INSTRUCTION MANUAL

Orion®
SkyQuest™ XT6 & XT8
Dobsonian Reflectors

#9960, #9980

TELESCOPES & BINOCULARS

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IN 118 Rev. A 0799

Figure 1. The SkyQuest XT Dobsonian (6" model shown)

Welcome to an exciting new world of adventure! Your SkyQuest XT Dobsonian is a high-quality optical instrument designed to bring you dazzling views of the outer reaches of our universe. With special new innovations, such as the CorrecTension (XT) Friction Optimization system, and deluxe accessory package, these telescopes represent a giant leap forward in the evolution of the Dobsonian. Whether you are brand-new to amateur astronomy or a seasoned stargazer, the SkyQuest XT Dobsonian will provide many evenings of enjoyment and fascination.

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1. Unpacking

The telescope will arrive in two boxes, one containing the optical tube assembly and accessories, the other containing the unassembled Dobsonian base. Be careful unpacking the boxes. We recommend keeping the original shipping containers. In the event that the telescope needs to be shipped to another location, or returned to Orion for warranty repair, having the proper shipping containers will help ensure that your telescope will survive the journey intact.

Make sure all the parts in the Parts List below are present. Be sure to check boxes carefully, as some parts are small. If anything appears to be missing or broken, immediately call Orion Customer Support (800-676-1343) for assistance.

WARNING: ***Never look directly at the Sun through your telescope or its finder scope—even for an instant—without a professionally made solar filter that completely covers the front of the instrument, or permanent eye damage could result. Young children should use this telescope only with adult supervision.***

Parts List

Box #1: Optical Tube Assembly and Accessories

Qty.	Description
1	Optical tube assembly
1	Dust cover
1	25mm Plössl eyepiece, 1.25" barrel diameter
1	9mm Plössl eyepiece, 1.25" barrel diameter
1	6x30 finder scope
1	Finder scope bracket
6	Finder scope adjustment setscrews with knurled lock nuts
1	Moon filter
1	Eyepiece rack
2	Eyepiece rack mounting screws (length 3/4")
2	Spring coils
2	Pull loops
4	Nylon spacers (black)
2	1/4" washers (black)
2	Phillips-head bolts (black, length 1-3/4")
2	Bolts with round knob attached

Box #2: Dobsonian Base

Qty.	Description
1	Left panel
1	Right panel
1	Front brace
1	Top baseplate
1	Ground baseplate
12	Base assembly screws (length 2")
1	Small Allen wrench (size 4mm)
3	Plastic feet
3	Feet attachment wood screws (length 1")
1	Self-adhesive rubber bumper
1	Large hex-head bolt (length 3")
2	3/8" washers
1	3/8" lock nut
1	Nylon spacer (white)
1	Handle
2	Socket-head cap screws (black, length 1-1/2")
2	5/16" washers (black)
2	5/16" nuts (black)
1	Large Allen wrench (6mm)

2. Assembly

Now that you have unpacked the boxes and familiarized yourself with all the parts in front of you, it's time to begin assembly. The optics of the telescope are already installed in the tube, so most of the required assembly concerns the Dobsonian base.

Assembly of the Dobsonian base

Refer to Figure 2 during base assembly. The base need only be assembled once, unless you disassemble it for long-term storage. The assembly process takes about 15 minutes and requires a Phillips screwdriver, an adjustable crescent wrench, and the provided Allen wrenches.

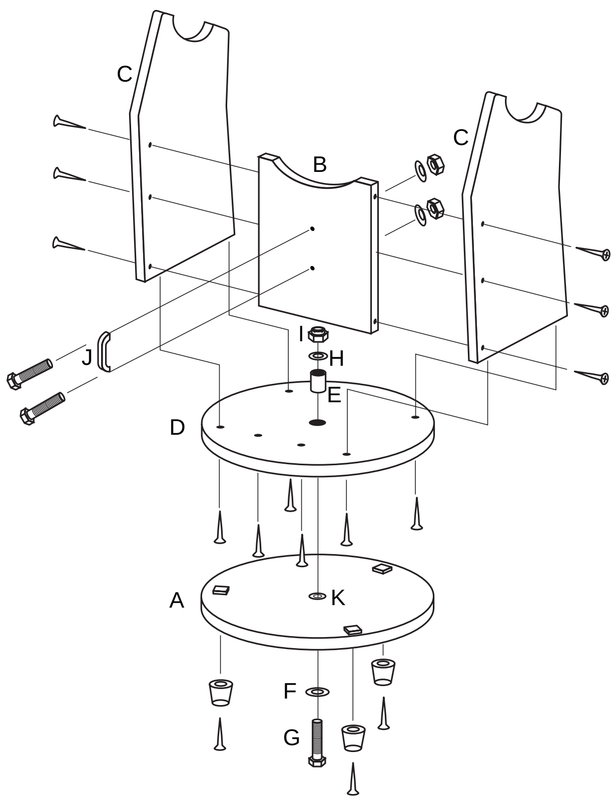

Figure 2. Exploded view of the SkyQuest XT Dobsonian base.

Note: When tightening screws, tighten them until firm, but be careful not to strip the holes by over-tightening. If you use an electric screwdriver, do final tightening with a standard screwdriver to avoid stripping.

1. Screw the plastic feet into the underside of the ground baseplate (A) using the self-tapping wood screws provided, with a Phillips screwdriver. Insert the screws through the feet and thread them into the predrilled starter holes.
2. Loosely attach the front brace (B) to the two side panels (C) with six of the base assembly screws in the predrilled holes. Use the smaller Allen wrench to tighten the screws. The side panels should be oriented so the SkyQuest label is facing outward. Do not completely tighten the screws yet.
3. Attach the two sides (C) with the front brace attached to the top baseplate (D) with the remaining six base assembly screws in the predrilled holes. Tighten all six screws.
4. Tighten the six side screws installed earlier.
5. Insert the white nylon bushing (E) into the hole in the center of the top baseplate (D). Tap the nylon bushing in so it goes all the way into the top baseplate. The nylon bushing should be flush with the top surface of the top baseplate.
6. Thread the large hex-head bolt (G) with a 3/8" washer (F) attached up through the bottom of the ground baseplate (A), and through the pre-installed T-nut (K). Now, position the top baseplate (D) (with side panels attached) over the ground baseplate so the top baseplate's center hole is over the exposed shaft of the large hex-head bolt. Lower the top baseplate over the bolt so that the bolt goes through the nylon spacer in the center hole. Now thread on the remaining 3/8" washer (H) and lock nut (I) to the bolt's shaft. You may need to hold the bolts in place with another crescent wrench or pliers to do this. Tighten the lock nut with the crescent wrench just enough to allow a slight separation of the top baseplate from the ground baseplate when the mount is lifted. The purpose of the nut is only to keep the two baseplates from coming apart when moving the telescope.

Note: Overtightening the lock nut (I) will make the mount difficult to rotate in the azimuthal (left-to-right) direction.

7. Attach the handle (J) to the front brace (B) with the two black socket-head screws. Insert the screws through the handle and into the predrilled holes. Place the 5/16" washers and 5/16" nuts on the protruding ends of the screws. Tighten the nuts with a crescent wrench while holding the bolts stationary with the large Allen wrench.
8. The rubber bumper provides a convenient "stop" for the telescope's altitude motion; it prevents the telescope mirror cell from being knocked against the hard surface of the base's front brace. At the bottom of the interior surface of the front brace, you will notice a small index mark engraved. Remove the backing from the rubber bumper and position the bumper over the index mark, as shown in Figure 3. Press firmly so the adhesive holds the bumper securely in place.

Figure 3. Position the rubber bumper "stop" over the index mark on the inside surface of the front brace.

Installing the Eyepiece Rack

The aluminum eyepiece rack is a standard accessory on SkyQuest Dobsonians. It holds four 1.25" eyepieces in a convenient place on the base, within easy reach while you're observing. A 1.25" barlow lens also can be held in the rack. About halfway down the left side panel of the base you will notice two predrilled starter holes, about 6" apart. Take the black wood screws that come packaged with the rack, insert them through the small holes in the rack, and then thread them into the starter holes with a Phillips screwdriver until tight (but do not overtighten!). Orient the rack as in Figure 4.

Figure 4. Using the two supplied screws, install the aluminum eyepiece rack in the predrilled holes about halfway down the left side panel of the base.

Placing the Optical Tube on the Dobsonian Base

Lift the optical tube and set the altitude bearings on either side of the tube in the "cradle" of the base (Figure 5). The unique flange design of the altitude bearing allows for automatic left-to-right centering of the optical tube in the cradle. Once in the cradle, the tube should pivot freely up and down with gentle hand pressure. Note that the tube will not yet be properly balanced, since the eyepiece and finder scope are not in place, and the CorrecTension system has not been installed.

Installing the Finder Scope

SkyQuest Dobsonians come with a high-quality, 6x30 achromatic crosshair finder scope and a precision metal finder bracket. This greatly aids in finding objects to view in the night sky, which will be discussed in detail later.

Before attaching the finder scope bracket to the telescope tube, it is convenient to first install the finder in the bracket. Thread the six finder scope adjustment setscrews (with knurled lock nuts attached) into the holes on the outside of the finder bracket's rings. Slide the finder scope through the bracket's rings and secure it in place with the adjustment setscrews; make sure the knurled lock nuts are adequately loosened to do this. The finder scope should be oriented within the finder bracket as shown in Figure 6.

Figure 5. Set the optical tube on the "cradle" of the base so that the altitude side bearings on the tube rest on the white plastic "pads."

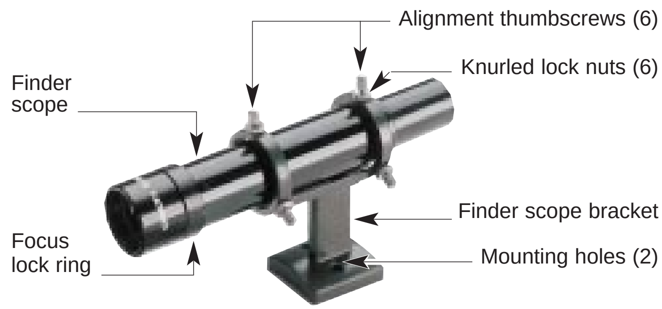

Figure 6. The finder scope slips into its mounting bracket and is held in place by six setscrews, which are used to align the finder with the telescope.

Now, connect the entire assembly to the telescope. Do this by first removing the round knurled nuts on the two threaded bolts adjacent to the focuser. Then position the holes in the base of the finder bracket over the bolts, and secure the bracket in place with the two round nuts. The large (objective) end of the finder scope should be pointing toward the front (open) end of the telescope tube.

Installing the CorrecTension (XT) Friction Optimization System

Perhaps the most exciting new feature of the SkyQuest Dobsonians is the CorrecTension Friction Optimization system. Because of their light weight, 6" and 8" Dobsonians have always been plagued by insufficient friction on the altitude bearing surfaces. As a result, such telescopes move up and down much too freely. This causes problems when the observer tries to accurately center and track an object for viewing, especially at higher powers. Also, the telescope becomes very sensitive to balance, requiring additional equipment such as counterweight systems or adjustable side bearings to compensate.

SkyQuest Dobsonians employ a simple yet effective remedy for the friction problem that obviates the need for such cumbersome countermeasures. CorrecTension Friction Optimization utilizes a spring coil to “pull” the tube assembly down onto the altitude bearing pads, thereby increasing the friction by just the right amount. With CorrecTension, you can change eyepieces, or add a barlow lens or solar filter without having to tediously adjust the telescope’s balance as you would with other Dobsonians. The altitude friction will roughly equal the azimuth friction, ensuring optimal performance.

To install the CorrecTension assembly, follow these steps while referring to Figure 7:

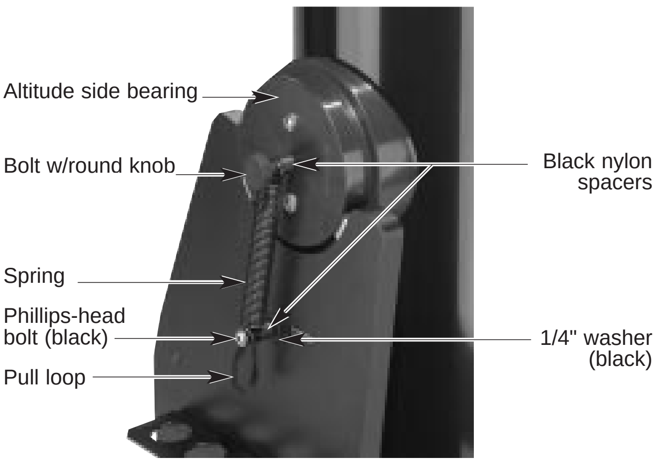

Figure 7. Close-up view of the CorrecTension system, which pulls the tube assembly down onto the altitude bearing pads.

1. Put one of the black nylon spacers on a black Phillips-head bolt. The spacer should be oriented so the narrow end seats against the head of the bolt. Slip one of the black 1/4" washers over the end of the bolt. Now, thread the bolt into the hole in the base side panel just below the cradle. The bolt will thread into the preinstalled T-nut in the hole. Use a Phillips screwdriver to tighten the bolt. Repeat this procedure on the opposite side panel.
2. Next, insert one of the bolts with round plastic knob attached through the end ring of one of the springs. Slip a black nylon spacer onto the bolt. Orient the spacer so the narrow end is closest to the knob. Thread the entire assembly into the hole in the center of the telescope’s altitude side bearing until tight. The end ring of the spring should seat onto the narrow end of the spacer. Repeat this procedure for the other altitude side bearing.
3. Attach a pull loop to the free end of each spring. Slide the loop through the opening in the ring on the end of the spring.
4. Now, pull each spring down using the pull loop, and position the springs end ring over the head of the Phillips bolt (installed in Part 1) and onto the narrow part of the nylon spacer, as shown in Figure 8. You needn’t attach both springs simultaneously; one at a time is fine.

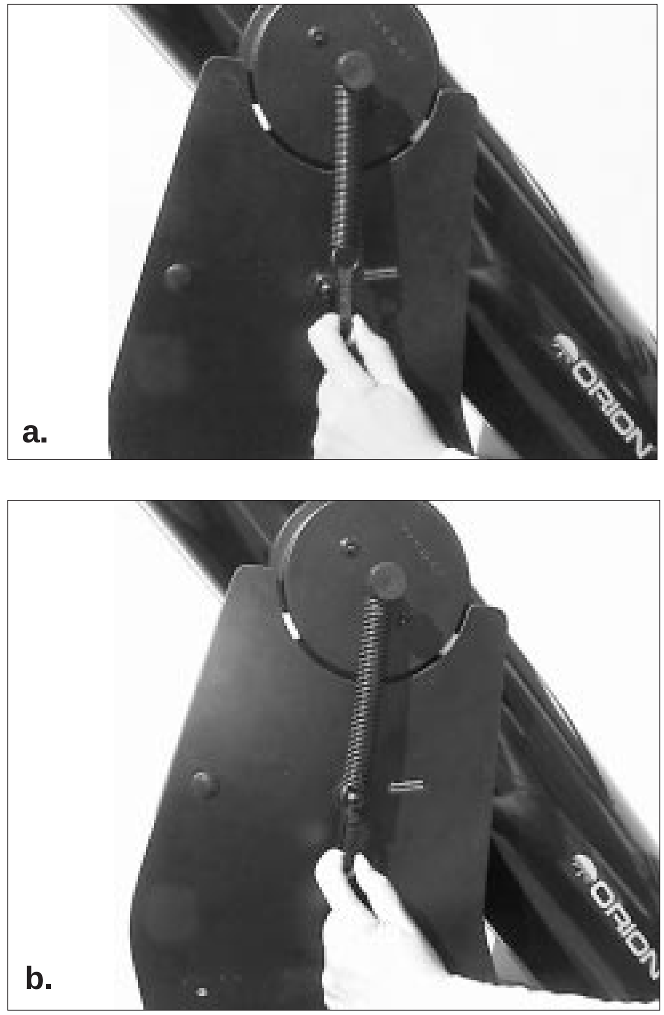

Figure 8. (a) To attach the spring to the base, grip the pull loop with your index finger and pull down on the spring. **(b)** While pulling down, slip the end ring of the spring over the bolt head and onto the narrow part of the nylon spacer, then release the pull loop.

The CorrecTension system is now installed and engaged. If you wish to remove the telescope from the base, you will first need to disconnect the springs from the “posts” on the Dobsonian base. The springs will remain captive on the altitude side bearings, so they will not get lost.

Inserting an Eyepiece

The final step in the assembly process is to insert an eyepiece to the telescope’s focuser. Take the cover cap off the end of the focuser drawtube. Loosen the setscrew on the focuser drawtube. Insert one of the eyepieces into the focuser drawtube, then secure it in place by tightening the setscrew. The other eyepiece can be placed in the eyepiece rack until it is needed.

The assembly of your SkyQuest Dobsonian is now complete. It should appear as shown in Figure 1. The dust cap on the front of the telescope tube should always remain in place when the telescope is not in use. It is also a good idea to store eyepieces in an eyepiece case and to replace the cover cap on the focuser when the telescope is idle.

3. Using Your Telescope

It is best to get a feel for the basic functions of the SkyQuest Dobsonian during the day, before observing astronomical objects at night. This way you will not have to fumble around trying to orient yourself in the dark! Find a spot outdoors where you have plenty of room to move around the telescope, and where you have a clear view of some object or vista that is at least 1/4-mile away. It is not critical that the base be exactly level, but it should be placed on somewhat flat ground or pavement to ensure smooth movement of the telescope.

Remember, never point the telescope at or near the Sun without using a proper solar filter over the front aperture!

Altitude and Azimuth

The Dobsonian base of the SkyQuest permits motion of the telescope along two axes: altitude (up/down) and azimuth (left/right) (see Figure 9). This is very convenient, since up/down and left/right are the most "natural" ways that people aim. As a result, pointing the telescope is exceptionally easy.

Figure 9. The SkyQuest has two axes of motion: altitude (up/down) and azimuth (left/right).

Simply take hold of the telescope tube and move it left or right so the base rotates about its central azimuth bolt, and move it up or down so the altitude side bearings rotate in the base's cradle. Both motions can be made simultaneously and in a continuous manner for easy aiming. Move the telescope gently—let it glide. In this way you can point the telescope to any position in the night sky, from horizon to horizon.

When moving the telescope, it may be convenient to grasp the front end of the telescope tube so that your fingers just protrude into it; this provides a convenient "handle."

Focusing the Telescope

Insert the low-power 25mm eyepiece into the focuser and secure with the setscrew. Move the telescope so the front (open) end is pointing in the general direction of an object at least 1/4-mile away. Now, with your fingers, slowly rotate one of the focusing knobs until the object comes into sharp focus. Go a little bit beyond sharp focus until the image just starts to blur again, then reverse the rotation of the knob, just to make sure you've hit the exact focus point.

If you have trouble focusing, rotate the focusing knob so the drawtube is in as far as it will go. Now look through the eyepiece while slowly rotating the focusing knob in the opposite direction. You should soon see the point at which focus is reached.

Aligning the Finder Scope

The finder scope must be aligned accurately with the telescope for proper use. To align it, first aim the main telescope in the general direction of an object at least 1/4-mile away—the top of a telephone pole, a chimney, etc. Position that object in the center of the telescope's eyepiece.

Now, look in the finder scope. Is the object visible? Ideally, it will be somewhere in the field of view. If it is not, some coarse adjustments of the six finder scope alignment thumbscrews will be needed to get the finder scope roughly parallel to the main tube.

NOTE: The image in both the finder scope and the main telescope will appear upside-down (rotated 180°). This is normal for finder scopes and reflector telescopes (see Figure 10).

Figure 10. The view through a standard finder scope and reflector telescope is upside down. This is true for the SkyQuest and its finder scope as well.

With the image in the finder scope's field of view, you will now use the six alignment thumbscrews to center the object on the intersection of the crosshairs.

By loosening one alignment screw and tightening another, you change the line of sight of the finder scope. The round, knurled lock nuts installed on the alignment screws must be adequately loosened to allow the screws to be threaded in or out. Continue making adjustments to the various alignment screws until the image in both the finder scope and the telescope's eyepiece is exactly centered. Check the alignment by moving the telescope to another object and fixing the finder scope's crosshairs on the exact point you want to look at. Then look through the telescope's eyepiece to see if that point is centered in the field of view. If it is, the job is done. If not, make the necessary adjustments until the two images match up. Once the finder scope is aligned, turn the lock nuts clockwise until finger-tight to secure the adjustment screws in place.

The finder scope alignment needs to be checked before every observing session. This can easily be done at night, before viewing through the telescope. Choose any bright star or planet, center the object in the telescope eyepiece, and then adjust the finder scope's alignment screws until the star or planet is also centered on the finder's crosshairs. The finder scope is an invaluable tool for locating objects in the night sky; its usage for this purpose will be discussed later, in detail.

Focusing the Finder Scope

If, when looking through the finder scope, the images appear somewhat out of focus, you will need to refocus the finder scope for your eyes. Loosen the lock ring located behind the objective lens cell on the body of the finder scope (see Figure 6). Back the lock ring off by a few turns, for now. Refocus the finder scope on a distant object by threading the objective lens cell in or out on the finder scope body. Precise focusing will be achieved by focusing the finder scope on a bright star. Once the image appears sharp, retighten the lock ring behind the objective lens cell. The finder scope's focus should not need to be adjusted again.

Aiming/Pointing the Telescope

Now that the finder scope is aligned, the telescope can be quickly and accurately pointed at anything you wish to observe. It has a much wider field of view than the telescope's eyepiece, and therefore it is much easier to first center an object in the finder scope. Then, if the finder scope is accurately aligned, the object will also be centered in the telescope's field of view.

Start by once again moving the telescope until it is pointed in the general direction of the object you want to see. Some observers find it convenient to sight along the tube to do this. Now, look in the finder scope. If your general aim is accurate, the object should appear somewhere in the finder scope. Make small adjustments to the telescope's position until the object is centered on the finder's crosshairs. Now, look in the telescope's eyepiece and enjoy the view!

Magnification

Now that the object you want to view is well-centered in the 25mm eyepiece, you may want to increase the magnification to get a closer view. Loosen the setscrew on the focuser drawtube and remove the eyepiece. Place it in the eyepiece rack, if you wish. Insert the 9mm eyepiece in the focuser then tighten the setscrew. If you were careful not to bump the telescope, the object should still be centered within the field of view. Notice that the object being viewed is now larger, but somewhat dimmer.

The SkyQuest is designed to accept any eyepiece with a barrel diameter of 1.25". Magnification, or power, is determined by the focal length of the telescope and the focal length of the eyepiece. Therefore, by using eyepieces of different focal lengths, the resultant magnification can be varied.

Magnification is calculated as follows:

$$\textit{Magnification} = \frac{\textit{Telescope Focal Length (mm)}}{\textit{Eyepiece Focal Length (mm)}}$$

The 6" and 8" SkyQuest Dobsonians both have a focal length of 1200mm. So, the magnification with the supplied 25mm eyepiece is 1200mm ÷ 25mm = 48x. The magnification provided by the 9mm eyepiece is 1200mm ÷ 9mm = 133x.

The maximum attainable magnification for a telescope is directly related to how much light its optics can collect. A telescope with more light-collecting area, or aperture, can yield higher magnifications than a smaller-aperture telescope. The maximum practical magnification for any telescope, regardless of optical design, is about 50x per inch of aperture. This translates to about 300x for the SkyQuest XT6 and 400x for the XT8.

Keep in mind that as magnification is increased, the brightness of the object being viewed will decrease; this is an inherent principle of the physics of optics and cannot be avoided. If magnification is doubled, an image appears four times dimmer. If magnification is tripled, image brightness is reduced by a factor of nine!

Note About High Magnifications

Maximum magnifications are achieved only under the most ideal viewing conditions at the best observing sites. Most of the time, magnifications are limited to 200x or less, regardless of aperture. This is because the Earth's atmosphere distorts light as it passes through. On nights of good "seeing," the atmosphere will be still and will yield the least amount of distortion. On nights of poor seeing, the atmosphere will be turbulent, which means different densities of air are rapidly mixing. This causes significant distortion of the incoming light, which prevents sharp views at high magnifications.

Tube Balance

Dobsonians are designed to balance with standard supplied accessories, such as an eyepiece and a finder scope. But what if you want to use a larger finder scope or a heavier eyepiece? The telescope will no longer be properly balanced, and will not hold its position properly. This makes the telescope impossible to use, since it is critical that it hold its position (when not purposefully moved) to keep objects centered in the field of vision.

Traditional Dobsonian designs expect the user to compensate for heavier accessories by adding weight to the opposite end of the telescope tube. Such counterweighting systems can be expensive and unwieldy. The CorrecTension Friction Optimization system of the SkyQuest Dobsonians, however, solves the finicky balance problem. The spring coils pull the tube down onto the base, thereby increasing the friction on the altitude bearing pads! With CorrecTension, the added weight of small front-end loads will not adversely affect the balance of the telescope.

If you install an array of heavier accessories onto your SkyQuest's optical tube, you may need at some point to counterbalance the telescope with a counterweight system.

Carrying the Telescope

Moving the SkyQuest is easy to do. Because the springs of the CorrecTension system hold the optical tube captive on the base, the entire telescope can be carried as one unit. This requires some caution, however. If the telescope is lifted improperly, the front of the tube could swing down and hit the ground.

First, point the optical tube straight up (vertical). Remove any eyepieces from the telescope and eyepiece rack, and place them in an eyepiece case. Grasp the handle on the front of the base with one hand while supporting the telescope tube vertically with the other (see Figure 11). Now, lift the telescope from the handle. Once the telescope is in the horizontal position, you can carry the entire unit with one hand. The handle position properly balances the load for easy carrying.

Figure 11. Picking up and carrying the SkyQuest as a single unit (with tube held captive on the base) requires some caution. **(a)** First, position the tube vertically. Then, grasp the handle on the base with one hand while supporting the tube with the other. **(b)** With knees bent, slowly lift the base while supporting the tube with one hand. This ensures that the tube will not swing down and impact the ground. **(c)** As you lift, the whole assembly will tilt down, becoming nearly parallel with the ground, at which time you can let go of the tube with your supporting hand. Make sure you are comfortable with the weight of the whole assembly before attempting to carry it!

If you wish to carry the optical tube and base separately, simply disengage the CorrecTension springs by unhooking them from the posts on the base, using the pull loops. The springs remain captive on the telescope side bearings. Now the base and tube are disengaged and can be transported separately.

NOTE: The SkyQuest may be too heavy for some users to lift and carry as one unit. Do not strain yourself! If the load seems too heavy, disengage the springs and carry the base and tube separately.

When putting the SkyQuest into a vehicle, common sense prevails. It is especially important that the optical tube does not knock around; this can cause the optics to become misaligned, and could dent the tube. We recommend transporting and storing the tube assembly in a padded case (#15160) for proper protection.

4. Collimation (Aligning The Mirrors)

Collimation is the process of adjusting the mirrors so they are perfectly aligned with one another. Your telescope's optics were aligned at the factory, and should not need much adjustment unless the telescope was handled roughly during shipment. Accurate alignment is important to ensure the peak performance of your telescope, so it should be checked regularly. Collimation is relatively easy to do and can be done in daylight.

To check the collimation, remove the eyepiece and look down the focuser drawtube. You should see the secondary mirror centered in the drawtube as well as the reflection of the primary mirror centered in the secondary mirror, and the reflection of the secondary mirror (and your eye) centered in the reflection of the primary mirror, as in Figure 12a. If anything is off-center, as in Figure 12b, proceed with the following the collimation procedure.

It helps to put a piece of white paper on the inside of the optical tube opposite the focuser. It forms a bright background behind the secondary mirror, making it easier to distinguish the mirror holder from the background.

Use a Collimating Tool

To aid in centering your line of sight down the focuser drawtube, and in centering the mirror reflections during collimation, it is very helpful to use a precision collimating tool containing crosshairs, such as the Orion Collimating Eyepiece (#3640). We strongly recommend that you purchase one.

Alternatively, you can make a crude collimating tool out of an empty, black plastic 35mm film canister. It will not have crosshairs, so it won't be as precise, but it will be better than nothing. Cut 1/2" from the top lip of the canister and put a 1/16" to 1/8" diameter hole in the center of its bottom. The film canister collimating tool goes into the focuser like an eyepiece, with the bottom end out.

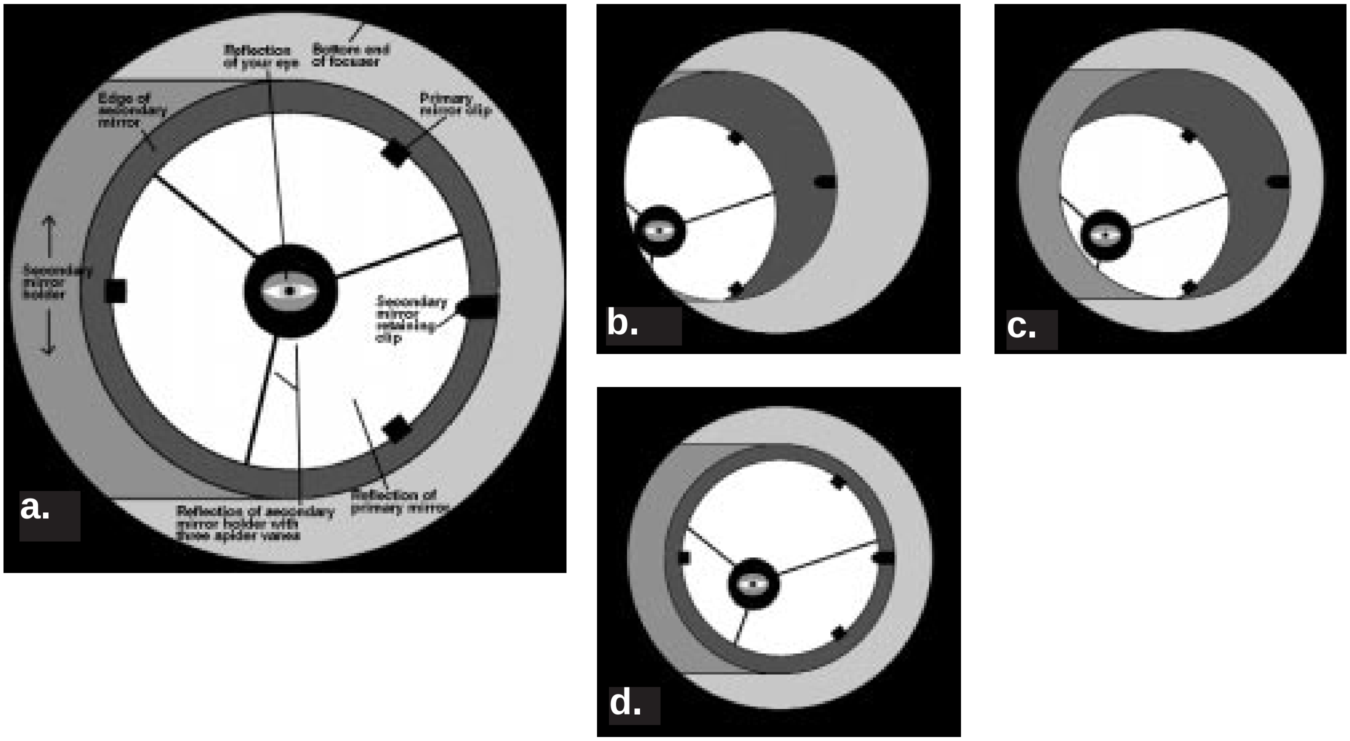

Figure 12. Collimating the optics. **(a)** When the mirrors are properly aligned, the view down the focuser drawtube should look like this. **(b)** If the optics are out of alignment, the view might look something like this. **(c)** Here, the secondary mirror is centered under the focuser, but it needs to be adjusted (tilted) so that the entire primary mirror is visible. **(d)** The secondary mirror is correctly aligned, but the primary mirror still needs adjustment. When the primary mirror is correctly aligned, the eye will be centered, as in (a).

Aligning the Secondary Mirror

With eyepiece removed, look straight down the open focuser drawtube at the secondary (diagonal) mirror. Ignore the reflections for the time being. The secondary mirror itself should be centered in the focuser drawtube, in the direction parallel to the length of the telescope. If it isn't, as in Figure 12b, it must be adjusted. (It helps to adjust the secondary mirror in a brightly lit room with the telescope pointed toward a bright surface, such as white paper or a wall.) Loosen the three small alignment screws in the center hub of the secondary mirror holder several turns. Now hold the secondary mirror holder stationary (be careful not to touch the surface of the secondary mirror!), while turning the center Phillips bolt (as in Figure 13). Turning the bolt clockwise will move the secondary mirror toward the front opening of the optical tube, while turning the bolt counter-clockwise will move the secondary mirror toward the primary mirror.

When the secondary mirror is centered in the focuser drawtube, rotate the secondary mirror holder slightly until the reflection of the primary mirror is as centered in the secondary mirror as it will get. It still may not be perfectly centered, but that is OK. Now tighten the three alignment screws to secure the secondary mirror in that position. This adjustment will rarely need to be done, if ever.

Figure 13. To center the secondary mirror under the focuser, hold the secondary mirror holder in place with one hand while adjusting the center bolt with a Phillips screwdriver. Do not touch the mirror's surface!

If the entire primary mirror reflection is not visible in the secondary mirror, as in Figure 12c, you will need to adjust the tilt of the secondary mirror. This is done by alternately loosening one of the three alignment screws while tightening the other two, as depicted in Figure 14. The goal is to center the primary mirror reflection in the secondary mirror, as in Figure 12d. Don't worry that the reflection of the secondary mirror (the smallest circle, with your eye reflected in it) is off-center, you will fix that in the next step.

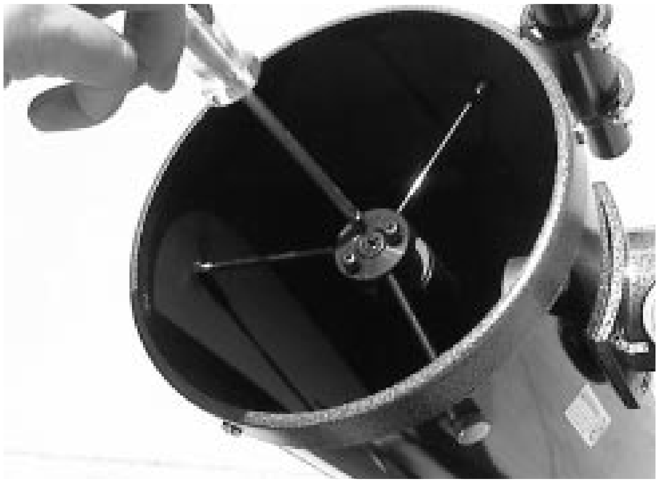

Figure 14. Adjust the tilt of the secondary mirror by loosening or tightening the three alignment screws with a Phillips screwdriver.

Adjusting the Primary Mirror

The final adjustment is made to the primary mirror. It will need adjustment if the small reflection of the secondary mirror (with your eye inside) is off-center, as in Figure 12d.

The tilt of the primary is adjusted with the three pairs of collimation screws on the back end of the optical tube using a Phillips screwdriver (Figure 15).

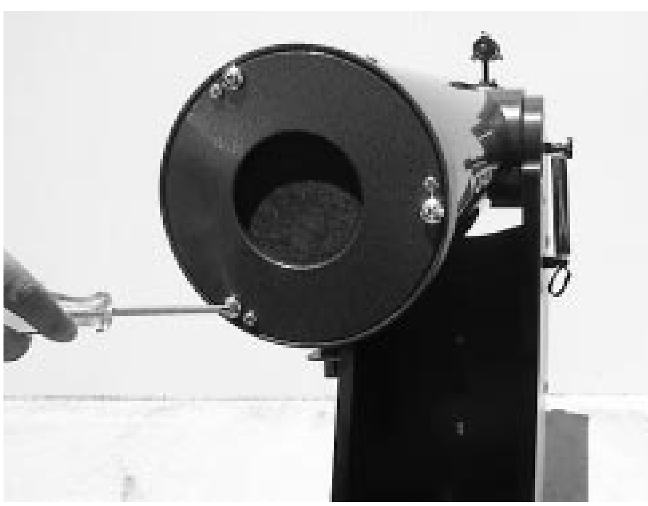

Figure 15. The tilt of the primary mirror is adjusted by loosening and tightening three pairs of collimation screws.

The two screws in each pair work in tandem to move the mirror, altering very slightly its tilt. The thing to remember is that you must *first loosen* one screw (either one), *then* tighten the other by the same amount. (You cannot tighten one first, then loosen the other.) For starters, pick one pair of collimation screws, loosen one of them one full turn, then tighten the other one full turn. Now, look down the open focuser drawtube to see if secondary mirror reflection has moved closer to the center. If it has, you might want to continue an additional turn or two, or move to one of the other pairs of screws and try adjusting them. If the image of the secondary moved farther off-center, you should try first loosening the screw you tightened before, and tightening the one you loosened, so the mirror moves in the opposite direction. Continue tweaking one or more pairs of collimation screws to try to bring the secondary mirror reflection closer to center. It will take a little trial and error to get a feel for how to tilt the mirror to center the reflection. (It helps to have two people for primary mirror collimation, one to look in the focuser while the other adjusts the collimation screws.)

The view down the focuser should now resemble Figure 12a. The secondary mirror is centered in the focuser; the reflection of the primary mirror is centered in the secondary mirror, and the reflection of the secondary mirror is centered in the reflection of the primary mirror.

A simple star test will tell you whether the optics are accurately collimated.

Star-Testing the Telescope

When it is dark, point the telescope at a bright star and accurately center it in the eyepiece's field-of-view with the R.A. and Dec. slow-motion controls. Slowly de-focus the image with the focusing knob. If the telescope is correctly collimated, the expanding disk should be a perfect circle (Figure 16). If the image is unsymmetrical, the scope is out of collimation. The dark shadow cast by the secondary mirror should appear in the very center of the out-of-focus circle, like the hole in a doughnut. If the "hole" appears off-center, the telescope is out of collimation.

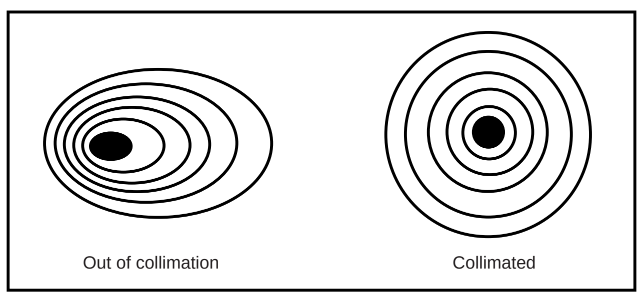

Figure 16. A star test will determine if a telescope's optics are properly collimated. An unfocused view of a bright star through the eyepiece should appear as illustrated on right if optics are perfectly collimated. If circle is unsymmetrical, as in illustration on left, scope needs collimation.

If you try the star test and the bright star you have selected is not accurately centered in the eyepiece, then the optics will always appear out of collimation, even though they may be perfectly aligned. It is critical to keep the star centered, so over time you will need to make slight corrections to the telescope's position in order to account for the sky's apparent motion.

5. Astronomical Observing

For many users, SkyQuest XT telescopes will be a major leap into the world of amateur astronomy. This section is intended to get you ready for your first voyage through the night sky.

Observing Tips

A. Site Selection

Pick a location away from street lights and bright yard lighting. Avoid viewing over rooftops and chimneys, as they often have warm air currents rising from them, which distort the image seen in the eyepiece. Similarly, you should not observe through an open window from indoors. Better yet, choose a site out-of-town, away from any "light pollution." You'll be stunned at how many more stars you'll see! Most importantly, make sure that any chosen site has a clear view of a large portion of the sky.

B. Seeing and Transparency

Atmospheric conditions play a huge part in quality of viewing. In conditions of good "seeing," star twinkling is minimal and objects appear steady in the eyepiece. Seeing is best overhead, worst at the horizon. Also, seeing generally gets better after midnight, when much of the heat absorbed by the Earth during the day has radiated off into space. Typically, seeing conditions will be better at sites that have an altitude over about 3000 feet. Altitude helps because it decreases the amount of distortion-causing atmosphere you are looking through.

A good way to judge if the seeing is good or not is to look at bright stars about 40 degrees above the horizon. If the stars appear to "twinkle," the atmosphere is significantly distorting the incoming light, and views at high magnifications will not appear sharp. If the stars appear steady and do not twinkle, seeing conditions are probably good, and higher magnifications will be possible.

Also, seeing conditions are typically poor during the day. This is because the heat from the Sun warms the air and causes turbulence.

Good "transparency" is especially important for observing faint objects. It simply means the air is free of moisture, smoke, and dust. All tend to scatter light, which reduces an object's brightness.

C. Cooling the Telescope

All optical instruments need time to reach "thermal equilibrium" to achieve maximum stability of the lenses and mirrors, which is essential for peak performance. When moved from a warm indoor location outside to cooler air (or vice-versa), a telescope needs time to cool to the outdoor temperature. The bigger the instrument and the larger the temperature change, the more time will be needed.

Allow at least 30 minutes for your SkyQuest XT to equilibrate. If the scope has more than a 40° temperature adjustment, allow an hour or more. In the winter, storing the telescope outdoors in a shed or garage greatly reduces the amount of time needed for the optics to stabilize. It also is a good idea to keep the scope covered until the Sun sets so the tube does not heat greatly above the temperature of the outside air.

D. Viewing with Eyeglasses

If you wear eyeglasses, you may be able to keep them on while you observe, if your eyepieces have enough eye relief to allow you to see the whole field of view. You can try this by looking through the eyepiece first with your glasses on and then with them off, and see if the glasses restrict the view to only a portion of the full field. If they do, you can easily observe with your glasses off by just refocusing the telescope the needed amount. If you suffer from severe astigmatism, however, you may find images noticeably sharper with your glasses on.

E. Let Your Eyes Dark-Adapt

Do not expect to go from a lighted house into the darkness of the outdoors at night and immediately see faint nebulas, galaxies, and star clusters—or even very many stars, for that matter. Your eyes take about 30 minutes to reach perhaps 80% of their full dark-adapted sensitivity. Many observers notice improvements after several hours of total darkness. As your eyes become dark-adapted, more stars will glimmer into view and you will be able to see fainter details in objects you view in your telescope. Exposing your eyes to very bright daylight for extended periods of time can adversely affect your night vision for days. So give yourself at least a little while to get used to the dark before you begin observing.

To see what you are doing in the darkness, use a red-filtered flashlight rather than a white light. Red light does not spoil your eyes' dark adaptation like white light does. A flashlight with a red LED light is ideal, like the Orion RedBeam LED (#5744), or you can cover the front of a regular incandescent flashlight with red cellophane or paper. Beware, too, that nearby porch and street lights and automobile headlights will spoil your night vision.

Tracking Celestial Objects

The Earth is constantly rotating about its polar axis, completing one full rotation every 24 hours; this is what defines a "day." We do not feel the Earth rotating, but we can tell that it is at night by seeing the apparent movement of stars from west to east. This movement translates into a rate of .25° per minute, or 15 arc-seconds per second. (There are 60 arc-minutes in 1°, and 60 arc-seconds in one arc-minute.) This is called the sidereal rate.

When you observe any astronomical object, you are watching a moving target. This means the telescope's position must be slowly updated over time to keep an object in the field of view. To keep the object in the telescope's field of view (to "track" it), the telescope must be moved by small increments every now and then, in the direction the object is moving. This is easy to do with a SkyQuest Dobsonian because of its buttery smooth motion on both axes. As the object moves off toward the edge of the field of view, you just lightly nudge the telescope to bring it back to the center.

You will notice that it is more difficult to track objects when the telescope tube is aimed nearly straight up. This is inherent to the basic design of the Dobsonian, and stems from the fact that there is very little leverage to move in azimuth when the tube is in a near-vertical position. To gain more leverage, try grasping the tube close to the altitude side bearings with both hands. Also, when looking overhead, if the telescope cannot be moved any more in altitude, rotate the telescope 180° in azimuth to continue motion.

Remember that objects appear to move across the field of view faster at higher magnifications. This is because the field of view becomes narrower.

Eyepiece Selection

By using eyepieces of varying focal lengths, it is possible to attain a great many magnifications with the SkyQuest XT Dobsonians. The telescopes come with two high-quality Plössl eyepieces: a 25mm, which gives a magnification of 48x, and a 9mm, which gives a magnification of 133x. (The magnifications are the same in both the 6" and 8" models, since both telescopes have the same focal length.) Other eyepieces can be used to achieve higher or lower powers. It is quite common for an observer to own five or more eyepieces to access a wide range of magnifications. This allows the observer to choose the best eyepiece to use depending on the object being viewed. At least to begin with, the two supplied eyepieces will suffice nicely.

Whatever you choose to view, always start by inserting your lowest-power (longest focal length) eyepiece to locate and center the object. Low magnification yields a wide field of view, which shows a larger area of sky in the eyepiece. This makes acquiring and centering an object much easier. If you try to find and center objects with high power (narrow field of view), it's like trying to find a needle in a haystack!

Once you've centered the object in the eyepiece, you can switch to higher magnification (shorter focal length eyepiece), if you wish. This is especially recommended for small and bright objects, like planets and double stars. The Moon also takes higher magnifications well.

Deep-sky objects, however, typically look better at medium or low magnifications. This is because many of them are quite faint, yet have some extent (apparent width). Deep-sky objects will often disappear at higher magnifications, since greater magnification inherently yields dimmer images. This is not the case for all deep-sky objects, however. Many galaxies are quite small, yet are somewhat bright, so higher power may show more detail.

The best rule of thumb with eyepiece selection is to start with a low power, wide field, and then work your way up in magnification. If the object looks better, try an even higher magnification. If the object looks worse, then back off the magnification a little by using a lower-power eyepiece.

Objects to Observe

Now that you are all set up and ready to go, one critical decision must be made: what to look at?

A. The Moon

With its rocky surface, the Moon is one of the easiest and most interesting targets to view with your telescope. Lunar craters, marias, and even mountain ranges can all be clearly seen from a distance of 238,000 miles away! With its ever-changing phases, you'll get a new view of the Moon every night. The best time to observe our one and only natural satellite is during a partial phase, that is, when the Moon is NOT full. During partial phases, shadows are cast on the surface, which reveal more detail, especially right along the border between the dark and light portions of the disk (called the "terminator"). A full Moon is too bright and devoid of surface shadows to yield a pleasing view. Make sure to observe the Moon when it is well above the horizon to get the sharpest images.

Use the included Moon filter to dim the Moon when it is very bright. It simply threads onto the bottom of the eyepieces (you must first remove the eyepiece from the focuser to attach a filter). You'll find that the Moon filter improves viewing comfort, and also helps to bring out subtle features on the lunar surface.

B. The Sun

You can change your nighttime telescope into a daytime Sun viewer by installing an optional full-aperture solar filter over the front opening of a SkyQuest XT. The primary attraction is sunspots, which change shape, appearance, and location daily. Sunspots are directly related to magnetic activity in the Sun. Many observers like to make drawings of sunspots to monitor how the Sun is changing from day to day.

Important Note: Do not look at the Sun with any optical instrument without a professionally made solar filter, or permanent eye damage could result.

C. The Planets

The planets don't stay put like the stars, so to find them you should refer to Sky Calendar at our website (www.telescope.com), or to charts published monthly in *Astronomy*, *Sky & Telescope*, or other astronomy magazines. Venus, Mars, Jupiter, and Saturn are the brightest objects in the sky after the Sun and the Moon. Your SkyQuest XT is capable of showing you these planets in some detail. Other planets may be visible but will likely appear starlike. Because planets are quite small in apparent size, optional higher-power eyepieces are recommended and often needed for detailed observations. Not all the planets are generally visible at any one time.

JUPITER The largest planet, Jupiter, is a great subject for observation. You can see the disk of the giant planet and watch the ever-changing positions of its four largest moons-Io, Callisto, Europa, and Ganymede. Higher-power eyepieces should bring out the cloud bands on the planet's disk.

SATURN The ringed planet is a breathtaking sight when it is well positioned. The tilt angle of the rings varies over a period of many years; sometimes they are seen edge-on, while at other times they are broadside and look like giant "ears" on each side of Saturn's disk. A steady atmosphere (good seeing) is necessary for a good view. You will probably see a bright "star" close by, which is Saturn's brightest moon, Titan.

VENUS At its brightest, Venus is the most luminous object in the sky, excluding the Sun and the Moon. It is so bright that sometimes it is visible to the naked eye during full daylight! Ironically, Venus appears as a thin crescent, not a full disk, when at its peak brightness. Because it is so close to the Sun, it never wanders too far from the morning or evening horizon. No surface markings can be seen on Venus, which is always shrouded in dense clouds.

MARS The Red Planet makes its closest approach to Earth every two years. During close approaches you'll see a red disk, and may be able to see the polar ice cap. To see surface detail on Mars, you will need a high-power eyepiece and very steady air!

E. The Stars

Stars will appear like twinkling points of light. Even powerful telescopes cannot magnify stars to appear as more than a point of light! You can, however, enjoy the different colors of the stars and locate many pretty double and multiple stars. The famous "Double-Double" in the constellation Lyra and the gorgeous two-color double star Albireo in Cygnus are favorites. Defocusing a star slightly can help bring out its color.

F. Deep-Sky Objects

Under dark skies, you can observe a wealth of fascinating deep-sky objects, including gaseous nebulas, open and globular star clusters, and a variety of different types of galaxies. Most deep-sky objects are very faint, so it is important that you find an observing site well away from light pollution. Take plenty of time to let your eyes adjust to the darkness. Do not expect these subjects to appear like the photographs you see in books and magazines; most will look like dim gray smudges. (Our eyes are not sensitive enough to see color in deep-sky objects except in a few of the brightest ones.) But as you become more experienced and your observing skills get sharper, you will be able to ferret out more and more subtle details and structure.

How to Find Deep-sky Objects: Starhopping

Starhopping, as it is called by astronomers, is perhaps the simplest way to hunt down objects to view in the night sky. It entails first pointing the telescope at a star close to the object you wish to observe, and then progressing to other stars closer and closer to the object until it is in the field of view of the eyepiece. It is a very intuitive technique that has been employed for hundreds of years by professional and amateur astronomers alike. Keep in mind, as with any new task, that starhopping may seem challenging at first, but will become easier over time and with practice.

To starhop, only a minimal amount of additional equipment is necessary. A star chart or atlas that shows stars to at least magnitude 5 is required. Select one that shows the positions of many deep-sky objects, so you will have a lot of options to choose from. If you do not know the positions of the constellations in the night sky, you will need to get a planisphere to identify them.

Start by choosing bright objects to view. The brightness of an object is measured by its visual magnitude; the brighter an object, the lower its magnitude. Choose an object with a visual magnitude of 9 or lower. Many beginners start with the Messier objects, which represent some of the best and brightest deep-sky objects, first catalogued about 200 years ago by the French astronomer Charles Messier.

Determine in which constellation the object lies. Now, find the constellation in the sky. If you do not recognize the constellations on sight, consult a planisphere. The planisphere gives an all-sky view and shows which constellations are visible on a given night at a given time.

Now, look at your star chart and find the brightest star in the constellation that is near the object you are trying to find. Using the finder scope, point the telescope at this star and center it on the crosshairs. Next, look again at the star chart and find another suitably bright star near the bright star currently centered in the finder. Keep in mind that the field of view of the finder scope is 6°, so you should choose another star that is no more that 6° from the first star, if possible. Move the telescope slightly, until the telescope is centered on the new star.

Continue using stars as guideposts in this way until you are at the approximate position of the object you are trying to find (Figure 18). Look in the telescope's eyepiece, and the object should be somewhere within the field of view. If it's not, sweep the telescope carefully around the immediate vicinity until the object is found.

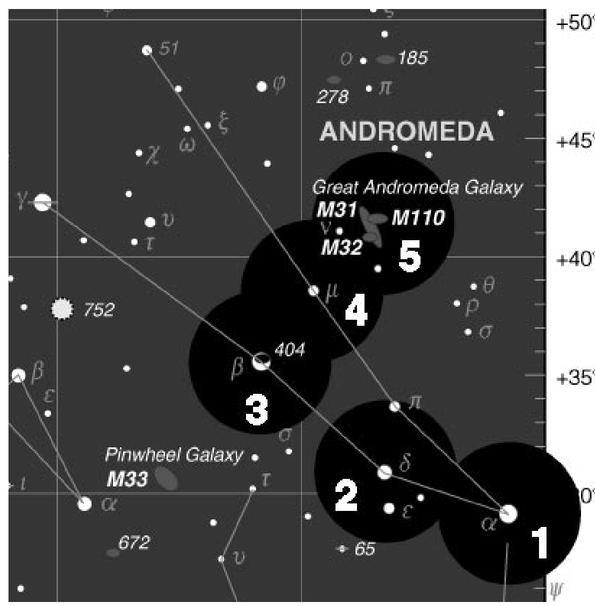

Figure 17. Starhopping is a good way to locate hard-to-find objects. Refer to a star chart to map a route to the object that uses bright stars as guideposts. Center the first star you've chosen in the finder scope and telescope eyepiece (1). Now move the scope carefully in the direction of the next bright star (2), until it is centered. Repeat (3 and 4). The last hop (5) should place the desired object in the eyepiece.

If you have trouble finding the object, start the starhop again from the brightest star near the object you wish to view. This time, be sure the stars indicated on the star chart are in fact the stars you are centering in the eyepiece. Remember, the finder scope (and main telescope eyepiece, for that matter) gives an inverted image, so you must keep this in mind when starhopping from star to star.

Note About Astrophotography

SkyQuest XT Dobsonians are designed for visual, not photographic, use. The Dobsonian mount is not an equatorial-type mount, so it cannot be motor driven for long-exposure astrophotography. SkyQuests have also been optically optimized for visual use, since photographic optimization degrades visual performance.

6. Care and Maintenance

If you give your telescope reasonable care, it will last a lifetime. Store it in a clean, dry, dust-free place, safe from rapid changes in temperature and humidity. Do not store the telescope outdoors, although storage in a garage or shed is OK. Small components like eyepieces and other accessories should be kept in a protective box or storage case. Keep the cap on the front of the telescope when it is not in use.

The telescope requires very little mechanical maintenance. The optical tube is steel and has a smooth painted finish that is fairly scratch-resistant. If a scratch does appear on the tube, it will not harm the telescope. If you wish, you may apply some auto touch-up paint to the scratch. Smudges on the tube can be wiped off with a soft cloth and a household cleaner such as Windex or Formula 409.

Cleaning Lenses

Any quality optical lens cleaning tissue and optical lens cleaning fluid specifically designed for multi-coated optics can be used to clean the exposed lenses of your eyepieces or finder scope. Never use regular glass cleaner or cleaning fluid designed for eyeglasses. Before cleaning with fluid and tissue, however, blow any loose particles off the lens with a blower bulb or compressed air. Then apply some cleaning fluid to a tissue, never directly on the optics. Wipe the lens gently in a circular motion, then remove any excess fluid with a fresh lens tissue. Oily fingerprints and smudges may be removed using this method. Use caution; rubbing too hard may scratch the lens. On larger lenses, clean only a small area at a time, using a fresh lens tissue on each area. Never reuse tissues.

Cleaning Mirrors

You should not have to clean the telescope's mirrors very often; normally once every year or so. Covering the telescope with the dust cap when it is not in use will prevent dust from accumulating on the mirrors. Improper cleaning can scratch mirror coatings, so the fewer times you have to clean the mirrors, the better. Small specks of dust or flecks of paint have virtually no effect on the visual performance of the telescope.

The large primary mirror and the elliptical secondary mirror of your telescope are front-surface aluminized and over-coated with hard silicon monoxide, which prevents the aluminum from oxidizing. These coatings normally last through many years of use before requiring re-coating (which is easily done).

To clean the secondary mirror, first remove it from the telescope. Do this by holding the secondary mirror holder stationary while turning the center Phillips-head bolt. Once the holder is out of the telescope tube, remove the secondary mirror from it by unthreading the circular plate on the bottom of the mirror holder. Carefully remove the foam backing and the secondary mirror itself will slide right out. Handle it carefully by the edges only; do not touch the mirror surface. Then follow the same procedure described below for cleaning the primary mirror.

To clean the primary mirror, carefully remove the mirror cell from the telescope. For the SkyQuest XT6, this is done by removing the three smaller collimation screws on the bottom of the mirror cell. You do not need to remove the larger collimation screws. For the SkyQuest XT8, you must remove the six screws that connect the entire mirror cell to the steel tube. These screws are located on the outside of the tube, just above the mirror cell casting.

Now, remove the mirror from the mirror cell by first removing the three mirror clips that secure the mirror in its cell. Use a Phillips screwdriver to unthread the mirror clip anchor screws. Next, hold the mirror by its edge, and remove it from the mirror cell. Be careful not to touch the aluminized surface of the mirror with your fingers! Set the mirror on a clean, soft towel. Fill a clean sink, free of abrasive cleanser, with room-temperature water, a few drops of liquid dishwashing detergent, and if possible, a cap-full of rubbing alcohol. Submerge the mirror (aluminized face up) in the water and let it soak for several minutes (or hours if it's a very dirty mirror). Wipe the mirror under water with clean cotton balls, using extremely light pressure and stroking in straight lines across the surface. Use one ball for each wipe across the mirror. Then rinse the mirror under a stream of lukewarm water. Any particles on the surface can be swabbed gently with a series of clean cotton balls, each used just one time. Dry the mirror in a stream of air (a "blower bulb" works great), or remove any stray drops of water with the corner of a paper towel. Water will run off a clean surface. Dry the bottom and edge surfaces with a towel (not the mirror surface!). Cover the mirror surface with Kleenex, and leave the entire assembly in a warm area until it is completely dry before reassembling the telescope.

7. Specifications

SkyQuest XT 6"

Focal Length: 1200mm

Aperture: 152mm

Focal Ratio: f/7.9

Mirror Coatings: aluminum with SiO overcoat, 89% reflective

Minor Axis of Secondary Mirror: 31mm

Weight: 37.8 lbs (tube & base)

Tube Length: 45"

Tube Outer Diameter: 175mm

SkyQuest XT 8"

Focal Length: 1200mm

Aperture: 203mm

Focal Ratio: f/6

Mirror Coatings: aluminum with SiO overcoat, 89% reflective

Minor Axis of Secondary Mirror: 50mm

Weight: 42.3 lbs (tube & base)

Tube Length: 44.5"

Tube Outer Diameter: 230mm

8. Suggested Accessories

Sirius™ Plössl Eyepieces

It's desirable to have several eyepieces of different focal length, to allow viewing at different magnifications. Sirius Plössl eyepieces provide sharp, ghost-free images and a 50° apparent field. 1.25" barrels.

#8730 40mm (30x), **#8728** 32mm (38x), **#8733** 20mm (60x), **#8734** 17mm (71x), **#8726** 12.5mm (96x), **#8736** 10mm (120x), **#8738** 7.5mm (160x), **#8739** 6.3mm (190x)

Orion Tube Tote™

A convenient strap-on handle with removable shoulder sling for safely carrying your SkyQuest tube.

#15185 Tube Tote for XT6

#15186 Tube Tote for XT8

Padded Case

Rugged, water-resistant, fully padded nylon case protects the SkyQuest tube and keeps it clean and dry. Strap handles for carrying in hand or over shoulder. Zipper closure. Fits XT6 or XT8. **#15160**

Orion ScopeSaver for Dobs

Perfect for storing your SkyQuest XT Dobsonian or just keeping it covered until the Sun sets. Resists moisture and keeps particulates out. Covers tube and base.

#15135 ScopeSaver for SkyQuest XT6

#15136 ScopeSaver for SkyQuest XT8

Orion Shorty™ 2x Barlow

Doubles the power of any eyepiece it's used with, without reducing eye relief. Great tool for achieving the higher powers desired for lunar and planetary observation. 1.25" barrel. **#8711**

Full-Aperture Glass Solar Filter

For SkyQuest XT6 **#7735**

For SkyQuest XT8 **#7780**

Recommended Resources

Star Charts/Atlases

Orion DeepMap 600 (#4150)

Seasonal Star Charts (#6552)

Mag 6 Star Atlas (#6142)

Sky Atlas 2000.0, Deluxe Edition (#6213)

The Hatfield Photographic Lunar Atlas (#51591)

Observing Guidebooks

The Universe From Your Backyard (#51530)

Constellation Guidebook (#51522)

The Messier Objects (#51602)

Turn Left at Orion (#51315)

General Reference

Star Ware (#51510)

The Complete Idiot's Guide to Astronomy (#51334)

Backyard Astronomer's Guide (#51277)

One-Year Limited Warranty

This Orion SkyQuest XT Dobsonian Reflecting Telescope is warranted against defects in materials or workmanship for a period of one year from the date of purchase. This warranty is for the benefit of the original retail purchaser only. During this warranty period Orion Telescopes & Binoculars will repair or replace, at Orion's option, any warranted instrument that proves to be defective, provided it is returned postage paid to: Orion Warranty Repair, 89 Hangar Way, Watsonville, CA 95076. If the product is not registered, proof of purchase (such as a copy of the original invoice) is required.

This warranty does not apply if, in Orion's judgment, the instrument has been abused, mishandled, or modified, nor does it apply to normal wear and tear. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. For further warranty service information, contact: Customer Service Department, Orion Telescopes & Binoculars, P. O. Box 1815, Santa Cruz, CA 95061; (800) 676-1343.

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Orion SkyQuest XT6 and XT8 Dobsonian Reflectors

#9960 and #9980

ADDENDUM TO THE INSTRUCTION MANUAL, PAGE 4, STEP 6

Because of a change in the manufacturing process, you will have to install a T-nut that the instruction manual indicates is pre-installed. The installation is simple. Please note that the T-nut (labeled K in Figure 2, page 4) is included in the parts kit but is not included in the parts inventory list on page 3.

The following procedure should be substituted for step 6, on page 4:

6. Insert the T-nut (K) into the center hole of the ground baseplate (A) so the nut's flanged top is on the same side of the baseplate as the Teflon pads. Thread the large hex-head bolt (G) with a 3/8" washer (F) attached up through the ground baseplate and through the T-nut until it is tight. Now position the top baseplate (D) (with side panels attached) over the ground baseplate and lower it so the bolt goes through the nylon spacer in the center hole of the top baseplate. Now thread the remaining 3/8" washer (H) and lock nut (I) onto the bolt's shaft. You might need to hold the bolt's head in place with another crescent wrench or pliers. Tighten the lock nut with the wrench just enough to allow a slight separation of the top and bottom baseplates when the mount is lifted. The purpose of the lock nut is merely to keep the two baseplates from coming apart when moving the telescope.

Note: Overtightening the lock nut (I) will make the mount difficult to rotate in the azimuthal (horizontal) direction.

Continue to step 7, page 4. The rest of the base assembly is as printed in the instruction manual.

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