WARNING

Viewing the sun without proper equipment can cause permanent blindness.

RB-10

Owner's Manual

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Introduction

The Reverse Binocular (RB) telescope system is an innovative dual-telescope binocular system in a single transportable package. It is covered by U.S. Patents No. D499,436 and 6,297,917.

We make every effort to ensure that each RB-10 is built to the highest quality standards. We hope that your new telescope gives you many thousands of hours of enjoyment, and that your pleasure in this precision instrument matches the pride we take in our work.

Checking for Shipping Damage

In an effort to reduce in-transit damage, each RB is shipped with a shock detection device, called a Shockwatch™, attached to the outside of the crate. If the shock indicator has turned red this shows that the crate has been handled more roughly than we would like. In that case, make a notation on the delivery document (with the signature of the delivery person if possible) then contact JMI directly as soon as possible.

Getting Started

We want you to begin enjoying your RB-10 as soon as possible. However you should first carefully read the instructions in "Assembling the RB-10." The binocular is designed to be easily disassembled, transported and reassembled to let you take advantage of the dark skies away from city lights as well as celestial phenomena not visible from your home base. Once you are familiar with the steps, assembly can take less than ten minutes.

Warning

Sunlight magnified through the RB-10 can cause instantaneous and permanent blindness, severe burns or fire. Keep the aperture covers in place when the RB is not in use.

Collimation

Each RB-10 is collimated before shipment and should require only minor adjustment from time-to-time. As with all Newtonians, some minor collimation adjustments will need to be made from time to time (see page 17). If you make a collimation adjustment you will need to realign the two tubes by using the convergence motors (see pages 12 and 13). <u>If the two optical systems are not collimated properly, it may be difficult to converge the two images into one.</u>

Optional Accessories

The following accessories extend the capabilities of your RB-10. They can be ordered at any time, and you will find them easy to use or install.

Handlebar and Wheels
For wheelbarrow-style transportation, use our optional Handlebar and Wheels to easily move the fully assembled binocular telescope over smooth surfaces. It uses 5" solid-rubber, or 10" pneumatic, ball-bearing wheels.

NGC-microMAX Computer with 245 Object Database
A small, lightweight unit with an eight-character red LED display that provides a real-time display of the telescope's Right Ascension and Declination. A guide feature assists the user in locating any of the 245 objects in its database, including 90 stars, the entire Messier catalog and 28 user-definable objects.

NGC-MAX Computer with 12,000+ Object Database
In addition to the Sun and planets, the NGC-MAX database contains nearly a thousand stars, the entire NGC catalog, and most of the IC catalog. A polar align feature greatly eases the task of polar aligning the telescope. An identification feature will search the internal database for the object nearest the telescope's current pointing position, assisting with identification of unfamiliar objects or suggesting possible new targets. A serial port allows a personal computer to obtain information about the telescope's current position—useful for applications such as Software Bisque's THESKY™.

NGC-superMAX Computer with 29,000+ Object Database
The NGC-superMAX (Argo Navis) operates basically the same as the other MAX computers but with more modes and user-adjustable parameters. It includes the following modes: Align, Align Star, Az Alt, Catalog, Encoder, Fix Alt Ref, Identify, RA Dec, Setup, Sidereal, Status, Time, Timer and Tour. There are over 29,000 objects including about 1,100 which are user-definable. The LCD display has a heater option for very cold weather. Free software and database upgrades are available as a download from the internet. The system includes a free computer mounting bracket. See www.wildcard-innovations.com.au for more information from the manufacturer.

SGT-MAX Software Guided Telescope System with Desktop Planetarium Software
This IBM PC compatible software beautifully represents the night sky on your computer screen, showing the position of the telescope and guiding you to any object. It provides extremely detailed information on each object, shows common names of objects, and allows you to toggle constellation lines on or off. The SGT-MAX plots current planetary positions, can zoom from 235° to one arc-minute fields of view, and is completely mouse-driveable. The software is available in assorted database sizes.

Specifications

Feature	Description
Type	Dual Newtonian reflectors
Mount	Alt-Az mount on a Pier
Mirrors	10" f/4.7 primary mirrors, 2.5" diagonal secondary mirrors
Focusers	Modified RCF-1 with motor
Eyepieces	30mm wide angle
Clearance Between Optical Tubes	9"
Eyepiece Spacing	Variable from 2" to 3.25"
Optical Alignment	Motorized x and y axis for optical tube alignment
Finder	Star Pointer
Power	6 volts DC 4.5 amp-hour battery with 110vAC/60Hz charger (Optional 220vAC/50Hz charger available)
Binocular Weight	Approx. 70 lbs
Pier Weight	Approx. 25 lbs
Binocular Height	59" (Vertical position on pier) 35" (Horizontal position on pier)
Binocular Width	34"
Binocular Depth	12"
Binocular Tube Length	47"

Assembling the RB-10

Your RB-10 is mostly assembled at the factory. With the following instructions and associated pictures, the final steps should be as easy as 1-2-3.

Uncrating and Assembling the Instrument

The contents of the shipping crate are covered by a wooden box. After removing the top portion of the box, proceed through the following steps:

1. Remove the two-piece pier (Figure 1) from the crate.
2. Place a 1/10th inch (0.100") thick flat piece of metal, plastic or wood on the floor as a shim (1-A). Place the center of the bottom of the pier on top of the shim.
3. Place the top portion of the pier in the hole in the bottom and secure the two parts together by tightening the two bolts (1-B) in the bottom of the pier. Tighten as much as possible to prevent slippage.
4. Attach the azimuth encoder bracket (2-C) and make sure the gears match up and mesh (2-D) by adjusting the encoder position. There is an encoder wrench in the hardware bag for turning the encoder mounting nut that is between the gear and bracket.
5. Please note the adjusting screw (2-E) for setting the horizontal initialization position for the optional guiding computer. This screw has been set at the factory and should not need adjustment.

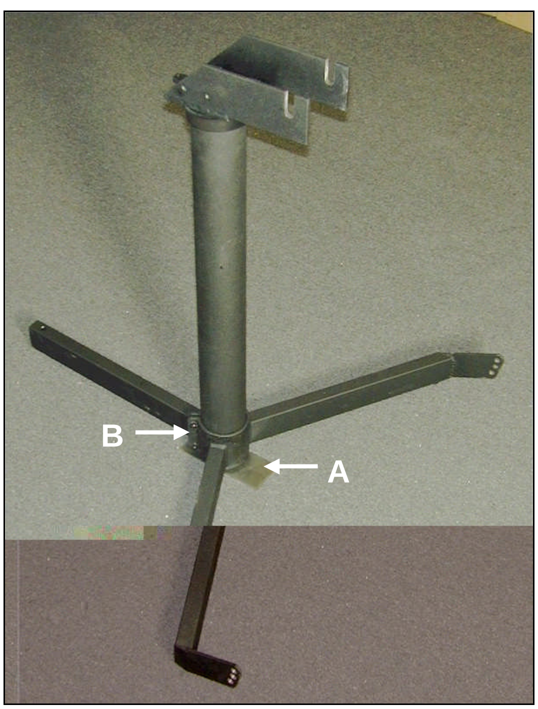


Figure 1
Assembling the Pier Mount

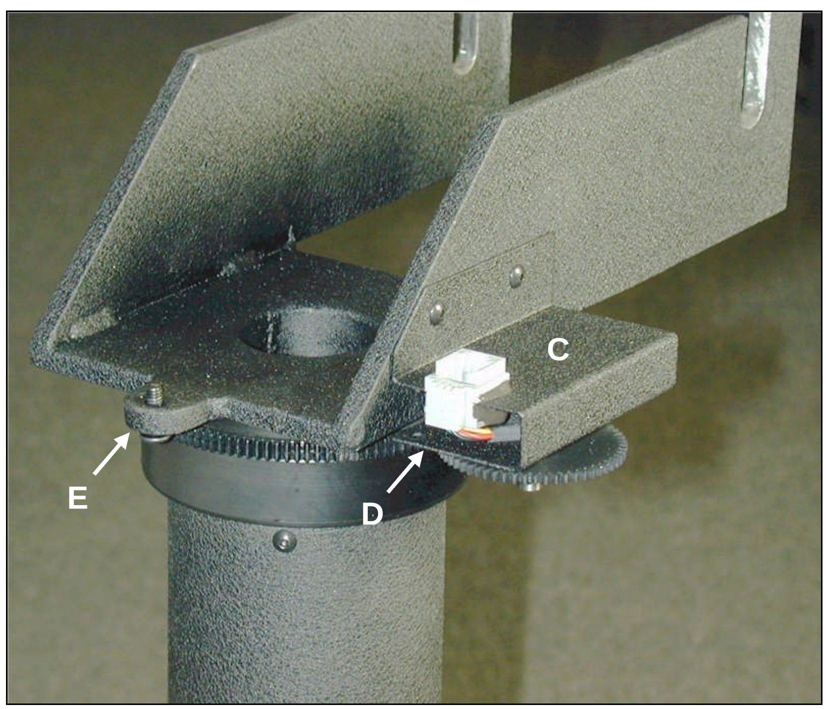


Figure 2
Mounting the Encoder Assembly

6. **WARNING: <u>Do not lift the RB-10 by the handle on the cover.</u> This handle is for the cover ONLY.**

7. There are three latches (Figure 3) that hold the top cover onto the bottom cover. One is in the back and the other two are on either side of the cover near the front of the binocular assembly. Release the latches (3-F), lift the cover off and set it aside.

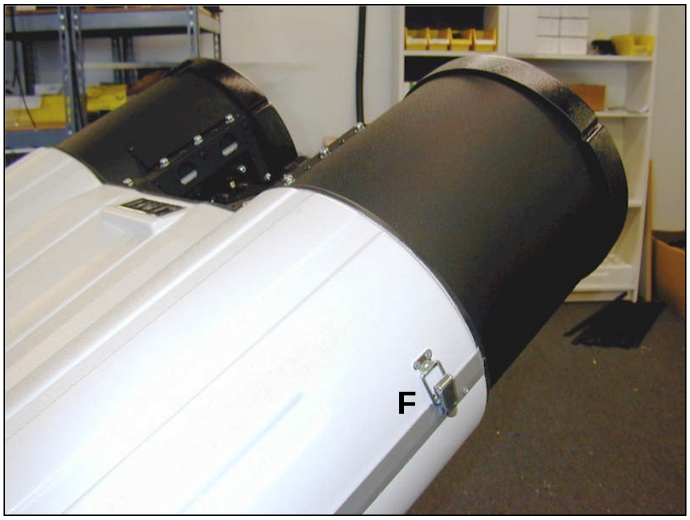


Figure 3
Cover Latches

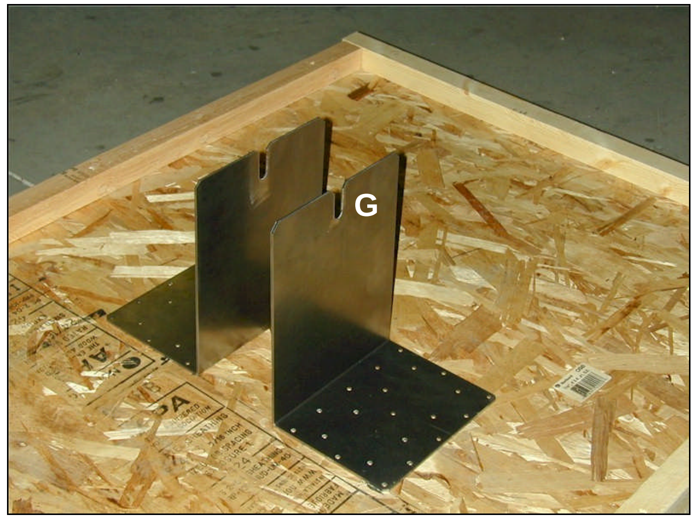


Figure 4
Shipping Cradle

8. The RB-10 is secured to the pallet (Figure 4) by a center cradle (4-G). The telescope altitude bolt is tightened against this cradle to secure it in the cradle slots. Loosen the bolt and lift the telescope off of the cradle (Figure 5) **<u>by grabbing and lifting the center bar (5-H) ONLY</u>**. The telescope weighs about 70 pounds so you may want to enlist the help of another person to lift it off of the cradle.

9. Place the telescope into the pier cradle (Figure 6) the same way it was in the pallet cradle. Make sure the washers (6-I) are on the outside of the cradle arms. Tighten the bolt (Figure 7) with two 3/4" wrenches (7-J) until the telescope has smooth resistance and will stay in place when released.

Figure 5
Lifting the RB-10

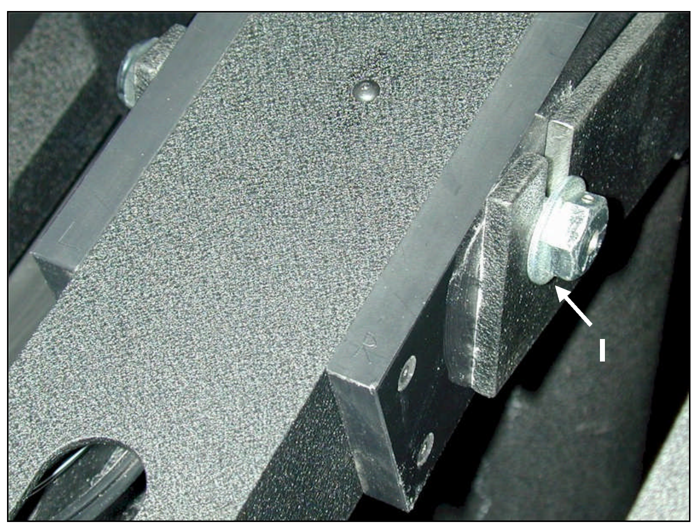


Figure 6
The RB-10 Placed in the Pier Cradle

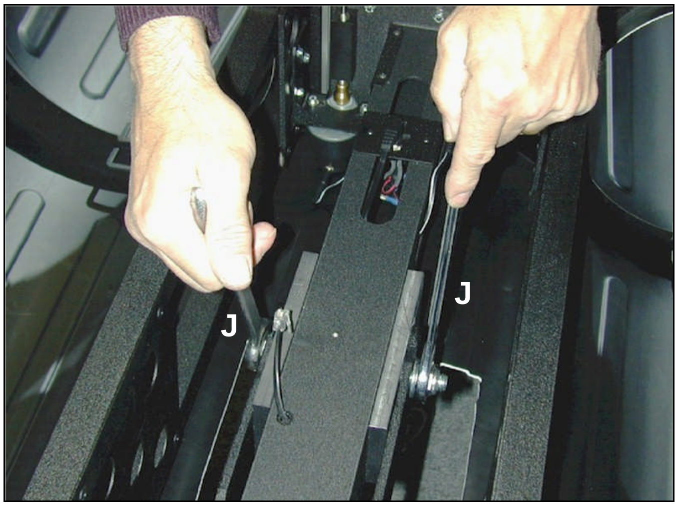


Figure 7
Tightening the Altitude Bolt

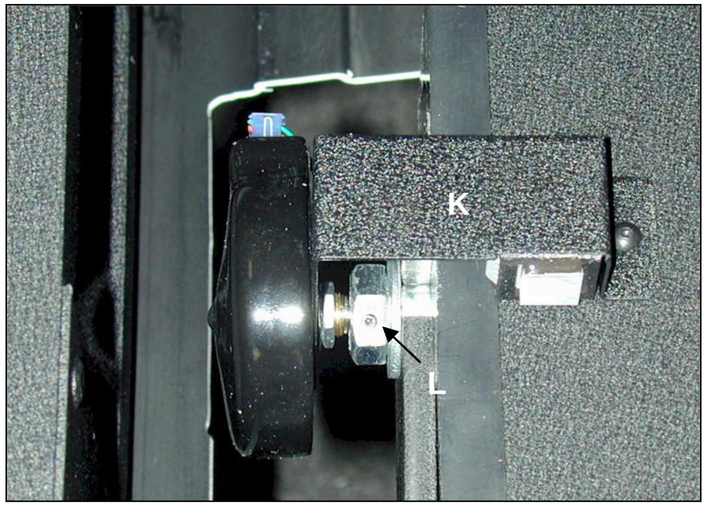


Figure 8
Altitude Encoder Assembly

10. Attach the altitude encoder (8-K) as shown in Figure 8. There is a setscrew (8-L) in the head of the bolt. Tighten the setscrew to secure the encoder shaft. The two encoder cables (9-M) are labeled. Plug each cable into its corresponding encoder jack.

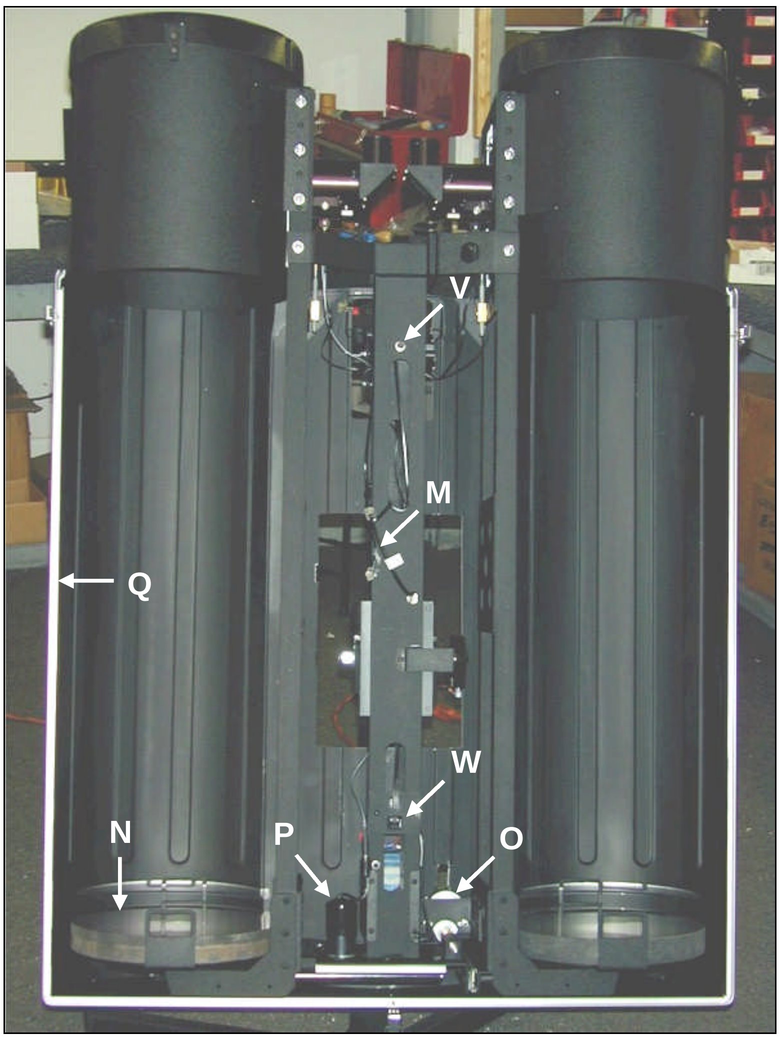


Figure 9
Inside the RB-10

11. Remove the paper covering the primary (9-N) and secondary mirrors. **Be very careful not to scratch the mirrors when removing the paper. Also, be careful not to bump the secondary mirrors out of position.**

12. Notice the vertical alignment motor (9-O) and horizontal alignment motor (9-P). Plug in the vertical motor cable. The other motor cables are plugged in at the factory. Plug in the main power cable into the main power jack (9-W).

    NOTE: In this manual, the vertical motor will be referred to as the Up/Down or U/D motor and the horizontal motor will be referred to as the Left/Right or L/R motor.

13. Replace the top cover making sure it is sitting all the way in the rail slot (9-Q) before securing the three latches.

14. Unfold the Control Center Handlebars (10-R) to their down position by loosening the two T-handle thumbscrews (10-S) on either side. Secure the MAX Computer to the Control Center Handlebars with the two strips of Velcro just above the red buttons. Plug the encoder cable (11-T) into the back of the MAX Computer.

    NOTE: The four thumbscrews (11-U) hold the bottom cover onto the frame.

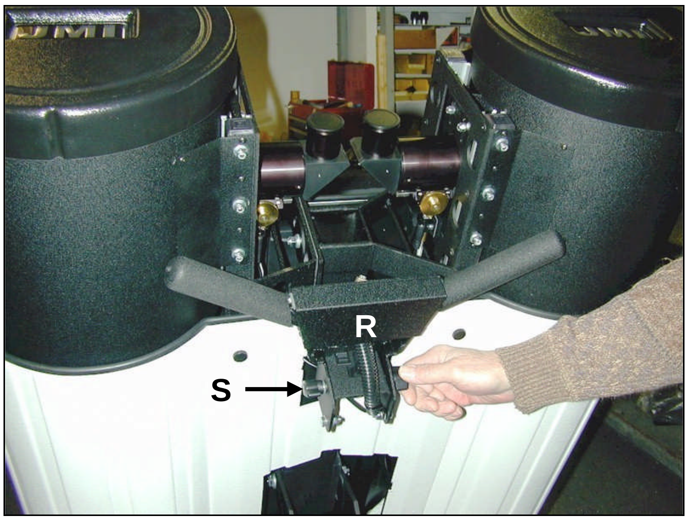


Figure 10
Unfolding the Control Center Handlebar

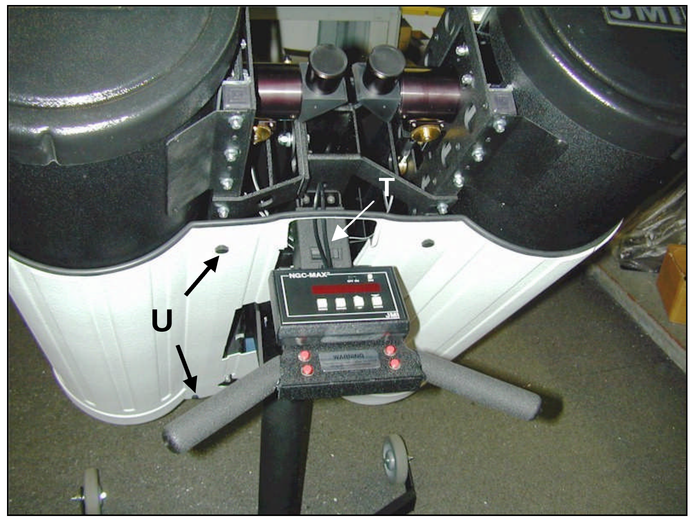


Figure 11
NGC-MAX Computer Installed

Optional Equipment

MAX Guiding Computers, also know as Digital Setting Circles, (see Figure 11 above) and Handlebar and Wheels are available for the RB-10.

15. The standard Handlebar and Wheels option, for easily moving the RB-10, includes 5" wheels. There are three positions available for mounting these wheels. The middle position works best.

    For the optional 10" pneumatic wheels, bolt the axle brackets (12-V) on the pier legs as shown in Figure 12. Slide the wheels on the axle stud and secure it by inserting the cotter pin as shown (13-W).

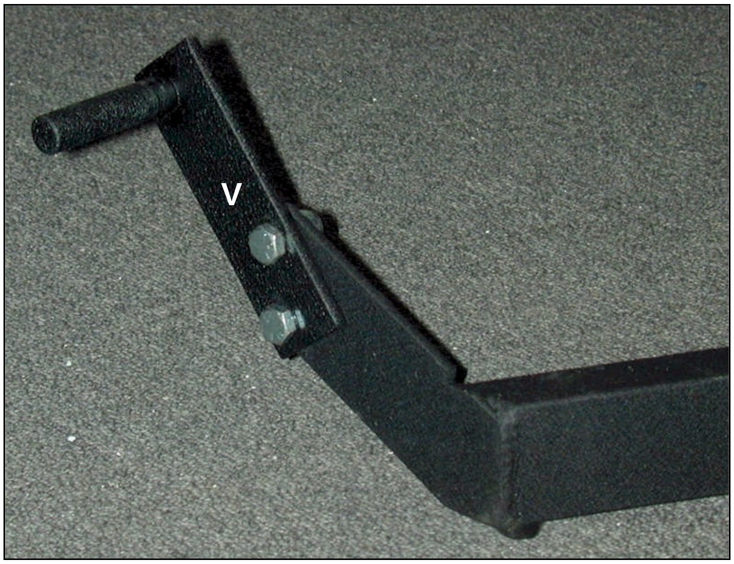


Figure 12
Handlebar and Wheels Option

Figure 13
Large 10" Pneumatic Wheels Option

Operating the RB-10

Your 10" Reverse Binocular has been designed to give you hours of pleasure with simple controls. Because binocular telescopes require special considerations, we recommend that you read and understand the following instructions before using the RB-10.

Operating the RB-10 Motors

The function of each button on the Control Center Handlebars is shown below (Figure 14). Should you ever have to remove the Control Center Handlebars, they are held onto the center piece by one 1/4-20 bolt (See 9-V) and **you must unplug all six motors and the main power cable before you take it off**. The cables coming out of the Control Center are in a three-tiered vertical arrangement (Figure 15). The top (and longest) cables go to the rear (U/D and L/R) motors. The center cables go to the motors that drive the lead screw that pushes the focuser sliding plate. The main power plug goes to the power jack (See 9-W) at the rear of the center piece. Should a temporary short ever occur, it will trip the fuse. If this happens, wait a few seconds and then reset the fuse switch.

1. L/R and U/D motors.
2. Switch for selecting between the L/R and U/D motors.
3. Eye-spacing motors.
4. Focus motors (in and out for left and right tubes).
5. Two black T-handle thumb knobs for tightening and loosening the guiding handlebar so it can fold up if needed.

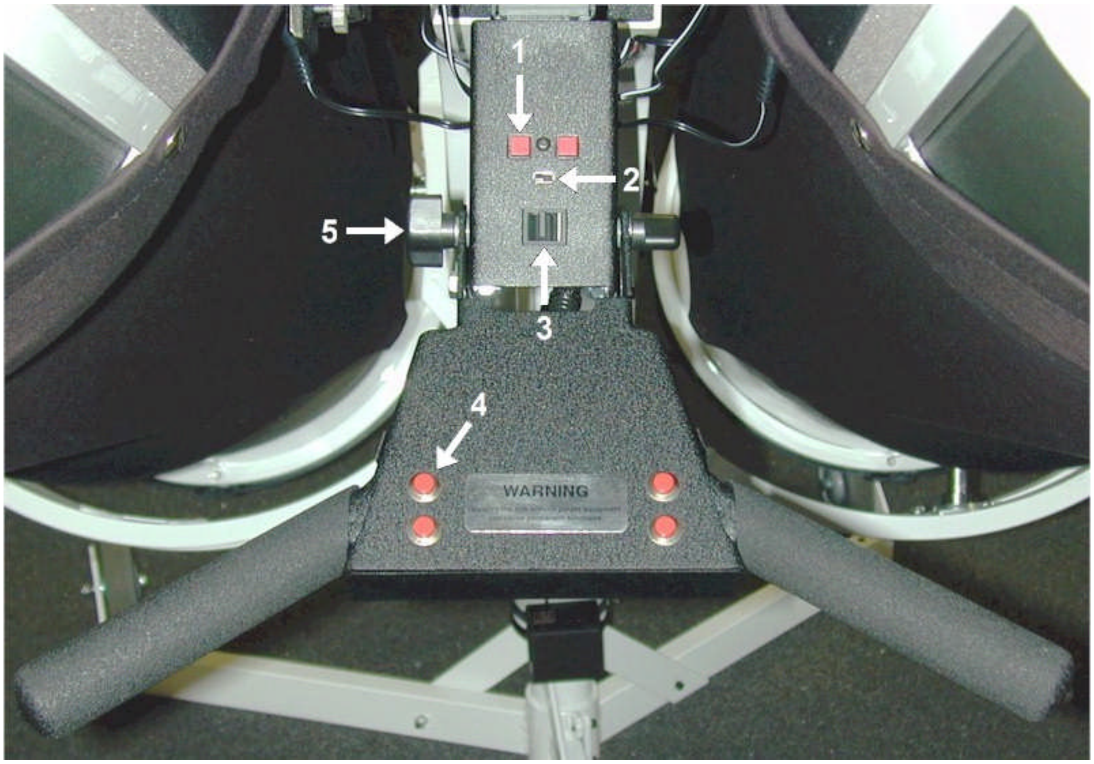


Figure 14
Control Center Handlebars

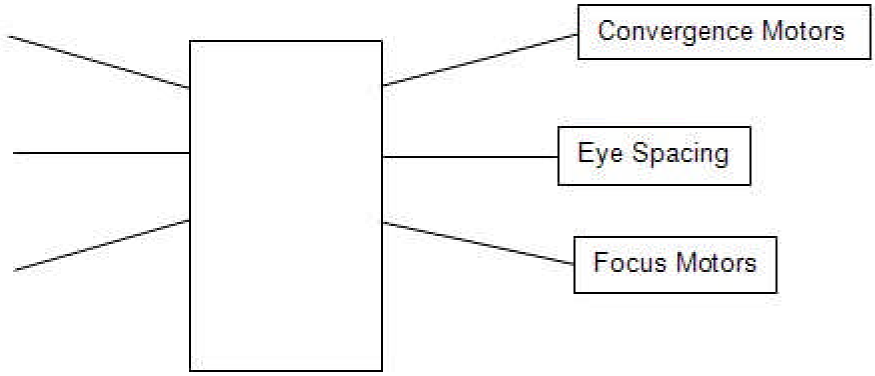


Figure 15
Control Center Wiring Tiers

Converging the Optical Tube Images

When you look through the RB-10 you may see that the images are not converged. As shown in Figure 16, you should **always move the images to a vertical alignment first** (one star above the other in the eyepieces), using the L/R (horizontal) toggle switch, and then move the images together with the U/D (vertical) toggle switch. The best way to do this is to look back and forth between the eyepiece view and a relaxed unaided view. The human eye will tend to converge the images by itself if you try to do this with a horizontal alignment first. Fight the urge to reverse steps one and two and do the vertical alignment first so you won't be looking at your image with crossed eyes, which will cause eye strain.

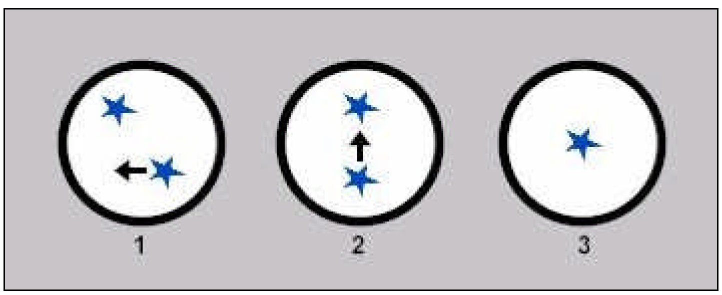


Figure 16
Steps in Aligning the Optical Tubes

Initializing the Digital Setting Circles

Most computer guiding systems have an initial alignment position that is either "tube vertical" or "tube horizontal" with respect to the base. The RB-10 uses a tube horizontal (LEVEL ME) initialization position. To go to this position, slowly push the telescope to the horizontal position until the center piece contacts the screw shown earlier (See 2-E). **Be careful not to bang the telescope against this stop.** This screw has been set at the factory for the telescope to be in a horizontal position upon contact. If you feel that this position may have been compromised, you can adjust the screw with an Allen wrench. Refer to the *MAX Computer Operator's Guide* for more information on using the computer.

Moving the Telescope

The tow handle (17-X) for the Handlebar and Wheels option is inserted into the bottom frame as shown and secured with a T-handle thumbscrew (17-Y). The best way to lift and move the telescope is to put one hand on the Tow Handle and one hand on the Control Center Handlebars (18-Z).

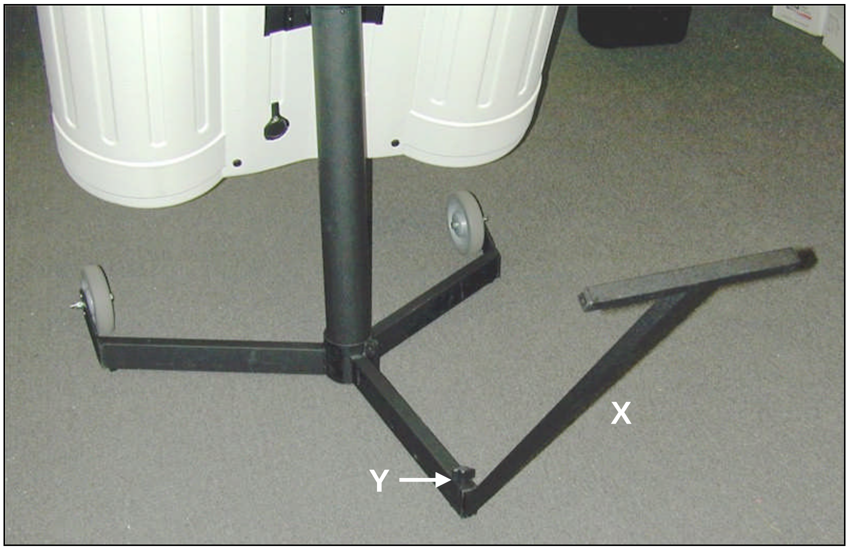


Figure 17
Handlebar Attached

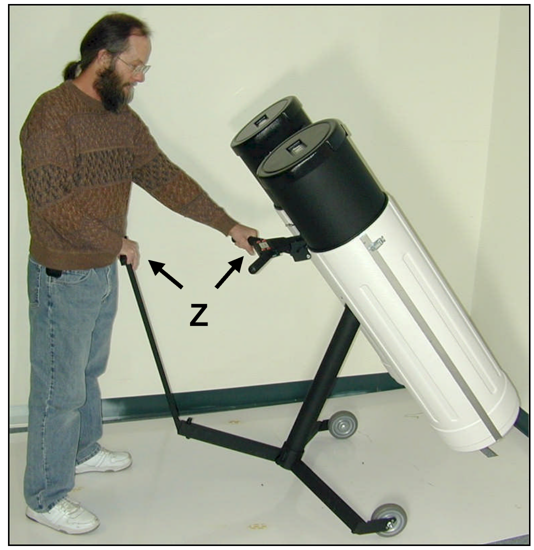


Figure 18
Moving the RB-10

Figure 19
The RB-10 Ready to Use

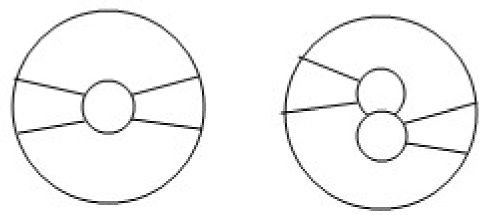
Understanding Collimation and Image Convergence

Because this is a twin-Newtonian telescope system, there are some special relationships that must be remembered to keep it both **collimated** and **converged** (these two terms are *not* the same thing). Collimating each optical tube is done as normal with a laser and/or Cheshire eyepiece like any Newtonian telescope. Converging the images is done with the L/R and U/D motors. Changes to the collimation of either the primary mirror or the secondary mirror will result in changes to the convergence of the images. (Some slight tweaking of the primary mirror can also be done to help with the convergence of the two images.)

If the two eyepieces are not parallel to each other (Figure 20) the two images will appear to be split vertically. You can tell if they are misaligned by looking in the focuser drawtubes without the eyepieces in place. The two secondary stalks and mirrors should be seen directly on top of each other and not split into two separate pieces (Figure 21). The eyepieces should also remain parallel with the optical tubes (Figure 22).

Parallel Eyepieces   Not Correct

Figure 20
Eyepiece Orientation



Parallel Drawtubes   Not Correct

Figure 21
Checking Drawtube Alignment

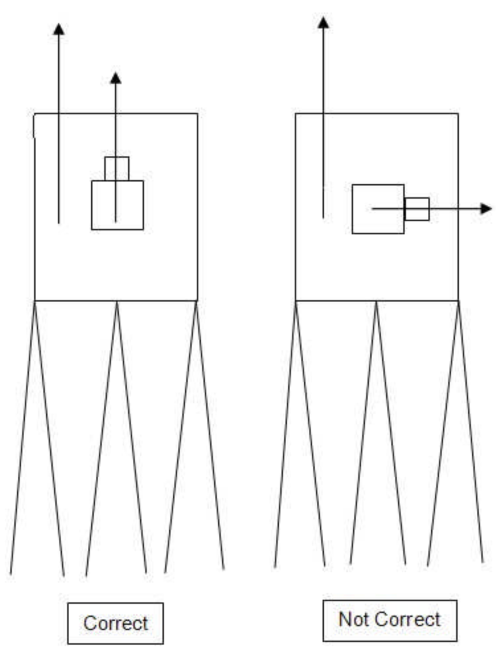


Figure 22
Optical Tube and Eyepiece Alignment

Synchronizing the Focusers

During the course of using the eye-spacing motors, they may become unsynchronized in their positions and need to be reset. It will appear obvious that even when the two eyepieces are in focus they will be sitting at different heights. Every effort is made to keep the eyepieces centered between the two optical tubes and even in height but occasionally they may be slightly off. In the example below (Figure 23), both images are in focus but the left eyepiece is lower than the one on the right. You can raise the left eyepiece (or focus point) by pushing the focuser drawtube inwards towards the secondary mirror (23-A), roughly the same distance as the difference in eyepiece height (23-B). This will move the focus point upwards (23-C) so that you will have to raise the focuser upwards so the eyepiece is at the same height as the other one. You will then have to reset the eye spacing because moving the drawtube inwards has increased the distance between the two eyepieces. After resetting the eye spacing you can then refocus each eyepiece. When set at the factory, each focuser drawtube protrudes into its respective nose assembly by the same amount.

Since eye spacing and focus are done with motors, this is easier that it sounds. The reverse is also true. If you need to lower the eyepiece, pull the drawtube out away from the secondary mirror and the focuser will have to be lowered. This can be done by unplugging one of the eye-spacing motors and running the other one by itself. You can also compensate for this by moving the primary mirror slightly forwards or backwards depending on where the eyepiece needs to be. If you move the primary mirror in this fashion, care must be taken to move all three collimation screws by the same distance so it will stay in collimation.

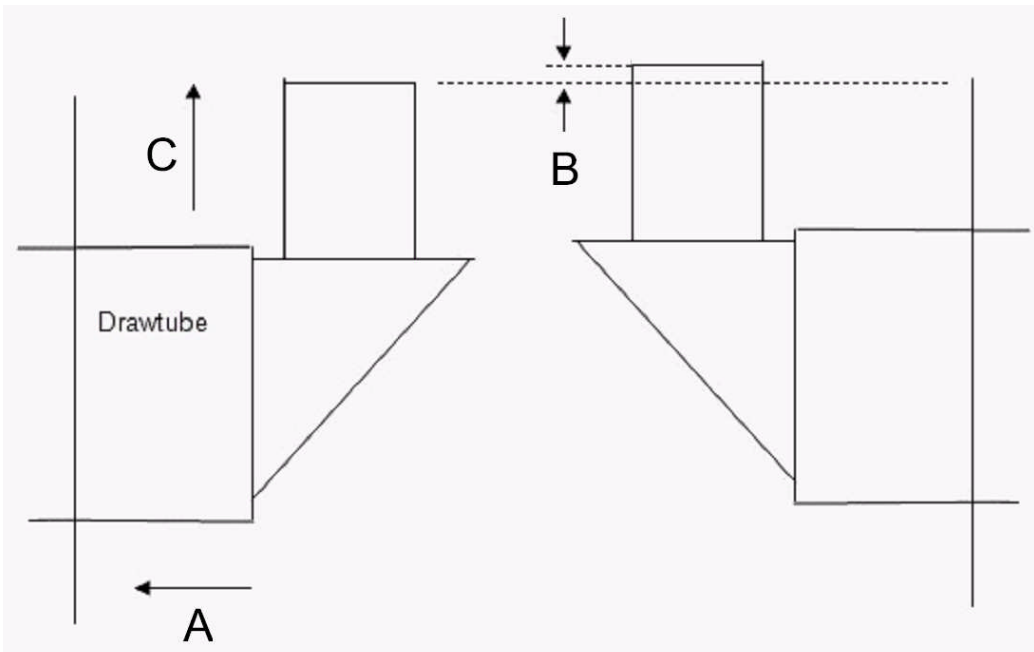


Figure 23

Maintaining the RB-10

The following maintenance routines will preserve the accuracy and reliability of your telescope and help prolong its life.

Removing the Primary Mirrors for Cleaning

Use the following steps to remove a mirror and mirror cell combination.

1. Do not touch or change the position of the three collimation bolts (see Figure 24).

2. Do not remove the mirror from the mirror cell. Leave it glued in place.

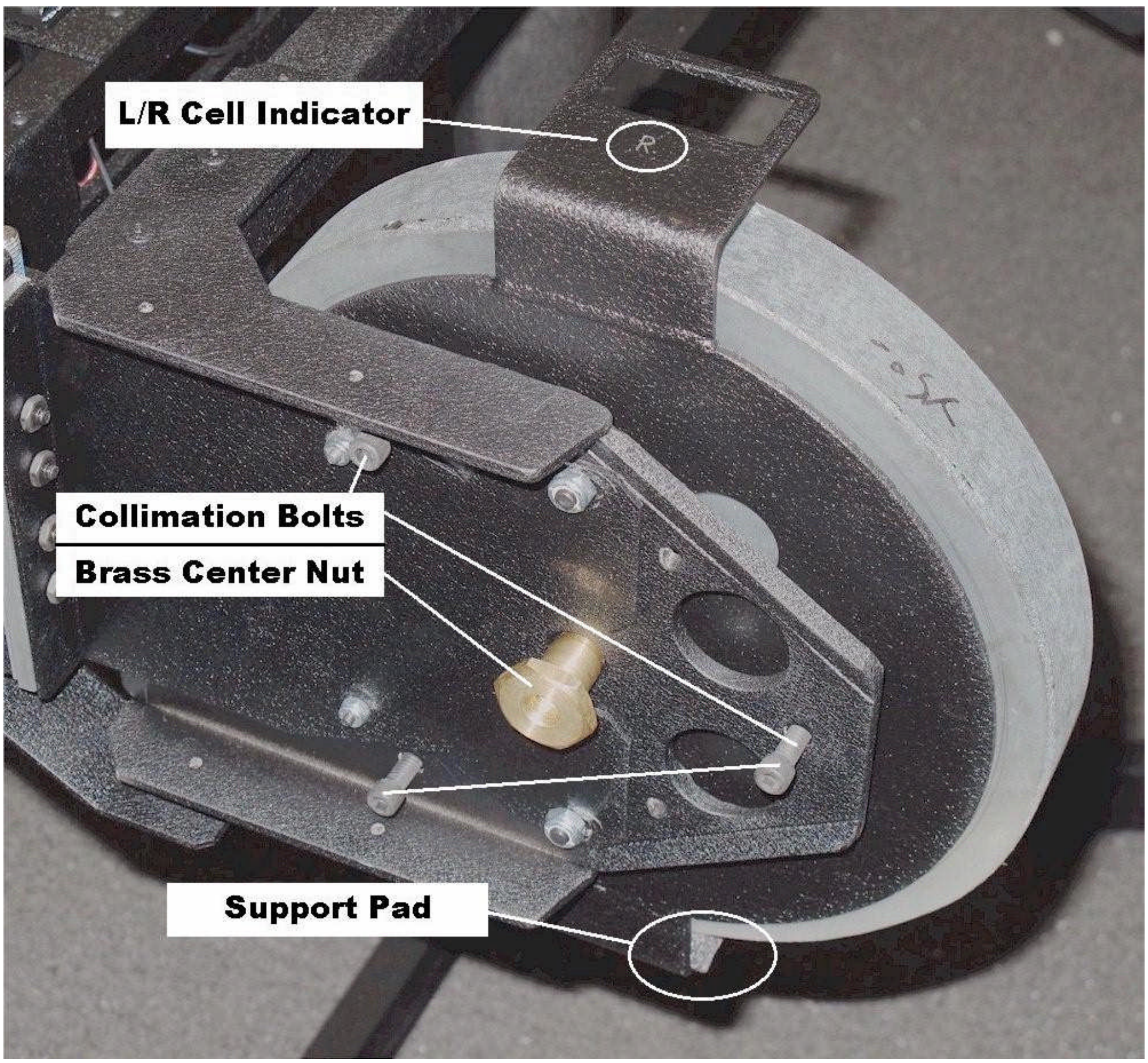


Figure 24

3. With one hand holding the top handle and supporting the mirror weight, loosen and remove the central brass centering nut to release the mirror cell from its position against the collimation bolts (Figure 25).

4. The mirror and mirror cell are waterproof so you can submerge the entire unit in water to clean. Carefully clean the mirror (see instructions below).

5. When putting the mirror cell back on the telescope, support the cell with one hand and slide the threaded stud through the mounting hole. Each mirror has a support pad between the mirror and the bottom handle and a letter on the top handle to denote whether it is the left or right mirror as seen from the back of the telescope (see Figure 24).

6. Thread the brass centering nut onto the stud about 3 to 4 turns (Figure 26).

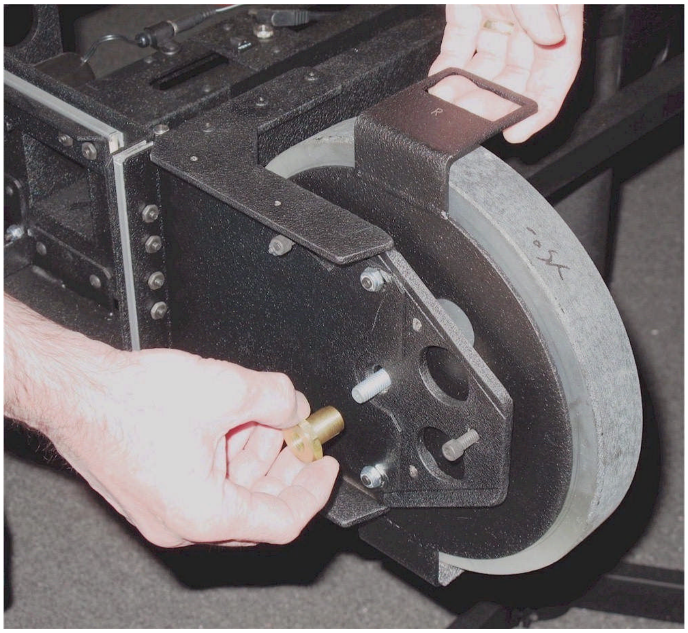


Figure 25

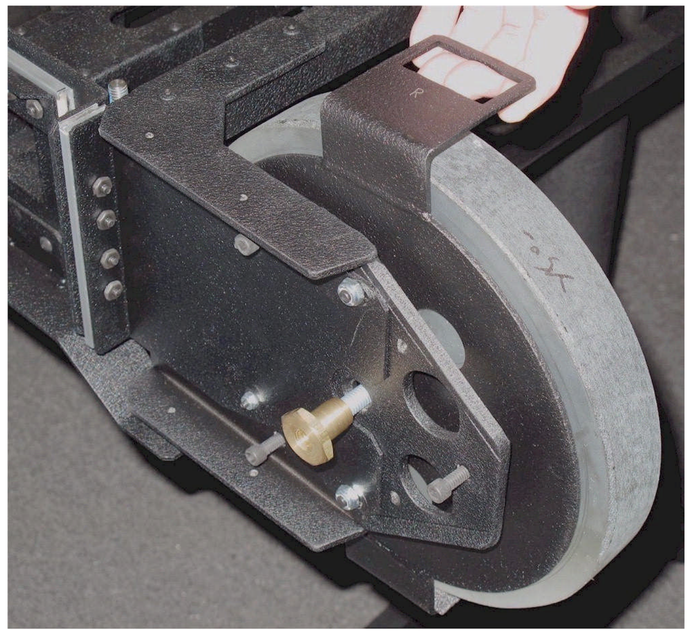


Figure 26

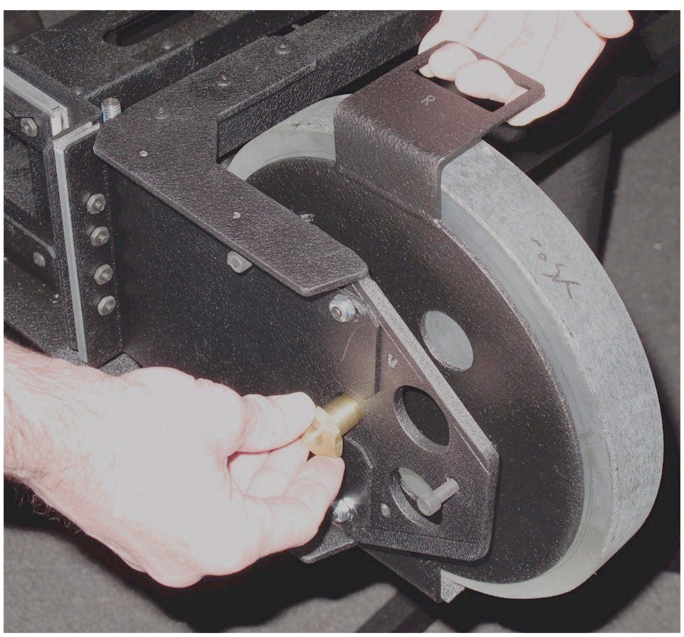


Figure 27

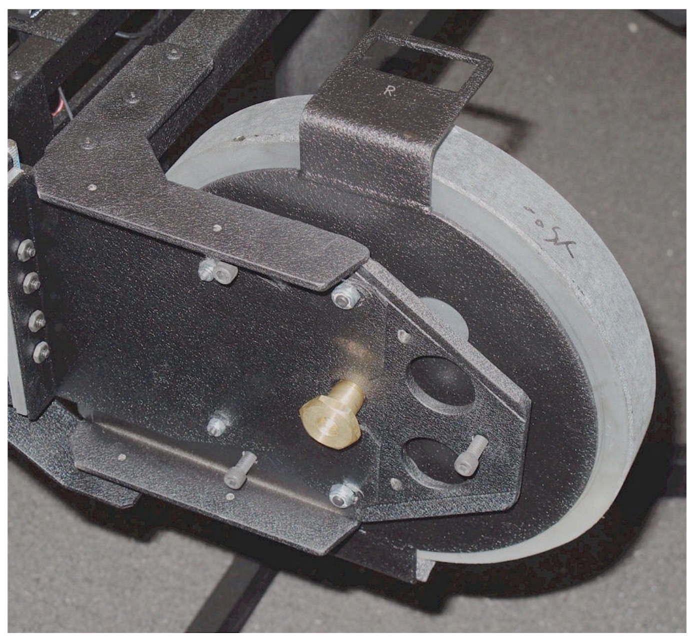


Figure 28

7. The end of the brass centering nut is conical in shape so that it will seat itself into the conical mounting-hole receptacle. The best way to make sure the cell is properly seated is to pull the mirror cell towards the front of the telescope until the cone of the brass nut is fully centered in the conical hole. Then tighten the nut until it draws the mirror cell back against the collimation bolts (Figure 27).

   The collimation bolts will have left a circular mark on the back of the mirror cell from turning against it during collimation. Try to line the circular marks up with the ends of the collimation bolts to assure you have returned to the same position.

8. The mirror cell should now be in virtually the same position as it was when you removed it and only require minor adjustments to achieve collimation (Figure 28).

Cleaning Front-Surface Mirrors

Never wipe a dry mirror with a lens tissue or other material, as this will scratch the surface coating.

Follow these steps to properly clean the RB mirrors and preserve their life. Do not clean the mirrors too frequently. If properly handled and protected from dirt, the mirrors should require cleaning only once or twice a year. The mirrors can be cleaned without removing them from the cell, however the cells should dry completely before they are returned to the binocular.

First, gather the following materials:

- Soft, absorbent cotton balls.

  Be sure the cotton is 100% pure (such as Red Cross). Other cottons may contain wood pulp or other foreign matter that will scratch the mirror surfaces.

- Mild detergent (such as Dawn)

- Distilled water

- Acetone, ethanol or compressed air in a can.

  Observe all cautions and warnings on the labels. Acetone and its vapors are harmful. Rubber gloves are recommended to prevent absorption of acetone through the skin. Acetone is available at most paint or hardware stores. (If acetone is used, remove the central dots prior to cleaning, as the acetone will dissolve the adhesive causing it to run and stain the mirror surface. The dots are required for collimation. Replace them after cleaning.) Ethanol—also known as ethyl alcohol, 200-proof alcohol or drinking alcohol—may be substituted for acetone. Do not use rubbing alcohol on your mirror surface, as it adversely reacts to the aluminized surface and can ruin the mirror coating over time. Compressed air can also be used as long as you are careful to keep any propellant from being discharged onto the mirror.

- A tub large enough to allow the mirror to be fully immersed.

Use the Following Procedure for Each Mirror
Fill the tub with a solution of lukewarm distilled water and mild soap. Rinse the mirror by pouring distilled water over the mirror, flooding the surface to remove loose dirt and dust—if large particles are not removed they will scratch the mirror during the cleaning process. Next, immerse the mirror in the tub and allow it to soak for 1.5 to 2 hours. Let the liquid do the work as much as possible to minimize contact with the mirror surface. Soaking overnight with pure distilled water will loosen almost any particles and will not hurt the glass or mirror surface.

After the mirror soaks, raise it to within 1cm (1/2-inch) of the water's surface and use the cotton balls to remove any remaining particles. It is best to roll the cotton ball over the mirror's surface—with the leading edge rolling upward—allowing the particles to be lifted away. Replace the cotton ball after one rotation, thus preventing the dirtied cotton from contacting the mirror surface. Do not apply pressure to the cotton—simply allow the weight of the wet cotton to do the work. Clean the entire surface of the mirror in this fashion. You may find it easiest to work from the mirror's center, spiraling outward.

Lift the mirror out of the tub and place it at an angle to drain as you rinse. Rinse with distilled water to remove all soap solution from the mirror surface.

Finally, before the mirror can dry, rinse again with acetone or ethanol or use compressed air to chase the water beads from the surface. Acetone and ethanol will evaporate to leave a pristine surface. (If necessary, remove any remaining water spots by dabbing them lightly with clean, dry Red Cross cotton. Dab, but do not wipe.)

If you have not removed the mirror from the mirror cell, be sure to allow the cell to dry completely before returning it to the telescope. A blow dryer can help speed the drying process.

Collimating a Newtonian

Collimating is the process of aligning the optical components of the telescope for optimum performance. When a telescope is in need of collimating, you are likely to note that a star in the center of the eyepiece field will not focus precisely and will appear to be non-circular (elliptical or fan-shaped) when the image is out of focus.

In a Newtonian reflector such as the optical tubes included in the Reverse Binoculars, there are three components to align: the eyepiece, the secondary mirror, and the primary mirror. All three must be accurately aligned with respect to each other. Information in this section will enable the RB owner to align the secondary and primary mirrors of each optical tube. See "Using the RB-10 Motors" (page 11) for information on focuser and optical tube alignments.

Under normal conditions you should only need to collimate the primary mirrors, so you can skip the first step below. Remember that changes in collimation will require realignment of the optical tubes.

The following instructions include illustrations for a Newtonian with a spider-type secondary mirror support. The RB-10 includes a double-stalk secondary mirror holder, so keep this in mind when comparing what you see with the examples.

The First Step in Collimating—Use of the Sight-Tube

A sight-tube with accurate crosshairs is essential in the first step of collimating a Newtonian reflector. The sight-tube is used to achieve accurate placement of the secondary.

First, adjust axial placement of the secondary by placing the sight-tube in the focuser and moving it in or out until the outside edge of the secondary mirror is just inside the bottom edge or rim of the sight-tube. The two circular images should be concentric. If the secondary is high or low, loosen the retaining screw and nut combination and move the secondary axially (toward or away from the primary) until concentricity is achieved.

Next, adjust the rotation of the secondary by rotating left or right until the reflection of the primary mirror as seen in the secondary mirror is perfectly centered left to right. Gently tighten the secondary center screw.

Finally, adjust the tilt by loosening one or two of the three screws on top of the secondary mirror cell, and carefully tightening the opposite one or two. (If you loosen one screw, you must tighten two; if you loosen two, you must tighten one.) The goal is to adjust the tilt of the secondary such that the bull's-eye, or target, on the primary mirror appears centered in the crosshairs of the sight-tube. When the secondary is properly adjusted, you will see the following (as described from the outside of the field of view toward the center):

- The rim of the sight-tube.
- The outside edge of the secondary mirror, concentric with the rim of the sight-tube all the way round.
- The reflection of the primary mirror perfectly centered in the secondary.
- The bull's-eye of the primary centered in the crosshairs of the sight-tube.

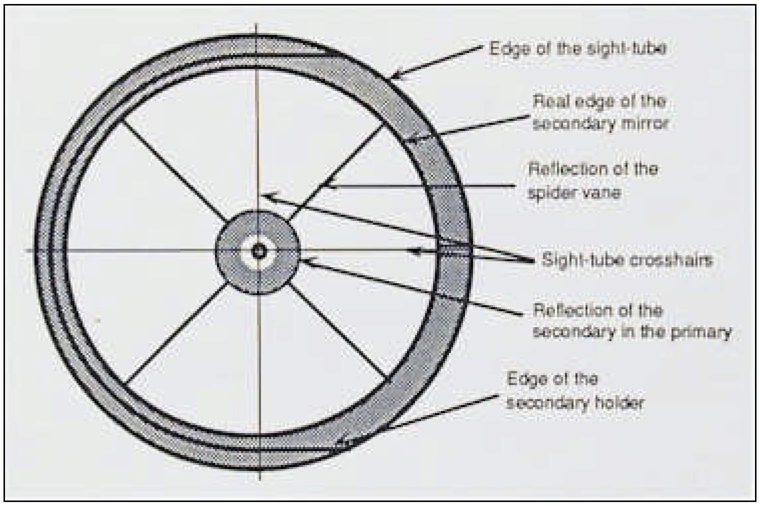


Image visible in the sight-tube

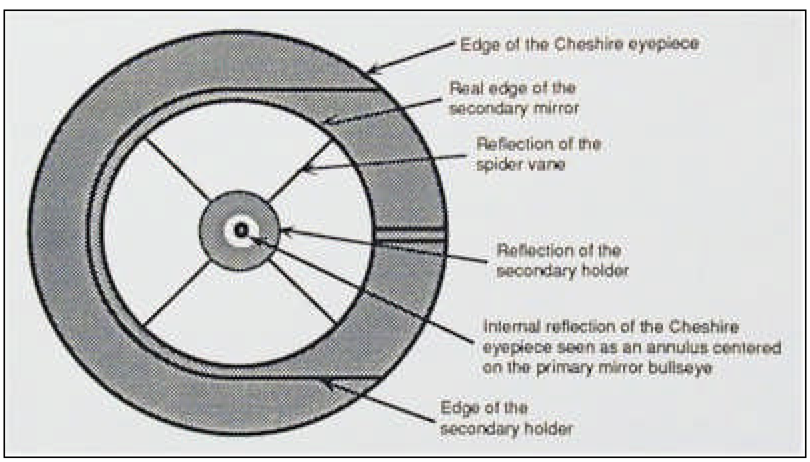
If the view does not match this description and illustration, then repeat the three adjustment steps until the view is correct.

The Second Step in Collimating—Use of the Cheshire Eyepiece

A Cheshire eyepiece is extremely useful for the next step in collimating, although the auto-collimator or star test can accomplish the same thing. Once the secondary mirror is adjusted by means of the sight-tube, insert the Cheshire eyepiece in the focuser. Do not push it all the way: the cutaway in the eyepiece must be exposed to a light source. (A red flashlight works well in the field at night.)

If you look through the eyepiece you will see the following (aside from the bull's-eye on the primary mirror):

- The reflection of the primary mirror in the diagonal.
- A generally dark field.
- A brightly lit annulus, or ring, in the center of the field.
- A dark spot, or bull's-eye, in the center of the annulus.



Detail of the image visible in the Cheshire eyepiece

Your goal is to bring the bull's-eye of the primary mirror into alignment with the central dot imaged by the Cheshire. Accomplish this by adjusting the three collimating bolts of the primary mirror cell. Adjust in small increments while checking the alignment. First, loosen the center brass nut to make it possible to turn the collimating bolts. (Tighten the brass nut again when collimation is complete.) Continue to make adjustments until the bull's-eye of the primary mirror appears within the central dot of the annulus. When you have achieved this, the telescope is collimated. (See the following illustration.)

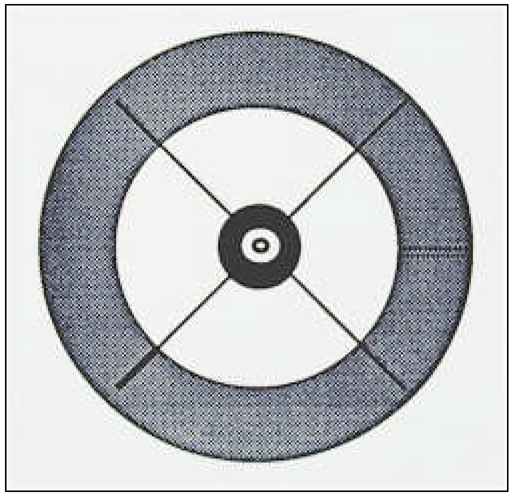


Image visible in Cheshire eyepiece when the system is properly collimated

If, after repeated adjustments you still cannot adjust the primary mirror into collimation, the problem is likely to be misalignment of the secondary. Check the secondary to determine whether it must be raised, lowered, rotated or tilted. While this process may require several repetitions the first few times, you will find that, with practice, you can quickly determine what adjustments to make to the secondary mirror by observing the location of the bull's-eye with respect to the central dot. Once you are familiar with the process, fine-tuning the collimation can be accomplished in just a few minutes.

Use of the Auto-Collimator

An auto-collimator eyepiece is available from Tectron, along with three tools and an instruction booklet. By following instructions provided with the auto-collimator, you can make final, ever-so-slight adjustments to the secondary mirror, if necessary. The auto-collimator is not intended, however, for use in making adjustments to the primary mirror. To adjust the primary mirror, follow the steps outlined in the section above, "Use of the Cheshire Eyepiece."

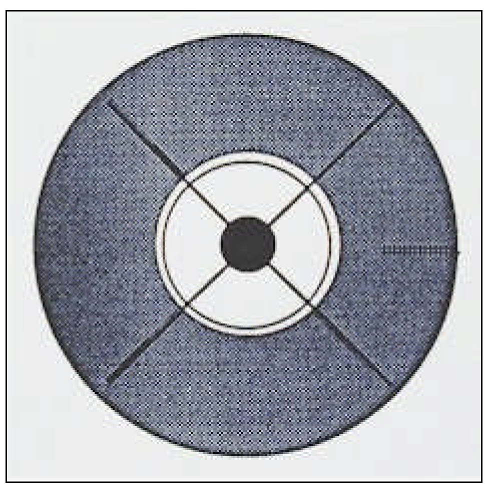


Image seen in the auto-collimator eyepiece when the system is properly collimated

General Maintenance

Unless you are using the instrument in extremely dirty condition or without the covers you should not need to clean anything inside (other than the mirrors) except possibly the threads on the focus motor lead screws. If it becomes necessary, clean the threads then add a small amount of grease.

Notes