



TimeCesium Primary Reference Source

User's Guide
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How to Use This Guide

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

In This Preface

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

Purpose of This Guide

The *TimeCesium User's Guide* describes the procedures for unpacking, installing, using, maintaining, and troubleshooting the Symmetricom TimeCesium Primary Reference Source. It also describes the alarms and events, the Monitor3 application that you use to communicate with the TimeCesium, default values, and other information.

Who Should Read This Guide

[Chapter 1, Product Overview](#), is written for non-technical audiences who need general information about the product. Subsequent chapters contain technical information about the product that describes installation and configuration instructions or details primarily intended for qualified maintenance personnel.

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

- **Systems Engineers** – [Chapter 1](#) provides an overview of the product and its options. Cross references in this chapter direct readers to detailed configuration information in [Chapter 3, Operating and Configuring the TimeCesium](#).
- **Installation Engineers** – [Chapter 2](#) provides installation and operation information and procedures. [Chapter 3, Operating and Configuring the TimeCesium](#) provides specific configuration information to ensure proper operation.

Structure of This Guide

This guide contains the following sections:

Chapter, Title	Description
Chapter 1, Product Overview	Provides both a physical and functional description of the TimeCesium Primary Reference Source.
Chapter 2, Installing the TimeCesium	Provides environmental considerations of the TimeCesium unit, a guide to mounting, and electrical (cable) connection procedures for the TimeCesium unit. It also provides instructions on installing the Monitor3 utility program that is used to configure the TimeCesium.
Chapter 3, Operating and Configuring the TimeCesium	Provides information on connecting the TimeCesium unit to a laptop, PC, or terminal for installing software and setting the systems configuration options.

Chapter, Title	Description
Chapter 4, Specifications	Provides system specifications information.
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 this User Guide. Thereafter, only the acronym or abbreviation is used.
- **Revision Control** – The title page lists the part number, issue number, and printing date of this Operating Manual.
- **Typographical Conventions** – This guide uses the typographical conventions described in the table below.

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

Warnings, Cautions, Recommendations, and Notes

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



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



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



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



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



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



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

Related Documents and Information

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



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

Where to Find Answers to Product and Document Questions

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

What's New In This Guide

Revision E of this guide contains the following new information:

- Removed Table 1-2 and replaced it with a reference to [Table 4-2](#)
- Revised the section [Alarms and the Alarm Relay Connector](#), on page 17
- Added a section about installation security in [Pre-Installation Checklist](#), on page 25
- Added a new section: [Security](#), on page 38
- Added a new section: [Configuring Unit Monitoring Options](#), on page 41
- Revised [Table 4-2](#) to include provisionable values
- Revised [Table 5-2](#) to include the level of the alarm
- Added a new section: [Contacting Symmetricom](#), on page 58

Chapter 1 Product Overview

This chapter provides both a physical and functional description of the TimeCesium Primary Reference Source.

In This Chapter

- [Functional Description](#)
- [Outputs](#)
- [Factory Configurations](#)

Functional Description

Introduction

The Symmetricom TimeCesium Primary Reference Source (PRS) is a low cost, accurate and stable frequency reference with fully automatic operation by microprocessor control. The unit provides a Stratum 1 quality signal without the need of an external reference.

The TimeCesium produces the following accurate and stable signals for telecom network synchronization:

- DS1 (1.544 Mb/s) and 1.544 MHz
- E1 (2.048 Mb/s) and 2.048 MHz
- Composite Clock (64 kHz/8 kHz BPV AMI pattern)
- Sinusoidal Outputs (X1 at 5 MHz and 10 MHz)

The signals can be configured using a cesium beam tube resonator to stabilize the output of a quartz crystal oscillator that provides the frequency source for the output generators.

The TimeCesium is available in two models:

- The TimeCesium 4500, which meets ANSI mounting and access requirements and applications
- The TimeCesium 4400, which meets ETSI mounting and access requirements and applications

The TimeCesium 4500 front and rear panel are shown in [Figure 1-1](#) and [Figure 1-2](#). The TimeCesium 4400 front and rear panel are shown in [Figure 1-3](#) and [Figure 1-4](#). Refer to [Table 4-1](#) for a list of the system's performance specifications.

Software

The TimeCesium has a number of software controllable features. The Monitor3 program delivered with the TimeCesium is a proprietary software utility program designed to help configure and monitor the TimeCesium using a proprietary interface. It requires a PC or laptop running Windows 98, Windows ME, Windows NT 4, Windows 2000, or Windows XP. The software is quickly installed and easy to use. Refer to [Installing the Monitor3 Software](#), on page 34, and [Starting the Monitor3 Software Application](#), on page 36, for more information.

Alarms and the Alarm Relay Connector

The TimeCesium continuously monitors key operating parameters and provides alarms to indicate if they deviate from acceptable values. An alarm is indicated by the ALARM LED on the front panel and by a set of Form-C relay contacts. There are two alarm levels:

- Minor – indicates that a parameter is out of nominal specifications, but is not expected to impact the performance of the TimeCesium. The ALARM LED lights and remains lit while the alarm condition persists. All outputs remain active.
- Major – indicates a fault that will cause the TimeCesium to fail to meet specifications. The LOCK LED turns off and the ALARM LED lights. All outputs are disabled. If the alarm condition ceases, the TimeCesium restarts from the initial power-on condition.

One set of form-C relay contacts, 1-Amp rating, is provided on the terminal block labeled ALARM. The alarm connection is available either as “normally open” or “normally closed” (see [Figure 1-2](#) and [Figure 1-3](#)). For connection instructions, see [Making Alarm and Signal Connections](#), on page 31.

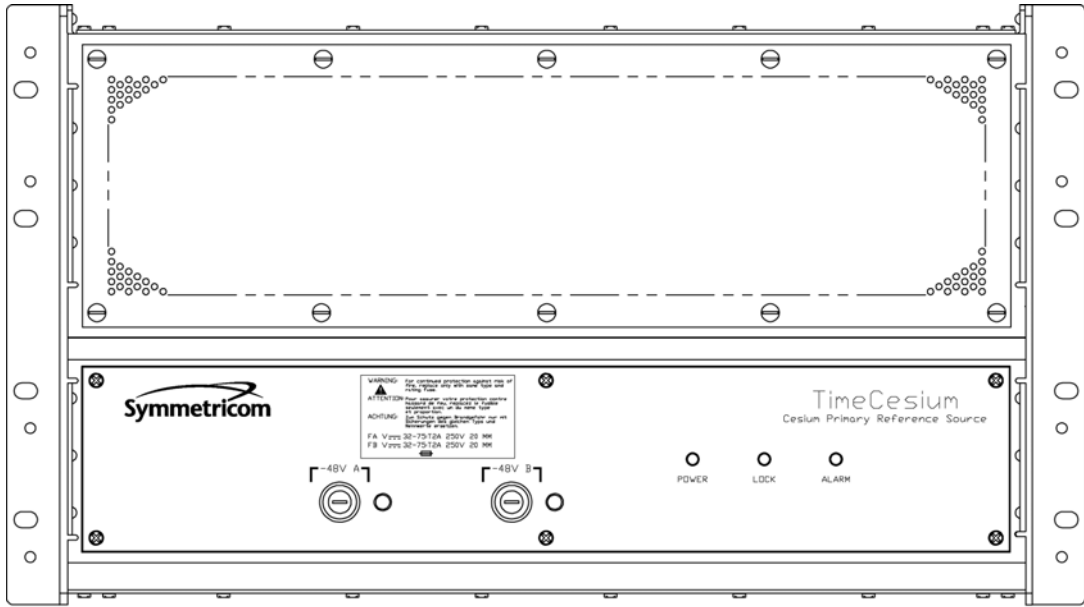
A list of currently-active alarms is available on the Alarms dialog box in the Monitor3 application. See [Viewing Alarms](#), on page 43 for details on accessing and viewing the Alarms dialog box.

Power

The TimeCesium is powered from a –48 V DC source by two redundant connections. The input power contacts (see [Figure 1-2](#) and [Figure 1-3](#)) are labeled –48V A and –48V B, Return (RTN), and Frame Ground (FR GND). Grounding practices should comply with local grounding codes. RTN is the positive side of the voltage supply and is isolated from frame ground (FR GND). The TimeCesium uses an internal DC-to-DC converter to provide a wide input voltage range as well as electrical isolation between the DC input and chassis ground. Either side of the DC input can be located at chassis ground potential. The external DC inputs are protected against reverse polarity connection by series diodes.

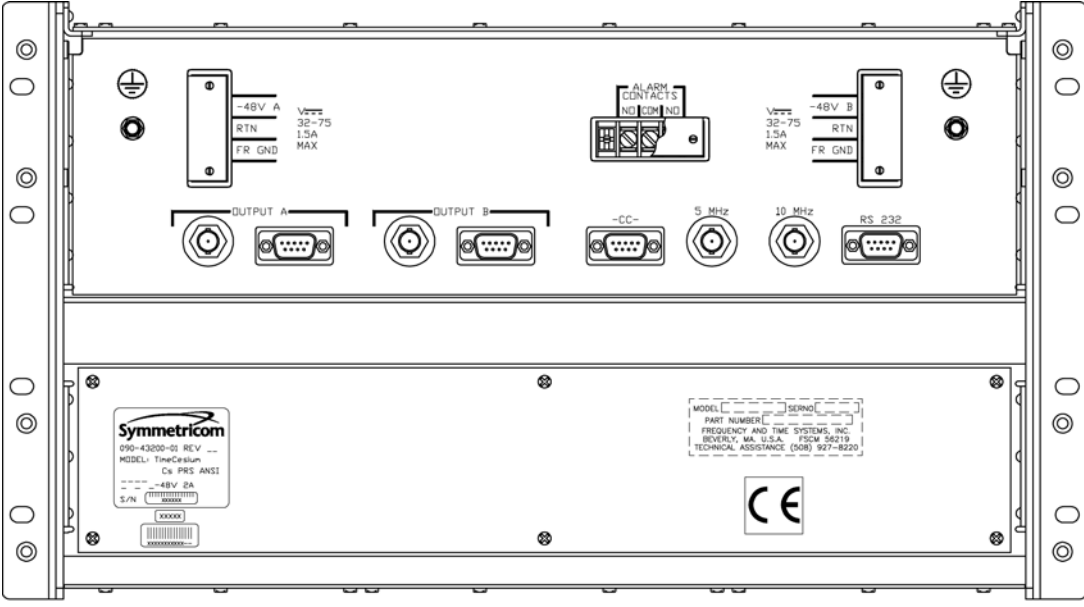
Fuses

The DC fuses are located on the front panel in the fuse holder labeled –48V A and –48V B (see [Figure 1-1](#) and [Figure 1-3](#)). In an emergency you can use the fuses as a disconnect device. Normally, you should remove power by disconnecting the hard-wired connections at either a switch panel or power panel.



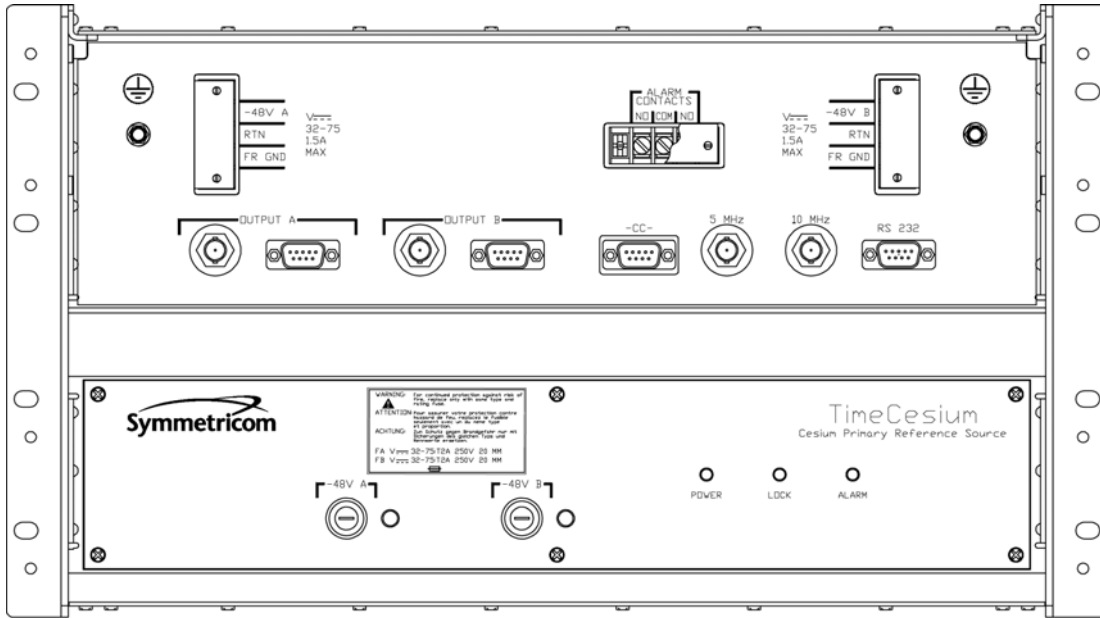
TC0003

Figure 1-1. Front View of the TimeCesium 4500



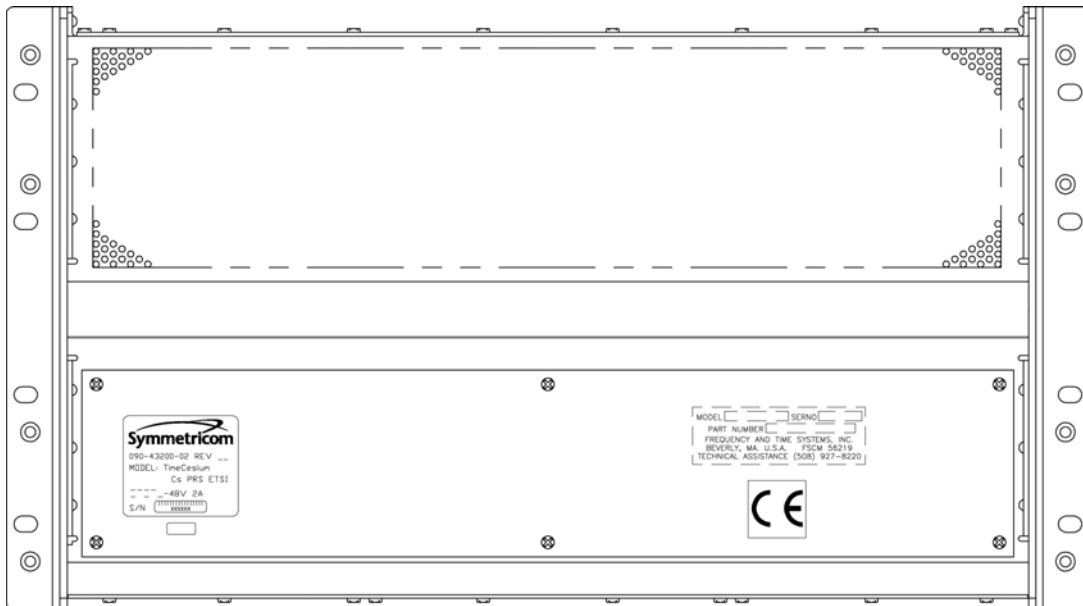
TC0004

Figure 1-2. Rear View of the TimeCesium 4500



TC0005

Figure 1-3. Front View of the TimeCesium 4400



TC0006

Figure 1-4. Rear View of the TimeCesium 4400

Connectors

All connections are made at the following locations:

- The rear panel of the TimeCesium 4500
- The front panel of the TimeCesium 4400

Refer to [Figure 1-2](#) and [Figure 1-3](#) for the location and designation for the various connectors.

RS-232 Serial Port

Connecting a PC or laptop to the RS-232 serial port with a null modem cable allows you to control and monitor the TimeCesium using the Monitor3 software application.

Synchronization Signals

The connectors labeled Output A and Output B provide both a DB9 connector for balanced signals (T1 at 100 Ω and E1 at 120 Ω), and a BNC connector for unbalanced signals (75 Ω). For wire-wrap applications the TimeCesium is supplied with a DB9 to wire-wrap connector adapter (P/N 22013085-000-0). The adapter pins are marked to identify tip, ring, and sleeve.

The DB9 connector labeled CC provides a composite clock output at a frequency of 64 kHz (AMI pattern) with bipolar violation (BPV) phase reversals every 125 microseconds corresponding to a frequency of 8 kHz.

Sinusoidal Signals

The BNC connectors labeled 5 MHz and 10 MHz provide high spectral purity sinusoidal outputs (X1 at 5 MHz and 10 MHz, 0.5 V_{rms} at 50 Ω).

Microprocessor

A microprocessor performs the following tasks:

- Digital demodulation and integration of the servo loop signals
- Monitoring of system parameters
- Control of adaptive servos
- Diagnostic functions to aid in troubleshooting
- Communication for monitoring and control

Outputs

T1–1.544 Mb/s Outputs

The TimeCesium provides T1 (1.544 Mb/s) telecom signals in either D4 or ESF format. The output format is user selectable through Monitor3 software settings. Line length settings are also selectable for various cable lengths up to 655 feet. In ESF operation, a Sync Status Message (SSM) is included in the output signals that identifies the source as a PRS (Stratum 1). See [Table 4-1](#) for system specifications.

E1–2.048 Mb/s Outputs

The TimeCesium provides E1 (2.048 Mb/s) telecom signals per ITU-T Reg. G.703. The outputs are framed in accordance with ITU-T Reg. G.704. The output signals contain a Sync Status Message that identifies the source as a PRS (Stratum 1). These outputs are available in either 120 Ω balanced or 75 Ω unbalanced form. See [Table 4-1](#) for system specifications.

Composite Clock

The TimeCesium provides a composite clock output at a frequency of 64 kHz (AMI pattern) with bipolar violation (BPV) phase reversals every 125 microseconds corresponding to a frequency of 8 kHz.

Sinusoidal Signals

The TimeCesium provides two (5 MHz and 10 MHz) high spectral purity sinusoidal outputs (X1 at 5 MHz and 10 MHz, 1.0 Vrms at 50 Ω).

Factory Configurations

The TimeCesium is available in two configurations. Refer to [Table 1-1](#) for configuration and part number reference information.

Table 1-1. Factory Configuration Options

Configuration	Part Number
TimeCesium 4500 (ANSI version)	PRS-4500
TimeCesium 4400 (ETSI version)	PRS-4400

Factory Settings

The default settings for outputs in the two TimeCesium configurations are shown in [Table 4-2](#). Use the procedures in [Configuring Telecom Outputs](#), on page 45 to change these settings.

Chapter 2 Installing the TimeCesium

This chapter provides TimeCesium installation information, including shelf installation, wiring and the operational procedure for power-on and power-off. It also provides information on installing the Monitor3 software application.

In This Chapter

- [Overview](#)
- [Installing the TimeCesium](#)
- [Making Power and Ground Connections](#)
- [Connecting the TimeCesium to a Computer](#)
- [Installing the Monitor3 Software](#)

Overview

This chapter provides unpacking instructions and installation procedures for the TimeCesium as well as warnings, cautions, notes, and recommendations that pertain to the procedures being performed. To prevent serious injury and/or equipment damage, do not ignore these safety, environmental, and operational messages.



Note: If you encounter problems during any of the following procedures, contact Symmetricom Global Services. See [Contacting Symmetricom](#), on page 58 for contact details.

Unpacking Instructions



Caution: To avoid electrostatic discharge (ESD) damage to sensitive internal parts in the TimeCesium, observe proper ESD handling procedures.

1. Inspect the container for signs of damage. If the container is damaged, notify both the carrier and the Symmetricom distributor. Retain the shipping container and packing material for the carrier to inspect.
2. Unpack all components in the shipping container.
3. Inventory, and set aside all items and paperwork that are included in the container. The following items are included in the shipping container:

TimeCesium 4500

- TimeCesium PRS (part number PRS-4500)
- Monitor3 Software CD (part number 15534-001)
- DB9 to wire-wrap adapters (3 ea.) (part number 22013085-000-0)
- Rack mounting screws (8 ea.) (part number 125-22441-08)
- Fuses (2 ea.) (part number 143-00239-02)
- Mounting ears (2 ea.) ANSI (part number 15411-001)
- Mounting ears (2 ea.) ETSI (part number 15412-001)

TimeCesium 4400

- TimeCesium PRS (part number PRS-4400)
- Monitor3 Software CD (part number 15534-001)
- DB9 to wire-wrap adapters (3 ea.) (part number 22013085-000-0)
- Rack mounting screws (8 ea.) (part number 125-22441-08)

- Fuses (2 ea.) (part number 143-00239-02)
 - Mounting ears (2 ea.) ETSI (part number 15412-001)
 - Mounting ears (2 ea.) ANSI (part number 15411-001)
4. 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 is on a label affixed to the rear panel. Contact the Symmetricom distributor if the model or item numbers do not match.

Environmental Considerations



Caution: To avoid compromising the safety precautions of the system, this instrument must be operated only as specified by the manufacturer.

When installing the instrument, consider the standard environmental factors (temperature, humidity, vibration, etc.) and the presence of magnetic fields that might affect the accuracy of the TimeCesium. Avoid installing or using the instrument near large motors, generators, transformers, or other equipment which radiates strong AC or DC fields of 2-gauss or more.

Pre-Installation Checklist

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

- The equipment rack is grounded and has power available
- The power supply fuses have been removed from the power input of the TimeCesium front panel
- The proper tools and materials are available as listed in the Tools and Materials section

Access to the installation location shall only be gained by service personnel or users who have been instructed in the reasons for the restrictions applied to the location and about any precautions that they should take. Access is by lock and key, or other means of security, and is controlled by the authority responsible for the location.

Tools and Materials

The following is a list of recommended tools and materials NOT supplied by Symmetricom:

- Standard tool kit
- Volt-Ohmmeter
- Cable ties or acceptable cable clamps
- # 16 AWG wire for –48V, RTN, and Frame Ground (minimum)
- #18 AWG wire for connecting office alarms
- Laptop or PC with CD drive and Windows 98/ME/2000/NT4/XP installed
- Null Modem cable (F-F)

Installing the TimeCesium

The TimeCesium is designed to be mounted in a standard telecom equipment rack. The front panel occupies a height of 10.5 in. (26.7 cm). The TimeCesium is 10.1 in. (25.7 cm) deep and weighs approximately 36 lbs (16.4 kg).



Caution: Due to weight consideration, the TimeCesium must be mounted at the lowest portion of the rack.

The TimeCesium comes equipped with removable rack mounting brackets that can be positioned for mounting the unit in a standard 19-inch (48.2 cm) rack or 23-inch (58.4 cm) rack. See the shelf mounting diagram in [Figure 2-1](#). The brackets can be mounted 0 in. or 3.625 in. (9.2 cm) behind the TimeCesium front panel.



Caution: To avoid damage to the TimeCesium, only trained service personnel should remove the access covers.



Warning: For continued protection against risk of fire, use only the specified fuse type and rating. Fuse specifications are contained in [Chapter 4, Specifications](#) and on the instrument's front panel.

Mounting the TimeCesium

Refer to [Figure 2-1](#) for the TimeCesium 4500 and [Figure 2-2](#) for the TimeCesium 4400, then perform the following procedures:



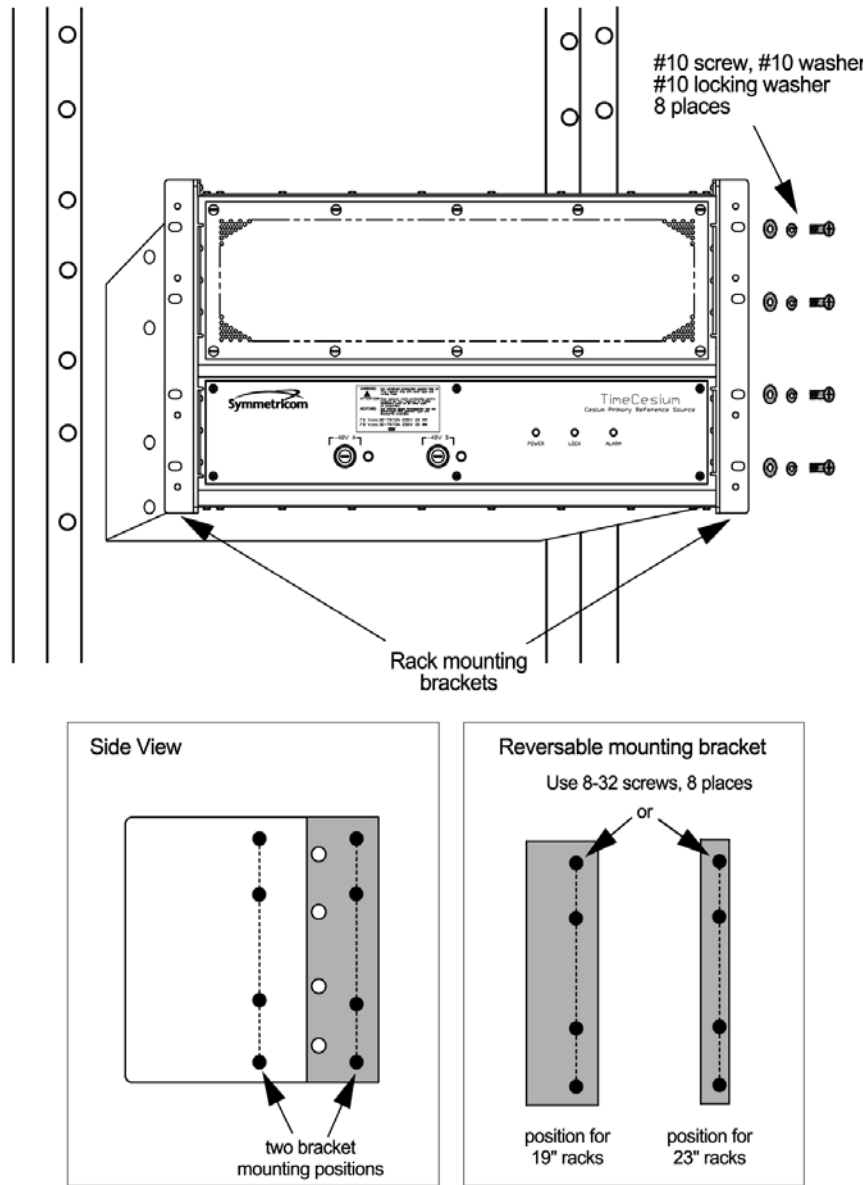
Caution: To prevent damage to the instrument during installation, ensure power is disconnected by removing both fuses from the front panel. The fuses are the emergency disconnect for the device – there is no ON/OFF switch.

The TimeCesium is convection cooled. To prevent the instrument from overheating, allow for a one rack unit (1.75 in./4.4 cm) space above and below the unit for cooling.



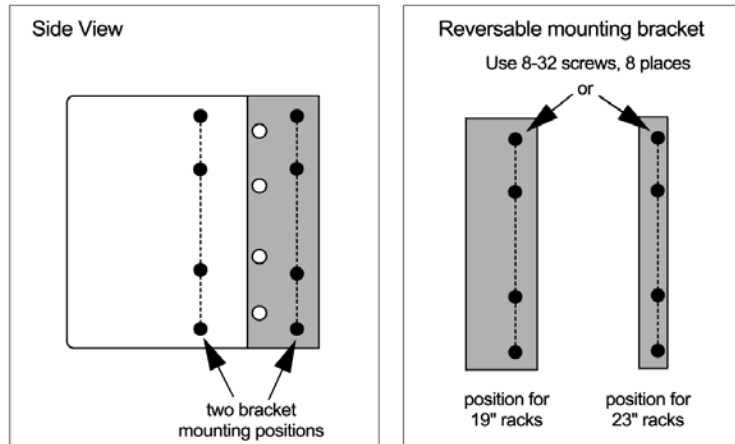
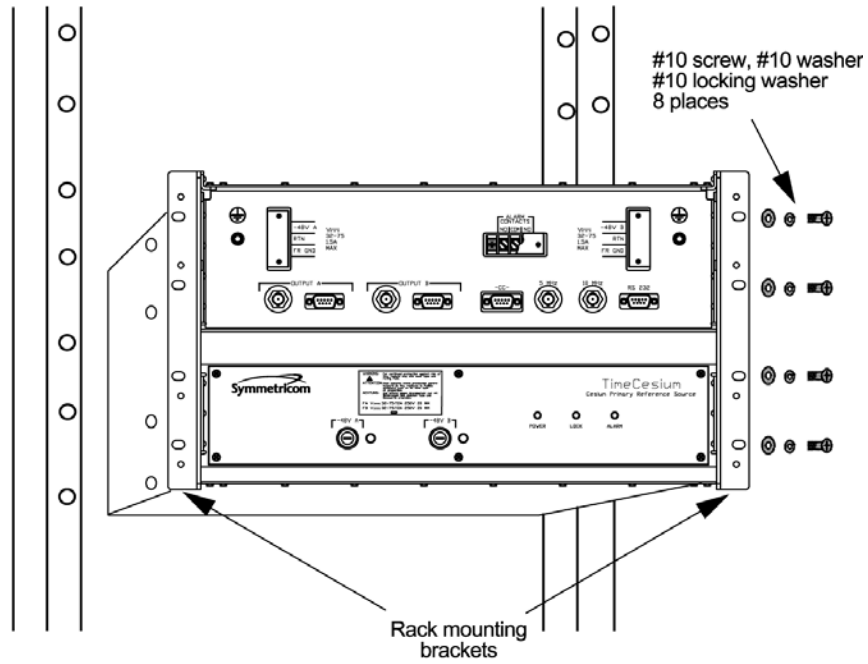
Caution: To avoid electrostatic discharge (ESD) damage to components in the TimeCesium, observe the appropriate ESD precautions and procedures.

1. Install the rack mounting ears in the desired position on the unit with the eight (8-32) screws provided.
2. Mount the TimeCesium in the lowest portion of the equipment rack using the eight #10 screws, washers, and lock washers provided.



TC0007

Figure 2-1. TimeCesium ANSI Shelf Rack Mounting Diagram



TC0008

Figure 2-2. TimeCesium ETSI Shelf Rack Mounting Diagram

Making Power and Ground Connections

- Both power inputs A and B must be used to satisfy the alarm criteria.
- The screw terminal marked “FR GND” can be connected to the frame ground in accordance with local grounding regulations, but must be isolated from the DC returns.
- The external DC inputs are protected against reverse polarity connection by series diodes.



Note: All permanent electrical connections are made on the rear panel of the TimeCesium 4500 and on the front panel of the TimeCesium 4400. Refer to [Figure 2-3](#) for the location and contact designation for the various connectors.



Note: To turn off the TimeCesium, disconnect the hard-wired connections at either a switch panel or power panel. In an emergency you can turn the unit off by removing the fuses labeled –48V A and –48V B on the TimeCesium front panel.

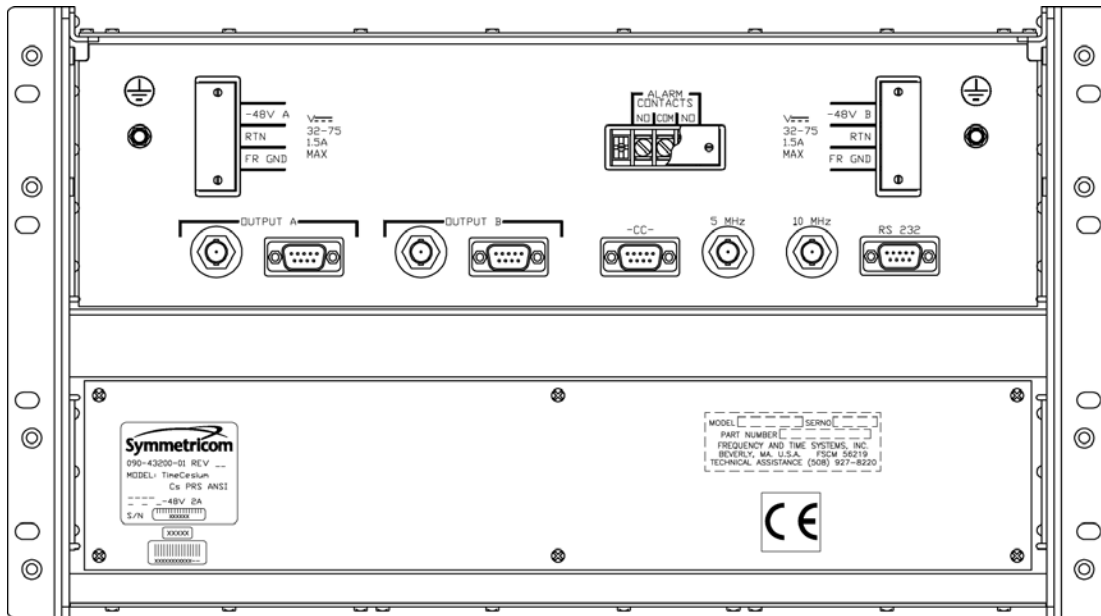


Warning: For continued protection against risk of fire, ensure that only the specified fuse type and rating are used. Fuse specifications are contained in the Specifications chapter and on the instrument's front panel.

1. Do not remove the fuses from the fuse holders labeled –48V A and –48V B from the front panel.
2. Connect Frame ground to the lug marked "FR GND" on –48V A and –48V B terminal blocks.
3. Connect –48Vdc "Power A" from the fuse panel to the lug marked "–48V A".
4. Connect –48Vdc "Power B" from the fuse panel to the lug marked "–48V B".
5. Connect the return side (+) of –48Vdc "Power A" to the terminal marked "RTN".
6. Connect the return side (+) of –48Vdc "Power B" to the terminal marked "RTN".

Making Alarm and Signal Connections

1. Connect one end of the alarms cable to the “ALARM CONTACTS” terminals labeled “COM”, and either “NO” or “NC” as required (see [Figure 2-3](#)). Connect the other end to the appropriate alarm monitoring device per local regulations.

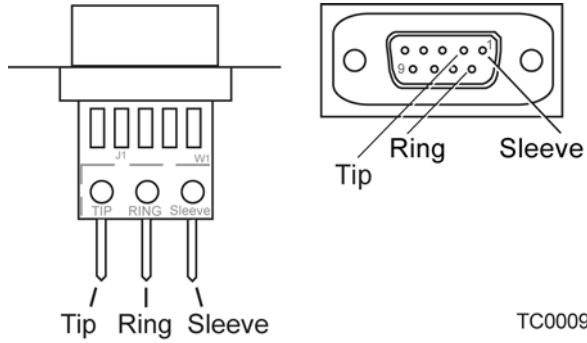


TC0004

Figure 2-3. TimeCesium Connector Locations

2. Route, connect, and dress the output cable from “OUTPUT A” to the selected network element. Select either BNC, DB9, or DB9 to wire-wrap connection; see [Figure 2-4](#) for pinout information if you are using the DB9 connector. If you are using the DB9 to wirewrap adapter (part number 22013085-000-0), refer to [Figure 2-4](#) for pinout information.
3. Route, connect, and dress the output cable from “OUTPUT B” to the selected network element. Select either BNC, DB9, or DB9 to wire-wrap connection. If you are using the DB9 to wirewrap adapter (part number 22013085-000-0), refer to [Figure 2-4](#) for pinout information.

Function	Pin
Tip	2
Ring	6
Sleeve	1



TC0009

Figure 2-4. DB9 to Wire-wrap Connector Pin Location and Pinout

4. Ensure the proper fuses are installed in the –48V A and –48V B mounting rack fuse panel and ensure that power is applied to the TimeCesium –48V A and –48V B power inputs.



Note: Applying DC power initiates the warm-up and automatic lock acquisition sequence. During this time, the ALARM relay is activated.

To turn off the TimeCesium, disconnect the hard-wired connections at either a switch panel or power panel. In an emergency you can turn the unit off by removing the fuses labeled –48V A and –48V B on the TimeCesium front panel.

5. Observe that the TimeCesium POWER and ALARM indicators are illuminated.
6. Ensure that neither of the –48 VDC Power Fault indicators are illuminated.
7. Wait for the unit to stabilize the frequency control loop. This can take up to 30 minutes. When stabilized, the ALARM indicator turns off and the LOCK indicator illuminates. The ALARM relay is also reset. At this time the signal outputs are ready for use.

Refer to [Table 2-1](#) for a description of all the front panel LED indicators.

Table 2-1. Front Panel LED Indicators

Indicator Name	Description
POWER	Turns green when DC power is present.
LOCK	Turns green when the frequency control loop is stable. Indicates normal operation. Outputs are active.
ALARM	Turns red when the unit is initialized and when a minor or critical alarm is present (alarm relay is activated).
–48 Vdc Power A Fault	Turns red when fuse is blown.
–48 Vdc Power B Fault	Turns red when fuse is blown.

Connecting the TimeCesium to a Computer

Connect one end of a null modem RS-232 cable to the serial communications port on your computer and the other end to the connector labeled RS 232 on the TimeCesium. Refer to [Table 2-2](#) for a DB9 to DB25 connection and [Table 2-3](#) for a DB9 to DB9 connection.



Note: Perform this step only if it is necessary to monitor or communicate with the unit.

Table 2-2. RS-232 Port DB9 to DB25 Connector Pinout

DB9-F	DB25-F	Function
3	3	RX (Receive Data)
2	2	TX (Transmit Data)
5	7	GND (Signal Ground)

Table 2-3. RS-232 Port DB9 to DB9 Connector Pinout

DB9-F	DB9-F	Function
3	2	RX (Receive Data)
2	3	TX (Transmit Data)
5	5	GND (Signal Ground)

Installing the Monitor3 Software

The TimeCesium has a number of software controllable features. The Monitor3 software is a utility program that can help you configure the TimeCesium instrument. It requires a PC or laptop operating with Windows 98, Windows ME, Windows NT 4, Windows 2000, or Windows XP.

1. Locate the Monitor3 software CD provided in the shipping container.
2. Install the CD into the computer.
3. Run the program `setup.exe` located on the disk by clicking **Start**, selecting **Run**, and at the command line typing `n:\setup.exe`, then pressing **Enter**, where `n` is the drive letter for the CD drive.
4. This installs the Monitor3 application files onto the hard disk in the `c:\Program Files\Symmetricom` directory. A folder labeled Symmetricom is added to the Start, Programs menu and contains an icon for the software. The installation also creates a desktop shortcut icon for Monitor3 For details on software operation, see [Chapter 3, Operating and Configuring the TimeCesium](#).



Note: To uninstall the Monitor3 software, use the Windows Add/Remove Programs in the control panel.

Chapter 3 Operating and Configuring the TimeCesium

This chapter provides information on how to use the Monitor3 application from a laptop, computer, or terminal connected to a TimeCesium serial port.

In This Chapter

- [Starting the Monitor3 Software Application](#)
- [Configuring the Serial Port](#)
- [Viewing Alarms](#)
- [Viewing the Event Log](#)
- [Configuring Telecom Outputs](#)
- [Changing TimeCesium RS-232 Settings](#)

Starting the Monitor3 Software Application

Before beginning the procedures in this section, ensure that the installation procedures in [Chapter 2, Installing the TimeCesium](#) have been performed.



Note: If problems are encountered during any of the following procedures, contact Symmetricom Global Services. See [Contacting Symmetricom](#), on page 58 for details.

Use the following procedure to start the Monitor3 application.

1. Ensure the Monitor3 software is installed (see [Chapter 2, Installing the TimeCesium](#)).
2. Ensure a null modem serial cable is connected from the computer to the RS-232 serial port as described in [Connecting the TimeCesium to a Computer](#), on page 33.
3. Ensure the proper fuses are inserted into the two fuse slots (–48V A and –48V B) of the front panel and that power is applied to the TimeCesium; the green POWER LED should illuminate. Disregard other LED indications at this time.



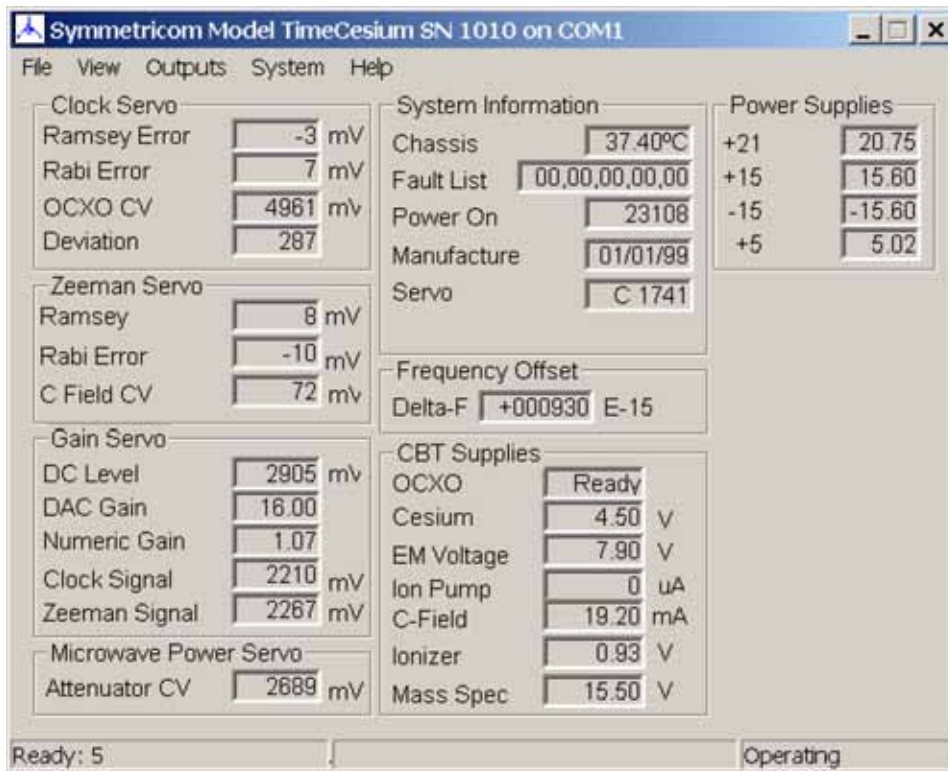
Warning: For continued protection against risk of fire, ensure that only the specified fuse type with the specified rating is used. Fuse specifications are provided in [Table 4-1](#) and on the instrument's front panel.

4. To launch the Monitor3 interface program, click **Start** and select **Programs, Symmetricom, Monitor3**. The TimeCesium start up screen appears as shown in [Figure 3-1](#).

When you launch the Monitor3 software utility program, it attempts to detect the communication settings for you, if different from the default. This can take anywhere from a few seconds to several minutes. As the scan progresses, the communication settings change. At the end of the scan a message appears, indicating if the cesium instrument was located. The communication settings are then displayed on the Real-Time Status Display.

[Figure 3-1](#) shows the Monitor3 main status window under normal operating conditions. The title bar of the main window shows the TimeCesium model, serial number, and PC communications port. The status bar at the bottom of the main window indicates RS232 communications activity and polling rate count-down on the left and instrument status (Warming Up, Operating, Minor Fault, or Major Fault) on the right. By default, the displayed data updates every 10 seconds.

If you cannot establish communications, a “Unit Not Responding” message appears at the bottom left of the main window. Check the cabling and power to the TimeCesium and ensure that no other programs are running that use the selected communications port on your computer.



TC0010

Figure 3-1. Monitor3 Initial Start-up Screen

Monitor3 initially attempts to communicate with the TimeCesium using the default settings:

- Com 1
- 9600 baud
- Odd parity
- 7 data bits
- 2 stop bits

If you wish to use Com 2, Com 3, or Com 4 on your PC, you must change this setup. This only needs to be done once; Monitor3 stores any changes you make. Refer to [Configuring the Serial Port](#), on page 40 to perform this operation.



Note: Valid COM ports can be 1 through 8; however, only the available COM ports are displayed in the option list. Ports that are being used and uninstalled ports are not shown.

5. To close the program, click **File** and select **Exit**.

Security

The TimeCesium is shipped with the password-based security feature disabled. If you enable this feature, then Monitor3 requests a password before applying a protected command. [Table 3-1](#) lists the protected and the unprotected commands. If you do not enable security, then Monitor3 immediately applies the requested command.

Table 3-1. Password-Protected and -Unprotected Commands

Unprotected Commands	Protected Commands
A08 – Report Date and Time	A06 – Set Date
A14 – Report Power On Hours	A07 – Set Time
C03 – Report Software Version	A20 – Set E1 Pattern Generator
C10 – Report Security Status	A21 – Set T1 Pattern Generator
D*1 – Report Variables	A22 – Set Telecom Output
D*2 – Report Constants	C05 – Set Serial Port Parameters
D*3 – Report Event Log	C08 – Set Admin Password
D*5 – Report NV RAM	C09 – Clear Admin Password
	W18 – Clear Event Log

To enable security (or change your current password) for your TimeCesium:

1. Click **System** and select **Security**. The Security dialog box appears, as shown in [Figure 3-2](#).
2. Enter your current password in the Current Password field. If the security feature is not active, this entry box is disabled.
3. Enter your new password (a five digit string between 00001 and 99999) in the New Password field.
4. Re-enter the password in the Confirm Password field.

5. Click **Apply** (or **Cancel**, if you wish to start over).
6. If you did not enter an acceptable password, you are asked to try again.
7. If you did not enter correctly the current password, the new password is rejected.

When you issue a password-protected command by clicking APPLY, the password entry window appears, as shown in [Figure 3-3](#).

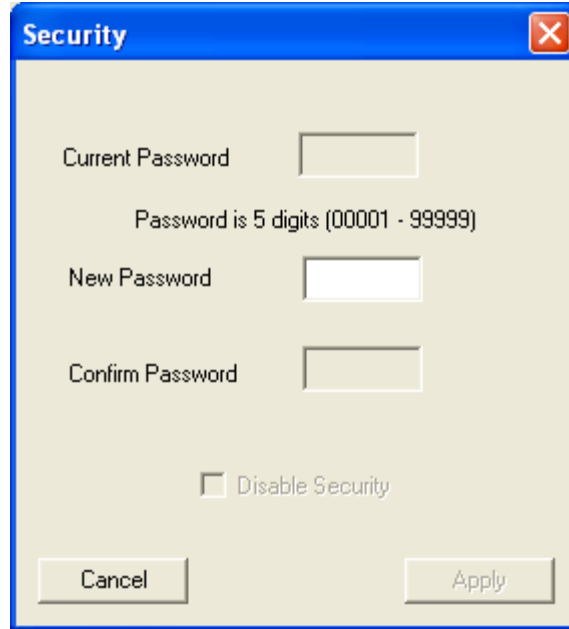


Figure 3-2. The Security Dialog Box

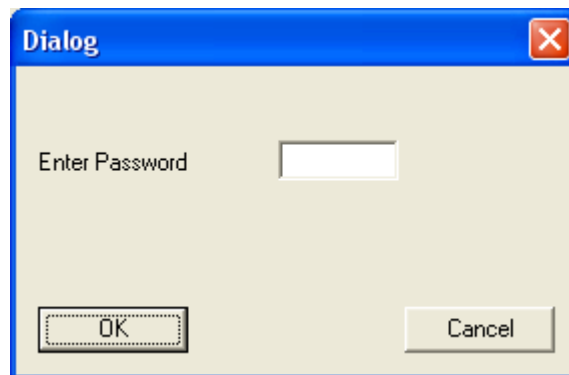


Figure 3-3. The Password Dialog Box

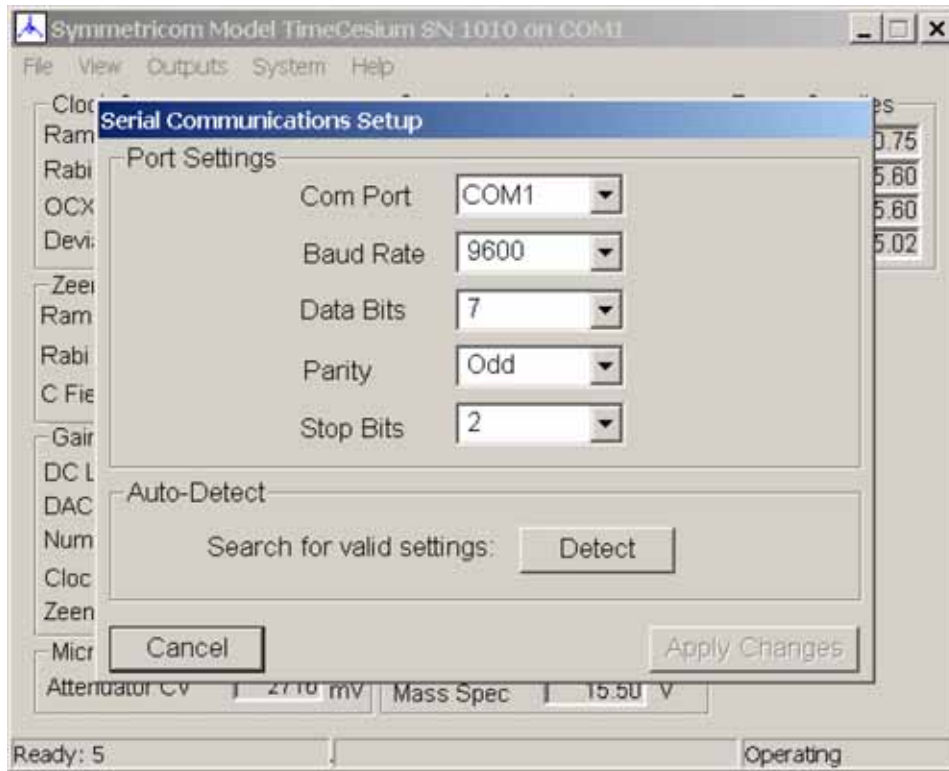
1. Enter your current password.
2. Click **OK** (or **Cancel**, if you wish to start over).
3. If you did not correctly enter the current password, the command is not applied.

In the following sections, if security is enabled, then all commands that change the state of your TimeCesium, such as configuring the serial port, require the user password.

Configuring the Serial Port

Monitor3 default settings are Com 1, 9600 baud, odd parity, 7 data bits, 2 stop bits. Use the following procedure to change the serial port configuration on the host computer:

1. Click **File** and select **Configure Serial Port** to open the Serial Communications Setup window (see [Figure 3-4](#)).



TC0011

Figure 3-4. Configuring the Serial Port

2. To automatically configure the port, use [Step a](#) through [Step c](#). To manually configure the port, go to [Step 3](#).
 - a. Click **Detect** in the Auto-Detect section.
 - b. Allow the unit to scan and automatically detect the correct settings. This can take anywhere from a few seconds to several minutes.



Note: If the appropriate configuration is not detected, the scan process continues to cycle through all possible settings. If you click **Cancel** to stop the process, communications will not be established and a message appears stating the Cesium instrument was not detected. Refer to [Connecting the TimeCesium to a Computer](#), on page 33 for proper cable connections.

- c. Click **OK** to select the detected settings. Skip to step 5.
3. Select the COM port where the TimeCesium is connected to the PC.
4. Select the baud rate, data bits, parity, and stop bits.
5. When you complete the setup, click **Apply Changes** to close the Serial Communications Setup window and save the setup, or click **Cancel** to close the window without saving the changes. The main window indicates if the unit is online and shows system status.

If you cannot establish communications, a “Unit Not Responding” message appears at the bottom left of the main window. At 10 second intervals, Monitor3 re-initializes the communications port and attempts to establish communications. If you cannot establish communications, check cabling, power to the cesium instrument, and ensure that no other programs are running that use the communications port on your computer.

Configuring Unit Monitoring Options

You can specify the following monitoring options available on the TimeCesium:

- Polling Rate
- Save to Disk

The polling rate determines how often the TimeCesium returns its status to the Monitor3 application. You can specify whether you want to save these status reports to a file, as well as specify the file path.

The TimeCesium returns the following information in the status response:

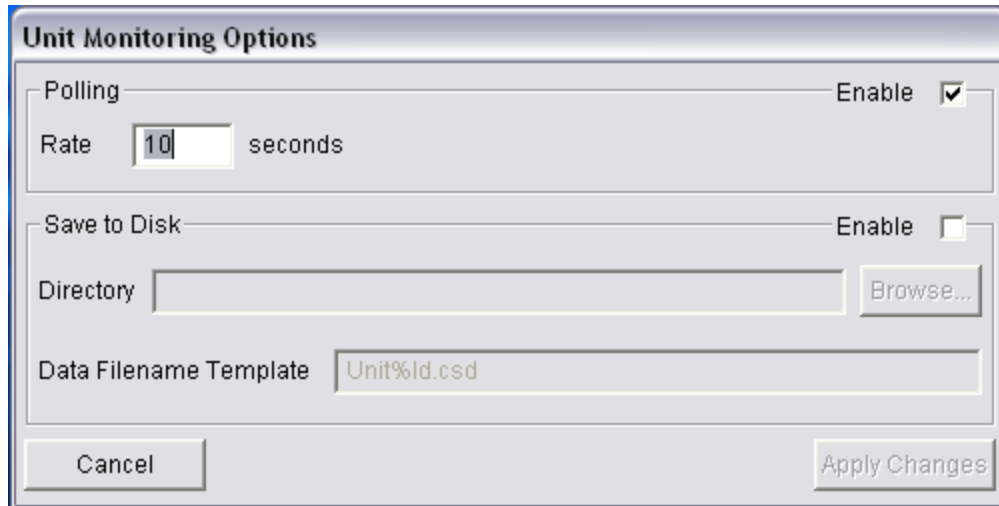
```
MJD, ID, UnitType, Factory, State, Alarm1, Alarm2, Alarm3,
Alarm4, Alarm5, StdDev, CRamErr, CRabErr, CLevel, VVCXO,
ZRamErr, ZRabErr, ZLevel, VCField, ICField, VuWave, DCLevel,
DACGain, NumGain, TChassis, VCsOven, OSCState, VEM, IIP,
VMS, VION, OCXOTau, FreqTune, Pos21V, Pos5V, Pos15V, Neg15V,
Version, System24, ACDC24, DCIN24, Batt24, Charge, Source,
NOMVMS, NOMVION, NOMZRabi, CBTD, CBTT, OCXOD, OCXOT.
```

This information is the same as reported in the start-up screen shown in [Figure 3-1](#).

Enabling Polling

To enable polling on the TimeCesium:

1. Click **File** and select **Configure Unit Monitoring**. This opens the dialog box shown in [Figure 3-5](#). The Polling Enable box is checked by default and the Apply Changes button is disabled until you make a change in the dialog box.



TC0020

Figure 3-5. Unit Monitoring Options Dialog Box

2. Type a value in the Rate field. This value is the number of seconds between polls. The Apply Changes button is enabled.
3. Click **Apply Changes** to close the dialog box and start polling. The status data is sent over the serial port at the rate you specified in step 3 above.

Enabling Save to Disk

You can save the status from the TimeCesium to a text file on your computer.

1. Click **File** and select **Configure Unit Monitoring**. This opens the dialog box shown in [Figure 3-5](#).
2. Click **Enable** in the Save to Disk window. The Directory and Data Filename Template fields are enabled.
3. Type the full location of the directory in which you want to save the status file in the Directory field, or click **Browse...** to navigate to the directory in which you want to save the file. This directory must already exist; you cannot create a new directory in the navigation pane.

4. Type the filename for the status file in the Data Filename Template field. The default of `Unit%Id.csd` creates the filename `Unitxxxxx.csd`, where `xxxxx` is the serial number of the TimeCesium.

You can also specify your own filename, subject to the file naming conventions of your operating system. If you intend to use Monitor3 as the default program for analyzing TimeCesium data, specify the `.csd` file extension. Other filename extensions, for example `.csv`, may be used to activate other data analysis programs. If you specify the `.txt` file extension, the file can be opened by most text processing applications.

5. Click **Apply Changes** to close the dialog box and start saving status to the designated file.

Each time the TimeCesium generates a new status update, it appends the information at the end of the existing file. To create a new status file, repeat the procedure in this section, and specify a different filename in step 4.

Viewing Alarms

The TimeCesium monitors the operating parameters as indicated on the Monitor3 main panel. Alarms are generated when any of several parameters deviates from the acceptable value. See [Alarms and the Alarm Relay Connector](#), on page 17 for information on alarm levels.

The current list of alarms is indicated by hexadecimal code in the Fault List in the System Information section on the Monitor3 main panel; [Table 5-2](#) lists the code and provides an explanation for each alarm.

To see an annotated list of alarms, perform the following steps.

1. Click **View** and select **Alarms**. This opens the Alarms dialog box as shown in [Figure 3-6](#).
2. Click **OK** to close the window.

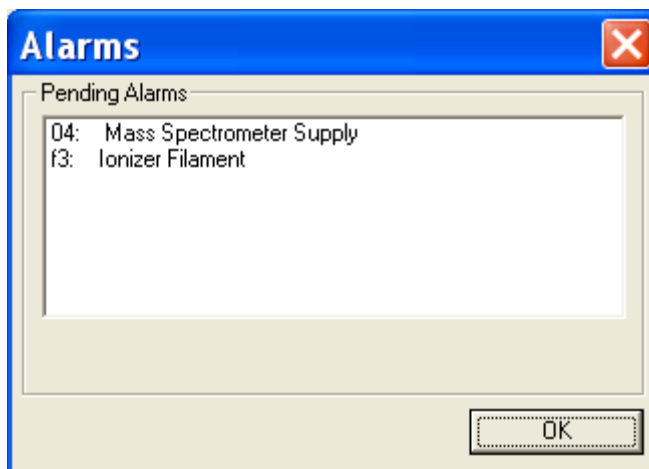


Figure 3-6. Alarms

Viewing the Event Log

Changes in the system status are recorded as new events in the log and each event has a time stamp. The Event Log Clock field shows the current setting of the clock.

1. Click **View** and select **Event Log**. The Event Log window appears, as shown in [Figure 3-7](#).
2. Click **Clear Instrument** to clear the event log.
3. Click **Refresh View** to display new events.
4. Click **Set from PC Clock** to set the Event Log Clock to match the current time in the PC.
5. Click **Cancel** to close the window without saving the changes.



Note: The Event Count window displays the current number of system events listed.

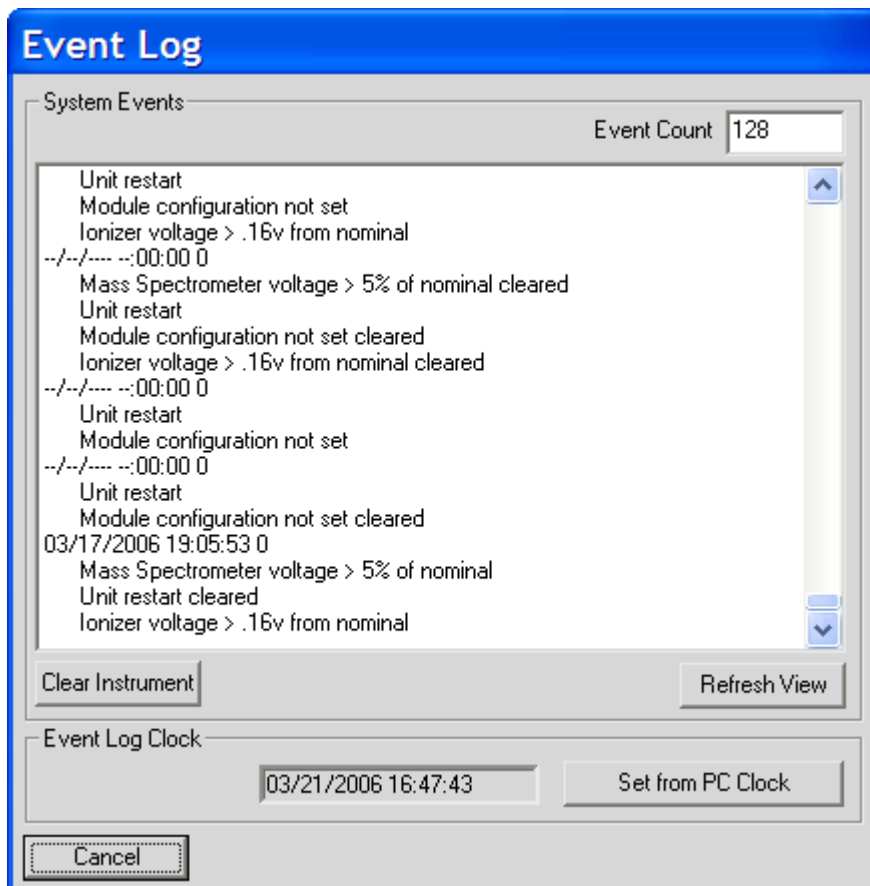


Figure 3-7. Event Log

Configuring Telecom Outputs

The TimeCesium has two Telecommunications outputs and each can be driven by a T1 or E1 signal. The output channels are configured separately from the signal generators as shown in [Figure 3-8](#). Each output can be a simple Clocked signal, or it can be a fully detailed PRS Framed signal. Use the following procedure to configure the telecom outputs.

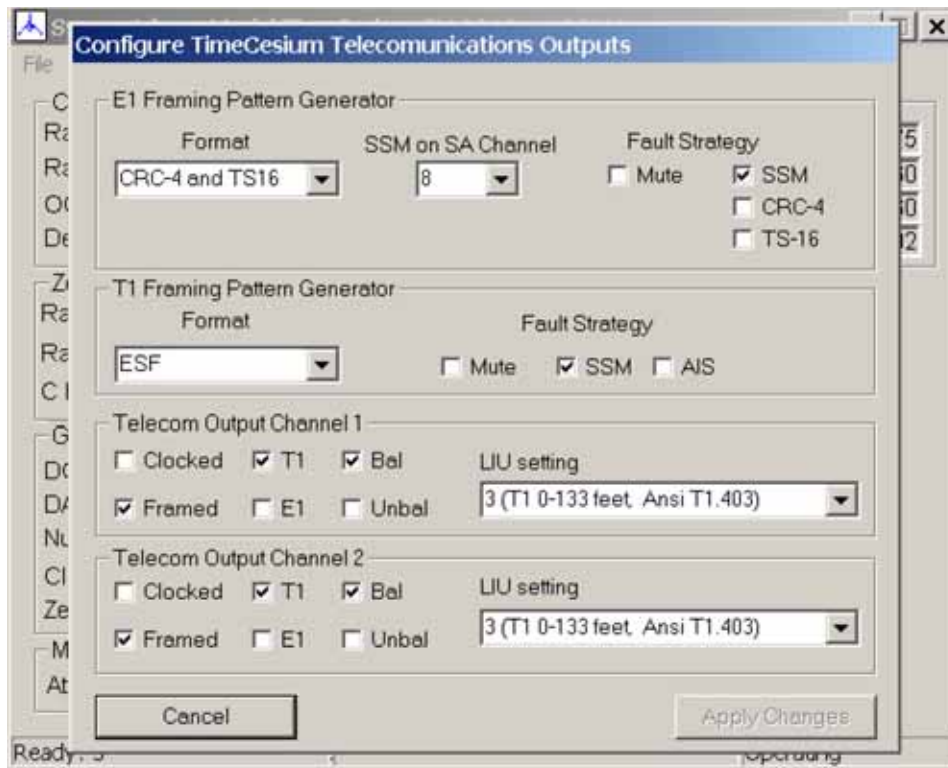
1. Click **Outputs** and select **Configure Telecom Outputs** from the menu option. This opens a dialog box as shown in [Figure 3-8](#).
2. Configure the E1 signal generator by selecting options according to the needs of your installation. See ITU specification G.703 for details. To make other changes in this dialog box, skip to step 3. If you do not wish to make any other changes, click **Apply Changes** to apply the changes and close the dialog box.

3. Configure the T1 signal generator by selecting options according to the needs of your installation. See relevant BellCore documentation for details. To make other changes in this dialog box, skip to step 4. If you do not wish to make any other changes, click **Apply Changes** to apply the changes and close the dialog box.
4. Configure Output Channel 1 and Output Channel 2 by selecting options according to the needs of your installation. Output drive can be either balanced or unbalanced. You cannot have both enabled simultaneously on a single channel.
5. Ensure the LIU setting matches the type of signal being produced by this channel.



Note: For E1 there is only one LIU setting. For T1, there are several LIU settings. See relevant BellCore documentation for details.

6. When all settings are complete, click **Apply Changes** to close the window and save the settings, or click **Cancel** to close the window without saving the changes.



TC0016

Figure 3-8. Configuring the Telecom Outputs

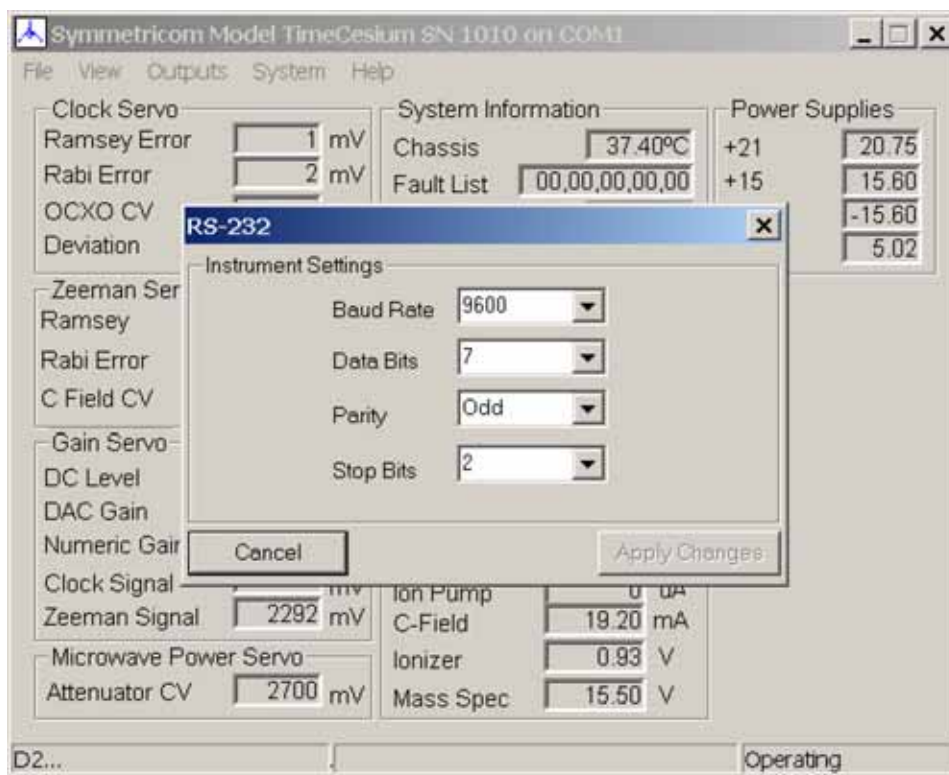
Changing TimeCesium RS-232 Settings

Use the following procedure to change the TimeCesium's communication settings. To change the Monitor3 communications settings, see [Configuring the Serial Port](#), on page 40.



Note: The Monitor3 application automatically changes its settings to match the TimeCesium RS-232 settings and maintains communications after the change.

1. Click **System** and select **RS-232** to open the RS-232 window (see [Figure 3-9](#)).
2. Select the baud rate.
3. Select the number of data bits.
4. Select parity.
5. Select the number of stop bits.
6. Click **Apply Changes** to close the RS-232 window and save the changes, or click **Cancel** to close the window without saving the changes.



TC0018

Figure 3-9. RS-232 Settings

Chapter 4 Specifications

This chapter provides the specifications for the TimeCesium.

TimeCesium Specifications



Note: All specifications are measured at 25° C unless otherwise specified.

Table 4-1. System Specifications

Category	Specification
Performance	
Accuracy, Calibrated to	$\leq \pm 1 \times 10^{-12}$
Accuracy (over environment)	$\leq \pm 1 \times 10^{-12}$
Retrace (reproducibility)	$\leq \pm 1.2 \times 10^{-12}$
Stability sg(t)	
Averaging Time	
1s	1.2×10^{-11}
10 s	8.5×10^{-12}
100 s	2.7×10^{-12}
1,000 s	8.5×10^{-13}
10,000 s	2.7×10^{-13}
Warm-up Time (typical)	30 minutes
Outputs	
Telecom Signals	Two channels: one input/output channel, either framed or clock, configurable by the Monitor3 software interface through the RS-232 port
Framed – 1.544 Mbps	ANSI T1.102 DS1 selectable framing: D4 or ESF, with Stratum 1 Sync Status Message (SSM)
Format	Framed all ones, B8ZS
Framed – 2.048 Mbps	ITU-I Rec. G.703/9 (E1) with G.704 framing and with Stratum 1 Sync Status Message (SSM)
Format	Framed all ones, HDB3
Clock – 1.544 MHz	Same as G.703/13
Clock – 2.048 MHz	G.703.13
Composite Clock	64 kHz / 8 KHz BPV, AMI, Balanced 133Ω

Table 4-1. System Specifications (Continued)

Category	Specification
Connectors	DB9 for balanced signals T1 at 100 Ω E1 at 120 Ω BNC for unbalanced signals, 75 Ω DB9 to wire-wrap adapter for balanced signals (P/N 22013085-000-0)
Sinusoidal Signals	x1 at 10 MHz, 1V rms/50 Ω , BNC x1 at 5 MHz, 1V rms/50 Ω , BNC
General	
Power Requirements	Dual redundant DC inputs
Operating Voltage	-48 V DC nominal (-36 to -62 V DC)
Power (operating)	40 W
Power (warm-up)	55 W
Interface Connections	
External DC inputs, A and B	#6 screw terminal block
RS-232	9 pin male connector (mate: DA9S, ITT Cannon or equal)
Chassis ground, A and B	#6 screw terminal block
Alarm - Critical and Minor	#6 screw terminal block
Fuses	
External DC Input	2 A, 250 V, slow acting (5 x 20 mm)
Dimensions	
Width	18.2 in (64.0 cm)
Depth	10.1 in (25.7 cm)
Height	10.5 in (26.67 cm)
Weight	36.5 lb. (16.6 kg)
Mounting	Mounting ears provided for 19 in or 23 in racks
Environment	
Temperature, Operating	0 to 50 $^{\circ}\text{C}$
Temperature, Non-operating	-40 to +75 $^{\circ}\text{C}$
Humidity	95%, non-condensing
Magnetic field	0 to 2 gauss @ DC, 50, 60 or 400 Hz

Table 4-2. Factory Default Settings

Parameter	Factory Default Setting	Provisionable Values
TimeCesium RS-232 Port		
Baud Rate	9600	1200 2400 4800 9600 19200
Data Bits	7	7 8
Parity	Odd	None Even Odd
Stop Bits	2	1 2
Monitor3 Serial Port (on host)		
Comm Port	COM1	COM1
Baud Rate	9600	1200 2400 4800 9600 19200
Data Bits	7	7 8
Parity	Odd	None Even Odd
Stop Bits	2	1 2
Unit Monitoring		
Polling Rate	Enable	Enable Disable
	10 seconds	2 3 ... 100000
Save to Disk	Disable	Enable Disable
Data File Name Template	Unit%ld.csd	any valid file name with extension .txt, .csv, or .csd
Unit ID	(Unit Serial #)	cannot be changed
Time Constant	1.00	cannot be changed
Language	English	cannot be changed
Daylight Savings Time	Off	cannot be changed
Leap Second Insertion	Disarm	cannot be changed
Telecom Outputs		
E1 Framing Pattern Generator		
Format	CRC4 and TS16	Basic E1 CRC-4 TS-16 CRC4 and TS16
SSM Channel	4	4 5 6 7 8
Fault Strategy	Mute	Mute SSM CRC-4 TS-16

Table 4-2. Factory Default Settings (Continued)

Parameter	Factory Default Setting	Provisionable Values
T1 Framing Pattern Generator		
Format	ESF	ESF D4 All 1's D4 1:7
Fault Strategy	Mute	Mute SSM AIS
Telecom Output Channel 1		
Format	Framed	Clocked Framed
Synthesizer	T1	E1 T1
Interface	Balanced	Balanced Unbalanced
LIU Setting	3 (T1 0 to 133 feet)	0: E1 2: ANSI T1.403 3 to 7: cable length
Telecom Output Channel 2		
Format	Framed	Clocked Framed
Synthesizer	T1	E1 T1
Interface	Balanced	Balanced Unbalanced
LIU Setting	3 (T1 0 to 133 feet)	0: E1 2: ANSI T1.403 3 to 7: cable length
Security		
Security	Disable	Disable Enable
Password	00000	five-digit string, 00001 to 99999

Chapter 5 Maintenance and Troubleshooting

This chapter provides information about preventive maintenance, troubleshooting alarm fault codes, and re-shipment of the product.

In This Chapter

- [Preventive Maintenance](#)
- [Troubleshooting](#)
- [Contacting Symmetricom](#)
- [Disposal](#)
- [Shipping](#)
- [Storage](#)
- [Manual Updates](#)

Preventive Maintenance



Caution: To avoid electrostatic discharge (ESD) damage to components in the TimeCesium, observe the appropriate electrostatic discharge (ESD) precautions and procedures.



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



Caution: To avoid electromagnetic discharge and damage to the circuitry, never attempt to clean the TimeCesium with a vacuum.



Note: Please retain the original packaging of the unit for re-shipping the product as needed. If the original packaging has been discarded, contact the Symmetricom Global Services (SGS) for assistance (see [Contacting Symmetricom](#), on page 58).

The TimeCesium requires minimum preventive maintenance. Care should be taken to insure the unit is not exposed to hazards such as direct sunlight, open windows, or extreme heat. Should the unit require cleaning, wipe the exterior chassis with a soft cloth dampened with mild soapy water.

[Table 5-1](#) lists suggested preventive maintenance measures to be performed at the user's discretion, as time permits. These procedures are *not required* to be performed. Do not disassemble components solely for the purpose of inspection. During a component disconnection procedure, such as a cable removal or replacement, inspect components according to the inspection procedures listed in the [Table 5-1](#).

Table 5-1. Preventive Maintenance

Item	Inspection	Corrective Action	Interval
Unit Case	Inspect for dirt or foreign material	Clean the exterior of shelf 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 connectors and jacks, bent or missing connector pins	Tighten loose connectors. If damaged, replace the connector and/or cable at the first opportunity	Periodically

Table 5-1. Preventive Maintenance (Continued)

Item	Inspection	Corrective Action	Interval
Input Power Fuses	Inspect for loose or damaged fuse holders	If loose or damaged contact Symmetricom Global Services	Periodically
Unit Case Screws	Inspect for loose or missing screws or hardware on shelf	If loose, tighten securely, replace missing hardware	Periodically

Troubleshooting

If the alarm activates and the Alarm LED remains lit indicating a failure of the TimeCesium, contact Symmetricom Global Services for instructions.

Table 5-2 lists the two-digit numeric alarm codes, a description of each, and any comments associated with the specific code. If any of the following fault codes are observed, refer to the comment in the Comments column. If unable to resolve the cause of the fault, contact Symmetricom Global Services for further instructions.

Table 5-2. Fault Messages

Alarm Code	Description	Comment	Level
0x01	Clock Fringe Level	<1320 or >3080 mV	Major
0x02	Clock Rabi Symmetry	>50 mV	Major
0x03	Zeeman Rabi Symmetry	>160 mV	Major
0x04	Mass Spectrometer Voltage	±5% of factory setting	Major
0x05	C-field Current	< 16 mA or >22 mA	Major
0x06	EM Voltage	< 7 or >13 V	Major
0x07	CBT Signal Quality	Signal Quality Degraded	Minor: Signal Noisy Major: Signal Failure
0x08	VCXO Tuning Voltage	<0.5 V or >4.5 V	Minor
0x09	Ambient Temperature	>80°C	Major
0x12	+5 V Supply	<4.75 or >5.25 V	Major
0x13	+15 V Supply	<13.75 or >17.0 V	Major
0x14	-15 V Supply	>-13.75 or <-17.0 V	Major
0x16	Unit Restart	Set on Reboot	Informative only
0x17	Module Configuration	Consistency check on Reboot	Informative only

Table 5-2. Fault Messages (Continued)

Alarm Code	Description	Comment	Level
0x18	DAC Gain at Maximum	= 256	Minor
0x26	Fuse A open	Replace fuse	Minor
0x27	Fuse B open	Replace fuse	Minor
0xF1	Cesium Oven Voltage	>10.0 V (after Cs lock)	Major
0xF2	Oscillator Oven Warm-up	Unlock (after Cs lock)	Major
0xF3	Ionizer Voltage out of range	>160 mV of factory setting	Major
0xF4	Ion Pump Current	>175 μ A	Major
0xF5	+21 V Supply	<17 V or >24 V	Major

Contacting Symmetricom

U.S.A. Call Center:

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

Toll-free North America: 888-367-7966
Tel: 408-428-7907
Fax: 408-428-7998

E-mail: cac@symmetricom.com
Internet: <http://www.symmetricom.com>

Europe, Middle East, and Africa (EMEA) Call Center:

Symmetricom Global Services EMEA
Fichtenstr. 25
85649 Hofolding Germany

Tel: +49 700 3288 6435
Fax: +49 8104 662 433

E-mail: emeasupport@symmetricom.com
Internet: <http://www.symmetricom.com>

Disposal

The cesium beam contained in the TimeCesium Primary Reference Source is classified as hazardous and should be disposed of in accordance with local, state, and federal guidelines. Symmetricom provides a disposal service. For current information and prices, contact Symmetricom Global Services.

Shipping

Turn off the TimeCesium by removing the external DC power. Remove all external connections and remove the unit from the rack or cabinet. Place the unit in the HAZMAT shipping container.

Hazardous Material (HAZMAT) Shipping Considerations

Symmetricom Cesium standards contain a small amount of cesium metal. The cesium isotope used (cesium 133) is non-radioactive. However, because of its reactive chemical properties, cesium is classified as a hazardous material by the U.S. Department of Transportation (USDOT) and the International Air Transport Association (IATA). During normal handling the TimeCesium presents no danger since the cesium is encased within a vacuum-sealed metal enclosure. Hazardous materials, depending upon their specific nature, are subject to certain shipping regulations of the USDOT and the IATA. These regulations govern the shipping container as well as its labeling.



Note: If you have questions about shipping the TimeCesium, contact Symmetricom Global Services (see [Contacting Symmetricom](#), on page 58). You can also find information on current hazardous material shipping requirements at the Department of Transportation (DOT) web site.

The initial shipment of every Symmetricom cesium standard complies with HAZMAT regulations by using a shipping container that has been tested and certified. This container has been designed to prevent damage to the unit during shipment and to meet current hazardous-material shipping regulations. The container can be used repeatedly and should be retained for any future shipping requirements of the instrument.

Shipping Products Back to the Factory

Return all units in the original packaging. After the standard packing procedure to protect the equipment, Cesium products being returned for repair require special preparation for shipment as described in [Hazardous Material \(HAZMAT\) Shipping Considerations](#), on page 59. Connectors should be protected with connector covers or the equipment should be wrapped in plastic before packaging. Take special care to protect the front and rear panels.

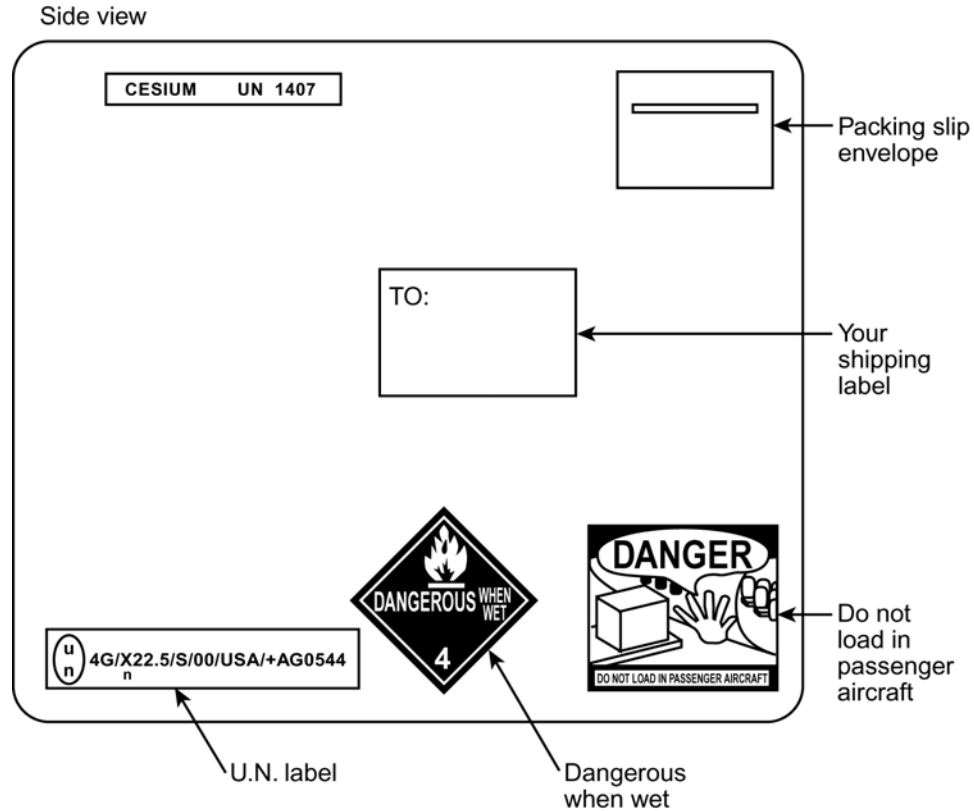
To return equipment to Symmetricom for repair, contact Symmetricom Global Services to obtain a return material authorization number (RMA) before returning the product for service. Retain this RMA number for future reference (see [Contacting Symmetricom](#), on page 58).

1. Provide a description of the problem, product item number, serial number, and warranty expiration date.
2. Provide the return shipping information (customer field contact, address, telephone number, and so forth.)
3. 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. For the shipping address, contact Symmetricom global Services (see [Contacting Symmetricom](#), on page 58).

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

Shipping Carriers

The shipper is responsible for the overall condition of the Hazardous Material shipping container; such as latches locked (if applicable), no visible damage to container and the proper placement of all labels on the container. [Figure 5-1](#) illustrates the proper placement of labels. Make sure an address label, proper HAZMAT labels, and packing slip (if necessary) are affixed to the shipping container and are clearly visible.



prs00002

Figure 5-1. Typical Label Placement

Several United States and international shipping companies can accommodate properly packaged hazardous materials. United Parcel Service and Federal Express are examples for the United States. Intercontinental (617-569-4400) provides international shipping services. Contact one of these shipping companies for assistance.

The following information is typically requested by the carrier:

Proper Shipping Name:	Caesium (Cesium) Dangerous When Wet
Class Or Division:	4.3
UN or ID No.:	UN1407
Type Of Packing:	One Fiberboard Box x5 Grams
Packing Instructions:	412

Re-Ordering Information

Contact your local sales office to re-order any subassembly or accessory or to obtain a current list of subassemblies, accessories, and part numbers. When you know which items you are ordering, supply the subassembly or accessory name and its part number along with the purchase order number to our sales office.

Storage

During storage of the TimeCesium, there are two factors to consider: cesium beam tube vacuum and shelf life.

Cesium Beam Tube Vacuum

If the TimeCesium is stored for extended periods of time (longer than 6 months), periodic storage-mode operation cycles of 30 minutes should be performed in order to maintain the tube vacuum. The TimeCesium must be turned-on and operated for a minimum of 30 minutes on or before the six month storage interval. Refer to [Mounting the TimeCesium](#), on page 27 for the turn-on procedure.

Cesium Beam Tube Shelf Life

Extended high temperature storage (>50 °C) reduces the expected operating life of the cesium beam tube. The reduction in tube life expectancy for each year at 70 °C is approximately 4 months.

Manual Updates

From time to time, this manual may be updated. The current version of the manual is available for downloading in pdf format at Symmetricom's website at www.symmetricom.com. After you download a manual, you can view it on your computer screen or you can print it out.



Note: If you are downloading a manual for the first time, you need to register on Symmetricom's website. If you are currently registered, log in and download the manual update.

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