



PowerSeeker 114

INSTRUCTION MANUAL
#21045

INTRODUCTION

Congratulations on your purchase and welcome to the **Celestron** world of amateur astronomy. Some of the terms and parts described in these instructions may be new to you, so a few commonly used terms you'll want to be familiar with are defined below.

Equatorial mount – a type of mounting that allows the telescope to be aligned with the earth's axis in order to track the motion of the sky.

Focal length - the distance from the optical center of the lens to the point where the incoming light rays converge, creating a clear, focused image.

Primary Mirror - It gathers incoming light to create a sharply focused image.

Reflecting telescope – an optical design in which light is reflected off of a curved mirror that converges the light into a small disk that is then magnified using an eyepiece.

First, you need to take the time to familiarize yourself with the parts of your **PowerSeeker** telescope, then assemble it, following the easy instructions provided. Next, read over the operating instructions and become familiar with how your telescope works, to prepare for hours of viewing enjoyment.

CAUTION: READ THIS SECTION BEFORE USING YOUR TELESCOPE

Your **PowerSeeker** telescope is designed to give you hours of fun and rewarding observing. However, there are a few things to be aware of before using your telescope that will ensure your safety and protect your equipment.



NEVER LOOK DIRECTLY AT THE SUN WITH THE NAKED EYE OR WITH A TELESCOPE. NEVER POINT YOUR TELESCOPE AT THE SUN UNLESS YOU'RE USING THE PROPER SOLAR FILTER. PERMANENT AND IRREVERSIBLE EYE DAMAGE MAY RESULT.

NEVER USE YOUR TELESCOPE TO PROJECT AN IMAGE OF THE SUN ONTO ANY SURFACE, OR USE AN *EYEPIECE* SOLAR FILTER OR A HERSCHEL WEDGE. INTERNAL HEAT BUILD-UP CAN DAMAGE THE TELESCOPE AND/OR ANY ACCESSORIES THAT MAY BE ATTACHED TO IT.

NEVER LEAVE YOUR TELESCOPE UNSUPERVISED, ESPECIALLY WHEN CHILDREN ARE PRESENT. THIS ALSO HOLDS TRUE FOR ADULTS WHO MAY NOT BE FAMILIAR WITH THE CORRECT OPERATING PROCEDURES FOR YOUR TELESCOPE.

ALWAYS COVER THE FINDERSCOPE WHEN USING YOUR TELESCOPE WITH THE CORRECT SOLAR FILTER. ALTHOUGH SMALL IN APERTURE, THIS INSTRUMENT HAS ENOUGH LIGHT GATHERING POWER TO CAUSE PERMANENT AND IRREVERSIBLE EYE DAMAGE. THE IMAGE PROJECTED BY THE FINDERSCOPE IS HOT ENOUGH TO BURN SKIN OR CLOTHING.

PowerSeeker 114

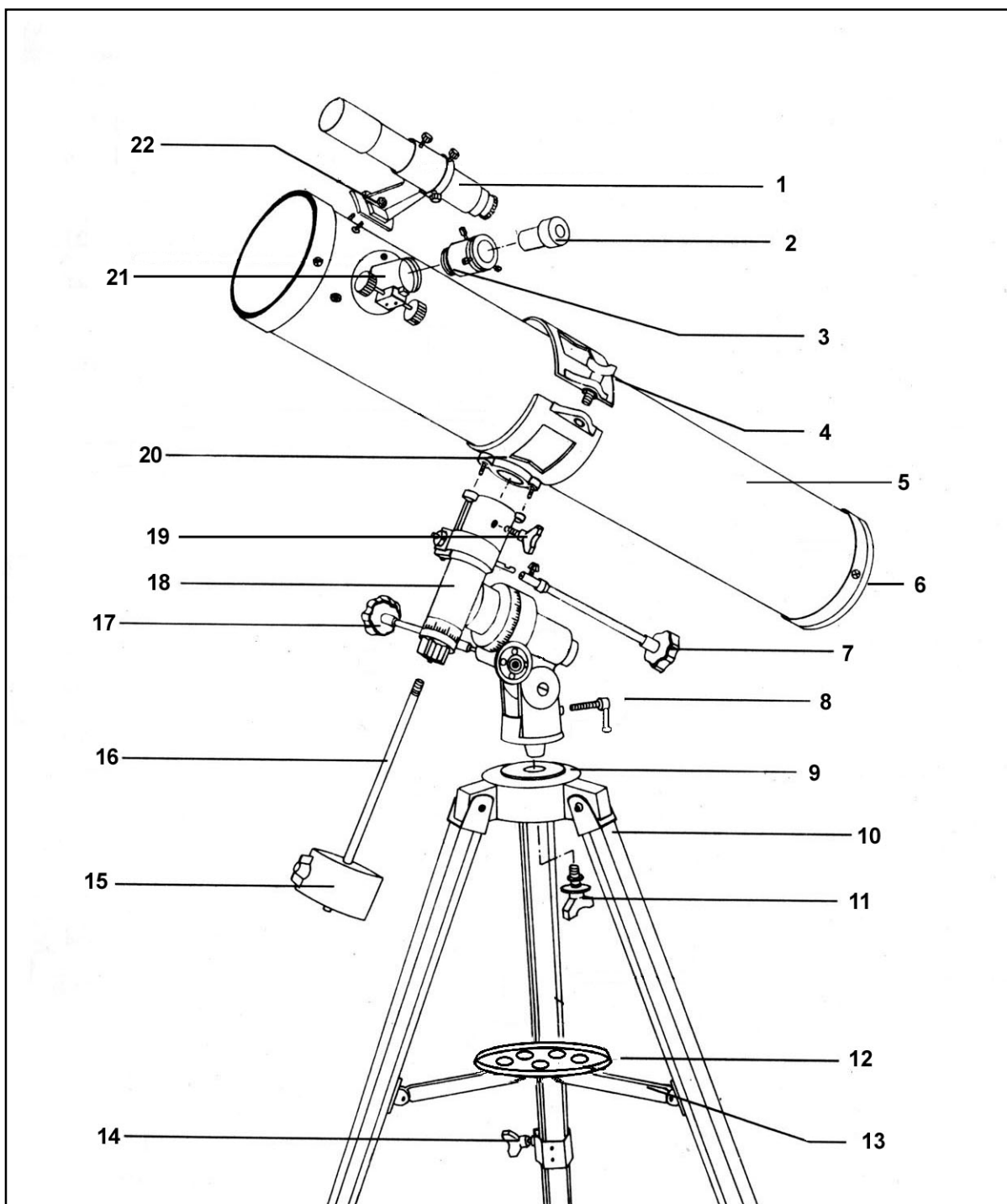


Figure 1-1

THE POWERSEEKER 114 Reflector

The **PowerSeeker** is a Newtonian reflecting telescope that comes on an equatorial mount. This section instructs you on the proper assembly and use of your **PowerSeeker** telescope, which is shipped in one box, containing all the parts you need to assemble it. Unpack and lay out all of the parts in a large, clear area where you'll have room to work. Keeping track of the parts, use the list below and the telescope diagram to confirm you have, and can identify each part.

PowerSeeker 114			
1.	5x24 Finderscope	12.	Accessory Tray
2.	Eyepiece	13.	Center Support Brace
3.	Focuser Draw Tube	14.	Tripod Tightening Screws
4.	Tube Ring Locking Bolt	15.	Counterweight
5.	Optical Tube	16.	Counterweight Bar
6.	Collimation Screws (not shown)	17.	R.A. Slow Motion Control
7.	Declination Slow Motion Control	18.	Equatorial Mount
8.	Latitude Adjustment Screw	19.	Declination Locking Screw
9.	Tripod Mounting Head	20.	Mounting Platform
10.	Tripod Leg	21.	Focuser
11.	Equatorial Head Mounting Screw	22.	Finderscope Bracket

Assembling Your Telescope

To set up the tripod, locate the equatorial mount (18), the tripod legs (10), and the tripod mounting head (9).

1. Slide the two top portions of each tripod leg around the sides of each flange on the tripod mounting head (9). Make sure that the tripod center support brace hinges (13) are located on the inside of the each leg.
2. Slide the provided screws through the tripod leg and flange, until the screw extends out the other side mount (see Figure 1-2). Slide the washer and the nut over the screw and tighten. This can be left slightly loose, to allow for positioning the legs later, when attaching the accessory tray.

You are now ready to attach the tripod accessory tray.

3. The tripod tray fits over the holes in the tripod's center support brace (13). Insert the winged bolts through the holes in each of the tripod center support braces and thread them into the holes in the accessory tray. Tighten all bolts to ensure proper stability to the mount.

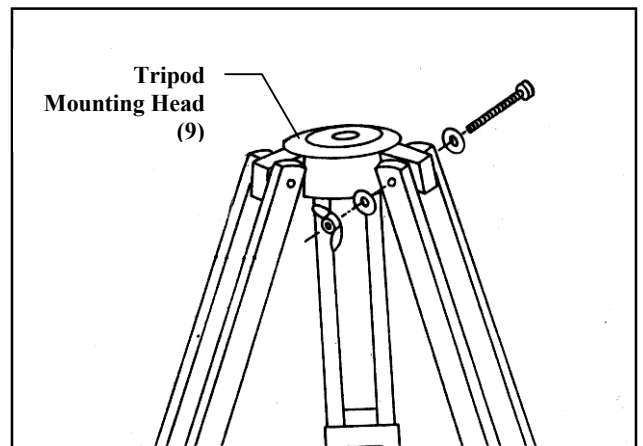


Figure 1-2

Attaching the Equatorial Mount

1. Place the base of the equatorial mount (18) into the hole on the top of the tripod mounting head (9).
2. Rotate the equatorial mount until the declination axis (where the counterweight bar (16) goes) is positioned over one of the tripod legs.
3. Attach the mount to the tripod by threading the equatorial head mounting screw (11) into the bottom of the mount

Before attaching the optical tube, the counterweight and slow motion controls should be added to the mount:

1. Thread the counterweight bar (16) clockwise into the declination axis of the equatorial mount. Slide the counterweight over the counterweight bar and lock down the screw on the side of the counterweight.
2. Locate the declination slow motion control (7) and attach to the mount by tightening the set screw on the control cable. See Figure 1-3. The set screw should be tightened down hard on the flat surface of the cable holder after

backing off the cable about 1/4" from being fully engaged. This method helps ensure there is no slippage when using the cable.

3. Locate the right ascension slow motion control (17) and attach it the same way as the declination cable was attached.

Attaching the Optical Tube

You are now ready to put the telescope optical tube (5) onto the equatorial mount (18).

1. Slightly loosen the screws (4) that hold the mounting rings on the telescope in place.
2. Slide the rings apart so that each is at the same distance as the holes in the mounting platform (20).
3. Place the telescope tube on the mount so that the treaded post at the bottom of the tube rings go through the holes on the mounting platform.
4. Thread a wing nut onto the end of the threaded posts and tighten to secure the tube to the mount.
5. Tighten the screws (4) that hold the mounting rings in place. This will keep the telescope from sliding back and forth in the mounting rings.

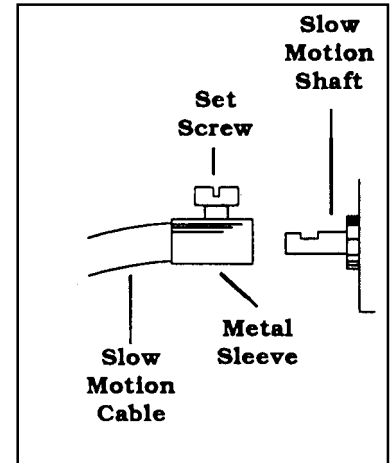


Figure 1-3

Attaching the Accessories

Your telescope comes with the following optical accessories:

- 20mm eyepiece 1 1/4"
 - 4mm eyepiece 1 1/4 "
 - 3x Barlow Lens 1 1/4"
1. Remove the caps from the focuser draw tube (3).
 2. Place the chrome barrel end of the eyepiece into the focuser (see Figure 1-4). Lock it into place with the thumb screw on the side of the focuser.
 3. Your telescope also comes with a 3x Barlow lens which triples the magnifying power of each eyepiece (see *Magnification* section of the manual). To use the barlow lens, insert the barlow lens directly into the focuser. Then start by using the low power eyepiece such as the 20mm, and insert it directly into the barlow lens.

Attaching the Finderscope

1. Remove the two small, silver thumbscrews located on top of the telescope tube. See Figure 1-4.
2. Place the finderscope bracket over the two holes in the telescope tube, lining up the holes on the finderscope bracket with those in the telescope tube.
3. Insert the thumbscrews through the finderscope bracket and thread them into the telescope tube.

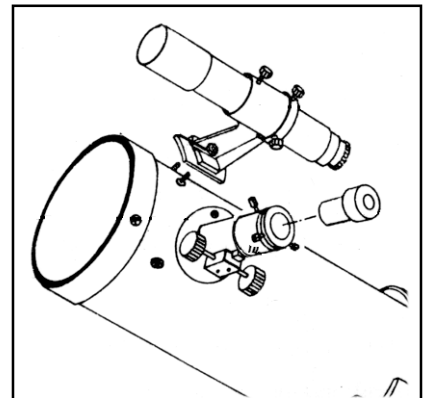


Figure 1-4

Aligning the Finderscope

1. Locate a distant daytime object and center it in a low power eyepiece in the main telescope.
2. Look through the finderscope and take notice of the position of the same object.
3. Without moving the main telescope, turn the adjustment thumb screws located around the finderscope bracket until the crosshairs of the finder are centered on the alignment object.

Finding Objects

In order to use the equatorial mount's setting circles, the mount must first be aligned with the earth's axis of rotation.

1. Turn the latitude adjustment screw (8) located at the rear of the mount to adjust the angle of the mount. Look at the latitude scale and move the mount to the latitude of your location. This only has to be done once unless you take the telescope to a different location. For example, Los Angeles, California is located at about 34°. If you do not know your latitude, it can be found on most road atlases of your area.

To change the direction your telescope is pointing:

2. To move the telescope in declination (north/south) there are two options. For large and quick movements, loosen the declination locking screw (20) and manually move the telescope, then tighten the knob when you are near the position you want. For very small movements and fine adjustments, use the declination slow motion control (7). The declination cable has a range of about 30°. **Do not try to force movement when the declination cable has reached the stop.**

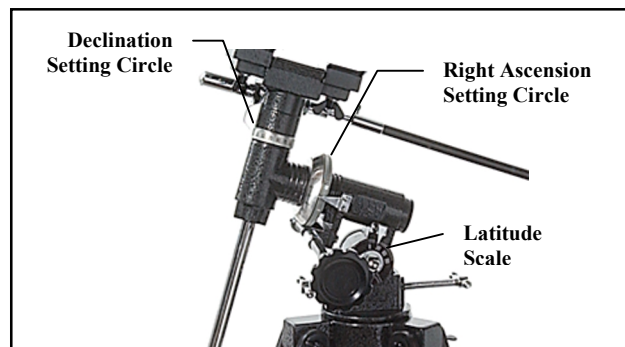


Figure 1-5

3. To move the telescope in right ascension (east/west) there are two options. For large and quick movements, loosen the right ascension locking screw (located above the setting circle) and manually move the telescope, then tighten the screw when you are near the position you want. For very small movements and fine adjustments, use the right ascension slow motion control (17).

The telescope should be properly balanced in order for it to move smoothly in both axes. Proper balance is essential if using an optional motor drive for accurate tracking.

4. To balance the right ascension axis, move the counterweight bar so it is parallel (horizontal) to the ground. Slowly release the right ascension locking screw and see if the optical tube moves. If the optical tube moves, then slide the counterweight up or down the counterweight bar until the optical tube remains stationary in the parallel position to the ground. When this happens, make sure the counterweight lock (located on the tip of the counterweight bar) is tight.

Focusing

1. Once you have found an object in the telescope, turn the focusing knob (21) until the image is sharp.
2. To focus on an object that is nearer than your current target, turn the focusing knob toward the eyepiece (i.e., so that the focusing tube moves away from the front of the telescope). For more distant objects, turn the focusing knob in the opposite direction.
3. To achieve a truly sharp focus, never look through glass windows or across objects that produce heat waves, such as asphalt parking lots.

Image Orientation

When observing with a Newtonian reflector telescope, the image seen will be correct for daytime viewing. However the image will be rotated depending on the position of the focuser relative to the optical tube. Newtonian telescopes are designed for astronomical use rather than for daytime land viewing. The finderscope will always give inverted (up-side-down and backwards) images.

Magnification

The magnification (or power) of a telescope varies depending upon the focal length of the eyepiece being used and the focal length of the telescope.

The PowerSeeker 114 telescope has a focal length of 900mm and comes with a 20mm 1¼" eyepiece. To calculate magnification, use the following formula, in which FL = focal length:

$$\text{Magnification} = \frac{FL \text{ (telescope) in mm}}{FL \text{ (eyepiece) in mm}}$$

Therefore, if you use the 20mm eyepiece your magnification is $900/20 = 45x$. The same formula can be applied to any of your eyepieces.

Important!

Magnification through any telescope has its limits. These limits are determined by the laws of optics and the nature of the human eye. Most of your viewing will be done in the range of 50x to 130x. Higher powers are used mainly for lunar and sometimes planetary observing where you can greatly enlarge the image and the atmospheric conditions are near perfect. The images at extremely high powers magnify the image, but remember that the contrast will be very low due to the high magnification. For the brightest images with the most contrast, start by using the lower power eyepiece with a smaller image scale.

The following magnification levels can be achieved when using the standard eyepieces in conjunction with the 3x Barlow lens:

Eyepiece	Magnification	Mag. with 3x Barlow Lens
20mm	45x	135x
4mm	225x	675x

TELESCOPE MAINTENANCE

With proper care, your telescope should rarely need any maintenance work. To maintain your telescope in the best possible condition, observe the follow suggestions:

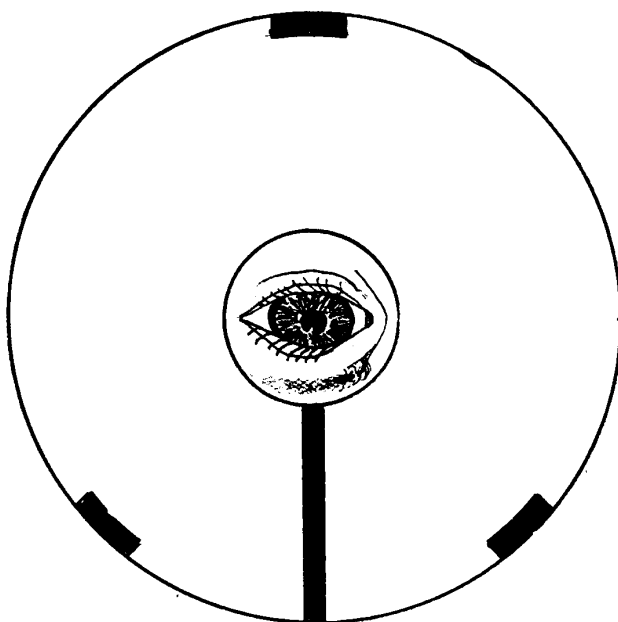
1. When your telescope isn't in use, replace all lens covers to keep dust and contaminants off the optical surfaces.
2. A small amount of dust on any optical surface isn't a problem and doesn't need to be removed. If the dust builds up, then use a can of compressed air and a camels hair brush to remove the dust. To remove fingerprints or other contaminants, use an optical cleaning kit or the **Celestron** Lens Pen (#93575).
3. If the inside of the objective lens needs cleaning, it should be done by a professional. Either have your instrument serviced by a telescope repair facility or return it to the factory for servicing.

Collimation

Collimation or alignment of the optical system is done at the factory before shipment.

1. If your telescope has received very rough handling during transport or is dropped, it may need collimation.

Refer to the following sketch to check if your telescope is in collimation. If you look into the eyepiece adapter (without an eyepiece) at the top of the focuser, this is what you should see. If the reflection of your eye is off center, then collimation is necessary.



2. Adjustments to the collimation of the telescope can be made by turning the collimation adjustment screws (6) located at the rear of the optical tube.
3. If your telescope is out of collimation, the best way to re-collimate it is with a good collimation tool. Celestron offers a Newtonian Collimation Tool (#94183) with detailed instructions that make it an easy chore.

SPECIFICATIONS

	PowerSeeker 114
Aperture	114mm
Focal Length	900mm
Focal Ratio	f/8
Mounting	Equatorial
Tripod	Adjustable Aluminum Tripod

NOTE: Specifications are subject to change without notice.

Optional Accessories

Celestron offers a full line of optional accessories for your telescope. Please refer to the **Celestron** Accessory Catalog (#93685) for a complete description, or logon to our web site at www.celestron.com.

Eyepieces – An assortment of 1¼” eyepieces are available to give you a wide range of magnifications.

- **OMNI Plössl** - Plössl eyepieces have a 4-element lens designed for low-to-high power observing. The Plössls offer razor sharp views across the entire field, even at the edges! In the 1-1/4" barrel diameter, they are available in the following focal lengths: 4mm, 6mm, 9mm, 12.5mm, 15mm, 20mm, 25mm, 32mm and 40mm.
- **Ultima** - Ultima is not really a design, but a trade name for our 5-element, wide field eyepieces. In the 1-1/4” barrel diameter, they are available in the following focal lengths: 5mm, 7.5mm, 10mm, 12.5mm, 18mm, 24mm, 30mm, 35mm, and 42mm. These eyepieces are all parfocal. The 35mm Ultima gives the widest possible field of view with a 1-1/4” diagonal.



Filters, Eyepiece - To enhance your visual observations of solar system objects, Celestron offers a wide range of colored eyepiece filter sets that thread into the 1-1/4" oculars. Available sets are:

- #94119-10 – Orange, Light Blue, ND13%T, Polarizing (#s 21, 80A, 96ND-13, Polarizing)
- #94119-20 - Deep Yellow, Red, Light Green, ND25% T (#s 12, 25, 56, 96ND-25)
- #94119-30 - Light Red, Blue, Green, ND50% T (#s 23A, 38A, 58, 96ND-50)
- #94119-40 - Yellow, Deep Yellow, Violet, Pale Blue (#s 8, 15, 47, 82A)

Flashlights - #93588 LED (light emitting diode) flashlights conveniently allow you to read star maps without diminishing your night vision. Feature adjustable brightness and is lightweight.

Light Pollution Reduction (LPR) Filter (#94126A) - A 1¼” filter that threads into a 1¼” eyepiece, designed to enhance your views of deep-sky astronomical objects when observed from urban areas. The LPR filter selectively reduces the transmission of certain wavelengths of light, specifically those produced by artificial lights. This includes mercury, and high and low pressure sodium vapor lights. Additionally, it blocks unwanted natural light (also known as sky glow).



Sky Maps (#93722) – When learning the night sky, **Celestron** Sky Maps offer just the guidance you need. The maps show all the constellations and brighter deep-sky objects and are printed on heavy, moisture-resistant paper for durability. The front cover features a rotating planisphere, indicating when specific constellations are visible.

Peterson First Guides® - Astronomy (#93728)

A simplified field guide to the stars, the planets and the universe featuring full color maps showing the positions of the stars throughout the year. This useful guide also includes beautiful constellation paintings, photographs, and clear, concise descriptions of stars, the planets, the sun, the moon, comets, black holes, galaxies and more.

CELESTRON TWO YEAR WARRANTY

- a. Celestron warrants this telescope to be free from defects in materials and workmanship for two years. Celestron will repair or replace such product or part thereof which, upon inspection by Celestron, is found to be defective in materials or workmanship. As a condition to the obligation of Celestron to repair or replace such product, the product must be returned to Celestron together with proof-of-purchase satisfactory to Celestron.
- b. The Proper Return Authorization Number must be obtained from Celestron in advance of return. Call Celestron at (310) 328-9560 to receive the number to be displayed on the outside of your shipping container.

All returns must be accompanied by a written statement setting forth the name, address, and daytime telephone number of the owner, together with a brief description of any claimed defects. Parts or product for which replacement is made shall become the property of Celestron.

The customer shall be responsible for all costs of transportation and insurance, both to and from the factory of Celestron, and shall be required to prepay such costs.

Celestron shall use reasonable efforts to repair or replace any telescope covered by this warranty within thirty days of receipt. In the event repair or replacement shall require more than thirty days, Celestron shall notify the customer accordingly. Celestron reserves the right to replace any product which has been discontinued from its product line with a new product of comparable value and function.

This warranty shall be void and of no force of effect in the event a covered product has been modified in design or function, or subjected to abuse, misuse, mishandling or unauthorized repair. Further, product malfunction or deterioration due to normal wear is not covered by this warranty.

CELESTRON DISCLAIMS ANY WARRANTIES, EXPRESS OR IMPLIED, WHETHER OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR USE, EXCEPT AS EXPRESSLY SET FORTH HEREIN.

THE SOLE OBLIGATION OF CELESTRON UNDER THIS LIMITED WARRANTY SHALL BE TO REPAIR OR REPLACE THE COVERED PRODUCT, IN ACCORDANCE WITH THE TERMS SET FORTH HEREIN. CELESTRON EXPRESSLY DISCLAIMS ANY LOST PROFITS, GENERAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM BREACH OF ANY WARRANTY, OR ARISING OUT OF THE USE OR INABILITY TO USE ANY CELESTRON PRODUCT. ANY WARRANTIES WHICH ARE IMPLIED AND WHICH CANNOT BE DISCLAIMED SHALL BE LIMITED IN DURATION TO A TERM OF TWO YEARS FROM THE DATE OF ORIGINAL RETAIL PURCHASE.

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitation on how long an implied warranty lasts, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Celestron reserves the right to modify or discontinue, without prior notice to you, any model or style telescope.

If warranty problems arise, or if you need assistance in using your telescope contact:

Celestron
Customer Service Department
2835 Columbia Street
Torrance, CA 90503 U.S.A.
Tel. (310) 328-9560
Fax. (310) 212-5835
Monday-Friday 8AM-4PM PST

This warranty supersedes all other product warranties.

NOTE: This warranty is valid to U.S.A. and Canadian customers who have purchased this product from an Authorized Celestron Dealer in the U.S.A. or Canada. Warranty outside the U.S.A. and Canada is valid only to customers who purchased from a Celestron Distributor or Authorized Celestron Dealer in the specific country and please contact them for any warranty service.