

# TCX1000 Inline Amplifier Quick Start Guide

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## About This Quick Start Guide

This Quick Start Guide contains information you need to install and connect the Juniper Networks TCX1000 Inline Amplifier (ILA). For complete installation instructions, see the *TCX1000 Inline Amplifier Hardware Guide* at <https://www.juniper.net/documentation/>.



**WARNING:** This Quick Start Guide contains a summary of safety warnings in “[Safety Warnings Summary](#)” on page 12. For a complete list of warnings for the TCX1000-ILA, including translations, see the *TCX1000 Inline Amplifier Hardware Guide* at <https://www.juniper.net/documentation/>.

The Juniper Networks TCX1000 Inline Amplifier is a standalone erbium-doped fiber amplifier (EDFA) with dual AC or DC power supplies. The TCX1000-ILA supports dual optical inline amplification—two functionally separate amplifiers. The TCX1000-ILA provides amplification of a dense wavelength-division multiplexing (DWDM) signal to enable long-distance transmission over fiber-optic cable. The TCX1000-ILA is used in conjunction with the TCX1000-RDM20.

## Step 1: Prepare Your Site for the TCX1000-ILA

Before installing the TCX1000-ILA, make sure your site meets all power, environmental, and clearance requirements.

Ensure that you have the following parts and tools available to install the TCX1000-ILA:

- Four self-tapping 10-24 bolts to secure the chassis and mounting brackets to the rack (provided).
- Two power cords with plugs appropriate for your geographical location (provided with the AC model).
- Two DC power connectors (provided with the DC model).
- 19-in. mounting brackets (preinstalled on the chassis).
- Grounding lug (provided).
- (Optional) 21-in. and 23-in. mounting brackets (provided).
- Electrostatic discharge (ESD) grounding strap (not provided).
- Screwdriver appropriate for the rack-mounting screws (not provided).
- Power cable or cables appropriate for your geographical location available to connect DC power to the TCX1000-ILA (not provided).
- Management host, such as a PC laptop, with a serial port (not provided).

## Step 2: Unpack the TCX1000-ILA

For detailed instructions on how to unpack the box and verify the parts received for the TCX1000-ILA, see the *TCX1000 Inline Amplifier Hardware Guide* at <https://www.juniper.net/documentation/>.

### Step 3: Mount the Chassis

To mount the TCX1000-ILA on two posts or four posts in a rack by using the provided mounting kit (see [Figure 1](#)):

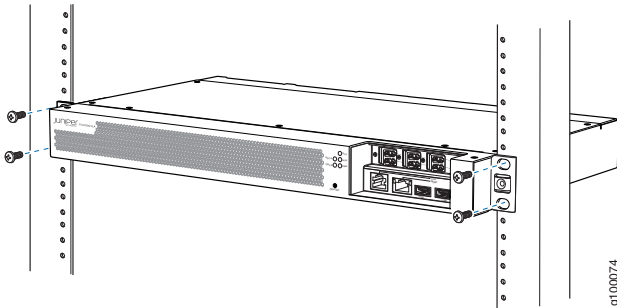


**NOTE:** The 19-inch brackets are attached to the TCX1000-ILA when they are shipped. If you want to attach the 21-inch or 23-inch brackets, unscrew the 19-inch brackets from the chassis, and attach the 21-inch or 23-inch brackets by using the same screws.



**NOTE:** This procedure requires two persons. Do not attempt to do it alone.

*Figure 1: Installing the TCX1000-ILA on a Rack*



1. Attach the ESD grounding strap to your bare wrist and to a site ESD point.



**NOTE:** Place the rack in its permanent location, allowing adequate clearance for airflow and maintenance, and secure it to the building structure. If you are mounting multiple units in the rack, mount the heaviest unit at the bottom and mount the others from bottom to top in order of decreasing weight. The TCX1000-ILA weighs 11.7 lb (5.30 kg).

2. Position the TCX1000-ILA in such a manner that the FRUs are next to the hot aisle.
3. Use four mounting screws (and cage nuts and washers if your rack requires them) to attach the brackets to the rack.
4. Tighten the screws.

## Step 4: Connect the Grounding Cable

To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the chassis to earth ground before you connect it to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the TCX1000-ILA chassis to connect to earth ground.



**NOTE:** An AC-powered TCX1000-ILA gains additional grounding when you plug the power supply in the device into a grounded AC power outlet by using an AC power cord appropriate for your geographical location. See the “TCX1000-ILA Power System” to see the AC power cord specifications in the *TCX1000 Inline Amplifier Hardware Guide*.



**CAUTION:** Before you connect power to the TCX1000-ILA, a licensed electrician must attach a cable lug to the grounding and power cables that you supply. A cable with an incorrectly attached lug can damage the TCX1000-ILA (for example, by causing a short circuit).



**NOTE:** Mount the TCX1000-ILA in the rack or cabinet before attaching the grounding lug to the TCX1000-ILA.

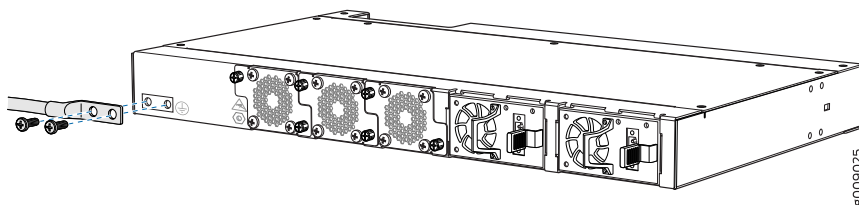
Ensure that you have the following parts and tools available:

- Grounding cable (not provided)—The grounding cable must be 14–10 AWG (2–5.3 mm<sup>2</sup>), minimum 90° C wire, or as permitted by the local code.
- Grounding lug (provided) for your grounding cable—The grounding lug required is a Panduit LCD6-14BH-L or equivalent.
- Two M5-0.8x8 mm screws (provided)—The screws are secured on the chassis when it is shipped.
- Screwdriver appropriate for the M5-0.8x8 mm screws.

To connect a grounding cable to the TCX1000-ILA:

1. Connect one end of the grounding cable to a proper site earth ground, such as the rack in which the TCX1000-ILA is mounted.
2. Unscrew the screws that are attached to the chassis.
3. Place the grounding lug attached to the grounding cable over the protective earthing terminal on the chassis (see [Figure 2](#)).

**Figure 2: Connecting a Grounding Cable to the TCX1000-ILA**



4. Secure the grounding lug to the protective earthing terminal with the screws.
5. Dress the grounding cable and ensure that it does not touch or block access to other device components and that it does not drape where people could trip over it.

## Step 5: Connect to the Management Console

The TCX1000-ILA has a console port with an RJ-45 connector. Use the console port to connect the device directly to a management console, such as a laptop, or to a console server.

Ensure that you have an RJ-45 to DB-9 rollover cable available.



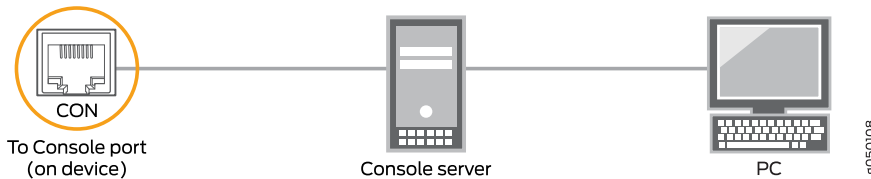
**NOTE:** If your laptop or PC does not have a DB-9 male connector pin and you want to connect your laptop or PC directly to the TCX1000-ILA, use a combination of the RJ-45 cable and RJ-45 to DB-9 adapter and a USB to DB-9 male adapter. You must provide the cable and adapter.

To connect the TCX1000-ILA to the management console (see [Figure 3](#) or [Figure 4](#)):

*Figure 3: Connecting the TCX1000-ILA to a Management Console*



*Figure 4: Connecting the TCX1000-ILA to a Management Console Through a Console Server*



**NOTE:** For instructions to connect to a management Ethernet device see the *TCX1000 Inline Amplifier Hardware Guide*, at <https://www.juniper.net/documentation/>.

## Step 6: Power On the TCX1000-ILA



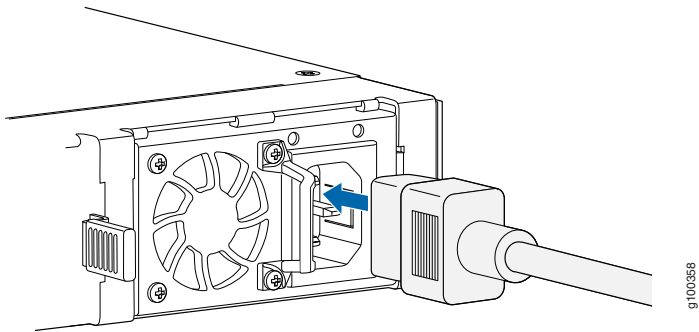
**NOTE:** The TCX1000-ILA is supplied with two factory-installed power supplies. The power supplies need to be both AC or both DC.

- [Connecting AC Power to the TCX1000-ILA on page 5](#)
- [Connecting DC Power to the TCX1000-ILA on page 7](#)

### Connecting AC Power to the TCX1000-ILA

To connect AC power to a TCX1000-ILA:

1. Prevent damage to the equipment caused by ESD, by attaching an ESD grounding strap to your bare wrist and connecting the strap to an approved site ESD grounding point.
2. Ensure that the power supplies are fully inserted in the chassis and the latches are secure.
3. Insert the coupler end of the power cord into the AC power cord inlet on the AC power supply faceplate (see [Figure 5](#)).

**Figure 5: Connecting an AC Power Cord to an AC Power Supply in a TCX1000-ILA**

4. If the AC power source outlet has a power switch, set it to the off (O) position.



**NOTE:** The TCX1000-ILA powers on as soon as power is provided to the power supply.

5. Insert the power cord plug into an AC power source outlet.
6. Repeat the steps for each power supply you are connecting to power.
7. If the AC power source outlet has a power switch, set it to the on (I) position.
8. Verify that the status LEDs on each power supply are lit green.

If any LED is lit red, remove power from the power supply, and replace the power supply (see “*Maintaining the TCX1000-ILA Power System*” in the *TCX1000 Inline Amplifier Hardware Guide*). Do not remove the power supply until you have a replacement power supply ready: either power supplies or blank cover panels must be installed in the TCX1000-ILA to ensure proper airflow.



**CAUTION:** Replace a failed power supply with a blank panel or new power supply within one minute of removal to prevent chassis overheating.

## Connecting DC Power to the TCX1000-ILA

To connect DC power to a TCX1000-ILA:

Before you begin connecting DC power to the TCX1000-ILA:

- Read the electrical safety warnings in the *TCX1000 Inline Amplifier Hardware Guide*.
- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see “*Prevention of Electrostatic Discharge Damage*”) in the *TCX1000 Inline Amplifier Hardware Guide*.
- Ensure that you have connected the TCX1000-ILA chassis to earth ground.



**CAUTION:** Before you connect power to the TCX1000-ILA, a licensed electrician must attach a cable lug to the grounding and power cables that you supply. A cable with an incorrectly attached lug can damage the switch (for example, by causing a short circuit).



**NOTE:** To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the chassis to earth ground before you connect it to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the TCX1000-ILA chassis to connect to earth ground.

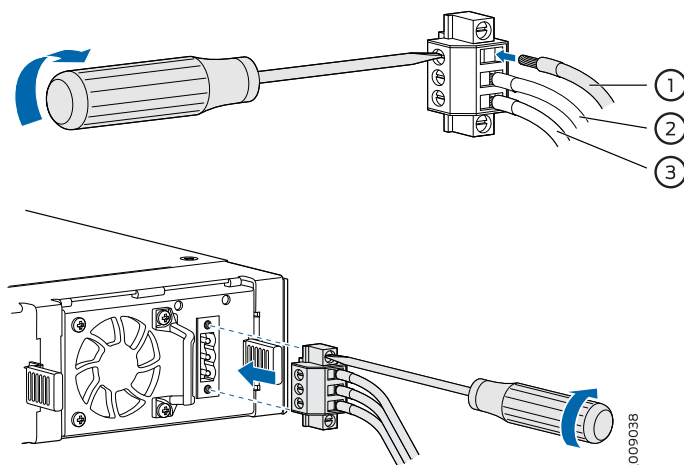
- Ensure that you have the following parts and tools available:
  - ESD grounding strap
  - Power cable or cables appropriate for your geographical location available to connect DC power to the TCX1000-ILA.



**NOTE:** Each power supply must be connected to a dedicated power source outlet.

1. Prevent damage to the equipment caused by static discharge, by attaching an ESD grounding strap to your bare wrist and connecting the strap to an approved site ESD grounding point.
2. Ensure that the power supplies are fully inserted in the chassis and the latches are secure.
3. Ensure that the power source is turned off, the voltage across the DC power source cable leads is 0 V, and there is no chance that the cable leads might become active during installation.
4. Locate and remove the three-position DC connectors included in the accessory kit.
5. Identify the ground, positive, and negative feed positions for the DC connector. See [Figure 6](#).

Figure 6: Connecting the DC Power Connector



1—Positive wire	3—Ground wire
2—Negative wire	

6. Strip each of the three wires coming out from the DC-input power source by 7–8 mm. Do not strip more than required, because doing so can leave the wire exposed from the DC connector after installation.
7. Insert the stripped wires into the three-position DC connector.
8. Use a ratcheting torque screwdriver to apply a torque of 4.5 lb-in. (0.5 Nm) to each of the terminal block captive screws (see Figure 6).
9. Insert the DC connector in the TCX1000-ILA DC power supply.
10. Tighten the attached screws (top and bottom) on the DC power connector to apply a torque of 4.5 lb-in. (0.5 Nm). See Figure 6.
11. Repeat Step 4 through Step 10 for each power supply you are connecting to power.



**WARNING:** Ensure that the power cables do not block access to device components or drape where people can trip on them.

12. Close the input circuit breaker.



**NOTE:** We recommend that the 48-VDC facility DC source be equipped with a circuit protector rated as required by local code.



**NOTE:** We recommend that the 60-VDC facility DC source be equipped with a circuit protector rated as required by local code.





**NOTE:** The TCX1000-ILA powers on as soon you connect the power.

13. Verify that the status LEDs on each power supply are lit green.

If the DC IN OK or DC OUT OK is lit steadily red, remove power from the power supply, and replace the power supply see “*Maintaining the TCX1000-ILA Power System*” in the *TCX1000 Inline Amplifier Hardware Guide*. Do not remove the power supply until you have a replacement power supply ready: the power supplies or a blank panel must be installed in the TCX1000-ILA to ensure proper airflow.



**CAUTION:** Replace a failed power supply with a new power supply within one minute of removal to prevent chassis overheating.

## Step 7: Perform the Initial Configuration

You must perform the initial configuration of the TCX1000-ILA through the command-line interface (CLI). The TCX1000-ILA supports two command line modes. When you first log in to the TCX1000-ILA, you are placed into user mode. In user mode, you can issue basic commands such as ping but you do not have access to regular CLI commands. To get access to the regular CLI, you need to log in to the administrative mode from user mode. From the administrative mode, you can set the IP address and do other tasks.

Before you begin connecting and configuring a TCX1000-ILA, set the following parameter values on the management console or console server:

- Baud Rate—115200
- Flow Control—None
- Data—8
- Parity—None
- Stop Bits—1

The default IP address of the TCX1000-ILA is 192.168.1.248. You need to set the IP address to the Data Communication Network (DCN) subnet.

To set up the IP address:

1. Connect to the CLI through one of the following methods:

- Connect the console port to a laptop or PC with an RJ-45 cable and an RJ-45 to DB-9 adapter (not provided). The console port (labeled **CON**) is located on the management panel of the TCX1000-ILA (see *Connecting the TCX1000-ILA to a Management Console* for more information). Start a serial connection to the TCX1000-ILA using your preferred application (such as PuTTY).
- Connect the management port (labeled MGMT) to a PC with an Ethernet cable (not provided). From your PC or laptop, use SSH to connect to the TCX1000-ILA and log in to the user mode with the username (**admin**) and the password (**admin**). Make sure your PC is on the same subnet as the TCX1000-ILA IP address. The user mode username and password are used if you are using SSH to connect to the CLI interface.



**NOTE:** If you are using Linux, use the following command to initiate a connection: `ssh admin@192.168.1.248`.

If you are using a PC or laptop, refer to your preferred application (such as PuTTY) to initiate a connection.

Change the user mode password by entering a new password at the prompt.

```
root@localhost:~# ssh admin@192.168.1.248

The authenticity of host '192.168.1.248 (192.168.1.248)' can't be established.
ECDSA key fingerprint is 46:40:8b:4b:21:ea:71:8e:36:7e:33:e3:b2:51:6c:e9.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.1.248' (ECDSA) to the list of known hosts.
admin@192.168.1.248's password:          SSH user "admin" default password is admin
*****
Please change default password!!!
*****
Changing password for admin.

(current) UNIX password: ****
Enter new UNIX password: *****
Retype new UNIX password: *****

passwd: password updated successfully
*****
OK. Please remember new password!!!
*****

Welcome to Command Line

EDFA>
```

2. Log in to the administrative mode with the username (**WRuser**) and default password (**WRuser123**). Change the administrative mode password by entering a new password at the prompt.

```
EDFA>login
Username: WRuser
Password: ***** CLI User "WRuser" default password is WRuser123
*****
Please change default password!!!
*****

Enter new password:*****
Retype new password:*****
*****
OK. Please remember new password!!!
*****

Completed!
EDFA>
```

3. Set the IP address. If you want to use IPv4 communication, see step 4 or if you want to use IPv6 communication see step 5.
4. For IPv4, enter the **system config network eth0 ipv4 *IP-address netmask gateway-address*** command.

See the following sample output to set the IPv4 address:

```
EDFA>system config network eth0 ipv4 192.0.2.0 255.255.255.0 192.0.2.1
04-12 02:12:04 Completed!
EDFA>
```

5. For IPv6, enter the **system config network eth0 ipv6 *IP-address gateway-address prefix*** command.

See the following sample output to set the IPv6 address:

```
EDFA>system config network eth0 ipv6 2001.db8::3 2001.db8::4 32
2018-12-12 02:40:58!
EDFA>
```

6. Set the hostname for the device:

Enter the **system config hostname *hostname*** command.

For example, set the hostname as ILA\_1:

```
EDFA>system config hostname ILA_1
```



**NOTE:** You can enter the **show system config** command to confirm the changes.

7. Save the new configuration to the persistent storage.



**NOTE:** If you do not save, your changes will be lost.

```
EDFA>system savecfg
```

8. Reboot the TCX1000-ILA after you set the IP address.

```
EDFA>system restart warm
```

9. Connect the management port (labeled **MGMT**) to the DCN to verify the IP address you configured. Use SSH to connect to the TCX1000-ILA and log in with the username (**admin**) and the configured password.
10. Use the proNX Optical Director to provision, monitor, and activate services on the TCX1000-ILA. See the proNX Optical Director documentation at: [https://www.juniper.net/documentation/product/en\\_US/pronx-optical-director](https://www.juniper.net/documentation/product/en_US/pronx-optical-director).



**NOTE:** The proNX Optical Director uses the administrative mode username and password to log in via NETCONF.

## Safety Warnings Summary

This is a summary of safety warnings. For a complete list of warnings, including translations, see the *TCX1000 Inline Amplifier Hardware Guide* at <https://www.juniper.net/documentation/>



**WARNING:** Failure to observe these safety warnings can result in personal injury or death.



**WARNING:** The intrabuilding ports of the equipment or subassembly are suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding ports of the equipment or subassembly **MUST NOT** be metalically connected to interfaces that connect to the Outside Plant (OSP) or its wiring. These interfaces are designed for use as intrabuilding interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection in order to connect these interfaces metalically to OSP wiring.



**WARNING:** For a device that has more than one power supply connection, you must ensure that all power connections are fully disconnected so that power to the device is completely removed.



**CAUTION:** Before removing or installing the TCX1000-ILA, attach an ESD strap to an ESD point, and place the other end of the strap around your bare wrist. Failure to use an ESD strap could result in damage to the equipment.

- Permit only trained and qualified personnel to install or replace TCX1000-ILA components.
- For the cooling system to function properly, the airflow around the chassis must be unrestricted.
- Before connecting the device to a power source, read the installation instructions in the TCX1000-ILA documentation.
- Perform only the procedures described in this Quick Start Guide and the TCX1000 documentation. Other services must be performed only by authorized service personnel.
- Before installing the device, read the planning instructions in the *TCX1000 Inline Amplifier Hardware Guide* to make sure that the site meets power, environmental, and clearance requirements for the TCX1000-ILA.
- If the rack or cabinet has stabilizing devices, install them in the rack before mounting or servicing the TCX1000-ILA in the rack or cabinet.
- Before installing or after removing an electrical component, always place it component-side up on a flat antistatic mat or in an electrostatic bag.
- Do not work on the TCX1000-ILA or connect or disconnect cables during electrical storms.
- Before working on equipment that is connected to power lines, remove jewelry, including rings, necklaces, and watches. Metal objects heat up when connected to power and ground and can cause serious burns or become welded to the terminals.
- Wire the DC power distribution unit by using the appropriate lugs. When connecting power, the proper wiring sequence is ground to ground, +RTN to +RTN, and then –48 V to –48 V. When disconnecting power, the proper wiring sequence is –48 V to –48 V, +RTN to +RTN, and then ground to ground. Always connect the ground wire first and disconnect it last.

## Power Cable Warning (Japanese)

The attached power cable is only for this product. Do not use this cable for another product. Contacting Juniper Networks For technical support, see <https://www.juniper.net/support/requesting-support.html>.

### 注意

附属の電源コードセットはこの製品専用です。  
他の電気機器には使用しないでください。

9040300

## NEBS Compliance Statements

- The equipment is suitable for installation as part of the Common Bonding Network (CBN).
- The equipment is suitable for installation in Network Telecommunications Facilities.
- The battery return connection is to be treated as an isolated DC return (that is, DC-I), as defined in GR-1089-CORE.
- You must provision a readily accessible device outside of the equipment to disconnect power. The device must also be rated based on local electrical code practice.

## Compliance Statements for EMC Requirements

- Canada on page 13
- European Community on page 13
- Israel on page 13
- Japan on page 13
- United States on page 14

### Canada

CAN ICES-3 (A)/NMB-3(A)

### European Community

This is a Class A product. In a domestic environment, this product might cause radio interference in which case the user might be required to take adequate measures.

### Israel

<p style="text-align: right;"><b>אזהרה</b></p> <p style="text-align: right;">מוצר זה הוא מוצר Class A. בסביבה ביתית, מוצר זה עלול לגרום הפרעות בתדר רדיו, ובמקרה זה, המשתמש עשוי להידרש לנקוט אמצעים מתאימים.</p>
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Translation from Hebrew—Warning: This product is Class A. In residential environments, the product might cause radio interference, and in such a situation, the user might be required to take adequate measures.

### Japan

<p>この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用する と電波妨害を引き起こすことがあります。この場合には使用者が適切な対策 を講ずるよう要求されることがあります。</p> <p style="text-align: right;">VCCI-A</p>
----------------------------------------------------------------------------------------------------------------------------------------------------

The preceding translates as follows:

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this product is used near a radio or television receiver in a domestic environment, it might cause radio interference. Install and use the equipment according to the instruction manual. VCCI-A.

## United States

The hardware 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, might 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 own expense.

## TCX1000 Series Documentation and Release Notes

For a list of the complete TCX1000 Series documentation including the release notes, see [https://www.juniper.net/documentation/en\\_US/release-independent/tcx/information-products/pathway-pages/index.html](https://www.juniper.net/documentation/en_US/release-independent/tcx/information-products/pathway-pages/index.html).

To obtain the most current version of all Juniper Networks technical documentation, see the product documentation page on the Juniper Networks website at <https://www.juniper.net/documentation/>.

## Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or Partner Support Service support contract, or are covered under warranty, and need postsales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <https://www.juniper.net/support/warranty/>.
- JTAC Hours of Operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

## Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <https://www.juniper.net/customers/support/>
- Find product documentation: <https://www.juniper.net/documentation/>
- Find solutions and answer questions using our Knowledge Base: <https://kb.juniper.net/>
- Download the latest versions of software and review release notes: <https://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum: <https://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <https://www.juniper.net/cm/>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://entitlementsearch.juniper.net/entitlementsearch/>

## Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <https://www.juniper.net/cm/>.

- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, visit us at <https://www.juniper.net/support/requesting-support.html>