

THUNDERBOLT® LAB KIT QUICK REFERENCE CARD

This Quick Reference Card describes how to set up and run the Trimble® ThunderBolt® Lab Kit.

Before you start

1. Check the Kit contents:



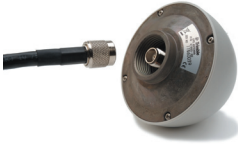
Number	Description	Number	Description
1	75 feet (22.9 m) of RG-6 cable, terminated with TNC connectors on both ends	5	Two power cables (power convertor and unterminated)
2	Trimble Bullet™ antenna (5 V, with TNC connector)	6	ThunderBolt E module
3	Power converter (24 V DC AC/DC)	7	Power pin adapters
4	BNC-m / TNC-f connector		

2. Your computer must be running one of the following Microsoft® operating systems: Windows® 7, Windows Vista®, Windows XP (with service pack 2), or Windows 2000 (with service pack 4). You must also have a free serial port.
 3. Download the Trimble GPS Studio software:
 - a. Go to www.trimble.com/support/, select ThunderBolt E and then select Trimble GPS Studio software.
 - b. Download the required files to a directory on the hard drive.
 4. Install and then run the Trimble GPS Studio software to confirm that the unit is communicating.
- For more information, refer to the *Trimble Thunderbolt E GPS Disciplined Clock User Guide*.

Set up the starter kit

Note: You can either set up the kit temporarily for testing or evaluation purposes or embed it permanently into your system. The procedures are similar.

1. Connect the TNC connector of the antenna cable to the Bullet antenna:



2. Place the antenna so that it has the fullest possible view of the sky.

To mount the antenna permanently, place it on a high point such as a roof. Make sure that it is placed away from any obstructions, such as neighboring buildings that may block its view of the sky, or overhanging objects such as trees or towers.

Note: If required, you can mount the antenna on a 1" marine pipe with 14 threads per inch (1-14 UNS per ANSI/ASME B1.1) or on a 3/4" plumbers pipe (3/4 NTP per ANSI / ASME B1.20.1).

3. Route the antenna cable to the receiver.

CAUTION: Be careful not to damage the cable. Take care to avoid sharp bends or kinks in the cable, hot surfaces (for example, exhaust manifolds or stacks), rotating or reciprocating equipment, sharp or abrasive surfaces, door and window jambs, and corrosive fluids or gases.

4. Secure the cable using tie-wraps, starting at the antenna and working towards the ThunderBolt E module. Ensure that the cable is secured at points close to the antenna and the ThunderBolt E module.
5. If required, cut the cable to the required length, and terminate it correctly, re-using the connectors. Make sure that:
 - There is enough slack for a service loop near the antenna to allow for disconnection, for moisture to drip away from the connection, and for normal movements of the antenna.
 - All contact surfaces are clean and firm before crimping.
6. Attach the BNC (m) - TNC (f) connector to the other end of the antenna cable:



7. Connect a DB9-m to DB9-f RS-232 cable (not supplied) between the ThunderBolt E and the office computer.
8. Connect the output lead of the AC/DC adaptor to the power adapter cable and plug the other end of the adapter cable into the ThunderBolt E DC power input.

9. Plug the AC/DC convertor into the main power source.

Note: Use a F-F DB9 adapter and an additional 4 foot (1.2 meter) cable if this is required.

Note: The TSIP serial port is set at 9600 baud, No Parity, 8-bit, 1 stop/start bit.

10. Verify communication from the Thunderbolt E to the user's computer using the Trimble GPS Studio software. You will see the status fields fill with information.

After power is applied, the Thunderbolt E takes 5 minutes for the ovenized oscillator to warm up. During this time it will begin acquiring satellites in less than 60 seconds, as shown in the Trimble GPS Studio software on your computer.

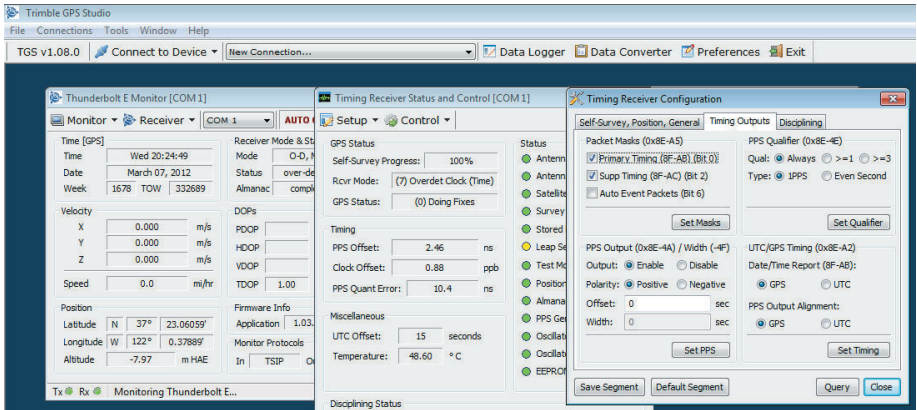
Once the Thunderbolt E has warmed up and acquired satellites it performs a self-survey, and if at least one satellite is currently available, will output 1PPS and 10 MHz. The complete process can take an hour.

Overall performance will improve after several days of continuous operation. 1PPS and 10 MHz is not synchronized with GPS until the unit enters Over-determined Clock Mode.

Correct for cable length

The antenna cable adds a delay to the GPS signal proportional to the length of the cable. To obtain accurate readings, the Thunderbolt E settings must be adjusted to compensate for the delay. Do this using the Trimble GPS Studio software.

1. In the *Thunderbolt E Monitor* dialog, select the *Monitor* pull-down menu and then select *Timing Receiver Monitor*:



2. The *Timing Receiver Status and Control* dialog appears. Select the *Setup* tab and then select *Configuration*.

3. The *Timing Receiver Configuration* dialog appears. Select the *Timing Outputs* tab.

4. Enter the timing delay adjustment into the *Offset* field.

5. Click **Set PPS** to send the configuration change to the Thunderbolt E GPS disciplined clock.

For more information, refer to the *Trimble Thunderbolt E GPS Disciplined Clock User Guide*.

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