INSTRUCTION MANUAL

Orion® Atlas™ EQ-G

Computerized GoTo Equatorial Mount

#9929

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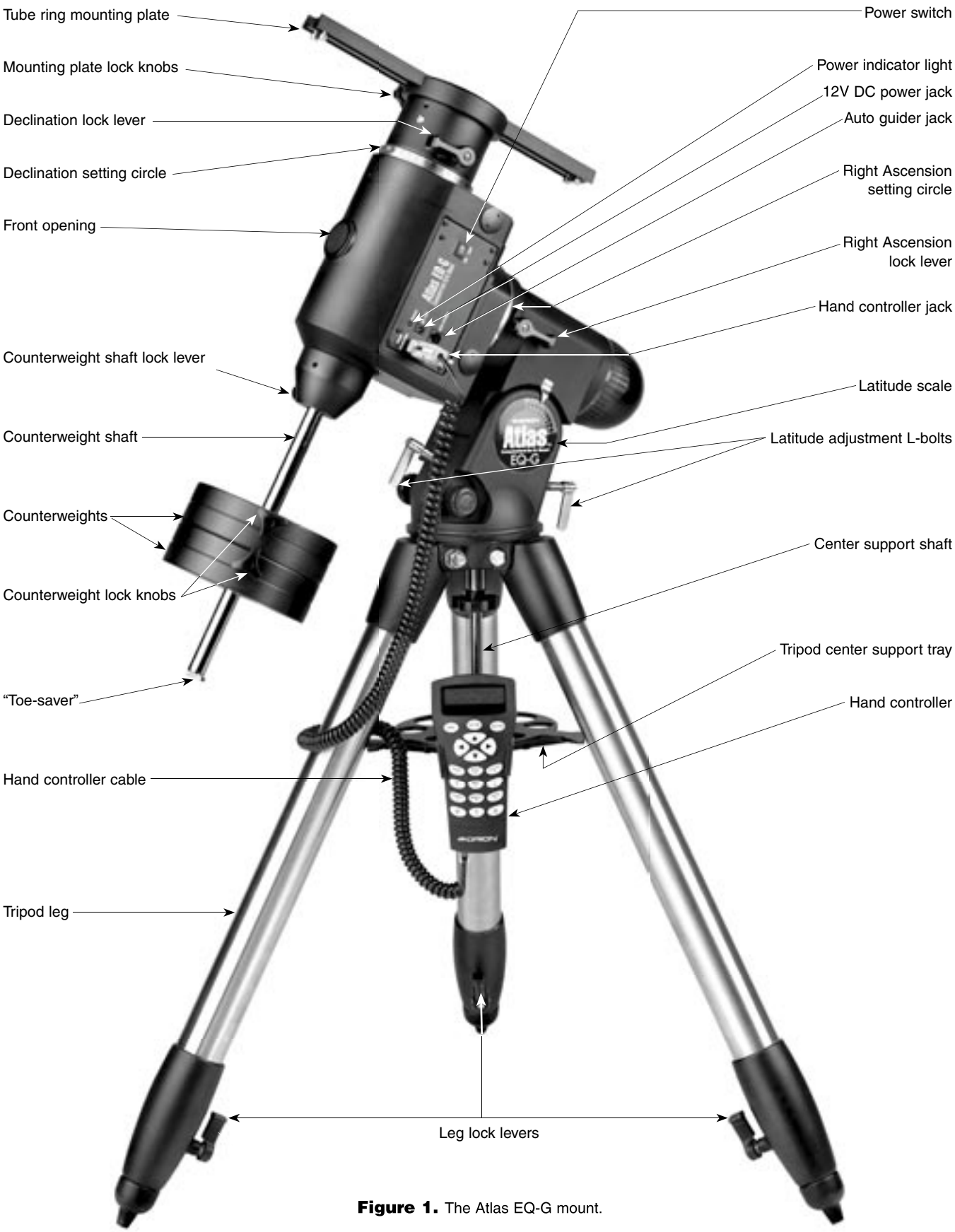

Figure 1. The Atlas EQ-G mount.

Congratulations on your purchase of a quality Orion mount. Your new Atlas EQ-G mount works with many different optical tubes. Designed for computerized astronomical use, this precision mount will locate and automatically slew to thousands of fascinating celestial denizens including the planets of our solar system, our Moon, galaxies, nebulae, stars, and star clusters. With a little practice, you'll find that the Atlas EQ-G mount is an invaluable tool for getting the most out of your astronomical observing sessions.

These instructions will help you set up and properly use your equatorial mount. Please read them over thoroughly before getting started.

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1. Unpacking

The entire mount will arrive in two boxes, one containing the tripod, the other containing the equatorial mount. Be careful unpacking the boxes. We recommend keeping the boxes and original packaging. In the event that the mount needs to be shipped to another location, or returned to Orion for warranty repair, having the proper packaging will ensure that your mount will survive the journey intact.

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

2. Parts List

Box 1: Tripod

Qty.	Item
1	Tripod
2	Counterweights (11lbs. each)
1	Tripod center support tray

Box 2: Equatorial Mount

Qty.	Item
1	Equatorial mount
1	Tube ring mounting plate
1	Hand controller
1	Hand controller cable
1	Computer interface cable (RS-232)
1	12V DC power cable
1	Hand controller bracket
1	Wire clip

3. Assembly

1. Stand the tripod legs upright and spread the legs out as far as they will go. Make certain that the leg lock levers are tightened. Keep the tripod legs at their shortest (fully retracted) length, for now; you can extend them to a more desirable length later, after the mount is fully assembled.
2. Place the base of the equatorial mount onto the tripod head. Orient the equatorial mount so that the post on the tripod head lines up with the azimuth adjustment knobs on the equatorial mount (Figure 2). You may need to loosen the azimuth adjustment knobs on the equatorial mount in order to fit the mount onto the tripod head.

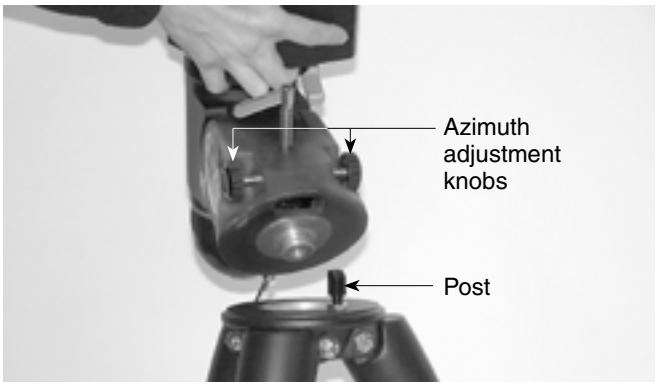


Figure 2. Orient the equatorial head so that the post on the tripod lines up with the azimuth adjustment knobs on the equatorial mount.

3. Remove the knob and washer from the bottom of the center support shaft. Slide the tripod support tray up the bottom of the central support shaft until the three tray arms are touching the legs of the tripod. The flat side of the support tray should be facing up. Make sure the "V" of each tray arm is against a tripod leg. Place the washer on the center support shaft against the tray, and follow it by threading the knob all the way up the center support shaft until it is tight against the tray. The tripod support tray provides additional stability for the tripod, and holds up to five 1.25" eyepieces and two 2" eyepieces.
4. Loosen the counterweight shaft lock lever and fully extend the counterweight shaft. Retighten the lock lever.

5. Remove the knurled “toe saver” retaining screw on the bottom of the counterweight shaft and slide both counterweights onto the shaft. Make sure the counterweight lock knobs are adequately loosened to allow the counterweight shaft to pass through the hole. Position the counterweights about halfway up the shaft and tighten the lock knobs. Replace the toe saver at the end of the bar. The toe saver prevents the counterweights from falling on your foot if the lock knobs happen to come loose.

Your Atlas EQ-G mount is now fully assembled and should resemble Figure 1 except for the hand controller, which will be installed and explained in Section 7.

4. Attaching a Telescope

The Atlas EQ-G equatorial mount is designed to hold telescope tubes weighing up to approximately 40 lbs. For heavier telescopes, the mount may not provide sufficient stability for steady imaging. Any type of telescope can be mounted on the Atlas EQ-G, including refractors, Newtonian reflectors, and catadiotropics, provided a set of tube rings is available to couple the tube to the mount. Orion sells a variety of telescope tube rings. Please visit our website at OrionTelescopes.com for details.

1. Attach the tube mounting rings to the tube ring mounting plate using the screws that come with the tube rings. The screws should go through the center holes in the ends of the mounting plate and rethread into the tube rings. Note that the side of the mounting plate with the central “groove” will be facing up (Figure 3). Use a small wrench to secure the tube rings to the mounting plate.

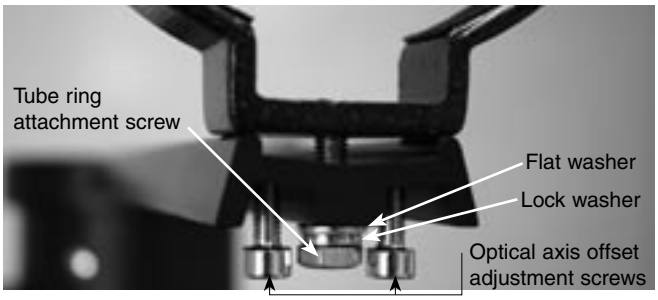


Figure 3. The tube ring mounting plate.

Note: The tube ring mounting plate included with the Atlas EQ-G includes four optical axis offset adjustment screws; these are the socket head cap screws located at each corner of the mounting plate. These adjustment screws will be explained further in Appendix A. For now, confirm that all four adjustment screws are sufficiently unthreaded so that the ends of their threaded shafts are flush with the top surface of the tube ring mounting plate.

Note: The optical axis offset adjustment screws should be oriented so that the threaded shaft extends upward through the top surface of the tube ring mounting plate. If the tube ring mounting plate arrives with the optical axis offset screws installed backwards, reverse their orientation before proceeding (Figure 3).

2. Loosen the black mounting plate lock knobs on the top of the equatorial mount. Place the mounting plate, with the tube rings attached, in the slot on top of the equatorial mount. Position the mounting plate so that it is centered in the slot. Re-tighten the mounting plate lock knobs until the plate is secure.
3. Open the tube rings and lay the telescope optical tube in the rings at about the midpoint of the tube’s length. Rotate the tube so that the focuser is at a convenient height for viewing. Close the tube rings and tighten them.

Note: The Atlas EQ-G mount is very heavy. Alone it weighs 54 lbs. With a large optical tube and counterweights it can easily weigh over 100 lbs. Keep this in mind when moving the telescope even small distances, and use assistance when needed. It is best to remove the optical tube and counterweights when moving the mount.

5. Balancing a Telescope

To ensure smooth movement of a telescope on both axes of the equatorial mount, it is imperative that the optical tube is properly balanced. We will first balance the telescope with respect to the right ascension (R.A.) axis, then the declination (Dec.) axis.

1. Keeping one hand on the telescope optical tube, loosen the R.A. lock lever. Make sure the Dec. lock lever is locked, for now. The telescope should now be able to rotate freely

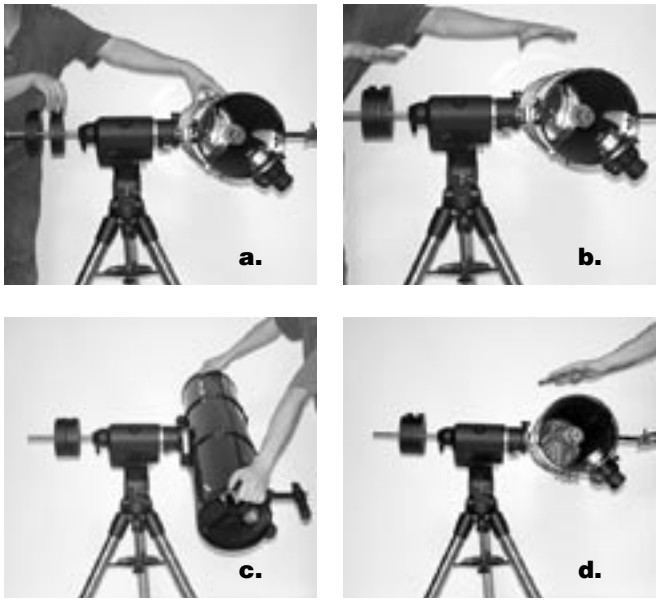


Figure 4a-d. Proper operation of the equatorial mount requires that the telescope tube be balanced on the R.A. and Dec. axes. (a) With the R.A. lock lever released, slide the counterweights down the counterweight shaft until they just counterbalance the telescope tube. (b) When you let go with both hands, the tube should not drift up or down. (c) With the Dec. lock lever released, loosen the tube ring lock clamps a few turns and slide the telescope forward or back in the tube rings. (d) When the tube is balanced about the Dec. axis, it will not move when you let go.

about the right ascension axis. Rotate it until the counterweight shaft is parallel to the ground (i.e., horizontal).

2. Now loosen both counterweight lock knobs and slide the weights along the shaft until they exactly counterbalance the telescope (Figure 4a). That's the point at which the shaft remains horizontal even when you let go with both hands (Figure 4b). If the telescope refuses to balance than you have either too much or too little counterweight. Remove a counterweight, or add optional counterweights if needed.
3. Retighten the counterweight lock knobs. The telescope is now balanced on the right ascension axis.
4. To balance the telescope on the declination axis, first tighten the R.A. lock lever, with the counterweight shaft still in the horizontal position.
5. With one hand on the telescope optical tube, loosen the Dec. lock lever. The telescope should now be able to rotate freely about the declination axis.
6. Loosen the knurled ring clamps on the tube rings a few turns, until you can slide the telescope tube forward and back inside the rings (this can be aided by using a slight twisting motion on the optical tube while you push or pull on it) (Figure 4c).
7. Position the telescope in the tube rings so it remains horizontal when you carefully let go with both hands. This is the balance point for the optical tube with respect to the Dec. axis (Figure 4d).
8. Retighten the knurled ring clamps.

The telescope is now balanced on both axes. When you loosen the lock lever on one or both axes and manually point the telescope, it should move without resistance and should not drift from where you point it.

6. 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 time. That apparent motion is caused by the Earth's rotation (from west to east). An equatorial mount (Figure 5) is designed to compensate for that motion, allowing you to easily "track" the movement of astronomical objects, thereby keeping them from drifting out of your telescope's field of view while you're observing.

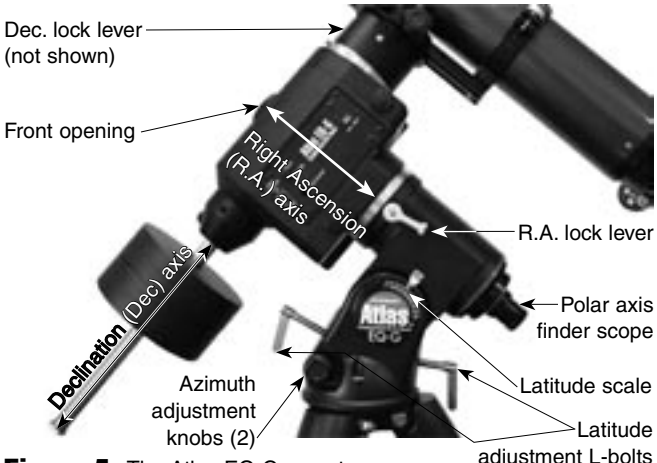


Figure 5. The Atlas EQ-G mount.

This is accomplished by slowly rotating the telescope on its right ascension (R.A.) axis, using the built in motor drive. 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 right ascension 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 6). The two stars at the end of the "bowl" of the Big Dipper point right to Polaris.

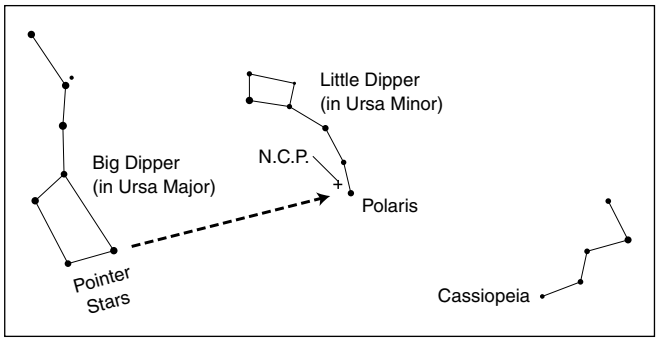


Figure 6. To find Polaris in the night sky, look north and find the Big Dipper. Extend an imaginary line from the two "Pointer Stars" in the bowl of the Big Dipper. Go about five times the distance between those stars and you'll reach Polaris, which lies within 1° of the north celestial pole (NCP).

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).

For general visual observation, an approximate polar alignment is sufficient.

1. Level the equatorial mount by adjusting the length of the three tripod legs.
2. There are two latitude adjustment L-bolts (see Figure 5); loosen one while tightening the other. By doing this you will adjust the latitude of the mount. Continue adjusting 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. 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 lever and rotate the telescope's optical tube until it is parallel with the right ascension axis, as it is in Figure 5.
4. Move the tripod so the telescope tube and right ascension axis point roughly at Polaris. If you cannot see Polaris directly from your observing site, consult a compass and rotate the tripod so the telescope points north.

The equatorial mount is now polar aligned for casual observing. More precise polar alignment is recommended for astrophotography. For this we recommend using the polar axis finder scope.

From this point on in your observing session, you should not make any further adjustments to 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.

The Polar Axis Finder Scope

The Atlas EQ-G mount comes with a polar axis finder scope (Figure 7) housed inside the right ascension axis of the mount. When properly aligned and used, it makes accurate polar alignment quick and easy to do. Unthread the cap at the rear of the mount's right ascension axis and remove the cap on the front opening of the equatorial mount (Figure 5) to view through the polar axis finder scope.

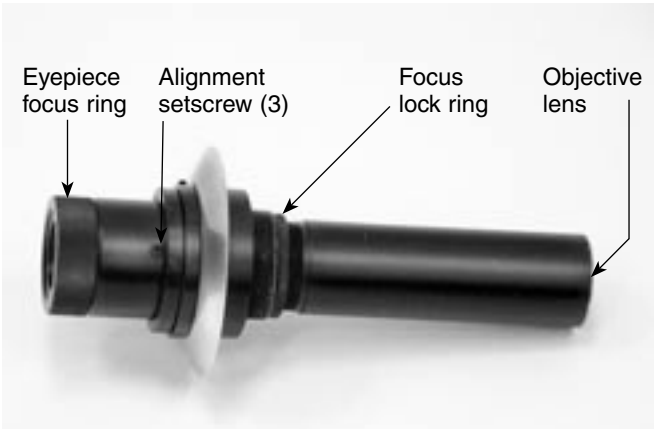


Figure 7. The polar axis finder scope.

Alignment of the Polar Axis Finder Scope

1. Loosen the Dec. lock lever and rotate the optical tube on the declination axis so that the tube is at a 90° angle to the right ascension axis (Figure 8). This provides an opening allowing a clear view through the polar axis finder scope along the R.A. axis. Tighten the Dec. lock lever.
2. Look through the polar finder at a distant object (during the day) and center it in the crosshairs. You may need to adjust the latitude adjustment L-bolts and the tripod position to do this. Focus the polar finder by rotating the eyepiece.
3. Rotate the mount 180° about the R.A. axis. It may be convenient to remove the counterweights and optical tube before doing this.
4. Look through the polar finder again. Is the object being viewed still centered on the crosshairs? If it is, then no further adjustment is necessary. If not, then look through the polar finder while rotating the mount about the R.A. axis. You will notice that the object you have previously centered moves in a circular path. Use the three alignment setscrews on the polar axis finder (Figure 7) to redirect the crosshairs of the polar finder to the apparent center of this circular path.
5. Repeat this procedure until the position that the crosshairs point to does not rotate off-center when the mount is rotated in R.A.

The polar axis finder scope is now ready to be used. When not in use, replace the plastic protective cover to prevent the polar finder from getting bumped.

Using the Polar Axis Finder Scope

The reticle of the polar axis finder scope for the Atlas EQ-G has a tiny star map printed on it that makes precise polar alignment quick and easy. To polar align the mount using the polar axis finder scope, follow these instructions:

1. Approximately polar-align the mount as outlined in the procedure above.
2. Loosen the Dec. lock lever and rotate the optical tube on the declination axis so the tube is at a 90° angle to the right ascension axis (Figure 8). Tighten the Dec. lock lever.

Figure 8. The optical tube must be at a 90° angle to the R.A. axis in order to view through the polar axis finder.

3. Focus the polar finder by rotating the eyepiece. Now, sight Polaris in the polar axis finder scope. If you have followed the approximate polar alignment procedure accurately, Polaris will probably be within the field of view. If not, move the tripod left-to-right, and adjust the latitude up-and down until Polaris is somewhere within the field of view of the polar axis finder scope.
4. The mount has a built-in illuminator that allows you to see the reticle pattern in the polar axis finder scope at night. Simply turn on the power switch on the Atlas EQ-G mount (see "Powering the Atlas EQ-G Mount") and the polar axis finder scope reticle will be illuminated. Note the constellation Cassiopeia and the Big Dipper in the reticle. They

do not appear in scale, but they indicate the general positions of Cassiopeia and the Big Dipper relative to the north celestial pole (which is indicated by the cross at the center of the reticle). Rotate the reticle so the constellations depicted match their current orientation in the sky when viewed with the naked eye. To do this, release the R.A. lock lever and rotate the main telescope around the R.A. axis until the reticle is oriented with sky. For larger optical tubes, you may need to remove the tube from the mount to prevent it from bumping into the mount. Once the reticle is correctly oriented, use the right ascension lock lever to secure the mount's position.

5. Now use the azimuth adjustment knobs (Figure 2) and the latitude adjustment L-bolts (Figure 5) on the mount to position the star Polaris inside the tiny circle marked "Polaris" on the finder's reticle. You must first loosen the knob underneath the equatorial mount on the center support shaft to use the azimuth adjustment knobs. Once Polaris is properly positioned within the reticle, you are precisely polar aligned. Retighten the knob underneath the equatorial mount.

If you do not have a clear view of Polaris from your observing site, you will not be able to use the polar-axis finder to precisely polar align the telescope.

Note: 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 right ascension and declination axes.

Additional Note Regarding Focusing the Polar Axis Finder Scope

The polar axis finder scope is normally focused by simple rotation of the eyepiece focus ring. However, if after adjusting the focus ring you find that the image of the reticle is sharp, but the stars are out of focus, then you must adjust the focus of the polar axis finder's objective lens. To do this, first remove the polar axis finder from the mount by unthreading it. Look through the polar axis finder at a star (at night) or distant object at least 1/4 mile away (during daylight). Use the eyepiece focus ring to bring the reticle into sharp focus. Now, loosen the focus lock ring (Figure 7) and thread the entire objective end of the finder inward or outward until images appear sharp. Re-tighten the focus lock ring. Once the polar axis finder's objective lens is focused, it should not need to be adjusted again.

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?

DO NOT make any adjustment to the latitude adjustment L-bolts. That will spoil 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 lever and rotate the telescope on the right ascension axis until the counterweight shaft is horizontal (parallel to the ground). Then loosen the Dec. lock lever and rotate the telescope until it is pointing straight overhead. The counterweight shaft is still horizontal. Then retighten both lock levers.

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 counterweights down as pictured in Figure 1. Again, you have to rotate the scope in right ascension so that the counterweight shaft is positioned horizontally. Then rotate the scope in declination so it points to where you want it near the horizon.

To point the telescope directly south, the counterweight shaft should again be horizontal. Then you simply rotate the scope on the declination axis until it points in the south direction.

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

Figure 9 illustrates how the telescope will look when pointed at the four cardinal directions: north (Figure 9a), south (Figure 9b), east (Figure 9c) and west (Figure 9d).

The key things to remember when pointing the telescope are that a) you only move it in right ascension and declination, 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!

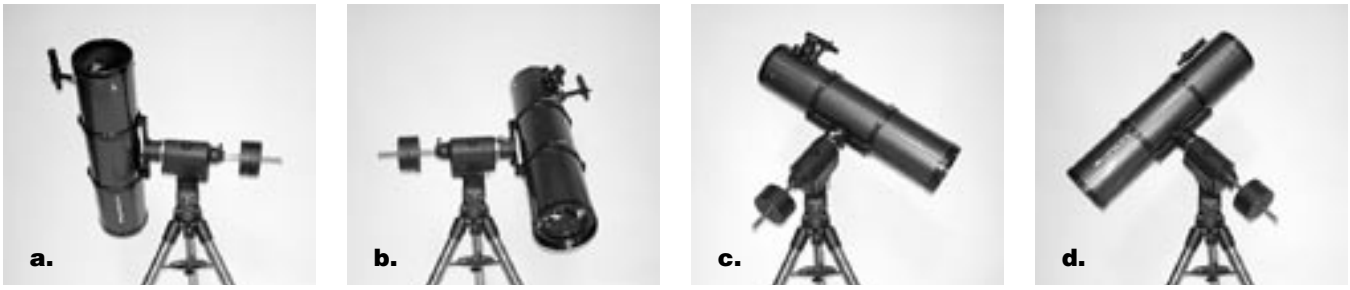


Figure 9a-d. These illustrations show the telescope pointed in the four cardinal directions. (a) north, (b) south, (c) east, (d) west. Note that the tripod and mount have not been moved; only the telescope has been moved on the its R.A. and Dec. axes.

7. The Atlas EQ-G Hand Controller

The Atlas EQ-G mount provides easy, computerized location of thousands of night sky objects such as planets, nebulae, star clusters, galaxies, and more for viewing through your telescope. The hand controller and internal dual-axis motors allow you to automatically point your telescope at a specific object, or tour the skies with push-button simplicity. The user-friendly menu allows auto-slewing to over 13,400 objects. Even inexperienced astronomers will find themselves quickly mastering the variety of features the Atlas EQ-G offers in just a few observing sessions.

Attaching the Hand Controller

The Atlas EQ-G hand controller cable has a large, serial connector (DB-9) on one end and a smaller, modular connector (RJ-45) on the other. Plug the modular connector of the hand controller cable into the hand controller (Figure 11). Push the connector into the jack until it clicks into place. Plug the serial connector into the mount (Figure 10). Use the captive screws to secure the serial connector in place. The smaller modular jack on the hand controller is used for RS-232 communications between the Atlas EQ-G and a computer equipped with astronomy software like Starry Night Pro (see "Linking with a Computer). The 12V power port on the hand controller allows independent use of the Atlas EQ-G hand controller for users who wish to browse the object database without connecting to the telescope mount.

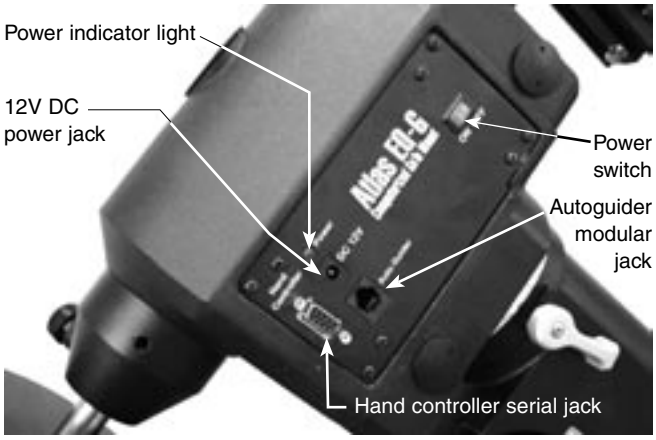


Figure 10. Atlas EQ-G mount faceplate.

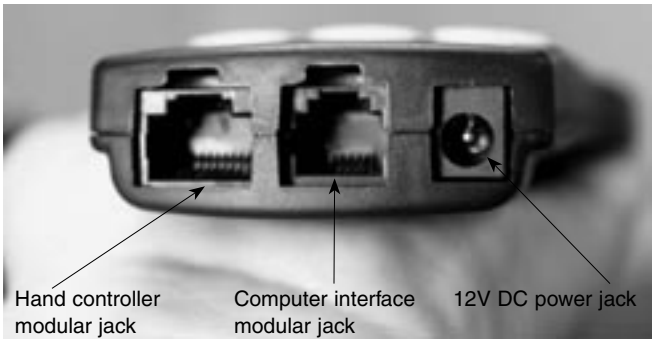


Figure 11. Hand controller jacks.

The Atlas EQ-G hand controller allows direct access to all of the motion controls of the mount and a database with a wide range of preset objects. The hand controller display is backlit for comfortable viewing at night.

The hand controller bracket included with the Atlas EQ-G attaches to the built-in notch in the tripod center support tray. To install the hand controller bracket, simply line up the tab on the back of the hand controller bracket with the notch in the tripod center support tray and slide the bracket forward until it clicks into place (Figure 12). You now have a spot to store the hand controller while you are viewing.

You can reduce the chances of getting your hand controller, power supply, or other wires tangled during use of the Atlas EQ-G by using the included wire-clip. The wire clip is adhesive backed for easy attachment to any convenient location on the mount.

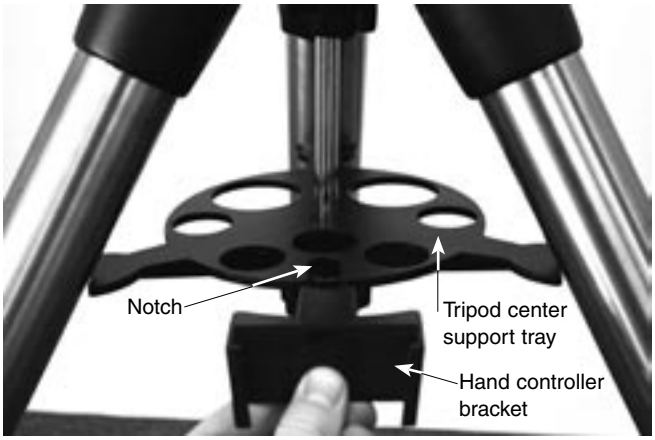


Figure 12. Installing the hand controller bracket.

Powering the Atlas EQ-G Mount

The Atlas EQ-G should be powered by a 12V DC power supply (tip positive) capable of producing continuous current with a minimum of 2 amps. We recommend using a portable rechargeable battery, like the Dynamo or Dynamo Pro available from Orion.

If you are using a portable battery like the Orion Dynamo, use the supplied 12V DC power cable (male cigarette lighter plug on one end, standard 12V DC power plug on other end) to connect the battery to the 12V DC power jack on the faceplate of the mount (Figure 10). Make sure the Dynamo's power switch is in the "on" position after connecting.

Figure 13. The Atlas EQ-G hand controller.

Functions of the Hand Controller

There are four main categories of control buttons on the hand controller (Figure 13):

1. Mode buttons
2. Directional buttons
3. Scroll buttons
4. Dual Purpose buttons

Mode Buttons

The three mode buttons are located at the top of the controller, directly below the LCD display. They include the ESC, ENTER, and SETUP buttons:

The ESC button is used to escape from a certain command or go back a level in the menu tree.

The ENTER button is used to select the functions and submenus in the menu tree, and to confirm certain functional operations.

The SETUP button is a "hot key" that takes you to the Setup menu.

Directional Buttons

The directional buttons allow the user to have complete control of the mount at almost any step in operation. These controls are locked out when the telescope is slewing to an object. The directional buttons are very helpful when initially aligning the Atlas EQ-G, centering objects in the eyepiece field of view, and manual guiding. The directional buttons are typically used in conjunction with the RATE button. The left and right directional buttons can also be used to move the text cursor when entering data on the hand controller.

Scroll Buttons

The up and down scroll buttons allow you to scroll up and down within the menu tree or selections displayed on the hand controller screen.

Dual Purpose Buttons

The dual purpose buttons serve two distinct purposes. They are used for data entry and as quick reference keys.

TOUR button: Takes you on a preset tour of the best night sky objects visible

RATE button: Changes the speed of the motors when the directional buttons are pressed. There are 10 speeds to choose from, with 0 being the slowest and 9 being the fastest.

UTILITY button: "Hot Key" access to the Utility Functions menu.

USER button: Enter or recall coordinates for up to 25 objects in the user-defined database.

ID button: Identifies the object the mount is currently pointing to.

NGC, IC, M, Planet, and Object buttons: Allow direct access to catalogs and databases of over 13,400 objects.

Hand Controller Operation

Initial Setup

1. Perform the polar alignment using the procedure previously outlined in Section 6. A rough polar alignment will suffice, but an accurate polar alignment using the polar axis finder scope will increase tracking accuracy (and pointing accuracy for one-star alignments).
2. Point the telescope you have mounted on the Atlas EQ-G roughly to the North Celestial Pole (or Polaris) if you are in the Northern Hemisphere. Point to the South Celestial Pole if viewing in the Southern Hemisphere. Make sure the counterweight shaft is pointed down as seen in Figure 1. This will be the home position of the telescope.
3. Turn on the power switch on the mount
4. The initial screen displayed on the hand controller is the version screen. Press ENTER to proceed.
5. The words "Begin Alignment?" will display on the hand controller screen. Press ENTER to proceed to the alignment procedure. (At any point, you can press ESC to exit to the main menu).

Note: The hand control's backlit display will become more dim and the illuminated buttons will turn off if left idle for 30 seconds. Pressing any button will re-illuminate the display.

6. Enter the telescope's current latitudinal and longitudinal position using the numeric keypad and scroll buttons. First enter the longitudinal coordinate and hemisphere (W or E), followed by the latitudinal coordinate and hemisphere (N or S). If

you do not know the latitude and longitude coordinate of your viewing location, consult an atlas or geographical map of your area. Press ENTER to confirm your coordinates.

Note: Latitude and longitude coordinates must be entered in degrees and arcminutes. If your map or atlas gives coordinates in decimal values (i.e. latitude = 36.95 N) you must convert into degrees and arcminutes (i.e. latitude 36.95 N = latitude 36°57' N).

7. Enter the time zone in which you are observing in hours (see Appendix D), using the scroll keys and numeric keypad (+ for east of Prime Meridian, - for west of Prime Meridian). Press ENTER to confirm your choice.
8. Enter the date in the following format mm/dd/yyyy using the numeric keypad. Press ENTER to confirm your choice.
9. Enter your current local time using the 24 hour time mode (example: 2:00PM = 14:00). Press ENTER to view the time you entered. If the time is incorrect, press ESC to go back to the previous screen. If the time is correct, press ENTER again to proceed to the next step.
10. Press ENTER if you are currently on Daylight Savings time. Use the scroll button to scroll down to "NO" and press ENTER if you are not on Daylight Savings Time.

The Atlas EQ-G is now ready to begin the alignment procedure.

Note: if a mistake was entered into the Atlas EQ-G hand control during the initial setup, press the ESC key to go back to the previous menu.

Aligning the Atlas EQ-G

In order for the Atlas EQ-G to accurately locate and point to objects in the sky, it must first be aligned on known positions (stars) in the sky. With the supplied information, the mount can replicate a model of the sky and the movements of astronomical objects.

There are three ways to align the Atlas EQ-G depending on your demand for accuracy. If you are using the Atlas EQ-G for the first time, we recommend you begin with the three-star alignment. In most cases, a three star alignment produces the most accurate alignment among the three methods. The description below will lead you through a step-by-step procedure on how to perform the three-star alignment.

Note: Before performing any of the alignment methods, be sure that your finderscope is well aligned with the telescope tube.

Three-Star Alignment

1. Access the alignment screen and select "3-Star Align" using the scroll buttons. Press ENTER to confirm your choice.
2. The Atlas EQ-G will provide a list of stars available in your current sky for you to choose as the first alignment star. Choose a star you are familiar with using the scroll buttons. Press ENTER to confirm your choice. The Atlas EQ-G will start slewing the telescope towards the chosen object. When the telescope stops slewing, adjust its position using the the directional buttons until the chosen star is centered in the crosshairs of the finderscope. Now look in the eyepiece and adjust the position of the telescope (using the directional buttons) so that the chosen star is centered in the field of view of the eyepiece. Press ENTER to confirm the star is centered.

Note: The slewing speed can be adjusted by pressing the RATE button. Choose a desired rate between 0 (slowest) and 9 (fastest).

Note: The Atlas EQ-G will make a "beep" sound once it has finished slewing to an object. Do not try to adjust the telescope before you hear the "beep" sound. The Atlas EQ-G will only respond to the ESC button while slewing (which stops the slewing).

3. The Atlas EQ-G will provide a list of stars that can be used as the second alignment star. Choose a star using the scroll buttons and press ENTER to confirm your choice. Repeat the centering procedure for the second alignment star using the directional buttons and press ENTER to confirm alignment.
4. The Atlas EQ-G will once again provide a list of stars that can be used as the third alignment star. Choose a star using the scroll buttons and press ENTER to confirm your choice. Once again, repeat the centering procedure for the third alignment star and press ENTER to confirm alignment.
5. Once the three alignment stars have been entered and alignment is completed, the hand controller will display "Alignment Successful."

Two-Star Alignment

Two-star alignment requires only two alignment stars but may produce lesser pointing accuracy than the three-star alignment. The description below will lead you on a step-by-step procedure on how to perform the two-star alignment.

1. Access the alignment screen and select "2-Star Align" using the scroll buttons. Press ENTER to confirm your choice.
2. The Atlas EQ-G will provide a list of stars available in your current sky for you to choose as the first alignment star. Using the scroll buttons, choose a star you are familiar with and press ENTER to confirm your choice. The Atlas EQ-G will start slewing the telescope towards the chosen star. When the telescope stops slewing, adjust its position with the directional buttons until the star is centered in the crosshairs of the finderscope. Now look in the eyepiece and adjust the position of the telescope (using the directional buttons) so that the chosen star is centered in the field of view of the eyepiece. Press ENTER to confirm the star is centered.
3. The Atlas EQ-G will provide a list of stars that can be used as the second alignment star. Choose a star using the scroll buttons and press ENTER to confirm your choice. Repeat the centering procedure for the second alignment star and press ENTER to confirm alignment.

4. Once the two alignment stars have been entered and alignment is complete, the hand controller will display "Alignment Successful".

One-Star Alignment

One-star alignment is the simplest and quickest alignment method, as only one alignment star is required. Due to minimal data input, however, a one-star alignment will not yield optimal results unless polar alignment is very accurate, and any cone error is minimized (see Appendix A). The description below will lead you on a step-by-step procedure on how to perform the one-star alignment.

1. Access the alignment screen and select "1-Star Align" using the scroll buttons. Press ENTER to confirm your choice.
2. The Atlas EQ-G will provide a list of stars available in your current sky for you to choose as the first alignment star. Using the scroll buttons, choose a star you are familiar with and press ENTER to confirm your choice. The Atlas EQ-G will start slewing the telescope towards the chosen star. When the telescope stops slewing, adjust its position with the directional buttons until the star is centered in the crosshairs of the finderscope. Now look in the eyepiece and adjust the position of the telescope (using the directional buttons) so that the chosen star is centered in the field of view of the eyepiece. Press ENTER to confirm the star is centered.
3. Once the alignment star has been entered and alignment is complete, the hand controller will display "Alignment Successful".

Object Catalog

The Atlas EQ-G boasts a vast database of over 13,400 object coordinates and information. The database contains the following catalogs:

Solar System: The other 8 planets of our solar system, and our planets' Moon.

Named Star: A list of 100 popular known stars

NGC: 7,840 of the brightest deep sky objects from the Revised New General Catalog.

IC: 5,386 of standard stars and deep sky objects from the Index Catalog.

Messier: Complete list of all 110 Messier objects

Others: You can also scroll through lists of the celestial objects organized by object type instead of catalog designation. These type-specific catalogs include: Single Stars, Double Stars, Globular Clusters, Uncertain Stars, Galaxies, Clusters & Nebulae, Reflection Nebulae, Planetary Nebulae, Open Star Clusters and User Defined (see "Using the User Defined Database").

Selecting an Object

Once the telescope has been aligned, you can access and view the 13,400 different objects in the Atlas EQ-G database. There are three methods of selecting a celestial object to view:

1. SHORTCUT BUTTONS

TOUR: Takes you on a preset tour across the night sky. The brightest and most beautiful deep-sky objects will automatically be chosen by the Atlas EQ-G for your viewing pleasure. Use the scroll buttons to view the different deep-sky objects that are available for viewing through the tour function. Choose the desired object by pressing ENTER. The hand controller will display the coordinate of the chosen object. Press ENTER once more to have the telescope slew to the object.

M, NGC, IC: These shortcut buttons give you access to the most popular celestial catalogs. Each catalog has a set number of objects to choose from. Use the numeric buttons to select an object by entering its number. Pressing ENTER will display its coordinate. Primary information such as size, magnitude, and constellation are obtained by pressing the scroll buttons. Press ENTER once more to have the telescope slew to the chosen object.

PLANET: This shortcut button takes you straight to the Planets submenu in the Atlas EQ-G database. Use the scroll buttons to scroll through the list of planets in our solar system. Press ENTER to display the chosen planet's coordinates, and press ENTER once more to have the telescope slew to the planet. If the planet you have chosen is currently below the horizon, the hand controller will prompt you to make another choice.

USER: This shortcut button will take you to the database that you have defined for yourself. You can enter a new location or recall the objects that have been previously saved (see "Using the User Defined Database").

2. OBJECT BUTTON

You can choose to locate and slew to objects within a specific object-type catalog. The OBJECT button takes you to the Objects Catalog, where you have complete access to over 13,400 celestial objects in the database, categorized by object type. Simply scroll through the object-type categories using the scroll buttons and choose the category of object you want to view. Press ENTER to confirm your choice. Use the scroll buttons to choose an individual object within the category and press ENTER a second time to display the object's coordinate. Press ENTER once more to have the telescope slew to the chosen object.

3. MENU

You can also access the Objects Catalog through the Main Menu. In the Main Menu, scroll down to Object Catalog and press ENTER. Like the OBJECT key, this gives you complete access to the 13,400 celestial objects in the Atlas EQ-G database, categorized by object type.

Other Functions

The Atlas EQ-G hand controller is equipped with a variety of additional functions that allow you to optimize performance and access other features of the system.

Utility Functions

Utility Functions are useful tools that provide simple, one-step processes to your Atlas EQ-G.

Show Position: This function displays the coordinates (Right Ascension and Declination) of the location where the telescope mounted on the Atlas EQ-G is currently pointing.

Display Time: This function displays the local time and local Sidereal time.

Park Scope: This function moves the telescope to the Home position. This allows you to power off the Atlas EQ-G while saving PEC training data (See Appendix B).

RS-232 Mode: This allows linking with a computer. (See "Linking with a Computer").

PEC Training: See appendix B for information

Setup Functions

The Setup functions allow you to change any system variable or information regarding location, time, date, and alignment configurations. To access the Setup Functions, either press the SETUP button on the hand controller or scroll to SETUP MODE under the menu option using the scroll keys. The different types of functions available to you are listed below, along with their respective purposes.

Date: Allows you to change the date entered at the initial setup.

Time: Allows you to change the current time.

Observing site: Allows you to change the current location setting.

Daylight Savings: Allows you to change the Daylight Savings option.

Alignment: Allows you to re-perform the star alignment, (see "Alignment").

Set Backlash: This function allows you to insert a value for each axis to compensate for slewing backlash experienced on that axis. Backlash is a delay in motorized motion of the mount due to slack between gears. Backlash is experienced when the slewing direction is reversed on one or both axes of motion. For improved pointing accuracy, it is important the backlash value is set to be equal or greater than the actual amount of backlash between the gears. If the actual amount of backlash is unknown, we recommend that you set the value to 5000 (approximately equivalent to 0.2°). First set the value for R.A. backlash, then press ENTER to set the value for DEC.

Note: Backlash compensation is only active for computerized slewing, not for manual slewing with the directional buttons.

Set Tracking:

-Sid. Rate: Activates tracking at sidereal rate This is the default tracking rate.

-Lunar Rate: Activates tracking at lunar rate.

-Solar Rate: Activates tracking at solar rate.

-PEC + Sidereal Rate: Activates sidereal rate tracking with Periodic Error Compensation.

-Stop Tracking: Stops tracking.

Auto Guide Speed: When using an autoguider, this sets the guiding speed to 1.25X, 1.5X, 1.75X, or 2X sidereal rate.

Using the User-Defined Database

The Atlas EQ-G allows you to save up to 25 objects in the User Defined Database. You can save unidentifiable objects, current comet and/or asteroid positions, or make a custom list of your favorite objects to view.

Saving an Object to the Database

1. Press the USER button or select USER DEFINED under the object catalog menu. Press ENTER.
2. Choose INPUT COORDINATE and press ENTER.
3. You can enter the chosen object's location by its R.A. and DEC coordinates, or telescope altitude and azimuth coordinates. Press 1 (R.A. and DEC) or 2 (Altitude and Azimuth) to make your selection. The default setting of the Atlas EQ-G will display the R.A./DEC or Alt/Az coordinates the telescope is currently pinted to. Change the coordinates using the numeric buttons and scroll buttons. Press ENTER to save the chosen setting.
4. The Atlas EQ-G will prompt you to choose a number between 1 to 25 for your chosen object. Press ENTER again, then select the number you wish to represent the object, using the scroll buttons. Press ENTER to confirm.
5. The hand controller will now display "View Object?". Press ENTER to slew the telescope to the object. Press ESC to exit.

Selecting a User-Defined Object

1. Press the USER button or select USER DEFINED under the object catalog. Press ENTER.
2. Choose RECALL OBJECT and press ENTER to confirm.
3. Select the number representing the object you wish to view, using the scroll buttons. Press ENTER to display the object's coordinate. Press ENTER once more to choose the object.
4. The Atlas EQ-G will display "View Object?". Press ENTER to slew the telescope to the coordinate. Press ESC to exit.

Identifying an Unknown Object

The Atlas EQ-G has the ability to identify celestial objects that are unknown to you. To identify an object that the telescope is centered on, simply press the ID key or scroll to IDENTIFY in the main menu and press ENTER to identify the object.

If the object is truly unknown (i.e. not listed in the Atlas EQ-G database), the hand controller will take you back to the IDENTIFY menu. Press ESC to exit this function.

Linking with a Computer

The Atlas EQ-G can be connected to a computer via the supplied computer interface cable. Many commercially available planetarium softwares can utilize this function and be used to control the Atlas EQ-G. Look for software that is compatible with the Celestron NexStar5, like Starry Night Pro. The description below will lead you through the procedure on how to connect and disconnect the Atlas EQ-G to a computer.

1. Align the mount as described previously (see "Aligning the Atlas EQ-G").
2. Connect the supplied computer interface cable to the smaller modular jack (RJ-11) on the hand controller (Figure 11). Connect the other end of the cable to the COM port of your computer.
3. Select RS-232 under the UTILITIES menu on the Atlas EQ-G hand controller. Press ENTER.
4. In the planetarium software of your choice, choose "Celestron NexStar5" in the driver setup and follow the instructions provided by the program to connect the mount and computer. The Atlas EQ-G will be under the full control of your computer once the connection is successfully established.

Disconnecting from the Computer

1. Follow the instructions provided by the planetarium software to close the connection to the mount.
2. On the Atlas EQ-G hand controller, press ESC to resume normal hand control operations.

Note: Do NOT disengage the Atlas EQ-G unit before you close the connection in the planetarium program. Doing so may cause some programs to freeze.

Note: See Appendix C for more information on computer interfacing.

Auto Guiding

For astronomical imaging, the Atlas EQ-G has a designated autoguider interface (Figure 10). The pin-outs on the 6 pin modular connector are SBIG compatible and can be used with most autoguiders available. Refer to Figure 15 when connecting the autoguider cable to the Atlas EQ-G and calibrating the autoguider. Guiding speed can be adjusted using the Auto Guide Speed function in the Setup Menu.

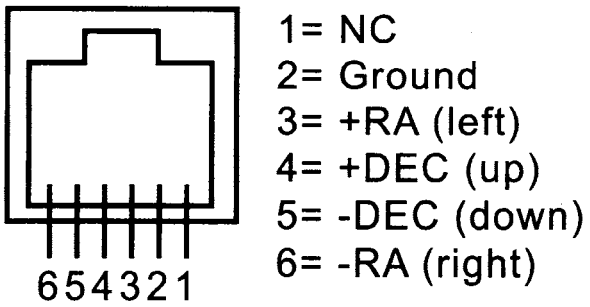
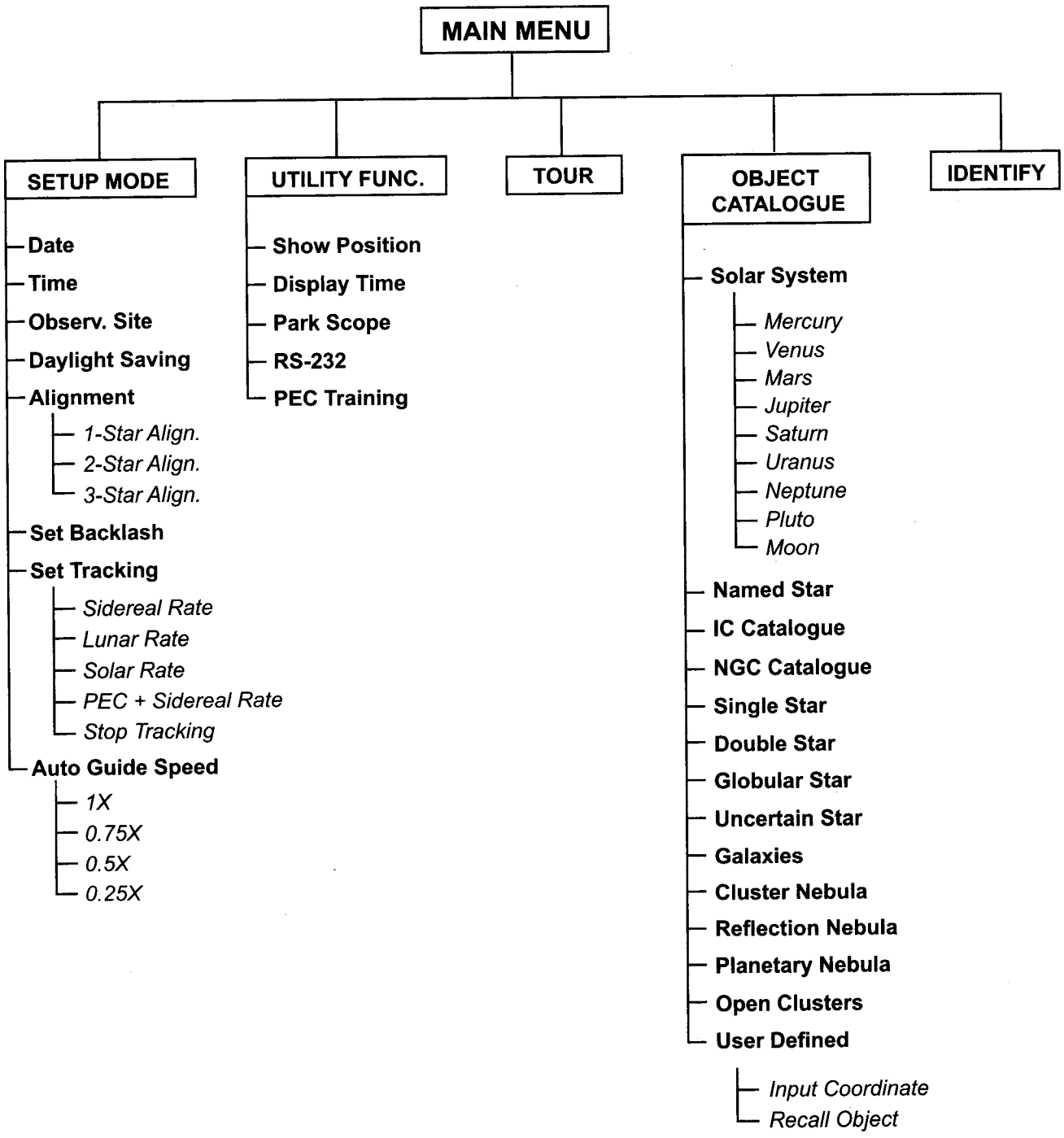


Figure 15. Pin diagram for the Atlas EQ-G autoguider jack.

Atlas EQ-G Menu Tree



8. Technical Specifications

Mount:	German equatorial
Tripod:	Steel
Weight:	54 lbs.
Counterweights:	Quantity 2, 11 lbs. each
Polar axis latitude adjustment:	10° to 65°
Polar axis finder scope:	Included, illuminator built into mount
Motor drives:	Dual-axis, GoTo computerized, internally housed
Operation: Southern hemisphere	Northern or
Autoguiding rates:	1.25X / 1.5X / 1.75X / 2X sidereal rate
Power requirrement:	12V DC, 2A (tip positive)
Motor type and resolution:	Microstep driven 1.8° stepper motors
Resolution:	0.144 arc sec (or 9,024,000 steps/rev)
Slew speeds:	Rate 0 = 1.5X
	Rate 1 = 2X
	Rate 2 = 8X
	Rate 3 = 16X
	Rate 4 = 32X
	Rate 5 = 64X
	Rate 6 = 400X
	Rate 7 = 500X
	Rate 8 = 600X
	Rate 9 = 800X (3.4°/sec)
Gear ratio:	705
Tracking rates:	Sidereal (default) lunar, solar, PEC + sidereal.
Tracking modes:	R.A. tracking
Alignment method:	One-star alignment, two-star alignment, three-star alignment
Database:	25 user-defined objects, complete M, NGC. and IC catalogs, total 13,436 objects.
Pointing accuracy:	Up to 1 arcminute with cone error calibration, up to 15 arcminutes without cone error calibration

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device nay not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes of modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will no occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *-Reorient or relocate the receiving antenna.*
- *-Increase the separation between the equipment and receiver.*
- *-Connect the equipment into an output on a circuit different from that to which the receiver in connected.*
- *-Consult the dealer or an experienced radio/TV technician for help.*

A shielded cable must be used when connecting a peripheral to the serial ports.

Appendix A: Enhancing the Precision

The Atlas EQ-G produces pointing accuracy and tracking accuracy adequate for most applications. If higher

precision is required, "cone" error calibration may be necessary.

Cone Error Calibration

"Cone" error is a common inaccuracy found on all German equatorial mount designs. Cone error results from the optical axis of the telescope not being aligned to the R.A. axis of the mount. This affects the pointing accuracy of the Atlas EQ-G. Three-star alignment automatically compensates for some of the "cone" error, but pointing accuracy will be optimized by mechanically minimizing the "cone" error. The following calibration procedure should be performed before the initial use of the telescope and periodically thereafter to ensure peak accuracy.

Testing for Cone Error

This test is performed at night using two bright stars located on opposite hemispheres of the night sky. Confirm that the

telescope is properly polar-aligned using the polar axis finder scope. Perform the one-star alignment using an eastern star as the alignment star (see "One-Star Alignment"). After completing the star alignment, choose a bright star in the western sky from the Atlas EQ-G object database and press ENTER to slew the telescope to the star. If the optical axis is perfectly aligned to the R.A. axis, the telescope will accurately put the star in the center of the eyepiece. This shows that there is no "cone" error in your telescope setup and you will not need to perform the calibration. It is acceptable if the star is slightly off-center as long as it appears in the eyepiece field of view and reasonable close to the center. Many factors determine the pointing accuracy of the Atlas EQ-G. Incorrect star alignment, loose R.A. or Dec. lock-knobs, or "cone" error. If the Atlas EQ-G puts the star outside the eyepiece field of view, you need to determine which of these factors is causing the pointing inaccuracy. To determine if the inaccuracy is caused by "cone" error, simply move the telescope about the R.A. axis by pressing the Left or Right direction button. If the star can be moved into the eyepiece field of view without adjusting the Dec. axis, it is likely that "cone" error exists in your telescope setup.

Calibration Procedure

1. Insert an illuminated reticle eyepiece (not supplied) into the focuser (or diagonal) of the telescope. Confirm the telescope is properly set up and balanced, and the finderscope is aligned with the optical tube of the telescope.

Note: Steps 2 to 4 are to identify R.A. and DEC movements in the reticle eyepiece. If you are already familiar with the movements, proceed to step 5.

2. Find a bright star and position the telescope so the star is centered in the eyepiece field of view.
3. Look into the eyepiece. Move the telescope about the R.A. axis using the R.A. direction buttons on the hand controller while carefully observing the movement of the star.
4. Keep moving the telescope about the R.A. axis back and forth to keep the star within the eyepiece field of view. Rotate the eyepiece in the focuser (or diagonal) until the movement of the star becomes parallel to one of the illuminated crosshairs (Figure 16). This crosshair will represent R.A. movement in the course of this procedure, and the perpendicular crosshair will represent Dec. movement. Tighten the set screws to secure the eyepiece in position. Make sure the eyepiece will remain stationary while the telescope is moved.

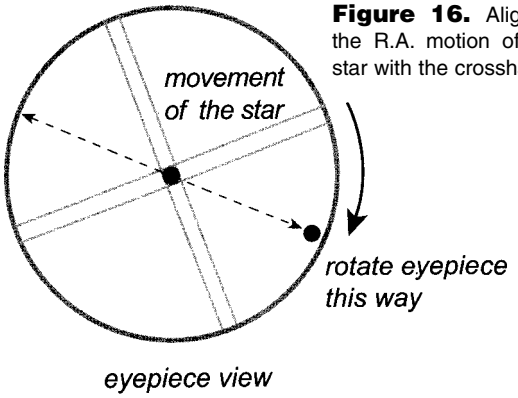


Figure 16. Aligning the R.A. motion of the star with the crosshairs.

5. Point the telescope North and set the latitude scale to your local latitude using the altitude adjustment L-bolts. Alternatively, place Polaris in the polar axis finder scope if your polar axis finder scope is accurately aligned with the mount.
6. Loosen the R.A. lock knob and rotate the telescope about the R.A. axis until the counterweight shaft is parallel to the ground (as shown in Figure 18a).
7. Using the Dec. direction button on the hand controller, adjust the telescope in Dec. so Polaris lies on the R.A. crosshairs of the illuminated reticle eyepiece (Figure 17).

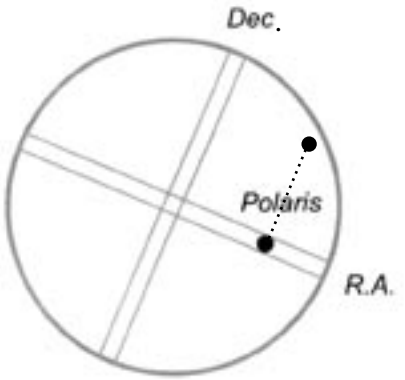


Figure 17. Adjust the telescope in Dec. (with the hand controller) to place the star on the R.A. crosshair.

8. Without moving the R.A. axis, adjust the azimuth control knobs (Figure 2) to orient Polaris in the center of the eyepiece field of view. Adjustment in Dec. axis using the hand controller may be necessary.
9. Loosen the R.A. lock knob and carefully rotate the telescope 180° about the R.A. axis (Figure 18a &18b) This should be done as accurately as possible referencing the R.A. mechanical setting circle.
10. Adjust the position of the telescope in the Dec. axis so Polaris lies on the R.A. crosshairs of the illuminated reticle eyepiece (Figure 17).
11. Carefully push the telescope in horizontal motion while observing the movement of Polaris in the eyepiece field of view (Figure 19). This will determine which direction (left or right) moves Polaris closer to the center of the eyepiece field of view.
12. Carefully and gently loosen both the tube ring attachment screws (Figure 3) by a couple of turns.
13. Make adjustments to the optical axis offset adjustment screws (the socket head cap screws located at each corner of the mounting plate, (Figure 3) according to the results of step 11. If Polaris moves toward the center when the telescope is pushed as indicated in Figure 19, loosen the adjustment screws near the front of the tube and tighten the adjustment screws closer to the back of the tube (Figure 20a). If Polaris moves away from the center when the telescope is pushed as in Figure 19, loosen the adjustment screws near the back of the tube and tighten the adjust-

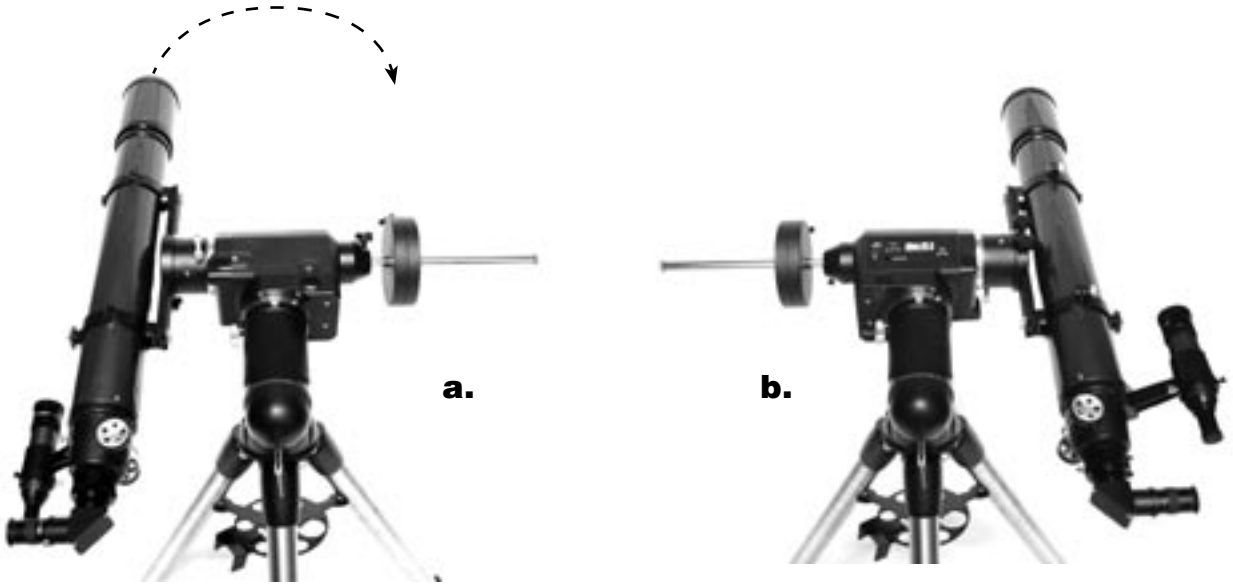


Figure 18a-b. Rotate the telescope 180° about the R.A.axis.

Figure 19. gently push the telescope horizontally to determine direction of optical axis offset.

ment screws closer to the front of the tube (Figure 20b). Look into the eyepiece. Adjust the adjustment screws just enough to place Polaris HALF the distance back to the center of the illuminated reticle eyepiece (Figure 21).

14. Repeat steps 7 to 12 until Polaris remains in the center of the eyepiece field of view, or moves slightly around the center, when the mount is rotated about the R.A. axis.

Note: This calibration method can be applied to both refracting and reflecting telescope designs. Differences in the optical path of telescopes do not affect how the telescope tube and tube rings should be adjusted on the mounting plate.

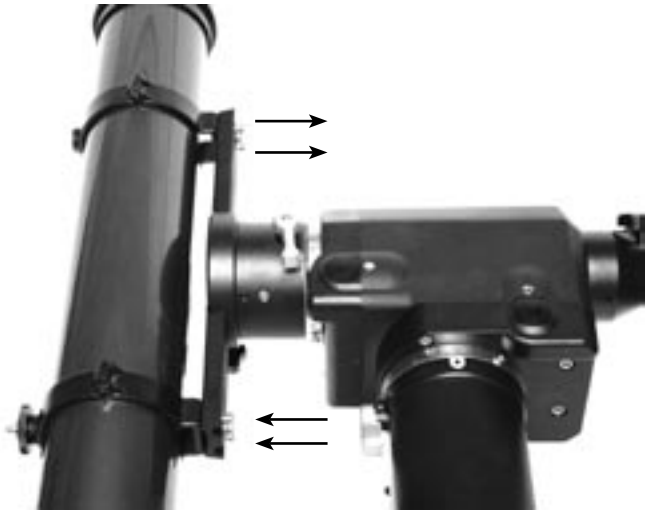


Figure 20a. Adjust the optical axis offset screws this way if Polaris moves toward the center of the eyepiece when the tube is pushed as in Figure 19.

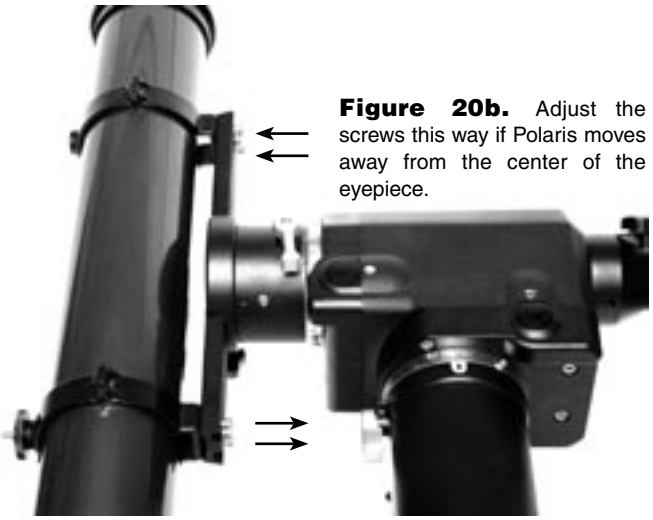


Figure 20b. Adjust the screws this way if Polaris moves away from the center of the eyepiece.

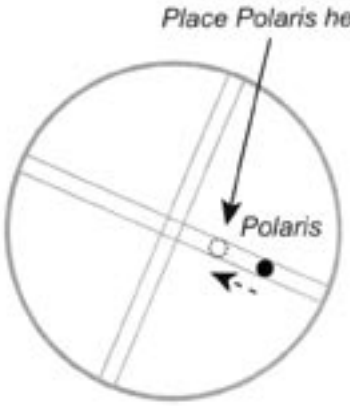


Figure 21. Using the optical axis offset screws move Polaris halfway to the eyepiece's center.

Appendix B: Periodic Error Correction (PEC)

(Requires an illuminated reticle eyepiece capable of producing at least 300X magnification when used with your telescope. For best results, the true field of view should not exceed 10 arcminutes.)

Periodic errors are inherent in almost all worm gears due to slight eccentricities and misalignments. The PEC (Periodic Error Correction) Training function provides a manual correcting method to reduce the amplitude of the worm gear errors. By recording a full cycle of guiding actions, the Atlas EQ-G can compensate for drifting in the R.A. sidereal tracking caused by periodic errors. The description below will lead you on a step-by-step procedure for performing the PEC.

Note: The PEC training function is recommended for advanced users with interest in long-exposure astrophotography only. Careful guiding is required. Standard sidereal tracking is sufficient for all casual visual applications of the Atlas EQ-G, and PEC training is not required.

PEC Training

1. Perform an accurate Polar alignment using the polar axis finder scope.
2. Manually point or electronically slew the telescope mounted on the Atlas EQ-G to a star with a small value DEC coordinate (DEC between +10° and –10°). This object will be used as the guide star.
3. Activate "Sidereal Tracking" from the Setup menu (see "Setup Functions"). Once tracking has initiated, press ESC to return to the Setup menu.
4. Rotate the reticle eyepiece in the focuser (or diagonal) until the R.A. movement of the star becomes parallel to (matches) one of the illuminated crosshairs
5. Move the guide star designated in step 2 to the center of the eyepiece field of view using the direction buttons.
6. On the hand controller, select PEC Training in the Utility Functions and press ENTER.

Note: Utility Functions can be accessed by pressing the UTILITY quick rererence button on the hand controller.

7. Select the R.A. guide speed for the PEC Training. You have two guide speed choices: 1) 0.25X and 2) 0.5X. Press the numeric button 1 to choose a guide speed of 0.25X or press 2 to choose a guide speed of 0.5X.
8. The Atlas EQ-G hand controller will display the current time once the guide speed has been selected, indicating the recording has begun.
9. Using the left or right direction button only, move the telescope so the guide star remains centered in the eyepiece field of view (Figure 22). Repeat as necessary.

The Atlas EQ-G hand controller will record the manual guiding actions for 8 minutes in order to characterize the periodic errors. Pressing ESC will immediately stop the recording and exit from the PEC Training function.

Note: Guiding actions are recorded even when the PEC training is stopped midway. The PEC + sidereal tracking will not be accurate until a full cycle of the PEC Training is performed.

Figure 22. Drifting caused by periodic error.

The Atlas EQ-G will emit a “beep” sound and display “Record completed” when the training time is up. Press any button to exit from the PEC Training upon completion.

Play Back the PEC Record

PEC tracking can be activated under the Setup menu or by pressing the Setup quick reference button when needed. In the Setup menu, choose “Set Tracking”, then “PEC + Sidereal”. The Atlas EQ-G will play back the corrections you made during the PEC training cycle and start tracking with periodic error compensated.

Note: The Atlas EQ-G will continue to track in the PEC + sidereal mode until another tracking mode is selected. If the power is turned off while the Atlas EQ-G is in the PEC + sidereal mode, the hand controller loses synchronization with the R.A. worm gear and the PEC training will have to be repeated when the power is turned back on. To avoid this, be sure to return the telescope to its home position by selecting “Park Scope” under “Utility Functions” before turning off the power.

Appendix C: RS-232 Connection

The Atlas EQ-G hand controller must be set to RS-232 mode in order to establish an interface connection with a PC. Under the UTILITIES menu, select RS232 and press ENTER to initiate the computer interface mode. The Atlas EQ-G will now communicate with the PC at a rate of 9600 bits/sec, no parity and stop bit. All angles are communicated with 16 bit numbers.

Initialization

1. PC sends one byte (63 = ASCII “?”) to check wheteher the Atlas EQ-G is ready.
2. The Atlas EQ-G responds with one byte (35 = ASCII “#”) when the Atlas EQ-G is ready to respond.

Note: All INITIALIZATION steps are recommended but not necessary

GoTo R.A.-DEC positions

1. NITIALIZATION
2. PC sends (82 = ASCII “R”)
3. PC sends the R.A. high byte, R.A. low byte, DEC high byte, DEC low byte.
4. When the scope is finished slewing, it will display a “@” on the hand controller.

GoTo Alt-Az positions

1. INITIALIZATION
2. PC sends (65 = ASCII “A”)
3. PC sends the Azm high byte, Azm low byte, Alt high byte, Alt low byte.
4. When the scope is finished slewing, it will display a “@” on the hand controller.

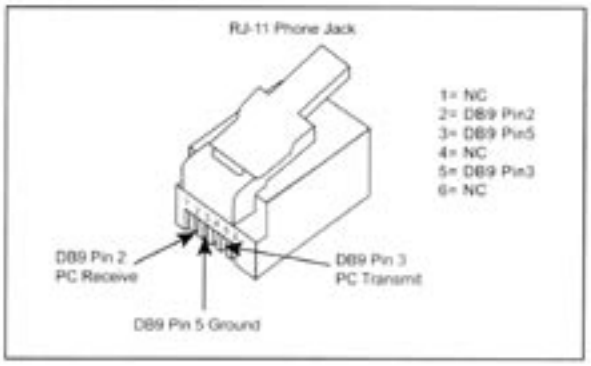
Get R.A.-DEC positions

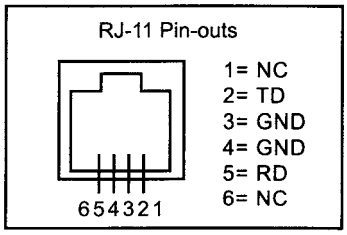
1. INITIALIZATION
2. PC sends (69 = ASCII “E”)
3. The Atlas EQ-G sends the R.A. high byte, R.A. low byte, DEC high byte, DEC low byte.

Get Alt-Az positions

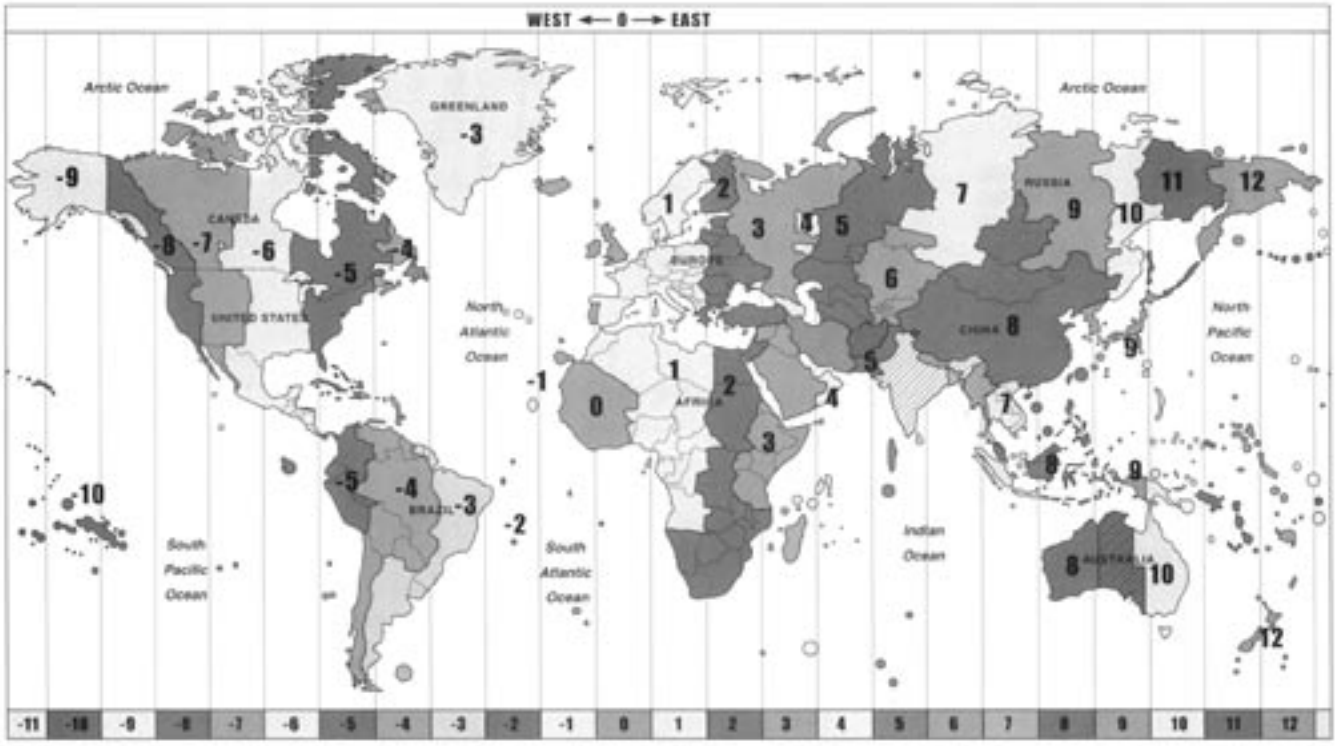
1. INITIALIZATION
2. PC sends (90 = ASCII “Z”)
3. The Atlas EQ-G sends the Azm high byte, Azm low byte, Alt high byte, Alt low byte.

Physical Connection Diagram





Appendix D: Standard Time Zones of the World



One-Year Limited Warranty

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

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

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