Connecting Cisco Fast Ethernet ISDN PRI Network Modules to the Network

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This guide describes how to connect Cisco Fast Ethernet Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI) network modules to your network. It contains the following sections:

- 1-Port Fast Ethernet and 1- or 2-Port Channelized T1/ISDN PRI Network Modules, page 1
- 1-Port Fast Ethernet and 1- or 2-Port Channelized T1/ISDN PRI with CSU Network Modules, page 3
- 1-Port Fast Ethernet and 1- or 2-Port Channelized E1/ISDN PRI Balanced or Unbalanced Network Modules, page 4
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Note

Unless specifically identified, references to Fast Ethernet-PRI network modules in this chapter include all these network modules.

1-Port Fast Ethernet and 1- or 2-Port Channelized T1/ISDN PRI Network Modules

This section provides information about the following network modules:

- 1-port Fast Ethernet 1-port channelized T1/ISDN PRI network module (NM-1FE1CT1) (see Figure 1)
- 1-port Fast Ethernet 2-port channelized T1/ISDN PRI network module (NM-1FE2CT1) (see Figure 2)
Connecting Fast Ethernet Channelized T1 Modules

Use the following sections for Fast Ethernet and PRI connections.

Fast Ethernet Port

Use a straight-through two-pair Category 5 unshielded twisted-pair (UTP) cable to connect the RJ-45 port on the Fast Ethernet-PRI network module to a switch, hub, repeater, server, or other network device. These ports are color-coded yellow. Figure 3 shows the RJ-45 port connected to a hub.

**Note**

RJ-45 cables are not available from Cisco Systems. These cables are widely available and must be Category 5 cables.

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**Figure 1** 1-Port Fast Ethernet 1-Port Channelized T1 Network Module

**Figure 2** 1-Port Fast Ethernet 2-Port Channelized T1 Network Module

**Figure 3** Connecting a Fast Ethernet RJ-45 Port to a Hub
PRI Ports

This section describes how to connect channelized T1 and channelized E1 ISDN PRI ports to the network. These ports are color-coded tan.

Use a DB-15-to-DB-15 T1 serial cable to connect a CT1/PRI port to a T1 channel service unit (CSU). (See Figure 4.)

**Figure 4 Connecting a CT1/PRI Port to a T1 CSU**

1-Port Fast Ethernet and 1- or 2-Port Channelized T1/ISDN PRI with CSU Network Modules

This section provides information about the following network modules:

- 1-port Fast Ethernet 1-port channelized T1/ISDN PRI with CSU network module (NM-1FE1CT1-CSU) (see Figure 5)
- 1-port Fast Ethernet 2-port channelized T1/ISDN PRI with CSU network module (NM-1FE2CT1-CSU) (see Figure 6)

**Figure 5 1-Port Fast Ethernet 1-Port Channelized T1 with CSU Network Module**
Connecting Fast Ethernet Channelized T1 with CSU Modules

Use the following sections for connections to the Fast Ethernet or CT1/PRI-CSU ports.

Fast Ethernet Port

To connect the Fast Ethernet port, see the “Fast Ethernet Port” section on page 2.

CT1/PRI-CSU Port

To connect the CT1/PRI-CSU PRI ports, use a straight-through RJ-48C-to-RJ-48C cable to connect a PRI port to an RJ-48C jack. (See Figure 7.) These ports are color-coded tan.

1-Port Fast Ethernet and 1- or 2-Port Channelized E1/ISDN PRI Balanced or Unbalanced Network Modules

This section provides information about the following network modules:

- 1-port Fast Ethernet 1-port channelized E1/ISDN PRI balanced (120-ohm) network module (NM-1FE1CE1B) (see Figure 8)
- 1-port Fast Ethernet 1-port channelized E1/ISDN PRI unbalanced (75-ohm) network module (NM-1FE1CE1U) (see Figure 8)
• 1-port Fast Ethernet 2-port channelized E1/ISDN PRI balanced (120-ohm) network module (NM-1FE2CE1B) (see Figure 9)
• 1-port Fast Ethernet 2-port channelized E1/ISDN PRI unbalanced (75-ohm) network module (NM-1FE2CE1U) (see Figure 9)

**Figure 8** 1-Port Fast Ethernet 1-Port Channelized E1 Network Module

**Figure 9** 1-Port Fast Ethernet 2-Port Channelized E1 Network Module

### Connecting Fast Ethernet Channelized E1 Modules

Use the following sections to connect to the Fast Ethernet or CE1-PRI-B ports.

**Fast Ethernet Port**

To connect the Fast Ethernet port, see the “Fast Ethernet Port” section on page 2.

**CE1/PRI-B Port**

Use the appropriate cable to connect a CE1/PRI-B (120-ohm) port to an E1 CSU. (See Figure 10, Figure 11, and Figure 12, showing DB-15, twinax, and RJ-45 CSUs respectively.) These ports are color-coded tan.
Connecting Cisco Fast Ethernet ISDN PRI Network Modules to the Network

1-Port Fast Ethernet and 1- or 2-Port Channelized E1/ISDN PRI Balanced or Unbalanced Network Modules

Figure 10  Connecting a CE1/PRI-B Port to an E1 CSU (DB-15-to-DB-15 Connectors)

Figure 11  Connecting a CE1/PRI-B Port to an E1 CSU (DB-15-to-Twinax Connectors)

Figure 12  Connecting a CE1/PRI-B Port to an E1 CSU (DB-15-to-RJ-45 Connectors)
CE1/PRI-U Port

Use the appropriate cable to connect a CE1/PRI-U (75-ohm) port to an E1 CSU. Figure 13 shows a CSU with BNC connectors. These ports are color-coded tan.

Figure 13 Connecting a CE1/PRI-U Module to an E1 CSU (DB-15-to-BNC Connectors)

Setting Interfaces to Balanced or Unbalanced Termination

This section describes how to configure an E1 network module for balanced or unbalanced termination. The module consists of two circuit boards, or cards. A terminal block and a set of five jumpers are provided on each card to configure termination. Figure 14 shows these terminal blocks.

Caution

To avoid damaging electrostatic discharge (ESD)-sensitive components, observe all ESD precautions when handling the circuit boards.
Note

The position of the jumpers is different on the two terminal blocks. See Figure 14 and the silk screening on the network module to ensure the correct jumper position.

Figure 15 shows a typical jumper.
Configuring Unbalanced Mode

To configure the network module for unbalanced mode, follow these steps:

**Step 1**
Turn off electrical power to the router. However, to channel ESD voltages to ground, do not unplug the power cable. Remove all network interface cables, including telephone cables, from the rear panel.

The following warning applies to routers that use a DC power supply:

**Warning**
Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position. Statement 7

**Step 2**
Loosen the module captive mounting screws, using a Phillips or flat-blade screwdriver.

**Step 3**
Hold the captive screws between two fingers, and pull the network module toward you until it slides free of the chassis.

**Step 4**
Set the network module on an ESD-preventive mat.

**Step 5**
Using needle-nose pliers, set jumpers J5 through J9 on the top terminal block to the 75-ohm position. Set jumpers J4 through J8 on the bottom terminal block to the same 75-ohm position. (See Figure 16.)

*Figure 16  Jumper Insertion*

*Figure 17* shows the top terminal block set to unbalanced (75-ohm) position.
Figure 17  Jumper in Unbalanced 75-Ohm Position (Top Card)

Step 6  Align the network module with the guides in the chassis and slide it gently into the slot.

Step 7  Push the module into place until you feel its edge connector mate securely with the connector on the motherboard.

Step 8  Fasten the module captive mounting screws into the holes in the chassis, using the Phillips or flat-blade screwdriver.

Step 9  If the router was previously running, reinstall the network interface cables and turn on power to the router.

The following warning applies to routers that use a DC power supply:

Warning  After wiring the DC power supply, remove the tape from the circuit breaker switch handle and reinstate power by moving the handle of the circuit breaker to the ON position. Statement 8

Configuring Balanced Mode

To configure the network module for balanced mode, follow these steps:

Step 1  Turn off electrical power to the router. However, to channel ESD voltages to ground, do not unplug the power cable. Remove all network interface cables, including telephone cables, from the rear panel.

The following warning applies to routers that use a DC power supply:

Warning  Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position. Statement 7

Step 2  Loosen the module captive mounting screws, using a Phillips or flat-blade screwdriver.

Step 3  Hold the captive screws between two fingers, and pull the network module toward you until it slides free of the chassis.

Step 4  Set the network module on an ESD-preventive mat.

Step 5  Using needlenose pliers, set jumpers J5 through J9 on the top terminal block to the 120-ohm position. Set jumpers J4 through J8 on the bottom terminal block to the same 120-ohm position. (See Figure 16.)
Step 6 Align the network module with the guides in the chassis and slide it gently into the slot.

Step 7 Push the module into place until you feel its edge connector mate securely with the connector on the motherboard.

Step 8 Fasten the module captive mounting screws into the holes in the chassis, using the Phillips or flat-blade screwdriver.

Step 9 If the router was previously running, reinstall the network interface cables and turn on power to the router.

The following warning applies to routers that use a DC power supply:

**Warning** After wiring the DC power supply, remove the tape from the circuit breaker switch handle and reinstate power by moving the handle of the circuit breaker to the ON position. Statement 8

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**Fast Ethernet-PRI Module LEDs**

All network modules have an enable (EN) LED. This LED indicates that the module has passed its self-tests and is available to the router.

All Fast Ethernet-PRI modules have four LEDs for the Fast Ethernet port, and four additional LEDs for each PRI port. Figure 18 shows LEDs for the 1-port Fast Ethernet 2-port channelized E1/ISDN PRI balanced (120-ohm) network module as an example.

![Fast Ethernet and ISDN PRI LEDs](image)

Table 1 describes Fast Ethernet LEDs. Table 2 describes ISDN PRI LEDs.

**Table 1 Fast Ethernet LEDs**

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLL</td>
<td>Yellow</td>
<td>Collision activity is occurring on the network.</td>
</tr>
<tr>
<td>LINK</td>
<td>Green</td>
<td>A link has been established with the station at the other end of the cable.</td>
</tr>
</tbody>
</table>
Table 1  Fast Ethernet LEDs (continued)

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>100MBPS</td>
<td>Green</td>
<td>Speed of the interface is 100 Mbps.</td>
</tr>
<tr>
<td>FDX</td>
<td>Green</td>
<td>Interface is in full-duplex mode.</td>
</tr>
</tbody>
</table>

Table 2  ISDN PRI LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>REMOTE ALARM</td>
<td>Yellow</td>
<td>A remote source is indicating an error at its end of the connection.</td>
</tr>
<tr>
<td>LOCAL ALARM</td>
<td>Yellow</td>
<td>Incoming signal shows loss of signal, loss of frame, or excessive errors.</td>
</tr>
<tr>
<td>LOOPBACK</td>
<td>Yellow</td>
<td>Line or local loopback state is set or detected.</td>
</tr>
<tr>
<td>CARRIER DETECT</td>
<td>Green</td>
<td>DS-1 carrier to the network is detected.</td>
</tr>
</tbody>
</table>

Related Documents

For additional information, see the following documents and resources.

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
</table>

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly What’s New in Cisco Product Documentation, which also lists all new and revised Cisco technical documentation, at:


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