TimeProvider 1000 and 1100
Node Clock

User Guide
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Symmetricom®

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

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Purpose of This Guide

The TimeProvider User's Guide describes the procedures for unpacking, installing, using, maintaining, and troubleshooting the Symmetricom TimeProvider. It also includes appendixes that describe default values and how to install the included software application SynCraft.

Who Should Read This Guide

Chapter 1, Introduction, and Chapter 2, Product Overview, are written for non-technical audiences who need general information about the product. Chapter 3, Installing the Product, 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.

Structure of This Guide

This guide contains the following sections and appendixes:

Chapter, Title	Description
Chapter 1, Overview of the TimeProvider	Provides an overview of the product, describes the major hardware and software features, and lists the system specifications.
Chapter 2, Engineering and Ordering Procedures	Lists the part number and ordering procedure for all TimeProvider parts and accessories.
Chapter 3, Installing the TimeProvider	Contains procedures for unpacking and installing the product.
Chapter 4, Provisioning the TimeProvider	Describes the TL-1 commands required to provision the TimeProvider after installing the unit.
Chapter 5, Testing the TimeProvider	Provides checklist-based commissioning tests that should be performed after completing turn-up and software configuration to ensure the system is ready for normal operation.
Chapter 6, Maintaining and Troubleshooting the TimeProvider	Contains preventive and corrective maintenance, and troubleshooting procedures for the product.
Chapter 7, Specifications of the TimeProvider	Lists the specifications for the TimeProvider
Appendix A, Factory Default Values	Includes a list of the factory default values for hardware and software parameters.
Appendix B, CRAFT Software Reference	Describes how to use the CRAFT software interface with the TimeProvider.
Index	Provides references to individual topics within this guide.

Conventions Used in This Guide

This guide uses the following conventions:

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

When text appears this way...	... it means:
TimeProvider User's Guide	The title of a document.
SSU CRITICAL IOC1	An operating mode, alarm state, status, or chassis label.
Select **File**, **Open**...	Click the Open option on the File menu.
Press **Enter** Press **;**	A named keyboard key. The key name is shown as it appears on the keyboard. An explanation of the key's acronym or function immediately follows the first reference to the key, if required.
`TimeProvider` `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.
A *re-timing* application	A word or term being emphasized.
Symmetricom ***does not*** recommend...	A word or term given special emphasis.

Warnings, Cautions, Recommendations, and Notes

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

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

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

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

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

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

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

Related Documents and Information

Other helpful documents and software tools are listed below. See your Symmetricom representative or sales office for a complete list of available documentation.

- *SynCraft* management software
- TimePictra management software
- *TimeProvider TL-1 Reference Guide*, part number 097-58001-001

Note: Symmetricom offers a number of applicable training courses designed to enhance product usability. Contact your local representative or sales office for a complete list of courses and outlines.

Where to Find Answers to Product and Document Questions

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

Chapter 1 Overview of the TimeProvider

This chapter describes the TimeProvider product.

In This Chapter

1.1 Overview

The TimeProvider is a node clock that performs the functions of a Synchronization Supply Unit (SSU) designed specifically to meet the needs at the network edge. In small offices where core office synchronization solutions are critical, a node clock like the TimeProvider is ideal. It can also be used in a “small” Central Office when accompanied with a Primary Reference Source (PRS). The TimeProvider chassis provides a compact footprint for installations where space can be a limiting factor.

The TimeProvider’s unique design incorporates the input, output, and clock functions in a single card. This allows you to simplify the storage inventory required for future expansion needs. The TimeProvider shelf requires only three plug-in cards to operate with full redundancy: dual Input/Output/Clock cards (IOCs) and a single Information Management Card (IMC), which serves as a communications/alarm interface. The main shelf provides up to 32 redundant universal timing outputs; an optional Expansion Panel provides an additional 32 redundant outputs.

Using Symmetricom’s SmartClock technology design, the oscillators within the IOCs are enhanced with improved performance and accuracy. Using intelligent firmware algorithms, SmartClock “learns” the effects of the ageing of the clock while it is locked to a reference signal and stores this information in its memory. If the reference signals are lost or disqualified, SmartClock uses the stored data to compensate for frequency changes while the TimeProvider continues to distribute highly stable synchronization signals.

Shelves

The TimeProvider is available in two shelf models. Each shelf supports up to 32 redundant output channels.

- The TimeProvider 1000 is a 175 mm tall ETSI shelf that meets the requirements of ETSI 300 119-4 January 1994. Figure 1-1 shows the TimeProvider 1000 shelf.
- The TimeProvider 1100 is a 130 mm tall rear-access shelf; indicators are on the front panel and connections are available on the rear panel. Figure 1-2 shows the front and rear panels of the TimeProvider 1100.

Figure 1-1. TimeProvider 1000 ETSI-style Shelf

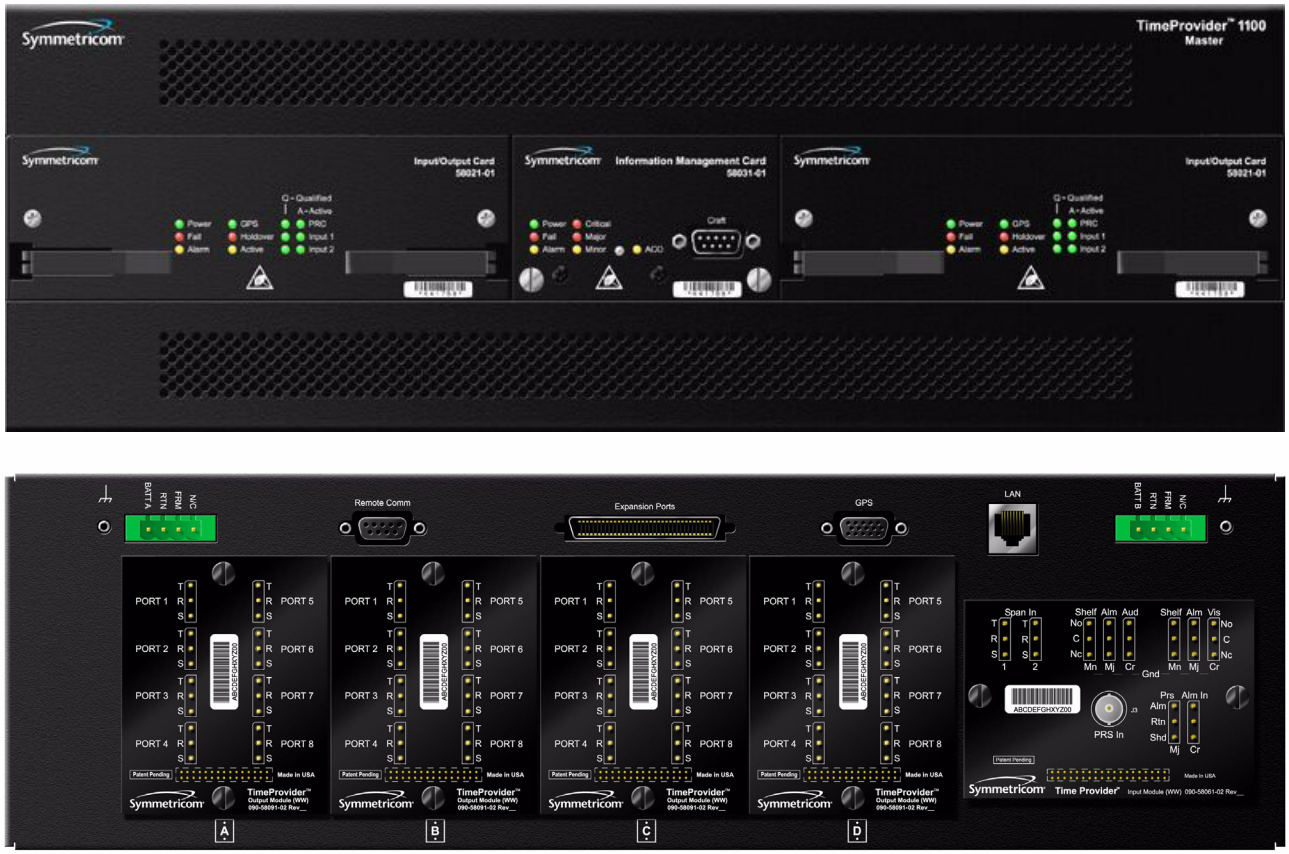


Figure 1-2. TimeProvider 1100 Rear Access Shelf (Front and Rear)

Expansion Panel

The TimeProvider has an optional Expansion Panel that doubles (to 64) the number of output channels available. Figure 1-3 shows the front-access version of the Expansion Panel. The Expansion Panel receives timing signals from the TimeProvider main shelf through an expansion cable.

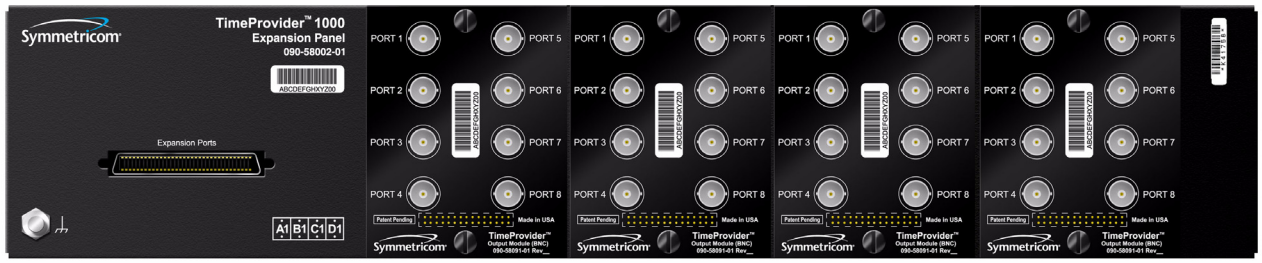


Figure 1-3. TimeProvider 1000 Expansion Panel

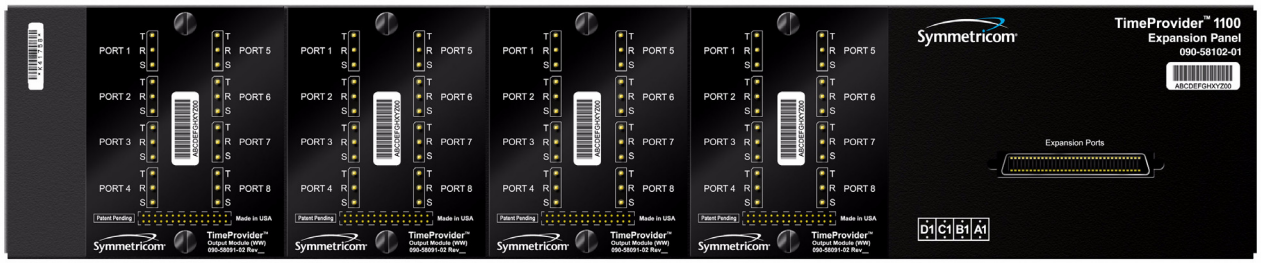


Figure 1-4. TimeProvider 1100 Expansion Panel

Inputs

The TimeProvider accepts one or two reference input signals. These can be E1, 2.048 MHz analog, T1, or CC signals. In addition, the TimeProvider accepts a 2.048, 5, or 10 MHz reference input on the PRS input port. The GPS input is reserved for future use. The TimeProvider can use the input as a frequency reference and distinguish the presence of an AIS on this input. The system qualifies the input reference signals using Loss of Signal (LOS), Alarm Indication Signal (AIS), Loss of Framing, and Synchronization Status Messages (SSM). Section 1.7, Reference Input Signals, describes the inputs in more detail.

Outputs

The TimeProvider produces a variety of outputs to meet different signal types. Output signal types include 8 kHz, E1, 2.048 MHz, T1, and Composite Clock (CC). The E1 and T1 signals can be provisioned with standard framing and G.703 formats. These outputs are available through one of several different connector panels. See Section 1.9, Output Signals, for more information on output signals.

The TimeProvider outputs are arranged into four groups of eight outputs per group. Each group, labeled A, B, C, and D, can be configured independently. The configuration of each output group matches the corresponding output group on the optional Expansion Panel.

Communication

Three communications ports provide access to the TimeProvider: Ethernet, local Craft serial port, and a Remote serial port. These ports are described in detail in Section 1.5, Communication Ports.

Clocks

The TimeProvider's clock design includes a highly stable ovenized crystal oscillator with Direct Digital Synthesis (DDS) to produce accurate synchronization outputs. In a dual-IOC configuration, the clock function is redundant to provide protection. Each IOC qualifies the input signal and filters jitter and wander noise elements that may exist. In the event that all input references are lost or disqualified, the TimeProvider's clock design, together with the SmartClock technology, goes into holdover mode with the oscillator providing the system reference.

1.2 Operating Modes

You can configure the TimeProvider to operate in one of two modes: Synchronization Supply Unit (SSU), or Subtending (SUB) as defined by Telcordia GR-378 Section 7. The distinguishing aspect between modes is defined by the inputs that can be selected as the system reference.

SSU Mode

This is the TimeProvider's default operating mode. The PRS, INP1, and INP2 signals can be selected as the system reference. The INP1 and INP2 inputs cannot be provisioned to receive Composite Clock signals. The method of selecting the system reference is described in Section 1.7.1, Selecting the Input.

SUB Mode

This mode allows the TimeProvider to operate as a Remote shelf. When you provision the unit for the SUB mode, the firmware automatically provisions INP1 and INP2 for CC inputs; they are the only inputs available as system references (you can provision the PRS input for monitoring, but it cannot be selected as system reference). The CC outputs are required to tightly phase-follow the selected CC input reference with minimal filtering.

1.3 Physical Description

The TimeProvider consists of a shelf, plug-in cards, connector adapter panels for the cards, cables, hardware, and software. The TimeProvider is available in two configurations: front access (Model 1000) and rear access (Model 1100), as shown in Figure 1-1 and Figure 1-2.

Figure 1-5 illustrates the location of the connectors, cards, and modules in the TimeProvider 1000.

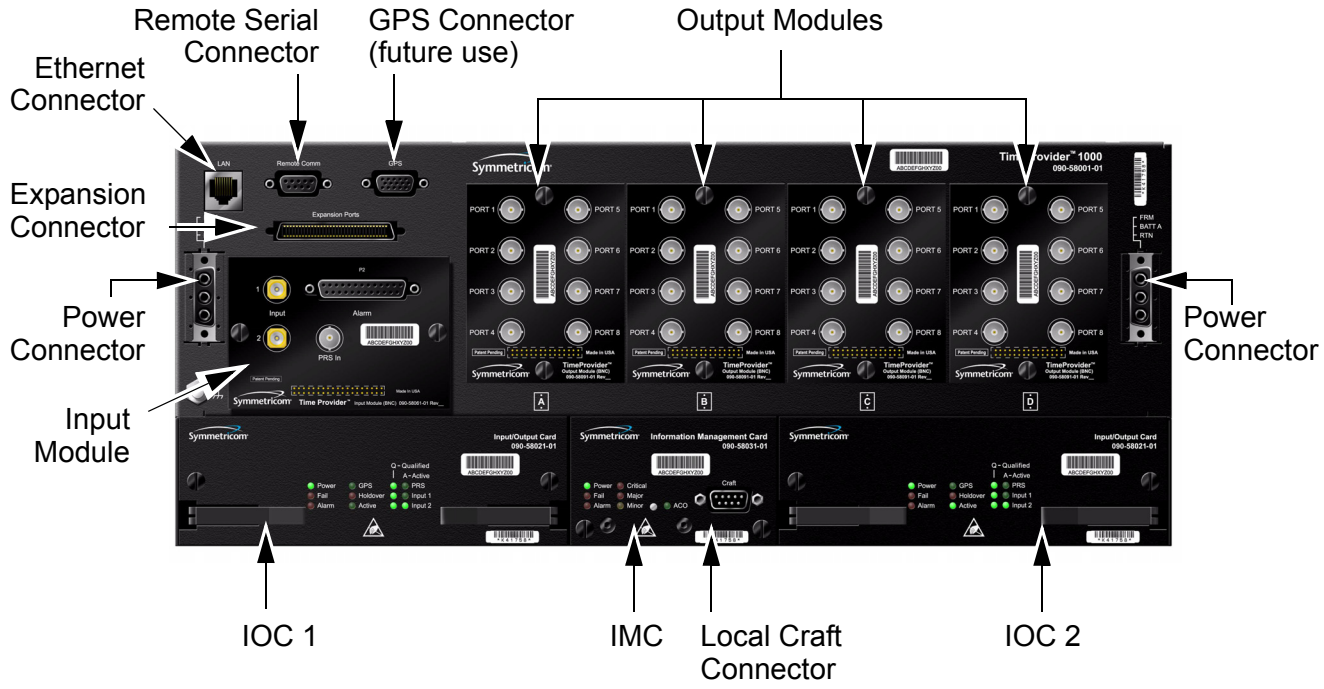


Figure 1-5. TimeProvider 1000 - Front Panel

Figure 1-6 illustrates the location of the connectors, cards, and modules in the TimeProvider 1100.

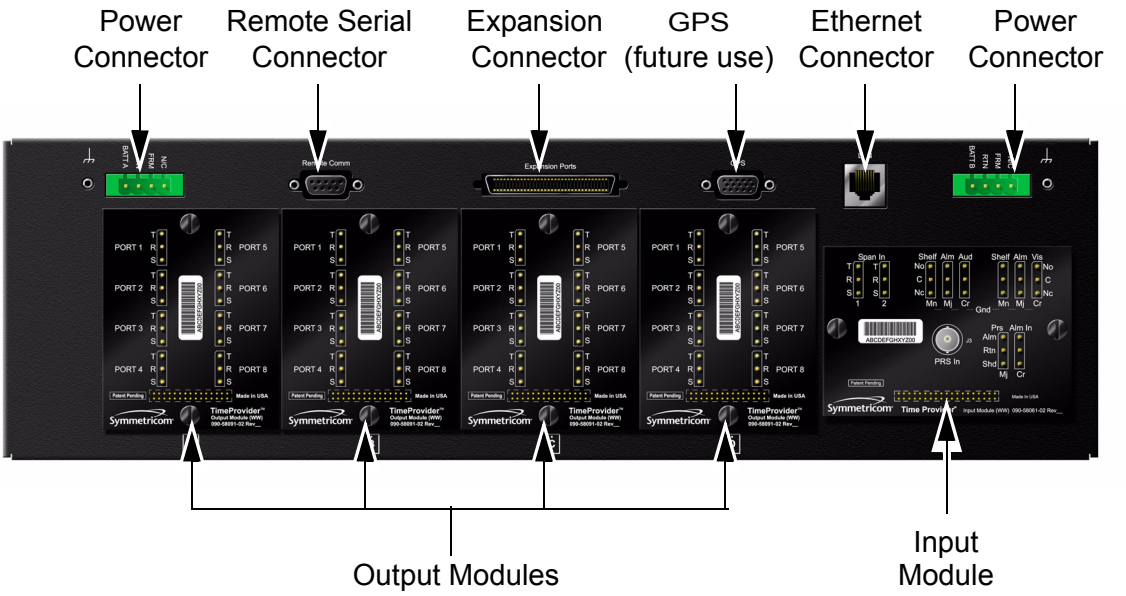


Figure 1-6. TimeProvider 1100 - Rear Panel

1.4 Functional Description

The TimeProvider consists of a shelf and slots for two IOCs and one IMC. One plug-in Input module and up to four plug-in Output modules complete the system. The optional Expansion Panel doubles the outputs to 64.

This section describes the components and block diagram of the TimeProvider. The block diagram, shown in Figure 1-7, contains the following major blocks:

- Shelf
- Input module
- IMC
- IOC
- Output module
- Expansion Panel required for ports 33 through 64

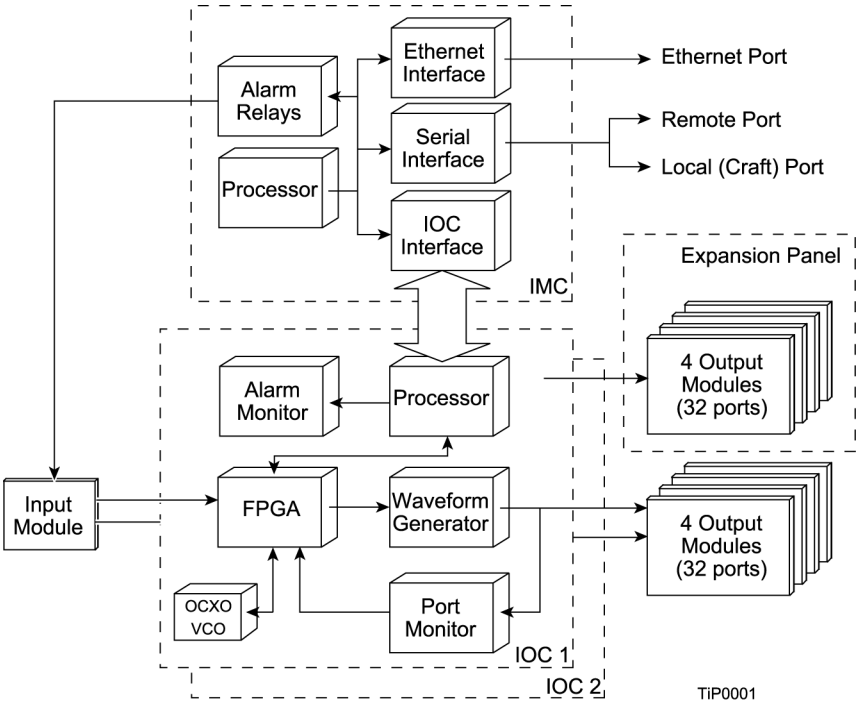


Figure 1-7. Block Diagram of the TimeProvider

Shelf

Both the front-access and rear-access shelf provides a chassis for mounting the Input module, one IMC, two IOCs, and up to four Output modules. A backplane provides connections between the modules.

Input Module

The Input module receives the incoming reference signals and contains the alarm input/output connector. A variety of connector modules allows you to select the connector style and input impedance to match the wiring system at the installation site.

Information Management Card (IMC)

The Information Management Card, known as the IMC, contains a processor that manages communications between the two IOCs and the serial and Ethernet communications ports.

Input/Output and Clock Module (IOC)

The TimeProvider operates with one or two IOCs. A second IOC in the shelf provides protection should the primary IOC fail. The IOC accepts the incoming reference signal and decodes the SSM, if present.

With the system properly provisioned and a reference signal selected, the local oscillator in the IOC operates in one of the following states:

- Warm-up – For up to 20 minutes after applying power to the shelf, the IOC operates in warm-up mode.
- Fast-lock – After warm-up is complete, the IOC enters the fast-lock state, where it quickly frequency-locks the local oscillator to the reference input.
- Normal lock – After the IOC has completed the fast-lock cycle, it enters the normal lock mode, in which the TimeProvider uses the proper amount of filtering for the selected mode. When set to the SSU mode and locked to an active input traceable to a Primary Reference Source (PRS), the TimeProvider complies with the G.811 and GR-2830-CORE standards.
- Holdover – If the reference signal is lost, then the clock enters the holdover mode. The accuracy of the TimeProvider output is then dependent on the quality level of the oscillator in the IOC.
- Free-run – If the IOC starts without a system reference, the TimeProvider enters the free-run state after warm-up. If a reference is applied, then the TimeProvider enters the fast-lock and then the normal-lock states.

After the IOC has been in the Normal lock mode for at least three days, SmartClock holdover mode becomes available. Compared to the normal holdover mode, this mode provides a superior output quality.

Output Module

The Output module provides the output connectors for the TimeProvider. Like the Input module, each Output module uses one of a variety of connectors that match the wiring system at the installation site. Section 3.5.5, Making Output Connections, describes the Output Modules available for the TimeProvider and the Expansion Panel.

1.5 Communication Ports

The TimeProvider contains three communications ports that allow you to provision, monitor, and troubleshoot the shelf. The Ethernet and Remote serial ports are located on the shelf, and the local Craft serial port is located on the IMC. You communicate with the TimeProvider using the TL-1 protocol.

1.5.1 Ethernet

An Ethernet connector provides connectivity to an Ethernet local area network. Each main shelf has a unique internet protocol (IP) address. Once the IP address is set and a connection is made to a LAN, you can access the TimeProvider on an intranet. You can select one of four security levels for each user; each level has varying levels of access to provisioning parameters.

The Ethernet port has two TCP ports: Command and Autonomous Output (AO). The Command port supports up to 10 simultaneous connections. The AO port supports one connection.

1.5.2 Local Craft Serial Port

This EIA-232 port supports local control; you can configure the TimeProvider with TL-1 commands using a terminal or personal computer (PC) with terminal emulation software or Symmetricom's craft software, SynCraft. The connector is located on the front panel of the IMC. The default specifications are 9600-8-N-1. The Local port is configured as a DCE interface.

1.5.3 Remote Serial Port

The Remote serial connector can be used in the same manner as the local Craft serial port. The Remote port has additional control support to manage an external modem for remote access. The Remote port is configured as a DTE interface.

1.6 System Power

The TimeProvider main shelf has redundant –48v DC inputs. The inputs are diode or'd; in the event that one supply fails, the other takes over. The –48v returns are isolated from the chassis and circuit grounds. A fuse on the IOC protects the TimeProvider; the shelf is protected from damage in case the connections are reversed.

The power supply range is from –36 to –72 v DC. The maximum power required is 40 W when the TimeProvider is powered up; typical power consumed is 30W. The procedure for installing power is described in Section 3.5.2, Making Power Connections.

1.7 Reference Input Signals

The Input module accepts one or two E1, 2.048 MHz analog, T1, or Composite Clock inputs on ports INP1 and INP2, as well as a 2.048, 5, or 10 MHz input reference signal on the PRS port. The TimeProvider accepts full-level signals or bridged signals (–20 dB); the inputs are terminated per G.703.

Make the input connections using the procedures described in Section 3.5.4, Making Input Connections, then provision the inputs using the software commands described in Section 4.7, Provisioning the Input Reference.

Input State

You can provision each input to one of three states:

- **Disabled** – the input is not used
- **Monitor** – the system monitors the input for signal faults and performance data, but it cannot be selected as the system reference
- **Enabled** – the system monitors the input for signal faults and performance data, and it can be selected as the system reference

1.7.1 Selecting the Input

Many considerations influence which system reference you choose:

- SSM or User-assigned Quality Level
- User-assigned Priority Level
- Switching mode
- User-assigned Input State
- Active alarms on an input

You can provision the TimeProvider to automatically select the highest-quality input signal, or you can manually select the input signal you want to use. If that signal becomes disqualified for any reason, the local oscillator goes into the Holdover mode.

Revertive Switching

Telcordia GR-378 and GR-1244 define two reference selection modes: Revertive and Non-revertive. In the revertive mode, when an input used as the system reference is disqualified (for any reason), if that input returns, it reverts to the system reference when the disqualifying reason is removed. The system reference switches two times: once when the disqualifying event occurs, and again when the input is no longer disqualified. In the non-revertive mode, the system reference does not revert to the initial input when the reason for disqualification is removed. The system reference switches only once when the disqualifying event occurs.

Quality Level and Priority Level

When the REFMODE parameter is provisioned to AUTO, the system reference switches when the input signal is disqualified. When the input signal is re-qualified, the TimeProvider can either keep the current reference or switch back to the re-qualified signal. If the REFMODE parameter is set to FORCED, then the reference does not switch and the local oscillator enters Holdover mode.

The QLEVEL (Section 4.7.6, Setting the Input Quality Level) and the PRIORITY (Section 4.7.7, Setting the Input Priority Level) parameters work together with SSMs to determine the switching strategy for the inputs when the unit is in the SSU mode. If the active/primary input becomes unavailable, the switching strategy determines which input to use: the TimeProvider uses the input with the next highest QLEVEL. If all inputs have the same QLEVEL, then the TimeProvider uses the input with the highest PRIORITY.

To provision the TimeProvider as non-revertive, you must provision the user-assigned Priority Level on all inputs to the same value. To provision the TimeProvider as revertive, you provision any one of the inputs to a different Priority Level.

If the original primary input becomes available again, the REFMODE, QLEVEL and PRIORITY parameters determine whether the TimeProvider switches back to that input. If REFMODE is set to AUTO, then the reference switches according to the QLEVEL and PRIORITY settings. If the QLEVEL and/or PRIORITY parameter of the original input is higher than the current input, the TimeProvider *reverts* back to the original input. If the QLEVEL parameter is the same for all inputs, then the TimeProvider does not revert back to the original input.

1.7.2 SSMs and Quality Level

Synchronization Status Messages (SSMs) can be included in the bit stream of the incoming signal to indicate its quality level. You must provision the input to read the SSM, and you must provision the bit position of the incoming SSM.

If the incoming signal does not include SSMs, or if you disable them, then you can provision the Quality Level to an appropriate value. The QLEVEL value is used in the same manner as the incoming SSM to determine which input is used when the active input is disqualified. SSMs are described in more detail in Section 1.11, Synchronization Status Messages (SSMs).

Table 1-1 illustrates which input is the active system reference under several different input conditions when the TimeProvider is in the SSM mode.

Table 1-1. SSM-Based Reference Selection Scenarios

Sequence	QLevel on PRC	QLevel on INP1	QLevel on INP2	Non-Revertive	Revertive
				Active Reference[1]	Active Reference[2]
1	2	2	2	PRC	INP1
2	4	2	2	INP1	INP1
3	4	4	2	INP2	INP2
4	4	4	4	INP2	INP1
5	4	4	2	INP2	INP2
6	4	2	2	INP2	INP1
7	2	2	2	INP2	INP1
8	2	2	LOS	PRC	INP1
9	2	LOS	2	PRC	PRC
10	LOS	LOS	2	INP2	INP2
11	LOS	LOS	LOS	Holdover	Holdover
12	LOS	LOS	2	INP2	INP2
13	2	LOS	2	INP2	PRC
14	2	2	2	INP2	INP1

Note:
1 Non-revertive example. Priority Levels set to: PRC = 3, INP1 = 3, and INP2 = 3
2 Revertive example. Priority Levels set to: PRC = 2, INP1 = 1, and INP2 = 2

Subtending Mode

Table 1-2 illustrates which input is the active system reference under several different input conditions when the TimeProvider is in the Subtending mode.

Table 1-2. Subtending-Based Reference Selection Scenarios

Sequence	QLevel on INP1	QLevel on INP2	Non-Revertive	Revertive
			Active Reference[1]	Active Reference[2]
1	1	1	INP1	INP1
2	2	1	INP2	INP2
3	2	2	INP2	INP1
4	2	1	INP2	INP2
5	1	1	INP2	INP1
6	1	LOS	INP1	INP1
7	LOS	LOS	Holdover	Holdover
8	LOS	1	INP2	INP2
9	1	1	INP2	INP1

Note:
1 Non-revertive example. Priority Levels set to: INP1 = 3, and INP2 = 3
2 Revertive example. Priority Levels set to: INP1 = 1, and INP2 = 2

1.8 Clock Performance

The IOC supports both ST3E or Type 1 ovenized crystal oscillators. IOCs with the ST3E oscillator meets or exceeds the ST3E requirements in ANSI T1.101 and Telcordia GR-244, as well as the ITU-T G.812 TYPE III specification. IOCs with the Type 1 oscillator meets or exceeds the ITU-T G.812 TYPEI specification.

1.9 Output Signals

The main shelf has 32 output connections arranged in four groups of eight outputs; using the optional Expansion Panel, you can expand to 64 outputs. The outputs are “universal,” and can supply E1, 2.048 MHz, T1, 8 kHz, and CC signals. E1 and T1 signals can be provisioned with standard framing and G.703 formats. You provision the outputs in groups of eight outputs (or 16 outputs if the optional Expansion Panel is installed).

The TimeProvider use interchangeable Output modules, allowing you to select the connector and termination impedance. Output modules are available with the following connectors:

- BNC – 75 Ω
- DB9 – 120 Ω
- Siemens 1.6/5.6 – 75 Ω
- Siemens 1.0/2.3 – 75 Ω
- Wirewrap – 100 Ω
- BT43 – 75 Ω

Each Output module plugs into the shelf (and Expansion Panel) and provides connectors and terminations for eight outputs. Make the output connections using the procedures described in Section 3.5.5, Making Output Connections. You provision the output signal type using the software commands described in Section 4.8, Provisioning the Outputs.

1.10 Alarms

The TimeProvider uses alarms to notify you when certain conditions are deteriorating below user-specified levels. These alarms are indicated by shelf and card status lamps (LEDs) and by TL-1 messages reported over the local or LAN communication ports. In addition, the input panel has a connector that provides contact closures to activate external alarms.

You can provision the alarm level for most alarms to one of the following levels: non-reportable (NR), non-alarm event (NA), minor (MN), major (MJ), or critical (CR). Alarms related to the inputs are special cases; you can only provision input alarms for minor, major, or critical. To help prevent spurious or transient input alarms, a delay timer (FLTDELAY) allows you to provision a waiting period that starts after the alarm condition occurs; the alarm is set at the end of the period. A similar timer (CLRDELAY) clears the alarm after the alarm condition is no longer present.

Recommendation: To prevent LOS alarms, Symmetricom recommends that you provision unused inputs to the Disabled state.

For more information on connecting alarms, see Section 3.5.6, Making Alarm Connections. For information on provisioning alarm levels, see Section 4.9.1, Provisioning the Alarm Levels.

1.11 Synchronization Status Messages (SSMs)

The TimeProvider supports input and output SSMs. SSMs provide a method for providing clock quality information to any equipment that uses synchronization inputs. Table 1-3 describes the ANSI SSM values and the traceability associated with each value. Table 1-4 describes the ITU SSM values and the traceability associated with each value.

Table 1-3. ANSI SSM Quality Level Definitions

Description	Quality Level	Abbreviation
Stratum 1 Traceable	1	PRS
Synchronized – traceability unknown	2	STU | UNK
Stratum 2 traceable	3	ST2 |
Transit Node traceable	4	TNC | TYPE I
Stratum 3E traceable	5	ST3E | TYPE III
Stratum 3 traceable	6	ST3 | TYPE IV
SONET Minimum Clock traceable (20 ppm clock)	7	SMC
Stratum 4 traceable	8	ST4
Do Not Use for synchronization	9	DUS

Table 1-4. ITU SSM Quality Level Definitions

Description	Quality Level	Abbreviation
Primary Reference Clock	2	PRC
Transit Node	4	SSUT
Local Node	8	SSUL
Synchronization Equipment Clock	11	SEC
Do Not Use for synchronization	15	DNU

The TimeProvider handles SSMs in accordance with T1X1.3 TR33, T1.101-1999, GR-253, and 379-CORE.

Input SSMs

The TimeProvider extracts and decodes the SSM (if any) on the available inputs. Using this information, the TimeProvider can automatically select the input with the higher quality level.

You can manually provision the input quality level for those signals that do not have SSM information or you can provision INP1 and INP2 to read the SSM on the input; in either case the quality level of the reference input becomes the system's quality level, which is passed through to the outputs in the output SSM. If the IOC enters the Free-run or Holdover mode, the system's quality level is determined by the CLKTYPE parameter for the local oscillator on the selected IOC module. You can provision the CLKTYPE parameter to TYPE I or ST3E (TYPE III).

Output SSMs

You must provision the TimeProvider's outputs to either Extended SuperFrame (ESF) for ANSI SSM operation or Channel Associated Signaling (CAS) with CRC4 framing for ITU SSM operation. These output formats automatically generate SSMs. The system-level quality level SSM is dependent on the input quality level of the input signal or the local oscillator's quality level. During normal operation, when a qualified input is used as the active timing reference, the TimeProvider copies the input's SSM to all DS1 ESF outputs and E1 CAS4 outputs.

If the IOC is operating in Holdover mode for whatever reason, the SSM quality is the internal level for the oscillator installed in the IOC.

You can also manually provision the output SSM to a selected value.

Chapter 2 Engineering and Ordering Procedures

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

In This Chapter

2.1 Shelf

The TimeProvider is available in two configurations: Model 1000 Front Access and Model 1100 Rear Access.

2.1.1 Model 1000 Front Access

The ETSI-style shelf complies with ETSI 300-119 shelf projections. Each shelf accepts one IMC and one or two IOCs; the shelf also supports one Input module and from one to four Output modules. Each Output module terminates eight output timing signals. Alarms terminate on wire-wrap or DB-25 connectors, depending on the Input module used. The minimum configuration is one IMC and one IOC for non-protected operation. Using two IOC modules provides protection in case one of the IOC modules fail. See Table 2-3 for part numbers for front-access shelf systems.

2.1.2 Model 1100 Rear Access

The NEBS-style shelf accepts one IMC and one or two IOCs; the shelf also supports one Input module and from one to four Output modules. Each Output module terminates eight output timing signals. Alarms terminate on wire-wrap or DB-25 connectors, depending on the Input module used. The minimum configuration is one IMC and one IOC for non-protected operation. Using two IOC modules provides protection in case one of the IOC modules fail. See Table 2-3 for part numbers for rear-access shelf systems.

2.2 Expansion Panel

The available Expansion Panel provides additional outputs from the main shelf. Like the main shelf, it comes in two configurations: Model 1000 Front Access and Model 1100 Rear Access. The Expansion Panel supports up to 32 additional output channels.

2.2.1 Front Access

The front-access Expansion Panel (part number 090-58002-01) provides an additional 32 outputs, for a system total of 64 outputs. The ETSI-style Expansion Panel supports up to four additional Output Modules with various connector types; each Output Module provides up to eight output signals. See Table 2-2 for part numbers for Output modules.

2.2.2 Rear Access

The front-access Expansion Panel (part number 090-58102-01) provides an additional 32 outputs, for a system total of 64 outputs. The NEBS-style Expansion Panel supports up to four additional Output Modules with various connector types; each Output Module provides up to eight output signals. See Table 2-2 for part numbers for Output modules.

2.3 Input Modules

Six Input modules are available to match the wiring scheme and termination impedance requirements at the installation site. Select one of these Input modules for use with your TimeProvider system. Table 2-1 lists the Input modules available for the TimeProvider.

Table 2-1. Input Modules Available for the TimeProvider

Part Number	Description
090-58061-01	BNC Input module
090-58061-02	Wire-wrap Input module
090-58061-03	DB9 Input module
090-58061-04	SMZ/BT43 Input module
090-58061-05	Siemens 1.0/2.3 Input module
090-58061-06	Siemens 1.6/5.6 Input module

2.4 Output Modules

Symmetricom has seven Output modules available for the TimeProvider that allow you to select the proper termination for your application. You can install any combination of up to four Output modules in the main shelf or in the available Expansion Panel. Table 2-2 lists the Output modules available for the TimeProvider.

Table 2-2. Output Modules Available for the TimeProvider

Part Number	Description
090-58091-01	BNC Output module
090-58091-02	Wire-wrap Output module
090-58091-03	DB9 Output module
090-58091-04	SMZ/BT43 Output module
090-58091-05	Siemens 1.0/2.3 Output module
090-58091-06	Siemens 1.6/5.6 Output module
090-58091-99	Blank module (cover for any unused Output module locations)

2.5 Ordering and Parts List

Use the following tables to identify the available systems and the available Input and Output modules.

Table 2-3 TimeProvider Systems Available

Shelf	Outputs		Part Number	IOCs	Expansion Panel
Front Access	8 to 32 (1 to 4 Output Connector modules)	Unprotected	990-58000-01	1	No
		Protected	990-58000-11	2	No
	8 to 64 (1 to 8 Output Connector modules)	Unprotected	990-58000-02	1	Yes
		Protected	990-58000-12	2	Yes
Rear Access	8 to 32 (1 to 4 Output Connector modules)	Unprotected	990-58100-01	1	No
		Protected	990-58100-11	2	No
	8 to 64 (1 to 8 Output Connector modules)	Unprotected	990-58100-02	1	Yes
		Protected	990-58100-12	2	Yes

2.6 Accessories, Tools, and Equipment

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

- Phillips-head screwdriver for installing the TimeProvider shelf in a rack
- ESD wrist strap for installing cards
- Digital multimeter (Fluke 77 or equivalent) for verifying power connections to the shelf
- Laptop computer with communications software such as HyperTerminal, ProComm Plus, etc. for provisioning the TimeProvider
- (Optional) Dual-channel oscilloscope with 100 MHz minimum bandwidth for verifying that clock input and output signal(s) are within the specified voltage range, and for checking output waveforms
- DB-9 M to DB-9 F cable for connecting to the local Craft port
- DB-25 M connector for alarms
- Soldering iron and solder and appropriate cable for building power and alarm connectors

Chapter 3 Installing the TimeProvider

This chapter describes the procedures for installing the TimeProvider shelf and the available Expansion Panel.

In This Chapter

3.1 Getting Started

Before beginning the installation, complete the pre-installation check described in Section 3.1.1, Pre-Installation Check, perform the site survey in Section 3.1.2, Performing a Site Survey, and gather the necessary tools and materials described in Section 3.1.3, Gathering the Tools.

Caution: All telecom signal wiring (including I/O, clocks and Ethernet) must be installed with shielded cabling only and appropriately grounded.

Cabling shall be installed in compliance with intra-building surge, lightning, and EMC requirements.

This section describes the preliminary activities you need to perform before you install the TimeProvider

3.1.1 Pre-Installation Check

Before installation, ensure that the following preparations are in place:

- Grounded equipment rack
- A fused power panel is present (–48 vDC at 5 Amp)

3.1.2 Performing a Site Survey

Physical Space

The TimeProvider is designed to mount in a 19-inch (48 cm) rack. The ETSI front-access shelf is 6.875 inches tall (177 mm), or 4 RU (Rack Units, where 1 RU = 1.75 in/44.45 mm). For ventilation, plan on leaving a 1 RU space below the shelf. The NEBS rear-access shelf is 5.25 inches tall (133 mm), or 3 RU. For ventilation, plan for a 1 RU space above and below the shelf.

The Expansion Panel also mounts in a 19-inch (48 cm) rack, and it is 3.5 inches (89 mm, or 2 RU) tall. The Expansion Panel does not require ventilation spaces above or below it.

You can mount the shelf so that it protrudes 2 inches (5 cm) from the front of the rack, or you can mount it flush with the front of the rack.

Environmental Requirements

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

Electromagnetic interference can adversely affect the operation of nearby equipment.

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

- Use only shielded cable for all signal wiring, including I/O, clocks and Ethernet, and ground appropriately at both ends, or as required by local standards.
- Secure all cable screws to their corresponding connectors.

3.1.3 Gathering the Tools

These standard tools and materials are not supplied, but may be required for installing the TimeProvider:

- Standard tool kit
- Cable ties, waxed string or acceptable cable clamps
- No. 16 AWG (minimum) wire (1.31 mm^2) for –48 vDC, return, and Frame Ground
- Telecom signal wiring (including I/O, clock, and Ethernet) uses shielded cabling of the appropriate impedance required by the specific signal type
- Mating connectors for terminating signal wiring
- For wire wrap connections only: No. 22 AWG (0.326 mm^2) shielded twisted pair wire-wrap cable of the appropriate impedance for the specific signal requirements
- Wire wrap tool (wire wrap modules only)
- Fasteners for mounting the equipment in rack
- Digital Voltmeter (DVM)
- Soldering iron and solder for the ETSI-version power connectors

3.2 Unpacking the Unit

The TimeProvider and accessories are packaged to protect from normal shock, vibration, and handling damage.

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

Unpack and inspect the unit as follows:

1. Wear a properly grounded protective wrist strap or other ESD device.
2. Inspect the container for signs of damage. If the container appears to be damaged, notify both the carrier and your Symmetricom distributor. Retain the shipping container and packing material for the carrier to inspect.
3. Open the container, being careful to cut only the packaging tape.
4. Locate and set aside the printed information and paperwork that is included in the container.
5. Remove the unit from the container and place it on an anti-static surface.
6. Locate and set aside small parts which may be packed in the container.
7. Remove the accessories from the container.
8. Remove the anti-static packaging from the unit and accessories.
9. Verify that the model and item number shown on the shipping list agrees with the model and item number on the equipment. The item number can be found on a label affixed to the TimeProvider. Contact your Symmetricom distributor if the model or item number *do not* match.

For a complete listing of TimeProvider item numbers and configuration options, contact your Symmetricom distributor.

3.3 Rack Mounting the Shelf

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

1. Using the appropriate bracket for the equipment rack, position each bracket as needed and attach the brackets using 8-32 x 3/8-inch screws. Ensure that both brackets are attached at equal distances from the front of the unit, see Figure 3-1 or Figure 3-2.

2. Mount the unit to the front of the equipment rack rails with four screws and associated hardware. Ensure that the screws mate with the equipment rack into which you install the unit.

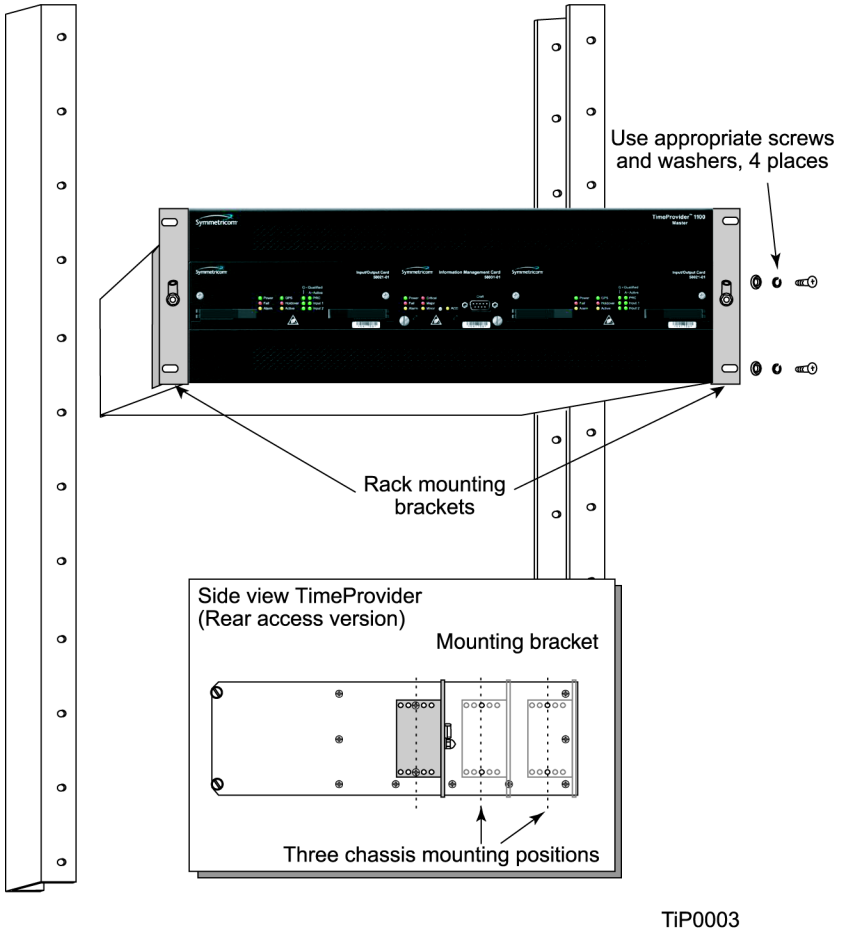


Figure 3-1. Rack Mounting the Rear Access Chassis

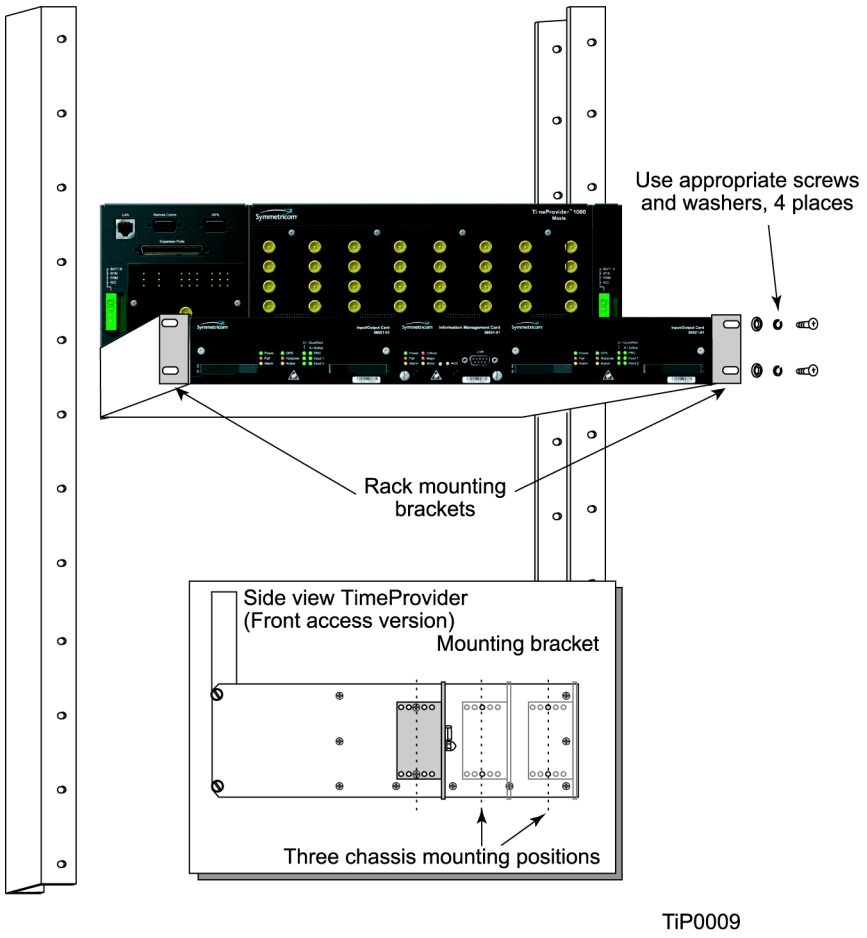


Figure 3-2. Rack Mounting the Front Access Chassis

3.4 Rack Mounting the Expansion Panel

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

1. Using the desired bracket to accommodate the equipment rack size, position each bracket as needed and attach the brackets using 8-32 x 3/8-inch screws. Ensure that both brackets are attached at equal distances from the front of the unit, see Figure 3-1.

2. Mount the unit to the front of the equipment rack rails with four screws and associated hardware. Ensure that the screws mate with the equipment rack into which you install the unit.

3.5 Making Connections

3.5.1 Making Ground Connections

Use the procedure in this section for both the main shelf and the Expansion panel. After installing the TimeProvider shelf and/or the Expansion panel into the rack, make the grounding connections as follows.

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.

Front Access Shelf

To connect Chassis Ground on the front access chassis, connect a cable from the frame ground lug on the left side of the front panel to the proper grounding zone or master ground bar.

Rear Access Shelf

To connect Chassis Ground on the rear access shelf, connect a cable from Pin 3 of the power connector to the proper grounding zone or master ground bar.

Expansion Panel

All connections to the Expansion Panel, including chassis ground, are made using the interconnection cable.

3.5.2 Making Power Connections

Electrical Shock Caution: To avoid possible injury from shock, make sure that the fuses are removed from the fuse panel or power supply before connecting or applying power to the unit.

Warning: For continued fire protection, replace power supply fuse(s) with the specified type and rating. There are no user-serviceable fuses in the TimeProvider shelf.

This unit must be grounded.

Refer all servicing to qualified personnel.

To install the TimeProvider power connections:

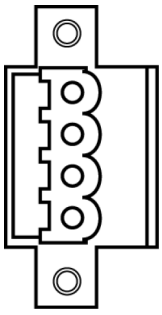
1. Locate the Power A and Power B connectors on the left and right of the shelf (see Figure 3-3).

2. Assemble one –48 vDC, one return, and a frame ground lead to each of the power connectors, as shown in Table 3-1. Use your company guidelines to assemble the connector.

3. Attach the connector to the Power A and Power B connectors on the shelf.

Table 3-1. Power Connections

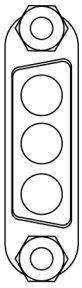
Rear Access (NEBS) Shelf		Front Access (ETSI) Shelf	
Signal	**Terminal**	**Signal**	**Terminal**
48 Volt Negative Lead	1	Frame Ground	1
48 Volt Positive Lead (return)	2	48 Volt Negative Lead	2
Frame Ground	3	48 Volt Positive Lead (return)	3
Unused	4	–	–



TiP0005

Rear Access Shelf

Pin 1: -48vDC Battery
Pin 2: -48vDC RTN
Pin 3: Frame ground
Pin 4: unused



TiP0004

Front Access Shelf

Pin 1: Frame ground
Pin 2: -48vDC negative lead
Pin 3: Return

Figure 3-3. Power Terminal Connectors

Expansion Panel

All connections to the Expansion Panel, including power, are made using the interconnection cable.

3.5.3 Verifying Power and Grounding Connections

To verify power and grounding connections:

1. Using a DVM, measure the voltage between pins 1 and 2 on the rear access (NEBS) connector or between pins 2 and 3 of the front access (ETSI) connector.

2. Verify that voltage is –36 to –72 vDC.

The inputs are protected against reverse polarity.

3.5.4 Making Input Connections

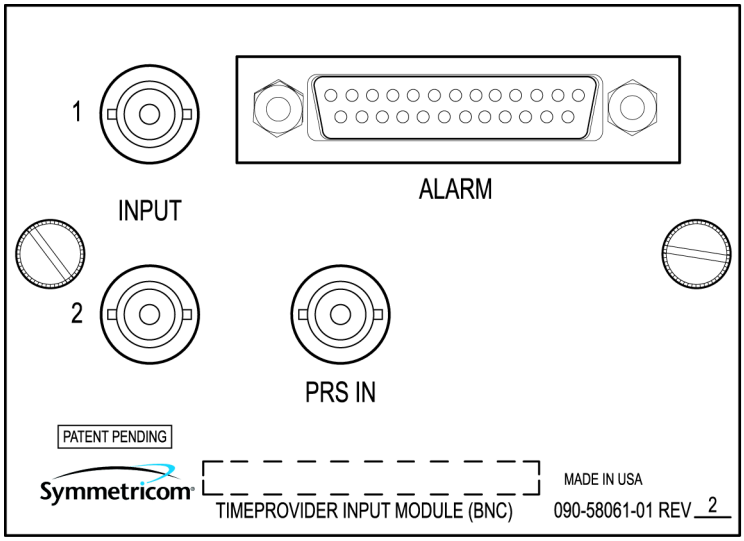
You connect the input signals to the TimeProvider using one of the Input modules listed in Table 3-2. Connect the Input module to the shelf before you attach cables.

Table 3-2. Input Connector Modules Available for the IOC

Item Number	Description	Alarm Connector	Reference
090-58061-01	BNC Input module	DB-25	Figure 3-4
090-58061-02	Wire-wrap Input module	Wire-wrap	Figure 3-5
090-58061-03	DB9 Input module	DB-25	Figure 3-6
090-58061-04	BT43 Input module	DB-25	Figure 3-7
090-58061-05	Siemens 1.0/2.3 Input module	DB-25	Figure 3-8
090-58061-06	Siemens 1.6/5.6 Input module	DB-25	Figure 3-8

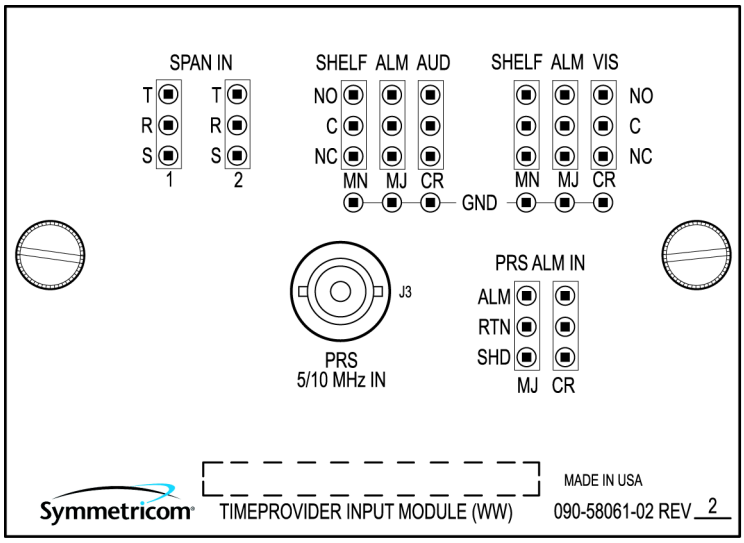
Installing the Input Module

Attach the Input module to the shelf and secure it using the screws on either side of the module.



TiP0006

Figure 3-4. BNC Input Module



TiP0008

Figure 3-5. Wire Wrap Input Module

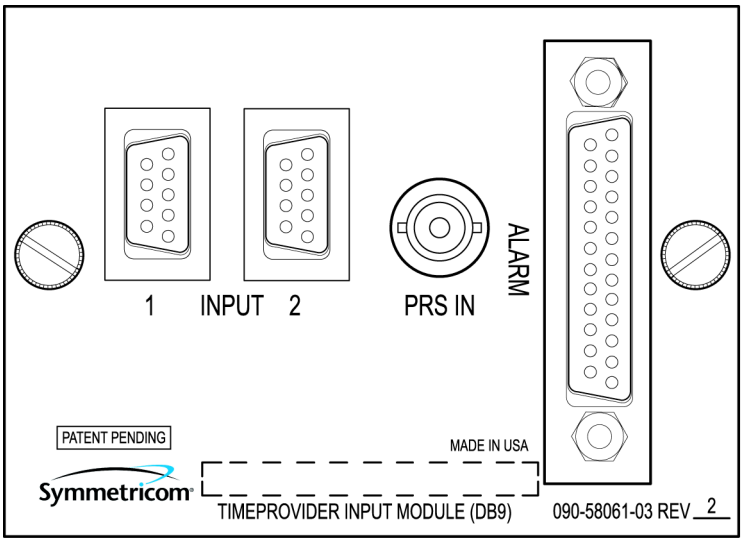


Figure 3-6. DB9 Input Module

The pinout for the DB9 Input module is shown in Table 3-3.

Table 3-3. Pinout for the DB9 Input Module

Pin	Description
3	Chassis ground
4	Span Input Tip
8	Span Input Ring

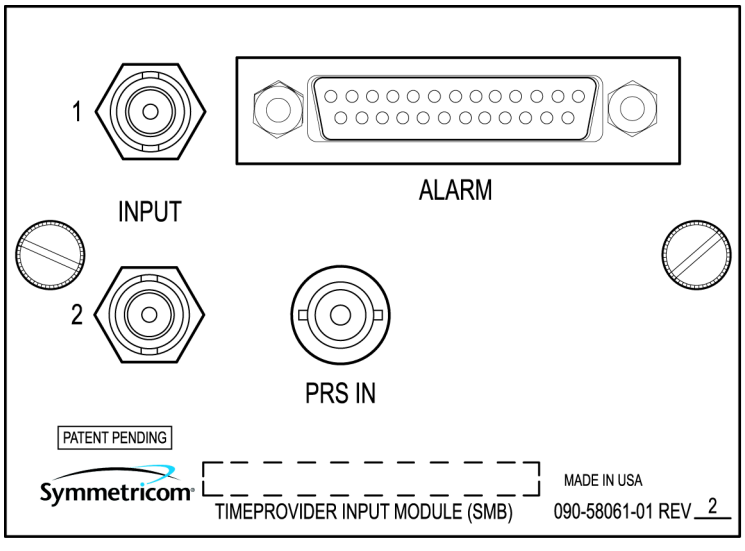


Figure 3-7. BT43 Input Module

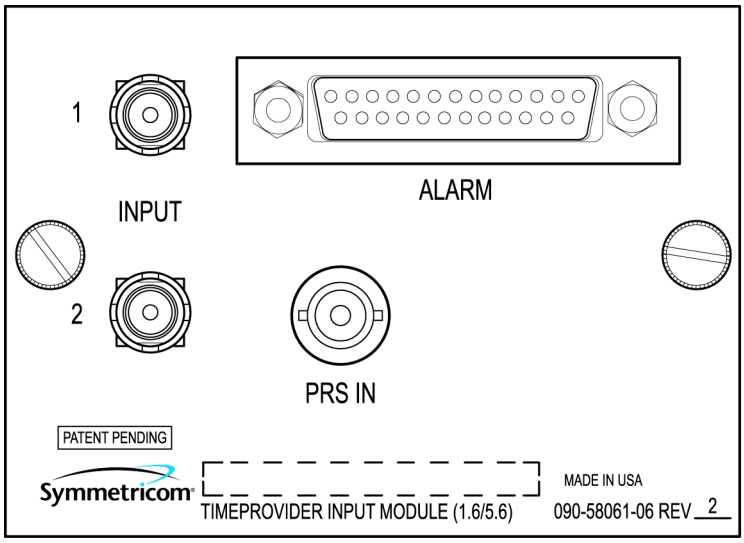


Figure 3-8. Siemens Input Module

3.5.5 Making Output Connections

You make the output signal connections using one of the Output modules listed in Table 3-4. Attach the module to the shelf before you connect cables.

Table 3-4. Output Connector Modules

Item Number	Description	Reference
090-58091-01	BNC Output module	Figure 3-9
090-58091-02	Wire-wrap Output module	Figure 3-9
090-58091-03	DB9 Output module	Figure 3-10
090-58091-04	SMZ/BT43 Output module	Figure 3-10
090-58091-05	Siemens 1.0/2.3 Output module	Figure 3-11
090-58091-06	Siemens 1.6/5.6 Output module	Figure 3-11

Installing the Output Module

Attach the Output module to the shelf and secure it using the screws at the top and bottom of the module.

Table 3-5 lists the pinout for the DB9 Output module, which is shown in Figure 3-10.

Table 3-5. Pinout for the DB9 Output Module

Pin	Description
1	Port A Tip
2	Port A Ring
4, 5, and 6	Chassis Ground
8	Port B Tip
9	Port B Ring

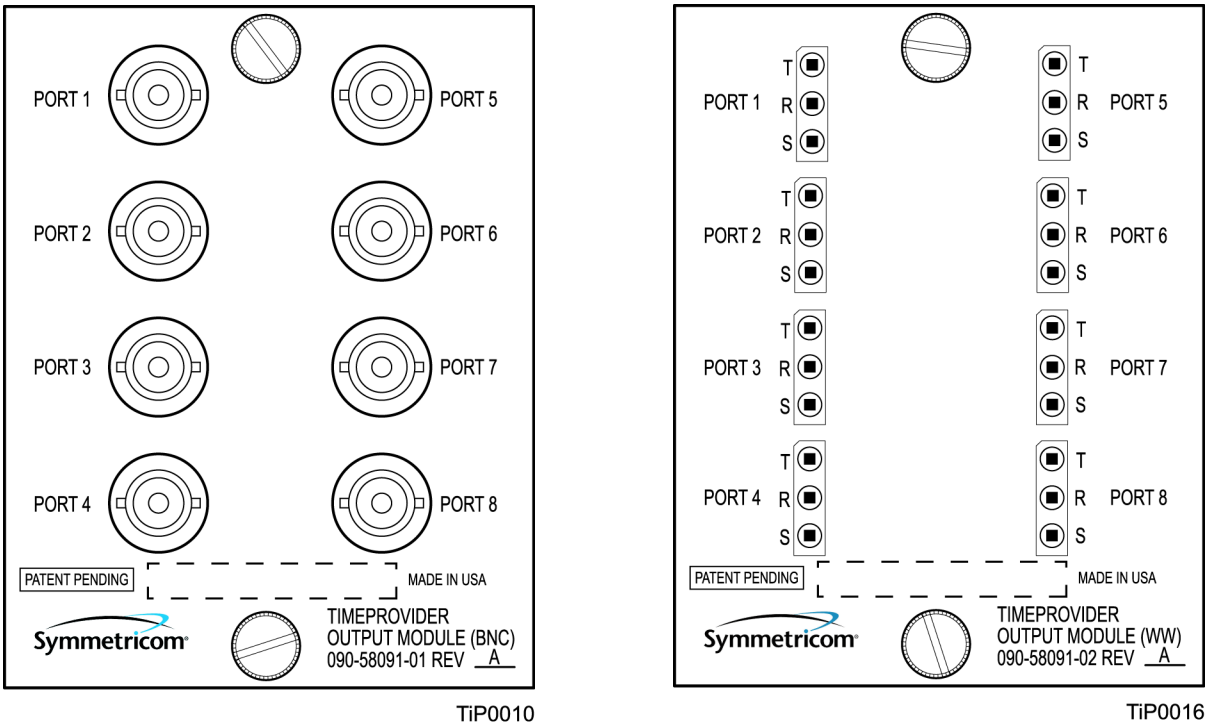


Figure 3-9. BNC and Wire Wrap Output Modules

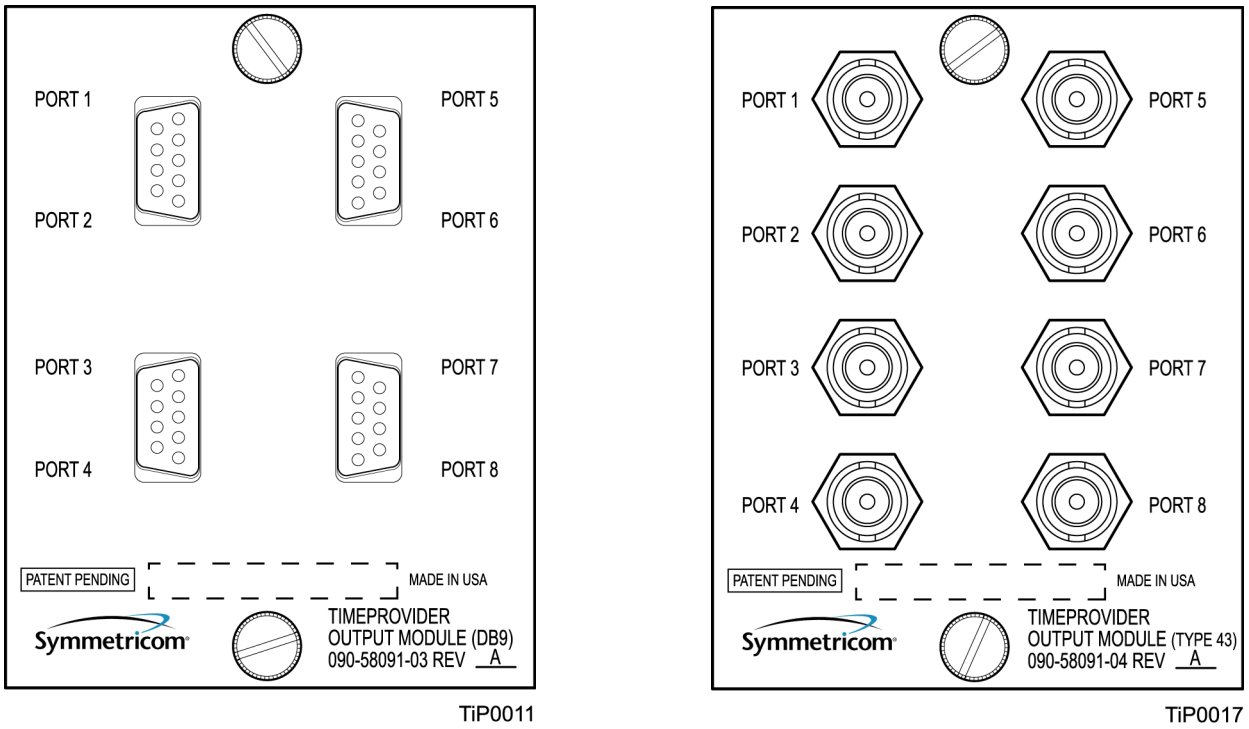


Figure 3-10. DB9 and BT43 Output Modules

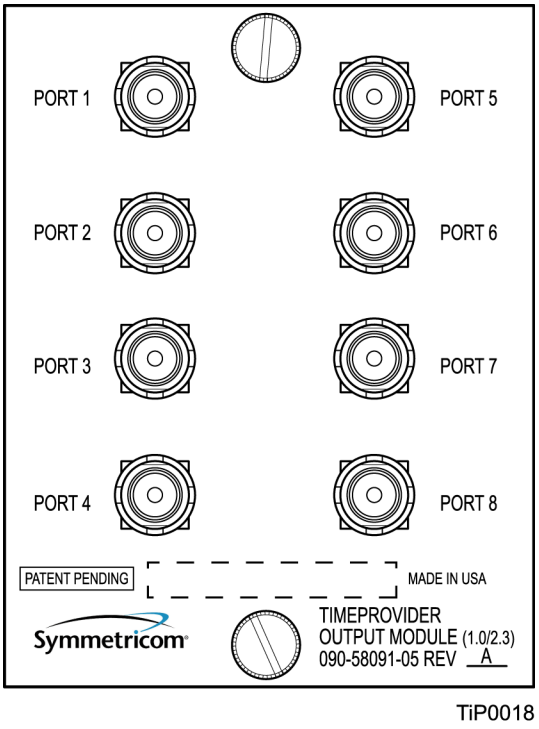


Figure 3-11. Siemens Output Module

3.5.6 Making Alarm Connections

To install alarm connections on the Input Module:

Use a customer-supplied DB-25 connector to build an alarm connection to the TimeProvider. Table 3-6 lists the pinout for the DB-25 Alarm connector found on all the Input modules (except the wire wrap version).

Table 3-6. Alarm Connector Pinout

Pin	Description
1	No Connection
2	Minor Normally Closed (NC) Audible
3	Minor Common Audible
4	Minor NC Visual
5	Minor Common Visual
6	Major NC Audible
7	Major Common Audible
8	Major NC Visual
9	Major Common Visual
10	Critical NC Audible
11	Critical Common Audible
12	Critical NC Visual
13	Critical Common Visual
14	Ground
15	Minor Normally Open (NO) Audible
16	Critical PRS Input NO
17	Minor NO Visual
18	Critical PRS Input Common
19	Major NO Audible
20	Major PRS Input NO
21	Major NO Visual
22	Major PRS Input Common
23	Critical NO Audible
24	No Connection
25	Critical NO Visible

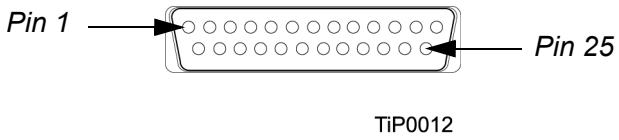


Figure 3-12. DB-25 Alarm Connector (Front View)

3.5.7 Making Communications Connections

The Time Provider has one Ethernet and two serial ports available. The Ethernet connector is on the front panel of the Front Access shelf and on the rear panel of the Rear Access shelf; the local Craft serial port is on the faceplate of the IMC, and the Remote port is on the shelf.

The local Craft serial port is used for control and monitoring of the unit, and is configured as a DCE device. The Remote port can be used for remote dial-in connection to the unit, and is configured as a DTE device.

Connecting to the Local Craft and Remote Serial Ports

To connect a device to the local Craft or the Remote serial port, perform the following steps:

1. Connect a 9-pin serial cable to the desired port.

2. Connect the other end of the cable to the serial port of the PC or terminal device. Use the procedure described in Section 4.2, Starting the TimeProvider for the First Time, to connect to the TimeProvider.

The default settings for the local Craft serial port are DCE, 9600 Baud, 8 bits, no parity, 1 stop bit, echo on, and handshaking disabled. Table 3-7 lists the signal connections for the serial ports.

Table 3-7. Connector Pinouts for the Serial Ports

Local Craft Connector		Remote Connector	
Signal	**Pin**	**Signal**	**Pin**
Local CD	1	CD	1
Local RD (Received Data)	2	RD	3
Local TD (Transmitted Data)	3	TD	2
Local DTR (Data Terminal Ready)	4	DTR	6
Ground	5	GND	5

Table 3-7. Connector Pinouts for the Serial Ports (Continued)

Local Craft Connector		Remote Connector	
Signal	**Pin**	**Signal**	**Pin**
Local DSR (Data Set Ready)	6	DCE	4
Local RTS (Request to Send)	7	RTS	8
Local CTS (Clear to Send)	8	CTS	7
Local RT	9	RT	9

The default settings for the Remote serial port are DTE, 9600 Baud, 8 bits, 1 stop bit, no parity (also known as 8-1-N), echo on, and handshaking disabled.

3.5.8 Changing Communications Settings

To change the default communication settings for the local or remote serial ports:

1. Connect a PC or laptop with terminal emulation software, such as Windows® Hilgraeve HyperTerminal© or ProComm Plus™ to the port and log in. For a complete description of this procedure, see Section 4.3, Setting Communications Parameters.

2. Use the ED-EQPT command to change the communications settings for the port as required. See Section 4.3, Setting Communications Parameters, and also refer to the *TimeProvider TL-1 Reference Guide* for a description of TL-1 commands.

3.5.9 Installing Connections to the Ethernet Port

You can connect a PC or terminal to the TimeProvider using the LAN connector for local monitoring or control, or you can connect the TimeProvider to a network for monitoring and control from a remote site.

Note: The TimeProvider can be controlled through a TCP/IP network connection, but before you can use it, you must configure the Ethernet settings using a serial connection. Refer to Section 4.3.2, Setting Ethernet Parameters.

Direct Connection

You use a direct connection when a service technician is on-site. You must configure the Ethernet settings using TL-1 commands over a serial connection before you can use the Ethernet connection. Use the direct connection to troubleshoot a LAN connection.

To connect the TimeProvider to a PC or terminal, perform the following steps:

1. Connect an RJ-45 Ethernet cable to the LAN connector on the shelf.
2. Connect the other end of the cable to the PC or terminal.
3. Start a terminal emulation program such as HyperTerminal or ProComm Plus. Configure the program for a telnet session and enter the IP address of the TimeProvider. Use Port 5000 to connect.
4. Type ; (semicolon). If the TimeProvider responds with a Deny response, you have established communications. If you do not receive the Deny response, check the connections, the cable, and the program settings.

Network Connection

You can use a network connection for routine monitoring and control of the TimeProvider from a remote site. Perform the following steps to connect the TimeProvider to a network.

1. Connect one end of an RJ45 cable to the LAN outlet. Connect the other end of the cable to the LAN connector on the TimeProvider.
2. To connect the PC or laptop to the LAN, connect one end of the RJ-45 cable to the Ethernet port of the PC or laptop. Connect the other end of the cable to the LAN outlet.
3. Use a remote monitoring software application such as SynCraft or TimePictra to connect to and monitor the TimeProvider. See Appendix B, CRAFT Software Reference, for more information on installing and using SynCraft.

Table 3-8 lists the Ethernet communications port signal connections.

Table 3-8. Ethernet Communications Port Signal Connections

Name	Pin
TX+ (Positive Side of Transmitted Data)	1
TX- (Negative Side of Transmitted Data)	2
RX+ (Positive Side of Received Data)	3
Not Used	4
Not Used	5
RX- (Negative Side of Received Data)	6
Not Used	7
Not Used	8

3.6 Installation Check List

To verify that the installation of the TimeProvider is complete, perform the following checks and procedures in the *Installation Completeness Checklist* in Table 3-9.

Table 3-9. Installation Completeness Checklist

Operation/Indication	Complete
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.	

3.7 Powering Up the Shelf

There is no power switch on the TimeProvider. When you apply power to the unit, it enters the warm-up state.

3.8 Working With Cards

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

3.8.1 Properly Handling Cards

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

1. Use proper static control precautions when handling cards! 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 card on an ungrounded surface.
4. Avoid allowing the card to come in contact with insulated surfaces.

3.8.2 Inserting Cards

This procedure is common for all cards.

Note: Cards can be removed and inserted while system power is supplied without damaging modules or affecting system operation.

Caution: For continued EMC compliance, replace all deformed module gaskets with the same type. Clean gaskets and mating surfaces. Secure all cards with captive screws.

To insert a card into the shelf:

1. Align the card edges within the guides of the selected slot.
2. Slide the card 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.

Caution: Ensure that you have completely inserted the card into the chassis and that you have securely tightened the captive screws. A partially inserted card can easily become damaged and cause intermittent failures.

3.8.3 Removing Cards

To remove an IOC, lift the tabs on the front panel and slide it out of the shelf. Be sure to place the card on a static-free surface.

To remove the IMC, Input, or Output modules, loosen and then pull out on the captive screws.

Chapter 4 Provisioning the TimeProvider

This chapter describes the procedures for provisioning the TimeProvider and the available Expansion Panel. Use the procedures in this chapter after you have installed the TimeProvider (see Chapter 3, Installing the TimeProvider).

For detailed information on the syntax and format for each available TL-1 command, refer to the *TimeProvider TL-1 Reference Guide*, part number 097-58001-01.

In This Chapter

4.1 TL-1 Overview

The TimeProvider uses the TL-1 syntax; this chapter and the *TimeProvider TL-1 Reference Guide* describes command lines and responses. For a complete description of the TL-1 syntax, refer to Telcordia (Bellcore) Technical Reference TR-NWT-00831 and TR-NWT-00833.

4.1.1 TL-1 Command Structure

The TL-1 commands you issue to the TimeProvider use the following structure:

```
verb-modifier:|tid|:|aid|:[<ctag>]::|<keyword>|=<value||;
```

where:

: (colon) is a block separator
, (comma) is a parameter field separator
; (semicolon) is the terminating character for commands and responses
[ ] (square brackets) indicate optional parameters

Adjacent colons indicate unused fields. If an unused field is the last parameter in the list, for example the general block or the parameter block, you can omit the colon and simply type the semicolon.

If you enter a space in the command string, the TimeProvider ignores it.

TL-1 commands are not case-sensitive.

Table 4-1 describes the syntax used in this manual.

Table 4-1. TL-1 Syntax Conventions

Symbol	Description
^	Space character (ASCII 0x20)
<cr>	Carriage return (ASCII 0x0D)
<lf>	Line feed (ASCII 0x0A)
[...]	Optional command parameter or data
< ... >	ASCII characters sent in commands or returned in response
(...)	Numeric data that can be positive or negative

4.1.2 TL-1 Response Format

Normal Response

For each TL-1 command described in this chapter there is a normal response, an in-process response, or an error response. The TimeProvider response is always upper-case. The format of a normal response is:

```
<cr><lf><lf>
^^^sid^date^time<cr><lf>
M ^ctag^COMPLD<cr><lf>
;
```

A sample normal response is:

```
   TIMEPROVIDER 03-28-08 11:23:54
M 1 COMPLD
;
```

In-Process Response

The TimeProvider sends an in-process response only if it cannot respond to the command within two seconds. The response terminates with a less-than character (<) with no semicolon until after the TimeProvider sends the requested output response message. The format of the in-process message is:

```
<cr><lf><lf>
^^^sid^date^time<cr><lf>
IP^ctag<cr><lf>
<
```

A sample in-process response is:

```
   TIMEPROVIDER 03-28-08 11:24:15
IP^2
<
```

Error Response

If you mis-type a command or issue an invalid command, the TimeProvider sends an error message. The format of the error response is:

```
<cr><lf><lf>
^^^sid^date^time<cr><lf>
M ^ctag^DENY<cr><lf>
^^^<errcde><cr><lf>
;
```

A sample error message is shown below:

```
   TIMEPROVIDER 08-28-03
M 3 DENY
   ICNV
;
```

The TL-1 command may generate an event message specific to the command. This event message accompanies the command description in this chapter.

4.1.3 Autonomous Messages

In addition to the TL-1 response messages described in the above sections, the TimeProvider returns Autonomous Messages to report alarms, configuration changes, or condition changes. Frequently, an Autonomous Message is returned at approximately the same time as the TL-1 response message that is associated with a command, because the command happens to change the unit's state. Autonomous Messages are not directly correlated with commands, and therefore they do not contain a correlation tag (ctag).

The TimeProvider can generate an Autonomous Message at any time, whether to report that a user-initiated change has occurred, to report that an active alarm condition exists, or to report that an alarm has been cleared. The format of the Autonomous message is as follows; note that the text REPT identifies the response as a Autonomous Message.

```
<cr><lf><lf>
   sid date time <cr><lf>
almcde atag REPT reptype aidtype<cr><lf>
  aid,aditype:ntfcncde,condtype,srveff,ocrdat,ocrtim:condscr”<cr><lf>
;
```

Refer to the *TimeProvider TL-1 Reference Guide* for more information on Autonomous Messages.

4.2 Starting the TimeProvider for the First Time

The TimeProvider is delivered with a copy of SynCraft, Symmetricom's network management application. Before you can use SynCraft or other network management software, you *must* provision the following parameters, as described in this section and in Section 4.3, Setting Communications Parameters:

- Security-level user
- Source ID (sid)
- Date and time
- Serial communications parameters
- Ethernet parameters

Appendix B, CRAFT Software Reference, provides procedures and instructions to get started using the SynCraft application.

Powering Up the TimeProvider

To power up the TimeProvider, perform one of the following tasks, as appropriate:

- Connect the power leads from the power supply (see Section 3.5.2, Making Power Connections)
- Install the fuse in the power supply
- Turn on the power supply

Logging In for the First Time

To log in to the TimeProvider for the first time:

1. Connect a straight-through serial cable to the local Craft port. Connect the other end of the cable to a computer.

2. Start a terminal emulation program such as HyperTerminal or ProComm Plus. Configure the program for 9600 baud, 8 data bits, No parity, and 1 stop bit.

3. Type ; (semicolon). If the TimeProvider responds with a Deny response, you have established communications. If you do not receive the Deny response, check the connections, the cable, and the program settings.

4.2.1 Defining a User at the Security Access Level

Recommendation: To avoid a possible service call to unlock the TimeProvider, Symmetricom recommends that you enable the security feature by defining a user at the Security access level.

TimeProvider Access Levels

The security measures built into the TimeProvider are based on a list of users authorized to access the unit. Each user has their own password and is assigned to one of the following access levels: NONE, USER, ADMIN, or SECURITY. Users can issue the TL-1 commands available at their access level. Section 4.5, Managing the User List, describes how to manage the user list.

If you do not define a Security-level user, the security features are not enabled and an unauthorized user could gain access to the TimeProvider and compromise the security of your network.

If you define a user at a level other than Security *before* you define a Security-level user, you cannot execute Security-level commands. You will need to contact Symmetricom Global Services to correct this problem.

Recommendation: Symmetricom recommends that you record and store the Security-level user's name and password in a secure location.

Adding a User at the Security Access Level

To define a user at the Security access level, issue the following TL-1 command:

Sample Command

```
ENT-USER-SECU::DEPTHEAD:TS1000::"TP01!",SECURITY;
```

This sample command creates a user with the name DEPTHEAD and a password of TP01!; this user is at the Security access level. See Section 4.5.3, Adding a User, for more information on the ENT-USER-SECU command.

Autonomous Message

```
   TP-SSU 03-05-15 09-59-09
A 1166 REPT EVT
   "IMC:NA,USRADD,NSA,03-05-15,09-59-09:\"USER HAS BEEN ADDED\""
;
```

Logging In

You can now log in using the ACT-USER command and the new user name and password to continue with the provisioning process.

Sample Command

```
ACT-USER::DEPTHEAD:TS1000::TP01!;
```

Normal Response

```
   TP-SSU 03-05-15 09-59-09
M  TS1000 COMPLD
;
```

Users with the Security access level can issue any of the TL-1 commands described in this chapter and in the *TimeProvider TL-1 Reference Guide*.

4.2.2 Setting the Source ID <sid>

Use the SET-SID command to set the name of the TimeProvider. This name appears in normal and error response messages sent by the unit.

```
SET-SID:[<tid>]::[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<keyword>	Description	Default value	<value>
SIDCHG	Sets the Source Identifier	N/A	Up to 20 alphanumeric characters. Do not use the “ character.

Sample Command

```
SET-SID:::TS1000::SIDCHG=TP-SSU;
```

This sample command sets the <sid> to TP-SSU All response messages are identified by this name. Symmetricom recommends that you use unique names for each TimeProvider in the network. Record the name you chose for the TimeProvider in Table 4-2.

If you include the _ character in the <value>, then the TimeProvider returns the SID in quote marks.

Autonomous Message

```
   TP-SSU 03-05-15,10-02-03
A 1167 REPT EVT
   "IMC,EQPT:NA,SIDCHG,NSA,03-05-15,10-02-03:\"SYSTEM'S SOURCE ID
HAS CHANGED,TP-SSU\""
;
```

4.2.3 Setting the Date and Time

Use the following TL-1 command to set the date and time in the IMC.

```
ED-DAT:[<tid>]:[<aid>]:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Value	Description
SYS	DATCHG <yy-mm-dd>	yy = <year> mm = 01 to 12 dd = 01 to 31	2-digit year Month Day
	TIMCHG (hh-mm-ss)	hh = 00 to 23 mm = 00 to 59 ss = 00 to 59	Hour of Day Minutes Seconds
	LOCTIM (±hh-mm)	±hh = 00 to 12 mm = 00 to 59	Time in hours and minutes that local time is offset from UTC.

Sample Command

```
ED-DAT::SYS:TS1000::DATCHG=03-10-24;
```

Autonomous Message

```
   TP-SSU 03-10-24 10-08-28
A 1168 REPT EVT
   SYS,EQPT:NA,DATCHG,NSA,03-10-24,10-08-28:\"SYSTEM DATE HAS
CHANGED,2003-10-24\""
;
```

4.3 Setting Communications Parameters

If you want to change the default communications parameter values, use the ED-EQPT command. The following sections describe the commands for performing each individual task. For detailed information on the ED-EQPT command, see the *TimeProvider TL-1 Reference Guide*.

4.3.1 Setting RS-232 Parameters

This section describes how to set the baud rate, the handshaking mode, and echo modes on the local and remote ports.

Setting the Baud Rate

Use the ED-EQPT command to provision the baud rate on the Local or Remote port.

```
ED-EQPT:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
COMp p = L | R		Communications ports L = Local R = Remote		
	BAUD	Baud rate	9600	2400 | 9600 | 19200 | 28800 | 38400 | 57600

Sample Command

```
ED-EQPT::COML:TS1000::BAUD=9600;
```

This command sets the local Craft communications port to 9600 baud.

Normal Response

```
   TIMEPROVIDER 03-10-24 10-10-25
M  TS1000 COMPLD
;
```

Setting the Handshaking (Flow) Mode

Use the ED-EQPT command to provision the handshaking mode on the local Craft or Remote port to None, Hardware, Software, or Hardware/Software.

```
ED-EQPT:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
COMp p = L | R		Communications ports		
	FLOW	Flow control	NONE	NONE | SW | HW | SWHW

Sample Command

```
ED-EQPT::COML:TS1000::FLOW=HW;
```

Normal Response

```
   TIMEPROVIDER 03-10-24 10-12-33
M  TS1000 COMPLD
;
```

Setting the Echo Mode

Use the ED-EQPT command to provision the echo mode on the local Craft or Remote port to On or Off. When set to ENABLE, characters you type at the keyboard also appear on the monitor. If one keystroke generates two characters on the monitor, set this parameter to DISABLE.

You can also use this command to echo the <tid> in the response from the TimeProvider.

```
ED-EQPT:[<tid>]:<aid>:[<ctag>]::<keyword>[=<value>];
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
COMp p = L | R		Communications ports		
	ECHO	Input echo	DISABLE	ENABLE | DISABLE
	TIDQUIET	Enables or disables the echo of the <tid>. This is a session setting.	DISABLE	ENABLE | DISABLE

Sample Command

```
ED-EQPT::COML:TS1000::ECHO=ENABLE;
```

Normal Response

```
   TIMEPROVIDER 03-10-24 10-15-04
M  TS1000 COMPLD
;
```

4.3.2 Setting Ethernet Parameters

Before you can begin using the Ethernet port, you *must* provision the addresses using the local Craft or Remote serial port.

If you are not planning to use the Ethernet port, you do not have to provision the parameters in this section.

Setting the IP Addresses

Use the ED-EQPT command to provision the following IP addresses for the TimeProvider:

- IP Gate address
- IP address
- IP Subnet address

You can also use this command to echo the <tid> in the response from the TimeProvider.

```
ED-EQPT:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
COMI		Comms ports		
	IPGATE	IP address of the default gateway	127.0.0.1	1.0.0.1 254.255.255.254
	IPADDR	IP address of the Network Element	127.0.0.1	1.0.0.1 254.255.255.254
	IPSUBNET	IP address of the Network Element	255.255.255.0	1.0.0.1 255.255.255.254
	TIDQUIET	Enables or disables the echo of the <tid>. This is a session setting.	DISABLE	ENABLE | DISABLE

Sample Command

```
ED-EQPT::COMI:TS1000::IPGATE=127.0.0.1;
```

This command sets the IP Gate address to 127.0.0.1. Use an appropriate gateway address for your network, and record the address in Table 4-2.

Autonomous Message

```
   TP-SSU 03-10-24 10-15-04
A 1169 REPT EVT
   "COMI:NA,IPGATE,NSA,03-10-24 10-15-04:\"IP GATE ADDRESS HAS
CHANGED\""
;
```

4.3.3 Checking Communication Links

Two commands allow you to check the communication links from a computer or network to the TimeProvider: PING and RTRV-HDR.

Ping

Use the PING command to check an Ethernet connection to the TimeProvider.

```
PING:[<tid>]::[<ctag>]::<ipaddr>;
```

This command has a default access level of USER.

<ipaddr>	Value	Description
IP address of host to be pinged	1.0.0.1 – 254.254.254.254	Pings the host system

Sample Command

```
PING:::TS1000::192.168.12.10;
```

Normal Response

```
   TP-SSU 03-05-15 09:59:09
M  TS1000 COMPLD
"Host 192.168.12.10 is alive. Roundtrip time was 165 milliseconds"
;
```

Retrieve Header

Use the RTRV-HDR command to display the response header, which includes the system identification <sid>, date, and time. You can also use this command to verify that the communication link between the computer and the TimeProvider is working properly.

This command has a default access level of NONE.

Sample Command

```
RTRV-HDR:::TS1000;
```

Normal Response

```
   TP-SSU 03-05-15 09:59:25
M  TS1000 COMPLD
;
```

4.4 Defining the Security Parameters

The TimeProvider supports users at the following four access levels:

- **None** – Anyone with access to a serial or Ethernet port on the TimeProvider can issue commands set to this access level. If no Security-level users are defined, then anyone connected to the TimeProvider can issue every command available
- **User** – Users entered into the user list at the User level can issue commands set at the User access level
- **Admin** – Users entered into the user list at the Admin level can issue commands set at the Admin access level
- **Security** – Users at this access level can issue every command available

You can edit the commands available at each access level using the ED-CMD-SECU command. You can display the current access level for each command by issuing the RTRV-CMD-SECU command. See the *TimeProvider TL-1 Reference Guide* for details on these commands.

The first person to log into the TimeProvider is automatically assigned the Security access level (described in Section 4.2.1, Defining a User at the Security Access Level); this person normally performs the initial provisioning and defines users and their appropriate access levels.

4.5 Managing the User List

Use the procedures in this section to manage the users that are authorized to access the TimeProvider.

4.5.1 Logging In

Use the following TL-1 command to log existing users into the system.

```
ACT-USER:[<tid>]:<uid>:[<ctag>]::<pid>;
```

This command has a default access level of NONE.

Parameter	<uid>	Description	Value
<uid>	<username>	Assigned user name	Up to 20 case-insensitive characters
<pid>	password	Assigned password	Up to 10 case-sensitive characters. Must include at least two non- alphabetic and one special character (any printing character other than a letter, number, comma, colon, or semicolon.

Sample Command

```
ACT-USER::TECHNICIAN:TS1000::TECH01!;
```

This command logs in the user named Technician.

Autonomous Messsage

```
   TP-SSU 03-10-24 10-18-24
A 1170 REPT EVT
   "IMC:NA,LOGIN,NSA,03-10-24 10-18-24:\"USER LOGGED
IN,TECHNICIAN\""
;
```

Error Response

```
   TP-SSU 03-10-24 10-18-24
M 04 DENY
   <errcode>
   "UNAUTHORIZED ACCESS TO THIS SYSTEM IS PROHIBITED."
;
```

4.5.2 Logging Out

Use the following TL-1 command to terminate a session and log out of the system. Security-level users can terminate any other user. The username is not case-sensitive, but it must be spelled exactly as assigned.

```
CANC-USER:[<tid>]:[<uid>]:[<ctag>];
```

This command has a default access level of USER.

<uid>	Value	Description
null		Terminates the current user's session and logs the user off the system
<uid>	Up to 20 case-insensitive characters	Allows an ADMIN or SECURITY access-level user to terminate another user's session

Sample Command

```
CANC-USER::TECHNICIAN:TS1000;
```

This command logs out the user named Technician.

Autonomous Message

```
   TP-SSU 03-10-24 10-25-31
A 1171 REPT EVT
   "IMC,EQPT:NA,LOGOUT,NSA,03-10-24 10-25-31:\"USER LOGGED
OUT,TECHNICIAN\""
;
```

4.5.3 Adding a User

You can store up to 20 users in the TimeProvider's user list. Each user has a name of up to 20 case-insensitive alphanumeric characters, a password of up to 10 case-sensitive characters, and one of the four defined access levels.

Use the following TL-1 command to add a user to the user list. If more than 20 users are defined in the user list, the DENY response is sent. Only a Security-level user can add to the user list.

```
ENT-USER-SECU:[<tid>]:<uid>:[<ctag>]::<pid>,<uap>;
```

This command always has a access level of SECURITY.

Parameter	Value	Description
<uid>	<username>	Up to 20 case-insensitive alphanumeric characters

Parameter	Value	Description
<pid>	<user password>	Up to 20 case-sensitive characters. You must include at least two non-alphabetic and one special character (other than a letter, number, comma, colon, or semicolon)
<uap>	NONE USER ADMIN SECURITY	The access level for the user

Sample Command

```
ENT-USER-SECU::TECHNICIAN:TS1000::TECH01!,USER;
```

This command defines a user named TECHNICIAN with a password of TECH01! at the User access level.

Autonomous Message

```
   TP-SSU 03-10-24 10-28-24
A 1172 REPT EVT
   "IMC:NA,USRADD,NSA,03-10-24 10-28-24:\"USER HAS BEEN ADDED\""
;
```

4.5.4 Changing the Current User's Password

The ED-PID command changes the specified user's password.

```
ED-PID:[<tid>]:[<uid>]:[<ctag>]::<oldpid>,<newpid>;
```

This command has a default access level of USER.

Keyword	Value	Description
<uid>	<username>	Up to 20 case-insensitive alphanumeric characters
<oldpid>	Must match existing value or DENY is issued for the command	Old password for the specified user
<newpid>	Up to 20 case-sensitive characters	New password for the specified user

Sample Command

```
ED-PID::TECHNICIAN:TS1000::TECH01!,#Tech02;
```

This command changes the current user's password from TECH01! to #Tech02.

Autonomous Message

```
   TP-SSU 03-10-24 10-30-01
A 1173 REPT EVT
   "IMC:NA,PIDCHG,NSA,03-10-24 10-30-01:\"USER PASSWORD HAS
CHANGED\""
;
```

4.5.5 Displaying a User's Access Level

Use the following TL-1 command to display the access level for a specified user or for all users.

```
RTRV-USER-SECU::[<uid>]:[<ctag>];
```

This command always has a access level of SECURITY.

Parameter	Value	Description
<uid>		Assigned user name. Displays the access level of the specified user.
null		Displays the access level for all assigned user names.

The response format is:

```
<cr><lf><lf>
^^^sid^date^time<cr><lf>
M ^ctag^COMPLD<cr><lf>
^^^"username,access"<cr><lf>
^^^"username,access"<cr><lf>
     .
     .
     .
^^^"username,access"<cr><lf>
;
```

Response	Value	Description
<username>	Up to 20 case-insensitive characters	Assigned user name
<access>	NONE USER ADMIN SECURITY	Access level

Sample Command

```
RTRV-USER-SECU::TS1000;
```

Normal Response

```
   TP-SSU 03-10-24 10-31-31
M TS1000 COMPLD
   "TECHNICIAN,USER"
   "DEPTHEAD,SECURITY"
   "DAVID,ADMIN"
;
```

Editing a User's Access Level

Use the following TL-1 command to change the access level for a specified user.

```
ED-USER-SECU:[<tid>]:<uid>:[<ctag>]::<keyword>=<value>;
```

This command always has a access level of SECURITY.

Parameter	<keyword>	Description	Value
<uid>		Assigned user name	Up to 20 case-insensitive characters
	ACCLVL	New access level for the specified user	NONE USER ADMIN SECURITY

Sample Command

```
ED-USER-SECU::TECHNICIAN:TS1000::ACCLVL=ADMIN;
```

This command changes the access level for the TECHNICIAN user to ADMIN.

Autonomous Message

```
   TP-SSU 03-10-24 10-33-04
A 1174 REPT EVT
   "IMC,EQPT:NA,ACCLVL,NSA,03-10-24 10-33-04:\"USER ACCESS LEVEL
HAS CHANGED\""
;
```

4.5.6 Deleting A User

Use the following TL-1 command to delete a specified user from the user list.

```
DLT-USER-SECU:[<tid>]:<uid>:[<ctag>];
```

This command has a default access level of SECURITY.

Parameter	Value	Description
<uid>	Up to 20 case-insensitive characters	Assigned user name

Sample Command

```
DLT-USER-SECU::TECHNICIAN:TS1000;
```

This command deletes the TECHNICIAN user from the user list.

Autonomous Message

```
   TP-SSU 03-10-24 10-35-54
A 1175 REPT EVT
   "IMC:EQPT:NA,USRDEL,NSA,03-10-24 10-35-54:\"USER HAS BEEN
DELETED\""
;
```

4.5.7 Retrieving Current Users

Use the RTRV-USER command to display a list of all currently connected users. The TimeProvider supports up to 10 TCP simultaneous connections, as well as one local and one remote serial connection. If a user is logged on, the username appears in the response.

```
RTRV-USER:[<tid>]::[<ctag>];
```

This command has a default access level of USER.

Sample Command

```
RTRV-USER;
```

Normal Response

```
   TP-SSU 03-10-24 10-37-14
M ^04^COMPLD
   TECHNICIAN
;
```

4.6 Provisioning the IOC

This section describes how to provision the IOC.

4.6.1 Setting the System Mode

The SET-SYS-MODE command allows you to provision the operating mode of the TimeProvider to one of the following:

- SSU – Synchronization Supply Unit: provides filtering compliant with G.812 and GR-1244
- SUB – Subtending mode: provides composite clock input tracking compliant with GR-378

In the SSU mode, you can select the system reference from signals on the PRS, INP1, or INP2 connectors.

In the SUB mode, the PRS input is set to Monitor only; you can select the system reference from signals on the INP1 or INP2 connectors. These inputs are provisioned to Composite Clock framing.

Retrieving the Current System Mode

Use the following TL-1 command to retrieve the current system mode.

```
RTRV-SYS-MODE:[<tid>]::[<ctag>];
```

This command has a default access level of USER.

Response	Description
<value>	SSU, SUB

Sample Command

```
RTRV-SYS-MODE:::TS1000;
```

Normal Response

```
   TP-SSU 03-10-24 10-37-54
M  TS1000 COMPLD
   SSU
;
```

Setting the System Mode

Use the SET-SYS-MODE command to provision the TimeProvider's operating mode. See Section 1.2, Operating Modes, for more information on how the operating mode affects the TimeProvider's inputs and outputs.

```
SET-SYS-MODE:[<tid>]::[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<keyword>	<value>	Description	Default value
SYSMODE	SSU	Set the TimeProvider to SSU operating mode. ■ PRC – Priority 1 and Enabled ■ INP1 – Priority 2 and Enabled ■ INP2 – Priority 3 and Enabled	SSU
	SUB	Set the TimeProvider in Subtending operating mode ■ PRC – Monitor only and Disabled, cannot be Enabled ■ INP1 – Priority 1 and Enabled ■ INP2 – Priority 2 and Enabled	

Sample Command

```
SET-SYS-MODE:::TS1000::SYSMODE=SUB;
```

Sets the system mode to Subtending (SUB). The inputs are set as described in the table above. Record the mode in Table 4-2.

Autonomous Message

```
   TP-SSU 03-10-24 10-40-10
A 1176 REPT EVT
   "SYS,EQPT:NA,SYSMODE,NSA,03-10-24 10-40-10:\"SYSTEM MODE OF
OPERATION HAS CHANGED,SUB\""
;
```

4.6.2 Setting the IOC Parameters

Use the ED-EQPT command to provision each IOC. This command allows you to select which IOC is Active and which is Standby; to switch the Active and Standby IOCs; to place a IOC "In Service" or "Out of Service"; and to define the oscillator type (Type 1 or ST3E).

```
ED-EQPT:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
IOCm (m = 1 | 2)		Management module		
	IOCMODE	Sets the mode of the specified IOC. For redundant systems, changing the state of one IOC forces the other IOC to the alternate state	ACTIVE	ACTIVE | STANDBY
	IOCACTV	Sets the Standby IOC to Active	n/a	n/a
	IOCSTATE	Places an “Out of Service” IOC in the “In Service” mode	INSERV	INSRV
		Places an “In Service” IOC in the “Out of Service” mode. An Out of Service IOC cannot generate outputs or monitor inputs and does not generate alarms		OOSRV
	CLKTYPE	Defines the Local Oscillator type. Selects the type of clock used to generate SSMs in Holdover mode	TYPEI	TYPEI | ST3E

Sample Command

```
ED-EQPT::IOC1:TS1000::IOCSTATE=INSERV;
```

This command places IOC 1 in the “In Service” mode. Use this command when you have taken an IOC out of service and are now ready to put it back in service.

Autonomous Message

```
   TP-SSU 03-10-24 10-42-40
A 1177 REPT EVT
   "IOC1,EQPT:NA,IOCSTATE,NSA,03-10-24 10-42-40:\"IOC STATE HAS
CHANGED,INSRV\"
;
```

4.7 Provisioning the Input Reference

You need to know the following information about the input reference signal before you can provision the Input Reference signals:

- Input selection mode
- Interface type
- Frame type/frequency
- Quality level
- Priority level
- SSMs and bit position
- CRC

4.7.1 Setting the Input Selection Mode

Use the ED-EQPT command to provision the inputs to the TimeProvider. You can enable, disable, or place an input in Monitor mode (where the input is monitored, but cannot be selected as the system reference).

```
ED-EQPT:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
PRS INPp (p = 1 | 2)		System inputs		
	INSTATE	Enables the specified input	ENABLE	ENABLE
		Places the specified input in Monitor Only mode.		MONITOR
		Disables the specified input		DISABLE

Sample Command

```
ED-EQPT::INP1:TS1000::INSTATE=MONITOR;
```

This command places Input 1 in the Monitor mode.

Autonomous Message

```
   TP-SSU 03-10-24 10-44-21
A 1178 REPT EVT
   "INP1,T1:NA,INSTATE,NSA,03-10-24 10-44-21:\"INPUT STATE HAS
CHANGED,MONITOR\""
;
```

4.7.2 Setting the Input Frame Type and Frequency

Use the ED-SYNC command to provision the input PRS frame type and frequency.

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
PRS		PRS input, except clock input signals		
	FRMTYPE	Provisions the input frequency of the PRS input	2M	2M (2048 kHz) | 5M | 10M SPANTYPE = NA

Sample Command

```
ED-SYNC::PRS:TS1000::FRMTYPE=5M;
```

Autonomous Message

```
   TP-SSU 03-10-24 10-46-01
A 1179 REPT EVT
   "PRS,EQPT:NA,FRMTYPE,NSA,03-10-24 10-46-01:\"INPUT FRAMING TYPE
HAS CHANGED,5M\""
;
```

4.7.3 Setting the Input Interface Type

Use the ED-SYNC command to provision the input interface type. You can connect E1 or T1 signals to INP1 or INP2. You must set the system mode to SSU in order to use E1 or T1 inputs (see Section 4.6.1, Setting the System Mode).

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

If you provision the TimeProvider to the Subtending mode (see Section 4.6.1, Setting the System Mode), then the inputs are automatically set to Composite Clock (CC) and the SPANTYPE is set to NA.

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
INP		System input		
	SPANTYPE	Provisions the interface signal type used by the input.	E1	E1 | T1

Sample Command

```
ED-SYNC::INP:TS1000::SPANTYPE=T1;
```

Autonomous Message

```
   TP-SSU 03-10-24 10-48-45
A 1180 REPT EVT
   "INP,T1:NA,SPANTYPE,NSA,03-10-24 10-48-45:\"INPUT SPAN TYPE HAS
CHANGED,T1\""
;
```

4.7.4 Setting the Input Frame Type

Use the ED-SYNC command to provision the input frame type. Valid parameter values depend on the SPANTYPE parameter setting, as described in Section 4.7.3, Setting the Input Interface Type.

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

If you provision the TimeProvider to the Subtending mode (see Section 4.6.1, Setting the System Mode), then the inputs are automatically set to Composite Clock (CC). You cannot set the FRMTYPE when the TimeProvider is in the Subtending mode.

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
INPp (p = 1 | 2)		System input		
	FRMTYPE	Provisions the frame signal type used by the input. If SPANTYPE = E1: If SPANTYPE = T1:	 2M ESF	 2M (2048 kHz) | CCS D4 | ESF

Sample Command

```
ED-SYNC::INP1:TS1000::FRMTYPE=ESF;
```

Autonomous Message

```
   TP-SSU 03-10-24 10-50-05
A 1181 REPT EVT
   "INP1,T1:NA,FRMTYPE,NSA,03-10-24 10-50-05:\"INPUT FRAMING TYPE
HAS CHANGED,ESF\""
;
```

4.7.5 Controlling Automatic Reference Switching

The TimeProvider can determine which input reference signal has the highest quality. When the active reference signal falls below a preset quality level, the TimeProvider can automatically switch to the next highest input reference signal. To use this feature, you must enable Automatic switching.

Automatic Return to a Higher Priority Reference

When the REFMODE parameter is provisioned to AUTO, the system reference switches when the input signal is disqualified. When the input signal is re-qualified, the TimeProvider can either keep the current reference or switch back to the re-qualified signal. The first case, keeping the current reference, is also known as “non-revertive”; the second case, switching back to the re-qualified input, is known as revertive.

The QLEVEL (Section 4.7.6, Setting the Input Quality Level) and the PRIORITY (Section 4.7.7, Setting the Input Priority Level) parameters work together with SSMs to determine the switching strategy for the inputs when the unit is in the SSU mode. If the active/primary input becomes unavailable, the switching strategy determines which input to use: the TimeProvider uses the input with the next highest QLEVEL. If all inputs have the same QLEVEL, then the TimeProvider uses the input with the highest PRIORITY.

To provision the TimeProvider as non-revertive, you must provision the user-assigned Priority Level on all inputs to the same value (1, 2, 3, or 4). To provision the TimeProvider as revertive, you provision any one of the inputs to a higher or lower Priority Level, with 1 being the highest priority.

If the original primary input becomes available again, the REFMODE, QLEVEL and PRIORITY parameters determine whether the TimeProvider switches back to that input. If the QLEVEL and/or PRIORITY parameter of the original input is higher than the current input, the TimeProvider *reverts* back to the original input. If the QLEVEL parameter is the same for all inputs, then the TimeProvider does not revert back to the original input.

Enabling Automatic Switching

Use the ED-SYNC command to set the reference selection to Automatic or Forced. When set to Automatic, then the QLEVEL and PRIORITY parameters determine the switching strategy to be revertive or non-revertive. When set to Forced, then the TimeProvider uses the input selected with the INPREF keyword (see Section 4.7.8, Manually Selecting the Reference).

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
SYS		System inputs		
	REFMODE	Sets the reference selection mode	AUTO	AUTO | FORCED

Sample Command

```
ED-SYNC::SYS:TS1000::REFMODE=AUTO;
```

Autonomous Message

```
   TP-SSU 03-10-24 10-52-25
A 1182 REPT EVT
   "SYS,EQPT:NA,REFMODE,NSA,03-10-24 10-52-25:\"SYSTEM REFERENCE
MODE HAS CHANGED,AUTO\""
;
```

4.7.6 Setting the Input Quality Level

Use the ED-SYNC command to set the quality level (QLEVEL) of the specified input. You set the QLEVEL when using inputs that do not have an associated SSM. The QLEVEL determines the TimeProvider's output SSM.

If you provision QLEVEL below the quality level of the local oscillator in the IOC, then the TimeProvider disqualifies the input with the INPQL alarm. An INPQL alarm also occurs if the incoming SSM indicates that the input signal is below the quality level of the local oscillator.

Normally, you provision the QLEVEL for each input to be either unique or all the same. If you set all QLEVEL for inputs to unique values, then you have set up a revertive switching strategy. If you set all inputs to the same value, then you have set up a non-revertive switching strategy.

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
PRS INPp (p = 1 | 2)		Input ports		
	QLEVEL	Sets the Quality Level for the specified input	2	1 = PRS 2 = UNK/STU 3 = TYPE II/ST2 4 = TYPE I 5 = TYPE V/TNC 6 = TYPE III/ST3E 7 = TYPE IV/ST3 8 = G.813OPT3/SMC 9 = DUS

Sample Commands

```
ED-SYNC::PRS:::QLEVEL=1;
ED-SYNC::INP1:::QLEVEL=1;
ED-SYNC::INP2:::QLEVEL=1;
```

This series of commands sets the QLEVEL for all inputs to the same level; if you also provision the PRIORITY level to the same value, then you have set up a non-revertive switching strategy.

Autonomous Message

```
   TP-SSU 03-10-24 10-54-44
A 1183 REPT EVT
   "PRS,EQPT:NA,QLEVEL,NSA,003-10-24 10-54-44:\"USER ASSIGNED
QUALITY LEVEL HAS CHANGED,1\""
;
```

4.7.7 Setting the Input Priority Level

The PRIORITY level works together with the QLEVEL parameter (described in Section 4.7.6, Setting the Input Quality Level) to determine the switching strategy. The PRIORITY level is the second factor the TimeProvider uses to determine which input to use when the original primary input becomes unavailable.

Use the ED-SYNC command to set the PRIORITY level of the selected reference.

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
PRS INPp (p = 1 | 2)		Input ports		
	PRIORITY	Sets the priority for the selected input	PRC = 2 INP1 = 3 INP4 = 4	2 | 3 | 4

Sample Command

```
ED-SYNC::PRS:TS1000::PRIORITY=2;
ED-SYNC::INP1:TS1000::PRIORITY=2;
ED-SYNC::INP2:TS1000::PRIORITY=2;
```

These commands set the PRIORITY for each input to the same value; if you also provision the QLEVEL to the same value, then you set up a non-revertive switching strategy.

Autonomous Message

```
   TP-SSU 03-10-24 10-56-00
A 1184 REPT EVT
   "PRS,EQPT:NA,PRIORITY,NSA,03-10-24 10-56-00:\"PRIORITY HAS
CHANGED,2\""
;
```

4.7.8 Manually Selecting the Reference

Use the ED-SYNC command to manually select the reference. To select the reference, you must first set the REFMODE keyword to FORCED, as described in Section 4.7.5, Controlling Automatic Reference Switching.

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
SYS		System inputs		
	INPREF	Sets the specified input to be the system reference	PRS	PRS | INP1 | INP2

Sample Command

```
ED-SYNC::SYS:TS1000::INPREF=PRS;
```

This command forces the signal on the PRS input to be the reference signal. The REFMODE keyword must be set to FORCED for this command to take effect.

Autonomous Message

```
   TP-SSU 03-10-24 10-58-30
A 1185 REPT EVT
   "SYS,EQPT:NA,INPREF,NSA,03-10-24 10-58-30:\"SYSTEM REFERENCE
INPUT HAS CHANGED, PRS\""
;
```

4.7.9 Provisioning the SSM

Before you can read Synchronization Status Messages (SSMs) on certain input signals, you need to provision the TimeProvider to read the incoming SSM and identify the bit position of the SSM. SSMs are on the following types of input signals:

- E1, CAS4, CCS4
- T1, ESF

Reading SSMs

To enable the use of SSMs, you must first provision the TimeProvider to read SSMs on the input. Use the ED-SYNC command to enable the specified input to read SSMs.

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
INPp (p = 1 | 2)		System inputs		
	SSMENA	Provisions the T1 ESF or E1 (CCS) input to read the received SSM	ENABLE	ENABLE | DISABLE

Sample Command

```
ED-SYNC::INP1:TS1000::SSMENA=ENABLE;
```

Autonomous Message

```
   TP-SSU 03-10-24 11-02-28
A 1186 REPT EVT
   "INP1,T1:NA,SSMENA,NSA,03-10-24 11-02-28:\"INPUT READING OF SSM
HAS CHANGED,ENABLE\""
;
```

Defining the SSM Bit Position

After you enable an E1 (CAS) input to read SSMs, you must then define the bit containing the SSM.

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
INPp (p = 1 | 2)		System inputs		
	SSMBIT	Provisions the E1 (CAS) SSM bit position.	8	4 | 5 | 6 | 7 | 8

Sample Command

```
ED-SYNC::INP1:TS1000::SSMBIT=4;
```

This command sets the SSM bit to position 4 in the E1 input string on Input 1.

Autonomous Message

```
   TP-SSU 03-10-24 11-05-18
A 1187 REPT EVT
   "INP1,T1:NA,SSMBIT,NSA,03-10-24 11-05-18:\"E1 SSM BIT HAS
CHANGED,4\""
;
```

4.7.10 Enabling CRC4

Use the ED-SYNC command to enable or disable the use of CRC4 on E1 inputs (see Section 4.7.3, Setting the Input Interface Type, for setting the SPANTYPE parameter).

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
INPp (p = 1 | 2)		System inputs		
	CRCENA	Provisions the use of CRC4 on E1 inputs	DISABLE	ENABLE | DISABLE

Sample Command

```
ED-SYNC::INP1:TS1000::CRCENA=ENABLE;
```

Normal Response

```
   TP-SSU 03-10-24 11-06-57
A 1188 REPT EVT
   "INP1,T1:NA,CRCENA,NSA,03-10-24 11-06-57:\"INPUT CRC HAS
CHANGED,ENABLE\""
;
```

4.8 Provisioning the Outputs

This section describes the commands you use to provision the outputs of the TimeProvider.

4.8.1 Enabling and Disabling the Outputs

Use the ED-EQPT command to enable or disable the output signal. This command affects the specified group of eight output channels; individual channels cannot be enabled or disabled.

```
ED-EQPT:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
OUTg g = A|B|C|D		Select the output group		
	OUTSTATE	Enable the specified output group	ENABLE	ENABLE
		Disable the specified output group		DISABLE

Sample Command

```
ED-EQPT::OUTA:TS1000::OUTSTATE=DISABLE;
```

Autonomous Message

```
   TP-SSU 03-10-24 11-09-12
A 1189 REPT EVT
   "OUTA,EQPT:NA,OUTSTATE,NSA,03-10-24 11-09-12:\"OUTPUT GROUP
STATE HAS CHANGED,DISABLE\""
;
```

4.8.2 Provisioning the Output Framing Type

Use the ED-SYNC command to provision the output framing type.

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
OUTg (g = A | B | C | D)		System inputs		
	FRMTYPE	Provisions the output framing	2M	2M | CAS | D4 | ESF | CC | ISOLATED_1

Sample Command

```
ED-SYNC::OUTA:TS1000::FRMTYPE=CAS;
```

Autonomous Message

```
   TP-SSU 03-10-24 11-11-18
A 1190 REPT EVT
   "OUTA,EQPT:NA,FRMTYPE,NSA,03-10-24 11-11-18:\"OUTPUT FRAMING
TYPE HAS CHANGED,CAS\""
;
```

4.9 Provisioning Alarms

This section describes how you provision and manage alarms in the TimeProvider. There are TL-1 commands that allow you to:

- Provision individual alarm levels
- Provision system-wide alarm levels
- Display current alarm settings
- Display current alarms
- Display alarm status

Alarms are displayed on the IMC LEDs; they also appear on the relay contact closures on the Input module.

4.9.1 Provisioning the Alarm Levels

Use the SET-ATTR command to set the alarms associated with the IMC and IOC. You can use this command to reset all alarm levels to the factory default values, and to allow the TimeProvider to escalate alarms.

```
SET-ATTR:[<tid>]:<aid>:[<ctag>]::<keyword>[=<value>];
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	<value>
SYS		System level	
	ELEVTIME	Allow alarms to escalate from Minor to Major and from Major to Critical	ENABLE | DISABLE (default)
	FACTORY	Set the alarm levels to factory default values	

<aid>	<keyword>	Description	<value>
SYS IMC IOC PRS INPp (p = 1 | 2)	Alarm ID	See the definitions for the Alarm ID in the following table	NR = Not Reported NA = A non-alarm event MN = Minor alarm MJ = Major alarm CR = Critical alarm CLEAR = Clears an active alarm; if the condition persists, then the alarm is reissued

Alarm ID	Description of Alarm Condition	Possible Alarm Levels	Error Delay Default	Error Delay Editable?	Default Level	
					SSU Mode	SUB Mode
<aid> = SYS						
PWRA	Loss of A power	MN MJ CR	IMMED	No	MJ	MJ
PWRB	Loss of B power	MN MJ CR	IMMED	No	MJ	MJ

Alarm ID	Description of Alarm Condition	Possible Alarm Levels	Error Delay Default	Error Delay Editable?	Default Level	
					SSU Mode	SUB Mode
EXPFAIL	Connection to the Expansion Panel is lost	NR NA MN MJ CR	IMMED	No	MJ	MJ
EXTALM	External alarm generated by external equipment	NR NA MN MJ CR	IMMED	No	MN	MN
<aid> = IMC						
IOC1COMM	Comm alarm with IOC 1	NR NA MN MJ CR	IMMED	No	MN	MN
IOC2COMM	Comm alarm with IOC 2	NR NA MN MJ CR	IMMED	No	MN	MN
<aid> = IOC						
IOC1COMM	Comm alarm from IMC module to IOC1 module	NR NA MN MJ CR	IMMED	No	MN	MN
IOC2COMM	Comm alarm from IMC module to IOC2 module	NR NA MN MJ CR	IMMED	No	MN	MN
IOC1TO2 COMM	Comm alarm from IOC1 to IOC2	NR NA MN MJ CR	IMMED	No	MN	MN
IOC2TO1 COMM	Comm alarm from IOC2 to IOC1	NR NA MN MJ CR	IMMED	No	MN	MN

Alarm ID	Description of Alarm Condition	Possible Alarm Levels	Error Delay Default	Error Delay Editable?	Default Level	
					SSU Mode	SUB Mode
IOCFAIL	Summary alarm of IOC failures; for example, calibration was unsuccessful	MN MJ CR	IMMED	No	MJ	MJ
CLKWARM	Local oscillator on the specified IOC is in Warm-up mode	MN MJ	IMMED	No	MN	MN
CLKFREE	Local oscillator on specified IOC is in Free-run mode	MN MJ CR	IMMED	No	MJ	MJ
CLKBRDG	Local oscillator on specified IOC is in Bridging mode	MN MJ CR	IMMED	No	MJ	MJ
CLKHOLD	Local oscillator on specified IOC is in Holdover mode	MN MJ CR	IMMED	No	MJ	MJ
<aid> = PRS						
INPDISQ	Specified input has been disqualified or qualified as a possible system reference.	MN MJ CR	FLTDELAY	Yes	MN	MN
INPLOS	Specified input has Loss Of Signal.[1]	MN MJ CR	IMMED	No	MN	MN
INPFRQ	Specified input has calculated received frequency that exceeds the pull-in range of the LO.This alarm condition disqualifies the input as a possible reference.[2]	NR NA MN MJ CR	IMMED	No	MN	NR
INPPHASE	Specified input port's phase measurement exceeds usable value.	NR NA MN MJ CR	IMMED	No	MN	MN

Alarm ID	Description of Alarm Condition	Possible Alarm Levels	Error Delay Default	Error Delay Editable?	Default Level	
					SSU Mode	SUB Mode
EXDSC	Input has had excessive discontinuities, indicated by more than 3 signal faults of the same type within a 5-minute period. The alarm clears when the 5-minute window contains less than 3 alarms of the same type.	NR NA MN MJ CR	IMMED	No	MN	MN
<aid> = INP1 or INP2						
INPDISQ	Specified input has been disqualified or qualified as a possible system reference.	MN MJ CR	FLTDELAY	Yes	MN	MN
INPAIS	The specified input is receiving an Alarm Indication Signal.[1]	MN MJ CR	IMMED	No	MN	MN
INPLOS	The specified input has Loss of Signal.[1]	MN MJ CR	IMMED	No	MN	MN
INPOOF	The specified input is receiving an Out of Frame signal.[1]	MN MJ CR	IMMED	No	MN	MN
INPFRQ	Specified input port's calculated received frequency exceeds the pull-in range of the LO.This alarm condition disqualifies the input as a possible reference.[2]	NR NA MN MJ CR	IMMED	No	MN	NR
INPPHASE	Specified input port's phase measurement exceeds usable value.	NR NA MN MJ CR	IMMED	No	MN	MN

Alarm ID	Description of Alarm Condition	Possible Alarm Levels	Error Delay Default	Error Delay Editable?	Default Level	
					SSU Mode	SUB Mode
INPQL	The received SSM is of lesser quality than the provisioned QLEVEL for a specified input. This alarm occurs when you provision the input's QLEVEL below the quality level of the LO.	NR NA MN MJ CR	IMMED	No	MN	MN
EXDSC	Input has had excessive discontinuities, indicated by more than 3 signal faults of the same type within a 5-minute period. The alarm clears when the 5-minute window contains less than 3 alarms of the same type.	NR NA MN MJ CR	IMMED	No	MN	MN

Notes:

1. When the fault is detected, the input is immediately removed from the possible reference list. The fault must be continuously present for the period specified by FLTDELAY before the alarm is set. After the alarm is set, it clears once the input signal is fault-free for the period specified by CLRDELAY.
2. Once INPFREQ is set, the alarm clears when the input frequency is within the defined pull-in range

Sample Command

```
SET-ATTR::SYS:TS1000::ELEVTIME=ENABLE;
```

This command allows alarms to automatically escalate to the next higher alarm level after the time period specified in the FLTDELAY keyword has elapsed (see Section 4.9.2, Provisioning System-Level Alarms, for more details).

4.9.2 Provisioning System-Level Alarms

You use the ED-SYNC command to provision system-level alarms. The CLRDELAY and FLTDELAY parameters are system-wide; the parameters cannot be set for individual alarms.

```
ED-SYNC:[<tid>]:<aid>:[<ctag>]::<keyword>=<value>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
SYS		Access identifiers		
	CLRDELAY	Sets the time delay to declare a valid input after an alarm condition clears	10 s	0 to 1000 s
	FLTDELAY	Sets the time delay before a fault is declared due to LOS, AIS, or OOF alarms on the input	5 s	1 to 15 s
	FREEFLT	Determines the action when the LO enters the Free-Run mode	SQUELCH	ON | SQUELCH | AIS
	HOLDFLT	Determines the action when the LO enters the Holdover mode	ON	ON | SQUELCH | AIS

Sample Command

```
ED-SYNC::SYS:TS1000::CLRDELAY=5;
```

This command declares a faulted input to be valid five seconds after the alarm condition has cleared.

Autonomous Message

```
   TP-SSU 03-10-24 11-18-00
A 1192 REPT EVT
   "SYS,EQPT:NA,CLRDELAY,NSA,03-10-24 11-18-00:\"INPUT CLEAR DELAY
HAS CHANGED\""
;
```

4.9.3 Retrieving Current Alarm Settings

You can display the current settings for any alarm using the RTRV-ATTR command.

```
RTRV-ATTR:[<tid>]:<aid>:[<ctag>][::<keyword>];
```

This command always has a access level of USER.

<aid>	<keyword>	Description	
SYS		System Level	
	ELEVTIME		ENABLE | DISABLE
SYS IMC IOC PRS INPp (p = 1 | 2)	Alarm ID	The Alarm ID is described in Section 4.9.1, Provisioning the Alarm Levels	
ALL (or null)	ALL (or null)	Returns all of the alarm attributes	

Response Format

```
<cr><lf><lf>
   sid date time<cr><lf>
M  ctag COMPLD<cr><lf>
   "<aid>:event id,alarm level"<cr><lf>
   "<aid>:event id,alarm level"<cr><lf>
     .
     .
   "<aid>:event id,alarm level"<cr><lf>
;
```

Field	Description
<aid>	The aid specified in the command
event id	The identifier of the alarm whose level is displayed
alarm level	The value indicates the alarm level that is generated by an alarm event: NR = Not Reported NA = A non-alarm event MN = Minor alarm MJ = Major alarm CR = Critical alarm

Sample Command

```
RTRV-ATTR::SYS:TS1000;
```

This command causes the TimeProvider to return the alarm levels associated with all system-level alarms.

Normal Response

```
   TP-SSU 03-10-24 11-21-20
M  TS1000 COMPLD
   "SYS:IOC1EQPT,NA"
   "SYS:IOC2EQPT,NA"
   "SYS:PWRA,MJ"
   "SYS:PWRB,MJ"
   "SYS:EXTALM1,MJ"
   "SYS:EXTALM2,CR"
   "SYS:EXPFAIL,MJ"
;
```

4.9.4 Retrieving Current Alarms

You can display the current active alarms using the RTRV-ALM command.

```
RTRV-ALM:[<tid>]:<aid>:[<ctag>];
```

This command has a default access level of USER.

<aid>	Description
ALL (or null) SYS IMC IOCm (m = 1 | 2) PRS INPp (p = 1 | 2 OUTg (g = A | B | C | D)	Access identifiers

Normal Response Format

```
<cr><lf><lf>
^^^sid^date^time<cr><lf>
M^<ctag>^COMPLD
^^^”<aid>,aidtype:ntfcncde,condtype,srveff,ocrdat,ocrtim<:condscr>
”<cr><lf>*
;
```

where * indicates zero or more of the preceding element

Response

Value	Description
<aid>	Access identifier
aidtype	Access identifier type EQPT – alarm associated with operation of the system T1 – alarm associated with inputs or outputs
ntfcncde	Notification code: MN – Minor alarm MJ – Major alarm CR – Critical alarm
condtype	Condition type – keyword associated with the command
srveff	Service effective indicator
ocrdat	Occurrence date of the alarm
ocrtim	Occurrence time of the alarm
condscr	Optional condition description – text string enclosed in quotation marks

Sample Command

```
RTRV-ALM:::TS1000;
```

This command causes the TimeProvider to return all current alarms.

Normal Response

```
   TP-SSU 03-10-24 11-22-11
M  TS1000 COMPLD
   "SYS,EQPT:MJ,PWRA,NSA,03-10-24 11-22-11:\"POWER A FAILED\""
   "SYS,EQPT:MJ,EXPFAIL,SA,03-10-24 11-22-11:\"EXPANSION
CONNECTIVITY FAILED\""
   "IOC2,EQPT:MJ,CLKFREE,SA,03-10-24 11-25-15:\"CLOCK ENTERED
FREE-RUN MODE\""
   "INP1,T1:MN,INPLOS,NSA,03-10-24 11-25-16:\"LOS FAULT\""
   "INP2,T1:MN,INPDISQ,NSA,03-10-24 11-25-17:\"INPUT DISQUALIFIED
AS POSSIBLE REFERENCE\""
   "INP2,T1:MN,INPLOS,NSA,03-10-24 11-25-17:\"LOS FAULT\""
;
```

4.9.5 Displaying Alarm Status

The RTRV-COND command displays information about the current summary alarm status of components within the TimeProvider. The active IOC reports alarms for the Input, Output, and Expansion Panel.

```
RTRV-COND:[<tid>]:<aid>:[<ctag>];
```

This command always has a access level of USER.

<aid>	Description
ALL (or null)	Access Identifiers

Normal Response Format

```
<cr><lf><lf>
^^^sid^date^time<cr><lf>
M ^ctag^COMPLD<cr><lf>
^^^"SYS:<pwra>,<pwrb>,<expstatus>,<extfault>"<cr><lf>
^^^"IMC:<ioc1comm>,<ioc2comm>"<cr><lf>
^^^"IOC1:<iocstatus>,<ioccomm>,<imccomm>"<cr><lf>
^^^"IOC2:<iocstatus>,<ioccomm>,<imccomm>"<cr><lf>
^^^"PRS:<prsstatus>"<cr><lf>
^^^"INP1:<inpstatus>"<cr><lf>
^^^"INP2:<inpstatus>"<cr><lf>
^^^"OUTA:<outstatus>"<cr><lf>
^^^"OUTB:<outstatus>"<cr><lf>
^^^"OUTC:<outstatus>"<cr><lf>
^^^"OUTD:<outstatus>"<cr><lf>
;
```

Response

<aid>	Description
SYS	Displays the connectivity status of the Expansion Panel and any alarms associated with the Expansion Panel <pwra> – PWRA-OK | PWRA-FAIL <pwrb> – PWRB-OK | PWRB-FAIL <expstatus> – OK | ALM <extfault> – OK | ALM
IMC	Displays all conditions related to the Information Management module <ioc1comm> – IOC1COMM-OK | IOC1COMM-FAIL <ioc2comm> – IOC2COMM-OK | IOC2COMM-FAIL

Response

<aid>	Description
IOCm (m = 1 | 2)	Displays the current setup and conditions related to the system-level function of the IOC module <iocstatus> – OK | ALM (IOCFAIL) <ioccomm> – IOC1TO2COMM-OK | IOC1TO2COMM-FAIL IOC2TO1COMM-OK | IOC2TO1COMM-FAIL <imccomm> – IMC1COMM-OK | IMC1COMM-FAIL IMC2COMM-OK | IMC2COMM-FAIL
PRS	Displays PRS Input state and any alarm events associated with PRS input <prsstatus> – OK | ALM
INPp (p = 1 | 2)	Displays Input state and any alarm events associated with Inputs 1 or 2 <inpstatus> – OK | ALM
OUTg (g = 1 | 2 | 3 | 4)	Displays output status; this reflects the state of IOCFAIL of the active IOC <outstatus> – OK | ALM

Sample Command

```
RTRV-COND::IOC:TS1000;
```

This command causes the TimeProvider to return the status of the power supplies and the optional Expansion Panel.

Normal Response

```
   TP-SSU 03-10-24 11-27-28
M  TS1000 COMPLD
   "SYS,PWRA-OK,PWRB-OK,OK,OK"
;
```

4.9.6 Clearing Alarms

Clearing the Office (Audible) Alarm

Use the following TL-1 command to turn off (squelch) the audible office alarm. The office alarm reactivates when a new alarm occurs.

```
OPR-ACO-ALL:[<tid>]::[<ctag>];
```

This command has a default access level of USER.

Sample Command

```
OPR-ACO-ALL   TS1000;
```

Normal Response

```
   TP-SSU 03-10-24 11-26-47
M  TS1000 COMPLD
   "IMC,EQPT:NA,ACO,NSA,03-10-24 11-26-47:\"AUDIO ALARM IS
DEACTIVATED"
;
```

4.10 System Commands

This section describes the TL-1 commands you use to perform the following routine operations with the TimeProvider:

- Displaying events
- Displaying the current configuration
- Restarting the TimeProvider

4.10.1 Displaying Events

The RTRV-LOG command displays all the events in the event log in chronological order (first in - first out). The event log contains the 500 most recent alarmed and non-alarmed events. Alarms with an alarm level of NONE are not stored in the log.

```
RTRV-LOG:[<tid>]:[<aid>]:[<ctag>][::<keyword>=<value>];
```

This command has a default access level of USER.

<aid>	<keyword>	Description	Default value	<value>
ALL (or null) IMC IOC IOCm (m = 1 | 2) PRS INPp (p = 1 | 2) OUTg (g = A | B | C | D)		Access identifiers		
	All (or null)	Displays both events and alarms stored in the log for the specified aid	NA	NA
	EVT	Displays events stored in the log for the specified event	NA	NA
	ALM	Displays alarms stored in the log for the specified event	NA	NA

Sample Command

```
RTRV-LOG::INP1:TS1000::ALM;
```

This command causes the TimeProvider to return all alarms stored in the log for Input 1.

Normal Response

```
   TP-SSU 03-10-24 11-28-02
M 2 COMPLD
   "INP1,T1:MJ,ALM,NSA,03-10-24 11-26-47"
;
```

Normal Response Format

```
<cr><lf><lf>
^^^sid^date^time<cr><lf>
M^<ctag>^COMPLD
^^^"<aid>,<aidtype>:ntfcncde,condtype,srveff,ocrdat,ocrtim
<:condscr>"<cr><lf>*
;
```

where * indicates zero or more of the preceding element

4.10.2 Displaying the Configuration of the TimeProvider

Use the following TL-1 command to display the current equipment parameters. You can display the entire set of parameters, or only the parameters for the following components: COM, IMC, IOC, INP, and OUT.

```
RTRV-EQPT:[<tid>]:<aid>:[<ctag>]::<keyword>;
```

This command has a default access level of USER.

Response	Description
<aid>	The access identifier for the equipment component (COM, IMC, IOC, INP, or OUT)
<keyword>	The specific equipment parameter you requested
<value>	The current setting of the requested equipment parameter.

Sample Command

```
RTRV-EQPT::IOC1:TS1000::IOCMODE;
```

This command causes the TimeProvider to return the current operating mode for IOC1.

Normal Response

```
   TP-SSU 03-10-24 11-30-42
M  TS1000 COMPLD
   "IOC1:IOCMODE,ACTIVE"
;
```

Normal Response Format

```
<cr><lf><lf>
^^^sid^date^time<cr><lf>
M ^ctag^COMPLD<cr><lf>
^^^"<aid>:<keyword>,<value>"<cr><lf>
;
```

4.10.3 Restarting the TimeProvider

Use the INIT-SYS command to reset the specified module. This command clears all information stored in volatile memory.

Caution: This command causes the local oscillator in the specified IOC to enter the Warm-up mode; the outputs will be in the holdover mode until the local oscillator locks on to the input reference signal.

All SYS parameters are reset, including the entire user list. You must create a new security-level user after issuing this command with the SYS:FACTORY aid and keyword.

```
INIT-SYS:[<tid>]:<aid>:[<ctag>]::<keyword>;
```

This command has a default access level of ADMIN.

<aid>	<keyword>	Description	Default value	<value>
SYS	FACTORY	Resets the SID, security, communication ports, and alarm settings to factory defaults (see Appendix A, Factory Default Values)	n/a	n/a
IMC IOCm (m = 1 | 2)	RESET	Performs a soft reset on the card. Does not affect the SID, security, communication ports, and alarm settings	n/a	n/a

Sample Command

```
INIT-SYS::IOC1:::RESET;
```

Autonomous Message

```
   TP-SSU 03-10-24 11-31-52
A 1193 REPT EVT
   "IOC,EQPT:MN,RESET,NSA,03-10-24 11-30-42:\"MODULE HAS BEEN
RESET\""
;
```

4.11 Saving Provisioning Data

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

Electronically Backing up Provisioning Data

Copy the contents of the IOC into the IMC memory by issuing the CPY-MEM command as follows. See the *TimeProvider TL-1 Reference Guide* for more information on the CPY-MEM command.

```
CPY-MEM:::TS1000::IOC,IMC,IOC;
```

Copy the contents of the IMC into the IOC memory by issuing the CPY-MEM command as follows:

```
CPY-MEM:::TS1000::IMC,IOC,IMC;
```

This command may take more than two seconds to execute; if it does, then the In-Process response is issued.

If two IOCs are in the shelf, the Active IOC automatically saves its data in the Standby IOC.

Provisioning Worksheet

Use Table 4-2 to record the values you provisioned into the TimeProvider.

Table 4-2. Provisioning Record

Section	Parameter	User-Defined Value
Section 4.2.2, Setting the Source ID <sid>	Source ID (<sid>	
Section 4.3.1, Setting RS-232 Parameters	Baud rate	
	Flow mode	
	Echo mode	
Section 4.3.2, Setting Ethernet Parameters	IP Gate address	
	IP address	
	IP Subnet address	
	IP Host 1address	
	IP Host 2 address	
	IP Host 3 address	
	IP Host 4 address	
Section 4.6.1, Setting the System Mode	System mode	
Section 4.6.2, Setting the IOC Parameters	Oscillator type, IOC1	
	Oscillator type, IOC2	
Section 4.7.1, Setting the Input Selection Mode	Input mode, PRS	
	Input mode, INP1	
	Input mode, INP2	
Section 4.7.2, Setting the Input Frame Type and Frequency	Frequency, INP1	
	Frequency, INP2	
Section 4.7.3, Setting the Input Interface Type	Span type INP1	
	Span type, INP2	
Section 4.7.4, Setting the Input Frame Type	Frame type, INP1	
	Frame type, INP2	
Section 4.7.5, Controlling Automatic Reference Switching	Reference selection, PRS	
	Reference selection, INP1	
	Reference selection, INP2	

Table 4-2. Provisioning Record (Continued)

Section	Parameter	User-Defined Value
Section 4.7.6, Setting the Input Quality Level	QLEVEL, PRS	
	QLEVEL, INP1	
	QLEVEL, INP2	
Section 4.7.7, Setting the Input Priority Level	PRIORITY, PRS	
	PRIORITY, INP1	
	PRIORITY, INP2	
Section 4.7.8, Manually Selecting the Reference	INPREF	
Section 4.7.9, Provisioning the SSM	SSMBIT, INP1	
	SSMBIT, INP2	
Section 4.7.10, Enabling CRC4	CRCENA, INP1	
	CRCENA, INP2	
Section 4.8.1, Enabling and Disabling the Outputs	OUTSTATE, OUTA	
	OUTSTATE, OUTB	
	OUTSTATE, OUTC	
	OUTSTATE, OUTD	
Section 4.8.2, Provisioning the Output Framing Type	FRMTYPE, OUTA	
	FRMTYPE, OUTB	
	FRMTYPE, OUTC	
	FRMTYPE, OUTD	
Section 4.9.1, Provisioning the Alarm Levels	ELEVTIME	
Section 4.9.2, Provisioning System-Level Alarms	CLRDELAY	
	FLTDELAY	
	FREEFLT	
	HOLDFLT	

Chapter 5 Testing the TimeProvider

This chapter describes a basic acceptance test for the TimeProvider product.

In This Chapter

5.1 Testing the TimeProvider

Perform the tests described in this chapter after you install (see Chapter 3, Installing the TimeProvider) and provision (see Chapter 4, Provisioning the TimeProvider) the TimeProvider. Record the results in the Test Record in Section 5.6, Test Record. These tests verify the operation of the TimeProvider and are not mandatory for operating the unit.

5.1.1 Test Overview

This chapter describes four tests that verify the operation of the TimeProvider:

- Verify normal operation
- Test alarm conditions
- Test communication ports
- Perform output checks

5.1.2 Test Equipment

To perform the tests in this chapter, you need the following equipment:

- Volt-ohmmeter
- Oscilloscope
- Communications analyzer

5.2 Verifying Normal Operation

The LEDs on the IMC and the IOC(s) indicate the status of the TimeProvider. Table 5-1 shows the condition of the LED indicators on the front panel of the IOC under normal operating conditions.

Table 5-1. LED Conditions for the IOC

LED Name	Condition	Description
Power	Green	Power is On
Fail	Off	No failure
Alarm	Off	No alarm

Table 5-1. LED Conditions for the IOC (Continued)

LED Name	Condition	Description
Active	Green Off	Card is active Card is in standby mode
Holdover	Off	Tracking at least one input
PRS	Q LED Green, A LED Green Q LED Green, A LED Off Q LED Red, A LED Off	Enabled, qualified, and active Enabled, qualified, and not active Enabled and not qualified
Input 1	Q LED Green, A LED Green Q LED Green, A LED Off Q LED Red, A LED Off	Enabled, qualified, and active Enabled, qualified, and not active Enabled and not qualified
Input 2	Q LED Green, A LED Green Q LED Green, A LED Off Q LED Red, A LED Off	Enabled, qualified, and active Enabled, qualified, and not active Enabled and not qualified
GPS	Off	Future use

Table 5-2 shows the condition of the LED indicators on the front panel of the IMC under normal operating conditions

Table 5-2. LED Conditions for the IMC

LED Name	Condition	Description
Power	Green	Power is On
Fail	Off	No failure
Alarm	Off	No alarm
Critical	Off	No Critical alarms
Major	Off	No Major alarms
Minor	Off	No Minor alarms
ACO	Off	Alarm cutoff disabled

5.3 Testing Alarm Conditions

5.3.1 Testing the IOC Operating Modes

Warm-up Mode

The IOC enters and remains in the Warm-up mode for approximately 30 minutes after you apply power to the shelf, or when you install the IOC into the shelf. The following actions occur when an IOC enters the Warm-up mode:

- The Power LED on the IOC flashes green
- An event is generated and stored in the event log

To verify that an IOC is in warm-up mode:

1. Apply an appropriate signal to the INP1, INP2, and/or PRS inputs.
2. Visually inspect the Power LED on the appropriate IOC. The LED is flashing green in the Warm-up mode.
3. Type `RTRV-ALM::IOC1;` (or `RTRV-ALM::IOC2;`). The TimeProvider responds with a complied message indicating that the designated IOC is in alarm.

Locked Mode

The IOC enters and remains in the locked mode after it has completed the warm-up cycle. The following actions occur when an IOC enters the Locked mode:

- The Power LED on the IOC is green
- An event is generated and stored in the event log

To verify that an IOC is in locked mode:

1. Visually inspect the Power LED on the appropriate IOC. The LED is continually green when the IOC is tracking at least one input.
2. Type `RTRV-LOG::IOC1:::EVT;` (or `RTRV-LOG::IOC1:::EVT;`). The TimeProvider responds with a list of events related to the specified IOC. Look for the entry with the text “Clock entered lock mode.”

5.3.2 Testing the Reference Switching

To test the ability of the TimeProvider to switch references, you perform a two-step test:

- Connect appropriate reference inputs to the TimeProvider.
- Create a fault on the selected reference signal and observe that the TimeProvider changes to the appropriate secondary input.

To test the reference switching:

1. Connect a suitable reference input to the REF input and a second reference input to INP1. Wait for the Qualified LEDs for both inputs to turn green and for the Active LED to light on the PRS input.

2. Issue the `ED-EQPT::PRS:::INSTATE=DISABLE;` command to disable the PRS input and force the TimeProvider to switch to the INP1 reference.

3. Observe that the Active LED changes from the original input to the secondary input (REF to INP1 or INP1 to REF).

5.3.3 Testing the Non-Revertive Operating Mode

When the TimeProvider is in the non-revertive operating mode, the input reference signal does not revert to the original input after it recovers from an error condition.

The TimeProvider is in non-revertive mode when the QLEVEL parameter for INP1, INP2, and PRS inputs is set to the same value, and the PRIORITY parameters for the same inputs are set to the same level.

To test the non-revertive operating mode, perform the following steps:

1. Define the non-revertive mode by setting the QLEVEL and PRIORITY parameters to appropriate values. See Section 4.7.6, Setting the Input Quality Level, and Section 4.7.7, Setting the Input Priority Level, for further information.

2. Provision and connect appropriate reference inputs to the TimeProvider.

3. Create a fault on the selected reference signal and observe that the TimeProvider changes to the appropriate secondary input.

4. Remove the fault on the initial reference signal and observe that the TimeProvider does not revert to that initial reference input. The event log indicates that the reference signal is no longer in fault.

5.3.4 Testing the Revertive Operating Mode

When the TimeProvider is in the revertive operating mode, the input reference signal reverts to the original input after it recovers from an error condition.

The TimeProvider is in the revertive mode when the QLEVEL parameter for INP1, INP2, and PRS inputs are set to different values, and the PRIORITY parameters for the same inputs are also set to different values.

To test the revertive operating mode, perform the following steps:

1. Define the revertive mode by setting the QLEVEL and PRIORITY parameters to appropriate values. See Section 4.7.6, Setting the Input Quality Level, and Section 4.7.7, Setting the Input Priority Level, for further information.

2. Provision and connect appropriate reference inputs to the TimeProvider.

3. Create a fault on the selected reference signal and observe that the TimeProvider changes to the appropriate secondary input.

4. Remove the fault on the initial reference signal and observe that the TimeProvider reverts to the initial reference input. The event log and the LEDs indicate that the input is no longer in fault, and that the reference has changed.

5.3.5 Testing the Power Alarms

To test the ability of the TimeProvider to detect and report problems with the battery power, you perform a two-step test:

- Connect power to the TimeProvider on both Batt A and Batt B terminals
- Remove power from one terminal and observe that the TimeProvider issues the appropriate alarm

When power is lost from the Batt A or Batt B terminal, the factory default alarm is Major.

1. Connect the appropriate power supply to both the Batt A and Batt B connectors. The TimeProvider enters the Warm-up mode.

2. Remove power from either the Batt A or Batt B terminal. Observe that the Major LED on the IMC is red. Verify that a Major alarm is included in the event log.

5.3.6 Detecting Input Errors

You can provision the TimeProvider to perform a variety of functions when an input error occurs. Possible errors include:

- AIS - Alarm Indication Signal
- LOS - Loss of Signal
- OOF - Out of Frame
- Loss of Alignment
- Excessive wander
- Input is disqualified

The TimeProvider reports these and other errors on the front panel alarm LEDs, in an autonomous event message, and via devices connected to the alarm relays. You can provision each error to a specific alarm level (Minor, Major, or Critical).

Setting an Alarm Strategy

You can set up the input alarms to prevent spurious input errors from triggering an alarm. The FLTDELAY keyword parameter sets a period from 1 to 15 seconds that an input error must be present before the alarm is issued. You can provision the alarm to clear from 1 to 1000 seconds after the input error clears using the FREEFLT keyword parameter. Use the ED-SYNC command syntax described in Section 4.9.2, Provisioning System-Level Alarms to provision the FLTDELAY and CLRDELAY keywords.

5.4 Testing the Communication Ports

The TimeProvider has three communication ports. This section describes how to test each port; if you do not plan to use a port, then you can skip the corresponding test.

- Local Craft serial port
- Remote serial port
- Ethernet port

5.4.1 Testing the Local Craft Serial Port

The local Craft serial port is on the faceplate of the IMC, and is configured as a DCE device. The default settings for the local Craft serial port are 9600 Baud, 8 bits, no parity, 1 stop bit, echo on, ICS mode and handshaking disabled.

To connect a device to the local Craft port, perform the following steps:

1. Connect a straight-through serial cable to the local Craft port. Connect the other end of the cable to a computer.

2. Start a terminal emulation program such as HyperTerminal or ProComm Plus. Configure the program for 9600 baud, 8 data bits, No parity, and 1 stop bit.

3. Type ; (semicolon). If the TimeProvider responds with a Deny response, you have established communications. If you do not receive the Deny response, check the connections, the cable, and the program settings.

5.4.2 Testing the Remote Serial Port

The Remote port is for remote dial-in connection to the unit, and is configured as a DTE device. The default settings for the Remote serial port are 9600 Baud, 8 bits, no parity, 1 stop bit, echo on, ICS mode and handshaking disabled.

To connect a device to the Remote port, perform the following steps:

1. Connect a straight-through serial cable to the Remote port. Connect the other end of the cable to a computer.

2. Start a terminal emulation program such as HyperTerminal or ProComm Plus. Configure the program for 9600 baud, 8 data bits, No parity, and 1 stop bit.

3. Type ; (semicolon). If the TimeProvider responds with a Deny response, you have established communications. If you do not receive the Deny response, check the connections, the cable, and the program settings.

5.4.3 Testing the Ethernet Port

You use a direct connection when a service technician is on-site. You must configure the Ethernet settings using a serial connection before using the Ethernet connection; the procedure is described in Section 4.3.2, Setting Ethernet Parameters.

To connect the TimeProvider to a PC or terminal using Ethernet, perform the following steps:

1. Connect an RJ-45 Ethernet cable to the LAN connector on the shelf.

2. Connect the other end of the cable to the PC or terminal.

3. Start a terminal emulation program such as HyperTerminal or ProComm Plus. Configure the program for a telnet session and enter the IP address of the TimeProvider.

4. Type ; (semicolon). If the TimeProvider responds with a Deny response, you have established communications. If you do not receive the Deny response, check the connections, the cable, and the program settings.

5.5 Testing the Outputs

The TimeProvider supports up to 32 output signals on four output groups. You can provision the output signal to the following types: 2M, CAS, D4, ESF, CC, or ISOLATED_1.

To test the outputs, connect the communications analyzer to the output under test and observe that the waveforms meet or exceed the specifications for that signal type.

5.6 Test Record

Use to record the results of the tests performed on the TimeProvider.

Table 5-3. Record of Test Results

Test	Results (Pass/Fail)	Date	Initials
Verifying Normal Operation			
IOC Operating Modes			
Reference Switching			
Non-Revertive Mode			
Revertive Mode			
Power Alarms			
Input Errors			
Local Serial Port			
Remote Serial Port			
Ethernet Port			
Outputs			

Chapter 6 Maintaining and Troubleshooting the TimeProvider

This chapter describes maintenance and troubleshooting procedures for the TimeProvider.

In This Chapter

6.1 Preventive Maintenance

The TimeProvider shelf requires minimal preventive maintenance. Take care to ensure the unit is not exposed to hazards such as direct sunlight, open windows, water, or extreme heat. See Environmental Requirements in Section 3.1.1, Pre-Installation Check, for electromagnetic compatibility conditions that may cause damage.

Caution: To avoid electromagnetic discharge damage to the circuitry, never attempt to vacuum the TimeProvider main shelf or expansion shelf.

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

6.2 Safety Considerations

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

6.3 ESD Considerations

Maintenance personnel should wear ESD wrist straps when installing or working on all TimeProvider equipment and cards. Plug the user-supplied wrist strap into the TimeProvider shelf.

Place IMC and IOC cards as well as the Input and Output panels into static-free bags when not in use.

6.4 Diagnosing the IOC

6.4.1 Reading LED Conditions

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

Table 6-2. LED Conditions for the IOC

LED Name	Condition	Description
Power	Green Off Flashing Green	Power is On Power is Off Warming Up
Fail	Red Off	Card failure No failure
Alarm	Green Off	Card alarm No alarm
Active	Green Off	Card is active Card is in standby mode
Holdover	Off Red	Tracking at least one input Tracking no inputs
PRS	Q LED Off, A LED Off Q LED Green, A LED Green Q LED Green, A LED Off Q LED Red, A LED Off	Disabled Enabled, qualified, and active Enabled, qualified, and not active Enabled and not qualified
Input 1	Q LED Off, A LED Off Q LED Green, A LED Green Q LED Green, A LED Off Q LED Red, A LED Off	Disabled Enabled, qualified, and active Enabled, qualified, and not active Enabled and not qualified

Table 6-2. LED Conditions for the IOC (Continued)

LED Name	Condition	Description
Input 2	Q LED Off, A LED Off Q LED Green, A LED Green Q LED Green, A LED Off Q LED Red, A LED Off	Disabled Enabled, qualified, and active Enabled, qualified, and not active Enabled and not qualified
GPS	Reserved for future use	Reserved for future use

6.4.2 Interpreting Error Messages

Error messages appear on the console as they occur, and include the time and date of occurrence. Refer to the event codes described in Table 6-4 and to the alarm codes described in Table 6-6.

6.4.3 Removing the IOC

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

Removing the Only IOC

To remove the only IOC in a shelf, use the following procedure. Output signals will be interrupted; they will resume once the IOC has achieved lock on an input signal.

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

```
CPY-MEM:::::IOC,IMC,IOC;
```

   This command may take more than two seconds to execute; if it does, then the In-Process response is issued. See the *TimeProvider TL-1 Reference Guide* for more information on the CPY-MEM command.

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

```
ED-EQPT::IOCm:::IOCSTATE:OOSRV;
```

   where m is 1 or 2, and depends on the IOC you are taking out of service.

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

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

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

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

6. Install a new IOC using the appropriate procedure in Section 6.4.4, Replacing the IOC.

Removing a Redundant IOC

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

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

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

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

```
ED-EQPT::IOCm:::IOCSTATE:OOSRV;
```

   where m is 1 or 2, and depends on the slot in which the IOC is installed (1 is the left slot and 2 is the right slot).

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

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

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

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

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

5. Install a new IOC using the appropriate procedure in Section 6.4.4, Replacing the IOC.

Removing Two IOCs

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

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

```
CPY-MEM:::::IOC,IMC,IOC;
```

   This command may take more than two seconds to execute; if it does, then the In-Process response is issued. See the *TimeProvider TL-1 Reference Guide* for more information on the CPY-MEM command.

2. Issue the following TL-1 command to take the Standby IOC out of service:

```
ED-EQPT::IOCm:::IOCSTATE:OOSRV;
```

   where m is 1 or 2, corresponding to the location of the Standby IOC (1 is the left slot and 2 is the right slot).

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

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

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

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

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

6. Repeat Steps 2, 3, and 4 for the Active IOC.

7. Install new IOCs using the appropriate procedure in Section 6.4.4, Replacing the IOC.

6.4.4 Replacing the IOC

This section contains procedures for replacing IOC in three circumstances;

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

Replacing the Only IOC

To replace the only IOC in a shelf, use the following procedure. Output signals will resume once the IOC has achieved lock on an input signal. This procedure assumes that you have stored the contents of the IOC memory in the IMC using the CPY-MEM command.

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

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

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

```
CPY-MEM:::::IMC,IOC,IOC;
```

   This command may take more than two seconds to execute; if it does, then the In-Process response is issued. See the *TimeProvider TL-1 Reference Guide* for more information on the CPY-MEM command.

   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 4, Provisioning the TimeProvider.

4. Wait for the IOC to reboot and qualify the reference inputs.

5. Issue the following TL-1 command to place the IOC back in service:

```
ED-EQPT::IOCm:::IOCSTATE,INSRV;
```

   where m is 1 or 2, corresponding to the left or right slot in the shelf.

Replacing a Redundant IOC

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

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

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

3. Issue the following TL-1 command to place the IOC in service:

```
ED-EQPT::IOCm:::IOCSTATE=INSRV;
```

   where m is 1 or 2, corresponding to the left or right slot in the shelf.

Replacing Both IOCs

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

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

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

3. Wait for the IOC to reboot.

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

```
CPY-MEM:::::IMC,IOC,IOC;
```

   This command may take more than two seconds to execute; if it does, then the In-Process response is issued. See the *TimeProvider TL-1 Reference Guide* for more information on the CPY-MEM command.

   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 4, Provisioning the TimeProvider.

5. Issue the following TL-1 command to place the IOC in service:

```
ED-EQPT::IOC1:::IOCSTATE=INSRV;
```

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

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

8. Issue the following TL-1 command to place the Standby IOC in service:

```
ED-EQPT::IOC2:::IOCSTATE=INSRV;
```

6.5 Diagnosing the IMC

6.5.1 Reading LED Conditions

Table 6-2 shows the function of the LED indicators on the front panel of the IMC.

Table 6-3. LED Conditions for the IMC

LED Name	Condition	Description
Power	Green Off	Power is On Power is Off
Fail	Red Off	Card failure No failure
Alarm	Red Off	Card alarm No alarm
Critical	Red Off	Critical system alarm No alarm
Major	Red Off	Major system alarm No alarm
Minor	Yellow Off	Minor system alarm No alarm
Alarm Cutoff (ACO)	Green Off	On Off

6.5.2 Interpreting Error Messages

Error messages appear on the console as they occur, and include the time and date of occurrence. Refer to the event codes described in Table 6-4 and to the alarm codes described in Table 6-6.

6.5.3 Replacing the IMC

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

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

```
CPY-MEM:::::IMC,IOC,IMC;
```

This command may take more than two seconds to execute; if it does, then the In-Process response is issued. See the *TimeProvider TL-1 Reference Guide* for more information on the CPY-MEM command.

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

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

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

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

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

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

```
CPY-MEM:::::IOC,IMC,IMC;
```

6.6 Replacing Output Modules

The TimeProvider supports up to four Output modules on the shelf, and up to four additional Output modules on the Expansion Panel. A variety of Output modules is available to support different wiring schemes (see Section 3.5.5, Making Output Connections, for a description of the available Output modules).

To remove an Output module:

1. Disable the outputs on the Output module by issuing the command:

```
ED-EQPT::OUTg:::OUTSTATE=DISABLE;
```

where g is the output group you are disabling (A, B, C, or D)

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

3. Remove the output connections.

4. Remove the Output module by loosening the captive screws and pulling the module off the shelf.

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

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

To install an Output module:

1. Install the Output module on the connector on the shelf and tighten the captive screws.

2. Install the output signal connections to the Output module. After you install the connections, you can remove the protective ground strap from your wrist.

3. Enable the outputs on the Output module by issuing the command:

```
ED-EQPT::OUTg:::OUTSTATE=ENABLE;
```

where g is the output group you are enabling (A, B, C, or D)

6.7 Replacing the Input Module

The Input module contains connectors for the input signals and the alarm output connector.

To remove the Input module:

1. Disable the inputs by issuing the following commands, as appropriate:

```
ED-EQPT::PRS:::INSTATE=DISABLE;
```

```
ED-EQPT::INPp:::INSTATE=DISABLE;
```

where p is 1 to disable INP1 or 2 to disable INP2

2. Wait for the TimeProvider to enter the Holdover state before proceeding.

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

4. Remove the input connections.

5. Remove the alarm connections.

6. Remove the Input module by loosening the captive screws and pulling the module off the shelf.

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

To install the Input module:

1. Install the Input module on the connector on the shelf and tighten the captive screws.

2. Install the input signal connections.

3. Install the alarm connections. After you install the connections, you can remove the protective ground strap from your wrist.

4. Enable the inputs by issuing the following commands as appropriate:

```
ED-EQPT::PRS:::INSTATE=ENABLE;
```

```
ED-EQPT::INPp:::INSTATE=ENABLE;
```

where p is 1 to enable INP1 or 2 to enable INP2

6.8 Troubleshooting

6.8.1 Using Events to Troubleshoot

You can provision most events to generate an alarm; alarm levels include Critical (CR), Major (MJ), Minor (MN), Event, (NA), and Not Reported (NR).Table 6-4 lists the event ID and the description of events for the IMC, IOC, and IOC Input.

Table 6-4. Event Codes

Event ID	Keyword Description	AIDTYPE	Default Value/ Keyword	Description of Values
IMC Event Codes				
ACCLVL	The user's system access level has changed in the database	EQPT	SECURITY (when no users have been assigned to the system)	NONE – User has no access USER – User can access User-level commands ADMIN – User can access Admin-level commands SECURITY – User can access all commands
ACO	Audio alarm has been deactivated	EQPT	N/A	N/A
ALMCHG	The IMC alarm parameters have changed	EQPT	N/A	Alarm keywords and values are listed in Table 6-6. When the user changes a value, the ALMCHG event is generated and contains the keyword and value
AOMERGE	Enable/Disable autonomous event generation for the current session	EQPT	ENABLE	ENABLE – Autonomous messages are displayed in the current session DISABLE – Autonomous messages are not displayed in the current session
BAUD	The IMC serial port baud rate has changed	EQPT	9600	2400 | 9600 | 19200 | 28800 | 38400 | 57600
CMDCHG	The command access level has changed	EQPT	ACCLVL-USER	NONE | USER | ADMIN | SECURITY

Table 6-4. Event Codes (Continued)

Event ID	Keyword Description	AIDTYPE	Default Value/ Keyword	Description of Values
ECHO	The current sessions' echo setting has changed	EQPT	DISABLE	ENABLE – User's keystrokes are echoed DISABLE – User's keystrokes are not echoed
FLOW	The IMC serial port flow control has changed	EQPT	NONE	NONE – No flow control SW – Software flow control XON/XOFF HW – Hardware flow control CTS/RTS SWHW – Both hardware and software flow control used
FWFAIL	Firmware upgrade of IMC or IOC was not successful	EQPT	NA	NA
FWOK	Firmware upgrade of IMC or IOC was successful	EQPT	NA	NA
INACTTIME	The communication inactivity timeout has been set. If no activity within the specified time, the session closes	EQPT	0	0 – Disable timeout 100 to 10000 seconds
INITLOG	The event log has been initialized	EQPT	NA	NA
IPADDR	The IMC Ethernet address has been changed	EQPT	127.0.0.1	1.0.0.1 to 254.255.255.254
IPGATE	The IMC Ethernet gateway address has been changed	EQPT	127.0.0.1	1.0.0.1 to 254.255.255.254
IPSUB	The IMC Ethernet subnet mask has been changed	EQPT	255.255.255.0	NA
ISDIFF	Indicates that the CRC of two Istate images stored on separate modules are different	EQPT	NA	NA

Table 6-4. Event Codes (Continued)

Event ID	Keyword Description	AIDTYPE	Default Value/ Keyword	Description of Values
ISEQ	Indicates that the CRC of two Istate images stored on separate modules are equal	EQPT	NA	NA
LOGECHO	The system echoes the login or logout events	EQPT	ENABLE	ENABLE – The login/logout events are echoed DISABLE – The login/logout events are not echoed
LOGIN	A user has logged in to the system	EQPT	NA	NA
LOGOUT	A user has logged out of the system	EQPT	NA	NA
PIDCHG	A user's password has changed in the database	EQPT	pid	User Password – up to 20 alphanumeric characters
RESET	The IMC has been reset by user command	EQPT	NA	NA
SIDCHG	The source ID has changed in the database	EQPT	NA	20-character name used to identify the network element
UIDCHG	A user's name has changed in the database	EQPT	uid	User Identification – up to 20 characters
USRADD	A user has been added to the database	EQPT	uid pid uap	uid – assigned user name pid – assigned user password uap – assigned user access level
USRDEL	A user has been deleted from the database	EQPT	uid	uid – username
XFERFAIL	Transfer of the IMC Istate to the IOC, transfer of the IOC Istate to the IMC, or transfer of the IOC Istate to the redundant IOC was not successful	EQPT	NA	NA

Table 6-4. Event Codes (Continued)

Event ID	Keyword Description	AIDTYPE	Default Value/ Keyword	Description of Values
XFEROK	Transfer of the IMC Istate to the IOC, transfer of the IOC Istate to the IMC, or transfer of the IOC Istate to the redundant IOC was successful	EQPT	NA	NA
IOC Event Codes				
CLKTYPE	The specified IOC clock has been set to the specified value. This value is used to define the IOCs pull-in range and SSM generation in Holdover mode	EQPT	TYPEI	ST3E | TYPEI
INPREF	The specified input has been set as the system reference	EQPT	PRS	PRS | INP1 | INP2
IOCMODE	The specified IOC has become Active	EQPT	ACTIVE	ACTIVE | STANDBY
IOCSTATE	The specified IOC has been inserted into the system. The IOC is automatically placed In-Service	EQPT	INSRV	INSRV – In service
	The specified IOC has been taken out of service. The IOC can no longer generate alarms, be provisioned, or accept queries			OOSRV – Out of service
	Communication between the IMC and IOC has failed			COMMFLT – Communications fault
	The specified IOC has been removed from the system			UNEQUIPPED

Table 6-4. Event Codes (Continued)

Event ID	Keyword Description	AIDTYPE	Default Value/ Keyword	Description of Values
RESET	The indicated IOC is being restarted after a user-requested reset. All alarms are cleared, if it was Active, it becomes Standby	EQPT	NA	NA
SYSMODE	The system mode of operation has been changed	EQPT	SSU	SSU – Sync Supply Unit mode SUB – Subtending mode PRR – Primary Reference Receiver mode
IOC Clock Events				
CLKFSTLK	The local oscillator in the specified IOC is in Fast-Lock mode	EQPT	NA	NA
CLKLOCK	The local oscillator in the specified IOC is in Lock mode	EQPT	NA	NA
SCAVAIL	The specified IOC is in SmartClock mode	EQPT	OFF	OFF – SmartClock is not available ON – SmartClock is available
IOC Input Events				
CRCENA	Indicates whether the E1 (CAS) inputs are using CRC4 checking. If the E1 input is provisioned to read SSMs, then this value is Enabled	T1	DISABLE	ENABLE | DISABLE
FRMTYPE	Indicates the type of input framing or the input frequency. Sets the output framing type	T1	Output = 2M	2M – 2048 kHz CCS – CCS Input ESF – Extended SuperFrame input CC – Composite Clock input ISOLATED_1 – Generates an isolated one test pattern for T1 outputs

Table 6-4. Event Codes (Continued)

Event ID	Keyword Description	AIDTYPE	Default Value/ Keyword	Description of Values
OUTSTATE	The specified output state has changed	T1	DISABLE	ENABLE – The output generates the defined signal type DISABLE – Disables the output and clears all active alarms associated with the input
RQLEVEL	The received quality level on the specified input has changed	T1	NA	Displays the prior quality level followed by the new quality level
SYS Events				
CLRDELAY	Time, in seconds, before a faulted signal indicates it is valid as a system reference	EQPT	5 s	0 to 1000 s
ELEVTIME	Indicates that Alarm elevation time (1440 min.) is enabled or disabled	EQPT	DISABLE	ENABLE | DISABLE
FACTORY	Indicates that the unit has been reset to Factory default. All modules installed in the system are reset	EQPT	NA	NA
FLTDELAY	Time, in seconds, before faulted signal indicates it is not valid as a system reference	EQPT	10 s	1 to 15 s
FREEFLT	Indicates if the Output Fault is issued when the local oscillator enters Free-Run mode.	EQPT	SQUELCH	ON – In fault mode, generate outputs based on system SSM AIS – In fault mode, generate AIS outputs SQUELCH – In fault mode, outputs are turned off
HOLDFLT	Indicates if the Output Fault is issued when the local oscillator enters Holdover mode	EQPT	ON	ON – In fault mode, generate outputs based on system SSM AIS – In fault mode, generate AIS outputs SQUELCH – In fault mode, outputs are turned off

Table 6-4. Event Codes (Continued)

Event ID	Keyword Description	AIDTYPE	Default Value/ Keyword	Description of Values
INPREF	Indicates if the system automatically selects another reference input. Operator has enabled the selected reference input (REFMODE must be set to FORCED)	T1	PRS	PRS – PRS input is selected as reference INP1 – INP1 is selected as reference INP2 – INP2 is selected as reference
LOCTIM	The local system time offset has changed	EQPT	(00)-00	(hh) – hours offset ±12 mm – minutes offset 00 to 59
REFMODE	Indicates if the system reference can be selected automatically or by the user	EQPT	AUTO	AUTO – System uses QLEVEL and Priority to select the system reference FORCED – User selects the system reference. If the selected reference fails, this value reverts to AUTO mode
TIMCHG	The system time has been changed	EQPT	hh-mm-ss	hh – hours (24-hour clock) mm – minutes ss – seconds

Table 6-5 describes the alarm codes and their set and clear conditions.

Table 6-5. Set and Clear Conditions for Alarms

Alarm ID	Set Alarm Conditional Description	Clear Alarm Conditional Description
SYS Codes		
EXPFAIL	Expansion connectivity failed	Expansion connectivity restored
PWRA	Power A Failed	Power A Restored
PWRB	Power B Failed	Power B Restored
EXTALM	External Alarm set	External Alarm cleared
IMC Codes		
IOC1COMM	IMC to IOC1 communication failed	IMC to IOC1 communication established
IOC2COMM	IMC to IOC2 communication failed	IMC to IOC2 communication established

Table 6-5. Set and Clear Conditions for Alarms

Alarm ID	Set Alarm Conditional Description	Clear Alarm Conditional Description
IOC Codes		
IMC1COMM	IOC1 to IMC communication failed	IOC1 to IMC communication established
IMC2COMM	IOC2 to IMC communication failed	IOC2 to IMC communication established
IOC1TO2COMM	IOC1 to IOC2 communication failed	IOC1 to IOC2 communication established
IOC2TO1COMM	IOC2 to IOC1 communication failed	IOC2 to IOC1 communication established
IOCFAIL	IOC hardware failure	IOC hardware restored
CLKWARM	Clock entered Warm-up mode	Clock exited Warm-up mode
CLKFREE	Clock entered Free-run mode	Clock exited Free-run mode
CLKBRDG	Clock entered Bridging mode	Clock exited Bridging mode
CLKHOLD	Clock entered Holdover mode	Clock exited Holdover mode
SYNTHEOR	Output generator exceeded pull-in range	Output generator within pull-in range
PRS and INP[p] Codes		
INPDISQ	Input disqualified as possible reference	Input qualified as possible reference
INPAIS	AIS fault	AIS fault cleared
INPLOS	LOS fault	LOS fault cleared
INPOOF	OOF fault	OOF fault cleared
INPFRQ	Frequency threshold exceeded	Frequency threshold exceeded
INPPHASE	Phase error exceeded threshold	Phase error within threshold
INPQL	Quality Level (SSM) exceeded threshold	Quality Level (SSM) within threshold
EXDSC	Excessive discontinuity fault	Excessive discontinuity cleared
OUT[g] Codes		
OUTFAIL	Output fault	Output fault cleared
SYNTHEOR	Output generator exceeds pull-in range	Output generator within pull-in range
SYNTHFAIL	Output generator failed	Output generator restored

6.8.2 Using Alarm Codes to Troubleshoot

Table 6-6 lists the alarm codes generated by the TimeProvider. Unless specified, each alarm has a default Error Delay of Immediate, and you cannot edit the Error Delay.

Table 6-6. Alarm Codes

Event ID	Description	AID TYPE	Service Affecting	SSU Mode Alarm Level	SUB Mode Alarm Level
AID = SYS					
EXTALM	External alarm - monitors alarms generated by external equipment	EQPT	NSA	MN	MN
EXPFAIL	Connection to the Expansion Panel is lost	EQPT	SA	MJ	MJ
PWRA	Loss of power on PWRA	EQPT	NSA	MJ	MJ
PWRB	Loss of power on PWRB	EQPT	NSA	MJ	MJ
AID = IMC					
IOC1 COMM	Communication alarm with IOC1	EQPT	NSA	MN	MN
IOC2 COMM	Communication alarm with IOC2	EQPT	NSA	MN	MN
AID = IOC1					
IMC1 COMM	Communication alarm with IMC and IOC1	EQPT	NSA	MN	MN
IOC1TO2 COMM	Communication alarm from IOC1 to IOC2	EQPT	NSA	MN	MN
IOCFAIL	Summary alarm for IOC hardware failures not specified in other alarms	EQPT	SA	MJ	MJ
CLKBRDG	Local oscillator in the specified IOC is in Bridging mode	EQPT	NSA	NA	MJ
CLKHOLD	Local oscillator in the specified IOC is in Holdover mode	EQPT	SA	MJ	MJ
CLKFREE	Local oscillator in the specified IOC is in the Free-run mode	EQPT	SA	MJ	MJ
CLKWARM	Local oscillator in the specified IOC is in the Warm-up mode	EQPT	SA	MN	MN
SYNTH EOR	Synthesizer generating the output frequency has reached a defined End-of-Range for the oscillator	EQPT	SA	MJ	MJ
SYNTH FAIL	Synthesizer generating the output frequency has failed	EQPT	SA	MJ	MJ

Table 6-6. Alarm Codes (Continued)

Event ID	Description	AID TYPE	Service Affecting	SSU Mode Alarm Level	SUB Mode Alarm Level
OUTFAIL	Specified output group is failed. Fault strategy is SQUELCH	T1	SA	MJ	MJ
AID = IOC2					
IMC2 COMM	Communication alarm with IMC and IOC2	EQPT	NSA	MN	MN
IOC2TO1 COMM	Communication alarm from IOC2 to IOC1	EQPT	NSA	MN	MN
IOCFAIL	Summary alarm for IOC hardware failures not specified in other alarms	EQPT	SA	MJ	MJ
CLKBRDG	Local oscillator in the specified IOC is in Bridging mode	EQPT	NSA	NA	MJ
CLKHOLD	Local oscillator in the specified IOC is in Holdover mode	EQPT	SA	MJ	MJ
CLKFREE	Local oscillator in the specified IOC is in the Free-run mode	EQPT	SA	MJ	MJ
CLKWARM	Local oscillator in the specified IOC is in the Warm-up mode	EQPT	SA	MN	MN
SYNTH EOR	Synthesizer generating the output frequency has reached a defined End-of-Range for the oscillator	EQPT	SA	MJ	MJ
SYNTH FAIL	Synthesizer generating the output frequency has failed	EQPT	SA	MJ	MJ
OUTFAIL	Specified output group is failed. Fault strategy is SQUELCH	T1	SA	MJ	MJ
AID = PRS					
INPDISQ[1]	Specified input is Disqualified as a possible system reference. The fault condition must be present for the entire Fault Delay Time (FLT-DELAY) before disqualifying the input as a possible reference. The alarm clears when the input signal is fault-free for the Clear Delay Time (CLRDELAY)	T1	NSA	MN	MN
INPLOS	Specified input port has a LOS. When detected, the input is immediately removed as a possible reference. The LOS must be present for the entire Fault Delay Time (FLT-DELAY) before disqualifying the input as a possible reference. The alarm clears when the input signal is fault-free for the Clear Delay Time (CLRDELAY)	T1	NSA	MN	MN

Table 6-6. Alarm Codes (Continued)

Event ID	Description	AID TYPE	Service Affecting	SSU Mode Alarm Level	SUB Mode Alarm Level
INPFRQ	Specified input port's calculated received frequency exceeds the pull-in range of the local oscillator. This alarm disqualifies an input as a system reference. The alarm clears when the input frequency is within the pull-in range limits	T1	NSA	MN	MN
INPPHASE	Specified input port has an excessive phase measurement that disqualifies it	T1	NSA	MN	MN
EXDSC	Specified input port has excessive discontinuities, indicated by more than three signal faults of the same time within five minutes. The alarm clears when there are less than three faults in a five-minute period	T1	NSA	MN	MN
AID = INP1 or INP2					
INPDISQ[1]	Specified input is Disqualified as a possible system reference. The fault condition must be present for the entire Fault Delay Time (FLTDELAY) before disqualifying the input as a possible reference. The alarm clears when the input signal is fault- free for the Clear Delay Time (CLRDELAY)	T1	NSA	MN	MN
INPAIS	Specified input port has an AIS. When detected, the input is immediately removed as a possible reference. The AIS must be present for the entire Fault Delay Time (FLTDELAY) before disqualifying the input as a possible reference. The alarm clears when the input signal is fault-free for the Clear Delay Time (CLRDEAY)	T1	NSA	MN	MN
INPLOS	Specified input port has a LOS. When detected, the input is immediately removed as a possible reference. The LOS must be present for the entire Fault Delay Time (FLTDELAY) before disqualifying the input as a possible reference. The alarm clears when the input signal is fault-free for the Clear Delay Time (CLRDELAY)	T1	NSA	MN	MN
INPOOF	Specified input port has an OOF. When detected, the input is immediately removed as a possible reference. The OOF must be present for the entire Fault Delay Time (FLTDELAY) before disqualifying the input as a possible reference. The alarm clears when the input signal is fault-free for the Clear Delay Time (CLRDELAY)	T1	NSA	MN	NR

Table 6-6. Alarm Codes (Continued)

Event ID	Description	AID TYPE	Service Affecting	SSU Mode Alarm Level	SUB Mode Alarm Level
INPFRQ	Specified input port's calculated received frequency exceeds the pull-in range of the local oscillator. This alarm disqualifies an input as a system reference. The alarm clears when the input frequency is within the pull-in range limits	T1	NSA	MN	MN
INPPHASE	Specified input port has an excessive phase measurement that disqualifies it	T1	NSA	MN	MN
INPQL	The received SSM on the specified input is of lesser quality than the local oscillator's QLEVEL.	T1	NSA	MN	MN
EXDSC	Specified input port has excessive discontinuities, indicated by more than three signal faults of the same time within five minutes. Alarm clears when there are less than three faults in a five- minute period	T1	NSA	MN	MN

NOTE:

1 Error Delay is set in the FLTDELAY parameter

Table 6-7 describes the conditions that generate the associated event.

Table 6-7. Conditions Causing an Event

Event ID	Condition
ACCLVL	User Access Level has changed
ACO	Audio alarm is deactivated
IMC Codes	
ALMCHG	Alarm parameter has changed <keyword>,<alarm>
AOMERGE	Autonomous event reporting has changed <state>
BAUD	Serial port baud rate has changed <value>
CMDCHG	Command access level has changed <command>
ECHO	Serial port echo mode has changed <state>
FLOW	Serial port flow control has changed <state>
FWFAIL	Firmware upgrade unsuccessful
FWOK	Firmware upgrade successful
INACTTIME	Communications timeout has changed <value>
INITLOG	Event log has been cleared
IPADDR	IP address has changed <value>
IPGATE	Gateway IP address has changed <value>
IPSUB	Subnet mask IP address has changed <value>
ISDIFF	Configuration images are different
ISEQ	Configuration images are the same
LOGECHO	Login event has changed <state>
LOGIN	User logged in <username>
LOGOUT	User logged out <username>
PIDCHG	User password has changed
RESET	Module has been reset
SIDCHG	Source ID has been changed <value>
USRADD	User has been added
USRDEL	User has been deleted
XFERFAIL	Configuration transfer failed <fromdev> <todev>
XFEROK	Configuration transfer successful <fromdev> <todev>

Table 6-7. Conditions Causing an Event (Continued)

Event ID	Condition
IOC Codes	
CLKTYPE	Clock type has changed <state>
IOCMODE	IOC mode is <mode>
IOCSTATE	IOC state has changed <state>
RESET	Module has been reset
SYSMODE	System mode of operation has changed <state>
IOC Clock Events	
CLKFSTLK	Clock entered Fast-lock mode
CLKLOCK	Clock entered Lock mode
SCAVAIL	SmartClock algorithm <value>
IOC Input Events	
CRCENA	Input CRC has changed <value>
FRMTYPE	Input framing type has changed <value>
INSTATE	Input state has changed <value>
PMCLR	Performance data has been cleared
PRIORITY	Priority has changed <value>
QLEVEL	Quality Level has changed <value>
SPANTYPE	Input Span Type has changed <value>
SSMBIT	E1 SSM bit has changed <bit position>
SSENA	Input reading of SSM has changed <value>
IOC Output Events	
FRMTYPE	Output framing type has changed <value>
OUTSTATE	Output group state has changed <value>
OUTMODE	Output fault mode has changed <value>
SYS Events	
CLRDELAY	Input clear delay has changed <value>
DATCHG	System date has changed <date>
ELEVTIME	Alarm elevation time has changed <state>
FACTORY	Provisioned to factory defaults
FLTDELAY	Input fault delay has changed <value>

Table 6-7. Conditions Causing an Event (Continued)

Event ID	Condition
FREEFLT	Free-run output fault strategy has changed <value>
HOLDFLT	Holdover output fault strategy has changed <state>
INPREF	System reference input has changed <value>
LOCTIM	System's local time offset has changed <time offset>
LOGECHO	Record login event <value>
REFMODE	System reference mode has changed <mode>
TIMCHG	System time has changed <time>

6.9 Repairing the TimeProvider

Refer to Section 3.8, Working With Cards, for information on how to properly handle cards and modules to prevent electrostatic or physical damage.

To remove an IOC, loosen the captive screws and lift the removal tabs on each side of the card, then slide the module out of the shelf. To remove the IMC, loosen the captive screws and pull the module out of the shelf using the captive screws. Place the module on an anti-static surface or in an anti-static bag.

To remove an Input or Output module, loosen the captive screws and then pull the module using the captive screw. 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.

6.10 Obtaining Technical Assistance

If you have technical questions about the TimeProvider, call Symmetricom Global Services (SGS) at 888-367-7966 (toll-free in USA only), 408-428-7907, or +44 (0) 1189 699 799 in Europe, Middle East, or Africa.

6.11 Upgrading the Firmware

You can upgrade the firmware in the IMC or IOC using TL-1 commands and software available from Symmetricom. Only users with Admin- or Security-level access can execute the command. The command places the management module in the firmware download mode and terminates all sessions except the session performing the upgrade. During the upgrade process, no new sessions are allowed.

After you issue the command, you have 60 seconds to begin transferring the upgrade file using the Ymodem transfer protocol.

The system downloads the firmware using the Ymodem protocol; once the download is complete, the processor in the IMC is reset.

Use the following TL-1 command to download the firmware.

```
ACT-SWDL:[<tid>]:<aid>:[<ctag>];
```

This command always has a security level of SECURITY.

<aid>	Description
IMC	Downloads a new firmware image to the IMC. If the IMC or IOC provisioning has changed in the newly upgraded firmware, you may need to issue the CPY-MEM command from an in-service IOC to the IMC before the IMC is fully functional. See the *TimeProvider TL-1 Reference Guide* for more details.
IOC	Downloads a new firmware image to the IOC. Symmetricom recommends that redundant IOCs use the same firmware revision. The Active IOC enters Standby mode, putting the second IOC in Active mode. After acknowledging the changeover, the IMC starts the firmware transfer to the Standby IOC. After the download, the Standby IOC must achieve Lock (CLKLOCK) mode before changing again to Active mode. The Standby IOC is then upgraded. If the first IOC upgrade is not successful, the entire process is aborted and an SROF error message is generated. The IOC restarts with the existing firmware.

If the version of firmware in the module matches the firmware you are trying to download, then the immediate response is CMPLD. During the transfer, the TimeProvider issues an In Progress response. When the transfer is complete, the COMPLD response is transmitted.

Sample Command

```
ACT-SWDL::IMC:TS1000;
```

Autonomous Message

```
   TP-SSU 03-05-15 09:59:09
A 1166 REPT EVT
   "IMC:NA,USRADD,NSA,03-04-05,15-17-57:\"See Appendix B.1\""
;
```

If the image transfer takes more than 60 seconds to start, the error response is SROF and the IMC returns to normal operation.

If the header information in the referenced file is not correct, the error response is SROF.

6.11.1 Upgrading the IMC

To upgrade the software in the IMC, use the following procedure. You must have the upgrade software available on diskette or other media, as well as a Ymodem file-transfer program available before you begin the procedure. Outputs are not affected during the upgrade procedure.

1. Log in to the TimeProvider with an Admin- or Security-level user id and password.

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

```
CPY-MEM:::::IMC,IOC,IMC;
```

3. Issue the command `ACT-SWDL::IMC;` The TimeProvider issues an In-Process response, the TL-1 connection closes, and the TimeProvider waits to receive the upgrade software using the Ymodem protocol.

4. Use a Ymodem file transfer program to transfer the upgrade software to the TimeProvider. You must start the transfer within 60 seconds or the TimeProvider issues a Deny response.

   The TimeProvider validates the received file, updates the flash memory and reboots the IMC if the file is valid. If the file is not valid, the TimeProvider issues a Deny response.

5. The COMPLD message appears after a successful transfer.

6.11.2 Upgrading the IOC

This section contains procedures for upgrading a shelf with a single IOC and for upgrading a shelf with redundant IOCs.

Single IOCs

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

1. Log in to the TimeProvider with an Admin- or Security-level user id and password.

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

```
CPY-MEM:::::IOC,IMC,IOC;
```

3. Issue the command `ACT-SWDL::IOC;` The TimeProvider issues an In-Process response, the TL-1 connection closes, and the TimeProvider waits to receive the upgrade software using the Ymodem protocol.

4. Use a Ymodem file transfer program to transfer the upgrade software to the TimeProvider. You must start the transfer within 60 seconds or the TimeProvider issues a Deny response.

   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. The COMPLD message appears after a successful transfer.

Redundant IOCs

To avoid output interruptions, the TimeProvider must be in the following state:

- Two installed and communicating IOCs
- Both IOCs are in the Locked mode
- Both IOCs are In Service
- Both IOCs are alarm-free
- One IOC is Active

If any of these conditions are not present, then the outputs are interrupted for up to 30 minutes until the upgraded IOC enters the Locked mode.

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

1. Log in to the TimeProvider with an Admin- or Security-level user id and password.

2. Issue the command `ACT-SWDL::IOC;` The TimeProvider issues an In-Process response, the TL-1 connection closes, and the TimeProvider waits to receive the upgrade software using the Ymodem protocol.

3. Use a Ymodem file transfer program to transfer the upgrade software to the TimeProvider. You must start the transfer within 60 seconds or the TimeProvider issues a Deny response.

   The active IOC (IOC1 for example) goes into Standby mode and the Standby IOC (IOC2, in this example) goes into Active mode. The new software is loaded into IOC1, after which it is rebooted and enters the Warm-up mode for up to 30 minutes.

   When IOC1 enters the Locked mode, it becomes the Active IOC again (IOC2 goes into Standby). The new software is loaded into IOC2, after which it is rebooted and enters the Warm-up mode for up to 30 minutes.

4. The COMPLD message appears after a successful transfer.

6.12 Returning the TimeProvider

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 of the unit for re-shipping the product as needed. If the original packaging has been discarded, contact Symmetricom Global Services (SGS) for assistance.

6.12.1 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.

6.12.2 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 +44 (0) 1189 699 799 in Europe, Middle East, or Africa to obtain a return material authorization number (RMA) before returning the product for service. Retain this 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:

   Attn: Global Services
   Symmetricom, Inc.
   Aguadilla Site
   Montana Industrial Park
   Street B, Lot 52
   Aguadilla, PR 00603
   Tel: 787-658-3535
   Fax: 787-658-3560

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

Chapter 7 Specifications of the TimeProvider

This chapter describes the specifications of the TimeProvider.

In This Chapter

7.1 Communications Ports

7.1.1 Serial Ports

Two EIA-232 serial ports are available: the local Craft port and the Remote port. Specifications are listed in Table 7-1..

Table 7-1. Serial Port Specifications

Specification	Factory Default	Available
Local Craft Port		
Baud rate	9600	2400, 9600, 19200, 28800, 34800, 57600, 115200
Word length	8 bits	8 bits
Parity	None	None, Odd, Even
Stop bits	1	1
Echo	Off	Off, On
Software flow control XON/XOFF	Off	Off, On
Hardware flow control CTS/RTS	Off	Off, On
RS-232 configuration	DCE	DCE
Remote Port		
Baud rate	9600	2400, 9600, 19200, 28800, 34800, 57600, 115200
Word length	8 bits	8 bits
Parity	None	None, Odd, Even
Stop bits	1	1
Echo	Off	Off, On
Software flow control XON/XOFF	Off	Off, On
Hardware flow control CTS/RTS	Off	Off, On
Handshake DTR/DSR	On	On
RS-232 configuration	DTE	DTE

7.1.2 LAN Port

The Ethernet 10BaseT port supports 10 telnet sessions and two TL-1 sessions over TCP/IP. To minimize response delays, Symmetricom recommends that you keep four or fewer sessions open at any one time.

7.2 Clocks

The clocks in the TimeProvider are controlled with Direct Digital Synthesis technology for calibration-free operation and precise frequency control.

Type I Clock

The Type I clock in the TimeProvider is compliant with ITU-T G.812 (06/98) and EN300 462-4-1 (see ICS proforma Compliance Annex B).

Type III Clock

The Type III clock in the TimeProvider complies with G.812 (06/98).

Type ST3E Clock

The Stratum 3E clock in the TimeProvider complies with ETSI 300 462-4, ANSI T1.101-1999, and Telcordia GR-378/1244-CORE.

SSM Compliance

The TimeProvider complies with the following SSM standards: ANSI T1.101-1999, GR-253 Core Issue 3, September 2000, ITU-T G.704 10.98, and T1X1.3 TR33.

Holdover

Enhanced Quartz (Type 1 for ITU-T standards)

7.3 Inputs

Front Access and Rear Access shelves contain three card slots: two for IOC cards and one for an IMC card.

Each IOC supports three input ports: two span inputs and one PRS input.

Input specifications: 2048 kbit/s G.703/9, 2048 kHz G.703/13, DS1, 1.544/5/10 MHz sine or square

Table 7-2. Input Signal Specifications

Parameter	Specification
PRS Inputs	
Frequency	2.048 MHz, 5 MHz, 10 MHz
Amplitude	0 dBm nominal; 1 V RMS ±3 dB
T1 Inputs	
Framing	D4/SF or ESF (User Selectable)
Bit Rate	1544 kbit/s
Format	AMI or B8ZS (per (ANSI) T1.102 & ITU-T G.703 Sec. 5)
Amplitude Range	+3 to –24 dB DSX
Jitter and Wander Tolerance	Meets the requirements of Bellcore GR-1244-CORE, Section 4.
E1 Inputs	
Type	G.703 Sec. 9 Framed E1
Bit Rate	2048 kbit/s
Format	CAS or CCS (per ITU-TG.703 Sec. 2 & (ANSI) T1.102 DS1A CRC4 enabled/disabled AMI or HDB3)
Amplitude Range	+3 to –27 dBTLO
Jitter and Wander Tolerance	Meets the requirements of ITU-T G.823
Type	G.703 Sec. 9 Framed E1

7.4 Outputs

The TimeProvider supports up to 32 outputs. The optional Expansion Panel provides an additional 32 outputs. You can provision the outputs in groups of eight.

Sync Status Messages: Compliant with SSM specification ITU-T G.704, T1X1.3 TR33, ANSI T1.101-1999, and Telcordia GR-253-CORE

Table 7-3. Output Signal Specifications

Parameter	Specification
T1 Signals	
Framing (user selectable)	D4/Super Frame (SF) Extended Super Frame (ESF)
Signal Waveshape	Framed, all ones, Alternate Mark Inversion (AMI) per (ANSI) T1.102 and ITU Rec. G.703
Pulse Amplitude	2.4 to 3.6 volts peak into 100 Ω
Output Jitter	< 0.03 UI
Termination Impedance	100 Ω ± 5%
E1 Signals	
Framing (user selectable)	CAS, CCS
Signal Waveshape	Framed, all ones, Alternate Mark Inversion (AMI) Per ITU Rec. G.703 Sec. 9
Pulse Amplitude	2.4 to 3.6 volts peak into 120 Ω 1.9 to 2.8 volts peak into 75 Ω
Output Jitter	< 0.03 UI
Termination Impedance	120 Ω ± 5%

7.5 Alarms

7.5.1 Input Alarms

The PRS input is inhibited when a contact closure (less than 1 Ω) is present across the PRS Alarm In connection.

7.5.2 Output Alarms

The output alarm connector is on the Input module, and can be either a DB25 connector or wire-wrap pins. See Section 3.5.6, Making Alarm Connections, for a pinout diagram of the DB-25 connector.

Table 7-4. Output Alarm Specifications

Alarm	Description
Minor	Contact closure (NC or NO) 1 Amp Form C
Major	Contact closure (NC or NO) 1 Amp Form C
Critical	Contact closure (NC or NO) 1 Amp Form C

7.6 Power

Dual power supplies from –36 to –72 vDC.

Power consumption is less than 40 W per shelf.

7.7 Mechanical

7.7.1 TimeProvider 1000 Front-Access Shelf

Size: 431.8 mm wide x 175 mm high x 254 mm deep (17 in wide x 6.875 in high x 10 in deep)

Weight: 9.0 pounds (4.1 kg) with two IOC modules and four Output modules

7.7.2 TimeProvider 1100 Rear-Access Shelf

Size: 431.8 mm wide x 133 mm high x 254 mm deep (17 in wide x 5.25 in high x 10 in deep)

Weight: 9.0 pounds (4.1 kg) with two IOC modules and four Output modules

7.8 Environmental

Operating Temperature: –5 to 55 °C

Storage Temperature: –25 to 55 °C, duration < 12 months

Operating Humidity: 5% to 85% non-condensing

Storage Humidity: 5% to 100% non-condensing, duration < 12 months

Altitude: –60 to 4000 m (–196 ft. to 13132 ft.)

Clock operation: ETSI EN 300 019-1-3 V2.1.2 Class 3.1

Appendix A Factory Default Values

In This Appendix

A.1 Default Command Access Levels

This section describes the default access level for the TL-1 commands described in this guide. Table A-1 also describes whether you can edit the default command access level using the ED-CMD-SECU command (see the *TimeProvider TL-1 Reference Guide* for details on this command). For a complete list of commands and their access levels, see the *TimeProvider TL-1 Reference Guide.*

Table A-1. Default Access Levels for TL-1 Commands

Command	Default Access Level	Editable?
RTRV-USER-SECU	Security	Yes
ENT-USR-SECU	Security	No
ED-USER-SECU	Security	No
ED-PID	Security	Yes
ENT-PID	User	Yes
DLT-SECU	Security	Yes
DLT-USR-SECU	Security	Yes
RTRV-CMD-SECU	Admin	Yes
ED-CMD-SECU	Admin	No
CPY-MEM	Admin	Yes
RTRV-DAT	User	Yes
ED-DAT	Admin	Yes
RTRV-EQPT	User	Yes
ED-EQPT	Admin	Yes
RTRV-SYNC	User	Yes
ED-SYNC	Admin	Yes
RTRV-ATTR	User	Yes
SET-ATTR	Admin	Yes
RTRV-LOG	User	Yes
INIT-LOG	Admin	Yes
INIT-SYS	Admin	Yes
RTRV-SYS-MODE	User	Yes

Table A-1. Default Access Levels for TL-1 Commands (Continued)

Command	Default Access Level	Editable?
SET-SYS-MODE	Admin	Yes
OPR-ACO-ALL	User	Yes
SET-SID	Admin	Yes
RTRV-ALM	User	Yes
RTRV-COND	User	Yes
RTRV-CRAFT	User	Yes
RTRV-HDR	None	Yes
RTRV-INV	User	Yes
ACT-USER	None	No
RTRV-USER	User	Yes
CANC-USER	User	No
PING	User	Yes
GEN-EVT	User	Yes

A.2 Alarm Default Values

This section describes the default values for alarms in the TimeProvider. Table A-2 includes the default error delay, which is set using the FLTDELAY keyword in the ED-SYNC command (see Section 4.9.2, Provisioning System-Level Alarms).

Table A-2. Default Alarm Settings

Alarm ID	Default Error Delay	Error Delay Editable?	Default Alarm Level	
			SSU Mode	SUB Mode
System-wide Alarms				
PWRA	IMMED	No	MJ	MJ
PWRB	IMMED	No	MJ	MJ
EXPFAIL	IMMED	No	MJ	MJ
EXTALM	IMMED	No	MN	MN
IMC-related Alarms				
IOC1COMM	IMMED	No	MN	MN
IOC2COMM	IMMED	No	MN	MN
IOC-related Alarms				
IOC1COMM	IMMED	No	MN	MN
IOC2COMM	IMMED	No	MN	MN
IOC1TO2COMM	IMMED	No	MN	MN
IOC2TO1COMM	IMMED	No	MN	MN
IOCFAIL	IMMED	No	MJ	MJ
CLKWARM	IMMED	No	MN	MN
CLKFREE	IMMED	No	MJ	MJ
CLKBRDG	IMMED	No	MJ	MJ
CLKHOLD	IMMED	No	MJ	MJ
PRS-related Alarms				
INPDISQ	FLTDELAY	Yes	MN	MN
INPLOS	IMMED	No	MN	MN
INPFRQ	IMMED	No	MN	NR
INPPHASE	IMMED	No	MN	MN

Table A-2. Default Alarm Settings (Continued)

Alarm ID	Default Error Delay	Error Delay Editable?	Default Alarm Level	
			SSU Mode	SUB Mode
EXDSC	IMMED	No	MN	MN
INP1 or INP2-related Alarms				
INPDISQ	FLTDELAY	Yes	MN	MN
INPAIS	IMMED	No	MN	MN
INPLOS	IMMED	No	MN	MN
INPOOF	IMMED	No	MN	MN
INPFRQ	IMMED	No	MN	NR
INPPHASE	IMMED	No	MN	MN
INPQL	IMMED	No	MN	MN
EXDSC	IMMED	No	MN	MN

A.3 Default Equipment Parameters

Table A-3. Default Equipment Parameters

Parameter	Default Value
System-Level Parameter (<aid>=SYS)	
INACTTIME	0 (no timeout)
LOGECHO	ENABLE
ELEVTIME	DISABLE
SYSMODE	SSU
Local/Remote Comm Port Parameters (<aid>=COMp)	
AOMERGE	ENABLE
BAUD	9600
ECHO	DISABLE
FLOW	NONE

Table A-3. Default Equipment Parameters (Continued)

Parameter	Default Value
TIDQUIET	DISABLE
Ethernet Parameters (<aid>=COMI)	
AOMERGE	ENABLE
IPGATE	127.0.0.1
IPADDR	127.0.0.1
IPSUBNET	255.255.255.0
ECHO	DISABLE
TIDQUIET	DISABLE
IOC Parameters (<aid>=IOCm)	
IOCMODE	ACTIVE
CLKTYPE	TYPEI
IOCSTATE	INSRV

A.4 Default Input Parameters

Table A-4. Default Input Parameters

Parameter	Default Value
Input Parameters (<aid>=SYS)	
CLRDELAY	10 seconds
FLTDELAY	5 seconds
REFMODE	AUTO
INPREF	PRS
FREEFLT	SQUELCH
HOLDFLT	ON
Input Parameters (<aid>=PRS)	
INSTATE	DISABLE
FRMTYPE	2M (2048 kHz)

Table A-4. Default Input Parameters (Continued)

Parameter	Default Value
Input Parameters (<aid>=INPp)	
INSTATE	ENABLE
SPANTYPE	E1
FRMTYPE	2M (for E1 spantype) ESF (for T1 spantype)
CRCENA	DISABLE
SSMENA	DISABLE
SSMBIT	8
Input Parameters (<aid>=PRS, INPp)	
QLEVEL	2
PRIORITY	PRS=2 INP1=3 INP2=4

A.5 Default Output Parameters

Table A-5. Default Output Parameters

Parameter	Default Value
Output Parameters (<aid>=OUTg)	
OUTSTATE	DISABLE
FRMTYPE	2M

Appendix B CRAFT Software Reference

This appendix describes the SynCraft software you use for provisioning the TimeProvider.

In This Appendix

B.1 Overview

SynCraft is a craft application for provisioning and managing the TimeProvider and other Network Elements via an Ethernet connection.

B.2 System Requirements

The following is the minimum computer configuration for a Windows NT 4.0 system:

- Pentium III 200 MHz platform
- 128 MB RAM
- 200 MB hard disk
- CD-ROM drive
- 1024 x 768 accelerated graphics
- 15" VGA monitor

Software

You can run the SynCraft application under the following operating systems:

- Windows XP
- Windows 2000 SP3 or later
- Windows NT 4 SP5 or later
- Windows ME5
- Windows 98 Second Edition
- Windows XP Professional Service Pack 1

You can download the following items from the Microsoft web site:

- Windows NT 4 Service Pack 5
- Windows 2000 Service Pack 3
- Windows XP Service Pack 1

Documentation

To access the help files and associated documentation for SynCraft, press F1 at any time while in the application.

B.3 Installing SynCraft

To install SynCraft on your computer, use the following procedure. You may need Administrator-level privileges on the computer to install this product.

1. Insert the SynCraft CD into the CD-ROM drive. If the Auto-Run feature is not enabled, then open the SynCraft folder on the CD and double-click the SynCraftSetup.exe icon. The Installation Wizard appears.

2. Follow the instructions that appear in the Installation Wizard.

B.4 Starting SynCraft

To start the SynCraft application, double click it's icon, or select **Start**, **Programs**, **Symmetricom**, **SynCraft**. The SynCraft window appears, as shown in Figure B-1..

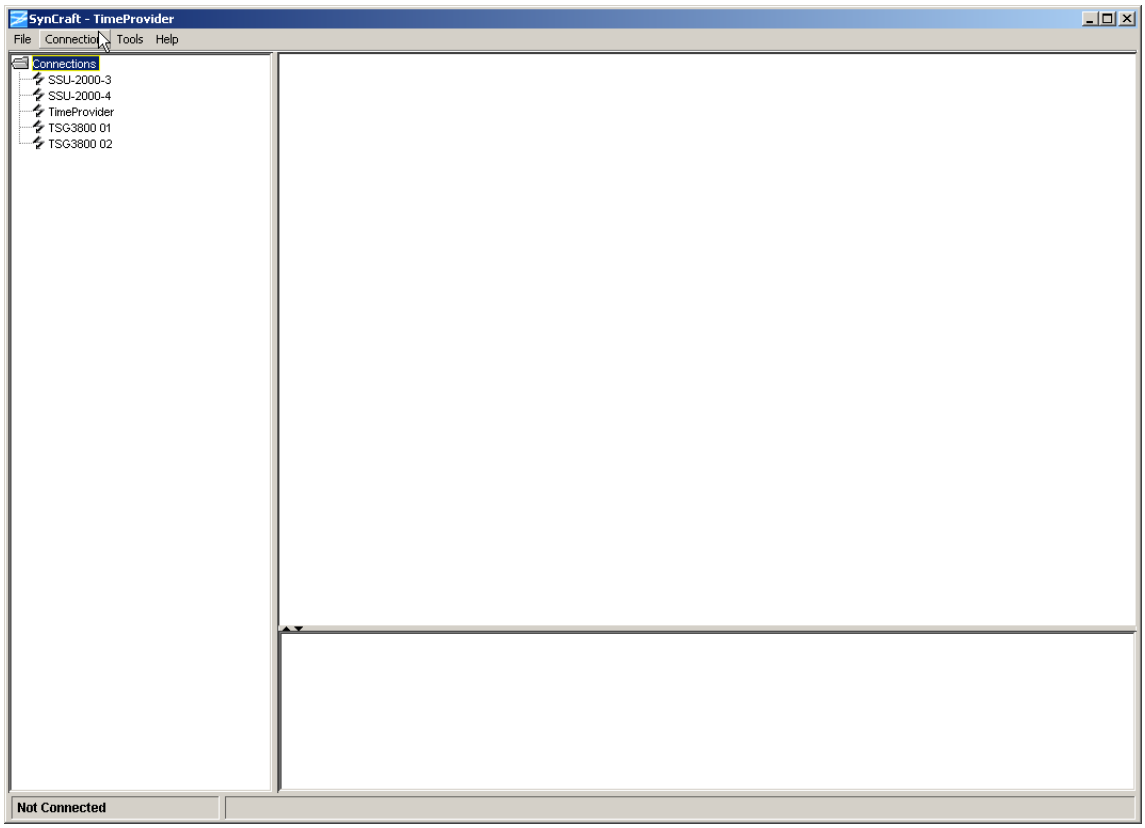


Figure B-1. The SynCraft Window

Creating a Connection

To create a connection to the TimeProvider, select **Connection**, **New Connection**. The Create New Connection window appears, as shown in Figure B-2..

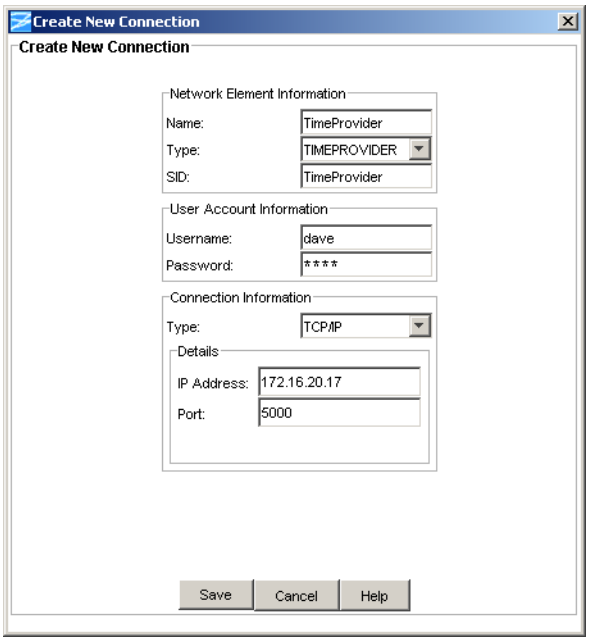


Figure B-2. The Create New Connection Window

Fill in each field as appropriate for your installation, then click Save.

- Name – the name of the connection as used by SynCraft
- Type – select TimeProvider from the drop-down list
- SiD – enter the Source ID for the unit
- Username – enter a valid user name defined in the TimeProvider's userid list
- Password – enter the password for the user
- Type – select TCP-IP for use with an Ethernet connection
- IP address – enter the unit's IP address
- Port – enter 5000 for use with an Ethernet connection

Opening a Connection

To open a connection to the TimeProvider, right-click the name of the connection in the network element list in the left column of the SynCraft window. Select **Open Connection** from the drop-down list that appears; the Logical View appears in the main SynCraft window, as shown in Figure B-3..

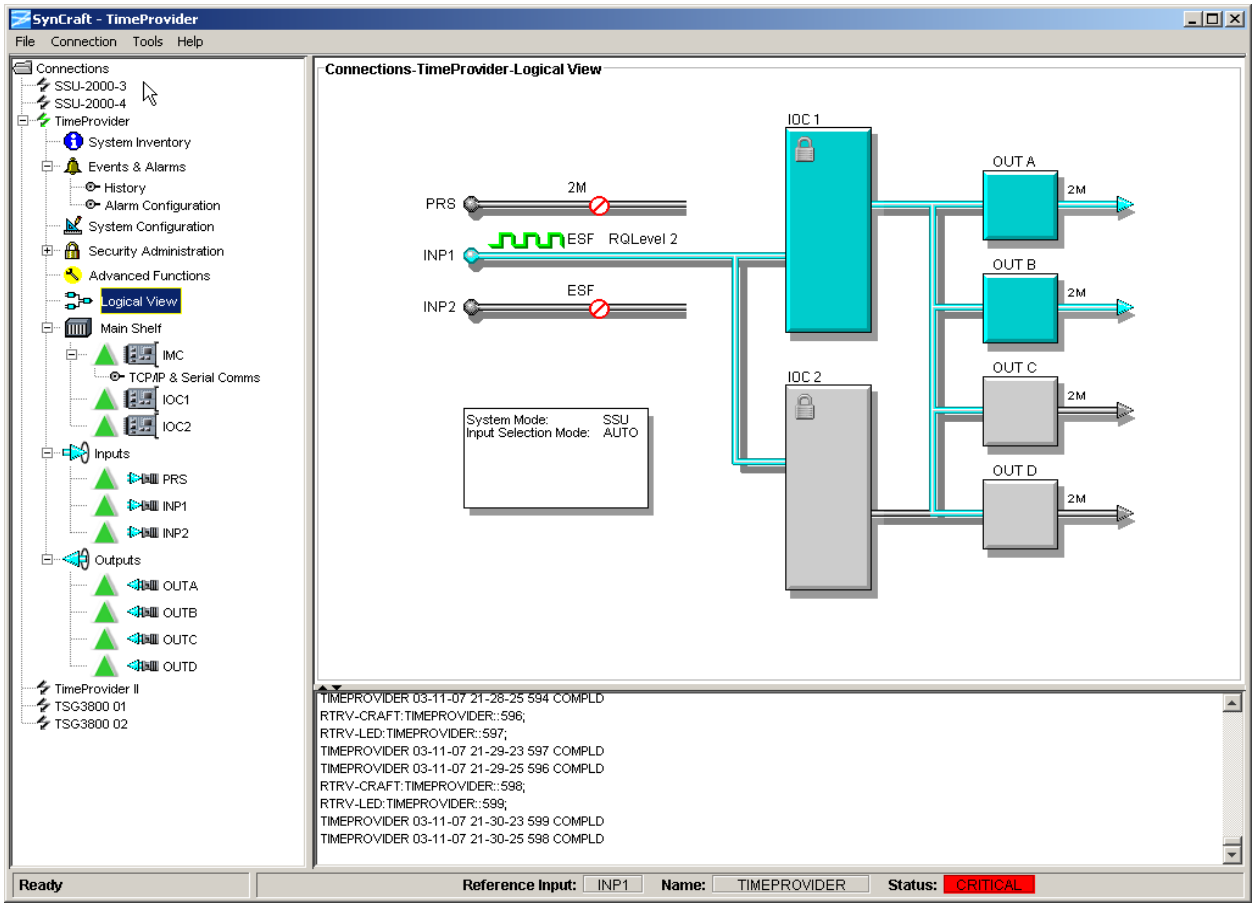


Figure B-3. Logical View of the TimeProvider

Closing a Connection

To close the connection to the TimeProvider, right-click the name of the connection in the network element list and select **Close Connection** from the drop-down list.

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