VIAVI
TEM Timing Module

Field timing and synchronization measurements for the VIAVI T-BERD/MTS-5800 and -5882

The preferred tool for installing and maintaining networks with stringent timing and synchronization requirements.

Together with the T-BERD®/MTS-5800 family, the field-optimized TEM delivers industry-leading accuracy to field portable timing and synchronization measurements. It features a GNSS antenna and a miniature atomic clock (MAC) to ensure nanosecond-accurate measurements even when a satellite signal is not present and the module is running in holdover.

With a T-BERD/MTS 5800 and a TEM, you can:

- Perform one-way delay measurements that help you root out asymmetric network delays
- Precisely measure PTP one-way delay, constant time error (cTE), dynamic time error (dTE) using wander analysis with ITU masks and maximum time error max |TE|
- Measure Floor Packet Percentile (FPP) of the Sync PDV packets to ensure PTP PDV is within limits for recovering frequency
- Qualify GNSS antenna installations by evaluating satellite signal strength and viewing 360° sky plot either instantly or over a 24 hour period
- Troubleshoot the accuracy of equipment 1 PPS output signals with 1 PPS wander analysis
- Measure T1 and E1 jitter and wander
- Measure PTP Frequency accuracy using a Floor Package Percentile (FPP) analysis

Key Features

- Performs 1588v2 (PTP) measurements including PDV and constant time error (TE) measurements accurate to +/-45ns when compared to GPS
- Verifies Ethernet and IP one-way delay network latency
- Confirms frequency, phase, and time synchronization with near-lab grade accuracy in the field
- Proves out GNSS antenna installations and faults
- Supports multiple GNSS constellations including GPS, GLONASS, BeiDou, SBAS, and QZSS
- Enable fast and accurate satellite acquisition with a modern 72 channel GNSS receiver
- Supports multiple 1 PPS and 10 Mhz inputs and disciplined outputs
- PTP grand master (PRTC) emulation and Wander Analysis per G.8273.1, G.8273.2
- SyncE Wander Analysis per G.8262
- One-Way-Delay measurements for 1 & 10 GE circuits accurate in nanoseconds

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Specifications

**General**

- **Weight**: 0.45 kg (1.0 lb)
- **Dimensions**: 12.9 x 13.5 x 4.7 cm (5.9 x 5.4 x 1.8 in)
- **Time drift in holdover, after stabilization**: ≤5xE-11 over 24 hours in a temperature controlled environment
- **Oscillator stability**

**Interfaces**

**GNSS Antenna**

- **Connector**: SMA
- **Power**: 0, 3.3, and 5V
- **Average Frequency Accuracy**: 2E-12 over 24 hours

**1 PPS**

- **Connector**: SMB
- **Inputs**: Two (2)
- **Output**: One (1) — disciplined
- **Time Accuracy Compared to UTC**: +/-25ns 1-sigma over 24 hours (in Fine Tune)

**10 Mhz**

- **Connector**: SMB
- **Input**: One (1)
- **Output**: One (1) — disciplined
- **Average Frequency Accuracy**: 2E-12 over 24 hours

**GNSS**

- **Constellations**: GPS, GLONASS, BeiDou, SBAS, QZSS, and Galileo with firmware upgrade; Sky plot supported

**Channels**

- **72 (32 for satellite tracking, 40 for acquisition aiding and noise estimation)**

**Signal strength**

- **Per channel**

**Time formats**

- **UTC, GPS**

**Location information**

- **Fixed (configurable), dynamic, survey**

**Oscillator**

- **Sync source**: GNSS, 1 PPS, 10 Mhz, BITS/SETS from S800
- **Atomic clock with rubidium oscillator**

*Stability is based on a constant room temperature environment with no vibration and a stable magnetic environment.

**Ordering Information**

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<th>Description</th>
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<tr>
<td>Timing expansion module for T-BERD/MTS-S800</td>
<td>CSTEM-R</td>
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<td>Test Options</td>
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<tr>
<td>10/100/1000 Mbps and 1 GE optical IEEE 1588v2 (PTP)</td>
<td>CSLS1588</td>
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<tr>
<td>1 PPS and 10 Mhz timing and clock analysis</td>
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<td>10/100/1000 Mbps and 1/10 GE one-way delay</td>
<td>CSOWD</td>
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<td>1 GE optical sync-e</td>
<td>CSLSYSYNCE</td>
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<td>10 GE optical sync-e</td>
<td>CS10GESYNCE</td>
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<tr>
<td>1 GE optical Ethernet wander</td>
<td>CS10GETHWANDER</td>
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<td>PDH (DS1, DS3, etc.) Rx and Tx electrical wander</td>
<td>CSPDHWND</td>
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<tr>
<td>10GE IEEE 1588v2 PTP</td>
<td>CS10G1588</td>
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