

Meridian II T1/E1 Primary Reference Source

Telecom Option for Meridian II Precision TimeBase

Meridian II is a high-performance, time and frequency standard with unparalleled precision, accuracy and reliability. Configured specifically for telecom applications, this Meridian is a stand-alone Primary Reference Source (PRS) with integrated GPS receiver. It is an ideal solution for synchronizing systems that require a reliable T1/E1 signal such as government communications, colocation facilities, optical network terminals, power substations and more. Meridian PRS provides Stratum 1 synchronization when locked to GPS. If the GPS signal is lost, it provides continued holdover of 1×10^{-10} for 24 hours with the optional Ultra-Stable OCXO. Meridian PRS also provides timing services via the Network Time Protocol (NTP), optional IEEE-1588 Precision Time Protocol (PTP), and a wide variety of timing signal outputs.



Telecom Features

Meridian PRS provides two to eight telecom outputs in a 1U chassis. Any combination of T1, E1, or Composite Clock can be accommodated with Sync Status Messaging (SSM). The system can be securely managed using the serial or dual gigabit Ethernet ports.

Stratum 1 Stability

Stratum 1 clocks require low levels of jitter and wander because propagation of the timing signal through the network can have a multiplication effect causing sporadic buffer overflows downstream. By starting with a

stable PRS, a usable clock can be recovered even after multiple hops. PRS stability depends upon the software algorithms and the system oscillator. The Meridian software has specialized frequency control algorithms that maximize the stability of the outputs. Specifications for the available OCXO and Rubidium oscillators are in the chart below.

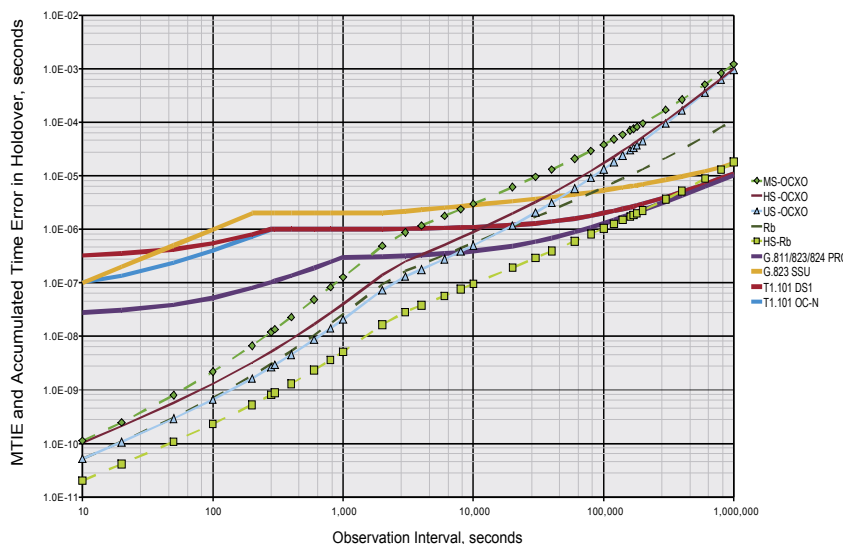
High Reliability and Two-Year Warranty

Meridian II uses EndRun's power-efficient, fanless design and thermal packaging with an estimated MTBF of over 25 years (16 years with Rubidium). The system is made in America, backed by a two-year warranty, a 60-day money-back guarantee, and supported by EndRun's top notch technical support team free of charge!

FEATURES

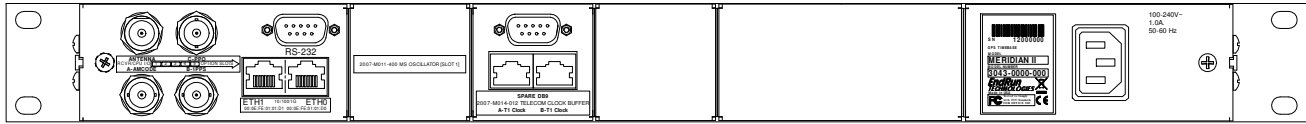
- Modular, 1U or 2U plug-and-play design supports up to 36 outputs.
- Timing accuracy: < 10 nanoseconds RMS to UTC (USNO).
- Frequency accuracy: < 6×10^{-14}
- Telecom clock outputs. Any combination of T1, E1, or Composite Clock. 2, 4, 6 or 8 outputs.
- Sync Status Messaging (SSM).
- Several oscillator options available for holdover performance.
- Dual gigabit, security-hardened Ethernet ports (SSH, HTTPs, SNMP).
- Network Time Protocol (NTP).
- Optional IEEE-1588/PTP.
- Optional SyncE with SSM.
- Optional -48 VDC.
- Optional TTL rate output, 1.544 MHz or 2.048 MHz.
- 1 PPS output.
- IRIG-B time code output.
- High-reliability, solid-state, fanless design.
- Many options available.

EndRun Disciplined Oscillator Holdover Performance vs G.811/G.823/G.824 and T1.101 Jitter/Wander Masks
5° C Max Delta in Holdover, 7.5° C/hr Max Slewrate



GPS-Synchronized T1/E1 Primary Reference Source

Specifications



Meridian II Rear Panel with One Telecom Option Module Installed

GPS RECEIVER

- L1 Band - 1575.42 MHz.
- 12 Channels, C/A Code.
- 15 dB minimum gain at receiver input.
- Static and dynamic (shipboard) operating modes.
- Timing Receiver Autonomous Integrity Monitoring (TRIM).
- TNC connector (female) on rear panel, $Z_{in} = 50\Omega$. 5 volts DC to antenna.

REFERENCE OSCILLATOR

Optional Oscillators Temperature Stability from 0° to 70° C:

- Medium Stability-OCXO 4×10^{-9}
- High Stability-OCXO 1×10^{-9}
- Ultra Stable-OCXO 5×10^{-10}
- Ultra-Stable Rubidium 2×10^{-10} (2U chassis only)

See [Oscillator Options](#) datasheet for more information.

FREQUENCY ACCURACY

- Locked to GPS: $< 6 \times 10^{-14}$.
 - Holdover: $< 1 \times 10^{-10}$ (US-OCXO) for 24 hours ($< 5^\circ\text{C}$ max delta).
- See holdover performance chart on first page.

TELECOM CLOCK OUTPUT CHARACTERISTICS

- Meets the requirements of ANSI T1.101 and ITU-T G.811 pertaining to PRS operation.
- Quantity: Two outputs minimum. Can be expanded up to eight outputs.
- Signal: Any combination of E1, T1 or Composite Clock.
- Frequency: 1.544 Mbps (T1) and/or 2.048 (E1) and/or 64 kbps (Composite Clock).
- Synchronization: Phase locked to the internal system 10 MHz.
- Pulse Shape: Conforms to ITU-T G.703.
- MTIE/Jitter/Wander: Conforms to ITU-T G.811/G.823 when locked (E1, Composite Clock) and ANSI T1.101, ITU-T G.811/824 when locked (T1).
- See [Telecom Clock Option](#) datasheet for more specifications.

1 PPS TIMING CHARACTERISTICS

The following accuracy and stability specifications assume a stationary platform, 4 satellite lock, and antenna installation with a full view-of-the-sky.

- Accuracy: < 10 nanoseconds RMS to UTC(USNO) when locked*.
- Stability: $TDEV < 10$ ns @ $\tau < 10^5$ secs, $\sigma_y(\tau) < 6 \times 10^{-14}$ @ $\tau = 10^5$ secs.
- Positive TTL pulse into 50Ω (standard) or RS-422 levels (option).
- User-Selectable Width: 20 us, 1 ms, 100 ms, 500 ms.
- User Calibration: ± 500 us, 1 ns resolution.

* See [GPS-UTC Timing Specifications](#) for details.

TIMECODE CHARACTERISTICS

- Signal: Amplitude-modulated (AM), 3:1 ratio, 1 kHz carrier, 1 Vrms into 50Ω .
- User-Selectable Formats: IRIG-B120 (IEEE-1344), IRIG-B122, IRIG-B123, NASA-36, or 2137.

ALPHANUMERIC DISPLAY/KEYPAD

- Display: Brilliant 16x280 dot-matrix vacuum-fluorescent.
- Keypad: Enter, Back, Edit, Right, Left, Up, Down, Help.

SYSTEM STATUS INDICATORS

- Sync LED: Green LED pulses to indicate GPS lock status.
- Alarm LED: Red LED indicates a serious fault condition.

SERIAL I/O PORT

- RS-232 serial I/O on DB9M jack for secure, local terminal access.
- Parameters fixed at 19200 baud, 8 data bits, no parity, 1 stop bit.

NETWORK I/O

- Two rear-panel RJ-45 jacks.
- 10/100/1000Base-T Ethernet.

NETWORK PROTOCOLS

- IPv4/IPv6.
- SNMP, NTP v2, v3, v4, SHA/MD5 authentication, broadcast/multicast mode and autokey.
- SSH client/server with "secure copy" utility, SCP.
- SNMP v1, v2c, v3 with Enterprise MIB.
- HTTPS (Web Interface).
- TIME and DAYTIME server.
- TELNET client/server. FTP and DHCP clients. SYSLOG.
- Optional PTP/IEEE-1588-2008 (v2) Grandmaster. 8-ns timestamp resolution.
- Optional SyncE with Sync Status Messaging (SSM). G.8261, G.8262, G.8264 compliant.

POWER

- 1U Chassis: 90-264 VAC, 47-63 Hz, 1.0A Max
- 2U Chassis: 90-264 VAC, 47-63 Hz, 1.5A Max
- 3-Pin IEC 320 on rear panel, 2 meter cord included.

SIZE

- 1U Chassis: 1.75"H x 17"W x 11.2"D. 19" rackmount.
- 2U Chassis: 3.5"H x 17.15"W x 11.8"D. 19" rackmount.
- Weight: < 8 pounds (1U). < 13 pounds (2U).

ENVIRONMENTAL

- Operating Temperature/Humidity: 0° to +50° C / 5% to 90% RH, non-condensing.
- Storage Temperature/Humidity: -40° to +85° C / 5% to 95% RH, non-condensing.

COMPLIANCE

- CE, FCC, RoHS, WEEE.

ANTENNA KIT OPTIONS

- 40 dB gain LNA with band-pass filter for out-of-band interference rejection.
- Rugged, all-weather housing capable of operation over -40° to +85° C.
- Mounting kit: 18" long, 3/4" pipe with clamps.
- 50' low-loss RG-59 cable. Optional lengths up to 1000' with preamplifiers.
- TNC connector (female), $Z_{out} = 50\Omega$, antenna power = +5V.
- Size: 2.5"H x 3.5" diameter.

OTHER OPTIONS

- Dual-Redundant Power Supplies. -48, 12, 24, 125 VDC Inputs.
- Alarm Output (Open Collector).
- 5 & 10 MHz Low-Phase-Noise Frequency Outputs.
- Direct Digital Synthesizer (DDS) output. User-selectable rates 1.544 MHz, 2.048 MHz, or any rate between 1 Hz and 10 MHz.

Refer to the [Meridian II Options](#) datasheet for more information.

Other options are available. Call us with your requirements.

