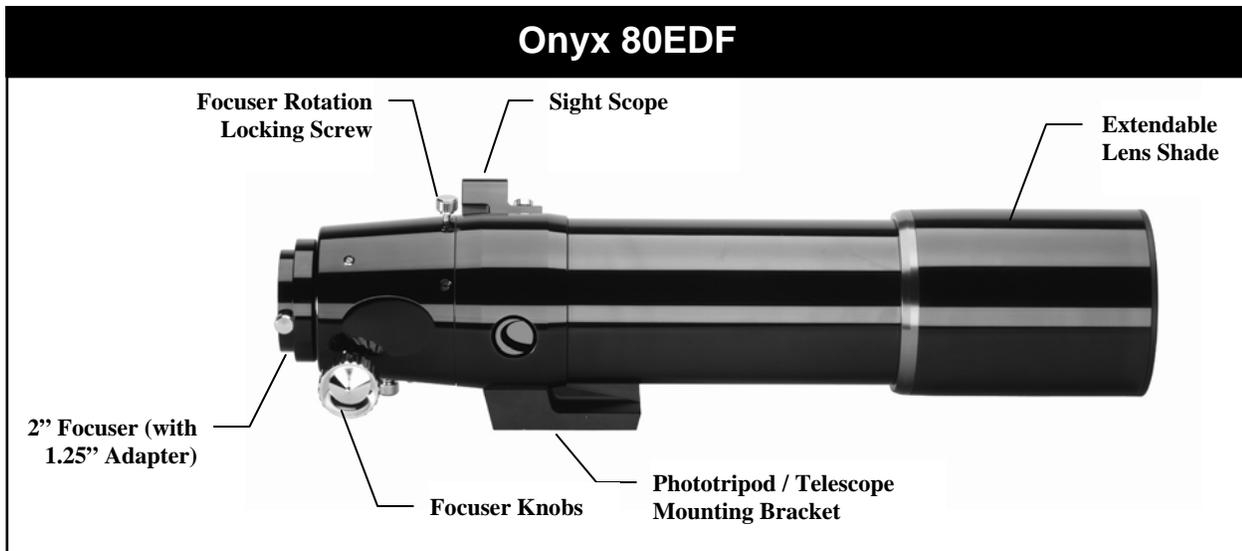




Congratulations on your purchase of the Celestron Onyx 80EDF telescope! Whether your interest lies in nature or celestial viewing the Onyx 80EDF telescopes offers the finest optical quality guaranteed to give you years of viewing pleasure.



Photographic Tripod

For best results, attach your Celestron telescope to a heavy duty photo tripod or equatorial mount.

1. To attach to a standard photo tripod:
2. Align the hole at the bottom of the tripod mounting bracket with the $\frac{1}{4}$ "x20 mounting screw on top of any standard photo tripod.
3. Thread the mounting screw into the tripod mounting bracket to secure the scope in place.

Equatorial Mount

Your Onyx 80EDF's mounting bracket can be used with the Advanced GT CG-5 equatorial mount. Follow the directions in your mounts owner manual for instruction on attaching the optical tube.

VISUAL OBSERVING INFORMATION

Focusing

In order to focus your telescope for visual use it is necessary to use the appropriate diagonal and eyepiece. Celestron offers both 1.25" and 2" diagonals that are suited for both daytime (land) viewing and nighttime stargazing. See Optional Accessories section for more information.

1. When working with any optical instrument, there are several focusing hints that will ensure that you get the sharpest possible image. The hints listed here are for visual observing and photography.
2. Never look through glass. Glass found in household windows is optically imperfect and may vary in thickness from one location to the next. This inconsistency can and will affect the ability to focus your telescope. In most cases, you will not be able to achieve a truly sharp focus. In some cases, you may actually see a double image.
3. Avoid looking across or over objects that are producing heat waves. This includes asphalt parking lots on hot summer days or building rooftops. The turbulent air caused by these conditions makes it impossible to get a truly sharp focus.
4. Avoid hazy skies, fog, and mist, all of which can make it difficult to focus, thus greatly reducing the amount of detail seen. Remember that no matter how good the optics of your instrument are, they can NOT perform to their fullest under adverse conditions.

Calculating Magnification (Power)

You can change the magnification of your scope simply by changing the eyepiece (also called an ocular). To determine the magnification with your telescope, simply divide the focal length of your telescope by the focal length of the eyepiece. In equation format, the formula looks like this:

$$\text{Magnification} = \frac{\text{Focal Length of Telescope (mm)}}{\text{Focal Length of Eyepiece (mm)}}$$

For example, to determine the magnification of the 80EDF with a 25mm eyepiece, divide the focal length of the telescope (500mm) by the focal length of the eyepiece (20mm). 500 divided by 20 yields 25 power.

Although the power is variable, each instrument has a limit to the highest useful magnification. The general rule is that 60 power can be used for every inch of aperture. For example, in a 3.2" diameter telescope, such as the 80EDF, the maximum useful magnification is 192 power. This is derived from multiplying 60 times 3.2". Although this is the maximum useful magnification, most observing is done in the range of 20 to 35 power for every inch of aperture which for the 80EDF is 64 to 112.

Field of View

Determining the field of view is important if you want to get an idea of the size of the object you are observing. To calculate the actual field of view, divide the apparent field of the eyepiece (supplied by the eyepiece manufacturer) by the magnification. In equation format, the formula looks like this:

$$\text{True Field (in degrees)} = \frac{\text{Apparent Field of Eyepiece (in degrees)}}{\text{Magnification}}$$

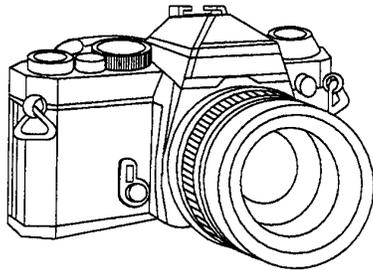
Using the example we started with in the previous section, we can determine the field of view using the same 25mm eyepiece. The 20mm eyepiece has an apparent field of view of 50° . Divide the 50° by the magnification, which is 25 power. This yields an actual field of 2° . To convert this to feet at one thousand yards, multiply the actual field of 2° by 52.5. This gives us a field width of 105 feet at one thousand yards.

PHOTOGRAPHY HINTS

Metering

Celestron telescopes have fixed apertures and, as a result, fixed f /ratios. To properly expose your subjects photographically, you need to set your shutter speed accordingly. Most 35mm SLR cameras offer through-the-lens metering which lets you know if your picture is under or overexposed. Adjustments for proper exposures are made by changing the shutter speed. Consult your camera manual for specific information on metering and changing shutter speeds.

Reducing Vibration



Releasing the shutter manually can cause vibrations, producing blurred photos. To reduce vibration when tripping the shutter, use a cable release. A cable release keeps your hands clear of the camera and lens, thus eliminating the possibility of introducing vibration. Mechanical shutter releases can be used, though air-type releases are best.

Blurry pictures can also result from shutter speeds that are too slow. To prevent this, use films that produce shutter speeds greater than $1/250$ of a second when hand-

holding the lens. If the lens is mounted on a tripod, the exposure length is virtually unlimited.

Another way to reduce vibration is with the Vibration Suppression Pads (#93503). These pads rest between the ground and tripod feet. They reduce the vibration amplitude and vibration time.

ASTRONOMY WITH YOUR TELESCOPE

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. Often, it is tempting to look at the Moon when it is full. At this time, the face we see is fully illuminated and its light is overpowering. In addition, little or no contrast can be seen at this time.

One of the best times to observe the Moon is during its partial phases (around the time of first or third quarter). Long shadows reveal a wealth of detail on the lunar surface. At low power you can see the entire lunar disk at one time. Change to higher power (magnification) to focus in on a smaller area.

Keep in mind that since you are not using a clock drive, the Earth's rotation causes the Moon to drift out of your field of view. This effect is more noticeable at high power. You must manually adjust your tripod to

keep the Moon centered. Consult your local newspaper or a current astronomy magazine to find out when the Moon is visible.

Observing the Planets

This same method used to observe the Moon applies to viewing the planets. You can see Venus go through its lunar-like phases. Mars reveals a host of surface detail and one, if not both, of its polar caps. You will be able to see the cloud belts of Jupiter and the great Red Spot (if it is visible at the time you are observing). In addition, you will also be able to see the moons of Jupiter as they orbit this gas giant. Saturn, with its beautiful ring system, is easily visible at moderate power. All you need to know is when and where to look. Most astronomy publications tell where the planets can be found in the sky each month.

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. Unless your telescope is mounted onto a computerized mount, you will need to know where to look in the sky for these objects. The Celestron Sky Maps (#93722) will help you locate the brightest deep sky objects. Once you start observing deep sky objects, there are a few things to remember. First, most deep sky objects have a large angular size. Therefore, low to moderate power is all you need to see them. Second, visually they are too faint to reveal any color that is common to photographs. Instead, they have a black and white appearance. And lastly, 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 see. An LPR (Light Pollution Reduction) Filter (#94126A) is available for use with 1 1/4" eyepieces to allow urban use of the 80EDF for looking at nebulae.

Photographing the Moon

After looking at the night sky for awhile you may want to try photographing it. If you do, start with a nice, bright object like the Moon. To photograph the Moon:

1. Attach your telescope to a stable platform like the Celestron Alt-Az Tripod (#93607).
2. Load your camera with film that has a moderate-to-fast speed (i.e., high ISO rating). Faster films are more desirable when the Moon is a crescent. When the Moon is full, and at its brightest, slower films are more desirable. If photographing during the full phase, use a yellow filter to reduce the light intensity and to increase contrast.
3. Center the Moon in the field of your telescope.
4. Set the shutter speed to the appropriate setting (see below).
5. Trip the shutter using a cable release so as not to shake the camera and telescope.

| Lunar Phase | ISO 50 | ISO 100 | ISO 200 | ISO 400 |
|-------------|--------|---------|---------|---------|
| Crescent | 1/8 | 1/15 | 1/60 | 1/125 |
| Quarter | 1/30 | 1/125 | 1/250 | 1/500 |
| Full | 1/125 | 1/500 | 1/1000 | 1/2000 |

The exposure times listed here should be used as a starting point. Always make exposures that are longer and shorter than the recommended time. Also, try bracketing your exposures, taking a few photos at each shutter speed. This will ensure that you will get a good photo. Keep accurate records of your exposures. This information will be useful if you want to repeat your results or if you want to submit some of your photos to various magazines for possible publication!

CARE AND CLEANING OF THE OPTICS

Occasionally, dust and/or moisture may build up on the lens of your telescope. Special care should be taken when cleaning any optical instrument so as not to damage the optics.

If dust has built up on the lens, remove the dust with a camel's hair brush or a can of pressurized air. Spray at an angle to the lens for approximately 2 to 4 seconds. Then use an optical cleaning solution (available at most optical suppliers) and white tissue paper to remove any remaining debris. Strokes should go from the center of the lens to the outer edge. Do not rub in circles.

You can use commercially-made lens cleaner or mix your own. A good cleaning solution is isopropyl alcohol mixed with distilled water. The solution should be 60% isopropyl alcohol and 40% distilled water. Or liquid dish soap diluted with water (a couple of drops per one quart of water) can be used.

Internal adjustments and cleaning should be done only by the Celestron repair department. If your telescope is in need of internal cleaning, please contact the factory for service.

More...

Celestron offers an extensive array of telescope accessories. Consult the Celestron Accessory Catalog (#93685) for details.

OPTIONAL ACCESSORIES

You will find that additional accessories enhance your viewing pleasure and expand the usefulness of your telescope. For ease of reference, all the accessories are listed in alphabetical order.

Advanced GT German Equatorial Mount (#91518) – Turn your 80EDF telescope into a wide field photographic instrument or high power planetary telescope, with the addition of this computerized EQ mount. This new German Equatorial mount has precision worm gears on both axes for extremely smooth stability. The key element that makes this system the most stable in its class is the re-designed heavy-duty tripod with larger and more substantial legs that offer excellent damping characteristics for more stable views.



Barlow Lens - A Barlow lens is a negative lens that increases the focal length of a telescope. Used with any eyepiece, it doubles the magnification of that eyepiece. Celestron offers two Barlow lenses in the 1-1/4" size. The 2x Ultima Barlow (#93506) is a compact triplet design that is fully multicoated for maximum light transmission and parfocal when used with the Ultima eyepieces. The X-Cel ED Barlow (#93327) is a compact Barlow lens that uses ED glass and is under three inches long and weighs only 4 oz. It works very well with all Celestron eyepieces.

Diagonal 2" Mirror (#93526) - Celestron offers a 2" 90° 1/10 λ Mirror Diagonal that slides into the barrel of a 2" focuser. This diagonal includes an adapter to accept 1/4" eyepieces. It has a Starbright XLT[®] multicoated mirror and smooth mechanics that are precision manufactured for reliability

Diagonal, Erect Image - 45° -1-1/4" (#94112-A) - Celestron's Erect Image Diagonals are an Amici prism design. This design allows you to look into the telescope at a 45° angle, at images that are oriented properly, meaning the image is upright and correct from left to right.

Eyepieces - Like telescopes, eyepieces come in a variety of designs. Each design has its own advantages and disadvantages. For the 1-1/4" barrel diameter there are four different eyepiece designs available.

- **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.
- **X-Cel** - This 6 element design allows each X-Cel Eyepiece to have 20mm of eye relief, 55° field of view and more than 25mm of lens aperture (even with the 2.3mm). In order to maintain razor sharp, color corrected images across its 55° field of view, extra-low dispersion glass is used for the most highly curved optical elements. The excellent refractive properties of these high grade optical elements, make the X-Cel line especially well suited for high magnification planetary viewing where sharp, color-free views are most appreciated. X-Cel eyepiece come in the following focal lengths: 2.3mm, 5mm, 8mm, 10mm, 12.5mm, 18mm, 21mm, 25mm.



T-Adapter – (#93642) -A T-Adapter allows you to attach your 35mm SLR camera to

the prime focus of your telescope. This arrangement is used for terrestrial photography and short exposure lunar and planetary photography. It can also be used for long exposure deep-sky photography when using a separate guide scope.

A full description of all Celestron accessories can be found at www.celestron.com)

SPECIFICATIONS

| | |
|-------------------------------|-----------------------|
| Model | 52285 |
| Series | Onyx 80EDF |
| Aperture (mm) | 80 |
| Focal Length (mm) | 500 |
| Coating | Starbright XLT |
| Length | 16 inches |
| Instrument Weight (lb) | 6 lbs |

A Word of Caution!

Your Celestron telescope is designed to give you hours of fun and rewarding observations. There are, however, a few things to consider 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 your telescope. Permanent and irreversible eye damage may result.
- Never use your telescope to project an image of the Sun onto any surface. Internal heat build-up can damage your telescope and/or any accessories attached to it.

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 USA
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