



## **Installation Guide**

**TSBC3000 Session Border Controller**

August 31, 2016

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# Preface



## About this Guide

This guide provides installation, and setup procedures for TSBC3000 series standalone and TSBC3000 series 1+1 systems.

## Conventions

Terminology	Description
TSBC3000 series	This term is used when a description applies to both the TSBC3000 session border controller standalone and TSBC3000 session border controller 1+1 system.
TSBC3000 series standalone	This term is used when a description applies to the TSBC3000 session border controller operating as a standalone unit.
TSBC3000 series 1+1 system	This term is used when a description applies to the TSBC3000 session border controller operating in conjunction with the TSBC3000 +1 series unit. This term may include the 1+1 patch panel when using TDM fall-back capability.
TSBC3000 series unit	This term is used when a description applies to all variations of the TSBC3000 series units, such as: TSBC3000-2700 and TSBC3000-680.
TSBC3000 series +1 unit	This term is used when a description applies to all variations of the TSBC3000 series +1 units, such as TSBC3000-2700 +1 and TSBC3000-680 +1.
1+1 Patch Panel	This term is used as a generic reference to a 1+1 patch panel, which enables a TSBC3000 series unit to connect to a TSBC3000 series +1 unit for TDM fall-back capability. This only applies to the TSBC3000-680.

To help guide you in the installation of your product, we use the following icons in this document. Take note of the icon that represents the type of installation you are conducting and follow those procedures throughout this guide to ensure proper equipment installation and set up.

Graphics	Description
	<p>This icon appears in the margins of pages describing the TSBC3000 series operating as a standalone unit. If you are installing a standalone unit, read and follow the instructions provided in those sections and pages.</p>
	<p>This icon appears in the margins of pages describing the TSBC3000 series unit operating in conjunction with a TSBC3000 series +1 and an optional 1+1 patch panel. If you are installing a 1+1 system read and follow the instructions provided in those sections and pages.</p>

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# Section 1 Introduction

This section provides an introduction of the installation and setup for the following system configurations:



TSBC3000 series standalone: TSBC3000 series unit operating in standalone mode.



## **TSBC3000 series 1+1 system:**

TSBC3000 series unit operating in conjunction with a with a TSBC3000 series +1 unit and an optional 1+1 patch panel(s).

The following topics are covered:

- Section 1.1 “Recognizing a TSBC3000 Series Standalone versus a TSBC3000 Series 1+1 System”
- Section 1.2 “Installation Prerequisites”
- Section 1.3 “Preventing Electrostatic Discharge Damage”
- Section 1.4 “Recommended Reading”



## 1.1 Recognizing a TSBC3000 Series Standalone versus a TSBC3000 Series 1+1 System



### 1.1.1 TSBC3000 Series Standalone

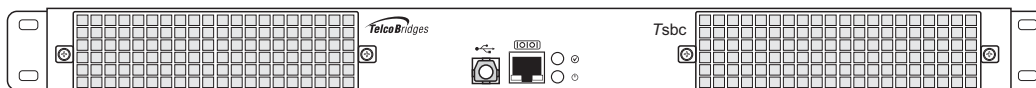
The TSBC3000 series standalone consists of one TSBC3000 session border controller. The front and rear views are shown in figure 1.1 on page 2.

### 1.1.2 TSBC3000 Series 1+1 System

The TSBC3000 series 1+1 system, see figure 1.1 on page 2, consists of:

- One TSBC3000 session border controller.
- One TSBC3000 + 1 session border controller.
- One or two 1+1 patch panels (Optional TDM fall-back feature)

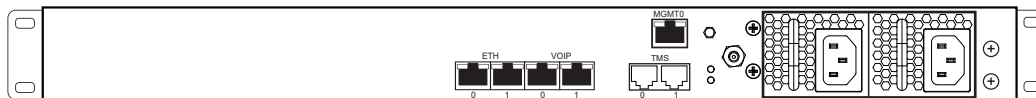
TSBC3000-680/TSBC3000-680 +1 and TSBC3000-2700/TSBC3000-2700 +1 (front view)



TSBC3000-680/TSBC3000-680 +1 (rear view)



TSBC3000-2700/TSBC3000-2700 +1 (rear view)



1+1 Patch Panel (RJ) - (Optional TDM fall-back feature)

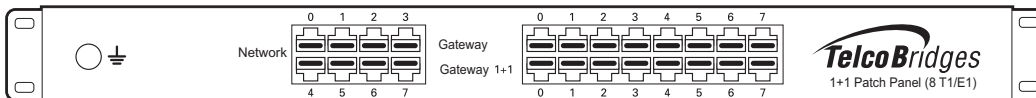




Figure 1.1 Equipment Front and Rear Views



## 1.2 Installation Prerequisites

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



 TSBC3000 Series Standalone	 TSBC3000 Series 1+1 System								
<p><b>Adequate space for the installation of the TSBC3000 series standalone.</b>                      You will need to mount the TSBC3000 series unit on a 19" equipment rack (customer provided). Your TSBC3000 series unit is a 1U unit.</p> <p><b>Adequate power supply and power connections.</b>                      The TSBC3000 series unit requires two power connections. To guarantee an uninterrupted supply of electricity, each power connection must be fed by a dedicated power source.</p> <p><b>IP addresses for the management ports.</b>                      To avoid delays, you should have the IP address, netmask and session border controller addresses on hand. Take note that the management port supports DHCP, see Section 2.4.1 "Connecting to the TSBC3000 Series Management Interface" on page 14 for further information.</p>	<p><b>Adequate space for the installation of the TSBC3000 series 1+1 system.</b>                      You will need to mount the TSBC3000 series 1+1 system on a 19" equipment rack (customer provided).</p> <p>The 1+1 System requires space for the following number of units:</p> <table border="0"> <tr> <td>TSBC3000 series Unit:</td> <td>1U</td> </tr> <tr> <td>TSBC3000 series +1 Unit:</td> <td>1U</td> </tr> <tr> <td>Total</td> <td>2U</td> </tr> </table> <p>Optional TDM fall-back 1+1 Patch Panel(s) 0U to 2U                      One patch panel for 8 PRI trunks or two patch panels for 16 PRI trunks:</p> <table border="0"> <tr> <td>Total:</td> <td>2U to 4U</td> </tr> </table> <p><b>Adequate power supply and power connections.</b>                      The TSBC3000 series and TSBC3000 series +1 units require two power connections each. To guarantee an uninterrupted supply of electricity, each power connection must be fed by a dedicated power source.</p> <p><b>IP addresses for the management ports.</b>                      To avoid delays, you should have the IP address, netmask and session border controller addresses on hand. Take note that the management port supports DHCP, see Section 2.4.1 "Connecting to the TSBC3000 Series Management Interface" on page 14 for further information.</p>	TSBC3000 series Unit:	1U	TSBC3000 series +1 Unit:	1U	Total	2U	Total:	2U to 4U
TSBC3000 series Unit:	1U								
TSBC3000 series +1 Unit:	1U								
Total	2U								
Total:	2U to 4U								



## 1.3

## Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. This 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 is 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 is written with the assumption that you have a clear understanding of the installation of the equipment described in this document and you are 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](mailto: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 Installing the Equipment

This section provides information about the following topics:

- Section 2.1 “Package Contents”
- Section 2.2 “Rack Mounting the TSBC3000 Series Standalone or the TSBC3000 Series 1+1 System”
- Section 2.3 “Choosing your Connection Procedures”
- Section 2.4 “TSBC3000 Series Standalone”
- Section 2.5 “TSBC3000 Series 1+1 System”
- Section 2.6 “Adding a TSB3000 +1 Unit to an Existing Standalone; Creating a TSBC3000 series 1+1 System”
- Section 2.7 “Verifying the LED Status Indications”
- Section 2.8 “Powering Down”



## 2.1 Package Contents

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

- Section 2.1.1 “TSBC3000 Series Standalone Package Contents” on page 6.
- Section 2.1.2 “TSBC3000 Series 1+1 System Package Contents” on page 7.

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

### 2.1.1 TSBC3000 Series Standalone Package Contents

#### **TSBC3000-680, TSBC3000-2700**

In the box, you will find the following items:

- One TSBC3000 series unit:  
TSBC3000-680 or TSBC3000-2700. See figure 1.1 on page 2.
- One set of mounting brackets and screws, used to mount the TSBC3000 series unit to a 19" rack.
- One Tsbcs serial adapter to interface the serial port of your computer with the RJ-45 port of the TSBC3000 series unit.
- Three CAT5 Ethernet 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.
- For AC powered units: Two AC power cables

Not included

- A 19" equipment rack. The TSBC3000 series unit must be installed on a 19" wide equipment rack.
- USB Type-B cable. This is an alternate way to connect to the console. This cable is used with the front USB connector. You can choose to connect either using the RJ-45 with the provided serial adapter or with a USB Type-B cable.

## 2.1.2 TSBC3000 Series 1+1 System Package Contents

### TSBC3000-680, TSBC3000-2700

In the box, you will find the following items:



- One TSBC3000 series unit:  
TSBC3000-680 or TSBC3000-2700. See figure 1.1 on page 2.
- One set of mounting brackets and screws, used to mount the TSBC3000 series unit to a 19" rack.
- One *Tsbc* serial adapter, to interface the serial port of your computer with the RJ-45 port of the TSBC3000 series unit.
- Three CAT5 Ethernet 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.
- For AC powered units: Two AC power cables

Not included

- A 19" equipment rack. The TSBC3000 series unit must be installed in a standard 19" wide equipment rack.

### TSBC3000-680 +1, TSBC3000-2700 +1

- One TSB3000+1 series unit. See figure 1.1 on page 2.
- One set of mounting brackets and screws, used to mount the TSB3000+1 series unit to a 19" rack.
- One *Tsbc* serial adapter, to interface the serial port of your computer with the RJ-45 port of the TSBC3000 series +1.
- Three CAT5 Ethernet 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.
- For AC powered units: Two AC power cables

### Optional TDM Fall-Back Feature

- The associated 1+1 patch panel. This is only available for the TSBC3000-680 +1. See Table 2.1, "1+1 Patch Panels for TSBC3000-680 +1", on page 8 for further details.

Not included:

- A 19" equipment rack. The TSBC3000 series +1 unit must be installed in a standard 19" wide equipment rack.



**1+1 Patch Panel**

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**Note** TDM fall-back connection to the PSTN is an optional feature.

---

One or two 1+1 patch panels are required for the proper connection of each grouping of 8 lines of the TSBC3000 series 1+1 system.

**Cables provided:** You are provided with 16 RJ48C cables (yellow), two meters in length with your 1+1 Patch Panel (8 T1/E1).

Table 2.1 1+1 Patch Panels for TSBC3000-680 +1

<p>1+1 Patch Panel (8/T1/E1)</p>	<p>Provides connection for up to 8 T1/E1 lines from the network to the 1+1 Patch Panel (8 T1/E1) and then links to the TSBC3000-680 and TSBC3000-680 +1</p> <p>Cables provided:</p> <p>You are provided with 16 RJ48C cables (yellow), two meters in length, per 1+1 Patch Panel (8 T1/E1) you receive.</p>
----------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

## 2.2 Rack Mounting the TSBC3000 Series Standalone or the TSBC3000 Series 1+1 System



The TSBC3000 series equipment is mounted on a customer provided equipment rack using the mounting hardware packaged in the box.

### 2.2.1 Prerequisites

To rack mount the equipment, you will need:

- One 19" customer-provided equipment rack. The rack must be solidly anchored to the floor with appropriate support at the top of the racks.
- Climate controlled room: 0 to +70 Celsius, 0 to 95% non-condensing humidity.

### 2.2.2 Vertical Placement of the Equipment

The TSBC3000 series standalone, TSBC3000 series +1, and 1+1 Patch Panel are each housed in a 1U chassis, as tabulated in table 2.2 on page 9. 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 the TSBC3000 series equipment. 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 TSBC3000 series equipment on the equipment rack.

---

**Note** The patch panel can be installed behind the TSBC3000 if the equipment rack is deep enough. Doing so will simplify cabling.

---

Table 2.2 TSBC3000 Series Physical Height

Model Number	Vertical Height
TSBC3000 series standalone	1U (1.75 inches or 44.45 mm)
TSBC3000 series +1	1U (1.75 inches or 44.45 mm)
Patch Panel (one or two)	1U (1.75 inches or 44.45 mm)

## 2.2.3

## Installing the TSBC3000 Series Standalone and the TSBC3000 Series 1+1 on an Equipment Rack

Both the TSBC3000 series standalone and the TSBC3000 series 1+1 system are mounted on the 19" equipment rack using the angle brackets and screws provided in the box.



### Mounting the TSBC3000 Series Standalone:

1. Using four metal screws, attach one angle bracket to the front, left-hand side of the TSBC3000 series unit, as shown in figure 2.1 on page 11. Do the same for the angle bracket on the right-hand side.
2. Start mounting equipment at the top-most position of the rack, keeping in mind the space required on the equipment rack as described in Section 2.2.2 "Vertical Placement of the Equipment" on page 9.

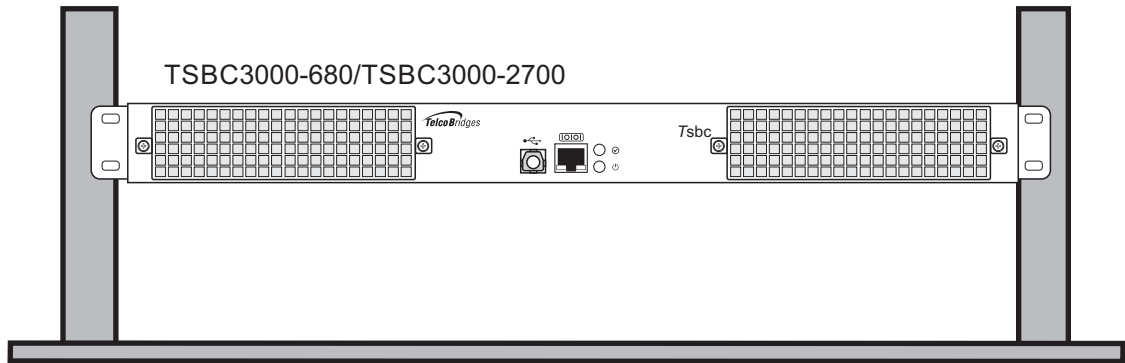


### Mounting the TSBC3000 Series 1+1 System:

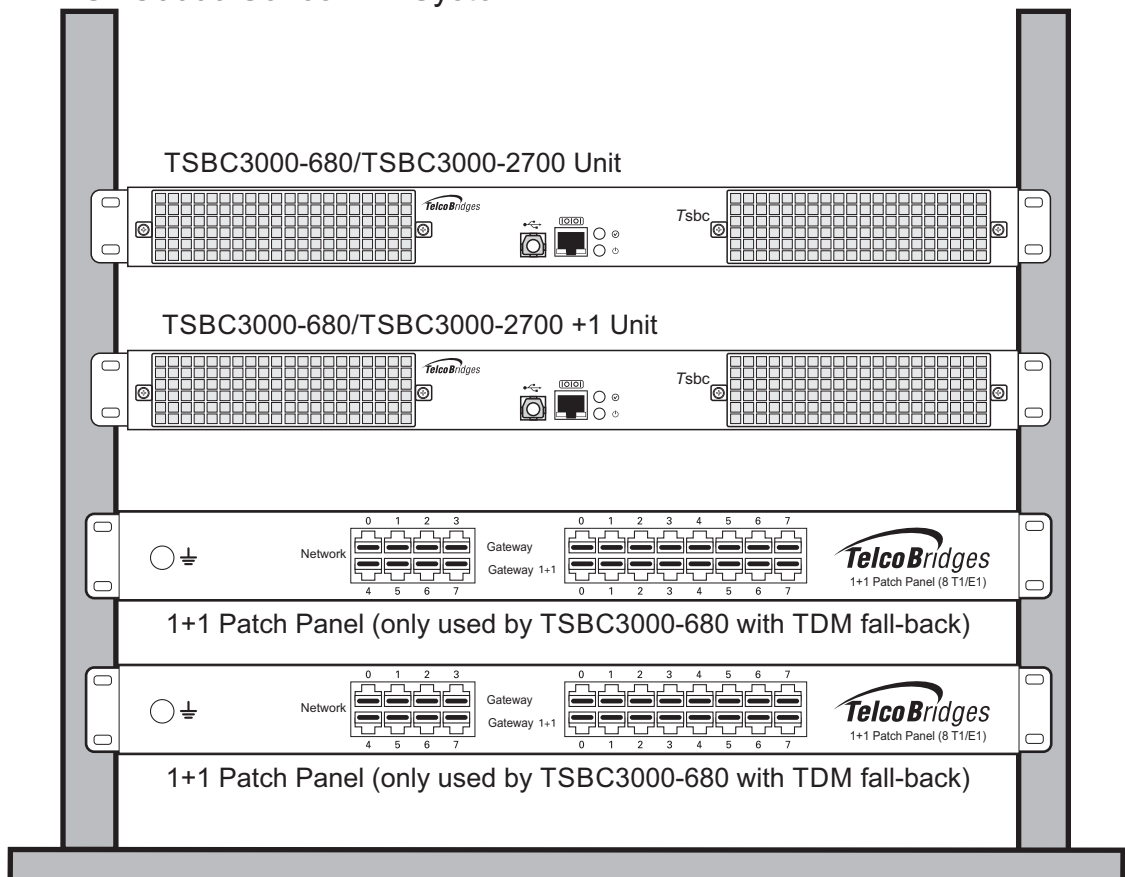
1. Mount the TSBC3000 series unit as mentioned above.
2. Install the TSBC3000 series +1 unit below the TSBC3000 series unit, as shown in figure 2.1 on page 11.
3. To attach the TSBC3000 series +1 unit to the equipment rack, follow the previous procedure.
4. Install one or two patch panels below the TSBC3000 series +1 unit, as shown in figure 2.1 on page 11 (Optional TDM fall-back feature).



### TSBC300 Series Standalone



### TSBC3000 Series 1+1 System



Due to the rear-exhaust heat vents there is no need to leave any vertical space above or below the TSBC3000 series equipment.

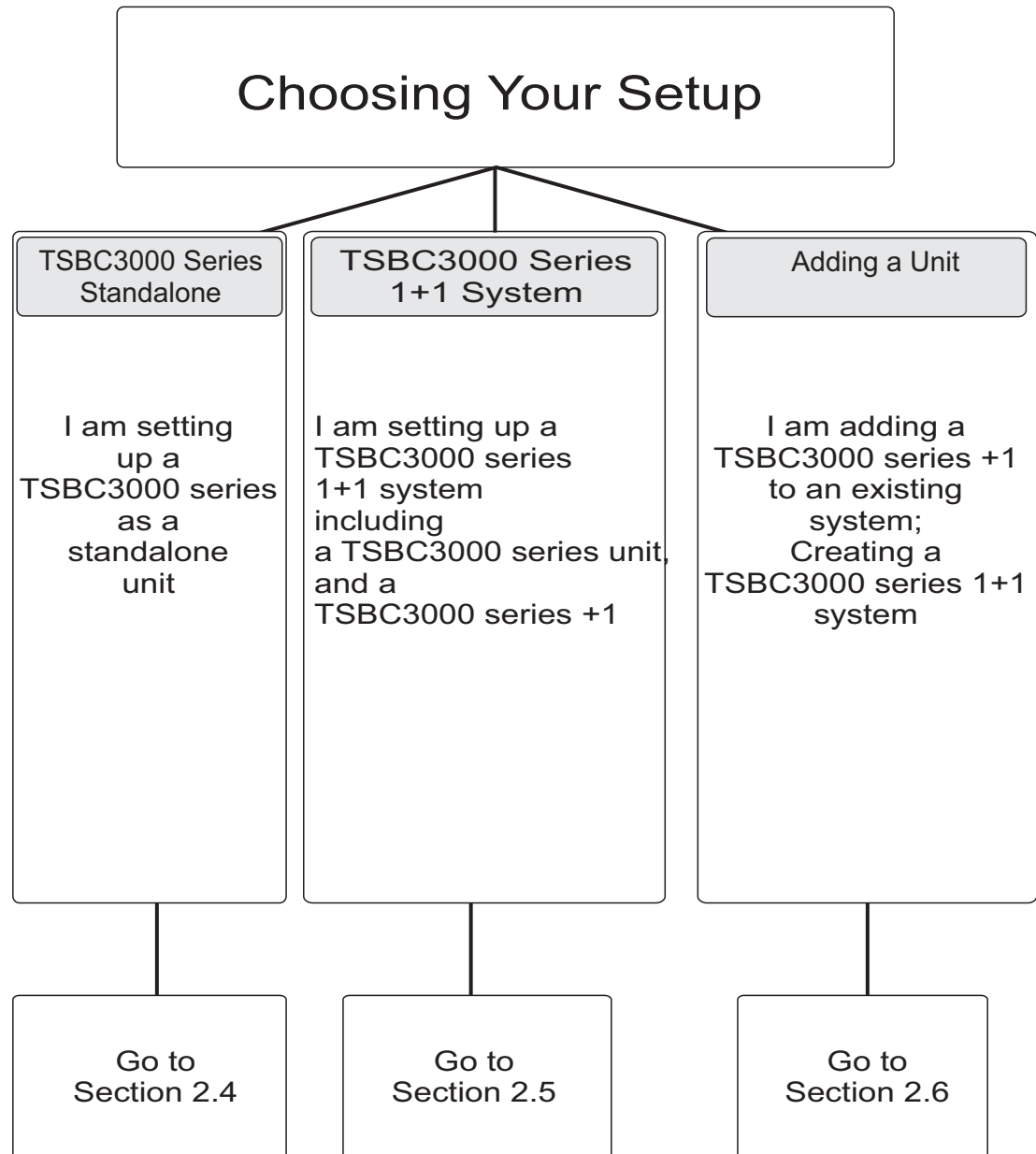
The patch panel can be installed behind the TSBC3000 if the equipment rack is deep enough.

Figure 2.1 Rack Mounting the Equipment

2.3

## Choosing your Connection Procedures

Use the following diagram to guide you to the appropriate section.



## 2.4 TSBC3000 Series Standalone



If you are here, you have a TSBC3000 series unit that you will set up as a standalone system. This section covers the following procedures:

- Section 2.4.1 “Connecting to the TSBC3000 Series Management Interface”.
- Section 2.4.2 “Connecting to a VoIP Network”.
- Section 2.4.3 “Connecting to the PSTN (Optional TDM fall-back feature)”.
- Section 2.4.4 “Grounding the Equipment Chassis”.
- Section 2.4.5 “Powering Up”.
- Section 2.4.6 “Start Up”.



## 2.4.1

## Connecting to the TSBC3000 Series Management Interface

The TSBC3000 series provides management interface(s) enabling administrators to perform management tasks on the TSBC3000 series unit.

### Prerequisites

To communicate with the management interface, One or two CAT5 Ethernet cable with RJ45 male-male terminations:

### Interconnections

The TSBC3000-680 provides redundant management interfaces each using one gigabit Ethernet network link, while the TSBC3000-2700 provides a single management interface. See figure 2.2 on page 14.

#### To communicate with the management interface:

1. Connect the supplied CAT5 Ethernet cable to the port labeled “MGMT0” at the rear of the TSBC3000 series. Connect the other end of the same CAT5 cable to the first gigabit Ethernet switch.
2. In the case of a TSBC3000-680, if your system employs a second gigabit Ethernet switch for redundancy, connect a second CAT5 Ethernet cable to MGMT1 at the rear of the TSBC3000-680. Connect the other end of the same CAT5 cable to the second gigabit Ethernet switch.

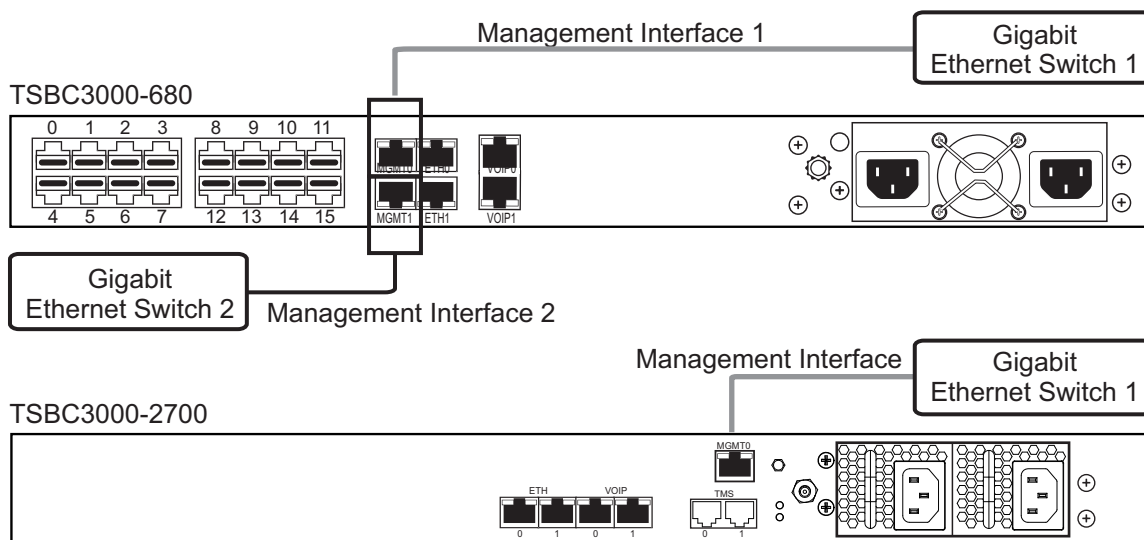


Figure 2.2

Management Interface

#### Note

The default IP addresses for the management ports are located in the “Important Notice” sheet received with the shipment. For the TSBC3000-680, MGMT ports are configured in bonding.

If you do not know the default IP address, go to Section 3.5 “Changing the TSBC3000 Series Management Port IP Address” on page 49.

## 2.4.2 Connecting to a VoIP Network



The TSBC3000 series features redundant GigE ports for connection to different VoIP networks. This provides an access point to manage VoIP traffic. Should one of the IP physical interface go down, the TSBC3000 series will continue to manage VoIP traffic using the alternate physical interface.

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

**Note:** Certain configurations of the TSBC3000 series will exceed 100 Mbps, therefore 1000 Mbps is recommended.

### Prerequisites

To connect the TSBC3000 series to the VoIP network, you will need:

- Gigabit layer 2 Ethernet switch. A second one is required to support redundancy of the VoIP interface.
- One or two CAT5 Ethernet cables with RJ45 male-male terminations.

### Connections

The TSBC3000 series is connected to the VoIP network by one or optionally two Ethernet GigE network links, as shown in figure 2.3 on page 15.

#### To connect the TSBC3000 series unit to the VoIP network:

1. Connect a CAT5 Ethernet cable to VoIP0 at the rear of the TSBC3000 series. Connect the other end of the same CAT5 cable to the gigabit Ethernet switch.
2. If your system employs a second gigabit Ethernet switch for redundancy, connect a second CAT5 Ethernet cable to VoIP1 at the rear of the TSBC3000 series. Connect the other end of the same CAT5 cable to the second gigabit Ethernet switch.

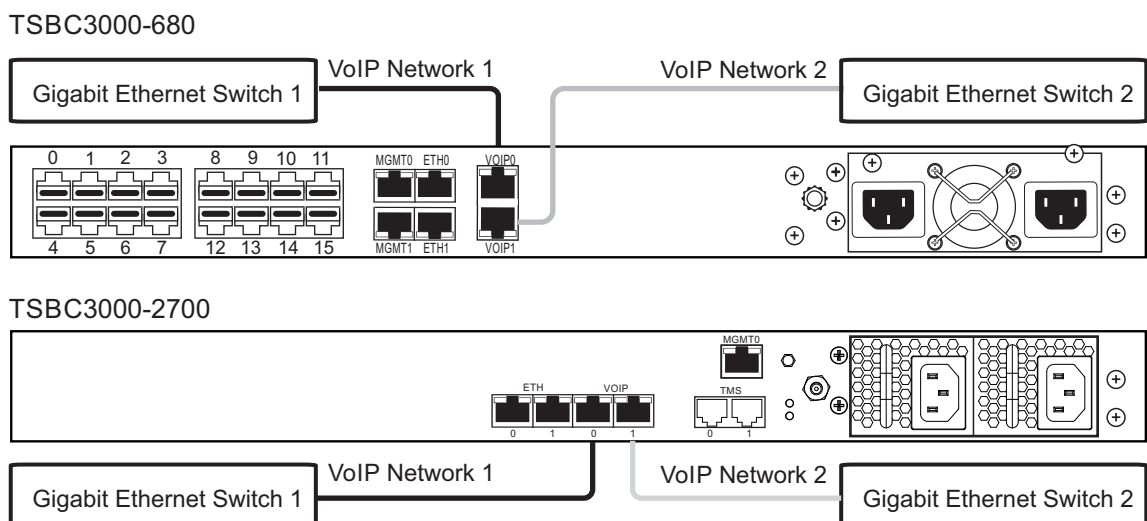


Figure 2.3 Connecting to the VoIP Network



## 2.4.3

## Connecting to the PSTN (Optional TDM fall-back feature)

**Note** This section only applies to the TSBC3000-680. In addition, TDM fall-back connection to the PSTN is an optional feature.

The TSCB3000-680 provides up to 16 RJ48C TDM fall-back interfaces for connection to T1/E1 lines. The termination impedance is set at 100 ohms for T1 lines and 120 ohms for E1 lines. It is possible to connect an external balun to convert the line impedance to 75 ohms.

If you are making your own cables, refer to Section A.1 “RJ48C (T1/E1) Wiring Diagram: Crossover and Straight Cables” on page 53 for crossover or straight cable wiring connections.

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

### To connect to the PSTN:

1. Start with port 0 located at the top and leftmost position. Connect one cable between this port and the T1/E1 line. See figure 2.4 on page 16.
2. Repeat step 1, using the next available port.



Figure 2.4

TSBC3000-680, 16-Port Interface to the PSTN



## 2.4.4 Grounding the Equipment Chassis

As a standard safety practice, the chassis of the TSBC3000 series must be properly grounded to protect against any contact with an electrical fault condition. It is recommended that the chassis be connected to an earth ground. When the TSBC3000 series is installed in an equipment rack, connect the ground wire between the ground lug of the session border controller and the equipment rack ground bar. If more than one TSBC3000 series is installed in an equipment rack, each TSBC3000 series must be grounded directly to 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 2.5 on page 17.
- Do not over tighten ground lug connections.

### To connect the TSBC3000 series to ground:

1. Connect one end of a ground wire to the ground lug of the TSBC3000 series. See figure 2.5 on page 17.
2. Connect the other end of the ground wire to a ground bar of the equipment rack. If the TSBC3000 series is not installed in an equipment rack, connect the ground wire to earth ground. In the case of DC powered units, connect an additional ground wire from the chassis ground terminal of each DC supply.
3. Verify that the resistance of the ground path is less than 0.5 ohms.

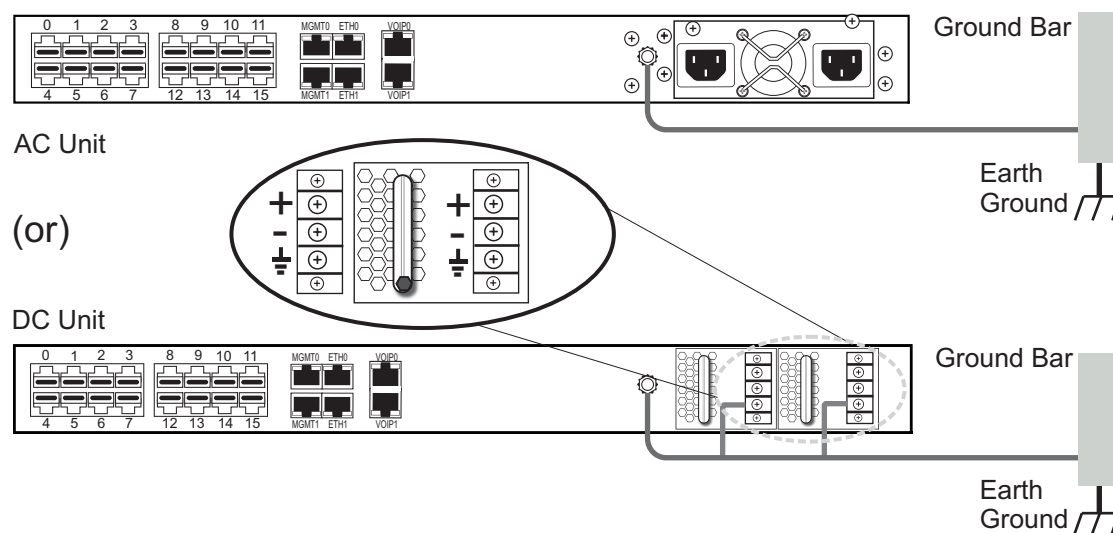


Figure 2.5 Ground Connection



## 2.4.5 Powering Up

The TSBC3000 series is furnished with two AC or DC power connections. Only once all other equipment installation work is completed should the TSBC3000 series be turned on.

### 2.4.5.1 Connecting to AC Power

#### Prerequisites

To power the TSBC3000 series, you will need:

- Two power sources.
- Two power cables for the TSBC3000 series.

#### To connect to AC Power:

1. Connect an AC power cable to each AC connector of the TSBC3000 series and an AC supply. See figure 2.6 on page 18.

**Note** It is important to connect both power supplies in order to avoid setting off the audible alarm.

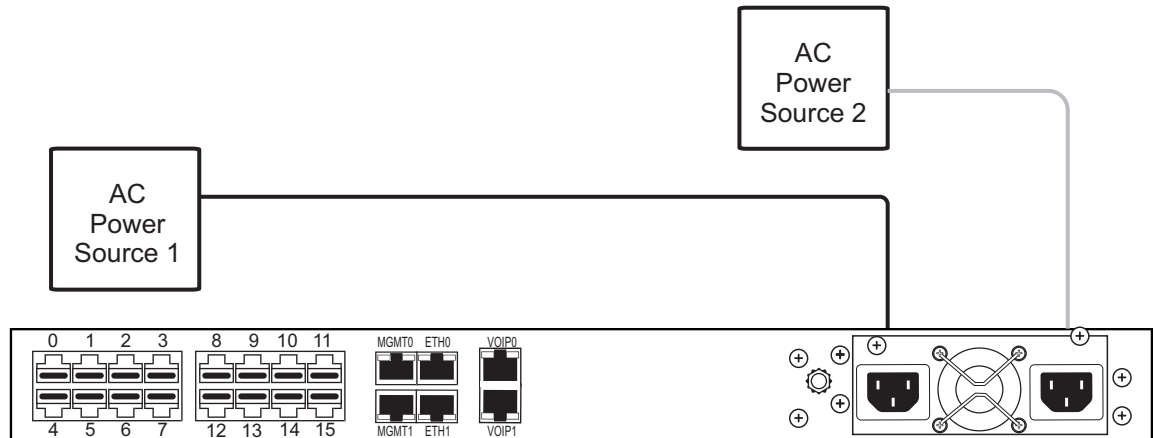


Figure 2.6 AC Power Connection



### 2.4.5.2 Connecting to DC Power

The TSBC3000 series, DC model, is furnished with two DC power supplies.



**Warning** To avoid electrocution, DC power connections must be performed by a trained technician.

**To connect to DC power:**

1. Connect one wire from the positive terminal of the TSBC3000 series to the return side of DC power source one, as shown in figure 2.7 on page 19.
2. Connect another wire from the negative terminal of the TSBC3000 series to the -48V side of DC power source one.
3. Connect a ground wire from the ground terminal of the TSBC3000 series to earth ground.
4. Repeat steps 1-3 for the second power DC power source.

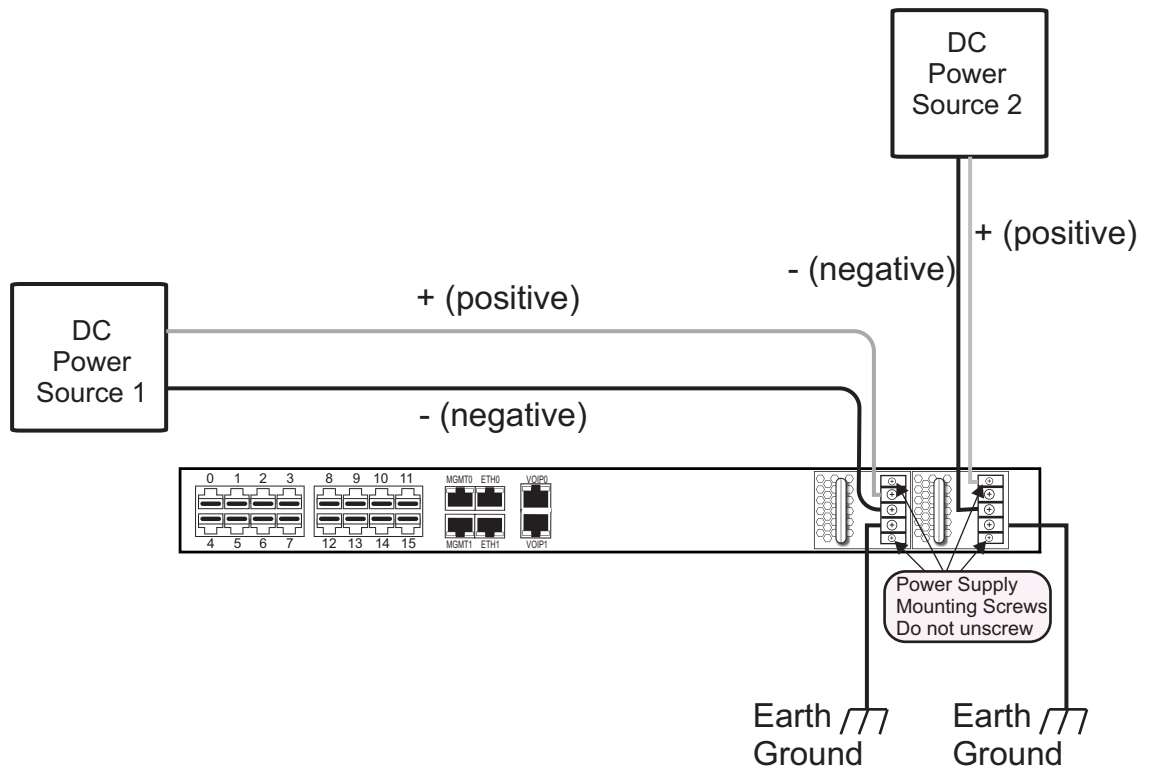


Figure 2.7 TSBC3000 Series Redundant DC Supply Wiring Diagram



## 2.4.6

### Start Up

The first time that you connect to a TSBC3000 series, the web portal is displayed and you are asked to configure the role of the TSBC3000 series. You must set the role as a TSBC3000 series standalone.

Once the configuration settings are applied, your TSBC3000 series starts up and displays the web portal configuration management tool.

---

**Note** To learn about the IP address for your system or how to change it, refer to Section 3.5 “Changing the TSBC3000 Series Management Port IP Address” on page 49.

---

### 2.4.6.1

#### Configuring the Role

To configure the role of your TSBC3000 series as a standalone unit, do the following:

1. Connect to the web portal of the standalone unit. The Welcome page appears.



2. Follow the instructions of the web portal to set the role to a standalone session border controller.

## 2.5 TSBC3000 Series 1+1 System

If you are here, you are installing a TSBC3000 series 1+1 system. This section covers the following procedures:



- Section 2.5.1 “Connecting to the TSBC3000 Series 1+1 System Management Interfaces”.
- Section 2.5.2 “Connecting to the TSBC3000 Series 1+1 System Control Network”.
- Section 2.5.3 “Connecting to the TSBC3000 Series 1+1 System VoIP Network(s)”.
- Section 2.5.4 “Connecting to the PSTN in a TSBC3000 Series 1+1 System (Optional TDM fall-back feature)”.
- Section 2.5.5 “Grounding the Equipment Chassis”.
- Section 2.5.6 “Powering Up”.
- Section 2.5.7 “Start Up”.

## 2.5.1 Connecting to the TSBC3000 Series 1+1 System Management Interfaces



The TSBC3000 series provides redundant management interfaces enabling administrators to perform management tasks on the TSBC3000 series 1+1 system.

### Prerequisites

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

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

### Interconnections

A TSBC3000 series 1+1 system provides redundant management interfaces for a TSBC3000 series and an TSB3000 +1 session border controller, each using a gigabit Ethernet network link. See figure 2.8 on page 23.

#### TSBC3000-680

##### To communicate with the management interface:

1. Connect a CAT5 Ethernet cable to the port labeled MGMT0 at the rear of the TSBC3000 series to the first gigabit Ethernet switch.
2. If your system employs a second Gigabit Ethernet switch for redundancy, connect a second CAT5 Ethernet cable to MGMT1 at the rear of the TSBC3000 series. Connect the other end of the same CAT5 cable to a second gigabit Ethernet switch.
3. Repeat steps 1 and 2 for the TSBC3000 series +1 unit.

#### TSBC3000-2700

##### To communicate with the management interface:

1. Connect a CAT5 Ethernet cable to the port labeled MGMT0 at the rear of the TSBC3000 series to the first gigabit Ethernet switch.
2. Repeat steps 1 and 2 for the TSBC3000 series +1 unit.

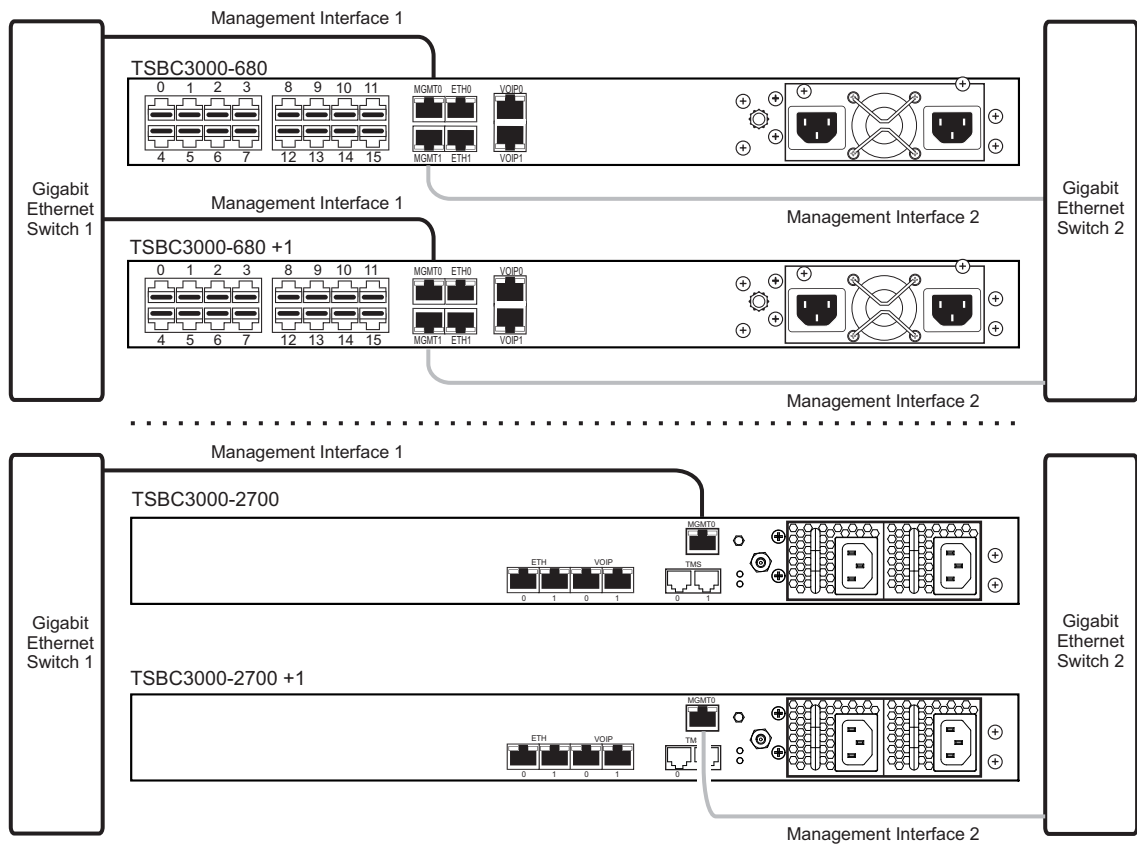


Figure 2.8 Management Interface

**Note** The default IP addresses for the management ports are located in the “Important Notice” sheet received with the shipment. For the TSBC3000-680, MGMT ports are configured in bonding.

If you do not know the default IP address, go to Section 3.5 “Changing the TSBC3000 Series Management Port IP Address” on page 49.

## 2.5.2 Connecting to the TSBC3000 Series 1+1 System Control Network

Each TSBC3000 series features dual GigE Ethernet ports to connect to the TSBC3000 series control network. This allows both units to communicate with one another.



### Prerequisites

To connect to the control network, you will need:

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

### To connect to the control network:

1. Connect one CAT5 Ethernet cable between ports ETH0 of both the TSBC3000 series and TSBC3000 series +1 units.
2. Connect a second CAT5 Ethernet cable between ports ETH1 of both the TSBC3000 series and TSBC3000 series +1 units.

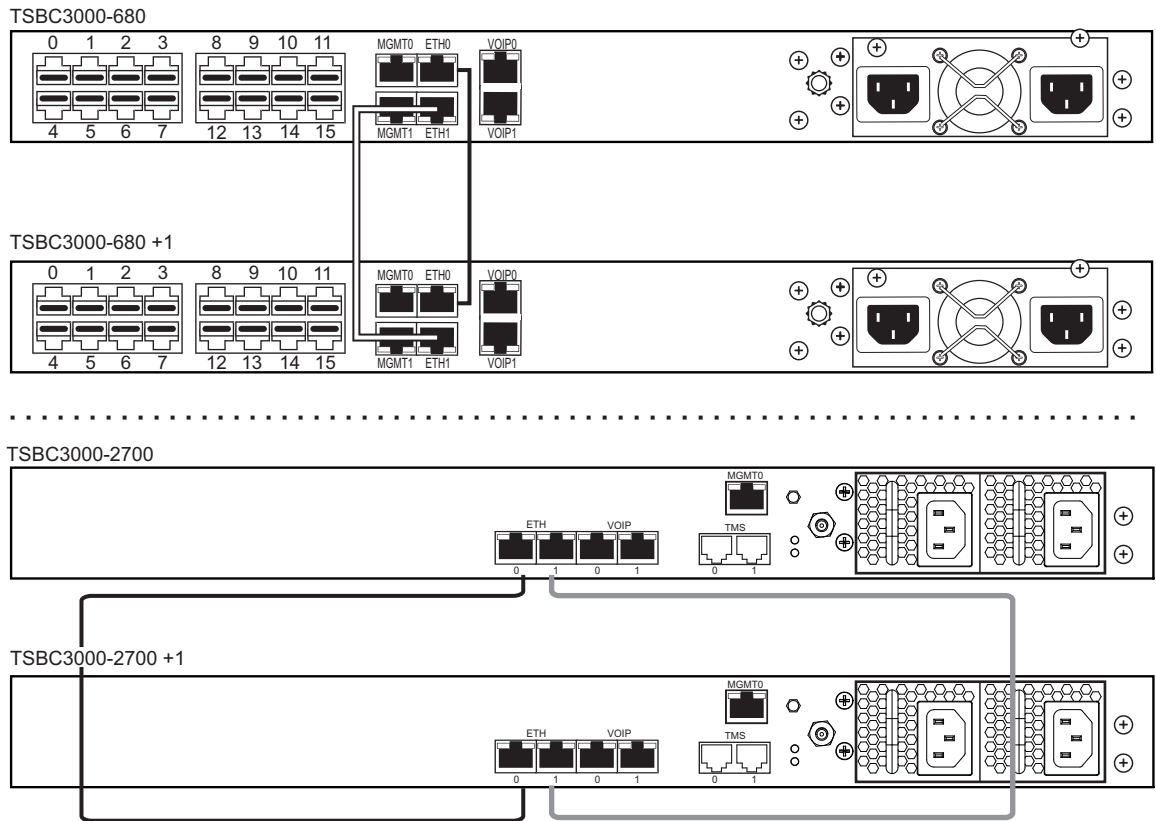


Figure 2.9 Connecting to the TSBC3000 Series Control Network

## 2.5.3 Connecting to the TSBC3000 Series 1+1 System VoIP Network(s)

Each TSBC3000 series features redundant GigE ports for connection to different VoIP networks. This provides an access point to manage VoIP traffic. Should one of the IP physical interface go down, the TSBC3000 series 1+1 session border controller will continue to manage VoIP traffic using the alternate physical interface.



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

---

**Note:** For full redundancy protection, the TSBC3000 series 1+1 system requires two (2) gigabit layer 2 Ethernet switches.

---

### Prerequisites

To connect 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.
- Four CAT5 Ethernet cables with RJ45 male-male terminations.

### Connections

The TSBC3000 series unit and TSBC3000 series +1 VoIP ports must to be connected on both Ethernet GigE network links, as shown in figure 2.9 on page 24.

#### To connect to the VoIP network:

1. Connect the VoIP0 connector from both the TSBC3000 series and TSBC3000 series +1 units to the first Ethernet switch.
2. Connect the VoIP1 connector from both the TSBC3000 series and TSBC3000 series +1 units to the second Ethernet switch.

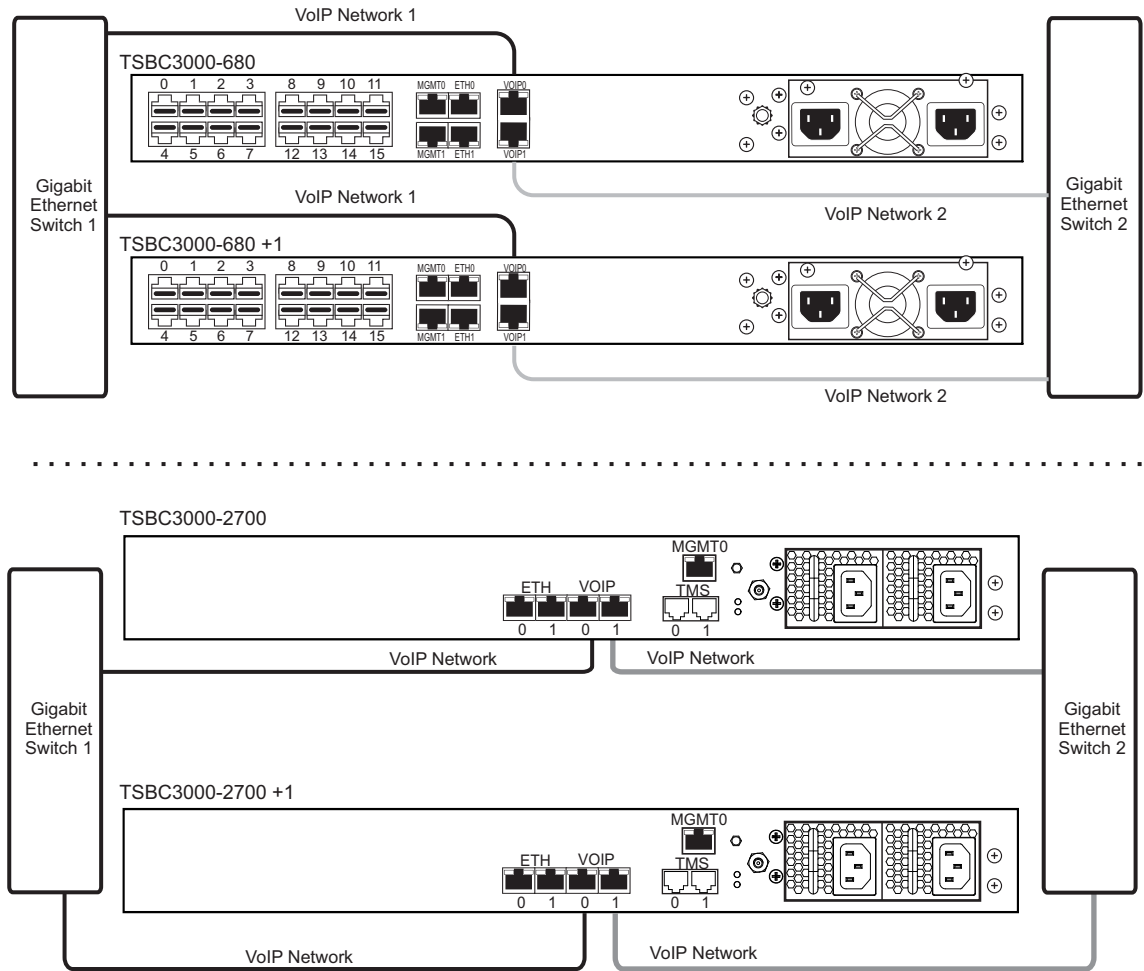


Figure 2.10 Connecting to the TSBC3000 Series VoIP Network



## 2.5.4 Connecting to the PSTN in a TSBC3000 Series 1+1 System (Optional TDM fall-back feature)

---

**Note** This section only applies to the TSBC3000-680. In addition, TDM fall-back connection to the PSTN is an optional feature.

---



A TSBC3000 series 1+1 system has a TDM interface featuring 16 RJ48C type ports enabling the connection to T1/E1 lines. The termination impedance is set at 100 ohms for T1 lines and 120 ohms for E1 lines. It is possible to connect an external balun in order to convert to 75 ohms. If you are making your own cables, refer to page 53 in Appendix A for crossover or straight cable wiring connections.

---

**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 a TSBC3000 series 1+1 system require straight cables. The supplied T1/E1 cables are straight cables. Cables used to connect the network to the 1+1 patch panel must do the cross connection.

---

### To connect to the PSTN:

1. Connect T1/E1 lines 0-7 of the Network section of the patch panel to the remote equipment. See figure 2.11 on page 28.
2. Connect T1/E1 lines 0-7 from the 'gateway' section of the patch panel to the RJ48C connectors of the TSBC3000 series unit.
3. Connect T1/E1 lines 0-7 from the 'gateway 1+1' section of the patch panel to the RJ48C connectors of the TSBC3000 series +1 unit.
4. Repeat step 1 - 3 for lines 8-15, connecting them to a second patch panel.

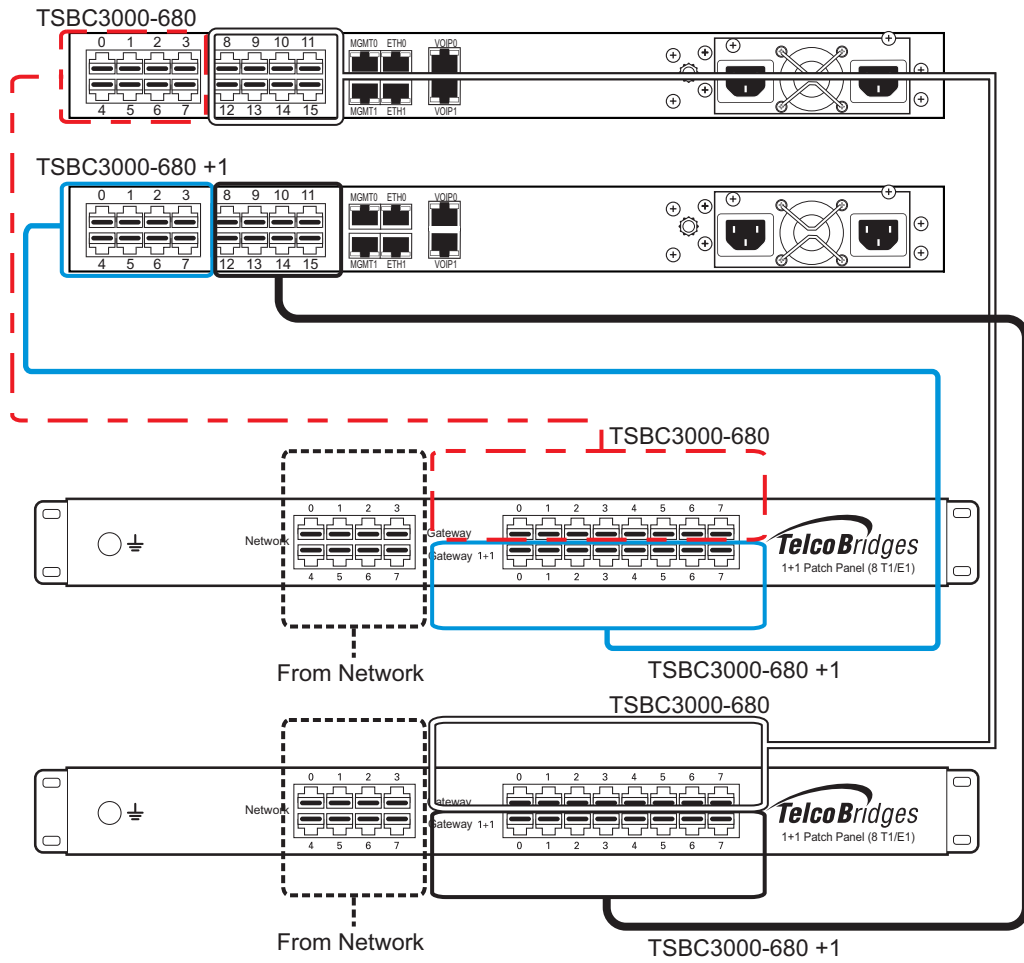


Figure 2.11 TSBC3000-680/TSBC3000-680 +1 connecting to the 1+1 patch panels (8/T1/E1)

## 2.5.5 Grounding the Equipment Chassis

As a standard safety practice, the chassis of the TSBC3000 series must be properly grounded to protect against any contact with an electrical fault condition. It is recommended that the chassis be connected to an earth ground. When the TSBC3000 series is installed in an equipment rack, connect the ground wire between the ground lug of the session border controller and the equipment rack ground bar. If more than one TSBC3000 series is installed in an equipment rack, each TSBC3000 series must be grounded directly to 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 2.12 on page 29.
- Do not over tighten ground lug connections.

### To connect the TSBC3000 series to ground:

1. Connect one end of a ground wire to the ground lug of the TSBC3000 series. See figure 2.12 on page 29.
2. Connect the other end of the ground wire to a ground bar of the equipment rack. If the TSBC3000 series 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.

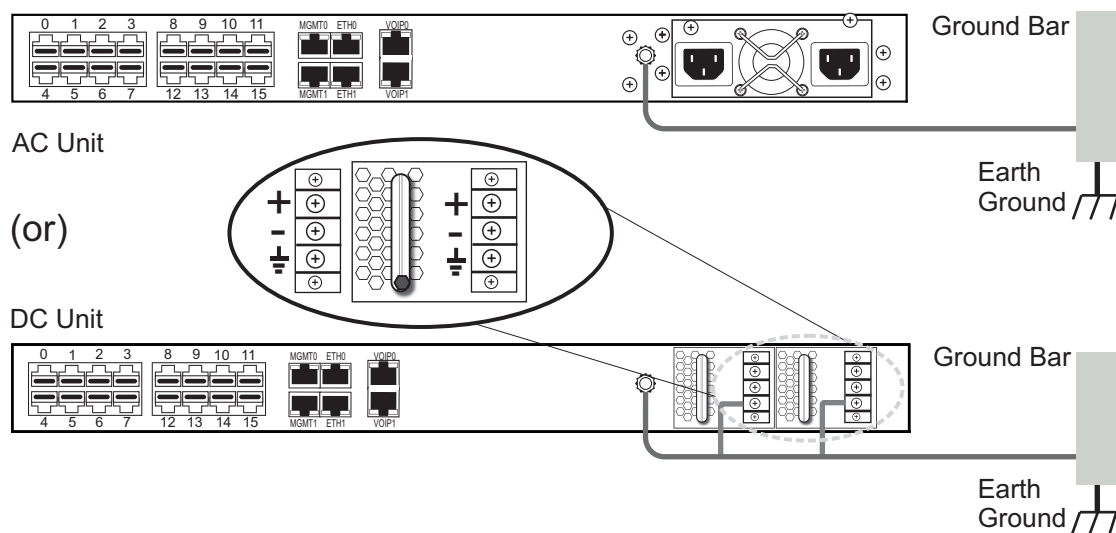


Figure 2.12 Ground Connection

## 2.5.6 Powering Up



The TSBC3000 series and TSBC3000 series +1 units are furnished with two AC or DC power connections. Only once all other equipment installation work has been completed should the TSBC3000 Series 1+1 system be powered up.

### Prerequisites

To connect power you will need:

- Two power sources.
- Two power cables for every TSBC3000 series and TSBC3000 series +1 unit.

### 2.5.6.1 Connecting to AC Power

**To connect to AC Power:**

1. Connect the first power connector of each unit to the first power source. See Figure 2.13.
2. Connect the second power connector of each unit to the second power source.

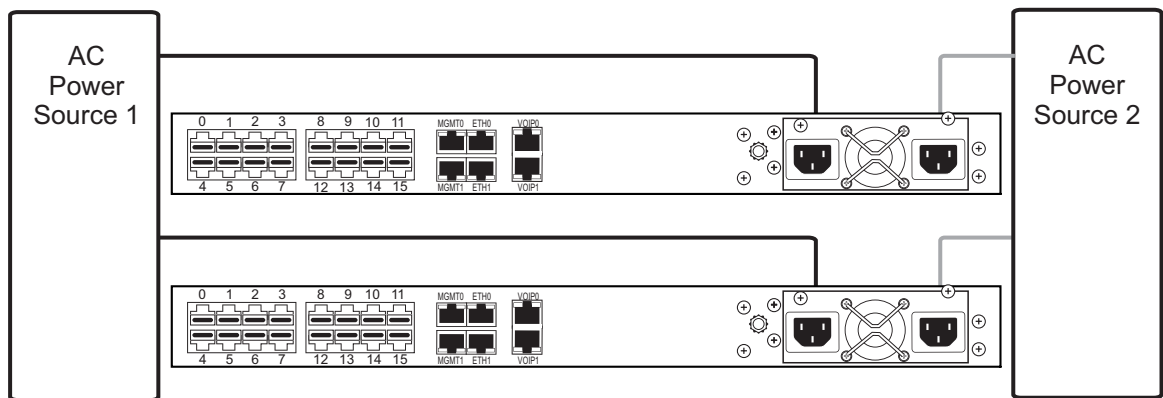


Figure 2.13 TSBC3000 Series and TSBC3000 Series +1 AC Power Connections

### 2.5.6.2 Connecting to DC Power

The TSBC3000 series, DC model, is furnished with two DC power supplies.

**Warning** To avoid electrocution, DC power connections must be performed by a trained technician.



1. Connect one wire from the positive terminal of the TSBC3000 series to the return side of DC power source one, as shown in figure 2.7 on page 19.
2. Connect another wire from the negative terminal of the TSBC3000 series to the -48V side of DC power source one.
3. Connect a ground wire from the ground terminal of the TSBC3000 series to earth ground.
4. Repeat steps 1-3 for the second power DC power source.

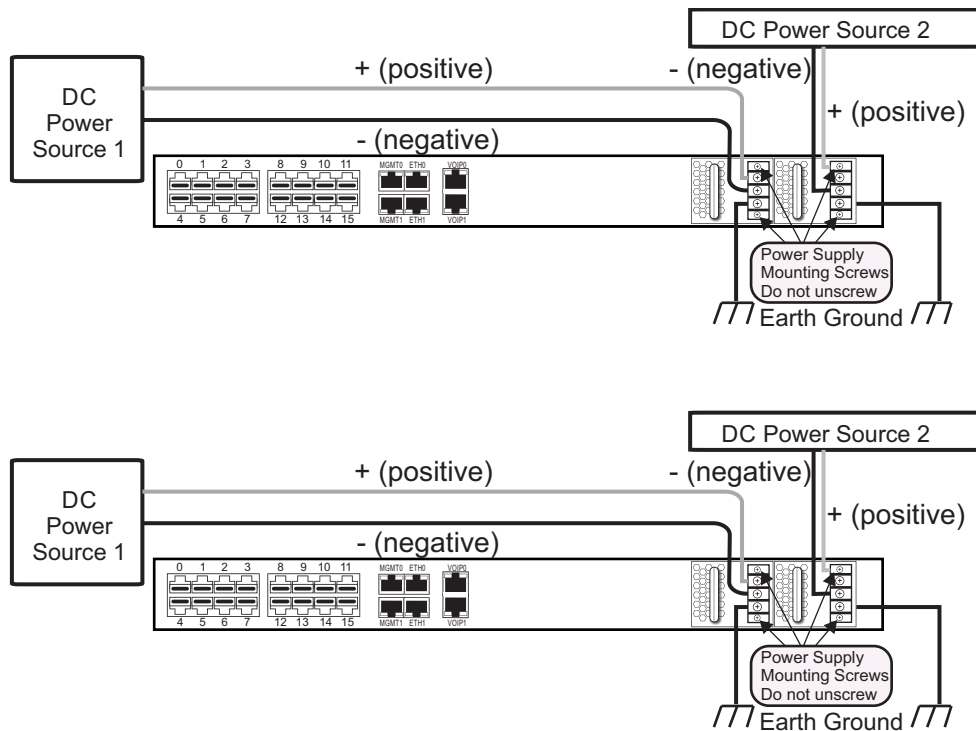


Figure 2.14 TSBC3000 Series Redundant DC Supply Wiring Diagram

## 2.5.7 Start Up

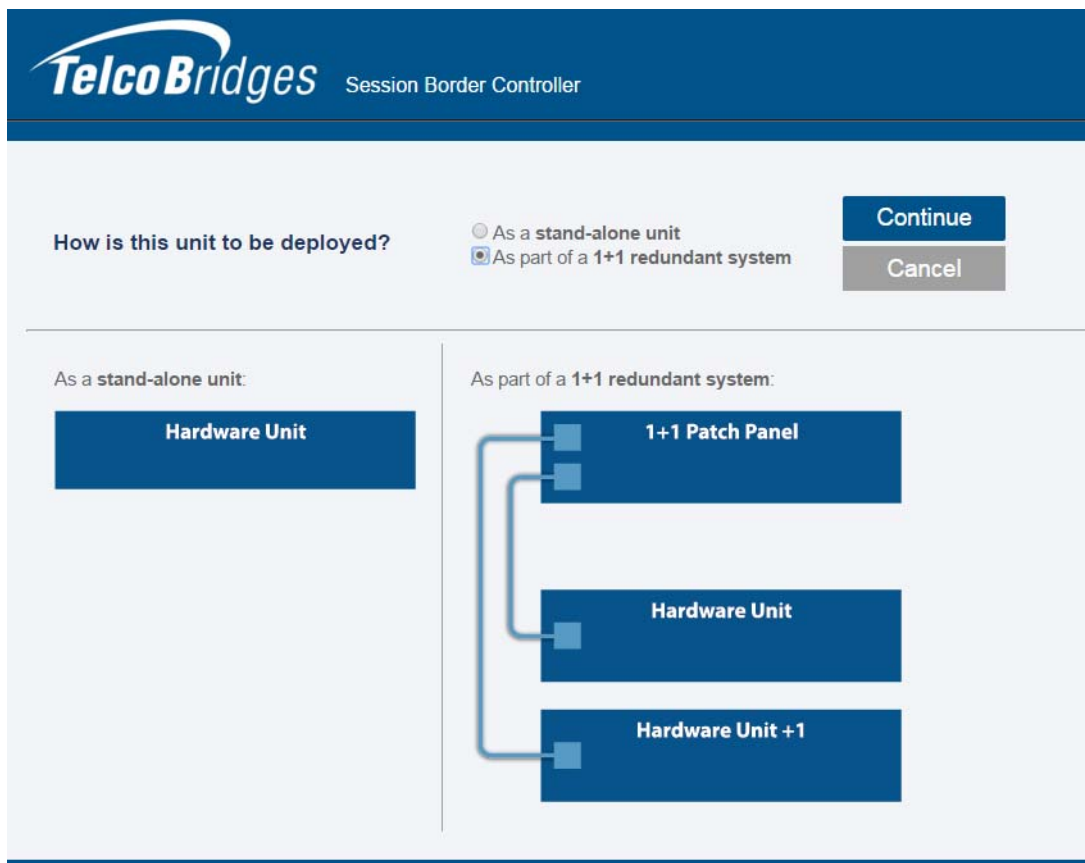


After powering up the TSBC3000 series 1+1 system, you must FIRST configure the primary unit followed by the secondary unit.

Once these configuration settings have been applied, your TSBC3000 series 1+1 system will start up and display the web portal configuration management tool.

**Note** To learn about the IP address for your system or how to change it, refer to Section 3.5 “Changing the TSBC3000 Series Management Port IP Address” on page 49.

1. Connect to the web portal. The Welcome page appears.



**Note:** The Welcome page indicates whether the TSBC3000 series unit is a primary or secondary.

2. Follow the instructions of the web portal to configure the units of your TSBC3000 series 1+1 system. Indicate the following:
  - Primary or secondary
  - VLAN IDs

---

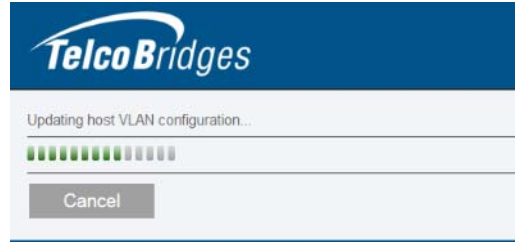
**Note** Default values are fine for most deployments. Adjust values only when necessary.

Repeat steps one and two for the secondary unit.

---



3. Once you confirm the changes, a progress page is displayed.



## 2.6 Adding a TSBC3000 +1 Unit to an Existing Standalone; Creating a TSBC3000 series 1+1 System



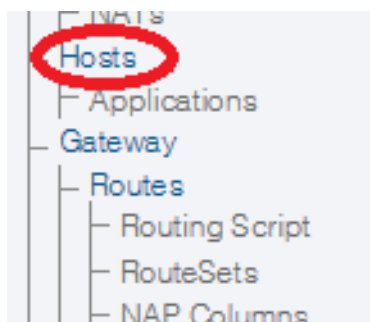
**Warning:** This procedure will require some system downtime.

In order to add a TSBC3000 series +1 unit to a TSBC3000 series standalone unit, you must perform the following procedures:

- Section 2.6.1 “Reconfigure a Standalone Unit as a Primary Unit in a TSBC3000 Series 1+1 System”
- Section 2.6.2 “Install the TSBC3000 Series +1 unit on the Equipment Rack”
- Section 2.6.3 “Install the 1+1 Patch Panel”
- Section 2.6.4 “Connect to the TSBC3000 Series 1+1 Management Interface”
- Section 2.6.5 “Connect to the TSBC3000 Series 1+1 Control Network”
- Section 2.6.6 “Connect to the TSBC3000 Series 1+1 VoIP Network(s)”
- Section 2.6.7 “Connect to the PSTN Network”
- Section 2.6.9 “Power Up the Equipment”
- Section 2.6.10 “Start Up”

### 2.6.1 Reconfigure a Standalone Unit as a Primary Unit in a TSBC3000 Series 1+1 System

1. Connect to the web portal of the standalone TSBC3000 series unit.
2. Select **Hosts** from the navigation panel.





- Select a host from the **Host Configuration List**.

Configuration | Status

[Create New Host](#)

**Host Configuration List**

Name	Applications	Actions
TB009708	gateway, logtrace, stream_server, tboamapp, tbuctwriter, toolpack_engine, toolpack_sys_mgr	Delete



- Select the **Status** tab.

Configuration | **Status**

List

**Editing Host Configuration:**

Name: TB005424

**Applications**

Current		Available
Applications	Action	
stream_server	Remove	
toolpack_engine		
toolpack_sys_mgr		
tbuctwriter	Remove	
gateway	Remove	
logtrace		
tboamapp		
tbanmappent	Remove	

**Editing Folder Cleanup:**

[Create all default folder cleanup configurations](#)

[Create New Folder Cleanup](#)

Name	Folder Path	Mask	Max files	Max size	Max age	Actions
------	-------------	------	-----------	----------	---------	---------



5. **Select Reset Host Role.**

The screenshot shows the 'Host Status - TB005424' configuration page. The 'Host Control' dropdown menu is open, showing the following options: None, Shutdown, Validate Requirements, Upgrade to Primary, and **Reset Host Role** (highlighted with a red circle). The 'Action Log' section is also visible below the dropdown.

Name	Value
Host	TB005424
Host role	Secondary
Qam mode	Slave
Qam state	Ready
Trng host	Yes
Host platform	TMG3200 Centos
Host package	x86_64-linux64_centos5
Host control last upload action	None

6. Follow the instructions of the web portal to configure your unit as a primary unit in a new TSBC3000 series 1+1 system.

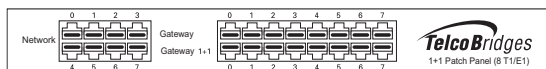
## 2.6.2 Install the TSBC3000 Series +1 unit on the Equipment Rack

The TSBC3000 series +1 unit is mounted on a customer provided equipment rack using the mounting hardware packaged in the box. Refer to Section 2.2 “Rack Mounting the TSBC3000 Series Standalone or the TSBC3000 Series 1+1 System” on page 9.



## 2.6.3 Install the 1+1 Patch Panel

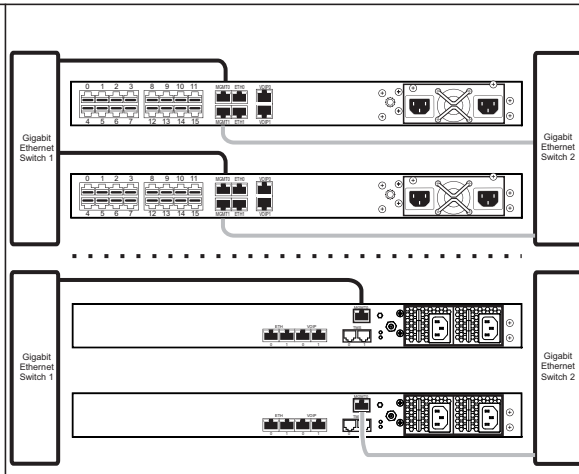
If you are installing a TSBC3000 series +1 unit, the associated one or two 1+1 patch panels will look like the image to the right. Refer to Section 2.2.3 “Installing the TSBC3000 Series Standalone and the TSBC3000 Series 1+1 on an Equipment Rack” on page 10.



## 2.6.4 Connect to the TSBC3000 Series 1+1 Management Interface

The TSBC3000 series redundant management interfaces enables administrators to perform management tasks on the TSBC3000 series equipment. Connect each management interface to different Ethernet switches.

Follow the procedure described in Section 2.5.1 “Connecting to the TSBC3000 Series 1+1 System Management Interfaces” on page 22.

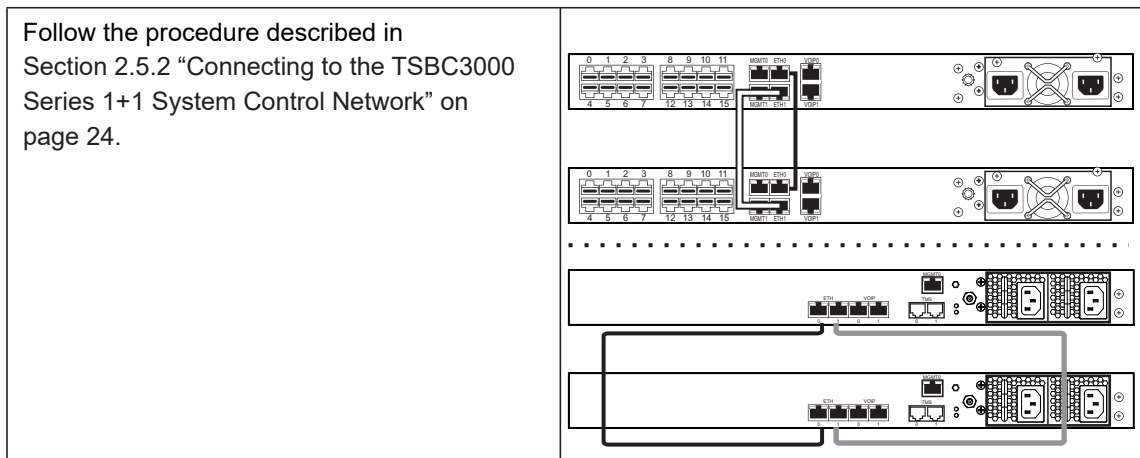




### 2.6.5

## Connect to the TSBC3000 Series 1+1 Control Network

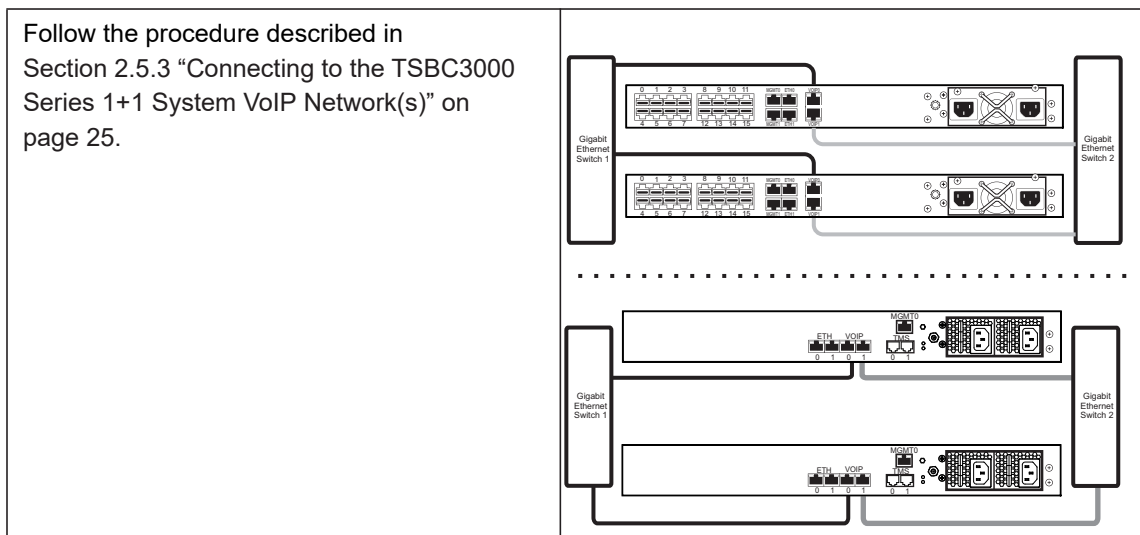
The TSBC3000 series and TSBC3000 series +1 units feature dual GigE ports to connect to the TSBC3000 series control network, which allows both units to communicate with each other.



### 2.6.6

## Connect to the TSBC3000 Series 1+1 VoIP Network(s)

The TSBC3000 series and TSBC3000 series +1 units feature 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 TSBC3000 series 1+1 system will continue to manage VoIP traffic using the alternate network.



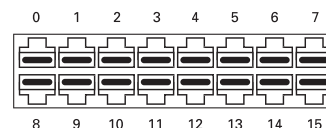
## 2.6.7 Connect to the PSTN Network

**Note** This section only applies to the TSBC3000-680. In addition, TDM fall-back connection to the PSTN is an optional feature.



The TSCB3000-680 provides up to 16 RJ48C TDM fall-back interfaces for connection to T1/E1 lines.

Refer to Section 2.5.4 “Connecting to the PSTN in a TSBC3000 Series 1+1 System (Optional TDM fall-back feature)” on page 27.



## 2.6.8 Grounding the Equipment Chassis

As a standard safety practice, the chassis of the TSBC3000 series must be properly grounded to protect against any contact with an electrical fault condition. Refer to Section 2.5.5 “Grounding the Equipment Chassis” on page 29.

## 2.6.9 Power Up the Equipment

The TSBC3000 series and TSBC3000 series +1 units are furnished with one (1) or two (2) AC or DC power connections. Only once all other equipment installation work has been completed should the TSBC3000 series 1+1 system be powered up. Refer to Section 2.5.6 “Powering Up” on page 30.

## 2.6.10 Start Up

---

**Note** To learn about the IP address for your system or how to change it, refer to Section 3.5 “Changing the TSBC3000 Series Management Port IP Address” on page 49.

---

1. Connect to the web portal of the TSBC3000 series 1+1 system. The Welcome page appears.



2. Follow the instructions of the web portal to configure the Vlans.

## 2.7 Verifying the LED Status Indications

### Front of Unit

When the equipment is powered, verify the front panel to determine that the LED indication is normal. See Table 2.3 on page 41.

Table 2.3 TSBC3000 Series Unit Displays

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

**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.

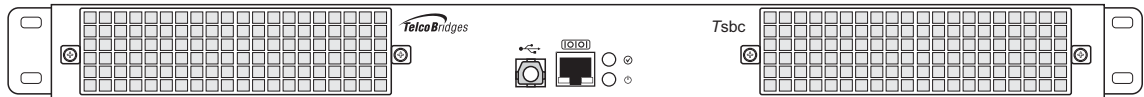


Figure 2.15 Front View LED

## 2.8 Powering Down

The TSBC3000 series 1+1 can be turned off using either the management port, the power button, or the web portal.

### 2.8.1 Management Port

To shut down the unit using the management port, connect to the management interface using SSH, and enter:

```
shutdown -hP now
```

### 2.8.2 Power Button

To shut down the unit, press and hold the front power button for one second.

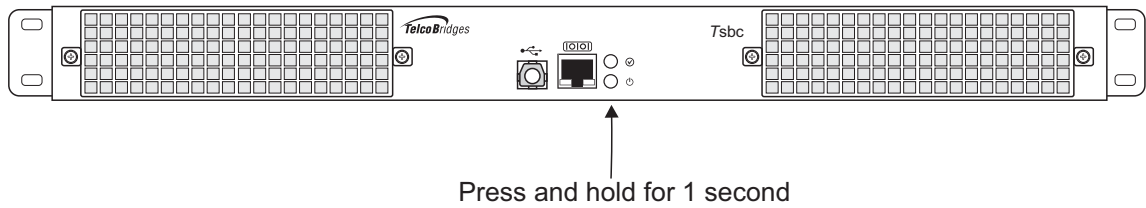
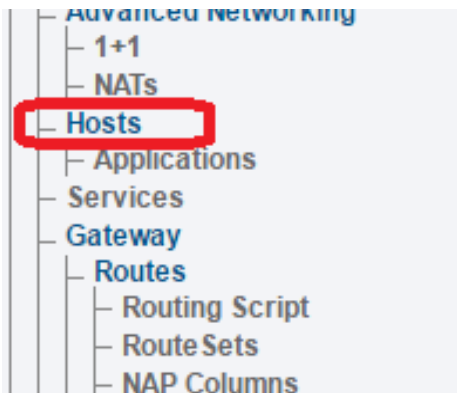


Figure 2.16 Front View LED

### 2.8.3 Web Portal

1. Select Hosts from the web portal navigation bar.





- 2. Click the Status tab.

Configuration | **Status**

[Create New Host](#)

### Host Configuration List

Name ▲	Applications	Actions
<a href="#">TB009708</a>	<a href="#">gateway</a> , <a href="#">logtrace</a> , <a href="#">stream server</a> , <a href="#">tboamapp</a> , <a href="#">tbuctwriter</a> , <a href="#">toolpack engine</a> , <a href="#">toolpack sys mgr</a>	<a href="#">Delete</a>

- 3. Select the host that you wish to shut down.

Configuration | **Status**

### Host Status List

**Status Refresh**

Refresh every: Don't refresh ▼ Now

Host	Host role	Oam mode	Oam state	Tmg host
<a href="#">TB009708</a>	Standalone	Master	Ready	Yes

- 4. Select Shutdown from the Action Log.

Configuration
Status

[List](#)

**Host Status - TB009708**

**Status Refresh**

Refresh every: Don't refresh No

Status Level: Level 2

Host	Processor Usage	Memory Usage	Filesystem Usage	Folder Clear
Name		Value		
Host	TB009708			
Host state	Up			
Host role	Standalone			
Oam mode	Master			
Oam state	Ready			
Tmg host	Yes			
Host platform	TMG800 Centos			
Host package	x86_64-linux64_centos5			
Host package update available	Disabled			
Host control upload package last log				
Host control upload license last log				
Host control last upload action	None			
Host control action package bg install	true			
Timestamp				
Current timestamp	2016-08-28 11:56:02.214-0400			
Timezone	America/Montreal			

**Host Control**

Action: None

**Action Log**

- None
- Shutdown
- None
- Upgrade Linux Packages
- Validate Requirements
- Reset Host Role
- Check Linux Packages



## Section 3 Initial System Configuration

This chapter provides information about the following topics:

- Section 3.1 “TSBC3000 Series SSH Connection”
- Section 3.2 “TSBC3000 Series Serial Connection”
- Section 3.3 “Changing TSBC3000 Series Management Port Passwords”
- Section 3.4 “Retrieving TSBC3000 Series Information”
- Section 3.5 “Changing the TSBC3000 Series Management Port IP Address”
- Section 3.3 “Changing TSBC3000 Series Management Port Passwords”
- Section 3.6 “Setting the Time Zone”
- Section 3.7 “Configuring the TSBC3000 Series Using the Web Portal”
- Section 3.8 “Changing VoIP Interface Addresses”



## 3.1

# TSBC3000 Series SSH Connection

The TSBC300 series session border controller is shipped with the *Tctrl* software preinstalled. In order to make changes to the system configuration, you must connect the port labeled MGMT0 or MGMT1 at the rear of the unit to a terminal.

To access the TSBC300 series session border controller, you must use an SSH connection. The **password** is set at the factory and is indicated on the shipment sheet.

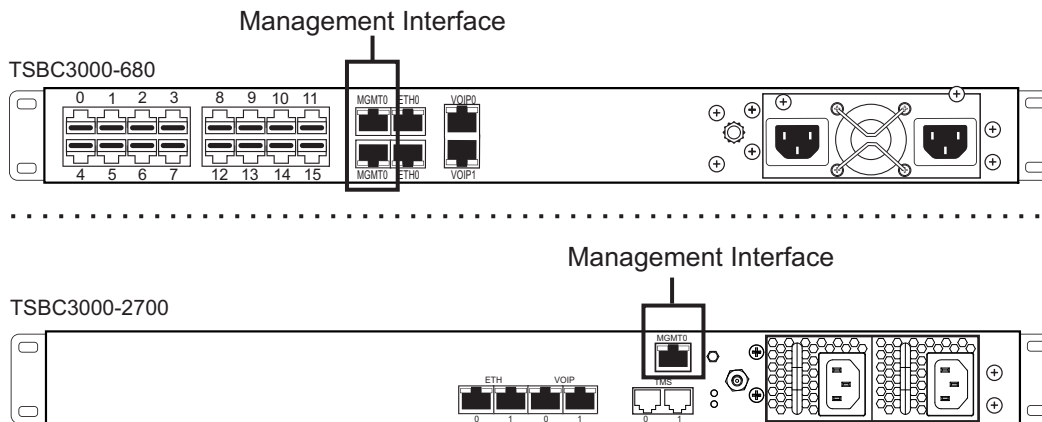


Figure 3.1 TSBC300 Series Session Border Controller Management Interface

---

**Note** See Section 3.5 on page 49 to learn how to change the IP address of the MGMT0 port.

---

## 3.2 TSBC3000 Series Serial Connection

### 3.2.1 Physical Connection

Two types of serial connection are possible:

- Section 3.2.1.1 “Connecting to the USB Port of the TSBC3000 Series”
- Section 3.2.1.2 “Connecting to the Serial Port of the TSBC3000 Series”

### 3.2.1.1 Connecting to the USB Port of the TSBC3000 Series

The Type B USB serial port interface enables administrators to perform management tasks on the TSBC3000 series session border controller.




---

**Note** The USB cable is not provided.

---

**To connect to the Type B USB serial port:**

1. Connect the Type A USB connector of the USB cable to a computer.
2. Connect the Type B USB connector of the USB cable to the USB port of the TSBC3000 series session border controller.

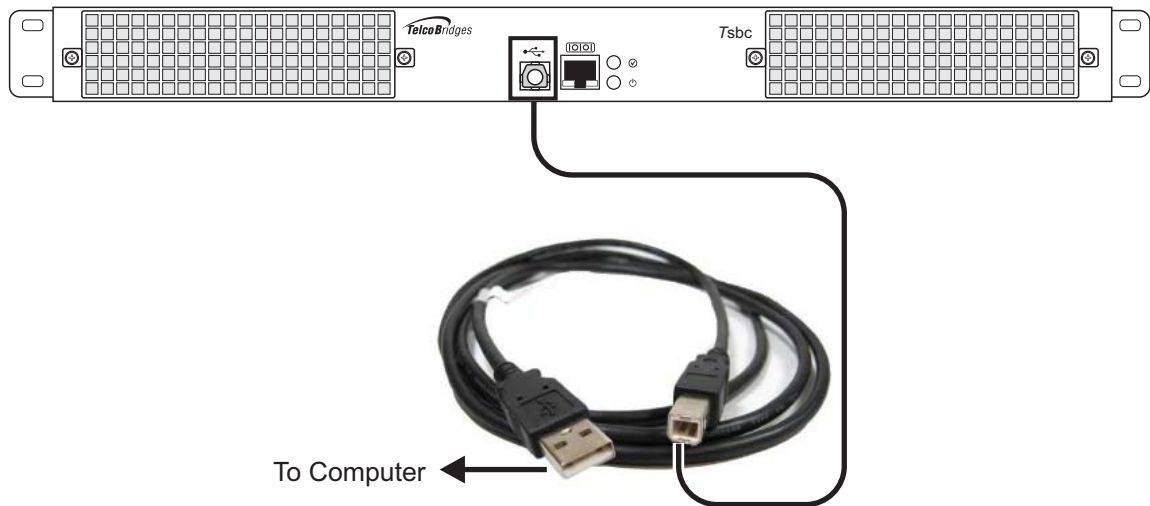


Figure 3.2 USB cable connection

### 3.2.1.2 Connecting to the Serial Port of the TSBC3000 Series

**Note** The default IP addresses for the management ports are located in the “Important Notice” sheet received with the shipment. For the TSBC3000-680, MGMT ports are configured in bonding.

If you do not know the default IP address, go to Section 3.5 “Changing the TSBC3000 Series Management Port IP Address” on page 49.

---

The serial port interface enables administrators to perform management tasks on the TSBC3000 series session border controller.

**To connect to the serial port of a TSBC3000 series:**

1. Connect one end of a CAT5 RJ-45 (male-male) cable to the *Tsbc* serial adapter (both supplied with unit). Connect the DB9 to RJ-45 to the serial port of the computer and the other end of the CAT5



RJ-45 (male-male) cable to the serial port (labeled 10101) of the TSBC3000 series. See Section A.2 on page 54 for a RJ-45 pin-out description.

2. If your computer's serial port features a DB9 connector connect directly otherwise use the *Tsbc* serial adapter supplied with your TSBC3000 series. If your computer's serial port features a USB connector, you will need to provide a USB to DB9 adapter. Refer to figure 3.3 on page 48.

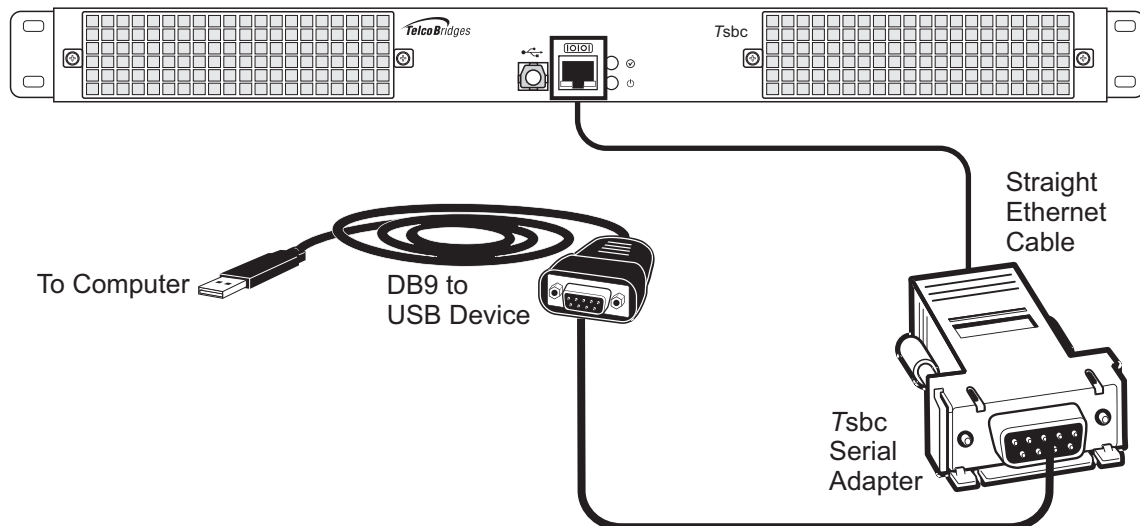


Figure 3.3 Conceptual View of a Serial Connection from the TSBC3000 Series to a Computer

### 3.2.2 Configuring the Terminal Emulator Application

Before communicating with the management interface, you must first configure a terminal emulator or console application to communicate with the TSBC3000 Series system 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**

---

**Note** See Section 3.5 on page 49 to learn how to change the IP address of the MGMT0 port.

---

### 3.3 Changing TSBC3000 Series Management Port Passwords



---

**Note** The following procedure must be performed on a TSBC3000 series standalone and the two units of a TSBC3000 series 1+1 system.

---

Once you are logged on to the TSBC3000 series, 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.
```

### 3.4 Retrieving TSBC3000 Series Information

The TSBC3000 series enables you to retrieve system information with the following shell commands:

- `tbproduct` (retrieve the TSBC3000 series product type). See [http://docs.telcobridges.com/mediawiki/index.php/Get\\_Product\\_Type](http://docs.telcobridges.com/mediawiki/index.php/Get_Product_Type), for further information.
- `tbserial` (retrieve the TSBC3000 series serial number). See [http://docs.telcobridges.com/mediawiki/index.php/Get\\_Serial\\_Number](http://docs.telcobridges.com/mediawiki/index.php/Get_Serial_Number), for further information.

### 3.5 Changing the TSBC3000 Series Management Port IP Address

---

**Note** The following procedure must be performed on a TSBC3000 series standalone unit and the two units of a TSBC3000 series 1+1 system.

---

The management port of the TSBC3000 series (labeled MGMT0) is configured using a static IP address by default, which is located on the “Important Notice” sheet. It 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:

- IP address: 172.24.0.2
  - Netmask: 255.255.255.0
-



## 3.6

## Setting the Time Zone

---

**Note** The following procedure must be performed on a TSBC3000 series standalone unit and the two units of a TSBC3000 series 1+1 system.

---

You can change the time zone of the TSBC3000 series using the *tbtimezone* shell command.

## 3.7

## Configuring the TSBC3000 Series Using the Web Portal

---

**Note:** The first time that you connect to the web portal, you will need to configure the role of the TSBC3000 series unit.

If your system features a TSBC3000 series standalone unit, refer to Section 2.4.6 “Start Up” on page 20.

If your system features a TSBC3000 series unit working in conjunction with a TSBC3000 series +1 unit, refer to Section 2.5.7 “Start Up” on page 32.

---

To change the default configuration of a TSBC3000 series using the Web Portal, 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://[MGMT0 IP address]:12358`

---

**Note** TSBC3000 series and TSBC3000 series +1 units 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

## 3.8

## Changing VoIP Interface Addresses

The default address of the VoIP interfaces of the TSBC3000 series can be modified. To learn how this is done, refer to the Web Portal tutorial guide on the Telcobridges TB Wiki at [docs.telcobridges.com](http://docs.telcobridges.com).





## Section 4 System Backups

This section provides information about the following topics:

- Section 4.1 “Creating a Database Backup”
- Section 4.2 “Downloading a Database Backup”
- Section 4.3 “Uploading a Database Backup”
- Section 4.4 “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>



## 4.1 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.

The screenshot shows the 'Database Backup' configuration page. On the left is a navigation sidebar with 'Backups' selected. The main area is divided into several sections:

- Manual database backups:** A table with columns 'Name', 'Actions', and 'Last validation result'. It lists two backup files: 'database\_clone\_toolpack\_0\_2016\_06\_13\_14\_58\_59\_v0\_500\_0.sql.gz' and 'database\_upgrade\_toolpack\_2\_9\_2016\_06\_13\_14\_59\_12\_v0\_500\_0.sql.gz'. Each row has 'Rename', 'Download', 'Delete', 'Validate', and 'Recover' actions.
- Automatic database backups:** A section with a 'Create' button.
- Upload database backup:** A section with a 'Backup file' label, a 'Choose File' button, and an 'Upload' button.

## 4.2 Downloading a Database Backup

A backup of system data is stored on the hard drive of the TSBC3000 series. It is important that system backups be downloaded to an external storage device.

## 4.3 Uploading a Database Backup

An external backup of your database can be uploaded to your TSBC3000 series.

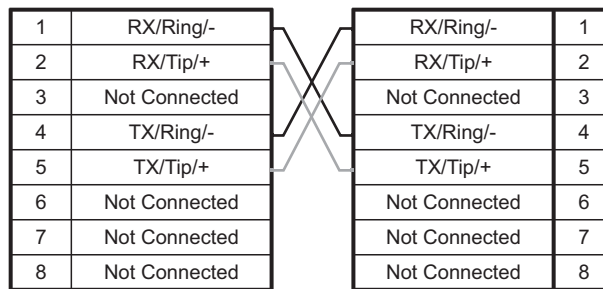
## 4.4 Restoring a Database Backup

In the event of a system failure requiring the replacement of a TSBC3000 series, a previously saved backup of system settings can be restored to the new unit.

# Appendix A Wiring Diagrams

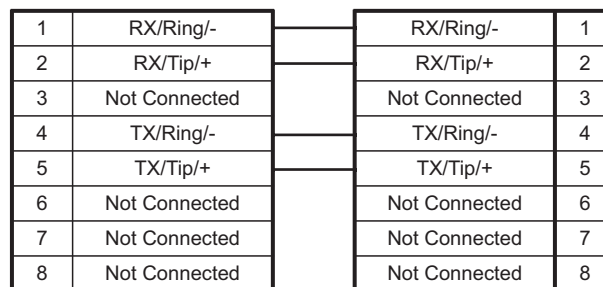
## A.1 RJ48C (T1/E1) Wiring Diagram: Crossover and Straight Cables

RJ48C (T1/E1) Wiring Schematic: Crossover Cable



1 8

RJ48C (T1/E1) Wiring Schematic: Straight Cable





A.2

Tsbc Serial Adapter Wiring Diagram

