

SecureSync® PTP

PTP Grandmaster Clock



- PTP grandmaster port via copper and fiber optic interfaces (via SFP module)
- Compliant to IEEE 1588-2008 standard
- Industry-best $\pm 4\text{ns}$ time stamp resolution (HW time stamping)
- Better than 25 nanosecond time stamp accuracy to UTC
- Supports default, enterprise and telecom PTP profiles (1 Gb PTP only)
- Provides multicast, unicast, and hybrid mode addressing
- Available time code reader/generator options
- High bandwidth PTP performance
- Ethernet 10/100 Base-T communications port for set-up and management
- PTPd compatible
- Industry-leading low phase noise capability
- GPS synchronization
- Multi-GNSS option (Galileo, GLONASS, BeiDou, QZSS)
- STL option
- 5-year limited warranty

As methods of data transfer evolve, so too does the need for increased speed in information transmission. Precision Time Protocol (PTP), as defined by the IEEE 1588 standard, provides the most advanced method of synchronization over today's Ethernet networks. To support optimum network time synchronization, Spectracom supports the latest features of Precision Time Protocol Version 2 (PTP v2) in its SecureSync PTP Grandmaster Clock system. Up to 6 PTP ports can be added, each one creating a physically isolated network, allowing for maximum scalability to handle the expansion of your network infrastructure.

Offering the most advanced combination of network timing accuracy, security, and capability available on the market, the SecureSync PTP Grandmaster Clock is the premiere network time and synchronization solution for your mission-critical applications. Equipped with an innovative 10/100/1000 Base-T Gigabit PTP Option Module (model 1204-32), the SecureSync PTP Grandmaster Clock uses standard SFP's to connect to your copper or fiber networks. It boasts industry leading throughput due to its dedicated resources devoted solely to PTP operations. PTP functions are implemented in hardware and separated from all other management functions resulting in much higher performance and reliability.

The SecureSync PTP Grandmaster Clock is designed for high performance / low-latency computing applications in financial, industrial, and defense markets with an enhanced level of timing performance, so that the management of real-time events over wide areas is drastically improved. This rack-mountable and modular precise time reference/source includes options for other precise time and frequency functions such as reading and generating IRIG timecode formats capable of delivering accuracy from microseconds to tens of nanoseconds to various devices.

Add STL to GPS or GNSS input references to improve resilience, or use STL alone for indoor applications.

To achieve the best performance, use PTP to precisely distribute time across a LAN from the SecureSync PTP Grandmaster Clock to our TimeKeeper™ LINUX PTP precision software client installed in your servers (see TimeKeeper datasheet). PTP ensures that you will get the best time transfer performance over a managed network.



PTP unit requires 1 option card slot for PTP module. Add up to 5 additional option modules in the remaining slots to get the features you need.

Specifications

System Performance

See option card descriptions for additional performance specifications.

10 MHz Frequency Output:

	TCXO	OCXO	Low Phase Noise OCXO	Rubidium	Low Phase Noise Rubidium
Accuracy (average over 24 hours when GPS locked)	1×10^{-11}	2×10^{-12}	1×10^{-12}	1×10^{-12}	1×10^{-12}
Medium Term Stability (without GPS after 2 weeks of GPS lock)	1×10^{-8} /day	5×10^{-10} /day	2×10^{-10} /day	5×10^{-11} /month (3×10^{-11} /month typical)	5×10^{-11} /month (3×10^{-11} /month typical)
Short Term Stability (Allan Deviation)					
1 sec	2×10^{-9}	5×10^{-10}	5×10^{-11}	2×10^{-11}	5×10^{-11}
10 sec	1×10^{-9}	5×10^{-11}	2×10^{-11}	2×10^{-12}	2×10^{-11}
100 sec	3×10^{-10}	1×10^{-11}	1×10^{-11}	2×10^{-12}	5×10^{-12}
Temperature Stability (peak-to-peak)	1×10^{-6}	5×10^{-9}	1×10^{-9}	1×10^{-10}	1×10^{-10}
Phase Noise (dBc/Hz)					
@1 Hz	—	-95	-100	-80	-100
@10 Hz	—	-123	-128	-98	-128
@100 Hz	-110	-140	-148	-120	-148
@1 kHz	-135	-145	-153	-140	-153
@10 kHz	-140	-150	-155	-140	-155
Signal Waveform & Levels: +13 dBm into 50 ohm, BNC					

1 PPS Output:

	TCXO	OCXO	Low Phase Noise OCXO	Rubidium	Low Phase Noise Rubidium
Accuracy to UTC (1-sigma locked to GPS)	± 50 ns	± 50 ns	± 25 ns	± 25 ns	± 25 ns
Holdover (constant temp after 2 weeks of GPS lock)					
After 4 hours	12 μ s	1 μ s	0.5 μ s	0.2 μ s	0.2 μ s
After 24 hours	450 μ s	25 μ s	10 μ s	1 μ s	1 μ s
Signal Waveforms and Levels: TTL (5V _{pp}), into 50 ohm, BNC					

Network Services

Timing

- NTP v2, v3, v4: Conforms with or exceeds RFC 1305 and 5905. Supports Unicast, Broadcast, Multicast, MD5 encryption, Peering, Stratum 2, Autokey
- SNTP v3, v4: Conforms with or exceeds RFC 1769, 2030, 4330, and 5905
- Time (RFC 868)
- Daytime (RFC 867)
- IEEE-1588v2 (PTP) via option card(s)
- NTP over Anycast

Management

- IPv4/IPv6: Dual stack
- DHCPv4/DHCPv6 (AUTOCONF)/SLAAC: Automatic IP address assignment
- Authentication: LDAP, RADIUS, TACACS+
- Syslog: Logging
- SNMP: Supports v1, v2c, and v3 (no auth/auth/priv) with Enterprise MIB

Communications

- HTTP: Browser-based configuration and monitoring
- Telnet: Remote configuration
- FTP Server: Access to files (logs, etc.)
- SMTP: Email

Security Features

- Enable/Block Protocols
- Set SNMP Community Names and Network Access
- Password Protected
- Standard encryption/authentication protocols
- SSL Web-based Interface: SSL is used to secure HTTPS protocol to access configuration and status web pages.
- SSH: SSL and data compression technologies provide a secure and efficient means to control, communicate with, and transfer data to or from the time server remotely.
- SCP: securely transfers files to and from the time server over an SSH session.
- SFTP: FTP replacement operates over an encrypted SSH transport
- SNMP v3: remotely configure and manage over an encrypted connection
- Alert notifications via SNMP Traps and e-mail

GNSS Receiver

- Connector: Type N, +5V to power active antenna
- Frequency: GPS L1 (1575.42 MHz); optional SAASM: GPS L1 & L2 (1227.6 MHz); optional Multi-GNSS: Galileo E1 (1575.42 MHz), GLONASS L1 (1602.0 MHz), BeiDou B1 (1561.1 MHz), QZSS L1 (1575.42 MHz)
- Satellite tracking: 1 to 72, T-RAIM satellite error management
- Synchronization time: cold start < 15 minutes (includes almanac download), warm start < 5 minutes (assumes almanac download)
- Antenna system: sold separately

Oscillator

- Standard Oscillator: OCXO
- Optional Oscillators: TCXO, Low Phase Noise OCXO (LPN OCXO), Rubidium (Rb), Low Phase Noise Rubidium (LPN Rb)

IEEE 1588 System Details (per port)

IEEE 1588 PTP is provided by the model 1204-32 module. Up to 6 modules may be accommodated in one grandmaster system.

Compliance

- IEEE 1588-2008 (PTP V2)
- Default, enterprise and telecom PTP profile support
- One-step or two-step operation
- Multicast, unicast, and hybrid mode addressing
- Compatible with PTPd and TimeKeeper software

Interface

- 1 Gb SFP port, BNC for 1 PPS output

Grandmaster Performance

- Time stamp resolution: ± 4 ns (HW time stamping)
- Sync intervals: Max 128 syncs/sec., configurable
- Process capacity: Up to 4,000 slaves at 128 requests/second
- Accuracy: 25 ns or better (3σ) via crossover cable

Communications

Network Port for Configuration and Management, One-step Operation Only

- RJ-45, 10/100 Base-T

Serial Set-up Interface

- RS-232 communications on DB-9 connector

Front Panel

- LED segments displays time
- Lockable keypad and configurable LCD display for network set-up
- Power/Status LEDs

Power

Choice of

- 100-240 V_{AC}, 50/60 Hz, $\pm 10\%$ or 100-120 V_{AC}, 400 Hz, $\pm 10\%$ from IEC60320 connector; power cord included
- 12-17 V_{DC}, -15% to +20% or 21-60 V_{DC}, -15% to +20%, secure locking device
- Auto-failover in the case of AC and DC

Power Draw

- TCXO: 40 W normal (50 W start-up)
- OCXO: 40 W normal (50 W start-up)
- Rb: 50 W normal (80 W start-up)
- LPN Rb: 52 W normal (85 W start-up)

Environmental

	Operating	Storage	MIL-STD-810F
Temperature	-20 to +65°C (+55°C for Rb)	-40 to +85°C	
Humidity	0%-95% RH non-condensing @ 40°C		
Altitude	100-240 V _{AC} up to 6,560 ft (2,000 m), 100-120 V _{AC} up to 13,123 ft (4,000 M) 12-17 V _{DC} and 21-60 V _{DC} up to 13,123 ft (4,000 m)	45,000 ft (13,700 m)	
Shock	15g, 11ms half sine wave	50g, 11ms half sine wave ¹	516.5
Vibration	10-55Hz/0.07g ² /Hz 55-500Hz/1.0g ² /Hz	10-55Hz/0.15g ² /Hz 55-500Hz/2.0g ² /Hz	514.5

¹SAASM GPS Storage Shock Specs: MRU 35g, GB-GRAM 40g

Agency Approvals

CE, UL, cUL, CSA, FCC part 15 class A, ROHS, WEEE

Physical & Environmental

Size/Weight

- Designed for EIA 19" rack. 16.75" W x 1.72" H (1U) x 14.33" D actual (425 mm W x 44 mm H x 364 mm D actual)
- Weight: 6.5 lbs. (2.95 kg) with Rubidium option; 6.0 lbs. (2.72 kg) without
- Rack mount hardware included (assembly required)

Warranty

Five Year Limited Warranty¹

- Oscillator for rubidium option is warranted for two years
- Extended warranty is available

¹The warranty period may be dependent on country.

Ordering Information

Base Units

1200-XYZ

Select power, internal oscillator and GPS reference options:

X=Power	Y=Internal Oscillator	Z=Primary Reference
0=AC	0=TCXO	1=No GPS
1=AC/DC (12 vdc)	1=OCXO	3=GPS/Multi-GNSS ²
2=AC/DC (24/48 vdc)	2=Low phase noise OCXO	5=SAASM GPS (MRU) ¹
3=DC (12 vdc)	3=Rubidium	7=SAASM GPS (GB-GRAM) ¹
4=DC (24/48 vdc)	5=Low phase noise Rb	

Example

A SecureSync base unit with AC power, OCXO internal oscillator, and GPS as the primary reference is Model Number 1200-013. It comes with a 10/100 Base-T network port for communications and NTP server and 1 each 1PPS and 10 MHz output signals. Order 1204-32 module per 1 Gb PTP grandmaster port. Order option modules for additional input/output functions.

¹SAASM GPS option occupies 2 option modules. Only 4 additional option modules may be purchased.
²Operation with Multi-GNSS requires SS-OPT-GNS upgrade.

Optional Upgrades

SS-OPT-GNS: Adds Galileo E1, GLONASS L1, BeiDou B1, QZSS L1
(Not available with SAASM GPS)

SS-OPT-SKY: Adds Skylight™ Indoor GPS Timing System

Option Modules

Up to 6 option modules can be accommodated per unit. See Option Module Card datasheet for details on additional option modules.

Master-Slave Configurations

For optimal performance, consider the following slave components for your PTP network:

1204-3B: 1Gb Precision Time Protocol option module card installed in other SecureSync units

TimeKeeper™ Linux PTP/NTP: Software