

INSTALLATION  
GUIDE

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# **Wellfleet Installation Guide**

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Please address questions about technical matters to our 24-Hour Customer Support Line:

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# FCC Compliance Notices

The following notices regarding compliance with Federal Communications Commission Rules pertain to the Feeder Node (FN), the Link Node (LN), and the Concentrator Node (CN).

## Radio Frequency Energy

This equipment generates, uses, and can radiate radio frequency energy. If you do not install and use this equipment according to the instruction manual, this product may interfere with radio communications. This product has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC Rules; compliance with these limits provides reasonable protection against radio interference when such equipment is operated in a commercial environment. Operating this equipment in a residential area is likely to interfere with radio communications; in which case, the user, at his own expense, must correct the interference.

Wellfleet shielded cables must be used with this unit to ensure compliance with the Class A limits.

## T1 Service

### **NOTE**

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The T1 Service notice applies to you *only* if you received a Channel Service Unit (CSU). If you received a CSU, you must also complete the affidavit in the rear pocket of this guide.

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The following notice regarding FCC compliance pertains to the Channel Service Unit (CSU). Refer to the packing list attached to the outside of the shipping carton to determine if you received a CSU.

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This equipment complies with Part 68 of FCC Rules. Please note the following:

1. **You are required to request T1 service from the telephone company before you connect the CSU to a T1 network. When you request T1 service, you must provide the telephone company with the following data:**
  - ◆ The Facility Interface Code  
Provide the telephone company with both codes below:
    - ◆ 04DU9-B (1.544 MB D4 framing format)
    - ◆ 04DU9-C (1.544 MB ESF format)The telephone company will select the code it has available.
  - ◆ The Service Order Code: 6.0F
  - ◆ The required USOC jack: RJ48C
  - ◆ The make, model number, and FCC Registration number of the CSU. This information is printed on the label at the rear of the FN, LN, and CN.
2. **Your telephone company may make changes to its facilities, equipment, operations, or procedures that could affect the proper functioning of your equipment. The telephone company will notify you in advance of such changes to give you an opportunity to maintain uninterrupted telephone service.**
3. **If your CSU causes harm to the telephone network, the telephone company may temporarily discontinue your service. If possible, they will notify you in advance, but if advance notice is not practical, you will be notified as soon as possible and will be informed of your right to file a complaint with the FCC.**
4. **If you experience trouble with the CSU, please contact Wellfleet Customer Support (at the address or telephone number on the copyright page of this guide) for service or repairs. Repairs should be performed only by service personnel authorized by Wellfleet Communications, Inc.**
5. **You are required to notify the telephone company when you disconnect the CSU from the network and when you disconnect the FN, LN, or CN from the network.**

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# Canadian Department of Communications Radio Interference Regulations

These digital apparatuses (the Feeder Node, Link Node, and Concentrator Node) do not exceed the Class A limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique (le Feeder Node, le Link Node, et le Concentrator Node) n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe A prescrites dans Le Règlement sur Le Brouillage Radioélectrique Édité par Le Ministère des Communications du Canada.

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# VDE Limit B Requirements

Hiermit wird bescheinigt, daß das **Datenverarbeitungsgerät Feeder Node** in Übereinstimmung mit den Bestimmungen der Vfg 1046/1984 funk-entstört ist. Der Deutschen Bundespost wurde das Inverkehrbringen des Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

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# United Kingdom Requirements

The port indicated by “Printer,” “Console,” “Modem,” and all ports on all other interface cards do not provide isolation sufficient to satisfy the relevant parts of BS6301. Apparatus connected to these ports must have either been approved to the relevant parts of BS6301 or have previously been evaluated against British Telecom (Post Office) Technical Guides 2 or 26 and given permission to attach. Other usage will invalidate any approval given to this apparatus.

## E1 Framer Card

Use of the E1 framer card within the United Kingdom is subject to the following restrictions:

(a) The E1 framer card is approved for connection only to the relevant branch systems for private digital circuits of Service Category 1 at a data rate of 2048 kbps. Connection to these circuits is to be made by 75 ohm BNC plugs.

(b) The E1 framer card is approved for use when installed in one of the following approved Hosts:

Feeder Node  
Link Node  
Concentrator Node

Any other usage will invalidate any approval given to the E1 framer card.

(c) When the E1 framer card is configured to generate its output port timing from the input port, only one end of a point-to-point connection through the network can be timed from the input port signal. The E1 framer card is only approved when used with equipment at the remote end of the digital circuit that complies with a limit on output jitter of 1.06 UI, where the timing is derived from the input signal, or 0.4 UI, where the timing is derived from an internal source.

(d) For initial installation, the outer conductors of coaxial cables should be connected as follows: the outer conductor of the coaxial cable pair connecting the E1 framer card’s transmit cable to the digital circuit shall be connected to the signal earth at the card, and the outer conductor of the coaxial cable pair connecting the E1 framer card’s receive cable to the digital circuit shall be isolated from the card.

- 
- (e) If any other apparatus, including cable or wiring, is to be connected between the E1 framer card and the point of the connection to any particular digital circuit, then all of the other apparatus shall conform to the following:
- (1) The overall transmission characteristics of all that other apparatus shall be such as to introduce degradation no greater than the following: attenuation according to a  $(f)^{1/2}$  law and the loss at a frequency of 1024 kHz shall not exceed 6 dB, or any lesser amount of degradation due to clocking the transmit signal from the input port, upon the electrical conditions presented to one another by the E1 framer card and the particular digital circuit.
  - (2) All the other apparatus shall comprise only:
    - ◆ apparatus approved (subject to the limitations on its use) for the purpose of connection between the E1 framer card and a particular digital circuit
    - ◆ cable or wiring complying with a code of practice for the installation of this type of apparatus or such other requirements as may be applicable

## DSDE II Card

Use of the DSDE II card within the United Kingdom is subject to the following restrictions:

The DSDE II card is approved for use when installed in one of the following approved Hosts:

Feeder Node  
Link Node  
Concentrator Node

Any other usage will invalidate any approval given to the DSDE II card.

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# Preface

This guide describes how to install and boot the Feeder Node (FN), Link Node (LN), or Concentrator Node (CN). This guide is current for Release 5.70.

## Audience

This guide is intended for experienced technicians who will be installing Wellfleet routers.

## Organization

This guide contains the following chapters:

### *Preparing for Installation*

Describes how to inspect your shipment and verify that your site meets all requirements for the router. This chapter also lists the tools you need.

### *Installing the Router*

Describes how to install the router in an electronic enclosure rack and cable the router to a console and a modem.

### *Booting the Router*

Describes how to start up the router using the system software to ensure that it is operating properly.

### *External Cables*

Describes the external cables you need to link Wellfleet systems to local or wide area network devices.

### *Changing the Fuse*

Describes how to change the fuse if your FN or LN has AC power but will not power on.

## Related Documents

This manual is part of a Wellfleet document set, which includes the following documents:

### *Operator's Guide*

Explains how to operate the router; includes information on the Network Command Language Interpreter and the system information base; lists all event messages generated during system operations.

### *Configuration Guide*

Explains how to configure the printed circuit boards, create a *config* file, and configure a network; includes information on configuring a network's current topology and future changes.

The following documents are also included when the appropriate software is ordered:

### *NCU User's Guide*

Explains how to use the Network Configuration Utility (NCU) to configure your Wellfleet router.

### *SNMP-NMS User's Guide*

Explains how to install and use the Simple Network Management Protocol-Network Management Software (SNMP-NMS) to manage local area networks (LANs) and wide area networks (WANs).

# 1 Preparing for Installation

This chapter describes how to inspect your shipment and how to ensure that your site meets all requirements for your Wellfleet router. This chapter also lists the installation equipment you need. Follow the instructions in this chapter before installing the router.

Your shipment includes a Feeder Node (FN), Link Node (LN), or Concentrator Node (CN) (see Figure 1-1). Refer to the following sections to inspect your shipment and prepare for router installation.



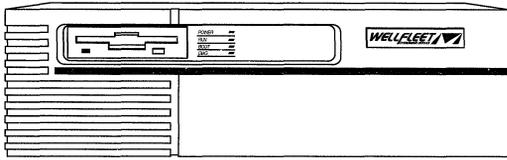
## **DANGER**

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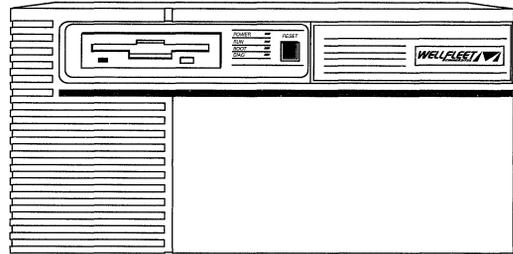
**Due to high-energy hazards, only personnel with written authorization from Wellfleet Communications are permitted to service a Wellfleet router. This router contains no user-serviceable parts. Do not attempt to disassemble this product. Do not remove the aluminum Radio-Frequency Interference (RFI) shield or power-supply screens behind the front cover. Do not remove the modules in the rear of the unit.**

**The FN and LN are *not* designed for use with an I.T. power system (a power distribution system that has no direct connection to earth); the exposed conductive parts of the FN and LN are grounded.**

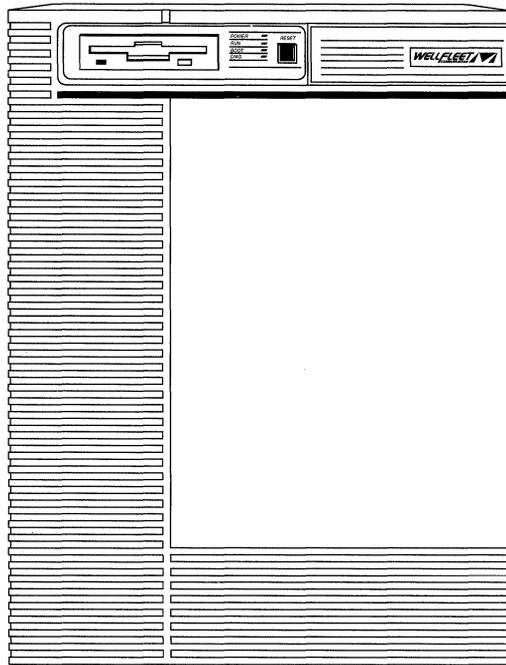
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Feeder Node (FN)



Link Node (LN)



Concentrator Node (CN)

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**Figure 1-1 Wellfleet Routers**

## 1.1 Inspecting your Shipment

This section tells you what your shipment should contain when you order a router.

Verify that the items in the shipment match the items listed in the packing list affixed to the shipping container. The items in the shipment include:

- ◆ One FN, LN, or CN (see Figure 1-1).
- ◆ The documentation: this manual, the *Operator's Guide, Configuration Guide*, and Survey Card.
- ◆ Two system diskettes (located in a plastic pocket at the back of this manual)
- ◆ One rack-mount hardware package containing four 10-32 x .5-in. panel-mount screws and four 10-32 cage nuts. (Two packages are included with the CN.)



FN and LN shipments also include a power cord. (The power cord is already attached to the CN.)

FN shipments also include a hardware package for attaching the front of the FN to an electronic enclosure rack. This package contains two flanges and four 8-32 flat head screws. (LNs and CNs are shipped with the flanges attached.)

CN shipments include a hardware package for attaching brackets to a rack to support the base of the CN. (The package is optional with the LN.) The package contains two rack-mount brackets, four 10-32 x .5-in. panel-mount screws, and four 10-32 cage nuts.

Ensure that you received the correct cables. Appendix A, *External Cables*, lists the cables available from Wellfleet.

If you ordered an LN with a table-top enclosure, you can identify the enclosure easily: table-top enclosures have slotted holes on the left side; standard rack-mount enclosures have circular screens on the left side (see Figure 1-2).

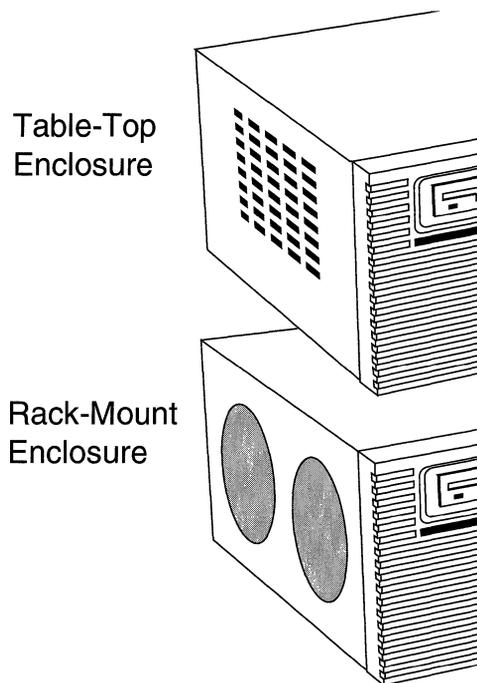
Inspect all items for any damage that may have occurred during shipment. In particular, ensure that the floppy disk drive on the front panel and the ports on the rear panel are not damaged.

### CAUTION

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**Do not attempt to install the router if you detect any damage. If items are missing or damaged, contact Wellfleet Customer Support at the address or telephone number on the copyright page of this guide.**

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**Figure 1-2 LN Enclosures**

## **1.2 Site Requirements**

Before installing your router, refer to the sections that follow to ensure that your site meets all air plenum, electrical, and environmental requirements.

## 1.2.1 Air Plenum Requirements

To ensure adequate cooling of a router, ensure that the area surrounding the router meets the minimum air plenum (volume of free space needed for cooling). Refer to Table 1-1 for the required and recommended air plenum requirements.

**Table 1-1 Air Plenum Requirements**

Router	Location	Required Air Plenum	Recommended Air Plenum
FN	Rear of FN	6 in. (15.3 cm)	6 in. (15.3 cm)
	Right of FN	2 in. (5 cm)	3 in. (7.6 cm)
LN	Right of LN	2 in. (5 cm)	3 in. (7.6 cm)
	Left of LN	2 in. (5 cm)	3 in. (7.6 cm)
CN	Top of CN	3.5 in. (9 cm)	6 in. (15.3 cm)
	Front of CN	2.5 in. (6.4 cm)	4 in. (10.2 cm)
	Rear of CN	2.5 in. (6.4 cm)	4 in. (10.2 cm)

Table 1-2 lists the dimensions of each router. Add the dimensions to the required or recommended air plenum listed in Table 1-1 to determine the total space needed for your router.

**Table 1-2 Router Dimensions**

Router	Height	Depth	Width
FN	5.2 in. (13.2 cm)	18 in. (45.7 cm)	17.5 in. (44.5 cm)
LN	8.7 in. (22.1 cm)	19.7 in. (50 cm)	19 in. (48.3 cm)
CN	24.4 in. (62 cm)	19.7 in. (50 cm)	19 in. (48.3 cm)

## 1.2.2 Electrical Requirements

Before installing your router, ensure that your site meets the electrical requirements specified in this section.

Refer to Table 1-3 to ensure that your site meets the electrical requirements for your router.

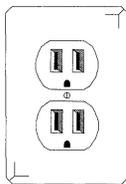
**Table 1-3 Electrical Requirements**

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<b>Router</b>	<b>Power Requirements</b>	<b>Proximity to Wall Receptacle</b>
FN	100 - 120 VAC at a minimum of 3.15 A <i>or</i> 200 - 240 VAC at a minimum of 1.60 A	Within 1.8 m (6 ft) of the FN
LN	100 - 120 VAC at a minimum of 6A <i>or</i> 200 - 240 VAC at a minimum of 3A	Within 1.8 m (6 ft) of the LN
CN	100 - 120 VAC at a minimum of 18 A <i>or</i> 200 - 240 VAC at a minimum of 9 A	Within 1.5 m (5 ft) of the CN

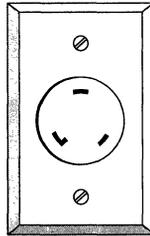
The wall receptacle (electrical outlet) must also meet the specification requirement for your router as follows:

- ◆ If you are installing an LN or an FN in the United States or Canada, you need a National Electrical Manufacturers Association (NEMA) 5-15R standard receptacle:



- ◆ If you are installing an LN or FN in a country other than the United States or Canada, your router distributor attaches the necessary plug to the power cable and informs you of the receptacle you need.

- ◆ If you are installing a CN in the United States or Canada, you need a National Electrical Manufacturers Association (NEMA) L5-30R standard receptacle:



- ◆ If you are installing a CN in a country other than the United States or Canada, your CN distributor will attach the necessary plug to the power cable and inform you of the receptacle you need.

### 1.2.3 Environmental Requirements

Before installing your router, ensure that your site meets the environmental requirements listed in Table 1-4. The environmental requirements are the same for all Wellfleet routers.

**Table 1-4 Environmental Requirements**

---

Altitude	Humidity	Temperature
0 - 2400 m (0 - 8000 ft)	10% - 90% Non-condensing	0 - 40°C (32 - 104°F) stable

## 1.3 Equipment You Need

To install your router, you need the following equipment:

- ◆ A DEC VT-100, VT-220, or compatible console
- ◆ A shielded console cable (only if you did not order one from Wellfleet Communications). Refer to Appendix A, *External Cables*, for cable information.
- ◆ An electronic enclosure rack (required for the CN, and optional for the FN and LN). This rack must meet the following specifications:
  - ◆ Heavy duty steel construction
  - ◆ Electronic Industries Association (EIA) standard hole spacing
  - ◆ Width: 19 in. (48.26 cm)
  - ◆ Depth: 24 in. (60.96 cm)
  - ◆ (CN Only) Vertical space (height) totaling 28 in. (71 cm) to accommodate the CN and the space required above the CN

### **WARNING**

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**If the electronic enclosure rack is equipped with panels, doors, or a top panel, they must be louvered or screened to prevent overheating.**

---

You need a tape measure and a phillips screwdriver to install the router in a rack.

After ensuring that your site meets all requirements and that you have all necessary equipment, proceed to Chapter 2, *Installing the Router*.

## 2 Installing the Router

This chapter describes how to install the router in an electronic enclosure rack and cable the router to a console and a modem.

If you are installing your router in an electronic enclosure rack, refer to the appropriate section:

Section	Page
Installing the FN in a Rack	2-2
Installing the LN in a Rack	2-4
Installing the CN in a Rack	2-8

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### **WARNING**

**Refer to the section *Air Plenum Requirements* on page 1-5 to verify that you have adequate space for heat exhaust before installing your router. These requirements apply to both table top and rack-mount models.**

**If you are installing a CN, you must mount it to an electronic enclosure rack.**

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If you are installing an LN that is equipped with a table-top enclosure, simply place the LN on a desk or table. Ensure that your site complies with the requirements specified in the section *Site Requirements* on page 1-4. Then proceed to *Cabling a Console to the Router* on page 2-12.

## 2.1 Installing the FN in a Rack

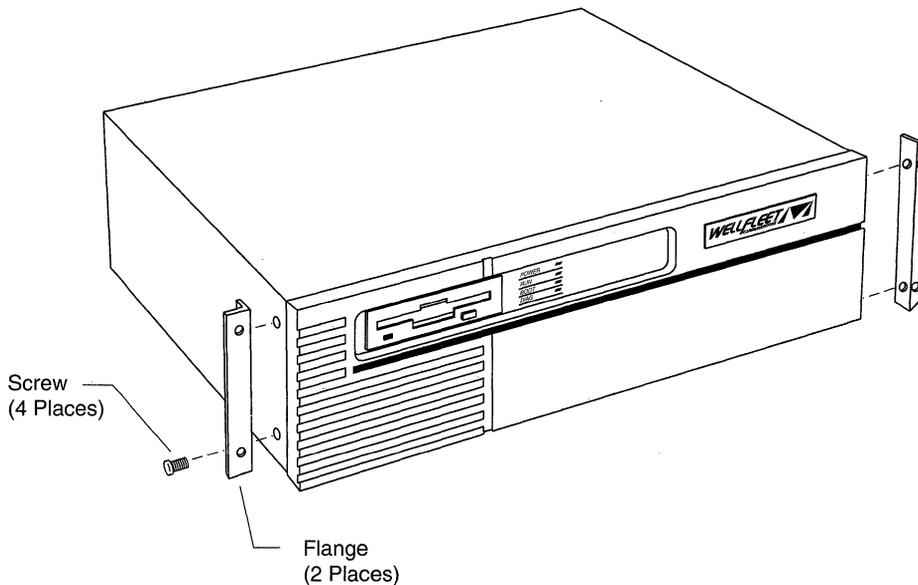
Installing the FN in a rack is optional. You install the FN in a rack as follows:

### **WARNING**

**Refer to *Air Plenum Requirements* on page 1-5 to verify that you have adequate space for heat exhaust before installing your FN.**

---

1. **Attach each flange to the front of the FN as follows (see Figure 2-1):**
  - a. Align the holes in the flange with the mounting holes on the sides of the FN.
  - b. Place one 8-32 flat head screw through each hole in the flange and into the FN.
  - c. Tighten the screws with a phillips screwdriver until they are secure.



**Figure 2-1 Attaching Flanges to the FN**

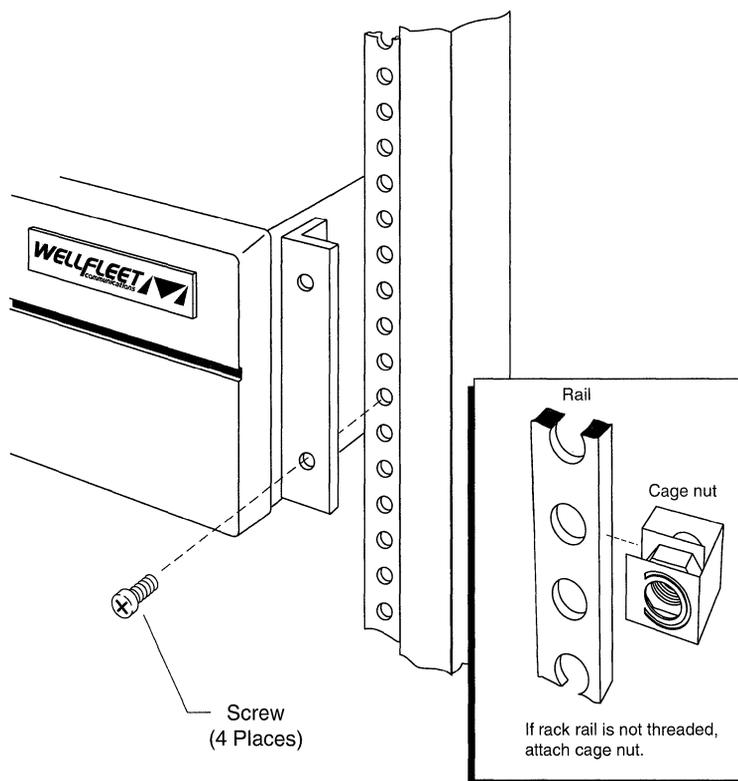
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2. **Place the FN in the rack (see Figure 2-2).**
3. **Align the holes in the flanges with the holes in the front vertical supports of the rack.**

If the holes in the rack are *not threaded*, place cage nuts over the four holes in the front vertical supports of the rack.

4. **Insert a 10-32 screw through both holes in each flange and into the corresponding holes in the front vertical supports of the rack.**
5. **Tighten the screws with a phillips screwdriver until secure.**

After you install your FN in the enclosure rack, proceed to *Cabling a Console to the Router* on page 2-12.



**Figure 2-2 Installing the FN in an Enclosure Rack**

## 2.2 Installing the LN in a Rack

This section describes how to attach angle brackets to a rack to support an LN and how to insert the LN into a rack.

Installing the LN in a rack is optional. If you are placing your LN on a desk or table, review the following warning; then proceed to the section *Cabling a Console to the Router* on page 2-12.

### **WARNING**

---

**Refer to *Air Plenum Requirements* on page 1-5 to verify that you have adequate space for heat exhaust before installing your LN.**

---

Wellfleet suggests that you place your router on angle brackets for added support when installing your LN in a rack. Attach angle brackets as follows (see Figure 2-3):

**1. Measure at least 8.7 in. (22.1 cm) of free, vertical space inside the rack.**

If the holes in the rails beneath this measurement are not threaded, insert four cage nuts over the holes before you attach the angle brackets.

**2. Insert each angle bracket inside the rack and attach it to the sides, below the space you measured in step 1, as follows:**

a. Align the edge of the bracket to the rack:

- ◆ If the interior of the rack is equipped with horizontal bracket supports, align the angle bracket with the horizontal bracket support.
- ◆ If the interior of the rack is *not* equipped with horizontal bracket supports, brace the angle bracket between the side rails.

The edge of the bracket that will support the router should be above the edge aligned with the rack. Ensure that the bracket can be adjusted vertically along its slots before securing it.

b. Insert two 10-32 screws through the bracket's slotted holes and into the holes in the supports of the rack. Do not tighten the screws.

**3. Adjust each bracket vertically along the bracket slots until the bracket is 1.2 in. (3.1 cm) below the center of one hole in the front vertical support of the rack.**

**4. Tighten the screws with a phillips screwdriver until secure.**

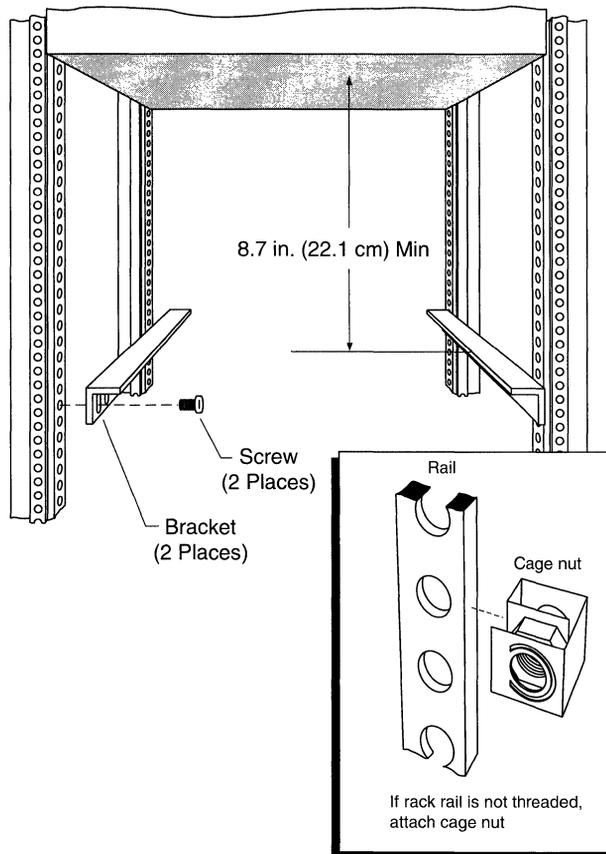


Figure 2-3 Attaching LN Brackets

## **WARNING**

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**Two people are needed to insert the LN into the rack.**

---

Insert the LN in a rack as follows (see Figure 2-4):

**1. Remove the front panel of the LN:**

- a. Grasp the front panel by its sides.
- b. Gently pull the front panel off the LN.

**2. Insert the LN in the rack.**

If you attached angle brackets to support the LN, place the LN squarely on the angle brackets.

**3. Align the slots in the left- and right-front flanges of the LN with the holes in the front vertical supports of the rack.**

If the holes in the rack are *not threaded*, attach four cage nuts to the holes behind the slots in the two front vertical supports.

**4. Insert four screws through the slots in the flanges of the LN and into the corresponding holes in the two front vertical supports.**

**5. Tighten the screws with a phillips screwdriver until secure.**

**6. Replace the front cover by aligning the ball and socket receptacle and pushing the cover gently.**

You can now proceed to the section, *Cabling a Console to the Router* on page 2-12.

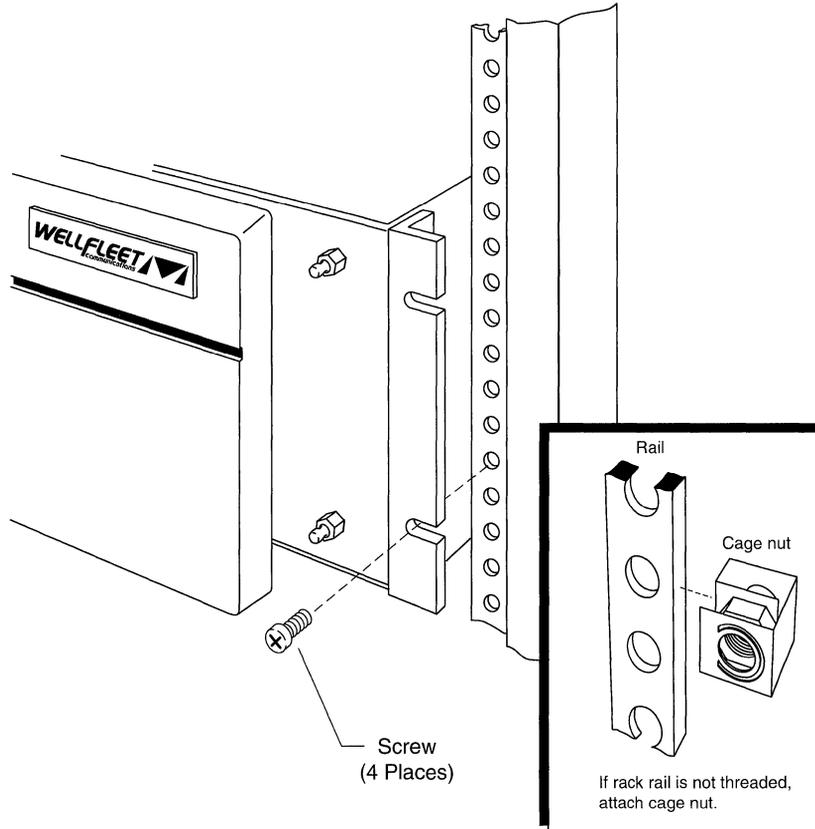


Figure 2-4 Installing the LN in an Enclosure Rack

## 2.3 Installing the CN in a Rack

This section describes how to attach angle brackets to the rack to support the CN and how to insert the CN into a rack.

### **WARNING**

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**Refer to *Air Plenum Requirements* on page 1-5 to verify that you have adequate space for heat exhaust before installing your CN.**

---

You attach angle brackets to the rack as follows (see Figure 2-5):

**1. Measure at least 28 in. (71 cm) of free, vertical space inside the rack.**

If the holes in the rails beneath this measurement are not threaded, insert four cage nuts over the holes before you attach the angle brackets.

**2. Insert each angle bracket inside the rack and attach it to the sides, below the space you measured in step 1, as follows:**

a. Align the edge of the bracket to the rack:

- ◆ If the interior of the rack is equipped with horizontal bracket supports, align the angle bracket with the horizontal bracket support.
- ◆ If the interior of the rack is *not* equipped with horizontal bracket supports, brace the angle bracket between the side rails.

The edge of the bracket that will support the router should be above the edge aligned with the rack. Ensure that the bracket can be adjusted vertically along its slots before securing it.

b. Insert two 10-32 screws through the slotted holes in the bracket and into the holes in the supports of the rack. Do not tighten the screws.

**3. Adjust each bracket vertically along the bracket slots until the bracket is 1.4 in. (3.6 cm) below the center of one hole in the front vertical-support of the rack.**

**4. Tighten the screws with a phillips screwdriver until secure.**

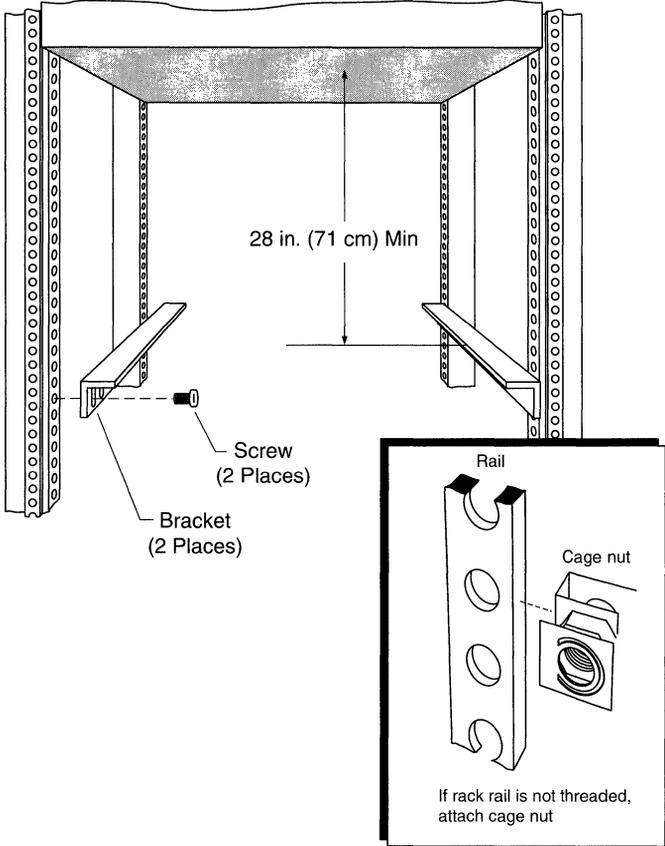


Figure 2-5 Attaching CN Brackets

Insert the CN in the rack as follows (see Figure 2-6):



---

## **DANGER**

**The CN weighs approximately 145 lb. Two people should lift and insert the CN.**

**Before inserting the CN in the rack, ensure that any equipment inside the rack is secure.**

---

- 1. Remove the front panel of the CN:**
  - a. Grasp the front panel by its sides.
  - b. Gently pull the front panel off the CN.
- 2. Insert the CN into the rack and place the CN squarely on the angle brackets.**
- 3. Align the slots in the left- and right-front flanges of the CN with the holes in the front vertical supports of the rack.**

If the holes in the rack are not threaded, attach eight cage nuts to the holes behind the slots in the two front vertical supports.
- 4. Insert eight screws through the slots in the flanges of the CN and into the corresponding holes in the two front vertical supports.**
- 5. Tighten the screws with a phillips screwdriver until secure.**
- 6. Replace the front cover of the CN: align the front cover with the CN and push the front cover gently.**

After you have inserted your CN in the enclosure rack, proceed to the section that follows to cable the CN to the console and a modem.

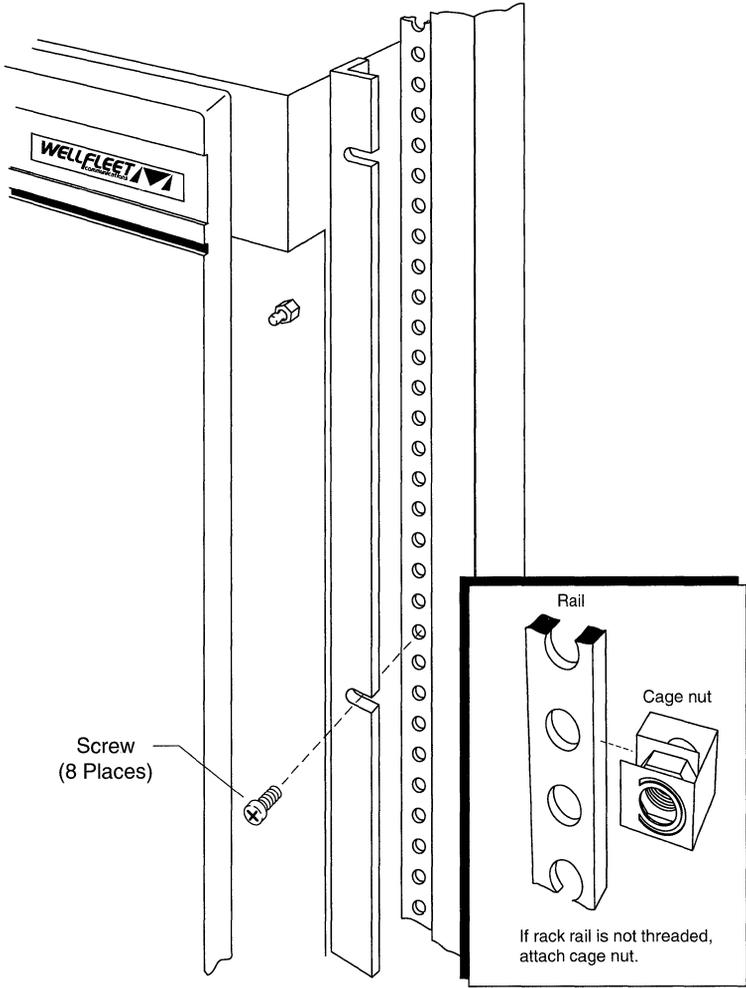


Figure 2-6 Installing the CN in an Enclosure Rack

## 2.4 Cabling a Console to the Router

This section describes how to cable the system console to a router. Wellfleet offers a cable (Model Number 7525) for this application. Refer to Table A-13 for cable information and to Figure 2-7 for an illustration of the cable connections.

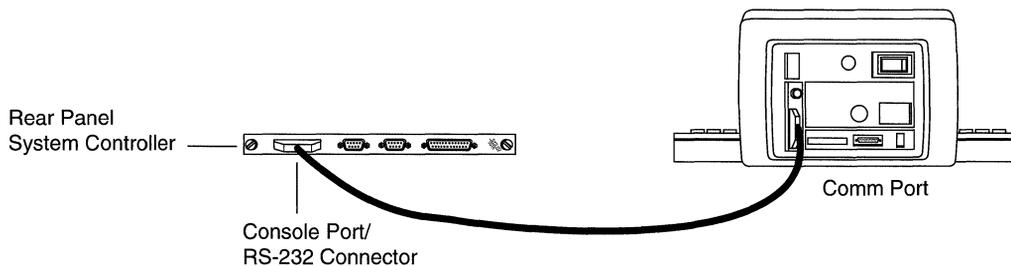
Cable the console to the router as follows:

1. **Power on the console and set its operating parameters (see Table 2-1). (Refer to your console user manual for instructions on setting operating parameters.)**

**Table 2-1 Console Operating Parameters**

Parameter	Value
Baud Rate	9600 (or less)
Start Bits	1
Stop Bits	2
Parity	none
Flow Control	Xon/Xoff
Wrap	off

2. **Insert the male end of the cable into the CONSOLE port of the System Controller board. This board is in the first slot of the router's rear panel.**
3. **Insert the female end of the cable into the communications port at the back of the console.**



**Figure 2-7 Cabling the Console**

## 2.5 Cabling a Modem to the Router

This section describes how to cable a modem to the router to enable remote dial-in access. This procedure is optional. If you do not wish to enable remote dial-in access to the router, proceed to Chapter 3, *Booting the Router*.

Wellfleet routers work with any Hayes-compatible modem. Wellfleet offers a cable (Model Number 7825) for connecting a Hayes-compatible modem to the router. Refer to Table A-16 for cable specifications.

Cable the modem to the router as follows:

1. **Power on and configure the modem (see Table 2-2). (Refer to the modem user documentation for instructions on configuring your modem):**

**Table 2-2 Modem Operating Parameters**

Parameter	Value
Baud Rate	9600 or less
Auto Answer	Set on <b>n</b> ring(s) with DTR active ( <b>n</b> must be greater than 0)
Clear to Send (CTS) Signal	Always on
Data Terminal Ready (DTR) Signal	DTR Signal fail-disconnect enabled (return to command mode, auto-answer off)
Data Carrier Detect (DCD) Signal	DCD Signal on while carrier present (the router uses DCD to detect modem disconnect)
Local Character Echo	Off
Supervisory Functions	Off
Data Set Ready (DSR) Signal	On

2. **Insert the 9-position D-sub plug located at one end of the modem cable into one of the two ports labeled MODEM1 or MODEM2 on the System I/O board at the back of the router.**
3. **Insert the 25-position D-sub plug located at the other end of the modem cable into the RS-232 data communications port at the back of the modem.**

The *Configuration Guide* describes how to configure the router for modem operation. Before referring to the configuration instructions, follow the instructions in the next chapter to ensure that your router starts up properly.



# 3 Booting the Router

This chapter describes how to start up the router to ensure that it is operating properly.

This process consists of the following steps:

1. Powering on the router
2. Loading the system software

Once the router is up and running, you can configure it for your network. After you finish this chapter, refer to the *Configuration Guide* and *Operator's Guide* for further instructions.

## 3.1 Powering on the Router

This section describes how to power on the router and describes the function of the Light Emitting Diodes (LEDs) located on the front panel of each router.

Power on the router as follows:

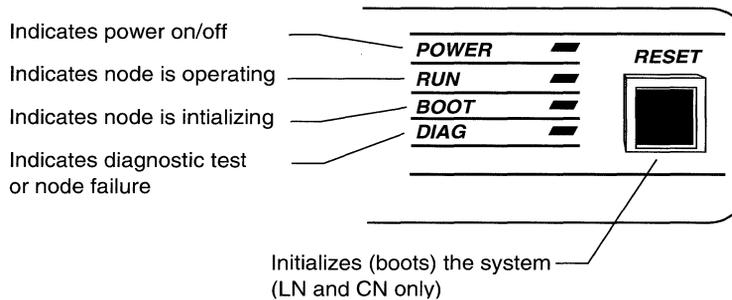
- 1. Ensure that the power switch on the rear panel is in the off position.**
- 2. Connect the power cable to the power switch assembly on the rear panel of the router (FN and LN only).**
- 3. Insert the power plug into the required receptacle identified in the section *Electrical Requirements* on page 1-6.**
- 4. Turn the power switch to the on position.**

The fans in the router will generate a constant humming sound as they spin.

- 5. Verify that air is flowing from the router.**

Pass your hand along the left side of the router to feel the air movement.

When you power on the router, the system automatically initiates a 1- to 4-minute diagnostic test to verify that the boards are functioning properly. The Light Emitting Diodes (LEDs) on the front panel of the router indicate the status of the router (see Figure 3-1).



---

**Figure 3-1 Front Panel LEDs**

The **POWER** and **DIAG** LEDs indicate the diagnostic test is in progress. After a successful test, the **DIAG** LED turns off, the **POWER** LED remains lit, and the **RUN** and **BOOT** LEDs light. You can now proceed to the next section to load the system software.

When you power on the router, if you cannot feel air flow from the vents, and the **POWER** and **DIAG** LEDs do not light or the **DIAG** LED does not turn off, turn the power switch at the rear of the router to the off position. Wait one minute and then turn the power switch to the on position. If the problem reoccurs, contact Wellfleet Customer Support at the address or telephone number on the copyright page of this guide.

If your FN or LN has AC power but will not power on, you may need to change the fuse. (The CN is equipped with a circuit breaker next to the power cord.) See Appendix B, *Changing the Fuse*, for instructions.

## 3.2 Loading the System Software

This section describes how to load the system software onto the router.

Use the two system diskettes (located in a plastic pocket at the back of this guide) as follows:

- ◆ Use one diskette to boot the system and to record data.
- ◆ Reserve the other diskette as a backup.

Never insert the backup diskette into the router's disk drive. If you need to use the backup diskette, first make a copy of it on a personal computer; then insert the copy into the router's disk drive.

When the router automatically completes the automatic power-up diagnostic test, the **POWER**, **RUN**, and **BOOT** LEDs light. You can then load the software as follows:

1. **Ensure that the console is on and that the brightness control is turned up.**
2. **Insert the system diskette into the floppy-disk drive.**

The disk drive LED lights while the system loads the software. If the router is *not* configured (using the Configuration process described in the *Configuration Guide*), booting takes one to four minutes. If the router is already configured, booting can take up to ten minutes, depending on your system's configuration.

The Main Menu appears on the screen before the software is fully loaded (see Figure 3-2). The software is fully loaded when the disk drive and **BOOT** LEDs turn off, and only the **POWER** and **RUN** LEDs remain lighted.

```
Wellfleet Communications, Inc. NULL_CONFIG 01-Jan-1992 8:44:12
-----
                        SESSION 1
                        Main Menu
-----

      1.  Statistics Screen Menu
      2.  Network Control Language Interpreter
      3.  Configuration Editor
      4.  Event Log
      5.  LOGOUT

PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
```

Figure 3-2 Main Menu

### WARNING

Once you boot the system, *do not* remove a diskette from the disk drive without first issuing the NCL command `remove` (refer to the *Operator's Guide* for information on NCL commands).

### **3.3 What to Do Next**

The installation process is complete when the system software is loaded.

You can now configure the router to function on your network. Refer to the *Configuration Guide* for instructions.

# A External Cables

This appendix describes the external cables that link Wellfleet systems to local- or wide-area network devices.

Table A-1 lists the external cables that connect a Wellfleet router to external devices, Ethernet transceivers, customer premises equipment, T-carrier lines, and a system console. In addition, Wellfleet offers a cross-over cable for technicians and engineers to connect synchronous ports of two Wellfleet systems for network simulation and/or testing.

Tables A-2 through A-16 describe the cables as follows:

- ◆ Shows the pinout for each connector and all associated signals (except for the FDDI cables, which have no wire connections)
- ◆ Identifies wire jumpers at either connector (when applicable)  

For example, Table A-6 lists local wire connections “Pin 9 -> 7 -> 1” under the Wellfleet Termination column. This indicates that pin 9 is wired to pin 7 and pin 7 is wired to pin 1, all within the Wellfleet connector. Table A-6 indicates Pin 1 carries Signal Ground; pins 9 and 7 therefore also carry Signal Ground. Pin 1 is connected to two wires: one is connected to pin 7 and the other is connected to pin B at the other (V.35) termination. Table A-9 does not list Wellfleet pins 7 and 9 in the pinout list because they are not wired to the other termination.
- ◆ Illustrates the Wellfleet connector on the left and the other connector on the right
- ◆ Specifies the cable length  

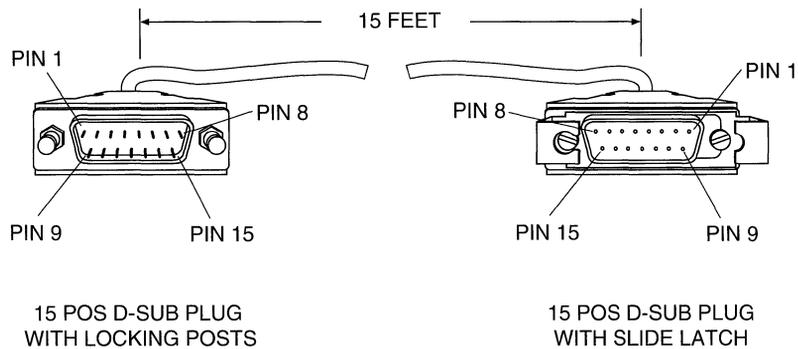
If you want to build longer cables, consult the appropriate standards to determine maximum cable lengths.
- ◆ Specifies the grounding arrangements that isolate the chassis from the DC ground within the cable

**Table A-1 External Cables**

<b>Model</b>	<b>Length</b>	<b>Connection</b>
7115	15 ft	Ethernet/802.3 Intelligent Link Interface (ILI) (labeled <b>XCVR1</b> or <b>XCVR2</b> ) to AUI connector for attachment to Ethernet transceiver
7125	5 ft	Token Ring/802.5 ILI to Token Ring Media Access Unit (Shielded Twisted Pair cable)
7128	15 ft	Shielded Twisted Pair to Unshielded Twisted Pair media filter cable (for Token Ring)
7135	10 m	FDDI ILI to FDDI ring (Multimode fiber extension cable with Fixed Shroud Duplex [FSD-to-FSD] connectors). Two are required for dual attachment to the FDDI ring.)
7136	10 m	FDDI ILI to FDDI ring (Multimode fiber extension cable with Fixed Shroud Duplex [FSD]-to-ST connectors). Two are required for dual attachment to the FDDI ring.)
7215	15 ft	Synchronous ILI (labeled <b>COM1</b> , <b>COM2</b> , <b>COM3</b> , or <b>COM4</b> ) to V.35 interface (for wide-area network [WAN] connections)
7221	15 ft	Synchronous ILI (labeled <b>COM1</b> , <b>COM2</b> , <b>COM3</b> , or <b>COM4</b> ) to X.21 interface (for WAN connections)
7255	15 ft	Synchronous ILI (labeled <b>COM1</b> , <b>COM2</b> , <b>COM3</b> , or <b>COM4</b> ) to RS-232 interface (for WAN connections)
7260	15 ft	Wellfleet-to-Wellfleet Synchronous cross-over (for back-to-back node operation)
7315	15 ft	Synchronous ILI (labeled <b>COM1</b> , <b>COM2</b> , <b>COM3</b> or <b>COM4</b> ) to RS-449/422 interface (for WAN connections)
7401	10 in.	T1 Framer ILI (labeled <b>DSX-1</b> or <b>DSX-2</b> ) to the <b>DTE</b> port of the Channel Service Unit (CSU)
7415	15 ft	T1 Framer ILI (labeled <b>DSX-1</b> or <b>DSX-2</b> ) to external Customer Premise Equipment (CPE)
7525	25 ft	System I/O board <b>CONSOLE</b> port to an ANSI-compatible terminal
7650	50 ft	CSU network interface (labeled <b>NI</b> ) to a T-carrier line by means of a standard RJ45 plug
7750	50 ft	CSU network interface (labeled <b>NI</b> ) to a T-carrier line by means of spade terminals
7825	25 ft	System I/O board modem port (labeled <b>MODEM1</b> or <b>MODEM2</b> ) to a dial modem.

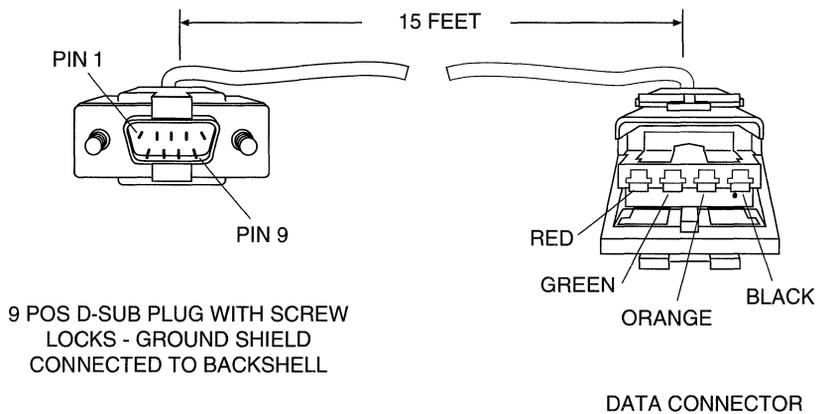
**Table A-2 Ethernet (Model 7115)**

Wellfleet Termination		Transceiver Termination	
Pin	Signal	Pin	Signal
2	Collision+	2	Collision+ (802.3 Circuit CI-A)
3	Transmit+	3	Transmit+ (802.3 Circuit DO-A)
5	Receive+	5	Receive+ (802.3 Circuit DI-A)
6	Voltage Common	6	Voltage Common (802.3 Circuit VC)
9	Collision-	9	Collision (802.3 Circuit CI-B)
10	Transmit-	10	Transmit (802.3 Circuit DO-B)
12	Receive	12	Receive (802.3 Circuit DI-B)
13	+12V	13	+12V (802.3 Circuit VP)



**Table A-3 Token Ring (Model 7125)**

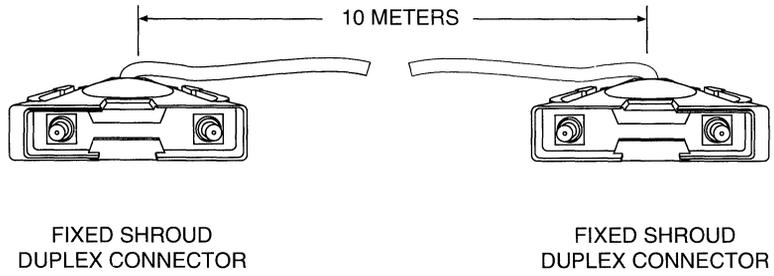
Wellfleet Termination		Token Ring MAU
Pin	Signal	Wire Color
1	Ring Receive 1	Red
2	GND	
3	+5 Volts	
4	GND	
5	Ring Transmit 1	Black
6	Ring Receive 2	Green
7	GND	
8	GND	
9	Ring Transmit 2	Orange



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**Table A-4 FDDI FSD to FSD (Model 7135)**

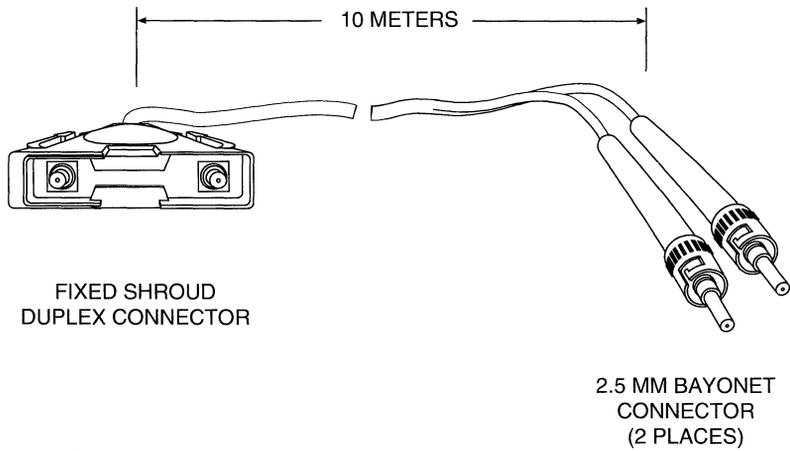
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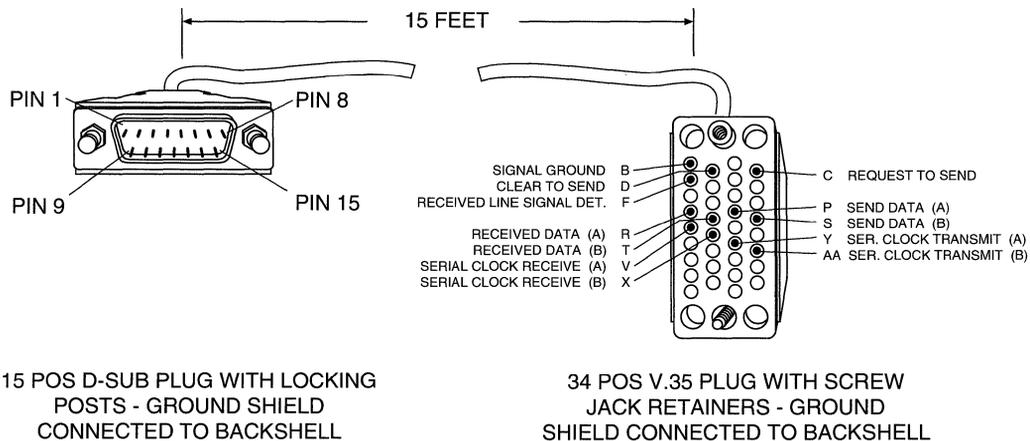
**Table A-5 FDDI FSD to ST (Model 7136)**

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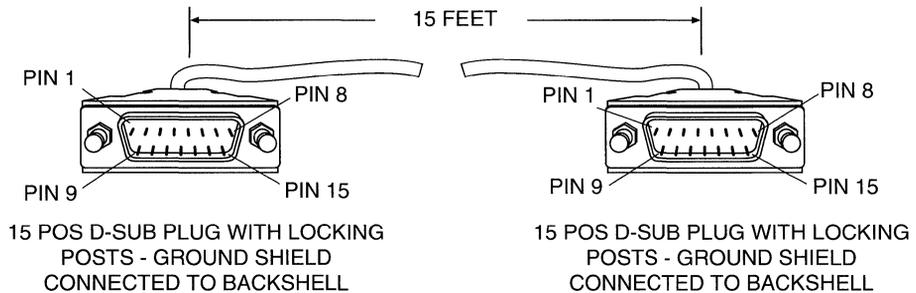
**Table A-6 Sync Port to V.35 (Model 7215)**

Wellfleet Termination		V.35 Termination	
Pin	Signal	Pin	Signal
1	Signal Ground	B	Signal Ground
2	Send Data+	P	Send Data (Signal A)
3	Send Data-	S	Send Data (Signal B)
4	Serial Clock Transmit+	Y	Serial Clock Transmit (Signal A)
5	Serial Clock Transmit-	AA	Serial Clock Transmit (Signal B)
6	Request to Send+	C	Request to Send
8	Clear to Send+	D	Clear to Send
10	Data Carrier Detect+	F	Data Carrier Detect
11	Serial Clock Receive-	X	Serial Clock Receive (Signal B)
12	Serial Clock Receive+	V	Serial Clock Receive (Signal A)
13	Receive Data-	T	Receive Data (Signal B)
14	Receive Data+	R	Receive Data (Signal A)
<b>Local Wire Connections</b>			
Pin 9 -> 7 -> 1			



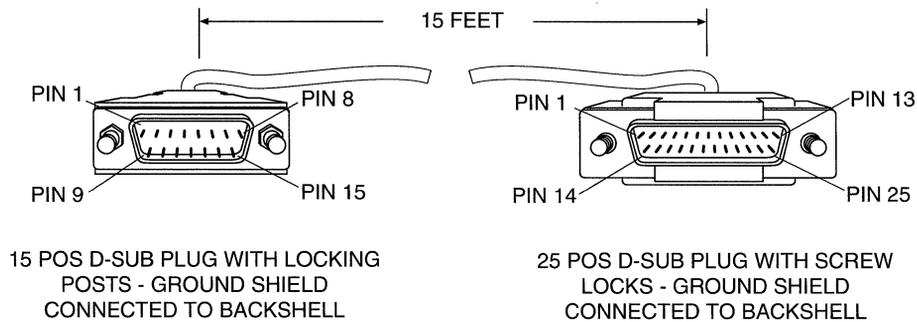
**Table A-7 Sync Port to X.21 (Model 7221)**

Wellfleet Termination		X.21 Termination	
Pin	Signal	Pin	Signal
1	Ground	1	Ground
2	TDAT+	2	TDAT+
3	TDAT-	9	TDAT-
6	RTS+	3	RTS+
15	RTS-	10	RTS-
14	RD+	4	RD+
13	RD-	11	RD-
10	DCD+	5	DCD+
9	DCD-	12	DCD-
4	TIM+	6	TIM+
5	TIM-	13	TIM-
<b>Local Wire Connections</b>			
Pin 12 -> 4			
Pin 11 -> 5			



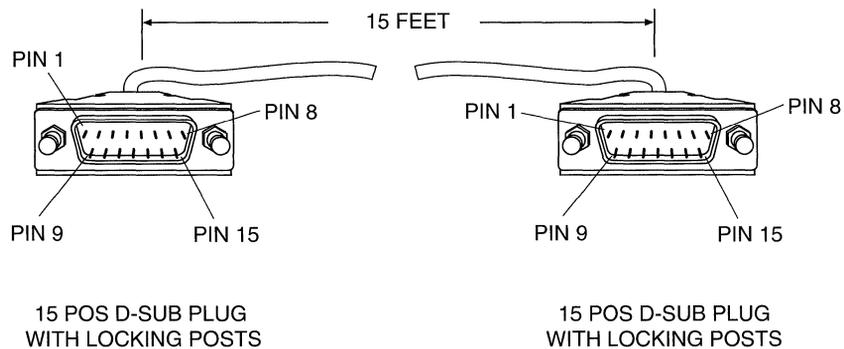
**Table A-8 Sync Port to RS-232 (Model 7255)**

Wellfleet Termination		RS232 Termination	
Pin	Signal	Pin	Signal
1	Signal Ground	7	Signal Ground
2	Transmitted Data	2	Transmitted Data
3	Transmitter Timing (DTE Source)	24	Transmitter Signal Element Timing (DTE Source)
4	Transmitter Signal Element Timing (DCE Source)	15	Transmitter Signal Element (DCE Source)
6	Request to Send	4	Request to Send
8	Clear to Send	5	Clear to Send
10	Carrier Detect	8	Carrier Detect
12	Receiver Signal Element Timing (DCE Source)	17	Receiver Signal Element Timing (DCE Source)
14	Received Data	3	Received Data
15	Data Set Ready	6	Data Set Ready
<b>Local Wire Connections</b>			
Pin 7 -> 9 -> 1		4 -> 20	



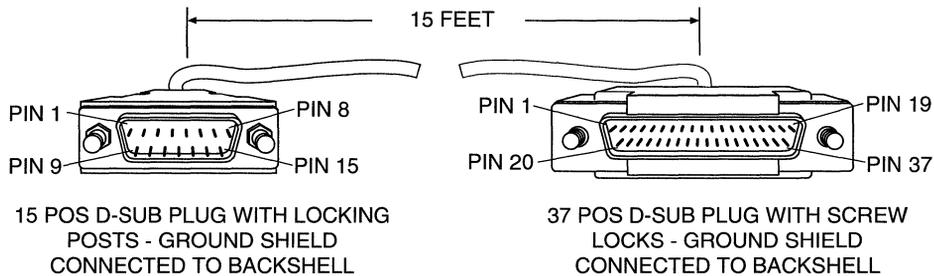
**Table A-9 Wellfleet to Wellfleet Cross-Over (Model 7260)**

Wellfleet Termination		Remote Termination	
Pin	Signal	Pin	Signal
1	Signal Ground	15	Return Common
2	Send Data+	14	Receive Data+
3	Send Data-	13	Receive Data-
4	Serial Clock Transmit+	12	Serial Clock Receive+
5	Serial Clock Transmit-	11	Serial Clock Receive-
6	Request to Send+	10	Data Carrier Detect+
10	Data Carrier Detect+	6	Clear to Send+
11	Serial Clock Receive-	5	Serial Clock Transmit-
12	Serial Clock Receive+	4	Serial Clock Transmit+
13	Receive Data-	3	Send Data-
14	Receive Data+	2	Send Data+
15	Return Common	1	Signal Ground
<b>Local Wire Connections</b>			
Pin 6 -> 8		Pin 6 -> 8	
Pin 7 -> 9 -> 15		Pin 7 -> 9 -> 15	



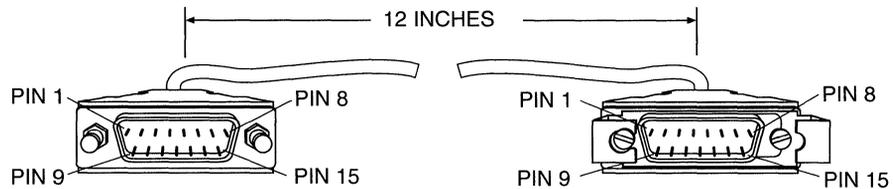
**Table A-10 Sync Port to RS-449/422 (Model 7315)**

Wellfleet Termination		Remote Termination	
Pin	Signal	Pin	Signal
1	Signal Ground	25	SC (Send Common)
2	Send Data+	4	SD (Send Data)
3	Send Data-	22	SD (Send Data)
4	Serial Clock Transmit+	5	ST (Send Timing)
5	Serial Clock Transmit-	23	ST (Send Timing)
6	Request to Send	12	TR (Terminal Ready)
7	Clear to Send-	27	CTS- (Clear to Send)
8	Clear to Send+	9	CTS+ (Clear to Send)
9	Data Carrier Detect-	31	DCD- (Data Carrier Detect)
10	Data Carrier Detect+	13	DCD+ (Data Carrier Detect)
11	Serial Clock Receive-	26	RT (Receive Timing)
12	Serial Clock Receive+	8	RT (Receive Timing)
13	Receive Data-	24	RD (Receive Data)
14	Receive Data+	6	Receive Data
Local Wire Connection			
		7 -> 12	
		37 -> 30 -> 25	



**Table A-11 T1 Port to CSU DTE Port (Model 7401)**

Wellfleet Termination		Remote Termination	
Pin	Signal	Pin	Signal
1	Send+	1	Send+
9	Send-	9	Send-
3	Receive+	3	Receive+
11	Receive-	11	Receive-

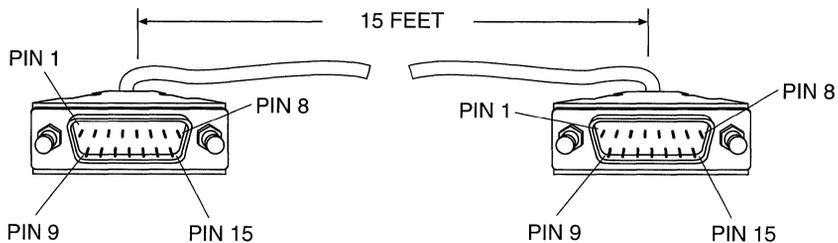


15 POS D-SUB PLUG WITH LOCKING  
POSTS - GROUND SHIELD  
CONNECTED TO BACKSHELL

15 POS D-SUB PLUG WITH SLIDE  
LATCH - GROUND SHIELD  
CONNECTED TO BACKSHELL

**Table A-12 Port to Customer Premises Equipment (Model 7415)**

Wellfleet Termination		Remote Termination	
Pin	Signal	Pin	Signal
1	Send+	1	Send+
9	Send-	9	Send-
3	Receive+	3	Receive+
11	Receive-	11	Receive-



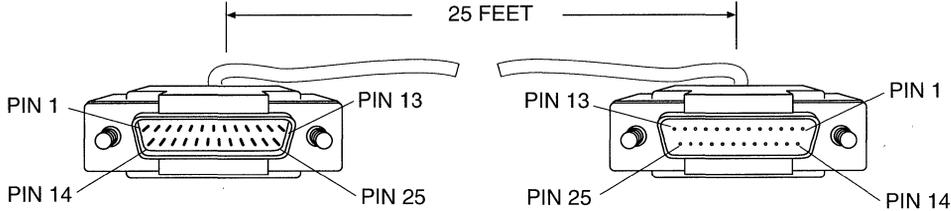
15 POS D-SUB PLUG WITH LOCKING POSTS - GROUND SHIELD CONNECTED TO BACKSHELL

15 POS D-SUB PLUG WITH LOCKING POSTS - GROUND SHIELD CONNECTED TO BACKSHELL

*has this cabled Da*

**Table A-13 System I/O Board to NMS Console (Model 7525)**

Wellfleet Termination		Remote Termination	
Pin	Signal	Pin	Signal
2	Transmitted Data	2	Transmitted Data
3	Received Data	2	Transmitted Data
4	Request to Send	5	Clear to Send
5	Clear to Send	4	Request to Send
7	Signal Ground	7	Signal Ground
<b>Local Wire Connections</b>			
Pin 7 -> 9 -> 1		6 -> 20	

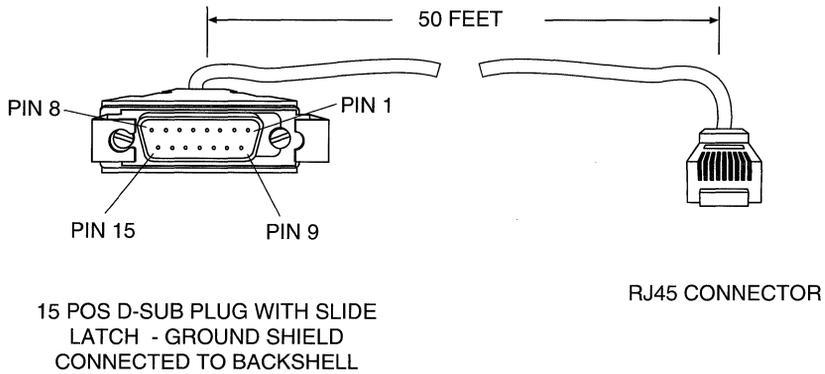


25 POS D-SUB PLUG WITH SCREW LOCKS - GROUND SHIELD CONNECTED TO BACKSHELL

25 POS D-SUB RECEPTACLE WITH SCREW LOCKS - GROUND SHIELD CONNECTED TO BACKSHELL

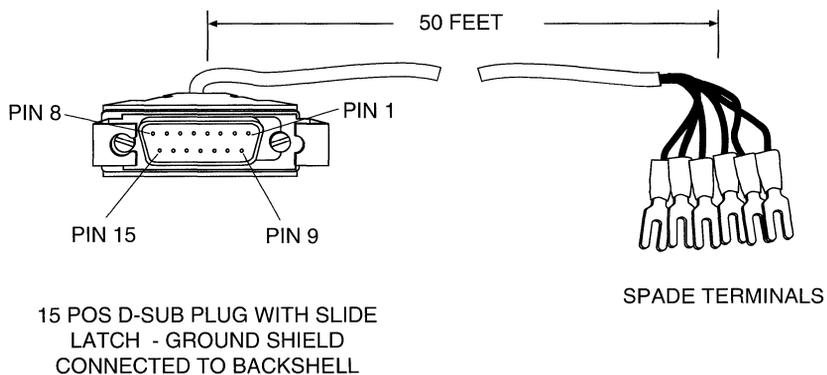
**Table A-14 CSU Network Interface Port to RJ45 (Model 7650)**

Wellfleet Termination		Remote Termination	
Pin	Signal	Pin	Signal
1	Send+	1	Send+
9	Send-	9	Send-
3	Receive+	3	Receive+
11	Receive-	11	Receive-



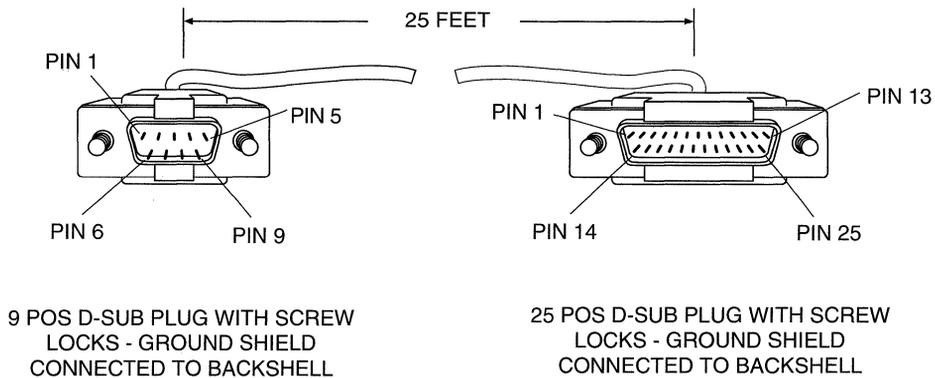
**Table A-15 CSU Network Interface Port to Spade  
Terminals (Model 7750)**

Wellfleet Termination		Remote Termination	
Pin	Signal	Pin	Signal
1	Send+	(wire)	Xmit+
9	Send-	(wire)	Xmit-
3	Receive+	(wire)	Receive+
11	Receive-	(wire)	Receive-
Chassis	GND	(wire)	Shield
Chassis	GND	(wire)	Shield



**Table A-16 Modem Port to RS-232 (Model 7825)**

Wellfleet Termination		Remote Termination	
Pin	Signal	Pin	Signal
2	Transmitted Data	2	Transmitted Data
3	Received Data	3	Received Data
4	Request to Send	4	Request to Send
5	Clear to Send	5	Clear to Send
6	Data Set Ready	6	Data Set Ready
7	Signal Ground	7	Signal Ground
8	Carrier Detect	8	Carrier Detect
9	Data Terminal Ready	20	Data Terminal Ready



## B Changing the Fuse

If your CN has AC power but will not power on, ensure that the circuit breaker switch next to the power cord is up.

If your FN or LN has AC power but will not power on, verify whether the fuse needs to be changed. Change the fuse as follows (see Figure B-1):

- 1. Verify that the router is powered down.**
- 2. Unplug the power cord from the wall receptacle.**
- 3. If necessary, remove the power cord from the router's power switch assembly to expose the fuse container (FN and LN only).**
- 4. Gently pry open the fuse door on the power switch assembly with a small, flat-blade screwdriver.**
- 5. Remove the plastic fuse container from the power switch assembly.**
- 6. Pull the fuse out of the fuse container.**
- 7. If the glass tube of the fuse is smoked, or if the wire within the glass tube is broken or gone, replace the fuse with a new one.**

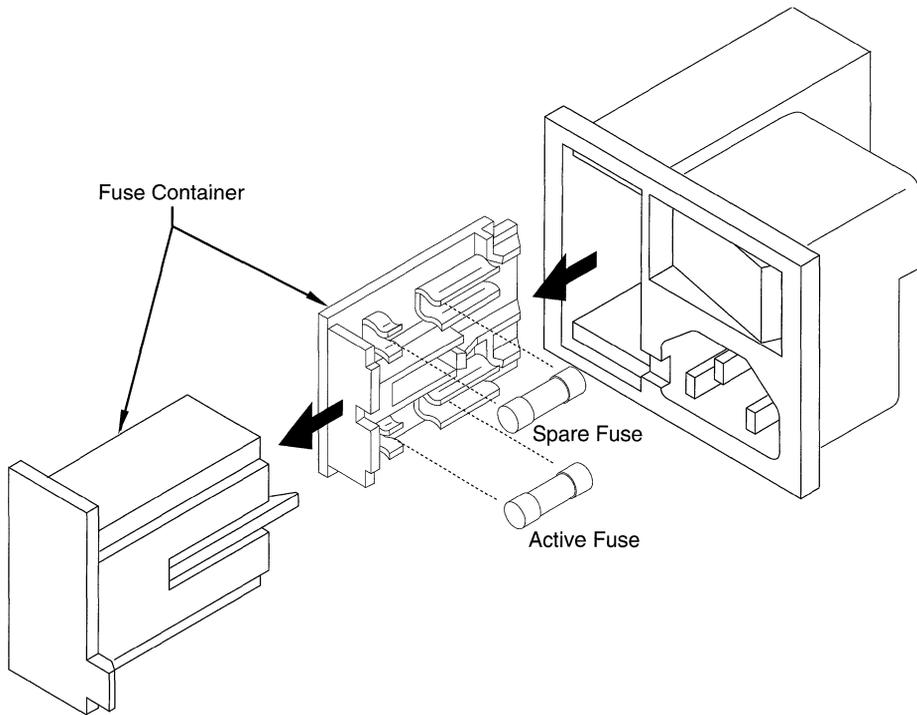
A spare fuse is stored in the fuse container.

- 8. Slide the fuse container back into the power switch assembly.**

If your router does not power on after you replace the fuse, contact Wellfleet Customer Support at the address or telephone number on the copyright page of this guide.

- 9. Be sure to order replacement fuses (see Table B-1).**

Contact Wellfleet Customer Support at the address or telephone number on the copyright page of this guide to order a new fuse. Order the fuse by the appropriate part number listed in Table B-1.



**Figure B-1 Removing the Fuse**

**Table B-1 Fuses**

<b>FN Type</b>	<b>Fuse Part Number</b>	<b>Amperage</b>	<b>Size</b>
FN with 100 - 120 Volt	101346	3.0A	5 x 20 mm
FN with 200 - 240 Volt	101198	F1.6A (250 Volt)	5 x 20 mm
LN with 100 - 120 Volt	100492	F6.0A (125 Volt)	5 x 20 mm
LN with 200 - 240 Volt	100759	T3.15A (250 Volt)	5 x 20 mm

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