



# XLi

## Time and Frequency System

### KEY FEATURES

- 12 Channel GPS Receiver with TRAIM
- Better Than 30 Nanoseconds RMS Accuracy to UTC
- Better Than  $1 \times 10^{-12}$  Frequency Accuracy
- Supports Primary and Secondary Reference Inputs (GPS, Time Code, 1PPS)
- Configurable as Dual Redundant GPS Receiver in One Chassis
- Standard 10/100 Base-T Network Port
- Intuitive Web Based Management
- HTML, Telnet, SNMP with MIB Standard
- Vacuum Fluorescent Display and Keypad
- Completely Modular with Plug-and-Play Capability
- Numerous Field-Upgradeable, Plug-in Option Cards Available
- Time code reader/generator (IRIG A,B; NASA 36) AM and DC
- Auxiliary Reference Input Supports Lock to External Cesium to Enhance Holdover
- Standard Outputs: 1PPS, Selectable Pulse Rates and Alarm
- Flash Memory for Remote Software Upgrades

The modular ultra precision Model XLi Time and Frequency System is the most versatile and flexible solution for timing and synchronization requirements. The XLi is completely modular through a variety of option cards that are easily configured by the user. The wide range of option cards make it easy to tailor your system to support nearly every possible output/input needed for time and frequency applications, by combining up to ten option modules (2U chassis), oscillator upgrades, and two GPS receivers per unit.

Configuration recognition software automatically detects the unit's setup, without modifications to the operating system, providing "plug-and-play" configuration capability for current and future application needs. Modularity delivers the freedom to configure the XLi as a GPS timing receiver, or a time code unit (TCU). Deploy Symmetricom's GPS technology to generate ultra high precision time and frequency outputs for a wide range of synchronization requirements, or leverage Symmetricom's years of expertise in Time Code technology, which is built into the heart of the XLi system.

The XLi seamlessly integrates into a network centric environment. The 10/100 Base-T interface is standard. Remote management

is facilitated with the intuitive HTML web based interface as well as SNMP with an enterprise MIB. Command line interface is also supported via Telnet or the RS-232/422 serial port. The XLi can function as a Stratum 1 NTP server with addition of the NTS option.

The standard XLi provides a wide range of time and frequency inputs and outputs such as: 1PPS output; time code input/output (IRIG A, B; NASA36) in both modulated (AM) and demodulated (DCLS) formats; programmable pulse rates; open collector alarm; front panel keypad and display; and more.

The modular XLi architecture allows easy extension of the software and hardware in the field. Software updates are remotely administered. Existing and future hardware option modules can be added as needed by the user. The GPS timing interface is also modular which facilitates future upgrade to alternate Global Navigation Satellite Systems (GNSS), such as Galileo, when available.



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## XLi Specifications

### GPS RECEIVER (OPTIONAL)

- Receiver input: 1575.42 MHz L1 C/A code. Coarse acquisition. Position accuracy: typical 10 m RMS tracking 4 satellites.
- Tracking: 12 parallel channels. Multi satellite ensembling with TRAIM.
- Acquisition time: Cold start <20 min. (typical)
- 1PPS output accuracy: UTC(USNO):  $\pm 30$  nS RMS 100 ns peak
- Frequency output accuracy:  $1 \times 10^{-12}$  @ 1 day
- Frequency/timing Allan Deviation stability (TCXO):  $1 \times 10^{-9}$  @ 1 sec  
 $3 \times 10^{-10}$  @ 10 sec  
 $3 \times 10^{-10}$  @ 100 sec  
 $2 \times 10^{-10}$  @ 1000 sec  
 $1 \times 10^{-12}$  @ 1 day
- Stability when not tracking satellites (TCXO):  $5 \times 10^{-7}$  (0°C to 50°C) typical

### TIME CODE UNIT (TCU) SYNC GENERATOR

- Sync code: IRIG A,B; NASA 36
- Code out: IRIG A,B; NASA 36

### OSCILLATOR

- Standard oscillator: VCTCXO
- Optional oscillators: OCXO, high stability OCXO, Rubidium, and high stability Rubidium.

### STANDARD INPUT/OUTPUT SIGNALS

- Eight standard I/Os
  - Two for control and monitoring:
  - Six for signals:
 Serial and Ethernet port.  
1PPS out, code in, code out, rate out, aux reference, and Open Collector Alarm output (all with BNC female connector).  
I/Os are configurable via the keypad/display, RS232/422, and the standard network port.
- RS-232/422: User selectable up to 19200 bps  
Connector: Male 9-pin D subminiature
- Network interface: Standard 10/100 Base-T RJ-45.  
Protocols: HTML, Telnet and SNMP for the user interface, FTP (for firmware upgrades), and optional NTP and SNTP.
- 1PPS: Pulse width: 20  $\mu$ s ( $\pm 1\mu$ s) on the rising edge on time, TTL levels into 50 $\Omega$ , BNC female connector.
- Code input: AM or DC code (IRIG A,B; NASA 36)  
AM Code: 0.5 Vp-p to 10 Vp-p, 100 k $\Omega$  ground, ratio (AM): 3:1  $\pm 10\%$   
DC Code: Logic low <1.25 V and Min 300 mV, Logic Hi >1.25 V and Max 10 V.  
Impedance: 100 K or 50 $\Omega$   
Polarity: positive or negative  
Connector: BNC female
- Code out: Default is IRIG-B AM  
Format: AM or DC code (IRIG A,B; NASA 36)  
AM Code: 3 Vp-p, into 50 $\Omega$   $\pm 10\%$ , ratio (AM): 3:1.  
DC Code: TTL into 50 $\Omega$   
Connector: BNC female
- Rate out: Default: 10 MPPS. Rate: 1PPS, 10 PPS, 100 PPS, 1 kPPS, 10 kPPS, 100 kPPS, 1 MPPS, 5 MPPS, and 10 MPPS. Duty cycle: 50% and 60/40%.  
Amplitude: TTL levels into 50 $\Omega$   
Connector: BNC female

- Aux ref input: Input frequency: 1, 5, and 10 MHz sine-wave.  
Amplitude: 1 Vp-p to 10 Vp-p at 1 k $\Omega$  to ground.  
1 Vp-p to 3 Vp-p at 50 $\Omega$  to ground.  
Impedance: Configurable 1 k $\Omega$  or 50 $\Omega$  to ground  
Connector: BNC female
- Alarm: Open collector. Max 25V/50 mA.  
Connector: BNC female

### MECHANICAL/ENVIRONMENTAL

- Time and frequency system
  - Power: Voltage: 90–260 Vac  
Frequency: 47–440 Hz
  - Connector: IEC 320
  - Size: 1U: 1.75" x 17.1" x 15.35"  
(4.44 cm x 43.4 cm x 38.9 cm)  
2U: 3.5" x 17.1" x 15.35"  
(8.89 cm x 43.4 cm x 38.9 cm)  
Standard 19" (48.26 cm) EIA rack system, hardware included.
  - Operating temperature: 0°C to +50°C (+32°F to +122°F)
  - Storage temperature: -55°C to +85°C (-67°F to +185°F)
  - Humidity: 95%, non-condensing
  - Display: Graphics (160 X 16) vacuum fluorescent display. One line for time and day of year (TOD). Two-line alpha-numeric display for status messages and user input.  
Keypad: numeric 0–9, left, right, up, down, CLR, Enter, time key, status key and menu key.
- Antenna
  - Size: 3" Dia. x 3" H (7.62 cm x 7.62 cm)
  - Input: BNC female to GPS receiver. TNC on antenna
  - Power: +12 Vdc
  - Operating temperature: -55°C to +85°C (-67°F to +185°F)
  - Storage temperature: -55°C to +85°C (-67°F to +185°F)
  - Humidity: 95%, non-condensing
  - Certification: UL, FCC, CE, and C-UL

### OPTIONS

(See Options datasheet for details  
[http://www.symmettm.com/pdf/Gps/ds\\_XLi\\_Options.pdf](http://www.symmettm.com/pdf/Gps/ds_XLi_Options.pdf))

### Software:

- Network time server on standard network port
- Frequency measurement
- Time interval/event timing
- Programmable pulse output
- Time Monitor Software for XLi

### Hardware:

- GPS Timing engine
- Oscillator upgrades: OCXO, High Stability OCXO, Rubidium, High Stability Rubidium
- 1, 5, 10 MHz/MPPS frequency outputs
- Low phase noise frequency output (5MHz and 10MHz)
- N.8 Frequency Synthesizer, 8kPPS to 8.192MPPS in 8kPPS steps
- N.1 Frequency Synthesizer, 1PPS to 50MPPS in 1PPS steps
- Have Quick/1PPS Time and Frequency Reference
- Have Quick output
- Multicode output for IRIG A, B, E, G, H; XR3/2137 and NASA 36
- DC power supplies (12 VDC, 24 VDC, and 48 VDC options)
- Telecommunications interface (E1 and T1 output options)
- Power Utility Frequency and Time Deviation Monitor
- Extended cable length solutions: in-line amplifier (to 300'), down/up converter (to 1500'), fiber optic (to 2 km).



Rear View



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