spectracom

SecureSync® High-Speed PTP Grandmaster Clock
Time and Frequency Synchronization System

- **Standard RF and fiber optic interfaces (via SFP+ module)**

- **Compliant to IEEE 1588-2008 standard**

- **Industry-best ±4ns time stamp resolution (HW time stamping)**

- **Better than 25 nanosecond time stamp accuracy to UTC**

- **Master and slave configurations available in single system (optional)**

- **Supports default and telecom PTP profiles**

- **Provides multicast, unicast, and hybrid mode addressing**

- **Available time code input/output (optional)**

- **High bandwidth PTP performance**

- **Additional Ethernet 10/100 Base-T port**

- **PTPd compatible**

- **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 High-Speed PTP Grandmaster Clock system. Up to 6 PTP ports can be added to operate in various PTP deployments, 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 High-Speed PTP Grandmaster Clock is the premiere network time and synchronization solution for your mission-critical applications. Equipped with the latest and most innovative 10/100/1000 Base-T Gigabit PTP Option Card on the market, the SecureSync High-Speed PTP Grandmaster Clock boasts industry-leading packet throughput and data processing power. The installment of an optional slave-ready 10/100 Mb PTP Option Card creates a powerful master-slave combination to satisfy even the most rigorous timing requirements. Standard RF and fiber optic interfaces via SFP+ modules provide the ability to select between either of the two media relative to your specific needs, greatly reducing the effects of distance limitations within your system architecture.

The SecureSync High-Speed 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 PTP grandmaster clock, precise 1PPS timing, and IRIG timecode formats capable of delivering accuracy from microseconds to tens of nanoseconds.

To achieve the best performance, use our PTP (Precision Time Protocol utilizing the IEEE-1588v2 standard) to precisely distribute time across a LAN from the SecureSync High-Speed PTP Grandmaster Clock to a TSync-PCIe-PTP timing card in a server or to our TimeKeeper™ LINUX PTP precision software client installed in your application or blade servers. 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 variance)					
1 SEC	2×10^{-9}	5×10^{-10}	5×10^{-11}	2×10^{-11}	5×10^{-10}
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 µs	1 µs	0.5 µs	0.2 µs	0.2 µs
After 24 hours	450 µs	25 µs	10 µs	1 µs	1 µs
Signal Waveforms and Levels: TTL (5v p-p), into 50 ohm, BNC					

Network Management
Network Protocols
- IEEE-1588v2 (PTP) via option card(s)
- 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
- IPSec: IPv4/IPv6 Transport Mode
- IPv4/IPv6: Dual stack
- DHCP/DHCP6 (AUTOCONF): Automatic IP address assignment
- HTTP: Browser-based configuration and monitoring
- LDAP: Authentication
- RADIUS: Authentication
- Telnet: Remote configuration
- FTP Server: Access to logs
- Syslog: Logging
- SNMP: Supports v1, v2, v2c, and v3 (no auth/auth/priv) with Enterprise MIB
- Time (RFC868)
- Daytime (RFC867)

Security Features
- Enable/Block Protocols
- Set SNMP Community Names and Network Access
- Password Protected
- Encryption DES, 3DES, AES
- Authentication SHA1, MD5
- 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: v1,v2, v3
- SNMP: remotely configure and manage over an encrypted connection.
- Alert notifications via SNMP Traps and e-mail

GPS Receivers
- Frequency: L1 (1575.42 MHz), optional: L1 & L2 (1227.6 MHz) (SAASM GPS), GLONASS L1 (1602.0 MHz)
- Satellite tracking: 1 to 12, GPS T-RAIM satellite error management
- Synchronization time: cold start < 15 minutes (includes almanac down load), warm start < 5 minutes (assumes almanac downloaded)
- Antenna system: included with SAASM GPS

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)

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

Interface
- BNC connector and SFP+ port

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
- 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 VAC, 50/60 Hz, ±10% or 100-120 VAC, 400 Hz, ±10% from IEC60320 connector; power cord included
- 12-17 VDC, -15% to +20% or 21-60 VDC, -15% to +20%, secure locking device
- Auto-failover in the case of AC and DC

Power Draw
- TCXO: 40W normal (40W start-up)
- OCXO: 40W normal (50W start-up)
- Rb: 50W normal (80W start-up)

Environmental

	Operating	Storage	MIL-STD-810F
Temperature	-20 to +65°C (+55°C for Rb)	-40 to +85°C	501.4, 502.4
Humidity	0%-95% RH non-condensing @ 40°C		507.4
Altitude	100-240 VAC to 6,560 ft (2,000 M), 100-120 VAC to 13,123 ft (4,000 M) 12-17 VDC and 21-60 VDC to 13,123 ft (4,000 M)	45,000 ft (13,700 M)	500.4
Shock	15g/0.53oz,11ms half sine wave	50g/1.76oz, 11ms half sine wave[1]	516.5
Vibration	10-55Hz/0.07g, 55-500Hz/1.0g	10-55Hz/0.15g, 55-500Hz/2.0g	514.5

[1]SAASM GPS Storage Shock Specs: MRU 35g/1.23oz, GB-GRAM 40g/1.41oz

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 14.0" D actual (425 mm W x 44 mm H x 356 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 Warranty[1]
- Oscillator for rubidium option is warranted for two years
- Extended warranty is available

[1]The 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/GLONASS[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 and 1 each 1PPS and 10 MHz output signals. Order option modules for additional input/output functions.

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

Optional Upgrades
SS OPT-GNS: Adds GLONASS L1 1602 MHz support (Not available with SAASM GPS)
SS OPT-SKY: Adds Skylight™ Indoor GPS Timing System

Option Modules
Up to 6 option modules can be accomodated per unit. The PTP module requires one card slot. See Option Module Card datasheet for details on additional option modules.

Accessories
SFP+ Modules: Contact sales for a list of compatible SFP+ modules

Master-Slave Configurations
For optimal performance, consider the following slave components for your PTP network:
1204-12: 10/100 Mb Precision Time Protocol option module card
TSync-PCIe-PTP: PTP timing board
TimeKeeper™ Linux PTP/NTP: Software