

# **ASTRO-TECH** **AT111EDT** from Astronomy Technologies

Thank you for choosing this **Astro-Tech AT111EDT** high-quality apochromatic triplet refractor.

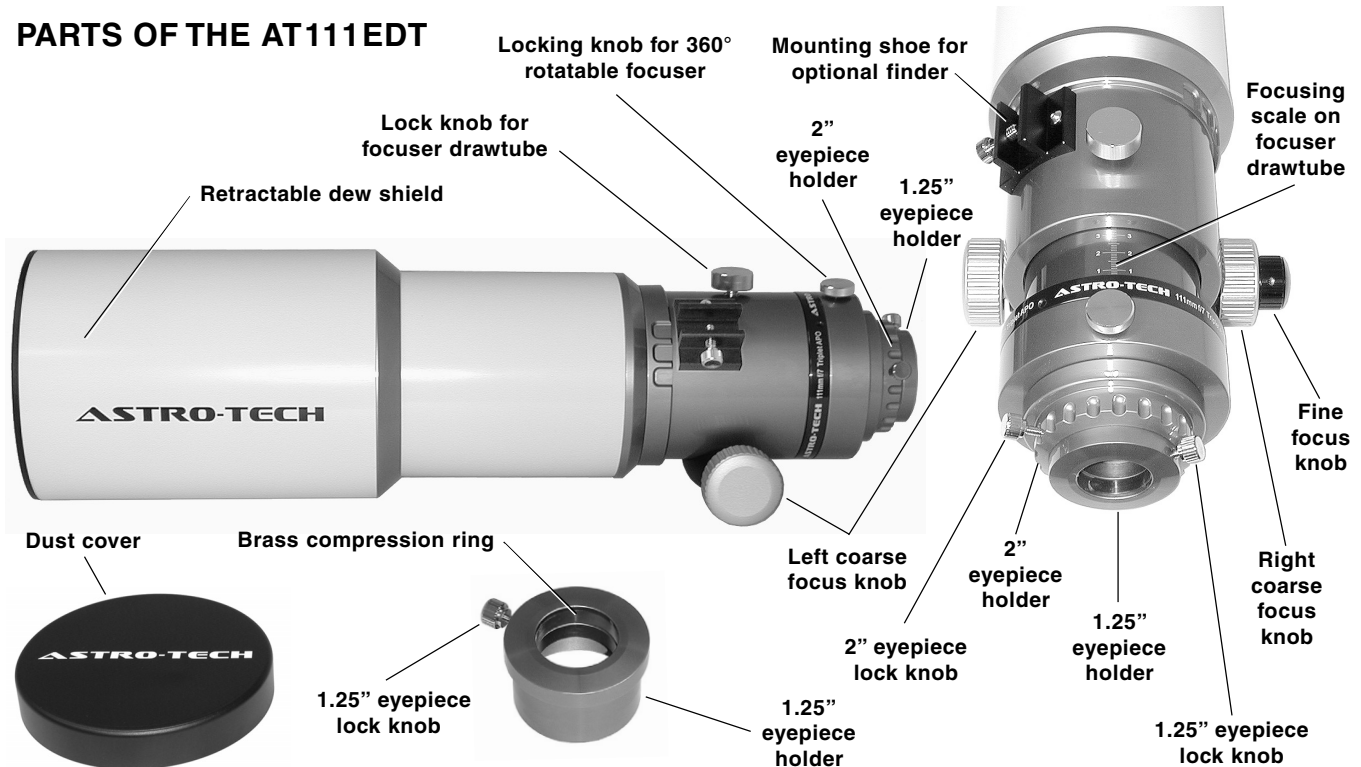
The lenses in your scope's 777mm f/7 air-spaced triplet optics use Ohara glass exclusively, from Japan's finest glass manufacturer. They include an advanced ED (Extra-low Dispersion) element to give you images that are virtually color-free, even at very high powers. Thanks to its computer-optimized optical design, top quality ED

glass, and high transmission multicoatings, the optical performance of your AT111EDT is exceptional indeed.

This instruction sheet will provide you with information on how to get the most out of your new Astro-Tech refractor, and how to properly maintain it so it can give you a lifetime of observing enjoyment.

Please familiarize yourself with the parts and functions of your AT111EDT before using it for the first time.

## PARTS OF THE AT111EDT



### Astro-Tech AT111EDT Apochromatic ED Triplet Refractor Specifications

**Aperture** ..... 111mm (4.4")  
**Focal Length** ..... 777mm  
**Focal Ratio** ..... f/7  
**Objective Type** ..... air-spaced triplet using all-Ohara glass, including an ED element  
**Optical Coatings** ..... fully multicoated  
**Resolving Power** (Dawes' Limit) ..... 1.04 arc seconds  
**Visual Limiting Magnitude** ..... 12.7 maximum  
**Light Grasp** (versus the eye) ..... 251x  
**Field Stops** ..... three knife-edge baffles  
**Focuser** ..... dual-speed rack and pinion with 11:1 reduction ratio fine focus; 360° rotating camera angle/observing angle adjuster; and 2" and 1.25" compression ring eyepiece holders  
**Focuser Travel** ..... 5.4" (138mm); millimeter scale on drawtube for repeatable focus

**Finder** ..... optional; mounting shoe provided for Astro-Tech multiple reticle finder or similar finder  
**Lens Shade** ..... retractable  
**Lens Shade Outer Diameter** ..... 150mm  
**Objective Lens Cover** ..... slip-on metal  
**Tube Diameter** ..... 124mm o. d.  
**Tube Length** (lens shade retracted) ..... 23.75" (603mm)  
**Tube Length** (lens shade extended) ..... 28" (711mm)  
**Optical Tube Weight** ..... 14.65 lbs. (6.66 kg)  
**Case** ..... aluminum-frame foam-fitted lockable hard case, with carrying handle  
**Case Dimensions** ..... 28" x 10.25" x 9"  
**Lowest Usable Power** ..... 19.4x (40mm eyepiece)  
**Highest Terrestrial Power** ..... 86x (9mm eyepiece)  
**Highest Practical Power** ..... 194x (4mm eyepiece)  
**Theoretical Maximum** ..... 222x (3.5mm eyepiece)

Your **Astro-Tech AT 111 EDT** refractor can be used for day and night viewing by simply adding a star diagonal and eyepiece. Any brand of eyepiece can be used, from a 40mm for the lowest practical magnification (19.4x), to a 3.5mm (222x) for very high power use. A 2" eyepiece holder on the focuser drawtube and the supplied 1.25" eyepiece adapter let you use either 1.25" or 2" star diagonals and eyepieces with no other adapter needed.

The focal length of the AT 111 EDT is ideal for low to medium power wide-angle views of nebulas, open star clusters, large galaxies, and comets. Crisp views of the Moon and planets are also routine at magnifications of 111x to 194x when seeing conditions permit.

To calculate the magnification of your telescope and eyepiece combination, divide the telescope focal length in mm by the eyepiece focal length in mm. For example, a 7mm eyepiece in the AT 111 EDT will give you a magnification of 111x ( $777\text{mm}/7\text{mm} = 111$ ).

**Mounting the AT 111 EDT:** A stable mount is essential for best viewing. The scope is not supplied with mounting rings, but machined 124mm i. d. split rings are readily available from your Astro-Tech dealer. These will allow you to install your scope on an equatorial mount of your choice for extended astronomical observing. Adding an optional Vixen-style dovetail bar to the rings will let you mount your AT 111 EDT on a suitably-sturdy altazimuth mount for terrestrial observing and casual grab-and-go backyard astronomy.

Astro-Tech makes an exceptionally stable altazimuth mount, the Astro-Tech Voyager, that can easily support the 14.65 lb. AT 111 EDT. The adjustable-height Voyager has automatic-clutch worm gear manual slow motion controls in both altitude and azimuth to make tracking terrestrial and astronomical objects smooth and easy.

**Astronomical Observing:** The theoretical maximum usable power available from this telescope is 222x, although this requires a 3.5mm eyepiece that provides a very dim 0.5mm diameter exit pupil. Higher powers are within the scope's capabilities, but require truly excellent seeing conditions and the patience to wait for those conditions to make their brief and infrequent appearances.

A more practical maximum magnification for astronomical viewing with the AT 111 EDT would be 194x, using a 4mm eyepiece. Keep in mind that seeing conditions play an important role in how high a magnification you can use on any given night. Only very good seeing conditions (clear skies and calm air) will support viewing at 194x. Under less than ideal conditions, lower powers in the 111x to 130x range provide more consistently usable and pleasing images.

The widest possible field of view with a 1.25" eyepiece is about 2.2°, which can be achieved with a 19.4x (40mm) Plössl eyepiece yielding a 5.71mm exit pupil. A 2" wide field eyepiece, such as the 40mm TMB Paragon, will give a 3.5° field at the same 19.4x power.

The AT 111 EDT does an outstanding job as a wide-field astrograph for 35mm and CCD imaging. A large chrome lock knob on top of the scope barrel lets you lock the position of the extra-long 138mm travel rack and pinion focuser drawtube at a sharp focus for photography.

**Rotating the Focuser:** The focuser's 2" eyepiece/accessory holder can be rotated a full 360° for the best photographic composition, or to put your star diagonal in the most comfortable observing position. To rotate the eyepiece holder, loosen the chrome lock knob on the telescope barrel just in front of the 2" eyepiece/accessory holder and rotate the holder to the desired angle. The indentations around the eyepiece holder provide a non-slip grip to make adjusting the angle easier. Tighten the lock knob to temporarily lock the eyepiece holder at the new angle.

**Terrestrial Observing:** The AT 111 EDT works well for daytime birding, nature studies, sweeping the landscape from the home with a view, etc. – provided it is installed on a suitably sturdy tripod or altazimuth mount, such as the Astro-Tech Voyager. It is also an excellent flat-field 777mm (15.5x) f/7 telephoto lens for terrestrial photography.

Generally speaking, the maximum usable daytime power with any terrestrial scope is about 1x per mm of aperture (theoretically 111x with the AT 111 EDT). However, attempts to push the daytime power to this high a magnification often magnify the heat waves, dust, and "mirage" in our atmosphere to the point where the images become blurry and unusable. A 22x (25mm) to 69x (8mm) eyepiece is usually more satisfying for everyday terrestrial use than a 111x eyepiece.

**Optional Astro-Tech Accessories:** Astro-Tech makes 1.25" and 2" star diagonals with state-of-the-art 99% reflectivity dielectric

coatings that nicely complement the performance of the AT 111 EDT. These diagonals are available from your Astro-Tech dealer to provide the maximum possible contrast and planetary detail. An Astro-Tech 45° viewing angle image-erecting 1.25" diagonal is available for terrestrial observing. An inexpensive Astro-Tech illuminated non-magnifying multi-reticle finder is also available for your AT 111 EDT.

**Collimating Your Optics:** See the supplied separate collimation sheet for information on collimating the lens for peak performance.

**Caring for Your Scope Optics:** Never store the telescope in a damp or humid environment. Avoid leaving it in a hot environment (exposed to direct sunlight on a window sill, in a car trunk, etc.) If you must store it in high humidity conditions, put a few packets of desiccant (silica gel or the equivalent, available from most camera stores) in with the telescope to absorb excess moisture. If not properly stored in a humid environment, the telescope may develop mildew which can damage the optics.

If dew has formed on the scope after a night of observing, allow the scope optics to air dry at room temperature before putting the lens cover on the scope and storing it away.

If the lens becomes dusty, smeared, or shows fingerprints or any other surface build-up, clean it as follows. First, gently blow away any surface dust or particles with a clean air blower (a child's ear syringe or a photographer's camel's hair brush with attached blower bulb, for example). Using canned or compressed air is not recommended, as the propellant in the can may spit out and leave difficult-to-remove deposits on the lens. Also, the expanding compressed air drops in temperature as it leaves the can. The cold air coming out of the tiny tube that most compressed air cans use to direct the air flow has been known to chill a lens enough to spall pieces of glass off the lens if pointed too closely at the same spot on the lens for too long.

Second, moisten a cloth with a few drops of a photographic-quality optical cleaning solution designed for multicoated camera and binocular lenses. A well-worn cotton handkerchief works well and Zeiss and Kodak both make suitable fluids. Do not drip the cleaning fluid directly on the lens. Use the barely damp (not wet) cloth to gently wipe the lens surface clean. Turn the cloth frequently to always keep a clean portion of the cloth in contact with the lens. Blot the lens dry with a dry portion of the cleaning cloth or with a separate cloth. Start with a clean cloth each time cleaning is needed.

Avoid overcleaning your optics. The multicoatings on the lens are quite hard and durable. However, frequent overzealous cleaning can scratch the coatings if all the dust particles (which are often tiny flecks of windborne rock) are not removed before you start pushing a damp cloth around the lens surface. A few specks of dust on the lens will not be visible in your images, as they are not in the focal plane and don't block enough light to measure, let alone be seen. Clean your optics only when absolutely necessary. If you take proper care of your scope, cleaning should rarely be needed.

**Caring for Your Scope Finish:** The AT 111 EDT uses a durable automotive-style baked paint finish with anodized components. The surfaces can become smudged with fingerprints during use, but these will not harm the finish. A soft cloth slightly dampened with plain water (or a little moisture from your breath and a quick wipe with a clean handkerchief) is generally enough to remove fingerprints. Avoid harsh chemical cleaners or organic solvents like benzene, alcohol, etc., as these may ruin the finish. They can certainly affect the optical coatings if they accidentally drip or splash on the objective lens.

Never use the telescope in the rain or in conditions where it may get wet. The telescope is not waterproof. If the telescope accidentally gets caught in a shower, immediately wipe off all water using a clean and dry soft cloth. If the telescope gets totally soaked in water, or submerged, immediately contact your dealer for service instructions. Do not disassemble or attempt to repair your telescope yourself, as this violates the warranty terms under the limited product warranty, and negates any guarantee.

**Caution! Never directly view the Sun with your telescope!** Never aim your AT 111 EDT at the Sun without having a professionally-manufactured solar filter mounted over the objective lens. Viewing the Sun through the scope without the proper protection for even a moment may result in permanent severe damage to your eyes, and can even cause blindness. Contact your Astro-Tech dealer if you are interested in purchasing a compatible professional solar filter.

 **ASTRO-TECH** [www.astronomytechnologies.com](http://www.astronomytechnologies.com)  
from Astronomy Technologies, 680 24th Avenue SW, Norman, OK 73069

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