



Installing Dialogic® TX 5000E PCI Express SS7 Boards and Regulatory Notices

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Revision History

Revision	Release Date	Notes
64-0434-06, Rev A	January 2015	PC

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Introduction

Dialogic® TX 5000E boards are PCI Express (PCIe) boards that provide up to four T1 or E1 digital trunk interfaces, two Ethernet 10/100/1000Base-T interfaces, and one Ethernet 10/100Base-T interface. For more information, refer to the *Dialogic® TX 5000E PCI Express SS7 Boards Installation Manual*.

Caution:	TX 5000E boards are shipped in a protective anti-static container. Leave the board in its container until you are ready to install it. Handle the board carefully and hold it only by its edges. We recommend that you wear an anti-static wrist strap connected to a good earth ground whenever you handle the board. Take care not to touch the gold fingers that plug into the PCIe connectors.
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Note: The product(s) to which this document pertains is/are among those sold by NMS Communications Corporation ("NMS") to Dialogic Corporation ("Dialogic") in December 2008. Certain terminology relating to the product(s) has been changed, whereas other terminology has been retained for consistency and ease of reference. For the changed terminology relating to the product(s), below is a table indicating the "New Terminology" and the "Former Terminology". The respective terminologies can be equated to each other to the extent that either/both appear within this document.

Former terminology	Current terminology
NMS SS7	Dialogic® NaturalAccess™ Signaling Software
Natural Access	Dialogic® NaturalAccess™ Software

Removing the PCI/PCIe Board from Clamshell Packaging

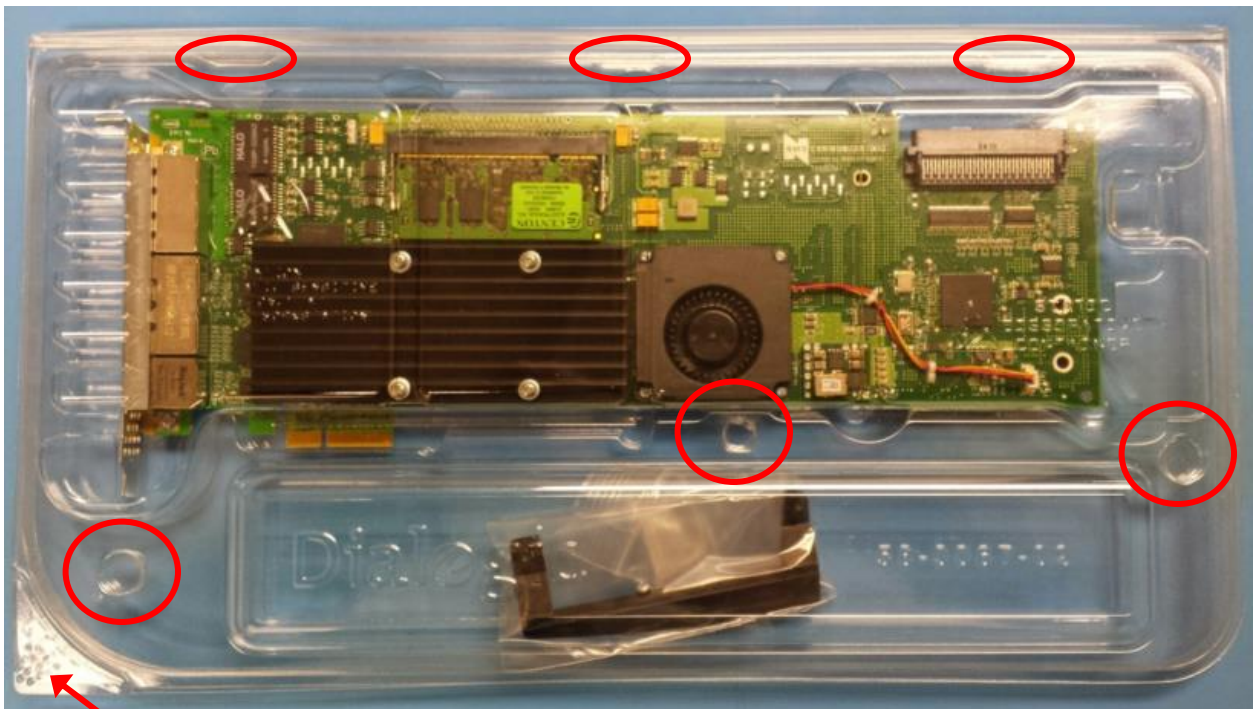
Follow the procedure below to remove the PCI/PCIe board from the packaging.



Please be extremely careful when handling **boards with fans**. The fans are very delicate and can be damaged when any pressure is applied to the impeller. **DO NOT TOUCH THE FAN OR THE FAN'S IMPELLER.**

Clamshell Snap locations

The clamshell cover is locked into position at six snap locations as shown in the figure below.

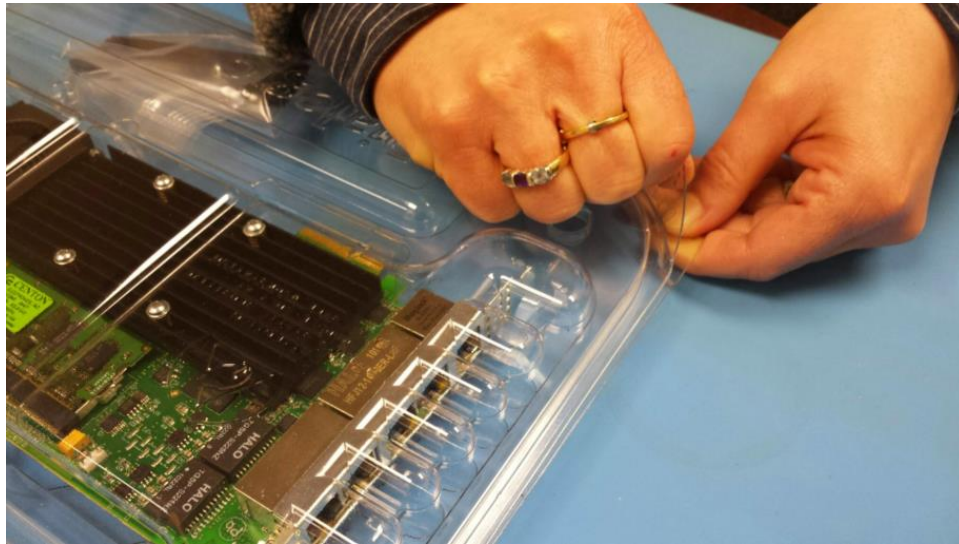


Opening Tab

Clamshell Locking Tabs

Opening the PCI/PCIe Clamshell

1. Firmly hold the Lower Opening Tab with your left hand.
2. Gently pull the Upper Opening Tab with your right hand while applying constant downward pressure on the clamshell as shown in the figure below. The resulting rolling hand motion will minimize stress on the board. If done correctly, only Snap Connection A will disengage.



Opening Clamshell – Disengage Snap A

3. Firmly hold the lower section of the clamshell with your left hand. Slide your right hand into the clamshell to disengage Snap Connections B and C.



Opening Clamshell – Disengage Snap B and C

Removing the PCI/PCIe Board from the Clamshell

1. Hold the Metal PCI/ PCIe bracket in your left hand and gently raise board and remove it from the clamshell.



Remove board from Clamshell

PCI/PCIe Board Packaging Procedure

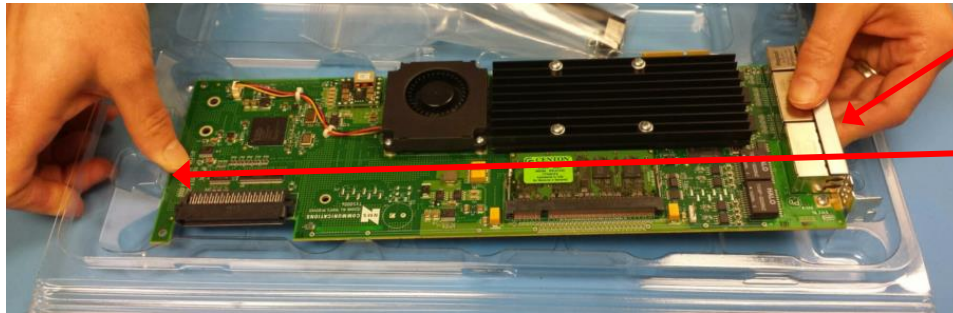
Follow the procedure below to install the PCI/PCIe board in the packaging for purposes including but not limited to returning the boards to Dialogic as well as storage.



Please be extremely careful when handling boards with fans. The fans are very delicate and can be damaged when any pressure is applied to the impeller. DO NOT TOUCH THE FAN OR THE FAN'S IMPELLER.

Installing PCI/PCIe board in Clamshell Packaging

1. While holding the Metal PCI/ PCIe bracket in your left hand, angle the board and gently position the board into clamshell. Use your thumb to guide edge of board into locking tab of clamshell as shown in the figure below.



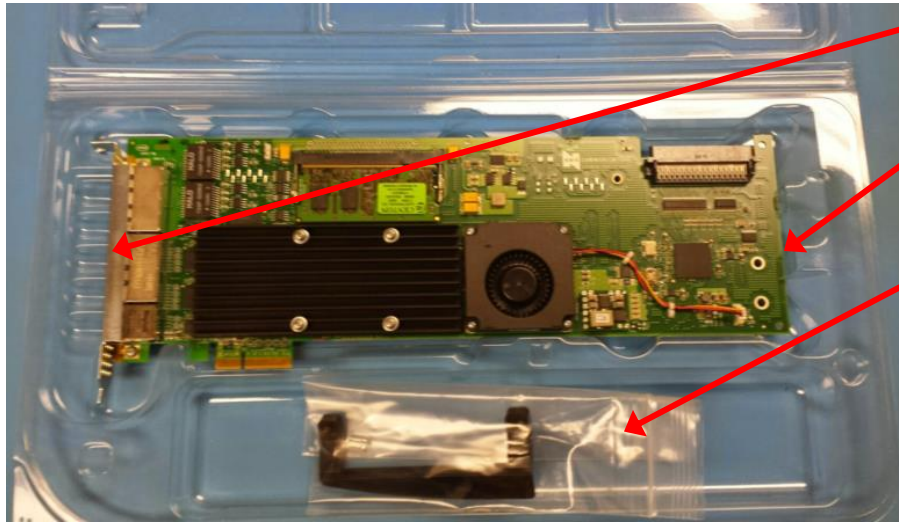
1) Metal PCI/ PCIe Bracket.

2) Guide edge of board into Clamshell Locking Tab.

Positioning board into Clamshell Packaging

2. Seat the board into the clamshell noting the tabs and groove locations that support the board.

3. Place any accessories in the clamshell Accessory tray as shown in the figure below.



1) Make sure Board is seated properly.

2) Make sure board is snapped into tab at location show.

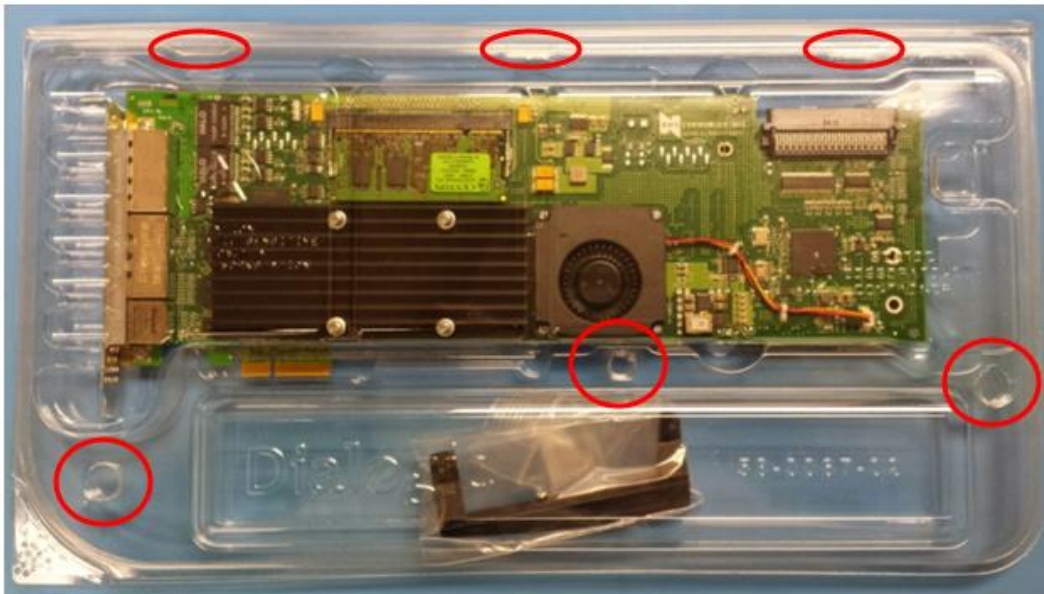
3) Place accessories in tray.

Installing board into Clamshell Packaging

Note: Board and Accessories are shown as reference only.

Closing and locking the clamshell: Install Clamshell/ Board Assembly into Corrugated box

Close and snap shut the clamshell at the six locations indicated in the figure below:



Close and Lock the Clamshell

Installation Overview

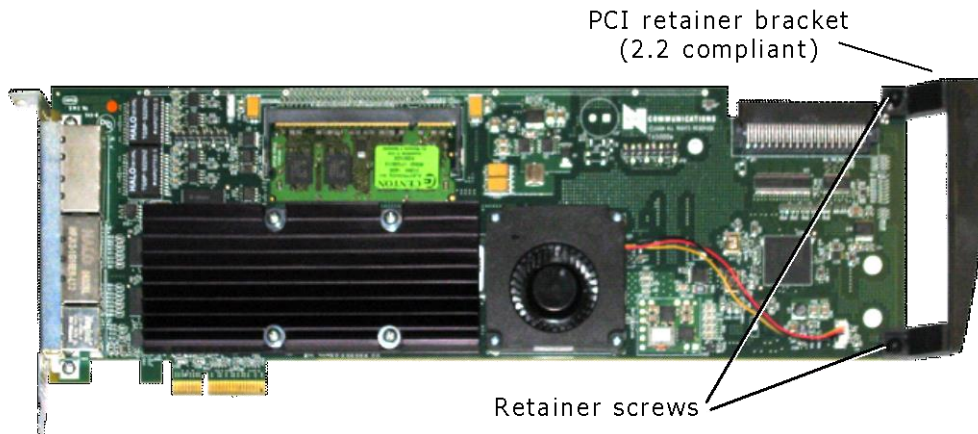
The following table summarizes the steps for installing TX 5000E hardware and software components:

Step	Description	For details, refer to...
1	<p>Ensure that your system meets the system requirements.</p> <p>Note: TX 5000E boards require a high current from the 3.3 V power supply.</p> <p>The board has a 25 watt power requirement.</p>	<i>Dialogic® TX 5000E PCI Express SS7 Boards Installation Manual.</i>
2	Install the retainer bracket as required.	<i>PCI Extender Bracket Installation on page 11.</i>
3	Power down the system if it is running.	
4	Configure the DIP switches on the board, if applicable.	<i>Configuring the DIP switches on page 12.</i>
5	Install the TX 5000E board into one of the computer's PCIe slots.	<i>Installing the board on page 15.</i>
6	Power up the system.	
7	Install the Dialogic® NaturalAccess™ software.	<i>The Natural Access Installation booklet and Natural Access Developer's Reference Manual.</i>
8	Install the Dialogic® NaturalAccess™ Signaling Software.	<i>The Installing Dialogic® NaturalAccess™ Signaling Software and Dialogic® NaturalAccess™ Signaling Software Configuration Manual.</i>
9	Assign a CP number for each TX 5000E board.	<i>Assigning a CP number on page 16.</i>
10	Connect the board interfaces to T1 or E1 trunks for SS7 connectivity, if applicable.	<i>Establishing network connections on page 17.</i>
11	Connect Ethernet interface for SIGTRAN connectivity, if applicable.	<i>IP network configuration on page 21.</i>
12	Connect Ethernet interface for board redundancy, if applicable.	<i>Connecting TX 5000E boards for redundancy on page 20.</i>
13	Verify that the TX 5000E board is operational.	<i>Interface status LEDs on page 23. Board status LEDs on page 26.</i>

PCI Extender Bracket Installation

TX 5000E boards are designed to fit into a variety of PCI chassis. Chassis supporting with PCI and ISA cards will require the installation of the ISA edge retaining bracket for proper mechanical support.

If you are installing the board into a chassis supporting both ISA and PCI cards you will need to add the retainer bracket by screwing it into the board.



Warning:



TX 500E boards are very delicate and sensitive to damage from board flex. Care must be taken not to flex the board both while removing it from the clam shell as well as during the bracket installation or removal.

Do not over-tighten screws.

Note: You will need a #2 Phillips screw driver and an ESD safe work space. A torque driver is recommended. The bracket is a plastic part as such repeated installation and removal is not recommended.

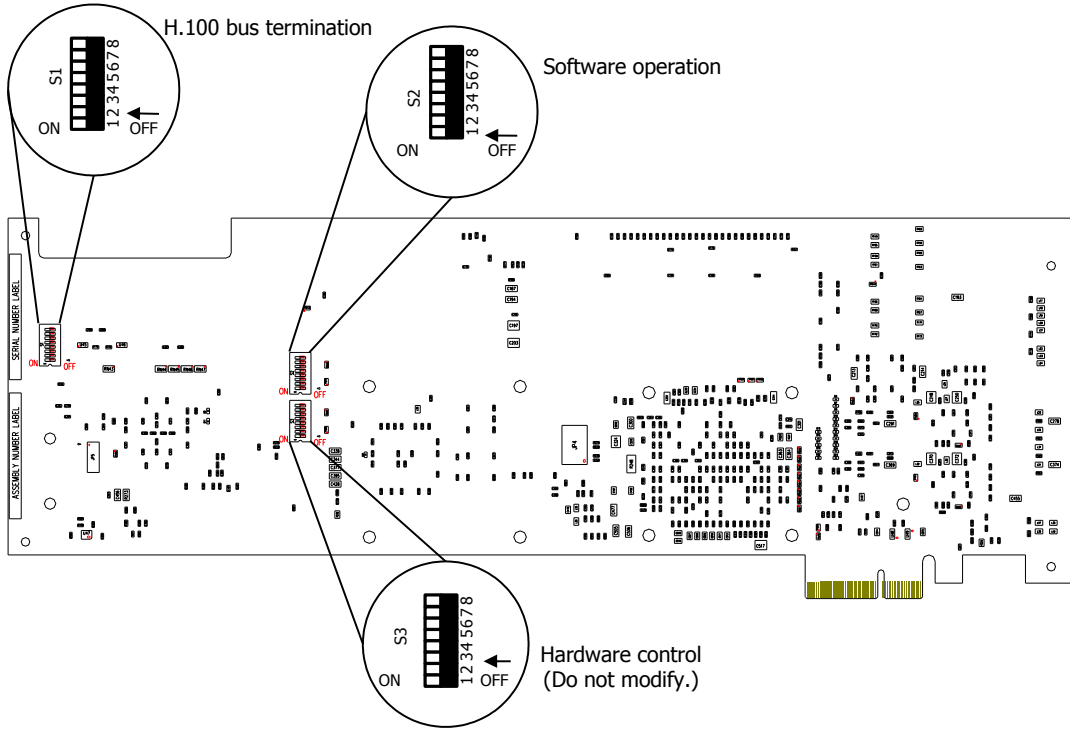
To install the bracket perform the following steps:

1. Remove the bracket kit (bracket and two screws) from the clamshell accessory tray.
2. Place the board on an ESD work surface (reference removal procedure).
3. Hold the board vertical such that the metal front panel is down and the two mounting holes are towards the top.
4. Align the bracket on the front of the card lining the mounting holes up.
5. Screw in the two 6/32 screws to 3 in-lbs from the rear of the card supporting the front of the card and bracket with your other hand (recommended method is to place your index finger opposite from the screw to absorb the pressure and prevent board flex).

Removal of the bracket is the reverse of the installation.

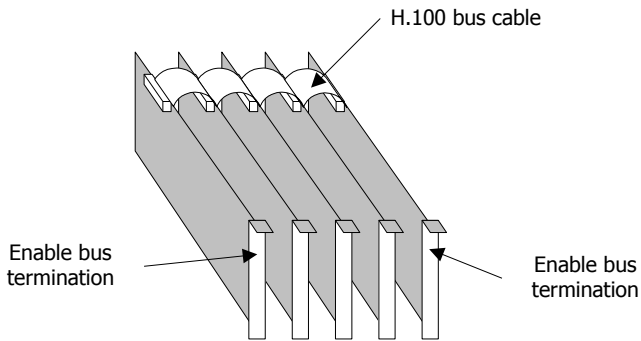
Configuring the DIP Switches

TX 5000E boards contain three DIP switches that are used to configure H.100 bus termination, configure the software operation of the board, and control the hardware-level behavior of the board. The following illustration shows the default DIP switch settings (all switches off) for a TX 5000E board:



DIP Switch S1: H.100 Bus Termination

TX 5000E boards connect to an H.100 bus. Boards on the H.100 bus are connected to one another with an H.100 bus cable. The two boards located at either end of the bus must have bus termination enabled, as shown in the following illustration:



DIP switch S1 controls the H.100 bus termination. By default, all S1 switches are set to the OFF position (H.100 bus termination disabled). To enable H.100 bus termination, set all S1 switches to the ON position only for the boards that are on the ends of the H.100 bus.

Note: The switches in the S1 DIP switch must be set to either all ON or all OFF.

DIP switch S2: Software Operation

DIP switch S2 controls the operation of the software stored on the board's FLASH memory. By default, all S2 switches are set to the OFF position. The following table describes the S2 switches:

S2 switch	Description
1	<p>Boot with original image. Set this switch to ON to boot the board to the original software image instead of using the current production software image. This allows for recovery from any condition that resulted in the corruption of the production software image.</p> <p>After setting this switch to ON, use <i>txreset</i> to boot the backup software image, and then use <i>txflash</i> to burn a clean copy of the production image.</p> <p>Once the production image is completely transferred to the board's flash memory, turn this switch to OFF, and issue <i>txreset</i> to boot the board using the newly loaded production software image.</p>
2	<p>Override Ethernet 3. Set this switch to ON to:</p> <ul style="list-style-type: none"> • Override the default usage of Ethernet 3 LEDs. • Use these LEDs to display the two TX board heartbeat indicators. <p>The TX board has two types of heartbeat indicators:</p> <ul style="list-style-type: none"> • An idle heartbeat LED that toggles to indicate that some processor resources remain available. • A timer heartbeat LED that toggles to indicate that the TX operating system is able to service interrupts. <p>These indications display on the internal LEDs but can be difficult to view when the board is installed. The DIP switch provides a way to view this information externally.</p> <p>To see an illustration of the Ethernet connectors, refer to <i>Interface status LEDs</i> on page 23.</p>
3	<p>Override Ethernet 1 and Ethernet 2. Set this switch to ON to:</p> <ul style="list-style-type: none"> • Override the default usage of Ethernet 1 and Ethernet 2 LEDs. • Use these LEDs to display any error indications presented by the TX operating system. <p>The TX board has four internal LEDs for indicating certain types of error conditions detected by the TX operating system. These error indications include:</p> <ul style="list-style-type: none"> • LOG ERROR LED - Set whenever the TX operating system logs an error to its internal log. • HOST COMMUNICATION ERROR LED • MEMORY FULL LED <p>These indications display on the internal LEDs but can be difficult to view when the board is installed. The DIP switch provides a way to view this information externally.</p> <p>For deployments that do not require the use of the Ethernet 1 and Ethernet 2 connectors (such as a TDM-based installation that is not using IP signaling), set DIP 3 ON to view error indicator LEDs on these Ethernet connectors.</p> <p>To see an illustration of the Ethernet connectors, refer to <i>Interface status LEDs</i> on page 23.</p>

S2 switch	Description
4	<p>Override trunk connector LED. Set this switch to ON to:</p> <ul style="list-style-type: none"> • Override the default usage of the trunk connector LEDs. • Use these LEDs to display any error indications presented by the TX operating system. <p>The TX board has four internal LEDs for indicating certain types of error conditions detected by the TX operating system. These error indications include:</p> <ul style="list-style-type: none"> • LOG ERROR LED - Set whenever the TX OS logs an error to its internal log. • HOST COMMUNICATION ERROR LED • MEMORY FULL LED <p>These indications display on the internal LEDs but can be difficult to view when the board is installed. The DIP switch provides a way to view this information externally.</p> <p>For deployments that do not require use of the two trunk connectors (such as an IP signaling installation that is not using TDM trunks), set DIP 4 ON to view error indicator LEDs on these trunk connectors.</p>
5	Reserved for future use.
6	Reserved for future use.
7	Reserved for future use.
8	Reserved for future use.

DIP Switch S3: Hardware Control

DIP switch S3 controls the hardware-level behavior of the board and is used during the manufacturing process. By default, all S3 switches are set to the OFF position. Do not modify any S3 DIP switch settings.

Installing the Board

Complete the following steps to install a TX 5000E board:

Warning:



Do not touch, spin, or apply pressure to the rotating part of the fan as this may shorten the operational life of the fan.

1. If necessary, configure the board as described in *Configuring the DIP switches* on page 11.
2. Power down the computer and disconnect the power cord from the power source. Remove the cover from the computer and set it aside.
3. Remove the blank slot cover from an open PCIe slot.
4. Arrange the TX 5000E board and other H.100 boards in adjacent slots.

Insert the board firmly into the slot. Ensure that the gold-striped edge of the board is seated properly in the expansion slot groove and the bracket of the board is seated in the groove that previously held the slot cover.

5. Align the top of the board bracket with the hole on the top of the expansion slot, and replace the screw that previously held the blank slot cover.
6. Connect the H.100 bus cable to the TX 5000E board. If you have multiple H.100 boards, connect the H.100 bus cable to each H.100 board.

Verify that the S1 DIP switches are set for H.100 bus termination if the TX 5000E board falls at either end of the H.100 cable.

7. Replace the cover and connect the computer to the power source.

Assigning a CP Number

Use the *txcpcfg* utility to assign a CP number. Depending on the operating system environment, the *txcpcfg* utility is located in the following directory:

- Windows: `\Program Files\Dialogic\tx\bin`
- UNIX: `/opt/dialogic/tx/bin/`

Complete the following steps to assign a CP number:

1. Power up the system if it is not running.

In a Windows system, the Windows New Hardware Wizard appears and prompts you for the files required to activate the TX PCI Express driver. Refer to the *Installing Dialogic® NaturalAccess™ Signaling Software* booklet for detailed information.

2. At the prompt, invoke *txcpcfg* by entering the following command:

```
txcpcfg
```

txcpcfg displays the bus number, slot number, CP number, and CP model of boards that are present and configured. Only the bus number, slot number, and CP model identify the board that you are currently configuring. The CP number is undefined.

3. Record the bus and slot values for the undefined TX 5000E board.
4. Assign a unique CP number to each undefined board by entering the following command:

```
txcpcfg bus slot unique_CP_number
```

where

- **bus** is the bus number of the TX 5000E board that you are configuring.
 - **slot** is the slot number of the TX 5000E board that you are configuring.
 - **unique_CP_number** is a number you assign. Valid CP numbers within the system start at 1 and must be unique. They do not have to be consecutive.
5. Verify the configuration of all of the TX Series boards by entering the following command:

```
txcpcfg
```

In this example, if you assign the new board a unique CP number of 3, the following configuration information displays:

Bus	Slot	CP Number	CP Model
2	2	1	TX 4000
2	4	2	TX 5500E
2	6	3	TX xxxxx

where **xxxxx** is 5500E or 5020E for a TX 5000 Series board; and 4000 for Dialogic® TX 4000 Series SS7 Boards (TX 4000 Series).

6. Save the configuration changes:
 - In a Windows system, configuration changes are saved automatically.
 - In a UNIX system, configuration changes are deleted when you restart the system. Save the changes by editing the *cpcfg* file as described in the *Dialogic® TX 5000E PCI Express SS7 Boards Installation Manual*.

Establishing Network Connections

Before connecting the board to a network, refer to *Compliance statements* on page 28 for information on the current approvals. For information about the products available for connecting and terminating Dialogic boards, contact a Dialogic Services and Support representative.

The trunk connectors and the Ethernet connectors are located on the PCI end bracket. For more information, refer to *Interface status LEDs* on page 23.

Warning:



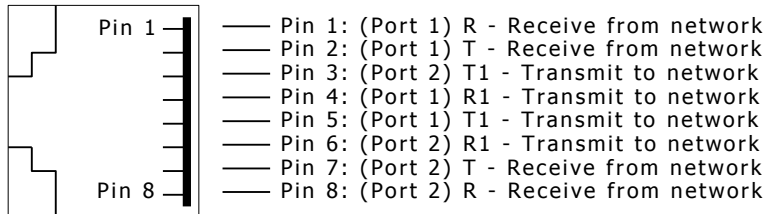
Important safety notes for telephony connections:

- Allow only qualified technical personnel to install this board and the associated telephone wiring.
- Make sure the PC chassis is grounded through the power cord or by other means before connecting the telephone line.
- If your system requires an external power supply, make sure it is grounded through the power cord or by other means.
- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations.

Telephone companies provide primary lightning protection for their telephone lines. However, if a site connects to private lines that leave the building, make sure that external protection is provided.

Connecting to a T1 or E1 Network

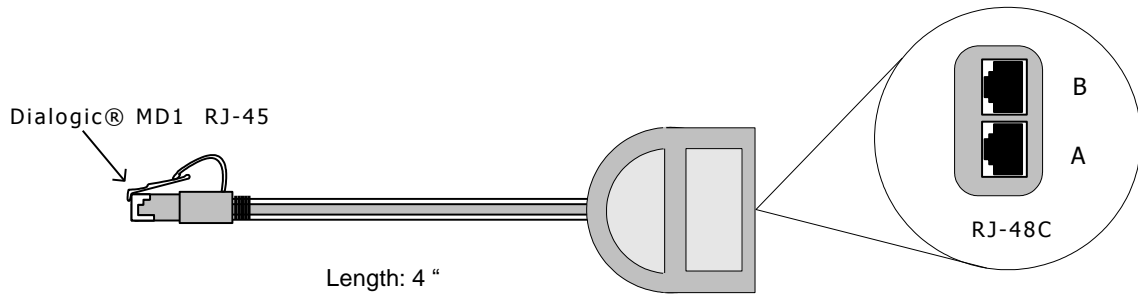
TX 5000E boards provide Dialogic® MD1 RJ-45 interfaces to connect to a T1 or E1 network. The following illustration shows the Dialogic® MD1 RJ-45 pin assignments:



To access Trunk 1, Trunk 2, or both Trunks 1 and 2, connect a shielded T1 or E1 RJ-45 cable to one or both 8-pin modular jacks on the board.

Use dual T1/E1 120 ohm trunk adapter cables to connect Trunk 3 or Trunk 4 to the 8-pin modular jacks on the board. Each trunk adapter cable divides the 8-pin modular jack on the end bracket into two RJ-48C connectors. If you are connecting both jacks, use two cables; otherwise, just use one. Connect the shielded RJ-45 cables directly to the trunk connector on the board or to the trunk adapter cable.

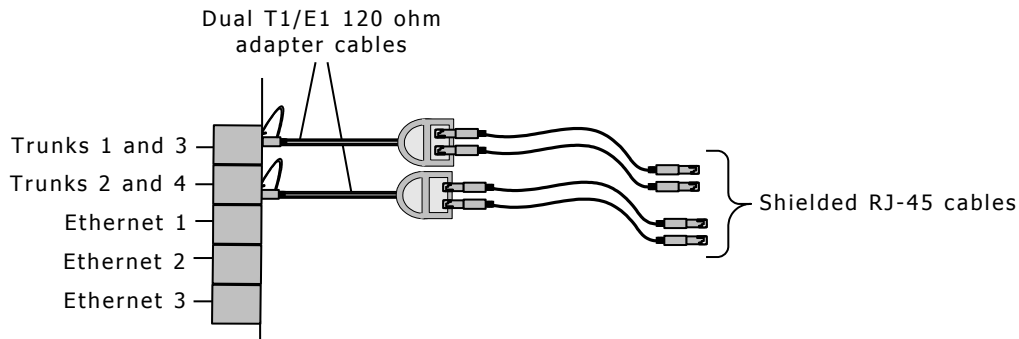
The following illustration shows a dual T1/E1 120 ohm trunk adapter cable:



Note: TX 5000E boards are configured as T1/E1 120 ohm boards. To connect a TX 5000E Series board as an E1 75 ohm board, use a balun transformer to convert the impedance from 120 ohm to 75 ohm. No other configuration changes are required.

Ensure that you have properly configured the T1 or E1 trunks. For more information, refer to the *Dialogic® NaturalAccess™ Signaling Software Configuration Manual*.

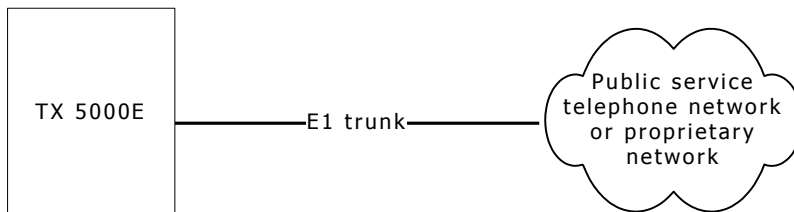
The following illustration shows the cabling required to connect all four trunks on a TX 5000E board:



Caution: Failure to use a shielded cable may negate your approval.

E1 Network Considerations

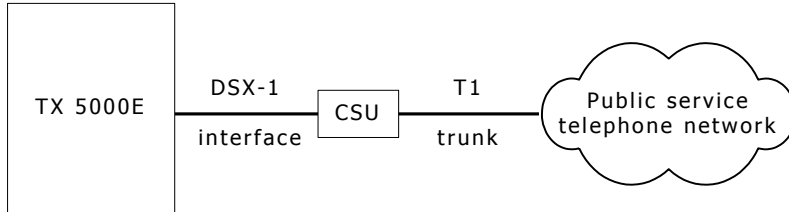
TX 5000E boards can support up to four CEPT E1 trunk interfaces. For typical E1 communications, each E1 interface connects directly to an E1 trunk, as shown in the following illustration:



Note: Trunks do not synchronize until the board is booted with a valid E1 configuration.

T1 Network Considerations

For typical T1 communications, each trunk interface connects to a channel service unit (CSU), which is connected to a T1 trunk line. The CSU provides a DSX-1 interface to the T1 line, and also contains circuitry that enables the central office (CO) to perform diagnostic tests remotely. The following illustration shows the TX 5000E trunk interface with CSU:



Note: Trunks do not synchronize until the board is booted with a valid T1 configuration.

You can purchase or lease the CSU from the telephone company or other vendor.

Warning:

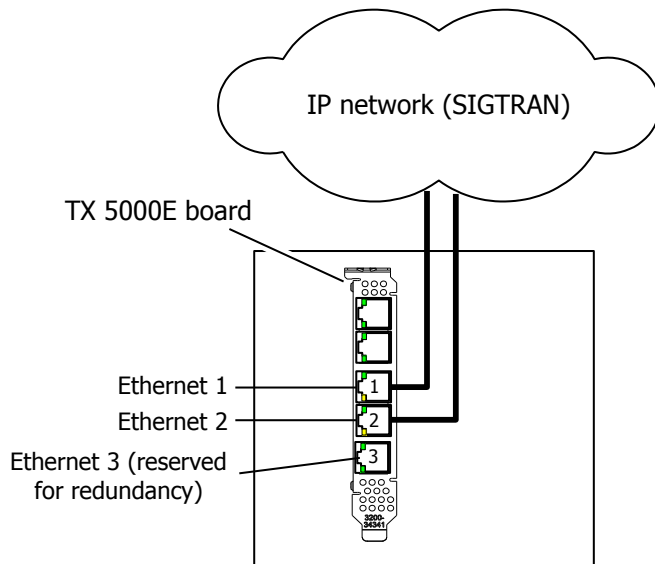


Important safety notes for telephony connections: Use a channel service unit (CSU) to isolate the cables that are attached to this product before the cables leave the building.

To avoid causing T1 service provider alarms, make sure that the board always sends a valid signal, either by looping back at the CSU or by connecting the CSU to a functioning TX 5000E board. The best way to provide a loopback is to unplug the cable from the TX board to the CSU. The modular connector on most CSUs loops back the transmit signal to the receive signal when nothing is plugged in.

Connecting to a SIGTRAN Network

To connect a TX 5000E board to a SIGTRAN network, connect the Ethernet 1 and Ethernet 2 connectors to the IP network connectors using standard Ethernet cables as shown:



Connecting TX 5000E Boards for Redundancy

Use the redundancy feature to enable the system to detect and recover from the failure of signaling links on a TX 5000E board, the failure of a signaling node, or the failure of the TX 5000E board itself.

In a redundant configuration, each pair of TX boards is connected through a private Ethernet connection. If other devices are connected to the private Ethernet link, avoid overloading the link. Packets can be lost between the redundant TX boards if the connection is overloaded.

The Ethernet 3 connector of a TX 5000E board is reserved for redundancy connectivity.

This topic describes dual-node redundant signaling and single-node redundant signaling for the following types of configurations:

- [TDM Configuration](#)
- [IP Network Configuration](#)

Note: TX 5000E boards support redundancy with other TX 5000 Series boards. A redundant configuration between a TX 5000E board and a TX 4000 Series board is not supported.

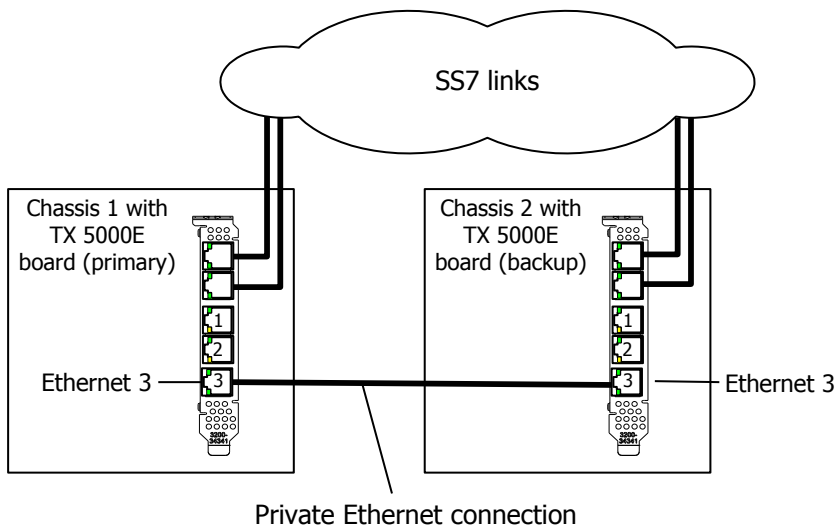
TDM Configuration

To connect a TX 5000E board to its redundant mate in a TDM configuration, connect Ethernet 3 on the primary board to Ethernet 3 on the backup board using a Category 5 shielded twisted pair (STP) Ethernet cable.

You must specify the IP address of the TX boards redundant mate using the mate command in the *txconfig* utility. For more information, refer to the *Dialogic® NaturalAccess™ Signaling Software Configuration Manual*.

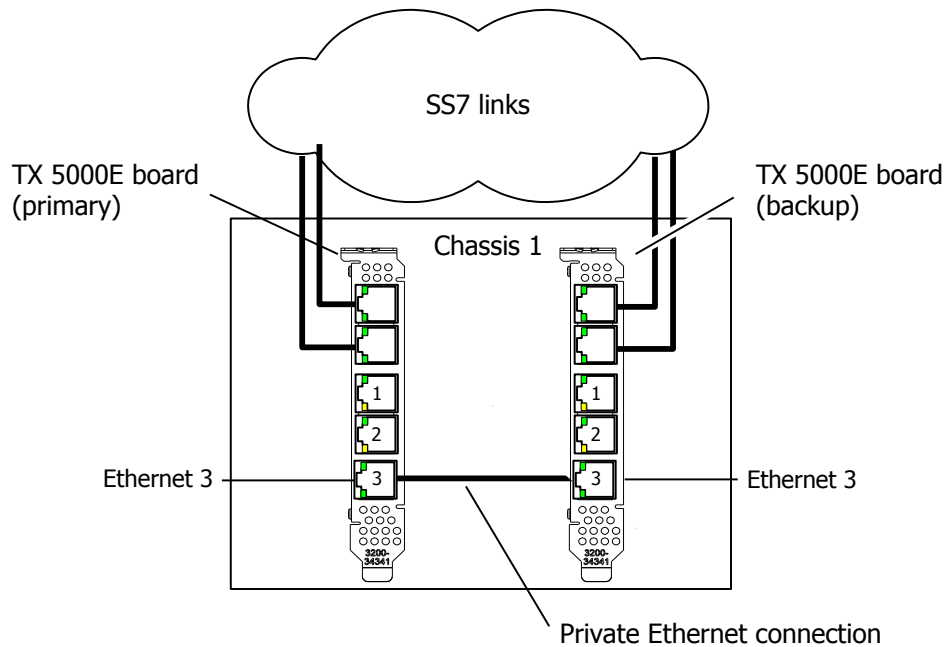
Dual-node Redundant Signaling Server

The following illustration shows how to set up two TX 5000E boards based on a dual-node redundant signaling server in a TDM configuration. The boards are located in two separate chassis to ensure board-level and system-level redundancy.



Single-node Redundant Signaling Server

The following illustration shows how to set up two TX 5000E boards based on the single-node signaling server in a TDM configuration. The boards are located in the same chassis to ensure board-level redundancy.



IP Network Configuration

To connect a TX 5000E board to its redundant mate in an IP network configuration, connect Ethernet 3 on the primary board to Ethernet 3 on the backup board using a Category 5 shielded twisted pair (STP) Ethernet crossover cable. Then connect the Ethernet 1 and Ethernet 2 connectors on both boards to the IP network connectors using standard Ethernet cables.

Note: Dialogic recommends using a private Ethernet link to connect the redundant boards to avoid loss or delay of vital checkpoint messages. However, if each board in the redundant pair requires a multi-homing configuration in which each board provides three separate network connections, then you can use Ethernet 3 for both the redundant pathway and for SIGTRAN network access. In this configuration, the Ethernet 3 on each board is connected to what is shown as an IP network cloud in the illustrations that follow (just as the Ethernet 1 and 2 connectors are). Be aware that this greatly increases the chance of lost or delayed checkpoint messages, which can result in the backup having outdated information.

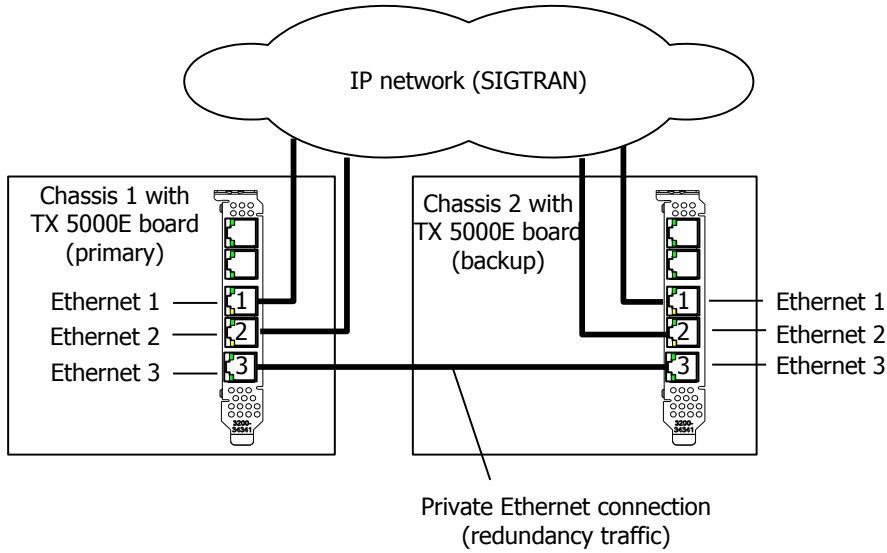
You must specify the:

- IP address of the TX board's redundant mate using the `mate` command in the `txconfig` utility.
- IP address and network mask of Ethernet interface 3 using the `ifcreate` command in the `txconfig` utility.

For more information, refer to the *Dialogic® NaturalAccess™ Signaling Software Configuration Manual*.

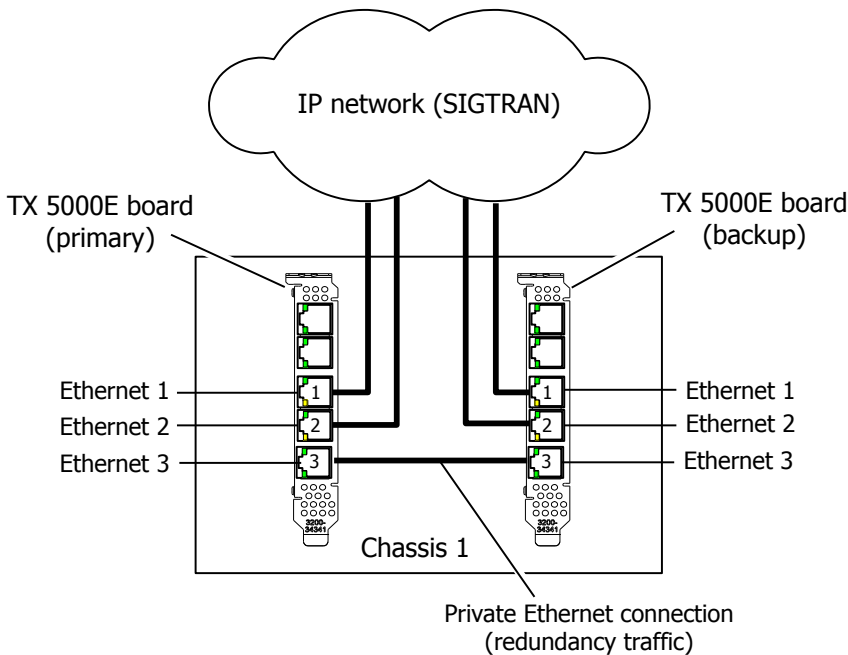
Dual-node Redundant Signaling Server

The following illustration shows how to set up two TX 5000E boards based on a dual-node redundant signaling server in an IP network configuration. The boards are located in two separate chassis to ensure board-level and system-level redundancy.



Single-node Redundant Signaling Server

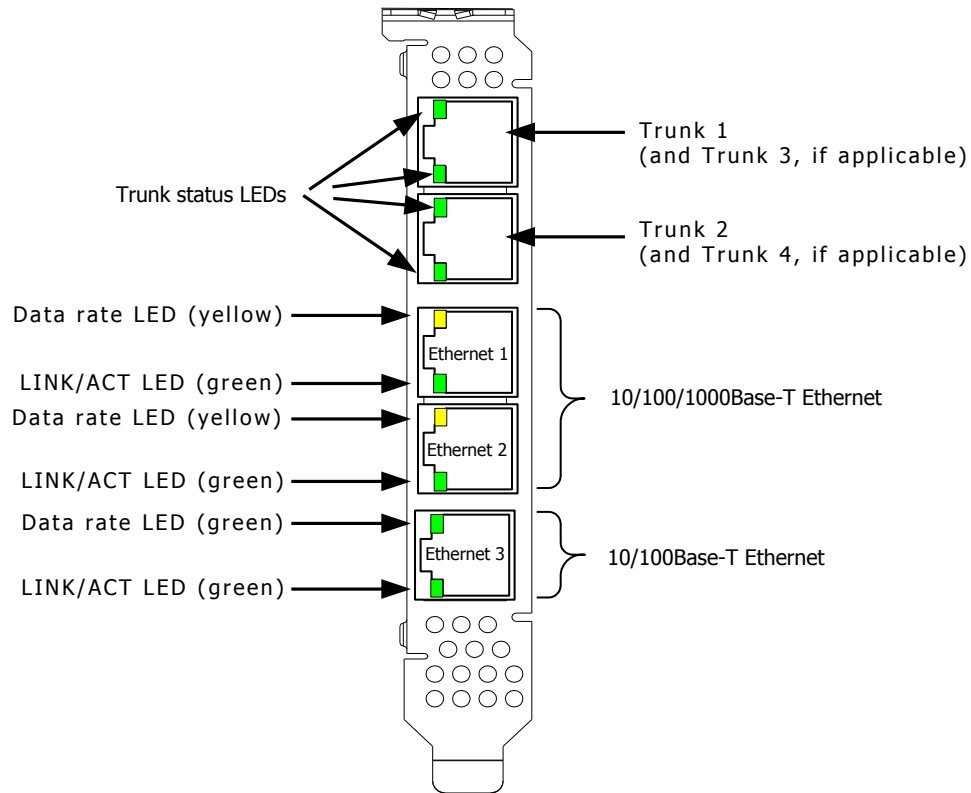
The following illustration shows how to set up two TX 5000E boards based on a single-node signaling server in an IP network configuration. The boards are located in the same chassis to ensure board-level redundancy.



For more information on NaturalAccess Signaling Software redundancy, refer to the *SS7 Health Management Developer's Reference Manual*.

Interface Status LEDs

TX 5000E boards provide LEDs to indicate the status of the trunk and Ethernet interfaces. The following illustration shows the location of the LEDs:



Trunk LEDs

TX 5000E boards have one green LED for each trunk interface on the end bracket of the board. The trunk LEDs provide the following indications:

Trunk LEDs	Description
Off	Trunk has not been configured.
Slow blinking green	Loss of signal.
Fast blinking green	Loss of frame or loss of signaling multiframe.
Steady green	Proper frame synchronization between the trunk and network has been established. All required framing alignment has been found.

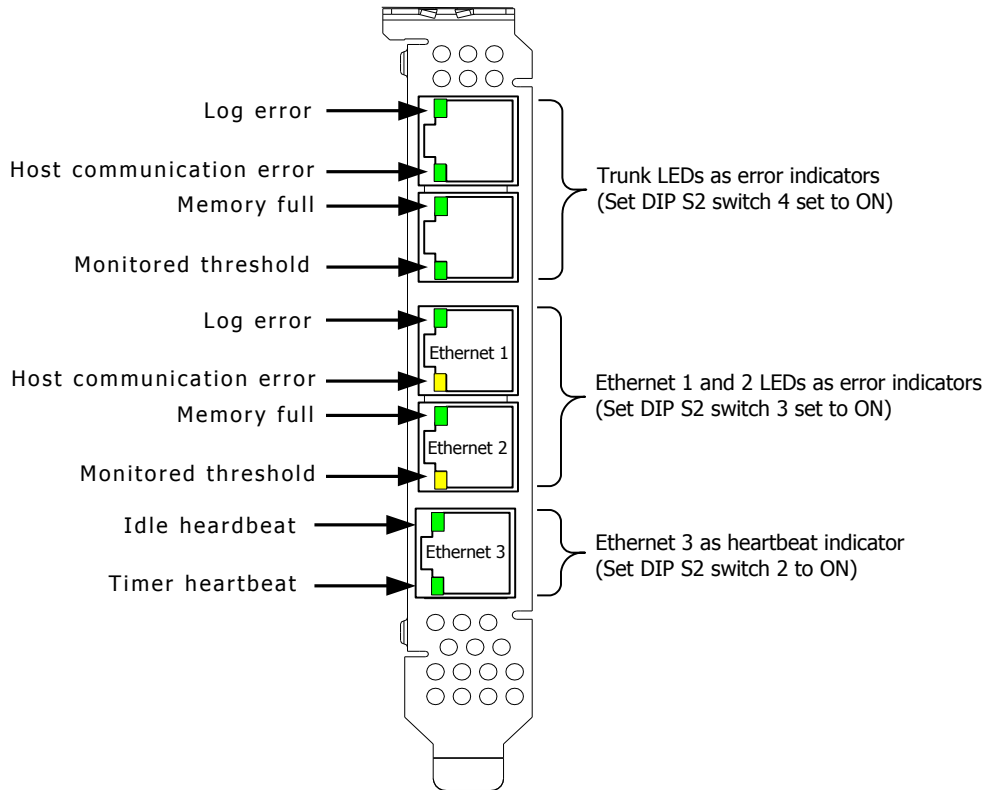
Ethernet LEDs

TX 5000E boards have two LEDs for each Ethernet interface on the end bracket of the board. The Ethernet LEDs provide the following indications:

Ethernet LED	Description
Yellow (Ethernet 1 and 2) Green (Ethernet 3)	<p>Ethernet link status (LINK/ACT):</p> <ul style="list-style-type: none"> Steady yellow (or green) = Ethernet link has established link integrity and indicates transmitting and receiving activity on the link. Flickering yellow (or green) = Activity is present on the link. Off = No link.
Green	<p>Ethernet link data rate (speed):</p> <ul style="list-style-type: none"> Steady green - 100 Mbit/s Off - 10 Mbit/s Blinking green (1 blink per second) = 1 Gb/s <p>Green LEDs are used only when a reliable Ethernet connection is established (the LINK/ACT LED is on).</p>

Alternative Uses for Faceplate LEDs

TX 5000E boards provide a set of DIP switches that you can use to override the default LED usage. By setting these switches, you can substitute TX operating system diagnostic information for the standard TDM trunk status, Ethernet connectivity status, or both. The following illustration shows the location of the LEDs and the alternative usage options:

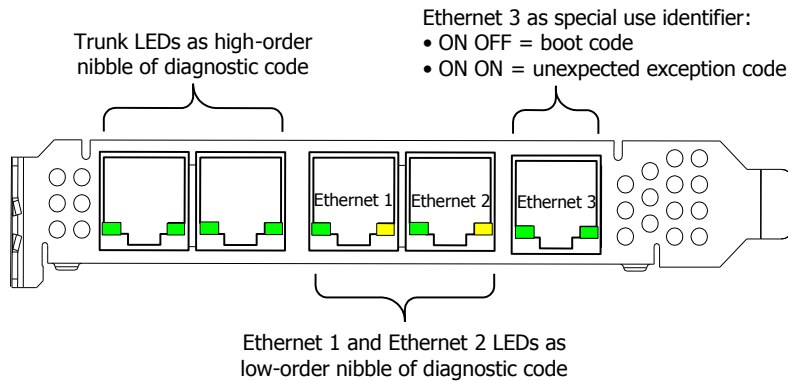


Boot Codes and Unexpected Exception Codes

The faceplate LEDs also show boot codes and unexpected exception codes that may occur. During initial system power-up or after a TX board is reset (using the *txreset* utility or the *txflash s* option) the faceplate LEDs hold an 8-digit code. This code can be used to help identify the root cause of the failure.

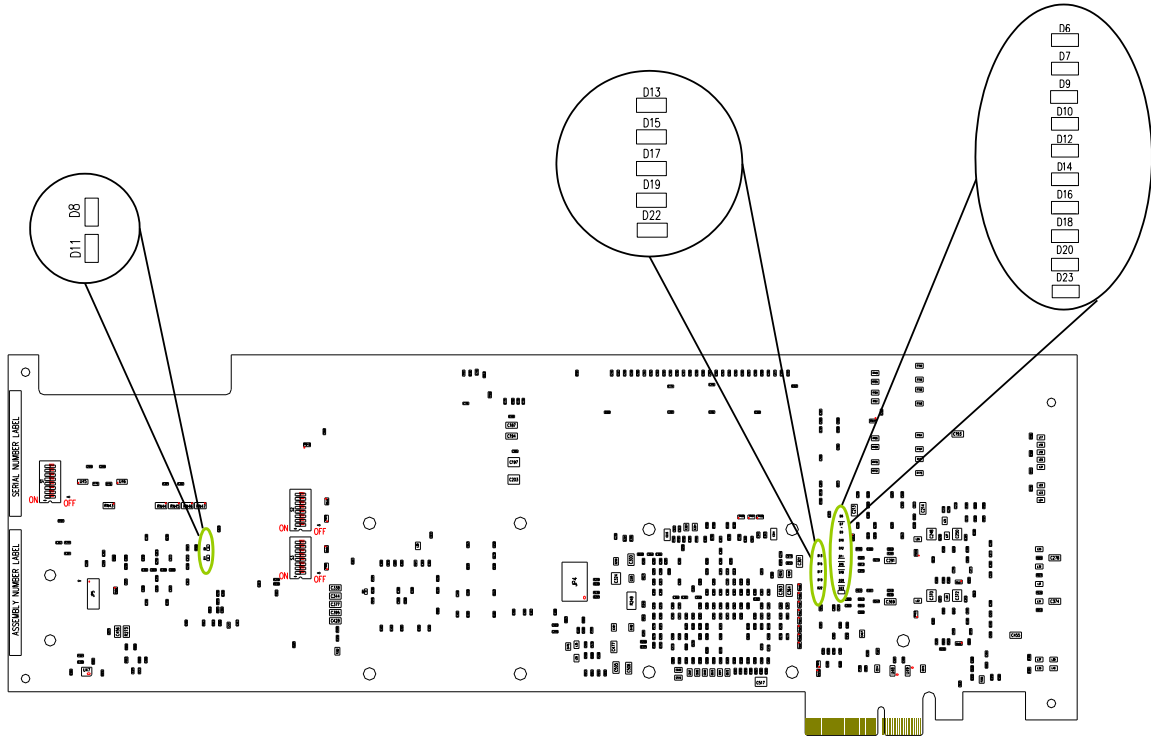
A boot code is identified when the Ethernet 3 LINK/ACT LED is ON and the Ethernet 3 Data rate LED is OFF. When both Ethernet 3 LEDs are ON, it indicates an unexpected exception code.

For these special cases, read the 8-bit diagnostic code from left to right with the first trunk connector to the left and the third Ethernet connector on the right. The trunk LEDs provide the high-order nibble of the code and the middle Ethernet connectors provide the low-order nibble of the code as shown:



Board Status LEDs

On the back of a TX 5000E board, two banks of green LEDs indicate the current status of the board. The following illustration shows the board status LEDs:



The following table provides a description of the board status LEDs:

LED	Status when illuminated
D6	Kernel detected a problem. Use the <i>cpcon</i> utility's log command to view error information. For more information on <i>cpcon</i> , refer to the <i>TX Utilities Manual</i> .
D7	Kernel detected a host communication error.
D8	Reserved for future use.
D9	Memory full condition occurred on the board.
D10	Reserved for future use.
D11	Reserved for future use.
D12	Idle task controlled heartbeat. The LED flickers to indicate that the on-board operating system is operational.
D13	Power Error: Over/Under voltage or over current condition has occurred on board. Board power is turned off.
D14	The TX board is actively burning a new image to the on-board flash memory.
D15	Reserved for future use.
D16	Board is executing in snapshot mode: the board is resetting or <i>txsnap</i> is running. For more information on <i>txsnap</i> , refer to the <i>TX Utilities Manual</i> .
D17	Reserved for future use.
D18	TX board is currently booting (see faceplate for boot code identifying specific phase of TX boot process).

LED	Status when illuminated
D19	3.3 V from PCIe connector is present.
D20	Unexpected exception occurred on the board.
D22	12 V from PCIe connector is present.
D23	Timer interrupt controlled heartbeat. The LED flickers to indicate that the timer interrupts are operating properly.

Compliance Statements

Products covered by this document may be approved as NFT104P2 or NFT204P2.

EU R&TTE Statement

This product is intended to be connected to the following public telecommunication networks:

- 2048 kbit/s 120 ohm digital structured or unstructured ONP leased line E1 interface in all EU countries.

For more information, refer to www.dialogic.com/declarations.

FCC Part 15 Class A Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense. Modifications not expressly approved by Dialogic may void the FCC granted authority to operate the equipment.

FCC Part 68 Statement

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the bottom of this equipment is a label that contains, among other information, a product identifier in the format US:EMCXDNANXXXXXXXXX. If requested, this number must be provided to the telephone company. The telephone company will need to know the Service Order Code, the Facility Interface Code, and the wiring configuration (or USOC jack type) corresponding to the service you are ordering, as shown in this table:

Service type	Facility interface code	Service order code	USOC jack
4-wire 1.544 Mbit/s (DS1) with Super Frame (SF), Alternate Mark Inversion ("AMI"), no line power, 100 ohms.	04DU9.BN	6.0N	RJ-48C
4-wire 1.544 Mbit/s (DS1) with SF, Bipolar with eight-zero substitution (B8ZS), no line power, 100 ohms.	04DU9.DN	6.0N	RJ-48C
4-wire 1.544 Mbit/s (DS1) with Extended Super Frame (ESF), AMI, no line power, 100 ohms.	04DU9.1KN	6.0N	RJ-48C
4-wire 1.544 Mbit/s (DS1) with ESF, Bipolar with Eight-Zero Substitution ("B8ZS"), no line power, 100 ohms.	04DU9.1SN	6.0N	RJ-48C

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify you as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service. This product is not intended for customer repair.

If you experience trouble with this equipment, contact Dialogic for warranty and repair information. The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning. This board may not be connected to party lines or used on coin service lines provided by the telephone company. The part 68 affidavit for digital and subrate services is included separately.

Canadian ICES-003 Statement

This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

CS-03 Statement

This product meets the applicable Industry Canada technical specifications. Le présent matériel est conforme aux spécifications techniques applicables d'Industrie Canada.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority or electrician.

Europe

CE Compliance

The Dialogic® products covered by this notice meet the following European Directives:

2006/95/EC	Safety/Low Voltage Directive
2004/108/EC	EMC Directive
1999/05/EC	R&TTE Directive
2011/65/EU	RoHS Directive

To achieve CE compliance, be sure to select a host that already meets the EMC and Low Voltage Directives before the addition of any optional board. Remember that the use of option boards declared compliant with the Directives by their manufacturer only gives "presumption of compliance" for the whole system. It is the responsibility of the system supplier to verify that the requirements of the listed Directives are still met by the final system, as supplied to the end-user. System integrators should take notice of further conditions expressed in this section and the Safety section.

The products covered by this notice have been successfully tested against TBR 4 basic call control. Application developers implementing supplementary services at application level must ensure that their implementation complies with the services offered by the local Public Switched Telephone Network (PSTN) operator. In case of doubt, network specifications must be consulted; the R&TTE Directive imposes that each PSTN operator makes such specifications available.

Inter-working is guaranteed only with Public Switched Telephone Networks (PSTNs) offering Primary Rate Access conforming to EuroISDN specifications.

Before any connection to PSTN offering Primary Rate Access to other national or international E1 standards, please consult your Dialogic representative.

Compliance with the R&TTE Directive

The R&TTE Directive includes its own safety and EMC requirements. Although equipment declared compliant to the R&TTE Directive does not require explicit declaration of conformity to EMC and Low Voltage Directives, the above conditions must also be met to satisfy the safety and EMC requirements of the R&TTE Directive.

Inter-working is guaranteed only with Public Switched Telephone Networks (PSTNs) as described in the sections above.

Dialogic Declarations of Conformity for these products can be found at:
www.dialogic.com/declarations

Manufacturer's office in European Union:

Dialogic
Unit O3 North Ring Business Park
Santry
Dublin 9
IRELAND

Tel: +353 1 630 9000
Fax: +353 1 630 9099

Hereby, Dialogic Corporation, declares that this equipment is in compliance with the essential requirements and other relevant provisions of European Union Directives 1999/5/EC (R&TTE), 2004/108/EC (EMC Directive) and 2006/95/EC (Low Voltage Directive).

[Česky]

Dialogic Corporation tímto prohlašuje, že tento ITE je ve shodě se základními požadavky a dalšími příslušnými ustanoveními smernice 1999/5/ES, 2004/108/ES, 2006/95/ES.

[Dansk]

Undertegnede Dialogic Corporation erklærer herved, at følgende udstyr ITE overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF, 2004/108/EF, 2006/95/EF.

[Deutsch]

Hiermit erklärt Dialogic Corporation, dass sich das Gerät ITE in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG, 2004/108/EG, 2006/95/EG befindet.

[Eesti]

Käesolevaga kinnitab Dialogic Corporation seadme ITE vastavust direktiivi 1999/5/EÜ, 2004/108/EÜ, 2006/95/EÜ, põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

[Español]

Por medio de la presente Dialogic Corporation declara que el ITE cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE, 2004/108/CE, 2006/95/CE.

[Ελληνική]

ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Dialogic Corporation ΔΗΛΩΝΕΙ ΟΤΙ ΙΤΕ ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ, 2004/108/ΕΚ, 2006/95/ΕΚ.

[Français]

Par la présente Dialogic Corporation déclare que l'appareil ITE est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE, 2004/108/CE, 2006/95/CE.

[Italiano]

Con la presente Dialogic Corporation dichiara che questo ITE è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE, 2004/108/CE, 2006/95/CE.

[Latviski]

Ar ao Dialogic Corporation deklarē, ka ITE atbilst Direktīvas 1999/5/EK, 2004/108/EK, 2006/95/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.

[Lietuvių]

Dialogic Corporation deklaruoja, kad šis ITE atitinka esminius reikalavimus ir kitas 1999/5/EB, 2004/108/EB, 2006/95/EB, Direktyvos nuostatas.

[Magyar]

Alulírott, Dialogic Corporation nyilatkozom, hogy a ITE megfelel a vonatkozó alapvető követelményeknek és az 1999/5/EK, 2004/108/EK, 2006/95/EK, irányelv egyéb előírásainak.

[Malti]

Hawnhekk, Dialogic Corporation, jiddikjara li dan ITE jikkonforma mal-h- tig- jiet essenzjali u ma provvedimenti oh- rajn relevanti li hemm fid-Direttiva 1999/5/KE, 2004/108/KE, 2006/95/KE.

[Nederlands]

Hierbij verklaart Dialogic Corporation dat het toestel ITE in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG, 2004/108/EG, 2006/95/EG.

[Polski]

Niniejszym, Dialogic Corporation, oświadcza, że ITE jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/WE, 2004/108/WE, 2006/95/WE.

[Português]

Dialogic Corporation declara que este ITE está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE, 2004/108/CE, 2006/95/CE.

[Slovensko]

Dialogic Corporation izjavlja, da je ta ITE v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES, 2004/108/ES, 2006/95/ES.

[Slovensky]

Dialogic Corporation týmto vyhlasuje, že ITE spĺňa základné požiadavky a vaetky príslušné ustanovenia Smernice 1999/5/ES, 2004/108/ES, 2006/95/ES.

[Suomi]

Dialogic Corporation vakuuttaa täten että ITE tyyppinen laite on direktiivin 1999/5/EY, 2004/108/EY, 2006/95/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.

[Svenska]

Härmed intygar Dialogic Corporation att denna ITE står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG, 2004/108/EG, 2006/95/EG.

[Íslenska]

Hér með lýsir Dialogic Corporation yfir því að ITE er í samræmi við grunnkröfur og aðrar kröfur, sem gerðar eru í tilskipun 1999/5/EC, 2004/108/EC, 2006/95/EC.

[Norsk]

Dialogic Corporation erklærer herved at utstyret ITE er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 1999/5/EF, 2004/108/EF, 2006/95/EF.

Australia

Dialogic is required to provide the following information as a condition of the telecommunications conformity of Dialogic® telecommunications products. You may also be responsible for meeting requirements other than those outlined in this document.

Note: Failure to meet the requirements listed may render the products non-compliant, with the user liable to significant penalties under the Telecommunications Act.

Do not connect these products directly to a telecommunications network. These products must be connected to a network terminating unit (NTU) or some other device that provides line isolation. This allows the carrier's telecommunications network to be electrically isolated from the product and host PC.

These products are only to be connected to safety extra low voltage circuits. These products should only be connected to the safety extra low voltage (SELV) port of the network termination unit (NTU) or PBX that is providing the E-1 interface.

Warning! This customer equipment is to be installed and maintained by service personnel as defined by AS/NZS 60950.1:2011 Service Personnel. It may be hazardous if your computer is not properly plugged in and grounded.

South Korea

명 칭 (모 델 명) : TX5500E

인 증 번 호 : DIA-TX5500E(A)

인증받은자의 상호 : Dialogic Corporation

제 조 년 월 일 : Marked on serial number tag

제 조 자 / 제 조 국 : Made in USA

Class A statement

This Class A digital apparatus meets all requirements of the Korean EMI regulations.

A급 기기 (업무용 방송통신기기)

이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Telecom regulatory approval of this product is conditional upon the use of suitable surge suppressors on the E1 interface port(s). The approved 4-wire E1 surge protector is available from Dialogic as part number 83294 or from Patton Electronics, part number 552-T1 (www.patton.com).

China



仅适用于海拔2000m 以下地区安全使用

Only safe to be used in altitudes of 2000m or less.



仅适用于非热带气候条件下安全使用

Only safe to be used in non-tropical climates.

Product Declarations and Global Approvals

For information about product declarations and global approvals, refer to www.dialogic.com/declarations.

RoHS Declaration of Conformity

For information about RoHS compliance for this product, refer to www.dialogic.com/rohs.

Product Environmental Information

During August 2005, the European Union Directive on Waste Electrical and Electronic Equipment (2002/96/EC) and its amendment (2003/108/EC), collectively known as the WEEE Directive, came into force throughout most of the European Union. This Dialogic® product comes within the scope of the WEEE Directive. We are confident that this product will provide you with many years of reliable service.

Moreover, we are pleased to advise you that Dialogic warrants this product, as detailed in the user guide and provides a fee based repair service when the product is out of warranty. However, a time will come when the product will no longer meet your needs or will become un-economic to repair. It is at that stage that we ask for your co-operation in recycling this product in the spirit of the WEEE directive.

Dialogic has taken great care to minimize the environmental burden of this product by careful design and manufacturing it under an Environmental Management System, registered to ISO14001. The requirements of ISO14001 are similar to and as rigorous as the requirements of ISO9001, Quality Management Systems with which you may be more familiar. We ask you to help us to ensure that the environmental burden of this product is minimized when it is of no further use to you by recycling it. Please do not dispose of this product through municipal or general waste systems because it contains materials which can be economically recycled. Like all electrical and electronic equipment, including televisions and computers, it may contain small amounts of materials which could lead to environmental damage. To minimize any environmental damage we ask you to have this product recycled by:

- Bringing it to the recycling collection point in your company
- Handing it into the store where you are purchasing the replacement
- Delivering it to a local bring-centre in your area

No charge can be imposed on you for this recycling service, in the European Union, as Dialogic has paid for recycling this product when it was placed on the market. These are requirements of the WEEE directive. We thank you in advance for you co-operation and working with Dialogic in protecting our environment.



■ Please do not dispose of this product through municipal or general waste, recycle it.

Limited Warranty

For warranty information, refer to www.dialogic.com/warranties.