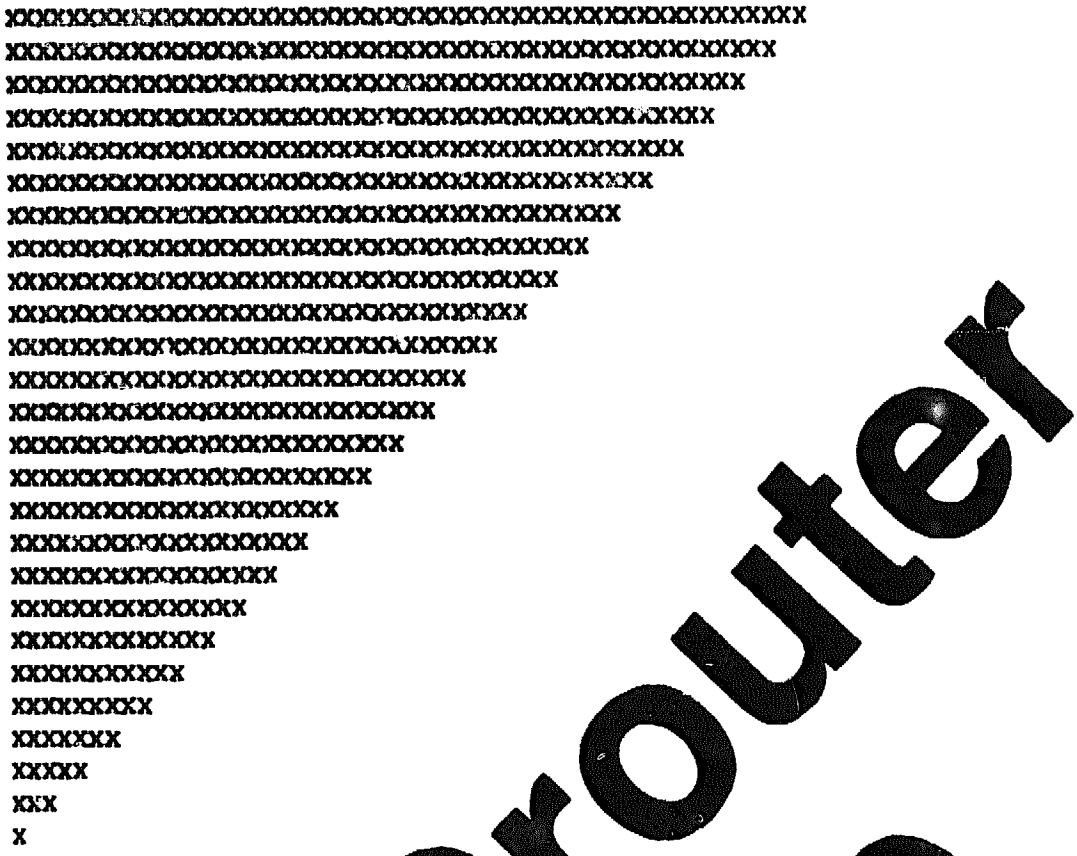
DECrouter
250

DECrouter 250

Hardware Installation

February 1990

This manual explains how to install the DECrouter 250 system and how to verify its operation. The manual also describes the DECrouter 250 hardware controls and indicators. This manual is intended for the hardware installer.

Supersession/Update Information: This is a new manual.

Software Version: DECrouter 250 V1.0

digital™

Order Number: EK-A0424-IN-001

EK–A0424–IN–001
February 1990

This manual was produced by Networks and Communications Publications.

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Preface

Intended Audience

This manual is intended for the hardware installer. The installer is responsible for ensuring that the hardware is installed and tested. The person installing the DECrouter 250 software can then verify the system installation.

NOTE

The DECrouter 250 system is comprised of a DECrouter 250 hardware unit and DECrouter 250 software.

Structure of This Manual

This manual contains the following chapters and appendixes:

Chapter 1	Provides an overview of the system installation.
Chapter 2	Describes how to unpack and check the contents of the shipment.
Chapter 3	Describes how to verify that the site is prepared for installation and lists the technical specifications of the router.
Chapter 4	Provides instructions for installing and testing the router hardware.
Chapter 5	Provides simple troubleshooting steps to correct problems encountered during the hardware installation.
Appendix A	Describes connector pins for the various router connectors and also describes various cables, adapters and accessories used with the router.

Appendix B	Lists the port devices supported by the router.
Appendix C	Describes procedures to cable to the network and to port devices.
Appendix D	Describes the Bootline Configuration Program and how you use it .
Appendix E	Provides information on ordering the router, router accessories and router cables.

Other DECrouter 250 Manuals

- *DECrouter 250 Software Installation (op-sys)*

  Explains how to install the DECrouter 250 distribution software, how to establish down-line load hosts, and how to verify the DECrouter 250 system installation. In the title, *(op-sys)* is the name of the load host operating system. This guide is intended for the load host system manager.

- *DECrouter 250 Identification Card*

  Provides the space to record the serial number, Ethernet Address, DECnet node address, and DECnet node name of the router. This document is intended for the network manager and the software installer.

- *DECrouter 250 Management*, Volumes I and II

  Describes all the initial and day-to-day management tasks. The topics cover all the information needed to configure the ports and to customize the permanent and operational databases of the router. This guide is intended for the network manager.

- *Routing and Networking Overview*

  Describes the basic routing terminology and concepts, and provides guidelines for achieving optimal routing performance when configuring networks.

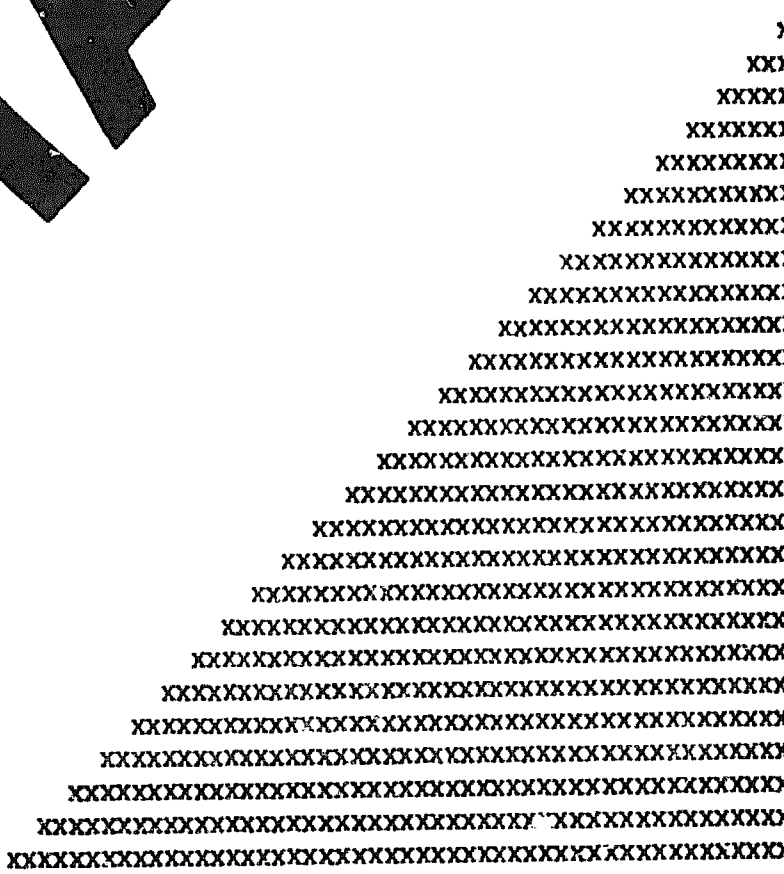
- *DECrouter 250 Maintenance Card*

  Summarizes procedures for installing and downline loading the DECrouter 250 system. Also, contains information for diagnosing DECrouter 250 problems and lists device cables and adapters.

FCC NOTICE

The equipment described in this manual generates, uses and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J Part 15 of FCC Rules, which are designed to provide reasonable protection against such a radio frequency interface when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense may be required to take measures to correct the interference.

CHAP 1



1

Overview

1.1 Installation Overview

Installing the DECrouter 250 system consists of the following:

- Installing the hardware
- Installing the software
- Verifying the system installation

This chapter provides an overview of the system installation and of the DECrouter 250 hardware. The procedures for installing the software and for verifying the system installation are contained in the *DECrouter 250 Software Installation* manual.

NOTE

Connection to individual devices is not described in detail. For more information, see Appendix C and the *DECconnect System Planning and Configuration Guide*.

There is no prescribed order for installing the hardware and the software. You may both install and test the hardware without using the software. You can install software on a load host before you install the hardware. However, the hardware and software must both be installed to verify the system installation. Figure 1–1 identifies the major steps that make up the total system installation.

Figure 1–1: DECrouter 250 System Installation

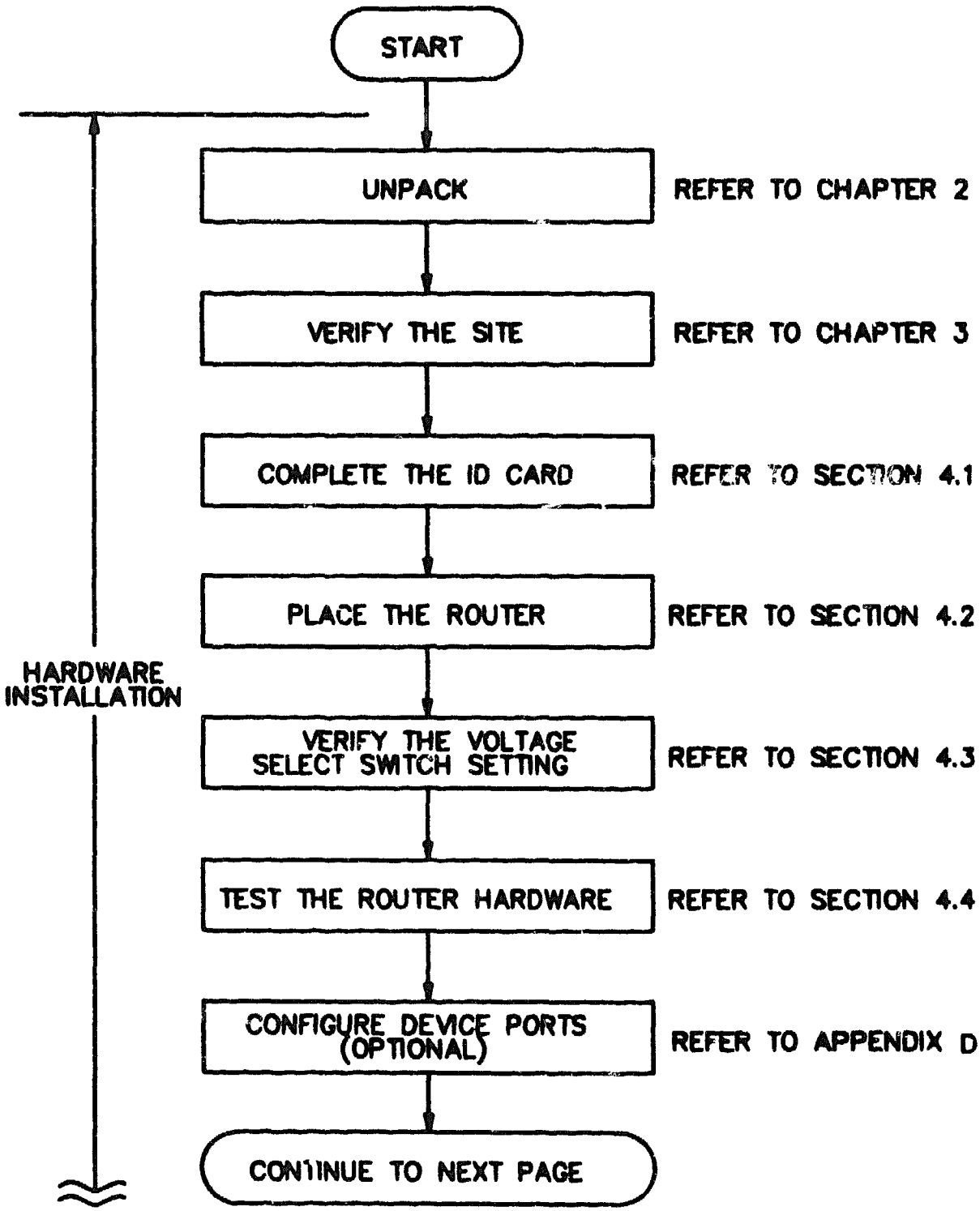


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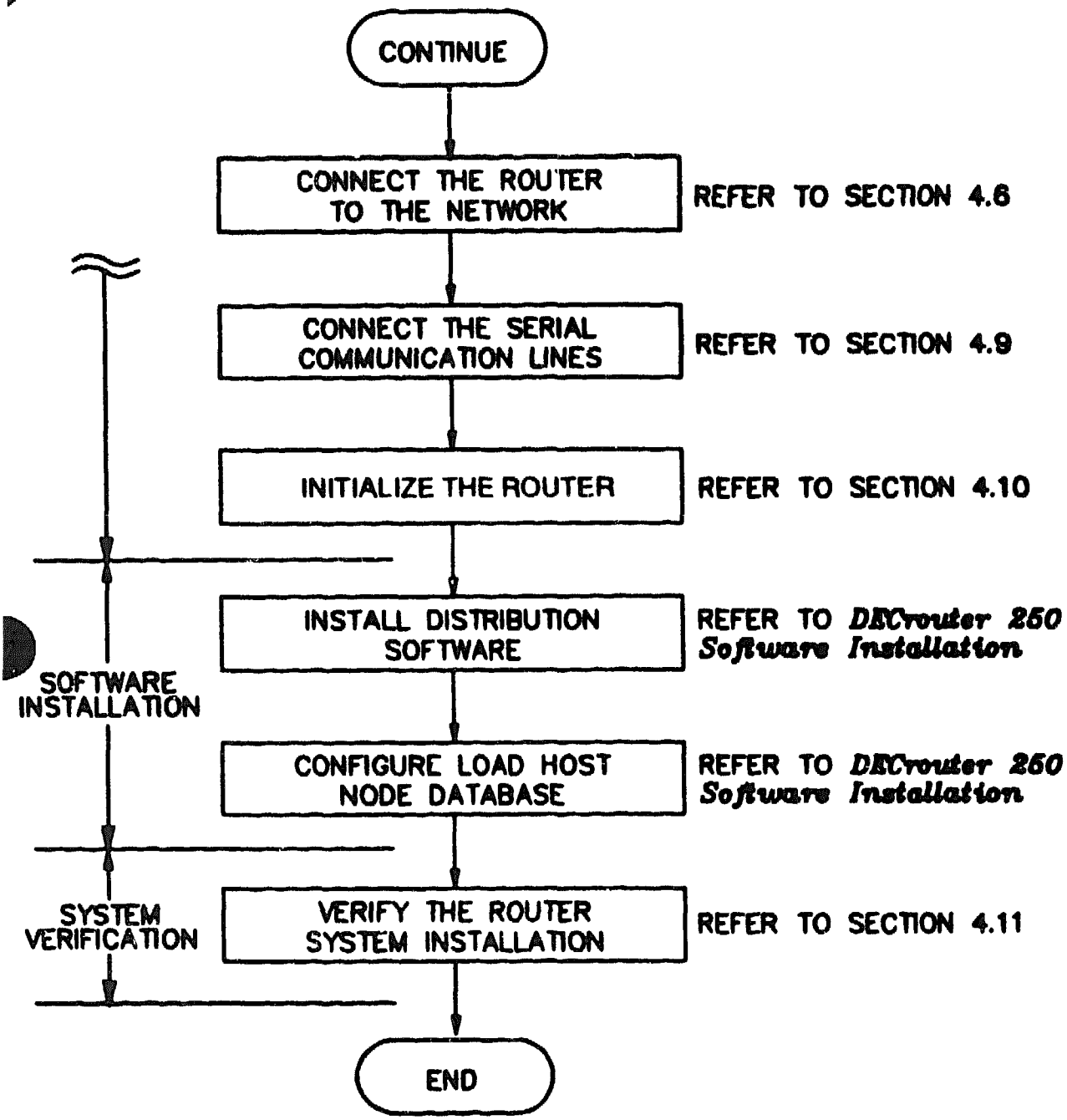
Figure 1–1 (Cont.): DECrouter 250 System Installation



1.2 Hardware Overview

The DECrouter 250 is a high-performance, router that connects synchronous or asynchronous devices (PCs, workstations, modems, and so forth) to each other and to an Ethernet or IEEE 802.3 local area network.

WARNING

Ethernet installations may extend to thousands of meters and couple hundreds of separate items of equipment. To prevent hazardous voltages appearing on the installation, it is important that all the equipment be part of a common equipotential system as defined in IEC publications 364-4-41 clauses 413.1.2 and 413.1.6. Where it is required to couple equipment outside of the main equipotential bonded area via Ethernet, then optical repeaters or other such galvanically isolated measures must be employed. If in doubt please refer to Digital Equipment Corporation for advice.

ADVARSEL

Ethernet-installationer kan strække sig over tusindvisaf meter og forbinde hundredevis af separate dele af udstyr. For at undgå farlig spænding i installationerne er det vigtigt, at alt udstyret er del af et fælles jordingspunkt som defineret i IEC publikation 364-4-41, klausulerne 413.1.2 og 413.1.6. Hvor det er nødvendigt at forbinde udstyr udenfor det større fælles jordingspunkt via Ethernet, skal der anvendes optisk kobling eller anden form for galvanisk isolering af udstyret. For yderligere oplysninger henvises til den lokale Digital afdeling.

VAROITUS

Ethernet-verkot voivat olla tuhansia metrejä pitkiä ja niihin voidaan liittää satoja erilaisia laitteita. Jotta verkkoon ei pääsisi syntymään vaarallisia jännitteitä, kaikkien laitteiden on ehdottomasti kuuluttava samaan potentiaalintasausjär jestelmään, jonka ominaisuudet on määritetty IEC:n julkaisussa 364-4-41,kohdissa 413.1.2 ja 413.1.6. Mikäli Ethernetiin halutaan liittää laite, joka ei kuulu potentiaalintasausjär jestelmään, on käytettävä optisia toistimia tai vastaavia galvaanisesti eristettyjä menetelmiä. Jos et ole varma käytettävästä menetelmästä, ota yhteys Digitaliin.

DANGER

Une installation Ethernet peut s'étendre sur des kilomètres et relier des centaines d'éléments. Afin d'éviter tout problème électrique, vérifiez la présence d'une mise à la terre commune ainsi qu'elle est définie par l'IEC (364.4.41, clauses 413.1.2 et 413.1.6). S'il s'avère nécessaire de relier par Ethernet des équipements non rattachés à une même terre, utilisez des répéteurs optiques ou autres matériels offrant la même qualité d'isolation. En cas de doute, prenez contact avec les Services techniques Digital.

VORSICHT

Ethernet-Netzwerke können sich über mehrere tausend Meter erstrecken und mehrere hundert einzelne Geräte miteinander verbinden. Zur Vermeidung von gefährlichen Spannungen im Netzwerk ist es unbedingt erforderlich, daß alle Geräte Teil einer gemeinsamen Erdungsschleife sind, wie in den IEC-Richtlinien 364-4-41, Abschnitte 413.1.2 und 413.1.6 angegebn. Wenn Geräte außerhalb der Erdungsschleife über Ethernet miteinander verbunden werden müssen, müssen optische Repeater oder andere galvanisch getrennte Mittel verwendet werden. Falls Sie Fragen haben, wenden Sie sich an Digital Equipment.

WAARSCHUWING

Ethernet-configuraties kunnen een afstand van verschillende kilometers overbruggen en honderden afzonderlijke apparaten met elkaar verbinden. Om te vermijden dat er zich gevaarlijke spanningen zouden voordoen op de configuratie, is het belangrijk dat alle apparatuur gebruik maakt van dezelfde voeding en dezelfde aarde, zoals gedefinieerd in de IEC-publikatie 364-4-41, bepalingen 413.1.2. en 413.1.6. Wanneer apparatuur die niet op eenzelfde equipotentiaal spanningsnet is aangesloten via Ethernet gekoppeld moet worden, moet men gebruik maken van optische repeaters of van andere galvanisch isolerende technieken. Bij twijfel gelieve u contact op te nemen met Digital.

ADVARSEL

Ethernettinstallasjoner kan strekke seg over flere tusen meter og ha tilkoblet flere hundre forskjellige utstyrsenheter. For å forhindre at det skal oppstå farlige spenninger på installasjonen, er det viktig at alt utstyret tilhører et felles ekvipotensialt forbindelsessystem, slik det er definert i IEC-publikasjon 364-4-41, para- grafene 413.1.2 og 413.1.6. Der hvor det er på- krevet å koble utstyr via Ethernet utenfor det ekvipotensiale hovedområdet, er det påbudt å be- nytte optiske linjeforsterkere (repeatere) eller tilsvarende galvanisk isolert materiale. Kontakt Digital hvis du er i tvil.

ATTENZIONE

Le installazioni Ethernet possono estendersi per migliaia di metri e collegare diverse centinaia di elementi separati di apparecchiature. Per evitare il rischio di scariche elettriche al momento dell'installazione, è importante che tutte le apparecchiature siano collegate ad un comune sistema di massa come qdefinito nella pubblicazione IEC 364-4-41, clausole 413.1.2 e 413.1.6. Laddove si richieda di collegare l'apparecchiatura fuori dalla principale area di massa via Ethernet, si devono utilizzare ripetitori su fibra ottica o qualsiasi altro strumento isolato galvanicamente. Per qualsiasi informazione rivolgersi alla sede Digital più vicina.

AVISO

A instalação da Ethernet pode estender-se por milhares de metros e agrupar centenas de itens de equipamento.

Para evitar que voltagens perigosas surjam na instalação, é importante que todo o equipamento faça parte de um sistema eléctrico equipotencial comum, tal como definido na publicação 364-4-41 do IEC, cláusulas 413.1.2 e 413.1.6.

Onde fôr necessário ligar equipamento fora da área principal de ligação eléctrica equipotencial, através da Ethernet, deverão ser empregues repetidores ópticos ou outras soluções galvanicamente isoladas.

Em caso de dúvida, contacte a Digital.

¡PRECAUCIÓN!

Las instalaciones de Ethernet pueden extenderse hasta cientos de metros y a un gran número de equipos. Para evitar tensiones peligrosas en la instalación, es importante que todos los equipos formen parte de un sistema equipotencial común, tal y como se define en las publicaciones del IEC 364-4-41, cláusulas 413.1.2 y 413.1.6. Cuando sea necesario conectar equipos a través de Ethernet fuera del área equipotencial principal, deben emplearse repetidores ópticos u otros elementos aislados galvánicamente del mismo tipo. En caso de duda, le rogamos se ponga en contacto con Digital Equipment Corporation.

VARNING

Ethernet installationer kan vara tusentals meter och koppla ihop hundratals enstaka delar. För att undvika spänningsfara, är det viktigt att alla delar ingår i ett ekvipotentiellt system enligt definitionen i IEC publikationen 364-4-41, klausulerna 413.1.2 och 413.1.6. Då det krävs att utrustning kopplas via Ethernet utanför det ekvipotentiella systemet, måste optiska för- stärkare eller annan galvaniserad isolering användas. Vid eventuella oklarheter, kontakta Digital Equipment AB för rådgivning.

א ז ה ר ה

התקנות ה-ETHERNET משתרעות לפעמים על פני אלפי מטרים, והן עלולות לכלול כמה מאות פריטי ציוד נפרדים. כדי למנוע מתחים חשמליים שעלולים להיות סכנה במתקן, מאד חשוב להקפיד שכל הציוד יהווה חלק ממערכת חשמל משותפת הנמצאת באותו מבנה והמחברת ביו מרכיביה, השווים בכח ובפוטנציאל, כפי שהוגדר ב- IEC, דבר דפוס 364-4-41 סעיפים 413.1.2 ו- 413.1.6.
במקומות שבהם נדרש לחבר ביו פריטי ציוד מחוץ למבנה הכולל את מערכת החשמל הראשית המשותפת, באמצעות ETHERNET, אזי חייבים להשתמש בציוד אופטי (OPTICAL REPEATERS, BRIDGES) או באמצעים אחרים המבודדים רצף מתכתי.
במידה ויתעוררו ספקות, נא לפנות למשרד דיגיטל הקרוב.

注　意

イーサネットの設置は数千メータに及んだり、二、三百の設置項目（機器）に及ぶことがあります。

設置に際する危険な電圧の発生を防ぐためには、ＩＥＣ公報３６４－４－４１の条項４１３．１．２、および４１３．１．６に定められているように、すべての機器が共通接地システムに接続されていることが重要です。

共通接地システムに接続できない場所にイーサネットを介して機器を設置する必要がある場合、オプチカルリピータ、または電気的に分離された手段を講じることが必要です。

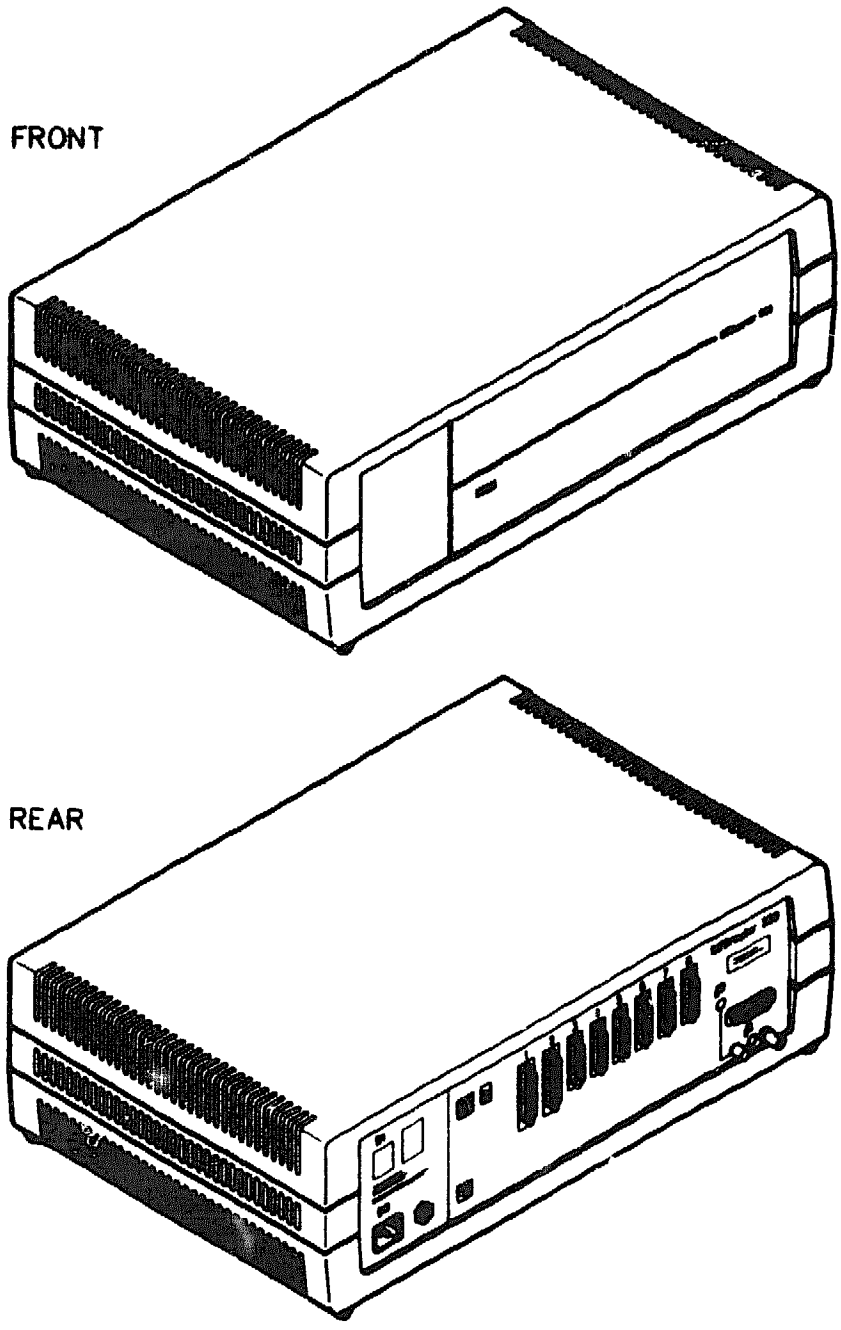
ご不明な点は当社にお問い合せ下さい。

1.2.1 Models

There is only one model of the DECrouter 250 (DSRVR-Ax) but this model (see Figure 1–2) has two versions depending on the input voltage as shown below:

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

Figure 1–2: DECrouter 250 Model DSRVR–Ax



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1.2.2 Functions of the DECrouter 250

Using the DECrouter 250 system, you may connect any combination of up to eight synchronous or asynchronous devices to each other and to a local area network (optional). 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.11
- V.35
- V.36

Devices that connect to the DECrouter 250 system, via synchronous or asynchronous ports, include modems, personal computers running DECnet, and larger computers running DECnet. For a list of devices supported by the DECrouter 250, see Appendix B.

The DECrouter 250 system offers the following features:

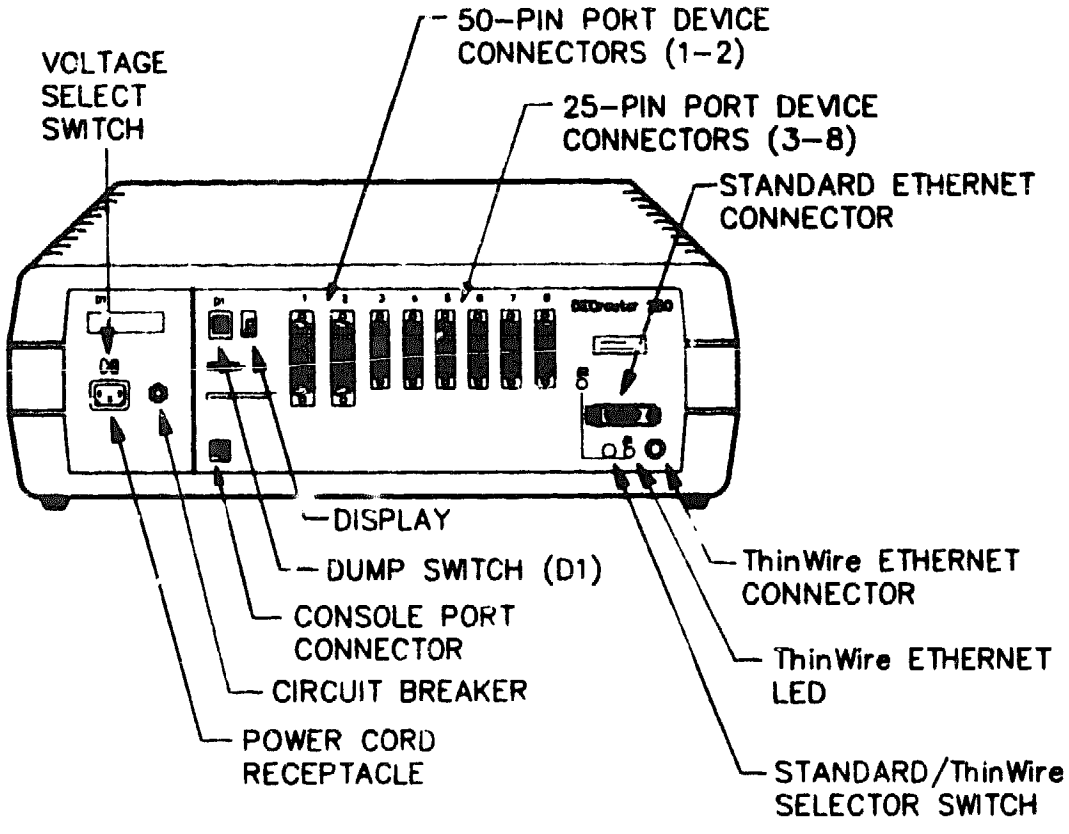
- Connections to the Ethernet Local Area Network (LAN) and to a wider area DECnet network for DECnet nodes with synchronous or asynchronous, full duplex, DDCMP, that use any of the foregoing standards.
- DECnet routing (for example, message switching and best path analysis) which allows host processors more time for application tasks.
- Reduced and simplified cabling requirements for connecting nodes to the DECnet network.
- Support for dial-in and dial-out modems.
- Support for dial-back security.

You can install the DECrouter 250 system in a variety of environments, including offices and computer rooms. The router can be placed on a desk or table, or can be mounted in a standard rack cabinet. Digital Equipment Corporation can also provide you with a wall/partition mounting bracket to mount the router directly onto an office wall or to suspend the router from partitioned office walls. This bracket must be ordered separately. See Appendix E for ordering information.

1.2.3 Router Controls, Indicators, and Connectors

All of the router controls, indicators and connectors that are used during router operation are located on the rear of the router as shown in Figure 1–3.

Figure 1–3: DECrouter 250 Back Panel



The router controls are described in Table 1–1. The indicators are described in Table 1–2 and a brief description of the connectors is given in Table 1–3. (Further information on the connectors and associated cables is given in Chapter 4 and Appendix A.)

Table 1–1 : Router Controls

Control	Description
Dump switch (D1)	When the router software is running, press this switch to force the router to dump its memory contents to a load host. On power up, press this switch to load the factory set parameters (see Appendix D).
Voltage select switch	This switch sets the input voltage to the range required (100-120 Vac or 220-240 Vac).
Circuit breaker	A circuit breaker (press to reset) protects the power supply against excessive current.
Standard/ThinWire selector switch	This switch selects either ThinWire or Standard Ethernet.

CAUTION

Do not press the standard/ThinWire selector switch when the router software is operating. This will cause a reset of the CPU and a subsequent reboot of the system — just as if the power cord had been pulled out and plugged back in again.

Table 1–2 : Router Indicators

Indicator	Display
ThinWire Ethernet LED	Lights (green) to indicate that the ThinWire Ethernet connector is selected.
Standard Ethernet LED	Lights (green) to indicate that the standard Ethernet connector is selected.
Display	This is a seven-segment display that provides error and status information (see Chapter 5 for further details).

Table 1–3 : Router Connectors

Connector	Description
25-way — Port device connectors	These six 25-pin male D-connectors connect EIA-232-D devices to the router.
50-way — Port device connectors	These two 50-pin female D-connectors connect devices to the router. The devices must support one of the following standards: EIA-232-D/V.24/V.28 RS-449,RS-423-A/V.10 RS-449,RS-422-A/V.11 V.35 V.36 The devices connect to the port via an adapter cable.
Standard Ethernet connector	This single 15-pin female D-connector connects to a standard Ethernet local area network using transceiver cable.
ThinWire Ethernet connector	This single female BNC connector connects to a ThinWire Ethernet local area network using ThinWire cable and a T-connector.
Power cord receptacle	The router power cord plugs into this receptacle.
Console connector	This 6-pin Modified Modular Jack (MMJ) connects a console to the router for installation, configuration, or troubleshooting procedures.

1.3 Software Requirements

The software requirements for installing and operating the DECrouter 250 are as follows:

- DECrouter 250 distribution software — installed on each DECrouter 250 system load host.
- DECnet Phase IV, or Phase IV Plus software — installed on each DECrouter 250 system load host (not required for ULTRIX systems).

The distribution software includes a router image file that is down-line loaded to a DECrouter 250. The load host down-line loads the router image whenever required, and provides the router image to any number of routers. The router image, running on the DECrouter 250, constitutes the router software that enables the router to perform its functions.

All software must be installed and verified before you can operate the router.

For more information, see the DECrouter 250 *Software Product Description* (SPD) that applies to the specific operating system.

1.4 Service Options

The following sections briefly describe the Digital Equipment Corporation hardware and software options that are available for the DECrouter 250 system. For more information, please contact your Digital sales representative.

1.4.1 Digital On-Site Service

Digital provides on-site service under a service agreement or on a per-call basis. Trained service specialists perform hardware maintenance at your site.

1.4.2 DECmailer

DECmailer allows you to ship the router to a Customer Return Center for repair.

1.4.3 Installation Service

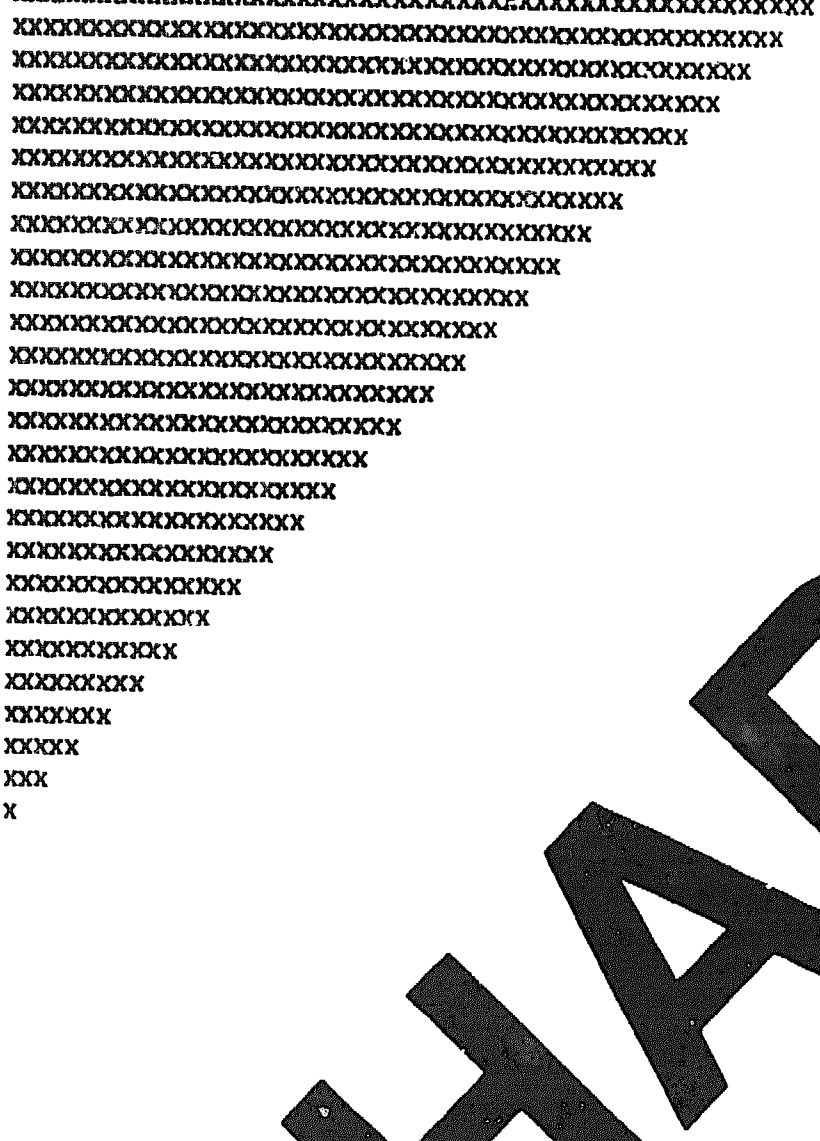
Installation service includes services provided by trained service specialists for successful installation of your DECrouter 250 system.

1.4.4 Software Product Service Agreements

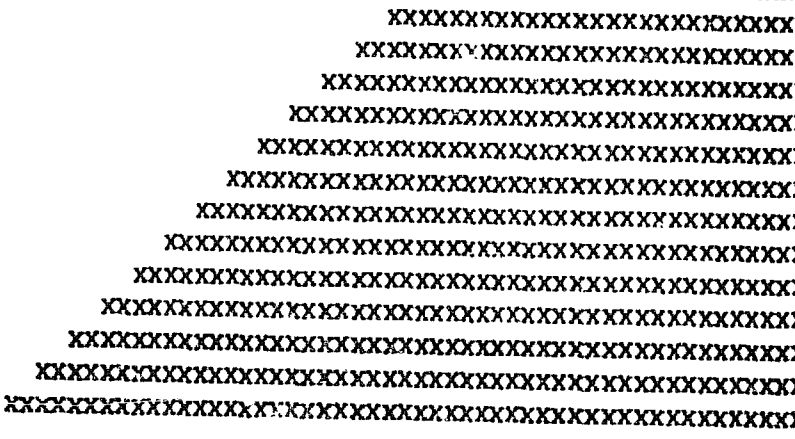
Digital offers software product service agreements to support your software.

1.4.5 Training

Digital Educational Services sells training for installation, maintenance, and management of Digital software. Course formats may vary from seminars to packaged training materials.



CHAP 2



2

Unpacking the Boxes

2.1 Number of Boxes in Shipment

A single DECrouter 250 hardware shipment consists of one or more boxes, depending on the optional equipment ordered. Check each box for damage.

- IN CASE OF DAMAGE

— Stop unpacking.
— Contact your Digital Equipment Corporation sales representative.

- IF PARTS ARE MISSING

— Identify missing parts.
— Contact your Digital Equipment Corporation sales representative.

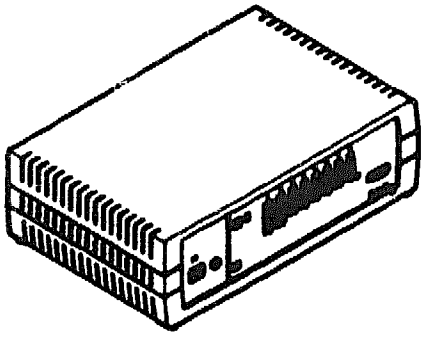
NOTE

Save the box and packing material in case you need to return the unit.

2.2 Contents of DECrouter 250 Hardware Shipment

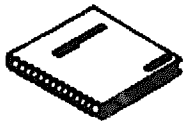
Check the shipment for the items shown in Figure 2–1.

Figure 2–1: Contents of the DECrouter 250 Hardware Shipment



☐ Power cord

☐ *DECrouter 250 Hardware Installation*



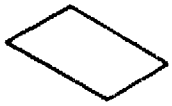
☐ *DECrouter 250 Identification Card*

☐ H3199 Loopback Connector

☐ Blank ID labels for cables

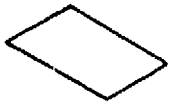
☐ H3266 Loopback Connector

☐ Software license



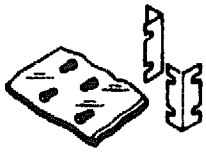
☐ BS23V cable kit -2 off

☐ FTZ card (Austria/Germany only)



☐ BNC T piece

☐ Rack mount kit



☐ BNC 50-ohm connectors (2)

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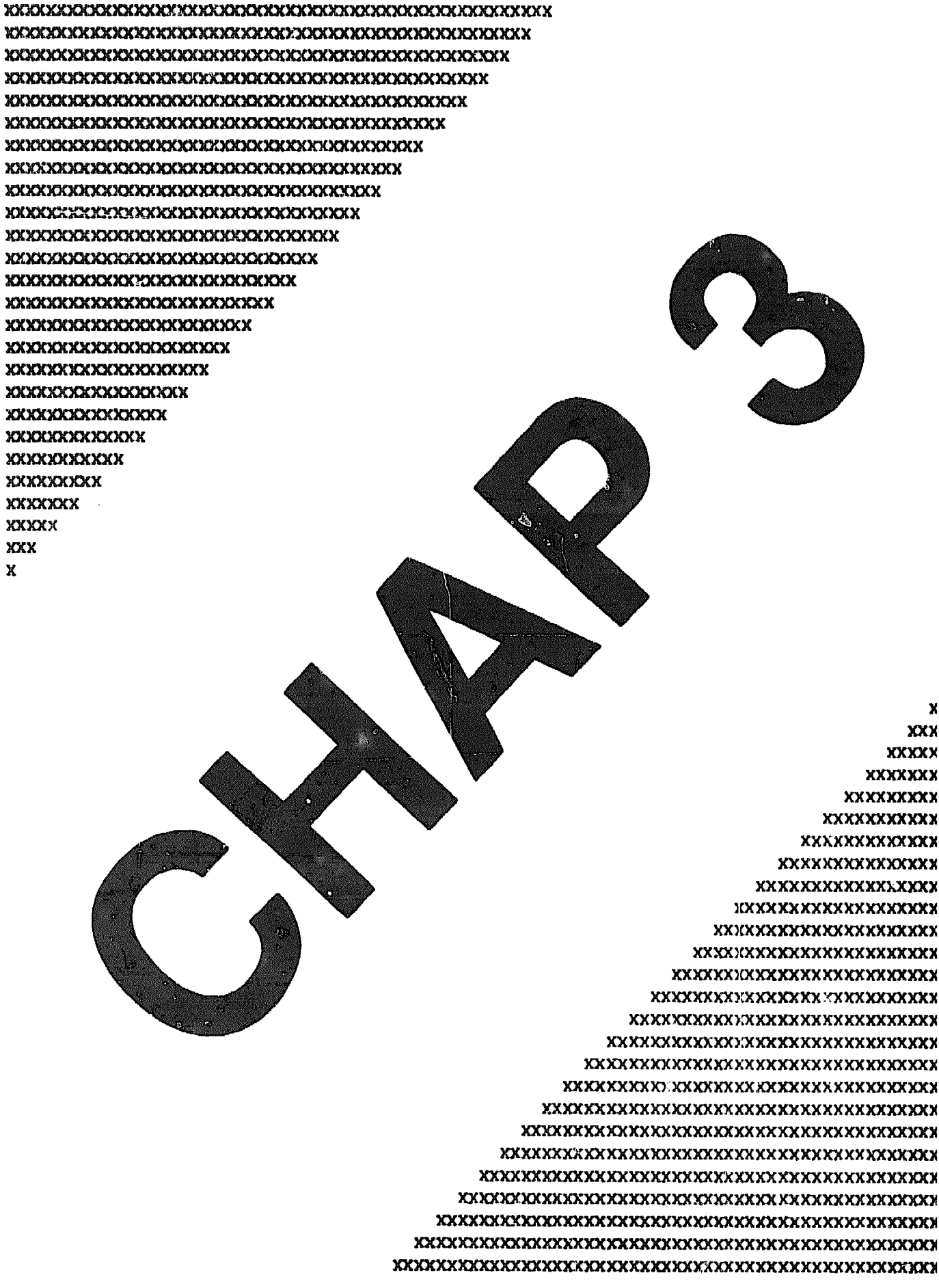

CHAP 3

3

Site Verification

This chapter lets you verify that the preselected installation site meets the router's physical, environmental, electrical, and network cabling requirements.

The instructions in this chapter assume that the customer has completed the following site preparation requirements:

- A router installation site is identified.
- An appropriate ac power source is within 1.6 meters (5.5 feet) of the router.
- Appropriate types and lengths of cable are available for connection to Ethernet (if required).
- Required devices are ready to be connected.
- The modems are selected and installed.
- At least one terminal (VT100-, VT200-, or VT300-series) with a keyboard is available for installation and troubleshooting.

3.1 Verifying Hardware and Cable Requirements

The router can operate in an office environment and in a standard equipment rack located in a computer room or satellite equipment room. Regardless of where you install the router, verify that all of the requirements in this section are met before beginning the installation.

3.1.1 Physical Requirements

Place the DECrouter 250 hardware at least 45 centimeters (18 inches) above the floor. Allow for 15 centimeters (6 inches) of airspace around the router air vents. Table 3–1 shows the size and weight of the router.

Table 3–1: Physical Specification of the Router

Dimension	Measurement
Width	49.3 cm (19.4 inches)
Height	16.1 cm (6.3 inches)
Depth	31.2 cm (12.3 inches)
Weight	8.1 kg (17.1 lbs)

3.1.2 Environmental Requirements

Environmental requirements for temperature and humidity must be within the ranges shown in Table 3–2.

Table 3–2: Environmental Specifications of the Router

Parameter	Minimum	Maximum
Temperature (°)		
Operating	5°C (41°F)	50°C (122°F)
Nonoperating	–40°C (–40°F)	66°C (151°F)
Maximum temperature changes per hour		20°C (36°F)
Altitude		
Operating		2438 meters (8000 feet)
Nonoperating		4876 meters (16000 feet)
Relative humidity		
Operating (noncondensing)	10%	95%
Nonoperating (noncondensing)	10%	95%

* If you are operating the router above 2.4 kilometers, decrease the operating temperature specification by 1.8°C for each 1000 meters (1°F for each 1000 feet)

3.1.3 Electrical Requirements

The power at the electrical outlet must match the requirements shown in Table 3–3.

Table 3–3: Electrical Requirements

Parameter	DSRVR–AA	DSRVR–AB
Voltage range	100–120 Vac (3–wire, single phase)	220–240 Vac
Frequency	50 to 60 Hz	50 to 60 Hz
Line current	1.5 Amps	1.0 Amps
Power	150 Watts	150 Watts

3.1.4 Leakage Current

The DECrouter 250 hardware earth leakage current is shown in Table 3–4.

Table 3–4: Earth Leakage Current

Parameter	DSRVR–AA	DSRVR–AB
Voltage range	100–120 Vac (3–wire, single phase)	220–240 Vac
Frequency	50 to 60 Hz	50 to 60 Hz
Leakage Current	0.308 mA	.482 mA

Note

The values in Table 3–4 are not a specification and therefore should be used only as a guide.

3.1.5 Line Speed Restrictions

You may configure the router to have any one of the following maximum line speed configurations:

- Both port 1 and port 2 configured for 64 kilobits per second and port 3 to port 8 (inclusive) disabled.
- Either port 1 or port 2 connected for 64 kilobits per second and any four ports connected for 9.6 kilobits per second. Disable the unused ports.
- All ports configured for 19.2 kilobits per second.

CAUTION

You should not configure the router to exceed the line speeds shown in Section 3.1.5.

3.1.6 Cabling Requirements

The cabling requirements of the router are shown in the following sections. Further information on cabling and configuring of local area networks, and using DECconnect system products, is provided in the *DECconnect System Planning and Configuration Guide*. Table 3–5 shows the maximum communication distances for different types of cable used between the router and transceiver, and also the maximum length of power cable. Table 3–6 shows the maximum cable lengths for a number of data rates using DECrouter 250 supported line protocols.

Table 3–5: Maximum Communications Distances

From	To	Maximum Distance	Cable Type
Router	Transceiver	50 meters (164 feet)	BNE3x–xx standard transceiver cable
Router	Transceiver	12.5 meters (41 feet)	BNE4x–xx office transceiver cable
Router	Power outlet	1.8 meters (6 feet)	Router power cable
Router *	DESPR/DEMPR	185 meters (606 feet)	H8243–A cable

* No other device in ThinWire segment

Table 3–6: Maximum Cable Lengths — Router to Devices

Line Protocol	Data Rate (b/s)	Cable Length
EIA-232-D/V.24	Up to 20 K	15 meters (50 feet)
RS-423-A	Below 1 K	1200 meters (3900 feet)
	20 K	400 meters (1300 feet)
	48 K	150 meters (500 feet)
	64 K	130 meters (400 feet)
	100 K (max)	85 meters (270 feet)
RS-422-A	Below 90 K	1200 meters (3900 feet)
	128 K	800 meters (2600 feet)
	256 K	400 meters (1300 feet)
V.35	48 K	60 meters (200 feet)

Table 3–6 assumes the following:

- The V.24 cable capacitance is 50 pF/ft.
- The RS-423-A cable capacitance is 15 pF/ft.
- The RS-422-A cable is 100 ohm terminated with a capacitance of 15 pF/ft.

The maximum cable length for V.35 is a recommended figure only.

3.1.6.1 Standard Ethernet Connection

The transceiver cable must reach the router and must not exceed the maximum distances listed in Table 3–5. Table 3–5 identifies the maximum communications distances that can be achieved using certain types of cables.

3.1.6.2 ThinWire Ethernet Connection

The ThinWire cable segment must conform to the following configuration rules:

- The maximum cable segment length must not exceed 185 meters (606 feet).
- There must be a 50-ohm terminator at each end of the cable segment unless the cable ends in a DEMPR or DESPR (both these devices have inbuilt 50-ohm terminators).
- There must be only one ground per cable segment.
- There must be at least 0.5meter (19 inches) between T–connectors.

- The maximum number of stations, between terminators, must not exceed 30.
- ThinWire cable segments must not be configured in a loop.
- ThinWire cable segments must not have any branch segments.

3.2 Preinstallation Checks

Before beginning the router installation, use the following checklist to make sure that the site preparation is complete.

3.2.1 Hardware Checks

- Arrangements have been made to connect the router Ethernet port to an Ethernet interface device (if required). For Standard Ethernet the device can be a DELNI network concentrator or an Ethernet transceiver. For ThinWire Ethernet the device can be a DEMPR, a DESPR or a ThinWire segment.
- The Ethernet interface device is installed (if required) and the required cabling is in place, tested, and tagged.
- The wall/partition mounting bracket kit or rack mount kit is installed (if required) as described in the kit documentation.
- Cables of appropriate length are available for connecting the router to the Ethernet interface device (if required).
- The devices (modems, personal computers, hosts) are ready to be connected.
- Cables of appropiate length and type are available for connection of serial devices.
- One terminal (asynchronous, DEC423 or EIA–232–D compatible) is available for hardware testing and system verification.

3.2.2 Software Checks

- The *DECrouter 250 Identification Card* was filled out (as described in Section 4.1) and given to the system manager.
- The system manager installed or will install the router software on the load host.
- DECnet Phase IV or later is installed and running on the load host.


СНАР 4

4

Hardware Installation

This chapter tells how you install the hardware and verify the router system installation.

4.1 Completing the Router Identification Card

Locate the *DECrouter 250 Identification Card* included in the router box and copy the following information in the spaces provided on the card:

- The router's serial number. The serial number is located on the back of the router.
- The router's Ethernet address. The Ethernet address is located on the back of the router.
- The location of the router, such as an office location, building number, or floor.
- Your name and the date of installation.

4.2 Placing the Router

You can install the DECrouter 250 system in a variety of environments, including offices and computer rooms, as long as the environmental specifications are met. You can place the router on a desk or table, or mount it in a standard rack cabinet. Digital can also provide you with a wall/partition mounting bracket to mount the router directly onto an office wall or to suspend the router from partitioned office walls. This bracket must be ordered separately. See Appendix D for ordering information.

4.2.1 Placing the Router in an Office

Place the DECrouter 250 hardware at least 45 centimeters (18 inches) above the floor. Allow for 15 centimeters (6 inches) of airspace around the router air vents.

4.2.2 Rack Mounting the Router

If you wish to mount the router in a rack, do the following:

WARNING

The following procedure involves the removal of the system covers, and should be performed only by trained service personnel.

ADVARSEL

Følgende procedure involverer fjernelse af kabinettet og bør kun udføres af uddannet servicepersonale.

VAROITUS

Seuraava toimenpide edellyttää laitteiston kansien avaamista, ja sen suoritus on jätettävä koulutetun ylläpitohenkilökunnan huoleksi.

ATTENTION

Faites appel à du personnel qualifié pour effectuer l'opération décrite ci-après.

WARNUNG

Für das folgende Verfahren müssen erst die Abdeckungen des Systems entfernt werden. Dies sollte nur von Servicespezialisten durchgeführt werden.

WAARSCHUWING

De volgende procedure omvat het verwijderen van de systeempanelen en moet alleen door getraind service-personeel worden uitgevoerd.

ATTENZIONE

La seguente procedura si riferisce alla rimozione degli involucri, e deve essere attuata esclu- sivamente da personale qualificato.

ADVARSEL

Fremgangsmåten nedenfor medfører at system- dekslene må fjernes. Dette må bare utføres av kvalifiserte fagfolk.

AVISO

O procedimento seguinte envolve a remoção das coberturas do sistema, a qual só deve ser efectuada por pessoal devidamente qualificado.

PRECAUCIÓN

El siguiente procedimiento conlleva la retirada de las cubiertas del sistema, y debe llevarlo únicamente a cabo personal del servicio técnico.

VARNING

I nedanstående anvisningar ingår borttagning av systemkåpor, vilket endast får utföras av utbildad servicepersonal.

אזהרה

התהליך הבא מחייב הסרת מכסי המערכת, והוא חייב להתבצע על ידי טכנאי השרות המקצועיים של דיגיטל.

注意

これから述べる手順には，本体カバーの取り外し作業が含まれているため，必ず，弊社のサービス担当者にご依頼ください。

1. Turn the router upside down.

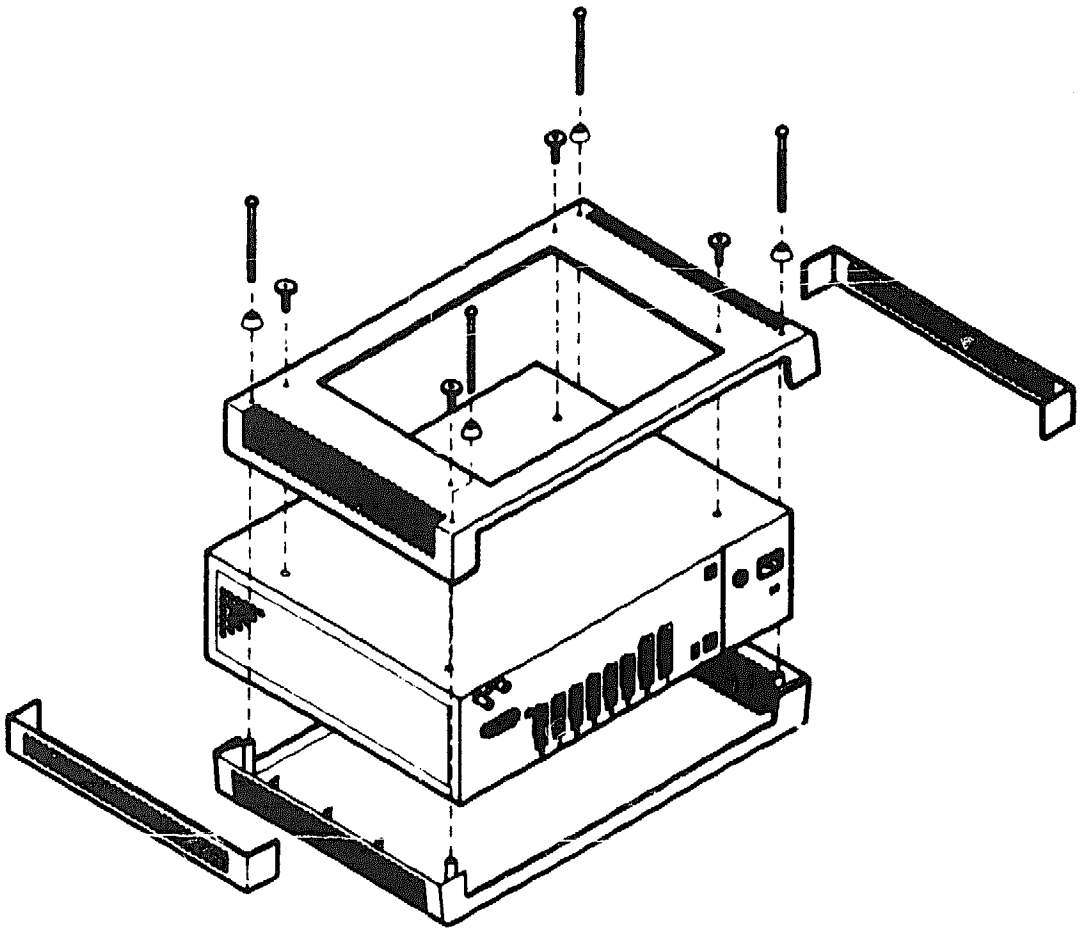
2. Remove the covers (see Figure 4–1).

NOTE

When you remove the covers, do not re-insert the cover screws.

3. Rack mount the router by following the instructions in Figure 4–2.

Figure 4–1: Removing the Covers

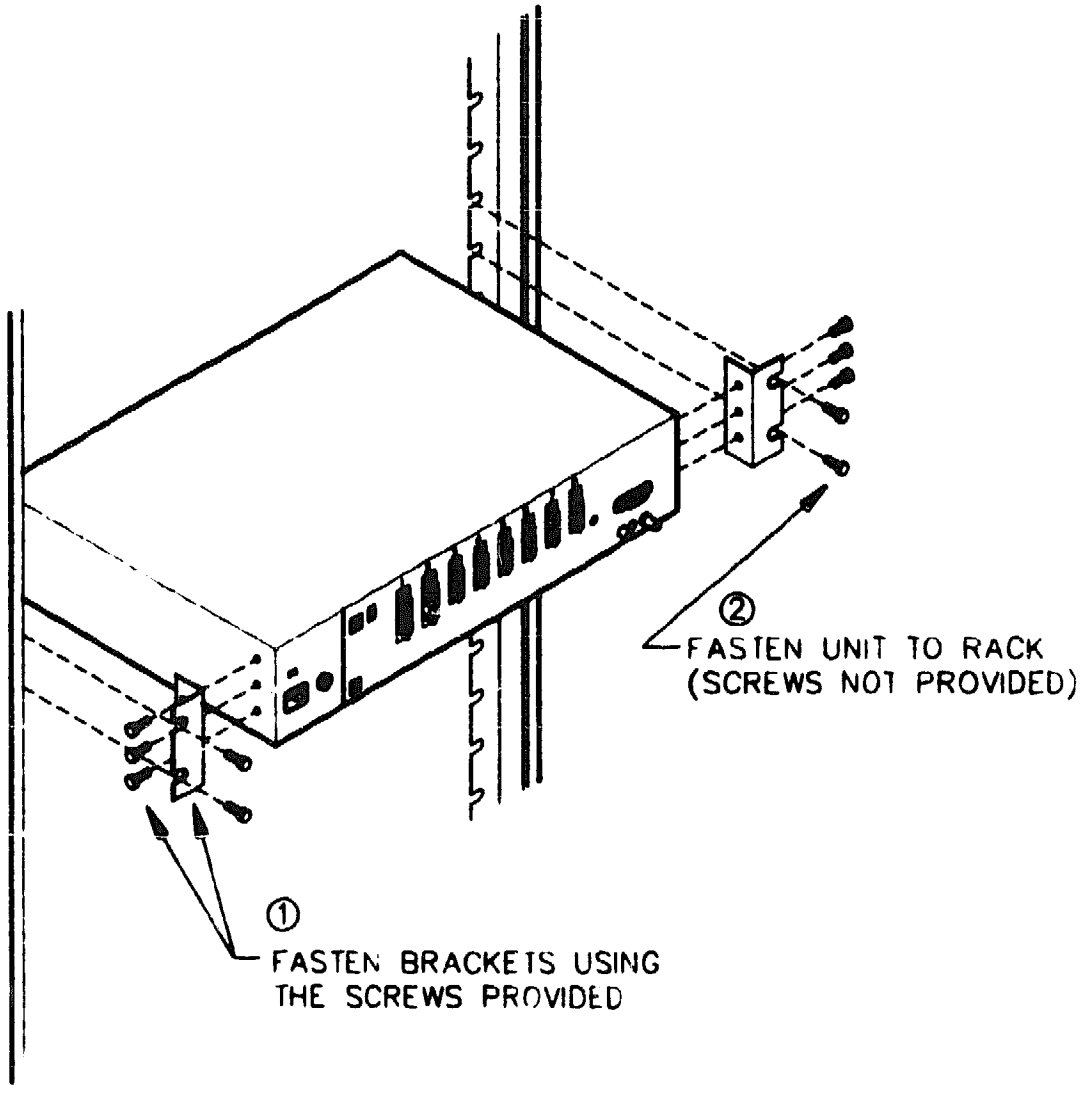


LKG–3116–89A

NOTE

When you remove the covers, **do not** re-insert the cover screws.

Figure 4–2: Rack Mounting the Router



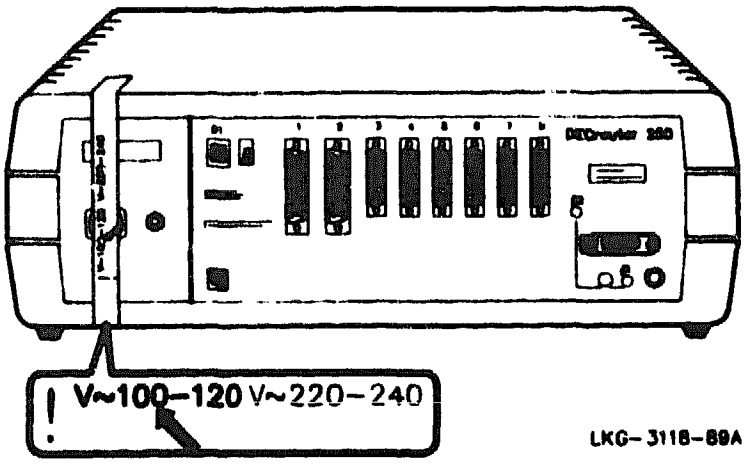
LKG–3117–89A

4.3 Verifying the Voltage Select Switch Setting

To verify or change the voltage select switch settings, do the following:

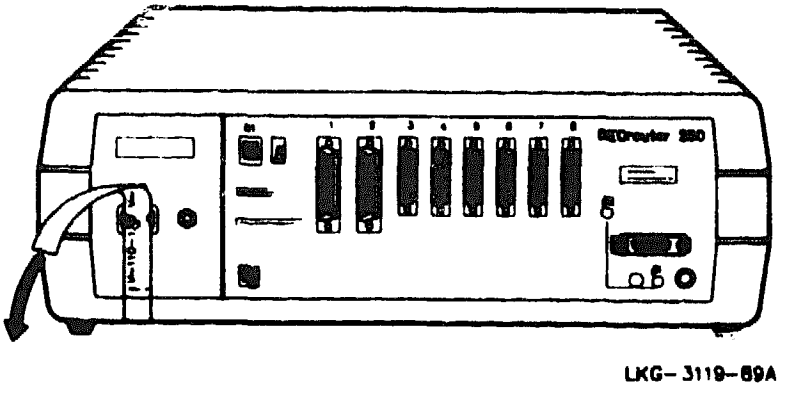
1. Locate the removable voltage label (see Figure 4–3).

Figure 4–3: Locating the Voltage Label



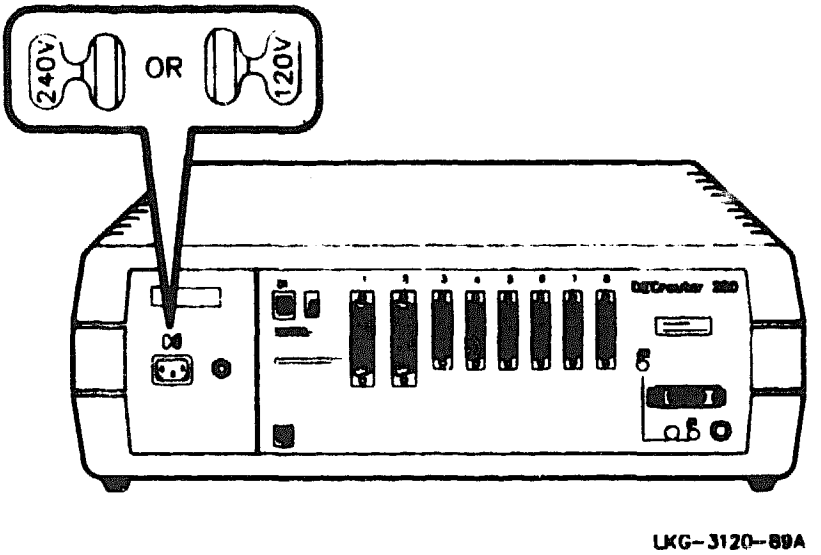
2. Remove the voltage label (see Figure 4–4).

Figure 4–4: Removing the Voltage Label



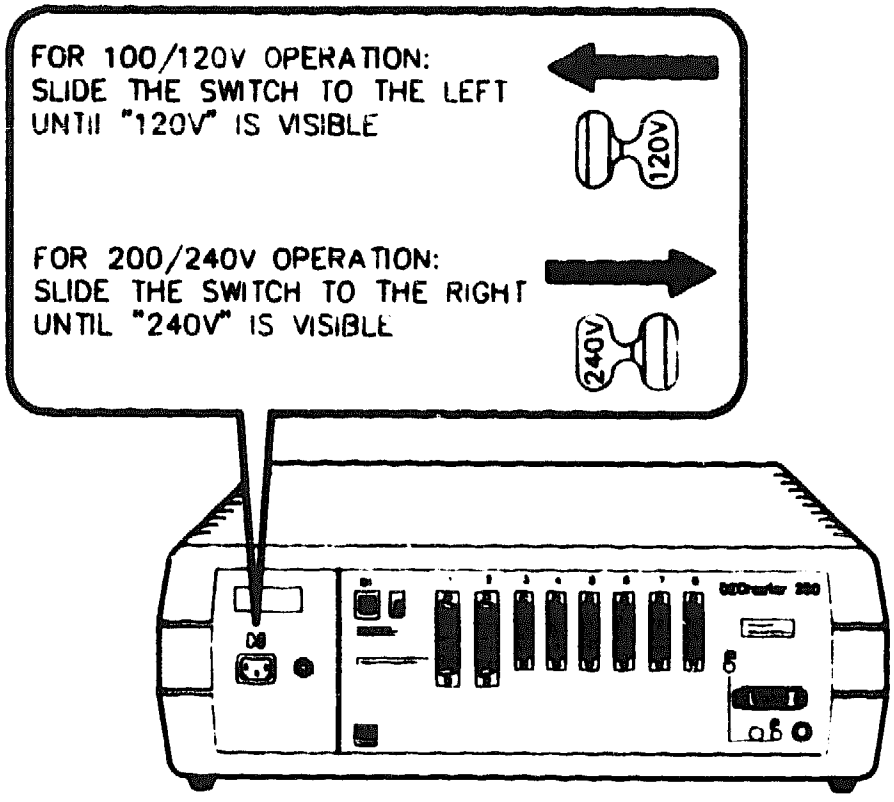
3. Check the voltage select switch (see Figure 4–5).

Figure 4–5: Checking the Voltage Select Switch



4. If necessary, adjust the voltage select switch (see Figure 4–6).

Figure 4–6: Adjusting the Voltage Select Switch



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4.4 Testing the Router Hardware

You should test the router hardware before connecting it to the LAN. The procedure is :

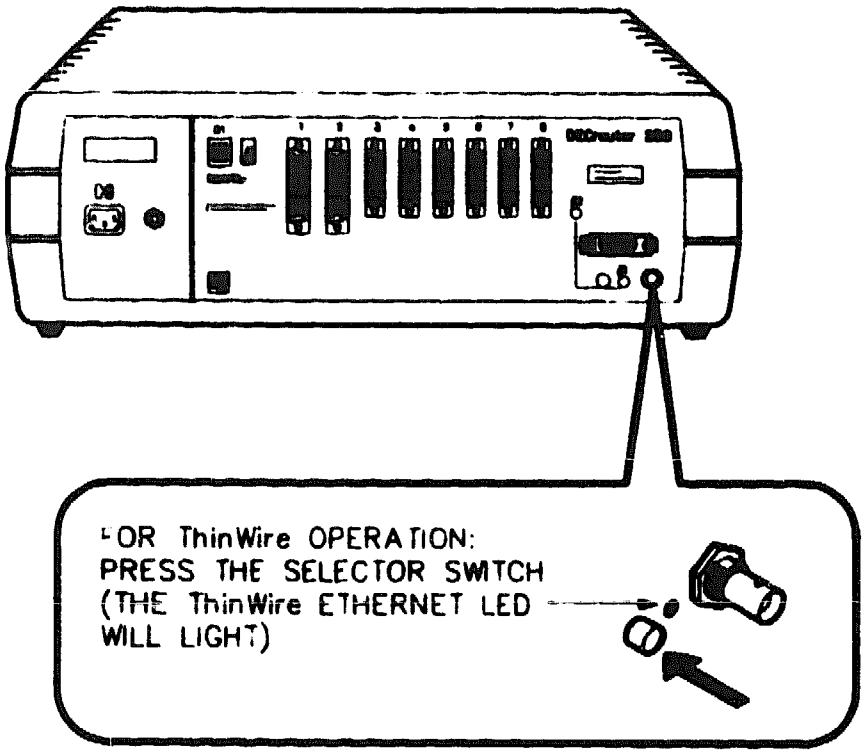
1. Select the ThinWire Ethernet.
2. Install the T-connector and both terminators.
3. Connect power to the router.
4. Run self-test.

These steps are explained in the following sections.

4.4.1 Selecting ThinWire Ethernet

To select ThinWire Ethernet, press the selector button. The button will remain in, and the ThinWire Ethernet LED will light when power is supplied to the router (see Figure 4–7).

Figure 4–7: Selecting ThinWire Ethernet

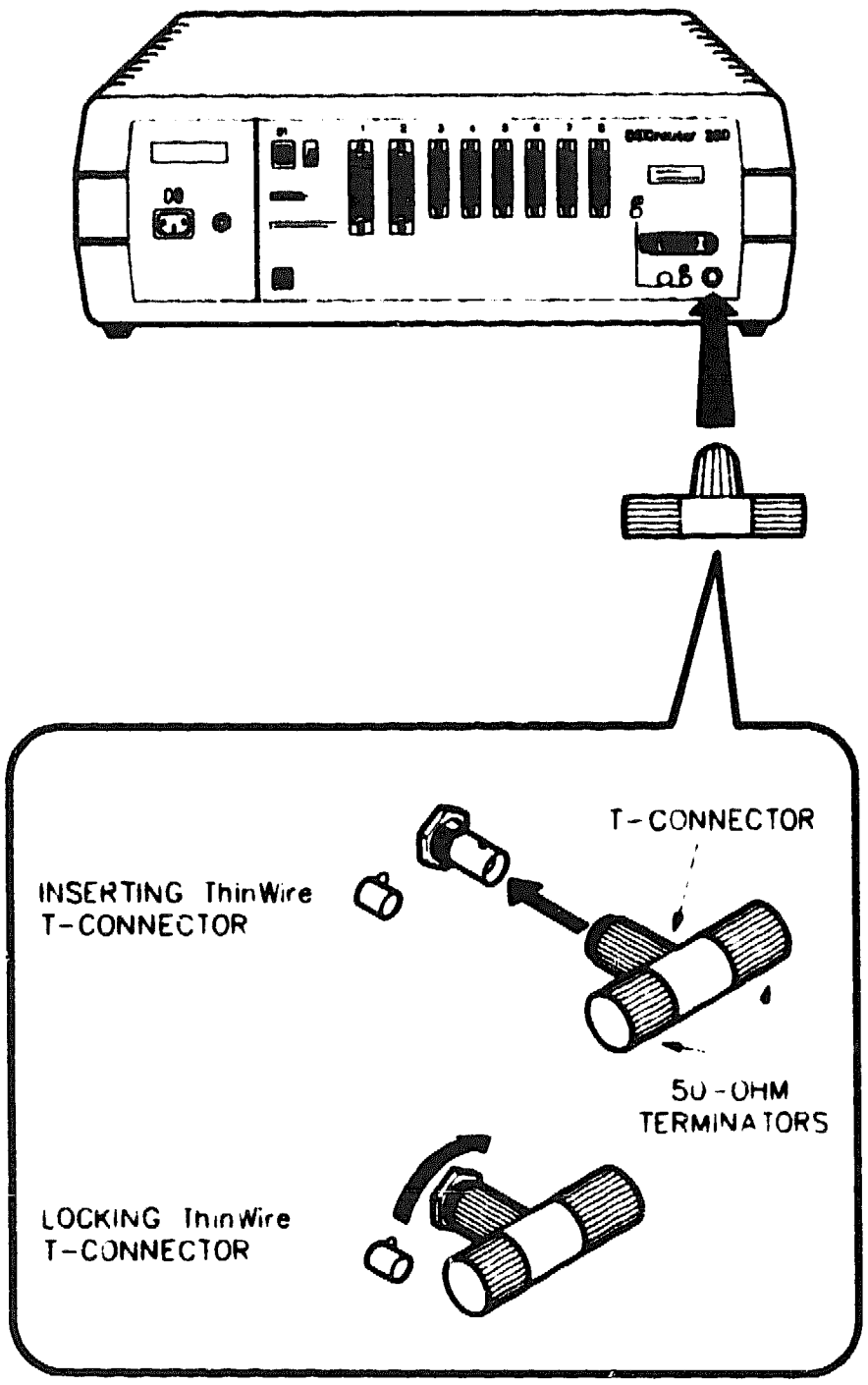


LKG-3122-89A

4.4.2 Connecting the ThinWire T-Connector and Terminators

Insert both of the 50-ohm terminators into the T-connector and insert the T-connector into the BNC connector at the rear of the router. Turn the barrel of the connector clockwise to lock (see Figure 4–8).

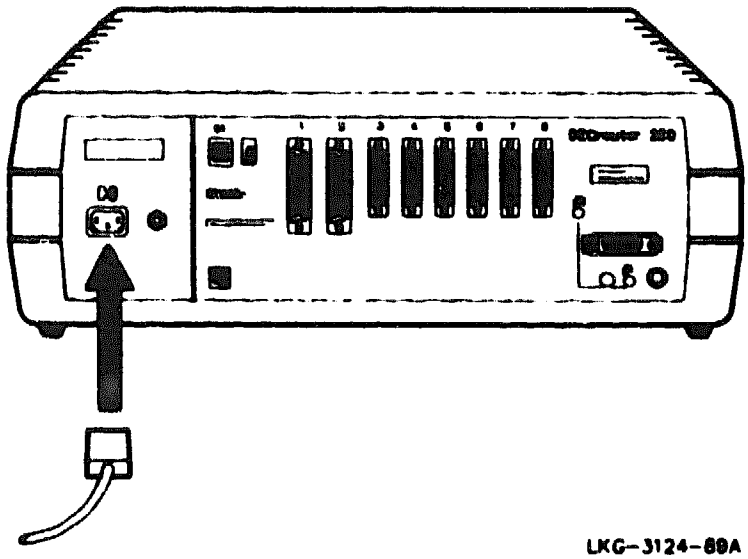
Figure 4–8: Connecting the ThinWire T-Connector and Terminators



4.4.3 Connecting Power to the Router

To connect power to the router, insert the power cord into the power cord receptacle (see Figure 4–9) and insert the power plug into a power outlet.

Figure 4–9: Connecting Power to the Router



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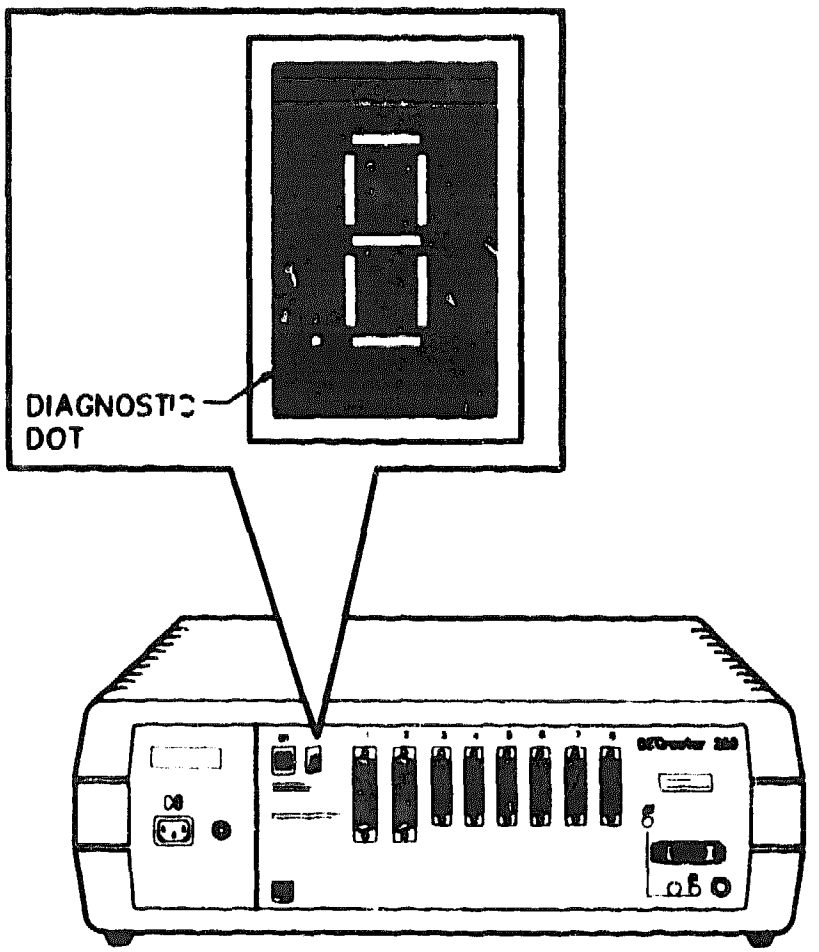
4.4.4 Running Self-Test

Plugging in the router power cord applies power directly to the router, starts the router self-test and, when the router is connected to the LAN, allows the router software to be loaded from a host. The seven-segment display and diagnostic dot (decimal point) supply diagnostic and status information. Figure 4–10 shows the seven-segment display and diagnostic dot.

NOTE

You may load the router software over a serial line, when the port has been configured, without being connected to the Ethernet (see Appendix E for further information).

Figure 4–10: The Seven-Segment Display



LKG–2000–89A

When you connect the router power cord, the seven-segment display shows an "8" for approximately 5 seconds, followed by a blank display for approximately 3 seconds. Self-test runs and the display counts down from "F" through "5" as each block of tests is executed. If a fatal error is detected, the count will stop and the code of the test which has failed will flash. If a nonfatal error is detected, the count will continue and the diagnostic dot will blink. (See Chapter 5 for what action to take.)

When the router passes self-test, it attempts to load the router software from the host and displays "4" on the seven-segment display. The router will attempt to load the software for approximately two minutes. Since the router is not connected to the network, this attempt fails and the router stops trying to load the software and displays "3" on the seven-segment display. The router remains in this state for about 30 seconds before trying to load the software again (display shows "4") for 2 minutes. The router will continue to alternate between these two states, with the times between attempted loads getting longer. At any time from the first "3" onwards, power down the router, disconnect the T-connector and terminators, and continue with the installation.

Table 4–1 explains the seven-segment display codes. Table 4–2 explains the diagnostic dot display.

Table 4–1: Seven-Segment Display Codes

Display	System Status
F	Bootstrap tests executing
E	RAM subsystem test executing
d	Interrupt subsystem tests executing
C	Timer tests executing
b	ROM subsystem tests executing
A	Ethernet subsystem tests executing (internal loopback)
9	Ethernet subsystem external loopback test executing
7	Asynch subsystem tests executing (internal loopback)
5	System exerciser tests executing
4	Requesting load
3	Request load backoff
2	Loading
1	Requesting dump
0	Dumping
(Rotating segment)*	Router software executing

* Segment rotates, outlining a "figure of zero" pattern.

Table 4–2: Diagnostic Dot Display

Diagnostic Dot	System Status
On	No fatal errors
Off	Fatal error or self-test in progress
Blinking	Nonfatal error detected

4.5 Selecting the ThinWire or Standard Ethernet LAN

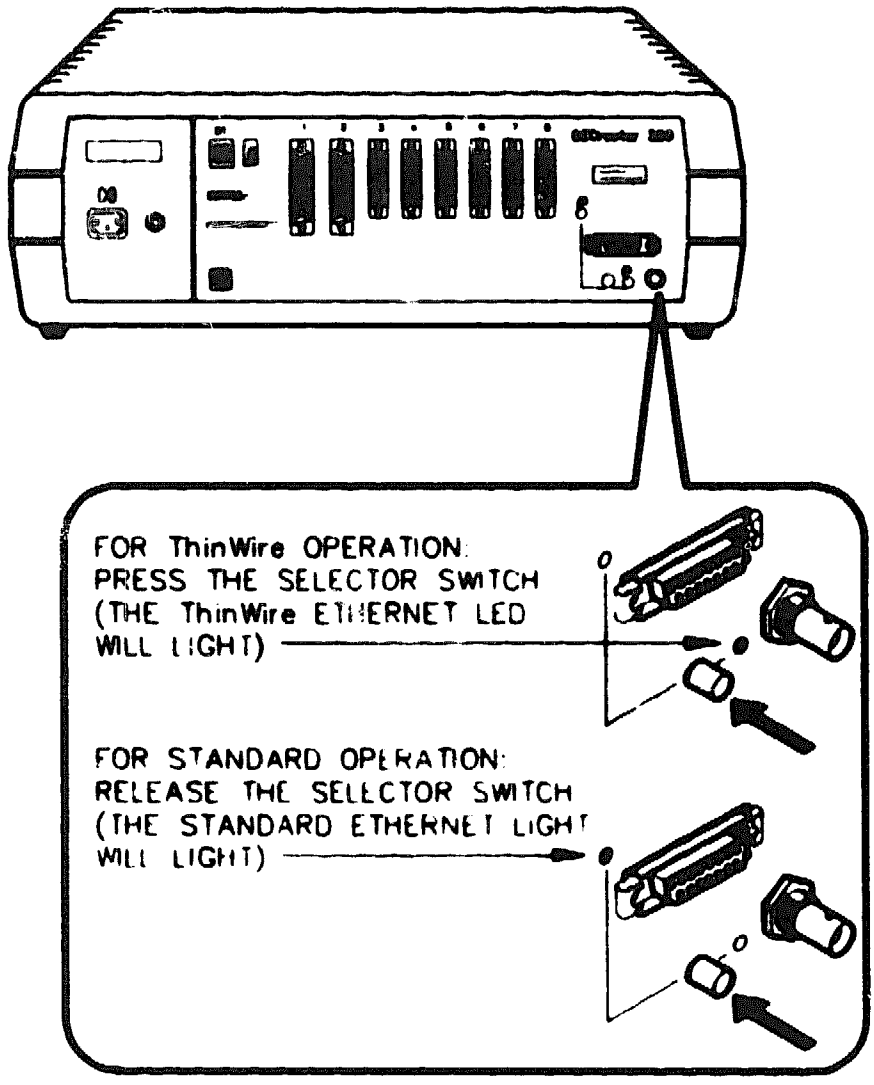
To select ThinWire Ethernet, press the selector switch and then apply power to the router. The ThinWire Ethernet LED will light when the router powers up (see Figure 4–11).

To select standard Ethernet, release the selector button and then apply power to the router. The standard Ethernet LED will go on (see Figure 4–11).

CAUTION

Do not press the standard/ThinWire selector switch when the router is powered up. This will cause a reset of the CPU and a subsequent reboot of the system — just as if the power cord had been pulled out and plugged back in again.

Figure 4–11: Selecting Standard or ThinWire Ethernet



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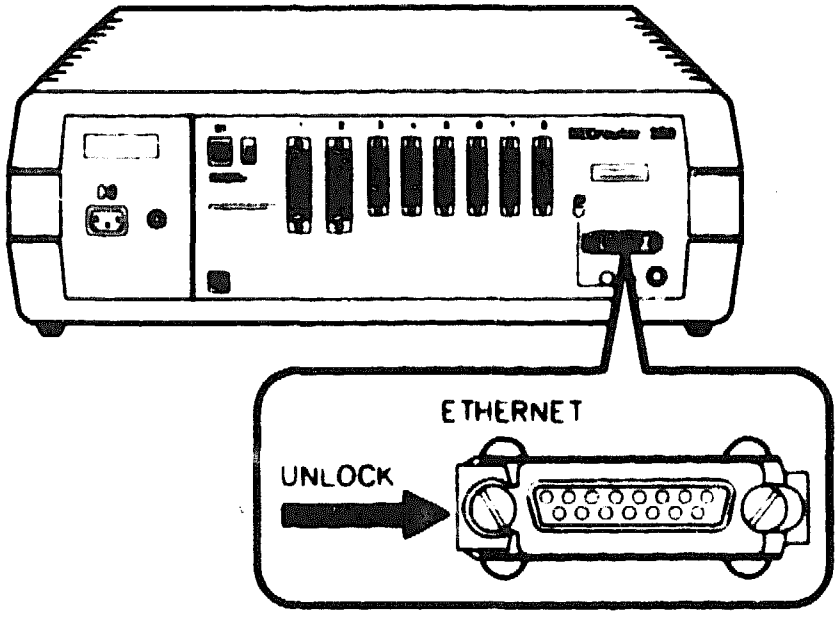
4.6 Connecting to Standard Ethernet LAN

To connect the transceiver cable to the router, do the following:

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 4–12.

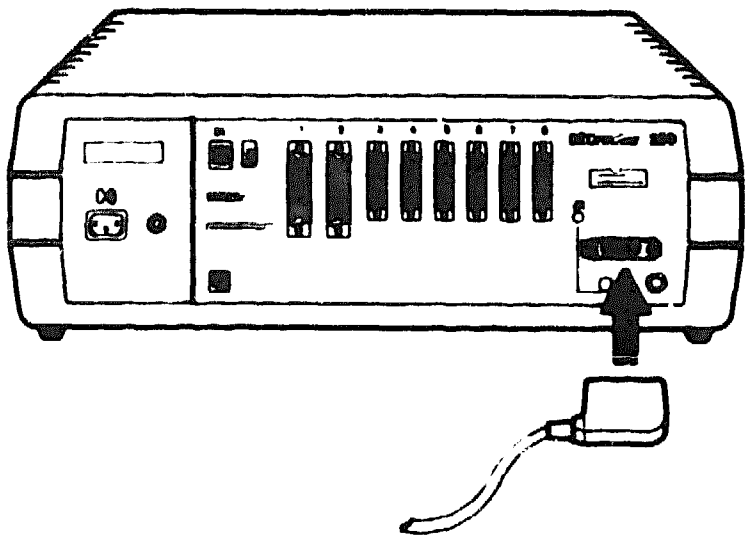
Figure 4–12: Unlocking the Slide Latch



LKG-3127-90A

3. Connect the transceiver cable (see Figure 4–13)

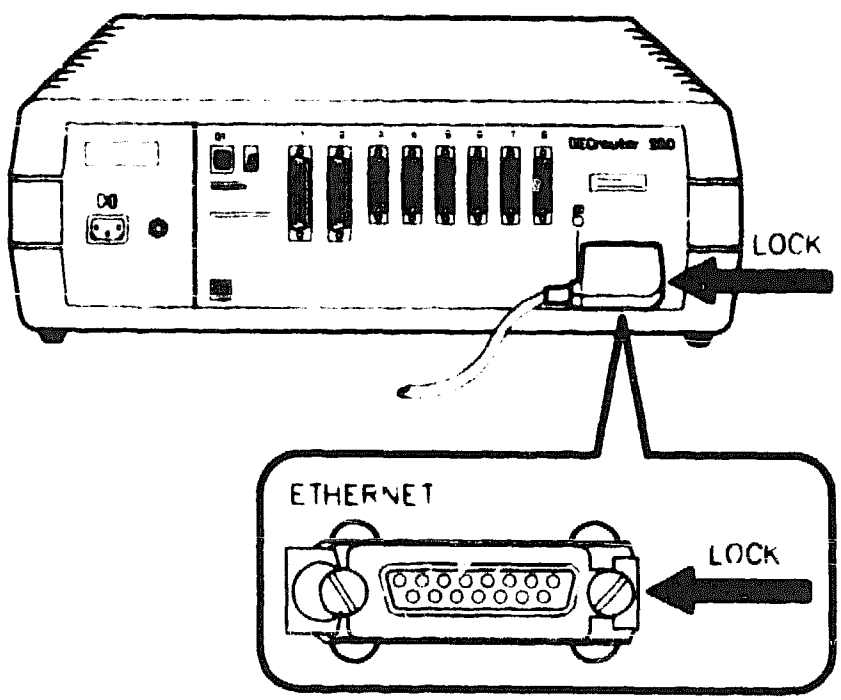
Figure 4–13: Connecting the Transceiver Cable



LKG–3128–89A

4. Lock the slide latch on the standard Ethernet connector by pushing it in the direction shown in Figure 4–14.

Figure 4–14: Locking the Standard Ethernet Connector



LKG–3129–89A

5. Power up the router.

6. Verify the standard/ThinWire Ethernet switch is in the OUT position and the standard Ethernet LED is on.

4.7 Connecting to the ThinWire Ethernet LAN

To connect to a ThinWire Ethernet LAN, do the following:

1. Insert the T-connector into the BNC connector at the rear of the router (see Figure 4–15).

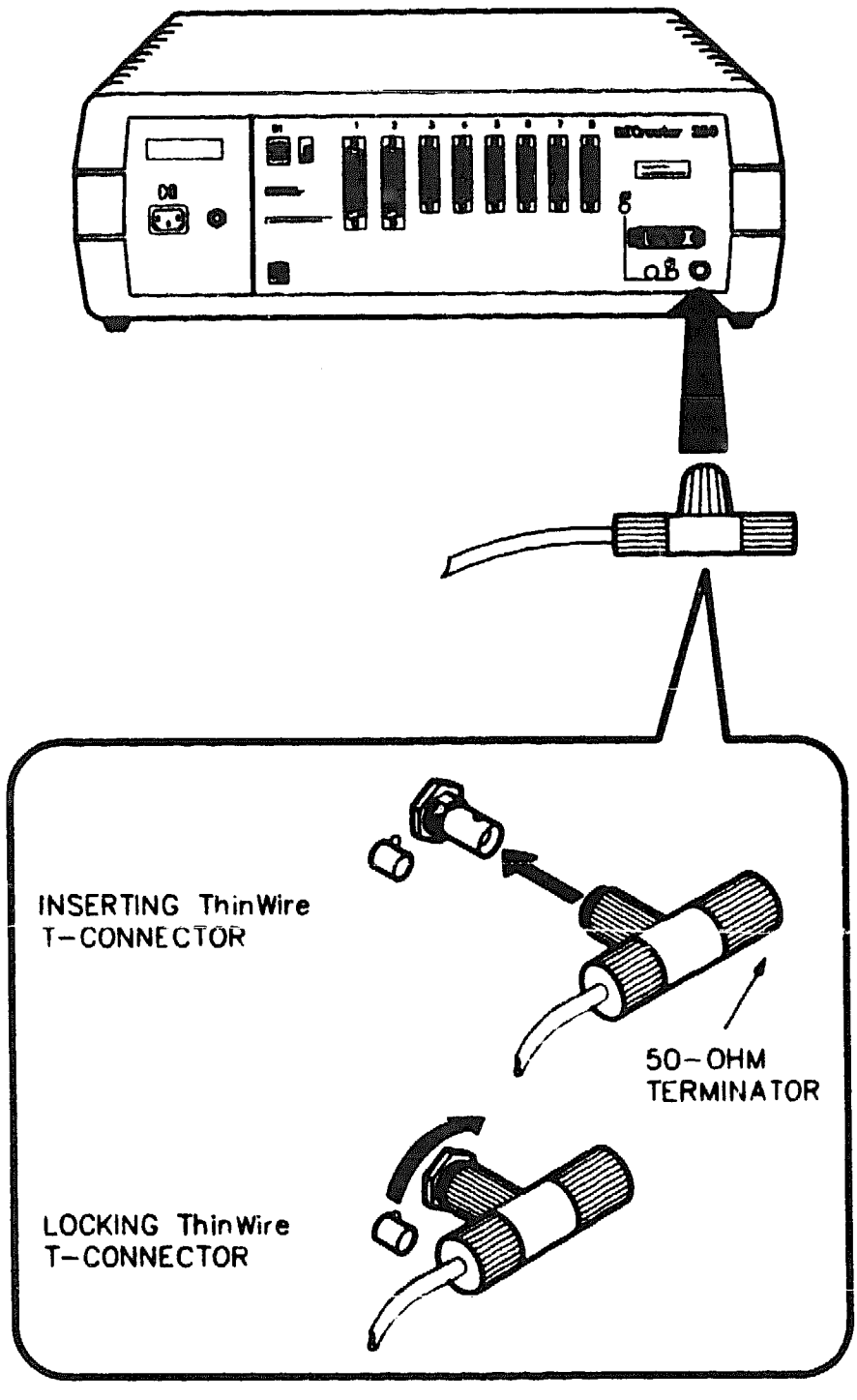
2. Turn the barrel of the connector clockwise to lock (see Figure 4–15).

3. Verify the standard/ThinWire Ethernet switch is in the IN position and the ThinWire LED is on.

NOTE

Figure 4–15 shows the T-connector terminated using a 50-ohm terminator. The 50-ohm terminator is replaced by a cable if the router is not at the end of a cable segment. The cable segment must be terminated by 50-ohm terminators at both ends unless a DEMPR or a DESPR is used. Where a cable segment is terminated in a DEMPR or a DESPR at one end only, the opposite end needs to have a 50-ohm terminator (see Appendix C, Cabling Strategies, for further details).

Figure 4–15: Connecting to the ThinWire Ethernet LAN



4.8 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, 4, 5, 6, 7, and 8). Both D-connectors have jack screws and are connected in the same way. The following sections describe how to connect a device to both a 25-pin port and a 50-pin port.

ADDITIONAL INSTRUCTIONS FOR USE IN THE UNITED KINGDOM WHERE CONNECTION TO PUBLIC DATA COMMUNICATIONS NETWORKS ARE REQUIRED.

WARNING

Interconnection directly, or by way of other apparatus, of ports marked:-

> "WARNING: Connect only apparatus complying with BS6301 to these ports."

with ports not so marked may produce hazardous conditions on the telecommunications network. Advice should be obtained from a competent engineer before such a connection is made. This does not apply to the network ports on the rear of the system, marked 1 through 8, when used for public network connections.

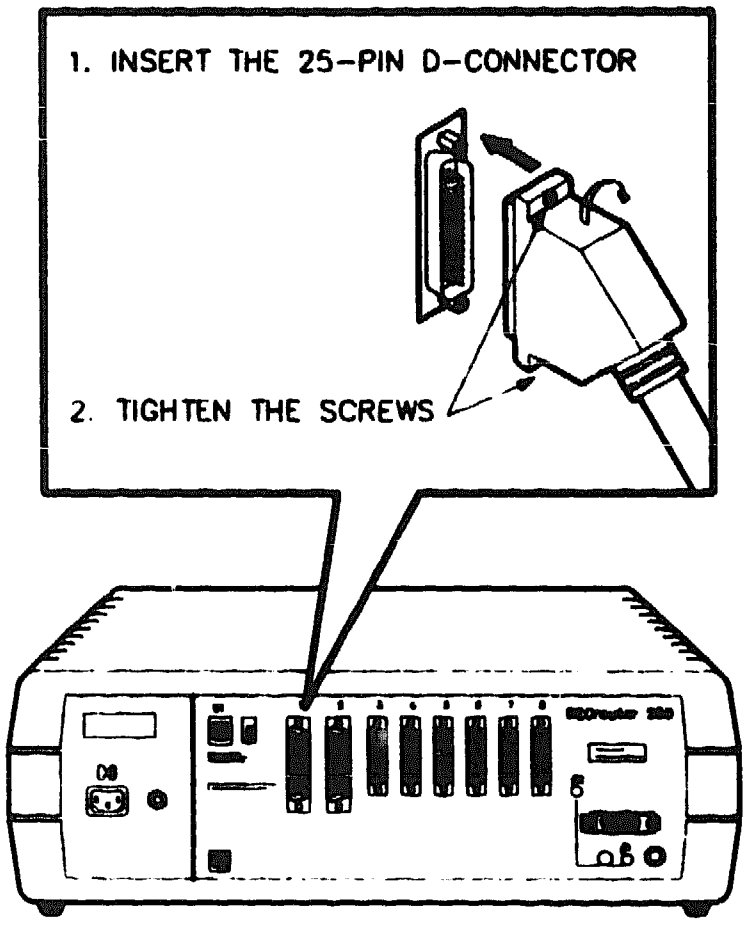
NOTE

Products complying with Oftel's General Approval NS/G/23/J/100003 may be connected to the above mentioned ports and do not necessarily need to carry the BS6301 warning text/label. All products supplied by Digital Equipment Co. comply with this General Approval.

4.8.1 Connecting to a 25-Pin Device Port

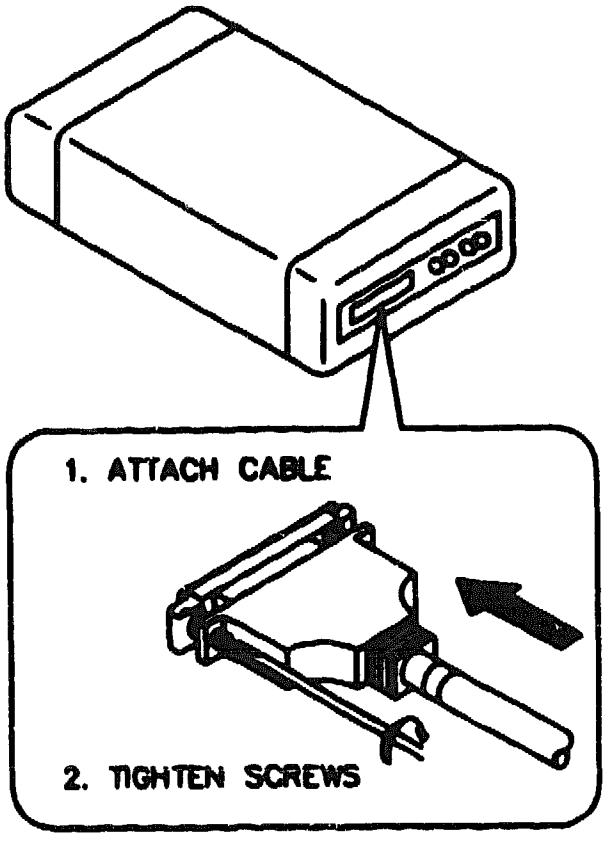
Connect the 25-pin female D-connector of the cable to the 25-pin male connector of the device port (see Figure 4–16).

Figure 4–16: Connecting to the 25-Pin D-Connector



Connect the 25-pin male connector of the cable to the 25-pin female connector on the device (see Figure 4–17).

Figure 4–17: Connecting to the Modem



UXB–3185–89A

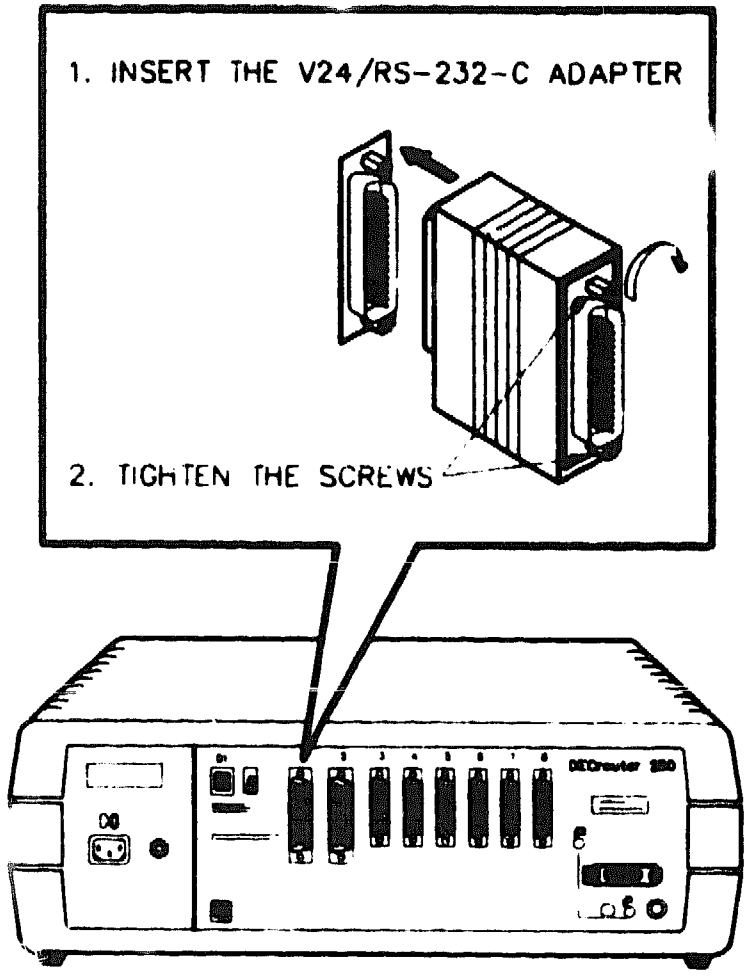
WARNING

The V24/RS-232-C adapter (12-27591-01) must be fitted between the device cable and the router (see Figure 4–18 and Figure 4–19) if the modem/eliminator has any of the following:

- A signal with a DCE source on pin 18
- Signal quality implemented of pin 21
- Data Signal Rate Selector (DCE) on pin 23

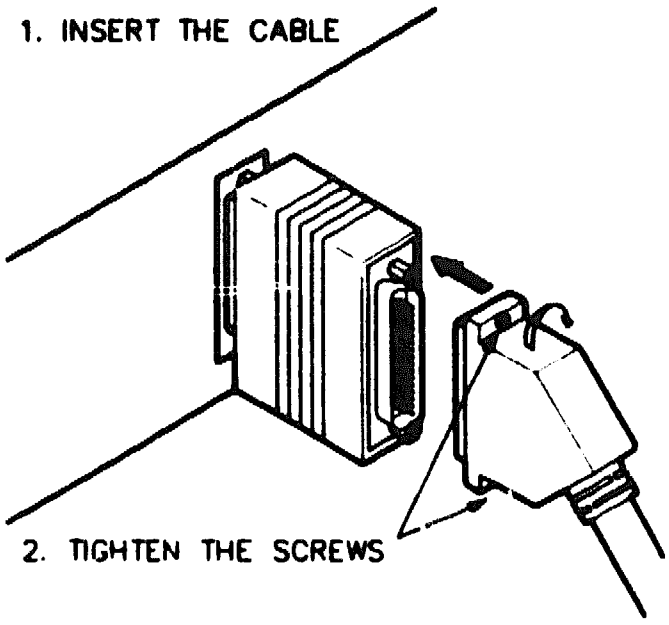
Failure to comply with this could result in damage to the interface module and modem or eliminator. If you are not sure what signals the modem or eliminator provides, contact Digital Field Service or fit the adapter as a matter of course.

Figure 4–18: Connecting V24/RS-232-C Adapter to the 25-Pin D-Connector



LKG-3156-89A

Figure 4–19: Connecting Cable to the V24/RS-232-C Adapter

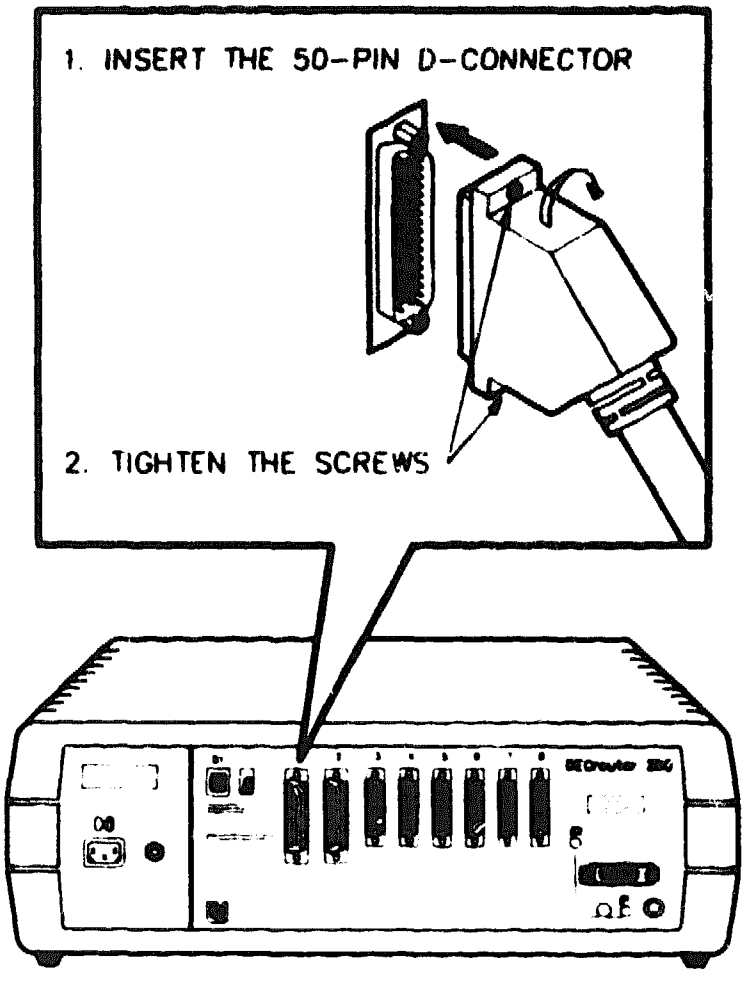


4.8.2 Connecting to a 50-Pin Device Port

You connect a device to a 50-pin device port with an adapter cable and an extension cable (see Appendix A, Section A.2.2, for information on adapter cables and Section A.2.3 for information on extension cables) as follows:

1. Connect the 50-pin female D-connector of the adapter cable to a 50-pin male D-connector on the router (see Figure 4–20).

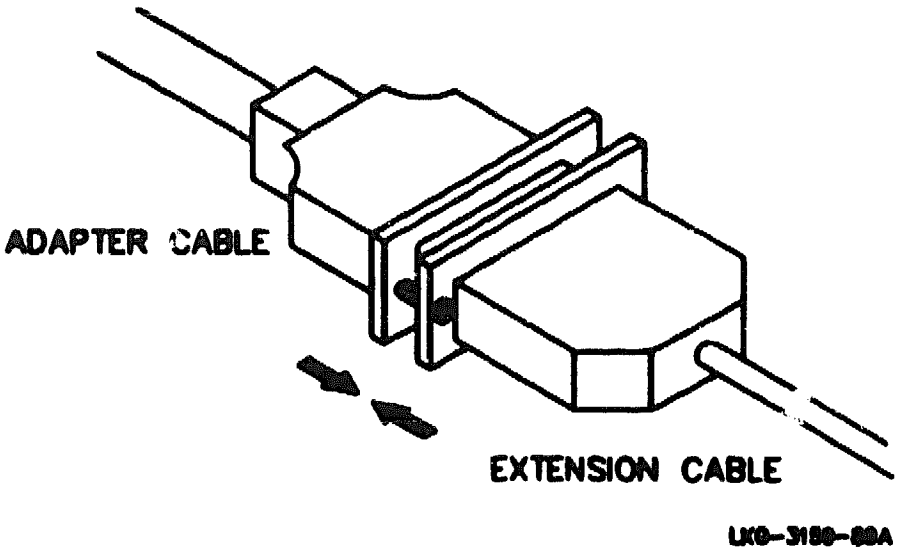
Figure 4–20: Connecting to the 50-Pin D-Connector



LKG-3158-89A

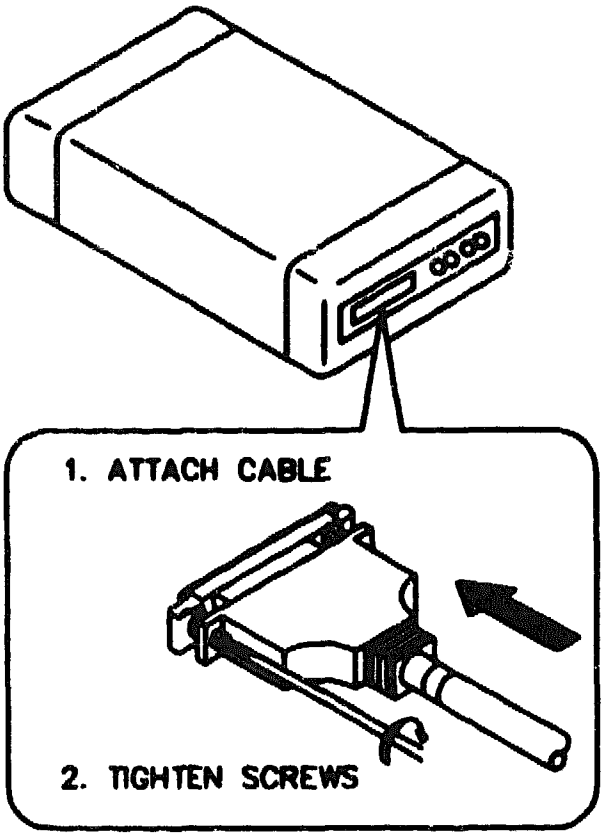
2. Connect the adapter cable to an extension cable (see Figure 4–21).

Figure 4–21: Connecting an Adapter Cable to an Extension Cable



3. Connect the extension cable to the modem (see Figure 4–22).

Figure 4–22: Connecting to the Modem



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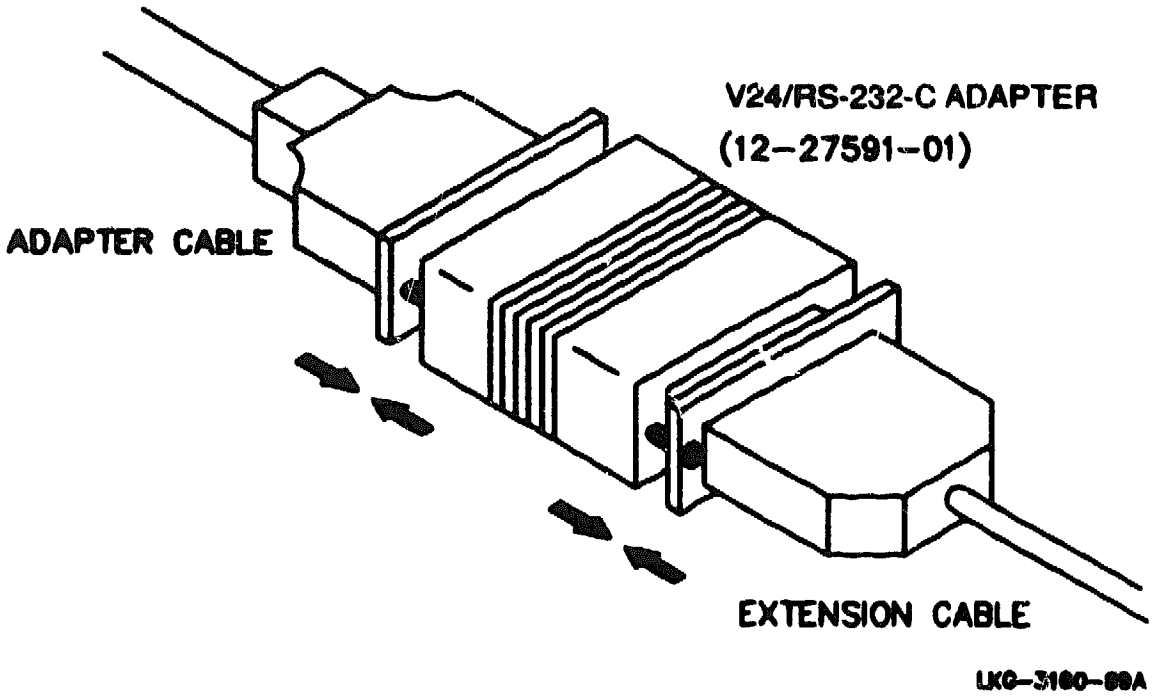
WARNING

The V24/RS-232-C adapter (12-27591-01) must be fitted between the adapter cable and the extension cable (see Figure 4–23) if the modem/eliminator has any of the following:

- A signal with a DCE source on pin 18
- Signal quality implemented on pin 21
- Data Signal Rate Selector (DCE) on pin 23

Failure to comply with this could result in damage to the interface module and modem or eliminator. If you are not sure what signals the modem or eliminator provides, contact Digital Field Service or fit the adapter as a matter of course.

Figure 4–23: Connecting an Adapter Cable, V24/RS-232-C Adapter and Extension Cable

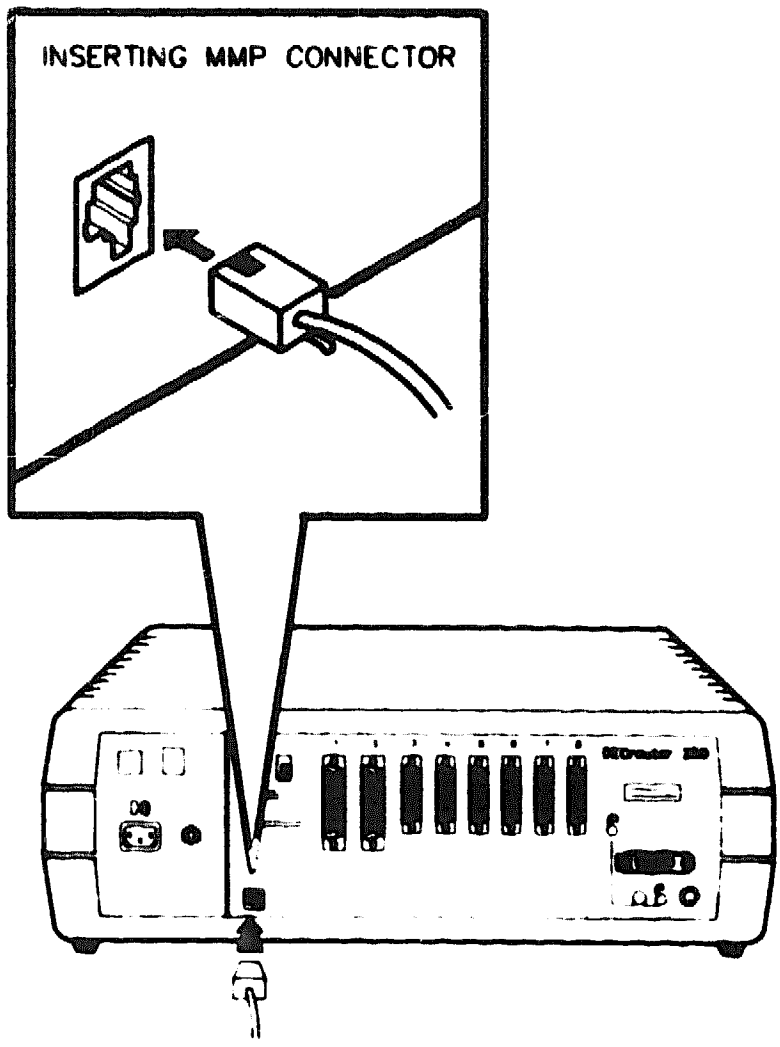


4.9 Connecting a Terminal to the Console Port Connector

To connect a terminal to the console port connector, do the following:

1. Insert the modified modular plug (MMP), on the cable, into the female modified modular jack (MMJ) connector (see Figure 4–24).

Figure 4–24: Connecting to the Console Port Connector



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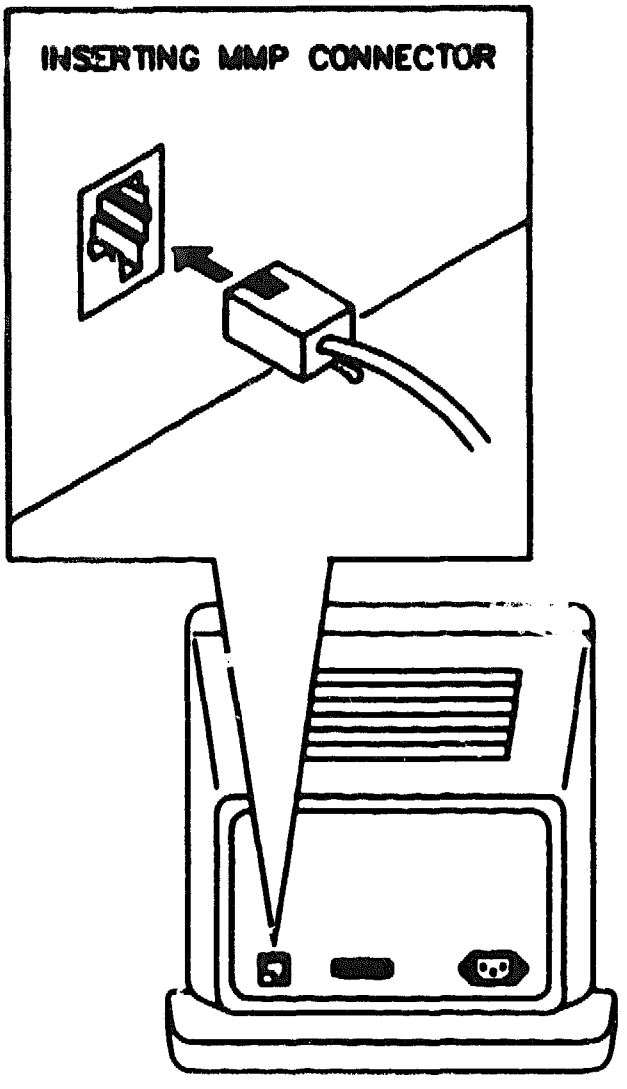
2. Insert the modified modular plug (MMP), on the cable, into the female modified modular jack (MMJ) connector on the terminal (see Figure 4–25). If the terminal has a 25-pin, male, D-connector, use an H8571-A adapter (see Figure 4–26).

Figure 4–25: Connecting to the Terminal



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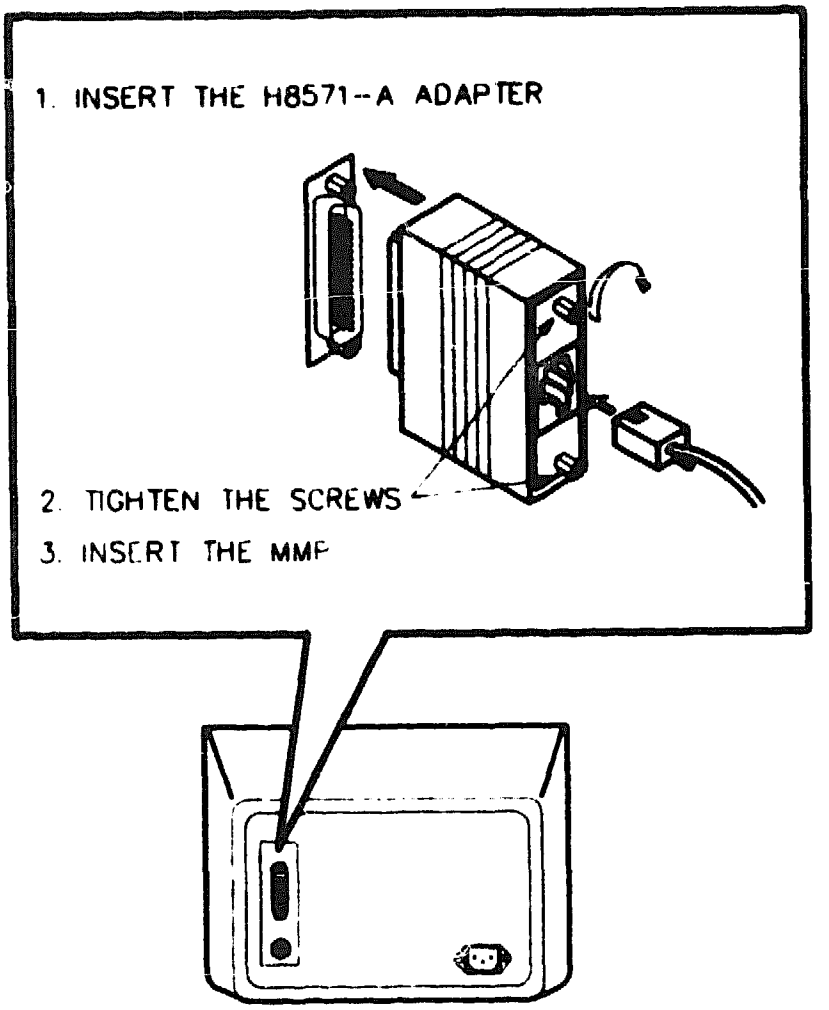
3. Power up the terminal
4. Configure the terminal to operate with a speed of 9600 bits per second and with a character size of 8 bits (no parity). (Refer to the specific terminal user's guide if you need help setting the terminal parameters.)

Figure 4–26: Connecting to 25-Pin D-Connector Terminal

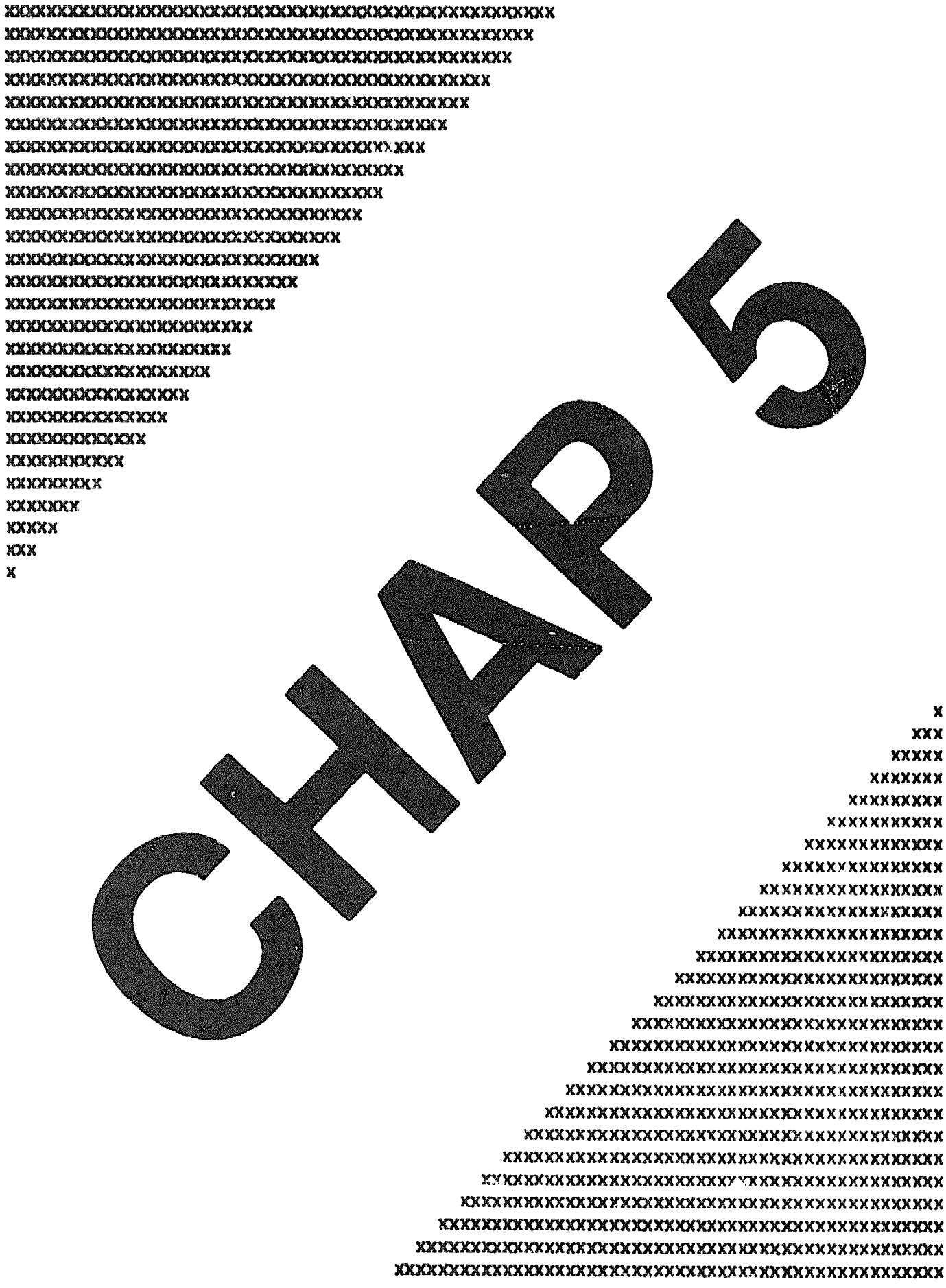


4.10 Initializing the Router

To initialize the router, reconnect the power cord. The router now runs self-test (see Section 4.4.4) and loads the router software from a host, if available. If the software is not available, the router will continue to make requests until it finds the software.

4.11 Verifying the Router System Installation

After you install the DECrouter 250 hardware, inform the system manager that the router installation is complete. You should also supply a list of the devices connected to the system and their router port locations. The person who installs the software then carries out the system verification procedure to ensure that the hardware and software function correctly together.


CHAP 5

5

What to Do If You Have Problems

This chapter helps you identify and correct problems you may encounter during the initial installation of the DECrouter 250 hardware. The troubleshooting procedures are for diagnosing and correcting hardware-related problems only.

NOTE

Notify the network manager if the troubleshooting procedures indicate the problem is software related or if the procedures do not correct the problem. Additional troubleshooting information is provided in *DECrouter 250 Management*.

5.1 Problem Indicators

The seven-segment display, located at the rear of the router, indicates the status of the router and helps diagnose router problems. The diagnostic dot of the display also provides diagnostic information and, if a terminal has been connected to the console port connector, the terminal will also provide information.

5.2 Diagnosing Router Problems

Compare the state of the seven-segment display and the diagnostic dot with those shown in Table 5–1 and go to the section indicated for information on corrective action.

NOTE

On power-up, the seven-segment display will show an "8" and the diagnostic dot will be "on" for about 0.5 seconds. Allow about 2 minutes to elapse before determining the state of the display.

Table 5–1: Display/Indications

Device	Definition	State	Indication	Corrective Action
Diagnostic dot	Diagnostic	On	Self-test passed	
		Off	Fatal error	Section 5.3
		Blinking	Nonfatal error	Section 5.5
Seven-segment display	Status/ diagnostic	Off	No power or display broken	Section 5.3
		Flashing	Fatal error	Section 5.4
		"3"	Load request backoff	Section 5.6
		Rotating segment pattern	Router software executing	

* A complete list of the seven-segment display codes is shown in Table 4-1

5.3 Seven-Segment Display Off

Problem

Power is not reaching the DECrouter 250 hardware.

Correction: Ensure that the voltage select switch is set to the correct voltage for your country (see Section 4.3).

Correction: Secure the power cable at the router and at the wall outlet and check the fuse in the power cable plug (if applicable).

Correction: Check the wall outlet using another appliance or light, or plug the router power cord into another outlet. If power is not available at the wall outlet, check the wall outlet's circuit breaker.

Correction: Check if the router circuit breaker has tripped. If it has, disconnect the power, press the white button to reset the breaker (see Figure 1–3), and reconnect the power. If the circuit breaker trips more than once, notify the network manager that the router must be returned to Digital Equipment Corporation for repair. (Refer to *DECrouter 250 Management* for information about returning the unit to Digital.)

Correction: Check the power cord by substituting another one. If the first is found to be defective, replace it.

Problem

The DECrouter 250 hardware is defective.

Correction: Notify the network manager that the router must be returned to Digital for repair or replacement. (Refer to *DECrouter 250 Management* for information about returning the unit to Digital.)

5.4 Diagnostic Dot Off/Seven-Segment Display Flashing

Problem

A hardware error occurred that makes the DECrouter 250 router nonoperational.

Correction: There is no corrective procedure for this problem. Notify the network manager that the router must be returned to Digital for repair or replacement. (Refer to *DECrouter 250 Management* for information about returning the unit to Digital.)

5.5 Diagnostic Dot Blinking

If the diagnostic dot is blinking after power up it indicates that the router has a nonfatal problem detected during self-test. To isolate the problem, connect a terminal to the console port 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, do the following:

1. Connect a console terminal to the console port of the router, then power up the terminal (see Section 4.9).
2. Configure the terminal to operate with a speed of 9600 bits per second and with a character size of 8 bits (no parity). (Refer to the specific terminal user's guide if you need help setting up the terminal parameters.)
3. Unplug the router power cord at the wall outlet, then reinsert it.
4. Read the error message that appears on the terminal display.

The following sections list the error messages that occur in conjunction with diagnostic dot blinking. Locate the section that describes the displayed error message and follow the recommended corrective action.

5.5.1 Error Message 1003

```
Init -1003- Enter ^P to repeat self-test or ^B to enter BCP
```

Problem

None of the ports which are enabled to down-line load the router software have passed self-test.

Correction: The router displays this error message with error message 1007 (see Section 5.5.3) or error message 1008 (see Section 5.5.4). Refer to these error messages for the correct action.

5.5.2 Error Message 1004

```
Init -1004- Enter ^B to enter BCP
```

Problem

No ports are enabled to down-line load the router software.

Correction: Use the boot configuration program (BCP) to configure a suitable port (see Section NO TAG, Appendix NO TAG).

5.5.3 Error Message 1007

```
Init -1007- Line x, Error detected by self-test
```

Problem

The specified port has failed self-test.

Correction: There is no corrective procedure for this condition. Notify the network manager that the router must be returned to Digital for repair or for replacement. (Refer to *DECrouter 250 Management* for information about returning the unit to Digital.)

5.5.4 Error Message 1008

```
Init -1008- NI External loopback error detected by self-test
```

Problem

The Ethernet port has failed self-test.

Correction: Test the hardware again as shown in Section 4.4. If this fails to correct the problem, notify the network manager that the router must be returned to Digital for repair or for replacement. (Refer to *DECrouter 250 Management* for information about returning the unit to Digital.) If the router passes self-test then the problem lies in the cables or equipment connected to the router.

NOTE

If you are not connecting to Ethernet, leave the ThinWire terminations in place and the selector switch set to ThinWire. This stops the router from generating an error message.

5.5.5 Error Message 1010

```
Init -1010- Parameter checksum error detected in NVRAM
```

Problem

Self-test has detected a checksum error in NVRAM parameters

Correction: Reset the router to factory settings (see Section D.5). If this fails to correct the problem, notify the network manager that the router must be returned to Digital for repair or for replacement. (Refer to *DECrouter 250 Management* for information about returning the unit to Digital.)

5.5.6 Error Message 1011

```
Init -1011- Console port error detected in executing Selftest
```

Problem

Self-test has detected an error on the console port

Correction: There is no corrective procedure for this condition. Notify the network manager that the router must be returned to Digital for repair or for replacement. (Refer to *DECrouter 250 Management* for information about returning the unit to Digital.)

5.5.7 Error Message 1012

```
Init -1012- Line x, Modem signal error detected by Selftest
```

Problem

The specified port (line) has failed the modem signal test routine in self-test

Correction: There is no corrective procedure for this condition. Notify the network manager that the router must be returned to Digital for repair or for replacement. (Refer to *DECrouter 250 Management* for information about returning the unit to Digital.)

5.6 Seven-Segment Display Has a "3"

If the seven-segment display has a "3" after powerup, it may indicate the router has a down-line loading problem. To isolate and to diagnose the problem, do the following:

1. Connect a terminal to the configuration port of the router, then power up the terminal.
2. Configure the terminal to operate with a speed of 9600 bits per second and a character size of 8 bits (no parity). (Refer to the specific terminal user's guide if you need help setting up the terminal parameters.)
3. Initialize the router by pressing CTRL/P on your console terminal.
4. Read the message that appears on the terminal display.

The following order of messages on the console terminal indicate down-line loading problems. Each is covered in the following sections.

5.6.1 Down-Line Load Starts, Then Fails

The following sequence of messages appears on the console terminal at various time intervals:

```
Init -1101- Attempting to locate load host, [ISO8802]
Init -1101- Attempting to locate load host, [ETHERNET]
Init -1100- Requesting load from host xx-xx-xx-xx-xx-xx [format]
Init -1102- Load failure, timeout
```

Problem

The host system failed to complete the down-line load to the router.

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

5.6.2 Down-Line Load Does Not Start

The following sequence of messages appears on the console terminal at various time intervals:

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

Problem

Load host(s) not responding to router down-line load request within the allotted time-out period.

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


APPA

A

Connector and Cable Pin Descriptions

This appendix describes the pins of the DECrouter 250 hardware connectors and the cables used to interface to the DECrouter 250 hardware. Wiring diagrams of the individual cables are included to help you in troubleshooting and cable building.

A.1 Connector Pin Descriptions

This section describes the pins for the following DECrouter 250 connectors:

- Ethernet transceiver interface
- Device port connectors
- Console port connector

A.1.1 Ethernet Transceiver Interface

The DECrouter 250 unit has a ThinWire Ethernet connector and a standard Ethernet connector. The ThinWire Ethernet connector is a 50-ohm, RG58 type, BNC connector with one pin and a shield.

The standard Ethernet transceiver interface matches the signal specifications described in *The Ethernet: A Local Area Network: Data Link Layer and Physical Layer Specification*.

Figure A–1 shows how the pins are numbered on a standard Ethernet transceiver interface connector. Table A–1 lists the signals for the standard Ethernet connector pins.

Figure A–1: Pin Numbers for Standard Ethernet Transceiver Interface Connector

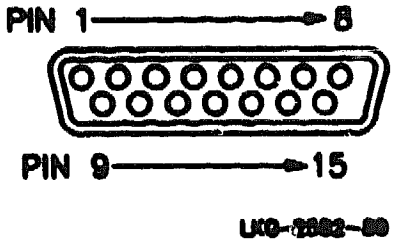


Table A–1: Pin Descriptions for Standard Ethernet Transceiver Interface

Pin Number	Signal Name
1	Shield
2	Collision presence +
3	Transmit +
4	Reserved
5	Receive +
6	+12 Volt Power return
7	Reserved
8	Reserved
9	Collision presence –
10	Transmit –
11	Reserved
12	Receive –
13	+12 Volt Power
14	Reserved
15	Reserved

A.1.2 Device Port Connectors

The two types of connectors you use for connecting devices (modems, personal computers, and so forth) to the router are described in the following sections.

A.1.2.1 25-Pin D-Connectors

Use the 25-pin D-connectors (ports 3, 4, 5, 6, 7 and 8) to connect devices that support EIA-232-D/V.24/V.28. Figure A–2 shows how the connector pins are numbered and Table A–2 describes the signals on each pin.

Figure A–2: Pin Numbers for 25-Pin D-Connector

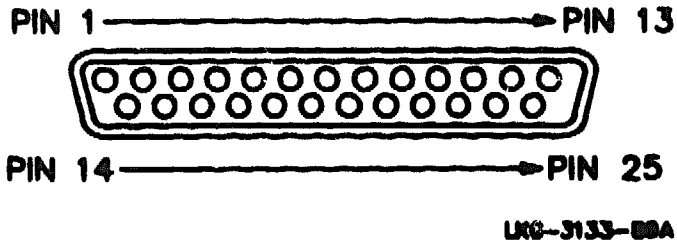


Table A–2 : Pin Descriptions for 25-Pin D-Connector

Pin	Signal Description	Signal Name	EIA-232-D	V.24
2	Transmitted data	TXD	BA	103
3	Received data	RXD	BB	104
4	Request to send	RTS	CA	105
5	Ready for sending	CTS	CB	106
6	Data set ready	DSR	CC	107
7	Signal ground	GND	AB	102
8	Data channel received line signal detector	CD	CF	109
12	Data signal rate selector (DCE)	SMI	CI	112
15	Transmitter signal element timing (DCE)	TXCLK	DB	114
17	Receiver signal element timing (DCE)	RXCLK	DD	115
18	Local Loopback	LOC LPBK	LL	141
20	Data terminal ready	DTR	CD	108/2
21	Remote loopback	REM LPBK	RL	140
22	Ring Indicator	RI	CE	125
23	Data signal rate selector (DTE)	DSRS	CH	111
24	Transmitter signal element timing (DTE)	CLK	DA	113
25	Test Indicate	TEST IND	TM	142

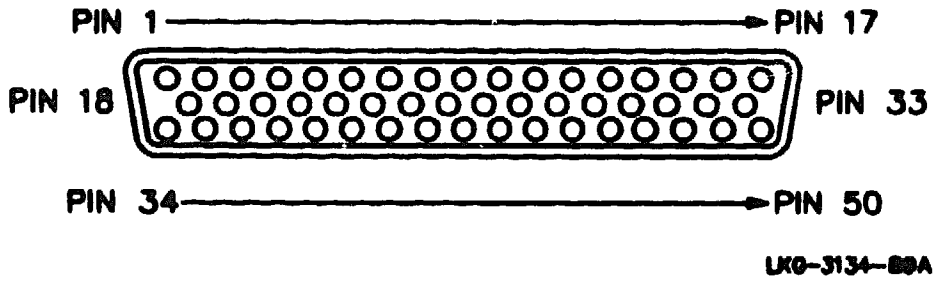
A.1.2.2 50-Pin D-Connectors

Use the 50-pin D-connectors (ports 1 and 2) to connect devices that support any of the following standards:

- EIA-232-D/V.24/V.28
- RS-449,RS-423-A/V.10
- RS-449,RS-422-A/V.11
- V.35
- V.36

Figure A–3 shows how the pins are numbered and Table A–3 describes the signals on each pin.

Figure A–3: Pin Numbers for 50-Pin D-Connector



NOTE

You use a separate adapter cable for each standard with the exception of V.36, which uses the same cable as RS-422-A. You will find information on the correct adapter cables to use in Section A.2.2.

Table A–3 : Pin Descriptions for 50-Pin D-Connector

Pin	Signal Description	Signal Name	EIA-232-D	V.24	RS-423	RS-422	V.35
1	Code Gnd						
2	Code 0 *						
3	Code 1 *						
4	Code 2 *						
5	Code 3 *						
6	Transmitted data A	TXD A				SD	
7	Transmitted data B	TXD B				SD	
8	Transmitted data	TXD	BA	103	SD		
9	Request to send A	RTS A				RS	
10	Request to send B	RTS B				RS	
11	Received data A	RXD A	BB	104	RD	RD	
12	Received data B	RXD B	earth	earth	RD	RD	
13	Local Loop	LOC LPBK	LL	141	LL	LL	
14	Data signal rate selector (DCE)	SMI	CI	112			
15	Test indicator	TEST IND	TM	142	TM	TM	
16	Remote loopback	REM LPBK	RL	140	RL	RL	
17	Ring indicator	RI	CE	125	IC	IC	
18	Receiver signal element timing (DCE) A	RXCLK A	DD	115	RT	RT	
19	Receiver signal element timing (DCE) B	RXCLK B	earth	earth	RT	RT	
20	Transmit signal element timing (DCE) A	TXCLK A	DB	114	ST	ST	
21	Transmit signal element timing (DCE) B	TXCLK B	earth	earth	ST	ST	
22	Transmit signal element timing (DTE)	CLK	DA	113	TT		
23	V35 Transmit signal element timing (DCE) A	V35 TXCLK A					114
24	V35 Transmit signal element timing (DCE) B	V35 TXCLK B					114
25	V35 Transmit signal element timing (DTE) A	V35 CLK A					113
26	V35 Transmit signal element timing (DTE) B	V35 CLK B					113
27	V35 RXD A	V35 RXD A					104
28	V35 RXD B	V35 RXD B					104
29	V35 TXD A	V35 TXD A					103
30	V35 TXD B	V35 TXDB					103
31	V35 Receiver signal element timing (DCE) A	V35 RXCLK A					115
32	V35 Receiver signal element timing (DCE) B	V35 RXCLK B					115
33	Data terminal ready	DTR	CD	108/2	TR		
34	Data set ready A	DSR A	CC	107	DM	DM	107
35	Data set ready B	DSR B	earth	earth	DM	DM	earth
36	Ready to send	RTS	CA	105	RS		105

* Code <0:3> identifies the adapter cable that is attached to the 50-pin connector.

Table A-3 : Pin Descriptions for 50-Pin D-Connector (Cont.)

Pin	Signal Description	Signal Name	EIA-232-D	V.24	RS-423	RS-422	V.35
37	Data channel received line signal detector A	DCD A	CF	109	RR	RR	109
38	Data channel received line signal detector B	DCD B	earth	earth	RR	RR	earth
39	Ready for sending A	CTS A	CB	106	CS	CS	106
40	Ready for sending B	CTS B	earth	earth	CS	CS	earth
41	DCE ground	DCE GND	earth	earth	RC	RC	earth
42	Test transmit data	TEST TXD	**	**			
43	Test RTS	TEST RTS	**	**			
44	DTE ground	DTE GND	AB	102	SC	SC	102
45	Data terminal ready A	DTR A				TR	
46	Data terminal ready B	DTR B				TR	
47	Terminal Timing A	CLOCK A				TT	
48	Terminal Timing B	CLOCK B				TT	
49	Test transmit clock	TEST TXCLK	**	**			
50	Data signal rate selector	DSRS	CH	111	SR	SR	

** These three pins are used for testing.

A.1.3 Console Port Connector

The console port connector on the DECrouter 250 hardware is a modified modular jack (MMJ).

Figure A–4 shows how the pins are numbered on an MMJ connector and Table A–4 lists the signals on the pins.

Figure A–4: Pin Numbers for the Console Port Connector

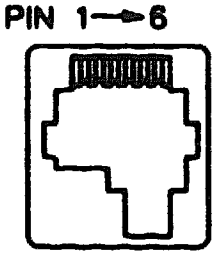


Table A–4 : Pin Descriptions for Serial Communication Interface

Pin Number	Signal Name
1	Tied to VCC via 150-ohm resistor
2	Txdata
3	Txcommon
4	Rxcommon
5	Rxdata
6	Tied to GND via 3K-ohm resistor

A.2 Cable Structure

This section describes the cable structures that are compatible with the DECrouter 250 device ports and with the serial configuration port. Wiring diagrams of individual cables are provided for use in troubleshooting and cable building.

A.2.1 Device Cables and Loopback Connectors for Serial Communication 25-Pin D-Connectors

Use the following cables to connect EIA-232-D devices to the DECrouter 250, 25-pin, D-connectors:

- BC17D shielded null-modem cable

  This cable is used to directly connect asynchronous devices that use modem signals.

- BC22D shielded null-modem cable

  This cable is used to directly connect asynchronous devices that use data leads only.

- BC22F shielded straight-through modem cable

  This cable is used to connect synchronous or asynchronous modems.

Use the following loopback connector with DECrouter 250, 25-pin, D-connectors, BC22D and BC22F cables:

- H3266 loopback connector

Use the following adapter to connect RS-232-C devices to the DECrouter 250, 25-pin, D-connector:

- 12-27591-01, V.24 to RS-232-C adapter

This adapter converts from V.24 to RS-232-C by eliminating the extra signals that exist in V.24. EIA-232-D has the same signals as V.24 so no adapter is necessary.

WARNING

The V.24 to RS-232-C adapter must be fitted if the modem/eliminator has:

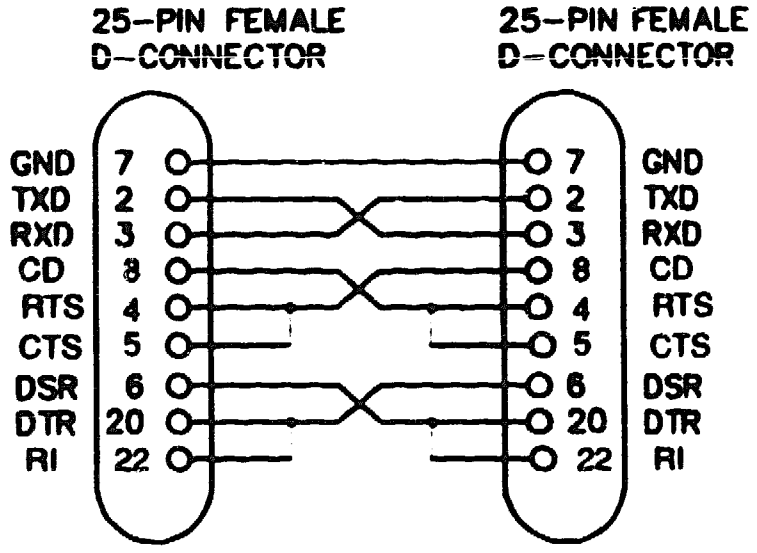
- A signal with a DCE source on pin 18
- Signal quality implemented on pin 21
- Data signal rate selector (DCE) on pin 21

Failure to comply with this could result in damage to the interface module and modem or eliminator. If you are not sure what signals the modem or eliminator provides, contact Digital Field Service, or fit the adapter connector as a matter of course.

A.2.1.1 BC17D Shielded Null-Modem Cable

Use the BC17D shielded null-modem cable to connect asynchronous devices directly to the 25-pin D-connector. The BC17D is a 10-wire cable with a 25-pin D-connector on each end (see Figure A–6).

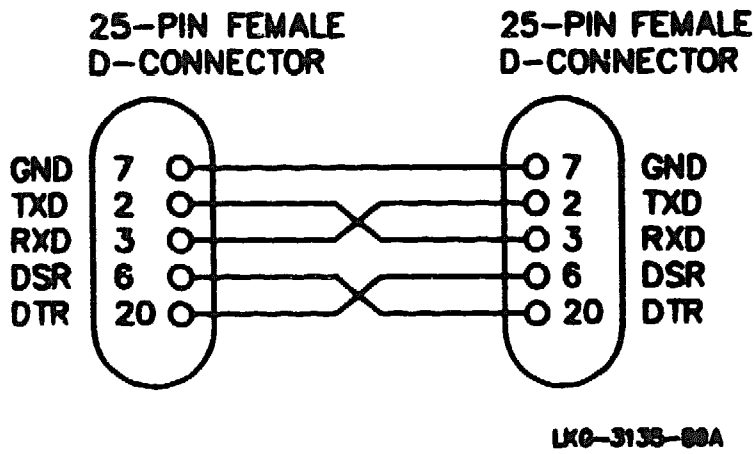
Figure A–5: Wiring Diagram for BC17D Null Modem Cable



A.2.1.2 BC22D Shielded Null-Modem Cable

Use the BC22D shielded null-modem cable to connect asynchronous devices, that use data leads only, to the 25-pin D-connector. The BC22D is a 6-wire cable with a 25-pin D-connector on each end (see Figure A–6).

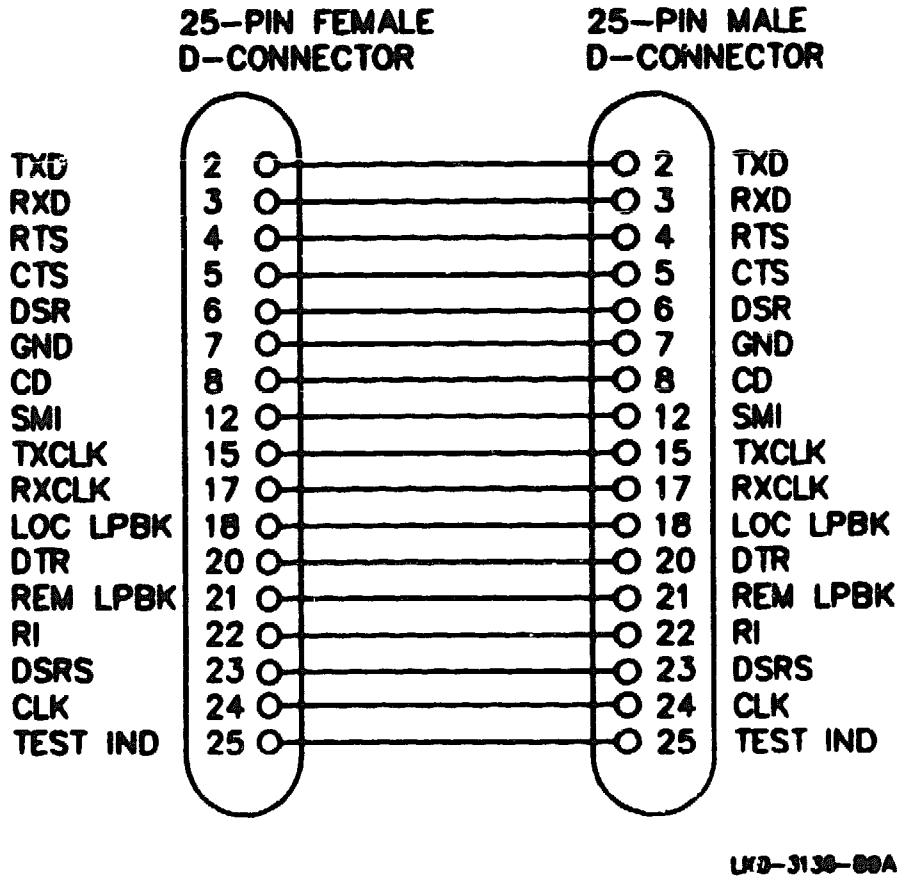
Figure A–6: Wiring Diagram for BC22D Null Modem Cable



A.2.1.3 BC22F Shielded Straight-Through Modem Cable

Use the BC22F shielded straight-through cable to connect synchronous or asynchronous modems to the 25-pin D-connector. The BC22F is a 25-wire cable with a male, 25-pin D-connector on one end and a female, 25-pin D-connector on the other end (see Figure A–7).

Figure A–7: Wiring Diagram for BC22F Straight-Through Cable



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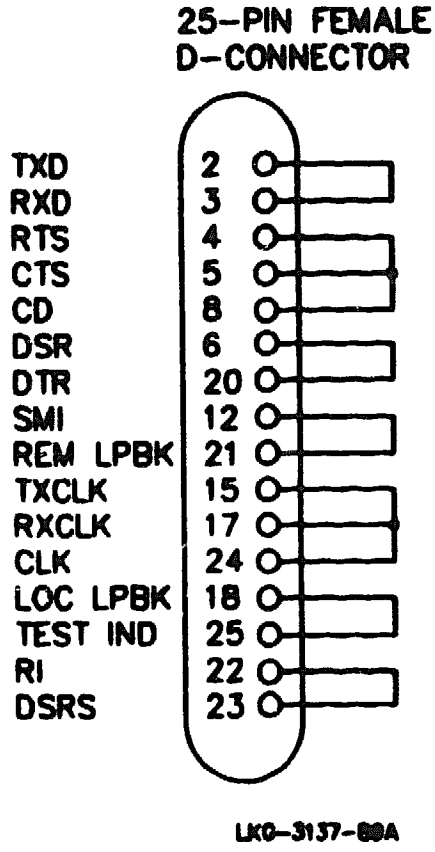
A.2.1.4 H3266 Loopback Connector

Use the H3266 loopback connector to test the 25-pin D-connector and the BC22F cable (see Figure A–8).

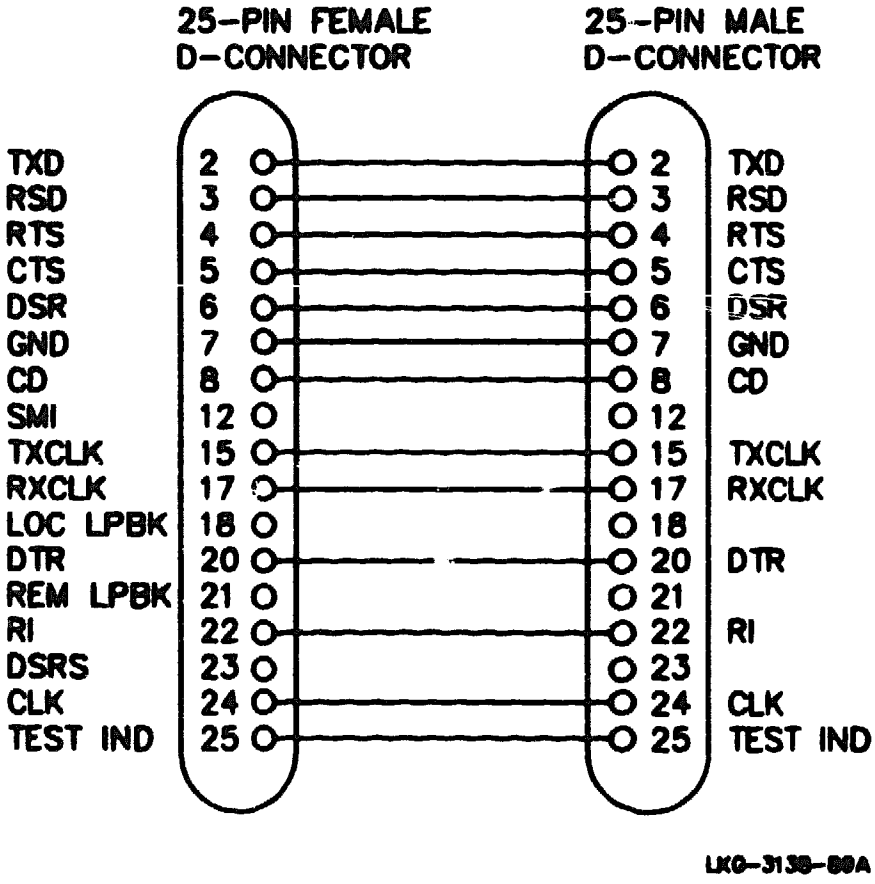
Figure A–8: H3266 Loopback Connector



A.2.1.5 V.24/RS-232-C Adapter (12-27591-01)

Use the V.24/RS-232-C adapter (12-27591-01) to convert the 25-pin D-connectors to RS-232-C format. The adapter works by passing through the RS-232-C signals and blocking the others (see Figure A–9).

Figure A–9: Wiring Diagram for V.24/RS-232-C Adapter



A.2.2 Device Cables and Loopback Connectors for Serial Communication 50-Pin D-Connectors

You use an adapter cable and extension cable (see Section A.2.3 for information on extension cables) to connect a device to the 50-pin D-connectors. Choose an adapter cable, to match the standard of the device you wish to connect, from the following list:

- BC19B-02 — Connects DECrouter 250 to RS-422-A and V.36 devices
- BC19E-02 — Connects DECrouter 250 to RS-423-A devices
- BC19F-02 — Connects DECrouter 250 to V.35 devices
- BC23V-02 — Connects DECrouter 250 to V.24 devices

WARNING

The V.24 to RS-232-C adapter must be fitted between the BC23V-02 adapter cable and the extension cable if the modem/eliminator has:

- A signal with a DCE source on pin 18
- Signal quality implemented on pin 21
- Data signal rate selector (DCE) on pin 21

Failure to comply with this could result in damage to the interface module and modem or eliminator. If you are not sure what signals the modem or eliminator provides, contact Digital Field Service, or fit the adapter connector as a matter of course.

Use any of four loopback connectors, from the following list, that match your adapter cable combination:

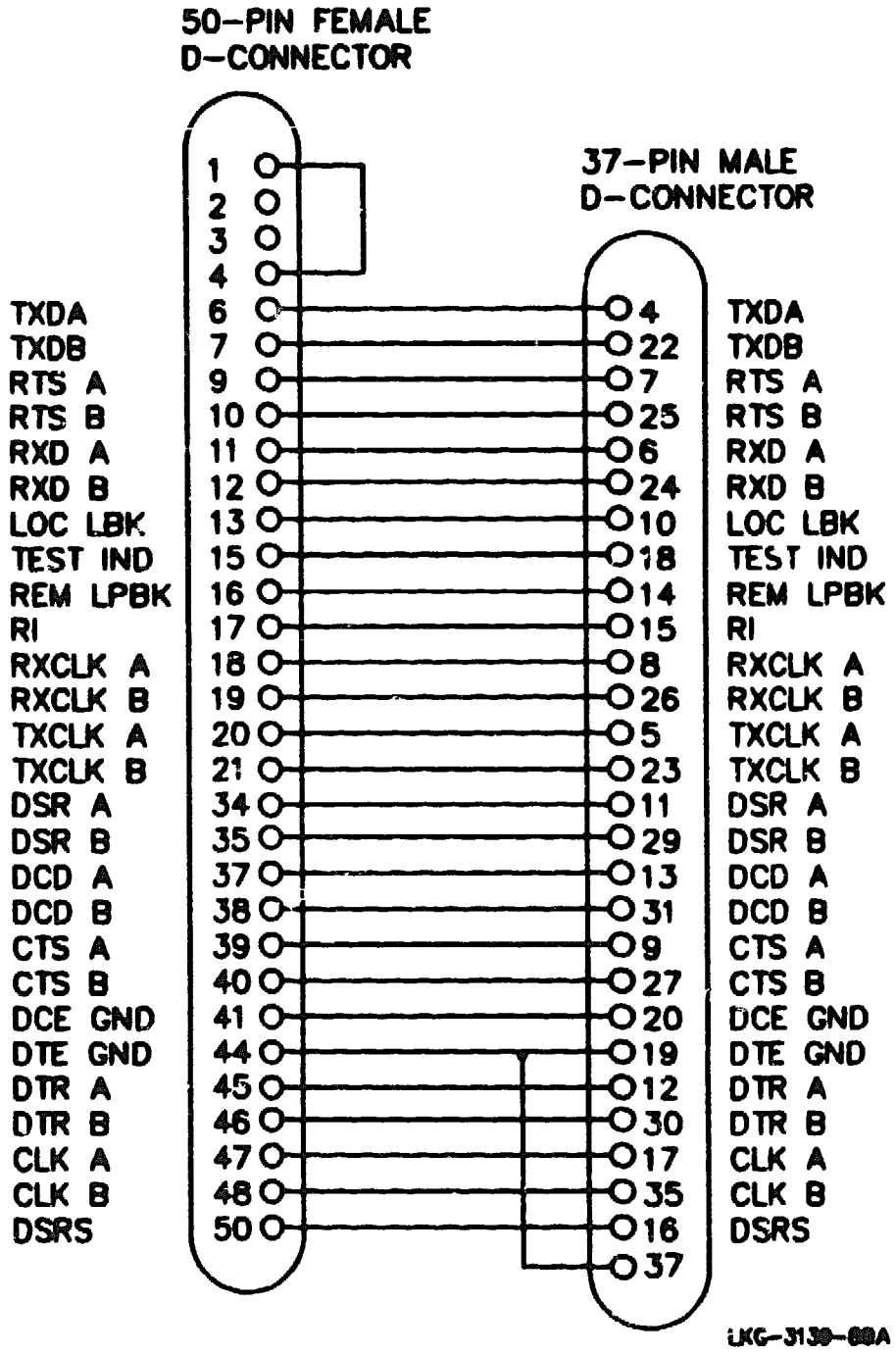
- H3199 — Universal 50-pin
- H3198 — Synchronous line loopback (RS-423-A and RS-422-A)
- H3250 — Synchronous line loopback (V.35)
- H3266 — Synchronous line loopback (EIA-232-D)

The following sections contain more information on these adapters and connectors.

A.2.2.1 BC19B-02 Synchronous Line Adapter Cable

Use the BC19B-02 synchronous line adapter cable to connect the DECrouter 250 50-pin D-connector to RS-422-A devices. The BC19B-02 is 28-wire cable with a 50-pin, female, D-connector on one end and a 37-pin, male, D-connector on the other end. Figure A–10 shows the wiring diagram.

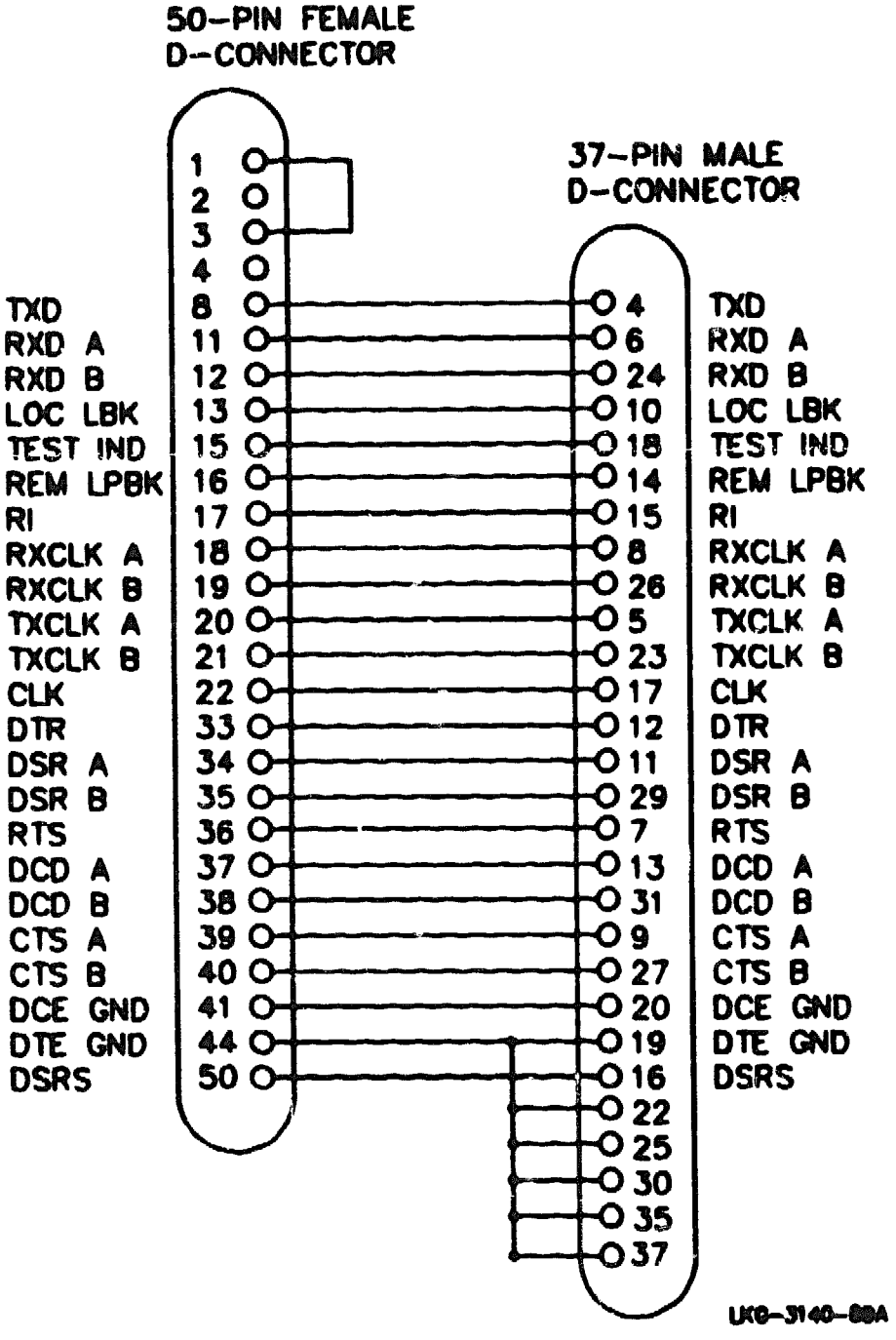
Figure A–10: Wiring Diagram for BC19B-02 Synchronous Line Adapter Cable



A.2.2.2 BC19E-02 Synchronous Line Adapter Cable

Use the BC19E-02 synchronous line adapter cable to connect the DECrouter 250, 50-pin, D-connector to RS-423-A devices. The BC19E-02 is 24-wire cable with a 50-pin, female, D-connector on one end and a 37-pin, male, D-connector on the other end. Figure A–11 shows the wiring diagram.

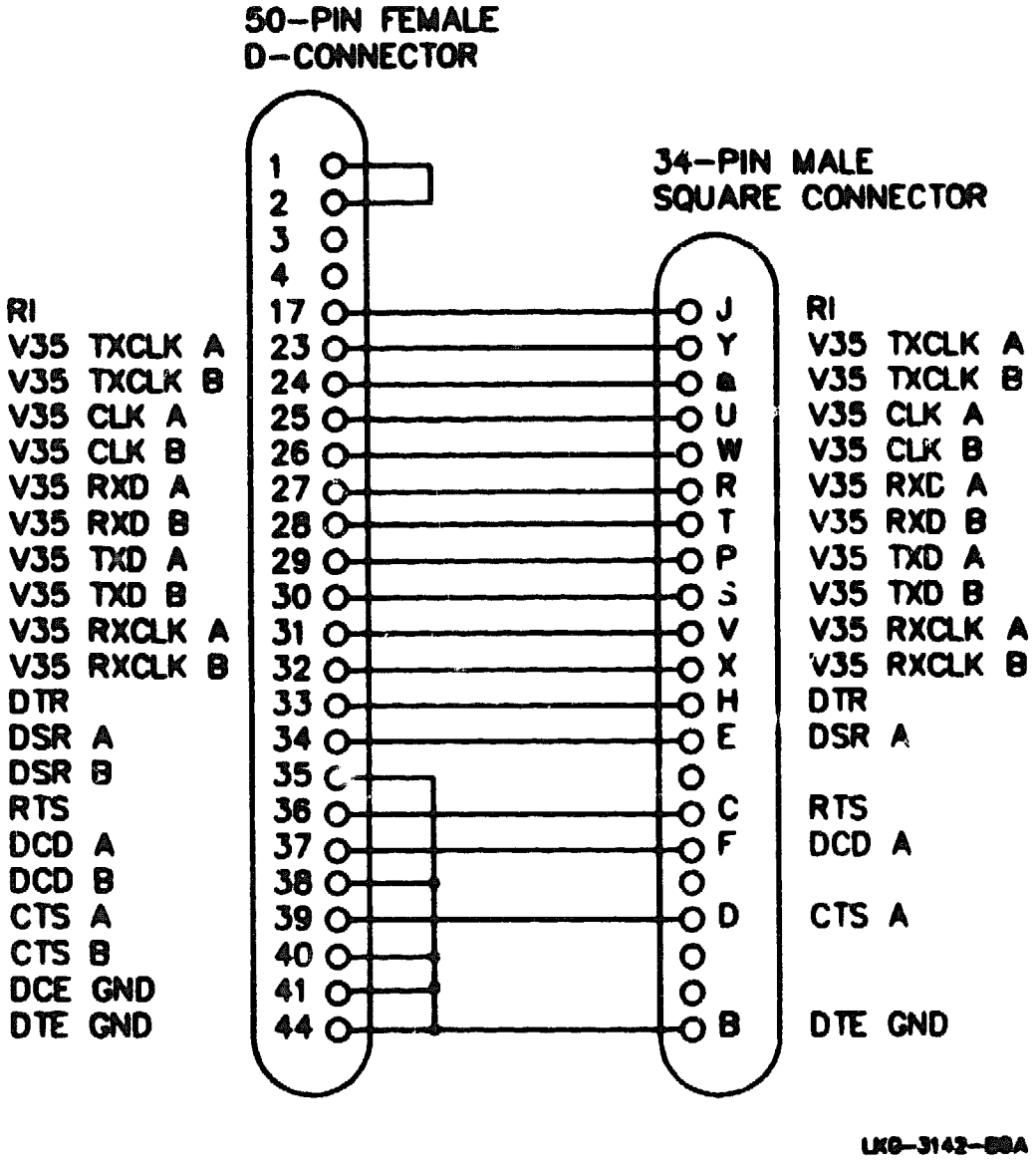
Figure A–11: Wiring Diagram for BC19E-02 Synchronous Line Adapter Cable



A.2.2.3 BC19F-02 Synchronous Line Adapter Cable

Use the BC19F-02 synchronous line adapter cable to connect the DECrouter 250, 50-pin, D-connector to V.35 devices. The BC19F-02 is 16-wire cable with a 50-pin, female, D-connector on one end and a 34-pin, male, square connector on the other end. Figure A–12 shows the wiring diagram.

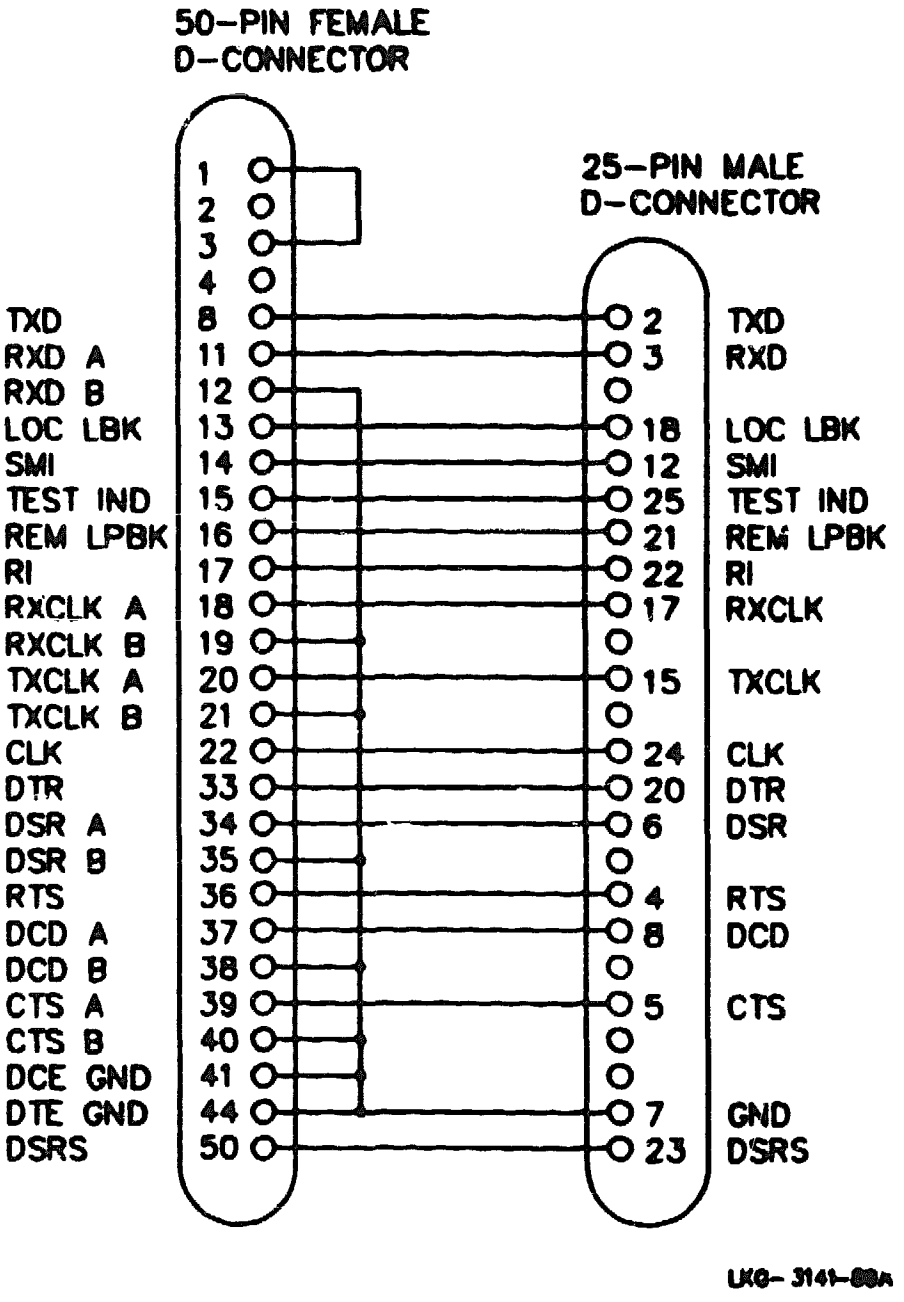
Figure A–12: Wiring Diagram for BC19F-02 Synchronous Line Adapter Cable



A.2.2.4 BC23V-02 Synchronous Line Adapter Cable

Use the BC23V-02 synchronous line adapter cable to connect the DECrouter 250, 50-pin, D-connector to V.24 devices. The BC23V-02 is 16-wire cable with a 50-pin, female, D-connector on one end and a 25-pin, male, D-connector on the other end. Figure A–13 shows the wiring diagram.

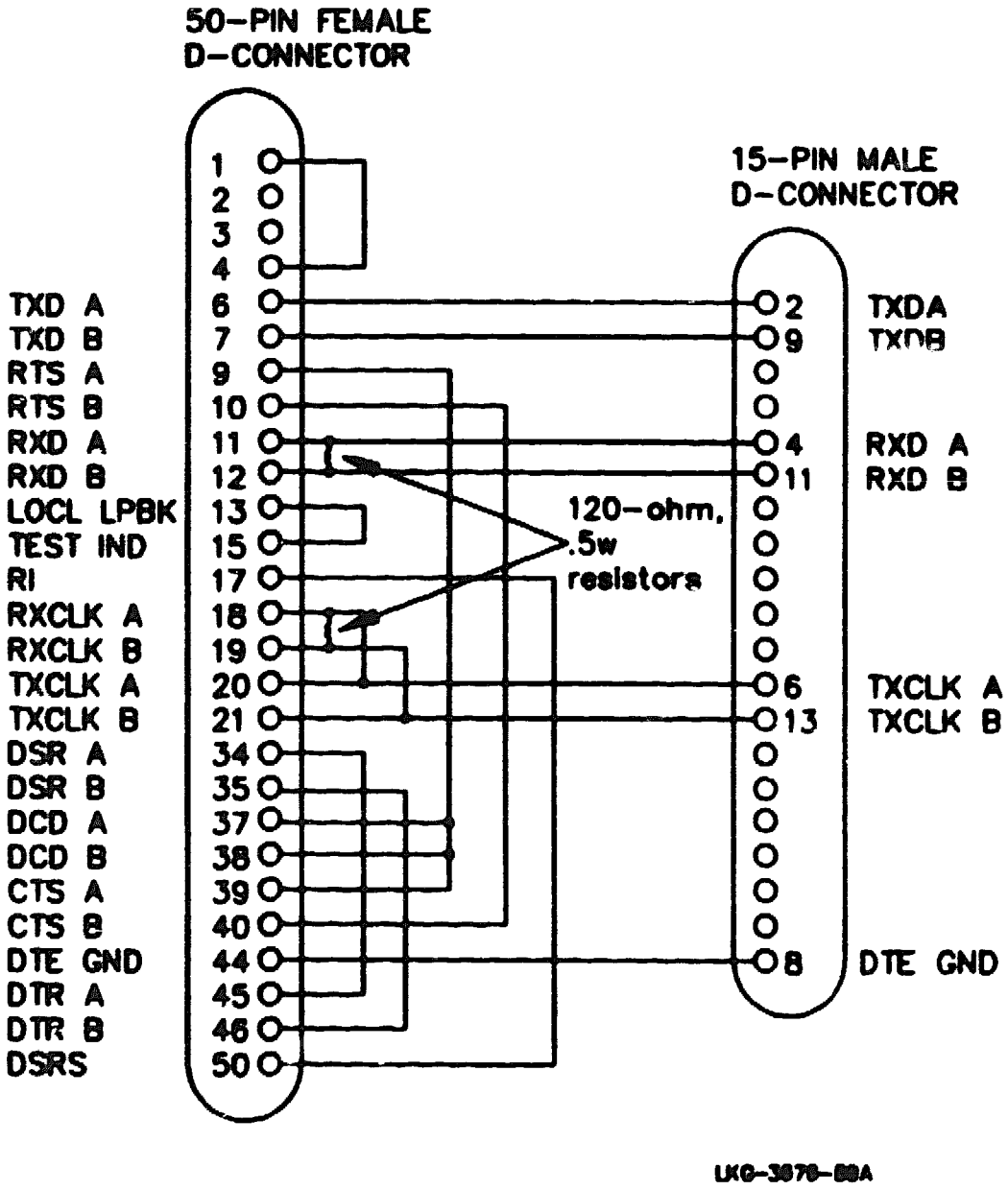
Figure A–13: Wiring Diagram for BC23V-02 Synchronous Line Adapter Cable



A.2.2.5 BC22X-02 BT Kilostream Adapter Cable (U.K. Only)

Use the BC22X-02 BT Kilostream adapter cable to connect the DECrouter 250, 50-pin, D-connector to British Telecom's Kilostream service (through the BC22Z-xx extension cable and the 64k bit/s, X.21 interface). The BC22X-02 is 7-wire cable with a 50-pin, female, D-connector on one end and a 15-pin, male, D-connector on the other end. Figure A–14 shows the wiring diagram.

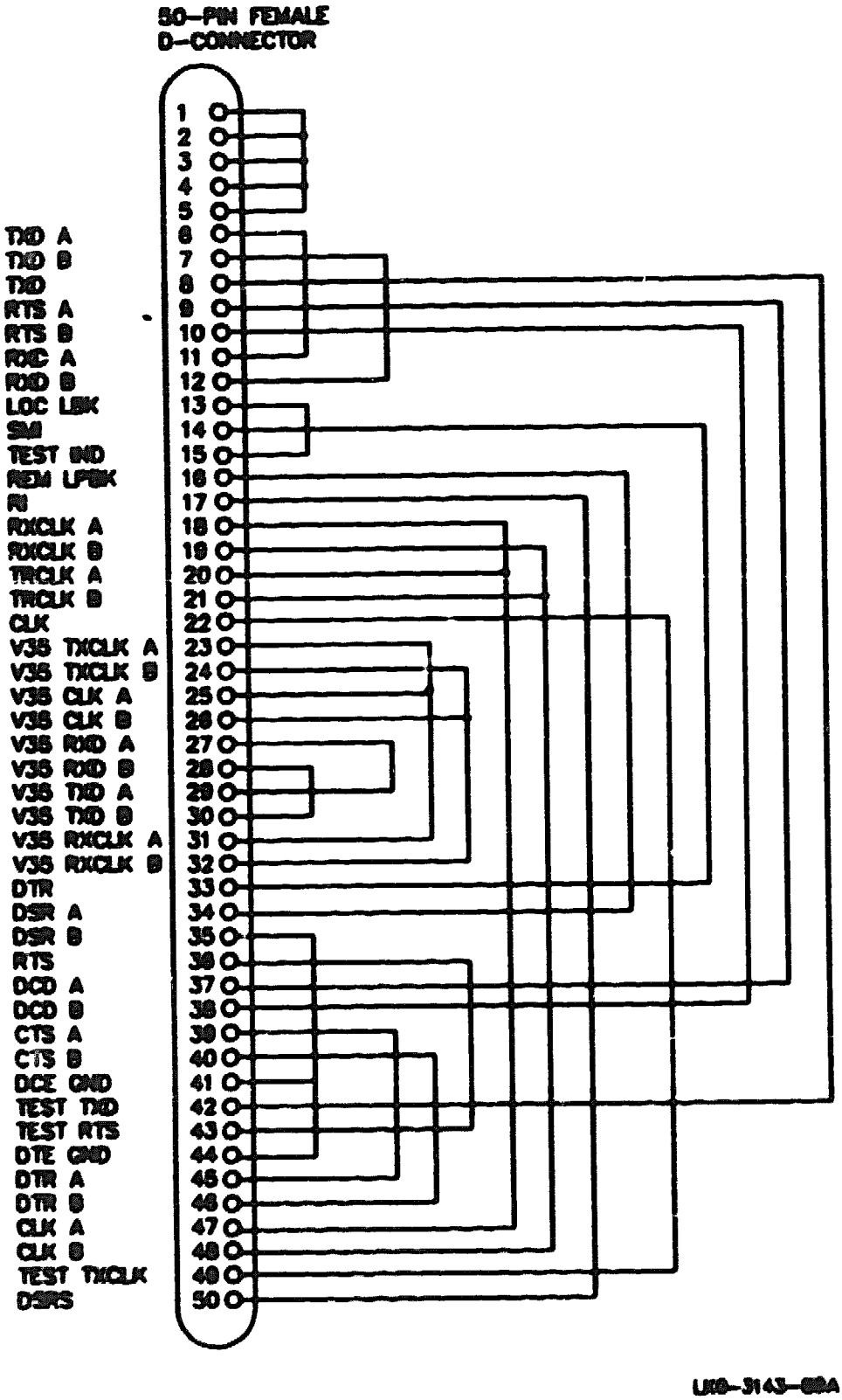
Figure A–14: Wiring Diagram for BC22X-02 BT Kilostream Adapter Cable



A.2.2.6 H3199 Universal, 50-Pin, Loopback Connector

Use the H3199 universal, 50-pin, loopback connector to test the 50-pin D-connector driver and receiver circuits. Figure A–15 shows the wiring diagram.

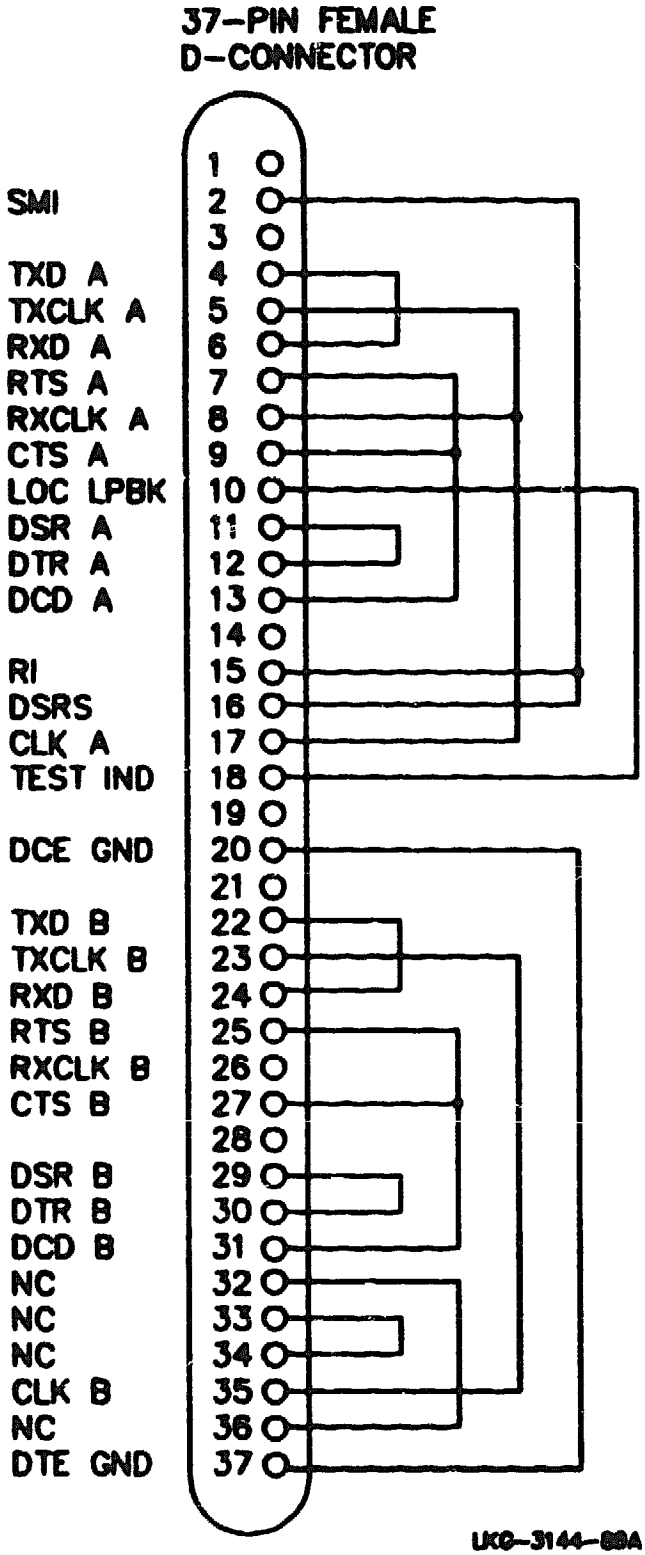
Figure A–15: Wiring Diagram for H3199 Universal, 50-Pin, Loopback Connector



A.2.2.7 H3198, 37-Pin, Loopback Connector

Use the H3198, 37-pin, loopback connector to test the RS-422-A and the RS-423-A interfaces on the 50-pin D-connector and the RS-422-A and RS-423-A adapter cables. Figure A-16 shows the wiring diagram for the H3198 loopback connector.

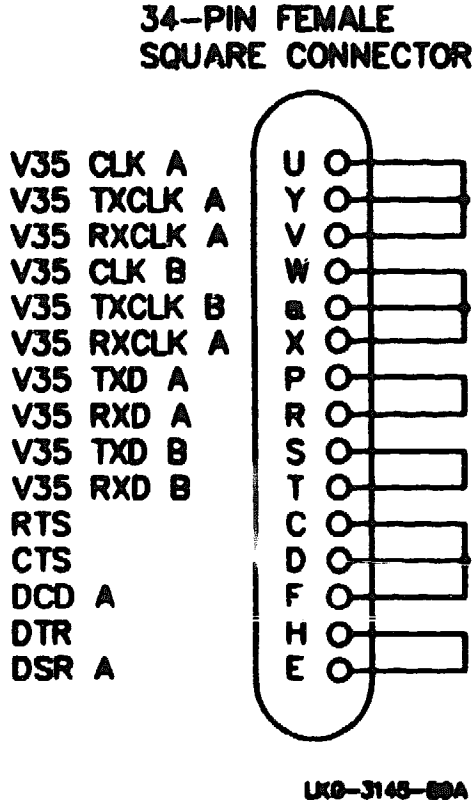
Figure A–16: H3198, 37-Pin, Loopback Connector



A.2.2.8 H3250, 34-Pin, Loopback Connector

Use the H3250, 34-pin, loopback connector to test the V.35 interface on the 50-pin, D-connector and the BC19F-02 adapter cable. Figure A–17 shows the wiring diagram of the H3250, 34-pin, loopback connector.

Figure A–17: Wiring Diagram for H3250, 34-Pin, Loopback Connector



A.2.3 Synchronous Line Extension Cables for Serial Communication

Use the cables in Table A–5 with the line adapter cables.

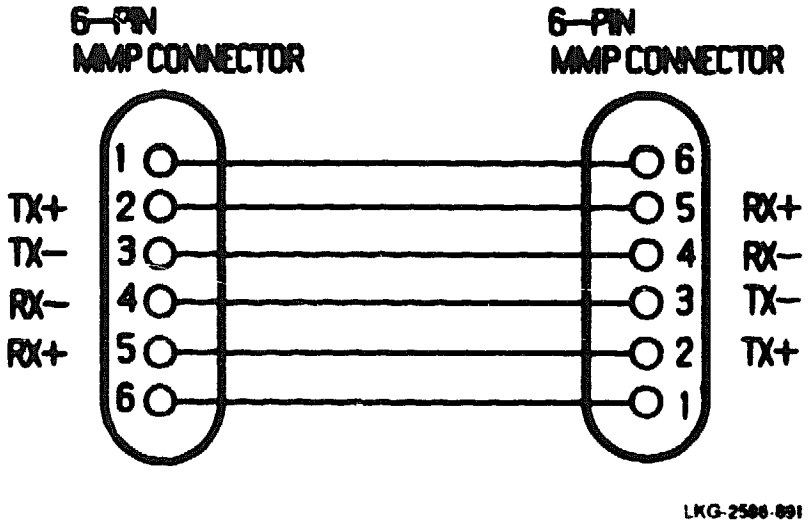
Table A–5 : Synchronous Line Extension Cables

Type	Description
BC55D-XX	Extends BC19B-02 line adapter cable (RS-422/V.36)
BC22F-YY	Extends BC19D-02 line adapter cable (V.2 4)
BC55D-XX	Extends BC19E-02 line adapter cable (RS-423-A)
BC19L-XX	Extends BC19F-02 line adapter cable (V.35)
BC22Z-XX	Extends BC22X-02 BT Kilostream Adapter Cable

A.2.4 BC16E-xx 6-Conductor DEC Office Cable

Use the BC16E cable to connect a terminal to the configuration port. The BC16E is an unshielded 6-conductor flat cable. This cable is terminated at both ends with an MMP. Figure A–18 shows a wiring diagram of the BC16E-xx.

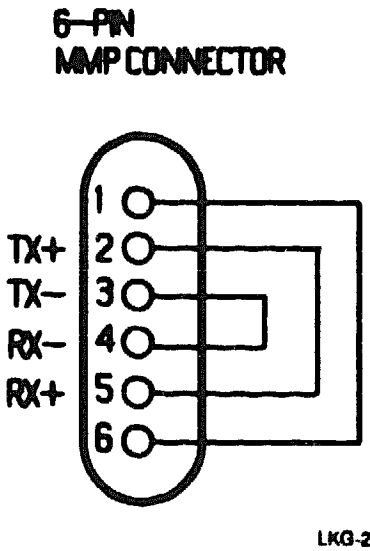
Figure A–18: Wiring Diagram for BC16E-xx Cable



A.2.5 H3103 MMJ Loopback Connector

Use the H3103 MMJ loopback connector to loop back signals on the configuration port. Figure A–19 shows a wiring diagram of the H3103 loopback connector.

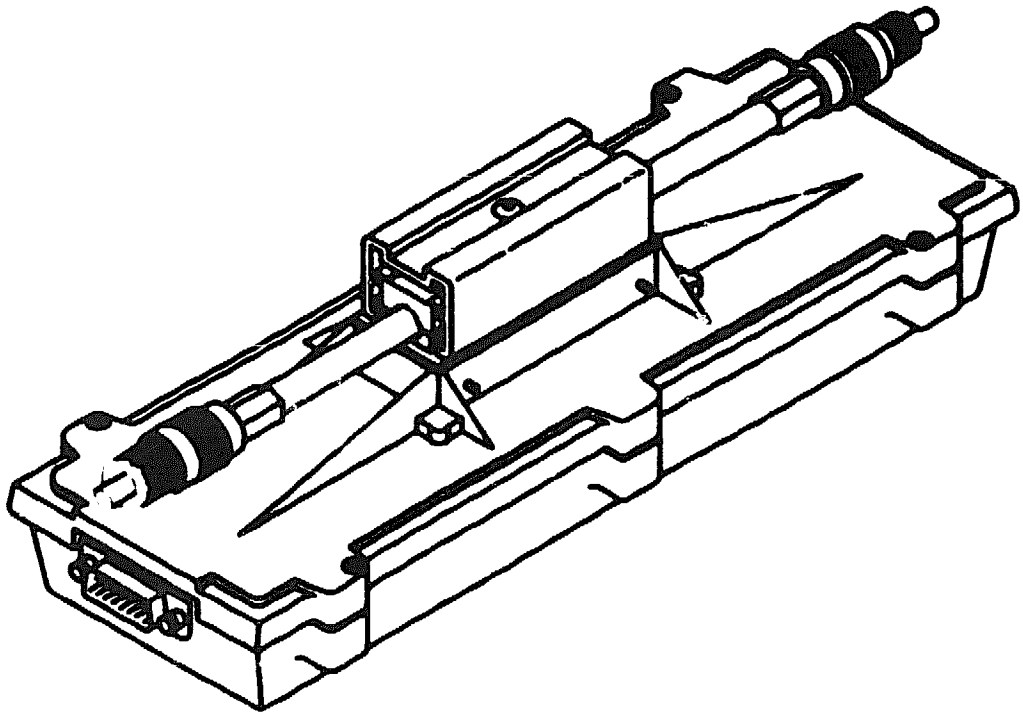
Figure A–19: Wiring Diagram — H3103 Loopback Connector



A.2.6 H4080 Turnaround Connector

Use the H4080 turnaround connector in conjunction with a standard Ethernet transceiver cable to loop back the Ethernet signals. Figure A–20 shows an H4080 turnaround connector.

Figure A–20: H4080 Turnaround Connector



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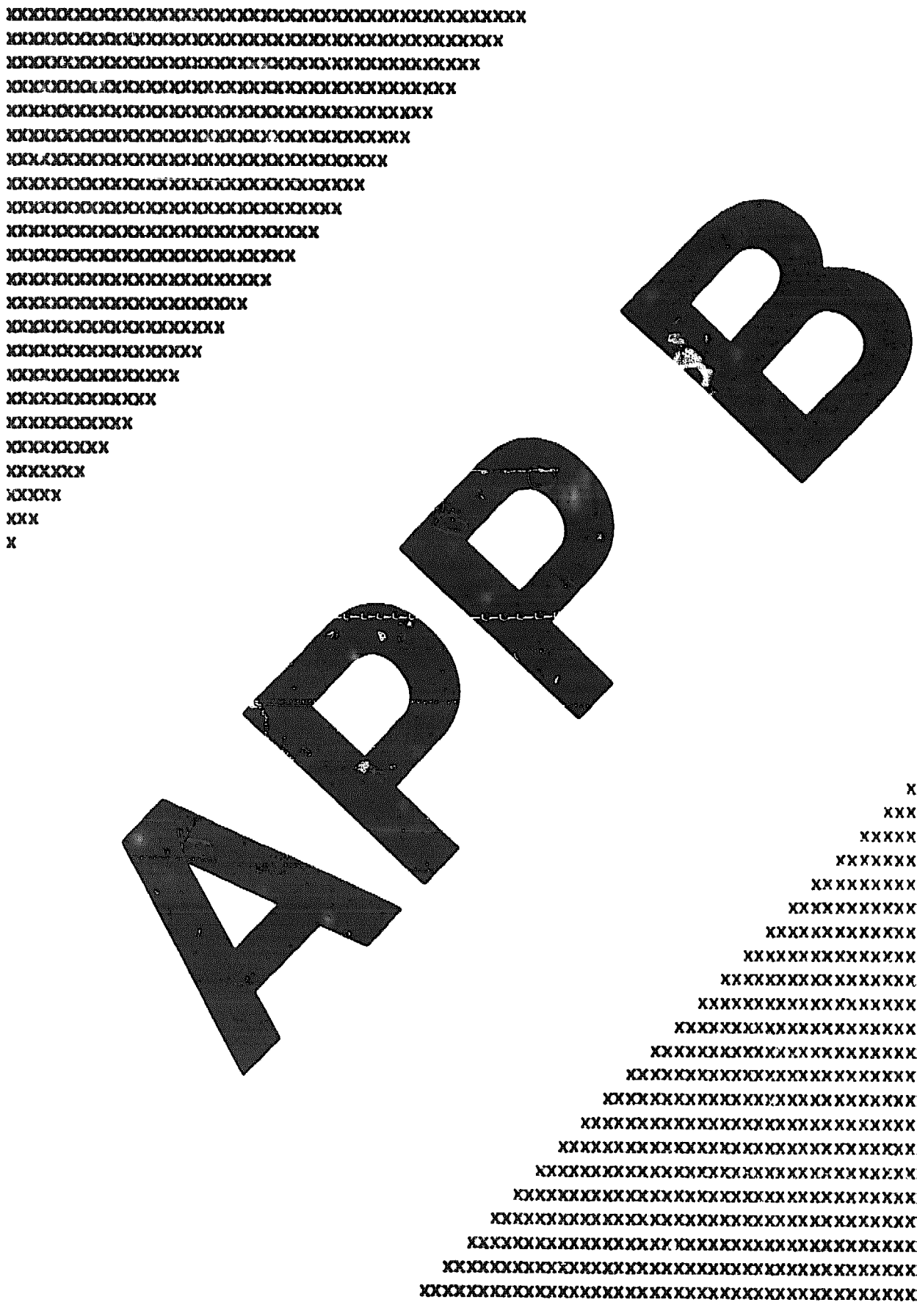

APP B

B

Port Devices Supported by the DECrouter 250

This appendix lists port devices supported by the DECrouter 250 system. For the latest listing of supported devices, see the DECrouter 250 *Software Product Description* that applies to your operating system.

B.1 Personal Computers

The DECrouter 250 system supports Digital and non-Digital personal computers.

Digital personal computers supported by DECrouter 250 include:

- Professional 300 series running Pro/DECnet
- Rainbow 100 series running DECnet-Rainbow
- VAXmate running DECnet-VAXmate

Non-Digital personal computers supported by DECrouter 250 include:

- IBM PC, IBM PC/XT, and IBM PC AT, running DECnet-DOS

B.2 Modems

The DECrouter 250 supports modems that use the following standards:

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

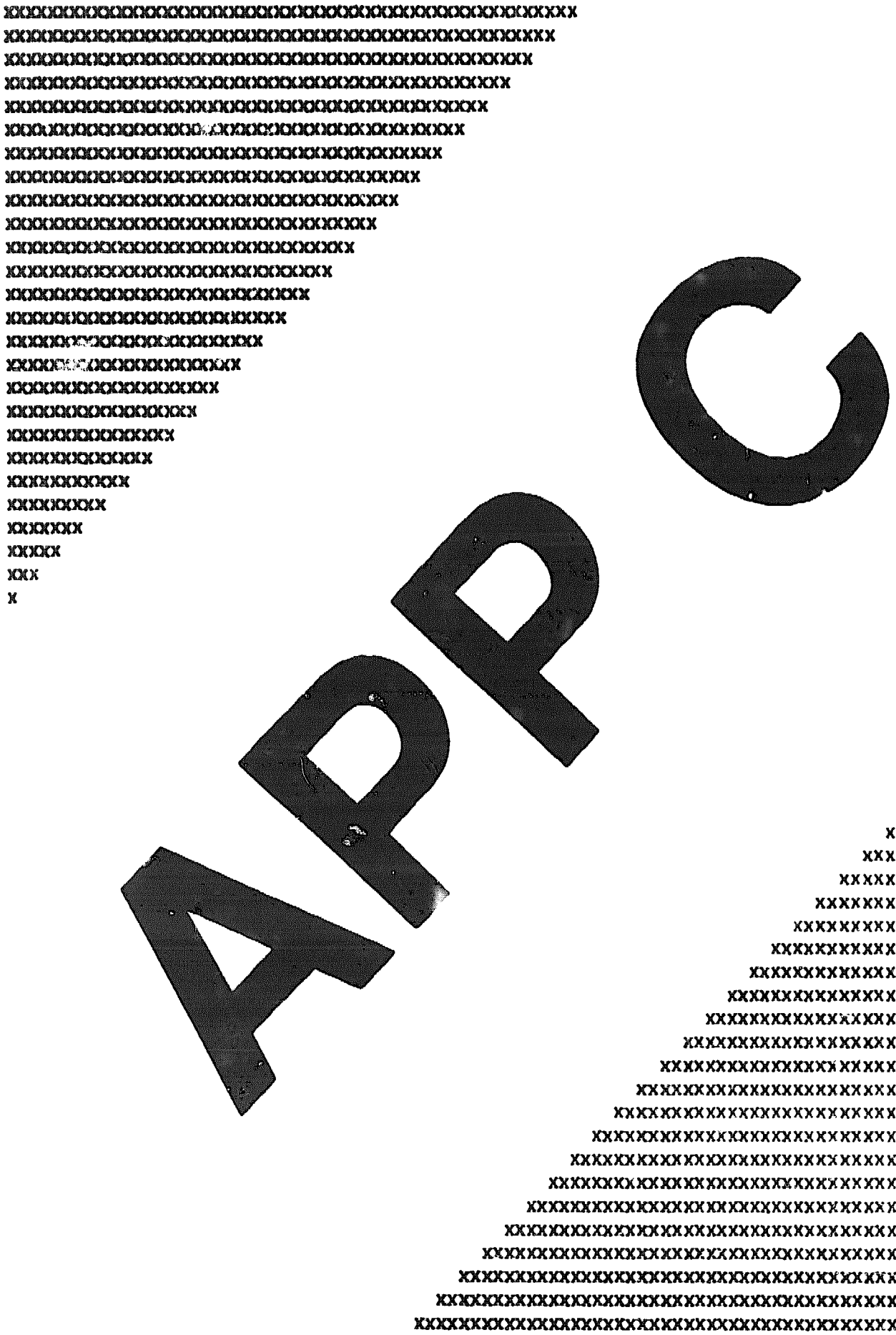
- RS-449, RS-422-A/V.11
- V.35
- V.36

Digital modems supported by the DECrouter 250 include:

- DF03
- DF112
- DF124
- DF224

Non-Digital modems supported by the DECrouter 250 include:

- Hayes Smartmodem 2400 (V.24)
- Codex (2400, 9600 bps) (V.24)
- Bell 212A (V.24)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C

Cabling Strategies

C.1 Router-to-Network Connection

Connect the DECrouter 250 hardware to either a standard Ethernet local area network or a ThinWire Ethernet local area network. The following sections describe commonly used strategies.

C.1.1 Standard Ethernet Connection

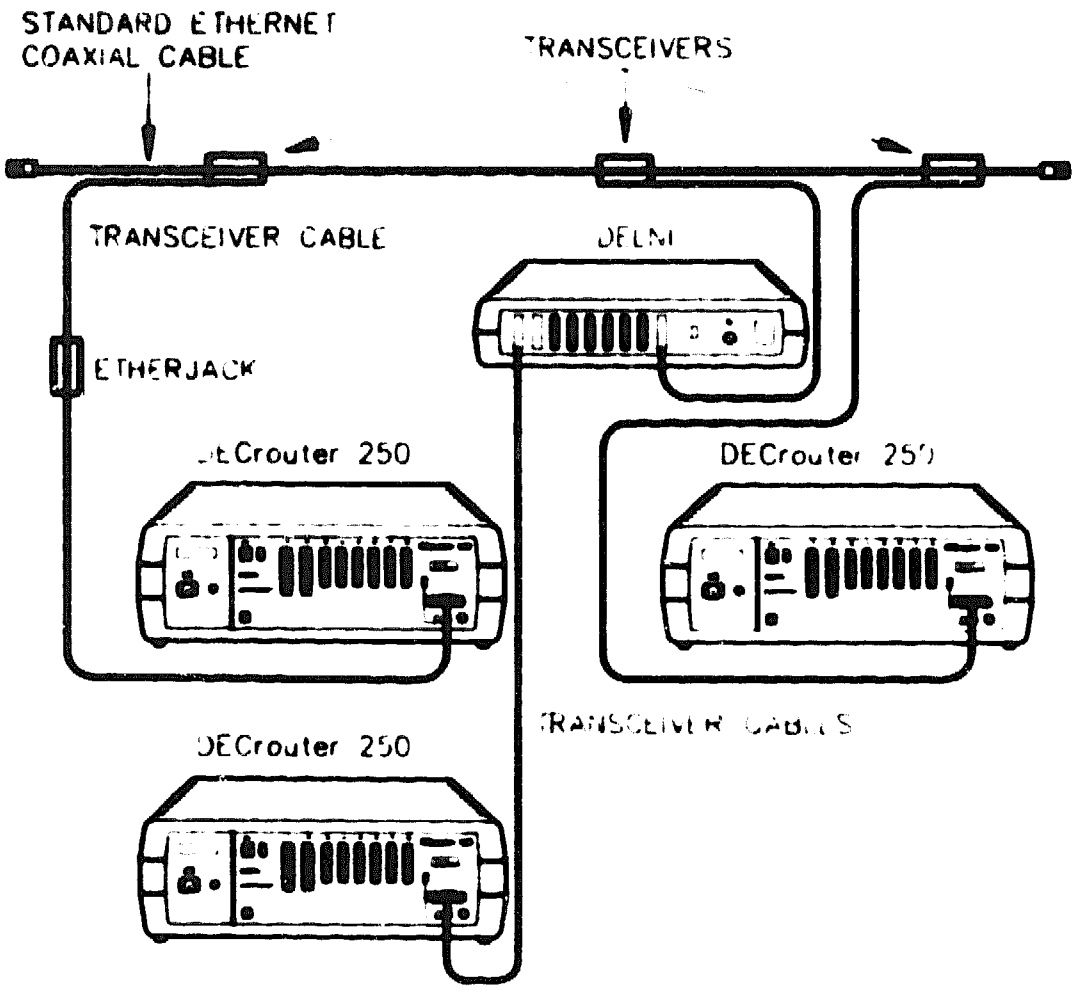
Use a transceiver cable to connect the router to the standard Ethernet network (see Figure C–1). Connect the transceiver cable to any of the following:

- Another transceiver cable section. This cable can be secured in an Etherjack junction box.
- A DELNI local area interconnect.
- A transceiver on a standard Ethernet coaxial cable for Digital Equipment Corporation baseband networks or a DECOM for Digital Equipment Corporation broadband networks.

NOTE

The DECrouter 250 is compatible with Digital baseband and broadband Ethernet products and with Ethernet and IEEE 802.3 specifications.

Figure C–1: Standard Ethernet Coaxial Cable Connection



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C.1.2 ThinWire Ethernet Connection

Use a ThinWire coaxial cable to connect the router to the system in either of two ways:

- As part of a stand-alone ThinWire Ethernet coaxial cable segment
- As part of a DEMPR or DESPR ThinWire Ethernet coaxial cable segment

Figure C–2 shows routers connected as part of a ThinWire Ethernet segment.

NOTE

A ThinWire segment must begin and end in a 50-ohm terminator as shown in Figure C–2.

Figure C–3 shows routers connected as part of a DEMPR ThinWire Ethernet segment.

NOTE

The DEMPR and DESPR terminate the line internally in 50 ohms so that it is not necessary to use a 50-ohm terminator. However, all unused lines on the DEMPR must have a 50-ohm terminator installed as shown in Figure C–4.

Further information on ThinWire Ethernet installation may be found in *DECconnect System Planning and Configuration Guide*.

Figure C–2: ThinWire Ethernet Stand-Alone Segment

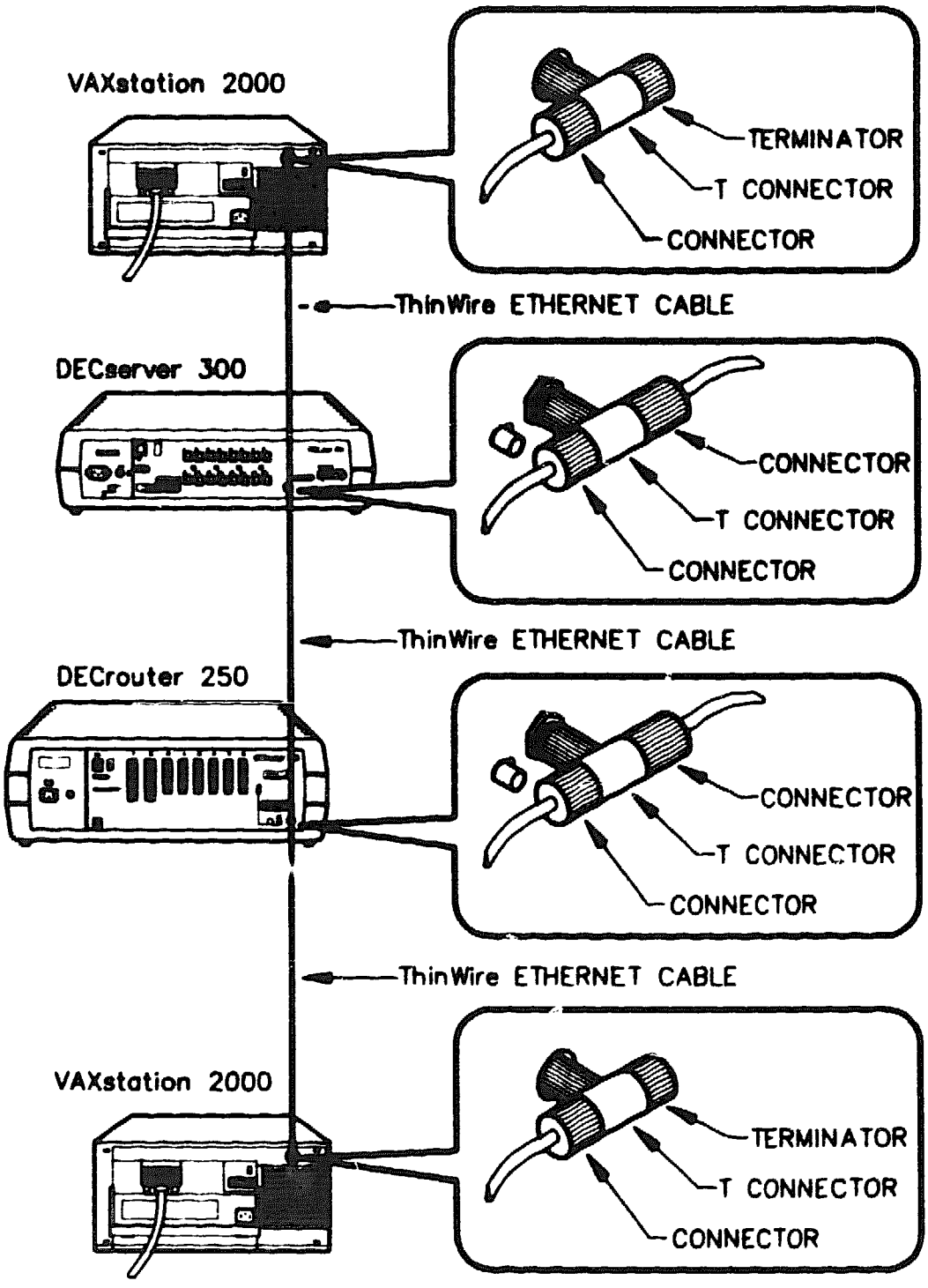

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Figure C–3: DEMPR ThinWire Connection

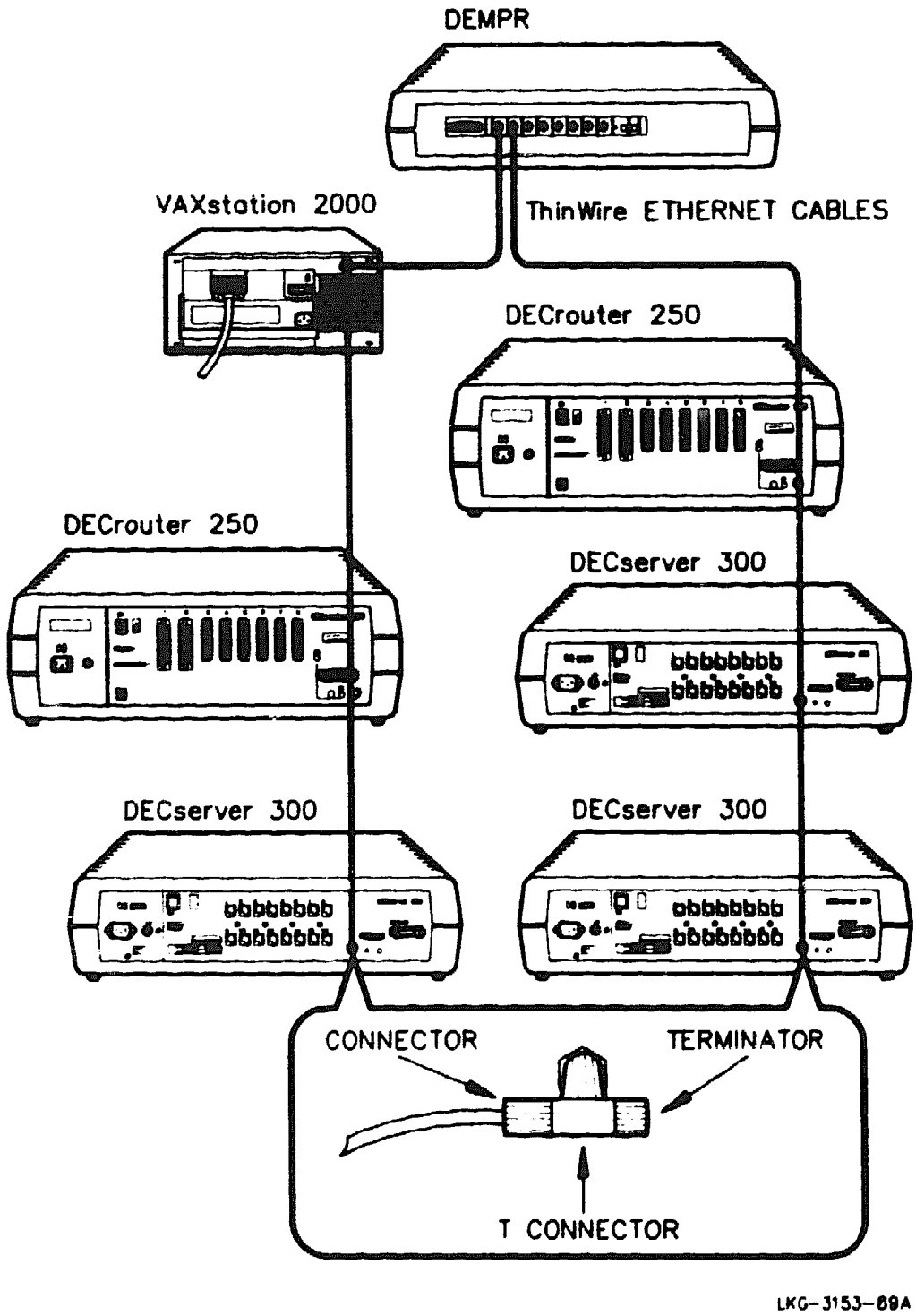
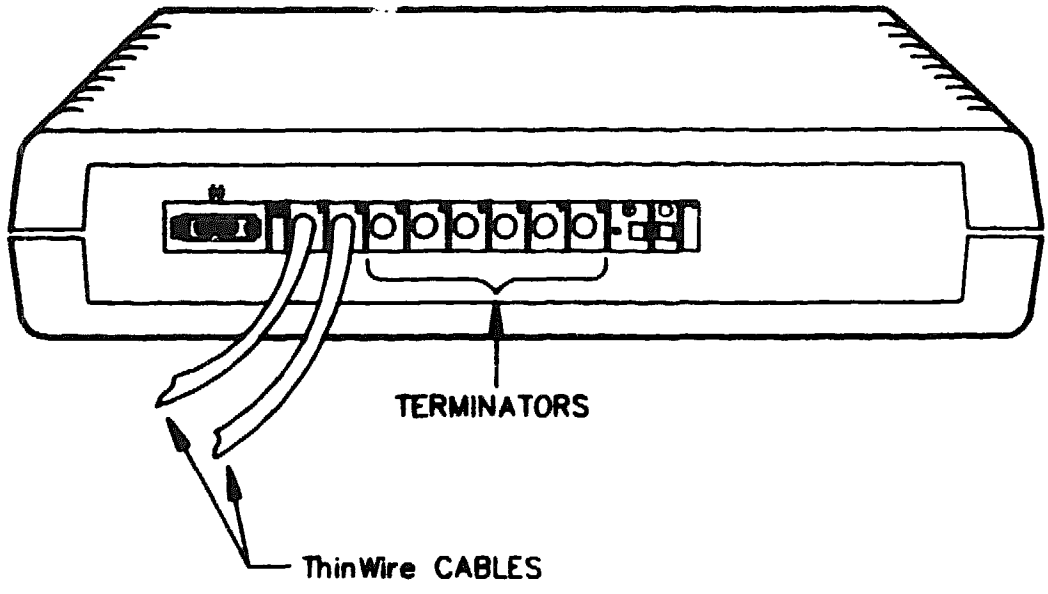


Figure C–4: DEMPR Connections



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C.2 Router-to-Device Connection

Connect devices (modems, personal computers) to either the 25-pin or the 50-pin D-connectors. The following sections describe some commonly used methods of connecting devices to the router.

C.2.1 Connecting to 25-Pin D-Connector

The 25-pin D-connector supports the standards named in Table C–1 below:

Table C–1: Standards Supported on 25-Pin D-Connector

Parameter	CCITT	ISO	EIA
Signal functions	V.24		EIA-232-D
Electrical characteristics	V.28		EIA-232-D
Connector/pin outs		ISO-2110	EIA-232-D

The following methods are used to connect devices to these connectors:

- Synchronous and asynchronous modems — Connected using BC22F cable.
- Asynchronous devices requiring modem signals — Connected using BC17D cable.

- Asynchronous devices requiring data leads only — Connected using BC22D cable.

C.2.2 Connecting to 50-Pin D-Connector

The 50-pin D-connector supports the following standards:

- EIA-232-D/V.24/V.28
- RS-449,RS-423-A/V.10
- RS-449,RS-422-A/V.11
- V.35
- V.36

Table C–2 shows the parameters to which the standards apply.

Table C–2: Standards Supported on 50-Pin D-Connector

Parameter	CCIT	EIA
Signal functions	V.24	EIA-232-D, RS-449
Electrical characteristics	V.28	EIA-232-D, RS-449
Electrical characteristics of voltage unbalanced circuits	V.10	RS-423-A
Electrical characteristics of voltage balanced circuits	V.11	RS-422-A
Wide Band Modems	V.35, V.36	

Use the following methods to connect devices to these connectors:

- Synchronous and asynchronous modems — Use adapter cable BC19D-02 and BC22F cable.
- Asynchronous devices requiring modem signals — Use adapter cable BC19D-02 and BC17D cable.
- Asynchronous devices requiring data leads only — Use adapter cable BC19D-02 and BC22D cable.
- RS-422-A and V.36 modems — Use adapter cable BC19B-02 and extension cable BC55D-xx.

- RS-423-A modems — Use adapter cable BC19E-02 and extension cable BC55D-xx.
- V.35 modems — Use adapter cable BC19F-02 and extension cable BC19L-xx.
- BT Kilostream service — Use adapter cable BC22X-02 and extension cable BC22Z-xx.


APP D

D

Bootline Configuration Program (BCP)

D.1 Introduction

You use the bootline configuration program (BCP) to configure a device port so that the software can be loaded through the port. You can also use BCP to see the current parameters of a device port and to test any port and its modems and cables.

BCP supports the following commands:

- CONFIGURE

  You use this command to set the parameters for a device port.

- SHOW

  You use this command to show the current parameters of a device port.

- TEST

  You use this command to perform loopback testing on any port and its associated cables and modems.

- CONTINUE

  This command returns the router to firmware control.

D.2 BCP Commands

The following subsections describe the BCP commands and the last subsection describes when and how to enter BCP.

D.2.1 CONFIGURE Command

You use the CONFIGURE command to:

- Enable/disable down-line load over the Ethernet

  If down-line loading over the Ethernet is disabled, the BCP program will inform the firmware and the firmware will only attempt to down-line load through a device port.

- Set the node password for the router

  This password is used by the router to accept or reject information. This password is set by the network manager.

- Set the device port parameters

  The device port parameters are shown in Table D–1.

Table D–1: Device Port Parameters

Parameter	Possible Values
Line State	Enable or Disable (down-line load)
Modem Control/ Data Leads Only	Modem control or data leads only
Protocol Type	Digital Data Communications Message Protocol (DDCMP)
Mode	Synchronous or asynchronous
*Speed	300, 600, 1200, 2400, 4800, 9600, 19200 baud — all ports (56K and 64K — on port 1 and port 2 are synchronous options only and are therefore set automatically)

*You can set speed in asynchronous mode only.

D.2.2 SHOW Command

You use the SHOW command to:

- See the current parameters for a device port

  (See Table D–1 for a list of the device port parameters.)

- See the node parameters for the router

  The node parameters are the router password, Ethernet down-line loading (enabled or disabled), and the router address (display only, cannot be changed).

D.2.3 TEST Command

You use the TEST command to perform loopback testing on any port and its associated cables or modems. The test command has four modes:

- Internal loop

  You use this mode to run the self-test loopback tests. The port connector and its internal wiring is not checked during this test.

- External loop

  You use this mode to test:

  a. A port connector and its internal wiring.

     You must terminate the port under test with a loopback connector.

  b. The port connector, its internal wiring, and associated cables.

     You must terminate the cables with a loopback connector

- Local loop

  You use this mode to test as far as the local modem. This test assumes that the modem recognizes the Local Loop modem signal.

- Remote loop

  You use this mode to test as far as the remote modem. This test assumes that the remote modem recognizes the Remote Loop modem signal

D.2.4 CONTINUE Command

You use the CONTINUE command to return from BCP.

D.2.5 How to Enter BCP

You enter BCP by typing CTRL/B on one of the following occasions:

1. When router passes self-test and is attempting to load.

   The router seven-segment display shows either a "3" or a "4". The terminal will show one of the following messages:

```
Init -1101- Attempting to locate load host, [ISO8802]
Init -1101- Attempting to locate load host, [ETHERNET]
Init -1100- Requesting load on serial lines
Init -1103- Router will retry operation in n seconds
```

2. When prompted by the screen display:

```
Init -1004- Enter ^B to enter BCP
```

This prompt occurs when no ports, Ethernet or device, have been enabled to load the software from a host or enabled ports have failed self-test.

3. When prompted by the screen display:

```
Init -1003- Enter ^P to repeat self-test or enter ^B to enter BCP
```

This prompt occurs when the Ethernet port has been enabled to load the software but fails self-test and none of the device ports is available for loading.

If the router is trying to load over the serial line, when you type CTRL/B, there is a delay of approximately five seconds and the following message is displayed:

```
Init  -1122- Entering BCP, please wait
```

D.2.6 How to Abort a Command Within BCP

To abort a CONFIGURE/SHOW/TEST command, press ESC.

D.3 BCP Messages

The conditions which cause BCP to display messages on the console terminal and the format of those messages are explained in the following sections.

D.3.1 CONFIGURE Command Messages

BCP displays the following messages if you make an error configuring the node password:

```
Init -1200- Password too long - enter 8 byte password
Init -1201- Invalid password - enter hexadecimal number
```

BCP displays the following message if it finds a checksum error when you configure/show the node password:

```
Init -1206- Checksum error found in maintenance section
Init -1207- Factory defaults applied to this section
```

BCP displays the following message if it finds a checksum error when you configure/show the device port parameters:

```
Init -1204- Checksum error found in line parameters section
Init -1207- Factory defaults applied to this section
```

BCP displays the following message if it finds a checksum error when you enable/disable/show the Ethernet ports:

```
Init -1204- Checksum error found in NI parameters section
Init -1207- Factory defaults applied to this section
```

D.3.2 Test Command Messages

BCP displays the following message if the router fails the specified test:

```
Init -1202- Test Failed
```

BCP displays the following message if the router passes the specified test:

```
Init -1208- Test Passed
```

D.3.3 General

BCP displays the following message if you make a mistake entering command keywords:

```
Init -1203- Unrecognised or ambiguous keyword
```

D.4 How to Configure Device Port Parameters and Node Parameters

In order to configure device port parameters and node parameters you must first enter BCP. The occasions when you can enter BCP are described in Section D.2. You configure the device port parameters and node parameters with the configure command. The following sections describe the procedures you use.

NOTE

Default values are shown in the square brackets. The default value, in the case of the CONFIGURE command, is the value which the parameter was set to previously. For the sake of explanation, the writer has assumed the default values shown in the procedure. You should also note that the BCP program refers to ports as lines.

D.4.1 How to Configure Device Port Parameters

To configure device port parameters, use the following procedure:

1. Enter BCP. Type:

   CTRL/B

   The terminal displays:

```
                Digital Equipment Corporation
          DECrouter 250 Boot-line Configuration Program
BCP>
```

2. Type:

   BCP>CONF RET

   The terminal displays:

```
(LINE, NODE) [LINE]:
```

3. To select line, press RET.

   The terminal displays:

```
(1 2 3 4 5 6 7 8) [1]:
```

4. Enter the number of the port you wish to configure. For example, to configure port 2, type:

```
(1 2 3 4 5 6 7 8) [1]:2
```

   The terminal displays:

```
(ENABLE, DISABLE) [ENABLE]:
```

5. To enable the port for down-line loading, press RET.

   The terminal displays:

```
(MODEM_CONTROL, DATA_LEADS_ONLY) [DATA_LEADS_ONLY]:
```

6. To enable the port for modem control, type:

```
(MODEM_CONTROL, DATA_LEADS_ONLY) [DATA_LEADS_ONLY]:MODEM_CONTROL
```

   The terminal displays:

```
(LINE PROTOCOL) [DDCMP]:
```

7. To select DDCMP, press RET.

NOTE

Alternatively, you can type HDLC to select the High Level Data Link Protocol (HDLC). HDLC is not currently implemented on the DECrouter 250. This option is reserved for a possible future version of the DECrouter 250 system.

The terminal displays:

```
(SYNC ASYNC) [SYNC]:
```

8. To select ASYNC type:

```
(SYNC ASYNC) [SYNC]:ASYNC
```

NOTE

If you choose SYNC, no further prompting is required as the speed is set by the external clock.

The terminal displays:

```
(300, 600, 1200, 2400,
9600, 4800, 19200) [300]:
```

9. To select 19200, type:

```
(300, 600, 1200, 2400,
9600, 4800, 19200) [300]:19200
```

You have now configured port 2 for down-line loading, using DDCMP protocol, asynchronously, at a speed of 19200. The terminal displays:

```
BCP>
```

10. To return command of the router to the firmware, type:

```
BCP>CONTINUE RET
```

The following example shows how to enable port 8 and configure it for DDCMP, ASYNC, 9600 baud.

```
BCP>CONF [RET]
(LINE, NODE) [LINE]: [RET]
(1 2 3 4 5 6 7 8) [2]:8
(ENABLE, DISABLE) [DISABLE]:ENABLE
(MODEM_CONTROL, DATA_LEADS_ONLY) [DATA_LEADS_ONLY]:MODEM_CONTROL
(LINE PROTOCOL) [DDCMP]: [RET]
(SYNC, ASYNC) [ASYNC]: [RET]
(300, 600, 1200, 2400,
9600, 4800, 19200) [4800]:9600
BCP>CONTINUE [RET]
```

D.4.2 How to Configure Node Parameters

The following sections describe how to configure the node parameters of the router.

D.4.2.1 How to Enable/Disable Ethernet Down-Line Load

To enable/disable Ethernet down-line load, use the following procedure:

1. Enter BCP Type:

   [CTRL/B]

   The terminal displays:

   ```
                Digital Equipment Corporation
         DECrouter 250 Boot-line Configuration Program
   BCP>
   ```

2. Type:

   ```
   BCP>CONF [RET]
   ```

   The terminal displays:

   ```
   (LINE, NODE) [LINE]
   ```

3. To select node, type:

   ```
   (LINE, NODE) [LINE] NODE
   ```

   The terminal displays:

   ```
   (NI, SERVICE PASSWORD) [NI]
   ```

4. To select NI, type:

   [RET]

The terminal displays:

```
(NI_ENABLED NI_DISABLED) [NI_ENABLED]:
```

5. To disable down-line load on Ethernet, type:

```
(NI_ENABLED NI_DISABLED) [NI_ENABLED]:NI_DISABLE
```

6. To return control of the router to the firmware, type:

```
BCP>CONTINUE RET
```

D.4.2.2 How to Set the Router Password

To set the router password, use the following procedure:

1. Enter BCP. Type:

   CTRL/B

   The terminal displays:

```
            Digital Equipment Corporation
      DECrouter 250 Boot-line Configuration Program
BCP>
```

2. Type:

```
BCP>CONF RET
```

   The terminal displays:

```
(LINE, NODE) [LINE]:
```

3. To select node, type:

```
(LINE, NODE) [LINE]:NODE
```

   The terminal displays:

```
(NI, SERVICE_PASSWORD) [NI]:
```

4. To set the password, type:

```
(NI, SERVICE_PASSWORD) [NI]:SERVICE_PASSWORD
```

   The terminal displays:

```
Enter New Service Password:
```

5. Type new service password, for example:

```
Enter New Service Password:fa0a5a
```

6. To return control of the router to the firmware, type:

```
BCP>CONTINUE RET
```

D.5 How to Return to Factory Set Parameters

To return to factory set parameters, use the following procedure:

1. Disconnect power from the router.
2. Press D1, on the rear of the router, and keep it pressed.
3. Reconnect power to the router.
4. When the seven-segment display shows E, release D1.

You have now loaded the factory set parameters into the router.

The factory set parameter values are shown in Table D–2.

Table D–2: Factory Set Parameters

Parameter	Values
Router password	0
Ethernet	Enabled
Line State	Enabled (down-line load)
Modem Control/ Data Leads Only	Data leads only
Protocol Type	Digital Data Communications Message Protocol(DDCMP)
Mode	Synchronous
Speed	9600 bps

D.6 How to Check Device Port Parameters and Node Parameters

To display device port parameters and node parameters you must first enter BCP. The occasions when you can enter BCP are described in Section D.2. You check the device port parameters and node parameters with the SHOW command. The following sections describe the procedures you use.

D.6.1 How to Check Device Port Parameters

To check device port parameters, use the following procedure:

1. Enter BCP. Type:

   CTRL/B

   The terminal displays:

```
            Digital Equipment Corporation
      DECrouter 250 Boot-line Configuration Program
BCP>
```

2. Type:

   BCP>SHOW RET

   The terminal displays:

```
(LINE, NODE) [LINE]:
```

3. Type RET.

   The terminal displays:

```
(1 2 3 4 5 6 7 8) [1]:
```

4. To display the device port parameters for port 2, type:

```
(1 2 3 4 5 6 7 8) [1]:2
```

   The terminal displays the parameters for port 2, for example:

```
Protocol Type                          : [DDCMP]
Mode                                   : [ASYNC]
Speed                                  : [19200]
Modem Control                          : [MODEM_CONTROL]
Loading enabled or disabled            : [ENABLED]
```

D.6.2 How to Check Node Parameters

To check node parameters use the following procedure.

5. Enter BCP. Type:

   CTRL/B

   The terminal displays:

```
            Digital Equipment Corporation
      DECrouter 250 Boot-line Configuration Program
BCP>
```

6. Type:

```
BCP>SHOW RET
```

The terminal displays:

```
(LINE, NODE) [LINE]:
```

7. Type :

```
(LINE, NODE) [LINE]:NODE
```

The terminal displays the node parameters, for example:

```
NI is ENABLED
Unite maintenance password is:00000000fa0a5a
Unite Station address:08-00-2b-12-34-56
```

D.7 How to Test a Device Port, Cables and Modem

To use the TEST command you must first enter BCP. The occasions when you can enter BCP are described in Section D.2. The following sections describe the procedures you use.

D.7.1 How to Test a Device Port

To test a device port, use the following procedure:

1. Enter BCP. Type:

```
CTRL/B
```

The terminal displays:

```
          Digital Equipmont Corporation
     DECrouter 250 Boot-line Configuration Program
BCP>
```

2. Type:

```
BCP>TEST
```

The terminal displays:

```
(1 2 3 4 5 6 7 8) [1]:
```

3. To select port 4, type:

```
(1 2 3 4 5 6 7 8) [1]:4
```

The terminal displays:

```
(LOCAL_LOOP REMOTE_LOOP EXTERNAL_LOOP INTERNAL_LOOP) [LOCAL_LOOP]:
```

4. To test port 4, type:

```
(LOCAL_LOOP          REMOTE_LOOP          EXTERNAL_LOOP          INTERNAL_LOOP)
[LOCAL_LOOP] : INTERNAL_LOOP
```

Self-test is now run on port 4. If the test is passed, the terminal displays:

```
Init -1208-, test passed
```

D.7.2 How to Test a Device Port Using a Loopback Connector

To test a device port with a loopback connector, connect the loopback connector to the required port, for example port 4, and use the following procedure:

1. Enter BCP. Type:

   CTRL/B

   The terminal displays:

```
            Digital Equipment Corporation
      DECrouter 250 Boot-line Configuration Program
BCP>
```

2. Type:

```
BCP>TEST
```

   The terminal displays:

```
(1 2 3 4 5 6 7 8) [1]:
```

3. To select port 4, type:

```
(1 2 3 4 5 6 7 8) [1]:4
```

   The terminal displays:

```
(LOCAL_LOOP REMOTE_LOOP EXTERNAL_LOOP INTERNAL_LOOP) [LOCAL_LOOP]:
```

4. To test port 4 using a loopback connector, type:

```
(LOCAL_LOOP          REMOTE_LOOP          EXTERNAL_LOOP          INTERNAL_LOOP)
[LOCAL_LOOP] :EXTERNAL_LOOP
```

Self-test is now run on port 4. If the test is passed, the terminal displays:

```
Init -1208- test passed
```

D.7.3 How to Test a Device Port and Its Cables

To test a device port, for example port 4, and its cables, terminate the cable in a loopback connector, and use the following procedure:

5. Enter BCP. Type:

   CTRL/B

   The terminal displays:

```
            Digital Equipment Corporation
      DECrouter 250 Boot-line Configuration Program
BCP>
```

6. Type:

```
BCP>TEST
```

   The terminal displays:

```
(1 2 3 4 5 6 7 8) [1]:
```

7. To select port 4, type:

```
(1 2 3 4 5 6 7 8) [1]:4
```

   The terminal displays:

```
(LOCAL_LOOP REMOTE_LOOP EXTERNAL_LOOP INTERNAL_LOOP) [LOCAL_LOOP]:
```

8. To test port 4 using a loopback connector, type:

```
(LOCAL_LOOP          REMOTE_LOOP          EXTERNAL_LOOP          INTERNAL_LOOP)
[LOCAL_LOOP]:EXTERNAL_LOOP
```

Self-test is now run on port 4. If the test is passed, the terminal displays:

```
Init -1208- test passed
```

D.7.4 How to Test a Device Port, Its Cables, and Its Local Modem

To test a device port, for example port 4, its cables, and its local modem, use the following procedure:

1. Enter BCP. Type:

   CTRL/B

   The terminal displays:

```
            Digital Equipment Corporation
      DECrouter 250 Boot-line Configuration Program
BCP>
```

2. Type:

```
BCP>TEST
```

   The terminal displays:

```
(1 2 3 4 5 6 7 8) [1]:
```

3. To select port 4, type:

```
(1 2 3 4 5 6 7 8) [1]:4
```

The terminal displays:

```
(LOCAL_LOOP REMOTE_LOOP EXTERNAL_LOOP INTERNAL_LOOP) [LOCAL_LOOP]:
```

4. To test port 4 using a loopback connector type:

```
(LOCAL_LOOP          REMOTE_LOOP          EXTERNAL_LOOP          INTERNAL_LOOP)
[LOCAL_LOOP] LOCAL_LOOP
```

Self-test is now run on port 4. If the test is passed, the terminal displays:

```
Init -1208- test passed
```

D.7.5 How to Test a Device Port, Its Cables, Its Local Modem, Its Modem Line, and Remote Modem

To test a device port, for example port 4, its cables, its local modem, its modem line and remote modem, use the following procedure:

1. Enter BCP. Type:

CTRL/B

The terminal displays:

```
            Digital Equipment Corporation
      DECrouter 250 Boot-line Configuration Program
BCP>
```

2. Type:

```
BCP>TEST
```

The terminal displays:

```
(1 2 3 4 5 6 7 8) [1]
```

3. To select port 4, type:

```
(1 2 3 4 5 6 7 8) [1] 4
```

The terminal displays:

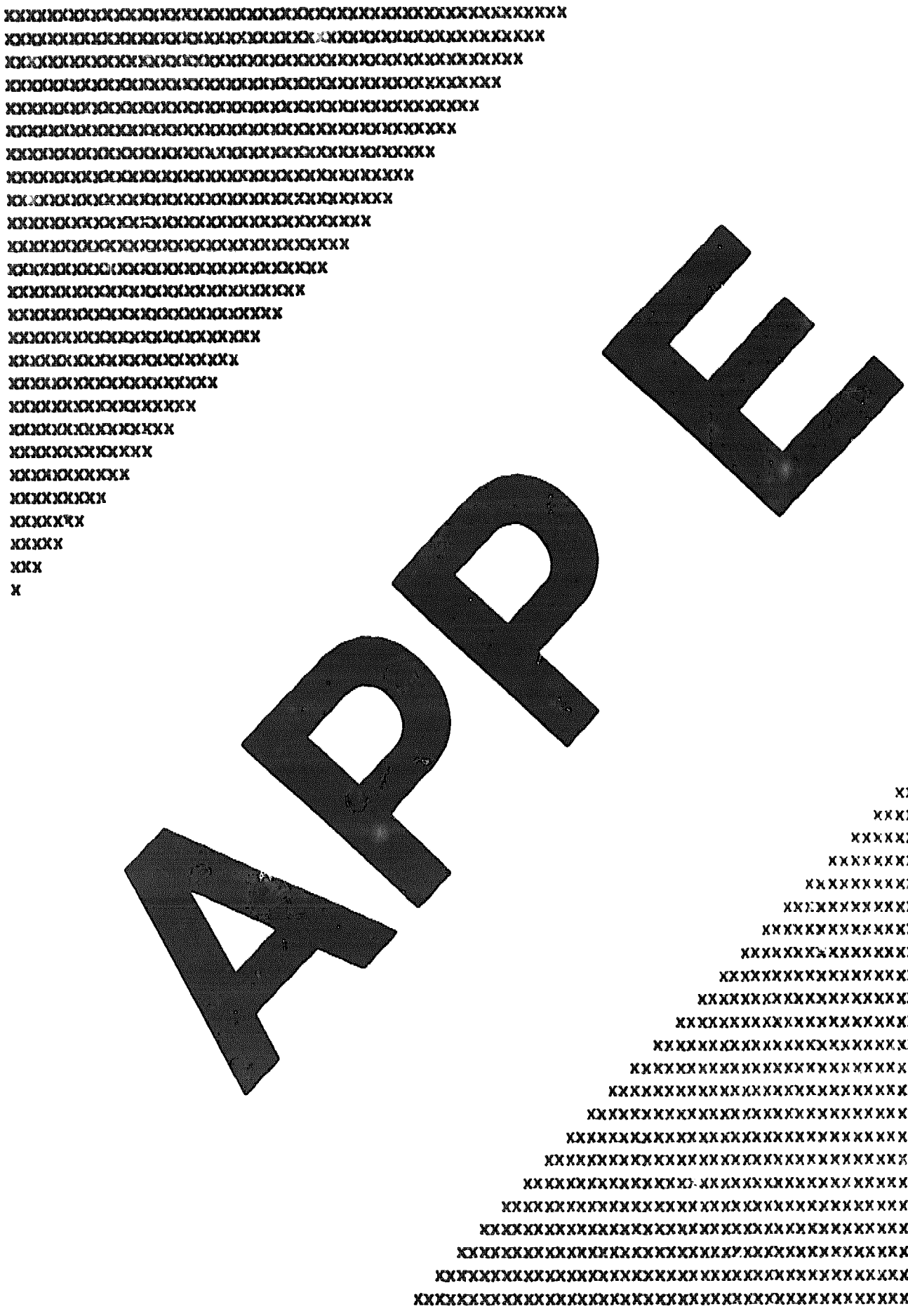
```
(LOCAL_LOOP REMOTE_LOOP EXTERNAL_LOOP INTERNAL_LOOP) [LOCAL_LOOP]:
```

4. To test port 4 using a loopback connector, type:

```
(LOCAL_LOOP          REMOTE_LOOP          EXTERNAL_LOOP          INTERNAL_LOOP)
[LOCAL_LOOP] REMOTE_LOOP
```

Self-test is now run on port 4. If the test is passed, the terminal displays:

```
Init -1208- test passed
```


APPE

E

How to Order Hardware

This appendix lists order codes for DECrouter 250 hardware-related products. See your Digital sales representative to purchase equipment.

For a listing of software options, see the DECrouter 250 *Software Product Description* that applies to your operating system.

E.1 DECrouter 250

The DECrouter 250 shipment consists of the following:

- DECrouter 250
- *DECrouter 250 Hardware Installation*
- *DECrouter 250 Identification Card*
- Rack mount kit
- BNC T-connector
- BNC 50-ohm terminators (2)
- Software License
- FTZ Card (Austria and Germany only)
- Power cord
- H3199 loopback connector
- H3266 loopback connector
- BS23V-02 cable kit

Table E–1 gives the order code for this shipment.

Table E–1: DECrouter 250

Country	Order Code
Australia	DSRVR-DZ
Belgium	DSRVR-DX
Canada (English and French)	DSRVR-DA
Denmark	DSRVR-DD
Finland	DSRVR-DX
France	DSRVR-DX
Germany	DSRVR-DX
Holland	DSRVR-DX
Italy	DSRVR-DI
Israel	DSRVR-DT
Japan	DSRVR-DA
New Zealand	DSRVR-DZ
Norway	DSRVR-DX
Spain	DSRVR-DX
Sweden	DSRVR-DX
Switzerland (French and German)	DSRVR-DK
United Kingdom	DSRVR-DE
United States	DSRVR-DA

E.2 DECrouter 250 Accessories

Table E-2 briefly describes the router's accessories and gives their order codes.

Table E-2: DECrouter 250 Accessories

Description	Order Code
Ethernet turnaround connector — For testing transceiver and transceiver cable	H4080
Etherjack kit — For covering and securing transceiver cable connections	DEXJK
Wall/partition mounting bracket kit — for mounting the DECrouter 250 to walls or office partitions	H039
Rack mount kit — For mounting the DECrouter 250 in standard rack cabinets	H041-AC

E.3 DECrouter 250 Device Cables and Adapters

Table E-3 shows the cables and adapters available to connect devices (modems and personal computers) to the DECrouter 250

Table E–3: DECrouter 250 Device Cables and Adapters

Description	Order Code
Null modem cable, 6-wire, fully shielded EIA-232-C/V.28	BC22D-YY *
Null modem cable, 10-wire, fully shielded EIA-232-C/V.28	BC17D-YY*
Full, EIA-232-C/V.28, modem cable, 25-wire, fully shielded	BC22F-YY *
Synchronous line adapter cable, DECrouter 250 to RS-422/V36	BC19B-02
Synchronous line adapter cable kit, DECrouter 250 to V.24	BS23V-02 #
Synchronous line adapter cable, DECrouter 250 to RS-423	BC19E-02
Synchronous line adapter cable, DECrouter 250 to V.35	BC19F-02
BT Kilostream adapter cable, DECrouter 250 to BT Kilostream	BC22X-02
Synchronous line extension cable, RS-422/RS-423/V 36	BC55D-XX **
Synchronous line extension cable, V.35	BC19L-XX **
X.21 modem extension cable, BT Kilostream service	BC22Z-XX **
Loopback connector for 25-pin D-connector	H3266
Universal 50-pin loopback connector	H3199
Synchronous line loopback connector (RS-423/RS-422)	H3198
Synchronous line loopback connector (V.35)	H3250
25-pin, male to MMJ (modified modular jack), adapter	H8571-A
25-pin, female to MMJ (modified modular jack), adapter	H8571-B

* YY represents one of:

10	10 ft (3.1 m)
25	25 ft (7.6 m)
35	35 ft (10.7 m)
50	50 ft (15.2 m)

** XX represents one of:

25	25 ft (7.6 m)
50	50 ft (15.2 m)
75	75 ft (22.9 m)
A0	100 ft (30.5 m)

Includes BC23V-02 cable and 12-27591-01 adapter

NOTE

The RS-232-C/EIA-232-D adapter, Digital part number 12-27591-01, can be obtained by contacting your local Digital service office.

E.4 Transceiver Cables

Use BNE3x-xx transceiver cable — available in FEP versions — in return air conduits and, in PVC versions — in nonenvironmental airspaces. The large diameter of this cable results in a lower signal cable loss per length of cable than the smaller diameter office transceiver cable. Two styles of connectors are available: a straight connector and a right-angle connector.

The following cables are available:

- BNE3A-xx PVC, straight-connector transceiver cable
- BNE3B-xx PVC, right-angle connector transceiver cable
- BNE3C-xx FEP, straight-connector transceiver cable
- BNE3D-xx FEP, right-angle connector transceiver cable
- BNE3H-xx PVC, straight-connector, 802.3-compliant transceiver cable
- BNE3K-xx PVC, right-angle connector, 802.3-compliant transceiver cable
- BNE3L-xx FEP, straight-connector, 802.3-compliant transceiver cable
- BNE3M-xx FEP, right-angle connector, 802.3-compliant transceiver cable

The above cables are available in 5 meters (16.4 feet), 10 meters (32.8 feet), 20 meters (65.6 feet), and 40 meters (131.2 feet) lengths.

Use BNE4x-xx office transceiver cable — available in PVC versions — in nonenvironmental airspaces. The smaller diameter of this cable makes it ideal for use in office environments; however, the smaller diameter results in a cable signal loss that is four times greater than that of BNE3x-xx transceiver cables. Two styles of connectors are available: a straight connector and a right-angle connector.

The following cables are available:

- BNE4A-xx PVC, straight-connector transceiver cable
- BNE4B-xx PVC, right-angle connector transceiver cable
- BNE4C-xx PVC, straight-connector, 802.3-compliant transceiver cable
- BNE4D-xx PVC, right-angle connector, 802.3-compliant transceiver cable

The preceding cables are available in 2 meters (6.6 feet) and 5 meters (16.4 feet) lengths.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