Enabling Australia's Field Technicians to build, troubleshoot and maintain better communications networks.

This reference material is provided by TMG Test Equipment, VIAVI's **only** Master Distributor for Contractors in Australia

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VIAVI
TEM Timing Module
Field timing and synchronization measurements for the VIAVI T-BERD/MTS-5800

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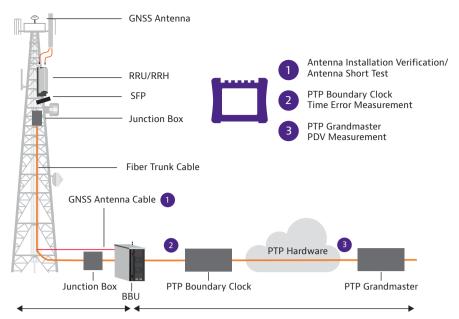
With a T-BERD/MTS 5800 and a TEM, you can:

- 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 nanosecond-accurate PDV and time error (TE) measurements

- Verifies Ethernet and IP one-way delay network latency

- Confirms frequency, phase, and time synchronization with near-lab grade accuracy in the field per G.8265.1, G.8275.1 and G.8275.2

- 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

Legend:
1. Antenna Installation Verification/Antenna Short Test
2. PTP Boundary Clock Time Error Measurement
3. PTP Grandmaster PDV Measurement

Diagram labels: GNSS Antenna, RRU/RRH, SFP, Junction Box, Fiber Trunk Cable, GNSS Antenna Cable ①, Junction Box, BBU, ② PTP Boundary Clock, PTP Hardware, ③ PTP Grandmaster

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 error	<= 176ns over 8 hours at room temperature with no vibration (in Holdover)
Average frequency stability*	<= 6E-12 over an 8 hour period (in Holdover)
1588v2 Timestamp Absolute Accuracy	<+/- 20ns

Interfaces	
GNSS Antenna	
Connector	SMA
Power	0, 3.3, and 5V
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 (in Fine Tune)

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 5800
	Atomic clock with rubidium oscillator

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

Ordering Information

Description	Part Number
Timing expansion module for T-BERD/MTS-5800	C5TEM-R
Test Options	
10/100/1000 Mbps and 1 GE optical IEEE 1588v2 (PTP)	C5LS1588
1 PPS and 10 Mhz timing and clock analysis	C5TIMING
10/100/1000 Mbps and 1/10 GE one-way delay	C5OWD
1 GE optical SyncE	C5LSSYNCE
10 GE optical SyncE	C510GESYNCE
1 GE optical Ethernet wander	C5LSETHWANDER
PDH (DS1, DS3, etc.) Rx and Tx electrical wander	C5PDHWND
10GE optical IEEE 1588v2 PTP	C510G1588

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