



**Installation Guide**

**TM3000 TMonitor**

**September 27, 2018**

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# Preface

## About this Guide

This guide provides installation, and setup procedures for the TM3000.

## Conventions

Terminology	Description
TMonitor TM3000	This term is used when referring to the TM3000 and patch panel.
TM3000	This term is used when referring only to the TM3000.

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# Section 1 Introduction

This section provides an introduction to the installation and setup of a TMonitor TM3000.

The following topics are covered:

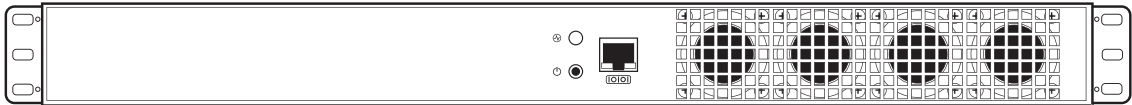
- Section 1.1 “Identifying the TMonitor TM3000 Equipment”
- Section 1.2 “Installation Prerequisites”
- Section 1.3 “Preventing Electrostatic Discharge Damage”
- Section 1.4 “Recommended Reading”

# 1.1 Identifying the TMonitor TM3000 Equipment

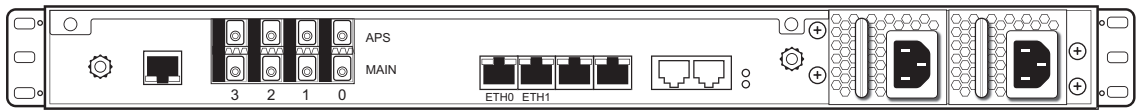
The TM3000 of the following equipment:

- One (1) TM3000.
- One (1) patch panel.

## TM3000 (front view)



## TM3000 (rear view)



## Patch Panel

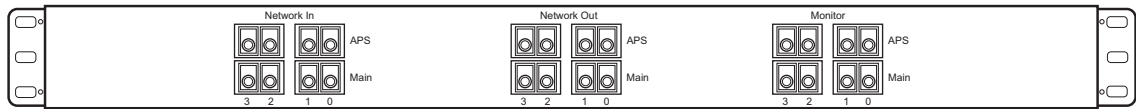


Figure 1.1 TMonitor TM3000 Equipment



## 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.

### **Adequate space for the installation of a TM3000**

You will need to mount the TM3000 and its patch panel on a 19" equipment rack (customer provided). The TM3000 and the patch panel are housed in a 1U chassis.

### **Adequate power supply and power connections**

The TM3000 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.



Warning

Always follow ESD prevention procedures when removing and replacing modules:

- Ensure that the equipment 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 equipment 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 the equipment, 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 TelcoBridges TM3000 and have been trained to work with the equipment. If you have any technical questions, TelcoBridges TB Support (technical support team) can be reached by telephone (+1 866 438 4703) or email: [support@telcobridges.com](mailto:support@telcobridges.com).

Documents exploring various aspects of the TM3000 are available on the TB Wiki:

<http://docs.telcobridges.com>



## Section 2      Installing the Equipment

This section provides information about the following topics:

- Section 2.1 “Package Contents”
- Section 2.2 “Rack Mounting the TM3000 Equipment”
- Section 2.3 “Connecting to the TM3000 Control Network” on page 9.
- Section 2.4 “Connecting to the PSTN” on page 10.
- Section 2.5 “Powering Up” on page 13.
- Section 2.6 “Verifying the LED Status Indications”

## 2.1 Package Contents

In the TM3000 box, you will find the following items:

- One TM3000.
- One set of mounting brackets and screws. These are used to mount the TM3000 to a 19" rack.
- One DB-9 to RJ-45 adapter to interface the serial port of your computer with the RJ-45 port of the TM3000.
- Three CAT5 Ethernet (blue) straight cables (male-male), 3 meters in length.
- Eight fiber optic modules.
- Two AC or DC power cables.
- One patch panel.
- One important Notice (two-sided document containing pertinent product serial numbers, and other important information).
- One Product Warranty.
- One packing slip.
- One Quick Installation Guide (two-sided document that provides a pictorial view of the equipment setup).

Not supplied:

- Fiber optic cables (6 cables are required for each full duplex STM1. Up to 24 are required if 2 STM1s with APS are monitored)

## 2.2 Rack Mounting the TM3000 Equipment

The TM3000 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 TM3000 Equipment

The TM3000 and patch panel are each housed in a 1U chassis, as tabulated in table 2.1 on page 7. 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 each device. 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 TM3000 on the equipment rack.

Table 2.1 TM3000 Equipment Physical Height

Model Number	Vertical Height
TM3000	1U (1.75 inches or 44.45 mm)
Patch Panel	1U (1.75 inches or 44.45 mm)

### 2.2.3 Installing the TM3000 on an Equipment Rack

The TM3000 and patch panel are mounted on a 19" equipment rack using the angle brackets and screws provided in the box.

#### **Mounting the TM3000:**

1. Using four metal screws, attach one angle bracket to the front, left-hand side of the TM3000, when viewed from the front. Do the same for the angle bracket on the right-hand side.
2. Mount the TM3000 on the equipment rack as described in Section 2.2.2 "Vertical Placement of TM3000 Equipment" on page 7.
3. Mount the TM3000 patch panel on the equipment rack.

## 2.3 Connecting to the TM3000 Control Network

The TM3000 Control network enables communication between the application server and the TM3000.

### Prerequisites

To connect the TM3000 to the control network, you will need:

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

### Connections

The TM3000 is connected to the control network using two CAT5 Ethernet cables, as shown in figure 2.1 on page 9.

#### To connect to the control network:

1. Connect the ETH0 connector on the TM3000 to the control network switch one.
2. Connect the ETH1 connector on the TM3000 to the control network switch two.

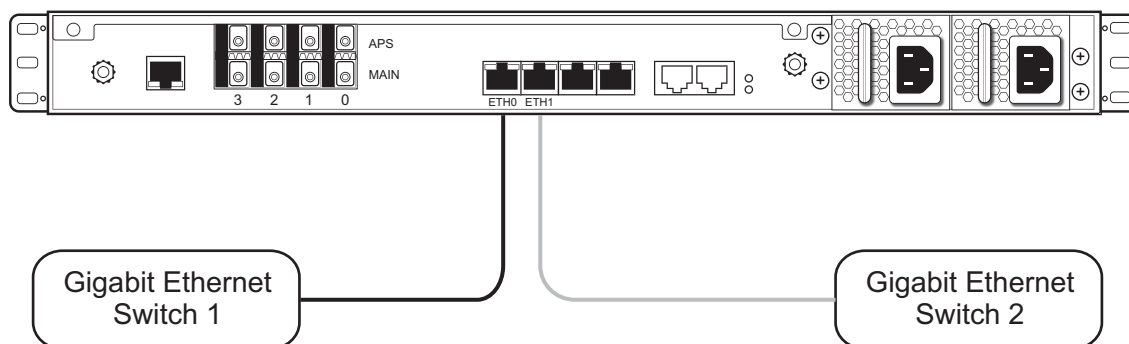


Figure 2.1

Connecting to the TM3000 Control Network

## 2.4 Connecting to the PSTN

The TM3000 features a variety of interfaces to the PSTN network.

### Prerequisites

Connection to the PSTN requires, at a minimum six (6) customer supplied fiber optic cables for each STM1. If an STM1 has Automatic Protection Switching (APS), then 12 cables are required. Furthermore, if 2 STM1s are monitored with APS, then 24 cables are required.

A TM3000 enables connections to OC3/STM1 lines. Refer to table 2.2 on page 10 for a listing of optical interfaces. The default SFP module for OC3/STM1 connection is SMF, intermediate reach, (SFP-OC3-IR1) 1310 nm with LC type connectors.

---

**Note** Please 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 2.2 Optical 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 (mini-coax)

---

**Note** Patch panels use straight connections. In other words, they do not cross the RX and TX signals. You must connect RX to RX, and TX to TX between the patch panels and TM3000. Cables used to connect the network to the patch panel must do the cross connection.

---

The connection of the TM3000 Main and APS interfaces is described in the following sections:

- Section 2.4.1 “Connecting the TM3000 Main Optical Interfaces to the Network” on page 11
- Section 2.4.2 “Connecting the TM3000 APS Optical Interfaces to the Network” on page 12



## 2.4.1 Connecting the TM3000 Main Optical Interfaces to the Network

### To connect the TM3000 Main Optical Interfaces to the Network:

1. Connect the TX fiber of equipment A to **Main 0** of the **Network In** region of the TM3000 patch panel, as shown in figure 2.2 on page 11.
2. Connect the RX fiber of equipment B to **Main 0** of the **Network Out** region of the TM3000 patch panel.
3. Connect from **Main 0** of the TM3000 to **Main 0** of the **Monitor** region of the TM3000 patch panel.
4. Connect the TX fiber of equipment B to **Main 1** of the **Network In** region of the TM3000 patch panel.
5. Connect the RX fiber of equipment A to **Main 1** of the **Network Out** region of the TM3000 patch panel.
6. Connect from **Main 1** of the TM3000 to **Main 1** of the **Monitor** region of the TM3000 patch panel.
7. Repeat this procedure for a second pair of **Main** interfaces using ports 2 and 3.

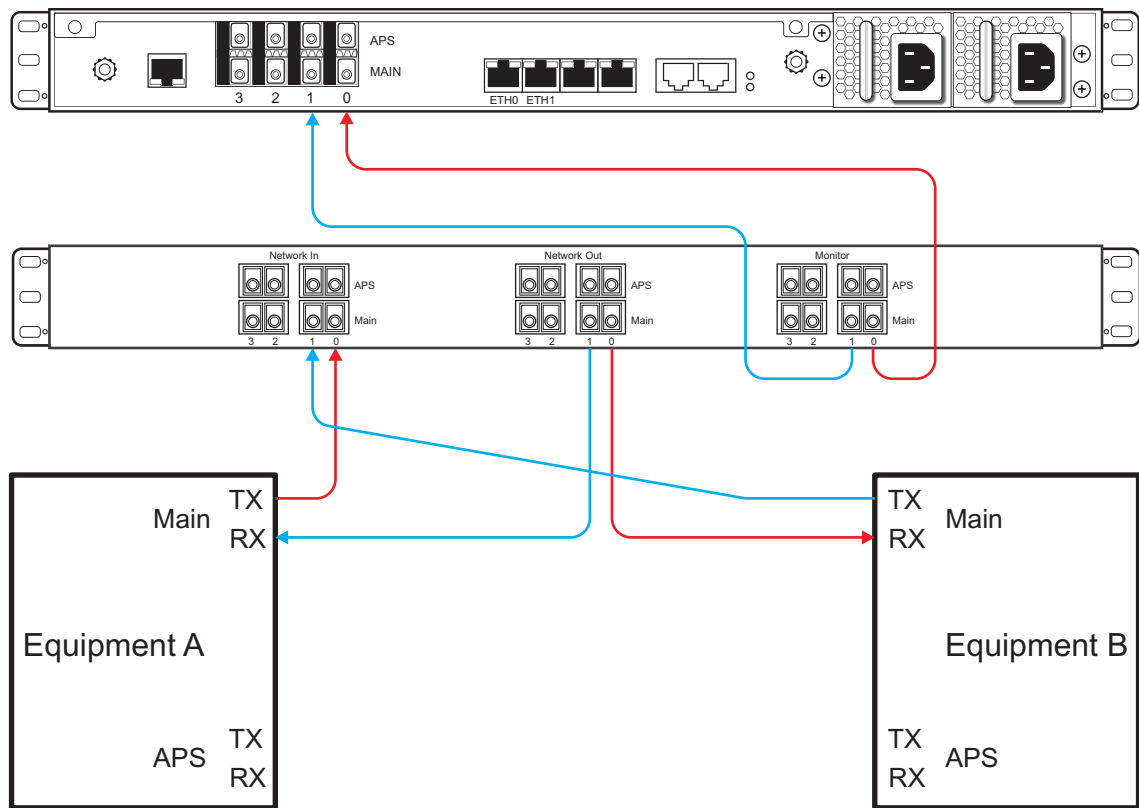


Figure 2.2 Connections for the Monitoring of Two **Main** STM1 Interfaces

## 2.4.2 Connecting the TM3000 APS Optical Interfaces to the Network

**Note** Follow this procedure if automatic protection switching is used

**To connect the APS Optical Interfaces to the Network:**

1. Connect the TX fiber of equipment A to **APS 0** of the **Network In** region of the TM3000 patch panel, as shown in figure 2.3 on page 12.
2. Connect the RX fiber of equipment B to **APS 0** of the **Network Out** region of the TM3000 patch panel.
3. Connect from **APS 0** of the TM3000 to **APS 0** of the **Monitor** region of the TM3000 patch panel.
4. Connect the TX fiber of equipment B to **APS 1** of the **Network In** region of the TM3000 patch panel.
5. Connect the RX fiber of equipment A to **APS 1** of the **Network Out** region of the TM3000 patch panel.
6. Connect from **Main 1** of the TM3000 to **APS 1** of the **Monitor** region of the TM3000 patch panel.
7. Repeat this procedure for a second pair of **APS** interfaces using ports 2 and 3.

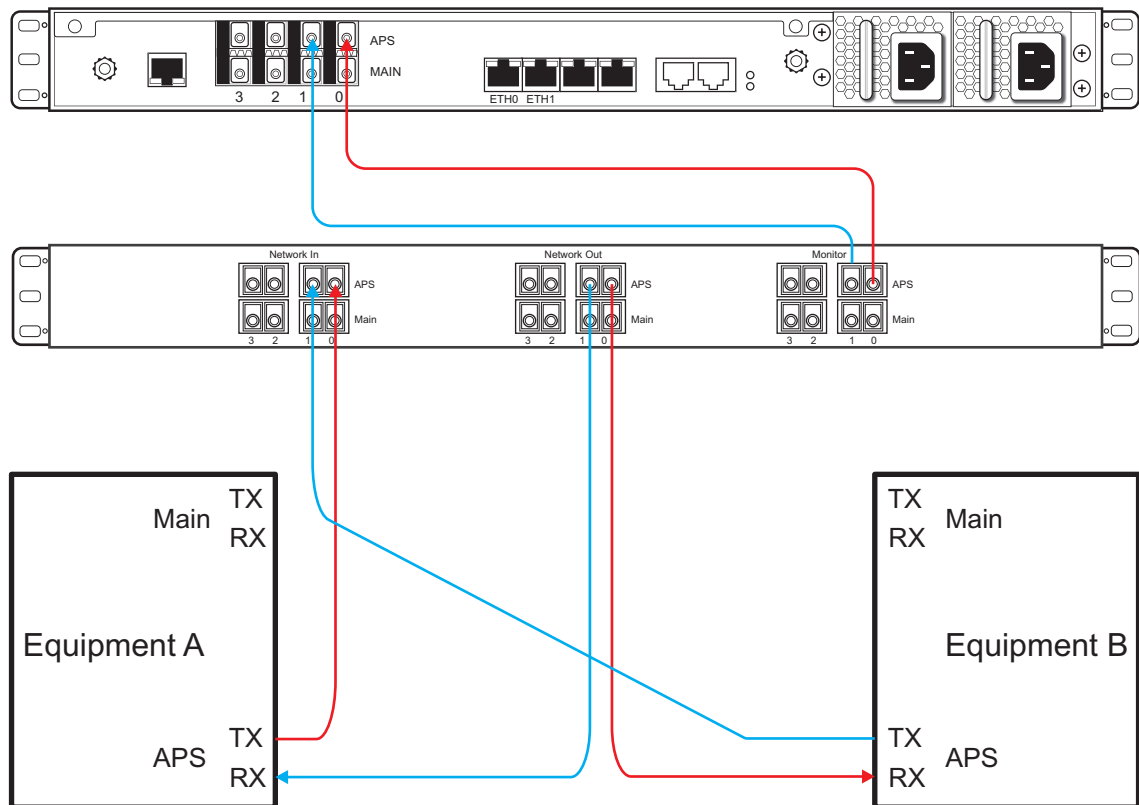


Figure 2.3 Connections for the Monitoring of Two **APS** STM1 Interfaces

## 2.5 Powering Up

The TM3000 is furnished with either two AC or DC power connections. Only once all other equipment installation work has been completed should the TM3000 be powered up.

### Prerequisites

To power the TM3000, you will need:

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

### 2.5.1 Connecting to AC Power

The AC model of the TM3000 is furnished with two AC power connectors.

#### To connect the TM3000 to AC Power:

1. Using an AC power cable, connect the first power connector of the TM3000 to the first AC power source. See figure 2.4 on page 13.
2. Using another AC power cable, connect the second power connector of the TM3000 to the second AC power source.

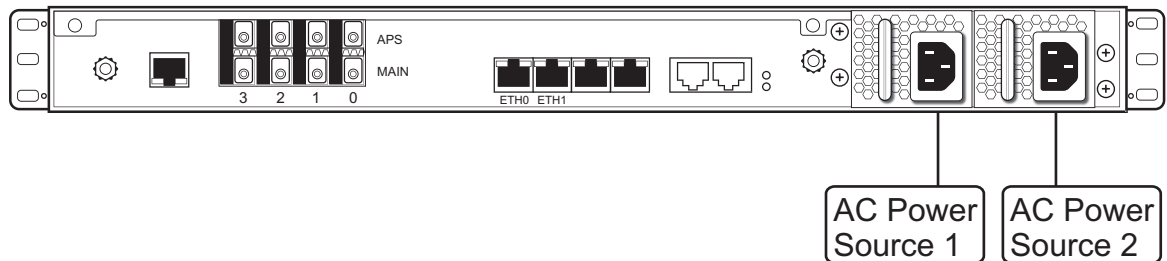


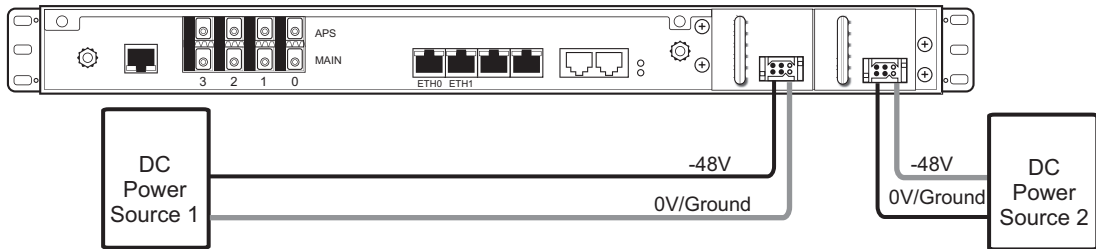
Figure 2.4 AC Power Connection

## 2.5.2 Connecting to DC Power

The DC model of the TM3000 is furnished with two DC power connectors.

### To connect the TM3000 to DC Power:

1. Connect the first DC power connector of the TM3000 to DC power source one See figure 2.5 on page 14.
  - 1a. Connect one lead of the DC power cable to the positive terminal of the DC power source.
  - 1b. Connect the other lead of the DC power cable to the negative terminal of the DC power source.
2. Repeat step 1 for DC power source two.



Cable Type	Voltage	
	Ov/Grou	-48V
Yellow/Blac	Black	Yellow
Red/Black	Red	Black

NOTE: DC power cable supplied with TM3000 (Two types: Black/Red and Yellow/Black)

Figure 2.5 DC Power Connection

## 2.6 Verifying the LED Status Indications

When the TM3000 has been powered up, verify that the power LED at the front of the TM3000 is on.  
See figure 2.6 on page 15

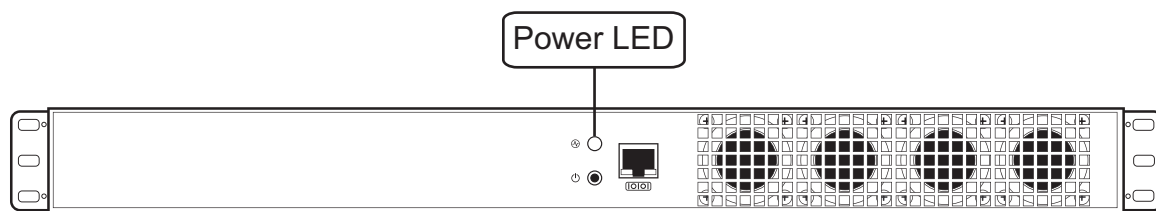


Figure 2.6 Power LED



## Section 3 Initial System Configuration

This section provides information about the following topics:

- Section 3.1 “Connecting to the Serial Port of the TM3000”
- Section 3.2 “Configuring the Terminal Emulator Application”
- Section 3.3 “Using the set\_boot and print\_boot Commands”
- Section 3.4 “Creating a Shell Password”

### 3.1 Connecting to the Serial Port of the TM3000

The serial port interface enables administrators to perform management tasks on the TM3000.

**To connect to the serial port of a TM3000:**

1. Connect a CAT5 RJ-45 (male-male) cable (supplied with TM3000) between the com port of your computer and the serial port (labelled 10101) of the TM3000 as shown in figure 3.1 on page 18. See Section A.2 on page 27 for a RJ-45 console wiring diagram.
2. If your computer's serial port features a DB9 connector, use the DB9 to RJ-45 adapter supplied with your TM3000. If your computer's serial port features a USB connector, you will need to provide a USB to DB9 adapter. See figure 3.2.

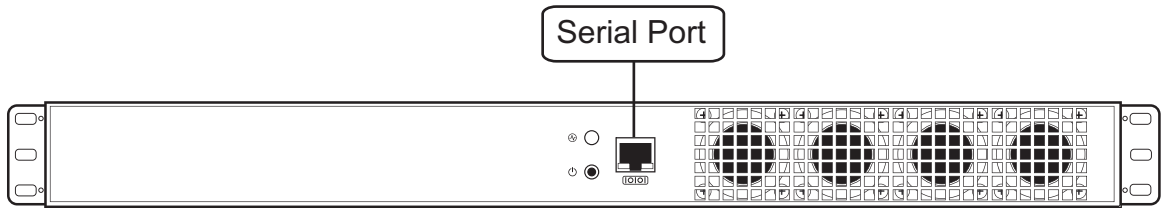


Figure 3.1 Computer to TM3000 Serial Port Connection

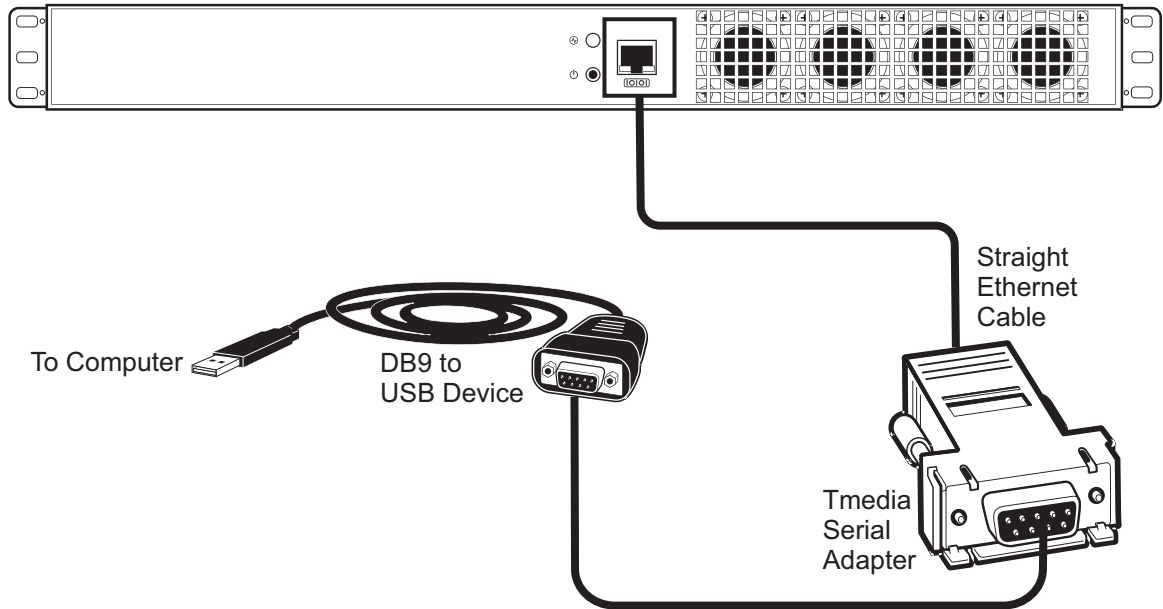


Figure 3.2 USB to DB9 Adapter



## 3.2 Configuring the Terminal Emulator Application

Before initiating communication with the TM3000 serial interface, you must first configure a terminal emulator or console application in order to configure initial settings. Available terminal emulation software includes:

- HyperTerminal
- 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**

## 3.3 Using the set\_boot and print\_boot Commands

The set\_boot command can be used to modify certain settings and the print\_boot command can be used to review the changes. Using the set\_boot command, the System ID (also known as gateway port) can be configured.

Settings will be applied on the next reboot of the TM3000.

Alternatively, you can use the default IP address of ETH1 or ETH2 to configure the TM3000. To do this, connect a device on the same subnet as the default IP addresses and connect using Telnet.

The default IP addresses are available in the 'Important Notice' sheet that is shipped with the TM3000.

---

**Note**      **System ID** is also known as **UDP gateway port**.

---

**To modify boot settings:**

1. Using the Management Interface, type **set\_boot** and press the **Enter** key to move to the next prompt.
2. Enter **reboot** to apply the changes.

```

10.2.0.140 - PuTTY
0/tbgw>set_boot

Press <ENTER> to use the existing value,
or insert a new value and press <ENTER>.
active cfg (max 80 char)(<cfgname>)=TB2933_TEST? :
autoboot (y|n)=y? :
autofs (y|n)=y? :
boottimeout (max=255)=5? :
gateway port (TBX_GW_PORT= 12358 )? :

Press <ENTER> to use the existing value,
or insert a new value and press <ENTER>.
adapter name (max 80 char)(<adaptername>)=TB002933? :
eth dhcp (y|n)=n? :
eth0 Ip Address (ipaddr)=10.2.0.140? :
eth0 Netmask (nmaddr)=255.255.255.0? :
eth0 Gateway (gwaddr)=10.2.0.1? :
eth1 Ip Address (ipaddr)=10.2.1.140? :
eth1 Netmask (nmaddr)=255.255.255.0? :
eth1 Gateway (gwaddr)=10.2.1.1? :
voip0 Ip Address (ipaddr)=10.2.2.140? :
voip0 Netmask (nmaddr)=255.255.255.0? :
voip0 Gateway (gwaddr)=10.2.2.1? :
voip1 Ip Address (ipaddr)=10.2.3.140? :
voip1 Netmask (nmaddr)=255.255.255.0? :
voip1 Gateway (gwaddr)=10.2.3.1? :
mgnt dhcp (y|n)=n? :
mgnt Ip Address (ipaddr)=172.31.5.140? :
mgnt Netmask (nmaddr)=255.255.255.0? :
mgnt Gateway (gwaddr)=172.31.5.1? :

List of available boot directories:
/
 licenses
  2_0_6.1
  02020101 (2_2_1.1)
  02010a01 (2_1_10.1)
  2_2_0.4
Curr Boot dir.....: /ffs/02020101/
Good Boot dir.....: /02020101
Next Boot dir.....: /02020101
nextbootdir (max 80 char)(<validbootdir>)=/02020101? :
0/tbgw>
    
```

The following prompts are displayed:

Prompt	Description
active config	This allows a device to make use of multiple configurations.
fs location.CPU0	/tb640
fs location.CPU1	/tb640
autoboot	When set to “no”, the device will stop booting after initial bootup sequence. This is used for debugging only, the default value is “yes”.

Prompt	Description
autofpgaload	When set to “no”, the device will stop booting after initial bootup sequence. This is used for debugging only, the default value is “yes”.
Boot timeout	This is used to set the time lapse between the initial bootup sequence and the complete bootup. The default value for this setting is 5 seconds.
gateway port	(see following note)
Adapter Name	Name of the TM3000. This character string must uniquely identify the TM3000. The default value is the serial number of the TM3000.
eth0/eth1 IP Address	When you are not using DHCP, the IP address is used as the static IP address for ports Ethernet 0 (ETH1), Ethernet 1(ETH2), and Management (Ethernet) of the TM3000.
eth0/eth1: Gateway	When you are not using DHCP, the gateway address is used for ports Ethernet 0, and Ethernet 1 of the TM3000. If you are planning to use the TM3000 in the same subnet as the host (i.e. you do not require access to an IP address outside the subnet), then the gateway can be set to '127.0.0.1'.
mgnt: IP address	Not used
mgnt: NetMask	Not used
mgnt: Gateway	Not used
Curr Boot dir....:	Current loaded firmware version.
Good Boot dir....:	Last successfully loaded firmware version.
Next Boot dir....:	Firmware version that will be loaded at the next reboot.

---

**Note** Each network interface (Eth0, ETH1) must be on a different subnet. For example, if the netmask is 255.255.0.0 and the IP address of ETH0 is 192.168.1.10.

---

**Note** Do not confuse the gateway port (also known as System ID) with the IP gateway address.

The gateway port is used to control the TM3000 and TelcoBridges strongly recommends that this setting be left at its default value: 12358.

The TM3000 on the same gateway port will be automatically detected by any Toolpack application.

Different gateway ports can be useful for the segmentation of systems configured to operate on the same physical network and IP subnet. Make certain that all applications in the same system are configured to use the same values.

For further information, contact TelcoBridges Technical Support.

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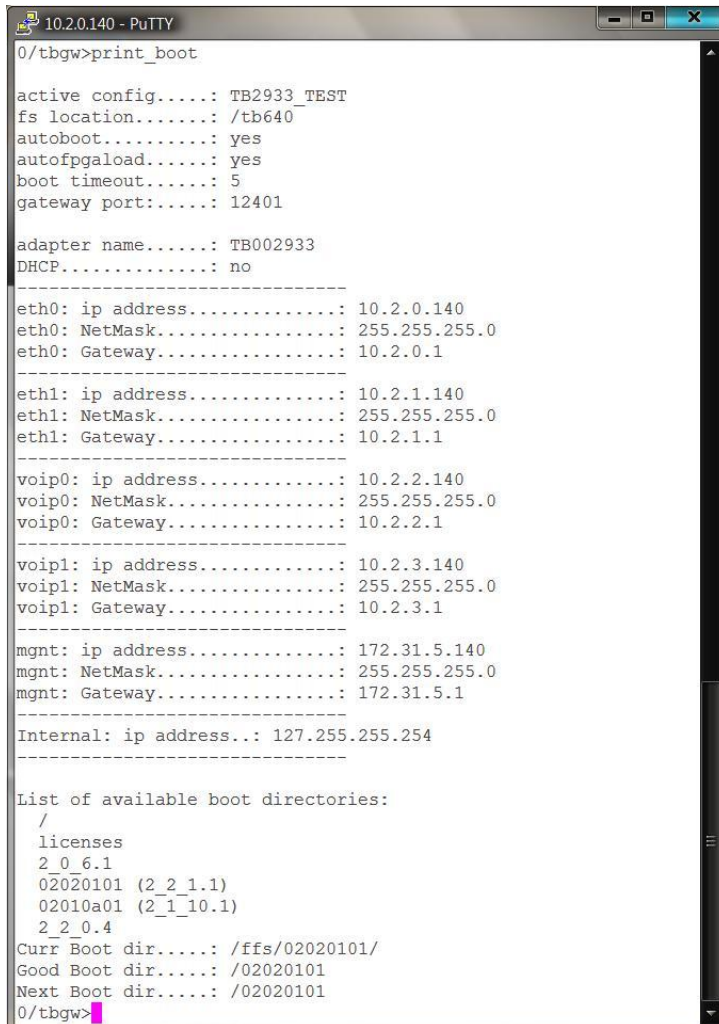
---

**Note** The management interface is reserved for future use. In addition, VoIP ports 0 and 1 are unused.

---

**To view the results of a set\_boot command:**

1. Type print\_boot



```
10.2.0.140 - PuTTY
0/tbgw>print_boot

active config.....: TB2933 TEST
fs location.....: /tb640
autoboot.....: yes
autofpgaload.....: yes
boot timeout.....: 5
gateway port.....: 12401

adapter name.....: TB002933
DHCP.....: no
-----
eth0: ip address.....: 10.2.0.140
eth0: NetMask.....: 255.255.255.0
eth0: Gateway.....: 10.2.0.1
-----
eth1: ip address.....: 10.2.1.140
eth1: NetMask.....: 255.255.255.0
eth1: Gateway.....: 10.2.1.1
-----
voip0: ip address.....: 10.2.2.140
voip0: NetMask.....: 255.255.255.0
voip0: Gateway.....: 10.2.2.1
-----
voip1: ip address.....: 10.2.3.140
voip1: NetMask.....: 255.255.255.0
voip1: Gateway.....: 10.2.3.1
-----
mgmt: ip address.....: 172.31.5.140
mgmt: NetMask.....: 255.255.255.0
mgmt: Gateway.....: 172.31.5.1
-----
Internal: ip address..: 127.255.255.254
-----

List of available boot directories:
/
 licenses
  2_0_6.1
  02020101 (2_2_1.1)
  02010a01 (2_1_10.1)
  2_2_0.4
Curr Boot dir.....: /ffs/02020101/
Good Boot dir.....: /02020101
Next Boot dir.....: /02020101
0/tbgw>
```

## 3.4 Creating a Shell Password

Access to the shell commands may be protected with a password.

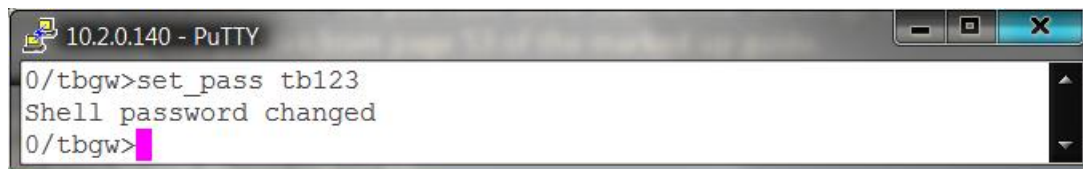
---

**Note** By default, access to the shell commands is not password protected.

---

### To create a password:

1. At the shell prompt, type **set\_pass <your password>**.



```
10.2.0.140 - PuTTY
0/tbgw>set_pass tb123
Shell password changed
0/tbgw>
```

2. Enter **reboot** to apply the changes.
3. Restart the TM3000. This will reset the TM3000 and add the enable and disable shell password commands to the console commands list.

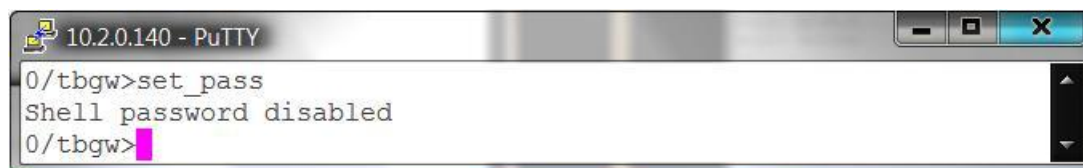
Once the shell password has been set, it cannot be changed unless you are in the **Enabled** mode. The enabled mode provides you with access to operation sensitive commands.

### To enter the enabled mode:

1. At the shell prompt, type **enable <your password>**.

### To clear the password mode:

1. At the shell prompt, type **set\_pass** (without entering a password).



```
10.2.0.140 - PuTTY
0/tbgw>set_pass
Shell password disabled
0/tbgw>
```

### To exit the enabled mode:

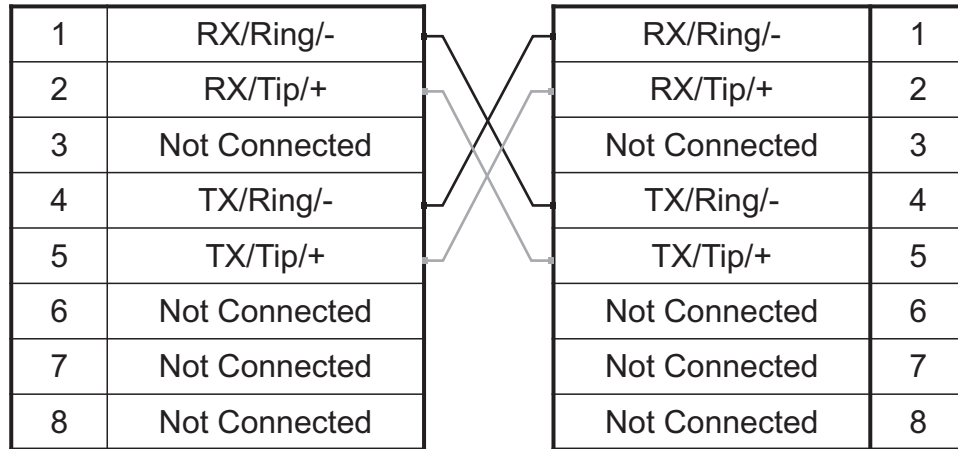
1. At the shell prompt, type **disable**.



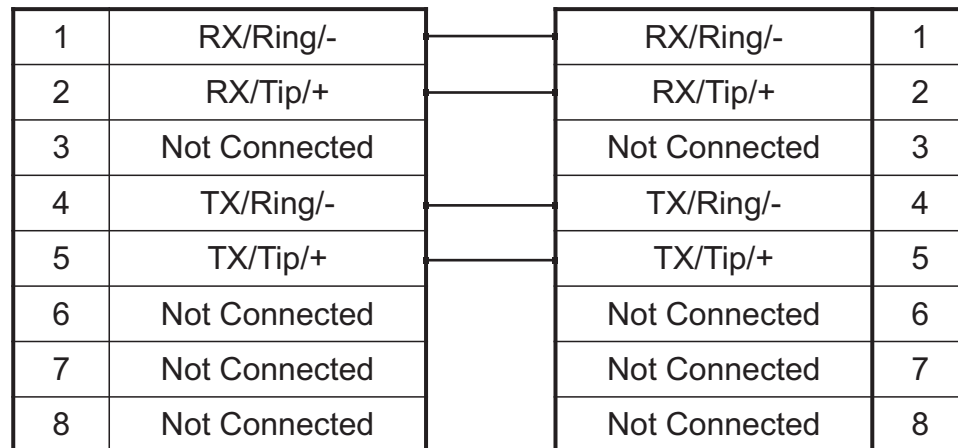
# Appendix A Wiring Diagrams

## 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

