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Find the *Microsemi / Symmetricom XL-GPS* at our website: ***Click HERE***

XL-GPS

Time and Frequency Receiver

The XL-GPS is discontinued. The replacement model is the SyncServer S650.



Key Features

- 12 channel GPS receiver with TRAIM
- Accurate to 30 nanoseconds RMS UTC (USNO)
- Frequency accuracy to $1x10^{-12}$
- Vibrant LCD display and keypad
- Time code reader/generator
- Selectable pulse rates from 1 PPS to 10 MPPS
- 10 MHz frequency output standard
- Ethernet network port
- Telnet, SNMP and serial port for monitoring and control
- Network time server (NTS) option
- Option module bay supports:
  - Expansion module
  - Alarm relay
  - 1/5/10 MHz frequency module
  - Multicode time code module
- Measurement options
  - Time interval/event timing
  - Frequency measurement

Key Benefits

- Internal, 12 channel GPS receiver provides high accuracy UTC time and frequency reference
- Built-in network port facilitates remote monitoring, configuration and control
- Easy setup via front panel display and keypad
- Multiple options available to extend signal generation and measurement capability
- Robust time code generation supports virtually any time code application
- RoHS 5/6 compliant with European Union environmental standard
- Remote software upgrade

The XL-GPS Time and Frequency Receiver is a high performance, cost effective GPS based instrument that generates precise time and frequency signals referenced to Coordinated Universal Time (UTC). This high value, networked managed instrument is an excellent solution for test and measurement, central timing systems, process automation, range timing and power industry applications.

The XL-GPS is a part of the Microsemi® ultra precise model XLi time and frequency family of products. The XL-GPS offers cost-effective functionality and ease-of-use where the XLi offers modularity and extensibility through multiple option slots and modules.

At the XL-GPS core is a high performance disciplined oscillator. The internal, time optimized GPS receiver provides exceptional accuracy for time (<30 nanoseconds to UTC) and frequency (better than $1x10^{-12}$). A high performance oven oscillator option is available for improved stability and holdover performance.

A robust time code reader synchronizes to an existing time code as an alternative or backup to GPS. Time codes supported include IRIG A, B; IEEE 1344, and NASA 36 in both amplitude modulated and DC level shift formats.

The XL-GPS generates signals to synchronize a broad array of time and frequency equipment. Standard outputs include a 10 MHz sine wave, and pulse rates from 1 pulse-per-second (PPS) to 10 mega-pulses-per second (MPPS). A time code generator output supports synchronization of remote devices.

Easy configuration, control and monitoring is provided with multiple user interfaces. The bright LCD front panel display and keypad supports a convenient interface with at-a-glance system status or time-of-day. The built-in network port supports remote operation via telnet and SNMP monitoring. Local control is supported via a serial port and an alarm output can drive an alarm monitoring system.

A number of options are available to extend the standard suite of functions to meet application requirements. The Network Time Server (NTS) option enables the XL-GPS to function as a Stratum 1 Network Time Protocol (NTP) server to synchronize networked computers and devices.

The XL-GPS can optionally function as a sophisticated measurement device to analyze frequencies and pulses. The Frequency Measurement (FM) option supports analysis of 1,5,10 MHz frequencies. The Time Interval/Event Timing (TI/ET) option supports precise event pulse time tagging and time interval measurements with 5 nanosecond resolution.

An option module bay is available to extend the standard set of hardware outputs. The Expansion Module provides independent time code and pulse rate outputs. A 1,5,10 MHz/MPPS module provides additional frequency outputs. A Multicode module supports a wide range of IRIG time codes.

The XL-GPS delivers advanced performance at a lower cost with a versatile feature set to meet the most demanding applications.

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Specifications

GPS RECEIVER

- 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)
- 1 PPS output accuracy: UTC(USNO): ±30 nS RMS 100 ns peak
- Frequency output accuracy: 1 x 10^{-12}@ 1 day
- Frequency/timing Allan Deviation stability:

	TCXO (std)	OCXO (optional)
	1 x 10^{-9} @ 1 sec	1 x 10^{-10} @ 1 sec
	2 x 10^{-10} @ 1000 sec	1 x 10^{-10} @ 1000 sec
	1 x 10^{-12} @ 1 day	1 x 10^{-12} @ 1 day

- Aging 5x10^{-9}/day

TIME CODE READER/GENERATOR

- Codes: IRIG A, B, IEEE 1344, NASA 36

STANDARD CPU INPUT/OUTPUT SIGNALS

- Serial I/O: RS-232/422: User selectable up to 19.2 kbps. Connector: Male 9-pin D subminiature
- Network interface: Standard 10/100 Base-T, RJ-45 8-pin connector. Protocols: Telnet and SNMP for the user interface, FTP (for firmware upgrades), Optional NTP server
- J1 Code input: AM or DC code (IRIG-B120/B000; IEEE 1344, NASA 36) AM Code: 0.5 Vpp to 10 Vpp, 100 kΩ, ratio: 3:1 ±10% DC Code: Logic low <1.5 V, Logic Hi >2.5 Impedance: 100 kΩ (AM) or 50 Ω (DCLS) Polarity: positive or negative Connector: BNC female Optional: TI/ET input
- J2 Rate Output: Rate: 1 PPS, 10 PPS, 100 PPS, 1kPPS, 10kPPS, 100kPPS, 1 MPPS, 5 MPPS, 10 MPPS (default). Duty cycle: 60/40% (±10%). Amplitude: TTL into 50 Ω Connector: BNC female Optional: Programmable Pulse Output (PPO)
- J3 FM Input: Optional Frequency Measurement Default: disabled. Frequency: 1,5,10 MHz Range: 1000 x10^{-6} Impedance: 1k Ω or 50 Ω
- 1PPS Output: Standard 1PPS output Pulse width: 20 µs (±1 µs) on the rising edge on-time. TTL into 50Ω. Connector: BNC female (Below J1).
- Code out: Format: AM or DC code (IRIG-B120/B000; IEEE 344 NASA 36). AM Code: 3 Vpp into 50Ω ±10%, ratio: 3:1 ±10%. DC Code: TTL into 50Ω Accuracy to 1PPS: AM ±10 usecs. DCLS ± 500 nsecs Connector: BNC female (Below J2).
- Alarm: Open collector. Max 25V/50 mA. Connector: BNC female (Below J3)

DISCRETE OUTPUT SIGNALS

- 10 MHz Output: Amplitude: +13dBm into 50Ω Synchronization: Coherent to standard 1PPS within 10 nsec Connector: BNC female
- 1PPS Output: Amplitude: >2V into 50Ω Synchronization: +/- 20 nsecs to standard 1PPS output Connector: BNC female (Left of 10 MHz)

MECHANICAL/ENVIRONMENTAL

- Time and frequency system
  - Power: Voltage: 90–260 Vac, 110-300 VDC Frequency: 47–63 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) 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 (120 X 16) LCD. One line for time and day of year (TOD). Two-line display for status message and user input.
  - Keypad: Includes: 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, RoHS 5/6, and C-UL

OPTIONS

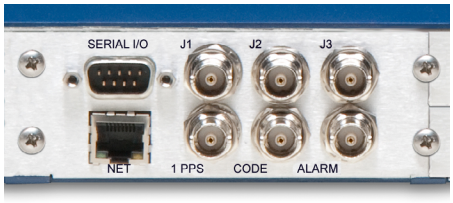
- Network Time Server (on standard network port)
- Oscillator Upgrade: OCXO
- 1,5,10 MHz/MPPS Output Module
- Multicode Output
- Expansion Module
- Alarm Relay
- Frequency Measurement (FM)
- Time Interval/Event Timing (TI/ET)
- Programmable Pulse Output (PPO)
- Extended cable lengths (75'-1500')
- GPS In-line amplifier for extended cable runs up to 300' (91 m)
- GPS Antenna down/up converter for long cable runs up to 1500' (457 m)
- Antenna splitter kit
- Lightning arrestor



XL-GPS Rear View (with Expansion Module)1530-602-1

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NETWORK TIME SERVER ON STANDARD NETWORK PORT



- Synchronize servers and workstations across the network
- High-bandwidth NTP capability
- High availability time referenced to UTC
- MD5 security protocol
- NTP broadcast mode
- SNMP Enterprise MIB
- Stratum 1 operation via GPS satellites

The high performance Microsemi Network Time Server (NTS) represents a breakthrough in network synchronization technology. By combining a high-speed/high-capacity network interface and a wide range of network protocol support, XL-GPS seamlessly integrates into existing networks.

The NTS distributes time to precisely synchronize client computer clocks over a network. Time is acquired from the host XL-GPS and distributed over the network using the Network Time Protocol (NTP). Client computer clocks can be synchronized within milliseconds. Information on the health and status of the NTP server and the primary time synchronization source is available by using the SNMP protocol Enterprise MIB. Also, MD5 security protocol is included to authenticate NTP client-server communication. The standard network port, when factory enabled, serves as the NTP server via an RJ-45 Ethernet connector.

No additional hardware is needed for this option; it utilizes the XL-GPS standard network port, leaving the option slot available.

Specifications: Network Time Server Option 87-8017

NETWORK PROTOCOLS

- Network time protocols
  - NTP v3/v4 (RFC 1305)
  - SNTP (RFC 1769)
  - TIME (RFC 868)
  - MD5 (RFC 1321)
- Other protocols
  - Telnet (RFC 854)
  - FTP (RFC 959)
  - MIB II (RFC 1213)
  - SNMP v2 Enterprise MIB II (RFC 1157)
- Network transport protocol: TCP/IP
- Simple Network Management Protocol (SNMP) SNMP provides the network administrator with network status and statistics. This feature implements SNMP versions 1 & 2 and Management Information Base (MIB) I and II.
- Network interface: 10/100 Base-T Ethernet
- Network time accuracy: 1 to 10 mS typical
- Accuracy: Function of input synchronization source (IRIG or GPS)

CLIENT SOFTWARE

An NTP client/daemon is required for client-side synchronization with any network time server. Comprehensive Domain Time II time client, server & management software for easy distribution, management and monitoring of time across the network is also available.

PROGRAMMABLE PULSE OUTPUT

The Programmable Pulse Output option is a software option that provides a user configurable TTL level pulse output that can be used to supply a precisely synchronized "trigger" pulse at specific times or provide periodic pulse outputs. The rising edge of the trigger output may be programmed with microsecond resolution for fine control. The periodic pulse rates supports several popular frequencies such as 1 PPS, 1 PP 10 SEC, 1 PPM, 1 PP 10 MIN, 1 PPH, 1 PP 10 HR, 1 PPD, 1 PP 10 DAYS or 1 PP 100 DAYS are available. The pulse width is also programmable. The pulse is supplied via a rear panel BNC.

Specifications: Programmable Pulse Output (PPO) 87-8024

- Range: 500PPS to 1 PP Year (integer multiples of 1 uS)
- Pulse width: Programmable in 1µS steps up to 1 year
- On time edge: Rising
- Amplitude: TTL Levels into 50Ω
- Accuracy: 200nSec

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FREQUENCY MEASUREMENT

The Frequency Measurement is a software option that provides the ability to precisely measure the frequency of an externally applied 1, 5, or 10 MHz signal. Measurement resolution is better than 120 x 10^{-12} with only a 1-second averaging time. It supports a periodic, zero dead-time mode of operation as well as a single-shot, measurement-on-demand mode. The measurement interval can be specified in integer seconds over the range of 1 to 100,000 seconds. Frequency measurement results appear on the front panel display and are output via the network and serial ports.

Specifications: Frequency Measurement 87-8025

INPUT FREQUENCIES

- Keypad selectable frequencies of 1, 5, 10 MHz.

  Input Level: 1.0 to 10 Vpp

  Input Impedance: 1kΩ or 50Ω

  Measurement Range: ±1 x 10-5 maximum offset; compares the external frequency under test directly to the clock's disciplined oscillator

  Input Frequency: 1 MHz, 5 MHz, 10 MHz

  Resolution:

  $120x10^{-12}$ @ 1 second

  $12x10^{-12}$ @ 10 seconds

  $1x10^{-12}$ @ 100 seconds

- Accuracy:

  TCXO

  $1x10^{-9}$ @ 1 second

  $2x10^{-10}$ @ 100 seconds

  $1x10^{-12}$ @ 1 day

  Ovenized quartz

  $1x10^{-10}$ @ 1 second

  $1x10^{-10}$ @ 100 second

  $1x10^{-12}$ @ 1 day

TIME INTERVAL/EVENT TIMING

Time Interval

The Time Interval function is a software option that provides the user with the ability to precisely measure the interval between the time of occurrence of the clock-derived 1 Hz reference pulse and the rising edge of the user-supplied 1 Hz pulse.

Event Timing

The Event Timing feature offers the capability of locating the time of occurrence of the rising edge of the applied pulse with respect to the time of year. A "burst" mode provides increased performance during short intervals. The collected data is available via the serial or the Telnet port.

Specifications: Time Interval/Event Timing (TI/ET) 87-8026

INPUT FREQUENCIES

- Rate: 1 PPS
- High level: Logic Hi >1.25V <10V
- Low level: Logic Low <1.25V >0V
- Active edge: Rising (Positive)
- Pulse width: 100 nS minimum
- Input impedance: >1k, or 50Ω

TIME INTERVAL FEATURE

- Measurement

  Rate: 1 per second

  Resolution: 5 nS

  Accuracy: ±5 nS (+ clock accuracy**)

  Range: 0.0 to 1 year

* Display: Time into the second, updated once per second, is displayed to the nanosecond until another event occurs or until the "TIME", "STATUS", or "POSITION" push-button is pressed.

EVENT TIMING FEATURE

- Measurement

  Rate: 10/second or 100/second burst

  Resolution: 5 nS

  Accuracy: ±5 nS (+ clock accuracy**)

  Range: 0.0 to 1 year

* Display: Event Time occurrence, hundreds of days through nanoseconds, is displayed until another event occurs or until the "TIME", "STATUS", or "POSITION" push-button is pressed.

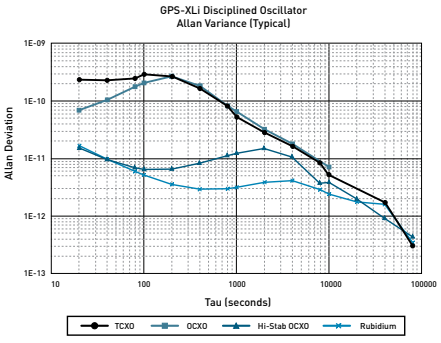
** For clock accuracy see accuracy of host unit.

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OSCILLATORS

Microsemi's XL-GPS receiver takes full advantage of the excellent long-term stability of the GPS system to steer or "discipline" the instrument's local oscillator. This process dramatically enhances performance by removing the long-term aging and drift of the oscillator without operator intervention.

Microsemi provides a full spectrum of ultra-precise frequency reference standards for every application. The upgrade to the XL-GPS standard Temperature Compensated Voltage Controlled Crystal Oscillator (TCVCXO) is the Ovenized Crystal Oscillator (OCXO). For applications requiring higher performance oscillators, the XLi offers rubidium atomic oscillators and high stability ovenized oscillators.



Oscillators Specifications (typical)

TCVCXO (Standard in XL-GPS)

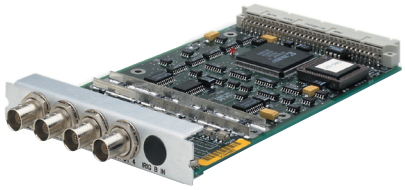
- Accuracy: Function of input synchronization source (GPS, IRIG)
- Frequency/timing Allan Deviation
- Stability
  - 1×10^{-9} @ 1 sec
  - 2×10^{-10} @ 1000 sec
  - 1×10^{-12} @ 24 hours
- Temperature: 5×10^{-7}, over 0°C to 50°C when not locked to a reference

OCXO OSCILLATOR OPTION 87-399-30

- Accuracy: Function of input synchronization source (GPS, IRIG, 1PPS)
- Frequency/timing Allan Deviation

  Stability:
  - 1×10^{-10} @ 1 sec
  - 1×10^{-10} @ 1000 sec
  - 1×10^{-12} @ 24 hours
- Temperature: 1×10^{-8}, over 0°C to 50°C when not locked to a reference
- Aging: 5×10^{-9} per 24 hours

MULTICODE OUTPUT



- Programmable formats
- Up to four code outputs
- Codes available: IRIG A, B, E, G, H; XR3/2137 and NASA 36

Select the various time code formats by using any of the three interfaces available: the front panel keypad and display, the RS-232/422 serial port, or the standard network port. The available time code format menu contains IRIG A, B, E, G, H; XR3/2137, and NASA 36.

Specifications: Multicode Output 87-6002-XL1

- Amplitude modulated;

Amplitude into 50Ω:	0–3 Vpp, adjustable via internally accessible potentiometer
Amplitude into 600Ω:	0–10 Vpp, adjustable via internally accessible potentiometer
Modulation ratio:	2:1 to 5:1 adjustable via internally accessible potentiometer

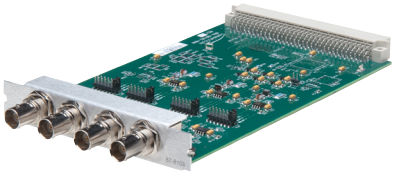
- Connector: BNC
- Quantity: 4
- Output impedance: 25Ω
- Accuracy: Function of input synchronization source (GPS, IRIG)
- Time codes

IRIG A 130	IRIG A 133	IRIG B 120	IRIG B 123
IRIG E 111	IRIG E 112	IRIG E 121	IRIG E 122
IRIG G 141	IRIG G 142	IRIG H 111	IRIG H 112
IRIG H 121	IRIG H 122	2137	XR-3

  NASA-36 (All codes in 24 hour format)
- Time references: Standard, UTC, GPS, or Local
- Compliance: RoHS Category 9 Exempt

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1, 5, 10 MHZ/MPPS



The 1, 5, 10 MHz/MPPS Output card provides four precise sine wave or square wave through four BNC outputs. These outputs are phased-locked to the host receiver's disciplined reference oscillator. They are automatically enabled upon power-up, and are independently selectable by the user with no configuration setup required.

Outputs are preconfigured at the factory. Please specify desired outputs on the sales order.

Specifications: 1, 5, 10 MHz/MPPS Output 87-8108

1, 5, or 10 MHz OUTPUT
- Amplitude: 1 Vrms into 50Ω
- Harmonic distortion: –30 dBc
- Synchronization: Phase locked to the clock 10 MHz
- Accuracy: Function of input synchronization source (GPS, IRIG)
- Connector: Female, BNC

1, 5, or 10 MPPS OUTPUT
- Amplitude: TTL into 50Ω
- Duty cycle: 50%
- Synchronization: Phase locked to the clock 10 MHz
- Accuracy: Function of input synchronization source (GPS, IRIG)

EXPANSION MODULE



The Expansion Module is a versatile option that expands the number of standard time code and pulse rate outputs from the XL-GPS. Four independent, user configurable outputs are provided. The output signals are selectable via an on-module rotary switch. Specify output signal configuration at time of order. A version of the module is also available supporting an alarm relay output.

The available output signal types are as follows:
- Time Code AM/DC: Format mirrors XL-GPS standard code output (IRIG A,B; IEEE 1344 or NASA 36)
- Alarm
- Rates (1 PPS, 1 kPPS, 10 kPPS, 100 kPPS, 1 MPPS, 5 MPPS,10 MPPS)
- Programmable Pulse (Requires PPO option to be installed)
- Alarm Relay (87-8134-2)

Specifications:
- Expansion Module 87-8134-1
- Expansion Module w/ Alarm Relay 87-8134-2

General
- Connector: Female BNC
- Quantity: 4

Time Code
- Format: IRIG B; IEEE 1344 or NASA 36
- Amplitude (AM): 3.0 Vp-p +/-1V, into 50Ω
- Ratio (AM): 3:1 +/- 10%
- Amplitude (DC): TTL into 50Ω
- Phasing: In phase with carrier ± 10µS

Alarm
- Active High (Alarm state)
- Amplitude: TTL Levels into 50Ω

Rates
- Rate: 1 PPS, 1 kPPS, 10 kPPS, 100 kPPS, 1 MPPS, 5 MPPS, 10 MPPS
- Duty cycle: 60/40% +/- 10%
- Amplitude: TTL Levels into 50Ω

Programmable Pulse (Optional)
- On time edge: Rising
- Amplitude: TTL Levels into 50Ω

Alarm Relay 87-8134-2
- Connection: Terminal strip, COM, NO, NC
- Max Voltage: 48 VAC/VDC
- Max Current: 2A @ 24 VDC

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