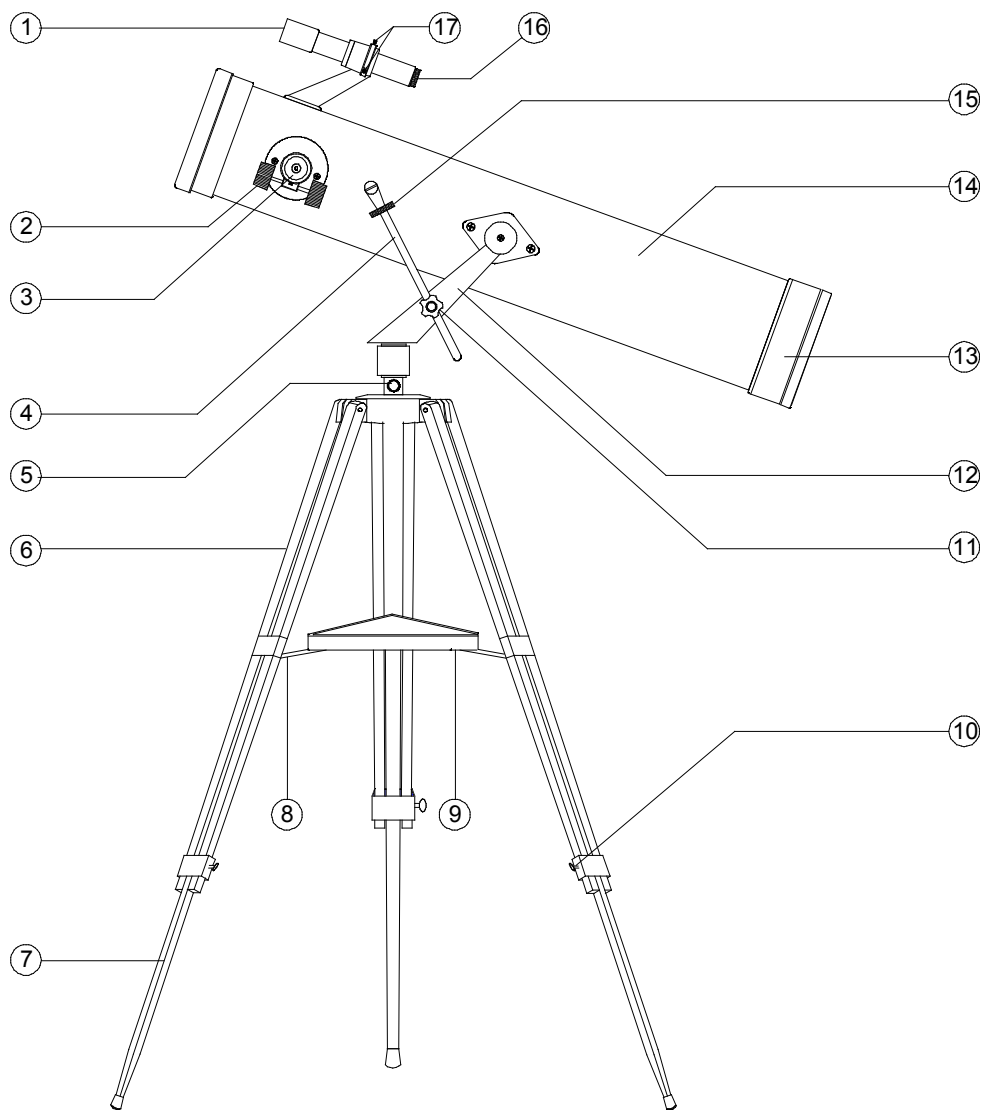


# Bushnell®

## DEEP SPACE SERIES

### 525X3" REFLECTOR

### MODEL 78-9003



- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 1. Finderscope                      | 9. Accessory Tray                    |
| 2. Rack & Pinion Focusing Mechanism | 10. Tripod Leg Lock Screws           |
| 3. .965" Format Eyepiece            | 11. Stabilizer Bar Mounting Screw    |
| 4. Vertical Stabilizer Bar          | 12. Alt-Azimuth Yoke Mount           |
| 5. Azimuth Lock Screw               | 13. Primary Mirror (Internal)        |
| 6. Tripod Leg                       | 14. Main Telescope Tube              |
| 7. Tripod Leg Middle Section        | 15. Vertical Fine Adjustment Screw   |
| 8. Accessory Tray Brace             | 16. Finderscope Focus Adjustment     |
|                                     | 17. Finderscope Adjustment Screws(3) |

## STANDARD EQUIPMENT

- Reflector Telescope Assembly
- Altazimuth Yoke Mount
- Variable Height - Hardwood Tripod
- 20mm and 4mm focal length - .965" diameter eyepieces.
- 3X Barlow Lens
- 5 x 24mm Finderscope w/ focus adjustment
- Vertical Stabilizer Bar
- Accessory Tray
- Hardware Pack
  - Tripod leg: 3-2.25" bolts, 6 -0.687" washers and 3-wingnuts
  - Accessory tray: 3-0.5" bolts, 6 -0.687" washers and 3-wingnuts
  - Tripod Leg Lock Screws: 3 pc.
  - Stabilizer Bar: 1 Mounting Screw

## TELESCOPE ASSEMBLY

### 1. Remove telescope from the carton and identify all components. READ THROUGH ASSEMBLY INSTRUCTION BEFORE YOU ASSEMBLE YOUR TELESCOPE

### 2. Set-Up Tripod

- Select one tripod leg and extend the *Tripod Leg Middle Section (7)*. Using the *Tripod Leg Lock Screws (10)* included in the hardware pack, insert a *Tripod Leg Lock Screw* into the lower brackets on the *Tripod Leg (6)*. Tighten the *Tripod Leg lock Screws* so that the *Middle Section* is securely in place. Repeat for the remaining two legs.

### 1. Attach Telescope and Finderscope

- Locate the pre-assembled *Telescope Main Tube (14)* and *Altazimuth Yoke Mount (12)*. **Note: Before assembling tripod legs to Altazimuth Yoke Mount, make sure the Accessory Tray Braces (8) face inward.** Locate the long bolts and washers from the hardware pack. Position the mount over the *Tripod Leg (6)* as shown (*fig.1*). and align the holes in the *Tripod Leg* with the holes in the mount. Insert the bolts through the holes at the top of a *Tripod Leg*. A washer should be positioned on both outer sides of the *Tripod Leg*. Attach a wing nut to the bolt, but do not tighten it all the way. Repeat on the remaining two *Tripod Legs*. Once you have attached all *Tripod Legs* to the mount, securely tighten all wing nuts. Remove the *Stabilizer Bar Mounting Screw (11)* from the hardware pack and insert it into the opening at the base of the *Vertical Stabilizer Bar (4)*.

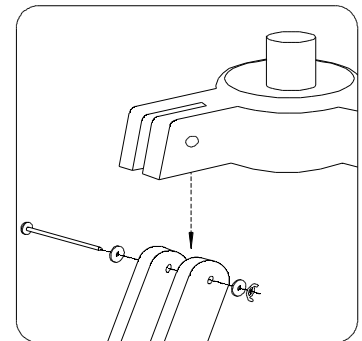


fig. 1

- Locate the *Finderscope (1)* with pre-assembled mounting bracket. Remove the two nuts located near the front of the telescope (closest to the eyepiece) and place the *Finderscope* and bracket assembly over the exposed screws. The *Finderscope Focus Adjustment (16)* should point towards the *Primary Mirror (13)*. Replace the nuts, and securely tighten the *Finderscope* and bracket assembly in place.

### 2. Attach Accessory Tray

- Locate the *Accessory Tray (9)*. Using the accessory tray bolts, wingnuts and washers (3-0.5" bolts, 6 -0.687" 3-wingnuts) connect the *Accessory Tray* to the *Accessory Tray Braces (8)*. Start with one tripod leg and attach wingnuts. Wingnuts should be positioned beneath the accessory tray. Do not tighten wingnuts until all *Accessory Tray Braces* are attached as some adjustments may be required.

**Your Bushnell® Telescope is now ready to be used. To obtain the fullest enjoyment from your telescope, please refer to the additional information below.**

## HOW TO USE YOUR NEW TELESCOPE

*Astronomical telescopes are designed such that the image you see will appear UPSIDE DOWN and REVERSED, this is acceptable for viewing celestial bodies.*

### Selecting an Ocular Lens:

1. You should always start viewing with the lowest power eyepiece, which in this case is the 20 mm lens. Note: the base power of each ocular lens is determined by the focal length of the telescope objective lens, which for this model is 700 mm. A formula can be used to determine the power of each eyepiece: **Telescope OBJECTIVE lens (Primary Mirror) focal length ÷ EYEPIECE focal length = MAGNIFICATION** (e.g. Using the 20 mm lens, the calculation would look like this: 700 mm ÷ 20mm = 35x or 35 power.)

### Focusing Telescope:

1. After selecting the desired *Eyepiece (3)*, aim *Main Telescope Tube (14)* at a land-based target at least 200 yards away (e.g. A telephone pole or building). Fully extend focusing tube by turning *Rack and Pinion Focusing Mechanism (2)*.
2. While looking through selected *Eyepiece (3)* (in this case the 20 mm), slowly retract focusing tube by turning *Rack and Pinion Focusing Mechanism (2)* until object comes into focus.

### Aligning Finderscope:

1. Look through *Main Telescope Tube (14)* and establish a well-defined target. (see focusing telescope section) tighten the *Stabilizer Bar Mounting Screw (11)* and *Azimuth Lock Screw (5)* so that telescope's aim is not disturbed.
2. Looking through finderscope, alternate tightening each *Finderscope Adjustment Screw* until crosshairs of finderscope are precisely centered on the same object already centered in main telescope tube's field of view.
3. Now, objects located first with the *Finderscope (1)* will also be centered in the field of view of the *Main Telescope Tube (14)*.

*Never Look Directly At The Sun With Your Telescope  
Permanent Damage To Your Eyes May Result.*

### Enjoying Your New Telescope

1. First determine your targeted object. Any bright object in the night sky is a good starting point. One of the favorite starting points in astronomy is the moon. This is an object sure to please any budding astronomer or experienced veteran. When you have developed proficiency at this level, other objects become good targets. Saturn, Mars, Jupiter, and Venus are good second steps to take.
2. The first thing you need to do after assembling the telescope as planned is center the desired object in the finderscope cross hairs. Provided you did a reasonable job aligning the finderscope, a quick look through the main telescope tube at low power should reveal the same image. With the lowest power eyepiece (the one with the largest number printed on it) you should be able to focus the same image that you saw through the finderscope. Avoid the temptation to move directly to the highest power. The low power eyepiece will give you a wider field of view, and brighter image--thus making it very easy to find your target object. At this point with a focused image in both scopes, you've passed the first obstacle. If you don't see an image after attempting to focus it in, you might consider aligning your finderscope again. Once you pass this step, you'll enjoy the time spent ensuring a good alignment. Every object you center in the finderscope will be easily found in the main telescope tube, which is important for continuing your exploration of the night sky.

3. The low power eyepieces are perfect for viewing the full moon, planets, star clusters, nebulae, and even constellations. These should build your foundation. However, for more detail, try bumping up in magnification to higher power eyepieces on some of these objects. During calm and crisp nights, the light/dark separation line on the moon (called the "Terminator") is marvelous at high power. You can see mountains, ridges and craters jump out at you due to the highlights. Similarly, you can move up to higher magnifications on the planets and nebulae. Star clusters and stars are best viewed through the low power no matter what.
4. The recurring astronomical theater we call the night sky is an ever-changing billboard. In other words, not the same movie plays all the time. Rather, the positions of the stars change not only hourly as they seem to rise and set, but also throughout the year. As the earth orbits the sun our perspective on the stars changes on a yearly cycle about that orbit. The reason the sky seems to move daily just as the sun and the moon "move" across our sky, is that the earth is rotating about its axis. As a result you may notice that after a few minutes or a few seconds depending on what power you are viewing at, the objects in your telescope will move. At higher magnifications especially, you will notice that the moon or Jupiter will "race" right out of the field of view. To compensate, just move the fine adjustment controls on your telescope to "track" it in the necessary path.

### Helpful Hints

1. Your telescope is a very sensitive instrument. For best results and fewer vibrations set your telescope up on a level location on the ground rather than your concrete driveway or your wooden deck. This will provide a more stable foundation for viewing, especially if you've drawn a crowd with your new telescope.
2. If possible view from a location that has relatively few lights. This will allow you to see much fainter objects. You'd be surprised how much more you'll see from your local lake or park when compared to a backyard in the city.
3. Using your telescope out a window is NEVER recommended.
4. View objects that are high in the sky if possible. Waiting until the object rises well above the horizon will provide a brighter and crisper image. Objects on the horizon are viewed through several layers of earth's atmosphere. Ever wonder why the moon appears orange as it sets on the horizon. It's because you are looking through a considerable more amount of atmosphere than you would directly overhead. (Note: If objects high in the sky are distorted or wavy, you are probably viewing on a very humid night.) During nights of unstable atmosphere, viewing through a telescope can be frustrating if not impossible. Astronomers refer to crisp, clear nights as nights of "good seeing."

### Where do I start?

Your Bushnell telescope can bring the wonders of the universe to your eye. While this manual is intended to assist you in the set-up and basic use of this instrument, it does not cover everything you might like to know about astronomy. The first thing you need to do is get a very simple star chart and a flashlight with a red bulb or red cellophane over the end. For objects other than stars and constellations, a basic guide to astronomy is a must. Some recommended sources appear on our website at [www.bushnell.com](http://www.bushnell.com). Also on our website will be current events in the sky for suggested viewing. But, some of the standbys that you can see are:

The Moon--a wonderful view of our lunar neighbor can be enjoyed with any magnification. Try viewing at different phases of the moon. Lunar highlands, lunar Maria (lowlands called "seas" for their dark coloration), craters, ridges and mountains will astound you.

Saturn--even at the lowest power you should be able to see Saturn's rings and moons. This is one of the most satisfying objects in the sky to see simply because it looks like it does in pictures. Imagine seeing what you've seen in textbooks or NASA images from your backyard!

Jupiter--the largest planet in our solar system is spectacular. Most noted features are its dark stripes or bands both above and below its equator. These are the north and south equatorial belts. Also interesting are Jupiter's four major moons. Pay close attention to their positions from night to night. They appear to be lined up on either side of Jupiter.

Mars--The Great Red Planet appears as a reddish-orange disk. Look at different times of the year and try to catch a glimpse of the white polar ice caps.

Venus--just like the moon, Venus changed phases from month to month. Some views of brilliant Venus appear as if you were looking at a distant crescent moon.

Nebulae--The Great Orion Nebula is a very well known night sky object. This and many others are brought to you by this telescope.

Star Clusters--View millions of stars densely packed in a cluster that resembles a ball.

Galaxies--One of the greatest and most interesting galaxies is our neighbor the Andromeda Galaxy. Enjoy this and many others. Much, much, more!

[www.bushnell.com](http://www.bushnell.com)

**ANSWERS TO COMMONLY ASKED QUESTIONS**

1. The image I see in the telescope is upside down and reversed from right to left ?	<ul style="list-style-type: none"> <li>An upside-down and reversed image is a common characteristic of most astronomical telescopes. Since telescopes are used for astronomical viewing orientation is not important. The image in the finderscope will also be upside down and reversed.</li> </ul>
2. How do I determine the power my telescope ?	<ul style="list-style-type: none"> <li>The power of your telescope can be determined by dividing the focal length of the objective lens by the focal length of the eyepiece. The eyepiece focal length is the number printed on the eyepiece. (For example: <math>700 \div 20 = 35X</math>)</li> </ul>
3. Where do I find the Telescope Focal Length	<ul style="list-style-type: none"> <li>The telescope focal length is the same focal length as the objective focal length. For this telescope it is 700mm. Telescope focal lengths range from 600mm to 900mm on Bausch &amp; Lomb, Bushnell and Jason telescopes.</li> </ul>
4. What can I see with my telescope ?	<ul style="list-style-type: none"> <li>Telescopes with power ranging from 25X to 50X can be used to view Star Clusters and Nebulae. 90X to 120X telescope can view galaxies. Most planets can be seen at 150X and higher.</li> </ul>
5. What do the numbers on the eyepiece mean ?	<ul style="list-style-type: none"> <li>The numbers on the eyepiece represents the "focal Length" of the eyepiece.</li> </ul>

**TROUBLESHOOTING GUIDE**

<p><i>If after you have set-up your new telescope you are unable to see any objects, use this Quick Reference guide to help you to understand the cause of the problem and quickly determine a remedy</i></p>	
1. I've completed the set-up yet I can't see anything	<ul style="list-style-type: none"> <li>Check to see if objective lens cover has been removed.</li> <li>Try to view an object that is 200 or more yards</li> </ul>

away.

- If there is more than one eyepiece included with the telescope, use the lowest power (highest number) eyepiece to begin viewing.
- Use the ***Rack & Pinion Focusing Mechanism (3)*** to bring the object you are trying to view into focus

## **Telescope LIFETIME LIMITED WARRANTY**

Your telescope is warranted to be free of defects in materials and workmanship for the lifetime of the original owner. The Lifetime Limited Warranty is an expression of our confidence in the materials and mechanical workmanship of our products and is your assurance of a lifetime of dependable service.

If your telescope contains electrical components the electronic components are warranted to be free of defects in materials and workmanship for one year after the date of purchase.

In the event of a defect under this warranty, we will, at our option, repair or replace the product, provided that you return the product postage prepaid. This warranty does not cover damages caused by misuse or improper handling, installation or maintenance of the product. Any return made under this warranty must be accompanied by the items listed below:

- 1) A check in the amount of \$15.00 to cover the cost of handling
- 2) Name and address for product return
- 3) An explanation of the defect
- 4) Product should be well packed in a sturdy outside shipping carton to prevent damage in transit and return postage prepaid to the address listed below:

IN U.S.A. Send To:

Bushnell \* 8500 Marshall Drive \* Lenexa, Kansas 66214

IN CANADA Send To:

Bushnell \* 25A East Pearce Street, Unit 1 \* Richmond Hill, Ontario L4B 2M9

For products purchased outside the United States and Canada please contact your local dealer for applicable warranty information. This warranty gives you specific legal rights. You may have other rights which vary from country to country.

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