ELECTRONICS & DEFENSE

SECURESYNC 2400

Resilient Time and Frequency Synchronization Platform

Resilient Timing for Evolving Requirements

Resilient Timing depends on securing the time reference acquisition and timescale keeping in the face of GNSS interference. Government recommendations, like the Executive Order in the US or the Cybersecurity Act in European Union, pave the way for future regulations in this domain.

The SecureSync product ecosystem offers a number of solutions to address GNSS threats. With a layered-defense approach, each protective layer increases the sophistication required to compromise, minimizing chances for successful attack.

SecureSync relies on the proven Interference Detection Suite, allowing jamming and spoofing detection. Threats are mitigated by high-performance internal oscillators, or through strong modularity and choice of input interfaces, building redundancy into the timing system architecture.

Whatever your industry, there is a cost-effective SecureSync configuration that keeps your time distribution accurate and available.

- Multi-GNSS synchronization (GPS, Galileo, GLONASS, BeiDou, QZSS)
- GPS jamming and spoofing detection option
- Internal precision timekeeping via TCXO, OCXO or Rb oscillator
- Supports a wide variety of available input/ output signals
- Modular (configure-to- order)
- Exceptional operating temperature range of -20°C to +65°C
- High bandwidth NTP
- PTP v2 Master/Slave
- Dual Gb Ethernet
- Secure network management: Enable or disable protocols for encryption, authentication, authorization and accounting
- REST API management
- Alert notifications via SNMP traps and email alert
- Industry-leading five year limited warranty

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Security

SecureSync 2400 is designed with security in mind, combining cybersecurity best practices, including VLAN support account/access management, authentication, encryption, security event logs, network features disabling, as well as regular, secured firmware updates to keep pace with the latest vulnerabilities and protocol improvements. SecureSync is the only time server which includes a FIPS 140-2 certified cryptomodule, at the heart of all authentication and cryptographic functions.

Networking that Scales

SecureSync 2400 provides leading and scalable networking capability, thanks to:
- Two Gigabit Ethernet ports (one RJ45, one SFP) on base unit.
- Optional network timing option cards, supporting NTP, PTP and White Rabbit protocols.

SecureSync supports up to 12 x 1 GbE ports and up to 8 x 10 GbE ports. As a PTP Grand-Master (with 1204-32 option cards), SecureSync 2400 supports up to 2 millions PTP requests per second.

SecureSync network ports can be configured as master/server or as slave/client, enabling building robust, redundant network timing distribution architectures.

Thanks to the WROX card, SecureSync provides nano-second level time transfer accuracy thanks to White Rabbit protocol, on 1 GbE or 10 GbE interfaces. SecureSync makes it possible to get as accurate time through White Rabbit network as through GNSS reception.

Refer to SecureSync option card datasheets for detailed features associated with option cards. Refer to the WROX option card datasheet for specific WROX features.

Modularity

For applications that use “physical” timing signals and require multiple interface types, SecureSync 2400 offers unmatched modularity and a choice of more than 40 option cards.

The base unit provides configurable Input/Output timing interfaces (TTL pulse, RS232/RS485, IRIG AM /DCLS), on top of 10 MHz and 1 pps outputs. If more interfaces are needed, the base unit supports either 2 (2402) or 6 (2406) option card slots, enabling whatever combination of frequency, phase, NMEA or Have Quick time codes, and network synchronization is needed.

Reliability

At the appliance level, SecureSync includes an optional, dual (redundant), hot swappable power supply combined with AC, 12 VDC or 24/48 VDC power modules. Modularity enables multiple time reference management as well as redundant time distribution architectures, which is instrumental to system- level reliability. Any failure is identified and reported in real time, reducing periods of unavailability.

Monitoring

SecureSync 2400 embeds local and remote monitoring tools, including detailed event logs, real-time access to health and operation status, timing performance graphs, and alerts. Integration into automated monitoring systems is supported with legacy protocols like SNMP as well as the more recent REST API. Quick, local diagnostics are accelerated thanks to the front panel indicators and OLED display.

Technical Specifications

Specifications

See option card descriptions for additional performance specifications.

10 MHz Frequency Output:

Internal Oscillator	TCXO	OCXO	LPN OCXO	Rubidium	LPN Rub
Accuracy (average over 24 hours when GPS locked)	$5x10^{-12}$	$4x10^{-12}$	$3x10^{-12}$	$1x10^{-12}$	$1x10^{-12}$
Medium Term Stability (without GPS after 2 weeks of GPS lock)	$1x10^{-8}$ / day	$5x10^{-10}$ /day	$2x10^{-10}$ / day	$5x10^{-11}$ /month ($3x10^{-11}$ /month typ)	
Short Term Stability (Allan Deviation)					
1 sec	$2.5x10^{-9}$	$1x10^{-11}$	$1x10^{-11}$	$1x10^{-11}$	$1x10^{-11}$
10 sec	$1x10^{-9}$	$9x10^{-12}$	$9x10^{-12}$	$9x10^{-12}$	$1x10^{-11}$
100 sec	$5x10^{-10}$	$9x10^{-12}$	$8x10^{-12}$	$4x10^{-12}$	$5x10^{-12}$
Temperature Stability (peak-to-peak)	$1x10^{-6}$	$5x10^{-9}$	$2x10^{-9}$	$1x10^{-10}$	$1x10^{-10}$
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	-150	-140	-150
@10 kHz	-140	-150	-150	-140	-150
Signal Waveform & Levels: +13 dBm Sine into 50 ohm, BNC					

1 PPS Timing Output

	TCXO	OCXO	LPN OCXO	Rubidium	LPN Rub
Accuracy to UTC (locked to GPS, @ 1 sigma)	±50 ns	±25 ns	±15 ns	±15 ns	±15 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 Waveform & Levels: TTL (5 V_{P-P}), into 50 ohm, BNC					

Timing Signals

10 MHz Sine Output, BNC

SW Configurable Timing Output, BNC

- TTL Output (1 PPS, xPPS [output only], IRIG DCLS, HAVE QUICK)

SW Configurable Timing Input/Output, HD-15

- TTL Input/Output (1 PPS, xPPS [output only], IRIG DCLS, HAVE QUICK)
- RS-232 Input/Output (NMEA, ASCII ToD)
- RS-485 Input/Output (1 PPS, xPPS [output only], IRIG DCLS, HAVE QUICK, NMEA, ASCII ToD)
- IRIG AM Output

Network Timing

- NTP v2, v3, v4: Conforms with RFC 1305 and 5905. Supports Unicast, Broadcast, Multicast, Symmetric Key Encryption, Peering, Stratum 2
- SNTP v3, v4: Conforms with RFC 1769, 2030, 4330, and 5905
- PTP v2: Conforms with IEEE 1588:2019. Supports Master, Slave, E2E, IPv4/v6, Multicast, Unicast, Hybrid modes
- PTP supported profiles: default, power (IEEE 61850-9-3, IEEE C37.238-2011/2017), telecom (ITU-T G.8265.1, G.8275.2 master only)

Management & Communications

- IPv4/IPv6: Dual stack
- VLAN support
- DHCPv4/DHCPv6 (AUTOCONF)/SLAAC: Automatic IP address assignment
- Syslog: Logging
- HTTP(S): Browser-based configuration and monitoring
- Command Line Interface (expert mode)
- REST API configuration and monitoring
- (S)FTP Server: Access to files (logs, etc.)
- SNMP: Supports v1, v2c, and v3 (no auth/auth/priv) with Enterprise MIB
- SMTP: Email

Security Features

- Configurable Password Policy
- Authentication: LDAP, RADIUS, TACACS+
- Enable/Block protocols
- Access Control Lists
- HTTP Strict Transport Security (HSTS) support
- SSL/SSH
- FIPS 140-2 certified cryptomodule
- SFTP/SCP: Securely transfers files to and from the time server over an SSH session
- SNMP v3: Remotely configure and manage over an encrypted connection
- Alert notifications via SNMP traps and email
- Signed software updates

GNSS Receiver

- Connector: Type SMA with Type N cable adapter, +5V to power active antenna
- Frequency: GPS L1 (1575.42 MHz), 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
- Antenna system: sold separately.

Communications

Network Port

- Dual Gb Ethernet (one RJ-45, one SFP)

Serial Set-up Interface

- RS-232 communications on front panel micro USB, rear panel RJ-45

Front Panel

- LED segments for time display
- OLED menu display and keypad for status and basic configuration
- LED status buttons with one-click menu access

Power

- Fixed 100-240 VAC, 50/60 Hz, ±10% from IEC60320 (option 0) connector; power cord included
- Fixed 12 VDC (option 3) or 24/48 VDC (option 4); mating connector and cable clamp included
- Optional dual hot-swap power with load-sharing and failover

Power Draw

- TCXO: 40 W normal (50 W start-up)
- OCXO: 40 W normal (50 W start-up)
- Rubidium: 50 W normal (80 W start-up)

Environmental

	Operating	Storage
Temp	-20 to +65°C (+55°C for Rb)	-40 to +85°C
Humidity	0%-95% RH non-condensing @ 40°C	
Altitude	100-240 VAC up to 13,123 ft (4,000 m)	45,000 ft (13,700 m)
Shock	MIL-STD-810H, 516.8 15g, 11 ms halfsine	
Vibration	MIL-STD-810H, 514.8C-2 cat 4 and 514.8D-11, cat 21 1.1 g rms vertical and 0.8 g rms longitudinal	

Agency Approvals

- CE, UKCA, TUV, cTUV, FCC part 15 class A, RoHS, REACH, WEEE

Physical & Environmental

Size/Weight

- Designed for EIA 19" rack. 17.1" W x 1.74" H (1U) x 15.17" D (434 mm W x 44 mm H x 385 mm D)
- Weight : 6.0 lbs (2.72 kg) for base unit with AC power supply
- Front rack mount hardware included (assembly required)

Warranty

Five Year Limited Warranty[1]

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

[1] *The warranty period may be dependent on country.*

Ordering Information

Base Units

240w-xyz

Select expansion capability, power, internal oscillator and GNSS options:

w = Expansion	x = Power	y = Internal Oscillator	z = GNSS Reference
2 = 2 Option Slots 6 = 6 Option Slots	0 = AC 3 = 12 VDC 4 = 24/48 VDC 6 = Dual Hot-Swap support[2]	0 = TCXO 1 = OCXO 2 = Low Phase Noise OCXO 3 = Rubidium 5 = Low Phase Noise Rubidium	3 = Multi-GNSS

[2] *Dual Hot-Swap requires ordering at least one power module (see power module options below), on top of power option 6 for the base unit .*

Example

A SecureSync with 6 slots base unit with fixed AC power, OCXO internal oscillator, and GPS as the primary reference is Model Number 2406-013. Order option modules for additional input/output functions.

A SecureSync with 2 slots base unit, with Dual Hot Swap AC power supplies, rubidium internal oscillator and GPS as the primary reference requires Model Number 2402-633 and the addition of 2 power supply module 2400-HS-A1.

Optional Upgrade

SS-OPT-BSH: GPS Jamming and Spoofing Detection

SS-OPT-AGP: RINEX server (generates GPS and GALILEO almanac and ephemeris file)

Option Modules

Up to 2 or 6 option modules can be accommodated per unit.

See Option Module Card datasheet for details.

Power Modules

Up to 2 power modules, from below list, shall be ordered with the Dual Hot-Swap power option 6:

- 2400-HS-A1: 100-240 VAC.
- 2400-HS-D1: 12 VDC Hot Swap Power module.
- 2400-HS-D2: 24/48 VDC Hot Swap Power module.

Accessories

- I/O timing signals breakout cable enables conversion from single HD-15 connector to individual BNC and Sub-D connectors
- SFP (copper, FO Single Mode, FO Multi-Mode)
- Ancillary kit, rugged installation

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