orolia
DEFENSE & SECURITY

Your Resilient PNT
Mission Partner

SecureSync® M-Code

Resilient Time and Frequency Synchronization Platform

- Military M-code and P(Y)-code receiver, with direct acquisition and continuous tracking of both L1 and L2 GPS satellite frequencies.
- Multi-GNSS synchronization (GPS, Galileo, GLONASS, BeiDou, QZSS)
- Alternate signal options
- BroadShield 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) ruggedized shock and vibration tested chassis
- 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

SecureSync® M-Code combines Orolia's precision time and frequency technology with an ultra-secure M-code GPS receiver. SecureSync M-code includes the latest generation of modernized security architecture, modernized anti-spoofing and anti-jamming for GPS-degraded environments, operations in mixed P(Y)-code and M-code constellations, accelerated Direct-Y and Direct-M code acquisitions, and Over-The-Air-Rekeying (OTAR). SecureSync M-code provides better than 41 dB J/S while tracking (state 5) and better than 54 dB J/S (state 3) while providing cryptographic key retention without battery backup.

Mission-critical military applications will benefit from SecureSync M-Code's extreme reliability, security, and flexibility. An important advantage of SecureSync M-Code is its ruggedized shock and vibration-tested chassis, designed to meet MIL-STD-810F for environmental performance. The base unit provides an extremely accurate 1PPS timing signal aligned to a 10 MHz frequency signal without any 10 MHz phase discontinuity. An assortment of internal oscillator options is available to fulfill a broad range of requirements for holdover and phase noise.

In addition to 1PPS and 10Mhz signals, the base unit provides two Gigabit Ethernet ports (one RH45, one SFP) enabling flexible network synchronization, along with configurable Input/Output interfaces (DCLS, RS232/RS485, IRIG AM). Up to 5 additional input/output modules can be added to each SecureSync M-Code to cater it to your specific needs. Choose from a vast selection of option cards to add to your configuration of timing signals, including additional 1PPS or time code (IRIG, ASCII, HaveQuick), frequency outputs (10 MHz, 5 MHz, 2.048 MHz, or 1.544 MHz), telecom T1/E1 data rates, multi-port NTP, and PTP. Modules can also be custom designed to meet the exact specifications of any military program.

SecureSync M-Code is a security-hardened network appliance designed to meet rigorous network security standards and best practices, including VLAN support. It ensures accurate timing through multiple references, tamper-proof management, and extensive logging. Robust network protocols are used to allow for easy but secure configuration. Features can be enabled or disabled based on your network policies. Installation is aided by DHCP (IPv4), AUTOCONF (IPv6), and a front-panel keypad and display. The 1 RU chassis is powered by AC on an IEC60320 connector. DC power is also available as a primary source or as a back-up to standard AC power. Additionally, SecureSync includes an optional, dual (redundant), hot swappable power supply for both AC and DC configurations.

Specifications

See option card descriptions for additional performance specifications.

10 MHz Frequency Output:

	TCXO	OCXO	Rubidium
Accuracy (average over 24 hours when GPS locked)	$1x10^{-12}$	$1x10^{-12}$	$1x10^{-12}$
Medium Term Stability (without GPS after 2 weeks of GPS lock)	$1x10^{-8}$/day	$5x10^{-10}$/day	$5x10^{-11}$/month ($3x10^{-11}$/month typical)
Short Term Stability (Allan Deviation)			
1 sec	$7x10^{-10}$	$1x10^{-11}$	$1x10^{-11}$
10 sec	$4x10^{-10}$	$9x10^{-12}$	$9x10^{-12}$
100 sec	$3x10^{-10}$	$9x10^{-12}$	$4x10^{-12}$
Temperature Stability (peak-to-peak)	$1x10^{-6}$	$5x10^{-9}$	$1x10^{-10}$
Phase Noise (dBc/Hz)			
@1 Hz	—	-95	-80
@10 Hz	—	-123	-98
@100 Hz	-110	-140	-120
@1 kHz	-135	-145	-140
@10 kHz	-140	-150	-140
Signal waveform and levels: +13 dBm into 50 ohm, BNC			

1 PPS Output:

	TCXO	OCXO	Rubidium
Accuracy to UTC (1-sigma locked to GPS)	±50 ns	±50 ns	±25 ns
Holdover (constant temp after 2 weeks of GPS lock)			
After 4 hours	12 µs	1 µs	0.2 µs
After 24 hours	450 µs	25 µs	1 µs
Signal waveform and levels: TTL ($5V_{p-p}$), into 50 ohm, BNC			

Timing Signals

10 MHz Output, BNC

SW Configurable Timing Output, BNC

- TTL Output (1 PPS, xPPS, 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, IRIG DCLS, HAVEbQUICK, NMEA, ASCII ToD)
- IRIG AM Output

Network Services

Timing

- NTP v2, v3, v4: Conforms with RFC 1305 and 5905.
- Supports Unicast, Broadcast, Multicast, MD5 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

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 email

GPS M-code Features

- Connector: Type N, +5V to power active antenna
- Receiver input: L1/L2
- Crypto Key input: DS-101 key loading. Front panel connector
- Security: M-code (MPE-M) MGUE
- Antenna/preamplifier: L1 1574.42 MHz & L2 1227.60 MHz, 40 dB gain (antenna sold separately)
- Acquisition time: TTFF (95%): <15 sec hot start, <90 sec warm start
- Purchases and Export of SecureSync M-code requires coordination through the SMC Production Corps.

GNSS Receiver

- Connector: Type SMA with Type N cable adapter, +5V to power active antenna (+3.3V for optional SAASM)
- 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); optional SAASM: GPS L1 & L2 (1227.6 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 downloaded
- Antenna system: sold separately, included with SAASM GPS

Oscillator

- Standard Oscillator: OCXO
- Optional Oscillators: TCXO, Rubidium (Rb)

Communications

Network Port

- Dual Gb Ethernet (RJ-45, SFP)

Serial Set-up Interface

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

Front Panel

- LED segments displays time
- 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 connector; power cord 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	MIL-STD-810
Temp	-20 to +65°C (+55°C for Rb)	-40 to +85°C	501.6, 502.6, 503.6
Humidity	0%-95% RH non-condensing @ 40°C		507.6
Altitude	100-240 VAC up to 13,123 ft (4,000 m)	45,000 ft (13,700 m)	500.6
Shock	ETSI EN 300 019-2-3 Class 3.2 IEC 60721-3-3 Class 12	ETSI EN 300 019-2-3 Class 3.2 IEC 60721-3-3 Class 12	516.7
Vibration	ETSI EN 300 019-2-3 Class 3.2 IEC 60721-3-3 Class 12	ETSI EN 300 019-2-3 Class 3.2 IEC 60721-3-3 Class 12	514.7

Agency Approvals

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

Physical & Environmental

Size/Weight

- Designed for EIA 19" rack. 18.75" W x 1.74" H (1U) x 15.13" D actual (476 mm W x 44 mm H x 384 mm D actual)
- Weight: 9.0 lbs. (4.08 kg) with Rubidium option; 8.5 lbs. (3.86 kg) without
- Front 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

240w-xyz

Select expansion, power, internal oscillator and GNSS reference 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[2]	0 = TCXO 1 = OCXO 3 = Rubidium	3 = Multi-GNSS 9 = M-Code GPS

Example

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

[2] Dual Hot-Swap requires ordering at least one power module.

Optional Upgrade

SS-OPT-BSH: GPS Jamming and Spoofing Detection.

Option Modules

Up to 2 or 6 option modules can be accommodated per unit. The M-Code GPS module occupies one card slot. See Option Module Card datasheet for details.

Antenna

8225S: GPS M-Code/SAASM Antenna

Power Modules

Up to 2 power modules may be ordered with the Dual Hot-Swap power option.

2400-HS-A1: 120-240 VAC, 50/60 Hz Hot Swap Power module.

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15 August, 2022 - SecureSync M-Code