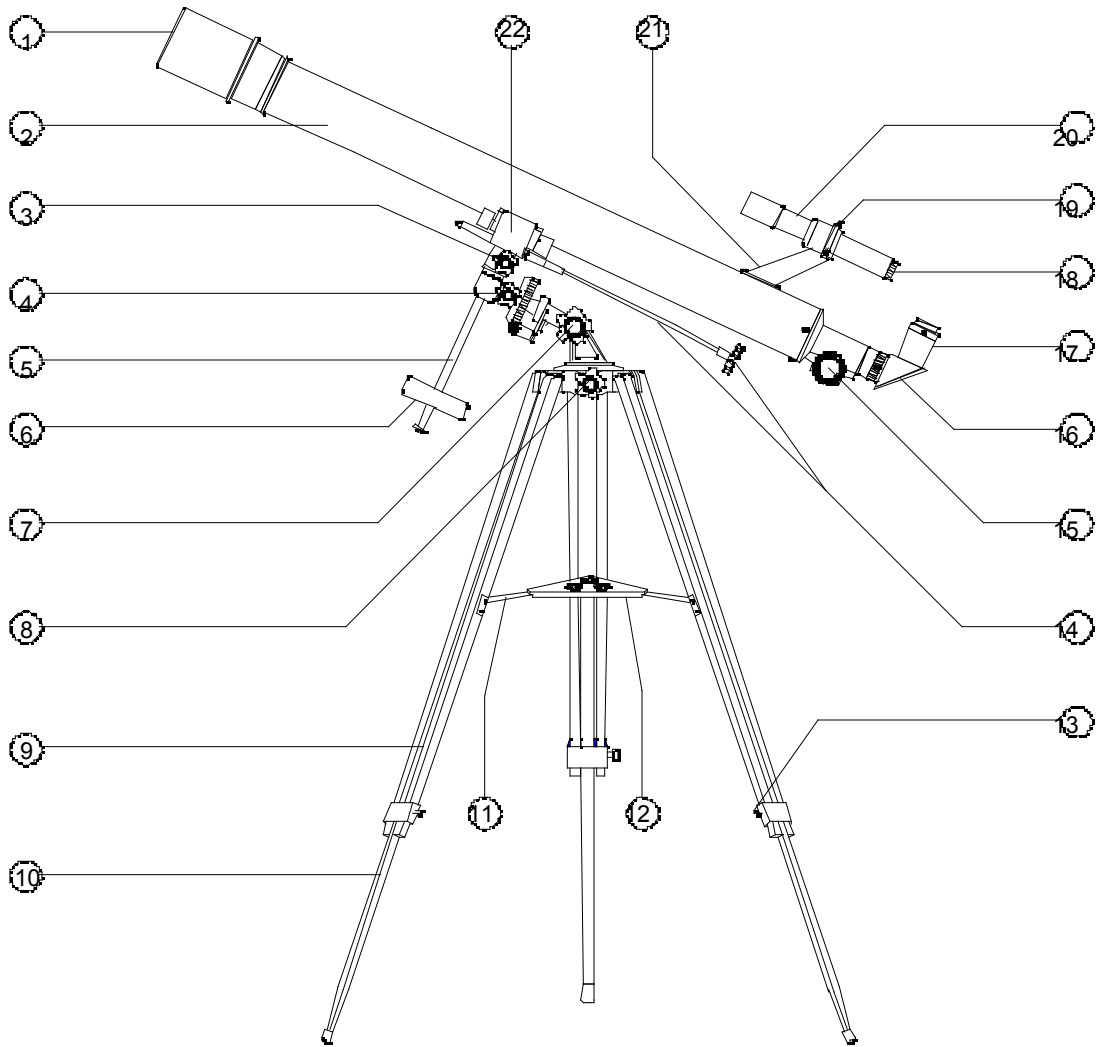


# Bushnell®

## DEEP SPACE SERIES

### 675 x 60 Refractor Telescope

#### Model 78-9519



- |     |                           |     |                                  |
|-----|---------------------------|-----|----------------------------------|
| 1.  | 60mm Objective Lens       | 12. | Accessory Tray                   |
| 2.  | Telescope Main Tube       | 13. | Tripod Leg - Lock Screws         |
| 3.  | Declination Lock Knob     | 14. | Fine Adjustment Cable & Knob     |
| 4.  | Right Ascension Lock Knob | 15. | Rack & Pinion Focusing Mechanism |
| 5.  | Counterweight Shaft       | 16. | Diagonal Mirror                  |
| 6.  | Counterweight             | 17. | Eyepiece                         |
| 7.  | Altitude Lock Knob        | 18. | Finderscope Focus Adjustment     |
| 8.  | Azimuth Lock Knob         | 19. | Finderscope Adjustment Screws    |
| 9.  | Tripod Leg                | 20. | Finderscope                      |
| 10. | Tripod Leg Middle Section | 21. | Finderscope Mount                |
| 11. | Accessory Tray Brace      | 22. | Equatorial Mount                 |

## STANDARD EQUIPMENT

- Complete Main Telescope Assembly
- Full Length Variable-Height Hardwood Tripod
- Equatorial Mount with counterweight and flexible adjustment cables
- 4mm, 12mm, 20mm focal length - Eyepieces
- Diagonal Mirror, 3x Barlow Lens, Erecting Lens
- 5 x 24 Finderscope w/focus adjustment, Accessory Tray
- Hardware Pack:
  - Tripod leg: 3-2\_”bolts, 6-<sup>11</sup>/<sub>16</sub> washers and 3-wingnuts
  - Accessory tray: 3-\_” bolts, 6-\_” washers and 3-wingnuts
  - Tripod Leg Lock Screws: 3 pc.
  - Fine Adjustment Knobs: 2 pc.

## TELESCOPE ASSEMBLY

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

### 2. Set-Up Tripod, Mount and Accessory Tray

- Select one *Tripod Leg (9)* and extend the *Tripod Leg Middle Section (10)*. Using *Tripod Leg Lock Screws (13)* included in the hardware pack, insert the *Tripod Leg Lock Screw* into the lower brackets on the *Tripod Leg (9)*. Tighten the *Tripod Leg Lock Screws* so that the *Middle Section* is securely in place. Repeat on remaining two legs.
- Locate the *Equatorial Mount (22)*. **Note: Before assembling tripod legs to Equatorial Mount make sure the *Accessory Tray Braces (11)* face inward.** Locate the long bolts and washers from the hardware pack. Position the mount over the *Tripod Leg* as shown (fig. a) 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 (9)*. 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.
- Locate the *Accessory Tray (12)*. Using the accessory tray bolts, wingnuts and washers (3-\_” bolts, 6-\_ washers and 3 - wingnuts) connect the *Accessory Tray* to the *Accessory Tray Braces (11)*. Start with one *Tripod Leg* and attach wingnut. 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.

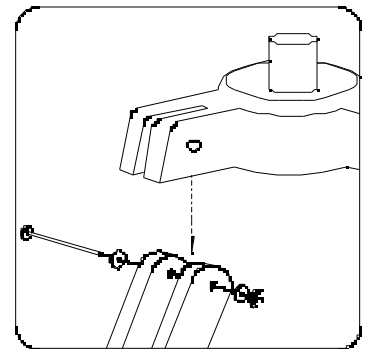


fig. a

### 1. Attach Finderscope

- Locate the *Finderscope(20)* with pre-assembled *Finderscope Mount (21)*. Remove the two nuts located near the back of the *Telescope Main Tube (2)* and place the *Finderscope* and *Mount* assembly over the exposed screws. Replace the nuts, and securely tighten the *Finderscope Mount* in place.

### 2. Attach Telescope Main Tube

- Locate the *Telescope Main Tube (2)*. Remove the wingnuts that are attached to the long screws protruding from beneath the telescope. Position the long screws over the two holes in the *Equatorial Mount (22)* and carefully secure the *Telescope Main Tube* to the *Equatorial Mount*.

### 3. Attach Control Cables, Counterweight and Eyepieces

- Locate the *Fine Adjustment Cables (14)* and the fine adjustment knobs (located in the hardware pack). Remove the black “Phillips” head screw at the end of the cables. Place the knobs over the adjustment cable and position so that the holes are aligned. Replace screws and secure tightly.

- Loosen the silver screws located at the opposite end of the **Fine Adjustment Cables (14)**. Now, attach the **Fine Adjustment Cables** to the two silver posts found on the **Equatorial Mount**. The first post is located just above the **Declination Lock Knob (3)**, the second post is located below the **Right Ascension Lock Knob (4)**.
- Locate the **Counterweight (6)** and **Counterweight Shaft (5)**. Loosen the thumb screw located on the **Counterweight** and slide the **Counterweight** onto the **Counterweight Shaft** and tighten thumb screw to secure the **Counterweight**. Thread the **Counterweight Shaft** into the hole located directly below the **Declination Lock Knob (3)**. Make sure that the shaft is securely locked into mount.
- Locate **Eyepiece (17)** and **Diagonal Mirror (16)**. Carefully place **Eyepiece** into **Diagonal Mirror** as shown (fig. b)

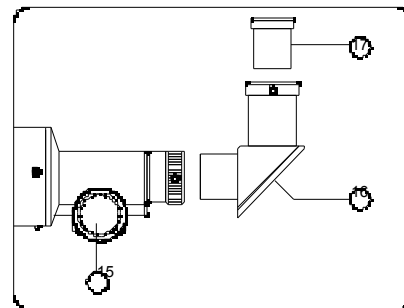


fig b.

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

### III. UNDERSTANDING THE EQUATORIAL MOUNT

The equatorial mount is designed to move in any direction. It can be set to allow manual controls to track the movements of celestial bodies across the sky. This is referred to as diurnal movement; movement of celestial bodies in the direction opposite to that of the earth's rotation and is around the earth's axis.

By aligning the telescope's polar axis at celestial North, you will place the telescope in parallel with the earth's axis and thus be able to locate stars in the sky based on star atlas information. To compensate for your position on earth, the polar axis is set in one of three ways:

- Set up the telescope at night. Loosen the **Declination Lock Knob (3)** and rotate the telescope around the declination axis until the arrow on the declination scale points to 90 degrees. Tighten the **Declination Lock Knob**. The telescope is now roughly in parallel with the polar axis.
- Loosen the **Azimuth Lock Knob (8)** and turn the telescope until the objective end faces due north. This can be done by approximating the location of the pole star (Polaris or North Star) or by the use of a compass. True North is then found by directing the telescope at Polaris, as magnetic North is slightly away from true North.
- Look up the latitude of your area in any geographical atlas. Loosen the **Altitude Lock Knob (7)** and set the latitude scale to the correct latitude for your area. Aim the **Finderscope (20)** at Polaris. You will probably notice that Polaris is not dead center in the **finderscope's** field of view. This is probably because your telescope is not absolutely level with the ground. Loosen the **Azimuth Lock Knob (8)** again and turn the telescope so that it is directly aimed at Polaris. Tighten both the **Azimuth Lock Knob** and **Altitude Lock Knob**. Polaris is 1 degree of the North celestial pole. Therefore, the sighting of stars will have to be slightly adjusted as you locate them in the heavens.

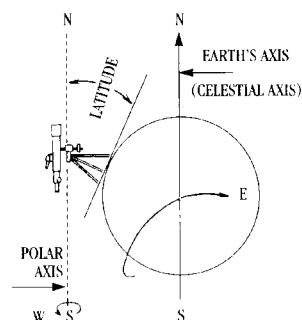


Fig. 1  
POLAR AXIS AND EARTH'S AXIS

## HOW TO USE YOUR NEW TELESCOPE

***Astronomical telescopes are designed in such a way that the image you will see appear will be UPSIDE DOWN and REVERSED, this is acceptable for viewing celestial bodies. For land-based viewing an "Erector Lens" is used to properly re-orient the image.***

### Selecting an Eyepiece:

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 eyepiece is determined by the focal length of the telescope objective lens, which for this model is 900 mm. A formula can be used to determine the power of each eyepiece: **telescope OBJECTIVE lens focal length ÷ EYEPIECE focal length = MAGNIFICATION** (e.g. Using the 20 mm lens, the calculation would look like this: 900 mm ÷ 20mm = 45x or 45 power.)
2. Included with this telescope is a Barlow lens. Barlow lenses are used to double or triple the power of your telescope. Place your Barlow between the focusing tube and the eyepiece. Using the example above, your 3x Barlow lens would give you a total power of 135x or 135 power. (45 x 3 = 135x or 135 power)
3. Also included with this telescope is an Erecting lens. The Erecting lens is used to view land-based objects where the correct image orientation is important. The Erecting lens re-oriens the telescope image so that the image you are viewing is properly oriented. Place your Erecting lens between the focusing tube and the eyepiece (fig. c). It is not recommended to use the **Diagonal Mirror (16)** with the Erecting lens. The **Diagonal Mirror** will make the erected image appear to be "flipped" depending on the orientation of the diagonal mirror- relative to the telescope.

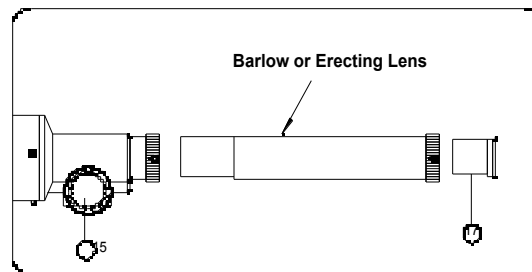


fig. c

### Focusing Telescope:

1. After selecting the desired eyepiece, aim main telescope tube 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 (15)**.
2. While looking through selected eyepiece (in this case the 20 mm), slowly retract focusing tube by turning **Rack and Pinion Focusing Mechanism** until object comes into focus.

### Aligning Finderscope:

1. Look through **Main Telescope Tube (2)** and establish a well-defined target. (see focusing telescope section) Tighten the **Altitude Lock Knob (7)** and **Azimuth Lock Knob (8)** so that telescope's aim is not disturbed.
2. Looking through **Finderscope (20)**, alternate tightening each **Finderscope Adjustment Screw (19)** 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 (20)** will be centered in the field of view of the main telescope.

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

## **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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