

RTM3204 GPS Timing Module

Compact Size for Portable Applications

The RTM3204 is a compact unit designed specifically for portable applications. Designed for 24V battery-powered systems, it accepts a wide range 18V to 30V power input and requires only 80 cubic inches of mounting space. In spite of its compact size, the RTM3204 provides a full time and frequency feature set as well as complete TCP/IP network connectivity.



GPS Timing and Frequency Control

Utilizing a Global Positioning System (GPS) receiver with advanced algorithms, the RTM3204 uses the GPS transmissions to precisely synchronize itself to UTC to < 100 nanoseconds (< 10 nanoseconds RMS to GPS Time). The frequency of the internal oscillator is disciplined to match the frequency of the UTC timescale to a 1 part in 10^{13} level-of-accuracy over 24-hour observation intervals. The time and frequency outputs are coherent after initial GPS synchronization, and synchronization is maintained via 20-bit DAC frequency control, rather than phase stepping, to provide the ultimate in short-term stability.

Upon loss of the GPS signals, the RTM3204 (with a Rubidium option installed) operates in an intelligent hold-over mode, continuing to correct the oscillator as needed to hold the accumulated time error under 5 microseconds for up to 24 hours. With the High-Stability Rubidium option the accumulated time error can be held to under 1 microsecond for 24 hours.

FEATURES

- Timing Accuracy: < 20 Nanoseconds RMS to GPS Time
- Frequency Accuracy: < 1×10^{-13}
- 1 PPS and 10 MPPS Outputs
- IRIG-B Timecode Output
- Network Port with Telnet, FTP, DHCP, SSH, HTTPS, SNMP with Enterprise MIB

Standard Features

In addition to sourcing a precision 1 PPS timing reference this unit provides a 10 MPPS and a user-selectable timecode output. Timecode choices are IRIG-B, NASA-36 or 2137. The RTM3204 can be managed via the network port or an RS-232 port.

Secure Network Interface

An ethernet port is provided as a standard feature of the RTM3204 with a wide variety of network protocols including TELNET, FTP, DHCP, SSH and SNMP with Enterprise MIB. The incorporation of SNMP v3 and SSH provides the ultimate in network security and allows the safe performance of monitoring and maintenance activities. Security-conscious users can also disable any of the risky protocols such as Telnet. In addition, access via SSH, SNMP and Telnet can be restricted to specific hosts.



RTM3204 Specifications



GPS RECEIVER:

- L1 Band - 1575.42 MHz.
- 8 Channels, C/A Code.

ANTENNA:

- TNC jack on rear panel, $Z_{in} = 50\Omega$.
- Integral +35 dB gain LNA and bandpass filter for out-of-band interference rejection.
- Rugged, all-weather housing capable of operation over -40° to $+85^{\circ}$ C temperature extremes.
- Mounting via 18" long, $\frac{3}{4}$ " PVC pipe with clamps.
- 50' low-loss RG-59 downlead cable is standard.
Other lengths are optional, up to 1000' with preamplifiers.

LOCAL OSCILLATOR:

- TCXO (standard): 2.5×10^{-6} over -20° to $+70^{\circ}$ C.
- Rubidium (option): 1×10^{-9} over -20° to $+70^{\circ}$ C.
Holdover Accuracy: < 5 microseconds to UTC for up to 24 hours after 72 hours locked to GPS with a maximum of 5° C peak-peak variation in temperature.
- High-Stability Rubidium Option: 1×10^{-10} over -20° to $+70^{\circ}$ C.
Holdover Accuracy (optional High-Stability Rubidium): < 1 microsecond to UTC for up to 24 hours after 72 hours locked to GPS with a maximum of 5° C peak-peak variation in temperature.

TIME TO LOCK:

- < 10 minutes, typical.

1 PPS CHARACTERISTICS:

- 1 PPS: Positive TTL pulse into 50Ω .
- User-Selectable Width: 20 μ s, 1 ms, 100 ms, 500 ms.
- Accuracy: < 100 nanoseconds to UTC (< 20 ns RMS to GPS Time) when locked.
- Stability: TDEV < 10 ns, $\tau < 10^5$ secs.
- User Calibration: ± 500 μ s, 1 ns resolution.
- This output is aligned within 10 ns of the 10M PPS output.

10 MPPS CHARACTERISTICS:

- Signal: TTL squarewave into 50Ω .
- Accuracy: $< 1 \times 10^{-13}$ to UTC for 24-hour averaging times when locked.
- Stability: ADEV $< 3 \times 10^{-11} \tau^{-1/2}$, $\tau < 10^5$ seconds.
- This output is aligned within 10 ns of the 1 PPS output.

TIMECODE CHARACTERISTICS:

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

NETWORK I/O:

- Rear-panel RJ-45 jack.
- 10/100Base-T Ethernet.

SUPPORTED NETWORK PROTOCOLS:

- SSH server with "secure copy" utility, SCP.
- HTTPS (Web Interface).
- SNMP v1, v2c, v3 with Enterprise MIB.
- TELNET client/server.
- FTP client.
- DHCP client.
- TIME and DAYTIME server.
- SYSLOG.
- IPv4, IPv6 and IPv4/IPv6 Hybrid.

SYSTEM STATUS INDICATORS:

- Sync LED: Green indicator pulses to indicate lock status.
- Network LED: Amber indicator illuminates when the ethernet connection is up, and flashes when ethernet packets are received or transmitted.
- Alarm LED: Red indicator illuminates when a serious fault condition exists.

FIRMWARE UPGRADES:

- Software is field-upgradeable and provided free-of-charge.

MAINTENANCE CONSOLE:

- RS-232 serial I/O on rear-panel DB9M jack for secure, local terminal access.
Parameters fixed at 19200 baud, 8 data bits, no parity, 1 stop bit.
A 2-meter adapter cable is included.

DC POWER:

- 25W maximum; 6W typical @ 23° C. (6W typical with Rubidium oscillator option.)
- 24 VDC $\pm 20\%$, 0.5A maximum. (0.75A maximum with Rubidium oscillator option.)
- Connector: Molex Micro-Fit 3.0 2-pin jack.
(Mate: Molex 43025-0200/20-24 AWG Terminal: Molex 43030-0002.)

PHYSICAL:

- Chassis Size: 2.00"H x 4.00"W x 10.00"D.
- Chassis Weight: < 3 pounds (1.35 kg.).
- Antenna: 2.5" H x 3.5" dia. at base.

ENVIRONMENTAL:

- Temperature: 0° to $+50^{\circ}$ C.
- Humidity: 0 to 95%, non-condensing.

OPTIONS:

- Rubidium and High-Stability Rubidium Oscillators.
- Additional Pulse Rate Output (1, 10, 100, 1K, 10K, 100K, 1M, 5M, 10M PPS).
- User-Selectable DDS Output (1 PPS - 10MPPS @ 1 PPS resolution, including 1.544 MPPS and 2.048 MPPS).
- DC level shift timecode (IRIG-B000, IRIG-B002, IRIG-B003).
- Alarm Output.

