

QUICK CARD

Enabling the TEM V2 Timing Expansion Module

This quick card outlines how to set up a TEM V2 Timing Expansion Module on the T-BERD/MTS 5800 and complete a survey to verify GNSS reception and qualify antennas. This procedure should be performed prior to running one-way delay measurements, GNSS Antenna delay measurement, IEEE 1588 PTP measurements, Wander analysis, or Timing and 1PPS Analysis.

EQUIPMENT REQUIREMENTS

- ▶ T-BERD/MTS 5800 with Transport Software Release V31.2.1 or greater
- ▶ Timing Expansion Module V2 (TEM V2)
- ▶ GNSS Antenna (Taoglas A.171, Taoglas AA.162, Tallysman TW7882, or Maxtena M9706CWT recommended)



Figure 1: Equipment Requirements

CONNECT GNSS ANTENNA AND ACTIVATE TEM V2


1. Connect the male SMA connector on the end of the antenna cable to the female SMA connector on the TEM V2 (labeled Antenna).
2. Tighten the connector until the antenna is securely attached.
3. Place the antenna in a location with minimum interference or blocking.
4. Press the Power button  to turn on the test set.
5. Tap the **Test** icon at the top of the screen.
6. Tap the **Timing Source** tab to activate the TEM V2 Timing Module.



Figure 2: TEM V2

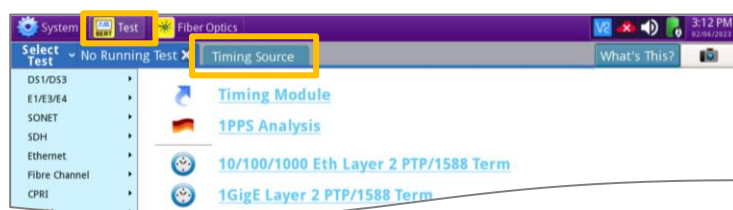


Figure 3: Home Screen

QUICK CARD

SETUP GNSS RECEIVER AND START SURVEY

1. Tap the **Setup** soft key on the upper right-hand corner of the screen.
2. Configure **GNSS** settings as follows:
 - **GNSS System:** Select **GPS** for use in North America. Other constellations or combination of constellations can also be used:
 - **Galileo** and **SBAS:** European systems
 - **GLONASS:** Russian System
 - **BeiDou:** Chinese system
 - **QZSS:** Japanese system
 - **Too few Satellites Alarm:** 3
 - **Time Reference:** GPS
 - **Time Format:** 12-hour
 - **Elevation Limit:** 5 to 15 deg recommended, Using satellites near the horizon may degrade performance but may be needed in “urban canyons”.
 - **Minimum C/No:** 9 dB-Hz recommended, 30 dB-Hz maximum. Using satellites with a weak carrier to noise ratio may degrade performance but may be needed in “urban canyons”.
 - **Antenna Power:** 3.3 volts for VIAVI supplied magnetic mount antennas. If you are using a different antenna, enter the antenna power, or select 0V if the site powers the GPS antenna.
 - **Antenna Time Bias:** Select Antenna Type for VIAVI supplied antennas; otherwise, Select “User Defined” and enter the cumulative delay introduced by the antenna, cables, and any in-line splitters or amplifiers. In absence of more specific information, use 1.2ns/foot or 4.5ns/meter of cable.
 - Jamming Detection: Off
3. Tap the **Location** settings tab and configure location settings as follows:
 - **Survey mode:** Typical (3 hours) recommended for best accuracy. Fast or Quick may be used, but timing accuracy is reduced.
4. Tap the **Start Survey** button to start a survey.
5. Tap the **Results** soft key on the upper right-hand corner of the screen.

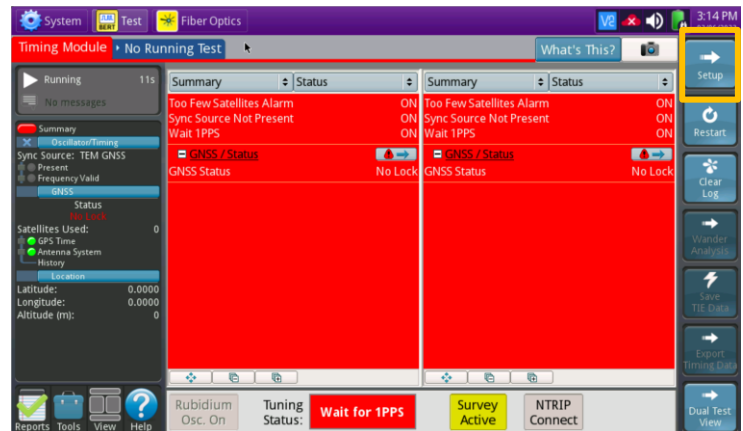


Figure 4: Timing Module Results

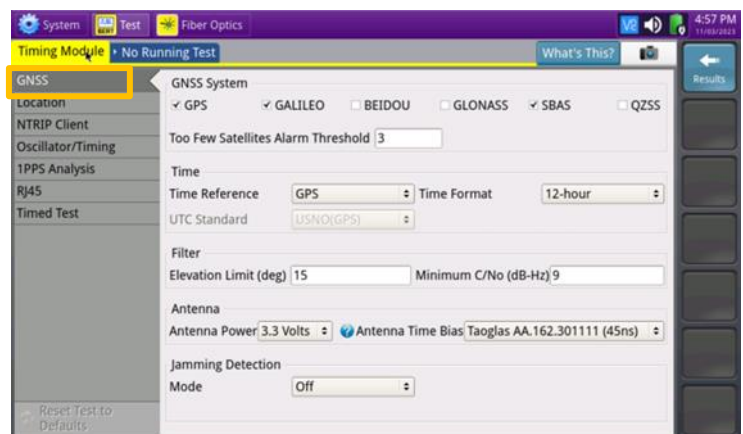


Figure 5: GNSS Settings

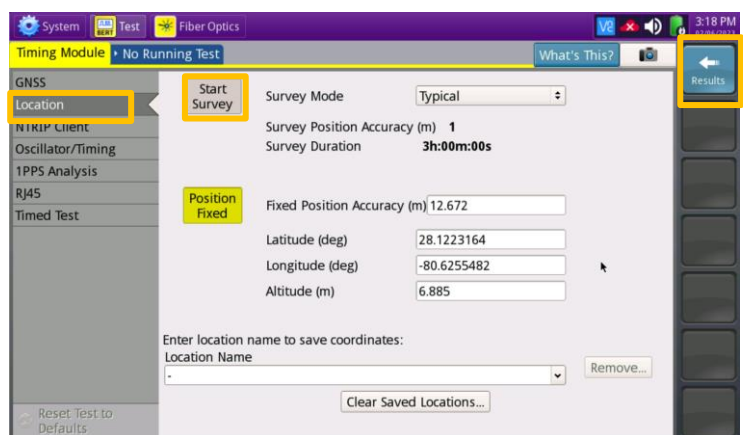


Figure 6: Location Settings

QUICK CARD

VERIFY GNSS RECEPTION

- Tuning Status** will be displayed at the bottom on the screen. The Oscillator will cycle through these stages: Warming Up, Initializing, Wait for 1PPD, Course Tune, Intermediate Tune, Fine Tune.
- Using the results group and category drop-down menus, change the right results display to the following:

 - ▶ **Satellites/Sky Plot:** Displays the satellites detected by the GNSS receiver. Ensure at least 4 satellites are “Used”. Otherwise, relocate antenna to a less obstructed location.
 - ▶ **Satellites/Signal Strength:** Uses a bar graph to display the signal strength for each identified satellite. Ensure signal strength of used satellites exceeds Minimum C/No setting (bar will be green). Otherwise, reduce Minimum C/No setting.
 - ▶ **GNSS/Status:** Displays general information concerning the GNSS Satellites. Ensure that Status progresses from “No Lock” to “Locked” to “Fixed Position” during the survey. Ensure that Timing Mode Status progresses from “Survey” to “Survey Done”.
 - ▶ **GNSS/Location:** Displays general information concerning the location and position accuracy. A Position Dilution of Precision (PDOP) value below 4.0 is desired.

- A “Typical” survey will run for 3 hours and stop if it has reached a 1-meter position accuracy. **If, after 3 hours, the survey still shows Survey Active**, the Timing Module was not able to attain a 1-meter or better position accuracy. Tap the **Setup** soft key, set **Survey Mode to Fast**, and tap the **Results** soft key. Repeat steps 1 and 2 above to conduct a 15-minute survey with 45-meter position accuracy.



Figure 7: Satellites/Sky Plot Results

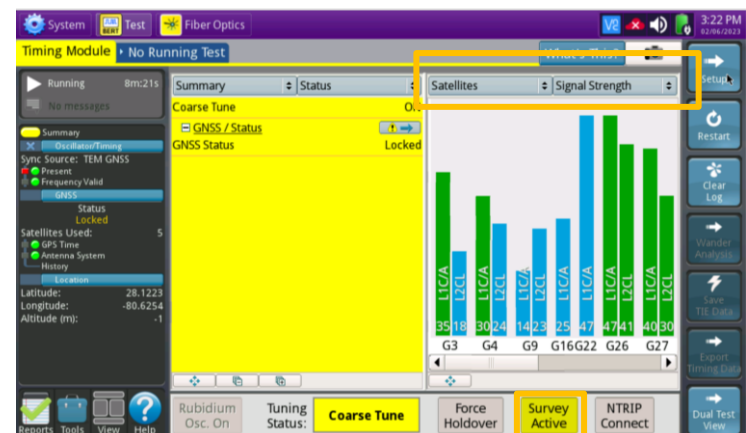


Figure 8: Satellites/Signal Strength Results

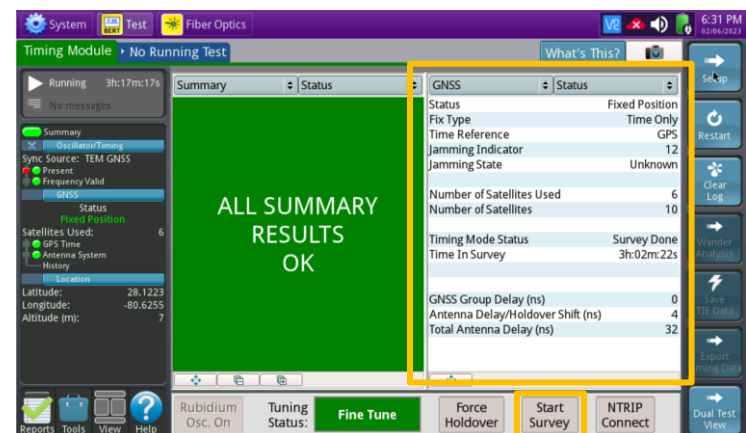


Figure 9: GNSS/Status Results