



# **TimeProvider 5000 IEEE 1588 Grand Master Clock**

***User's Guide***  
*Revision A – December 2008*  
*Part Number 098-00028-000*

Symmetricom, Inc.  
2300 Orchard Parkway  
San Jose, CA 95131-1017  
U.S.A.

<http://www.symmetricom.com>

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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](#)
- [Who Should Read This Guide](#)
- [Structure of This Guide](#)
- [Conventions Used in This Guide](#)
- [Warnings, Cautions, Recommendations, and Notes](#)
- [Related Documents and Information](#)
- [Where to Find Answers to Product and Document Questions](#)
- [What's New In This Guide](#)

## Purpose of This Guide

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The *TimeProvider 5000 User's Guide* describes the procedures for unpacking, installing, using, maintaining, and troubleshooting the Symmetricom TimeProvider 5000 Precision Timing Protocol Grand Master (TimeProvider 5000). It also includes appendixes that describe alarms and events, the languages that you use to communicate with the TimeProvider 5000, default values, and other information.

## Who Should Read This Guide

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[Chapter 1, Overview of the TimeProvider 5000](#), 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 TimeProvider 5000, 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, configuration, and testing of the TimeProvider 5000.
- **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 TimeProvider 5000 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

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This guide contains the following sections and appendixes:

Chapter, Title	Description
<a href="#">Chapter 1, Overview of the TimeProvider 5000</a>	Provides an overview of the product, describes the major hardware and software features, and lists the system specifications.
<a href="#">Chapter 2, Engineering and Ordering Procedures</a>	Lists the part number and ordering procedure for all TimeProvider 5000 parts and accessories.
<a href="#">Chapter 3, Installing the TimeProvider 5000</a>	Contains procedures for unpacking and installing the system, and for powering up the unit.
<a href="#">Chapter 4, General Guidelines for using TimeProvider 5000</a>	Provides basic information to which users can refer to ensure proper system operation.
<a href="#">Chapter 5, Provisioning</a>	Describes the commands and procedures required to provision the TimeProvider 5000 after installing the unit.
<a href="#">Chapter 6, Maintenance and Troubleshooting</a>	Contains preventive and corrective maintenance, and troubleshooting procedures for the product.
<a href="#">Appendix A, System Messages</a>	Lists the alarms and events and provides basic indications of the source of the alarm.
<a href="#">Appendix B, Command Descriptions and Communications Interface</a>	Describes the CLI command conventions, functions, and features and the SNMP, SSH, and SFTP protocols.
<a href="#">Appendix C, Specifications and Factory Defaults</a>	Lists the specifications for the TimeProvider 5000.
<a href="#">Appendix E, Software Licenses</a>	Contains licensing information for third party software.
<a href="#">Index</a>	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:
TimeProvider 5000 User's Guide	The title of a document.
CRITICAL	An operating mode, alarm state, status, or chassis label.
Select <b>File</b> , <b>Open</b> ...	Click the Open option on the File menu.
Press <b>Enter</b> 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.
<i>qualified personnel</i>	A word or term being emphasized.
Symmetricom <b>does not</b> 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.

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## Related Documents and Information

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



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**Note:** Symmetricom offers training courses designed to enhance your knowledge of the TimeProvider 5000. Contact your local representative or sales office for a complete list of courses and outlines.

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## Where to Find Answers to Product and Document Questions

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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](http://www.symmetricom.com).

## What's New In This Guide

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This is the first release of this User's Guide.

# Chapter 1 Overview of the TimeProvider 5000

This chapter provides introductory information for the TimeProvider 5000.

## In This Chapter

- [Overview](#)
- [TimeProvider 5000 Connections](#)
- [Physical Description](#)
- [Functional Description](#)
- [Configuration Management](#)
- [Alarms](#)

## Overview

---

The TimeProvider 5000 is a Next Generation Network (NGN) packet-based timing and frequency device that combines the functionality of a highly-accurate, IEEE 1588 v2 Grand Master Clock with T1/E1 and 1PPS/10MHz I/O ports. The TimeProvider 5000, available with either a Quartz or Rubidium oscillator, incorporates hardware-based time stamping to provide the highest level of timing and frequency accuracy over a broad range of wireline and wireless application.

The TimeProvider 5000 features are as follows:

- Compact 1 RU Footprint
- ETSI Compliant: Front Access for all Connectors
- Dual –48 VDC Power Connectors
- 2 UTI Ports (future capability)
- Up to 2 Legacy Inputs (T1/E1 - T1 is a future capability)
- Up to 4 Legacy Outputs (E1/T1 is a future capability)
- 2 SFP Connectors on each IOC
- 1 L1 GPS Input on the IMC
- 1 Ethernet Mgmt Port on the IMC
- 1 EIA-232 Serial (Craft) Port on the IMC
- LED indicators on the IOC and IMC
- Hardware Protected (Redundant IOCs is a future capability)
- CLI and SNMP Management

## TimeProvider 5000 Connections

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[Figure 1-1](#) is a front view of the TimeProvider 5000 showing connectors and LEDs. Connections for the GPS input signal, Ethernet Management, and EIA-232 serial connection are located on the IMC module. Small Form-factor Pluggable (SFP) connectors are located on the IOC modules. UTI, 10 MHz/1pps, and I/O ports are located on the I/O module. The 1PPS/10MHz ports are optional. In the current version of TimeProvider 5000, units have two E1 input ports. In the future customers can order units with either four E1 I/O ports or two E1 I/O ports and a 10MHz and 1PPS port.

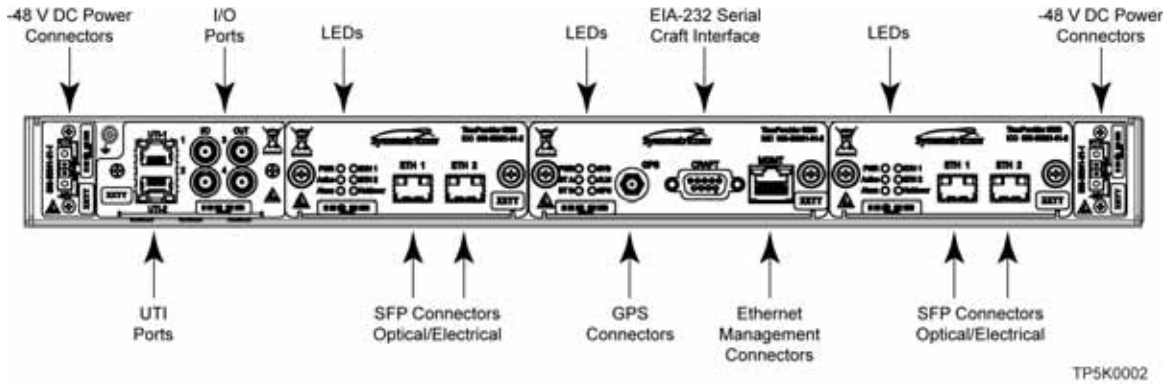


Figure 1-1. TimeProvider 5000 Connectors and LEDs

## UTI Input and Output Connections

The UTI connectors are for future use.

## Communications Connections

The IMC allows user control of the TimeProvider 5000 through either the Ethernet Management port or the EIA-232 serial port.

### Ethernet Management Port

The Ethernet Management port is standard 10/100Base-T shielded RJ-45 receptacle. To connect the TimeProvider 5000 to an Ethernet network, use a shielded twisted pair Ethernet RJ-45 cable.

### EIA-232 Serial (Craft) Port

The EIA-232 serial port connection is made through a EIA-23 female connector on the IMC. This port allow you to connect to a terminal or computer using a terminal emulation software package. When connecting to this port, use a shielded EIA-232 direct connect cable.

Figure 1-2 shows the EIA-232 male connector pin assignments for the serial port.

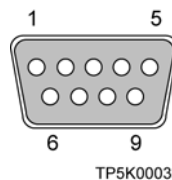


Figure 1-2. Serial Port Male Connector Pins

Table 1-1 describes the EIA-232 connector pin assignments for the serial port.

Table 1-1. Serial Port Connector Pin Assignments

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

## Output Connections

### Coaxial Output Connections

The four traditional telecom synchronization mini-BNC ports on the I/O module (Figure 1-3) are software configurable as output ports with the following signal types:

- 2.048 Mb/s (G.703/9) (future capability)
- 2.048 MHz (G.703/13) (future capability)
- 1PPS/10MHz



**Note:** Units that provide 1PPS/10MHz output must be ordered from the factory; they cannot be reconfigured in the field. One port provides 1PPS output and one port provides 10 MHz output.

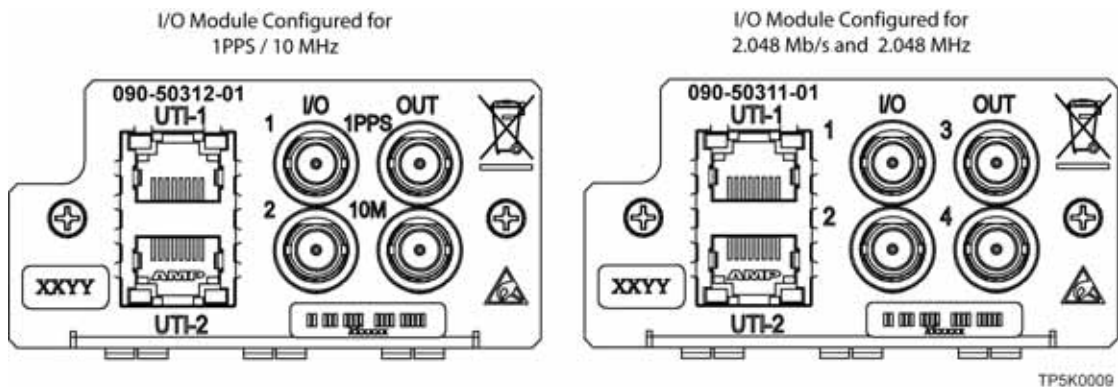


Figure 1-3. I/O Module



**Notes:**

1. Mini-BNC ports 1 and 2 are inputs in this release. In future releases, they can be configured as either outputs or inputs.
2. The UTI connectors in [Figure 1-3](#) are for future use.

**PTP Output Connections**

The TimeProvider 5000 provides two Ethernet 100/1000 Small-form Factor Pluggable (SFP) connections on each IOC (see [Figure 1-4](#)). In PTP (IEEE 1588v2) grand-master mode, the TimeProvider 5000 supports many slaves per system in unicast mode. The TimeProvider 5000 will also support multi-cast mode (a future capability).

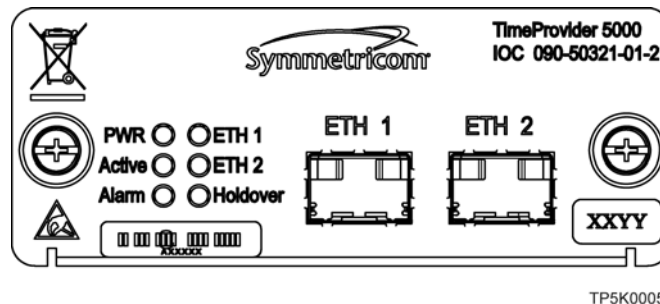


Figure 1-4. PTP Output Connections

**Input Connections**

**E1 Input Connections**

Mini-BNC ports 1 and 2 on the I/O module (see [Figure 1-3](#)) are software configurable as traditional telecom input ports with the following signal types:

- 2.048 Mb/s (G.703/9)
- 2.048 MHz (G.703/13)

**GPS Connection**

The IMC has a GPS input to provide a frequency and time reference (see [Figure 1-5](#)).

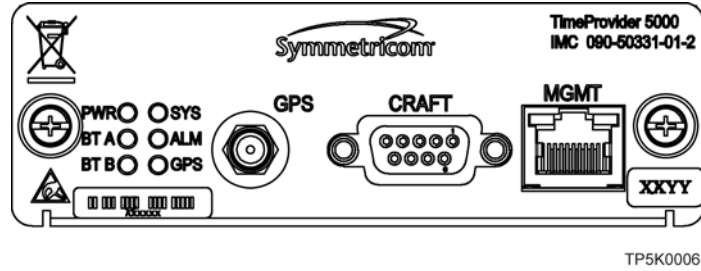


Figure 1-5. GPS Connection

## Power and Ground Connections

The TimeProvider 5000 uses  $-48$  VDC power and is not equipped with a Power switch; DC power is controlled by a power distribution panel connected to the power connectors. Frame ground connections are made on the grounding stud located on the left side of the front panel, as identified with the international Ground marking.



**Warning:** To avoid serious personal injury or death, exercise caution when working near high voltage lines and follow local building electrical codes for grounding the chassis.

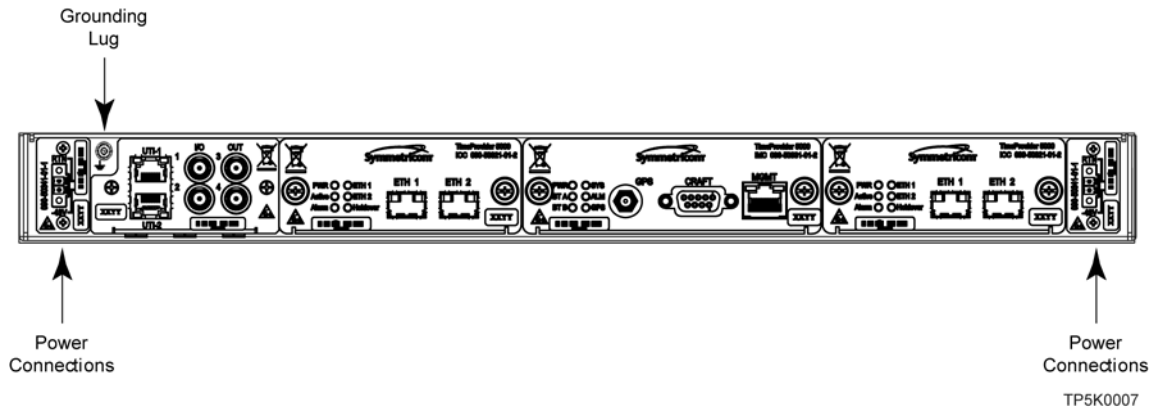


Figure 1-6. Power and Ground

## Physical Description

The TimeProvider 5000 consists of a 19-inch (48 cm) rack mount chassis, plug-in modules, and hardware.



**Note:** The TimeProvider 5000 comes equipped with 19-inch rack mounting brackets. 23-inch (58.42 cm) rack mounting adapters are also available as a separately ordered item. 21-inch (ETSI) rack mounting adapters are available as a separately ordered item.



The TimeProvider 5000 has one I/O module slot, two IOC module slots, and one IMC module slot. The grounding lug is located near the I/O module and the power supply connectors are located on both sides of the chassis (see [Figure 1-7](#)). The minimum configuration is an I/O module, an IOC module, and an IMC module. The second IOC module slot is available for redundancy. See [Overview](#), on page 30.

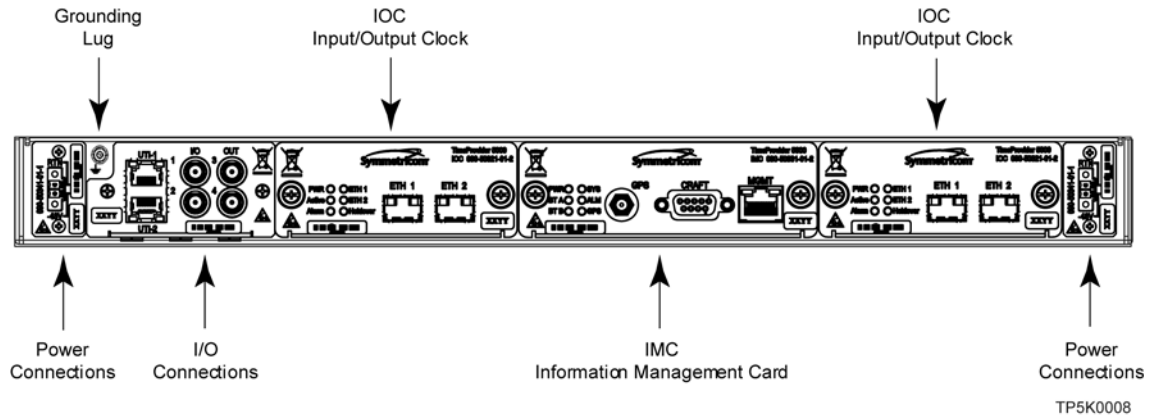


Figure 1-7. TimeProvider 5000 Modules and Power Connections

## Functional Description

[Figure 1-8](#) is a block diagram of the TimeProvider 5000.

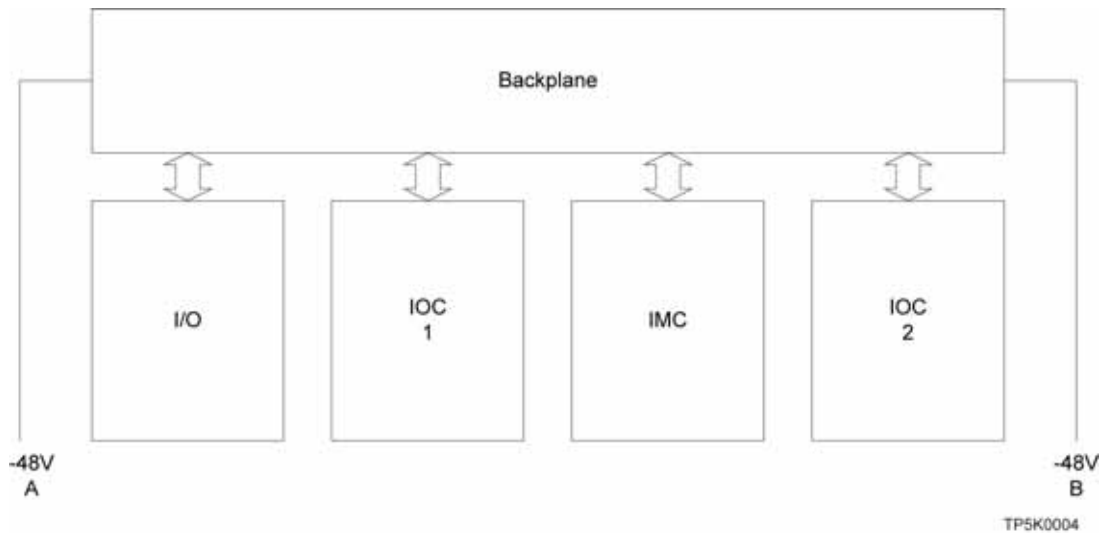


Figure 1-8. TimeProvider 5000 Block Diagram

## IMC Module LEDs

The IMC module provides connectors for 10/100 Ethernet management, EIA-232 serial management, and the GPS Timing Antenna. The IMC's LEDs indicate the following:

- Power Status
- Alarm Status
- GPS Signal Status

## IOC Module LEDs

The IOC module also has two PTP Grand Master 100/1000 Ethernet SFP ports with LEDs that indicate link and link speed. The IOC module has LED status indicators and test outputs for the system. The LEDs indicate:

- Power Status
- Active Status
- Ethernet Status
- Alarm Status
- Holdover Status

## Communication Ports

Communications ports on the IMC allow you to provision, monitor, and troubleshoot the chassis. You can communicate with the TimeProvider 5000 using either CLI or SNMP protocols.



**Note:** The SNMP feature can either be ordered in a new system, or added to a previously ordered system as a field upgrade (see [Table 2-1](#) for part number). Contact your Symmetricom representative for more information.

---

### Local Craft Serial Port

The EIA-232 port supports local control; you can configure the TimeProvider 5000 with CLI commands using a terminal or computer with terminal emulation software. The connector is located on the IMC module. The Local port is configured as a DCE interface and the default settings are as follows:

- Baud = 57.6K
- Data Bits = 8 bits
- Parity = None
- Stop bits = 1
- Flow Control, None

## 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 TimeProvider 5000.

## Synchronization and Timing Inputs

The TimeProvider 5000 can use either GPS or E1 signals as external input references. The GPS reference connects to a SMA connector on the IMC card and the E1 inputs are configurable ports located on the I/O module.

## Synchronization and Timing Outputs

The TimeProvider 5000 has four GbE Precision Timing Protocol (PTP) timing outputs (2 per IOC card).

## System Inputs and Outputs

The TimeProvider 5000 has four mini-BNC ports on the I/O module that are software configurable as either input or output ports. When configured as output ports, they can provide the following signal types:

- 2.048 Mb/s (G.703/9) (future capability)
- 2.048 MHz (G.703/13) (future capability)
- 1PPS/10 MHz



**Note:** Units that provide 1PPS/10MHz output must be configured at the factory when ordered; they cannot be reconfigured in the field. One port provides 1PPS output and one port provides 10MHz output.

---

Two of the mini-BNC ports are software configurable as input ports with the following signal types:

- 2.048 Mb/s (G.703/9)
- 2.048 MHz (G.703/13)

# Configuration Management

---

The Command Line Interface (CLI), also called the ASCII command set, can be used to control the TimeProvider 5000 from a terminal connected to the EIA-232 serial port, or the Ethernet port. Refer to [Appendix B, Command Descriptions and Communications Interface](#) for further details.



**Note:** Before you can communicate with the TimeProvider 5000 through an Ethernet connection, you must first configure the Ethernet port using the serial connection (see [Provisioning the Ethernet Ports](#), on page 66).

---

## Alarms

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The TimeProvider 5000 uses alarms to notify you when certain conditions are deteriorating below 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 70 and [Appendix A, System Messages](#).

# Chapter 2 Engineering and Ordering Procedures

This chapter describes the items available for the TimeProvider 5000, and lists the part number for each item.

## In This Chapter

- [Overview](#)
- [TimeProvider 5000 Part Numbers](#)
- [User-Supplied Tools and Materials](#)

## Overview

---

The TimeProvider 5000 can operate in either a basic configuration, or in a redundant configuration in one chassis. Basic configuration consists of the following components:

- 1 Chassis
- 1 IMC module
- 1 IOC module



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

---

Redundant configuration consists of the following components:

- 1 Chassis
- 1 IMC module
- 2 IOC modules

## TimeProvider 5000 Part Numbers

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### System and Accessory Part Numbers

This section provides part numbers and descriptions for the system and accessories available for the TimeProvider 5000. Also available as separately ordered items are 23-inch (58.42 cm) rack mounting adapters and 21-inch (ETSI) rack mounting adapters. See [Table 2-1](#) for component part numbers and [Table 2-2](#) for connection accessories.

*Table 2-1. Component Part Numbers*

Item	Part Number
<b>Base Units</b>	
TimeProvider 5000 Front Access ETSI Chassis –includes User’s Documentation CD and Installation Kit	990-50301-01
Spare TimeProvider 5000 Front Access ETSI Chassis	090-50301-01
TimeProvider 5000 Rear Access NEBS Chassis (future release)	990-50302-01

Table 2-1. Component Part Numbers

Item	Part Number
<b>I/O Modules</b>	
I/O Module with 4x E1 Ports and 2x UTI Ports	090-50311-01
I/O Module with 2x E1 Ports, 1PPS/10MHz Ports and 2x UTI Ports	090-50312-01
Blank I/O Face Plate	090-50312-99
<b>IOC and IMC Module</b>	
Quartz IOC Module	090-50321-01
Rubidium IOC Module	090-50322-01
Blank IOC Module Face Plate	090-50322-99
IMC Module with Integrated GPS	090-50331-01
<b>Rack Mounting Adaptor Kits</b>	
21-inch (ETSI) Bracket Rack Mounting Adaptor Kit	093-00011-000
23-inch (58.42 cm) Bracket Rack Mounting Adaptor Kit	093-00012-000
<b>Software Licenses</b>	
NTP Server License (future release)	920-50360-01
SNMP License	920-50370-01



**Note:** A blank face plate is required for EMC compliance if a slot is empty

Table 2-2. Connection Accessories

Item	Part Number
Optical 1000 Base-SX Multi-Mode Ethernet 850nm SFP Transceiver	121-20621-11-2
Optical 1000 Base-LX Single-Mode Ethernet 1310nm SFP Transceiver	121-20621-10-2
RJ45 100/1000/1GbE Base-T Full-Duplex SFP Transceiver	121-20621-13-2
Mini-BNC-to-BNC Adaptor Cable Kit (4 cables)	093-00068-000

## GPS Antenna

Table 2-3 lists the GPS antenna kits. Table 2-4 lists the cables available for the GPS antenna.

Table 2-3. GPS Antenna Kits

Part Number	Description
990-13091-006	Antenna Kit, 6 Meter (3 meter and 3 meter cables), 26dB Antenna
990-13091-013	Antenna Kit, 13 Meter (3 meter and 10 meter cables), 26dB Antenna
990-13073-070	Antenna Kit, 70 Meter (10 meter and 60 meter cables), 40dB Antenna
990-13074-150	Antenna Kit, 150 Meter (10 meter and 140 meter cables), 48db Antenna
990-13075-230	Antenna Kit, 230 Meter (10 meter and 220 meter cables), 48dB Antenna/20dB Amp

Table 2-4. GPS Roof Mount Cables (spares and replacements only)

Part Number	Description
58521A-001	1 Meter, LMR400 Interconnect Cable, connectorized
58521A-002	2 Meter, LMR400 Interconnect Cable, connectorized
58521A-005	5 Meter, LMR400 Interconnect Cable, connectorized
58521A-010	10 Meter, LMR400 Interconnect Cable, connectorized
58521A-015	15 Meter, LMR400 Interconnect Cable, connectorized
58521A-030	30 Meter, LMR400 Interconnect Cable, connectorized
58521A-060	60 Meter, LMR400 Interconnect Cable, connectorized
58521A-110	110 Meter, LMR400 Interconnect Cable, connectorized
58521A-220	220 Meter, LMR400 Interconnect Cable, connectorized



## User-Supplied Tools and Materials

---

You need to supply the following tools and materials for installing and testing the TimeProvider 5000.

- Standard tool kit
- Cable ties, waxed string or acceptable cable clamps
- 1 mm<sup>2</sup> / 18 AWG (minimum) stranded wire at 300 volt insulation for –48 VDC
- 1 mm<sup>2</sup> / 16 AWG wire to connect grounding lug to permanent earth ground
- Two U.L listed Ring Lugs for grounding connections
- Crimping tool to crimp the ring lug
- Shielded cabling of the appropriate impedance required by the specific signal type for signal wiring (including GPS, and Ethernet)
- Mating connectors for terminating signal wiring
- ESD wrist strap for installing modules
- Fasteners for mounting the equipment in rack
- Digital multimeter or standard Voltmeter for verifying power connections to the chassis
- Laptop computer with communications software (e.g., Microsoft Hyperterminal, ProComm Plus or EmTec ZOC) for setting system parameters



# Chapter 3 Installing the TimeProvider 5000

This chapter describes the procedures for installing the TimeProvider 5000.

## In This Chapter

- [Getting Started](#)
- [Unpacking the Unit](#)
- [Rack Mounting the Chassis](#)
- [Working With Modules](#)
- [Signal Connections](#)
- [Connecting the GPS Antenna](#)
- [Making Ground and Power Connections](#)
- [Installation Check List](#)
- [Applying Power to the TimeProvider 5000](#)

## Getting Started

---

Before you begin to install the TimeProvider 5000, 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 83 for telephone numbers. Contact SGS - Product Technical Support for technical information. Contact Customer Service for information about your order, RMAs, and other information.

### Site Survey

Before you begin installation, determine the chassis location, ensure the appropriate power source is available (–48 VDC), and ensure that the equipment rack is properly grounded.

The TimeProvider 5000 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 18 in (45.7 cm)..



**Note:** 1RU above the TimeProvider 5000 must be left unoccupied for heat dissipation



**Note:** 23-inch (58.42 cm) rack mounting adapters are also available as a separately ordered item. 21-inch (ETSI) rack mounting adapters are available as a separately ordered item.

---

The TimeProvider 5000 is to be installed into a rack with permanent connection to the -48VDC mains. This connection is to be made to a branch over-current, short-circuit protection device with replaceable fusing of 5 amps, maximum. For permanently connected equipment a readily accessible disconnect device shall be incorporated in the building installation wiring.

### 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: 23° F to 113° F (–5° C to 45° C)
- Operating Humidity: 5% to 85% 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.

- 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 TimeProvider 5000.

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 TimeProvider 5000:

- Standard tool kit
- Cable ties, waxed string or acceptable cable clamps
- 1 mm<sup>2</sup> / 18 AWG (minimum) stranded wire at 300 volt insulation for –48 VDC
- 1 mm<sup>2</sup> / 16 AWG wire to connect grounding lug to permanent earth ground
- Two U.L listed Ring Lugs for grounding connections
- Crimping tool to crimp the ring lug
- Shielded cabling of the appropriate impedance required by the specific signal type for signal wiring (including GPS, and Ethernet)
- Mating connectors for terminating signal wiring
- ESD wrist strap for installing modules
- Fasteners for mounting the equipment in rack
- Digital multimeter or standard Voltmeter for verifying power connections to the chassis
- Laptop computer with communications software (e.g., Microsoft Hyperterminal, ProComm Plus or EmTec ZOC) for setting system parameters

## Unpacking the Unit

---

The TimeProvider 5000 is packaged to protect it from normal shock, vibration and handling damage.



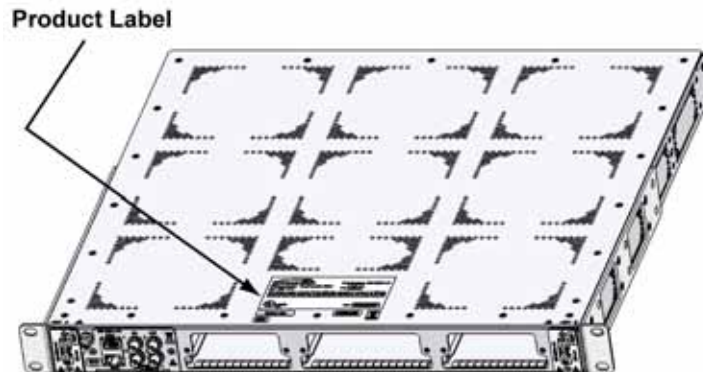
**Caution:** To avoid electrostatic discharge (ESD) damage to parts that are packaged with the TimeProvider 5000, observe the following procedures.

---

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 CD, 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 top of the unit, front and center. See [Figure 3-1](#) for the location of the label. Contact your Symmetricom distributor if the model or item number do not match.

For a complete listing of item numbers, see [Table 2-1](#) and [Table 2-3](#).



*Figure 3-1. Location of Product Label*

## Rack Mounting the Chassis

---

The installation procedure described in this section provides general guidelines for installing the TimeProvider 5000. Always follow applicable local electrical standards.

Use the following steps to mount the TimeProvider 5000 in a rack.



**Note:** 1RU above the TimeProvider 5000 must be left unoccupied for heat dissipation.



**Note:** The TimeProvider 5000 comes equipped with 19-inch rack mounting brackets. 23-inch (58.42 cm) rack mounting adapters are also available as a separately ordered item. 21-inch (ETSI) rack mounting adapters are available as a separately ordered item.

---

1. TimeProvider 5000 is shipped with rack mounting brackets attached. The rack mounting brackets can be removed and reattached in a different orientation, if desired. Ensure that the mounting brackets on both sides are attached to the chassis at equal distances from the front of the unit (see [Figure 3-2](#)) using 6-32 x 1/4-inch screws. See [Figure 3-3](#) for mounting hole placements. See [Figure 3-4](#) and [Figure 3-5](#) for chassis dimensions.
2. Mount the chassis to the front of the equipment rack rails with four screws and associated hardware. Use the proper screws for the equipment rack.

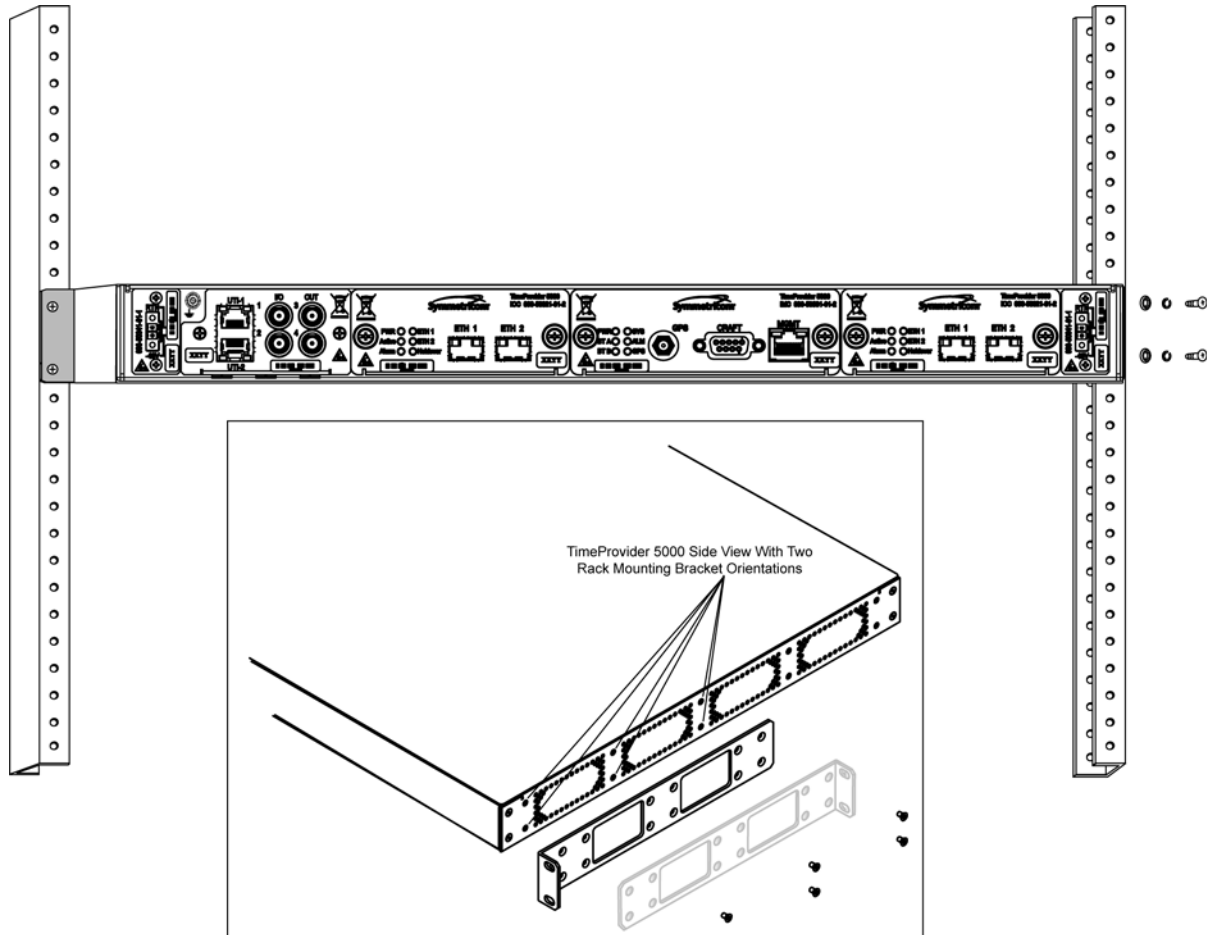


Figure 3-2. Installing the TimeProvider 5000

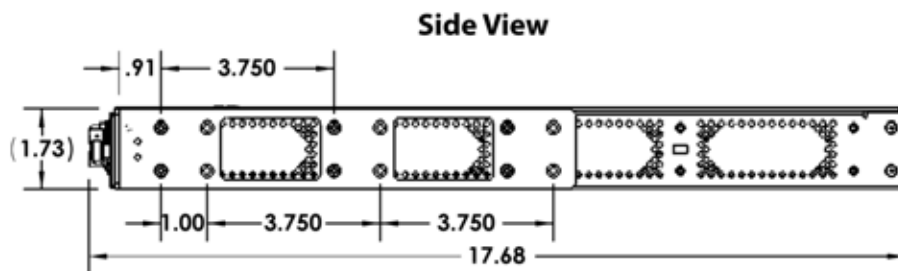


Figure 3-3. Chassis Dimensions – Side View



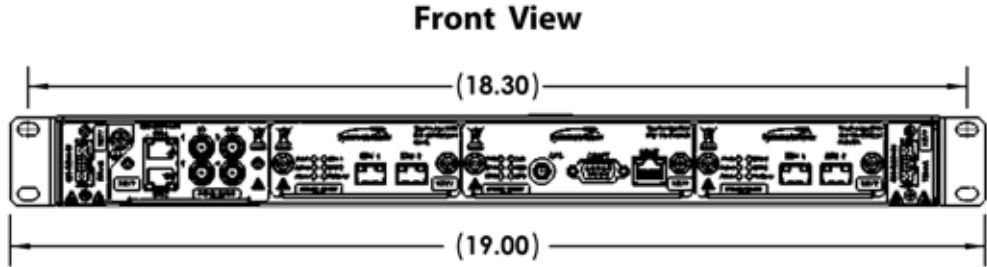


Figure 3-4. Chassis Dimensions – Front View

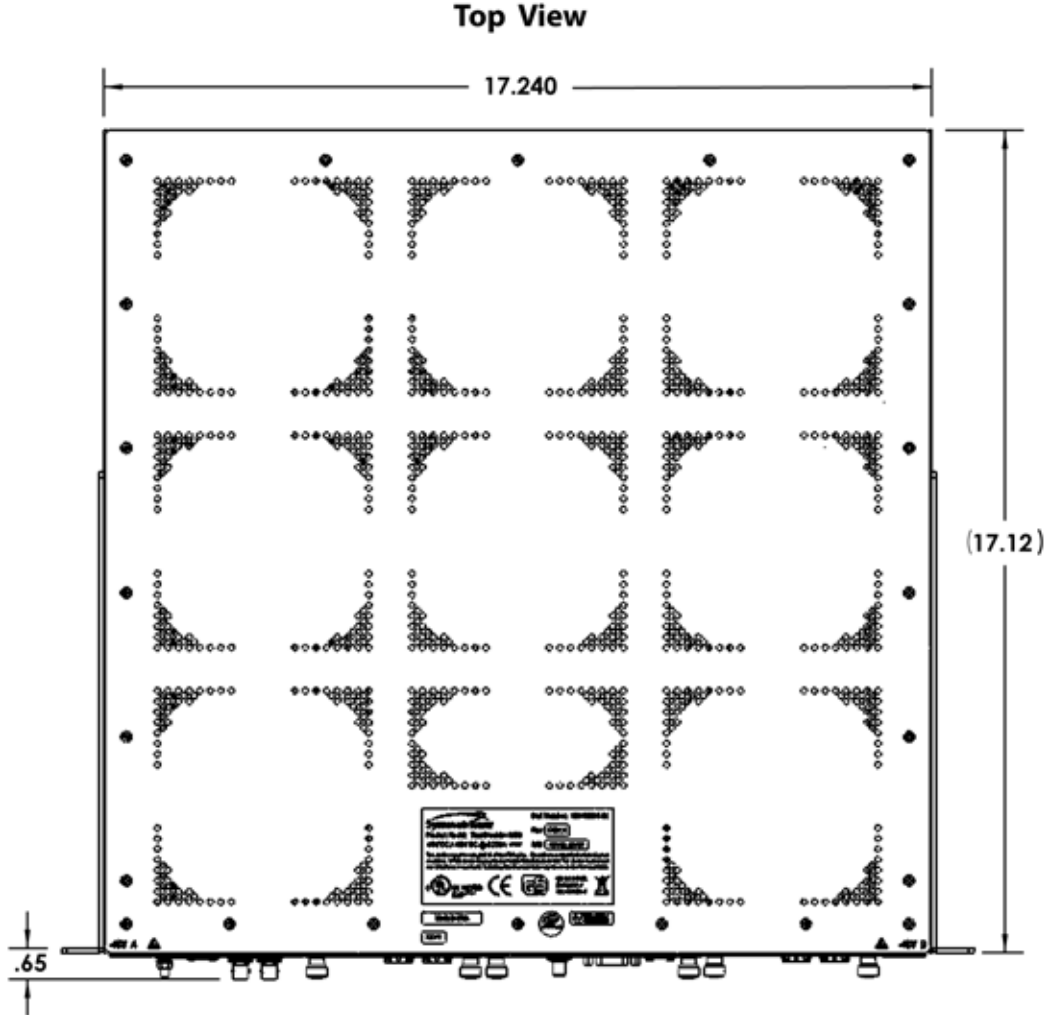


Figure 3-5. Chassis Dimensions – Top View

## Working With Modules

---

This section describes how to install, remove, and handle the modules associated with the TimeProvider 5000.

### 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:** All 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 chassis:

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.
3. Tighten the captive screws located on each side of the panel.



**Note:** The I/O card does not have captive screws and requires a Phillips screwdriver.

---



**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.

---

## Removing Modules

To remove a module, loosen the screws and then pull out the module. Be sure to place the module on a static-free surface.



**Caution:** You must disconnect the GPS antenna before removing the IMC module.

## Signal Connections

The connectors for the GPS input signal, Ethernet Management, and EIA-232 serial connection are located on the IMC module. The PTP output connectors are located on the IOC module. The E1 and UTI connectors are located on the I/O module.



**Note:** The UTI connectors are for future use.

## Communications Connections

The IMC allows user control of the TimeProvider 5000. The EIA-232 serial port and Ethernet Management port are located on the IMC as shown in [Figure 3-6](#). See [Working With Modules](#), on page 42 for module installation instructions.

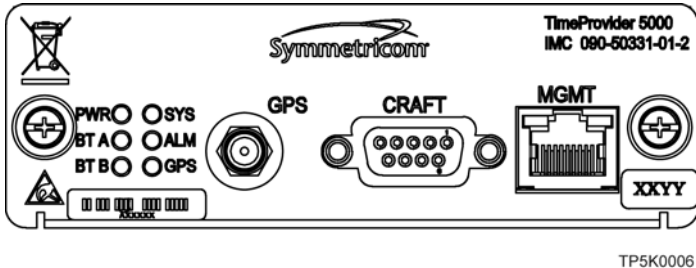


Figure 3-6. IMC Module

### Ethernet Management Port

The Ethernet Management port is standard 10/100Base-T shielded RJ-45 receptacle. To connect the TimeProvider 5000 to an Ethernet network, use a shielded twisted pair Ethernet RJ-45 cable.

The connector pinouts are listed in [Table 3-1](#).

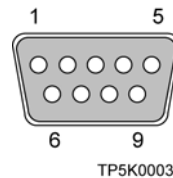
*Table 3-1. Management Ethernet Connector Pin Assignments*

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 EIA-232 female connector on the IMC. This ports allow you to connect to a terminal or computer using a terminal emulation software package for remote monitoring and control. When connecting to this port, use a shielded EIA-232 direct connect cable.

[Figure 3-7](#) shows the EIA-232 male connector pin assignments for the serial port.



*Figure 3-7. Serial Port Male 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

## Synchronization and Timing Connections

The TimeProvider 5000 has one GPS input on the IMC module, two redundant PTP timing outputs on each IOC module, and four E1/T1 connections on the I/O module. Two of the four E1/T1 connectors can be outputs, or inputs.

### GPS Connections

To connect a GPS signal, you must install a GPS antenna. See [Connecting the GPS Antenna](#), on page 47. Also see [Working With Modules](#), on page 42 for module installation instructions.



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

---

### PTP Connections

The two Ethernet 10/100/1000 Small-form Factor Pluggable (SFP) connections on each IOC provide redundant PTP outputs (see [Figure 3-8](#)).

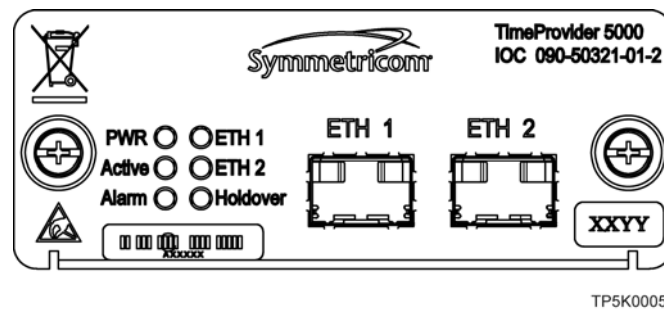


Figure 3-8. PTP Output Connections

The following SFP transceivers are recommended and supported:

**Optical 1000 Base-SX Multi-Mode Ethernet 850nm SFP Transceiver  
(Symmetricon 121-20621-11-2)**

- Avago AFBR-5710PZ
- Finisar FTLF8519P2BNL

**Optical 1000 Base-LX Single-Mode Ethernet 1310nm SFP Transceiver  
(Symmetricon 121-20621-10-2)**

- Avago AFCT-5701PZ
- Finisar FTLF1319P1BTL

**RJ45 100/1000/1GbE Base-T Full-Duplex SFP Transceiver**

Avago ABCU-5710RZ

Other SFP transceivers are not supported and may cause the TimeProvider 5000 to not comply with regulatory requirements.

### E1 Connections

The four E1 mini-BNC ports on the I/O module (see [Figure 3-9](#)) are software configurable as output ports with the following signal types:

- 2.048 Mb/s (G.703/9) (future capability)
- 2.048 MHz (G.703/13) (future capability)
- 1PPS/10 MHz



**Note:** Units that provide 1PPS/10MHz output must be configured at the factory when ordered; they cannot be reconfigured in the field. One port provides 1PPS output and one port provides 10MHz output



**Note:** Amphenol mini-BNC connectors (031-70261) can be used to create cables. Alternatively, Symmetricom sells a kit of 4 mini-BNC to BNC adapter cables (093-00068-000).

The TimeProvider 5000 provides two ports that are software configurable as E1 input ports with the following signal types:

- 2.048 Mb/s (G.703/9)
- 2.048 MHz (G.703/13)

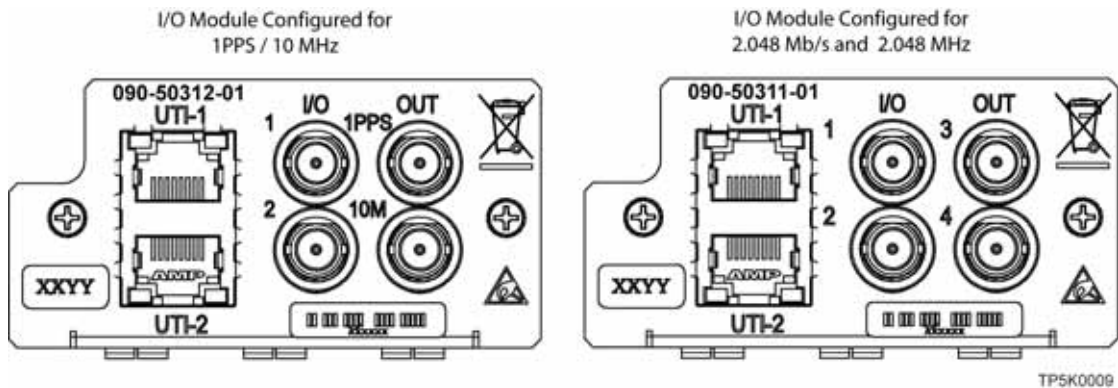


Figure 3-9. E1 Output Connections

## Connecting the GPS Antenna

---



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

The antenna connections are made at the IMC module connector labeled GPS. Allow at least one hour for the unit to track and lock to GPS.

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.



**Warning:** To avoid serious personal injury or death, exercise caution when working near high voltage lines. In particular:

- Use extreme caution when installing the antenna near, under, or around high voltage lines.
- Follow local building electrical codes for grounding the chassis.

## Making Ground and Power Connections

---



**Warning:** To avoid accidental power-up of the chassis, remove the A and B fuses on the branch over-current protection unit before beginning the TimeProvider 5000 installation. The unit is not equipped with a power on/off switch.

The TimeProvider 5000 has two –48 VDC power connectors for redundant operation, which are located on the right and left sides of the front panel (see [Figure 3-10](#)). A separate frame ground lug is provided on the left side of the front panel.

### Ground Connections

Frame ground connections are made using the M4 Grounding Terminal Stud located on the left side of the front panel of the unit. This stud is marked with the universal ground symbol, as shown in [Figure 3-11](#).

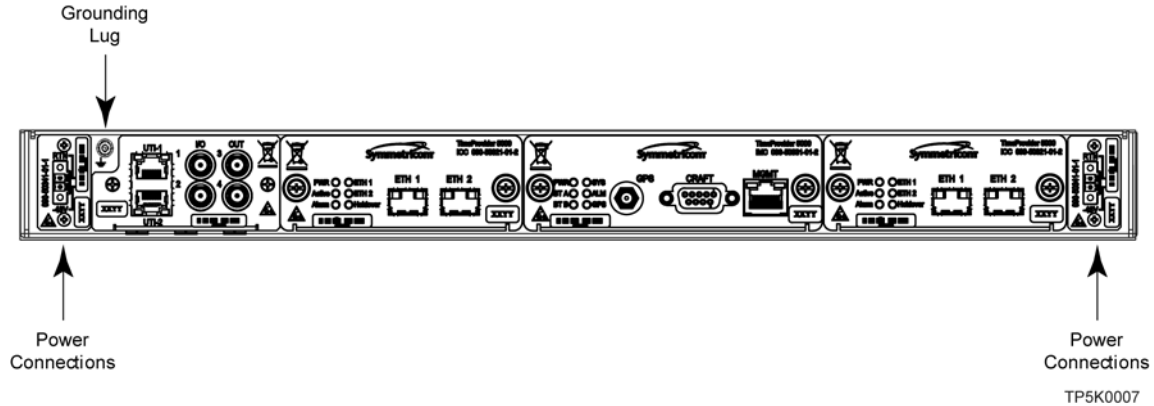


Figure 3-10. TimeProvider 5000 Power Connections



Figure 3-11. Universal Ground Symbol

After installing the TimeProvider 5000 into the rack, connect the chassis to the proper grounding zone or master ground bar. Run a 16 AWG green/yellow-striped insulated wire from the TimeProvider 5000 grounding terminal to the Earth Ground on the rack. The rack grounding method is below.



**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.

1. Crimp the customer-supplied U.L listed Ring Lug to one end of the 16 AWG wire and connect it to the ground terminal on the left side of the front panel using the supplied M4 Kept machine nut. The surface of the TimeProvider 5000 Earth grounding terminal must be clean of contaminants and oxidation.
2. Crimp the appropriate customer-supplied U.L listed Ring Lug to the other end of the 1 mm<sup>2</sup> / 16 AWG green/yellow-striped wire. Remove the paint and sand the area around the screw hole to ensure the proper conductivity. Coat the connection with an electrically conductive antioxidant compound such as Kopr-shield spray. Connect this Ring Lug to the rack with appropriate customer supplied screws and external star lock washers.
3. Using a digital voltmeter, measure between the ground and chassis and verify that no voltage exists between them.



## Power Connections

Use the following procedure to make the power connections:



**Warning:** To avoid possible damage to equipment, you must provide power source protective fusing as part of the installation. The TimeProvider 5000 is intended for installation in a restricted-access location.

---



**Caution:** To avoid damage to the unit, remove the fuses in the fuse panel which provides power to the TimeProvider 5000 before making power connections.

---

1. Ensure the power source is turned off.
2. Connect the frame ground terminal to earth ground.
3. Locate the power connectors included in the installation kit.
4. Using 1 mm<sup>2</sup> / 18 AWG (minimum) stranded wire, connect primary power to the connectors per the polarity markings. Use the polarity markings of "-48V" and "RTN" as a reference for the proper polarity connection..



**Note:** The -48VDC power must be connected with the proper polarity. The unit will not be damaged by reverse polarity, but the unit will not operate if the polarity is reversed.

---

5. Insert the connectors into the power connections in the chassis. See [Figure 3-12](#). Tighten screws in the connector

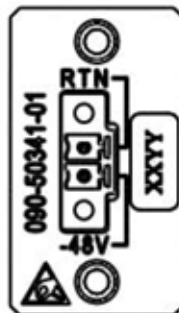


Figure 3-12. TimeProvider 5000 Power Connector

## Testing Power Connections

To verify that the power connections to the TimeProvider 5000 are correct, follow the steps in this section. The connections on the primary power module are referred to as Power A and Return A. The connections on the secondary power module are referred to as Power B and Return B. Use a digital multimeter (Fluke 77 or equivalent) to make the measurements.

1. Remove all fuses that supply power to the unit from the fuse panel.
2. Ensure that no IOC or IMC modules are installed in the unit.
3. Disconnect the -48V battery leads from the unit's power connector terminals. See the primary and secondary power connections in [Figure 3-13](#). Leave the Return battery leads connected to the unit.



Figure 3-13. Power and Ground Connections on the TimeProvider 5000

4. At the chassis end of the battery leads, use the multimeter to measure the voltage between the following test points:

Test Point	Test Point	Result
Battery A lead	Battery B lead	0 V
Battery A lead	Primary: Return A	0 V
Battery A lead	Earth Ground	0 V
Battery B lead	Secondary: Return B	0 V
Battery B lead	Earth Ground	0 V

5. Reconnect the -48V battery A and battery B leads to the -48V A and -48V B terminal connectors.
6. Install the A fuse in the power source fuse panel.
7. Measure the voltage between the -48V A and Return terminals on the primary power module. The multimeter should indicate -42 VDC to -56 VDC.
8. Install the B fuse in the power source fuse panel.
9. Measure the voltage between the -48V B and Return terminals on the secondary power module. The multimeter should indicate -42 VDC to -56 VDC.

The unit is now powered up.

## Installation Check List

---

To verify that the installation of the TimeProvider 5000 is complete, perform the checks and procedures in [Table 3-3](#).

*Table 3-3. Installation Completeness Checklist*

Operation	Complete
Ensure the TimeProvider 5000 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 TimeProvider 5000

---

The TimeProvider 5000 is not equipped with a Power switch. DC power is controlled by a power distribution panel. After installing the unit in a rack and making the necessary connections described in previous sections, turn on power at the distribution panel.

### Normal Power Up Indications

As the TimeProvider 5000 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 3-4](#) provides a description of the module LEDs.

Table 3-4. Module LED Descriptions

LED	Label	Description
<b>IMC Module</b>		
Power Module Power Indicator	PWR	<b>Green</b> - Module power available <b>Off</b> - Module power not available
-48V A-Bus A-Bus Battery Indicator	BT A	<b>Off</b> - A-Bus power connected <b>Red</b> - A-Bus power not connected
-48V B-Bus B-Bus Battery Indicator	BT B	<b>Off</b> - B-Bus power connected <b>Red</b> - B-Bus power not connected
System Health Aggregation of system alarms indicator	SYS	<b>Off</b> - System operating normally <b>Amber</b> - System operational Minor Alarm(s) <b>Red</b> - System operational Major or Critical Alarm(s)
IMC Alarm IMC module alarm/fault indicator	ALM	<b>Off</b> - IMC operating normally <b>Amber</b> - IMC operational Minor Alarm(s) <b>Red</b> - IMC operational Major/Critical Alarm(s) <b>Flashing Green</b> - Software starting up
GPS Status GPS engine communication and antenna cable status indicator	GPS	<b>Red</b> - Internal GPS hardware fault <b>Green</b> - GPS enabled and GPS engine/interface is operating normally <b>Amber</b> - GPS enabled and GPS engine or antenna interface has operational issues <b>Off</b> - GPS disabled
TCP/IP Management Port LEDs on the Ethernet connector	MGMT	<b>Left Amber Flash</b> - Activity <b>Left Off</b> - No Activity <b>Right Green</b> - Link has been established <b>Right Off</b> - Link has not been established
<b>IOC Module</b>		
Power Module Power Indicator	PWR	<b>Green</b> - Module power available <b>Off</b> - Module power not available
Active Indicates which IOC is responsible for generating Telecom, 10MHz, and 1PPS outputs	ACT	<b>Off</b> - Standby IOC or System Startup <b>Green</b> - Active IOC
IOC Alarm IOC module alarm/fault indicator	ALM	<b>Off</b> - IOC operating normally <b>Amber</b> - IOC operational Minor Alarm(s) <b>Red</b> - IOC has Failed or has Major/Critical Alarm(s) <b>Flashing Green</b> - Software starting up

Table 3-4. Module LED Descriptions (Continued)

LED	Label	Description
Ethernet Port 1 ETH1 port that is used for timing distribution	ETH1	<b>Green</b> - Link has been established <b>Flashing Green</b> - Link activity <b>Amber</b> - Indicates Standby PTP port <b>Off</b> - Link has not been established
Ethernet Port 2 ETH2 port that is used for timing distribution	ETH2	<b>Green</b> - Link has been established <b>Flashing Green</b> - Link activity <b>Amber</b> - Indicates Standby PTP port <b>Off</b> - Link has not been established
Local Oscillator State Indicates the current mode of operation of the LO servo	HOLD	<b>Off</b> - LO servo is operating in Locked mode <b>Amber</b> - LO servo is operating in Holdover or Acquire modes <b>Flashing Amber</b> - LO servo is operating in Warm-up mode



# Chapter 4 General Guidelines for using TimeProvider 5000

This chapter provides guidelines for using the TimeProvider 5000.

## In This Chapter

- [Logging In And Out](#)
- [Adding And Deleting Users](#)
- [Saving The Present Configuration To Non-volatile Memory](#)
- [Restoring Default Configuration](#)
- [Determining Status](#)
- [Forcing Unit To Send New Time](#)
- [Configuring Static IP \(default\)](#)
- [Configuring Dynamic IP \(DHCP\)](#)

## CLI commands

---



**Note:** The "sync tod-source" command used in some of the following examples forces the TimeProvider 5000 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 issues with equipment using the outputs of the TimeProvider 5000.

---

### Logging In And Out

The default administrator user name is "admin" with password "symmadmin\*\*"

To login:

```
tp5000> login
User: <user name>
Password: <password>
```

To logout:

```
tp5000> logout
```

### Adding And Deleting Users

Only a security-level admin user can add or delete users.

Users can be added or removed with the following commands:

```
set user add <username>
set user delete <username>
```

### Saving The Present Configuration To Non-volatile Memory

Use the following commands to save IMC module settings to the active IOC memory and to save the active IOC module settings in the IMC memory:

```
set configuration backup imc-to-ioc
set configuration backup ioc-to-imc
```

### Restoring Default Configuration

The user can restore the TimeProvider 5000 to Symmetricom factory default values in two ways. The `default` mode preserves user login information and system IP addresses, and is set with the following command:

```
set configuration default
```



The `factory` mode overwrites all user login information and system IP addresses, and is set with the following command:

```
set configuration factory
```

## Determining Status

```
show alarm (displays presently active alarms)
```

```
show gps (displays GPS information)
```

```
show inventory (according IMC and IOC cards)
```

```
show status (displays general status of unit)
```

## Forcing Unit To Send New Time

If you change the TOD source after the unit has left warm-up, you must enter the following command to change the time:

```
sync tod-source now
```

If you change to GPS, enter the command after the unit is ready; use the `show alarms` command and 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.

## Configuring Static IP (default)

Example for host ip address of 192.168.0.10, with router gateway at 192.168.0.1:

```
set ip-mode static
```

```
set ip imc address 192.168.0.10 netmask 255.255.255.0 gateway  
192.168.0.1
```

```
set ip imc restart
```

```
show ip mode (to verify change to static mode)
```

```
show ip config imc (to verify change to IP address, gateway, and mask)
```

## **Configuring Dynamic IP (DHCP)**

Ethernet cable should already be connected and DHCP server configured:

```
set ip-mode dhcp
```

```
set ip imc restart
```

```
show ip mode (to verify change to DHCP mode)
```

## **Switching Active And Standby Cards**

Capability will be added in future release

# Chapter 5 Provisioning

This chapter describes the procedures for provisioning the TimeProvider 5000. Use the procedures in this chapter after you have installed and powered up the TimeProvider 5000 (see [Chapter 3, Installing the TimeProvider 5000](#)).

## In This Chapter

- [Establishing a Connection to the TimeProvider 5000](#)
- [Managing the User Access List](#)
- [Provisioning Login Authentication](#)
- [Provisioning the Ethernet Ports](#)
- [Provisioning PTP](#)
- [Setting the System Date Time and Time Offset](#)
- [Provisioning the Input Reference](#)
- [Provisioning Alarms](#)
- [Routine Operation Commands](#)
- [Saving and Restoring Provisioning Data](#)
- [Simple Network Management Protocol](#)
- [SNMP Users and Manager Addresses](#)

## Establishing a Connection to the TimeProvider 5000

---

To set up and manage the TimeProvider 5000 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 60. If the TimeProvider 5000 is connected to an Ethernet LAN, use the procedure described in [Communicating Through the Ethernet Port](#), on page 60.



**Note:** Before you can communicate with the TimeProvider 5000 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 TimeProvider 5000 to a terminal or a computer with terminal emulation via a straight through serial cable:



**Note:** For information on restricting user access, see [Managing the User Access List](#), on page 61.

---

1. Connect one end of a straight through serial 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, 57600 baud rate, and no flow control.
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 TimeProvider 5000 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 TimeProvider 5000 Ethernet parameters (IP Address, Subnet Mask, and Gateway Address).



**Note:** The TimeProvider 5000 default IP address is 192.168.0.100, the subnet mask is 255.255.255.0, and the gateway address is 0.0.0.0. If these defaults are acceptable, the following procedure using the serial port is not required.

1. Establish a direct serial connection to the TimeProvider 5000 as described in [Communicating Through the Serial Port](#), on page 60.
2. Provision the IP, Gateway, and Subnet Mask addresses for the TimeProvider 5000. The IT department or site administrator for your location can recommend specific addresses for these parameters. Use the dotted decimal format xxx.xxx.xxx.xxx to enter the address parameters with the following commands:

### Example

```
tp5000> set ip imc address 192.168.0.10 netmask 255.255.255.0
gateway 192.168.0.254 <enter>
tp5000> set ip imc restart <enter>
```

## Connecting Through an Ethernet LAN

1. Ensure that the TimeProvider 5000 is connected to a LAN (see [Communications Connections](#), on page 43 for details).
2. Telnet from your computer to the IP address assigned to the TimeProvider 5000 (see [Configuring the Ethernet Port](#), on page 61).
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 63.
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.

Table 5-1. User Level and Access

Security Level	Description
User	Users can edit their password and show information, or access any command at the User security level.
Config	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 TimeProvider 5000.

## Logging In

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

1. Ensure that the TimeProvider 5000 is connected to a LAN, or directly connected to a computer through the EIA-232 serial port. See [Communications Connections](#), on page 43.
2. If the TimeProvider 5000 is connected to a LAN, Telnet from your computer to the assigned IP address.

If the TimeProvider 5000 is connected to a computer directly through the serial port, start a Terminal 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 "symmadmin\*\*\*". 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.

Username can consist of numbers, upper and lower case letters, dash “-”, and underscore “\_”, with a maximum of 20 characters. Username cannot use a leading dash “-” as the first character.

For a description of user access levels, see [Managing the User Access List](#), on page 61.

---

1. Login at the Admin level (see [Logging In](#), on page 62).
2. Type `show user` and press **Enter** to view the current list of users.
3. Type `set user add` and press **TAB** twice. The system prompts you for a user name.
4. Type a user name and press **SPACE** and then **TAB**. The name you enter will be the log-in name for the user. The system prompts you for the access-level for the user.
5. Type in the desired access-level (user, config, or admin) 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**. The system indicates that “CLI user has been added: <user>”.
8. Type `show user` and press **Enter** to verify that the account exists.
9. Repeat steps 3 through 8 of this procedure to add other users.

## Deleting A User

Use the following procedure to delete user ABCD1234 from the system access list. Do not delete the default username and password.

1. Login at the Admin level (see [Logging In](#), on page 62).
2. Type `show user` and press **Enter** to view the current list of users.

3. Type `set user delete ABCD1234` and press **Enter**.

## Displaying Current Users and User Access Levels

Use the following procedure to show a list of all assigned users and their access levels.

1. Login at the Admin level (see [Logging In](#), on page 62).
2. Type `show user` and press **Enter**. The system displays the current list of users.

## Changing a User's Password and Access Level

To change a user's password and access level you must delete and then re-create the user. 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 "-" as the first character.

For a description of user access levels, see [Managing the User Access List](#), on page 61.

---

1. Login at the Admin level (see [Logging In](#), on page 62).
2. Type `show user` and press **Enter** to view the current list of users.
3. Type `set user delete <user name>` and press **Enter**.
4. Type `set user add` and press **TAB** twice. The system prompts you for a user name.
5. Type a user name and press **SPACE** and then **TAB**. The name you enter will be the log-in name for the user. The system prompts you for the access-level for the user.
6. Type in the desired access-level (user, config, or admin) and press **Enter**. The system prompts you for a password.
7. 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.



8. Retype the password and press **Enter**. The system indicates that "CLI user has been added: <user>".
9. Type `show user` and press **Enter** to verify that the account exists.
10. Repeat Steps 3 through 9 to modify other user passwords and access levels.

## Provisioning a RADIUS Server

---

To authenticate using RADIUS, the RADIUS server must be properly configured. The usernames, passwords, and security level of the remotely-authenticated users can be controlled from the RADIUS server. The TimeProvider 5000 uses the "User-Name" attribute to determine the security level. For admin-level, use "remote\_admin". For config level, use "remote\_config". For user-level, use "remote\_user".

Listed below are example configurations in the `/etc/raddb/users` file for the FreeRADIUS server.

### Example 1:

```
usr_a Auth-Type := Local, User-Password == "test"  
Reply-Message = "Level 1 access granted\n",  
User-Name=remote_admin
```

### Example 2:

```
usr_c Auth-Type := Local, User-Password == "test"  
Reply-Message = "Level 2 access granted\n",  
User-Name=remote_config
```

### Example 3:

```
usr_u Auth-Type := Local, User-Password == "test"  
Reply-Message = "Level 3 access granted\n",  
User-Name=remote_user
```

## Provisioning Login Authentication

The authentication scheme used in the TimeProvider 5000 allows you to provision a RADIUS server IP address and authentication key(s) for server access. If RADIUS is enabled, the system allows local login if the server doesn't authenticate the user and the user is configured locally.

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

1. Type `set authentication radius server <address>` and press **Enter** (address is the server IP address, for example 192.168.0.10).
2. Type `set authentication radius key <key>` and press **Enter** (key is up to 32 ASCII characters).
3. Type `set authentication radius enable` and press **Enter**.

## Provisioning the Ethernet Ports

---

The TimeProvider 5000 supports static IP addresses as well as dynamically allocated addresses on the MGMT (Management) 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 C, Specifications and Factory Defaults](#) for addresses.

### Static IP Mode

Use the following procedure to configure the TimeProvider 5000 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 Config-user level (see [Logging In](#), on page 62).
2. Type `set ip-mode static` and press **Enter**.
3. Type `set ip imc address 192.168.0.10 netmask 255.255.255.0 gateway 192.168.0.1` and press **Enter**.
4. Type `set ip imc restart`.

### DHCP Mode

You can either enable or disable DHCP mode on the MGMT port. Use the following procedure to configure the TimeProvider 5000 to enable DHCP on the MGMT port.

#### *Example*

1. Login at the Admin or Config-user level (see [Logging In](#), on page 62).
2. Type `ip-mode imc dhcp` and press **Enter**.

3. Type `set ip imc restart` and press **Enter**.

## Provisioning IOC Ethernet Ports

The Ethernet ports on an IOC card can be configured as a redundant pair or independent ports.

Use the following procedure to configure ports on IOC 1 as a redundant pair.

1. Login at the admin or Config-user level.
2. Type `set ip ioc1-1 address 192.168.2.10 netmask 255.255.255.0 gateway 192.168.2.1` and press **Enter**.
3. Type `set redundancy port IOC1 enable` and press **Enter**.
4. Type `set ip ioc1-1 restart` and press **Enter**.

Use the following procedure to configure the ports on IOC 1 as independent ports.

1. Login at the admin or Config-user level.
2. Type `set ip ioc1-1 address 192.168.2.10 netmask 255.255.255.0 gateway 192.168.2.1` and press **Enter**.
3. Type `set ip ioc1-1 restart` and press **Enter**.
4. Type `set ip ioc1-2 address 192.168.2.12 netmask 255.255.255.0 gateway 192.168.2.1` and press **Enter**.
5. Type `set ip ioc1-2 restart` and press **Enter**.

## Provisioning VLAN

---

The TimeProvider 5000 can support up to 16 VLANs. Each VLAN must have its own address and subnet. Use the following procedure to configure a VLAN:

1. Login at the Admin or Config-user level.
2. Type `set vlan-config add ioc1-1 INDEX 1 vlan-id 2 priority 3 address 192.168.3.20 netmask 255.255.255.0 gateway 192.168.3.1` and press **Enter**.
3. Type `set vlan-config state ioc1-1 INDEX 1 enable` and press **Enter**.

4. Type `set vlan-mode ioc1-1 enable` and press **Enter**.
5. Type `set ip ioc1-1 restart` and press **Enter**.
6. Type `show vlan` and press **Enter** to verify the configuration.

## Provisioning PTP

---

By default, PTP is enabled with unicast negotiation. If static configuration or changes are required to the PTP configuration, please see [Command Descriptions and Communications Interface](#) in Appendix B.

## Setting the System Date Time and Time Offset

---

The TimeProvider 5000 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, but if the TOD source has been set to GPS (default), it is not possible to set the time manually.

1. Login at the Admin or Config-user level (see [Logging In](#), on page 62).
2. Type `show tod-source` and press **Enter** to check the TOD source.
3. Type `set tod-source sys` and press **Enter**.
4. Type `set clock date-time <value>` and press **Enter**. Enter the value in format `yyyy-mm-dd,hh:mm:ss`.
5. Type `sync tod-source now` and press **Enter**.

## Provisioning the Input Reference

---

When operating in normal (locked) mode, the TimeProvider 5000 uses an external reference (such as GPS) to acquire the system's frequency and/or TOD alignment. 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. The GPS reference input is enabled by default. 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.



**Note:** Manual mode should not be used unless antenna location has been accurately surveyed.

---

### Example

To provision the TimeProvider 5000 to set a GPS reference for automatic mode, perform the following steps:

1. Login at the Admin or Config-user level (see [Logging In](#), on page 62).
2. Type `show tod-source gps` and press **Enter** to verify that the TOD source has been set to GPS.
3. Type `set tod-source gps` and press **Enter**.

## Setting the E1 Parameters

An E1 input can be configured as a frequency reference. To provision port 1 to use 2 MHz as the reference, perform the following steps:

1. Login at the Admin or Config-user level (see [Logging In](#), on page 62).
2. Type `show tod-source` and press **Enter** to check the TOD source.
3. Type `set tod-source sys` and press **Enter**.
4. Type `set io port1 input` and press **Enter**.
5. Type `set input state port1 enable` and press **Enter**.
6. Type `show tod-source` and press **Enter** to verify the TOD source.
7. Type `sync tod-source now` and press **Enter**.

# Provisioning Alarms

---

This section describes the commands used to provision and manage alarms in the TimeProvider 5000. 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, System Messages](#).

Software commands allow you to perform the following:

- Provision the severity level
- Provision the alarm (enable or disable)
- Show current alarm settings
- Show current alarms
- Display alarm status

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

## Disabling Specific Alarms

The Set Alarm Config command allows you to enable or disable specified alarms.

Example

To disable the GPS antenna fault alarm (alarm #64), enter the following:

1. Login at the Admin or Config-user level (see [Logging In](#), on page 62).
2. Type `set alarm-config state 64 disable` and press **Enter**.

## Showing Current Alarm Settings

The Show Alarm Config command displays the set and clear alarm thresholds for every alarm type.

Example

To display the configuration for all alarm types, enter the following:

Type `show alarm-config` and press **Enter**.

## Showing Current Alarms

The Show Alarm command displays all current alarms. To display a list of all current alarms enter the following:

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

## Displaying Alarm and Unit Status

The Show Status command displays the system status information as follows:

- Assigned System Name and asset tag value
- Uptime for the IMC module
- System date and time
- Number of standing system alarms
- Active IOC module
- Standby IOC module
- Currently selected TOD Source
- Reference Input
- Clock status for each IOC module
- PTP Port Configuration/State

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 TimeProvider 5000:

- Displaying alarms log
- Displaying events log
- Displaying the TimeProvider 5000 configuration

### Displaying Alarms Log

The Show Log Alarm command displays all local alarms in the alarm log in chronological order (first in - first out).

Example

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

## Displaying Events Log

The Show Log Event command displays all 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.

### Example

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

## Restarting the TimeProvider 5000

The system can be restarted via the `reboot system` 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 `reboot imc` command restarts the IMC card, and no output will be lost.

### Example:

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

## Saving and Restoring Provisioning Data

---

Symmetricon recommends that you keep an electronic version and/or a written version of the provisioning changes you make to the TimeProvider 5000.

### Backing up Provisioning Data

The configuration is automatically backed up one minute after a configuration change. To backup up the current configuration immediately, enter the following:

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

To change the current configuration to factory default while preserving user and IP information, enter the following:

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

To change the current configuration to the factory default, enter the following:



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.

---

## Simple Network Management Protocol

---

This section describes the two versions of SNMP supported by the TimeProvider 5000: SNMPv2c and SNMPv3.



**Note:** The SNMP feature can either be ordered in a new system, or added to a previously ordered system as a field upgrade. Contact your Symmetricom representative for more information.

---

### 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 TimeProvider 5000) is the server generating responses. The TimeProvider 5000 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
- 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 10 users to the SNMP user table.

# SNMP Users and Manager Addresses

---

SNMP CLI commands allows you to:

- Enable and disable SNMP
- Set SNMP manager IP address for traps
- Add up to 10 SNMP user names in the SNMP user table
- Display SNMP user names (read community string) and their associated access levels
- Delete SNMP user names

## Enabling SNMP

SNMP is an optional feature. To enable this feature, enter the command printed on the Symmetricom-issued certificate for this unit.

## Adding a Manager IP Address

The Set SNMP Manager command allows you to specify an SNMP manager IP address.

Example:

Use the following command to add the SNMP manager IP address 192.100.100.100 and engineID 0x12345678901234567890:

Type `set snmp add manager address 192.100.100.100 engineid 0x12345678901234567890` then press **Enter**.

## Adding and Removing SNMP Users

The Set SNMP User command allows you to add or remove 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.

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 add user abc securlvl private` 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 SNMP Users

The Show SNMP commands allow you to display the SNMP configuration. This includes the SNMP manager, users, trap version, trap user, and whether SNMPv2 is enabled.

### Example

Use the following command to display the list of SNMP users (user at security level admin).

Type `show snmp user` 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.

---



# Chapter 6 Maintenance and Troubleshooting

This chapter describes maintenance and troubleshooting procedures for the TimeProvider 5000.

## **In This Chapter**

- [Preventive Maintenance](#)
- [Safety Considerations](#)
- [ESD Considerations](#)
- [Diagnosing the IOC](#)
- [Diagnosing the IMC](#)
- [Repairing the TimeProvider 5000](#)
- [Obtaining Technical Assistance](#)
- [Upgrading the Firmware](#)
- [Returning the TimeProvider 5000](#)
- [User's Guide Updates](#)

## Preventive Maintenance

---

The TimeProvider 5000 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 36, for electromagnetic compatibility conditions that may cause damage.



**Caution:** To avoid electromagnetic discharge damage to the circuitry, never attempt to vacuum the TimeProvider 5000.



**Caution:** To avoid damage, under no circumstances should the interior chassis of the TimeProvider 5000 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

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

## ESD Considerations

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Maintenance personnel should wear ESD wrist straps when installing or working on all TimeProvider 5000 equipment and modules. Plug the user-supplied wrist strap into the TimeProvider 5000. 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	Label	Description
Power Module Power Indicator	PWR	Green - Module power available Off - Module power not available
Active Indicates which IOC is responsible for generating Telecom, 10MHz, and 1PPS outputs	ACT	Off - Standby IOC or System Startup Green - Active IOC
IOC Alarm IOC module alarm/fault indicator	ALM	Off - IOC operating normally Amber - IOC operational Minor Alarm(s) Red - IOC has Failed or has Major/Critical Alarm(s)
Ethernet Port 1 ETH1 port that is used for timing distribution	ETH1	Green - Link has been established Flashing Green - Link activity Amber - Indicates Standby PTP port Off - Link has not been established
Ethernet Port 2 ETH2 port that is used for timing distribution	ETH2	Green - Link has been established Flashing Green - Link activity Amber - Indicates Standby PTP port Off - Link has not been established
Local Oscillator State Indicates the current mode of operation of the LO servo	HOLD	Off - LO servo is operating in Locked mode Amber - LO servo is operating in Holdover or Acquire modes Flashing Amber - LO servo is operating in Warm-up mode

## Removing the IOC

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

### Removing the IOC

To remove the IOC in a chassis, 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-to-imc` and press **Enter**.

2. Attach a wrist grounding strap and connect it to the TimeProvider 5000 chassis.
3. Loosen the captive retaining screws and pull out on them to unseat the IOC from the chassis.



**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.

Install a new IOC using the appropriate procedure in [Replacing the IOC](#), on page 80.

## Replacing the IOC

This section contains procedures for replacing IOC in three circumstances:

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

### Replacing the IOC

To replace the IOC in a chassis, 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` command.

1. Attach a wrist grounding strap and connect it to the TimeProvider 5000 chassis.
2. Install the IOC into the chassis 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.



# 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	Label	Description
Power Indicator (IOC and IMC)	PWR	Green - Module power available Off - Module power not available
-48V A-Bus A-Bus Battery Indicator (IMC)	BT A	Off - A-Bus power connected Red - A-Bus power not connected
-48V B-Bus B-Bus Battery Indicator (IMC)	BT B	Off - B-Bus power connected Red - B-Bus power not connected
System Health Aggregation of system alarms indicator	SYS	Off - IMC, IOC operating normally Amber - IMC, IOC operational Minor Alarm(s) Red - IMC, IOC operational Major or Critical Alarm(s)
IMC Alarm IMC module alarm/fault indicator	ALM	Off - IMC operating normally Amber - IMC operational Minor Alarm(s) Red - IMC operational Major/Critical Alarm(s)
GPS Status GPS engine communication and antenna cable status indicator	GPS	Red - Internal GPS hardware fault Green - GPS enabled and GPS engine/interface is operating normally Amber - GPS enabled and GPS engine or antenna interface has operational issue Off - GPS disabled
TCP/IP Management Port LEDs on the Ethernet connector	MGMT	Left Amber Flash - Activity Left Off - No Activity Right Green - Link has been established Right Off - Link has not been established

## Replacing the IMC

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**Caution:** You must disconnect the GPS antenna cable before removing the IMC module.

---

You can remove the IMC from the chassis 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-to-ioc1` and press **Enter**.

2. Attach a wrist grounding strap and connect it to the TimeProvider 5000 chassis.
3. Remove the IMC by loosening the captive screws and pulling the IMC from the chassis.



**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 chassis and tighten the captive screws.
6. Reload the IMC memory from the IOC by issuing the following command:

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

## Repairing the TimeProvider 5000

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Repairing the TimeProvider 5000 is limited to replacing modules. Refer to [Working With Modules](#), on page 42, for information on how to properly handle modules to prevent electrostatic or physical damage.

Each power module in the TimeProvider contains a 3A fuse, but these fuses are not field-replaceable. There are no field-serviceable fuses in the TimeProvider 5000. If a fuse blows in a TimeProvider 5000, the unit must be returned to the factory for repair.

To remove an IOC, loosen the captive screws and pull the module out of the chassis. 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 chassis. 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.

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## Obtaining Technical Assistance

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If you have technical questions about the TimeProvider 5000, 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](mailto:support@symmetricom.com) or [emeasupport@symmetricom.com](mailto:emeasupport@symmetricom.com).

## Upgrading the Firmware

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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 164 for details on the upgrade process.



**Caution:** To avoid a possible service call, do not issue a command to the TimeProvider 5000, do not remove power from the TimeProvider 5000, and do not remove an IOC or IMC from the chassis during the upgrade process. Doing so could corrupt the flash memory in a module, disabling the TimeProvider 5000.

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## 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 chassis with a single IOC and for upgrading a chassis with redundant IOCs.

### Upgrading IOCs

To upgrade the software in an IOC, use the procedure in this section. Outputs from the TimeProvider 5000 are interrupted for up to 30 minutes until the upgraded IOC enters the Locked mode.

1. Login at the Admin level (see [Logging In](#), on page 62).
2. Type `set configuration backup local` and press **Enter** to save the contents of the IOC configuration. The alternate is `set configuration backup ioc-to-imc`.
3. Type `upgrade ioc <filename> <ftp-server><user name>` (for example, `upgrade ioc ver2.bin ftp:192.168.5.64`) and press **Enter**. The user is then prompted for the user name and password for the server.



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

---



**Note:** If an SFTP server is used, the protocol does not need to be included with the address.

```
ftp:192.168.5.64  
[sftp:]192.168.5.64
```

---

4. The new software is loaded into the IOC, after which it is rebooted and enters the Warm-up mode for up to 30 minutes.
5. Type `set configuration restore ioc-from-imc` and press **Enter** to restore the contents of the IOC configuration. This step is not necessary if the configuration is backed up to `local`.

## 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 [Logging In](#), on page 62).
2. Type `set configuration backup local` and press **Enter** to save the contents of the IMC configuration. The alternate is `set configuration backup imc-to-ioc`
3. Type `upgrade imc <filename> <ftp-server> <user name>` (use the IP address or server name) 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 or name) and then upgrade the module.

- 
5. Type `set configuration restore imc-from-ioc` and press **Enter** to restore the contents of the IMC configuration. This step is not necessary if the configuration is backed up to `local`.
  6. The TimeProvider 5000 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 TimeProvider 5000 will reject it.

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## Returning the TimeProvider 5000

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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.

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## 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 display and 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/Support/req\\_repair.htm](http://www.symmetricom.com/Support/req_repair.htm).

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

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When this manual is updated the updated version will be available for downloading from Symmetricom's internet web site. Manuals are provided in PDF format for ease of use. After downloading, you can view the manual on a computer or print it using Adobe Acrobat Reader.

Manual updates are available at:

[www.symmetricom.com](http://www.symmetricom.com)



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

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## Appendix A System Messages

This section provides information about the system messages that are displayed in response to a provisioning event or to an alarm that occurs when an associated threshold or timer is outside of the provisioned setting.

### In This Appendix

- [Message provisioning](#)
- [System Notification Messages](#)
- [System State and Status Change Notifications](#)

# Message provisioning

---

The TimeProvider 5000 supports logging of events using Syslog defined facility and severity codes and system defined facility codes as follows:

## Facility codes

- 0 kernel messages
- 1 User-level messages
- 3 System daemons
- 4 Security/authorization messages
- 5 Messages generated internally by syslogd
- 9 Clock daemon
- 11 FTP daemon
- 20 Time Provider 5000 Messages (events and alarms)
- 21 TimeProvider 5000 Command Response

## Severity codes

- 0 (critical) Emergency: system is unusable
- 1 (critical) Alert: action must be taken immediately
- 2 (critical) Critical: critical conditions
- 3 (major) Error: error conditions
- 4 (minor) Warning: warning conditions
- 5 (event) Notice: normal but significant condition
- 6 (event) Informational: informational messages





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**Notes:**

1. Severity codes, 0, 1, 2, 3, and 4, are also indicated by the Alarm LED(s) on the IMC and IOC modules.
  2. Severity Code 0, 1, and 2 indicate Critical Alarms.
  3. Severity Code 3 indicates Major Alarms.
  4. Severity Code 4 indicates Minor Alarms.
  5. Severity Code 5 and 6 are not associated with an Alarm Level.
- 

The syslog message format is as follows:

```
Mmm dd hh:mm:ss  
host_machine,Event/AlarmID,MsgType1,MsgID,MsgText
```

Where:

- Mmm = Month dd = date hh:mm:ss = system time
- host\_machine = hostname
- AlarmID = 000 thru 128
- EventID = 128 thru 255
- MsgType = Event | Minor | Major | Critical (defined by severity code)
- MsgID = SNMP message ID (facility code+severity code)
- MsgText = (see tables)

The following is an example syslog message showing Input Port 1 state being set to Disabled:

```
Aug 19 21:23:12 TP5000 I/O,196,Event,215, Input Port 1 state is  
set to disabled
```

Syslog messages are stored according to Message IDs in the following log files:

- 35, 44, and 45 are stored in the Security Log in the following format:  

```
Mmm dd hh:mm:ss host_machine OS defined Security Issue Message
```
- 200 through 204 are stored in the Alarm Log
- 205 and undefined IDs are stored in the Event Log
- 215 is stored in the Command Log in the following format:  

```
Mmm dd hh:mm:ss host_machine,MsgType1,MsgID,MsgText
```

## System Notification Messages

Table A-1 provides a list of system notification messages. These messages are logged and sent to a remote syslog server if configured. Alarms will also generate an SNMP trap.

Table A-1. System Notification Messages

Description	CompID	EventID	MsgLevel	MsgText	Corrective Action
Communication to peer card failed	IMC/IOC	0	Critical	Communication to <card> failed	Troubleshoot any existing system alarms
				Communication to <card> restored	None required
GPS engine communications failed	IMC	1	Minor	GPS engine communications failed	Check for any system alarms and rectify as needed
				GPS engine communications restored	None required
GPS engine not tracking satellite	IMC	2	Minor	GPS engine not tracking satellite	Check antenna and connections
				GPS engine tracks satellite	None required
TOD source invalid	IMC	3	Major	TOD source <source> invalid	Troubleshoot TOD source
				TOD source <source> valid	None required
TOD has been set by TOD source	IMC	4	Event	TOD has been set by <source>	None required
IMC time has been updated	IMC	5	Event	IMC time has been updated	None required
Management port link down	IMC	6	Minor	Management port link down	Check network connections
				Management port link up	None required

Table A-1. System Notification Messages (Continued)

Description	CompID	EventID	MsgLevel	MsgText	Corrective Action
Ethernet port (ETH1 or ETH2) link down	IOC	7	Minor	<port> port link down  <port> port link up	Check network connections  None required
Manual sync IOC time to IMC required	IMC	8	Minor	Manual sync IOC time to IMC required  Synced IOC time to IMC	Sync IOC time to clear alarm  None required
Power out of range	IMC/IOC	9	Major	<x.x V> power out of range (voltage value)  <x.x V> power within range (voltage value)	Hardware failure - Replace module  None required
GPS antenna voltage out of range	IMC	10	Major	GPS antenna voltage out of range (voltage value)  GPS antenna voltage within range (voltage value)	Check antenna connections  None required
GPS antenna current out of range	IMC	11	Major	GPS antenna current out of range (current value)  GPS antenna current within range (current value)	Check all cable and antenna connections, check voltage suppressor  None required
GPS antenna short-circuit	IMC	12	Minor	GPS antenna short-circuit (voltage value)  GPS antenna short-circuit cleared (voltage value)	Check all cable and antenna connections, check voltage suppressor  None required

Table A-1. System Notification Messages (Continued)

Description	CompID	EventID	MsgLevel	MsgText	Corrective Action
GPS antenna open-circuit	IMC	13	Minor	GPS antenna open-circuit (current value)	Check all cable and antenna connections, check voltage suppressor
				GPS antenna open-circuit cleared (current value)	None required
Battery(-48V)-A failure	IMC	14	Major	Battery (-48V) -A failure	Troubleshoot the -48V power supply. Check voltage supply to A side of shelf
				Battery (-48V) -A failure cleared	None required
Battery(-48V)-B failure	IMC	15	Major	Battery (-48V) -B failure	Troubleshoot the -48V power supply. Check voltage supply to B side of shelf
				Battery (-48V) -B failure cleared	None required
FPGA access failure	IMC/IOC	16	Critical	FPGA access failure	Hardware fault -Replace module
				FPGA access failure cleared	None required
Flash memory failure	IMC/IOC	17	Critical	Flash memory failure	Hardware fault -Replace module
				Flash memory failure cleared	None required
PLL unlock error	IMC	18	Critical	PLL unlock error	Reboot System - If alarm remains, replace module
				PLL unlock error cleared	None required
Internal communication error	IOC	19	Critical	Internal communication error	Reboot System - If alarm remains, replace module
				Internal communication error cleared	None required

Table A-1. System Notification Messages (Continued)

Description	CompID	EventID	MsgLevel	MsgText	Corrective Action
FPGA temperature exceed limit	IOC	20	Minor	FPGA temperature exceed limit	Check room temperature setting.
				FPGA temperature exceed limit cleared	None required
IOC detected but none of them active	IMC	21	Major	IOC detected but none of them active	Reboot system
				Active IOC detected	None required
Module reboot	IMC/IOC	22	Event	Module reboot	None required
RTE communication to peer error	IOC	23	Major	RTE communication to peer error	Reboot System - If alarm remains, replace IOC module
				RTE communication to peer error restored	None required
Entered warmup mode	IOC	24	Minor	Entered warmup mode	None required - If still present after 30 min. check other system alarms
				Transitioned out of warmup mode	None required
Entered freerun mode	IOC	25	Event	Entered freerun mode	If freerun mode not desired, check system input reference
				Transitioned out of freerun mode	None required
Entered fast-track mode	IOC	26	Event	Entered fast-track mode	None required
				Transitioned out of fast-track mode	None required
Entered normal-track mode	IOC	27	Event	Entered normal-track mode	None required
				Transitioned out of normal-track mode	None required

Table A-1. System Notification Messages (Continued)

Description	CompID	EventID	MsgLevel	MsgText	Corrective Action
Entered bridging mode	IOC	28	Event	Entered bridging mode	Check input system reference
				Transitioned out of bridging mode	None required
Entered holdover mode	IOC	29	Minor	Entered holdover mode	Check input system reference
				Transitioned out of holdover mode	None required
In holdover mode for extended period	IOC	30	Major	In holdover mode for extended period	Check input system reference
				Transitioned out of extended holdover mode	None required
Operational failure	IMC/IOC	31	Critical	Operational failure	Check system alarms-troubleshoot as required to determine recommended action
				Operational failure cleared	None required
Input active	IOC	32	Event	<input> active	None required
				<input>inactive	Check state of input port
IOC-to-IOC sync fault	IOC	33	Major	IOC-to-IOC sync fault	Hardware fault -Replace module
				IOC-to-IOC sync fault cleared	None required
Input disqualified as possible reference	IOC	34	Minor	<input> disqualified as system reference	Check system input reference
				<input> disqualification cleared	None required
Input failed due to LOS	IOC	35	Minor	<input> loss of signal	Check system input reference
				<input> loss of signal cleared	None required

Table A-1. System Notification Messages (Continued)

Description	CompID	EventID	MsgLevel	MsgText	Corrective Action
Input phase error	IOC	36	Minor	<input> phase error	Check system input reference
				<input> phase error cleared	None required
Input IPLL not settled	IOC	37	Minor	<input> IPLL not settled	Check system input reference
				<input> IPLL settled	None required
Input frequency error	IOC	38	Minor	<input> frequency error	Check system input reference
				<input> frequency error cleared	None required
Input failed due to OOF	IOC	39	Minor	<input> out of frame	Check system input reference
				<input> out of frame cleared	None required
Input failed due to AIS	IOC	40	Minor	<input> alarm indication signal	Check system input reference
				<input> alarm indication signal cleared	None required
PTP server near maximum packet limit	IOC	41	Minor	PTP server exceeded <x%> of packet limit on ETHx	Reduce number of clients or client request rate
				PTP server near packet limit cleared on ETHx	None required
PTP server reached maximum client limit	IOC	42	Minor	PTP server exceeded <x%> of client limit on ETHx	Increase number of clients allowed or reduce number of clients total
				PTP server near client limit cleared on ETHx	None required

Table A-1. System Notification Messages (Continued)

Description	CompID	EventID	MsgLevel	MsgText	Corrective Action
PTP client is unreachable	IOC	43	Event	PTP client with IP <0.0.0.0> is unreachable	Check IP address for correct configuration, possible network problems. Check for client down- if yes, enable client
				PTP client with IP <0.0.0.0> is reachable	None required
Hardware incompatible with software	IMC/IOC	44	Minor	Hardware incompatible with software	Software upgrade required
				Hardware compatible with software	None required
IMC-IOC Software incompatible	IMC/IOC	45	Minor	IMC-IOC Software incompatible	Software upgrade required
				IMC-IOC Software compatible	None required
IOC-IOC Software incompatible	IOC	46	Minor	IOC-IOC Software incompatible (0)	Software upgrade required
				IOC-IOC Software compatible (0)	None required
IOC installed	IOC	47	Event	<IOC> present	None required
IOC removed	IOC	48	Event	<IOC> not present	Check IOC slot in shelf for module
No IOC installed	IOC	49	Minor	No IOC installed	Check IOC slot in shelf for module
				At least one IOC installed	None required
Transitioned to active state	IOC	50	Event	Transitioned to active state	None required
Transitioned to standby state	IOC	51	Event	Transitioned to standby state	None required



Table A-1. System Notification Messages (Continued)

Description	CompID	EventID	MsgLevel	MsgText	Corrective Action
Input software loop not settled	IOC	52	Minor	<input> software loop not settled	Check system input reference
				<input> software loop settled	None required
Input PPS Loss	IMC/IOC	53	Critical	Input PPS loss	Hardware fault- replace IOC first - If alarm is still present, replace IMC
				Input PPS loss cleared	None required
User configuration lost	IMC/IOC	54	Event	User configuration lost	Reconfigure system then backup
				User configuration restored	None required
Primary image failed. Running backup image	IMC/IOC	55	Minor	Primary image failed. Running backup image	Image in primary partition of flash corrupted. Run upgrade to recover the image
Production configuration data error	IMC	56	Critical	Production configuration data error	Hardware failure- replace module
Direct access image error. Use JFFS2 image	IMC	57	Minor	Direct access image error. Use JFFS2 image	Direct access image corrupted. Run upgrade to recover the image
IMC-IOC FPGA link failed	IMC/IOC	58	Critical	IMC-IOC FPGA link failed	Hardware failure- replace module
				IMC-IOC FPGA link failure cleared	None required
Excessive traffic on Ethernet port	IOC	59	Minor	Excessive traffic on ETHx	Check traffic level on network
				Excessive traffic cleared on ETHx	None required

Table A-1. System Notification Messages (Continued)

Description	CompID	EventID	MsgLevel	MsgText	Corrective Action
Unsupported SFP on Ethernet port	IOC	60	Minor	Unsupported SFP on ETHx	Replace SFP with Symmetricom approved SFP listed in User Guide
				Unsupported SFP cleared on ETHx	None required
Input poor SSM	IOC	61	Minor	<input> poor SSM	Check system input reference quality level
				<input> poor SSM cleared	None required
Input SSM changed	IOC	62	Event	Input SSM changed	None required
Input GPS not tracking	IOC	63	Minor	Input GPS not tracking	Check GPS antenna location, cable connections
				Input GPS not tracking cleared	None required
Input GPS RGP data loss	IOC	64	Minor	Input GPS RGP data loss	This alarm could occur during configuration. If the alarm still present 1 minute after configuration, reboot system. If alarm still present, replace IOC module
				Input GPS RGP data loss cleared	None required

## System State and Status Change Notifications

Table A-2 provides a list of system provisioning messages. These messages are logged and sent to a remote syslog server if configured.

Table A-2. System Provisioning Messages

Action	MsgText
Command Syntax Error	"Invalid Command" "Invalid Parameter"
Alarm Set Delay	"Alarm # Set Delay has been set to <i>value</i> "
Set Bridging Time	"Bridging time has been set to <i>value</i> "
IOC Module State	"IOC # has been set to Active" "IOC # has been set to Standby" "IOC # has been set to Disabled"
Time set	"Date has been set to <i>value</i> " "Time has been set to <i>value</i> " "Local time offset has been set to <i>value</i> " "GPS to TAI time offset is <i>value</i> " "UTC to TAI time offset is <i>value</i> " "PTP timescale set to <i>value</i> "
System Configuration Saved/Restored	"System configuration has been backed-up" "System configuration has been restored" "System configuration has been saved to user defaults" "System configuration has been set to user defaults" "System configuration has been set to factory defaults"
Log file size	"logfiletype log size has been set to <i>size</i> "
User Message	"user message goes here"
IMC Hostname	"Hostname has been set to <i>value</i> "
IMC Firewall Configuration	"Firewall state has been set to <i>state</i> on <i>daemon_name</i> "
IMC IP Configuration	"IMC Host IP address has been set to <i>ip_address</i> " "IMC Host Mask has been set to <i>ip_address</i> " "IMC Host Gateway has been set to <i>ip_address</i> " "IMC Broadcast address has been set to <i>ip_address</i> " "IMC IP-mode has been set to <i>value</i> "
IMC SNMP Management	"SNMP manager host has been set to <i>ip_address</i> " "SNMP manager port has been set to <i>udp_port</i> " "SNMP agent port host has been set to <i>udp_port</i> " "SNMP user has been added" "SNMP user has been deleted"
IMC User Management	"User has been added" "User has been modified" "User has been deleted"

Table A-2. System Provisioning Messages (Continued)

Action	MsgText
Intra-System Communication Configuration	"Intra-system addresses have been set to Class #"
RADIUS Configuration	"RADIUS mode has been set to mode [, ip_address]" "RADIUS key has been set"
Remote Syslog	"Remote Syslog set to ip_addr   hostname" "Remote System at ip_addr   hostname is value"
Reboot	"IMC module reboot requested by user" "IOC# module reboot requested by user"
Upgrade System Firmware	"Firmware upgrade successful to version" "Firmware upgrade unsuccessful"
Active Image Set	"Active image set to value"
User Login/Logout	"username logged in" "username logged out"
IOC IP Configuration	"IOCx Host IP address has been set to ip_address" "IOCx Host Mask has been set to ip_address" "IOCx Host Gateway has been set to ip_address"
IOC State	"IOCx state has been set to value"
Reboot	"IMC module reboot requested by user" "IOC# module reboot requested by user"
Upgrade System Firmware	"Firmware upgrade successful to version" "Firmware upgrade unsuccessful"
Active Image Set	"Active image set to value"
GPS Configuration	"GPS Position mode has been set to value" "GPS Position has been set to lat, long, height" "GPS Position mask has been set to value" "GPS Antenna Cable Delay has been set to value"
Input State	"GPS port state has been set to value" "Input Port # state has been set to value"
PTP Common Configuration	"PTP Address Mode has been set to value" "PTP Clock ID has been set to value" "PTP Bonding has been set to value" "PTP Module Redundancy has been set to value"

Table A-2. System Provisioning Messages (Continued)

Action	MsgText
PTP Unicast Configuration	<p>“PTP Unicast Negotiation has been set to <i>value</i>”  “PTP Dynamic Lease Interval has been set to <i>value</i>”  “PTP Static Unicast Range # [1-10] has been set to <i>value</i>”  “PTP Static Unicast Priority 1 has been set to <i>value</i>”  “PTP Static Unicast Priority 2 has been set to <i>value</i>”  “PTP Static Unicast Domain has been set to <i>value</i>”  “PTP Static Unicast Sync Message Rate has been set to <i>value</i>”  “PTP Static Unicast Announce Timeout has been set to <i>value</i>”  “PTP Static Unicast Delay Response has been set to <i>value</i>”  “PTP Static Unicast PDelay Response has been set to <i>value</i>”  “PTP Unicast VLAN State has been set to <i>value</i>”  “PTP Unicast VLAN ID &amp;Priority has been set to <i>value</i>”  “PTP Unicast Diffserv State has been set to <i>value</i>”  “PTP Unicast DSCP has been set to <i>value</i>”</p>
Telecom I/O Port Configuration	<p>“I/O Port # configured as <i>value</i>”</p>
Input Port Configuration	<p>“Input Port # State is set to <i>value</i>”  “Input Port # Priority is set to <i>value</i>”  “Input Port # Frame Type is set to <i>value</i>”  “Input Port # CRC is <i>value</i>”  “Input Port # SSM is <i>value</i>”  “Input Port # SSM Bit is set to <i>value</i>”  “Input Port # PQL Value is set to <i>value</i>”  “Input Port # ToD Pair is set to <i>value</i>”  “Input Port # is the manually selected reference”</p>
Output Port Configuration	<p>“Output Port # State is set to <i>value</i>”  “Output Port # Frame Type is set to <i>value</i>”  “Output Port # CRC is <i>value</i>”  “Input Port # SSM is <i>value</i>”  “Output Port # SSM Bit is set to <i>value</i>”  “Output Port # will turn-on during <i>value</i>”</p>
10 MHz Output Port Configuration	<p>“10 MHz Output State is set to <i>value</i>”  “10 MHz Output will turn-on during <i>value</i>”</p>
1 PPS Output Port Configuration	<p>“1 PPS Output State is set to <i>value</i>”  “1 PPS Output will turn-on during <i>value</i>”</p>



# 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](#)
- [TimeProvider 5000 CLI Command Set](#)
- [Simple Network Management Protocol](#)
- [Secure Shell Protocol](#)
- [Secure File Transfer Protocol](#)

# CLI Overview

The Command Line Interface (CLI), also called the ASCII command set, can be used to control the TimeProvider 5000 from a terminal connected to the EIA-232 serial port, or the Ethernet port.

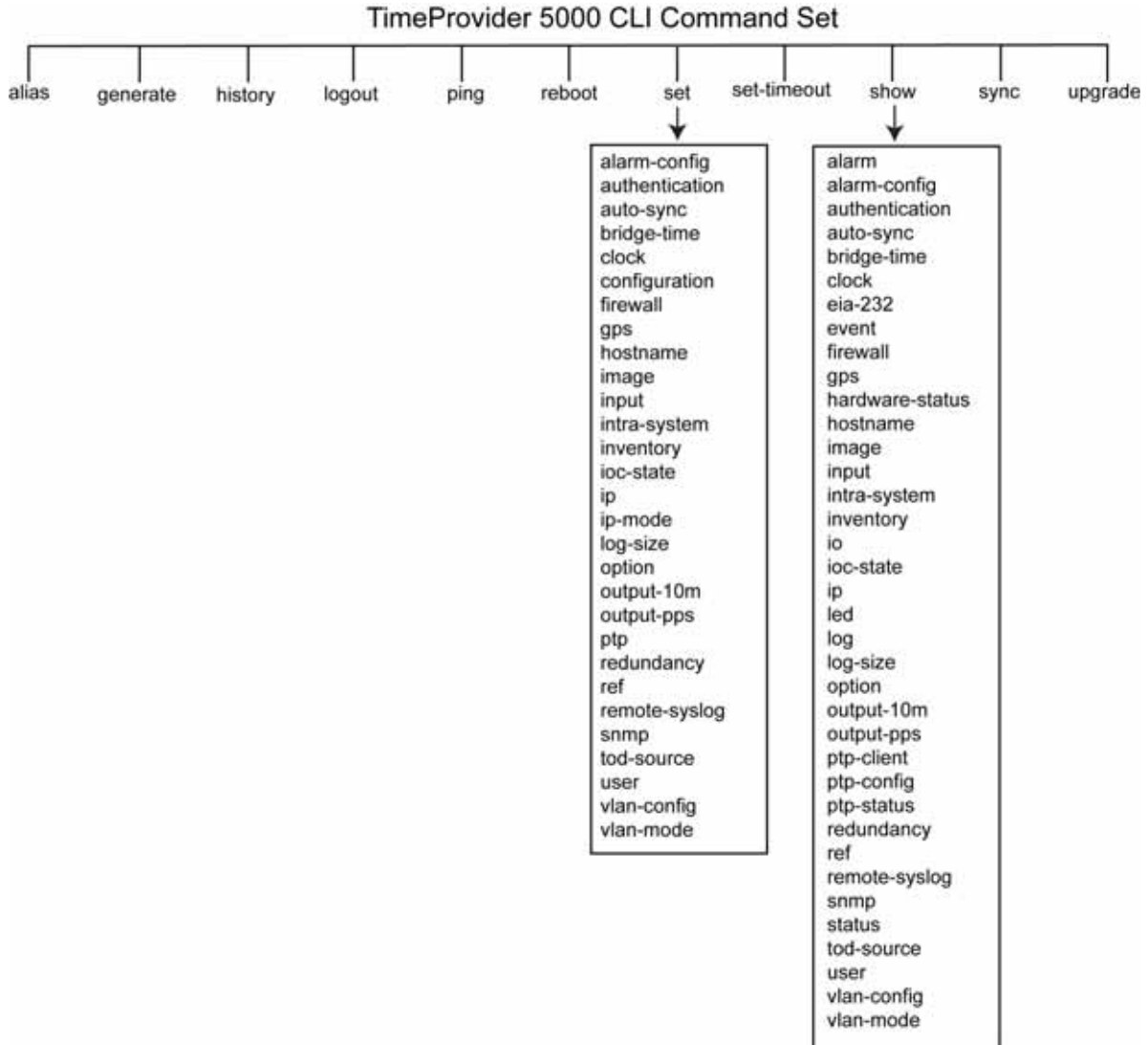


Figure B-1. TimeProvider 5000 CLI Command Set

## TimeProvider 5000 CLI Command Conventions

The following are conventions used for the TimeProvider 5000 CLI command set .



- Commands are case sensitive
- { } – Braces indicate more than one parameter data option. When entering options in the CLI command, enter one option from those available within the braces. Options within braces { } are separated by a pipe ( | ).
- [ ] – Brackets provide information about the allowed range. The first value is the minimum, and the last value is the maximum.
- **Bold** highlights keywords in the command syntax
- *Italics* indicate variable options.

## CLI Command Keyboard Usage

- You must press the SPACE key, and then press the TAB key after entering a CLI command. Also, after entering a command, you may see <enter>. This is a prompt for you to press ENTER to execute the command that you entered.
- The interface has built-in features for navigating within the CLI command hierarchy, which are as follows:
  - The TAB key can be used at any time while typing a command (including at the prompt) to provide continuation options. Press the TAB key to display a list of the available commands. Press the TAB key at any time while typing a command – TimeProvider 5000 will respond with the completion of the keyword or available completion choices based on the letters you typed.
  - The ? (SHIFT+QUESTION MARK) accesses the CLI online help. It can be used at any time while typing a command (including at the prompt) to provide continuation options. These options include brief descriptions of commands, or data type, format, and range.
  - If typing of a keyword is partially complete, the completion will display if it is unique, otherwise, the completion choices will be available.
  - If the keyword is complete, and you press the TAB key or ? (SHIFT+QUESTION MARK), the choices for the next syntax element will display.

In the following example, if you press the TAB key, or the ? (SHIFT+QUESTION MARK), after typing s, the CLI commands set, set-timeout, show, and sync display.

Typing s at the prompt:

```
tp5000> s
```

Then pressing the TAB key :

```
set      set-timeout  show      sync
```

Or pressing the ? (SHIFT+QUESTION MARK) will display the available commands that start with s (for this example) and brief descriptions of those commands:

```
set          -Set TP5000 information or setting  
  
show        -Display TP5000 information or setting  
  
sync        -Synchronize the TOD source  
  
set-timeout -Set the inactivity timeout to the defined seconds
```

- Previously typed commands can be recalled by using the UP ARROW key. You can recall up to five previously typed commands. Continually pressing the UP ARROW key will cycle you through the five previously typed commands. After pressing the UP ARROW key five times, you will go back to the last command you previously typed. Use the DOWN ARROW key to cycle the five prior typed commands in the opposite direction.
- You can use the BACKSPACE to correct keystroke errors, or to reuse parts of a previously typed command. When using BACKSPACE, the removed characters will still appear on the screen, but they have been removed to the position shown by the cursor. When you start typing, the removed characters are overwritten.

## Command Line Format

The command line format is as follows:

```
[Verb] Command [Parameter] [Data] EOL
```

- **Verb** - the type of action to be taken with the command.
  - **Set** - enables you to provision a defined parameter.
  - **Show** - enables you to display the provisioned state of a parameter.
- **Parameter** - command input that defines the particular command element to be shown or modified.
- **Data** - the data input for the parameter.
- **EOL** - this parser responds only to <CR Return>. When the parser receives <CR Return>, the input is terminated, and the command line entry is processed.

## Command User Levels

The TimeProvider 5000 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 - config user class, with read-write rights

- Level 3 - administrator user class, with read-write rights and can also configure users and upgrade firmware

## TimeProvider 5000 CLI Command Set

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This section provides an alphabetical listing and details of all CLI commands.

### Show Alarm

Displays the system's standing (active) alarms and events.

**Level 1:** `show {alarm | event}`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Remarks:** The information displayed is expected to be identical to an entry in the Event/Alarm Log File.

**Related:** `show status`, `show alarm-threshold`, `set alarm-threshold`,  
`show alarm-state`, `set alarm-state`

### Show Alarm-config

Displays the alarm level, set, and clear alarm delay time for the specified alarms.

**Level 1:** `show alarm-config`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Remarks:**

**Related:** `set alarm-config`

### Set Alarm-config

Provisions the alarm level, set, and clear alarm delay time for the specified alarms.

**Level 1:** Not Applicable

**Level 2:** `set alarm-config state {alarm # | all} {enable | disable}`  
`set alarm-config level [alarm # | all] value`  
`set alarm-config delay [alarm # | all] [set] value`

Provisions the state of the specified alarm.

Provisions the Level of the specified Alarm # to the a value of 0 thru 6

0 - Emergency: system is unusable - critical

1 - Alert: action must be taken immediately - critical

2 - Critical: critical conditions - critical

3 - Error: error conditions - major

4 - Warning: warning conditions - minor

5 - Notice: normal but significant condition - event

6 - Informational: informational messages - event

Provisions the Delay of the specified Alarm # to a value of 5 thru 500000 (seconds).

**Level 3:** Same as Level 2

**Remarks:** The alarm is disabled if either threshold, set or clear, is set to zero.

**Related:** `show alarm-threshold`

## Alias

This command will display defined aliases. It will also allow the user to add an alias for a command.

**Level 1:** `alias`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

### Example:

```
tp5000> alias TP5000 ATC
```

```
tp5000> alias
```

```
alias TP5000='ATC'
```

### Show Authentication

Displays how the system authenticates users.

If applicable, displays RADIUS server IP address or hostname and key.

**Level 1:** Not Applicable

**Level 2:** Not Applicable

**Level 3:** `show authentication`

**Remarks:** Authentication can be local or RADIUS

**Related:** `set authentication`

### Example:

```
tp5000> show authentication <enter>

Radius server addr           - 0.0.0.0
Radius server key           - none
Radius server state         - disable
```

### Set Authentication

Provisions the authentication source for user logins.

**Level 1:** Not Applicable

**Level 2:** Not Applicable

**Level 3:** `set authentication radius {enable | disable}`

Provisions the specified state for RADIUS authentication.

```
set authentication radius ip_addr key_value
```

Provisions the RADIUS server IP address or hostname and key.

**Remarks:** Only one server is supported. Only one key is supported.

**Related:** `show authentication`

### **Show Auto-sync**

Displays the auto sync state

**Level 1:** `show auto-sync`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Remarks:**

**Related:** `set auto-sync`

**Example:**

```
tp5000> show auto-sync <enter>
AUTO-SYNC                               - enable
```

### **Set Auto-sync**

Provisions the auto sync state

**Level 1:** Not Applicable

**Level 2:** `set auto-sync {enable | disable}`

**Level 3:** Same as Level 2

**Remarks:**

**Related:** `show auto-sync`

### **Show Bridge-time**

Displays the bridging time that is used to allow the frequency servo to coast through short periods when the system does not have qualified reference.

**Level 1:** `show bridge-time`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Remarks:** If the system has not qualified a ToD Source (frequency reference) within the specified bridging time the system transitions into holdover mode of operation.

**Related:** `set bridge-time`

### **Set Bridge-time**

Provisions the amount of time, in seconds, the system remains in bridging mode before transitioning into the holdover mode of operation.

**Level 1:** Not Applicable

**Level 2:** `set bridge-time value`

**Level 3:** Same as Level 2

Remarks:

**Related:** `show bridge-time`



## Show Clock

Displays the date, time, local time offset, and leap seconds in several formats.

**Level 1:** `show clock`

Displays the following:

- 1) the current local time as a date, time, and local time offset
- 2) the current UTC time as a date and time
- 3) the accumulated leap seconds between TAI and UTC time.

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Remarks:**

**Related:** `set clock`

**Example:**

```
tp5000> show clock

IMC time: 2008-11-19 02:02:01
IOC time: 2008-11-19 02:02:01
Leap sec: 33
Leap pend: +1 at end of 2008-12-31
```

## Set Clock

Provisions the user-assigned Date, Time, and accumulated leapseconds. The TOD source must be set to the system mode with the `set tod-source sys` command in order to change any clock settings.

**Level 1:** Not Applicable

**Level 2:** `set clock date-time value`

`set clock leapseconds value`

**Level 3:** Same as Level 2

**Remarks:** If the Time of Day source has set the date and time, the user is not allowed to overwrite the date, time.

**Related:** `show clock`

**Restrictions:** The format is yyyy-mm-dd;hh:mm:ss.

## 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.

**Level 1:** Not Applicable

**Level 2:** `set configuration {default | factory}`

```
set configuration backup {imc-to-ioc | ioc-to-imc | local |  
                        backup | default | factory | restore}
```

```
set configuration restore {imc-from-ioc | ioc-from-imc}
```

Default preserves user logins and communication attributes, such as ip addresses.

Factory resets all attributes.

Backup IMC-to-IOC or IOC-to-IMC (Saves configuration to local non-volatile storage immediately).

Restore IMC-from-IOC or IOC-from-IMC.

**Level 3:** Same as Level 2

**Remarks:** Setting the configuration to Default will not overwrite all user login information or system's IP address.

**Related:** See Set commands

### Show EIA-232

This command displays the serial port's operating parameters: baud rate, parity, word length, and stop bits.

**Level 1:** `show eia-232`

```
Baud rate      - 57600
Stop bit       - 1
Parity         - 0
Data length    - 8
Flow control   - none
```

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Remarks:** The system's serial interface is fixed at 57.6K, 0, 8, 1; there is no handshaking. There is no associated Set command.

**Related:** `show services`

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### **Show Event**

This command displays the current events.

**Level 1:** `show event`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Remarks:**

**Related:** `set | show services`

## Show Firewall

This command displays the firewall configuration.

**Level 1:** Not Applicable

**Level 2:** `show firewall`

**Level 3:** Same as Level 2

**Related:** `set firewall`

### Example:

```
tp5000> show firewall <enter>

ICMP Firewall           - allow
TELNET Firewall        - block
SSH Firewall           - allow
SFTP Firewall          - allow
SNMP Firewall          - allow
FTP Firewall           - block
```

## Set Firewall

Use this command to configure the system's Ethernet port firewall.

**Level 1:** Not Applicable

**Level 2:** Not Applicable

**Level 3:** `set firewall imc telnet {enable|disable}`  
`set firewall imc ssh {enable|disable}`  
`set firewall imc ftp {enable|disable}`  
`set firewall imc sftp {enable|disable}`  
`set firewall imc snmp {enable|disable}`  
`set firewall [imc|iocx-y]icmp {enable|disable}`  
IOCx-y where x=1 | 2 and y=A | B

**Remarks:** The firewall can control Telnet, SSH, FTP, and SNMP on the IMC's or IOC's PTP ports. Telnet is disabled by default.

**Related:** `show firewall`

**Generate**

This command generates an event or alarm message.

**Level 1:** Not Applicable

**Level 2:** Not Applicable

**Level 3:** generate message

**Related:**

**Example:**

```
tp5000> generate message
```

```
message - Generate event/alarm messages
```

```
tp5000> generate message <enter> - Execute command
```

## 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, health, noise ratio, satellite elevation, satellite azimuth.

**Level 1:** `show gps`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** `set gps`

**Example:** `tp5000>show GPS <enter>`

GPS Information

```

GPS Mode                - auto
GPS Mask                - 10
GPS Antenna Delay       - 0

GPS Latitude            - N37:22:42.900
GPS Longitude           - W121:55:34.571
GPS Height              - 15.4
    
```

Index	No.	SNR	Health	Azimuth	Elevation
1	3	37	healthy	313	23
2	6	38	healthy	309	35
3	15	43	healthy	57	31
4	16	39	healthy	259	24
5	18	39	healthy	300	82
6	21	42	healthy	36	67
7	22	42	healthy	240	47
8	24	42	healthy	85	29
9	26	38	healthy	42	18
10	29	42	healthy	150	26

## 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.

---

**Level 1:** Not Applicable

**Level 2:** `set gps mode [auto|manual position lat long height`  
`set gps mask value`  
`set gps cable-delay value`

Latitude is in the format N|Sddd: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

**Level 3:** Same as Level 2

**Related:** `show gps`

**Restrictions:** The system must have the GPS mode of operation provisioned as manual before you can successfully provision the position manually.



## Show Hardware-status

This command displays the status of the specified hardware.

**Level 1:** show hardware-status {imc | ioc1 | ioc2}

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

### Related:

### Examples:

```
tp5000> show hardware-status imc <enter>
```

```
-48V-A      :      ok
-48V-B      :      failed
+1.2V       :      2.423V
+1.8V       :      2.449V
+2.5V       :      0.386V
+5.5V       :      3.506V
VCXO        :      0.360V
GPS Power   :      0.824V
GPS Current :      109mA
GPS Antenna :      ok
FPGA        :      failed
```

```
tp5000> show hardware-status ioc1 <enter>
```

```
+1.8V       :      1.808V
10M EFC     :      1.143V
20M EFC     :      0.957V
25M EFC     :      1.143V
24.5M EFC   :      1.001V
24.7M EFC   :      1.177V
OSC Current :      168mA
FPGA VCCint :      1.008V
FPGA VCCaux :      2.499V
FPGA Temp   :      76C
FPGA Temp High :      77C
FPGA Temp Low :      64C
```

## History

This command shows the command history for the current session.

**Level 1:** history

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:**

**Example:**

```
tp5000> history      <enter> - Execute command

0 2008-01-01 05:04:41 show alarm-config
1 2008-01-01 05:05:13 history
2 2008-01-01 05:08:09 show ioc-state
3 2008-01-01 05:08:31 show ptp-client iocl-1
4 2008-01-01 05:12:29 show ptp-status
5 2008-01-01 05:12:51 show ptp-status iocl-1
6 2008-01-01 05:13:19 show ptp-config
7 2008-01-01 05:13:32 show ptp-config common iocl-1
8 2008-01-01 05:14:17 show ptp-config unicast iocl-1 index 1
9 2008-01-01 05:16:08 show log-size alarm
10 2008-01-01 05:16:15 show log-size event
11 2008-01-01 05:16:21 show log-size command
12 2008-01-01 05:16:26 show log-size security
13 2008-01-01 05:17:23 show redundancy port
14 2008-01-01 05:17:50 show status
15 2008-01-01 05:18:17 show option
16 2008-01-01 05:18:45 show remote-syslog
17 2008-01-01 05:19:40 show ref
18 2008-01-01 05:20:59 show output-pps
19 2008-01-01 05:21:12 show tod-source
20 2008-01-01 05:21:28 show led
21 2008-01-01 05:24:34 show user
22 2008-01-01 05:24:39 show history
23 2008-01-01 05:24:43 history

tp5000>
```

### Show Hostname

This command displays the host name for the TimeProvider 5000.

**Level 1:** show hostname

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** set hostname

### Example:

```
tp5000> showhostname <enter> - Execute command
Host name                - TP5000
```

### Set Hostname

This command sets the host name for the TimeProvider 5000.

**Level 1:** Not Applicable

**Level 2:** set hostname hostname\_string

**Level 3:** Same as Level 2

**Remarks:** Hostname can contain up to 20 characters.

**Related:** show hostname

### Show Image

This command displays the firmware image used by each module in the system and the firmware version.

**Level 1:** show image

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** set image

### Example:

```
tp5000> show image      <enter> - Execute command

IMC IMAGE DETAILS
Active image:    2  1.0.4_200811040901
Backup image:   1  1.0.2_200810231325
Next boot image: 2

IOC1 IMAGE DETAILS
Active image:    2  1.0.4_200811040858
Backup image:   1  1.0.2_200810231322
Next boot image: 2

IOC2 IMAGE DETAILS
Active image:    2  1.0.4_200811040858
Backup image:   1  1.0.4_200811040858
Next boot image: 2
```

### Set Image

Use this command to provision the module firmware image from which to boot.

**Level 1:** Not Applicable

**Level 2:** set image [imc|ioc1|ioc2][1|2]

**Level 3:** Same as Level 2

**Related:** show image

## Show Input

This command displays the input port's priority, framing type, zero suppression, CRC, SSM Bit (if applicable), user assigned SSM value. It also displays the input port's status (OK, ALM, DIS).

**Level 1:** show input

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** set input

## Example:

```
tp5000> show input
```

```
-----
```

Port	State	Prio	Frame Type	CRC State	SSM State	SSM Bit	SSM Val	SSM Cur
port1	disable	1	freq2048khz	disable	disable	8	3	15
.....	.....	....	.....	.....	.....	.....	.....	.....
port2	disable	2	freq2048khz	disable	disable	8	3	15

```
-----
```

## Set Input

Use this command to provision the System's Input Port(s) for the following:

- Priority
- State
- Framing Type
- CRC state
- SSM state
- SSM Bit value for E1 signals
- SSM PQL Value

PQL values are listed in the following table.

Quality Level	DS1 SSM	E1 SSM	Description
1	0x04	0x02	Stratum 1/PRS/PRC
2	0x08	0x00	STU, Stratum Unknown (presumed ST1)
3	0x0C	0x04	Stratum 2/Type II
4	0x0C	0x04	Type I
5	0x78	0x04	Transit Node/Type V
6	0x7C	0x08	Type III/Stratum 3E
7	0x10	0x0B	Type IV/Stratum 3
8	0x22	0x0F	G.813OPT3/SMC
9	0x30	0x0F	DUS, Do not Use for Sync

**Level 1:** Not Applicable

**Level 2:** set input priority port# [1|2]  
 set input state port# [enable|disable]  
 set input frametype port# [ccs|cas|2048khz]  
 set input crc port# [enable|disable]  
 set input ssm port# [enable|disable]  
 set input ssm-bit port# [4 thru 8] (used only for ccs or cas framing type)  
 set input ssm-value port# [pql value]  
 where # is a choice between 1 | 2, and pql value is from 1 to 9

**Level 3:** Same as Level 2

**Related:** show input

**Example:**

```
tp5000> set input ssm-value port1 <tab>
```

- 1 - Stratum 1/PRS/PRC
- 2 - STU, Stratum unknown
- 3 - Stratum 2/Type II
- 4 - Type I
- 5 - Transit Node/Type V
- 6 - Type III/Stratum 3E
- 7 - Type IV/Stratum 3
- 8 - G.813OPT3/SMC
- 9 - DUS, Don't use for Sync

### Show Intra-System

Use this command to display which Class of network and IP addresses are used for IMC-to-IOC and IOC-to-IOC communications.

**Level 1:** Not Applicable

**Level 2:** `set intra-system [a|b|c]`

A: IP address range 10.0.250.8 to 10.0.250.47

B: IP address range 172.16.250.8 to 172.16.250.47

C: IP address range 192.168.250.8 to 192.168.250.47

**Level 3:** Same as Level 2

**Remarks:** These addresses can't be used for external Ethernet ports.

**Related:** `show ip`

#### Example:

```
tp5000> show intra-system <enter>

Intra-communication IP set      - setB
```

### Set Intra-System

Use this command to provision which Class of network and IP addresses are used for IMC-to-IOC and IOC-to-IOC communications.

**Level 1:** Not Applicable

**Level 2:** `set intra-system [a|b|c]`

A: IP address range 10.0.250.8 to 10.0.250.47

B: IP address range 172.16.250.8 to 172.16.250.47

C: IP address range 192.168.250.8 to 192.168.250.47

**Level 3:** Same as Level 2

**Remarks:** These addresses can't be used for external Ethernet ports.

**Related:** `show ip`

### Show Inventory

This command displays the installed module inventory information as follows:

- model number
- user-assigned asset number
- IMC and IOC module part numbers
- IMC and IOC module CLEI numbers
- IMC and IOC module serial numbers
- IMC and IOC module hardware versions
- IMC and IOC module FPGA versions
- IMC and IOC module compatibility mask
- IMC and IOC module firmware versions

The firmware may include operating system and application versions.

**Level 1:** `show inventory`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Remarks:** Only the asset number can be modified.

**Related:** `set inventory`

#### Example:

```
tp5000> show inventory <enter> - Execute command
```

```
General Inventory Info:
```

```
System Model           - TimeProvider 5000
Chassis Type           - front-access(090-50301-01)
I/O Module Type        - 4 port E1 I/O
module(090-50311-01)
Asset Number           - unknown
```

```
Module Inventory Info:
```

Mod	Part Num	CLEI Num	Serial	HW Ver	FPGA	SW Version	Compati.
imc	090-50331-01-2	unknown	R62310	2	0x14	1.0.4	0
ioc1	unknown	unknown	unknown	unknown	0x19	1.0.4	0
ioc2	090-50321-01	unknown	P37401	B	0x19	1.0.4	0



### **Set Inventory**

Use this command to provision the system's user-assigned asset value information.

**Level 1:** Not Applicable

**Level 2:** `set inventory asset value`

Enter user-assigned asset value from 1 to 20 characters.

**Level 3:** Same as Level 2

**Related:** `show inventory`, `show image`, `set image`

## **Show IO**

This command displays the system's port configuration for the two ports that can be defined as either Input or Output.

**Level 1:** `show io`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

### 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.

**Level 1:** `show ioc-state`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** `set ioc-state`

### 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.

**Level 1:** Not Applicable

**Level 2:** `set ioc-state {ioc1 | ioc2} active`

**Level 3:** Same as Level 2

## Show IP

This command displays the Host, Mask, and Gateway IP addresses for Ethernet interfaces on the specified module. It also indicates if DHCP is enabled and if the port is enabled.

**Level 1:** show ip config [imc|ioc1|ioc2]  
show ip status [imc|ioc1|ioc2]

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** set ip

**Remarks:** The default IP settings are:

```
IMC:
      IP MODE:
      IP ADDRESS 192.168.0.100 NETMASK: 255.255.255.0
      GATEWAY: 0.0.0.0

IOC1:
IOC1-1 IP ADDRESS 192.168.1.11 NETMASK: 255.255.255.0
      GATEWAY: 0.0.0.0
IOC1-2 IP ADDRESS 192.168.2.11 NETMASK: 255.255.255.0
      GATEWAY: 0.0.0.0

IOC2:
IOC2-1 IP ADDRESS 192.168.1.31 NETMASK: 255.255.255.0
      GATEWAY: 0.0.0.0
IOC2-2 IP ADDRESS 192.168.2.31 NETMASK: 255.255.255.0
      GATEWAY: 0.0.0.0
```

## Examples:

```
tp5000> show ip config imc <enter> - Execute command
```

```
MGMT PORT PARAMETERS
IP mode      :      static
IP address:   192.168.0.100
IP mask      :      255.255.255.0
IP gateway:   0.0.0.0
```

```
tp5000> show ip status imc      <enter> - Execute command
```

```
MGMT      Link encap:Ethernet HWaddr 00:B0:AE:01:A5:6F
inet addr:192.168.0.100 Bcast:192.168.0.255 Mask:255.255.255.0
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:1450 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:91688 (89.5 KiB) TX bytes:0 (0.0 B)
Interrupt:21 Base address:0xe000
```

tp5000> show ip config ioc1 <enter> - Execute command

```
ETH1 PORT PARAMETERS
IP address: 192.168.1.11
IP mask   : 255.255.255.0
IP gateway: 0.0.0.0
```

```
ETH2 PORT PARAMETERS
IP address: 192.168.2.11
IP mask   : 255.255.255.0
IP gateway: 0.0.0.0
```

tp5000> show ip status ioc1 <enter> - Execute command

```
bond0      Link encap:Ethernet HWaddr 00:B0:AE:00:00:06
           inet addr:192.168.1.11 Bcast:192.168.1.255 Mask:255.255.255.0
           UP BROADCAST MASTER MULTICAST MTU:1500 Metric:1
           RX packets:0 errors:0 dropped:0 overruns:0 frame:0
           TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:0
           RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
```

```
ETH1      Link encap:Ethernet HWaddr 00:B0:AE:00:00:06
           UP BROADCAST RUNNING SLAVE MULTICAST MTU:1500 Metric:1
           RX packets:0 errors:0 dropped:0 overruns:0 frame:0
           TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:1000
           RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
```

```
ETH2      Link encap:Ethernet HWaddr 00:B0:AE:00:00:06
           UP BROADCAST RUNNING SLAVE MULTICAST MTU:1500 Metric:1
           RX packets:0 errors:0 dropped:0 overruns:0 frame:0
           TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:1000
           RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
```

## Set IP

Use this command to provision the Host, Mask, and Gateway IP addresses for both Ethernet interfaces.

**Level 1:** Not Applicable

**Level 2:** `set ip [imc|ioc[x-y]] [enable|disable|restart]`  
`set ip [imc|ioc[x-y]] address <addr_value> netmask`  
`<mask_value> gateway <gateway value>`

iocx where: x=1 | 2, where x is the IOC module number  
y=1 | 2, where y is the port number on the IOC

**Level 3:** Same as Level 2

**Remarks:** The address format allows IPv4 multiple octet formats. Restart the interface after configuring the system.



**Note:** PTP will be restarted after the IP interface is restarted.

---

**Related:** `show ip`, `set ip-mode`, `set intra-system`

### **Set IP-Mode**

Use this command to set the DHCP mode for the IMC Ethernet interface. You can set up the interface to use either DHCP or a static IP.

**Level 1:** Not Applicable

**Level 2:** `set ip-mode imc {dhcp|static}`

**Level 3:** Same as Level 2

**Remarks:** Use `set ip` to restart the interface after configuring the system.

**Related:** `show ip`, `set ip`

### Show LED

This command displays the LED status for each of the modules.

**Level 1:** show led

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Remarks:**

**Related:**

**Example:**

```
tp5000> show led
```

Index	Module ID	LED	LED Status
1	imc	bta	off
2	imc	btb	off
3	imc	sys	red
4	imc	alm	red
5	imc	gps	green
6	imc	mgmt	green
7	ioc1	active	green
8	ioc1	alarm	amber
9	ioc1	eth1	off
10	ioc1	eth2	off
11	ioc1	holdover	off
12	ioc2	active	off
13	ioc2	alarm	amber
14	ioc2	eth1	off
15	ioc2	eth2	off
16	ioc2	holdover	off



## 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 displays the specified log's user provisioned line buffer size and total number of lines buffered. The log files are:

- Alarm Log
- Event Log
- Command Log
- Security Log

**Level 1:** `show log {alarm|event|command|security} [index {head|tail} count]`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** `show log-size`, `set log-size`

### Examples:

```
tp5000> show log <tab>
```

```
alarm      - alarm log
event      - event log
command    - command log
security   - security log
```

```
tp5000> show log alarm      <enter> - Execute command
```

```
Jan 01 00:02:49 TP5000 alarmd: 000,CRITI, IMC: Communication to IOC2 failure
cleared
Jan 01 00:04:49 TP5000 alarmd: 024,MINOR, IOC1: Transitioned out of warmup
mode
Jan 01 00:04:49 TP5000 alarmd: 034,MINOR, IOC1: GPS disqualification
cleared
Jan 01 00:04:49 TP5000 alarmd: 063,MINOR, IOC1: Input GPS not tracking
cleared
Jan 01 00:04:50 TP5000 alarmd: 007,MINOR, IOC1: ETH2 port link down cleared
Jan 01 00:04:50 TP5000 alarmd: 007,MINOR, IOC1: ETH1 port link down cleared
Jan 01 00:04:55 TP5000 alarmd: 021,MINOR, IMC: IOC detected but none of them
active
Jan 01 00:05:03 TP5000 alarmd: 058,CRITI, IMC: IMC-IOC FPGA link failed
Jan 01 00:05:29 TP5000 alarmd: 000,CRITI, IMC: Communication to IOC1 failed
Jan 01 00:05:50 TP5000 alarmd: 021,MINOR, IMC: Active IOC detected
```

Appendix B Command Descriptions and Communications Interface  
TimeProvider 5000 CLI Command Set

```
Jan 01 00:05:50 TP5000 alarmd: 058,CRITI, IMC: IMC-IOC FPGA link failure cleared
Jan 01 00:05:53 TP5000 alarmd: 016,CRITI, IMC: FPGA access failure
Jan 01 00:08:00 TP5000 alarmd: 064,MINOR, IOC1: Input GPS RGP data loss
Jan 01 00:08:00 TP5000 alarmd: 034,MINOR, IOC1: GPS disqualified as system reference
Jan 01 00:08:00 TP5000 alarmd: 024,MINOR, IOC1: Entered warmup mode
Jan 01 00:08:00 TP5000 alarmd: 064,MINOR, IOC1: Input GPS RGP data loss cleared
Jan 01 00:08:00 TP5000 alarmd: 063,MINOR, IOC1: Input GPS not tracking
Jan 01 00:08:24 TP5000 alarmd: 000,CRITI, IMC: Communication to IOC1 failure cleared
Jan 01 00:08:52 TP5000 alarmd: 007,MINOR, IOC1: ETH1 port link down
Jan 01 00:08:52 TP5000 alarmd: 007,MINOR, IOC1: ETH2 port link down
```

tp5000> show log event <enter> - Execute command

```
Nov 03 19:23:33 TP5000 alarmd: 032,EVENT, IOC1: GPS inactive
Nov 03 19:23:34 TP5000 alarmd: 027,EVENT, IOC1: Transitioned out of normal-track mode
Nov 03 19:23:34 TP5000 alarmd: 028,EVENT, IOC1: Entered bridging mode
Nov 03 19:38:34 TP5000 alarmd: 028,EVENT, IOC1: Transitioned out of bridging mode
Nov 05 20:41:02 TP5000 alarmd: 022,EVENT, IMC: Module reboot
Oct 14 12:04:05 TP5000 alarmd: 032,EVENT, IOC1: GPS active
Oct 14 12:04:27 TP5000 alarmd: 032,EVENT, IOC1: GPS inactive
Oct 14 12:04:36 TP5000 alarmd: 047,EVENT, IMC: IOC1 present
Oct 14 12:04:36 TP5000 alarmd: 047,EVENT, IMC: IOC2 present
Oct 14 12:05:22 TP5000 alarmd: 022,EVENT, IOC1: Module reboot
Oct 14 12:05:28 TP5000 alarmd: 022,EVENT, IMC: Module reboot
Jan 01 00:00:21 TP5000 alarmd: 005,EVENT, IOC1: IMC time has been updated
Jan 01 00:01:00 TP5000 alarmd: 047,EVENT, IMC: IOC1 present
Jan 01 00:01:00 TP5000 alarmd: 047,EVENT, IMC: IOC2 present
Jan 01 00:02:44 TP5000 alarmd: 048,EVENT, IMC: IOC2 not present
Jan 01 00:04:50 TP5000 alarmd: 022,EVENT, IOC1: Module reboot
Jan 01 00:05:47 TP5000 alarmd: 047,EVENT, IMC: IOC2 present
Jan 01 00:05:48 TP5000 alarmd: 048,EVENT, IMC: IOC2 not present
Jan 01 00:08:06 TP5000 alarmd: 005,EVENT, IOC1: IMC time has been updated
Jan 01 04:00:15 TP5000_ACT alarmd: 005,EVENT, IMC: IMC time has been updated
```

tp5000> show log command <enter> - Execute command

```
Jan 01 03:30:50 TP5000_ACT KCLI: [user: admin]: show ptp-status ioc1-2
Jan 01 03:30:54 TP5000_ACT KCLI: [user: admin]: show ptp-status ioc1-1
Jan 01 03:32:03 TP5000_ACT KCLI: [user: admin]: show ioc-state
Jan 01 03:33:08 TP5000_ACT KCLI: [user: admin]: show option
Jan 01 03:33:29 TP5000_ACT KCLI: [user: admin]: show alarm
Jan 01 03:40:55 TP5000_ACT KCLI: [user: admin]: show auto-sync
Jan 01 03:41:48 TP5000_ACT KCLI: [user: admin]: show ref
Jan 01 03:45:25 TP5000_ACT KCLI: [user: admin]: show ptp-status ioc1-1
Jan 01 03:45:29 TP5000_ACT KCLI: [user: admin]: show ptp-status ioc1-2
Jan 01 03:46:38 TP5000_ACT KCLI: [user: admin]: show ioc-state
Jan 02 01:29:42 TP5000_ACT KCLI: [user: admin]: show hostname
Jan 02 01:30:29 TP5000_ACT KCLI: [user: admin]: show user
Jan 02 01:30:36 TP5000_ACT KCLI: [user: admin]: show led
Jan 02 01:35:30 TP5000_ACT KCLI: [user: admin]: show status
Jan 02 01:36:00 TP5000_ACT KCLI: [user: admin]: show alarm
```

```
Jan 02 01:38:31 TP5000_ACT KCLI: [user: admin]: show image
Jan 02 01:39:57 TP5000_ACT KCLI: [user: admin]: show log event
Jan 02 01:40:11 TP5000_ACT KCLI: [user: admin]: show log alarm
Jan 02 01:40:15 TP5000_ACT KCLI: [user: admin]: show log event
Jan 02 01:40:25 TP5000_ACT KCLI: [user: admin]: show log command
```

```
tp5000> show log security      <enter> - Execute command
```

```
Nov 03 18:09:44 TP5000 login[2048]: (pam_unix) check pass; user
unknown
Nov 03 18:09:46 TP5000 login[2048]: PAM: failed login: 2 from: symm
error: Authentication failure
Nov 03 18:18:33 TP5000 login[10783]: (pam_unix) check pass; user
unknown
Nov 03 18:18:33 TP5000 login[10783]: (pam_unix) authentication
failure; logname= uid=0 euid=0 tty=ttyS0 ruser= rhost=
Nov 03 18:18:35 TP5000 login[10783]: PAM: failed login: 1 from:
symm error: Authentication failure
Nov 03 18:18:45 TP5000 login[10783]: (pam_unix) check pass; user
unknown
Nov 03 18:18:47 TP5000 login[10783]: PAM: failed login: 2 from:
symm error: Authentication failure
Nov 03 18:20:20 TP5000 login[14832]: (pam_unix) check pass; user
unknown
Nov 03 18:20:20 TP5000 login[14832]: (pam_unix) authentication
failure; logname= uid=0 euid=0 tty=ttyS0 ruser= rhost=
Nov 03 18:20:22 TP5000 login[14832]: PAM: failed login: 1 from:
symm error: Authentication failure
Nov 03 18:20:28 TP5000 login[14832]: (pam_unix) check pass; user
unknown
Nov 03 18:20:30 TP5000 login[14832]: PAM: failed login: 2 from:
symm error: Authentication failure
Nov 03 18:20:36 TP5000 login[14832]: (pam_unix) check pass; user
unknown
Nov 03 18:20:39 TP5000 login[14832]: PAM: failed login: 3 from:
symm error: Authentication failure
Nov 03 18:23:46 TP5000 login[15647]: admin login
Nov 05 20:36:18 TP5000 login[22890]: admin login
Oct 14 12:04:35 TP5000 login[1135]: admin login
Jan 01 00:03:11 TP5000 login[1135]: admin login
Jan 01 03:22:14 TP5000_ACT login[28819]: admin login
Jan 02 01:28:48 TP5000_ACT login[32184]: admin login
```

### 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.

**Level 1:** show log-size {alarm|event|command|security}

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** show log, set log-size

### Examples:

```
tp5000> show log-size
```

```
alarm      - alarm
event      - event
command    - command
security   - security
```

```
tp5000> show log-size alarm
```

```
Log size of alarm log is : 100 kilobytes
```

```
tp5000> show log-size event
```

```
Log size of event log is : 100 kilobytes
```

```
tp5000> show log-size command
```

```
Log size of command log is : 100 kilobytes
```

```
tp5000> show log-size security
```

```
Log size of security log is : 100 kilobytes
```

### 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.

**Level 1:** Not Applicable

**Level 2:** `set log-size {alarm|event|command|security}size`

**Level 3:** Same as Level 2

**Remarks:** Provisioning a log file size to zero disables the logging of that type of data.

**Related:** `show log-size`

## **Logout**

This command terminates the current user connection.

**Level 1:** `logout`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

### Show Option

This command displays the option mode and key information.

**Level 1:** show option

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:**

**Example:**

```
tp5000> show option <enter> - Execute command

OPTION SERVICE          OPTION KEY          KEY VALIDITY
-----
SNMP                    not available      invalid
```

### Set Option

This command sets the option mode and key information.

**Level 1:** Not Applicable

**Level 2:** set option

**Level 3:** Same as Level 2

**Related:**

**Example:**

```
tp5000> set option

snmp - snmp

tp5000> set option snmp

<value String 6 - 6> - Enter key string
```

### Show Output-10M

This command displays the System's 10 MHz Output Port state.

**Level 1:** `show output-10m`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** `set output-10m`

#### Example:

```
tp5000> show output-10m <enter>

10MHz output parameters

Port status           - enable
Output generation    - normal
```

### Set Output-10M

Use this command to provision the System's 10 MHz Output Port state and enable the port to begin generating outputs when the specified operating mode is achieved.

**Level 1:** Not Applicable

**Level 2:** `set output-10m state [enable|disable]`  
`set output-10m generation {warm-up|free-run|`  
`fast-lock|normal}`

**Level 3:** Same as Level 2

**Related:** `show output-10m`



### Show Output-PPS

This command displays the System's 1PPS Output Port state and output generation level.

**Level 1:** `show output-pps`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** `set output-pps`

#### Example:

```
tp5000> show output-pps <enter>

1PPS output parameters

Port status           - enable
Output generation     - normal
```

### Set Output-PPS

Use this command to provision the System's 1PPS Output Port state and to enable the port to begin generating outputs when the specified operating mode is achieved.

**Level 1:** Not Applicable

**Level 2:** `set output-pps state [enable|disable]`  
`set output-pps generation {warm-up|free-run|`  
`fast-lock|normal}`

**Level 3:** Same as Level 2

**Related:** `show output-pps`

## Ping

Use this command to ping the host specified by the address (xxx.xxx.xxx.xxx) and display ping statistics.

**Level 1:** ping [imc|iocx-y [vlanid vlanid] address

Where *x* is the IOC number and *y* is the port number on the IOC

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

### Examples:

```
tp5000>ping <tab>
```

```
imc      - IMC MGMT for PING operation
ioc1-1   - IOC1 eth1 for PING operation
ioc1-2   - IOC1 eth2 for PING operation
ioc2-1   - IOC2 eth1 for PING operation
ioc2-2   - IOC2 eth2 for PING operation
```

```
tp5000> ping imc 192.168.100 <enter>
```

```
Ping imc success
```

## Set PTP

Use this command to provision the PTP port's common provisioned attributes, multicast specific attributes, and unicast specific attributes.

### Common Provisioned Attributes:

Addressing Mode, Clock ID, Port Redundancy, Module Redundancy, Priority 1, Priority 2, Domain, Diffserv State, Diffserv Code Point.

### Unicast Specific Attributes:

Unicast Negotiation Flag, Dynamic Lease Interval, Unicast IP ranges (up to ten groups), VLAN State, VLAN Priority, VLAN ID, Sync Message Interval, Announce Message Interval, Delay Interval

**Level 1:** Not Applicable

### Level 2: Common

```
set ptp timescale {auto | arb | ptp}
set ptp state ioc[#][-1|-2] {enable | disable}
set ptp max-client ioc[#][-1|-2] value
set ptp announce-limit ioc[#][-1|-2] value
set ptp sync-limit ioc[#][-1|-2] value
set ptp delay-limit ioc[#][-1|-2] value
set ptp profile ioc[#][-1|-2] value
set ptp clockid ioc[#][-1|-2] value
set ptp priority-1 ioc[#][-1|-2] value
set ptp priority-2 ioc[#][-1|-2] value
set ptp domain ioc[#][-1|-2] value
set ptp dscp ioc[#][-1|-2] value
set ptp dscp-state ioc[#][-1|-2] {enable|disable}
```

### Unicast

```
set ptp unicast negotiate ioc[#][-1|-2] [enable|disable]
set ptp unicast lease-duration ioc[#][-1|-2] [10 t0 1000]
set ptp unicast state ioc[#][-1|-2] [1 - 10]
[enable|disable]
set ptp unicast address ioc[#][-1|-2] {add|remove} [1 - 10]
address1
set ptp unicast clockid ioc[#][-1|-2] [1 - 10] value
set ptp unicast vlanid ioc[#][-1|-2] [1 - 10] value
set ptp unicast sync-int ioc[#][-1|-2] [1 - 10] rate_value
set ptp unicast announce-int ioc[#][-1|-2] [1 - 10]
rate_value
set ptp unicast delay-int ioc[#][-1|-2] [1 - 10] rate_value
```

**Level 3:** Same as Level 2

**Related:** show ip, set ip, show ptp

### **Show PTP-client**

Use this command to display the PTP client attributes:

**Level 1:** Not Applicable

**Level 2:** `show ptp-status`

**Level 3:** Same as Level 2

**Related:** `show ptp-config`, `show ptp-status`

### **Example:**

```
tp5000> show ptp-client
```

```
ioc1-1 - IOC1-1 (eth1) port  
ioc1-2 - IOC1-2 (eth2) port  
ioc2-1 - IOC2-1 (eth1) port  
ioc2-2 - IOC2-2 (eth2) port
```

```
tp5000> show ptp-client ioc1-1 <enter> - Execute command
```

```
No client
```

## Show PTP-config

Use these commands to display the PTP port's common provisioned attributes and unicast specific attributes.

### Common Provisioned Attributes:

PTP Profile, Clock ID, Port ID, Port Redundancy, and Module Redundancy.

### Unicast Specific Attributes:

Unicast Negotiation Flag, Dynamic Lease Interval, Unicast IP ranges (up to ten groups), Two-Step process state, Priority 1, Priority 2, Domain, VLAN Priority, VLAN ID, Diffserv Code Point, TTL value, Sync Message Interval, Announce Message Interval, Delay Interval, PDelay Interval.

**Level 1:** Not Applicable

**Level 2:** `show ptp-config common IOC-x-y`  
`show ptp-config unicast IOC-x-y index <index>`

Where:

x = 1 or 2 (for IOC1 or IOC2)

y = 1 or 2 (for ETH1 or ETH2)

**Level 3:** Same as Level 2

**Related:** `show ip`, `set ip`, `set ptp`

### Examples:

```
tp5000> show ptp-config  
  
common - common parameters  
unicast - unicast parameters
```

### Unicast Example:

```
tp5000> show ptp-config common  
  
ioc1-1 - IOC1-1 (eth1) port  
ioc1-2 - IOC1-2 (eth2) port  
ioc2-1 - IOC2-1 (eth1) port  
ioc2-2 - IOC2-2 (eth2) port  
  
tp5000> show ptp-config common ioc1-1      <enter>
```

PTP Timescale	AUTO
PTP State	enabled
PTP Max Number Clients	500
PTP Profile	unicast
PTP ClockId	FF:FF:FF:FF:FF:FF:FF:FF
PTP Priority 1	128
PTP Priority 2	128
PTP Domain	0
PTP DSCP	4
PTP DSCP State	disabled
PTP Sync Limit	-7
PTP Announce Limit	-3
PTP Delay Limit	-7
PTP Unicast Negotiation	enabled
PTP Unicast Lease Duration	300

### Unicast Example:

```
tp5000> show ptp-config unicast
```

```
ioc1-1 - IOC1-1 (eth1) port  
ioc1-2 - IOC1-2 (eth2) port  
ioc2-1 - IOC2-1 (eth1) port  
ioc2-2 - IOC2-2 (eth2) port
```

```
tp5000> show ptp-config unicast ioc1-1
```

```
index - client id
```

```
tp5000> show ptp-config unicast ioc1-1 index
```

```
<clientnum Integer 1 - 10> - Enter client id
```

```
tp5000> show ptp-config unicast ioc1-1 index 1 <enter> -  
Execute command
```

PTP Unicast State	disabled
PTP Unicast Addr	0.0.0.0
PTP Unicast VlanId	0
PTP Unicast ClockId	FF:FF:FF:FF:FF:FF:FF:FF
PTP Unicast Sync Intv	-3
PTP Unicast Announce Intv	1
PTP Unicast Delay Intv	-3

## Show PTP-status

Use this command to display the PTP ports common provisioned attributes:

- PTP Profile
- Clock ID
- Current Port ID
- Current Clock Class
- Number of unique clients seen in last 60 seconds
- Number of Transactions per Second.

**Level 1:** Not Applicable

**Level 2:** `show ptp-status`

**Level 3:** Same as Level 2

**Related:** `show ip`, `set ip`, `set ptp`

### Example:

```
tp5000> show ptp-status <tab>
```

```
ioc1-1 - IOC1-1 (eth1) port  
ioc1-2 - IOC1-2 (eth2) port  
ioc2-1 - IOC2-1 (eth1) port  
ioc2-2 - IOC2-2 (eth2) port
```

```
tp5000>showptp-statusioc1-1 <enter>-Executecommand
```

Grandmaster status information on ioc1 eth1 port:

```
Port Enabled      :      yes  
Clock Id         :      00:B0:AE:FF:FE:00:00:06  
Profile          :      unicast  
Clock Class      :      PTP_unknown  
Clock Accuracy   :      PTP_unknown  
Timescale       :      ARB  
Num clients      :      0  
Client load      :      0%  
Packet load     :      0%
```

## Reboot

This command restarts one or more of the modules. Using this command can cause a loss of outputs.

**Level 1:** Not Applicable

**Level 2:** Not Applicable

**Level 3:** `reboot {system|imc|ioc1|ioc2}`

**Remarks:** Selecting the `system` restarts all system modules. Selecting `system`, or the only IOC, disrupts the system outputs.

### Example 1:

```
tp5000> reboot <tab>

system - Reset System
imc    - Reboot IMC Card
ioc1   - Reboot IOC1 Card
ioc2   - Reboot IOC2 Card

tp5000> reboot imc <enter> - Execute command NO WARNING

The system is going down NOW!
Sending SIGTERM to all processes

Sending SIGKILL to all processes
Requesting system reboot
Restarting system.

U-Boot 1.1.6 (Oct 23 2008 - 13:17:59) MPC83XX

Symmetricom Time Provider 5000 (TP5000) IMC

Clock configuration:
Coherent System Bus: 166 MHz
Core:                 333 MHz
Local Bus Controller: 166 MHz
Local Bus:            41 MHz
DDR:                  333 MHz
SEC:                  55 MHz
I2C1:                 166 MHz
I2C2:                 166 MHz
TSEC1:                166 MHz
TSEC2:                166 MHz
USB MPH:              0 MHz
USB DR:               55 MHz

CPU: MPC8313E, Rev: 10 at 333.333 MHz

INFO: Initializing IOMEM for regset 0
```



```
DRAM: 256 MB  
NAND: 256 MiB  
Using default environment  
.....  
Symmetricom tp5000_ime  
login:
```

**Example 2:** Reboot IOC1. No message until complete.

```
tp5000> reboot ioc1  
NO MESSAGE.  
NO INDICATION.  
LED ALARM GREEN BLINKING  
  
tp5000>
```

**Example 3:** Defective IOC or no IOC

```
tp5000> reboot ioc2 <enter> - Execute command  
  
Error  
IOC is not present.  
  
tp5000>
```

### Show Redundancy

This command displays the IOC redundancy configuration: Port Bonding and IOC Module.

**Level 1:** show redundancy port  
show redundancy card

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** set redundancy

#### Example:

```
tp5000> show redundancy  
  
port - port  
  
tp5000> show redundancy port <enter> - Execute command
```

Module ID	Redundancy	Active Port
ioc1	enable	none
.....	.....	.....
ioc2	enable	none

### Set Redundancy

Use this command to provision the IOC redundancy configuration: Port Bonding and IOC Module.

**Level 1:** Not Applicable

**Level 2:** set redundancy port iocx [enable|disable]  
set redundancy active-port iocx-y  
iocx where: x=1 | 2 y=a | b

**Level 3:** Same as Level 2

**Related:** show IP show redundancy

### Show REF

Use this command to display the system's selected reference, reference mode, and input reference mode.

**Level 1:** `show ref`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** `set ref`, `set input`

### Example:

```
tp5000> show ref

Reference Criteria          - priority
Reference Override        - port1
```

### Set REF

Use this command to provision the system's input port(s) state and configuration. It allows the user to select the system reference and override the currently selected reference. This reference remains selected until failure, or until the user selects an alternate reference.

When switching to backup frequency reference, the system selects the new reference based on REF CRITERIA

When the TOD source is SYS, the default frequency reference is INP. In this case, the selection of INP1 or INP2 is also based on INP REF MODE.

When Mode is set to MANUAL, the system requires Manual intervention to select the backup reference.

When Mode is set to PRIORITY, the system selects the reference based on the TOD Source and priority setting.

When Mode is set to SSM, the system selects the reference as frequency reference based on the TOD Source and SSM (received or provisioned).

**Level 1:** Not applicable

**Level 2:** `set ref override {port | utix}`  
`set ref criteria {manual|priority|ssm}`

**Level 3:** Same as Level 2

**Related:** `show ref`, `show input`

### Show Remote-Syslog

This command displays the remote syslog server that log messages are sent to from the TimeProvider 5000.

**Level 1:** `show remote-syslog`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** `set remote-syslog`

### Example:

```
tp5000> show remote-syslog      <enter> - Execute command

State                - disable
Remote Address       - 0.0.0.0
```

### Set Remote-Syslog

This command is used to configure a remote syslog server to receive log messages from the TimeProvider 5000.

**Level 1:** Not Applicable

**Level 2:** `set remote-syslog {enable|disable} [hostaddr]`

**Level 3:** Same as Level 2

**Related:** `show remote-syslog`

## Show SNMP

Use these commands to display the SNMP Manage assigned to the agent, all assigned users (username only), and the SNMP trap version and SNMP trap user.

**Level 1:** `show snmp manager`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1 and the following:

```
show snmp user
show trapuser
```

This command displays all assigned users (user names only).

```
show snmp trap
```

This command displays whether traps are sent as SNMPv2 or SNMPv3 and also the SNMPv3 trap user.

```
show v2-community
```

This command displays the v2 community strings.

**Related:** `set snmp`

## Examples:

```
tp5000> show snmp

manager      - Show SNMP Manager assignment
user         - Show SNMPv3 User Configuration
trapuser     - Show SNMP TRAP user information
v2-community - Show SNMP v2-community information
trapversion  - Show SNMP TRAP version information
state-v2     - Show SNMP V2 state
```

```
tp5000> show snmp manager

No SNMP manager configured
```

```
tp5000> show snmp user

No SNMP user configured
```

```
tp5000> show snmp trapuser
```

```
No SNMP trap user configured.
```

```
tp5000> show snmp v2-community
```

```
SNMP community data is not available yet.
```

```
tp5000> show snmp trapversion
```

```
Trap version                - v2c
```

```
tp5000> show snmp state-v2
```

```
SNMP v2 state                - enable
```

## Set SNMP

Use this command to provision the SNMP state, user assignment (up to 10 users), and manager.

**Level 1:** Not Applicable

**Level 2:** Not Applicable

**Level 3:** `set snmp add user username securLvl`  
`{NoAuth, Auth, Private}`

If security level is auth, prompt for:

```
AuthKey value
authType {MD5|SHA}
```

If security level is priv, prompt for:

```
authType {MD5|SHA}
AuthKey value
privType {DES|AES}
PrivKey value
```

```
set snmp delete user username
set snmp trapversion {2|3}
set snmp add trapuser username securlvl
{NoAuth, Auth, Private}
```

Prompts are the same as for `set snmp add user`.

```
set snmp delete trapuser username
set snmp add manager address [engineid value]
set snmp delete manager address
set snmp add v2-community name {read | read-write}
set snmp delete v2-community name
set snmp state-v2 {enable | disable}
```

**Related:** `show snmp`

## Show Status

Use this command to display the following system status information:

- Assigned System Name And Asset Tag
- Uptime For The Imc
- System Date And Time
- Number Of Standing System Alarms
- Active Ioc Module
- Standby Ioc Module Is Available To Become The Active Ioc Module
- Currently Selected TOD Source
- Reference Input
- Summary For Each UTI Client Port
- Summary For Each UTI Server Port
- Servo Control Status For The Active IOC Module
- PTP Port(s) Summary:
  - PTP Port Configuration/State

**Level 1:** `show status`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** `show alarms`

### Example:

```
tp5000> show status      <enter> - Execute command

System name              : TP5000
IMC uptime               : 5 hrs 20 mins
IMC time                 : 2008-01-01 05:26:22 (invalid)
Active alarms           : 8
Ioc1 state               : active
Ioc2 state               : standby
Tod source               : GPS
Current reference input  : GPS
Clock status             : warmup
```



## **Sync**

This command synchronizes the Time Of Day Source.

**Level 1:** Not Applicable

**Level 2:** `sync tod-source`

### **Example:**

```
tp5000> sync tod-source now <enter> - Execute command
```

```
tp5000>
```

**Level 3:** Same as Level 2

**Related:** `set tod-source`

### **Set-Timeout**

This command sets the inactivity timeout to the defined time interval, in seconds.

**Level 1:** `set-timeout`

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:**

**Example:**

```
tp5000> set timeout <enter> - Execute command  
  
Timeout (0 - 86400 sec): 1800  
  
1800 sec timeout set successfully  
  
tp5000>
```

### Show TOD-Source

This command displays the Time Of Day Source and the last date and time of ToD sync.

**Level 1:** `show tod-source`

#### Example:

```
tp5000> show tod-source      <enter> - Execute command
ToD Source                   - gps
```

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** `set tod-source`, `show gps`

### Set TOD-Source

Use this command to provision the TOD Source to be provided by GPS or the System. You can also provision the TOD-Source to "sync".

**Level 1:** Not Applicable

**Level 2:** `set tod-source {gps|sys}`  
`sync tod-source`

**Level 3:** Same as Level 2 (default)

**Related:** `show tod-source`, `set clock`

## Upgrade

Use this command to upgrade the specified modules firmware with the specified filename. If the IP address, username, and password is provided, the system will FTP the filename from the specified server (IP or name) and then upgrade the specified module.

**Level 1:** Not Applicable

**Level 2:** Not Applicable

**Level 3:** upgrade {imc|ioc|ioc1|ioc2} filename [protocol:]  
ftp\_server username passwd

Protocol can be either FTP or SFTP.

**Related:** ftp

### Examples:

```
tp5000> show image
```

```
IMC IMAGE DETAILS
```

```
Active image: 1 1.0.2_200810231325  
Backup image: 2 1.0.2_200810231325  
Next boot image: 1
```

```
IOC1 IMAGE DETAILS
```

```
Active image: 1 1.0.2_200810231322  
Backup image: 2 1.0.2_200810231322  
Next boot image: 1
```

```
IOC2 IMAGE DETAILS
```

```
Active image: 1 1.0.4_200811040858  
Backup image: 2 1.0.4_200811040858  
Next boot image: 1
```

```
tp5000> upgrade imc /tp5000/current_tp5000_imc_upd  
192.168.5.56 tp5000
```

```
Password:
```

```
Upgrade of imc is in progress
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!  
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!  
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

```
Upgrade of imc is successfully completed
```

To verify the upgrade:

```
tp5000> show image      <enter> - Execute command
```

```
IMC IMAGE DETAILS
```

```
Active image:   2  1.0.4_200811040901  
Backup image:  1  1.0.2_200810231325  
Next boot image: 2
```

```
IOC1 IMAGE DETAILS
```

```
Active image:   2  1.0.4_200811040858  
Backup image:  1  1.0.2_200810231322  
Next boot image: 2
```

```
IOC2 IMAGE DETAILS
```

```
Active image:   2  1.0.4_200811040858  
Backup image:  1  1.0.4_200811040858  
Next boot image: 2
```

### Show User

This command displays the list of users assigned access privileges to the system.

**Level 1:** `show user`

**Level 2:** Same as Level 1

**Level 3:** `show user`  
Display all assigned users, username and access level only are displayed.

**Related:** `set user`, `set snmp`

### Set User

Use this command to provision the local user password and access level, or to delete the specified user or set the entire user table to default.

**Level 1:** Not Applicable

**Level 2:** Not Applicable

**Level 3:** `set user add <username> access-level`  
`[user | config | admin]`  
Prompt for password  
Prompt for password confirmation  
  
`set user delete username`

**Related:** `show user`

## Show VLAN

Use this command to

**Level 1:** Not Applicable

**Level 2:** show vlan-config IOC-x-y  
show vlan-mode IOC-x-y

Where:

x = 1 or 2 (for IOC1 or IOC2)

y = 1 or 2 (for ETH1 or ETH2)

**Level 3:** Same as Level 2

### Example:

```
tp5000> show vlan-mode          <enter> - Execute command
```

Results:

Index	Module ID	Port ID	State
1	ioc1	eth1	disable
2	ioc1	eth2	disable
3	ioc2	eth1	disable
4	ioc2	eth2	disable

```
tp5000> show vlan-config
```

```
ioc1-1 - IOC1-1 (eth1) port
ioc1-2 - IOC1-2 (eth2) port
ioc2-1 - IOC2-1 (eth1) port
ioc2-2 - IOC2-2 (eth2) port
```

```
tp5000> show vlan-config ioc1-1    <enter> - Execute command
```

No vlans configured on ioc1 eth1 port.

```
tp5000> show vlan-config ioc2-1    <enter> - Execute command
```

No vlans configured on ioc2 eth1 port.

## Set VLAN

Use this command to

```
Level 1: set vlan-mode iocx-y {enable | disable}
set vlan-config add ioc-x-y index {1..16} vlan_id <id>
           priority <priority> address <address> netmask <mask>
           gateway <gateway>
set vlan-config modify ioc-x-y index {1..16} address
           <address> netmask <mask> gateway <gateway>
set vlan-config delete ioc-x-y index {1..16} vlan_id
set vlan-config state ioc-x-y index {1..16}
           {enable | disable}
```

Where:

x = 1 or 2 (for IOC1 or IOC2)

y = 1 or 2 (for port ETH1 or ETH2)

index = 1 thru 16 (for VLAN table index)

vlan\_id = 2 thru 4095 (0 is invalid and used as default, 1 is reserved)

priority = 0 thru 7

address, netmask and gateway are configured similarly to IP configuration

vlan-mode is used to enable or disable VLAN on the specified physical Ethernet port.

vlan state is used to enable or disable the VLAN associated with specified index.

Use `set ip <port> restart` after configuring VLAN to apply changes.



**Note:** Each VLAN must be configured on a separate subnet.

---

**Level 2:** Same as Level 1

**Level 3:** Same as Level 1

**Related:** `set ip`

**Example:**

```
tp5000> set vlan-config
add      - Add a vlan id, address, mask and gateway
modify   - modify a vlan address, mask and gateway
delete   - VLAN delete
state    - Enable/disable vlan id
```



```
tp5000> set vlan-config add
```

```
ioc1-1 - IOC1-1 (eth1) port  
ioc1-2 - IOC1-2 (eth2) port  
ioc2-1 - IOC2-1 (eth1) port  
ioc2-2 - IOC2-2 (eth2) port
```

```
tp5000> set vlan-config add ioc1-1 index 1 vlan-id 25  
priority 0 address 192.168.1.5 netmask 255.255.255.0 gateway  
192.168.1.1
```

```
tp5000> set vlan-config modify
```

```
ioc1-1 - IOC1-1 (eth1) port  
ioc1-2 - IOC1-2 (eth2) port  
ioc2-1 - IOC2-1 (eth1) port  
ioc2-2 - IOC2-2 (eth2) port
```

```
tp5000> set vlan-config modify ioc1-1 index 1 address  
192.168.10.5 netmask 255.255.255.0 gateway 192.168.10.1
```

```
tp5000> set vlan-config delete
```

```
ioc1-1 - IOC1-1 (eth1) port  
ioc1-2 - IOC1-2 (eth2) port  
ioc2-1 - IOC2-1 (eth1) port  
ioc2-2 - IOC2-2 (eth2) port
```

```
tp5000> set vlan-config delete ioc1-1 index 4 <enter>
```

```
tp5000> set vlan-config state
```

```
ioc1-1 - IOC1-1 (eth1) port  
ioc1-2 - IOC1-2 (eth2) port  
ioc2-1 - IOC2-1 (eth1) port  
ioc2-2 - IOC2-2 (eth2) port
```

```
tp5000> set vlan-config state ioc1-1 index 5
```

```
enable - Enable  
disable - Disable
```

```
tp5000> set vlan-config state ioc1-1 index 5 enable <enter>
```

# Simple Network Management Protocol

---

This section describes the two versions of SNMP supported by the TimeProvider 5000: SNMPv2c and SNMPv3.



**Note:** The SNMP feature can either be ordered in a new system, or added to a previously ordered system as a field upgrade (see [Table 2-1](#) for part number). Contact your Symmetricom representative for more information.

---

## 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 TimeProvider 5000) is the server generating responses. The TimeProvider 5000 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
- 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 10 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 TimeProvider 5000, its modules, module features, input ports, output ports, etc. and variables that include settings and measurements.

The MIB is controlled by the TimeProvider 5000's SNMP agent. The SNMP agent is a server program that sends TimeProvider 5000 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 allows you to:

- Enable and disable SNMP
- Set SNMP manager IP address for traps
- Add up to 10 SNMP user names in the SNMP user table
- Display SNMP user names (read community string) and their associated access levels
- Delete SNMP user names

### Enabling SNMP

This command allows you to enable or disable the SNMP.

Example:

Use the following command to enable SNMP:

Type `set service snmp enable` and press **ENTER**.

### Adding a Manager IP Address

The Set SNMP Manager command allows you to specify an SNMP manager IP address (see [Set SNMP](#), on page 159).

Example:

Use the following command to add the SNMP manager IP address 192.100.100.100 and engineID 0x12345678901234567890:

Type `set snmp manager address 192.100.100.100 engineid 0x12345678901234567890` then press **Enter**.

### Adding and Removing SNMP Users

The Set SNMP User command allows you to add or remove 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 159).

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 user add abc securlvl priv` 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 SNMP Users

The Show Snmp commands allow you to display the SNMP configuration. This includes the SNMP manager, users, trap version, trap user, and whether SNMPv2 is enabled (see [Show SNMP](#), on page 157).

#### Example

Use the following command to display the list of SNMP users (admin user level 3 required).

Type `show snmp user` 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.

---

## 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 Specifications and Factory Defaults

This appendix provides mechanical and electrical specifications and factory defaults for the TimeProvider 5000.

## **In This Appendix**

- [Specifications](#)
- [Factory Defaults](#)

# Specifications

---

This section provides the specifications for the TimeProvider 5000 components and input and output signals.

## Mechanical

Table C-1. TimeProvider 5000 Mechanical Specifications

Parameter	Description
Mounting	19 in. Rack
Rack Mounting Position	For front mounting location unit protrudes 0.65 in / 1.651 cm  See <a href="#">Figure 3-3</a> , <a href="#">Figure 3-4</a> , and <a href="#">Figure 3-5</a> for drawings with detailed chassis dimensions.
Width	17.24 in. / 438 mm
Height	1.73 in. / 44 mm
Depth	17.12 in. / 435 mm
Weight	9 lb. / 4 kg fully loaded

## Environmental

Table C-2. TimeProvider 5000 Environmental Specifications

Parameter	Description
Operating Temperature	-5° to 45° C, 23° to 113° F
Storage Temperature	-25° to 55° C, -13° to 131° F
Operating Humidity	5% to 85% RH non-condensing
Storage Humidity	5% to 100% RH non-condensing

## Power

Table C-3. TimeProvider 5000 Power Specifications

Parameter	Description
DC Input Power	-48 VDC / -60 VDC nominal, 0.75 A typical (0.6A for -60VDC)
DC Recommended Battery Feed Fuse	5 A, maximum
DC Power	36 W, typical

## Serial Port

Table C-4. Serial Port Specifications

Item	Description
Connector Type	9-pin, female D connector
Connector Label	Craft
Interface	RS-232, data terminal equipment (DTE)
Baud Rate	57.6 Kbps
Data Bits	8
Parity Bit	None
Stop Bits	1
Flow Control	None

## LAN Port

Table C-5. LAN Port Specifications

Connector	Description
MGMT	RJ-45 (10Base-T/100 Base-T) - Supports telnet sessions and SSH sessions over TCP/IP.

## Input Signals

Table C-6. Input Signal Specifications

Parameter	Specification
<b>GPS</b>	
Requirement	Total gain should be between 25 dB and 35 dB, including gain of antenna and loss of cable
Interface	SMA connector
<b>E1</b>	
Type	G.703 Section 9 Framed E1 or G.703 Section 13 2048 kHz
Format	CAS or CCS, CRC4 enable/disable
Impedance	75 ohms
Connector	Mini-BNC coax

## Output Signals

Table C-7. Output Signal Specifications

Parameter	Specification
<b>PTP</b>	
Ports	Ethernet Small Form-factor Pluggable (SFP) Optical 1000 Base-X Electrical 100/1000 Base-T
<b>10 MHz</b>	
Impedance	50 $\Omega$ unbalanced
Amplitude	1.5 dBm to 4.5 dBm
Signal type	Sine
Connector	Mini-BNC
Phase Noise (minimum)	<ul style="list-style-type: none"> <li>■ 1 Hz: -60 dBc/Hz</li> <li>■ 10 Hz: -90 dBc/Hz</li> <li>■ 100 Hz: -100 dBc/Hz</li> <li>■ 1 kHz: -110 dBc/Hz</li> <li>■ 10 kHz: -135 dBc/Hz</li> <li>■ 100 kHz: -140 dBc/Hz</li> </ul>



Table C-7. Output Signal Specifications (Continued)

Parameter	Specification
<b>1PPS</b>	
Impedance	50 $\Omega$ unbalanced
Amplitude	2.0 Vpp
Signal type	Square Wave
Rise Time	< 20 ns
Connector	Mini-BNC
Pulse Width	5 $\mu$ s $\pm$ 10%

## Factory Defaults

Table C-8. General and Communication Parameters

Description	Default Value	Value Range
Time-of-Day Source	GPS	GPS   SYSTEM
PTP Timescale	AUTO	AUTO   PTP   ARB
Telnet Firewall	Block	Allow   Block
ICMP Firewall	Allow	Allow   Block
SSH Firewall	Allow	Allow   Block
SNMP Firewall	Allow	Allow   Block
FTP Firewall	Block	Allow   Block
SFTP Firewall	Allow	Allow   Block
User #1 Name	admin	20 ASCII Characters
User #1 Password	symmadmin**	32 ASCII Characters, a Minimum of 8
User #1 Access level	admin	user   config   admin
IMC EIA-232 Port	57.6k-8-N-1	fixed
IMC IP Mode	Static	DHCP   Static
IMC IP State	Enable	Enable   Disable
IMC IP Address	192.168.0.100	Valid IPv4 Address

Table C-8. General and Communication Parameters (Continued)

Description	Default Value	Value Range
IMC Gateway Address	0.0.0.0	Valid IPv4 Address
IMC Network Mask	255.255.255.0	Valid IPv4 Mask
IP Intra Comm	B: 172.16.250.8 to 172.16.250.47	<u>IP address ranges:</u> A: 10.0.250.8 to 10.0.250.47 B: 172.16.250.8 to 172.16.250.47 C: 192.168.250.8 to 192.168.250.47
Hostname	TP5000	20 ASCII Characters
Image		1, 2
Asset Number		20 ASCII Characters
SNMP Manager (Up to 5)	None	Address: Valid IPv4 Address Engine ID: Max of 32 ASCII Characters
SNMP User (Up to 10)	None	Username: Max of 20 ASCII Characters Security Level: noauth, auth, private Auth Type: MD5, SHA Auth Key: Max of 32 ASCII Characters Private Type: DES, AES Private Key: Max of 32 ASCII Characters, Minimum of 8
SNMP Trap User	None	Username: Max of 20 ASCII Characters Security Level: noauth, auth, private Auth Type: MD5, SHA Auth Key: Max of 32 ASCII Characters Private Type: DES, AES Private Key: Max of 32 ASCII Characters, Minimum of 8
SNMP Community (Up to 10)	None	Name: Max of 20 ASCII Characters Access: read   read-write
SNMP Trap Version	2	2, 3
SNMP V2 State	Enable	Enable   Disable
UTC to TAI offset	33	19 to 255
RADIUS Authentication	Disable	Enable   Disable
RADIUS Server IP Address	0.0.0.0	Valid IPv4 Address
RADIUS Server Key	None	Max of 32 ASCII characters
Remote Syslog Host	0.0.0.0	Valid IPv4 Address
Remote Syslog State	Disable	Enable   Disable
Local Alarm Log Buffer Size	100	0 to 100 Kbytes

Table C-8. General and Communication Parameters (Continued)

Description	Default Value	Value Range
Local Event Log Buffer Size	100	0 to 100 Kbytes
Local Command Log Buffer Size	100	0 to 100 Kbytes
Local Security Log Buffer Size	100	0 to 100 Kbytes
Auto-Sync	Enable	Enable   Disable

Table C-9. GPS and Input Port Parameters

Description	Default Value	Value Range
GPS Antenna Cable Delay	0	0 to 1,000,000,000 ns
GPS Position Mode	Auto	Auto   Manual
GPS Position	Lat - N37:22:43.425 Long - W121:55:34.815 Elevation - 13.7m	LAT = Ndd:mm:ss.ss or Sdd:mm:ss.ss LONG = Eddd:mm:ss.ss or Wddd:mm:ss.ss ELEV= ±hhhh.h height in meters
GPS Elevation Mask	10	0 to 45 degrees
Reference Criteria	Priority	Priority   SSM   Manual
Reference Override	Port 1	Port 1, Port 2
Input Reference	INP1	INP1   INP2
Telecom Input Port 1 State	Disable	Enable   Disable
Telecom Input Port 1 Priority	1	1   2
Telecom Input Port 1 Frame Type	2.048 MHz	2.048 MHz   CCS   CAS
Telecom Input Port 1 CRC	Disable	Enable   Disable
Telecom Input Port 1 SSM State	Disable	Enable   Disable
Telecom Input Port 1 SSM Bit	8	4   5   6   7   8
Telecom Input Port 1 SSM PQL Value	3	1 to 9
Telecom Input Port 2 State	Disable	Enable   Disable

Table C-9. GPS and Input Port Parameters (Continued)

Description	Default Value	Value Range
Telecom Input Port 2 Priority	2	1   2
Telecom Input Port 2 Frame Type	2.048 MHz	2.048 MHz   CCS   CAS
Telecom Input Port 2 CRC	Disable	Enable   Disable
Telecom Input Port 2 SSM State	Disable	Enable   Disable
Telecom Input Port 2 SSM Bit	8	4   5   6   7   8
Telecom Input Port 2 SSM PQL Value	3	1 to 9

Table C-10. Output Port Parameters

Description	Default Value	Value range
10 MHz Output Port State	Enable	Enable   Disable
10 MHz Output Generation State	Normal	Warm-up   Freerun   Fast-lock   Normal
1PPS Output Port State	Enable	Enable   Disable
1PPS Output Generation State	Normal	Warm-up   Freerun   Fast-lock   Normal

Table C-11. PTP Grand Master Port IP Parameters

Description	Default Value	Value Range
IOC <sub>x</sub> -y IP Address IOC <sub>1-1</sub> IOC <sub>1-2</sub>	192.168.1.11 192.168.2.11	Valid IPv4 Address
IOC <sub>x</sub> -y IP Mask	255.255.255.0	Valid IPv4 Mask
IOC <sub>x</sub> -y IP Gateway	0.0.0.0	Valid IPv4 Address

Table C-11. PTP Grand Master Port IP Parameters (Continued)

Description	Default Value	Value Range
IOCx Port Redundancy (Bonding)	Enable	Enable   Disable
IOC IP State	Enable	Enable   Disable

Table C-12. VLAN Parameters

Description	Default Value	Value Range
IOCx-y Address IOC <sub>1-1</sub> IOC <sub>1-2</sub>	192.168.1.11 192.168.2.11	192.168.x.(10+index) x=1 or 2 index=1 through 16
IOCx-y Mask	255.255.255.0	Valid IPv4 Mask
IOCx-y Gateway	0.0.0.0	Valid IPv4 Address
ID	0	
Priority	1	
Mode	Disable	Enable   Disable
State	Disable	Enable   Disable

Table C-13. PTP Grand Master Common Parameters

Description	Default Value	Value Range
PTP IOCx-y Clock Identity	ff:ff:ff:ff:ff:ff	64-bit value
PTP IOCx-y Priority 1	128	0 to 255
PTP IOCx-y Priority 2	128	0 to 255
PTP IOCx-y Domain	0	0 to 255
PTP IOCx-y DSCP State	Disable	Enable   Disable
PTP IOCx-y DSCP value	4	4 to 252
PTP Sync Limit	-7	-7 to 7
PTP Announce Limit	-3	-3 to 3
PTP Delay Limit	-7	-7 to 7

Table C-13. PTP Grand Master Common Parameters (Continued)

Description	Default Value	Value Range
PTP State	Enable	Enable   Disable
PTP Max Number of Clients	500	1 to 500

Table C-14. PTP Grand Master Unicast Parameters

Description	Default Value	Value Range
PTP IOCx-y Unicast Negotiation	Enable	Enable   Disable
PTP IOCx-y Dynamic Unicast Lease Duration	300	10 to 1000 seconds
PTP IOCx-y Static Unicast State (A maximum of 10 clients can be assigned)	Disable	Enable   Disable
PTP IOCx-y Static Unicast IP Address	0.0.0.0	Valid IPv4 Address
PTP IOCx-y Static Unicast Clock ID	ff:ff:ff:ff:ff:ff	64-bit Value
PTP IOCx-y Static Unicast VLAN ID	0	0 to 4095
PTP IOCx-y Static Unicast Sync Message Rate (2^y)	-3	-7 to 7
PTP IOCx-y Static Unicast Announce Message Rate (2^y)	1	-3 to 3
PTP IOCx-y Static Unicast Delay Response Message Rate (2^y)	-3	-7 to 7

## Alarm Default Values

Table C-15. GPS Port Alarm Parameters

Description	Default Value	Value Range
Bridging Time	900	100 to 100000
Alarm Delay Time	0	0 to 500000
Alarm State (for each alarm)	Enable	Enable   Disable
Alarm Severity Level (See <a href="#">System Notification Messages</a> , on page 90)		0 to 6





## Appendix D Installing the GPS Antenna

The GPS L1 Reference Antenna is one component of a complete line of GPS accessories for your GPS antenna system provided by Symmetricom. These accessories are designed to deliver precise GPS signals over a wide temperature range and in harsh environmental conditions.

### In This Document

- [Antenna Kits and Accessories](#)
- [Installing the Antenna](#)
- [Optional Accessories](#)
- [Contacting Technical Support](#)

## Antenna Kits and Accessories

This section provides a list of antenna kits and accessories as well as descriptions and associated part numbers.

### Selecting the Proper Gain Antenna

When installing the GPS radio receiver, it is important to select the proper gain antenna and coaxial cable that accounts for the insertion loss between the antenna and the radio receiver to avoid under-driving or over-driving the radio receiver antenna input. The gain required at 1575 MHz for a GPS radio receiver input is the manufacturer's specification for the radio receiver to acquire satellites, with some level of signal degradation allowed.

L1 Antenna gains are usually specified as the minimum effective gain. Such antenna gains can have 4.5 to 10 dB more signal strength at different satellite azimuths and elevations, depending on their reception pattern. The GPS engine requires a signal level at the antenna connector input of the chassis to be between 25 dB and 35 dB. This tolerance allows for the signal loss of the internal coaxial cable and connectors. The optimal signal level at the radio receiver input is 30 dB.

All antenna kits include the GPS L1 antenna, mounting pipe, floor flange, transient eliminator, pre-assembled coaxial cable (for antenna to transient eliminator), roll of 3M 2150 weatherproof tape, and a right angle adapter. All chassis, antennas, transient eliminators, and in-line amplifiers have N-type connectors.

All antenna kits supplied use LMR-400, or equivalent, low-loss coaxial cable. Other types of coaxial cable are available for GPS antenna applications; however, it is imperative that you calculate the specific cable loss to ensure a signal level between 25 dB and 35 dB at the antenna connector input. The L1 signal loss of LMR-400 is 0.167 dB/meter. The L1 signal loss of a 90 V transient eliminator is typically 0.25 dB.

#### **GPS Antenna With a Low Noise Amplifier, 26, 40, or 48 dB**

Symmetricon offers three versions of GPS antennas with 26, 40, or 48 dB internal Low Noise Amplifier (LNA). These antennas, which are compatible with most commercial GPS receivers, receive, amplify, and filter the L1 (1575.42 MHz) signal from GPS satellites. The antenna is housed in a weatherproof package suitable for permanent installation in an exposed location. For additional transient eliminator protection requirements, you can install a 250B-90 Gas Tube transient eliminator in series with the antenna coaxial cable.

The cable between the antenna and the TimeProvider 5000 cable should be kept to the shortest reasonable length. Before using additional cables, verify that the total antenna system gain is acceptable as described in the [Selecting the Proper Gain Antenna](#) section of Appendix D. The tables listed below provide information about the antenna:

- [Table D-1](#) lists the item number and provides a brief description of each antenna
- [Table D-2](#) provides specification information for GPS antenna with internal LNA
- [Table D-3](#) lists the item numbers and provides a brief description of the antenna accessories available for the GPS series antennas.

Table D-1. GPS Antennas with Internal LNA

Part Number	Description	Minimum Cable Length
99013091-006	26 dB Antenna with 3 m + 3 m cable	3 m (10 ft)
99013091-013	26 dB Antenna with 3 m + 10 m cable	3 m (10 ft)
99013073-070	40 dB Antenna with 10 m + 60 m cable	30 m (100 ft)
99013074-150	48 dB Antenna with 10 m + 140 m cable	76 m (250 ft)
99013075-230	48 dB Antenna with 10 m + 220 m cable and 20 dB Amplifier	198 m (650 ft)

[Table D-2](#) provides specifications for GPS antennas with internal LNA.

Table D-2. Specifications for GPS Antennas with Internal LNA

Characteristic	Specification
<b>Mechanical</b>	
Mounting	4 holes, 1.75 in x 1.75 in (4.445 cm x 4.445 cm) centers, 0.25 in (0.635 cm) mounting holes
Diameter	3.5 in (88.9 cm)
Height	12.94 in (328.7 cm), including pipe mount
Weight	< 3 lbs (1.4 kg)
<b>Environmental</b>	
Temperature	-40°C to +75°C
Relative Humidity	100% Non-Immersed
Altitude	200 ft. (60 m) below sea level to 13,000 ft. (3962 m) above sea level
<b>Electrical</b>	
Power	4.7 to 28 VDC (5 VDC Nominal)
Element	Right Hand Circular
Carrier	L1 (1545.42 MHz)
Bandwidth	10 MHz

Table D-2. Specifications for GPS Antennas with Internal LNA (Continued)

Characteristic	Specification
Noise Figure	< 2.5 dB
Output Impedance	50 $\Omega$
Gain	
Marine 26	26.5 dB $\pm$ 3 dB
Marine 40	40 dB minimum
Marine 50	48 dB minimum

Table D-3 lists the available accessories for GPS antennas with internal LNA.

Table D-3. 26 dB L1 GPS Antenna Accessory Kit

Part Number	Description
112-43400-00-3	Transient Eliminator, 90 Volts, 1.5 GHz, N-Type
12010210-000-0	Bracket Assembly, Antenna Mount Right Angle
12813080-000-0	Crimper Kit, LMR-400 (crimp tool, 2150 tape, LMR preptool, 10 each crimp N-type connectors)

## Transient Eliminators

Symmetricon offers the FCC-250B-90-1.5NFNF Transient Eliminator for installations that require antenna coaxial lead-in protection. The FCC-250B- 90-1.5NFNF Transient Eliminator passes DC power and frequencies in the 1.5 GHz range with non-downconverter L1 GPS antennas. In most installations, the transient eliminator mounts near the point at which the antenna lead enters the facility. Table D-4 provides the transient eliminator specifications.

Table D-4. FCC-250B-90-1.5NFNF Specifications

Characteristic	Specification
Type	Gas
Response Time	< 2 nanoseconds
Impedance	50 $\Omega$
Insertion Loss	< 0.25dB @ 1,575 MHz
VSWR	< 1.6:1 @ 1,575 MHz
DC Breakdown Voltage	90 Volts

Table D-4. FCC-250B-90-1.5NFNF Specifications (Continued)

Characteristic	Specification
Dissipation Capacity	10,000 Amperes, impulse 8/20 $\mu$ sec
Connector Type	N-Type
Temperature	-55°C to + 70°C
Relative Humidity	100% Non-immersed
Altitude	200 ft. (60 m) below sea level to 13 000 ft. (3962 m) above sea level

## GPS L1 Inline Amplifier

The GPS L1 Inline Amplifier (570704-0002) option boosts the signal from the antenna. Use this amplifier on LMR-400 cables that are longer than 650 feet; it receives power from the GPS radio receiver through the antenna coaxial cable connections. [Table D-5](#) provides mechanical and electrical specifications for the amplifier.

Table D-5. GPS L1 Inline Amplifier Specifications

Characteristic	Specification
<b>Mechanical</b>	
Connectors, (In/Out)	N-Type
Gain	20 dB $\pm$ 2 dB
Dimensions, includes connectors	Length: 3.77 in (9.6 cm)
<b>Electrical</b>	
Power	+4 VDC to +28 VDC
Current	< 10 mA
Noise Factor	< 3 dB

## GPS L1 Inline Amplifier Assembly

This assembly (item number 11013077-000-0) mounted on an aluminum plate is designed with mounting holes to allow for several mounting configurations. The assembly consists of a GPS inline amplifier, a 90 V L1 Transient Eliminator, and an adapter for connectivity.

## Antenna Coaxial Cables

Symmetricon provides several low-loss cable types, as well as LMR-400 with N-type connectors on both ends. Before using additional cables, verify that the total antenna system gain is acceptable as described in the [Selecting the Proper Gain Antenna](#) section of Appendix D.

- [Table 2-4](#) in Chapter 2 of this User's Guide lists the optional antenna coaxial cables
- [Table D-6](#) provides antenna cable specifications

Table D-6. Antenna Cable Specifications

Cable Type	Measured Loss (@1.575 GHz dB per foot)	DC Resistance ( $\Omega$ per foot)	Type Center Conductor	Flammability
RG213/U (Belden 8267)	0.093 dB	0.0030	Stranded 13 AWG	U/L CSA
RG213/U (Belden 8267)	0.093 dB	0.0030	Stranded 2.62 mm <sup>2</sup>	U/L CSA
UHF/VHF (Belden 9913)	0.058 dB	0.0027	Solid 10 AWG	
UHF/VHF (Belden 9913)	0.058 dB	0.0027	5.26 mm <sup>2</sup>	
UHF/VHF (Belden 89913)	0.089 dB	0.0027	Solid 10 AWG	Plenum U/L CSA
UHF/VHF (Belden 89913)	0.089 dB	0.0027	5.26 mm <sup>2</sup>	Plenum U/L CSA
LMR-400	0.051 dB	Shield – 0.00165 Center – 0.00139	0.109 inch Solid	
LMR-400	0.051 dB	Shield – 0.00165 Center – 0.00139	0.27686 cm <sup>2</sup> Solid	

# Installing Antennas

This section provides a procedure for installing a GPS antenna. Before beginning the installation, review [Planning the Installation](#), on page 191, and gather the necessary tools and materials described in [Antenna Installation Tools and Materials](#), on page 194

## Antenna Connection Overview

The TimeProvider 5000 chassis has one antenna connection located on the front of the IMC module. The antenna connection is made via a SMA connector, labeled GPS. The connectors are DC isolated and AC bypassed to frame ground. This connection is used for a radio receiver antenna connection only. Installation procedures for GPS antennas are outlined below.

## Planning the Installation

Prior to installing the antenna, you should plan the site, antenna location, grounding scheme, cable route, and all other details.

### Locating the Antenna

Use [Figure D-1](#) as a guide to locating the antenna.

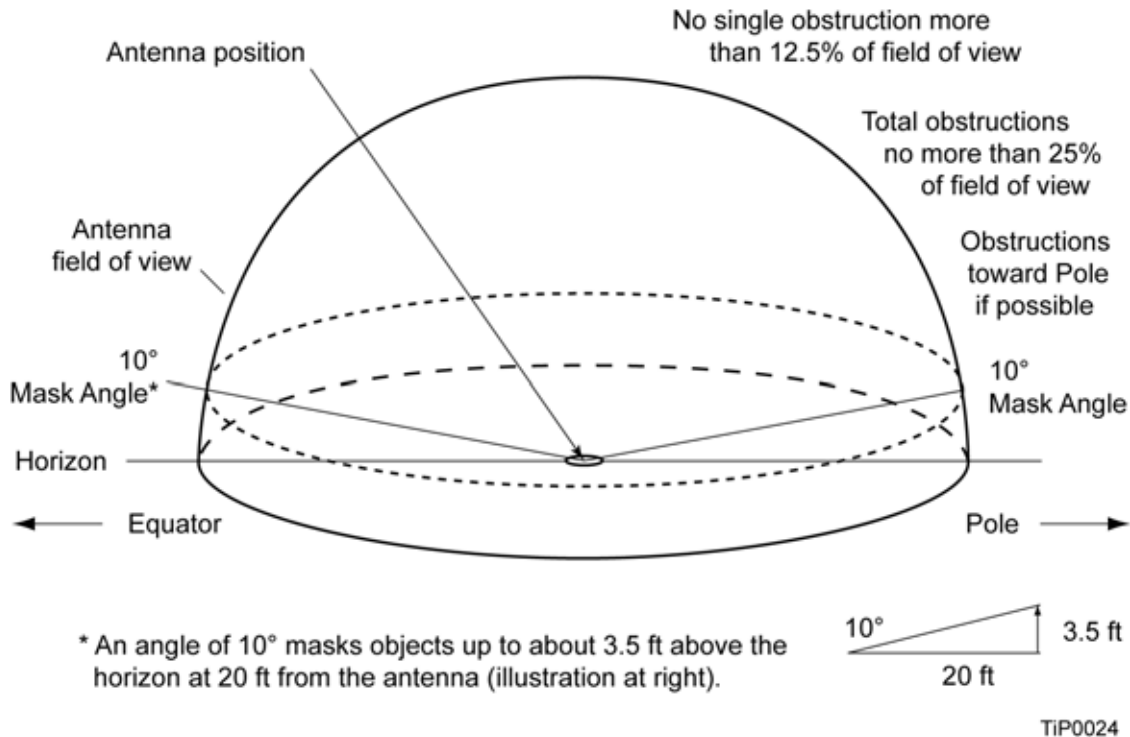


Figure D-1. Locating the GPS Antenna



**Caution:** To avoid damage to the GPS antenna, *do not* place the antenna where high-power radio signals are beamed directly at the unit. Such signals can damage the preamplifier of the GPS antenna.

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**Warning:** To avoid serious injury to personnel or damage to equipment, exercise caution when working near high voltage lines. In particular:

- Use extreme caution when installing the GPS antenna near, under, or around high voltage lines.
  - Follow local building electrical codes for grounding using the frame ground lug on the TimeProvider 5000 chassis.
  - The in-line amplifier receives 5 VDC power from the GPS radio receiver, and is supplied on the center conductor of the LMR-400 or equivalent coaxial cable. If the application requires an in-line amplifier, mount the amplifier/plate assembly where the transient eliminator would normally be mounted.
  - Symmetricom does not recommend cutting the antenna cables provided in the GPS Antenna Kit.
- 



**Recommendation:** Symmetricom recommends that you consider the following location and environment influences before installing the GPS antenna:

- If possible, provide the antenna with an unobstructed 360-degree view of the sky from the horizon.
  - In general, do not allow obstructions that obscure the horizon (as viewed from the antenna) by more than 10 degrees, as shown in [Figure D-1](#).
  - Locate the antenna well away from, and preferably in a plane above electrical equipment such as elevators, air conditioners, or other machinery.
  - To reduce the risk of lightning damage, *do not* place the antenna at the highest point of the building.
  - Locate the GPS antenna at least 12 feet from metallic objects, if possible.
  - Locate the antenna high enough to avoid drifted snow.
  - Locate the transient eliminator in a protected area to avoid contact with standing water.
  - Locate the antenna within 30 feet of the point at which the antenna cable enters the building.
  - Allow at least 10 feet of separation distance between GPS antennas.
  - Surfaces above the plane of the unit that are between the antenna and the horizon can produce reflected (multi-path) signals, which can degrade the performance of the radio receiver.
-



## Developing a Grounding Scheme

In addition to determining where to locate and mount the antenna and cabling, you should develop a grounding scheme. The purpose of the grounding scheme is to provide some protection against voltage surges and static discharge. If transient eliminators are used, they also need to be connected to the perimeter ground system or bulkhead entrance panel that is connected to the perimeter ground system.



**Caution:** To ensure proper grounding, observe these precautions when installing the antenna:

- Allow no sharp bends in the ground conductors.
- Ensure that no painted surface insulates the transient eliminator or grounding clamps.
- Ensure that ground conductors are bonded to the metal enclosure box (if used) and do not enter through an access hole.
- Do not use soldered connections for grounding purposes.
- Secure all grounding connections with mechanical clamp type connectors.

- 
- In general, follow local building codes when selecting a grounding scheme, wire size, and installation.

Use #6 AWG (13.3 mm) copper ground wire or larger, depending on the distance to the earth ground electrode. Refer to your local electrical codes for specific details. In most cases, 1/0 AWG (55.0 mm) ground wire will maintain 1/10 the resistance of the coaxial shield..



**Note:** Larger ground conductors provide better transient elimination; that is, the larger the ground conductor, the less likely the chance of transients.

- 
- Connect transient eliminators, if part of the grounding scheme, to earth ground through a conductor.

Symmetricon makes no recommendation as to whether to install transient eliminators. Symmetricon can provide suitable transient eliminators as an option.



**Note:** *Do not* connect the outside transient eliminator ground to the inside equipment rack ground. Doing so can defeat the protection afforded by the transient eliminator.

- 
- Never connect antenna systems to the same earth ground connector as heating and cooling systems, elevator or pump motors, or other motors or machinery which can induce noise in the antenna system.

## Antenna Installation Tools and Materials

These standard tools and materials are not supplied in the antenna kit, but may be required for installing the GPS antenna. For a list of antenna kit contents, see [Table D-1](#).

- Four each 0.25 in (6 mm) fasteners for installing the antenna floor flange
- Extra cable ties or acceptable cable clamps
- #6 AWG (minimum) copper ground wire
- Eight-foot (2.9 m) ground electrode
- Custom mounting plates, U-bolts, masonry bolt, and so forth, as needed for mounting to a tower, roof, or wall of a building
- A cable puller may be required for installing the antenna coaxial cable
- Digital voltmeter (DVM)



**Caution:** To prevent damage to connectors, use caution while pulling cable.

---



**Caution:** To avoid damage to the connectors, do not use the connectors to pull the cable. If at all possible, avoid bundling the coaxial cable with other cables (and possible noise sources). Use appropriate cable-pulling devices when pulling the coaxial cable through conduit or a weather head.

---

## Cutting Antenna Cables

Symmetricon recommends that you coil excess cable to avoid gain mismatch between the GPS antenna and the radio receiver. Coiling the excess cable also allows you to use the factory-installed crimped connector.

Symmetricon *does not* recommend cutting the antenna cables provided in the GPS Antenna Kits. If you must cut the cables, please ensure that the following requirements are met.

Be aware of these cable and connector requirements before cutting antenna cables:

**Cable Requirements** – The total cable length from the radio receiver to the antenna must not be shorter than the minimum cable lengths indicated in the GPS Antenna Kits (see [Table D-1](#)).

**Connector Requirements** – The cables provided with the GPS Antenna Kit have factory installed crimped connectors. If you cut these cables, you must supply and add a connector. Symmetricon recommends that you use only crimp-style N-type connectors in the Crimper Kit for this application.

## Installing the Antenna

This section provides installation procedures for installing the GPS antenna.



**Note:** Follow local building electrical codes when installing the GPS antenna.

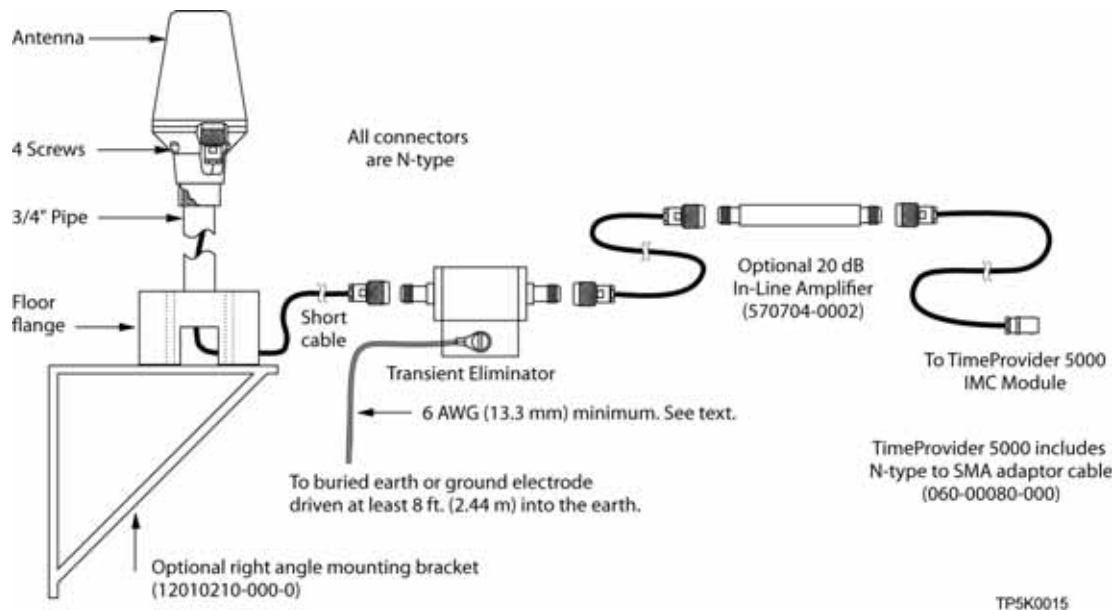


Figure D-2. GPS Antenna Installation

To mount the GPS antenna:

- To mount the antenna to any stable flat surface, use the floor flange supplied in the GPS Antenna Kit. The mounting surface and the local building codes determine the type and number of fasteners, screws, bolts, and so forth, that may be required.
- To mount the antenna on the side of a building or tower, use the optional right angle mounting bracket (part number 12010210-000-0).
- To secure the coaxial cable to the mast, use one or more 8-inch cable ties or appropriate cable clamps.

## Connecting the Cable to the Antenna

To connect the coaxial cable to the mounted antenna (see [Figure D-2](#)):

1. Loosen the four screws securing the top of the antenna in place to gain access to the connector.
2. Route the shorter antenna coaxial cable from the antenna through the floor flange (in the lower half of the antenna base) to the unit.



**Caution:** To avoid damage to the connectors, do not use the connectors to pull the cable. If at all possible, avoid bundling the coaxial cable with other cables (and possible noise sources). Use appropriate cable-pulling devices when pulling the coaxial cable through conduit or a weather head.

---

3. Connect the cable to the antenna and run the cable from the antenna through the slot of the floor flange.



**Caution:** To avoid damage to internal solder connections, do not over-tighten the connector.

---

4. Replace the four screws to secure the top of the antenna in place with the cable connected.

## Installing the Transient Eliminator

If you are installing a transient eliminator, follow these guidelines:

- Transient eliminators should be installed in accordance with your antenna system grounding scheme
- Mount the transient eliminator within 30 feet (9 m) of the GPS antenna
- If required, mount a second transient eliminator near the GPS antenna

To install the transient eliminator:



**Note:** Step 6 in the following procedure cannot be done if you cut the cable (as described in Step 1).

---

1. If necessary, cut the coaxial cable and install mating connectors (see [Cutting Antenna Cables](#), on page 194).
2. Using the DVM, measure the resistance between the center conductor and shield to verify that the center conductor and shield are not shorted together.
3. Connect the longer GPS antenna coaxial cable to the transient eliminator.

4. Connect the ground wire between the transient eliminator and the proper grounding zone (building ground, master ground bar, or other) for the mounting location.



**Recommendation:** Symmetricom does not recommend soldered connections for grounding purposes. All grounding connections should be secured with mechanical clamp connectors.

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5. Wrap the connectors with weatherproof tape for added protection.
6. Verify that the antenna coaxial cable center conductor is not shorted to the shield of the cable.

## Installing the Antenna Cable

You should install the antenna cable from the transient eliminator to the TimeProvider 5000 using the shortest route possible. Follow all applicable building and electrical codes to ensure a water-tight and fire-resistant installation. .



**Caution:** To avoid damage to the connectors, do not use the connectors to pull the cable. If at all possible, avoid bundling the cable with other cables (and possible noise sources). Use appropriate cable-pulling devices when pulling the cable through conduit or a weather head.

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## Connecting the GPS Antenna

Before connecting the GPS antenna to the TimeProvider 5000, see [Antenna Connection Overview](#), on page 191. Then, follow the instructions below.

1. Before connecting the antenna coaxial cable to the TimeProvider 5000, test the DC resistance between the center conductor and the shield using an ohmmeter. The reading should be approximately 260  $\Omega$  for an active GPS antenna.

If the actual reading is incorrect, you may have a shorted or open cable or transient eliminator (if installed). Therefore, apply the same measurements directly to the GPS antenna. This requires disconnecting the antenna cable at the antenna.



**Note:** The open-circuit range of an individual ohmmeter can cause readings to vary among meters.

---

2. Secure the free end of the antenna cable to the appropriate antenna connector on the rear panel of the TimeProvider 5000 using the right angle adapter provided with the antenna cable.



**Recommendation:** Symmetricom recommends coiling excess cable to avoid gain mismatch between the GPS antenna and the TimeProvider 5000. Coiling the excess cable also allows you to use the factory-installed crimped connector.

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## Antenna Installation Completeness Checklist

To verify that antenna installation is complete:

- Verify that all power and ground wires are installed correctly and securely fastened.
- Verify that all input and output cables are properly installed.
- Verify that all antenna connectors are secure, tight, and weatherproofed.

## Optional Accessories

Table D-7 provides a list of optional accessories which may be used to mount or install the TimeProvider 5000.

Table D-7. Optional Accessories

Part Number	Description
551026-0038	Cable EIA-232 shielded DB9P to DB9S, 5 ft. (1.5 m)

## Contacting Technical Support

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If you encounter any difficulties installing or using the product, contact Symmetricom Global Services:

### **U.S.A. Call Center**

Symmetricom, Inc.  
2300 Orchard Parkway  
San Jose, CA 95131-1017

Toll-free in North America: 888-367-7966  
Telephone: 408-428-7907  
Fax: 408-428-7998  
E-mail: [support@symmetricom.com](mailto:support@symmetricom.com)  
Internet: <http://www.symmetricom.com>

### **Europe, Middle East, and Africa (EMEA) Call Center:**

Symmetricom Global Services EMEA  
Fichtenstr. 25  
85649 Hofolding  
Germany

Telephone: +49 700 3288 6435  
Fax: +49 8104 662 433  
E-mail: [emeasupport@symmetricom.com](mailto:emeasupport@symmetricom.com)  
Internet: <http://www.symmetricom.com>

### **Latin America**

Symmetricom Latin America  
Ft Lauderdale, Florida, USA

Telephone: +1 305-895-4301  
Telephone: +1 954 385 2416  
Fax: +1 954 252 4031  
email: [latin\\_america\\_sales@symmetricom.com](mailto:latin_america_sales@symmetricom.com)

### **Asia and Pacific Rim**

Symmetricom Hong Kong Ltd  
P.O. Box No. 71  
Texaco Road Post Office  
Hong Kong

Telephone: + 852 2405 5203  
Fax: + 852 2405 5713  
email: [asia\\_sales@symmetricom.com](mailto:asia_sales@symmetricom.com)



## 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 CDROM that is supplied with the TimeProvider 5000. 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 TimeProvider 5000, the user agrees to the terms of these licenses.

### **In This Appendix**

- [Third-Party Software](#)

## Third-Party Software

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The following is a list of third-party software applications provided with the TimeProvider 5000.

- busybox-1.10.4
- dropbear-0.50
- dtc-1.0.0
- elfutils-libelf-libs-0.108
- ethtool-5
- expect-5.42.1
- glibc-2.5.90
- iproute-20061002
- iptables-1.3.7
- libgcc-4.2.0
- libpcap-libs-0.9.5
- linux-2.6.20
- logrotate-3.7
- mtd-utils-20070514
- net-snmp-5.1
- pam-libs-0.79
- pam-modules-0.79
- pam\_radius-1.3.16
- pam\_tacplus-1.2.9
- popt-libs-1.10.2
- sudo-1.6.8p9
- syslogd-1.4.1
- tcl-dev-8.4.6
- tcpdump-3.9.5
- tftpd-hpa-0.43
- u-boot-1.1.6
- zlib-libs-1.2.3

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