

**RELEASE NOTES**

CyTime Event Recorder SER-3200 / SER-2408

Version n.nn (*Time / Event / System processor firmware*)**Version 2.24 (2.11 / 2.00 / 2.24) [ build 1 ]**

10-March-2025

- Improved performance of NTP: Fixed NTP time synchronization issue when device has not been reset after 3+ years.
- Improved performance of ASCII output: When DCF77 is the time input, and ASCII output is enabled, removed extra character from the output.

**Version 2.23 (2.10 / 2.00 / 2.23) [ build 1 ]**

10-May-2022

- Increased robustness of the SER's control power loss detection mechanism to improve ride-through performance.
- Addressed issues with DST (Daylight Saving Time) for Southern Hemisphere applications, manual time source(s) and all time zones.
- Corrected inconsistency with the application of DST offset for ASCII, IRIG-B and DCF time outputs.

**Version 2.21 (2.10 / 2.00 / 2.21) [ build 1 ]**

03-Apr-2020

- Enhanced the control power loss detection mechanism in the SER.  
- If control power falls outside the stated 24 Vdc, - 10% tolerance, the SER will apply a 50 ms delay and evaluate the control power voltage a second time prior to automatically restarting to protect itself from an undervoltage situation.

**Version 2.20 (2.10 / 2.00 / 2.20) [ build 1 ]**

20-Jan-2020

- Corrected Modbus register 409008 (date of manufacture).
- Changed copyright year from 2019 to 2020 in LCD and Web UI.
- Added 3rd party network stack enhancements.

**Version 2.19 (2.10 / 2.00 / 2.19) [ build 1 ]**

03-Dec-2019

- Fix applied to address invalid characters shown on LCD screen.
- Security Enhancement: Closed UDP ports 7 & 9 to meet customer security requirements.
- Added Ethernet buffers value to help detect network loop conditions on the SER network.
- New diagnostic pages (8 and 9) to LCD diagnostic menu to provide additional details for network activity.
- Corrected Modbus value for PTP priority 1 & 2 where value wasn't set correctly in the Modbus Register.
- Watchdog timer support to address issue with 'freezing' SER.

**Version 2.18 (2.10 / 2.00 / 2.18) [ build 1 ]**

29-Mar-2019

- Corrected a freezing issue caused by an invalid network "loop" in the network switches. Added "Error Code 2020 Ethernet Error" to show on the front display indicating when this issue occurs.
- Reduced PTP network traffic during startup to prevent overload and improve syncing efficiency between multiple SERs and master PTP.
- Fixed timing issue in which SER loses communications when a switch loses and regains power intermittently.

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- Corrected issue with setting time manually in which changes were not applied after first attempt.
  - Fixed SD card size calculation in the SER web UI.
  - Fixed random time change events in SERs using Daylight Savings Time (DST) with "Time Source (IN)" set to "Manual (external)" or NTP.
  - Fixed issue with settings for time zones not on the hour such as "UTC + 5:45".
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- Corrected an issue in which no "setup change" was shown in the event log after an Input/Output's name had been changed in the SER's setup.

**Version 2.17 (2.08 / 2.00 / 2.16)** [ build 1 ]

25-May-2018

- Replaced Adobe Flash in web UI with HTML5
- Fixed a rare issue where PTP Slave loses time quality (time quality goes from Good to Bad), but diagnostics shows PTP in slave mode
- Fixed a rare issue where DCF time source is not syncing after a reset

**Version 2.16 (2.08 / 2.00 / 2.16)** [ build 1 ]

08-Jan-2018

- Corrected web interface to fix potential issue when applying setup changes for the NTP time sync.
- Improved error recovery during failures in event log file access for error codes 6000 / 7000 / 8000
- Corrected rare issue that could disable PTP operation
- Improved error checking during NTP time sync to not allow a sync <Y2k start value (2000), or >= NTP time max value (2036)
- Updated copyright notice on LCD display

**Version 2.15 (2.08 / 2.00 / 2.15)** [ build 1 ]

31-Oct-2017

- Corrected a condition (inadvertently introduced in version 2.14) in which PTP hardware compatibility may not be recognized correctly on startup.

**Version 2.14 (2.08 / 2.00 / 2.14)** [ build 1 ]

16-Oct-2017

- Added support for Daylight Saving Time (DST) adjustment (default = disabled), with selectable start and end periods.
- Added Modbus register 400101 to indicate real-time status of DST adjustment (only applies if DST setting is enabled).
- Added Modbus registers 404191 to 404199 to indicate user settings for DST.
- Added bit 11 to Event Log register 1 to indicate if event timestamp was adjusted for DST (0 = STD, 1 = DST).
- Added local LCD menu screen 7 under Time category to show DST status and settings.
- Added setting for "alternate date format" (dd/mm/yyyy) in addition to default format (mm/dd/yyyy).
- Added Modbus register 404207 to indicate alternate date format setting (0 = disabled, 1 = enabled).
- Added settings for PTP priority1 and priority2 (used in best master clock algorithm for multiple grandmasters).

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*(Time / Event / System processor firmware)*

- Added Modbus register 400233 to report PTP license status (none, valid, fail, N/A).
- Added Modbus registers 404235 and 404236 to report PTP priority1 and priority2, respectively.
- Changed behavior: operate normally regardless of position of write-protect tab on SD card.
- Changed behavior of relay output operation (model SER-2408 only) to allow on/off command of relays only if enabled for event recording.
- Improved usability of local IP address setup (from front panel) by suppressing character flashing while button is depressed to select new value.
- Combined Setup-Inputs and Setup-Inputs-Groups web pages into a single (wider) setup web page.
- Corrected Setup-Comms web page to restrict user input of DeviceID and Device name to 12 and 32 characters, respectively.
- Expanded command interface to allow on/off of “virtual relay” outputs VR9 - VR16 (model SER-2408 only), reflecting status change via Modbus register (400250) and record an event, for the purpose of establishing a performance baseline for control applications. (Specific customer request.)
- Changed name of “Hourly Time Update” to “Hourly Test Event” to better describe its purpose.
- Revised XML setup file to use **schema version 7** to support new features (e.g., DST and alternate date format).
- Corrected Reference Guide to include Setup-Communications registers which had been inadvertently deleted in a previous revision.

**Version 2.13 (2.07 / 2.00 / 2.13)** [ internal release only ]

15-Dec-2016

- For factory use only: internal changes to facilitate automated calibration and configuration.

**Version 2.12 (2.07 / 2.00 / 2.12)** [ build 1 ]

29-Oct-2016

- Added new time setup option: apply time zone offset setting to PLX time-sync output signal (IRIG-B or DCF77). The default value is false: time is output with reference to UTC, regardless of time zone setting.
- Added new time setup option: apply time zone offset setting to ASCII / RS-485 time-sync output signal. The default value is false: time is output with reference to UTC, regardless of time zone setting.
- Added reporting of both time zone offset settings (PLX and ASCII out) via LCD and Modbus registers (404205 and 404206, respectively).
- Clarified time source (IN) data on Diagnostics web page by displaying two values for time source: setup value (user setting) and actual value (confirms setting if locked, displays “none” if expected time source not present). Made corresponding changes to LCD screens as well.
- Added display of PTP domain number on Diagnostics web page.
- Changed behavior of time sync output when set to use PTP (PTP master): now, in addition to PTP output, the ASCII/ RS-485 output is also enabled by default. (Same behavior as PTP slave).
- Modified descriptive text for Time Quality when time source is NTP, or when time source is PTP and ClockSource (PTP master time source) is NTP: now shows “2:OK (NTP)” if NTP sync or “3:Bad (no sync)” if NTP server not found. This change affects the Events web page, Diagnostics web page and LCD time quality screen.
- Improved behavior associated with Error code 9000: SD card missing. Now, if valid SD card is re-inserted, the unit detects this corrective action and resumes normal operation automatically. (Previously a restart was required.)
- Improved the PTP fine-tuning rate-calibration function for non-zero PTP domain numbers (previously this feature required the PTP domain number to be set to default value of zero).
- Improved error checking to self-protect against invalid syntax, in case a user inadvertently corrupts the \_SETUP.XML while making direct edits to the XML file.
- Revised XML setup file to use **schema version 6** to support new features (e.g., apply time zone offset to outputs).

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## RELEASE NOTES (cont.)

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### Version 2.11 (2.06 / 2.00 / 2.11) [ build 1 ]

29-Apr-2016

- Added IRIG-B time-sync output option (requires optional PLX-5V or PLX-24V + STR-IDM).
- Added DCF77 time-sync output option (requires optional PLX-24V).
- Added 1per10 time-sync output option (requires optional PLX-24V).
- Added more NTP update interval settings: 1, 2, 5, 10, 15 and 30 minutes.
- Added reporting of device serial number via LCD, Diagnostics web page and Modbus registers (409024-409025).
- Corrected reporting of PTP model codes in Modbus register 409002.
- Corrected reporting of time-sync output codes for IRIG-B/RS-485 and DCF77/RS-485 in Modbus register 404220.
- Changed duration of trigger output from 50 ms to 100 ms (corrected to match published specs).
- Changed ASCII RS-485 output to be based on UTC (independent of SER time zone setting).
- Added restriction to prohibit comma in user-specified text fields to prevent errors in Events web page and csv file.
- Changed the maximum number of temporary (system) files to 100.
- Improved reliability of FTP service and compatibility with Chrome browser when used as an FTP client.
- Improved SD card memory management to prevent inadvertent, partial file transfer when low on free space.
- Updated copyright notice on LCD and all web pages.

### Version 2.10 (2.05 / 2.00 / 2.10) [ build 1 ]

13-Jan-2016

- Added support for PTP (IEEE 1588) time-sync, master and slave. Feature is enabled via license key.
- Added PTP time-source (PTP slave) and PTP time-sync-out (PTP master) setup options.
- Revised XML setup file to use **schema version 5** to support new PTP features (e.g., PTP domain number).
- Added calculation of delta-time between events to Events web page and Export Events csv file.
- Added option to hide Sequence Number on Events web page (now hidden by default to make room for delta-time).
- Changed Events web page to display 20 events per page (previously 16 per page) using smaller font size.
- Changed default values for NTP primary and secondary servers—to 25.56.178.140 (www.nist.gov) and 129.6.15.30 (time-c.nist.gov).
- Enhanced accuracy performance under certain conditions when time source set to NTP or external/manual.
- Added command code 3322 to allow open/close of multiple relay outputs via a single Modbus write (bitmap).
- Combined all three firmware components into a single firmware file (.S19 extension) to simplify update process.
- Added file size and checksum data checks to verify integrity of firmware file prior to starting the update.
- Corrected bug with auto-test feature in which it was possible (though rare) to have start/end events out of sequence.
- Updated copyright notice on all web pages.

### Version 2.08 (2.00 / 2.00 / 2.08) [ build 1 ]

04-Feb-2015

- Eliminated a vulnerability to memory corruption under very specific circumstances: following a power failure, if power were to fail again during a 200 ms window within approximately 35 seconds after first restart, this result in the unit's MAC address to be corrupted, preventing the unit from operating normally. Reported symptoms include units which appear unresponsive after power is restored. The LCD display may show some opaque "shadow" characters or appear to have failed.
- This firmware update is intended to eliminate this vulnerability, assuming the SER unit is still operating normally. Once this failure mode has occurred, it is not possible to fix the problem in the field; the unit must be returned to the factory for reinstallation of the MAC address, which requires special software.

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## RELEASE NOTES (cont.)

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### Version 2.07 (2.00 / 2.00 / 2.07) [ build 1 ]

01-Dec-2014

- Corrected error in which sequence numbers could be assigned out of chronological order (time-stamps still correct).

### Version 2.06 (2.00 / 2.00 / 2.06) [ build 3 ]

21-Oct-2014

- Increased TCP listening port-pending connections (to 5) for Modbus (port 502) and Flash (ports 843 and 8080).
- Increased Modbus accept timeout to 2 seconds.
- Added Modbus ReadWithTimeout (with 3 second timeout).
- If number of free sockets falls below 7, automatically logs socket states for the next 4 minutes.
- Corrected diagnostics error reporting for relay wiring errors involving control power (model SER-2408 only).

### Version 2.05 (2.00 / 2.00 / 2.05) [ build 1 ]

02-Sep-2014

- Corrected filter and debounce functions to ensure proper filtering of successive events, even if they occur within milliseconds of each other. Under certain conditions, “hyper-sensitive” event recording could result in multiple events being recorded, despite filter/debounce settings. This issue was inadvertently introduced in v. 2.00; earlier firmware versions are not affected.
- Changed Modbus header property--slave unit ID of 255 now supported (in addition to ID=1). Support for special ID=255 facilitates interoperability with some application software.

### Version 2.04 (2.00 / 2.00 / 2.04)

08-Jul-2014

- Corrected an issue with manual reset (via hardware reset button) in which a “Reset” event was not getting recorded.
- Modified data exchange interface (port 8080) for web browser access. Specifically:
- Changed commands to initiate auto-test, reset, and apply-settings to avoid inadvertent operation when performing cyber security intrusion testing or other abnormal network transmissions.
- Disabled relay control via custom web page (SER-2408 only); must be enabled explicitly. (Factory use only.)

### Version 2.03 (2.00 / 2.00 / 2.03)

30-May-2014

- Added diagnostics log. (Records additional details of any internal error codes, etc.)
- Improved response to erratic control power failures. Instead of displaying error message, an additional reset is attempted in order to restore operation, provided control power has stabilized.

### Version 2.02 (2.00 / 2.00 / 2.02)

10-Apr-2014

- Added export-events feature. (Export button on Events web page allows user to save event data to csv file.)
- Corrected an issue where changes to a group’s definition did not always reset its EPSS data log. Events in a given EPSS data log recorded prior to the change could still appear in the data log (unless the SER was reset).
- Changed the way an EPSS data log stores events in the scenario where two or more group members change state simultaneously. (Now, a single record is stored for these events.)

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## RELEASE NOTES (cont.)

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### Version 2.01 (2.00 / 2.00 / 2.01)

28-Mar-2014

- Corrected command interface function to “reset counters for all channels” (previously affected 01 to 24, not 01 to 32.)
- Added error-correction to protect against accidental or malicious deletion of EVENTS files from SD card.
- Added automatic reset of all counters whenever event log is cleared.
- Corrected a problem with the “Event log cleared” event (previously not recorded under certain conditions).
- Corrected event-log-clear command to preserve sequence numbers.

### Version 2.00 (2.00 / 2.00 / 2.00)

27-Nov-2013

- Initial release of SER-2408 model (24 inputs / 8 outputs).
- Added support for relay outputs controllable externally via Modbus TCP command interface (SER-2408 only).
- Added event types for output status change and test output status change (SER-2408 only).
- Added 16 configurable data logs with group assignments to facilitate EPSS test-compliance reporting.
- Added coincident event logging for groups: if any group member changes state, all members' states are recorded.
- Added operations counters for each input/output state change, individually resettable, with last time/date.
- Added local setup of IP address via front LCD/keypad.
- Added inverted option for inputs—to facilitate reporting of normally-closed contacts.
- Expanded events web page—usability improvements to make it simpler and faster.
- Expanded test web page with auto and manual test modes—facilitates commissioning of application software.
- Expanded diagnostics—reported via LCD, Modbus TCP and Diagnostics web page.
- Changed Modbus header property--slave unit ID must be set to 1 for proper operation.
- Added consolidated firmware value (Modbus register 409009).
- Added 3-register condensed time format (Modbus registers 400210-400212).
- Added command interface 25001 (alternate time-set via condensed format, plus optional fourth register for ms)
- TCP keep-alives implemented with multiple retries to improve performance of Modbus TCP socket connections.
- Additional Modbus registers defined to support expanded feature set.
- Added ASCII RS-485 time-sync output option when time source is IRIG-B or DCF77—compatible with Arbiter “ASCII + Quality” for use with ION 7550/7650 meters.
- Changed default values for NTP primary and secondary servers—to 96.47.67.105 (nist1-nj.ustiming.org) and 165.193.126.229 (nist1-nj2.ustiming.org). Also improved NTP time accuracy when used with local NTP server.
- Improved page-load times to increase overall web server performance.
- Revised XML setup file to use **schema version 4** to support new features (e.g., relays, time sync output option).

### Version 1.60 (1.10 / 1.01 / 1.60)

31-May-2012

- Extended default time-out values on ports 843 and 8080 to 2s to be more tolerant of complex and/or high-traffic network conditions.
- Optimized internal handling of MAC address for faster access via web pages and Modbus TCP requests.
- Added reporting of composite firmware version number on Diagnostics web page.
- Optimized Diagnostics web page operation for faster response and additional error reporting.
- Corrected a styling issue with “Home” and “CSI Web Site” links (upper right of web pages), which could occur in certain circumstances when using earlier versions of Internet Explorer (IE7, IE8).

### Version 1.51 (1.10 / 1.01 / 1.51)

09-Apr-2012

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**CyTime Event Recorder SER-3200/SER-2408***(Time / Event / System processor firmware)*

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- Added DCF77 and SER inter-device (DCF77) time sources.
- Added support for SDHC cards up to 32GB (added higher scale factor in Modbus register map).
- Added reporting of TCP sockets (total available, used and free) to local LCD display and Diagnostics web page.
- Added “Enable/disable” check boxes in header of Inputs Setup web page for usability purposes.
- Added capacity for 12 additional TCP connections (to 44 total).
- Increased Modbus TCP connections to 32, max.
- Deleted viewing options of 16- and 32-events-per-page (new default = 100) to the Monitoring-Events page.
- Added utility (or “mailbox”) registers for customer use. (Modbus read/write registers 415800 to 415999.)

**Version 1.30 (1.07 / 1.00 / 1.30)**

24-Jan-2012

- Added support for (external) SERintegrator database utility/service.
- Adjusted brown-out threshold for optimal performance during repeated control power failure events.
- Changed internal mechanism for events to dramatically improve event retrieval performance of Events web page.
- Optimized TCP socket management to prevent negative file descriptors (invalid sockets) to be counted as active.
- Changed to “enable” event recording of each input by default.

**Version 1.10 (1.06 / 1.00 / 1.10)**

29-Jun-2011

- Added time-source option for time sync via NTP time server, with user-selectable NTP polling interval and IP addresses for primary/secondary NTP time servers.
- Added time-source option for manual time set (when no time reference available—such as demo or testing).
- Added events for NTP time sync/fail (events 20, 21) and manual time set (event 14).
- Changed XMLSocket TCP port (used by Flash Player) from 10000 to 8080, to facilitate access through firewalls.
- Changed DHCP mode to report user-configured device name to DHCP server for identification in its device table.
- Added duplicate registers (400253 to 400257) for selected time data to allow access as a contiguous block.
- Added a viewing option of 16-events-per-page (new default value) to the Monitoring-Events page.
- Adjusted header and syntax for 100% compliance to XHTML 1.0 doctype and to ensure proper display in IE9.
- Made several minor usability and aesthetic improvements.
- Revised XML setup file structure to support new features.
- Updated instruction bulletins (new User's Guide Addendum and revised Reference Guide) to reflect all changes.

**Version 1.04 (1.04 / 1.00 / 1.04)**

02-Mar-2011

- Update for manufacturing purposes only—added code to detect alternate suppliers for certain parts.  
*(Not needed for units with DOM of Dec-2010 or earlier.)*

**Version 1.04 (1.03 / 1.00 / 1.04)**

04-Nov-2010

- Corrected problem with multiple ftp sessions exceeding normal limit of five (5) when using Windows Explorer.
- Corrected problem with reported year when using SER inter-device time sync as time source.

**Version 1.03 (1.02 / 1.00 / 1.03)**

27-Oct-2010

- Corrected web page display problem when viewed with IE6.
- Corrected a timing issue with test mode that could introduce Modbus comms delays under certain circumstances.

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- Corrected an error with compatibility mode in which the number of events was not reset to 0 after final read.

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## **RELEASE NOTES (cont.)**

CyTime Event Recorder SER-3200/SER-2408

*(Time / Event / System processor firmware)*

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### **Version 1.02 (1.02 / 1.00 / 1.02)**

05-Oct-2010

- Improved response times for Ethernet Modbus TCP/IP interface.
- Corrected an error with time source display (for SER inter-device).

### **Version 1.01 (1.01 / 1.00 / 1.01)**

15-Sep-2010

- Corrected an error with the year for certain dates beyond 2010.
- Corrected a spelling error on setup page.

### **Version 1.00 (1.00 / 1.00 / 1.00)**

30-Aug-2010

- Initial release (model SER-3200).xxx