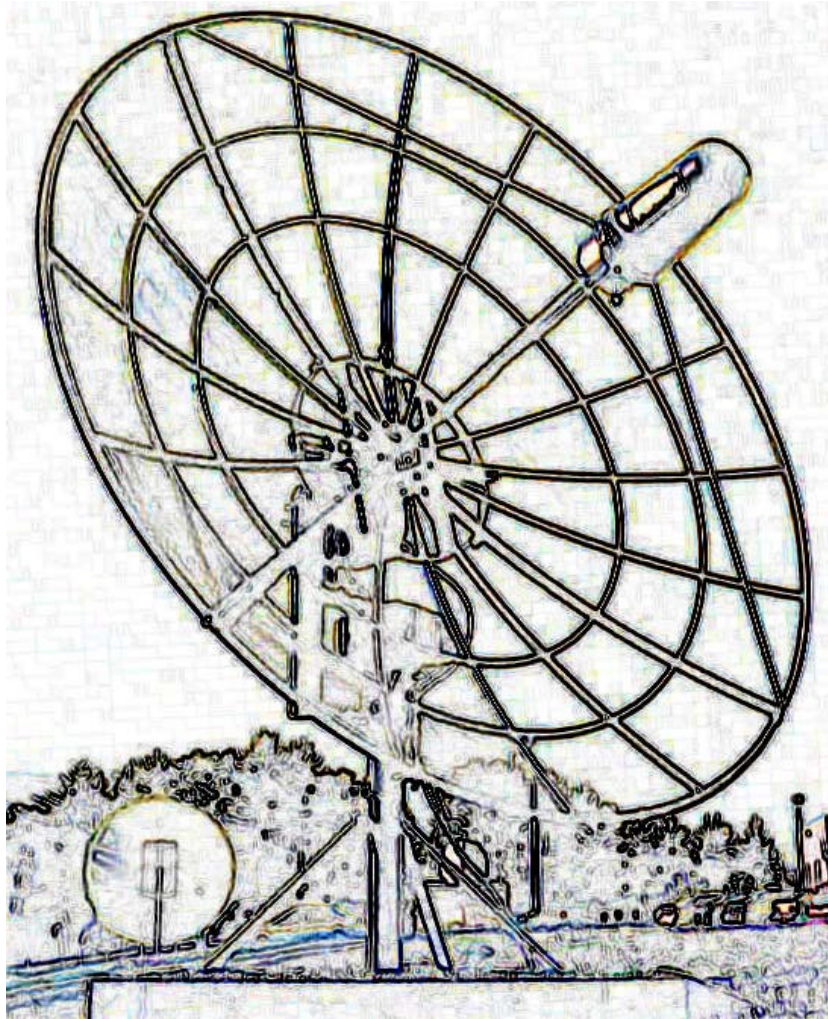


*NEROC Haystack Observatory
Small Radio Telescope (SRT)*

Telescope Mount Assembly Instructions



August 28, 2001

Once a base has been assembled and the vertical post plumbed proceed to **Step 1**. Additional SRT assembly instructions can be found on-line at:

<http://fourier.haystack.mit.edu/SRT/SRTassembly.html>

Tools needed for the SRT assembly:

- 2 - 1/2" wrench
- 2 - 5/8" wrench
- 2 - 3/4" wrench
- 2 - 15/16" wrench
- 1 - 1 1/16" wrench
- 1 - medium adjustable wrench
- 1 - phillips head screw driver
- 1 - level
- 1 - Socket Set

Step 1.

If you have assembled the optional roof mount, **Figure 1** shows the vertical post, as it should look with the braces attached and tightened. The post is now ready to receive the azimuth drive assembly. The indicated area shown by the arrow is the azimuth drive assembly attachment pipe. The azimuth drive assembly can be seen attached to the mount post in **Figure 1a**. This illustration shows the drive unit slightly tilted from its operational orientation.

Action: Slip the Azimuth Drive Assembly over the Vertical Mount Pipe. Lightly tighten the five holding bolts on the Vertical Pipe connection (white arrows). Final tightening of the holding bolts should be done AFTER the first Sun orientation scan.

Tools needed: 3/4" wrench

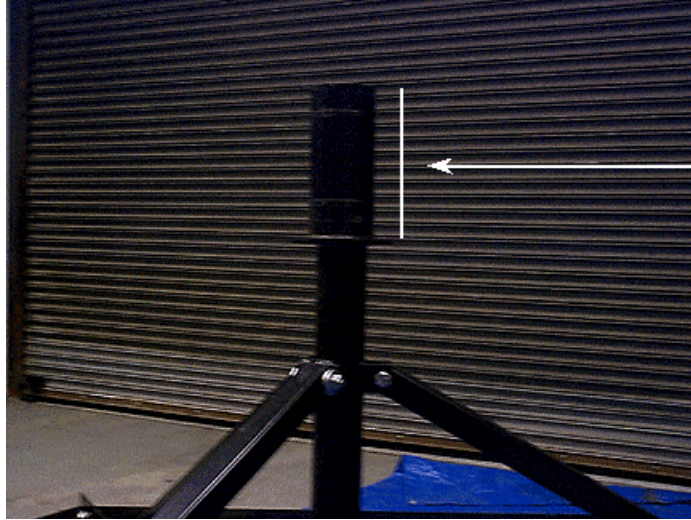


Figure 1



Figure 1a

Step 2.

With the Azimuth Drive Assembly attached to the Vertical Mount Pipe, you will need to attach the Elevation Motor Assembly adapter pipe to the two flanges on the side of the Azimuth Motor Assembly. *Note: The Azimuth Drive Assembly is shipped with the motor/pipe orientation 90 degrees from vertical*

Action: Because the Azimuth Motor Assembly is shipped 90 degrees from its final orientation, access to the adapter pipe bottom attachment nut is allowed. Holding the Adapter Pipe in the orientation shown in **Figure 2**. Rotate the adapter around the axis of the bottom attachment bolt. Two spacing washers should be placed on the lower attachment bolt BEFORE you slip the bottom flange hole over the bolt **Figure 2a**. Slide the upper flange OVER the Azimuth Drive Assembly flange. Rotate the adapter pipe to the orientation shown in **figure 2** and attach the two upper bolts (5/8" x 1 1/2"). The lower attachment point should now have two washers on the bolt, then the lower adapter flange, then a washer and nut.

Tools Needed: 15/16" wrench
 5/8" wrench
 adjustable wrench

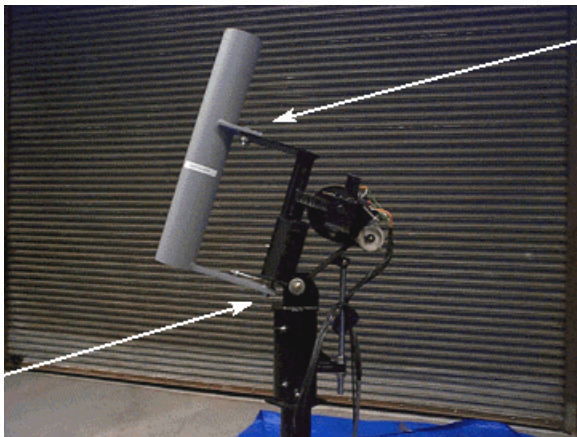


Figure2

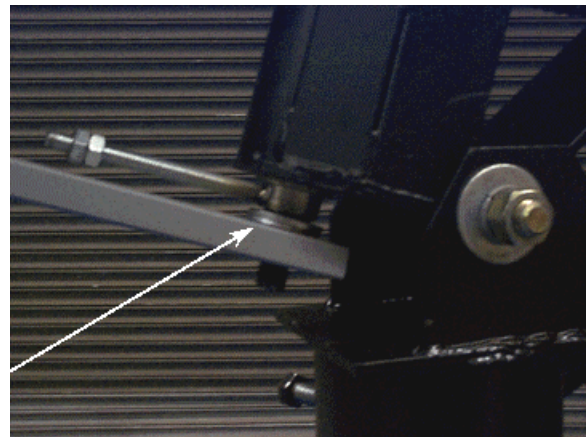


Figure 2a

Step 3.

Now that the Adapter Pipe has been tightened, the lower nut should clear the top of the lower Azimuth Motor Assembly mount pipe.

Action: Loosen the *horizontal* Azimuth Motor Assembly bolt (bolt at the right in Figure 2a) and with a small level, align the Assembly and Adapter Pipe to vertical, as in **Figure 3**. (The axis of rotation of the assembly to vertical is the axis of the horizontal bolt)

Tools Needed: 15/16" wrench



Figure 3

Step 4.

Now that the Azimuth Motor Assembly and Adapter Pipe are vertical, attach the 15-inch 3/4 tie-rod to the bracket and slot on the side of the Azimuth Motor Assembly lower pipe.

Action: Thread the tie-rod down through the lower slot flange with one of the two adjustment nut/washer sets threaded on the rod but above the slot flange. Put the upper tie-rod end through the hole in the upper tie-rod attachment point. Attach the bolt and nut through the top of the tie-rod. Thread the lower adjustment nut/washer set to the tie-rod below the slot flange. This will be the fine vertical-plumb adjustment for the SRT **Figure 4**.

Tools Needed: 3/4" wrench
 1" wrench
 adjustable wrench

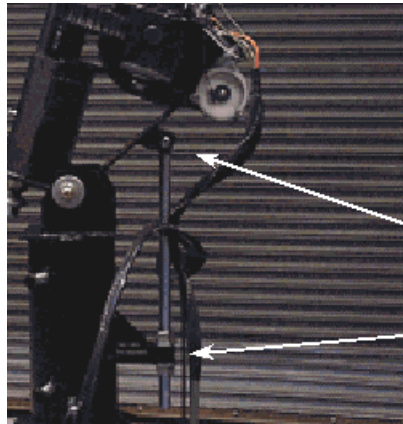


Figure 4

Step 5.

With the Azimuth Motor Assembly and the Adapter Pipe properly oriented to vertical mount the Elevation Motor Assembly on the Adapter Pipe

Safety Note: The Elevation Assembly is more than six feet above the mount base and is very heavy, use caution!

Action: Lift the Elevation Motor Assembly onto the Adapter-Pipe. Orient the Elevation Motor as seen in **Figure 5**. Tighten the Adapter-Pipe holding bolts (white arrows). The angle between the Adapter-Pipe axis and the Elevation Gear axis should be 90 degrees. This is adjusted by loosening the *horizontal* bolt on the Elevation Assembly and adjusting the 8-inch by 3/4 tie-rod **Figure 5a**

The elevation motor assembly is oriented so that the motor and elevation leveling screw is over the plate in the direction of the azimuth axis. When the mount is correctly orientated (for the northern hemisphere) the dish will point South in the center of the azimuth motion and point approximately East at stow. The adapter pipe will point WEST in the center of azimuth rotation and approximately SOUTH at stow.

Tools Needed: 3/4" wrench, 9/16" wrench, 15/16" wrench



Figure 5

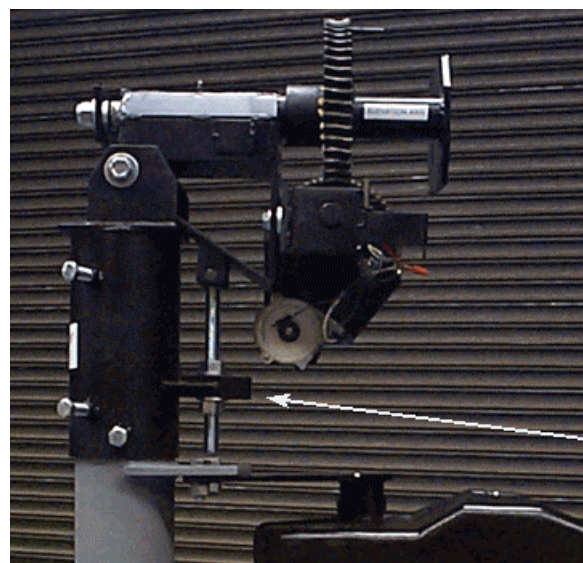


Figure 5a

Step 6.

With the two axis motor assemblies in place and tightened to the mount, it is time to attach the assembled 7 ft parabolic antenna to the attachment flanges on the Elevation Motor Assembly. There are two flanges on the Elevation Assembly. One flange (to the right of the elevation sector gear as seen in **Figure 5a**) is fixed with two mounting holes (**Figure 6**). The second flange (at the left end of the elevation gear shaft in **Figure 5a**) has adjustments to allow the user to attach the dish and then align and tighten the assembly (**Figure 6a**). Out of the box, the mounting flanges will be pointing to the zenith. This will require the persons assembling the mount to lift the dish assembly *in zenith position* and hold the dish in place while the attachment between the dish ring and the flanges is fastened.

You may want to skip this step until the drives are powered and the unit is under computer control!

Action: With the Elevation Assembly flanges at zenith position place the assembled dish with the rear mounting-ring attachment holes aligned with the flanges. Be sure to allow the adjustable flange some loose play to facilitate a quick attachment fit. Once the attachment fasteners are in place, tighten the dish assembly to the mount.

Tools Needed: 3/4' wrench
 adjustable wrench

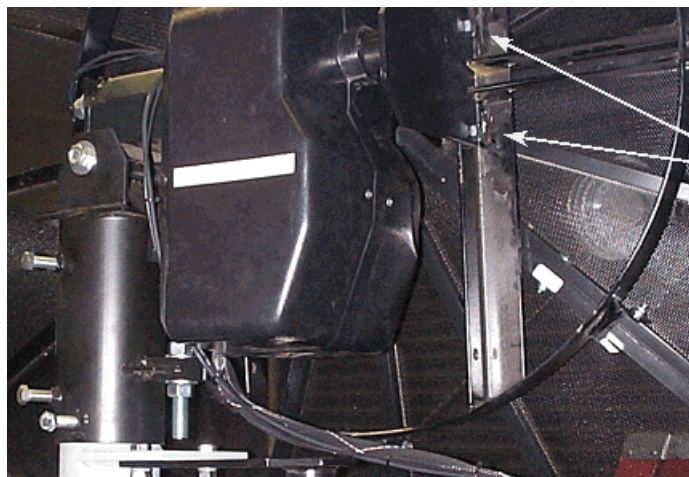


Figure 6

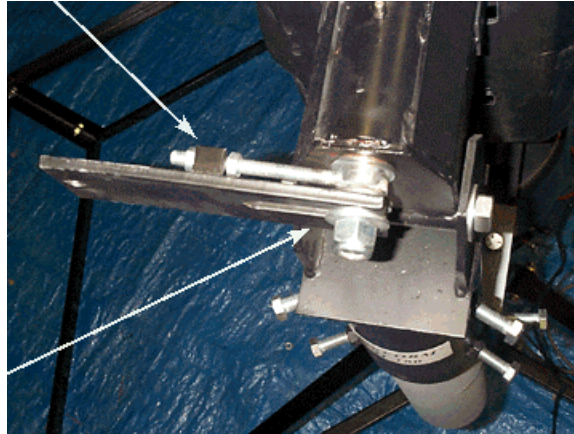


Figure 6a

Step 7.

Whether you skipped **Step 6** or not, you may now attach the wiring harness to the Azimuth and Elevation Motor Assemblies. Your SRT parts shipment included an approximately 100ft wiring assembly. The orange and blue wires at the lead end of the spool will need to be stripped and attached to the calibrator motor at the prime focus or to the noise calibrator. (see [Calibration Information](#) on the Haystack SRT web pages and the wiring section of the SRT manual at [Harness.PDF](#)) The wire connectors to the Elevation Motor Assembly (green, green/black and white wires) should be placed approximately ten feet from the lead end of the harness. The Azimuth Motor Assembly connectors (red, red/black and white/black wires) should be placed approximately fourteen feet from the lead end.

Action: The wiring of the feeds and motor assemblies is quite simple. Close attention must be paid however, to the *PATH* of the wiring harness on the mount. ***THIS IS CRITICAL TO AVOID PINCHING OR STRETCHING WIRES OVER THE RANGE OF MOTION OF THE SRT!***

The next set of images will show the recommended progression of the wiring harness over the SRT mount. **Figure 7** shows the attachment of the Azimuth Motor Assembly to the wiring harness. The wires are labelled with the motor wires attached to the proper lugs prior to shipment.

Tools Needed: wire cutters/strippers, crimping tool, screw driver

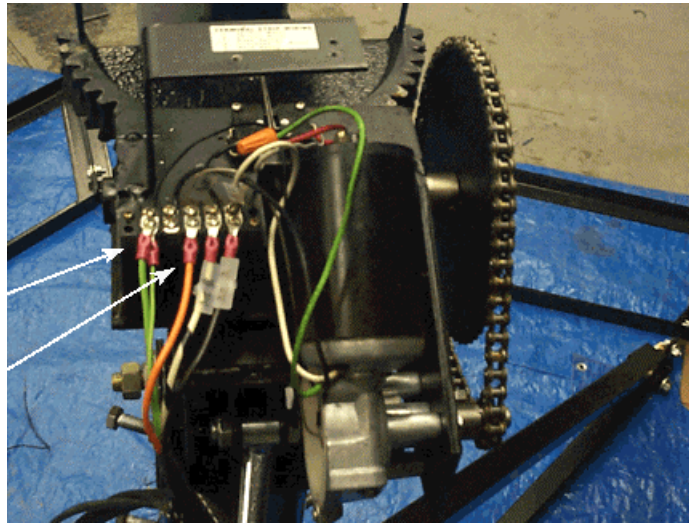


Figure 7

Figure 7a shows the harness continuation after the Azimuth Motor Assembly is wired. This image shows the motor covers attached and the proper wiring path when the full harness is in place.

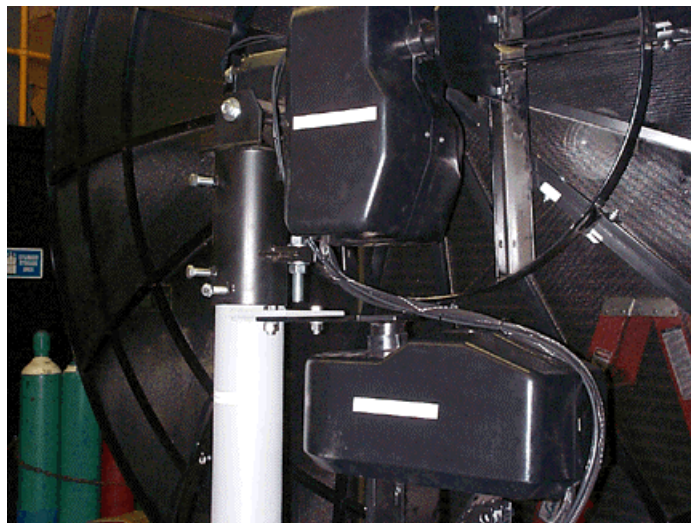


Figure 7a

Next, attach the Elevation Motor Assembly to the wiring harness (as was done for the Azimuth Assembly). As **Figure 7b** indicates, the wires are labelled for proper placement.

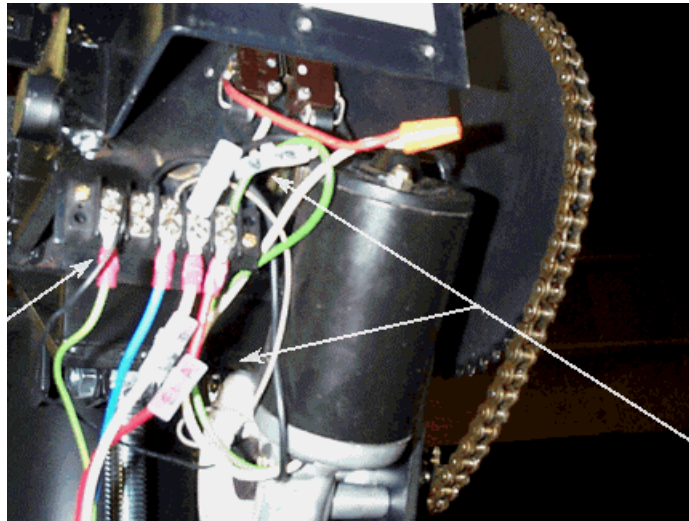


Figure 7b

Figure 7c shows the continuation of the wiring path after the attachment to the Elevation Motor Assembly. The right arrow shows the wire path going up and over the elevation gear axis shaft and being attached with wire tie-wrap to the dish backup structure. The image shows two more tie-wrap attachments to the dish backup ring (right arrows) before running down along the lower left (as seen from the back) dish panel seam (**Figure 7d**)

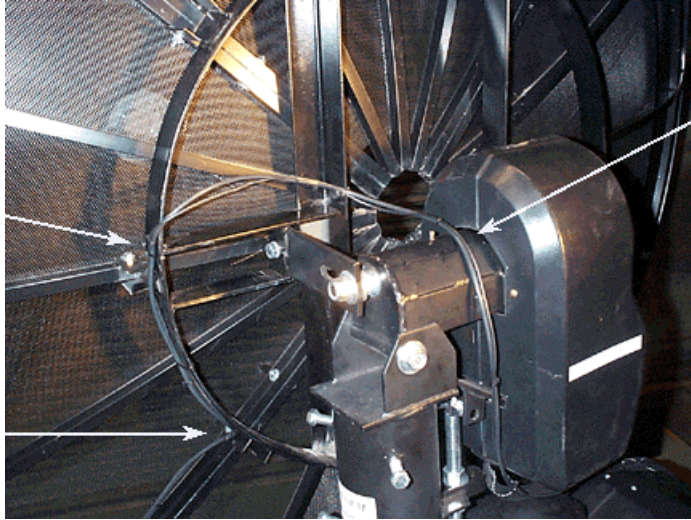


Figure 7c

In **Figure 7d**, the harness after running along the back of the lower dish seam, is brought around to the front edge of the dish and is tie-wrapped to the lower right feed-spar leg (as seen from the front of the SRT).



Figure 7d

At the "top" of the feed-spar, the, now two-wire (receiver coaxial wire added alongside the 9-wire harness), set is tie-wrapped before the paths split (**Figure 7e** arrow). The coaxial wire is brought through the plastic feed-cover flange slot and attached to the back of the receiver box. The other wire is fed between the plastic flange and the feed housing and attached to the calibration load housing.

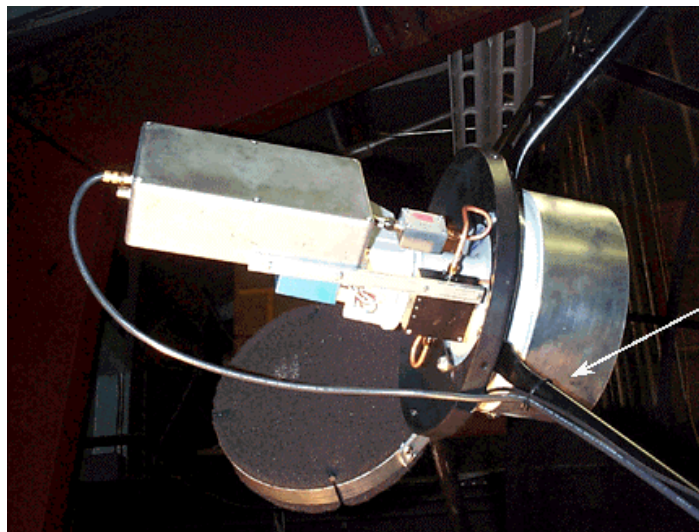


Figure 7e

CPC/9 CONDUCTOR CABLE COLOR CODE

Pin Number	Function	Conductor Color
1	AZ-A	RED
2	AZ-B	RED/BLACK
3	CAL-A	ORANGE
4	EL-A	GREEN
5	EL-B	GREEN/BLACK
6	CAL-B	BLUE
7	EL PULSE	WHITE
8	GND	BLACK
9	AZ PULSE	WHITE/BLACK