

## 1. BCTO App

Download and install BCTO app on your smartphone.

- iOS users can search "BCTO" on Apple App Store and download it for free
- Android users can download the App from our company official website



Once enter the BCTO App, you will be taken to the starry chart.

This App contains two parts:

1. Star Chart
2. Telescope Control Menu

Distribution of functions:

- 1 Display Menu
- 2 Control Menu
- 3 Utilities Menu
- 4 Object Menu
- 5 Information Display



## 2. Star Chart

Star Chart shows a realistic sky in 3D, just like what you see with the naked eye. According to user's geographic coordinations, time information and sensor data from smartphone, it simulates and displays the stars distribution.

Star Chart contains data up to 30,000 celestial objects. It includes a great many star catalogues, including

- Solar System Objects
- Deep-sky Objects
- Messier Objects
- Caldwell Objects
- NGC Objects



Users can move the Star Chart up and down, side to side, zoom in and zoom out on smartphone screen.

Moreover, you can activate the gyroscope sensor by the switch on Display Menu. When activated, you only need to move the smartphone to aim at the sky. BCTO App can simulate in real-time the sky on screen from the present angle of view.

During the observation, users can zoom in the chart to look more stars which is less bright in deep sky.

**Note:** Once activated the gyroscope feature and zoom in the Electronic Star Chart, any slight movement of the smartphone will lead to obvious drift of the Star Chart.



Click the Display Menu in lower-left and slide the menu to show the options.

**Motion:** Open/Close gyroscope feature

**Scope:** Switch telescope pointing angle or user viewing angle

**Equatorial Grid:** Open/close Equatorial coordinates

**Horizontal Grid:** Open/close Altazimuth coordinates

**Constellation Lines:** Open/close constellation picture

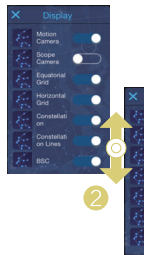
**BSC:** Open/close BSC catalogue

**NGC:** Open/close NGC catalogue

**IC:** Open/close IC catalogue

**Messier:** Open/close Messier catalogue

**Caldwell:** Open/close Caldwell catalogue



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## 3. Telescope Control

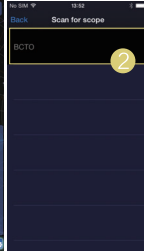
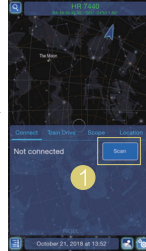
Before connecting the telescope, please open the Bluetooth and GPS function of your phone, refer to your phone setting for specific operation.

Click **Utilities** Menu at the bottom right of the screen (icon 2), and enter **Connect** Menu.

1. Click **Scan** key

2. Select the name of the telescope that is needed to be connected. The default name of the telescope is BCTO.

3. Select the telescope model name according to your own. At the first time when BCTO App connects with a telescope, it will carry out a motor detection automatically. During the detection process, please do not interrupt.

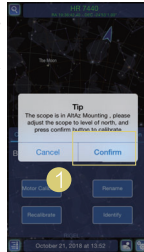


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1. When connect with the telescope, the app will show the following prompt "The scope is in AltAz Mounting, please adjust the scope to level and north, and press confirm button to calibrate." You need to lose the horizontal lock and vertical lock of the telescope, adjust the telescope tube in leveling and pointing to North, after that click Confirm key. Also, you can use Compass to help for the adjustment.

If the tripod mountings Polar/Altazimuth Mounting, you can select switch these two mountings on Tools - Scope Menu.

2. When enter **Connect** menu, if it's the first time that the app connects with a telescope or the app has been connected to another telescope before, users have to select and run Self-testing function.



2

Access **Utilities - Location** Menu, it offers the window to get users' current location information, there are two options for getting location, **Auto**, **Locate** or **Modify**.

**Auto Locate:** BCTO App obtains the geographic coordinate from smartphone. This feature requires user permission of location function in smartphone.

**Modify:** users can input geographic coordinates manually. BCTO App will simulate the Star Chart according to the new coordinate.



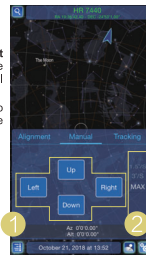
2

Access **Control - Manual** Menu, you can control the telescope to rotate manually.

1. Use the **Up/Down/Left/Right** directional keys to control the turning of telescope in all directions.

2. Use the right side slider to adjust the slow speed of the telescope.

1x = 1x sidereal 0.5° = 0.57/sec  
 2x = 2 x sidereal 1.0° = 1.07/sec  
 8x = 8 x sidereal 1.5° = 1.57/sec  
 16x = 16 x sidereal  
 64x = 64 x sidereal  
 Max = Maximum



4

Access **Control - Alignment** Menu.

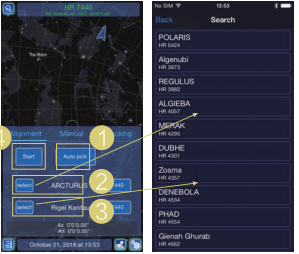
1. Click **Auto Pick** key. BCTO will automatically select two bright stars that are easily recognizable in the current sky from the system database, and display them in the following select box according to the current user geography and time information.

2. Users can check the name of the first alignment star, if the selected star is not visual, users can press **Select** key on the left side to pick manually another star for alignment from the given list.

3. Users can check the name of the second alignment star, if the selected star is not visual, users can press **Select** key on the left side to pick manually another star for alignment from the given list.

4. After selecting the Star Chart, click **Start** key, telescope will perform the alignment automatically.

**Note:** before executive Align function, please adjust the telescope tube to leveling and pointing to North.



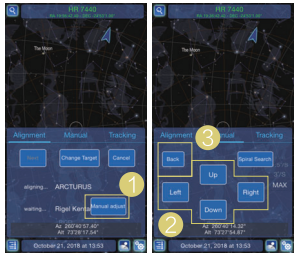
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When perform the alignment, telescope will automatically turn to the first alignment star. When telescope stop slewing, if the star is not centered on the eyepiece, users have to press **Manual Adjust** key to center it.

1. Click **Manual Adjust** key and enter **Manual** Menu.

2. Use the **Up/Down/Left/Right** directional keys to control the turning of telescope in all directions. In this process, users can slide speed slider on the right side to adjust the slow speed of the telescope.

3. When the first alignment star has been centered in the eyepiece, click **Back** key to return to **Alignment** Menu.



6a

4. After the first star alignment, click **Next** to perform the second star.

Repeat steps 1-3 listed above to complete the second star alignment.


5. After the alignment with two stars, click **Finish** key to complete.

6. In the process, click **Cancel** key to abort the alignment.



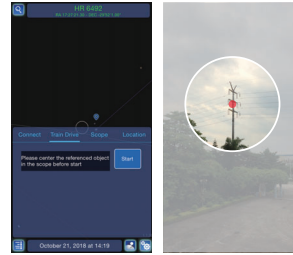
6b

3

- Observe the stars in Star Chart:
1. Click **Control** Menu icon (icon ) , slide down the menu and return to the Star Chart.
  2. Find a celestial object to observe in the Star Chart, click and select it as below:
    - Touch and slide the smartphone screen to search the object on Star Chart, Click and select the object.
    - Or access the **Display** Menu and active **Motion** function, lift up the smartphone and aim to the celestial object, click and select it.
  3. Confirm the celestial object whether it is correct at the top of the Star Chart.
  4. Turn to **Control -Tracking** Menu, click **Start** key, the telescope will automatically rotate to the selected object.
  5. If the selected celestial object is not centered in the eyepiece, users can adjust it by **Manually Adjust**.
  6. End Tracking can stop the tracking of the current celestial object.



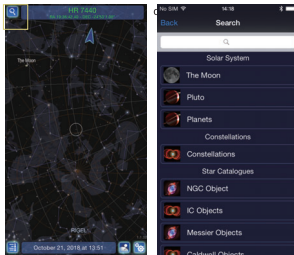
- Train Drive** is the feature training the Altitude and Azimuth motor to locate objects with more precision.
1. Access **Utilities - Train Drive** Menu
  2. Following the instruction on App, adjust the telescope pointing to a terrestrial object in the distance (1-2km or so) . It is better to perform this procedure on daytime.
- Warning:** never use the telescope to look at the sun.
3. Observe and center the target on the eyepiece, In this procedure, users can adjust the telescope with UP/DOWN/LEFT/RIGHT keys in **Manual** Menu.
  4. Click **Start** key.



2a

Click **Object** Menu at the top left of the screen, it will list plenty of celestial catalogue and select the object you aim to observe.

- Catalogues including:
- Solar System
  - Constellation
  - NGC Objects
  - IC Objects
  - Messier Objects
  - Caldwell Objects
  - Named Stars
  - BSC Objects



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## 4. Utilities

Access **Connection** menu, if it's the first time for the app to connect a telescope or the app has connected to another telescope before, please click **Motor Calibrate** key to perform self test.

**Motor Calibrate** if the telescope motors appear to have a problem, use this option to retest the motors. This option is also used if the App unit is moved between telescopes, to match App to the new one.

**Rename** enable users to change the telescope name to distinguish telescopes of different users.

**Recalibrate** helps users to reset current calibration data and set the current position as the HOME position.

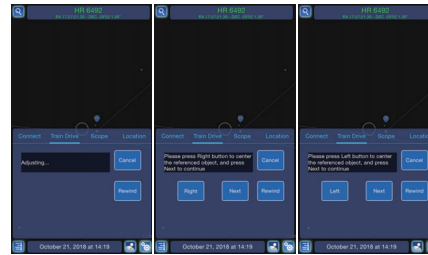
**Identify** is an advance feature for an observer who wants to scan the night sky and start exploring. After the telescope has been properly aligned, click **Identify** key then App searches the database for the identity object being observed.



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5. Telescope will slow left automatically, then turn back slightly and stop.
6. Click and keep pressing the Right key in the menu, the telescope will continue to turn right slowly until the target object appear in the center of the eyepiece.
7. Click Next Step and start to calibrate horizontally from right to left and repeat steps 3-6 listed above.
8. Repeat Steps 3-6 and complete the drive calibration on the up and down direction on vertical axis.
9. After completing the drive calibration on horizontal and vertical direction, click **Finish** key.



2b

**Scope** Menu offers the configuration options for telescope, including:

- **Quiet Slew** restrict the maximum slew speed of the telescope within 64x, efficiently decrease the noise caused by motor rotation.
- **Reserve L/R** when clicking the **Left** key, the telescope will slew right and when clicking the **Right** key, the telescope will slew left.
- **Reserve Up/Down** when clicking the **Up** key, the telescope will slew down and when clicking the **Down** key, the telescope will slew up.
- **AltAz/Polar Mounting** switch to Altazimuth or Polar mounting when using different tripod or telescope model (Only support ETX serial)
- **High Precision** if turned on, when looking for a faint celestial object, App first slows to a nearby bright star, Center the star in eyepiece with **Manual** adjust the click **Return to Target** key ,At that point the telescope has a high precision alignment to that part of the sky and it then slews to the object that was originally requested.
  - **Train Drive** the drive calibration will display the calibration value from the operation of step 2a and 2b mentioned above. Users are also enable to input another value by clicking **Edit**.



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## Wireless Control with Bluetooth BCTO App

**BCTO**  
—博通光电—



 **Never use the telescope to look at the Sun!**