ECO8000 Series
Automatic Changeover Unit

User Manual

Tektronix

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www.tektronix.com

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Tektronix

Contacting Tektronix

Tektronix, Inc.
14150 SW Karl Braun Drive
P.O. Box 500
Beaverton, OR 97077
USA

For product information, sales, service, and technical support:
- In North America, call 1-800-833-9200.
- Worldwide, visit www.tektronix.com to find contacts in your area.

Warranty

Tektronix warrants that this product will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If any such product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by Tektronix for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of Tektronix.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

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[W2 – 15AUG04]

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Important safety information

This manual contains information and warnings that must be followed by the user for safe operation and to keep the product in a safe condition.

To safely perform service on this product, additional information is provided at the end of this section. (See page vi, *Service safety summary*.)

General safety summary

Use the product only as specified. Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. Carefully read all instructions. Retain these instructions for future reference.

Comply with local and national safety codes.

For correct and safe operation of the product, it is essential that you follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

The product is designed to be used by trained personnel only.

Only qualified personnel who are aware of the hazards involved should remove the cover for repair, maintenance, or adjustment.

Before use, always check the product with a known source to be sure it is operating correctly.

This product is not intended for detection of hazardous voltages.

Use personal protective equipment to prevent shock and arc blast injury where hazardous live conductors are exposed.

While using this product, you may need to access other parts of a larger system. Read the safety sections of the other component manuals for warnings and cautions related to operating the system.

When incorporating this equipment into a system, the safety of that system is the responsibility of the assembler of the system.

To avoid fire or personal injury

Use proper power cord. Use only the power cord specified for this product and certified for the country of use.

Do not use the provided power cord for other products.

Ground the product. This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, make sure that the product is properly grounded.

Do not disable the power cord grounding connection.

Power disconnect. The power cord disconnects the product from the power source. See instructions for the location. Do not position the equipment so that it is difficult to operate the power cord; it must remain accessible to the user at all times to allow for quick disconnection if needed.

Observe all terminal ratings. To avoid fire or shock hazard, observe all ratings and markings on the product.

Do not operate without covers. Do not operate this product with covers or panels removed, or with the case open. Hazardous voltage exposure is possible.

Do not operate with suspected failures. If you suspect that there is damage to this product, have it inspected by qualified service personnel.

Disable the product if it is damaged. Do not use the product if it is damaged or operates incorrectly. If in doubt about safety of the product, turn it off and disconnect the power cord. Clearly mark the product to prevent its further operation.

Examine the exterior of the product before you use it. Look for cracks or missing pieces.

Do not operate in wet/damp conditions. Be aware that condensation may occur if a unit is moved from a cold to a warm environment.

Do not operate in an explosive atmosphere.

Keep product surfaces clean and dry. Remove the input signals before you clean the product.

Provide proper ventilation. Refer to the installation instructions in the manual for details on installing the product so it has proper ventilation.

Slots and openings are provided for ventilation and should never be covered or otherwise obstructed. Do not push objects into any of the openings.

Provide a safe working environment. Always place the product in a location convenient for viewing the display and indicators.

Be sure your work area meets applicable ergonomic standards. Consult with an ergonomics professional to avoid stress injuries.

Use only the Tektronix rackmount hardware specified for this product.

Service safety summary

The *Service safety summary* section contains additional information required to safely perform service on the product. Only qualified personnel should perform service procedures. Read this *Service safety summary* and the *General safety summary* before performing any service procedures.

To avoid electric shock. Do not touch exposed connections.

Do not service alone. Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

Disconnect power. To avoid electric shock, switch off the product power and disconnect the power cord from the mains power before removing any covers or panels, or opening the case for servicing.

Use care when servicing with power on. Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

Verify safety after repair. Always recheck ground continuity and mains dielectric strength after performing a repair.

Terms in this manual

These terms may appear in this manual:

⚠️ **WARNING.** *Warning statements identify conditions or practices that could result in injury or loss of life.*

⚠️ **CAUTION.** *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Symbols and terms on the product

These terms may appear on the product:

- DANGER indicates an injury hazard immediately accessible as you read the marking.

- WARNING indicates an injury hazard not immediately accessible as you read the marking.

- CAUTION indicates a hazard to property including the product.

⚠️ When this symbol is marked on the product, be sure to consult the manual to find out the nature of the potential hazards and any actions which have to be taken to avoid them. (This symbol may also be used to refer the user to ratings in the manual.)

The following symbol(s) may appear on the product:

⚠️ CAUTION Refer to Manual   ⏚ Protective Ground (Earth) Terminal

Compliance information

This section lists the EMC (electromagnetic compliance), safety, and environmental standards with which the instrument complies.

EMC compliance

EC Declaration of Conformity – EMC

Meets intent of Directive 2004/108/EC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

EN 55103:1996. Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. [1] [2]

- Environment E2 – commercial and light industrial

- Part 1 Emission

  - EN 55022:1987. Class B radiated and conducted emissions

  - EN 55103-1:1996 Annex A. Radiated magnetic field emissions

- Part 2 Immunity

  - IEC 61000-4-2:2001. Electrostatic discharge immunity

  - IEC 61000-4-3:2006. RF electromagnetic field immunity

  - IEC 61000-4-4:2004. Electrical fast transient / burst immunity

  - IEC 61000-4-5:2005. Power line surge immunity

  - IEC 61000-4-6:2003. Conducted RF Immunity

  - IEC 61000-4-11:2004. Voltage dips and interruptions immunity

  - EN 55103-2:1996 Annex A Radiated magnetic field immunity

EN 61000-3-2:2006. AC power line harmonic emissions

EN 61000-3-3:1995. Voltage changes, fluctuations, and flicker

European contact.
Tektronix UK, Ltd.
Western Peninsula
Western Road
Bracknell, RG12 1RF
United Kingdom

[1] For compliance with the EMC standards listed here, high quality shielded interface cables should be used.

[2] Average half-cycle r.m.s. inrush current at initial switch-on, and after a 5 second power interruption, is 2 A.

Australia / New Zealand Declaration of Conformity – EMC

Complies with the EMC provision of the Radiocommunications Act per the following standard, in accordance with ACMA:

- EN 55022:1987. Radiated and conducted emissions, Class B, in accordance with EN 55103-1:1996.

Australia / New Zealand contact.

Baker & McKenzie
Level 27, AMP Centre
50 Bridge Street
Sydney NSW 2000, Australia

Safety compliance

This section lists the safety standards with which the product complies and other safety compliance information.

EU declaration of conformity – low voltage

Compliance was demonstrated to the following specification as listed in the Official Journal of the European Union:

Low Voltage Directive 2006/95/EC.

- EN 61010-1. Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements.

U.S. nationally recognized testing laboratory listing

- UL 61010-1. Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements.

Canadian certification

- CAN/CSA-C22.2 No. 61010-1. Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements.

Additional compliances

- IEC 61010-1.   Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements.

Equipment type

Test and measuring equipment.

Safety class

Class 1 – grounded product.

Pollution degree descriptions

A measure of the contaminants that could occur in the environment around and within a product. Typically the internal environment inside a product is considered to be the same as the external. Products should be used only in the environment for which they are rated.

- Pollution degree 1. No pollution or only dry, nonconductive pollution occurs. Products in this category are generally encapsulated, hermetically sealed, or located in clean rooms.

- Pollution degree 2. Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service.

- Pollution degree 3. Conductive pollution, or dry, nonconductive pollution that becomes conductive due to condensation. These are sheltered locations where neither temperature nor humidity is controlled. The area is protected from direct sunshine, rain, or direct wind.

- Pollution degree 4. Pollution that generates persistent conductivity through conductive dust, rain, or snow. Typical outdoor locations.

Pollution degree rating

Pollution degree 2 (as defined in IEC 61010-1). Rated for indoor, dry location use only.

IP rating

IP20 (as defined in IEC 60529).

Measurement and overvoltage category descriptions

Measurement terminals on this product may be rated for measuring mains voltages from one or more of the following categories (see specific ratings marked on the product and in the manual).

- Category II. Circuits directly connected to the building wiring at utilization points (socket outlets and similar points).

- Category III. In the building wiring and distribution system.

- Category IV. At the source of the electrical supply to the building.

NOTE. Only mains power supply circuits have an overvoltage category rating. Only measurement circuits have a measurement category rating. Other circuits within the product do not have either rating.

Mains overvoltage category rating

Overvoltage category II (as defined in IEC 61010-1).

Environmental considerations

This section provides information about the environmental impact of the product.

Product end-of-life handling

Observe the following guidelines when recycling an instrument or component:

Equipment recycling. Production of this equipment required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. To avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.

This symbol indicates that this product complies with the applicable European Union requirements according to Directives 2002/96/EC and 2006/66/EC on waste electrical and electronic equipment (WEEE) and batteries. For information about recycling options, check the Support/Service section of the Tektronix Web site (www.tektronix.com).

Perchlorate materials. This product contains one or more type CR lithium batteries. According to the state of California, CR lithium batteries are classified as perchlorate materials and require special handling. See www.dtsc.ca.gov/hazardouswaste/perchlorate for additional information.

Restriction of hazardous substances

This product is classified as an industrial monitoring and control instrument, and is not required to comply with the substance restrictions of the recast RoHS Directive 2011/65/EU until July 22, 2017.

Preface

This manual provides safety and installation information for the ECO8000 Series Automatic Changeover Unit. Also included is information about basic instrument operation.

Product description

The ECO8000 Series Automatic Changeover Unit is a highly versatile automatic sync and signal changeover unit with configurations and capabilities required to address modern master sync application and other advanced sync timing application. The ECO8000 Series offers exceptional reliability, stability, and is designed with optional high-bandwidth input changeover capabilities for HD/SD and/or 3G-SDI signal environments.

Each ECO8000 unit can be used with the following signal generators to form the complete sync generator system, which offers extra redundancy for the critical timing and synchronization system in the facilities.

- A pair of Tektronix Master Sync / Master Clock Reference Generators (SPG8000) for most broadcast facility timing applications.

- A pair of Tektronix Test Signal Generators (TG8000) for more advanced post production facility timing applications.

ECO8000 Series models   The ECO8000 Series consist of the following models:

- **ECO8000:** This model provides up to nine user-configurable BNC channels and four LTC channels. The base configuration has three 50 MHz Electronic Fast Switch (REF/ELSW) channels with options for six more 50 MHz Electronic Fast Switch or 3 GHz Relay Switch (HREF/Relay) channels in groups of three channels each, plus four optional LTC channels. Each channel consisting of primary and backup inputs, and an output.

- **ECO8020:** This model provides up to 20 user-configurable high-density BNC channels and four LTC channels. The base configuration has five 50 MHz Electronic Fast Switch (REF/ELSW) channels with options for 15 more 50 MHz Electronic Fast Switch or 3 GHz Relay Switch (HREF/Relay) channels in groups of five channels each, plus four optional LTC channels. Each channel consisting of primary and backup inputs, and an output.

Key features and benefits

- Innovative architecture provides highly reliable basic ECO function and advanced monitoring capability

- Switches analog black burst, HD tri-level sync, AES/DARS, word clock, LTC, as well as 3G-SDI, HD-SDI, and SD-SDI signals – all the timing and synchronization signals required in modern broadcast, production, and post production facilities

- Scalable product architecture to fit various application needs

- Electronic Fast Switch function for near glitch-less sync source switching, minimizing disruption in operations if a switch is necessary to service the primary sync source

- Relay backups provide continued signal connection in the event that the ECO loses power

- Automatic and Manual changeover modes with indicator

- Front panel LED indicators for the status of each Primary and Backup channel

- Front panel LED indicators for the AC and DC status of each installed power supply

- Dual hot-swappable power supplies ensure continuous availability of reference signals

Web Interface. An easy to navigate Web-based interface allows quick access to most of the instrument settings and views. (See page 95, *How to use the Web Interface*.) In most cases, it is easier to access and configure the instrument using the Web Interface. Examples of where this is especially true are:

- Viewing instrument status

- Viewing the Event Log

- Viewing diagnostic results

- Configuring event reporting

- Configuring e-mail reporting

- Configuring channel settings such as threshold levels, labels, etc.

Product documentation

Product documentation

To read about	Use these documents
Product safety, installation, and operation	■ *ECO8000 Series User Manual* (Tektronix part number 071-3221-xx (English)) (Tektronix part number 077-0873-00 (Japanese)) (Tektronix part number 077-0874-00 (Russian)) ■ *ECO8000 Series Video System Integration Technical Reference* (Tektronix part number 077-0877-00)
Product specifications and performance verification	■ *ECO8000 Series Specifications and Performance Verification Technical Reference* (Tektronix part number 077-0876-00)
Servicing the product	■ *ECO8000 Series Service Manual* (Tektronix part number 077-0880-00)
Clearing or sanitizing the product	■ *ECO8000 Series Declassification and Security Instructions* (Tektronix part number 077-0879-00)
New features or known operational issues	■ *ECO8000 Series Release Notes* (Tektronix part number 077-0878-00)
Software licenses	The software licenses used by the ECO8000 Series are available for download from the Tektronix Web site. The licenses are bundled with the product firmware package.

Conventions Used in This Manual

The following icons are used throughout this manual.

Sequence Step	Front panel power	Connect power	Network	PS2	SVGA	USB
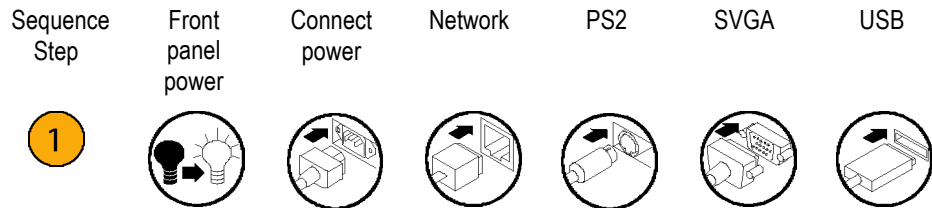
Getting Started

Initial product inspection

Perform the following product inspection procedure when you receive your instrument:

1. Inspect the shipping carton for external damage, which may indicate damage to the instrument.

2. Remove the instrument from the shipping carton, and then check that the instrument has not been damaged in transit. Prior to shipment the instrument is thoroughly inspected for mechanical defects. The exterior should not have any scratches or impact marks.

NOTE. Save the shipping carton and packaging materials for instrument repackaging in case shipment becomes necessary.

3. Verify that the shipping carton contains the basic instrument, all modules you ordered, the standard accessories and any optional accessories that you ordered listed in the table. (See Table 1.)

Contact your local Tektronix Field Office or representative if there is a problem with your instrument or if your shipment is incomplete.

Accessories

The following table lists the standard and optional accessories provided with the ECO8000 Series product.

Table 1: Standard and optional accessories

Accessory	Std.	Opt.	Tektronix part number
ECO8000 Series User Manual (English)	●		071-3221-xx
Japanese and Russian language versions are available in PDF format on the Tektronix Web site.			
Power cord	●		Varies by option
(See page 2, *International power cord options*.)			
Rackmount slides and rails kit (Option RACK only)		●	NA [1]
Adapter cable (6 feet long) from 15-pin D-sub LTC OUT connector on the ECO8000 to 4 XLR male connectors (for LTC outputs) and 3 BNC male connectors (for General Purpose Interface outputs) (Option XLR only)		●	NA [2]
Coaxial adapter cables from high-density male BNC connector to standard male BNC connector (a set of 10 cables, 75 Ω, 18 inches long) (ECO8020 Option CBL only)		●	NA [3]

[1]   To reorder the rack mounting kit, order ECO800UP or ECO802UP Option RACK.

[2]   To reorder the XLR adapter cable, order ECO800UP or ECO802UP Option XLR.

[3]   To reorder the set of BNC adapter cables, order ECO802UP Option CBL.

International power cord options

All of the available power cord options listed below include a lock mechanism except as otherwise noted.

■ Opt. A0 – North America power (standard)

■ Opt. A1 – Universal EURO power

■ Opt. A2 – United Kingdom power

■ Opt. A3 – Australia power

■ Opt. A5 – Switzerland power

■ Opt. A6 – Japan power

■ Opt. A10 – China power

■ Opt. A11 – India power (no locking cable)

■ Opt. A12 – Brazil power (no locking cable)

■ Opt. A99 – No power cord

Product installation

Environmental operating requirements

Check that the location of your installation has the proper operating environment as listed in the following table. (See Table 2.)

⚠ **CAUTION.** *Damage to the instrument can occur if this instrument is powered on at temperatures outside the specified temperature range.*

Table 2: ECO8000 Series environmental requirements

Parameter		Description
Temperature	Operating	0 °C to +50 °C
	Nonoperating	−20 °C to +60 °C
Relative Humidity	Operating	20% to 80% (No condensation); Maximum wet-bulb temperature 29.0 °C
	Nonoperating	5% to 90% (No condensation); Maximum wet-bulb temperature 40.0 °C
Altitude	Operating	To 3,000 m (9,842 feet)
		Maximum operating temperature decreases 1 °C for each 300 m above 1.5 km.
	Nonoperating	To 15,000 m (49,212 feet)

Leave space for cooling by ensuring standard side clearance for rack mounting or 2 inches (5.1 cm) of side clearance for benchtop use. Also, ensure sufficient rear clearance (approximately 2 inches) so that cables are not damaged by sharp bends.

For complete specifications for the instrument, refer to the *ECO8000 Series Specifications and Performance Verification Technical Reference*. You can locate this document on the Tektronix Web site (www.tektronix.com\downloads).

**Rackmount installation
(Option RACK only)**

This instrument is configured at shipment for use in an equipment rack only if Option RACK was ordered. Refer to the *Rackmount Slides and Rails Kit Instructions*, Tektronix part number 071-2746-XX, that was supplied with the instrument for instructions on how to install the rackmounting hardware.

⚠ *WARNING. Personal injury or damage to the instrument can occur if the instrument is not properly secured in the equipment rack.*

To install the instrument into an equipment rack. After you have installed the rackmounting hardware, perform the following steps to install the instrument into an equipment rack:

⚠ *WARNING. To prevent injury during product installation, use care not to pinch hands or fingers in the rails and slides.*

1. Insert the instrument left and right slides into the ends of the rack rails while tilting the long handle part of each lever upward. (See Figure 1.)

⚠ *NOTE. Make sure to insert the instrument slides inside the inner rack rails. You may also need to tilt the rear of the instrument up or down at a slight angle to fit the slides into the rails.*

2. Push the instrument into the rack until it stops.

⚠ *CAUTION. To prevent damage to the instrument and rackmount, do not force the instrument into the rack if it does not slide smoothly. The rails assembly may need to be adjusted to resolve the problem.*

3. Retighten any loose screws and push the instrument all the way into the rack. If the tracks do not slide smoothly, readjust the rail assemblies.

4. When adjusting is completed, tighten all rail assembly 10-32 screws using 28 inch-lbs of torque.

5. If the instrument has knob screws on the front corners, tighten them so that they are secured in the rack.

6. To remove the instrument from the rack, loosen the knob screws.
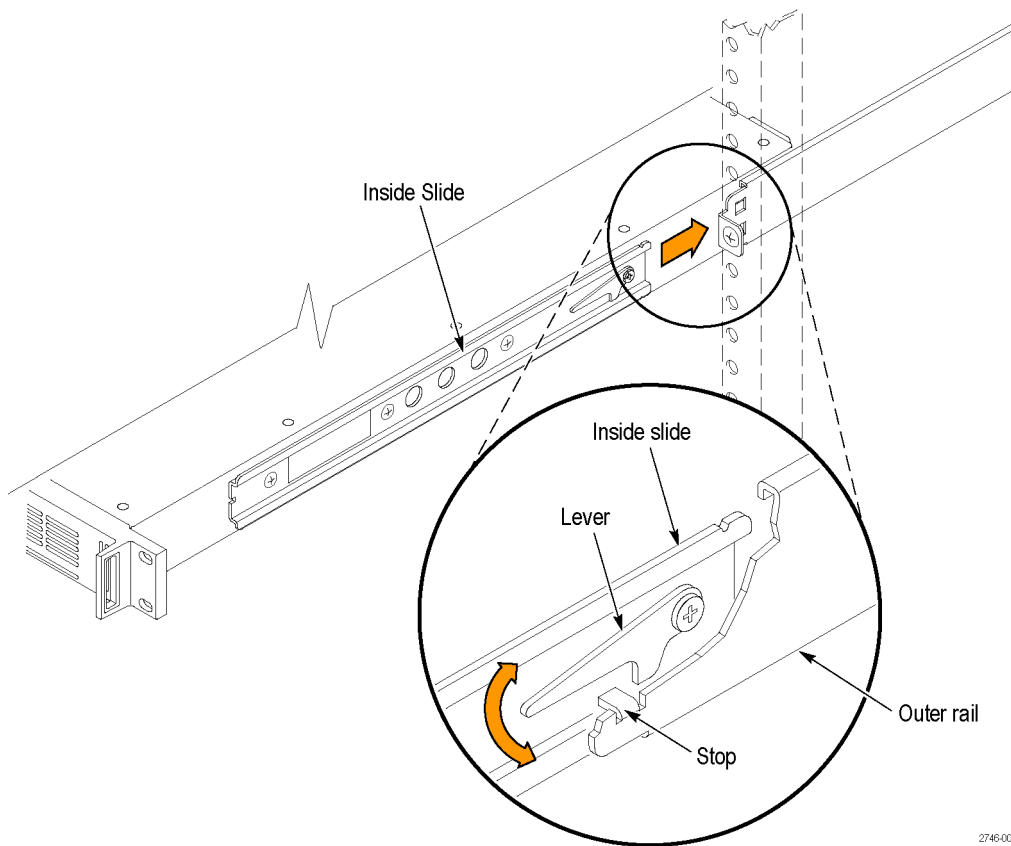
Figure 1: Installing or removing the instrument into or from the rack

To remove the instrument from an equipment rack. Perform the following steps to remove an instrument that is installed in an equipment rack:

⚠️ *WARNING. To prevent injury when removing the product from the rack, do not forcefully and abruptly pull the product from the rack. Pull with the minimum force required to move the instrument with a consistent, even motion.*

1. Loosen the knob screws, if present, that attach the front of the instrument to the rack.

2. Gently pull the instrument toward you until you can reach the levers at the rear of the instrument.

3. Tilt both lever handles upward simultaneously to allow them to clear the stops. (See Figure 1.)

4. Pull the instrument past the stops and out of the rack.

Power connection   This instrument operates from a single-phase power source with the neutral conductor at or near earth ground. The line conductor is fused for over-current protection. A protective ground connection through the grounding conductor in the locking power cord is essential for safe operation.

⚠ *CAUTION. The instrument does not have a power switch. When you connect the power plug to one of the AC line connectors, and the Power Supply module for that slot is installed, the instrument powers on. If you have only one power supply installed, be sure to connect the power plug to the correct rear-panel power connector.*

AC power requirements.   Check that your location provides the proper electrical power requirements as listed in the following table. (See Table 3.)

Table 3: AC line power requirements

Parameter	Description
Line Voltage Range	100 - 240 VAC
	⚠ *WARNING. To reduce the risk of fire and shock, ensure that the mains supply voltage fluctuations do not exceed 10% of the operating voltage range.*
Line frequency	50/60 Hz
Maximum power	50 VA

Connect the power cable(s). Standard instruments are shipped with one Power Supply module installed in slot 1. If you ordered Option DPW, your instrument was shipped with two Power Supply modules installed.

Connect the power cable(s) to the instrument first, and then connect it to the AC power source. Connecting the power cable causes the instrument to power on.

After connecting the power, make sure that the fan in the instrument is working. If the fan is not working, turn off the power by disconnecting the power cable from the AC power source, and then contact your local Tektronix Field Office or representative.

A power-on self test is run when the instrument first boots up. (See page 27, *Power-on self test*.)
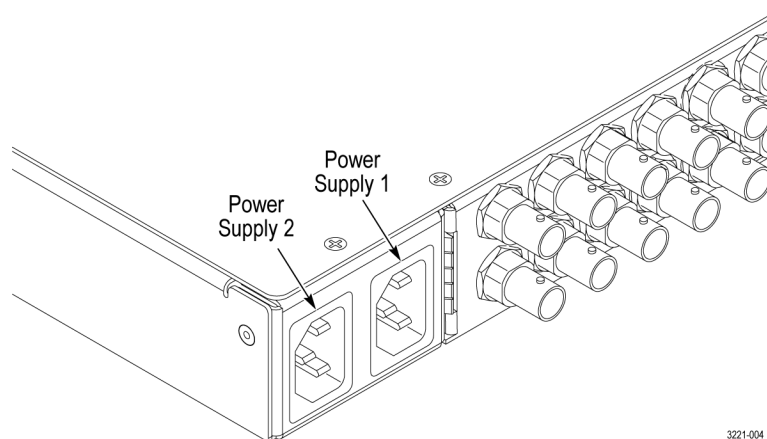
Figure 2: **Location of rear panel power connectors (ECO8000 shown)**

Configure the preferred supply (Option DPW only). If your instrument has two Power Supply modules installed, configure one of the supplies to be the preferred (active) supply. (See page 37, *Configuring the preferred (active) supply (Option DPW only)*.)

Network installation

The ECO8000 Series has a 10/100 BASE-T Ethernet port on the rear panel that allows you to use a PC to remotely control the instrument.

This section provides instructions for connecting the ECO8000 Series to a single PC or to a network and for setting the network parameters on the Ethernet port.

Connecting the instrument to your PC(s)

You can use one of the following two methods to connect the instrument to your PC(s):

- If you are connecting the instrument directly to a single PC, use an Ethernet cable to connect between the Ethernet port on the instrument and the Ethernet port on the PC.

- If you are connecting the instrument to your local Ethernet network, use an Ethernet cable to connect between the Ethernet port on the instrument and the Ethernet hub port of your local network. By connecting to an Ethernet network, you can access the instrument using any PC on the network.

To configure the network parameters

The following two procedures describe how to configure the ECO8000 Series network parameters. Use the first procedure if your network supports DHCP; use the second procedure if your network does not support DHCP.

To configure parameters for a network with a DHCP server. If your network has a DHCP server, perform the following steps to configure the instrument to function as a DHCP client. When the instrument is connected to the network and DHCP service is enabled, the instrument obtains the necessary network addresses automatically from the DHCP server.

NOTE. Under some network environments, the instrument may not be able to get the IP address automatically from a DHCP server. In this case, you need to manually enter the appropriate network parameter values.

Refer to your network administrator or to the user documentation supplied with your network server operating system (OS) for detailed information about DHCP server functions.

1. Press the front-panel **BACK** button as necessary to access the top-level Main menu.

2. Press the up (▲) or down (▼) arrow button to select **SYSTEM CONFIG**, and then press the **ENTER** button to access the SYSTEM CONFIG menu.

3. Press the up (▲) or down (▼) arrow button to select **NETWORK CONFIG**, and then press the **ENTER** button to access the NETWORK CONFIG submenu. The display shows whether DHCP is enabled or not.

4. If necessary, press the left (◄) or right (►) arrow button to select **Enable**, and then press the **ENTER** button to implement the selection.

5. Press the down (▼) arrow button to select **IP ADDRESS**.

6. The second line of the display will show an IP address after the instrument receives an address from the DHCP server. The message "Waiting for DHCP" will appear until the instrument receives the address.

7. After the display shows an IP address, press the **BACK** button to exit the NETWORK CONFIG submenu.

To configure parameters for a network without a DHCP server. If your network does not have a DHCP server, perform the following procedure to set the network parameters:

1. Press the front-panel **BACK** button as necessary to access the top-level Main menu.

2. Press the up (▲) or down (▼) arrow button to select **SYSTEM CONFIG**, and then press the **ENTER** button to access the SYSTEM CONFIG menu.

3. Press the up (▲) or down (▼) arrow button to select **NETWORK CONFIG**, and then press the **ENTER** button to access the NETWORK CONFIG submenu. The display shows whether DHCP is enabled or not.

4. If necessary, press the left (◄) or right (►) arrow button to select **Disable**, and then press the **ENTER** button to implement the selection.

5. If you connected the instrument directly to a single PC:

    a. Press the up (▲) or down (▼) arrow button to select **IP ADDRESS**, and then press the **ENTER** button to enter the edit mode.

    b. Use the arrow buttons to set the IP address to be the same IP address as the PC's address except for the last number, and then press the **ENTER** button. The last number in the address must be different than the last number in the PC's IP address.

    c. Press the up (▲) or down (▼) arrow button to select **SUBNET MASK**, and then press the **ENTER** button to enter the edit mode.

    d. Use the arrow buttons to set the subnet mask to be the same net mask (subnet mask) used by the PC, and then press the **ENTER** button. Do not enter a number if the PC does not have a net mask.

    e. You do not need to enter a **GATEWAY** address if you are directly connected to a single PC.

    f. Press the **BACK** button to exit the NETWORK CONFIG submenu.

6. If you connected the instrument to your local Ethernet network:

⚠️ **CAUTION.** *To prevent communication conflicts on your Ethernet network, ask your local network administrator for the correct numbers to enter in the NETWORK CONFIG submenu if you connect the instrument to your local Ethernet network.*

    a. Press the up (▲) or down (▼) arrow button to select **IP ADDRESS**, and then press the **ENTER** button to enter the edit mode.

    b. Use the arrow buttons to set the IP address to the address supplied by your network administrator, and then press the **ENTER** button.

    c. Press the up (▲) or down (▼) arrow button to select **SUBNET MASK**, and then press the **ENTER** button to enter the edit mode.

    d. Use the arrow buttons to set the subnet mask to the address supplied by your network administrator, and then press the **ENTER** button.

    e. Press the up (▲) or down (▼) arrow button to select **GATEWAY ADDRESS**, and then press the **ENTER** button to enter the edit mode.

    f. Use the arrow buttons to set the gateway address to the address supplied by your network administrator, and then press the **ENTER** button.

    g. Press the **BACK** button to exit the NETWORK CONFIG submenu.

7. Verify the Ethernet connection by using a ping command from the PC.

System considerations

Using identical sync sources

It is recommended that the primary and backup sync sources be identically configured. If the two sync source generators have significantly different configurations, it may cause a source switch when both of the sync sources lose power.

To understand this, consider the following scenario. If power is cut to both of the sync sources, the sync signals will fail as the power supples on the generators turn off. If the signal output from one of the sync generators is maintained longer, then the ECO8000 Series may detect one input as good and the other as bad and switch to the "good" sync source.

This might happen if the backup sync generator has only a few black outputs, but the primary sync generator has many blacks, audio and SDI signal outputs. The difference in the number of outputs loading the power supplies will make the primary sync generator turn off faster. This causes the ECO8000 Series to detect the primary source as failed while the backup is still working, resulting in a source switch.

The ECO8000 Series detects the loss of AC power and inhibits source switching to mitigate this issue. However, it can still occur in extreme cases. If it is necessary to have differently configured sync generators on the primary and backup inputs, it is recommended that you thoroughly test the loss of power condition during the system qualification testing.

Using the Expansion port to gang two ECOs

The ECO8000 Series has the ability to connect two instruments so that they function as a single larger switch. This function is useful in situations where more channels are needed than can be supported using only one instrument. One instrument operates as a master unit and the other as a slave unit.

A slave unit may change state if the master unit is changed from master to disabled or if the interconnection cable is removed. It is recommended that you configure the master and slave units during system setup and that you not change the configuration while the instrument is in operation. To help enforce this recommendation, the ECO8000 Series must be in Manual mode before you can change the state of the expansion port. (See page 35, *Configure the Expansion port*.)

Testing the backup source

Tektronix recommends that you test the backup sync source every 6 months. The ECO8000 Series keeps track of the last time the source was changed from primary to backup and visa-versa. If it has been more that 6 months since a source switch, then an event will be entered in the Event Log. You can also configure any of the reporting methods (SNMP trap, e-mail, GPI signal, instrument beeper) to generate an output when the backup test is due. (See page 83, *EVENT submenus*.)

Signal connections

Before you connect signals to the ECO8000 Series, create a table similar to the one shown below so that you can plan which signals need to connect to which channels on the ECO8000 Series.

Table 4: Example plan for connecting signals to an ECO8000

Channel	Channel type	Signal source	Destination	Signal format	Notes
1	REF (ELSW)	Black 1	Studio 1	NTSC	
2	REF (ELSW)	Black 2	Studio 2	PAL	
3	REF (ELSW)	Black 3	Basement	1080i59	
4	REF (ELSW)	Black 4	MC Tri	1080i50	
5	REF (ELSW)	Black 5	Truck 1	1080i60	
6	REF (ELSW)	Word Clock	MC WC	5 V	
7	HREF (Relay)	Silence	Sound room	AES	2.5, 2.3 dB
8	HREF (Relay)	SDI 1	MC SD BARS	SD 525	
9	HREF (Relay)	SDI 2	MC HD BARS	HD 1080i59	
LTC1	LTC	0.5 V	MC LTC	30 DF	
LTC2	LTC	1 V	Studio 1 LTC	30 DF	4 dB
LTC3	LTC	2 V	Studio 2 LTC	25 FPS	
LTC4	LTC	5 V	Basement LTC	30 DF	
SPG trigger		Loss of lock, hardware error			

Channel type connection guidelines. When connecting signals to the instrument, use the following guidelines:

- Use REF (ELSW) channels to connect non-SDI signals

- Use HREF (Relay) channels to connect SDI signals

You can connect non-SDI signals to HREF (Relay) channels. However, there will be a sync interruption when primary/backup source switches occur.

Recommended tools. The ECO8020 uses HD BNC connectors. Due to the tight spacing between connectors, it is recommended that you use a HD BNC installation/removal tool to connect or disconnect cables on these connectors. Listed below is one source where you can obtain this tool.

Manufacturer	Part number
Amphenol® RF (www.amphenolrf.com)	227–T2000

Example connection diagrams. The following illustrations show a couple of examples on how to connect signals from a pair of Tektronix SPG8000 generators to the ECO8000 Series. For more detailed information about connecting signals, see the *ECO8000 Series Video System Integration Technical Reference* manual.
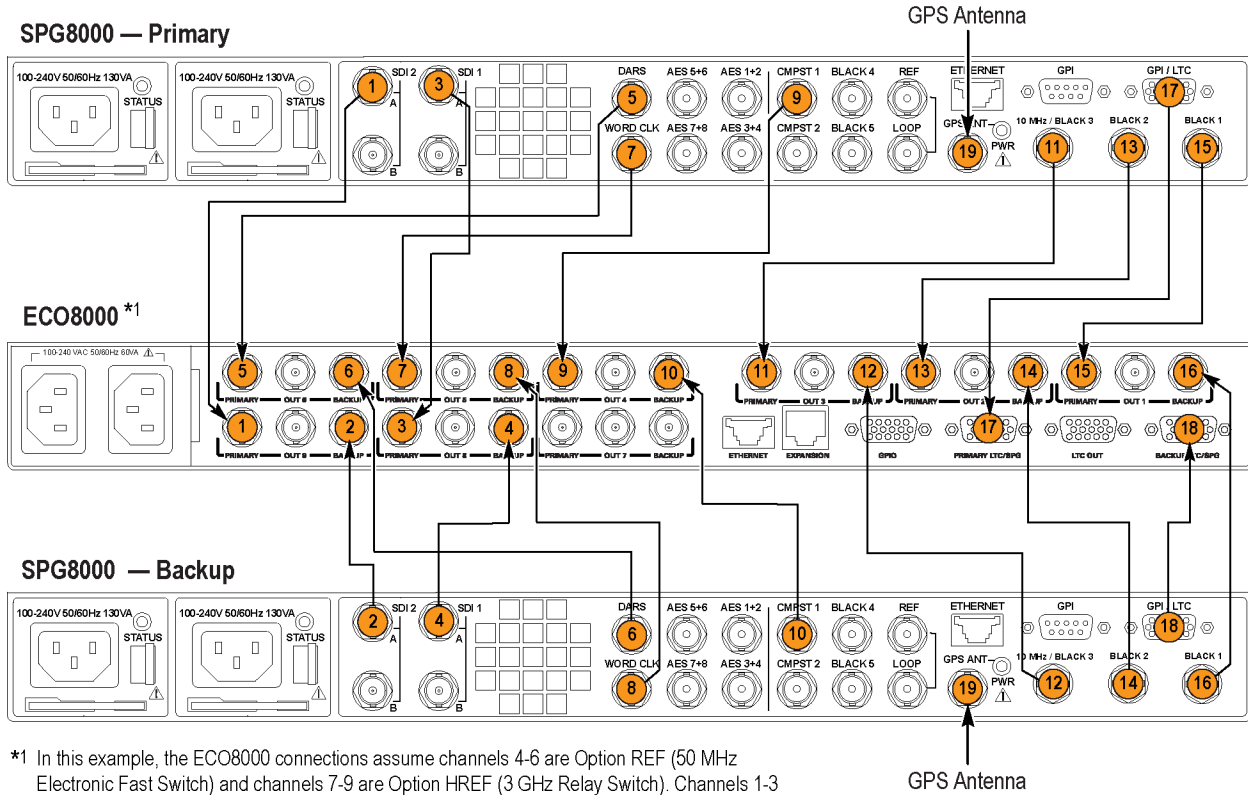
*1 In this example, the ECO8000 connections assume channels 4-6 are Option REF (50 MHz Electronic Fast Switch) and channels 7-9 are Option HREF (3 GHz Relay Switch). Channels 1-3 come standard with the base unit with 50 MHz Electronic Fast Switch functionality.

Figure 3: ECO8000 and SPG8000 system installation example

Table 5: ECO8000 and SPG8000 system installation example connections

Connection number (See Figure 3.)	External signal	SPG8000 primary connector	SPG8000 backup connector	ECO8000 connector
1		SDI 2		PRIMARY 9
2			SDI 2	BACKUP 9
3		SDI 1		PRIMARY 8
4			SDI 1	BACKUP 8
5		DARS		PRIMARY 6
6			DARS	BACKUP 6
7		WORD CLK		PRIMARY 5
8			WORD CLK	BACKUP 5
9		CMPST 1		PRIMARY 4

Table 5: ECO8000 and SPG8000 system installation example connections (cont.)

Connection number (See Figure 3.)	External signal	SPG8000 primary connector	SPG8000 backup connector	ECO8000 connector
10			CMPST 1	BACKUP 4
11		10 MHz/ BLACK 3		PRIMARY 3
12			10 MHz/ BLACK 3	BACKUP 3
13		BLACK 2		PRIMARY 2
14			BLACK 2	BACKUP 2
15		BLACK 1		PRIMARY 1
16			BLACK 1	BACKUP 1
17		GPI/LTC		PRIMARY LTC/SPG
18			GPI/LTC	BACKUP LTC/SPG
19	GPS signal	GPS ANT	GPS ANT	NA

SPG8000 — Primary

ECO8020 *1

SPG8000 — Backup

*1 In this example, the ECO8020 connections assume channels 6-15 are Option REF (50 MHz Electronic Fast Switch) and channels 16-20 are Option HREF (3 GHz Relay Switch). Channels 1-5 come standard with the base unit with 50 MHz Electronic Fast Switch functionality.
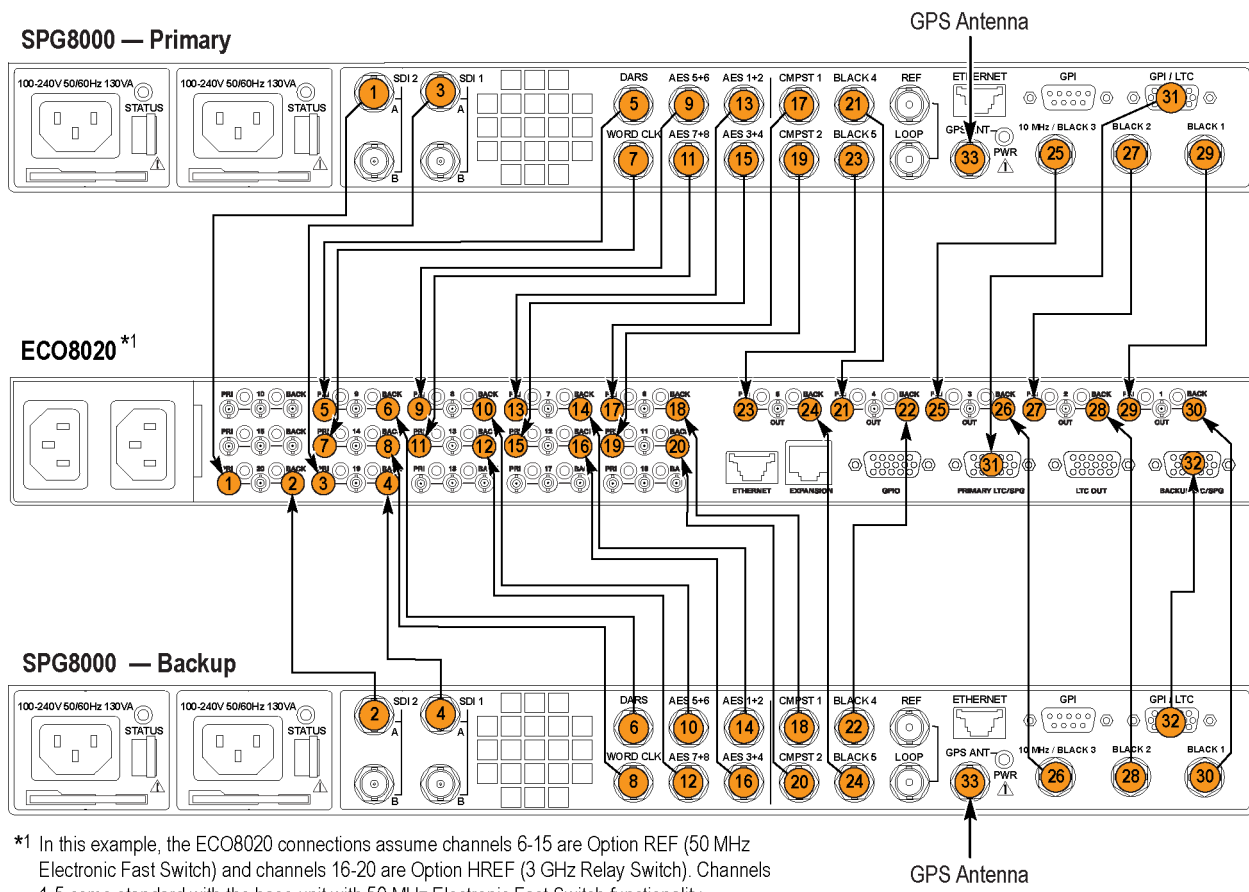
0877-004

Figure 4: ECO8020 and SPG8000 system installation example

Table 6: ECO8020 and SPG8000 system installation example connections

Connection number (See Figure 4.)	External signal	SPG8000 primary connector	SPG8000 backup connector	ECO8000 connector
1		SDI 2		PRI 20
2			SDI 2	BACK 20
3		SDI 1		PRI 19
4			SDI 1	BACK 19
5		DARS		PRI 9
6			DARS	BACK 9
7		WORD CLK		PRI 14
8			WORD CLK	BACK 14
9		AES 5+6		PRI 8
10			AES 5+6	BACK 8
11		AES 7+8		PRI 13

Table 6: ECO8020 and SPG8000 system installation example connections (cont.)

Connection number (See Figure 4.)	External signal	SPG8000 primary connector	SPG8000 backup connector	ECO8000 connector
12			AES 7+8	BACK 13
13		AES 1+2		PRI 7
14			AES 1+2	BACK 7
15		AES 3+4		PRI 12
16			AES 3+4	BACK 12
17		CMPST 1		PRI 6
18			CMPST 1	BACK 6
19		CMPST 2		PRI 11
20			CMPST 2	BACK 11
21		BLACK 4		PRI 4
22			BLACK 4	BACK 4
23		BLACK 5		PRI 5
24			BLACK 5	BACK 5
25		10 MHz/ BLACK 3		PRI 3
26			10 MHz/ BLACK 3	BACK 3
27		BLACK 2		PRI 2
28			BLACK 2	BACK 2
29		BLACK 1		PRI 1
30			BLACK 1	BACK 1
31		GPI/LTC		PRIMARY LTC/SPG
32			GPI/LTC	BACKUP LTC/SPG
33	GPS signal	GPS ANT	GPS ANT	NA

Operating Basics

Operational overview

The ECO8000 Series has three main subsystems:

- Channel Control system

- Configuration and Monitoring system

- Redundant Power system

These three subsystems are loosely coupled to assume maximum reliability of the main ECO function, which is sensing faults on the input signals and switching to a backup if necessary.
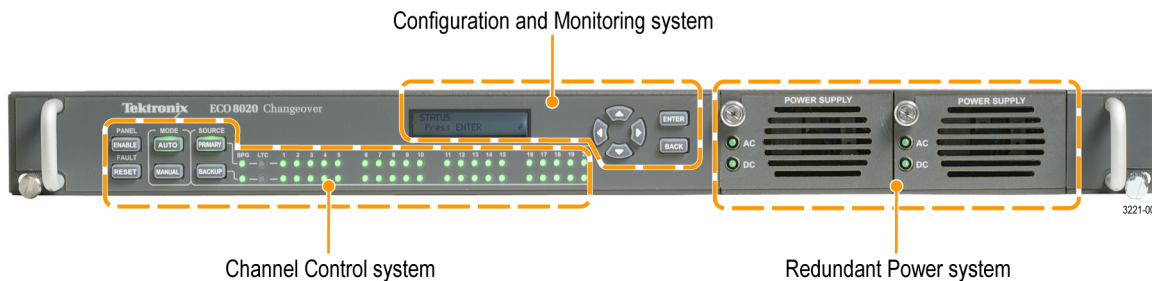
Figure 5: ECO8000 Series subsystems (ECO8020 with Option DPW shown)

Channel Control system

The Channel Control system monitors the level on each input, and switches to the other sync source if a fault occurs. This subsystem is implemented as a simple hardware state machine to maximize reliability. This portion of the instrument is accessed via the left keyboard, and the status is displayed on the button lights and the per-channel LEDs on the front panel.

If the instrument is in AUTO mode, then the Channel Control system locks out any changes from the other subsystems. This prevents most issues in the other subsystems from impacting the basic operation of the ECO.

When the instrument powers on, the Channel Control system restores all basic configuration settings that were in place when the instrument was powered off. This restoration is independent of the processor booting to run the display and the Configuration and Monitoring system. If the Configuration and Monitoring system is rebooted, the Channel Control system is unaffected.

If the instrument loses power, the REF/ELSW channels will automatically switch from electronic to relay mode to maintain the signal throughput. These channels will automatically switch back to electronic mode when power is restored. When the REF/ELSW channels switch from electronic mode to relay mode and back, the sync on these channels will experience a momentary glitch.

Configuration and Monitoring system

The Configuration and Monitoring system is software based and includes the menus. This system is accessed via the right keyboard, the LCD, and the Web Interface. If the instrument is in MANUAL mode, then the Configuration and Monitoring system can program the settings in the Channel Control system. For example, it can set the level threshold on each channel, or disable unused channels. When the instrument is in AUTO mode, most configuration is disabled and this subsystem is used for monitoring only.

If the Configuration and Monitoring system processor stops running, a 20 minute watchdog timer in the Channel Control System will automatically cause a processor reboot. If the watchdog timer causes a reboot, the event is entered in the Event Log.

Under certain conditions, such as after several years of continued use, you may want to reboot the Configuration and Monitoring system. You can reboot this system by pressing and holding the ENABLE and RESET buttons for about five seconds until the instrument beeps about five times. Rebooting this system will have no affect on the other subsystems. When this system is rebooted, a power-on self test is performed. (See page 27, *Power-on self test*.)

Menu system. The top-level Main menu provides access to the following three menus:

- ■ **STATUS:** Use this menu to view instrument faults and the Event Log. (See page 56.)

- ■ **CHANNEL:** Use the CHANNEL menu to view and configure the settings for each of the BNC or LTC (Option LTC only) channels.(See page 62.)

- ■ **SYSTEM CONFIG:** Use this menu to view and configure all instrument settings except for the channel configuration.

Redundant Power system

The Redundant Power system monitors each Power Supply module (Option DPW provides a second, backup supply) and switches to the backup if the preferred supply has a problem. This subsystem is independent of the other two systems. The Configuration and Monitoring system can set some parameters in the Redundant Power system and display its status.

Channel configuration

The channel configuration for the ECO is done in MANUAL mode. When the system is fully configured, and all channels in use show green status LEDs and good signal margin, switch the instrument to AUTO mode. When the instrument is in AUTO mode, the channel configuration is disabled and the system will react to input signal faults. In AUTO mode, monitoring can be done locally via the LCD or remotely via the Web Interface with no risk of accidental changes that would impact the basic ECO operation.

Controls, connectors, and LED indicators

The following figures show the front-panel controls and rear-panel connectors for the ECO8000 and ECO8020 changeover units. See the following table for a description of each control and connector.
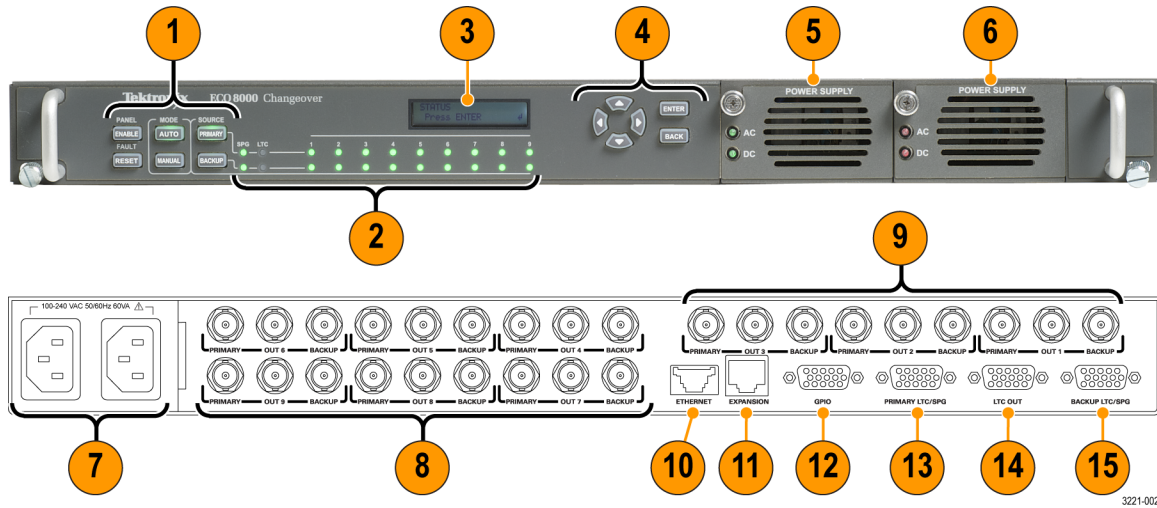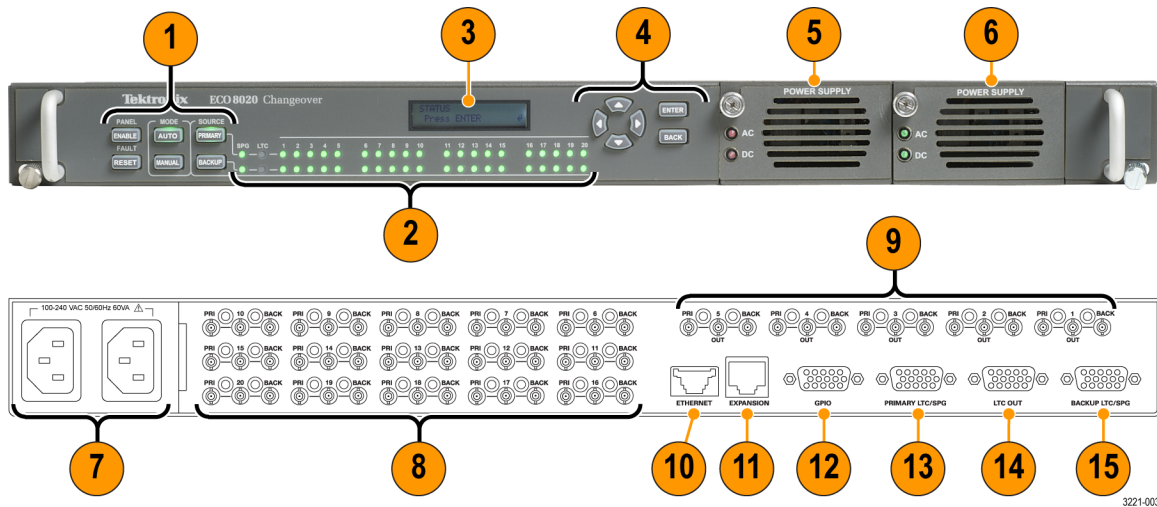
Figure 6: ECO8000 controls and connectors

Figure 7: ECO8020 controls and connectors

Item (See Figure 6.) (See Figure 7.)	Description
1	Control buttons (Channel Control system):
	■ PANEL ENABLE – Press and hold for about four seconds to enable/disable the front-panel control buttons. The instrument beeps to indicate the change in the enable/disable status of the front-panel control buttons.
	NOTE. *The front panel must be enabled to use the following five control buttons.*
	■ FAULT RESET – Press to clear the individual channel fault history on the front-panel LEDs (turn yellow LEDs to green).
	■ MODE – Press AUTO or MANUAL to select the desired changeover mode. The changeover mode must set to AUTO to react to signal faults. The changeover mode must be set to MANUAL before you can change the instrument configuration settings. The selected mode button is illuminated.
	■ SOURCE – When in Manual mode, press PRIMARY or BACKUP to select which signal source to output. This setting applies to all channels. The selected source button is illuminated.
2	Status LED's:
	■ SPG – When enabled, indicates the status of the SPG trigger input.
	■ LTC – When Option LTC is installed, indicates the combined status of all LTC channels which are enabled. If any enabled LTC channel had a fault, then this LED will be red.
	■ **ECO8000:** The 1 to 9 LEDs indicate the status for each of the possible 9 installed channels.
	■ **ECO8020:** The 1 to 20 LEDs indicate the status for each of the possible 20 installed channels.
	The color of the LED's indicate their status:
	■ Green: Indicates a no-fault condition.
	■ Yellow: Indicates that a fault condition occurred in the past but has been corrected. Press the FAULT RESET button to change yellow LEDs to green.
	■ Red: Indicates an active fault condition.
	■ Off: Indicates the channel is inactive (disabled).
3	LCD display showing the instrument status and the control menu.
4	Menu navigation (Configuration and Monitoring system) buttons:
	■ Arrow buttons – Use to navigate through the menus or to change parameter values.
	■ ENTER button – Use to enter submenus or to implement menu selections.
	■ BACK button – Use to exit submenus.
5	Standard Power Supply module. (See page 25, *Power Supply module LED states*.)
6	Optional backup Power Supply module (Option DPW only). (See page 25, *Power Supply module LED states*.) (See page 37, *Configuring the preferred (active) supply (Option DPW only)*.)

Item (See Figure 6.) (See Figure 7.)	Description
7	Power connectors. When viewed from the rear of the instrument, the Power Supply 1 connector is on the right. (See Figure 3 on page 13.)
8	**ECO8000:** Optional channels 4–9; each row can be either 50 MHz Electronic Fast Switch channels or 3 GHz Relay Switch channels
	ECO8020: Optional channels 6–20; each row can be either 50 MHz Electronic Fast Switch channels or 3 GHz Relay Switch channels
9	**ECO8000:** Standard 50 MHz Electronic Fast Switch channels 1–3.
	ECO8020: Standard 50 MHz Electronic Fast Switch channels 1–5.
10	ETHERNET – Standard Ethernet connector used for connecting the instrument to an Ethernet network. (See page 7, *Network installation*.)
11	EXPANSION – Standard Ethernet connector used for connecting multiple ECO8000 Series instrument together so that they function as one larger changeover unit. (See page 35, *Configure the Expansion port*.)
12	GPIO – 15-pin DSUB connector used to connect GPI signals to the ECO8000 Series units. (See page 22, *GPIO connector signal pinouts*.)
13	*NOTE. The SPG Trigger signal on this connector (pin 1) will operate even when Option LTC is not installed. (See page 23, LTC/SPG connector signal pinouts.)* PRIMARY LTC/SPG – 15-pin DSUB connector used to connect LTC and GPI signals from Tektronix SPG8000 or TG8000 generators to the ECO8000 Series units. (See page 31, *Configure the SPG trigger input*.)
14	*NOTE. The SPG Trigger signals on this connector (pins 1 and 2) will operate even when Option LTC is not installed. (See page 24, LTC OUT connector signal pinouts.)* **Option LTC only:** LTC OUT – 15-pin DSUB connector for connecting LTC signals. The LTC1 signal can be be configured as an input using the CHANNEL menu. (See page 62, *CHANNEL menu*.)(See page 31, *Configure the SPG trigger input*.)
15	*NOTE. The SPG Trigger signal on this connector (pin 1) will operate even when Option LTC is not installed. (See page 23, LTC/SPG connector signal pinouts.)* BACKUP LTC/SPG – 15-pin DSUB connector used to connect LTC and GPI signals from Tektronix SPG8000 or TG8000 generators to the ECO8000 Series units. (See page 31, *Configure the SPG trigger input*.)

GPIO connector signal pinouts

The following table lists the signals and their function for each pin on the GPIO connector.

3221-041
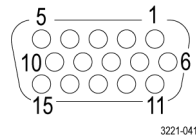
Table 7: GPIO connector signal pinouts

Pin	Signal	Function
1	State – Primary Backup	Output – high if Primary is selected, low if Backup is selected
2	Primary fault	Output – goes low if a Primary fault is present
3	Backup fault	Output – goes low if a Backup fault is present
4	State – Manual Auto	Output – high if Manual mode is selected, low if Auto mode is selected
5	GND	Ground
6	Power fault	Output – goes low if a fault is preset in the power subsystem as indicated by the AC or DC LEDs on the supplies
7	Manual mode	Input – drive this pin low to assert Manual mode (10 KΩ pullup resistor)
8	Auto mode	Input – drive this pin low to assert Auto mode (10 KΩ pullup resistor)
9	Fault reset	Input – drive this pin low to assert a fault reset (10 KΩ pullup resistor)
10	Configurable fault	Output – goes low if any fault selected in the GPI EVENTS menu are present; also goes low during any watchdog reboot
11	GND	Ground
12		Not used
13	Primary select	Input – drive this pin low to select the Primary source (10 KΩ pullup resistor)
14	Backup select	Input – drive this pin low to select the Backup source (10 KΩ pullup resistor)
15		Not used

LTC/SPG connector signal pinouts
The following table lists the signals and their function for each pin on the LTC/SPG connector.

NOTE. The SPG Trigger signal on this connector (pins 1) will operate even when Option LTC is not installed.

3221-041
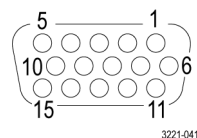
Table 8: LTC/SPG connector signal pinouts

Pin	Signal	Function
1	SPG trigger	Input – Used to receive a fault-condition trigger signal from the sync generator
2		Not used
3		Not used
4		Not used
5	LTC4–	Input – LTC4– signal
6	GND	Ground
7	LTC3–	Input – LTC3– signal
8	LTC2–	Input – LTC2– signal
9	GND	Ground
10	LTC1–	Input or output – LTC1– signal [1]
11		Not used
12	LTC3+	Input – LTC3+ signal
13	LTC2+	Input – LTC2+ signal
14	LTC1+	Input or output – LTC1+ signal [1]
15	LTC4+	Input – LTC4+ signal

[1] The LTC 1 channel can be configured as an input or output in the CHANNEL menu. (See page 62, *CHANNEL menu*.)

LTC OUT connector signal pinouts

The following table lists the signals and their functions for each pin on the LTC OUT connector.

NOTE. The SPG Trigger signals on this connector (pins 1 and 2) will operate even when Option LTC is not installed. (See page 24, LTC OUT connector signal pinouts.)

3221-041
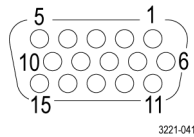
Table 9: LTC OUT connector signal pinouts

Pin	Signal	Function
1	Primary SPG trigger	Output – SPG trigger signal from the primary input
2	Backup SPG trigger	Output – SPG trigger signal from the backup input
3		Not used
4		Not used
5	LTC4–	Output – LTC4– signal
6	GND	Ground
7	LTC3–	Output – LTC3– signal
8	LTC2–	Output – LTC2– signal
9	GND	Ground
10	LTC1–	Output or input – LTC1– signal [1]
11		Not used
12	LTC3+	Output – LTC3+ signal
13	LTC2+	Output – LTC2+ signal
14	LTC1+	Output or input – LTC1+ signal [1]
15	LTC4+	Output – LTC4+ signal

[1] The LTC 1 channel can be configured as an input or output in the CHANNEL menu. (See page 62, *CHANNEL menu*.)

Power Supply module LED states

When the instrument is running, the power supply LEDs indicate the status of the supplies, including the internal fans and which of the supplies is currently powering the instrument.

If the instrument loses power from both supplies, the LEDs continue to provide status to help troubleshoot the root of the problem. In this mode, the LEDs flash to conserve the power in the storage capacitor. Typically the LED flashing should last for 10 minutes after the loss of power.

If both of the supplies are good, the system will use the supply that is configured to be the preferred (active) supply. If one power supply has a problem, the system will switch to the other supply. If either supply can support the instrument load, even if it has a non-fatal problem, the system will choose the best supply and attempt to continue to operate.

The following table shows the states of the AC and DC LEDs on a Power Supply module when the power is on.

Table 10: Power on LED states for a Power Supply module

Power Supply state	AC LED state	DC LED state
Normal, Active	Green	Green
Normal, Backup	Green	Dim Green
AC < 75 V, DC supply running	Red	Green
AC < 75 V, DC supply failed	Red	Red
AC OK, DC supply failed	Green	Red
Marginal Low or High DC, Active		Orange
Marginal Low or High DC, Backup		Yellow
Load Test Fail - Backup		Red
Load Test Fail – Active		Orange
Fan Fail - Active		Orange
Fan Fail - Backup		Red
Supply not installed, AC present	Green	Off
Supply not installed, AC absent	Off	Off

The following table shows the states of the AC and DC LEDs on a Power Supply module when the power is off. The LEDs will blink for several minutes after power is removed from the instrument to help troubleshoot power problems.

Table 11: Power off LED states for a Power Supply module

Power Supply state	AC LED state	DC LED state
AC present, DC bad	Flash green	Flash red
AC missing, DC missing	Flash red	Off
AC present, supply not installed	Flash green	Off
AC missing, supply not installed	Off	Off
AC present, DC present, on-board converter failure	Flash green	Flash green

Troubleshooting power supply problems. For troubleshooting power supply problems, take these steps:

■ If the AC LED is red, verify the power source connecting to the instrument.

■ If the DC LED is red, replace the supply module.

■ Examine the STATUS menu display and the Event Log readouts to locate details on the nature of the faults.

Power-on self test   The power-on self test is run when the Configuration and Monitoring system first boots up. (See page 18, *Configuration and Monitoring system*.) The test is run regardless of whether the reboot is caused by cycling power or by other means, such as a watchdog timeout or by pressing and holding the ENABLE and RESET keys.

If any failure occurs, it will be reported in the following ways:

■   An error message is written on the LCD display and is visible for 2 seconds.

■   The STATUS menu FAULT display will indicate that the self-test has failed and display the event code. This display will not be erased until instrument power is cycled.

■   A similar message, which includes the event code, is entered in the Event Log.

■   If the user-configurable event reporting methods (SNMP trap, e-mail, GPI signal, instrument beeper) are enabled to notify in the event of a voltage error, then a message is sent using the enabled method(s).

Event codes.   The self-test event code is a bit-wise value with each fault type assigned a bit. The following table lists the possible error codes.

Table 12: Self test error codes

Test type	Code
Front panel communications	0 (LSB)
Main board communications	1
Module 1 communications	2
Module 2 communications (if installed)	3
Module 3 communications (if installed)	4
Module 4 communications (if installed)	5
Power Supply combiner communications	6
MRAM communications	7
RTC communications	8 (MSB)

Initial product setup

Perform the following steps after you have installed the instrument and have connected the input and output signals as described earlier in this manual:

1. Press and hold the PANEL ENABLE button to enable the front-panel control buttons. The instrument beeps when the panel buttons are enabled.

2. Press the MANUAL MODE button to put the ECO8000 Series in Manual mode.

3. Use the CHANNEL menu (See page 62, *CHANNEL menu.*) to configure each of the installed channels as follows:

   a. Disable all unused channels.

   b. Enter identification labels for each channel that will be in use.

   c. Enable/disable the changeover trigger function for each channel that will be in use.

   d. Set the correct threshold level (based on the signal type) for each channel that will be in use. (See page 29, *Configure the channel inputs and threshold levels.*)

   e. For HREF channels, enable/disable the Relay Check function for each channel that will be in use.

4. Configure the primary and backup sync generators which are providing inputs to the ECO8000 Series as follows:

   a. Set the signal outputs to the desired format.

   b. Set the GPI outputs to assert on the desired fault conditions. (See page 31, *Configure the SPG trigger input.*)

   c. Save the configured signal and GPI settings as the power-on preset.

5. Configure the startup delay. (See page 30, *Configure the startup delay.*)

6. Verify the channel threshold settings:

   a. Press the front-panel FAULT RESET button. If the signal thresholds are properly set, the LED indicators for the active channels should all turn green.

   b. Use the DIAGNOSTICS submenu readouts to verify the threshold settings. The levels should be around +3 dB for BNC channels and around +4 dB for LTC channels. (See page 89, *DIAGNOSTICS submenu.*)

7. Press the front-panel AUTO MODE button to put the ECO8000 Series in Auto mode.

8. Verify the installation as follows:

    a. Disconnect signal inputs to the ECO8000 Series to simulate errors. Verify a proper source switch.

    b. Cycle power on the primary sync pulse generator to verify a switch to the backup source. Repeat on the backup sync pulse generator.

    c. Remove power input to the ECO8000 Series to verify correct operation.

    d. Cycle power to the entire system to verify correct operation after power is restored.

9. Configure event reporting. (See page 34, *Configure event reporting*.)

Configure the channel inputs and threshold levels

Once you have connected the signals, you need to configure each channel you have connected and disable any unused channels. Use the Main menu to select a channel and then press the ENTER button to enter the CHANNEL menu for that channel.

Use the CHANNEL menu to enable/disable the channel, to enable/disable the channel from triggering a changeover if the signal crossed the threshold level, to set the threshold level, and to assign a label to the channel as an aid in identifying the signal connected to that channel (See page 62, *CHANNEL menu*.).

Verify the signal margin. Once you have configured the channels, use the PRI VS THRES and the BACK VS THRS readouts in the DIAGNOSTICS submenu to verify that you have set the thresholds to the proper levels (See page 89, *DIAGNOSTICS submenu*.).

Terminate the HREF outputs. If the HREF/Relay board outputs are not terminated, it will change the level readings in the DIAGNOSTICS submenu on the selected channel (primary or backup). (See page 89, *DIAGNOSTICS submenu*.) The unselected primary or backup channel is terminated in the ECO8000 Series, but the selected primary or backup channel drives through to the output. Be sure to connect the channel output to the actual load during setup to insure proper configuration.

Configure the startup delay
The Startup Delay function defines the time period after the ECO8000 Series unit powers up, during which the instrument will not make AUTO mode source switches. The Channel Control system (left-hand buttons) and the basic ECO functions are fully operational a second or two after power is applied. However, on loss of power the sync sources may not be ready for a period of time depending on the type of sync pulse generator. While the sync pulse generator is starting up, the ECO may make undesirable source switches as the sync pulse generator signals turn on at different times.

To prevent this, the ECO8000 Series has the ability to delay AUTO mode switching for the period of time set in the Startup Delay function. Additionally, at the end of the start up delay, any yellow LED states are cleared (this is effectively like asserting the Fault Reset button at the end of the timeout period).

Set the startup delay. Perform the following steps to set the startup delay:

1. Cycle the power on the sync pulse generators connected to the ECO8000 Series and measure the amount time until the sync generators are fully booted and the LEDS on the ECO have all turned to yellow.

⚠ *CAUTION. If the sync generators are configured to use GPS as the timing source and if you have the SPG trigger function configured to monitor the GPS lock, you need to include the time necessary for the sync generators to lock to the GPS signal.*

2. Add a few seconds to the measured startup time of the sync pulse generators to provide some margin. For example, if the startup time of the sync pulse generators is 30 seconds, then a good value for the ECO startup delay would be 35 seconds.

3. On the ECO8000 Series, access the SYSTEM CONFIG menu.

4. Press the up (▲) and down (▼) arrow buttons to select STARTUP DELAY.

5. Press the left (◄) or right (►) arrow button to set the startup delay time period.

NOTE. You can also use the System tab in the Web Interface to set the startup delay.

Configure the SPG trigger input

The SPG trigger input function allows for a condition that is sensed in the Tektronix SPG8000 and TG8000 generators to trigger a source changeover on the ECO8000 Series unit. For example, if the genlock on the primary SPG8000 generator loses lock, then that SPG8000 can signal the ECO8000 Series unit to switch to the backup source. Since the SPG8000 and TG8000 generators have comprehensive internal monitoring capability, this allows the overall system to react to more subtle sync conditions, sometimes even before they start to cause problems.

To use this function, the GPI outputs from the primary and backup sync generators must be connected to the LTC/SPG conectors on the ECO8000 Series. If the sync generator is a Tektronix SPG8000, or a TG8000 with a GPS7 installed, the connections can be done using a 15-pin HD DSUB cable. For other sync generators, a custom wiring harness may be required. See *SPG trigger cable connections* below.

The primary and backup SPG8000 or TG8000 generators need to have the GPI1 output programmed to assert on the combination of events which are intended to cause a changeover trigger. A common set of conditions to enable are "Hardware Fault," "Near Loss of Lock," and "Lock Error". With these settings, the SPG will detect these conditions, assert GPI1, and then the ECO will detect that SPG Trigger input and trigger a changeover.

Configure the SPG alarm delay. To prevent unnecessary signal source changeovers, the SPG8000 and TG8000 generators allow you to configure a time delay before an error condition triggers a changeover. Setting a delay allows time for short errors and warnings to clear before an error signal is sent to trigger a changeover.

With the holdover capability in the SPG8000 and TG8000 generators, a short GPS unlock will not cause any disruption in the syncs, so there is no reason to immediately register an error and trigger an ECO to changeover.

To minimize unnecessary changeovers when using the SPG8000 and TG8000 generators as your signal sources, it is recommended that you configure the alarm delay on the generators for a time period between one and five minutes.

CAUTION. If the primary and backup SPG8000 generators use a common reference, such as the same genlock source or the same GPS antenna, then the primary SPG8000 generator should be set for a longer delay on loss on lock. In case of a failure on the common reference, this allows the primary SPG8000 generator to assert the fault later, which avoids an unnecessary source switch by the ECO8000 Series.

Additionally, the ECO8000 Series may switch sources when the two SPG8000 generators relock if the backup generator locks before the primary generator.

SPG trigger cable connections and GPI configuration. The following table lists the types of connections that can be made from a SPG8000 or TG8000 generator to the LTC/SPG connector on the ECO8000 Series. (See page 23, *LTC/SPG connector signal pinouts*.)

Table 13: SPG trigger cable connections and GPI configuration

Connection type	Cable requirements	Configuration requirements
From the SPG8000 LTC/GPIO connector to the ECO8000 Series LTC/SPG connector	Use a 15-pin DSUB cable with male connectors	On the SPG8000, configure GPO1 to assert on the desired fault conditions
From the SPG8000 GPI connector to the ECO8000 Series LTC/SPG connector	You will need to build a custom cable. One end will have a 9-pin male DSUB connector and the other end will have a 15-pin male DSUB connector.	On the SPG8000, configure the GPI output that you connected to pin 1 on the ECO8000 Series LTC/SPG connector to assert on the desired fault conditions
	Connect one of the three GPO signals on the SPG8000 GPI connector to pin 1 on the ECO8000 Series LTC/SPG connector.	
	Ground the cable: connect pin 1 of the SPG8000 GPI connector to pin 6 or 9 on the ECO8000 Series LTC/SPG connector.	
From the TG8000 GPS7 module LTC/GPI connector to the ECO8000 Series LTC/SPG connector	Use a 15-pin DSUB cable with male connectors	On the TG8000 GPS7 module, configure GPO1 to assert on the desired fault conditions
From the TG8000 GPI port to the ECO8000 Series LTC/SPG connector [1]	You will need to build a custom cable. One end will have a RJ-45 connector and the other end will have a 15-pin male DSUB connector.	On the TG8000, configure the GPI output that you connected to pin 1 on the ECO8000 Series LTC/SPG connector to assert on the desired fault conditions
	Connect pin 6 of the TG8000 GPI port to pin 1 on the ECO8000 Series LTC/SPG connector.	
	Ground the cable: connect pin 8 of the TG8000 GPI port to pin 6 or 9 on the ECO8000 Series LTC/SPG connector.	

[1] This connection type is for TG8000 generators that do not have a GPS7 module installed.

The signal pinouts for each of the SPG8000 and TG8000 connectors are shown in the following tables.

Table 14: Signal pinouts for the SPG8000 GPI/LTC connector and the TG8000 GPS7 module LTC/GPI connector

Pin	Signal
1	GPO1
2	GPO2
3	GPI
4	
5	LTC4–

Table 14: Signal pinouts for the SPG8000 GPI/LTC connector and the TG8000 GPS7 module LTC/GPI connector (cont.)

6	GND
7	LTC3–
8	LTC2–
9	GND
10	LTC1–
11	
12	LTC3+
13	LTC2+
14	LTC1+
15	LTC4+

Table 15: Signal pinouts for the SPG8000 GPI connector

Pin	Signal
1	GND
2	GPO1
3	GPO2
4	GPI
5	5 V
6	GPO3
7	Preset1
8	Preset2
9	Preset3

Table 16: Signal pinouts for the TG8000 GPI port

Pin	Signal
1	GPI1
2	GPI2
3	GPI3
4	
5	
6	GPO
7	
8	GND

Configure event reporting The ECO8000 Series monitors several operational parameters and records events when faults occur (See page 49, *Fault and event descriptions*.).

The instrument provides four methods for the reporting of fault events: SNMP trap, e-mail, GPI signal, and instrument beeper. You can configure which events are reported using one or a combination of these methods.

SNMP trap reporting. The instrument can send SNMP traps to up to four IP addresses when enabled events occur. Use the SNMP CONFIG submenu to the SNMP settings (See page 74, *SNMP CONFIG submenu*.) and use the TRAP EVENTS submenu to select which events will be reported using SNMP traps (See page 83, *EVENT submenus*.).

E-mail reporting. The instrument can send e-mail notifications to one e-mail address when enabled events occur. Use the EMAIL REPORTING submenu to configure the e-mail settings (See page 76, *EMAIL REPORTING submenu*.) and use the EMAIL EVENTS submenu to select which events will be reported using e-mail (See page 83, *EVENT submenus*.).

NOTE. The e-mail client used by the ECO8000 Series does not support the TLS (Transport Layer Security) protocol. This protocol is used by most ISPs and free e-mail services like gmail, yahoo, live.com, etc.

Some e-mail servers do not require a login name and password. Before you configure the e-mail reporting parameters, it is recommended that you contact your local network administrator to determine the e-mail server address and to determine whether an e-mail login name and password are required.

GPI signal reporting. The instrument can send a GPI signal using the GPIO connector when enabled events occur (See page 22, *GPIO connector signal pinouts*.). Use the GPI EVENTS submenu to select which events will be reported using the GPIO connector (See page 83, *EVENT submenus*.).

Instrument beeper reporting. The instrument can emit a beep when enabled events occur. Some events, such as a primary/backup source switch, emit a single beep. Other events, such as a primary fault, emit one beep per second for as long as the event is active. Use the BEEPER EVENTS submenu to select which events will be reported using the instrument beeper (See page 83, *EVENT submenus*.).

Configure the Expansion port

The ECO8000 Series has the ability to connect two instruments so that they function as a single larger switch. This function is useful in situations where more channels are needed than can be supported using only one instrument.

To enable the Expansion port function, you need to configure one ECO as the master unit and the other ECO as the slave unit using the SYSTEM CONFIG menu. (See page 68.) Both instruments must be connected together via the rear-panel EXPANSION port connectors using a standard Ethernet RJ-45 cable.

Once the two instruments are configured as Master and Slave and are connected together, the left-hand buttons (Channel Control system) on the Master unit will control both instruments and the left-hand buttons on the Slave unit will be disabled. The right-hand buttons (Configuration and Monitoring system) on both units will operate normally. This allows the configuration for each ECO to be set independently either via the front panel or the Web Interface.

If the Expansion port connection between two instruments is disconnected, the Slave unit will revert to Master mode so that it will operate independently.

⚠ *CAUTION. A slave unit may change state if the master unit is changed from master to disabled or if the interconnection cable is removed.*

It is recommended that you configure the master and slave units during system setup and that you not change the configuration while the instrument is in operation. To help enforce this recommendation, the ECO8000 Series must be in Manual mode before you can change the state of the expansion port.

Independent GPI outputs. When you use the Expansion port to connect two instruments, the GPI outputs are still independent. For example, if a fault occurs on a master unit signal, only the GPI output on the master unit will be activated. Likewise, if a fault occurs on a slave unit signal, only the GPI output on the slave unit will be activated.

If you want to have a common GPI output for the connected instruments, the two GPI signals can be connected together. The GPI outputs are open with a weak pull-up resistor to 5 V when they are not asserted, and are connected to ground when they are asserted. Therefore, the GPI outputs can be connected in a "wire-OR" so that either unit can drive the GPI output low.

For the GPI inputs, only the master unit needs to driven. The slave unit will follow any changes which are made to the master unit.

How to operate an instrument with two power supplies (Option DPW only)

The standard instrument has one Power Supply module installed. With Option DPW, a second hot-swappable, redundant (backup) Power Supply module is provided. When two Power Supply modules are installed in the instrument, one module is configured as the primary supply and the other is configured as the backup supply.

In the event that the primary supply fails, the backup supply automatically provides power to maintain instrument operation. You can remove and replace a failed supply without having to remove the instrument from operation. (See page 39, *To hot-swap a Power Supply module*.)

If you need to remove one of the two supplies for repair and you do not have a replacement supply available, be sure to install a blank power supply cover into the empty power supply slot (Tektronix part number 333-4724-XX).

Power supply status

The status of the Power Supply modules can be viewed from the front of the instrument. On the front panel, the AC and DC indicators illuminate using various colors to show the status of the Power Supply modules. (See page 25, *Power Supply module LED states*.)

You can use the SYSTEM CONFIG menu to perform a load test on the backup supply. You can use the DIAGNOSTICS menu to view voltage levels in the instrument.

Temperature weighted hours (TWH)

The instrument keeps track of the age of a Power Supply module by calculating the temperature weighted hours (TWH). You can view the TWH of each installed supply using the DIAGNOSTICS submenu in the SYSTEM CONFIG menu.

TWH calculation method. When the outside air temperature is at 25 °C or cooler, the Power Supply module is expected to last 15 years. As the outside air temperature rises to the maximum operating temperature of 50 °C, the expected life of the supply decreases to 5 years. Every hour, the instrument measures the supply temperature and increments the temperature weighted hours count in response to the measured temperature.

When the TWH value reaches a value of 131,400 hours, then an entry will be made in the Event Log and notifications will be sent using the enabled reporting methods (SNMP trap, e-mail, GPI signal, instrument beeper).

NOTE. When two Power Supply modules are installed, the active supply runs warmer than the backup supply. Therefore, the TWH of the active supply will increase faster than the backup supply.

Configuring the preferred (active) supply (Option DPW only)

When two Power Supply modules are installed in the instrument, one is configured as the primary supply and the other is configured as the backup supply. In the event that the primary supply fails, the backup supply automatically provides power to maintain instrument operation.

NOTE. The preferred supply configuration only applies if two Power Supply modules are installed and both of the supplies are connected to a power source. If there are two Power Supply modules installed but one of the supplies has a failure, the good supply will be used to power the instrument regardless of the preferred supply configuration.

The recommended usage strategy is to configure one supply as preferred, and use the second supply only in case the first supply has a failure. This usage strategy allows the backup supply to have the maximum remaining life when it is needed.

The preferred supply configuration is not set as part of the Hardware Initialization function. Therefore, the preferred supply configuration will not change when you reset the instrument using the Hardware Initialization function.

Perform the following steps to configure which Power Supply module is the preferred (active) supply:

1. Check the status of the front-panel DC LED indicators on both supplies:

   - Bright green indicates the current preferred (active) supply

   - Dim green indicates the current inactive (backup) supply

   NOTE. If the color of the LED indicators is other than bright or dim green, service the faulty Power Supply module before proceeding.

2. Check the temperature weighted hours of the installed supplies:

NOTE. It is recommended that you configure the supply with the most temperature weighted hours to be used as the primary preferred supply. This allows for the newer supply to be preserved so it can provide the best possible backup should the primary supply fail. For more information about temperature weighted hours, see the ECO8000 Series Quick Start User Manual.

   a. From the top-level Main menu, press the up (▲) or down (▼) arrow button to select **SYSTEM CONFIG**, and then press the **ENTER** button to access the SYSTEM CONFIGURATION menu.

    b. Press the up (▲) arrow button to select **DIAGNOSTICS**, and then press the **ENTER** button to access the DIAGNOSTICS submenu.

    c. Press the up (▲) or down (▼) arrow button to select **PS1 HOURS**. The second line of the display lists the number of hours the supply has been the active supply.

    d. Press the right (►) arrow button to select **PS1 TW HOURS**. The second line of the display lists the number of temperature weighted hours of the first supply. Note the number of hours of hours shown.

    e. Press the down (▼) arrow button to select **PS2 HOURS**.

    f. Press the right (►) arrow button to select **PS2 TW HOURS**. The second line of the display lists the number of temperature weighted hours of the second supply. Note the number of hours of hours shown.

    g. Press the **BACK** button to exit the DIAGNOSTICS submenu and return to the SYSTEM CONFIGURATION menu.

3. If the Power Supply module with the greatest number of temperature weighted hours is not the currently the preferred supply, then continue this procedure. Otherwise, you do not need to change the preferred supply configuration.

4. If you want to change the preferred supply configuration, press the up (▲) or down (▼) arrow button to select **PREFERRED SUPPLY**.

5. Press the left (◄) or right (►) arrow button to display the supply you want to be the primary (active) supply: PS1 or PS2. The second line of the display shows the selected supply and its status: **Active, Preferred** or **Inactive**.

NOTE. When viewed from the front of the instrument, PS1 is the left Power Supply module and PS2 is the right Power Supply module.

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6. If status of the desired supply is Inactive, press the **ENTER** button to change the status to Active, Preferred. The front-panel DC indicator for the selected supply should change from dim green to bright green.

To hot-swap a Power Supply module

Perform the following steps to hot-swap a Power Supply module while the instrument is in operation:

1. Use the DIAGNOSTICS submenu (See page 89.) or the states of the front-panel AC and DC LEDs (See page 25, *Power Supply module LED states*.) to identify the faulty Power Supply module.

⚠ **CAUTION.** *To prevent an unexpected shutdown of the instrument, be sure to remove the correct Power Supply module if you are replacing a faulty module.*

When viewed from the front of the instrument, Power Supply 1 is the left Power Supply module and Power Supply 2 is the right Power Supply module.

2. Remove the desired Power Supply module by unscrewing the front-panel retaining screw, and then pulling the module out of the instrument.
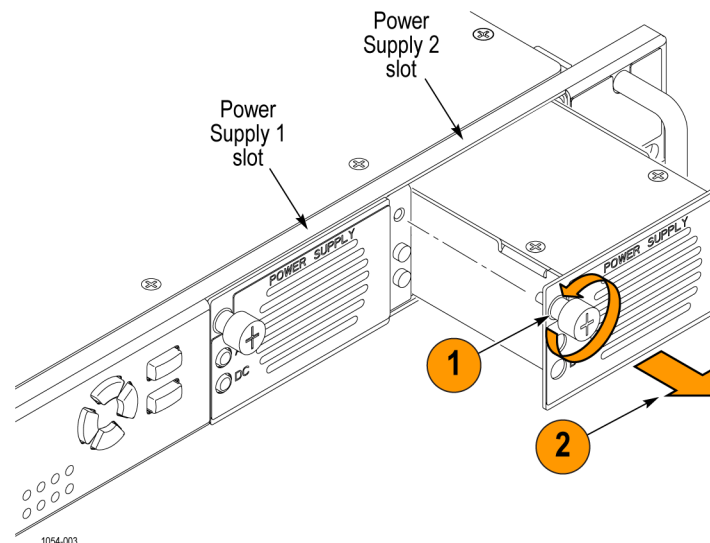

Figure 8: Removing a Power Supply module

3. Insert the replacement supply module into the instrument until it latches into place, and then turn the retaining screw clockwise to secure the module in the chassis.
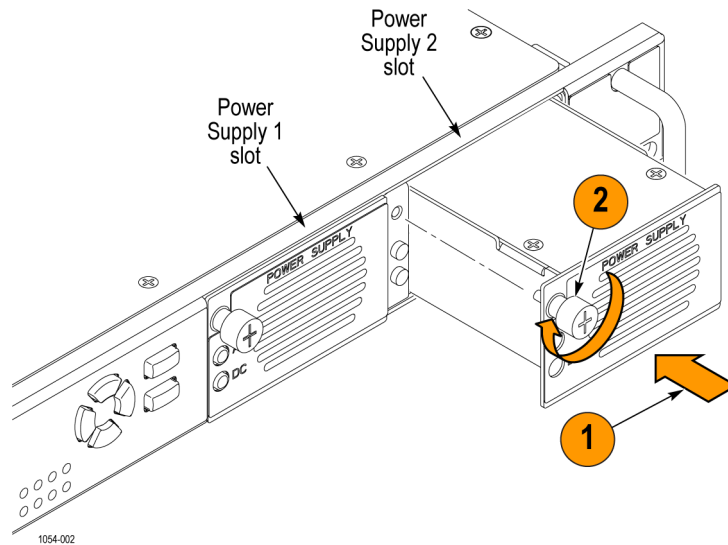

Figure 9: Installing the backup or replacement Power Supply module

4. Check that the status LEDs of the Power Supply module you just installed. Both LEDS should be bright green or dim green. (See page 25, *Power Supply module LED states*.)

5. If desired, change the preferred supply configuration. (See page 37, *Configuring the preferred (active) supply (Option DPW only)*.)

How to upgrade the instrument firmware

Tektronix releases software and firmware updates for products to add new features and to fix product problems. You can find the latest firmware for your product at the Tektronix Web site (www.tektronix.com/downloads).

Be aware of the following upgrade considerations:

- We recommend that the instrument be out of service to perform the upgrade

- You must perform the firmware upgrade using the instrument front panel (you cannot use the Web Interface)

- The instrument must be connected to the same Ethernet network as the computer you will use to perform the upgrade

Before you begin the upgrade

Before you begin the upgrade, perform the following steps to determine if the firmware on your instrument should be upgraded.

> ⚠ **CAUTION.** *The firmware upgrade process may disrupt the sync signals. We recommend that you upgrade the firmware only when the instrument is not in service.*

1. Power on the instrument.

2. Verify the current firmware version installed on the instrument:

   a. Press the **BACK** button as necessary to return to the top-level Main menu.

   b. Press the up (▲) or down (▼) arrow button to select **SYSTEM CONFIG**, and then press the **ENTER** button to access the SYSTEM CONFIG menu.

   c. Press the up (▲) or down (▼) arrow button to select **FW VERSION**.

   d. Press the left (◄) or right (►) arrow button to note the firmware version number.

Installed firmware version number	

3. Verify the latest version of software at the Tektronix Web site:

   a. On a computer, use a Web browser to navigate to the following Tektronix Web site:

   `http://www.tektronix.com/downloads`

   b. On the Downloads Finder Web page, search by model number (such as ECO8000) and filter by software and software type to locate the firmware-upgrade package for the instrument.

   c. Note the latest version number of the firmware-upgrade package(s).

Web site firmware version number	

4. If the latest firmware version at the Web site is the same as the version installed on your instrument, you do not need to upgrade the instrument firmware.

5. If the latest firmware version at the Web site is newer than the version on your instrument, download the latest firmware package to your computer.

6. After the firmware package ZIP file is downloaded, extract the following files into the directory of your choice: transfer.exe and firmware.pkg.

NOTE. The two upgrade files need to be located in the same directory for the upgrade to work.

If a readme.txt file is included in the firmware package, be sure to read the file before you upgrade the firmware.

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7. If the firmware in your instrument needs to be upgraded, verify which options are currently installed before you install the software. After you install the upgrade, you will verify that any previously installed options are still enabled.

   a. Connect the instrument and computer to your local Ethernet network. (See page 7, *Network installation*.)

   b. Press the front-panel **BACK** button as necessary to access the top-level Main menu.

   c. Press the up (▲) or down (▼) arrow button to select **SYSTEM CONFIG**, and then press the **ENTER** button to access the SYSTEM CONFIG menu.

   d. Press the up (▲) or down (▼) arrow button to select **INSTALLED OPTION**.

   e. On the second line of the display, note the installed hardware option boards.

   f. Press the **ENTER** button to access the OPTIONS ENABLED submenu.

   g. On the second line of the display, note the installed software options. **None** is displayed if no software option is installed; **LTC** is displayed of Option LTC is installed.

Firmware upgrade overview   The time required to complete the firmware upgrade is approximately 10 minutes.

⚠️ *CAUTION. The firmware upgrade process may disrupt the sync signals. We recommend that you upgrade the firmware only when the instrument is not in service.*

Once the instrument has started to erase internal flash, do not remove power from the instrument. If you do so, the instrument flash may be corrupted and you will have to run the recovery procedure. (See page 46, Firmware upgrade troubleshooting.)

NOTE. If power to the instrument is lost before it begins erasing the internal flash, you can restart the firmware upgrade after the instrument reboots. If the instrument displays only a blank screen after power is reapplied, see the troubleshooting section for help. (See page 46, Firmware upgrade troubleshooting.)

Firmware upgrade procedure

Use the following steps to upgrade the instrument firmware using a network connection:

1. Connect the instrument and a Windows PC to your local Ethernet network or directly connect the instrument to a Windows PC. (See page 7, *Network installation*.)

2. Power on the instrument.

3. Prepare the instrument for the firmware upgrade:

   a. Press and hold the PANEL ENABLE button to enable the front-panel control buttons. The instrument beeps when the panel buttons are enabled.

   b. Press the front-panel **MANUAL MODE** button to put the instrument in Manual mode.

   c. Press the front-panel **BACK** button as necessary to access the top-level Main menu.

   d. Press the up (▲) or down (▼) arrow button to select **SYSTEM CONFIG**, and then press the **ENTER** button to access the SYSTEM CONFIG menu.

   e. Press the up (▲) or down (▼) arrow button to select **FIRMWARE UPGRADE**.

   f. Press the **ENTER** button. A confirmation message is displayed as shown below.

   ```
   * Begin FW Upgrade?
   * Yes: ENTER  No: Back
   ```
   3221-024

   g. Press **ENTER** to proceed with the upgrade or press the **BACK** button to cancel the upgrade.

   h. A second confirmation is displayed as shown below.

   ```
   * Continue Upgrading?
   * Yes: ENTER  No: Back
   ```
   3221-023

   i. Press the **ENTER** button to proceed with the upgrade or press the **BACK** button to cancel the upgrade.

   j. When you press ENTER, a **Waiting for network** message is displayed along with the IP address of the instrument. This indicates the instrument is ready to be upgraded.

4. Perform the firmware upgrade:

    a. On the PC, double-click the **transfer.exe** file to launch the transfer program.

    b. Type the IP address of the instrument you are upgrading, and then press **Enter**. This starts the firmware upgrade process. Messages indicating the progress of the upgrade appear in the transfer program window and on the instrument display.

⚠ *CAUTION. Once the instrument has started to erase internal flash, do not remove power from the instrument. If you do so, the instrument flash may be corrupted and you will have to run the recovery procedure. (See page 46, Firmware upgrade troubleshooting.)*

NOTE. The upgrade will not proceed until all of the firmware data is transferred to the instrument. Once the upgrade has started, the instrument will attempt to complete the upgrade even if it loses contact with transfer.exe. So that you can monitor the progress of the upgrade, it is suggested that you do not close the transfer.exe window until the transfer utility asks for another IP address.

Figure 10: Sample of transfer.exe window after the upgrade is complete

5. If the instrument does not reboot at the completion of the firmware upgrade, remove and then reconnect the power cable.

6. Proceed to *Verify the firmware upgrade and reinstall user files*. (See page 46.)

Verify the firmware upgrade

1. After the instrument reboots at the end of the upgrade process, press the **SYSTEM** button to access the SYSTEM menu.

2. Press the up (▲) or down (▼) arrow button to select **SYSTEM CONFIG**, and then press the **ENTER** button to access the SYSTEM CONFIG menu.

3. Press the up (▲) or down (▼) arrow button to select **FW VERSION**.

4. Press the left (◄) or right (►) arrow button to verify that the displayed firmware version is the same version as the firmware package you used to perform the upgrade.

5. Press the up (▲) or down (▼) arrow button to select **INSTALLED OPTION**.

6. On the second line of the display, verify that installed hardware option boards are the same as before the upgrade.

7. Press the **ENTER** button to access the OPTIONS ENABLED submenu.

8. On the second line of the display, verify that the installed software option list is the same as before the upgrade. **None** is displayed if no software option is installed; **LTC** is displayed of Option LTC is installed.

Firmware upgrade troubleshooting

If a power failure occurs during the upgrade and the instrument has a blank screen when you reapply power, perform the following procedure.

1. Connect an Ethernet cable between the instrument and your computer or local Ethernet network.

2. Remove the power cable to turn off the instrument.

3. Press and hold the up (▲) arrow button and then reconnect the power cable. Continue to hold the up (▲) arrow button until the message **Select upgrade network mode:** appears on the top line of the LCD display.

4. When the message **Select upgrade network mode:** is displayed, press the left (◄) or right (►) arrow button to select from the following modes and then press the **ENTER** button.

- **DHCP** – Use this selection if the instrument is connected to a network with DHCP support. An IP address will be assigned to the instrument from your network server.

- **Local IP (192.168.1.1)** – Use this selection if the instrument is connected to a network without DHCP support or is connected to a standalone computer. In this case, the factory default, static IP address of 192.168.1.1 will be used for the upgrade.

NOTE. When you select either the Local IP or the Saved static IP upgrade mode, you cannot edit the displayed IP address. The IP address cannot be edited when the instrument is in recovery mode.

- **Quit and continue booting** – Use this selection to quit the upgrade process and leave the instrument in its current condition.

5. If you did not select Quit and continue booting in the previous step, the top line of the instrument display will show the message **Waiting for network connection** and the second line will list an IP address. Make a note of the displayed IP address.

6. Enter the IP address you noted in the previous step into the upgrade transfer application window on your PC to restart the upgrade process.

⚠ *CAUTION. To prevent upgrade failure, leave the instrument power on during the upgrade process. The upgrade process may take up to 15 minutes to complete.*

7. When the upgrade is complete, the instrument should reboot. If it does not, cycle the power.

If you continue to experience an upgrade problem, contact Tektronix customer support or your local Tektronix representative for assistance.

How to use the Event Log and event history

Outputting the Event Log   Using the Web Interface, you can save the contents of the Event Log to a file.

1. Connect to the instrument using the Web Interface.

2. In the Status tab, use the Event Log drop-down box to select how you want the log formatted. You can sort the log by event type, event time, or by the last event by type.

3. Click the View Event Log button.

NOTE. *If you have your Web browser configured to block popups, you will not be able to view the Event Log.*

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4. Save the displayed log as an HTML file on your local computer.

5. On your computer, use Excel to open the saved HTML file.

NOTE. *If you save the Event Log directly as an Excel file, the cell sizes will not be correctly formatted for the size of the cell contents.*

Fault and event descriptions

The following table describes the faults and events that may be reported by the instrument.

Table 17: Fault and event descriptions

Fault or event	Description
Primary fault	One or more of the active primary input channels is being driven by a signal that is below the configured level threshold for that channel
Backup fault	One or more of the active backup input channels is being driven by a signal that is below the configured level threshold for that channel
Pri/Backup switch	The instrument has switched sources from primary to backup (or vice-versa), either manually or automatically
PS<1 or 2> LD test fail	The indicated Power Supply module has failed the last manual or automatic load test (load tests are run every 24 hours during normal operation if two power supplies are installed)
PS<1 or 2> AC fault	The AC input to the indicated power supply has failed
PS<1 or 2> DC fault	The 12 V DC output of the indicated power supply has failed (reported only on supplies which have a power input)
PS<1 or 2> fan fault	The fan in the indicated power supply has failed
PS<1 or 2> warning	The 12 V DC output level on the indicated supply is above or below the nominal range
PS<1 or 2> temp fault	The indicated power supply is over temperature
PS<1 or 2> TWH warning	The TWH (Temperature Weighted Hours) limit has been exceeded on the indicated power supply (See page 36, *Temperature weighted hours (TWH).*)
PS switchover	On instruments with two Power Supply modules, the instrument has switched from using one supply to using the other supply
Board supply	A power supply has failed on the indicated circuit board (See page 50, *Diagnostic board voltage error codes.*)
Temperature fault	The instrument is being operated at too high a temperature
Back test due	The recommended test interval for checking the backup channels has been exceeded
Post failed	A failure was detected during the power on self test (See page 27, *Power-on self test.*)
HREF relay fail	A relay failure was detected on one of the HREF channels
Reboot normal	The instrument was rebooted manually
Reboot watchdog	The CPU (Configuration and Monitoring system) was rebooted automatically when its watchdog signal was not detected

Diagnostic board voltage error codes

Diagnostic voltages are read by the instrument every second and any out of tolerance results are sent to the Fault Manager. If any voltage failure occurs, it will be reported in the following ways:

■ An error message is written on the front panel LCD in the STATUS: FAULTS display with the code "0xmn" listed in the box representing the error code as shown below. The letter "m" represents the board number and "n" represents the index on that board. In the case of board 0, the leading 0 is truncated.

```
▶▶ BOARD SUPPLY    0xmn
MM:DD:YYYY HH:MM:SS
```

3221-032

■ A similar message, which includes the event code, is entered in the Event Log.

■ If the user-configurable event reporting methods (SNMP trap, e-mail, GPI signal, instrument beeper) are enabled to notify in the event of a voltage error, then a message is sent using the enabled method(s).

Event codes. The event code consists of two numbers, where the first number represents the board and the second number represents the voltage index of the board. The Main board number is 0 and the module board numbers are 1 to 4.

Depending on the configuration of your instrument, only some of the modules may be installed. The relationship between the module number and the channel numbers of an instrument are as follows:

Table 18: Relationship between module and channel numbers

Instrument model	Module number	Channel numbers
ECO8000	1	1–3
	2	4–6
	3	7–9
ECO8020	1	1–5
	2	6–10
	3	11–15
	4	16–20

The modules can be either REF/ELSW or HREF/Relay boards. The REF boards do not have the +3.1RL voltage. The index number is the same for all module types. The following table lists the possible code combinations.

Table 19: Board voltage error codes

Description	Board number	Index	Code
Main Board			
+5.0 V	0	8	0x8
+3.3 V	0	9	0x9
−5.0 V	0	a	0xa
+5.25 V	0	b	0xb
+7.0 V	0	c	0xc
Module 1			
+5.25RL V	1	2	0x12
+3.3 V	1	3	0x13
+5.0 V	1	4	0x14
−5.0 V	1	5	0x15
+4.0 V	1	6	0x16
+7.0 V	1	7	0x17
+3.1RL V	1	e	0x1e
Module 2			
+5.25RL V	2	2	0x22
+3.3 V	2	3	0x23
+5.0 V	2	4	0x24
−5.0 V	2	5	0x25
+4.0 V	2	6	0x26
+7.0 V	2	7	0x27
+3.1RL V	2	e	0x2e
Module 3			
+5.25RL V	3	2	0x32
+3.3 V	3	3	0x33
+5.0 V	3	4	0x34
−5.0 V	3	5	0x35
+4.0 V	3	6	0x36
+7.0 V	3	7	0x37
+3.1RL V	3	e	0x3e
Module 4			
+5.25RL V	4	2	0x42
+3.3 V	4	3	0x43
+5.0 V	4	4	0x44
−5.0 V	4	5	0x45
+4.0 V	4	6	0x46
+7.0 V	4	7	0x47
+3.1RL V	4	e	0x4e

ECO8000 Series Automatic Changeover Unit User Manual

Menus

This section provides diagrams and descriptions of the various instrument settings and readouts available in the front-panel menu system. All of the settings can also be configured using the Web Interface except for the following (See page 95, *How to use the Web Interface*.):

- SNMP configuration settings

- Network configuration settings

- Web Interface level of control setting

Menu navigation

To navigate through the menu system, use the four arrow buttons in conjunction with the ENTER and BACK buttons. The LCD display uses various symbols to help you navigate the menus and make selections:

- **Carriage return.** As shown below, when a carriage return symbol appears in the right bottom corner of a display, this indicates that you can either press the ENTER button to access a submenu or that you need to press the ENTER button to make a setting change.

```
STATUS
  Press ENTER
                                   ↵
```
3221-033

```
► WEB USER INTERFACE
■ Full Control                     ↵
```
3221-034

- **Bullet.** As shown above, when a bullet symbol appears as the first character on the bottom line of the display, this indicates that there are multiple setting selections available and that the displayed selection is the currently selected setting. Press the left or right arrow buttons to view other possible selections and press the ENTER button to implement a setting change.

- **Left and right arrows.** As shown below, when left and right arrows appear on the far right side of the display, this indicates that you can view more diagnostic or event readouts using the left and right arrow buttons.

```
►► BACKUP FAULT
  MM:DD:YYYY HH:MM:SS              ⇄
```
3221-035
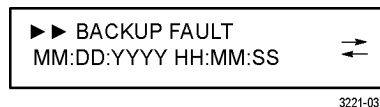
- **Indentation.** As shown above, when right-arrow characters appear as the first characters on the top line of the display, this indicates that you have entered a submenu. The number of right-arrow characters represents the number of times you need to press the BACK button to return to the top-level menu.

Menu readout updates   Many of the menu readouts are static and do not update when instrument conditions change. To view the latest menu readout information, press the BACK button to exit the current menu and then press the ENTER button to reenter the menu and view the current readout information. This is especially useful when viewing items in the STATUS menu.

Main menu

The Main menu is the top level menu and appears by default when the instrument is turned on. Use the Main menu to access the STATUS, CHANNEL, and SYSTEM CONFIG menus. Use the up (▲) and down (▼) arrow buttons to scroll through the menu selections. If you have navigated to a submenu, you may need to press the BACK button several times to return to this top-level menu.
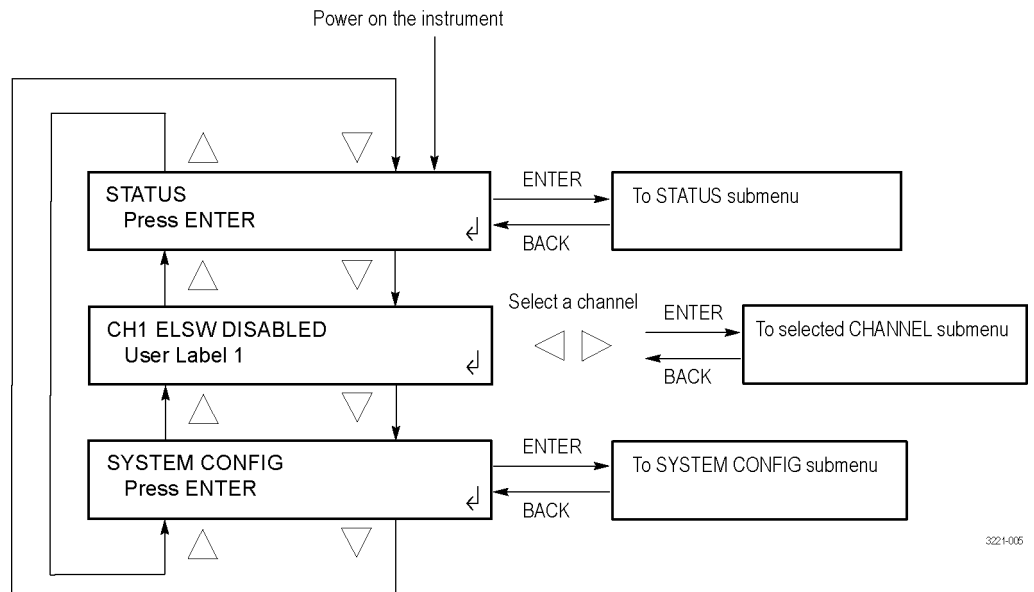

Figure 11: Main menu

STATUS. Select this menu item and press the ENTER button to access the STATUS menu, which you can use to view instrument faults and the Event Log contents. (See page 56, *STATUS menu*.)

CH1 ELSW <status>. Select this menu item and press the left (◄) or right (►) arrow button to select the desired BNC or LTC (Option LTC only) channel. After you select the desired channel, press the ENTER button to access the menu for the selected channel, which you can use to view and configure the channel settings. (See page 62, *CHANNEL menu*.)

The top line of the display lists the following information:

- The channel or LTC number.

- The type of channel: ELSW, Relay, or LTC.

- The channel status or the current threshold level. If the selected channel is disabled, "DISABLED" is displayed after the channel type. If the selected channel is enabled, then the current threshold level for the channel is displayed. For example, if the threshold is set to NTSC, then "NTSC" will be displayed after the channel type.

SYSTEM CONFIG. Select this menu item and press the ENTER button to access the SYSTEM CONFIG menu, which you can use to view or configure various instrument settings. (See page 65, *SYSTEM CONFIG menu*.)

STATUS menu

To access this menu, select STATUS in the Main menu and press the ENTER button. (See page 54, *Main menu*.) Use the STATUS menu to view instrument faults and the Event Log contents. Use the up (▲) and down (▼) arrow buttons to scroll through the menu selections.

NOTE. *Many of the STATUS menu readouts are static and do not update when instrument conditions change. To view the current status information, press the BACK button to exit the current menu and then press the ENTER button to reenter the menu.*
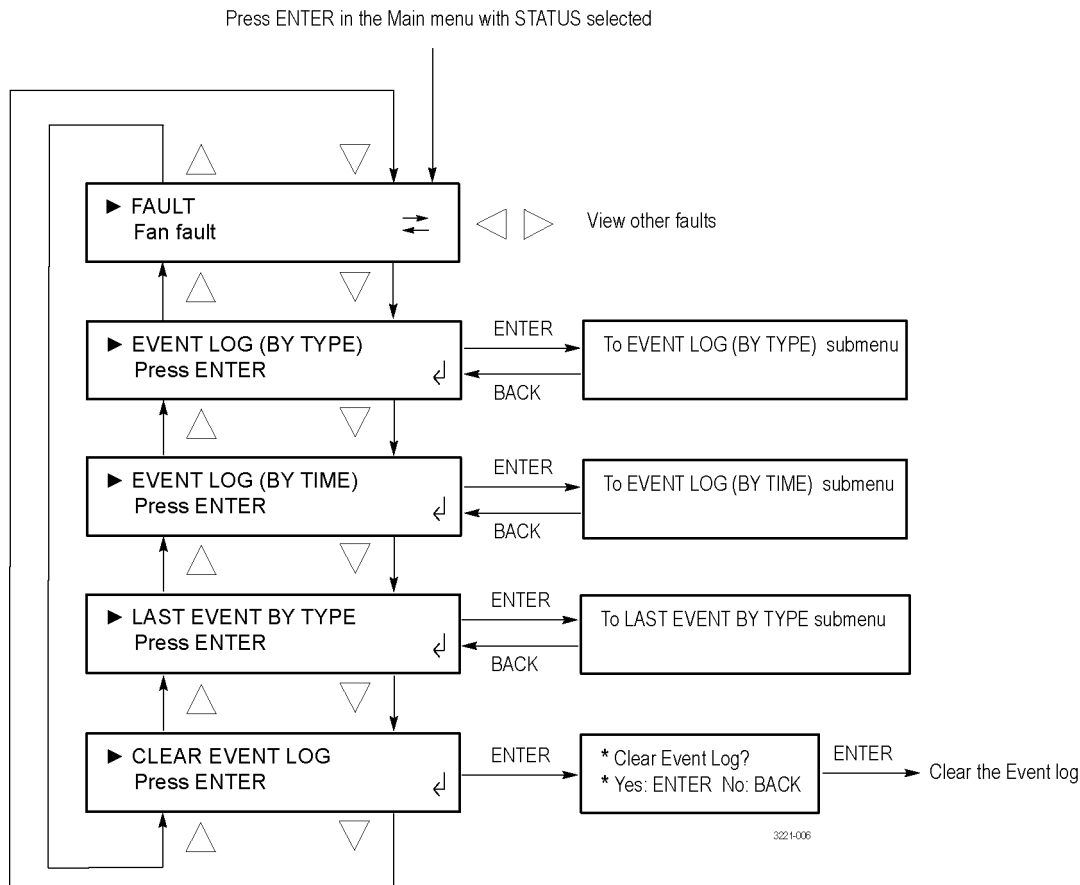

Press ENTER in the Main menu with STATUS selected

△   ▽

► FAULT
Fan fault   ⇄   ◁ ▷   View other faults

△   ▽

► EVENT LOG (BY TYPE)   ENTER   To EVENT LOG (BY TYPE) submenu
Press ENTER   ↵   ←─ BACK

△   ▽

► EVENT LOG (BY TIME)   ENTER   To EVENT LOG (BY TIME) submenu
Press ENTER   ↵   ←─ BACK

△   ▽

► LAST EVENT BY TYPE   ENTER   To LAST EVENT BY TYPE submenu
Press ENTER   ↵   ←─ BACK

△   ▽

► CLEAR EVENT LOG   ENTER   * Clear Event Log?   ENTER   Clear the Event log
Press ENTER   ↵   * Yes: ENTER No: BACK

△   ▽

3221-006

Figure 12: STATUS menu

FAULT. Select this menu item to view any instrument faults. If no faults are currently active, "No Fault" is displayed. If more than one fault is currently active, press the left (◄) or right (►) arrow button to view the additional faults.

EVENT LOG (BY TYPE). Select this menu item and press the ENTER button to access the EVENT LOG (BY TYPE) submenu, which you can use to view the last 1024 events, sorted first by the event type, and then sorted by time within each event type. (See page 57, *EVENT LOG (BY TYPE) submenu*.)

EVENT LOG (BY TIME). Select this menu item and press the ENTER button to access the EVENT LOG (BY TIME) submenu, which you can use to view the last 1024 events sorted by the time of their occurrence. (See page 61, *EVENT LOG (BY TIME) submenu*.)

LAST EVENT BY TYPE. Select this menu item and press the ENTER button to access the LAST EVENT BY TYPE submenu, which you can use to view the last instance of each event type, regardless of how many events of other types have occurred. (See page 61, *LAST EVENT BY TYPE submenu*.)

CLEAR EVENT LOG. Select this menu item and press the ENTER button to clear the Event Log. In the confirmation screen, press ENTER to clear the Event Log or press BACK to return to the STATUS menu.

EVENT LOG (BY TYPE) submenu

To access this menu, select EVENT LOG (BY TYPE) in the STATUS menu and press the ENTER button. (See page 56, *STATUS menu*.) Use this submenu to view the last 1024 events, sorted first by the event type, and then sorted by time within each event type. (See page 48, *How to use the Event Log and event history*.)

Press the up (▲) or down (▼) arrow button to select an event type, and then press the left (◄) or right (►) arrow button to view additional events for the selected event type, if any exist. The display readout shows "No occurrence found" if no events have occurred for an event type. If an event has occurred, the display readout shows the event date and time in the following format: MM:DD:YYYY HH:MM:SS.
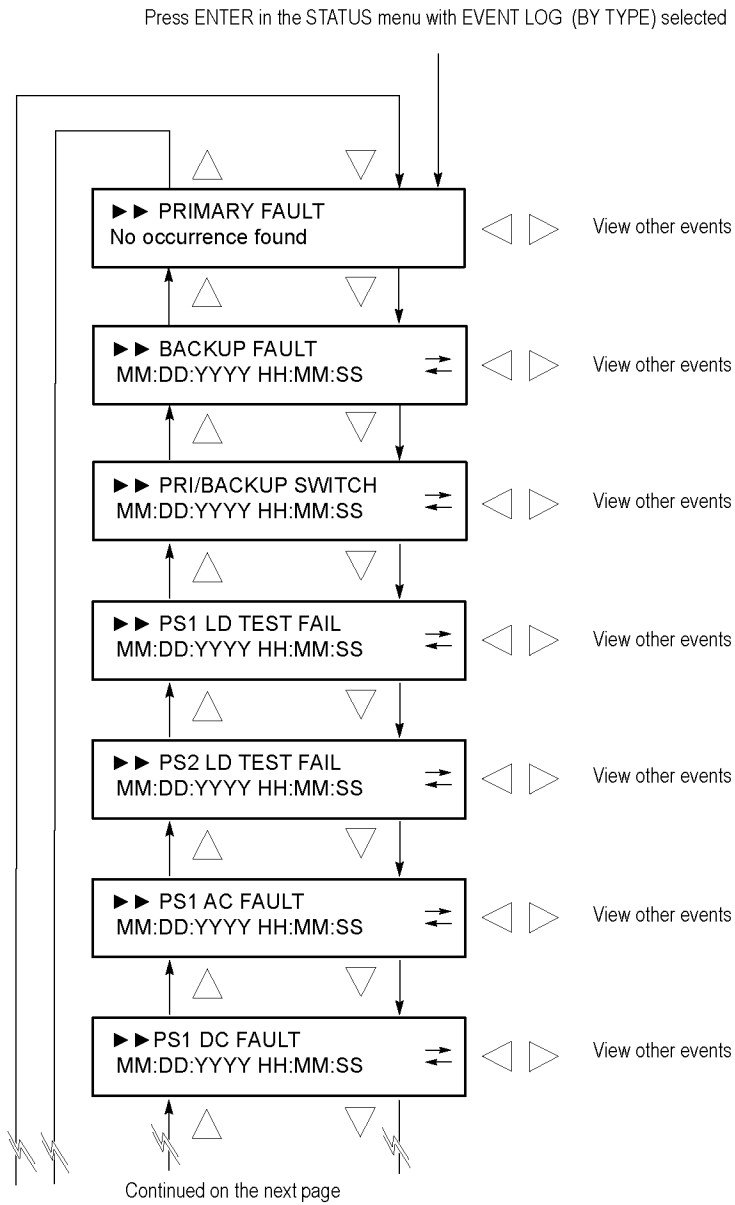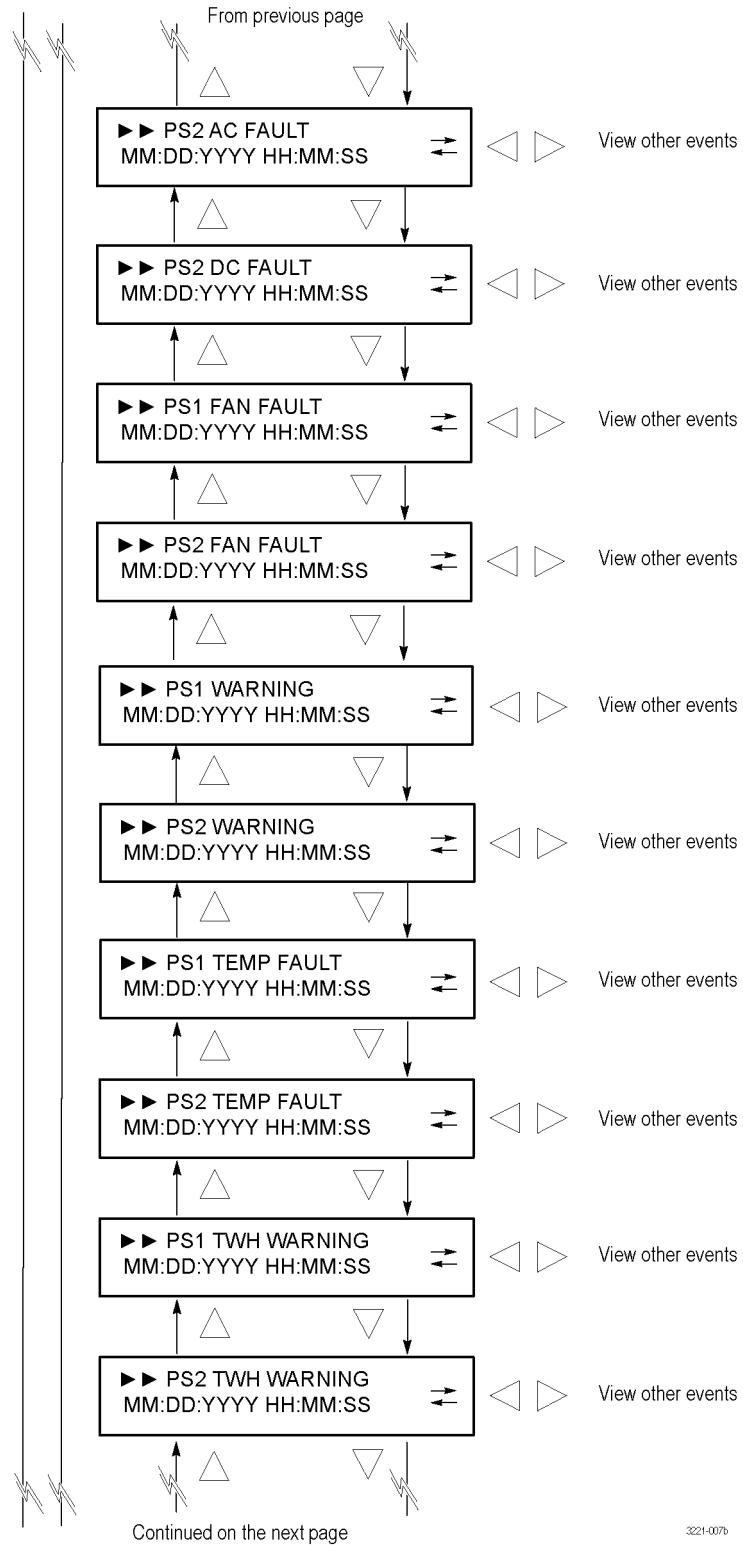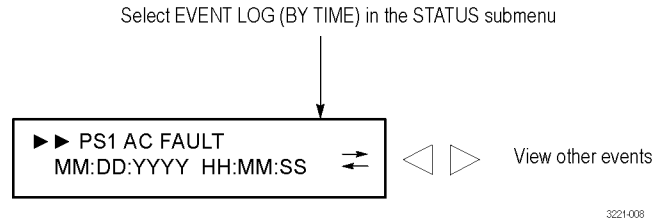
Press ENTER in the STATUS menu with EVENT LOG (BY TYPE) selected

Figure 13: EVENT LOG (BY TYPE) submenu – part 1

From previous page

►► PS2 AC FAULT
MM:DD:YYYY HH:MM:SS   View other events

►► PS2 DC FAULT
MM:DD:YYYY HH:MM:SS   View other events

►► PS1 FAN FAULT
MM:DD:YYYY HH:MM:SS   View other events

►► PS2 FAN FAULT
MM:DD:YYYY HH:MM:SS   View other events

►► PS1 WARNING
MM:DD:YYYY HH:MM:SS   View other events

►► PS2 WARNING
MM:DD:YYYY HH:MM:SS   View other events

►► PS1 TEMP FAULT
MM:DD:YYYY HH:MM:SS   View other events

►► PS2 TEMP FAULT
MM:DD:YYYY HH:MM:SS   View other events

►► PS1 TWH WARNING
MM:DD:YYYY HH:MM:SS   View other events

►► PS2 TWH WARNING
MM:DD:YYYY HH:MM:SS   View other events

Continued on the next page   3221-007b

Figure 14: EVENT LOG (BY TYPE) submenu – part 2

From previous page

►► PS SWITCHOVER
MM:DD:YYYY HH:MM:SS   View other events

►► BOARD SUPPLY
MM:DD:YYYY HH:MM:SS   View other events

►► TEMPERATURE FAULT
MM:DD:YYYY HH:MM:SS   View other events

►► BACKUP TEST DUE
MM:DD:YYYY HH:MM:SS   View other events

►► POST FAILED
MM:DD:YYYY HH:MM:SS   View other events

►► HREF RELAY FAIL
MM:DD:YYYY HH:MM:SS   View other events

►► REBOOT NORMAL
MM:DD:YYYY HH:MM:SS   View other events

►► REBOOT WATCHDOG
MM:DD:YYYY HH:MM:SS   View other events

3221-007c

Figure 15: EVENT LOG (BY TYPE) submenu – part 3

EVENT LOG (BY TIME) submenu

To access this menu, select EVENT LOG (BY TIME) in the STATUS menu and press the ENTER button. (See page 56, *STATUS menu*.) Use this submenu to view the last 1024 events sorted by the time of their occurrence. (See page 48, *How to use the Event Log and event history*.)

The oldest event, if any, is displayed first. Press the right (►) arrow button to advance through the time-ordered list, or press the left (◄) arrow button to view the most recent fault and to progress backwards through the list.

The display readout shows "No event in the log" if no events have occurred. If an event has occurred, the display readout shows the event date and time in the following format: MM:DD:YYYY HH:MM:SS.

Select EVENT LOG (BY TIME) in the STATUS submenu

```
►► PS1 AC FAULT
    MM:DD:YYYY  HH:MM:SS        ⇄      ◁ ▷     View other events
```

3221-008

Figure 16: EVENT LOG (BY TIME) submenu

LAST EVENT BY TYPE submenu

To access this menu, select LAST EVENT BY TYPE in the STATUS menu and press the ENTER button. (See page 56, *STATUS menu*.) Use this submenu to view the last instance of each event type, regardless of how many events of other types have occurred. (See page 48, *How to use the Event Log and event history*.)

Press the up (▲) or down (▼) arrow button to select an event type. The display readout shows "No occurrence found" if no events have occurred for an event type. If an event has occurred, the display readout shows the event date and time in the following format: MM:DD:YYYY HH:MM:SS.

The menu readouts appear in the same order as in the EVENT LOG (BY TYPE) submenu. (See Figure 13 on page 58.)

CHANNEL menu

To access this menu, select the desired BNC or LTC (Option LTC only) channel in the Main menu and press the ENTER button. (See page 54, *Main menu*.) Use the CHANNEL menu to view and configure the settings for each of the BNC or LTC channels. Use the up (▲) and down (▼) arrow buttons to scroll through the menu selections.

Press ENTER with a channel / LTC selected in the Main menu

▶ LTC 1 INPUT-OUTPUT
■ Output
           *1   Output / Input

▶ CH/LTC <n> ACTIVE
■ Enabled
           Disabled / Enabled

▶ CH/LTC <n> TRIGGER
■ Enabled
           *2   Disabled / Enabled

ELSW	RELAY	LTC
NTSC	NTSC	0.5 Volt
PAL	PAL	1.0 Volt
TRILEVEL	TRILEVEL	1.5 Volt
AES	AES	2.0 Volt
WC 1V	WC 1V	2.5 Volt
WC 5V	SD-SD1	3.0 Volt
CUSTOM *4	HD-SD1	3.5 Volt
	3G-SD1	4.0 Volt
	CUSTOM *4	4.5 Volt
		5.0 Volt
		CUSTOM *4

▶ CH/LTC <n> THRESHOLD
■ NTSC
     *2

▶ CH/LTC <n> RELAY CHECK
■ NTSC
     *3   Disabled / Enabled

▶ CH/LTC <n>LABEL
User-defined label
     ENTER / BACK   Edit the channel / LTC label

*1 This menu selection appears only for the LTC 1 channel.
*2 These menu selections appear only when the selected channel is enabled.
*3 This menu selection appears only when the selected relay channel is enabled.
*4 When Custom is selected as the threshold, use the left and right arrow buttons to set the custom threshold level.

3221-011

Figure 17: CHANNEL submenu

INPUT-OUTPUT. This menu item appears for only the LTC 1 channel. Select this menu item and press the left (◄) or right (►) arrow button to set the LTC 1 channel to be an output or an input. When the LTC 1 channel is configured as an input, this allows both ports to connect so that an LTC input can drive the common line and input timecode to both SPG8000 generators.

You should set the LTC 1 channel to input only if your sync generators are using LTC as their time source input.

ACTIVE. Select this menu item and press the left (◄) or right (►) arrow button to enable or disable the selected channel. Press the ENTER button to implement the selection. You should disable any channel that is not going to be used.

TRIGGER. When the selected channel is enabled (active), select this menu item and press the left (◄) or right (►) arrow button to enable or disable the selected channel from triggering a changeover if the signal level crosses the configured threshold level. Press the ENTER button to implement the selection. For channels with the trigger function disabled, the levels will still be shown on the front panel LEDs, but the levels will not be used in the decision to switch signal sources.

THRESHOLD. When the selected channel is enabled (active), select this menu item and press the left (◄) or right (►) arrow button to select the threshold level that will trigger a changeover if the signal level crosses that threshold level. Press the ENTER button to implement the selection. The available threshold levels depend on the type of the selected channel: ELSW, relay, or LTC. (See Figure 17.)

If you set the threshold level to "Custom," you can use the left (◄) or right (►) arrow button to set the threshold level. After you set the threshold level, press the BACK button to exit the custom level edit mode. It is suggested that you set the level so that the signal is near +3 dB relative to the threshold level as shown below. For LTC channels, the level should be +4 dB relative to the threshold level.
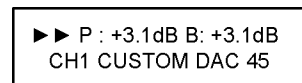
```
►► P : +3.1dB B: +3.1dB
   CH1 CUSTOM DAC 45
```
3221-015

Figure 18: Custom level threshold display

RELAY CHECK. When the selected channel is a HREF relay channel, select this menu item and press the left (◄) or right (►) arrow button to enable or disable the Relay Check function for the selected channel. Press the ENTER button to implement the selection.

The HREF (Relay) channels rely exclusively on relays for signal switching. On rare occasions after long periods of inactivity, the relay contacts can build up a nonconductive coating on the relay contacts. This coating can create a condition so that when a fault occurs and the ECO switches primary/backup sources, the sync signal will not get through the ECO to the load.

When enabled, the Relay Check function measures the signal level on each HREF input before and after every changeover switch. If the signal level indicates that the channel is not connected to a load, then it is possible that the relay is not properly closed for that channel. In that case, the instrument will cycle the relay 20 times to attempt to wear through the layer of nonconductive coating to restore the connection.

⚠ *CAUTION. Do not enable the Relay Check function on channels that are not terminated, since the unterminated output looks similar to an open relay and will cause unfounded Relay Check events.*

LABEL. Select this menu item and press the ENTER button to access the edit mode for the channel label. Use the channel label to help identify channels. For example, you could label a channel "Master Sync" if that channel was carrying the master sync signal for your video system. The channel labels can be up to 16 characters in length.

Press the left (◄) or right (►) arrow button to select a label digit and then press the up (▲) or down (▼) arrow button to change the value of the selected digit. After you edit the channel label, press the ENTER button to implement the change. Press the BACK button to exit the label edit mode without saving any changes.

NOTE. It is easier to enter the channel labels using the Web Interface. (See page 95, How to use the Web Interface.)

SYSTEM CONFIG menu

To access this menu, select SYSTEM CONFIG in the Main menu and press the ENTER button. Use this menu to view and configure all instrument settings except for the BNC and LTC channels. Use the up (▲) and down (▼) arrow buttons to scroll through the menu selections.
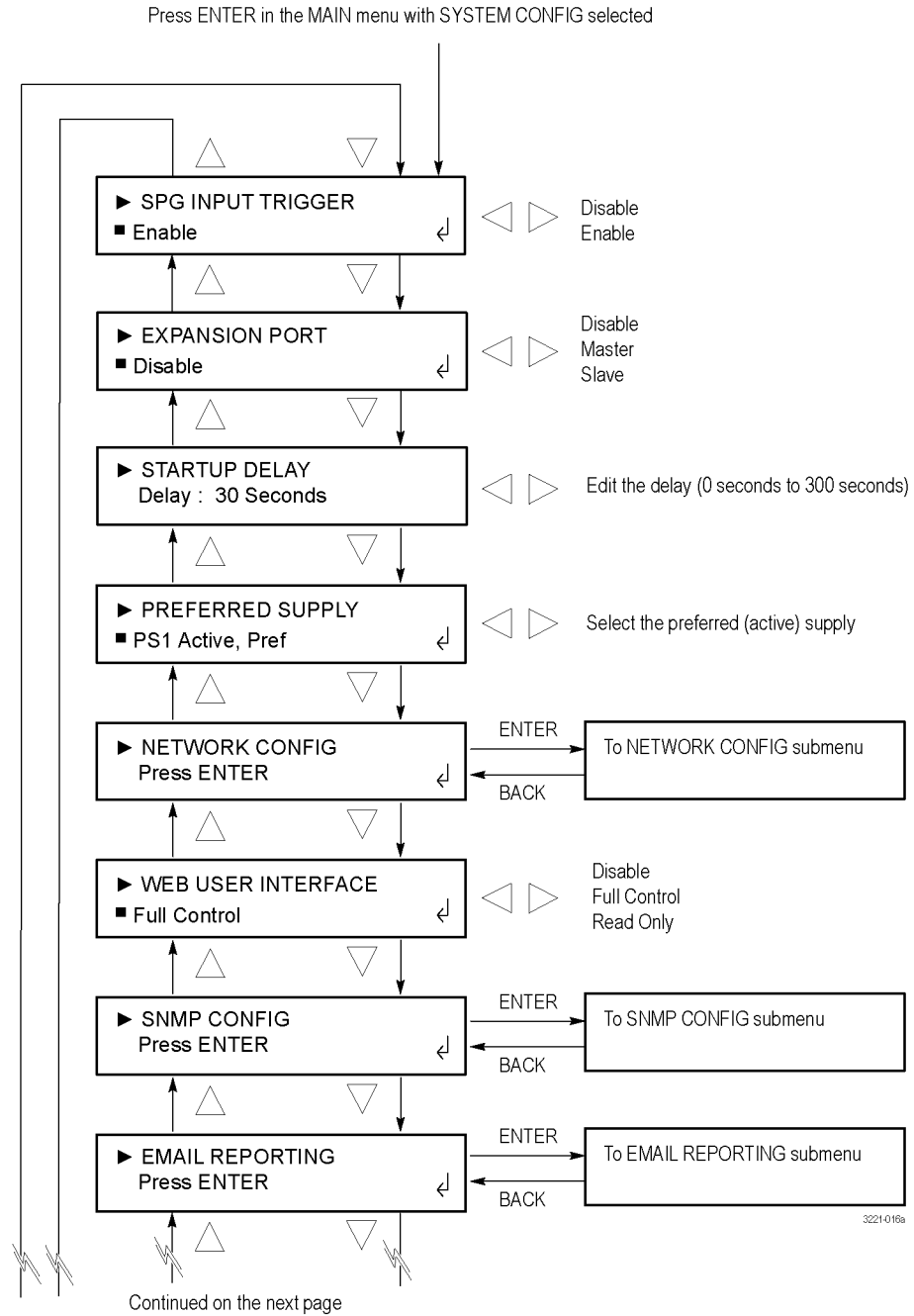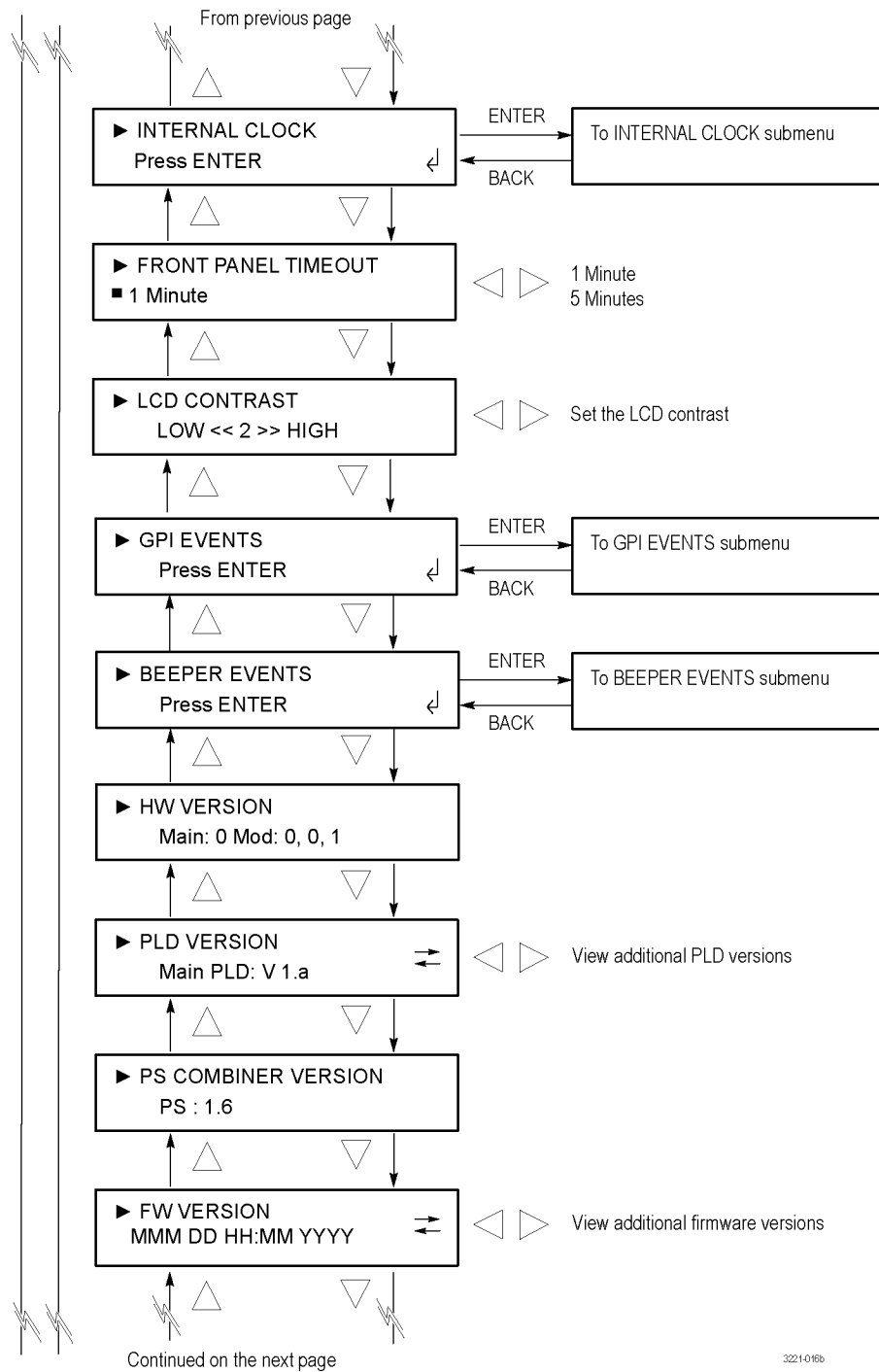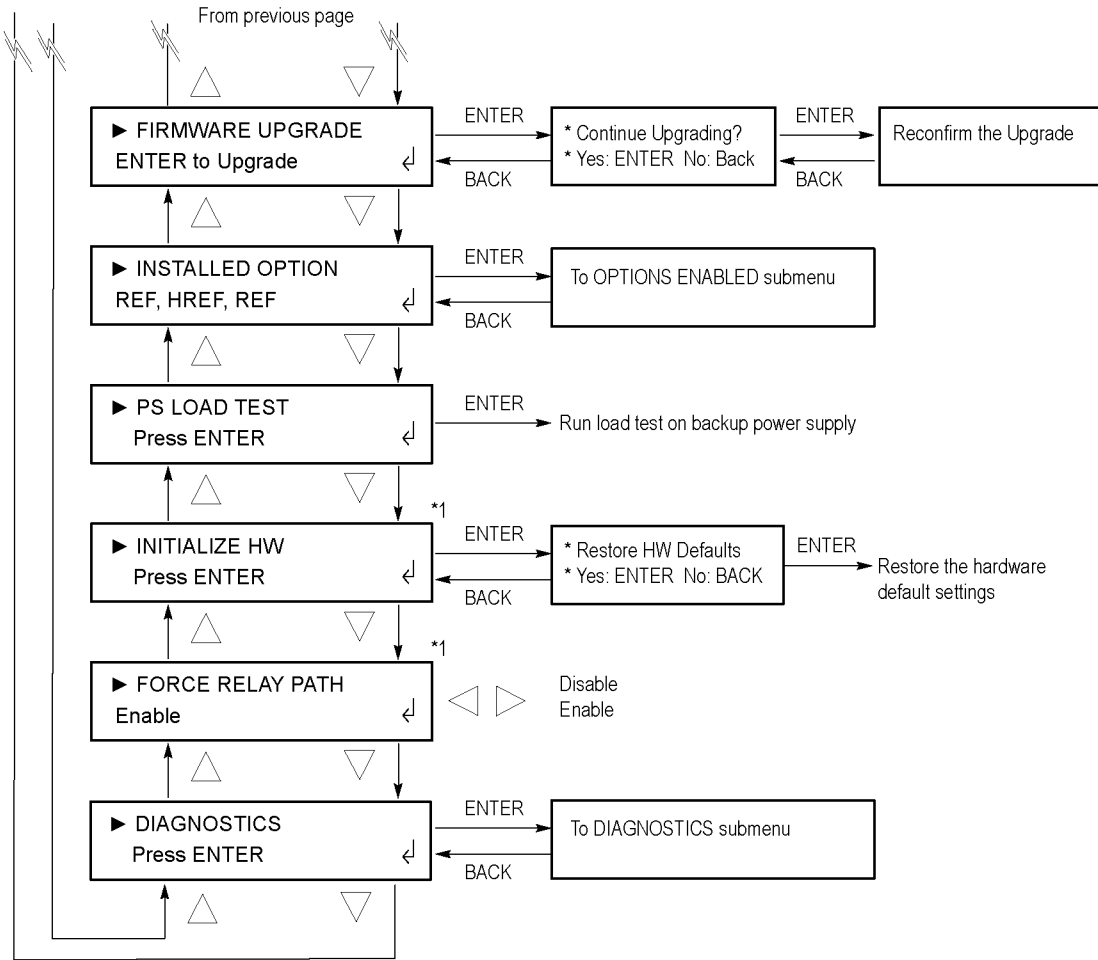

Figure 19: SYSTEM CONFIG menu – part 1

Figure 20: SYSTEM CONFIG menu – part 2

From previous page

▶ FIRMWARE UPGRADE
ENTER to Upgrade   ↵

ENTER → * Continue Upgrading?
         * Yes: ENTER No: Back

ENTER → Reconfirm the Upgrade
BACK

BACK

▶ INSTALLED OPTION
REF, HREF, REF   ↵

ENTER → To OPTIONS ENABLED submenu
BACK

▶ PS LOAD TEST
Press ENTER   ↵

ENTER → Run load test on backup power supply

*1

▶ INITIALIZE HW
Press ENTER   ↵

ENTER → * Restore HW Defaults
         * Yes: ENTER No: BACK

ENTER → Restore the hardware
         default settings
BACK

*1

▶ FORCE RELAY PATH
Enable   ↵

◁ ▷ Disable
     Enable

▶ DIAGNOSTICS
Press ENTER   ↵

ENTER → To DIAGNOSTICS submenu
BACK

*1 These menu items are not intended to be used while the instrument is in operation.   3221-016c

Figure 21: SYSTEM CONFIG menu – part 3

NOTE. *The ECO8000 Series must be in Manual mode to make changes in the SYSTEM CONFIG menu that will effect the basic ECO operation. Examples of settings that can only be made in Manual mode are the SPG input trigger, expansion port, startup delay, front panel timeout, initialize hardware, and force relay path.*

If these types of changes are attempted when the instrument in Auto mode, a warning message will pop up on the LCD display and the Web Interface. Most of the menus in the SYSTEM CONFIG menu do not require the instrument to be in Manual mode.

SPG INPUT TRIGGER. Select this menu item and press the left (◄) or right (►) arrow button to enable or disable the SPG Input Trigger function. Press the ENTER button to implement the selection. When enabled, the SPG Input Trigger function allows a Tektronix SPG8000 generator to trigger a changeover if it detects an error condition, such as the loss of genlock. (See page 31, *Configure the SPG trigger input*.)

EXPANSION PORT. Select this menu item and press the left (◄) or right (►) arrow button to enable or disable the Expansion Port. Press the ENTER button to implement the selection. When enabled, you can connect multiple ECO8000 Series instruments together to act as a single changeover unit. (See page 35, *Configure the Expansion port*.)

STARTUP DELAY. Select this menu item and press the left (◄) or right (►) arrow button to adjust the startup delay. You can adjust the delay between 0 and 300 seconds in 5 second increments. (See page 30, *Configure the startup delay*.)

PREFERRED SUPPLY. Select this menu item and press the left (◄) or right (►) arrow button to select which of the two installed Power Supply modules will be the preferred (active) supply. This menu selection applies only when Option DPW is installed. (See page 37, *Configuring the preferred (active) supply (Option DPW only)*.)

NETWORK CONFIG. Select this menu item and press the ENTER button to access the NETWORK CONFIG submenu, which you can use to configure the network settings or to view the MAC address of the instrument. (See page 72, *NETWORK CONFIG submenu*.)

WEB USER INTERFACE. Select this menu item and press the left (◄) or right (►) arrow button to select the level of instrument control that can be exercised by a Web browser connecting to the instrument. (See page 95, *How to use the Web Interface*.) The following settings are available:

■ **Full Control.** This setting allows the a user to have full control of instrument settings from a Web browser.

■ **Read Only.** This setting allows the a user to have read-only access to instrument settings from a Web browser.

■ **Disable.** This setting disables a Web browser from connecting to the instrument.

SNMP CONFIG. Select this menu item and press the ENTER button to access the SNMP CONFIG submenu, which you can use to configure the SNMP trap addresses, to configure the public and private community strings, and to configure which events will trigger an SNMP trap to be sent from the instrument. (See page 74, *SNMP CONFIG submenu*.)

EMAIL REPORTING. Select this menu item and press the ENTER button to access the EMAIL REPORTING submenu, which you can use to configure the e-mail login name, password, and to/from addresses, and to configure which events will trigger an e-mail to be sent from the instrument. (See page 76, *EMAIL REPORTING submenu*.)

INTERNAL CLOCK. Select this menu item and press the ENTER button to access the INTERNAL CLOCK submenu, which you can use to set the local time of the instrument and to configure the Daylight Savings Time (DST) schedule. (See page 79, *INTERNAL CLOCK submenu*.)

FRONT PANEL TIMEOUT. Select this menu item and press the left (◄) or right (►) arrow button to set the front panel time-out period to either 1 minute or 5 minutes. Press the ENTER button to implement the selection. When the front panel of the instrument has not been used for the amount of time configured as the time-out period, the instrument control buttons become inoperative. In this case, press and hold the PANEL ENABLE button until the instrument beeps.

The control buttons include the FAULT RESET, AUTO MODE, MANUAL MODE, PRIMARY SOURCE, and BACKUP SOURCE buttons. The navigation arrow buttons and the ENTER and BACK buttons are always operational and are not affected by the time-out setting.

The backlight of the LCD display turns off after 5 minutes of inactivity to preserve the life of the backlight. When the instrument is powered on and the LCD display is off, press any of the menu navigation buttons to turn on the display backlight.

LCD CONTRAST. Select this menu item and press the left (◄) or right (►) arrow button to adjust the contrast of the LCD display. You can adjust the contrast setting between 0 and 8.

GPI EVENTS. Select this menu item and press the ENTER button to access the GPI EVENTS submenu, which you can use to select which events will trigger a GPI signal to be sent from the instrument using the GPIO port. Enabled events will cause pin 10 of the port to go low. (See page 22, *GPIO connector signal pinouts*.) (See page 83, *EVENT submenus*.) (See page 49, *Fault and event descriptions*.)

BEEPER EVENTS. Select this menu item and press the ENTER button to access the BEEPER EVENTS submenu, which you can use to select which events will trigger a beep sound from the instrument. (See page 83, *EVENT submenus*.) (See page 49, *Fault and event descriptions*.)

HW VERSION. Select this menu item to view the hardware version of the instrument.

PLD VERSION. Select this menu item to view the PLD versions of the instrument. Press the left (◄) or right (►) arrow button to view additional PLD versions.

PS COMBINER VERSION. Select this menu item to view the version of the Power Supply Combiner installed in the instrument.

FW VERSION. Select this menu item to view the firmware version installed in the instrument. Press the left (◄) or right (►) arrow button to toggle the view between the firmware version number and the version date.

FIRMWARE UPGRADE. Select this menu item and press the ENTER button to initiate an upgrade of the instrument firmware. (See page 40, *How to upgrade the instrument firmware*.)

INSTALLED OPTION. Select this menu item to view the options installed in the instrument. The second line of the display identifies the type of channels installed in the instrument: REF (ELSW) or HREF (Relay). Press the ENTER button to access the OPTIONS ENABLED submenu, which you can use to view the installed software option (None or LTC) or to enter a new option key to enable Option LTC. (See page 87, *OPTIONS ENABLED submenu*.)

PS LOAD TEST. Select this menu item and press the ENTER button to manually initiate a load test on the backup Power Supply module. Option DPW must be installed for this menu selection to be operational. A load test is performed automatically every 24 hours during instrument operation. You can view the results of the load test using the Event Log and diagnostic readouts. (See page 48, *How to use the Event Log and event history*.)

INITIALIZE HW. The Initialize Hardware function is intended for use only during the manufacturing and service of the instrument. Use of this function is not recommended during the normal operation of the instrument. Select this menu item and press the ENTER button to initiate a reset of the instrument hardware.

⚠ *CAUTION. To prevent a loss of instrument configuration and a disruption in the output signals, do not perform the Initialize Hardware function while the instrument is in service.*

When this function is activated, the CPU determines which hardware and software options are installed and then configures the following system parameters to a default state:

■ Enables all of the installed channels including the LTC channels if Option LTC is installed

■ Arms all of the installed BNC channels as switchover triggers (but not the LTC channels if Option LTC is installed)

■ Sets all thresholds to the default values (NTSC for BNC channels, 2 V for LTC channels if Option LTC is installed)

■ Disables the Relay Check function

■ Disables the SPG input trigger function

■ Sets the Startup Delay setting to 15 seconds

FORCE RELAY PATH.   Select this menu item and press the left (◄) or right (►) arrow button to enable or disable the Force Relay Path function for all installed REF (ELSW) channels. Press the ENTER button to implement the selection.

⚠ *CAUTION. The Force Relay Path function is intended only for troubleshooting when the instrument is not in service. If the Force Relay Path function is asserted and a channel threshold level is set incorrectly, it is possible to make the ECO8000 Series continuously toggle between the primary and backup sources.*

The REF option channels (Electronic 50 MHz Fast switch "ELSW" channels) have two signal paths: an electronic switch path that works when the power is on and a backup path via latching relays that takes over when the instrument is turned off or loses power. When the FORCE RELAY PATH menu option is enabled, this allows the relay path to be used while the instrument power is on. This function is useful for troubleshooting but is generally not helpful or useful for normal operation. This mode is automatically reset to "Disable" if the instrument power is removed.

DIAGNOSTICS.   Select this menu item and press the ENTER button to access the DIAGNOSTICS submenu, which you can use to view various instrument diagnostics. (See page 89, *DIAGNOSTICS submenu*.)

NETWORK CONFIG submenu

To access this menu, select NETWORK CONFIG in the SYSTEM CONFIG menu and press the ENTER button. Use this menu to configure the network settings or to view the MAC address of the instrument. Use the up (▲) and down (▼) arrow buttons to scroll through the menu selections.
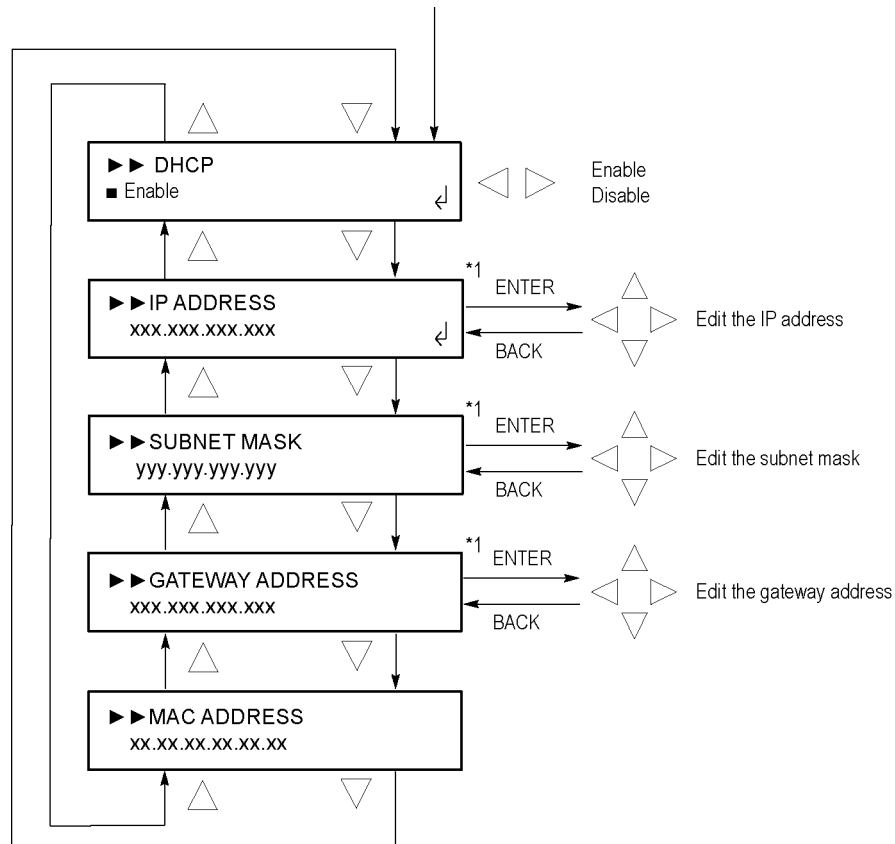
*1 These selections can be edited only when DHCP is disabled.

Figure 22: NETWORK CONFIG submenu

Manually setting a network address. When DHCP service is disabled, use the following procedure to manually enter a network address:

1. Select the address to edit and press the ENTER button to enter the edit mode for that address.

2. Use the left (◄) or right (►) arrow button to move the underscore character (_), and use the up (▲) or down (▼) arrow button to edit the address value.

3. After you enter the address value, press the ENTER button to enable the address.

DHCP. Select this menu item and press the left (◄) or right (►) arrow button to enable or disable the instrument from receiving IP address settings using the DHCP (Dynamic Host Configuration Protocol) service on your network. Press the ENTER button to implement the selection. If you select Disable in this menu, you will need to manually set the IP address, subnet mask, and gateway address values in the following menu items.

NOTE. Under some network environments, the instrument might not be able to get the IP address automatically from a DHCP server. In this case, you will need to manually enter the appropriate network parameter values.

In some cases, swapping ports on your Ethernet port hub or rebooting the instrument processor may fix the DHCP connection problem. You can reboot the instrument processor by pressing and holding the ENTER and BACK buttons for a few seconds.

Refer to your network administrator or to the user documentation supplied with your network server operating system (OS) for detailed information about DHCP server functions.

IP ADDRESS. Select this menu item to view the IP address of the instrument. If DHCP service is enabled, the IP address obtained from the DHCP server is displayed. When DHCP service is disabled, press the ENTER button to edit the address as described below in *Manually setting a network address*.

NOTE. If you enter blank characters for the IP address, the network function of the instrument becomes invalid.

SUBNET MASK. Select this menu item to view the subnet mask address of the instrument. If DHCP service is enabled, the subnet address obtained from the DHCP server is displayed. When DHCP service is disabled, press the ENTER button to edit the address as described below in *Manually setting a network address*.

GATEWAY ADDRESS. Select this menu item to view the gateway address of the instrument. If DHCP service is enabled, the gateway address obtained from the DHCP server is displayed. When DHCP service is disabled, press the ENTER button to edit the address as described below in *Manually setting a network address*.

MAC ADDRESS. Select this menu item to view the unique MAC address of the instrument. If you order an upgrade software option after you purchase the instrument, such as Option LTC, you will need to provide the MAC address of the instrument when you order the upgrade.

SNMP CONFIG submenu   To access this menu, select SNMP CONFIG in the SYSTEM CONFIG menu and press the ENTER button. Use this menu to configure the SNMP (Simple Network Management Protocol) remote control of the instrument. You can configure up to four SNMP trap addresses, configure the public and private community strings, and configure which events will trigger an SNMP trap to be sent from the instrument. Use the up (▲) and down (▼) arrow buttons to scroll through the menu selections.
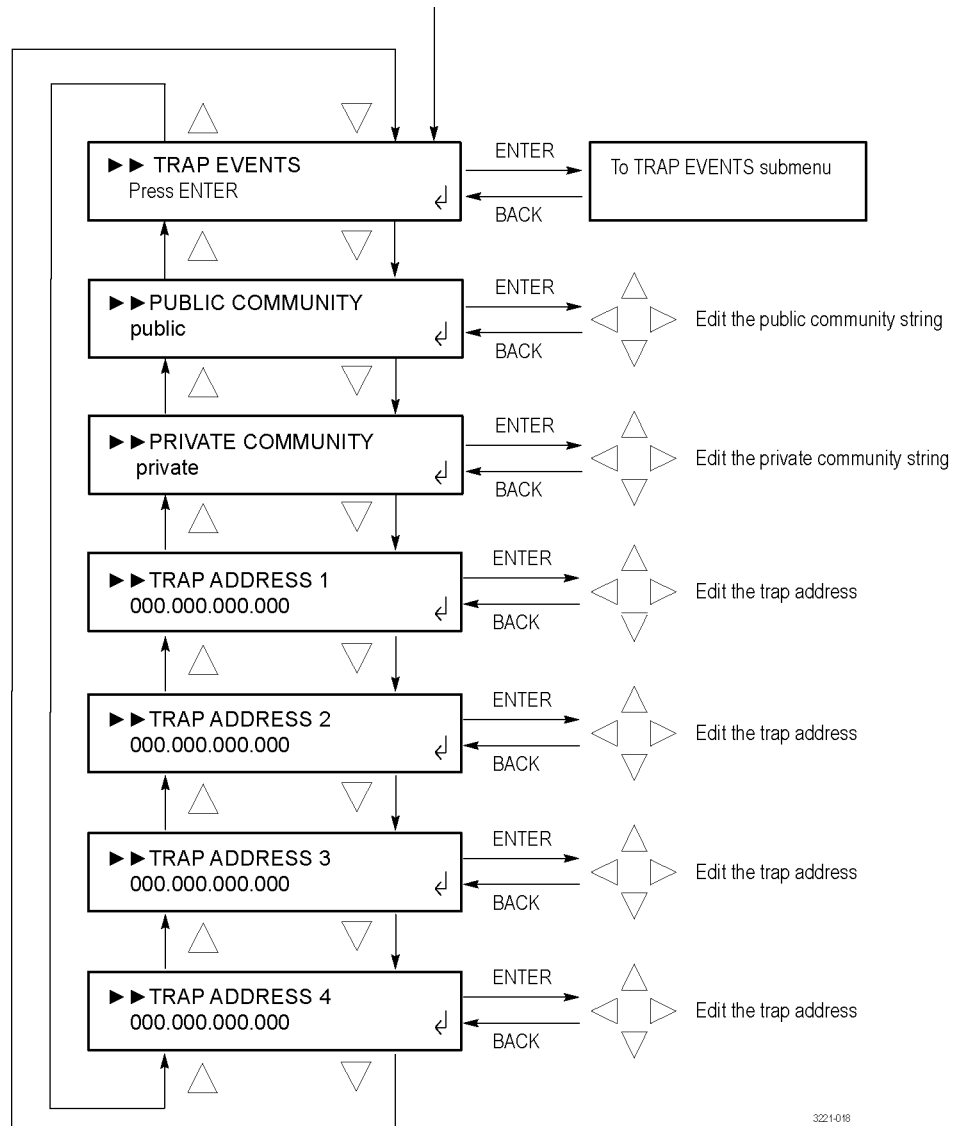
Figure 23: SNMP CONFIG submenu

TRAP EVENTS. Select this menu item and press the ENTER button to access the TRAP EVENTS submenu, which you can use to select which events will trigger a trap to be sent from the instrument. (See page 83, *EVENT submenus*.) (See page 49, *Fault and event descriptions*.)

PUBLIC COMMUNITY. Select this menu item to view the Public Community string, which is effectively a password and is required before SNMP commands can read values from the instrument. The default string value is "public". Press the ENTER button to edit the string. Use the left (◄) or right (►) arrow button to select one of the available 16 characters, and then use the up (▲) or down (▼) arrow button to edit the selected character. Press the ENTER button to confirm the string selection.

⚠ *CAUTION. If the public or private community strings are changed from their default values, the Web Interface will not operate. (See page 95, How to use the Web Interface.)*

PRIVATE COMMUNITY. Select this menu item to view the Private Community string, which is effectively a password and is required before SNMP commands can read or write changes into the instrument. The default string value is "private". Press the ENTER button to edit the string. Use the left (◄) or right (►) arrow button to select one of the available 16 characters, and then use the up (▲) or down (▼) arrow button to edit the selected character. Press the ENTER button to confirm the string selection.

TRAP ADDRESS <1–4>. Select one of the four trap address menu items to view the SNMP trap address. You can configure up to four IP addresses to which SNMP traps will be sent when error conditions are detected. Use the TRAP EVENTS submenu to select which events will trigger a trap to be sent from the instrument. (See page 83, *EVENT submenus*.)

NOTE. The default value for the SNMP trap addresses is all zeroes, which disables the trap outputs.

To edit a trap address, use the up (▲) or down (▼) arrow button to selected the desired trap address (1–4), and then press the ENTER button. Use the left (◄) or right (►) arrow button to select one of the address digits, and then use the up (▲) or down (▼) arrow button to edit the selected address digit. Press the ENTER button to implement the trap address selection.

EMAIL REPORTING submenu

To access this menu, select EMAIL REPORTING in the SYSTEM CONFIG menu and press the ENTER button. Use this menu to configure the e-mail login name, password, to/from addresses, and to configure which events will trigger an e-mail to be sent from the instrument. Use the up (▲) and down (▼) arrow buttons to scroll through the menu selections.

Press ENTER in the SYSTEM CONFIG menu with EMAIL REPORTING selected

Figure 24: EMAIL REPORTING submenu

EMAIL SERVER ADDR. Select this menu item to view the IP address of the e-mail server. Press the ENTER button to edit the address. Use the left (◄) or right (►) arrow button to select one of the address digits, and then use the up (▲) or down (▼) arrow button to edit the selected address digit. Press the ENTER button to implement the new e-mail server address.

EMAIL LOGIN NAME. Select this menu item to view the login name used to access the e-mail server. Press the ENTER button to edit the login name. Use the left (◄) or right (►) arrow button to select one of the name digits, and then use the up (▲) or down (▼) arrow button to edit the selected name digit. Press the ENTER button to implement the new e-mail login name.

EMAIL PASSWORD. Select this menu item to edit the password used to access the e-mail server. The characters of the password are represented by "*" characters. The default password is "welcome".

Press the ENTER button to edit the login password. Use the left (◄) or right (►) arrow button to select one of the password digits, and then use the up (▲) or down (▼) arrow button to edit the selected password digit. The password character appears briefly as you press the up (▲) or down (▼) arrow button before it is replaced by the "*" character.

The password can be up to 18 characters long. Once you start entering the password, you cannot use the left (◄) arrow button to backspace to a previous character. If you make an error while entering the password, press the BACK button to exit the edit mode, and then reenter the password edit mode. Press the ENTER button to implement the new e-mail login password.

EMAIL ADDRESS FROM. Select this menu item to view the e-mail address that the e-mail server will use to send the e-mail. Press the ENTER button to edit the address. Use the left (◄) or right (►) arrow button to select one of the address digits, and then use the up (▲) or down (▼) arrow button to edit the selected address digit. You can enter an e-mail address up to 40 characters long. Press the ENTER button to implement the new e-mail address.

EMAIL ADDRESS TO. Select this menu item to view the e-mail address that the e-mail server will use to send the e-mail. Press the ENTER button to edit the address. Use the left (◄) or right (►) arrow button to select one of the address digits, and then use the up (▲) or down (▼) arrow button to edit the selected address digit. You can enter an e-mail address up to 40 characters long. Press the ENTER button to implement the new e-mail address.

SEND EMAIL. Select this menu item and press the ENTER button to send a test e-mail. This function allows you to test the e-mail configuration without first needing an instrument fault to occur.

EMAIL EVENTS. Select this menu item and press the ENTER button to access the EMAIL EVENTS submenu, which you can use to select which events will trigger an e-mail to be sent from the instrument. (See page 83, *EVENT submenus*.) (See page 49, *Fault and event descriptions*.)

INTERNAL CLOCK submenu

To access this menu, select INTERNAL CLOCK in the SYSTEM CONFIG menu and press the ENTER button. Use this menu to view or set the local time of the instrument and to configure the Daylight Savings Time (DST) schedule. Use the up (▲) and down (▼) arrow buttons to scroll through the menu selections.

Press ENTER in the SYSTEM CONFIG menu with INTERNAL CLOCK selected

►► LOCAL TIME
YYYY-MM DD HH:MM:SS

View current local time

►► SET LOCAL TIME
Press ENTER

ENTER

BACK

To SET LOCAL TIME submenu

►► DST SCHEDULE
Press ENTER

ENTER

BACK

To DST SCHEDULE submenu

3221-026
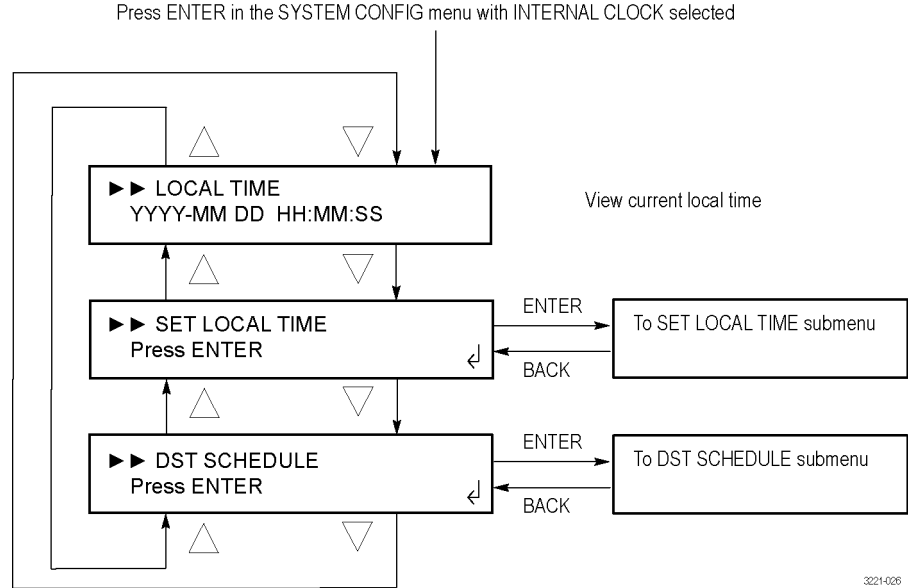
Figure 25: INTERNAL CLOCK submenu

LOCAL TIME. Select this menu item to view the internal time and date of the instrument.

SET LOCAL TIME. Select this menu item and press the ENTER button to access the SET LOCAL TIME submenu, which you can use to set the internal time and date of the instrument and to set the local time zone offset. (See page 80, *SET LOCAL TIME submenu*.)

DST SCHEDULE. Select this menu item and press the ENTER button to access the DST SCHEDULE submenu, which you can use to enable or disable the Daylight Savings Time function, set the DST offset, and to set the start date and time and the end date and time of the DST function. (See page 81, *DST SCHEDULE submenu*.)

SET LOCAL TIME submenu

To access this menu, select SET LOCAL TIME in the INTERNAL CLOCK menu and press the ENTER button. Use this menu to set the local time and date of the instrument and to configure the local time zone offset. Use the up (▲) and down (▼) arrow buttons to scroll through the menu selections.
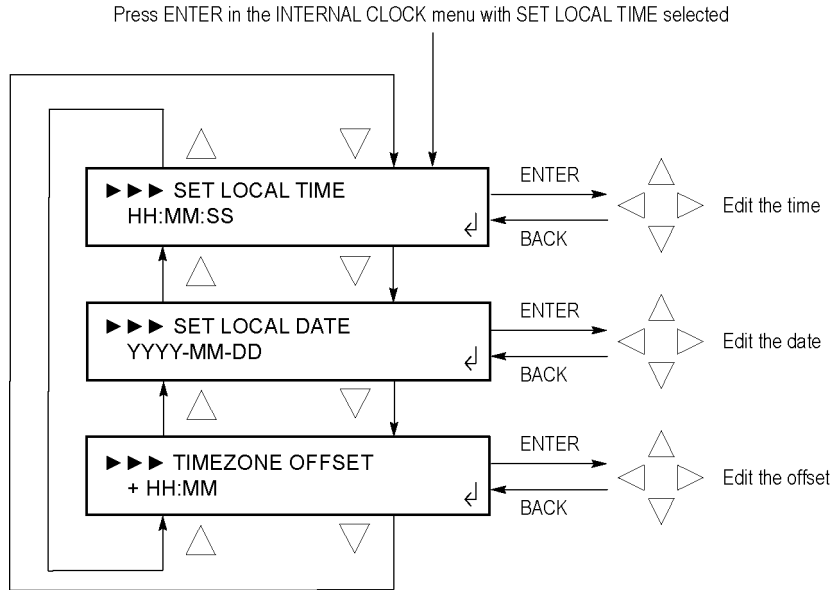
Figure 26: SET LOCAL TIME submenu

NOTE. The DST offset and the Timezone offset settings must be set prior to setting the local time and date. This order of operation is necessary to correctly establish the internal UTC and local time.

The instrument time is set correctly when the instrument is shipped from the factory. After you configure the DST and Timezone offset settings for your location, the local time should be very close to correct.

SET LOCAL TIME. Select this menu item to view and edit the internal time of the instrument. Press the ENTER button to edit the local time. Use the left (◄) or right (►) arrow button to select one of the time digits, and then use the up (▲) or down (▼) arrow button to edit the selected time digit. Press the ENTER button to implement the new local time.

SET LOCAL DATE. Select this menu item to view and edit the internal date of the instrument. Press the ENTER button to edit the local date. Use the left (◄) or right (►) arrow button to select one of the date digits, and then use the up (▲) or down (▼) arrow button to edit the selected date digit. Press the ENTER button to implement the new local date.

TIMEZONE OFFSET.   Select this menu item to view and edit the internal time zone offset of the instrument. Press the ENTER button to edit the time zone offset. Use the left (◄) or right (►) arrow button to select one of the offset digits, and then use the up (▲) or down (▼) arrow button to edit the selected offset digit. Press the ENTER button to implement the new local time zone offset.

NOTE. The time zone offset must be set to maintain the correct relationship between UTC and local time.

DST SCHEDULE submenu   To access this menu, select DST SCHEDULE in the INTERNAL CLOCK menu and press the ENTER button. Use this menu to enable or disable the Daylight Savings Time function, set the DST offset, and to set the start date and time as well as the end date and time of the DST function. Use the up (▲) and down (▼) arrow buttons to scroll through the menu selections.
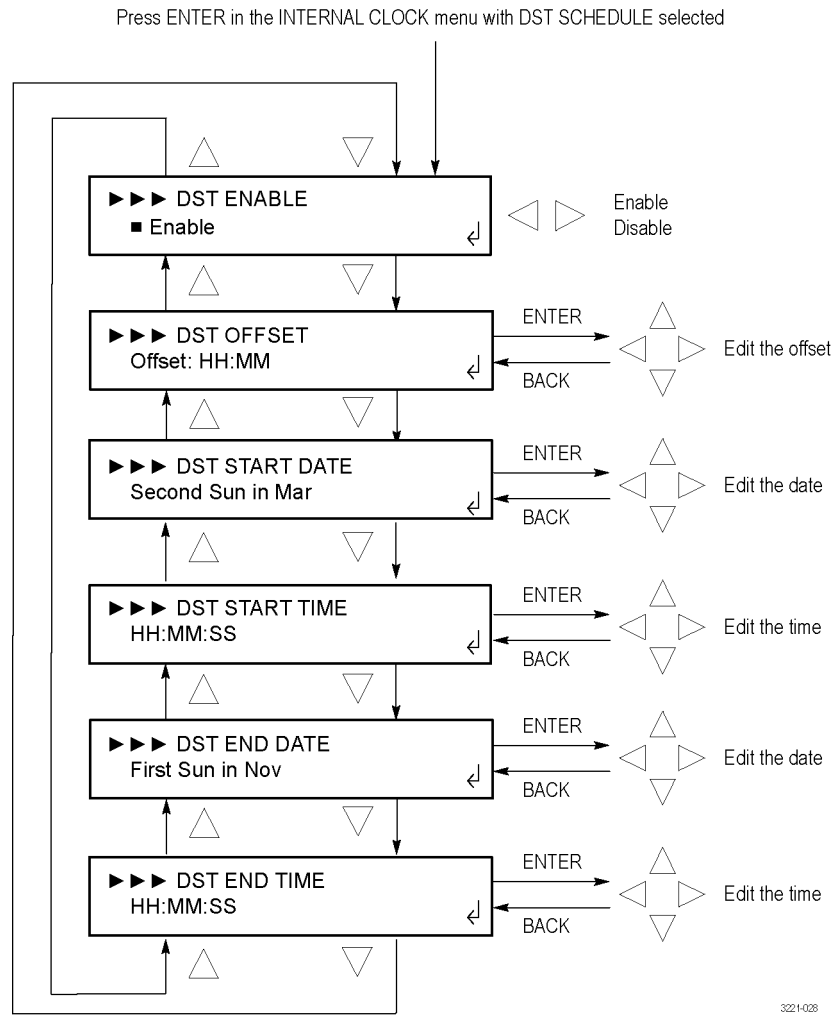
Figure 27: DST SCHEDULE submenu

DST ENABLE. Select this menu item and press the left (◄) or right (►) arrow button to enable or disable the DST (Daylight Savings Time) function in the instrument. Press the ENTER button to implement the selection.

DST OFFSET. Select this menu item to view the DST (Daylight Savings Time) offset setting. Press the ENTER button to edit the DST offset that will be applied when the DST START event occurs at the user-scheduled time. Use the left (◄) or right (►) arrow button to select one of the time digits, and then use the up (▲) or down (▼) arrow button to edit the selected time digit. Press the ENTER button to implement the offset setting.

NOTE. When the DST START event occurs, the scheduled DST offset will be added to the time zone offset.

DST START DATE. Select this menu item to view the DST (Daylight Savings Time) start date. Press the ENTER button to edit the DST start date. The date takes the following form: Week-Day-Month (for example, Second Sunday in March). Use the left (◄) or right (►) arrow button to select one of the date parameters, and then use the up (▲) or down (▼) arrow button to edit the selected date parameter. Press the ENTER button to implement the date setting.

DST START TIME. Select this menu item to view the DST (Daylight Savings Time) start time. Press the ENTER button to edit the DST start time. The time takes the following form: HH:MM:SS. Use the left (◄) or right (►) arrow button to select one of the time digits, and then use the up (▲) or down (▼) arrow button to edit the selected time digit. Press the ENTER button to implement the time setting.

DST END DATE. Select this menu item to view the DST (Daylight Savings Time) end date. Press the ENTER button to edit the DST end date. The date takes the following form: Week-Day-Month. Use the left (◄) or right (►) arrow button to select one of the date parameters, and then use the up (▲) or down (▼) arrow button to edit the selected date parameter. Press the ENTER button to implement the date setting.

DST END TIME. Select this menu item to view the DST (Daylight Savings Time) end time. Press the ENTER button to edit the DST end time. The time takes the following form: HH:MM:SS. Use the left (◄) or right (►) arrow button to select one of the time digits, and then use the up (▲) or down (▼) arrow button to edit the selected time digit. Press the ENTER button to implement the time setting.

EVENT submenus The ECO8000 Series provides four external methods to notify you when fault events occur. Each notification method has its own submenu where you can enable or disable a notification for each type of reportable event. (See Table 17 on page 49.)

NOTE. The Event Log records all of the fault events and is not affected by the settings in the event notification menus.

The table below lists the available notification methods and the menu access points where you enable or disable event notifications.

Table 20: Event reporting methods and menu access points

Event reporting method	Description	Menu access point
SNMP traps	Sends a trap to up to four IP addresses	In the SYSTEM CONFIG menu, select SNMP CONFIG and then select TRAP EVENTS
E-mail	Sends an e-mail to one address	In the SYSTEM CONFIG menu, select EMAIL REPORTING and then select EMAIL EVENTS
GPI signal	Asserts a low signal on pin 10 of the GPI connector (See page 22, *GPIO connector signal pinouts*.)	In the SYSTEM CONFIG menu, select GPI EVENTS
Instrument beeper	The instrument emits a beep. Some events, such as a primary/backup source switch emit a single beep. Other events, such as a primary fault, emit one beep per second for as long as the event is asserted.	In the SYSTEM CONFIG menu, select BEEPER EVENTS

Press the up (▲) or down (▼) arrow button to select an event type, and then press the left (◄) or right (►) arrow button to enable or disable notification for that event type. Press the ENTER button to implement the selection.
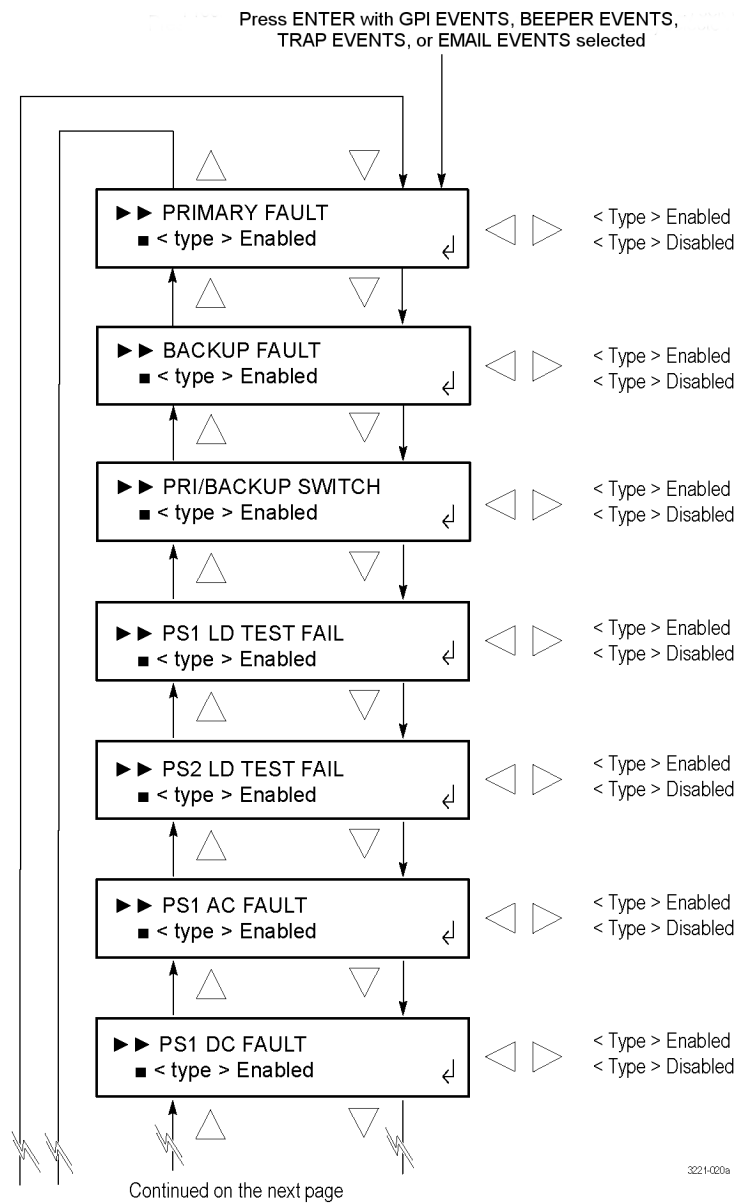
Figure 28: <type> EVENTS submenu – part 1

From previous page

△   ▽

▶▶ PS2 AC FAULT
■ < type > Enabled ↵

◁ ▷   < Type > Enabled
      < Type > Disabled

△   ▽

▶▶ PS2 DC FAULT
■ < type > Enabled ↵

◁ ▷   < Type > Enabled
      < Type > Disabled

△   ▽

▶▶ PS1 FAN FAULT
■ < type > Enabled ↵

◁ ▷   < Type > Enabled
      < Type > Disabled

△   ▽

▶▶ PS2 FAN FAULT
■ < type > Enabled ↵

◁ ▷   < Type > Enabled
      < Type > Disabled

△   ▽

▶▶ PS1 WARNING
■ < type > Enabled ↵

◁ ▷   < Type > Enabled
      < Type > Disabled

△   ▽

▶▶ PS2 WARNING
■ < type > Enabled ↵

◁ ▷   < Type > Enabled
      < Type > Disabled

△   ▽

▶▶ PS1 TEMP FAULT
■ < type > Enabled ↵

◁ ▷   < Type > Enabled
      < Type > Disabled

△   ▽

▶▶ PS2 TEMP FAULT
■ < type > Enabled ↵

◁ ▷   < Type > Enabled
      < Type > Disabled

△   ▽

▶▶ PS1 TWH WARNING
■ < type > Enabled ↵

◁ ▷   < Type > Enabled
      < Type > Disabled

△   ▽

▶▶ PS2 TWH WARNING
■ < type > Enabled ↵

◁ ▷   < Type > Enabled
      < Type > Disabled

△   ▽

Continued on the next page

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Figure 29: <type> EVENTS submenu – part 2

From previous page

►► PS SWITCHOVER
■ < type > Enabled ↵
< Type > Enabled
< Type > Disabled

►► BOARD SUPPLY
■ < type > Enabled ↵
< Type > Enabled
< Type > Disabled

►► TEMPERATURE FAULT
■ < type > Enabled ↵
< Type > Enabled
< Type > Disabled

►► BACKUP TEST DUE
■ < type > Enabled ↵
< Type > Enabled
< Type > Disabled

►► POST FAILED
■ < type > Enabled ↵
< Type > Enabled
< Type > Disabled

►► HREF RELAY FAIL
■ < type > Enabled ↵
< Type > Enabled
< Type > Disabled

►► REBOOT NORMAL
■ < type > Enabled ↵
< Type > Enabled
< Type > Disabled

►► REBOOT WATCHDOG
■ < type > Enabled ↵
< Type > Enabled
< Type > Disabled

3221-020c

Figure 30: <type> EVENTS submenu – part 3

OPTIONS ENABLED submenu

To access this menu, select OPTIONS ENABLED in the SYSTEM CONFIG menu and press the ENTER button. Use this menu to view which software options are installed and to enter a new option key for a software option upgrade. Use the up (▲) and down (▼) arrow buttons to scroll through the menu selections.
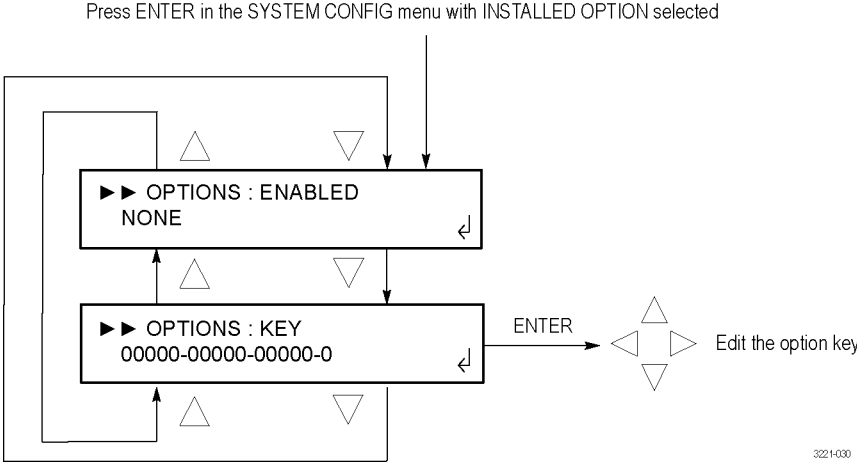
Figure 31: OPTIONS ENABLED submenu

ENABLED. Displays whether or not a software option is installed. NONE is displayed for no software option is installed. LTC is displayed if Option LTC is installed.

KEY. Displays the current option key string in the form XXXXX-XXXXX-XXXXX-XXXXX-XXXXX-X, with each X representing an alphanumeric character. To edit the option string, perform the following steps:

⚠ *CAUTION. Do not edit this string unless you are upgrading to Option LTC. Before you edit the string, verify that you are upgrading the correct instrument. The upgrade documentation will list the MAC address of the instrument to be upgraded. Use the NETWORK CONFIG submenu to view the MAC address. (See page 72.)*

NOTE. It is easier to use the Web Interface to enter the option key string since you can enter the string directly or cut and paste the string into the entry box. If you cut and paste the string, be careful not to include any extra spaces at the ends of the string.

1. Press the **ENTER** button to enter the option key edit mode. The underscore character (_) appears under the first character of the option key.

2. Use the up (▲) or down (▼) arrow button to select the first character of the option key.

3. Use the left (◄) or right (►) arrow button to move the underscore character to the next character in the option key.

4. Enter all of the option key characters, and then press **ENTER** button to confirm the selection.

5. Press the **BACK** button to exit the OPTIONS submenu.

DIAGNOSTICS submenu

To access this menu, select DIAGNOSTICS in the SYSTEM CONFIG menu and press the ENTER button. Use this menu to view various instrument diagnostics. This menu provides information on all of the conditions that drive the Event Log.

Press the up (▲) or down (▼) arrow button to select a diagnostic type, and then press the left (◄) or right (►) arrow button to view additional diagnostics readouts for the selected diagnostic type.

Press ENTER in the SYSTEM CONFIG menu with DIAGNOSTICS selected

►► TEMPERATURE
Main: 32.0C (OK)   ◄ ▷ View more temperatures

►► CH1 PRI vs THRES
+3.0 dB   ◄ ▷ View other channels

►► CH1 BACK vs THRES
+3.0 dB   ◄ ▷ View other channels

►► MAIN BOARD
+5.0 V = 4.95 V (OK)   ◄ ▷ View more voltages

►► MODULE 1
+5.2 R = 5.12 V (OK)   ◄ ▷ View more voltages

►► MODULE 2
+5.2 R = 5.12 V (OK)   ◄ ▷ View more voltages

►► MODULE 3
+5.2 R = 5.12 V (OK)   ◄ ▷ View more voltages

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Continued on the next page

Figure 32: DIAGNOSTICS submenu – part 1

From previous page

►► MODULE 4
No module present → ⇄ ◁ ▷ View more voltages

►► FAN STATUS
PS1: Fan running → ⇄ ◁ ▷ View other fan status

►► PS1 HOURS
Active: 000040 → ⇄ ◁ ▷ View more details

►► PS2 HOURS
Active: 000012 → ⇄ ◁ ▷ View more details

►► RTC BATTERY LEVEL
More than 40 (OK)

►► FP LED TEST
Press ENTER — ENTER → Run front panel LED test

►► PS2 LOAD TEST PASS
YYYY-MM-DD HH:MM:SS

3221-031b
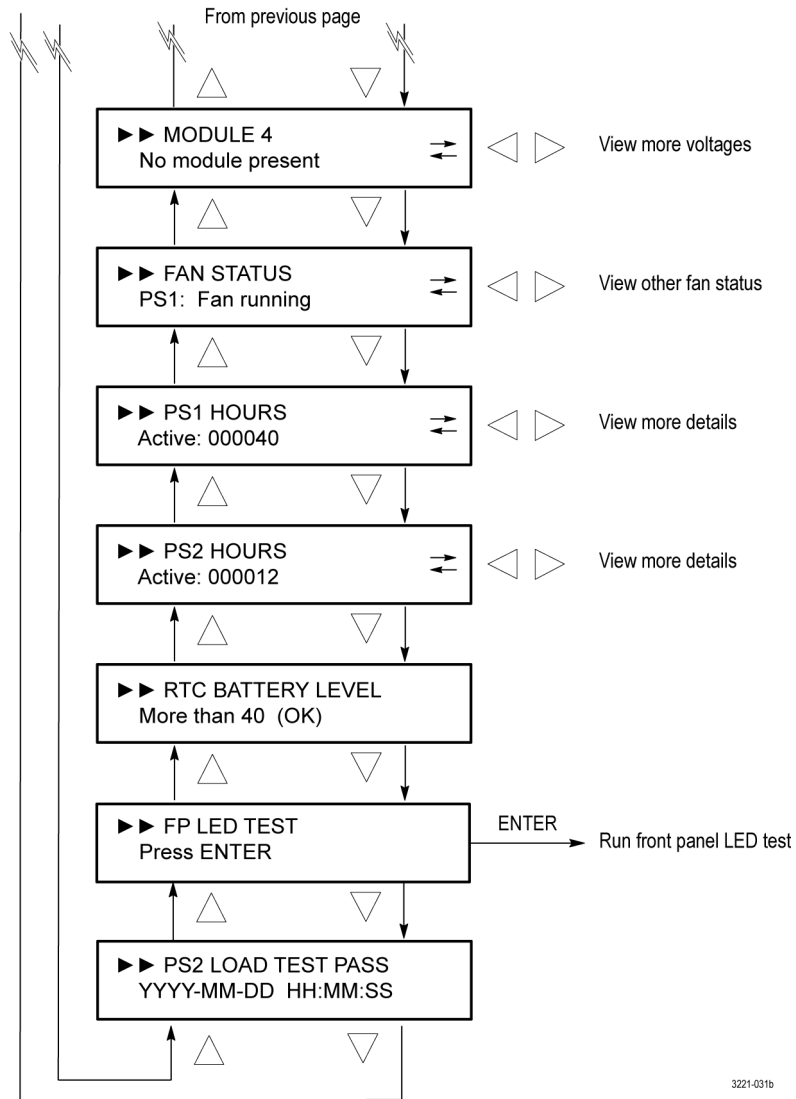
Figure 33: DIAGNOSTICS submenu – part 2

TEMPERATURE. Displays the temperature of various internal components. **OK** is displayed as the status when a temperature is within the operating range; **WARN** is displayed when a temperature is out of range. Press the left (◄) or right (►) arrow button to view additional temperature readouts.

CH<n> PRI VS THRES. Displays the signal level for the selected primary channel versus the configured threshold level. Press the left (◄) or right (►) arrow button to view the threshold readout for each installed channel. When the readout is around +3.0 dB (+4.0 dB for LTC channels), then the signal level is correct. A readout in the range of –13.9 dB indicates a missing signal (the level value depends on the selected threshold level).

NOTE. If the HREF/Relay board outputs are not terminated, it will change the level readings on the selected channel (primary or backup). The unselected primary or backup channel is terminated in the ECO8000 Series, but the selected primary or backup channel drives through to the output. Be sure to connect the channel output to the actual load during setup to insure proper configuration.

Readout levels above +3.0 dB may be normal depending on the signal type. Black signals levels should be around +3.0 dB. However, color bar signals will have a higher level. Signals with a higher threshold level will switch slower.

CH<n> BACK VS THRES. Displays the signal level for the selected backup channel versus the configured threshold level. Press the left (◄) or right (►) arrow button to view the threshold readout for each installed channel. When the readout is around +3.0 dB (+4.0 dB for LTC channels), then the signal level is correct. A readout in the range of –13.9 dB indicates a missing signal (the level value depends on the selected threshold level).

MAIN BOARD. Displays the Main board voltages. **OK** is displayed as the status when a voltage is within the operating range; **WARN** is displayed when a voltage is out of range. Press the left (◄) or right (►) arrow button to view additional voltage readouts.

MODULE <1–4>. Displays the voltages for the selected module (1 to 4). **OK** is displayed as the status when a voltage is within the operating range; **WARN** is displayed when a voltage is out of range. If a module is not installed, **No module present** is displayed. Press the left (◄) or right (►) arrow button to view additional voltage readouts.

NOTE. Some of the voltage readouts are from the power supplies; these readout have the OK and WARN limits. Other voltage readouts are from the peak detectors on the input signal or the internal thresholds. These other voltage readouts vary depending on the applied signals and the instrument settings, and are intended to be used only for troubleshooting and service activities.

Depending on the configuration of your instrument, only some of the modules may be installed. The relationship between the module number and the channel numbers of an instrument are as follows:

Table 21: Relationship between module and channel numbers

Instrument model	Module number	Channel numbers
ECO8000	1	1–3
	2	4–6
	3	7–9
ECO8020	1	1–5
	2	6–10
	3	11–15
	4	16–20

FAN STATUS. Displays the fan status for the selected Power Supply module. **Fan running** is displayed when the fan is within the operating range. **Fan stopped** is displayed when there is a problem. If Option DPW is installed, press the left (◄) or right (►) arrow button to view the status of the other fan.

PS<1–2> HOURS. Displays information about the operating hours and hardware for the selected Power Supply module. Press the left (◄) or right (►) arrow button to view additional information about the selected power supply. The following information is displayed:

■ **Active hours:** The number of hours the supply has been the preferred (active) supply.

■ **Standby hours:** The number of hours the supply has been the backup supply.

■ **TW (Temperature Weighted) hours:** The calculated number of temperature weighted hours. (See page 36, *Temperature weighted hours (TWH)*.)

■ **+12 V output:** The current level of the +12 V supply. **OK** is displayed as the status when the voltage is within the operating range; **WARN** is displayed when the voltage is out of range.

■ **Part Number:** The Tektronix part number of the power supply inside the Power Supply module.

■ **MFG date:** The date the Power Supply module was manufactured.

RTC BATTERY LEVEL. Displays the status of the RTC (Real Time Controller) battery power level. The following status messages may appear:

- **More than 40% (OK)** indicates the battery power is good.

- **20% to 40% (WARN)** indicates the battery power is getting low and should be replaced soon.

- **Less than 20% (LOW)** indicates that the battery should be replaced immediately.

FP LED TEST. Press ENTER to run a test of the front panel LED indicators. Each LED will be illuminated in the possible colors to verify they are fully functional.

PS<1–2> LOAD TEST . Displays the status of the most recent load test of the backup power supply. The instrument automatically runs a load test on the backup supply every 24 hours when Option DPW is installed. **Load test not run** is displayed when only one supply is installed. When the test is run, the top line of the display lists whether the test passed or not and the second line lists the date and time of the test.

Remote control

This section describes how to use the ECO8000 Series Web Interface and how to use SNMP traps for remote control.

How to use the Web Interface

You can remotely control the ECO8000 Series using the Web Interface. When the Web Interface is enabled in the SYSTEM CONFIG menu, you can use a Web browser to remotely access the instrument. When you enter the IP address of the instrument in a supported Web browser, the ECO8000 Web Interface opens as shown in the following figure. Click the various tabs to access the instrument settings and controls as you would using the front panel buttons. (See Figure 34.)

NOTE. The Web Interface must be enabled from the SYSTEM CONFIG menu on the instrument front-panel before it can be accessed from a Web browser. (See page 65, SYSTEM CONFIG menu.)

All of the settings and functions that can configured using the front panel are available in the Web Interface except for the following:

- Configuring the SNMP settings

- Configuring the network settings

- Configuring the Web Interface level of control setting

- Performing a firmware upgrade

NOTE. Just like making setting changes using the instrument front panel, making setting changes using the Web Interface which affect the basic operation of the instrument are only possible when the instrument is in MANUAL mode. When the instrument is in AUTO mode, the Web Interface is selectively locked out and is therefore safe to use for status monitoring.

Operational considerations When you operate the Web Interface, be aware of the following operational considerations:

> ⚠ **CAUTION.** *If the SNMP community strings are changed from the factory-default values of "public" and "private" to some other user-defined strings, the Web Interface will not operate.*

It is recommended that a maximum of four simultaneous users be connected to the instrument using the Web Interface. If more users are connected, it may result in lower performance and inconsistent behavior.

Some front panel operations may interrupt or reduce the performance of the Web Interface. For example, the Web server may experience temporary delays when many buttons are being pressed on the front panel.

Levels of control. Use the SYSTEM CONFIG menu to configure the level of instrument control that is available from the Web Interface. The following levels of control are available:

- ■ **Full control:** All settings can be changed.

- ■ **Read only:** Settings can be viewed but not changed.

- ■ **Disabled:** No instrument access allowed by a Web browser.

Supported Web browsers. For best results, use Google Chrome, Mozilla Firefox, Safari, or Internet Explorer 9.0 or later when you connect to the ECO8000 Series Web Interface.

> **NOTE.** *The Web Interface requires Javascript to run.*

Ease of use. Most instrument controls and views are easier to access and configure using the Web Interface. Examples of where this is especially true are:

- ■ Viewing instrument status

- ■ Viewing the Event Log

- ■ Viewing diagnostic results

- ■ Configuring event reporting

- ■ Configuring e-mail reporting

- ■ Configuring channel settings such as threshold levels, labels, etc.

Elements of the Web Interface

The following figure highlights elements of the Web user interface window. Some display elements are dependent on certain options being installed in the instrument.

NOTE. A red exclamation mark next to a menu item indicates that an alert exists. Click the item to view the alert details.
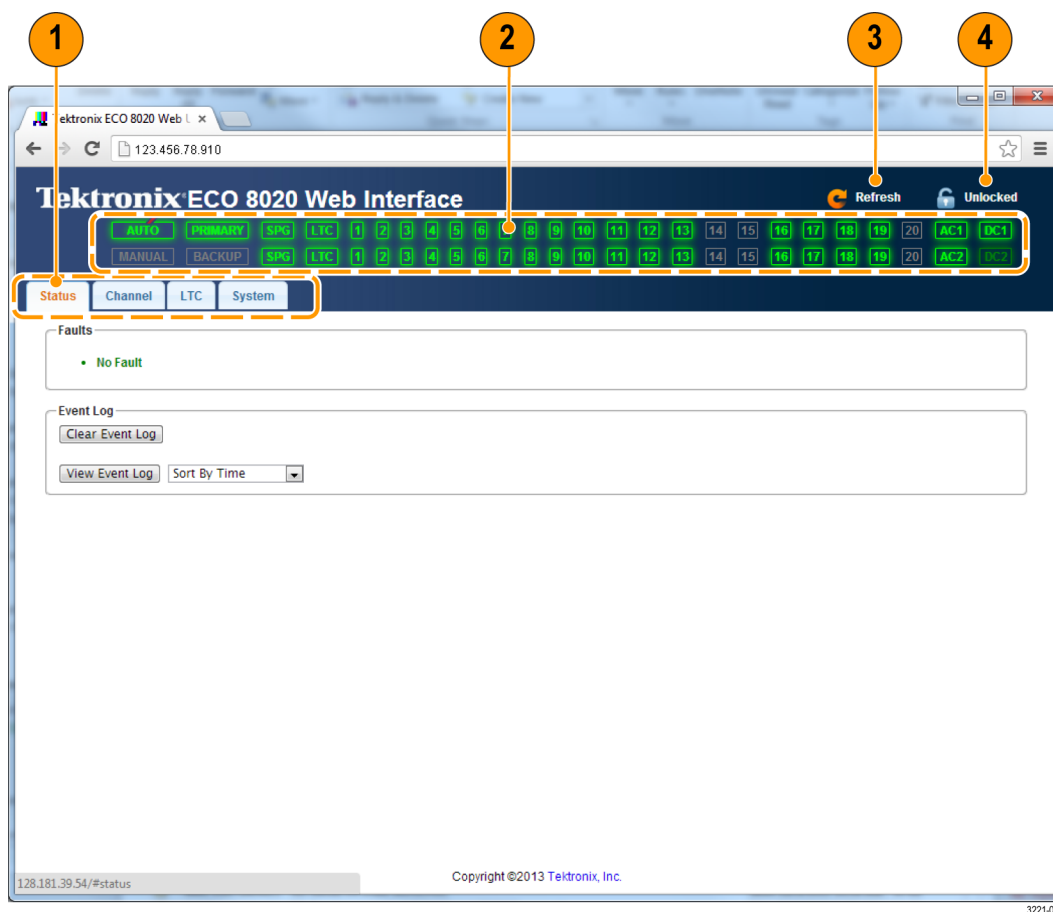
Figure 34: Example ECO8020 Web Interface window

Table 22: Elements of the Web user interface

Item number	Description
1	Menu tabs. Click a tab to access one of the following menus:
	■ **Status menu**: Use this menu to view active instrument faults and the Event Log contents. You cannot make changes to instrument settings from the Status menu. For more information, see the *STATUS menu* section. (See page 56.)
	■ **Channel menu**: Use this menu to view or change the settings for each of the BNC channels. For more information, see the *CHANNEL menu* section. (See page 62.)
	■ **LTC menu (Option LTC only)**: Use this menu to view or change the settings for each of the LTC channels. For more information, see the *CHANNEL menu* section. (See page 62.)
	■ **System menu**: Use this menu to view or change general instrument settings and to view diagnostic results. The System settings includes General System Configuration, Installed Options, SNMP and Network Configuration, E-mail Settings, Event Reporting, Internal Clock Configuration, and Diagnostics submenus. Click on the arrow next to the desired setting group to access the submenu for that group. For more information, see the *SYSTEM CONFIG menu* section. (See page 65.)
2	Indicators matching the indicators on the front panel of the instrument :
	■ **AUTO** and **MANUAL**: Indicates the selected changeover mode. The selected mode button is illuminated. The changeover mode must be set to MANUAL using the front-panel button before you can change the instrument configuration settings.
	■ **PRIMARY** and **BACKUP**: Indicates which signal source is being output. This setting applies to all channels. The selected source button is illuminated.
	■ **SPG**: When enabled, indicates the status of the SPG trigger input.
	■ **LTC**: When Option LTC is installed, indicates the status of all LTC channels that are enabled. If any enabled LTC channel had a fault, then this LED will be red.
	■ **1–9 (ECO8000)** and **1–20 (ECO8020)**: Indicates the status of the for each of the possible installed channels. The ECO8000 has up to 9 channels, the ECO8020 has up to 20 channels. Inactive (disabled) channels are colored gray.
	■ **AC1/DC1** and **AC2/DC2**: Indicates the status of the AC and DC supplies on the installed Power Supply module(s).
	For information about the possible states for each indicator, see the *Controls, connectors, and LED indicators* section.(See page 19.)
3	Click on Refresh to refresh the Web user interface.
4	Locked / Unlocked. Indicates whether the Web Interface controls are locked or unlocked. Click to toggle the setting.

How to use SNMP

When the ECO8000 Series is connected to an Ethernet network, you can configure the instrument to send SNMP traps to an NMS (Network Management Station) when certain events are detected. If you intend to use SNMP commands to control the instrument, you must configure the SNMP parameters.

SNMP configuration   The following table shows the SNMP parameters you can view or set using the SNMP CONFIG submenu of the SYSTEM CONFIG menu or the Event Reporting section of the System tab in the Web Interface.

Table 23: SNMP parameters

Setting	Description
Trap Events	You can enable or disable traps for the following events. (See page 49, *Fault and event descriptions*.)
	■ Primary fault
	■ Backup fault
	■ Primary / Backup switch
	■ Power supply 1 load test fail
	■ Power supply 2 load test fail
	■ Power supply 1 AC fault
	■ Power supply 1 DC fault
	■ Power supply 2 AC fault
	■ Power supply 2 DC fault
	■ Power supply 1 fan fault
	■ Power supply 2 fan fault
	■ Power supply 1 warning
	■ Power supply 2 warning
	■ Power supply 1 temperature fault
	■ Power supply 2 temperature fault
	■ Power supply 1 TWH warning
	■ Power supply 2 TWH warning
	■ Power supply switch over
	■ Main board supply fault
	■ Temperature fault
	■ Backup test due
	■ Power on start test failed
	■ HREF relay failed
	■ Reboot normal
	■ Reboot watchdog

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