



Installation Guide

7800 Series Gateway

July 27, 2016

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Preface

About this Guide

This guide provides installation, and setup procedures for the 7800 series gateway.

Conventions

Terminology	Description
7800 series gateway	This term is used when a description applies to both a TMG7800 and the TMGIP7800 systems.
TMG7800 system	This term is used when a description applies to a TMG7800-CTRL, TMG7800 Telecom Unit and TMG7800-TMS.
TMGIP7800 system	This term is used when a description applies to a TMGIP7800-CTRL, TMGIP7800 Telecom Unit and TMGIP7800-TMS.
7800-TE	This term is used when a description applies to the TMG7800-TE.
7800-DS3	This term is used when a description applies to the TMG7800-DS3.
7800-CTRL	This term is used when a description applies to a TMG7800-CTRL and TMGIP7800-CTRL.
7800-TMS	This term is used when a description applies to a TMG7800-TMS and TMGIP7800-TMS.
TMG7800 +1	This term is used when a description applies to a TMG7800 that is selected to provide N+1 protection.
7800 N+1 patch panel	This term is used to refer to patch panels for TMG7800 systems that have N+1 protection.

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If you have comments about this guide or any other TelcoBridges technical documentation, please send an email to marketing@telcobridges.com.

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Section 1 Introduction

This section provides an introduction to the installation and setup of a 7800 Series Gateway:

The following topics are covered:

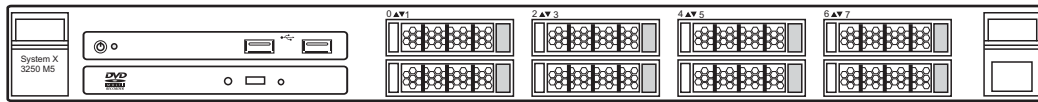
- Section 1.1 “Identifying the 7800 Series Gateway Equipment”
- Section 1.2 “Installation Prerequisites”
- Section 1.3 “Preventing Electrostatic Discharge Damage”
- Section 1.4 “Recommended Reading”

1.1 Identifying the 7800 Series Gateway Equipment

The 7800 series gateway is comprised of the following equipment:

- One or two 7800-CTRL gateway controller(s). See figure 1.1 on page 2.
- One to sixteen 7800 Telecom Unit(s). See figure 1.2 on page 3.
- Based upon the configuration of your 7800 series gateway, the number of 7800-TMS media switch(es) may range from zero to two. See figure 1.3 on page 3.
- If the 7800 series gateway employs N+1 protection, one to two 7800 N+1 patch panels are used to provide protection for the TDM network. See figure 1.4 on page 3.
- If the 7800 series gateway employs 1+1 protection, one to two 1+1 patch panels are used to provide protection for the TDM network. See figure 1.4 on page 3.

TMG7800-CTRL/TMGIP7800-CTRL (front view)



TMG7800-CTRL/TMGIP7800-CTRL (rear view)

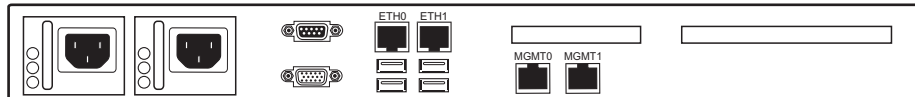
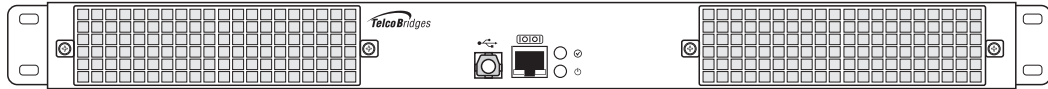
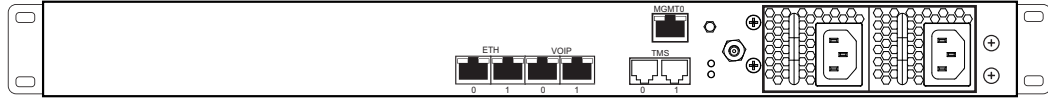


Figure 1.1 7800-CTRL

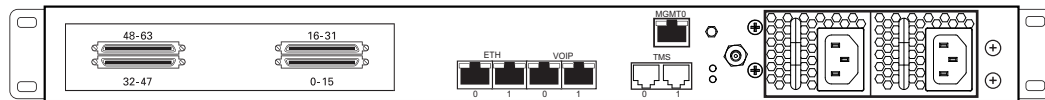
TMG7800 Telecom Unit/TMGIP7800 Telecom Unit (front view)



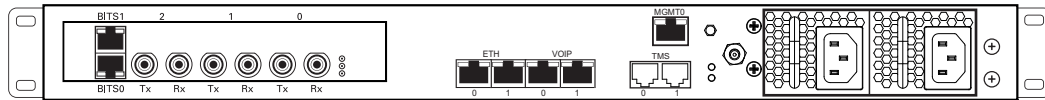
TMGIP7800 (rear view)



TMG7800-TE (rear view)



TMG7800-DS3 (rear view)



TMG7800-STM1 (rear view)

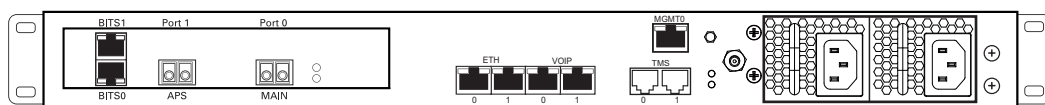
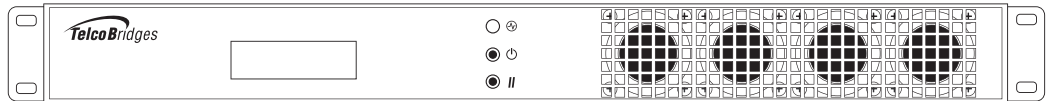


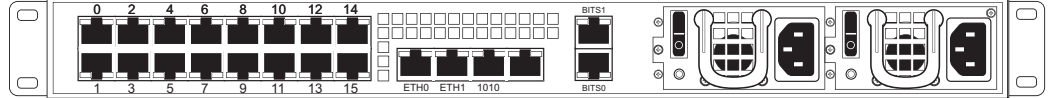
Figure 1.2

7800 Series Telecom Units

TMG7800-TMS/TMGIP7800-TMS Unit (front view)



TMG7800-TMS/TMGIP7800-TMS Unit - (earlier models rear view)



TMG7800-TMS/TMGIP7800-TMS Unit - (later models rear view)

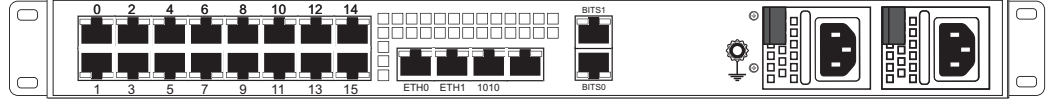


Figure 1.3

7800-TMS

7800 N+1 Patch Panel (rear view)

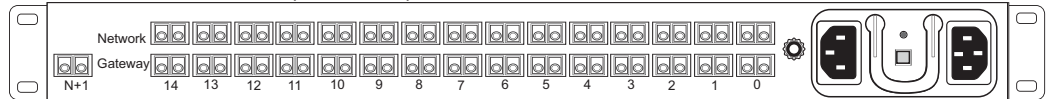


Figure 1.4

7800 N+1 Patch Panel

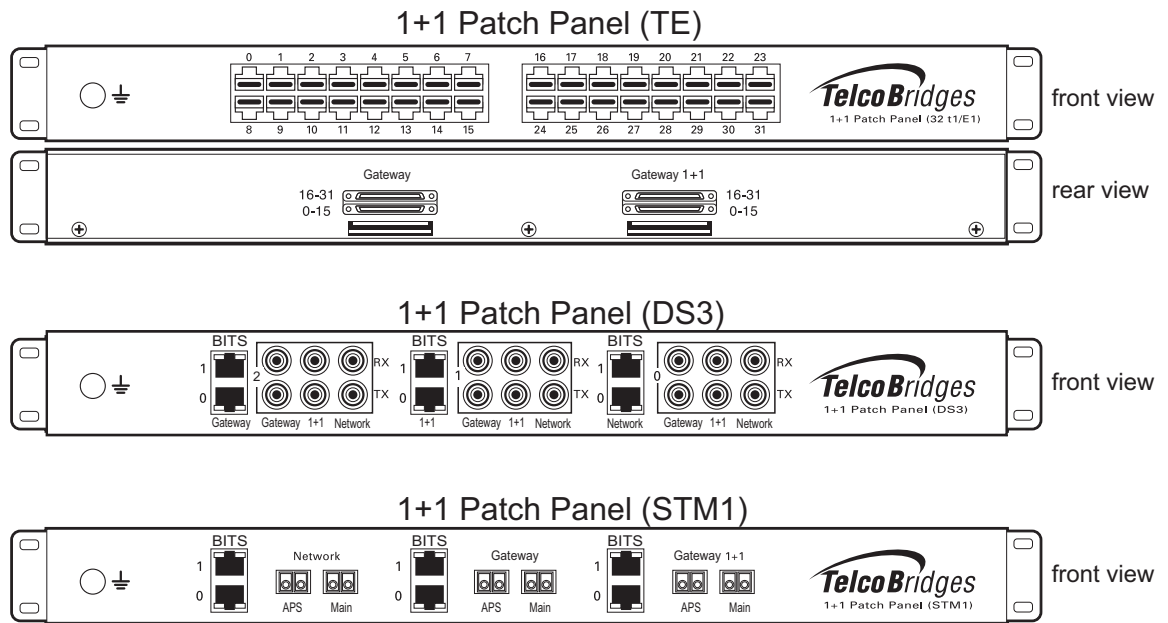


Figure 1.5 1+1 Patch Panels (Front and Rear Views)

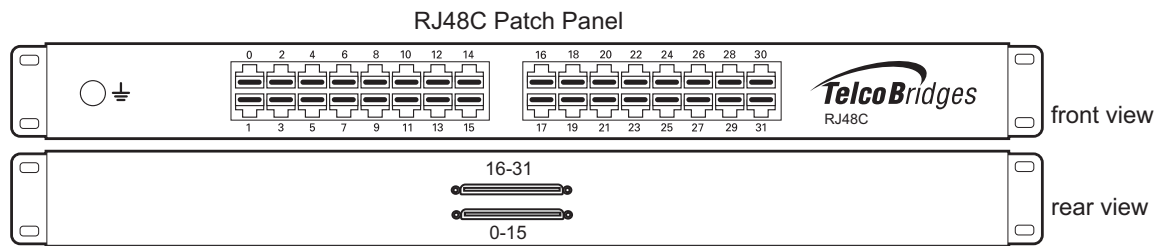


Figure 1.6 RJ48C Patch Panel (Front and Rear Views)

1.2 Installation Prerequisites

For the installation to proceed without interruption, it is important that you verify that you have all necessary materials on hand.

A TMG7800 system can range in size from 2 to 22U in vertical rack space, at full capacity with redundant N+1 patch panels. In addition, if your system is configured to use multiple groups of 1+1 patch panels, the total vertical rack space may exceed 22U.

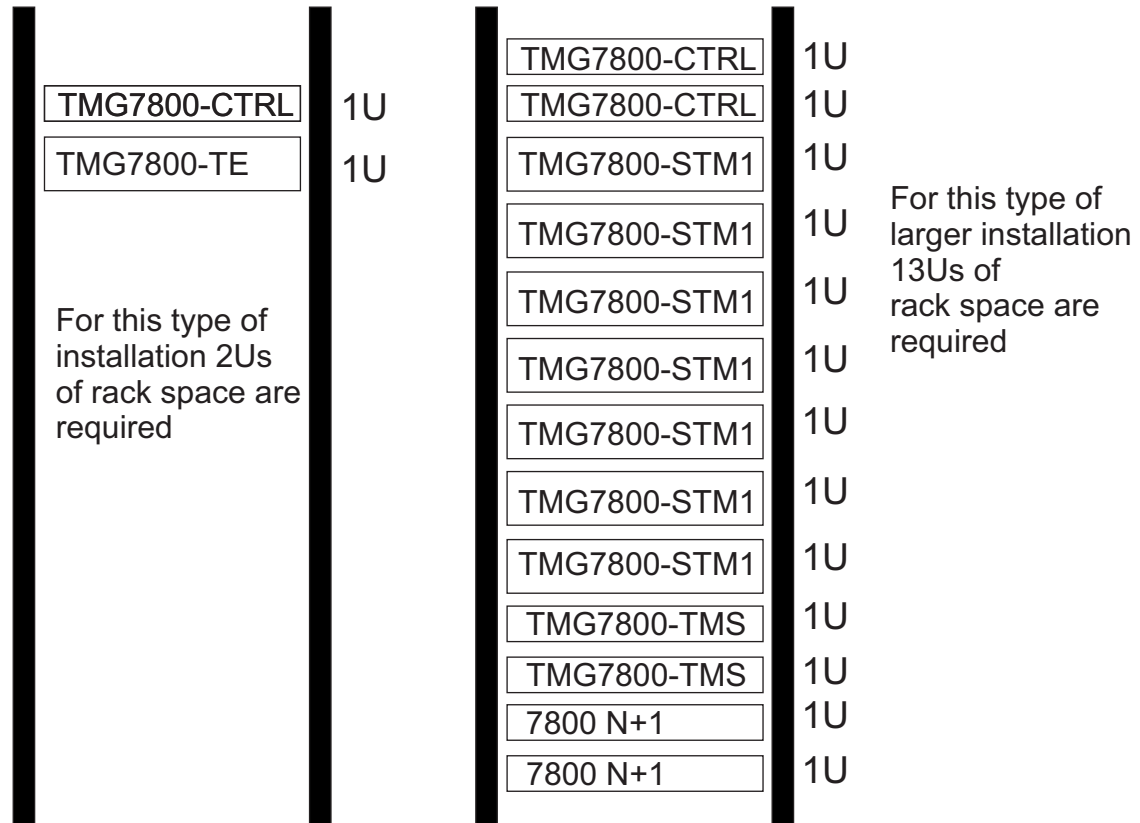


Figure 1.7 Example of an equipment rack-space allocation

1.2.1 7800-CTRL

Adequate space for the installation of the 7800-CTRL

You must mount the 7800-CTRL on a 19" equipment rack (customer provided). Your 7800-CTRL is a 1U unit. Plan for an additional 1U space on the equipment rack for a redundant 7800-CTRL.

Note The depth of the 7800-CTRL is 22.68" (576mm), instead of the 16" (406mm) depth of the TMG7800 telecom units. It is important to plan for an equipment rack of adequate size.

The dimension of the TMG7800-CTRL are as follows:

- Depth x Width x Height (mm) 576 x 434 x 43
- Depth x Width x Height (inch) 22.68 x 17.11" x 1.69"

Adequate power supply and power connections

Each 7800-CTRL requires two power connections to provide for its redundant power supply. To guarantee an uninterrupted supply of electricity, each power connection must be fed by a dedicated power source.

An IP address for the management port

Each 7800-CTRL requires a IP address for the management port. To avoid delays, you should have the IP address, netmask and gateway addresses on hand. Take note that the management port supports DHCP, see Section 3.1 “Connecting to the 7800 Series Gateway Management Interface” on page 18 for further information.

Cabling

Three customer supplied Ethernet cables are required for each 7800-CTRL, to connect the 7800-CTRL to the switches.

1.2.2 7800 Series Telecom Units

Adequate space for the installation of each 7800 Series Telecom Unit

You will need to mount each 7800 Series Telecom Unit (1-16 units) on a 19" equipment rack (customer provided). Each 7800 Series Telecom Unit is housed in a 1U chassis.

Adequate power supply and power connections

Each 7800 Series Telecom Unit requires two power connections to provide for its redundant power supply.

To guarantee an uninterrupted supply of electricity, each power connection must be fed by a dedicated power source.

1.2.3 7800-TMS

Adequate space for the installation of the 7800-TMS

You will need to mount the 7800-TMS on a 19" equipment rack (customer provided). Your 7800-TMS is a 1U unit. Plan for an additional 1U space on the equipment rack for a redundant 7800-TMS.

Adequate power supply and power connections

Each 7800-TMS requires two power connections to provide for its redundant power supply. To guarantee an uninterrupted supply of electricity, each power connection must be fed by a dedicated power source.

1.2.4 7800 N+1 Patch Panel

Adequate space for the installation of the 7800 N+1 Patch Panel

If your system employs N+1 protection, you will need to mount the 7800 N+1 patch panel on a 19" equipment rack (customer provided). Your 7800 N+1 patch panel is a 1U unit. If your system is using Automatic Protection Switching (APS), plan for an additional 1U space on the equipment rack for a second 7800 N+1 patch panel.

Adequate power supply and power connections

Each 7800 N+1 patch panel requires two power connections to provide for its redundant power supply. To guarantee an uninterrupted supply of electricity, each power connection must be fed by a dedicated power source.

1.2.5 7800 1+1 Patch Panel

Adequate space for the installation of the 7800 1+1 Patch Panel

If your system employs 1+1 protection, you will need to mount one or two 7800 1+1 patch panels on a 19" equipment rack (customer provided). Your 7800 1+1 patch panel is a 1U unit.

Adequate power supply and power connections

Each 7800 1+1 patch panel requires two power connections to provide for its redundant power supply. To guarantee an uninterrupted supply of electricity, each power connection must be fed by a dedicated power source.

1.2.6 7800 RJ48C Patch Panel

Adequate space for the installation of the 7800 RJ48C Patch Panel

In a standalone configuration, you will need to mount one or two 7800 RJ48C patch panels on a 19" equipment rack (customer provided). Your 7800 RJ48C patch panel is a 1U unit.

Adequate power supply and power connections

Each 7800 RJ48C patch panel requires two power connections to provide for its redundant power supply. To guarantee an uninterrupted supply of electricity, each power connection must be fed by a dedicated power source.

1.3 Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It may occur if electronic printed circuit cards are improperly handled and may cause complete or intermittent failure.



Always follow ESD prevention procedures when removing and replacing modules:

- Ensure that the Tmedia VoIP gateways are grounded.
- Wear an ESD-preventive wrist strap and ensure that it makes good contact with your skin. Connect the wrist strap clip to an unpainted surface of the Tmedia VoIP Gateway or the grounded equipment rack in order to channel away all ESD voltage safely to ground. To guard against ESD damage and shocks, the wrist strap and cord must be in proper working condition.
- If no wrist strap is available, and you must work with Tmedia VoIP Gateways, ground yourself by touching a metal part of the chassis.

1.4 Recommended Reading

This document assumes that you have a clear understanding of the installation of the equipment described in this document and have been trained to work with the equipment. If you have any technical questions, TelcoBridges TB Support (technical support team) can be reached at the following numbers or an email can be sent to: support@telcobridges.com.

- Americas & Europe Technical Support Centre (GMT-05:00, Montreal):
Telephone: +1-450-655-8993 x131 or x102
- Asia Technical Support Centre (GMT +08:00, Hong Kong)
Telephone: +852-3749-9818
- 24/7 International Support
Telephone: +1-866-438-4703
- Documents exploring various aspects of the product are available on the TB Wiki:
<http://docs.telcobridges.com>

Section 2 Installation Preparations

This section provides information about the following topics:

- Section 2.1 “Package Contents”
- Section 2.2 “Rack Mounting the 7800 Series Gateway Equipment”

2.1 Package Contents

Depending on your system requirements, you may receive one or more of the following items:

- Section 2.1.1 “7800-CTRL Gateway Controllers” on page 10.
- Section 2.1.2 “7800 Series Telecom Unit” on page 11.
- Section 2.1.3 “7800-TMS Media Switch” on page 12.
- Section 2.1.4 “7800 N+1 Patch Panel” on page 12.

The contents of these devices are described in the following sections.

2.1.1 7800-CTRL Gateway Controllers

In the box, you will find the following items:

- One 7800-CTRL (TMG7800-CTRL or TMGIP7800-CTRL). See figure 1.1 on page 2.
- Two hard drives.
- Two power cords.
- One Product Warranty.
- One TelcoBridges Important Notice (pertinent product serial numbers and other important information).
- One Levono Important Notice
- One Levono Rack Installation Instructions
- One packing slip.
- One set of sliding rails and associated screws.
- One set of brackets and associated screws.
- Two AC power cables (optional)

Not included

- Ethernet cables.

2.1.2 7800 Series Telecom Unit

In the box, you will find the following items:

- One 7800 series unit (TMGIP7800, TMG7800-TE, TMG7800-DS3, or TMG7800-STM1). See figure 1.2 on page 3.
- One set of mounting brackets and screws, used to mount the 7800 series telecom unit to a 19" rack.
- One Tmedia serial adapter to interface with the serial port of your computer with the RJ-45 port of the 7800 series telecom unit.
- Three CAT5 Ethernet (blue) straight cables (male-male), 3 meters in length.
- One Important Notice (two-sided document containing pertinent product serial numbers, and other important information).
- One Product Warranty.
- One packing slip.
- Two AC power cables (optional)

Specifically with the TMG7800-TE unit you will also have:

- One or two patch panel(s)
- Two SCSI cables per patch panel.

For patch panel information, see Table 2.1, "1+1 Patch Panels", on page 13:

Not included

- A 19" equipment rack. The 7800 series telecom unit must be installed on a 19" wide equipment rack.
- USB-Type B cable. This can be used as an alternative way to connect to the serial port of the telecom unit.

2.1.3 7800-TMS Media Switch

Note The 7800-TMS that you receive may feature visually different power supplies. This difference is shown in figure 1.3 on page 3.

In the 7800-TMS media switch box, you will find the following items:

- One 7800-TMS unit (TMG7800-TMS or TMGIP7800-TMS). See figure 1.3 on page 3.
- Three CAT5 Ethernet (blue) straight cables (male-male), 3 meters in length.
- One Tmedia serial adapter to interface with the serial port of your computer with the RJ-45 port of the 7800-TMS.
- One set of mounting brackets and screws, used to mount the TMG7800-TMS to a 19" rack.
- One Important Notice (two-sided document containing pertinent product serial numbers, and other important information).
- One Product Warranty.
- One packing slip.
- Two AC power cables (optional)

Not included

- A 19" equipment rack. The 7800-TMS must be installed on a 19" wide equipment rack.
- You must order one TelcoBridges CAT7 shielded Ethernet crossover cable, with RJ45 type male-male connectors, for each connection between 7800 Telecom units and a 7800-TMS.
- If your system features a second 7800-TMS, you must order an additional TelcoBridges CAT7 shielded Ethernet cable, with RJ45 male-male terminations, for each 7800 Telecom Unit.

2.1.4 7800 N+1 Patch Panel

In the 7800 N+1 Patch Panel box, you will find the following items:

- One 7800 N+1 patch panel. See figure 1.4 on page 3.
- Three CAT5 Ethernet (blue) straight cables (male-male), 3 meters in length.
- One Tmedia serial adapter to interface with the serial port of your computer with the RJ-45 port of the 7800 N+1 patch panel.
- One set of mounting brackets and screws, used to mount the 7800 N+1 patch panel to a 19" rack.
- Two AC power cables (optional)
- One packing slip.
- One Important Notice (two-sided document containing pertinent product serial numbers, and other important information).
- One Product Warranty.

Not included

- Optic fibers (They can be purchased from TelcoBridges).
- A 19" equipment rack. The 7800 N+1 patch panel must be installed on a 19" wide equipment rack.

2.1.5 7800 1+1 Patch Panels

1+1 patch panels are required for the proper connection of the 7800 series 1+1 system, and are automatically included when a 7800 +1 series unit is ordered. Table 2.1 lists the various 1+1 patch panels you will receive based upon the type of 7800 series telecom unit ordered for your 7800 series 1+1 system.

Table 2.1 1+1 Patch Panels

<p>1+1 Patch Panel (32/T1/E1)</p>	<p>Provides connection for up to 32 T1/E1 lines from the network to the 7800-TE and 7800-TE+1.</p> <p>To connect the 7800-TE-16 and the 7800-TE-32 to their respective +1 units and the network, you will required one 1+1 Patch Panel (32 T1/E1).</p> <p>To connect the 7800-TE-48 and the 7800-TE-64 to their respective +1 units and the network, you will require two 1+1 Patch Panel (32 T1/E1).</p> <p>Cables provided:</p> <p>4 SCSI straight cables per 1+1 Patch Panel (32 T1/E1). Three meters in length. This provides connection for up to 32 lines.</p>
<p>1+1 Patch Panel (DS3)</p>	<p>Provides connection for up to 3 DS3 lines from the network to the 7800-DS3 and 7800-DS3+1.</p> <p>Cables provided (with each 1+1 Patch Panel (DS3)):</p> <ul style="list-style-type: none"> • 4 DS3 cables, each two meters in length, are shipped for each DS3 that is ordered. (4, 8, or 12 cables) • 4 RJ48C straight cables (yellow), two meters in length.
<p>1+1 Patch Panel (STM1)</p>	<p>Provides connection of 1 STM1 line from the network to the 7800-STM1 and 7800-STM1+1.</p> <p>Cables provided (with each 1+1 Patch Panel (STM1)):</p> <ul style="list-style-type: none"> • 4 pairs of fiber optic cables, two meters in length. • 4 RJ48C straight cables (yellow), two meters in length.

2.2 Rack Mounting the 7800 Series Gateway Equipment

The 7800 series equipment is mounted on a customer provided equipment rack using the mounting hardware packaged in each box.

2.2.1 Prerequisites

To rack mount the equipment, you will need:

- One customer-provided equipment rack, measuring 19" in width and 31.5" in depth. The rack must be solidly anchored to the floor with appropriate support at the top of the racks.
- Climate controlled room: 0 to +50 Celsius, 0 to 95% non-condensing humidity.

2.2.2 Vertical Placement of the Equipment

The 7800-CTRL and 7800-TMS are each housed in 1U chassis, while 7800 Telecom units are housed in 2U chassis, as tabulated in table 2.2 on page 14. It is important that you provide for enough room on the equipment rack to allow for the installation of the equipment.

Consider the available space on your equipment rack and the height of one or two 7800-CTRL unit(s), one to sixteen 7800 Telecom unit(s), and from zero to two TMG7800-TMS units. Due to the rear-exhaust heat vents and the efficient heat dissipation design, there is no need to leave any physical vertical space above or below the 7800-CTRL unit(s), 7800 N+1 patch panel(s), 7800 Telecom unit(s), and the 7800-TMS unit(s) on the equipment rack.

Table 2.2 Tmedia VoIP Gateway Physical Height

Tmedia Model Number	Vertical Height
7800-CTRL	1U (1.75 inches or 44.45 mm)
7800 Telecom Unit	1U (1.75 inches or 44.45 mm)
7800-TMS	1U (1.75 inches or 44.45 mm)
RJ48C Patch Panels	1U (1.75 inches or 44.45 mm)
7800 N+1 Patch Panels	1U (1.75 inches or 44.45 mm)

2.2.3 Installing the 7800 Series Gateway on an Equipment Rack

The 7800-CTRL, 7800 Telecom Unit, and 7800-TMS are mounted on a 19" equipment rack using the angle brackets and screws provided in the box.

2.2.3.1 7800-CTRL

To install the 7800-CTRL unit on the equipment rack, refer to the Levono Rack Installation Instructions document shipped with the unit.

2.2.3.2 7800 Telecom Units

Mounting the 7800 Telecom Unit(s)

1. Using four metal screws, attach one angle bracket to the front, left-hand side of the 7800 Telecom Unit, when viewed from the front. Do the same for the angle bracket on the right-hand side.
2. Start mounting equipment beneath the 7800-CTRL, keeping in mind the space required on the equipment rack as described in Section 2.2.2 "Vertical Placement of the Equipment" on page 14.
3. Repeat steps 1 and 2 for each additional 7800 Telecom Unit.

Note If you are installing TMG7800-TE units you will require one to two patch panels per TMG7800-TE. Mount the patch panels beneath each TMG7800-TE.

2.2.3.3 7800-TMS

Mounting the 7800-TMS Unit(s):

1. Using four metal screws, attach one angle bracket to the front, left-hand side of the 7800-TMS, when viewed from the front. Do the same for the angle bracket on the right-hand side.
2. Start mounting equipment beneath the last 7800 Telecom Unit, keeping in mind the space required on the equipment rack as described in Section 2.2.2 "Vertical Placement of the Equipment" on page 14.
3. Repeat steps 1 and 2 for a second 7800-TMS.

2.2.3.4 7800 N+1 Patch Panel

Mounting the 7800 N+1 Patch Panel(s):

1. Using four metal screws, attach one angle bracket to the front, left-hand side of the 7800 N+1 patch panel, when viewed from the front. Do the same for the angle bracket on the right-hand side.
2. Start mounting this equipment beneath the last 7800-TMS, keeping in mind the space required on the equipment rack as described in Section 2.2.2 "Vertical Placement of the Equipment" on page 14.
3. Repeat steps 1 and 2 for a second 7800 N+1 patch panel.

2.2.3.5 7800 1+1 Patch Panel

Mounting the 7800 1+1 Patch Panel(s):

1. Using four metal screws, attach one angle bracket to the front, left-hand side of the 7800 1+1 patch panel, when viewed from the front. Do the same for the angle bracket on the right-hand side.
2. Start mounting this equipment beneath the last 7800-TMS, keeping in mind the space required on the equipment rack as described in Section 2.2.2 “Vertical Placement of the Equipment” on page 14.
3. If required, repeat steps 1 and 2 for a second 7800 1+1 patch panel.

2.2.3.6 7800 RJ48C Patch Panel

Mounting the 7800 RJ48C Patch Panel(s):

1. Using four metal screws, attach one angle bracket to the front, left-hand side of the 7800 RJ48C patch panel, when viewed from the front. Do the same for the angle bracket on the right-hand side.
2. Start mounting this equipment beneath the last 7800-TMS, keeping in mind the space required on the equipment rack as described in Section 2.2.2 “Vertical Placement of the Equipment” on page 14.
3. If required, repeat steps 1 and 2 for a second 7800 RJ48C patch panel.

Section 3 Installing the 7800-CTRL

This section covers the following procedures:

- Section 3.1 “Connecting to the 7800 Series Gateway Management Interface” on page 18.
- Section 3.2 “Connecting to the 7800 Series Control Network” on page 19.
- Section 3.3 “Powering Up” on page 20.

3.1 Connecting to the 7800 Series Gateway Management Interface

The 7800 series gateway management interface enables administrators to perform management tasks on a 7800-CTRL.

Prerequisites

To communicate with the management interface, the following is needed:

- One CAT5 Ethernet cable with RJ45 male-male terminations.

Note Ethernet cables are not supplied with the 7800-CTRL.

To communicate with the Management Interface:

1. Connect an RJ45 cable from the 7800-CTRL to a Gigabit Ethernet switch.

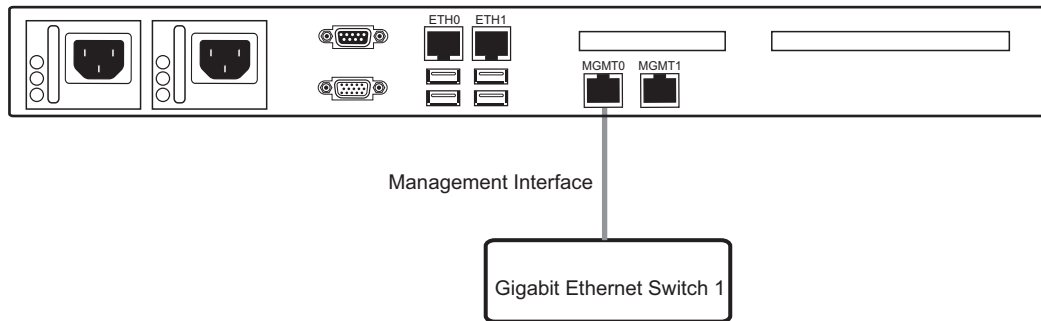


Figure 3.1 7800-CTRL System Management Interface

3.2 Connecting to the 7800 Series Control Network

The 7800 Series Control network enables communication between the 7800-CTRL, the 7800 Telecom Unit(s), and the 7800-TMS.

Prerequisites

To connect the 7800-CTRL to the control network, you will need:

- Two CAT5 Ethernet cables with RJ45 male-male terminations.

Connections

The 7800-CTRL is connected to the control network using two CAT5 Ethernet cables, as shown in figure 3.2 on page 19.

To connect to the control network:

1. Connect the ETH0 connector on the 7800-CTRL to the Control network switch one.
2. Connect the ETH1 connector on the 7800-CTRL to the Control network switch two.

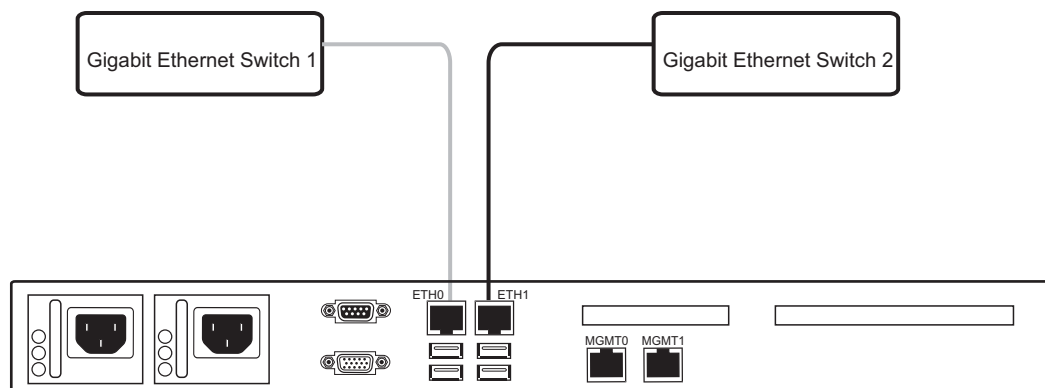


Figure 3.2 Connecting to the Control Network

3.3 Powering Up

The 7800-CTRL is furnished with two AC or two DC power connections. Only once all other equipment installation work has been completed should the Tmedia VoIP gateway be powered up.

Prerequisites

To power the 7800-CTRL, you will need:

- Two independent AC or DC power sources.
- Two power cables.

3.3.1 Connecting to AC Power

The 7800-CTRL is furnished with two AC power connectors.

To connect the TMG7800-CTRL to AC Power:

1. Connect the first power connector of the 7800-CTRL to the first power source. See Figure 3.3.
2. Connect the second power connector of the 7800-CTRL to the second power source.

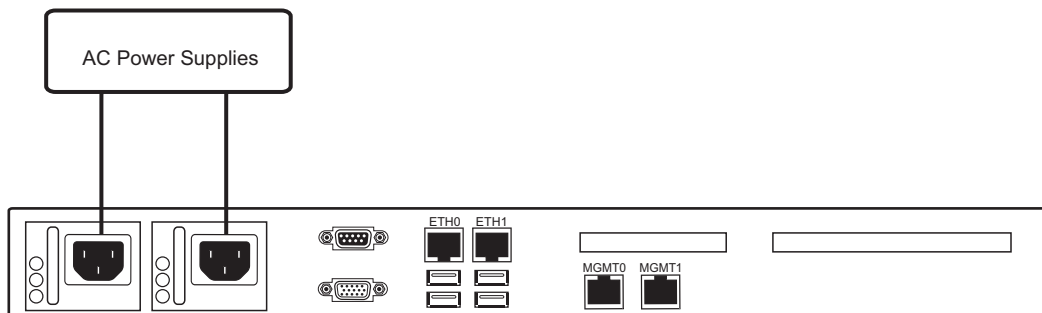


Figure 3.3 7800-CTRL AC Power Connections

Section 4 Installing the 7800 Series Telecom Units

This section covers the following procedures:

- Section 4.1 “Connecting to the Control Network” on page 22.
- Section 4.2 “Connecting to the VoIP Network(s)” on page 23.
- Section 4.3 “Connecting to the PSTN” on page 24.
- Section 4.4 “Connecting to the TMS Network” on page 35.
- Section 4.5 “Grounding the Equipment Chassis” on page 38.
- Section 4.6 “Powering Up” on page 39.

4.1 Connecting to the Control Network

The 7800 Series Control network enables communication between the 7800-CTRL, the 7800 Telecom unit(s), the 7800-TMS, and 7800 N+1 patch panel(s).

Prerequisites

To connect the 7800 Telecom unit(s), you will need:

- Two CAT5 Ethernet cables with RJ45 male-male terminations for each 7800 Telecom unit.

Connections

The 7800 Telecom unit(s) are connected to the control network using two CAT5 Ethernet cables, as shown in figure 4.1 on page 22.

To connect to the control network:

1. Connect the ETH0 connector on the 7800 Telecom unit to the control network switch one.
2. Connect the ETH1 connector on the 7800 Telecom unit to the control network switch two.
3. Repeat steps 1 and 2 for each additional 7800 Telecom Unit.

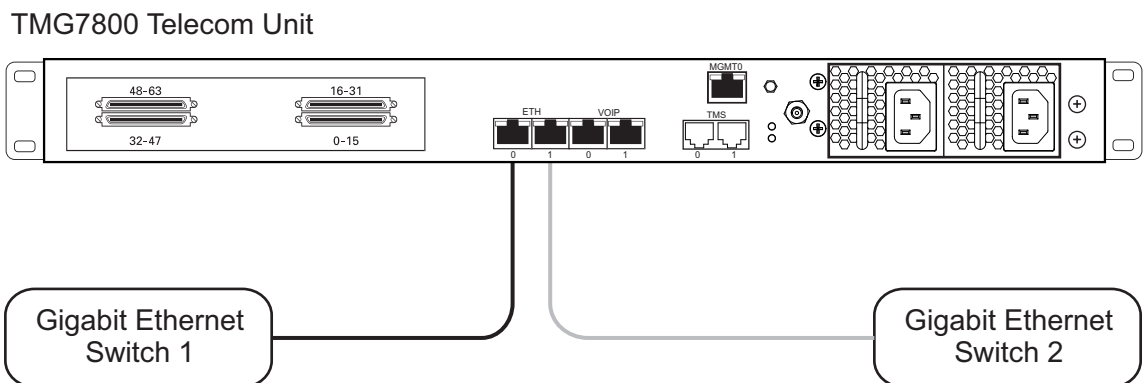


Figure 4.1 Connecting to the Control Network

4.2 Connecting to the VoIP Network(s)

Each 7800 Telecom unit features dual GigE ports for connection to different VoIP networks. This provides an access point to manage VoIP traffic. Should one of the IP networks fail, the 7800 Telecom Units will continue to manage VoIP traffic using the alternate network.

The IP address of the VoIP ports can be modified using the web portal.

Note: The 7800 Telecom Units require two (2) gigabit layer 2 Ethernet switches.

Prerequisites

To connect the 7800 Telecom units to the VoIP network, you will need:

- Two gigabit layer 2 Ethernet switches. A second one is required to support redundancy of the VoIP interface.
- Two CAT5 Ethernet cables with RJ45 male-male terminations.
- Two IP addresses located on different subnets.

Connections

The 7800 Telecom units are connected to the VoIP network through two Ethernet GigE network links, as shown in figure 4.2 on page 23.

To connect to the VoIP network:

1. Connect the VoIP0 connector from each 7800 Telecom unit to the first Ethernet switch.
2. Connect the VoIP1 connector from each 7800 Telecom unit to the second Ethernet switch.

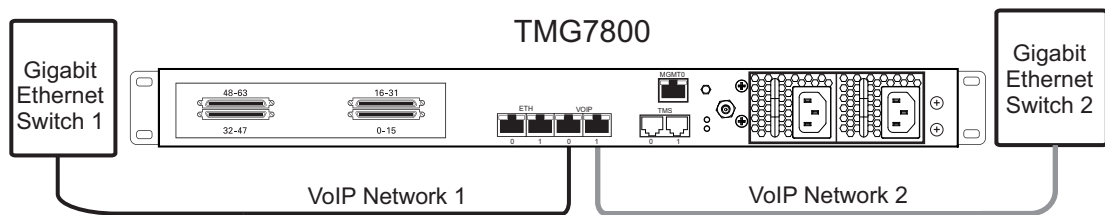


Figure 4.2 Connecting to the VoIP Network

4.3 Connecting to the PSTN

The 7800 Telecom Units feature a variety of interfaces to the PSTN network.

Prerequisites

To connect to the PSTN network, you must comply with the requirements of one of the following 7800 Telecom units:

- Your TMG7800-TE features SCSI connectors for connection to T1/E1 lines.

Standalone Configuration

You will require one RJ48C patch panel for each 32 line grouping of T1/E1 line interfaces with 2 SCSI cables per patch panel (supplied). Each T1/E1 line interfaces requires a RJ48C to connect to the PSTN (not supplied).

1+1 configuration

You will require a 1+1 Patch Panel (32 T1/E1) for each 32 line grouping of T1/E1 line interfaces with 4 SCSI cables per patch panel (supplied). Each T1/E1 line interfaces requires a RJ48C to connect to the PSTN (not supplied).

- Your TMG7800-DS3 features BNC connectors for connection to DS3 lines.

Standalone Configuration

You will require two coaxial cables for each DS3 interface.

1+1 Configuration

Your 7800-DS3 and 7800-DS3+1 feature BNC connectors for connection to DS3 lines using a 1+1 patch panel. You will require two coaxial cables for each DS3 interface.

- Your TMG7800-STM1 features DIN 1.0/2.3 75 Ohm electrical or SMF LC optical connectors.

Standalone Configuration

You will require two coaxial cables for each STM-1e interface (Main and APS) or two fiber optic cables for each STM-1 optical interfaces (Main and APS).

1+1 Configuration

Note: The 1+1 patch panel does not support STM-1e interfaces.

Your 7800-STM1 and 7800-STM+1 feature SMF LC optical connectors for connection to STM-1 lines using a 1+1 patch.panel.

You will require two fiber optic cables for each STM-1 optical interface (Main and APS).

N +1 Configuration

Note: The N+1 patch panel does not support STM-1e interfaces.

Your 7800-STM1 and 7800-STM+1 feature SMF LC optical connectors for connection to STM-1 lines using an N+1 patch.panel.

You will require two fiber optic cables for each STM-1 optical interface (Main and APS).

4.3.1 SCSI Interface (T1/E1) for the TMG7800-TE

A TMG7800-TE with 4 SCSI connectors enables the connection to T1/E1 lines. The termination impedance is set at 120 ohms. It is possible to connect an external balun in order to convert to 75 ohms.

Note All ports may not be active. T1/E1 ports are activated by software license; the number of active ports depends on the licenses purchased.

Patch panels use straight connections. In other words, they do not cross the RX and TX signals. Connections between the patch panels and the TMG7800 require straight cables. The supplied SCSI cables are straight cables. Cables used to connect the network to the patch panel must do the cross connection.

4.3.1.1 Standalone Configuration

To connect the TMG7800-TE to the PSTN:

1. Start with SCSI ports 0-15 located at the bottom right as shown in figure 4.3 on page 26. Connect one SCSI cable between this port and RJ48C patch panel number 1, ports 0-15. Connect SCSI ports 16-31 to patch panel number 1, ports 16-31.
2. Repeat step 1, using lines 32-63 and a second RJ48C patch panel. Connect lines 32-47 to patch panel 2, ports 0-15. Connect lines 48-63 to patch panel 2, ports 16-31.

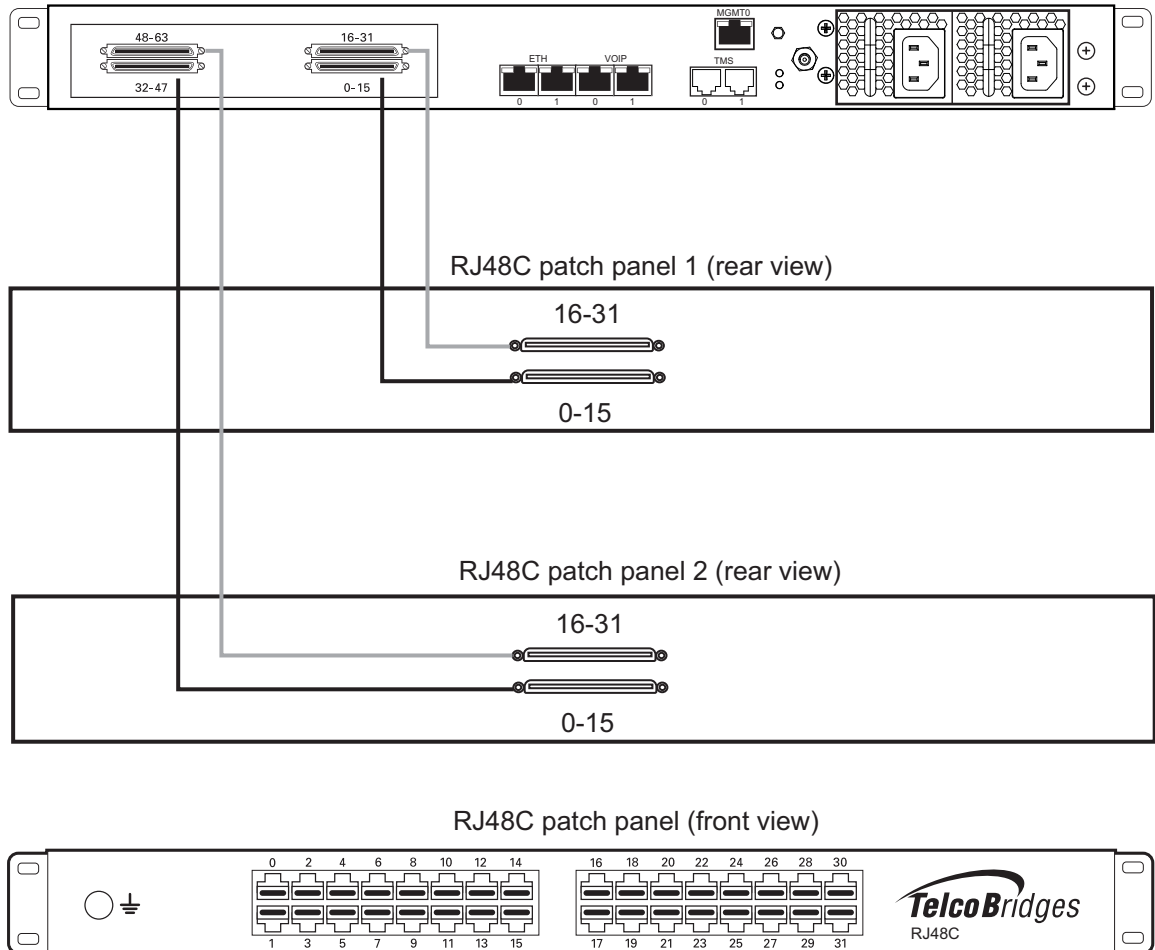


Figure 4.3 TMG7800-TE with SCSI connectors

4.3.1.2 1+1 Configuration

To connect both the 7800-TE and 7800-TE+1 (SCSI) to the PSTN:

1. Connect each T1/E1 line from the network section of the 1+1 patch panel to the remote equipment. See figure 4.4 on page 28.
2. Connect SCSI ports 0-15 from the Gateway section at the rear of the 1+1 patch panel to the SCSI ports 0-15 of the 7800-TE.
3. Connect SCSI ports 16-31 from the Gateway section at the rear of the 1+1 patch panel to the SCSI ports 16-31 of the 7800-TE.
4. Connect SCSI ports 0-15 from the Gateway 1+1 section at the rear of the 1+1 patch panel to the SCSI ports 0-15 of the 7800-TE+1.
5. Connect SCSI ports 16-31 from the Gateway 1+1 section at the rear of the 1+1 patch panel to the SCSI ports 16-31 of the 7800-TE+1.

Note: To connect 32 more lines to the 7800-TE and the 7800-TE+1, install another 1+1 patch panel and connect the additional 32 lines to ports 32-63 on each unit.

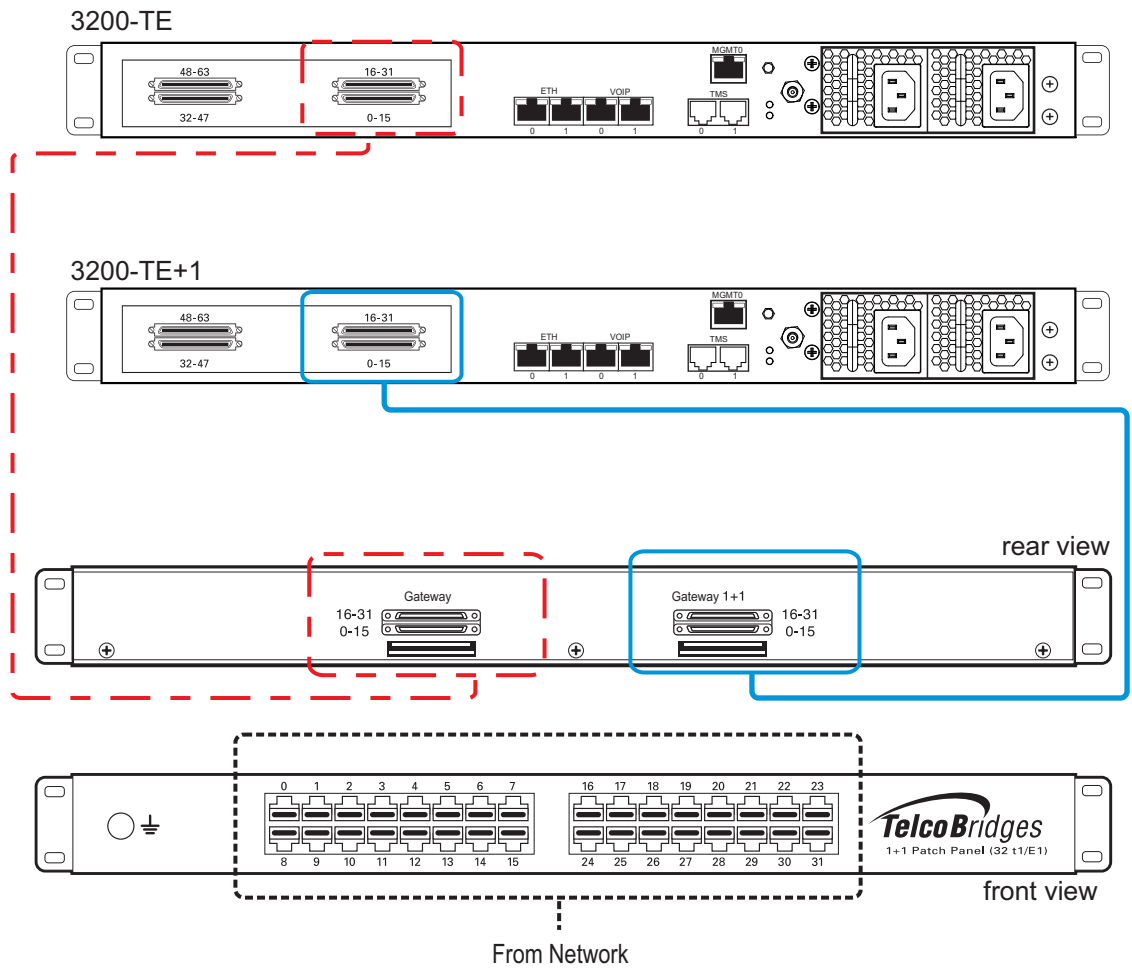


Figure 4.4 7800-TE and 7800-TE+1 connecting to the TDM 1+1 32/T1/E1 1+1 patch panel

4.3.2 Dual BNC Interface (DS3) for the TMG7800-DS3

A TMG7800-DS3 with 3 sets of BNC connectors enables the connection to DS3 lines. See figure 4.5 on page 29.

Note All ports may not be active. DS3 ports are activated by software license; the number of active ports depends on the licenses purchased.

4.3.2.1 Standalone Configuration

To connect the TMG7800-DS3 to the PSTN:

1. Start with the Dual BNC port pair #0 (right-most) as shown in figure 4.5 on page 29. Connect one pair of BNC cables between this port and the DS3 line.
2. Repeat step 1, using the next available pair of BNC PSTN interface ports.

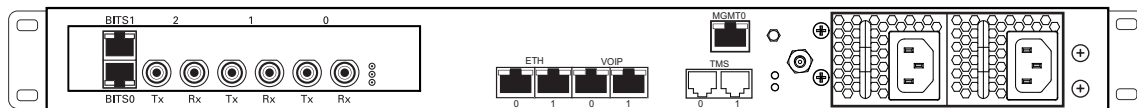


Figure 4.5 DS3 Interface to the PSTN

Note The TMG7800-DS3 features 2 RJ48C connectors that can be used to synchronize the TDM network (BITS interface) or to carry E1/T1 signaling.

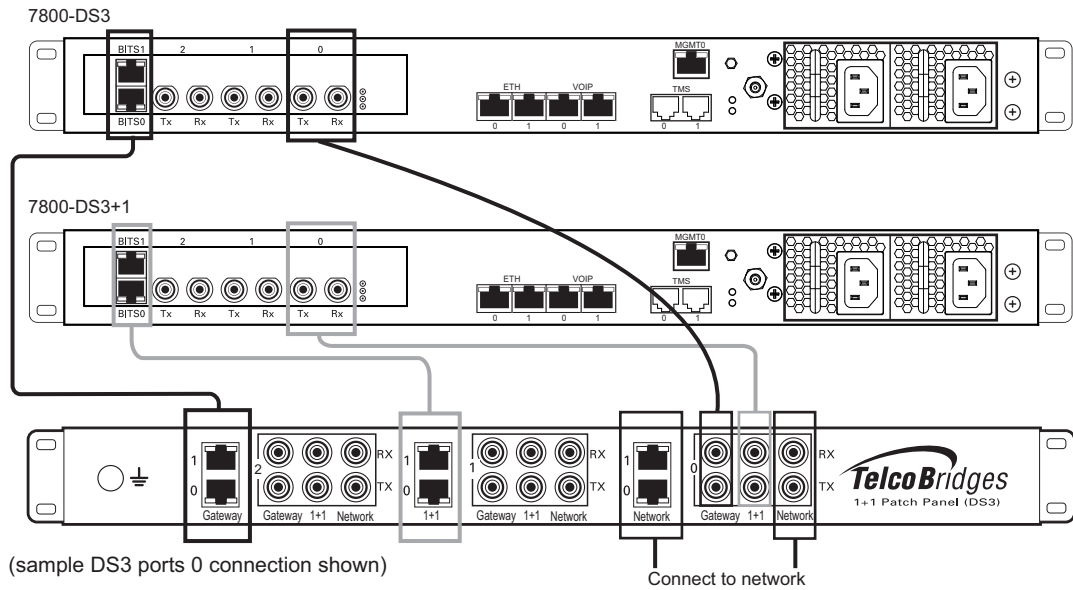
4.3.2.2 1+1 Configuration

To connect both the 7800-DS3 and 7800-DS3+1 to the PSTN:

1. Connect each DS3 line from the network section of the 1+1 patch panel to the remote equipment. See figure 4.6 on page 30.
2. Connect each DS3 line from the DS3 connectors labeled **Gateway** of the 1+1 patch panel to the 7800-DS3.
3. Connect each DS3 line from the DS3 connectors labeled **1+1** of the 1+1 patch panel to the 7800-DS3+1.

Optional

1. Connect bits port 0 and 1 from the 7800-DS3 to the 1+1 patch panel
2. Connect bits port 0 and 1 from the 7800-DS3+1 to the 1+1 patch panel



(sample DS3 ports 0 connection shown)

Figure 4.6 7800-DS3 and 7800-DS3+1 connecting to the TDM 1+1 DS3 1+1 patch panel

4.3.3 OC3/STM-1 Interface for the TMG7800-STM1

This section describes the connection to OC3/STM-1 interfaces using three methods:

- Standalone (without a patch panel)
- 1+1 protection (with a 1+1 patch panel)
- N+1 protection (with an N+1 patch panel)

Refer to table 4.1 on page 31 for a listing of supported STM-1 interfaces. The default SFP module for OC3/STM1 connection is SMF, intermediate reach, (SFP-OC3-IR1) 1310 nm with LC type connectors.

Note Make certain that the correct SFP model is selected at the time of ordering. If your installation requires a different model from the one that has been provided, you must replace it.

Table 4.1 STM-1 Interfaces

Transceiver Model	Description	Spec	Mode	Type	Range (Km.)	Wavelength (NM)	Connection
SFP-OC3-IR1	OC3/STM1	Hot Pluggable	Single-mode	Intermediate reach	15	1310	LC
SFP-STM1E	STM1E (Electrical)	Hot Pluggable	75 ohms Cooper	Max 180m	1	NA	DIN 1.0/2.3

A TMG7800-STM1, with one main and one backup APS OC3 or STM1 port enables connection to OC3/STM1 lines. See figure 4.7 on page 32. The APS port is used for OC3/STM1 redundancy. Switchover occurs automatically based on configurable parameters. It is recommended that APS be used if the installation provides this feature.

Note The TMG7800-STM1 features 2 RJ48C connectors that can be used to synchronize the TDM network (BITS interface) or to carry E1/T1 signaling.

4.3.3.1 Standalone Configuration

To connect the TMG7800-STM1 (Optical Interface) to the PSTN:

1. Connect a fiber optic cable between the Port 0 (Main) port and OC3/STM1 line, as shown in figure 4.7 on page 32.
2. Connect a fiber optic cable between the Port 1 (APS) port and OC3/STM1 line.

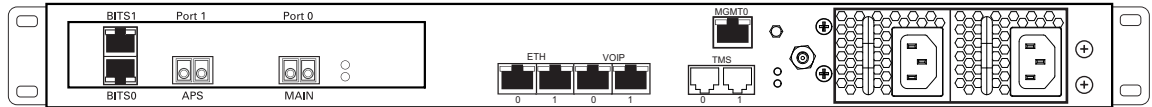


Figure 4.7 Optical Interface to the PSTN

4.3.3.2 1+1 Configuration

To connect both the 78007800-STM1 and 7800-STM +1 (Optical Interface) to the PSTN:

1. Connect each OC3/STM1 line of the network section of the 1+1 patch panel to the remote equipment. See figure 4.8 on page 33.
2. Connect a fiber optic cable between STM1 of the Gateway section of the 1+1 patch panel and the main port of the 7800-STM1.
3. Connect a fiber optic cable between APS of the Gateway section of the 1+1 patch panel and the APS port of the 7800-STM1.
4. Connect a fiber optic cable between STM1 of the Gateway 1+1 section of the 1+1 patch panel and the main port of the 7800-STM1 +1.
5. Connect a fiber optic cable between APS of the Gateway 1+1 section of the 1+1 patch panel and the APS port of the 7800-STM1 +1.

Optional

1. Connect bits port 0 and 1 from the 7800-STM1 to the 1+1 patch panel
2. Connect bits port 0 and 1 from the 7800-STM1+1 to the 1+1 patch panel

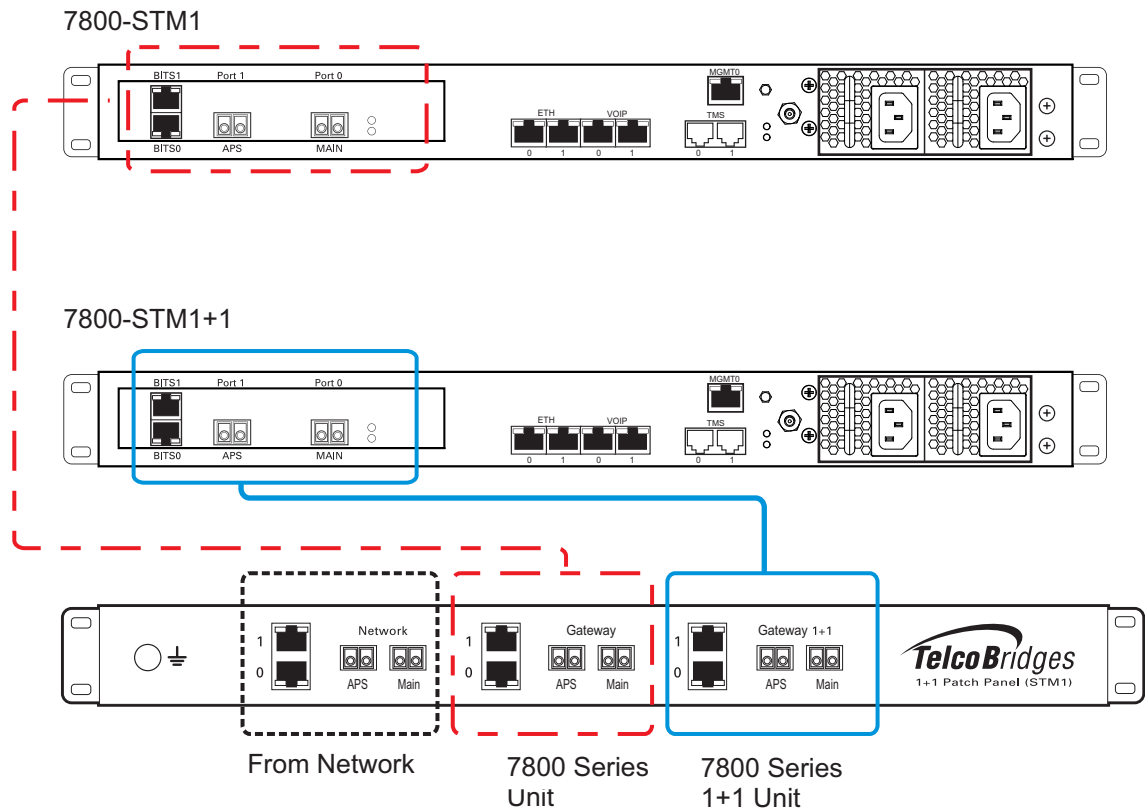


Figure 4.8 7800-STM1 and 7800-STM1 +1 connecting to the STM1 1+1 patch panel

4.3.3.3 N+1 Configuration

The 7800 N+1 patch panels function as the bridge between the provider network and the TMG7800-STM1 gateways. To properly wire your gateways to the 7800 N+1 patch panel(s) to provide N+1 protection, follow these guidelines.

1. Prepare a diagram that links each Tmedia unit serial number with an N+1 patch panel port and the network provider's STM1. This diagram will help for the web portal configuration later on.
2. Relate the fiber optic cables from the network provider with each TMG7800-STM1 and use the same port number that is assigned to each TMG7800-STM1. See figure 4.9 on page 34
3. If Automatic Protection Switching (APS) is used then repeat the EXACT SAME numbering scheme for each APS connection. For example, if a TMG7800-STM1 is assigned port number one on a 7800 N+1 patch panel that is being used for main connections, then the APS connections must also be assigned port number one on a 7800 N+1 patch panel that is being used for APS connections.
4. Connect the TMG7800+1 unit to the N+1 port of the N+1 patch panel.

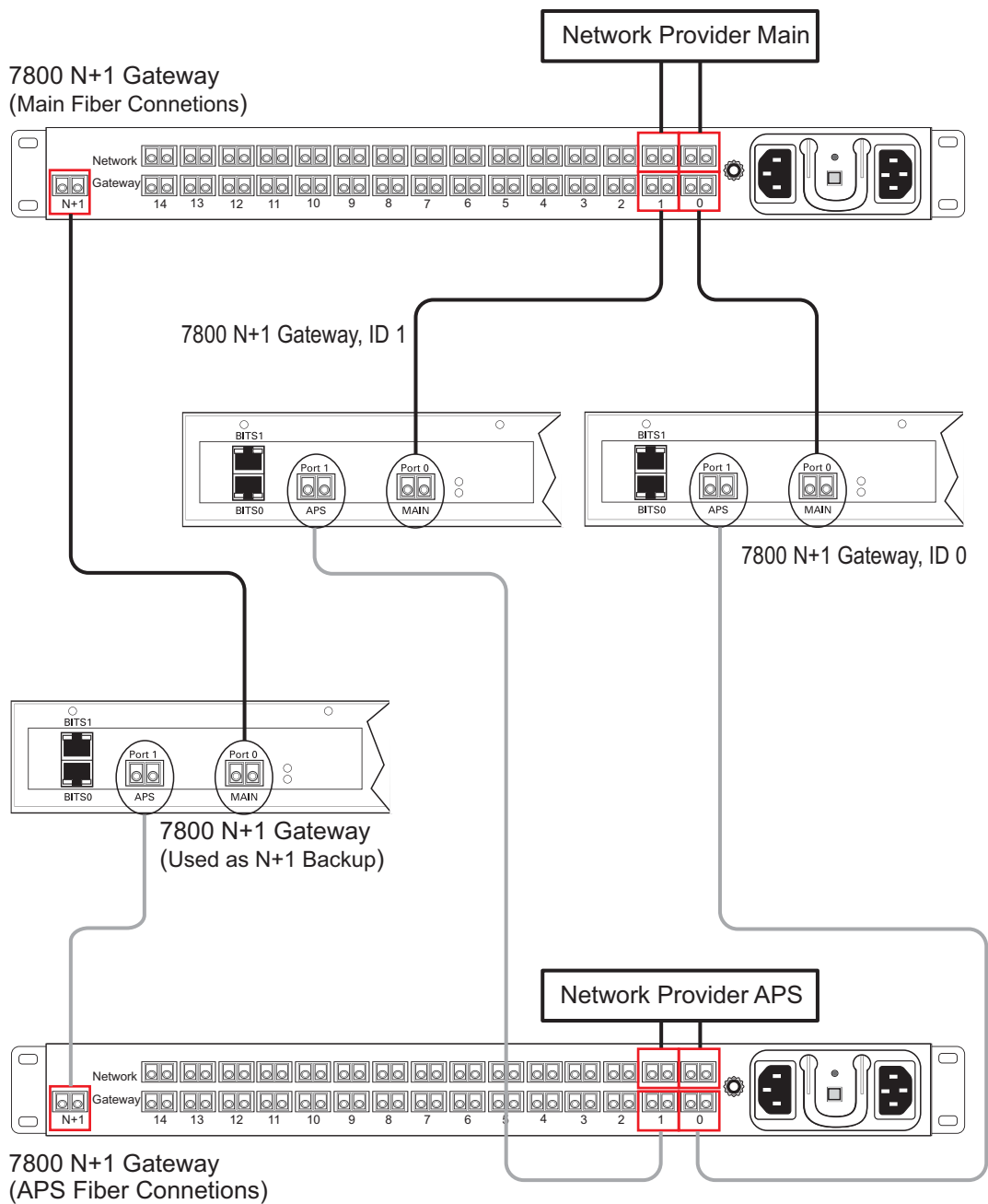


Figure 4.9 Optical Interface Connections to the 7800 N+1 Patch Panel

Note To learn more about the connections to a 7800 N+1 patch panel, See “Installing the 7800 N+1 Patch Panel” on page 47 for more information.

4.4 Connecting to the TMS Network

Note You must order one TelcoBridges CAT7 shielded Ethernet crossover cable, with RJ45 type male-male connectors, for each connection between 7800 Telecom units and a 7800-TMS.

4.4.1 Connecting to the TMG7800 Telecom Units

The 7800-TMS enables you to scale your system by interfacing as many as sixteen 7800 Telecom Units with the 7800-TMS Switch network, building a non-blocking system of up to 32,768 channels. A second 7800-TMS provides your system with an active/standby high availability architecture.

4.4.1.1 Prerequisites

Use TelcoBridges CAT7 shielded Ethernet crossover cable to interconnect the 7800 Telecom Units with the 7800-TMS.

- Order one TelcoBridges CAT7 shielded Ethernet crossover cable, with RJ45 type male-male connectors, for each connection between 7800 Telecom units and a 7800-TMS.
- If your system features a second 7800-TMS, you must order an additional TelcoBridges CAT7 shielded Ethernet cable, with RJ45 male-male terminations, for each 7800 Telecom Unit.

4.4.1.2 Interconnections

To interconnect the 7800-TMS:

1. Start with the 7800 Telecom Unit at the topmost position of the equipment rack and connect a TelcoBridges CAT7 shielded Ethernet crossover cable to the TMS0 connector at the rear of the 7800 Telecom Unit, figure 4.10 on page 36. Connect the other end of the same TelcoBridges CAT7 cable to the first port of the first 7800-TMS.

Note Ensure that the TMS0 port of all the 7800 Telecom units connect to the same 7800-TMS switch.

2. If your system employs a second 7800-TMS, connect a second TelcoBridges CAT7 shielded Ethernet crossover cable to TMS1 at the rear of the TMG7800 Telecom Unit, figure 4.10 on page 36. Connect the other end of the same TelcoBridges CAT7 cable to the first port of a second 7800-TMS.

Note Ensure that the TMS1 port of all the 7800 Telecom units connect to the same 7800-TMS switch.

3. Repeat steps 1-2 for each 7800 Telecom Unit until they have all been connected to the 7800-TMS.

Note All telecom units must use the same TMS port number when two 7800-TMS units are available.

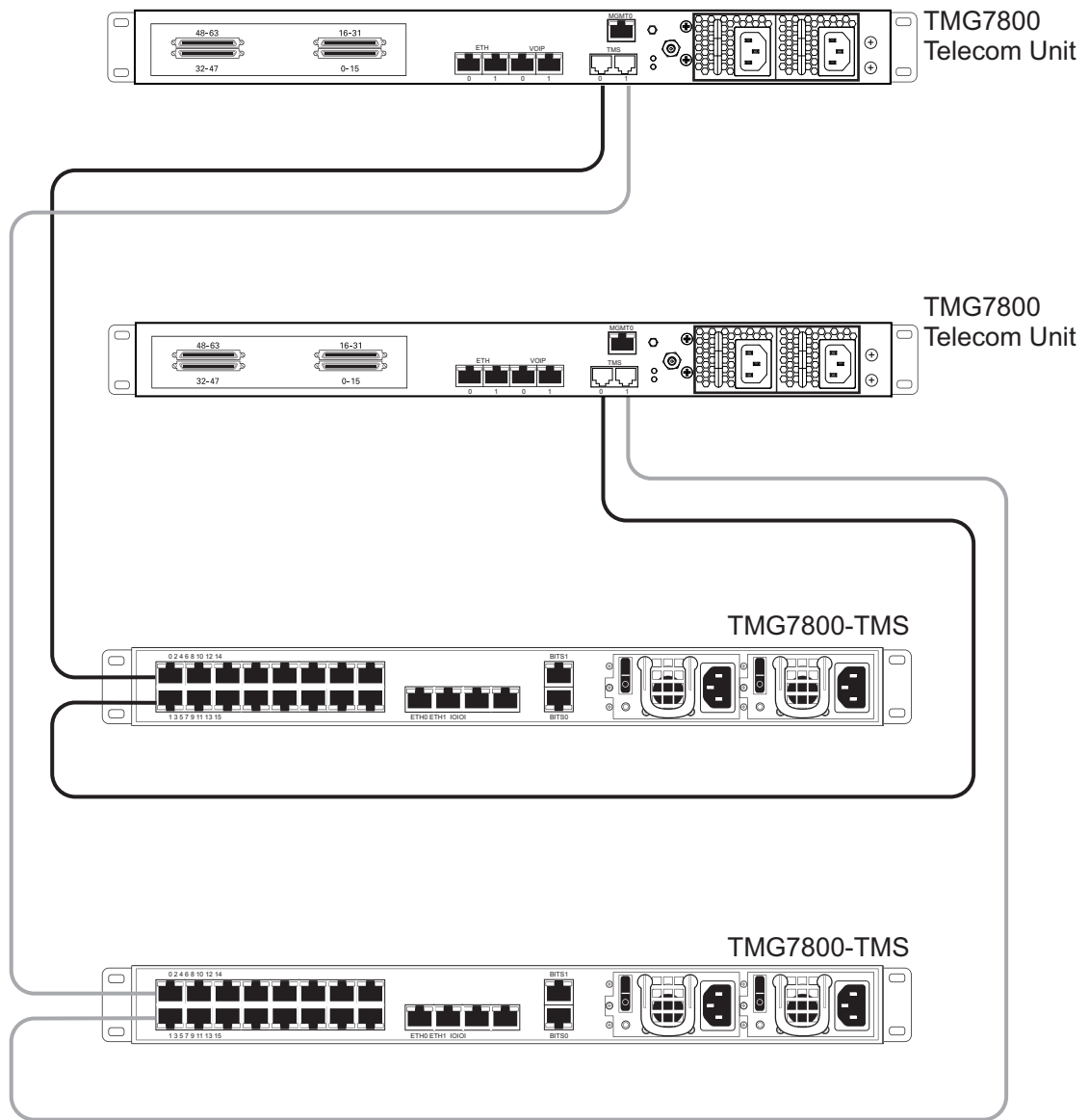


Figure 4.10 Interconnecting Two 7800 Telecom Units to an active and standby 7800-TMS

4.4.2 Interconnecting Two 7800 Telecom Units

If your 7800 Series gateway has no more than two 7800 Telecom Units, they can be connected to each other without the use of a 7800-TMS switch, with two TelcoBridges CAT7 shielded Ethernet crossover cables, with RJ45 type male-male connectors.

Simply connect the TMS0 ports of each unit together using a TelcoBridges CAT7 shielded cross-over cable, with RJ45 male-male terminations. Do the same for the TMS1 ports of each unit. See figure 4.11 on page 37.

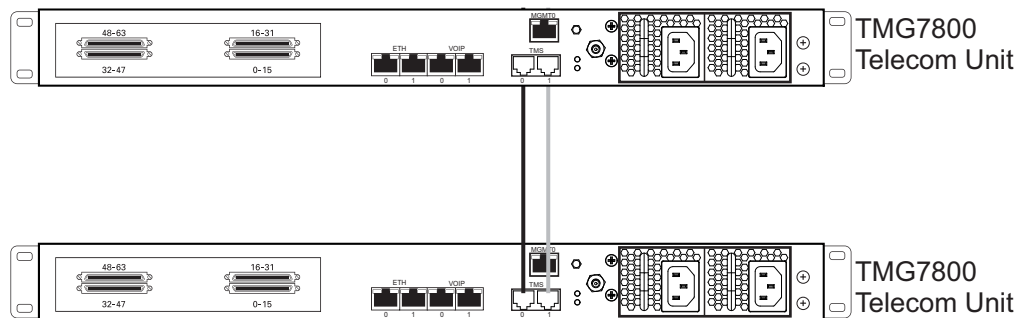


Figure 4.11 Interconnecting two 7800 Telecom Units.

4.5 Grounding the Equipment Chassis

As a standard safety practice, the chassis of the 7800 Telecom unit must be properly grounded to protect against any contact with an electrical fault condition. It is recommended that the chassis be connected to earth ground. When the 7800 Telecom unit is installed in an equipment rack, connect the ground wire between the ground lug of the Telecom unit and the equipment rack ground bar.

Guidelines

- Use 10 AWG (minimum) stranded ground wire.
- Terminate equipment side of ground wire with a #10 ring terminal.
- Keep the length of the ground wire as short as possible.
- Do NOT daisy chain the ground between equipment. Use a ground bus bar, as show in figure 4.12 on page 38.
- Do not over tighten ground lug connections.

To connect the 7800 Telecom unit to ground:

1. Connect one end of a ground wire to the ground lug of the 7800 Telecom unit. See figure 4.12 on page 38.
2. Connect the other end of the ground wire to a ground bar of the equipment rack. If the 7800 Telecom unit is not installed in an equipment rack, connect the ground wire to earth ground.
3. Verify that the resistance of the ground path is less than 0.5 ohms.

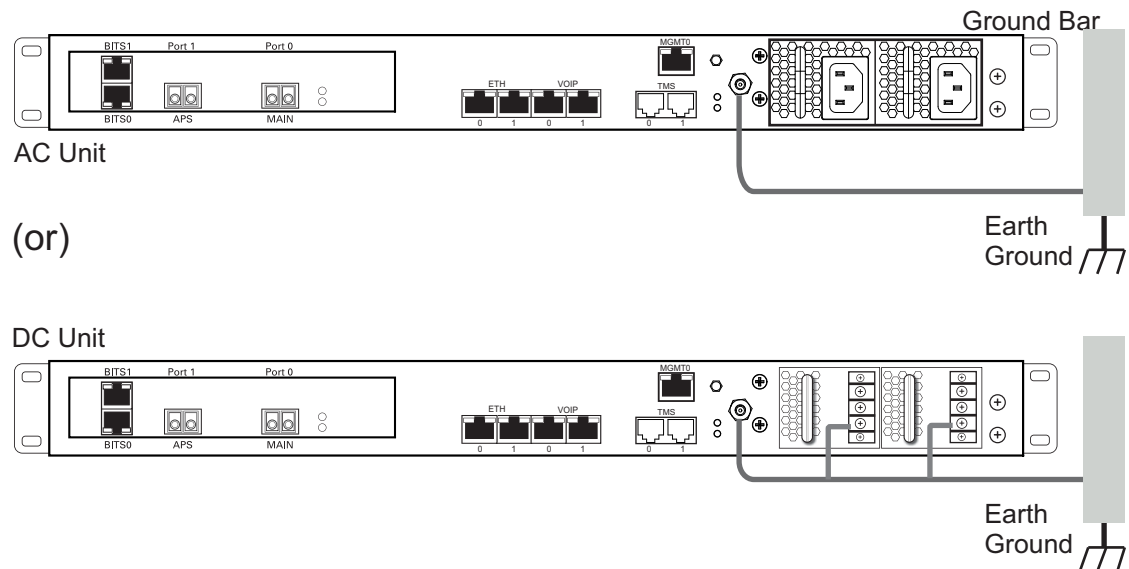


Figure 4.12 Chassis Ground Connection

4.6 Powering Up

The 7800 Telecom Units are furnished with two AC or DC power connections. Only once all other equipment installation work has been completed should the 7800 Telecom Unit be powered up.

4.6.1 Connecting to AC Power

Prerequisites

To power the 7800 Telecom Unit, you will need:

- One to two power sources.
- Two power cables.

The 7800 Telecom Unit AC model is furnished with two AC power connectors.

To connect the 7800 Telecom Unit to AC Power:

1. Connect an AC power cable between the AC connector of the 7800 Telecom Unit and an AC supply. See figure 4.13 on page 39.

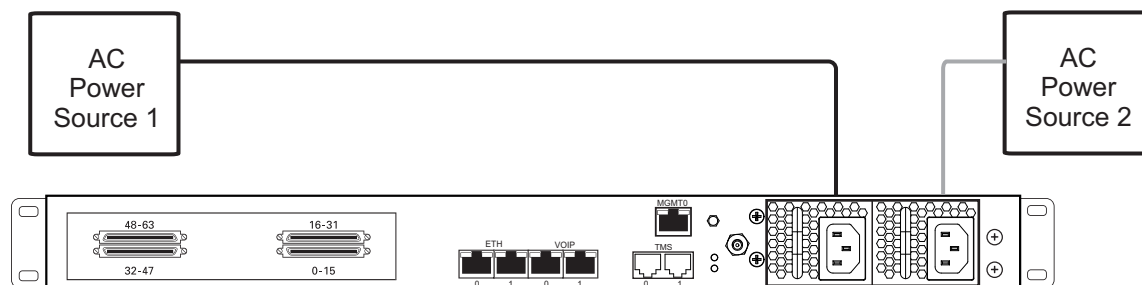


Figure 4.13 AC Power Connection

4.6.2 Connecting to DC Power

The 7800 series gateway DC model is furnished with two DC power connection ports. In addition, each DC powered unit is supplied with two DC power cables.

Fuse and Cabling Requirements

16 AWG wiring must be used and the 48V supply must be protected with a customer provided 5A 48V fuse.

To connect o DC power:

1. Connect one wire from the positive terminal of the 7800 series gateway to the return side of DC power source one, as shown in figure 4.14 on page 41.
2. Connect another wire from the negative terminal of the 7800 series gateway to the -48V side of DC power source one.
3. Connect a ground wire from the ground terminal of the 7800 series gateway to earth ground.
4. Repeat steps 1-3 for the second power DC power source.

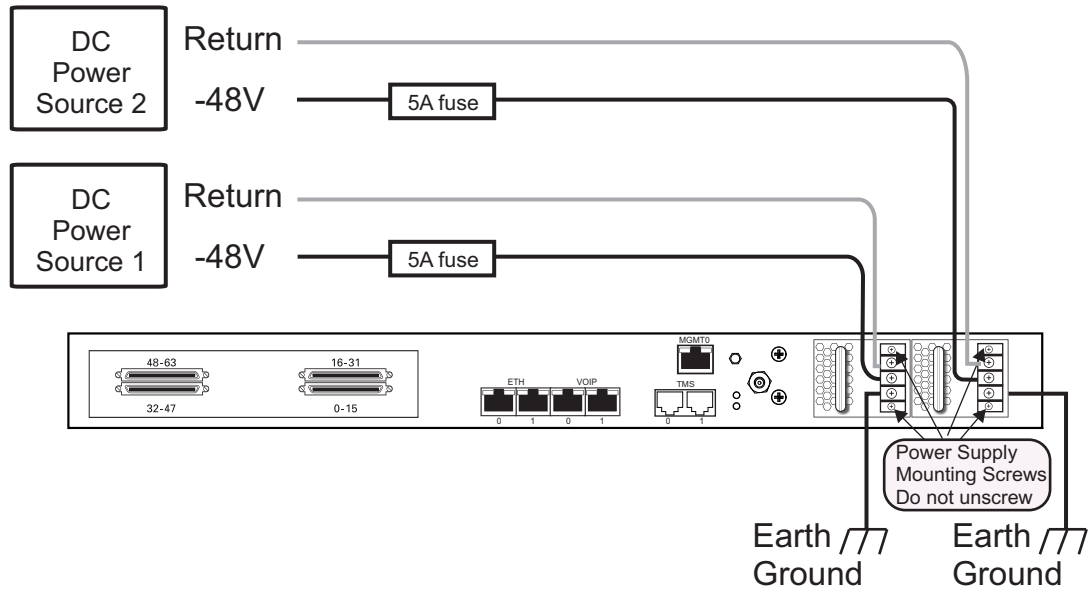


Figure 4.14 DC Power Connection

Section 5 Installing the 7800-TMS

This section covers the following procedures:

- Section 5.1 “Connecting to the Control Network” on page 43.
- Section 5.2 “Grounding the Equipment Chassis” on page 44.
- Section 5.3 “Powering Up” on page 45.

5.1 Connecting to the Control Network

The Control network enables the communication between the 7800-CTRL, the 7800 Series Telecom Unit(s), and the 7800-TMS.

Prerequisites

To connect the 7800-TMS, you will need:

- Two CAT5 Ethernet cables with RJ45 male-male terminations.

Connections

The 7800-TMS is connected to the 7800 series control network using two CAT5 Ethernet cables, as shown in figure 5.1 on page 43.

To connect to the control network:

1. Connect the ETH0 connector on the 7800-TMS to Control network switch one.
2. Connect the ETH1 connector on the 7800-TMS to Control network switch two.
3. Repeat step 1 and 2 for a second 7800-TMS.

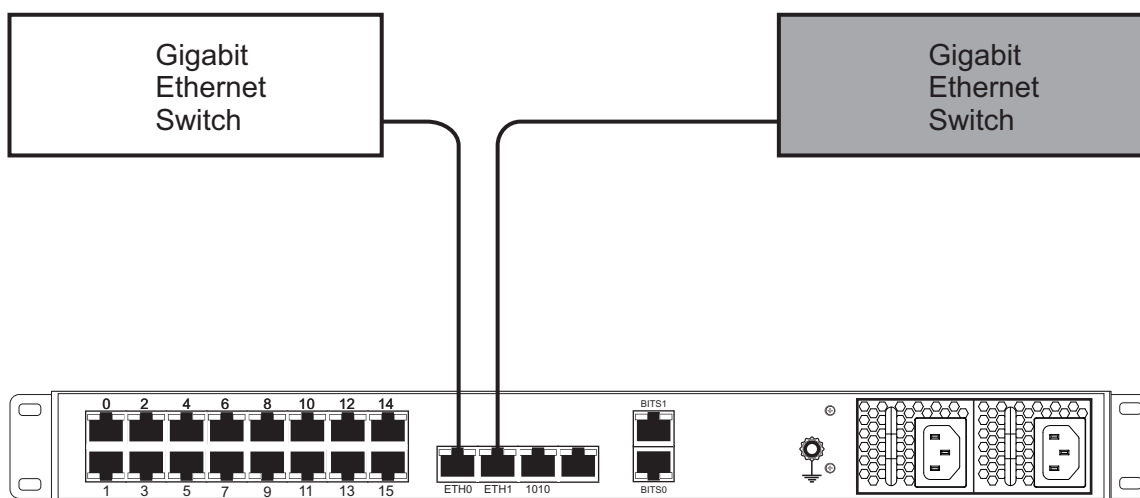


Figure 5.1 Connecting to the Control Network

5.2 Grounding the Equipment Chassis

As a standard safety practice, the chassis of the 7800 TMS must be properly grounded to protect against any contact with an electrical fault condition. It is recommended that the chassis be connected to earth ground. When the 7800 TMS is installed in an equipment rack, connect the ground wire between the ground lug of the unit and the equipment rack ground bar (figure 5.2 on page 44), or in the case of earlier 7800-TMS models (figure 5.2 on page 44), connect a ground wire between the power supply mounting bolt and the equipment rack ground bar.

Guidelines

- Use 10 AWG (minimum) stranded ground wire.
- Terminate equipment side of ground wire with a #10 ring terminal.
- Keep the length of the ground wire as short as possible.
- Do NOT daisy chain the ground between equipment. Use a ground bus bar, as show in figure 5.2 on page 44.
- Do not over tighten ground lug connections.

5.2.1 7800 TMS

To connect 7800 TMS unit to ground:

1. Connect one end of a ground wire to the chassis ground lug of the 7800 TMS. See figure 5.2 on page 44.
2. Connect the other end of the ground wire to a ground bar of the equipment rack. If the 7800 TMS is not installed in an equipment rack, connect the ground wire to earth ground.
3. Verify that the resistance of the ground path is less than 0.5 ohms.

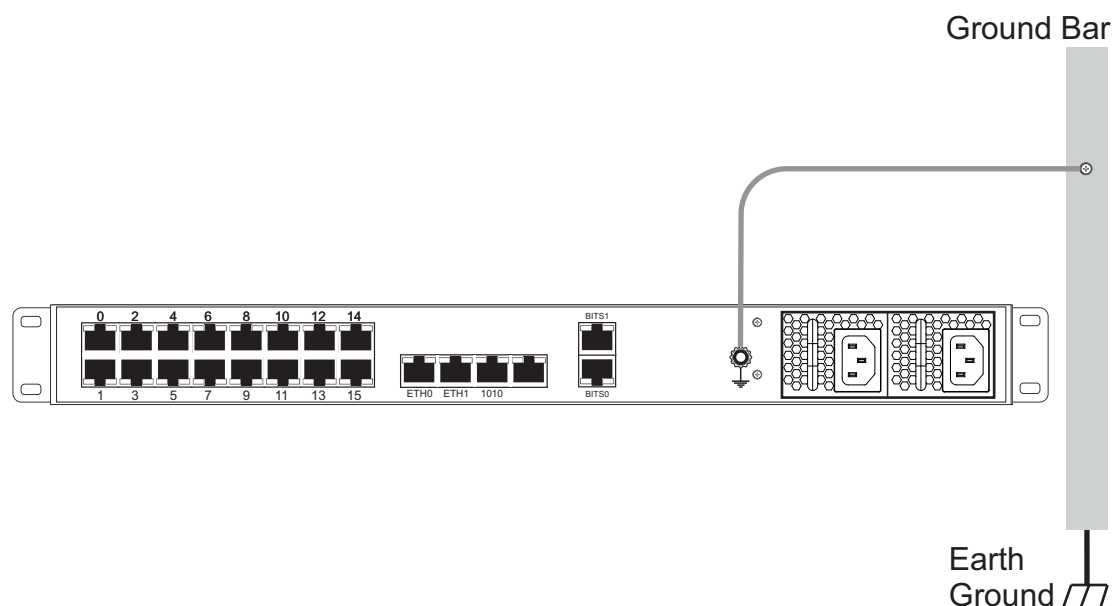


Figure 5.2 Chassis Ground Connection- 7800 TMS Later Models

5.3 Powering Up

The 7800-TMS is with two (2) AC or two (2) DC power connections. Only once all other equipment installation work has been completed should the 7800-TMS be powered up.

Prerequisites

To power the 7800-TMS, you will need:

- One to two power sources.
- Two power cables.

5.3.1 Connecting to AC Power

The 7800 Telecom Unit AC model is furnished with two AC power connectors.

To connect the 7800 Telecom Unit to AC Power:

1. Connect an AC power cable between the AC connector of the 7800-TMS and an AC supply. See figure 5.3 on page 45.

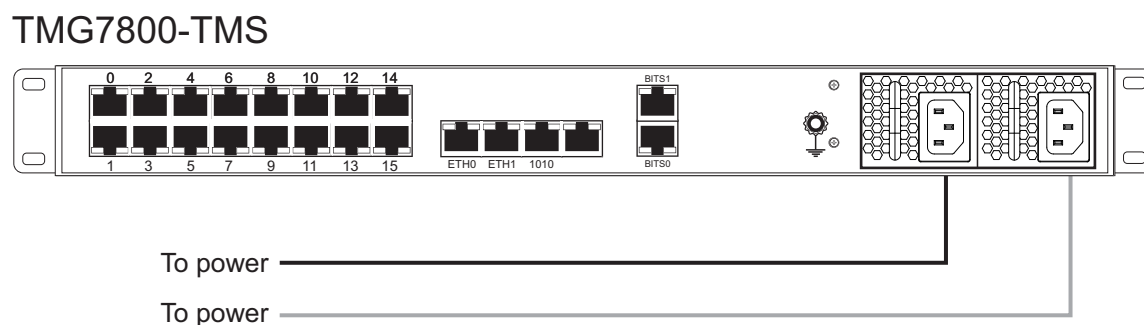


Figure 5.3 7800-TMS AC Power Connections

5.3.2 Connecting to DC Power

The 7800-TMS DC models are furnished with two DC power connection ports.

Fuse and Cabling Requirements

16 AWG wiring must be used and the 48V supply must be protected with a customer provided 5A 48V fuse.

To connect o DC power:

1. Connect one wire from the positive terminal of the 7800-TMS to the return side of DC power source one, as shown in figure 5.4 on page 46.
2. Connect another wire from the negative terminal of the 7800-TMS to the -48V side of DC power source one.
3. Connect a ground wire from the ground terminal of the 7800-TMS to earth ground.
4. Repeat steps 1-3 for the second power DC power source.

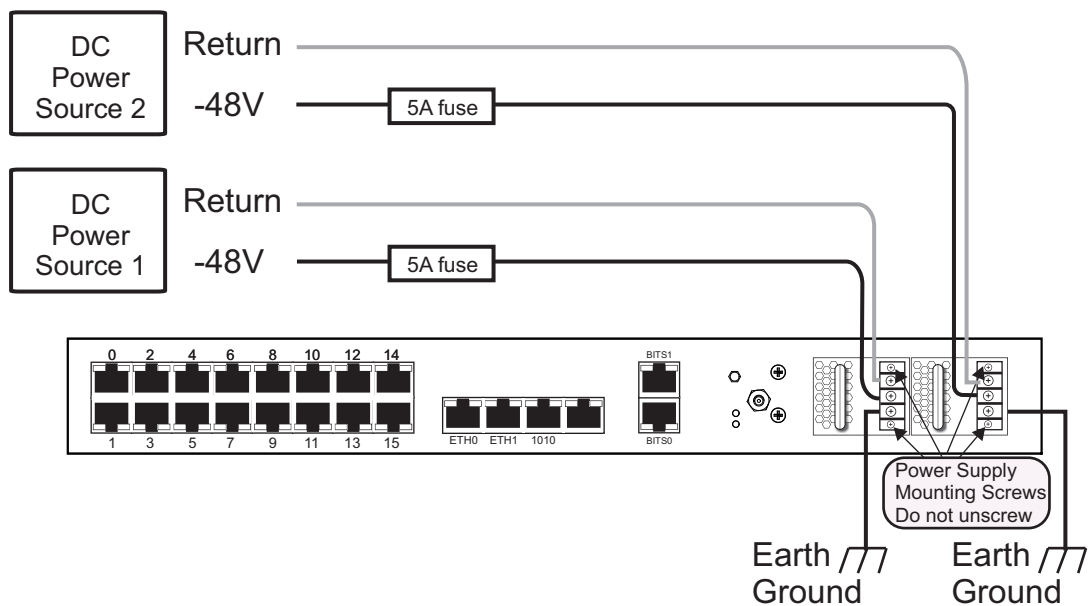


Figure 5.4 7800-TMS DC wiring diagram

5.4 TDM System Clock

The 7800 series system must be synchronized with the TDM network in one of several ways:

- Synchronized with an incoming trunk
- Synchronized with a SONET SDH
- Synchronized with a BITS port. If your system features a 7800-TMS and a BITS interface is available, it is recommended that the BITS interface be connected to the BITS port of the 7800-TMS

Section 6 Installing the 7800 N+1 Patch Panel

This section covers the following procedures:

- Section 6.1 “Connecting Fiber Optic Cables to the 7800 N+1 Patch Panel” on page 48.
- Section 6.2 “Connecting to the Control Network” on page 48
- Section 6.3 “Grounding the Equipment Chassis” on page 49
- Section 6.4 “Connecting to AC Power” on page 50.

6.1 Connecting Fiber Optic Cables to the 7800 N+1 Patch Panel

Note To learn more about the TDM connections to a 7800 N+1 patch panel, See “N+1 Configuration” on page 33 for more information.

6.2 Connecting to the Control Network

The 7800 Series Control network enables communication between the 7800-CTRL, the 7800 Telecom unit(s), the 7800-TMS, and 7800 N+1 patch panel(s).

Prerequisites

To connect the 7800 N+1 patch panel(s) to the control network, you will need:

- Two CAT5 Ethernet cables with RJ45 male-male terminations for each 7800 N+1 patch panel.

Connections

The 7800 N+1 patch panel(s) are connected to the control network using two CAT5 Ethernet cables, as shown in figure 6.1 on page 48.

To connect to the control network:

1. Connect the ETH0 connector on the 7800 N+1 patch panel to the control network switch one.
2. Connect the ETH1 connector on the 7800 N+1 patch panel to the control network switch two.
3. Repeat steps 1 and 2 for an additional 7800 N+1 patch panel.

7800 N+1 Patch Panel (front view)

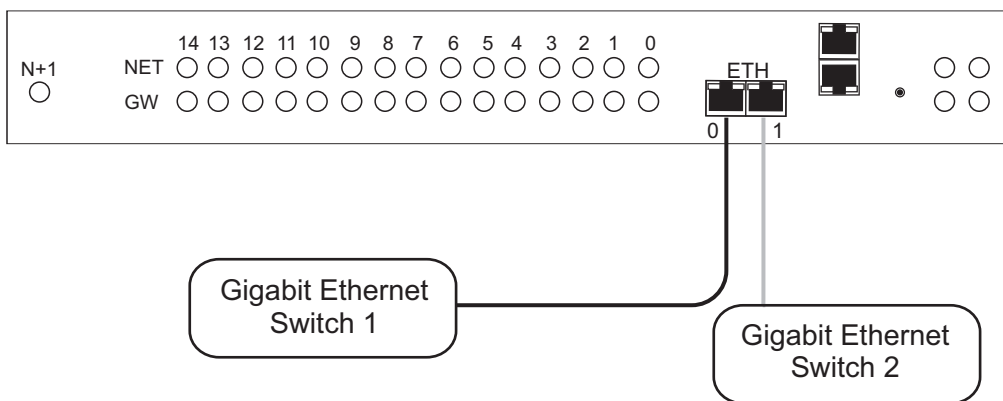


Figure 6.1 Connecting to the Control Network

6.3 Grounding the Equipment Chassis

As a standard safety practice, the chassis of 7800 N+1 patch panel must be properly grounded to protect against any contact with an electrical fault condition. It is recommended that the chassis be connected to earth ground. When the 7800 N+1 patch panel is installed in an equipment rack, connect the ground wire between the ground lug of the patch panel and the equipment rack ground bar.

Guidelines

- Use 10 AWG (minimum) stranded ground wire.
- Terminate equipment side of ground wire with a #10 ring terminal.
- Keep the length of the ground wire as short as possible.
- Do NOT daisy chain the ground between equipment. Use a ground bus bar.
- Do not over tighten ground lug connections.

To connect to the 7800 N+1 Patch Panel to ground:

1. Connect one end of a ground wire to the ground lug of the 7800 N+1 Patch Panel. See figure 6.2 on page 49.
2. Connect the other end of the ground wire to a ground bar of the equipment rack. If the 7800 N+1 Patch Panel is not installed in an equipment rack, connect the ground wire to earth ground.
3. Verify that the resistance of the ground path is less than 0.5 ohms.

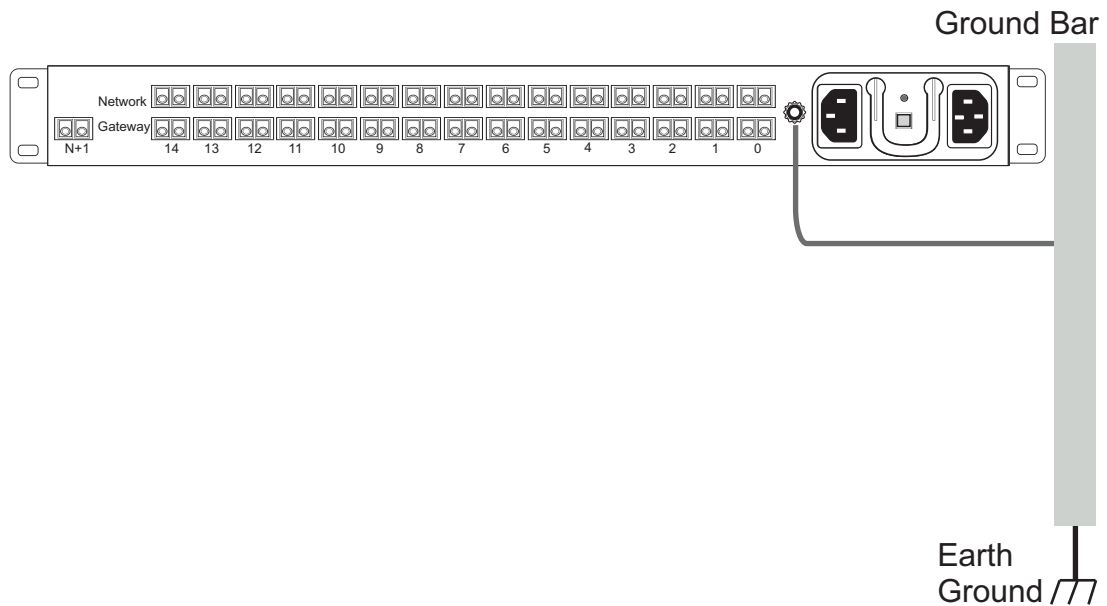


Figure 6.2 Chassis Ground Connection

6.4 Connecting to AC Power

The 7800 N+1 patch panel is furnished with two AC power connections. Only once all other equipment installation work has been completed should the equipment be powered up.

Prerequisites

To power the 7800 N+1 patch panel, you will need:

- One to two power sources.
- Two power cables.

To connect the 7800 N+1 Patch Panel to AC Power:

1. Connect an AC power cable between the AC connector of the 7800 N+1 Patch Panel and an AC supply. See figure 6.3 on page 50.

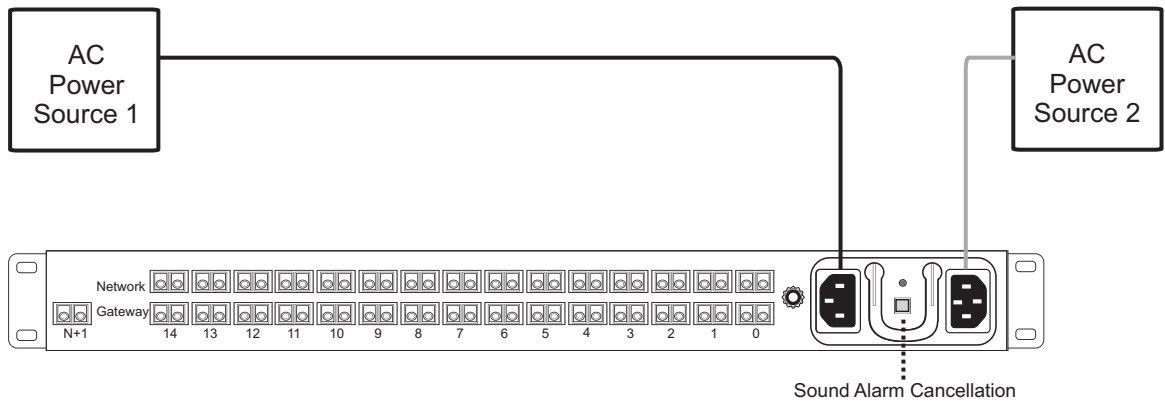


Figure 6.3 AC Power Connection

Section 7 Start Up and Verification

This section provides information about the following topics:

- Section 7.1 “Start Up”
- Section 7.2 “Verifying the LED Status Indications”

Note To learn about the IP address for your system or how to change it, refer to Section 9.3 “Changing the 7800 Series Gateway Management Port IP Address” on page 62.

7.1 Start Up

1. Connect to the web portal of the 7800-CTRL primary unit.



2. Follow the web portal instructions to configure your unit as a primary unit in a new 7800 series system.
3. Before clicking the “yes, it is connected like that already” button, make sure that the physical connections have been properly done.
4. Connect to the web portal of the 7800-CTRL secondary unit.
5. Follow the web portal instructions to configure your unit as a secondary unit in a new 7800 series system.
6. Before clicking the “yes, it is connected like that already” button, make sure that the physical connections have been properly done.

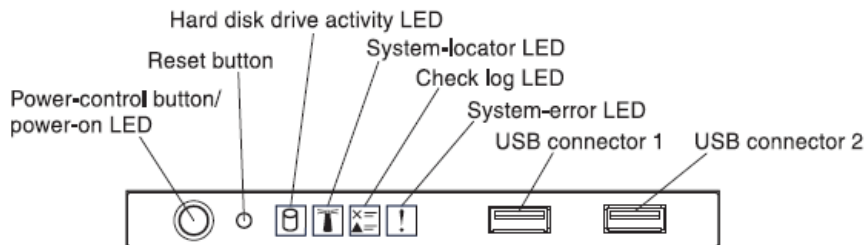
7.2 Verifying the LED Status Indications

When the 7800 series gateway has been powered up, verify the LEDs of each unit to determine that all indications are normal.

7.2.1 7800-CTRL

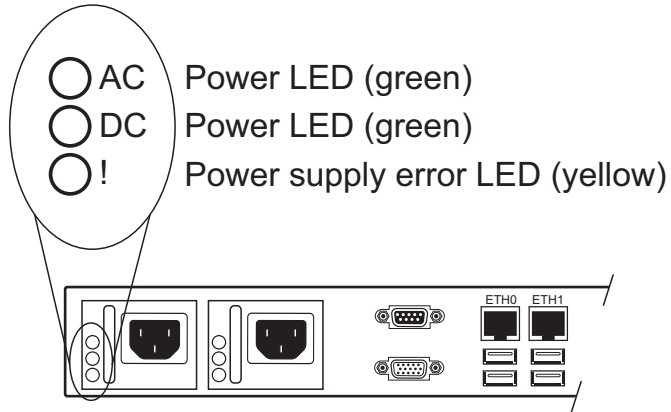
To determine the operating health of the 7800-CTRL, verify the LED statuses of at the front and the rear of the unit.

7.2.1.1 Operator Information Panel-Front of Unit



LED/Button	Description
Power-control button and power-on LED	Press this button to turn the server on and off manually. The states of the power-on LED are as follows: <ul style="list-style-type: none"> – Off: Power is not present or the power supply, or the LED itself has failed. – Flashing rapidly (4 times per second): The server is turned off and is not ready to be turned on. The power-control button is disabled. This will last approximately 5 to 10 seconds. – Flashing slowly (once per second): The server is turned off and is ready to be turned on. You can press the power-control button to turn on the server. – Lit: The server is turned on.
Reset button	Press this button to reset the server and run the power-on self-test. You may need to use a pen or the end of a straightened paper clip to press the button.
Hard disk drive activity LED	When this LED is flashing, it indicates that the associated hard disk drive is in use.
System locator LED	Use this blue LED to visually locate the server among other servers. This LED is also used as a presence detection button. You can use IBM Systems Director to light this LED remotely. This LED is controlled by the IMM2.
Check Log LED	When this yellow LED is lit, it indicates that a system error has occurred. Check the event log for additional information.
System error LED	When this yellow LED is lit, it indicates that a system error has occurred. Check LEDs on the system board to help isolate the error or identify the failed part. This LED is controlled by the IMM2.

7.2.1.2 Power Supply-Rear of Unit



Power Supply LED Indicators					
AC	DC	Error	Description	Action	Notes
On	On	Off	Normal Operation		
Off	Off	Off	No AC power to the server, or there is a problem with the AC power source.	<ul style="list-style-type: none"> - Verify the AC power to the server. - Make sure that the power cord is connected to a functioning power source. - Restart the server. If the error remains, check the power-supply LEDs. - If the problem remains, replace the power-supply. 	This is a normal condition when no ac power is present.
On	Off	Off	Faulty system board or faulty power supply	<ul style="list-style-type: none"> - Turn off the server and disconnect the power cord from the server; then, reconnect the power cord. - If the system board error (fault) LED is not lit, replace the power supply. - (Trained technician only) If the system board error LED is lit, replace the system board. 	
On	Off or flashing	On	Faulty power supply	Replace the power supply.	
On	On	On	Power supply is faulty but still operational	Replace the power supply.	

7.2.2 7800 Telecom Unit

Front of unit

When the equipment is powered, verify the front panel to determine that the LED indication is normal. See Table 7.1 on page 54.

Table 7.1 7800 Series Unit Displays

LED	Description
Green - Steady	<ul style="list-style-type: none"> Ready
Green - Blinking	<ul style="list-style-type: none"> Starting up Shutting down
Orange - Steady	<ul style="list-style-type: none"> Shut down (stopped)
Red - Blinking	<ul style="list-style-type: none"> Fault condition

Note An alarm will sound if one of the power supplies is faulty. There is no alarm button to disable the alarm. To stop the alarm, you must remove the faulty power supply.

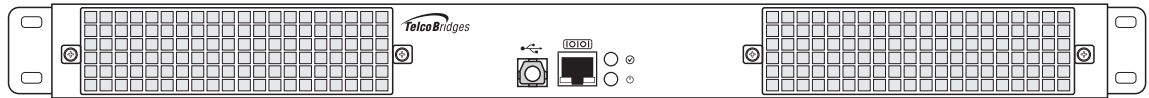


Figure 7.1 Front display and LEDs

7.2.3 7800-TMS

Once the 7800-TMS has run successfully through its system boot procedures, the following will be displayed in an alternating fashion as described in table 7.2 on page 55:

Table 7.2 7800-TMS Displays

Display Order	Display
First Screen	Toolpack controlled from host <serial number>
Second Screen	Serial <Serial number> IP <eth0 ip>/<eth1 ip>

When pressing the reset button, the following will appear (it is only possible to restart, no shutdown option available):

```
Reset?
>Yes
  No
```

Select with the function button, then press the reset button again to apply the change.

7.2.4 7800 N+1 Patch Panel

Once the 7800 N+1 Patch Panel has run successfully through its system boot procedures, the following will be displayed as described in table 7.3 on page 56:

Table 7.3 7800 N+1 Patch Panel LEDs Description

LED	Display
Net	<ul style="list-style-type: none"> • Solid Green: Laser received from network. • Black: Not configured. • Red: Configured but no laser is received.
GW	<ul style="list-style-type: none"> • Black: Configured normal state, or not configured. • Blinking yellow: Unit replaced by backup unit. • Blinking red: Replaced but no signal is received from the network.
N+1	<ul style="list-style-type: none"> • Black: N+1 unit is in standby. • Blinking green: N+1 unit is active. • Blinking red: Replaced but no signal is received from the network.
4 LEDs to the far right	<ul style="list-style-type: none"> • Top left: Green (power on); Red (booting) • Bottom left: Green steady (ready); yellow or green blinking (booting); red (boot sequence error) • Top right: Unused • Bottom right: Black (patch panel OK); red (hardware failure)

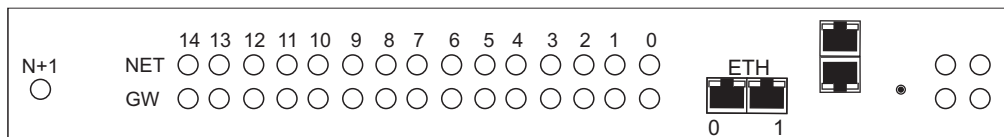


Figure 7.2 7800 N+1 Patch Panel LEDs

Section 8 Powering Down the Equipment

This section provides the following power-down topics:

- Section 8.1 “7800-CTRL”
- Section 8.2 “7800 Telecom Unit”
- Section 8.3 “7800-TMS”

8.1 7800-CTRL

Attention DO NOT TURN OFF the power to the 7800-CTRL unless the Linux host has been properly shut down beforehand. Use the reset button display, or manually use the shutdown command.

Allow enough time for the Linux host to shut down before turning off the power (example, 1 minute). Be aware that the shutdown procedure of the unit is logged and traceable for support and warranty purposes.

8.1.1 Local Method

To power down the 7800 series, press and hold the reset button for two seconds. The power LED will turn off.

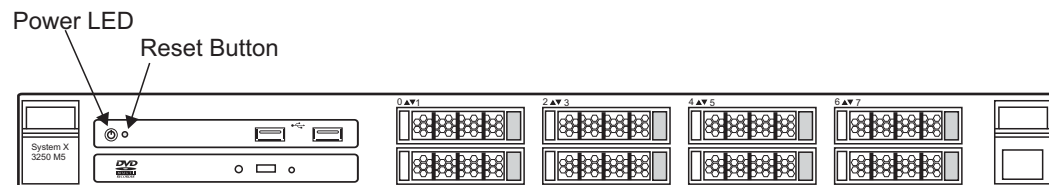


Figure 8.1 7800 CTRL power LED and reset button.

8.1.2 Remote Method

To power down, you must connect to the management interface using SSH, and enter:

```
shutdown -hP now
```

8.2 7800 Telecom Unit

Unplug the power cord from the unit. The unit can be restarted using restart button on the front of the unit.

Note As an alternate method to this procedure, refer to Section 7.2.2 “7800 Telecom Unit” on page 54, to power down the Tmedia VoIP gateway with the reset button.

8.3 7800-TMS

Unplug the power cord from the unit. The unit can be restarted using restart button on the front of the unit.

Note As an alternate method to this procedure, refer to Section 7.2.2 “7800 Telecom Unit” on page 54, to power down the Tmedia VoIP gateway with the reset button.

8.4 7800 N+1 Patch Panel

Unplug the power cord.

Section 9 Initial System Configuration

This section provides information about the following topics:

- Section 9.1 “7800 Series Gateway SSH Connection”
- Section 9.2 “7800 Series Gateway Serial Connection”
- Section 9.3 “Changing the 7800 Series Gateway Management Port IP Address”
- Section 9.4 “Retrieving 7800 Series Gateway Information”
- Section 9.5 “Changing 7800 Series Gateway Management Port Passwords”
- Section 9.6 “Configuring the 7800 Series Gateway Using the Web Portal”

9.1 7800 Series Gateway SSH Connection

The 7800 Series Gateway is shipped with the TMG-CONTROL software preinstalled. In order to make changes to the system configuration, you must connect the port labelled MGMT0 at the front of the 7800 Series Gateway to a terminal.

To access the 7800 Series Gateway, you must use an SSH connection. The password is set at the factory and is indicated on the shipment sheet.

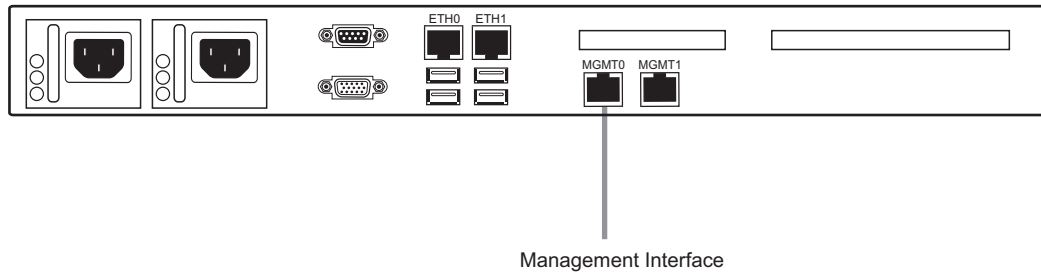


Figure 9.1 7800 Series Management Interface

Note See Section 9.3 on page 62 to learn how to change the IP address of the MGMT0 port.

9.2 7800 Series Gateway Serial Connection

9.2.1 Connecting to the 7800-CTRL Console

Note The default IP addresses for the management ports are located in the “Important Notice” sheet received with the shipment. MGMT ports are configured in bonding.

If you do not know the default IP address, go to Section 9.3 “Changing the 7800 Series Gateway Management Port IP Address” on page 62.

The serial port interface enables administrators to perform management tasks on the 7800 Series gateway. You can connect to the serial port of a 7800-CTRL, using one of the following three methods.

Method 1: Null modem DB9 female-female cable

1. Connect a null modem DB9 female-female cable between the DB9 serial port of your computer and the DB9 serial port of the 7800-CTRL. See figure 9.2 on page 61.

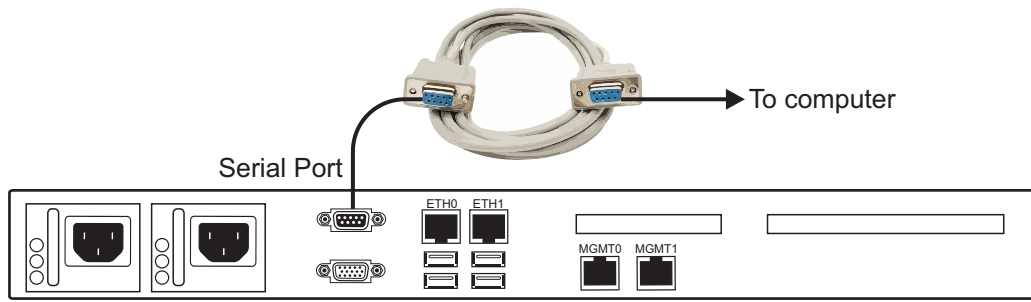


Figure 9.2 7800-CTRL Serial Port Connection

Method 2: USB to DB9 adapter

1. Connect the USB connector of the cable to a USB port on your computer and the DB9 male connector of the cable to one end of a null modem DB9 female-female cable. Connect the other end of the null modem DB9 female-female cable to the DB9 serial port of the 7800-CTRL. See figure 9.3 on page 61.

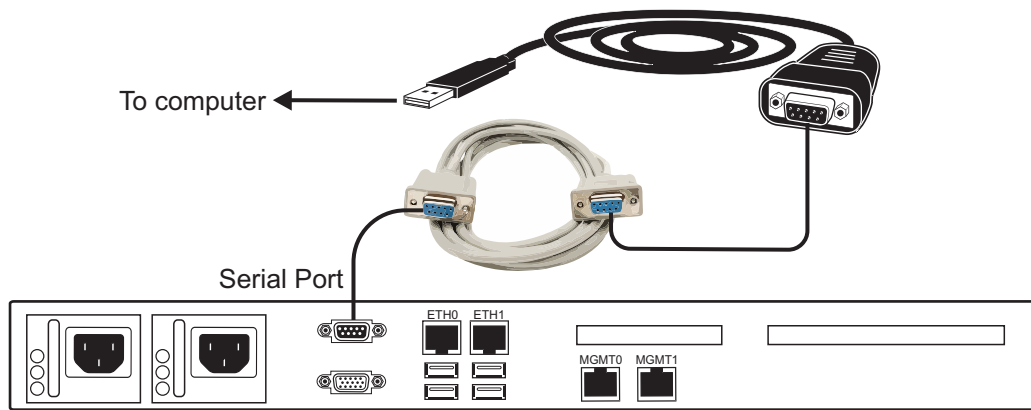


Figure 9.3 USB to DB9 Adapter

Method 3: VGA Monitor, USB Keyboard, and USB Mouse

1. Connect a VGA monitor to the VGA port of the 7800-CTRL. Connect a USB keyboard to an available USB port on the 7800-CTRL. Do the same for a USB mouse See figure 9.4 on page 62.

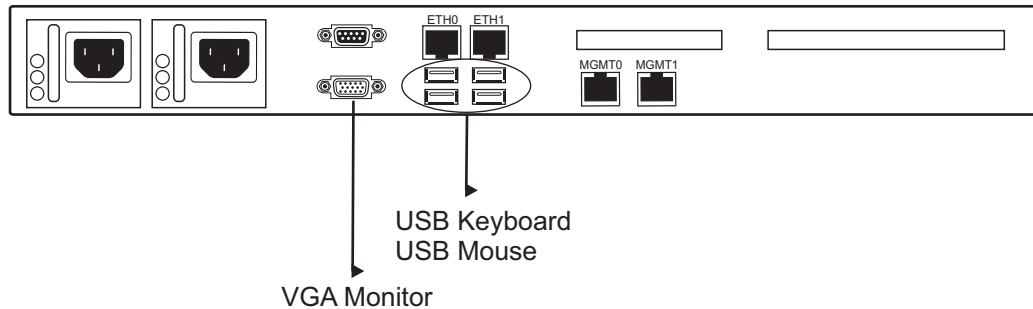


Figure 9.4 USB to DB9 Adapter

9.2.2 Configuring the Terminal Emulator Application

Before initiating communication with the management interface, you must first configure a terminal emulator or console application to communicate with the 7800 series system in order to configure initial settings. Available terminal emulation software includes:

- SecureCRT
- Putty
- Minicom

To configure the terminal emulator application:

1. Set the baud rate (bits per second) to **9600**
2. Set the data rate to **8 bits**
3. Set the parity to **None**
4. Set the stop bits to **1**
5. Set the flow control to **None**

Note See Section 9.3 on page 62 to learn how to change the IP address of the MGMT0 port.

9.3 Changing the 7800 Series Gateway Management Port IP Address

The management port of the 7800 series gateway (MGMT0 and MGMT1) are configured in bonding by default and the values are located on the “Important Notice” sheet.

The values can be modified using the following shell script:

tbchangeip

Note If you do not have the “Important Notice” sheet, the default IP address and netmask are set as follows:

MGMT0

- IP address: 172.24.0.2
- Netmask: 255.255.255.0

MGMT1

- IP address: 172.24.0.3
 - Netmask: 255.255.255.0
-

9.4 Retrieving 7800 Series Gateway Information

The 7800 series gateway enables you to retrieve system information with the following shell commands:

- `tbproduct` (retrieve the 7800 series gateway product type). See http://docs.telcobridges.com/mediawiki/index.php/TMG:Get_Product_Type, for further information.
- `tbserial` (retrieve the 7800 series gateway serial number). See http://docs.telcobridges.com/mediawiki/index.php/TMG:Get_Serial_Number, for further information.

9.5 Changing 7800 Series Gateway Management Port Passwords

Once logged you are logged on to the Tmedia VoIP Gateway, type “passwd”, to change the password being used. The following information will be displayed:

```
[root@TB003540 ~]# passwd

Changing password for user root.
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated successfully.
```

9.6 Configuring the 7800 Series Gateway Using the Web Portal

Note: The first time that you connect to the web portal, you will need to configure the role of the 7800-CTRL. See Section 7.1 “Start Up” on page 51

Use the Web Portal to configure the 7800 series gateway. Follow the steps described in the Web Portal System Configuration Tutorial Guide, found on the TBWiki:

<http://docs.telcobridges.com>

The Web Portal can be accessed with a Web browser.
The default url is: `http://[7800-ctrl MGMT0 IP address]:12358`

Note If your system features two 7800-CTRL units, they can access the Web Portal from either one of their IP addresses.

The default login information to access the Web Portal application is:

- Username: root
- Password: root

Section 10 System Backups

This section provides information about the following topics:

- Section 10.1 “Creating a Database Backup”
- Section 10.2 “Downloading a Database Backup”
- Section 10.3 “Uploading a Database Backup”
- Section 10.4 “Restoring a Database Backup”

For more detailed information with regard to any of the points described in this section, please refer to the TBWiki: <http://docs.telcobridges.com>

10.1 Creating a Database Backup

It is important that backups be made of system configuration settings in the event of a system failure. It is recommended that a backup be made once the system has been configured. Backups are performed using the web portal.

10.2 Downloading a Database Backup

A backup of system data is stored on the hard drive of the 7800 series gateway. It is important that system backups be downloaded to an external storage device.

10.3 Uploading a Database Backup

An external backup of your database can be uploaded to your 7800 series gateway.

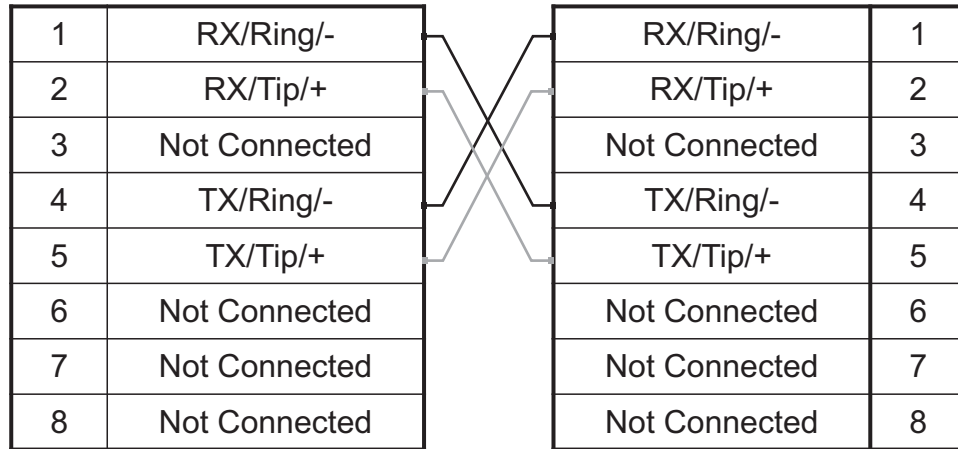
10.4 Restoring a Database Backup

In the event of a system failure requiring the replacement of a 7800 series gateway, a previously saved backup of system settings can be restored to the new unit.

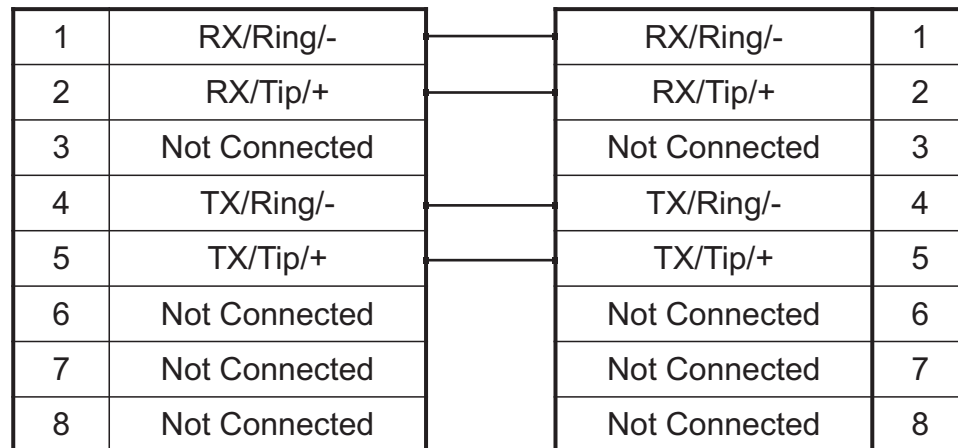
Appendix A Wiring Diagrams

A.1 RJ48C Wiring Diagram: Crossover and Straight Cables

RJ 48 (T1/E1/J1) Wiring Schematic: Crossover Cable



RJ 48 (T1/E1/J1) Wiring Schematic: Straight Cable



A.2 RJ48 Console Wiring Diagram

