



CyTime™ Sequence of Events Recorder

SER-3200 / SER-2408

Key Functions

- Status monitoring (32 digital inputs)
- E** Event recording (1-ms time-stamp accuracy)
- Δt** Stopwatch function, elapsed time (to 1 ms)
- 123** Operations counters (with individual reset)
- Remote control (on/off) via Modbus TCP
- Trigger output for Waveform Capture
- 1588** Time-sync output for non-PTP devices

Know what happened and when—to 1ms!

The CyTime™ Sequence of Events Recorder monitors the status of 32 channels and records state changes with 1ms accuracy. Up to 8192 events are stored in non-volatile memory. Two models are available: the SER-3200 features 32 high-speed digital inputs, and the SER-2408 has 24 inputs and 8 relay outputs.

An embedded web server enables setup and monitoring over an Ethernet network using a standard web browser. Flexible time synchronization and Modbus TCP communications enable easy integration with supervisory systems such as an electrical power management system (EPMS), all in high definition.

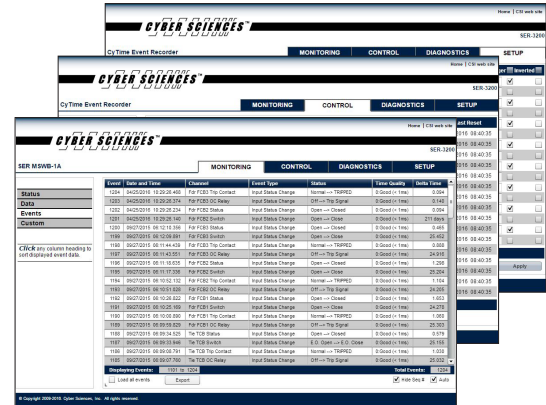
Command relays over the network (model SER-2408). Open/close relay outputs remotely over an Ethernet network using Modbus TCP.

Ethernet (Modbus TCP) for system integration:

- EPMS
- SCADA
- BMS
- DCIM

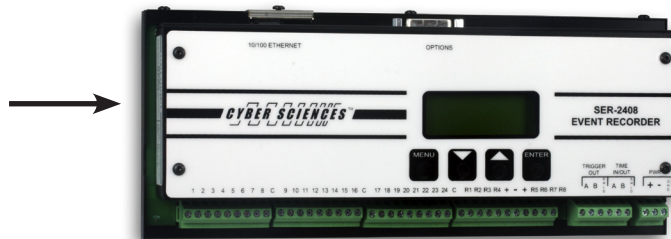
Web interface:

- Events
- Status
- Counters
- Controls
- Diagnostics
- Setup
- Custom



Time source (IN):

- PTP (Ethernet)
- IRIG-B, 5V (via EZC)
- DCF77, 24V (via EZC)
- NTP (Ethernet)
- Modbus TCP (Ethernet)
- Manual (web interface)



Time-sync outputs:

- PTP (Ethernet)
- IRIG-B, 5V (via PLX-5V)
- IRIG-B, 24V (via PLX-24V)
- DCF77, 24V (via PLX-24V)
- 1per10, 24V (via PLX-24V)
- ASCII (RS-485)
- Inter-SER (RS-485) *

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- E**
- Δt**
- 123**

32-channel I/O:

- 32 high-speed digital inputs (SER-3200), or
- 24 high-speed digital inputs, 8 relay outputs (SER-2408)

- 1588**

High-speed Trigger Output
(e.g., for Waveform Capture)

* Inter-SER (RS-485) is for existing installations only. Replaced by PTP master/slave for new projects.



Sequence of Events Recording (SER)

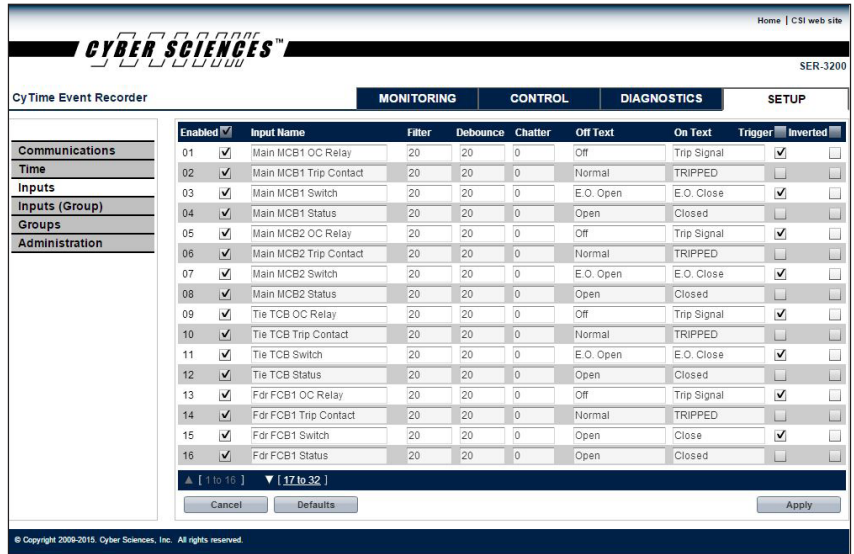
Setup and Monitoring Using any Web Browser

SER typical monitored points:

- Breaker status: open/closed/tripped
- Relay trip signal: normal/trip
- Control switches: open/close commands
- Control scheme status: auto/manual/test
- Auto-transfer switch (ATS) status: normal/emergency/test
- UPS status: normal/transfer/bypass
- Generator status: stopped/running
- Battery status: normal/alarm
- TVSS, transformer temperature, fan status and other auxiliary contacts and alarms

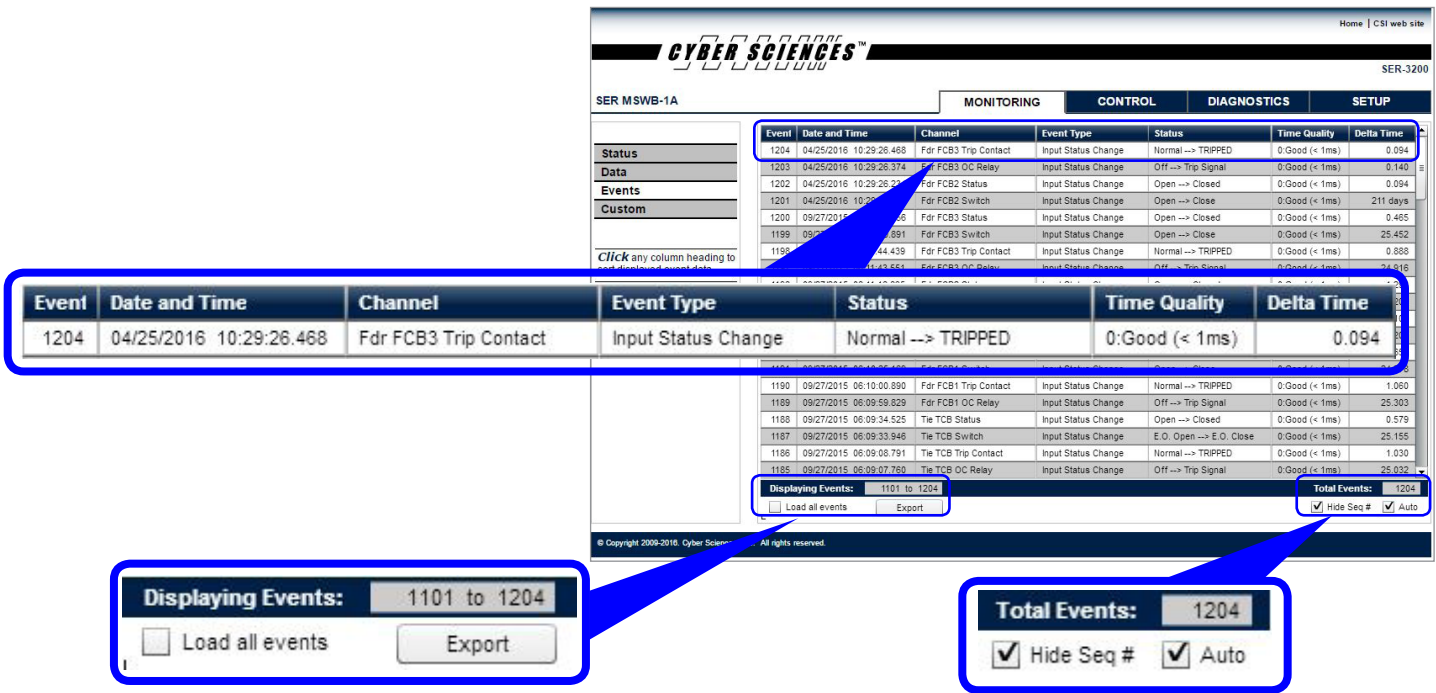
Customize

CyTime™ Event Recorders offer simple setup using a web browser—no proprietary software required. An embedded web server hosts user-friendly pages for setup and monitoring. Digital inputs have user-configurable filter, debounce and chatter functions. Each input can be customized with descriptive name (32-char. max.), and assigned text to describe on and off states.



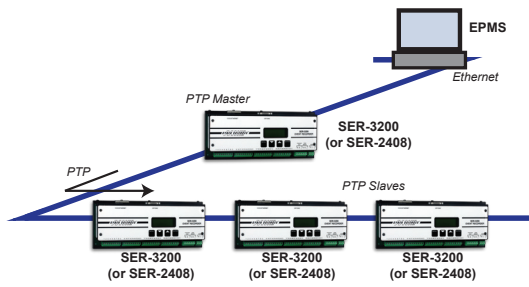
View Events, Export to Excel, Access via Modbus TCP

The CyTime™ Event Recorder's Events web page displays detailed information for all event records, sortable by any field. An Export button makes it easy to save data to Excel for further analysis or reports. These tools are useful during commissioning or troubleshooting, even if the same data is also integrated into a comprehensive power monitoring system, building management system or other host software.



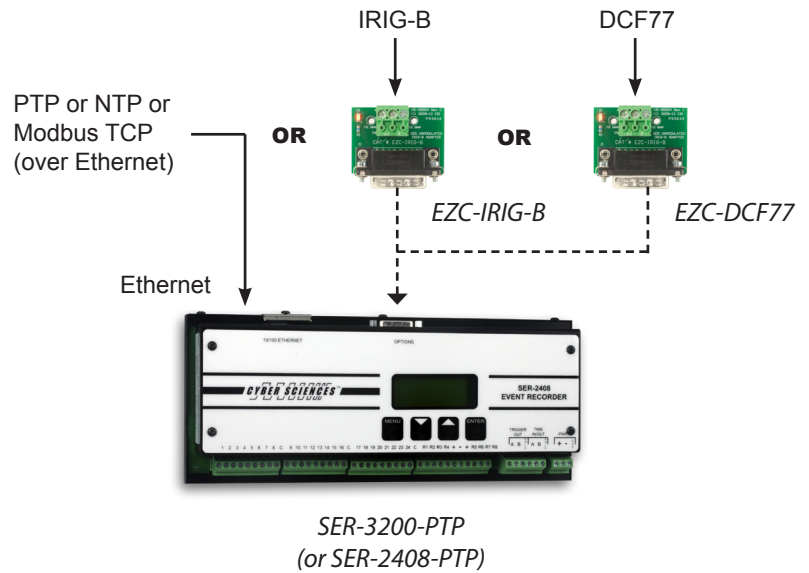
Sequence of Events Recording (SER)

Time Synchronization Made Simple



Automatic Time Sync (within 100 microseconds)

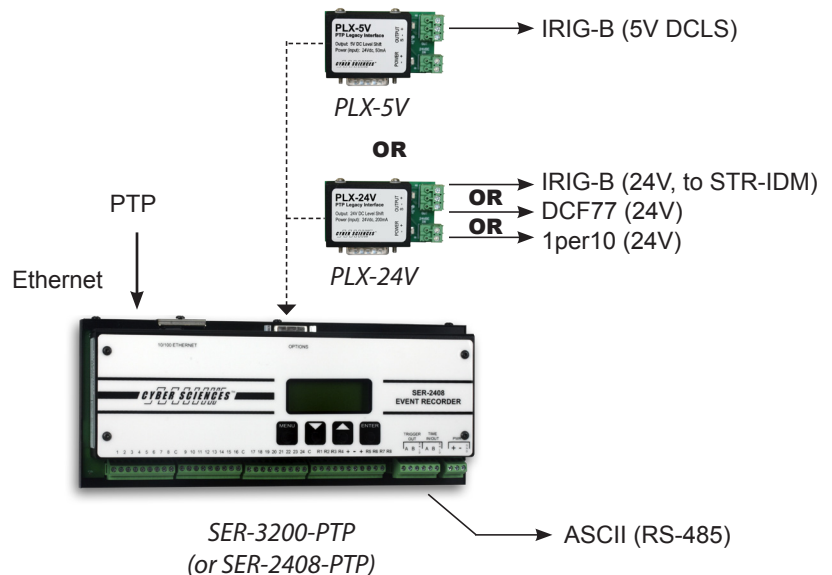
Cyber Sciences enables hi-res (sub-millisecond) time synchronization over the same Ethernet network used for the Electrical Power Monitoring System (EPMS). Set the time in the first CyTime Event Recorder, and all other SER devices sync automatically over Ethernet. The breakthrough technology: PTP (Precision Time Protocol), per IEEE Std 1588™. Time-sinc input (time source) options are shown below:



No PTP? No Problem.

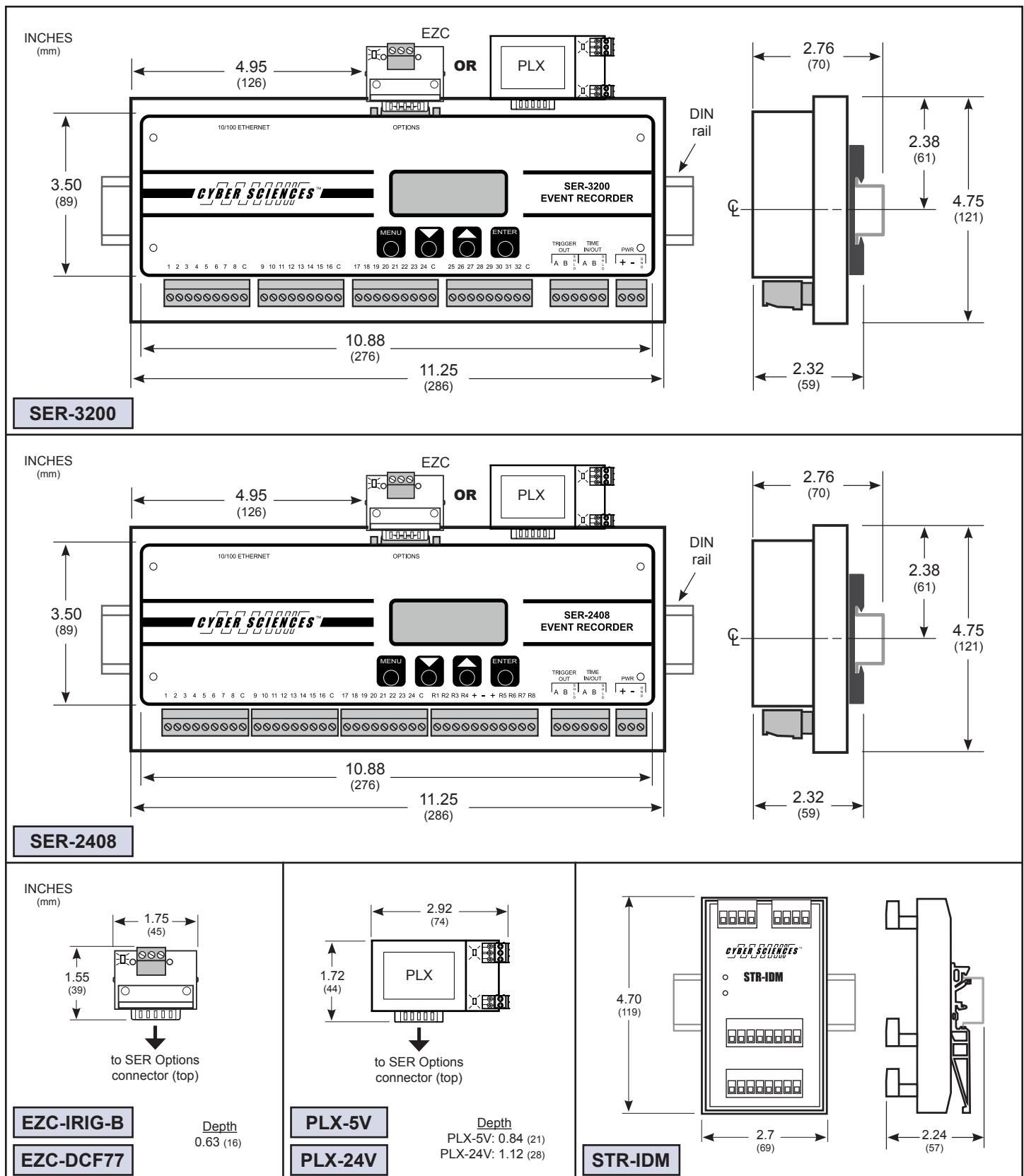
CyTime SER Outputs All Legacy Protocols

CyTime Event Recorders don't simply leverage the power of PTP for themselves. Any SER-3200/2408 configured to accept PTP as its time source (PTP slave) can in turn output the legacy protocol required by complementary devices, such as relays or meters. ASCII/RS-485 is available directly from the SER, while others (IRIG-B, DCF77 or 1per10) require a small adapter, PTP Legacy Interface (PLX-5V or PLX-24V), according to the voltage supported by the target device.



Sequence of Events Recording (SER)

Dimensions



Sequence of Events Recording (SER)

Specifications

Electrical		
Digital inputs	Number of optically-isolated inputs	32 (SER-3200) or 24 (SER-2408)
	Voltage, operating	24 Vdc (-15% to +10%)
	Must turn on/off voltage	20 Vdc (on) / 9 Vdc (off)
	Input impedance	10K ohms resistive, 1 mA current draw (max.)
Relay Outputs (SER-2408)	Number and type of outputs	8 Form A, solid-state relays (two groups of four)
	Voltage operating range	16 to 30 Vdc (24 Vdc nominal)
	Current capacity	2.0 A per relay output (8.0 A per group, 16 A total)
High-speed Trigger Output	Relay type	Form A, solid-state relay
	Maximum current	100 mA at 24 Vdc nominal
	Contact closure characteristics	Momentary contact closure, duration of 100 ms
Control Power	Voltage, operating	24 Vdc (± 10%)
	Burden (max.)	Steady state: 10 VA (10 watts) / Inrush current: 0.8 A for 5-8 ms
Time Synchronization		
Time Source (IN) Protocols Supported	PTP slave (requires license key)	IEEE 1588-2008 (v2), E2E Default Profile, per Annex J.
	IRIG-B (via optional EZC-IRIG-B connector)	Unmodulated IRIG-B (5V DCLS) types B004 - B007 (IEEE-1344 extensions ON)
	DCF77 (via optional EZC-DCF77 connector)	DCF77 (24 Vdc)
	SER inter-device time sync (legacy applications)	RS-485 (IRIG-B or DCF77 time code)
	NTP (SNTP) client	User-configurable NTP primary/secondary servers and update interval
Time-sync Output Protocols Supported	PTP master (requires license key)	IEEE 1588-2008 (v2), E2E Default Profile, per Annex J.
	IRIG-B (via optional PLX-5V connector)	Unmodulated IRIG-B (5V DCLS) type B006
	IRIG-B (via optional PLX-24V connector)	IRIG-B (24V DCLS) type B006, compatible with STR-IDM
	DCF77 or 1per10 (via PLX-24V connector)	DCF77 (24 Vdc) or 1 pulse per 10 seconds (24 Vdc)
	RS-485	ASCII / RS-485 (ASCII + Quality) or SER inter-device time sync / RS-485 (legacy)
Clock	Accuracy	< 100 µs (with time source = PTP, IRIG-B or DCF77)
	Holdover (after sync for at least 2.5 min.)	5 min. (remains within 100 µs even after loss of sync for up to 5 min.)
Communications		
Ethernet Interface (10/100 Mbps)	Modbus TCP (TCP port 502)	32 simultaneous TCP connections (Modbus TCP sockets), max.
	Web server (TCP ports 80, 8080, 843)	W3C standards-compliant. Flash Player v.10 or later required.
	FTP file server (TCP port 21)	5 simultaneous FTP sessions, max.
Memory	SDHC flash memory card (user-accessible)	8GB (32GB when ordered with -32GB option)
Mechanical / Environmental / Regulatory		
Mechanical	Mounting	Standard DIN rail (EN 50022, 35 mm x 15 mm)
	Wire sizes supported	#24 to #12 AWG (#26 to #14 for EZC 3-position connector)
	Dimensions (W x H x D)	11.25 x 4.75 x 3.13 inches (286 x 121 x 79 mm)
	Dimensions (W x H x D), in carton	12.50 x 6.50 x 4.50 inches (318 x 165 x 114 mm)
	Weight	3.0 lbs. (1.4 kg) / in carton: 3.5 lbs. (1.6 kg)
Environmental	Temperature	-25° to +70° C (Operating) / -40° to +85° C (Storage)
	Humidity rating	5% to 95% relative humidity (non-condensing) at 40° C
Regulatory Compliance	UL Listing	UL-61010, UL-508, cUL, CSA C22.2
	Global standards	CE Mark, RCM Mark, EN standards
	Radiated Emissions	FCC Class A / EN 55022:2010 (CISPR 22:2008) Class A
	Sustainability	RoHS-compliant, lead-free
	Country of Origin	USA

Sequence of Events Recording (SER)

Ordering Information

The following models and accessories are available for the CyTime SER-3200 and SER-2408 Event Recorders:

	Catalog no.	Description
CyTime™ Sequence of Events Recorders (SER)	SER-3200-P2X2	CyTime Event Recorder, 32-inputs
	SER-3200-PTP ①	CyTime Event Recorder, 32-inputs, PTP option
	SER-3200-32GB ①	CyTime Event Recorder, 32-inputs, PTP + 32GB options
	SER-2408-P2X2	CyTime Event Recorder, 24-inputs/8-outputs
	SER-2408-PTP ①	CyTime Event Recorder, 24-inputs/8-outputs, PTP option
	SER-2408-32GB ①	CyTime Event Recorder, 24-inputs/8-outputs, PTP + 32GB options
	PTP-UPGRADE ① ②	PTP (IEEE 1588) Field Upgrade Kit for CyTime SER-3200/SER-2408
Accessories (for SER)	EZC-IRIG-B	EZ connector for SER (IRIG-B input)
	EZC-DCF77	EZ connector for SER (DCF77 input)
	PLX-5V	PTP Legacy Interface (5V DCLS, for unmodulated IRIG-B output)
	PLX-24V	PTP Legacy Interface (24V DCLS, for DCF77, 1per10 or 24V IRIG-B output to STR-IDM)
	STR-IDM	IRIG-B Distribution Module (requires STR-100/IRIG-B or PLX-24V)

① The PTP option is activated by a software license key, unique to each SER. When ordered with the -PTP or -32GB suffix, this key is installed at the factory. When ordered as a field-upgrade to an existing SER-3200/2408 (requires hardware version B1 or later), the key is provided via a license certificate.

② To order PTP field upgrade, please provide the serial number and MAC address of the existing CyTime SER at the time the order is placed.

For More Information

Handout: Sequence of Events Recording (SER)
 Data Sheet: Precision Timing via PTP (DS-PTP-01)
 CyTime SER User's Guide (IB-SER-01)
 CyTime SER Reference Guide (IB-SER-02)
 Guide Spec: Sequence of Events Recording (SER)
 Tech Note: Hi-res Time Sync using PTP/1588 (TN-100)
 Tech Note: SER System Architectures (TN-101)
 Tech Note: IRIG-B Time Codes (TN-102)
 Tech Note: DCF77 Time Protocol (TN-103)

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