

Orion SkyQuest™ XT Classic Dobsonians

XT6 #8944, XT8 #8945, XT10 #8946



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Figure 1. The SkyQuest XT Dobsonian (XT6 pictured)

Welcome to an exciting new world of adventure! Your SkyQuest Dobsonian is a high-quality optical instrument designed to bring you dazzling views of the outer reaches of our universe. Easy enough for kids to use, and portable enough for anyone to carry, the SkyQuest will provide fun and entertainment for the entire family. Whether you are brand-new to amateur astronomy or a seasoned stargazer, get ready for many evenings of enjoyment and fascination. Before venturing into the night with your new telescope, we recommend that you read through this instruction manual. Not only does it provide accurate directions for assembly and use, but it also serves as a guide for your first explorations in the sky.

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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.

Parts List

Box #1: Optical Tube Assembly and Accessories

Qty.	Description
1	Optical tube assembly
1	Dust cover
1	25mm Sirius Plössl eyepiece, 1.25" barrel diameter
1	EZ Finder II (with bracket)
1	Collimation cap
2	Spring coils
2	Pull loops
4	Nylon spacers (black)
2	1/4" washers (black)
2	Phillips-head screws (black, length 1-3/4")
2	Screws 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	Hex key (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	T-nut
1	Handle
2	Socket-head cap screws, 5/16" (black)
2	5/16" washers (black)
2	5/16" nuts (black)
1	Hex key (6mm)

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.*

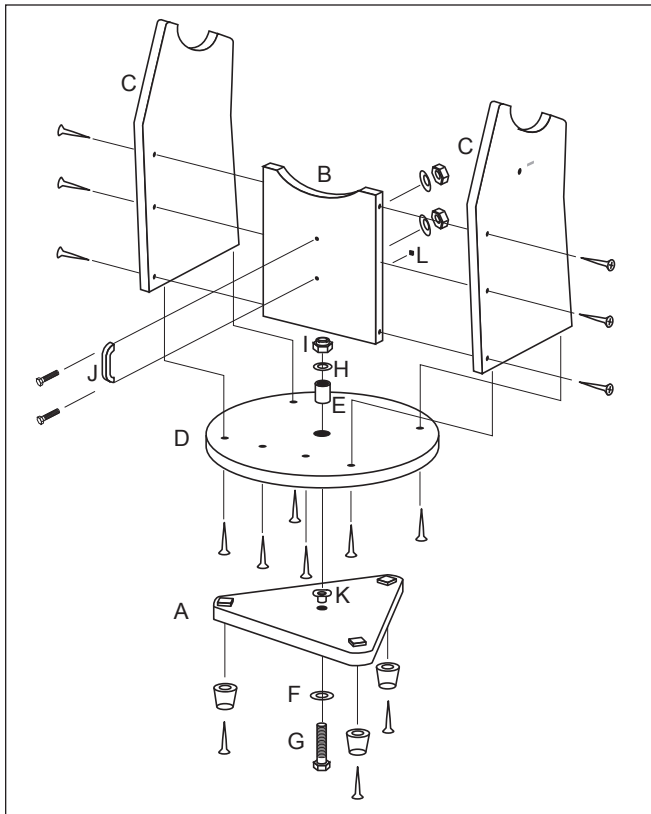


Figure 2. Exploded view of the SkyQuest XT Dobsonian base.

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 30 minutes and requires a Phillips screwdriver, an adjustable crescent wrench, and the provided hex keys.

Note: *When tightening the base assembly screws, tighten them until firm, but be careful not to strip the holes by over-tightening. If you use an electric screwdriver, do the 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 4mm hex key to tighten the screws. The side panels should be oriented so the SkyQuest label is facing outward. Do not completely tighten the screws yet.



Figure 3. 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," and the finder is facing away from the front brace (Part B).

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 panel 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. 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 PTFE/UHMW 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 bolts shaft. You might need to hold the bolts 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.*
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 6mm hex key.
 8. Lift the optical tube and set the altitude bearings on either side of the tube in the "cradle" of the base (Figure 3). The unique flange design of the altitude bearing allows for automatic left-to-right centering of the optical tube in the cradle.

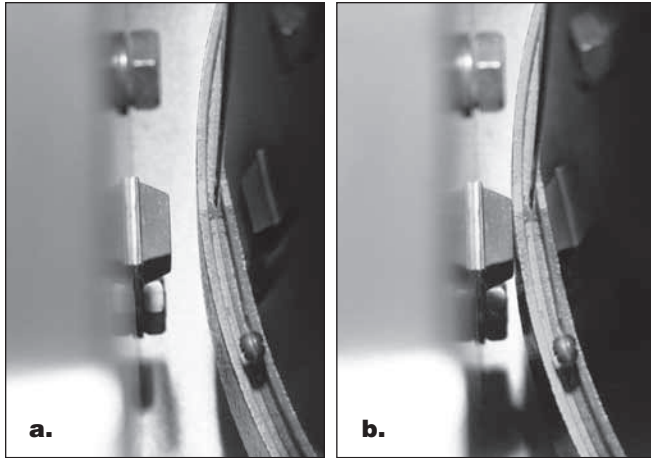


Figure 4. Position the tube on the mount pointed vertical. Place the rubber bumper “stop” where the mirror cell contacts the front base to cushion the impact.

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 EZ Finder II are not in place, and the CorrecTension system has not been installed.

9. The rubber bumper (L) 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. Remove the backing from the rubber bumper and position the bumper so it is positioned in the spot where the optical tube (mirror cell) contacts the front base as shown in Figure 4a and 4b. Press firmly so the adhesive holds the bumper securely in place.

Installing the EZ Finder II

Using the included dovetail mounting bracket, the EZ Finder II will slip neatly into the dovetail base preinstalled on your SkyQuest optical tube. To attach the dovetail mounting bracket to the EZ Finder II, loosen the two thumbscrews on the bottom rail of the EZ Finder II. Slide the EZ Finder II onto the bracket and tighten the two thumbscrews (See Figure 5). Then simply slide the dovetail mounting bracket into the telescope’s dovetail mounting base and tighten the thumbscrew on the base to secure the mounting bracket.

Operation

The EZ Finder II works by projecting a tiny red dot (it’s not a laser beam) onto a lens mounted in the front of the unit. When you look through the EZ Finder II, the red dot will appear to float in space, helping you locate even the faintest of deep space objects. The red dot is produced by a light-emitting diode (LED) near the rear of the sight. A 3-volt lithium battery provides the power for the diode.

Turn the power knob (see Figure 5) clockwise until you hear the “click” indicating that power has been turned on. Look through the back of the reflex sight with both eyes open to see the red dot. Position your eye at a comfortable distance from the back of the sight. In daylight you may need to cover the front of the sight with your hand to be able to see the

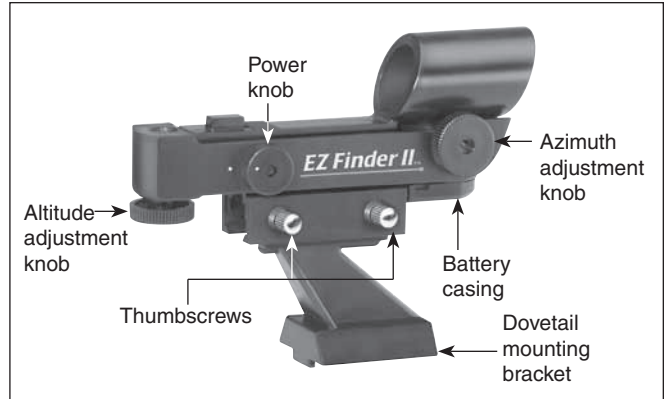


Figure 5. The EZ Finder II

dot, which is purposefully quite dim. The intensity of the dot is adjusted by turning the power knob. For best results when stargazing, use the dimmest possible setting that allows you to see the dot without difficulty. Typically a dimmer setting is used under dark skies and a bright setting is used under light-polluted skies or daylight.

At the end of your observing session, be sure to turn the power knob counterclockwise until it clicks off. When the white dots on the EZ Finder II’s body and power knob are lined up, the EZ Finder II is turned off.

Installing the CorrecTension (XT) Friction Optimization System

Perhaps the most exciting feature of the SkyQuest Dobsonians is the CorrecTension Friction Optimization system. Because of their light weight, 10" and smaller 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 6:

1. Put one of the black nylon spacers on a black Phillips-head screw. The spacer should be oriented so the narrow end seats against the head of the screw. Slip one of the black 1/4" washers over the end of the screw. Now, thread the screw into the hole in the base side panel just below the cradle. The screw will thread into the preinstalled insert in

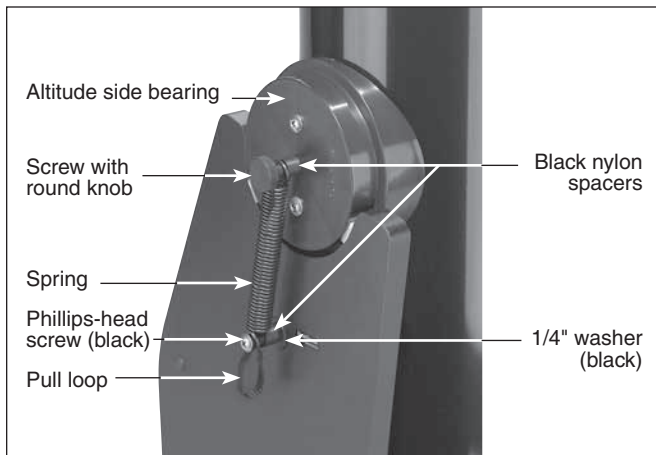


Figure 6. Close-up view of the CorrecTension system, which pulls the tube assembly down onto the altitude bearing pads.

the hole. Use a Phillips screwdriver to tighten the screw. Repeat this procedure on the opposite side panel.

2. Next, insert one of the screws with a round plastic knob attached through the end ring of one of the springs. Slip a black nylon spacer onto the screw. 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 spring's end ring over the head of the Phillips screw (installed in Step 1) and onto the narrow part of the nylon spacer, as shown in Figure 7b. You needn't attach both springs simultaneously; one at a time is fine.

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 into the telescope's focuser. Take the cover cap off the end of the focuser drawtube.

For the XT6: Loosen the two thumbscrews on the eyepiece holder and insert the eyepiece. Then secure it in place with the thumbscrews.

For the XT8 and XT10: There are three thumbscrews on the focuser, one holds the eyepiece, and two hold the 1.25" adapter. To insert the eyepiece, loosen the thumbscrew that is on the 1.25" adapter itself (it will be highest up on the focuser). Insert the eyepiece into the adapter and secure it by tightening the thumbscrew.

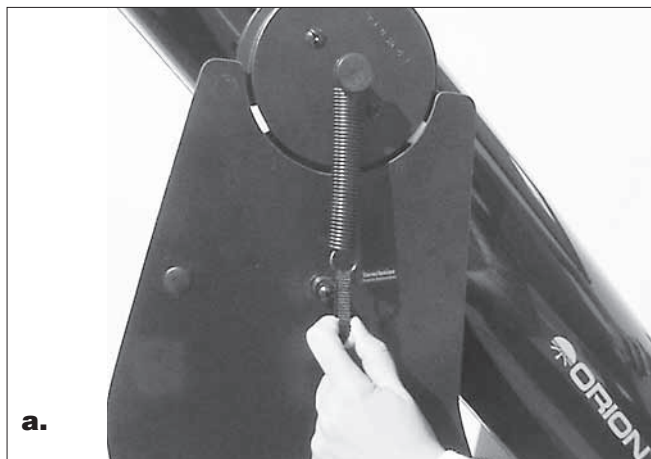


Figure 7. (a) To attach the spring to the base, grip the pull loop with your index finger and pull down on the spring. **(b)** While pulling down, slip the end ring of the spring over the bolt head and onto the narrow part of the nylon spacer, then release the pull loop.

The assembly of your SkyQuest Dobsonian is now complete. It should appear as in Figure 1. The dust cover on the front of the telescope 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.



Figure 8. The SkyQuest has two axes of motion: altitude (up/down) and azimuth (left/right).

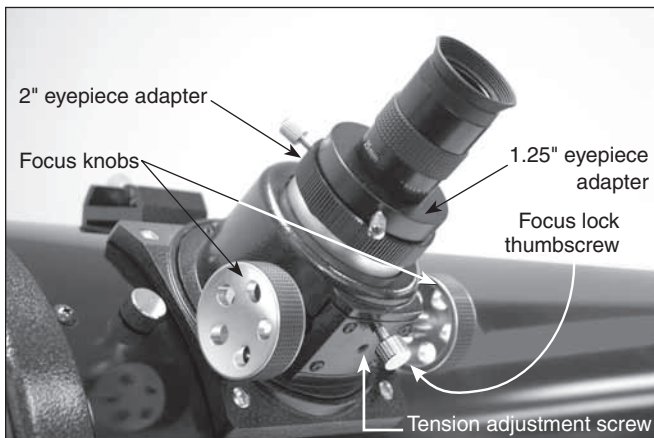


Figure 9. The 2" Crayford focuser (XT8 and XT10)

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) (Figure 8). 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.

Simply take hold of the end of the 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 gen-



Figure 10. The view through a reflector telescope is upside down.

tly—let it glide. In this way you can point the telescope to any position in the night sky, from horizon to horizon.

Focusing the Telescope

Insert the 25mm eyepiece into the focuser and secure with the thumbscrew(s). 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.

The 2" Crayford focuser of the XT8 and XT10 models features a thumb screw on the bottom of the focuser body (Figure 9) which will lock the focuser drawtube in place once the telescope is properly focused.

If you find the drawtube tension when focusing is either too tight (focus knob is difficult to turn) or too loose (image shifts when focusing or drawtube moves inward by itself), the tension can be adjusted for optimal performance. On the XT8 & XT10, the focusing tension adjustment set screw is a 3mm socket head set screw located below the focus lock thumb screw (Figure 9). A 3mm hex key is required for adjustment of focus tension. Due to the rack-and-pinion focuser design on the XT6, tension adjustment should not normally be needed as it has been pre-adjusted at the factory.

Note: The image in the main telescope will appear upside-down (rotated 180°). This is normal for reflector telescopes (see Figure 10).

Aligning the EZ Finder II

When the EZ Finder II is properly aligned with the telescope, an object that is centered on the EZ Finder II's red dot should also appear in the center of the field of view of the telescope's eyepiece. Alignment of the EZ Finder II is easiest during daylight, before observing at night. Aim the telescope at a distant object such as a telephone pole or roof chimney and center it in the telescope's eyepiece. The object should be at least 1/4 mile away. Now, with the EZ Finder II turned on, look through the EZ Finder II. The object should appear in the field of view.

Without moving the main telescope, use the EZ Finder II's azimuth (left/right) and altitude (up/down) adjustment knobs (see Figure 5) to position the red dot on the object in the eyepiece.

When the red dot is centered on the distant object, check to make sure that the object is still centered in the telescope's field of view. If not, recenter it and adjust the EZ Finder II's alignment again. When the object is centered in the eyepiece and on the EZ Finder's red dot, the EZ Finder II is properly aligned with the telescope.

Once aligned, EZ Finder II will usually hold its alignment even after being removed and remounted. Otherwise, only minimal realignment will be needed.

Replacing the Battery

Should the battery ever die, replacement 3-volt lithium batteries are available from many retail outlets. Remove the old battery by inserting a small flat-head screwdriver into the slot on the battery casing (Figure 5) and gently prying open the case. Then carefully pull back on the retaining clip and remove the old battery. Do not overbend the retaining clip. Then slide the new battery under the battery lead with the positive (+) end facing down and replace the battery casing.

Aiming/Pointing the Telescope

Now that the EZ Finder II is aligned, the telescope can be quickly and accurately pointed at anything you wish to observe. The EZ Finder II 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 EZ Finder II. Then, if the EZ Finder II 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 EZ Finder II. If your general aim is accurate, the object should appear somewhere in the EZ Finder II. Make

small adjustments to the telescope's position until the object is centered on the red dot of the EZ Finder. Now, look in the telescope's eyepiece and enjoy the view!

Magnification

Magnification of the telescope can be changed by using additional eyepieces (optional). To switch eyepieces, simply loosen the thumbscrew(s) on the focuser drawtube and lift the eyepiece out of the focuser. Insert your new eyepiece in the focuser and tighten the thumbscrews. If you are careful not to bump the telescope your object should remain in the field of view. With higher powers 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". The XT8 and XT10 can also accept 2" eyepieces. 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:

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

The 6", 8" and 10" SkyQuest Dobsonians all have a focal length of 1200mm. So, the magnification with the supplied 25mm eyepiece is:

$$\frac{1200\text{mm}}{25\text{mm}} = 48x$$

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 60x per inch of aperture. This translates to about 360x for the SkyQuest XT6 and 480x 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, regard-

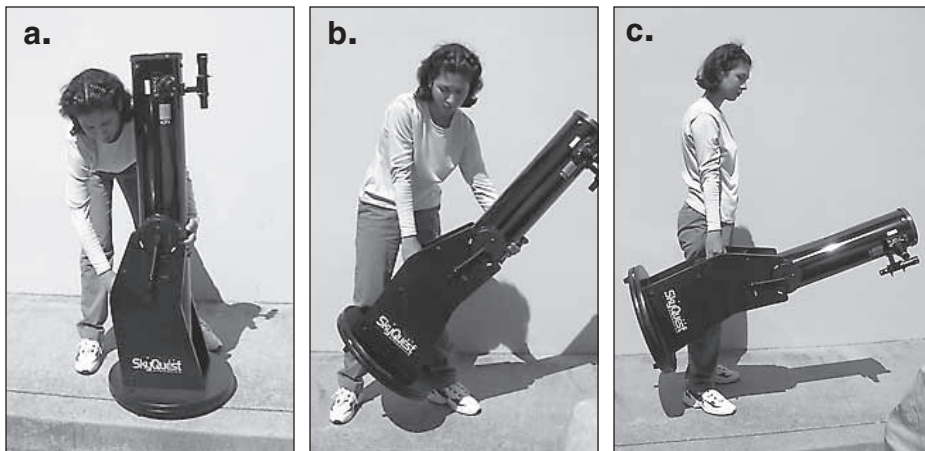


Figure 11. Picking up and carrying the SkyQuest as a single unit (with tube held captive on the base) requires some caution. **(a)** First, position the tube vertically. Then, grasp the handle on the base with one hand while supporting the tube with the other. **(b)** With knees bent, slowly lift the 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!

less 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 EZ Finder II. 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 difficult 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 (6" and 8" models only). 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 optional 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.

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 for proper protection.

4. Specifications

SkyQuest XT6

Primary mirror focal length:	1200mm
Primary mirror diameter:	150mm
Focal Ratio:	f/8.0
Focuser:	Rack and pinion, accepts 1.25" eyepieces
Optical tube material:	Rolled steel
Eyepiece:	25mm Sirius Plössl, fully coated with multi-coatings, 1.25" barrel diameter
Magnification with supplied eyepiece:	48x
Reflex Sight:	EZ Finder II
Reflex Sight Bracket:	Plastic bracket with dovetail base
Mirror coatings:	Enhanced aluminum (94% reflectivity) with SiO ₂ overcoat
Minor axis of secondary mirror:	34.5mm
Optical tube weight:	13.5 lbs.
Base weight:	20.9 lbs.
Tube length:	45.5"
Tube outer diameter:	7.25"

SkyQuest XT8

Primary mirror focal length:	1200mm
Primary mirror diameter:	203mm
Focal Ratio:	f/5.9
Focuser:	Crayford, accepts 2" eyepieces and 1.25" eyepieces with adapter
Optical tube material:	Rolled steel
Eyepiece:	25mm Sirius Plössl, fully coated with multi-coatings, 1.25" barrel diameter
Magnification with supplied eyepiece:	48x
Reflex Sight:	EZ Finder II
Reflex Sight Bracket:	Plastic bracket with dovetail base
Mirror coatings:	Enhanced aluminum (94% reflectivity) with SiO ₂ overcoat
Minor axis of secondary mirror:	47.0mm
Optical tube weight:	20.3 lbs.
Base weight:	20.7 lbs.
Tube length:	46.5"
Tube outer diameter:	9.25"

One-Year Limited Warranty

This Orion product 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. Proof of purchase (such as a copy of the original receipt) is required. This warranty is only valid in the country of purchase.

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. It is not intended to remove or restrict your other legal rights under applicable local consumer law; your state or national statutory consumer rights governing the sale of consumer goods remain fully applicable.

For further warranty information, please visit www.OrionTelescopes.com/warranty.

SkyQuest XT10

Primary mirror focal length:	1200mm
Primary mirror diameter:	254mm
Focal Ratio:	f/4.7
Focuser:	Crayford, accepts 2" and 1.25" eyepieces with included adapter, collimatible
Optical tube material:	Rolled steel
Eyepiece:	25mm Sirius Plössl, fully coated with multi-coatings, 1.25" barrel diameter
Magnification with supplied eyepiece:	48x
Reflex Sight:	EZ Finder II
Reflex Sight Bracket:	Plastic bracket with dovetail base
Mirror coatings:	Enhanced aluminum (94% reflectivity) with SiO ₂ overcoat
Minor axis of secondary mirror:	63.0mm
Optical tube weight:	30.8 lbs.
Base weight:	22.6 lbs.
Tube length:	47.25"
Tube outer diameter:	12.0"

Orion Telescopes & Binoculars

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