

NexStar 4

The NexStar 4 is the most difficult of the little NexStars to disassemble and adjust correctly. There are two sections that potentially need attention: the altitude axis and the azimuth axis. We will discuss disassembly, lubrication, and reassembly/adjustment. Adjustments to the altitude axis are the most common requirement as it carries the weight of the optical tube directly. You will not likely find it necessary to disassemble and lubricate your telescope for several years. I would recommend lubrication once every two or three years, unless your scope starts to exhibit problems preventing smooth motion.

Disassembly of the Altitude Axis First remove the hand control bracket located in the fork arm. It is best to loosen the screws slightly and then hold the entire telescope on its side with the fork arm down while removing the screws. This helps to prevent the screws from falling inside the fork arm. If they do, you **must** retrieve them, as otherwise they will bind the gears in the base. After removing the hook, you will see a nut attached to the altitude axis as shown in Figure 12.6.

Remove this nut while supporting the optical tube. Lay the nut and washers on a clean cloth in the order in which you remove them. It is critical that they are reassembled in the same order. It is best to make a quick sketch of the order of assembly for these parts. At

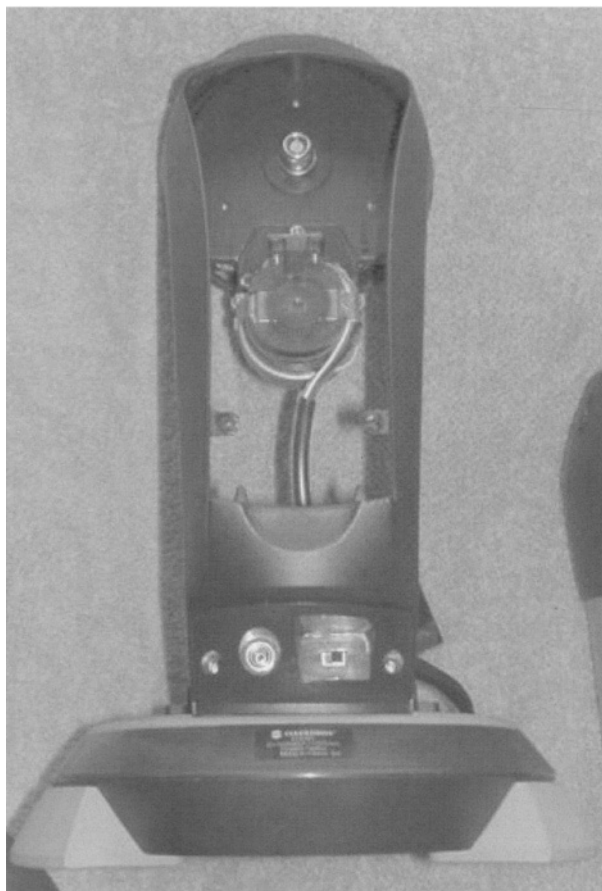


Figure 12.6. NexStar 4 with hand control bracket and inside arm cover removed. Photo courtesy Dan Hupp.

this point, the optical tube, a large gear, and the shaft they both ride on will come free from the fork arm. You will also find three nylon disks held in three recesses on the large gear. If any of the nylon disks is missing, you will find it in the round track inside the fork arm. When reassembling, you must position these disks in the recesses in the gear.

Disassembly of the Azimuth Axis On the bottom of the base you will find a large nut. Remove this nut and the washers beneath. Set them on a clean cloth in the order in which they are removed to insure correct reassembly. It is best to make a quick sketch of the order of assembly for these parts. Slide the base away from the rest of the mount.

A large gear is found between the base and the mount. It will either remain in the mount or come off with the base. In either case, remove it as well and set it on a clean cloth. You will also find three nylon disks at the end of three posts on the bottom of the mount. These disks support the mount and slide along the top surface of the large gear. Occasionally the disks stick to the gear; if this happens, place them back on the posts in the mount.

Between the gear and the base you will find a fiber disk. This disk provides the slip that allows the mount to be moved left and right by hand while at the same time providing

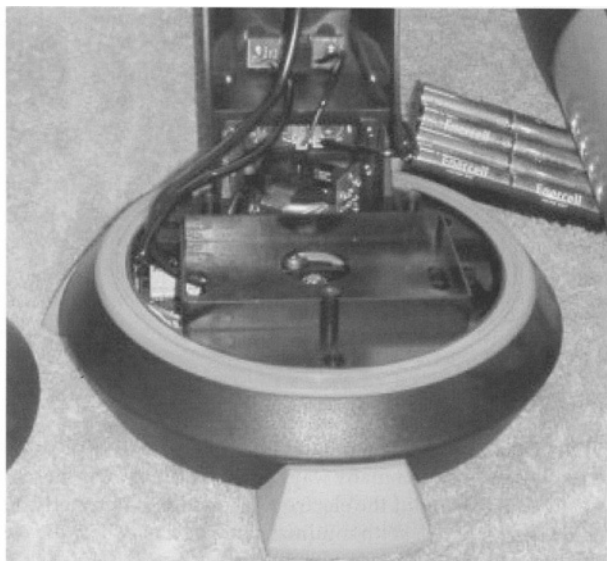
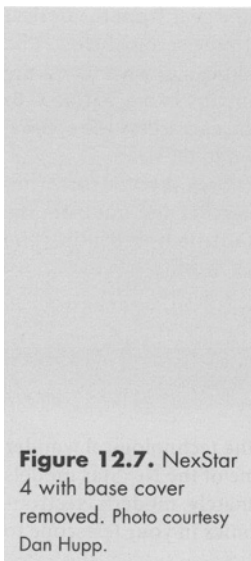
sufficient grip to drive the mount during normal use. This disk and the surfaces it mates to must be kept free of grease.

Cleaning and Lubrication Start by cleaning away old grease. For the large gear removed from the base you may use an old toothbrush and kerosene in a small plastic basin while working in a well-ventilated area. (Please **do not use gasoline** – it is extremely flammable and the fumes are explosive!) To remove the slight residue left by the kerosene and grease, spray-on automotive break cleaner can be used. Break cleaner will deform plastic – use care! Do not immerse the fiber disk in any liquids, although you can use a clean cloth dampened *lightly* with alcohol to degrease the surfaces of the disk. Use alcohol to completely degrease the parts that mate to the fiber disk as well. For other parts, use cotton swabs, lint-free cloths, and alcohol.

Apply high-quality lithium or synthetic grease in the recesses for the nylon disks. A thin coating of grease is also needed on the surfaces that the disks slide on. Also, apply a small amount of grease to the teeth of the large gears.

Reassembly and Adjustment of the Azimuth Axis Referring to your sketch, reassemble all parts in the correct order. Tighten the nut just to the point at which the base no longer rocks back and forth. This adjustment is not as sensitive as the altitude axis, but if the nut is too tight, the scope will not slew left and right smoothly and might not slew at all at lower rates. If it is too loose, the fork arm will rock left and right. Power up the scope and test the azimuth motion. A little trial and error may be required before you are satisfied with the results.

If you cannot seem to get a good adjustment, there is a second nut on the top end of the azimuth axis. It is accessed under the battery holder on top of the base. Gently pry the battery holder from the base, using care not to break the wires. Under this cover you will find a nut as shown in Figure 12.7.



This nut and the one underneath the base work together to provide stability and smooth movement of the azimuth axis. The nut underneath the base adjusts the ability of the azimuth axis to slip left and right. This is only important to protect the motor and this adjustment must be tight enough to drive the azimuth axis securely. The nut found under the base cover (on the top of the axis) adjusts the tension of the axis against the nylon disks. Generally, the nut underneath the base can be adjusted as tight as you like. The nut under the base cover (on top) is adjusted to allow smooth movement without allowing the fork arm to rock back and forth. It takes a little trial and error to get the best setting.

Reassembly and Adjustment of the Altitude Axis Referring to your sketch, reassemble all parts in the correct order. Tighten the nut until the altitude axis does not rock back and forth. Push down on the front of the scope. If it moves too easily (some experience will be called for), tighten the nut a bit and try again. If you tighten it too much, the motor will be under excessive strain, up/down motion will not be smooth, and the scope will use too much battery power. If it takes significant effort to push the front of the scope up or down, loosen the nut a small amount. When you think you have it right, connect power and set the slew rate to 1. Check to insure the scope will move at this slow rate. Put in an eyepiece and focus on a distant object. Check that motion is smooth while observing through the eyepiece. If not, loosen the nut a very small amount and test again.

If you cannot seem to get a good adjustment, there is a second nut located under the optical tube. This nut and the one on the outside of the fork arm work together to provide stability and smooth movement of the altitude axis. The nut under the optical tube adjusts the ability of the altitude axis to slip up and down. This is important to protect the motor, but this adjustment must be tight enough to support the weight of the optical tube. The nut found on the outside of the fork arm adjusts the tension of the axis against the nylon disks. Generally, the nut under the optical tube can be adjusted as tight as you like (while still allowing a good push on the front of the optical tube to cause it to slip) and the nut on the outside of the fork arm is adjusted to allow smooth movement without allowing the optical tube to rock back and forth.

It is a major task to access the nut under the optical tube and a frustrating ordeal to adjust correctly. Remove the outside nut (the one under the hand control hook) and pull the optical tube from the fork arm again. Next you must remove the gear from the optical tube. It is necessary to rotate the gear to align the three holes with the screws below. The best way to do this is to put the assembly back in the fork arm and push down a bit on the optical tube. This causes the optical tube to slip while the gear remains in place. Check to see if the holes and screws have lined up; if not, try again. Once you can access the screws, remove them and the OTA will finally come off the bracket attached to the gear.

At this point, put the gear, optical tube bracket, and altitude axis back into the fork arm. Tighten the nut shown in Figure 12.8 by a quarter turn. Pull the bracket and nut from the fork arm and reattach the optical tube. Reassemble everything and attempt to adjust the axis for smooth motion. It takes a little trial and error to get the best setting.

Figure 12.8. NexStar 4 with optical tube removed. Photo courtesy Dan Hupp.

