

SecureSync® M-Code

Secure and Rugged Time and Frequency Synchronization System



- Military M-code and P(Y)-code receiver, with direct acquisition and continuous tracking of both L1 and L2 GPS satellite frequencies.
- Robust Web-based user interface
- A wide variety of input/output signals supported
- Industry-leading low phase noise capability
- Modular (configure-to-order) ruggedized shock and vibration tested chassis
- Exceptional operating temperature range of -20°C to +65°C
- Ethernet 10/100 Base-T
- Ultra-secure system with the latest network management tools
- Field-upgradable option cards
- IPv4/IPv6 dual stack
- Alert notifications via SNMP traps and e-mail alert
- Remote upgradable software
- IRIG time code generator (optional)
- 5-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.

The modular design enables a wide variety of highly specialized time and frequency functions. Up to 4 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. 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.



M-Code unit requires 2 option card slots for M-Code GPS module. Add up to 4 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:

Preliminary	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 and levels: +13 dBm into 50 ohm, BNC					

1 PPS Output:

Preliminary	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 waveform and levels: TTL (5V _{P-P}), into 50 ohm, BNC					

Network Services

Timing

- NTP v2, v3, v4: Conforms with or exceeds RFC1305 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

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.

Oscillator

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

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
- Zeroize flip switch and key fill

Power

Choice of

- 100-240 VAC, 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 (preliminary)

- 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, 55-500Hz/1.0g	10-55Hz/0.15g, 55-500Hz/2.0g	514.5

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

A-1200-XYZ

Select power, internal oscillator and GNSS reference options:

X=Power	Y=Internal Oscillator	Z=Primary Reference
0=AC 1=AC/DC (12 vdc) 2=AC/DC (24/48 vdc) 3=DC (12 vdc) 4=DC (24/48 vdc)	0=TCXO 1=OCXO 2=Low phase noise OCXO 3=Rubidium 5=Low phase noise Rb	9=M-code GPS

Example

A SecureSync base unit with AC power, OCXO internal oscillator, and M-Code GPS as the primary reference is Model Number A-1200-019. 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.

Option Modules

6 option card slots can be accommodated per SecureSync. The M-Code GPS module occupies one card slot. See Option Module Card datasheet for details on additional option modules.

Antenna

8225S: GPS M-Code/SAASM Antenna

