TimeCreator 1000

DOCSIS Timing Interface Server

User's Guide

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How to Use This Guide

This section describes the format, layout, and purpose of this guide.

In This Preface

Purpose of This Guide

The *TimeCreator 1000 User's Guide* describes the procedures for unpacking, installing, using, maintaining, and troubleshooting the Symmetricom TimeCreator 1000 DOCSIS Timing Interface Server (TimeCreator 1000). It also includes appendixes that describe alarms and events, the languages that you use to communicate with the TimeCreator 1000, default values, and other information.

Who Should Read This Guide

Chapter 1, Overview of the TimeCreator 1000, is written for non-technical audiences who need general information about the product. Chapter 2, Engineering and Ordering Procedures, and subsequent chapters contain technical information about the product. Other chapters and appendixes describe installation, maintenance, and configuration instructions or details primarily intended for qualified maintenance personnel.

This User's Guide is designed for the following categories of users:

- **Systems Engineers** – Chapter 1 provides an introduction to the TimeCreator 1000, Cross-references in this chapter direct you to detailed system information in other chapters as appropriate.
- **Installation Engineers** – Chapter 2 through Chapter 6 and the appendixes provide detailed information and procedures to ensure proper installation, operation, and configuration of the TimeCreator 1000.
- **Maintenance Engineers** – Chapter 6 and the appendixes provide preventive and corrective maintenance guidelines, as well as procedures for diagnosing and troubleshooting fault indications and alarms.

While Chapter 1 is written for non-technical audiences who need information about the TimeCreator 1000 system, others, such as Chapter 2 through Chapter 6 contain detailed information and instructions which are intended to be performed by *qualified personnel* only.

Structure of This Guide

This guide contains the following sections and appendixes:

Chapter, Title	Description
Chapter 1, Overview of the TimeCreator 1000	Provides an overview of the product, describes the major hardware and software features, and lists the system specifications.
Chapter 2, Engineering and Ordering Procedures	Lists the part number and ordering procedure for all TimeCreator 1000 parts and accessories.
Chapter 3, Installing the TimeCreator 1000	Contains procedures for unpacking and installing the system, and for powering up the unit.
Chapter 4, General Guidelines for using the Symmetricom TimeCreator 1000	Provides basic information to which users can refer to ensure proper system operation.
Chapter 5, Provisioning	Describes the commands and procedures required to provision the TimeCreator 1000 after installing the unit.
Chapter 6, Maintenance and Troubleshooting	Contains preventive and corrective maintenance, and troubleshooting procedures for the product.
Appendix A, Alarms, Events and SNMP Traps	Lists the alarms and events and provides basic indications of the source of the alarm.
Appendix B, Command Descriptions and Communications Interface	Describes the CLI command conventions, functions, and features and the SNMP, NTP, SSH, and SFTP protocols.
Appendix C, Installing the Two-Way GPS Antenna	Provides procedures for installing a GPS antenna and connecting it to the TimeCreator 1000.
Appendix D, Specifications and Factory Defaults	Lists the specifications for the TimeCreator 1000.
Appendix E, Software Licenses	Contains licensing information for third party software.
Index	Provides references to individual topics within this guide.

Conventions Used in This Guide

This guide uses the following conventions:

- **Acronyms and Abbreviations** – Terms are spelled out the first time they appear in text. Thereafter, only the acronym or abbreviation is used.
- **Revision Control** – The title page lists the printing date and versions of the product this guide describes.
- **Typographical Conventions** – This guide uses the typographical conventions described in the table below.

When text appears this way...	... it means:
TimeCreator 1000 User's Guide	The title of a document.
CRITICAL	An operating mode, alarm state, status, or chassis label.
Select **File**, **Open**...	Click the Open option on the File menu.
Press **Enter** Press**;**	A named keyboard key. The key name is shown as it appears on the keyboard. An explanation of the key's acronym or function immediately follows the first reference to the key, if required.
`Username:`	Text in a source file or a system prompt or other text that appears on a screen.
`ping` `status`	A command you enter at a system prompt or text you enter in response to a program prompt. You must enter commands for case-sensitive operating systems exactly as shown.
qualified personnel	A word or term being emphasized.
Symmetricom ***does not*** recommend...	A word or term given special emphasis.

Warnings, Cautions, Recommendations, and Notes

Warnings, Cautions, Recommendations, and Notes attract attention to essential or critical information in this guide. The types of information included in each are explained in the following examples.

Warning: To avoid serious personal injury or death, *do not* disregard warnings. All warnings use this symbol. Warnings are installation, operation, or maintenance procedures, practices, or statements, that if not strictly observed, may result in serious personal injury or even death.

Caution: To avoid personal injury, *do not* disregard cautions. All cautions use this symbol. Cautions are installation, operation, or maintenance procedures, practices, conditions, or statements, that if not strictly observed, may result in damage to, or destruction of, the equipment. Cautions are also used to indicate a long-term health hazard.

ESD Caution: To avoid personal injury and electrostatic discharge (ESD) damage to equipment, *do not* disregard ESD cautions. All ESD cautions use this symbol. ESD cautions are installation, operation, or maintenance procedures, practices, conditions, or statements that if not strictly observed, may result in possible personal injury, electrostatic discharge damage to, or destruction of, static-sensitive components of the equipment.

Electrical Shock Caution: To avoid electrical shock and possible personal injury, do not disregard electrical shock cautions. All electrical shock cautions use this symbol. Electrical shock cautions are practices, procedures, or statements, that if not strictly observed, may result in possible personal injury, electrical shock damage to, or destruction of components of the equipment.

Recommendation: All recommendations use this symbol. Recommendations indicate manufacturer-tested methods or known functionality. Recommendations contain installation, operation, or maintenance procedures, practices, conditions, or statements, that provide important information for optimum performance results.

Note: All notes use this symbol. Notes contain installation, operation, or maintenance procedures, practices, conditions, or statements, that alert you to important information, which may make your task easier or increase your understanding.

Related Documents and Information

See your Symmetricom representative or sales office for a complete list of available documentation.

Note: Symmetricom offers training courses designed to enhance your knowledge of the TimeCreator 1000. Contact your local representative or sales office for a complete list of courses and outlines.

Where to Find Answers to Product and Document Questions

For additional information about the products described in this guide, please contact your Symmetricom representative or your local sales office. You can also contact us on the web at www.symmetricom.com.

What's New In This Guide

Added "Managing the IP Address Whitelist" section to Chapter 5.

Added "Provisioning Root Server Recovery Modes" section to Chapter 5.

Modified commands in Appendix B:

- Set Authentication radius radiusserveraddress:port
- Set Configuration restoreuser IMC
- Set Configuration restoreuser IOC
- Show Logged-in-user
- Set Recvconfig IMC user@host:file
- Set Recvconfig IOC user@host:file
- Set Remote-syslog
- Show Remote-syslog
- Show Root-recovery status
- Show Root-recovery config
- Set Root-recovery autorecoverymode
- Set Root-recovery rapidrecovery

- Set Sendconfig IMC user@host:file
- Set Sendconfig IOC user@host:file
- Show SNMP accessv2
- Set SNMP accessv2
- Set SNMP accessv2 Rocommunity
- Set SNMP accessv2 Rwcommunity
- Show SNMP accessv3
- Set SNMP accessv3
- Show Whitelist
- Set Whitelist

Deleted CLI commands in Appendix B:

- History
- Clear log

Chapter 1 Overview of the TimeCreator 1000

This chapter provides introductory information for the TimeCreator 1000.

In This Chapter

Overview

The TimeCreator 1000, shown in Figure 1-2, is a DOCSIS Timing Interface (DTI) Server that delivers accurate timestamp and frequency synchronization, and with GPS it can also provide Time of Day (TOD) to DTI client elements in a Modular Cable Modem Termination System (M-CMTS) architecture. M-CMTS elements shown in Figure 1-1 (Edge QAMs, Upstream Receivers, M-CMTS Core, etc.) use DTI to synchronize the DOCSIS Timestamp and Symbol Clock used in the DOCSIS communications between modems and the headend/hub. The TimeCreator 1000 functions as either a root server or subtending server. The root server is at the top of a server hierarchy and is the source of traceable time and frequency for all subtending DTI servers and clients in a building. The subtending server receives its time and frequency reference through a direct connection to a root server's DTI link connector; a subtending server cannot be referenced to another subtending server.

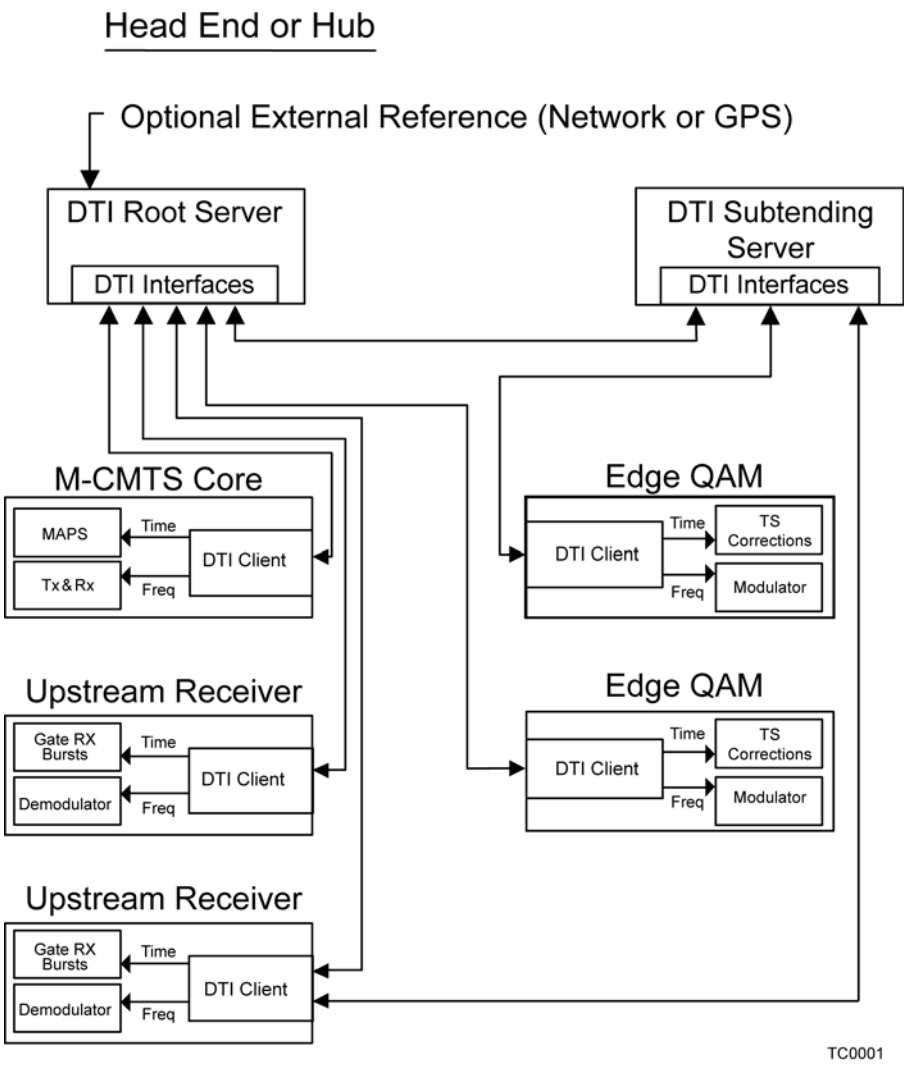

Figure 1-1. DTI Server Hierarchy and M-CMTS Elements

A TimeCreator 1000 in a root server configuration can use either its internal clock as the master frequency for the headend/hub meeting DOCSIS specifications, or it can be configured to use GPS. GPS is required for Business Services over DOCSIS (BSoD), which allows you to deliver T1, E1, and NxDSO emulation services. GPS is also required to implement Network Time Protocol (NTP) server mode, which allows common time between headends/hub and other applications. NTP, the user-specified time, and the IMC's real-time clock (RTC) can also be used as a basis for the DOCSIS timestamp to provide system TOD for operation in free-run mode only.

The TimeCreator 1000 features include:

- 10+2 DTI Ports
  - 10 standard DTI Client Connections (6 for 8-port option)
  - 2 dual mode DTI Connections for use as a standard DTI Client Connection or input from a Root DTI Server with Carrier-Class Performance
- Optional High Reliability Redundant Operation
- SNMP and CLI management over SSH, Telnet and Craft port
- DTI Client Health Monitoring
- NTP Server Option
- TOD and BSoD Support (requires GPS input)
- Compact 1RU Design
- AC and DC Power Options
- Subtending of up to Twelve DTI Servers
- DTI Server Configurable with Dual Path Protection and 24 Hour Holdover
- Software Upgradeable

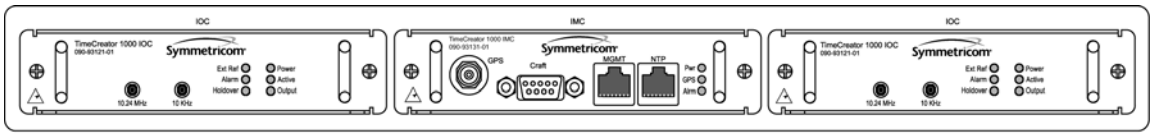

Figure 1-2. TimeCreator 1000 Front View

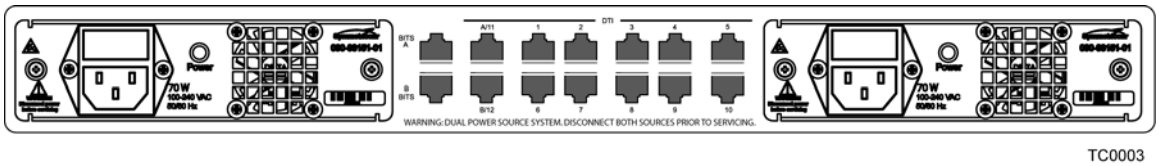

Figure 1-3. TimeCreator 1000 Rear View

Shelf

The TimeCreator 1000 shelf requires a minimum of three plug-in modules to operate:

- Power Supply module
- Input/Output/Clock (IOC) module
- Information Management Card (IMC) module.

It is recommended that a second Power Supply module and IOC are added to the configuration for redundant operation. Since the TimeCreator 1000 provides the Master DOCSIS Clock and Timestamp for the entire Headend or Hub site, it is designed to provide high reliability through redundancy, although redundancy is not required. The flexibility of configuration and therefore cost enables various deployment scenarios for root, slave, and protected architectures.

Input Signals

The TimeCreator 1000 can use either GPS or DTI signals as external input references to acquire the system's frequency, DTI timestamp, and TOD alignment. NTP and the user-specified time from the IMC's real-time clock (RTC) can also provide system TOD with much less accuracy. See Table 1-1 for descriptions. Only GPS can provide a common timestamp across the network for a distributed M-CMTS deployment. It is suggested that all root TimeCreator 1000 servers be configured with GPS. Upgrading any DTI Server from a user time or NTP time to GPS for BSoD or distributed M-CMTS architectures will require resetting the DOCSIS Timestamp and thus re-range all cable modems. The GPS input connects to the TNC connector on the IMC and the DTI input from a root DTI Server connects to the rear panel port A and port B RJ-45 connectors (labeled A/11 and B/12). NTP runs on the IMC's management Ethernet port.

Note: When ports A/11 and B/12 are provisioned as outputs, they are referenced as Ports 11 and 12.

Table 1-1. TimeCreator 1000 Input Signal Source

Input Source	Description
GPS	GPS antenna used to acquire the system's frequency, DTI timestamp, and TOD.
DTI	External DTI signals used as external input references to acquire the system's frequency, DTI timestamp, and TOD.
NTP	NTP server used to acquire the TOD. Frequency is provided by IOC's clock in freerun mode.
Real-Time Clock	Clock on IMC used to acquire the TOD. Frequency is provided by IOC's clock in freerun mode.
USER	User manually enters TOD. Frequency is provided by IOC's clock in freerun mode.

DTI Input Priority Level

You can assign a priority level to each DTI input and the value determines which input is used as the system reference. The range is 1 to 5 and the lower the priority level, the higher the priority. Use the Set Interface Priority command to provision these parameters.

Setting the Input Reference Switching Mode

The DTI reference selection at ports A and B can be either revertive or non-revertive (see Provisioning Revertive and Non-Revertive Mode, on page 94). In the revertive mode, if an input used as the system reference is disqualified (for any reason), the reference switches to the next-highest input and reverts to the initial input when that input is re-qualified. In this mode, the reference switches two times: once when the disqualifying event occurs, and again when the initial input is re-qualified. In the non-revertive mode, the system reference switches to the next-highest input but does not revert to the initial input when the initial input is re-qualified. The system reference switches only once when the disqualifying event occurs. Revertive mode is used when the port priorities are different and non-revertive mode is used when the priorities are the same.

Output Signals

The TimeCreator 1000 passes frequency and TOD output through rear panel DTI links. Ports 1 through 10 (12-port version) or Ports 1 through 6 (8-port option) are permanent output ports. Ports A/11 and B/12 can be provisioned as either outputs or inputs.

Note: When ports A/11 and B/12 are provisioned as inputs, they are referenced as ports A and B.

Communications Ports

The EIA-232 serial and Ethernet connections are located on the IMC. The EIA-232 serial and Ethernet connections allow you to provision the system from a terminal or computer running a terminal emulation application.

Local Craft Serial Port

The EIA-232 port supports local control; you can configure the TimeCreator 1000 with commands using a terminal or personal computer (PC) with terminal emulation software (see Communicating Through the Serial Port, on page 72). The connector is located on the IMC. The Local port is configured as a DCE interface and the default specifications are as follows:

- 8 data bits
- 1 stop bit
- no parity
- 9600 baud rate (57600 is supported only in the IMC rev H version 1.00.13 or below)
- Flow Control: None

Ethernet

An Ethernet connector provides connectivity to a local area network (LAN) and each port can be assigned a unique internet protocol (IP) address (see Communicating Through the Ethernet Port, on page 72). Once the IP address is set and a connection is made, you can access the TimeCreator 1000 on an intranet. The Ethernet port supports two simultaneous connections to port 23.

Clock Design

The TimeCreator 1000 clock design includes a highly stable ovenized Quartz crystal to produce accurate synchronization outputs. In a dual-IOC configuration, the clock function is redundant to provide protection. Each IOC qualifies the input signal and filters jitter and wander noise elements that may exist. In the event that all input references are lost or disqualified, the unit goes into holdover mode with the oscillator providing the system reference.

The IOC meets Type III performance.

Operating Modes

The TimeCreator 1000 has the following operating modes:

- **Warm-up** – The period immediately following power-up that allows local oscillator stabilization required for stable frequency generation from the system.
- **Free-run** – This operating mode allows the system to generate a DTI output that has stable generation of frequency and TOD when the system has no external frequency reference (GPS or DTI). TOD can be from NTP, a user-specified time, or from the IMC's real-time clock.
- **Fast-Lock** (Acquire) – In this mode the system quickly locks the local oscillator frequency to another frequency source (GPS or DTI reference) to establish the system's frequency and TOD.
- **Normal** (Locked) – In this operating mode, the system's output frequency and TOD are tracking the reference frequency (GPS or DTI) and TOD within the DTI specified requirements.
- **Bridging** – If all input references are lost, the TimeCreator 1000 goes into bridging mode. In this mode, the outputs continue to provide accurate timing for a limited period. If the system qualifies the reference prior to the end of the bridging time, the system re-enters Fast-Lock or Normal operation mode. If the inputs are not re-qualified before the bridging time has elapsed, the TimeCreator 1000 enters holdover mode.
- **Holdover** – If the reference signal is lost and not re-qualified when the bridging time elapses, the clock enters holdover mode. The accuracy of the TimeCreator 1000 output is then dependent on the quality level of the oscillator.
- **Extended Holdover** – If the clock remains in holdover for an extended duration, typically 4 hours, the clock enters extended holdover mode.

- **Frequency Mode** – In this operating mode, the system's frequency is tracking the reference frequency (GPS). In this mode, a user can add a GPS reference to the TimeCreator 1000 and use the frequency from GPS to meet BSoD specifications without re-setting the DOCSIS Timestamp and causing a re-ranging of the cable modems.

Note: In Frequency Mode, DTI output and IMC GPS are not in sync.

Performance Monitoring

Server Status Monitoring

DTI client status log files provide information on client status, oscillator type, and the server's cable advance flag and cable advance value.

Phase Measurements

TheTimeCreator 1000 measures phase data. Peak to peak jitter and MTIE results are calculated for the user. Frame error rate (FER) is also calculated and made available to the user. It is calculated over a 10-second window.

MTIE Calculations

MTIE is a measure of the relative noisiness of a signal that relates to frequency offsets and phase transients. The TimeCreator 1000 automatically calculates MTIE for each enabled input from the most recent 1000 seconds. From this calculation, you can retrieve MTIE values for 35-second and user-configurable windows. You can set an alarm threshold for each of these windows; if the MTIE value exceeds this threshold and the alarm is enabled, the TimeCreator 1000 generates an alarm.

Physical Description

The TimeCreator 1000 consists of a 19-inch (48 cm) rack mount shelf, plug-in modules, AC power supply cables and *optional* GPS cables, and hardware.

Note: 23-inch (58.42 cm) rack mounting brackets are also available as a separately ordered item.

The front of the TimeCreator 1000 has two IOC module slots and one IMC module slot. The rear has two power supply slots, twelve DTI link connectors and two BITS connectors (see Figure 1-4). The minimum configuration is one Power module, one IOC module, and an IMC module. The second IOC and Power module slots are available for redundancy.

Note: The BITS connectors are not functional in this release.

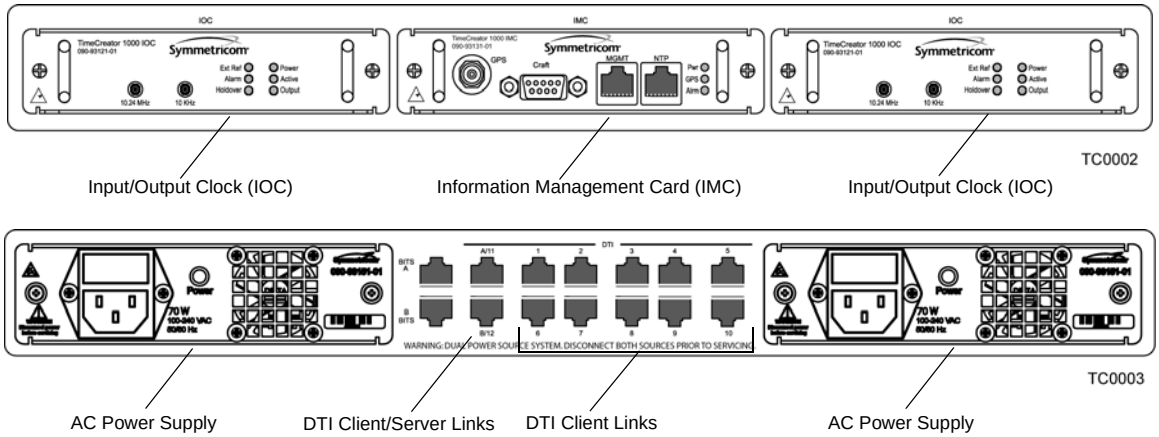

Figure 1-4. TimeCreator 1000 Modules and DTI Links

Functional Description

The TimeCreator 1000 accepts one GPS input and two DTI inputs for system reference and it allows you to provision the DTI input reference priority. When a GPS or DTI reference is qualified as the system reference, the server uses the qualified reference to acquire the system's frequency, DTI timestamp, and TOD alignment.

The TimeCreator 1000 rear panel has ten DTI client links (six DTI client links for 8-port option) and two client/server links. Client links connect to an M-CMTS Core, Upstream receiver, Edge QAM, or DTI server. Server links allow a subtending server to receive time and frequency signals from a DTI root server. There are also two T1/E1 BITS frequency inputs.

Note: The BITS connectors are not functional in this release.

Figure 1-5 is a block diagram of the TimeCreator 1000, Figure 1-6 is a block diagram of the IMC card, and Figure 1-7 is a block diagram of the IOC card.

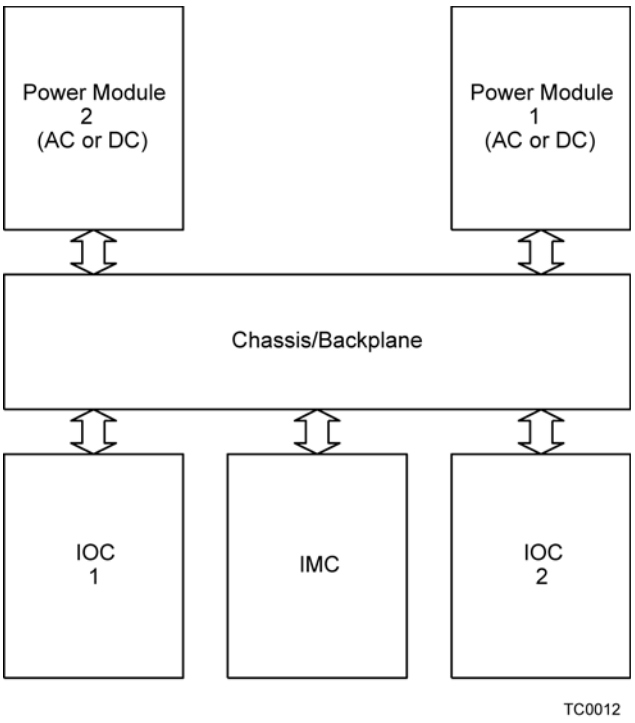

Figure 1-5. TimeCreator 1000 Block Diagram

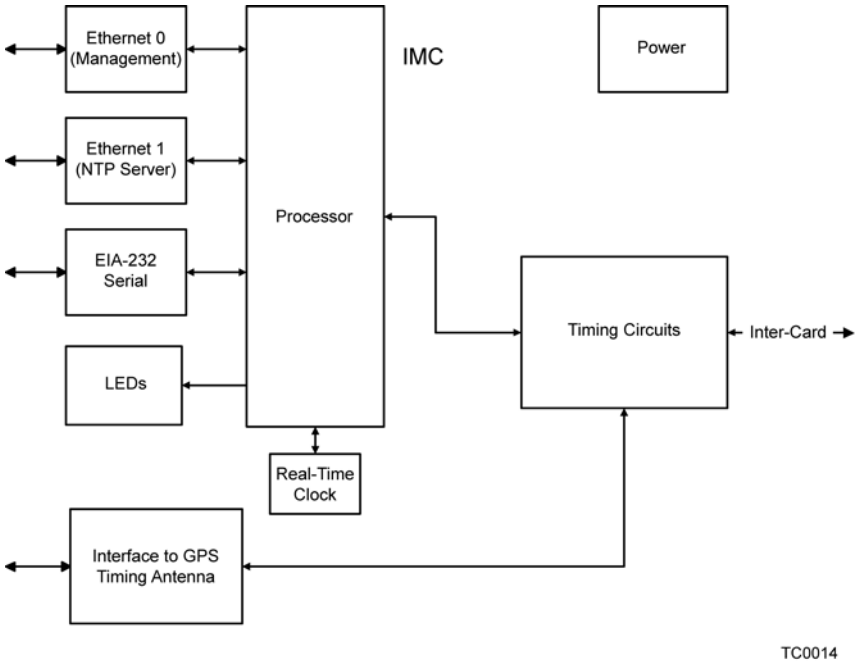

Figure 1-6. IMC Module Block Diagram

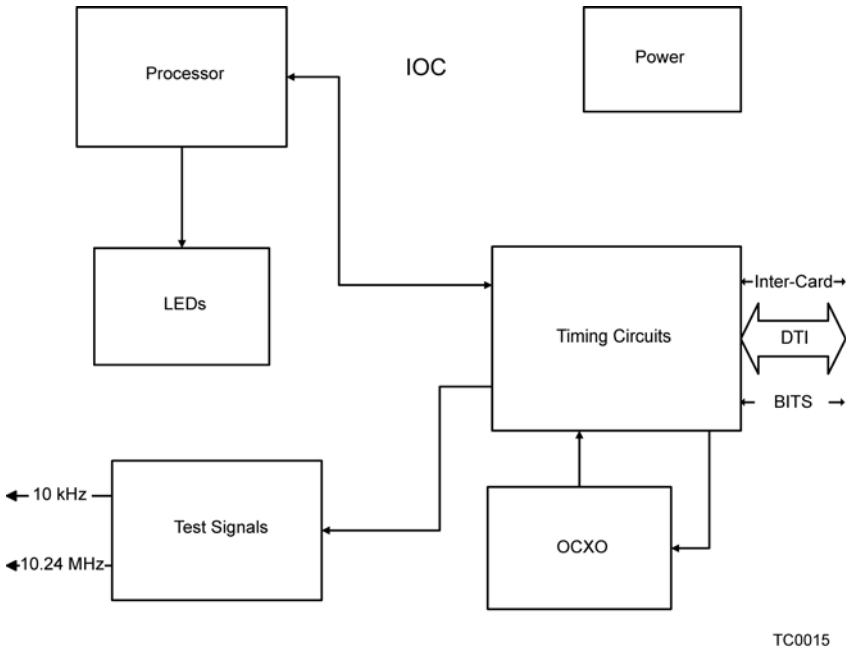

Figure 1-7. IOC Module Block Diagram

IOC Module

The IOC module has LED status indicators and test outputs for the system. The LEDs indicate:

- Power Status
- Active Status
- Output Status
- External Reference Status
- Alarm Status
- Holdover Status

The test output connectors provide a 10.24 MHz master clock signal and a 10 kHz DTI frame clock signal.

IMC Module

Connectors for Ethernet management, NTP time server, EIA-232 serial, and the Two-Way GPS Timing Antenna connections are located on the IMC module. The IMC's LEDs indicate the following:

- Power Status
- Alarm Status
- GPS Signal Status

Power Module

The TimeCreator 1000 allows either –48 V DC power connection, or 120/220 V AC power connection depending on the type of module used. The LED indicates power status.

Rear Panel Connectors

The TimeCreator 1000 rear panel connections are RJ-45 connectors. There are ten permanent DTI client connectors and two DTI client/server connectors that can be provisioned as either client or server links. This allows the TimeCreator 1000 to support up to 12 DTI client links (8 DTI client links for 8-port option), or when provisioned as a subtending server to receive two time and frequency references. There are also two BITS connectors.

Each DTI link connection has associated LEDs that indicate connection status.

Note: The BITS connectors are not functional in this release.

Communication Ports

Communications ports on the IMC allow you to provision, monitor, and troubleshoot the shelf. You communicate with the TimeCreator 1000 using either CLI or SNMP protocols.

Local Craft Serial Port

The EIA-232 port supports local control; you can configure the TimeCreator 1000 with CLI commands using a terminal or personal computer (PC) with terminal emulation software (see Communicating Through the Serial Port, on page 72). The connector is located on the IMC. The Local port is configured as a DCE interface and the default settings are as follows:

- Baud = 9600 baud rate (57600 is supported only in the IMC rev H version 1.00.13 or below)
- Word Length = 8 bits
- Parity = None
- Stop bits = 1
- Software Handshaking, Xon/Xoff

Management Ethernet Port

The Management Ethernet connector provides connectivity to an Ethernet local area network. Each Ethernet port has a unique internet protocol (IP) address and once the IP address is set and a connection is made to a LAN, you can access the TimeCreator 1000 (see Communicating Through the Ethernet Port, on page 72).

NTP Server Ethernet Port

The NTP server port serves the TimeCreator 1000's system time to external NTP clients. The NTP server option only works with a TOD-source of GPS. This Ethernet port is configured separately from the management port (see Provisioning an NTP Server, on page 104). The NTP server option requires the purchase of a license.

Outputs

The DTI link connectors use a single pair for transmission in both directions. The server and client alternate data transmission therefore eliminating the need for a crossover connection. The DTI server output is a Manchester encoded frame with an underlying bit-rate of 5.12 Mbps locked to the DTI Master Clock. You can enable or disable each output individually through user commands (see the command Set Interface, on page 213). The TimeCreator 1000 automatically calibrates each DTI Output when a DTI Client is connected eliminating the need to manually compensate for cable lengths. The maximum cable length is 656 Ft. (200 m).

The TimeCreator 1000 provides a 10.24 MHz master clock signal and a 10 kHz frame clock on the front panel.

Reference Inputs and TOD Sources

The TimeCreator 1000 can use either GPS or DTI signals as external input references to acquire the system's frequency, DTI timestamp, and TOD alignment. The GPS reference signal input connects to a TNC connector on the IMC module and the DTI reference signal input is connected to RJ-45 connectors labeled A/11 and B/12 on the rear panel. The Set Interface Priority user command allows you to set priority levels for the two DTI reference signals (see the command Set Interface, on page 213).

Note: When ports A/11 and B/12 are provisioned as outputs, they are referenced as ports 11 and 12.

NTP, the user-specified time, and the IMC's real-time clock (RTC) provide system TOD for operation in free-run mode only, as shown in Table 1-1.The default settings provision the TimeCreator 1000 to operate in free-run mode only.

Note: The BITS input connectors are not functional in this release.

It is recommended that the root server in a DTI network with root and subtending servers be referenced to GPS. Using GPS allows the user to recover from root server outages with minimal cable modem re-ranging. The root server can be set to user mode and still provide protection from excessive re-ranging, but requires some additional network resources to enable an orderly network recovery from any major root outages. If, for example, a power outage affects the root server, it must have a way to recover the previous network time and phase when it returns to normal operation. To do this the TimeCreator has a 'Root-Server Recovery' function that re-synchronizes the root server to the rest of the network. To accomplish this there has to be a connection between the root server, port 12 and a subtending server port 1, with port 12 of the root server set as a Client, but not enabled. When the root server recovers power (or has been serviced) it will automatically query time from a subtending server so that it will not cause unnecessary cable modem re-ranging. See Provisioning Root Server Recovery Mode, on page 95 for details.

Alarms

The TimeCreator 1000 uses alarms to notify you when certain conditions are deteriorating below user-specified levels. These alarms are indicated by module status LEDs and by SNMP traps. You can provision the alarm to either be enabled or disabled and the current alarm state can be obtained via the communication ports. For more information, see Provisioning Alarms, on page 105 and Appendix A, Alarms, Events and SNMP Traps.

Chapter 2 Engineering and Ordering Procedures

This chapter describes the items available for the TimeCreator 1000, and lists the part number for each item.

In This Chapter

Overview

The TimeCreator 1000 can operate in either a basic configuration, or in a redundant configuration in one shelf. Basic configuration consists of the following components:

- 1 Shelf
- 1 IMC module
- 1 AC or DC power module
- 1 12-port or 8-port IOC module

Note: When operating in basic configuration, blank panels are available to cover the vacant module slots in the shelf.

Redundant configuration consists of the following components:

- 1 Shelf
- 1 IMC module
- 2 AC or DC power modules
- 2 12-port or 2 8-port IOC modules

TimeCreator 1000 Part Numbers

System Configurations

This section provides part numbers and descriptions for the various system configurations and parts available for the TimeCreator 1000. Table 2-1 provides a list of common configurations and Table 2-3 lists the shelf component and accessory part numbers.

Table 2-1. Common Configurations

System Configuration	Part Number
TimeCreator 1000 No Redundancy With NA AC Power - see Table 2-5	990-93101-01
TimeCreator 1000 - NA AC Power (1 SH, 1 IMC, 2 IOC, 2 AC) - see Table 2-6	990-93105-01
TimeCreator 1000 - NA AC Power, 8port IOC (1 SH, 1 IMC, 2 IOC-8 port, 2 AC) - see Table 2-7	990-93105-02
TimeCreator 1000 - DC Power (1 SH, 1 IMC, 2 IOC, 2 DC) - see Table 2-8	990-93106-01

Table 2-1. Common Configurations (Continued)

System Configuration	Part Number
TimeCreator 1000 - NA AC Power (1 SH, 1 IMC, 2 IOC, 2 AC, GPS) - see Table 2-9	990-93107-01
TimeCreator 1000 - DC power (1 SH, 1 IMC, 2 IOC, 2 DC, GPS) - see Table 2-10	990-93108-01
TimeCreator 1000 - NA AC Power (1 SH, 1 IMC, 2 IOC, 2 AC, GPS, NTP) - see Table 2-11	990-93109-01
TimeCreator 1000 - DC power (1 SH, 1 IMC, 2 IOC, 2 DC, GPS, NTP) - see Table 2-12	990-93110-01

Configuration part numbers, as shown in Table 2-1, are of the form 990-*xxxxx*-0y. For AC configurations the y value in the part number corresponds to the power cord configuration. See Table 2-2. For example, the part number for a basic TimeCreator 1000 with no redundancy and a North American (NA) power cord is 990-93105-01. The part number for a basic TimeCreator 1000 with no redundancy and a European (EU) power cord is 990-93105-02. With a United Kingdom (UK) power cord, the part number for a basic TimeCreator 1000 with no redundancy is 990-93105-00.

Table 2-2. AC Power Cord Options

Power Cord Options	Designation	*y*
North American	NA	1
European	EU	2
United Kingdom	UK	0

Table 2-3. Component Part Numbers

Item	Part Number
Shelf - (SH)	090-93100-01
IOC Module - 12 port	090-93121-01
IOC Module - 8 port	090-93121-02
IMC Module	090-93131-01
DC Power Module (DC)	090-93141-01
AC Power Module (AC)	090-93151-01

Table 2-3. Component Part Numbers

Item	Part Number
IOC Module Slot Blank Panel	090-93122-01
Power Module Slot Blank Panel	090-93142-01
TimeCreator 8 port to 12 port IOC Upgrade kit	990-93121-99

Two-Way GPS Antenna

Table 2-4 lists the parts available for the GPS antenna.

Table 2-4. GPS Parts and Accessories

Part Number	Description
990-93500-01[1]	Two Way Antenna Kit
090-58545-01	Two Way GPS Antenna (spare)
043-00018-01	Lightning suppressor (spare)
060-58545-01	RG-58 cable, 3 m (10 ft.)
060-58545-02	RG-58 cable, 6 m (20 ft.)
060-58545-05	RG-58 cable, 15 m (50 ft.)
060-58545-10	RG-58 cable, 30 m (100 ft.)
060-58545-20	RG-58 cable, 60 m (200 ft.)
060-58545-30	RG-58 cable, 90 m (300 ft.)
060-58545-50	RG-58 cable, 150 m (500 ft.)
154-00023-01	Crimp tool for RG-58 cable
371-001	TNC connectors for RG-58 cable

Note:

1 Kit includes GPS antenna, mounting hardware, and lightning suppressor. Order antenna cables separately

Common Configuration Parts Lists

The following tables list the items shipped with each common system configuration. In addition, Table 2-13 provides a list of items shipped with the GPS Antenna Kit, and Table 2-14 provides the NTP option license part number.

Table 2-5. TimeCreator 1000 No Redundancy - NA AC Power - P/N 990-93101-01

Item	Part Number	Quantity
TimeCreator 1000 Shelf (SH)	090-93100-01	1
TimeCreator 1000 IOC card (IOC)	090-93121-01	1
TimeCreator 1000 IMC card (IMC)	090-93131-01	1
TimeCreator 1000 AC power card (AC)	090-93151-01	1
TimeCreator 1000 Blank Panel for power slot (BPP)	090-93142-01	1
TimeCreator 1000 Blank panel for IOC slot (BPI)	090-93122-01	1
NA AC power connector cable	160-00004-02	1
CD Manuals	998-93101-01	1

Table 2-6. TimeCreator 1000 - NA AC Power - P/N 990-93105-01

Item	Part Number	Quantity
TimeCreator 1000 Shelf (SH)	090-93100-01	1
TimeCreator 1000 IOC card (IOC)	090-93121-01	2
TimeCreator 1000 IMC card (IMC)	090-93131-01	1
TimeCreator 1000 AC power card (AC)	090-93151-01	2
NA AC power connector cable	160-00004-02	2
CD Manuals	998-93101-01	1

Table 2-7. TimeCreator 1000 - NA AC Power & Rdnt Clk, 8port - P/N 990-93105-02

Item	Part Number	Quantity
TimeCreator 1000 Shelf (SH)	090-93100-01	1
TimeCreator 1000 IOC card (IOC), 8 port	090-93121-02	2
TimeCreator 1000 IMC card (IMC)	090-93131-01	1
TimeCreator 1000 AC power card (AC)	090-93151-01	2

Table 2-7. TimeCreator 1000 - NA AC Power & Rdnt Clk, 8port - P/N 990-93105-02

Item	Part Number	Quantity
NA AC power connector cable	160-00004-02	2
CD Manuals	998-93101-01	1

Table 2-8. TimeCreator 1000 - DC Power - P/N 990-93106-01

Item	Part Number	Quantity
TimeCreator 1000 Shelf (SH)	090-93100-01	1
TimeCreator 1000 IOC card (IOC)	090-93121-01	2
TimeCreator 1000 IMC card (IMC)	090-93131-01	1
TimeCreator 1000 DC power card (DC)	090-93141-01	2
CD Manuals	998-93101-01	1

Table 2-9. TimeCreator 1000 - NA AC Power - P/N 990-93107-01

Item	Part Number	Quantity
TimeCreator 1000 Shelf (SH)	090-93100-01	1
TimeCreator 1000 IOC card (IOC)	090-93121-01	2
TimeCreator 1000 IMC card (IMC)	090-93131-01	1
TimeCreator 1000 AC power card (AC)	090-93151-01	2
2-way Timing Antenna	090-58545-01	1
GPS/volute ant bracket kit	093-00001-01	1
TimeProvider/TimeCreator GPS hardware kit	093-58545-01	1
IF antenna mounting kit	093-72010-71	1
AC power connector cable	160-00004-02	2
CD Manuals	998-93101-01	1

Table 2-10. TimeCreator 1000 - DC power - P/N 990-93108-01

Item	Part Number	Quantity
TimeCreator 1000 Shelf (SH)	090-93100-01	1
TimeCreator 1000 IOC card (IOC)	090-93121-01	2
TimeCreator 1000 IMC card (IMC)	090-93131-01	1
TimeCreator 1000 DC power card (DC)	090-93141-01	2
2-way Timing Antenna	090-58545-01	1
GPS/volute ant bracket kit	093-00001-01	1
TimeProvider/TimeCreator GPS hardware kit	093-58545-01	1
IF antenna mounting kit	093-72010-71	1
CD Manuals	998-93101-01	1

Table 2-11. TimeCreator 1000 - NA AC Power - P/N 990-93109-01

Item	Part Number	Quantity
TimeCreator 1000 Shelf (SH)	090-93100-01	1
TimeCreator 1000 IOC card (IOC)	090-93121-01	2
TimeCreator 1000 IMC card (IMC)	090-93131-01	1
TimeCreator 1000 AC power card (AC)	090-93151-01	2
License Certificate	920-93200-01	1
2-way Timing Antenna	090-58545-01	1
GPS/volute ant bracket kit	093-00001-01	1
TimeProvider/TimeCreator GPS hardware kit	093-58545-01	1
IF antenna mounting kit	093-72010-71	1
NA AC power connector cable	160-00004-02	2
CD Manuals	998-93101-01	1

Table 2-12. TimeCreator 1000 - DC power - P/N 990-93110-01

Item	Part Number	Quantity
TimeCreator 1000 Shelf (SH)	090-93100-01	1
TimeCreator 1000 IOC card (IOC)	090-93121-01	2
TimeCreator 1000 IMC card (IMC)	090-93131-01	1
TimeCreator 1000 DC power card (DC)	090-93141-01	2
License Certificate	920-93200-01	1
2-way Timing Antenna	090-58545-01	1
GPS/volute ant bracket kit	093-00001-01	1
TimeProvider/TimeCreator GPS hardware kit	093-58545-01	1
IF antenna mounting kit	093-72010-71	1
NA AC power connector cable	160-00004-02	2
CD Manuals	998-93101-01	1

Table 2-13. GPS Antenna Kit - P/N 990-93500-01

Item	Part Number	Quantity
2-way Timing Antenna	090-58545-01	1
GPS/volute ant bracket kit	093-00001-01	1
TimeProvider/TimeCreator GPS hardware kit	093-58545-01	1
IF antenna mounting kit	093-72010-71	1

Table 2-14. NTP option - P/N 990-93200-01

Item	Part Number	Quantity
License Certificate	920-93200-01	1

User-Supplied Tools and Materials

You need to supply the following tools and materials for installing and testing the TimeCreator 1000.

- Phillips-head screwdriver to install the TimeCreator 1000 shelf in a rack
- ESD wrist strap for installing modules
- Digital multimeter (Fluke 77 or equivalent) for verifying power connections to the shelf
- Laptop computer with communications software (e.g., Windows Hyperterminal, ProComm Plus) for setting system parameters

These standard tools and materials are not supplied, but may be required for installing the GPS antenna and the Two-Way Antenna Interface:

- Standard tool kit
- Fasteners for mounting the equipment in rack
- PVC glue

Chapter 3 Installing the TimeCreator 1000

This chapter describes the procedures for installing the TimeCreator 1000.

In This Chapter

Getting Started

Before you begin to install the TimeCreator 1000, review the information in this section.

If you encounter any difficulties during the installation process, contact Symmetricom Global Services (SGS). See Obtaining Technical Assistance, on page 123 for telephone numbers. SGS includes Product Technical Support for technical information, and Customer Service for information about your order, RMAs, and other information.

Site Survey

Before you begin installation, determine the shelf location, ensure the appropriate power source is available (–48 V DC or 120/220 V AC depending on power module type), and ensure that the equipment rack is properly grounded.

The TimeCreator 1000 is designed to mount in a 19-inch (48 cm) rack, occupies 1.75 in (4.5 cm, 1 RU) of vertical rack space, and has a depth of 20 in (50.8 cm).

Note: 23-inch (58.42 cm) rack mounting brackets are also available as a separately ordered item.

Environmental Requirements

To prevent the unit from malfunctioning or interfering with other equipment, install and operate the unit according to the following guidelines:

- Operating temperature: 32° F to 104° F (0° C to 40°C)
- Operating Humidity: 10% to 90% RH non-condensing
- Use only shielded cable for all signal wiring, including I/O, clocks and Ethernet. Ground appropriately at both ends, or as required by local standards.

Note: Continuing improvements to the design of the TimeCreator 1000 have lowered the level of emissions. UTP cable can be used for DTI links with TimeCreator 1000 chassis revisions E or greater (revision is on label on bottom of shelf). UTP cable can be used for Ethernet connections to IMCs of revision H or later.

- Secure all cable screws to their corresponding connectors.

Caution: To avoid interference, you must consider the electromagnetic compatibility (EMC) of nearby equipment when you install the TimeCreator 1000.

Electromagnetic interference can adversely affect the operation of nearby equipment.

Installation Tools and Equipment

You will need the following tools and equipment to install the TimeCreator 1000:

- Standard tool kit
- Cable ties, waxed string or acceptable cable clamps
- No. 18 AWG (minimum) wire at 300 volt insulation for –48 V DC
- No. 12 AWG wire to connect grounding lug to permanent earth ground
- Signal wiring (including DTI Links, GPS, and Ethernet) uses shielded cabling of the appropriate impedance required by the specific signal type
- Mating connectors for terminating signal wiring
- Fasteners for mounting the equipment in rack
- Digital Voltmeter (DVM)

Unpacking the Unit

The TimeCreator 1000 is packaged to protect it from normal shock, vibration and handling damage.

Caution: To avoid electrostatic discharge (ESD) damage to parts that are packaged with the TimeCreator 1000, observe the following procedures.

Unpack and inspect the unit as follows:

1. Wear a properly grounded protective wrist strap or other ESD device.

2. Inspect the container for signs of damage. If the container appears to be damaged, notify both the carrier and your Symmetricom distributor. Retain the shipping container and packing material for the carrier to inspect.

3. Open the container, being careful to cut only the packaging tape.

4. Locate and set aside the printed information and paperwork that is included in the container.

5. Remove the unit from the container and place it on an anti-static surface.

6. Locate and set aside small parts which may be packed in the container.

7. Remove the accessories from the container.

8. Remove the anti-static packaging from the unit and accessories.

9. Verify that the model and item number shown on the shipping list agrees with the model and item number on the equipment. The item number can be found on a label affixed to the unit. Contact your Symmetricom distributor if the model or item number do not match.

For a complete listing of item numbers, contact your Symmetricom distributor.

Rack Mounting the Shelf

The installation procedure described in this section provides general guidelines for installing the TimeCreator 1000. Always follow applicable local electrical codes.

Use the following steps to mount the TimeCreator 1000 in a 19- or 23-inch (48 or 58.42 cm) rack.

Note: The TimeCreator 1000 comes equipped with 19-inch rack mounting brackets. 23-inch rack mounting brackets are available as a separately ordered item.

1. If necessary, attach the rack mounting brackets to the shelf using 6-32 x 1/4-inch screws. Ensure that the mounting brackets on both sides are attached at equal distances from the front of the unit (see Figure 3-1).

2. Mount the shelf to the front of the equipment rack rails with four screws and associated hardware. Use the proper screws for the equipment rack.

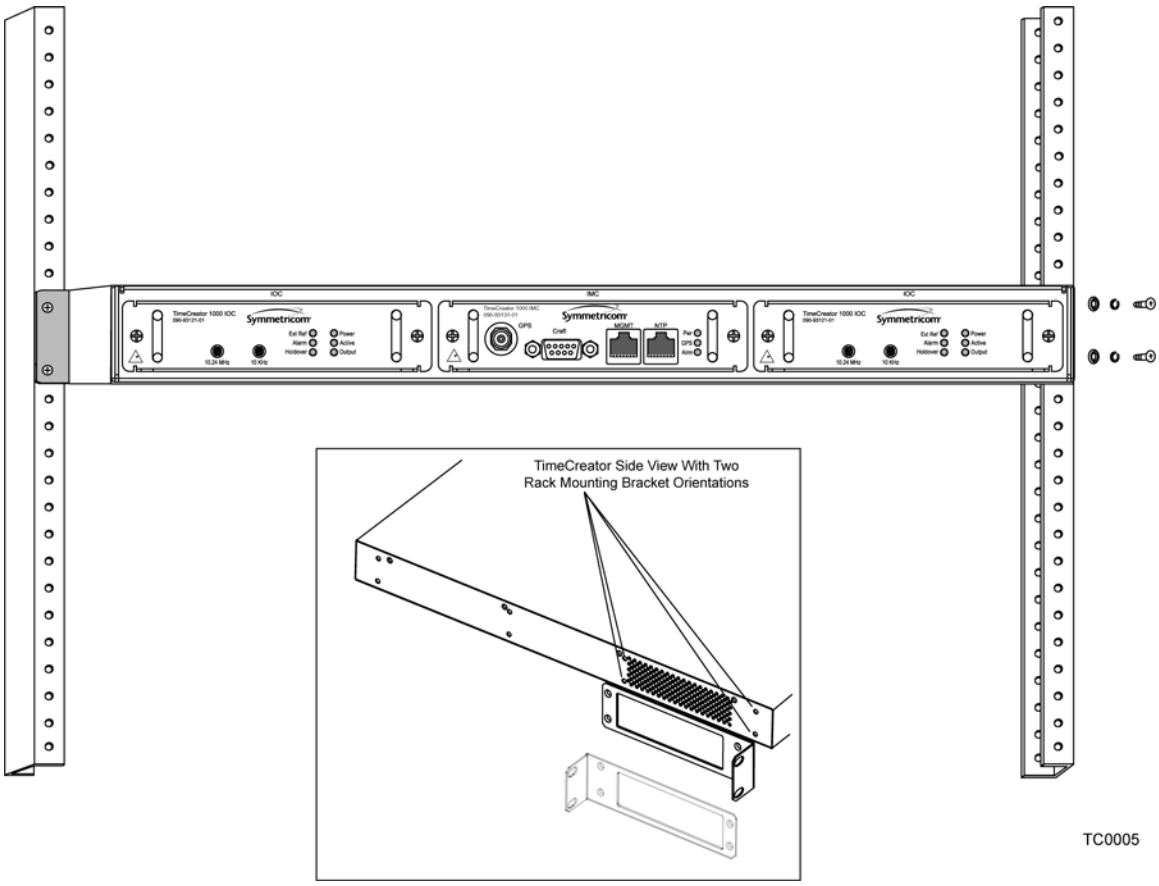

Figure 3-1. Installing the TimeCreator 1000

Working With Modules

This section describes how to install, remove, and handle the modules associated with the TimeCreator 1000.

Handling Modules

When handling any of the modules, observe the following precautions:

1. Use proper static control precautions when handling modules! Protect the equipment against ESD (electrostatic discharge) by using a grounded protective wrist strap and normal equipment grounding.

2. Avoid touching component leads and edge connectors.

3. Avoid placing the module on an ungrounded surface.

4. Avoid allowing the module to come in contact with insulated surfaces.

Inserting Modules

This procedure is common for all modules.

Caution: You must disconnect power prior to removing the power module, but all other modules can be removed and inserted while system power is supplied without damaging modules; however, system performance may be affected.

Use the following procedure to insert a module into the shelf:

1. Align the module edges within the guides of the selected slot.
2. Slide the module into the chassis and press firmly until it seats fully into its backplane edge connector. Handles on each side of the faceplate are provided for removing and inserting the module.
3. Tighten the captive screws located on each side of the panel.

Caution: To avoid possible damage or intermittent failures, ensure that you have completely inserted the module into the chassis and that you have securely tightened the captive screws.

Note: A Phillips screw driver is required to tighten or loosen the power supply module fasteners.

Removing Modules

Caution: You must disconnect power prior to removing the power supply module.

Caution: You must disconnect the GPS antenna before removing the IMC module or removing ground connection.

To remove a module, loosen the captive screws and then pull out on the handles located on each side of the module. Be sure to place the module on a static-free surface.

Making Signal Connections

The connectors for the GPS input signal, Management and NTP Server Ethernet connections, and EIA-232 serial connection are located on the IMC module. The rear panel has RJ-45 connectors for ten client DTI links, two DTI client/server links, and two T1/E1 BITS frequency links.

Note: The T1/E1 BITS links do not function in this release.

Making Communications Connections

The IMC allows user control of the TimeCreator 1000. The EIA-232 serial port, Ethernet Management port, and NTP server port are located on the IMC as shown in Figure 3-2. See Working With Modules, on page 51 for module installation instructions.

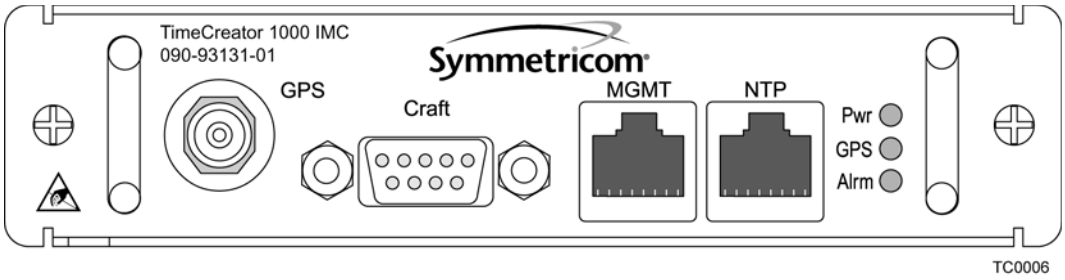

Figure 3-2. IMC Module

Ethernet Management and NTP Server Ports

The Ethernet Management and NTP server ports are standard 10Base-T/100Base-T shielded RJ-45 receptacles. To connect the TimeCreator 1000 to an Ethernet network, and to connect the NTP server to an NTP client, use shielded twisted pair Ethernet RJ-45 cable.

Note: Continuing improvements to the design of the TimeCreator 1000 have lowered the level of emissions. UTP cable can be used for DTI links with TimeCreator 1000 chassis revisions E or greater (revision is on label on bottom of shelf). UTP cable can be used for Ethernet connections to IMCs of revision H or later.

The connector pinouts are listed in Table 3-1.

Table 3-1. Management and NTP Server Ethernet Connector Pin Assignments

Signal Name	Pin
TX+ (Transmit positive)	1
TX- (Transmit negative)	2
RX- (Receive negative)	3
RX+ (Receive positive)	6
Not Used	4, 5, 7, 8

EIA-232 Serial (Craft) Port

The EIA-232 serial port connection is made through a DE9S female connector on the IMC. This port allow you to connect to a terminal or PC using a terminal emulation software package for remote monitoring and control. When connecting to this port, use a shielded EIA-232 direct connect cable with the cable shield connected to pin 1.

Figure 3-3 shows the EIA-232 connector pin assignments for the serial port.

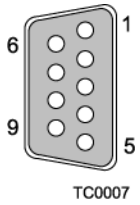

Figure 3-3. Serial Port Connector Pins

Table 3-2 describes the EIA-232 connector pin assignments for the serial port.

Table 3-2. Serial Port Connector Pin Assignments

Signal	Pin
TXD (Received Data)	2
RXD (Transmitted Data)	3
Ground	5

GPS Connections

The TimeCreator 1000 GPS input TNC connector is located on the IMC. To connect a GPS signal, you must install a GPS antenna. For detailed installation instructions, see Appendix C, Installing the Two-Way GPS Antenna. In addition to the installation instructions, this appendix also provides a list of the standard tools you will need and a list of available parts. See Working With Modules, on page 51 for module installation instructions.

Caution: The GPS cable should only be connected while the unit is properly grounded.

Input and Output Connections

The DTI link and BITS connections are RJ-45 connectors located on the rear panel (see Figure 3-4).

Note: The BITS connectors are not functional in this release.

Note: Guidelines for deploying the TimeCreator 1000 are available in the application note titled “Deploying Reliable DOCSIS Synchronization. Visit Symmetricom’s website at the following URL to access this application note.

http://www.symmetricom.com/resources/downloads/application-notes

DTI Connectors

The DTI server and client connections are shielded RJ-45 receptacles on the rear panel and they are standard 10Base-T/100Base-T connectors. The client connectors are ports 1 through 10 and additionally ports 11 and 12 if these two ports are provisioned as outputs. The server connectors are ports A and B if these two ports are provisioned as inputs.

To connect a TimeCreator 1000 server output to M-CMTS components, install a shielded twisted pair RJ-45 cable, CAT5E or better, between the M-CMTS components and the rear panel DTI server output connector (port 1-10 or port 11 or 12 if optioned as a server port).

Note: Continuing improvements to the design of the TimeCreator 1000 have lowered the level of emissions. UTP cable can be used for DTI links with TimeCreator 1000 chassis revisions E or greater (revision is on label on bottom of shelf).

To connect a TimeCreator 1000 root server to a subtending server, install a shielded twisted pair RJ-45 cable, CAT5E or better, from the root server's rear panel DTI connector to the subtending server's client input port (port A or port B, when optioned as 'client').

Note: Continuing improvements to the design of the TimeCreator 1000 have lowered the level of emissions. UTP cable can be used for DTI links with TimeCreator 1000 chassis revisions E or greater (revision is on label on bottom of shelf).

If the root server in a DTI network with subtending servers is set to user mode to utilize root server recovery, a connection should be made from the root server port 12 to a subtending server port 1. This enables root server recovery, in an orderly manner, from any outages affecting the root server

The connector pinouts are listed in Table 3-3.

Table 3-3. DTI and Root DTI Connector Pin Assignments

Signal Name	Pin
SIG+ (Positive Side of Transmitted/Received Data)	1
SIG– (Negative Side of Transmitted/Received Data)	2
Not Used	3, 4, 5, 6, 7, 8

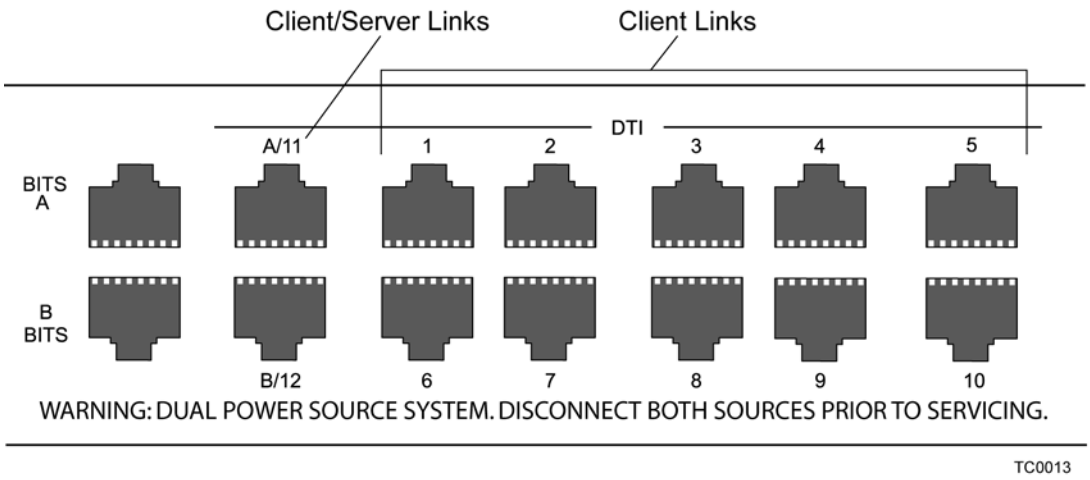

Figure 3-4. Rear Panel DTI Links

Note: The 8-port option only uses Ports 1 through 6, A/11 and B/12. Ports 7 through 10 cannot be enabled for this option.

Making Ground and Power Connections

The TimeCreator 1000 has the option of using either 120/220 V AC, or –48 V DC power. For non-redundant operation, install either one AC module or one DC module. For redundant operation, install either two AC modules, two DC modules, or one AC and one DC module (see Figure 3-6).

Ground Connections

After installing the TimeCreator 1000 into the rack, connect the shelf to the proper grounding zone or master ground bar. The grounding lug is a screw on the side of the unit, near the back. Using a ring terminal on the 12 AWG wire, connect the ground lug to permanent earth ground

Recommendation: Although there are a number of methods for connecting the equipment to earth ground, Symmetricom recommends running a cable of the shortest possible length from the ground lug to earth ground.

Power Connections

Install the appropriate power module and make the power connections as follows:

DC Power

1. Ensure the power source is turned off.
2. Connect the frame ground terminal to earth ground.
3. Locate power terminals on the –48 V DC Power Module.
4. Using 16 AWG (minimum) stranded wire, connect primary power to the terminal screws. Symmetricom recommends that you use a #6 spade lug termination for each power lead.

Warning: To avoid possible damage to equipment, you must provide power source protective fusing as part of the installation.

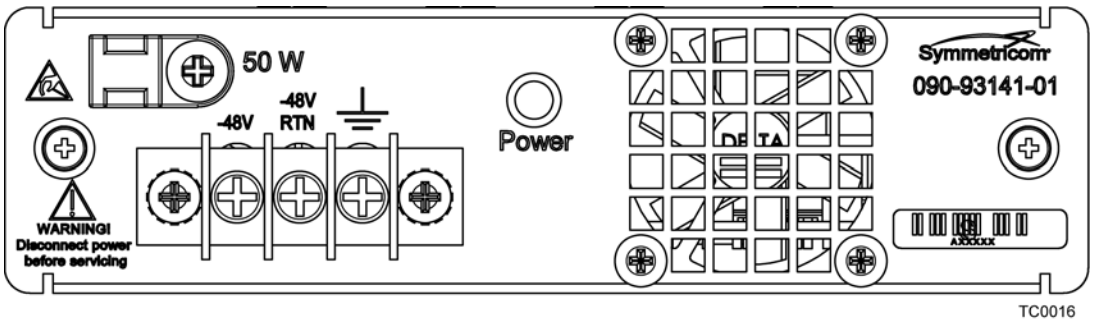

Figure 3-5. TimeCreator 1000 DC Power Module

AC Power

1. Ensure the power source is turned off.

2. Connect the power cord to the power connector on the 120V-220V AC Power Module.

Note: The AC power socket contains two 2 amp fuses: one in line and one spare.

3. Connect the power cord to the power source.

Warning: To avoid possible damage to equipment, you must provide power source protective fusing as part of the installation.

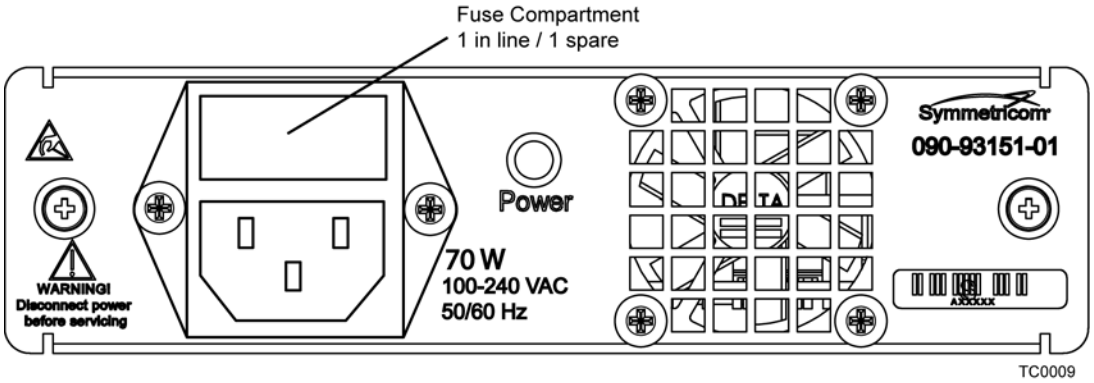

Figure 3-6. TimeCreator 1000 AC Power Module

Installation Check List

To verify that the installation of the TimeCreator 1000 is complete, perform the checks and procedures in Table 3-4.

Table 3-4. Installation Completeness Checklist

Operation	Complete
Ensure the TimeCreator 1000 chassis is securely attached to mounting rack	
Ensure that the appropriate modules (and filler panels if needed) are installed	
Verify that all power and ground wires are installed correctly and securely	
Verify that all communications cables are properly installed	
Verify that all input and output cables are properly installed	

Applying Power to the TimeCreator 1000

The TimeCreator 1000 is not equipped with a Power switch. DC power is controlled by a power distribution panel. AC power is applied when a standard 120 or 220 V AC power cord connected to the 100-240 AC Power module is plugged into the appropriate power outlet.

Normal Power Up Indications

As the TimeCreator 1000 powers up and begins normal operation, the IOC module and IMC module LEDs all turn on. After the module self-test is complete and the module firmware is operational, the LED states may change to indicate the appropriate state or status.

Table 3-5 provides a description of the module LEDs.

Table 3-5. Module LED Descriptions

LED	Color	Description
Power Module		
Status	Off	Power input not connected or Power Module Failure
	Green	Power Module is functioning properly

Table 3-5. Module LED Descriptions (Continued)

LED	Color	Description
IMC Module		
Power	Off	Module power fault
	Green	Module power is functioning properly
GPS	Off	System is not provisioned to use GPS reference
	Amber	GPS input is enabled but GPS input has not been qualified as reference
	Green	System is provisioned to use GPS reference and GPS reference is qualified as reference
Alarm	Off	There are no alarms being generated by the system
	Red	There are alarms being generated by the system
Ethernet Connection	Off	No Ethernet link established
	Green	Ethernet link established
Ethernet Activity	Off	No Ethernet activity
	Amber	Blinks with Ethernet activity
IOC Module		
Ext Ref	Off	System is not provisioned to use external references
	Amber	System is provisioned to use external references, but at least one of the reference inputs has been disqualified from being selected as system reference
	Green	System is provisioned to use external reference(s) and all reference inputs are qualified as possible system references
Power	Off	Module power fault
	Green	Module power is functioning properly
Alarm	Off	There are no alarms being generated by IOC Module's components, Input, Outputs, Clocks, etc.
	Red	There are alarms being generated by IOC Module's components, Input, Outputs, Clocks, etc.
Active	Off	Module is in Standby Mode
	Green	Module is in Active Mode, output source
Holdover	Off	Module is not in Holdover
	Amber	Module is in Holdover
Output	Off	DTI output error or port is in standby mode
	Green	All DTI server ports are operating normally

Table 3-5. Module LED Descriptions (Continued)

LED	Color	Description
DTI Links		
A/11 - B/12 DTI Client State	Off	Disabled, or Enabled and qualified as reference input
	Amber	Enabled and not qualified as reference input
A/11 - B/12 DTI Client Connection Status	Off	Disabled or not connected to DTI Server
	Green	Connected to DTI Server
A/11 - B/12 DTI Server State	Off	Disabled, or client operating normally
	Amber	1. Enabled, client indicates Warm-up, Free-run, Holdover, or Acquire states 2. In Test Mode, the DTI Output State LED and DTI Server Port Connectivity Status LED alternate being ON and OFF
A/11 - B/12 DTI Server Connection Status	Off	Disabled or not connected to DTI client
	Green	1. Connected to DTI client 2. In Test Mode, the DTI Server Port State LED and DTI Server Port Connectivity Status LED alternate being ON and OFF
1 - 10 DTI Server State	Off	Disabled, or client operating normally
	Amber	1. Enabled, client indicates Warm-up, Free-run, Holdover, or Acquire states 2. In Test Mode, the DTI Output State LED and DTI Server Port Connectivity Status LED alternate being ON and OFF
1 - 10 DTI Server Connection Status	Off	Disabled or not connected to DTI client
	Green	1. Connected to DTI client 2. In Test Mode, the DTI Server Port State LED and DTI Server Port Connectivity Status LED alternate being ON and OFF

Chapter 4 General Guidelines for using the Symmetricom TimeCreator 1000

This chapter provides basic information to which users can refer to ensure proper system operation.

In This Chapter

Clock Operations

For TOD sources of RTC, User, and NTP, the unit initially sets the time from the selected source. The unit then operates in freerun after that, keeping time according to its local oscillator frequency.

The user can force an update in the User and NTP modes. In GPS mode, the initial time is set from GPS, and the unit maintains frequency and phase lock to GPS.

When recovering from extended holdover, the frequency is locked to the GPS reference. If the phase error is small, the phase is corrected by slewing. If the phase error is large, an alarm is generated and the user will need to manually correct the phase. This prevents unmanaged discontinuities of the DOCSIS time stamp.

Table 4-1. TOD Source Modes

TOD Source	Initial Time	Frequency Lock	Phase Lock
RTC (Default)	Real-time clock	Freerun	Freerun
User	User	Freerun	Freerun
NTP	NTP	Freerun	Freerun
GPS	GPS	GPS	GPS
DTI (subtending)	Root server	Root server	Root server

GPS

For details on proper installation of the GPS antenna, refer to Appendix C. Proper cable, grounding techniques, and lightning arrestors should be used. Mount the antenna outside, preferably on the roof with a clear view of the sky. *Do not* mount the antenna near a wall or other obstruction blocking part of the sky. Mount the antenna well above roads or parking lots.

Allow at least one hour for the unit to track and lock to GPS.

NTP Client Mode

If the system time is off by more than four hours, then the system mode should be set to user mode and the time set to within four hours. The unit can then be configured to use NTP.

Since the unit only sets the time once, the time could be off by more than 100 ms if this procedure is not followed.

DHCP

This unit's DHCP client will not continually attempt to acquire an IP address if the Ethernet cable is not connected at power up, or when DHCP mode is enabled.

After the cable is connected, enter the following commands to restart DHCP:

```
set ip-state eth0 disable

set ip-state eth0 enable
```

CLI commands

Note: The "sync tod-source now" command used in some of the following examples forces the TimeCreator 1000 to immediately start using the new reference for time and frequency. This command is useful in lab tests, but its use should be carefully planned since it may cause cable modems to resync.

Logging In And Out

At the login prompt, enter the user name. At the password prompt, enter the password. The default administrator user name is “admin” with password “SymmTC1000”.

To logout, use the command “logout”:

Example

Type `logout` and press **Enter**.

Adding And Deleting Users

Only an administrator-level user can add or delete users.

Additional users can be added with the `set user` command

Saving The Present Configuration To Non-volatile Memory

Enter the following command to backup the current configuration:

```
Set configuration backup
```

Enter the following command to backup the current IOC configuration in the IMC card:

```
Set configuration backup IOC
```

Enter the following command to backup the current IMC configuration in the IOC1 card:

```
Set configuration backup IMC IOC1
```

Enter the following command to backup the current IMC configuration in the IOC2 card:

```
Set configuration backup IMC IOC2
```

Note: IMC configuration changes are not saved automatically, so it is necessary use the command “set configuration backup” to explicitly save the changes. Failure to save changes with this command will result in IMC configuration changes being lost after the IMC reboots.

See Backing up Provisioning Data, on page 110 for additional details.

Restoring Default Configuration

To restore factory defaults, while preserving users and IP configuration:

```
Set configuration default
```

To restore factory defaults:

```
Set configuration factory
```

See Restoring Provisioning Data, on page 111 for additional details.

Determining Status

Enter the following commands to display current alarms, the unit status, GPS information, and inventory:

```
Show alarms (presently active alarms)
```

```
Show status (general status of unit)

Show gps (GPS information)

Show inventory
```

See Backing up Provisioning Data, on page 110 for additional details.

Enabling Outputs

Enter the following command to set the interface state.

Example for port 5:

```
Set interface state port 5 enable
```

Setting The Output To Test Mode

Enter the following command to set the interface test mode.

Example for port 9:

```
Set interface test-mode port 9 enable
```

Configuring For Default Mode (Real Time Clock)

Enter the following commands to set the TOD source to RTC”

```
Set tod-source rtc

Sync tod-source now
```

Configuring For User Mode

Enter the following command to set the clock in user mode:

```
Set tod-source user
```

Example to set the clock in user mode:

```
Set clock date 2006-05-20 time 10:23:00

Sync tod-source now
```

Configuring For GPS Mode

Enter the following commands to the TOD source to GPS:

```
Set tod-source gps

Set interface state gps enable
```

(Wait until GPS is available)

```
Sync tod-source now
```

Configuring For NTP Mode

Enter the following commands to set up NTP mode:

```
Show clock
```

Example if time is more than 4 hours off:

```
Set tod-source user
Set clock date yyyy-mm-dd time hh:mm:ss

Set tod-source ntp

Set NTP-server add <ip address>

Set service ntpd disable

Set service ntpd enable

Sync tod-source now
```

Configuring For Subtending Mode

Enter the following commands to set up Subtending mode:

Example for portA (port 11):

```
Set tod-source dti

Set interface type porta client

Set interface state port 11 enable (Previous 2 commands must be
issued first)
```

Example on root server using port 5:

```
Set interface state port 5 enable

Set interface tod-mode verbose
```

Forcing Unit To Send New Time

Whenever the “Jam sync required” alarm is raised, which can be caused by changing the TOD source after the unit has left warm-up, you must enter the following command to change the time and DOCSIS time stamp:

```
Sync tod-source now
```

If the unit is not ready when the "`sync tod-source now`" command is issued, actual execution of this command is postponed until the unit is ready. Use the "`show alarms`" command to check for the presence of the "jam sync required" alarm to indicate readiness.

This command should also be entered after you change the time in user mode.

Setting Manual Cable Advance

Caution: Manual cable advance should only be performed in a lab environment.

Example to set cable advance for port 5 to 0x001023:

```
Set cable-adv port 5 manual 00:10:23
```

Setting Auto Cable Advance

Example to set cable advance for port 5:

```
Set cable-adv port 5 auto
```

Configuring Static IP

Example for host ip address of 192.168.5.2, with router gateway at 192.168.5.1:

```
Set ip-state eth0 disable

Set ip-mode eth0 mode static

Set ip eth0 addr 192.168.5.2

Set ip eth0 mask 24

Set ip eth0 gateway 192.168.5.1

Set ip eth0 broadcast 192.168.5.255

Set ip-state eth0 enable
```

Configuring Dynamic IP

Ethernet cable should already by connected and DHCP server configured:

```
Set ip-state eth0 disable

Set ip-mode eth0 mode dhcp

Set ip-state eth0 enable
```

Switching Active And Standby Cards

Example for IOC 1 presently active, and switching to IOC 2):

```
Set ioc-state IOC2 active
```

Chapter 5 Provisioning

This chapter describes the procedures for provisioning the TimeCreator 1000. Use the procedures in this chapter after you have installed and powered up the TimeCreator 1000 (see Chapter 3, Installing the TimeCreator 1000).

In This Chapter

Establishing a Connection to the TimeCreator 1000

To set up and manage the TimeCreator 1000 with a terminal or a computer with terminal emulation, you must establish either a serial connection or an Ethernet connection. To connect through the serial port, see Communicating Through the Serial Port, on page 72. If the TimeCreator 1000 is connected to an Ethernet LAN, use the procedure described in Communicating Through the Ethernet Port, on page 72.

Note: Before you can communicate with the TimeCreator 1000 through an Ethernet connection, you must first configure the Ethernet port using the serial connection.

Communicating Through the Serial Port

An EIA-232 serial port is available on the IMC module for a direct serial connection to a terminal or a computer with terminal emulation. Use the following procedure to connect the TimeCreator 1000 to a terminal or a computer with terminal emulation through a straight serial cable:

Note: For information on restricting user access, see Managing the User Access List, on page 74.

1. Connect one end of a straight cable to the serial port on the computer or terminal and the other end to the EIA-232 connector on the IMC.

2. Configure the emulation software for 8 data bits, 1 stop bit, no parity, and 9600 baud rate.

Note: 57600 baud rate is supported only in the IMC rev H version 1.00.13 or below.

3. Start the terminal emulation software and press **Enter**. The system prompt should appear. If it does not, recheck each step in this procedure.

Communicating Through the Ethernet Port

To communicate with the TimeCreator 1000 using an Ethernet LAN connection, you must first configure the Ethernet port through the EIA-232 serial port.

Configuring the Ethernet Port

Use the following procedures to configure the TimeCreator 1000 Ethernet parameters (IP Address, Subnet Mask, and Gateway Address).

Note: The TimeCreator 1000 default IP address is 10.0.0.100, the subnet mask is 255.255.255.0, gateway address is 0.0.0.0 (no gateway), and the broadcast address is 10.0.0.255. If these defaults are acceptable, the following procedure using the serial port is not required.

1. Establish a direct serial connection to the TimeCreator 1000 as described in Communicating Through the Serial Port, on page 72.

2. Provision the IP, Gateway, and Subnet Mask addresses for the TimeCreator 1000. The IT department or site administrator for your location can recommend specific addresses for these parameters. The mask is specified as a prefix number which is the number of 1's from the MSB with the remaining bits set to 0. For example 255.255.255.0 is set with the value 24.Use the dotted decimal format xxx.xxx.xxx.xxx to enter the address parameter with the following commands:

Example

Type `set ip eth0 addr 192.168.0.10` then press **Enter**.
Type `set ip eth0 mask 24` then press **Enter**.
Type `set ip eth0 broadcast 192.168.0.255` then press **Enter**.
Type `set ip eth0 gateway 192.168.0.254` then press **Enter**.
Type `set ip-state eth0 restart`

Connecting Through an Ethernet LAN

1. Ensure that the TimeCreator 1000 is connected to a LAN (see Making Communications Connections, on page 53 for details).

2. Telnet from your PC to the IP address assigned to the TimeCreator 1000 (see Configuring the Ethernet Port, on page 73).

3. Type your user name and press **Enter**. If you are not assigned as a user in the system, contact the system administrator or see Adding a User, on page 75.

4. Type your assigned password and press **Enter**. The system prompt appears.

Managing the User Access List

When you are logged in at the Admin level you can add, edit, or delete user names in the user access list. The user list can contain up to 20 names and users can be set to one of three different security levels described in Table 5-1. Users are required to enter a user name and password to log in to the system. Users can access or modify only the parameter settings allowed by their assigned security level.

Caution: To avoid a possible service call, do not lose or misplace the user name and password of the Admin-level user.

Caution: After three failed login attempts the user account is locked out for 15 minutes; this includes the admin user. To avoid a service call, it is recommended that at least two admin-level users be configured.

Table 5-1. User Level and Access

Security Level	Description
User	Users can edit their password and retrieve information, or access any command at the User security level.
Power-User	Users are allowed to change configuration and issue User-level commands.
Admin	Users are allowed to modify the security database or download new firmware and issue commands at any level.

Use the procedures in this section to manage user access to the TimeCreator 1000.

Login

Use the following procedure to log in to the system at the admin level.

1. Ensure that the TimeCreator 1000 is connected to a LAN, or directly connected to a PC through the EIA-232 serial port. See Making Communications Connections, on page 53.

2. If the TimeCreator 1000 is connected to a LAN, Telnet from your PC to the assigned IP address, and start a Telnet session and press **Enter**.

If the TimeCreator 1000 is connected to a PC directly through the serial port, start a session and press **Enter**.

3. Type your user name and press **Enter**. The system prompts for a password.
4. Type your password and press **Enter**. The system prompt appears.

Note: The unit's default user name is admin and the default password is SymmTC1000. To avoid unauthorized access, you should change the default user name and password.

Adding a User

Use the following procedure to add a user to the system access list.

Note:

User passwords can consist of alphanumeric characters, "~", "*", "(",")", "!", "?", "-", "_", and "." with a minimum of 8 characters and a maximum of 32 characters.

Usernames can consist of numbers, upper and lower case letters, dash "-", and underscore "_", with a maximum of 20 characters. Usernames cannot use a leading dash "-" or underscore "_" as the first character. Usernames cannot use any of the following characters:

`/ ( ) | \ ; : " ' , < >`

Passwords must contain at least one number or special character.

For a description of user access levels, see Managing the User Access List, on page 74.

1. Login at the Admin level (see Login, on page 74).
2. Type `show user` and press **Enter** to view the current list of users.
3. Type `set user add` and press **Enter**. The system prompts you for a user name.
4. Type a user name and press **Enter**. The name you enter will be the log-in name for the user. The system prompts you for the user access level.
5. Type the user access level and press **Enter**. The system prompts you for a password.
6. Type a password and press **Enter**. The password you enter will be the log-in password for the user. The system responds with the confirm password prompt.

7. Retype the password and press **Enter**.

8. Type `show user` and press **Enter** to verify that the account exists (repeat steps 3, 4, 5, 6, and 7 to add other users).

Deleting A User

Use the following procedure to delete user ABC from the system access list.

1. Login at the Admin level (see Login, on page 74).

2. Type `show user` and press **Enter** to view the current list of users.

3. Type `set user del abc` and press **Enter**.

Displaying Current Users and User Access Levels

Use the following procedure to retrieve a list of all assigned users and their access levels. Users logged in remotely via RADIUS or TACACS+ will be displayed as <username> (remote), rather than just <username> for local users.

1. Login at the Admin level (see Login, on page 74).

2. Type `show user` and press **Enter**. The system displays the current list of users.

Note: Users logged in remotely via RADIUS or TACACS+ will be displayed as <**username**> (remote), rather than just <**username**> for local users.

Displaying Logged in Users

Use the following procedure to retrieve a list of users that are currently logged in.

1. Login at the Admin level (see Login, on page 74).

2. Type `show logged-in-user` and press **Enter**. The system displays the current list of users who are logged in.

Changing a User's Password and Access Level

Use the following procedure to change the password and access level.

Note:

User passwords can consist of alphanumeric characters, "~", "*", "(",")", "!", "?", "-", "_", and "." with a minimum of 8 characters and a maximum of 32 characters.

Usernames can consist of numbers, upper and lower case letters, dash "-", and underscore "_", with a maximum of 20 characters. Usernames cannot use a leading dash "-" or underscore "_" as the first character. Usernames cannot use any of the following characters:

`/ ( ) | \ ; : " ' , < >`

Passwords must contain at least one number or special character.

For a description of user access levels, see Managing the User Access List, on page 74.

1. Login at the Admin level (see Login, on page 74).
2. Type `show user` and press **Enter** to view the current list of users.
3. Type `set user password <user>` and press **Enter**. The system prompts you for a password.
4. Type the user's password and press **Enter**. The system responds with the confirm password prompt.
5. Type the user's password again and press **Enter**.
6. Type `set user modify <user> access-level` <access-level>and press **Enter**. (The access level is 1, 2, or 3, where 3 is admin level.)

Managing the IP Address Whitelist

The whitelist feature in TimeCreator allows the user to filter IP access addresses to prevent malicious attacks. In the default condition, all IP addresses are allowed access. Once the first IP address has been added to the whitelist, any future IP sessions will only be accepted if they originate from IP addresses from the whitelist. This feature is useful when the management port is connected to a public network rather than a private network.

Note: Symmetricom recommends that the IP address of the administrator station always be added to the whitelist first. This will prevent an accidental lockout of the administrator via Telnet/SSH.

The whitelist must be committed before any changes to the whitelist will be implemented.

Note: If the whitelist function is being use for a TimeCreator 1000 with the TOD-source of NTP, the local host address (127.0.0.1) should be added to the whitelist with the command “set whitelist add 127.0.0.1”.

Add an IP Address to the Whitelist

Use the dot-decimal notation format xxx.xxx.xxx.xxx to enter the IP address parameter.

1. Login at the Admin level (see Login, on page 74).

2. To view the current list of IP addresses on the whitelist, type `show whitelist` and press **Enter**.

3. To add a specific IP address to the whitelist, type `set whitelist add <ip address>` and press **Enter**. (For example, `set whitelist add 192.168.5.10`).

4. To add IP addresses using a subnet mask, type `set whitelist add <ip address>/<ip mask>` and press **Enter**. The mask indicates which parts of the IP address are significant – it is specified as a prefix number which is the number of 1s from the MSB with the remaining bits set to 0. A mask of 255.255.255.0 is set with the value 24. (For example, `set whitelist add 192.168.5.0/24`) The default value is 32, or 255.255.255.255, to match the full 32-bit IP address. .

5. Type `set whitelist commit` and press **Enter.**

Delete an IP Address From the Whitelist

1. Login at the Admin level (see Login, on page 74).
2. To view the current list of IP addresses on the whitelist, type `show whitelist` and press **Enter**.
3. Type `set whitelist delete <ip address>` and press **Enter**. (For example, `set whitelist delete 192.168.5.10`).
4. Type `set whitelist commit` and press **Enter.**

Set the Whitelist to Default

1. Login at the Admin level (see Login, on page 74)).
2. Type `set whitelist default` and press **Enter.**

Provisioning Login Authentication

The authentication scheme used in the TimeCreator 1000 allows you to provision either a RADIUS or TACACS+ server IP address and authentication key(s) for server access. If RADIUS or TACACS+ is enabled, the system allows local login if the server doesn't authenticate the user and the user is configured locally.

Provisioning the TC1000 for Login Authentication

RADIUS Server

To provision the TC1000 with the RADIUS server IP address and the authentication key for server access:

1. Login at the Admin level (see Login, on page 74).
2. Type `set authentication radius address <address>[:<port#>]` and press **Enter** (address is the server IP address, for example 192.168.0.10, and the port# is optional).
3. Type `set authentication radius key <key>` and press **Enter** (key is up to 32 ASCII characters).
4. Type `set authentication radius state enable` and press **Enter**.

TACACS+ Server

To provision the TACACS+ server IP address and the authentication key for server access:

1. Login at the Admin level (see Login, on page 74).

2. Type `set authentication tacacs+ address <address>[:<port#>]` and press **Enter** (address is the server IP address, for example 192.168.0.10, and the port # is optional).

3. Type `set authentication tacacs+ key <key>` and press **Enter** (key is up to 32 ASCII characters).

4. Type `set authentication tacacs+ state enable` and press **Enter**.

Configuring the RADIUS Server

For a FreeRADIUS server (see http://www.freeradius.org/), configuration requires placing the TimeCreator 1000 user information in the file "/etc/raddb/users.conf". For other RADIUS servers, see the appropriate user documentation for information on how to configure the server. The "Class" attribute from the RADIUS server is used by the TimeCreator 1000 to indicate the security level for each authorized user, as described in the Table 5-2 below:.

Table 5-2. Security Levels vs. RADIUS Server Class Attribute Settings

TimeCreator 1000 Security Level	RADIUS Server “Class” Attribute
User	1 - 4
Power-user	5 - 9
Admin	10 - 15

Listed below are example configurations for the file “/etc/raddb/users.conf” for the FreeRADIUS server.

Example 1: “Admin”-Level User

For user "usr_a" with a password of "test1a":

```
usr_a  Auth-Type := Local, User-Password == "test1a"
Class= "15"
```

Example 2: “Power-User”-Level User

For user "usr_b" with a password of "test2b":

```
usr_b  Auth-Type := Local, User-Password == "test2b"
Class= "8"
```

Example 3: “User”-Level User

For user "usr_c" with a password of "test3c":

```
usr_c  Auth-Type := Local, User-Password == "test3c"
Class= "1"
```

The RADIUS client and secret key must also be configured in the RADIUS server. For a FreeRADIUS server, this is configured in the "/etc/raddb/clients.conf" file.

Example

```
client 192.168.0.0/16

{
        secret= testing123
        shortname= private-network-2
}
```

Note: When using the TimeCreator's “show user” command, users logged in remotely via RADIUS will be displayed as <username> (remote), rather than just <username> for local users.

Note: If you change the "Class" attribute in the file "/etc/raddb/users.conf", you need to use the “set user del” command to delete the TimeCreator's stale user account (if it exists) for your remote RADIUS user. Then log in to TimeCreator again so the TimeCreator 1000 will recreate the user account for your remote RADIUS user with the new user security level corresponding to new "Class" attribute you specified in the file "/etc/raddb/users.conf".

Configuring the TACACS+ Server

For the Cisco TAC_PLUS TACACS+ server, configuration requires placing the TimeCreator 1000 user information in the file tac.cfg. For other TACACS+ servers, see the appropriate user documentation for information on how to configure the server. The "priv-lvl " attribute from the TACACS+ server is used by the TimeCreator 1000 to indicate the security level for each authorized user, as described in the Table below:.

Table 5-3. Security Levels vs. RADIUS Server Class Attribute Settings

TimeCreator 1000 Security Level	TACACS+ Server “priv-lvl” Attribute
User	1 - 4
Power-user	5 - 9
Admin	10 - 15

Listed below are example configurations for the file “tac.cfg” for the Cisco TAC_PLUS TACACS+ server.

Example 1: “Admin”-Level User

For user "usr_a" with a password of "test1a", and a secret (key) of "testing123":

```
#
# CONFIGURE ENCYPTION KEY
key = testing123
# Configure User
user = usr_a {
pap = cleartext test1a
opap = cleartext test1a
global = cleartext test1a
service = exec {
default attribute = permit
priv-lvl = 15
}
}
# End file
```

Example 2: "Power-User"-Level User

```
For user "usr_b" with a password of "test2b", and a secret
(key) of "testing123":

#
# CONFIGURE ENCYPTION KEY
key = testing123
# Configure User
user = usr_b {
pap = cleartext test2b
opap = cleartext test2b
global = cleartext test2b
service = exec {
default attribute = permit
priv-lvl = 8
}
}
# End file
```

Example 3: "User"-Level User

```
For user "usr_c" with a password of "test3c", and a secret
(key) of "testing123":

#
# CONFIGURE ENCYPTION KEY
key = testing123
# Configure User
user = usr_c {
pap = cleartext test3c
opap = cleartext test3c
global = cleartext test3c
service = exec {
default attribute = permit
priv-lvl = 1
}
}
# End file
```

Note: When using the TimeCreator's “show user” command, users logged in remotely via TACACS+ will be displayed as <username> (remote), rather than just <username> for local users.

Note: If you change the "priv-lvl" attribute in the file “tac.cfg”, you need to use the “set user del” command to delete the TimeCreator's stale user account (if it exists) for your remote TACACS+ user. Then log in to TimeCreator again so the TimeCreator will recreate the user account for your remote TACACS+ user with the new user security level corresponding to the "priv-lvl" attribute you specified in the file “tac.cfg”.

Provisioning Services

Using the Set Service command, you can control the TimeCreator 1000 services (see Set Service, on page 250). This command allows you to enable or disable the following services:

- EIA-232
- Telnet
- SSH
- NTP
- SNMP

Example

To enable NTP, enter the following command:

Type `set service ntp enable` and press **Enter**.

Provisioning the Ethernet Ports

The TimeCreator 1000 supports static IP addresses as well as dynamically allocated addresses on the MGMT (Management) port and NTP port. The dynamically allocated address requires a connection to a DHCP server. When provisioning the unit for static IP address, you can set the Host address, Mask address, and Gateway address, or you can set the addresses to the factory default. See Appendix D, Specifications and Factory Defaults for default IP addresses.

Static IP Mode

Use the following procedure to configure the TimeCreator 1000 IP parameters (Host Address, Subnet Mask, and Gateway Address) on the MGMT port. Use the dot-decimal notation format xxx.xxx.xxx.xxx to enter the address parameter.

Example

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `set ip-mode eth0 mode static` and press **Enter**.
3. Type `set ip eth0 addr 192.168.0.10` and press **Enter**.
4. Type `set ip eth0 mask 24` and press **Enter**.
5. Type `set ip eth0 gateway 192.168.0.1` and press **Enter**.
6. Type `set ip-state eth0 restart` and press **Enter**.

DHCP Mode

You can either enable or disable DHCP mode on the MGMT port or NTP port. Use the following procedure to configure the TimeCreator 1000 to enable DHCP on the MGMT port.

Example

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `set ip-mode eth0 mode dhcp` and press **Enter**.
3. Type `set ip-state eth0 restart` and press **Enter**.

Setting the System Date, Time and Time Offset

The TimeCreator 1000 Time of Day can be set either by an external source, or manually with the Set Clock command. You can set the time and date only in the user tod-source mode. The local time offset only affects the time associated with the logs. Use the following procedure to manually set the system date, time, and time offset:

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `set tod-source user` and press **Enter**.
3. Type `set clock date <date value> time <time value>` and press **Enter**. Enter the date value in format yyyy-mm-dd.

4. Type `set clock offset <offset value>` and press **Enter**. Enter the time offset value in format hh-mm. Only offsets corresponding to valid time zones are supported. The time offset will only affect the time associated with the logs.

Note: If the offset is changed, then the unit saves the configuration and restarts the IMC.

Setting the DTI Server Type

The TimeCreator 1000 can be provisioned as a root server operating with a GPS external reference, or if no external reference is qualified, it can operate in free-run mode. The TimeCreator 1000 can also be provisioned to operate as a subtending server receiving its reference from a root DTI server.

The TimeCreator 1000 stays in warm-up until the time is obtained. If RTC mode is selected, then the time is already available. Other modes need to obtain the time from an external source. Once the unit has passed beyond warm-up, a jam sync is required to adjust the time when changing the TOD source.

Warning: Changing the TOD source and performing the jam sync may require cable modems to re-sync. For information on jam sync, see Force System Time to Reference (Jam Sync), on page 91 and refer to the command Sync TOD-Source, on page 262.

Table 5-4. TimeCreator 1000 Input Signal Source

Reference Source	Server Mode	Description
GPS	Root	GPS antenna used to acquire the system's frequency, DTI timestamp, and TOD
DTI	Subtending	External DTI signals used as external input references to acquire the system's frequency, DTI timestamp, and TOD
NTP	Root	NTP server used to acquire the TOD. Frequency is provided by IOC's clock in freerun mode

Table 5-4. TimeCreator 1000 Input Signal Source

Reference Source	Server Mode	Description
Real-Time Clock (RTC)	Root	Clock on IMC used to acquire the TOD. Frequency is provided by IOC's clock in freerun mode
USER	Root	User manually enters TOD. Frequency is provided by IOC's clock in freerun mode

Use the following procedure to provision the TimeCreator 1000 mode of operation as either a root DTI server or subtending server.

Note: A TimeCreator 1000 that is provisioned as a subtending server must use the reference source of a root DTI server.

Root DTI Server in Free-run Mode

The TimeCreator 1000 operates in free-run mode when there is no qualified external reference and the TOD is either set by the user, set with NTP, or set to the default Real Time Clock (RTC) mode.

User Time Set Mode

The Set Clock Date Time command is used to set the system time.

Example

To provision the TimeCreator 1000 as a root server in free-run mode with the TOD set by the user to the current time, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `set tod-source user` and press **Enter**.
3. Type `set clock date <date> time <time>` and press **Enter**.

NTP (Client) Set Mode

The Set TOD-Source NTP command is used to provision the Time of Day source to be an NTP server.

Example

To provision the TimeCreator 1000 as a root server with an NTP server supplying the TOD, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type `set tod-source ntp` and press **Enter**.

Default Time Set Mode
In the default mode, RTC, the time is obtained from the real-time clock (RTC) on the IMC card.

Example

To provision the TimeCreator 1000 TOD source to be the IMC's real-time clock (RTC), perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type `set tod-source rtc` and press **Enter**.

Root DTI Server in GPS Mode

In GPS mode, the time is obtained from GPS. The system waits until it has valid time from GPS before it transitions out of warm-up.

Example

To provision the TimeCreator 1000 as a root server with GPS as the external reference, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type `set tod-source gps` and press **Enter**.

3. Type `set interface tod-mode verbose` and press **Enter**.

Subtending DTI Server Mode

A TimeCreator 1000 provisioned as a subtending server must connect directly to a root DTI server through the DTI client interface. A subtending server cannot be referenced to another subtending system. The root server must be in the verbose TOD mode so that the subtending server can obtain the necessary information via the DTI link.

Example

To provision the TimeCreator 1000 as a subtending server, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `set tod-source dti` and press **Enter**.
3. Follow the steps in Provisioning the Input Reference, on page 89 to provision the input reference ports.

Note: The root server *must* be in verbose TOD mode. On the root server, enter the following command: Type `set interface tod-mode verbose` and press **Enter**.

Provisioning the Input Reference

When operating in normal (locked) mode, the TimeCreator 1000 uses the external reference (GPS or DTI) to acquire the system's frequency, DTI timestamp, and TOD alignment. (See Operating Modes, on page 29 for details about Normal and other operating modes.) A GPS reference is connected to the GPS interface on the IMC of root server. DTI references are connected to ports A and B of a subtending server, and you can provision a priority level for each port. You can also provision NTP to provide TOD, with frequency provided by the IOC clock. The TOD source must be set prior to enabling the desired interface.

Setting the GPS Parameters

When the GPS reference is enabled, you can set the satellite position parameters either automatically or manually. Use the command "set gps auto" to set the satellite position parameters automatically. For manual mode, use the command "set gps mode manual position <latitude> <longitude> <height> [mask <mask>]". As the command shows, in manual mode, you must specify the latitude, longitude, and height. You can also specify the elevation mask which filters the satellites used by the system. See the Set GPS command description for additional examples and details.

Note: Symmetricom recommends using GPS in "auto" mode.

Example

To provision the TimeCreator 1000 to set a GPS reference for manual mode and specify the position as a latitude of N37.22.45.123, longitude of W121.55.36.123, height of 17.5 meters, with a mask of 25 degrees, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type the command show `show tod-source` to verify that the TOD source has been set to GPS.

   If the TOD source is set to GPS, proceed to step 3. If the the TOD source is not set to GPS, type the command `set tod-source gps` and press **Enter**

3. Type `set interface state gps enable` and press **Enter**.

4. Type `set gps mode manual position n37:22:45.123 w121:55:36.123 17.5 mask 25` and press **Enter**.

Setting the DTI Parameters

DTI references connect to ports A and B. When you provision DTI as a reference (TOD-source set to DTI), you must set ports A and B for client mode and enable these ports. You can also set a priority value for each port.

Example

To provision ports A and B for DTI reference, set port A for a priority of 1 and port B for a priority of 2 then perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type the command show `show tod-source` and press **Enter** to verify that the TOD source has been set to DTI. This must be set before the state or type can be set.

   If the TOD source is set to DTI, proceed to step 3. If the the TOD source is not set to DTI, type the command `set tod-source dti` and press **Enter**

3. Type `set interface type portA client` and press **Enter**.

4. Type `set interface type portB client` and press **Enter**.

5. Type `set interface priority portA 1` and press **Enter**.

6. Type `set interface priority portB 2` and press **Enter**.

7. Type `set interface state port 11 enable` and press **Enter**.

8. Type `set interface state port 12 enable` and press **Enter**.

Setting the NTP Parameters

When the TimeCreator 1000 is provisioned for free-run mode, the unit can reference its time from an external NTP server connected to the MGMT or NTP port.

Example

To enable the MGMT port to receive TOD from an NTP server, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type the command show `show tod-source` and press **Enter** to verify that the TOD source has been set to NTP.

   If the TOD source is set to NTP, proceed to step 3. If the the TOD source is not set to NTP, type the command `set tod-source ntp` and press **Enter**

3. Type `set service ntp enable` and press **Enter**.

4. Type `set firewall ntp enable` and press **Enter**.

5. Type `set ntp-server add <ip address>` and press **Enter**. If required by the NTP server, specify a keyID with the NTP-Server command, use the NTP-Key command to add key configuration, and NTP-Authorization to enable or disable authorization operation.

Force System Time to Reference (Jam Sync)

The “jam sync” function allows you to either set the current clock as TOD-source reference immediately, or to specify when the “jam sync” will occur.

Warning: Changing the TOD source and performing the jam sync may require cable modems to re-sync. For information on jam sync, see Force System Time to Reference (Jam Sync), on page 91 and refer to the command Sync TOD-Source, on page 262.

Example

To immediately perform a “jam sync”, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type `sync tod-source now` and press **Enter**.

Provisioning the DTI Links

The TimeCreator 1000 rear panel has ten permanent DTI client links that provide DTI timing signals to client elements in an M-CMTS architecture. With the 8-port IOC module option, however, only Ports 1 through 6 are active. There are also two DTI client/server ports that can be provisioned as either DTI reference links (for subtending servers), or as additional DTI links to client elements. DTI ports 11 and 12 must be provisioned to the appropriate type, either client or server, before being enabled or disabled.

The LED status indicators on the DTI links are described in Table 5-5.

Enabling and Disabling the DTI Server Links

To enable all DTI link ports, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `set tod-source dti` and press **Enter**.
3. Type `set interface state all enable` and press **Enter**.

Enabling and Disabling the DTI Client/Server Links

To set up ports 11 and 12 as client DTI links, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `set interface type portA client` and press **Enter**.
3. Type `set interface type portB client` and press **Enter**.
4. Type `set interface state port 11 enable` and press **Enter**.
5. Type `set interface state port 12 enable` and press **Enter**.

Table 5-5. DTI Link LED Indicators

Indicator	Color	Description
Front Panel of IOC Module		
DTI Output Status	Off	1. A DTI output issue exists on at least one DTI output port 2. When operating as the Standby IOC
	Green	All DTI outputs are operating normally
Connectors for DTI Ports 1 - 10 and DTI Ports 11 & 12 (in Server mode)		
DTI Output State	Off	1. Disabled 2. Client Operating Normally
	Amber	1. Enabled, client indicates Warm-up, Free-run, Holdover, or Fast-Lock states 2. In Test Mode the DTI Output State LED and DTI Output Connectivity Status LED shall alternate being “on” and “off”
DTI Output Connectivity Status	Off	1. Disabled 2. Not connected to DTI client
	Green	1. Connected to DTI client 2. In Test Mode the DTI Output State LED and DTI Output Connectivity Status LED shall alternate being “on” and “off”
DTI Ports 11 & 12 (in Client mode		
DTI Input State	Off	1. Disabled 2. Enabled and qualified as reference input
	Amber	Enabled and not qualified as reference input
DTI Input Connectivity Status	Off	1. Disabled 2. Not connected to DTI server
	Green	Connected to DTI server

Enabling DTI Test Mode

Test Mode produces a continuous stream test signal from the DTI links that is all ones prior to Manchester encoding.

Example

To enable test mode on port 10, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type `set interface test-mode port 10 enable` and press **Enter**.

Provisioning Revertive and Non-Revertive Mode

The revertive and non-revertive function allows you to select the action taken when the system reference at ports A and B is disqualified and then re-qualified.

In the revertive mode, if an input used as the system reference is disqualified (for any reason), the reference switches to the next-highest input and reverts to the initial input when that input is re-qualified. In this mode, the reference switches two times: once when the disqualifying event occurs, and again when the initial input is re-qualified.

In the non-revertive mode, when the system reference is disqualified (for any reason), the system reference switches to the other input but does not revert to the initial input when the initial input is re-qualified. The system reference switches only once when the disqualifying event occurs. When the priorities of the ports are the same, the ports act in the non-revertive mode. If the priorities are different, the ports act in the revertive mode.

Example

To provision the TimeCreator 1000 ports A and B for revertive mode, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type `set interface priority portA 2` and press **Enter**.

3. Type `set interface priority portB 3` and press **Enter**.

Provisioning Root Server Recovery Mode

Root Server Recovery is Symmetricom's enhancement to the DOCSIS Timing Interface (DTI) Specification which allows a root server to re-align its subtending servers in a timely and orderly fashion, without network interruption.

Root Server Recovery consists of two separate mechanisms:

1. Root Server automatically switching to client mode to acquire time and phase from a subtending server

2. Root Server returning to server mode and slowly steering the subtending servers' time and phase back in phase with the root

With the TimeCreator 1000, when the root server has lost power or is taken off line for servicing, the subtending servers' clocks will enter the holdover state and slowly drift over time. When the root server is restored and has warmed up, it will automatically switch to a DTI Client role and acquire the time and phase from a subtending server connected Port 12. The root server will then switch back to its role as server and use this time and phase to steer the remaining subtending servers time and phase. Clients connected to the subtending server will also slew with the subtending server. If the subtending servers are forced to slew their time and phase too rapidly, however, this may cause modems to re-range, resulting in service disruption. Root Server Recovery can be configured to slew at a slow rate that avoids service disruptions.

Benefit of Using Root Server Recovery

Root Server Recovery minimizes service disruption caused by root server outage, thus improving network availability.

Root Server Recovery vs. Root Recovery

The way the root server recovers is based on the TOD Source mode in which it is operating. When the root server is in USER TOD Source mode and auto recovery is enabled, Root Server Recovery mode is used. When the root server is in GPS, NTP, or RTC TOD Source mode, Root Recovery mode is used. Table 5-6 shows the recovery mode for all TOD Source modes.

In Root Server Recovery mode, the root is switched from server to client mode, thus allowing it to acquire TOD and phase data from a subtending server. The root is then switched back to server mode, allowing it to steer the subtending servers time and phase. Automatic root server recovery is only available for the USER TOD Source mode, as shown in Figure 5-1. Figure 5-2 shows a simple deployment with Root Server Recovery. Figure 5-3 shows a larger scale deployment with Root Server Recovery.

In Root Recovery mode, the root remains in server mode when it acquires TOD and phase from its TOD source. When the root server is turned on after power failure or after it has been serviced, it will automatically query time and phase from its TOD source, and use this time and phase to steer the subtending servers time and phase. Clients connected to the subtending server will also slew with the subtending server. Figure 5-4 illustrates the root recovery process based on TOD source.

Table 5-6. Recovery Modes Based on TOD Source

TOD Source	Recovery Mode	Root Server Requirements	Subtending Server Requirements
USER	Root Server Recovery	Configure Port 12 as a Client, but do NOT enable it Connect Port 12 of root server to Port 1 of subtending server Enable root server auto recovery feature	Connect Port 1 of subtending server to Port 12 of root server Enable Port 1 of subtending server as DTI output
GPS	Root Recovery	No action required for root server	n/a
NTP	Root Recovery	No action required for root server	n/a
Real-Time Clock	Root Recovery	No action required for root server	n/a
DTI	n/a	n/a	n/a

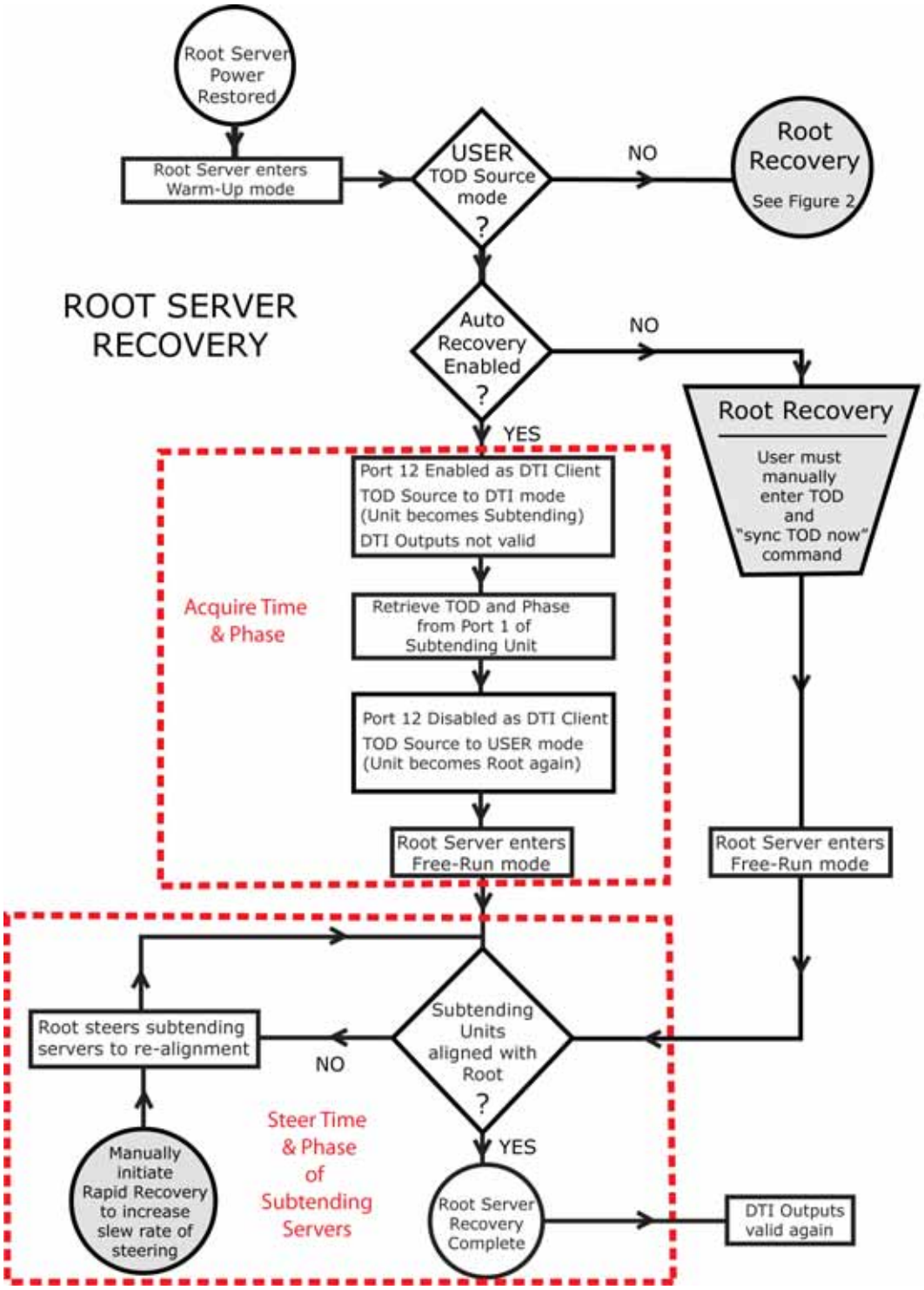

Figure 5-1. State Diagram for Root Server Recovery - USER mode

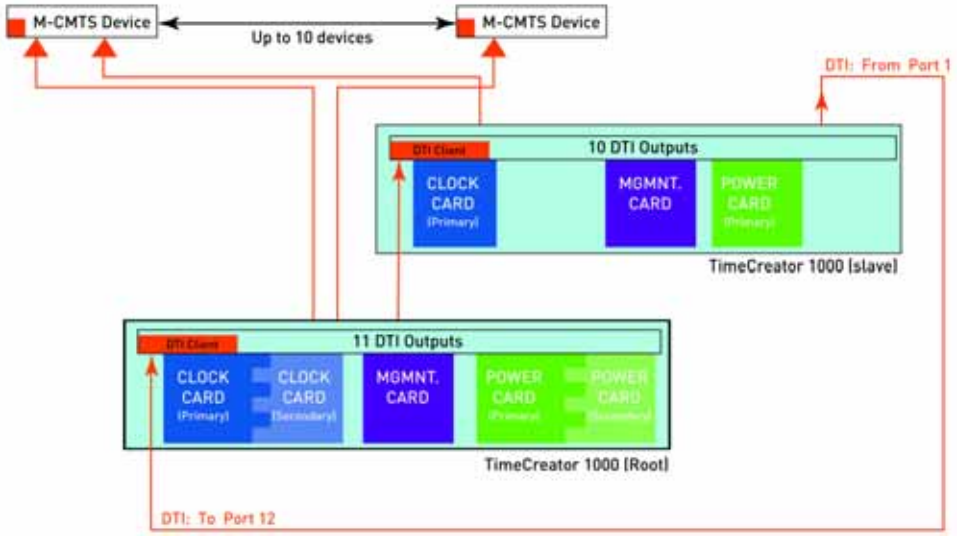

Figure 5-2. Simple Deployment with Root Server Recovery

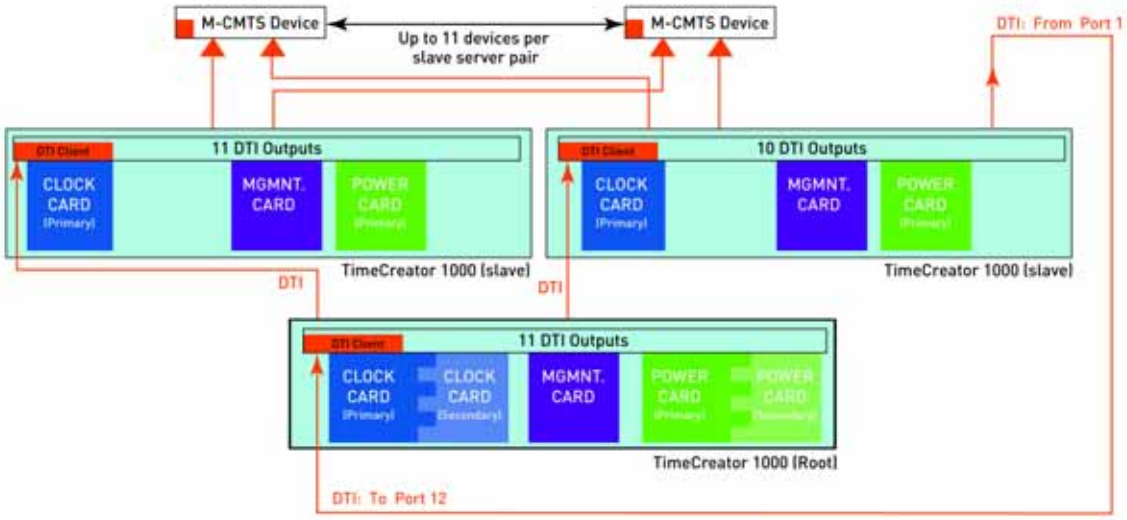

Figure 5-3. Large Scale Deployment with Root Server Recovery

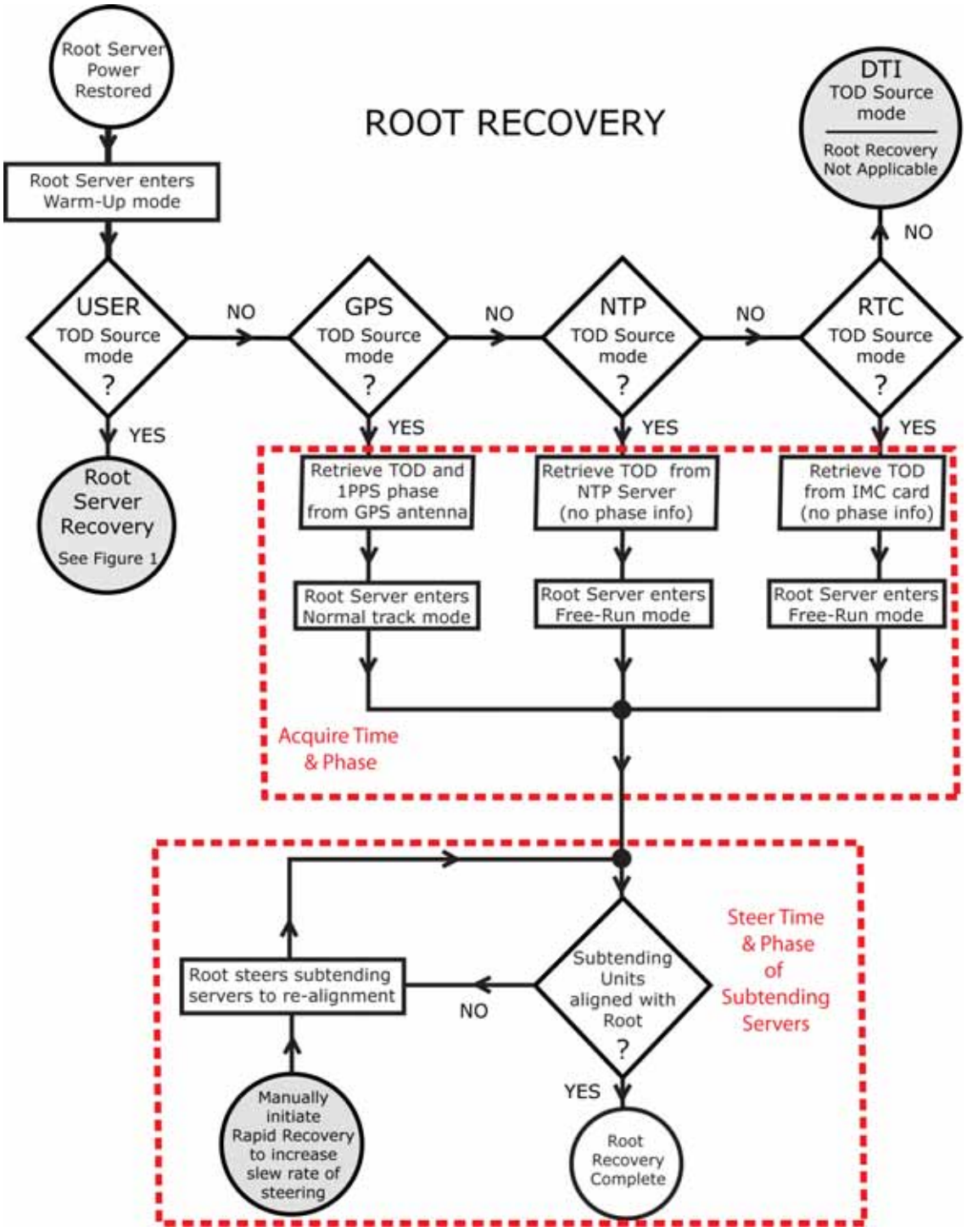

Figure 5-4. State Diagram for Root Recovery - GPS, NTP, and RTC modes

Requirements for Root Server Recovery

Root Server Requirements

The requirements to configure the root server for root server recovery are:

- Configure Port 12 as a Client, but do NOT enable it
- Connect Port 12 of root server to Port 1 of subtending server
- Enable root server auto recovery feature

Subtending Server Requirements

The requirements to configure the subtending server for root server recovery are:

- Connect Port 1 of subtending server to Port 12 of root server
- Enable Port 1 of subtending server as DTI output

Duration of Root Server Recovery Process

If there is an outage of a TimeCreator root server, when it gets back on line, it will slowly pull the phase of the subtending servers back into alignment in a manner which minimizes cable modem re-ranging. The process of steering the subtending servers time and phase can take as much as 32 hours depending on how long the root server was off line, and on whether rapid recovery mode is selected. If mis-alignment of the subtending server is large, it may take a long time for all the DTI elements to be aligned.

When conditions warrant, the user can set another root-recovery per port control, rapid recovery, to achieve a shorter re-alignment time. Note that this will cause re-ranging of some DTI clients. The user can view the amount of time required for recovery to determine whether they need to activate rapid recovery by displaying status of the recovery process. See the sections Displaying Status of Root Server Recovery, on page 101 and Enabling Rapid Recovery Mode, on page 102 for details.

Warning: Using rapid recovery mode will cause network interruption.

Enabling Root Server Recovery

Use the “set root-recovery autorecoverymode enable” command to let the root server know that on power-up, it should retrieve time and phase from the chosen subtending server.

Note: This command is only applicable for a TimeCreator 1000 that is being used as a root server in TOD Source mode of USER.

Example:

To set the root server so that it can automatically recover from an outage enter the following command:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type `set root-recovery autorecoverymode enable` and press **Enter**.

If the autorecovery mode is not enabled when the root server is in USER TOD Source mode, the user must manually enter the TOD and the “sync TOD source now” to allow recovery of the root.

Displaying Configuration of Root Server Recovery

Use the command “show root-recovery config” to see the configuration of root server recovery. It shows the autorecoverymode setting and the per-port rapid recovery mode.

Example:

Root recovery settings in the root server can be retrieved by using the following query:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type `show root-recovery config` and press **Enter**.

Displaying Status of Root Server Recovery

Use the command “show root-recovery status” to get status of the recovery. It will show:

- whether the auto recovery process is taking place (running or not running)
- whether a port is able to recover in a controlled manner,

- how long re-alignment will take, in minutes (displays total time required, but does not count down remaining time for re-alignment)

Note: If a shorter recovery is necessary, enable rapid recovery for all ports or for each individual port

Example:

Root recovery status in the root server can be retrieved by using the following query:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type `show root-recovery status` and press **Enter**.

Enabling Rapid Recovery Mode

If the user decides that a shorter recovery is necessary, enter the following command at the root server:

```
Set root-recovery rapidrecovery {port #|all} {enable | disable}
```

The Rapid Recovery mode can shorten the duration of the recovery process by at least a factor of 10, depending on the phase error of the subtending server as a result of the outage duration.

Example:

Rapid recovery mode can be enabled for all ports of the root server by using the following commands:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type `show root-recovery status` and press **Enter** to verify the status of the root server recovery process and expected time for re-alignment.

3. Type `set root-recovery rapidrecovery all enable` and press **Enter**.

Aborting Root Server Recovery

Use the command “set root-recovery autorecoverymode abort ” to abort the root server recovery process.

Example:

To abort the root server recovery process under way, enter the following command:

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `show root-recovery status` and press **Enter** to verify the status of the root server recovery process and expected time for re-alignment.
3. Type `set root-recovery autorecoverymode abort` and press **Enter**.

Provisioning SNMP

Enabling SNMP allows you to use an SNMP interface to remotely manage the TimeCreator 1000 over an Ethernet connection. This also allows the user to:

- provision SNMPv2 to be enabled or disabled on the specified Ethernet port
- provision the SNMP trap destination to the specified IP address and SNMPv3 user or SNMPv2 community, or to the default settings
- add/delete/modify SNMPv3 users
- add/delete/modify SNMPv2 communities

Example 1:

To enable SNMP on the MGMT port, add an SNMPv3 user ABC, with no authorization or privacy, and to set the trap destination IP address to 192.168.100.100, port 1098, for user ABC with a security level of “noauth” and an access level of “ro”, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `set service snmp enable` and press **Enter**.
3. Type `set snmp accessv3 add ABC securLvl noauth accessLvL ro` and press **Enter**.
4. Type `set firewall snmp enable` and press **Enter**.

5. Type `set snmp trap add 192.168.100.100:1098 abc` and press **Enter**.

Example 2:

To enable SNMP on the MGMT port, add SNMPv2 rwcommunity named "v2rwcommunity1", and to set the trap destination IP address to 192.168.100.100 for the SNMPv2 rwcommunity named "v2rwcommunity1", perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `set service snmp enable` and press **Enter**.
3. Type `set snmp accessv2 rwcommunity v2rwcommunity1` and press **Enter**.
4. Type `set firewall snmp enable` and press **Enter**.
5. Type `set snmp trap add 192.168.100.100 v2rwcommunity1` and press **Enter**.

Provisioning an NTP Server

To provision the NTP server, you must enable it on the NTP server port. When NTP is enabled, the TimeCreator 1000 can serve its system time to external NTP clients.

Example

To enable NTP on the NTP server port, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `set service ntp enable` and press **Enter**.
3. Type `set firewall ntp enable` and press **Enter**.

Note: The NTP server option requires the purchase of a license. If desired, use the NTP-Key command to configure keys.

Provisioning Cable Advance

The Cable Advance command allows you to compensate for the response time between client and server DTI links due to cable length. You can specify any or all ports and provision for auto correction or manual correction.

Note: Symmetricom recommends that you use the automatic cable advance feature. Refer to the command Set Cable Advance, on page 191. The valid range for the manual cable advance value is from 00:00:00 to 0E:A0:EA.

Example

To provision cable advance auto mode on DTI link port 1, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `show cable-adv` and press **Enter** to view the current setting.
3. Type `set cable-adv port 1 auto` and press **Enter**.

Provisioning Alarms

This section describes the commands used to provision and manage alarms in the TimeCreator 1000. The user can provision the alarms to be enabled or disabled and set thresholds to turn the alarms on and off. For a list of all alarms, see Appendix A, Alarms, Events and SNMP Traps.

Software commands allow you to perform the following:

- Provision the set and clear alarm thresholds
- Provision the alarm-state (enable or disable)
- Retrieve current alarm settings
- Retrieve current alarms
- Display system status

Alarms are also indicated by LEDs on the IOC and IMC modules.

Provisioning the Set and Clear Alarm Thresholds

Alarm set and clear values can be entered for the following:

- MTIE-t
- MTIE-35
- Jitter
- FER

The set and clear values are the threshold settings that determine when an alarm is activated and deactivated. The set value is the threshold above which an alarm is activated. The clear value is the threshold below which an alarm is deactivated.

Use the following commands to provision the set and clear alarm threshold values.

Example

To set the MTIE-t, MTIE-35, Jitter, FER threshold of all ports to a set value of 8000 and a clear value of 5000, perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).
2. Type `set alarm-threshold mtie-t all set 8000` and press **Enter**.
3. Type `set alarm-threshold mtie-t all clear 5000` and press **Enter**.
4. Type `set alarm-threshold mtie-35 all set 8000` and press **Enter**.
5. Type `set alarm-threshold mtie-35 all clear 5000` and press **Enter**.
6. Type `set alarm-threshold jitter all set 8000` and press **Enter**.
7. Type `set alarm-threshold jitter all clear 5000` and press **Enter**.
8. Type `set alarm-threshold fer all set 8000` and press **Enter**.
9. Type `set alarm-threshold fer all clear 5000` and press **Enter**.

Provisioning the Alarm-States

The “set alarm-state <alarm code> {enable|disable}” command is used to enable or disable specific alarms. Table 5-7 provides a list of TimeCreator alarm types and their descriptions.

Example

To enable the alarm for IOC in holdover for extended period (alarm type of EXTHOLD), perform the following steps:

1. Login at the Admin or Power-User level (see Login, on page 74).

2. Type `set alarm-state exthold enable` and press **Enter**.

Table 5-7. TimeCreator 1000 Alarm Codes

Alarm Code	Description
IOCFAIL	IOC card failure
IMCFAIL	IMC card failure
IMCCOM	IMC communication failure
IOCCOM	IOC communication failure
OUTDISC	DTI output disconnect
INPDISC	DTI input disconnect
INPCBLADV	DTI input cable advance invalid
INPUNSTBL	DTI input performance unstable
INPDISQ	DTI Input disqualified
IOCINCOMP	IOC cardss are incompatible
IMCINCOMP	IMC and IOC are incompatible
EXTHOLD	IOC in holdover for extended period
GPSCOMM	GPS communications failure
MTIET	MTIE-t threshold exceeded
MTIE35	MTIE-35 threshold exceeded
PPJITTER	PP-jitter threshold exceeded
FER	Frame error rate threshold exceeded
PWROUTPUT	Power module output failure
PWRFAN	Power module fan failure
IOCRMV	Both IOC removed
JAMSYNC	Jam sync required
XSYNC	Sync signal between IOC failed

Table 5-7. TimeCreator 1000 Alarm Codes

Alarm Code	Description
DCMUNLOCK	IOC DCM unlocked
PLLUNLOCK	IOC PLL unlocked

Retrieving Current Alarm Settings

The “show alarm threshold” command displays the set and clear alarm thresholds of all ports.

Example

To display set and clear thresholds for all ports, enter the following:

1. Login at the User, Admin or Power-User level (see Login, on page 74).
2. Type `show alarm-threshold` and press **Enter**.

Retrieving Current Alarms

The “show alarms” command displays all current alarms. The “show alarm-state” command displays the state of all alarms.

Example

To display a list of all current alarms and list of the state of all alarms, enter the following:

1. Login at the User, Admin or Power-User level (see Login, on page 74).
2. Type `show alarms` and press **Enter**.
3. Type `show alarm-state` and press **Enter**.

Displaying System Status

The “show status” command displays the system status information as follows:

- Summary for each DTI client port
- Summary for each DTI server port
- Active IOC module
- Standby IOC module

- Summary for the GPS Input
- Number of standing system alarms
- Currently selected TOD Source
- System date and time
- Uptime for the IMC
- Clock operating mode for the IOC
- Assigned asset tag

To display the system status, enter the following:

Type `show status` and press **Enter**.

Routine Operation Commands

This section describes the commands you use to perform the following routine operations with the TimeCreator 1000:

- Displaying alarms
- Displaying events
- Restarting the server IMC card

Displaying Alarms

The Show Log Alarm command displays some of the local alarms in the alarm log in chronological order (first in - first out). This command also allows the user to display a specified number of alarms from the beginning or end of the log file.

Example

Type `show log alarm` and press **Enter**.

Displaying Events

The Show Log Event command displays some of the local events in the event log in chronological order (first in - first out). The event log contains the 1000 most recent alarmed and non-alarmed events. This command also allows the user to display a specified number of alarms from the beginning or end of the log file.

Example

Type `show log event` and press **Enter**.

Restarting TimeCreator 1000's IMC Card

The system can be restarted via a command. Since reference output signals will be lost, it is not recommended to restart the entire system unless required. Only the admin user can issue the reboot command. The following command restarts the IMC card:

Example

Type `reboot imc` and press **Enter**.

Saving and Restoring Provisioning Data

Symmetricom recommends that you keep an electronic version and/or a written version of the provisioning changes you make to the TimeCreator 1000.

Note: IMC configuration changes are not saved automatically, so it is necessary to use the command "set configuration backup IMC" to explicitly save the changes. Failure to save changes with this command will result in IMC configuration changes being lost after the IMC reboots.

Backing up Provisioning Data

Configuration of the IOC and IMC is independent. Both the IOC and IMC can be used to store configuration files.

Backup Current Configuration

To backup up the current configuration, use the command "set configuration backup".

Example

Type `set configuration backup` and press **Enter.**

Backup Current IOC Configuration to IMC Card

To backup the current IOC configuration in the IMC card, use the command "set configuration backup IOC":

Example

Type `set configuration backup IOC` and press **Enter**.

Backup Current IMC Configuration to IOC Card

To backup the current IMC configuration in the IOC1 card, use the command “set configuration backup IMC IOC1”:

Example 1

Type `set configuration backup IMC IOC1` and press **Enter**.

To backup the current IMC configuration in the IOC2 card, use the command “set configuration backup IMC IOC 2”:

Example 2

Type `set configuration backup IMC IOC2` and press **Enter**.

Restoring Provisioning Data

Change Current Configuration to Backup Copy

To change the current configuration to the backup copy, use the command “set configuration restore”.

Example

Type `set configuration restore` and press **Enter**.

Change Current Configuration to Default - Saving Users and IP Info

To change the current configuration to factory default, while preserving user and IP information, use the command “set configuration default”.

Example

Type `set configuration default` and press **Enter**.

Change Current Configuration to Factory Default

To change the current configuration to the factory default, use the command “set configuration factory”.

Example

Type `set configuration factory` and press **Enter**.

Notes:

Setting the configuration to `default` will not overwrite the user login information or the system's IP address. Setting the configuration to `factory` will overwrite the user login information and return the system's IP address to the factory set address.

IOC configuration is automatically saved in the IOC card one minute after the configuration is changed.

Restore IMC Configuration From Remote Server

To restore the IMC configuration from the remote server using the Secure Copy (SCP) protocol, use the command "set configuration restoreuser IMC". This is a two-step process that also requires using the command "set recvconfig IMC user@host:file" to specify the server address and file name.

Example 1

To retrieve the IMC configuration file "/home/user/imc.bak" from the remote server at IP address 192.168.3.86 -

Type `set recvconfig IMC user@192.168.3.86:/home/user/imc.bak` and press **Enter**.

Example 2

To restore the IMC configuration file that was retrieved rom the remote server -

Type `set configuration restoreuser IMC` and press **Enter**.

Restore IOC Configuration From Remote Server

To restore the IOC configuration from the remote server using the Secure Copy (SCP) protocol, use the command "set configuration restoreuser IOC". This is a two-step process that also requires using the command "set recvconfig IOC user@host:file" to specify the server address and file name.

Example1

To retrieve the IOC configuration file "/home/user/ioc.bak" from the remote server at IP address 192.168.3.86 -

Type `set sendconfig IOC user@192.168.3.86:/home/user/ioc.bak` and press **Enter**.

Example 2

To restore the IOC configuration file that was retrieved rom the remote server -

Type `set configuration restoreuser IOC` and press **Enter**.

Chapter 6 Maintenance and Troubleshooting

This chapter describes maintenance and troubleshooting procedures for the TimeCreator 1000.

In This Chapter

Preventive Maintenance

The TimeCreator 1000 requires minimal preventive maintenance. Ensure the unit is not exposed to hazards such as direct sunlight, open windows, water, or extreme heat. See Environmental Requirements, on page 48, for electromagnetic compatibility conditions that may cause damage.

Caution: To avoid electromagnetic discharge damage to the circuitry, never attempt to vacuum the TimeCreator 1000.

Caution: To avoid damage, under no circumstances should the interior chassis of the TimeCreator 1000 be allowed to come in contact with water.

Table 6-1 lists preventive maintenance measures to be performed periodically. Do not disassemble components just for the purpose of inspection.

Table 6-1. Preventive Maintenance

Item	Inspection	Corrective Action	Interval
Chassis	Inspect for dirt or foreign material	Clean the exterior of chassis with a soft dry cloth	Periodically
Cables	Inspect for pinched, worn or damaged cable	Replace pinched, worn or damaged cable at the first opportunity	Periodically
Connectors	Inspect for loose or damaged connector	Tighten loose connectors. If damaged, replace the connector and/or cable at the first opportunity	Periodically

Safety Considerations

Follow your company's safety guidelines and policies when working on or around live equipment.

ESD Considerations

Maintenance personnel should wear ESD wrist straps when installing or working on all TimeCreator 1000 equipment and modules. Plug the user-supplied wrist strap into the TimeCreator 1000. Place IMC and IOC modules into static-free bags when not in use.

Diagnosing the IOC

Reading LED Conditions

Table 6-2 shows the function of the LED indicators on the IOC.

Table 6-2. LED Conditions for the IOC

Indicator	Color	Description
Power	Off	power is off or power fault
	Green	power is on
Alarm	Off	no alarms generated by module inputs, outputs, or clock
	Red	module failure
External Ref	Off	System is not provisioned to use external references
	Amber	one of the provisioned reference inputs has been disqualified from being selected as system reference
	Green	all provisioned reference inputs are qualified as possible system references
Active	Off	module is in standby mode
	Green	module is in active mode
Holdover	Off	Module is not in holdover and is tracking at least one input
	Amber	Module is in holdover and not tracking inputs
Output	Off	A DTI output issue exists on at least one DTI output port, or the module is the standby IOC
	Green	All DTI outputs are operating normally

Removing the IOC

You can remove either of two IOCs in a shelf without affecting outputs. If you need to remove the only IOC in a shelf, or remove both IOCs from a shelf, outputs are interrupted and will resume once one IOC has achieved normal operating state.

Removing the Only IOC

To remove the only IOC in a shelf, use the following procedure. Output signals will be interrupted; they will resume once the IOC has achieved normal operating state.

1. Save the contents of the IOC memory in the IMC by issuing the following command:

   Type `set configuration backup ioc` and press **Enter**.

2. Issue the following command to take the IOC out of service:

   Type `set ioc-state IOC1 disable` and press **Enter**.

3. Attach a wrist grounding strap and connect it to the TimeCreator 1000 chassis.

4. Loosen the captive retaining screws and pull out on them to unseat the IOC from the shelf.

Warning: To avoid possible electrostatic damage to the IOC, place it in a static-free bag or on a static-free surface.

5. Place the IOC in a static-free bag or on a static-free surface.

Install a new IOC using the appropriate procedure in Replacing the IOC, on page 120.

Removing a Redundant IOC

To remove one IOC when two IOCs are in a shelf, use the following procedure:

Note: To avoid generating unnecessary alarms, be sure to take the IOC out of service before removing it.

Caution: To avoid a loss of output signals, do not take the only IOC in a shelf out of service.

1. Issue the following command to take the IOC out of service:

   Type `set ioc-state disable IOC2` and press **Enter**.

Note: An IOC that is out of service cannot be selected to generate or monitor outputs. An out-of-service IOC does not generate alarms.

2. Attach a wrist grounding strap and connect it to the TimeCreator 1000 chassis.

3. Loosen the captive retaining screws and pull out on them to unseat the IOC from the shelf.

Warning: To avoid possible electrostatic damage to the IOC, place it in a static-free bag or on a static-free surface.

4. Place the IOC in a static-free bag or on a static-free surface.

5. Install a new IOC using the appropriate procedure in Replacing the IOC, on page 120.

Removing Two IOCs

To remove both IOCs in a shelf, use the following procedure:

1. Save the contents of the active IOC memory in the IMC by issuing the following commands:

   Type `set configuration backup ioc` and press **Enter**.

2. Issue the following commands to take the standby and active IOCs out of service:

   Type `set ioc-state disable IOC2` and press **Enter**.

   Type `set ioc-state disable IOC1` and press **Enter**.

Caution: Output signals are turned off when you place the second IOC out of service.

3. Attach a wrist grounding strap and connect it to the TimeCreator 1000 chassis.

4. Loosen the captive retaining screws and pull out on them to unseat the standby IOC from the shelf.

Warning: To avoid possible electrostatic damage to the IOC, place it in a static-free bag or on a static-free surface.

5. Place the IOC in a static-free bag or on a static-free surface.

6. Repeat Steps 3 and 4 for the Active IOC.

7. Install new IOCs using the appropriate procedure in Replacing the IOC, on page 120.

Replacing the IOC

This section contains procedures for replacing IOC in three circumstances:

- Replacing the only IOC in a shelf
- Replacing one of two IOCs in a shelf
- Replacing both IOCs in a shelf

Replacing the Only IOC

To replace the only IOC in a shelf, use the following procedure. Output signals will resume once the IOC has achieved normal operating state. This procedure assumes that you have stored the contents of the IOC memory in the IMC using the Set Configuration Backup IOC command.

1. Attach a wrist grounding strap and connect it to the TimeCreator 1000 chassis.

2. Install the IOC into the shelf and tighten the captive retaining screws.

3. Copy the contents of the IOC memory stored in the IMC by issuing the following command.

   Type `set configuration restore ioc` and press **Enter**.

If you have not stored the contents of the IOC memory in the IMC, then provision the IOC using the procedures and commands described in Chapter 5, Provisioning.

4. Wait for the IOC to reboot and achieve normal operating state.

Replacing a Redundant IOC

To replace either of two IOCs in a shelf, use the following procedure. Output signals will not be affected by this procedure. You can also use this procedure to add an IOC to a shelf that has only one IOC.

1. Install the IOC into the shelf and tighten the captive retaining screws.

2. Wait for the IOC to reboot and achieve the normal operating state. During this time the Active IOC updates the new IOC's memory with current values.

Replacing Both IOCs

Use this procedure to replace both IOCs in a shelf. Output signals will resume when the Active IOC has warmed up and qualified the reference signals. This procedure assumes that you have stored the contents of the IOC memory in the IMC using the Set Configuration Backup IOC command.

1. Attach a wrist grounding strap and connect it to the TimeCreator 1000 chassis.

2. Install the IOC into the left slot of the shelf and tighten the captive retaining screws. This IOC will become the Active IOC.

3. Wait for the IOC to reboot.

4. Retrieve the contents of the IOC memory stored in the IMC by issuing the following command:

   Type `set configuration restore ioc` and press **Enter**.

   If you have not stored the contents of the IOC memory in the IMC, then provision the IOC using the procedures and commands described in Chapter 5, Provisioning.

5. Install the second IOC into the right slot of the shelf and tighten the captive retaining screws. This IOC will become the Standby IOC.

6. Wait for the IOC to reboot and qualify the reference inputs. During this time the active IOC updates the new IOC's memory with current values.

Diagnosing the IMC

Reading LED Conditions

Table 6-3 shows the function of the LED indicators on the front panel of the IMC.

Table 6-3. LED Conditions for the IMC

Indicator	Color	Description
Power	Off	Module power fault
	Green	Module power is functioning properly
Alarm	Off	There are no alarms being generated
	Red	There are alarms being generated by some component in the system
GPS	Off	System is not provisioned to use GPS reference
	Amber	GPS input enabled, GPS input not qualified as reference
	Green	System is provisioned to use GPS reference, GPS reference is qualified as reference
Ethernet state	Off	No Ethernet link established
	Green	Ethernet link established
Ethernet activity	Off	No Ethernet activity
	Amber	Blinks with Ethernet activity

Replacing the IMC

You can remove the IMC from the shelf and replace it without affecting outputs.

1. Save the contents of the IMC memory in an IOC (example is for IOC1) by issuing the following command:

   Type `set configuration backup imc ioc1` and press **Enter**.

2. Attach a wrist grounding strap and connect it to the TimeCreator 1000 chassis.

3. Remove the IMC by loosening the captive screws and pulling the IMC from the shelf.

Warning: To avoid possible electrostatic damage to the IMC, place it in a static-free bag or on a static-free surface.

4. Place the IMC in a static-free bag or on a static-free surface.

5. Insert another IMC into the shelf and tighten the captive screws.

6. Reload the IMC memory from the IOC by issuing the following command:

   Type `set configuration restore imc ioc1` and press **Enter**.

Repairing the TimeCreator 1000

Repairing the TimeCreator 1000 is limited to replacing modules. Refer to Working With Modules, on page 51, for information on how to properly handle modules to prevent electrostatic or physical damage.

To remove an IOC, loosen the captive screws and pull the module out of the shelf. Place the module on an anti-static surface or in an anti-static bag.

To remove the IMC, loosen the captive screws and pull the module out of the shelf. Place the module on an anti-static surface or in an anti-static bag.

Warning: To avoid possible electrostatic damage to the module or panel, place it in a static-free bag or on a static-free surface.

Obtaining Technical Assistance

If you have technical questions about the TimeCreator 1000, call Symmetricom Global Services (SGS) at 888-367-7966 (toll-free in USA only), 408-428-7907, or +49 700 3288 6435 in Europe, Middle East, or Africa. You can also E-mail your technical questions to support@symmetricom.com or emeasupport@symmetricom.com.

Upgrading the Firmware

You can upgrade the firmware in the IMC, IOC, or redundant IOCs using CLI commands and software available from Symmetricom. Only users with Admin level access can execute the command. The command places the IMC in the firmware download mode and prevents all other sessions from making changes to the configuration. During the upgrade process, no new sessions are allowed. Refer to Appendix B, Command Descriptions and Communications Interface and the command Upgrade, on page 264 for details on the upgrade process.

Caution: To avoid a possible service call, do not issue a command to the TimeCreator 1000, do not remove power from the TimeCreator 1000, and do not remove an IOC or IMC from the shelf during the upgrade process. Doing so could corrupt the flash memory in a module, disabling the TimeCreator 1000.

Upgrading the IOC

The Upgrade command allows you to install firmware in a single IOC in basic configuration, or in either IOC of a redundant configuration. This section contains procedures for upgrading a shelf with a single IOC and for upgrading a shelf with redundant IOCs.

Upgrading Single IOCs

To upgrade the software in a single IOC, use the procedure in this section. Outputs from the TimeCreator 1000 are interrupted for up to 30 minutes until the upgraded IOC enters the Locked mode.

1. Login at the Admin level (see Login, on page 74).

2. Type `set configuration backup` and press **Enter** to save the contents of the IOC configuration.

3. Type `upgrade ioc1 <filename> <ftp-server> ftp auto-reboot` and press **Enter**. (For example, `upgrade ioc1 ver2.bin 192.168.5.64 ftp`

`auto-reboot`)The user is then prompted for the user name and password for the server and the new software is loaded into the IOC.

Note: The system will FTP the file from the specified FTP server (IP address) and then upgrade the module.

Note: Firmware upgrades will not be implemented unless the IOC is rebooted, whether manually or with the `auto-reboot` command.

4. The new software is loaded into the IOC, the IOC is rebooted, and it then enters Warm-up mode for up to 30 minutes..

Caution: For non-redundant IOC modules, the IOC will restart and the outputs will be interrupted for approximately 30 minutes.

5. Type `set configuration restore` and press **Enter** to restore the contents of the IOC configuration.

Upgrading Redundant IOCs

When upgrading redundant IOCs, you should upgrade them one at a time if the unit is in service and a service interruption needs to be avoided. When you enter the command without specifying an IOC (such as IOC1 or IOC2), both IOCs are loaded with the firmware and a reboot is necessary to activate it. Adding the auto-reboot option to the end of the upgrade command sequences rebooting of the IOCs so that the standby IOC is rebooted first. The IMC waits until that IOC is out of warmup, and then it is set active. At that point, the previously active IOC is rebooted.

Note: Symmetricom recommends that redundant IOCs use the same firmware revision.

To upgrade the software in both IOCs, use the following procedure:

1. Login at the Admin level (see Login, on page 74).

2. Type `set configuration backup` and press **Enter** to save the contents of the active IOC configuration.

3. Type `upgrade ioc <filename> <ftp-server> ftp auto-reboot` <IP address>and press **Enter**.

4. When prompted, enter a user name and password for the server.

Note: The system will FTP the file from the specified FTP server (IP address) and then upgrade the module.

5. The new software is loaded into the IOC, the IOC is rebooted, and it then enters Warm-up mode for up to 30 minutes.

If you are upgrading the active IOC, the TimeCreator 1000 performs the following:

- the active IOC enters standby mode
- the second IOC changes to active mode
- firmware is transferred to the standby IOC

After the download, the standby IOC must achieve Lock mode before changing back again to active mode. The standby IOC is then upgraded.

Note: If the initial IOC upgrade is not successful, the entire process is aborted, an error message is generated, and the IOC restarts with the original firmware.

6. Type `set configuration restore` and press **Enter** to restore the contents of the IOC configuration.

Upgrading the IMC

To upgrade the software in the IMC, use the following procedure:

Note: Outputs are not affected during the IMC upgrade procedure.

1. Login at the Admin level (see Login, on page 74).

2. Type `set configuration backup` and press **Enter** to save the contents of the IMC configuration.

3. Type `upgrade imc <filename> <ftp-server> ftp auto-reboot` (use the IP address) and press **Enter**. The `auto-reboot` option automatically reboots the unit after the firmware is installed to activate it. Otherwise, the user must enter the command `reboot IMC` when installation is complete.

4. When prompted, enter a user name and password for the server.

Note: The system will FTP the file from the specified FTP server (IP address) and then upgrade the module.

5. The TimeCreator 1000 validates the received file, and if the file is valid it updates the flash memory and reboots the IMC.

Note: If the file is not valid, the TimeCreator 1000 will reject it.

Returning the TimeCreator 1000

You should return the equipment to Symmetricom only after you have exhausted the troubleshooting procedures described earlier in this chapter, or if Symmetricom Global Services has advised you to return the unit.

Note: Please retain the original packaging for re-shipping the product. If the original packaging is not available, contact Symmetricom Global Services (SGS) for assistance.

Repacking the Unit

Return all units in the original packaging. If the original packaging is not available, contact Symmetricom Global Services. Use standard packing procedures for products being returned for repair to protect the equipment during shipment. Connectors should be protected with connector covers or the equipment should be wrapped in plastic before packaging. Ensure that the connectivity panels are protected when packaged.

Equipment Return Procedure

To return equipment to Symmetricom for repair:

1. Call Symmetricom Global Services (SGS) at 888-367-7966 (toll-free in USA only), 408-428-7907, or +49 700 3288 6435 in Europe, Middle East, or Africa to obtain a return material authorization number (RMA) before returning the product for service.

   You can request an RMA on the internet at:
   www.symmetricom.com/user/sign-in/

   This URL will send you to a sign-in page. Log in and navigate to the RMA form.

Retain the assigned RMA number for future reference.

2. Provide a description of the problem, product item number, serial number, and warranty expiration date.

3. Provide the return shipping information (customer field contact, address, telephone number, and so forth.)

4. Ship the product to Symmetricom, transportation prepaid and insured, with the Return Material Authorization (RMA) number and item numbers or part numbers clearly marked on the outside of the container to the address given with the RMA.

   Repaired equipment is returned to you with shipping costs prepaid by Symmetricom.

User's Guide Updates

When this manual is updated the updated version will be available for downloading from Symmetricom's internet web site. After downloading, you can view the manual on a computer or print it using Adobe Acrobat Reader.

Manual updates are available by logging in to Telecom Solutions at:

www.symmetricom.com/support/

Note: If you are downloading a manual for the first time, you will need to register with Symmetricom. If you are currently registered, login and download the manual update.

Appendix A Alarms, Events and SNMP Traps

The TimeCreator 1000 provides a log of events and alarms that are stored in non-volatile memory on the IMC module. This appendix provides details on the TimeCreator 1000 alarms, including corrective actions. This appendix also provides details and descriptions about events and SNMP traps.

In This Appendix

Alarm Messages

The TimeCreator 1000 provides set and clear alarm messages to notify you when certain conditions are exceeding the user-specified levels (when alarms are set) and when certain conditions return to within the user-specified levels (when alarms are cleared). Alarms also indicate hardware and signal status.

There are several parameters used to identify or specify individual alarms, events and traps, as shown in Table A-1 below.

Table A-1. Identification Parameters for Alarms, Events and Traps

Parameter	Description	Where Found
Alarm/Event ID	Integer value used with the “generate message” command to specify individual alarms/events	In Trap OID Name column in Table A-6 and Table A-9. Values listed in parentheses. *Example*: (id=27)
Trap Name (trapID)	Text string used as a Binding to specify or identify individual alarms,events and traps.	See Table A-2, Table A-3, Table A-5, Table A-6, Table A-8, and Table A-9
Alarm Code	Text string used to: ■ set the alarm states with “set alarm-state” command ■ set the alarm thresholds with “set alarm-threshold” command	See Table 5-7 and Table B-1

Table A-2 below provides a list of alarm messages and a description of each message. Event Messages

Note: You can display the events and alarms on a terminal or computer running terminal emulation by entering the Show Alarm command. Refer to Show Alarms, on page 178 and Establishing a Connection to the TimeCreator 1000, on page 72 for further details.

Table A-2. System Notification Messages - Alarms

Index	Trap Name (trapID)	Severity (default)	Trap Messages (trapDescription)	Description	Corrective Action
1	IMCNCOM	Critical	IMC-IOC <#> communication failed	Indicates that communication between IOC and IMC has failed	If problem persists, check IMC and IOC modules for alarms. If module has failed, re-seat, if issue is not resolved, replace module.
			IMC-IOC <#> communication restored	Indicates that communication between IOC and IMC has been restored	No action required
2	IOCNCOM	Critical	Inter-IOC communication failed	Indicates that communication between redundant IOC modules has failed	If problem persists, check IOC modules for alarms. If IOC has failed, re-seat, if issue is not is resolved, replace module.
			Inter-IOC communication restored	Indicates that communication between redundant IOC modules has been restored	No action required
3	CARDFAIL	Critical	IOC <#> operational failure	Indicates that the specified IOC module is not functioning properly	Re-seat the IOC module, if issue not resolved, replace module
			IOC <#> recovered from operational failure	Indicates that the specified IOC module is now functioning properly	No action required

Table A-2. System Notification Messages - Alarms (Continued)

Index	Trap Name (trapID)	Severity (default)	Trap Messages (trapDescription)	Description	Corrective Action
4	OUTDISC	Minor	Output Port <#> cable is disconnected	Output Port (port 1 through port 12) DTI client cable is disconnected	Check cable and NE on that port
			Output Port <#> cable is connected	Output Port (port 1 through port 12) DTI client cable is connected	No action required
5	INPDISC	Minor	Input Port <#> cable is disconnected	DTI input port A or B cable is disconnected	Check cable and NE on that port
			Input Port <#> cable is connected	DTI input port A or B cable is connected	No action required
			BITS Port <#> cable is disconnected	BITS port 1 or 2 cable is disconnected	Check cable and NE on that port
			BITS Port <#> cable is connected	BITS port 1 or 2 cable is connected	No action required
6	INPADVINV	Minor	Input Port <#> cable advance value is invalid	Indicates that the cable advance value for the specified port is not valid	Check cable and NE on that port
			Input Port <#> cable advance value is valid	Indicates that the cable advance value for the specified port is valid	No action required
7	INPUNSTBL	Minor	Input Port <#> performance is unstable	Indicates that performance for the specified port is unstable	Check cable and NE providing input on that port
			Input Port <#> performance is stable	Indicates that performance for the specified port is stable	No action required

Table A-2. System Notification Messages - Alarms (Continued)

Index	Trap Name (trapID)	Severity (default)	Trap Messages (trapDescription)	Description	Corrective Action
8	INPDISQ	Minor	GPS reference is disqualified as system reference for IOC <#>	Indicates that the GPS reference signal at the specified port cannot be used as system reference	May occur occasionally, but if problem persists, check antenna cable, lightning arrestor and antenna; replace faulty item
			GPS reference is qualified as system reference for IOC <#>	Indicates that the GPS reference signal at the specified port can be used as system reference	No action required
			DTI Port <#> reference is disqualified as system reference	Indicates that the reference signal at the specified DTI input port cannot be used as system reference	Check cable and NE providing input on that port
			DTI Port <#> reference is qualified as system reference	Indicates that the reference signal at the specified DTI input port can be used as system reference	No action required
			BITS Port <#> reference is disqualified as system reference	Indicates that the reference signal at the specified BITS input port cannot be used as system reference	Check cable and NE providing input on that port
			BITS Port <#> reference is qualified as system reference	Indicates that the reference signal at the specified BITS input port can be used as system reference	No action required

Table A-2. System Notification Messages - Alarms (Continued)

Index	Trap Name (trapID)	Severity (default)	Trap Messages (trapDescription)	Description	Corrective Action
9	IOCINCOMP	Minor	IOC 1, IOC 2 incompatible	Indicates that redundant IOC modules are not compatible	Need to upgrade IOCs to same firmware version
			IOC 1, IOC 2 compatible	Indicates that redundant IOC modules are compatible	No action required
			IOC 2, IOC 1 incompatible	Indicates that redundant IOC modules are not compatible	Need to upgrade IOCs to same firmware version
			IOC 2, IOC 1 compatible	Indicates that redundant IOC modules are compatible	No action required
10	CLKEXTHOLD	Critical	IOC <#> has been in Holdover Mode for extended period	Indicates that the specified IOC has been in Holdover mode for an extended period	Check cable and NE providing input on that port
			IOC <#> has transitioned out of extended Holdover Mode	Indicates that the specified IOC (IOC1 or IOC2) is now out of extended holdover mode	No action required
11	XSYNCLOS	Major	Xsync between IOCs lost	Indicates that the Xsync between IOC modules is lost	Re-seat the IOC module, if issue not resolved, replace module
			Xsync between IOCs recovered	Indicates that the Xsync between IOC modules has been restored	No action required

Table A-2. System Notification Messages - Alarms (Continued)

Index	Trap Name (trapID)	Severity (default)	Trap Messages (trapDescription)	Description	Corrective Action
12	IMCFAIL	Critical	IMC operational failure	Indicates that the specified IMC module is not functioning properly	Re-seat the IMC module, if issue not is resolved, replace module
			IMC recovered from operational failure	Indicates that the specified IMC module is now functioning properly	No action required
13	IMCNCOMP	Minor	IMC and IOC <#> incompatible	Indicates that the IMC and IOC modules are not compatible	Need to upgrade IOCs or IMC to same firmware versions
			IMC and IOC <#> compatible	IMC and IOC modules are compatible	No action required
14	GPSNCOM	Minor	GPS antenna communication failed	Indicates that the GPS signal is not connected	Check antenna cable, lightning arrestor and antenna; replace faulty item
			GPS antenna communication restored	Indicates that the GPS signal is OK	No action required
15	MTIETEXC	Minor	Port <#> has exceeded the MTIE-t threshold, <value>	Indicates that the MTIE-t error rate has exceeded the user-set threshold	Check cable and NE (network element) on that port
			Port <#> is within the MTIE-t threshold, <value>	Indicates that the MTIE-t error rate is within the user-set threshold	No action required

Table A-2. System Notification Messages - Alarms (Continued)

Index	Trap Name (trapID)	Severity (default)	Trap Messages (trapDescription)	Description	Corrective Action
16	MTIE35EXC	Minor	Port <#> has exceeded the MTIE-35 threshold, <value>	Indicates that the MTIE-35 error has exceeded the user-set threshold	Check cable and NE on that port
			Port <#> is within the MTIE-35 threshold, <value>	Indicates that the MTIE-35 error is within the user-set threshold	No action required
17	PPJEXC	Minor	Port <#> has exceeded the P-P Jitter threshold, <value>	Indicates that the P-P Jitter error has exceeded the user-set threshold	Check cable and NE on that port
			Port <#> is within the P-P Jitter threshold, <value>	Indicates that the P-P Jitter error is within the user-set threshold	No action required
18	FEREXC	Minor	Port <#> has exceeded the FER threshold, <value>	Indicates that the Frame Error Rate has exceeded the user-set threshold	Check cable and NE on that port
			Port <#> is within the FER threshold, <value>	Indicates that the Frame Error Rate is within the user-set threshold	No action required
19	PWRFAIL	Major	Power Module <#> output failure	Power module A or B output voltage failure	Re-seat the power module, if issue is not resolved, replace module
			Power Module <#> output failure cleared	Power module A or B output voltage OK	No action required

Table A-2. System Notification Messages - Alarms (Continued)

Index	Trap Name (trapID)	Severity (default)	Trap Messages (trapDescription)	Description	Corrective Action
20	PWRFANFAIL	Major	Power Module <#> fan failure	The fan of power module A or B failed	Check fan and if not spinning or alarm persists then replace power module
			Power Module <#> fan failure cleared	The fan of power module A or B is ok	No action required
21	NOIOC	Minor	No IOC module in system	Both IOC modules are removed	Insert IOC module
			One or more IOC modules in system	At least one IOC module in the system	No action required
22	JAMSYNC	Minor	Jam sync required	Need to jam sync the IOC module	Run the "sync TOD-source now" command
			Jam sync completed	Jam sync of IOC module is completed	No action required
23	DCMUNLOCK	Major	IOC <#> DCM unlocked	Distributed clock module has become unlocked	Hardware failure, contact Symmetricom tech support
			IOC <#> DCM locked	Distributed clock module has become locked	No action required
24	PLLUNLOCK	Major	IOC <#> PLL unlocked	Phase clock module has become unlocked	Hardware failure, contact Symmetricom tech support
			IOC <#> PLL locked	Phase clock module has become locked	No action required

Event Messages

Table A-3 below provides a list of event messages and a description of each message.

Note: You can display the events and alarms on a terminal or computer running terminal emulation by entering the Show Alarm command. Refer to Show Alarms, on page 178 and Establishing a Connection to the TimeCreator 1000, on page 72 for further details.

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Table A-3. System Notification Messages - Events

Index	Trap Name (trapID)	Severity	Trap Messages (trapDescription)	Description	Corrective Action
1	IOCRST	nonalarm	IOC <#> Module reboot	Indicates that IOC module has rebooted	No action required
2	COPYFAIL	nonalarm	Firmware copy between IOC modules failed	Indicates that the Firmware copy between IOC modules has failed	No action required
3	CARDACTV	nonalarm	IOC <#> is the active IOC module	Indicates that IOC module became active	No action required
			IOC <#> is not active IOC module	Indicates that IOC module became standby	No action required
4	CARDSTBY	nonalarm	IOC <#> is the standby IOC module	Indicates that IOC module became standby	No action required
			IOC <#> is not standby IOC module	Indicates that IOC module became active	No action required
5	CLKWARM	nonalarm	IOC <#> has transitioned into Warm-up Mode	Indicates that IOC module has entered into Warm-up mode	No action required
6	CLKFREE	nonalarm	IOC <#> has transitioned into Free-run Mode	Indicates that IOC module has entered into Free-run mode	No action required

Table A-3. System Notification Messages - Events (Continued)

Index	Trap Name (trapID)	Severity	Trap Messages (trapDescription)	Description	Corrective Action
7	CLKFSTRK	nonalarm	IOC <#> has transitioned into Fast-lock Mode	Indicates that IOC module has entered into Fast-lock mode	No action required
8	CLKNMTRK	nonalarm	IOC <#> has transitioned into Normal Mode	Indicates that IOC module has entered into Normal mode	No action required
9	CLKBRG	nonalarm	IOC <#> has transitioned into Bridging Mode	Indicates that IOC module has entered into Bridging mode	No action required
10	CLKHOLD	nonalarm	IOC <#> has transitioned into Holdover Mode	Indicates that IOC module has entered into Holdover mode	No action required
11	CARDOFF	nonalarm	IOC<#> is disabled	The user has disabled the IOC module	No action required
			IOC <#> is enabled	The user has enabled the IOC module	No action required
12	CLTWARM	nonalarm	Port <#> has transitioned into Warm-up Mode	Indicates that specified port has entered into Warm-up mode	No action required
13	CLTFREE	nonalarm	Port <#> has transitioned into Free-run Mode	Indicates that specified port has entered into Free-run mode	No action required
14	CLTFSTRK	nonalarm	Port <#> has transitioned into Fast-lock Mode	Indicates that specified port has entered into Fast-lock mode	No action required
15	CLTNMTRK	nonalarm	Port <#> has transitioned into Normal Mode	Indicates that specified port has entered into Normal mode	No action required
16	CLTBRG	nonalarm	Port <#> has transitioned into Bridging Mode	Indicates that specified port has entered into Bridging mode	No action required

Table A-3. System Notification Messages - Events (Continued)

Index	Trap Name (trapID)	Severity	Trap Messages (trapDescription)	Description	Corrective Action
17	CLTHOLD	nonalarm	Port <#> has transitioned into Holdover Mode	Indicates that specified port has entered into Holdover mode	No action required
18	CLTADVINV	nonalarm	Output Port <#> cable advance value is invalid	Indicates that the cable advance value for the specified port is not valid	No action required
			Output Port <#> cable advance value is valid	Indicates that the cable advance value for the specified port is valid	No action required
19	CLTUNSTBL	nonalarm	Output Port <#> performance is unstable	Indicates that performance for the specified port is unstable	No action required
			Output Port <#> performance is stable	Indicates that performance for the specified port is stable	No action required
20	CLKFREQ	nonalarm	IOC <#> has transitioned into Frequency Mode	Indicates that IOC module has entered into Frequency mode	No action required
			IOC <#> has transitioned out of Frequency Mode	Indicates that IOC module has exited Frequency mode	No action required

Table A-3. System Notification Messages - Events (Continued)

Index	Trap Name (trapID)	Severity	Trap Messages (trapDescription)	Description	Corrective Action
21	INPACTV	nonalarm	IOC <#> has selected GPS as reference	Indicates that IOC module has selected the GPS port as the reference	No action required
			IOC <#> has de-selected GPS as reference	Indicates that IOC module has de-selected the GPS port as the reference.	No action required
			IOC <#> has selected DTI Port <#> as reference	Indicates that IOC module has selected the port as the reference	No action required
			IOC <#> has de-selected DTI Port <#> as reference	Indicates that IOC module has de-selected the port as the reference.	No action required
			IOC <#> has selected BITS Port <#> as reference	Indicates that IOC module has selected the port as the reference	No action required
			IOC <#> has de-selected BITS Port <#> as reference	Indicates that IOC module has de-selected the port as the reference.	No action required
22	OUTTEST	nonalarm	Port <#> has transitioned into Test Mode	Indicates that specified port has entered into Test mode	No action required
23	AUTORST	nonalarm	IOC <#> Module auto reboot	Indicates that specified IOC module has rebooted automatically without a manual cycling of power	No action required
24	INSVRWARM	nonalarm	Input Port <#> server has transitioned into Warm-up Mode	Indicates that specified input port has entered into Warm-up Mode	No action required

Table A-3. System Notification Messages - Events (Continued)

Index	Trap Name (trapID)	Severity	Trap Messages (trapDescription)	Description	Corrective Action
25	INSVRFREE	nonalarm	Input Port <#> server has transitioned into Free-run Mode	Indicates that specified input port has entered into Free-run Mode	No action required
26	INSVRFAST	nonalarm	Input Port <#> server has transitioned into Fast-lock Mode	Indicates that specified input port has entered into Fast-lock Mode	No action required
27	INSVRNORM	nonalarm	Input Port <#> server has transitioned into Normal Mode	Indicates that specified input port has entered into Normal Mode	No action required
28	INSVRHOLD	nonalarm	Input Port <#> server has transitioned into Holdover Mode	Indicates that specified input port has entered into Holdover Mode	No action required
29	INPATHINV	nonalarm	Input Port <#> path traceability invalid	Indicates that specified input port 's path traceability is invalid	No action required
			Input Port <#> path traceability valid	Indicates that specified input port 's path traceability is valid	No action required
30	INTODINV	nonalarm	Input Port <#> TOD invalid	Indicates that the TOD for the specified input port is not valid	No action required
			Input Port <#> TOD valid	Indicates that the TOD for the specified input port is valid	No action required
31	BT3ENGINE	nonalarm	BestTime engine mode <#> gear <#>	Indicates the BestTime engine's progress	No action required

Table A-3. System Notification Messages - Events (Continued)

Index	Trap Name (trapID)	Severity	Trap Messages (trapDescription)	Description	Corrective Action
32	TPIUTUNE	nonalarm	TPIU tuning voltage outside 10%-90% range	Indicates that the TPIU tuning voltage is outside the 10%-90% range	No action required
			TPIU tuning voltage within 10%-90% range	Indicates that the TPIU tuning voltage is within the 10%-90% range	No action required
33	TATUNE	nonalarm	Timing Antenna tuning voltage outside 10%-90% range	Indicates that the Timing Antenna tuning voltage is outside the 10%-90% range	No action required
			Timing Antenna tuning voltage within 10%-90% range	Indicates that the Timing Antenna tuning voltage is within the 10%-90% range	No action required
34	GPSCRC	nonalarm	GPS CTS CRC error occurred	Indicates that the GPS CTS CRC error has occurred	No action required
			GPS CTS CRC error cleared	Indicates that the GPS CTS CRC error has been cleared	No action required
35	OUTRREC	nonalarm	Output Port <#> entered <#> recovery	Indicates that the output port (1-12) has entered bridging/normal holdover/extended holdover/exceptional holdover recovery	No action required
			Output Port <#> exited <#> recovery	Indicates that the output port (1-12) has exited bridging/normal holdover/extended holdover/exceptional holdover recovery	No action required

Table A-3. System Notification Messages - Events (Continued)

Index	Trap Name (trapID)	Severity	Trap Messages (trapDescription)	Description	Corrective Action
36	OUTRTOUT	nonalarm	Output Port <#> recovery timeout	Indicates that the recovery for output port (1-12) has timed out	No action required
37	AUTHGRN	nonalarm	<#> authorization granted	The authorization for the specified user is granted	No action required
38	AUTHTERM	nonalarm	<#> authorization terminated	The authorization for the specified user is terminated	No action required
39	AUTHDENY	nonalarm	<#> authorization denied	The authorization for the specified user is denied	No action required
40	SETBYGPS	nonalarm	System TOD has been set by GPS	The TOD has been set by GPS	No action required
41	SETBYNTP	nonalarm	System TOD has been set by NTP	The TOD has been set by the NTP server	No action required
42	SETTOD	nonalarm	DTI TOD has been set	The TOD has been set by DTI	No action required
43	IOCREMOVED	nonalarm	IOC <#> has been removed	Indicates that the IOC module has been removed	No action required
			IOC <#> has been inserted	Indicates that the IOC module has been inserted	No action required
44	PWRREMOVED	nonalarm	Power Module <#> has been removed	Indicates that the power module has been removed	No action required
			Power Module <#> has been inserted	Indicates that the power module has been inserted	No action required
45	UTCAVA	nonalarm	UTC time from GPS is available	Indicates that the UTC time for GPS is available	No action required

Table A-3. System Notification Messages - Events (Continued)

Index	Trap Name (trapID)	Severity	Trap Messages (trapDescription)	Description	Corrective Action
46	MTIETALA	nonalarm	Port <#> MTIE-t threshold set to 0, alarm disabled	Indicates that the MTIE-t threshold for the port has been set to 0 and the alarm is disabled	No action required
			Port <#> MTIE-t threshold set above 0, alarm enabled	Indicates that the MTIE-t threshold for the port has been set to nonzero and the alarm is enabled	No action required
47	MTIE35ALA	nonalarm	Port <#> MTIE-35 threshold set to 0, alarm disabled	Indicates that the MTIE-35 threshold for the port has been set to 0 and the alarm is disabled	No action required
			Port <#> MTIE-35 threshold set above 0, alarm enabled	Indicates that the MTIE-35 threshold for the port has been set to nonzero and the alarm is enabled	No action required
48	PPJALA	nonalarm	Port <#> P-P Jitter threshold set to 0, alarm disabled	Indicates that the P-P Jitter threshold for the port has been set to 0 and the alarm is disabled	No action required
			Port <#> P-P Jitter threshold set above 0, alarm enabled	Indicates that the P-P Jitter threshold for the port has been set to nonzero and the alarm is enabled	No action required

Table A-3. System Notification Messages - Events (Continued)

Index	Trap Name (trapID)	Severity	Trap Messages (trapDescription)	Description	Corrective Action
49	FERALA	nonalarm	Port <#> FER threshold set to 0, alarm disabled	Indicates that the FER threshold for the port has been set to 0 and the alarm is disabled	No action required
			Port <#> FER threshold set above 0, alarm enabled	Indicates that the FER threshold for the port has been set to nonzero and the alarm is enabled	No action required
50	PHALOSS	nonalarm	PM phase data lost	Indicates that the performance monitor's phase data has lost	No action required
			PM phase data recovered	Indicates that the performance monitor's phase data has been restored	No action required
51	JITLOSS	nonalarm	PM jitter data lost	Indicates that the performance monitor's jitter data has lost	No action required
			PM jitter data recovered	Indicates that the performance monitor's jitter data has been restored	No action required
52	SETBYDTI	nonalarm	System TOD has been set by root server	The TOD has been set by the root server	No action required
53	SETBYUSER	nonalarm	System TOD has been set by user	The TOD has been set by the user	No action required
54	RSREN	nonalarm	Entered auto root recovery	Indicates that the system has entered auto root recovery	No action required

Table A-3. System Notification Messages - Events (Continued)

Index	Trap Name (trapID)	Severity	Trap Messages (trapDescription)	Description	Corrective Action
55	RSREX	nonalarm	Exited auto root recovery	Indicates that the system has exited auto root recovery	No action required
56	RSRAB	nonalarm	Aborted auto root recovery	Indicates that the user has aborted auto root recovery	No action required

SNMP Traps

The MIB for TimeCreator 1000 v1.2 has MIB var bindings for all Symmetricom specific SNMP traps, as shown in Table A-4 below:

Table A-4. MIB Var Bindings for Symmetricom- specific Traps

trapID	A unique string assigned to each trap
trapAID1	integer, trap AIDs
trapAID2	integer, trap AIDs
trapState	The TimeCreator 1000 provides set and clear trap messages to notify you when certain conditions are exceeding the user-specified levels (when traps are set) and when certain conditions return to within the user-specified levels (when traps are cleared). Traps also indicate hardware and signal status. These are integer values, where: clear (1) - the condition for this trap has been cleared, set (2) - the trap condition has been raised
trapSeverity	A 32 bit-wise value: minor (1), major (2), critical (3), clear (4), nonalarm (5)
trapTimestamp	The time when the trap was generated
trapDescription	A string description for the trap
trapValue	String, trap value

See Figure A-1, Figure A-2, and Figure A-3 for details about other relevant MIB table entries.

Note: Users need to load 2 mib files into their MIB browser:

- symm-smi.mib
- TC1000.my

The symm-smi.mib file must be loaded first before TC1000.my file.

(The “TC1000.my” file was originally named “TC1000.mib” in v1.1 and v1.0 of TimeCreator 1000.)

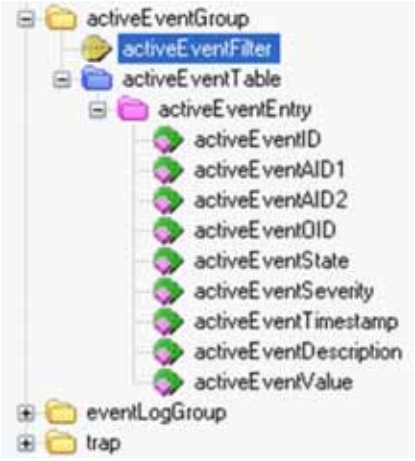


Figure A-1. SNMP MIB - Event Table Entries

Figure A-2. SNMP MIB - Trap Object Parameters and Event Log Entries

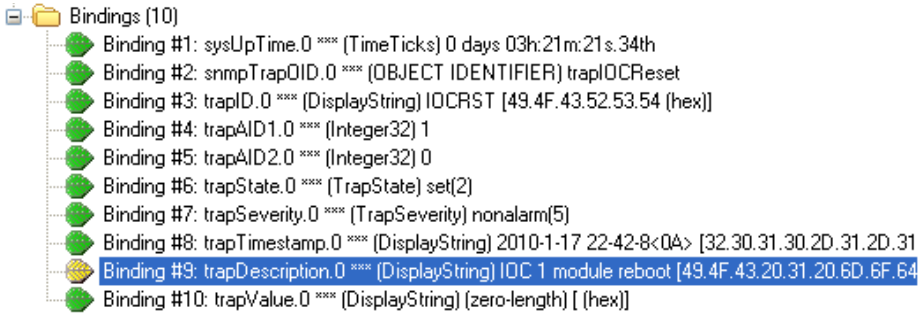


Figure A-3. SNMP MIB - Trap Object Binding Example

SNMP Alarm Traps

Table A-5 shows some details for TimeCreator SNMP alarm traps, such as trap name, OID, and severity.

Table A-5. TimeCreator 1000 Alarm Trap Details

Trap Name (trapID)	OID	Trap OID Name	Trap Severity
IMCNCOM	1.3.6.1.4.1.9070.1.2.4.1.100.2.1	trapIOCIMCComError	Critical
IOCNCOM	1.3.6.1.4.1.9070.1.2.4.1.100.2.2	trapIOCIOCComError	Critical
CARDFAIL	1.3.6.1.4.1.9070.1.2.4.1.100.2.3	trapIOCCardFail	Critical
OUTDISC	1.3.6.1.4.1.9070.1.2.4.1.100.2.4	trapIOCOutputDisconnected	Minor
INPDISC	1.3.6.1.4.1.9070.1.2.4.1.100.2.5	trapIOCInputDisconnected	Minor
INPADVINV	1.3.6.1.4.1.9070.1.2.4.1.100.2.6	trapIOCInputCableAdvanceInvalid	Minor
INPUNSTBL	1.3.6.1.4.1.9070.1.2.4.1.100.2.7	trapIOCInputPerformanceUnstable	Minor
INPDISQ	1.3.6.1.4.1.9070.1.2.4.1.100.2.8	trapIOCInputDisqualified	Minor
IOCINCOMP	1.3.6.1.4.1.9070.1.2.4.1.100.2.9	trapIOCIncompatible	Minor
CLKEXTHOLD	1.3.6.1.4.1.9070.1.2.4.1.100.2.10	trapIOCExtendedHoldover	Critical
XSYNCLOS	1.3.6.1.4.1.9070.1.2.4.1.100.2.11	trapIOCXyncLoss	Major
IMCFAIL	1.3.6.1.4.1.9070.1.2.4.1.100.2.12	trapIMCFail	Critical
IMCNCOMP	1.3.6.1.4.1.9070.1.2.4.1.100.2.13	trapIMCIOCIncompatible	Minor
GPSNCOM	1.3.6.1.4.1.9070.1.2.4.1.100.2.14	trapGPSAntennaComError	Minor

Table A-5. TimeCreator 1000 Alarm Trap Details (Continued)

Trap Name (trapID)	OID	Trap OID Name	Trap Severity
MTIETEXC	1.3.6.1.4.1.9070.1.2.4.1.100.2.15	trapMTIETExceed	Minor
MTIE35EXC	1.3.6.1.4.1.9070.1.2.4.1.100.2.16	trapMTIE35Exceed	Minor
PPJEXC	1.3.6.1.4.1.9070.1.2.4.1.100.2.17	trapPPJitterExceed	Minor
FEREXC	1.3.6.1.4.1.9070.1.2.4.1.100.2.18	trapFERExceed	Minor
PWRFAIL	1.3.6.1.4.1.9070.1.2.4.1.100.2.19	trapPowerFail	Major
PWRFANFAIL	1.3.6.1.4.1.9070.1.2.4.1.100.2.20	trapPowerFanFail	Major
NOIOC	1.3.6.1.4.1.9070.1.2.4.1.100.2.21	trapNoIOC	Minor
JAMSYNC	1.3.6.1.4.1.9070.1.2.4.1.100.2.22	trapJamSyncRequired	Minor
DCMUNLOCK	1.3.6.1.4.1.9070.1.2.4.1.100.2.23	trapDCMUnlocked	Major
PLLUNLOCK	1.3.6.1.4.1.9070.1.2.4.1.100.2.24	trapPLLUnlocked	Major

See Table A-6 below for additional trap details, such as descriptions and bindings. The OID for alarms traps are of the format:

Alarm OID = 1.3.6.1.4.1.9070.1.2.4.1.100.2.*x*

where *x* corresponds to index values that identify specific alarms. The digits shown for the OID Index in Table A-6 below correspond to *x*. See Table A-5 for listings of the full OID for each alarm.

Note: The ID in the Trap OID Name column in Table A-6 below is used with the Generate Message command to raise a specific trap:

```
tc1000>generate message
“id,trapAID1,trapAID2,trapState,trapValue”
```

If trapAID1 corresponds to the IOC module number,1 or 2, use the value trapAID1=257 for IOC1 and trapAID2=258 for IOC2. Use the number “0” for entries of “n/a”.

Example

To generate the message for the trap “IMC-IOC 1 communication failed”, which has id=2, trapAID1=257 (corresponds to trapAID1=1 for IOC1 in Table A-6) trapAID2=0, trapState=2, and trapValue=0:

```
tc1000>generate message “2,257,0,2,0”
```

The severity level for an alarm trap can be critical, major, or minor if trapState is set (2) for this alarm trap; otherwise, the severity level will be clear if trapState is clear (1) for this alarm trap.

Table A-6. TimeCreator 1000 Alarm Traps - Additional Details

OID Index (x)	Trap OID Name	Description	Bindings	trapSeverity
1	trapIOCIMCComError (id = 2)	IMC-IOC <#> communication failed IMC-IOC <#> communication restored	trapID: IMCNCOM trapAID1: 1 or 2, IOC module id trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Critical
2	trapIOCIOCComError (id = 3)	Inter-IOC communication failed Inter-IOC communication restored	trapID: IOCNCOM trapAID1: n/a trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Critical
3	trapIOCCardFail (id = 14)	IOC <#> operational failure IOC <#> recovered from operational failure	trapID: CARDFAIL trapAID1: 1 or 2, IOC module id trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Critical
4	trapIOCOutputDisconnected (id = 17)	Output Port <#> cable is disconnected Output Port <#> cable is connected	trapID: OUTDISC trapAID1: output port # (1-12) trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Minor

Table A-6. TimeCreator 1000 Alarm Traps - Additional Details (Continued)

OID Index (x)	Trap OID Name	Description	Bindings	trapSeverity
5	trapIOCInputDisconnected (id = 26)	Input/BITS Port <#> cable is connected/disconnected	trapID: INPDISC	Minor
			trapAID1: 1: input port A 2: input port B 3: BITS port 1 4: BITS port 2	
			trapAID2: n/a	
			trapState: clear (1), set (2)	
			trapValue: n/a	
6	trapIOCInputCableAdvanceInvalid (id = 27)	Input Port <#> cable advance value is invalid Input Port <#> cable advance value is valid	trapID: INPADVINV	Minor
			trapAID1: 1: input port A 2: input port B	
			trapAID2: n/a	
			trapState: clear (1), set (2)	
			trapValue: n/a	
7	trapIOCInputPerformanceUnstable (id = 28)	Input Port <#> performance is unstable Input Port <#> performance is stable	trapID: INPUNSTBL	Minor
			trapAID1: 1: input port A 2: input port B	
			trapAID2: n/a	
			trapState: clear (1), set (2)	
			trapValue: n/a	

Table A-6. TimeCreator 1000 Alarm Traps - Additional Details (Continued)

OID Index (x)	Trap OID Name	Description	Bindings	trapSeverity
8	trapIOCInputDisqualified (id = 29)	GPS reference is qualified/disqualified as system reference for IOC <#> DTI Port <#> reference is qualified /disqualified as system reference BITS Port <#> reference is qualified /disqualified as system reference	trapID: INPDISQ trapAID1: 0: GPS 1: input port A 2: input port B 3: BITS port 1 4: BITS port 2 trapAID2: 1 or 2, IOC module id trapState: clear (1), set (2) trapValue: n/a	Minor
9	trapIOCIncompatible (id = 32)	IOC 1, IOC 2 incompatible IOC 1, IOC 2 compatible IOC 2, IOC 1 incompatible IOC 2, IOC 1 compatible	trapID: IOCINCOMP trapAID1: 1 or 2, IOC module id trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Minor
10	trapIOCExtendedHoldover (id = 34)	IOC <#> has been in Holdover Mode for extended period IOC <#> has transitioned out of extended Holdover Mode	trapID: CLKEXTHOLD trapAID1: 1 or 2, IOC module id trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Critical

Table A-6. TimeCreator 1000 Alarm Traps - Additional Details (Continued)

OID Index (x)	Trap OID Name	Description	Bindings	trapSeverity
11	trapIOCXyncLoss (id = 60)	Xsync between IOCs lost Xsync between IOCs recovered	trapID: XSYNCLOS trapAID1: n/a trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Major
12	trapIMCFail (id = 310)	IMC operational failure IMC recovered from operational failure	trapID: IMCFAIL trapAID1: n/a trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Critical
13	trapIMCIOCIncompatible (id = 311)	IMC and IOC <#> are incompatible IMC and IOC <#> are compatible	trapID: IMCNCOMP trapAID1: 1 or 2, IOC module id trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Minor
14	trapGPSAntennaComError (id = 312)	GPS antenna communication failed GPS antenna communication restored	trapID: GPSNCOM trapAID1: n/a trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Minor
15	trapMTIETExceed (id = 313)	Port <#> has exceeded the MTIE-t threshold, <value> Port <#> is within the MTIE-t threshold, <value>	trapID: MTIETEXC trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: threshold value	Minor

Table A-6. TimeCreator 1000 Alarm Traps - Additional Details (Continued)

OID Index (x)	Trap OID Name	Description	Bindings	trapSeverity
16	trapMTIE35Exceed (id = 314)	Port <#> has exceeded the MTIE-35 threshold, <value> Port <#> is within the MTIE-35 threshold, <value>	trapID: MTIE35EXC trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: threshold value	Minor
17	trapPPJitterExceed (id = 315)	Port <#> has exceeded the P-P Jitter threshold, <value> Port <#> is within the P-P Jitter threshold, <value>	trapID: PPJEXC trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: threshold value	Minor
18	trapFERExceed (id = 316)	Port <#> has exceeded the FER threshold, <value> Port <#> is within the FER threshold, <value>	trapID: FEREXC trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: threshold value	Minor
19	trapPowerFail (id = 318)	Power Module <#> output failure Power Module <#> output failure cleared	trapID: PWRFAIL trapAID1: power module # trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Major

Table A-6. TimeCreator 1000 Alarm Traps - Additional Details (Continued)

OID Index (x)	Trap OID Name	Description	Bindings	trapSeverity
20	trapPowerFanFail (id = 319)	Power Module <#> fan failure Power Module <#> fan failure cleared	trapID: PWRFANFAIL trapAID1: power module # trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Major
21	trapNoIOC (id = 320)	No IOC module in system One or more IOC modules in system	trapID: NOIOC trapAID1: n/a trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Minor
22	trapJamSyncRequired (id = 327)	Jam sync required Jam sync completed	trapID: JAMSYNC trapAID1: n/a trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Minor
23	trapDCMUnlocked (id = 56)	IOC <#> DCM unlocked IOC <#> DCM locked	trapID: DCMUNLOCK trapAID1: 1 or 2, IOC module id trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Major
24	trapPLLUnlocked (id = 52)	IOC <#> PLL unlocked IOC <#> PLL locked	trapID: PLLUNLOCK trapAID1: 1 or 2, IOC module id trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	Major

Standard SNMP Traps Supported by TC1000

In addition to the traps described in Table A-5 and Table A-6, the TimeCreator 1000 sends traps that are derived from the SNMP standard. These traps are listed below.

Table A-7. Standard SNMP Traps Supported by TC1000

Trap OID Name	OID	Description
coldStart	1.3.6.1.2.1.11.0	Sent to all registered SNMP trap destinations upon power-up (or power cycle)
nsNotifyShutdown	1.3.6.1.4.1.8072.4.0.2	Sent to all registered SNMP trap destinations as an indication that the SNMP daemon is in the process of being shut down
nsNotifyRestart	1.3.6.1.4.1.8072.4.0.3	Sent to all registered SNMP trap destinations as an indication that the SNMP daemon restarts
authenticationFailure	1.3.6.1.4.1.8072.4.0.4	Sent to all registered SNMP trap destinations when TimeCreator receives an SNMPv2c request using an unknown community name

SNMP Event Traps

Table A-8 shows some details for TimeCreator SNMP event traps, such as trap name, OID, and severity.

Table A-8. TimeCreator 1000 Event Trap Details

Trap Name (trapID)	OID	Trap OID Name	Trap Severity
IOCRST	1.3.6.1.4.1.9070.1.2.4.1.100.1.1	trapIOCReset	nonalarm
COPYFAIL	1.3.6.1.4.1.9070.1.2.4.1.100.1.2	trapIOCFirmwareCopyFail	nonalarm
CARDACTV	1.3.6.1.4.1.9070.1.2.4.1.100.1.3	trapIOCActive	nonalarm
CARDSTBY	1.3.6.1.4.1.9070.1.2.4.1.100.1.4	trapIOCStandby	nonalarm
CLKWARM	1.3.6.1.4.1.9070.1.2.4.1.100.1.5	trapIOCWarmup	nonalarm

Table A-8. TimeCreator 1000 Event Trap Details (Continued)

Trap Name (trapID)	OID	Trap OID Name	Trap Severity
CLKFREE	1.3.6.1.4.1.9070.1.2.4.1.100.1.6	trapIOCFreerun	nonalarm
CLKFSTRK	1.3.6.1.4.1.9070.1.2.4.1.100.1.7	trapIOCFasttrack	nonalarm
CLKNMTRK	1.3.6.1.4.1.9070.1.2.4.1.100.1.8	trapIOCNormaltrack	nonalarm
CLKBRG	1.3.6.1.4.1.9070.1.2.4.1.100.1.9	trapIOCBridging	nonalarm
CLKHOLD	1.3.6.1.4.1.9070.1.2.4.1.100.1.10	trapIOCHoldover	nonalarm
CARDOFF	1.3.6.1.4.1.9070.1.2.4.1.100.1.11	trapIOCOffline	nonalarm
CLTWARM	1.3.6.1.4.1.9070.1.2.4.1.100.1.12	trapPortWarmup	nonalarm
CLTFREE	1.3.6.1.4.1.9070.1.2.4.1.100.1.13	trapPortFreerun	nonalarm
CLTFSTRK	1.3.6.1.4.1.9070.1.2.4.1.100.1.14	trapPortFasttrack	nonalarm
CLTNMTRK	1.3.6.1.4.1.9070.1.2.4.1.100.1.15	trapPortNormaltrack	nonalarm
CLTBRG	1.3.6.1.4.1.9070.1.2.4.1.100.1.16	trapPortBridging	nonalarm
CLTHOLD	1.3.6.1.4.1.9070.1.2.4.1.100.1.17	trapPortHoldover	nonalarm
CLTADVINV	1.3.6.1.4.1.9070.1.2.4.1.100.1.18	trapCableAdvance	nonalarm
CLTUNSTBL	1.3.6.1.4.1.9070.1.2.4.1.100.1.19	trapPerformance	nonalarm
CLKFREQ	1.3.6.1.4.1.9070.1.2.4.1.100.1.20	trapClockFrequency	nonalarm
INPACTV	1.3.6.1.4.1.9070.1.2.4.1.100.1.21	trapInputActive	nonalarm
OUTTEST	1.3.6.1.4.1.9070.1.2.4.1.100.1.22	trapPortTesting	nonalarm
AUTORST	1.3.6.1.4.1.9070.1.2.4.1.100.1.23	trapAutoReset	nonalarm
INSVRWARM	1.3.6.1.4.1.9070.1.2.4.1.100.1.24	trapInputWarmup	nonalarm
INSVRFREE	1.3.6.1.4.1.9070.1.2.4.1.100.1.25	trapInputFreerun	nonalarm
INSVRFAST	1.3.6.1.4.1.9070.1.2.4.1.100.1.26	trapInputFasttrack	nonalarm
INSVRNORM	1.3.6.1.4.1.9070.1.2.4.1.100.1.27	trapInputNormaltrack	nonalarm
INSVRHOLD	1.3.6.1.4.1.9070.1.2.4.1.100.1.28	trapInputHoldover	nonalarm
INPATHINV	1.3.6.1.4.1.9070.1.2.4.1.100.1.29	trapInputPath	nonalarm

Table A-8. TimeCreator 1000 Event Trap Details (Continued)

Trap Name (trapID)	OID	Trap OID Name	Trap Severity
INTODINV	1.3.6.1.4.1.9070.1.2.4.1.100.1.30	trapInputTOD	nonalarm
BT3ENGINE	1.3.6.1.4.1.9070.1.2.4.1.100.1.31	trapBestTimeEngine	nonalarm
TPIUTUNE	1.3.6.1.4.1.9070.1.2.4.1.100.1.32	trapTPIUVoltage	nonalarm
TATUNE	1.3.6.1.4.1.9070.1.2.4.1.100.1.33	trapAntennaVoltage	nonalarm
GPSCRC	1.3.6.1.4.1.9070.1.2.4.1.100.1.34	trapGPSCRCError	nonalarm
OUTRREC	1.3.6.1.4.1.9070.1.2.4.1.100.1.35	trapOutputRootRecovery	nonalarm
OUTRTOUT	1.3.6.1.4.1.9070.1.2.4.1.100.1.36	trapOutputRecoveryTimeout	nonalarm
AUTHGRN	1.3.6.1.4.1.9070.1.2.4.1.100.1.37	trapAuthorizationGranted	nonalarm
AUTHTERM	1.3.6.1.4.1.9070.1.2.4.1.100.1.38	trapAuthorizationTerminated	nonalarm
AUTHDENY	1.3.6.1.4.1.9070.1.2.4.1.100.1.39	trapAuthorizationDenied	nonalarm
SETBYGPS	1.3.6.1.4.1.9070.1.2.4.1.100.1.40	trapSystemTODSetByGPS	nonalarm
SETBYNTP	1.3.6.1.4.1.9070.1.2.4.1.100.1.41	trapSystemTODSetByNTP	nonalarm
SETTOD	1.3.6.1.4.1.9070.1.2.4.1.100.1.42	trapDTITODSet	nonalarm
IOCREMOVED	1.3.6.1.4.1.9070.1.2.4.1.100.1.43	trapIOCRemoved	nonalarm
PWRREMOVED	1.3.6.1.4.1.9070.1.2.4.1.100.1.44	trapPowerRemoved	nonalarm
UTCAVA	1.3.6.1.4.1.9070.1.2.4.1.100.1.45	trapUTCAvailable	nonalarm
MTIETALA	1.3.6.1.4.1.9070.1.2.4.1.100.1.46	trapMTIETAlarm	nonalarm
MTIE35ALA	1.3.6.1.4.1.9070.1.2.4.1.100.1.47	trapMTIE35Alarm	nonalarm
PPJALA	1.3.6.1.4.1.9070.1.2.4.1.100.1.48	trapPPJitterAlarm	nonalarm
FERALA	1.3.6.1.4.1.9070.1.2.4.1.100.1.49	trapFERAlarm	nonalarm
PHALOSS	1.3.6.1.4.1.9070.1.2.4.1.100.1.50	trapPMPhaseData	nonalarm
JITLOSS	1.3.6.1.4.1.9070.1.2.4.1.100.1.51	trapPMJitterData	nonalarm
SETBYDTI	1.3.6.1.4.1.9070.1.2.4.1.100.1.52	trapSystemTODSetByDTI	nonalarm
SETBYUSER	1.3.6.1.4.1.9070.1.2.4.1.100.2.53	trapSystemTODSetByUser	nonalarm

Table A-8. TimeCreator 1000 Event Trap Details (Continued)

Trap Name (trapID)	OID	Trap OID Name	Trap Severity
RSREN	1.3.6.1.4.1.9070.1.2.4.1.100.2.54	trapEnterAutoRecovery	nonalarm
RSREX	1.3.6.1.4.1.9070.1.2.4.1.100.2.55	trapExitAutoRecovery	nonalarm
RSRAB	1.3.6.1.4.1.9070.1.2.4.1.100.2.56	trapAbortAutoRecovery	nonalarm

See Table A-9 below for additional trap details, such as descriptions and bindings. The OID for events traps are of the format

Event OID = 1.3.6.1.4.1.9070.1.2.4.1.100.1.*y*

where *y* corresponds to index values that identify specific events. The digits shown for the OID Index in Table A-9 below correspond to *y*. See Table A-8 for listings of the full OID for each event.

Note: The ID in the Trap OID Name column in Table A-9 below is used with the Generate Message command to raise a specific trap -

```
tc1000>generate message
“id,trapAID1,trapAID2,trapState,trapValue”
```

If trapAID1 corresponds to the IOC module number,1 or 2, use the value trapAID1=257 for IOC1 and trapAID2=258 for IOC2. Use the number “0” for entries of “n/a”.

Example

To generate the message for the trap “IOC <#> has transitioned in to Holdover Mode”, which has id=13, trapAID1=258 (corresponds to trapAID1=2 for IOC2 in Table A-9) trapAID2=0, trapState=2, and trapValue=0:

```
tc1000>generate message “13,258,0,2,0”
```

The event trap is for information only and always has the nonalarm severity.

Table A-9. TimeCreator Events Traps - Additional Details

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
1	trapIOCReset (id = 1)	IOC <#> Module reboot	trapID: IOCRST	nonalarm
			trapAID1: 1 or 2, IOC module id	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
2	trapIOCFirmwareCopy Fail (id = 5)	Firmware copy bwtween IOC modules failed	trapID: COPYFAIL	nonalarm
			trapAID1: n/a	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
3	trapIOCActive (id = 6)	IOC <#> is the active IOC module IOC <#> is not active IOC module	trapID: CARDACTV	nonalarm
			trapAID1: 1 or 2, IOC module id	
			trapAID2: n/a	
			trapState: clear (1), set (2)	
			trapValue: n/a	
4	trapIOCStandby (id = 7)	IOC <#> is the standby IOC module IOC <#> is not standby IOC module	trapID: CARDSTBY	nonalarm
			trapAID1: 1 or 2, IOC module id	
			trapAID2: n/a	
			trapState: clear (1), set (2)	
			trapValue: n/a	
5	trapIOCWarmup (id = 8)	IOC <#> has transitioned in to Warm-up Mode	trapID: CLKWARM	nonalarm
			trapAID1: 1 or 2, IOC module id	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	

Table A-9. TimeCreator Events Traps - Additional Details (Continued)

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
6	trapIOCFreerun (id = 9)	IOC <#> has transitioned in to Free-run Mode	trapID: CLKFREE	nonalarm
			trapAID1: 1 or 2, IOC module id	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
7	trapIOCFasttrack (id = 10)	IOC <#> has transitioned in to Fast-lock Mode	trapID: CLKFSTRK	nonalarm
			trapAID1: 1 or 2, IOC module id	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
8	trapIOCNormaltrack (id = 11)	IOC <#> has transitioned in to Normal Mode	trapID: CLKNMTRK	nonalarm
			trapAID1: 1 or 2, IOC module id	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
9	trapIOCBridging (id = 12)	IOC <#> has transitioned in to Bridging Mode	trapID: CLKBRG	nonalarm
			trapAID1: 1 or 2, IOC module id	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
10	trapIOCHoldover (id = 13)	IOC <#> has transitioned in to Holdover Mode	trapID: CLKHOLD	nonalarm
			trapAID1: 1 or 2, IOC module id	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	

Table A-9. TimeCreator Events Traps - Additional Details (Continued)

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
11	trapIOCOffline (id = 15)	IOC <#> is disabled IOC <#> is enabled	trapID: CARDOFF trapAID1: 1 or 2, IOC module id trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
12	trapPortWarmup (id = 18)	Port <#> has transitioned into Warm-up Mode	trapID: CLTWARM trapAID1: port # trapAID2: n/a trapState: set (2) trapValue: n/a	nonalarm
13	trapPortFreerun (id = 19)	Port <#> has transitioned into Free-run Mode	trapID: CLTFREE trapAID1: port # trapAID2: n/a trapState: set (2) trapValue: n/a	nonalarm
14	trapPortFasttrack (id = 20)	Port <#> has transitioned into Fast-lock Mode	trapID: CLTFSTRK trapAID1: port # trapAID2: n/a trapState: set (2) trapValue: n/a	nonalarm
15	trapPortNormaltrack (id = 21)	Port <#> has transitioned into Normal Mode	trapID: CLTNMTRK trapAID1: port # trapAID2: n/a trapState: set (2) trapValue: n/a	nonalarm

Table A-9. TimeCreator Events Traps - Additional Details (Continued)

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
16	trapPortBridging (id = 22)	Port <#> has transitioned into Bridging Mode	trapID: CLTBRG trapAID1: port # trapAID2: n/a trapState: set (2) trapValue: n/a	nonalarm
17	trapPortHoldover (id = 23)	Port <#> has transitioned into Holdover Mode	trapID: CLTHOLD trapAID1: port # trapAID2: n/a trapState: set (2) trapValue: n/a	nonalarm
18	trapCableAdvance (id = 24)	Output Port <#> cable advance value is invalid Output Port <#> cable advance value is Valid	trapID: CLTADVINV trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
19	trapPerformance (id = 25)	Output Port <#> performance is unstable Output Port <#> performance is stable	trapID: CLTUNSTBL trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
20	trapClockFrequency (id = 30)	IOC <#> has transitioned in to Frequency Mode IOC <#> has transitioned out of Frequency Mode	trapID: CLKFREQ trapAID1: 1 or 2, IOC module id trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm

Table A-9. TimeCreator Events Traps - Additional Details (Continued)

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
21	trapInputActive (id = 31)	IOC <#> has selected GPS as reference IOC <#> has selected DTI Port <#> as reference IOC <#> has selected BITS Port <#> as reference IOC <#> has de-selected GPS as reference IOC <#> has de-selected DTI Port <#> as reference IOC <#> has de-selected BITS Port <#> as reference	trapID: INPACTV trapAID1: 0: GPS 1: DTI A 2: DTI B 3: BITS 1 4: BITS 2 trapAID2: 1 or 2, IOC module id trapState: clear (1), set (2) trapValue: n/a	nonalarm
22	trapPortTesting (id = 33)	Port <#> has transitioned into Test Mode	trapID: OUTTEST trapAID1: port # trapAID2: n/a trapState: set (2) trapValue: n/a	nonalarm
23	trapAutoReset (id = 37)	IOC <#> Module auto reboot	trapID: AUTORST trapAID1: 1 or 2, IOC module id trapAID2: n/a trapState: set (2) trapValue: n/a	nonalarm

Table A-9. TimeCreator Events Traps - Additional Details (Continued)

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
24	trapInputWarmup (id = 38)	Input Port <#> server has transitioned into Warm-up Mode	trapID: INSVRWARM	nonalarm
			trapAID1: port #	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
25	trapInputFreerun (id = 39)	Input Port <#> server has transitioned into Free-run Mode	trapID: INSVRFREE	nonalarm
			trapAID1: port #	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
26	trapInputFasttrack (id = 40)	Input Port <#> server has transitioned into Fast-lock Mode	trapID: INSVRFAST	nonalarm
			trapAID1: port #	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
27	trapInputNormaltrack (id = 41)	Input Port <#> server has transitioned into Normal Mode	trapID: INSVRNORM	nonalarm
			trapAID1: port #	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
28	trapInputHoldover (id = 42)	Input Port <#> server has transitioned into Holdover Mode	trapID: INSVRHOLD	nonalarm
			trapAID1: port #	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	

Table A-9. TimeCreator Events Traps - Additional Details (Continued)

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
29	trapInputPath (id = 43)	Input Port <#> path traceability invalid Input Port <#> path traceability valid	trapID: INPATHINV trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
30	trapInputTOD (id = 44)	Input Port <#> TOD invalid Input Port <#> TOD valid	trapID: INTODINV trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
31	trapBestTimeEngine (id = 50)	BestTime engine mode <#> gear <value>	trapID: BT3ENGINE trapAID1: engine mode trapAID2: n/a trapState: clear (1), set (2) trapValue: gear	nonalarm
32	trapTPIUVoltage (id = 57)	TPIU tuning voltage outside 10%-90% range TPIU tuning voltage within 10%-90% range	trapID: TPIUTUNE trapAID1: n/a trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
33	trapAntennaVoltage (id = 58)	Timing Antenna tuning voltage outside 10%-90% range Timing Antenna tuning voltage within 10%-90% range	trapID: TATUNE trapAID1: n/a trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm

Table A-9. TimeCreator Events Traps - Additional Details (Continued)

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
34	trapGPSCRCError (id = 59)	GPS CTS CRC error occurred GPS CTS CRC error cleared	trapID: GPSCRC trapAID1: n/a trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
35	trapOutputRootRecovery (id = 61)	Output Port <#> entered <#> recovery Output Port <#> exited <#> recovery	trapID: OUTRREC trapAID1: port # trapAID2: 1: bridging 2: normal holdover 3: extended holdover 4: exceptional holdover 5: exceptional holdover trapState: clear (1), set (2) trapValue: n/a	nonalarm
36	trapOutputRecoveryTimeout (id = 62)	Output Port <#> recovery timeout	trapID: OUTRTOUT trapAID1: port # trapAID2: n/a trapState: set (2) trapValue: n/a	nonalarm
37	trapAuthorizationGranted (id = 301)	<#> authorization granted	trapID: AUTHGRN trapAID1: n/a trapAID2: n/a trapState: set (2) trapValue: user name	nonalarm

Table A-9. TimeCreator Events Traps - Additional Details (Continued)

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
38	trapAuthorizationTerminated (id = 302)	<#> authorization terminated	trapID: AUTHTERM	nonalarm
			trapAID1: n/a	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: user name	
39	trapAuthorizationDenied (id = 303)	<#> authorization denied	trapID: AUTHDENY	nonalarm
			trapAID1: n/a	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: user name	
40	trapSystemTODSetByGPS (id = 304)	System TOD has been set by GPS	trapID: SETBYGPS	nonalarm
			trapAID1: n/a	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
41	trapSystemTODSetByNTP (id = 305)	System TOD has been set by NTP	trapID: SETBYNTP	nonalarm
			trapAID1: n/a	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
42	trapDTITODSet (id = 306)	DTI TOD has been set	trapID: SETTOD	nonalarm
			trapAID1: n/a	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	

Table A-9. TimeCreator Events Traps - Additional Details (Continued)

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
43	trapIOCRemoved (id = 308)	IOC <#> has been removed IOC <#> has been inserted	trapID: IOCREMOVED trapAID1: 1 or 2, IOC module id trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
44	trapPowerRemoved (id = 309)	Power Module <#> has been removed Power Module <#> has been inserted	trapID: PWRREMOVED trapAID1: 1 or 2, power module # trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
45	trapUTCAvailable (id = 317)	UTC time from GPS is available	trapID: UTCAVA trapAID1: n/a trapAID2: n/a trapState: set (2) trapValue: n/a	nonalarm
46	trapMTIETAlarm (id = 321)	Port <#> MTIE-t threshold set to 0, alarm disabled Port <#> MTIE-t threshold set above 0, alarm enabled	trapID: MTIETALA trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
47	trapMTIE35Alarm (id = 322)	Port <#> MTIE-35 threshold set to 0, alarm disabled Port <#> MTIE-35 threshold set above 0, alarm enabled	trapID: MTIE35ALA trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm

Table A-9. TimeCreator Events Traps - Additional Details (Continued)

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
48	trapPPJitterAlarm (id = 323)	Port <#> P-P Jitter threshold set to 0, alarm disabled Port <#> P-P Jitter threshold set above 0, alarm enabled	trapID: PPJALA trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
49	trapFERAlarm (id = 324)	Port <#> FER threshold set to 0, alarm disabled Port <#> FER threshold set above 0, alarm enabled	trapID: FERALA trapAID1: port # trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
50	trapPMPhaseData (id = 325)	PM phase data lost PM phase data recovered	trapID: PHALOSS trapAID1: n/a trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
51	trapPMJitterData (id = 326)	PM jitter data lost PM jitter data recovered	trapID: JITLOSS trapAID1: n/a trapAID2: n/a trapState: clear (1), set (2) trapValue: n/a	nonalarm
52	trapSystemTODSetByDTI (id = 328)	System TOD has been set by root server	trapID: SETBYDTI trapAID1: n/a trapAID2: n/a trapState: set (2) trapValue: n/a	nonalarm

Table A-9. TimeCreator Events Traps - Additional Details (Continued)

OID Index (*y*)	Trap OID Name	Description	Bindings	Severity
53	trapSystemTODSetByUser (id = 329)	System TOD has been set by user	trapID: SETBYUSER	nonalarm
			trapAID1: n/a	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
54	trapEnterAutoRecovery (id = 330)	Entered auto root recovery	trapID: RSREN	nonalarm
			trapAID1: n/a	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
55	trapExitAutoRecovery (id = 331)	Exited auto root recovery	trapID: RSREX	nonalarm
			trapAID1: n/a	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	
56	trapAbortAutoRecovery (id = 332)	Aborted auto root recovery	trapID: RSRAB	nonalarm
			trapAID1: n/a	
			trapAID2: n/a	
			trapState: set (2)	
			trapValue: n/a	

Appendix B Command Descriptions and Communications Interface

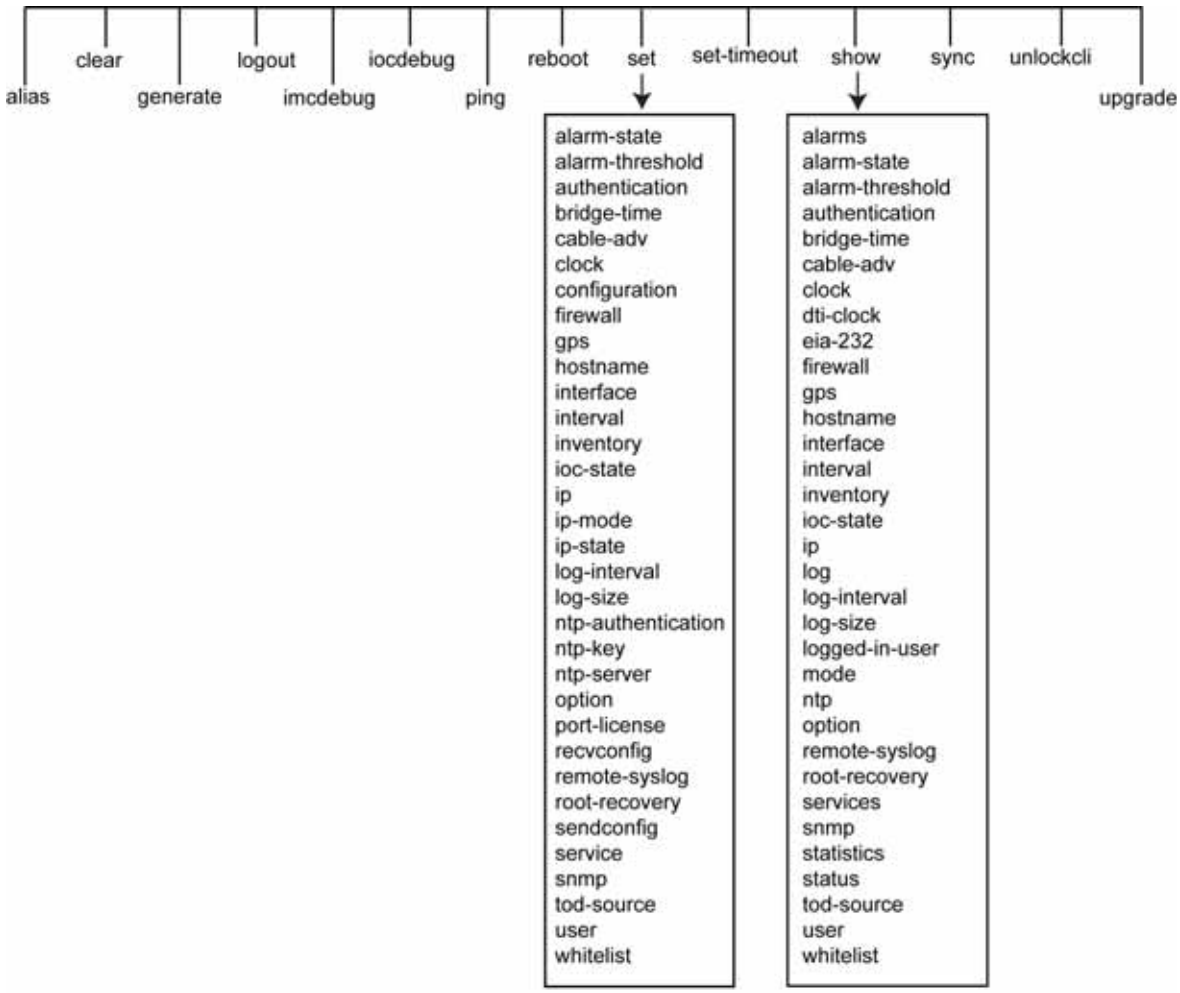
This appendix describes the CLI command conventions, the prompts, line editing functions, and command syntax. The CLI command functions and features are organized by user security access levels and are listed alphabetically.

In This Appendix

CLI Overview

The Command Line Interface (CLI), also called the ASCII command set, can be used to control the TimeCreator 1000 from a terminal connected to the EIA-232 serial port, or the Ethernet port. See Figure B-1 below for an overview of the command set.

Figure B-1. TimeCreator 1000 CLI Command Set



General Conventions

The following are CLI command general conventions:

- Commands *are not* case sensitive
- Braces { } indicate multiple options. When entering options in the CLI command, enter one option from the options listed in the braces. Options within braces { } are separated by a pipe (|).
- Brackets [ ] indicate that the enclosed information is optional.

- *Italics* indicate variable options.

Each command listed provides the following information:

- Command name
- Description of command function
- Operation of this command at security levels 1 through 3, with descriptions of syntax and command functions
- Remarks and comments about the command operation
- Related Commands lists other commands that may affect or be affected by the command.
- Restrictions describes any special restrictions on the use or operation of the command.

Command User Levels

The TimeCreator 1000 provides a hierarchy of CLI command user levels that permit an increasing level of access to system parameters. This allows the system administrator to add users who can only view but not change system parameters and users who can view *and* change system parameters.

The users assigned to each security level have access options available as follows:

- Level 1 - user class, with read-only rights
- Level 2 - power-user class, with read-write rights
- Level 3 - administrator user class, with read-write rights and can also configure users and upgrade firmware

CLI Commands

This section provides an alphabetical listing of all CLI commands.

Show Alarms

This command displays a list of all standing (active) system alarms.

Command Syntax:

```
show alarms
```

Example:

```
tc1000>show alarms
```

Response:

```
DTI Port B reference is disqualified as system reference

Input Port B cable is disconnected
```

Level: User, Power-User and Admin

Remarks: The information displayed is expected to be identical to an entry in the Event/Alarm Log File.

Related: `show status, generate message, show alarm-threshold, set alarm-threshold`

Show Alarm-State

This command displays the state of each alarm: if it is enabled or disabled.

Command Syntax:

```
show alarm-state
```

Example:

```
tc1000>show alarm-state
```

Response:

```
IOC Failed                    - enable
IMC Failed                    - enable
IMC Communication             - enable
IOC Communication             - enable
Output Disconnected           - enable
Input Disconnected            - enable
Input Cable Advance           - enable
Input Unstable                - enable
Input Disqualified            - enable
IOC Incompatible              - enable
IMC Incompatiable             - enable
Ext Hold                      - enable
GPS Communication             - enable
MTIE Threshold                - enable
MTIE 35 Threshold             - enable
PP Jitter Threshold           - enable
FER Threshold                 - enable
Power Output                  - disable
Power Fan                     - disable
IOCs Removed                  - enable
JamSync                       - enable
XSYNC Loss                    - enable
DCM unlocked                  - enable
PLL unlocked                  - enable
```

Remarks: See the list of alarm codes in the Set Alarm-State command.

Related: `set alarm-state`

Level : User, Power-User and Admin

Set Alarm-State

This command is used to enable or disable specific alarms. Table A-2 provides a list of alarm codes and their description.

Command Syntax:

```
set alarm-state <alarm code> {enable|disable}
```

Example:

To enable the alarm for IOC in holdover for extended period (alarm code of EXTHOLD) -

```
tc1000>set alarm-state exthold enable
```

Related: `show alarm-state`

Level: Power-User and Admin only

Table B-1. TimeCreator 1000 Alarm Codes

Alarm Code	Description
IOCFAIL	IOC card failure
IMCFAIL	IMC card failure
IMCCOM	IMC communication failure
IOCCOM	IOC communication failure
OUTDISC	DTI output disconnect
INPDISC	DTI input disconnect
INPCBLADV	DTI input cable advance invalid
INPUNSTBL	DTI input performance unstable
INPDISQ	DTI Input disqualified
IOCINCOMP	IOC cardss are incompatible
IMCINCOMP	IMC and IOC are incompatible
EXTHOLD	IOC in holdover for extended period
GPSCOMM	GPS communications failure
MTIET	MTIE-t threshold exceeded
MTIE35	MTIE-35 threshold exceeded

Table B-1. TimeCreator 1000 Alarm Codes

Alarm Code	Description
PPJITTER	PP-jitter threshold exceeded
FER	Frame error rate threshold exceeded
PWROUTPUT	Power module output failure
PWRFAN	Power module fan failure
IOCRMV	Both IOC removed
JAMSYNC	Jam sync required
XSYNC	Sync signal between IOC failed
DCMUNLOCK	IOC DCM unlocked
PLLUNLOCK	IOC PLL unlocked

Show Alarm-Threshold

This command displays the set and clear alarm thresholds for MTIE-35, Jitter, MTIE-35, MTIE-t, and FER.

Command Syntax:

```
show alarm-threshold
```

Example:

```
tc1000>show alarm-threshold
```

Response:

```
port                          - 1
FER set                       - 100
FER clear                     - 10
MTIE-t set                    - 10000
MTIE-t clear                  - 7000
Jitter set                    - 8000
Jitter clear                  - 5000
MTIE-35 set                   - 10000
MTIE-35 clear                 - 7000

port                          - 2
FER set                       - 100
FER clear                     - 10
MTIE-t set                    - 10000
MTIE-t clear                  - 7000
Jitter set                    - 8000
Jitter clear                  - 5000
MTIE-35 set                   - 10000
MTIE-35 clear                 - 7000

port                          - 3
FER set                       - 100
FER clear                     - 10
MTIE-t set                    - 10000
MTIE-t clear                  - 7000
Jitter set                    - 8000
Jitter clear                  - 5000
MTIE-35 set                   - 10000
MTIE-35 clear                 - 7000

.................
```

Remarks: When ports A/11 and B/12 are configured as clients, alarm thresholds are not used.

Related: `set alarm-threshold`

Level : User, Power-User and Admin

Set Alarm-Threshold

Use this command to provision the set and clear alarm thresholds for MTIE-35, Jitter, MTIE-35, MTIE-t, and FER on the specified port. The threshold can be set for all ports or an individual port.

Command Syntax:

- To set the alarm threshold for Jitter:

```
set alarm-threshold jitter [port#|all] [set|clear] <value>
```

- To set the alarm threshold for MTIE-35:

```
set alarm-threshold mtie-35 [port#|all][set|clear] <value>
```

- To set the alarm threshold for MTIE-t:

```
set alarm-threshold mtie-t [port#|all][set|clear] <value>
```

- To set the alarm threshold for FER:

```
set alarm-threshold fer [port#||all][set|clear] <value>
```

Range:

Jitter: 5000 - 10,000,000
MTIE-35: 5000 - 10,000,000
MTIE-t: 5000 - 10,000,000
FER: 5 - 10,000

Example 1:

To set the alarm threshold for Jitter on Port 5 to a value of 50,000:

```
tc1000>set alarm-threshold jitter port 5 set 50000
```

Example 2:

To set the alarm threshold for MTIE-35 on Port 6 to a value of 100,000:

```
tc1000>set alarm-threshold mtie-35 port 6 set 100000
```

Example 3:

To set the alarm threshold for MTIE-t on Port 7 to a value of 100,000:

```
tc1000>set alarm-threshold mtie-t port 7 set 100000
```

Example 4:

To set the alarm threshold for FER on Port 8 to a value of 750:

```
tc1000>set alarm-threshold fer port 5 set 750
```

Remarks: When ports A/11 and B/12 are configured as clients, alarm thresholds are not used. The alarm is disabled if either threshold, set, or clear is set to zero.

Related: `show alarm-threshold`

Level : Power-User and Admin only

Alias

Use this command to create a short form of a frequently used command.

Command Syntax:

- To assign an alias name to a command (or any portion of a command):

  ```
  alias <user-defined-alias>=<character-string>
  ```

- To display all defined aliases and the commands to which they have been assigned:

  ```
  alias
  ```

Example 1:

To set the alias “abc” for the command “`show ip status`” –

```
tc1000> alias ip=show ip status
```

Example 1a:

To use the alias “abc” to execute the command `show ip status` –

```
tc1000> ip
```

Response 1a:

```
eth0: negotiated 100baseTx-FD flow-control, link ok
eth1: negotiated 100baseTx-FD flow-control, link ok
eth0      Link encap:Ethernet  HWaddr 00:B0:AE:01:25:85
inet addr:192.168.5.62  Bcast:192.168.5.255  Mask:255.255.255.0
UP BROADCAST NOTRAILERS RUNNING MULTICAST  MTU:1500  Metric:1
RX packets:177125 errors:0 dropped:0 overruns:0 frame:0
TX packets:341 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:100
RX bytes:11003080 (10.4 Mb)  TX bytes:40789 (39.8 Kb)
Interrupt:9 Base address:0xc000

eth1      Link encap:Ethernet  HWaddr 00:B0:AE:01:25:86
inet addr:10.0.0.101  Bcast:10.0.0.255  Mask:255.255.255.0
UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
RX packets:176695 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:100
RX bytes:10976936 (10.4 Mb)  TX bytes:0 (0.0 b)
Interrupt:9 Base address:0xf000 Memory:fbfaf000-fbfb0000
```

```
lo        Link encap:Local Loopback
inet addr:127.0.0.1  Mask:255.0.0.0
UP LOOPBACK RUNNING  MTU:16436  Metric:1
RX packets:82 errors:0 dropped:0 overruns:0 frame:0
TX packets:82 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:8584 (8.3 Kb)  TX bytes:8584 (8.3 Kb)
```

Example 2:

To display all defined aliases:

```
tc1000> alias
```

Response 2:

```
alias    ip='show ip status'
alias    inv='show inventory'
```

Related: None

Level : User, Power-User and Admin

Show Authentication

Displays how the TimeCreator 1000 authenticates users. If applicable, it displays the RADIUS server and key and TACACS+ server and key.

Command Syntax:

```
show authentication
```

Example:

To display the authentication status:

```
tc1000>show authentication
```

Response:

```
RADIUS Authentication          - disable
RADIUS Server                  - None
RADIUS Key                     - None
TACACS+ Authentication         - disable
TACACS+ Server                 - None
TACACS+ Key                    - None
```

Remarks: Authentication can be local, RADIUS, or TACACS+. Authentication can also be disabled, but not local.

Related: None

Level : Power-User and Admin only

Set Authentication

Use this command to provision the authentication scheme, the RADIUS server IP address and the authentication key(s) for server access, or the TACACS+ server IP address and the authentication key(s) for server access. Only one RADIUS or TACACS+ server is supported at any one time. Only one key is supported at any one time. This command also allows the user the option to specify the server port in addition to the server address.

Command Syntax:

- To provision the state of RADIUS authentication:

```
set authentication radius {enable | disable}
```

- To provision the state of TACACS+ authentication:

```
set authentication tacacs+ {enable | disable}
```

- To provision the RADIUS server IP address (port # is optional):

```
set authentication radius address <address>[:<port#>]
```

- To provision the RADIUS server authentication key for server access:

```
set authentication radius key <key string>
```

- To provision the TACACS+ server IP address (port # is optional):

```
set authentication tacacs+ address <address>[:<port#>]
```

- To provision the TACACS+ server authentication key for server access:

```
set authentication tacacs+ key <key string>
```

Example 1:

To enable RADIUS authentication:

```
set authentication radius enable
```

Example 2:

To enable TACACS+ authentication:

```
tc1000>set authentication tacacs+ enable
```

Example 3

To provision the RADIUS server IP address to 192.168.5.17, port 1812:

```
tc1000>set authentication radius address 192.168.5.17:1812
```

Example 4:

To provision the RADIUS server to authentication key “ABCDEFGHIJ12345678” for server access:

```
tc1000>set authentication radius key ABCDEFGHIJ12345678
```

Example 5:

To provision the TACACS+ server IP address to 192.168.5.27, with no port specified:

```
tc1000>set authentication tacacs+ address 192.168.5.27
```

Example 6:

To provision the TACACS+ server to authentication key “ABCDEFGH1234567890” for server access:

```
tc1000>set authentication tacacs+ key ABCDEFGH1234567890
```

Remarks: Authentication can be by local, RADIUS, and TACACS+. If no port is defined for RADIUS or TACACS+ IP address, the default Port (1812 for RADIUS, 49 for TACACS+) is used.

Related: `show authentication`

Level : Power-User and Admin

Show Bridge-Time

This command displays the bridging time that is used when the system does not have a qualified reference.

Command Syntax:

```
show bridge-time
```

Example:

```
tc1000>show bridge-time
```

Response:

```
Bridging Time                   - 900
```

Remarks: If the system does not qualify a TOD source (frequency reference) within the specified bridging time, the system transitions to holdover mode.

Related: `set bridge-time`

Level : User, Power-User and Admin

Set Bridge-Time

Use this command to provision the amount of time the system will remain in bridging mode before transitioning into the holdover mode.

Command Syntax:

```
set bridge-time <value>
```

Example:

To set the bridge time to a value of 1000 seconds -

```
tc1000>set bridge-time 1000
```

Remarks: The default value is 900 seconds. Based on DOCSIS requirements and the characteristics of the TimeCreator 1000 oscillator, impairments in performance are not expected within this default time period.

The range for this parameter is 100 –100000 seconds

Related: `show bridge-time`

Level : Power-User and Admin only

Show Cable Advance

This command displays the cable advance setting for all enabled DTI outputs.

Command Syntax:

```
show cable-adv
```

Example:

```
tc1000>show cable-adv
```

Remarks: The cable advance value may not be updated if the cable is disconnected or the port is disabled, including manual cable advance values.

Related: `set cable-adv`

Level : User, Power-User and Admin

Set Cable Advance

Use this command to provision DTI client and server link(s) to use the specified cable advance value.

Command Syntax:

```
set cable-adv {port# | all} {auto | manual<value>}
```

Example 1:

To set the cable advance for all ports to auto -

```
tc1000>set cable-adv all auto
```

Example 2:

To set the cable advance for Port 5 to Manual, with a value of 00x01023 -

```
tc1000>set cable-adv port 5 manual 00:10:23
```

Caution: Manual cable advance should only be performed in a lab environment.

Remarks: The valid range for the manual cable advance value is from 00:00:00 to 0E:A0:EA.

Note: If the cable advance is presently valid, then the cable advance setting is constrained to update at a rate of 26 ps/s, as required by the DTI specification, in both automatic and manual modes. To make a large change in the cable advance manually, first disable the port with the Set Interface command.

Related: `show cable-adv`

Level : Power-User and Admin only

Show Clock

This command displays the system's date, time, leap seconds, and local time offset.

Command Syntax:

```
show clock
```

Example:

```
tc1000>show clock
```

Response:

```
Date                          - 2010-01-13
Time                          - 06:47:46
Local Time Offset             - +00:00
IMC Uptime                    -  9:43
Leap Seconds                  - 14
```

Remarks: If the Show Clock command and the Show DTI-Clock command time/date values are different and the unit is not in warm-up, then a "jam-sync" is probably required (see Sync TOD-Source command).

Related: `show DTI-clock, set clock`

Level : User, Power-User and Admin

Set Clock

Use this command to provision the IMC's user-assigned date, time, leap seconds, and local time offset.

Command Syntax:

- To set the date and time for the IMC clock-

```
set clock date <yyyy-mm-dd> time <hh:mm:ss>
```

- To set the local time offset for the IMC clock -

```
set clock offset <value>
```

- To set the leapseconds value for the IMC clock -

```
set clock leapseconds <value>
```

Example 1:

To set the IMC clock to a date of 2010-02-12 and time of 11:23:44 -

```
tc1000>set clock date 2010-02-12 time 11:23:44
```

Example 2:

To set the local time offset to -8:00 for the IMC clock -

```
set clock offset -8:00
```

Example 3:

To set the leapseconds to 12 for the IMC clock -

```
set clock leapseconds 12
```

Remarks: The date and time can only be set in the user tod-source mode. The leap seconds value can only be set in the user and NTP tod-source modes. The leap seconds value is the accumulated number of seconds between GPS and UTC time. The local time offset only affects the time associated with the logs.

Table B-2 provides a list of supported time zone offsets:

Note: If the offset is changed, then the unit saves the configuration and restarts.

Restrictions: The Date format is yyyy-mm-dd.
The Time format is hh:mm:ss.
The Local Time Offset is hh:mm

Related: `show clock, show dti-clock`

Level : Power-User and Admin only

.

Table B-2. Time Zone Offsets

Supported Time Zone Offsets									
-12:00	-11:00	-10:00	-9:00	-8:00	-7:00	-6:00	-5:00	-4:00	-3:30
-3:00	-2:00	-1:00	+0:00	+1:00	+2:00	+3:00	+4:00	+4:30	+5:00
+5:30	+6:00	+6:30	+7:00	+8:00	+9:00	+9:30	+10:00	+11:00	+12:00

Set Configuration

Use this command to backup the current configuration, restore the current configuration from a backup copy, or set the current configuration to factory default values.

Command Syntax:

- To backup the current configuration in the same card -

```
set configuration backup
```

- To backup the current IOC configuration in the IMC card -

```
set configuration backup IOC
```

- To backup the current IMC configuration in the specified IOC card -

```
set configuration backup IMC {IOC1 | IOC2}
```

Note: IMC configuration changes are not saved automically, so it is necessary use the command “set configuration backup IMC” to explicitly save the changes. Failure to save changes with this command will result in IMC configuration changes being lost after the IMC reboots.

- To restore the configuration from the same card -

```
set configuration restore
```

- To restore the IOC configuration from the IMC card -

```
set configuration restore IOC
```

- To restore the IMC configuration from the specified IOC card -

```
set configuration restore IMC {IOC1 | IOC2}
```

- To restore the configuration to the default values, but preserving user and ip configuration -

```
set configuration default
```

- To restore the configuration to the factory values -

```
set configuration factory
```

Example 1:

To backup the current configuration in the same card -

```
tc1000>set configuration backup
```

Example 2:

To backup the current IOC configuration in the IMC card -

```
tc1000>set configuration backup IOC
```

Example 3:

To backup the current IMC configuration in IOC1 card -

```
tc1000>set configuration backup IMC IOC1
```

Example 4:

To restore the configuration from the same card -

```
tc1000>set configuration restore
```

Example 5:

To restore the IOC configuration from the IMC card -

```
tc1000>set configuration restore IOC
```

Example 6:

To restore the IMC configuration from IOC2 -

```
tc1000>set configuration restore IMC IOC2
```

Example 7:

To restore the configuration to the default values, but preserving user and ip configuration -

```
tc1000>set configuration default
```

Example 8:

To restore the configuration to the factory values -

```
tc1000>set configuration factory
```

Remarks: Setting the configuration to default will not overwrite user login information or system's IP address. Setting the configuration to factory resets all settings to the factory default. The IOC configuration is automatically saved in the IOC one minute after a configuration setting is changed.

Related: See Set commands

Level : Power-User and Admin only

Set Configuration Restoreuser IMC

This command is used to restore the IMC configuration from the remote server. This is a two-step process that also requires using the `set recvconfig IMC user@host:file` command.

Command Syntax:

```
set configuration restoreuser IMC
```

Example 1a:

To retrieve the IMC configuration file “/home/user/imc.bak” from the remote server at IP address 192.168.3.86 -

```
set sendconfig IMC user@192.168.3.86:/home/user/imc.bak
```

Example 1b:

To restore the IMC configuration file that was retrieved rom the remote server -

```
set configuration restoreuser IMC
```

Remarks:

Level : Power-User and Admin only

Set Configuration Restoreuser IOC

This command is used to restore the IOC configuration from the remote server. This is a two-step process that also requires using the `set recvconfig IOC user@host:file` command.

Command Syntax:

```
set configuration restoreuser IOC
```

Example 1a:

To retrieve the IOC configuration file “/home/user/imc.bak” from the remote server at IP address 192.168.3.86 -

```
set sendconfig IOC user@192.168.3.86:/home/user/imc.bak
```

Example 1b:

To restore the IOC configuration file that was retrieved rom the remote server -

```
set configuration restoreuser IOC
```

Remarks:

Related:

Level : Power-User and Admin only

Show DTI-Clock

This command displays the date, time, leap seconds, and local time offset transmitted on the DTI ports.

Command Syntax:

```
show dti-clock
```

Example:

```
tc1000>show dti-clock
```

Response:

```
DTI Time: 2010-01-13 07:35:24
Leap seconds: 14
```

Remarks: If the Show Clock command and the Show DTI-Clock command time/date values are different and the unit is not in warm-up, then a "jam-sync" is probably required.

Related: `show clock, set clock`

Level : User, Power-User and Admin

Show EIA-232

This command displays the serial port's operating parameters: baud rate, parity, word length, stop bits, and handshaking.

Command Syntax:

```
show eia-232
```

Example:

```
tc1000>show eia-232
```

Response:

```
Serial port configuration:
Baud: 9600
Data: 8
Parity: none
Stop: 1
State: enabled
```

Remarks: The serial interface is fixed at 9600, None, 8, 1, Xon/Xoff. There is no associated set command. The EIA-232 interface can be enabled and disabled using the Set Service command. h

Note: 57600 baud rate is supported only in the IMC rev H version 1.00.13 or below.

Related: `set resource, show resource`

Level : User, Power-User and Admin

Show Firewall

This command displays the firewall configuration.

Command Syntax:

```
show firewall
```

Example:

```
tc1000> show firewall
```

Response:

```
ICMP     - disable
Telnet   - enable
SSH      - enable
NTP      - enable
SNMP     - enable
TACPLUS  - enable
RADIUS   - enable
SYSLOG   - enable
```

Related: `set firewall`

Level : User, Power-User and Admin

Set Firewall

Use this command to configure the firewall. The firewall is used to selectively block traffic of specified protocols from the Ethernet ports. If the firewall is enabled for a protocol, then traffic using that protocol is allowed. If the protocol type is disabled, then traffic of that type is blocked. If remote authentication is to be used, the firewall for RADIUS and/or TACACS+ must be set to Enable to allow remote authentication to work.

Command Syntax:

- To provision the firewall to allow or block ICMP traffic -

```
set firewall icmp {enable|disable}
```

- To provision the firewall to allow or block Telnet traffic -

```
set firewall telnet {enable|disable}
```

- To provision the firewall to allow or block SSH traffic -

```
set firewall ssh {enable|disable}
```

- To provision the firewall to allow or block NTP traffic -

```
set firewall ntp {enable|disable}
```

- To provision the firewall to allow or block SNMP traffic -

```
set firewall snmp {enable|disable}
```

- To provision the firewall to allow or block RADIUS traffic -

```
set firewall radius {enable|disable}
```

- To provision the firewall to allow or block TACACS+ traffic -

```
set firewall tacplus {enable|disable}
```

- To provision the firewall to allow or block Syslog traffic -

```
set firewall syslog {enable|disable}
```

Example 1:

To enable the firewall to allow NTP traffic -

```
tc1000> set firewall ntp enable
```

Example 2

To disable the firewall to block RADIUS traffic -

```
tc1000> set firewall radius enable
```

Related: `show firewall`

Level : Power-User and Admin only

Generate Message

Use this command to generate all TimeCreator 1000 traps in one run, or to generate a specific trap. This command essentially acts as a trap simulator.

Command Syntax:

- To generate all trap messages -

```
generate message
```

- To generate a specific trap message -

```
tc1000>generate message
“trapID,trapAID1,trapAID2,trapState,trapValue”
```

Note: See Table A-6 for the the alarm trap bindings “trapID”, “trapAID1”, “trapAID2”, “trapState” and “trapValue”.

See Table A-8 for the the event trap bindings.

If trapAID1 corresponds to the IOC module number,1 or 2, use the value trapAID1=257 for IOC1 and trapAID1=258 for IOC2. Use the number “0” for entries of “n/a”, such as for trapAID2 and trapValue.

Example 1:

To generate all trap messages -

```
tc1000>generate message
```

Example 2a:

To generate the message for the trap “IMC-IOC 1 communication failed”, which has ID=2, trapAID1=257 (corresponds to trapAID1=1 for IOC1 in Table A-6) trap AID2=n/a (use 0), trapState=2, and trapValue=n/a (use 0) -

```
tc1000>generate message “2,257,0,2,0”
```

Example 2a:

To generate the message for the trap “IMC-IOC 1 communication restored”, which has ID=2, trapAID1=257 (corresponds to trapAID1=1 for IOC1 in Table A-6) trap AID2=n/a (use 0), trapState=1, and trapValue=n/a (use 0) -

```
tc1000>generate message “2,257,0,1,0”
```

Related: `show log`

Level : User, Power-User and Admin

Show GPS

This command displays the position (latitude, longitude, height), elevation mask value (positioning filter), mode of operation (manual or automatic), and GPS satellite tracking status. It also displays information for all satellite vehicles being tracked: vehicle number, noise ratio, satellite elevation, satellite azimuth.

Command Syntax:

```
show gps
```

Example:

```
tc1000>show gps
```

Response:

```
State                          - disable
Mode                           - auto
Latitude                       - N37:22:42.885
Longitude                      - W121:55:34.702
Height                         - 13.2
Elevation Mask                 - 10
Position Hold State            - positionHold


Number of tracked: 6
PRN     ELEV    AZIM    C/N
11      34      235     40
16      16      137     39
20      50      313     43
23      32      275     42
31      53      52      42
32      77      0       42
```

Related: `set gps`

Level : User, Power-User and Admin

Set GPS

Use this command to provision the GPS for mode of operation, position, and positioning elevation mask. With this command, you can provision the GPS to use either automatic or manual mode to determine the system's position. You can provision the GPS position if the system is provisioned for Manual mode of operation. You can also provision the elevation mask to provide a method of filtering satellites to be used by the system.

Note: Latitude and Longitude are entered as pddd:mm:ss.sss, where p is N or S for latitude and E or W for longitude, ddd is degrees, mm is minutes, and ss.sss is seconds. For example: N59:20:3.458 or W121:31:42.69. Height is in meters.

Command Syntax:

- To provision GPS to manual or auto mode -

```
set gps mode [auto|manual]
```

- To manually provision the GPS position -

```
set gps mode manual position <lat> <long> <height>
[mask <mask value>]
```

If GPS is already set to manual mode -

```
set gps position <lat> <long> <height> [mask <mask value>]
```

- To manually provision the GPS elevation mask-

```
set gps mode manual mask <mask value>}
```

If GPS is already set to manual mode -

```
set gps mask <mask value>}
```

Example 1:

To provision GPS to auto mode -

```
tc1000>set gps mode auto
```

Example 2:

To provision the GPS reference for manual mode and specify the position as a latitude of N37.22.45.123, longitude of W121.55.36.123, height of 17.5 meters, with a mask of 25 degrees, perform the following steps -

```
tc1000>set gps mode manual position n37:22:45.123
w121:55:36.123 17.5 mask 25
```

Note: Before changing GPS parameters, verify that the TOD source has been set to GPS with the command

```
tc1000>show tod-source
```

If the the TOD source is not set to GPS, type the command

```
tc1000>set tod-source gps
```

If GPS is already set to manual mode -

```
tc1000>set gps position n37:22:45.123 w121:55:36.123 17.5
mask 25
```

Note: The GPS port state must also be enabled for positioning changes to be implemented.

```
tc1000>set interface state gps enable
```

Example 3:

To manually provision the GPS elevation mask to a value of 18 degrees -

```
tc1000>set gps mode manual mask 18
```

If GPS is already set to manual mode -

```
tc1000>set gps mask <mask value>}
```

Remarks: The system must have the GPS mode of operation provisioned as manual before you can successfully provision the position manually.

Latitude is in the format N|Sdd:mm:ss.sss, for example:

```
N37:22:45.123
S48:33:67.456
```

Longitude is in the format E|Wddd:mm:ss.sss, for example:

```
W121:55:36.123
E157:33:47.456
```

Height is in meters with one digit after the decimal point, for example: 17.5

Mask is in degrees, for example: 15

Related: `show gps`

Level : Power-User and Admin only

Show Hostname

This command displays the host name for the TimeCreator 1000.

Command Syntax:

```
show hostname
```

Example:

```
tc1000>show hostname
```

Response:

```
Host name                        - abc100
```

Related: `set hostname`

Level : User, Power-User and Admin

Set Hostname

This command sets the host name for the TimeCreator 1000.

Command Syntax:

```
set hostname <hostname>
```

Example:

To set the hostname to “abc100” -

```
tc1000>set hostnameabc100
```

Remarks: Hostname can contain up to 20 characters.

Related: `show hostname`

Level : Power-User and Admin only

Imcdebug

This command is used to initiate an IMC debugger. This is for use by Symmetricom personnel only. Not for customer use.

Command Syntax:

```
imcdebug
```

Remarks:

Related: `iocdebug`

Level : Admin only

Iocdebug

This command is used to initiate an IOC debugger. This is for use by Symmetricom personnel only. Not for customer use.

Command Syntax:

```
iocdebug
```

Remarks:

Related: `imcdebug`

Level : Admin only

Show Interface

This command displays the port state (enabled or disabled) for the GPS, client, or server ports. It also displays the reference priorities and the port number, type, test mode, and state.

Note: With the 8-port IOC module option, only DTI Ports 1 through 6 are active, in addition to Port A/11 and Port B/12.

Command Syntax:

```
show interface
```

Example:

```
tc1000>show interface
```

Response:

```
Interface State

---------------------------------
|Port      |State               |
|----------|--------------------|
|GPS       |disable             |
|..........|....................|
|Port1     |enable              |
|..........|....................|
|Port2     |enable              |
|..........|....................|
|Port3     |enable              |
|..........|....................|
|Port4     |enable              |
|..........|....................|
|Port5     |enable              |
|..........|....................|
|Port6     |enable              |
|..........|....................|
|Port7     |disable             |
|..........|....................|
|Port8     |disable             |
|..........|....................|
|Port9     |disable             |
|..........|....................|
|Port10    |disable             |
|..........|....................|
|PortA/11  |enable              |
|..........|....................|
|PortB/12  |enable              |
---------------------------------
```

```
Interface Type

---------------------------------
|Port      |Type                |
|----------|--------------------|
|PortA     |server              |
|..........|....................|
|PortB     |server              |
---------------------------------

Interface Priority

---------------------------------
|Port      |Priority            |
|----------|--------------------|
|PortA/11  |2                   |
|..........|....................|
|PortB/12  |3                   |
---------------------------------

Interface Test Mode

---------------------------------
|Port      |Test Mode           |
|----------|--------------------|
|1         |false               |
|..........|....................|
|2         |false               |
|..........|....................|
|3         |false               |
|..........|....................|
|4         |false               |
|..........|....................|
|5         |false               |
|..........|....................|
|6         |false               |
|..........|....................|
|7         |false               |
|..........|....................|
|8         |false               |
|..........|....................|
|9         |false               |
|..........|....................|
|10        |false               |
|..........|....................|
|11        |false               |
|..........|....................|
|12        |false               |
---------------------------------

ToD Mode:  verbose
```

Remarks: There are a total of 12 ports. Ports A/11 and B/12 have dual functionality; they can be provisioned as either DTI client or DTI server ports.

Related: `set interface`

Level : User, Power-User and Admin

Set Interface

Use this command to provision the port state to be enabled or disabled for the GPS, client, or server ports. You can provision ports A/11 and B/12 as either DTI client ports or DTI server ports and you can also provisions the priority levels. You can provision the DTI server ports to be in test mode.

Note: With the 8-port IOC module option, only DTI Ports 1 through 6 are active, in addition to Port A/11 and Port B/12.

Command Syntax:

- To provision the port state for the GPS or other ports to be enabled or disabled -

```
set interface state {gps|port #|all} {enable|disable}
```

- To enable or disable the test-mode for the DTI server ports -

```
set interface test-mode (port #|all} {enable|disable}
```

- To provision the TOD mode as short or verbose -

```
set interface tod-mode {short|verbose}
```

- To provision Port A and Port B as client or server -

```
set interface type {porta|portb} {client|server}
```

- To set the priority value for Port A or Port B -

```
set interface priority {porta|portb} <value>
```

Example 1:

To enable the GPS port -

```
tc1000>set interface state gps enable
```

Example 2:

To enable Port 5 for test mode -

```
tc1000>set interface test-mode port 5 enable
```

Example 3:

To set the TOD mode to verbose -

```
tc1000>set interface tod-mode verbose
```

Example 4:

To provision Port A as a server port -

```
tc1000>set interface type porta server
```

Example 5:

To set the priority value for Port A to a value of 2 and the priority value of Port B to a value of 3 -

```
tc1000>set interface priority porta 2

tc1000>set interface priority portb 3
```

Remarks: Rear panel ports A/11 and B/12 are referred to as ports A and B for the interface state and type commands.

If the priority of the ports are the same, the port selection is non-revertive. For instance:

1. If one port is disqualified and the second port is qualified, the second port will be used as the reference.
2. If the first port is once again qualified, then the unit will not switch back to using the first port; it will continue to use the second port as reference.

Set the ToD source to the desired value before setting the interface state or type. The type should be set before the state is set for ports 11 and 12. Ports A/11 and B/12 must be configured as server ports for the test signal is generated in test mode. If test mode is enabled, the test signal is generated regardless of the port enable/disable state setting.

Level : Power-User and Admin only

Show Interval

This command displays the interval over which performance data is calculated for all types of data and for all output ports.

Command Syntax:

```
show interval
```

Example:

```
tc1000>show interval
```

Response:

```
port                          - 1
MTIE-t                        - 35
Jitter                        - 10
FER                           - 10
Jitter                        - 10

port                          - 10
MTIE-t                        - 35
FER                           - 10
Jitter                        - 10

port                          - 11
MTIE-t                        - 35
FER                           - 10
Jitter                        - 10

port                          - 12
MTIE-t                        - 35
FER                           - 10
Jitter                        - 10
```

Related: `set interval`

Level : User, Power-User and Admin

Set Interval

This command allows you to provision the interval over which performance data is calculated for the specified type of data (P-P Jitter, MTIE-t, FER) and for the specified output ports.

Command Syntax:

- To provision the interval over which jitter performance data is calculated for the specified port-

```
set interval jitter [port#|all] <value>
```

- To provision the interval over which MTIE-t performance data is calculated for the specified port-

```
set interval mtie-t [port#|all] <value>
```

- To provision the interval over which Frame Error Rate (FER) performance data is calculated for the specified port-

```
set interval fer [port#|all] <value>
```

Example 1:

To set the interval for jitter calculations for all ports to 20 -

```
tc1000>set interval jitter all
```

Example 2:

To set the interval for MTIE-t calculations for Port 5 to 40 -

```
tc1000>set interval mtie-t port 5 40
```

Example 3:

To set the interval for MTIE-t calculations for Port 10 to 15 -

```
tc1000>set interval fer port 10 15
```

Remarks: The range is 0 to 1000. Setting the interval to 0 disables calculation of performance data.

Level : Power-User and Admin only

Show Inventory

This command displays the installed module inventory information: model number, user-assigned asset number, IMC's MAC addresses, IMC and IOC modules' serial numbers, IMC and IOC modules' PCB versions, IMC and IOC modules' FPGA versions, IMC and IOC modules' firmware versions.

Command Syntax:

```
show inventory
```

Example:

```
tc1000>show inventory
```

Response:

```
System Information:

Asset Tag                - TC1000
IMC Serial #             - J11590
IMC Firmware Version     - 1.02.03
IMC Firmware Date        - "Fri Jan  8 17:57:28 2010"
IMC FPGA Version         - 40
IOC1 Serial #            - Q46786
IOC1 Part #              - 090-93121-01
IOC1 Hardware Version    - C
IOC1 Firmware Version    - 1.02.03
IOC1 FPGA Version #      - 46
IOC2 Serial #            - R14388
IOC2 Part #              - 090-93121-02
IOC2 Hardware Version    - F
IOC2 Firmware Version    - 1.02.03
IOC2 FPGA Version #      - 46
Ethernet 0 MAC Address   - 00:b0:ae:01:25:85
Ethernet 1 MAC Address   - 00:b0:ae:01:25:86
```

Remarks: The user can only modify the Asset number.

Related: `set inventory`

Level : User, Power-User and Admin

Set Inventory

Use this command to provision the IMC module's user-assigned asset value information.

Command Syntax:

```
set inventory asset <string>
```

Example:

To set the asset tag for the TimeCreator 1000 to “abcdefghijklmnopqrs” -

```
tc1000>set inventory asset abcdefghijklmnopqrs
```

Remarks: Enter user-assigned asset value string from 1 to 20 characters.

Related: `show inventory`

Level : Power-User and Admin only

Show IOC-State

This command displays the state of both the active and standby IOC module. If either IOC module cannot assume the active, standby, or disabled state, the state indicates NOT AVAILABLE.

Command Syntax:

```
show ioc-state
```

Example:

```
tc1000>show ioc-state
```

Response:

```
--------------------------
|IOC     |State          |
|--------|---------------|
|1       |active         |
|........|...............|
|2       |standby        |
--------------------------
```

Remarks: The active IOC module generates DTI outputs. The redundant module is the standby Module.

Related: `set ioc-state`

Level : User, Power-User and Admin

Set IOC-State

Use this command to provision the standby module to become the active module, or for either module to be disabled. IOC1 references the IOC module to the left of the IMC and IOC2 references the IOC module to the right of the IMC.

Command Syntax:

```
set ioc-state [active|standby|disable][IOC1|IOC2]
```

Example:

To set the standby module IOC2 to become the active module -

```
tc1000>set ioc-state active IOC2
```

Remarks: If the active IOC module is disabled, the system sets the redundant IOC module to be the active module prior to disabling the currently active module. If the redundant IOC module cannot become the active module, the command is ignored.

Related: `show ioc-state`

Level : Power-User and Admin only

Show IP

This command displays the Host address, Mask, and Gateway IP settings for both Ethernet interfaces. It also indicates if DHCP is enabled for the interface and if the interface is disabled.

Command Syntax:

```
show ip {config | status}
```

Example 1:

To display the IP configuration -

```
tc1000>show ip config
```

Response 1:

```
eth0 config:
         mode: dhcp
         addr: 192.168.5.62
         netmask: 255.255.255.0
         broadcast: 192.168.5.255
         gateway: 192.168.5.1

eth1 config:
         mode: static
         addr: 10.0.0.101
         netmask: 255.255.255.0
         broadcast: 10.0.0.255
```

Example 2:

To display the IP status -

```
tc1000>show ip status -
```

Response 2:

```
eth0: negotiated 100baseTx-FD flow-control, link ok
eth1: negotiated 100baseTx-FD flow-control, link ok
eth0    Link encap:Ethernet  HWaddr 00:B0:AE:01:25:85
        inet addr:192.168.5.62  Bcast:192.168.5.255
Mask:255.255.255.0
        UP BROADCAST NOTRAILERS RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:2238869 errors:0 dropped:0 overruns:0 frame:0
        TX packets:4798 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:100
        RX bytes:139427807 (132.9 Mb)  TX bytes:452343 (441.7 Kb)
        Interrupt:9 Base address:0xc000
```

```
eth1    Link encap:Ethernet  HWaddr 00:B0:AE:01:25:86
        inet addr:10.0.0.101  Bcast:10.0.0.255  Mask:255.255.255.0
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:2233926 errors:0 dropped:0 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:100
        RX bytes:139026829 (132.5 Mb)  TX bytes:0 (0.0 b)
        Interrupt:9 Base address:0xf000 Memory:fbfaf000-fbfb0000

lo      Link encap:Local Loopback
        inet addr:127.0.0.1  Mask:255.0.0.0
        UP LOOPBACK RUNNING  MTU:16436  Metric:1
        RX packets:665 errors:0 dropped:0 overruns:0 frame:0
        TX packets:665 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:0
        RX bytes:101158 (98.7 Kb)  TX bytes:101158 (98.7 Kb)
```

Remarks: Use `show ip config` to display the current user-selected configuration settings. Use `show ip status` to display the current interface configuration. The status version of the command gives the Ethernet link status and the IP interface status.

Related: `set ip`

Level : User, Power-User and Admin

Set IP

Use this command to provision the Host address, Mask, Gateway, and Broadcast IP settings for both Ethernet interfaces.

Command Syntax:

```
set ip {eth0|eth1} {addr|mask|gateway|broadcast} <address>
```

Example:

To set the IP address for ETH1 to 192.168.7.44 -

```
tc1000>set ip eth1 addr 192.168.7.44
```

Remarks: The address format allows IPv4 and IPv6 multiple octet formats. Use IP-State to disable the interface while configuring the system. The mask is defined as an integer defining the number of 1-bits from the MSB. The rest of the bits are 0. For example a value of 24 corresponds to 255.255.255.0

.

Notes:

IPv6 is not supported in this release.

If a gateway address is configured, but the gateway device is not functioning or is not connected, then the Ethernet interface will not function.

Use `set ip-state {port} restart` after configuring the IP interface.

Related: `show ip, set ip-mode, set ip-state`

Level : Power-User and Admin only

Set IP-Mode

Use this command to set the DHCP mode for both Ethernet interfaces. You can set up the interface to use either DHCP or a static IP.

Command Syntax:

```
set ip-mode {eth0|eth1} mode {dhcp|static}
```

Example:

To set ETH1 to static IP mode -

```
tc1000>set ip-mode eth1 mode static
```

Remarks: Use Set IP-State to restart the interface after configuring the system.

Related: `show ip, set ip, set ip-state`

Level : Power-User and Admin only

Set IP State

Use this command to enable or disable the specified Ethernet interface. You must restart the interface after you configure it.

Command Syntax:

```
set ip-state {eth0|eth1} {enable|disable|restart}
```

Example 1:

To enable the ETH1 inteface -

```
tc1000>set ip-state eth1 enable
```

Example 2:

To restart the ETH1 inteface -

```
tc1000>set ip-state eth1 restart
```

Remarks: Restart disables the interface and then enables it.

Related: `show ip`

Level : Power-User and Admin only

Show Log

This command displays the specified log file from the local storage. The Index parameter selects one of the rotated log files. The Head parameter, along with the count value, displays the specified number of events from the beginning of the file. The Tail parameter, along with the count value (#), displays the specified number of events from the end of the file. If the Index is not specified or set to zero, the current log file is displayed. If neither Head nor Tail parameter is issued, the 20 most recent entries are displayed. the command display the specified log's user provisioned line buffer size and total number of lines buffered. The log files are:

- Performance Log - log of performance monitoring data
- NTP Log
- Alarm Log
- Event Log
- Command Log
- Security Log

Command Syntax:

```
show log {performance|ntp|alarm|event|command|security}
[index {head|tail} count]
```

Example:

To display the last five entries from the alarm log -

```
tc1000>show log event index tail 5
```

Response:

```
Jan 20 22:17:08 admin alarmMgr: Output Port 6 cable is disconnected
Jan 20 22:17:08 admin alarmMgr: Output Port 11 cable is disconnected
Jan 20 22:17:08 admin alarmMgr: Output Port 12 cable is disconnected
Jan 20 23:21:10 admin alarmMgr: Jam sync required
Jan 20 23:26:51 admin alarmMgr: Jam sync completed
```

Related: `set log`

Level : User, Power-User and Admin

Show Log-size

Use this command to display the specified log buffer, the maximum number of kilobytes stored in the file before it is rotated.

Command Syntax:

```
show log-size
```

Example:

To display the sizes of the logs -

```
tc1000>show log-size
```

Response:

```
performance                    - 100
ntp                            - 100
alarm                          - 100
event                          - 100
command                        - 100
security                       - 100
```

Level : User, Power-User and Admin

Set Log-size

Use this command to provision the specified log file buffer size, the maximum number of kilobytes to be stored in the file before it is rotated.

Command Syntax:

```
set log-size {performance|ntp|alarm|event|command|security}
<size>
```

Example:

To set the size of the ntp log to 75 kilobytes-

```
tc1000>show log ntp 75
```

Remarks: The range is 0 to 100 kilobytes. Provisioning a log file size to zero disables the logging of that type of data.

Related: `show log`

Level : Power-User and Admin

Show Log-Interval

This command displays the user provisioned log intervals.

Command Syntax:

```
show log-interval
```

Example:

To display the intervals of the perfromance log -

```
tc1000>show log-interval
```

Response:

```
Performance                    - 60
```

Related: `show log`

Level : User, Power-User and Admin

Set Log-Interval

Use this command to provision the interval for the specified log. The interval is the time, in seconds, between successive log entries. Only the performance log can be provisioned.

Command Syntax:

```
set log-interval performance {interval}
```

Example:

To set the interval between successive log entries for the perfromance log to a value of 75 seconds -

```
tc1000>set log-interval performance 75
```

Remarks: Setting the log interval to zero disables logging. The range is 10 - 86,400.

Related: `show log`

Level : Power-User and Admin only

Show Logged-in-user

This command displays a list of currently logged in users.

Command Syntax:

```
show logged-in-users
```

Example:

```
tc1000>show logged-in-users
```

Response:

```
root     tts/0        Jan 22 21:52
admin    pts/0        Jan 24 23:10 (192.168.7.33)
```

Remarks:

Related:

Level : User, Power-User and Admin

Logout

This command terminates the current user connection.

Command Syntax:

```
logout
```

Example:

```
tc1000>logout
```

Level : User, Power-User and Admin

Show Mode

This command displays the TimeCreator 1000 mode configuration, either root or subtending.

Command Syntax:

```
show mode
```

Example:

```
tc1000>show mode
```

Response:

```
Operation Mode                  - root
```

Remarks: For subtending mode, this command returns "proxy". This is the term used by the SNMP MIB.

Related: `set tod-source`

Level : User, Power-User and Admin

Show NTP

This command displays the NTP configuration, including server addresses, polling intervals, preferred server, and key information.

Command Syntax:

```
show ntp
```

Example:

```
tc1000>show mode
```

Response:

```
NTP Authentication: Disabled

NTP configuration:

Servers: (*: Prefer server)
         127.127.45.0 minpoll 4 maxpoll 6
         192.168.83.180
         192.168.3.98 *

NTP Query:

     remote           refid            st t  when poll reach   delay   offset  jitter
==============================================================================
    SYMM_TE(0)      .GPS.            0 l    -   16    0    0.000    0.000   0.015
    192.168.83.180  .STEP.          16 u    - 1024    0    0.000    0.000   0.000
    *192.168.3.98    192.168.10.44    2 u  845 1024  377    1.292    0.048   0.207
```

Level : User, Power-User and Admin

Set ntp-server

This command provisions which NTP servers to use, the minimum and maximum poll intervals, if the server is preferred, and key ID. This information is used when the TimeCreator 1000 is acting as an NTP client.

Command Syntax:

- To add a new NTP server, its key ID, minimum and maximum poll intervals, and if the server is preferred -

```
set ntp-server add <server ip-address> [key <keyid>] [min
<value>] [max <value>] [preferred {yes|no}]
```

- To modify an existing NTP server, its key ID, minimum and maximum poll intervals, and if the server is preferred -

```
set ntp-server modify <server ip-address> [key <keyid>] [min
<poll value>] [max <poll value>] [preferred {yes|no}]
```

- To delete an NTP server -

```
set ntp-server del <server ip-address>
```

Example 1:

To add an NTP server with IP address 192.168.15.86, a key ID of 41267, a minimum poll interval of 16 seconds (<poll value> = 4), a maximum poll value of 256 seconds (<poll value> = 8), that is preferred:

```
tc1000>set ntp-server add 192.168.15.86 key 41267 min 4 max
8 preferred yes
```

Example 2:

To modify the minimum and maximum poll intervals of the NTP server at IP address 192.168.15.86 to 32 seconds (<poll value> = 5) and 512 seconds (<poll value> = 9), respectively:

```
tc1000>set ntp-server modify 192.168.15.86 min 5 max 9
```

Example 3:

To delete the NTP server at IP address 192.168.15.86:

```
tc1000>set ntp-server del 192.168.15.86
```

Remarks: Valid key ID range is 1 to 65534. The poll interval is 2^z seconds, where z = <poll value>. Valid poll intervals are 16 to 1024 seconds, which corresponds to a range of <poll values> of 4 to 10. The NTP service must be disabled and then enabled with the Set Service command for changes to take effect. If a key ID is specified, then authentication is used when connecting to the NTP server. The key must be defined with the Set NTP-Key command. A maximum of 8 NTP servers can be specified.

Level : Power-User and Admin only

Set ntp-authentication

This command provisions NTP authentication.

Command Syntax:

```
set ntp-authentication {enable|disable}
```

Example:

To enable NTP authentication:

```
tc1000>set ntp-authentication enable
```

Remarks: The NTP service must be disabled and then enabled with the Set Service command for changes to take effect. This configuration is not used in the client-server mode of NTP.

Level : Power-User and Admin only

Set ntp-key

This command provisions NTP key ID and key string pairs. This will be used when the TimeCreator 1000 is an NTP client and also when it is an NTP server. Key ID and string pairs can be added, modified, or deleted.

Command Syntax:

- To add a new NTP key ID and key string pair -

```
set ntp-key add <keyid> <key_string>
```

- To modify an existing NTP key ID and key string pair -

```
set ntp-key modify <keyid> <key_string>
```

- To delete an NTP key ID and key string pair -

```
set ntp-key del <keyid>
```

Example 1:

To add a new NTP key ID of 41567 with a key string of “abcdefghijklmnop123:”

```
tc1000>set ntp-key add 41567 abcdefghijklmnop
```

Example 2:

To modify the key string for NTP key ID 41567 to the new string “zyxvutsrqponmlkj321”:

```
tc1000>set ntp-key modify 41567 zyxvutsrqponmlkj321
```

Example 3:

To delete the NTP key ID of 41567 and its associated key string:

```
tc1000>set ntp-key del 41567
```

Remarks: Valid key ID range is 1 to 65534 and the key string can be up to 32 ASCII characters. Up to nine NTP keys can be configured. The key must not contain the "#" or "?" characters. The NTP service must be disabled and then enabled with the Set Service command for changes to take effect.

Level : Power-User and Admin only

show option

This command displays the option mode and key information.

Command Syntax:

```
show option
```

Example:

```
tc1000> show option
```

Response:

```
NTP server option disabled.
```

Remarks:

Level : User, Power-User and Admin

set option

This command sets the option mode and key information. The key information is printed on the Symmetricom-issued certificate for the unit.

Command Syntax:

```
set option <key>
```

Example:

To enable the snmp option with an authentication key of “ABCDEF”,

```
tc1000> set option ABCDEF
```

Remarks:

Level : Power-User and Admin only

Ping

Use this command to ping the host at the specified IP address and display ping statistics.

Command Syntax:

```
ping <IP-address>
```

Example:

To ping the host at the IP address 192.168.6.122:

```
tc1000> ping 192.168.6.122
```

Level : User, Power-User and Admin

Reboot

This command restarts one of the modules. Using this command can cause a loss of outputs.

Command Syntax:

```
reboot {imc|ioc1|ioc2}
```

Example:

To reboot the IOC1 module:

```
tc1000>reboot ioc1
```

Remarks:

Level : Admin only

Set Recvconfig IMC user@host:file

This command is used to restore the IMC configuration from the remote server. This is a two-step process that also requires using the `set configuration restoreuser IMC` command.

Note: Use the Secure Copy Protocol (SCP) to download the configuration file from the remote server.

Command Syntax:

```
set recvconfig IMC user@host:file
```

Example 1a:

To retrieve the IMC configuration file “/home/user/imc.bak” from the remote server at IP address 192.168.3.86 -

```
tc1000>set recvconfig IMC
user@192.168.3.86:/home/user/imc.bak
```

Example 1b:

To restore the IMC configuration file that was retrieved rom the remote server -

```
tc1000>set configuration restoreuser IMC
```

Related:

Level : Power-User and Admin only

Set Recvconfig IOC user@host:file

This command is used to restore the IOC configuration from the remote server. This is a two-step process that also requires using the `set configuration restoreuser IOC` command.

Note: Use the Secure Copy Protocol (SCP) to download the configuration file from the remote server.

Command Syntax:

```
set recvconfig IOC user@host:file
```

Example 1a:

To retrieve the IOC configuration file "/home/user/imc.bak" from the remote server at IP address 192.168.3.86 -

```
tc1000>set recvconfig IOC
user@192.168.3.86:/home/user/imc.bak
```

Example 1b:

To restore the IOC configuration file that was retrieved rom the remote server -

```
tc1000>set configuration restoreuser IOC
```

Related:

Level : Power-User and Admin only

Show Remote-syslog

This command displays the remote syslog server(s) that log messages are sent to from the TimeCreator 1000.

Command Syntax:

```
show remote-syslog
```

Example:

To display the remote syslog server(s) that log messages are sent to from the TimeCreator 1000 -

```
tc1000>show remote-syslog
```

Related: `set remote-syslog`

Level : User, Power-User and Admin

Set Remote-syslog

This command is used to configure the remote syslog servers (maximum 8) to receive log messages from the TimeCreator 1000.

Command Syntax:

- To add a new remote syslog server:

```
set remote-syslog add <hostaddr>
```

- To delete a specific remote syslog server or all of them:

```
set remote-syslog delete {<hostaddr>|all}
```

Example 1:

To add a remote syslog server at IP address 192.168.33.75:

```
tc1000>set remote-syslog add 192.168.33.75
```

Example 2a:

To delete the remote syslog server at IP address 192.168.33.77:

```
tc1000>set remote-syslog delete 192.168.33.77
```

Example 2b:

To delete all remote syslog servers:

```
tc1000>set remote-syslog delete all
```

Related: `show remote-syslog`

Level : Power-User and Admin only

Show Root-recovery Config

This command displays the root server recovery configuration. It shows whether the auto recovery mode is enabled or not, a global setting; or if rapid recovery is enable or not for each port (1 through 12).

Command Syntax:

```
show root-recovery config
```

Example:

```
tc1000> show root-recovery config
```

Response:

```
Root server recovery configuration:

Auto recovery mode: disabled
Port 01 rapid recovery mode: disabled
Port 02 rapid recovery mode: disabled
Port 03 rapid recovery mode: disabled
Port 04 rapid recovery mode: disabled
Port 05 rapid recovery mode: disabled
Port 06 rapid recovery mode: disabled
Port 07 rapid recovery mode: disabled
Port 08 rapid recovery mode: disabled
Port 09 rapid recovery mode: disabled
Port 10 rapid recovery mode: disabled
Port 11 rapid recovery mode: disabled
Port 12 rapid recovery mode: disabled
```

Related:

Level : User, Power-User and Admin

Show Root-recovery Status

This command displays the root server recovery status. It shows read-only properties, such as whether the auto recovery script is running or not, projected recovery time in minutes, and rapid recovery capable.

Command Syntax:

```
show root-recovery status
```

Example:

```
tc1000> show root-recovery status
```

Response:

```
Auto recovery process: not running

Port 01 projected recovery time: 0 minutes
Port 02 projected recovery time: 0 minutes
Port 03 projected recovery time: 0 minutes
Port 04 projected recovery time: 0 minutes
Port 05 projected recovery time: 0 minutes
Port 06 projected recovery time: 0 minutes
Port 07 projected recovery time: 0 minutes
Port 08 projected recovery time: 0 minutes
Port 09 projected recovery time: 0 minutes
Port 10 projected recovery time: 0 minutes
Port 11 projected recovery time: 0 minutes
Port 12 projected recovery time: 0 minutes
Port 01 recovery capability status: No
Port 02 recovery capability status: No
Port 03 recovery capability status: No
Port 04 recovery capability status: No
Port 05 recovery capability status: No
Port 06 recovery capability status: No
Port 07 recovery capability status: No
Port 08 recovery capability status: No
Port 09 recovery capability status: No
Port 10 recovery capability status: No
Port 11 recovery capability status: No
Port 12 recovery capability status: No
```

Related:

Level : User, Power-User and Admin

Set Root-recovery Autorecoverymode

This command is used to enable or disable the auto recovery mode (a global setting) for root server recovery, or to abort the root server recovery process.

Note: This command is only applicable for a TimeCreator 1000 that is being used as a root server in TOD Source mode of USER.

Command Syntax:

```
set root-recovery autorecoverymode [enable|disable|abort]
```

Example

To enable the auto recovery mode for root server recovery:

```
tc1000> set root-recovery autorecoverymode enable
```

Related: `show root-recovery config`

Level : Power-User and Admin only

Set Root-recovery Rapidrecovery

This command is used to enable or disable the rapid recovery mode, enable or disable the rapid recovery mode for all ports, and enable or disable the rapid recovery mode on a per port basis (1 through 12).

Note: This command is only applicable for a TimeCreator 1000 that is being used as a root server.

Command Syntax:

```
set root-recovery rapidrecovery [port#|all] [enable|disable]
```

Example:

To enable the rapid recovery mode for root server recovery on Port 5:

```
tc1000> set root-recovery rapidrecovery port5 enable
```

Related: `show root-recovery config'`

Level : Power-User and Admin only

Set Sendconfig IMC user@host:file

This command is used to save the IMC configuration to a remote server using the Secure Copy (SCP) protocol

Command Syntax:

```
set sendconfig imc user@host:file
```

Example:

To save the IMC configuration file "`/home/user/imc.bak`" to a remote server at IP address 192.168.3.86 -

```
set sendconfig IMC user@192.168.3.86:/home/user/imc.bak
```

Related:

Level : Power-User and Admin only

Set Sendconfig IOC user@host:file

This command is used to save the IOC configuration to a remote server using the Secure Copy (SCP) protocol.

Command Syntax:

```
set sendconfig IOC user@host:file
```

Example:

To save the IOC configuration file "`/home/user/ioc.bak`" to a remote server at IP address 192.168.3.86 -

```
set sendconfig IOC user@192.168.3.86:/home/user/ioc.bak
```

Related:

Level : Power-User and Admin only

Show Services

This command displays all TimeCreator 1000 service states.

Command Syntax:

```
show services
```

Example:

```
tc1000>show services
```

Reponse:

```
Service States:

eia-232                         - enable
telnet                          - enable
ssh                             - enable
ntp                             - enable
snmp                            - enable
syslog                          - enable
```

Remarks: Services include EIA-232, Telnet, SSH, NTP, Syslog, and SNMP.

Level : User, Power-User and Admin

Set Service

Use this command to specify the state of each service.

Command Syntax:

- To provision the state of EIA-232:

```
set service eia-232 {enable|disable}
```

- To provision the state of Telnet:

```
set service telnet {enable|disable}
```

- To provision the state of SSH:

```
set service ssh {enable|disable}
```

- To provision the state of NTP:

```
set service ntp {enable|disable}
```

- To provision the state of Syslog:

```
set service syslog {enable|disable}
```

- To provision the state of SNMP:

```
set service snmp {enable|disable}
```

Example:

To enable SNMP:

```
set service snmp enable
```

Remarks: Services include EIA-232, Telnet, FTP, SSH, NTP, Syslog, and SNMP.

Level : Power-User and Admin only

Note: The command also includes the capability of controlling the syslog service. Disabling this service is not recommended.

Show SNMP

Use this command to display all assigned SNMPv3 users, including AuthType, PrivType, and access type.

This command can also be used to display whether SNMPv2 is enabled, and whether read-write access is available.

This command can also be used to display whether traps are sent as SNMPv2 or SNMPv3, the trap destination IP addresses, and the trap ports (default is 162).

Command Syntax:

- To display the configured SNMPv3users:

```
show snmp accessv3
```

- To display whether traps are sent as SNMPv2 or SNMPv3, the trap destination IP addresses, and the trap ports (default is 162):

```
show snmp trap
```

Note: Response to this command refers to a “trap sink” or “host”, which is equivalent to trap destination.

- To display the SNMPv2 read-only community and read-write community:

```
show snmp accessv2
```

Example 1:

```
>show snmp accessv3
```

Response 1:

```
v3user1 priv
v3user2 auth
v3user3 auth (read only user)
v3user4 noauth (read only user)

Total 4 SNMPv3 user(s)
```

Example 2:

```
>show snmp trap
```

Response 2:

```
SNMP trap sinks:
Host: 192.168.3.44
SNMPv2 trap community: rouser
```

```
Host: 192.168.3.45
SNMPv3 trap user: v3user1

Host: 192.168.3.44
SNMPv3 trap user: v2user2
```

Note: Response to this command refers to a “trap sink” or “host”, which is equivalent to trap destination.

Example 3:

```
>show snmp accessv2
```

Response 3:

```
SNMPv2 is enabled
SNMPv2 read only community: public
SNMPv2 read write community: private
```

Related: `set snmp`

Level: User, Power-User and Admin

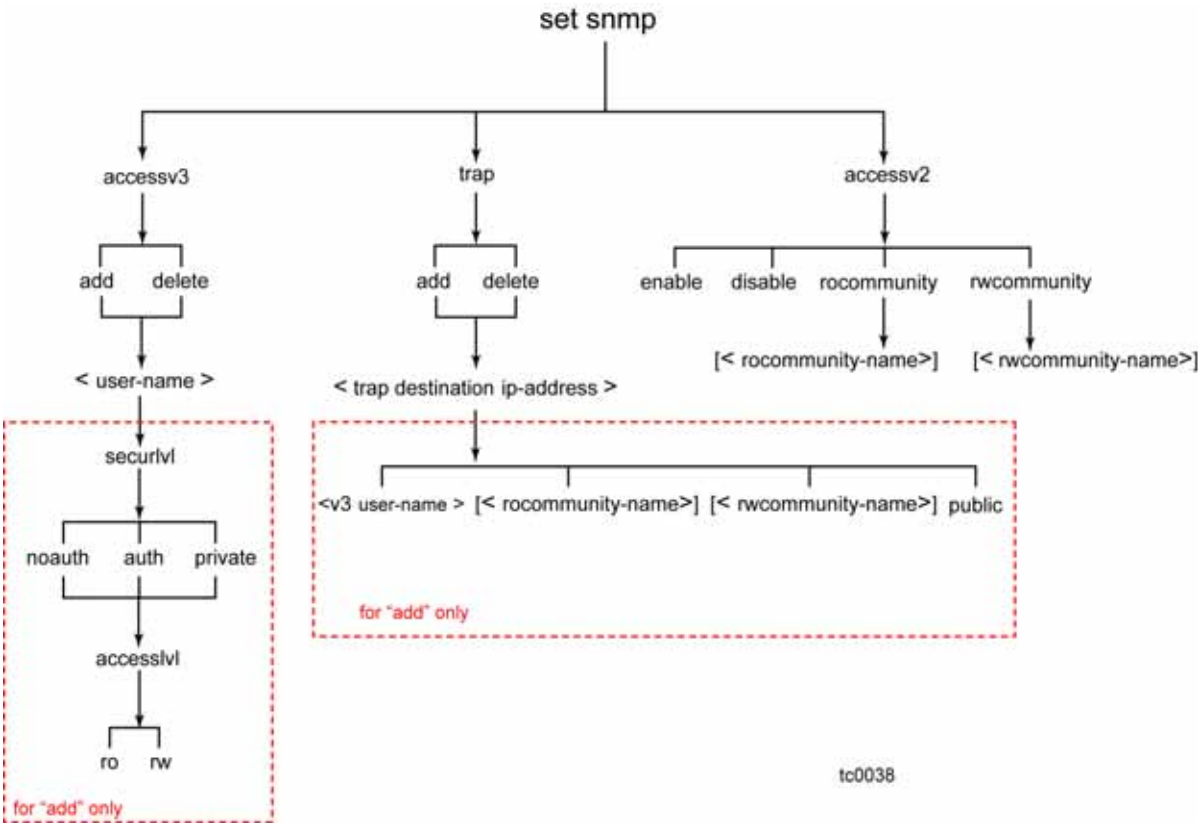
Set SNMP

Use this command to provision the SNMPv3 user assignments, trap destination assignments, SNMPv2 state, and v2 community assignments.

In order to use SNMP traps, the user must specifiy the IP address of the destination for the trap message. Up to 5 destinations can be specified. In order to send notifications, you must enter at least one trap destination IP address.

SNMPv3 users can provisioned as one of three security levels: Private, Author, and Non Author. SNMPv3 users can be provisioned as one of two access levels: read-only and read-write.

The following figure shows the hierarchy for the `set snmp` command:



Command Syntax:

- To add an SNMPv3 user:

```
set snmp accessv3 add <username> securlvl {noauth|auth|priv}
accesslvl {ro|rw}
```

The TC1000 will prompt for authentication protocol and key for security levels of Author or Private. The authentication type can be set to MD5 or SHA. If the security level is Private, the TC1000 will also prompt for a privacy protocol and key. The privacy type can be set to DES or AES (128-bit).

Note: Only characters {a-z,A-Z,0-9,! ( )- _ . ? ~ * @ ^ + = : / %} are accepted for authentication or privacy keys.

- To delete an SNMPv3 user:

```
set snmp accessv3 delete <username>
```

- Use this command to add an SNMP trap destination at the specified IP address and port, if desired.

```
set snmp trap add <trap destination
IP-address>[:<port#>][<SNMPv3 user>|
<SNMPv2 rocommunity-name>|<SNMPv2 rwcommunity-name>|public]
```

- Use this command to delete the SNMP recipient at the specified IP address:

```
set snmp trap delete <trap destination IP-address>
```

- Use this command to enable or disable SNMPv2.

```
set snmp accessv2 {enable|disable}
```

- Use the above command to create a read-only SNMPv2 community. The default value for `rocommunity-name` is “public”.

```
set snmp accessv2 rocommunity [<rocommunity-name>]
```

- Use the above command to create a read-write SNMPv2 community. The default value for `rwcommunity-name` is “private”.

```
set snmp accessv2 rwcommunity [<rwcommunity-name>]
```

Example 1:

To add an SNMPv3 user named “v3user1”, with a security level of `“priv” and an access level of “rw”`:

```
tc1000> set snmp accessv3 add v3user1 secureLvl priv
accessLvl rw
```

The user will then be prompted for the authentication protocol -

```
Authentication protocol (MD5, SHA):
```

- and authentication key.

```
Authentication key:
```

Note: Only characters {a-z,A-Z,0-9,! ( )- _ . ? ~ * @ ^ + = : / %} are accepted for authentication or privacy keys.

The user will then be prompted for the privacy protocol -

```
Privacy protocol (DES, AES):
```

- and privacy key.

```
Privacy key:
```

Response 1:

```
Disabling snmpd service:

Enabling snmpd service:
```

```
A new user v3user1 has been successfully added to SNMPv3
```

Example 2:

To delete an SNMPv3 user named “v3user2”:

```
tc1000> set snmp accessv3 delete v3user2
```

Example 3a:

To add an SNMP trap destination with the IP address 192.168.5.177 and a v3 user named “v3user1”:

```
set snmp trap add 192.168.5.177 v3user1
```

Example 3b:

To add an SNMP trap destination with the IP address 192.168.5.178, port 1098, and v2 trap rocommunity named “v2rocommunity1”:

```
set snmp trap add 192.168.5.177:1098 v2rocommunity1
```

Example 4:

To delete SNMP trap destination at IP address 192.168.5.177:

```
tc1000> set snmp trap delete 192.168.5.177
```

Example 5:

To enable SNMPv2 on the TC1000:

```
tc1000> set snmp accessv2 enable
```

Example 6a:

To create a read-only SNMPv2 community named “v2rocommunity1”:

```
tc1000> set snmp accessv2 rocommunity v2rocommunity1
```

Example 6b:

To create a read-only SNMPv2 community with the default name of “public”:

```
tc1000> set snmp accessv2 rocommunity
```

Example 7:

To create a read-write SNMPv2 community named “v2rwcommunity2”:

```
tc1000> set snmp accessv2 rwcommunity v2rwcommunity2
```

Related: `show snmp`

Level : Admin only

Show Statistics

This command displays the statistics information for the following:

- DTI Client Peak-to-Peak Jitter (connected to a server port)
- DTI Client MTIE-35 (connected to a server port)
- DTI Client MTIE-t (connected to a server port)
- DTI Client FER (connected to a server port)

Command Syntax:

```
show statistics
```

Example:

```
tc1000>show statistics
```

Related: `clear statistics`

Level : User, Power-User and Admin

Clear Statistics

This command clears all statistics.

Command Syntax:

```
clear statistics
```

Example:

```
tc1000>clear statistics
```

Related: `show statistics`

Level : Power-User and Admin only

Show Status

This command displays the system status information as follows:

- Summary for each DTI client port
- Summary for each DTI server port
- Active IOC module
- Standby IOC module
- Summary for the GPS Input
- Number of standing system alarms
- Currently selected TOD Source
- System date and time
- Uptime for the IMC
- Clock operating mode for the IOC
- Assigned System Name and asset tag

Command Syntax:

```
show status
```

Example:

```
tc1000>show status
```

Related: `show alarms`

Level : User, Power-User and Admin

Set-timeout

Use this command to change the timeout time. If the timeout is reached, the CLI logs out with a message “Session timeout” … The user can set the timeout as desired.

Command Syntax:

```
set-timeout <value>
```

Example:

To set the timeout time to a value of 900 seconds:

```
tc1000>set-timeout 900
```

Remarks: The range for the session timeout parameter is 30 – 3600 seconds. TimeCreator will accept the `set-timeout` command from Level 1 and Level 2 users, but TimeCreator will return the message “Unable to open configuration file to record timeout value”. The value entered by Level 1 or Level 2 users will only apply to the session in which the command was entered.

Level : Power-User and Admin only

Show TOD-Source

This command displays the Time Of Day Source.

Command Syntax:

```
show tod-source
```

Example:

```
tc1000>show tod-source
```

Related: `sync tod-source, set tod-source`

Level : User, Power-User and Admin

Set TOD-Source

Use this command to provision the TOD Source for GPS, DTI client port, NTP server, or the local Real-Time Clock.

Command Syntax:

```
set tod-source {gps|dti|ntp|rtc|user}
```

Example:

To set the TOD source to GPS:

```
tc1000>set tod-source gps
```

Related: `sync tod-source, show tod-source`

Level : Power-User and Admin only

Note: If the system has passed the warm up state, the Sync TOD-Source command is also required.

Sync TOD-Source

Use this command to change the time and phase of the DTI outputs by synchronizing with the TOD source. Use this command to provision the TOD-Source to “jam sync” when the command is issued or at the specified date/time.

Command Syntax:

```
sync tod-source {now | yyyy-mm-dd hh:mm:ss}
```

Example 1:

To jam sync immediately:

```
tc1000>sync tod-source now
```

Example 2:

To jam sync on March 23, 2011 at exactly 12:30 pm:

```
tc1000>sync tod-source 2011-03-23 12:30:00
```

Related: `set tod-source, show tod-source`

Level : Power-User and Admin only

Unlockcli

This command is used to release a CLI lock. The TimeCreator 1000 can support up to 5 Telnet sessions, with commands being executed on a first-in/first-out (FIFO) basis. In the event that a command from a session cannot be fully executed, other CLI users are essentialy locked out. This command releases the CLI lock.

Command Syntax:

```
unlockcli
```

Example:

```
tc1000>unlockcli
```

Level : User, Power-User and Admin

Upgrade

Use this command to upgrade the specified modules firmware with the specified filename. The system can download the file from an http, ftp, or sftp server. If the optional keyword “auto-reboot” is added, then the upgraded card will reboot after being upgraded. IOC cards will verify that there is a standby IOC card available before rebooting. The new firmware is not used until the card is rebooted.

Command Syntax:

```
upgrade {imc|ioc|ioc1|ioc2} filename server {ftp|sftp|http}
[auto-reboot]
```

The user will be prompted for the username and password for the server.

Example:

To upgrade IOC1 with the file “ver2.bin”, which is located at server IP address 192.168.5.64, via FTP, and then to auto-reboot IOC1 afterwards:

```
tc1000>upgrade ioc1 ver2.bin 192.168.5.64 ftp auto-reboot
```

Level : Admin only

Show User

This command displays all assigned users and access levels.

Note: Users logged in remotely via RADIUS or TACACS+ will be displayed as <**username**> (remote), rather than just <**username**> for local users.

Command Syntax:

```
show user
```

Example:

```
tc1000>show user
```

Response:

```
Name                          - admin
Access Level                  - admin
Lock State                    - unlock

Name                          - bobo
Access Level                  - user
Lock State                    - unlock

Name                          - juan (remote)
Access Level                  - user
-Lock State                    - unlock
```

Related: `set user`

Level : Admin only

Set User

Use this command to provision the local user password and access level.

Command Syntax:

- Use this command to add a new user. The system prompts the Administrator for username, password, password verification and level of access. A maximum of 30 users can be specified.

  ```
  set user add
  ```

- Use this command to delete a user from the access list.

  ```
  set user del <username>
  ```

- Use this command to modify the access level for an existing user.

  ```
  set user modify <username> access-level <level>
  ```

- Use this command to change the password for the indicated user. The system prompts for the password.

  ```
  set user password <username>
  ```

- Use this command to unlock the specified user. Users are locked out after 3 consecutive failed login attempts.

  ```
  set user unlock <username>
  ```

- Use this command to remove all users from the access list and set the default user and password.

  ```
  set user default
  ```

Note:

User passwords can consist of alphanumeric characters, “~”, “*”, “(“,“)”, “!”, “?”, “-”, “_”, and “.” with a minimum of 8 characters and a maximum of 32 characters.

Usernames can consist of numbers, upper and lower case letters, dash "-", and underscore "_", with a maximum of 20 characters. Usernames cannot use a leading dash “-” or underscore "_" as the first character. Usernames cannot use any of the following characters:

```
/ ( ) | \ ; : “ ‘ , < >
```

Passwords must contain at least one number or special character.

Example:

See Managing the User Access List, on page 74 for detailed examples for this command.

Remarks: The password is not echoed back to the user’s terminal.

Related: `show user`

Level : User and Power-User (change password only)
Admin (add, delete, modify, and unlock users, plus create password)

Show Whitelist

This command displays the list of IP addresses on the whitelist.

Command Syntax:

```
show whitelist
```

Example:

```
tc1000>show whitelist
```

Related: `set whitelist`

Level : User, Power-User and Admin

Set Whitelist

Use this command to add or delete IP addresses to/from the whitelist. Once the first IP address has been added to the whitelist, any future IP sessions will only be accepted if they originate from IP addresses from the whitelist. In the default condition, all IP addresses are allowed access.

Command Syntax:

- Use this command to add an IP address to the whitelist:

  ```
  set whitelist add <ip address>
  ```

- Use this command to add an IP address and ip mask to the whitelist.

  ```
  set whitelist add <ip address>/<ip mask>
  ```

- Use this command to delete an IP address from the whitelist.

  ```
  set whitelist delete <ip address>
  ```

- Use this command to commit changes to the whitelist. The whitelist must be committed before any changes to the whitelist will be implemented:

  ```
  set whitelist commit
  ```

- Use this command to set the whitelist to default conditions, where all IP addresses are allowed access:

  ```
  set whitelist default
  ```

Example 1:

To add the IP address 192.168.5.10 to the whitelist:

```
tc1000>set whitelist add 192.168.5.10
tc1000>set whitelist commit
```

Example 2:

To add the IP address 192.168.5.0, with the mask value of “24” bits (255.255.255.0) to the whitelist:

```
tc1000>set whitelist add 192.168.5.0/24
tc1000>set whitelist commit
```

Example 3:

To delete the IP address 192.168.5.10 from the whitelist:

```
tc1000>set whitelist delete 192.168.5.10
tc1000>set whitelist commit
```

Note: Symmetricom recommends that the IP address of the administrator station always be added to the whitelist first. This will prevent an accidental lockout of the administrator via Telnet/SSH.

Example 4:

To set the whitelist to default conditions, where all IP addresses are allowed access:

```
tc1000>set whitelist default
tc1000>set whitelist commit
```

Remarks: The whitelist must be committed before any changes to the whitelist will be implemented.

Related: `show whitelist`

Level : Power-User and Admin only

Simple Network Management Protocol

This section describes the two versions of SNMP supported by the TimeCreator 1000: SNMPv2c and SNMPv3.

SNMP Features

The Simple Network Management Protocol (SNMP) is an application layer protocol that allows you to manage network devices. SNMP is based on a client-server query-response mode that requires an Ethernet connection. A manager application (software installed on a computer) is the client generating the queries, and an agent (software on the TimeCreator 1000) is the server generating responses. The TimeCreator 1000 SNMP supports most existing functions.

If SNMP is present, port 161 becomes the port of standard SNMP interactive communications and port 162 becomes the trap port.

SNMP allows you to perform the following functions:

- Alarm management
- GPS input configuration
- DTI client and server port configuration
- TOD source configuration

SNMPv3 Security Features

SNMPv3 provides additional security features not available in SNMPv2c. In addition to the functions of SNMPv2c, SNMPv3 allows user levels that are based on authentication and privacy settings. The authentication protocol HMAC-SHA-1-96 is 20 characters long and the privacy protocol CBC-DES is a 16-character key. All keys are uppercase.

The administrator can add up to 20 users to the SNMP user table.

Management Information Base

The Management Information Base (MIB) is a virtual database of managed objects, their object identifiers, and variables. Typical MIB object identifiers include the TimeCreator 1000, its modules, module features, input ports, output ports, etc. and variables that include settings and measurements.

The MIB is controlled by the TimeCreator 1000's SNMP agent. The SNMP agent is a server program that sends TimeCreator 1000 status (stored in the MIB database) to the network manager when the manager transmits GET or GETNEXT messages. The manager can also transmit SET messages that instruct the agent to set MIB variables to new values. The TRAP message is used by the server to send the manager indications of MIB occurrences, such as a fault condition.

SNMP Users and Manager Addresses

SNMP CLI commands allow you to:

- Enable and disable SNMPv2c
- Set SNMP destination IP addresses for traps
- Display SNMPv2 community names, SNMPv3 user names, and assigned trap destinations
- Add/Delete SNMPv3 user names

Enabling SNMP

The Set Service Snmp command allows you to enable or disable the SNMP (see Set Service, on page 250).

Example:

Use the following command to enable SNMP:

Type `set service snmp enable` and press **ENTER**.

Adding a Trap Destination IP Address

The “set snmp trap” command allows you to specify an SNMP trap destination IP address (see Set SNMP, on page 253).

Example 1:

Use the following command to add a trap (SNMPv2) destination IP address 192.100.100.100:

Type `set snmp trap add 192.100.100.100` then press **Enter**.

Example 2:

Use the following command to add a trap (SNMPv3) destination IP address 192.100.100.100 for a v3 user named “v3user1”:

Type `set snmp trap add 192.100.100.100 v3user1` then press **Enter**.

Adding and Removing SNMPv3 Users

The “set snmp accessv3” command allows you to add or remove SNMPv3 users and specify access privileges using algorithm HMAC-SH-1-96 or MD5 with the 20 character authentication key and a CBC-DES 16 or AES character privacy key (see Set SNMP, on page 253).

Example

Use the following command to add user ABC with the 20 character MD5 authentication key 123456789ABCDEFGHIJK and 16 DES character privacy key 123456789ABCDEFG.

Type `set snmp accessv3 add abc SecureLvl priv AccessLvl rw` and press **Enter**.

Enter MD5 at the authentication protocol prompt.

Enter 123456789ABCDEFGHIJK at the authentication key prompt

Enter DES at the privacy protocol prompt

Enter 123456789ABCDEFG at the privacy key prompt

Displaying Trap Destinations, SNMPv2 Communities, and SNMPv3 Users

The “show snmp” command allow you to display the SNMP configuration. This includes the SNMPv3 users, SNMPv2 communities, trap version, trap user, and whether SNMPv2 is enabled (see Show SNMP, on page 252).

Example 1

Use the following command to display the list of SNMPv3 users (admin user level 3 required).

Type `show snmp accessv3` and press **Enter**.

Example 2

Use the following command to display the list of SNMP trap destinations and trap users (admin user level 3 required).

Type `show snmp trap` and press **Enter**.

Example 1

Use the following command to display the list of SNMPv2 communities (admin user level 3 required).

Type `show snmp accessv2` and press **Enter**.

Note: Valid authentication key and privacy key characters include numbers, upper and lowercase letters, and the character set `:=?@_`. Do not use spaces in user names.

Network Time Protocol

Network Time Protocol (NTP) is used to synchronize system clocks to a common time source by transmitting and receiving time of day over a TCP/IP network.

The TimeCreator 1000 implements NTPv4, and supports the NTP v.3 (RFC 1305) version. It can run as a server application and a client application. The NTP server always runs and the client is enabled independently.

Server Mode

The NTP server application always runs at port 123 (default NTP port) on the NTP Ethernet port and responds to requests for time in the NTP format. The NTP datagram provides fields (bits) of information that indicate the integrity of the time delivered by the server, two of these are the LI and STR fields. The Leap Indicator (LI) field indicates that Time has been successfully set (LI=0) or that Time has not been successfully set (LI=3). The Stratum (STR) field indicates the number of “hops” a client is from the root NTP server: for every hop, STR is incremented by one (1). If the unit has time set from GPS, then it indicates it is a primary time source with 0 in the LI field and 1 in the STR field. If the unit has time set by the client application, it indicates it is a secondary source with a 0 in the LI field and the source server STR + 1 in the STR field.

If the unit time has not been set by one of the above then it indicates that time is not valid by setting the LI field to 3. Once the unit time has been set by either radio or client then LI = 0. Setting time by the keyboard sets (or leaves) LI = 3, since this is not an accurate time setting.

Client Mode

If GPS is not available or if it is disabled, and a valid NTP server is configured, then the unit will request time from port 123 of the assigned server IP at the designated time interval (16 to 1024 seconds). Once time is set by the client mode, the server will have LI = 0 and Stratum = the time source STR + 1. A second server IP may be entered and the NTP protocol will check both servers and select the best source per the NTP specifications. An NTP response received in the client mode overrides the time set by keyboard and changes the LI field to 0 as indicated above.

Secure Shell Protocol

Secure Shell Protocol (SSH) provides secure, encrypted communications and services between hosts on unsecured networks.

Secure File Transfer Protocol

Secure File Transfer Protocol (SFTP) uses SSH to transfer files encrypting both commands and data, including passwords, to provide secure transmission for copying files.

Appendix C Installing the Two-Way GPS Antenna

This document describes the procedures for installing the Symmetricom Two-Way GPS antenna and the Two-Way Antenna Interface.

In This Appendix

Tools

These standard tools and materials are not supplied, but may be required for installing the Two-Way GPS antenna:

- Standard tool kit
- Fasteners for mounting the equipment in rack
- PVC glue

Parts

The following table identifies the parts available for the GPS antenna.

Table C-1. GPS Parts and Accessories

Part Number	Description
990-93500-01[1]	Two-Way GPS Antenna Kit
090-58545-01	Two-Way GPS Antenna (spare)
043-00018-01	Lightning suppressor (spare)
060-58545-01	RG-58 cable, 10 ft. (3 m)
060-58545-02	RG-58 cable, 20 ft. (6 m)
060-58545-05	RG-58 cable, 50 ft. (15 m)
060-58545-10	RG-58 cable, 100 ft. (30 m)
060-58545-20	RG-58 cable, 200 ft. (60 m)
060-58545-30	RG-58 cable, 300 ft. (90 m)
060-58545-50	RG-58 cable, 500 ft. (150 m)
154-00023-01	Crimp tool for RG-58 cable
371-001	TNC connectors for RG-58 cable

Note:

1 Kit includes GPS antenna and mounting hardware. Order antenna cables separately

Making GPS Connections

To connect the GPS antenna signal, you must install a GPS antenna using the procedure in this document.

Installing the GPS Antenna

These installation procedures are to be used in support of local company procedures and the Installation Job Specification.

Prior to installing the antenna, the site, antenna location, lightning suppressor location, cable route, and all other details should be planned. Use Figure C-1 as a guide to locating the antenna.

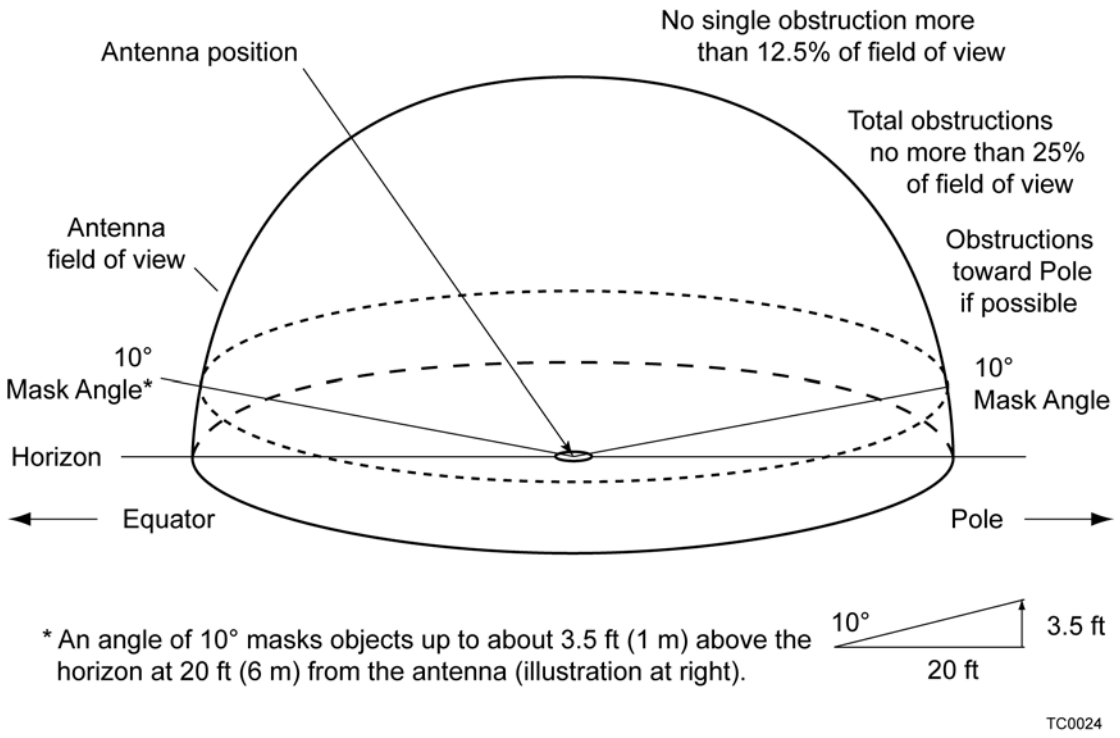


Figure C-1. Locating the GPS Antenna

To install the antenna, refer to Figure C-2, and perform the procedure in this section. Ensure all user-supplied materials are available. The maximum distance between the antenna and the device is approximately 985 feet (300 m). The minimum cable length is 6.6 feet (2 m). The GPS Antenna should always be as close to the TimeCreator 1000 as practical.

Warning: To prevent arcing, ensure that the lightning suppressor is installed away from electrical devices and cabling.

Note: Use the following antenna installation instructions as a guideline only. Install the antenna using company-approved techniques, and follow all appropriate local building and electrical codes.

Recommendation: Symmetricom recommends that you use one of the following grounding points:

- Valid roof ring ground system
- Cad weld to building structural steel
- Ground plate within 50 feet (15 m) of antenna cable entrance into building

You can order two lengths of cable: one connecting the antenna to the lightning suppressor and one from the suppressor to the TimeCreator 1000. Or you can order one length of cable; you need to cut the cable and terminate it properly, using your own tools.

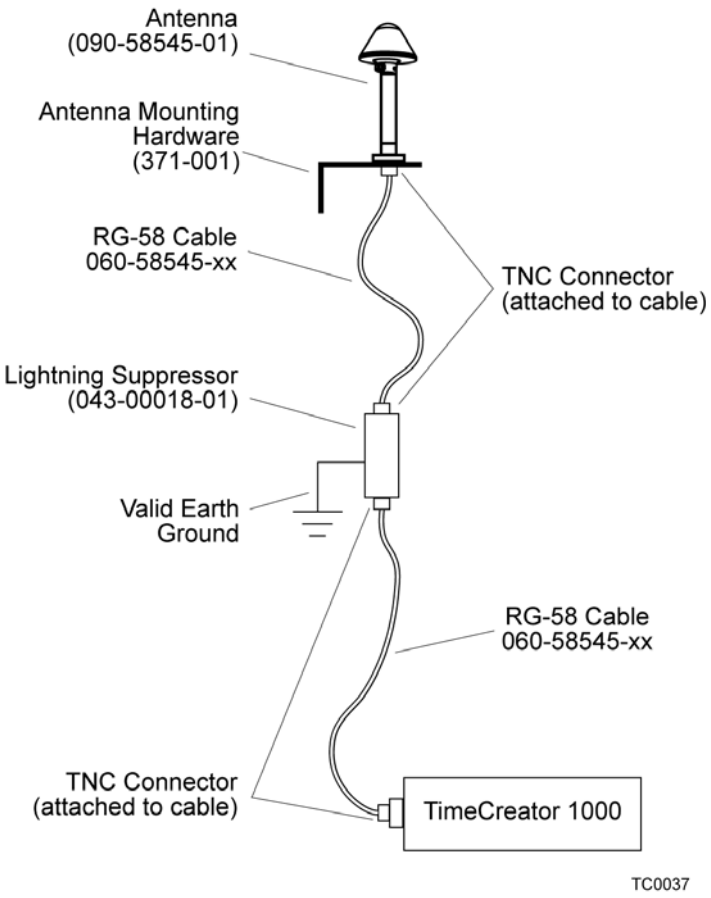


Figure C-2. Antenna-to-Device Cabling

To install the antenna:

1. Attach the antenna mounting bracket to a 1-inch (2.5 cm) diameter pipe or wood post.

   – If you are mounting the bracket to a pipe, assemble as shown in Figure C-3. Slide the two V-bolts over the pipe, and through the mounting bracket slots; then place the provided four washers and four nuts over the V-bolts, against the mounting bracket. Leave the V-bolts loose enough to allow for final adjustments.

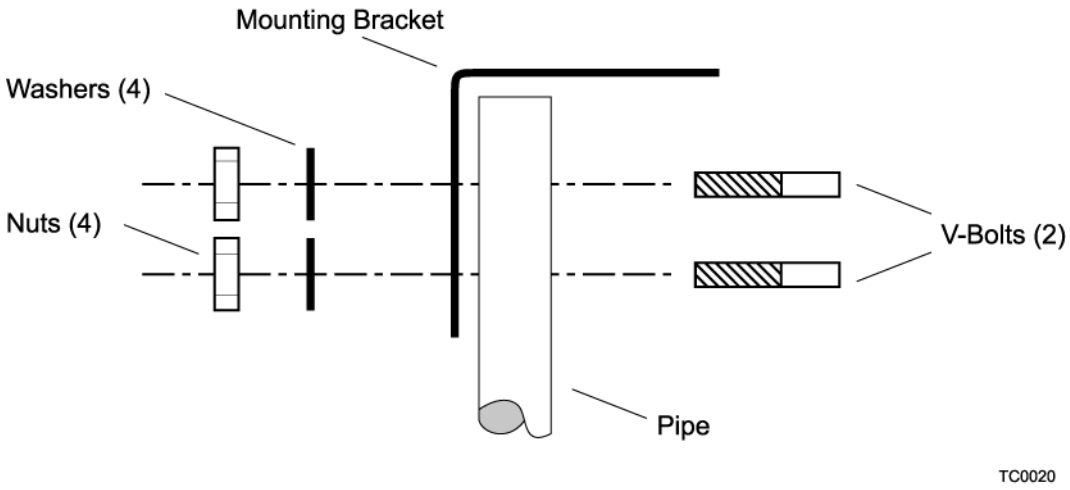


Figure C-3. Installing the Antenna Bracket on a Pipe

– If you are mounting the bracket to a wood post, assemble as shown in Figure C-4. Install the provided two self-tapping screws in two diagonally positioned mounting bracket slots, and attach to the post.

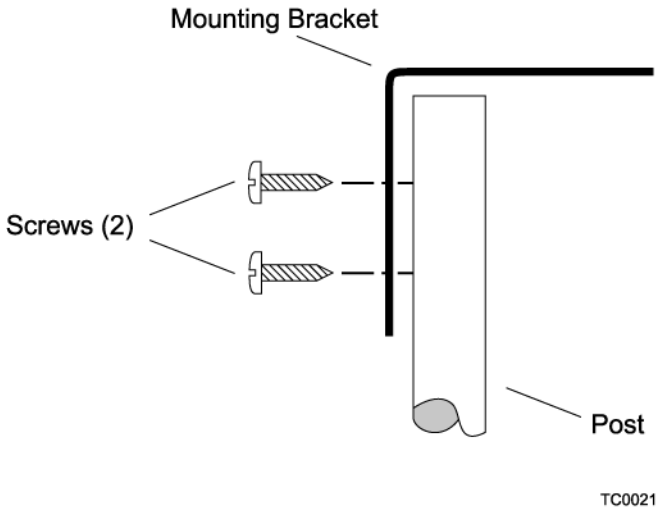


Figure C-4. Installing the Antenna Bracket on a Post

2. Mount the antenna and mast assembly to the “L” bracket.

3. Connect the mast to the flange using PVC glue.

4. Feed an RG58 (060-58545-xx) cable through the bottom of the mast as illustrated. See Table C-1 for specific cable lengths.

5. Connect the cable to the antenna “pigtail” and pull the cable back through the mast.

6. Mount the antenna and mast assembly to the “L” bracket using the supplied nuts, bolts, and washers, as shown in Figure C-5.

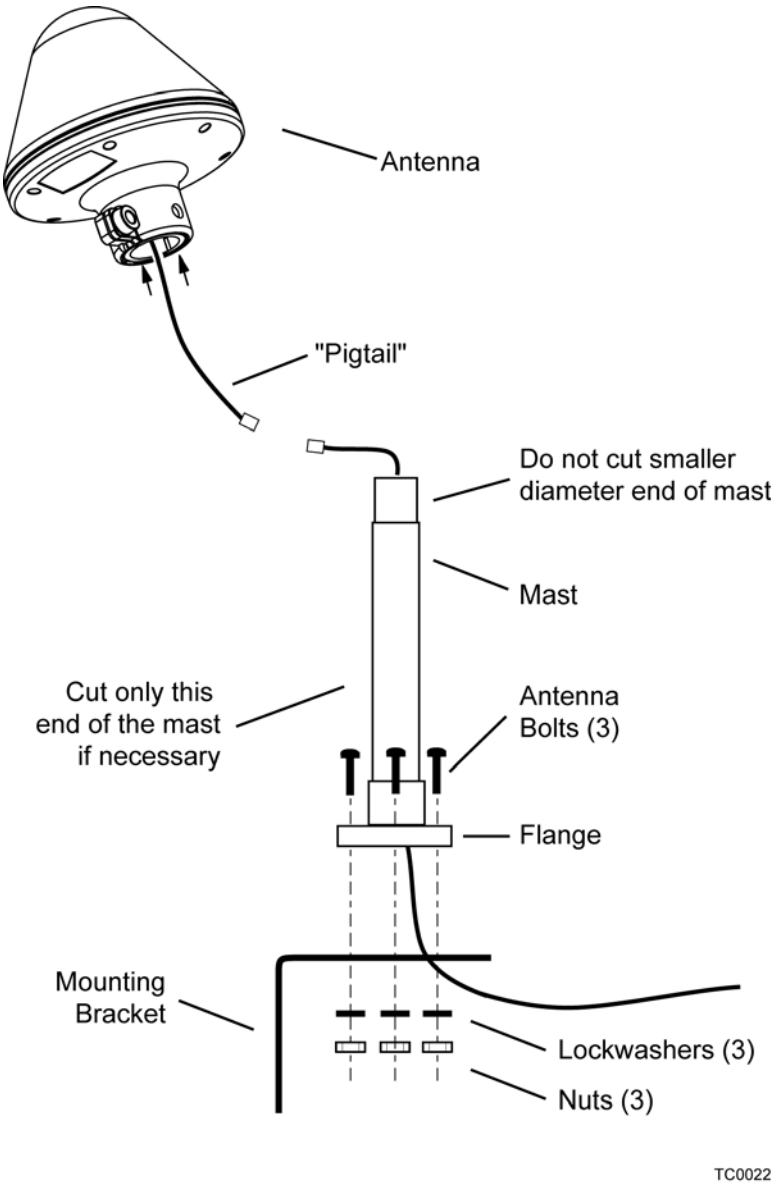


Figure C-5. Attaching the Antenna to the Bracket

7. Using a plumb line or bubble level, ensure the antenna is within 5° of vertical (perpendicular to the horizon), and tighten the mounting bracket bolts.

8. Bolt the lightning suppressor mounting plate to a flange that is attached to a valid earth ground. The roof ring ground system, a grounding plate, and building structural steel are examples of valid earth ground points. If the mounting plate cannot be bolted to a valid earth ground, bolt the mounting plate to a point within 15 feet (4.6 m) of the chosen valid earth ground. A minimum 30-foot (9 m) bend radius is required when installing the ground wire. If the mounting plate is to be

installed in a nonmetallic junction box, perform the installation and bolt the assembly near the chosen valid earth ground.

Note: A junction box must have inside dimensions of 2.75 inches by 2.75 inches by 1.6 inches (7 cm by 7 cm by 4 cm) to hold the mounting plate and attached components.

9. Assemble the lightning suppressor as shown in Figure C-6.

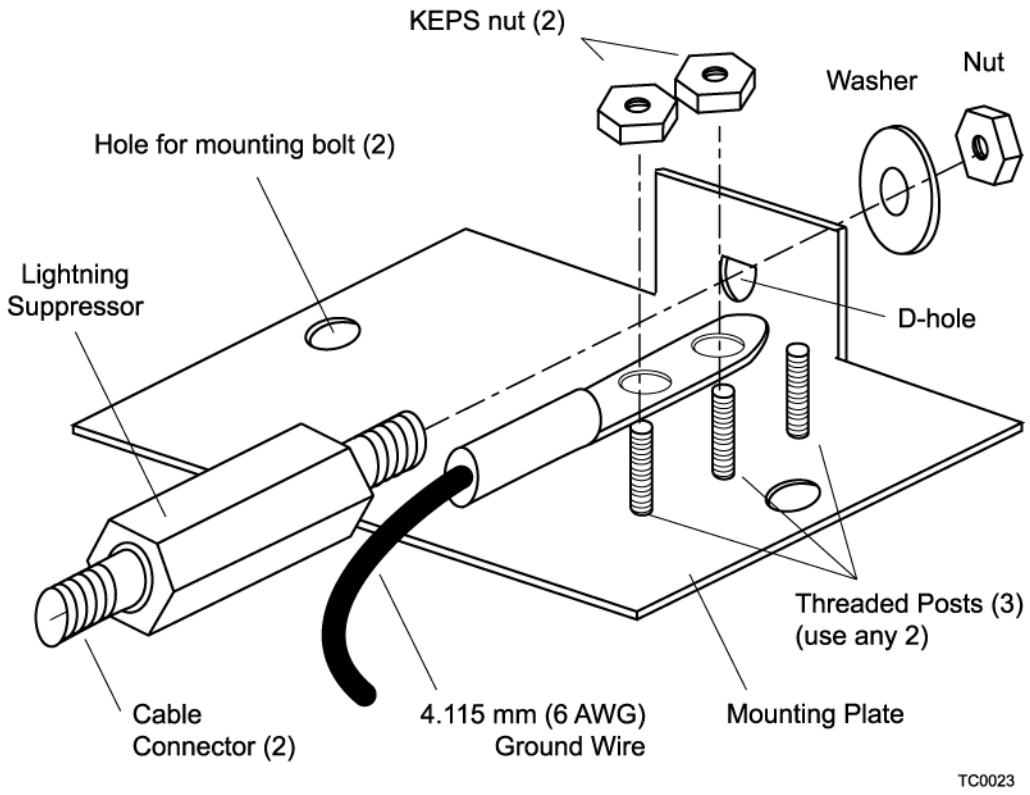


Figure C-6. Assembling the Lightning Suppressor

10. Install 1.5 inch (3.8 cm) nonmetallic conduit from the antenna to the lightning suppressor, and from the lightning suppressor to the cable entrance into the building.

11. Install a user-supplied bracket, preferably non-metallic, to support the vertical section of conduit to the antenna.

12. Route the antenna cable through the conduit, and connect the cable to the lightning suppressor. See Table C-1 for specific cable lengths.

13. If the lightning suppressor is not mounted directly to a valid earth ground, crimp a length of 4.115 mm (6 AWG) ground cable to the two-hole terminal, slide the

terminal over two of the three threaded posts on the lightning suppressor mounting plate, and attach the terminal to the mounting plate with two KEPS nuts. Use the two posts that allow the least bending of the cable.

14. Connect an RG58 (060-58545-xx) cable between the lightning suppressor and the TimeCreator 1000. See Table C-1 for specific cable lengths.

15. Install fire-stopping material in all holes opened in the roof and/or walls during this procedure.

16. Check all connections for tightness to prevent arcing and intermittent operation.

17. Coat all exposed connectors with an electrically conductive antioxidant compound (e.g. Kopr-Shield spray).

Appendix D Specifications and Factory Defaults

This appendix provides mechanical and electrical specifications and factory defaults for the TimeCreator 1000.

In This Appendix

Specifications

This section provides the specifications for the TimeCreator 1000 components and input and output signals.

Mechanical

Table D-1. TimeCreator 1000 Mechanical Specifications

Parameter	Description
Mounting	19 in. Rack
Rack Mounting Positions	Front mounting location, unit protrudes 0.75 in. (4.445 cm) Mid-point mounting location, unit protrudes 6.33 in. (16.08 cm)
Width	17.25 in. (43.82 cm)
Height	1.75 in. (4.45 cm)
Depth	19.9 in. (50.5 cm)
Weight	11 lb. (5 kg) fully loaded 7 lb. (3.2 kg) empty

Environmental

Table D-2. TimeCreator 1000 Environmental Specifications

Parameter	Description
Operating Temperature	0° to 40° C, 32° to 104° F
Storage Temperature	–25° to 70° C, –13° to 158° F
Operating Humidity	10% to 90% RH non-condensing
Storage Humidity	5% to 90% RH non-condensing

Power

Table D-3. TimeCreator 1000 Power Specifications

Parameter	Description
AC Input Power	100-240 V AC at 50/60 Hz.
AC Power Fuse	2 A (2 each)
AC Power	40 W
DC Input Power	–36 V DC to –72 V DC –48 V DC, 2.7 A (maximum) Either positive or negative ground
DC Recommended Battery Feed Fuse	3 A
DC Power	40 W

Serial Port

Table D-4. Serial Port Specifications

Item	Description
Connector Type	9-pin, female D connector
Connector Label	Craft
Interface	RS-232
Baud Rate	9600 Kbps (57600 is supported only in the IMC rev H version 1.00.13 or below)
Data Bits	8
Parity Bit	None
Stop Bits	1
Flow Control	None

LAN Port

Table D-5. LAN Port Specifications

Connector	Description
MGMT	RJ-45 (10Base-T/100 Base-T) - Supports two telnet sessions and two SSH sessions over TCP/IP.
NTP	RJ-45 (10Base-T/100 Base-T) - Supports NTP clients that comply with RFC 1305.

Input Signals

Table D-6. Input Signal Specifications

Parameter	Specification
GPS	
Requirement	Proprietary Rooftop Antenna (see Roof Antenna specification in Table D-8)
Interface	TNC connector
DTI	
Termination Impedance	100 ohms
Amplitude	2.2Vpp to 2.8Vpp
Data Rate	5.12 Mbps

Output Signals

Table D-7. Output Signal Specifications

Parameter	Specification
Termination Impedance	100Ω
Amplitude	2.2Vpp to 2.8Vpp
Data Rate	5.12 Mbps

Roof Antenna

Table D-8. Antenna Specifications

Parameter	Specification
Type	Active, with proprietary 2-way time transfer technology
Cable length	Maximum 1000 ft. (305 m) from antenna to shelf
Dimensions	Height: 6.5 in (16.5 cm) Diameter: 5.9 in (15 cm)
Weight	1.7 lb. (0.77 kg)
Operating Temperature	–35 to 75°C
Storage Temperature	–40 to 80°C
Operating Humidity	0 to 100% relative humidity
Power	36 V nominal
Connector type	TNC
Impedance	50 Ω / 75 Ω

Factory Defaults

This section provides the factory defaults for the TimeCreator 1000 GPS and DTI port parameters, IMC and communications parameters, and alarm parameters.

Table D-9. GPS and DTI Port Parameters

Description	Default Value	Value Range
System Mode of Operation	Root	Root | Subtending
Port 1 thru 10 State (Port 1 thru 6 State for 8-port option)	Enable	Enable | Disable
Port 1 thru 12 Cable Advance Mode (Ports 1 thru 6, 11, and 12 for 8-port option)	Auto	Auto | Manual
Port 1 thru 12 Cable Advance Value (Ports 1 thru 6, 11, and 12 for 8-port option)	0	0 to 200 meters
Port A & B Type	Server	Server | Client
Port A & B State	Disabled	Enable | Disable

Table D-9. GPS and DTI Port Parameters (Continued)

Description	Default Value	Value Range
Port A Priority (input)	2	1 thru 5
Port B Priority (input)	3	1 thru 5
GPS State	Disable	Enable | Disable
GPS Priority	1	1 thru 5
GPS Position Mode	Auto	Auto | Manual
GPS Position	Lat – 0:0:0.0 Long – 0:0:0.0 Elevation– 0.0 m	LAT = dd:mm:ss.ssN or dd:mm:ss.ssS LONG = dd:mm:ss.ssE or dd:mm:ss.ssW ELEV = +/-hhhh.h height in meters
GPS Elevation Mask	10	0 to 45 degrees
Leapseconds	14	0 to 40

Table D-10 provides the IMC module and communication parameter factory default values and range.

Table D-10. IMC and Communication Parameters

Description	Default Value	Value Range
TOD Source	RTC	RTC | USER | NTP | DTI | GPS
Local Time Offset	00:00	+/-hh:mm
EIA-232 Service	Enable	Enable | Disable
Telnet Service	Enable	Enable | Disable
SSH Service	Enable	Enable | Disable
SNMP Service	Enable	Enable | Disable
NTP Service	Enable	Enable | Disable
SYSLOG Service	Enable	Enable | Disable
User #1 Access level	3	1 | 2 | 3
User #1 UserName	admin	
User #1 Password	SymmTC1000	
Eth0 IP mode	Static	Static|DHCP

Table D-10. IMC and Communication Parameters (Continued)

Description	Default Value	Value Range
Eth0 IP state	Enable	Enable|Disable
Eth0 Host IP Address	10.0.0.100	Valid IPv4 Host Address
Eth0 Host Gateway Address	0.0.0.0	Valid IPv4 Gateway Address
Eth0 Host Mask	255.255.255.0 (24)	0 to 32
Eth1 IP mode	Static	Static|DHCP
Eth1 IP state	Enable	Enable|Disable
Eth1 Host IP Address	10.0.0.101	Valid IPv4 Host Address
Eth1 Host Gateway Address	0.0.0.0	Valid IPv4 Gateway Address
Eth1 Host Mask	255.255.255.0 (24)	0 to 32
Hostname	TC1000	20 ASCII characters
SNMP Trap Destination IP Address		Valid IPv4 Host Address or
SNMP Username (list)		20 ASCII Characters
SNMP Authentication Key (list)		20 ASCII Characters
SNMP Private Key (list)		20 ASCII Characters a Minimum of 8 characters
NTP Server Key ID		1 to 65535
NTP Server Encryption Key		Max of 32 ASCII Characters
NTP Peer IP or hostname		Valid IPv4 Address or hostname
NTP Peer Key ID		1 to 65535
NTP Peer Encryption Key		Max of 32 ASCII Characters
RADIUS Authentication	Disable	Enable | Disable
RADIUS Server IP Address		Valid IPv4 Host Address
RADIUS Server Key		Max of 32 ASCII characters
TACACS+ Authentication	Disable	Enable | Disable
TACACS+ Server #1 IP Address		Valid IPv4 Host Address
TACACS+ Server key		Maximum of 32 ASCII characters
Local Alarm Log Buffer Size	100	0 to 100 kbytes
Local Event Log Buffer Size	100	0 to 100 kbytes

Table D-10. IMC and Communication Parameters (Continued)

Description	Default Value	Value Range
Local Command Log Buffer Size	100	0 to 100 kbytes
Local Security Log Buffer Size	100	0 to 100 kbytes
Local NTP Log Buffer Size	100	0 to 100 kbytes
Local Performance Log Buffer Size	100	0 to 100 kbytes
Performance Log Interval (sec)	60	0 = disable or 10 to 86400

Alarm Default Values

Table D-11. GPS and DTI Port Alarm Parameters

Description	Default Value	Value Range (seconds)
Port 1 thru 12 – FER Interval	10	0 = Disable, 1 to 1000
Port 1 thru 12 – Jitter Interval	10	0 = Disable, 1 to 1000
Port 1 thru 12 – MTIE-t Interval	35	0 = Disable, 1 to 1000
Port 1 thru 12 – FER Set Threshold (E-04)	100	0 = Disable, 5 to 10000
Port 1 thru 12 – FER Clear Threshold (E-04)	10	0 = Disable, 5 to 10000
Port 1 thru 12 – P-P_Jitter Set Threshold (pS)	8000	0 = Disable, 5000 to 10000000
Port 1 thru 12 – P-P_Jitter Clear Threshold (pS)	5000	0 = Disable, 5000 to 10000000
Port 1 thru 12 – MTIE-35 Set Threshold (pS)	10000	0 = Disable, 5000 to 10000000
Port 1 thru 12 – MTIE-35 Clear Threshold (pS)	7000	0 = Disable, 5000 to 10000000
Port 1 thru 12 – MTIE-t Set Threshold (pS)	10000	0 = Disable, 5000 to 10000000
Port 1 thru 12 – MTIE-t Clear Threshold (pS)	7000	0 = Disable, 5000 to 10000000

Note: For 8-port IOC module option, these parameters apply to Ports 1 thru 6, Port 11, and Port 12

Appendix E Software Licenses

This product contains licensed third party software, including software available under the GPL licensing scheme. The text of each license is available in the “License” folder located on the Product Information CD-ROM that is supplied with the TimeCreator 1000. Additionally, you can obtain these licenses and the open-source software by contacting Symmetricom Technical support at the following numbers:

- Worldwide (Main Number): 1-408-428-7907
- USA, Canada, Latin America including Caribbean, Pacific Rim including Asia, Australia and
- New Zealand: 1-408-428-7907
- USA toll-free: 1-888-367-7966 (1-888-FOR-SYMM)
- Europe, Middle East & Africa: 49 700 32886435

An administrative fee may be charged to obtain the source code.

By using the TimeCreator 1000, the user agrees to the terms of these licenses.

In This Appendix

Third-Party Software

The following is a list of third-party software applications provided with the TimeCreator 1000.

- bash-2.05a
- busybox-1.01
- cron-3.0pl1
- daemontools-0.76
- dhcpcd-1.3.22pl1
- e2fsprogs-1.27
- eepro100-1.09
- findutils-4.1.7
- glibc-2.3.2
- glibc-2.3.2
- grub-0.97
- hardhatutils-1.14
- hostname-2.09
- ifupdown-0.6.4
- initscripts-2.78
- iproute-20030805
- iptables-1.2.9
- iputils-tracepath-20020124
- kernel-2.4.20_dev
- less-358
- libpam-0.72
- libpam-cracklib-0.72
- libpam-dev-0.72
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