

NanoSync IV

M-code Receiver Performance

BAE Systems MPE-M M-code GPS Receiver

For Use in Man-Portable, Surface Vehicle or Low Dynamic Environments US Army Standard Embedded Receiver:

- Velocity (Surface Vehicle Limit): Up to ± 25 meters/sec
- Acceleration (Surface Vehicle Limit): Up to ± 3 meters/sec²
- Jerk (Surface Vehicle Limit): Up to ± 2 meters/sec³

All-in-view 24 Channel Receiver, with continuous independent tracking:

- Simultaneous L1 (C/A, P(Y),M-code) and L2 (P(Y),M-code) Dual Frequency Tracking
- Receiver Interface Protocols: ICD-TNL-153DM, NMEA 0183 v3.2
- FLASH/FLASH MPE-M standard (no battery back-up required)
- Time Accuracy (in State 5, L1&L2, WAGE enabled & within other operating parameters)::
- UTC(GPS): ≤ 100 ns 2σ (95.5 %)
- Acquisition Time /TTFF:
- Hot Start: ≤ 15 seconds
- Warm Start: ≤ 90 seconds
- Position & Velocity Accuracy (in State 5, L1&L2, WAGE enabled & within operating parameters):
- Position: ≤ 5 meters CEP
- Velocity (Surface Vehicle): Better than 4.0 meters/sec (3D, 2o)
- Low Dynamic Aircraft: Better than 10.0 meters/sec (3D, 2o)

Supports GB-GRAM Type I and Type II Form-Factors



* U.S. Government policy restricts the sale of Precise Positioning Service (PPS) equipment to those authorized by the U.S. Department of Defense. Non-U.S. authorized users must purchase PPS equipment through the Foreign Military Sales (FMS) process.

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Military-Grade Position, Navigation, Timing (PNT) & Frequency Reference System, With M-code GPS

- Suitable for Fixed, Ground Mobile, Airborne and Maritime Systems
- Flexible Choice of M-code or Coarse/Acquisition (C/A) Receivers for **Specific Applications**
- Rubidium Atomic Clock for High Precision Time & Frequency **Outputs with Extended Holdover Performance when GPS is Degraded or Denied**
- Ethernet Interface Supporting PTPv2 Grandmaster, NTP & **Status & Control For Network-Based Applications**
- JASA Version 3, Annex 1, TFNG Compliant

Designed, Manufactured and

Supported in the U.S.A



High Performance Position & Navigation Engine

Precise Time & Frequency Reference

COTS for Military **Applications**

Compact, Rugged Design

Low Power -< 20W **Steady-State**

Wide Operating Temperature Range

No Maintenance Required

NanoSync IV

FEATURES

- Accuracy
- Time: < 25 ns to UTC(GPS)
- Frequency: 1E-12 (24 hour average)
- M-code GPS Receiver Options
- BAE Systems MPE-M
- Status & Control Ports
- RS-232 Serial
- 10/100 Ethernet

Standard Output Configuration

- (2) 1 PPS
- (2) 10 MHz
- NTP v2, v3, v4
- PTPv2 IEEE 1588-2008
- Time Code Output:
- User Programmable - BCD: 24b or 40b
- HaveQuick:
- HQ2 (STANAG 4246)
- PTTI HQ (ICD-GPS-060)
- XHQ (STANAG 4430)
- IRIG: B02x (x=2,3,6,7)

Options:

- · Low g-sensitivity Oscillator for **High Vibration & Shock**
- Environments
- 704A / 1275D Compliant
- **Input Power Option** • EMI Gasket for MIL-STD-461G compliance (RE & RS)
- Combination EMI/Drip Proof Gasket for MIL-STD-810E
- Rain/Drip (Method 506.5) MIL Circular Connectors
- (5015 or 38999 Series as req.) for ruggedization, EMI / Drip

Custom Options Available, For More Information Call 714-933-4000 or Email sales@fei-zyfer.com

Model 424 Position, Navigation, Time (PNT) and Frequency Reference System, With M-code GPS



The NanoSync IV is a small form factor GPS Position, Navigation, Time (PNT) and Frequency reference system that provides multiple reference outputs and includes support for NTP & PTPv2 IEEE 1588-2008. The NanoSync IV has a Rubidium Atomic Clock and is equipped with a M-code receiver (BAE Systems MPE-M) for military users. The NanoSync IV is packaged in a small, rugged enclosure ideally suited for embedded electronic warfare applications.

The NanoSync IV incorporates proven features designed into all FEI-Zyfer products, including exceptional holdover performance when GPS signals are lost or degraded. This assures continued system operation as a time and frequency reference. The NanoSync IV can be monitored and controlled through an RS-232 port using FEI-Zyfer's Serial Communication Protocol and via the 10/100Base-TX RJ-45 Ethernet port.



As with all FEI-Zyfer time and frequency products, the NanoSync IV incorporates advanced, proprietary learning algorithms that compensate for external temperature changes and aging characteristics of the oscillator while operating in holdover. This FEI-Zyfer feature ensures accuracy and consistent performance throughout the specified operating temperature range.



Status LEDs, Key Load Port, PLGR/DAGR Port & Zeroize switch



NanoSync IV Mounting

Specifications for MPE-M M-code GPS Receiver-based Models

Dutput Specifications		Status & Control Ports:		
0 MHz Output: Vaveform: Connectors: Amplitude: Coherency: Harmonic Distortion: Non-Harmonic Distortion:	Sine wave, AC coupled (2) SMA Female 13 dBm +3/-1 dBm @ 50 Ω Coherent to 1 PPS \leq -50 dBc \leq -60 dBc	Serial Port: Interface: Connector: Baud Rate: Protocol:	RS-232 (1) DE-S 19200 F 1 Start F No Parit FEI-Zyfe	C 9 (9-pin D-sub), Female Fixed Bit, 8 Data Bits, 1 Stop Bit ty er Serial Comm Protocol
Frequency Accuracy: - Locked to GPS: ≤ 1E-12 (24 hr. average) - Holdover with FE-5680B Rb Atomic Clock (a): ≤ 7.5E-11 (at 24 hours, ± 10 °C change) Phase Noise: 0 Hz: ≤ -100 dBc/Hz		Ethernet Port: Ethernet Type: Connector: Configuration: Compatibility:	10/100E RJ-45 IPv4, IP gateway TCP/IP, TELNE	Base-TX v6 address, netmask & / user-selectable Ethernet ver. 2.0 / IEEE 802.3 I, SSH, SNMP (v1, v2c, v3)
0 HZ: 00 HZ: kHZ: Short Term Stability (All second: 0 seconds: 00 seconds:	≤ -100 dBC/H2 ≤ -125 dBc/Hz ≤ -145 dBc/Hz an Deviation, typical): ≤ 3E-11 ≤ 1E-11 ≤ 3E-12	Time & Synchronization Protocols: NTP v2, v3, v4 & SNTP v4 NTP Server Performance: Stratum 1 Client synchronization accuracy: 1-10 ms (typical) NTP requests per second: ≥ 100 PTPv2 Grandmaster Performance: Packet throughput: > 100 Delay Requests/second 		
PPS Output (b): Connectors: Drive Level: Pulse Width: Synchronization: Pulse Rise Time: IPPS Jitter:	Pulse, Rising Edge on-time (2) SMA Female TTL into 50 Ω 2 ms Rising edge on-time ≤ 20 ns $\leq \pm 5$ ns 2 σ (95 %)	Input Voltage / Power Consumption: - Standard: + 24 VDC (18 to 28 VDC) (externally regulated) Warm Up: 40 W maximum @ 25 °C Warm Up time: ≤ 10 minutes Steady State: 20 W maximum @ 25 °C		
Fime Accuracy: - Locked to GPS: < 25 ns 2σ (95 %) to UTC		- Option: 704A / 1275 D Compliant (15 to 33 VDC) Warm Up: 50 W maximum @ 25 °C Warm Up time: ≤ 10 minutes Steady State: 30 W maximum @ 25 °C		
Time Code Output Options (User Programmable): Connector: (1) SMA Female 3CD: 24b or 40b HaveQuick: - HaveQuick 2 (STANAG 4246) - PTTI HaveQuick (ICD-GPS-060) - Extended HaveQuick (STANAG 4430) RIG: B02x (x=2,3,6,7)		Key Load Interface: - Electrical Interface per IS-GPS-154C & IS-GPS-164 - Communication Protocol per DS-102		
		PLGR/DAGR Interface: - Electrical Interface per IS-GPS-154C & IS-GPS-164 (RS-232 I/O and 1 PPS I/O supported) - Serial Interface Protocol per IS-GPS-153C		
GPS Antenna Interface: Power: Connector Type: nput Gain Required:	5 VDC @ 100 mA SMA Female +10 dB	Chassis Dimensions: Height: 3.50" (89 mm) Width: 4.02" (102 mm) excluding I/O connectors Length: 8.27" (211 mm) excluding connectors Weight: < 4.9 lbs. (2.2 kg)		
Notes: a) After 48 hours of GPS locked operation, fixed antenna ocation and antenna delays entered. b)1 PPS output can be disabled until GPS lock is achieved and time offset error is less than a user programmable amount.		Environmental: Operating Temper Rate of Change: Storage Tempera Relative Humidity	erature: iture: /:	-20 °C to 50 °C (@ Baseplate 10 °C / Hour maximum -40 °C to +100 °C 5 % to 95 %, non-condensing 0 to 35000 fact
specifications subject to change without notice.		Annuae, Operatin	ıy.	



Altitude, Storage:

0 to 40000 feet

Additional information on our website:

- NanoSync IV **User Manual**
- NanoSync IV Serial Comm. **Protocol Manual**

Visit www.fei-zyfer.com