED
C. TOTAL TRANSCEIVER CABLE LENGTH LIMIT FROM THE H4000 TO THE DECserver 100 CANNOT EXCEED:

1. 50 METERS (164 FT) OF BNE3X CABLE
2. 12.5 METERS (41 FT) OF BNE4X CABLE

NOTE

1 METER (3.28 FT) OF BNE4X IS EQUIVALENT TO 4 METERS (13.21 FT) OF BNE3X. IF THE TWO CABLE TYPES ARE MIXED, THE TOTAL CABLE LENGTH CANNOT EXCEED THE ELECTRICAL EQUIVALENT OF 50 METERS (164 FT) OF BNE3X CABLE.

FOR ADDITIONAL INFORMATION ON INSTALLATION OF THE CONNECTING DEVICE AND TRANSCEIVER CABLE LIMITS, REFER TO:

– ETHERNET INSTALLATION GUIDE (EK-ETHER-IN)
– DELNI INSTALLATION/OWNER'S MANUAL (EK-DELNI-IN)
– INSTALLING ETHERJACK (EK-DEXJK-IN)

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Figure 4 DECserver 100 Installation Flow Diagram (Sheet 2 of 9)

D. ENVIRONMENTAL REQUIREMENTS

1. VOLTAGE:

DSRVA-AA	DSRVA-AB
100-120 VAC	200-240 VAC
SINGLE PHASE	1n+PE
47–63 HZ	47–63 HZ
0.5 AMP	0.3 AMP
30 WATTS	30 WATTS
3AG 1.0 A SB	5 MM (.20 IN) T 1 .0 A
250 VAC	250 VAC

2. TEMPERATURE

OPERATING	NONOPERATING
50 – 104° F	-40 – 151° F
10 – 40° C	-40 – 66° C

THERMAL OUTPUT
95 BRITISH THERMAL UNITS

3. HUMIDITY

OPERATING	NONOPERATING
10% – 90% NONCONDENSING	90% MAXIMUM

4. ALTITUDE

OPERATING	NONOPERATING
2.4 KM (8000 FT)	9.1KM (30,000 FT)

MKV85-1201

Figure 4 DECserver 100 Installation Flow Diagram (Sheet 3 of 9)

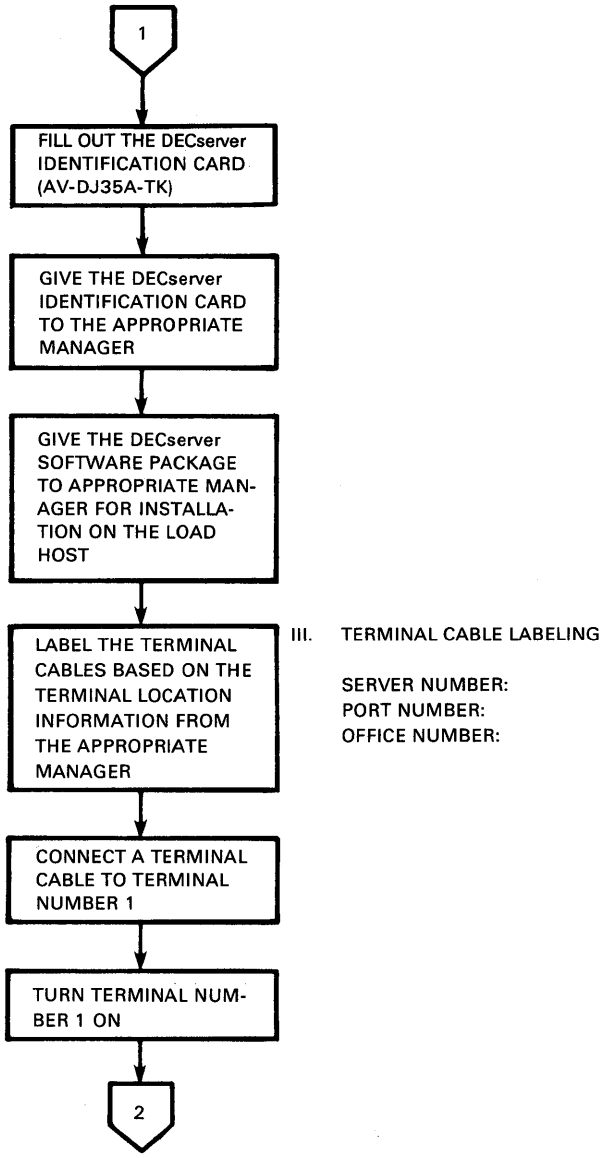

Figure 4 DECserver 100 Installation Flow Diagram (Sheet 4 of 9)

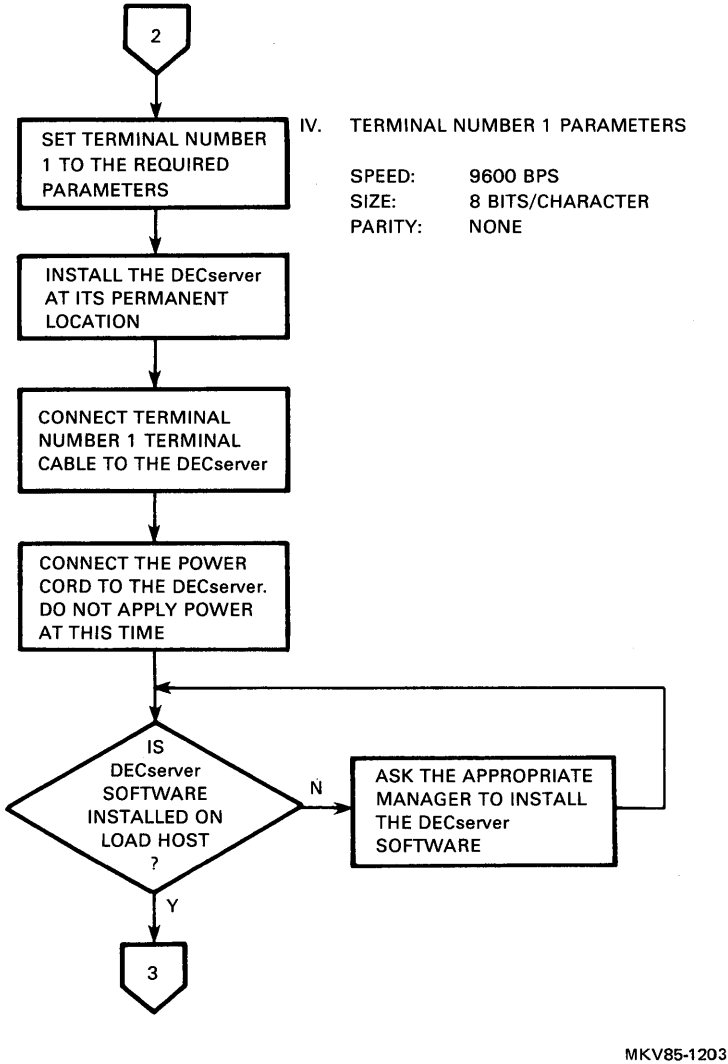

Figure 4 DECserver 100 Installation Flow Diagram (Sheet 5 of 9)

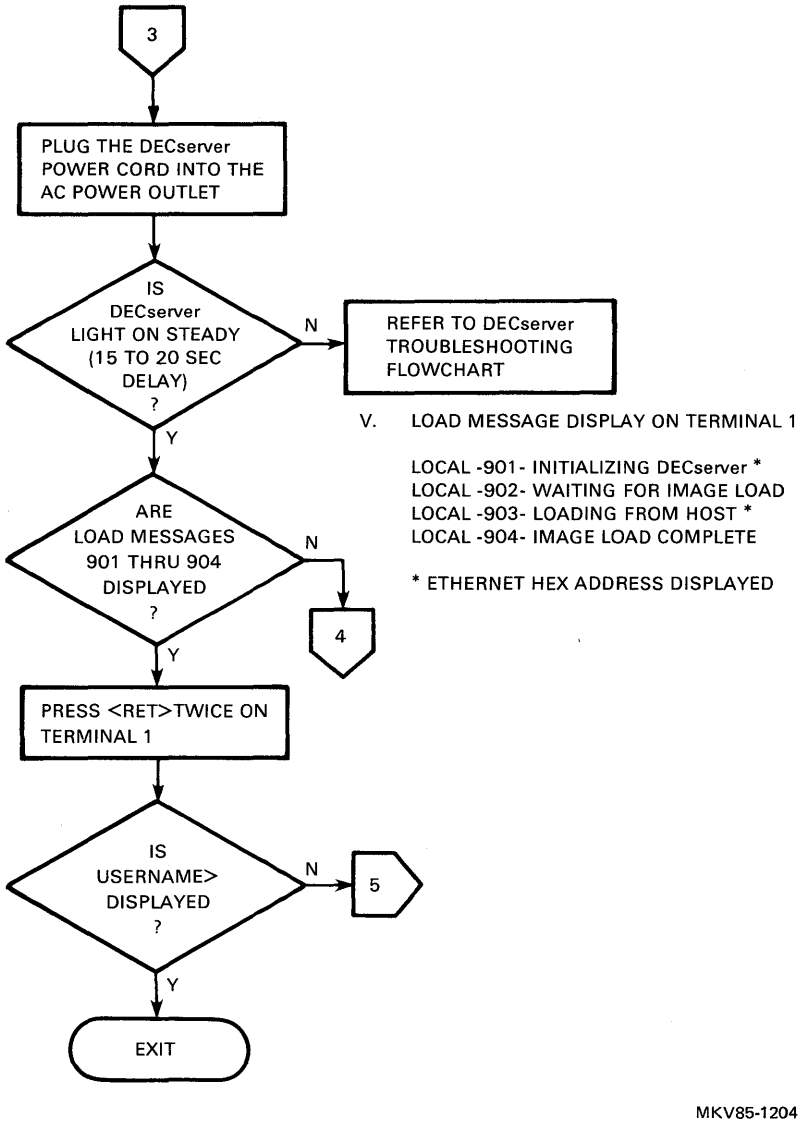

Figure 4 DECserver 100 Installation Flow Diagram (Sheet 6 of 9)

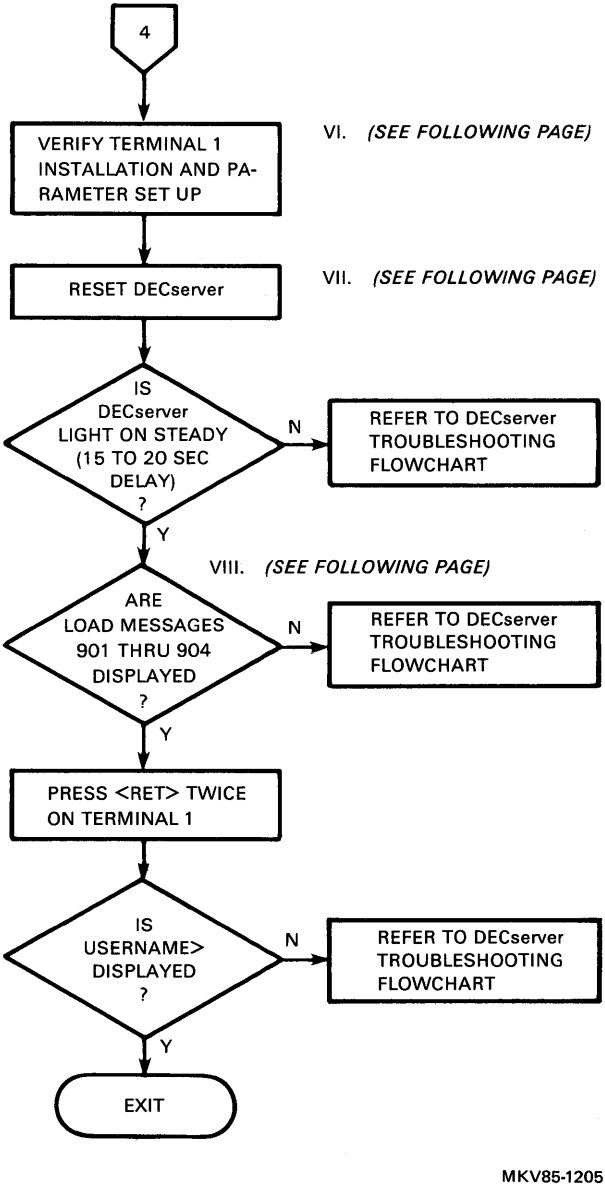

Figure 4 DECserver 100 Installation Flow Diagram (Sheet 7 of 9)

VI. TERMINAL 1 VERIFICATION

A. TERMINAL OF THE CORRECT TYPE?
B. POWER AVAILABLE?
C. TERMINAL TURNED ON?
D. TERMINAL CABLE IN GOOD CONDITION AND PROPERLY CONNECTED TO TERMINAL AND DECserver?
E. TERMINAL PARAMETERS SET UP?

SPEED:	9600 BPS
CHAR. SIZE:	8 BITS/CHARACTER
PARITY:	NONE

VII. RESETTING DECserver

RESET THE DECserver BY HOLDING SWITCH S1 IN, AND UNPLUGGING AND REINSERTING THE POWER CORD ON THE DECserver

VIII. TERMINAL 1 DISPLAY

LOCAL -901- INITIALIZING DECserver *
LOCAL -902- WAITING FOR IMAGE LOAD
LOCAL -903- LOADING FROM HOST *
LOCAL -904- IMAGE LOAD COMPLETE

* ETHERNET HEX ADDRESS DISPLAYED

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Figure 4 DECserver 100 Installation Flow Diagram (Sheet 8 of 9)

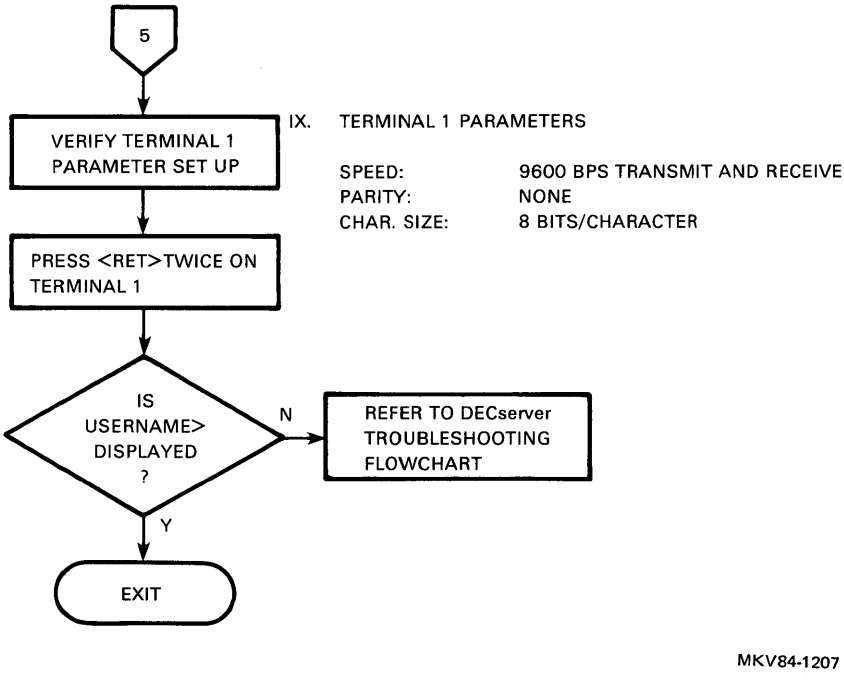


Figure 4 DECserver 100 Installation Flow Diagram (Sheet 9 of 9)

Power Cord Length
The length of the power cord for the DECserver 100 terminal server is 1.8 m (6 ft).

Ethernet Transceiver Cable Length
The maximum transceiver cable length, as measured from the H4000 transceiver to the server (this includes lengths of transceiver cable connecting the server to either a DELNI unit or Etherjack connector box), cannot exceed the following limits.

- 50.0 m (164 ft) when using BNE3X-XX transceiver cable
- 12.5 m (41 ft) when using BNE4X-XX transceiver cable

The BNE4X transceiver cable (also referred to as Office Cable) has an attenuation ratio of 1:4 when compared to BNE3X transceiver cable. In other words, 1 m (3.3 ft) of BNE4X transceiver cable is equivalent to 4 m (13.1 ft) of BNE3X transceiver cable.

If a combination of the two cable types is used, the total physical cable length cannot exceed the electrical equivalent of 50 m (164 ft) of BNE3X transceiver cable.

Diagnostic Maintenance Features
The DECserver 100 terminal server provides the following maintenance features.

- Hardware self-test – Initiated at power-up or by the Initialize command; verifies the server hardware.

- Software loopback testing to the Ethernet network – Run from the privileged terminal; verifies that the Ethernet transceiver functions properly.

- Test functions for terminals – Run from the privileged terminal; verifies that the server's asynchronous ports are functioning properly.

- Reset-to-factory-settings switch (S1) – Used to reset the permanent server and terminal characteristics to their factory-set values. The switch is used as follows when the unit is replaced or when the current values cause the server to be unusable.

  - Press and hold the reset-to-factory-settings switch.
  - Unplug the ac power cord.
  - Plug in the ac power cord.
  - Hold the reset-to-factory-settings switch for 1 second, then release.

Diagnostic Description
The DECserver 100 terminal server uses an internal self-test as its only diagnostic. The self-test verifies the following areas.

- Operation of the 68000 microprocessor
- Operation of the DART chips
- Integrity of its internal memories (RAM, ROM, NVRAM)
- Operation of its Ethernet controller interface

A green light emitting diode (LED) on the server rear panel and the error messages sent to terminal port number 1 at server initialization, are the only indicators of the status of the self-test.

The green LED can be in one of three states.

- ON STEADY – The self-test has completed successfully and did not detect any hardware errors.

- BLINKING – The self-test has detected a nonfatal problem during its execution.

- OFF – The server either has no power or the self-test has detected a fatal hardware error during its execution.

Executing Diagnostic
There are two methods for initiating the DECserver 100 self-test.

- Issuing the Initialize command from the console (privileged) terminal

- Unplugging and reinserting the server power cord

Error Indications/Symptoms

The status of the green LED on the rear panel and the operating condition of the connected terminals can be of help in determining the possible cause of a fault associated with the server. The LED will be in one of the three states listed earlier and the terminals will be in one of the three states listed below.

- ALL terminals functioning properly
- SOME of the terminals functioning properly
- NONE of the terminals functioning properly

The one exception to the above is when the state of the LED is OFF. In this case the terminals are unable to function.

Table 3 summarizes these error indications and the possible causes of the malfunction.

Table 3 DECserver 100 Error Indications/Symptoms and Possible Causes

LED/Terminal Status	Possible Cause
ON/All inoperative	1. Software not loaded on host 2. Service node(s) not available 3. Server/terminal parameter mismatch
ON/Some inoperative	1. Server/terminal parameter mismatch 2. Service node(s) not available 3. EIA drivers on server port bad
Blinking/All inoperative	1. Server diagnostic checksum error 2. Server parameter checksum error 3. Ethernet loopback test failure 4. Ethernet heartbeat test failure
Blinking/Some inoperative	1. Server diagnostic checksum error 2. Server parameter checksum error 3. Server port parameter checksum error 4. Server port hardware failure
OFF/All inoperative	1. Power not applied to server 2. Fatal server diagnostic failure

Status and Error Message Types
Table 4 lists the types of message codes that may be returned by the server software during operation. Status and error messages are displayed in the following format where *xxx* (unless undefined) is a decimal status or error code.

Local -*xxx*- Command response or error message

Table 4 Server Status and Error Message Types

Code Range	Message Type
000 to 099	Informational messages, normal command responses
100 to 199	Warning messages
200 to 299	Connection error messages
500 to 599	Server-specific informational messages
600 to 699	Server-specific warning messages
700 to 799	Server user and command error messages
900 to 999	Status and error messages issued by the firmware routines in program ROM

Fatal Bugcheck Error Message
The following message is displayed on a fatal bugcheck.

Local -913- Fatal Bugcheck PC=xxx, SP=xxx, SR=xxx, MEM=xxx, CODE=xxx

The message displays the contents of the CPU program counter (PC), stack pointer (SP), and status register (SR) at the time of the failure.

The MEM field displays the illegal memory address on an addressing error or displays the address of the instruction that may have caused the failure. The CODE field gives the reason for the failure as listed in Table 5.

Table 5 System Crash Error Codes

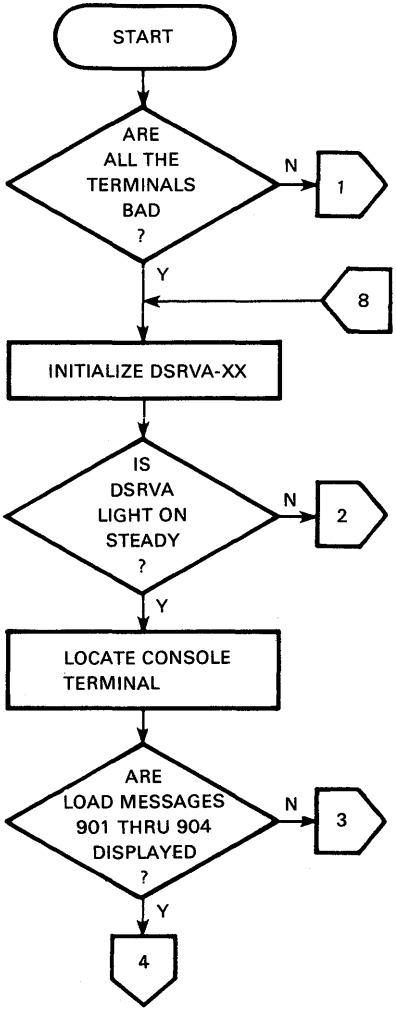
Code	Description
CPU Exceptions	
2	Bus error
3	Address error
4	Illegal instruction
5	Divide by zero
6	CHK instruction
7	TRAPV instruction
8	Privilege violation
9	Trace
A	Line 1010 emulator
B	Line 1111 emulator
C	Other
D	Spurious interrupt
Self-Test Bugchecks (Program ROM)	
11	NI port hardware memory error
12	NI port initialization timeout error
14	NI port transmit buffer error
15	Stack value incorrect in idle loop
22	Unlink error
23	Deallocate error
24	Unable to allocate XCB
31	Command completion error
32	Local output completion error
Server Software Bugchecks (Program RAM)	
200	LAT software checksum error
211	NI port hardware memory error
212	NI port initialization timeout error
214	NI port transmit buffer error
215	Stack value incorrect in idle loop
216	Unlink error
217	Deallocate error
218	Unable to allocate XCB
219	Command completion error
220	Local output completion error
221	EEPROM write block error
222	Entry on output queue with no slots
223	Transmit too long
224	Cannot find status
225	No available circuit control blocks
226	Low pool allocation error
227	Illegal local output state
228	Service defined with no nodes
229	Duplicate node/service name found
230	T_IMAXC out of range

Troubleshooting Flow Diagram

Next to some of the flow diagram symbols are roman numerals. These roman numerals refer to supplementary information.

NOTE

If the DECserver 100 unit requires replacement, a new DECserver 100 Identification Card mut be filled out and given to the system, server, or network manager.



I. DSRVA-XX INITIALIZATION

INITIALIZE THE DSRVA BY HOLDING SWITCH S1 IN, AND UNPLUGGING AND REINSERTING THE POWER CORD

II. LOAD MESSAGE DISPLAY

LOCAL -901- INITIALIZING DECserver *
LOCAL -902- WAITING FOR IMAGE LOAD
LOCAL -903- LOADING FROM HOST *
LOCAL -904- IMAGE LOAD COMPLETE

* ETHERNET HEX ADDRESS DISPLAYED

MKV85-1208

Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 1 of 12)

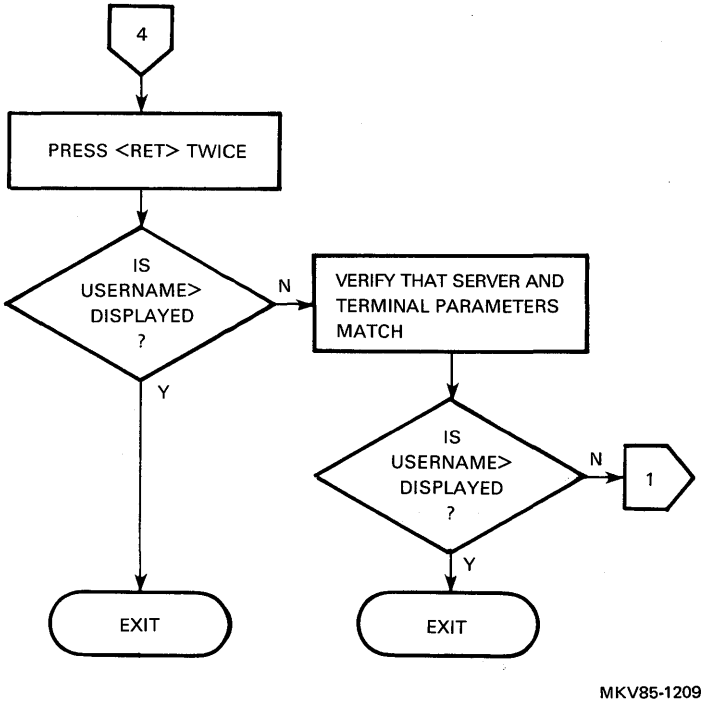
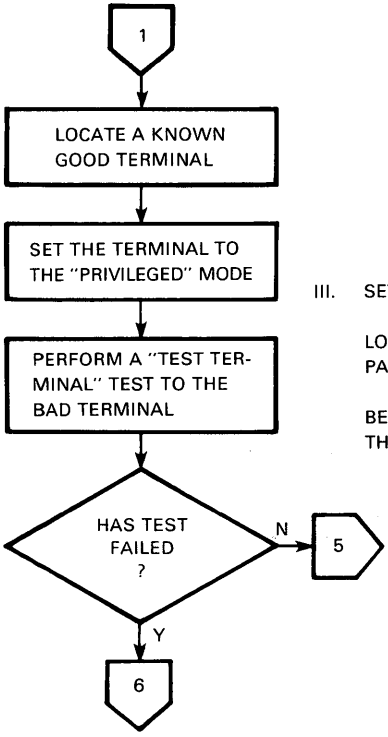


Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 2 of 12)



III. SETTING TERMINAL TO PRIVILEGED MODE

LOCAL> SET PRIVILEGED
PASSWORD> (OBTAIN FROM SERVER MANAGER)

BE SURE TO SET THE TERMINAL BACK TO THE NONPRIVILEGED MODE WHEN DONE.

MKV86-0553

Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 3 of 12)

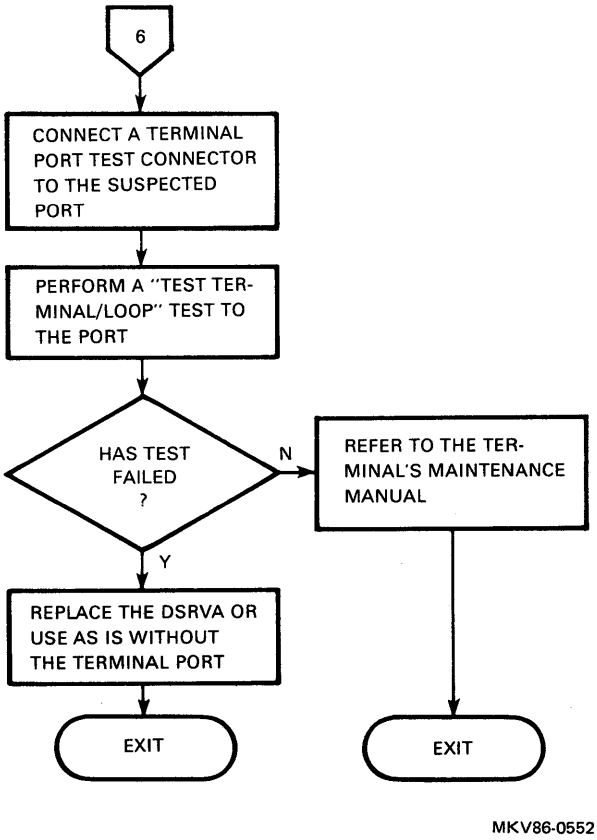


Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 4 of 12)

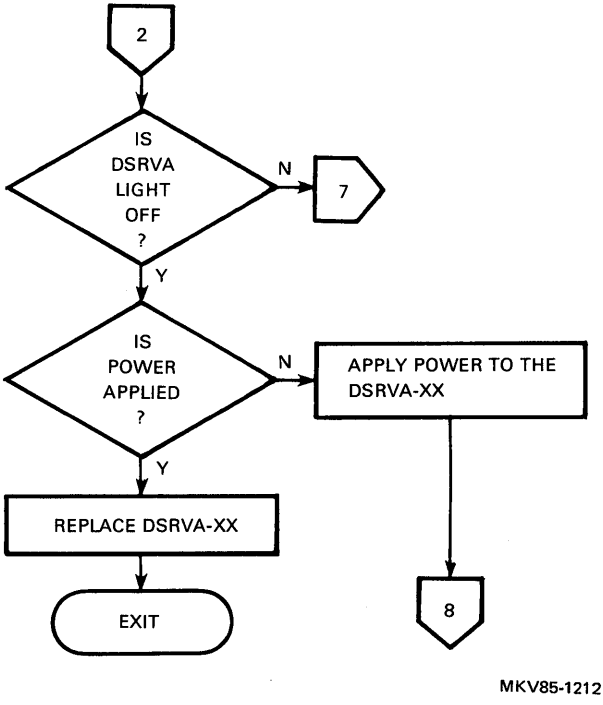


Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 5 of 12)

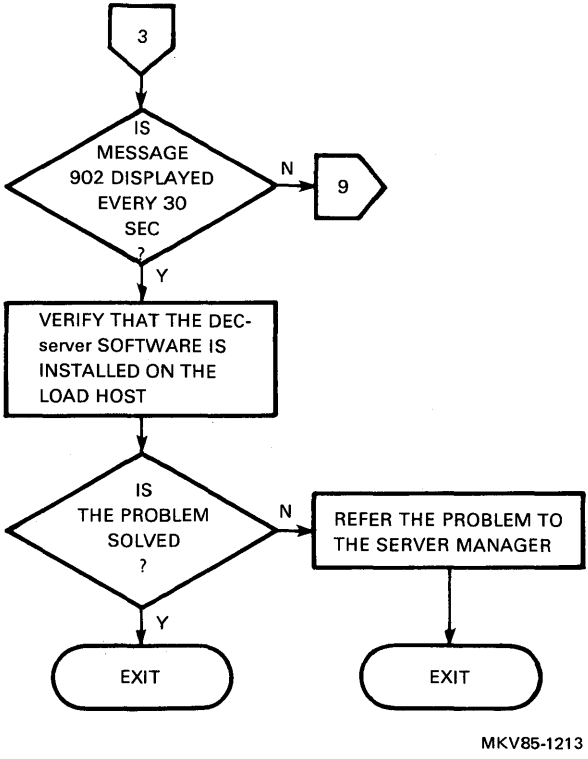
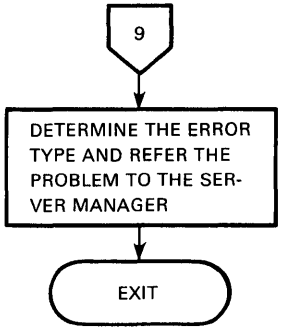


Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 6 of 12)



IV. *(SEE BELOW)*

IV. ONE OR MORE OF THE FOLLOWING ERROR MESSAGES MAY BE DISPLAYED:

LOCAL -905- WAITING FOR IMAGE DUMP
LOCAL -906- DUMPING TO HOST *
LOCAL -907- IMAGE DUMP COMPLETE
LOCAL -912- LOAD FAILURE, TIMEOUT
LOCAL -913- FATAL BUGCHECK ** (INDICATES A SYSTEM CRASH)
LOCAL -914- TIMEOUT, DUMP ABORTED
LOCAL -915- TRANSMISSION FAILURE AFTER TEN ATTEMPTS

* HOST ETHERNET HEX ADDRESS IS DISPLAYED
** MEMORY LOCATIONS, ERROR CODES, ETC. ARE DISPLAYED

FOR ADDITIONAL INFORMATION REFER TO THE DECserver 100 TERMINAL SERVER OPERATIONS GUIDE – APPENDIX A

MKV85-1214

Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 7 of 12)

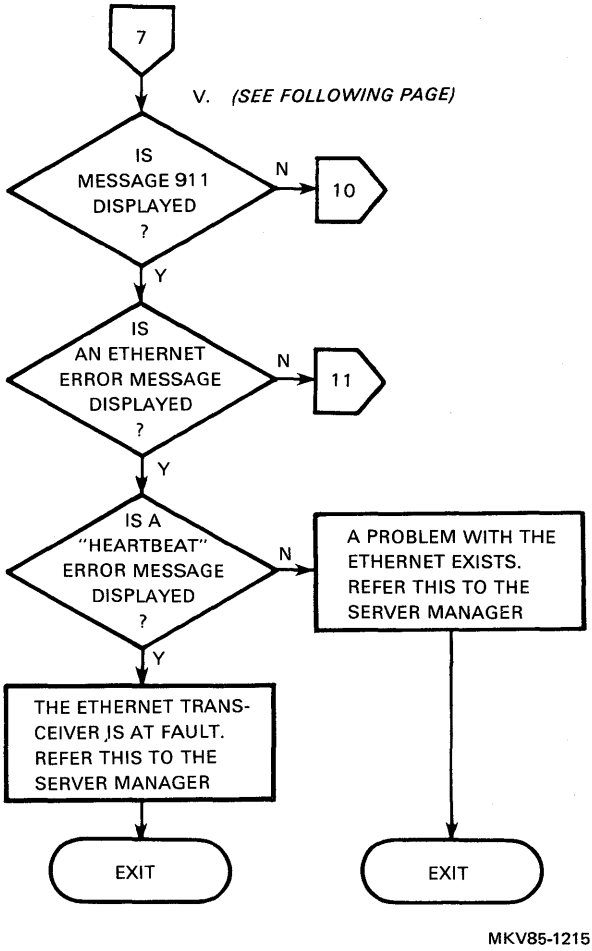


Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 8 of 12)

V. LOCAL -911- WARNING – NONFATAL HARDWARE ERROR DETECTED
SERVER CODE 0000, TERMINAL CODES 00 **

LEFT TO RIGHT SERVER CODES ARE:

- ETHERNET HEARTBEAT ERROR
- ETHERNET LOOPBACK ERROR
- DIAGNOSTIC NVRAM CHECKSUM ERROR
- SERVER PARAMETERS CHECKSUM ERROR

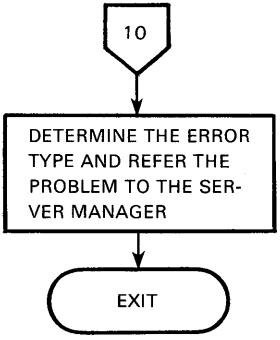
LEFT TO RIGHT TERMINAL CODE IS:

- TERMINAL PORT ERROR
- TERMINAL PARAMETERS CHECKSUM ERROR

** CODES FOR THE REMAINING TERMINALS

MKV85-1216

Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 9 of 12)



VI. *(SEE BELOW)*

VI. LOCAL -905- WAITING FOR IMAGE DUMP
LOCAL -906- DUMPING TO HOST *
LOCAL -907- IMAGE DUMP COMPLETE
LOCAL -912- LOAD FAILURE, TIMEOUT
LOCAL -913- FATAL BUGCHECK ** (INDICATES A SYSTEM CRASH)
LOCAL -914- TIMEOUT, DUMP ABORTED
LOCAL -915- TRANSMISSION FAILURE AFTER TEN ATTEMPTS

* HOST ETHERNET HEX ADDRESS IS DISPLAYED
** MEMORY LOCATIONS, ERROR CODES, ETC. ARE DISPLAYED

FOR ADDITIONAL INFORMATION REFER TO THE DECserver 100 TERMINAL SERVER OPERATIONS GUIDE – APPENDIX A

MKV85-1217

Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 10 of 12)

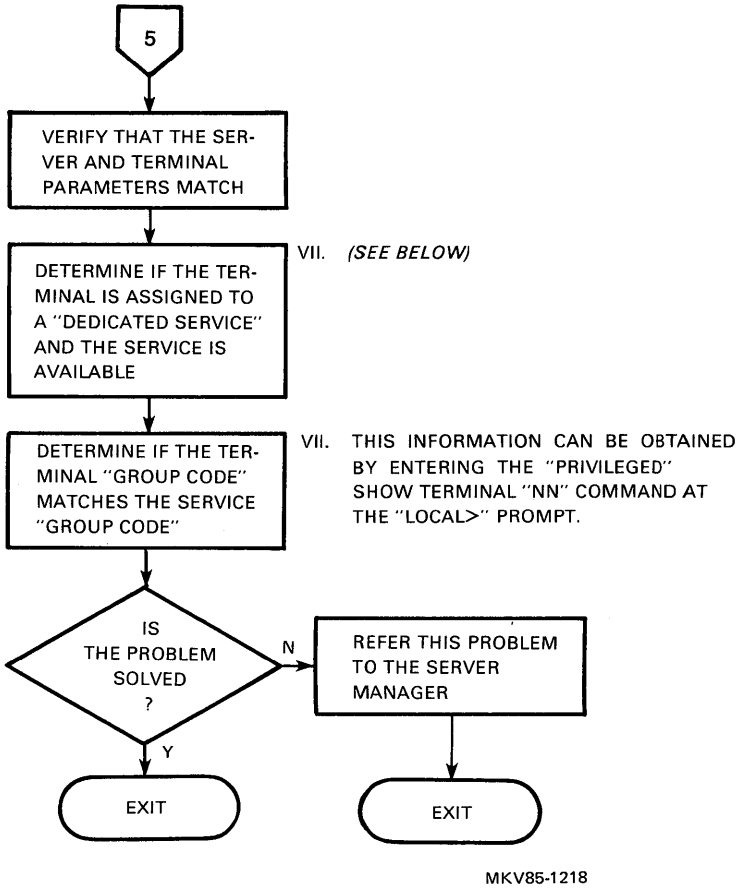


Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 11 of 12)

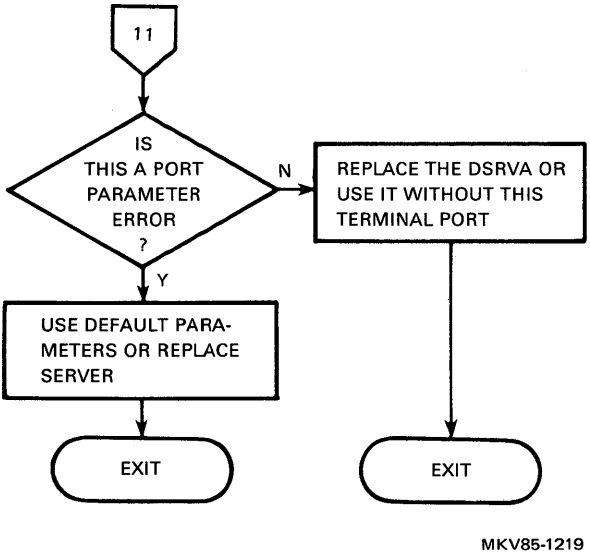
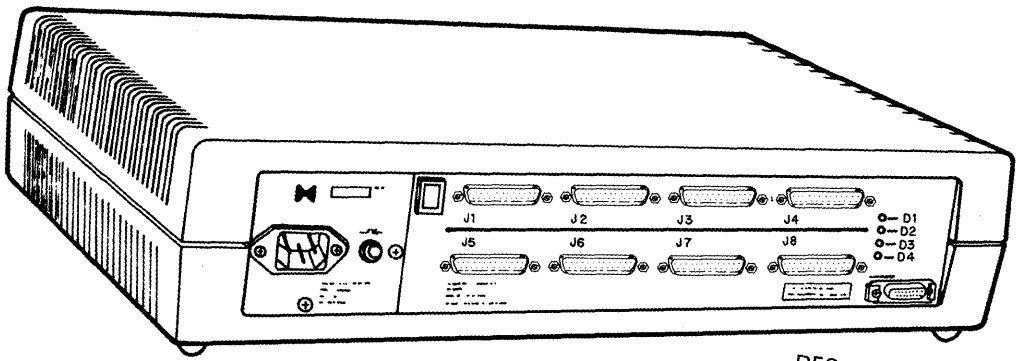


Figure 5 DECserver 100 Troubleshooting Flow Diagram (Sheet 12 of 12)

General Description

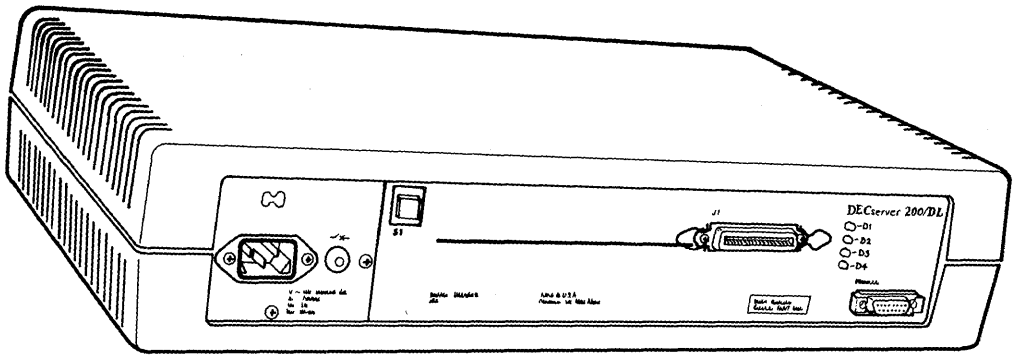
The DECserver 200 asynchronous terminal server connects up to eight terminals, printers, modems, an computers to an Ethernet Local Area Network (LAN).

The DECserver 200 allows any combination of eight locally attached devices access to each other and to remote computer systems on a LAN. Each device is logically connected to the network.



DECserver 200/MC

(DSRVB-Ax)



DECserver 200/DL

(DSRVB-Bx)

Figure 1 DECserver 200 Terminal Server

MKV87-1266

DECserver 200 Versions

The server is available in two versions (DSRVB-Ax and DSRVB-Bx).

- DSRVB-Ax DECserver 200/MC supports RS-232-C connections with full modem control (MC).
- DSRVB-Bx DECserver 200/DL supports devices that require data-leads (DL) only for operation.

NOTE

The letter "A" or "B" replaces the "x" in the model designation to represent the following voltage requirements.

Model	Input Voltages
DSRVB-AA	100 - 120 Vac
DSRVB-AB	220 - 240 Vac
DSRVB-BA	100 - 120 Vac
DSRVB-BB	220 - 240 Vac

Product Configuration

The DECserver 200 terminal server can be connected directly to an Ethernet network via an H4000 Ethernet transceiver or it can be connected to either a DELNI unit or Etherjack connector box.

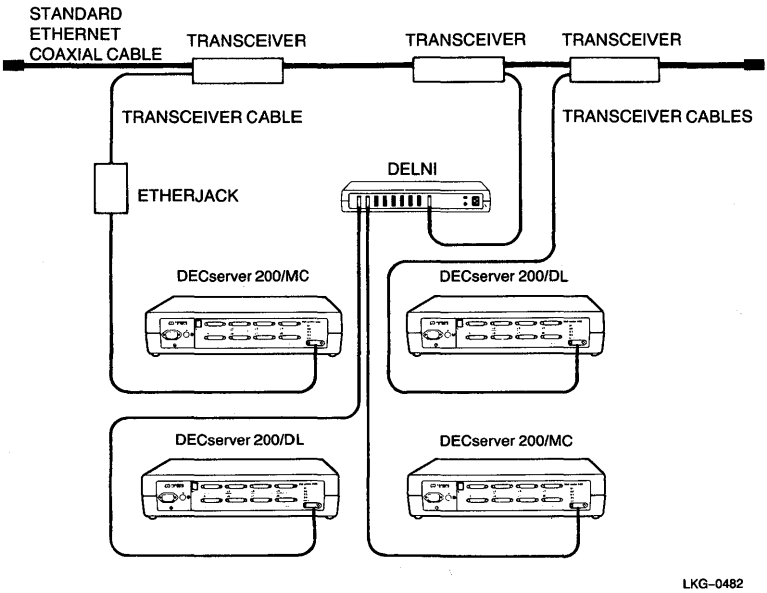


Figure 2 Standard Ethernet Connections

The DECserver 200 terminal server can also be connected to a ThinWire Ethernet network via a DIGITAL Ethernet Station Adapter (DESTA) or it can be connected to either a DELNI unit or Etherjack connector box.

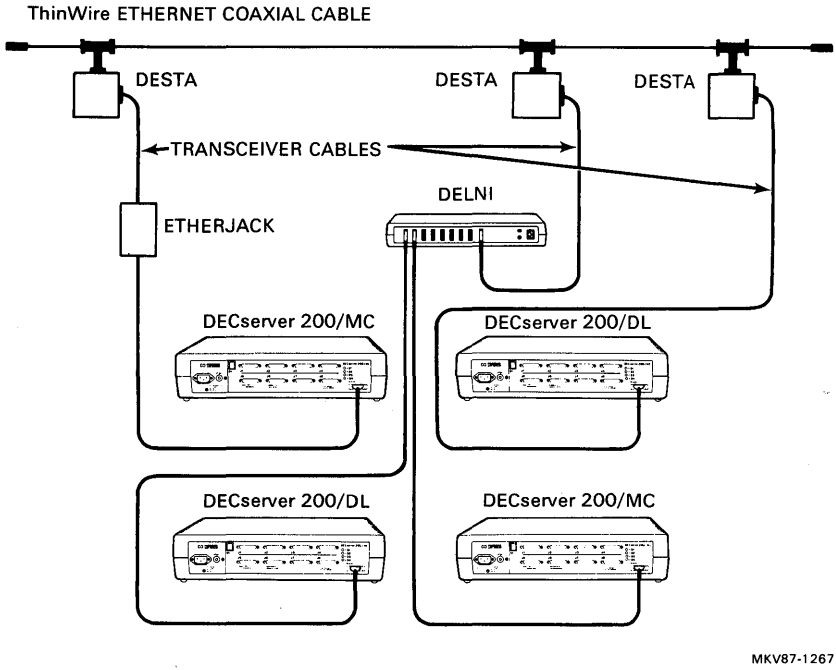


Figure 3 ThinWire Ethernet Connections

Reference Documentation
Refer to the following documents for more information on the DECserver 200 terminal server:

- *DECserver 200 Technical Manual*
- *DECserver 200 Software Installation Manual*
- *DECserver 200 Management Guide*
- *DECserver 200 User's Guide*
- *DECserver 200 User's Reference Card*
- *DECserver 200 Identification Card*
- *Terminal Server Commands and Messages Guide*
- *LATplus/VMS Service Node Management Guide*

Software Components
The basic software that is required for the installation and operation of the DECserver 200 includes:

- DECserver 200 distribution software to be installed on each load host.
- DECnet Phase IV software to be installed on each load host (not required for ULTRIX systems).
- LAT service node software to be installed on all LAT service nodes that communicate with the DECserver 200 devices.

The distribution software must be installed on a load host that runs DECnet Phase IV software. The distribution includes an image file that is down-line loaded to the DECserver 200.

LAT (Local Area Transport) software must be installed on each node using devices connected to the DECserver 200.

LAT software packaging is OS (operating system) dependent.

- **VAX/VMS or MicroVMS OS Version 4.2 or later** – LATplus/VMS is contained in the DECserver 200 software kit.
- **ULTRIX-32/32M OS** – LAT service node software included in the OS.
- **RSX-11-PLUS or Micro/RSX OS** – LAT software included with DECnet-RSX software.
- **TOPS-10 or TOPS-20 OS** – LAT software included with OS.

Preinstallation Checklist
Verify that the following items are installed or ready to be installed:

Hardware

- The appropriate network interface (that is; Ethernet junction box, DELNI, DESTA, or Ethernet transceiver, and so on). See Product Configuration section.
- Transceiver cabling (installed, tested, and tagged). See Cabling section.
- All devices and cables that connect to the DECserver 200. A terminal or personal computer (in the terminal emulation mode) is available for installation verification as per the *DECserver 200 Software Installation Guide.* See Cabling section.
- The H039 wall/partition mounting bracket kit or H041-AA rack mount kit if required.

Software

- DECserver 200 ID card complete and given to the system/network manager. See Arranging for Software Installation section.
- Distribution software installed on the load host(s). See Software Components section.
- DECnet Phase 4 software installed as required.
- LAT service node software installed as required.

Environment

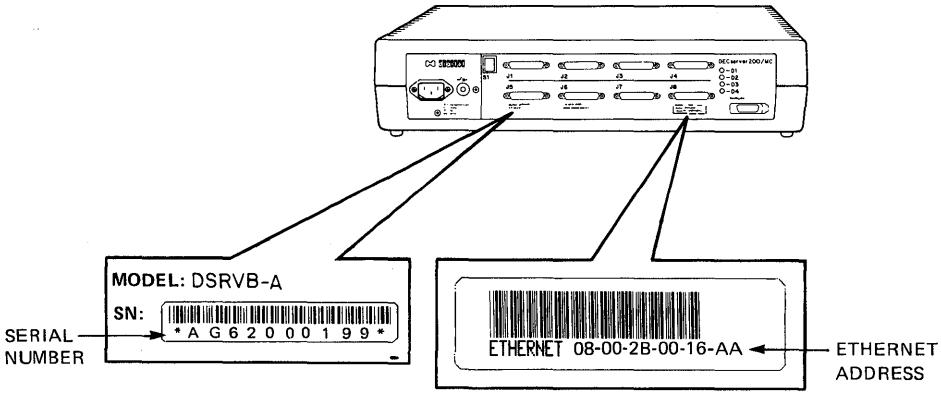
- Verify that power requirements and DECserver 200 voltage select switch setting is correct (100 – 120 Vac or 220 – 240 Vac).
- Verify that operating temperature 5° to 50°C (41° to 122°F); humidity 10% to 95%; and altitude 2.4 km (8000 ft) requirements are met.

Service

- Optional service contracts are in place if requested.

Arranging for Software Installation

- Fill out the *DECserver 200 Terminal Server Identification Card* – Order Number EK-D200T-ID-001 (see Figure 4).
- Give the ID card and any software to the appropriate manager (systems/network manager).
- Label the terminal cables based on the location information from the appropriate manager.
- Connect and power-up a terminal to port number one. Configure the console terminal for 9600 bits/s, no parity, and 8-bit characters.



DECserver 200 Identification Card

The serial number and Ethernet address uniquely identify your DECserver 200 hardware unit. Please copy the information from your hardware unit onto this card. Include your name, the date of installation, and the location (for example, office number, building, floor) of the hardware unit. You should then give this card to your system/network manager at the same time as you hand over the software carton.

Serial number | A | G | | | | | | | | |

Ethernet address | | | - | | | - | | | - | | | - | | | - | | | - | | |

Location _____

Your name _____ Date ____ /____/_____

MKV87-1269

Figure 4 DECserver 200 Identification Card

Installation Flow Diagram

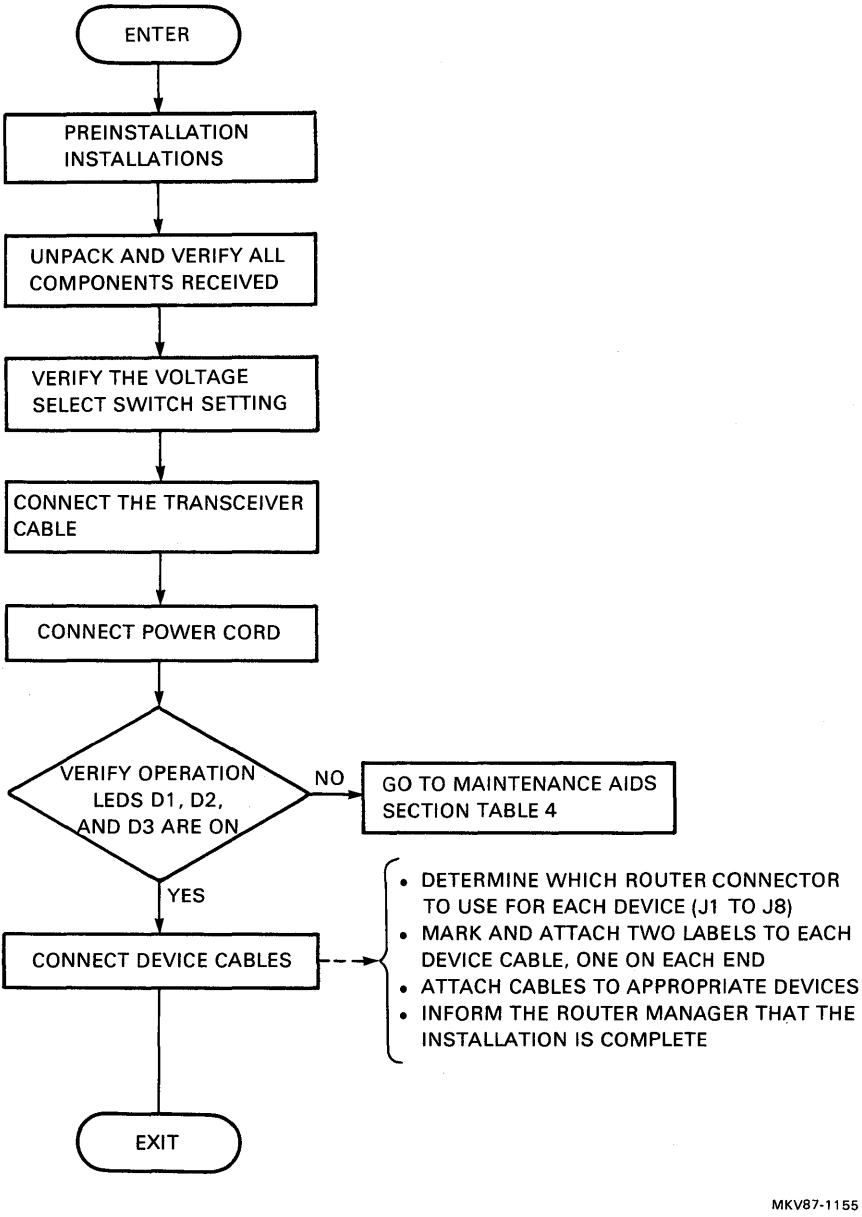


Figure 5 DECserver 200 Installation Flow Diagram

Verifying Operation

Proper operation of the server is verified by the status of the four LEDs on the server's control/indicator panel.

Whenever power is applied to the unit, the server performs diagnostic self-test and indicates a request for a down-line load of the server image from the load host. The server self-test normally takes about 20 seconds to complete, but the down-line loading of the server image could take longer if the network is busy. Allow up to two minutes for the self-test and down-line loading of the server image to complete. The D2 status LED will be ON indicating successful completion of self-test. Refer to the Diagnostic and Maintenance Aids sections for more information.

Maximum Cable Length
The maximum cable length from transceiver to server for the following cables is:

- BNE3X-xx = 50 m (164 ft)
- BNE4X-xx = 12.5 m (41 ft)

Table 1 Loopback Connectors for DECserver 200/MC or 200/DL

Part Number	Type	MC	DL
12-22196-01	Ethernet	X	X
12-15336-08	Port	X	
H3101	Port		X
H3103	MMJ*	X	Optional**

*Used with H3104 cable concentrator.
**Not supplied with DECserver 200.

DECserver 200/MC

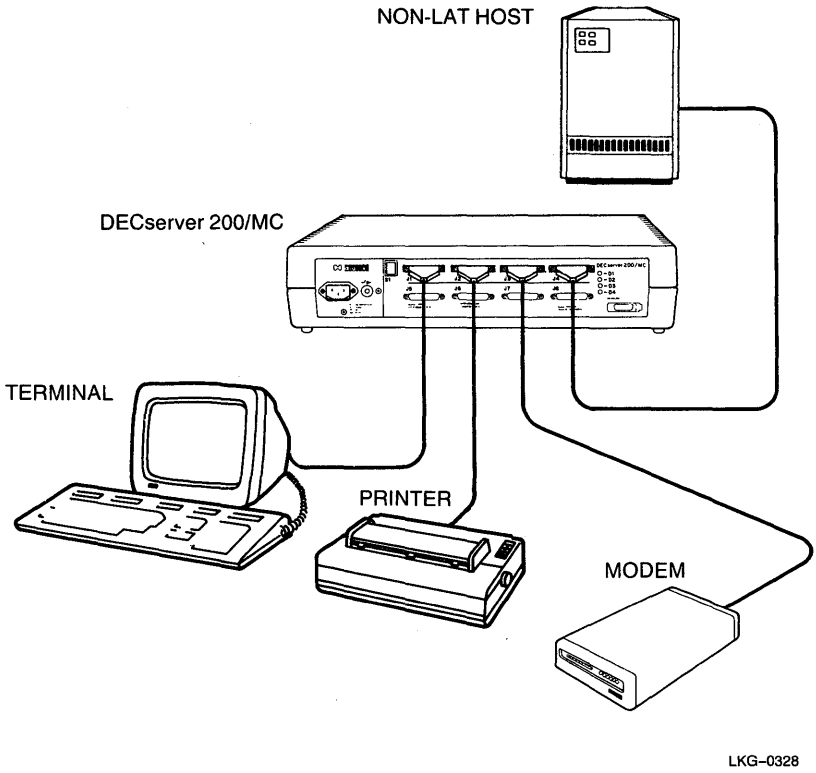


Figure 6 Connecting Port Devices to the DECserver 200/MC

Table 2 Device Cables

Cable Type	Description	For Connecting
BC22D	Null modem cable	Printers, terminals, and personal computers that *are not* utilizing modem control signals for operation.
BC22R*	Null modem cable	Printers, terminals, and personal computers that *are* utilizing modem control signals for operation.
BC22E or BC22F	Modem cable	Dial-in or dial-out modems.

*Recommended for devices that use full modem control signals.

DECserver 200/DL

Table 3 H3104-B DECserver 200/DL Adapter Kit

Part	Item
BC16C-10	10-foot, 36-conductor cable.
H3103	MMJ loopback connector.
H3104	Cable connector that has eight 6-pin modified modular jacks which accept BC16E-xx DIGITAL office cables.

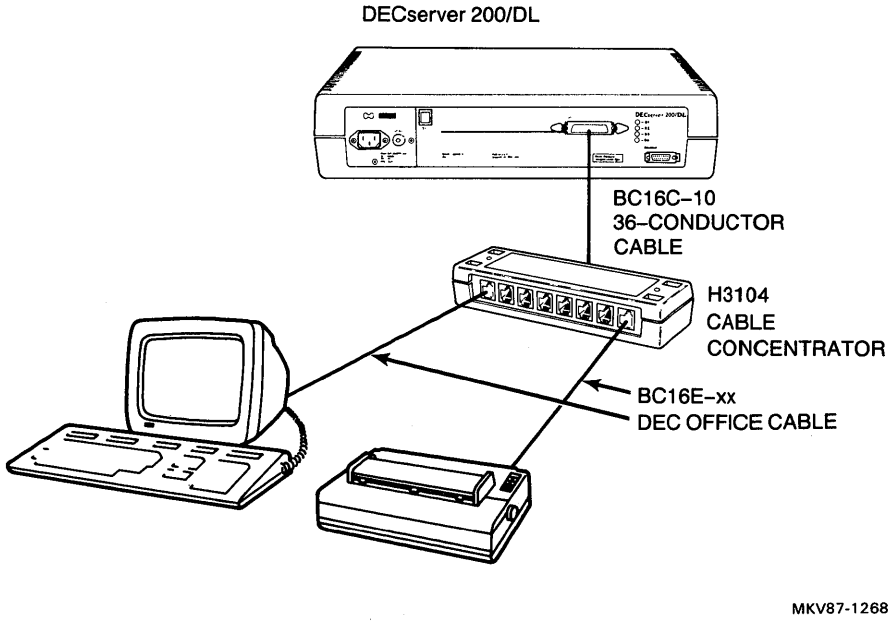
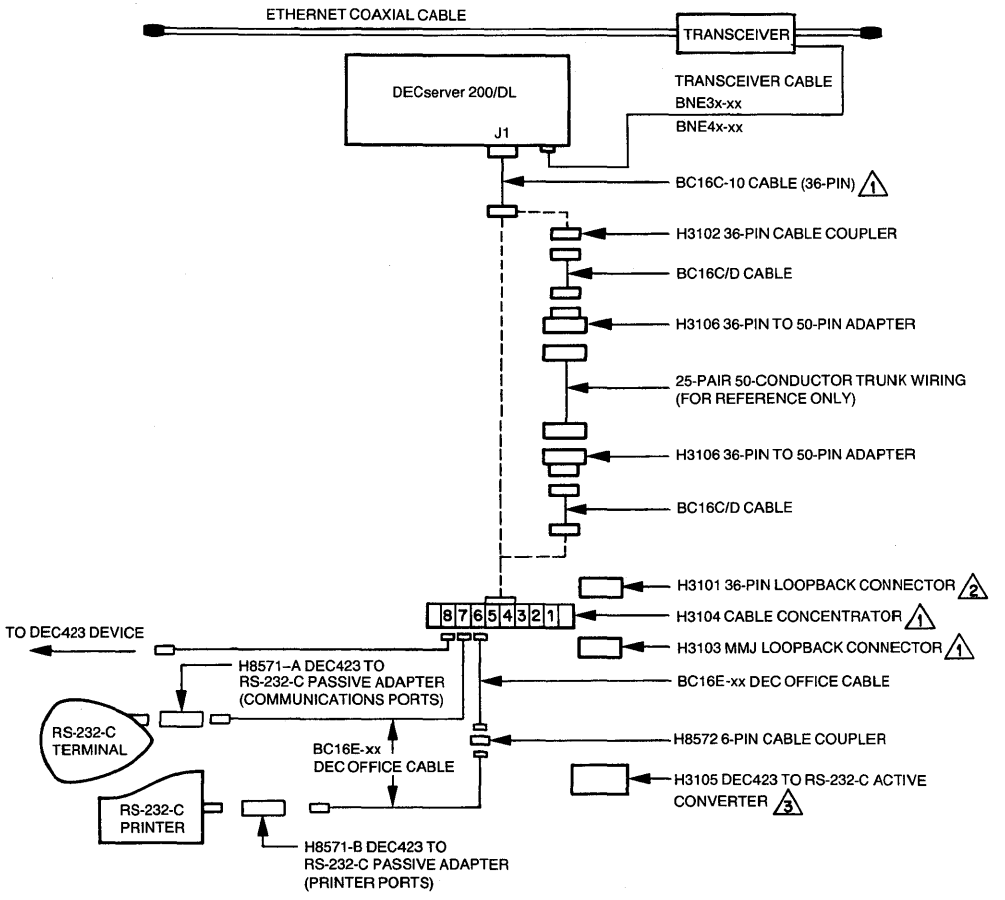


Figure 7 DECserver 200/DL Cabling (Sheet 1 of 2)



ALSO AVAILABLE (NOT SHOWN):

- H8240 50-FOOT SPOOL OF UNTERMINATED BC16E CABLE FOR CUSTOM WIRING APPLICATIONS.
- H8241 CRIMPING TOOL FOR ATTACHING MMJs TO UNTERMINATED BC16E CABLES.
- H8220 PACKAGE OF 50 MMJ CONNECTORS USED WITH THE H8241 CRIMPING TOOL TO TERMINATE CUSTOM CABLE LENGTHS FROM H8240 SPOOL.

1 PART OF H3104-B DECserver 200/DL ADAPTER KIT.

2 SHIPPED WITH EACH DECserver 200/DL UNIT.

3 DEPENDING ON THE DATA SIGNAL RATES AND CABLE LENGTH, SOME APPLICATIONS MAY REQUIRE THE USE OF THE H3105 DEC423 TO RS-232-C ACTIVE CONVERTER. SEE YOUR DIGITAL SALES REPRESENTATIVE FOR MORE INFORMATION.

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Figure 7 DECserver 200/DL Cabling (Sheet 2 of 2)

Diagnostics

The DECserver 200 diagnostic self-test performs a number of DECserver 200 hardware tests. The self-test executes (and a down-line load occurs) whenever the DECserver initializes. The DECserver can be initialized in a number of ways:

- By powering up the server,
- By executing the INITIALIZE command,
- By executing a NCP LOAD command on a DECnet load host, and
- By pressing <CTRL/P> if there was an error that prevented down-line loading during the most recent self-test.

The D2 status LED on the control/indicator panel displays the results of the self-test.

- If it remains OFF after the self-test, there is a *fatal* error.
- If it blinks, there is a *nonfatal* error. For nonfatal hardware errors, an error message appears on a terminal attached to the console port.
- If it glows, the self-test detected *no* hardware errors.

Table 4 Status LEDs

LED Name	Name Definition	State	Indications
D1	Power ON/OFF	ON*	DC voltages correct.
		OFF	DC voltages incorrect (see NOTE).
D2	Diagnostic	ON	Passed self-test.
		OFF	Fatal error (see NOTE).
		Blinking	Nonfatal error.
D3	Software	ON*	Server image file successfully loaded.
		OFF	Down-line load in progress.
		Blinking	Multiple load failure.
D4	Network activity	ANY STATE*	Network active.
		OFF	Network inactive.

NOTE
Remove and replace the DECserver 200.

IMPORTANT
Allow two minutes for power-up diagnostic and down-line loading (DLL) to complete. All LEDs light for one second at power-on (lamp-test) time.

*Indicates normal condition after the two minute power-up diagnostic and DLL have completed.

DECserver 200 Fault Conditions

D1 LED OFF – Power is not reaching DECserver 200.

- Ensure that the voltage select switch is set to the correct voltage.
- Secure the power cable at the server and at the wall outlet.
- Check the wall outlet using another appliance or light, or plug the server power cord into another outlet. If no power is available, check the wall outlet's circuit breaker.
- Determine if the server circuit breaker has tripped. If it has, reset the circuit breaker. If the breaker trips more than once, replace the server.
- Replace a defective power cord with a new cord.

D2 LED OFF – Fatal error or test is in progress. If D2 remains OFF for more than 20 seconds after the D1 LED goes ON, there is a fatal hardware error. There is no corrective procedure for this problem.

D2 LED Blinking – If the D2 LED is blinking after power-up, the server has detected a nonfatal hardware error during self-test. The following sections list the errors that occur in conjunction with the D2 LED blinking on your display.

Error Messages 920 and 921

Local -920- parameter checksum error on port n
Local -921- factory-set parameters applied to port n

These messages indicate a port checksum error. The permanent characteristics for the indicated port do not pass the internal checksum test. The factory-set defaults are in effect.

1. Enter the DEFINE PORT command to reset the port characteristics to values of your choice. Then reinitialize the server using the INITIALIZE command, or

2. Reset the server characteristics using the software Reset Switch (S1) on the back of the server. Press and hold the switch IN while removing and reinserting the server power cord.

Error Messages 922 and 923

Local -922- port hardware error on port n
Local -923- port n has been disabled

These messages indicate a port hardware error. There is no corrective procedure for this problem.

Error Messages 930 and 931

Local -930- server parameters checksum error
Local -931- factory-set server parameters applied

The server characteristics in the permanent data base are not operational. The factory-set defaults are operating.

1. Enter the DEFINE SERVER command to reset the port characteristics to values of your choice. Then reinitialize the server using the INITIALIZE command, or

2. Reset the server characteristics using the software Reset Switch (1) on the back of the server. Press and hold the switch IN while removing and reinserting the server power cord. If this action fails to correct the problem, the memory used to store the characteristics is faulty. The server *must be* replaced.

Error Message 932

Local -932- hardware revision level checksum error

The server's nonvolatile memory is faulty. There is no corrective procedure for this problem. The server *must be* replaced.

Error Messages 935 and 936

Local -935- service characteristics checksum error
Local -936- service has been disabled

The service characteristics in the permanent data base are not operational. The factory-set defaults are operating.

1. Enter the DEFINE SERVER command to reset the port characteristics to values of your choice. Then reinitialize the server using the INITIALIZE command, or

2. Reset the server characteristics using the software Reset Switch (1) on the back of the server. Press and hold the switch IN while removing and reinserting the server power cord. If this action fails to correct the problem, the memory used to store the characteristics is faulty. The server *must be* replaced.

Error Messages 941, 942, and 950

Local -941- transceiver loopback error
Local -942- image load not attempted
Local -950- troubleshooting procedures should be followed

These messages indicate that there is a fault between the server and the coaxial cable.

1. Check the transceiver cable that runs from the server to the transceiver, to the DELNI, or to the Etherjack. Ensure that there is a secure connection at both ends of the cable. Check the cable for damage. If damaged, replace the cable.

2. If the above action does not correct the problem:

   a. Disconnect the transceiver cable from the server.

   b. Plug the Ethernet loopback connector into the Ethernet connector on the server.

   c. Initialize the server by pressing <CTRL/P> on the console terminal, or by unplugging and reinserting the server's power cord.

   d. Wait 20 seconds for the diagnostic test to complete, then observe the status of the D2 LED:

      (1) If the D2 LED continues to blink and the error messages reappear after the self-test, the server is faulty and must be replaced.

      (2) If the D2 LED stays ON, proceed to the next step to isolate and determine the faulty unit.

   e. Unplug the Ethernet loopback connector from the Ethernet connector on the server.

   f. Reconnect the transceiver cable to the Ethernet connector on the server.

   g. Disconnect the other end of the transceiver cable from the DELNI, from the Etherjack, or from the transceiver on the Ethernet coaxial cable.

   h. Plug the Ethernet loopback connector into the transceiver cable.

i. Initialize the server by pressing <CTRL/P> on the console terminal, or by unplugging and reinserting the server's power cord. Wait 20 seconds for the self-test to complete.

(1) If the D2 LED continues to blink, the transceiver is faulty and must be replaced.

(2) If the D2 LED stays ON, the faulty unit is the device the transceiver cable was connected to (the DELNI, the Etherjack extension, the transceiver, or the Ethernet tap for the transceiver).

If the above procedures do not correct the problem, the transceiver unit or transceiver Ethernet tap is faulty. Remove and reinstall the transceiver in a new location. Initialize by pressing <CTRL/P> on the console terminal, or by unplugging and reinserting the server's power cord. If the D2 LED stays ON, the new Ethernet tap is working and the DECserver 200 will function properly. If the error messages persist, the transceiver is probably faulty. Replace the transceiver.

Error Messages 943 and 944

Local -943- transceiver heartbeat error
Local -944- check transceiver type for heartbeat support

These messages indicate that a heartbeat signal was not detected by self-test. This does not cause the D2 LED to blink.

1. The transceiver is an 802.3 compatible transceiver or a non-DIGITAL transceiver that was made to conform to the Ethernet Version 1.0 specification. The signal is used in all DIGITAL Ethernet transceivers. If this condition occurs on a DIGITAL transceiver or a DELNI, there may be a problem with the transceiver.

2. If a non-DIGITAL (or 802.3) transceiver is being used, disable the server heartbeat detection ability by defining the server characteristic (HEARTBEAT) as DISABLED>. Enter the DEFINE/ST SERVER HEARTBEAT DISABLED commands.

If the above procedures do not correct the problem, there is a transceiver or transceiver cable problem.

No Messages on Console Terminal

- The port to which the terminal is physically connected is not defined as the console port.
- The console terminal is faulty.
- The internal characteristics for the console terminal are not set up correctly.

D3 LED Blinking – Perform the following steps before proceeding with problem analysis:

- Connect a terminal to port one.
- Configure the terminal for 9600 bits/s, 8-bit character size, and no parity.
- Press <CTRL/P> on the terminal. <CTRL/P> restarts the DECserver 200 self-test and DLL.
- Terminal will display messages.

Down-Line Load Starts and Then Fails

The following messages appear on the console terminal at various intervals:

Local -902- waiting for image to load
Local -903- loading from host *host-address*
Local -912- load failure, timeout

The load host does not contain a node data base for the server, or the load host does not contain the proper node information.

Copy the error message exactly as it appears on the console terminal display and notify the server manager.

Down-Line Load Does Not Start

The following messages appear on the console terminal at various intervals:

Local -902- waiting for image to load
Local -912- load failure, timeout

Copy the error message exactly as it appears on the console terminal display and notify the server manager.

900-999 Console Messages – Messages in this section appear under one of the following circumstances:

- When the INITIALIZE command is entered
- When the server is powered up
- When a fatal error occurs

These messages appear only on the console port device. Message codes are always enabled for the console port device.

Nonfatal Error messages

Message Number 911 Appears

Local -911- Warning – Nonfatal hardware error detected server code XXXX, terminal codes nn nn nn nn nn nn nn nn

XXXX Service Code Indication
1000 Ethernet heartbeat error
0100 Ethernet loopback error
0010 ECO/LANCE checksum error
0001 Server parameter checksum error.

Terminal codes [each nn indicates one of eight terminals]:

nn	Terminal Code Indication
10	Terminal port error
01	Terminal parameter checksum error
00	NO ERROR AT PORT

Message Number 913 Appears

If message number 913 appears on the console port terminal, it means that the DECserver 200 detected an internal fatal error (fatal bugcheck).

A software problem, or bug, is likely to cause only an intermittent fatal bugcheck on the DECserver 200. The unit may operate for a period of time, and then fail. If there is more than one server on the Ethernet, the problem may affect all units.

If the fatal error was a hardware error, the problem is probably isolated to one DECserver. The hardware problem may be intermittent and only affect the unit occasionally.

Fatal Bugcheck Error Message

Local -913- Fatal Bugcheck PC=XXX, SP=XXX, SR=XXX, MEM=XXX, CODE=XXX

PC = Contents of Program Counter
SP = Contents of Stack Pointer
SR = Contents of Status Register
MEM= The illegal memory address of an addressing error or the address of the instruction that caused the error.

CODE = The reason for the failure

Code 002 to 00C	CPU exceptions. CPU communication and instruction errors.
Code 011 to 032	Self-test bugchecks – Program ROM. Errors when mapping ROM.
Code 101 to 1FF	ROM code detected errors during DLL or dump.
Code 200 to 300	System crash error codes.
Code 100	Memory parity error.
Code 400	Hardware watchdog timer expired.

For additional information, see the DECserver 200 Crash Code List section.

DECserver 200 Crash Code List –

*** 68000 exceptions

002 Bus Error
003 Odd Address Error
004 Illegal Instruction
005 Zero Divide
006 CHK Instruction
007 TRAPV Instruction
008 Privilege Violation
009 Trace
00A Line 1010 Emulator
00B Line 1111 Emulator
00C Other Exception

*** ROM code detected crash codes

101 – 1FF These should never appear while software is running; only during down-line load and up-line dump.

*** Software detected crash codes

FE_CHK	EQU	$200	Code Checksum Error (Code Corruption)
FE_MERR	EQU	$211	Port Hardware Memory Error
FE_INIT	EQU	$212	Port Initialization Timeout Error
FE_RBUFF	EQU	$213	Port Receive Buffer Error
FE_XBUFF	EQU	$214	Port Transmit Buffer Error
FE_STK	EQU	$215	Stack Value Error
FE_ULNK	EQU	$216	Unlink Error
FE_DELOC	EQU	$217	Deallocate Error
FE_XCBAL	EQU	$218	Unable to allocate XCB
FE_CMD	EQU	$219	Command Completion Error
FE_LOUT	EQU	$220	Local Output Completion Error
FE_NVR	EQU	$221	NV_RAM Write Block Error
FE_OUTQ	EQU	$222	Entry on output queue with no slots
FE_XMT	EQU	$223	Transmit too long
FE_STS	EQU	$224	Cannot find status
FE_CCB	EQU	$225	Ran out of CCBs
FE_ALLOC	EQU	$226	Allocation Error
FE_OUTS	EQU	$227	Illegal local output state
FE_HSB	EQU	$228	Host service block with no NCBs found
FE_DUP	EQU	$229	Duplicate service/node names processed
FE_IMAXC	EQU	$230	T_IMAXC out of range crash
FE_NOCB	EQU	$231	No node counter block when counter incremented
FE_ASB	EQU	$232	No NCB pointer in ASB
FE_EXSE	EQU	$251	Existing session on reverse port
FE_RXSLF	EQU	$252	Retransmitted a message to ourself! (IB connects)
FE_XSMSG	EQU	$253	Excess messages to ourself (IB connects)
FE_ISPD	EQU	$260	Invalid speed during table scan
FE_MEVNT	EQU	$261	Nonexistent modem event
FE_MPAR	EQU	$290	Memory parity error detected
FE_USER	EQU	$300	User-initiated crash (via CRASH command)

*** Miscellaneous error codes

100 Memory Parity Error
400 Hardware watchdog timer expired

DECserver 250 ETHERNET BASED SERVER

General Description
The DECserver 250 Ethernet Based Server (Figure 1) is a six-line server. It provides the interface between four asynchronous serial data communications channels and two parallel channels with an Ethernet or IEEE 802.3 local area network.

The DECserver 250 supports:

- RS-232-C connection with full-modem control on port 1
- RS-232-C connection for terminals on port 1
- RS-232-C connections for printers on ports 1 through 4
- Digital Data Products parallel connections for printers on ports 5 and 6

Features
The DECserver 250 offers the following features.

- Permits fast, easy connections between the devices attached locally to the server ports and the remote devices on the network.
- Manages device traffic and leaves computer systems more time for applications tasks.
- Reduces and simplifies cabling required for connecting devices to a network.
- Supports two parallel connected line printers.
- Supports up to four serial connected line printers.
- Supports a dial-in and dial-out modem on port 1.

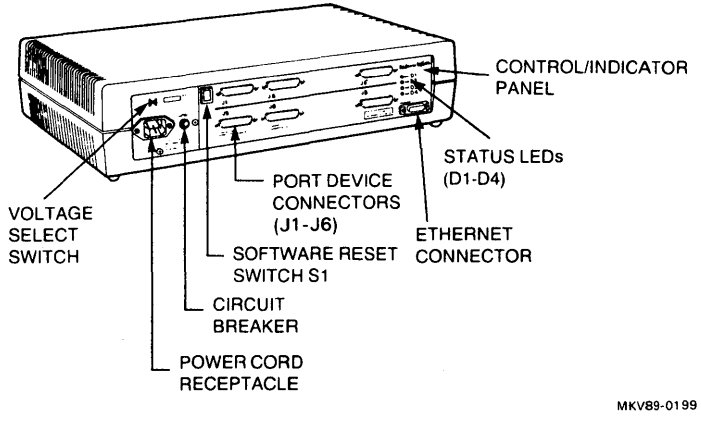

Figure 1 DECserver 250 (Rear View)

DECserver 250 Configuration Rules

There are many different ways to configure the DECserver 250 as long as the transceiver cables, the device cables, and the server power cable do not exceed the maximum length as described in Table 1, and that the following constraints are observed.

1. Maximum length for the transceiver cable cannot exceed 50 m (164 ft). This maximum length may be reduced due to the internal cabling equivalence of a device (such as a DELNI) that is connected between the server and the transceiver, or due to the use of office transceiver cable.

   a. Cabling equivalence is a measure of the internal timing delay of a device, expressed in meters of transceiver cable. This cabling equivalence must be subtracted from the 50-meter maximum. For example; if a device has a 5-meter cable equivalence, then its maximum allowable transceiver cable length is (50 m – 5 m) or 45 meters.

   b. Office transceiver cable (BNE4x-xx), due to its smaller diameter, has a signal loss that is four times that of the BNE3x-xx transceiver cable. Therefore, if office transceiver cable is used, the maximum transceiver cable distance must be divided by 4. This means the maximum office transceiver cable length allowed is 12.5 meters.

   If the configuration includes a device, and the device has any internal cabling equivalence, this should be subtracted from the 50-meter maximum before dividing by 4. For example; if a device has a 10-meter cabling equivalence and is attached to its transceiver using office cable, then the maximum allowable transceiver length is (50 m – 10 m)/4 or 10 meters.

2. When connecting the server to a configuration that includes a DELNI, allow a 5-meter cabling equivalence loss for the DELNI.

3. Maximum allowable lengths for device cables should not exceed guidelines set by RS-232-C (EIA232) specifications. Parallel ports are limited to 9.1 m (30 ft) unless an LLF01 (Long Line Fiber Optic Interface) Fiber Optic Long Line adapter is used.

Table 1 Maximum Cable Lengths

From	To	Maximum Cable Length	Cable Type
Transceiver	Server	50 m (164 ft) See rules 1 & 2	BNE3x-xx* transceiver cable
Transceiver	Server	12.5 m (41 ft) See rules 1 & 2	BNE4x-xx* office transceiver cable
Device	Server	See rule 3	Depends on specific device. See the *DECserver 250 Hardware Installation/Owner's Guide* (EK-D250C-IN)
Wall outlet	Server	1.8 m (6 ft)	Server power cable (included in DSRVP-xx country kit)

*BNE3x-xx transceiver cables and BNE4x-xx office transceiver cables can be interconnected. However, the cable attenuation (signal loss) for the office transceiver cable is greater than that of the BNE3x-xx transceiver cable by a factor of four. For example, 2 m (6.6 ft) of office transceiver cable is electrically equivalent to 8 m (26.2 ft) of BNE3x-xx transceiver cable.

DECserver 250 Versions
The DECserver 250 is available in two versions:

Model	Input Voltage
DSRVP-AA	100-120 Vac
DSRVP-AB	220-240 Vac

Reference Documentation
Refer to the following documents for more information on the DECserver 250 Ethernet server.

Title	Document Number
DECserver 250 Hardware Installation/Owner's Guide	EK-D250C-IN
DECserver 250 Software Installation Guide (VMS)	AA-MH06A-TE
DECserver 250 Software Installation Guide (ULTRIX-32)	AA-MG92A-TE
DECserver 250 Management Guide	AA-MH07A-TE
DECserver 250 Problem Determination Guide	AA-MG96A-TE
DECserver 250 Commands Mini-Reference	AA-NC53A-TE
DECserver 250 Identification Card	EK-D250T-ID
Terminal Server User's Reference Card	AV-HY69S-TK
Terminal Server Commands and Messages Reference	AA-LD83C-TK
DECserver 250 Rackmount Option Installation Guide	EK-DC200-IN

Hardware Components
The following hardware is required for a DECserver 250 installation.

- DECserver 250 Ethernet Server
- Country kit containing:
  - Power cord
  - *DECserver 250 Hardware Installation/Owner's Guide* (EK-D250C-IN)
  - *DECserver 250 Identification Card* (EK-D250T-ID)
  - Blank labels for cables
  - Ethernet loopback connector (12-22196-01)
  - Parallel loopback connector (12-15336-14)
  - Rackmount kit (H041-AA)
- Serial loopback connector (12-15336-08)
- Accessories Box(es)/Bags (The number of accessories boxes or bags depends on the options ordered). Accessories may include:
  - Transceiver cables (straight end or right-angled end connectors)
  - Device cables
  - H4080 turnaround connector
  - Etherjack junction box (DEXJK)
  - Wall/partition mounting bracket kit (H039)

Software Components
DECserver 250 operation requires the following software packages.

- DECserver 250 distribution software – Installed on at least one load host.
- DECnet Phase IV software – Installed on at least one load host.
- LAT service node software – Required on all LAT service nodes that communicate with DECserver 250 devices.

The distribution software must be installed on a load host that runs DECnet Phase IV software. The distribution software includes a server image file that is down-line loaded to the DECserver 250. The server image constitutes the server software that enables the server to perform its functions.

Table 2 Minimum Operating System Version

Operating System	Version
VMS	V4.7
ULTRIX	V2.0

Equipment Placement
The DECserver 250 can be located in a variety of environments, including offices and computer rooms. The DECserver 250 can be rack or wall mounted or placed on a desk or shelf.

Environmental Requirements

Temperature	5° to 50°C (41° to 122°F)
Relative humidity	10% to 95% (noncondensing)

Physical Description

Length	49.3 cm (19.4 in.)
Height	11.75 cm (4.6 in.)
Depth	31.2 cm (12.3 in.)
Weight (unpacked)	5.9 kg (13.0 lbs)

Power Requirements
The operating power range of the DECserver 250 is provided in Table 3.

Table 3 DSRVP Power Requirements

Version	Nominal Voltage	Voltage Range	Current	Frequency
DSRVP-AA	120 Vac	100 - 120 Vac	1.0 A	50/60 Hz
DSRVP-AB	240 Vac	220 - 240 Vac	0.5 A	50/60 Hz

Installation Flow Diagram

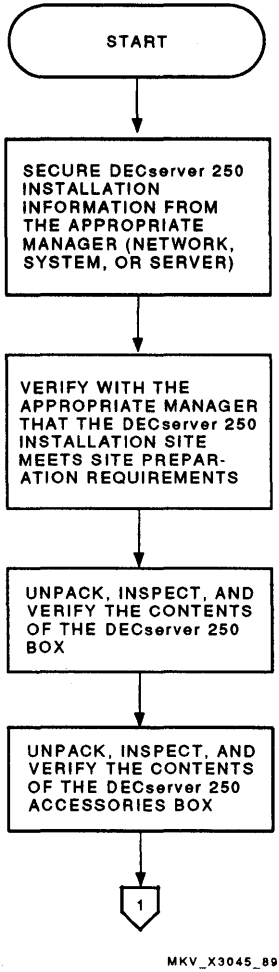

Figure 2 Installation Flow Diagram (Sheet 1 of 4)

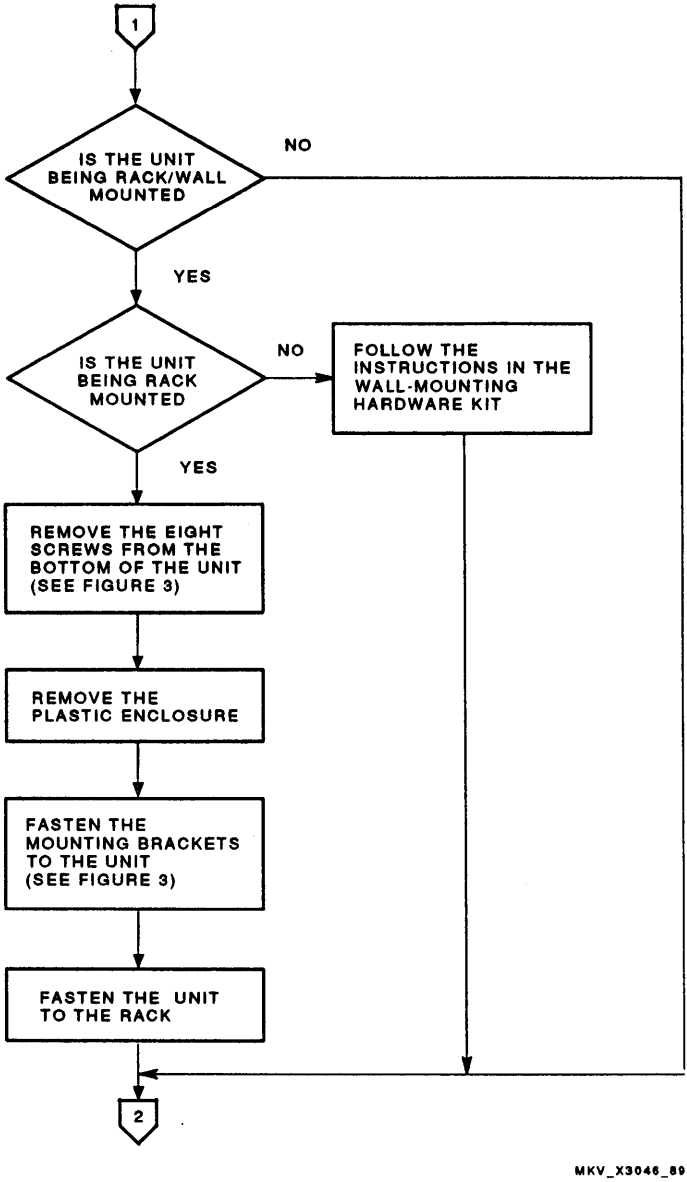

Figure 2 Installation Flow Diagram (Sheet 2 of 4)

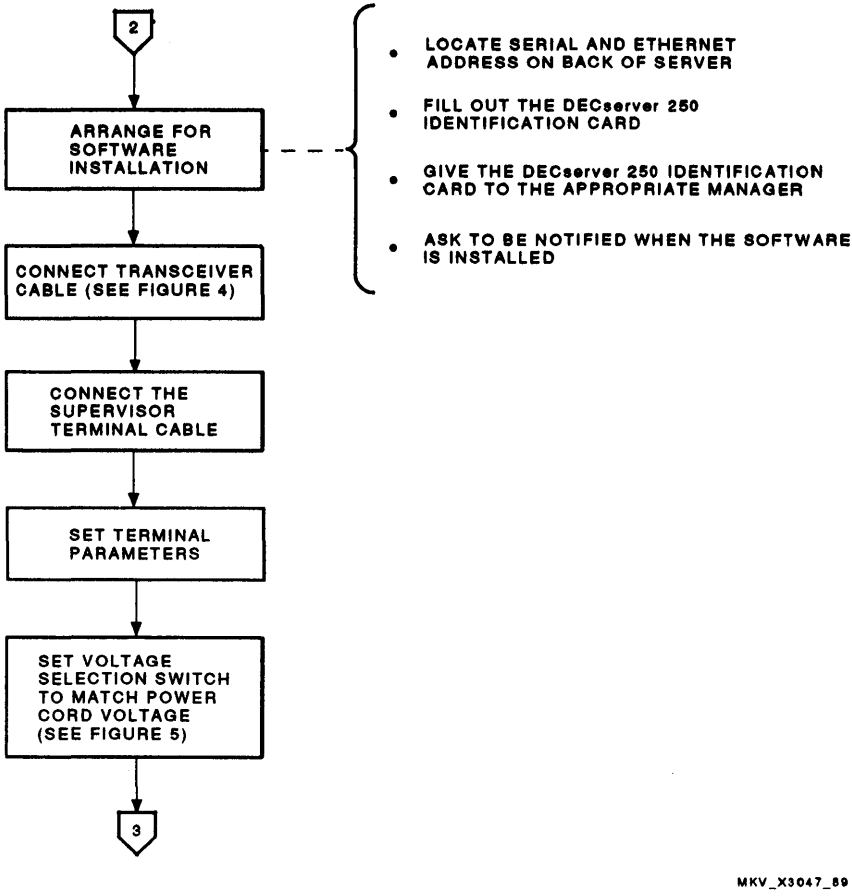

Figure 2 Installation Flow Diagram (Sheet 3 of 4)

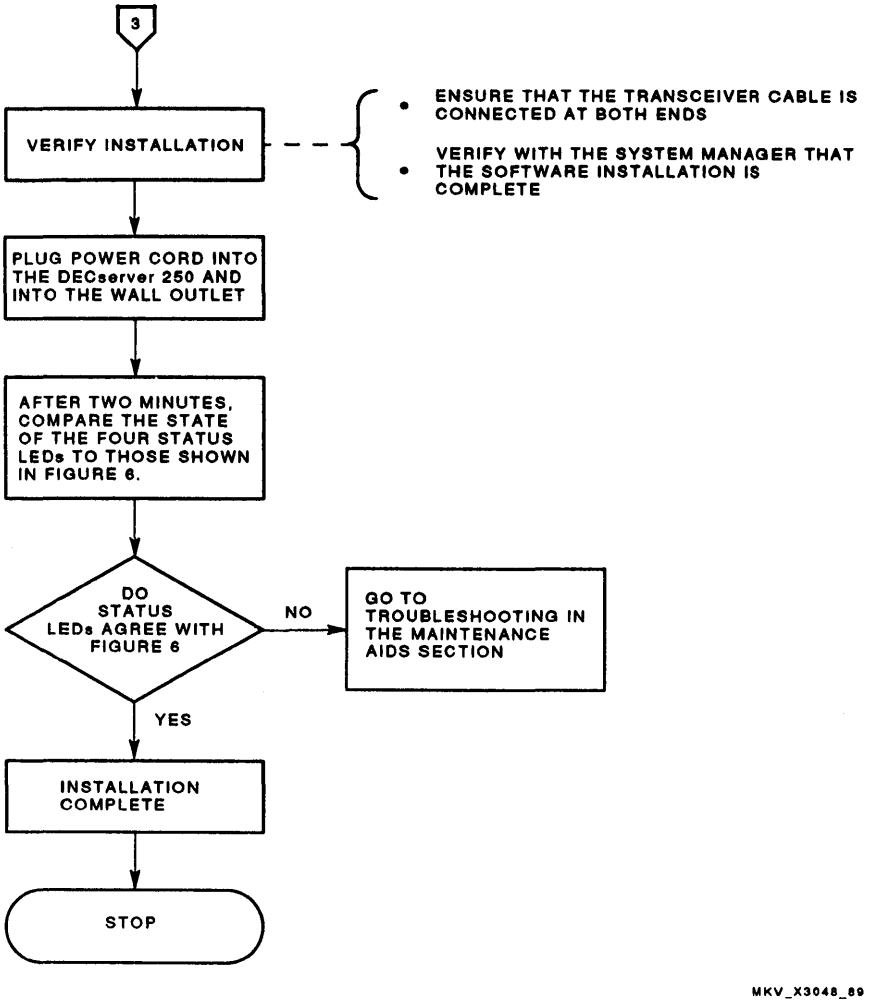

Figure 2 Installation Flow Diagram (Sheet 4 of 4)

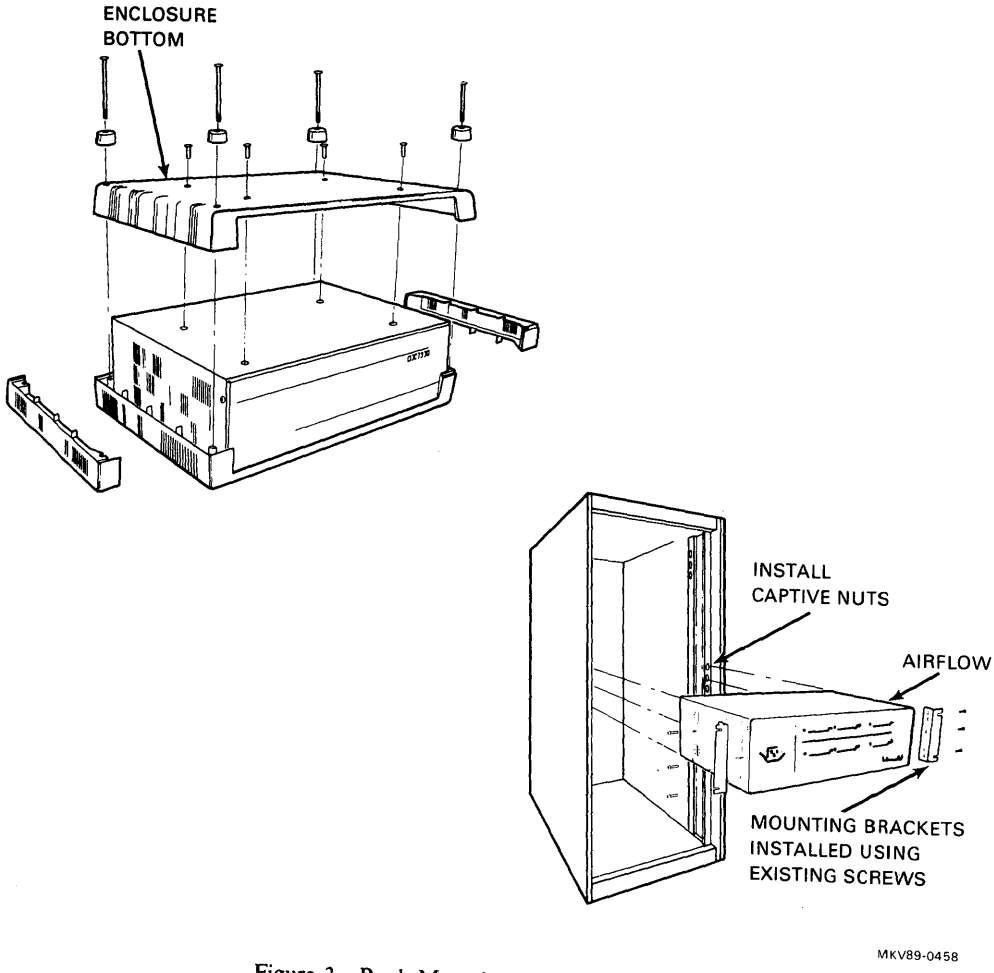

Figure 3 Rack Mounting the DECserver 250

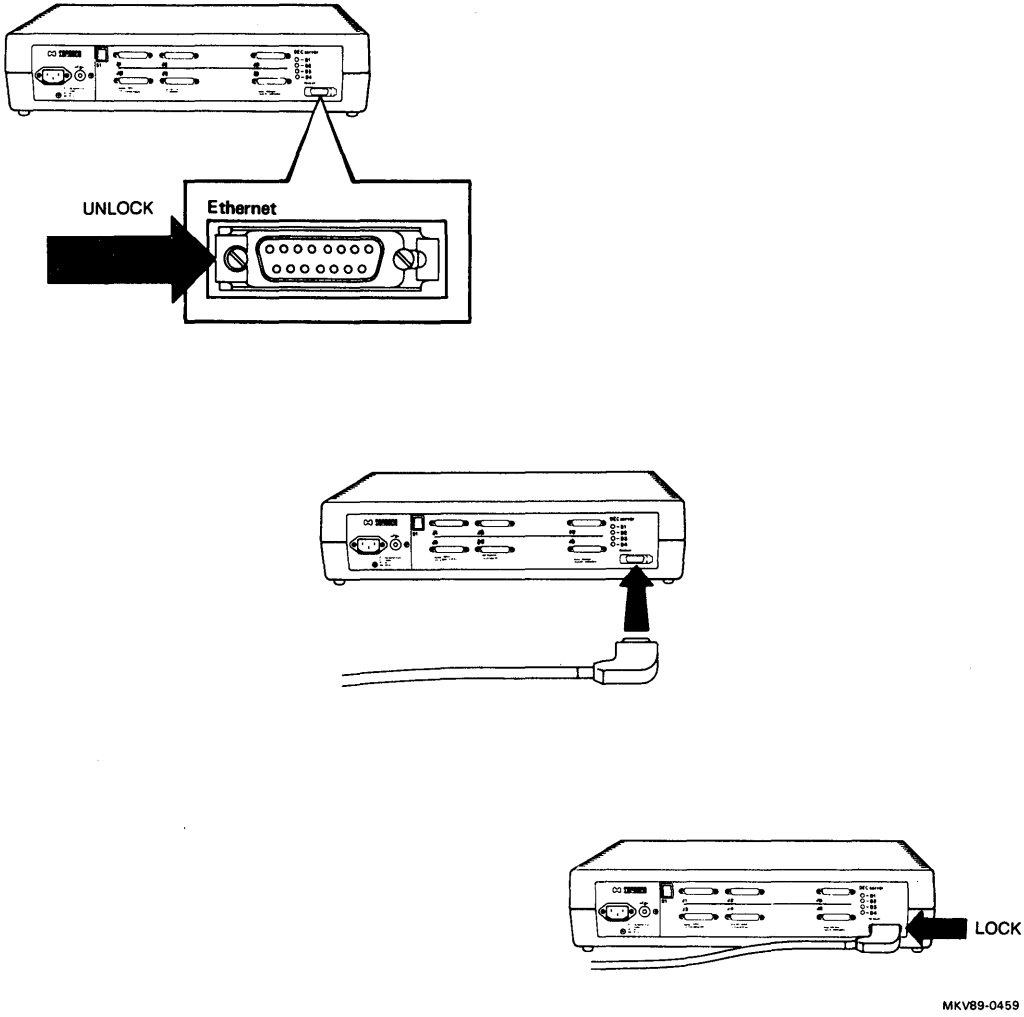

Figure 4 Connecting the Transceiver Cable

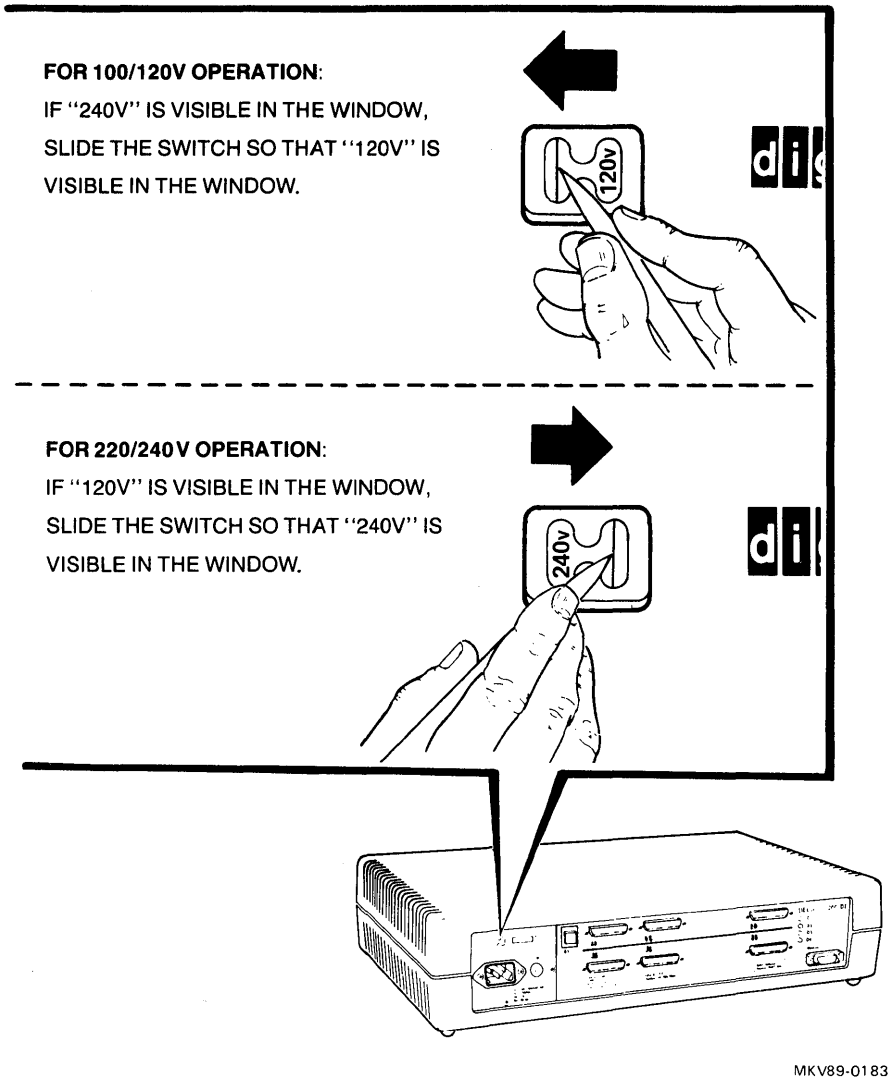

Figure 5 Selecting the Operating Voltage

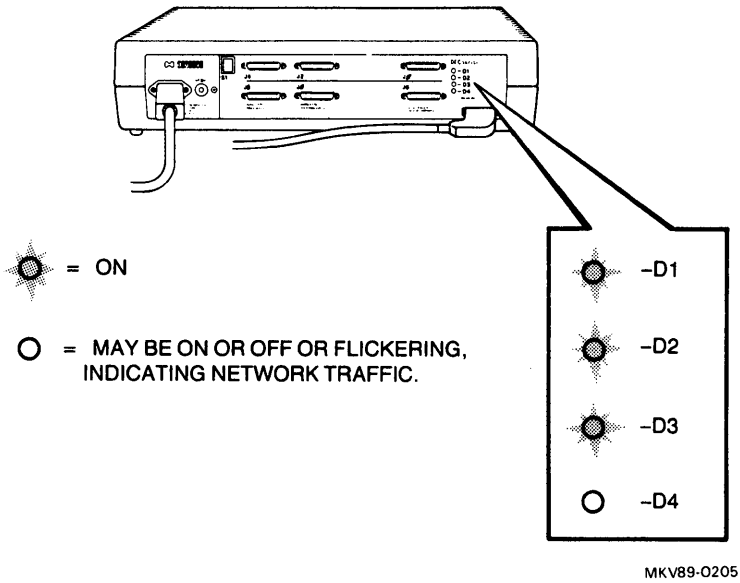

Figure 6 Status LED Indications for Proper Server Operation

Cabling

Before connecting the device connectors to the server, contact the server manager to determine if certain devices were designated to specific ports on the server. Make a list that identifies the server and the server port location for each device connected to the server.

Use the cabling flow diagram (Figure 7) to complete the cabling of the DECserver 250.

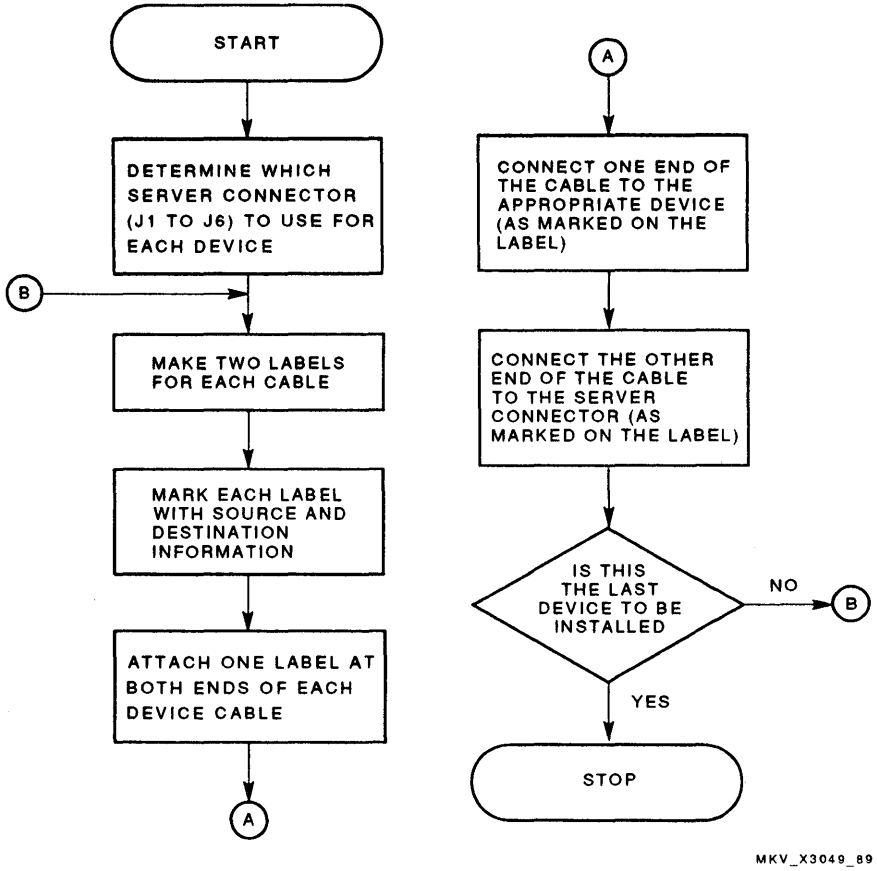

Figure 7 DECserver 250 Cabling Diagram

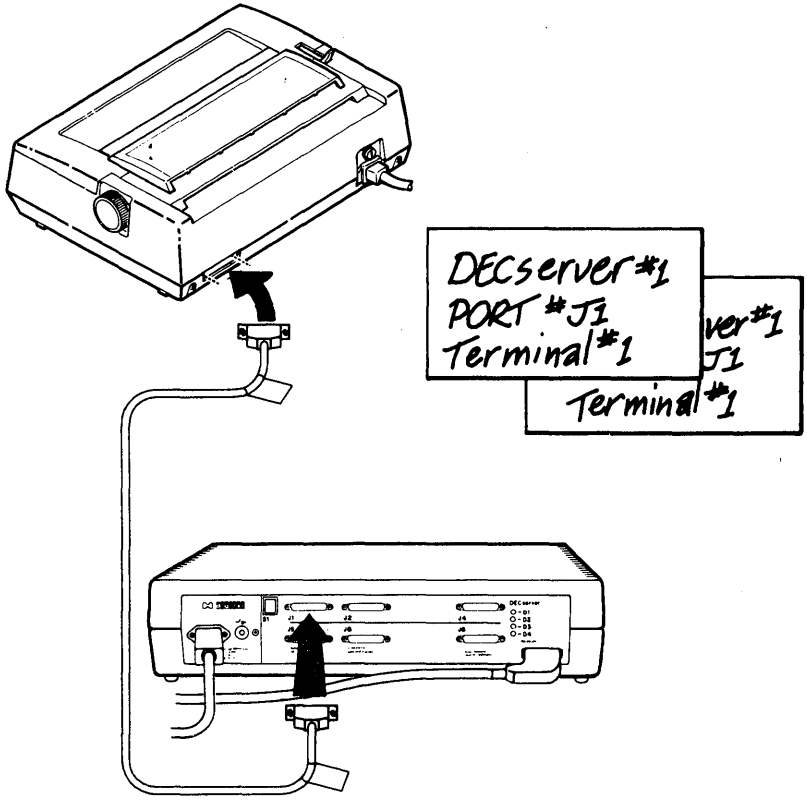

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Figure 8 Connecting Device Cables

Self-Test Diagnostics

When power is applied to the DECserver 250, it performs a diagnostic self-test and initiates a request for a down-line load of the DECserver image from the load host. All four status LEDs illuminate for 1 second (lamp check) when power is first applied. Allow 2 minutes to elapse before determining the state of the status LEDs.

Compare the state of the status LEDs on the server to those shown in Table 4 and follow the corrective action indicated.

Table 4 Status LEDs/Indications

LED	Definition	State	Indication	Corrective Action
D1	Power ON/OFF	ON	The server's dc voltages are correct	-
		OFF	The server's dc voltages are NOT correct	See Table 5
D2	Diagnostic	ON	Self-test passed	-
		OFF	Fatal error or test-in-progress	See Table 5
		Blinking	Nonfatal error	See Table 5
D3	Software	ON	Server image successfully loaded	-
		OFF	Down-line load in progress	-
		Blinking	Multiple-load failure	See Table 5
D4	Network Activity	ON*	Indicates activity on the network	-

*May be ON or OFF or flickering, depending on the amount of traffic on the network.

Troubleshooting

Table 5 Troubleshooting Chart

Symptom	Possible Cause	Corrective Action
D1 LED OFF	Power is not reaching the DECserver	Ensure that the voltage select switch is set to the correct voltage for the country where the unit is being installed (see Figure 5). Secure the power cable at the server and the wall outlet. Check the wall outlet for power. Determine if the server circuit breaker has tripped. If it has, press in on the white button to reset the breaker. If the circuit breaker trips more than once, replace the DECserver 250 unit. Replace the defective server power cable with a new one.
	The DECserver is defective	Replace the DECserver 250 unit.
D2 LED OFF	A hardware error has made the unit nonoperational	There is no corrective procedure for this problem. Replace the DECserver 250 unit.
D2 LED Blinking	Nonfatal error in self-test	To isolate and diagnose the problem: 1. Connect a console terminal to port 1 (J1) of the server, then power up the terminal. 2. Configure the terminal to operate at 9600 bits/s with a character size of 8 bits and no parity. 3. Unplug the server power cable at the wall outlet, then reinsert it. 4. Read the error message that appears on the terminal display. Find the error message in the **Error Messages** section and follow the recommended corrective action. If no message appears, refer to the **No Messages on Console Terminal** section.

Table 5 Troubleshooting Chart (Cont)

Symptom	Possible Cause	Corrective Action
D3 LED Blinking	Down-line load problem	To isolate and diagnose the problem: 1. Connect a console terminal to port 1 (J1) of the server, then power up the terminal. 2. Configure the terminal to operate at 9600 bits/s with a character size of 8 bits and no parity. 3. Press CTRL/P on the console terminal keyboard to restart the server self-test and start the down-line loading of the server image from the load host. 4. Read the message that appears on the terminal display. Find the error message in the **Error Messages** section and follow the recommended corrective action.

Error Messages

The following error messages may appear on the console terminal. These messages are associated with a blinking LED D2 or D3.

NOTE

For server installation, the console terminal must be configured to operate at 9600 bits/s with a character size of 8 bits and no parity.

Local -920- Parameter checksum error on port n
Local -921- Factory-set parameters applied to port n

Problem – These messages indicate a port checksum error. The permanent characteristics for the indicated port do not pass the internal checksum test. The factory-set defaults are in effect.

Corrective Action – Reset the server characteristics using the software reset switch (S1), located on the server's control/indicator panel. Press and hold this switch in while unplugging and reinserting the power cable. If this action fails to correct the problem, replace the DECserver 250 unit.

Local -922- Port hardware error on port n
Local -923- Port n has been disabled

Problem – These messages indicate a port hardware error.

Corrective Action – Replace the DECserver 250 unit.

Local -930- Server parameters checksum error
Local -931- Factory-set server parameters applied

Problem – These error messages indicate that the server characteristics in the server's permanent database are not operational. The factory-set defaults are now in effect.

Corrective Action – Reset the server characteristics using the software reset switch (S1), located on the server's control/indicator panel. Press and hold this switch in while unplugging and reinserting the power cable. If this action fails to correct the problem, replace the DECserver 250 unit.

Local -932- Hardware revision level checksum error

Problem – This error message indicates that the server's nonvolatile memory is faulty.

Corrective Action – Replace the DECserver 250 unit.

Local -935- Service characteristics checksum error
Local -936- Service has been disabled

Problem – These error messages indicate that the service characteristics in the permanent database are not operational. The factory-set defaults are operating.

Corrective Action – Enter the DEFINE SERVICE command to reset the service characteristics, then use the INITIALIZE command to reinitialize the server.

Reset the server characteristics using the software reset switch (S1), located on the server's control/indicator panel. Press and hold this switch in while unplugging and reinserting the power cable. If this action fails to correct the problem, replace the DECserver 250 unit.

Local -941- Transceiver loopback error
Local -942- Image load not attempted
Local -950- Troubleshooting procedures should be followed

Problem – These error messages indicate that there is a fault in the transceiver cabling between the server and the coaxial cable.

Corrective Action – Check the transceiver cable to be sure the connection is secure at both ends. Check the cable for any sign of damage. Replace the cable if it is questioned.

If this action fails to correct the problem:

1. Disconnect the transceiver cable from the server.
2. Plug the Ethernet loopback connector (12-22196-01) into the Ethernet connector on the server.
3. Initialize the server by pressing CTRL/P on the console terminal, or by unplugging and reinserting the power cable.

4. Wait 20 seconds for the diagnostic test to complete, then observe the status of the D2 LED.

   a. If the D2 LED continues to blink and the error messages reappear after the self-test (within 10 or 15 seconds), the server is faulty and must be replaced.

   b. If the D2 LED glows steadily, go to step 5 to isolate the faulty unit.

NOTE

When using the Ethernet loopback connector to troubleshoot the DECserver 250, the D3 LED may blink and messages 902 and 912 may appear on the console terminal. This is because the DECserver 250 was disconnected from the network and an attempt was made to down-line load the server image.

5. Unplug the Ethernet loopback connector from the Ethernet connector on the server.

6. Reconnect the transceiver cable to the Ethernet connector on the server.

7. Disconnect the other end of the transceiver cable.

8. Plug the Ethernet loopback connector into the transceiver cable.

9. Initialize the server by pressing CTRL/P on the console terminal, or by unplugging and reinserting the power cable.

   a. If the D2 LED continues to blink, the transceiver cable is faulty and must be replaced.

   b. If the D2 LED glows steadily, the faulty unit is the device the transceiver cable was connected to. Repair or replace the faulty device.

Local -902- Waiting for image load
Local -903- Loading from host host-address
Local -912- Load failure, timeout

Problem – These error messages indicate that the host system (addressed in the error message) failed to complete the down-line load to the server.

Corrective Action – Copy the error message exactly as it appears on the console terminal and notify the server manager.

Local -902- Waiting for image load
Local -912- Load failure, timeout

Problem – These error messages indicate that the load host is not responding to server down-line load request within the allotted timeout period.

Corrective Action – Copy the error message exactly as it appears on the console terminal and notify the server manager.

No Messages on Console Terminal

When there are no error messages on the console terminal, refer to Table 6 for possible causes and corrective action.

NOTE

For server installation, the console terminal must be configured to operate at 9600 bits/s with a character size of 8 bits and no parity.

Table 6 Troubleshooting Without Error Messages

Possible Cause	Corrective Action
The port to which the console terminal is physically connected is not defined as the console port.	Ensure that the console terminal is physically connected to port 1 (J1) on the server.
The console terminal is faulty.	Replace the console terminal.
The internal characteristics for the console terminal are not set up properly.	Reset the internal characteristics for the console terminal.

DECserver 300 TERMINAL SERVER

General Description

The DECserver 300 Ethernet terminal server (Figure 1) allows devices to communicate on an Ethernet local area network (LAN). The DECserver 300 hardware supports the EIA-423-A electrical interface standard, and connects up to 16 terminals, printers, modems, and computers to an Ethernet LAN.

Features

The DECserver 300 offers the following features:

- Permits fast, easy connections between the devices attached locally to the server ports and the remote devices on the network.
- Manages device traffic and leaves computer systems more time for applications tasks.
- Reduces and simplifies cabling required for connecting devices to a network.
- Provides access to Digital host systems on the LAT network.

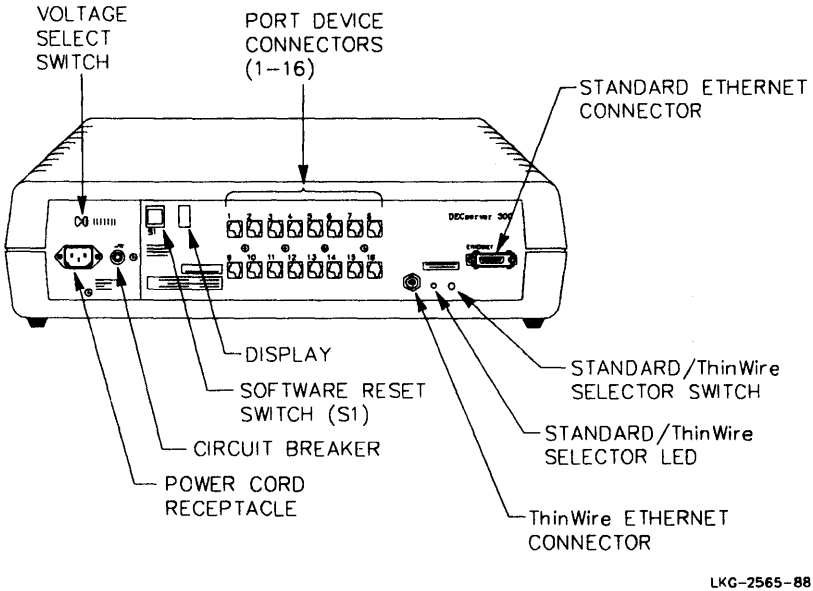

Figure 1 DECserver 300 Terminal Server

DECserver 300 Configuration Rules

There are many different ways to configure the DECserver 300 as long as the transceiver cables, the device cables, and the server power cable do not exceed the maximum length as described in Table 1, and that the following constraints are observed.

1. Maximum length for the transceiver cable cannot exceed 50 m (164 ft). This maximum length may be reduced due to the internal cabling equivalence of a device (such as a DELNI) that is connected between the server and the transceiver, or due to the use of office transceiver cable.

   a. Cabling equivalence is a measure of the internal timing delay of a device, expressed in meters of transceiver cable. This cabling equivalence must be subtracted from the 50-meter maximum. For example, if a device has a 5-meter cable equivalence, then its maximum allowable transceiver cable length is (50 m - 5 m) or 45 meters.

   b. Office transceiver cable (BNE4x-xx), due to its smaller diameter, has a signal loss that is four times that of the BNE3x-xx transceiver cable. Therefore, if office transceiver cable is used, the maximum transceiver cable distance must be divided by 4. This means the maximum office transceiver cable length allowed is 12.5 meters.

   If the configuration includes a device, and the device has any internal cabling equivalence, this should be subtracted from the 50-meter maximum before dividing by 4. For example, if a device has a 10-meter cabling equivalence and is attached to its transceiver using office cable, then the maximum allowable transceiver length is (50 m - 10 m)/4 or 10 meters.

2. When connecting the server to a configuration that includes a DELNI, allow a 5-meter cabling equivalence loss for the DELNI.

Table 1 Maximum Cable Lengths

From	To	Maximum Cable Length	Cable Type
Transceiver	Server	50 m (164 ft) see rules 1 & 2	BNE3x-xx* transceiver cable
Transceiver	Server	12.5 m (41 ft) see rules 1 & 2	BNE4x-xx* office transceiver cable
Wall outlet	Server	1.8 m (6 ft)	Server power cable (included in DSRVP-xx country kit)
Server	RS423/ EIA-423-A device	1200 m (4000 ft) (4.8 Kbytes) 900 m (3000 ft) (9.6 Kbytes) 300 m (1000 ft) (19.2 Kbytes)	H8245 or H8246 (24 AWG, 4-pair, twisted-pair)
Server**	EIA-232-D device	75 m (250 ft) (4.8 or 9.6 Kbytes) 15 m (50 ft) (19.2 Kbytes)	24 AWG, twisted-pair
Server**	EIA-232-D	15 m (50 ft)	BC16E

* BNE3x-xx transceiver cables and BNE4x-xx office transceiver cables can be interconnected. However, the cable attenuation (signal loss) for the office transceiver cable is greater than that of the BNE3x-xx transceiver cable by a factor of four. For example, 2 m (6.6 ft) of office transceiver cable is electrically equivalent to 8 m (26.2 ft) of BNE3x-xx transceiver cable.

** May be extended using the H3105 active adapter.

Configurations

There are many possible LAN configurations for the DECserver 300. Some of the possible configurations are shown in Figures 2 through 4.

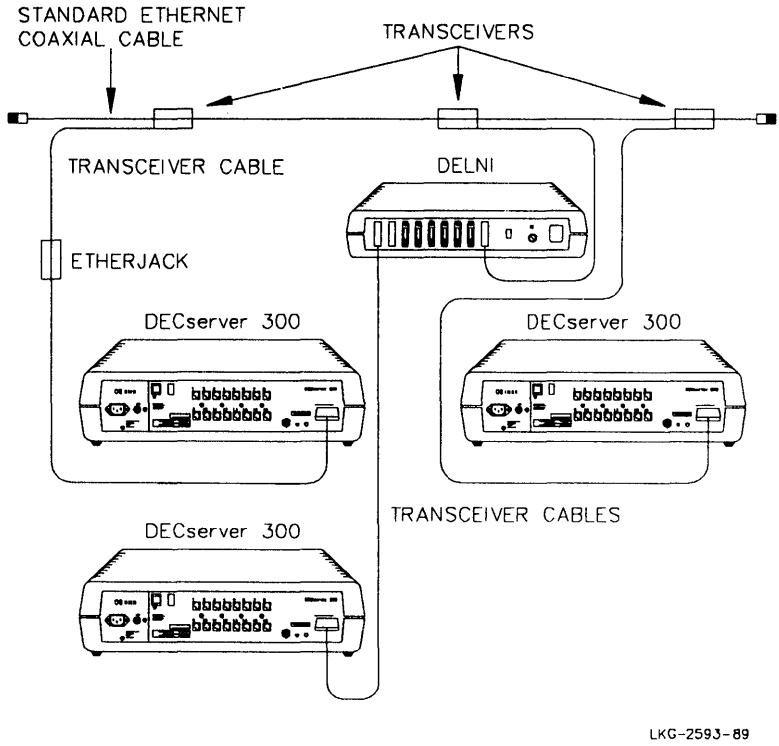

Figure 2 Standard Ethernet Coaxial Cable Configuration

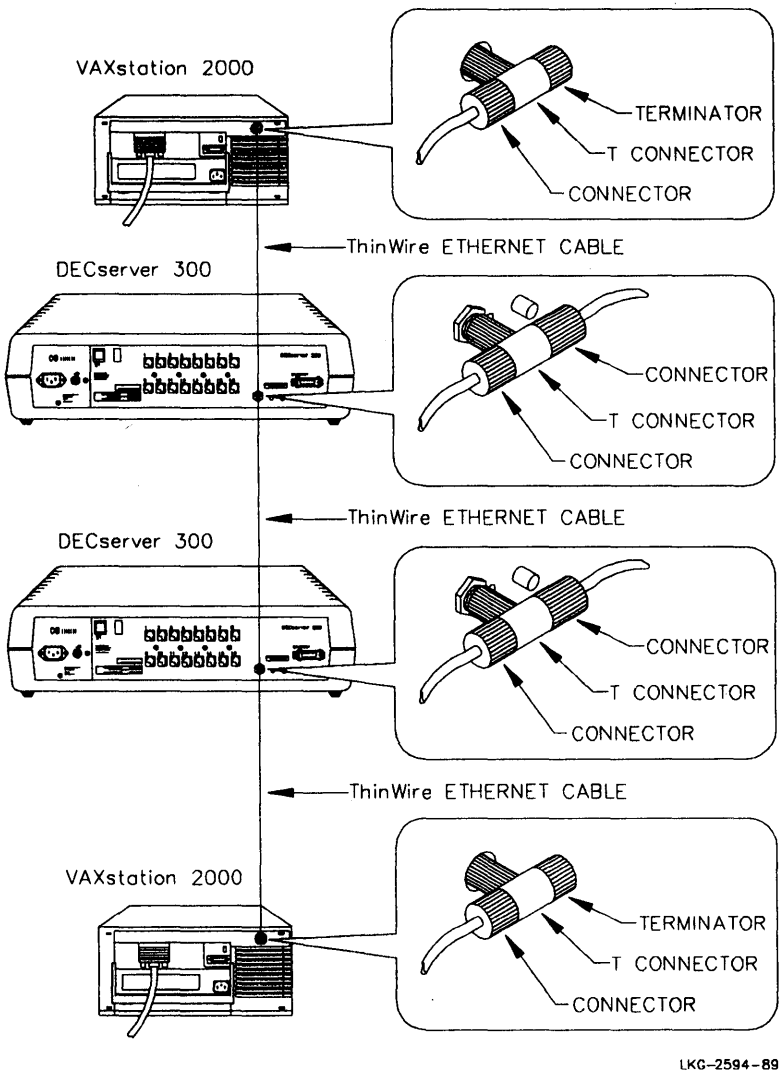

Figure 3 ThinWire Ethernet Standalone Configuration

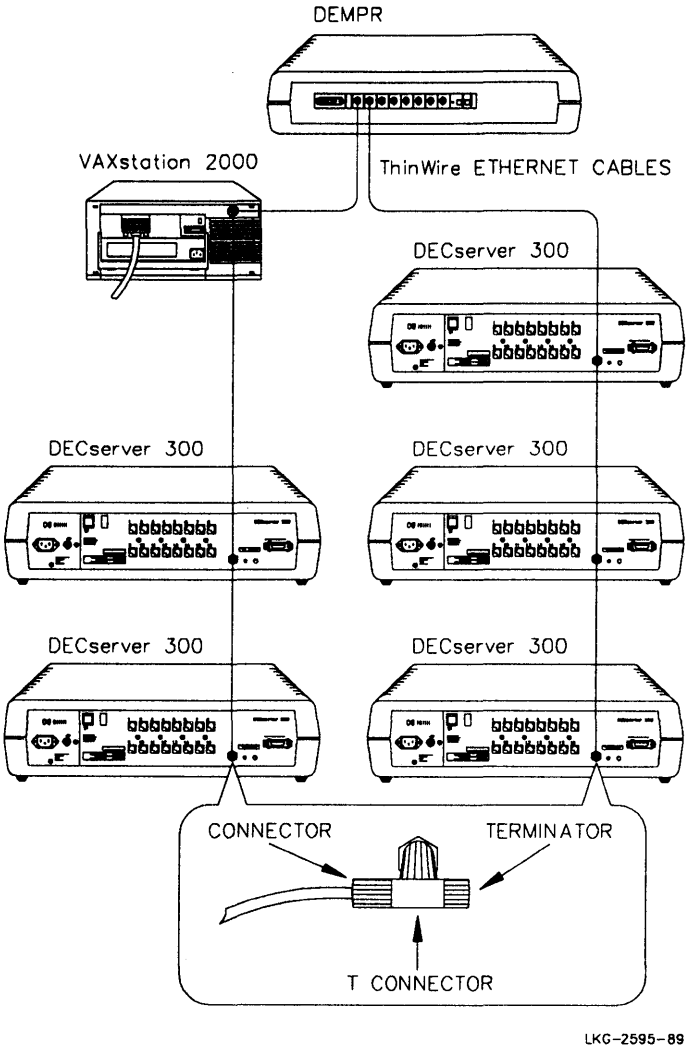

Figure 4 DEMPR ThinWire Configuration

DECserver 300 Versions
The DECserver 300 is available in the following two versions.

Model	Input Voltage
DSRVF-BA	100–120 Vac
DSRVF-BB	220–240 Vac

Reference Documentation
Refer to the following documents for more information on the DECserver 300 Ethernet server.

- *DECserver 300 Hardware Installation/Owner's Guide* EK-A0366-IN
- *DECserver 300 Technical Description* EK-A0367-TM
- *DECserver 300 Software Installation Guide (VMS)* AA-NE45A-TE
- *DECserver 300 Software Installation Guide (ULTRIX-32)* AA-NE30A-TE
- *DECserver 300 Problem Determination Guide* AA-NE42A-TE
- *DECserver 300 Identification Card* EK-A0368-IC
- *Terminal Server Commands and Messages Guide* AA-HQ84A-TK
- *LAT Terminal Server Network Manager's Guide* AA-DJ18B-TK
- *LAT11 Server Manager's Guide* AA-BT77A-TC
- *LATplus/VMS Service Node Management Guide* AA-HB28A-TE

Hardware Components
The following hardware is required for a DECserver 300 installation.

- DECserver 300 Ethernet server
- Country kit containing:
  - Power cord (DSRVF-BB only)
  - *DECserver 300 Hardware Installation/Owner's Guide* (EK-A0366-IN)
  - *DECserver 300 Identification Card* (EK-A0368-IC)
  - Blank labels for cables
  - Rackmount kit (H041-AA)
  - BNC T-connector (12-25869-01)
  - 2 BNC terminators (12-26318-01)
  - Port (serial) loopback connector (H3103)
- Accessories box(es)/bags (the number of accessories boxes or bags depends on the options ordered). Accessories may include:
  - Transceiver cables (straight end or right-angled end connectors)
  - Device cables
  - H4080 turnaround connector
  - Etherjack junction box (DEXJK)
  - Wall/partition mounting bracket kit (H039)

Software Components
DECserver 300 operation requires the following software packages.

1. DECserver 300 distribution software (installed on at least one load host)
2. DECnet Phase IV software (installed on at least one load host)
3. LAT service node software (required on all LAT service nodes that communicate with DECserver 300 devices)

The distribution software must be installed on a load host that runs DECnet Phase IV software. The distribution software includes a server image file that is down-line loaded to the DECserver 300. The server image constitutes the server software that enables the server to perform its functions.

Table 2 Minimum Operating System Version

Operating System	Version
VMS	V4.7
ULTRIX	V2.0

Equipment Placement

The DECserver 300 can be located in a variety of environments, including offices and computer rooms. The DECserver 300 can be rack or wall mounted, or placed on a desk or shelf. Regardless of where it is mounted, it must be at least 45 cm (18 in.) above the floor. Allow for 15 cm (6 in.) of airspace around the server air vents.

Environmental Requirements

Temperature	5° to 50°C (41° to 122°F)
Relative Humidity	10% to 95% (noncondensing)

Physical Description

Length	49.3 cm (19.4 in.)
Height	11.75 cm (4.6 in.)
Depth	31.2 cm (12.3 in.)
Weight (unpacked)	5.4 kg (11.9 lbs)

Power Requirements

The operating power range of the DECserver 300 is provided in Table 3.

Table 3 DSRVF Power Requirements

Version	Nominal Voltage	Voltage Range	Current	Frequency
DSRVF-BA	120 Vac	100 - 120	1.0 A	50/60 Hz
DSRVF-BB	240 Vac	220 - 240	0.5 A	50/60 Hz

Installation Flow Diagram

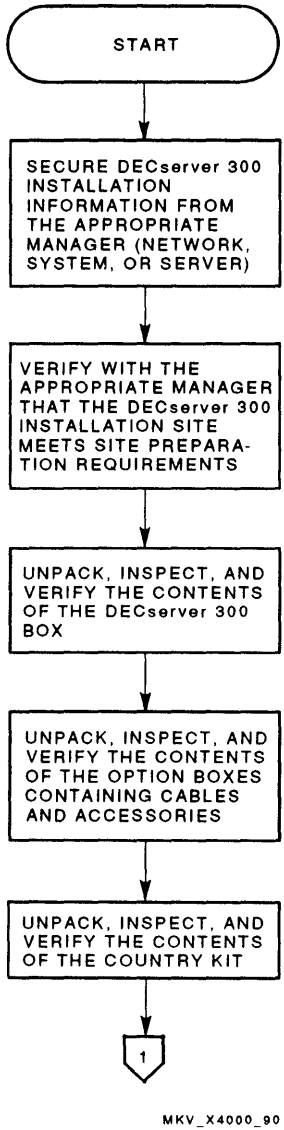

Figure 5 Installation Flow Diagram (Sheet 1 of 4)

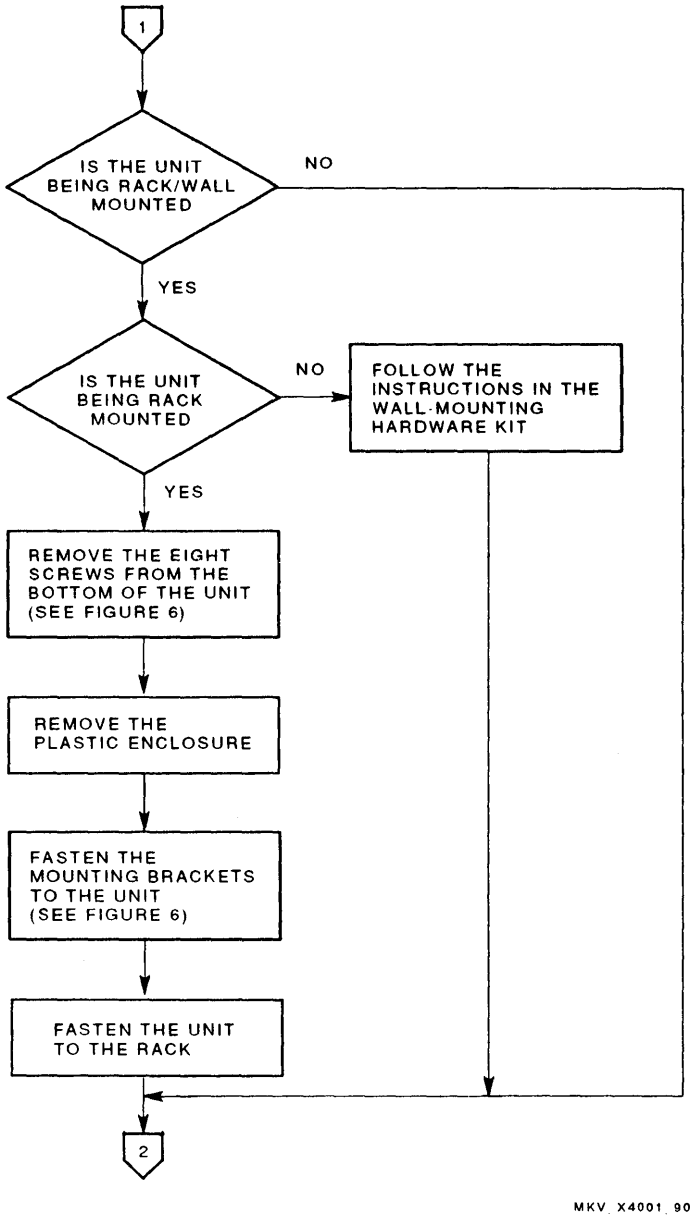

Figure 5 Installation Flow Diagram (Sheet 2 of 4)

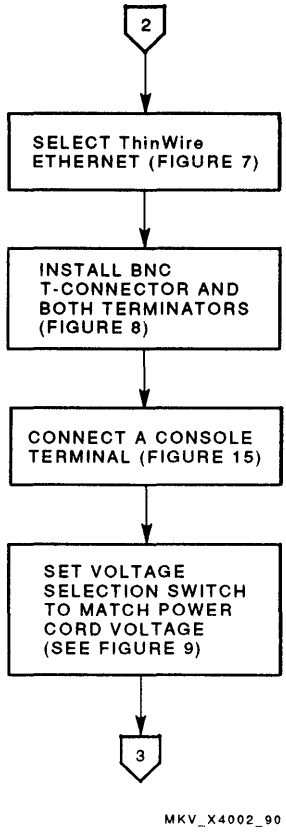

Figure 5 Installation Flow Diagram (Sheet 3 of 4)

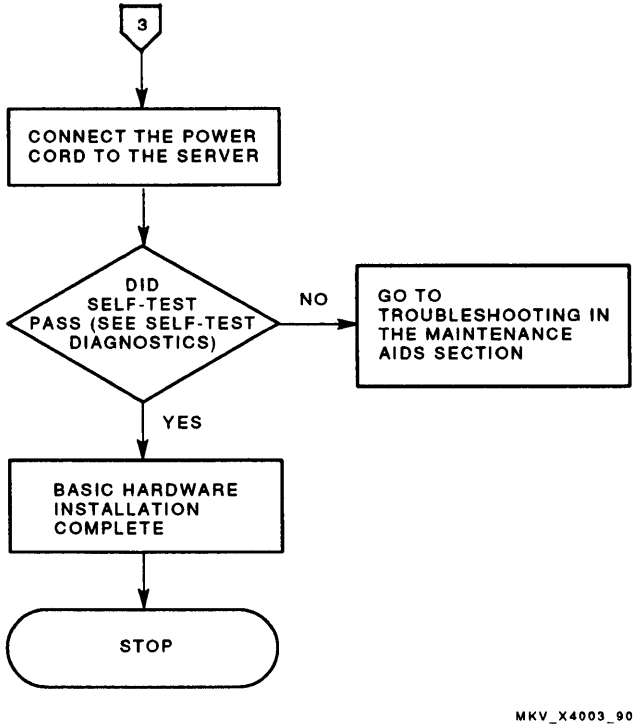

Figure 5 Installation Flow Diagram (Sheet 4 of 4)

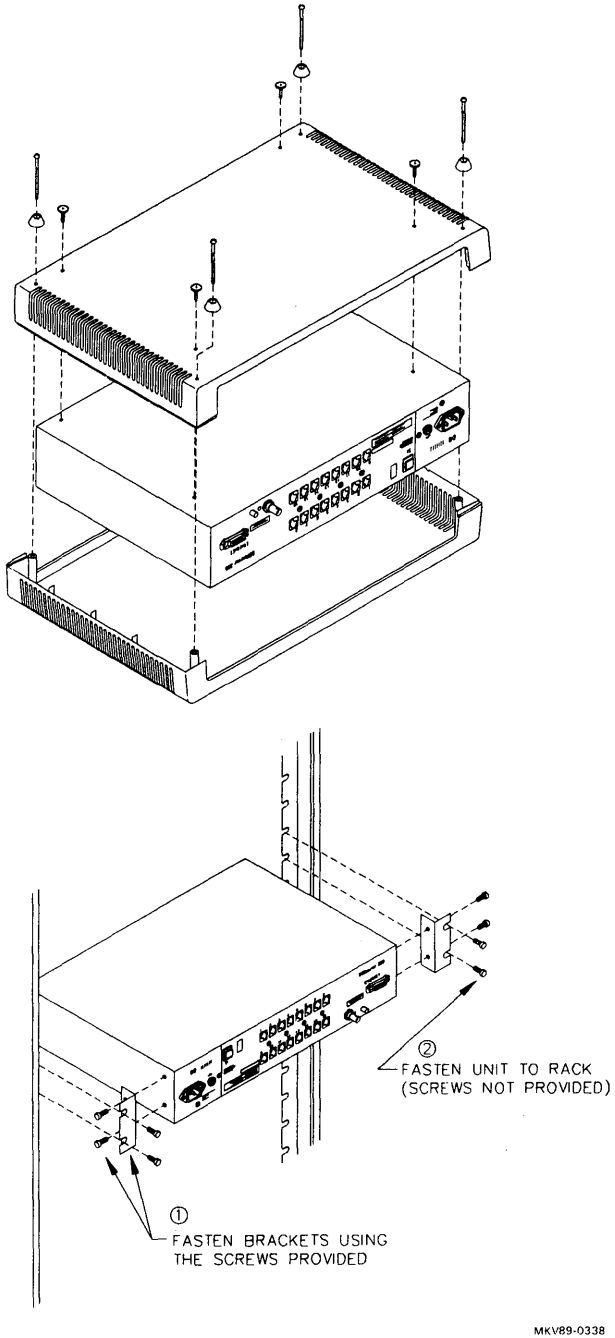

Figure 6 Rack Mounting the DECserver 300

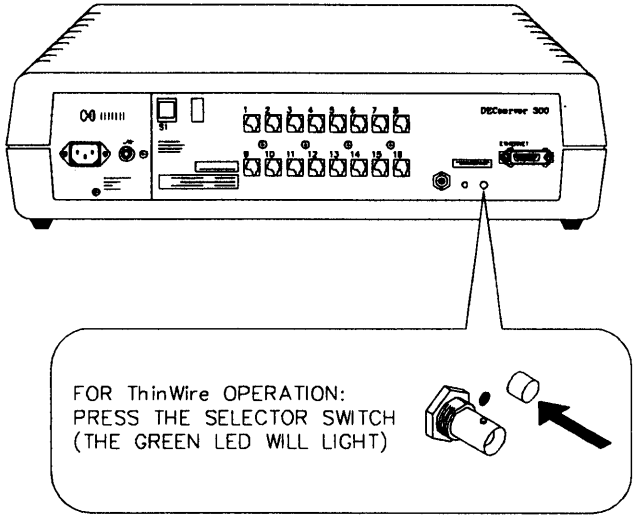

Figure 7 Selecting ThinWire Ethernet

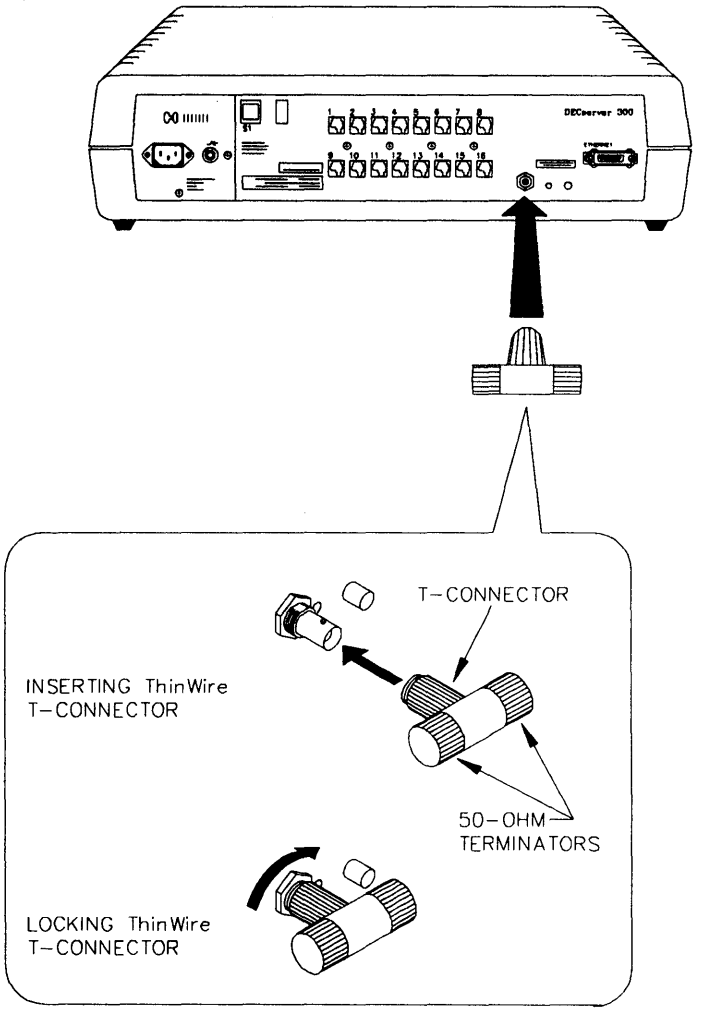

Figure 8 Connecting the ThinWire T-Connector and Terminators

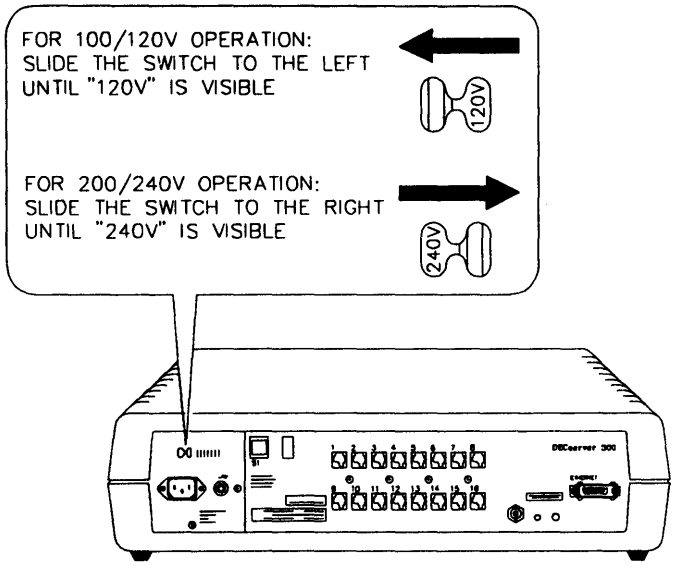

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Figure 9 Selecting the Operating Voltage

Cabling

Before connecting the device connectors to the server, contact the server manager to determine if certain devices were designated to specific ports on the server. Make a list that identifies the server and the server port location for each device connected to the server.

The DECserver 300 can connect to either standard Ethernet or to ThinWire Ethernet. To select ThinWire Ethernet, press the selector switch (Figure 10) and then apply power to the server. The ThinWire Ethernet LED lights when the server is powered up.

To select standard Ethernet, release the selector switch and then apply power to the server. The standard Ethernet LED lights.

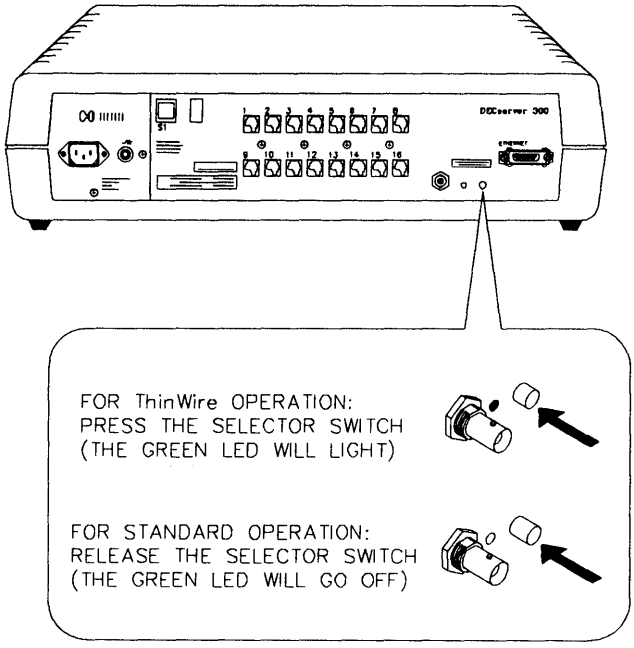

Figure 10 Selecting Standard or ThinWire Ethernet

Connecting to Standard Ethernet – Proceed as follows:

1. Power down the server.
2. Unlock the slide latch on the server's standard Ethernet connector by pushing it in the direction shown in Figure 11.

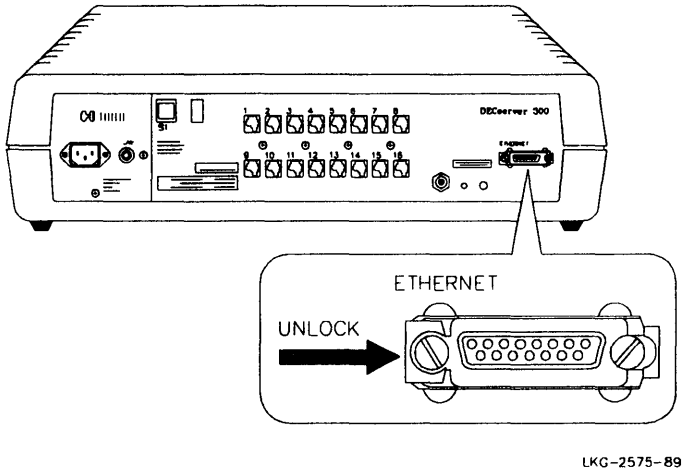

Figure 11 Unlocking the Slide Latch

3. Connect the transceiver cable (Figure 12).

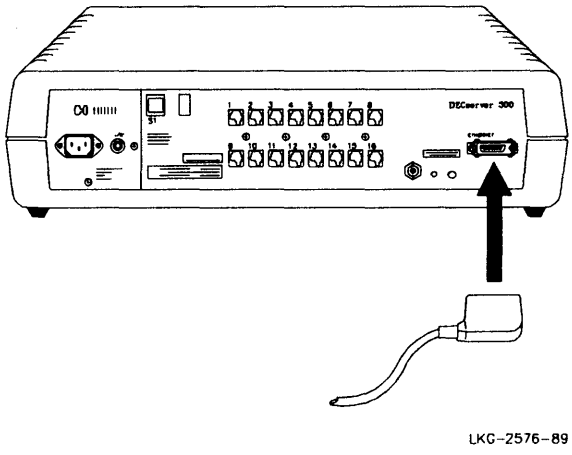

Figure 12 Connecting the Transceiver Cable

4. Lock the slide latch by pushing it in the direction shown in Figure 13.

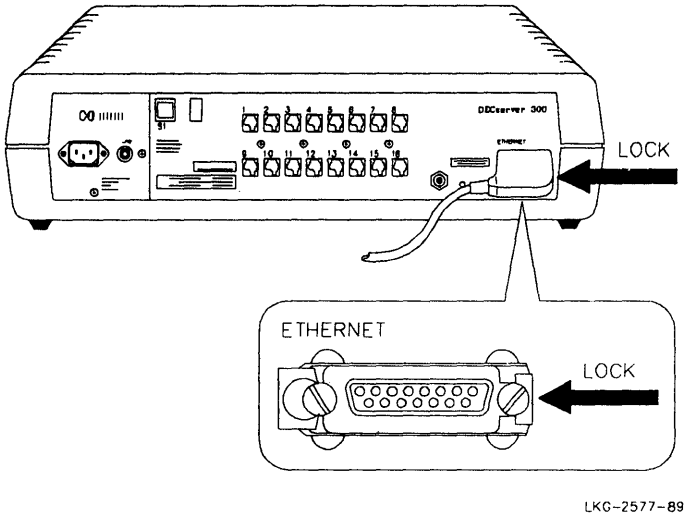

Figure 13 Locking the Slide Latch

5. Power up the server.

6. Verify that the standard/ThinWire Ethernet selector switch is in the OUT position and the standard Ethernet LED is ON.

Connecting to ThinWire Ethernet – Proceed as follows:

1. Insert the T-connector into the BNC connector (Figure 14) at the rear of the server.
2. Turn the barrel of the connector clockwise to lock it.
3. Verify that the standard/ThinWire Ethernet selector switch is in the IN position and the ThinWire Ethernet LED is ON.

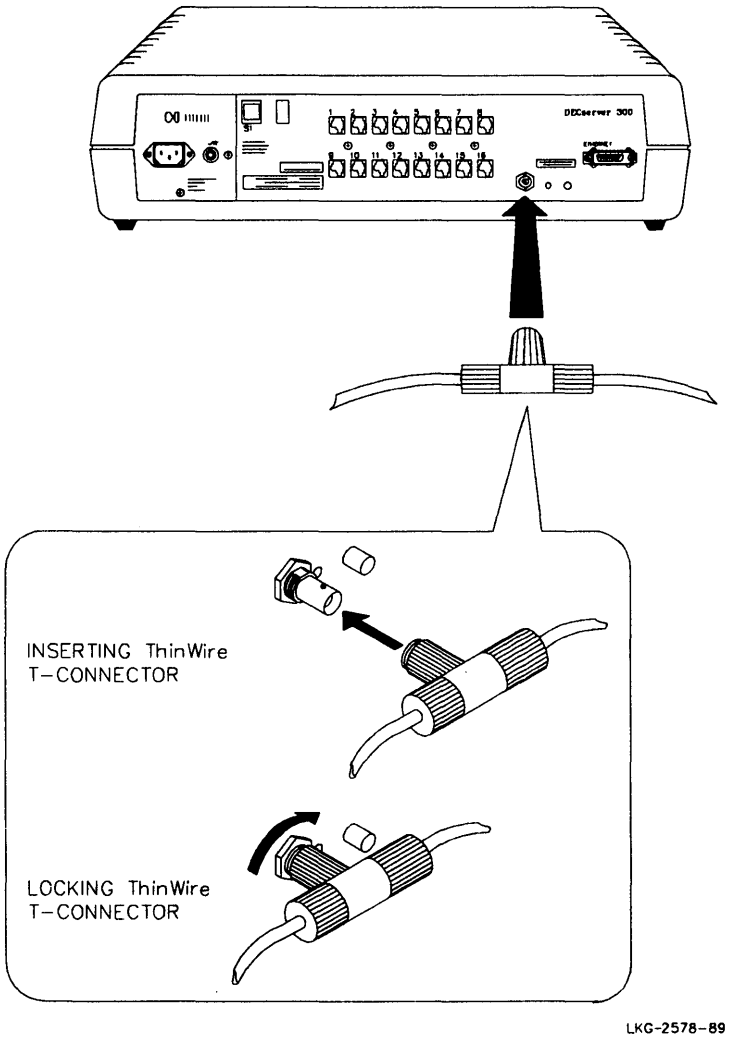

Figure 14 Connecting to ThinWire Ethernet

Connecting to a Serial Communication Line

To connect a serial communication line, insert the modified modular plug (MMP) into one of the 16 female modified modular jack (MMJ) connectors (Figure 15). If a console terminal is to be connected, it *must* be connected to port 1.

In a rackmount configuration, the server is connected to a patch panel using a DECconnect SER cable; BC23P-10 (unshielded) or BC23R-10 (shielded).

NOTE

The BC23R-10 cable has ground tabs at the MMP cable end that must be attached to the DECserver 300 earthing screws (see Figure 1).

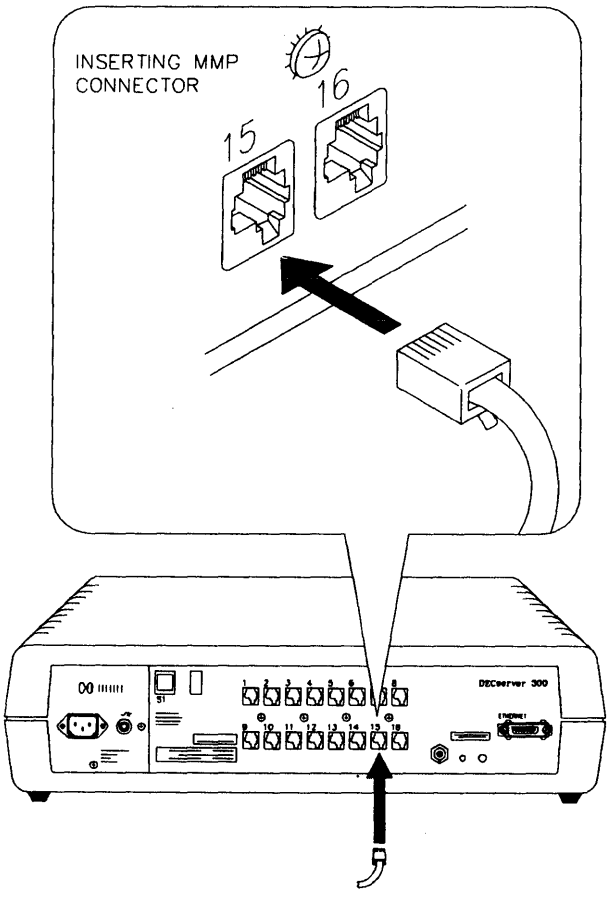

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Figure 15 Connecting to a Serial Communication Line

Self-Test Diagnostics

When power is applied to the DECserver 300, it performs a diagnostic self-test and initiates a request for a down-line load of the DECserver image from the load host.

NOTE

For self-test to successfully complete, the DECserver 300 must be connected to one of the following:

- **An operational Ethernet segment**
- **ThinWire Ethernet port selected and fitted with BNC T-connector and two terminators (supplied with country kit)**
- **Standard Ethernet port selected and fitted with optional Ethernet loopback connector (12-22196-02)**

Before power is applied to the DECserver 300, perform the following steps:

1. Connect a console terminal to port number 1.
2. Configure the terminal for 9600 bits/s, 8-bit character size, and no parity.
3. Remove and reinsert the server ac power plug.
4. Observe the seven-segment display (Figure 16).

When the server power cord is plugged in, the seven-segment display shows an "8", and the Diagnostic Dot is on for approximately 0.5 seconds as a DISPLAY CHECK. The display then counts down from F to 5 as the self-test diagnostics are run. If the self-test diagnostics are successful, the server attempts a down-line load of software from the host. If the server is not connected to an Ethernet segment at this time, the display alternates between "4" and "3" and the Diagnostic Dot remains ON (see Table 4).

NOTE

An alternating 4-3 display without an Ethernet connected, indicates successful completion of self-test.

If a fatal error is detected, the count stops and the code of the test that failed flashes. If a nonfatal error is detected, the count continues and the Diagnostic Dot blinks. See **Troubleshooting** in the MAINTENANCE AIDS section for more information.

NOTE

There is one exception to this sequence. If the server fails the Ethernet subsystem external loopback test, the display stops at "9" and the Diagnostic Dot blinks. The "9" on the display does not blink.

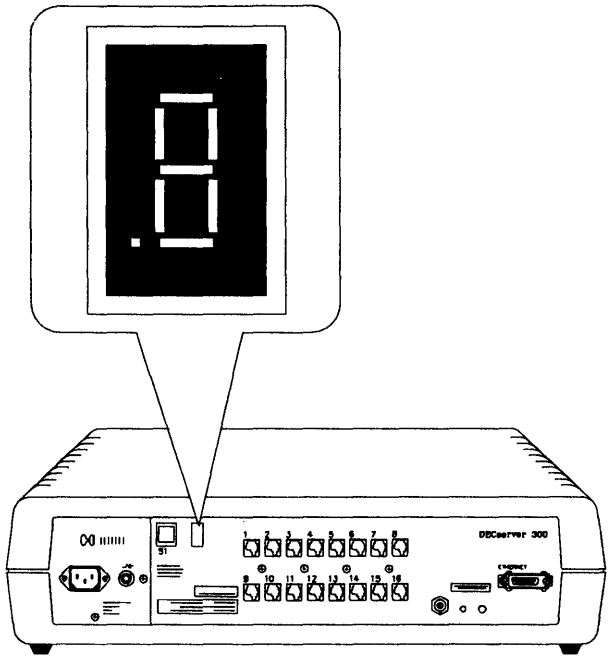


Figure 16 The Seven-Segment Display

All segments and the Diagnostic Dot on the seven-segment display are initially turned on for approximately 0.5 seconds as a DISPLAY CHECK. Table 4 lists all other possible displays and their meaning.

Table 4 DECserver 300 Seven-Segment Display Codes

Display	System Status
F	Bootstrap test executing
E	RAM subsystem test executing
d	Interrupt subsystem test executing
C	Timer test executing
b	ROM subsystem test executing
A	Ethernet subsystem test executing in the internal loopback mode
9	Ethernet subsystem external loopback test executing
7	Asynchronous subsystem test executing in the internal loopback mode
6	Reserved
5	System exerciser test executing
4	Requesting load
3	Requesting load backoff
2	Loading
1	Requesting a dump
0	Dumping
Rotating Figure 8 Pattern*	Server software is executing
■	Diagnostic Dot** (Status as follows)
	ON — No fatal errors
	OFF — Fatal errors or self-test in progress
	BLINKING — Nonfatal error detected

* The rotating figure 8 pattern indicates normal operation.
** The Diagnostic Dot is part of the seven-segment display.

Table 5 DECserver 300 Display and Indications

Device	State	Indication	Corrective Action
Diagnostic Dot	ON*	Self-test passed	None required
	OFF	Fatal error	See the DECserver 300 problems and corrections section
	Blinking	Nonfatal error	See the DECserver 300 problems and corrections section
Seven-Segment Display	OFF	No power	See the DECserver 300 problems and corrections section
		Display failed	See the DECserver 300 problems and corrections section
	9	Nonfatal error	See the DECserver 300 problems and corrections section
	9 and blinking dot	Ethernet error	Ethernet external loopback failed
	Blinking F through 5	Fatal error	Remove and replace the DECserver 300
	3	Load request backoff	See the DECserver 300 problems and corrections section
	Rotating figure 8*	Server software executing	None required

* Indicates normal server operation.

Problem – Seven-segment display OFF

Corrective Action – Verify that the ac power is being applied to the unit. Remove and replace the DECserver 300 if the following items are not at fault.

- The voltage select switch is set correctly.
- The ac power being supplied by the wall outlet and DECserver 300 power cable is correct.
- The server circuit breaker is not in the tripped position.

Problem – Diagnostic Dot OFF, seven-segment display is blinking F through 5

Corrective Action – Remove and replace the DECserver 300 unit.

Problem – Diagnostic Dot BLINKING

Corrective Action – Perform the following procedure to isolate and diagnose the problem.

1. Connect a console terminal to port 1 of the terminal server. Power ON the console terminal. All console terminals used for terminal servers are configured for 9600 bits/s, no parity, and 8-bit character size.
2. Unplug and reinsert the server power cord.
3. Read the error messages that are displayed on the console terminal. If no error messages are displayed (when using a working terminal), then the console port may be defective or undefined.

Problem – Seven-segment display always displays a 3

Corrective Action – Perform the following procedure to isolate and diagnose the problem.

1. Connect a console terminal to port 1 of the terminal server. Power ON the console terminal. All console terminals used for terminal servers are configured for 9600 bits/s, no paity, and 8-bit character size.
2. Enter <CTRL/P> on your console terminal keyboard.
3. Read the error messages that are displayed on the console terminal. If no error messages are displayed (when using a working terminal), then the console port may be defective or undefined.

Terminal Display Messages
The Initialize program outputs messages to a terminal connected to port 1 (see **EXAMPLE 1**). Messages occur at 30 second intervals if no errors are detected by the self-test.

EXAMPLE 1 SUCCESSFUL LOAD

```
Local -901- Initializing DECserver [SERVER HARDWARE ADDR.-ROM-H/W REV]
Local -902- Waiting for image to load
Local -903- Loading from [EXTENDED DECNET ADDRESS]
Local -904- Image load complete
```

EXAMPLE 2 LOAD HOST NOT FOUND

```
Local -912- Load failure, timeout
```

EXAMPLE 3 NETWORK COMMUNICATIONS PROBLEMS

```
Local -910- Image load not attempted, network communication error
Local -916- Illegal load image, load aborted
Local -915- Transmission failure after ten attempts
```

Up-Line Dump Messages
The following messages are displayed when the DECserver 300 requests an up-line dump to the original load host. If the host does not support an up-line dump, a dump occurs to any dump host responding to the multicast service message.

- After requesting assistance from a dump host:
  Local -905- Waiting for image to dump

- After the up-line dump starts:

  Local -906- Dumping to host [EXTENDED DECNET ADDRESS]

- On completion of the up-line dump:

  Local -907- Image dump complete

At completion of the up-line dump, the DECserver 300 enters the self-test program and reboots.

Timeout, Dump Aborted Message
The message "Local -914- Timeout, dump aborted" is displayed during an up-line dump.

Program control transfers to self-test at the completion of the up-line dump.

LOAD or DUMP Failure Message

Local -915- Transmission failure after 10 attempts

- The procedure is restarted for a down-line load.
- During an up-line dump, the process is aborted and program control transfers to self-test.

Local -910- Image load not attempted, network communication error

- The Ethernet loopback fails under self-test.
- There are possible transceiver or cable problems.
- Typing CTRL/P restarts self-test and down-line load.
- Typing CTRL/P has no effect if the LAT software is successfully loaded to the server.

Nonfatal Error Messages

Local -911- Warning-Nonfatal hardware error detected server code XXXX, terminal codes nn nn nn nn nn nn nn nn

- Server status codes

  XXXX Service code indication
  1000 Ethernet heartbeat error
  0100 Ethernet loopback error
  0010 ECO/LANCE checksum error
  0001 Server parameter checksum error

- Terminal codes (each nn indicates one of eight terminals)

  nn Terminal code indication
  10 Terminal port error
  01 Terminal parameter checksum error

  00 NO ERROR AT PORT

Image File Bad Message

Local -916- Illegal load image, load aborted

The down-line load process specified one of the following:

- An odd memory address
- The address of an interrupt vector area
- A parameter load with an odd address

Fatal Bugcheck Error Message

Local -913- Fatal Bugcheck PC=XXX, SP=XXX, SR=XXX, MEM=XXX, CODE=XXX

PC=Contents of program counter
SP=Contents of the stack pointer
SR=Contents of status register
MEM=Illegal memory address on an addressing error or the address of the instruction that caused the error
CODE=Reason for the failure (see Table 6)

Table 6 Fatal Bugcheck Codes

Code	Reason Failed
002 to 00C	CPU exceptions, CPU communications and instruction errors
011 to 032	Self-test bugchecks; program ROM errors when mapping ROM
101 to 1FF	ROM code detected errors during down-line load or up-line dump
200 to 300	System crash error codes
100	Memory parity error
400	Hardware watchdog timer expired

Ethernet Failure Messages

Local -941- Transceiver loopback error
Local -942- Image load not attempted
Local -950- Troubleshooting procedures should be followed

Additional Tests

TEST PORT Command - The TEST PORT command is used to send a stream of ASCII data to a port. **EXAMPLE 4** shows the format used for the TEST PORT command.

EXAMPLE 4 TEST PORT COMMAND

TEST [PORT port-number] [COUNT n][WIDTH n] [LOOPBACK {EXTERNAL}] {INTERNAL}

PORT port-number	Specifies the port to be tested.
COUNT n	Specifies the number of lines in the data stream.
WIDTH n	Determines the width (in characters) of each line: Range of 1 to 132 characters Default of 72
LOOPBACK	Specifies that the data stream is looped back and checked for errors.
EXTERNAL	Loops the data back through an external loopback connector.
INTERNAL	Loops the data back from internal port hardware loopback.

In **EXAMPLE 5**, port 2 was tested in Internal Loopback mode from a privileged port.

EXAMPLE 5 TESTING PORTS IN INTERNAL LOOPBACK MODE

```
Local> TEST PORT 2 COUNT 10 LOOPBACK INTERNAL
Local -511- Test complete

720 Bytes written,          0 error(s) detected
```

The display indicates that 720 bytes were transmitted and received without error.

In **EXAMPLE 6**, port 2 was tested from a privileged port in External Loopback mode, without the use of a loopback connector.

EXAMPLE 6 TESTING PORTS IN EXTERNAL LOOPBACK MODE

```
Local> TEST PORT 2 COUNT 10 LOOPBACK EXTERNAL
Local -511- Test complete

720 Bytes written,          720 error(s) detected
```

The display indicates that 720 bytes were transmitted and none were returned.

TEST SERVICE Command – The TEST SERVICE command in **EXAMPLE 7** tests the communications link between the DECserver 300 and a service node or port offering a service.

EXAMPLE 7 TEST SERVICE

TEST SERVICE service-name [NODE node-name] [DESTINATION port-name] - [COUNT n] [WIDTH n] [LOOPBACK {EXTERNAL}][{INTERNAL}]

service-name	Specifies the name of the service to be tested.
NODE node-name	Specifies the name of the service node.
DESTINATION port-name	Specifies the name of the port on the service node.
COUNT n	Specifies how many buffers of characters are transmitted.
WIDTH n	Specifies how many characters are transmitted in each buffer.
LOOPBACK	Determines how the data is looped back; from an EXTERNAL loopback connector or from INTERNAL port hardware. If LOOPBACK is omitted, the protocol software loops back the data.

TEST LOOP Command – The TEST LOOP command in **EXAMPLE 8** can be used to test the physical connections between your server and another Ethernet node.

EXAMPLE 8 TEST LOOP

TEST LOOP address1 [HELP {TRANSMIT} ASSISTANT address2] {RECEIVE}{FULL }

address1	Specifies the Ethernet address of the target node.
ASSISTANT address2	Specifies the Ethernet address of an assistant node.
FULL	Assistant node that relays outgoing and returning transmissions.
RECEIVE	Assistant node that relays transmissions returning to the server.
TRANSMIT	Assistant node that relays outgoing server transmissions.

DECserver 500 TERMINAL SERVER

General Description

The DECserver 500 is an Ethernet communications server connected to a maximum of 128 devices such as host systems, terminals, printers, plotters, and modems. These devices (although they may not support LAT) are then allowed to communicate on an Ethernet LAN with LAT devices. The LAN must employ LAT software.

DECserver 500 Versions

The server is available in two versions (DSRVS-nx), where "nx" designates the particular model. The "n" in the model number is an A or B, which specifies rack-mount or office. The "x" in the model number also uses an A or B, which specifies the operating voltage of the server. Each style is factory equipped for either 120 Vac or 240 Vac operation. Table 1 lists the four basic models. Figure 1 and Figure 2 show controls, indicators, and connectors found on a typical DECserver 500.

Table 1 DECserver 500 Model Designator

Model	Description
DSRVS-AA	120 Vac Rack-mount model
DSRVS-AB	240 Vac Rack-mount model
DSRVS-BA	120 Vac Office model
DSRVS-BB	240 Vac Office model

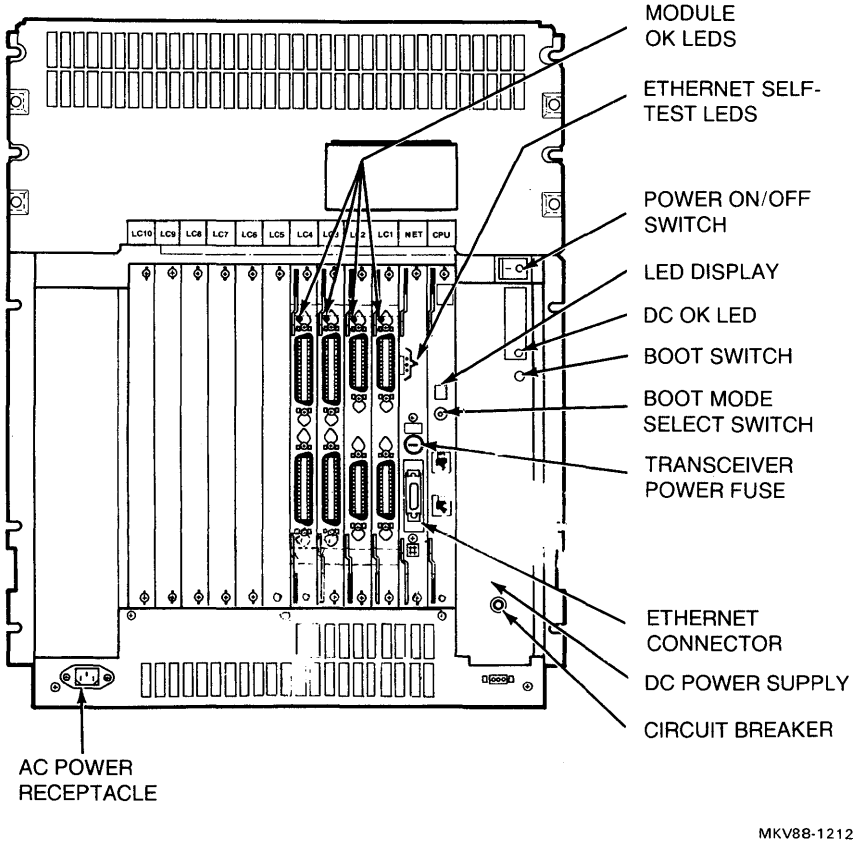


Figure 1 Controls and Indicators

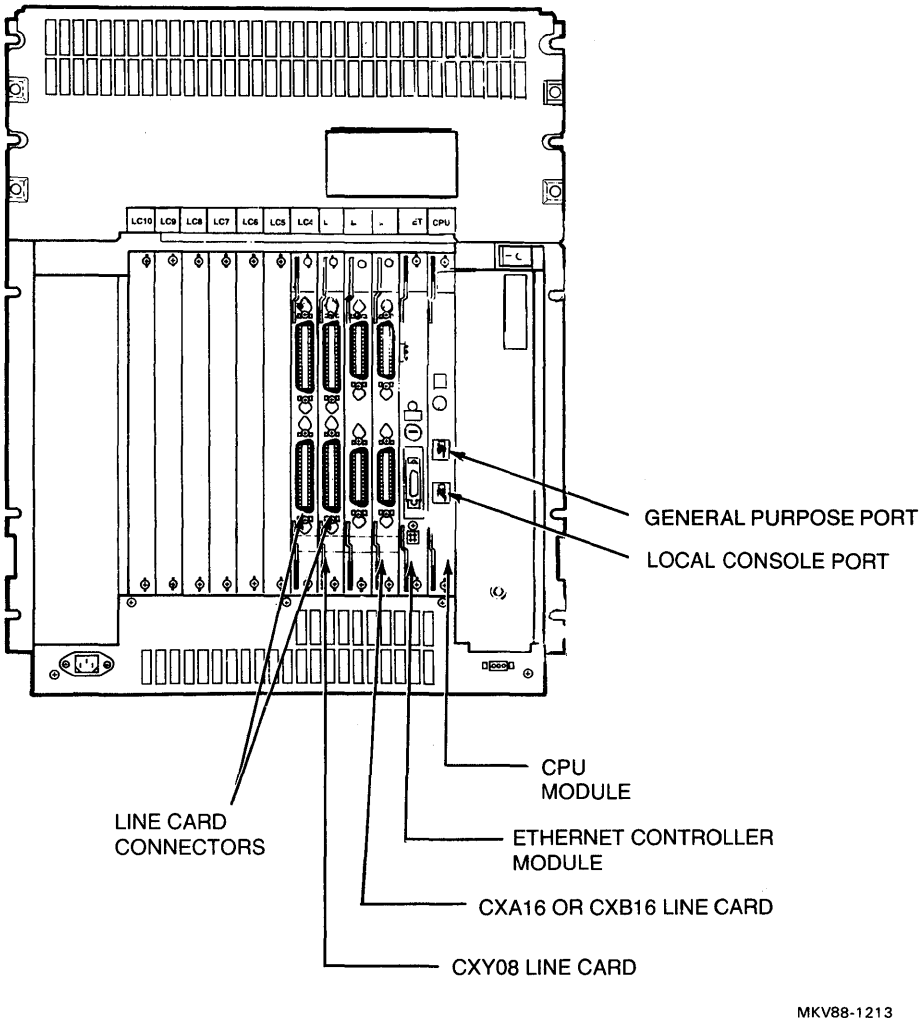


Figure 2 Line Cards, Ports, and Connectors

Network Configuration

Configurations depend on the type and the number of line cards that populate the DECserver 500 backplane. Up to 128 ports are possible. Any combination of devices properly connected to the available ports are allowed to communicate with LAT devices on Ethernet. Figure 3 shows a DECserver 500 network configuration.

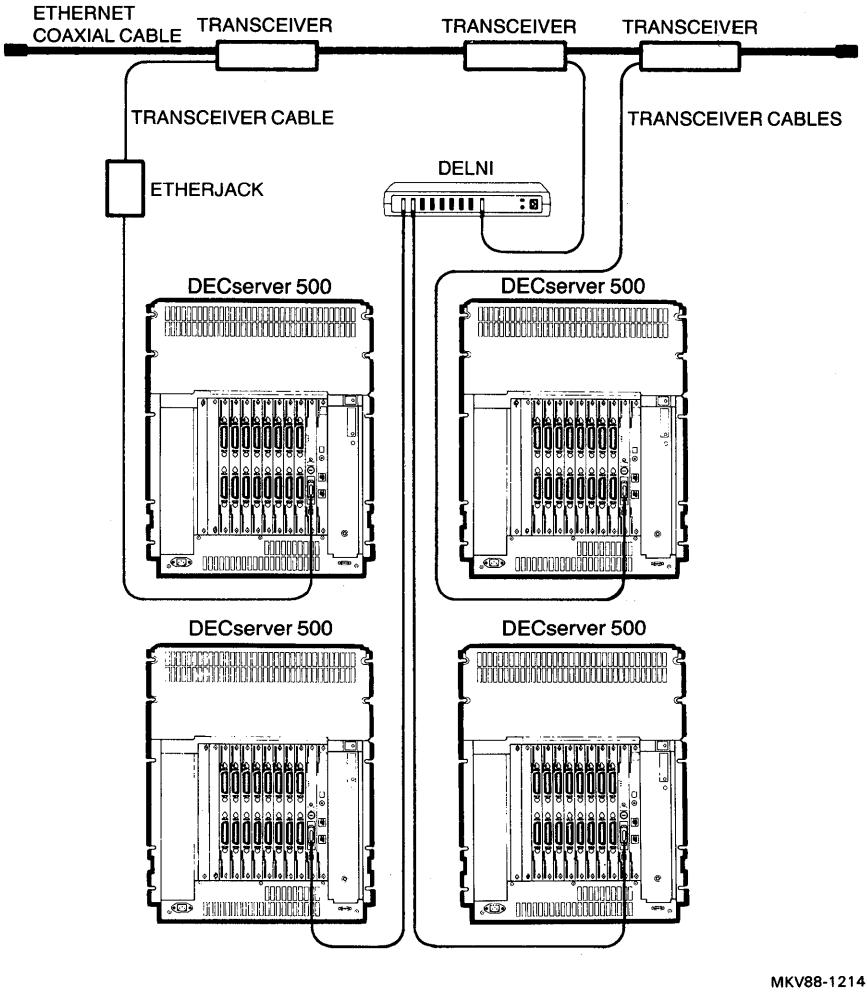


Figure 3 Typical Configuration

Modular Hardware Description
Table 2 describes the modular DECserver 500 hardware.

Table 2 Hardware

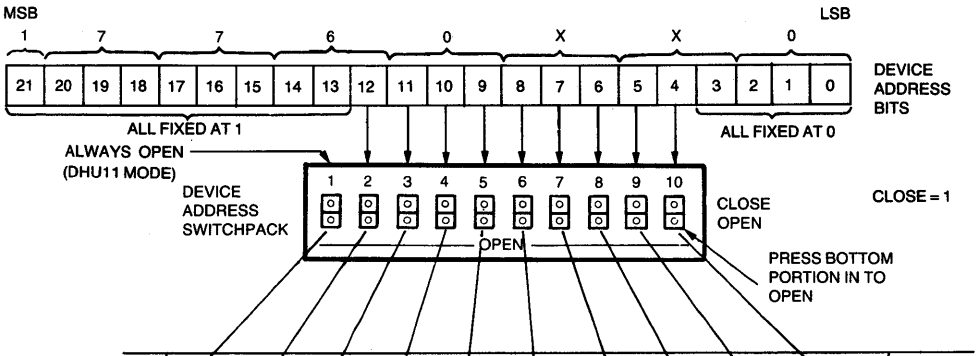
Module	Description
System Unit	An office model or a 19-inch rack-mount model DECserver 500. Each model contains a 120 or 220 Vac power supply, two fans, and a Q-bus backplane.
KDJ11-SB	CPU that manages powerup self-test and down-line load (DLL) of server software from the host. Provides communications between individual device ports and Ethernet LAN nodes. Supports user services (multiple-session, intraport communications, on-line HELP, and various diagnostic routines used to test server functions).
Ethernet Controller	Performs all data and physical link layer functions.
CXA16	A two-connector line card that supports up to 16 DEC423 type port devices. Each connector has eight full-duplex, asynchronous channels using data-lead- only communications. A status LED on the card remains lit after self-test has successfully completed.
CXB16	A two-connector line card that supports up to 16 RS-422-A type port devices. Each connector has eight full-duplex, asynchronous channels using data-lead- only communications. A status LED on the card remains lit after self-test has successfully completed.
CXY08	A two-connector line card that supports up to eight RS-232-C type port devices. Each connector has four full-duplex, asynchronous channels using full modem control communications signals. A status LED on the card remains lit after self-test has successfully completed.
Bus Grant	Continuity jumper card used to fill vacant line card slots in the backplane and pass priority control signals when a failed line card is removed.

Line-Card Vectors/Addresses

Table 3 lists the octal device addresses and interrupt vectors for line cards in slots 3 through 10. Figures 4 and 5 show the line-card switchpacks.

Table 3 Line-Card Device Address and Interrupt Vectors

Slot	Card	Address	Vector
3	LC1	17760440	310
4	LC2	17760460	320
5	LC3	17760500	330
6	LC4	17760520	340
7	LC5	17760540	350
8	LC6	17760560	360
9	LC7	17760600	370
10	LC8	17760620	400



CARD SLOT	1	2	3	4	5	6	7	8	9	10	DEVICE ADDRESS
	SWITCHPACK SWITCHES										
LC1	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	OPEN	CLOSE	OPEN	17760440
LC2	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	OPEN	CLOSE	CLOSE	17760460
LC3	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	CLOSE	OPEN	OPEN	17760500
LC4	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE	17760520
LC5	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	CLOSE	CLOSE	OPEN	17760540
LC6	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	CLOSE	CLOSE	CLOSE	17760560
LC7	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	CLOSE	OPEN	OPEN	OPEN	17760600
LC8	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	CLOSE	OPEN	OPEN	CLOSE	17760620

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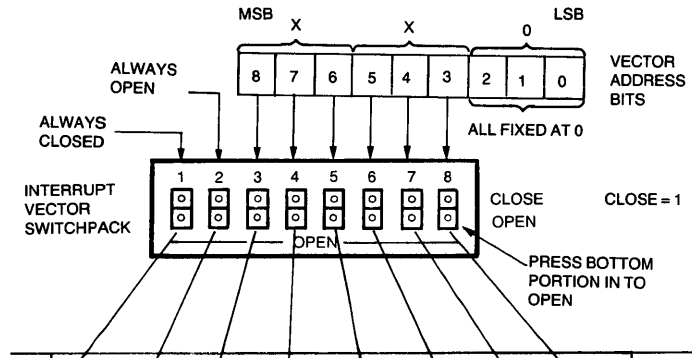
Figure 4 10-Position Address Switch Selection



CARD SLOT	SWITCHPACK SWITCHES 1	2	3	4	5	6	7	8	VECTOR ADDRESS
LC1	CLOSE	OPEN	OPEN	CLOSE	CLOSE	OPEN	OPEN	CLOSE	310
LC2	CLOSE	OPEN	OPEN	CLOSE	CLOSE	OPEN	CLOSE	OPEN	320
LC3	CLOSE	OPEN	OPEN	CLOSE	CLOSE	OPEN	CLOSE	CLOSE	330
LC4	CLOSE	OPEN	OPEN	CLOSE	CLOSE	CLOSE	OPEN	OPEN	340
LC5	CLOSE	OPEN	OPEN	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	350
LC6	CLOSE	OPEN	OPEN	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	360
LC7	CLOSE	OPEN	OPEN	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	370
LC8	CLOSE	OPEN	CLOSE	OPEN	OPEN	OPEN	OPEN	OPEN	400

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Figure 5 8-Position Vector Switch Selection

DECserver 500 Software Installation Requirements

The requirements are:

- DECserver 500 distribution software must be installed on the identified load host(s).
- DECnet Phase IV software must be installed on the identified load host(s) (supports DLL, dumps, and remote console operation).
- LAT service node software must be installed on all LAT (Local Area Transport) service nodes that communicate with the DECserver 500 over the Ethernet LAN.

Once identified, system hosts become load hosts only after the distribution software is installed and the systems are running DECnet Phase IV software. The distribution includes an image file that is down-line loaded to the DECserver 500.

LAT software must be installed on each service node using devices connected to the DECserver 500.

LAT software packaging is operating-system dependent as follows.

- VAX/VMS or MicroVMS Version 4.2 or later – LATplus/VMS is contained in the DECserver 500 software kit.
- RSX-11M-PLUS or Micro/RSX – LAT software included with DECnet-RSX software.
- TOPS-10 or TOPS-20 – LAT software included with operational software.

All service-node software on the LAN should be installed and running before the server becomes operational. For more information see the *DECserver 500 Software Product Description.*

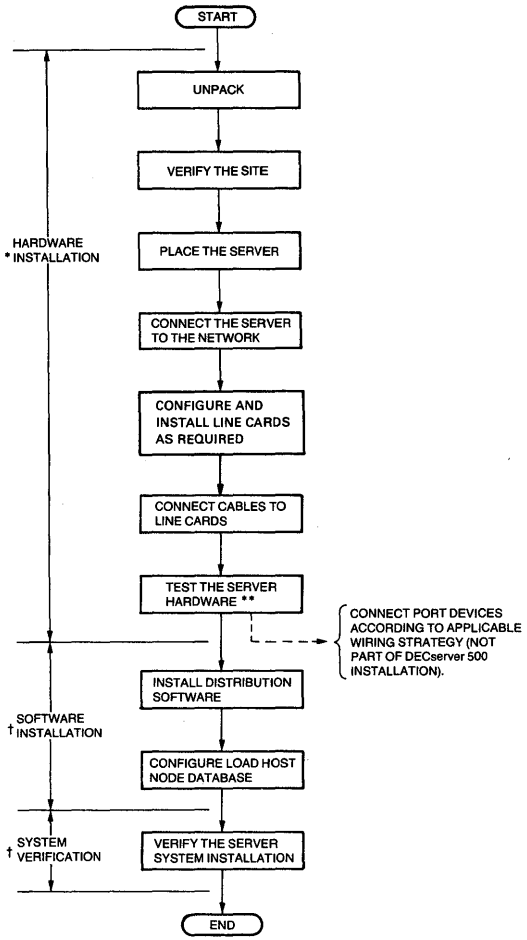
Reference Documentation

Refer to the following documents for more information on the DECserver 500 terminal server:

Title	Part Number
DECserver 500 Hardware Documentation Kit	EK-DECS5-KT
DECserver 500 Site Preparation Instruction Kit	EK-DECS5-SP
DECserver 500 Quick Reference Card	EK-DECS5-RC
DECserver 500 Problem Determination and Service Guide	AA-JD81A-TK
DECserver 500 System Technical Manual	EK-DECS5-TM
DECserver 500 User's Guide	AA-HU81A-TK
DECserver 500 User's Reference Card	AV-HY69A-TK
DECserver 500 Hardware Installation Guide	EK-DECS5-IN
DECserver 500 Software Installation Guide (VMS/MicroVMS)	AA-HS49A-TE
DECserver 500 Software Installation Guide (RSX-11M-PLUS)	AA-HS60A-TC
DECserver 500 Software Installation Guide (Micro/RSX)	AA-HS61A-TC
DECserver 500 System Owner's Guide	AA-HY68A-TK
DECserver 500 Management Guide	AA-HU80A-TK
DECserver 500 Management Reference Card	AV-HY67A-TK
DECserver 500 Glossary of Terms	AA-KK21A-TK
DECserver 500 Identification Card	EK-DECS5-IC
Terminal Server Commands and Messages Guide	AA-HQ84B-TK
LAT Concepts Guide	AA-HY66A-TE
LATPLUS/VMS Service Node Management Guide	AA-HB28A-TE
DECserver 500 System Service Manual	None Listed
DECserver 500 Commands Mini-Reference	None Listed

Installation Flow Diagram

Figure 6 is a flowchart that outlines the hardware and software installation steps for the DECserver 500.



NOTES

* REFER TO THE *DECserver Hardware Installation Guide*

** IF BLANK SLOTS ARE LEFT BETWEEN MODULES ON THE SERVER BACKPLANE, THE SERVER WILL FAIL THE DIAGNOSTIC SELF-TEST. BECAUSE THE BUS-REQUEST AND BUS-GRANT SIGNALS ARE PASSED FROM SLOT TO SLOT BY THE MODULES, A BLANK SLOT PREVENTS MODULES BEYOND THE OPEN SLOT RELATIVE TO THE CPU MODULE FROM GAINING CONTROL OF THE Q-BUS.

† REFER TO THE *DECserver 500 Software Installation Guide [op. sys.]*

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Figure 6 Installation Flow Diagram

Devices
The DECserver 500 can be connected to a number of current DIGITAL products and to various non-DIGITAL devices.

The following are RS-232-C devices. More information can be found in the Software Product Description (SPD).

DIGITAL Terminals

- LA12, LA100, LA120
- LA34, LA36, LA38
- VT100 and VT200 series

DIGITAL Personal Computers

- VT180 (in the VT100 terminal emulation mode)
- Professional 300 series
- Rainbow 100 series
- DECmate I, II, and III
- VAXmate

Non-DIGITAL Personal Computers (VT100 emulation)

- IBM PC, PC/XT, and AT

DIGITAL Printers

- LA50, LA100, LA180, and LA110
- LCP01 ink jet printer
- LG series printers
- LN01, LN03 laser printers with RS-232-C interface option
- LPQ02, LPQ03
- LXY12, LXY22
- DECtalk

DECserver 500 supports asynchronous modems compatible with BELL 103J and 212A standards, and modems that conform to CCITT V.21, V.21 bis, V.22, and V.22 bis. The following DIGITAL modems supported in both dial-in and dial-out modes include:

- DF02 (300 bits/s)
- DF03 (300/1200 bits/s)
- DF112 (300/1200 bits/s)
- DF124 (1200/2400 bits/s)
- DF224 (300/600/1200/2400 bits/s)

The terminal interfaces listed, enable non-LAT host connections to server ports, providing non-LAT devices with access to LAT and LAN.

- DL11, DLV11
- DZ11, DHV11
- DH11, DHV11, DHU11
- DMF32, DMZ32

Device Placement

Table 4 lists the maximum allowable distance that a port device connected to the DECserver 500 can be placed. The CXA16 line card supports DEC423-to-DEC423 standards. A passive adapter or an active adapter can be used to convert from DEC423 to RS-232-C four-wire (see Figure 7). The CXB16 line card supports the DEC422 standards.

Table 4 Maximum Distance Guidelines for CXA16/CXB16

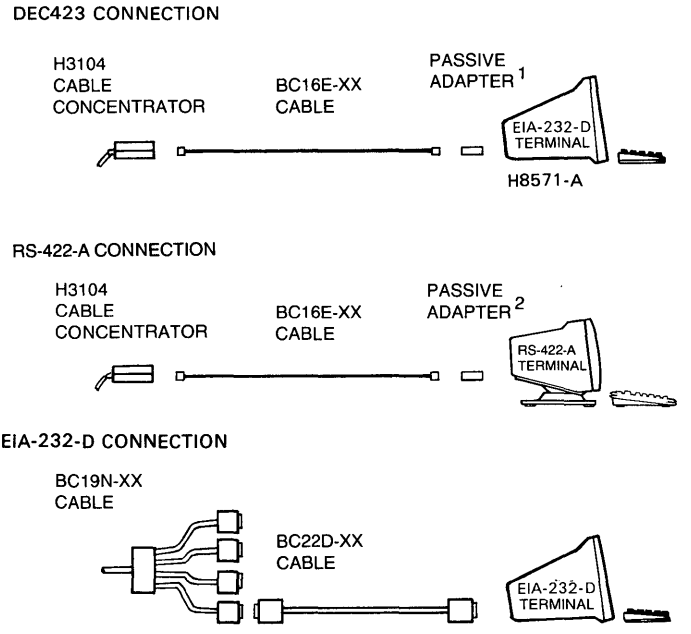
Standards	4800 Bits/s	9600 Bits/s	19200 Bits/s	38400 Bits/s
DEC423 to DEC423	300 m (1000 ft)	300 m (1000 ft)	300 m (1000 ft)	150 m (500 ft)
DEC423 to RS-232-C w/H3105A adapter	300 m (1000 ft)	300 m (1000 ft)	300 m (1000 ft)	150 m (500 ft)
DEC423 to RS-232-C	75 m (250 ft)	60 m (200 ft)	—	—
RS-422-A to RS-422-A	1200 m (4000 ft)	1200 m (4000 ft)	1200 m (4000 ft)	1200 m (4000 ft)

A shielded male-to-male cable with 18 twisted pairs (TP) connects between the CXA16 or CXB16 line card and the H3104 cable concentrator. The following are part numbers for the cables (see the *DECserver 500 Hardware Installation Guide* for more information).

BC16C-10	10 ft
BC16C-25	25 ft (shipped with CXA16/CXB16)
BC16C-50	50 ft
BC16C-150	150 ft

The six-wire cable, with MMJ connectors, is used between the cable concentrator and the device. The following are part numbers for the cables.

BC16E-02	2 ft
BC16E-10	10 ft
BC16E-25	25 ft
BC16E-50	50 ft



1. EIA-232-D terminals can be adapted to DEC423 by using a passive adapter. Use an H8571-A adapter for terminals with a 25-pin connector. Use an H8571-B adapter for terminals with a 9-pin connector.

2. RS-422-A terminals may require an adapter for MMJ to RS-422-A connectors. (Not supplied by Digital Equipment Corporation).

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Figure 7 Connecting a Test Terminal to a Server Port

Ethernet Connections
Information on the transceiver cables can be found in the *Communications Options Minireference Manual.*

Port Device Connections
The *DECserver 500 System Owner's Guide* and the *DECserver 500 Hardware Installation Guide* provide a complete list of order numbers for accessories, office cables, adapters, and connectors. The illustrations in this section are from the guides and show how the DECserver 500 is connected to Ethernet and how the various line cards are connected (Figures 8 through 15).

Table 5 lists the port numbers associated with each line-card slot. Figures 14 and 15 show a configuration that uses CXA16 (CXB16) and CXY08 line cards. Each line-card slot supports 16 ports. When a CXA16 or CXB16 line card is installed in a slot, all of the 16 associated ports are used. A CXY08 line card in the same slot, however, uses only the first 8 ports assigned to that slot.

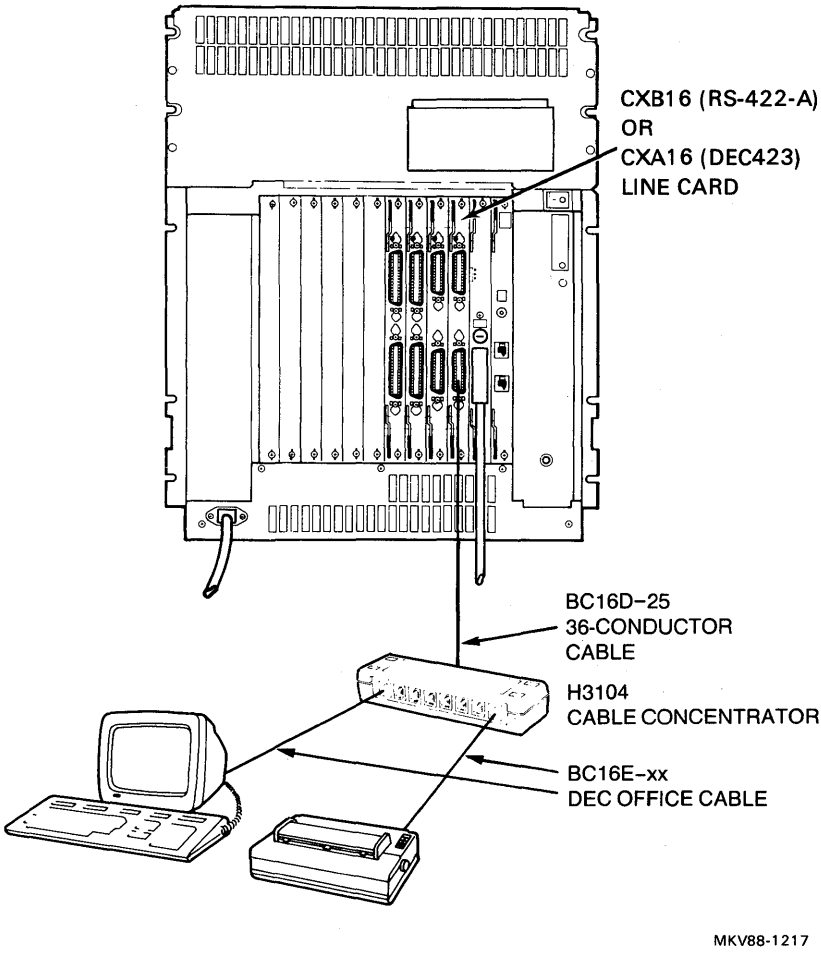
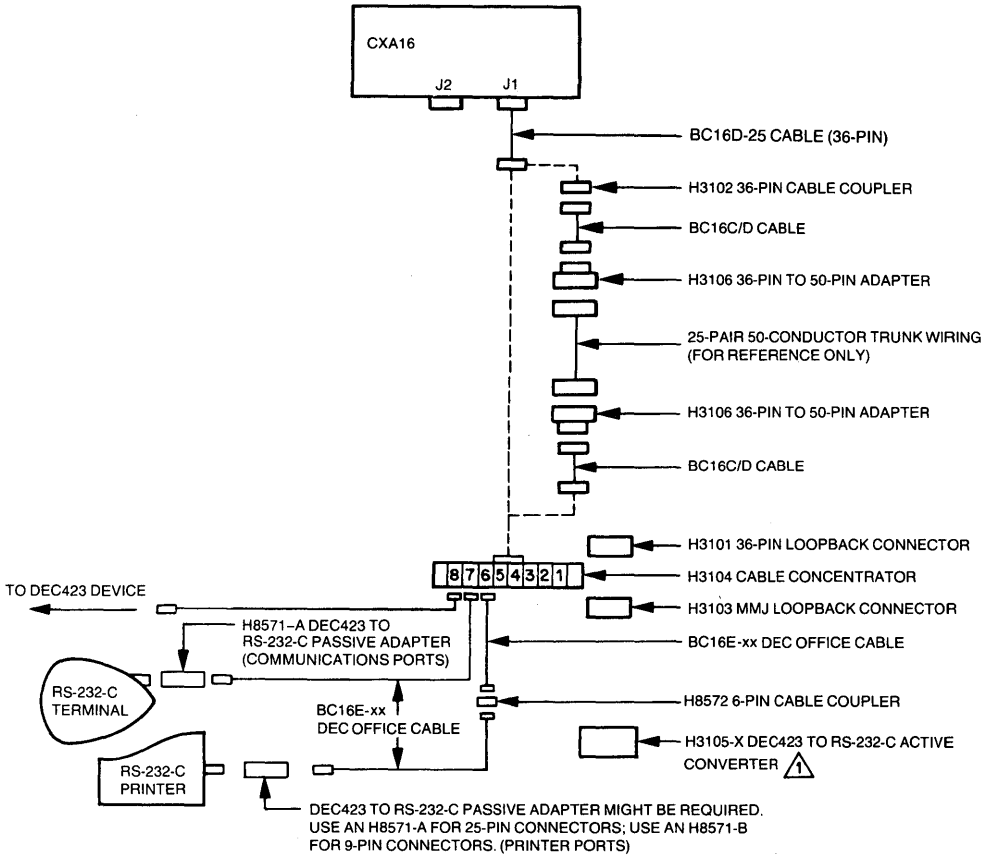


Figure 8 RS-422-A or DEC423 Device Connections



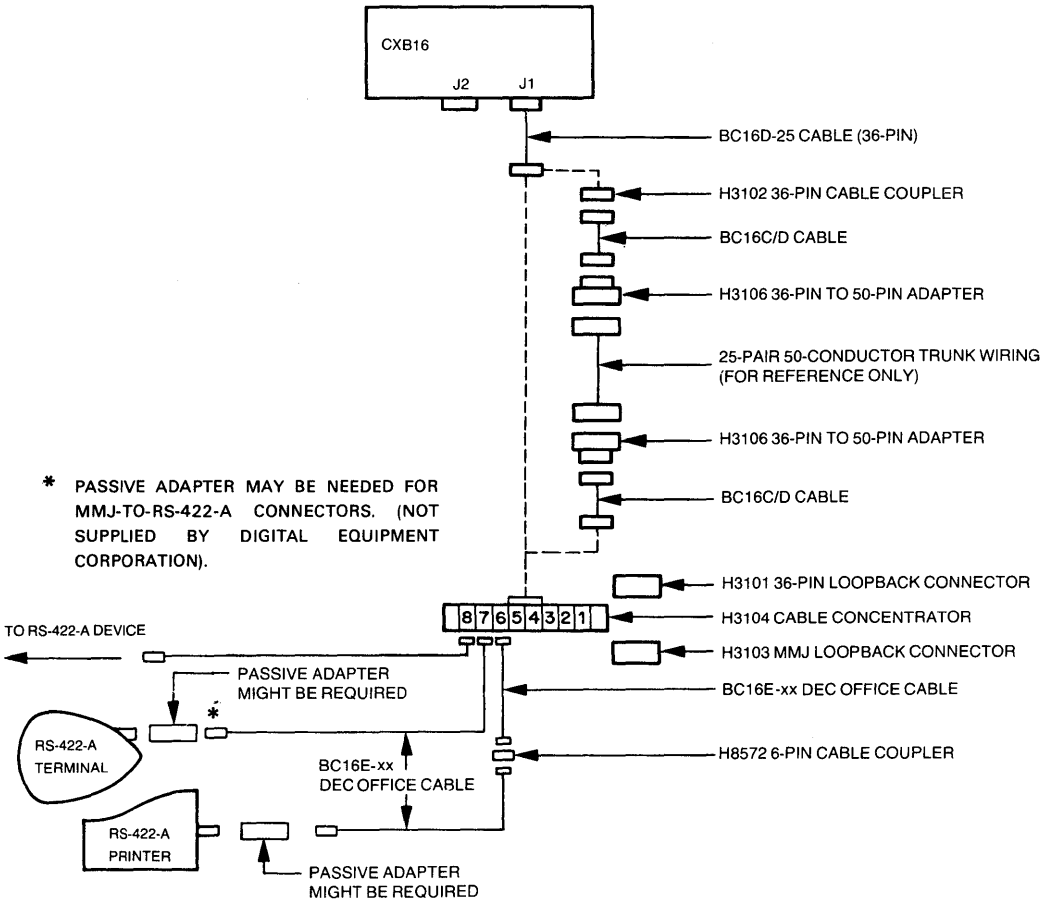
ALSO AVAILABLE (NOT SHOWN):

- **H8240 1000-FOOT SPOOL OF UNTERMINATED** BC16E CABLE FOR CUSTOM WIRING APPLICATIONS.
- H8241 CRIMPING TOOL FOR ATTACHING MMJs TO UNTERMINATED BC16E CABLES.
- H8220 PACKAGE OF 50 MMJ CONNECTORS USED WITH THE H8241 CRIMPING TOOL TO TERMINATE CUSTOM CABLE LENGTHS FROM H8240 SPOOL.

1 DEPENDING ON THE DATA SIGNAL RATES AND CABLE LENGTH, SOME APPLICATIONS MAY REQUIRE THE USE OF THE H3105-X DEC423 TO RS-232-C ACTIVE CONVERTER. SEE YOUR DIGITAL SALES REPRESENTATIVE FOR MORE INFORMATION.

LKG-0880

Figure 9 DEC423 Accessories



ALSO AVAILABLE (NOT SHOWN):

- H8240 1000-FOOT SPOOL OF UNTERMINATED BC16E CABLE FOR CUSTOM WIRING APPLICATIONS.
- H8241 CRIMPING TOOL FOR ATTACHING MMJs TO UNTERMINATED BC16E CABLES.
- H8220 PACKAGE OF 50 MMJ CONNECTORS USED WITH THE H8241 CRIMPING TOOL TO TERMINATE CUSTOM CABLE LENGTHS FROM H8240 SPOOL.

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Figure 10 RS-422-A Accessories

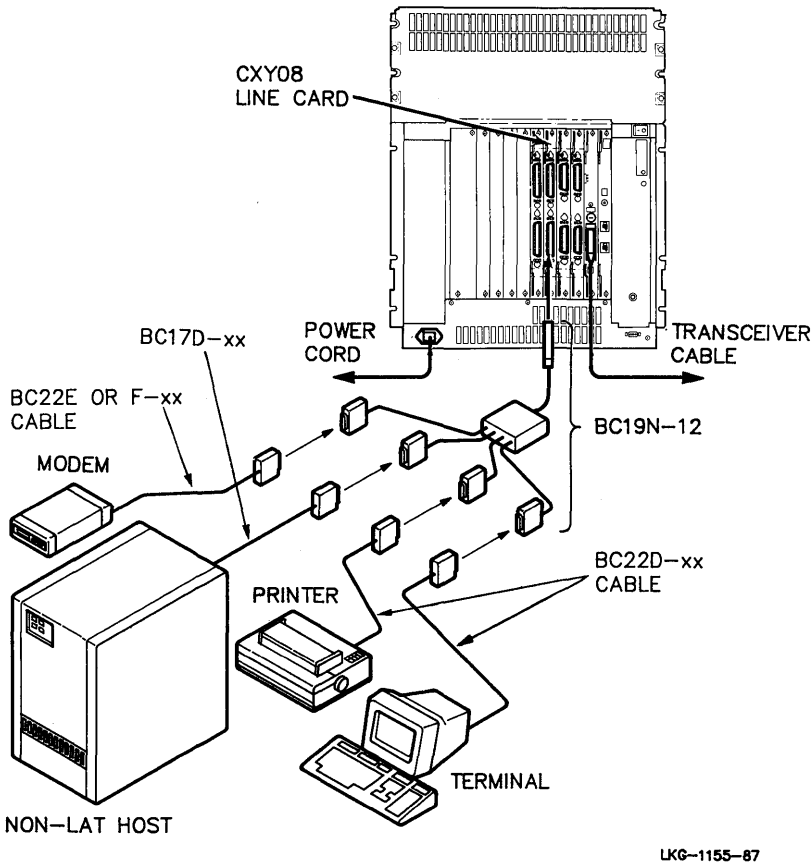

Figure 11 EIA-232-D Device Connection

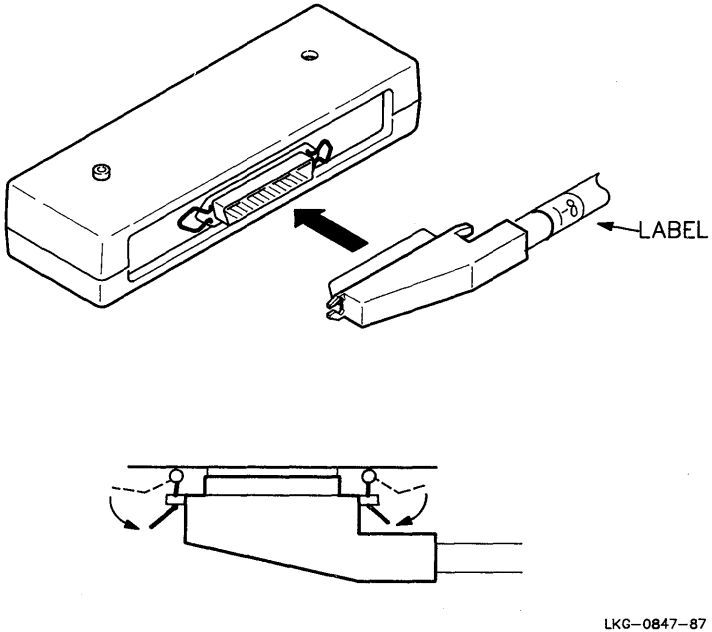

Figure 12 Connecting a BC16D Cable to an H3104 Cable Concentrator

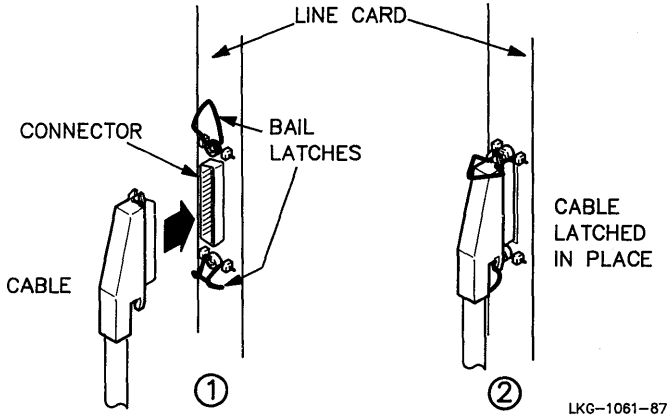

Figure 13 Line-Card Cabling

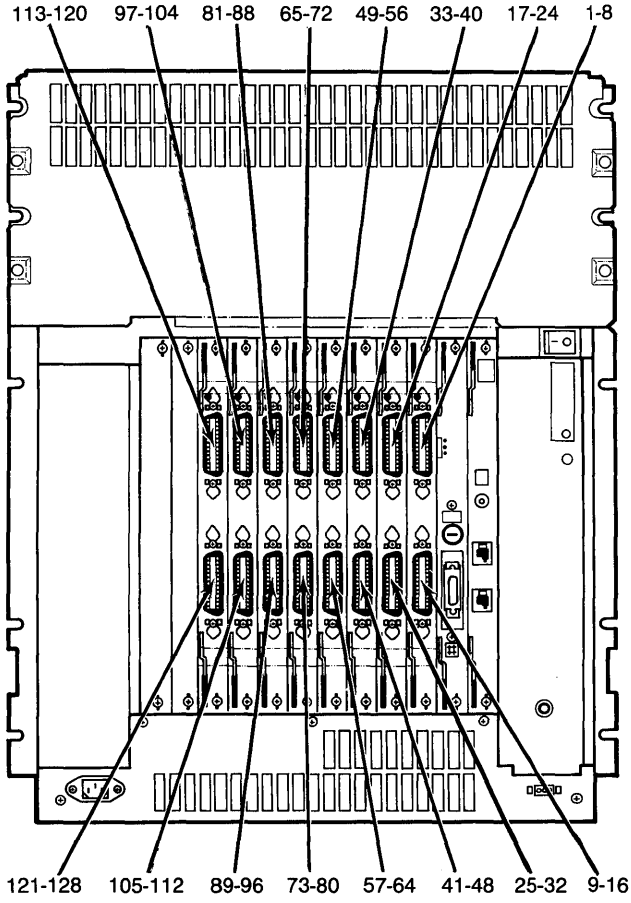

Figure 14 Maximum Port Numbering with CXA16 Line Cards

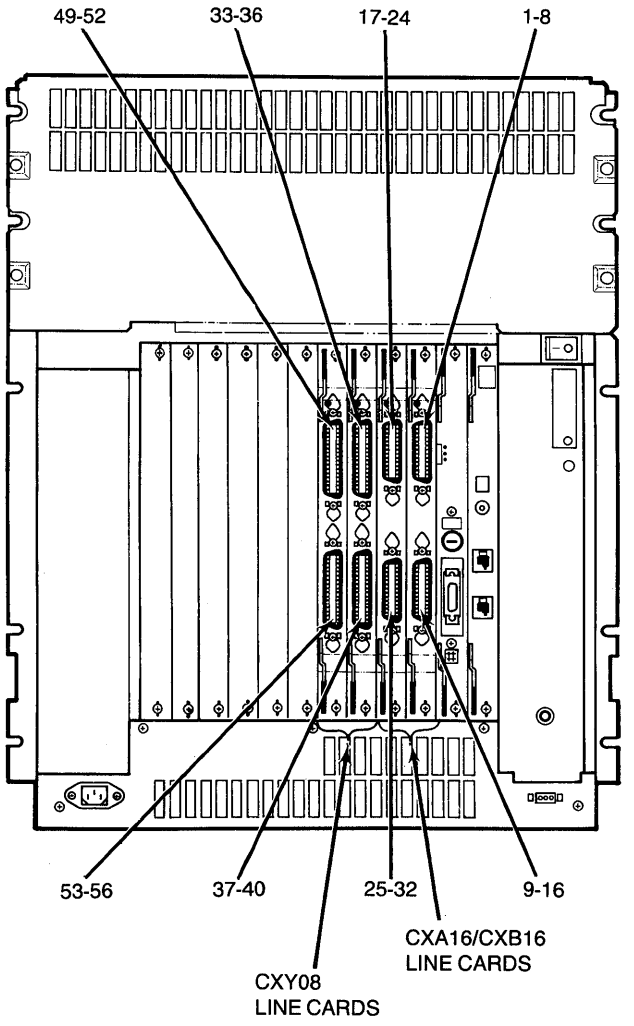

Figure 15 Mixed Line-Card Port Numbering

Table 5 Port Numbering

Item	LC-8	LC-7	LC-6	LC-5	LC-4	LC-3	LC-2	LC-1
Card Slot Range	**113-128**	**97-112**	**81-96**	**65-80**	**49-64**	**33-48**	**17-32**	**1-16**
CXY08 Line Card								
Top Connector	113-116	97-100	81-84	65-68	49-52	33-36	17-20	1-4
Bottom Connector	117-120	101-104	85-88	69-72	53-56	37-40	21-24	5-8
Unused Ports*	121-128	105-112	89-96	73-80	57-64	41-48	25-32	9-16
CXA16 or CXB16 Line Cards								
Top Connector	113-120	97-104	81-88	65-72	49-56	33-40	17-24	1-8
Bottom Connector	121-128	105-112	89-96	73-80	57-64	41-48	25-32	9-16
Unused Ports	none	none	none	none	none	none	none	none

* CXY08 line cards do not use the high-order eight ports of their line-card slot.

Diagnostic Self-Test Program

The server diagnostic self-test program performs two primary functions:

- Tests the server hardware for failures
- Initiates a down-line load of the server from a host computer if no hardware failures are detected

Additionally, the program supports the following functions:

- A boot mode that allows the server software to be loaded when nonfatal hardware errors are detected by the diagnostics. Nonfatal errors are errors that affect only the line cards.
- The use of a local console terminal that enables users to interact with the diagnostic tests to control the testing of specific server modules.
- Maintenance Operations Protocol (MOP) functions that enable the use of a remote console to test server hardware, to load the server software, and to execute an up-line dump of the contents of server memory to a designated host computer.
- The continuous self-testing of the server to support manufacturing testing requirements.
- A System Configuration Verification Program that automatically checks for a valid server hardware configuration each time the server is powered ON or the BOOT switch is pressed.
- An interactive System Configuration Assistance Program that helps the user verify that server modules are properly addressed and installed in the correct slots in the server backplane.

Switch-Selected Diagnostic Boot Modes

The BOOT MODE select switch selects different modes. The modes are listed in Table 6. This switch is a 16-position rotary switch (see Figure 16) located on the face of the CPU module. The unused switch positions are reserved. For more information, see the *DECserver 500 Problem Determination and Service Guide.*

Table 6 Boot Modes

Switch Position	Boot Mode
0	Normal boot, line-card errors allowed
1	Normal boot, no errors allowed
2	Local console, no boot
3	System Configuration Assistance Program, no boot
7	Installation testing, boot

NOTE:
Booting the server in a mode other than those listed will cause the server to malfunction. Verify that the desired boot mode is properly selected.

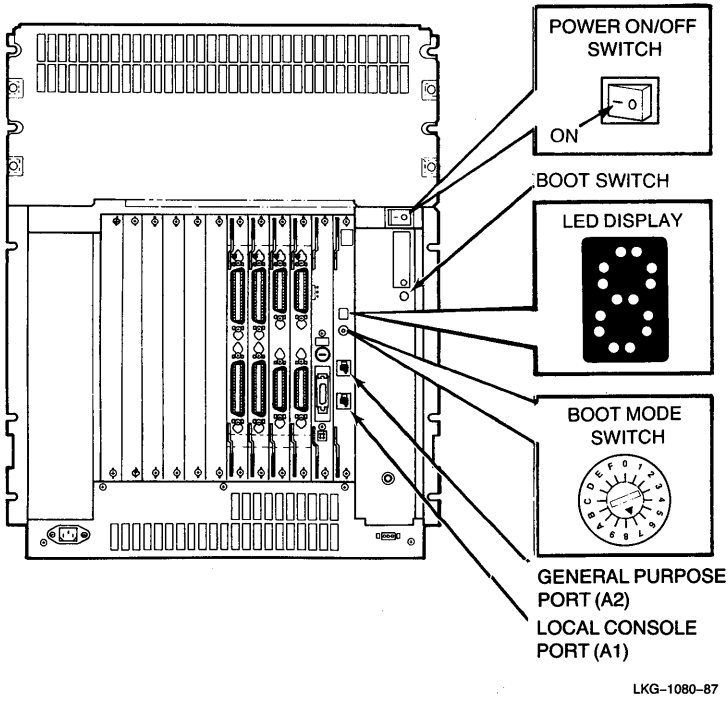

Figure 16 Boot Mode Selection

To select and execute a boot mode, refer to Figure 16 and perform the following steps:

CAUTION

Use a small screwdriver to position the BOOT MODE select switch; otherwise damage to the switch will occur.

1. Using a small screwdriver, turn the BOOT MODE select switch to the number that corresponds to the desired boot mode. Table 6 lists the different boot modes.

2. Boot the server by pressing the BOOT switch.

3. Observe that the selected boot mode is displayed in the LED display for five (5) seconds and then the server proceeds to execute the selected boot mode.

NOTE

The five-second delay allows time to select a different boot mode.

Boot the server in Mode 0 or 1 for normal operation. These modes can be used for troubleshooting.

Each time the server is booted in one of these modes, the diagnostic self-test program executes the following tests before requesting a down-line load of the server software.

- System Kernel Test
- Ethernet Citizenship Test
- Board-Level Line-Card Test
- System Configuration Verification Program

Boot Mode 0 – In Boot Mode 0, line-card faults are nonfatal and are ignored.

Boot Mode 1 – In Boot Mode 1, any hardware fault is considered fatal. When fatal faults are detected, the server displays an error code in the LED display and does not request down-line load of the server software. If the diagnostics detect fatal hardware faults in either Mode 0 or 1, the server displays an error code in the LED display and does not request a down-line load.

Boot Mode 2 – Boot Mode 2 (Local Console), places the server under the control of the server firmware and activates the server Console Commands Interface. Select this mode only when a local console terminal is connected and when there is a need to control system testing for an extended period of time.

When booting the server in Boot Mode 2, the server executes the following tests automatically:

- System Kernel Test
- Ethernet Citizenship Test
- Board-Level Line-Card Test
- System Configuration Verification Program

If these tests complete successfully, the Console Commands Interface activates, the local console prompt (Console >) is displayed at the local console terminal, and control of the server is passed directly to the local console port. The local console terminal can then be used to run more extensive diagnostic tests using the Console Commands Interface commands.

In Boot Mode 2, the Remote Console Facility (RCF) is also enabled. While NCP commands are typically used to activate a remote console, other facilities can also be used depending on the DECnet implementation and the operating system. Once the remote console is activated, it can be used just like the local console to execute Console Commands Interface commands.

When the remote console is activated, the following message appears on the local console:

```
Console >
Remote console activated, no input accepted for local consoles.
Console >
```

While the remote console is activated, the local console becomes an output-only terminal, and a copy of all communications between the remote console and the server is printed at the local console. When the remote console is deactivated, the local console is reactivated and the following message is printed at the local console:

```
Console >
Remote console de-activated, input accepted from local consoles.
Console >
```

Boot Mode 3 (System Configuration Assistance Program) – This diagnostic program helps to verify that the server hardware configuration is valid. This is particularly important when the server hardware is upgraded, or when modules are replaced or are repositioned on the server backplane due to hardware failures.

When booting the server in Boot Mode 3, the server automatically executes the following:

- System Kernel Test
- Ethernet Citizenship Test
- Board-Level Line-Card Test
- System Configuration Verification Program

After completing these tests, the System Configuration Assistance Program must be executed. This program performs the following operations:

1. Prints a map of the server hardware configuration at the local console terminal.

2. Generates the address that corresponds to the selected slot number and prints the following information when module slots are selected using the BOOT MODE select switch:

   a. Selected module slot number
   b. Device address
   c. Vector address
   d. Module type

   If the slot is empty, or the module installed in that slot does not respond, the program prints the following message:

   THIS SLOT HAS NO UNIT INSTALLED.

3. Causes the MODULE OK LED on the module that responds to the address to blink. If the module that responds is in a slot other than the slot selected, then the module should be moved to the correct slot or its address must be changed. If none of the modules respond, then either none of the modules have the address generated or the module having the address failed. If more than one module responds, then two or more modules are set to the same address.

NOTE

When a module is removed from the server, another module or a bus grant module must be installed if a vacant slot is created between modules. The server cannot be operated with a vacant slot between modules on the server backplane. If the server is powered ON with a vacant slot, it will fail the diagnostic self-test program.

To execute the System Configuration Assistance Program, proceed as follows:

1. Connect an interactive terminal to the local console port (A1).

2. Use a small screwdriver to turn the BOOT MODE select switch to position 3.

3. Boot the server using the BOOT switch and observe that the number 3 displays for five (5) seconds in the LED display. If a different number displays, make sure the BOOT MODE select switch is in position 3.

4. After a five-second delay, the System Configuration Verification Program addresses each slot on the server backplane in ascending order (starting with the Ethernet controller module), momentarily lights the MODULE OK LED on each module that responds, and prints a configuration map (see Figure 17) of the server configuration at the local console.

5. The System Configuration Assistance Program then flashes the LED on LC1 in slot 3. If a linecard LED other than the one in slot 3 flashes, then the module is incorrectly addressed.

NOTE

Failure of the MODULE OK LED to blink can also mean that the module is faulty.

6. To check the addressing of the other modules, turn the BOOT MODE select switch to positions 1 through A and observe that the LEDs on each module, except for the CPU module, flash according to the information in Table 7. Additionally, as each module slot is selected, the server prints the module slot number, the module device address and vector, and the module type at the local console terminal. Any deviation from Table 7 or the printout in Figure 18 indicates an addressing problem.

```
Slot - 3   17760440 - 17760456   EXP = 310 ACT = 310 CXA16 IN DHU11 MODE
Slot - 4   17760460 - 17760476   EXP = 320 ACT = 320 CXA16 IN DHU11 MODE
Slot - 5   17760500 - 17760516   EXP = 330 ACT = 330 CXY08 IN DHU11 MODE
Slot - 6   17760520 - 17760536   EXP = 340 ACT = 340 CXY08 IN DHU11 MODE
Slot - 7   17760540 - 17760556   EXP = 350 ACT = 350 CXY08 IN DHU11 MODE
Slot - 8   17760560 - 17760576   EXP = 360 ACT = 360 CXA16 IN DHU11 MODE
Slot - 9   17760600 - 17760616   EXP = 370 ACT = 370 CXA16 IN DHU11 MODE
Slot - 10  17760620 - 17760636   EXP = 400 ACT = 400 CXA16 IN DHU11 MODE
Slot - 11                        This slot has no unit installed.
Slot - 12                        This slot has no unit installed.
Press RETURN to continue
           17772100              Memory Error Register
           17772516              Memory Management Register #3
           17773000 - 17773776   BOOT ROM
Slot - 2   17774440 - 17774456   Ethernet, DEQNA Vector = 120
                                 Physical Address: 08-00-2B-00-9C-1C
           17776500 - 17776506   SLU1 (alternate console)
           17777520              Native Mode Register
           17777546              Line Time Clock CSR, BEVENT = 1
           17777560 - 17777566   SLU0 (main console)
           17777572 - 17777576   Memory Management Registers 0, 1, 2
           17777750 - 17777752   Maintenance Register
           17777766              CPU Error Register
Press <CTRL/C> to leave Configuration Assistance Mode
```

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Figure 17 System CAP Printout Number 1

Table 7 Switch Positions for Server Module Slots

Switch Positions	Slot Address
1	CPU
2	NET
3	LC1
4	LC2
5	LC3
6	LC4
7	LC5
8	LC6
9	LC7
A	LC8

```
Slot 1 is the CPU slot.
Slot - 2  17774440 - 17774456  Ethernet, DEQNA, VECTOR = 120
                               Physical Address: 08-00-2B-00-9C-1C
Slot - 3  17760440 - 17760456  VECTOR = 310  CXA16 IN DHU11 MODE
Slot - 4  17760460 - 17760476  VECTOR = 320  CXY08 IN DHU11 MODE
Slot - 5  17760500 - 17760516  VECTOR = 330  CXA16 IN DHU11 MODE
Slot - 6  17760520 - 17760536  VECTOR = 340  CXA16 IN DHU11 MODE
Slot - 7  17760540 - 17760556  VECTOR = 350  CXA16 IN DHU11 MODE
Slot - 8  17760560 - 17760576  VECTOR = 360  CXY08 IN DHU11 MODE
Slot - 9  17760600 - 17760616  VECTOR = 370  CXA16 IN DHU11 MODE
Slot - 10 17760620 - 17760636  VECTOR = 400  CXA16 IN DHU11 MODE
```

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Figure 18 System CAP Printout Number 2

Boot Mode 7 (Installation Testing) – This mode is intended for initial installation of the server hardware and software. This mode is also used for troubleshooting. When the server is booted in this mode, the following tests are automatically executed:

- System Kernel Test
- Ethernet Citizenship Test
- Board-Level Line-Card Test
- System Configuration Verification Program
- Extended Ethernet Interface Test
- Extended Line-Card Test
- System Exerciser Test
- Internal Loopback Test

On successful completion of the above tests, the server automatically initiates the loading of server software by sending out an MOP Request Program message over the Ethernet LAN using the MOP dump/load multicast address.

NOTE

Boot Mode 7 should not be used for normal operation. Because additional testing is done in this mode, the server takes longer to boot. Therefore, to expedite booting the server for normal operation, use either Boot Mode 0 or Boot Mode 1. Boot Mode 0 is recommended because it allows a remote console to be used for troubleshooting when a line card fails.

Status and Error Codes LED Display

The LED display provides a visual indication of server status. It displays status and error codes that indicate whether the server is operating properly or whether it has failed. In case of failures, the error code assists in isolating the fault.

The codes displayed by the LED display fall into two general categories:

- **Diagnostic Status and Error Codes** – These codes are displayed while the server self-test diagnostics are running.

- **Software Status and Error Codes** – These codes are displayed after successful completion of server diagnostics and initiation of the down-line load request for server software.

Diagnostic Status and Error Codes – Status and error codes are displayed in the LED display (refer back to Figure 16) while the server diagnostic self-test program is running. The codes indicate which test is currently executing or has failed. Refer to Table 8 for an explanation of each diagnostic status and error code.

Server Software Status and Error Codes – The server software status and error codes are not displayed until after the successful completion of the diagnostics and the initiation of a down-line load request for server software. While the software is being loaded, the LED display indicates the load status. For example, the LED display alternately flashes the letter B and the number 3 to indicate that a load host has responded to the server's request for a down-line load and that the server software is about to be loaded.

After the software is successfully loaded, the LED display indicates that the software is running by alternately flashing the numbers 0 and 8. If the software does not load successfully or fails after it has been loaded, the LED display indicates the type of failure.

Refer to Table 9 for an explanation of each software status and error code.

Table 8 Diagnostic Status and Error Codes

LED Display	Description SLASH (/) = ALTERNATING DISPLAY
STATUS CODES	
1	Indicates that the System Kernel Test is running. The system kernel comprises the CPU, ROM, and RAM on the CPU module.
1/2	Indicates that the Ethernet Citizenship Test and Board-Level Line-Card Test on all modules except the CPU module are running.
1/C	Indicates that the System Configuration Verification Program is executing.
1/3	Indicates that the Extended Ethernet Interface Test is running.
1/4	Indicates that the Extended Line-Card Test is running.
1/5	Indicates that the System Exerciser Test is running.
1/6	Indicates that the server is under the control of the local console.
1/7	Indicates that the server is under the control of a remote console.
LED Display	**Description**
ERROR CODES	
0	Indicates failure of the System Kernel Test.
E/2	Indicates failure of the Ethernet Citizenship Test or the Board-Level Line-Card Test. If the Ethernet Citizenship Test fails, at least one of the LEDs on the Ethernet controller module illuminates. If the Board-Level Line-Card Test fails, the LED on the faulty line card extinguishes.
E/3	Indicates failure of the Extended Ethernet Interface Test.
E/4	Indicates failure of the Extended Line-Card Test.
E/5	Indicates failure of the System Exerciser Test.
E/C	Indicates that a software error has occurred within the diagnostic self-test program.
E/F	Indicates that a hardware configuration error was detected by the System Configuration Verification Program.

NOTE:
If error codes other than those listed in this table are displayed, reboot the server and observe the sequence of status codes up to the point of failure.

Table 9 Server Software Status and Error Codes

LED Display	Description SLASH (/) = ALTERNATING DISPLAY
B/1	Indicates that the server is requesting a load host by specific address.
B/2	Indicates that the server is requesting a load host by issuing a multicast message. The first host computer to respond becomes the load host for the duration of the down-line load.
B/3	Indicates that the load host has responded and the server is requesting that the software be down-line loaded.
B/4	Indicates that the software is being down-line loaded.
B/5	Indicates that the server software is initializing and is starting up.
0/8	Indicates that the software is running normally.
E/B	Indicates that efforts to down-line load the server software from a load host failed.
E/C	Indicates that a software error has occurred within the diagnostic self-test program.
F	Indicates that the server failed to successfully complete software initialization due to an internal software problem or to an unsupported hardware configuration.
D/1	Indicates that the server has requested a specific host computer to serve as a dump host.
D/2	Indicates that the server has issued a multicast message for a dump-host volunteer.
D/3	Indicates that server memory is being dumped to a host computer.
D/4	Indicates that server memory has been dumped to a host computer.
E/D	Indicates that efforts to dump server memory to a host computer failed.

Module Self-Test LEDs
All of the modules have LEDs that indicate whether the Board-Level Line-Card Test executes successfully.

CPU Module
The CPU module board-level test checks the system kernel, that is; the CPU, ROM, and RAM. If a failure is detected, the number 0 displays in the LED display.

Ethernet Controller Module
DEQNA, the Ethernet controller module, has three LEDs that are all turned ON when the server is powered up or when the BOOT switch is pressed. The Ethernet Citizenship Test then turns OFF the LEDs one at a time to indicate that the following events have occurred:

1. The first LED turns OFF when the test starts running.
2. The second LED turns OFF after the module's internal loopback test executes successfully.
3. The third LED turns OFF after the module's external loopback test executes successfully.

If one or more of the LEDs remain ON, it means that the Ethernet controller module has failed the test.

NOTE
If the Ethernet Citizenship Test fails, the server displays error code E/2 in the LED display on the CPU module.

CXA16, CXB16, and CXY08 Line Cards
Each line card has a MODULE OK LED. The LED turns ON to indicate that the module Board-Level Line-Card Test has executed successfully.

The effect that failing the Board-Level Line-Card Test has on the server depends on the boot mode. In Boot Mode 0 (line-card errors allowed), the diagnostic self-test program issues a request for a down-line load of the server software. In Boot Mode 1 (no errors allowed), the diagnostic self-test program does not issue the down-line load request, but displays error code E/2 in the LED display on the CPU module.

Server Local Console Ports
The server is equipped with two local ports (refer to Figure 16).

- **The Local Console Port** – An input/output port used to connect the local console. This port is provided primarily for use during installation, maintenance, and reconfiguration of the server. The server software considers this port to be port 0.
- **The General Purpose Port** – Operational only when the diagnostic firmware is running on the server, but not when the server software is running. It is a backup port during diagnostic testing. If the local console port fails, this port can be used for the same purpose.

Local Console Terminal
A local console terminal is used to monitor server events during the execution of the server diagnostic self-test program and to display diagnostic and software error messages. If the server fails, the local console terminal can also be used for troubleshooting.

To execute an up-line dump of the server memory, refer to the *DECserver 500 Problem Determination and Service Guide.*

To execute a dump using the CRASH command, enter the following commands:

Local> SET PRIVILEGED<RET>

Password> SYSTEM (Default password, not echoed)<RET>

Local> CRASH<RET>

Spares
The modules contained in the Field Service spares kits, and the loopback connectors applicable to the DECserver 500 server, are listed in Table 10.

Table 10 Server Spares and Test Equipment

Spare/Equipment	Part Number
AC switch assembly	70-01469-01
AC line filter	70-23769-01
Backplane blank module cover (single width)	70-23981-01
BC16D-xx cable	N/A
BC19N-xx cable	N/A
Bus grant module	M9047
Cable concentrator	H3104
CXA16 line card	M3118-YA
CXB16 line card	M3118-YB
CXY08 line card	M3119-YA
DC fans (left or right)	12-23609-04
DEQNA-SA Ethernet controller module	M7504-PA
Ethernet 15-pin loopback connector	12-22196-01
Fuse for the Ethernet controller module	N/A
H3101 CXA16/CXB16 module/cable 36-way loopback connector	12-25146-01
H3103 cable concentrator MMJ loopback connector	12-25083-01
H3197 CXY08 25-pin cable loopback connector	12-15336-07
H3046 CXY08 module 50-way loopback connector	12-26964-01
KDJ11-SB CPU module	M7554-PB
Power cable (backplane to dc fans)	17-01360-01
Power supply (120 Vac/240 Vac)	H7868-A/H7868-B

NOTE:
Refer to the *DECserver 500 Hardware Installation Guide* for electrical schematics of the DECserver 500 loopback connectors.

FRU Removal and Replacement Procedures

This section describes how to remove and how to install the server field replaceable units (FRU). In cases where the installation procedure is different from the removal procedure, a separate installation procedure is provided.

WARNINGS

The procedures described should be performed by qualified service personnel only. DO NOT attempt to remove any FRUs while server power is turned ON.

SAFETY REGULATIONS REQUIREMENT: Do not apply power to the server unless all modules and blank module covers are installed. The server must not be operated with uncovered module slots.

CAUTION

Static electricity can damage system components. Use a grounded wrist strap (29-11762-00) and grounded work surface when accessing any internal part of the system.

Cover Removal and Replacement

The office model of the server is equipped with front and back covers. All FRUs except the backplane are accessed from the front of the server and, therefore, require only the front cover to be removed. To remove the backplane, both covers must be removed.

Front Cover – To remove the cover, perform the following steps:

1. Refer to Figure 19 and insert the antistatic key into the keyhole and turn it clockwise to the STOP position (unlocking the front cover).

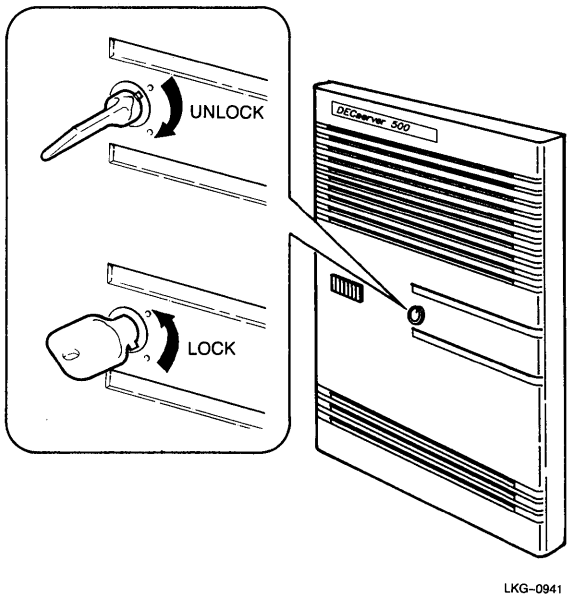

Figure 19 Unlocking the Front Cover

2. Refer to Figure 20 and lift the cover up and then outward.

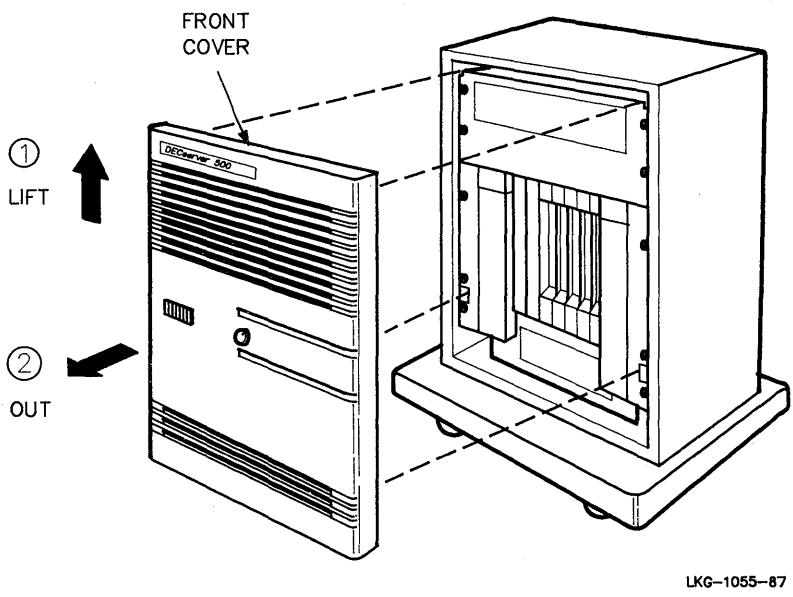

Figure 20 Cover Removal

To replace the cover, refer back to Figure 20 and perform the removal steps in reverse order:

1. Insert the antistatic key in the keyhole and turn it clockwise to the STOP position.
2. Position the front cover so that the door brackets slide onto the notches in the server frame.
3. Lock the cover in place by turning the key counterclock- wise to the STOP position.

Rear Cover – To remove and replace the rear cover, refer to Figure 21 and perform the following steps:

NOTE
This procedure requires a phillips-head screwdriver.

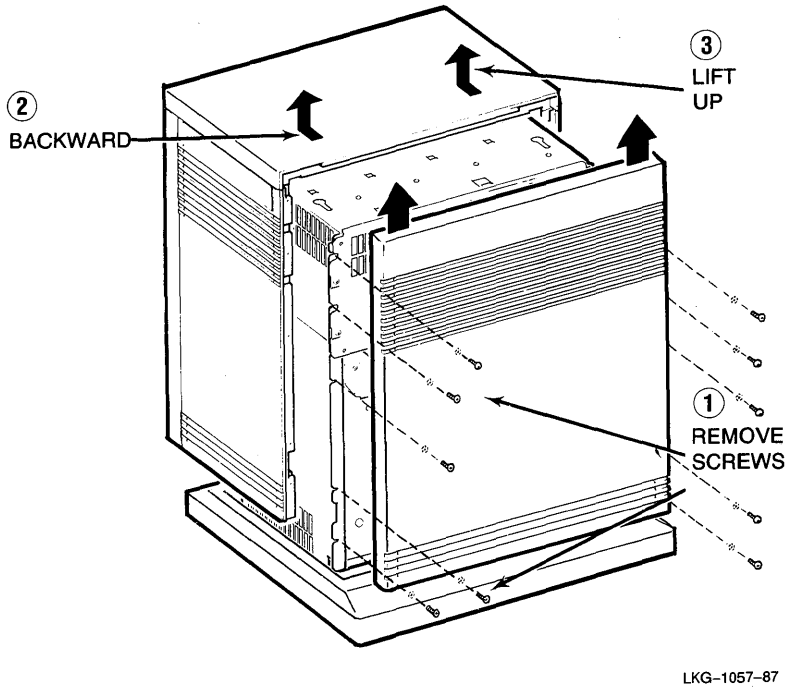

Figure 21 Rear Cover Removal and Installation

1. Remove the front cover as described earlier.
2. Remove the ten (10) screws (five on each side) holding the rear cover to the front of the chassis.

NOTE
The rear cover is bound to the top panel and side panels. The four panels constitute the rear cover and are removed as one piece.

3. To remove the rear cover, slide it backward about 2.4 cm (1 inch) to disengage the two buttons on the top panel from the two slots at the top of the chassis.
4. Lift the rear cover up and away from the chassis.
5. To replace the cover, reverse the above steps.

Module Removal

NOTE
If blank slots are left between modules on the server backplane, the server will fail the diagnostic self-test. Because the bus-request and bus-grant signals are passed from slot to slot by the modules, a blank slot prevents modules beyond the open slot relative to the CPU module from gaining control of the Q-bus.

To remove a module, perform the following steps:

NOTE
This procedure requires a phillips-head screwdriver.

1. If the server has a front cover, remove the cover as described earlier.
2. Set the server power ON/OFF switch to the OFF position and unplug the power cord.

WARNING
ELECTRICAL SHOCK HAZARD: Do not remove or replace any FRUs with power applied to the server.

3. Refer to Figure 22 and loosen the two (2) 1/4-turn fasteners securing the handle to the card cage by pressing in and turning in a counterclockwise direction.

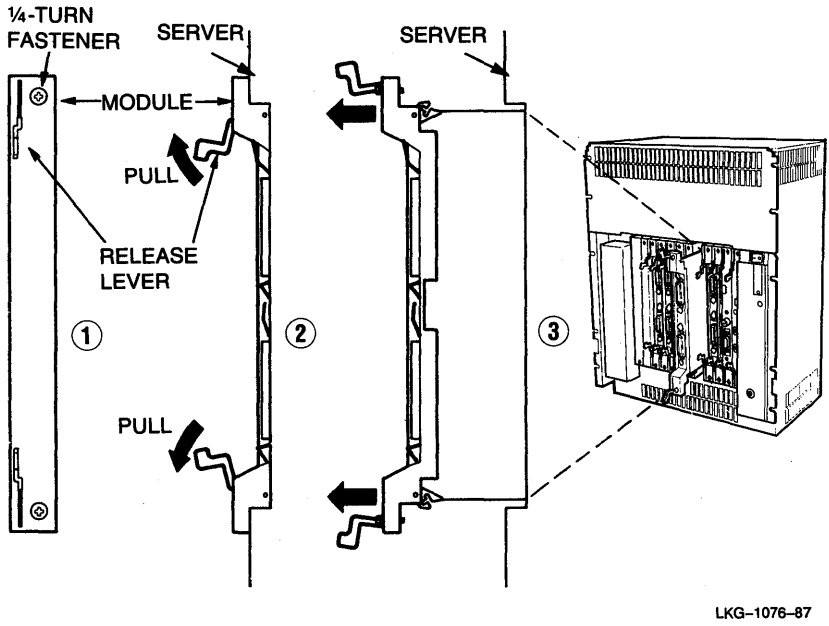

Figure 22 Module Removal

4. Simultaneously pull the upper and lower release levers outward to disengage the module from the backplane. Gently slide the module outward and remove it from the server.

5. Put the module in a safe place.

6. If the module is to be returned to Digital Equipment Corporation, it must be properly packed for shipping.

NOTE

If the module is to be replaced by a new module, use the shipping container and packing material from the new module to pack and ship this module.

Power Supply Removal and Installation

To remove and replace the power supply, perform the following steps:

NOTE
This procedure requires a phillips-head screwdriver and a flathead screwdriver.

1. If the server has a front cover, remove the cover as described earlier.

2. Set the server power ON/OFF switch to the OFF position and unplug the power cord.

WARNING
ELECTRICAL SHOCK HAZARD: Do not remove or replace any FRUs with power applied to the server.

3. Refer to Figure 23 and remove the five (5) screws securing the metal ventilation plate (located just below the modules) and remove the plate.

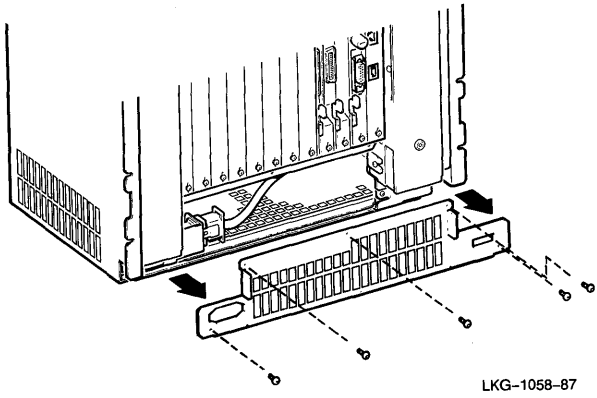

Figure 23 Ventilation Plate Removal

4. Refer to Figure 24 and loosen the two (2) fasteners holding the power supply to the server enclosure.

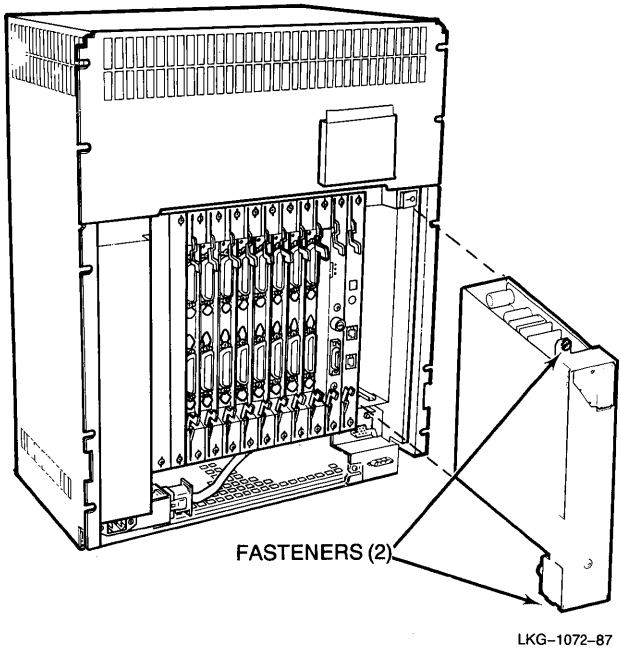

Figure 24 Power Supply Removal and Installation

5. Slowly slide the power supply out of the server.

CAUTION

The power supply is directly connected to the backplane. Remove it slowly to avoid damage to the backplane connector.

6. To install the new power supply, reverse the above steps.

CAUTION

When installing the power supply, be sure that the bottom and top edges of the supply are mounted in the plastic guides in the card cage.

AC Switch Assembly Removal and Installation

To remove and replace the ac switch assembly, perform the following steps:

NOTE

This procedure requires a phillips-head screwdriver, a flathead screwdriver, and a small ratchet set.

1. If the server has a front cover, remove the cover as described earlier.

2. Set the server power ON/OFF switch to the OFF position and unplug the power cord.

WARNING

ELECTRICAL SHOCK HAZARD: Do not remove or replace any FRUs with power applied to the server.

3. Remove the power supply as described earlier.

4. Refer to Figure 25 and remove the three (3) screws holding the bottom of the ac switch assembly to the server enclosure.

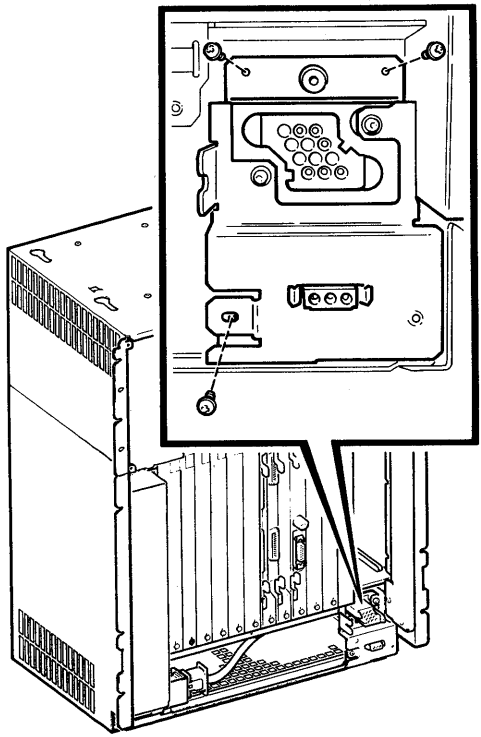

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Figure 25 AC Switch Assembly Screw Removal

5. Refer to Figure 26 and locate the three (3) bolts holding the ac switch assembly to the right side of the server enclosure, and remove the nuts from the bolts.

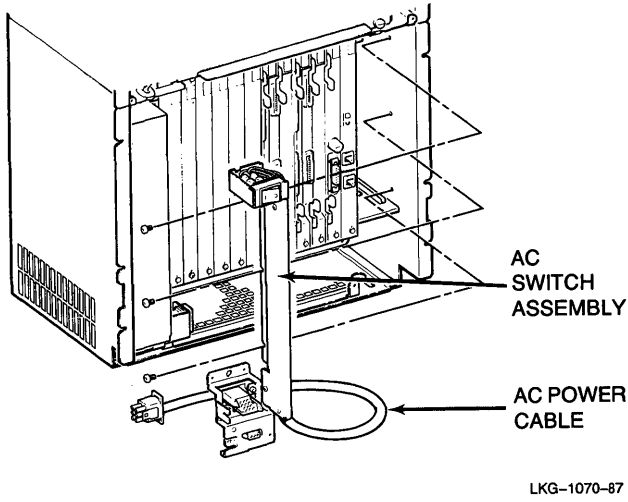

Figure 26 Removing the AC Switch Assembly

6. Disconnect the ac power cable from the plug on the ac line filter. The power cable is part of the ac switch assembly.

7. Slowly slide the assembly out of the server.

8. To install the new ac switch assembly, reverse the above steps.

CAUTION

When installing the power supply, be sure that the bottom and top edges of the supply are mounted in the plastic guides in the card cage.

AC Line Filter Removal and Installation

To remove and replace the ac line filter, perform the following steps:

NOTE
This procedure requires a phillips-head screwdriver.

1. If the server has a front cover, remove the cover as described earlier.

2. Set the server power ON/OFF switch to the OFF position and unplug the power cord.

WARNING
ELECTRICAL SHOCK HAZARD: Do not remove or replace any FRUs with power applied to the server.

3. Refer back to Figure 23 and remove the five (5) screws securing the metal ventilation plate (located just below the modules) and remove the plate.

4. Refer to Figure 27 and loosen the two (2) screws holding the left-most server panel in place, and remove the panel.

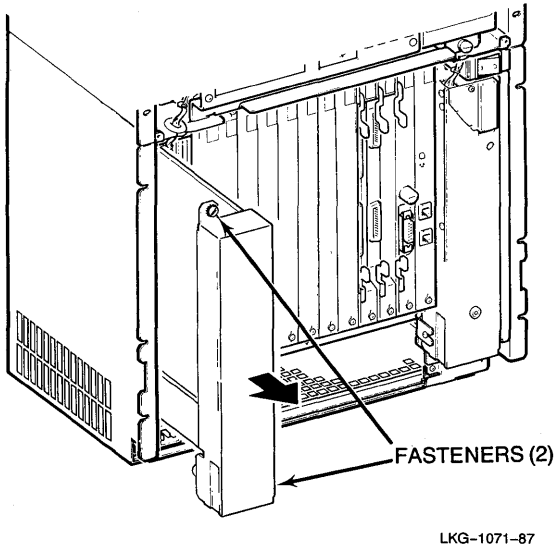

Figure 27 Left-Most Panel Removal

5. Refer to Figure 28 and disconnect the ac power cable from the ac line filter.

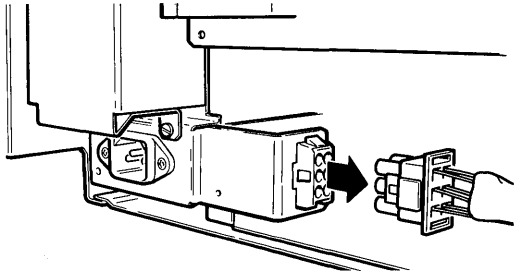

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Figure 28 Unplugging the AC Power Cable

6. Refer to Figure 29, remove the three (3) screws holding the ac line filter in place, and slide the filter out of the server.

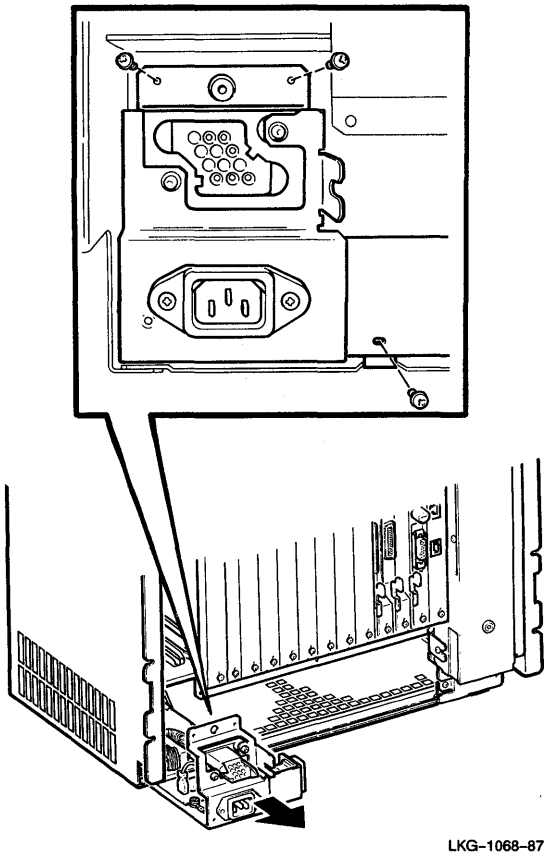

Figure 29 Removing the AC Line Filter

7. To install the new ac line filter, reverse the above steps.

Fan Removal and Installation
Two cooling fans are attached to a metal plate bolted to the bottom of the card cage.

To remove and install the fans, perform the following steps:

NOTE
This procedure requires a phillips-head screwdriver.

1. If the server has a front cover, remove the cover as described earlier.
2. Set the server power ON/OFF switch to the OFF position and unplug the power cord.

WARNING
ELECTRICAL SHOCK HAZARD: Do not remove or replace any FRUs with power applied to the server.

3. Remove the ac line filter as described earlier.
4. Refer to Figure 30 and carefully disconnect the two (2) dc power cords from the fans.

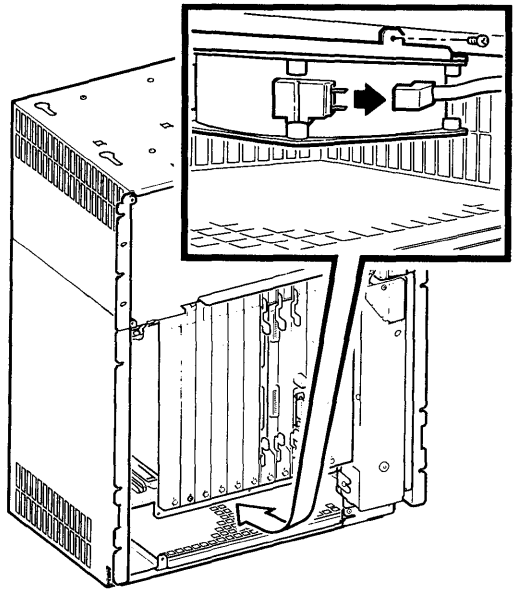

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Figure 30 Disconnecting the Fan Power Cords

5. Refer to Figure 31 and locate the two (2) screws that hold the fans in place, and remove them.

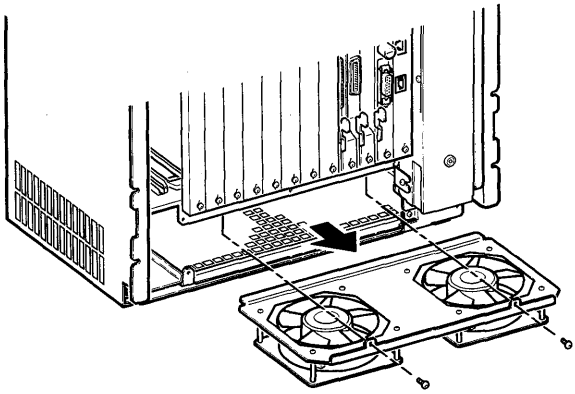


Figure 31 Fan Removal and Installation

6. Lower the metal plate and remove the fans from the server.

7. Remove the fan(s) from the metal plate.

8. To install the new fans, reverse the above steps.

CAUTION

When installing the new fans, be sure the fans are positioned so that the direction of the airflow is down. Each fan has arrows next to the power connector to indicate the direction of fan rotation and airflow.

CPU Module Installation Procedure
The CPU module installation procedure is made up of the following steps:

- Module installation
- Testing

Module Installation – Perform the following steps:

NOTE
This procedure requires a phillips-head screwdriver.

1. Ensure that the server power ON/OFF switch is OFF and the power cord is unpluged.

WARNING
ELECTRICAL SHOCK HAZARD: Do not remove or replace any FRUs with power applied to the server.

2. Hold the module up to the CPU module slot with the component side facing the power supply.

3. Align the module with the card cage guides and slide it into the slot until it engages the backplane. The module handle should be about a 1/4-inch from being flush with the Ethernet controller module handle when it engages the backplane.

4. Simultaneously pull the upper release lever down and the lower release lever up to fully seat the module. The module handle should now be flush with the Ethernet controller module handle.

5. Carefully press in on the 1/4-turn fasteners and turn them clockwise to secure the module.

Testing - To test the CPU module to ensure that it is working properly, proceed as follows:

1. Refer to the "Connecting A Local Console Terminal" section and connect an interactive terminal to local console port A1.

2. Plug in the server power cord and set the server power ON/OFF switch to ON.

3. Observe that the CPU light emitting diode (LED) display illuminates.

4. Use a small screwdriver to set the BOOT MODE select switch to position 2 (Local Console mode). The server allows five (5) seconds for a boot mode to be selected when the power ON/OFF is turned ON; otherwise, simply press the BOOT switch after selecting Boot Mode 2.

5. Observe that the server executes the diagnostic self-test program and then alternately displays the numbers 1 and 6 in the LED display to indicate that the local console terminal is activated.

6. Type the following commands at the local console prompt:

```
Console >Desel/test:all<RET>
Console >Sel/test:Sys<RET>
Console >Start/EOP:1<RET>
```

NOTE

While the System Exerciser Test is executing, the LED display alternately displays the numbers 1 and 5.

7. Observe the local console for error information. If the test passes, the message: "End of Pass 1" is displayed. If the test fails, the message: "n errors" is displayed (n equals the number of errors detected).

Ethernet Controller Module Installation Procedure
The module installation procedure is made up of the following steps:

- Module preparation
- Module installation
- Testing

Module Preparation – Before installing the Ethernet controller module, the module jumpers must be *verified* and the Ethernet address chip must be *swapped* with the Ethernet address chip on the faulty Ethernet controller module.

Verifying Module Jumpers
The module is configured with three jumpers, W1 through W3. When the module is shipped, the jumpers are properly configured for the server. Use Figure 32 and Table 11 to verify that the jumpers are properly configured.

Swapping the Ethernet Address Chip and Address Plate
The Ethernet controller module is equipped with an Ethernet address chip that determines the server's Ethernet address. If the Ethernet address changes, the node database on each load host must be updated with the DSVCONFIG procedure to swap the server's Ethernet address in the database. To avoid having to do that, remove the address chip and the address plate from the Ethernet controller module that failed and install that chip and plate on the new module.

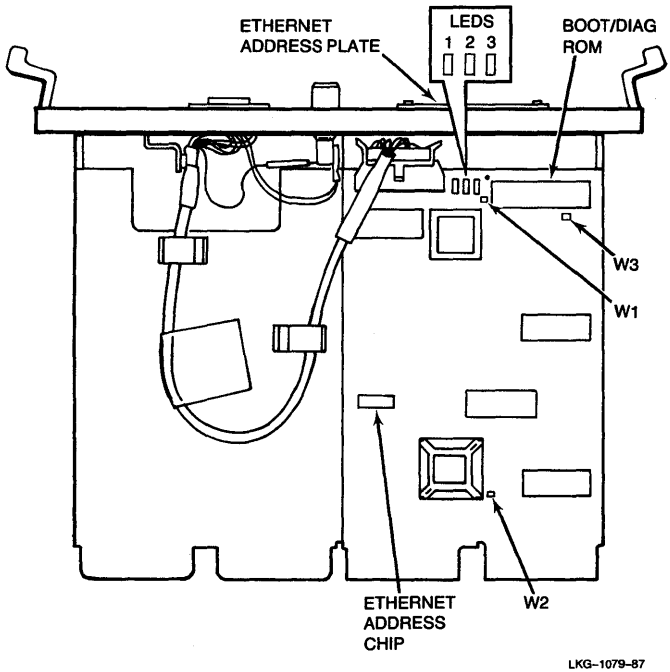


Figure 32 Ethernet Controller Module

Table 11 Ethernet Controller Module Jumper Configuration and Functions

Jumper	Installed	Function Selected
W1	Yes	Device address (17774440)
W2	No	Bus request holdoff timer (disabled)
W3	Yes	Sanity timer (disabled)

Perform the following steps:

1. Refer back to Figure 32 and locate the Ethernet address chip and the address plate on the new module.

2. Refer to Figure 33 and use the chip removal tool supplied with the module to remove the chip.

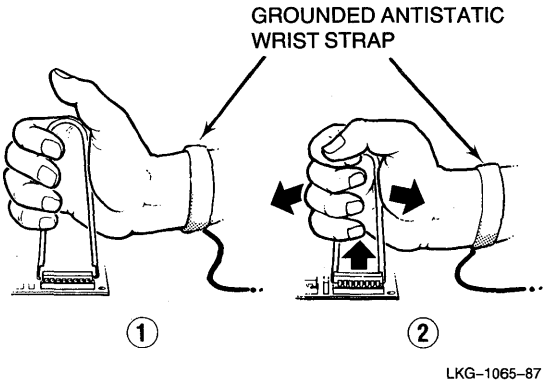


Figure 33 Removing the Ethernet Address Chip

3. Remove the Ethernet address plate from the new module.

4. Put the chip and the plate into an envelope and label it "new address parts." This prevents confusing the new parts with the old parts.

5. Remove the address chip and the address plate from the old Ethernet controller module.

6. Refer to Figure 34 and position the old chip over the chip socket slots on the new module. Make sure that the notch on the chip is on the correct side, and align one side at a time before pressing the chip down into the socket.

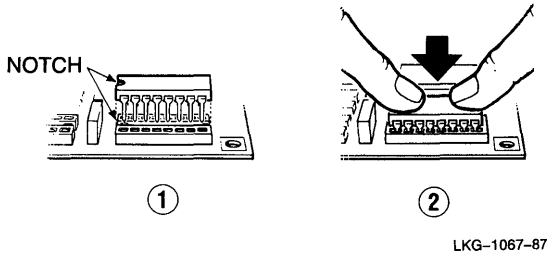


Figure 34 Installing the Ethernet Address Chip

7. Press the chip into place, being careful not to bend the legs.

8. Install the old address plate on the new module.

Module Installation – Perform the following steps:

NOTE
This procedure requires a phillips-head screwdriver.

1. Set the server power ON/OFF switch to the OFF position and unplug the power cord.

WARNING
ELECTRICAL SHOCK HAZARD: Do not remove or replace any FRUs with power applied to the server.

2. Hold the module up to the Ethernet controller module slot with the component side facing the CPU module.

3. Align the module with the card cage guides and slide it into the slot until it engages the backplane. The module handle should be about a 1/4-inch from being flush with the CPU module handle when it engages the backplane.

4. Simultaneously pull the upper release lever down and the lower release lever up to fully seat the module. The module handle should now be flush with the CPU handle.

5. Carefully press in on the 1/4-turn fasteners and turn them clockwise to secure the module.

6. Refer to Figure 35 and, if necessary, unlock the slide latch on the Ethernet connector, install the transceiver cable, and lock the slide latch.

7. Tug gently on the transceiver cable to be sure it is securely connected.

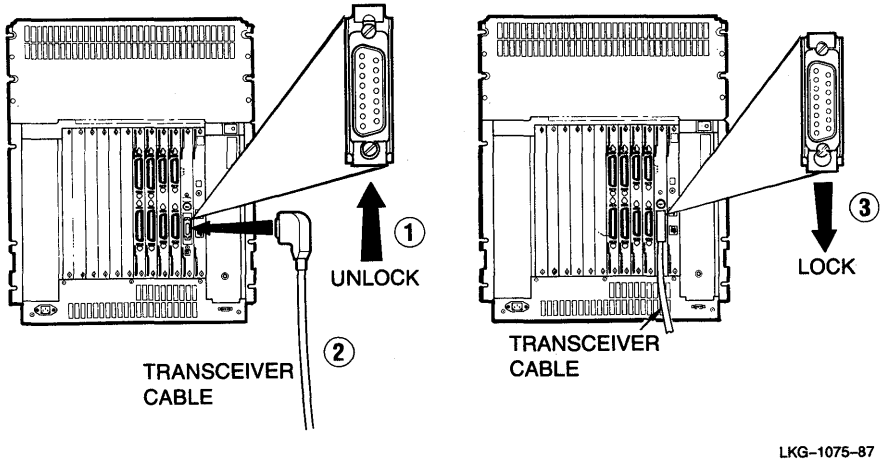


Figure 35 Installing the Transceiver Cable

Testing – Perform the following tests to verify that the Ethernet controller module and the server are operating properly.

NOTE

In order to successfully run the Ethernet Citizenship Test, the server must be connected to an operational Ethernet transceiver, or an Ethernet loopback connector must be installed on the Ethernet controller module.

LED Checks

The Ethernet controller module has three LEDs that indicate the results of the Ethernet diagnostic tests (see Figure 36). Table 12 defines the LED indications.

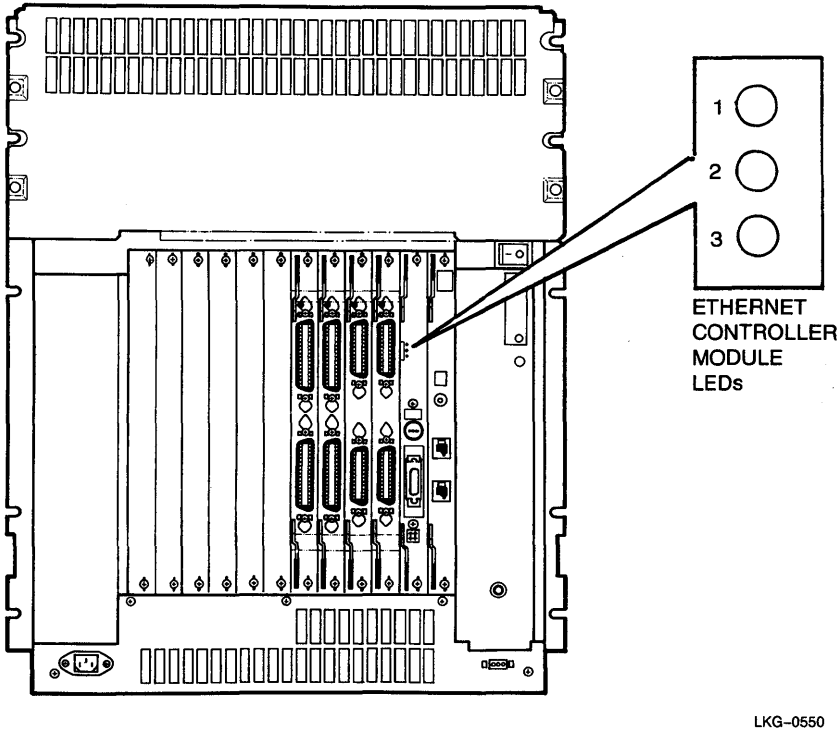


Figure 36 Ethernet Controller Module LEDs

Table 12 Ethernet Controller Module LED Indications

LED 1	LED 2	LED 3	Definition
OFF	OFF	OFF	The module passed the Ethernet Citizenship Test.
OFF	OFF	ON	Transceiver, Ethernet, or cable error.
OFF	ON	ON	Module internal error.
ON	ON	ON	Cannot load boot/diagnostic ROM contents, the bootstrap has not yet executed, or the first set-up message frame has failed.

Test Procedure
To test the module:

1. Refer to the "Connecting A Local Console Terminal" section and connect an interactive terminal to local console port (A1).

2. Plug in the server power cord and set the server power ON/OFF switch to ON.

3. Observe that all three LEDs on the Ethernet controller module turn ON within 1 second after the power is turned ON.

4. Use a small screwdriver to set the BOOT MODE select switch to position 2 (Local Console mode). The server allows five (5) seconds for a boot mode to be selected when the power ON/OFF is turned ON; otherwise, simply press the BOOT switch after selecting Boot Mode 2.

5. Observe that the server executes the diagnostic self-test program and then alternately displays the numbers 1 and 6 in the LED display to indicate that the local console terminal is activated.

6. Type the following commands at the local console prompt:

```
Console >Drop/units:all<RET>
Console >Add/units:NET<RET>
Console >Desel/test:all<RET>
Console >Sel/test:Eth<RET>
Console >Start/EOP:1<RET>
```

NOTE
While the Extended Ethernet Interface Test is executing, the LED display alternately displays the numbers 1 and 3.

7. Observe the local console for error information. If the test passes, the message: "End of Pass 1" is displayed. If the test fails, the message: "n errors" is displayed (n equals the number of errors detected).

Line-Card Installation Procedure
The following sections describe how to install the CXA16, the CXB16, and the CXY08 line cards. The procedure is made up of the following steps:

- Module preparation
- Module installation
- Testing

Module Preparation – The module device address and interrupt vector must be set before the module is installed. Each module is factory set to a device octal address of 17760440 and an octal interrupt vector of 300. For the module to operate properly in the server, however, the device address and interrupt vector must be set according to the line-card slot selected to house the module.

To set the addresses:

1. Refer to Table 13 and determine the proper device address and the interrupt vector.

Table 13 Line Card Device Octal Addresses and Interrupt Vectors

Slot	Device Address	Interrupt Vector
LC1	17760440	310
LC2	17760460	320
LC3	17760500	330
LC4	17760520	340
LC5	17760540	350
LC6	17760560	360
LC7	17760600	370
LC8	17760620	400

2. Refer to Figure 37 and locate the two (2) switchpacks.

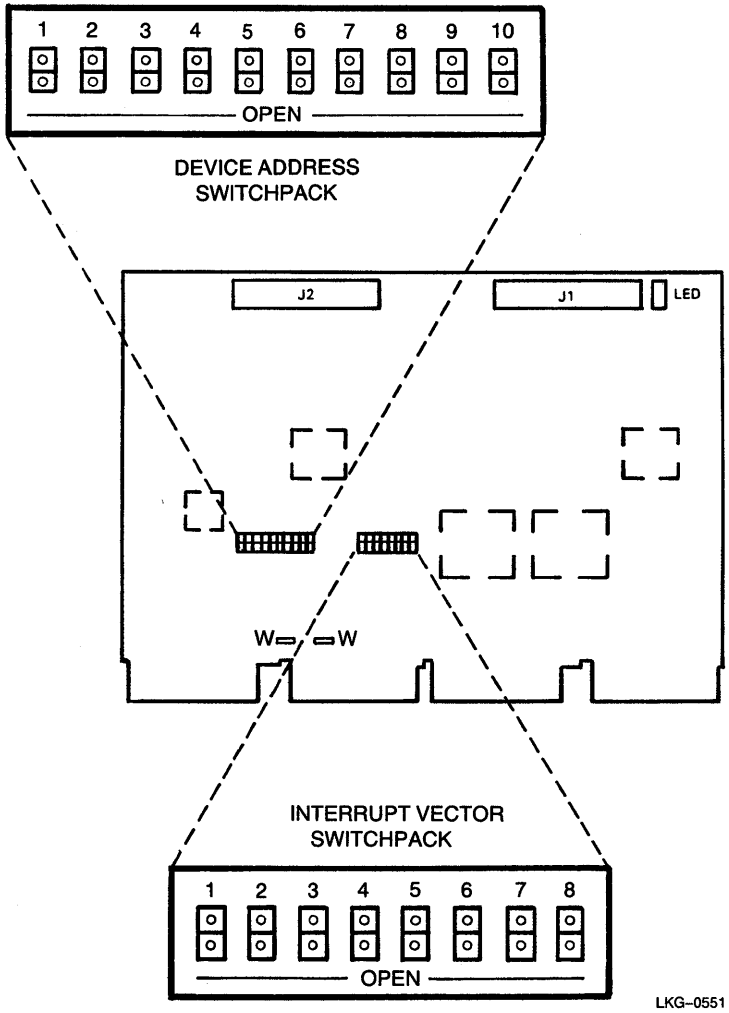
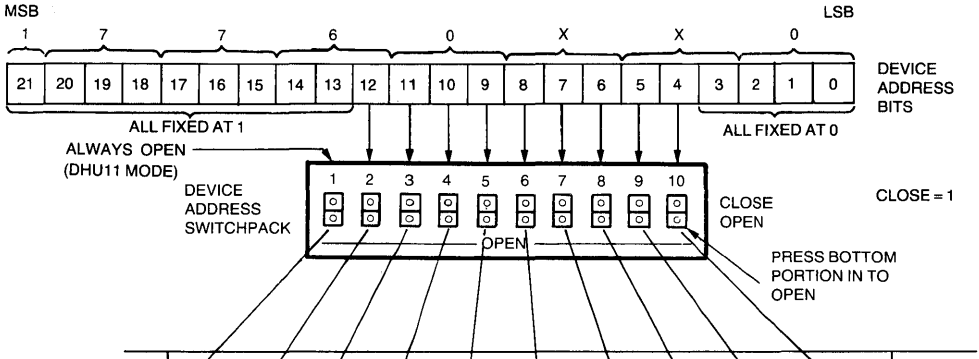


Figure 37 Line-Card Switchpack Locations

3. Refer to Figure 38 and use the 10-position switchpack to set the device address.



CARD SLOT	SWITCHPACK SWITCHES 1	2	3	4	5	6	7	8	9	10	DEVICE ADDRESS
LC1	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	OPEN	CLOSE	OPEN	17760440
LC2	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	OPEN	CLOSE	CLOSE	17760460
LC3	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	CLOSE	OPEN	OPEN	17760500
LC4	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE	17760520
LC5	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	CLOSE	CLOSE	OPEN	17760540
LC6	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	CLOSE	CLOSE	CLOSE	17760560
LC7	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	CLOSE	OPEN	OPEN	OPEN	17760600
LC8	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	CLOSE	OPEN	OPEN	CLOSE	17760620

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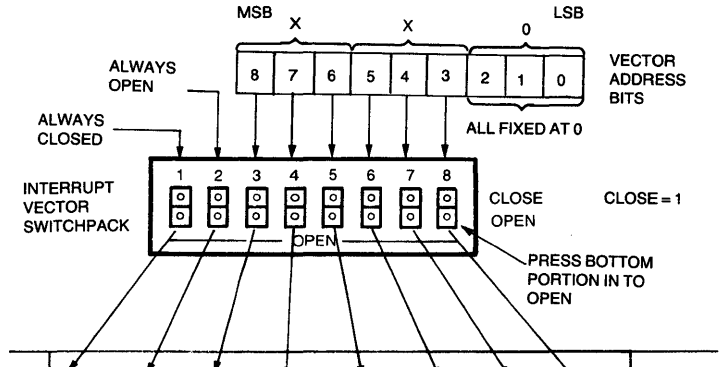
Figure 38 Line-Card Device Address Selection Guide

4. Refer to Figure 39 and use the 8-position switchpack to set the interrupt vector.



CARD SLOT	SWITCHPACK SWITCHES 1	2	3	4	5	6	7	8	VECTOR ADDRESS
LC1	CLOSE	OPEN	OPEN	CLOSE	CLOSE	OPEN	OPEN	CLOSE	310
LC2	CLOSE	OPEN	OPEN	CLOSE	CLOSE	OPEN	CLOSE	OPEN	320
LC3	CLOSE	OPEN	OPEN	CLOSE	CLOSE	OPEN	CLOSE	CLOSE	330
LC4	CLOSE	OPEN	OPEN	CLOSE	CLOSE	CLOSE	OPEN	OPEN	340
LC5	CLOSE	OPEN	OPEN	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	350
LC6	CLOSE	OPEN	OPEN	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	360
LC7	CLOSE	OPEN	OPEN	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	370
LC8	CLOSE	OPEN	CLOSE	OPEN	OPEN	OPEN	OPEN	OPEN	400

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Figure 39 Line-Card Interrupt Vector Selection Guide

Module Installation – Perform the following steps:

CAUTION

Be careful not to snag module components on the card guides or the adjacent modules. Ensure that an antistatic wrist strap is being worn.

1. Set the server power ON/OFF switch to the OFF position and unplug the power cord.

WARNING

ELECTRICAL SHOCK HAZARD: Do not remove or replace any FRUs with power applied to the server.

2. Hold the module up to the appropriate line-card slot with the component side facing the CPU module.

3. Align the module with the card cage guides and slide it into the slot until it engages the backplane. The module handle should be about a 1/4-inch from being flush with the adjacent line-card handle when it engages the backplane.

4. Simultaneously pull the upper release lever down and the lower release lever up to fully seat the module. The module handle should now be flush with the adjacent line card.

5. Carefully press in on the 1/4-turn fasteners and turn them clockwise to secure the module.

6. Refer to Figure 40 and reconnect the appropriate line- card cable to the lower line-card connector.

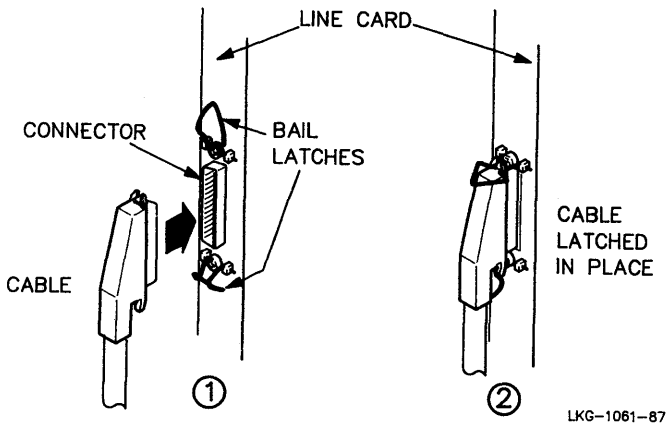

Figure 40 Connecting the Line-Card Cable

7. Lock the connector in place using the line-card bail latches.

8. Repeat Steps 6 and 7 to install the upper line-card cable.

Testing – To test the line card to ensure that it is working properly, proceed as follows:

1. Refer to the "Connecting A Local Console Terminal" section and connect a console terminal to the server local console port (A1).

2. Plug in the server power cord and set the server power ON/OFF switch to ON.

3. Use a small screwdriver to set the BOOT MODE select switch to position 3 (System Configuration Assistance Program). The server allows five (5) seconds for a boot mode to be selected when the power ON/OFF is turned ON; otherwise, simply press the BOOT switch after selecting Boot Mode 3.
4. Observe that the server executes the diagnostic self-test program, that the LED display constantly displays the number 3, and that a configuration map is printed out at the local console terminal.

5. Check the configuration map to ensure that the line card's device address and interrupt vector are set correctly.

6. Use a small screwdriver to set the BOOT MODE select switch to position 2 (Local Console mode) and press the BOOT switch.

7. Observe that the server executes the diagnostic self-test program and then alternately displays the numbers 1 and 6 in the LED display to indicate that the local console terminal is activated.

8. Type the following commands at the local console prompt:

```
Console >Drop/units:all<RET>
Console >Add/units:LCn<RET>
Console >Desel/test:all<RET>
Console >Sel/test:Asy<RET>
Console >Start/EOP:1<RET>
```

NOTE

The "n" in LCn represents the line-card slot number. While the Asynchronous Test is executing, the LED display alternately displays numbers 1 and 4.

9. Observe the local console for error information. If the test passes, the message: "End of Pass 1" is displayed. If the test fails, the message: "n errors" is displayed (n equals the number of errors detected).

Connecting a Local Console Terminal

The console terminal must be RS-232-C (or DEC423) compatible. If possible, the console terminal should be a hard-copy terminal, such as an LA100 or an LA36 terminal and so on. If a hard-copy terminal is not available, a video (soft copy) terminal (such as a VT100 terminal) can be used.

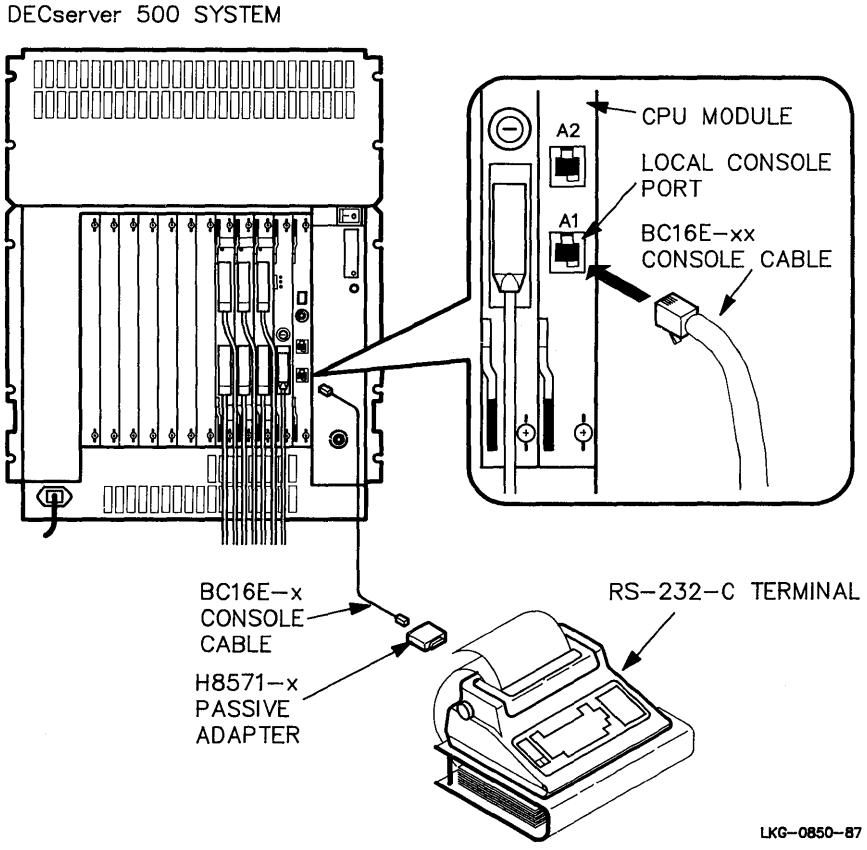

Figure 41 Connecting a Console Terminal

Refer to Figure 41 and perform the following steps to connect the terminal to the server local console port (A1).

1. Connect a BC16E-xx console cable to the local console port on the CPU module.

2. Connect the other end of the console cable to the communications port of the terminal.

A passive adapter can be used to adapt the communications connector to the BC16E-xx cable. Use an H8571-A adapter for 25-pin connectors and an H8571-B adapter for 9-pin connectors.

3. Configure terminal communications parameters to match the console port default parameters identified in Table 14.

Table 14 Console Port Default Parameters

Parameter	Default Value
Character size	8
Parity	None
Speed	9600

DECserver 550 TERMINAL SERVER

General Description

The DECserver 550 is a high-end, Ethernet based terminal server that can be used to connect terminals, printers, modems, personal computers, and host computers to an Ethernet or IEEE 802.3 local area network. The DECserver 550 can support connections of host computers to its serial data communication interface modules.

The DECserver 550 is compatible with Ethernet Specification V2.0 and supports communications with asynchronous port devices that are compatible with the DEC423, RS-422, and RS-232-C/CCITT V.24/V.28 signaling specifications.

NOTE

Refer to the DECserver 500 section in this volume for details on installing and testing the DECserver 550.

Functionally and physically, the DECserver 550 is similar to the DECserver 500 and the upgraded DECserver 500, with the following differences.

Table 1 DECserver 500/DECserver 550 Differences

DECserver 500	DECserver 500 Upgrade	DECserver 550
Single power supply	Single power supply	Two nonredundant power supplies M9060-YA load module
KDJ11-SB CPU (0.5 MB memory)	KDJ11-SD CPU (1.5 MB memory)	KDJ11-SD CPU (1.5 MB memory)
DEQNA Ethernet controller (supports standard Ethernet)	DEQNA Ethernet controller. Also supports use of DESQA for both standard and ThinWire Ethernet	DESQA Ethernet controller (supports both standard and ThinWire Ethernet
CXA16, CXB16, CXY08	CXA16, CXB16, CXY08	CXA16, CXB16, CXY08, CXM04 and future high-power options
256 sessions	512 sessions	512 sessions
V1.0 minimum software version	V1.1 minimum software version	V1.1 minimum software version

DECserver 550 Versions

The DECserver 550 is available in two versions (DSRVS-nx), where "nx" designates the particular model. The "n" specifies whether the model is a rack-mount version or an office version. The "x" specifies the operating voltage. Table 2 lists the four basic models.

Table 2 DECserver 550 Models

Model	Description
DSRVS-CA	120 Vac rack-mount model
DSRVS-CB	240 Vac rack-mount model
DSRVS-DA	120 Vac office model
DSRVS-DB	240 Vac office model

Network Configurations

The DECserver 550 supports both standard (Thickwire) and ThinWire Ethernet interconnects which can be selected by a jumper on the DESQA module (Figure 1). DECserver 550 configurations for standard Ethernet are the same as the DECserver 500 configurations.

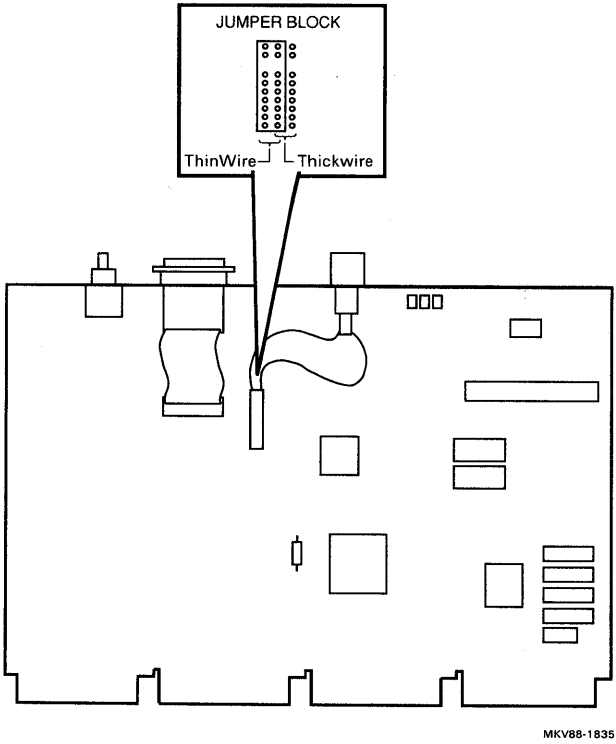

Figure 1 Standard/ThinWire Ethernet Selection

Reference Documentation

Refer to the following documents or documentation kits for more information on the DECserver 550 terminal server.

Use the documentation kit order number when ordering software documentation; use the document number when ordering hardware documents.

Software Manual Kits

#1 VMS Software Documentation Kit
Order number QA-03KAA-GZ
Contents Identified by number 1 in Table 3

#2 RSX-11M-PLUS Software Documentation Kit
Order number QRZ46-GZ
Contents Identified by number 2 in Table 3

#3 Micro/RSX Software Documentation Kit
Order number QYZ46-GZ
Contents Identified by number 3 in Table 3

Table 3 Software Manuals

Found in Kit	Title
1,2,3	*Using DECserver 500 Documents*
1	*DECserver 500 Software Installation Guide (VMS)*
2	*DECserver 500 Software Installation Guide (RSX-11M-PLUS)*
3	*DECserver 500 Software Installation Guide (Micro/RSX)*
1,2,3	*DECserver 500 User's Guide*
1,2,3	*Terminal Server User's Reference Card*
1,2,3	*DECserver 500 Management Guide*
1,2,3	*Terminal Server Commands and Messages Reference*
1,2,3	*DECserver 500 Commands Mini-Reference*
1,2,3	*DECserver 550 System Owner's Guide*
1,2,3	*Local Area Transport (LAT) Network Concepts*
1,2,3	*DECserver 550 Problem Determination and Service Guide*
1	*LATplus/VMS Service Node Management Guide*
1,2,3	*Terminal Server Glossary*

Hardware Manuals

Title	Part Number
DECserver 550 Hardware Installation Guide	EK-DS550-IN
DECserver 550 Identification Card	EK-DS550-IC
DECserver 550 Troubleshooting Quick Reference Card	EK-DS550-RC
BA213 Enclosure Illustrated Parts Breakdown	EK-BA213-IP
DECserver 500/550 Print Set	MP-02505-01

Hardware Components

The following list shows the difference in the field replaceable units between the DECserver 500 and the DECserver 550.

DECserver 500	DECserver 550
DEQNA (M7504-PA) Ethernet controller. Supports standard Ethernet interconnects.	DESQA (M3127-PA) Ethernet controller. Supports standard and ThinWire Ethernet interconnects.
KDJ11-SB CPU (M7554-SB) with 0.5 MB memory	KDJ11-SD CPU (M7554-SD) with 1.5 MB memory
	M9060-YA load module
	ThinWire loopback connector made up of: • One BNC TEE (H8223), and • Two terminators (H8225)
	Strain relief clamp (P/N: 12-29702-01)

Physical Specifications
The only difference in physical specifications between the DECserver 500 and the DECserver 550 is the weight. The DECserver 550 office model weighs 40.7 kilograms (90 lbs) and the rack-mount model weighs 29.9 kilograms (66 lbs).

Electrical Specifications
Table 4 lists the power specifications for the DECserver 550.

Table 4 Power Specifications

Parameter	DSRVS-CA (or -DA)	DSRVS-CB (or -DB)
Voltage range	100-120 Vac (3-wire)	220-240 Vac (1N+PE)
Frequency	47 to 63 Hz	47 to 63 Hz
Line Current	10.2 amperes (maximum)	4.7 amperes (maximum)
Power	675 watts	675 watts

The DECserver 550 has two nonredundant power supplies. These power supplies are the same as those used in the DECserver 500, and the installation procedures are also the same. The power distribution is different, however, as shown in Figure 2.

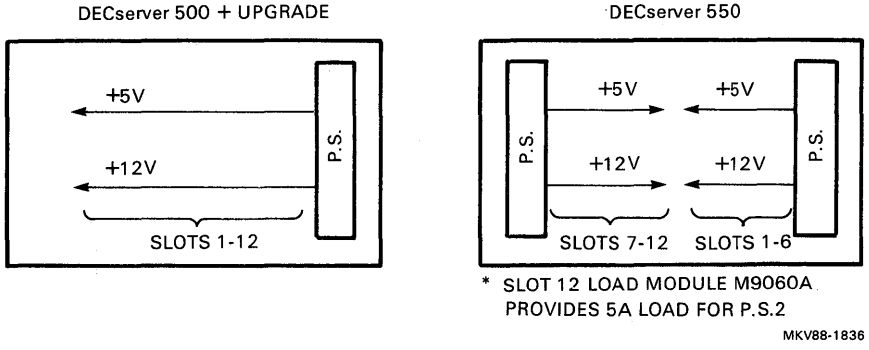

Figure 2 Power Distribution (DECserver 500/DECserver 550)

Installation
Installation for the DECserver 550 is the same as installation for the DECserver 500. Refer to the DECserver 500 section in this volume for details on installing the server. For information on installing the CXM04 Line Card, continue with this section.

Installing the CXM04 Line Card

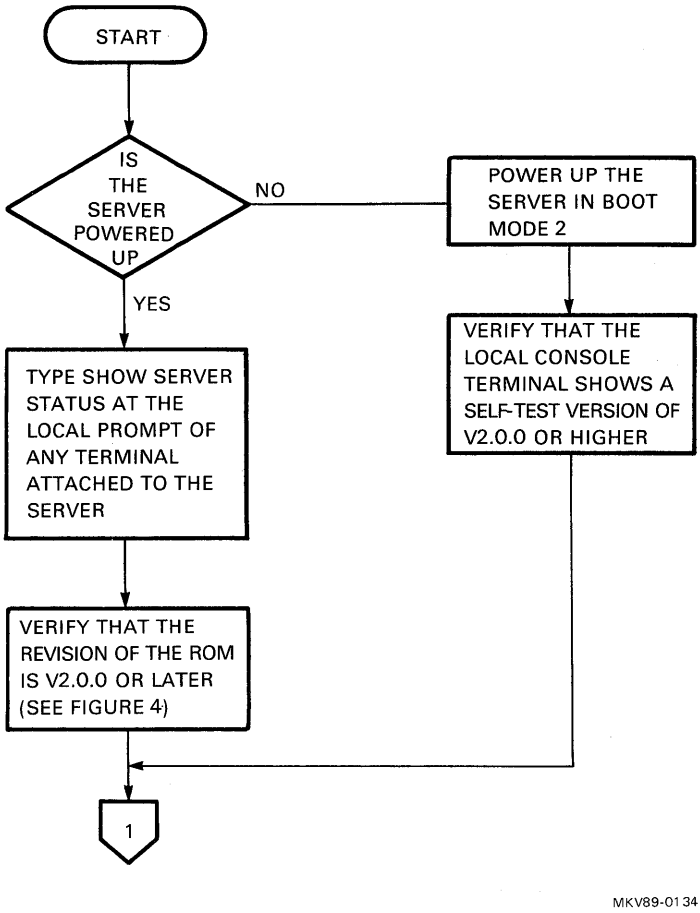

Figure 3 CXM04 Installation Flow Diagram (Sheet 1 of 4)

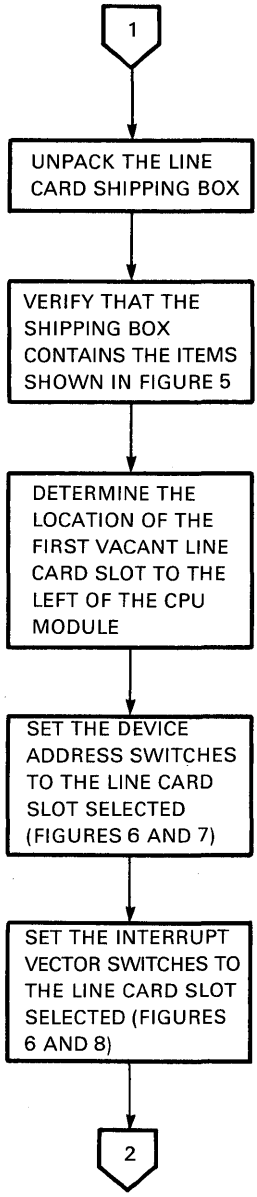

Figure 3 CXM04 Installation Flow Diagram (Sheet 2 of 4)

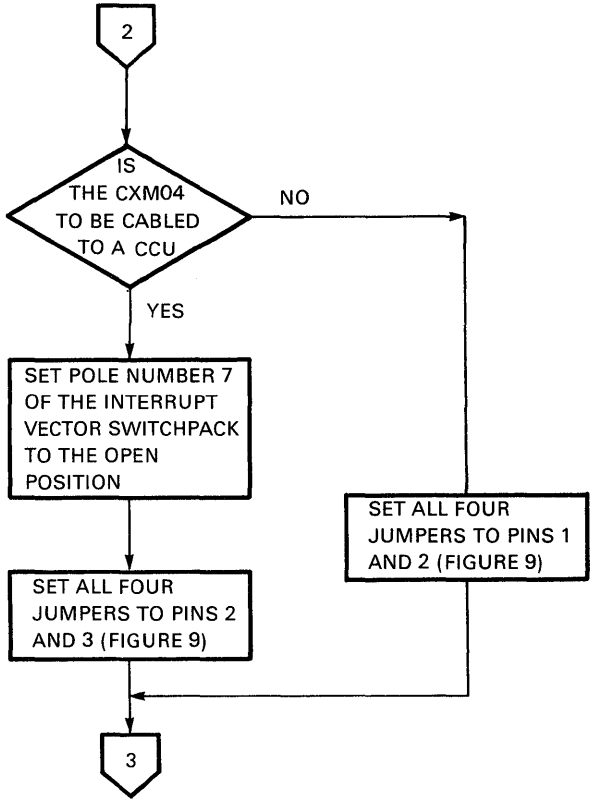

Figure 3 CXM04 Installation Flow Diagram (Sheet 3 of 4)

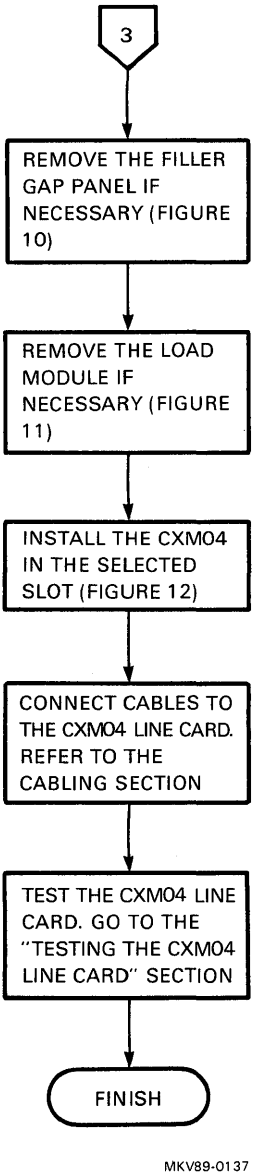

Figure 3 CXM04 Installation Flow Diagram (Sheet 4 of 4)

```
Local> SHOW SERVER STATUS

DECserver 500 V2.1.1          LAT V5.1       ROM V2.0.2      Uptime: 0 1:10:40

Address:   08-00-2B-08-D2-28          Name:   C212       Number:     0

                       Cur    High     Max

Active Ports:            1       1      33          Minutes to Shutdown:        0
Active Users:            1       1      33          DisCARDd Nodes:             0
Queue Entries:           0       0       8          Resource Errors:            0

Available Services:     18      18     N/A          Port Framing Errors:        0
Local Services:          0       0     255          Port Parity Errors:         0
Reachable Nodes:        18      18     100          Port Overrun Errors:        0

Active Circuits:         0       0      64          Primary Host:          JOANY
Connected Nodes:         0       0      64          Load Address: AA-00-04-00-35-04
Connected Sessions:      0       0     256          Dump Address: None Available
% CPU Used:              1      41     100
% Memory Used:           5       5     100
```

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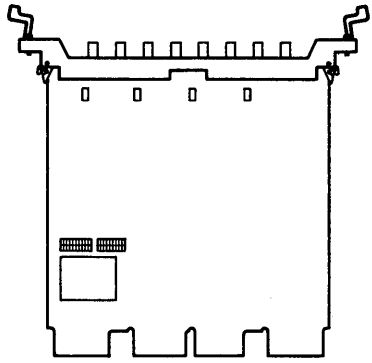
Figure 4 Example of A SHOW SERVER STATUS Command

☐ CXM04 LINE CARD



☐ CXM04 LOOPBACK CABLES (4)

☐ BARREL CONNECTOR

MKV89-0157

Figure 5 Contents of Shipping Box

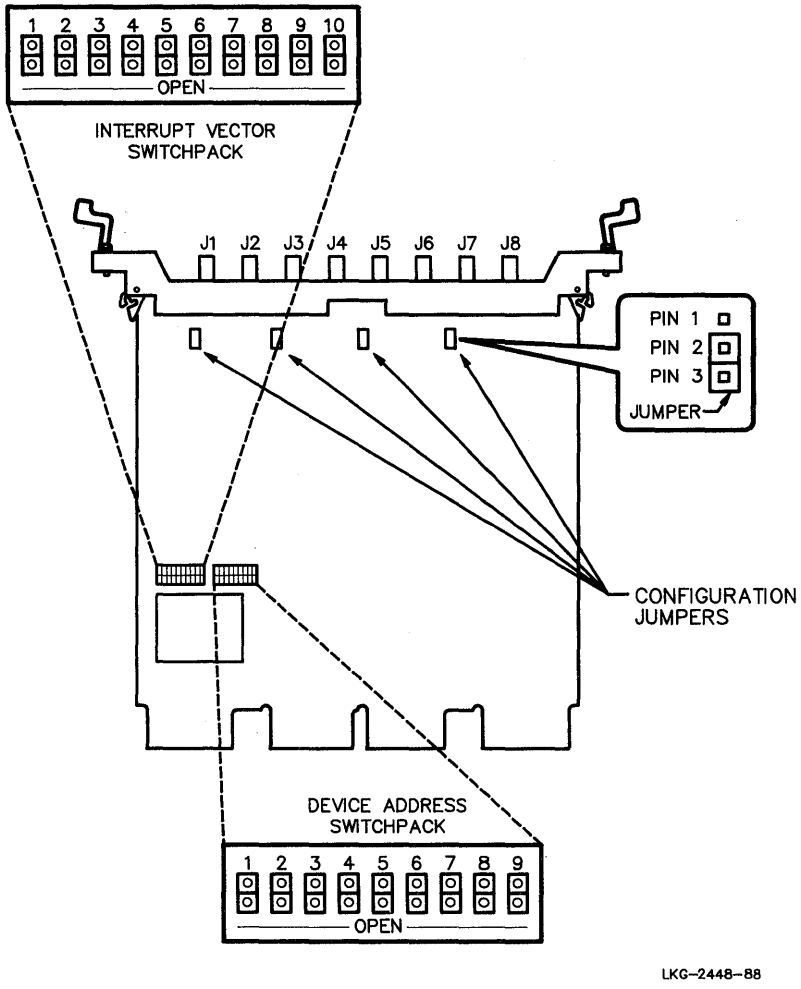
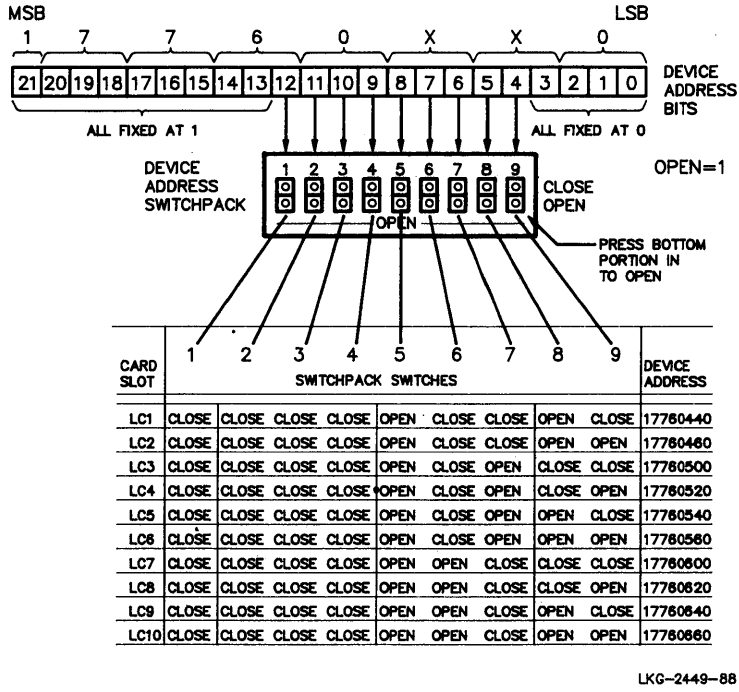


Figure 6 CXM04 Switchpack Locations



CARD SLOT	1	2	3	4	5	6	7	8	9	DEVICE ADDRESS
	SWITCHPACK SWITCHES									
LC1	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	CLOSE	OPEN	CLOSE	17760440
LC2	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	CLOSE	OPEN	OPEN	17760460
LC3	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	OPEN	CLOSE	CLOSE	17760500
LC4	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN	17760520
LC5	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	OPEN	OPEN	CLOSE	17760540
LC6	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	OPEN	OPEN	OPEN	17760560
LC7	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	OPEN	CLOSE	CLOSE	CLOSE	17760600
LC8	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	OPEN	CLOSE	CLOSE	OPEN	17760620
LC9	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	OPEN	CLOSE	OPEN	CLOSE	17760640
LC10	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	OPEN	CLOSE	OPEN	OPEN	17760660

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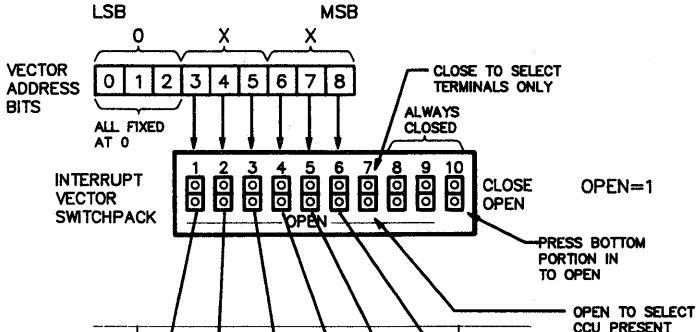
Figure 7 CXM04 Device Address Switch Settings



CARD SLOT	1	2	3	4	5	6	VECTOR ADDRESS
	SWITCHPACK SWITCHES						
LC1	OPEN	CLOSE	CLOSE	OPEN	OPEN	CLOSE	310
LC2	CLOSE	OPEN	CLOSE	OPEN	OPEN	CLOSE	320
LC3	OPEN	OPEN	CLOSE	OPEN	OPEN	CLOSE	330
LC4	CLOSE	CLOSE	OPEN	OPEN	OPEN	CLOSE	340
LC5	OPEN	CLOSE	OPEN	OPEN	OPEN	CLOSE	350
LC6	CLOSE	OPEN	OPEN	OPEN	OPEN	CLOSE	360
LC7	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	370
LC8	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	400
LC9	OPEN	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	410
LC10	CLOSE	OPEN	CLOSE	CLOSE	CLOSE	OPEN	420

LKG-2450-88

Figure 8 CXM04 Interrupt Vector Switch Settings

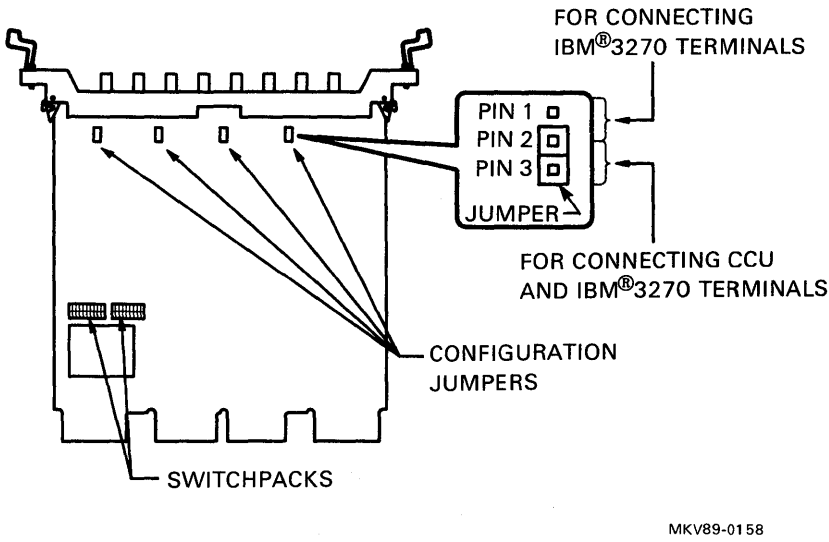


Figure 9 Configuration Jumper Setting

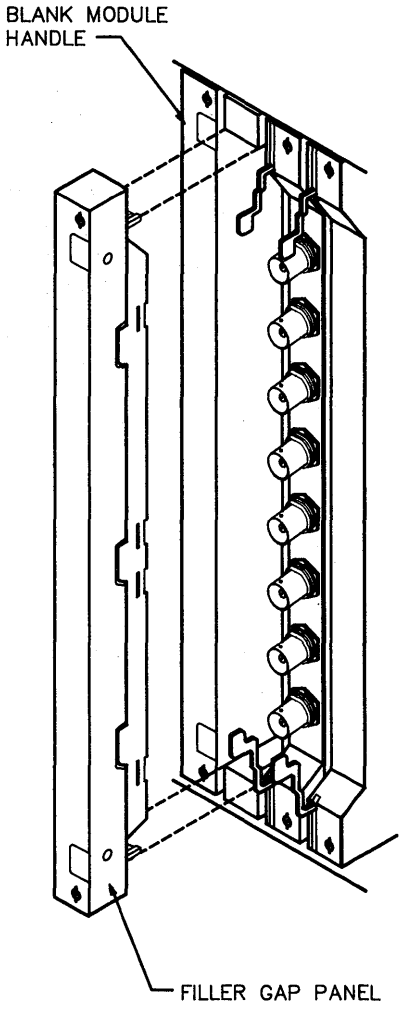


Figure 10 Removing the Filler Gap Panel

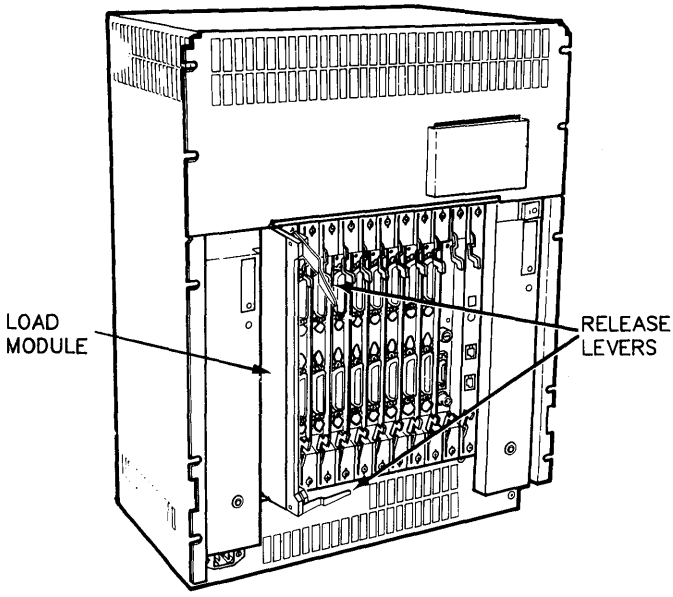


Figure 11 Removing the Load Module

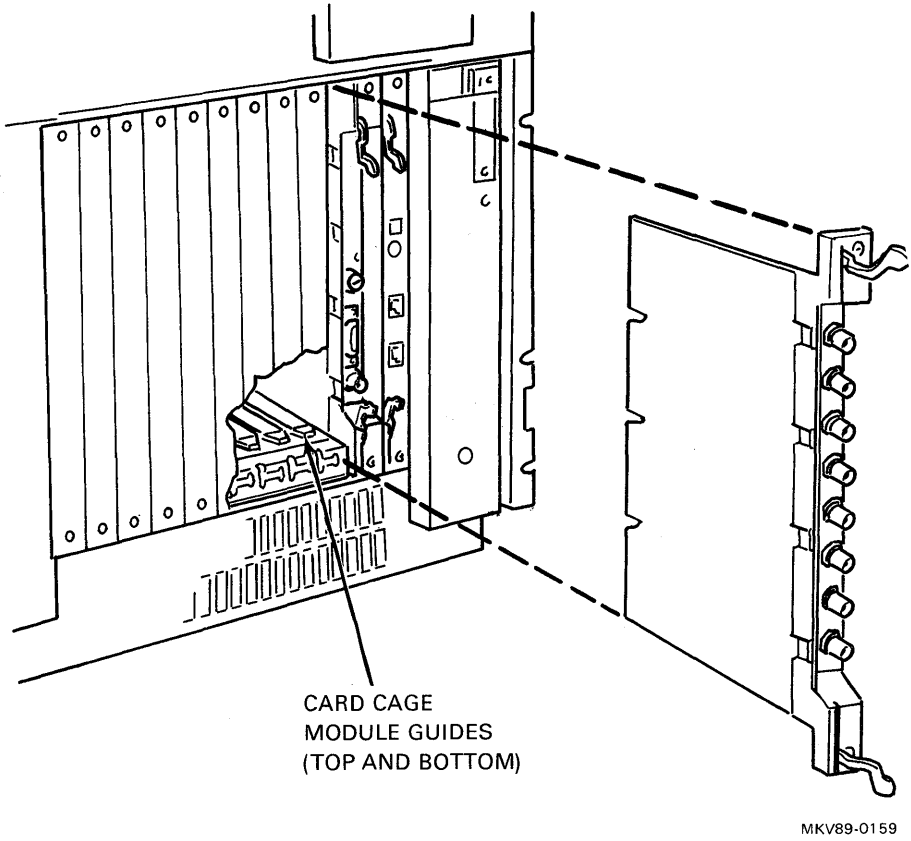


Figure 12 Installing the Line Card

Cabling

Cabling for the DECserver 550 is the same as cabling for the DECserver 500 except for the cabling of the CXM04 Line Card. This section covers cabling for the CXM04. Refer to the DECserver 500 section in this volume for details on cabling the DECserver 550.

The CXM04 Line Card can be used in one of two configurations.

- A single line card can support up to four IBM® 3270 terminals with associated connections to a single IBM® 3*x*74 or equivalent cluster controller unit (CCU). Figure 13 is an example of this configuration.

- A single line card can support up to eight IBM® 3270 terminals with no connections to a CCU. Figure 14 is an example of this configuration.

Each CXM04 Line Card supports up to eight coaxial cables and/or twisted-pair cables with baluns. Whenever twisted-pair cabling is used, baluns must be used at the CXM04 Line Card connector and at the terminal (or CCU) connector.

NOTE
The coaxial cable must be RG62A/U or equivalent.

Table 5 shows the maximum cable lengths and the cabling procedure is provided in the flow diagrams of Figures 15 and 16.

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Table 5 Maximum Cable Lengths

Cable	To	Maximum Distance	Cable Type
Server	IBM® 3270 terminal with no connection to a CCU	1500 m (4920 ft)	Coaxial only
Server	IBM® 3270 terminal with no connection to a CCU	305 m (1000 ft)	Twisted pair
Server	IBM® 3270 terminal with no connection to a CCU	610 m (2000 ft)	Shielded twisted pair
CCU	IBM® 3270 terminal via the server	1500 m (4920 ft)*	Coaxial only
CCU	IBM® 3270 terminal via the server	305 m (1000 ft)* with two baluns total between the CCU and the IBM® 3270 terminal	Coaxial and unshielded twisted pair
CCU	IBM® 3270 terminal via the server	610 m (2000 ft)* with two baluns total between the CCU and the IBM® 3270 terminal	Coaxial and unshielded twisted pair
CCU	IBM® 3270 terminal via the server	244 m (800 ft)* with four baluns total between the CCU and the IBM® 3270 terminal	Unshielded twisted pair

*This is the combined distance from the terminal to the server, and from the server to the CCU.

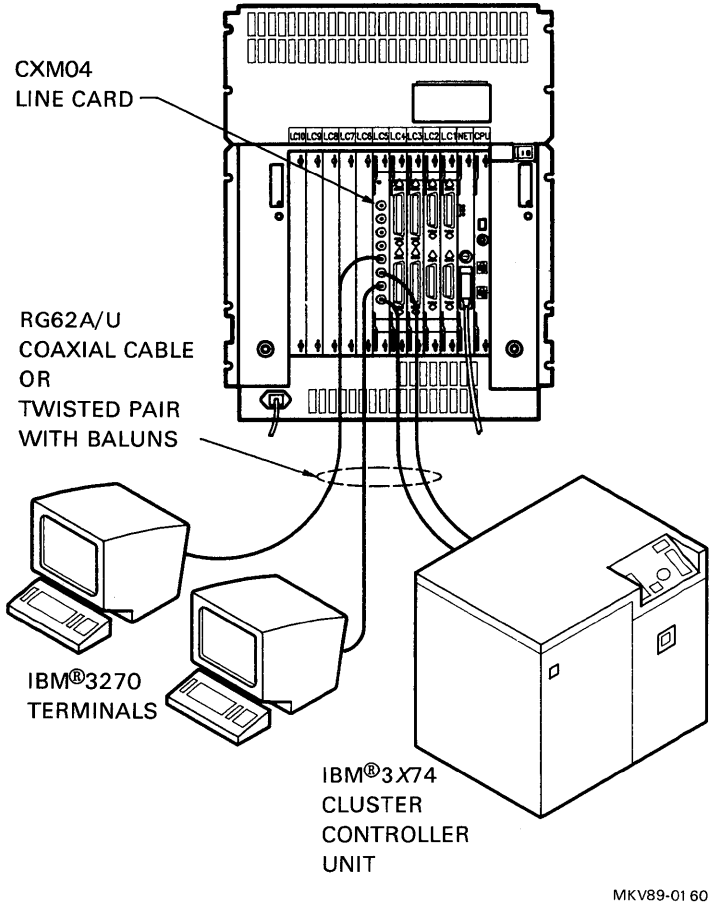

Figure 13 CXM04 Configuration for IBM® 3270 Terminals and CCU

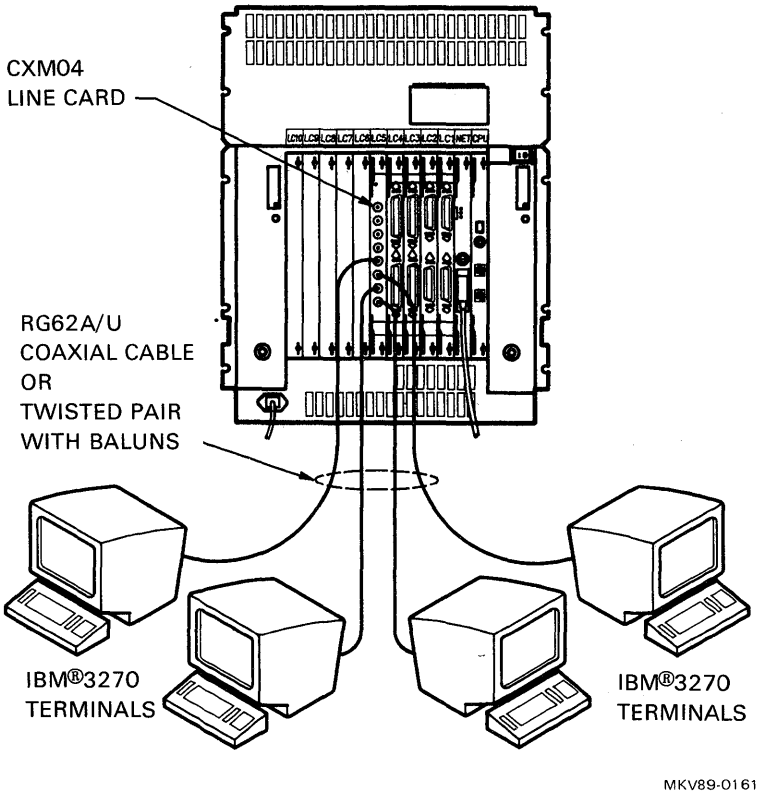

Figure 14 CXM04 Configuration for IBM® 3270 Terminals Only

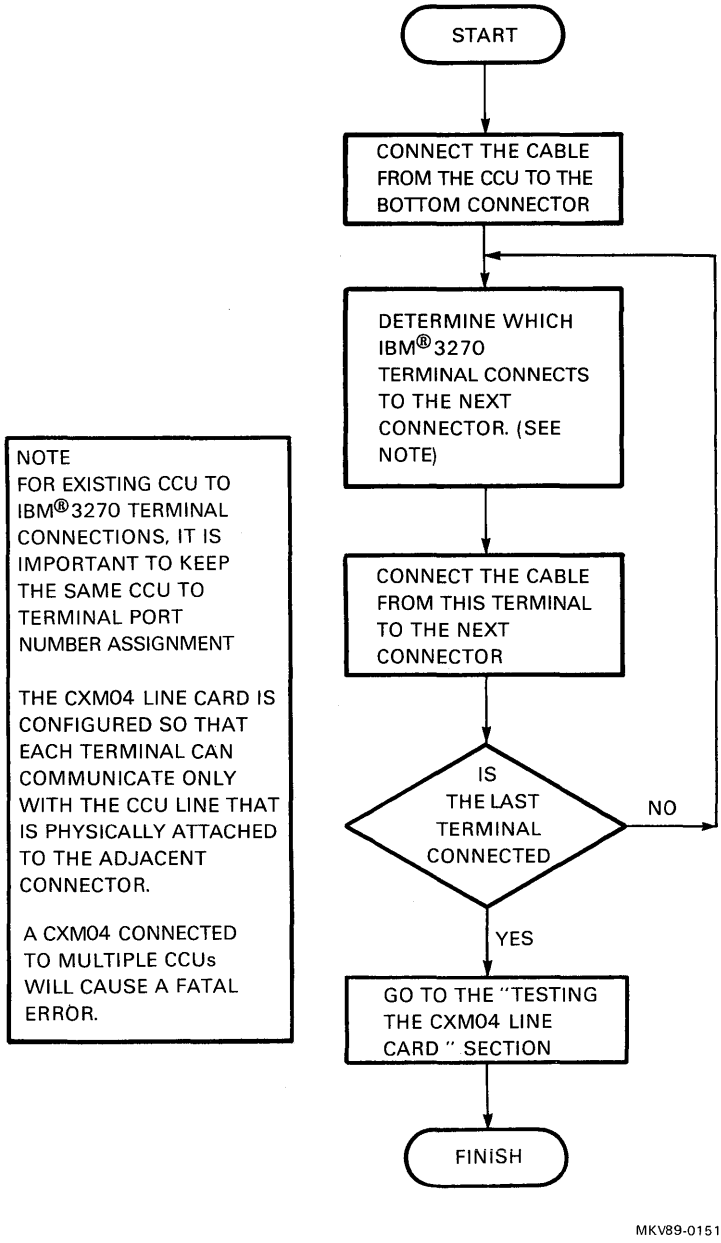

Figure 15 Cabling Flow Diagram for IBM® 3270 Terminals and CCU

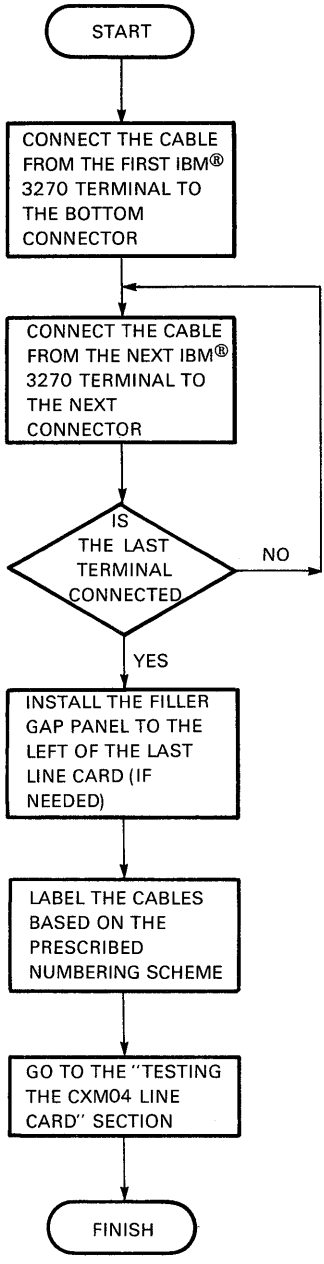

Figure 16 Cabling Flow Diagram for IBM® 3270 Terminals Only

Diagnostics

Diagnostics for the DECserver 550 are the same as diagnostics for the DECserver 500. Refer to the DECserver 500 section in this volume for details on diagnostics. Continue with this section for information on testing the CXM04 Line Card.

Testing the CXM04 Line Card

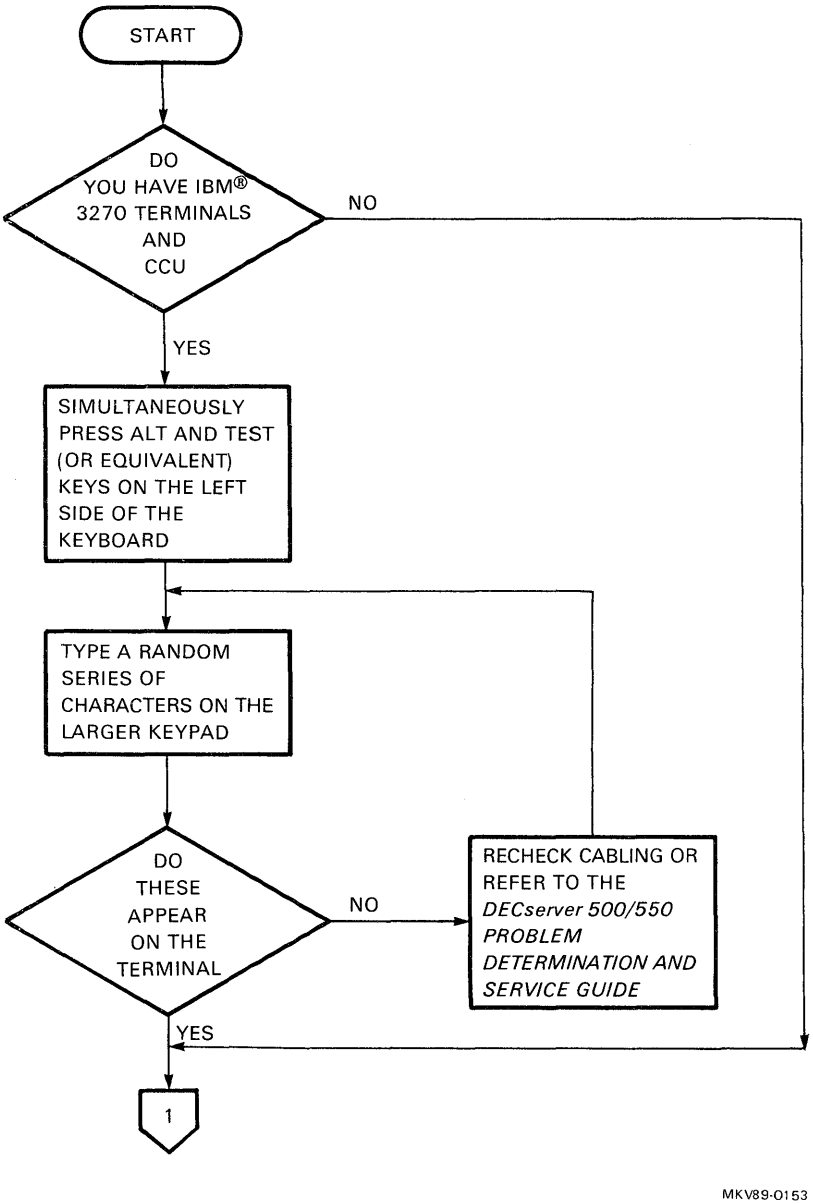

Figure 17 Testing the CXM04 (Sheet 1 of 4)

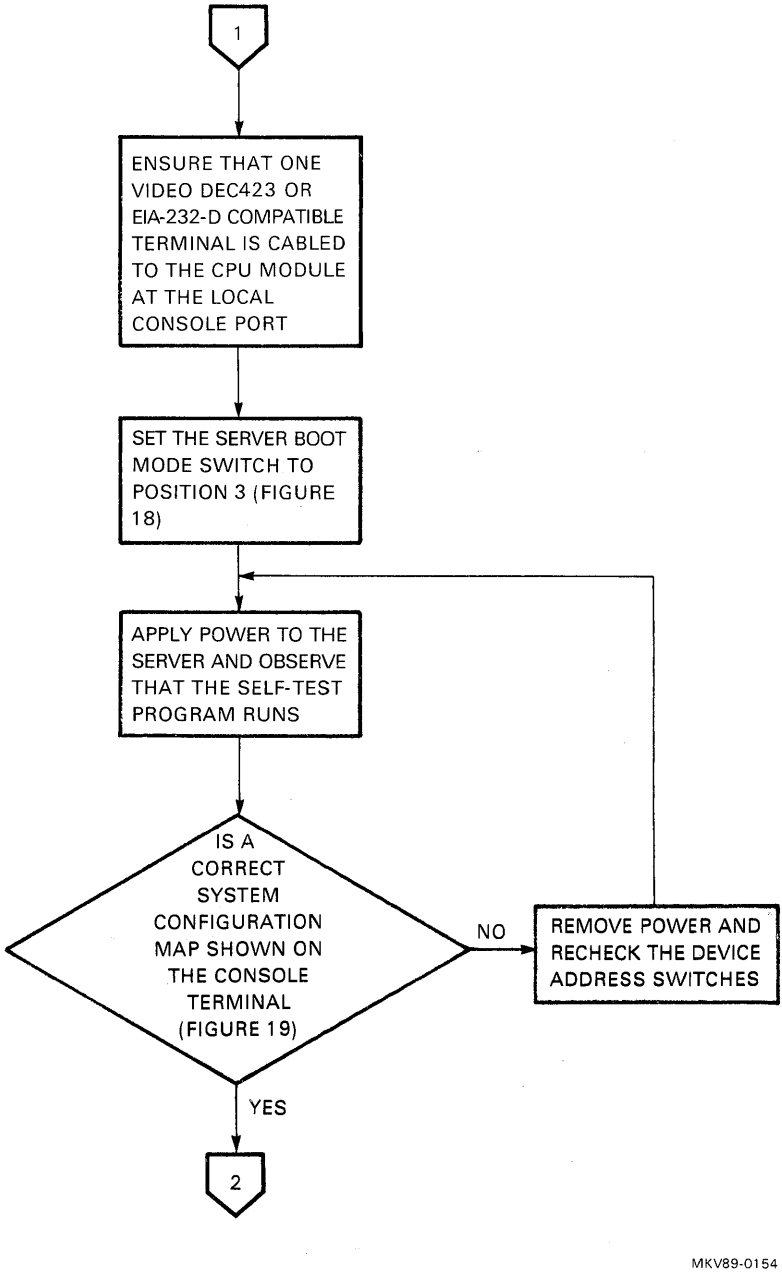

Figure 17 Testing the CXM04 (Sheet 2 of 4)

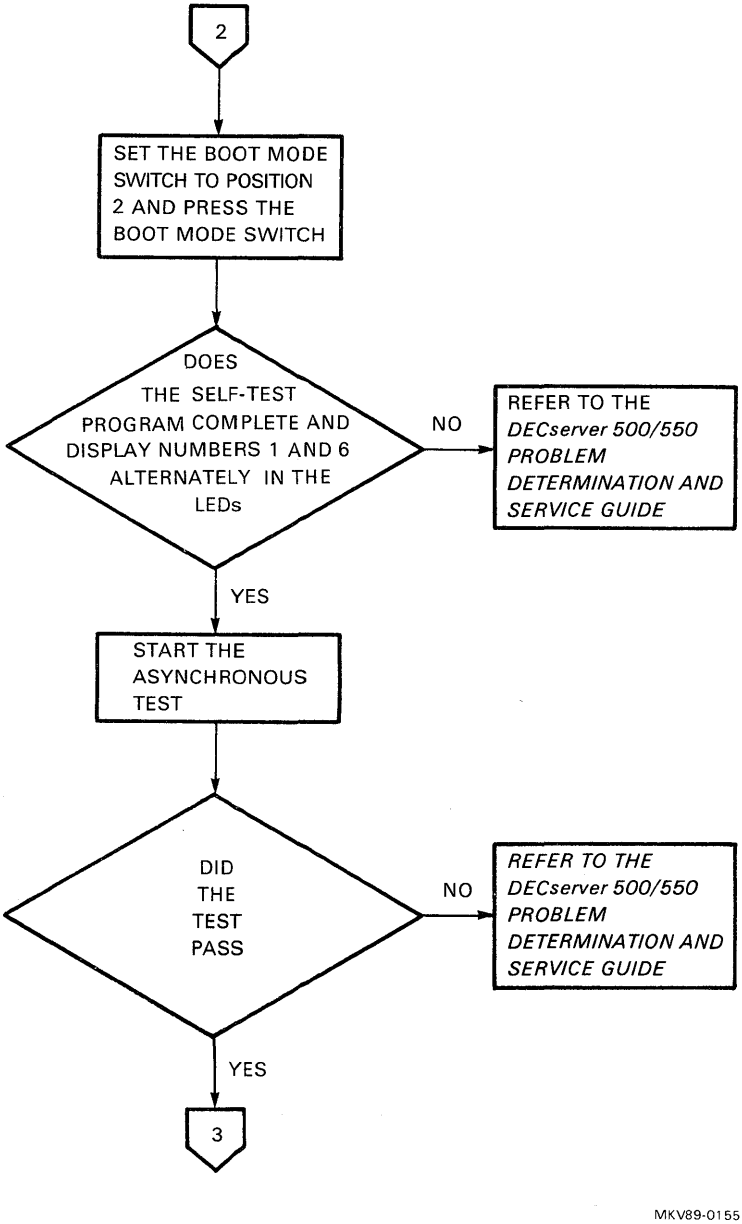

Figure 17 Testing the CXM04 (Sheet 3 of 4)

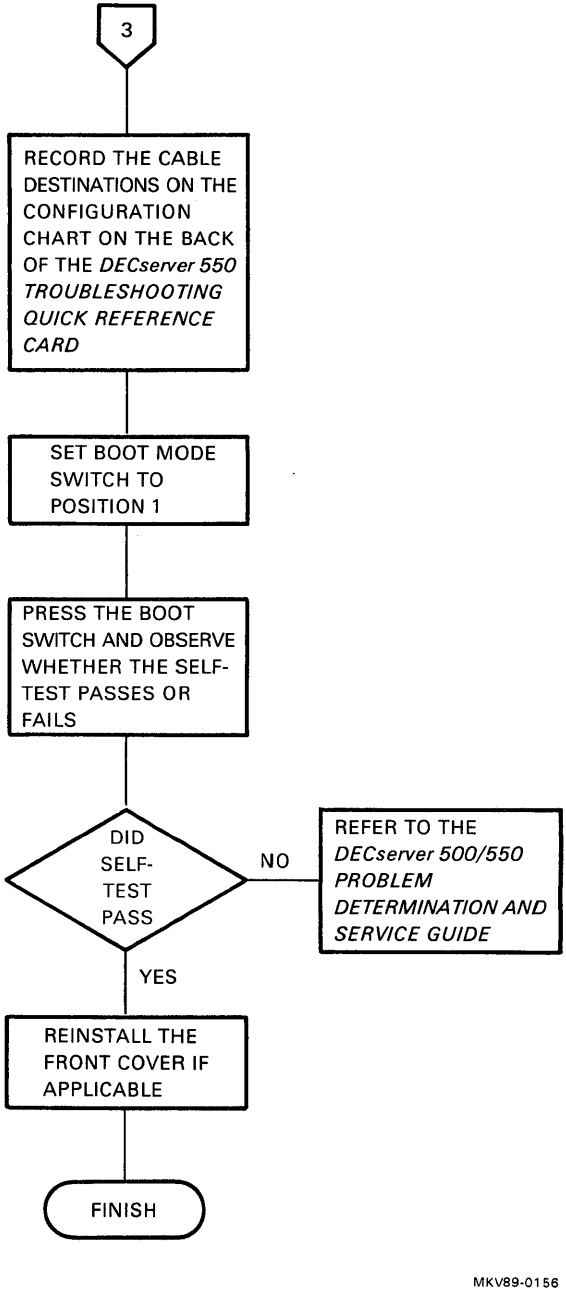

Figure 17 Testing the CXM04 (Sheet 4 of 4)

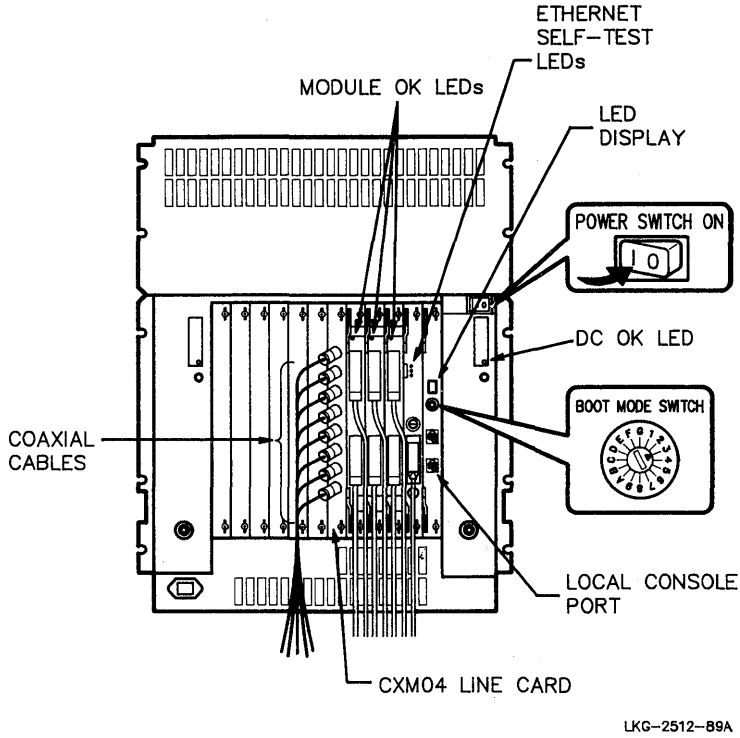

Figure 18 Server Self-Test Indicators and Switches

MAP OF THE DECserver 500/550

Slot	Qbus Address	Vector Exp	Vector Act	Name	Device	Installed	Status
1				CPU	KDJ11-SD, 18 MHz, 1024kb		Good
2	17774440 - 17774456	120	120	NET0	DESQA, 08-00-00-00-00-01		Good
3	17760440 - 17760456	310	310	LC01	CXM04		Good
4	17760460 - 17760476	320	320	LC02	CXY08, DHU11 MODE		Good
5	17760500 - 17760516	330	330	LC03	CXA16, DHU11 MODE		Good
6	17760520 - 17760536	340	340	LC04	CXA16, DHU11 MODE		Good
7	17760540 - 17760556	350	350	LC05	CXA16, DHU11 MODE		Good
8	17760560 - 17760576	360	360	LC06	CXY08, DHU11 MODE		Good
9	17760600 - 17760616	370	370	LC07	CXA16, DHU11 MODE		Good
10	17760620 - 17760636	400	400	LC08	CXA16, DHU11 MODE		Good
11	17760640 - 17760656	410		Nothing installed			
12	17760660 - 17760676	420		Nothing installed			

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Figure 19 Sample System Configuration Map

Maintenance Aids

Maintenance aids for the DECserver 550 are the same as the maintenance aids for the DECserver 500, except those concerning the DESQA Ethernet controller. Refer to the DESQA section in Volume 6 for DESQA maintenance aids. Refer to the DECserver 500 section in this volume for details on the DECserver 500 maintenance aids

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Clarity	5	4	3	2	1
Completeness	5	4	3	2	1
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