TCA8000 and TCA8500 Timing Server

Installation and Configuration Guide

Modified: 2015-08-31

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TCA8000 and TCA8500 Timing Server Installation and Configuration Guide

Revision History
August 2015—Release 3.6.0.

The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at http://www.juniper.net/support/eula.html. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

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Documentation Conventions

Table 1 on page xiii defines the notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

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 post-sales 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 http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf.
- Product warranties—For product warranty information, visit http://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: http://www.juniper.net/customers/support/
- Search for known bugs: http://www2.juniper.net/kb/
- Find product documentation: http://www.juniper.net/techpubs/
- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: http://kb.juniper.net/InfoCenter/
- Join and participate in the Juniper Networks Community Forum: http://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: http://www.juniper.net/cm/

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

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 http://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, see http://www.juniper.net/support/requesting-support.html.

PART 1

TCA8000 and TCA8500 Timing Server Overview

CHAPTER 1

TCA8000 and TCA8500 Timing Server Description

TCA8000 and TCA8500 Timing Server Description

The Juniper Networks TCA8000 and TCA8500 Timing Servers are Stratum 1 traceable, carrier-class, 1588v2 Precision Time Protocol (PTP) Grandmasters, Network Time Protocol (NTP) peers, and Primary Reference Source (PRS) providing superior time stamping accuracy and redundant configurability. The TCA8000 has an internal OCXO reference oscillator while the TCA8500 has a Rubidium reference oscillator. Both systems have either a pre-configured AC or -48 V DC input power source.

This user manual provides installation and operational information for the Timing Servers to allow successful deployment and operation of the servers. The TCA8000 and TCA8500 Timing Servers are integral components of legacy and IP-based networks that are designed to deliver highly accurate and resilient timing and synchronization capabilities to support today's next-generation deployments. The Timing Servers have been designed to accept a GPS signal from a variety of manufacturers' antennas.

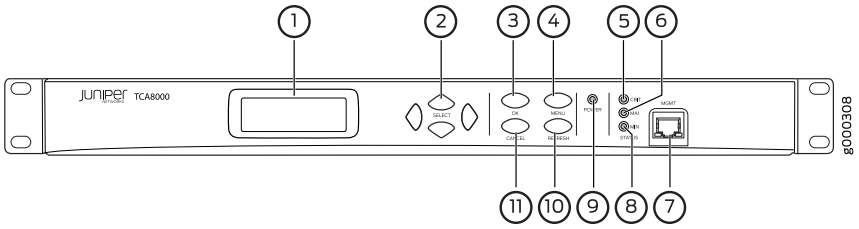
NOTE: **The TCA8000 and TCA8500 Timing Servers ship with both T1 and E1 software images installed in the two internal non-volatile memory partitions. By default, the TCA8000 and TCA8500 Timing Servers use the E1 interface type. This manual refers to E1 configuration, alarms, and status but is also applicable to T1 except for some differences in nomenclature that are specific to each frame type. See "Upgrading the TCA8000 and TCA8500 Software" on page 59 to install the software image for the appropriate interface type for the system.**

TCA8000 and TCA8500 Chassis Overview

The chassis of both TCA8000 and TCA8500 Timing Servers look similar, only their internal function is different.

NOTE: Timing Server with AC power connector or DC power terminals are available.

Figure 1: TCA8000 and TCA8500—AC Timing Server, Front View

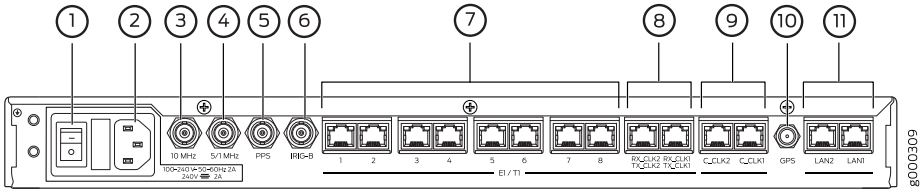


The front panel of the Timing Server with AC power connector contains the following components as shown in the Figure 1 on page 4:

- 1–LCD screen
- 2–Selection buttons
- 3–OK button
- 4–MENU button
- 5–Critical alarm LED
- 6–Major alarm LED
- 7–Craft MGMT port
- 8–Minor alarm LED
- 9–Power LED
- 10–REFRESH button
- 11–CANCEL button

The LCD screen displays the applicable menus and the hostname as “Juniper Networks”. You can change the default IP address of the Timing Server through the craft MGMT port or by using the buttons. The LEDs display the power status and alarm status of the Timing Server.

Figure 2: TCA8000 and TCA8500—AC Timing Server, Rear View

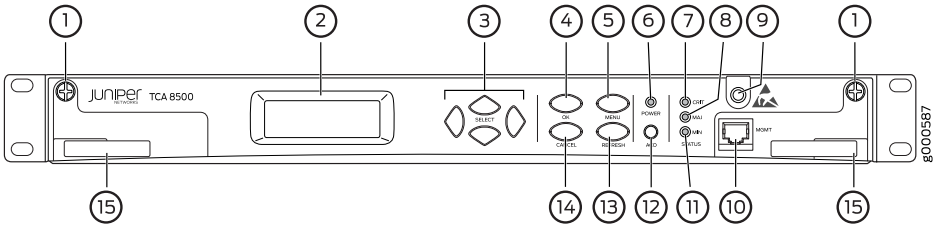


The rear panel of the Timing Server with AC power connector contains the following components as shown in the Figure 2 on page 4:

- 1–Power switch
- 2–AC power connector
- 3–10 MHz timing output port
- 4–5/1 MHz timing output port
- 5–PPS timing output port
- 6–IRIG-B timing output port
- 7–T1/E1 timing output ports (BITS)
- 8–T1/E1 timing input/output ports (BITS)
- 9–CClock timing output ports
- 10–GPS antenna port
- 11–LAN ports

The power switch is used to switch on or switch off the power of the Timing Server. The AC power connector is used to supply power to the Timing Server. Timing output ports are used to deliver 5/1 MHz output signal, 10 MHz output signal, Pulse-per-Second (PPS) output signal, Inter-Range Instrumentation Group – B (IRIG-B) output signal, T1/E1 output signal, and CClock output signal. Timing input/output ports are used to receive input from external T1/E1 sources and provide a timing T1/E1 source outputs. The GPS antenna port is used to connect the Timing Server with an appropriate GPS L1 antenna. Each LAN port is an RJ45 connector with synch and activity LEDs. Both the LAN ports can be used for out-of-band management network connectivity that is Telnet, web interface, and SNMP. The LAN port "LAN1" is used for the PTP or NTP network connectivity to the Timing Clients.

Figure 3: TCA8000 and TCA8500—DC Timing Server, Front View



The front panel of the Timing Server with DC power connectors contains the following components as shown in the Figure 3 on page 5:

- 1–Retainer screws
- 2–LCD screen
- 3–Selection buttons
- 4–OK button
- 5–MENU button
- 6–Power LED

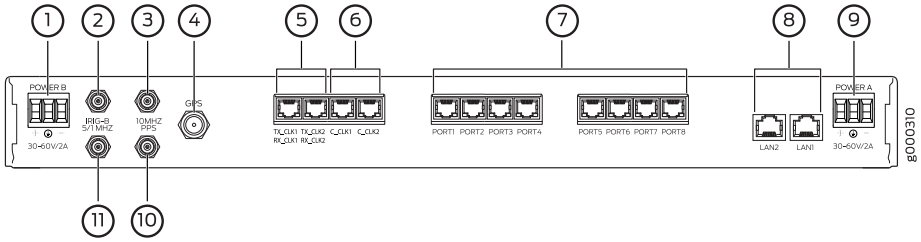
- 7–Critical alarm LED
- 8–Major alarm LED
- 9–ESD grounding point
- 10–Craft MGMT port
- 11–Minor alarm LED
- 12–ACO button
- 13–REFRESH button
- 14–CANCEL button
- 15–Card ejectors

The LCD screen displays the applicable menus and the hostname as “Juniper Networks”. You can change the default IP address of the Timing Server through the craft MGMT port or by using the corresponding buttons. The LEDs display the power status and alarm status of the Timing Server. The retainer screws are used to secure the removable base board inside the chassis and the card ejectors are used to gently remove the base board from the chassis for service. You can clear all alarms set on the device by using the ACO button.

CAUTION: You must loosen the retainer screws before removing the base board from the chassis using the card ejectors for any servicing requirement.

CAUTION: To protect the device and its components from electrostatic damage, wear an antistatic wrist strap and connect it to the ESD grounding point while handling the device.

Figure 4: TCA8000 and TCA8500—DC Timing Server, Rear View



The rear panel of the Timing Server with DC power connectors contains the following components as shown in the Figure 4 on page 6:

- 1–DC power terminal B
- 2–IRIG-B timing output port
- 3–10 MHz timing output port
- 4–GPS antenna port

- 5–T1/E1 timing input/output ports (BITS)
- 6–Cclock timing output ports
- 7–T1/E1 timing output ports (BITS)
- 8–LAN ports
- 9–DC power terminal A
- 10–PPS timing output port
- 11–5/1 MHz timing output port

Both of the DC terminals have positive, negative, and ground terminals used to connect a DC power source to the Timing Server. All other components of the DC version Timing Server performs the same operation as that of the AC version Timing Server.

PART 2

Installing and Setting Up a TCA8000 or TCA8500 Timing Server

CHAPTER 2

Installing and Setting Up a TCA8000 or TCA8500 Timing Server

This chapter describes the procedure to correctly install the Juniper Networks TCA8000 and TCA8500 Timing Server. The following topics are described:

Unpacking the TCA8000 or TCA8500 Timing Server

The Timing Server is shipped with the following items to ensure an optimum installation:

- TCA8000 or TCA8500 Timing Server

Requirements for Installing a TCA8000 or TCA8500 Timing Server

This section describes the requirements to correctly install and use the TCA8000 or TCA8500 Timing Server. Table 2 on page 12 lists the items needed to install the Timing Server.

You must use an appropriate GPS L1 antenna (1575.42 MHz) to receive a minimum GPS signal from the Timing Server. The antenna must allow a minimum signal input level of 20 dB with respect to the antenna output for the Timing Server.

NOTE: To calculate whether the external antenna, cable type, and length meets the minimum TCA GPS antenna input, use the following formula:

TCA GPS signal input = *antenna gain* – [(*cable length*) * (*cable loss* / Meter or Feet)]

Table 2: Antenna Mounting Requirements

Customer Supplied
• GPS L1 antenna with a frequency band of 1575.42 +/-10 MHz 3 dB bandwidth. • Antenna mount • Mounting area clear for at least two meters of any metal or other material that could act as a shield and block the GPS signal • 160 degree clear view of the sky • Clamps, cable ties, and so on, to secure cable

Reserving an IP Address for the TCA8000 or TCA8500 Timing Server

The TCA8000 and TCA8500 Timing Servers support both dynamic and static IP addressing. If a static address is required, an IP address must be reserved and assigned for the Timing Server by a network administrator. The DHCP server will always assign a unique address.

Installing the TCA8000 or TCA8500 Timing Server

Install the Timing Server in a 19-in. or 23-in. rack using the supplied rack mount kit. The AC system is shipped with the appropriate country power cord and should be connected to the input plug on the back of the unit. For the DC system the -48 V DC on the back of unit should be connected to the 48 V DC source.

CAUTION:

For the -48 V DC option:

- Ground cable—Make a ground cable using 8-gauge wire with the supplied ground lug. This should attach to your building's earth ground infrastructure.
- Power— Route power connection using 18-22 gauge wire to a 48-volt circuit breaker panel.

Recommendations for Mounting the Antenna (TCA8000 or TCA8500 Timing Server)

This section describes mounting the antenna for the Timing Server at a location where the unit will receive a GPS signal from several satellites. A site survey is highly recommended prior to any installation activity. This will determine the best method and location for mounting the antenna. A site survey will also provide additional information

including cable lengths and required mounting materials in order to perform a secure and reliable installation.

Optimal GPS Antenna Mounting Conditions

Ideally, the GPS antenna should be mounted where a 160º clear view of the sky (a 10º angle from horizontal) is available to enable a connection to visible GPS satellites. The ideal mounting location is a roof, tower or an antenna mast, high above any obstruction or any device that may cause signal interference. We recommend a location that has the following characteristics:

- Clear view of the sky in all directions—at least 270º
- Away from high-power transmitters and radar antennas
- At least 3 meters away and at least 1 meter below the highest point of a lightning rod
- Convenient path for running the outdoor coax cable from the GPS antenna to the network

Minimal TCA8000 or TCA8500 Timing Server Installation Conditions

The TCA8000 or TCA8500 Timing Server can still maintain accurate time when an antenna is mounted in a location that has limited visibility of GPS satellites; however, it is recommended any obstructions should be minimized. Limitations to satellite visibility for an antenna include overhanging foliage or tall structures. Such structures can block the GPS signal from the antenna and cause gaps in the GPS satellite signal reception. In locations where satellite visibility is limited, it is suggested the following be considered:

- Position the antenna for the Timing Server on the side of the structure with good visibility toward the equator where more satellites are visible. For example, if you are in the northern hemisphere, place the unit on the southern side of the structure unless that view is restricted or blocked. If that view is restricted or blocked, place the unit on the east or west side of the structure. Avoid the polar side where there are fewer visible satellites.
- Ensure that the GMT time zone parameter is set while you configure the Timing Server.

Mounting the Antenna

Follow the manufacturer's guidelines for the installation of the GPS antenna.

Route the coax cable from the newly installed antenna into the building following the manufacturer's antenna safety guidelines.

Route the coax from the building's ingress to the server's installation site, and connect to the GPS server.

WARNING:

- Locate the TCA8000 or TCA8500 Timing Server away from power lines, electric lights, and power circuits.
- When installing the Timing Server, do not touch power lines, or other sources of live power.
- Have a qualified technician and or certified electrician perform the installation.
- Observe all local and regulatory standards and ordinances.
- Grounding the unit (metal mast or ground cable to the unit's base) is required for the lightning protection to work properly.

Changing the Password of Admin User Account

Juniper Networks assigns a default user account (admin/admin) with login class as Admin to a TCA8000 or TCA8500 Timing Server for logging in to the Timing Server. You can create and manage Read-Only or Read/Write user accounts in the TCA8000 or TCA8500 Timing Server by logging in as **admin**. For more information about TCA user account management, see "Managing TCA User Accounts" on page 42 and "TCA User Accounts Overview" on page 21.

BEST PRACTICE: Before installing the Timing Server on an active network, change the default password (admin) of the Admin user to maintain secure access to the Timing Server.

NOTE: You can reset passwords of the Admin user and the enable mode to factory defaults through the CLI, GUI, or hardware mechanism. For more information about resetting of passwords, see "Changing/Resetting the Login Password for Admin User" on page 25 and "Resetting the Passwords of Both Admin User Account and Enable Mode to Factory Defaults" on page 150.

To change the password of the Admin user, one of the following methods may be used:

- Configuration through the craft MGMT port on the front panel:
  1. Login as **admin**.
     a. >**admin**<cr>
     b. >password: **admin**<cr>
  2. Enable privileged commands.
     a. >**enable**<cr>

b. >password: **enable**<cr>

3. Execute the following command to change the Admin user password:

   # config password
   Please input old password: **admin**<cr>
   Please input new password: **admin123**<cr>
   Please re-type new password: **admin123**<cr>

- Configuration from the management interface through the Ethernet port on the back panel:

1. Connect a standard Ethernet cable between the Timing Client, LAN1/LAN2, and the network port of the PC.
2. Launch an Internet browser on your PC.
3. In the **URL** field, type the following default IP address:

   LAN1–**http://192.168.0.200**
   LAN2–**http://192.168.1.200**

   The Timing Server login page appears.
4. In the **Login** field, enter the following:

   admin (Case sensitive—use all “lower” case)
5. In the **password** field, enter the following:

   admin (Case sensitive—use all “lower” case)
6. Click the **Login** button.
7. Click the **Admin** tab and locate the **Password** tab across the top tabs of the Admin page.
8. In the **Hostname** field, enter the name assigned to the Timing Server.
9. In the **Old Password** field, enter the current password of the Admin user.
10. In the **New Password** field, enter the new password to replace the old password.
11. In the **Retype New Password** field, reenter the new password.
12. Click the **Apply** button to save hostname and password changes to the memory.

NOTE: **All the examples in this guide use the default password (admin) for the Admin user.**

Assigning an IP Address to the TCA8000 or TCA8500 Timing Server

Juniper Networks assigns a default IP address to a TCA8000 or TCA8500 Timing Server to allow access to the user interface. The default IP address must be changed before installing the Timing Server on an active network. To change the IP address, one of the following methods may be used:

- Manual entry from the keypad on the front panel.
- Configuration through the craft MGMT port on the front panel.
- Configuration from the management interface through the Ethernet port.

  To change the IP address through the Ethernet port:

  1. Connect the standard Ethernet cable between the Timing Server, LAN 1/LAN 2 ports and the network port of the PC.
  2. Apply power to the Timing Server.
  3. Launch an Internet browser on your PC.
  4. In the **URL** field, type the following default IP address:

     LAN1—http://192.168.0.200

     LAN2—http://192.168.1.200

     The Timing Server login page appears.
  5. In the **Login** field, enter the following:

     admin (Case sensitive–use all “lower” case)
  6. In the **password** field, enter the following:

     admin (Case sensitive–use all “lower” case)
  7. Click the **Login** button.
  8. Click the **Config** tab if it not already displayed (default).
  9. Select the **LAN1** option button.
  10. Locate Mode in the Network section, and select the **Static** or **DHCP** button that will be used to assign the Timing Server an IP address, and perform one of the following:
      a. Select the **Static** button and enter the following information in the fields above the Mode selection:
         - In the **IP Address** field, enter the IP address to be assigned to the Timing Server.
         - In the **Mask** field, enter the subnet mask to be assigned to the Timing Server.
         - In the **Gateway** field, enter the IP address of the gateway to be assigned to the Timing Server.

- In the **Primary DNS** field, enter the IP address of the primary DNS to be assigned to the Timing Server.

  NOTE: **Leave blank, if not required.**

- In the **Secondary DNS** field, enter the IP address of the secondary DNS to be assigned to the Timing Server.

  NOTE: **Leave blank, if not required.**

  Apply, save.

b. If the **DHCP** button is selected, the DHCP server will automatically provide the Timing Server with IP address information.

   Apply, save.

   Connect to the network.

c. Contact a network administrator to enable appropriate settings for the following:

   - Speed (100 Mbps, recommended)
   - Duplex (Full-duplex, recommended)
   - Auto negotiation (Disabled, recommended)

Visually Testing the TCA8000 or TCA8500 Timing Server With GPS

1. Connect the Timing Server and computer to the local network segment and launch the web browser.
2. Open the Timing Server webpage by using the new IP address (from above), enter login/password.
3. Click the **Status** button and observe the System page. The following information should be present:
   - Model
   - Board S/N
   - System S/N
   - Software version
   - Hardware version
   - FPGA version
   - Temperature
   - MAC addresses for LAN 1 and LAN 2 ports
4. Click the GPS page, and observe the following information:

- Receiver status = Good
- Antenna status = Good
- Satellite status = Acquired

Verifying the Product T1/E1 Interface Support

The TCA8000 or TCA8500 Timing Server ship with both T1 and E1 software images installed in the two internal non-volatile memory partitions. By default, the TCA8000 or TCA8500 Timing Server use the E1 interface type. To select the T1 interface type, see "Upgrading the TCA8000 and TCA8500 Software" on page 59.

PART 3

Configuring and Upgrading the TCA8000 or TCA8500 Timing Server

CHAPTER 3

Configuring a TCA8000 or TCA8500 Timing Server

This chapter describes the procedure to configure the Juniper Networks TCA8000 and TCA8500 Timing Servers. The following topics are described in this chapter:

TCA User Accounts Overview

Juniper Networks assigns a default user account (admin/admin) with login class as Admin to a TCA8000 or TCA8500 Timing Server for logging in to the Timing Server. The user logging in to the Timing Server using the Admin user account can configure the Timing Server and create, delete or modify user accounts with login class as Read-Only or Read/Write.

The TCA software supports three predefined login classes to define the access privileges for the user accounts in your Timing Server. Table 3 on page 22 defines the login classes predefined in the TCA software.

Table 3: Login Classes for TCA User Accounts

Login Class	Access Privilege	Description
Admin	Create, Delete, or Modify	User can: • Configure all Timing Server features or parameters through CLI or WEB. • View all Timing Server configuration or log details through CLI or WEB.
Read/Write	Modify	User can: • Configure Timing Server features or parameters through CLI or WEB except Admin user functionalities such as creation, deletion, and modifying of user accounts. • View Timing Server configuration or log details through CLI or WEB except some of the Admin user functionalities such as viewing command history of other user accounts.
Read-Only	Show view	User can: • View Timing Server configuration or log details through CLI or WEB except some of the Admin user functionalities such as viewing command history of other user accounts.

The TCA software creates a separate log file for each user account to store the commands executed by the corresponding user. The software stores the session ID and timestamp in the log file to identify the various sessions for that particular user. The software deletes the log file created for the user account, when the Admin user deletes any Read-Only or Read/Write user account.

NOTE: **The software can store only a maximum of 150 commands in a log file.**

Guidelines for User Account Management

Keep in mind the following considerations when you (Admin) configure user accounts:

- The software supports only five user accounts.
- You cannot delete the default Admin user account assigned by Juniper Networks.
- You cannot create another Admin user account.
- The username should be 4 to 12 characters long. The characters can only include alphanumeric and underscore. No other special characters are allowed.
- The username should be unique.
- The password should be 4 to 12 characters long. The characters can include alphanumeric and special characters (that is, !@#$_).

Dynamic SSL Certificate Overview

The TCA 8000 or 8500 Timing Server enables you to access the GUI through Hypertext Transfer Protocol (HTTP) or Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS) based on the web mode configured by the Admin user. The Admin user can configure the Timing Server to use the customized key and certificate instead of the default key and certificate, when the GUI is accessed through HTTPS. By default, the Timing Server uses the default key and certificate when the GUI is accessed through HTTPS.

The Admin user can download the customized key and certificate files of **.pem** format in the Timing Server through CLI or GUI. The downloaded key file is stored as an **ssl_key.pem** file in the **etc/config** path. The downloaded certificate file is stored as an **ssl_cert.pem** file in the **etc/config** path. The Admin user can generate the customized files by using OpenSSL or FIPS 140-2 capable OpenSSL as trusted certification authority. For complete information and source of OpenSSL utility, see http://www.openssl.org/.

When you access the GUI through HTTPS, the Timing Server checks for the **ssl_key.pem** and **ssl_cert.pem** files in the **etc/config** path. If any one of the files is not available, the Timing Server uses the default key and certificate. If the files are available, the Timing Server checks the BEGIN header and the END footer in both the files. If the header and footer are valid in both the files, the Timing Server compares the key file with the certificate file. On successful match, the Timing Server loads the GUI and generates a syslog.

The Timing Server does not load the GUI but generates a syslog during the following scenarios:

- Mismatch identified between the key and certificate files.
- Invalid header or footer identified in one of the files.
- Validity of any file got expired.

The Admin user must keep the following conditions in mind when downloading the customized files:

- After downloading both the files, you must reboot the Timing Server for the changes to take effect.
- The Timing Server uses the default key and certificate if both or any one of the customized files is unavailable.
- You cannot modify the downloaded files but you can replace them with another ones.
- You should use only Secure Hash Algorithm (SHA-1) and RSA (1024 bits) cryptographic algorithms while generating the customized key and certificate files.

Accessing the User Interface

You can configure the TCA8000 or TCA8500 Timing Server using one of the following methods:

- Graphical user interface (GUI)
- Telnet
- Secured shell (SSH)

This chapter describes how to access the GUI. Accessing the Timing Server using Telnet and SSH is described in
"Using Telnet with the TCA8000 and TCA8500 Timing Servers" on page 149.

Requirements for Using the Graphical User Interface

To use the TCA8000 or TCA8500 GUI, log in to the embedded Web server with an Internet browser. The following browsers and versions are supported:

- Internet Explorer version 6.x or later
- Firefox version 1.5.0.7 or later (Firefox 3.0 is currently not supported)

Accessing the Graphical User Interface

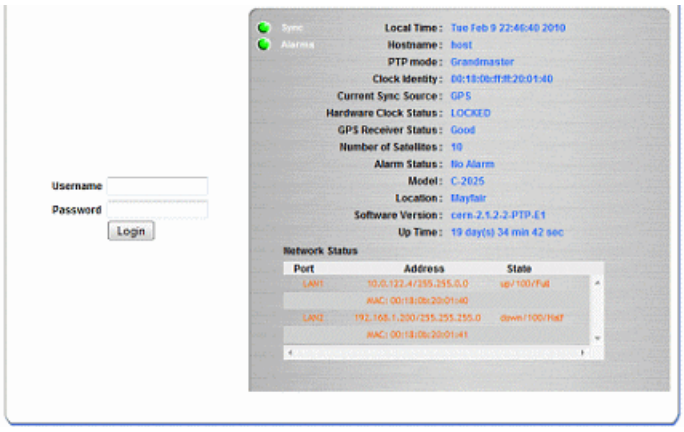
To access the GUI:

1. Open an Internet browser.
2. In the **address** or **URL** field enter the IP address assigned to the Timing Server to be accessed, using the following command:

   http://*ip_address*

   The Login page appears. See Figure 5 on page 24.

Figure 5: TCA8000 or TCA8500 Timing Server Login Page



3. In the **Username** field enter the username that you want to use to log in to the server.

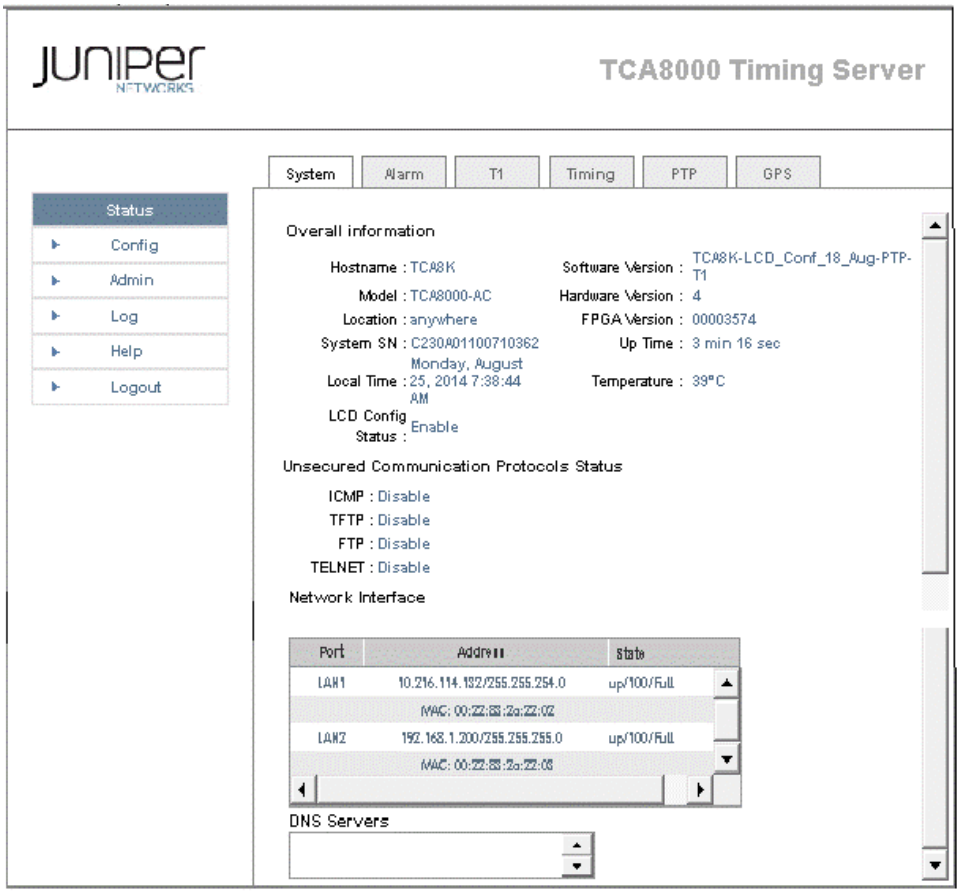
NOTE: The default username assigned by the Juniper Networks is admin. You cannot change the default username. You can create new user accounts from the config page by logging in as Admin user.

4. In the **Password** field enter the password required to log in to the server.

NOTE: The default password assigned by the Juniper Networks is admin. You can change the log in password of the Admin user from the Admin page.

5. Click the **Login** button. The Status page appears. See Figure 6 on page 25.

Figure 6: Timing Server Status Page—System Pane



The Timing Server GUI will automatically time out after 5 minutes of inactivity. The login and password will have to be reentered to gain access to the unit.

Changing/Resetting the Login Password for Admin User

We recommend that the TCA8000 or TCA8500 Timing Server login password of the Admin user be changed from the manufacturer set default to maintain secure access to the server.

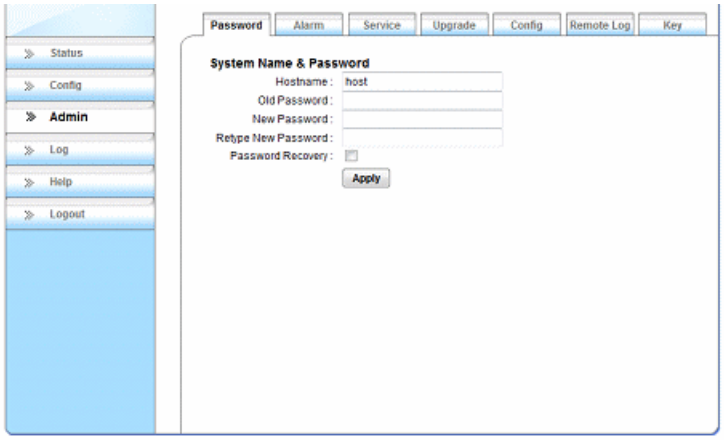
To change the login password of the Admin user:

1. Click the **Admin** tab.

   The Admin page—Password pane appears. See Figure 7 on page 26.

NOTE: The Admin tab is visible only to the Admin user.

Figure 7: Timing Server Admin Page—Password Pane



2. In the **Hostname** field of the System Name & Password section, enter the hostname to be assigned to the Timing Server.
3. In the **Old Password** field, enter the current admin password.
4. In the **New Password** field, enter the password that you want to use.

NOTE: Passwords are case sensitive and accept alphanumeric characters. Passwords must contain a minimum of four characters.

5. In the **Retype New Password** field, enter the password that you want to use.
6. Click the **Apply** button.

To reset passwords of the Admin user and the enable mode to factory defaults:

1. Click the **Admin** tab.

   The Admin page—Password pane appears. See Figure 7 on page 26.

NOTE: The Admin tab is visible only to the Admin user.

2. Select the **Password Recovery** check box.
3. Click the **Apply** button to reset passwords of the Admin user and the enable mode to factory defaults.

NOTE: If you have forgotten the password of the Admin user, you can reset the password to factory default through hardware mechanism. For more information about resetting the password through hardware mechanism, see "Resetting the Passwords of Both Admin User Account and Enable Mode to Factory Defaults" on page 150.

Changing the IP Address

The TCA8000 and TCA8500 Timing Servers are configured to use the manufacturer's default static IP addresses assigned to the Ethernet ports. Use the user interface to manually change the IP addresses of the Ethernet ports and configure or change VLAN settings for the Ethernet ports.

NOTE: You cannot configure Ethernet and VLAN port addresses to be in the same subnet (that is, all logical and physical interfaces should be configured to be in different subnets).

To change the address information for Ethernet ports:

1. Click the **Config** tab. The Config page appears. See Figure 8 on page 29.
2. In the **Mode** field, click the **Static** button to activate the address fields.
3. In the **IP Address** field, enter the IP address that you want the Timing Server to use.

   NOTE: After you save the IP address change, you must launch the Timing Server user interface using the new IP address to view and configure the current settings.

4. In the **Mask** field, enter the subnet mask that you want the Timing Server to use.
5. In the **Gateway** field, enter the IP address of the gateway with which you want the Timing Server to register.
6. In the **Primary DNS** field, enter the IP address of the Primary DNS with which you want to register the Timing Server.
7. In the **Secondary DNS** field, enter the IP address of the Secondary DNS with which you want to register the Timing Server.
8. To determine whether an IP address is currently assigned, enter the IP address in the **Ping** field and click **Go**. If the ping goes through, then the IP address is already taken. Otherwise, it is not assigned, and can be used by the Timing Server.
9. Click the **Apply** button to save and implement the changes.

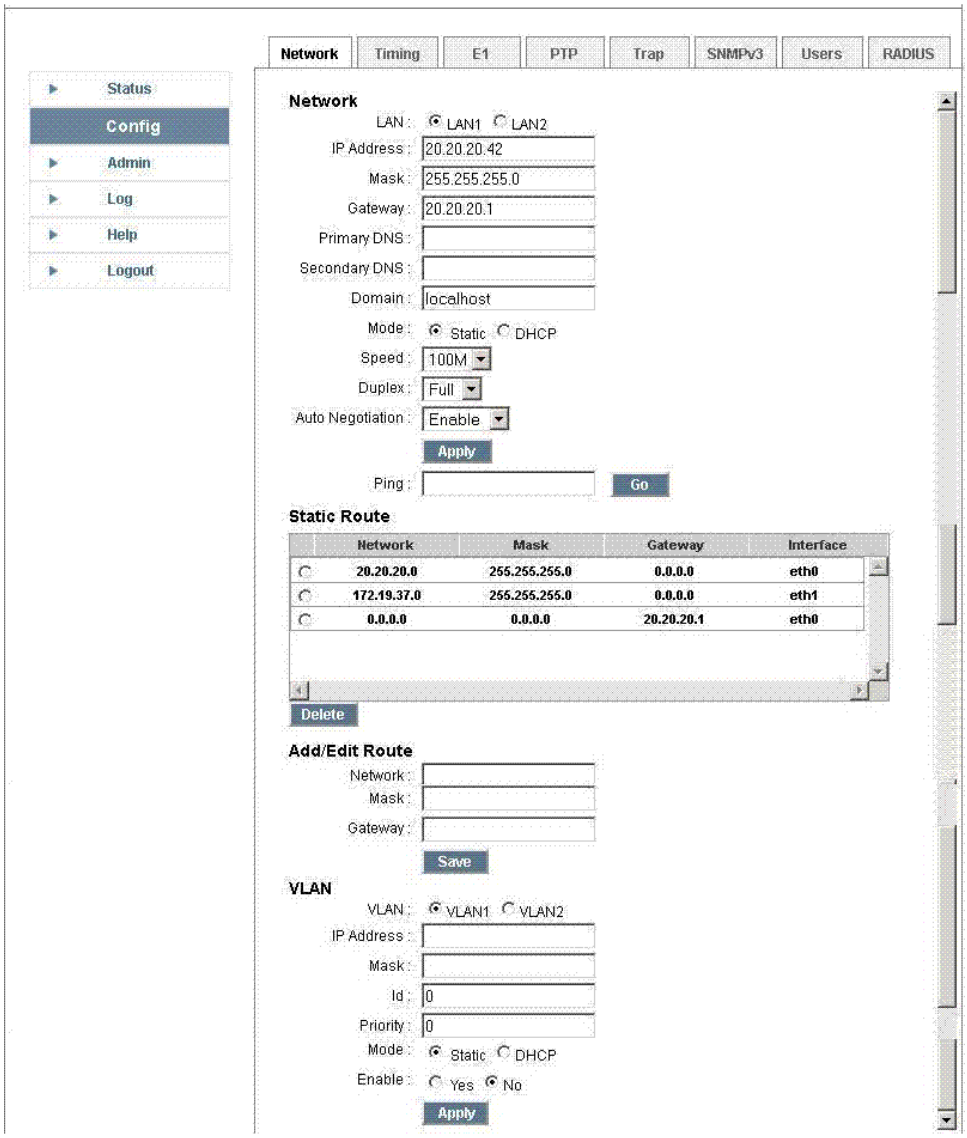
To configure or change VLAN settings for the Ethernet ports:

1. Click the **Config** tab. The Config page appears. See Figure 8 on page 29.
2. In the **LAN** field, select a LAN (LAN1 or LAN2) for which VLAN settings to be configured.
3. In the **Mode** field, select the **Static** option button to activate the VLAN address fields.
4. In the **VLAN** field, select a VLAN (VLAN1 or VLAN2) for which settings should be configured.
5. In the **IP Address** field, enter the IP address for the selected VLAN.
6. In the **Mask** field, enter the subnet mask assigned to the selected VLAN.
7. In the **Id** field, enter a unique identifier in the range 2 through 4095 that is used to identify the VLAN encapsulation packet.

   NOTE: If the ID you have entered is already being used by any other VLAN, a warning message is displayed.

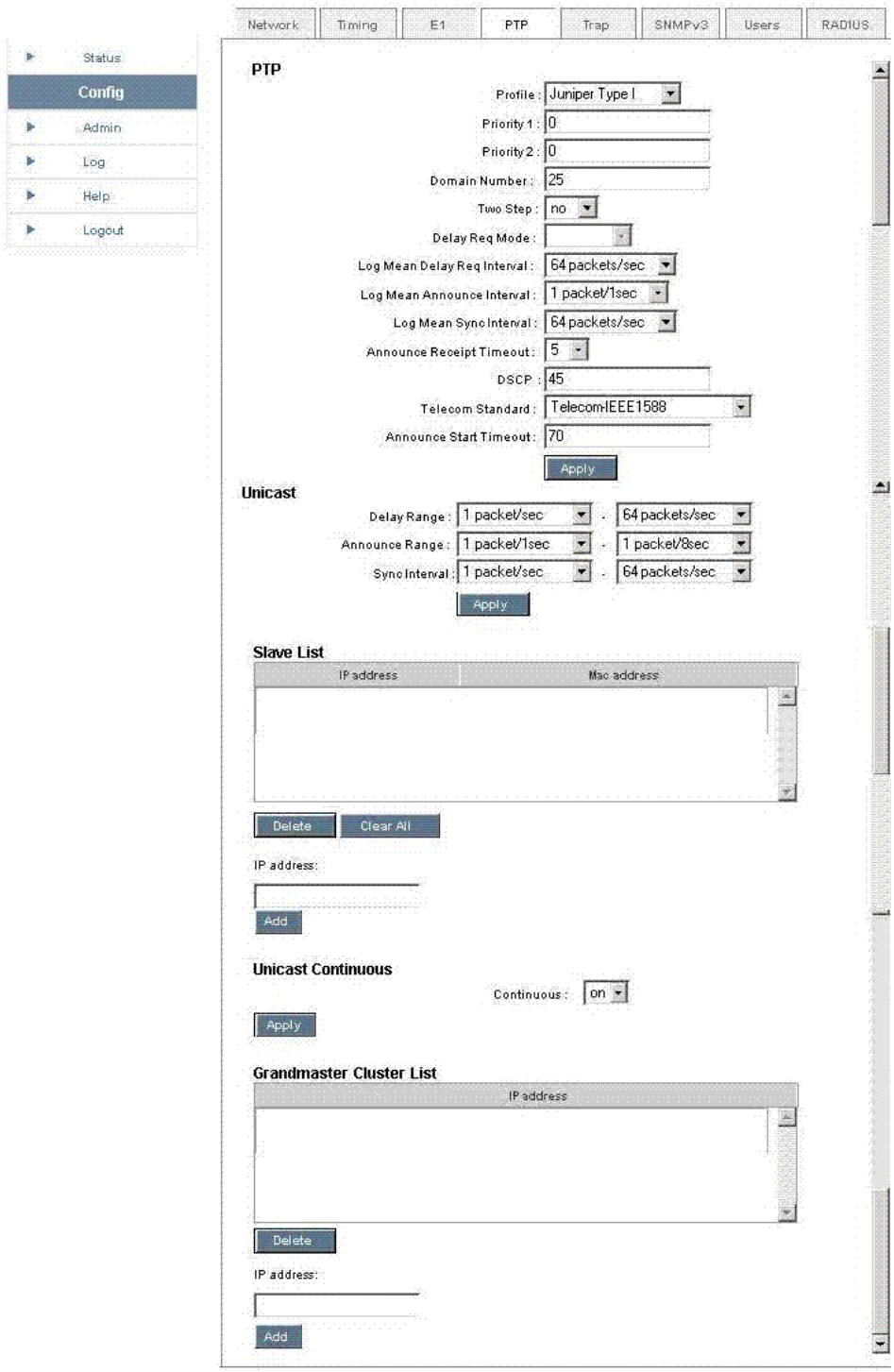
8. In the **Priority** field, enter a priority value for the VLAN header to be used for differential services transporting the packet.
9. In the **Enable** field, select the **Yes** option button to enable VLAN encapsulation for IP packets, or select the **No** option button to disable VLAN encapsulation for IP packets.
10. Click **Apply** to save and implement the changes.

Figure 8: Timing Server Config Page—Network Pane



Setting Precision Time Protocol (PTP) Parameters

Figure 9: Timing Server Config Page—PTP Pane



NOTE: You can view this pane only if the PTP support is enabled in the Timing Server.

The PTP pane on the Configuration page allows you to set parameters to be part of a distributed synchronous network using Precision Time Protocol (PTP). To configure the TCA8000 or TCA8500 Timing Server to provide time synchronization:

1. Click the **Config** tab. The Config page appears.
2. Locate the **PTP** tab across the top of the Config page. See Figure 9 on page 30.
3. In the **Profile** field, select "Default" profile to use multicast PTP messages only, or "Juniper Type 1" profile to use multicast PTP messages for Announce and Sync, and unicast messages for Delay Request and Delay Response.
4. In the **Priority 1** and **Priority 2** fields, enter a value within the range of 0 through 254 to configure the priorities of each master for proper Best Master Clock (BMC) algorithm operation.
5. The **Domain Number** field specifies the domain number which the TCA8000 or TCA8500 Timing Server has been assigned to. Enter a value within the range of 0 through 254 to configure the PTP domain for the Timing Server, which then becomes a synchronization reference source to all the slave clocks within the same domain using the PTP protocol.
6. In the **Two Step** field, select "no" to enable One-Step clock, or select "yes" to enable Two-Step clock.
7. In the **Log Mean Delay Req Interval** field, select a minimum mean time interval at which you want the Timing Server to respond to successive Delay Request packets from a slave clock. The default value is 8 pps.
8. In the **Log Mean Announce Interval** field, select a mean time interval between successive Announce messages. The default value is 1 pps.
9. In the **Log Mean Sync Interval** field, select a mean time interval between successive Sync messages. The default value is 32 pps.
10. Announce Receipt Timeout. The default value is 3.
11. In the **DSCP** field, enter the Differential Service (DiffServ) value for the IP packet.
12. In the **Telecom Standard** field, select a telecom standard to be implemented with the telecom profile for advertising the announce message. The default value is Telecom-IEEE1588.
13. In the **Announce Start Timeout** field, enter a value within the range of 0 through 120 minutes. On rebooting, the TCA Timing Server delays the transmission of announce messages either until any configured synchronization source is locked to the frequency within the configured timeout value or until the expiry of the configured timeout value.
14. Click the **Apply** button to save the PTP parameter changes.

To configure the unicast related parameters:

1. From the Delay Range lists, select the range (minimum and maximum) of delay request or response event message rate from the options: **1 packet/sec**, **2 packet/sec**, **4 packet/sec**, **8 packet/sec**, **16 packet/sec**, **32 packet/sec**, and **64 packet/sec**.
2. From the Announce Range lists, select the range (minimum and maximum) of announce interval message rate from the options: **1 packet/1 sec**, **1packet/2 sec**, **1 packet/4 sec**, and **1 packet/8 sec**.
3. From the Sync Interval lists, select the range (minimum and maximum) of sync event message rate from the options: **1 packet/sec**, **2 packet/sec**, **4 packet/sec**, **8 packet/sec**, **16 packet/sec**, **32 packet/sec**, and **64 packet/sec**.
4. Click the **Apply** button to save the unicast parameter changes.

To add the Timing Clients (Slaves) for the Timing Server:

1. In the **IP Address** field, enter the IP address of the Timing Client (Slave) through which the Grandmaster sends or receives event messages.
2. Click the **Add** button to add the Timing Client entry in the **Slave List** window.

To delete the Timing Client entry:

1. Select the Timing Client entry that you want to delete from the **Slave List** window.
2. Click the **Delete** button to delete the entry or click the **Clear All** button to delete all the entries from the **Slave List** window.

Setting NTP Parameters

The TCA8000 and TCA8500 Timing Servers support using the NTP to synchronize time. You can define the NTP association details and the MD5 key list to configure NTP.

Enabling the NTP Support

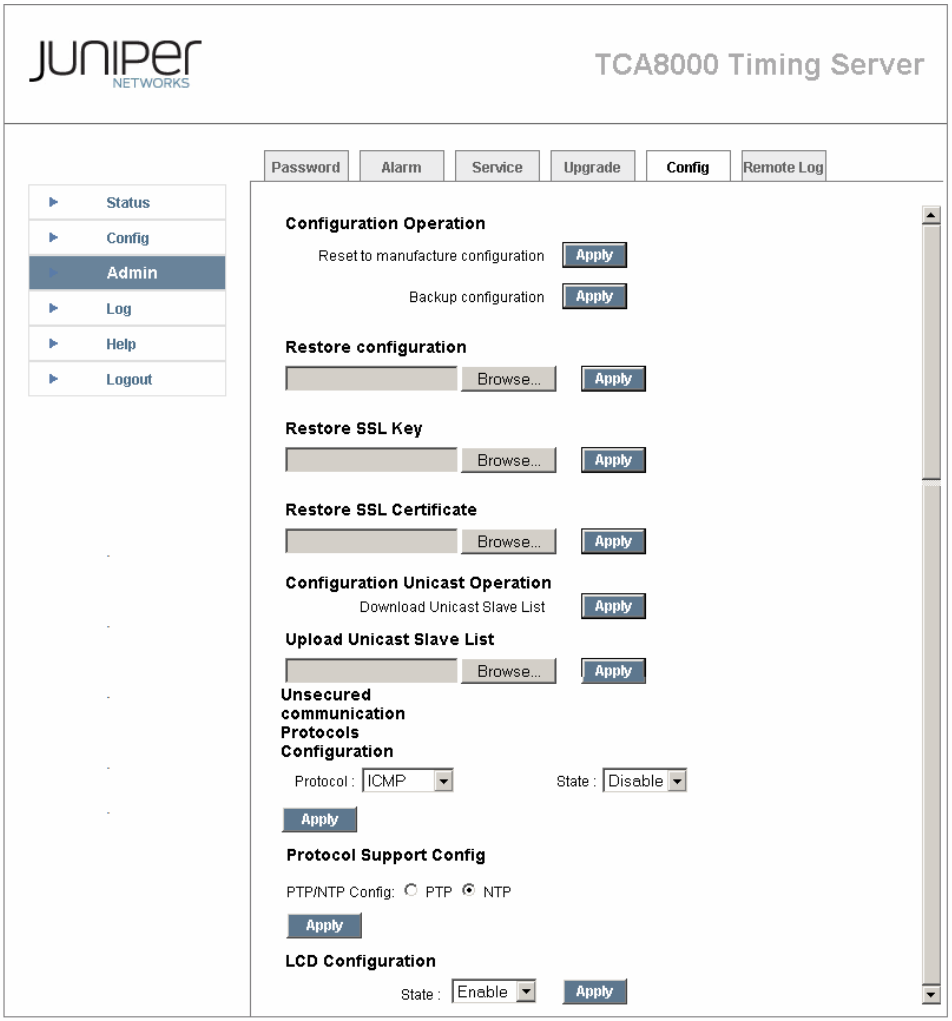
The Config pane on the Admin page enables you to configure the protocol (NTP or PTP) to be used for time synchronization. By default, the PTP support is enabled in the Timing Server.

To enable the NTP support in the Timing Server:

1. Log in to the Timing Server as Admin user.
2. Click the **Admin** tab.

3. Locate the **Config** tab across the top tabs of the **Admin** page. See Figure 10 on page 33.

Figure 10: Timing Server Admin Page—Config Pane



4. In the **PTP/NTP Config** field, select the **NTP** option button.
5. Click the **Apply** button.

   A dialog box stating “System reboot is required to make changes effective. Do you want to reboot?” is displayed.
6. Click **Yes** to reboot the Timing Server with the NTP support.

NOTE:

- If you reject the rebooting of the Timing Server, the protocol change is not saved and the Timing Server continues to use the PTP.
- After rebooting, you cannot use the PTP commands and panes for configuring PTP functionalities. To configure PTP functionalities by using the PTP panes and CLI commands, you must enable the PTP support and reboot the Timing Server.

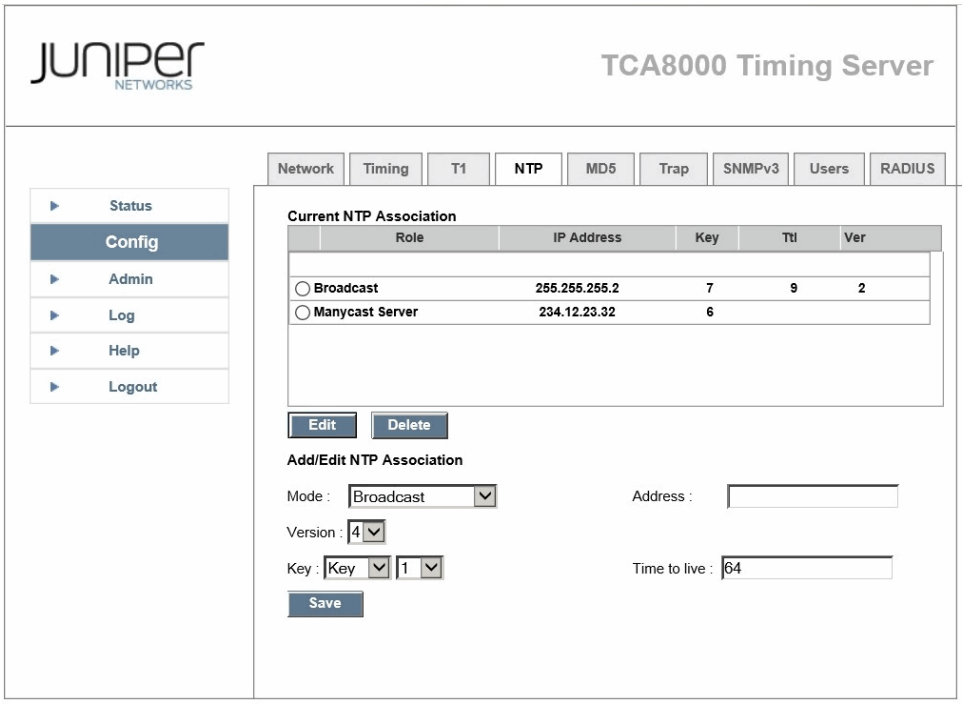
Creating an NTP Association Entry

To create a new NTP association entry:

NOTE: You can add only a maximum of 20 NTP association entries. Each NTP association entry should have a unique IPv4 address configured.

1. Log in to the Timing Server as Admin or Read/Write user.
2. Click the **Config** tab.
3. Locate the **NTP** tab across the top tabs of the **Config** page. See Figure 11 on page 34.

Figure 11: Timing Server Config Page—NTP Pane



NOTE: You can view this pane only if the NTP support is enabled in the Timing Server.

4. From the **Mode** list, select the NTP operation mode for the association entry.
5. In the **Address** field, enter the IPv4 address for the association entry. The IPv4 address depends on the value selected from the **Mode** list.

Mode	Valid IPv4 Address
Broadcast	Class D or broadcast address of a local interface.
Manycast Server	Class D

6. From the **Version** list, select the version to be used for the outgoing NTP packets. This list appears dimmed if you have selected the **Manycast Server** mode.
7. From the **Key** list, select the key identifier used for encryption.
8. In the **Time to live** field, enter the number of hops for the NTP packets. This field appears dimmed if you have selected the **Manycast Server** mode.
9. Click the **Save** button to create a new NTP association entry.

Modifying an Existing NTP Association Entry

To modify an existing NTP association entry:

1. Log in to the Timing Server as Admin or Read/Write user.
2. Click the **Config** tab.
3. Locate the **NTP** tab across the top tabs of the **Config** page. See Figure 11 on page 34.
4. In the **Current NTP Association** window, select the association entry to be modified.
5. Click the **Edit** button to populate details of the selected association entry in the fields in the **Add/Edit NTP Association** section.
6. Modify the applicable parameters for the selected association entry.
7. Click the **Save** button to save the changes.

Deleting an Existing NTP Association Entry

To delete an existing NTP association entry:

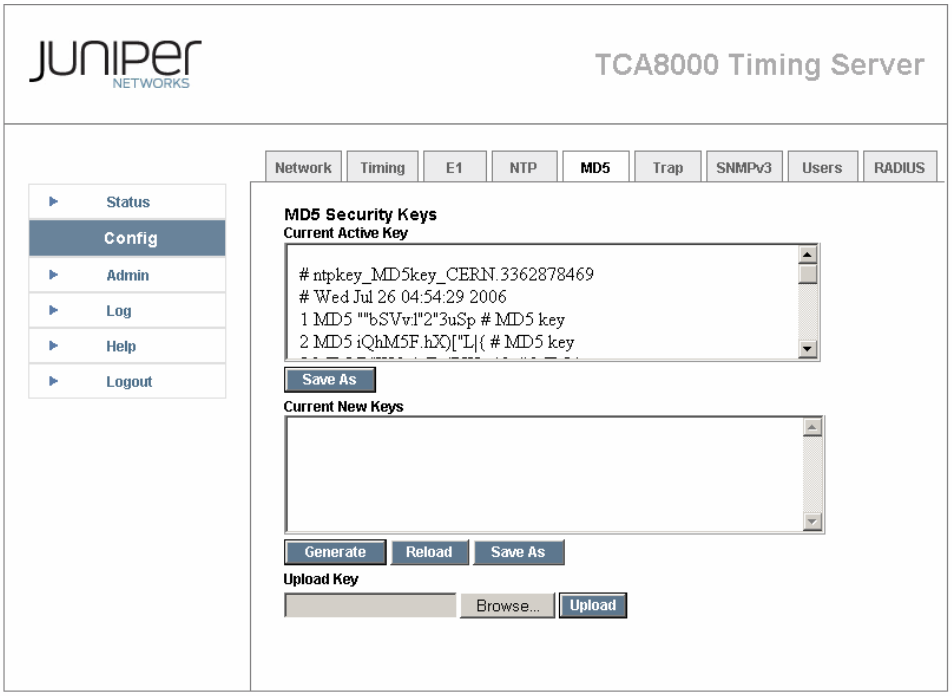
1. Log in to the Timing Server as Admin or Read/Write user.
2. Click the **Config** tab.
3. Locate the **NTP** tab across the top tabs of the **Config** page. See Figure 11 on page 34.
4. In the **Current NTP Association** window, select the association entry to be deleted.
5. Click the **Delete** button to delete the selected association entry.

Configuring the MD5 Key List

To configure the MD5 key list:

1. Log in to the Timing Server as Admin or Read/Write user.
2. Click the **Config** tab.
3. Locate the **MD5** tab across the top tabs of the **Config** page. See Figure 12 on page 36.

Figure 12: Timing Server Config Page—MD5 Pane



NOTE: You can view this pane only if the NTP support is enabled in the Timing Server.

4. Configure the MD key list:
   a. Click the **Generate** button to generate MD5 key list by using the system command **ntp-keygen**.

      or

   b. Click the **Browse** button to locate a file containing new MD5 keys and click the **Upload** button to upload the new keys.

Configuring Alarms

You can specify how you want the TCA8000 or TCA8500 Timing Server to handle alarms that occur during operation. To configure the alarms:

1. Click the **Admin** tab. The Admin page appears.
2. Click the **Alarm Profile** tab. See Figure 13 on page 38 and Figure 14 on page 39.

3. For each alarm, the following parameters can be configured:
   a. Select the **Clear Now** check box to clear the alarm right away.
   b. Select the **Auto Clear** check box to clear the alarm after it happens for 24 hours.
   c. In the **Severity** field, select the flag to accompany this alarm. Select:
      - Critical—Indicates this alarm needs immediate attention, and is affecting the normal operation of the Timing Server.
      - Major—Indicates this alarm needs immediate attention.
      - Minor—Indicates this alarm needs attention but is not urgent.
      - None—Indicates this alarm is for information only.
   d. Select the **Send Trap** check box. The Timing Server will send the alarm to the Trap destinations identified on the Config page.
   e. Select the **Write Log** check box. The Timing Server will send the alarm to the local log file.
   f. Select the **Send to Email** check box. The Timing Server will send an e-mail message about this alarm to the users identified in the **Alarm E-mail Recipients** section of the **Alarm** tab.

Figure 13: Timing Server Admin Page—Alarm Pane (PTP)

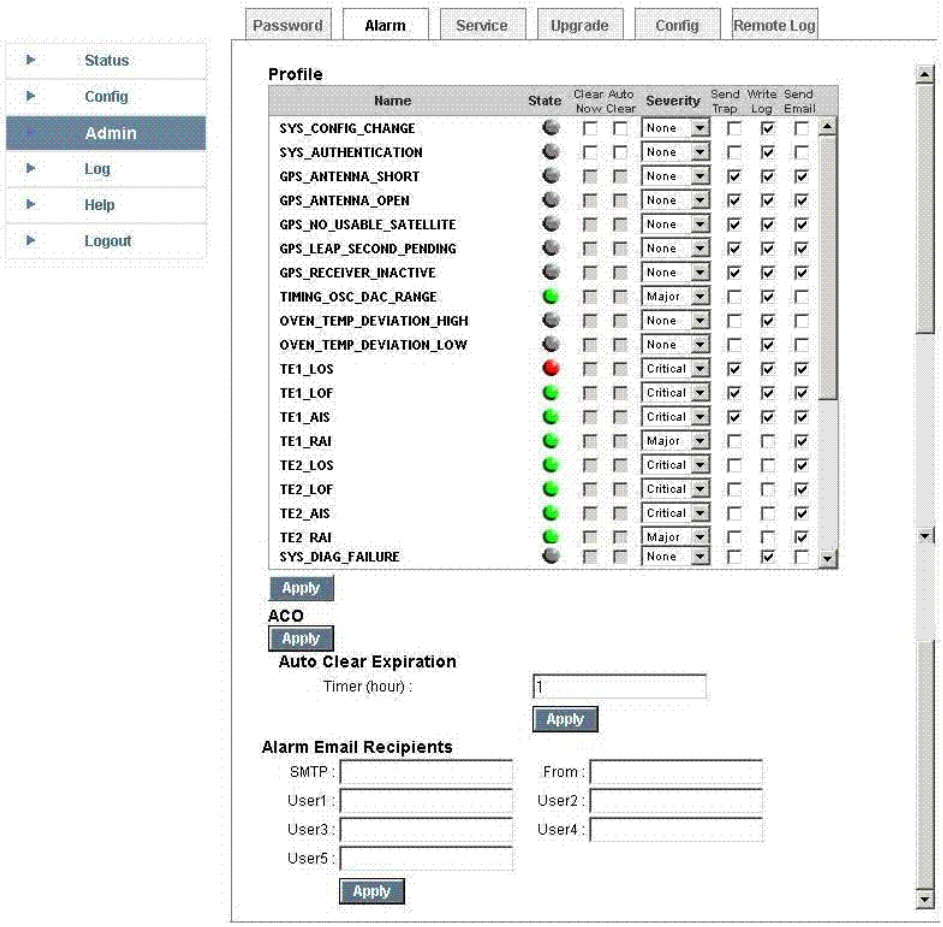
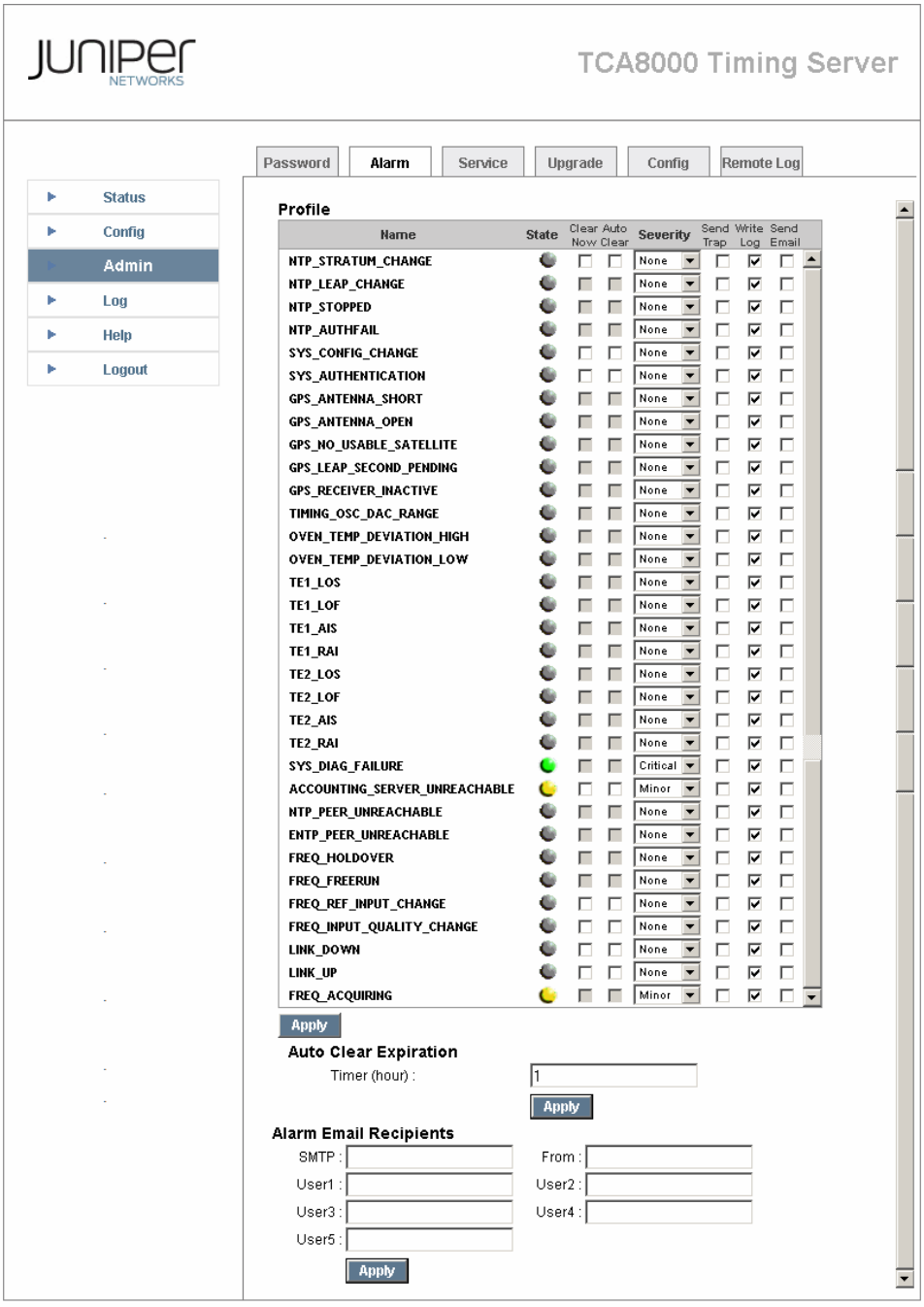


Figure 14: Timing Server Admin Page—Alarm Pane (NTP)



Configuring Traps

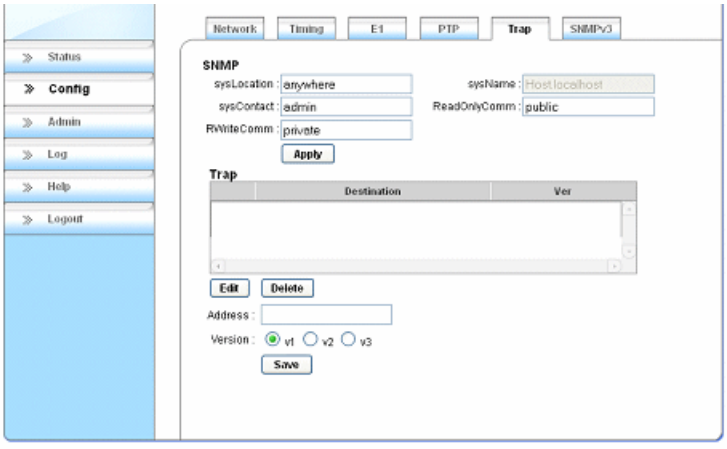
The TCA8000 and TCA8500 Timing Servers can be configured to send event information to trap destinations on a network.

Specifying SNMPv3 Contacts

You can configure the TCA8000 or TCA8500 Timing Server to send alarm information to SNMP community files. To configure the Timing Server to send information to community files:

1. Click the **Config** tab. The Config page appears.
2. Locate the **Trap** tab at the top right of the page. See Figure 15 on page 40.
3. In the **sysLocation** field, enter the location of the Timing Server.
4. In the **sysName** field, enter the name used to identify the Timing Server.
5. In the **sysContact** field, enter the X-address of the manager that you want the Timing Server to use.
6. In the **ReadOnlyComm** field, enter the string that you want the Timing Server to use to access the local SNMP read community.
7. In the **RWriteComm** field, enter the string that you want the Timing Server to use to access the local SNMP write community.
8. Click **Apply** to save changes.

Figure 15: Timing Server Config Page—Trap Pane



Creating Trap Targets

To create a Trap destination (see Figure 15 on page 40):

1. Click the **Config** tab.
2. Locate the **Trap** tab across the top of the **Config** page.
3. In the **Address** field, enter the IP address or domain name to which you want the Timing Server event information sent.
4. In the **Version** area, select the option button for the version of SNMP that this trap supports.
5. Click the **Save** button to save your changes.

Deleting Trap Targets

To delete a Trap destination:

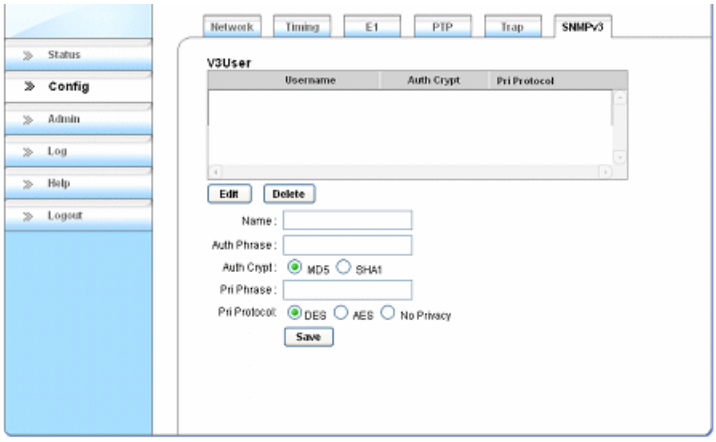
1. Click the **Config** tab.
2. Locate the **Trap** tab across the top tabs of the **Config** page.
3. Click the Trap address that you want deleted.
4. Click the **Delete** button to remove the entry from the **Trap** pane.

Creating SNMPv3 Users

The TCA8000 and TCA8500 Timing Servers support security measures in SNMPv3. To create SNMPv3 users:

1. Click the **Config** tab. The Config page appears.
2. Click the **SNMPv3** section across the top of the Config page. See Figure 16 on page 42.
3. In the **Name** field, enter the username that will be used to log into SNMPv3 log files.
4. In the **Auth Phrase** field, enter the authentication phrase you want this user to use.
5. In the **Auth Crypt** area, select the encryption method that you want this user to use.
6. In the **Pri Phrase** field, enter the private phrase that you want this user to use if required.
7. In the **Pri Protocol** field, select the privilege level that you want this user to use. Select:
   - DES—The user must use the authentication phrase to log in.
   - AES—The user is not required to use the authentication phrase to log in.
   - No Privacy—The user is required to use the authentication phrase and the private phrase to log in.
8. Click the **Save** button to save the user information in the **V3User** window.

Figure 16: Timing Server Config Page—SNMPv3 Pane



Managing TCA User Accounts

The TCA8000 and TCA8500 Timing Servers support multiple user accounts to be created and managed by the Admin user. Juniper Networks assigns a default user account (admin/admin) with login class as Admin to a TCA8000 or TCA8500 Timing Server for logging in to the Timing Server. This Admin user account allows the administrator to create and manage multiple user accounts with login class as Read-Only and Read/Write.

The TCA user accounts can be managed by:

- Creating an User Account on page 42
- Modifying an Existing User Account on page 43
- Deleting an Existing User Account on page 44

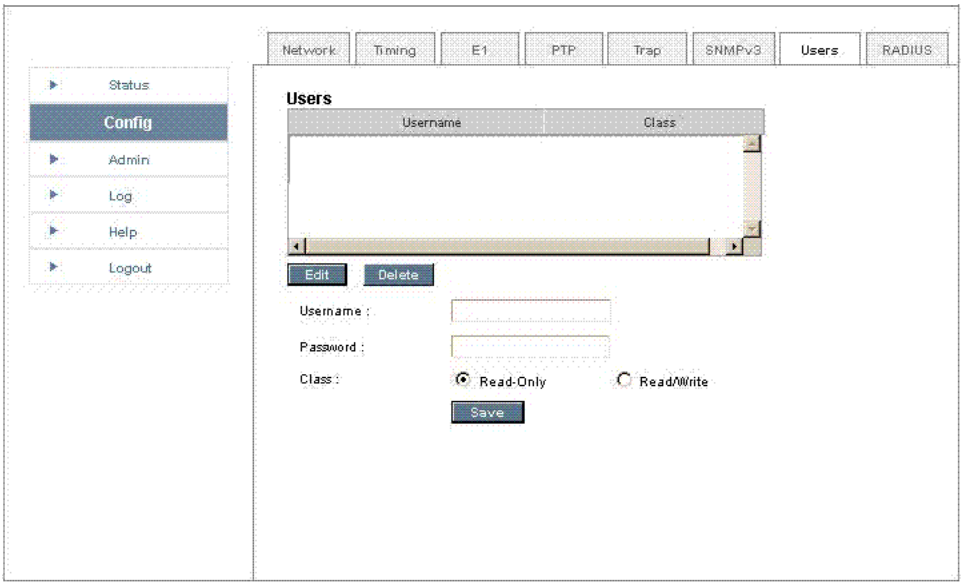
Creating an User Account

To create a new user account:

NOTE: **You can create only a maximum of five user accounts.**

1. Log in to the Timing Server as Admin user.
2. Click the **Config** tab.
3. Locate the **Users** tab across the top tabs of the **Config** page. See Figure 17 on page 43.

Figure 17: Timing Server Config Page—Users Pane



4. In the **Username** field, enter the username for the new user account.
5. In the **Password** field, enter the password for the new user account.
6. In the **Class** field, select an option button to set the login class for the new user account as Read-Only or Read/Write.
7. Click the **Save** button to create a new user account.

Modifying an Existing User Account

To modify an existing user account:

NOTE: **You cannot modify the username.**

1. Log in to the Timing Server as Admin user.
2. Click the **Config** tab.
3. Locate the **Users** tab across the top tabs of the **Config** page. See Figure 17 on page 43.
4. In the **Users** window, select the user account to be modified.
5. Click the **Edit** button to populate the details of the selected user account in the **Username**, **Password**, and **Class** fields.
6. Modify the password or class for the selected user account.

NOTE:

- If you change the password, all the active sessions for the corresponding user are not logged out. The user must use the new password for new sessions.
- If you change the class, all active sessions for the corresponding user are logged out.

7. Click the **Save** button to save the changes done.

Deleting an Existing User Account

To delete an existing user account:

1. Log in to the Timing Server as Admin user.
2. Click the **Config** tab.
3. Locate the **Users** tab across the top tabs of the **Config** page. See Figure 17 on page 43.
4. In the **Users** window, select the user account to be deleted.
5. Click the **Delete** button to delete the selected user account.

NOTE: All active sessions for the deleted user are logged out.

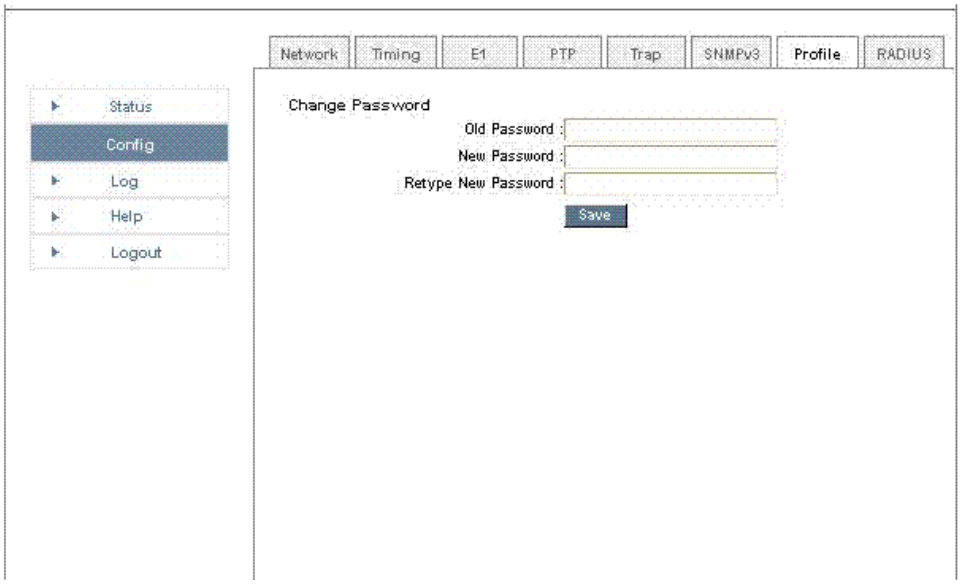
Changing the Login Password for Read/Write User

The TCA8000 and TCA8500 timing servers allow Read/Write users to change their password configured and shared by the TCA Admin user.

To change your (Read/Write user) password:

1. Log in to the Timing Server as Read/Write user.
2. Click the **Config** tab.
3. Locate the **Profile** tab across the top tabs of the **Config** page. See Figure 18 on page 45.

Figure 18: Timing Server Config Page—Profile Pane



4. In the **Old Password** field, enter your current password.
5. In the **New Password** field, enter the new password to replace the old password.
6. In the **Retype New Password** field, reenter the new password.
7. Click **Save** button to change your password and save the changes.

NOTE: **The new password will be effective from next login onwards. The current session is not affected.**

Configuring User Authentication through RADIUS

The TCA 8000 and TCA 8500 Timing Servers support RADIUS server authentication, local authentication, or both based on the configured authentication order to authenticate the user logging in to the Timing Server.

When you configure the authentication order as RADIUS server authentication followed by the local authentication, the Timing Server passes the information about the logging user to the configured RADIUS servers for authentication. If any one of the RADIUS server successfully authenticates the user, then the Timing Server allows the user to login. If all the configured RADIUS servers fail to authenticate the user or configured RADIUS servers are not available, then the Timing Server performs the local authentication and allows the user to login after successful local authentication. The Timing Server blocks the logging user if both RADIUS and local authentication fails.

When you configure the authentication order as local authentication followed by the RADIUS server authentication, the Timing Server performs the local authentication to grant access to the logging user. If the local authentication fails to authenticate the user, then the Timing Server passes the information about the logging user to the configured

RADIUS servers for authentication. If any one of the RADIUS server successfully authenticates the user, then the Timing Server allows the user to login. If all configured RADIUS servers fail to authenticate the user, then the Timing Server denies access to the logging user.

When you configure the authentication order as RADIUS server authentication only, the Timing Server passes the information about the logging user to the configured RADIUS servers for authentication. If any one of the RADIUS server successfully authenticates the user, then the Timing Server allows the user to login. If all configured RADIUS servers fail to authenticate the user, then the Timing Server denies access to the logging user. If all configured RADIUS servers are not available, then the Timing Server performs local authentication and allows the user to login after successful local authentication.

When you configure the authentication order as local authentication only, the Timing Server performs the local authentication to grant or deny access to the user logging in to the Timing Server.

NOTE:

- The selection of RADIUS authentication server to authenticate user is based on the order in the RADIUS authentication server list.
- The user authentication process is implemented only for the Access Request, Access Reject, and Access Accept messages.
- The user authentication process is not supported for shell users.

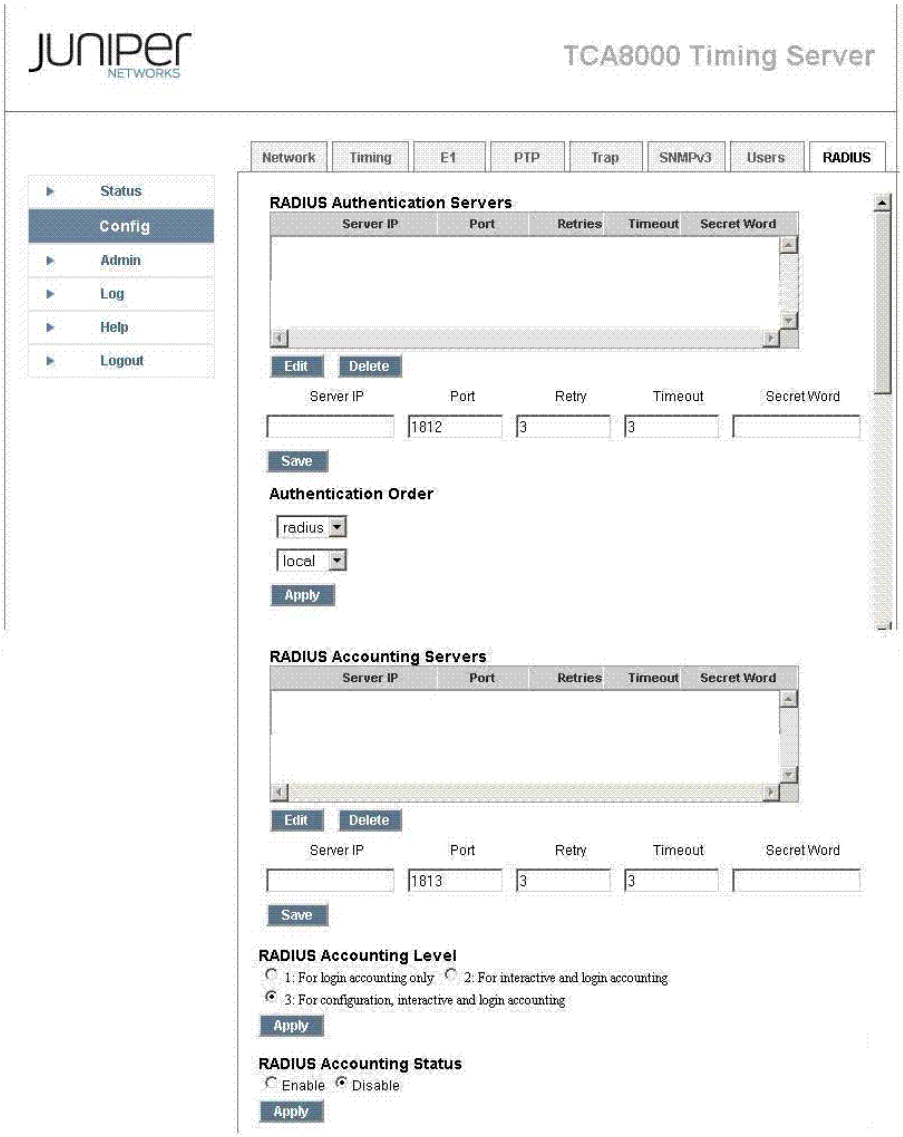
The user authentication process protects the Timing Server from being accessed by unauthorized persons. The usage of RADIUS authentication servers provides the following advantages:

- Management of multiple user credentials on remote machine for detailed logging.
- Centralized user information and authentication process at one server.
- No loss of user information due to Timing Server damage.

To configure user authentication process:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 19 on page 47.

Figure 19: Timing Server Config Page—RADIUS Pane (Authentication)



3. Configure the RADIUS authentication server details.
4. Click the **Save** button to save the authentication server configuration.
5. Select the authentication order.
6. Click the **Apply** button to apply the configured authentication order.

The following sections describe RADIUS authentication server configuration and authentication order configuration:

- Adding a New RADIUS Authentication Server Entry on page 48
- Deleting a RADIUS Authentication Server Entry on page 48

- Modifying RADIUS Authentication Server Entry Details on page 48
- Configuring Authentication Order on page 49

Adding a New RADIUS Authentication Server Entry

To add a new RADIUS authentication server entry to the authentication server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 19 on page 47.
3. In the **Server IP** field, enter the IP address of the RADIUS authentication server to be used for user authentication.
4. In the **Port** field, enter the port through which the specified RADIUS authentication server is contacted for user authentication.
5. In the **Retry** field, enter the number of attempts should be made for contacting the specified RADIUS authentication server.
6. In the **Timeout** field, enter the time in seconds till which the Timing Server waits for a response from the specified RADIUS authentication server.
7. In the **Secret Word** field, enter the password shared with the specified RADIUS authentication server.
8. Click the **Save** button to add the RADIUS authentication server entry in the RADIUS Authentication Servers window and memory.

Deleting a RADIUS Authentication Server Entry

To delete a RADIUS authentication server entry from the authentication server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 19 on page 47.
3. In the **RADIUS Authentication Servers** window, click the RADIUS authentication server entry to be deleted.
4. Click the **Delete** button to remove the entry from the RADIUS Authentication Server window and memory.

Modifying RADIUS Authentication Server Entry Details

To modify the details of a RADIUS authentication server entry existing in the authentication server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 19 on page 47.

3. In the **RADIUS Authentication Servers** window, select the RADIUS authentication server entry to be modified.
4. Click the **Edit** button to populate the values of the selected RADIUS authentication server entry in the **Server IP**, **Port**, **Retry**, **Timeout**, and **Secret Word** fields.
5. Modify the populated values.
6. Click the **Save** button to save the changes done in the selected RADIUS authentication server entry.

Configuring Authentication Order

To configure the authentication order:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 19 on page 47.
3. In the first drop box, select the type of authentication to be performed initially. Select:
   - radius—To authenticate the user using the configured RADIUS authentication servers.
   - local—To authenticate the user using local settings.
4. In the second drop box, select the type of authentication to be performed on failure or unavailability of initial authentication. Select:
   - radius—To authenticate the user using the configured RADIUS authentication servers.
   - local—To authenticate the user using local settings.
5. Click the **Apply** button to save the authentication order.

Configuring RADIUS Accounting

The TCA 8000 and TCA 8500 Timing Servers support RADIUS accounting for the user logged in to the Timing Server. Once the user is logged in to the Timing Server, the Timing Server passes the accounting information to the configured RADIUS accounting servers. The Timing Server stops the accounting process when the user session is closed either voluntarily or involuntarily. The Timing Server waits for acknowledgment from the accounting servers for each accounting packet.

When the RADIUS accounting is enabled, the Timing Server tries to log the accounting information in any one of the configured RADIUS accounting server based on the configured timeout period and number of retries. When the logging of accounting information fails for all configured accounting server, the Timing Server raises an ACCOUNTING_SERVER_UNAVAILABLE alarm.

When the RADIUS accounting server is unavailable, the accounting information (latest 15 commands) is buffered. The Timing Server sends the buffered information to the RADIUS accounting server after the server becomes available.

The accounting process supports login accounting, interactive commands accounting, and configuration commands accounting.

NOTE:

- The selection of RADIUS accounting server to log the accounting information is based on the order in the RADIUS accounting server list.
- The accounting process is implemented only for the Accounting Request and Accounting Response messages.
- The RADIUS accounting is not supported for shell users.
- The accounting process does not support immediate accounting and accounting of web configurations.

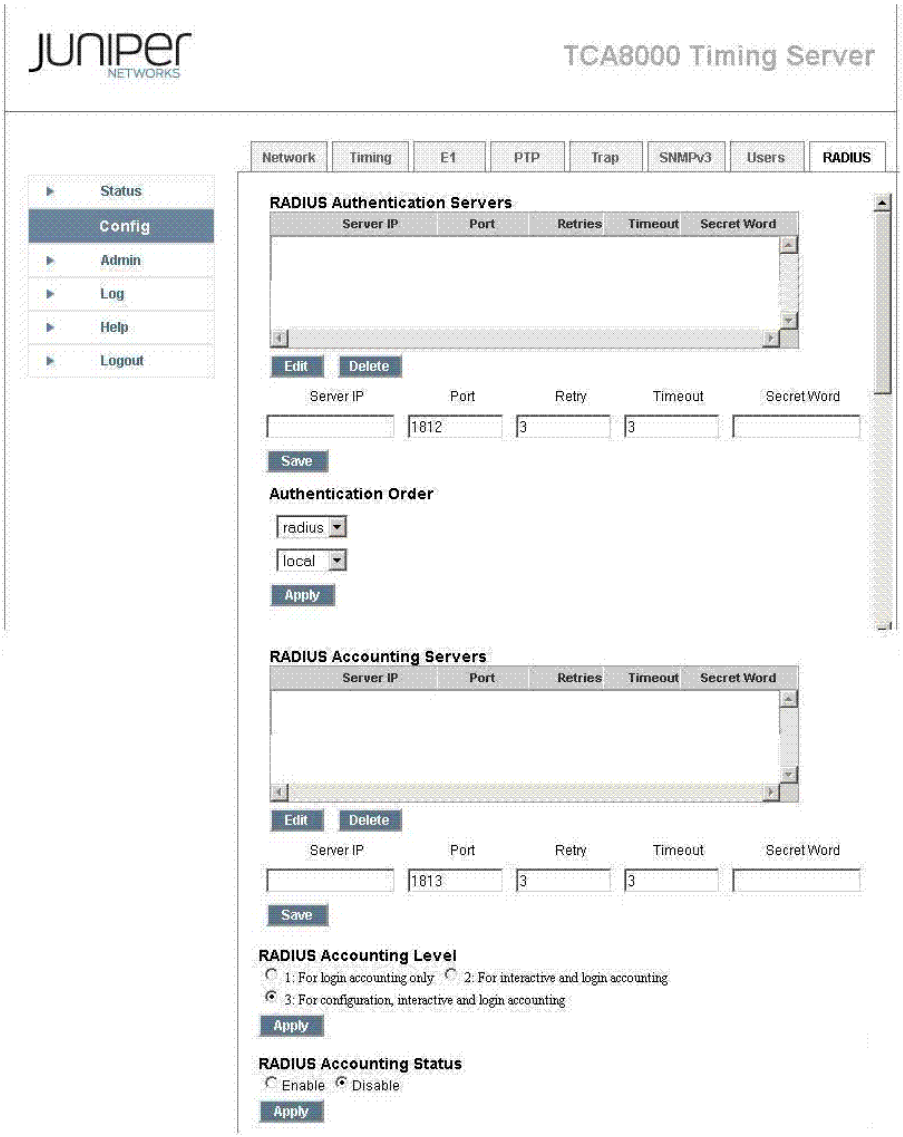
The usage of RADIUS accounting servers provides the following advantages:

- Centralized usage history of all users on one server.
- No loss of usage history of users due to Timing Server damage.

To configure RADIUS accounting:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 20 on page 51.

Figure 20: Timing Server Config Page—RADIUS Pane (Accounting)



3. In the **RADIUS Accounting Status** field, select the **Enable** option to enable RADIUS accounting.
4. Click the **Apply** button to apply RADIUS accounting status configuration.
5. Configure the RADIUS accounting server details
6. Click the **Save** button to save the accounting server configuration.

7. In the **RADIUS Accounting Level** field, select the type of accounting information to be logged in the RADIUS accounting server.
8. Click the **Apply** button to apply the configured RADIUS accounting level.

The following section describe RADIUS accounting server configuration:

- Adding a New RADIUS Accounting Server Entry on page 52
- Deleting a RADIUS Accounting Server Entry on page 52
- Modifying RADIUS Accounting Server Entry Details on page 53

Adding a New RADIUS Accounting Server Entry

To add a new RADIUS accounting server entry to the accounting server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 20 on page 51.
3. In the **Server IP** field, enter the IP address of the RADIUS accounting server to be used for accounting.
4. In the **Port** field, enter the port through which the specified RADIUS accounting server is contacted for accounting.
5. In the **Retry** field, enter the number of attempts should be made for contacting the specified RADIUS accounting server.
6. In the **Timeout** field, enter the time in seconds till which the Timing Server waits for a response from the specified RADIUS accounting server.
7. In the **Secret Word** field, enter the password shared with the specified RADIUS accounting server.
8. Click the **Save** button to add the RADIUS accounting server entry in the RADIUS Accounting Servers window and memory.

Deleting a RADIUS Accounting Server Entry

To delete a RADIUS accounting server entry from the accounting server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 20 on page 51.
3. In the **RADIUS Accounting Servers** window, click the RADIUS accounting server entry to be deleted.
4. Click the **Delete** button to remove the entry from the RADIUS Accounting Servers window and memory.

Modifying RADIUS Accounting Server Entry Details

To modify the details of a RADIUS accounting server entry existing in the accounting server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 20 on page 51.
3. In the **RADIUS Accounting Servers** window, select the RADIUS accounting server entry to be modified.
4. Click the **Edit** button to populate the values of the selected RADIUS accounting server entry in the **Server IP**, **Port**, **Retry**, **Timeout**, and **Secret Word** fields.
5. Modify the populated values.
6. Click the **Save** button to save the changes done in the selected RADIUS accounting server entry.

Specifying Recipients for Alarm E-Mail Notifications

The TCA8000 and TCA8500 Timing Servers can e-mail alarm event messages directly to users.

Adding a User to the E-Mail List

To add a user to the list of e-mail recipients to whom the Timing Server sends alarm events:

1. Click the **Admin** tab.
2. Locate the **Alarm** section across the top of the Admin page. See Figure 21 on page 54 and Figure 22 on page 55.
3. In the **Alarm Email Recipients** section:
   a. In the **SMTP** field, enter the IP Address or domain name of the e-mail server the Timing Server will use to send e-mail messages.
   b. In the **User x** field, enter the IP address or domain name of the user to which the Timing Server will send alarm event information.
   c. In the **From** field, enter the IP address or domain name of the from address which the Timing Server will use to send e-mail messages.
4. Click the **Apply** button to save your changes.

Figure 21: Timing Server Admin Page—Alarm Pane (PTP)

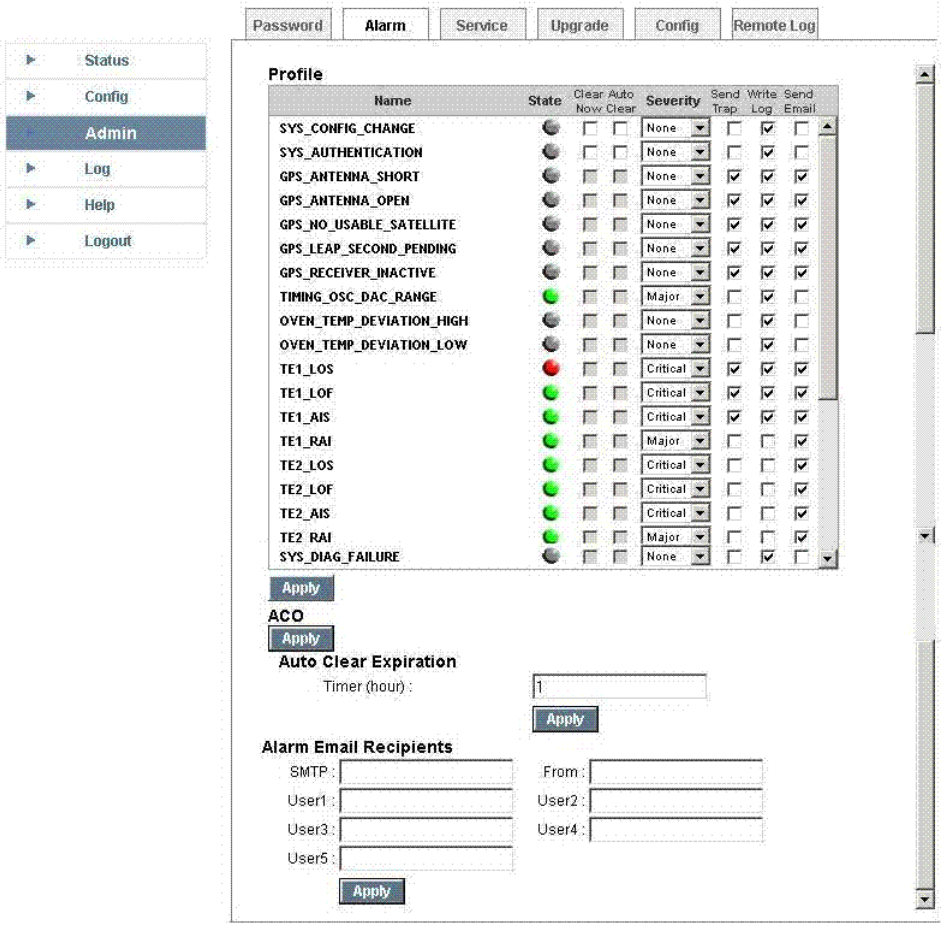
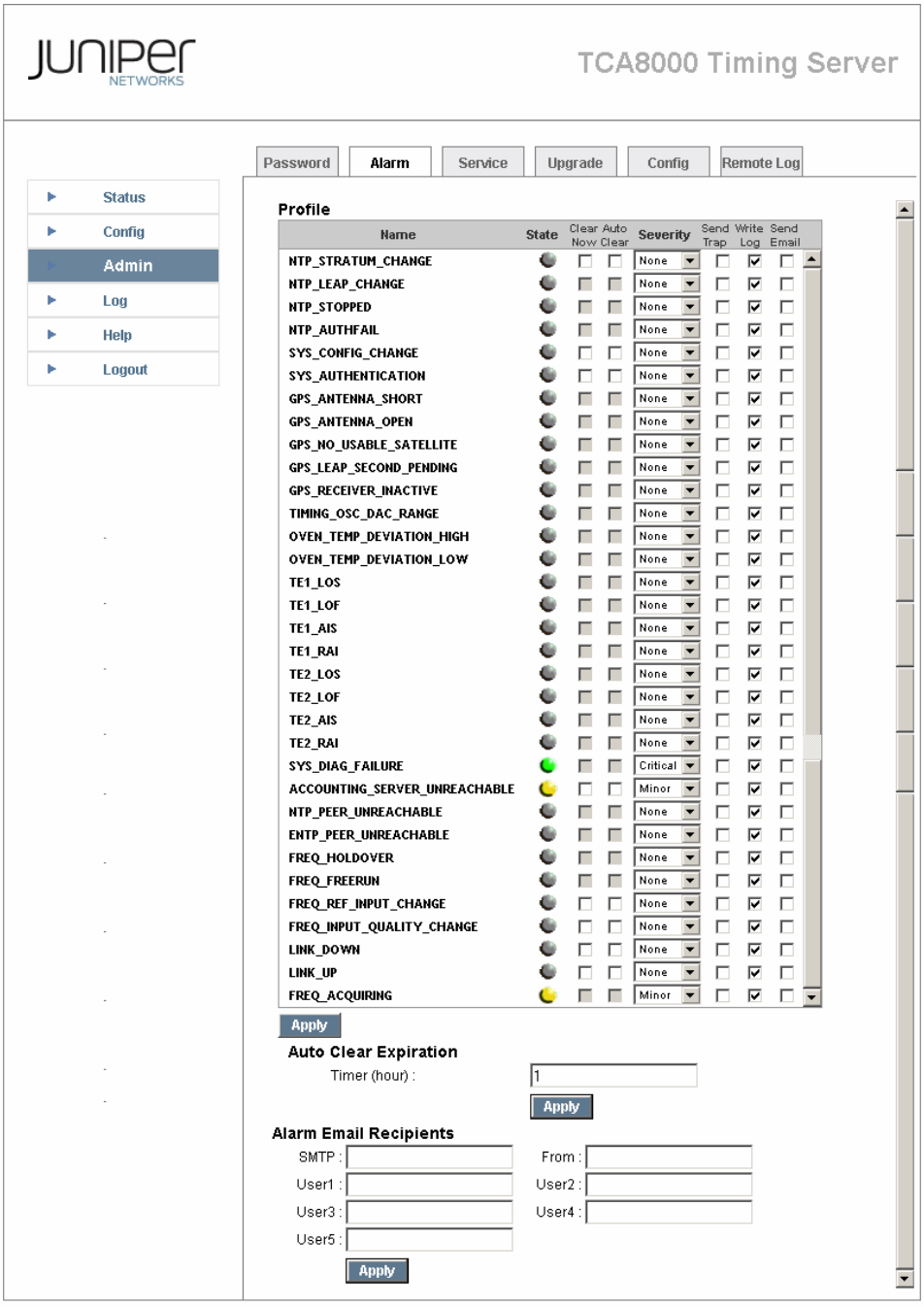


Figure 22: Timing Server Admin Page—Alarm Pane (NTP)



Removing a User from the Alarm Event Recipient List

To remove a user from the list of recipients who receive alarm events:

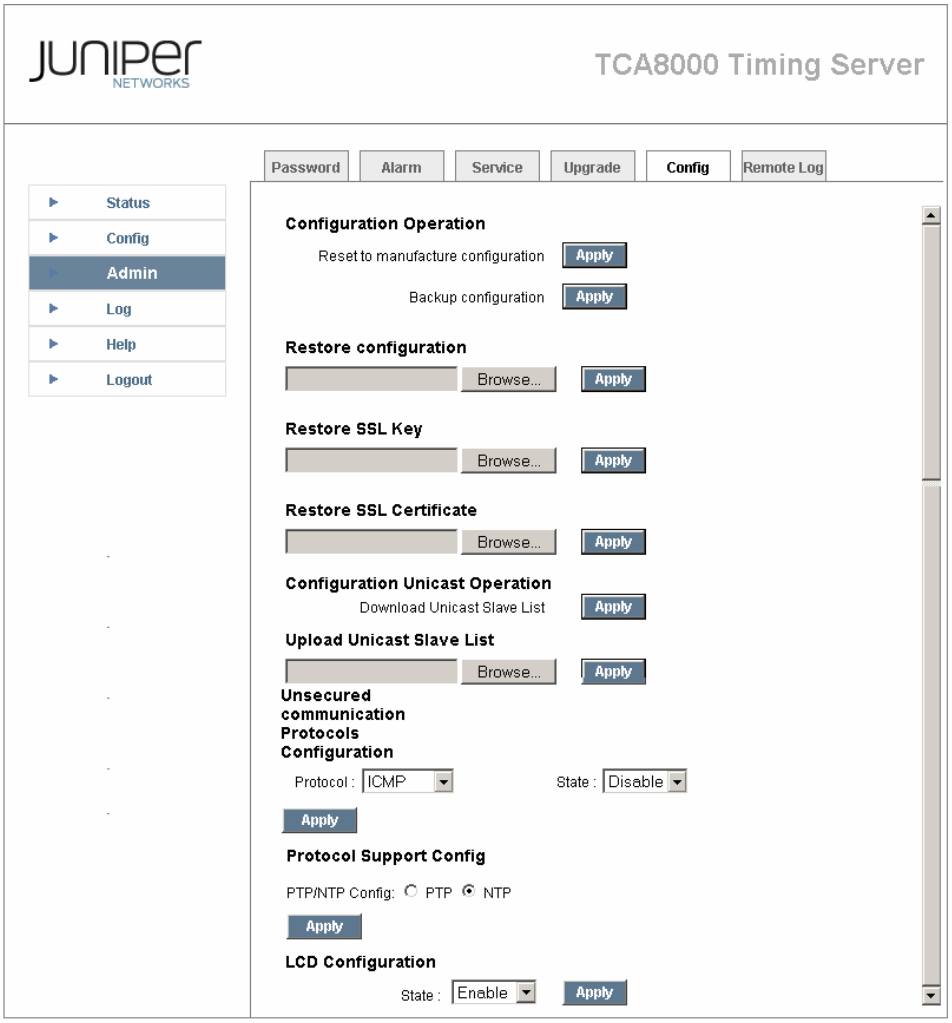
1. Click the **Admin** tab.
2. Locate the Alarm section across the top of the **Admin** page. See Figure 21 on page 54 and Figure 22 on page 55.
3. In the Alarm Email Recipient section, locate the **User** field that contains the address of the recipient you want to remove.
4. Highlight all addresses, and press the **Delete** key.
5. Click the **Apply** button to save your changes.

Resetting Factory Defaults

The TCA8000 and TCA8500 Timing Server parameters can be set to the factory default parameters. To reset the unit to the factory default parameters:

1. Click the **Admin** tab.
2. Locate the Config tab across the top of the Config pane. See Figure 23 on page 57.
3. In the Configuration Operation section, click the **Apply** button next to the text “Reset to manufacture configuration” to reset the parameters.

Figure 23: Timing Server Admin Page—Config Pane



Stopping and Restarting the TCA8000 or TCA8500 Timing Server

You can reboot the TCA8000 or TCA8500 Timing Server, or perform a clean power down by halting all the processes running on the Timing Server. To reboot or halt the Timing Server:

1. Click the **Admin** tab.
2. Select the **Upgrade** tab at the top of the page.
3. Click the **Reboot** or **Halt** button.
4. Click **Apply** to reboot or halt the Timing Server.

The TCA8000 and TCA8500 Timing Servers provide carrier-class upgrade capability. Two flash partitions are allocated to store software images. All upgrade or downgrade images go to volatile RAM first, and are written to the inactive flash partition. The active

or non-active images can be selected to run on the Timing Server by selecting the image using the drop-down arrow. After the unit has been rebooted, the new selected image will be running.

Figure 24: Timing Server Admin Page—Upgrade Pane Showing the Current Image

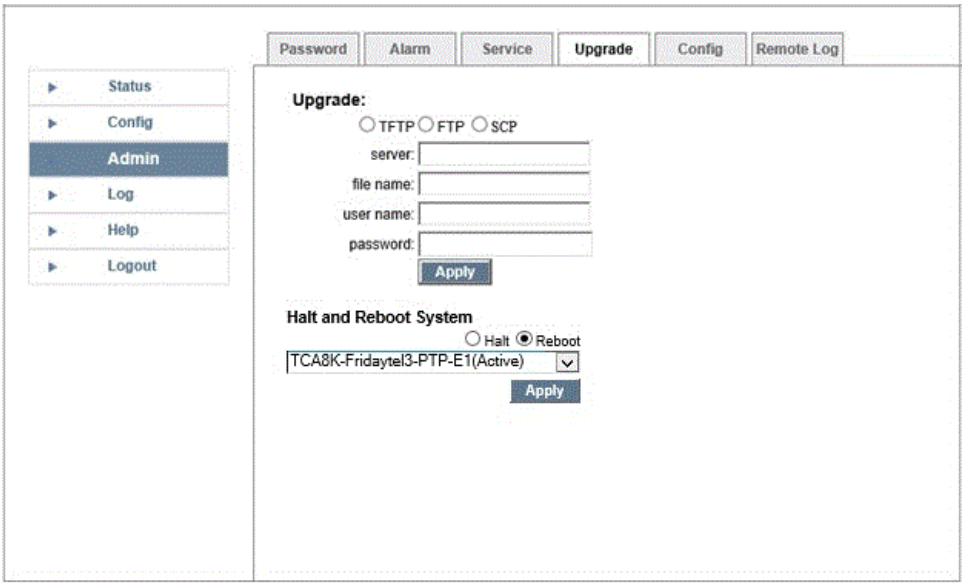
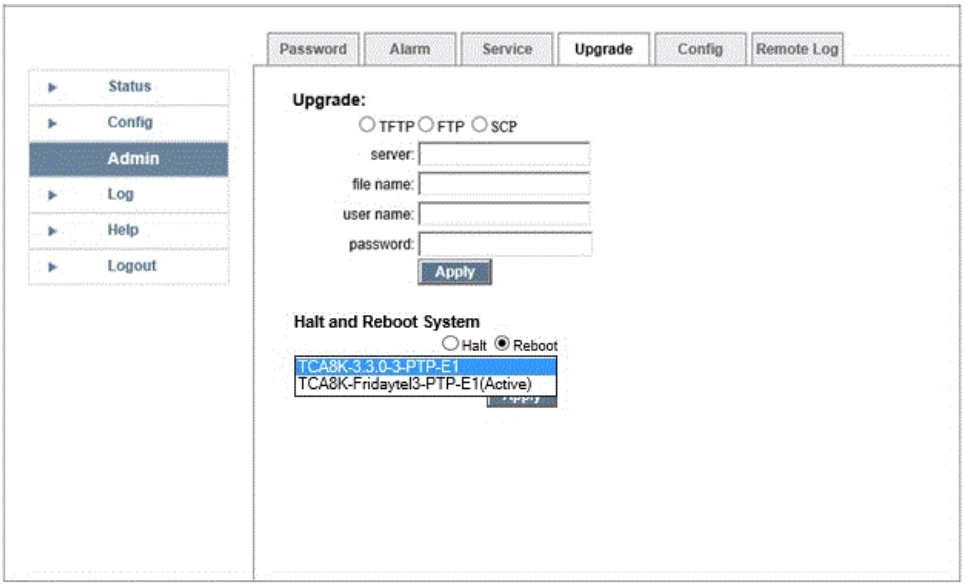


Figure 25: Timing Server Admin Page—Upgrade Pane Showing the New Image



CHAPTER 4

Upgrading the TCA8000 and TCA8500 Software

This chapter describes the processes for upgrading software on Juniper Networks TCA8000 and TCA8500 Timing Servers. The following topics are discussed:

Upgrade Requirements

The TCA8000 and TCA8500 Timing Servers are shipped with software pre-installed and ready to be configured when the Timing Server is powered on. To upgrade the software you must connect to the Timing Server using the GUI or a Telnet connection.

Upgrades affect service and cause the Timing Server to reboot. The Timing Server must reboot to load the new software version. All timing outputs are interrupted during this period (approximately 1-3 minutes). After the new version is loaded, frequency and time lock can take up to 50 minutes to resume normal status (LOCKED) for PTP or NTP features.

Gather the following information before upgrading the Timing Server:

- Admin password
- Name of the TFTP, FTP, or SCP server
- IP address of the TFTP, FTP, or SCP server
- Username and password of the FTP or SCP server
- Filename of the software upgrade or downgrade image

Selecting Between the Pre-Installed Software Images Using a GUI/Browser

The TCA8000 and TCA8500 Timing Servers ship with both a T1 and E1 software image installed in the two internal non-volatile memory partitions. By default, the TCA8000 and TCA8500 Timing Servers use the E1 interface type. You can view the software images from the Timing Server Admin web interface page (see Figure 26 on page 62). The active software image is displayed as **(Active)** in the Halt and Reboot System drop-down menu.

To select an alternate software image using the Web-based GUI:

1. Verify that the Timing Server is powered on.
2. Enter the IP address of the Timing Server into a web browser.

   For example, **https://10.1.0.42**.
3. Log in to the Timing Server as **admin**.

   Login: admin

   Password: admin
4. Select the **Admin** tab from the menu on the left.
5. Select the required interface from the drop-down menu.
6. Select the **Reboot** option.
7. Click **Apply** to reboot the Timing Server.
8. Select **Yes** when prompted with the dialog box stating "Do you confirm a system reboot system?" The Timing Server reboots and loads the selected software image.

NOTE: If the appropriate software image interface is not shown in either software image partitions, upgrade the in-active partition with the appropriate software image, and then perform the reboot as described in "Upgrading the Software Using a GUI/Browser" on page 60.

Upgrading the Software Using a GUI/Browser

To upgrade the TCA8000 and TCA8500 Timing Server using the Web-based GUI:

1. Verify that the Timing Server is powered on.
2. Enter the IP address of the Timing Server into a web browser.

   For example, **https://10.1.0.42**.
3. Log in to the Timing Server as **admin**.

   Login: admin

   Password: admin
4. Select the **Admin** tab from the menu on the left.

5. Select the network protocol to be used for transferring the software upgrade or downgrade image.
   - Select **TFTP** to download the software image from the server supporting TFTP.
   - Select **FTP** to download the software image from the server supporting FTP.
   - Select **SCP** to download the software image from the server supporting SCP.
6. In the **server** field, enter the IP address of the server that contains the software upgrade or downgrade image.

   For example, **10.1.0.52**.
7. In the **file name** field:
   - Enter the name of the software image file supplied by Juniper Customer Support if the image is to be downloaded from the TFTP or FTP server.

     For example, **TCA8K-Fridaytel3-PTP-E1**.
   - Enter the name of the Juniper supplied software image file with the file path if the image is to be downloaded from the SCP server.

     For example, **/build/tca/images/TCA8K-Fridaytel3-PTP-E1**.

NOTE: Two flash partitions are allocated to store software images. These can be used to store the same images or two different images should you wish to revert to a previous version.

All upgrade or downgrade images are written in volatile RAM first, and are loaded to the inactive flash partition. You can select active or non-active images to run on the Timing Server by selecting the image using the drop-down arrow. After the unit has been rebooted, the new selected image will be running on the appliance.

8. In the **user name** field, enter a valid server username.

NOTE: The **user name** field is applicable only if the image is to be downloaded from the SCP or FTP server.

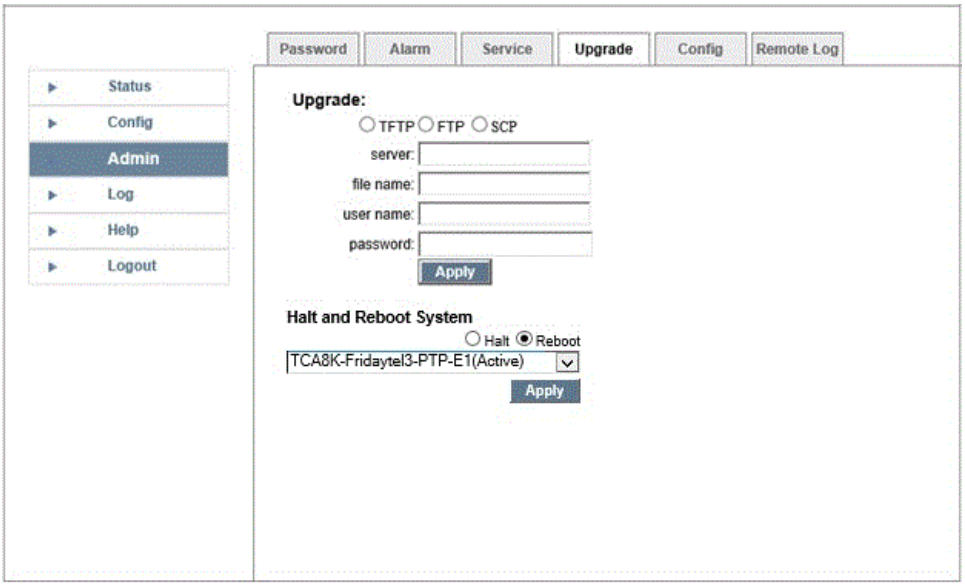
9. In the **password** field, enter the password of the server username.

NOTE: The **password** field is applicable only if the image is to be downloaded from the SCP or FTP server.

10. Select the **Apply** button. The browser status (bottom of webpage) shows the download progress. After the image file is completely downloaded (typically 1-3 minutes), a dialog box appears with the message, “Upgrade successful. The new software image will take effect after the system reboots!”

11. Select **OK** to acknowledge the upgrade message.
12. Select the **Reboot** option.
13. Click **Apply** to reboot the Timing Server.
14. Select **Yes** when prompted with the dialog box stating "Do you confirm a system reboot system?" The Timing Server reboots and loads the new software image.

Figure 26: Timing Server Admin Page—Upgrade Pane



Rebooting the Timing Server will invoke an upgrade if it completes successfully. If the upgrade fails in a detectable manner, the upgrade or downgrade image is discarded, and the Timing Server boots from the previous image. If the upgrade failed in a manner detectable only during the booting sequence, the hardware recovery cycle interrupts the process and the system reverts back to the previous image; the upgrade or downgrade image is discarded.

Selecting Between the Pre-Installed Software Images Using the CLI

The TCA8000 and TCA8500 Timing Servers ship with both T1 and E1 software images installed in the two internal non-volatile memory partitions. By default, the TCA8000 and TCA8500 Timing Servers use the E1 interface type. Use the **show partition** command to display the active and backup software images. The CLI displays the current software image as **Active**.

To select an alternate software image using the CLI:

1. Verify that the Timing Server is powered on.
2. Connect to the Timing Server over a Telnet application.

   >telnet 10.1.0.42
3. Enter the login and password.

```
>login: admin
Password: admin
```

4. Issue the **en** command, and then enter **enable** as the password.

```
>en
Password: enable
```

5. Issue the **show partition** command to verify that the software image appears in Partition 1.

```
# show partition
Partition 1: cern-2.1.2-2-PTP-E1 (Active)
Partition 2: cern-2.1.2-2-PTP-T1
```

6. To initiate the reboot, issue the **reboot *partition-number*** command where *partition-number* is the number of the partition you want to load. Type **Y** to confirm.

```
# reboot 2
Are you sure you want> to reboot? y/n
```

```
>Y
The appliance will reboot resulting in a “no service” condition.
```

NOTE: If the appropriate software image interface is not shown in either software image partitions, upgrade the in-active partition with the appropriate software image, and then perform the reboot as described in “Upgrading the Software Using the CLI” on page 63

Upgrading the Software Using the CLI

To upgrade the software using the CLI:

1. Verify that the TCA8000 and TCA8500 Timing Server is powered on.
2. Connect to the Timing Server over a Telnet application.

```
>telnet 10.1.0.42
```

3. Enter the login and password.

```
>login: admin
Password: admin
```

4. Issue the **en** command, and then enter **enable** as the password.

```
>en
Password: enable
```

5. Issue the corresponding CLI command to load the software into the partition, then confirm the upgrade.

   - Issue the **tftp *tftp-ip-address filename*** command if you want to download the software image from the TFTP server.

```
# tftp 10.0.122.10 TCA8K-Fridaytel3-PTP-E1
Are you sure you want to upgrade? y/n
```

```
>Y
Please wait during file transfer...
upgrade successful!
The new software will take effective after the reboot
```

- Issue the **ftp** ***ftpserverip filename username password*** command if you want to download the software image from the TFTP server.

```
# ftp 10.0.122.10 TCA8K-Fridaytel3-PTP-E1 user_1 user123
Are you sure you want to upgrade? y/n

>Y
Please wait during file transfer...
upgrade successful!
The new software will take effective after the reboot
```

- Issue the **scp** ***username scpserverip filename*** command if you want to download the software image from the SCP server.

```
# scp user_1 10.209.164.21 /build/tca/images/TCA8K-Fridaytel3-PTP-E1
Password: ******
Are you sure you want to upgrade? y/n

>Y
Please wait during file transfer...
upgrade successful!
The new software will take effective after the reboot
```

6. Issue the **show partition** command to verify that the software image appears in Partition 1.

```
# show partition
Partition 1: TCA8K-Fridaytel3-PTP-E1
Partition 2: TCA8k-3.3.0-3-PTP-E1(Active)
```

7. Issue the **reboot 1** command to initiate the reboot, and then type **Y** to confirm.

```
# reboot 1
Are you sure you want> to reboot? y/n

>Y
The appliance will reboot resulting in a “no service” condition.
```

Rebooting the Timing Server will invoke an upgrade if it completes successfully. If the upgrade fails in a detectable manner, the upgrade or downgrade image is discarded, and the Timing Server boots from the previous image. If the upgrade failed in a manner detectable only during the booting sequence, the hardware recovery cycle interrupts the process and the system reverts back to the previous image; the upgrade or downgrade image is discarded.

Selecting Between the Pre-Installed Software Images Using the Hardware Mechanism

The TCA8000 and TCA8500 Timing Servers are shipped with both T1 and E1 software images installed in the two internal non-volatile memory partitions. By default, the TCA8000 and TCA8500 Timing Servers use the E1 interface type and the active software image is present in the partition 1. The LCD screen displays the partition 1 as **Primary** and the partition 2 as **Secondary** under the **Admin** menu.

To select an alternate software image using the hardware mechanism:

1. Press the Menu button in the front panel of the Timing Server to display menus in the LCD screen.
2. Press the appropriate SELECT buttons in the front panel to select the **Admin** menu from the displayed menus.
3. Press the OK button in the front panel to display sub-menus for the selected **Admin** menu in the LCD screen.
4. Press the appropriate SELECT buttons in the front panel to select the **Reboot-Secondary** sub-menu for rebooting the Timing Server with the software image present in the partition 2.
5. Press the OK button in the front panel to reboot the Timing Server with the selected image.

NOTE: If the appropriate software image interface is not shown in either software image partitions, upgrade the inactive memory partition with the appropriate software image, and then perform the reboot as described in "Upgrading the Software Using a GUI/Browser" on page 60 or "Upgrading the Software Using the CLI" on page 63.

If the LCD configuration change functionality is disabled, the system does not display the **Admin** menu in the LCD screen. In such scenario, you cannot use the hardware mechanism for rebooting the Timing Server.

PART 4

Understanding the TCA8000 and TCA8500 Graphical User Interface (GUI)

CHAPTER 5

Understanding the TCA8000 and TCA8500 Login Page

This chapter describes the Login page for the Juniper Networks TCA8000 and TCA8500 Timing Servers. The following topics are discussed:

Login Page Description

The Login page appears when the TCA8000 or TCA8500 Timing Server is accessed. The Login page provides information about the Timing Server configuration and other relevant details.

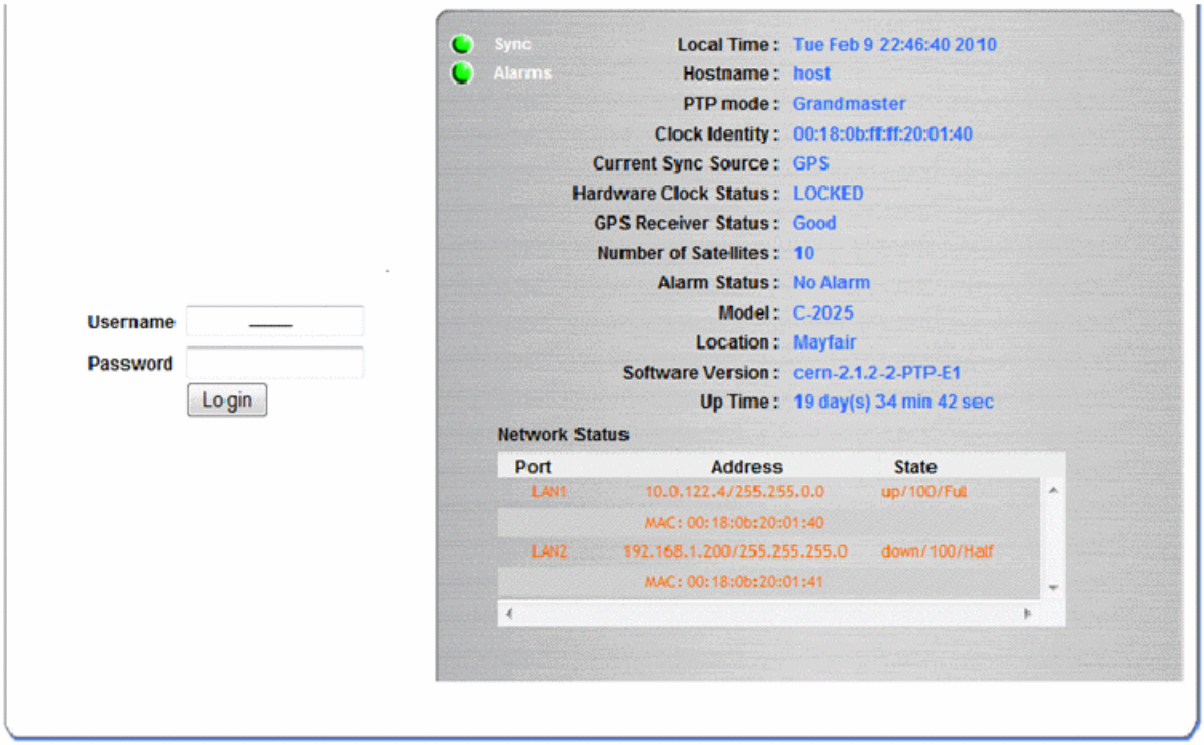
Accessing the Login Page

To access the TCA8000 or TCA8500 Timing Server Login page:

1. Open an Internet browser on a computer.
2. In the **address** field, enter the IP address that has been assigned to the Timing Server, and select Go.

   The Login page appears. See Figure 27 on page 70.

Figure 27: TCA8000 or TCA8500 Login Page



Understanding the Login Page

Table 4 on page 70 describes the elements that appear in the Login page of the TCA8000 and TCA8500 Timing Servers.

NOTE: After the Login page opens, select the Refresh button in the browser to update the page.

Table 4: Elements on the Timing Server Login Page

Element	Description
Username	Enter the name to be used as a login to the Timing Server.
Password	Enter the user password.
Login Button	Click to access the Timing Server pages.
Sync LED	Indicates whether the Timing Server is providing time synchronization to a device on the network. • Green—Indicates that the Timing Server is in the PTP or NTP lock state. • Amber—Indicates that the Timing Server is receiving PTP or NTP timing packets from the TCA6000 or TCA6500 Timing Client and is in the Timing acquire state.

Table 4: Elements on the Timing Server Login Page *(continued)*

Element	Description
Alarms LED	Indicates whether there are active alarms present on the Timing Server. • Green—Indicates that there are no active alarms on the Timing Server. • Red—Indicates that there is one or more active alarms on the Timing Server.
Local Time	The time kept by the Timing Server clock. NOTE: You must click the Refresh button in your browser to update the time.
Hostname	The name assigned to the Timing Server.
PTP Mode	Indicates that the Timing Server is a PTP grandmaster.
Clock Identity	A unique 64-bit value identifies the clock.
Current Sync Source	Indicates the current sync source type.
Hardware Clock Status	Indicates the synchronization status of the hardware clock. • Acquiring—Indicates hardware clock is in process to lock to a provisioned reference. • Locked—Indicates hardware clock is synchronized to the reference source. • Freerun—Indicates no reference is available. • Holdover—Indicates hardware clock is in holdover state after all references are disqualified.
GPS Receiver Status	Indicates the GPS receiver status of the Timing Server clock. States are as follows: • No GPS Time • Good—GPS receiver is tracking minimum of three satellites for position solution. • No Usable Satellites • Survey-in Progress—GPS board is in self-survey mode and waiting to complete 100%. Do not move unit. • Position is Questionable—Saved stored position does not track to the GPS location while tracking present moment. • Almanac not Complete—GPS constellation information not completely downloaded. Upon initial power-on, can take up to 12.5 minutes.
Number of Satellites	Indicates the number of GPS satellites the Timing Server has located. All satellites may not be visible.
Alarm Status	Indicates whether there are active alarms in effect.
Model	Specifies the Juniper Networks Timing Server model.
Location	Displays the location of the Timing Server.
Software Version	Indicates the software version of the Timing Server.
Up Time	Indicate the uptime since the most recent power up.

Table 4: Elements on the Timing Server Login Page *(continued)*

Element	Description
Network Status Window	This window provides network connection information of the Timing Server.
Port	Indicates the port the Timing Server is using.
Address	Lists the IP address assigned to the Timing Server. Lists the MAC address assigned to the Timing Server by the manufacturer.
State	Displays the status of the connection—up or down.

CHAPTER 6

Understanding the TCA8000 and TCA8500 System Status Page

This chapter describes the information provided on the TCA8000 or TCA8500 Status page. The following topics are addressed:

Understanding System LEDs

The TCA8000 and TCA8500 Timing Servers have four LEDs, which indicate:

Power (PWR)—Indicates that the Timing Server is receiving power

Critical (CRT)—Indicates that the Timing Server has generated a CRITICAL alarm

Major (MAJ)—Indicates that the Timing Server has generated a MAJOR alarm

Minor (MIN)—Indicates that the Timing Server has generated a MINOR alarm

Port LEDs

The network Ethernet port—LAN—has integrated Sync and Activity LEDs embedded in the RJ45 connector.

IEEE 1588-2008 Sync LED

The SYNC LED provides a status indication of the IEEE 1588-2008 Link:

Yellow—Acquire State

Green—Frequency & Phase Lock State

Status Page Description

The Status page provides operational and connectivity information for TCA8000 and TCA8500 Timing Servers.

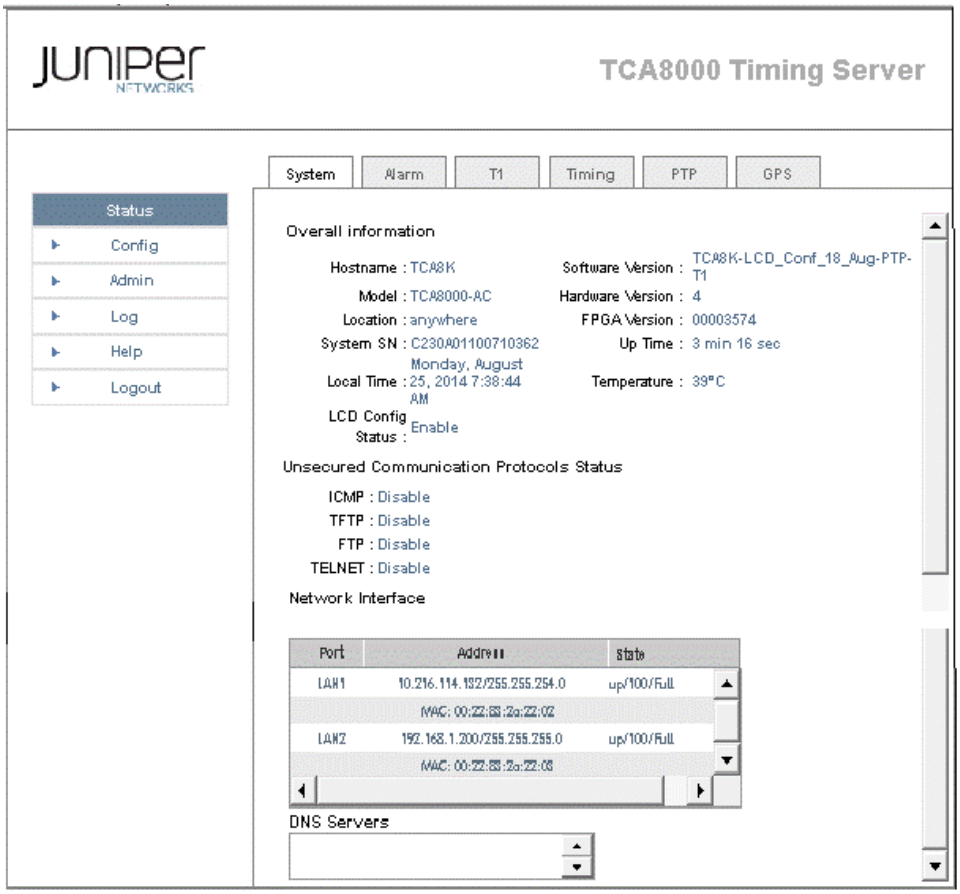
Accessing the Status Page

To access the Status page:

1. Log into a TCA8000 or TCA8500 Timing Server.
2. Click the **Status** tab. The Status page appears. See Figure 28 on page 74.

NOTE: After the Status page opens, click the Refresh button in the browser to update the page.

Figure 28: Timing Server Status Page—System Pane



NOTE: If the NTP support is enabled in the Timing Server, the Status page displays the NTP tab instead of the PTP tab. By default, the PTP support is enabled in the Timing server.

Understanding the Status Page

The Status Page–System Pane

Figure 29: Timing Server Status Page—System Pane

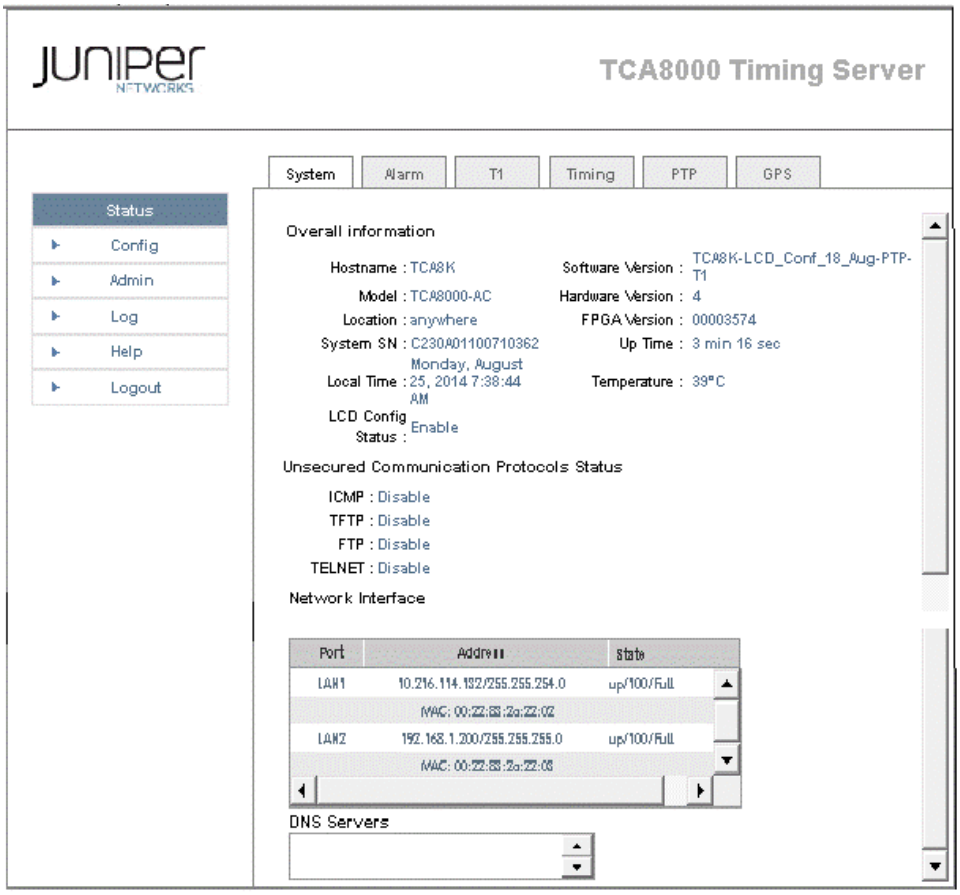


Table 5 on page 76 describes the elements that appear on the Status page—System Pane of the TCA8000 and TCA8500 Timing Servers.

Table 5: Elements on the Timing Server Status Page—System Pane

Element	Description
Overall Information Section	**This section provides general information about the Timing Server.**
Hostname	The name assigned to the Timing Server. You can use the Admin page to assign a name to the server.
Model	The model name of your Timing Server.
Location	Indicates the physical location where the Timing Server is installed.
Board SN	The serial number of the Timing Server motherboard.
System SN	The serial number of the Timing Server system assembly.
Local Time	The time set on the clock of the Timing Server.
LCD Config Status	Indicates whether the LCD configuration change functionality is enabled or disabled.
Software Version	The version of software installed on the Timing Server.
Hardware Version	The version of the Timing Server hardware.
FPGA Version	The version of FPGA installed on the Timing Server.
Up Time	Indicates how long the Timing Server has run since the last power up.
Temperature	Shows the temperature of the Timing Server.
Unsecured Communication Protocols Status Section	**This section displays the status of unsecured transfer or communication protocols.**
ICMP	Indicates whether the Internet Control Message Protocol (ICMP) is enabled or disabled.
TFTP	Indicates whether the Trivial File Transfer Protocol (TFTP) is enabled or disabled.
FTP	Indicates whether the FTP is enabled or disabled.
TELNET	Indicates whether the Telnet protocol is enabled or disabled.
Network Interface Section	**This section provides information about the Timing Server network connections.**
Port	Indicates the Timing Server port to which the address and state information pertains.
Address	The IP address and MAC address used by the Timing Server port.
State	The connectivity state of the port with the network.

Table 5: Elements on the Timing Server Status Page—System Pane *(continued)*

Element	Description
DNS Servers Window	This window lists the DNS servers the Timing Server is accessing.

The Status Page—Alarm Pane

The Alarm pane provides valuable information about the health of the system. The Alarm pane provides the necessary information to identify and analyze issues that may be caused as a result of a system problem or an issue external to the system.

Figure 30: Timing Server Status Page—Alarm Pane

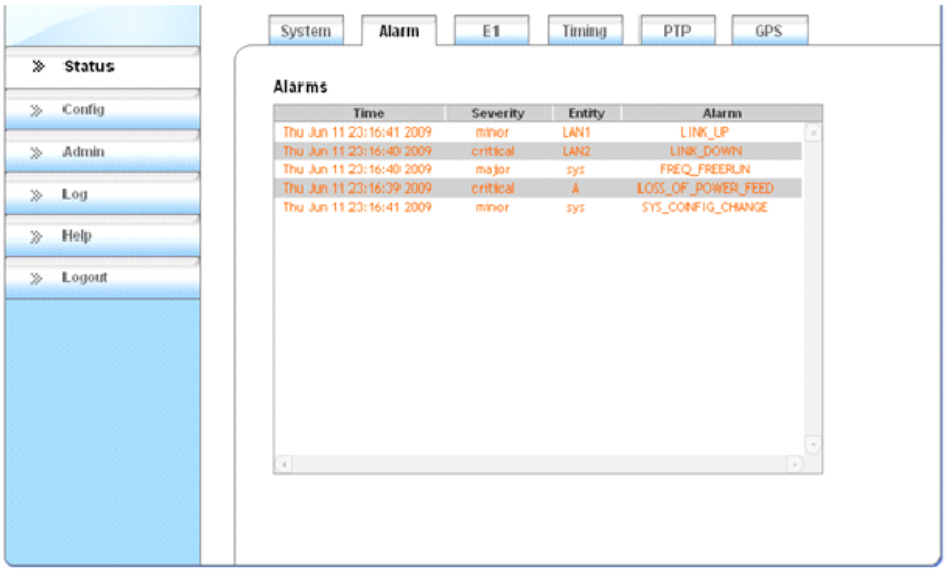


Table 6 on page 77 describes the elements that appear on the Status page—Alarm Pane of the TCA8000 and TCA8500 Timing Servers.

Table 6: Elements on the Timing Server Status Page—Alarm Pane

Element	Description
Alarms Section	This section lists the alarms the Timing Server issues.
Time	Indicates the time an alarm occurred.
Severity	Indicates the severity of the generated alarm.
Entity	Indicates the entity this alarm is associated with. Alarms can be associated with an input/output or with the whole system.
Alarm	Describes the alarm. See Table 26 on page 125 for descriptions.

The Status Page—E1 Pane

Figure 31: Timing Server Status Page—E1 Pane

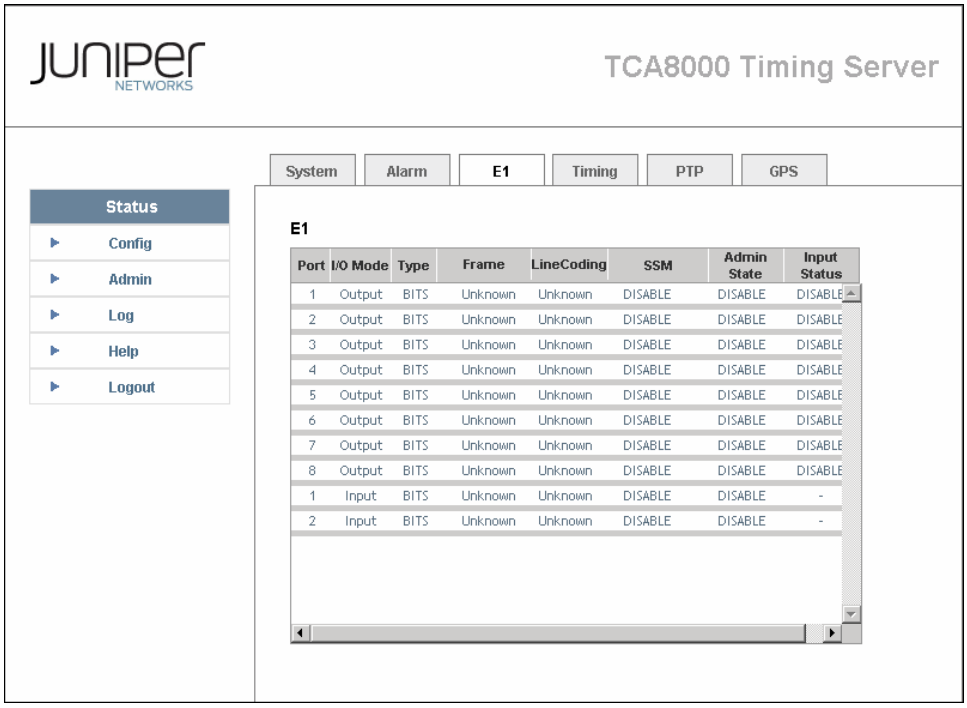


Table 7 on page 78 describes the elements that appear on the Status page—E1 Pane of the TCA8000 and TCA8500 Timing Servers.

Table 7: Elements on the Timing Server Status Page—E1 Pane

Element	Description
E1 Section	This section provides information about elements used by the Timing Server to maintain E1 parameters.
Port	This section indicates the E1 port number of the Timing Server.
I/O Mode	Indicates the input or output modes of the E1 ports on the Timing Server.
Type	Indicates that the E1 ports on the Timing Server are BITS ports.

Table 7: Elements on the Timing Server Status Page—E1 Pane *(continued)*

Element	Description
Frame/Line Coding	Describes the framing status of the E1 output ports on the Timing Server as the follows: • Normal • LFA, Loss of Frame Alignment • LMFA, Loss of Multi-Frame Alignment • RA, Remote Alarm • RAR, Remote Alarm Recovery • FAR, Frame Alignment Recovery • AIS_ACT, AIS Active • AIS_DEACT, AIS De-active • RRA, Receive Remote Alarm • LOS, Loss of Signal • LOF, Loss of Frame Describes the line coding of the E1 ports as HDB3.
SSM	Indicates the E1 Synchronization Status Message for the respective port, and describes the stratum level of the signal as either: • QUALITY_UNKNOWN • REC_G_811 • SSU_A • SSU_B • SETS • DO_NOT_USE
Admin State	Indicates the Port Administration Status in either Disable or Enable mode.
Input Status	Indicates the input status of E1 output ports. NOTE: The Disable value is hard-coded for all E1 output ports. The support for displaying input status is not applicable for E1 input ports.

The Status Page—Timing Pane

Figure 32: Timing Server Status Page—Timing Pane

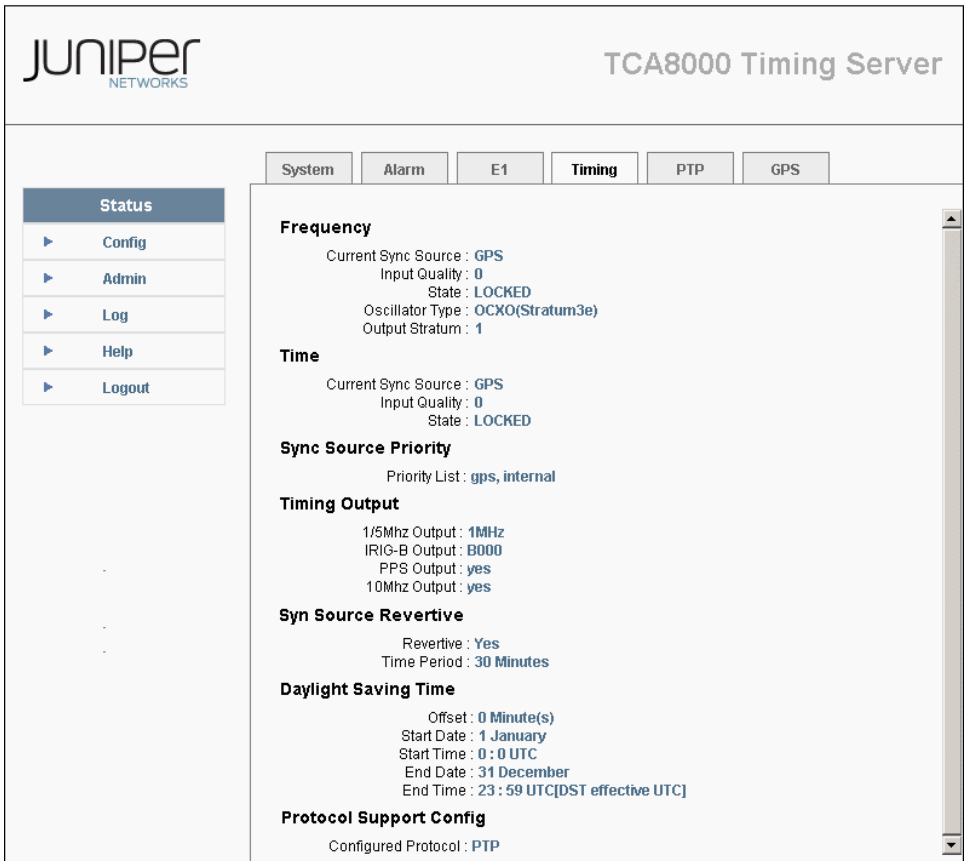


Table 8 on page 80 describes the elements that appear on the Status page—Timing Pane of the TCA8000 and TCA8500 Timing Servers.

Table 8: Elements on the Timing Server Status Page—Timing Pane

Element	Description
Frequency Section	Describes the status of frequency synchronization.
Current Sync Source	Indicates the reference source used by the Timing Server for frequency synchronization.
Input Quality	Indicates the frequency accuracy, and Stratum level (1 to 3).
State	Indicates the state of the Timing Server as a frequency source: • Acquiring—in process to lock to a provisioned reference • Lock—locked to a provisional reference • Freerun—no reference is available • Holdover—in holdover state after all references are disqualified
Oscillator Type	The type of oscillator installed in the Timing Server.

Table 8: Elements on the Timing Server Status Page—Timing Pane *(continued)*

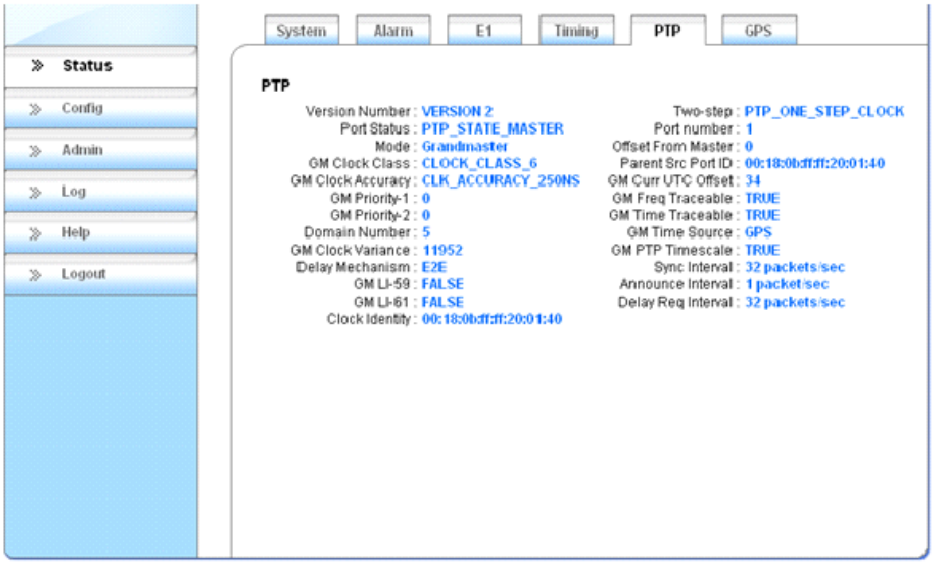
Element	Description
Output Stratum	Stratum level: 1 to 3
Time Section	**Describes status for timing synchronization.**
Current Sync Source	Indicates the reference source the Timing Server uses for synchronization.
Input Quality	Input time accuracy, Stratum 1 to 3
State	Indicates the state of the Timing Server as a time reference: • Acquiring—in process to lock to a provisioned reference • Lock—locked to a provisional reference • Freerun—no reference is available • Holdover—in holdover state after all references are disqualified
Synch Source Priority Section	**Describes the priority of various available clock references the Timing Server uses for synchronization.**
Priority List	Lists all available clock references in orders of priority for synchronization.
Timing Output Section	**Describes the configuration of the timing outputs.**
1/5Mhz Output	Indicates if the output frequency of the 1/5 MHz output is either 1MHz or 5MHz.
IRIG-B	Output indicates the format of the IRIG-B output.
PPS Output	Indicates the availability of the PPS output.
10Mhz Output	Indicates the availability of the 10 MHz output.
Syn Source Revertive Section	**Describes the configuration of the synchronization source revertive feature.** NOTE: This section is visible only to the Admin user.
Revertive	Indicates if the synchronization source selection mode is set as revertive or not.
Time Period	Indicates the time period used by the Timing Server for changing back to the available highest priority synchronization source when the revertive feature is enabled (that is, the synchronization source selection mode is set as revertive and the time period is not configured as zero minute).
Daylight Saving Time Section	**Describes the configuration of daylight saving time (DST).**
Offset	Indicates the configured DST offset value.
Start Date	Indicates the date and month on which the DST starts.
Start Time	Indicates the UTC time scale (in 24-hour format) at which the DST starts.
End Date	Indicates the date and month on which the DST ends.

Table 8: Elements on the Timing Server Status Page—Timing Pane *(continued)*

Element	Description
End Time	Indicates the DST time scale (in 24-hour format) at which the DST ends.
Protocol Support Config Section	Describes the protocol support that is enabled in the Timing Server
Configured Protocol	Indicates the current protocol support enabled in the Timing Server: • PTP—PTP support is enabled • NTP—NTP support is enabled

The Status Page—PTP Pane

Figure 33: Timing Server Status Page—PTP Pane



NOTE: You can view this pane only if the PTP support is enabled in the Timing Server.

Table 9 on page 82 describes the elements that appear on the Status page—PTP Pane of the TCA8000 and TCA8500 Timing Servers.

Table 9: Elements on the Timing Server Status Page—PTP Pane

Element	Description
PTP Section	This section provides PTP information pertaining to the Timing Server.
Version Number	IEEE 1588-2008v2 version number.

Table 9: Elements on the Timing Server Status Page—PTP Pane *(continued)*

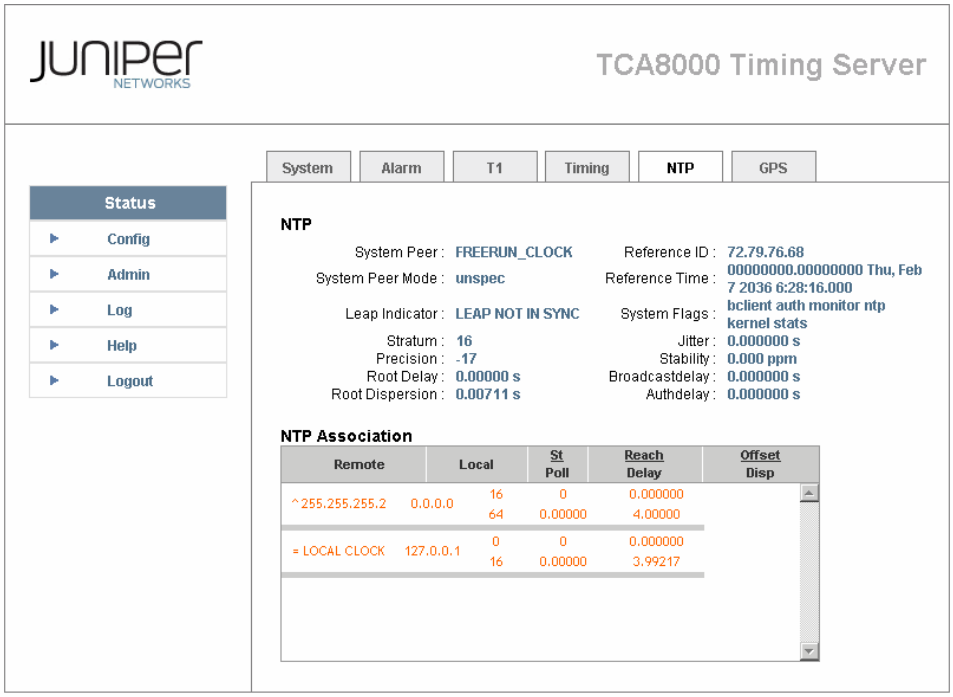
Element	Description
Port Status	Indicates the current state of the PTP port. The values are: • PTP_STATE_INITIALIZING • PTP_STATE_FAULTY • PTP_STATE_DISALBED • PTP_STATE_LISTENING • PTP_STATE_PRE_MASTER • PTP_STATE_MASTER • PTP_STATE_PASSIVE • PTP_STATE_UNCALIBRATED
Mode	Indicates that the Timing Server is a PTP slave.
GM Clock Class	Indicates the traceability of the time or frequency distributed by the PTP Grandmaster clock. When the Timing Server is a Grandmaster clock, this field represents the Timing Server clock class. Clock classes are defined by the configured telecom standard, and are used in the BMC (Best Master Clock) algorithm. The telecom standard can be set as ITU-T G.8265.1, ITU-T G.8275.1, or IEEE1588v2 by using the **config telecom-standard** command or through the PTP pane in the timing server configuration page.
GM Clock Accuracy	Indicates the clock accuracy of the PTP Grandmaster clock. When the Timing Server is a Grandmaster clock, this field represents the server's clock accuracy. Clock accuracy value is also used in the BMC (Best Master Clock) algorithm.
GM Priority-1	Indicates the priority1 value of the PTP Grandmaster clock. The values range from 0 to 254. Priority1 value is used in the BMC (Best Master Clock) algorithm.
GM Priority-2	Indicates the priority2 value of the PTP Grandmaster clock. The values range from 0 to 254. Priority2 value is used in the BMC (Best Master Clock) algorithm.
Domain Number	Indicates the current PTP domain which the Timing Server participates in.
GM Clock Variance	Indicates the inherent precision of the PTP Grandmaster clock. When the Timing Server is a Grandmaster clock, this field represents the clock variance of the Timing Server. Clock variance is used in the BMC (Best Master Clock) algorithm.
Delay Mechanism	Indicates the delay measurement between the Grandmaster and Timing Server. The system supports E2E.
LI-59	Indicates the last minute of the current UTC day contains 59 seconds. This field is used during leap second correction.
LI-61	Indicates the last minute of the current UTC day contains 61 seconds. This field is used during leap second correction.
Clock Identity	Indicates the local clock identity in 64 bits UUID.
Two Steps	Indicates the option for using one step or two step functions for the PTP protocol.

Table 9: Elements on the Timing Server Status Page—PTP Pane *(continued)*

Element	Description
Port Number	Indicates the port number of the Grandmaster the PTP communicates with.
GM Current UTC Offset	Displays the offset between TAI and UTC for the Grandmaster clock. When the Grandmaster is locked to GPS. The current value of the UTC offset is 33.
GM Freq Traceable	Shows whether the frequency determining the time scale of the Grandmaster clock is traceable to a primary standard.
GM Time Traceable	Indicates whether the timestamp of the Grandmaster clock is traceable to a primary standard.
GM Time Source	Indicates the time source currently in use by the Grandmaster clock. Available options are GPS or Internal clock.
GM PTP Timescale	Displays the clock time scale of the Grandmaster clock. Available options are TRUE if it is PTP, or FALSE if not PTP.
Sync Interval	Indicates the number of sync packet per second the Grandmaster sends. Values are 1, 2, 4, 8, 16, 32 or 64 pps.
Announce Interval	Indicates how long in seconds for the Grandmaster to send the announce packet. The values are one packet per 1, 2, 4 or 8 seconds.
Delay Req Interval	Indicates the number of delay packet per second the Grandmaster sends. Values are 1, 2, 4, 8, 16, 32 or 64 pps.

The Status Page—NTP Pane

Figure 34: Timing Server Status Page—NTP Pane



NOTE: You can view this pane only if the NTP support is enabled in the Timing Server.

Table 10 on page 85 describes the elements that appear on the Status page—NTP Pane of the TCA8000 and TCA8500 Timing Servers.

Table 10: Elements on the Timing Server Status Page—NTP Pane

Element	Description
NTP Section	This section enables you to view the NTP details
System Peer	Indicates the number or name of the peer used in clock synchronization.
System Peer Mode	Indicates the NTP operation mode of the peer. The values are: • Unspecified • Broadcast—The peer (selected using the broadcast messages) is used to synchronize the Timing Server clock.

Table 10: Elements on the Timing Server Status Page—NTP Pane *(continued)*

Element	Description
Leap Indicator	Displays a warning about an impending leap second to be inserted or deleted in the last minute of the current day. The values are: • 0—No warning. • 1—Last minute has 61 seconds. • 2—Last minute has 59 seconds. • 3—Alarm condition, clock not synchronized.
Stratum	Indicates the stratum level of the Timing Server clock. The value ranges from 0 through 255.
Precision	Indicates the precision (in seconds) of the peer clock.
Root Delay	Indicates the total round trip delay (in seconds) to the primary reference source.
Root Dispersion	Indicates the maximum error (in seconds) relative to the primary reference source.
Reference ID	Displays the reference clock used for synchronization.
Reference Time	Indicates the time (in timestamp format) when the Timing Server clock was last updated.
System Flags	Displays the enabled NTP flags. The values are: • None—Flags are not enabled. • bclient—Broadcast Client flag is enabled. • auth—Authentication flag is enabled. • monitor—Monitor flag is enabled. • ntp—NTP support is enabled. • kernel—Kernel flag is enabled. • stats—Statistics flag is enabled. • calibrate—Calibrate flag is enabled. • pps—PPS flag is enabled.
Jitter	Indicates the magnitude of jitter (in milliseconds) between time queries.
Stability	Indicates the stability of the Timing Server clock to maintain a constant frequency.
Broadcastdelay	Indicates the round trip delay (in seconds) between the broadcast NTP servers.
Authdelay	Indicates the round trip delay (in seconds) between the authentication NTP servers.
NTP Association Section	**This section enables you to view the NTP association details.**
Remote	Displays the address or name of the remote NTP peer.
Local	Displays the address or name of the local clock.
St Poll	Displays the stratum of the remote peer and the polling interval (in seconds).

Table 10: Elements on the Timing Server Status Page—NTP Pane *(continued)*

Element	Description
Reach Delay	Displays the results of the last eight poll attempts and the current estimated delay (in milliseconds) of the peer.
Offset Disp	Displays the current estimated offset (in milliseconds) and the current estimated dispersion (in milliseconds) of the NTP peer.

The Status Page—GPS Pane (When GPS Option Is Connected)

Figure 35: Timing Server Status Page—GPS Pane

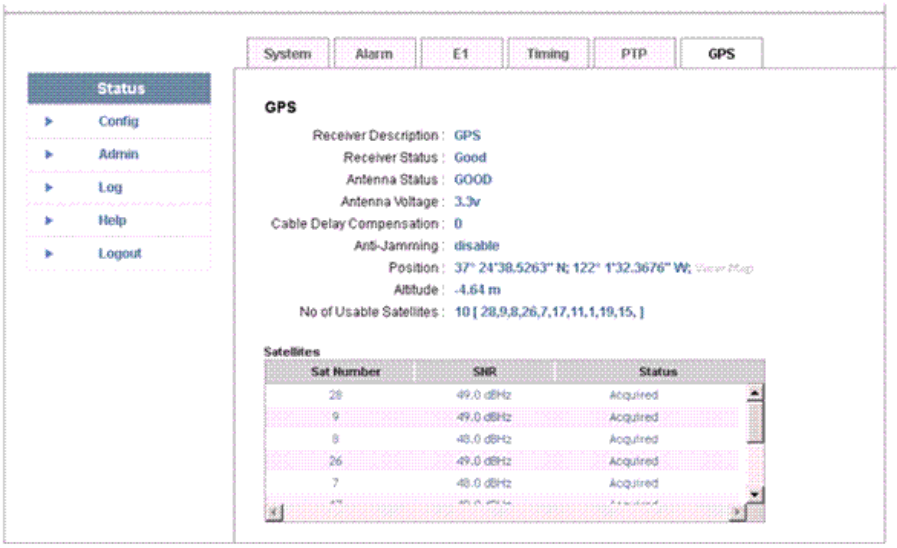


Table 11 on page 87 describes the elements that appear on the Status page—GPS Pane of the TCA8000 and TCA8500 Timing Servers.

Table 11: Elements on the Timing Server Status Page—GPS Pane

Element	Description
GPS Section	This section provides information about the GPS functionality
Receiver Description	Indicates the satellite source to which the Timing Server synchronizes time.

Table 11: Elements on the Timing Server Status Page—GPS Pane *(continued)*

Element	Description
Receiver Status	Indicates the GPS receiver status of the Timing Server clock. States are as follows: • No GPS Time. • Good—Receiver is functioning normally • No Usable Satellites. • Survey in Progress—GPS board is in self-survey mode and waiting to complete. Do not move unit until finished. • Position is Questionable—Saved stored position does not track to the GPS location while tracking present moment. • Almanac not Complete—GPS constellation information not completely downloaded. Upon initial power-on, can take up to 12.5 minutes.
Antenna Status	Indicates the condition of the connection between the Timing Server sync-server and the antenna. • Open—Electronically open. • Short—Electronically short. • Good—Electronically good.
Anti-Jamming	Indicates whether the anti-jamming functionality of the Resolution SMT GPS Timing Receiver is enabled or disabled. NOTE: This field is visible only if the TCA8000 and TCA8500 Timing Servers use the Resolution SMT GPS Timing Receiver.
Position	Indicates the coordinates of the Timing Server antenna.
Altitude	Indicates this height of the antenna as determined using GPS information relative to sea level. NOTE: Not accurate to survey height tied to GPS normalized altitude.
No. of Usable Satellites	Indicates the number of satellites observed with an appropriate SNR level.
Satellites Section	**This window provides information about the satellites to which the Timing Server has established a connection.**
Sat Number	Indicates the number of the satellite contacted.
SNR	Indicates the strength of the satellite signal. Typical SNR value should be 4 AMU or higher.
Status	Indicates the communication status between the satellite and the Timing Server. • Acquired—Communication is established. • Never Acquired—Communication with a satellite has never been established.

CHAPTER 7

Understanding the TCA8000 and TCA8500 Config Page

This chapter describes the Config page for the Juniper Networks TCA8000 and TCA8500 Timing Servers. The following topics are addressed:

Config Page Description

The Config pages enable you to change the IP address assigned to your TCA8000 or TCA8500 Timing Server, change the sync source priority, configure T1 output ports, set SNMP access parameters, and adjust the PTP or NTP parameters to be used by the Timing Server, manage user accounts, and configure RADIUS accounting and authentication servers.

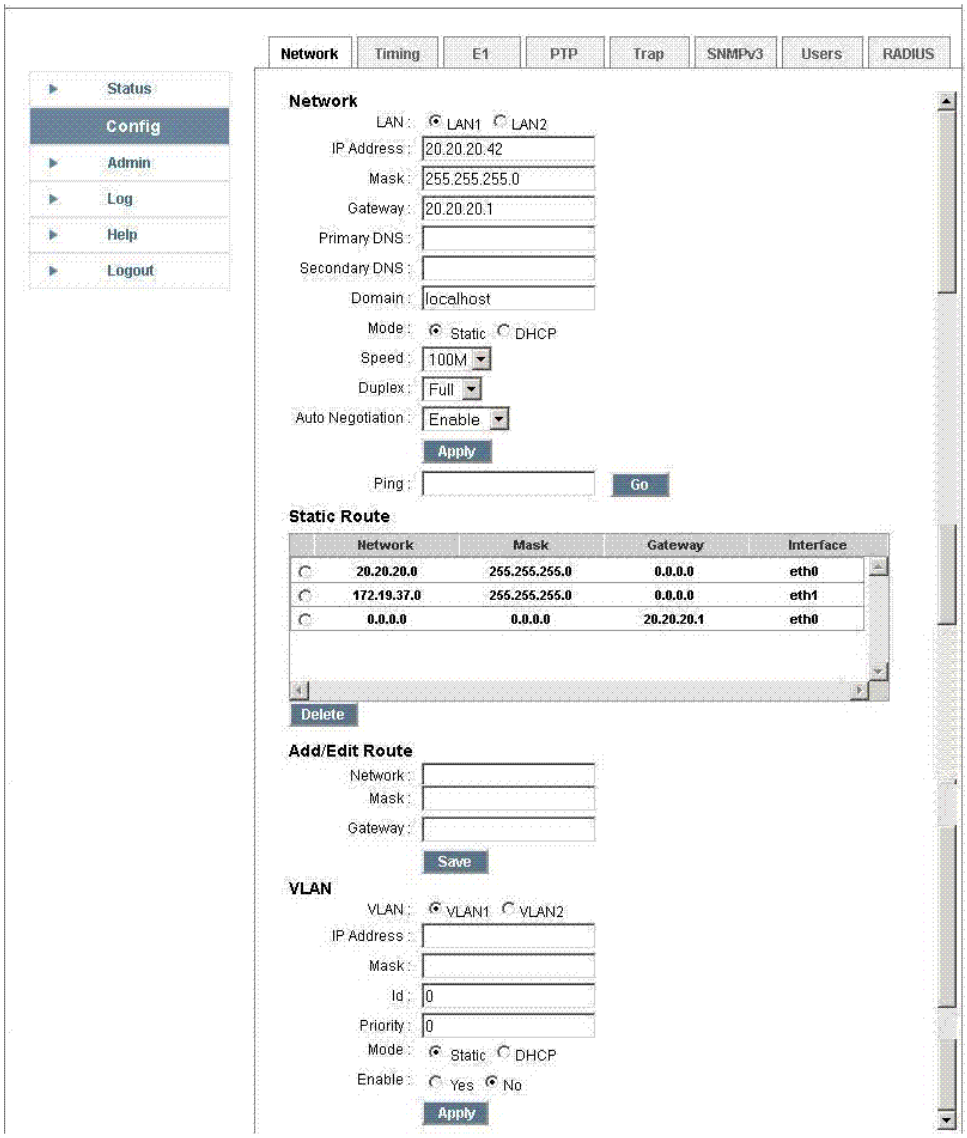
NOTE: **The Config pages are not visible to the Read-Only users.**

Accessing the Config Page

To access the TCA8000 or TCA8500 Timing Server Config page:

1. Log in to the Timing Server.
2. Click the **Config** tab. The Config page appears. See Figure 36 on page 90.

Figure 36: Timing Server Config Page—Network Pane



NOTE:

- After the Config page opens, click the Refresh button in your browser. This will update the page.
- If the NTP support is enabled in the Timing Server, the Config page displays the NTP tab instead of the PTP tab and also displays the MD5 tab. By default, the PTP support is enabled in the Timing server.

Understanding the Config Page

The Config Page—Network Pane

Figure 37: Timing Server Config Page—Network Pane

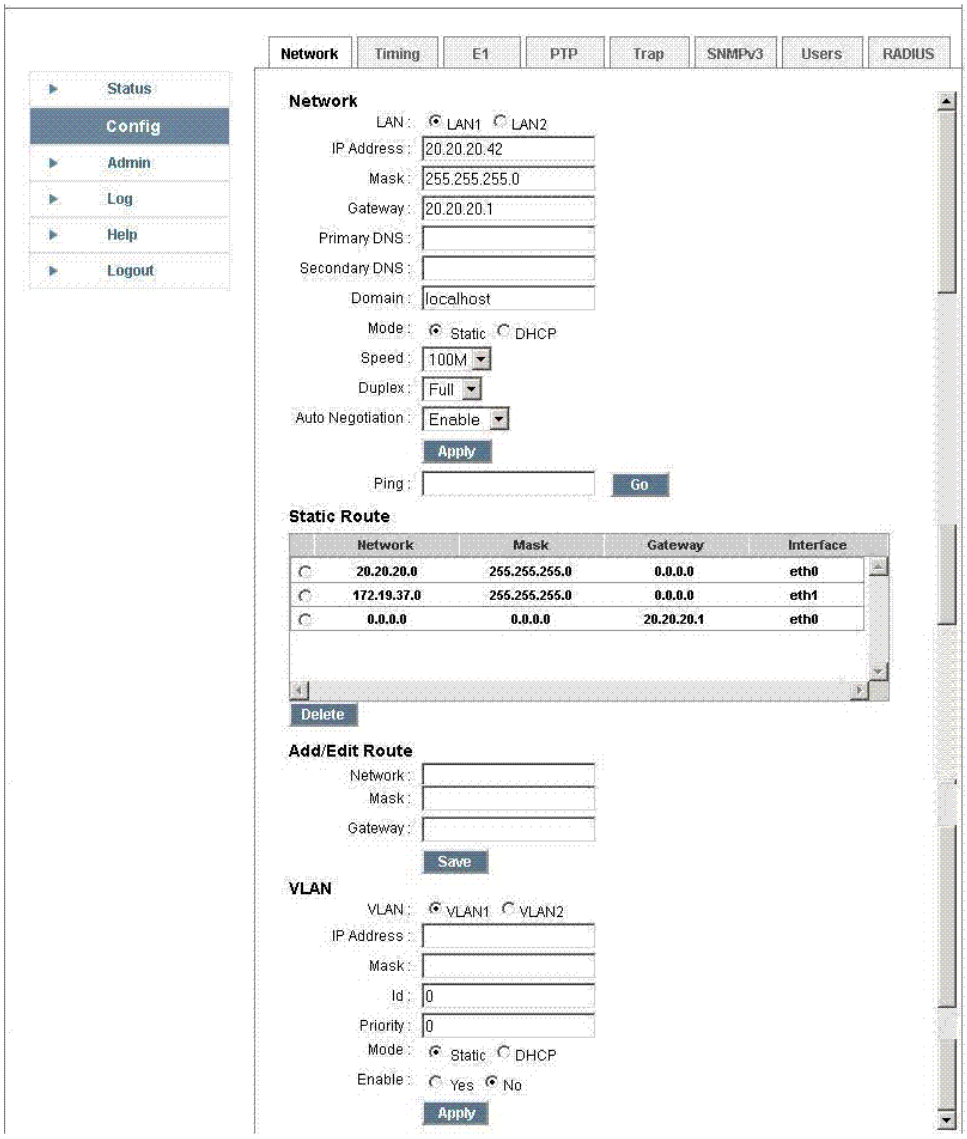


Table 12 on page 92 describes the elements that appear on the Config page—Network pane of the TCA8000 and TCA8500 Timing Servers.

Table 12: Elements on the Timing Server Config Page—Network Pane

Element	Description
Network Section	This section allows you to change the network related parameters for the Timing Server.
LAN1/LAN2 Radio Buttons	Allows the user to change the network setting for LAN port 1/2.
IP Address	The IP address assigned to the selected port.

Table 12: Elements on the Timing Server Config Page—Network Pane *(continued)*

Element	Description
Mask	The subnet mask assigned to the selected port.
Gateway	The IP address of the gateway the Timing Server uses to communicate across the network. NOTE: TCA supports only one default gateway for both eth0 and eth1 interfaces.
Primary DNS	IP address of the primary DNS the Timing Server uses.
Secondary DNS	IP address of the secondary DNS the Timing Server uses.
Domain	Domain name of the LAN.
Mode	Allows you to select the method you want the Timing Server to use to obtain an IP address. • Static—Choose this option button to manually assign an IP address. • DHCP—Choose this option button to have the network assign an IP address to the Timing Server.
Speed	Allows you to select either 100Mbps or 10Mbps for the LAN port.
Duplex	Allows you to select either full or half duplex mode for the LAN port.
Auto Negotiation	Allows you to enable or disable auto negotiation for the LAN port.
Ping	Allows you to ping a device on the network by entering the device IP address in the box next to the **Go** button. • **Go** Button—Click this button to run the ping command.
VLAN Section	**This section allows you to configure or change the VLAN related parameters for the Timing Server.**
VLAN	Use the option button to configure or change the VLAN settings per Ethernet port (that is, LAN1 (eth0) and LAN2 (eth1)).
IP Address	Enter the IP address for the selected VLAN.
Mask	Enter the subnet mask assigned to the selected VLAN.
Id	Enter the VLAN ID ranging from 2 through 4095, which is used to identify the VLAN encapsulation packet.
Priority	Enter a priority value for the VLAN header to be used for differential services transporting the packet. This value ranges from 0 through 7.
Mode	Select a mode to be used by the Timing Server to obtain an IP address for the VLAN. • Static—Select this option to manually assign an IP address for the VLAN. • DHCP—Select this option if you want the IP address to be automatically assigned for the VLAN by using the DHCP server.

Table 12: Elements on the Timing Server Config Page—Network Pane *(continued)*

Element	Description
Enable	Use the option button to enable or disable VLAN encapsulation for IP packets.
Apply	Click to save and implement the changes.

The Config Page—Timing Pane

Figure 38: Timing Server Config Page—Timing Pane

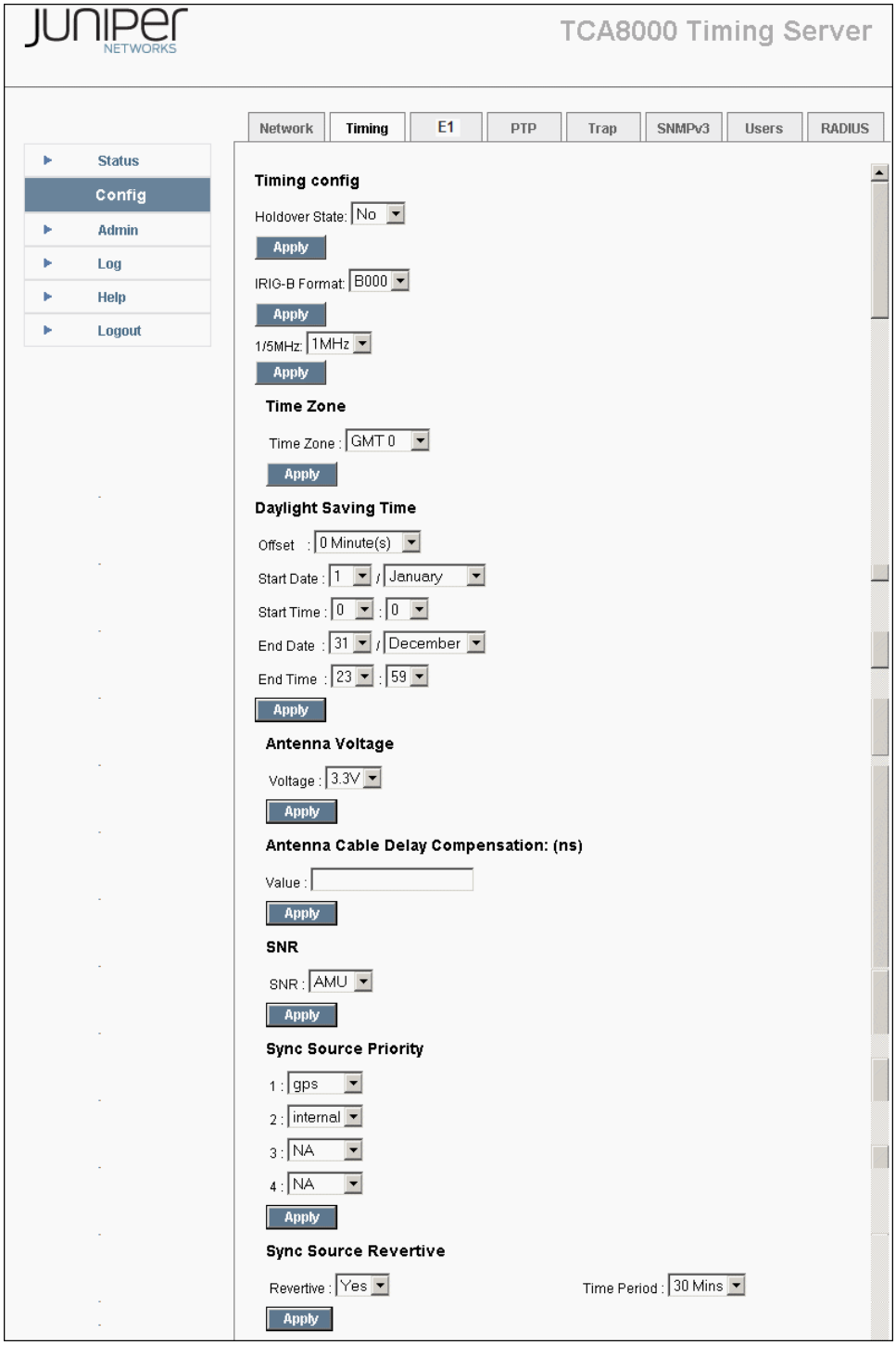


Table 13 on page 96 describes the elements that appear on the Config page—Timing pane of the TCA8000 and TCA8500 Timing Servers.

Table 13: Elements on the Timing Server Config Page—Timing Pane

Element	Description
Timing Config Section	**This section allows the user to configure the timing output options on the Timing Server.**
Holdover State	Allows you to set the TCA system to remain in the holdover state or change to the internal state after 24 hours of holdover state. • Yes—The system remains in the holdover state instead of changing to the internal state after 24 hours of holdover state. However, the system changes to the internal state when the signal is lost during acquisition, locking, or resetting the system. • No (default)—The system changes to the internal state after 24 hours of holdover state.
IRIG-B Format	Allows you to set the IRIG-B output format.
1/5MHz	Allows you to set the frequency of the 5/1 MHz output port.
Time Zone Section	**Allows you to set the local time zones.**
Time Zone	Allows you to set the local time zone.
Daylight Saving Time Section	**Allows you to adjust the clock for DST.**
Offset	Allows you to select the time period (in minutes) to be adjusted for DST. The default value is 0 minute (that is, the DST is turned off).
Start Date	Allows you to select the date and month on which the DST starts. The default value is 1st January.
Start Time	Allows you to select the UTC time scale (in 24-hour format) at which the DST starts. The default value is 00:00 UTC (GMT).
End Date	Allows you to select the date and month on which the DST ends. The default value is 31st December.
End Time	Allows you to select the DST time scale (in 24-hour format) at which the DST ends. The default value is 23:59 DST.
Antenna Voltage Section	**Allows user to set antenna voltage.**
Voltage	Allows you to set the antenna voltage to be either 3.3V or 5V.
Antenna Cable Delay Compensation (ns)	Allows you to set a delay compensation value to compensate for varying cable lengths. This value ranges from -10000 through 10000 nanoseconds. NOTE: You are advised to enter: • A negative delay compensation value to compensate the positive delay introduced by the cable. • A positive delay compensation value to advance the PPS output delay relative to the absolute value.

Table 13: Elements on the Timing Server Config Page—Timing Pane *(continued)*

Element	Description
SNR Section	**Allows user to select different display format for the GPS satellite signal and noise ratio.**
SNR	Allows you to set the signal strength display format to be either AMU or dBHz NOTE: This field is not visible if the TCA8000 and TCA8500 Timing Servers use the Resolution SMT GPS Timing Receiver. The AMU is not an industry standard unit of measurement.
Sync Source Priority Section	**Allows you to configure the priority of various synchronization reference sources. Available options are NA, gps, e1, or internal.** NOTE: The t1 option is displayed instead of e1 when the Timing Server uses T1 interface type.
Priority List	Allows you to enable a priority to be assigned to a reference source. The sync source list is arranged in orders of priority, with 1 being the highest order.
Apply	Allows you to save the current configuration.
Sync Source Revertive Section	**Allows you to configure the synchronization source revertive feature.** NOTE: This section is visible only to the Admin user.
Revertive	Allows you to configure the synchronization source selection mode. By default, the synchronization source selection mode is set as revertive. • Yes—Sets the synchronization source selection mode as revertive. • No—Sets the synchronization source selection mode as non-revertive.
Time Period	Allows you to select the time period used by the Timing Server for changing back to the available highest priority synchronization source when the synchronization source selection mode is set as revertive. The default value is 0 minute. • 0 Min • 10 Min • 20 Min • 30 Min • 40 Min • 50 Min • 60 Min
Apply	Allows you to save the revertive feature configuration.
AntiJamming Section	**This section allows you to enable or disable the anti-jamming capability of the Resolution SMT GPS Timing Receiver.** NOTE: This section is visible only if the TCA8000 and TCA8500 Timing Servers use the Resolution SMT GPS Timing Receiver.

Table 13: Elements on the Timing Server Config Page—Timing Pane *(continued)*

Element	Description
Anti-Jamming	Allows you to enable or disable the anti-jamming capability of the Resolution SMT GPS Timing Receiver. • Enable—Enables the anti-jamming capability of the Resolution SMT GPS Timing Receiver. • Disable—Disables the anti-jamming capability of the Resolution SMT GPS Timing Receiver.
Apply button	Allows you to save the anti-jamming configuration.

The Config Page—E1 Pane

Figure 39: Timing Server Config Page—E1 Pane

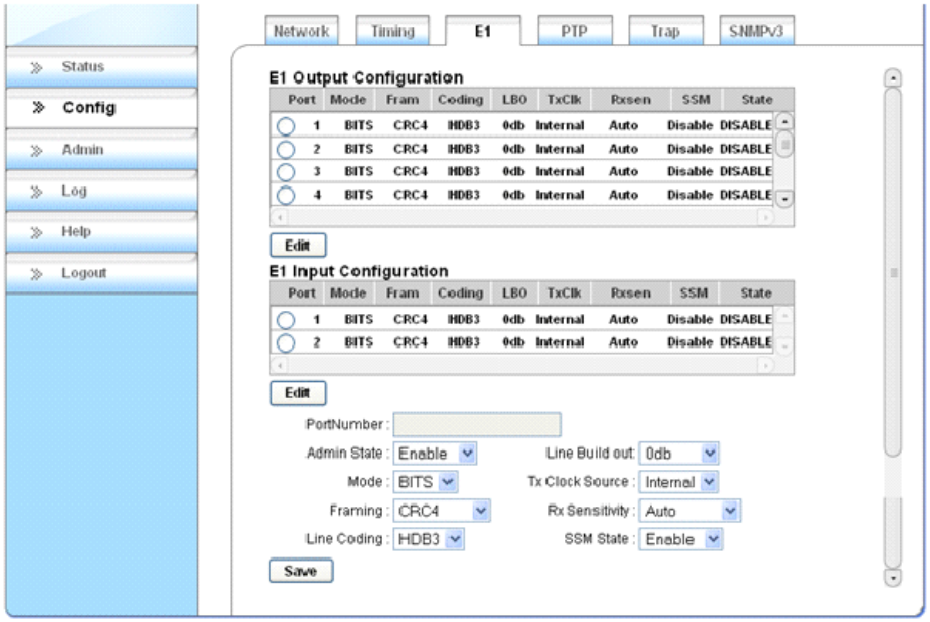


Table 14 on page 98 describes the elements that appear on the Config page—E1 pane of the TCA8000 and TCA8500 Timing Servers.

Table 14: Elements on the Timing Server Config Page—E1 Pane

Element	Description
E1 Output Configuration Section	This windows displays the available E1 output ports and their current configuration.
Port	Port number.
Mode	Describes E1 port mode as BITS.

Table 14: Elements on the Timing Server Config Page—E1 Pane *(continued)*

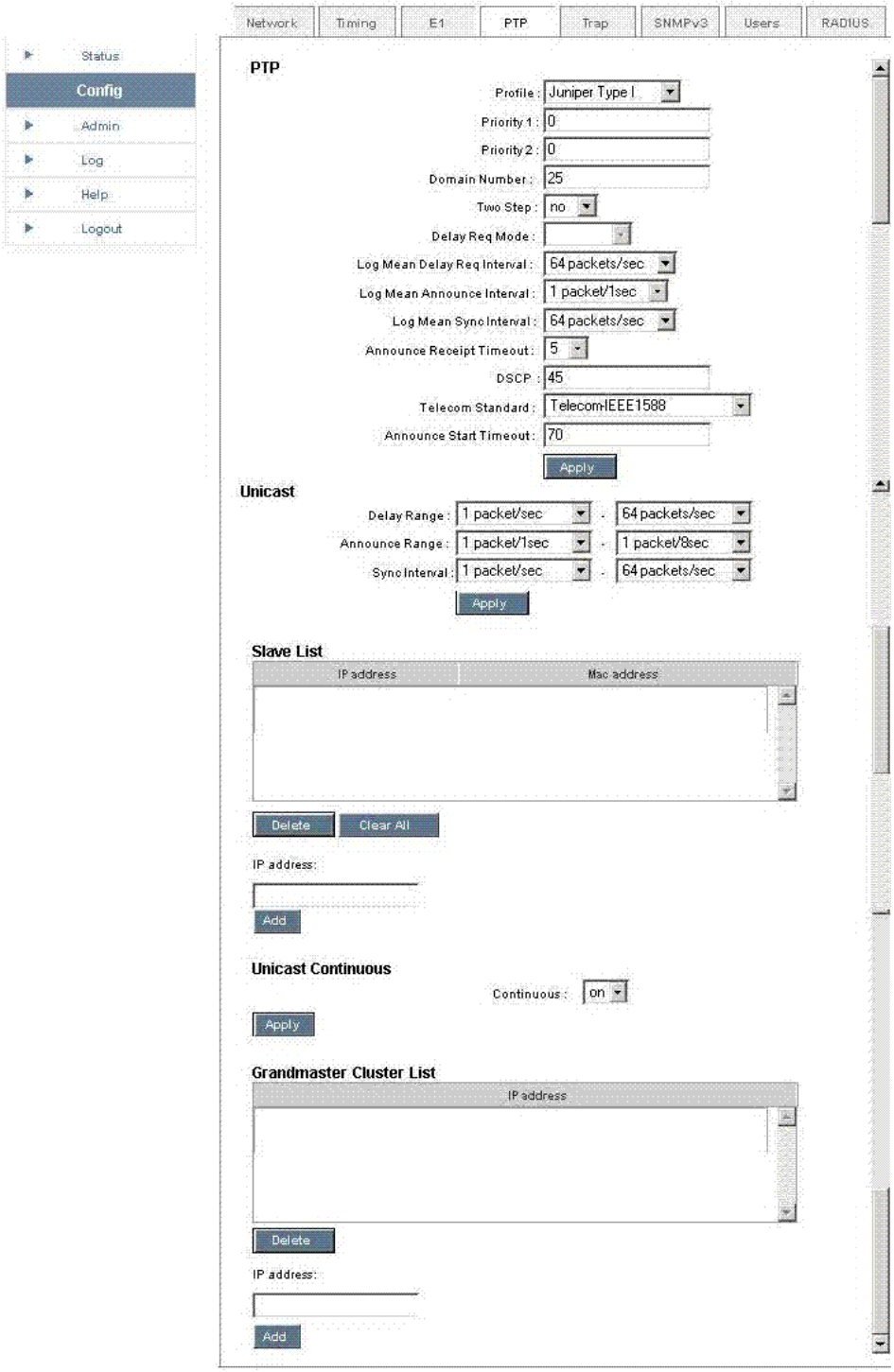
Element	Description
Frame	Describes E1 Framing modes: • CRC4 = Common Channel Signaling (CCS) +CRC4. • No CRC4 = Common Channel Signaling (CCS). • Channel Associated Signaling (CAS) is NOT supported.
Coding	Describes E1 line coding, HDB3, or 2.048MHz (2 MHz) clock.
LBO	E1 Line Build Out (dB): • 0dB • –7.5dB • –15dB • –22.5dB
TxClk	Describes the Tx clock source as internal.
RxSen	Describes the Rx clock sensitivity: • Auto • Short Haul • LongHaul
SSM	Describes Synchronization Status Message state. Options are Enable or Disable.
State	Describes admin state. Options are Enable or Disable.
Edit Button	Allows the user to edit the parameters of the selected output port using the pull-down manuals at the bottom of the page.
E1 Input Configuration Section	This windows displays the available E1 input ports and their current configuration.
Port Number	Allows the user to configure the port number.
Frame	Allows user to configure E1 Framing modes: • CRC4 = Common Channel Signaling (CCS) +CRC4. • No CRC4 = Common Channel Signaling (CCS). • Channel Associated Signaling (CAS) is NOT supported.
Line Coding	Allows user to configure E1 line coding. HDB3, or 2.048MHz (2MHz) clock.
Line Build Out (LBO)	E1 Line Build Out (DB): • 0dB • –7.5dB • –15dB • –22.5dB

Table 14: Elements on the Timing Server Config Page—E1 Pane *(continued)*

Element	Description
Rx Sensitivity	Allows the user to configure the Rx Clock Sensitivity. Options are: • Auto • Short Haul • Long Haul
SSM	Allows the user to configure Synchronization Status Message state. Options are Enabled or Disabled.
State	Describes admin state, Enable or Disable.
Edit Button	Allows the user to edit the parameters of the selected output port using the pull-down manuals at the bottom of the page.
Port Number	Allows the user to configure the port number.
Admin State	Allows the user to enable or disable the port.
Mode	Allows user to configure E1 port mode. For the current software release, only BITS is supported.
Framing	Allows user to configure E1 Framing modes: • CRC4 = Common Channel Signaling (CCS) +CRC4. • No CRC4 = Common Channel Signaling (CCS). • Channel Associated Signaling (CAS) is NOT supported.
Line Coding	Allows user to configure E1 line coding. HDB3, or 2.048MHz (2MHz) clock.
Line Build Out (LBO)	E1 Line Build Out (DB): • 0dB • –7.5dB • –15dB • –22.5dB
Tx Clock Source	Allows user to configure Tx clock source. For the current software release, only Internal is supported.
Rx Sensitivity	Allows the user to configure the Rx Clock Sensitivity. Options are: • Auto • Short Haul • Long Haul
SSM State	Allows user to configure Synchronous Status Message, either enable or disable.

The Config Page—PTP Pane

Figure 40: Timing Server Config Page—PTP Pane



NOTE: You can view this pane only if the PTP support is enabled in the Timing Server.

Table 15 on page 102 describes the elements that appear on the Config page—PTP pane of the TCA8000 and TCA8500 Timing Servers.

Table 15: Elements on the Timing Server Config Page—PTP Pane

Element	Description
PTP Config Section	This window lists devices with which the Timing Server has a PTP relationship
Profile	Allows you to select the PTP profiles supported by the Timing Server. • 0: Default (Default: 0) • 1: Juniper Type I • 2: Telecom Profile (By default, signalling is disabled, but can be enabled using the CLI) • 3: Juniper Type II
Priority 1	Allows you to enter a value within the range of 0 through 254 to configure the Priority 1 parameter of the Timing Server for proper Best Master Clock (BMC) algorithm operation. 0 to 254 (Default: 128)
Priority 2	Allows you to enter a value within the range of 0 through 254 to configure the Priority 2 parameter of the Timing Server for proper Best Master Clock (BMC) algorithm operation. 0 to 254 (Default: 128)
Domain Number	Allows you to select a value within the range of 0 through 254 to configure the PTP domain for the Timing Server, which then becomes a synchronization reference source to all the slave clocks within the same domain using the PTP protocol. 0 to 254 (Default: 0) PTP protocol. 0 to 254 (Default: 0)
Two Step	Configure the Timing Server to use either one-step or two-step messaging mechanism 0:no (Default: 0) 1:yes
Log Mean Delay Req Interval	Allows you to select a minimum mean time interval at which you want the Timing Server to respond to successive Delay Request packets from a slave clock. The default value is 32 pps. • 1 packet/sec • 2 packets/sec • 4 packets/sec • 8 packets/sec • 16 packets/sec • 32 packets/sec • 64 packets/se

Table 15: Elements on the Timing Server Config Page—PTP Pane *(continued)*

Element	Description
Log Mean Announce Interval	Allows you to select a mean time interval between successive Announce messages. The default value is 1 pps. • 1 packet/sec • 2 packets/sec • 4 packets/sec • 8 packets/sec
Log Mean Sync Interval	Allows you to select a mean time interval between successive Sync messages. The default value is 32 pps. • 1 packet/sec • 2 packets/sec • 4 packets/sec • 8 packets/sec • 16 packets/sec • 32 packets/sec • 64 packets/sec
Announce Receipt Timeout	2 to 10 intervals
DSCP	Enter the Differential Service (DiffServ) value for the IP packet. NOTE: This should be configured to Explicit Forward (EF) which is a value of 46 decimal.
Telecom Standard	Allows you to select the telecom standard to be implemented with the telecom profile for advertising the announce message based on the selected standard. The default standard is Telecom-IEEE1588. The telecom standard defines the clock class value in Freerun, Acquire, Lock and Holdover states. • Telecom-IEEE1588 • Telecom-G8265.1-option 1 • Telecom-G8265.1-option 2 • Telecom-G8275.1 NOTE: You can select a specific telecom standard only if the Profile field is set as Telecom Profile. For other profiles, the telecom standard is always set as Telecom-IEEE1588.

Table 15: Elements on the Timing Server Config Page—PTP Pane *(continued)*

Element	Description
Announce Start Timeout	Allows you to enter a value within the range of 0 through 120 minutes to delay the transmission of announce messages. On rebooting, the TCA Timing Server starts transmitting the announce messages for the synchronization source selection if any one of the following condition is satisfied: • After the expiry of the configured timeout value • Any configured synchronization source is locked to the frequency within the configured timeout value When you set the value as 0 (default value), the transmission delay feature is disabled. NOTE: • The transmission delay feature is applicable only to the first lock state of any synchronization source. • The configured timeout value is effective on next reboot.
Apply	Click this button to save the PTP configuration changes.
Unicast Section	**This section allows you to configure the unicast related parameters.**
Delay Range	Select the range for delay request or response event message rate. The available options are: • **1 packet/sec** • **2 packets/sec** • **4 packets/sec** • **8 packets/sec** • **16 packets/sec** • **32 packets/sec** • **64 packets/sec** NOTE: It is recommended that the range be set for the full range support (that is, minimum = 1 pps and maximum = 64 pps).
Announce Range	Select the range for announce interval message rate. The available options are: • **1 packet/1 sec** • **1 packet/2 sec** • **1 packet/4 sec** • **1 packet/8 sec** NOTE: It is recommended that the range be set for the full range support (that is, minimum = 1 packet/1 sec and maximum = 1 packet/8 sec).

Table 15: Elements on the Timing Server Config Page—PTP Pane *(continued)*

Element	Description
Sync Interval	Select the range for sync event message rate. The available options are: • **1 packet/sec** • **2 packets/sec** • **4 packetss/sec** • **8 packet/sec** • **16 packets/sec** • **32 packets/sec** • **64 packets/sec** NOTE: It is recommended that the range be set for the full range support (that is, minimum = 1 pps and maximum = 64 pps).
Apply	Click this button to save the unicast parameter changes.
Slave List Section	This section allows you to add or delete the Timing Clients (Slaves) for the Timing Server through which the Grandmaster sends or receives event messages.
Slave List window	Displays a list of Timing Clients with their IP addresses and MAC addresses.
Delete	Click to delete the selected Timing Client entry.
Clear All	Click to delete all the Timing Client entries in the **Slave List** window.
IP Address	Enter the IP address of the Timing Client (Slave) for the Timing Server.
Add	Click to add the Timing Client (Slave) to the Timing Server.

TCA8000 and TCA8500 Timing Server Configurable Profiles

- Default Profile:
  - Supports One-step and Two-step modes
  - Process Multicast Announce/Sync/Delay Response
  - Sends Multicast Delay Request with 32 pps or 64 pps.
  - There is no Signaling/Management Packet support.
- Juniper Profile:
  - Supports One-step and Two-step modes
  - Process Multicast Announce/Sync and Unicast Delay Response
  - Sends Unicast Delay Request with 32 pps or 64 pps.
  - There is no Signaling/Management Packet support.
- Telecom Profile:

- Supports One-step mode only
- Process Unicast Announce/Sync and Unicast Delay Response
- Sends Unicast Delay Request with 32 pps or 64 pps.
- Master's BMC between the Grandmaster Table Masters.
- Max Grandmaster supported is three (3)
- There is no Signaling/Management Packet support Manual Configuration of Slave IP Address.
- Automatic MAC Auto Discovery – need to configure MAC Address
- Total 256 Unicast Slave support
- Supports OneStep mode only
- Sends one ARP request for slave every approximately 128 seconds when unicast continuous enable case.
- Sends one ARP request to gateway ip address for every 1 minute when unicast continuous enable case.
- In Telecom Profile Mode - Make sure all masters in the Grandmaster Cluster table point to other masters and have same unicast slave table configuration for BMC to work.

```
UNICAST SLAVE Table:
     SLAVE S1:  10.1.10.1
      SLAVE S2:  10.1.10.2
      SLAVE S3:  10.1.10.3
      ……..
      ……..
     SLAVE S256:  10.1.12.23
```

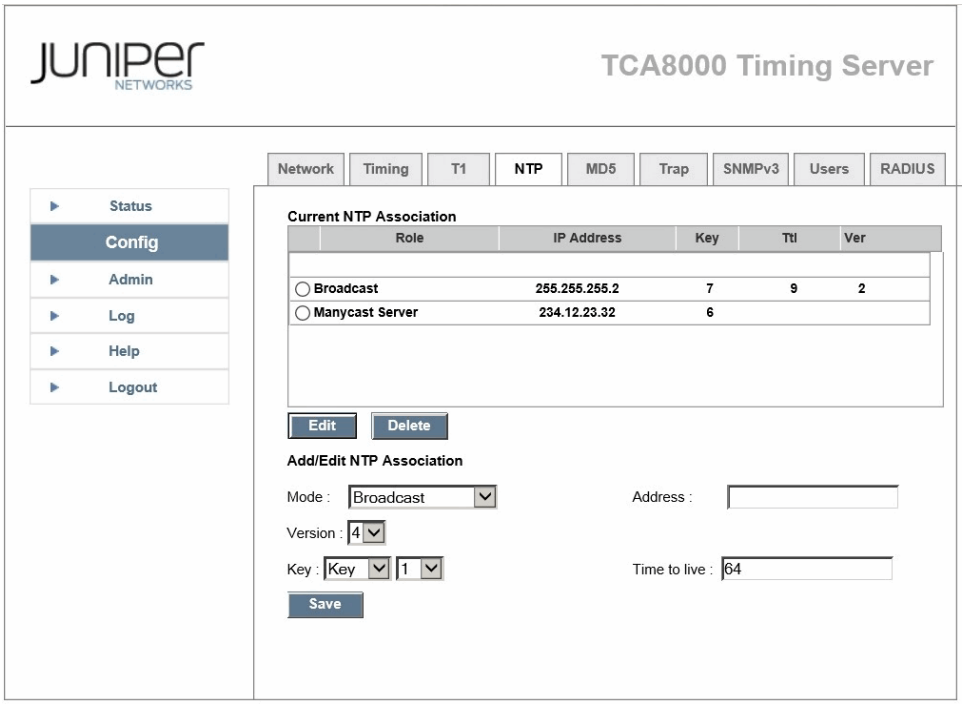
- Master supports signaling messages to the following extent
  - Process REQUEST UNICAST TRANSMISSION for Announce, SYNC and delay responses
  - Support GRANT UNICAST TRANSMISSION for SYNC and Delay Response

Table 16: Configuration for Each Profile

Profile	Event Message Type	Setting
Brilliant/Juniper Profile	Sync/Delay Response	Multicast
	Delay Request	Unicast
Telecom Profile	Sync/Delay Response	Unicast
	Delay Request	Unicast
Default Profile	Sync/Delay Response	Multicast
	Delay Request	Multicast

The Config Page—NTP Pane

Figure 41: Timing Server Config Page—NTP Pane



NOTE: You can view this pane only if the NTP support is enabled in the Timing Server.

Table 17 on page 107 describes the elements that appear on the Config page—NTP pane of the TCA8000 and TCA8500 Timing Servers.

Table 17: Elements on the Timing Server Config Page—NTP Pane

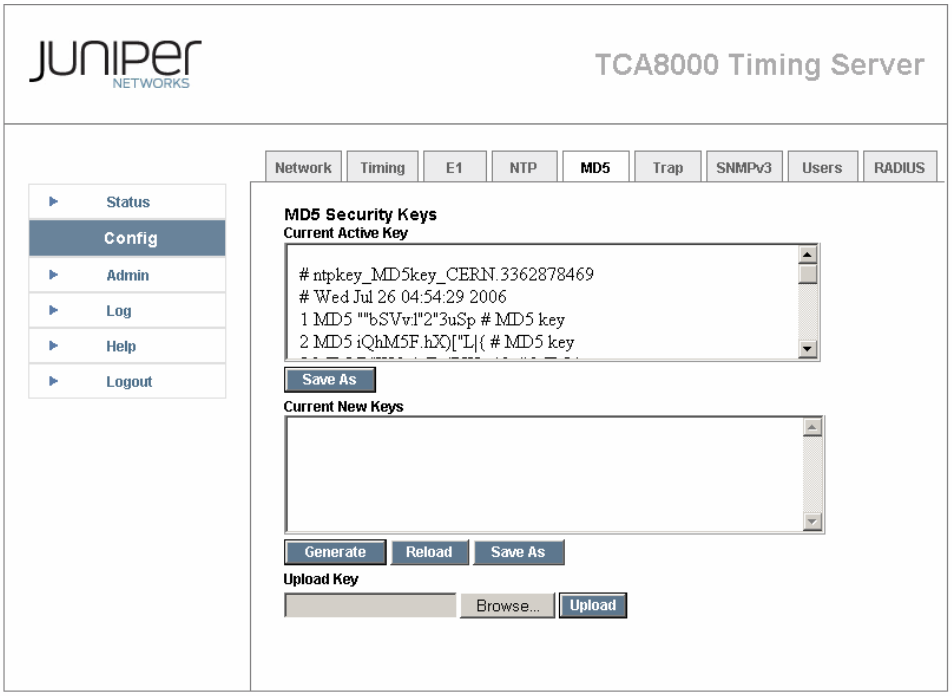
Element	Description
Current NTP Association Section	This section enables you to view and configure the current NTP association details.
Current NTP Association Window	Displays a list of NTP association entries with their corresponding configuration details.
Edit Button	Click to modify the configuration details of the selected NTP entry using the elements at the bottom of the page.
Delete Button	Click to delete the selected NTP entry. NOTE: Timing Server should be restarted if a manycast server NTP entry is deleted.

Table 17: Elements on the Timing Server Config Page—NTP Pane *(continued)*

Element	Description
Add/Edit NTP Association Section	This section enables you to add or edit NTP association details. NOTE: You can add only a maximum of 20 NTP association entries. Each NTP association entry should have a unique IPv4 address configured.
Mode	Select the NTP operation mode to be used by the Timing Server for implementing clock synchronization. • Broadcast—All remote peers available in the mentioned network or in the mentioned multicast group are synchronized to the Timing Server but the Timing Server is not synchronized to any of the remote peer. • Manycast Server—If the Timing Server is in scope of the current time-to-live (TTL), synchronized to a valid source, and operating at a stratum level equal to or lower than the manycast client, the manycast client is synchronized to the Timing Server.
Address	Enter an IPv4 address for the NTP association. If the mode is set to Broadcast, you can enter only a Class D address or the broadcast address of a local interface. If the mode is set to Manycast Server you can enter only a Class D address.
Version	Select the version to be used for the outgoing NTP packets. The available options are 1, 2, 3, and 4. The default version is 4. NOTE: This list appears dimmed if you have selected the **Manycast Server** mode.
Key	Select the key identifier that is used to encrypt the authentication fields included in all transferred NTP packets. The available options are None, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16. The key identifier is set to None (no encryption field is included in the NTP packets) by default.
Time to live	Enter a TTL value that defines the number of hops for the NTP packets. The value ranges from 1 through 255. The default value is 64. NOTE: This field appears dimmed if you have selected the **Manycast Server** mode.
Save Button	Click to save the changes.

The Config Page—MD5 Pane

Figure 42: Timing Server Config Page—MD5 Pane



NOTE: You can view this pane only if the NTP support is enabled in the Timing Server.

Table 18 on page 109 describes the elements that appear on the Config page—MD5 pane of the TCA8000 and TCA8500 Timing Servers.

Table 18: Elements on the Timing Server Config Page—MD5 Pane

Element	Description
Current Active Key Section	This section enables you to view the current active MD5 key list.
Current Active Key window	Displays the currently active MD5 key list, which is stored in the /etc/config/ntp/keys path.
Save As Button	Click to download the currently active MD5 key list.
Current New Keys Section	This section enables you to view and configure the MD5 key list.
Current New Keys window	Displays the new MD5 key list, which is stored in the /etc/config/ntp/tempkeys path.
Generate Button	Click to generate MD5 key list by using the system command **ntp-keygen**. This generated key list is stored in the /etc/config/ntp/tempkeys path.

Table 18: Elements on the Timing Server Config Page—MD5 Pane *(continued)*

Element	Description
Reload Button	Click to reload the new MD5 key list.
Save As Button	Click to download the new MD5 key list.
Upload Key Section	This section enables you to upload new MD5 keys.
Upload Key	Displays the file (including path) containing new MD5 keys. These keys are merged with the list stored in the /etc/config/ntp/tempkeys path.
Browse Button	Click to locate the file containing new MD5 keys.
Upload Button	Click to upload new MD5 keys.

The Config Page—Trap Pane

Figure 43: Timing Server Config Page—Trap Pane

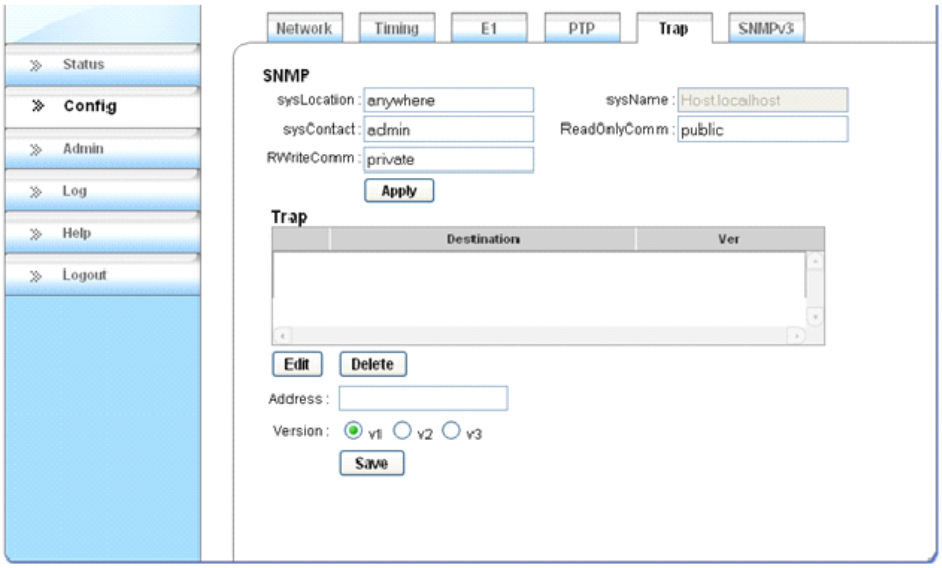


Table 19 on page 110 describes the elements that appear on the Config page—Trap pane of the TCA8000 and TCA8500 Timing Servers.

Table 19: Elements on the Timing Server Config Page—Trap Pane

Element	Description
SNMP Section	This section allows you to set the SNMP contact parameters to be used by the Timing Server.
sysLocation	Specifies the location of the Timing Server.
sysName	Provides information describing the Timing Server.

Table 19: Elements on the Timing Server Config Page—Trap Pane *(continued)*

Element	Description
sysContact	Specify contact information of the administrator assigned to manage the Timing Server.
ReadOnlyComm	Enter the command the network will use to request read community strings.
RWriteComm	Enter the command the network will use to request write community strings.
Apply Button	Click to save SNMP parameters.
Trap Section	View and specify trap destinations to which the Timing Server sends alarm information.
Destination	The IP address of the trap to which the Timing Server sends SNMP data.
Ver	Version of the SNMP trap.
Edit Button	Edit the parameters of the trap destination.
Delete	Delete the trap destination.
Address	Enter the IP address of the Trap to which the Timing Server will send alarm information.
Version	Allows you to specify version of the SNMP trap.
Save Button	Save information.

The Config Page—SNMPv3 Pane

Figure 44: Timing Server Config Page—SNMPv3 Pane

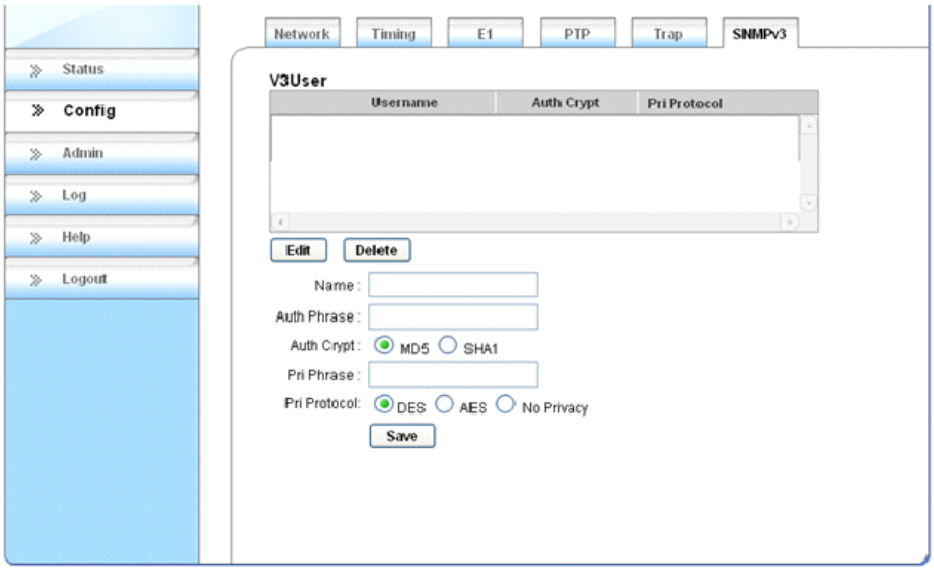


Table 20 on page 112 describes the elements that appear on the Config page—SNMPv3 pane of the TCA8000 and TCA8500 Timing Servers.

Table 20: Elements on the Timing Server Config Page—SNMPv3 Pane

Element	Description
V3User Section	The V3User section allows the identification of SNMPv3 users who have access to information about the Timing Server.
Username	Login name of the SNMPv3 user.
Auth Crypt	Allows you to specify the type of encryption you want this SNMPv3 user to use to log in to the Timing Server.
Pri Protocol	Allows you to configure the privacy protocol for this SNMPv3 user.
Edit Button	Edit the parameters for the SNMPv3 user.
Delete Button	Removes a user from the list.
Name	The username assigned to access the Timing Server.
Auth Phrase	Create an authentication password for this user. The password must be six or more characters long.
Auth Crypt	Selects encryption type: • MD5—Use MD5 cryptographic scheme • SHA1—Use SHA1 cryptographic scheme
Pri Phrase	Allows you to create a unique encryption privilege-phrase pass phrase for messages exchanged between the user and the Timing Server.
Pri Protocol	Allows you to configure the privacy protocol for the SNMPv3 user. • DES = Use DES (Data Encryption Standard) • AES = Use AES (Advanced Encryption Standard) • No Privacy = Do not use encryption
Save Button	This button allows you to add this user to the V3User window and to save this information.

The Config Page—Users Pane

Figure 45: Timing Server Config Page—Users Pane

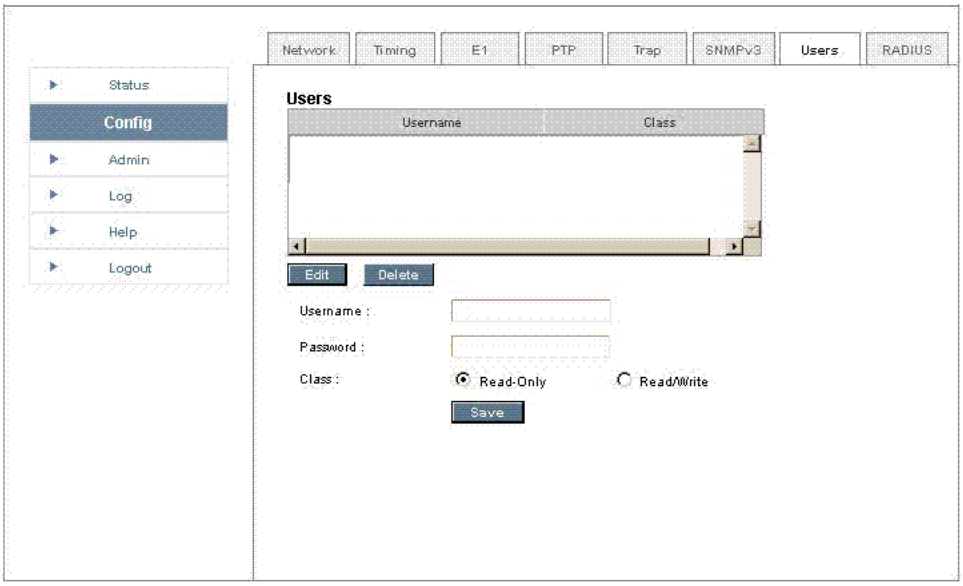


Table 21 on page 113 describes the elements that appear on the Config page—Users pane of the TCA8000 and TCA8500 Timing Servers.

NOTE: For Read/Write users, the Profile pane is available instead of the Users pane. The Users pane is visible only to the Admin user. For information about the Profile pane, see "The Config Page—Profile Pane" on page 114.

Table 21: Elements on the Timing Server Config Page—Users Pane

Element	Description
Users Section	This section allows you (Admin user) to view and configure user account details
Users Window	Displays a list of configured user accounts with their username and login class details. NOTE: • Account information of the Admin user is not displayed in this list. Only the information of the Read-Only and Read/Write users is listed. • You can create only a maximum of five user accounts.
Edit Button	Click to modify the configuration details of the selected user account.
Delete Button	Click to delete the selected user account from the user account list.
Username	Enter the username for the user account. The character length ranges from 4 through 12 characters. The characters that can be used are alphanumeric and underscore (that is, _).

Table 21: Elements on the Timing Server Config Page—Users Pane *(continued)*

Element	Description
Password	Enter the password for the user account. The character length ranges from 4 through 12 characters. The characters that can be used are alphanumeric and special characters (that is, !@#$_).
Class	Select to configure the login class for the user account. The options are: • ReadOnly—User is given show view privilege. For more information, see Table 3 on page 22. • Read/Write—User is given modify privilege. For more information, see Table 3 on page 22.
Save Button	Click to save the changes.

The Config Page—Profile Pane

Figure 46: Timing Server Config Page—Profile Pane

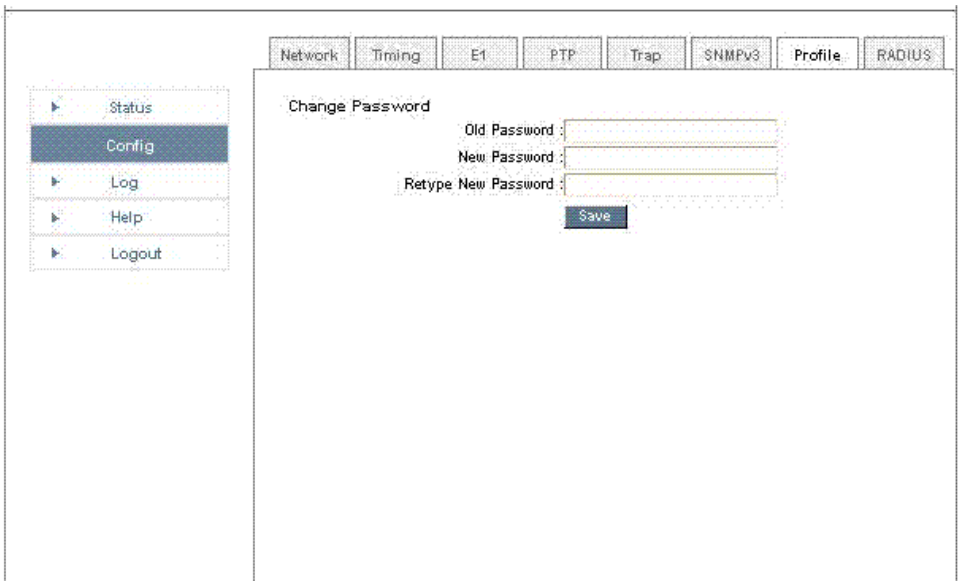


Table 22 on page 114 describes the elements that appear on the Config page—Profile pane of the TCA8000 and TCA8500 Timing Servers.

NOTE: For the Admin user, Users pane is available instead of the Profile pane. Profile pane is visible only to the Read/Write user. For information about the Users pane, see "The Config Page—Users Pane" on page 113. The password of the Admin user can be changed from the Admin page.

Table 22: Elements on the Timing Server Config Page—Profile Pane

Element	Description
Change Password Section	This section allows you (Read/Write user) to change the password for your user account.

Table 22: Elements on the Timing Server Config Page—Profile Pane *(continued)*

Element	Description
Old Password	Enter the current password.
New Password	Enter the new password to be set for your user account. The character length ranges from 4 through 12 characters. The characters that can be used are alphanumeric and special characters (that is, !@#$_).
Retype New Password	Reenter the password typed in the **New Password** field.
Save Button	Click to change your password and save the changes. NOTE: The new password will be effective from next login onwards. The current session is not affected.

The Config Page—RADIUS Pane

Figure 47: Timing Server Config Page—RADIUS Pane

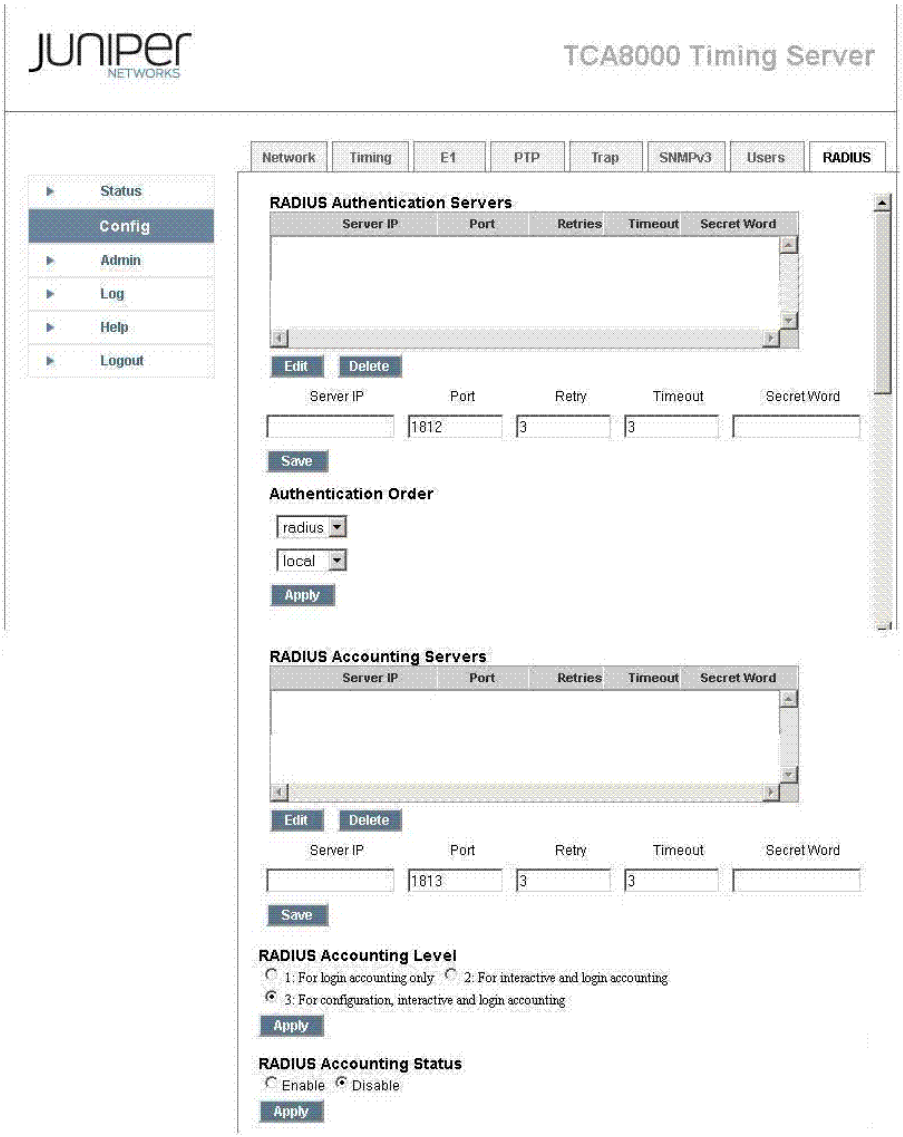


Table 23 on page 116 describes the elements that appear on the Config page—RADIUS pane of the TCA8000 and TCA8500 Timing Servers.

Table 23: Elements on the Timing Server Config Page—RADIUS Pane

Element	Description
RADIUS Authentication Servers Section	This section allows you to view and configure RADIUS authentication servers to be used by the Timing Server for user authentication.

Table 23: Elements on the Timing Server Config Page—RADIUS Pane *(continued)*

Element	Description
Radius Authentication Servers window	Displays a list of configured RADIUS authentication servers with their corresponding configuration details. NOTE: You can add only a maximum of three RADIUS authentication servers.
Edit Button	Click to modify the configuration details of the selected RADIUS authentication server.
Delete Button	Click to delete the selected RADIUS authentication server from the server list.
Server IP	Enter the IP address of the RADIUS authentication server to be used for user authentication.
Port	Enter the port through which the specified RADIUS authentication server is contacted for user authentication. The default port number is 1812.
Retry	Enter the number of attempts to be tried for contacting the specified RADIUS authentication server. The value ranges from 1 through 10. The default value is 3. When all retries fail, the Timing Server contacts the next RADIUS authentication server in the authentication server list.
Timeout	Enter the time in seconds till which the Timing Server waits for a response from the specified RADIUS authentication server. The value ranges from 1 through 90 seconds. The default value is 3 seconds. If the response is not received within the specified time period and the configured retry limit is not attained, then the Timing Server once again tries to contact the authentication server. If the response is not received within the specified time period and the configured retry limit is attained, then the Timing Server contacts the next RADIUS authentication server in the authentication server list.
Secret Word	Enter the password shared with the specified RADIUS authentication server. The character length ranges from 16 through 32 characters. The characters that can be used to define the secret word are A-Z, a-z, 0-9, and special symbols (that is, ` ! @ # $ % ^ * ( ) _ + - = { } [ ] : ; < > , . /).
Save Button	Click to save the configuration details of the RADIUS authentication server.
Authentication Order Section	This section allows you to configure the order of authentication. The default authentication order is RADIUS server authentication and then the local authentication. • radius—User is authenticated by using configured RADIUS authentication servers. • local—User is authenticated locally. NOTE: The value in the first drop box takes precedence over the value in the second drop box.
RADIUS Accounting Servers Section	This section allows you to view and configure RADIUS accounting servers to be used by the Timing Server for accounting.
Radius Accounting Servers window	Displays a list of configured RADIUS accounting servers with their corresponding configuration details. NOTE: You can add only a maximum of three RADIUS accounting servers.

Table 23: Elements on the Timing Server Config Page—RADIUS Pane *(continued)*

Element	Description
Edit Button	Click to modify the configuration details of the selected RADIUS accounting server.
Delete Button	Click to delete the selected RADIUS accounting server from the server list.
Server IP	Enter the IP address of the RADIUS accounting server to be used for accounting.
Port	Enter the port through which the specified RADIUS accounting server is contacted for accounting. The default port number is 1813.
Retry	Enter the number of attempts should be made for contacting the specified RADIUS accounting server. The value ranges from 1 through 10. The default value is 3. When all retries fail, the Timing Server contacts the next RADIUS accounting server in the accounting server list.
Timeout	Enter the time in seconds till which the Timing Server waits for a response from the specified RADIUS accounting server. The value ranges from 1 through 90 seconds. The default value is 3 seconds. If the response is not received within the specified time period and the configured retry limit is not attained, then the Timing Server once again tries to contact the accounting server. If the response is not received within the specified time period and the configured retry limit is attained, then the Timing Server contacts the next RADIUS accounting server in the accounting server list.
Secret Word	Enter the password shared with the specified RADIUS accounting server. The character length ranges from 16 through 32 characters. The characters that can be used to define the secret word are A-Z, a-z, 0-9, and special symbols (that is, ` ! @ # $ % ^ * ( ) _ + - = { } [ ] : ; < > , . /).
Save Button	Click to save the configuration details of the RADIUS accounting server.
RADIUS Accounting Level Section	This section allows you to configure the type of accounting information to be logged in the RADIUS accounting server. • 1: For login accounting only—Only the login information is sent to the RADIUS accounting server for accounting. • 2: For interactive and login accounting—The login information and interactive command details are sent to the RADIUS accounting server for accounting. • 3: For configuration, interactive and login accounting—The login information, interactive command details, and configuration command details are sent to the RADIUS accounting server for accounting. The default value is 3: For configuration, interactive and login accounting.
Apply Button	Click to activate the selected accounting level.
RADIUS Accounting Status Section	This section allows you to enable or disable RADIUS accounting in the Timing Server. • Enable—Enables RADIUS accounting. • Disable—Disables RADIUS accounting. By default RADIUS accounting is enabled.

Table 23: Elements on the Timing Server Config Page—RADIUS Pane *(continued)*

Element	Description
Apply Button	Click to activate the selected RADIUS accounting status.

CHAPTER 8

Understanding the TCA8000 and TCA8500 Admin Page

This chapter describes the Admin page for the Juniper Networks TCA8000 and TCA8500 Timing Servers. The following topics are addressed:

Admin Page Description

The Admin page allows you to perform administrative tasks and to set administrative parameters for the TCA8000 and TCA8500 Timing Servers.

NOTE: **The Admin page is visible only for the Admin user.**

Accessing the Admin Page

To access the Admin page of a TCA8000 or TCA8500 Timing Server:

1. Log in to the Timing Server.
2. Click the **Admin** tab. The Admin page appears. See Figure 48 on page 122.

NOTE: **After the Admin page opens, click the Refresh button in the browser to update the page.**

Understanding the Admin Page

- The Admin Page—Upgrade Pane on page 128
- The Admin Page—Config Pane on page 130

The Admin Page—Password Pane

Figure 48: Timing Server Admin Page—Password Pane

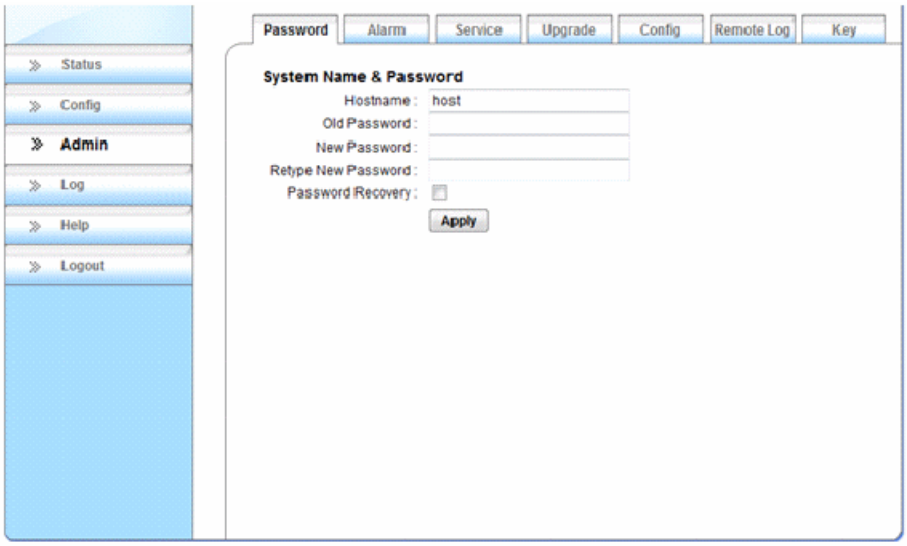


Table 24 on page 122 describes the elements that appear on the Admin page—Password pane of the TCA8000 and TCA8500 Timing Servers.

Table 24: Elements on the Timing Server Admin Page—Password Pane

Element	Description
System Name & Password Section	This section enables a name to be assigned to the Timing Server and change the login password.
Hostname	The name assigned to the Timing Server. This name is displayed on the Status page.
Old Password	Enter the current password.
New Password	Enter the new password to replace the old password.
Retype New Password	Reenter the new password to replace the old password.
Password Recovery	Allows the password to be reset to the factory default value.
Apply Button	Saves the hostname and password changes.

The Admin Page—Alarm Pane

Figure 49: Timing Server Admin Page—Alarm Pane (PTP)

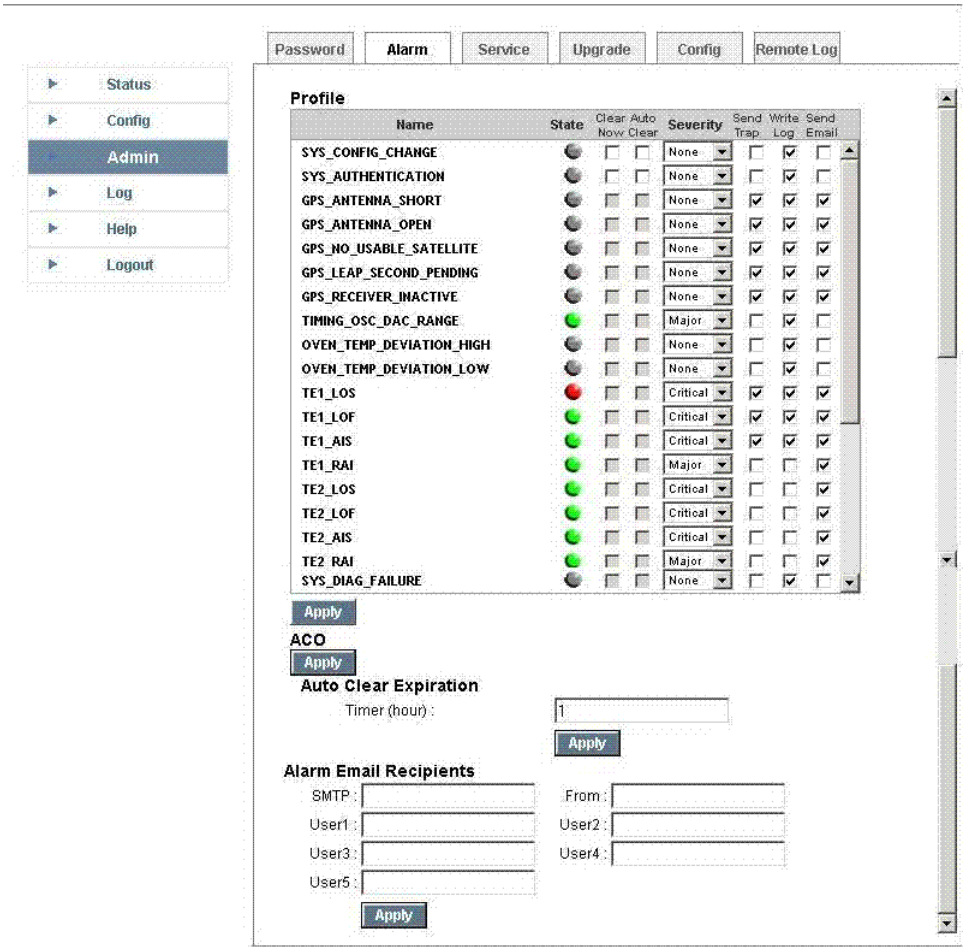


Figure 50: Timing Server Admin Page—Alarm Pane (NTP)

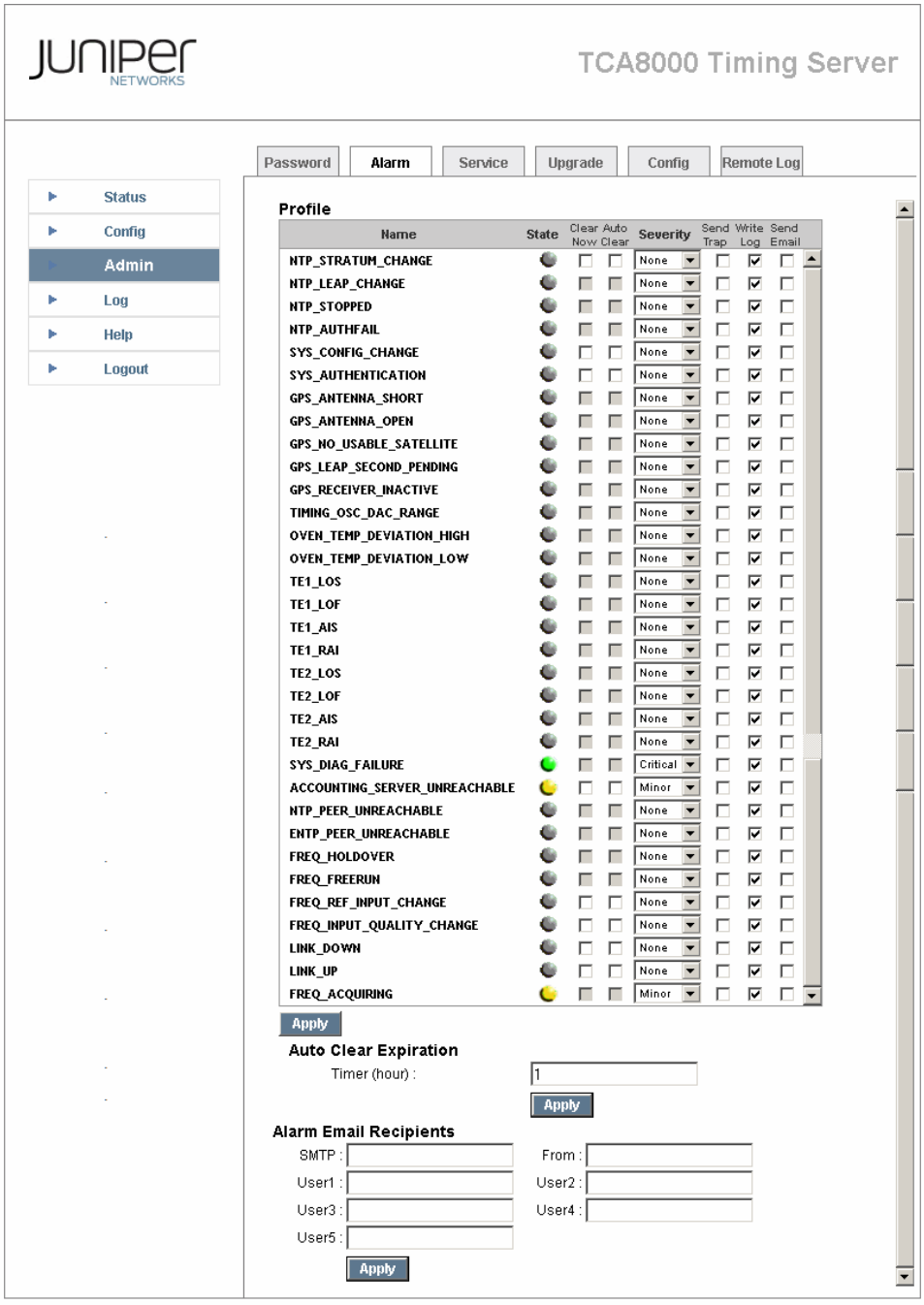


Table 25 on page 125 describes the elements that appear on the Admin page—Alarm pane of the TCA8000 and TCA8500 Timing Servers.

Table 26 on page 125 describes the alarms.

Table 25: Elements on the Timing Server Admin Page—Alarm Pane

Element	Description
System Name & Password Section	**This section allows the configuration of alarms generated by the Timing Server.**
Name	Name of the Timing Server alarm. See Table 26 on page 125 for more information about the alarms.
State	Indicates whether the alarm is on or off.
Clear Now	Check this box to clear alarms when the **Apply** button is pressed.
Auto Clear	Check this box to clear alarms automatically after 24 hours.
Severity	Specifies the severity level of an alarm.
Send Trap	Check this box for the Timing Server to send an alarm message to trap locations.
Write Log	Check this box for the Timing Server to record the alarm in the local log file.
Send Email	Check this box for the Timing Server to send an e-mail message of the alarm to users who have been configured to receive alarm messages.
Apply Button	Allows you to save changes.
ACO Section	**Allows you to turn off the alarm relay signals on the backplane, as well as the alarm LEDs on the front panel.**
Apply Button	Click the button to enable alarm cut-off.
Alarm Email Recipient Section	Allows you to specify the SMTP server to which you want the Timing Server to send alarm e-mail messages and specify the recipients you want the messages sent. • SMTP—Enter the domain name of the mail server. • From—Enter the from address of the outbound alarm e-mails. • User X—Enter the e-mail address of the user to whom the Timing Server will send alarm e-mail messages. • Apply—Click to save alarm e-mail recipient information.

Table 26: Description of Alarm Names

Alarm Name	Description
NTP_STRATUM_CHANGE	Indicates that the stratum level of the NTP server has changed.
NTP_LEAP_CHANGE	Indicates that the NTP leap seconds have changed.
NTP_STOPPED	Indicates that the NTP daemon is stopped.
NTP_AUTHFAIL	Indicates a NTP authentication failure.

Table 26: Description of Alarm Names *(continued)*

Alarm Name	Description
SYS_CONFIG_CHANGE	Indicates the configuration has changed.
SYS_AUTHENTICATION	Indicates a system authentication failure.
GPS_ANTENNA_SHORT	Indicates an electrical short in the link to the GPS antenna.
GPS_ANTENNA_OPEN	Indicates an electrical open in the link to the GPS antenna.
GPS_NO_USABLE_SATELLITE	Indicates the GPS antenna is not receiving a signal from any satellite.
GPS_LEAP_SECOND_PENDING	Provides a warning of an impending leap second change (within 61 seconds).
GPS_RECEIVER_INACTIVE	The GPS receiver is not active.
TIMING_OSC_DAC_RANGE	Indicates that the frequency of the oscillator is out of the tuning range.
OVEN_TEMP_RANGE_HIGH	Indicates that the secondary oscillator oven temperature is greater than the set point temperature. This is only a status indicator as there is no impact on the oscillator primary oven control or its stability. We recommend that the severity be set to NONE.
OVEN_TEMP_RANGE_LOW	Indicates that the secondary oscillator oven temperature is less than the set point temperature. This is only a status indicator as there is no impact on the oscillator primary oven control or its stability. We recommend that the severity be set to NONE.
TE1_LOS	Indicates a loss of signal condition on the first T1/E1 timing input port.
TE1_LOF	Indicates a loss of frame condition on the first T1/E1 timing input port.
TE1_AIS	Indicates that an alarm indication signal is received on the first T1/E1 timing input port.
TE1_RAI	Indicates that a remote alarm indication signal is received on the first T1/E1 timing input port.
TE2_LOS	Indicates a loss of signal condition on the second T1/E1 timing input port.
TE2_LOF	Indicates a loss of frame condition on the second T1/E1 timing input port.
TE2_AIS	Indicates that an alarm indication signal is received on the second T1/E1 timing input port.
TE2_RAI	Indicates that a remote alarm indication signal is received on the second T1/E1 timing input port.
SYS_DIAG_FAILURE	Indicates that there is a system failure, reported by the system diagnostic utility.
NTP_PEER_UNREACHABLE	Indicates that the configured NTP peer is not reachable.

Table 26: Description of Alarm Names *(continued)*

Alarm Name	Description
LOSS_OF_POWER_FEED	Indicates that one of the two DC power feeds is not connected, or is not powered.
FREQ_ACQUIRING	Indicates that the system tries to adjust the local oscillator based on the input source such as GPS, T1, E1, NTP, and PTP. If the adjustments are completed, then the system state is changed from acquiring state to locked state.
FREQ_HOLDOVER	Indicates that the Timing Server is in holdover.
FREQ_FREERUN	Indicates that the Timing Server is in freerun.
FREQ_REF_INPUT_CHANGE	Indicates that the reference source for Timing Server has changed.
FREQ_REF_QUALITY_CHANGE	Indicates that the stratum level of the reference source for the Timing Server has changed.
LINK_DOWN	Indicates that one of the Ethernet ports is down.
LINK_UP	Indicates that one of the Ethernet ports is up.

The Admin Page—Service Pane

Figure 51: Timing Server Admin Page—Service Pane

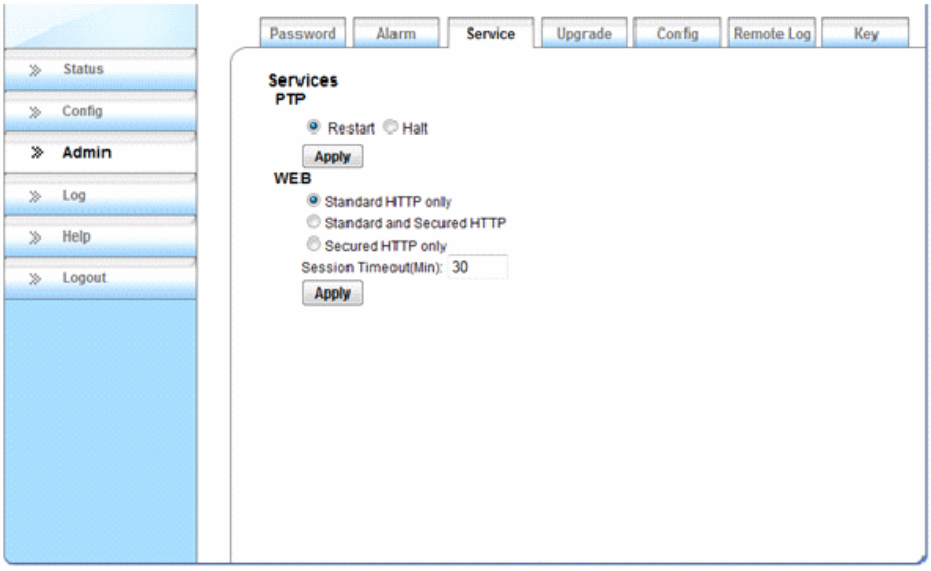


Table 27 on page 128 describes the elements that appear on the Admin page—Service pane of the TCA8000 and TCA8500 Timing Servers.

Table 27: Elements on the Timing Server Admin Page—Service Pane

Element	Description
Services Section	Understand how to configure standard or secured HTTP, set the session timeout, either halt or restart the PTP daemon, and restart the NTP daemon.
PTP	Understand how to manipulate PTP operations. • Restart—Allows you to restart PTP operations. • Halt—Allows you to stop PTP operations. • Apply—Executes radio button selection. NOTE: This field is available only if the PTP support is enabled in the Timing Server.
NTP	Enables you to manipulate the NTP daemon. • Restart—Restarts the NTP daemon. All current NTP related processes are killed before restarting the NTP daemon. NOTE: This field is available only if the NTP support is enabled in the Timing Server.
WEB	Allows you to choose either standard or secure HTTP, and manage your web screen time-out. • Standard HTTP only—Allows you to use only standard HTTP to access the web on the Timing Server. • Standard and Secure HTTP—Allows you to use either standard or secure HTTP to access the web server on the Timing Server. • Secured HTTP only—Allows you to use only secure HTTP to access the web on the Timing Server • Session Timeout(Min)—Allows you to specify the web server time out period. • Apply—Executes radio button selection.

The Admin Page—Upgrade Pane

Figure 52: Timing Server Admin Page—Upgrade Pane

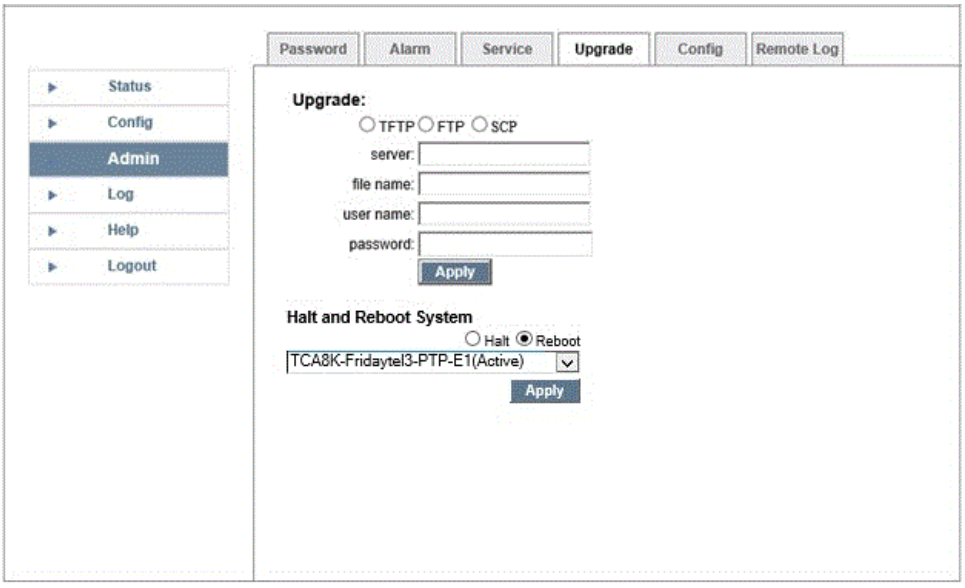


Table 28 on page 129 describes the elements that appear on the Admin page—Upgrade pane of the TCA8000 and TCA8500 Timing Servers.

Table 28: Elements on the Timing Server Admin Page—Upgrade Pane

Element	Description
Upgrade Section	**This section allows you to set the details for downloading the software upgrade or downgrade image to the inactive flash partition.**
TFTP	Select to download the upgrade or downgrade image from the TFTP server.
FTP	Select to download the upgrade or downgrade image from the FTP server.
SCP	Select to download the upgrade or downgrade image from the SCP server.
server	Enter the IP address of the server in which the image is located.
file name	For TFTP and FTP servers, enter the filename of the image. For SCP server, enter the filename of the image along with the full path where the file is located.
user name	Enter the username for accessing the server. NOTE: This field is applicable only for the SCP and FTP server.
password	Enter the corresponding password of the provided server username. NOTE: This field is applicable only for the SCP and FTP server.
Apply Button	Click to download the image to the inactive flash partition.
Halt and Reboot System Section	**This section allows you to halt and reboot the Timing Server.**
Halt	Select to halt the current operation of the Timing Server.
Reboot	Select to reboot the Timing Server. The pull-down menu below the option buttons displays the current software image that's active. User can also use the pull-down menu to select a different image. This new image will take effect after the system finishes rebooting.
Apply Button	Click to execute the corresponding operation.

The Admin Page—Config Pane

Figure 53: Timing Server Admin Page—Config Pane

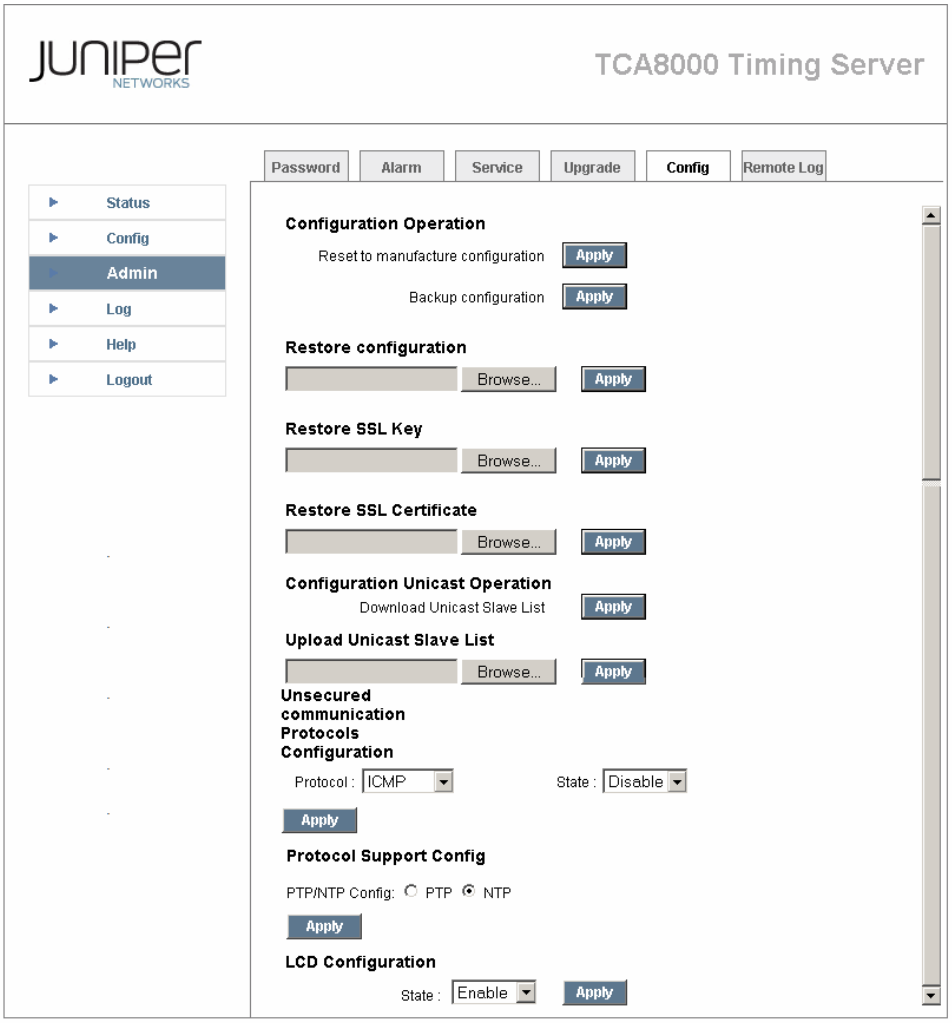


Table 29 on page 130 describes the elements that appear on the Admin page—Config pane of the TCA8000 and TCA8500 Timing Servers.

Table 29: Elements on the Timing Server Admin Page—Config Pane

Element	Description
Configuration Operation Section	Allows you to back up and restore configuration. • Reset to manufacture configuration—Allows you to reset to the default configuration. • Backup configuration—Allows you to back up your most recent configuration to a file. • Restore configuration—Allows you to restore configuration from a saved file. • Browse—Allows you to locate the system configuration file to restore. • **Apply** Button—Executes option button selection.

Table 29: Elements on the Timing Server Admin Page—Config Pane *(continued)*

Element	Description
Restore SSL Key	Allows you to download a customized key file of **.pem** format. The file is downloaded locally without using any protocol. For more information about the dynamic SSL certificate support, see "Dynamic SSL Certificate Overview" on page 23. • **Browse** Button—Click to locate the customized key file. • **Apply** Button—Click to download the customized key file.
Restore SSL Certificate	Allows you to download a customized certificate file of **.pem** format. The file is downloaded locally without using any protocol. For more information about the dynamic SSL certificate support, see "Dynamic SSL Certificate Overview" on page 23. • **Browse** Button—Click to locate the customized certificate file. • **Apply** Button—Click to download the customized certificate file.
Unsecured communication Protocols Configuration Section	**This section allows you to configure unsecured transfer or communication protocols.**
Protocol	Allows you to select the unsecured transfer or communication protocol to be enabled or disabled. The available options are: • ICMP • TFTP • FTP • TELNET • ALL
State	Allows you to enable or disable the unsecured transfer or communication protocols. The available options are: • Enable—Enables the selected unsecured transfer or communication protocol. • Disable—Disables the selected unsecured transfer or communication protocol. By default, all the unsecured transfer or communication protocols (ICMP, TFTP, FTP, and Telnet protocol) are enabled.
LCD Configuration Section	**This section allows you to configure the state of the LCD configuration change functionality.**
State	Allows you to enable or disable the LCD configuration change functionality. • Enable—Enables the LCD configuration change functionality. The TCA system displays all menus (**Status**, **Config**, **Admin**, and **Help**) in the LCD panel. • Disable—Disables the LCD configuration change functionality. The TCA system does not display the **Config** and **Admin** menus in the LCD panel. By default, the LCD configuration change functionality is enabled. NOTE: The status change becomes effective on next reboot. CAUTION: If the LCD configuration change functionality is disabled, then you cannot use the hardware mechanism for resetting the passwords of the Admin user and the enable mode. Hence, if you forget the password of the Admin user, you cannot perform any administrator functionalities in the TCA system.

Table 29: Elements on the Timing Server Admin Page—Config Pane *(continued)*

Element	Description
Protocol Support Config Section	**This section allows you to enable the required protocol support.**
PTP/NTP Config	Select an option button to enable the corresponding protocol support in the Timing Server. • PTP—Enables the PTP support. • NTP—Enables the NTP support. NOTE: When you enable the PTP support, the NTP related commands and pages are unavailable, or vice versa.
Apply Button	Click to reboot the Timing Server with the selected protocol support after your confirmation. NOTE: If you reject the rebooting of the Timing Server, the protocol change is not saved and the Timing Server continues to use the current protocol.

CHAPTER 9

Understanding the TCA8000 and TCA8500 Log Page

This chapter describes the Log page of the Juniper Networks TCA8000 and TCA8500 Timing Servers. The following topics are addressed:

Log Page Description

The Log page provides data which is reported by the Timing Server during operation.

NOTE: **The Clear button appears dimmed for the Read-Only and Read/Write users, so they cannot clear the displayed log messages.**

Accessing the Log Page

To access the Log page of a TCA8000 or TCA8500 Timing Server:

1. Log in to the Timing Server.
2. Click the **Log** section to the left of the page. The Event Log pane appears at the top. See Figure 54 on page 134.

NOTE: **After the Log page launches, click the Refresh button in the browser to update the page.**

Understanding the Log Page

- The Log Page—AuthLog Pane on page 135
- The Log Page—Daemon Pane on page 136

The Log Page—EventLog Pane

Figure 54: Timing Server Log Page—EventLog Pane

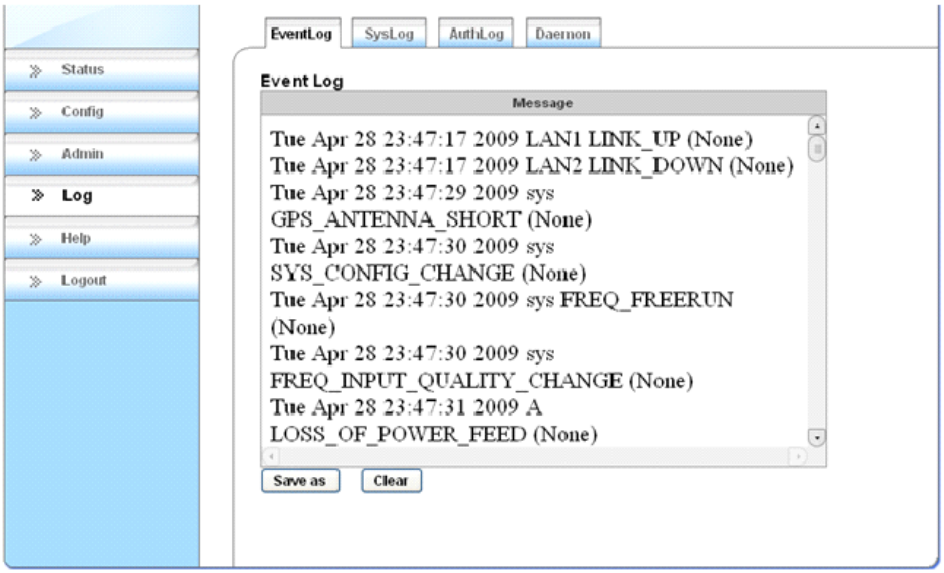


Table 30 on page 134 describes the elements that appear on the Log page—EventLog pane of the TCA8000 and TCA8500 Timing Servers.

Table 30: Elements on the Timing Server Log Page—EventLog Pane

Element	Description
EventLog Section	This window displays event messages reported to the Timing Server. • Message—Lists the event messages received. • Save as—Allows you to save the event log to a file. • Clear—Clears the log page.

The Log Page—SysLog Pane

The Syslog displays internal system level messages which indicate the operational state and status of the Timing Server software applications. Any error event that impacts the operational state of the system is reflected with the appropriate alarm event in the EventLog. For details, see "The Log Page—EventLog Pane" on page 134.

Figure 55: Timing Server Log Page—SysLog Pane

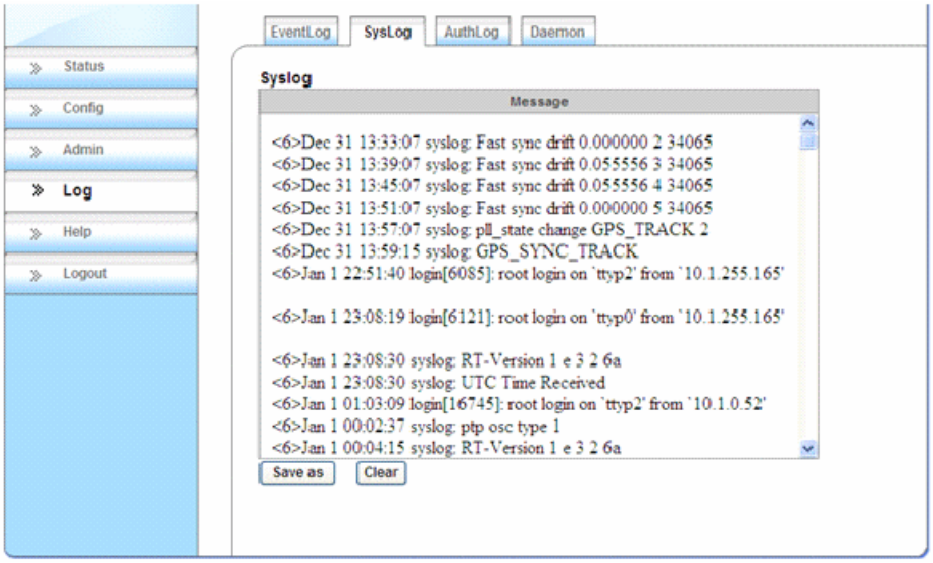


Table 31 on page 135 describes the elements that appear on the Log page—SysLog pane of the TCA8000 and TCA8500 Timing Servers.

Table 31: Elements on the Timing Server Log Page—SysLog Pane

Element	Description
SysLog Section	This window displays system messages reported to the Timing Server. • Message—Lists the system messages received. • Save as—Allows you to save the syslog to a file. • Clear—Clears the log page.

The Log Page—AuthLog Pane

The AuthLog pane provides a history of login events.

Figure 56: Timing Server Log Page—AuthLog Pane

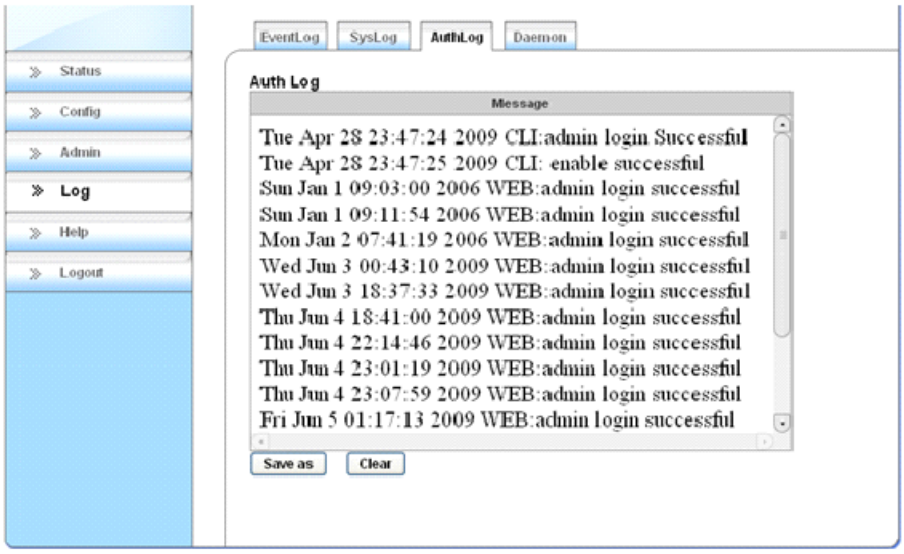


Table 32 on page 136 describes the elements that appear on the Log page—AuthLog pane of the TCA8000 and TCA8500 Timing Servers.

Table 32: Elements on the Timing Server Log Page—AuthLog Pane

Element	Description
Auth Log Section	This window displays authentication messages reported to the Timing Server. • Message—Lists the authentication messages received. • Save as—Allows you to save the auth.log to a file. • Clear—Clears the log page.

The Log Page—Daemon Pane

The Daemon log displays the internal operating PTP or NTP level messages which indicate the operational state and status of the PTP or NTP. Any error event that impacts the operational state of the system is reflected with the appropriate alarm event in the EventLog. For details, see "The Log Page—EventLog Pane" on page 134.

Figure 57: Timing Server Log Page—Daemon Pane

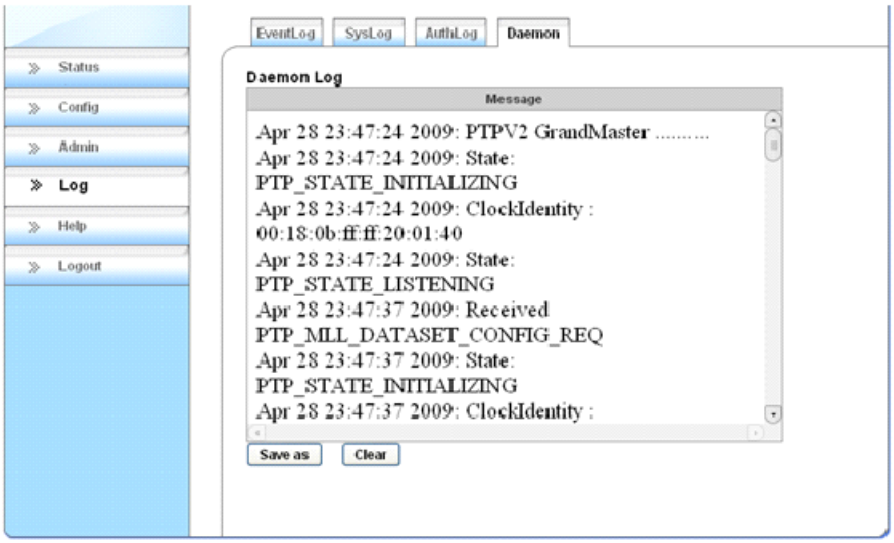


Table 33 on page 137 describes the elements that appear on the Log page—Daemon pane of the TCA8000 and TCA8500 Timing Servers.

Table 33: Elements on the Timing Server Log Page—Daemon Pane

Element	Description
Daemon Log Section	This window displays daemon messages reported to the Timing Server. • Message—Lists the daemon messages received. • Save as—Allows you to save the daemon.log to a file. • Clear—Clears the log page.

PART 5

Troubleshooting a TCA8000 or TCA8500 Timing Server

CHAPTER 10

Troubleshooting a TCA8000 or TCA8500 Timing Server

If you need post sales technical support, it is available through the Juniper Networks Technical Assistance Center (JTAC). For information about contacting JTAC, see "Warranty and Support" on page 205.

Event States and Alarm Types

Table 34 on page 141 shows alarms and their corresponding states.

Table 34: Event States

Alarm Condition	State
NONE	Indicates event as NONE in the Severity alarm profile.
Critical	Indicates event as Critical in the Severity alarm profile.
Major	Indicates event as Major in the Severity alarm profile.
Minor	Indicates event as Minor in the Severity alarm profile.
Clear	Indicates event alarm condition is no longer active.

Table 35 on page 141 shows alarms and their corresponding types.

Table 35: Alarm Types

Alarm	Details
Transient	Outstanding alarms are used for those time persistent condition. System will automatically raise and clear these type of alarm based on the state of the condition.

Table 35: Alarm Types *(continued)*

Alarm	Details
Static	System will raise this alarm whenever the condition occurs and hold the alarm, it require user acknowledgement and manually cleared by the administrator or by the auto clear expiration timer.

Troubleshooting the TCA8000 or TCA8500 Timing Server Using the Event Log

Use Table 36 on page 142 to identify which actions to perform when an event is reported in the event log.

Table 36: Troubleshooting the TCA8000 or TCA8500 Timing Server Using the Event Log

Event	Type	Description	Action
SYS_CONFIG_CHANGE	Static	One or more parameters were changed in the Config menu.	Verify changes were as expected.
SYS_AUTHENTICATION	Static	The was a failed Login / Password attempt in the unit.	Verify Login name and Password.
GPS_ANTENNA_SHORT	Transient	Antenna connection is shorted between the Cable Conductor Pin and Shield.	For TCA8500 only, check for a cable short on the center and ground shield.
GPS_ANTENNA_OPEN	Transient	Cable Connection has an open in it.	For TCA8500 only, check for a cable open on the center and ground shield.
GPS_NO_USABLE_SATELLITE	Transient	The antenna is unable to acquire any satellites with sufficient signal levels.	For TCA8500 only: 1. Assure the antenna has a clear view of the sky is not obstructed. For a roof antenna, find location that provides full 360-degree visibility of the horizon. 2. Validate that there is no source of high frequency interference near the antenna. Set the height of the antenna to be at least three to six feet (1-2 m) from a reflecting surface.
GPS_LEAP_SECOND_PENDING	Transient	GPS notifies of this event approximately 3 months before event.	For TCA8500 only: 1. This is a normal GPS operation which if occurs will happen either in June 30 or Dec. 31. 2. Verify event is cleared July 1 and Jan. 1, if does not clear reset unit.

Table 36: Troubleshooting the TCA8000 or TCA8500 Timing Server Using the Event Log *(continued)*

Event	Type	Description	Action
GPS_RECEIVER_INACTIVE	Transient	Internal communication to the GPS Receiver failed to respond.	For TCA8500 only: 1. Potentially the CPU has lost communication with GPS Receiver. 2. Reset unit and if it continues to occur RMA unit.
TIMING_OSC_DAC_RANGE	Transient	The Digital-to-Analog Converter (DAC) which controls the voltage adjustment for the Oscillator frequency has exceeded its range of control voltage.	Verify operational temperature is within specification of the unit.
OVEN_TEMP_DEVIATION_HIGH	Transient	Secondary oscillator Oven Temperature increase was faster than the internal oven control could compensate.	This is status only information as the internal oscillator oven temperature control will eventually compensate for this.
OVEN_TEMP_DEVIATION_LOW	Transient	Secondary oscillator Oven Temperature decrease was faster than the internal oven control could compensate.	This is status only information as the internal oscillator oven temperature control will eventually compensate for this.
TE1_LOS or TE2_LOS NOTE: TE1 denotes first T1/E1 timing input port. TE2 denotes second T1/E1 timing input port.	Transient	T1 or E1 Rx Input has a Loss of Signal (LOS) which is a physical layer alarm.	1. Check that cable is connected properly 2. Verify far-end equipment is sending a signal.
TE1_LOF or TE2_LOF NOTE: TE1 denotes first T1/E1 timing input port. TE2 denotes second T1/E1 timing input port.	Transient	The Rx Input has intermittent or permanent Loss of Frames (LOF) which indicate that the receiver is getting too errors to maintain frame.	1. Check that cable is connected properly 2. Verify far-end equipment is sending an error free signal.
TE1_AIS or TE2_AIS NOTE: TE1 denotes first T1/E1 timing input port. TE2 denotes second T1/E1 timing input port.	Transient	The Rx input has detected Alarm Indication Signal (AIS) alarm. The AIS is an unframed, all-ones signal transmitted on the T1/E1 line	This is being transmitted from the far-end Tx due to its Rx input is not operating correctly. Verify the far-end equipment Rx input has no alarm indications such as LOS or LOF.

Table 36: Troubleshooting the TCA8000 or TCA8500 Timing Server Using the Event Log *(continued)*

Event	Type	Description	Action
TE1_RAI or TE2_RAI NOTE: TE1 denotes first T1/E1 timing input port. TE2 denotes second T1/E1 timing input port.	Transient	The Remote Alarm Indication (RAI) alarm is sent in the "upstream" direction if the equipment is either receiving an AIS alarm, an LOS condition, or has a LOF condition in the "downstream" direction. This is a repeater alarm to indicate a problem in one or more of the T1/E1 links.	Check connections and alarm state of links which are in the path of the T1/E1 link connected to the this equipment. The condition may be in links which have been multiplexed to a higher rate such as DS3/E3, STS-3/STM-1, and so on.
SYS_DIAG_FAILURE	Transient	The boot-up System Diagnostics had one or more failures.	1. Turn power off and then back on. 2. If unit continues to show failure, the unit is defective and RMA unit for repair or replacement.
PTP_SERVER_UNREACHABLE	Transient	There is no master PTP Grand Master available in the network for the configured domain number.	1. Check domain number should match with the Grand Master domain number. 2. Check network for support of multicast packets. 3. Verify Ethernet connection is functioning properly for unit.
PTP_SERVER_CHANGE	Static	A Best Master selection has occurred and the server was changed.	Verify the "other" master had an abnormal event that caused this event.
LOSS_OF_POWER_FEED	Transient	One of the DC inputs has no voltage connected.	1. Check cables. 2. If only one power feed being used disable alarm in Admin > Alarms and configure to "NONE"
FREQ_ACQUIRING	Transient	System tries to adjust the local oscillator based on the input source such as GPS, T1, E1, NTP, and PTP. If the adjustments are completed, then the system state is changed from acquiring state to locked state.	This is a positive indication of sync source availability.
FREQ_HOLDOVER	Transient	Local Oscillator is in Holdover state. There is no configured servers sync sources available. Only goes to this state after a sync source has been qualified for a period of time and than is not available.	Check sync source quality which was configured in the sync source table.

Table 36: Troubleshooting the TCA8000 or TCA8500 Timing Server Using the Event Log *(continued)*

Event	Type	Description	Action
FREQ_FREERUN	Transient	Local Oscillator is in Freerun state. The unit has not obtained initial lock sync lock state and is operating on the local oscillator.	1. Check sync source table is configured for at least one source available. If not locked with a period of time (ex. >2 hours) reboot system. 2. Verify the PTP verify PTP state is slave. 3. Verify network connections and activity. 4. This could be caused by unit not initially being locked for a period long enough to generate a holdover value. Verify the unit has been locked for 8 hours or more.
FREQ_REF_INPUT_CHANGE	Static	The reference input being used as a sync source has changed.	Verify one of the reference input such as GPS, external inputs has changed.
FREQ_INPUT_QUALITY_CHANGE	Static	The timing input quality has changed due to lower or higher quality level of the new sync source.	Verify the quality states changes were as expected.
LINK_DOWN	Static	Ethernet connection is not functional.	Verify Ethernet connection, cables and so on.
LINK_UP	Static	Ethernet connection is functional.	This is a positive indication of the Ethernet link status. To suppress go to Configure Admin > Alarm > Severity and set to NONE.

PART 6

Appendixes

APPENDIX A

Using Telnet with the TCA8000 and TCA8500 Timing Servers

Use Telnet to access the Juniper Networks TCA8000 or TCA8500 Timing Server to configure and set operating parameters. This appendix addresses the following topics:

Accessing the Timing Server Using the CLI

To access a TCA8000 or TCA8500 Timing Server using the CLI:

1. On a computer which is on the same network segment as the Timing Server, click the **Start** button and choose **Run** from the menu. The Run dialog box appears.
2. In the **Open** field, enter the following:

   telnet *ip address*

   NOTE: If you are accessing the Timing Server for the first time, see "Assigning an IP Address to the TCA8000 or TCA8500 Timing Server" on page 16 for information about connecting to the unit and accessing the user interface.

3. Click the **OK** button.
4. A DOS window appears.
5. At the User name prompt, type the username and press Enter.
6. At the Password prompt, type the corresponding password and press Enter.

NOTE: To see a list of the commands you can use, type **help**. Refer to Table 37 on page 152 for a list of viewing options and Table 38 on page 157 for a list of configurable elements.

Changing the IP Address of the Timing Server using the CLI

The Timing Server is assigned a default IP address by the manufacturer to allow access to the unit for the first time. The IP address should be changed prior to installing on a network. See "Reserving an IP Address for the TCA8000 or TCA8500 Timing Server" on page 12 for additional information on how to reserve an IP address for the Timing Server. This section describes how to connect the Timing Server to a computer and how to use the CLI to change the IP address.

To use the CLI to change the default IP address of the Timing Server:

1. Using the computer which is connected to the Timing Server, click the **Start** button and choose **Run** from the menu. The Run dialog box appears.
2. In the **Open** field, enter the following:

   telnet 192.168.0.75
3. Click the **OK** button.
4. A DOS window appears
5. At the User name prompt, type the username and press Enter.
6. At the Password prompt, type the corresponding password and press Enter.
7. At the prompt, type **enable** and press Enter.
8. At the password prompt, type **enable** and press Enter.
9. At the prompt, type **config eth0/1 ip** (LAN1 and LAN2 ports, respectively) and press Enter.
10. At the IP address prompt, enter the IP address to be assigned to the unit and press Enter. The current IP address is shown in the brackets <>.
11. At the prompt, type **exit**, save your changes, and exit enable mode or type **help** to view additional commands.

Resetting the Passwords of Both Admin User Account and Enable Mode to Factory Defaults

You can reset passwords of the Admin user account and the enable mode to factory defaults through the CLI, GUI, or hardware mechanism. For more information about resetting passwords through GUI, see "Changing/Resetting the Login Password for Admin User" on page 25.

NOTE: Only the Admin user can reset passwords through the CLI command.

To reset passwords through CLI:

1. Login as **admin**.
   a. >**admin**<cr>
   b. >password: **admin**<cr>
2. Enable privileged commands.
   a. >**enable**<cr>
   b. >password: **enable**<cr>
3. Execute the following command to reset Admin user and enable mode passwords:

   # reset password

If you forget the password of the Admin user, you can reset passwords of the Admin user and the enable mode without logging in to the Timing Server through hardware mechanism.

CAUTION: If the LCD configuration change functionality is disabled, the system does not display the **Admin** and **Config** menus in the LCD screen. In such scenario, you cannot use the hardware mechanism for resetting the passwords of the Admin user and the enable mode. Hence, if you forget the password of the Admin user, you cannot perform any administrator functionalities in the TCA system.

To reset passwords through hardware mechanism:

1. Press the Menu button in the front panel of the Timing Server to display menus in the LCD screen.
2. Press the appropriate SELECT buttons in the front panel to select **Admin** menu from the displayed menus.
3. Press the OK button in the front panel to display sub-menus for the selected **Admin** menu in the LCD screen.
4. Press the appropriate SELECT buttons in the front panel to select **Reset default** sub-menu from the displayed sub-menus.
5. Press the OK button in the front panel to reset passwords of the Admin user and the enable mode.

Using the CLI to View Status and Configuration Parameters

The CLI can be used to view the status of Timing Server operations and to view current parameter settings. This section describes the options that are available for viewing and how to view them.

Options That You Can View in the CLI

To list the options that can be viewed, type **help** after the CLI session has started. Table 37 on page 152 lists the options that can be viewed.

NOTE: **All NTP or PTP commands and GUI pages are available only if the corresponding protocol support is enabled in the Timing Server.**

Table 37: CLI Viewing Options

Command	Description	Supported Users
enable	Turns on privileged commands	• Admin • Read/Write
exit	Exits from current mode	• Admin • Read/Write • Read-Only
help	Displays available list of commands	• Admin • Read/Write • Read-Only
history	Displays a list of previously run commands	• Admin • Read/Write • Read-Only
logout	Disconnect	• Admin • Read/Write • Read-Only
quit	Disconnect	• Admin • Read/Write • Read-Only
show accounting-level	Displays the type of information to be accounted	• Admin • Read/Write • Read-Only

Table 37: CLI Viewing Options *(continued)*

Command	Description	Supported Users
show accounting-server	Displays the details of the configured RADIUS accounting servers	• Admin • Read/Write • Read-Only
show accounting-status	Displays the current status of RADIUS accounting	• Admin • Read/Write • Read-Only
show alarm all	Displays all active alarms	• Admin • Read/Write • Read-Only
show alarm E1	Displays only E1 active alarms	• Admin • Read/Write • Read-Only
show alarm-email-receiver	Displays alarm's e-mail receivers	• Admin • Read/Write • Read-Only
show alarm-profile	Displays alarm's profile information	• Admin • Read/Write • Read-Only
show all-configuration	Displays the current configurations of the TCA system. NOTE: Only the configurations available in the **config.dat** file are displayed with appropriate fields.	• Admin • Read/Write • Read-Only
show auth-order	Displays the configured authentication order	• Admin • Read/Write • Read-Only
show authlog	Displays authorization log {num of lines}	• Admin • Read/Write • Read-Only
show cli-banner	Displays the customized CLI banner	• Admin • Read/Write • Read-Only
show daemonlog	Displays daemon log {num of lines}	• Admin • Read/Write • Read-Only

Table 37: CLI Viewing Options *(continued)*

Command	Description	Supported Users
show dst-config	Displays the configured offset, starting date and time, and ending date and time for DST	• Admin • Read/Write • Read-Only
show E1 config	Displays current port configuration for all E1 input and output ports	• Admin • Read/Write • Read-Only
show E1 status	Displays status of all E1 input and output ports	• Admin • Read/Write • Read-Only
show eventlog	Displays event log {num of lines}	• Admin • Read/Write • Read-Only
show frequency	Displays Frequency Sync Source, its quality, state, Stratum, and Oscillator Type in the system.	• Admin • Read/Write • Read-Only
show gps	Displays GPS status including Receiver and Antenna status, location, number of satellites and their signal strengths	• Admin • Read/Write • Read-Only
show holdover-state	Indicates whether the TCA system remains in the holdover state or changes to the internal state after 24 hours of holdover state	• Admin • Read/Write • Read-Only
show irig-b	Displays IRIG-B output format	• Admin • Read/Write • Read-Only
show license	Displays information on Software Licensable features	• Admin • Read/Write • Read-Only
show network	Displays network information	• Admin • Read/Write • Read-Only
show ntp config	Displays the details of the configured NTP association entries.	• Admin • Read/Write • Read-Only
show ntp current-active-md5-key-list	Displays the current active MD5 keys. The keys stored in the /etc/config/ntp/keys path are displayed.	• Admin • Read/Write • Read-Only

Table 37: CLI Viewing Options *(continued)*

Command	Description	Supported Users
show ntp current-new-md5-key-list	Displays the newly added MD5 keys. The keys stored in the etc/config/ntp/tempkeys path are displayed.	• Admin • Read/Write • Read-Only
show ntp status	Displays the status of the configured NTP association entries.	• Admin • Read/Write • Read-Only
show partition	Displays software image information on different partitions	• Admin • Read/Write • Read-Only
show protocol-support	Displays the protocol enabled in the Timing Server.	• Admin • Read/Write • Read-Only
show ptp config	Displays PTP configuration information, including mode, domain, profile used, one vs. two-step, announce start timeout, announce receipt timeout, and delay request, announce, and sync packet intervals	• Admin • Read/Write • Read-Only
show ptp default-dataset	Displays the PTP parameter including domain number that is configured	• Admin • Read/Write • Read-Only
show ptp parent-dataset	Displays Grandmaster priority settings and other Grandmaster parameters	• Admin • Read/Write • Read-Only
show ptp stat	Displays statistics on PTP packets	• Admin • Read/Write • Read-Only
show ptp status	Displays PTP stack status	• Admin • Read/Write • Read-Only
show radius-server	Displays the details of the configured RADIUS authentication servers	• Admin • Read/Write • Read-Only
show session	Displays web and CLI configuration session information	• Admin • Read/Write • Read-Only

Table 37: CLI Viewing Options *(continued)*

Command	Description	Supported Users
show snmp	Displays SNMP configuration information	• Admin • Read/Write • Read-Only
show snmp-trap	Displays information about trap receivers	• Admin • Read/Write • Read-Only
show snmp-v3 user	Displays SNMPv3 user information	• Admin • Read/Write • Read-Only
show sync-src-priority	Displays the current Sync Source priority list	• Admin • Read/Write • Read-Only
show sync-src-revertive	Displays if the synchronization source selection mode is set as revertive or not and the time period.	• Admin
show sysinfo	Displays system information	• Admin • Read/Write • Read-Only
show syslog	Displays system log {num of lines}	• Admin • Read/Write • Read-Only
show telecom-standard	Displays the telecom standard set for the telecom profile	• Admin • Read/Write • Read-Only
show time	Displays Time Sync Source, its quality, state, and Stratum	• Admin • Read/Write • Read-Only
show timing-output	Displays timing output information for PPS, IRIG-B, 5/1 MHz, and 10 MHz output ports	• Admin • Read/Write • Read-Only
show unsecured-communication-protocols-status	Displays the status of unsecured transfer or communication protocols such as ICMP, TFTP, FTP, and Telnet protocol.	• Admin • Read/Write • Read-Only

Table 37: CLI Viewing Options *(continued)*

Command	Description	Supported Users
show user-history	Displays command history for users. NOTE: The Read-Only or Read/Write users can use this command to view only command history of their sessions. The Admin user can use this command to view command history of all users.	• Admin • Read/Write • Read-Only
show users	Displays details (username and class) of Read-Only and Read/Write users.	Admin

Viewing an Option in the CLI

To look at an option in the CLI:

1. Launch a Telnet session
2. At the prompt, type **show *option*** and then press Enter. (Where *option* is the option that you want to view.) Information for the option is displayed.

Using the CLI to Configure Timing Server Parameters

The CLI can be used to configure the Timing Server. This section identifies and describes the element that can be configured using the CLI and describes how to configure parameters using Telnet.

- Elements that You Can Configure in the CLI on page 157
- Using the CLI to Configure the Timing Server on page 171

Elements that You Can Configure in the CLI

To list the elements that you can configure using the CLI, type **enable** at the prompt and press Enter. Table 38 on page 157 list the configurable elements that appear.

NOTE: All NTP or PTP commands and GUI pages are available only if the corresponding protocol support is enabled in the Timing Server.

Table 38: Configurable Elements in the CLI

Command	Description	Supported Users
alarm-cut-off	Cuts off audio alarms.	• Admin • Read/Write
backup tftp	Backs up the configuration file to a TFTP server.	Admin

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
backup scp	Backs up the configuration file (**config.dat**) in the specified path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	Admin
backup-unicast tftp	Backs up the unicast table entries file (**unicast.dat**) in the specified path of the TFTP server.	Admin
backup-unicast scp	Backs up the unicast table entries file (**unicast.dat**) in the specified path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	Admin
clear alarm	Clears the alarm.	• Admin • Read/Write
clear all-unicast-entry	Clears all the Timing Clients IP addresses.	• Admin • Read/Write
clear authlog	Clears authorization log.	Admin
clear daemon log	Clears daemon log.	Admin
clear eventlog	Clears event log.	Admin
clear md5-key-entry	Deletes the MD5 key list.	• Admin • Read/Write
clear ptp-stat	Clears statistics of PTP packets.	• Admin • Read/Write
clear syslog	Clears system log.	Admin
config 1/5MHz	Selects between 1MHz vs. 5MHz output on the 5/1 MHz port.	• Admin • Read/Write
config accounting	Enables or disables RADIUS accounting in the Timing Server.	• Admin • Read/Write

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config accounting-level	Configures the information to be used by the Timing Server for accounting. The values are: • 1—For login accounting only • 2—For interactive and login accounting • 3—For configuration, interactive and login accounting	• Admin • Read/Write
config accounting-server add	Adds the IP address of the RADIUS accounting server and sets other related configurations (secret word, retries, timeout, and port) to be used by the Timing Server for accounting.	• Admin • Read/Write
config accounting-server del	Deletes the RADIUS accounting server and its configuration from the accounting server list by using the IP address of the accounting server.	• Admin • Read/Write
config antenna-cable-delay-compensation	Configures a delay compensation value in the range of -10000 through 10000 nanoseconds to compensate antenna cable delay. NOTE: You are advised to enter: • A negative delay compensation value to compensate the positive delay introduced by the cable. • A positive delay compensation value to advance the PPS output delay relative to the absolute value.	• Admin • Read/Write
config antenna-voltage	Configures the input voltage for the antenna between 3.3 or 5V.	• Admin • Read/Write
config alarm-email-receiver	Configures recipients of alarm e-mail notifications	• Admin • Read/Write
config alarm-profile	Configures the alarm profile.	Admin
config auth-order	Configures the authentication order to be followed by the Timing Server while authenticating an user. The following combination of authentication order is allowed: • RADIUS server authentication and then local authentication • Local authentication and then RADIUS server authentication • Only RADIUS server authentication • Only local authentication	• Admin • Read/Write
config change-password	Modifies your current login password.	Read/Write

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config cli-banner-file	Downloads the specified text file from the mentioned path of the configured Secure Copy Protocol (SCP) server to the **/etc/config/cli_banner.txt** path for customizing the CLI banner. The downloaded file should be a plain text file. On rebooting, the TCA system checks for the **cli_banner.txt** file and displays the content in the file as CLI banner. NOTE: • The file cannot be downloaded from TFTP and FTP servers. • The TCA system supports only 1024 characters (including spaces and new line characters) for the downloaded file, so the TCA system would truncate any extra characters in the file. • The TCA system detects all special characters in the downloaded file as normal strings. • The TCA system displays the default hard coded CLI banner, if no customized CLI banner is configured. • The TCA system displays an empty banner, if the **cli_banner.txt** file is empty.	Admin
config cli-banner-text	Configures a customized CLI banner. The CLI banner text that you have provided in this command is stored in the **cli_banner.txt** file in the **/etc/config** path. On rebooting, the TCA system checks for the **cli_banner.txt** file and displays the content in the file as CLI banner. The maximum length of the CLI banner text that you can enter in this command is 100 characters, which include spaces and special characters. You can also use special characters (such as \n. \v, \t, and so on) to format the CLI banner text provided in this command. NOTE: • If the **cli_banner.txt** file is available and already contains any content, then the existing content is replaced with the provided content. • You should avoid using the following special characters in the CLI banner text: |, ", and '. • The TCA system displays the default hard coded CLI banner, if no customized CLI banner is configured. • The TCA system displays an empty banner, if the **cli_banner.txt** file is empty.	Admin
config cli-timeout	Configures the session in-action session timeout.	• Admin • Read/Write
config datetime	Configures date and time for the Timing Server.	• Admin • Read/Write
config dns0	Configures the primary DNS server IP.	• Admin • Read/Write

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config dns1	Configures the second DNS server IP.	• Admin • Read/Write
config domain	Configures the domain. {domain name}	• Admin • Read/Write
config dst	Configures offset, starting date and time, and ending date and time for DST.	• Admin • Read/Write
config e1 output loopback	Configures the E1 input port's number of ports, mode, framing, encoding, Receive Sensitivity, SSM, and state.	• Admin • Read/Write
config e1 output port	Configures the E1 output port's number of ports, mode, framing, encoding, LBO, SSM, and state.	• Admin • Read/Write
config enable-password	Modifies the password of the enable mode.	Admin
config eth0 auto-nego	Turns Auto Negotiation ON or OFF for Ethernet 0 (LAN1) port.	• Admin • Read/Write
config eth0 duplex	Selects the duplex mode for the Ethernet 0 (LAN1) port between half or full duplex.	• Admin • Read/Write
config eth0 ip	Configures IP settings for Ethernet 0 (LAN1) port : IP address, mask, and gateway. NOTE: TCA supports only one default gateway for both eth0 and eth1 interfaces. You can create static routes to reach a network through a specific Ethernet interface.	• Admin • Read/Write
config eth0 ip-mode	Selects the IP mode for the Ethernet 0 (LAN1) port between Static and DHCP.	• Admin • Read/Write
config eth0 speed	Selects the speed for the Ethernet 0 (LAN1) port between 10 and 100Mbps.	• Admin • Read/Write
config eth1 auto-nego	Turns Auto Negotiation on or off for Ethernet 1 (LAN2) port.	• Admin • Read/Write
config eth1 duplex	Selects the duplex mode for the Ethernet 1 (LAN2) port between half or full duplex.	• Admin • Read/Write
config eth1 ip	Configures IP settings for Ethernet 1 (LAN2) port : IP address, mask, and gateway. NOTE: TCA supports only one default gateway for both eth0 and eth1 interfaces. You can create static routes to reach a network through a specific Ethernet interface.	• Admin • Read/Write

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config eth1 ip-mode	Selects the IP mode for the Ethernet 1 (LAN2) port between Static and DHCP.	• Admin • Read/Write
config eth1 speed	Selects the speed for the Ethernet 1 (LAN2) port between 10 and 100Mbps.	• Admin • Read/Write
config gps anti-jamming	Enables or disables the anti-jamming capability for the Resolution SMT GPS Timing Receiver. NOTE: This command is available only if the TCA8000 and TCA8500 Timing Servers use the Resolution SMT GPS Timing Receiver.	• Admin • Read/Write
config holdover-state	Configures the TCA system to remain in the holdover state or change to the internal state after 24 hours of holdover state. • 1—The system remains in the holdover state instead of changing to the internal state after 24 hours of holdover state. However, the system changes to the internal state when the signal is lost during acquisition, locking, or resetting the system. • 0 (default)—The system changes to the internal state after 24 hours of holdover state.	• Admin • Read/Write
config irig-b	Configures modes for the IRIG-B output port.	• Admin • Read/Write
config hostname	Configures the hostname. {hostname}	Admin
config language	Configures the webpages language.	• Admin • Read/Write
config lcd-config	Enables or disables the LCD configuration change functionality. When the LCD configuration change functionality is enabled, the TCA system displays all menus (**Status**, **Config**, **Admin**, and **Help**) in the LCD panel. When the LCD configuration change functionality is disabled, the TCA system does not display the **Config** and **Admin** menus in the LCD panel. By default, the LCD configuration change functionality is enabled. NOTE: The status change becomes effective on next reboot. CAUTION: If the LCD configuration change functionality is disabled, then you cannot use the hardware mechanism for resetting the passwords of the Admin user and the enable mode. Hence, if you forget the password of the Admin user, you cannot perform any administrator functionalities in the TCA system.	Admin

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config ntp add broadcast	Creates an NTP association entry for the specified IPv4 address with the NTP mode set to Broadcast. You can define the following optional parameters: prefer, version, min poll, max poll, and keyid. NOTE: The IPv4 address should be a Class A address, Class B address, or Class C address. You can add a maximum of 20 entries including all types of NTP modes. Each entry should have a unique IPv4 address.	• Admin • Read/Write
config ntp add manycast_server	Creates an NTP association entry for the specified IPv4 address with the NTP mode set to Manycast Server. You can define the optional parameter keyid. NOTE: The IPv4 address should be a Class D address. You can add a maximum of 20 entries including all types of NTP modes. Each entry should have a unique IPv4 address.	• Admin • Read/Write
config ntp del	Deletes the specified NTP association entry.	• Admin • Read/Write
config ntp generate-md5-key-list	Generates the MD5 key list using the system command **ntp-keygen**. The generated list is stored in the /etc/config/ntp/tempkeys path.	• Admin • Read/Write
config ntp reload-md5-key-list	Reloads the MD5 key list.	• Admin • Read/Write
config password	Modifies your current login password.	Admin
config protocol-support	Enables either the NTP or PTP support in the Timing Server. By default, the PTP support is enabled. • ptp—Enables PTP support. • ntp—Enables NTP support. NOTE: • If you reject the rebooting of the Timing Server, the protocol change is not saved and the Timing Server continues to use the current protocol. • After rebooting the Timing Server, you can access only the commands and GUI pages related to the enabled protocol.	Admin
config ptp add server	Adds a PTP server.	• Admin • Read/Write
config ptp gm announce-receipt-timeout	Configures the timeout period for the announce event messages.	• Admin • Read/Write
config ptp gm enable	Enables the PTP protocol.	• Admin • Read/Write

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config ptp gm disable	Disables the PTP protocol.	• Admin • Read/Write
config ptp gm domain	Configures the PTP domain number for the Timing Client.	• Admin • Read/Write
config ptp gm dscp	Configures the Differential Service (DiffServ) of the IP packet, which transports the PTP event and signaling messages.	• Admin • Read/Write
config ptp gm priority1	Provides a priority value for the Priority 1 parameter, which is used in the Best Master Clock (BMC) algorithm. The value is assigned to assist the BMC to select a Grandmaster for the PTP domain.	• Admin • Read/Write
config ptp gm priority2	Provides a priority value for the Priority 2 parameter, which is used in the BMC algorithm. The value is assigned to assist the BMC to select a Grandmaster for the PTP domain.	• Admin • Read/Write
config ptp gm profile	Configures the PTP profile type as Telecom Profile, which is the same profile type value as used for Telecom Profile without Signaling.	• Admin • Read/Write
config ptp gm two-step	Enables the One-Step or Two-Step clock. • 0—Enables the One-Step clock. • 1—Enables the Two-Step clock.	• Admin • Read/Write
config ptp grandmaster	Configures PTP grandmaster settings: profile selection, 1- vs. 2-step, Sync, Delay Request, and Announcement Packet intervals.	• Admin • Read/Write
config ptp start-announce	Configures the announce packet start timeout value to delay the transmission of announce messages. On rebooting, the TCA Timing Server starts transmitting the announce messages if any one of the following condition is satisfied: • After the expiry of the configured timeout value • Any configured synchronization source is locked to the frequency within the configured timeout value The timeout value range is between 0 and 120 minutes. The default value is 0 minutes (that is, transmission delay feature is disabled). NOTE: • The transmission delay feature is applicable only to the first lock state of any synchronization source. • The configured timeout value is effective on next reboot.	• Admin • Read/Write
config ptp unicast add	Adds the IP address of a Timing Client (Slave) through which the Grandmaster sends or receives event messages.	• Admin • Read/Write

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config ptp unicast announce-int-range	Configures the range for announce interval message rate.	• Admin • Read/Write
config ptp unicast continuous	Configures the Grandmaster to continuously send the ARP messages to the unicast IP addresses in its Unicast table. • ON—Sends an ARP request for every 2 minutes per Timing Client. • OFF—Sends ARP requests until the Grandmaster receives the ARP response from the Timing Client and then does not send the ARP requests again until either the Grandmaster is reset or the IP address is deleted and added back.	• Admin • Read/Write
config ptp unicast del	Deletes the IP address of a Timing Client (Slave) through which the Grandmaster sends or receives event messages.	• Admin • Read/Write
config ptp unicast delay-int-range	Configures the range for delay request or response event message rate.	• Admin • Read/Write
config ptp unicast sync-int-range	Configures the range for Sync event message rate.	• Admin • Read/Write
config radius-server add	Adds the IP address of the RADIUS authentication server and sets other related configurations (secret word, retries, timeout, and port) to be used by the Timing Server for user authentication.	• Admin • Read/Write
config radius-server del	Deletes the RADIUS authentication server and its configuration from the authentication server list by using the IP address of the authentication server.	• Admin • Read/Write
config snmp-trap add	Adds a trap receiver address to the list.	• Admin • Read/Write
config snmp-trap del	Deletes a trap receiver from the list.	• Admin • Read/Write
config snmp-v3user add	Adds a SNMP v3 user.	• Admin • Read/Write
config snmp-v3user del	Deletes a SNMPv3 user.	• Admin • Read/Write
config snmp contact	Configures the SNMP contact.	• Admin • Read/Write
config snmp readonly-community	Configures the SNMP read only community.	• Admin • Read/Write
config snmp readwrite-community	Configures the SNMP read and write community.	• Admin • Read/Write

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config snr	Selects SNR units between AMU or dBHz. NOTE: This command is not available if the TCA8000 and TCA8500 Timing Servers use the Resolution SMT GPS Timing Receiver. The AMU is not an industry standard unit of measurement.	• Admin • Read/Write
config ssl-key	Downloads the specified SSL key file from the mentioned path of the configured SCP server. For more information about the dynamic SSL certificate support, see "Dynamic SSL Certificate Overview" on page 23. NOTE: • The file cannot be downloaded from TFTP and FTP servers. • You must download the corresponding certificate file. • The file path and username should not contain any space characters.	Admin
config ssl-cert	Downloads the specified SSL certificate file from the mentioned path of the configured SCP server. For more information about the dynamic SSL certificate support, see "Dynamic SSL Certificate Overview" on page 23. NOTE: • The file cannot be downloaded from TFTP and FTP servers. • You must download the corresponding key file. • The file path and username should not contain any space characters.	Admin
config static-route add	Adds a static route that defines a gateway IP address for reaching the destination network. The gateway IP address acts as an interface IP address for the next hop. NOTE: • The gateway IP address should be in the same subnet of the eth0 or eth1 interface IP address. • TCA supports only one default gateway for both eth0 and eth1 interfaces. • You can create only 10 static routes (inclusive of default routes). For a list of default routes, see Table 41 on page 189.	• Admin • Read/Write
config static-route del	Deletes a static route. NOTE: You cannot delete default routes. For a list of default routes, see Table 41 on page 189.	• Admin • Read/Write
config sync-src-priority	Configures the highest priority synchronization source that the Timing Server should use. Choices include: gps, e1, or internal. NOTE: The t1 option is available instead of e1 when the Timing Server uses T1 interface type.	• Admin • Read/Write

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config sync-src-revertive	Configures the synchronization source selection mode and the time period. The status can be: • yes—Sets the synchronization source selection mode as revertive. • no—Sets the synchronization source selection mode as non-revertive. The time period options are: • 1—Time period is set to zero minute. • 2—Time period is set to 10 minutes. • 3—Time period is set to 20 minutes. • 4—Time period is set to 30 minutes. • 5—Time period is set to 40 minutes. • 6—Time period is set to 50 minutes. • 7—Time period is set to 60 minutes.	• Admin
config telecom-standard	Configures the telecom standard for the telecom profile. The PTP grandmaster announces the clock class based on the configured telecom standard. The values are: • 1 (Default value)—Telecom standard is set as Telecom-IEEE1588. • 2—Telecom standard is set as Telecom-G8265.1-option 1. • 3—Telecom standard is set as Telecom-G8265.1-option 2. • 4—Telecom standard is set as Telecom-G8275.1. NOTE: The telecom standard can be configured only for the telecom profile. For other profiles, the default value is set and you cannot configure the telecom standard.	• Admin • Read/Write
config timezone	Configures the time zone information.	• Admin • Read/Write
config unsecured-communication-protocols	Enables or disables unsecured transfer or communication protocols such as ICMP, TFTP, FTP, and Telnet protocol. The values are: • **1**—Specifies the ICMP. • **2**—Specifies the TFTP. • **3**— Specifies the FTP. • **4**—Specifies the Telnet protocol. • **5**—Specifies all the preceding protocols. By default, all the unsecured transfer or communication protocols are enabled.	Admin
config user add	Creates a new user account with login class as Read-Only or Read/Write.	Admin

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config user class	Modifies the login class for the Read-Only or Read/Write user account.	Admin
config user del	Deletes the Read-Only or Read/Write user account.	Admin
config user password	Creates a new password for the Read-Only or Read/Write user account.	Admin
config web	Configures the web enable/disable.	• Admin • Read/Write
config web-mode	Configures the web mode.	Admin
config web-timeout	Configures the web-timeout. [min]	Admin
Disable	Disables privileged access (to configuration commands)	• Admin • Read/Write
ftp	Installs the specified software image from the configured FTP server.	Admin
halt	Halts the system.	• Admin • Read/Write
ping	Pings the remote host.	• Admin • Read/Write
reboot	Reboots the system.	• Admin • Read/Write
reset config	Restores the Timing Server to the manufacturer default configuration.	Admin
reset password	Restores the default password value.	Admin
restart ntp	Restarts the NTP daemon. All NTP processes are killed before restarting the NTP daemon.	Admin
restart ptp	Starts PTP operations	Admin
restore tftp	Restores the configuration file from a TFTP server.	Admin

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
restore scp	Restores the configuration file from the mentioned path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	Admin
restore-unicast tftp	Restores the unicast table entries from the mentioned file in a TFTP server.	Admin
restore-unicast scp	Restores the unicast table entries from the mentioned file in a SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	Admin
save active-md5-key-list scp	Downloads the current active MD5 keys from the Timing Server to the mentioned path in the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	• Admin • Read/Write
save active-md5-key-list tftp	Downloads the current active MD5 keys from the Timing Server to the mentioned file in the TFTP server.	• Admin • Read/Write
save tftp authlog	Saves the author log to a TFTP server.	• Admin • Read/Write
save tftp daemonlog	Saves the daemon log to a TFTP server.	• Admin • Read/Write
save tftp eventlog	Saves the event log to a TFTP server.	• Admin • Read/Write
save tftp syslog	Saves the system log to a TFTP server.	• Admin • Read/Write

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
save scp authlog	Saves the author log in the specified path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	• Admin • Read/Write
save scp daemonlog	Saves the daemon log in the specified path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	• Admin • Read/Write
save scp eventlog	Saves the event log in the specified path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	• Admin • Read/Write
save scp syslog	Saves the system log in the specified path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	• Admin • Read/Write
scp	Installs the specified software image from the mentioned path of the configured SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	Admin
stop ntp	Stops the operations of the NTP daemon.	Admin
tftp	Installs a software upgrade image file by TFTP	Admin
tftp license	Upload TFTP license for value-added features.	• Admin • Read/Write

Table 38: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
upload-md5-key-list scp	Uploads the MD5 keys to the Timing Server from the mentioned path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	• Admin • Read/Write
upload-md5-key-list tftp	Uploads the MD5 keys to the Timing Server from the mentioned file in a TFTP server.	• Admin • Read/Write

Using the CLI to Configure the Timing Server

To use the CLI to configure the Timing Server:

1. Launch a CLI session as described in "Accessing the Timing Server Using the CLI" on page 149.
2. At the prompt, type **enable** and press Enter.
3. At the password prompt, type **enable** and press Enter.
4. At the prompt, enter the configuration command for the element to be changed or configured.
5. At the element prompt, enter the value to be used to replace the current value shown in the brackets < > and press Enter or just press Enter to retain the current value.
6. When changing the elements have been completed, enter **exit** and press Enter to save your changes and return to exit the enable condition.

Accessing the Timing Server Using SSH

To access the Timing Server using SSH:

1. Using a computer connected on the same network segment as the Timing Server, run the SSH client software (such as the free-ware "PuTTY" or TuTTY").
2. Enter the IP address of the Timing Server in the hostview window.

NOTE: If the Timing Server is being accessed for the first time, see "Assigning an IP Address to the TCA8000 or TCA8500 Timing Server" on page 16 for information about connecting to the unit and accessing the user interface.

3. Click the **OK** button. A DOS window appears.
4. At the login prompt, type the login name chosen and press Enter.

5. At the User name prompt, type the username and press Enter.
6. At the Password prompt, type the corresponding password and press Enter.

   To see a list of available commands, type **help**.

   Refer to Table 37 on page 152 for a list of viewing options and Table 38 on page 157 for a list of configurable elements.

APPENDIX B

Using the CLI to Configure PTP and Network Interface Parameters

The TCA8000 and TCA8500 Timing Servers are equivalent with respect to all features except the oscillator type is either an OCXO or Rubidium, respectively. This document addresses the configuration for the PTP functionality in order to communicate with the TCA6x00 or third-party Timing Client. Since the Ethernet physical layer and packet protocol (UDP/IP) are part of the connectivity this is also covered in the document even though this is a general requirement in order to access also the management interface of the system. Similarly this applies to the VLAN which is optional. All configuration commands are preceded by config and status commands preceded by show, except where noted with an asterisk (*).

Server PTP Functions

The TCA8000 and TCA8500 Timing Servers are equivalent with respect to these features. Reference to the TCA8000 Timing Server applies also for the TCA8500 Timing Server.

PTP Profile Types

Default Profile:

- Supports Multicast Sync, Announce, Delay response
- Supports One-Step and Two-Step modes

Juniper Type I Profile:

- Supports Default Profile (Multicast Sync, Announce and Delay response)
- Supports Multicast Sync, Announce and Unicast Delay response
- Supports One-Step and Two-step modes

Telecom Profile with and without signaling:

- Manual Configuration of Slave IP Address for Telecom profile without signaling
- Unicast Discovery features
- Total 256 Unicast Slave support
- Supports Unicast - OneStep mode only
- Signaling Support at Master and Slave
- Sends one ARP request for slave every approximately 128 seconds when unicast continuous enable case
- Sends one ARP request to gateway IP address for every 1 minute when unicast continuous enable case
- Supports Grand Master Cluster Support

  Master's BMC between the Grand Master Cluster Table Masters

  Max Grand Master Cluster Masters allowed is 3
- Master supports signaling messages for

  Process REQUEST UNICAST TRANSMISSION for Announce

  Process REQUEST UNICAST TRANSMISSION for SYNC

  Process REQUEST UNICAST TRANSMISSION for Delay Response

  Support GRANT UNICAST TRANSMISSION for Announce

  Support GRANT UNICAST TRANSMISSION for SYNC

  Support GRANT UNICAST TRANSMISSION for Delay Response

  Support CANCEL UNICAST TRANSMISSION for Delay Response

  There is support for Dynamic Slave IP address configuration after sending Grant Message

  There is support for Dynamic delete Slave IP address after expiry of duration of Request Unicast messages
- Master supports only multiple set of configuration for Announce Rate, Sync Rate, and Delay Response Rate

  Master supports the Sync/Delay Range from 1 pps to 64 pps and Announce from 1 packet per second to 1 packet per 8 seconds

Juniper Profile Type II Profile:

- Supports Default Profile

- Supports BrilliantJuniper Type I Profile
- Supports Telecom Profile (Supports OneStep mode only)

CLI Configuration / Status

Configuration requires the second level of login which is after login using admin / admin (or user assigned information) the config login needs to be executed which is “en” at the prompt followed by entering the password “enable”.

The network parameters of the Ethernet interface should be configured before configuring the PTP profile information.

The following parameters are set for the PTP profile through the configuration commands:

Table 39: Configuration Commands

Parameter	Value
Profile	0:Default 1:Juniper Type I 2:Telecom Profile 3:Juniper Type II
Priority 1	0 to 255
Priority 1	0 to 255
Domain Number	0 to 255
Two Step	0:no 1:yes
Delay Interval	0: 1 pps 1: 2 pps 2: 4 pps 3: 8 pps 4: 16 pps 5: 32 pps 6: 64 pps

Table 39: Configuration Commands *(continued)*

Parameter	Value
Announce Interval	0: 1 pps 1: 1 packet per 2 seconds 2: 1 packet per 4 seconds 3: 1 packet per 8 seconds
Sync Interval	0: 1 pps 1: 2 pps 2: 4 pps 3: 8 pps 4: 16 pps 5: 32 pps 6: 64 pps
Announce Receipt Timeout	2 to 10 intervals

The parameter options for the configuration command can be obtained for the configuration commands by adding a question-mark (?) after typing in # config, such as "# config ptp grandmaster ?".

NOTE: **Configuration for Default, Brilliant/Juniper and Telecom with or without Signaling profiles can also be done through the Web Interface.**

- Default Profile Configuration Command on page 176
- Juniper Profile Configuration Command on page 177
- Telecom Profile—Without Signaling Configuration Command on page 178
- Telecom Profile—With Signaling Configuration Command on page 179
- Grandmaster Cluster Configuration on page 181
- Status Commands on page 182

Default Profile Configuration Command

The profile is configured with other PTP parameters within a configuration string. The Sync and Delay_Response rates at the Grandmaster are required to match the Timing Client Sync and Delay_Request packet rates.

ptp grandmaster—The parameters that are required to be configured are the profile type (0-3), priority 1 and 2 (0 to 128) PTP Domain # (0-254), one/two-step mode, the Delay_Response / Sync / Announce packet rates and announce message timeout

interval, that is [profile] [priority1] [priority2] [domain number] [two step] [delay interval] announce interval] [sync interval] [announce receipt timeout]

NOTE: Two-step is not enabled when using TCA Timing Client as it is not required.

```
#config ptp grandmaster 0 1 1 20 0 6 0 6 3 where [default profile=0], [priority1 & 2
= 1], [domain #=20] [one-step] [Delay_Response/Request Rate= 6] [Announce
Interval =0] [Sync Rate = 6] [Announce Timeout=3]
```

ptp gm dsc—Configures the Differential Service (DiffServ) of the IP packet which transports the PTP event and signaling messages. This should be configured to Explicit Forward (EF) which is a value of 46 decimal.

```
# config ptp gmslv dscp 46
```

config ptp gm disable—Disables the PTP protocol. Only after your confirmation, the PTP protocol is disabled.

NOTE: This command is applicable for all profile types.

```
# config ptp gm disable
Are you sure you want to disable grandmaster ptp? y/n
y
```

config ptp gm enable—Enables the PTP protocol. Only after your confirmation, the PTP protocol is enabled.

NOTE: This command is applicable for all profile types.

```
# config ptp gm enable
Are you sure you want to enable grandmaster ptp? y/n
y
```

ptp start-announce—Configures the announce packet start timeout value in minutes. The value can be between 0 and 120.

```
# config ptp start-announce 70
Effective upon reboot.
```

Juniper Profile Configuration Command

The profile is configured with other PTP parameters within a configuration string. The Sync and Delay Response rates at the Grandmaster are required to match the Timing Client Sync and Delay_Request packet rates.

ptp grandmaster—The parameters that are required to be configured are the profile type (0-3), priority 1 and 2 (0 to 128) PTP Domain # (0-254), one/two-step mode, the Delay_Response / Sync / Announce packet rates and announce message timeout

interval, that is [profile] [priority1] [priority2] [domain number] [two step] [delay interval] announce interval] [sync interval] [announce receipt timeout]

NOTE: Two-step is not enabled when using TCA Timing Client as it is not required.

```
#config ptp grandmaster 1 1 1 20 0 6 0 6 3 where [BrilliantJuniper profile=1], [priority1
& 2 = 1], [domain #=20] [one-step] [Delay_Response/Request Rate= 6] [Announce
Interval =0] [Sync Rate = 6] [Announce Timeout=3]
```

ptp gm dscp—Configures the Differential Service (DiffServ) of the IP packet which transports the PTP event and signaling messages. This should be configured to Explicit Forward (EF) which is a value of 46 decimal.

```
# config ptp gmslv dscp 46
```

ptp start-announce—Configures the announce packet start timeout value in minutes. The value can be between 0 and 120.

```
# config ptp start-announce 70
Effective upon reboot.
```

Telecom Profile—Without Signaling Configuration Command

The profile is configured with other PTP parameters within a configuration string. In order for the Grandmaster to recognize the slave unit, the Timing Client IP address of the Timing Client needs to be configured at the Grandmaster for the Ethernet network IP protocol communication link. The Sync and Delay_Response rates at the Grandmaster are required to match the Timing Client Sync and Delay_Request packet rates.

ptp grandmaster—The parameters that are required to be configured are the profile type (0-3), priority 1 and 2 (0 to 128) PTP Domain # (0-254), one/two-step mode, the Delay_Response / Sync / Announce packet rates and announce message timeout interval, that is [profile] [priority1] [priority2] [domain number] [two step] [delay interval] announce interval] [sync interval] [announce receipt timeout]

NOTE: Two-step is not enabled when using TCA Timing Client as it is not required

```
#config ptp grandmaster 2 1 1 20 0 6 0 6 3 where [Telecom profile=2], [priority1 & 2
 = 1], [domain #=20] [one-step] [Delay_Response/Request Rate= 6] [Announce
Interval =0] [Sync Rate = 6] [Announce Timeout=3]
```

ptp gm dscp—Configures the Differential Service (DiffServ) of the IP packet which transports the PTP event and signaling messages. This should be configured to Explicit Forward (EF) which is a value of 46 decimal.

```
# config ptp slv gm dscp 46
```

ptp start-announce—Configures the announce packet start timeout value in minutes. The value can be between 0 and 120.

```
# config ptp start-announce 70
Effective upon reboot.
```

ptp unicast add—This adds the IP-address of a Timing Client (Slave) in which the Grandmaster will be sending / receiving event messages.

```
# config ptp unicast add 192.168.40.50
```

ptp unicast del—This deletes the IP-address of a Timing Client (Slave) in which the Grandmaster will stop sending / receiving event messages.

```
# config ptp unicast del 192.168.40.50
```

clear all-unicast-entry*—Clears all the Timing Clients IP-addresses

ptp unicast continuous—Configures the Grandmaster in continuously sending the ARP message to the unicast IP-Addresses in its Unicast table. These are the IP-Addresses which where configured. It is recommended that this be set to ON.

- Continuous ON — Sends ARP request for every 2 minutes per Timing Client
- Continuous OFF — Sends ARP request until it receives the ARP response from the Timing Client and then does not send again until either Grandmaster is reset or the IP-Address is deleted and added back.

```
config ptp unicast continuous ON
```

telecom-standard—Configures the telecom standard based on which the PTP grandmaster announces the clock class. The values can be 1 to 4.

```
# config telecom-standard 2 [where 2 = Telecom-G8265.1-option 1]
```

Telecom Profile—With Signaling Configuration Command

When the PTP domain that is supported by the TCA8000 Timing Server consists of Timing Clients that support Telecom Profile with Signaling, this profile is used.

The Sync, Delay_Response, and Announce range can be restricted to allow only certain rates to be accepted and thereby acknowledged in the Signaling response. The default values or configured for the completer range supported for each parameter by the TCA8000 Timing Server. The configuration parameters in italics do not need to be configured, if parameters where set when configuring Telecom Profile without Signaling.

ptp grandmaster—This configuration command which is described in all the other profiles can also be used to set the following parameters instead of using the individual configuration commands. The parameters that are required which can be configured for signaling are the profile type (0-3), priority 1 and 2 (0 to 128) PTP Domain # (0-254), one/two-step mode, and Announce Timeout. The Sync, Delay_Response and Announce Interval needs to be configured through the specific commands related to these parameters.

NOTE: **Two-step is not enabled when using TCA Timing Client as it is not required.**

```
#config ptp grandmaster 2 1 1 20 0 6 0 6 3 where [Telecom profile=2], [priority1 & 2
 = 1], [domain #=20] [one-step] [Delay_Response/Request Rate= 6] [Announce
Interval =0] [Sync Rate = 6] [Announce Timeout=3]
```

ptp gm profile—Configures the PTP profile type as Telecom Profile which is the same profile type value as used for Telecom Profile without Signaling.

```
# config ptp gm profile 2
```

ptp gm domain—Configures the PTP domain number for the Timing Client(s). The values can be 0 to 254 and needs to be configured as the same domain number of the associated Timing Client(s).

```
# config ptp gm domain 20
```

ptp gm priority1—Provides a priority value (0 to 255) for Priority 1 parameter which is used in the Best Master Clock algorithm. The value is assigned to assist the BMC to select a Grandmaster for the PTP domain. There are two 8-bit priority fields which this is the one of them.

```
# config ptp gm priority1  128
```

ptp gm priority2—Provides a priority value (0 to 255) for Priority 2 parameter which is used in the Best Master Clock algorithm. The value is assigned to assist the BMC to select a Grandmaster for the PTP domain. There are two 8-bit priority fields which this is the one of them.

```
# config ptp gm priority3  128
```

ptp gm two-step—Enable the Follow-up event message when two-step is configured.

NOTE: Two-step enabled is not supported.

```
# config gm two-step 0
```

sync-interval-range [min max]—Configures the Sync event message rate from 1 pps through 64 pps. It is recommended that the range be set for the full range support.

```
# config ptp unicast sync-int-range 0 6 [where 0 = 1 pps and 6 = 64 pps]
```

delay- interval-range [min max]—Configures the Delay_Request/Response event message rate from 1 pps through 64 pps. It is recommended that the range be set for the full range support.

```
# config ptp unicast sync-int-range 0 6 [where 0 = 1 pps and 6 = 64 pps]
```

announce- interval-range [min max]—Configures the Announce interval message rate from 1pkt/1sec – 1pkt/8sec. It is recommended that the range be set for the full range support.

```
config ptp unicast announce-int-range 0  3 [where 0 = 1pkt/1sec and 3 = 1pkt/8sec]
```

ptp gm announce-receipt-timeout—Configures the timeout period for the Announce event message period from 2 to 10 seconds.

```
# config ptp gm announce-receipt-timeout 3
```

ptp gm dscp—Configures the Differential Service (DiffServ) of the IP packet which transports the PTP event and signaling messages. This should be configured to Explicit Forward (EF) which is a value of 46 decimal.

```
# config ptp slv gm dscp 46
```

Although signaling will enter and move Timing Clients that are no longer connected to an inactive state, the following commands can be used to keep the unicast table up to date with current Timing Client IP-addresses. It can also be used for allowing the Timing Client to re-negotiate the PTP parameters.

ptp start-announce—Configures the announce packet start timeout value in minutes. The value can be between 0 and 120.

```
# config ptp start-announce 70
Effective upon reboot.
```

ptp unicast del—This deletes the IP-address of a Timing Client (Slave) in which the Grandmaster will stop sending / receiving event messages.

```
# config ptp unicast del 192.168.40.50
```

clear all-unicast-entry*—Clears all the Timing Clients IP-addresses

telecom-standard—Configures the telecom standard based on which the PTP grandmaster announces the clock class. The values can be 1 to 4.

```
# config telecom-standard 2 [where 2 = Telecom-G8265.1-option 1]
```

Grandmaster Cluster Configuration

This needs to be configured when multiple Grandmasters are used in order to provide a level of network path and / or Grandmaster system protection for the Timing Client devices. The Best Master Clock algorithm (BMC) is used to provide decision process which is being executed on the Grandmasters within the cluster and the Timing Client devices.

It is necessary that all Master's in Grand Master Cluster table should point to other masters and have same unicast slave table configuration for BMC to function properly

ptp grandmaster-cluster add—The IP-Address of the other Grandmaster(s) is added to the cluster table.

```
config ptp grandmaster-cluster  add 192.168.40.220
```

```
config ptp grandmaster-cluster  add 192.168.40.220
```

ptp grandmaster-cluster del—Deletes the IP-Address of the other Grandmaster(s) currently in the cluster table.

```
config ptp grandmaster-cluster  del 192.168.40.220
```

Grandmaster Cluster Example—The example show there Grandmaster cluster consists of four TCA8000 Timing Servers (Grandmaster) and IP-address configurations at each TCA8000 Timing Server.

- Master M1 : 10.1.9.10
- Master M2 : 10.1.9.11
- Master M3 : 10.1.9.12
- Master M4 : 10.1.9.13

Grandmaster Table Cluster @ Master – M1 is—

- Master M2 : 10.1.9.11
- Master M3 : 10.1.9.12
- Master M4 : 10.1.9.13

Grandmaster Table Cluster @ Master – M2 is—

- Master M1 : 10.1.9.10
- Master M3 : 10.1.9.12
- Master M4 : 10.1.9.13

Grandmaster Table Cluster @ Master – M3 is—

- Master M1 : 10.1.9.10
- Master M2 : 10.1.9.11
- Master M4 : 10.1.9.12

At each Grandmaster the Unicast Slave table should have the same Timing Client IP-addresses.

Table 40: UNICAST SLAVE Table

SLAVE S1: 10.1.10.1
SLAVE S2: 10.1.10.2
SLAVE S3: 10.1.10.3
.....
.....
SLAVE S256: 10.1.12.23

Status Commands

Most status commands can be executed at the first level of login except where noted by an asterisk (*). These commands require the second level of login which is the same level as when configuration commands are executed.

ptp config—Displays the configuration parameters of the PTP for the Default, Juniper or Telecom Profile without Signaling.

show ptp config

ptp unicast sync-int-range—Displays the Sync event message rate for the Telecom Profile with Signaling.

ptp unicast delay-int-range—Displays the Delay_Request/Response event message rate for the Telecom Profile with Signaling.

ptp unicast ann-int-range—Displays the Announce interval event message rate for the Telecom Profile with Signaling.

ptp status—Shows the PTP state parameters. This is a summary and the following individual commands provide similar information.

ptp default-dataset—Displays the PTP parameter including Domain # that is configured.

ptp parent-dataset—Identifies Grandmaster priority settings and other Grandmaster parameters.

ptp port-dataset—Shows the PTP port state parameters.

ptp timescale-prop—Displays the timing source and other timing parameters

ptp grandmaster-cluster-config—Displays the other Grandmasters IP-Addresses which are configured for the BMC.

ptp gm dscp—Displays the Differential Service value for the IP packets which transport the PTP event and signaling messages.

ptp stat—Displays statistics of PTP packets.

clear ptp-stat—*Clears statistics of PTP packets.

telecom-standard—Displays the configured telecom standard based on which the PTP grandmaster announces the clock class.

Backup and Restore Commands—PTP

When using Telecom Profile with and without signaling, the unicast IP-address table can be stored within a file and restored to the same or another Grandmaster.

NOTE: Only configurable through the CLI.

backup-unicast tftp—Stores the Timing Client IP-address that are configured in the unicast table.

backup-unicast tftp [tftp-ip-server] [filename]

restore-unicast tftp—Configures the unicast table from the entries in the file.

restore-unicast tftp [tftp-ip-server] [filename]

Sync Source Selection

The synchronization source selection provides a priority selection and revertive feature support for the TCA8000/8500 Timing Server. The selected clock source is used to provide the clock reference for the IEEE1588v2 (PTP) event messages along with the external timing ports that is, T1/E1, 10/5/1 MHz and Pulse-per-Second (PPS).

The TCA6000 Timing Client should be configured for “ptp” that is, the IEEE1588v2 recovered timing. The TCA8000 Timing Server has multiple source selections. GPS is a Stratum-1 source and should be used as the highest priority sync source selection. The T1/E1 BITS inputs can be used as a secondary source.

When the currently used highest priority synchronization source is lost, the Timing Server immediately starts to use the next available lowest priority synchronization source irrespective of the revertive feature configuration. When the highest priority synchronization source becomes available and the currently used lowest synchronization source is lost, the Timing Server immediately changes back to the highest priority synchronization source irrespective of the revertive feature configuration. When the highest priority synchronization source becomes available and the currently used lowest synchronization source is available, the Timing Server changes the source on the basis of the following conditions:

- If the synchronization source selection mode is set as non-revertive, the Timing Server continues to use the current lowest priority synchronization source. The Timing Server changes back to the highest priority synchronization source only after the current lowest priority synchronization source is lost.
- If the synchronization source selection mode is set as revertive and the time period is set to a value other than zero minute, the Timing Client starts to use the highest priority synchronization source provided that the highest priority synchronization source is available for the configured time period.
- If the synchronization source selection mode is set as revertive and the time period is set as zero minute, the Timing Server continues to use the current lowest priority synchronization source. The Timing Server changes back to the highest priority synchronization source only after the current lowest priority synchronization source is lost.

NOTE:

- If the Timing Server uses the internal synchronization source and the highest priority synchronization source becomes available, then the Timing Server immediately starts to use the highest priority synchronization source irrespective of the revertive feature configuration.
- Only an Admin user can set and view the revertive feature configuration.

- Configuration Commands on page 185
- Status Commands on page 185

Configuration Commands

sync-src-priority—Configures the priority selection for the timing source that is used with starting with the highest priority first in the string. Both products use the internal reference oscillator when a source is not available.

```
# config sync-src-priority gps e1 internal
```

NOTE:

- 'Internal' should always be the lowest priority.

sync-src-revertive—Configures the synchronization source selection mode and corresponding time period.

```
# config sync-src-revertive yes 2
Where: [2=time period (that is, 10 minutes)]
```

Status Commands

sync-src-revertive—Displays if the synchronization source selection mode is set as revertive or not and the time period.

Ethernet Port Network Configuration

The Ethernet port is required to be configured with the appropriate Ethernet and IP parameters. The TCA8000 Timing Server has two Ethernet ports. The LAN1 (eth0) is used for the IEEE1588v3 (PTP) network connectivity to the Timing Clients. For the out-of-band management network connectivity, that is Telnet, web interface, SNMP, and so on, either LAN1 (eth0) or LAN2 (eth1) can be used.

NOTE: You cannot configure Ethernet and VLAN port addresses to be in the same subnet (that is, all logical and physical interfaces should be configured to be in different subnets).

- Configuration Commands on page 185
- Status Commands on page 186

Configuration Commands

The reference to eth0 (LAN1 port) is for the single TCA6000 Timing Client Ethernet port and the similar configuration is used for LAN2 (eth1).

eth0 speed—Configures the Ethernet port to either 10 or 100 Mbps. It is recommended to use 100 Mbps (default)

eth0 duplex—Configures the Ethernet port as half or full duplex. For performance requirements to be achieved, full duplex (default) is required.

eth0 auto-nego—Configures the Ethernet port as being able to auto negotiate the speed and half/full duplex (yes / no). It is recommended this be disabled (default), that is no.

eth0 ip—Configures the port IP address, IP Mask and Gateway. There is only one gateway for eth0 and eth1.

```
config eth0 ip 192.168.50.120 255.255.255.0 192.168.50.1
```

eth0 ip-mode—Configures the IP address as being a static or dynamic.

```
# config eth0 ip-mode static
```

Status Commands

network—Displays the network configuration and MAC address of the Ethernet port.

VLAN Port Association (optional)

VLAN port association is not required for the operation of IEEE1588v2 and is used only when it is required to encapsulate the IEEE1588v2 timing packets and signaling (if enabled) into a VLAN packet format. If the Ethernet switch in which the TCA6000 Timing Client is connected supports port based VLAN than this operation can be accomplished within the actual Ethernet switch.

Two VLANs are supported per Ethernet port, that is LAN1 (eth0) and LAN2 (eth1). When using VLANs the application would be that one VLAN is associated with PTP message events which are on the same VLAN as the PTP Grandmaster Ethernet port (LAN1). The second VLAN would be associated with the management system within the network. Following is the configuration commands to attach a VLAN to IEEE1588v2 (PTP) event messages.

Configuration requires the second level of login which is after login using admin / admin (or user assigned information) the config login needs to be executed which is “en” at the prompt followed by entering the password “enable”.

The network parameters of the Ethernet interface should be configured before configuring the VLAN information. The LAN1 (eth0) is used for the IEEE1588v3 (PTP) network connectivity to the Timing Clients. For the out-of-band management network connectivity, that is Telnet, web interface, SNMP, so on, either LAN1 (eth0) or LAN2 (eth1) can be used.

NOTE: **You cannot configure Ethernet and VLAN port addresses to be in the same subnet (that is, all logical and physical interfaces should be configured to be in different subnets).**

- Configuration Commands on page 187
- Status Commands on page 188
- Configuration Validation on page 188

Configuration Commands

There are duplicate commands for the second VLAN, that is vlan2 instead of vlan1.

eth0 vlan1 ip—Configures the VLAN Ethernet IP address.

```
# config eth0 vlan1 ip 192.168.1.100 255.255.0.0
```

eth0 vlan1 id—Assigns a unique VLAN ID that is used for the VLAN encapsulation packet. This value can be in the range from 2 through 4095.

```
# config eth0 vlan1 id 100
```

NOTE: If the VLAN ID you have configured is already being used by any other VLAN, a warning message is displayed.

eth0 vlan1 priority—This assigns the 3 bit priority in the VLAN header which is used for differential services transporting the packet. It is recommended this be configured to the high priority level and use the value 7.

```
# config eth0 vlan1 priority 7
```

eth0 vlan1 ip-mode—Configures the IP address as being a static or dynamic.

```
# config eth0 vlan1 ip-mode static
```

ptp gm dscp—Configures the Differential Service (DiffServ) of the IP packet which transports the PTP event and signaling messages. This should be configured to Explicit Forward (EF) which is a value of 46 decimal.

```
# config ptp gmslv dscp 46
```

ptp gm interface—Configures the VLAN 1 or 2 configuration parameters to be used to encapsulate the PTP signaling and event messages.

NOTE: PTP functionality is only available on eth0.

```
# config ptp gm interface eth0 1
```

eth0 vlan1 enable—VLAN encapsulation of the IP packet is enabled

```
# config eth0 vlan1 enable
```

NOTE: After VLAN related configuration restart PTP by using the command “# restart ptp”.

eth0 vlan1 disable—VLAN encapsulation of the IP packet is disabled

```
# config eth0 vlan1 disable
```

NOTE: After VLAN related configuration restart PTP by using the command “# restart ptp”.

Status Commands

ptp interface—Displays if there is VLAN encapsulation enabled and if it is which VLAN1 and 2 encapsulation parameters are being used for the PTP event and signaling messages.

network—Displays the network IP and port parameters which includes the VLAN enable/disable information

vlan—Show the VLAN parameters for VLAN 1 and 2

Configuration Validation

Validate the VLAN following the procedure:

- Create a VLAN in the TCA8000 Timing Server (eth0 or eth1) through CLI. Create a unique IP-address/Network mask along with the VLAN-id. Make sure the IP-Address/Netmask doesn’t lap with the physical interface IP-Address/Netmask.
- Create a VLAN in the PC
- Ping from the PC to the TCA8000 Timing Server IP-address. If the reply comes VLAN is successful.
- Repeat the same procedure for the eth1.

Static Route IP (optional)

Static routing provides a way of configuring path selection in the network which LAN1 or LAN2 are connected. The network connectivity is achieved by manually adding routes into the local static route table (maximum 10 static routes).

NOTE: TCA supports only one default gateway for both eth0 and eth1 interfaces.

- Configuration Commands on page 188
- Status Commands on page 189
- Examples on page 189

Configuration Commands

static-route add—Adds the static route, mask and gateway IP-Addresses.

```
config static-route add 192.168.60.0 255.255.255.0 10.0.0.1
```

static-route del—Deletes the static route, mask and gateway IP-Addresses.

config static-route del 192.168.60.0 255.255.255.0 10.0.0.1

Status Commands

static-route-config—Shows the static route list which were configured.

static-route-status—Shows the static route list which were configured and its LAN1 (eth0) and LAN2 (eth1) port association.

Examples

The following are default routes which cannot be modified, that is deleted

Table 41: Default Routes

Network	Mask	Gateway	Interface
192.168.1.0	255.255.255.0	0.0.0.0	Eth1
192.168.1.0	255.255.255.0	0.0.0.0	Eth0
0.0.0.0	0.0.0.0	192.168.0.1	Eth0

Example 1: If the user wants to reach the 2.2.2.2 IP address by using the Gateway as 192.168.0.100 on Eth0 interface

```
#  config static-route add 2.2.2.0 255.255.255.0 192.168.0.100
```

After adding the route for 2.2.2.0 network all the packets for 2.2.2.0 n/w goes through "Eth0" interface.

Example 2: If the user wants to reach the 3.3.3.3 IP address by using the Gateway as 192.168.1.200 on Eth1 interface

```
# config static-route add 3.3.3.0 255.255.255.0 192.168.1.200
```

After adding the route for 3.3.3.0 network all the packets for 3.3.3.0 n/w goes through "Eth1" interface.

Table 42: Network Configurations

Network	Mask	Gateway	Interface
192.168.1.0	255.255.255.0	0.0.0.0	Eth1
192.168.1.0	255.255.255.0	0.0.0.0	Eth0
0.0.0.0	0.0.0.0	192.168.0.1	Eth0
2.2.2.0	255.255.255.0	192.168.0.100	Eth0
3.3.3.0	255.255.255.0	192.168.1.200	Eth1

Example 3: To delete the static routes:

```
config static-route del 2.2.2.0 255.255.255.0 192.168.0.100
```

config static-route del 3.3.3.0 255.255.255.0 192.168.1.200

APPENDIX C

Using the CLI to Configure NTP Parameters

This appendix explains the configurations to be done for the NTP functionality in the Timing Server in order to communicate with the TCA6x00 or third-party Timing Client. All configuration commands are preceded by **config** and all status commands are preceded by **show**, except where noted with an asterisk (*).

NOTE:

All NTP configuration and status commands are available only if the NTP support is enabled in the Timing Server.

NTP Modes

NTP is used to synchronize system clocks among a set of distributed Timing Servers and Timing Clients. The Timing Server supports the following NTP modes:

- Broadcast—All remote peers available in the mentioned network or in the mentioned multicast group are synchronized to the Timing Server but the Timing Server is not synchronized to any of the remote peer.
- Manycast Server—If the Timing Server is in scope of the current TTL, synchronized to a valid source, and operating at a stratum level equal to or lower than the manycast client, the manycast client is synchronized to the Timing Server.

Enabling the NTP Support in the Timing Server using the CLI

By default, the PTP support is enabled in the Timing Server. You should enable the NTP support to view the NTP commands and GUI pages for configuring NTP.

NOTE: Only the Admin user can change the protocol support.

To enable the NTP support through the CLI:

1. Login as admin.
   a. >**admin**<cr>
   b. >password:**admin**<cr>
2. Enable privileged commands.
   a. >**enable**<cr>
   b. >password:**enable**<cr>
3. Execute the corresponding command to enable the NTP support and then type **y** to confirm rebooting the Timing Server with the enabled protocol support.

   # config protocol-support ntp
   System reboot is required to make changes effective. Do you want to reboot (y/n)
   Y

NOTE: If you reject the rebooting of the Timing Server, the protocol change is not saved and the Timing Server continues to use the PTP.

NTP Association Configuration or Status

You can configure the NTP functionality in the Timing Server by creating NTP association entries with the supported NTP modes. The commands used to configure NTP functionality can be executed only at the Enable mode. You can enter into this Enable mode by using the **enable** command after logging in to the Timing Server.

While creating the entry, the default values are set for the optional parameters if optional parameters are not configured. You can add only a maximum of 20 entries. Each entry should have a unique IPv4 address.

The following parameters are set while creating the NTP association entry.

Table 43: NTP Configuration Commands

Parameter	Value	Default Value
Version	1 through 4	4
keyid	0 through 16	0
ttl	1 through 255	64

The parameter options for the configuration command can be obtained by adding a question-mark (?) after typing in # config, such as "# config ntp add server ?".

- Configuration Commands on page 193
- Status Commands on page 193

Configuration Commands

ntp add broadcast—Creates an NTP association entry for the specified IPv4 address with the NTP mode set to Broadcast. While creating the entry, you can define the optional parameters version (1 through 4), keyid (0 through 16), and ttl (1 through 255).

NOTE: You can use the same command for modifying configuration details of the existing entry. The IPv4 address should be a Class D address or a broadcast address of a local interface.

 # config ntp add broadcast 2.4.6.8 4 7 240 where [version=4], [keyid=7], [ttl=240 seconds]

ntp add manycast_server—Creates an NTP association entry for the specified IPv4 address with the NTP mode set to Manycast Server. While creating the entry, you can define the optional parameter keyid (0 through 16).

NOTE: You can use the same command for modifying configuration details of the existing entry. The IPv4 address should be a Class D address.

 # config ntp add manycast_server 224.1.4.7 5 where [keyid=5]

ntp del—Deletes the specified NTP association entry.

 # config ntp del 2.4.5.6

Status Commands

ntp config—Displays the details of the configured NTP association entries.

ntp status—Displays the status of the configured NTP association entries.

MD5 Key List Configuration or Status

You can generate, reload, modify, and view the MD5 key list used by the NTP.

- Configuration Commands on page 193
- Status Commands on page 194

Configuration Commands

ntp generate-md5-key-list—Generates the MD5 key list using the system command ntp-keygen. The generated list is stored in the /etc/config/ntp/tempkeys path.

 # config ntp generate-md5-key-list

ntp reload-md5-key-list—Reloads the MD5 key list.

```
# config ntp reload-md5-key-list
```

upload-md5-key-list tftp*—Uploads the MD5 keys to the Timing Server from the TFTP server.

```
upload-md5-key-list tftp [tftpserver ip] [file name]
# upload-md5-key-list tftp 10.45.6.2 md5-list
```

upload-md5-key-list scp*—Uploads the MD5 keys to the Timing Server from the SCP server.

```
upload-md5-key-list scp [Username][Scp-Server-IP][Target-FilePath]
# upload-md5-key-list scp user_1 10.209.164.21 /ntp/keys
```

save active-md5-key-list tftp*—Downloads the current active MD5 keys from the Timing Server to the TFTP server.

```
save active-md5-key-list tftp [tftp-server] [file-name]
# save active-md5-key-list tftp 10.45.6.2 active-md5-list
```

save active-md5-key-list scp*—Downloads the current active MD5 keys from the Timing Server to the SCP server.

```
save active-md5-key-list scp [Username][Scp-Server-IP][Target-FilePath]
# save active-md5-key-list scp user_1 10.209.164.21 /ntp/active/keys
```

clear md5-key-entry*—Deletes the MD5 key list.

```
# clear md5-key-entry
```

Status Commands

ntp current-active-md5-key-list—Displays the current active MD5 keys stored in the /etc/config/ntp/keys path.

ntp current-new-md5-key-list—Displays the newly added MD5 keys stored in the etc/config/ntp/tempkeys path.

Restart and Stop Commands—NTP

You can restart and stop the NTP daemon.

restart ntp*—Restarts the NTP daemon. All NTP processes are killed before restarting the NTP daemon.

stop ntp*—Stops the operations of the NTP daemon.

NOTE: **You can stop the NTP daemon only through the CLI.**

APPENDIX D

Using the CLI to Configure User Authentication and RADIUS Accounting

This appendix explains the CLI commands used to configure user authentication and RADIUS accounting in the TCA8000 and TCA8500 Timing Servers. The TCA8000 and TCA8500 Timing Servers work the same in case of these features.

User Authentication

User authentication enables the user logging in to the Timing Server to be authenticated either locally, using RADIUS authentication servers, or both based on the authentication order.

Configuration Commands

radius-server add—Adds the IP address of the RADIUS authentication server to be used by the Timing Server for user authentication. While adding the IP address, you can set the optional parameters secret word, retries (1 to 10), timeout (1 to 90), and port, that is [secret-word] [retries] [timeout] [port].

NOTE: **The default values are set for the retries, timeout, and port options, if not configured. You can use the same command for modifying the configuration details of existing RADIUS authentication server. You can add only 3 RADIUS authentication servers.**

 # config radius-server add 192.168.0.2 auth123 5 50 1800 where [secret-word=auth123], [retries=5], [timeout=50 seconds], [port=1800]

radius-server del—Deletes the RADIUS authentication server and its configuration by using the IP address of the server. The server is no longer used by the Timing Server for user authentication.

#config radius-server del 192.168.0.2

auth-order—Configures the authentication order to be followed by the Timing Server.

#config auth-order radius [Only RADIUS server authentication]

Status Commands

radius-server—Displays the details of the configured RADIUS authentication servers.

auth-order—Displays the configured authentication order.

RADIUS Accounting

RADIUS accounting enables the Timing Server to remotely account users logged in to the Timing Server.

- Configuration Commands on page 196
- Status Commands on page 196

Configuration Commands

accounting-server add—Adds the IP address of the RADIUS accounting server to be used by the Timing Server for accounting. While adding the IP address, you can set the optional parameters secret word, retries (1 to 10), timeout (1 to 90), and port, that is [secret-word] [retries] [timeout] [port].

NOTE: **The default values are set for the retries, timeout, and port options, if not configured. You can use the same command for modifying the configuration details of existing RADIUS accounting server. You can add only three RADIUS accounting servers.**

 # config accounting-server add 192.169.0.2 auth123 5 50 1814 where [secret-word=auth123], [retries=5], [timeout=50 seconds], [port=1814]

accounting-server del—Deletes the RADIUS accounting server and its configuration by using the IP address of the server. The server is no longer used by the Timing Server for accounting.

#config accounting-server del 192.169.0.2

accounting-level—Configures the information (1: For login accounting only, 2: For interactive and login accounting, 3: For configuration, interactive and login accounting) to be used by the Timing Server for accounting. Default value is 3.

 # config accounting-level 1 where [1=For login accounting only]

accounting—Enables or disables RADIUS accounting in the Timing Server.

 # config accounting enable

Status Commands

accounting-server—Displays the details of the configured RADIUS accounting servers.

accounting-level—Displays the type of information to be accounted.

accounting-status—Displays the current status of RADIUS accounting.

APPENDIX E

Specifications

This appendix lists the specifications for the Juniper Networks TCA8000 and TCA8500 Timing Servers.

Physical Dimensions

Table 44 on page 199 lists the physical dimensions of the TCA8000 and TCA8500 Timing Servers.

Table 44: Physical Dimensions

Dimension	Specification
Height	1.75 in (4.45 cm)
Width	17.5 in (44.45 cm)
Depth	12 in (30.48 cm)

Power Specifications

Table 45 on page 199 lists the power specifications for the TCA8000 and TCA8500 Timing Servers.

Table 45: Power Specifications

Dimension	Specification
Power Consumption	25 W Normal
Input Voltage	DC option: –48 V DC nominal (–22 to –60 V DC) AC option: 90 V AC to 264 V AC (50 to 60 Hz)

Environmental Specifications

Table 46 on page 200 lists the environmental specifications for the TCA8000 and TCA8500 Timing Servers.

Table 46: Environmental Specifications

Dimension	Specification
Operating Temperature	+ 32° F to +122° F (0° C to + 50° C)
Storage Temperature	–104° F to +176° F (–40° C to +80° C)
Operating Humidity	5% to 95% non-condensing

APPENDIX F

Agency Compliance

Agency Compliance

The Juniper Networks TCA8000 and TCA8500 Timing Servers are "Suitable for deployment" in any environment where the following compliance certifications are accepted:

- EMC testing to:
  - ETSI EN301-489-1
  - ETSI EN301-444
  - EN 300-386 and reports FCC, ICES 003, EN55022, AS/NZS CISPR22, VCCI
  - EN 301-489-1 and EN301-444 (Spurious Rad emissions above 1 GHz on the GPS version)
- Safety testing to:
  - IEC 60950-1, EN 60950-1+A11
  - UL/CSA 60950-1 and certification by TUV for TUV T-mark (European)
  - cTUVus—mark (North America) and CB test report, CB certificate (worldwide)
  - NEBS Level 3 Compliance.

APPENDIX G

Cable Specification

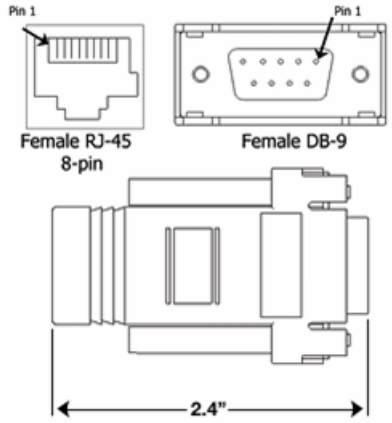
Console Cable Specification

To communicate with a Juniper Networks TCA8000 or TCA8500 Timing Server, a standard RJ-45 to DB-9 cable is used.

Table 47: Signal Flow Diagram

From RJ-45	Signal	Direction	Signal	To DB-9
1	RTS (not connected)	→	CTS	8
2	DTR (not connected)	→	DSR	6
3	TXD	→	RXD	2
4	GND	↔	GND	5
5	GND	↔	GND	5
6	RXD	←	TXD	3
7	DSR (not connected)	←	DTR	4
8	CTS (not connected)	←	RTS	7

Figure 58: Console Cable Connectors



APPENDIX H

Warranty and Support

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 JNASC support contract, or are covered under warranty, and need post sales 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 http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf.
- Product warranties—For product warranty information, visit http://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: http://www.juniper.net/customers/support/
- Search for known bugs: http://www2.juniper.net/kb/
- Find product documentation: http://www.juniper.net/techpubs/
- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://www.juniper.net/alerts/

- Join and participate in the Juniper Networks Community Forum: http://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: http://www.juniper.net/cm/

Returning a Hardware Component to Juniper Networks, Inc.

If a problem cannot be resolved by the JTAC technician, a Return Materials Authorization (RMA) is issued. This number is used to track the returned material at the factory and to return repaired or new components to the customer as needed.

NOTE: Do not return any component to Juniper Networks, Inc. unless you have first obtained an RMA number. Juniper Networks, Inc. reserves the right to refuse shipments that do not have an RMA. Refused shipments will be returned to the customer through collect freight.

For more information about return and repair policies, see the customer support webpage at http://www.juniper.net/support/guidelines.html.

For product problems or technical support issues, contact the Juniper Networks Technical Assistance Center (JTAC) using the Case Manager link at http://www.juniper.net/support/ or at 1-888-314-JTAC (within the United States) or 1-408-745-9500 (from outside the United States).

To return a hardware component:

1. Determine the part number and serial number of the component.
2. Obtain an RMA number from the Juniper Networks Technical Assistance Center (JTAC). You can send e-mail or telephone as described above.
3. Provide the following information in your e-mail message or during the telephone call:
   - Part number and serial number of component
   - Your name, organization name, telephone number, and fax number
   - Description of the failure
4. The support representative validates your request and issues an RMA number for return of the component.
5. Pack the component for shipment.

PART 7

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