INSTRUCTION MANUAL

Orion®
Transporter 70 Min-EQ™

#9859 Tabletop Equatorial Refracting Telescope

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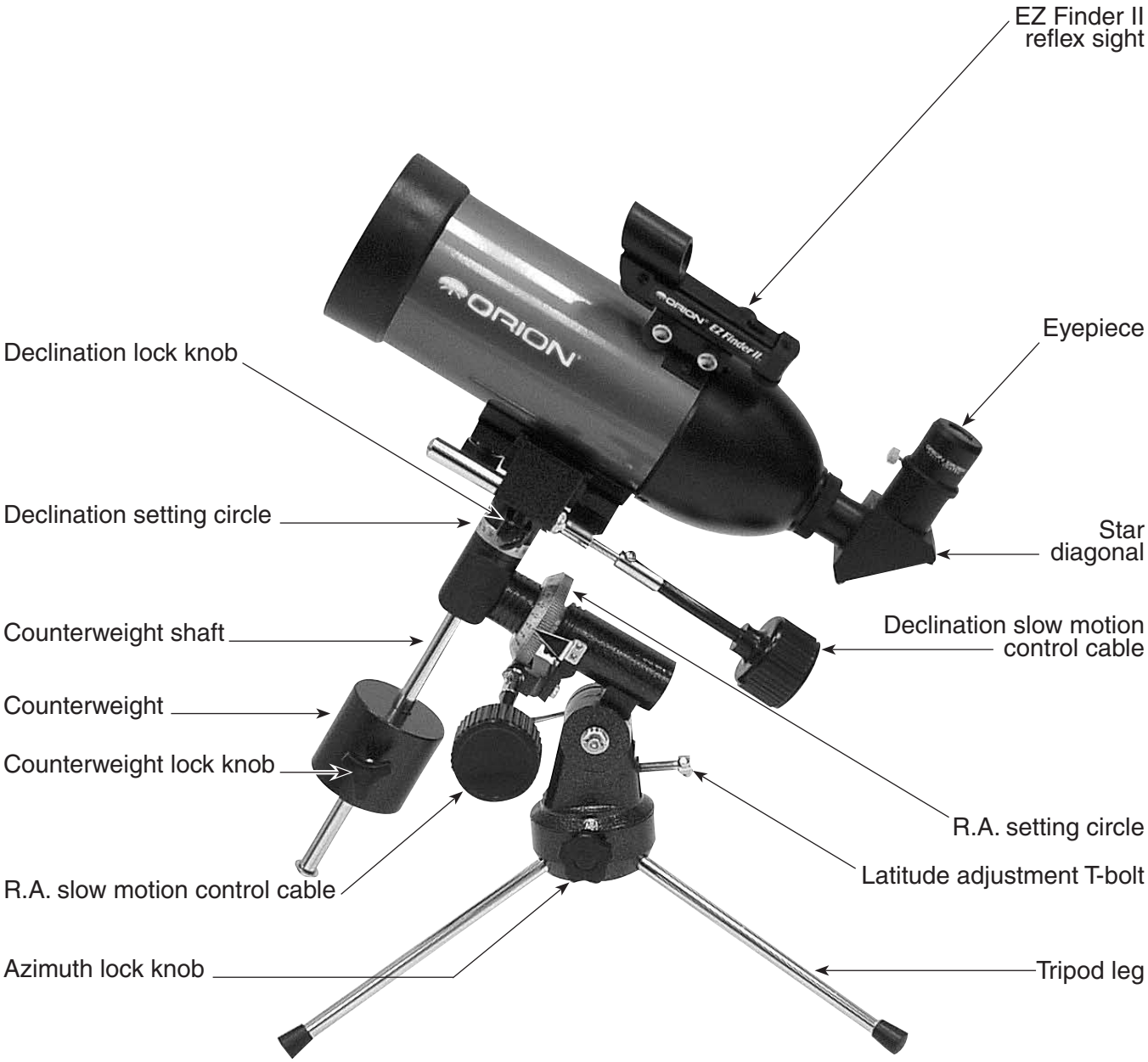

Figure 1. The Transporter 70 Min-EQ.

Congratulations on your purchase of an Orion telescope. Your new Transporter 70 Min-EQ is the most portable equatorially mounted telescope ever developed by Orion. Since it fits completely in its included carrying case, you can take the Transporter 70 Min-EQ on camping trips, vacations, and anywhere else you want to bring it. Weighing in at just over 12.5 lbs., the Transporter is a breeze to carry.

If you have never owned a telescope before, we would like to welcome you to amateur astronomy. Take some time to familiarize yourself with the night sky. Learn to recognize the patterns of stars in the major constellations. With a little practice, a little patience, and a reasonably dark sky away from city lights, you'll find your telescope to be a never-ending source of wonder and exploration.

These instructions will help you set up, properly use and care for your telescope. Please read over them thoroughly before getting started.

Table of Contents

1. Parts List

1	German equatorial mount
2	Slow-motion control cables
1	Counterweight shaft
1	Counterweight
3	Tripod legs
1	Optical tube assembly
2	Optical tube attachment knobs with washers
1	17mm Explorer II eyepiece
1	6mm Explorer II eyepiece
1	Mirror star diagonal
1	EZ Finder II reflex sight
1	Dust cover
1	Soft carry case

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.***

2. Assembly

Carefully remove all of the items from the shipping box. Make sure all the parts listed in the parts list are present. Save all boxes and packaging material. In the unlikely event that you need to return the telescope, you should use the original packaging.

Assembling the telescope for the first time should take about 10 minutes. No tools are required. During assembly (and anytime for that matter), do not touch the any of the lenses of either the telescope or the eyepieces with your fingers. The optical surfaces have delicate coatings on them that can easily be damaged if touched. Never remove any lens assembly from its housing for any reason, or the product warranty and return policy will be voided.

Refer to Figure 1 during the assembly process.

1. Attach the tripod legs, one at a time, by threading them into the holes at the base of the equatorial mount.
2. With the tripod legs now attached to the equatorial mount, stand the mount upright.
3. Orient the equatorial mount as it appears in Figure 1, at a latitude of about 40°, i.e., so the pointer next to the latitude scale is pointing to the mark at "40." To do this, loosen the latitude lock T-bolt, and turn the latitude adjustment T-bolt until the pointer and the "40" line up. Then retighten the latitude lock T-bolt. The declination (Dec.) and right ascension (R.A.) axes may also need re-positioning (rotation) to match Figure 1. Be sure to loosen the R.A. and Dec. lock knobs before doing this. Retighten the R.A. and Dec. lock knobs once the equatorial mount is properly oriented.
4. Thread the counterweight shaft into the equatorial mount at the base of the declination axis until tight.
5. Remove the screw and washer on the bottom of the counterweight shaft and slide the counterweight onto the shaft. Make sure the counterweight lock knob is adequately loosened to allow the counterweight shaft to pass through the hole in the counterweight. Position the counterweight about halfway up the shaft and tighten the lock knob. Replace the screw and washer on the end of the shaft.
6. Attach the two slow-motion control cables to the R.A. and Dec. slow motion control shafts of the equatorial mount by positioning the thumb screw on the end of the cable (you can attach a control cable to either end of the R.A. slow-motion

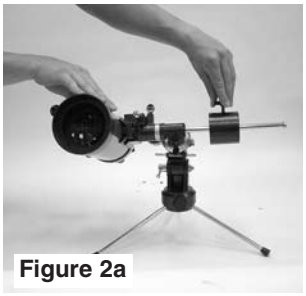
Figure 2a

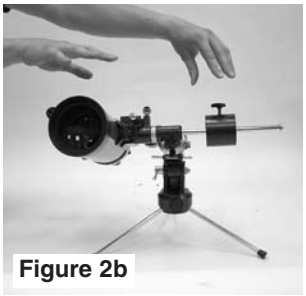
Figure 2b

Figure 2a, b. Proper operation of the equatorial mount requires balancing the telescope tube on the R.A. axis. (a) With the R.A. lock knob released, slide the counterweight along the counterweight shaft until it just counterbalances the tube. (b) When you let go with both hands, the tube should not drift up or down.

control shaft) over the indented slot on the shaft, then tightening the thumb screw.

7. Attach the optical tube assembly to the equatorial mount. First, take the two optical tube attachment knobs and place a lock washer, then a flat washer on each knob's shaft. Line up the holes in the optical tube's mounting plate with the holes in the top of the equatorial mount. Then push the optical tube attachment knobs up through the holes and thread them into the mounting plate.
8. Attach the EZ Finder II reflex sight to the mounting bracket on the optical tube assembly. Loosen the two securing thumbscrews on the EZ Finder II (Figure 3) and slide the EZ Finder onto the mounting bracket. Tighten the two thumbscrews.
9. Attach the star diagonal to the telescope by threading the diagonal onto the telescope tube with the knurled attachment ring on the diagonal
10. Insert the chrome barrel of the 17mm Explorer II eyepiece into the star diagonal and secure it with the thumbscrews on the diagonal

Your telescope is now fully assembled and should now resemble Figure 1.

3. Getting Started

Balancing the Telescope

Once the optical tube is attached to the equatorial mount, the next step is to balance the telescope on the mount's R.A. axis. Proper balance is required to insure smooth movement of the telescope on the equatorial mount.

Keeping one hand on the telescope optical tube, loosen the R.A. lock knob. Make sure the Dec. lock knob is locked tight. The telescope should now be able to rotate freely about the R.A. axis. Rotate it until the counterweight shaft is parallel to the ground (i.e., horizontal).

Now loosen the counterweight lock knob and slide the weight along the shaft until it exactly counterbalances the telescope (Figure 2a). That's the point at which the shaft remains horizontal even when you let go of the telescope with both hands (Figure 2b). Retighten the counterweight lock knob. The telescope is now balanced on the R.A. axis.

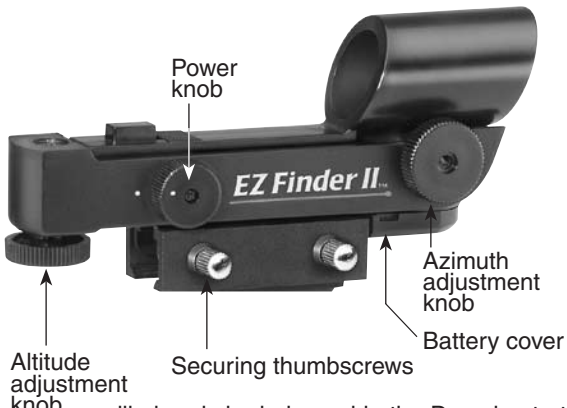

Figure 3. The EZ Finder II reflex sight.

The telescope will already be balanced in the Dec. due to the placement of the optical tube's mounting plate.

Now that the telescope is properly balanced, when you loosen the lock knob on one or both axes and manually point the telescope, it should move without resistance and should not drift from where you point it.

Focusing the Telescope

With the 17mm Explorer II eyepiece inserted into the star diagonal, 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 turn the focusing knob until the object comes into sharp focus. Go a little bit beyond sharp focus until the image starts to blur again, then reverse the rotation of the knob, just to make sure you've hit the exact focus point.

Do You Wear Eyeglasses?

If you wear eyeglasses, you may be able to keep them on while you observe. In order to do this, your eyepiece must have enough "eye relief" to allow you to see the entire field of view with glasses on. 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 the glasses do restrict the field of view, you may be able to observe with your glasses off by just refocusing the telescope the needed amount.

If your eyes are astigmatic, images will probably appear the best with glasses on. This is because a telescope's focuser can accommodate for nearsightedness or farsightedness, but not astigmatism. If you have to wear your glasses while observing and cannot see the entire field of view, you may want to purchase additional eyepieces that have longer eye relief.

Operating the EZ Finder II Reflex Sight

The EZ Finder II reflex sight (Figure 3) makes pointing your telescope almost as easy as pointing your finger! It's a non-magnifying aiming device that superimposes a tiny red dot on the sky, showing exactly where the telescope is pointed.

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. The red dot is produced by a light-emitting diode (LED) near the

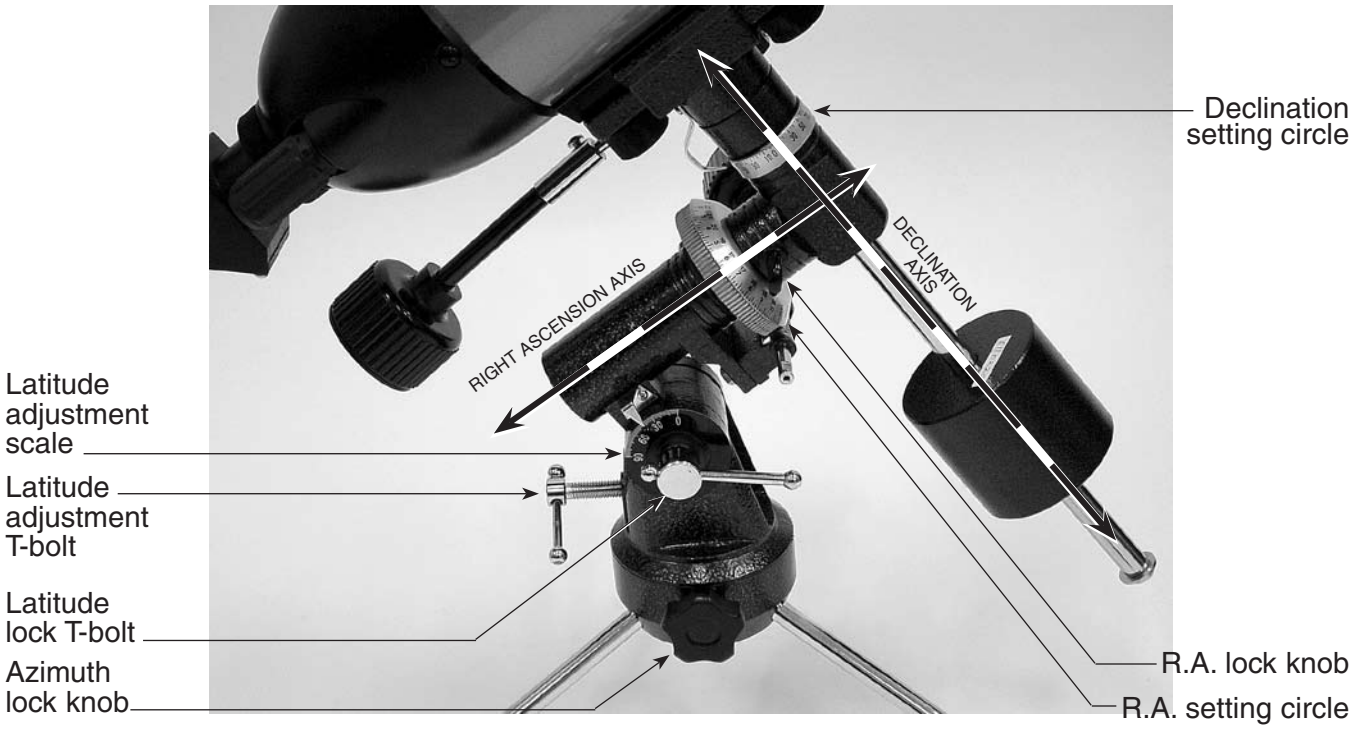

Figure 4. The Transporter 70 Min-EQ equatorial mount.

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 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. 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 two white dots on the EZ Finder II's rail and power knob are lined up, the EZ Finder II is turned off.

Aligning the EZ Finder II Reflex Sight

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.

1. 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 turned on, look though it. The object will appear in the field of view near the red dot.

   Note: The view through a refractor telescope with a star diagonal will be reversed from left-to-right.

2. Without moving the main telescope, use the EZ Finder II's azimuth (left/right) and altitude (up/down) adjustment knobs to center the red dot on the object in the eyepiece.
3. 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.

The EZ Finder II alignment should be checked before every observing session. Choose any bright star or planet, center the object in the telescope's eyepiece, then adjust the knobs until the object is centered on the red dot of the EZ Finder.

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 cover (Figure 3) and gently prying open the cover. 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 (+) side facing down and replace the battery cover.

4. Setting up and Using the Equatorial Mount

When you look at the night sky, you no doubt have noticed that the stars appear to move slowly from east to west over

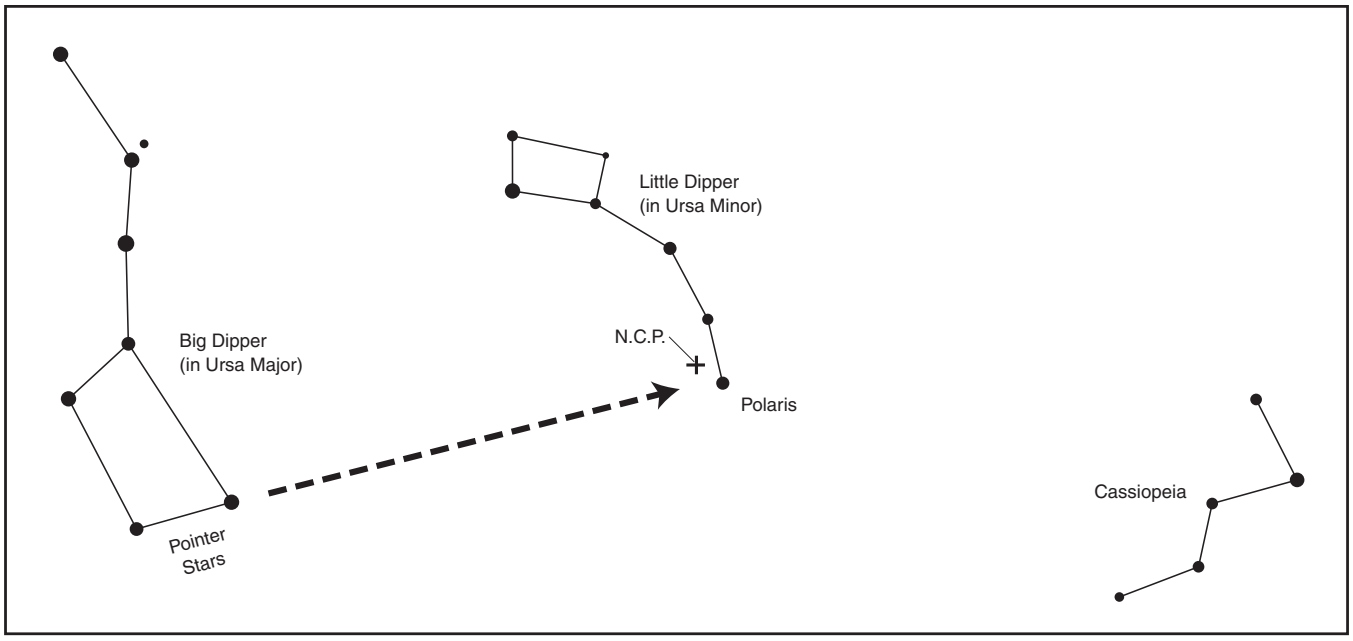

Figure 5. To find Polaris in the night sky, look north and find the Big Dipper. Extend an imaginary line from the two "Pointer Stars" in the bowl of the Big Dipper. Go about five times the distance between those stars and you'll reach Polaris, which lies within 1° of the north celestial pole (NCP).

time. That apparent motion is caused by the Earth's rotation (from west to east). An equatorial mount (Figure 4) is designed to compensate for that motion, allowing you to easily "track" the movement of astronomical objects, thereby keeping them from drifting out of the telescope's field of view while you're observing.

This is accomplished by slowly rotating the telescope on its right ascension (R.A.) axis, using only the R.A. slow-motion cable. But first the R.A. axis of the mount must be aligned with the Earth's rotational (polar) axis – a process called polar alignment.

Polar Alignment

For Northern Hemisphere observers, approximate polar alignment is achieved by pointing the mount's R.A. axis at the North Star, or Polaris. It lies within 1° of the north celestial pole (NCP), which is an extension of the Earth's rotational axis out into space. Stars in the Northern Hemisphere appear to revolve around the NCP.

To find Polaris in the sky, look north and locate the pattern of the Big Dipper (Figure 5). The two stars at the end of the "bowl" of the Big Dipper point right to Polaris.

Observers in the Southern Hemisphere aren't so fortunate to have a bright star so near the south celestial pole (SCP). The star Sigma Octantis lies about 1° from the SCP, but it is barely visible with the naked eye (magnitude 5.5).

To polar-align the Transporter 70 Min-EQ:

1. Place the telescope on a flat, level surface, such as a sturdy table.
2. Loosen the latitude lock T-bolt. Turn the latitude adjustment T-bolt and tilt the mount until the pointer on the latitude scale is set at the latitude of your observing site. If you don't know your latitude, consult a geographical atlas to find it. For example, if your latitude is 35° North, set the pointer to 35. Then retighten the latitude lock T-bolt. The latitude setting should not have to be adjusted again unless you move to a different viewing location some distance away.
3. Loosen the Dec. lock knob and rotate the telescope optical tube until it is parallel with the R.A. axis, as it is in Figure 1. The pointer on the Dec. setting circle should read 90°. Retighten the Dec. lock lever.
4. Loosen the azimuth lock knob at the base of the equatorial mount and rotate the mount so the telescope tube (and R.A. axis) points roughly at Polaris. If you cannot see Polaris directly from your observing site, consult a compass and rotate the mount so the telescope points North. Retighten the azimuth lock knob.

The equatorial mount is now polar aligned.

From this point on in your observing session, you should not make any further adjustments in the azimuth or the latitude of the mount, nor should you move the tripod. Doing so will undo the polar alignment. The telescope should be moved only about its R.A. and Dec. axes.

Use of the R.A. and Dec. Slow-Motion Control Cables

The R.A. and Dec. slow-motion control cables allow fine adjustment of the telescope's position to center objects within

the field of view. Before you can use the cables, you must manually "slew" the mount to point the telescope in the vicinity of the desired target. Do this by loosening the R.A. and Dec. lock knobs and moving the telescope about the mount's R.A. and Dec. axes. Once the telescope is pointed somewhere close to the object to be viewed, retighten the mount's R.A. and Dec. lock knobs.

The object should now be visible somewhere in the EZ Finder II. If it isn't, use the slow-motion controls to scan the surrounding area of sky. When the object is visible in the EZ Finder II, use the slow-motion controls to center it on the red dot. Now, look in the telescope's eyepiece. If the EZ Finder II is properly aligned, the object should be visible somewhere in the field of view. Once the object is visible in the eyepiece, use the slow-motion controls to center it in the field of view.

The Dec. slow-motion control cable can move the telescope a maximum of 25°. This is because the Dec. slow-motion mechanism has a limited range of mechanical travel. (The R.A. slow-motion mechanism has no limit to its amount of travel). If you can no longer rotate the Dec. control cable in a desired direction, you have reached the end of travel, and the slow-motion mechanism must be reset. This is done by first rotating the control cable several turns in the opposite direction from which it was originally being turned. Then, manually slew the telescope closer to the object you wish to observe (remember to first loosen the Dec. lock knob). You should now be able to use the Dec. slow-motion control cable again to finely adjust the telescope's position.

Tracking Celestial Objects

When you observe a celestial object through the telescope, you'll see it drift slowly across the field of view. To keep it in the field, if your equatorial mount is polar aligned, just turn the R.A. slow-motion control cable clockwise. The Dec. slow-motion control cable is not needed for tracking. Objects will appear to move faster at higher magnifications, because the field of view is narrower.

Optional Electronic Drives for Automatic Tracking

An optional DC electronic drive can be mounted on the R.A. axis of the equatorial mount to provide hands-free tracking. Objects will then remain stationary in the field of view without any manual adjustment of the R.A. slow-motion control cable.

Understanding the Setting Circles

The setting circles on an equatorial mount enable you to locate celestial objects by their "celestial coordinates". Every object resides in a specific location on the "celestial sphere". That location is denoted by two numbers: its right ascension (R.A.) and declination (Dec.). In the same way, every location on Earth can be described by its longitude and latitude. R.A. is similar to longitude on Earth, and Dec. is similar to latitude. The R.A. and Dec. values for celestial objects can be found in any star atlas or star catalog.

The mount's R.A. setting circle is scaled in hours, from 1 through 24, with small marks in between representing 10-minute increments. The numbers closest to the R.A. axis gear apply to viewing in the Southern Hemisphere, while the numbers above them apply to viewing in the Northern Hemisphere.

The Dec. setting circle is scaled in degrees, with each mark representing 2.5° increments. Values of Dec. coordinates range from +90° to -90°. The 0° mark indicates the celestial equator. When the telescope is pointed north of the celestial equator, values of the Dec. setting circle are positive, while when the telescope is pointed south of the celestial equator, values of the Dec. setting circle are negative.

So, the coordinates for the Orion Nebula listed in a star atlas will look like this:

R.A. 5h 35.4m Dec. -5° 27'

That's 5 hours and 35.4 minutes in right ascension, and -5 degrees and 27 arc-minutes in declination (there are 60 arc-minutes in 1 degree of declination).

Before you can use the setting circles to locate objects, the mount must be correctly polar aligned, and the R.A. setting circle must be calibrated. The Dec. setting circle has been permanently calibrated at the factory, and should read 90° whenever the telescope optical tube is parallel with the R.A. axis.

Calibrating the Right Ascension Setting Circle

1. Identify a bright star in the sky near the celestial equator (Dec. = 0°) and look up its coordinates in a star atlas.
2. Loosen the R.A. and Dec. lock knobs on the equatorial mount, so the telescope optical tube can move freely.
3. Point the telescope at the bright star whose coordinates you know. Lock the R.A. and Dec. lock knobs. Center the star in the telescope's field of view with the slow-motion control cables.
4. Rotate the setting circle until the metal arrow indicates the R.A. coordinate listed in the star atlas for the object.

Finding Objects With the Setting Circles

Now that both setting circles are calibrated, look up in a star atlas the coordinates of an object you wish to view.

1. Loosen the Dec. lock knob and rotate the telescope until the Dec. value from the star atlas matches the reading on the Dec. setting circle. Remember that values of the Dec. setting circle are positive when the telescope is pointing north of the celestial equator (Dec. = 0°), and negative when the telescope is pointing south of the celestial equator. Retighten the lock knob.
2. Loosen the R.A. lock knob and rotate the telescope until the R.A. value from the star atlas matches the reading on the R.A. setting circle. Remember to use the upper set of numbers on the R.A. setting circle. Retighten the lock knob.

Most setting circles are not accurate enough to put an object dead-center in the telescope's eyepiece, but they should place the object somewhere within the field of view of the EZ Finder II, assuming the equatorial mount is accurately polar aligned.


Figure 6a

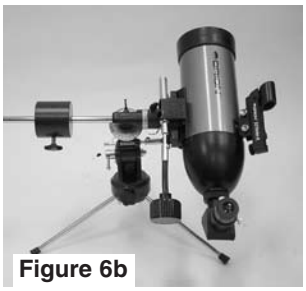
Figure 6b


Figure 6c


Figure 6d

Figure 6a,b,c,d. This illustration shows the telescope pointed in the four cardinal directions: (a) North, (b) South, (c) East, (d) West. Note that the tripod and mount have not been moved; only the telescope tube has been moved on the R.A. and Dec. axes.

Use the slow-motion controls to center the object in the EZ Finder II, and it should appear in the telescope's field of view.

The R.A. setting circle must be re-calibrated every time you wish to locate a new object. Do so by calibrating the setting circle for the centered object before moving on to the next one.

Confused About Pointing the Telescope?

Beginners occasionally experience some confusion about how to point the telescope overhead or in other directions. In Figure 1 the telescope is pointed north, as it would be during polar alignment. The counterweight shaft is oriented downward. But it will not look like that when the telescope is pointed in other directions. Let's say you want to view an object that is directly overhead, at the zenith. How do you do it?

One thing you DO NOT do is make any adjustment to the latitude adjustment T-bolt. That will nullify the mount's polar alignment. Remember, once the mount is polar aligned, the telescope should be moved only on the R.A. and Dec. axes. To point the scope overhead, first loosen the R.A. lock knob and rotate the telescope on the R.A. axis until the counterweight shaft is horizontal (parallel to the ground). Then loosen the Dec. lock knob and rotate the telescope until it is pointing straight overhead. The counterweight shaft is still horizontal. Then retighten both lock knobs.

Similarly, to point the telescope directly south, the counterweight shaft should again be horizontal. Then you simply rotate the scope on the Dec. axis until it points south.

What if you need to aim the telescope directly north, but at an object that is nearer to the horizon than Polaris? You can't do it with the counterweight down as pictured in Figure 1. Again, you have to rotate the scope in R.A. so the counterweight shaft is positioned horizontally. Then rotate the scope in Dec. so it points to where you want it near the horizon.

To point the telescope to the east or west, or in other directions, you rotate the telescope on its R.A. and Dec. axes. Depending on the altitude of the object you want to observe, the counterweight shaft will be oriented somewhere between vertical and horizontal.

Figure 6 illustrates how the telescope will look pointed at the four cardinal directions—north, south, east, and west

The key things to remember when pointing the telescope are that a) you only move it in R.A. and Dec., not in azimuth or latitude (altitude), and b) the counterweight and shaft will not always appear as it does in Figure 1. In fact, it almost never will!

5. Astronomical Observing

Choosing an Observing Site

When selecting a location for observing, get as far away as possible from direct artificial light such as street lights, porch lights, and automobile headlights. The glare from these lights will greatly impair your dark-adapted night vision. Set up on a grass or dirt surface, not asphalt, because asphalt radiates heat which disturbs the surrounding air and degrades the images seen through the telescope. Avoid viewing over rooftops and chimneys, as they often have warm air currents rising from them. Similarly, avoid observing from indoors through an open (or closed) window, because the temperature difference between the indoor and outdoor air will cause image blurring and distortion.

If at all possible, escape the light-polluted city sky and head for darker country skies. You'll be amazed at how many more stars and deep-sky objects are visible in a dark sky!

"Seeing" and Transparency

Atmospheric conditions vary significantly from night to night. "Seeing" refers to the steadiness of the Earth's atmosphere at a given time. In conditions of poor seeing, atmospheric turbulence causes objects viewed through the telescope to "boil". If, when you look up at the sky with just your eyes, the stars are twinkling noticeably, the seeing is bad and you will be limited to viewing with low powers (see section on "choosing eyepieces" for more details on power). Planetary observing may also be poor.

In conditions of good seeing, star twinkling is minimal and images appear steady in the eyepiece. Seeing is best overhead, worst at the horizon. Also, seeing generally gets better

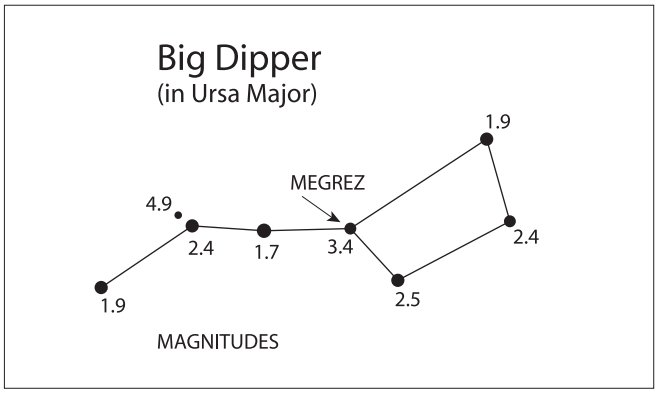

Figure 7. Megrez connects the Big Dipper's handle to it's "pan". It is a good guide to how conditions are. If you can not see Megrez (a 3.4 mag star) then conditions are poor.

after midnight, when much of the heat absorbed by the Earth during the day has radiated off into space.

Especially important for observing faint objects is good "transparency" – air free of moisture, smoke, and dust. All tend to scatter light, which reduces an object's brightness. Transparency is judged by the magnitude of the faintest stars you can see with the unaided eye (6th magnitude or fainter is desirable).

One good way to tell if conditions are good is by how many stars you can see with your naked eye. If you cannot see stars of magnitude 3.5 or dimmer then conditions are poor. Magnitude is a measure of how bright a star is; the brighter a star is, the lower its magnitude will be. A good star to remember for this is Megrez (mag. 3.4), which is the star in the "Big Dipper" connecting the handle to the "dipper". If you cannot see Megrez, then you have fog, haze, clouds, smog, or other conditions that are hindering your viewing (Figure 7).

Cooling the Telescope

All optical instruments need time to reach "thermal equilibrium." The bigger the instrument and the larger the temperature change, the more time is needed. Allow at least 30 minutes for your telescope to cool to the temperature outdoors.

Let Your Eyes Dark-Adapt

Don't 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. As your eyes become dark-adapted, more stars will glimmer into view and you'll be able to see fainter details in objects you view in your telescope.

To see what you're 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, or you can cover the front of a regular incandescent flashlight with red cellophane or paper. Beware, too, that nearby porch and streetlights and car headlights will ruin your night vision.

Eyepiece Selection

By using eyepieces of varying focal lengths, it is possible to attain many magnifications with the Transporter 70 Min-EQ. Your telescope comes with two Explorer II eyepieces, a 17mm that gives a magnification of 21x, and a 6mm that gives a magnification of 58x. 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.

To calculate the magnification, or power, of a telescope and eyepiece combination, simply divide the focal length of the telescope by the focal length of the eyepiece:

$$\frac{\textbf{focal length of telescope}}{\textbf{focal length of eyepiece}} = \textbf{Magnification}$$

For example, the Transporter 70 Min-EQ, which has a focal length of 350mm, used in combination with the 17mm eyepiece, yields a magnification of:

$$\frac{\textbf{350mm}}{\textbf{17mm}} = \textbf{21x}$$

Every telescope has a useful magnification limit of about 2x per millimeter of aperture (which means maximum magnification of about 140x for the Transporter 70 Min-EQ). Claims of higher power by some telescope manufacturers are a misleading advertising gimmick and should be dismissed. Keep in mind that at higher powers, an image will always be dimmer and less sharp (this is a fundamental law of optics). The steadiness of the air (the "seeing") can also limit how much magnification an image can tolerate.

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.

The best rule of thumb with eyepiece selection is to start with a low power, wide-field eyepiece, 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.

What to Expect

So what will you see with your telescope? You should be able to see bands on Jupiter, the rings of Saturn, craters on the Moon, the waxing and waning of Venus, and many bright deep-sky objects. Do not expect to see color as you do in NASA photos, since those are taken with long-exposure cameras and have "false color" added. Our eyes are not sensitive enough to see color in deep-sky objects except in a few of the brightest ones.

Remember that you are seeing these objects using your own telescope with your own eyes! The object you see in your eyepiece is in real-time, and not some conveniently provided image from an expensive space probe. Each session with your telescope will be a learning experience. Each time you work with your telescope it will get easier to use, and stellar objects will become easier to find. Take it from us, there is big difference between looking at a well-made full-color NASA image of a deep-sky object in a lit room during the daytime, and seeing that same object in your telescope at night. One can merely be a pretty image someone gave to you. The other is an experience you will never forget!

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 an optional 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 Planets

The planets don't stay put like the stars, so to find them you should refer to Sky Calendar at our website (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. Other planets may be visible but will likely appear star-like. 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.

C. 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.

D. 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.

6. Terrestrial Viewing

The Transporter 70 Min-EQ can be used for long-distance viewing over land. We recommend using an optional 45° correct-image prism diagonal instead of the included 90° mirror star diagonal. The correct-image diagonal will yield upright, non-reversed images and provide a more comfortable viewing angle.

The equatorial mount should not be used for terrestrial viewing. While it is excellent for tracking the stars, the equatorial mount will make aiming the telescope towards terrestrial targets difficult. However, the Transporter 70's optical tube can be mounted to any sturdy camera tripod via the 1/4"-20 threaded holes in its mounting block. Any tripod capable of handling 2.5lbs. or more can support the Tranporter 70's optical tube. Simply unthread the attachment knobs and remove the optical tube from the Min-EQ mount, then attach the optical tube to the camera tripod by threading the camera tripods mounting stud into the Transporter 70's mounting block. Use the threaded hole that will best balance the optical tube on the tripod.

Remember to aim well clear of the Sun, unless the front of the telescope is fitted with a professionally made solar filter and the finder scope is covered, or better yet, removed altogether.

7. Transporting the Telescope

The Transporter 70 Min-EQ was designed for observers who wanted a telescope that is easy to transport. The entire telescope, including the optical tube and Min-EQ mount, will fit in the provided soft carry case. This makes the Transporter 70 Min-EQ incredibly portable.

To use the carrying case, you need to disassemble the mount. Once disassembled, place the counterweight shaft and telescope legs at the very bottom of the carry case, underneath the case's padded "floor". The counterweight goes into the corner separated by a padded wall. The mount itself is secured to the padded "floor" with the cloth velcro straps. Place the slow motion control cables in with the mount. Then, place the padded compartment separator on top of the mount and

secure it in place with the velcro to form the top compartment of the carry case. Place the optical tube in the top compartment of the carry case. The star diagonal and eyepieces should go into the carry case's front pocket.

8. 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 the front pocket of the carry case. Keep the dust cover on the front of the telescope when not in use.

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 Transporter's objective lens or exposed lenses of your eyepieces. 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. For the large surface of the objective lens, clean only a small area at a time, using a fresh lens tissue on each area. Never reuse tissues.

9. Specifications

Objective lens: Achromatic, fully coated

Aperture: 70mm

Focal length: 350mm (f/5)

Finder: EZ Finder II reflex sight

Diagonal: 90° Mirror star diagonal

Eyepieces: 17mm Explorer II (21x), 6mm Explorer II (58x), fully coated, 1.25"

Mount: Min-EQ tabletop equatorial mount

Motor drives: Optional

Weight: 12.6 lbs.

One-Year Limited Warranty

This Transporter 70mm Min-EQ 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, 89 Hangar Way, Watsonville, CA 95076; (800) 676-1343.

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