The UniTraQ GT-320 GPS receiver is the inexpensive GPS receiver every near space flight computer needs. The 48 channel GPS with high altitude firmware is designed to plug into a NearSys flight computer, including the BalloonSat Extreme. Once plugged in, the GT-320 receives power and begins outputting seven GPS sentences.

Onwards and Upwards,
Your near space guide

Overview of the UniTraQ GT-320

The GT-320 is a 48 channel GPS receiver with high sensitivity to NavStar signals and quick acquisition time. The receiver outputs seven standard GPS sentences, GPGGA, GPGLL, GPGSA, GPGSV, GPRMC, GPVTG, and GPZDA at 4800 baud, N81. The receiver has onboard voltage regulation and accepts a wide range of voltages, 3.5V to 8.3V. The GT-320 has an integral patch antenna, so just apply power and a flight computer is ready to read the signals. A back up battery is included to maintain time and satellite ephemeris in the receiver.

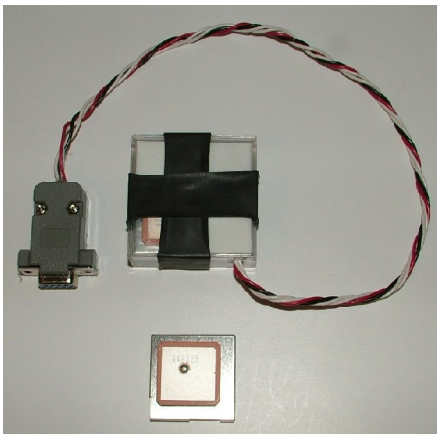

Figure 1. The GT-320 GPS, in and out of its case.

Assembly Directions

The following parts are included with the NearSys kit.

GT-320 GPS Receiver
Six wire connector
Two inch square plastic box
Four feet of wire
Two inches of thin heat shrink
Female DB-9
DB-9 housing
Two inch square neoprene foam, 5 mm thick
(2) Two inch square neoprene foam, 2 mm thick
Band of two-inch diameter heat shrink

Assembly involves adding the DB-9 to the GT-320 connector and placing both the DB-9 and GT-320 into plastic boxes.

First locate the six wire connector and three pieces of #24 AWG wire (two are one foot long and the third is two feet long).

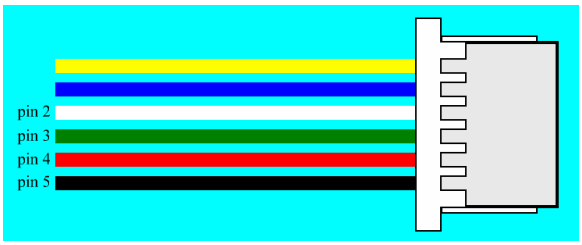

Figure 2. Pin out of the six wire connector.

□ trim the bare ends from the yellow and blue wires
□ bare ½ inch of insulation from the four remaining wires (white, green, red, and black)
□ cut the long wire into two equal length pieces
□ bare ½ inch insulation from one end of all four #24 wires
□ tin all eight bare wires
□ hold the red wires together and heat with a solder iron to fuse the wires together
□ hold the black wires together and heat with a solder iron to solder together
□ hold a remaining wire to the white wire and heat with a solder iron and solder together
□ hold the remaining wire to the green wire and heat with a solder iron and solder
□ cut the heat shrink into four pieces and cover the soldered connections

Locate the female DB-9 connector and look on the back and you'll see fine numbering next to each solder cup. The numbers label the pins of the DB-9 from 1 to 9.

Figure 3. The back of a DB-9 connector and its solder cups.

□ cut the four wires to equal lengths
□ bare ½ inch of insulation from the four wires
□ tin the ends of the four wires
□ tin the following four solder cups of the DB-9 (2, 3, 4, and 5)

□ trace one wire at a time from the six wire connector prepare to solder each to its proper DB-9 cup

Note: Figure 2 shows the proper pin for each wire.

□ place a tinned wire against its proper solder cup
□ heat the solder cup with a soldering iron and press the tinned wires into the molten solder
□ remove the soldering iron and hold the wire in place until the solder cools
□ repeat for the remaining solder cups

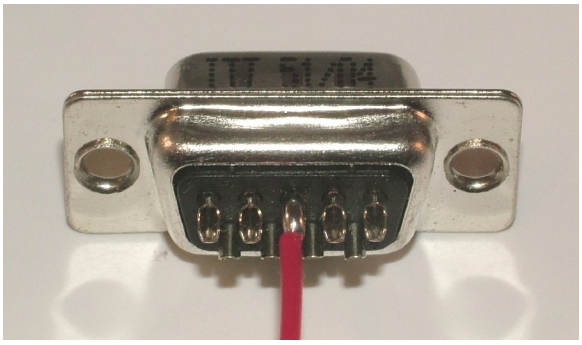

Figure 4. The back of a DB-9 with a wire soldered to cup #3.

□ open the DB-9 shell bag and set the shell, shell bolts, and shell nuts aside
□ fill the bottom half of one shell with hot glue and press the DB-9 inside and bring the cable out the back end of the shell
□ fill around the solder cups with hot glue
□ fill the other shell with hot glue and close the shells around the DB-9 and cable
□ bolt the shells together
□ back fill the end of the shell where the cable exits
□ tie an overhand knot in the #24 AWG portion of the GPS cable, just past where it solders to the wires in the connector

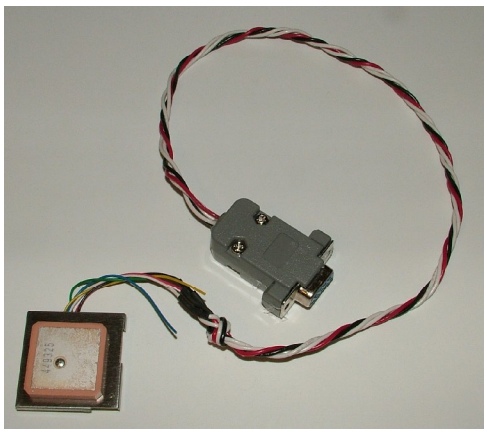

Figure 5. The GT-320 with its completed serial cable.

In the next steps, the clear Lucite box will be prepared for the GPS.

□ unwrap the Lucite box and set the lid aside
□ press the open end of the box into a sheet of thin neoprene foam
□ cut out the square marked in the foam by the box

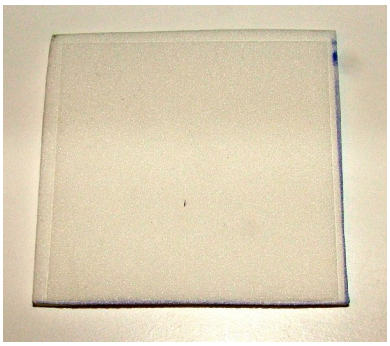

Figure 6. After pressing the Lucite box into neoprene, you can faintly see the box's outline.

Note: Cut just inside the square marked on the foam, it needs to be just smaller than the outline to fit inside the box.

□ repeat with the two pieces of neoprene foam
□ use an Exacto knife to cut a small notch in the box as shown in figure 7.

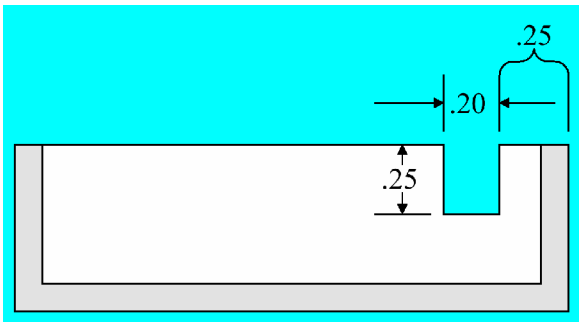

Figure 7. The dimensions in this figure are in inches.

□ lay a thin sheet of neoprene foam into the bottom of the Lucite box
□ cut a square notch out of the corner of the thick neoprene foam as shown in figure 7

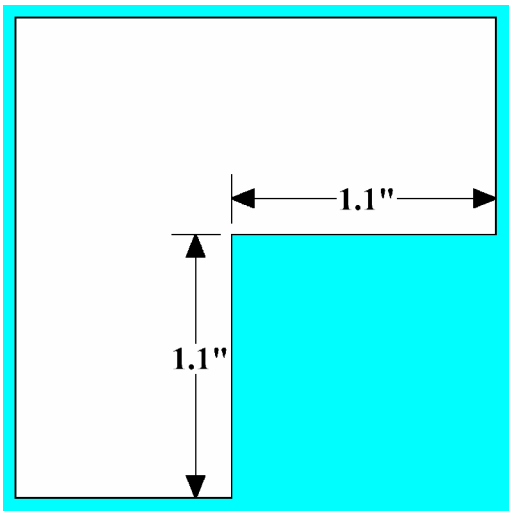

Figure 8. The square notch cut into the thicker neoprene will prevent the GT-320 from sliding around inside the Lucite box.

□ place the GT-320 into the Lucite box, with the wider face on the bottom and the smaller patch antenna on top

Note: The patch antenna has the pink border.

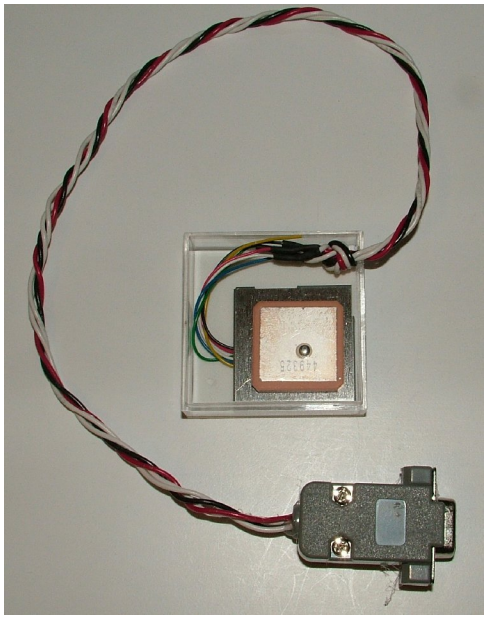

Figure 9. The GT-320 inside the Lucite box. The knot in the GPS cable is too large to pass through the notch in the Lucite box.

□ slide the GT-320 to one corner and pass the cable through the notch in the Lucite box (as seen in figure 9)

□ place the thicker sheet of neoprene over the GT-320, covering the cable, but leaving the patch antenna uncovered

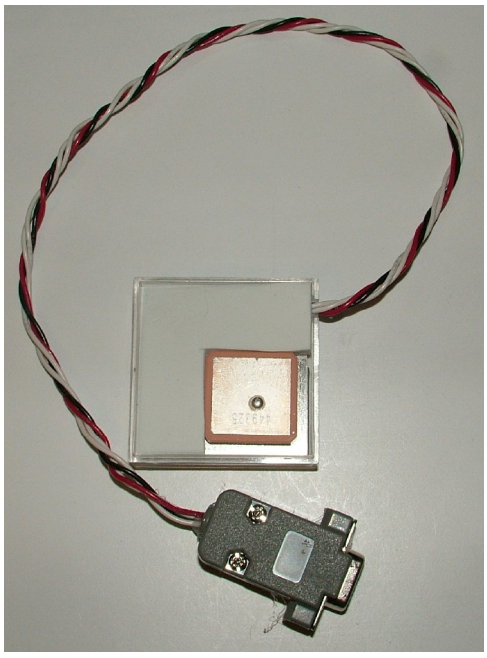

Figure 10. The thicker neoprene in place.

□ write the word "UP" on the face of the neoprene sheet and in the four corners
□ place the neoprene inside the Lucite box, covering the GPS
□ close the Lucite box by placing the lid over the GT-320 and neoprene foam

Figure 11. The GT-320 is now buried inside the Lucite box and immobilized with neoprene foam.

□ cut the two-inch diameter heat shrink into two narrow bands
□ slip one band over the box and heat until it shrinks
□ repeat with the second band, but wrapped in a perpendicular direction

Note: Do not cover the writing on the top layer of neoprene.

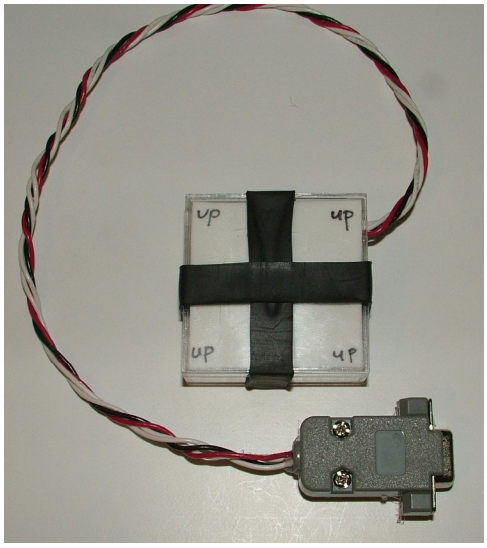

Figure 12. The shrunken bands will keep the lid in place, but can be easily cut away to access the GT-320.

8 Dec 2010