

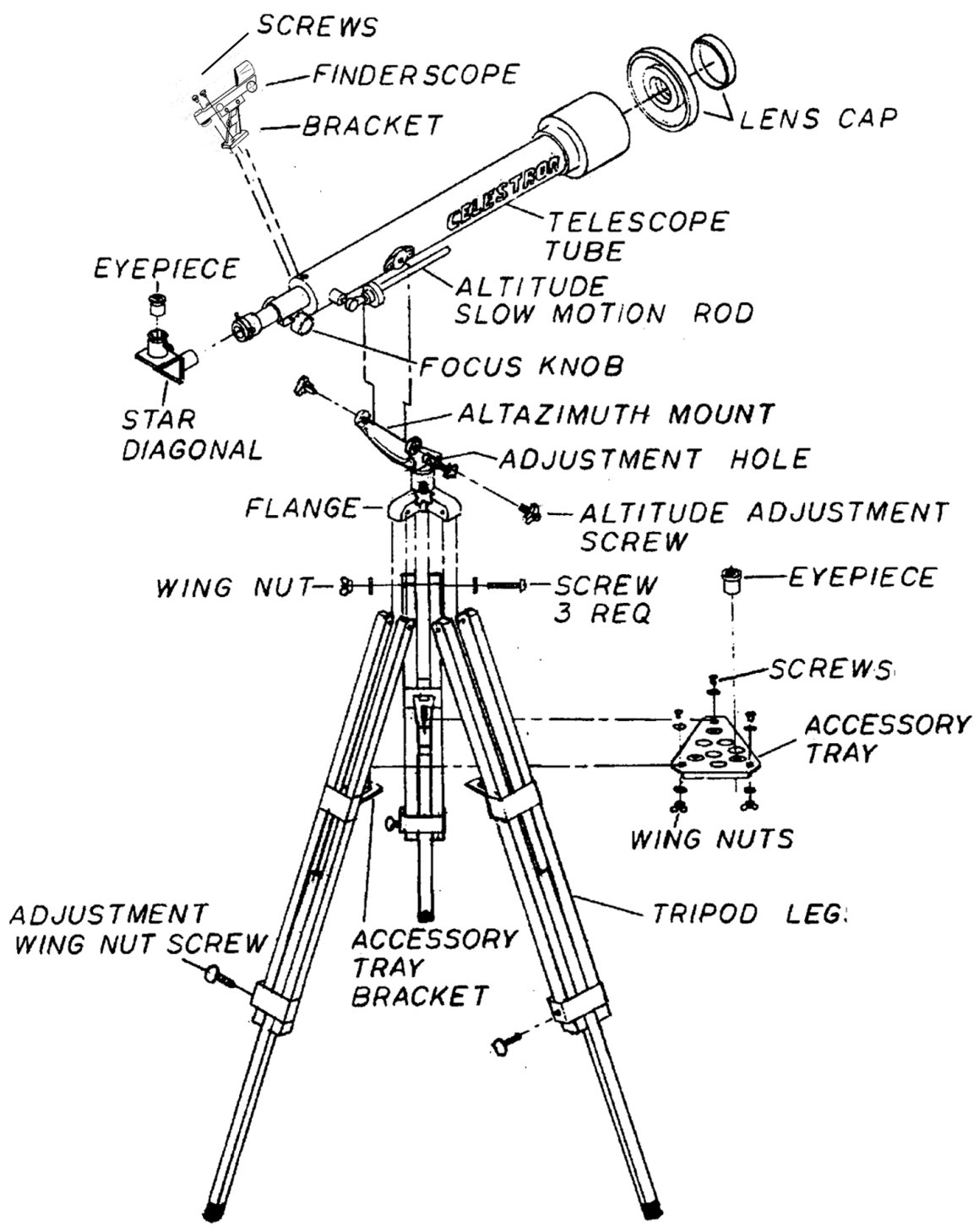


**FIRSTSCOPE 60 AZ REFRACTORS**  
MODELS #21052

**FIRSTSCOPE 70 AZ REFRACTOR**  
MODEL #21071

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***INSTRUCTION MANUAL***



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## INTRODUCTION

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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.

**Altazimuth mount** - the simplest type of mount, with two motions: altitude (up and down) and azimuth (side-to-side). "Mount" refers to the part of the telescope that support the tube, which carries all the telescope's optics.

**Altitude lock** - allows the telescope tube to be locked into place once a focused image has been set up, by tightening the two screws on the outside of the altazimuth mount.

**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.

**Objective lens** - the front lens of the telescope. It gathers incoming light to create a sharply focused image.

**Refracting telescope** - a long, thin tube where light passes in a straight line from the front objective lens directly to the eyepiece at the opposite end of the tube.

First, you need to take the time to familiarize yourself with the parts of your **Firstscope** 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 **Firstscope 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.

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## **THE FIRSTSCOPE 60 REFRACTOR**

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The **Firstscope AZ** is a classical, two element refracting telescope that comes on an altazimuth mount. This section instructs you on the proper assembly and use of your **Firstscope** 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.

- Three tripod legs, with one accessory tray bracket mounted on each leg. (Firstscope 70 AZ comes with a collapsible center leg brace).
- Tripod accessory tray
- Altazimuth mount
- Telescope Optical Tube
- Lens shade; front and rear lens caps (pre-assembled)
- Rack and pinion focuser (pre-assembled)
- Altitude slow motion rod assembly (Firstscope 60 model)
- Star Pointer Finderscope with bracket.
- One 1¼" 90° diagonal
- 20mm 1¼" eyepieces
- 10mm 1¼" eyepiece
- 1.5x Erecting eyepiece

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### ***Setting Up The Tripod***

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To set up the tripod, locate the altazimuth mount, the tripod legs and the tripod bolt pack.

1. Extend the center portion of each of the three tripod legs down 6-8".
2. Open the tripod adjustment bolt pack. Use the three wing nut screws to secure each of the extended legs by threading these screws through the holes in the brackets at the bottom of each leg. This is important. If you do not extend the legs now, you won't be able to once the tripod head is assembled. Fine tuning of tripod height can be done later, and the wing nuts can be adjusted to secure the telescope at a desirable height.
3. Orient the three tripod legs so the brackets that hold the accessory tray are on the inside.
4. Slide the two top portions of the tripod leg around the flange on the altazimuth mount, so the flange is secured between them.
5. Remove the wing nut and one washer from the screw.
6. Slide the screw through the tripod leg and flange, until the screw extends out the other side.
7. Slide the washer and wing nut over the screw and tighten. This can be left slightly loose, to allow for positioning the legs later, when attaching the accessory tray.
8. Repeat this process for the remaining two legs. Now the tripod will stand by itself.

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### ***Attaching the Accessory Tray***

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Start by locating the accessory tray and bolt pack for the accessory tray.

1. Remove the wing nut and one washer from each screw.
2. Slide one corner of the accessory tray over the bracket hanging from the tripod leg. Note: remove plastic tips from each bracket. Plastic tips serve only to protect the tripod leg from being scratched. Make sure the tray is placed over the tip of the bracket, so the bracket doesn't cover the holes cut into the accessory tray, allowing for full use. For the Firstscope 70 AZ, the accessory tray sits on top of the center leg brace and attaches with the provided winged bolts.
3. Insert a screw—with washer—down through the accessory tray and bracket.
4. Slide the washer and wing nut over the end of the screw. Tighten the screw completely.
5. Repeat this process for the remaining two corners of the accessory tray.

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## ***Installing the Telescope Onto the Mount***

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1. Slide the slow motion rod through the adjustment hole on the side of the telescope tube.
2. Place the telescope tube inside the altazimuth mount.
3. Insert the altitude adjustment screws (star shaped handles) through the mount and thread into the sides of the telescope.
4. Remove the lens cap from the telescope.

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## ***Attaching the Star Pointer Finderscope***

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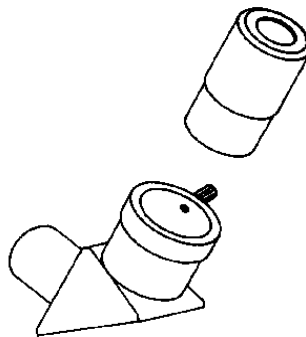
1. Remove the two (2) small, silver thumbscrews located at the back of the telescope tube.
2. Place the finderscope bracket over the two holes in the telescope tube, lining up the holes on the finderscope bracket with those in the telescope tube. Orient the Star Pointer finderscope so that the glass window is facing towards the front of the tube.
3. Insert the thumbscrews through the finderscope bracket and thread them into the telescope tube.

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## ***Attaching the Eyepieces***

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1. Remove the caps from the focuser (at the end of the telescope tube) and the diagonal. The cap for the diagonal is at the center of the top cover.
2. Insert the chrome end of the diagonal into the focuser.
3. Lock into place by tightening the set screws on the focuser.
4. Remove caps from the eyepiece (ocular) and place it into the diagonal. Lock it into place with the set screw.



**1 1/4" Eyepiece and star diagonal**

The **Firstscope AZ** comes with an erecting eyepiece, primarily for daytime terrestrial viewing. This eyepiece corrects the image you see in your telescope, so that it's both right side up and corrected from left to right. Without this eyepiece, the image you see is reversed from left to right, when using the standard diagonal. To use the erecting eyepiece, remove the diagonal and insert the erecting eyepiece directly into the focuser. Then use a low power eyepiece such as the 20mm, inserting it directly into the erecting eyepiece.

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## ***Aligning the Star Pointer Finderscope***

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The Star Pointer is the quickest and easiest way to point your telescope exactly at a desired object in the sky. It's like having a laser pointer that you can shine directly onto the night sky. The Star Pointer is a zero magnification pointing tool that uses a coated glass window to superimpose the image of a small red dot onto the night sky. While keeping both eyes open when looking through the Star Pointer, simply move your telescope until the red dot, seen through the Star Pointer, merges with the object as seen with your unaided eye. The red dot is produced by a light-emitting diode (LED); it is not a laser beam and will not damage the glass window or your eye. The star pointer is powered by a long life 3-volt lithium battery (#CR2032) located underneath the front portion of the Star Pointer. Like all finderscopes, the Star Pointer must be properly aligned with the main telescope before it can be used. This is a simple process using the azimuth and altitude control knobs located on

the side and bottom of the Star Pointer. The alignment procedure is best done at night since the LED dot will be difficult to see during the day.

1. To turn on the Star Pointer, rotate the variable brightness control clockwise until you here a "click". To increase the brightness level of the red dot, continue rotating the control knob about 180° until it stops.
2. Locate a bright star or planet and center it in a low power eyepiece in the main telescope.
3. With both eyes open, look through the glass window at the alignment star.

If the Star Pointer is perfectly aligned, you will see the red LED dot overlap the alignment star. If the Star Pointer is not aligned, take notice of where the red dot is relative to the bright star.

Without moving the main telescope, turn the Star Pointer's azimuth and altitude alignment controls until the red dot is directly over the alignment star.

If the LED dot is brighter than the alignment star, it may make it difficult to see the star. Turn the variable brightness control counterclockwise, until the red dot is the same brightness as the alignment star. This will make it easier to get an accurate alignment. The Star Pointer is now ready to be used . **Remember to always turn the power off after you have found an object. This will extend the life of both the battery and the LED.**

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## ***Finding Objects***

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1. Loosen the altitude locks on the sides of the telescope tube and the silver azimuth lock on the base of altazimuth mount, then move the telescope in the desired direction.
2. Look through the Star Pointer finderscope and pan the telescope until the object appears in the field of view. Once it's in the field, tighten the altitude and azimuth locks.
3. To center the object with the red dot in the Star Pointer, use the fine adjustment ring on the altitude slow motion rod assembly.

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## ***Focusing***

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1. Once you have found an object in the telescope, turn the focusing knob 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.

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## ***Image Orientation***

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1. When observing with a diagonal, the image will be right side up, but reversed from left to right.
2. When observing straight through, with the eyepiece inserted directly into the telescope, the image will be inverted. Also, the image in the finderscope is inverted.

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## ***MAGNIFICATION***

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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 Firstscope telescope has a focal length of 700mm and comes with a 20mm 1¼" eyepiece. To calculate magnification, use the following formula, in which FL = focal length:

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

Therefore, if you use the 20mm eyepiece your magnification is  $700/20 = 35x$ . The same formula can be applied to any of your eyepieces.

**Celestron** offers numerous optional eyepieces to expand your range of magnification. Eyepieces come in barrel diameters of .96" and 1¼". In general, 1¼" eyepieces are of a higher optical quality and give you sharper images, along with a wider field of view and better eye relief.

Magnification through the telescope has its limits. These limits are determined by the laws of optics and the nature of the human eye. The maximum usable power (with sharp images) is equal to 60 times the aperture of the telescope (in inches). So, with a 60mm telescope it has a maximum useful power of 144x ( $2.4" \times 60$ ) and with the 70mm the maximum is 165x ( $2.7559 \times 60$ ). Most of your viewing will be done in the range of 30x to 120x. Higher powers are used mainly for lunar and sometimes planetary observing where you can greatly enlarge the image. The images at extremely high powers like 675x magnify the image but remember that the contrast will be very low and the image somewhat blurred due to the super power. For the brightest images with the most contrast, use the lower powers with a smaller image scale.

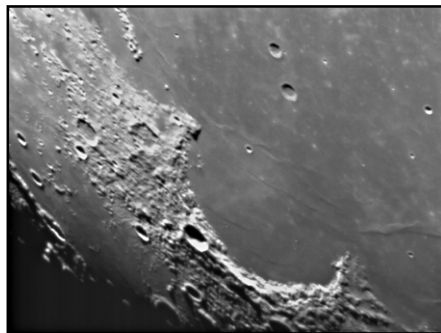
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## **TELESCOPE OPERATION — ASTRONOMICAL OBSERVING**

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Now that your telescope is set up, you're ready to use it for observing.

### **Observing the Moon**



In the night sky, the moon is a prime target for your first look because it is extremely bright and easy to find. Although the beauty of the full moon may make it seem a perfect viewing object, in fact, the light reflected from its fully illuminated face can be overpowering. In addition, little or no contrast can be seen during this phase.

One of the best times to observe the moon is during its partial phases, such as a crescent or quarter moon. At these times, long shadows reveal a great amount of detail on the lunar surface. At low power, with the standard eyepiece, you'll be able to see the whole lunar disk at one time. Change to higher power (magnification) to focus in on a smaller area.

Keep in mind that the rotation of the earth will cause the moon to drift out of your field of view. You'll have to manually adjust the telescope to keep the moon centered. This effect is more noticeable at higher power. Consult a current astronomy magazine or your local newspaper to find out the current phase of the moon.

### **Lunar Observing Hint**

To increase contrast and bring out visible detail on the lunar surface, try using different eyepiece filters (available through your local **Celestron** dealer). A yellow filter works well for improving contrast.

### **Observing the Planets**

Other easy targets include the five "naked eye" planets of our solar system, so called because they can be spotted in the night sky by the unaided eye. You can see **Venus** go through its lunar-like phases. **Mars** can reveal a host of surface detail and one, if not both, of its polar caps. You'll be able to see the cloud belts of **Jupiter**, perhaps even the great Red Spot. In addition, you'll be able to see the moons of Jupiter as they orbit the giant planet. **Saturn**, with its beautiful rings, is easily visible at moderate power, as is **Mercury**. All you need to know is where to look. Most astronomy publications indicate where the planets are in the sky each month.



The drawing of Jupiter provides a good representation of what you can expect to see with moderate magnification, during good “seeing” conditions.

### Observing the Sun

Although overlooked by many amateur astronomers, solar observation is both rewarding and fun. However, because the sun is so bright, special precautions must be taken when observing this star, so as not to damage your eyes or your telescope. Never project an image of the sun through the telescope. This can damage the telescope and/or any accessories attached to the telescope. For safe solar viewing, use a **Celestron** solar filter. This filter reduces the intensity of the sun's light, making it safe to view. With this filter you can see sunspots as they move across the solar disk and faculae, which are bright patches seen near the sun's edge. Before any solar viewing, please review the warning earlier in this manual.

To enable you to find objects you should have a set of Star Charts. The location of the planets may appear in local newspapers.

### Observing Deep-Sky Objects

Deep-sky objects are simply those objects outside the boundaries of our solar system. They include star clusters, planetary nebulae, diffuse nebulae, double stars and other galaxies outside our own Milky Way. Unlike the sun, moon and our five major planets, most deep-sky objects are not visible to the naked eye. **Celestron Sky Maps** (#93722) can help you locate the brightest deep-sky objects.

Most deep-sky objects have a large angular size. Therefore, a low-to-moderate power eyepiece is all you need to see them. Visually, they are too faint to reveal any of the color seen in long exposure photographs. Instead, they appear black and white. Because of their low surface brightness, they should be observed from a “dark-sky” location. Light pollution around large urban areas washes out most nebulae making them difficult, if not impossible, to observe. The amount of detail you can see is dependent on your observing site (dark-sky rural locations are best), atmospheric conditions, brightness of the object and your observing experience.

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## TELESCOPE MAINTENANCE

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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.

## SPECIFICATIONS

	<b>Firstscope 60's</b>	<b>Firstscope 70's</b>
Aperture	60mm	70mm
Focal Length	700mm	700mm
Focal Ratio	f/12	f/10
Mounting	Altazimuth	Altazimuth
Tripod	Adjustable Tripod	Adjustable Tripod

**NOTE: Specifications are subject to change without notice.**



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## Optional Accessories

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**Celestron** offers a full line of optional accessories for your **Firstscope** telescope. Please consult the **Celestron** Accessory Catalog (#93685) for a complete description.

**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, 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, 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.



**Eyepiece filters** - To enhance your visual observations, individual filters and sets are available for 1¼" eyepieces.

**Flashlights** - **Celestron's #93592 and #93588** LED (light emitting diode) flashlights conveniently allow you to read star maps without diminishing your night vision. Both feature adjustable brightness and are small and lightweight, (#93592 is only 6 inches long, and weighs in at a mere 3 ounces).

**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.

**Solar Filters** - **Celestron's** AstroSolar® solar filters permit completely safe, direct observation of the sun. This filter, which transmits .00001% of visible light, allows sunspots to be seen as they move across the solar disk. While reducing the intensity of the sun's visible light, it also blocks 99.999% of invisible infrared light. The solar filter is made of precision engineered polyester film. A layer of aluminum is vacuum-deposited on the surface of the sheet used to make each filter. This aluminum coating produces a cool, comfortable, pale blue image of the sun. A #21 orange eyepiece filter works well in conjunction with the filter to produce a more naturally colored image of the sun.

### **Peterson First Guides® - Astronomy**

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.

**Planisphere (#93720)** - A colorful rotating star map that indicates when specific constellations are visible, with removable markers for tracking the movement of planets. Available in three different latitudes: 30°, 40°, and 50° — all ±10°.

**A full description of all Celestron accessories can be found in the Celestron Accessory Catalog (#93685).**

## 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  
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.**