Trimble 5700 Operation for 24+ Hour Geodetic Survey

by Francisco Gomez (Cornell University)
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The Trimble 5700 receiver operation follows the same general idea for the Trimble 4000 SSE/SSI receivers (UNAVCO's equipment pool). However, the exact steps are different, and in many cases simpler.

Introduction

Figures 1 – 4 depict the features, ports, etc., of the Trimble 5700. As you can see, there are only two buttons (Data and Power), 5 LED indicators, 3 serial ports, and two antenna ports (GPS and Radio). [In fact, one of the receivers does not have a Radio antenna port because it serves as a RTK base station by connecting to an external antenna.]

Top panel
Front panel
Rear panel
Bottom panel

Figure 1

Buttons
Indicator LEDs
CompactFlash/ USB door catch

Figure 2

Serial ports
Port 1   Port 2   Port 3
GPS   RADIO
GPS antenna port
Radio antenna port
TNC ports

Figure 3

CompactFlash/ USB door
CompactFlash port
Internal battery
USB port
Internal battery compartment
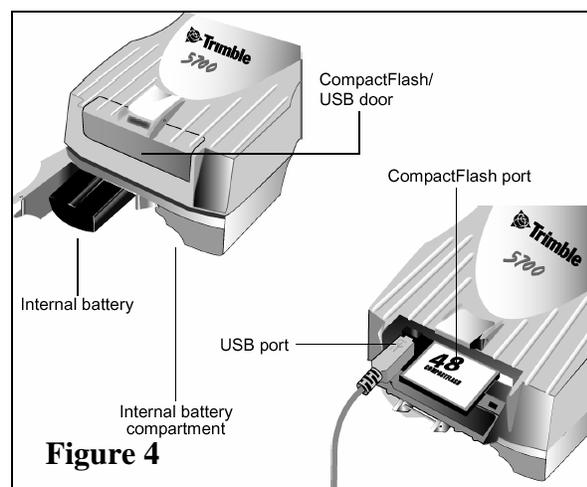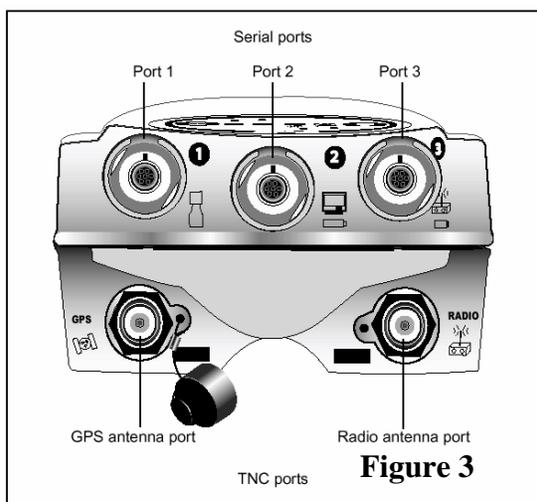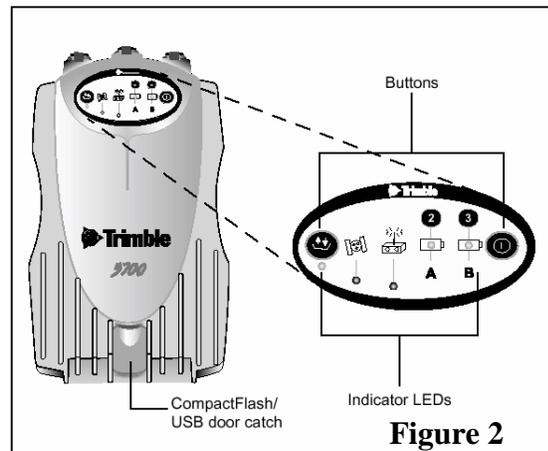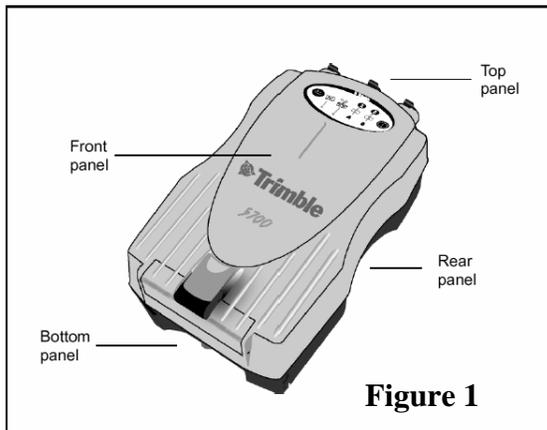
Figure 4

Table 1: Icons shown in Figure 3

Icon	Name	Connections
	Port 1	TSC1 data collector, event marker, or computer
	Port 2	Power in, computer, 1PPS, or event marker
	Port 3	External radio, power in
	ANT	GPS antenna
	RADIO	Radio communications antenna

The Trimble 5700 operates between 10.5 and 28 DC volts (VDC). The receiver draws approximately 3 watts of power. The Trimble 5700 can be powered either by internal batteries or external power sources connected through port 2 and / or port 3. Two fully charged internal batteries will, in principle, power the receiver for about 10 hours. A 12 V battery with a 60 A*hr rating (i.e., and automobile battery) will theoretically power the receiver for 10 days (60 A*hr * 12 V / 3 W). Hence, for our surveys, solar panels will not be necessary to maintain the charge on the battery. However, these times depend on the operating temperature and the number of charging cycles the battery has experienced.

The Trimble 5700 manual provides all information necessary to use different power configurations. For our surveys, we will power the Trimble 5700 receiver with an automobile battery using the internal batteries as back up power sources.

Antenna Setup
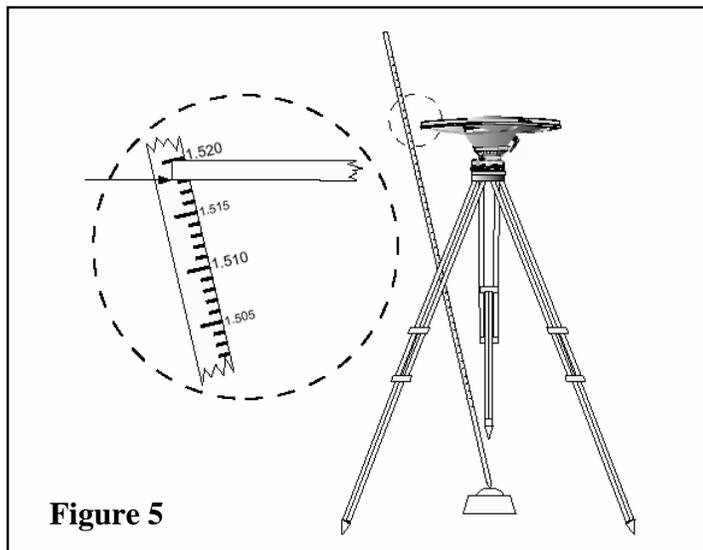
Figure 5

This follows the same procedure as outlined for the Trimble 4000 SSE/SSI.

- Set the tripod over the mark and level it (refer to Chapter 2 of the UNAVCO handout). Attach the antenna to the tribrach adapter. Carefully slide the tribrach adapter into the tribrach, being careful not to disturb the tripod.
- Carefully unroll the antenna cable.
- Connect the antenna cable to the threaded connection on the antenna housing. Be careful not to cross-thread the connection.
- Connect the antenna cable to the antenna port on the receiver.
- Orient the antenna to true north and secure it in place.

- Secure the dangling antenna cable to the tripod so that it will not blow in the wind.
- Recheck the level and centering of the antenna.

Note: The antenna height is measured to the <u>BASE</u> of the Trimble Zephyr Geodetic antenna (see Figure 5)

Power Configuration

The general power and antenna setup is depicted in Figure 6, below.
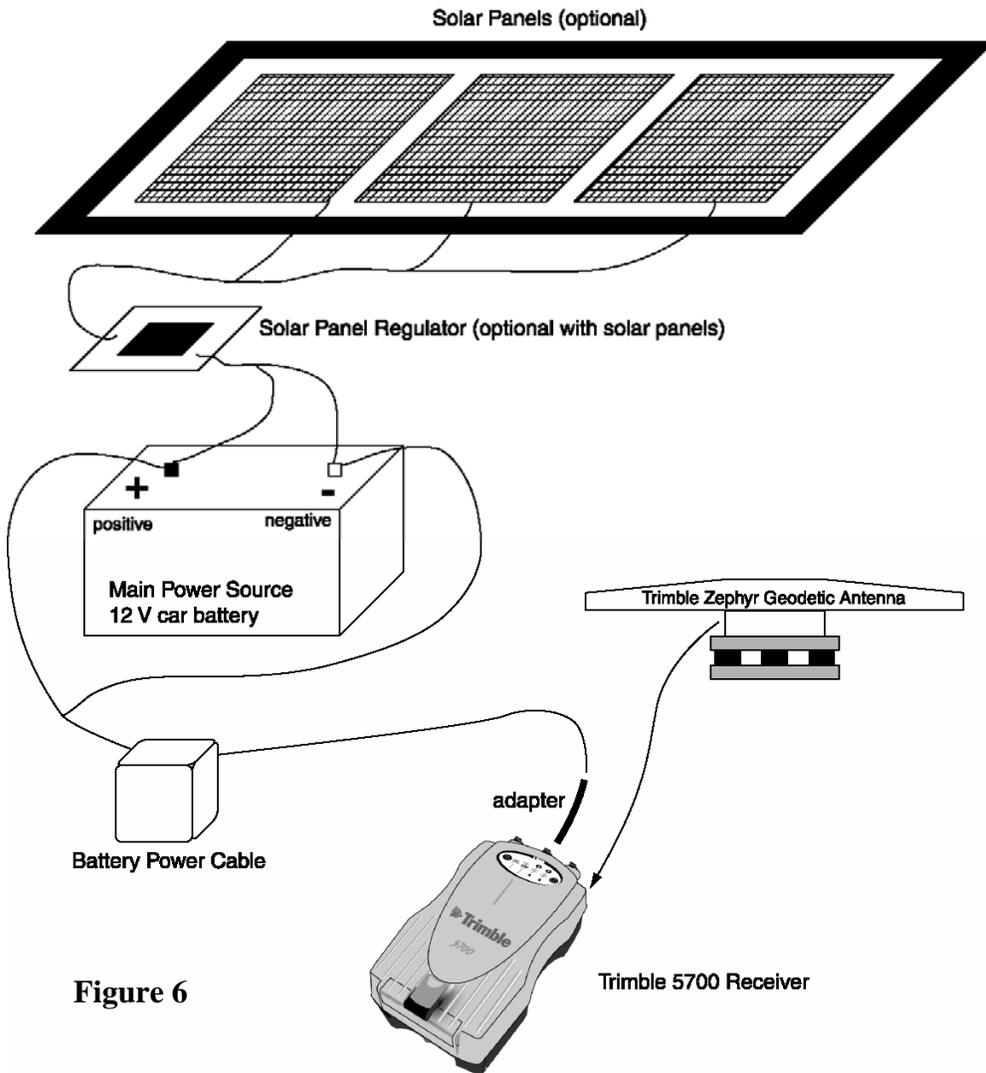
Figure 6

<u>Main Battery.</u> Using the auxiliary battery cable, attach the car battery to Port 2. Note that at present, an adapter cable must be used to connect the battery cables to the Trimble 5700 – the connections are a different size from that of the Trimble 4000 series. Ensure that the battery connections are correct. The positive (+) terminal is red or white, and the negative (-) terminal is black.

Backup Batteries. These internal batteries should be inserted into the bottom panel of the Trimble 5700 (see Figure 4).   The batteries recharge within the Trimble 5700, so they will probably already be inside. However, this should be verified before each survey to avoid any nasty surprises.

Solar Panels. (Optional, and not being used in this survey.)

- Attach the solar panel regulator to the solar panels. Place the regulator in a plastic bag. Connect the alligator clips to the appropriate terminals on the main battery.
- Open the solar panels one panel at a time. This avoids creating a power surge. Place the panels in the sun perpendicular to the sun's rays. Ensure the panels are placed in an area that has maximum sunlight over the course of the day.
- As previously noted, the solar panels are not entirely necessary for the Trimble 5700 due to the lower power consumption. However, they can provide a backup, and they will, theoretically, maintain the full charge on the automobile battery.

Receiver Setup and Operation

- Connect the power system as described above.
- Connect the antenna as described above.
- Power on the receiver by pressing the Power button (see Figure 7).
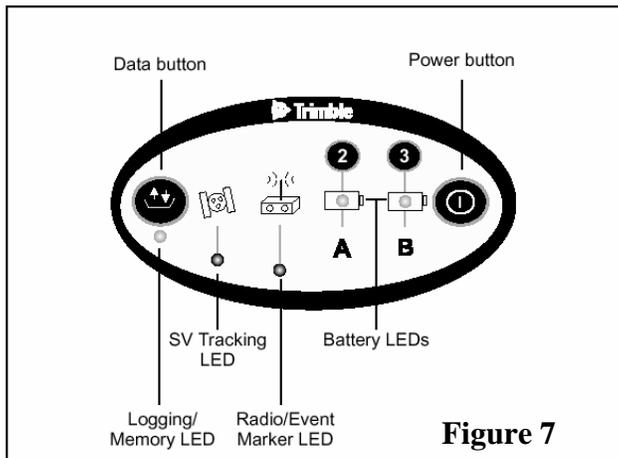
Figure 7

- Check status with the indicator lights on the receiver. Make sure it is tracking satellites and logging. The indicator lights on the top panel (Figure 7) will show the following:
  - Logging/Memory LED is on with no flash or slow flash, only.
  - SV Tracking LED flashes slowly (fast flash means 3 or fewer SVs; no light means no SVs).
  - Battery A is green with no flash (flashing indicates low or no power).
  - Battery B is orange with no flash.
- If the receiver does not automatically begin logging, then press the Data button (see Figure 7).

- To end a survey, press the Data button for two seconds (no more, no less). This will stop data logging. Then, press the power button for two seconds (no more, no less) to turn the receiver off.

Note: Holding the Power button for 15 seconds clears the configuration, and holding the Power button for 30 seconds erases and reformats the memory card. Do not do this!

Data Download

Note: Downloading the data from the Trimble 5700 does not use the UNAVCO Data Assistant software. Data downloading requires Trimble 5700 Receiver software to be installed on the computer.

GPS data are stored on removable Compact Flash memory cards which provide considerably more memory than the Trimble 4000 series. Hence, DO NOT delete files from the memory cards until it is necessary. Data are not easily replaced if lost!

Data files have the an 8 character name with a 3 character extension: e.g., **12345678.t00** The first 4 numbers (1234) are the serial number of the receiver. The next three numbers (567) report the Julian Date. The final number (8) is the session number. The extension, *.t00, is a Trimble compressed file format. Hence, the Trimble software is required to convert this into a *.dat file. **These filenames are automatically labeled by the receiver. Hence, the field operators must make careful notes so the station and date can be correlated with the filename after download.**

On a computer with Trimble Data Transfer installed, create the local directory for downloading data.

From this point, there are two methods to transfer data, but they both require Data Transfer to be installed.

Method #1: From the Compact Flash memory card (fastest data transfer)
- Remove the memory card from the receiver.
- Connect the memory card to the computer using either:
    - (a) A Compact Flash card reader
    - (b) A Compact Flash – PCMCIA adapter
- The Compact Flash card will appear as an external disk in Microsoft Windows (e.g., using Windows Explorer).
- Copy the *.t00 files to the local directory (e.g., click-and-drag in Windows or Windows Explorer).

Convert the *.t00 files to *.dat files **in the local directory.** To do this, in Windows, right-click the mouse button on the *.t00 file. In the menu, select "Convert to DAT format" (once again, this option only appears if Trimble Data Transfer has been installed). The *.dat file is now created.

Method #2: From the Trimble 5700 Receiver (slower data transfers)

- Leave the memory card in the receiver.
- Connect the computer to the receiver using either:
    - (a) The USB cable (fast) (Figure 8a)
    - (b) The Serial cable (slow) (Figure 8b)

Figure 8a

USB cable

USB port

USB port

Figure 8b

data/power cable

serial (COM) port

Port 2
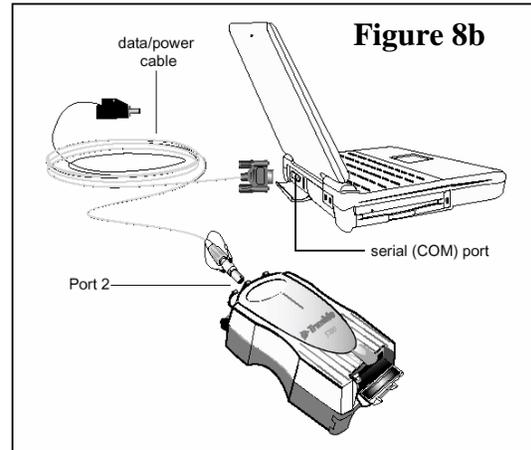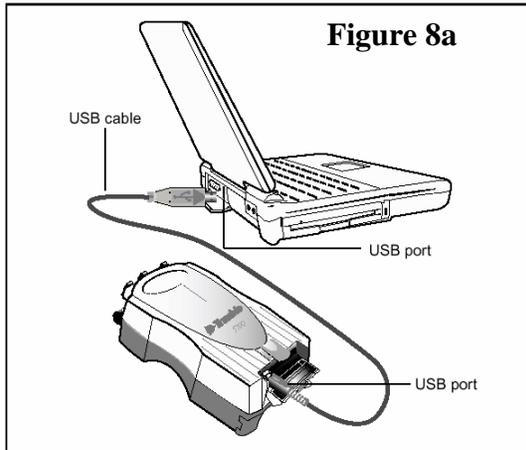
- From the Start menu, start Trimble Data Transfer. This is a Windows-based program, so all selection is done with the mouse.
- Select the appropriate Device (e.g., Trimble 5700 Receiver). The program will try to connect to the receiver.

[Note: If the device selection does not exist, do the following: select "New". When prompted for the device type, select "GPS Receiver (5000 Series)". Next, select the appropriate serial port (usually Port 1). Finally name the device, perhaps "Trimble 5700 Receiver". Now select the newly created device setting, and proceed as above.]

- Make sure the "Receive" tab is selected.
- Select "Add".
- Under "File Type", select "5000 Series Receiver Files". The *.t00 files should be displayed.
- Select all appropriate files.
- Under "Destination" select the local directory on the computer. Either type in the full path name, or use the "Browse" option to select the directory using Windows Explorer.
- When all is ready, select "Open", and the files will be added to the list on the main window.
- Select "Transfer All" to download data and convert them into *.dat files. The conversion results and a notice indicating a successful data transfer should appear.

Receiver Configuration

The receiver will be configured prior to the field work. However, if the receiver configuration is reset (e.g., holding the power button for 15 seconds), then the configuration for the geodetic survey must be restored. The configuration file will be saved on the field computer, so it can be easily uploaded from the computer to the receiver using the Trimble Configuration Toolbox program as follows:

- Connect the computer to the receiver, as described above, using either:
    - (a) The USB cable (fast)
    - (b) The Serial cable (slow)
- Start the Trimble Configuration Toolbox (e.g., from the Start menu).
- From the File menu, select Open.
- Select the configuration file (*.cfg). The file is loaded, and a configuration file window appears.
- With the mouse, select Transfer to upload the configuration file to the receiver.

If the configuration file does not exist, it must be created as follows:

- From the File menu, select New.
- Select 5700. A configuration file window appears.
- File settings:
    - Settings should be Applied Immediately
    - Stored in Receiver as an auto power up file
- From the list entitled Available, select and apply the following settings:
- General   10 degree elevation mask
- Logging   30 second logging rate
- Antenna
    - Group: All
    - Type: Zephyr Geodetic
    - Method: Bottom of notch
    - Note: measured height will be corrected in post-processing.
- SV Enable Move all satellites to Always Use
- Save the file under File>Save
- As above, use the Transfer button to upload the configuration file to the receiver.

Recharging the Receiver Batteries

The internal batteries are recharged inside the receivers. To recharge them, simply connect the receiver to the download/power cable through Port 2 (as if the receiver is to be connected to a computer). Then, connect the recharger to the AC power supply. This is shown below in Figure 9a. Multiple receivers can be recharge by connecting the download/power cables in series as shown in Figure 9b.

Figure 9a

Figure 9b