

PTS-M

Network Ready Precision Time System



The PTS-M is a state of the art frequency instrument offering a wide range of features and time and frequency outputs accurate to $< 40\text{ns}_{\text{rms}}$ to UTC (USNO) and 1×10^{-12} respectively.

This new generation of network appliance is economical and reliable and offers complete remote control and monitoring via a web-browser based interface.

The PTS-M can be used in either a single or dual redundant configuration and in conjunction with one of Brandywine Communications range of Distribution Amplifiers, such as the FTSU-100.

Applications for the popular PTS-M include central time and frequency systems, satellite earth stations, military communication systems, and high availability network time servers.

An extremely accurate internal rubidium oscillator is used as the internal time base that drives all the time and frequency outputs. This rubidium oscillator is disciplined using an advanced control algorithm, ensuring superior holdover performance. The time constants of this algorithm are user-adjustable to suit specific applications.

The PTS-M utilizes MPE-M - an advanced dual frequency backward compatible for current users of the SAASM (MPE-S) GPS receiver. It may also be disciplined to an external 1PPS/HaveQuick time code source.

A 10/100 Ethernet port is provided which is used both for monitoring and control of the instrument and for Network Time Protocol. This interface supports both fixed and dynamic IP address assignment via DHCP.

In addition to configuring the PTS-M, the built-in web browser provides information on GPS, internal monitoring of time errors, and internal parameters of the atomic oscillator. The user may set thresholds of any monitored parameter to trigger an alarm.

A precision 1PPS time mark is available for synchronizing or calibrating other equipment and the IRIG B serial time code allows synchronization to be distributed to other computers, displays, and related equipment requiring precise time.

An ASCII serial port outputs any user-selected time of day message at a 1/sec rate for synchronizing other equipment. The same output port may also be configured to output 50 bit/sec BCD time code in accordance with ICD-GPS-060.

A high stability 10MHz sine wave output provides an ultra-stable, low phase noise frequency reference derived from an SC cut crystal that is locked to the rubidium reference.

FEATURES

- **GPS Disciplined Atomic Clock**
- **Network Time Server**
- **Dual Redundant Version Available**
- **Complete Remote Network Control using Standard Web Browser**
- **Mcode GPS Receiver**
- **10MHz, 1PPS IRIG B, Serial and Time Codes**
- **Timing Accuracy $< 40\text{ns}_{\text{rms}}$ to UTC**
- **1PPS, Have Quick Inputs**

Specifications

P(Y) Code GPS Receiver Specification

| | |
|------------------------|---|
| Receiver Type | MPE-M Receiver |
| Satellite Signal | GPS L ₁ , L ₂ Dual Frequency |
| Satellite Code | C/A, P(Y), M-Code |
| Receiver Type | Parallel 12 Channel 12 all-in-view receiver |
| Position Accuracy | <5m CEP in PPS environment with CV loaded |
| Warm start | <120 seconds with CV loaded |
| Anti-spoofing | Accuracy maintained in spoofing environment up to 10db> satellite signals |
| Jamming | Operates with 34dB J/S at both L ₁ and L ₂ |
| Cold Start Requirement | Automatic. No input of time or position required |
| CV Fill compatibility | DS101 (EKMS-603) |

Serial Interface

| | |
|-----------------|------------------------------------|
| Number of Ports | 1 |
| Port Function | Setup and Control |
| Connector | DB-9 |
| Type | RS232 |
| Baud Rate | 300-115,200(Default 115k, N, 8, 1) |

1 PPS Output

| | |
|-------------------|---|
| Number of Outputs | 1 |
| Connector | SMA |
| Type | 5V _{0-pk} , 10 microseconds wide |
| On-Time | Rising Edge |

Sine Wave Output

| | |
|---------------------|---|
| Number of Outputs | 1 |
| Connector | SMA |
| Frequency | 10 MHz |
| Level | 2.5 V _{pp} into 50 Ω |
| Harmonic Distortion | <25 dBc |
| Phase Noise (SSB) | <-130 dBc/Hz (10 Hz) typical <-140 dBc/Hz (100 Hz) typical <-150 dBc/Hz (1 kHz) typical |

Time Code Output 1

| | |
|---------------------------|---------------------------------|
| Number of Outputs | 1 |
| Connector | SMA |
| Code Format (link select) | IRIG B 1 kHz or DCLS |
| Level | 2.2 V _{pp} 600 Ω HCMOS |

Time Code Output 2

| | |
|---------------------------|---------------------------------|
| Number of Outputs | 1 |
| Connector | DB-9 |
| Code Format (link select) | IRIG B 1 kHz or DCLS |
| Level | 2.2 V _{pp} 600 Ω HCMOS |

Fault Alarm Status

| | |
|-------------------|-------------------|
| Number of Outputs | 1 |
| Connector | DB-9 |
| Output Type | HCMOS level |
| Output Polarity | User-programmable |

Timing Accuracy

| | |
|---------------------|------------------------------|
| Tracking Satellites | ±100 ns Absolute UTC σ 20 ns |
| Holdover Mode | 1 μs/day |

Frequency Stability

| | |
|---------------------|---|
| Tracking Satellites | See Table Below |
| Holdover Mode | |
| Aging | <5x10 ⁻¹¹ /month after 30 days aging |
| Temperature | 0.1x10 ⁻¹⁰ 0 to 50°C |

| Oscillator Stability/°C | AVERAGING TIME | | | | | |
|-------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | 1 s | 10 s | 100 s | 1 ks | 10 ks | 1 day |
| 2 x 10 ⁻¹² | 2x10 ⁻¹¹ | 1x10 ⁻¹¹ | 2x10 ⁻¹² | 1x10 ⁻¹² | 1x10 ⁻¹² | 1x10 ⁻¹² |

Ethernet Interface

| | |
|-----------------------|--|
| Number of Connectors | 1 |
| Type | 10/100 |
| Connector | RJ45 |
| Protocols Supported | NTP(RFC1305), SNTP, Daytime, Telnet, FTP, DHCP |
| Web Browser Interface | 5 Pages |
| IP Selection | Status, GPS, Configuration, Alarms, Charts Static or Dynamic via DHCP |

Power

| | |
|-------------------|-------------------------|
| Operating Voltage | 110/230 VAC |
| Optional Power | 24 VDC, 48 VDC, 125 VDC |

Environmental

| | |
|------------------------|--------------------------|
| Instrument Temperature | -0°C to +50°C |
| Antenna Temperature | -40°C to +85°C |
| Humidity | Up to 95% non-condensing |

Physical

| | |
|------------------------|--|
| Size | 3.25" H x 7.25" W x 15.8" D (82.55mm H x 184.15mm W x 401.32mm D) |
| Size with Rack Adapter | 19 In Rack Mount, 3.48" (2U) height 15.8" depth in rack |
| Weight | 5.5 lbs, typical (2.5 kg, typical) |