The CyTime™ Sequence of Events Recorder from Cyber Sciences monitors the status of 32 channels and records state changes with 1ms accuracy. Up to 8192 events are stored in nonvolatile memory. Two models are available: the SER-3200 features 32 high-speed digital inputs, while 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. Custom web pages can be created for specific applications and added functionality. With the GMR5000 GPS Master Clock and Modbus TCP communications, integration with supervisory systems such as an electrical power monitoring system (EPMS) is simple.

SPECIFICATIONS

Available Configurations
- SER-3200 - 32 high-speed digital inputs
- SER-2408 - 24 high-speed digital inputs and 8 control relay outputs

Time Reference Sources
- PTP (IEEE 1588) Master/Slave via Ethernet (option)
- Primary and secondary NTP servers via Ethernet
- IRIG-B0 or DCF77 via optional EZC
- IRIG-B0 or DCF77 via RS-485 (from another SER)

High-Speed Digital Inputs
- Turn on/off time (max.) 0.5 ms / 0.5 ms
- Each input is optically isolated
- 24 Vdc nominal voltage

Digital Relay Outputs
- Controllable via Modbus TCP
- Form A solid-state relay
- Normally open, true high signal
- 24 Vdc nominal voltage
- 2.0A rated contacts
- Response time: <0.1 ms OFF to ON, < 0.1 ms ON to OFF

Other Features
- Embedded web server
- LCD display and keypad
- 4 GB SD memory card
- Trigger relay output contact closure duration: 100 ms
- Status available via LCD, Modbus TCP and Web page
- Standard DIN-rail mount hardware

Other Options
- 32 GB memory option
- EZ Connector for IRIG-B or DCF77

Power, Physical Dimensions, Operating Parameters
- DC input (24 Vdc), 10 W max
- Size: 11.25 x 4.75 x 3.13 in (286 x 121 x 79 mm)
- Weight: 3.0 lb (1.4 kg)
- Temperature: -25 to 70°C
- Humidity: Up to 95% (non-condensing)

Compliance
- FCC, ROHS, CE Marked, UL, cUL, RCM

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The GMR5000 can act as a Stratum 1 PTP or NTP server or provide an IRIG-B time code source.
Simple and Affordable: Hi-Res Time Sync Over Ethernet

Achieve high-resolution time synchronization without expensive infrastructure changes. The GMR5000 Master Clock and the CyTime™ Sequence of Events Recorder utilize PTP IEEE1588 to greatly improve timing accuracies over an existing Ethernet network without the need for special PTP-aware equipment or additional wiring. The system provides the exact time of power system events, enabling root-cause analysis, identifying slow breakers and allowing operators to verify proper system operation. The PTP-enabled solution is simple, affordable and completely scalable, from a few devices to the largest installation. Now engineers can expect more from their investment in power monitoring and know what happened and when – to one millisecond – and without all the extra wires.

Solution Benefits

- **Stratum 1 PTP synchronization**
  > Accurate timing reference to within ±15 ns of UTC using 24-channel GPS/GLONASS receiver

- **Holdover stability in case of GPS signal loss**
  > Internal high-stability OCXO oscillator provides accuracy of ±0.25 seconds/year

- **Time-critical information for root-cause analysis (1 ms)**
  > Time-stamped records of events—up to 8192 events stored in non-volatile memory

- **Reliable event recording**
  > Isolated digital inputs with user-configurable filter, debounce and chatter functions

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

- **Advanced troubleshooting**
  > High-speed trigger output to capture waveforms by a compatible power meter

- **Operations counters**
  > Counts each input/output transition, with date/time of last reset

- **Simple setup using a web browser—no proprietary software**
  > Embedded web server hosts user-friendly pages for setup and monitoring

- **Easy system integration**
  > Integrate with multiple systems via Ethernet, Modbus TCP, and web technologies

- **EPSS generator test-compliance reports enabled**
  > 16 data logs: when any group member changes state, all members’ states are recorded

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**Example PTP IEEE1588 Time Synchronization**

- GMR5000 PTP Grandmaster
- GPS Antenna
- Surge Arrester
- Switch
- PTP
- SER-3200/2408 PTP Slave
- SER-3200/2408 PTP Slave
- SER-3200/2408 PTP Slave
- PTP

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