TSC 4032A
1 x 15 Pulse Distribution Amplifier

Operations and Maintenance Manual

TIMING SOLUTIONS™

TSC 4032A 1 x 15 Pulse Distribution Amplifier Operations and Maintenance Manual

DOC04032 Rev B

Revision History

Revision	Description	Date	Approved
A	Initial Release	12/23/03	GAR
B	Updates for CE requirements Change pollution note Add call out for rear panel GND stud	2/5/04	GAR

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1: Introduction

Note

FIRST READ THIS MANUAL THROUGHLY!
This is especially true for the sections regarding **Safety** and **Installation.**

1.1 Symbols

These symbols appear throughout the manual as well as on the unit itself.

 Note

This symbol means the following information is a note that gives you important information that may affect how you use the 4032A.

 Caution, refer to manual. Read all instructions in Manual before using this product.

 CE marking, attesting compliance to applicable European Directives

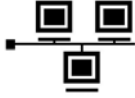 Caution – Risk of Electrical shock

 Fuse symbol

| | Mains Power is ON |

Mains Power is OFF

LAN port, NETWORK, DO NOT CONNECT TO TELECOM CONNECTIONS THAT CARRY HAZARDOUS VOLTAGES.

101010   Serial port connection, DO NOT CONNECT TO TELECOM CONNECTIONS THAT CARRY HAZARDOUS VOLTAGES.

Earth terminal symbol: Used to indicate an earth ground connection to chassis.

1.2 About This Manual

This manual tells you how to install, set up, monitor, and troubleshoot the 4032A.

"Chapter 1, Introduction" on page 4 explains symbols that appear in the manual and on the unit as well as documentation conventions. The chapter also briefly describes the 4032A.

"Chapter 2, Installing and Setting Up the 4032A" on page 8 contains important safety information and describes how to install the 4032A, and assign a fixed IP address.

"Chapter 3, Monitoring the 4032A" on page 13 describes how to monitor alarms.

"Chapter 4, Troubleshooting the 4032A" on page 15 describes how to replace fuses and verify operational problems.

"Chapter 5, Warranty and Shipping Information" on page 17 explains how to contact Timing Solutions Corporation for warranty service and provides shipping guidelines.

"Chapter 6, Declaration of Conformity" on page 19 provides the information pertaining to CE marking of this product.

"Appendix A, Specifications" on page 21 contains the detailed specifications for the 4032A.

1.2.1 Conventions

This manual uses several typographical conventions to help explain how to use the 4032A.

Convention	Definition
Bold	Words in **bold** show: ■ Buttons and icons to click ■ Menu options to select ■ Commands to type ■ Non-variable information displayed in response to commands
Italics	Words in *italics* show: ■ Names of windows and dialog boxes ■ Variable information displayed in response to commands

1.3 4032A Overview

The TSC 4032A is a one input, fifteen output pulse distribution amplifier housed in a 1U high 19 inch rack mount chassis. It provides fifteen outputs from a single input. An Ethernet port on the rear panel provides the capability to remotely monitor the status of the input and all output signals. Any input or output failure in the unit will immediately provide an alarm to this port. The front panel provides green LED status for the input and green/red for all output signals, as well as indicating an input of 1 PPS, DC IRIG, or Other. A green LED on the front panel also provides power status.

Figure 1 shows the 4032A's front panel, and Figure 2 shows the 4032A's rear panel.

POWER–
Green when
power is on.

INPUT FREQUENCY–
Lit Green LED
shows whether input
is 1 PPS, DC IRIG,
or Other.

OUTPUT STATUS–
Green during normal operation of output signal.
Red when output signal fails.

Figure 1: Front panel

**Additional
Ground
connection**

POWER–
connector

ETHERNET PORT–
1 RJ-45 connector

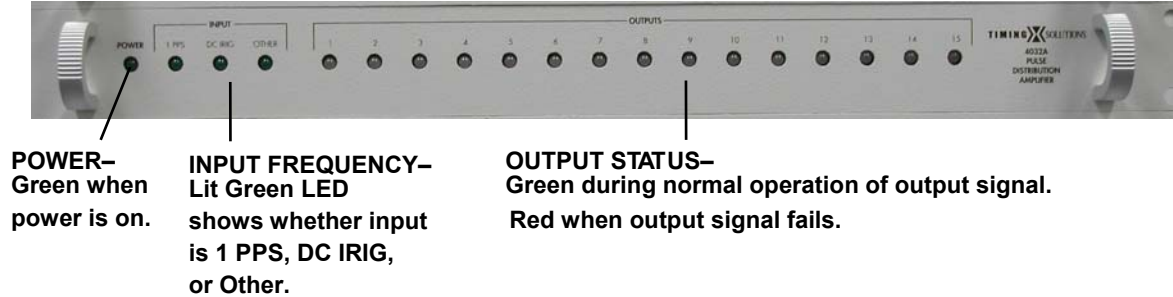**INPUT–**
1 BNC connector
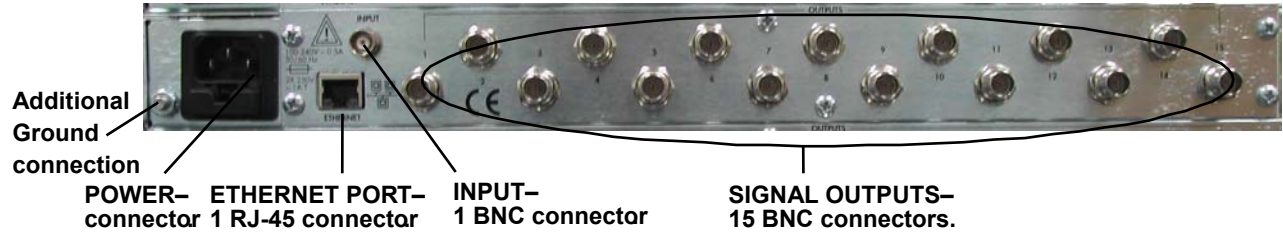
SIGNAL OUTPUTS–
15 BNC connectors.

Figure 2: Rear panel

2: Installing and Setting Up the 4032A

2.1 Safety First!

⚠ **Warnings:**

This unit is for INDOOR USE ONLY. It is not protected against a harmful ingress of moisture.

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

Equipment is intended to be installed in an Enclosed or Open type equipment rack

Ensure that all cables are properly connected. The power cord must be easy to remove from the back.

Verify that input line voltage and current capacity are within specifications before turning on power to the unit.

Disconnect all sources of input power before removing the top cover of this unit.

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

2.2 Unpacking

To unpack the TSC 4032A unit:

1. Unpack and carefully inspect the unit.
2. Check for physical damage.
3. If no physical damage is apparent, then proceed with making appropriate connections.
   - If physical damage is observed, then immediately contact Timing Solutions and the carrier.
4. Save the shipping container for submitting any necessary claims to the carrier.

2.3 Cleaning

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

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

2.4 Installing the 4032A

The 4032A is shipped ready for installation into a standard 19" (48.3 cm) rack. Provisions are included for mounting General Devices slides with part numbers C-300-S-126, -128 and -130.

2.4.1 Required materials for installation

North American or European IEC power cord. One or the other will be supplied with the unit.

Customer supplied double shielded RG223 cables with BNC connectors from source, and to next devices in system.

Customer supplied LAN cable for network connection (RJ-45).

Rack-mount slide kit from General Devices, C-300-S-126, -128 or -130 (Optional)

Rack mounting screws.

Screwdriver for the rack mount screws, and slide as needed.

2.4.2 Making Connections

2.4.2.1 Input Power

AC INPUT POWER - The input power to the unit is supplied through a detachable 3-prong power cable. First plug the female end into the male IEC-320 plug on the rear of the unit, then plug the male end of the cable into a 100V~ to 240V~, 50/60 Hz power source.

 Warning

Ensure that this power supply cord is connected to a properly grounded mains receptacle to ensure safety.

 Since the unit does not have a AC Mains Power Switch, both the Appliance Inlet Connector and the Plug on the detachable type power supply cord are considered to be suitable Disconnect Means for disconnecting the unit from the AC Mains Supply. If the rear of the unit is not accessible after installation in the instrument rack, the User is responsible for the provision of a suitable external AC Disconnect Means for the unit.

2.4.2.2 Input Signal

Connect the input signal cable to the **INPUT** BNC connector on the back of the unit.

2.4.2.3 Output Signals

Connect up to fifteen cables to the **OUTPUT** BNC connectors on the rear panel of the unit to supply users with a copy of the input signal.

2.4.2.4 LAN - Ethernet Network Port

Connect a network LAN cable (not supplied with the unit) to the LAN port on the back of the unit.

2.5 Assigning a Static IP Address

The 4032A contains a Lantronix® Xport™ Ethernet to RS-232 converter, which provides the 4032A's Ethernet connection.

The 4032A ships from the factory with a default IP address of 0.0.0.0, which enables DHCP. If the network has a DHCP server, it will automatically assign the unit an IP address, gateway address, and subnet mask when the unit starts up.

To monitor multiple 4032As remotely through their Ethernet connections without DHCP re-assigning IP addresses, you must assign each unit a static IP address. You identify which unit is the source of an alarm by its IP address. Each unit has its own unique hardware address, labeled MAC address, on a label on the rear panel. Follow the instructions in this section to manually assign a unit's static IP address.

Note

For more detailed information, see the *Xport™ User Manual.* Section 3.3 discusses several different ways that you can assign IP addresses. Chapter 4 explains how to configure a static IP address. You can download the *Xport™ User Manual* from the Lantronix® Web site as an Adobe® Acrobat® PDF file. Go to:
http://www.lantronix.com/products/eds/xport/XPort_UM_900-270.pdf

If you want to configure a static IP address of many different 4032As, you can install the Lantronix® DeviceInstaller software. This software is available only by downloading from the Lantronix® Web site. Go to: http://www.lantronix.com/support/utils/dst/index.html. Alternatively you may use your companies IT protocol to determine the IP address assigned to a particular hardware address, then set a static address.

To manually assign the static IP address using the Lantronix® DeviceInstaller software:

1. Obtain the following network information from your system administrator for each 4032A you want to install:

   IP Address: _____ _____ _____ _____

   Subnet Mask: _____ _____ _____ _____

   Gateway: _____ _____ _____ _____

2. Connect a Windows® PC to the same local subnet as the 4032A.

3. Install and start the Lantronix® DeviceInstaller software.

4. Click the **Search Network** icon and search for XPORT devices connected to the network, press save and then exit.

5. Click the IP icon or select **Assign IP Address** on the **Tools** menu.

   ■ The hardware device number and IP address appear in the *Assign IP Address* dialog box.

5. Type the new IP address for the appropriate "**Hardware or Ethernet address**" and click **Set IP address.**

   ■ The new IP address appears in the Lantronix® DeviceInstaller window.

6. Test the IP address by pinging the 4032A's Xport™ on the Lantronix Xport Installer window. Click the **Ping** icon or select **Ping Device** on the **Tools** menu.

   ■ The *Ping Device* window should show the IP address of the 4032A's Xport™ device, and it should show successful replies if the IP address has been configured correctly.

7. Exit the browser.

To change the IP address using telnet:

1. Telnet to the assigned address, port 9999. Press enter within five seconds to enter the setup mode.

2. Select Option 0

3. Set the IP address and follow on screen commands to save the setting

Sending an **I** command will turn on the three front panel input LEDs for 2 seconds before returning to normal operation. This provides the capability for the user to ensure they are communicating over the Ethernet connection to the correct device via front panel feedback.

Note

If you move the 4032A to a different network hub after setting up the static IP address, the host computer may not be able to make a connection. You may need to release the IP address lease on your operating system.

3: Monitoring the 4032A

3.1 Accessing the System

You access the 4032A remotely by connecting to its Command-And-Response (CNR) Port through the Ethernet connection. The CNR port (Port 10001), which uses TCP/IP, lets users input commands, displays results of the commands, and publishes alarms as they occur.

When users Telnet to the CNR port, the system does not display a prompt.

3.2 Checking System Status

3.2.1 Checking Alarms and Input Frequency

The system can report current alarms, latched alarms, and the type of input signal.

To check system status:

- Type: **S** (case sensitive)

  You do not need to type a carriage return or line feed.

The system returns **S***cccc,llll,x***\r\n** where

- *cccc* is current alarms.

- *llll* is latched alarms since the last status request.

  Both *cccc* and *llll* are hexadecimal numbers, with each binary bit position representing one output. The MSB is the input signal status. The LSB (farthest right) is output 1 status. A value of 1 in a bit position indicates an alarm condition.

- *x* is one of the values for inputs shown in Table 2.

Table 2: Input values

Value	Input Frequency
0	Not 1 PPS, DC IRIG, or Other
1	1 PPS
2	DC IRIG (IRIG-B is 100 PPS) (IRIG-A is 1 kPPS)
3	Other

Example: S0000,0001,2

This example shows that the system has no current alarms, output 1 alarmed since last status request, and the input type is DC IRIG. With no input signal, all output status bits will report 0.

3.2.2 Checking Model Number and Software Version

Both commands are case sensitive. You do not need to type a carriage return or line feed.

To check the TSC model number:

- Type: **I**

The system returns **I4032A-00\r\n**.

To check the software version

- Type: **V**

The system returns **V***xx***\r\n** where *xx* is the software version.

Example: V80.

Sending an **I** command will turn on the three front panel input LEDs for 2 seconds before returning to normal operation. This provides the capability for the user to ensure they are communicating over the Ethernet connection to the correct device via front panel feedback.

3.3 Understanding Alarm Output

The 4032A automatically publishes alarms to the CNR port as they occur.

The alarms appear in the format **ALARM***cccc* where *cccc* is the summary status of the input and output signals. The format of the alarm status is identical to the "S" command response *cccc* for current status.

Example: ALARM0008

This example shows that output 4 failed.

4: Troubleshooting the 4032A

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

4.1 Replacing Fuses

If you know that a local event caused blown fuses throughout a rack, you can replace the fuses in each 4032A power entry module.

Required for this procedure:

- Small flat-head screwdriver
- Replacement fuse for a standard IEC 320 power entry module with fuse (5 x 20 mm, 1 A 250 V Time lag fuse)

To replace a fuse:

1. Disconnect the power cable from the back of the 4032A.
2. Using a small screwdriver, open the fuse cover on the back of the 4032A.
3. Replace the old fuses as necessary.
4. Close the fuse cover.
5. Reconnect the power cable to the back of the 4032A.

4.2 Verifying Operational Problems

If the unit does not operate properly after you have verified that:

- the correct power is applied to the rear of the 4032A

  and

- the fuses are good,

call Timing Solutions Corporation to obtain a Returned Materials Authorization and return the unit to TSC for repair.

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5: Warranty and Shipping Information

This chapter provides information on how to contact Timing Solutions Corporation for warranty service, as well as shipping guidelines for the 4032A.

5.1 Warranty Information

The 4032A carries a warranty from Timing Solutions Corporation for a period of 1 year from date of shipment.

For repairs, contact Timing Solutions Corporation:

- Phone (303) 939-8481
- Fax (303) 443-5152

Address written correspondence to:

Timing Solutions Corporation
4775 Walnut Street, Suite 1B
Boulder, CO 80301
USA

5.2 Shipping Information

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

5.2.1 Packing Instructions

- Always ship the 4032A 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.

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6: Declaration of Conformity

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Declaration of Conformity
According to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name: Timing Solutions Corporation

Manufacturer's Address: 4775 Walnut Drive Suite 1B
                               Boulder CO 80301
                               USA

declares that the product:
          Product Name: 1 x 15 Pulse Distribution Chassis
          Model Number: TSC 4032A
          Product Options: All

Conforms to the following Product Specifications:

Safety:
          EN61010-1:2000, Safety Requirements for Electrical Equipment for Measurement, Control and
                    Laboratory Use - Part 1: General Requirements

EMC
          EN61326:2000, Electrical Requirements for Electrical Equipment for Measurement, Control and
                    Laboratory Use - Part 1: General Requirements
          EN55011, Class A Emissions
          EN61000-3-2, AC Power Line Harmonics
          EN61000-3-3, AC Power Line Flicker

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the
EMC Directive 89/336/EEC and carries the CE-marking accordingly.

This product was tested in a typical configuration.

Boulder, CO   February, 2004

European Contact: Contact the Manufacturer directly at the address above

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Appendix A: Specifications

A.1 Electrical Specifications

Table 3: *Table 3 lists the electrical specifications for the 4032A.*

Table 3: Electrical specifications

Item	Specification
Protection Class	Class I (Grounded Type)
Power Input Voltage	100 – 240 V~ 50/60 Hz 0.5 A **Note:** Fluctuations not to exceed ± 10% of nominal supply voltage.
Power Inlet Type	IEC 60320 sheet C14
Power Supply Cord Set	18 AWG (0.75 mm^2 minimum)
Power Mains Fuse	(2) - 250V~1A Time lag 5x20 mm
Signal Input	■ Impedance: 50 Ω ■ Logic one > 2.4 V ■ Logic zero < 0.8 V ■ 1 PPS to 1 MPPS ■ Duty Cycle 0-50%
Connectors	■ Input: 1 BNC ■ Output: 15 BNC ■ LAN: RJ-45
Output voltage	■ Logic one : + 3.0 V Typical into 50 Ω ■ Logic zero : + 0.8 V Maximum into 50 Ω
Pulse rise time	< 2.0 ns
Pulse fall time	< 2.0 ns
Skew between outputs	< ± 500 ps
Jitter	< 50 ps rms

Item	Specification
Output impedance	50 Ω

A.2 Environment Specifications

⚠️ **Warning**

Ordinary protection: This unit is for **INDOOR USE ONLY.** It is not protected against a harmful ingress of moisture.

Equipment intended to be installed in an Enclosed/Open type equipment rack

- Pollution Degree 2 per EN61010-1
- Installation (Over-Voltage) Category II for transient over-voltages per EN 61010-1
- Equipment suitable for continuous operation

Table 4 lists the environmental specifications for the 4032A.

Table 4: 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)	

A.4 Physical Specifications

Table 5 lists the physical specifications for the 4032A.

Table 5: Physical specifications

Item	Specification
Width	Standard 19-inch rack mount
Height	Standard 1U
Depth	31.875 cm or 12.75 inches
Weight	Approximately 4.1 kg

Glossary

\n	Line feed
\r	Carriage return
CNR	Command and Response
DHCP	Dynamic Host Configuration Protocol
ESD	electrostatic discharge
LED	light-emitting diode
LSB	least significant bit
MSB	most significant bit
PDF	portable document format
PWA	printed wiring assembly
RF	radio frequency
TSC	Timing Solutions Corporation

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