#08944, #08945, #08946

SkyQuest XT Classic Dobsonian



Instruction Manual

Never look at the sun with this telescope! Serious permanent eye damage, including blindness, can occur.

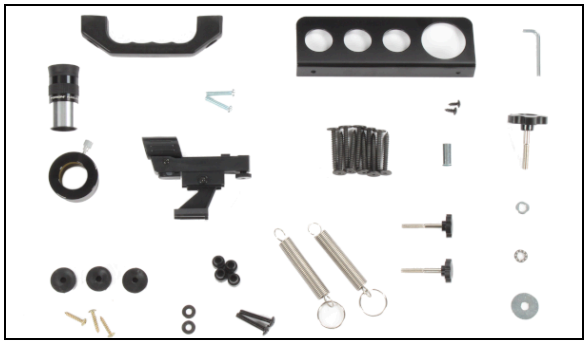
Introduction

Thank you for choosing the Orion SkyQuest XT Classic Dobsonian Telescope. If this is your first step into observational astronomy, we're glad to have you join the community. If you're a seasoned observer, we think you'll find great utility in this telescope.

The SkyQuest XT Classic Dobsonian Telescope features a parabolic primary mirror and quality mechanics.

The following guide will help you get the most from your new telescope. We encourage you to review it fully before your first observing session. If this is your first telescope, we also recommend taking a little time to become familiar with the night sky. Recognizing the major constellations and their star patterns will make your observing experience far more intuitive and rewarding. Under reasonably dark conditions, with a bit of practice and patience, this instrument can provide years of meaningful exploration and fun. Enjoy your time under the stars!

What's Included





- Optical Tube
- Base
  - Ground Board
  - Base Board
  - Side Boards
  - Front Board
  - Azimuth Bearing Components
  - Altitude Tension Components
  - Handle
- 25 mm Plossl Eyepiece
- Red Dot Sight
- Dust Cap
- Allen Wrench

When unpacking the telescope, it is advisable to retain the packaging materials. In the rare event the instrument must be shipped back for service or return, the original packing will help ensure safe transport. Before proceeding with assembly, confirm all components listed in the parts inventory are present and in good working order.

Specifications

General

Optical design	Newtonian
Mounting base	Dobsonian (Alt-Az)
Primary mirror figure	Parabolic
Primary mirror coating	Aluminum with SiO2
Sec. mirror coating	Aluminum with SiO2
Focuser	Crayford Style 2"
Eyepieces	25 mm Plossl
Finder scope	Red dot reflex

XT6

Aperture	150 mm
Focal length	1,200 mm
Focal ratio	f/8
Weight OTA box	20.6 lb
Weight base box	26 lb

XT8

Aperture	200 mm
Focal length	1,200 mm
Focal ratio	f/6
Weight OTA box	27.2 lb
Weight base box	28.4 lb

XT10

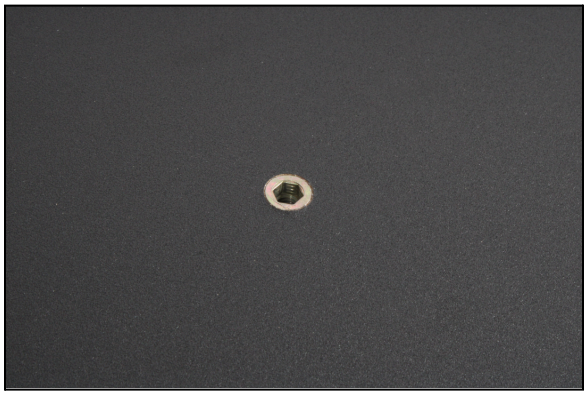
Aperture	250 mm
Focal length	1,250 mm
Focal ratio	f/5
Weight OTA box	46 lb
Weight base box	30.6 lb

Setting Up the Telescope

The Orion SkyQuest XT Classic Dobsonian telescope is shipped in two separate boxes. One box holds the optical tube assembly (OTA) and the other box holds the base, flat packed. Begin by unpacking both boxes and checking for any damage that might have occurred during shipping, and verify that app parts listed on Page 1 are present and in good condition. Then, begin by assembling the base.

Assembly: Dobsonian Base

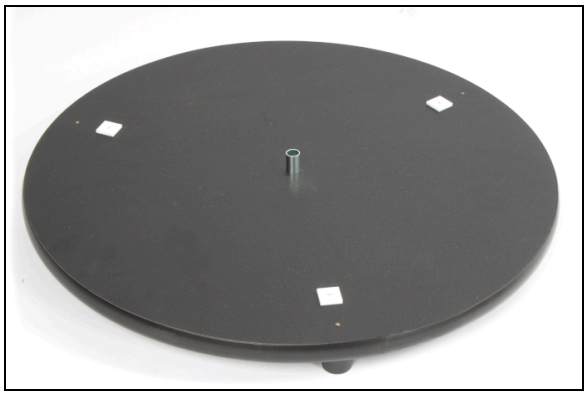
Begin by selecting the ground board. This is the large round disc with three plastic squares attached to it, 3 drilled holes, and a central brass threaded insert. Place the ground board face down, with the plastic squares facing the ground, the brass threaded insert on top.



Locate the three cylindrical black plastic feet, and accompanying three screws. If you are unsure of which screw to use, it is the only style which has a count of 3 pieces. Place a foot over each of the three holes located on the ground board, and using a Phillips screw driver, thread in a screw, and gently tighten it.



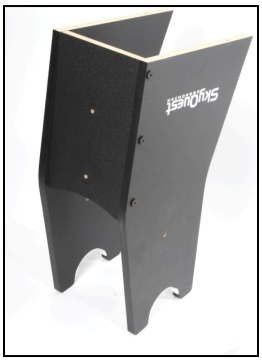
Flip the ground board over and place it upright, with the plastic pads on top, and feet on the bottom. Then, Insert the steel cylindrical azimuth bushing into the base. This can be seen inserted into the center of the base in the following image.



Next, locate the two side boards and front board. The side boards are mirror images of each other, and the front board is a small rectangular board with a scallop removed from the top of it. It is very important that when assembling these boards, that the brass threaded inserts face inward, towards the center. If this step is ignored the threaded insert will be on the wrong side of the board and will fail in use.



Using the large pan head wood screws attach the side boards to the front board. It is important that the boards are not fully tightened. Leave about ⅛” of screw exposed at this step. Now, flip the assembly over so that the parts are positioned as shown in the following image.



Now take the remaining base part, the bottom board, and sit it on the assembly with the counter sink side of the holes facing up. Line up the holes and install the large panhead wood screws using a hex key.



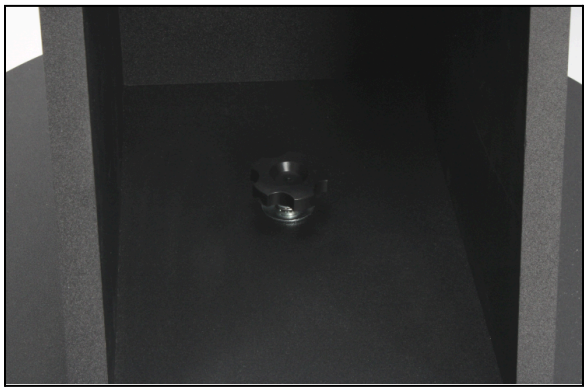
Once the bottom screws have been tightened. Go back and tighten the screws that hold the side boards to the front board. At this point, the assembly can be flipped over so that it is upright. The central hold of this assembly is placed over the middle sleeve that was positioned on the ground board, earlier in the process.

Attach the handle to the front board.



Assemble the azimuth tension bearing as shown in the following image. First install the small washer, then the small roller bearing, then the large fender washer. This assembly is installed through the center of both large round bottom and ground boards and tightened in place. Keep the tension light on this assembly so that the telescope has a nice easy to move motion.

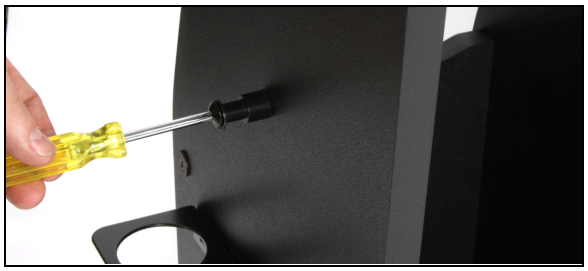




Locate and install the eyepiece tray as shown, using the two included black Phillips drive wood screws.



Install the Altitude Tension connection on the side boards. Utilize the long black phillips machine screws, installing the stepped spacer as shown.



Assembly: Optical Tube

Stand the telescope upright, with the large mirror at the bottom and opening at the top. Locate the two long springs, plastic knob bolts, and two remaining stepped spacers. Install the spring on the spacer.



Then, install the stepped spacer, and thread this assembly into the side of the telescope's altitude pivot point.



To attach the OTA to the base, sit the tube in the base as shown in the following image.



Loop the "key ring" of the spring over the bolt and offset spacer that was attached to the base earlier.



Installing the Eyepiece

One 25 mm Plossl eyepiece is included with the telescope. To install the eyepiece, remove the focuser cap and loosen the thumbscrews to create clearance for the eyepiece barrel. Insert the barrel fully into the focuser and lightly tighten the thumbscrews to secure it.



Installing the Finder

Slide the bracket foot of the red dot finder into the dovetail shoe on the telescope tube. The sighting tube should face the front end of the instrument.The additional set screw installed into the finder base can be tightened with a hex key if you want the finder installation to be more permanent.

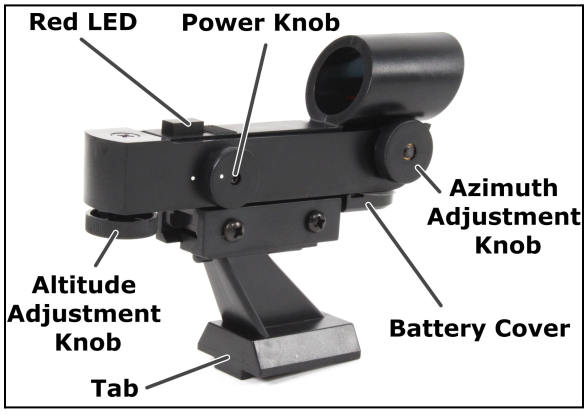


Using the Red Dot Finder

Using the Red Dot Finder

The finder 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 finder, 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 clockwise until you hear the "click" indicating 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.



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 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 the retaining clip (outward) and replace the battery casing.

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

Aligning the Finder

Proper alignment ensures an object centered on the red dot will also be centered in the telescope’s eyepiece. Alignment is most easily performed during daylight. Follow the alignment procedure described in the next section to match the sight’s aim with the optical axis of the telescope.

1. Remove the dust cover from the front of the telescope.
2. Install the 25 mm eyepiece in the focuser and point the telescope at a clearly defined land target (ideally at least a quarter mile away) such as the top of a telephone pole, tree, or building.
3. Center the target in the telescope eyepiece.
4. Without moving the telescope, use the Red Dot Finder’s altitude and azimuth adjustment knobs to position the red dot directly on the target.
5. Once the red dot is centered on the target, verify the object remains centered in the telescope’s eyepiece. If necessary, re-center the target in the eyepiece and adjust the Red Dot Finder again. When the target is aligned in both the eyepiece and the Red Dot Finder, the finder is properly aligned with the telescope.

Using the Telescope

Focusing the Telescope

The SkyQuest XT Classic Dobsonian is equipped with a 2” Crayford style focuser. It is recommended to practice focusing during the daytime on distant objects to become familiar with the process. Please note that a Newtonian telescope will generally not reach focus on close objects, and will focus on distant objects only.

With the 25 mm eyepiece installed, aim the optical tube at a clearly defined object at least a quarter mile away. Slowly rotate either of the two focus knobs, which move together, until the object comes into sharp focus. Continue past sharp focus until the image begins to blur, then reverse the rotation gradually to precisely achieve the clearest focus point.

The focuser has two knobs on its lower side. The knob closest to the telescope locks the focuser in place when it is tightened. In normal use, this should be left very loose. The upper knob should be quite tight. This knob sets the tension of the focuser draw tube. A tighter setting allows it to support heavier loads.

If you find that the focuser is slipping, simply tighten the upper knob shown here.

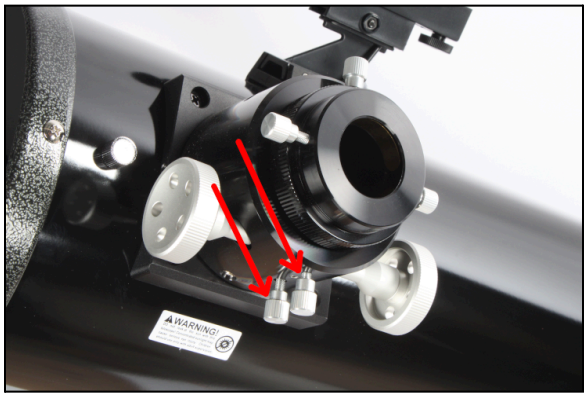


Image Orientation

Images seen through a Newtonian telescope’s eyepiece will appear rotated or upside down. This is a normal characteristic of reflector telescopes. While this makes them less suitable for daytime terrestrial viewing, it does not affect astronomical observations; there is no “right side up” when observing the night sky.

Altitude and Azimuth (Aiming the Telescope)

The SkyQuest XT Classic Dobsonian base allows movement along two axes: altitude (up and down) and azimuth (left and right). These motions can be used together to smoothly point the telescope to any position in the night sky, from horizon to horizon.



Choosing an Observing Site

For the best viewing experience, choose a location as far as possible from artificial lights such as street lamps, porch lights, and car headlights. Bright lights interfere with dark-adapted night vision and reduce the number of visible stars and celestial objects. Avoid observing over rooftops or chimneys, which can produce warm air currents that distort the image. Observing from indoors, even through an open window, should also be avoided because temperature differences between indoor and outdoor air can blur and distort the view.

Whenever possible, travel away from city lights to darker rural skies. Under a dark sky, the number of visible stars and deep-sky objects increases dramatically.

Cooling the Telescope

All optical instruments require time to reach thermal equilibrium. The larger the telescope and the greater the temperature difference between indoor storage and outdoor conditions, the longer it takes to stabilize. Allow at least 20 minutes for the telescope to acclimate to the outdoor temperature before beginning high-magnification observations.

Allow Your Eyes to Dark-Adapt

Moving from a well-lit area into nighttime darkness will not immediately reveal faint nebulae, galaxies, star clusters, or even many stars. Eyes take approximately 30 minutes to reach about 80% of their full dark-adapted sensitivity. As night vision develops, more stars will appear, and faint details in objects viewed through the telescope will become clearer.

To maintain night vision while working in the dark, use a red-filtered flashlight instead of white light. Red light preserves dark adaptation and allows you to see what you are doing without reducing sensitivity. Flashlights with red LED lights are particularly effective. Keep in mind nearby porch lights, street lights, and car headlights can also compromise night vision.

Objects to Observe

Once the telescope is set up and aligned, the next step is deciding what to explore in the night sky.

The Moon
The Moon is one of the easiest and most rewarding targets for observation. Its craters, maria, and mountain ranges are visible even from a distance of 238,000 miles. Because the Moon goes through different phases, each night provides a slightly different view. The best time to observe is during a partial phase, when shadows along the terminator, the line between the illuminated and dark portions of the lunar surface, highlight surface details. A full Moon is very bright and lacks shadows, making it less ideal for detailed observation. Observing the Moon when it is high above the horizon provides the sharpest images.

The Planets
Planets move across the sky rather than remaining fixed like stars, so their positions change nightly. To locate them, consult a sky calendar, astronomy magazines, online astronomy charts, or smartphone apps. Venus, Jupiter, and Saturn are the brightest objects after the Moon, while other planets may appear star-like in a small telescope. Higher magnification is recommended for observing planets and even then, they will still appear very small through this telescope.

Jupiter is the largest planet and an excellent target. Through the telescope, the disk of Jupiter can be seen, along with its four largest moons: Io, Callisto, Europa, and Ganymede. The disc of the planet will likely be smaller than expected.

Saturn is famous for its rings. Depending on the tilt, the rings may appear edge-on or broadside. A steady atmosphere is important for a clear view. Titan, Saturn's brightest moon, is often visible nearby.

Venus is extremely bright and can sometimes be seen during daylight. At its peak brightness, Venus appears as a thin crescent rather than a full disk, and no surface markings are visible due to dense cloud cover.

The Stars
Stars will appear as points of light through the telescope. While stars cannot be magnified into disks, their colors can be observed, and many double or multiple star systems can be resolved. The two-color, double star, Albireo in Cygnus, is a popular target. Slightly defocusing a star can sometimes enhance its color.

Deep-Sky Objects
Under dark skies, the telescope can reveal faint objects such as gaseous nebulae, open clusters, globular star clusters, and galaxies. Most deep-sky objects appear as dim gray shapes rather than the colorful images often seen in photographs. Patience, dark-adapted eyes, and a location away from light pollution are essential. Without dark-adapted eyes, most deep sky objects are extremely challenging to

view. As observing skills develop, more subtle details and structures become visible.

Star charts, planetarium programs, apps, and planispheres are helpful tools for locating deep-sky objects. Low-power scanning of the Milky Way with the 25 mm eyepiece is a rewarding way to explore the dense fields of stars. Maybe you'll stumble across one of the great nebulae! The Milky Way is especially impressive on summer and winter evenings.

Collimation – Aligning the Optics

Collimation is the process of aligning the optics of the telescope so the mirrors are precisely positioned relative to each other and the telescope tube. For a reflector telescope, both the primary and secondary mirrors must be accurately aligned. The optics are aligned at the factory, and adjustments are often not required unless the telescope has been handled roughly.

Accurate alignment ensures the sharpest possible images and should be checked occasionally. With practice, collimation is straightforward and can be done in daylight. Keep in mind even a telescope without technically perfect collimation can still allow you to see good views of the night sky. While collimation is very important, don't let small deviations stop you from observing.

Perform collimation in a brightly lit room with the telescope pointed horizontally at a bright surface, such as a light-colored wall. Placing a piece of white paper opposite the focuser can help during alignment.

To check the current collimation, remove the eyepiece and look down the focuser. You should see the secondary mirror centered in the focuser, the reflection of the primary mirror centered in the secondary mirror, and the reflection of the secondary mirror and your eye centered in the primary mirror reflection. Compare what you see with the provided illustration. If anything appears off-center, proceed with the collimation steps.

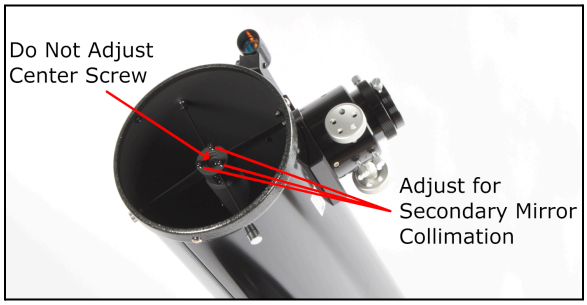
Precise collimation is easiest with a collimation tool like a Laser or Cheshire Eyepiece.Though, rough collimation can be done by eye, if careful to keep your eye centered on the focuser.

Primary Mirror Center Mark

The telescope features a small ring in the center of the primary mirror. This center mark allows precise collimation. It does not affect optical performance because it exists in the shadow of the secondary mirror.

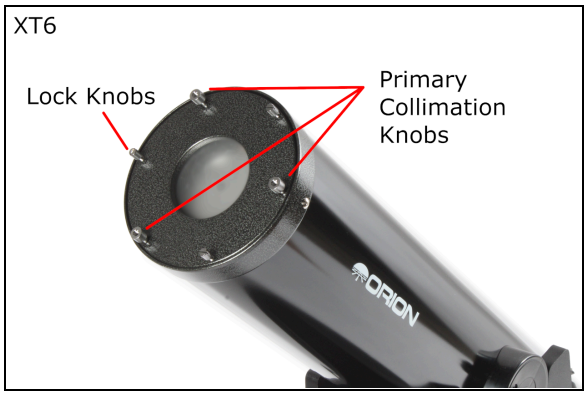
Aligning the Secondary Mirror

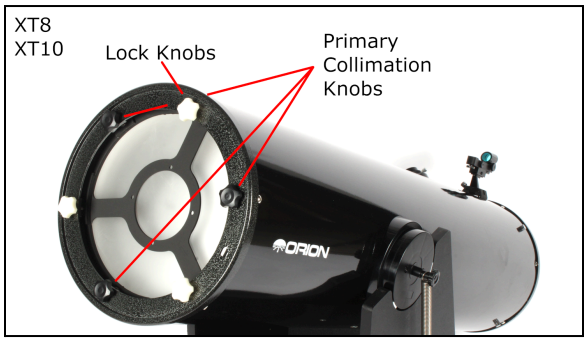
Begin with the secondary mirror. The secondary mirror adjustment screws are Allen screws. Look down the focuser at the secondary mirror. If the primary mirror reflection is not centered in the secondary mirror, adjust the tilt of the secondary mirror by loosening one screw and lightly tightening the others. The goal is to center the primary mirror reflection in the secondary mirror. Do not worry if the reflection of the secondary mirror itself is off-center at this stage. It will be corrected when adjusting the primary mirror. This process may take a few attempts to achieve precise alignment.



Aligning the Primary Mirror

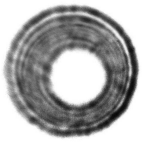
Next, adjust the primary mirror. If the primary mirror reflection is centered in the secondary mirror but the secondary mirror reflection is off-center, use the three spring-loaded collimation knobs and the three locking thumbscrews on the back of the optical tube. Loosen the locking thumbscrews slightly, then adjust each collimation knob in small increments, observing how the secondary mirror reflection moves. Repeat as needed until the reflection of the primary mirror's center mark is aligned with the collimating tool. Lightly retighten the locking thumbscrews to secure the mirror. A star test will confirm accurate collimation.





Star Testing the Telescope

At night, point the telescope at a bright star and center it in the eyepiece. Slowly defocus the star using the focuser. If collimation is correct, the out-of-focus star should appear as a symmetrical circle with the shadow of the secondary mirror centered, similar to a donut hole. If the shadow is off-center or the disk is unsymmetrical, further adjustment to the primary mirror is needed. Keep the star centered during testing; this is critical. Make slight adjustments to the telescope's position to center the star, if necessary. Polaris, the North Star, is a convenient choice because it remains relatively fixed in the sky.



Out of Collimation



Collimated

Orion StarGuard 2 Year Warranty

Visit telescope.com for more information about the Orion StarGuard 2 Year Warranty.