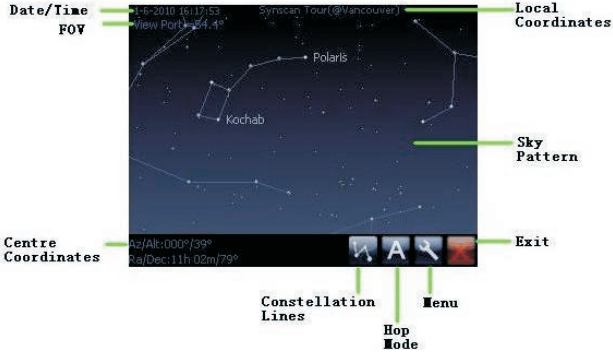
4. Star Hopper Application

Select the Astronomy menu icon in the main menu, then touch the "Star Hopper" button onscreen to start this application.

4.1 Main Star Hopper Screen



The above figure is an example of what the display screen looks like when the Star Hopper application is running. This screen displays a "sky map" view of a section of the sky. The sky map shows the names and locations of planets, stars, constellations, and other deep sky objects.

When you are outside on a clear night with SynScan Tour, simply hold it up to the sky, and the sky map on the display screen will match the section of sky located directly behind it. This makes identifying stars incredibly easy, just hold SynScan Tour to the star's approximate position in the sky, and match the stars on the map to the stars in the sky. The brightest star names are shown on the star map. It's easy!

Stars are shown as white dots according to their magnitude. The bigger the star appears onscreen, the brighter the star will appear in the sky. Bright star names are shown in light blue color next to the stars they correspond to.

Constellation lines and names are also shown in color blue. You can toggle these on and off by simply touching the “Constellation Lines” icon at the bottom right of the screen.

Deep sky objects (DSOs) are shown as tiny icons which vary by object type. DSO names are in color blue next to the icons.

FOV (Field of view) is the area of sky covered by the display screen. Increasing the FOV is like “zooming” outward, while decreasing the FOV is like zooming inward. Increase or decrease the FOV with the scroll wheel. The current FOV setting is shown in the upper left corner of the screen (“View Port=”).

The celestial coordinates of the center of the star map are shown in the lower left corner of the screen, both RA/Dec and Az/Alt coordinates are given. Your local geographic coordinates (as entered in the Settings>Location menu) are shown at the upper center of the screen.

There are 4 icons at the bottom right of the touch screen.

-The “Constellation Lines” icon toggles the constellation lines and names on or off.

-The “Hop Mode” icon changes how SynScan Tour selects the area of sky displayed onscreen. This will be discussed in more detail later in this manual.

-The “Menu” icon takes you to the Star Hopper Menu. (The Menu key will also do this.) The Star Hopper Menu provides more functions and settings, these will be discussed later.

The “Exit” button will quit the Star Hopper application and take you back to the main menu.

When the FOV is reduced below 9.6 degrees, two additional icons will appear at the bottom of the screen, as shown below. When touched, these icons reverse the display vertically or horizontally. These are used when comparing the sky map with the image seen through a telescope (which is typically inverted or rotated). If you are not using SynScan Tour in conjunction with a telescope, you will not need to use these icons.

4.2 Setting the Hop Mode

The Star Hopper application has three different modes for displaying the sky on the screen; these are “Sensor” mode (icon), “Keypad” mode (icon), and “Telescope” mode(icon). Switch between these star hopping modes by touching the Hop Mode icon onscreen, or by using the Device key. The currently activated mode's icon is shown on the Hop Mode button.

In Sensor mode, SynScan Tour uses its internal sensor to update the sky map displayed. The map will update in real-time to show the area of sky located directly behind the display screen. This is the Hop Mode that will typically be used when you are outside with SynScan Tour at night.

In Keypad mode, the directional keys on the keypad select the areaof sky to be displayed. The left and right keys are used to change theview horizontally, while the up and down keys are used to changethe view vertically. This is the Hop Mode you will usually use when perusing the sky map while indoors.

Telescope mode is used when SynScan Tour is connected to a telescope mount. In this mode, the sky map display synchronizes to the location in the sky where the telescope is currently pointing.

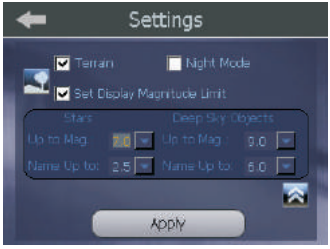
In any of the Hop Modes, pressing the scroll wheel down places SynScan Tour into its “locked mode”. The star map will freeze its current display, and will no longer synchronize with the internal sensor or any connected telescope. You can still use the scroll wheel to zoom in-and-out of the sky map, but the display will remain centered on its locked position. A cursor will be displayed onscreen.Use the direction keys to move the cursor onto a celestial object, and you can access multimedia files associated with the selected object.You can also select a celestial object in locked mode by simply touching it onscreen.

4.3 Setting Display Parameters

You can customize what is shown on the sky map to suit your needs. Press the Menu key, or touch the Setting icon ( ) at the lower right corner of the screen. This accesses the Star Hopper Menu. Now, touch the large “Settings” icon onscreen.

In the following window, select the items you want displayed on the sky map.

Touch the “More” button onscreen, and the following screen appears.



Selecting the “Terrain” check box displays a landscape in the sky map to indicate your local horizon. This gives the sky map a more natural feel, and helps orient you to the sky.

The “Night Mode” check box toggles the sky map display to have a red tint. Select this to best preserve your night vision outside in the dark.

Select the “Set Display Magnitude Limit” check box to change the magnitude parameters of the stars and deep sky objects to be displayed on the sky map. Magnitude is related to an object's apparent brightness; the brighter an object is, the lower its magnitude will be. So, if you lower the display magnitude limit for stars and deep sky objects, only the brighter stars and deep sky objects will be shown on the sky map. This can help when attempting to identify stars from a light-polluted sky, as you will usually only see the brightest ones with your naked eye. For example, if you are viewing near a city, you will probably want to set the star magnitude limit lower since you will only be able to see the brighter stars in the sky. From a country sky, you would set the star magnitude limit higher so the display shows all the stars you can see. You can also set the magnitude limits of the star and deep sky object names to be displayed; this can be used to help keep the star map display uncluttered of faint object names.

In the above example, the sky map will display stars up to magnitude (Mag.) 7.0 and deep sky objects up to magnitude 9.0. Only stars brighter than Mag. 2.5 and deep sky objects brighter than Mag. 6.0 will be labeled with their names.

If the “Set Display Magnitude Limit” check box is not selected, the Star Hopper application will determine the magnitude parameters based on the current FOV of the sky map. As you zoom in, fainter objects will be shown.

After entering the above settings, touch the “Apply” button onscreen to confirm.

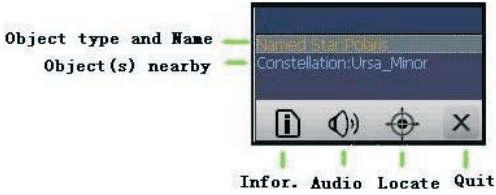
4.4 Identifying Celestial Objects

The following figure shows SynScan Tour pointing to Polaris, the North Star.

Identifying celestial objects in the night sky is easy with SynScan Tour. Just set the Hop Mode to Sensor mode, and hold SynScan Tour up to the celestial object in the sky you want to identify. The back of SynScan Tour should be pointing to the celestial object's position in the sky. Hold SynScan Tour still for about 2 seconds, and the sky map will display the area of sky located directly behind the screen.

Press the scroll wheel down, or simply touch the display screen, to lock the sky map in place. The display will now stay locked on the area of sky you initially pointed it to. SynScan Tour will make a sound and display a cursor. Now, by comparing the sky map with the actual sky, you can easily match the stars on the screen with those in the sky.

You can select any object (i.e. planet, star, or deep sky object) with the cursor and direction keys, or by simply touching it onscreen. The Star Hopper application will then show the following:



- Touch the "Info." icon to obtain information about the selected object. Its coordinates, magnitude, and images (if there are any) will be displayed..
- If the "Audio" icon is not grey, touch it for an audio pesentation about the selected object.
- If a telescope is connected to SynScan Tour, touch the "Locate" icon to automatically point the telescope to the selected object.
- Touch the "Quit" icon to close the window.

Press the Cancel key to exit from "locked" mode, and SynScan Tour will once again update the sky map in real-time.

4.5 Locating Celestial Objects

Sometimes you may want to find where a celestial object is, but not know its location in the night sky. SynScan Tour will lead you to it in seconds!

First, set the Hop Mode to Sensor mode. Then press the Menu key, or touch the Setting icon  at the lower right corner of thescreen,and the Star Hopper Menu appears.

Several commonly used object catalogs are listed in the lower window. These are:

- **Star Tour**
  A collection of the brightest stars currently visible in the sky from your location.
- **DSO Tour**
  A collection of the best deep sky objects that appear in your current sky.
- **Constellation**
  This contains all the 88 constellations.
- **Named Star**
  A list of the stars which have proper names, such as “Arcturus” and “Vega”.
- **Named DSO**
  A list of the deep sky objects which have proper names, like “The Whirlpool Galaxy” and “The Crab Nebula”.
- **Solar System**
  This includes all planets, the Sun, the Moon, and Pluto.
- **Messier**

The Messier catalog includes the brightest and most well-known deep sky objects. These were first catalogued by the Frenchman Charles Messier in the late 1700's. These objects can be easily seen with a small telescope, and many of them can even be observed with binoculars.

- **NGC**

The NGC (New General Catalog) contains thousands of beautiful, but fainter, deep sky objects. You'll need a larger telescope (6" aperture or greater) to see most of these in the sky!

- **Double Star**

This is a list of the most popular and visually-pleasing double stars. These are fun to "split" (i.e. individually resolve the double star components), and many have contrasting colors.

- **IC**

The IC (Index Catalog) contains many very dim deep sky objects.

- **SAO**

The SAO star catalog includes essentially all the visible stars in the sky; these stars are all brighter than visual magnitude 9. It is quite an extensive list, and each star is given a unique catalog number. This is how astronomers name the thousands and thousands of fainter stars you can see in the sky.

Select one of the above catalogs, then select the object in the catalog which you want to find in the sky. For example, the below figure shows what the display screen will look like when Mars is selected from the Star Tour catalog.

Now, touch the “Locate” icon, and the Star Hopper application will return SynScan Tour to the sky map to begin guiding you to the location in the sky of the selected celestial object. If the selected object does not appear in your current sky (based upon your time and location), the “Locate” icon will be color grey, and will not be available to select.

The screen then returns to the real-time sky map. It will again display the area of sky located directly behind the SynScan Tour, but now a circular “radar chart” appears in the upper right corner. There is a red line on the radar chart which directs you how to move SynScan Tour in order to point it at the selected object.

- If the red line is in the left side of the circle, the SynScan Tour should be rotated to the left.
- If the red line is in the right side of the circle, the SynScan Tour should be rotated to the right.
- If the red line is in the upper half of the circle, tilt the SynScan Tour upwards.
- If the red line in the lower half of the circle, tilt the SynScan Tour downwards.
- The length of the red line shrinks as the SynScan tour points closer to the object's position in the sky. When the arrow shrinks all the way down to the center of the circle, the SynScan Tour is pointing close to the selected object, and the object should appear somewhere on the sky map. Now, a “locating box” will appear at the center of the screen. Move SynScan Tour until the object enters the box, and the SynScan tour is pointing at the object's location in the night sky.

To quit from locating an object, simply touch the screen or press the Cancel key.

The easiest way to use the radar chart is to first hold SynScan Tour so that it is pointing at the horizon. Then, rotate SynScan Tour left or right until the radar chart's red line is vertical. Finally,

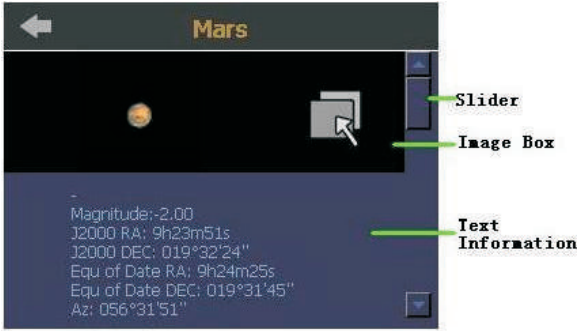
Just tilt SynScan Tour upwards until the red line shrinks to the center of the radar chart's circle, and the locating box will appear at the center of the sky map. Move SynScan Tour until the object enters the locating box onscreen, and SynScan Tour is pointing at the object.

4.6 Accessing Celestial Object Information

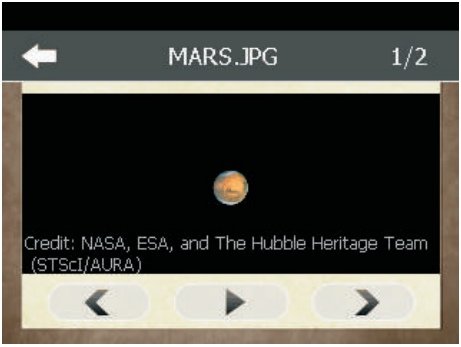
Sometimes, you may just want to learn more about a celestial object, but don't necessarily need to know its location in the sky. You can access object information by selecting an object from the Star Hopper Menu, similar to how you would select an object it you were attempting to locate it. First, press the Menu key, then select a catalog in the lower frame. The screen will appear like the one below if the “Star Tour” catalog, then Mars, is selected.

You can use the up and down keys to scroll through the selected list, or use the “Name Input” to enter the object name directly with the virtual keyboard which appears. Remember, only objects which can be seen in your current sky (based upon your time and location) will be shown on the list.

When an object in the list is selected, a “quick data” balloon will appear for several seconds. It gives some basic text information about the object. Touch the “Info.” icon onscreen to access more information about the object, and the display will look similar to this:



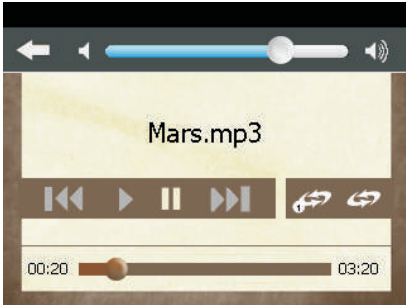
The text information zone of the window provides some basic data for the selected object. Use the onscreen slider to scroll down for more text, if it is available. If SynScan Tour has an image in its memory for the selected object, the image box will be available to select. Touching one of the “thumbnail” images within the image box onscreen will access the image. The display will now look something like this:



Use the scroll wheel to “zoom-into” the image to see more fine details. The four direction keys allow you to move the image within the display screen when you are zoomed-in. The touch screen button with the solid triangle pointing to the right on it (i.e. the “play” button) fills the entire SynScan Tour display screen with the image. Touch the screen to exit the full-screen display of the image. The number of available images for the selected object will be shown in the upper right corner of the screen. Touch the left and right buttons onscreen, or use the left and right keys, to switch among the available images.

Upon selecting an object from one of the catalogs in the Star Hopper Menu, the “Audio” icon will be available if there is an audio presentation for the object in SynScan Tour's memory.

Touch the Audio icon onscreen, and the presentation will begin playing in the following window:



You can adjust the volume with the touch screen slider at the top of the display. Touch the arrow at the upper left corner of the screen to exit the audio presentation.

4.7 Shortcut to the Best Celestial Objects

When the Star Hopper application is displaying the sky map, pressing the Shift key will open up an image window under the map. The screen will look like this:

This window displays images of the most spectacular celestial objects currently visible in your sky. The images are sorted into three groups; these are solar system objects, deep sky objects, and constellations. Press the Shift key to switch among these object groups. Touch the left or right arrow icons in the image window onscreen, or use the left and right keys, to see more objects within a group. Now, select one of the images by touching it onscreen (or pressing the OK key), and the Star Hopper application will enter locating mode and guide you to the selected object's location in the night sky. It's that easy!

Press the Cancel key to close the image window and return to the normal operating mode of the Star Hopper application.

4.8 Controlling a Telescope

One of the best features of SynScan Tour is its ability to control a telescope mount. It essentially replaces your existing telescope hand controller, and provides much more functionality. SynScan Tour works with many of the most popular telescope mounts. Along with these instructions, refer to your telescope's instruction manual as needed.

4.8.1 Connecting SynScan Tour to a Telescope

An optional cable is required to connect SynScan Tour to a telescope mount. The cable is mount-specific, so make sure to purchase the proper connecting cable for your mount. One end of the cable connects to the serial port in the left edge of the SynScan Tour, and the other end connects to the hand controller port of the telescope mount. Make sure SynScan Tour is on, then turn on the power to the mount. Press the Menu key to open the Star Hopper Menu, then touch the “Telescope” icon onscreen, and the following window will appear:

Select your mount from the list and touch the “Connect” button onscreen.

●If SynScan Tour is connecting to an equatorial mount, a window will pop-up and ask “Is the telescope at polar home position?” Set the telescope mount to the “home position” (i.e. the telescope is pointing at the North or South Celestial Pole and the mount is rotated in right ascension until the end of counterweight shaft is at its lowest position). Then, touch the “Yes” button onscreen to confirm. If you are just re-connecting to the mount (and you have not moved the mount), you can keep the mount in its current position and touch the “No” button here. Now, SynScan Tour will ask if you want to activate sidereal tracking for the mount. Touch the “Yes” button onscreen, and the mount will begin tracking the motion of the sky as the Earth rotates.

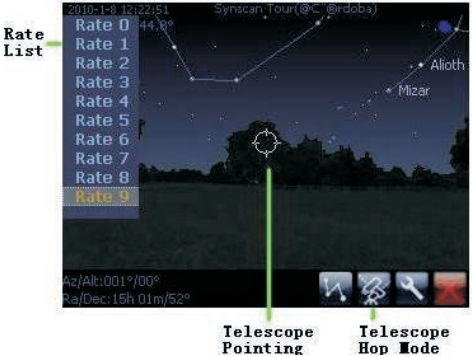
●If SynScan Tour is connecting to an alt-azimuth mount, it will ask you to input the current pointing direction of the telescope. “Azm” is the azimuth coordinate (in degrees) of the telescope's pointing direction; it starts from true North, and increases from North to East. “Elev” is the elevation angle (in degrees) of the telescope's pointing direction; it starts from the horizon and increases from horizon to zenith. Correctly inputting these parameters will allow good telescope pointing and tracking accuracy with no further telescope alignment needed. After inputting the current pointing direction of the telescope, SynScan Tour will ask if you would to like to activate sidereal tracking for the mount. If you have correctly entered the telescope's pointing direction (and your time and location data), touching “Yes” will activate accurate sidereal tracking. ***Note: If you don't know the azimuth or elevation of the telescope's pointing direction, that's OK. You can align the mount with SynScan Tour by using a star alignment; this will be described later in this manual.***

After telescope connection is established, only the connected telescope model will be shown in the Connect tab of the Telescope menu. The text on the button on the screen will now change to “Disconnect”. Press this button to disconnect the mount from SynScan Tour.

4.8.2 Using the Direction Keys to Move the Telescope

Once connection to a telescope mount has been established, SynScan Tour can control its movement, just like a standard telescope hand controller does. To do this, simply set the Hop Mode (by pressing

the Device key) to Telescope mode. (Note: Telescope mode will only be available if the SynScan Tour is actually connected to a mount.) Now, the four direction keys of SynScan Tour will move the telescope's position. Pressing the Rate key will display the following screen:



Use the scroll wheel to select the desired speed rate in the Rate List. The higher the rate is, the faster the telescope will move when you press the direction keys. Press the OK key to close the Rate List.

If you have activated sidereal tracking, the mount will automatically resume tracking after you release any of the direction keys.

4.8.3 Star Aligning the Telescope with SynScan Tour

“GOTO” functionality means a telescope mount can automatically point to a selected celestial object. SynScan Tour can immediately provide rough GOTO functionality (and sidereal tracking) upon connection to the mount, provided the following conditions are met:

●The longitude and latitude entered for your location are correct.
●The time, time zone, and daylight setting are correct for your local time.
●For equatorial mounts, the mount is polar aligned, and SynScan Tour has been connected when the mount was precisely in its home position.
●For alt-azimuth mounts, the original pointing direction has been accurately inputted, and the base of the mount is level.

However, to obtain the best GOTO and tracking accuracy, you need to do a star alignment with SynScan Tour. This is very easy to do. Just point the telescope at a few stars, and SynScan Tour will collect the data needed to improve the GOTO and tracking accuracy.

After connecting SynScan to you telescope, from the Star Hopper Menu, touch the Telescope icon, then touch the " Alignment" tab onscreen (or use the left and right direction keys to select), and you'll see the following:

First, use the up and down buttons on the right of the touch screen to set the maximum magnitude of stars that will be used for telescope alignment. You will not usually need to adjust this, but you can set it to a lower number for a bright city sky. This will only show the very brightest stars visible from your location.

SynScan Tour provides three alignment methods; choose one by touching the corresponding selection circle.

●One-Star Alignment is used for equatorial mounts that are accurately polar-alignment and have a minimum of cone error inherent in the mount. This alignment method should not normally be used unless your mount resides in a permanent location (i.e. such as an observatory or permanent pier).
●Two-Star Alignment is used for most alt-azimuth mounts, and also provides good results for equatorial mounts which don't have much inherent cone error.
● Three-star alignment provides the most precise alignment for equatorial mounts.

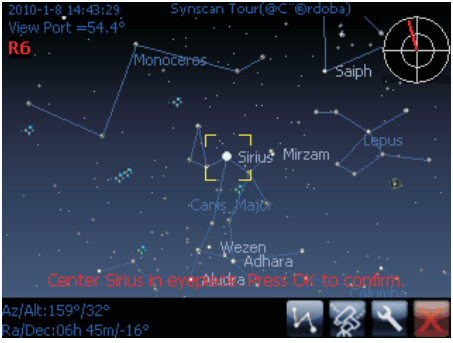
Upon selecting an alignment method, touch the “Apply” button onscreen to continue. For example, upon selecting a two-star alignment, the display will look like this:

There are two star lists. Select a first alignment star from the left list by touching it onscreen (or by using the up and down direction keys) to highlight it. Choose a star whose position you know in the sky. Then choose a second star in the right list. The stars shown in the right list depend on the choice of the first star in the left list. Only the stars which are suitable to be used as a second alignment star will be listed. The stars are listed in order of magnitude (brightness) by default. This helps you to choose the brightest stars, which are easiest to identify in the sky, as alignment stars. Alternatively, you can touch the “Sorted by Alphabet” bar onscreen to change the sorting method.

Now, touch the “Apply” button to continue. The telescope will begin to slew to the first alignment star. The telescope will point close to the star provided the following conditions have been met:

- The longitude and latitude entered for your location are correct.
- The time, time zone, and daylight setting are correct for your local time.
- For equatorial mounts, the mount is polar aligned, and SynScan Tour has been connected when the mount was precisely in its home position.
- For alt-azimuth mounts, the original pointing direction has been accurately inputted, and the base of the mount is level.

The star map of the SynScan will change to “alignment mode”, which will help you identify and center the alignment stars. The first alignment star will be shown at the center of the screen surrounded by a yellow frame. The sky map will display the area of sky surrounding the star. A radar chart will appear in the upper right corner, and the screen will look similar to this:



Use the radar chart as discussed earlier (in section 4.1.5., “Locating Celestial Objects”), and move SynScan Tour until the red line shrinks to the center of the circle. SynScan Tour is now pointing near the first alignment star. Compare the sky map onscreen with the actual sky, and identify which star in the sky is the first alignment star.

Now, use the direction keys to move the telescope so the first alignment star is centered in the telescope's field of view (FOV). Use a telescope eyepiece that provides a wide field of view (low magnification) to acquire the star into the field of view, then switch to a higher-magnification eyepiece to precisely center the alignment star. Select an appropriate telescope slewing (moving) speed rate by pressing the Rate key and using the scroll wheel. You'll want to use a higher rate when the telescope is further away from the alignment star, then switch to a lower rate to precisely center the star when you can see it in the telescope's eyepiece. Once the alignment star is centered in the FOV of the telescope's eyepiece, press the OK key to confirm. You have now finished aligning on the first alignment star.

The telescope will then automatically begin slewing the telescope to the second alignment star. It should point near the second alignment star when it stops. Compare the displayed sky map with the actual sky to identify the second alignment star. Now, center the second alignment star in the FOV of the telescope's eyepiece with SynScan Tour's direction keys, just like was done for the first alignment star. Once the second alignment star is centered in the telescope's FOV, press the OK key to confirm. You have now completed a Two Star Alignment, and SynScan Tour is ready for accurate GOTO operation of your telescope.

For best pointing accuracy, try a Three Star Alignment. This is performed just like a Two Star Alignment, but upon centering the second alignment star in the telescope's FOV and pressing the OK key, the telescope will automatically begin slewing the telescope to the third alignment star. Center the third alignment star in the telescope's FOV using SynScan Tour's direction keys, and press the OK key once more. You'll find that utilizing the Three Star Alignment gives the best results when GOTO operations are utilized over a wide area of the sky.

4.8.4 Setting Telescope Parameters

From the sky map, press the Menu key, then touch the Telescope icon onscreen to access the Telescope menu. Select the “Settings” tab to set parameters relating to the telescope mount, as indicated in the following screen:

Touch a parameter onscreen, or use the Device key to choose the parameter, then use the up and down keys (or the up and down buttons onscreen) to change the value of the parameter. Use the “Apply” button to confirm the change.

--The “Pitch high limit” and “Pitch low limit” set altitude slew limits for the telescope mount. These can be utilized to prevent the telescope from bumping the mount when pointed near zenith (90 degrees altitude) or near the horizon (0 degrees altitude).

--The “Backlash” settings should be adjusted depending upon the amount of backlash inherent in your mount's motors. The “Guide Rates” are used for autoguiding during astro-imaging applications.

--The “EQ Tracking Mode” is set here; this is used for equatorial mounts only. Choose auto, RA/Dec, or just RA.

- RA/Dec: The mount will track with both motors. This is a good choice for accurate tracking when the mount is not accurately polar aligned.
- RA: The mount will track with the RA motor only. This can be chosen if your polar alignment is excellent.
- Auto: SynScan Tour automatically chooses RA/Dec or RA for the EQ Tracking Mode based upon the results of the three star alignment. If SynScan Tour calculates that the mount is not accurately polar aligned, it will automatically choose RA/Dec for the tracking mode. Otherwise, it will choose RA only.

--The “Tracking Rate” can also be changed here, select from sidereal, King, solar, and lunar tracking rates. The sidereal tracking rate is the one that should be used in most circumstances; it is the exact rate that the sky moves relative to the Earth.

4.8.5 Accessing the User Catalog and Slewing to a RA/Dec Coordinate

From the Telescope menu, select the “Custom” tab and the screen will appear as shown below.

●Select the “User Catalog” circle by touching it on screen, then select the target object from the list in the “User Catalog” window. Touch the “Goto Object” button to automatically slew the telescope to the object's position in the sky. To create the User Catalog, refer to section 8.5 of this manual.
●To automatically slew the telescope to any specific RA and Dec coordinate, select the “Input Target” circle onscreen, then directly input the RA and Dec coordinates in the “Input Target” window. Use the up and down keys, or the up and down buttons onscreen, to enter the coordinate in each box, then touch the screen (or press the Device key) to switch among the boxes. When the RA and Dec coordinates have been input, touch the “Goto Object” button to automatically slew the telescope to the input location.

4.8.6 Precision Goto Function

From the Telescope menu, select the “Custom” tab. You can select or deselect the “Activate Precise-Goto Function” check box by touching it onscreen.

SynScan Tour's GOTO pointing accuracy with your telescope might not be perfect in some areas of the sky, even if the telescopemount has been perfectly aligned. This is generally due to mechanical errors inherent in your mount. The Precision Goto function can help improve the pointing accuracy in these areas of sky. This function is especially useful for locating the faintest deep sky objects. Even if you can't see the object in your telescope eyepiece, the Precision Goto Function will assure that you are at least looking in the right place!

When the Precision Goto Function is activated, it changes the way GOTO slewing is performed with SynScan Tour. Instead of slewing directly to a chosen object, SynScan Tour will first point the telescope to a bright star near the object. SynScan Tour will then ask you to center the bright star in the FOV of the telescope (using the direction keys), and then press the OK key to confirm. SynScan will now slew the telescope very precisely to the chosen object's location.

The bright stars which are used in the Precision Goto Function are recorded. Select the “Aligned Stars” circle in the Custom tab to seethese stars in the “Aligned Stars” window, as shown below.

The time of the star alignment is also listed with the star names. SynScan Tour will skip re-alignment on these stars if a newly selected object is near any of them. As time passes, however, these stars will move away from their aligned position in the sky (due to the rotation of the Earth), and the star alignments will no longer be suitable for the Precise-Goto Function. You should highlight the old star alignments and touch the “Delete Object” button to delete them after a period of approximately 1 to 2 hours. Deleting a star will re-enable alignment on it when slewing to an object near its location again.