VIAVI Solutions

Data Sheet

VIAVI

TEM Timing Module version 2

Field timing and synchronization reference for the VIAVI T-BERD/MTS-5800 and OneAdvisor-800

The field-optimized TEM2 is an industry-leading reference for field portable timing and synchronization measurements. It features a multi-band GNSS antenna and a Rubidium oscillator that delivers nanosecond accurate measurements even when a satellite signal is not present, and the module is running in holdover.

With 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|
- 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

Features

- Enable fast and accurate satellite acquisition with a multi-channel, multi-band GNSS receiver
- Confirms frequency, phase, and time synchronization with near-lab grade accuracy in the field using ITU G.8265.1, G.8275.1 and G.8275.2 profiles
- Verifies Ethernet and IP one-way-delay
- Proves out GNSS antenna installations including measuring individual satellite signal strength, overall Dilution of Precision and automatically displaying the number of usable satellite signals
- Concurrent multiple GNSS constellations including GPS, GLONASS, Galileo, BeiDou, and SBAS
- Supports multiple 1 PPS and 10 Mhz inputs and disciplined outputs concurrently; BITS/SETS clock inputs are available
- Includes a standard RJ-45 V.11 interface per G.703 Amendment 1 supporting 1 PPS and Time of Day inputs
- PTP grand master (PRTC) emulation
- Wander Analysis per ITU, G.8262.1, G.8273.1, and G.8273.2

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)
Inputs	Two (2)
Output	One (1) — disciplined
Time Accuracy Compared to UTC	+/- 5ns 1-sigma
Interfaces	
GNSS Antenna	
Connector	SMA
Power	0, 3.3, and 5V
1 PPS - 45RJ	
Connector	RJ-45
Input	1 PPS and Time of Day (ToD) over V.11 serial interface per G.703
Output	1 PPS per G.703 with adjustable voltages
1 PPS	
Connector	SMB
Inputs	Two (2)
Output	One (1) — disciplined
External Clock	
Connector	SMB
Input	BITS/SETS, 2MHz, 10MHz
10 Mhz Output	
Connector	SMB
Input	One (1)
Output	One (1) — disciplined
GNSS	
Constellations	GPS, GLONASS, Galileo, BeiDou, and SBAS; sky plot
Channels	184 channels with per channel signal strength
Time formats	UTC, GPS, Galileo, BeiDou, Glonass
Location information	Fixed (configurable), dynamic, survey
Oscillator	
Sync source	GNSS, 1 PPS, 10 Mhz, BITS/SETS Atomic clock with rubidium oscillator

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

Ordering Information

Description	Part Number
Timing Expansion Module with Rubidium Oscillator	C5TEM-R2
Test Options	
10/100/1000 Mbps and 1 GE optical IEEE 1588v2 (PTP)	C5LS1588
10GE optical IEEE 1588v2 PTP	C510G1588
25GE optical IEEE 1588v2 PTP	C525G1588
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
10 GE optical Ethernet wander	C510GETHWANDER
PDH (DS1, DS3, etc.) Rx and Tx electrical wander	C5PDHWND

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