Mediant™ 2000

VoIP Digital Media Gateway

SIP Protocol

Hardware Installation Manual

Version 6.6

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AudioCodes

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Notice

This document describes the hardware installation for AudioCodes Mediant 2000 SIP VoIP media gateway.

Trademarks

AudioCodes, AC, AudioCoded, Ardito, CTI2, CTI², CTI Squared, HD VoIP, HD VoIP Sounds Better, InTouch, IPmedia, Mediant, MediaPack, NetCoder, Netrake, Nuera, Open Solutions Network, OSN, Stretto, TrunkPack, VMAS, VoicePacketizer, VoIPerfect, VoIPerfectHD, What's Inside Matters, Your Gateway To VoIP and 3GX are trademarks or registered trademarks of AudioCodes Limited. All other products or trademarks are property of their respective owners.

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Customer Support

Customer technical support and services are provided by AudioCodes or by an authorized AudioCodes Service Partner. For more information on how to buy technical support for AudioCodes products and for contact information, please visit our Web site at www.audiocodes.com/support.

Abbreviations and Terminology

Each abbreviation, unless widely used, is spelled out in full when first used.

Throughout this manual, unless otherwise specified, the term *device* refers to the Mediant 2000 gateway.

Related Documentation

Manual Name
SIP Release Notes
Mediant 2000 SIP User's Manual
CPE Configuration Guide for IP Voice Mail

Notes and Warnings

> **Warning:** This device is an **indoor** unit and therefore, must be installed only indoors.

> **Warning:** The device is supplied as a sealed unit and must only be serviced by qualified service personnel.

> ## Caution Electrical Shock
>
> Do not open or disassemble this device. The device carries high voltage and contact with internal components may expose you to electrical shock and bodily harm.

Documentation Feedback

AudioCodes continually strives to produce high quality documentation. If you have any comments (suggestions or errors) regarding this document, please fill out the Documentation Feedback form on our Web site at http://www.audiocodes.com/downloads.

1   Introduction

This document provides a hardware description of the Mediant 2000 (hereafter referred to as *device*) and step-by-step procedures for cabling the device.

> **Note:** For information on configuring the device, refer to the device's *User's Manual*.

Reader's Notes

2   Unpacking and Checking Package Contents

Follow the procedure below for unpacking the carton in which the device is shipped.

➢ **To unpack the device and verify content:**

1. Open the carton and remove packing materials.
2. Remove the device from the carton.
3. Check that there is no equipment damage.
4. Ensure that in addition to the device, the package contains the following items:

    • One CD containing AudioCodes software utilities.
    • Two AC power cables (only applicable for the dual AC power supply version).
    • One AC power cable (only applicable for the single AC power supply version).
    • One DC power cable (crimp connection type) and one DC adaptor (screw connection type) connected to the rear panel of the device - use only one type (only applicable for the DC power supply version).
    • Small plastic bag containing (refer to the figure below) the following:
        ♦ Two brackets and four bracket-to-device screws for 19-inch rack installation option.
        ♦ Four anti-slide bumpers for desktop / shelf installation option.

Figure 2-1: 19-inch Rack and Desktop Accessories

5. Check, retain and process any documents.
6. Notify AudioCodes or your local supplier of any damage or discrepancies.

Reader's Notes

3 Physical Description

The device's chassis is an industrial platform that is 19" wide, 1U high rack-mount and 12" deep. The device houses a single blade in Slot #1 (the lower slot - form factor 6U PICMG 2.0 single slots) on the front panel. This blade is composed of one or two identical modules: Gateway-1 and Gateway-2, each containing 240 DSP channels. These modules are fully independent, each possessing its own Media Access Control (MAC) and IP address, as well as LED indicators.

This section provides a physical description of the device's front (refer to 'Front Panel' on page 11) and rear (refer to 'Rear Panel' on page 12) panels.

3.1 Front Panel

The front panel of the device is shown in the figure below and described in the subsequent table:

Figure 3-1: Front Panel
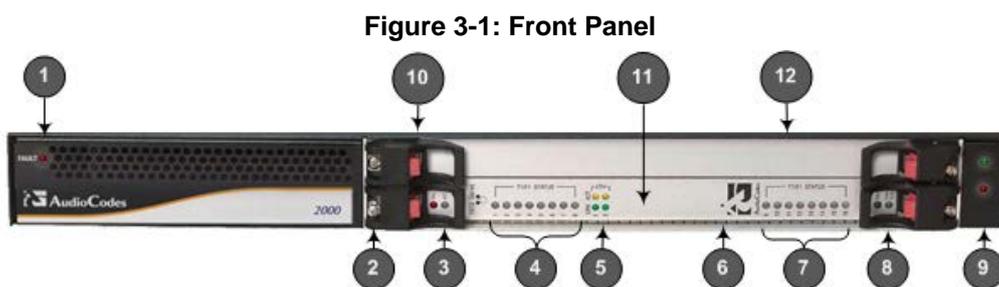
Table 3-1: Front Panel Description

Item #	Label	Component Description
1	FAULT	Dual AC power LED. The device's power supply is available in one of the following configuration options: ▪ Single universal 100-240 VAC, 1 A max, 50-60 Hz ▪ Dual-redundant 100-240 VAC, 1.5 A max, 50-60 Hz ▪ -48 VDC power supply suitable for field wiring applications For more information on this LED, see Section 3.3.7 on page 16.
2	-	Blade locking screws
3	FAIL & ACT	Status LEDs. For more information, see Section 3.3.1 on page 14.
4	T1/E1 STATUS	E1/T1 Trunk status LEDs (for each of the 1-8 trunks). For more information on this LED, see Section 3.3.2 on page 14.
5	ETH (LINK & ACT)	Ethernet LEDs. For more information on this LED, see Section 3.3.3 on page 15.
6	-	Reset pinhole button for resetting the device. To reset the device, press down on the button using a paper clip or any other similar pointed object, for up to five seconds and then release the button.
7	T1/E1 STATUS	E1/T1 Trunk Status LEDs (for each of the 9-16 trunks). For more information on this LED, see Section 3.3.2 on page 14.

Item #	Label	Component Description
8	**PWR** and **SWAP READY**	Blade slot status LEDs. For more information on the **PWR** LED, see Section 3.3.4 on page 15. For more information on the **SWAP Ready** LED, see Section 3.3.5 on page 15.
9	-	Power and Fan LEDs. For more information on the power LED, see Section 3.3.7 on page 16. For more information on the fan LED, see Section 3.3.6 on page 16
10	-	Blade latches
11	**-**	1610-Series blade (e.g., 16-trunk configuration) in Slot #1
12	-	Empty slot covered with a blank panel.

3.2   Rear Panel

The rear panel provides the port interfaces such as E1/T1 PSTN, Ethernet (IP), and power. The PSTN and Ethernet port interfaces are provided by a single Rear Transition Module (RTM-1610) in Slot #1 (the lower slot).

The rear panel design depends on the number of supported trunks and the type of power (AC or DC), as shown in the figures below:

Figure 3-2: RTM-1610 for 16 Trunks (and AC Power)
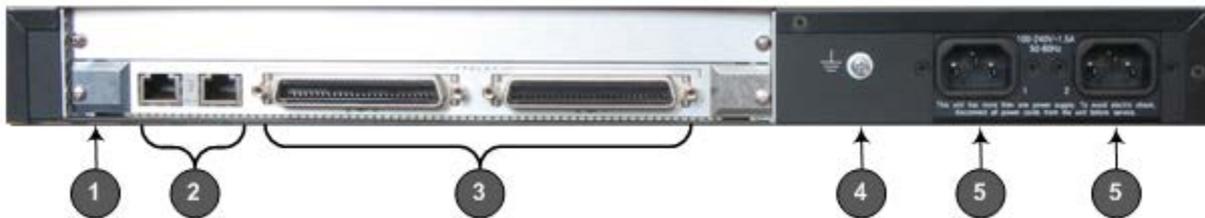
Figure 3-3: RTM-1610 for 8 Trunks (and AC Power)
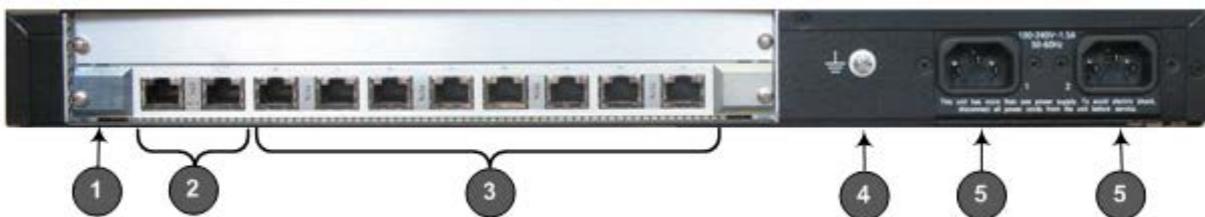
Table 3-2: Rear Panel Description

Item #	Label	Component Description
1	-	RTM locking screws (or RTM latches).
2	**ETH**	Two 10/100Base-TX, RJ-45 shielded ports. This dual Ethernet interface provides an Ethernet redundancy scheme (active/standby), offering protection against Ethernet failure.
3	**TRUNKS** (16 spans) -or- **PSTN** (1, 2, 4, or 8 spans)	The connector depends on the number of required spans: ▪ **16 Spans:** Two 50-pin female Telco connector (DDK 57AE-40500-21D) for E1/T1 trunks 1 to 8, and 9 to 16 respectively. ▪ **1, 2, 4, or 8 Spans:** Up to eight RJ-48c ports, each supporting an E1/T1 trunk.
4	⏚	Protective earthing screw.
5	**100-240~1.5A** or **48V 4A max**	One of the following power interfaces (depending on customer requirements): ▪ Dual AC power sockets ▪ 2-Pin DC connector

3.3 Front-Panel LEDs Description

The device provides LEDs on the front panel. These LEDs are located on the blade and on the chassis.

3.3.1 General Operating Status LEDs Description

The blade provides LEDs for indicating general operating status, as described in the table below:

Table 3-3: General Operating Status LEDs Description

Label	Color	State	Description
FAIL	Red	On	Device failure (fatal error).
	-	Off	Normal functioning.
ACT	Green	On	Initialization sequence terminated OK.
	Yellow	On	N/A.

⚠️ **Note:** During correct operation, the **ACT** LED is lit green and the **FAIL** LED is off.

3.3.2 E1/T1 Trunk LEDs Description

The blade provides LEDs for indicating the E1/T1 trunk status, as described in the table below:

Table 3-4: E1/T1 Trunk Status LEDs Description

Label	Color	Status	Description
T1/E1 Status 1 to 8 T1/E1 Status 9 to 16	Green	On	Trunk is synchronized (normal operation).
	Red	On	Loss due to any of the following signals: • LOS Loss of Signal • LOF (Loss of Frame) • AIS (Alarm Indication Signal -- 'Blue alarm') • RAI (Remote Alarm Indication -- 'Yellow alarm')

⚠️ **Note:** On the front panel, 16 LEDs are provided for 16-span units and 8 LEDs are provided for 1-span, 2-, 4-, and 8-span units. In the case of 1-, 2-, and 4-span units, the extra LEDs are not used.

3.3.3   Ethernet LEDs Description

The blade provides LEDs for indicating Ethernet status, as described in the table below:

Table 3-5: Ethernet LEDs Description

Label	Color	Status	Description
LINK	Green	On	Link all OK.
ACT	Yellow	On	Transmit / receive activity.

3.3.4   Blade Power LED Description

The blade provides a LED for indicating power status, as described in the table below:

Table 3-6: Blade Power LED Description

Label	Color	Status	Description
PWR	Green	On	Power is supplied to the blade.
	-	Off	No power is received by blade.

3.3.5   Blade Slot Installation LED Description

The blade provides a LED for indicating slot installation status, as described in the table below:

Table 3-7: Blade Slot Installation LED Description

Label	Color	Status	Description
SWAP READY	Blue	On	The blade can be removed.
			The blade is installed successfully.

3.3.6 Chassis Fan LED Description

The chassis provides a LED for indicating the fan status. This LED is located on the right side of the front panel (see Item #9 in Figure 3-1).

Table 3-8: Fan LED Description

Color	State	Description
Red	On	At least one of the internal fans has significantly reduced its speed or has stopped (i.e., fan failure).
-	Off	Normal operation.

3.3.7 Chassis Power LED Description

The chassis provides LEDs for indicating the chassis power status, as described in the table below:

Table 3-9: Chassis Power LEDs Description

Label / Location	Color	State	Description
Front Panel - Right Side	Green	On	Power is on. **Note:** For the location of this LED, see Item #9 in Figure 3-1.
FAULT	Red	On	One of the two AC redundant power supplies is faulty or disconnected from the AC / mains outlet (i.e., power supply failure). **Note:** This LED is applicable only to **dual** AC power.

4   Mounting the Device

The device can be mounted in one of the following ways:

■ Desktop mounting – see Section 4.1 on page 17
■ 19-inch rack mounting – see Section 4.2 on page 17

4.1   Desktop Mounting

The device can be mounted on a desktop by attaching the four anti-slide bumpers (supplied) to the underside of the device. Once you have attached these bumpers, simply place it on the desktop in the position you require.

4.2   19-inch Rack Mounting

The device can be installed in a standard 19-inch rack by one of the following methods:

■ Placing it on a pre-installed shelf in the rack (recommended method).
■ Attaching it directly to the rack's frame.

Rack-Mount Safety Instructions

When installing the chassis in a rack, adhere to the following safety instructions:

- **Elevated Operating Ambient Temperature:** If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) of 40°C (104°F).

- **Reduced Air Flow:** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation on the equipment is not compromised.

- **Mechanical Loading:** Mounting of the equipment in the rack should be such that a hazardous condition is not **achieved** due to uneven mechanical loading.

- **Circuit Overloading:** Consideration should be given to the connection of the equipment to the supply circuit **and** the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

- **Reliable Earthing:** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips.)

4.2.1 Mounting in a 19-Inch Rack by Attaching to Rack Frames

The procedure below describes how to mount the device in a 19-inch rack.

> **Note:** When mounting the chassis in a 19-inch rack, it is **MANDATORY** to use two additional rear-mounting brackets. The rear-mounting brackets are **not** provided by AudioCodes and must be purchased from a third-party vendor of your choosing.

➢ **To mount the device in a 19-inch rack:**

1. Attach the two front-side mounting brackets (supplied) to the device, by performing the following:

   a. On one side of the device, remove the two screws located nearest the front panel.

   b. Align a bracket (supplied) over the two holes from which you removed the screws so that the bracket's larger holes face the front. Using the two replacement screws (supplied), screw the bracket to the chassis.

   c. Attach the second bracket to the other side of the device, by following steps a through b, above.

Figure 4-1: Device with 19-inch Rack-Mount Brackets

Mounting Brackets   Mounting Brackets

2. Attach the two rear mounting brackets (not supplied) to the chassis' left and right rear-end sides:

   • The distance between the screws on each bracket is 26.5 mm (1.04 inches).

   • Use 4-40 screws with a maximal box penetration length of 3.5 mm (0.14 inch).

3. Position the device in a 19-inch rack and align the left-hand and right-hand bracket holes to the desired holes in the vertical tracks of the 19-inch rack.

4. Use standard 19-inch rack bolts (not supplied) to fasten the device to the frame of the rack.

4.2.2 Mounting on a Pre-installed Rack Shelf

The device can be placed on a shelf in a 19-inch rack, as described below.

➢ **To mount the device on a pre-installed shelf in a 19-inch rack:**

1. Place the device on the pre-installed shelf.

2. (Recommended) Attach the device to the frame of the rack (as described in the previous section) to prevent it from sliding when inserting cables into connectors on the rear panel.

5   Cabling the Device

This section describes how to cable the device:

- Connecting to earth or ground – see Section 5.1 on page 19
- Connecting to the IP / Ethernet network – see Section 5.2 on page 23
- Connecting the E1/T1 trunks – see Section 5.3 on page 21
- Connecting to power – see Section 5.4 on page 24

5.1   Grounding the Device

The procedure below describes how to ground the device.

Protective Earthing

The equipment is classified as Class I EN60950 and UL60950 and must be connected to an earthed mains socket-outlet (using an equipment-earthing conductor).

For Finland: "Laite on liltettava suojamaadoituskoskettimilla varustettuun pistorasiaan".

For Norway: "Apparatet rna tilkoples jordet stikkontakt".

For Sweden: "Apparaten skall anslutas till jordat uttag".

Electrical Earthing

The device must be permanently connected to the earth using the screw provided on the rear panel. Use 14-16 AWG wire and a proper ring terminal for the earthing.


➤ **To ground the device:**

1. Connect an electrically earthed strap of 16 AWG wire (minimum) to the chassis' earthing screw (located on the rear panel), using the supplied washer.
2. Connect the other end of the strap to a protective earthing. This should be in accordance with the regulations enforced in the country of installation.

5.2   Connecting to the Ethernet (IP Network) Interface

The procedure below describes how to connect to the IP / Ethernet network. The device provides two RJ-45 (10/100Base-TX) ports for connection to the Ethernet network. The dual ports provide Ethernet redundancy.

An RJ-45 cable connector with the following pinouts is used:

Figure 5-1: RJ-45 Connector Pinouts for IP / Ethernet Network
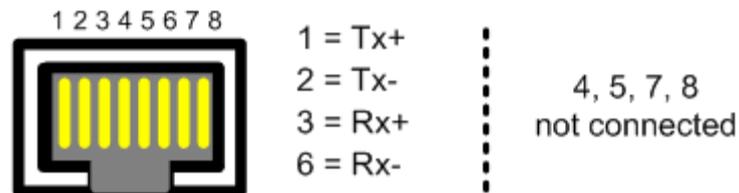
➢ **To connect the Ethernet interface:**

1. On the rear panel, connect a standard Category 5 network cable to the Ethernet RJ-45 port (labeled **ETH**).

2. Connect the other end of the Category 5 network cable to your IP network.

3. For Ethernet redundancy/backup, repeat steps 1 and 2 for the second Ethernet port.

Note: For Ethernet redundancy, it's recommended to connect each of the Ethernet connectors to a different switch.

5.3   Connecting to E1/T1 Trunks

Depending on your model, the device connects to E1/T1 trunks using the following connection type:

- Telco connector for devices with 16 spans – see Section 5.3.1 on page 21
- RJ-48c connector for devices with 1, 2, 4, or 8 spans – see Section 5.3.2 on page 23

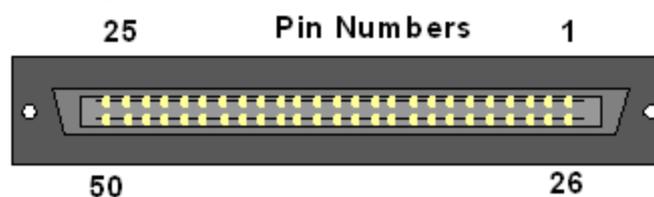## 5.3.1   Connecting 16-Span Device using Telco Connector

The procedure below describes how to connect the 16-span device. This connection uses a 50-pin male Telco cable connector with pinouts as shown in the table below:

Table 5-1: E1/T1 Connector Pinouts for Each 50-Pin Telco Connector

E1/T1 Trunk Number		Tx Pins (Tip/Ring)	Rx Pins (Tip/Ring)
1 to 8	9 to 16		
1	9	27/2	26/1
2	10	29/4	28/3
3	11	31/6	30/5
4	12	33/8	32/7
5	13	35/10	34/9
6	14	37/12	36/11
7	15	39/14	38/13
8	16	41/16	40/15

The 50-pin male Telco cable mates with the device's female connector shown in the figure below:
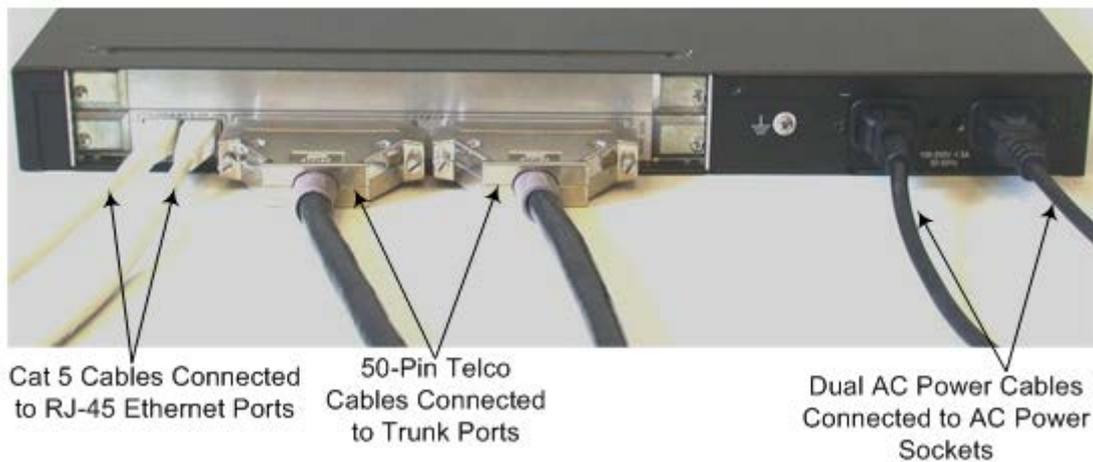
Figure 5-2: Device's 50-Pin Female Telco

➢ **To connect the 16-span device using 50-pin Telco connectors:**

1. On the rear panel, attach the trunk cable (of at least 26 AWG UTP) 50-pin male Telco connector to the 50-pin female Telco port (labeled **TRUNKS 1-8**).

2. Connect the other end of the trunk cable to the PBX / PSTN switch.

3. Repeat steps 1 and 2 for the second trunk cable, but this time, connect it to the connector labeled **TRUNKS 9-16**.

The figure below displays a cabled device for 16 trunks (and dual AC power).

Figure 5-3: Cabling for 16-Span Device using Telco Connectors

Cat 5 Cables Connected to RJ-45 Ethernet Ports

50-Pin Telco Cables Connected to Trunk Ports

Dual AC Power Cables Connected to AC Power Sockets

5.3.2   Connecting 1-, 2-, 4-, 8-Span Device using RJ-48c Connectors

The procedure below describes how to connect the 1-, 2-, 4-, 8-span device. This connection uses RJ-48c trunk connectors with pinouts as shown in the figure below:

Figure 5-4: RJ-48c Connector Pinouts for 1-, 2-, 4-, 8-Span Device
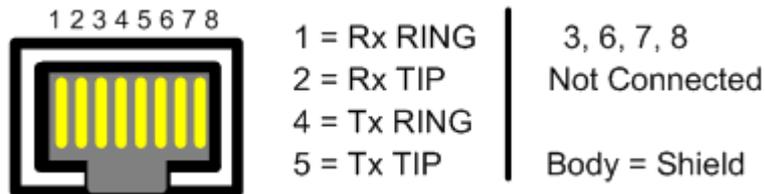
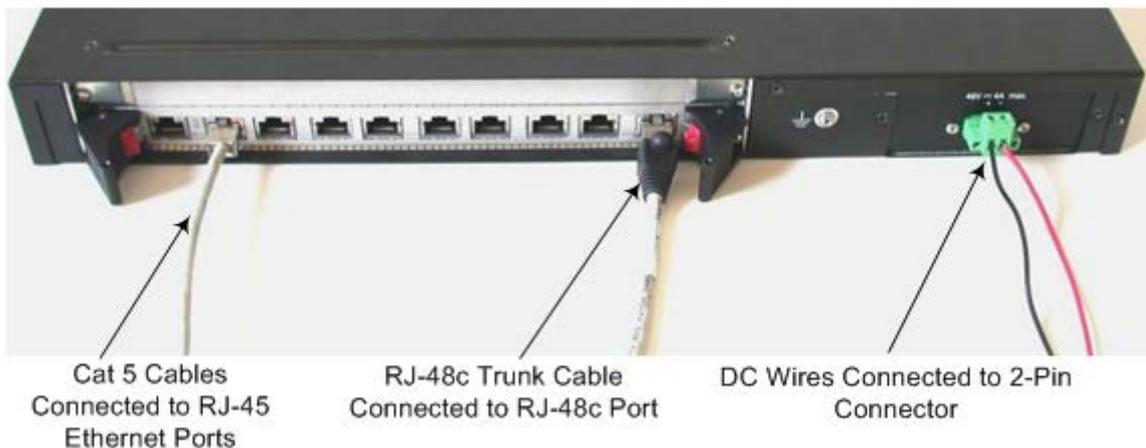➤ **To connect 1-, 2-, 4-, 8-span device using RJ-48c:**

1.   On the rear panel, connect the E1/T1 trunk cables to the ports labeled **PSTN 1 to 8** (in the case of the 8-trunk device).

2.   Connect the other ends of the trunk cables to the PBX / PSTN switch.

The figure below displays a cabled device for 8 trunks (and DC power).

Figure 5-5: Cabling for 8 Trunks using RJ-48c Connectors

5.4   Connecting to Power

The connection to the power supply depends on the supported hardware configuration:

■   Single or dual AC power – see Section 5.4.1 on page 24

■   DC power – see Section 5.4.2 on page 25

5.4.1   Connecting to AC Power

The device can support up to two AC power interfaces (single or dual).

Warnings:

•   Units must be connected (by service personnel) to a socket-outlet with a protective earthing connection.

•   Use only the AC power cord supplied with the device.

➢   **To connect to AC power:**

1.   Attach one end of the 100/240 VAC power cable (supplied) to the rear AC socket.

2.   Connect the other end of the power cable to an earthed AC power supply.

3.   For connecting the second AC power socket (if power supply redundancy is supported), follow steps 1 and 2, but connect this second power cable to a separate earthed mains circuits.

Note: For dual AC power supply:

•   The **FAULT** LED is used to indicate dual AC power. For more information, see Section 3.3.7 on page 16.

•   When both the AC power cables are connected to power, you can disconnect one of the plugs without affecting operation.

•   A UPS can be connected to either (or both) of the AC connections.

•   The dual AC connections operate in a 1+1 configuration and provide load-sharing redundancy.

•   Each of the dual power cables can be connected to different AC power phases.

5.4.2   Connecting to DC Power

The device can connect to a DC power supply using one of the following methods:

■   DC terminal block with a screw connection type – see Section 5.4.2.1 on page 25

■   DC terminal block with a crimp connection type – see Section 5.4.2.2 on page 26

5.4.2.1   Connecting to DC Power using the DC Terminal Block Screw

The procedure below describes how to connect to DC power using the DC terminal block screw connector.

➢   **To connect DC power using a DC terminal block screw connector:**

1.   Create a DC cable by inserting two 14-16 AWG insulated wires into the supplied terminal block adaptor (refer to the figure below), and then fasten the two screws, each located directly above each wire.

2.   Connect the two insulated wires to the correct DC power supply. Ensure that the connections to the DC power supply maintain the correct polarity.

3.   On the device's rear panel, insert the terminal block into the DC inlet.

**Figure 5-6: DC Power Terminal Block Screw Connector**

5.4.2.2 Connecting to DC Power using the DC Terminal Block Crimp

The procedure below describes how to connect to DC power using the DC terminal block crimp connector.

➢ **To connect DC power using a DC terminal block crimp connector:**

1. Remove the DC adaptor (screw connection type) that is attached to the device's rear panel.
2. Connect the two insulated wires to the correct DC power supply. Ensure that the connections to the DC power supply maintain the correct polarity.
3. Insert the terminal block into the DC inlet located on the device's rear panel.

Figure 5-7: DC Power Terminal Block Crimp Connector
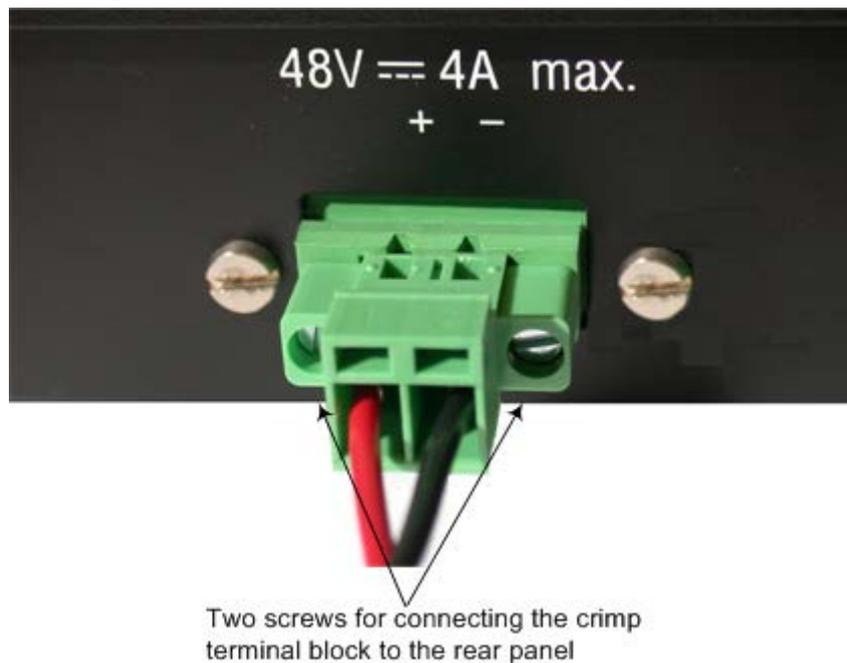
6   Maintenance – Installing Blades

This section describes how to replace the TP-1610 blade. This may be necessary, for example, if the blade is faulty.

Electrical Earthing

Before installing a blade in the chassis, connect the chassis to a safety ground according to the laws and regulations of the country in which the installation is performed.

Electrical Component Sensitivity

Electronic components on printed circuit boards (PCB) are extremely sensitive to static electricity. Normal amounts of static electricity generated by clothing can damage electronic equipment. To reduce the risk of damage due to electrostatic discharge (ESD) when installing or servicing electronic equipment, it is recommended that anti-static earthing straps (connected to the rack frame using an alligator clip) and mats be used. Do not set components down without protecting them with a static bag.

6.1   Removing the Blade from the Chassis Slot

The procedure below describes how to remove the blade from the chassis slot.

➢ **To remove the blade from the chassis:**

1. Power down the chassis.
2. Disconnect all cables from the RTM-1610 (on the rear panel).
3. Unfasten the screws on the brackets at both ends of the blade that secure it to the chassis.
4. Press the red ejector buttons on the two black ejector/injector latches on both ends.
5. Pull on the two ejector/injector latches and gently ease the blade out of the slot.

6.2   Installing a Blade in the Chassis Slot

The procedure below describes how to install a blade in the chassis slot.

➢ **To install a blade in the chassis slot:**

1. Power down the chassis.
2. Gently insert the blade into the chassis slot; as you insert the blade, the black plastic handles at both ends of the blade's front panel, must engage with the chassis. When the blade is firmly mounted in the correct position inside the chassis, the red plastic latches within each handle self-lock (this also ensures that the blade is properly earthed by the chassis).
3. Fasten the screws on the front panel of the blade to secure it to the chassis.

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