

4370A DVB Sync Server

Operations and Maintenance Manual



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4370A DVB Sync Server Operations and Maintenance Manual

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A	Initial release	8/23/07	GAR
B	Updates for -x5y and -06y	1/18/08	GAR

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1: Introduction



Note

FIRST READ THIS MANUAL THOROUGHLY!

This is especially true for the sections regarding “2.1 Safety Information” on page 15 and “2.2 Unpacking and Installing the Chassis” on page 15.

1.1 Symbols

These symbols appear throughout the manual as well as on the 4370A itself.

Symbol	Definition
Note	This symbol means the following information is a note that gives you important information that may affect how you use the 4370A.
	Caution, refer to manual. Read all instructions in this manual before using this product.
	Caution - Risk of Electrical shock
	Fuse symbol.
	LAN port, network. DO NOT CONNECT TO TELECOM CONNECTIONS THAT CARRY HAZARDOUS VOLTAGES.
	Alarm signal out.

1.2 About This Manual

This manual describes how to set up, maintain, and troubleshoot the 4370A.

“[Chapter 1, Introduction](#)” on page 1 explains symbols that appear in the manual and on the unit as well as documentation conventions. The chapter also describes the 4370A chassis options and output modules.

“[Chapter 2, Setting Up the 4370A](#)” on page 15 contains important safety information, describes how to set up the 4370A, and describes how to connect the 4370A.

“[Chapter 4, Configuring and Monitoring the 4370A](#)” on page 25 describes how to configure and monitor the 4370A using SNMP.

“[Chapter 5, Troubleshooting the 4370A](#)” on page 37 describes general troubleshooting and how to replace modules.

“[Appendix A, MIB Reference](#)” on page 41 contains information about the SNMP MIBs associated with the 4370A.

“[Appendix B, Warranty and Shipping Information](#)” on page 53 contains the warranty and shipping information.

“[Appendix C, Specifications](#)” on page 55 contains the Declaration of Conformity and detailed specifications for the 4370A

1.2.1 Conventions

This manual uses several typographical conventions to help explain how to use the 4370A.

Convention	Definition
Bold	Words in bold show: <ul style="list-style-type: none">■ Buttons and icons to click■ Menu options to select■ Commands to type■ Non-variable information displayed in response to commands
<i>Italics</i>	Words in <i>italics</i> show: <ul style="list-style-type: none">■ Variable information displayed in response to commands

1.3 4370A Overview

The 4370A DVB Sync Server is a flexible timing system designed for Single Frequency Network (SFN) synchronization for Digital Video Broadcast (DVB) and Digital Audio Broadcast (DAB) applications. These applications require a precision time and frequency reference to synchronize transmitters across multiple locations. Without synchronization, networks are not able to reliably deliver video and audio content to the end user.

The 4370A receives reference timing signals from GPS, fiber optic, 2 MHz, or 2 Mbit/sec inputs (depending on model) and translates them to generate the output signals. In case of a loss of GPS, the 4370A-x5y (where x and y can be 0, 1 or 2) automatically switches to and locks to the auxiliary

fiber optic or 2 MHz/2Mbit input to continually provide outputs. The 4370A-x5y can also be set up to use the 2 MHz/2Mbit input as its frequency reference in the event that GPS is not available.

You can link two 4370A-x5y units using the input module fiber optic transceiver to provide a fully redundant system without a single point of failure.

The 4370A uses a modular design with different chassis configurations and a variety of plug-in output modules, letting you select the functions and features you need. The 4370A chassis has slots for six output plug-in modules, plus an additional front panel slot for a second power supply.

Table 1 describes the possible chassis configurations.

Table 1: Chassis configurations (See Note 1 for explanation of “y” in part numbers)

Model	Connections	Oscillator
4370A-x4y	Inputs <ul style="list-style-type: none"> ■ GPS receiver Outputs <ul style="list-style-type: none"> ■ Alarm 	One of the following: <ul style="list-style-type: none"> ■ TCXO (model 4370A-04y) ■ OCXO (model 4370A-14y) ■ Rubidium (model 4370A-24y)
4370A-x5y	Inputs <ul style="list-style-type: none"> ■ GPS receiver ■ Fiber optic ■ 2 MHz or 2 Mbit/s Outputs <ul style="list-style-type: none"> ■ Alarm 	One of the following: <ul style="list-style-type: none"> ■ TCXO (model 4370A-05y) ■ OCXO (model 4370A-15y) ■ Rubidium (model 4370A-25y)
4370A-06y	Dual fiber inputs Outputs <ul style="list-style-type: none"> ■ Alarm 	TCXO

Note 1: The possible power supply configurations are as follows (and control the y character of the model numbers in Table 1):

- Two AC (model number ending in 0)
- One AC and one DC (model number ending in 1)
- Two DC (model number ending in 2)

You must determine which type of power supplies you want when you make your purchase.

The 4370A-xxx chassis includes one AC or DC power supply. You can purchase a second power supply module for a fully redundant power system.



Note

The AC and DC power supply slots are *not* interchangeable. Each slot has a keyed pin which prevents installation of the incorrect power supply type

If you have two power supplies, the power supplies are hot swappable if one power supply remains installed in the unit.

An Ethernet port on the rear panel provides the capability to remotely monitor and control the unit using Simple Network Management Protocol (SNMP).

1.3.1 NTP Server

All models provide standard NTP v4 server functionality over the Ethernet connection located on the input module panel.

NTP client software is available for free on the Internet for most operating systems. UNIX users can find information on how to set up a computer for NTP client capability on the www.ntp.org web site. Windows users can refer to the document <http://download.microsoft.com/download/2/0/f/20f61625-7b2a-4531-b007-1c714f1e51b7/wintimeserv.doc> for information on the Windows time service or to the web site <http://geodsoft.com/howto/timesync/> for a description of NTP for Windows and some of the client software available on the Internet.

Table 2 lists the specifications for the NTP server.

Table 2: NTP sever specifications

Characteristic	Description
NTP Server Stratum	Stratum 1 via GPS
Accuracy	<ul style="list-style-type: none">■ < 100 μs @ 200 NTP packets per second.■ Network factors can limit LAN NTP client synchronization accuracy to 2 ms typical.

1.4 Chassis Front and Rear Panels

Each chassis model has front different front and rear panel LEDs, buttons, and connections:

- “1.4.1 4370A-x4y Chassis” on page 4
- “1.4.2 4370A-x5y Chassis” on page 7
- “1.4.3 4370A-06y Chassis” on page 9

1.4.1 4370A-x4y Chassis

The 4370A-x4y chassis has the following inputs and outputs:

- Inputs
 - GPS receiver
- Outputs
 - Alarms - Major and Minor

Figure 1 shows the 4370A-x4y's front panel, and Figure 2 shows the 4370A-x4y's rear panel.

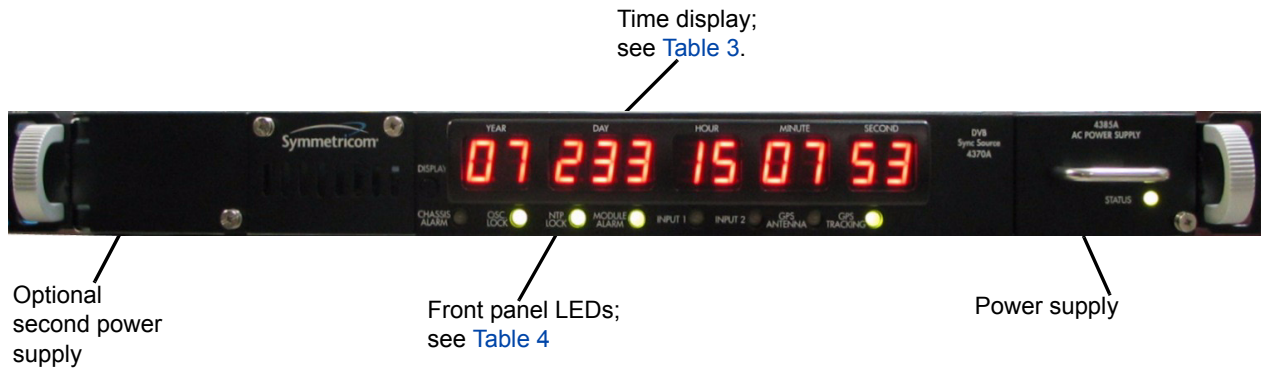


Figure 1: Front panel - 4370A-x4y

Table 3: Time display LEDs - 4370A-x4y

Time display	Description
YEAR	<ul style="list-style-type: none"> ■ Last two digits of the current year ■ Example: "06" for 2006 ■ Range: 00 to 99 ■ The four-digit year value is known, though it is not displayed.
DAY	<ul style="list-style-type: none"> ■ Julian day of the year ■ Example: "366" for 31 Dec 2004 (a leap year) ■ Range: 1 to 366 ■ Displays the value "366" for the last day of a leap year.
HOUR	<ul style="list-style-type: none"> ■ Hour of the day in military time ■ Example: "23" for 11 p.m. ■ Range: 0 to 23
MINUTE	<ul style="list-style-type: none"> ■ Minute of the hour ■ Range: 0 to 59
SECOND	<ul style="list-style-type: none"> ■ Second of the minute ■ Range: 0 to 60 ■ Displays the value "60" during a positive leap second.

Table 4: Front panel LEDs and buttons - 4370A-x4y

Name	Definitions
STATUS (on each power supply)	<ul style="list-style-type: none"> ■ Off—No power connected to chassis, or fault in power supply if the rest of the unit is operating properly ■ Red—No power supply connection or internal power supply fault. ■ Green—OK.
NTP LOCK	<ul style="list-style-type: none"> ■ Red—NTP server not providing time service. ■ Green—NTP server providing time service.
MODULE ALARM	<ul style="list-style-type: none"> ■ Off—No module is installed or waiting for module status. ■ Red—Module alarm. ■ Green—Module installed and working properly.

Table 4: Front panel LEDs and buttons - 4370A-x4y (Continued)

Name	Definitions
INPUT 1 INPUT 2	<ul style="list-style-type: none"> ■ Off—No input is connected or waiting for input status. ■ Red—Input level is low or type is wrong. ■ Green—Input level and type are correct.
GPS ANTENNA	<ul style="list-style-type: none"> ■ Off—GPS antenna input is drawing less than 20 mA from the antenna input. (This is normal when the unit is connected through a distribution amplifier to an antenna.) ■ Red—GPS antenna input is drawing more than 80 mA from the antenna input. ■ Green—GPS antenna input is drawing between 20 and 80 mA from the antenna input.
GPS TRACKING	<ul style="list-style-type: none"> ■ Off—Waiting for the GPS receiver to begin tracking at least three GPS satellite signals. ■ Green—The GPS receiver is currently tracking at least one GPS satellite signal.
DISPLAY Button	<ul style="list-style-type: none"> ■ Press and release DISPLAY to display the current IP address of the unit. ■ Press and hold DISPLAY to reset IP address to 192.168.0.1. The default IP address will display on the front panel after it is set.

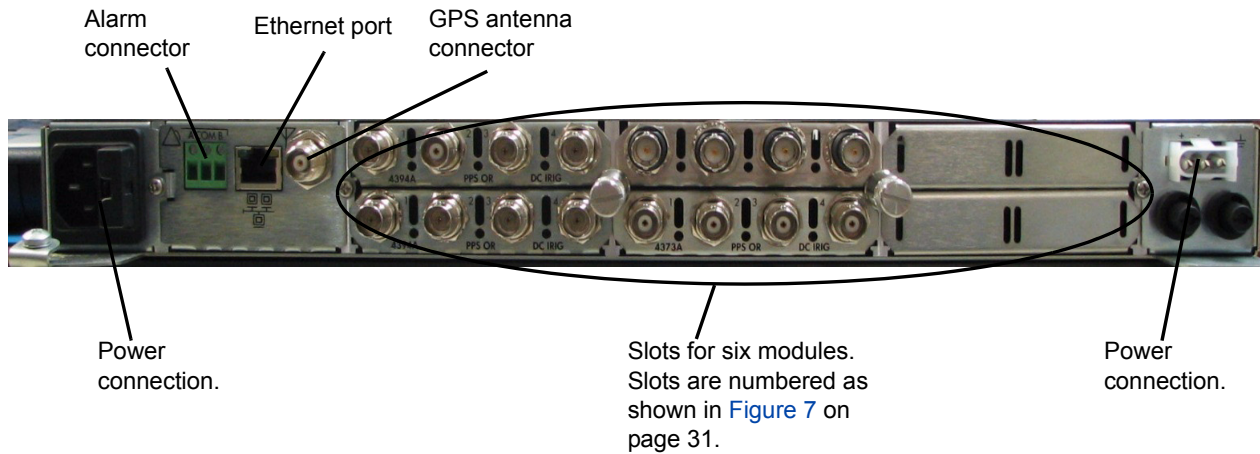


Figure 2: Rear panel - 4370A-x4y

Table 5: Rear panel connections - 4370A-x4y

Connections	Description
Power	<ul style="list-style-type: none"> ■ 100–240 V AC, 50/60 Hz power ■ or –40 to –57.6 VDC on units equipped with DC inputs
Alarm	<ul style="list-style-type: none"> ■ Relay contact closed—No alarm; <8 Ω ■ Relay contact open—Alarm condition <p>Screw terminal connections:</p> <ul style="list-style-type: none"> ■ A—Major alarms ■ COM—Common for all alarms ■ B—Minor alarms

Table 5: Rear panel connections - 4370A-x4y

Connections	Description
Ethernet	<ul style="list-style-type: none"> ■ Interface for Ethernet communications with the device ■ Bi-directional ■ EUI-64 address printed on serial number tag on right side of unit
GPS	<ul style="list-style-type: none"> ■ See “Chapter 3, Setting Up the GPS Antenna” on page 21

1.4.2 4370A-x5y Chassis

The 4370A-x5y chassis has the following inputs and outputs:

- Inputs
 - GPS receiver
 - Fiber optic
 - 2 MHz or 2 Mbit/s
- Outputs
 - Alarm - Major and Minor

Figure 3 shows the 4370A-x5y’s front panel. The 4370A-x5y rear panel is the same as the 4370A-x4y panel, except it has a fiber optic input/output connector and an additional BNC connector for 2 MHz/2 Mbit/s input. The standard power supply is located to the right of the front panel, with the optional redundant power supply to the left.

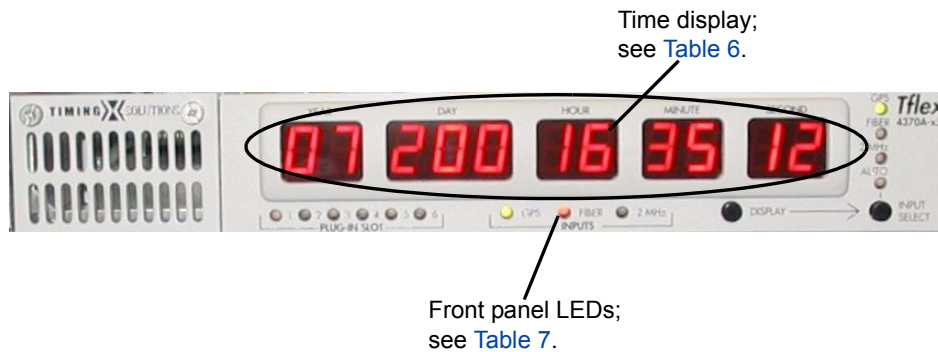


Figure 3: Front panel - 4370A-x5y

Table 6: Time display LEDs - 4370A-x5y

Time display	Description
YEAR	<ul style="list-style-type: none"> ■ Last two digits of the current year ■ Example: “06” for 2006 ■ Range: 00 to 99 ■ The four-digit year value is known, though it is not displayed.
DAY	<ul style="list-style-type: none"> ■ Julian day of the year ■ Example: “366” for 31 Dec 2004 (a leap year) ■ Range: 1 to 366 ■ Displays the value “366” for the last day of a leap year.

Table 6: Time display LEDs - 4370A-x5y (Continued)

Time display	Description
HOUR	<ul style="list-style-type: none"> ■ Hour of the day in military time ■ Example: “23” for 11 p.m. ■ Range: 0 to 23
MINUTE	<ul style="list-style-type: none"> ■ Minute of the hour ■ Range: 0 to 59
SECOND	<ul style="list-style-type: none"> ■ Second of the minute ■ Range: 0 to 60 ■ Displays the value “60” during a positive leap second.

Table 7: Front panel LEDs and buttons - 4370A-x5y

Name	Definitions
STATUS (on power supplies)	<ul style="list-style-type: none"> ■ Off—No power connected to chassis, or fault in power supply if the rest of the unit is operating properly ■ Red—No power supply connection or internal power supply fault. ■ Green—OK.
PLUG-IN SLOT	<ul style="list-style-type: none"> ■ Off—No module is installed or waiting for module status. ■ Red—Module alarm. ■ Green—Module installed and working properly.
INPUTs <ul style="list-style-type: none"> ■ GPS ■ FIBER ■ 2 MHz or 2 Mbit/sec 	<ul style="list-style-type: none"> ■ Off—No input is connected or waiting for input status. ■ Red—Input level is low or type is wrong. ■ Green—Input level and type are correct.
DISPLAY button INPUT SELECT button	<ul style="list-style-type: none"> ■ Press and hold DISPLAY, then press INPUT SELECT to change the current input source. For more information, see “2.4 Selecting the Active Input from the Front Panel” on page 19. ■ Press and release DISPLAY to display the current IP address of the unit. ■ Press and hold DISPLAY to reset IP address to 192.168.0.1. The default IP address will display on the front panel after it is set.
<ul style="list-style-type: none"> ■ GPS ■ FIBER ■ 2MHz 	<ul style="list-style-type: none"> ■ Off—Not the active input source. ■ Green—Active input source.
AUTO	<ul style="list-style-type: none"> ■ Off—Automatic switching between input sources is not enabled. ■ Green—Automatic switching between input sources is enabled. <p>The only way to change this setting is via SNMP or when a user changes the input selected by using the front panel buttons.</p>

Table 8: Rear panel connections - 4370A-x5y

Connections	Description
Power	<ul style="list-style-type: none"> ■ 100–240 V AC, 50/60 Hz power ■ or –40 to –57.6 VDC on units equipped with DC inputs
Alarm	<ul style="list-style-type: none"> ■ Relay contact closed—No alarm; <8 Ω ■ Relay contact open—Alarm condition Screw terminal connections: <ul style="list-style-type: none"> ■ A—Major alarms ■ COM—Common for all alarms ■ B—Minor alarms
Ethernet	<ul style="list-style-type: none"> ■ Interface for Ethernet communications with the device ■ Bi-directional ■ EUI-64 address printed on serial number tag on right side of unit
GPS	<ul style="list-style-type: none"> ■ See “Chapter 3, Setting Up the GPS Antenna” on page 21
Fiber optic	<ul style="list-style-type: none"> ■ Duplex LC multimode transceiver in an SFP socket to connect a cable to another 4370A-x5y
2 MHz/2 Mbit	2 MHz <ul style="list-style-type: none"> ■ BNC ■ Complies with ITU-T Rec. G.703 paragraph 13 ■ Impedance: 75 Ω 2 Mbit/s <ul style="list-style-type: none"> ■ BNC ■ Complies with ITU-T Rec. G.703 paragraph 9 ■ Impedance: 75 Ω

1.4.3 4370A-06y Chassis

The 4370A-06y chassis has the following inputs:

- Inputs
 - Fiber A
 - Fiber B

Figure 4 shows the 4370A-06y’s front panel. The 4370A-06y rear panel is the same as the 4370A-x4y panel, except it does not have a GPS input and has two fiber optic input/output connectors. The standard power supply is located to the right of the front panel, with the optional redundant power supply to the left.



Front panel LEDs; see Table 9.

Figure 4: Front panel - 4370A-06y

Table 9: Front panel LEDs and buttons

Name	Definitions
STATUS (on power supply)	<ul style="list-style-type: none"> ■ Off—No power connected to chassis, or fault in power supply if the rest of the unit is operating properly ■ Red—No power supply connection or internal power supply fault. ■ Green—OK.
PLUG-IN SLOT 1-6	<ul style="list-style-type: none"> ■ Off—No module is installed or waiting for module status. ■ Red—Module alarm. ■ Green—Module installed and working properly.
INTERNAL	<ul style="list-style-type: none"> ■ Off—Oscillator locked. ■ Red—Oscillator not locked.
FIBER INPUT A FIBER INPUT B	<ul style="list-style-type: none"> ■ Off—No SFP transceiver module installed or waiting for input status. ■ Red—Input level is low or type is wrong. ■ Green—Input level and type are correct.
ENABLE button INPUT SELECT button	<p>Press and hold ENABLE, then press INPUT SELECT to change the current input source. For more information, see “2.4 Selecting the Active Input from the Front Panel” on page 19.</p> <p>Press and hold ENABLE for ten seconds to reset the IP address to a default of 192.168.0.1.</p>
FIBER A FIBER B	<ul style="list-style-type: none"> ■ Off—Not the active input source. ■ Green—Active input source.
AUTO	<ul style="list-style-type: none"> ■ Off—Automatic switching between input sources is not enabled. ■ Green—Automatic switching between input sources is enabled. ■ Red—Automatic switching occurred. <p>The only way to change this setting is via SNMP or by using the front panel to manually select an input.</p>

Table 10: Rear panel connections

Connections	Description
Power	<ul style="list-style-type: none"> ■ 100–240 V AC, 50/60 Hz power ■ or –40 to –57.6 VDC on units equipped with DC inputs
Ethernet	<ul style="list-style-type: none"> ■ Interface for Ethernet communications with the device ■ Bi-directional ■ EUI-64 address printed on serial number tag on right side of unit
Fiber optic	<ul style="list-style-type: none"> ■ Duplex LC cable connected to the output of a 4371A installed in a 4370A-x4y or 4370A-x5y.

1.5 Plug-in Modules and Accessories

Table 11 lists the available plug-in modules.

Table 11: 4370A plug-in modules

Module	Part number	More information
Fiber Optic Output	4371A	“1.5.1 Fiber Optic Output Module (4371A)” on page 11
1 pps or DC IRIG	4394A	“1.5.2 pps or DC IRIG Module (4394A)” on page 11
10 MHz Output	4395A-10	“1.5.3 10 MHz Module (4395A-10)” on page 12
2 MHz	4396A	“1.5.4 2 MHz Module (4396A)” on page 12
2 Mbit	4397A	“1.5.5 2 Mbit/second Module (4397A)” on page 12

A GPS antenna (4370A OP001), additional AC input power supply (4385A), and additional DC input power supply (4386A) are available as accessories. For more information about the GPS antenna, see “Chapter 3, Setting Up the GPS Antenna” on page 21.

1.5.1 Fiber Optic Output Module (4371A)

This module provides four outputs with SFP sockets populated with LC connector multimode transceivers. Each output is used to supply fiber optic based time and frequency data for the 4370A-06y chassis.



Warning

Do not install more than one 4371A in a chassis that has all five other slots populated. A fully populated chassis with more than one 4371A will draw more power than is safe for this chassis.

1.5.2 pps or DC IRIG Module (4394A)

This module provides four outputs, each of which is independently selectable as disabled, pps (1 to 10 Mpps), or DC IRIG.

Table 12 lists the specifications for the pps or DC IRIG module.

Table 12: Configurable pps or DC IRIG module specifications

Characteristic	Description
Number of outputs	Four
Rates (pps)	1, 10, 100, 1 k, 100 k, 1 M, and 10 M
Pulse width	10 μ s to maximum 50% duty cycle, default is 100 μ s
1 pps to 10 MHz alignment	pps outputs rising edge within one clock cycle of 10 MHz output and 1 pps in rising edge.
DC IRIG types	B003 and B007

Table 12: Configurable pps or DC IRIG module specifications (Continued)

Characteristic	Description
Skew	Maximum offset difference between any two outputs is less than ± 2 nanoseconds at 50% point of rising edge.
Output connectors	50 Ω BNC

1.5.3 10 MHz Module (4395A-10)

This module provides four 10 MHz outputs which can be squelched individually via SNMP.

Table 13 lists the specifications for the 10 MHz module.

Table 13: 10 MHz module specifications

Characteristic	Description
Number of outputs	Four
Output connectors	50 Ω BNC
Amplitude	13 \pm 1 dBm
Phase noise	Dependent on chassis oscillator option
Skew between outputs	Less than ± 2 nanoseconds

1.5.4 2 MHz Module (4396A)

The 2 MHz module provides four 2.048 MHz frequency outputs which can be squelched individually via SNMP. The module also monitors the Transmitter IC for each output, and an alarm is raised via an SNMP trap.

Table 14 lists the specifications for the 2 MHz module.

Table 14: 2 MHz module specifications

Characteristic	Description
Number of outputs	Four
Output connectors	BNC
Output signal	Complies with ITU-T Rec. G.703 paragraph 13
Output impedance	75 Ω
Time code	None; frequency output only

1.5.5 2 Mbit/second Module (4397A)

The 2 Mbit/s module provides four 2.048 Mbit/s outputs which can be squelched individually via SNMP. The module also monitors the Transmitter IC for each output, and an alarm is raised via an SNMP trap.

Table 15 lists the specifications for the 2 Mbit/s module.

Table 15: 2 Mbit/s module specifications

Characteristic	Description
Number of outputs	Four
Output connectors	BNC
Output signal	Complies with ITU-T Rec. G.703 paragraph 9
Output impedance	75 Ω
Time code	None; frequency output only. The bit pattern is HDB3.

2: Setting Up the 4370A

You should read the safety information below before setting up the 4370A. You can then set up the unit. For more information, see the following:

- [“2.1 Safety Information”](#) on page 15
- [“2.2 Unpacking and Installing the Chassis”](#) on page 15
- [“2.3 Connecting the Inputs and Outputs”](#) on page 17
- [“2.4 Selecting the Active Input from the Front Panel”](#) on page 19
- [“2.5 Connecting a Redundant System”](#) on page 19
- [“2.6 Inserting or removing plug-in modules”](#) on page 20
- [“2.7 Cleaning the 4370A”](#) on page 20

2.1 Safety Information



Warning

This unit is for indoor use only. It is not sealed to prevent moisture from entering the enclosure.

Do not attempt to set up or operate this equipment if you have not first acquired proper training.

Ensure that all cables are properly connected. The power cord must be located for easy removal.

Verify that input line voltage and current capacity from the supply circuit are within specifications before turning on power to the 4370A.

Operating and maintenance personnel must receive proper training before setting up or maintaining electrical equipment.

2.2 Unpacking and Installing the Chassis

The 4370A ships ready for installation into a standard 19" (48.3 cm) rack. You can use mounting slides from General Devices with part numbers C-300-S-126, -128, and -130.

If you are setting up two units for total redundancy, see [“2.5 Connecting a Redundant System”](#) on page 19.

Required for installation:

- Rack-mount slide kit from General Devices, C-300-S-126, -128, or -130 (Optional).
- Rack mounting screws (4 are installed on the sides of the unit). Do not use longer screws than the ones supplied, as they could damage the power supply and/or make it non-removable.
- Screwdriver for the rack mount screws and slide as needed.
- North American or European IEC power cord. One or the other will be supplied with the unit.
- Customer-supplied CAT 5 LAN cable for network connection (RJ-45).
 - If you need to connect the 4370A directly to your computer using the Ethernet port, you must use a crossover cable instead of a standard LAN cable.

To unpack and install the 4370A:

1. Carefully unpack and inspect the 4370A.
2. Check for physical damage.
 - If you observe physical damage, immediately contact Symmetricom and the carrier.
 - We recommend saving the shipping container for submitting any necessary claims to the carrier.
3. Install the 4370A in the rack using the rack-mount screws and rack-mount slide kit, as needed. It is recommended that either slides or rails be installed to support the chassis, as the front ears may not support a fully loaded chassis with cables hanging from the rear of the chassis.
4. Connect a shielded LAN cable to the Ethernet port on the rear panel of the 4370A.
5. Connect the appropriate power cord to the rear of the chassis:
 - For a AC power supply, connect the female end of the power cord into the male IEC-320 plug on the rear of the power supply.



Caution

Ensure that the AC Mains power supply cord is connected to a properly grounded mains receptacle.

- For a DC power supply, connect the 3-pin Amp Part#: 1-350346-0 connector with female sockets Amp Part# 925661-1 to the rear of the chassis.
 - Pin 1 is +, Pin 2 is -, and pin 3 is Ground. Pin 1 is not connected to ground in the unit.
 - The external wiring to this connector must be at a minimum of 1.5 mm² (14 AWG) with a 15A fuse or circuit breaker. A 20A circuit breaker may be used if the external wiring is jacketed 14 AWG, with a maximum length of 20 feet.



Caution

Ensure that the DC input power GROUND connection is connected to a properly grounded connection at the power source.

6. Connect the appropriate power cord to the power source:

- For a AC power supply, connect the male end of the AC power cord into a 100–240 VAC, 50/60 Hz power source.
- For a DC power supply, connect the opposite end of the DC power cord to a –48 VDC power source. If you purchased the optional second power supply, repeat steps 5 and 6 with the second power supply.
- You can now continue with connecting the inputs and outputs.

2.2.1 Power-up Sequence

The unit will perform a power-up sequence after you connect the power. No signals are provided on the plug-in module outputs until the time is known and the oscillator is locked to the GPS receiver, or is locked to the fiber optic input on the 4370A-06x version.

The system cycles through the time display LEDs (except on the 4370A-06y), then the round LEDs will light red, green, then off before displaying all dashes on the time display (except on the 4370A-06y). After the operating system has booted, the front panel time display will first display all zeros, then will display dashes that cycle down the time display until it acquires the time (the -06y will flash the AUOT LED).

The unit will take up to 12 minutes to download an almanac from the GPS satellites, if this is the first power-up. The oscillator will also be locking to the GPS receiver 1 pps.

Once the GPS receiver has almanac information and the oscillator is locked, the time will display on the front panel, and the signals will be present on the plug-in module outputs. After short power outages of less than a few seconds, the unit will lock to GPS and provide outputs in typically less than 2 minutes 20 seconds. The unit will take up to 12 minutes to provide output signals if the unit has been powered off for more than a few minutes. This is due to the warm up time of the OCXO to provide a stable frequency reference.

2.3 Connecting the Inputs and Outputs

Depending on which chassis model you purchase, you have different inputs to connect. See the following sections:

- “2.3.1 Connecting the 4370A-x4y” on page 17
- “2.3.2 Connecting the 4370A-x5y” on page 18
- “2.3.3 Connecting the 4370A-06y” on page 18

If you are setting up two units for total redundancy, see “2.5 Connecting a Redundant System” on page 19.

2.3.1 Connecting the 4370A-x4y

You must connect the 4370A-x4y to a GPS antenna to properly synchronize multiple units. A future version of software will allow the user to start up the unit and enable the unit’s outputs without GPS.

You can also connect an alarm sensing device to the alarm outputs.

Required for connection:

- Customer supplied GPS antenna cable, TNC male

- Customer-supplied alarm wires (Requirements: Conductor cross section, rigid max. 2.5 mm² and conductor cross section flexible min. 0.2 mm²)
- Customer-supplied cable with BNC outputs for each output port you are using

To connect the 4370A-x4y:

1. Connect the GPS antenna cable from the GPS antenna to the TNC connector on the rear panel.
 - For more information, see “Chapter 3, Setting Up the GPS Antenna” on page 21.
2. Connect the alarm wires to the alarm connectors on the rear panel.
3. Connect the BNC end of cables to the connectors on each plug-in module to supply signals to other devices.
4. Connect an Ethernet cable to the rear of the chassis for monitoring and control via SNMP.

2.3.2 Connecting the 4370A-x5y

You can connect the 4370A-x5y to a GPS antenna, fiber optic cable, and 2 MHz/2 Mbit/s inputs. The fiber and 2 MHz/2 Mbit/s inputs are backups should the GPS input or receiver fail.

You can also connect an alarm sensing device to the alarm outputs.

Required for connection:

- Customer supplied GPS antenna cable, TNC male.
- Customer-supplied duplex multimode fiber cable with LC connectors
- Customer supplied 75 Ω BNC cable for the 2 MHz/2Mbit/s input.
- Customer-supplied alarm wires (Requirements: Conductor cross section, rigid max. 2.5 mm² and conductor cross section flexible min. 0.2 mm²)
- Customer-supplied cable with BNC outputs for each output port you are using

To connect the 4370A-x5y:

1. Connect the GPS antenna cable from the GPS antenna to the TNC connector on the rear panel.
 - For more information, see “Chapter 3, Setting Up the GPS Antenna” on page 21.
2. Connect the fiber cable from another 4370A-x5y Fiber INPUT to the fiber connection on the input panel.
3. Connect the cable from a 2 MHz or 2 Mbit/s source to the 2 MHz/2Mbit connector on the rear panel.
4. Connect the alarm wires to the alarm connectors on the rear panel.
5. Connect the BNC end of cables to the connectors on each plug-in module to supply signals to other devices.
6. Connect an Ethernet cable to the rear of the chassis for monitoring and control via SNMP.

2.3.3 Connecting the 4370A-06y

You must connect the 4370A-06y to a 4371A module installed in a 4370A-x4y or 4370A-x5y chassis.

You can also connect an alarm sensing device to the alarm outputs.

Required for connection:

- Customer-supplied duplex multimode fiber cable with LC connectors
- Customer-supplied alarm wires (Requirements: Conductor cross section, rigid max. 2.5 mm² and conductor cross section flexible min. 0.2 mm²)
- Customer-supplied cable with BNC outputs for each output port you are using

To connect the 4370A-06y:

1. Connect the fiber cable from a 4371A module installed in a 4370A-x4y or 4370A-x5y to the Fiber A connection on the rear panel.
2. Connect the fiber cable from a 4371A module installed in a different 4370A-x4y or 4370A-x5y used in step 1 to the Fiber B connection on the rear panel.
3. Connect the alarm wires to the alarm connectors on the rear panel.
4. Connect the BNC end of cables to the connectors on each plug-in module to supply signals to other devices.
5. Connect an Ethernet cable to the rear of the chassis for monitoring and control via SNMP.

2.4 Selecting the Active Input from the Front Panel

Normally, you set the active input using the DVB Sync Source User Interface. For more information, see “4.4 Configuring the Input Priority” on page 29.

You can override which input is the active input using the buttons on the front panel.

NOTE: Selecting the active input from the front panel disables auto switching. To re-enable, you must use the GUI or SMNMP management system to enable autos switching.

To select the active input from the front panel:

1. Press and hold **DISPLAY** or **ENABLE**.
2. Press **INPUT SELECT** to select the next input.
 - Press **INPUT SELECT** multiple times to cycle through the available inputs.
3. When the input you want is selected, release **DISPLAY** or **ENABLE**.
 - The unit will now use the selected input for a frequency reference. This will disable the automatic switching feature.

2.5 Connecting a Redundant System

For full GPS input redundancy, you can connect two 4370A-x5y units together via the input module fiber optic transceiver using a duplex multimode LC fiber-optic cable. You can set up the primary, secondary, and tertiary inputs that each unit will use. The units will automatically switch to the highest priority input that is good.

Required for connection:

- Customer-supplied duplex multimode fiber cable with LC connectors

To connect a redundant system:

1. Connect both units as described in the previous sections.
2. Connect one end of the fiber cable to the connector on the rear panel of one unit.
3. Connect the other end of the fiber cable to the connector on the rear panel of the other unit.

For information about configuring the units, see “[4.5 Configuring a Redundant System](#)” on page 29.

2.6 Inserting or removing plug-in modules

Plug-in modules for the rear panel slots are hot swappable. They can be inserted or removed when the chassis is powered up or not. When removing or inserting a module, use a quick smooth motion. Slowly inserting or removing a module may result in a software error.



Warning

Do not install more than one 4371A in a chassis that has all five other slots populated. A fully populated chassis with more than one 4371A will draw more power than is safe for this chassis.

2.7 Cleaning the 4370A

Clean the main chassis with a soft cloth dampened with a mild soap and water solution.



Caution

Do not spray or use too much liquid when cleaning the unit. Liquid can enter the unit and damage sensitive electronic components.

3: Setting Up the GPS Antenna

3.1 GPS Antenna



Warning

If an outside antenna is connected to the unit, be sure the antenna is grounded to provide some protection against voltage surges and built-up static charges. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information about proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding connectors, location of antenna discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, take extreme care to keep from touching such power lines or circuits, as contact with them might be fatal.

Once the antenna is installed, connect the GPS antenna cable to the ANTENNA TNC connector on the rear panel of the unit.

For information about configuring the GPS receiver, see [“4.3 Configuring the GPS Receiver”](#) on page 27.

3.1.1 New Antenna Installation

The primary consideration in choosing an antenna location should be sky coverage. Sky coverage is the amount of unobstructed sky that is available to the antenna. Poor antenna placement can severely limit the amount of sky coverage. To maximize sky coverage, place the antenna above the height of the building as much as possible. Do not place it near other features that can obstruct the sky (for example, buildings, trees, satellite dish).

[Figure 5](#) illustrates the effect antenna placement has on sky coverage. You may have multiple obstructions to contend with and complete sky coverage may not be possible. In those instances, use your judgment to determine the best antenna location.

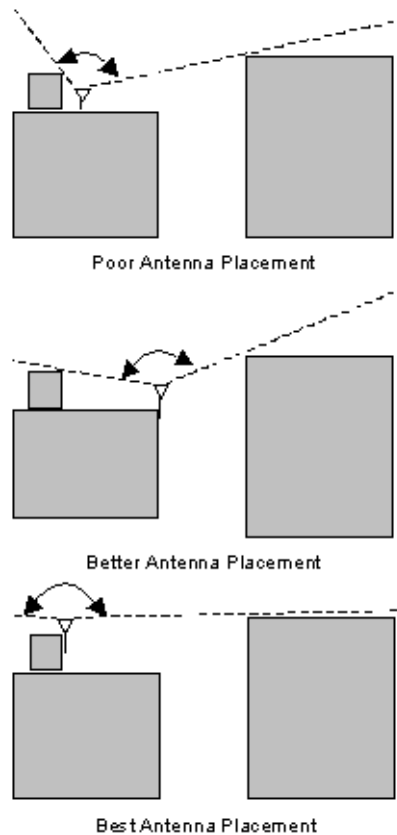


Figure 5: Effect of antenna placement on sky coverage

Once you identify a suitable antenna location, ensure that the GPS signal that reaches the unit is of suitable quality. The 4370A antenna input requires a minimum of 15 dB gain from the combination of the antenna and cable loss. The optional antenna included with the unit has 27 dB gain, so the total cable losses in the system must not exceed 12 dB at 1.5 GHz.

If the location of the antenna dictates using a longer cable, you must add a line amplifier in the signal path. A line amplifier is a device that amplifies the GPS signal to overcome the losses resulting from longer cable runs. In selecting a line amplifier, make sure that it provides an adequate amount of gain and that it operates from 1200 MHz to 1600 MHz.

You can calculate the gain required from a line amplifier by knowing the total loss of the antenna cables being used. The signal loss due to a cable varies depending upon the frequency of the signal. For the purposes of GPS antennas, calculate the cable loss at 1500 MHz. The manufacturer of the cable being used should be able to provide an estimate of the cable loss at 1500 MHz. Once you know the cable loss, you can insert it into the equation below to calculate the required gain of the line amplifier:

$$MIN_Gain(dB) = \frac{Cable_Loss(dB/100ft) * Cable_Length(ft)}{100} - 12$$

The MIN_Gain value above is the minimum gain required from the line amplifier. You can use amplifiers with a slightly higher gain than the minimum value, but it will not improve the performance of the system. Using amplifiers with significantly higher gain values can also cause degradation of the GPS signal.

Placement of the line amplifier is also a concern in a properly designed system. Placing the amplifier too close or too far from the antenna may cause unexpected degradation in the GPS signal. The best place for the amplifier is typically half way between the antenna and 4370A.

Figure 6 shows a block diagram of a typical installation that requires a longer antenna cable. In addition to the line amplifier, you must also provide some means of powering the GPS antenna. The antenna voltage supplied by the unit must be DC blocked from the amplifier input when using an in-line amplifier. A bias tee can provide a simple solution to power the antenna by allowing a DC voltage to be applied to the antenna cable without disrupting the GPS signal. The bias tee must operate between 1200 MHz and 1600 MHz.

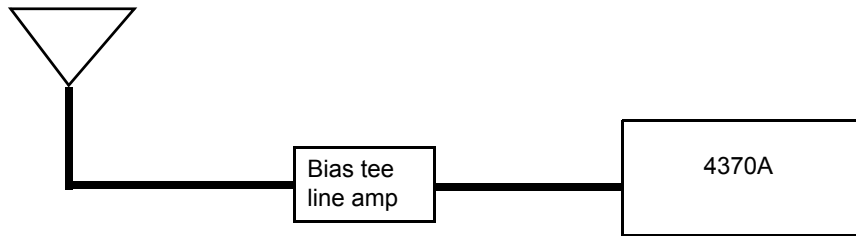


Figure 6: Typical configuration for longer cable runs

4: Configuring and Monitoring the 4370A

Simple Network Management Protocol (SNMP) provides a standard method to manage devices on your network. The management information bases (MIBs) for the 4370A let you configure and monitor the unit via a MIB browser or SNMP management system. You can use also the built-in DVB Sync Source User Interface, which is a graphical user interface (GUI) for the 4370A's SNMP function. Access to the Web page or GUI requires a separately supplied password. Contact Symmetricom support to obtain the password

The instructions in this section describe how to use the built-in SNMP GUI, DVB Sync Source User Interface, to configure the 4370A. If you have third-party SNMP management tools, you can use them as well. For information about the MIBs associated with the 4370A, see “[Appendix A, MIB Reference](#)” on page 41.

The following topics describe how to install and use the DVB Sync Source User Interface:

- “[4.1 Changing the Unit’s IP Address and Installing the DVB Sync Source User Interface](#)” on page 25
- “[4.2 Accessing the 4370A](#)” on page 27
- “[4.3 Configuring the GPS Receiver](#)” on page 27
- “[4.4 Configuring the Input Priority](#)” on page 29
- “[4.5 Configuring a Redundant System](#)” on page 29
- “[4.6 Configuring the 4370A Plug-in Modules Using DVB Sync Source User Interface or SNMP](#)” on page 30
- “[4.7 Monitoring the 4370A Status Using the DVB Sync Source User Interface or SNMP](#)” on page 31
- “[4.8 Sending SNMP Traps on the Network](#)” on page 34
- “[4.9 Restarting the 4370A](#)” on page 34
- “[4.11 Updating the System Image on Flash Memory](#)” on page 34

4.1 Changing the Unit’s IP Address and Installing the DVB Sync Source User Interface

You access the 4370A using the Ethernet connection and a web browser. The unit’s IP address is set to 192.168.0.1 at the factory. You can determine the current IP address of the 4370A-x4y and 4370A-x5y by pressing and holding the front panel **DISPLAY** or **ENABLE** button. The IP address will display in the front panel time display after pressing and releasing the button. If you do not know the IP address of the 4370A-06y chassis, press and hold the **ENABLE** button for 10 seconds to reset the IP address to 192.168.0.1. You can access the unit’s web page to change the IP address, net mask, and default router.

To access the unit via the Ethernet connection, you must be using a computer in the same private domain as the unit, for example 192.168.x.x. You may connect directly to the unit from a computer through a cross-over network cable.

Once you have made a network connection to the unit, use a web browser to open the web page at the unit's IP address. The web page requires a user name and password that is provided separately. At this point you can follow the on screen instructions to change the IP address to suit your specific needs.

The DVB Sync Source User Interface installs automatically when selected on the Web page, if you have a Java Runtime Environment (JRE) installed that can run Web Start. If you do not, you can use the alternate installation instructions to install.

You must enter the correct community and password to access the DVB Sync Source User Interface: Contact Symmetricom Support to obtain the community and password.

To change the unit's IP address and install the DVB Sync Source User Interface:

1. Press and release the **DISPLAY** or **ENABLE** button on the front of the unit to see its current IP address (4370A-x4y or 4370A-x5y).
 - If you are trying to access a 4370A-06y unit and do not know the IP address, press and hold the **ENABLE** button to reset the IP address to 192.168.0.1.
 - The default IP address is 192.168.0.1. If you have difficulty accessing the unit, contact your network administrator for assistance.
2. Open your browser, enter the IP address, and press **Enter**.
 - Enter the username and password.
 - The unit's web page displays.
3. Click **Change IP Address** to change the unit's IP address.
 - Follow the instructions on the page to change the address.
4. When you return the unit's web page, click **Web Start the User Interface** to download and install the DVB Sync Source User Interface.
 - If you have already installed the DVB Sync Source User Interface on the computer you are using, you do not need to install it again. You can use the shortcut on your desktop to access the unit at its new IP address.
 - If you do not have a JRE installed that can run Web Start, the installation will not work automatically. Close the window that opens. On the unit's web page, click the **Alternate user interface installation instructions** text link. The page that displays provides instructions on installing a JRE and the DVB Sync Source User Interface manually.
 - When the installation is complete, the Connection Settings window displays.
5. In the Agent field, enter the IP address of the 4370A you want to access.
 - The Port field should automatically populate with an appropriate port number. You can enter a different port, if needed.
6. Enter the community name
7. Enter the Community Password, press enter.
8. Make sure the GUI Trap Address field displays the IP address of the computer you are using to access the DVB Sync Source User Interface.

**Note**

In some cases, the wireless network interface is automatically selected as the GUI Trap Address.

9. Click **Apply**.
 - The DVB Sync Source User Interface window displays.
 - Ensure that the O and M Manual revision displayed in the Status tab is the same revision as this manual.

4.2 Accessing the 4370A

After you have installed the DVB Sync Source User Interface, you can use the shortcut on your Windows Desktop to access the 4370A using the GUI. The unit can also be monitored and controlled using an SNMP Manager software package.

To access the 4370A using the GUI:

1. On your Windows Desktop, double-click the DVB Sync Source User Interface shortcut.
 - The Connection Settings window displays.
2. In the Agent field, enter the IP address of the 4370A you want to access.
 - The Port field should automatically populate with an appropriate port number. You can enter a different port, if needed.
3. Enter the community name in the Community field.
4. Enter the Community Password
5. Make sure the GUI Trap Address field displays the IP address of the computer you are using to access the DVB Sync Source User Interface.

**Note**

In some cases, the wireless network interface is automatically selected as the GUI Trap Address.

6. Click **Apply**.
 - The DVB Sync Source User Interface window displays.

4.3 Configuring the GPS Receiver

You can configure the following related to the GPS receiver:

- Position mode
- Antenna mask angle
- Cable delay
- Longitude, latitude, altitude

To configure the 4370A using the DVB Sync Source User Interface:

1. Access the 4370A.
 - For more information, see “4.2 Accessing the 4370A” on page 27.
2. In the GPS Receiver area, click the **Configuration** tab.
3. Click **Configure**.
4. Select the settings you want.
 - Position Mode—You can set the GPS position mode to:
 - 3D—Continuously updates the position (default setting). In this mode, the current position is stored after the first 100 seconds of valid position measurements are received from the GPS receiver. If the position reported by the GPS receiver is more than 100 m from the stored position, a Major Alarm will be reported and a trap will be sent by the SNMP agent. This mode also provides
 - Auto—Automatically surveys its position, which takes about 2.5 hours, then changes to Fixed and uses the position coordinates it determined.
 - Fixed—Holds the position you enter or the one determined by the Auto setting’s survey. In this mode, the unit uses the GPS receiver’s Time-Receiver Autonomous Integrity Monitoring (TRAIM) algorithm for checking timing solution integrity. TRAIM is an algorithm that uses redundant satellite measurements to confirm the integrity of the timing solution. The position is not updated when the GPS receiver is in this mode.
 - Antenna Mask Angle—The GPS receiver attempts to track satellites for which the elevation angle is greater than the satellite mask angle. This parameter lets you control the elevation angle that was used for this decision.
 - Range—0 to 89 degrees
 - Default value—10 degrees
 - 1 PPS Advance/Delay—Adjusts the 1 pps signal from the 4370A by the amount entered (in ns).
 - Range— -1 to + 1 seconds, maximum step is 100 ms
 - Increment—10 ns (enter 1000 to obtain -1 microsecond delay).
5. If fixed position mode is desired and a surveyed position is available, enter the Latitude, Longitude, and Altitude and select Position Mode fixed.
6. Select the alarms you want to be major alarms.
 - Major alarms are sent out through alarm connectors A and COM on the rear panel. All other alarms are minor and are sent through alarm connectors B and COM on the rear panel.
7. Click **Apply**.

4.4 Configuring the Input Priority

You can configure the input priority in case one or more inputs fail by selecting the order in which the system will switch to redundant inputs. The unit will failover in the order you select, depending on the inputs connected to the unit.

If no external inputs are available, the unit will failover to holdover mode using the internal oscillator. Holdover mode is only available for 144 minutes in units with an OCXO, after which the outputs will be disabled. The 144 minutes is the estimated amount of time that the internal OCXO will maintain the required 1 pps accuracy.

To configure the input priority:

1. Access the 4370A.
 - For more information, see “[4.2 Accessing the 4370A](#)” on page 27.
2. In the Input Module area, click the **Configuration** tab.
3. Click **Configure**.
4. From the Preferred Input drop-down list, select the input priority you want.
 - The Auto Switch drop-down list only applies to redundant systems (two units connected together).
5. Click **Apply**.

4.5 Configuring a Redundant System

For full redundancy, you can connect two 4370A-x5y units together. The units will automatically switch to the highest priority input. You must connect the two units input transceiver with a fiber cable.

For information about connecting the two units, see “[2.5 Connecting a Redundant System](#)” on page 19.

The failover process works as follows:

- If GPS fails in the primary unit, the system will automatically switch to the redundant unit to use its GPS as its input and the primary unit will use its fiber input if valid.
- If the primary unit’s GPS recovers, the unit will automatically switch back to using that as its input.
- If both GPS and fiber fail on the input to a unit, the unit will switch to the 2 MHz/2 Mbit/s input.
- If all three of the inputs fail, the unit will switch to holdover mode. Holdover mode is only available for 144 minutes, after which the outputs will be turned off. The 144 minutes is the estimated amount of time that the OCXO will maintain the required 1 pps accuracy.

In the Input Module section, the Status tab shows the GPS and fiber status of both units. Fiber A is the input to the unit. Peer GPS is the status of the GPS receiver in the unit that is connected to the fiber input. Peer Fiber is the status of the output fiber from this unit.

To configure a redundant system:

The unit will automatically be set up for GPS/FIBER/2MHz/2Mbit switching order and AUTOSWITCH enabled. The unit will automatically switch to the highest priority input that is good. If you want to change these settings, follow these instructions.

1. Access the primary 4370A.
 - For more information, see “4.2 Accessing the 4370A” on page 27.
2. In the Input Module area, click the **Configuration** tab.
3. Click **Configure**.
4. From the Preferred Input drop-down list, select the switching order you would like
5. From the Auto Switch drop-down list, select enabled.
6. Click **Apply**.
7. In the GPS Receiver area, click the **Configuration** tab.
8. Click **Configure**.
9. Make sure the Position Mode is set to 3D (this is the factory default setting).
 - This ensures that the 100-meter accuracy testing operates.
10. Click **Apply**.
11. Access the redundant 4370A.
12. In the Input Module area, click the **Configuration** tab.
13. Click **Configure**.
14. From the Preferred Input drop-down list, select the input switching order you would like.
15. From the Auto Switch drop-down list, select enabled.
16. In the GPS Receiver area, click the **Configuration** tab.
17. Click **Configure**.
18. Make sure the Position Mode is set to 3D.
 - This ensures that the 100-meter accuracy testing operates.
19. Click **Apply**.

4.6 Configuring the 4370A Plug-in Modules Using DVB Sync Source User Interface or SNMP

The instructions in this section describe how to use the built-in GUI, DVB Sync Source User Interface, to configure the 4370A using SNMP. If you have third-party SNMP management tools, you can use them as well. For information about the MIBs associated with the 4370A, see “Appendix A, MIB Reference” on page 41.

The plug-in configuration is associated with the slot on the back of the unit. If you move a plug-in module to a different slot, the information does not move with it. You will need to reconfigure the settings for the new slot.

Power Supply Input	Input Module	Slot 1	Slot 3	Slot5	Power Supply Input
		Slot 2	Slot4	Slot6	

Figure 7: Slot numbering

To configure plug-in modules using the DVB Sync Source User Interface:

1. Access the 4370A.
 - For more information, see “4.2 Accessing the 4370A” on page 27.
2. In the Plug-in Slot area on the right, click the number of the slot you want.
3. Click the **Configuration** tab.
4. Click **Configure**.
5. Select the settings you want.
 - If you want to disable the plug-in module, select disabled from the Power drop-down list.
 - Enter a Description and Owner if you want to identify information about the use of the slot.



Note

The 4395A-10 will provide about -7 dBm on an output that is turned off by selecting the squelch button on the GUI.

6. Click **Apply**.

4.7 Monitoring the 4370A Status Using the DVB Sync Source User Interface or SNMP

You can monitor the status of the power supply, reference clock, GPS receiver, and plug-in modules from the DVB Sync Source User Interface. The status information automatically updates about every 45 seconds. If you have third-party SNMP management tools, you can use them as well. For information about the MIBs associated with the 4370A, see “Appendix A, MIB Reference” on page 41.

To monitor the 4370A status:

1. Access the 4370A.
 - For more information, see “4.2 Accessing the 4370A” on page 27.
 - The main DVB Sync Source User Interface window, with general status information available will display.

Click this icon to display a menu to update the display, stop queries, or connect to a different 4370A.

General status information about the 4370A, including the temperature of the main PCB.

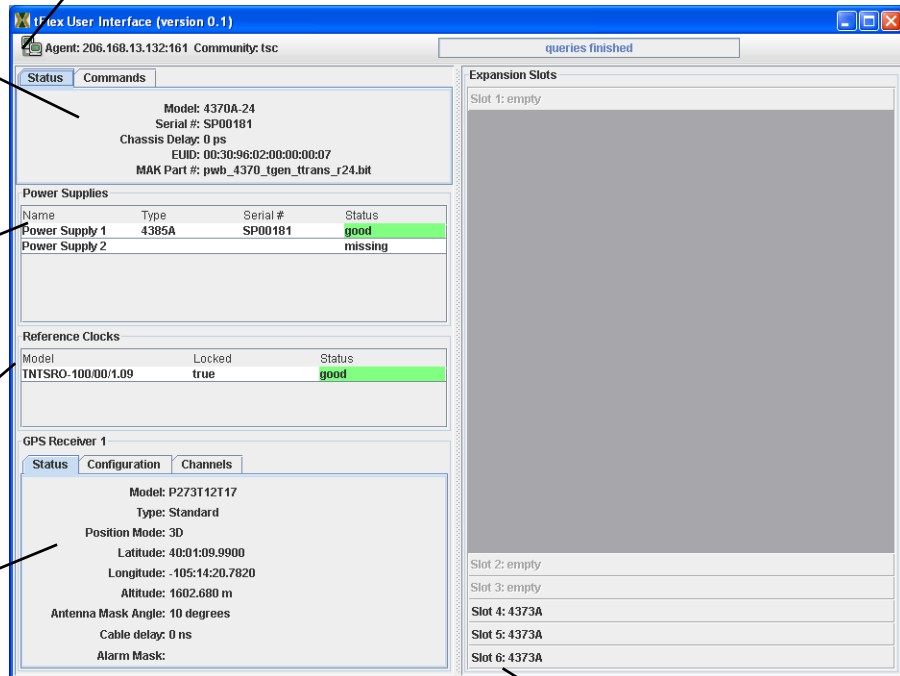
Power supply information. Missing means the power supply is not in the slot.

Reference clock information.

GPS receiver status and tabs to configure and view channels.

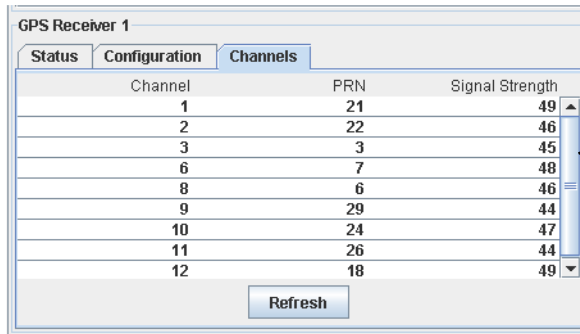
Alarms—Displays current alarms. See “5.1 Handling Alarms” on page 37.

Latched Alarms—Displays alarms that the system has cleared.



Click each slot number to see information about the plug-in module in the slot.

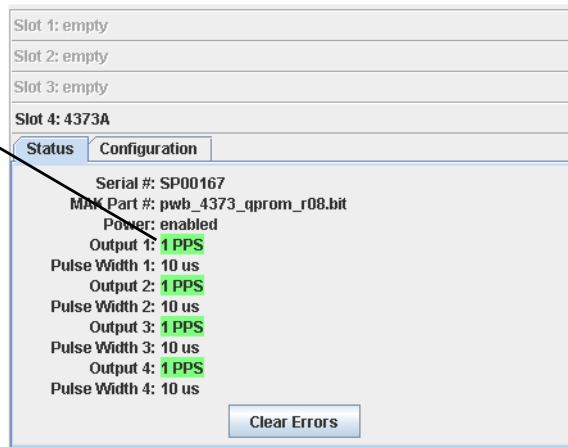
2. If you want to update the status information, click the icon in the upper-left corner of the window and select **Force Query**.
 - If the unit you are using the GUI to monitor and control is powered off and you want to stop the queries, select **Stop Queries** from the menu.
 - If you need to connect to a different 4370A, select **Connection Settings** from the menu and enter the IP address of the unit you want.
3. In the GPS Receiver area, click the **Channels** tab.
 - The Channels tab displays, where you can see the channel information, including the signal strength for each satellite.



You may need to scroll to see all of the channels. At least three channels should show a value above zero.

4. Click **Refresh** to update the channel information.
5. In the Expansion Slots area on the right, click a slot number to see information about the plug-in module in the slot.

Green shows that output is working properly.
 Blue shows that output is disabled (power set to disabled).
 Red shows that output is not working



4.7.1 Clearing Latched Alarms

Alarms are “latched” and continue to display in the GUI with an orange background. Latched alarms let you see a history of alarms that have occurred. You can clear the latched alarms manually.

To clear latched alarms:

1. Access the 4370A.
 - For more information, see “4.2 Accessing the 4370A” on page 27.
 - The main DVB Sync Source User Interface window, with general status information available.
2. At the top of the window, click the **Commands** tab.
3. Click **Clear Errors**.
 - The system removes the latched alarms from the display.

4.8 Sending SNMP Traps on the Network

You can set up IP addresses that you want the 4370A to send all SNMP traps to. These permanent trap sinks persist after you power down the unit and power it back up. Up to 8 trap sink addresses can be set.

To send SNMP traps to up to 8 servers on the network:

1. Access the 4370A.
 - For more information, see “4.2 Accessing the 4370A” on page 27.
2. At the top of the window, click the **SNMP** tab.
3. Click **Add**.
4. Enter the IP address and port of the computer you want to send traps to.
5. Click **OK**.

4.9 Restarting the 4370A

You can restart the 4370A if it seems unresponsive or is not working properly. This restarts the unit’s operating system, which also shuts down and restarts the hardware monitor and SNMP server.

To restart the 4370A:

1. Access the 4370A.
 - For more information, see “4.2 Accessing the 4370A” on page 27.
2. At the top of the window, click the **Commands** tab.
3. Click **Reboot**.

4.10 Starting the 4370A-x5y with no GPS

You can restart the 4370A if there is no GPS available and 2 MHz or 2 Mbit/second is available. On the GUI commands tab, press Start With No GPS. This will enable the outputs of the unit and lock to the 2 MHz or 2 Mbit/second input. You can then adjust the 1 PPS by using the Slew command in the Input Module Configuration tab. The 1 PPS output can be slewed + or - in increments of 10 ns up to 100 ms per slew.

4.11 Updating the System Image on Flash Memory

You can update the flash memory with a new version of software.

To update the flash memory:.

1. Log into the unit’s web page.
2. Select Upgrade System Image

3. Select the ISO image to be used for the upgrade
4. Press Upload System Image
5. The web page will show progress of the update. The file is first downloaded to the unit and then it is extracted, configured and automatically reboots with the new software revision. This process should take no longer than 15 minutes depending on the network speed and traffic.

5: Troubleshooting the 4370A

Perform all of the following procedures before returning the 4370A for service. If the unit still appears to have a problem, call Symmetricom, Inc. and request technical support. Have the serial number of your unit ready to provide to a technical representative.



Caution

Do not remove the top cover of the unit, except to replace the flash memory. It does not contain any user-serviceable parts. The memory card on the main PCBA must be replaced only by trained and authorized personnel. The only user-serviceable parts are the fuses on the input power modules. For more information, see “5.4 Replacing Fuses” on page 38.

If the unit does not appear to be operating properly, check the following first:

1. Check for visible damage on the unit, cables, and connectors.
2. Ensure that all cables are firmly connected.
3. Determine if any input power circuit breakers have been tripped.
4. Ensure that your power source is within specification.

5.1 Handling Alarms

Table 16 describes the system alarms and how to resolve them.

Table 16: Alarms

Alarm	What it means	What to do
Temperature	Internal PCB exceeds 65°C	<ol style="list-style-type: none">1. Check that the ambient temperature does not exceed 50°C.2. If the ambient temperature is below 50°C, contact technical support for assistance.
Power Supply	Power supply does not have power applied or fuse is damaged	<ol style="list-style-type: none">1. Ensure proper power is applied to the AC or DC inputs.2. If the fuses were damaged by an external event, replace the fuses.

5.2 Replacing Plug-in Modules

Plug-in modules are hot swappable. You can leave the power connected when removing and inserting plug-in modules.

**Note**

If you are replacing the module with the same part number as previously used in the slot, the unit will reconfigure the plug-in module to the same configuration previously used in that slot. If this is a different module type than was previously used in the slot, the unit will set the module to its default settings.

To replace a plug-in module:

1. Remove the large knurled screws that cover the corners of the module.
2. Slide the module out of the slot in one smooth motion.
3. Slide another module into the slot in one smooth, quick motion. If the module is inserted slowly, the module may not be sensed properly and a software error may occur.

**Note**

Note that the 10 MHz module requires waiting at least 15 seconds after removing a module prior to re-installing a module.

4. Replace the large knurled screws to hold the module in place.

5.3 Replacing a Power Supply

The chassis provides the capability for dual, redundant power supplies. If both power supplies are present and power is connected to each of them, you can hot-swap either power supply without disrupting operation of the chassis. The appropriate power supply must be installed in the corresponding AC or DC power supply slot in the chassis. There are alignment pins which also act as keys to ensure that the wrong type of power supply is not installed in a slot.

To replace a power supply module:

1. Loosen the captive screw on the front of the power supply module.
2. Slide the module out of the chassis.
3. Slide the new module into the chassis.
4. Tighten the captive screw to hold the module in place.

5.4 Replacing Fuses

If you know that a local event caused blown fuses, you can replace the fuses in the unit's input power connections on the rear panel.

Required for this procedure:

- Small flat-head screwdriver
- Replacement fuse for the appropriate input:
 - AC input: 250-volt, 1 amp, time delay, 5 x 20 mm fuse, T
 - DC input: 250-volt, 1.6 amp, time delay, 5 x 20 mm fuse, T

To replace a fuse in an AC input connector:

1. Disconnect the power cable from the back of the 4370A.
2. Using a small screwdriver, open the fuse cover on the back of the 4370A.
3. Replace the old fuses as necessary.
4. Close the fuse cover.
5. Reconnect the power cable to the back of the 4370A.

To replace a fuse in a DC input connector:

1. Unscrew the fuse covers on the back of the 4370A by pushing in on the housing and rotating counter-clockwise about 1/8 turn.
2. Replace the old fuses as necessary.
3. Close the fuse covers by pushing in on the housing and rotating clockwise about 1/8 turn.
4. Reconnect the power cable to the back of the 4370A.

5.5 Copying the configuration files

If you need to replace a unit and have configuration information that you would like to copy to the replacement unit, perform the following:

Login to the system via SSH

Type su

Type Killall Tflex

To backup:

Type cp /dev/icee1 /mod/db/mementos

To restore:

Type cp /mod/db/mementos /dev/icee1

Appendix A: MIB Reference

SNMP provides a standard method to manage devices on your network. The MIBs for the 4370A let you configure and monitor the unit. You can use the built-in DSS User Interface to monitor and control the unit via SNMP, or you can use a third party SNMP management tool.

This section describes how to access the MIBs and provides information about them.

A.1 Retrieving 4370A MIB Definitions

MIB definitions as served by the 4370A can be obtained from its web server. Access the web server using the 4370A's IP address (<http://192.168.0.1>, the default) and click one of the **Download MIB definitions** text links. The MIBs can be downloaded via a [zip file](#) a [gzipped tar archive](#) or [individually](#). You can use the complete URL (http://192.168.0.1/mibs/tflex_mibs.zip, for example) to access the definitions directly.

Once you download the MIB definition bundle, you can extract it for import into MIB browser applications or SNMP management software. The bundle contains MIB definitions for the 4370A chassis, plug-in module types, trap recipient registration, and a MIB module that holds only textual conventions used throughout the other MIB modules.

A.2 4370A MIB Overview

The 4370A serves an enterprise MIB rooted at `iso.org.dod.internet.private.enterprises.timing` or `1.3.6.1.4.1.6914`. The 4370A chassis status, including information about any GPS receivers, reference clocks, and power supplies, is provided in a child MIB node with OID 4370, that is `1.3.6.1.4.1.6914.4370`.

One of the 4370 MIB nodes of particular interest is the `tsc4370Slots` node. It contains definitions for:

- `tsc4370SlotTrap` (1.3.6.1.4.1.6914.4370.4.1)—Trap sent whenever plug-in modules:
 - Are hot swapped
 - Are reconfigured
 - Detect errors on any of their outputs
- `tsc4370SlotTable` (1.3.6.1.4.1.6914.4370.4.4)—Table with a row for each of the six plug-in slots. Each row:
 - Holds a string description of the module type contained in the slot
 - Provides an object ID that references the module's status information (see “[A.3 4370A MIB Example Table Contents](#)” on page 42)

- Includes a truth value that indicates if there are known error conditions on the module in the slot
- tsc4370ErrorModuleTable (1.3.6.1.4.1.6914.4370.4.5)— Table that publishes error information in the form of “pseudo modules” when low level hardware errors occur. The modules publish strings indicating the cause of the error and a suggestion on how to proceed. Example error conditions that result in the instantiation of such pseudo modules include:
 - Failure to read a plug-in module’s ID EEPROM because of corruption or the module is poorly seated
 - Detection of an plug-in module which requires a firmware upload, but for which no firmware was available when the chassis was shipped (requires a new version of software in the chassis)

Plug-in module status and configuration are maintained in MIB modules specific to the plug-in module’s type. Since a main board can interface to multiple modules of the same type, both status and configuration are maintained as tables, with one row each for each plug-in module of the same type.

Plug-in module MIB modules are rooted under the timing enterprises MIB, just as the 4370A chassis MIB module is. The 4373A and 4387A MIB modules are rooted at 1.3.6.1.4.1.6914.4373 and 1.3.6.1.4.1.6914.4387, respectively. Each of the plug-in module MIB modules contains two tables, one for the module’s status and one for configuration. The status tables contain object ID columns that:

- Reference the configuration table entry
- Cross reference the plug-in module’s tsc4370SlotTable entry

A.3 4370A MIB Example Table Contents

The following tables show example table contents for a system that contains two 4373A modules in plug-in slots 1 and 3, a 4378A-10 module in slot 5, and a 4378A-5 module in slot 6. Some columns are omitted for brevity.

Table 17 shows example contents of plug-in slot table. Note the following:

- The object ID in the Module column is a RowPointer. It references the first accessible column in the plug-in module conceptual rows (hence the .2 as the second to last sub OID in every entry).
- Empty slots’ module RowPointers point to 0.0 (zeroDotZero), while the ModuleType column returns an empty string.

- The HasErrors column for slot 5 is a crude indicator that there is something wrong with the module in slot 5.

Table 17: tsc4370SlotEntry (1.3.6.1.4.1.6914.4370.4.4.1)

SlotIndex (.1)	ModuleType (.2)	Module (.3)	HasErrors (.4)
1	4373A	1.3.6.1.4.1.6914.4373.2.1.2 .1	false (2)
2		0.0	false (2)
3	4373A	1.3.6.1.4.1.6914.4373.2.1.2 .6	false (2)
4		0.0	false (2)
5	4387A-10	1.3.6.1.4.1.6914.4378.2.1.2 .3	true (1)
6	4387A-5	1.3.6.1.4.1.6914.4378.2.1.2 .4	false (2)

Table 18 shows example contents of the 4378A instance table. Note the following:

- The Out2Status column indicates that an output error on the second output has been detected on the 4378A-10 with index 3.
 - This is why the HasErrors column indicated a problem in slot 5 in the slots table.
 - The error status is latched. Once detected, the value continues to return “bad (2)” until latched errors are reset by a set request of “resetLatchedErrors (2)” to the Command column (which is omitted from the table to fit it on the page).
- The Slot and Config columns follow the RowPointer convention.
- The module status and configuration row indices are arbitrary and must be correlated using the instance table entry.
 - The status entry with index 3 is configured according to configuration entry with index 6.
- All outputs on the module with index 4 are “disabled (3)” as a consequence of power to the module being disabled.

Table 18: tsc4378Instance (1.3.6.1.4.1.6914.4378.2.1)

Idx (.1)	Slot (.2)	Config (.3)	SerialNo (.4)	Power (.5)	Frequency (.6)	Out[1234]Status (.7, .8, .9, .10)
3	...6914.4370.4.4.1.2.5	...6914.4378.1.1.2.6	SP00175	true (1)	10	good (1), bad (2), good (1), good (1)
4	...6914.4370.4.4.1.2.6	...6914.4378.1.1.2.9	SP00179	false (2)	5	disabled (3), disabled (3), disabled (3), disabled (3)

Table 19 shows the configuration entries for the 4378A modules. Note the following:

- The Desc and Owner columns can be set to arbitrary strings that identify the plug-in module’s purpose and owner.
- A set request on the Power column enables and disables power to the module which follows the configuration entry.
 - Setting “tsc4378CfgPower.9 (1.3.6.1.4.1.6914.4378.1.1.3.9)” to “true (1)” requests that the plug-in module be enabled. Once the plug-in module has successfully powered up, the tsc4378Instance entry columns (those for the row with index 4 in the previous table) are updated to reflect the new status, and a tsc4370SlotTrap is sent to indicate that status has changed.

Table 19: tsc4378Cfg (1.3.6.1.4.1.6914.4378.1.1)

Idx (.1)	Desc (.2)	Power (.3)	Owner (.4)
6	10 MHz to integration area	true (1)	Joe Smith - extension 137
9	test set burn in	false (2)	testers@nowhere.org

The 4378A modules were used for the detailed slot/status/configuration correlation example above, because they are relatively simple. Their outputs cannot be configured individually, so their configuration and status tables have few entries. The description of how slots, module status, and module configuration are correlated is applicable to all module types.

A.4 Example MIB Module (4373 Plug-in Module)

The following is a listing of the TSC-4373.mib MIB module contained in the bundle. It holds textual conventions specific to the 4373A, as well as tables for individual modules’ status and configuration. Note that frequently used textual conventions are imported from a separate MIB module (TSC-COMMON.mib module).

[Update example MIB]

```
TSC-4373 DEFINITIONS ::= BEGIN

IMPORTS
MODULE-IDENTITY, OBJECT-TYPE, OBJECT-IDENTITY,
    enterprises, Integer32
FROM SNMPv2-SMI
DisplayString, RowPointer, RowStatus, TruthValue,
    TEXTUAL-CONVENTION
FROM SNMPv2-TC
    SnmpAdminString
    FROM SNMP-FRAMEWORK-MIB
    TscPortStatus, TscModulePowerStatus, TscModuleCommand, timing
    FROM TSC-COMMON;

tsc4373Identity MODULE-IDENTITY
    LAST-UPDATED "200702260000Z"
    ORGANIZATION "Symmetricom, Inc."
    CONTACT-INFO
    "
        EMAIL: support@symmetricom.com (Americas, Asia, Pacific Rim)
            emeasupport@symmetricom.com (Europe, Middle East, Africa)
```

VOICE: worldwide: 1-408-428-7907
USA toll-free: 1-888-367-7966 (1-888-FOR-SYMM)
Europe, Middle East & Africa: 49 700 32886435

When calling worldwide, or USA toll-free number:

- *) select Option 1 at the first prompt
- *) select Option 2 for Timing, Test and Measurement Division products

WEB: <http://www.symmetricom.com>
<http://www.symmetricom.com/support/>
http://www.symmetricom.com/Contact/Customer_Assistance_Centers/

DESCRIPTION "Configuration and status of TSC 4373 expansion modules"

REVISION "200702260000Z"

DESCRIPTION

"Initial Revision."

::= { tsc4373 99 }

tsc4373 OBJECT-GROUP

OBJECTS { tsc4373CfgTable, tsc4373InstanceTable }

STATUS current

DESCRIPTION "Aggregates TSC 4373 Configurations and Instances"

::= { timing 4373 }

-- #####
-- Textual Conventions #####
-- #####

Tsc4373OutputType ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Enumerates the TSC 4373 output signal types. Enumeration values were selected so they could be computed:

PPS_enum_value = 2 + log(desired_pulse_rate)

DCIRIG_enum_value = irig_code_letter * 1000 + irig_code_digits

where irig_code_letter is numeric index into the alphabet, using A = 1"

SYNTAX Integer32 {

disabled (1),

pps1 (2), pps10 (3), pps100 (4),

pps1K (5), pps10K (6), pps100K (7),

pps1M (8), pps10M (9),

nasa36 (36),

dcIrigA000 (1000), dcIrigA003 (1003), dcIrigA007 (1007),

dcIrigB000 (2000), dcIrigB003 (2003), dcIrigB007 (2007),

dcIrigD002 (4002),

dcIrigE002 (5002),

dcIrigG002 (7002),

dcIrigH002 (8002)

}

Tsc4373PulseWidth ::= TEXTUAL-CONVENTION

```

STATUScurrent
DESCRIPTION
    "Restricts PPS mode pulse width (in microseconds) to absolute minimum
    and maximum (increment) values.

    The absolute maximum is 500 milliseconds (500000 microseconds) because
    this is 50 % duty cycle of the lowest frequency signal (1 PPS).

    Pulse width is further restricted to a multiple of 10 microseconds.
    The agent rejects SET requests for pulse widths that are not multiples
    of ten.

    Finally, pulse width is implicitly forced to 50 % duty cycle of the
    desired PPS rate, when the minimum of 10 microseconds results in a
    pulse width greater than 50 % of the duty cycle. When 50 % duty
    cycle is implicitly enforced, it is denoted as a 0 (the true
    minimum enforced by the textual convention alone) in status fields.
    The agent will reject a pulse width of 0 in SET requests on
    configuration table entries if output type does not require forced
    pulse width, or is not a PPS output type to begin with (see the
    Tsc4373OutputType textual convention for details about non-PPS
    output types."

SYNTAXInteger32 (0 | 10 .. 500000)

-- #####
-- Configurations #####
-- #####

Tsc4373CfgEntry ::= SEQUENCE
{
    tsc4373CfgIdx          Integer32,
    tsc4373CfgDesc        DisplayString,
    tsc4373CfgPower        TruthValue,
    tsc4373CfgOut1        Tsc4373OutputType,
    tsc4373CfgOut1PulseWidth Tsc4373PulseWidth,
    tsc4373CfgOut2        Tsc4373OutputType,
    tsc4373CfgOut2PulseWidth Tsc4373PulseWidth,
    tsc4373CfgOut3        Tsc4373OutputType,
    tsc4373CfgOut3PulseWidth Tsc4373PulseWidth,
    tsc4373CfgOut4        Tsc4373OutputType,
    tsc4373CfgOut4PulseWidth Tsc4373PulseWidth,
    tsc4373CfgOwner        SnmpAdminString,
    tsc4373CfgStatus        RowStatus
}

tsc4373Cfg OBJECT-TYPE
    SYNTAX      Tsc4373CfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION "conceptual row in tsc4373CfgTable"
    INDEX       { tsc4373CfgIdx }
    ::= { tsc4373CfgTable 1 }

tsc4373CfgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF tsc4373Cfg
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Table of TSC 4373 Module configurations."
    ::= { tsc4373 1 }

```

```

tsc4373CfgIdx OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION "Index to the tsc4373CfgTable."
    ::= { tsc4373Cfg 1 }

tsc4373CfgDesc OBJECT-TYPE
    SYNTAX      DisplayString
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "User friendly description of a desired 4373 configuration."
    ::= { tsc4373Cfg 2 }

tsc4373CfgPower OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "True if the configuration is to power on, disable to power it off."
    DEFVAL     { true }
    ::= { tsc4373Cfg 3 }

tsc4373CfgOut1 OBJECT-TYPE
    SYNTAX      Tsc4373OutputType
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "Signal output on port 1 in this configuration. See the Tsc4373OutputType
        textual convention for details."
    DEFVAL     { pps1 }
    ::= { tsc4373Cfg 4 }

tsc4373CfgOut1PulseWidth OBJECT-TYPE
    SYNTAX      Tsc4373PulseWidth
    UNITS      "us"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "PPS pulse width of port 1 in this configuration, only applicable
        when tsc4373CfgOut1 is set to one of the PPS modes. See
        the Tsc4373PulseWidth textual convention description for details."
    DEFVAL     { 10 }
    ::= { tsc4373Cfg 5 }

tsc4373CfgOut2 OBJECT-TYPE
    SYNTAX      Tsc4373OutputType
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "Signal output on port 2 in this configuration. See the Tsc4373OutputType
        textual convention for details."
    DEFVAL     { pps1 }
    ::= { tsc4373Cfg 6 }

tsc4373CfgOut2PulseWidth OBJECT-TYPE
    SYNTAX      Tsc4373PulseWidth
    UNITS      "us"
    MAX-ACCESS  read-write

```

```

STATUScurrent
DESCRIPTION
    "PPS pulse width of port 2 in this configuration, only applicable
    when tsc4373CfgOut2 is set to one to one of the PPS modes. See
    the Tsc4373PulseWidth textual convention description for details."
DEFVAL{ 10 }
::= { tsc4373Cfg 7 }

tsc4373CfgOut3 OBJECT-TYPE
SYNTAX      Tsc4373OutputType
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
    "Signal output on port 3 in this configuration. See the Tsc4373OutputType
    textual convention for details."
DEFVAL      { pps1 }
::= { tsc4373Cfg 8 }

tsc4373CfgOut3PulseWidth OBJECT-TYPE
SYNTAXTsc4373PulseWidth
MAX-ACCESSread-write
STATUScurrent
DESCRIPTION
    "PPS pulse width of port 3 in this configuration, only applicable
    when tsc4373CfgOut3 is set to one to one of the PPS modes. See
    the Tsc4373PulseWidth textual convention description for details."
DEFVAL{ 10 }
::= { tsc4373Cfg 9 }

tsc4373CfgOut4 OBJECT-TYPE
SYNTAX      Tsc4373OutputType
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
    "Signal output on port 4 in this configuration. See the Tsc4373OutputType
    textual convention for details."
DEFVAL      { pps1 }
::= { tsc4373Cfg 10 }

tsc4373CfgOut4PulseWidth OBJECT-TYPE
SYNTAXTsc4373PulseWidth
UNITS"us"
MAX-ACCESSread-write
STATUScurrent
DESCRIPTION
    "PPS pulse width of port 4 in this configuration, only applicable
    when tsc4373CfgOut3 is set to one to one of the PPS modes. See
    the Tsc4373PulseWidth textual convention description for details."
DEFVAL{ 10 }
::= { tsc4373Cfg 11 }

tsc4373CfgOwner OBJECT-TYPE
SYNTAX      SnmpAdminString
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
    "Arbitrary string field that can be used to track who created
    the configuration. The creator might have to be consulted
    before configuration is changed for example."
::= { tsc4373Cfg 12 }

```

```

tsc4373CfgStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION "Synchronizes access to the configuration table"
    ::= { tsc4373Cfg 13 }

-- #####
-- Instances #####
-- #####

Tsc4373InstanceEntry ::= SEQUENCE
{
    tsc4373Idx      Integer32,
    tsc4373Slot    RowPointer,
    tsc4373Config  RowPointer,
    tsc4373SerialNo DisplayString,
    tsc4373MakPartNo DisplayString,
    tsc4373Power   TscModulePowerStatus,
    tsc4373Out1Type Tsc4373OutputType,
    tsc4373Out1PulseWidth Tsc4373PulseWidth,
    tsc4373Out1Status TscPortStatus,
    tsc4373Out2Type Tsc4373OutputType,
    tsc4373Out2PulseWidth Tsc4373PulseWidth,
    tsc4373Out2Status TscPortStatus,
    tsc4373Out3Type Tsc4373OutputType,
    tsc4373Out3PulseWidth Tsc4373PulseWidth,
    tsc4373Out3Status TscPortStatus,
    tsc4373Out4Type Tsc4373OutputType,
    tsc4373Out4PulseWidth Tsc4373PulseWidth,
    tsc4373Out4Status TscPortStatus,
    tsc4373Command TscModuleCommand,
    tsc4373Status  RowStatus
}

tsc4373Instance OBJECT-TYPE
    SYNTAX      Tsc4373InstanceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION "conceptual row in tsc4373InstanceTable"
    INDEX      { tsc4373Idx }
    ::= { tsc4373InstanceTable 1 }

tsc4373InstanceTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF tsc4373Instance
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Table of TSC 4373 modules instances."
    ::= { tsc4373 2 }

tsc4373Idx OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Indexes the tsc4373InstanceTable."
    ::= { tsc4373Instance 1 }

tsc4373Slot OBJECT-TYPE
    SYNTAX      RowPointer

```

```

MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "References the expansion module slot in the 4370 in which this 4373
    is installed"
 ::= { tsc4373Instance 2 }

tsc4373Config OBJECT-TYPE
SYNTAX RowPointer
MAX-ACCESS read-only
STATUS current
DESCRIPTION "References the desired configuration for this 4373."
 ::= { tsc4373Instance 3 }

tsc4373SerialNo OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The expansion module's serial number in user friendly format."
 ::= { tsc4373Instance 4 }

tsc4373MakPartNo OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The expansion module's MAK part number."
 ::= { tsc4373Instance 5 }

tsc4373Power OBJECT-TYPE
SYNTAX TscModulePowerStatus
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "Reports if the module is powered on, off, or should be powered on but
    cannot be, because of insufficient power in the chassis."
 ::= { tsc4373Instance 6 }

tsc4373Out1Type OBJECT-TYPE
SYNTAX Tsc4373OutputType
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The type of signal currently output on port 1. See the Tsc4373OutputType
    textual convention for details."
 ::= { tsc4373Instance 7 }

tsc4373Out1PulseWidth OBJECT-TYPE
SYNTAX Tsc4373PulseWidth
UNITS "us"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The pulse width on output port 1. This value is only applicable when
    tsc4373Out1Type is one of the PPS modes. See the Tsc4373PulseWidth
    textual
    convention description for details."
 ::= { tsc4373Instance 8 }

tsc4373Out1Status OBJECT-TYPE

```



```

SYNTAX      TscPortStatus
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The first output port's current status"
 ::= { tsc4373Instance 9 }

tsc4373Out2Type OBJECT-TYPE
SYNTAX      Tsc4373OutputType
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The type of signal currently output on port 2. See the Tsc4373OutputType
    textual convention for details."
 ::= { tsc4373Instance 10 }

tsc4373Out2PulseWidth OBJECT-TYPE
SYNTAX      Tsc4373PulseWidth
UNITS       "us"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The pulse width on output port 2. This value is only applicable when
    tsc4373Out2Type is one of the PPS modes. See the Tsc4373PulseWidth
    textual convention description for details."
 ::= { tsc4373Instance 11 }

tsc4373Out2Status OBJECT-TYPE
SYNTAX      TscPortStatus
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The second output port's current status"
 ::= { tsc4373Instance 12 }

tsc4373Out3Type OBJECT-TYPE
SYNTAX      Tsc4373OutputType
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The type of signal currently output on port 3. See the Tsc4373OutputType
    textual convention for details."
 ::= { tsc4373Instance 13 }

tsc4373Out3PulseWidth OBJECT-TYPE
SYNTAX      Tsc4373PulseWidth
UNITS       "us"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The pulse width on output port 3. This value is only applicable when
    tsc4373Out3Type is one of the PPS modes. See the Tsc4373PulseWidth
    textual convention description for details."
 ::= { tsc4373Instance 14 }

tsc4373Out3Status OBJECT-TYPE
SYNTAX      TscPortStatus
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The third output port's current status"

```

```

 ::= { tsc4373Instance 15 }

tsc4373Out4Type OBJECT-TYPE
    SYNTAX      Tsc4373OutputType
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The type of signal currently output on port 4. See the Tsc4373OutputType
        textual convention for details."
 ::= { tsc4373Instance 16 }

tsc4373Out4PulseWidth OBJECT-TYPE
    SYNTAXTsc4373PulseWidth
    UNITS"us"
    MAX-ACCESSread-only
    STATUScurrent
    DESCRIPTION
        "The pulse width on output port 4. This value is only applicable when
        tsc4373Out4Type is one of the PPS modes. See the Tsc4373PulseWidth
        textual convention description for details."
 ::= { tsc4373Instance 17 }

tsc4373Out4Status OBJECT-TYPE
    SYNTAX      TscPortStatus
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The fourth output port's current status"
 ::= { tsc4373Instance 18 }

tsc4373Command OBJECT-TYPE
    SYNTAXTscModuleCommand
    MAX-ACCESSread-write
    STATUScurrent
    DESCRIPTION
        "Accepts commands for the module represented for the row. Always
        returns 0 when read. To issue a command send one of the valid
        TscModuleCommmand enumerations. See TscModuleCommand textual
        convention for details."
 ::= { tsc4373Instance 19 }

tsc4373Status OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Synchronizes access to the expansion module instance"
 ::= { tsc4373Instance 20 }

END

```

Appendix B: Warranty and Shipping Information

This chapter provides information on how to contact Symmetricom, Inc. for warranty service, as well as shipping guidelines for the 4370A.

B.1 Warranty Information

The 4370A carries a warranty from Symmetricom, Inc. for a period of 1 year from date of shipment.

B.2 Symmetricom Customer Assistance Centers

Symmetricom's Customer Assistance Centers are a centralized resource to handle your support needs.

B.2.1 Telephone Support

- Worldwide (Main Number): 1-408-428-7907
- USA, Canada, Latin America including Caribbean, Pacific Rim including Asia, Australia and New Zealand: 1-408-428-7907
- USA toll-free: 1-888-367-7966 (1-888-FOR-SYMM)
- Europe, Middle East, and Africa: 49 700 32886435

You can contact Technical Support by calling one of the numbers above, or from our web site at <http://www.symmetricom.com/support/>.

When calling the Worldwide or USA telephone number:

- Select option 1 at the first prompt.
- Select option 2 for Timing, Test and Measurement Division products.

Technical Support personnel are available by phone 24 hours a day, 7 days a week through the Main Customer Assistance Center number above and from 8 AM to 5 PM Central European Time on weekdays at the Europe, Middle East, and Africa number.

B.2.2 Email Support

Customers who have purchased Technical Support Contracts can email support requests to:

- support@symmetricom.com (Americas, Asia, Pacific Rim)
- emeasupport@symmetricom.com (Europe, Middle East, Africa)

B.3 Shipping Information

If you need to ship this unit for any reason, including returning equipment to Symmetricom for warranty service, follow these shipping instructions. Failure to follow these instructions may damage your system.

B.3.1 Packing Instructions

- Always ship the 4370A appropriately packaged to protect it from damage, preferably in the package in which it was originally shipped.
- No cables or connectors may be attached to the rear of the chassis.
- Wrap the chassis in plastic to protect against moisture.

Appendix C: Specifications

C.1 EC Declaration of Conformity

In accordance with EN 45014:1998

We Symmetricom, Incorporated
Of 4775 Walnut Drive Suite 1B
Boulder, CO 80301
USA

declare that:

Equipment DVB Sync Source
Model Numbers **4370A-140, 4370A-141, 4370A-142, 4370A-240, 4370A-241, 4370A-242, 4370A-150, 4370A-151, 4370A-152, 4370A-250, 4370A-251, 4370A-252, 4370A-060, 4370A-061, 4370A-062**

Product Options None

in accordance with the following Directives:

2006/95/EC The Low Voltage Directive

EN 55011: 2007The Electromagnetic Compatibility Directive
and its amending directives

has been designed and manufactured to the following specifications:

Safety: EN 60950-1:2001
Information Technology Equipment – Safety – Part 1: General Requirements

EMC Emissions: EN 55011 Class A, Group 1 office/light industrial environments
Immunity: EN 61000-6-2 for Information Technology Equipment

Restriction of Hazardous Substances (ROHS)

2002/95/EEC Restriction of Hazardous Substances in Electrical and Electronic Equipment

Contains lead in solder per Annex exemption 7 for telecommunications infrastructure equip.

I hereby declare that the equipment named above has been designed and tested as required to comply with the relevant sections of the above referenced specifications. The unit complies with all essential requirements of the Directives.

Signed by: Name: S.R. Stein
Position: Vice President, Engineering, TT & M

Done at Boulder, Colorado U.S.A on 18 August 2007

C.2 Chassis Specifications

C.2.1 Electrical Specifications

Table 20 lists the electrical specifications for the 4370A.

Table 20: Electrical specifications

Item	Specification
Protection Class	Class I (Grounded Type)
Power Input Voltage	100–240 V AC Power draw: 0.75 A or –48 VDC (SELV type) 1 A Note: Power draw is for a fully loaded chassis. Note: Fluctuations not to exceed $\pm 10\%$ of nominal supply voltage.
Power Input Frequency, AC input	50–60 Hz
Power Inlet Type, AC input	IEC 60320 sheet C14
Power Supply Cord Set, AC input	18 AWG (0.75 mm ² minimum)
Power Inlet Type, DC input	Mates with 3 pin Amp Part#: 1-350346-0 connector with female sockets Amp Part# 925661-1
Power Supply Cord Set, DC input	Minimum 1.5 mm ² (14 AWG) with a 15A fuse or circuit breaker. A 20A circuit breaker may be used if the external wiring is jacketed 14 AWG, with maximum length of 20 feet.
Power Mains Fuse	AC Input: Two 250 V~1 A T (Time delay) 5 x 20 mm DC Input: Two 250 V~1.6 A T (Time delay) 5 x 20 mm
GPS Antenna Input	TNC female with +5 VDC, 80 mA maximum output on center conductor.

Table 20: Electrical specifications

Item	Specification
Fiber Optic Input/Output 4370A-x5y only	SFP Multimode Transceiver, Dual LC connectors Must be connected to another -x5y Fiber Optic Input/Output through an LC Multi-Mode dual fiber cable less than 2 km long
2 MHz or 2Mbit/second Input 4370A-x5y only	BNC female 2 MHz <ul style="list-style-type: none"> ■ Complies with ITU-T Rec. G.703 paragraph 13 ■ Impedance: 75 Ω ■ Pull in range + or - 0.6 Hz 2 Mbit/second <ul style="list-style-type: none"> ■ BNC ■ Complies with ITU-T Rec. G.703 paragraph 9 ■ Impedance: 75 Ω ■ HDB3 ■ Pull in range + or - 0.6 Hz

C.2.1.1 Phase Noise

Table 21 lists the phase noise specifications of the available oscillators.

Table 21: Phase noise, 10 MHz

Offset (Hz)	TCXO dBc/Hz	OCXO dBc/Hz
1	-60	-90
10	-90	-125
100	-105	-125
1 k	-125	-135
10 k	-135	-135

C.2.1.2 Accuracy of the pps

- The pps accuracy when locked to GPS is better than 500 ns rms in 3D mode.
- The pps accuracy when in holdover is:
 - TCXO: 5×10^{-7} per day
 - OCXO: better than 1×10^{-10} per day after 72 hours

C.2.1.3 Allan Deviation

Table 22 lists the Allan deviation.

Table 22: Allan deviation

Averaging times	TCXO Tau	OCXO Tau
1	4×10^{-10}	8×10^{-11}

Table 22: Allan deviation

Averaging times	TCXO Tau	OCXO Tau
10	5×10^{-10}	8×10^{-11}
100	1×10^{-9}	8×10^{-11}

C.2.2 Environmental Specifications



Warning

Ordinary protection: This unit is for **INDOOR USE ONLY**. It is not sealed to prevent moisture from entering the enclosure.

- Pollution Degree 2 per EN60950-1
- Installation (Over-Voltage) Category II for transient over-voltages per EN 60950-1, EN61326-1 Class A
- Compliant with RoHS Directives 5 and 6
- Equipment suitable for continuous operation

Table 23 lists the environmental specifications for the 4370A.

Table 23: Environment specifications

Item	Temperature	Relative Humidity	Altitude
In Use	0°C to 50°C	0% to 90% (non-condensing)	3,000 meters (9,843 feet)
Storage	-40°C to 70°C	0% to 90% (non-condensing)	
Transportation	-40°C to 70°C	0% to 90% (non-condensing)	

C.2.3 Physical Specifications

Table 24 lists the physical specifications for the 4370A.

Table 24: Physical specifications

Item	Specification
Width	Standard 19-inch rack mount
Height	Standard 1U (4.44 cm [~1.75"])
Depth	48.3 cm (19 inches)
Size	48.3 cm x 43.2 cm x 4.5 cm (19" x 17" x 1.75")
Weight	Approximately 8.4 kg (18.5 pounds) with two power supplies and six plug-in modules

Figure 8 shows the dimensions of the 4370A.

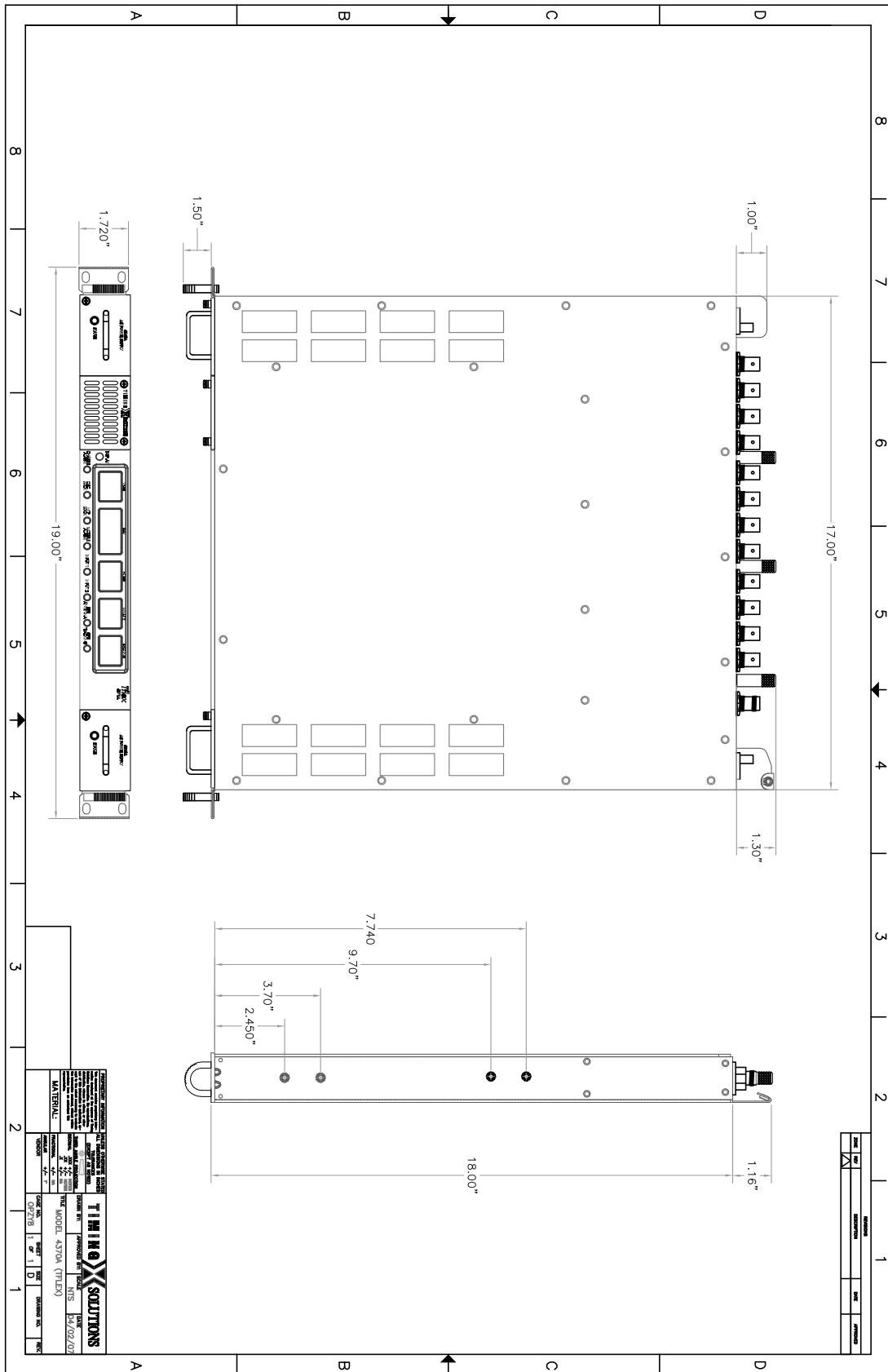


Figure 8: 4370A dimensions

C.3 Plug-in Module Specifications

The following sections provide the specifications for the plug-in modules.

C.3.1 Fiber Optic Output Module (4371A)

This module can be installed in a 4370A-x4y or 4370A-x5y and provides four outputs for distribution of time and frequency to 4370A-06y chassis. It contains four SFP sockets with can be loaded with multimode or single mode LC connector transceivers. Time and frequency as well as status of the 4370A-x4y or 4370A-x5y are provided to the downstream 4370A-06y. The output time code is proprietary.

C.3.2 pps or DC IRIG Module (4371A and 4394A)

Table 25 lists the specifications for the pps or DC IRIG module.

Table 25: Configurable pps or DC IRIG module specifications

Characteristic	Description
Number of outputs	Four
Rates (pps)	1, 10, 100, 1 k, 100 k, 1 M, and 10 M
Pulse width	10 μ s to maximum 50% duty cycle. Default is 100 μ s
Amplitude	High >2.4 V into 50 ohm load
1 pps to 10 MHz alignment	1 pps output rising edge within 10 ns of 10 MHz output rising edge.
DC IRIG types	B003 and B007
Skew	Maximum offset difference between any two outputs is less than ± 2 nanoseconds at 50% point of rising edge.
Output connectors	BNC

C.3.3 10 MHz Output Module (4378A-10 and 4395A-10)

Table 26 lists the specifications for the 10 MHz output module.

Table 26: 10 MHz Output module specifications

Characteristic	Description
Number of outputs	Four
Output connectors	BNC
Amplitude	13 \pm 2 dBm
Phase noise	Dependent on chassis oscillator option
Skew between outputs	Less than ± 2 nanoseconds
Output Squelch	Per output, user selectable (4395A-10 only). The squelch function on the 4395A-10 does not fully squelch the signal, a maximum of -7dBm will still be provided on the output.

C.3.4 2 MHz Output Module (4396A)

Table 27 lists the specifications for the specifications for the 2 MHz module.

Table 27: 2 MHz output module specifications

Characteristic	Description
Number of outputs	Four
Output connectors	BNC
Output signal	Complies with ITU-T Rec. G.703 paragraph 13
Output impedance	75 Ω
Time code	None; frequency output only
Output Squelch	Per output, user selectable

C.3.5 2 Mbit/s Module (4397A)

The 2 Mbit/s module provides four 2.048 Mbit/s frequency outputs.

Table 28 lists the specifications for the 2 Mbit/s module.

Table 28: 2 Mbit output module specifications

Characteristic	Description
Number of outputs	Four
Output connectors	BNC
Output signal	Complies with ITU-T Rec. G.703 paragraph 9
Output impedance	75 Ω
Time code	HDB3.PCM31, all zeros except time slot 16, which is all ones
Output Squelch	Per output, user selectable

Glossary

CAT 5	Category 5 cable
DAB	Digital Audio Broadcast
dB	decibels
dBm	Decibels relative to 1 mW
DSS	DVB Sync Server
DVB	Digital Video Broadcast
EUI	extended unique identifier
GPS	Global Positioning System
IEC	International Electrotechnical Commission
LAN	local area network
MAC	Media Access Control
MIB	Management Information Base
NTP	Network Time Protocol
PCBA	Printed Circuit Board Assembly
SFN	Single Frequency Network
SNMP	Simple Network Management Protocol
STC	Serial Time Code
VAC	volts alternating current
VDC	volts direct current

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