



iOptron® SkyHunter™ Portable EQ/AZ GOTO System

Instruction Manual

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WARNING!

NEVER USE A TELESCOPE TO LOOK AT THE SUN WITHOUT A PROPER FILTER!
Looking at or near the Sun will cause instant and irreversible damage to your eye.
Children should always have adult supervision while observing.

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1. SkyHunter Portable EQ/AZ GOTO Mount Overview

Introducing the SkyHunter™ -- iOptron's new ultra compact EQ/AZ GoTo mount!



Figure 1 SkyHunter GoTo Mount

The SkyHunter™ mount takes the next step toward perfection. It is the lightest and most compact full function portable goto mount in iOptron's exceptional history. Weighing in at only 2.9 lbs (including internal rechargeable battery), the SkyHunter is capable of supporting a 7 lbs payload in both equatorial and alt-azimuth modes.

The SkyHunter™ mount features four tracking rates, 1X or sidereal, 1/2X for sky and landscape combined, solar and lunar. All 4 tracking rates work in both northern and southern hemispheres.

The SkyHunter™ mount can be controlled by an iOS or Android SmartPhone/tablet, an optional 8410 hand controller, or a computer via ASCOM, INDI or embedded drive.

Features:

- Specialized Grab N' Go GOTO EQ/AZ mount
- Mount weighs 2.9 lbs (1.3kg)
- Payload 7 lbs (3.2kg) (balanced, exclude CW)
- Dual-axis servomotors with optical encoders
- Tracking speed: solar, lunar, 1X, 1/2X, S/N
- Operation in both northern and southern hemisphere
- Vixen dovetail saddle
- Built-in rechargeable battery for up to 10 hours of operation (20°C)
- Built-in WIFI adapter for full ASCOM, iOptron Commander™ and Sky Safari control
- USB port for firmware upgrade and computer control
- Optional Go2Nova® 8410 controller with Advanced GOTO NOVA® GOTO Technology
- iPolar electronic polar scope (#SHEQA, otherwise optional)
- Counterweight Shaft: $\Phi 20 \times 200$ mm with 3/8" thread, stainless steel
- Counterweight: 3 lbs (1.35kg)
- Attaches to a camera tripod with 3/8" or 1/4" threads

- 1.25" Stainless steel tripod (#3221)
- Optional carbon fiber tripod (#8061)
- Pier-extension (#8041)
- One year limited warranty on mount, 90 day for battery

2. SkyHunter™ Mount Assembly

2.1. Parts List¹

Depends on the configuration, a SkyHunter mount system may come with the following parts:

- SkyHunter™ GOTO EQ/AZ mount head
- EQ base (not included in SHAZ)
- Stainless steel counterweight shaft
- 3 lbs counterweight (#8605)
- iPolar electronic polar scope (for SHEQA only)
- MiniUSB charging cable
- #3221 Tripod
- #8041 Pier extension
- One Year Limited Warranty (90 day on battery)

OPTIONAL PARTS

- Carbon fiber tripod (#8061)
- iGuider mini autoguiding system (#3360)
- 8410 hand controller
- Additional counterweight #8605

ONLINE RESOURCES (*click on the “Support” menu at www.iOptron.com*)

- Quick Start Guide
- Instructional manual
- Tips for set up
- Hand controller and mount firmware upgrades (check online for latest version)
- iOptron ASCOM driver and computer control
- Reviews and feedback from other customers
- Accessories

¹ US market only. Actual contents, design and function may vary.

2.2. Identification of Parts

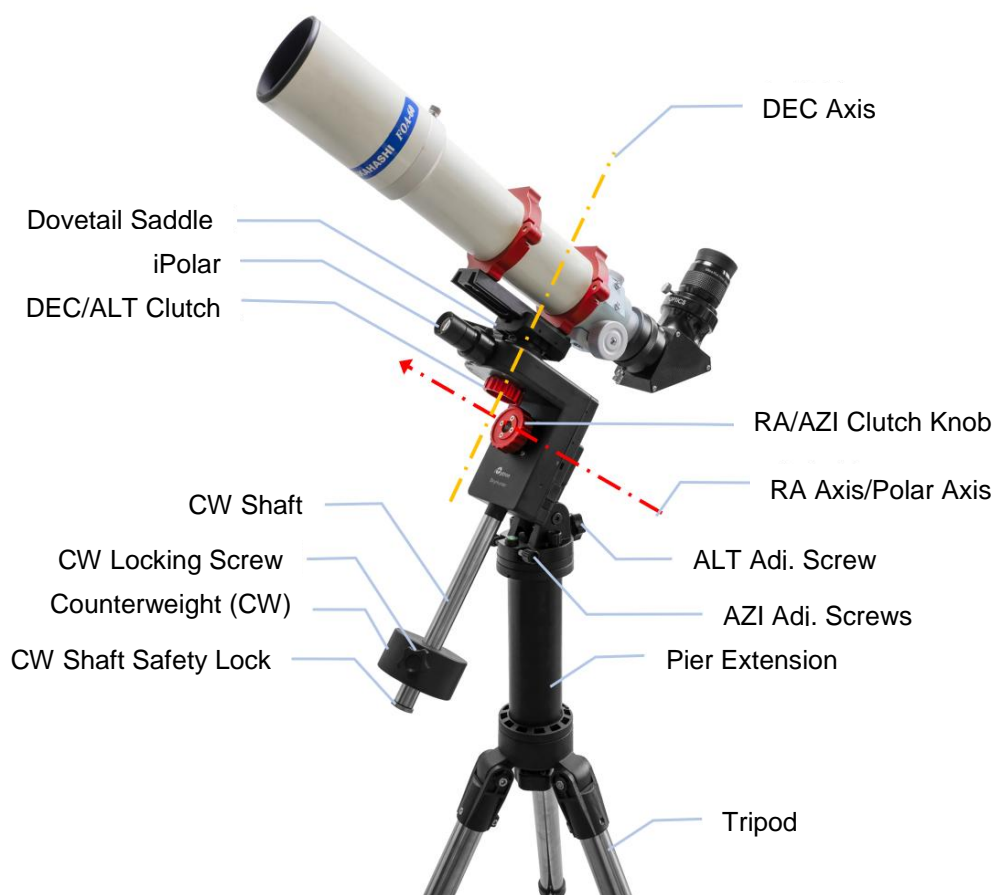


Figure 2 SkyHunter mount (EQ) assembly

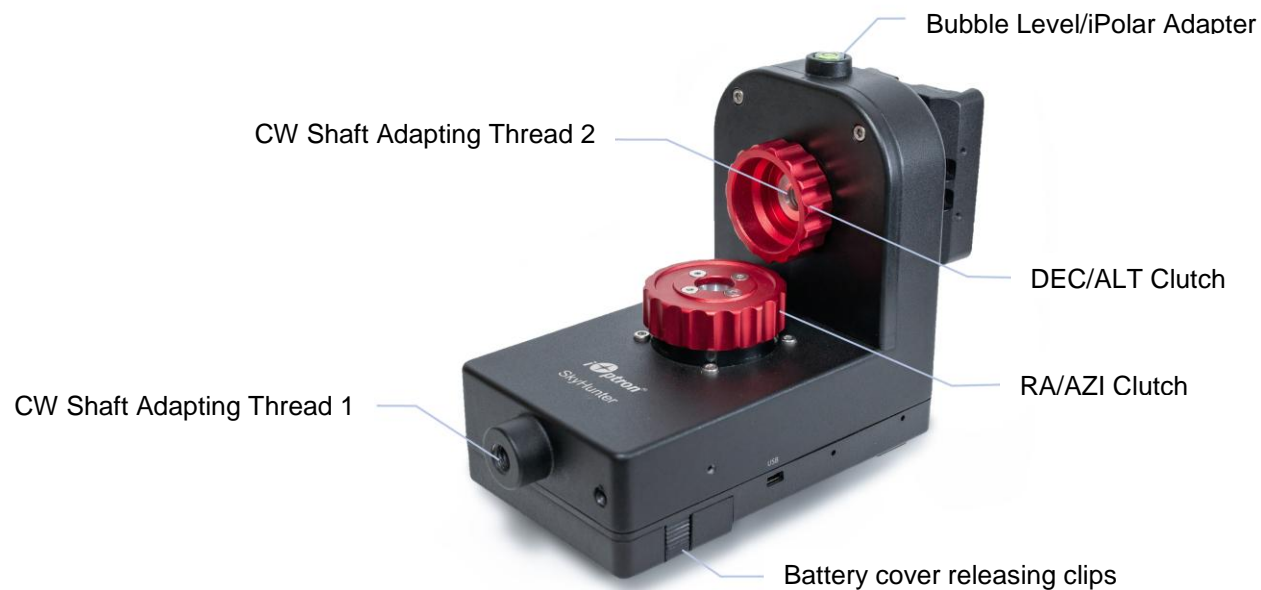


Figure 3 SkyHunter mount head

2.3. SkyHunter Ports and Buttons

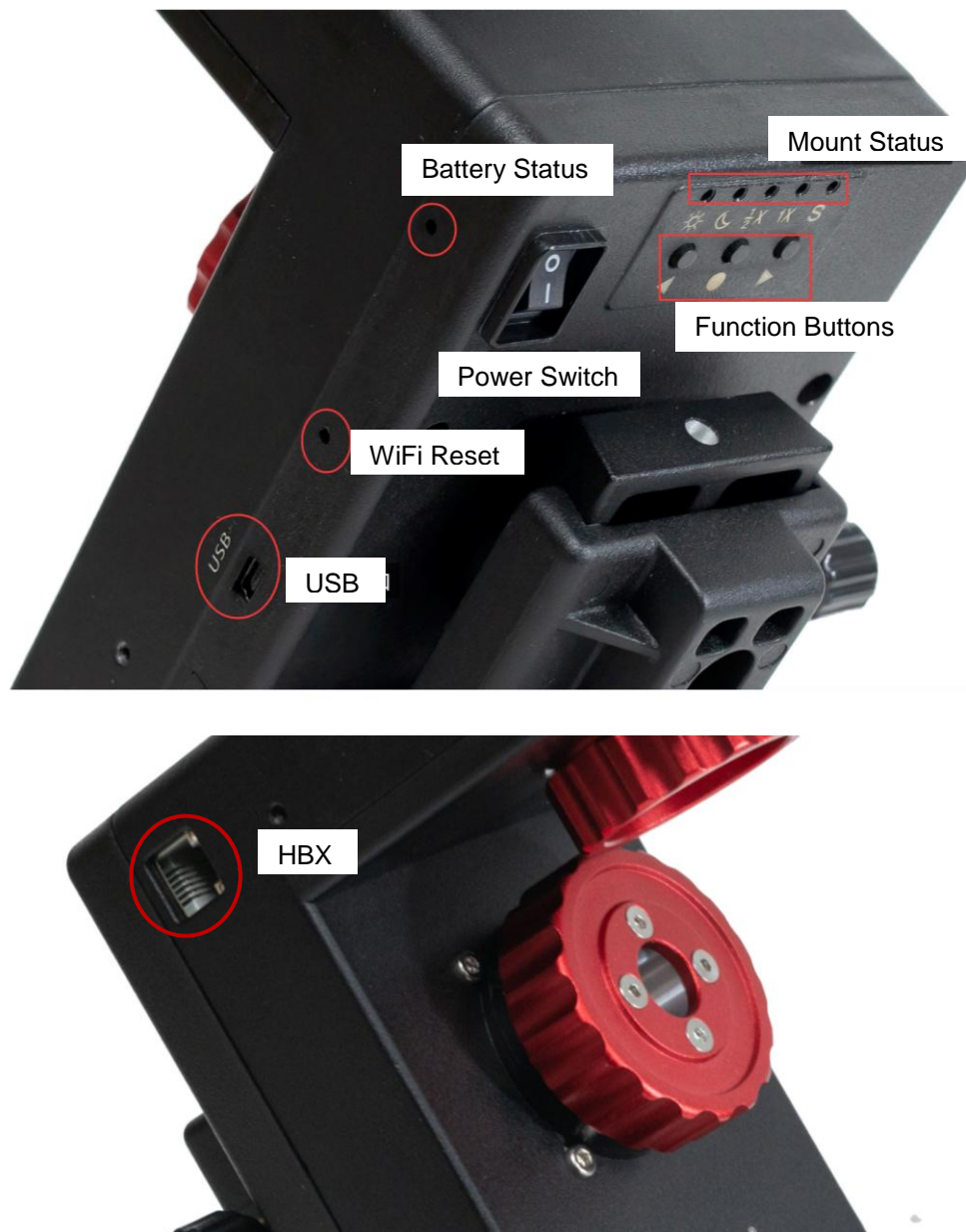


Figure 4. Ports and buttons on a SkyHunter mount

USB Port: MiniUSB port to charge the battery, power the mount and connect the mount to a computer.

WiFi Reset Button: with mount power on, use a sharp tool, such as a toothpick, to restart the WiFi (short press) or to reset to factory default (press and hold for 3 seconds).

Power/Battery Status Indicator: With mount power on, if the battery indicator LED stays steady on, the battery has sufficient power for mount operation. When the indicator blinks slowly (about 0.5Hz), it indicates the power is low and the battery needs be charged. When the battery is new and fully charged, the status indicator may flash rapidly (about 5Hz). You may charge the mount with the power switch either ON or OFF. However, when the power switch is turned off, the battery status indicator does not function.

Mount Status Indicator: Current mount operation status. It indicates the current tracking speed if the mount is in EQ mode. If **NONE** of the tracking speed LED is turned on, the mount is in AA mode. When LED under **S** is on, the mount is set in Southern Hemisphere.

Function Button: to change the mount status.

Power Switch: Turn the mount power ON/OFF.

HBX Port: For optional 8410 hand controller. **DO NOT** connect the guiding camera ST-4 cable into this port. I may damage the mount or camera electronics.

2.4. SkyHunter™ Mount Assembly

STEP 1. Charge the battery

The SkyHunter™ mount is shipped with battery partially charged. ***It is suggested to fully charge the battery before each session.*** Insert the miniUSB plug into the USB port on the side of the mount, and connect the other end of the USB cable into a USB port of a computer, a smart phone charger or a portable battery pack (not included). The input power should be 5V, >1A.

When a new battery is fully charged, the battery status indicator may flash rapidly (about 5Hz). You may charge the mount with the power switch either on or off. (However, when the power switch is turned off, the Battery Status Indicator does not function). When the indicator stays steady without blinking, the battery power should be sufficient for your session. When the indicator blinks slowly (about 0.5Hz), it indicates the power is low and recharging is necessary.



Figure 5 Charging the Battery



Please don't charge the battery or use USB power when temperature is at or below 0°C (32°F), otherwise the rechargeable battery might be permanently damaged.

The mount can be operated while the battery is charging.

Equatorial Mode Setup

STEP 2. Attach SkyHunter mount onto a tripod: EQ mode

To set up a SkyHunter mount in EQ mode, an EQ base is needed. The EQ base has a 3/8" threaded hole. Attach it onto an iOptron #3221 tripod, #8041 extension pier, #8601 carbon fiber tripod or a camera tripod with a 3/8" mounting pole.

There are 4 threaded holes and a stopper screw on the EQ base. Move the stopper to the position reflecting your site latitude.



Figure 6 iOptron SkyHunter mount EQ Base

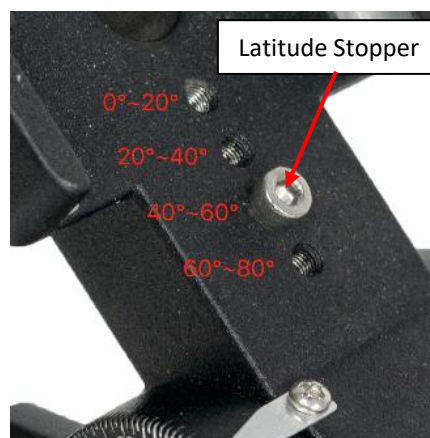


Figure 7 Four (4) latitude position for the EQ base

The dovetail bar also acts as the RA clutch lock. Turn the dovetail bar counterclockwise (or hold the dovetail bar then turn the mount clockwise) to release the RA clutch. Do the opposite to lock the RA clutch. Insert a small screwdriver or an Allen wrench into one of the small holes on the dovetail bar for added turning torque.

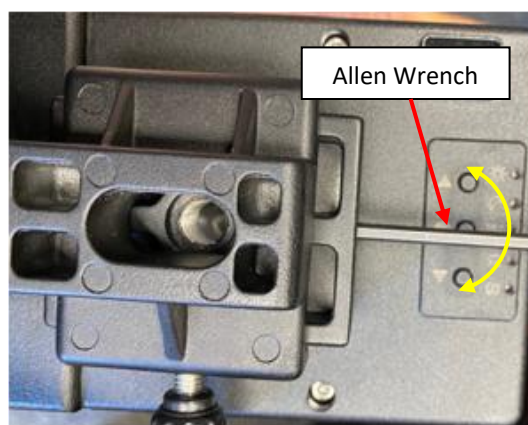
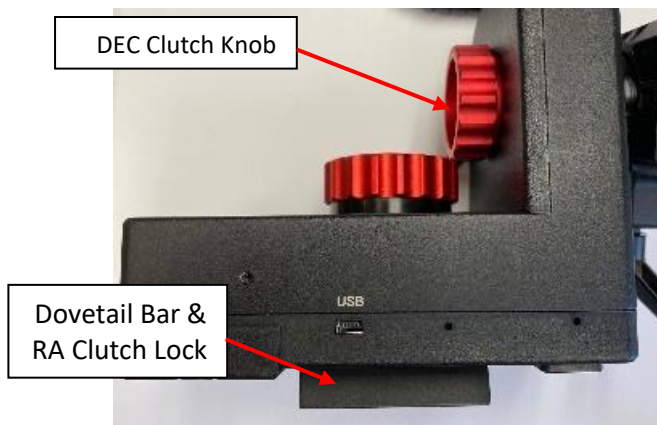


Figure 8 Dovetail bar as an RA clutch lock

Release the EQ base dovetail bar locking screw and slide the mount head into the EQ base dovetail saddle. Tighten the locking screw. Make sure that dovetail bar sits flush inside the saddle.



Figure 9 Slide mount head into an EQ base

STEP 3. Adjust latitude

Release EQ base Latitude Locking Lever, turn Latitude Adjustment Knob to adjust the latitude until the arrow points to the current latitude on the Latitude Scale. Tighten the locking lever. Turn the lever while pulling it outward to rest the lever at a position that does not interfere with the mount body.



Figure 10 Adjust EQ base latitude

STEP 4 Install counterweight

Thread the CW shaft into the **CW Shaft Adapting Thread 1** located at the bottom of the mount. Remove the CW Safety Cap at the end of CW Shaft. Slide the CW over the shaft with the larger opening facing down. Tighten the CW Locking Screw to hold the CW in place. Place the Safety Cap back onto the shaft.

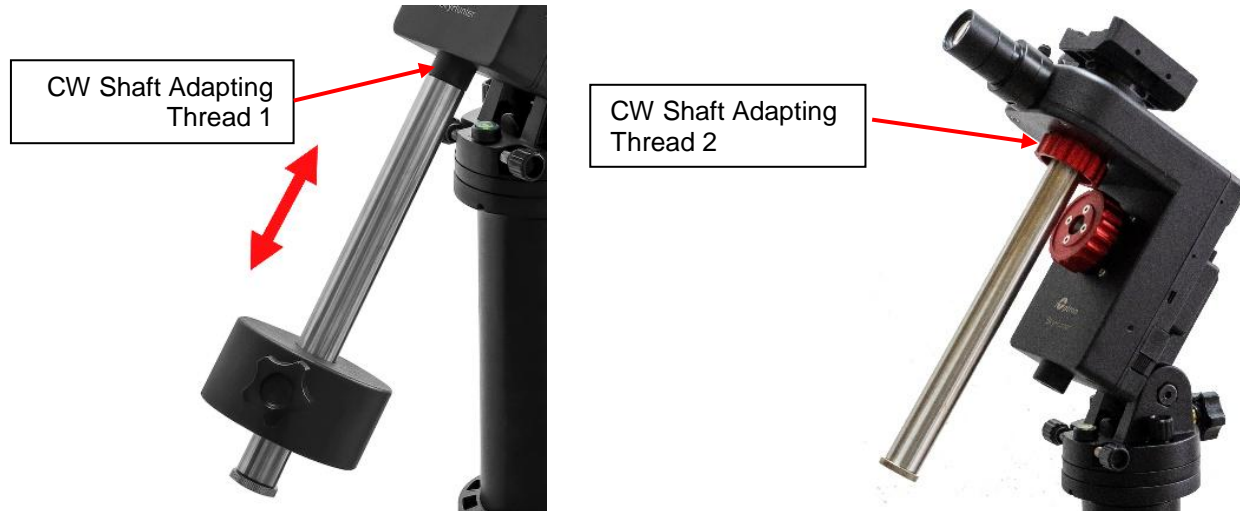


Figure 11 Install counterweight shaft and CW

For a low latitude use, the CW shaft can be threaded into **CW Shaft Adapting Thread 2** (the DEC Clutch Locking Knob) to avoid the CW interfering with the tripod/pier.

STEP 5. Install and balance telescope

The SkyHunter mount has a Vixen dovetail saddle. Release the Dovetail Saddle Locking Lever and slide the telescope dovetail plate into the saddle. Tighten the Saddle Locking Lever. ***Adjust the locking lever handle parallel to the saddle to avoid it hitting the mount during GOTO and tracking.***

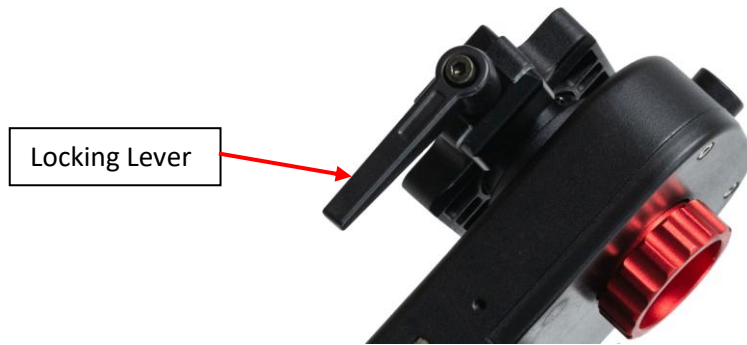


Figure 12 Dovetail saddle and locking lever for telescope mounting

Loosen RA and DEC clutches to balance the telescope. Insert a small screwdriver or an Allen wrench into the small hole on the mounting bar for added turning torque as shown in **Figure 8**.

You may need more than one CW for heavier payload or large diameter scope.



Figure 13 Balancing a telescope

STEP 6 Install iPolar

To install an iPolar electronic polar scope, loosen the iPolar thumb screw, slide it over the mount bubble level house, then tighten the thumb screw (iPolar might be with two thumb screws).



Figure 14 Install iPolar

STEP 7 Polar Alignment

Polar alignment is required for an EQ mount to tracking properly. A very rough alignment is facing the RA axis to True North and adjusting the altitude to your latitude.

A simple and improved alignment is aiming through the polar sight hole located on the RA axis to Polaris (or Sigma Octantis) while adjusting the azimuth and altitude angles until Polaris appears in the center of the field of view. Lock all the knobs when done.



Figure 15 Polar alignment through Polar Sight Hole

If an iPolar is installed, refer to the iPolar Operation Manual from iOptron's website to perform the polar alignment (https://www.ioptron.com/v/manuals/3339_iPolarOperationManual.pdf) or steps briefly outlined below:

- Download and install iPolar Software via iOptron website (Windows) or MacOS App store
- Connect a miniUSB cable between the iPolar and a computer USB port (Windows or MacOS)
- Click Connect and start polar alignment by following on-screen instructions.

When the pole star is not in sight or no iPolar installed, refer to optional 8410 hand controller **Polar Iterate Align** to perform Polar Alignment. Another way to perform polar alignment is using the polar alignment procedure in planetarium software.

Altazimuth Mode Setup

STEP 8. Attach SkyHunter mount onto a tripod: AA Mode

The SkyHunter mount has a 3/8" threaded mounting hole. It can be directly mounted onto an iOptron #3221 tripod, #8041 extension pier, #8601 carbon fiber tripod or a camera tripod with a 3/8" mounting pole.



Figure 16 Attach a SkyHunter mount head onto a tripod for AA mode

Adjust the tripod to level the mount by placing the bubble inside the middle circle. For a better result, check the bubble position while rotating the mount in azimuth and make sure it stays at the same place. Leveling is very important to the mount performance in AA mode.



Figure 17 Leveling a SkyHunter in AA mode

Balance under the AA mode is not very critical, especially in azimuth direction. However, good balance or slightly front heavy in altitude direction is recommended. Slightly front heavy should help engaging the alt axle and prevent the alt clutch from loosening.

3. SkyHunter™ Mount Operation

3.1. Use mount control panel

The mount control panel is located near the power switch. If the mount is set at EQ mode, the mount will be in tracking mode at a rate that is shown on the Mount Status Indicator when the mount is powered on.

If your goal is only to take image of the sky and stars, set the tracking speed to **1X** (celestial/sidereal tracking speed). With a good polar alignment, this should keep the stars round in your image.

If you would like to take an image of both the starry sky and the night landscape at the same time, you may set the tracking speed at **1/2X**. This will let you take clear images of both the sky and the land objects at a proper exposure.

Solar speed is for tracking the Sun and **lunar** speed for the moon.

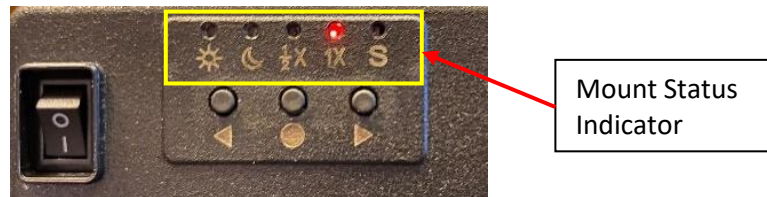


Figure 18 Mount Status Indicator

Keep pressing the center round Function Button ● to change the tracking speed from **Solar**=>**Lunar**=>**1/2X**=>**1X**.

The letter “**S**” indicates if the mount is set to northern or southern hemisphere. If the LED under “**S**” is on, it indicates the mount is set to southern hemisphere. To change this setting, press and hold the center round function button ● until the LED under letter “**S**” starts to blink. Press the ● button briefly to toggle between “**S** (LED on, left)” and “**N** (LED off, right)”. Then press and hold ● button for 3 seconds to store the change.

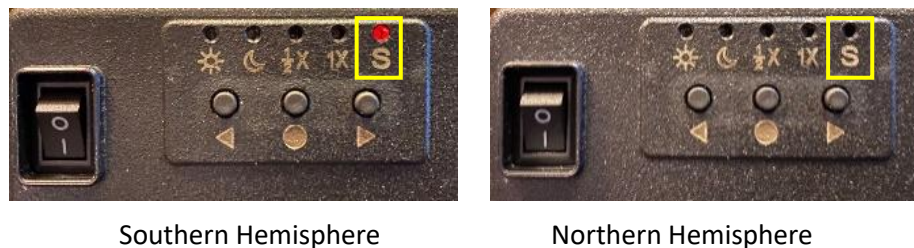


Figure 19 Change mount S/N settings

To switch between EQ and AA modes, press and hold the ● button while power on the mount. When switch from EQ to AA, all 5 LEDs should blink, and when release the ● button, all four tracking speed LED should be off when in AA mode.

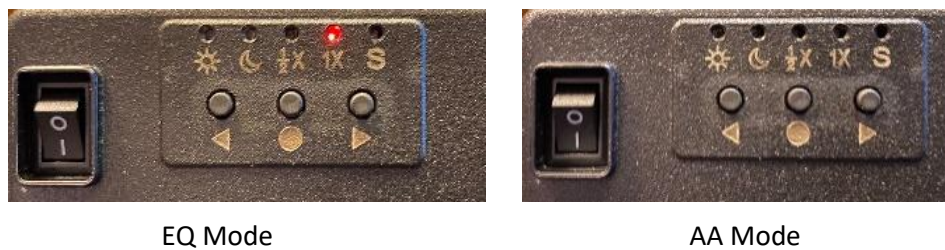


Figure 20 Mount EQ or AA mode

Repeat the above one more time to switch from AA to EQ. When releasing the ● function button, one tracking speed LED will be on when in EQ mode.

If there is **ONE** (any one) tracking speed LED on, the mount is in EQ mode (left). If **NO** LED is on, the mode is in AA mode (right).

3.2. Use the mount as a tracking mount

The mount can be used as a simple single axis tracking mount. The procedures are:

- (1) Set the mount in EQ mode;
- (2) Mount a camera to the mount and lock it firmly by turning the mount dovetail bar;
- (3) Polar align the mount;
- (4) Select tracking speed and N/S;
- (5) Power the mount on. The mount will start tracking automatically;
- (6) Aim the mount to the sky/sky-landscape you are interested in by adjust camera in DEC direction;
- (7) Press and hold ◀ or ▶ button to adjust the camera in RA direction.

There is no auto-tracking in AA mode when the mount is powered on. Tracking will start after GOTO.

3.3. Zero Position

This is the starting reference point of the GOTO performance. Assuming you are in northern hemisphere, align the SkyHunter™ mount RA axis to the true north with the assistance of a compass, with telescope at the highest point, for the EQ mode (left in Figure 21).

For AA mode (right in Figure 21), point the scope to Zenith, with the HBX port side facing South (scope on the right side of the mount).



Figure 21 Zero Position of a SkyHunter Mount: EQ Mode (left) and AA Mode (right)

After attach the mount to tripod and lock the RA/AZI clutch with the assistance of a screw driver or Allen wrench, you may press and hold the ◀ or ▶ button to adjust the mount in RA/AZI direction. After set the mount to Zero Position physically, power cycling the mount to ensure the mount is at Zero Position. , **The mount power on position is Zero Position for control software.**

If you have downloaded iOptron Commander Lite, you can use MOVE command in iOptron Commander Lite to adjust the RA and DEC. Then use Zero Position command to set the Zero Position.

3.4. Control SkyHunter Mount via iOptron Commander Lite

The mount can be controlled by the iOptron Commander Lite app for GOTO and tracking.

Turn the mount power on. Check your SmartPhone WIFI setting and connect to a WIFI device named SH_XXXXXX.

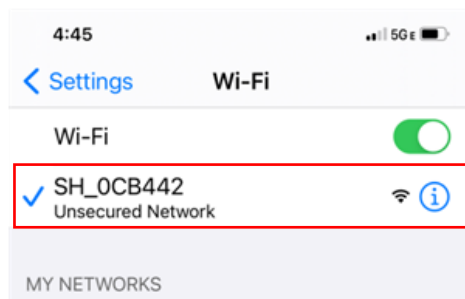


Figure 22 SkyHunter WiFi network

Launch iOptron Commander Lite (iOS as an example) and tap to connect the mount.
the mount.

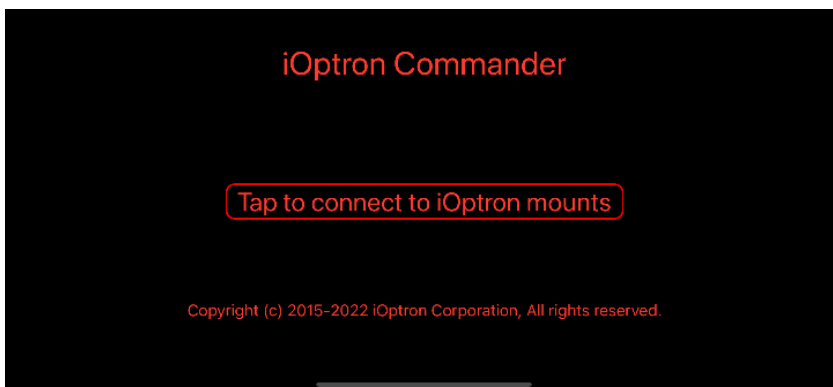


Figure 23 Commander Lite for iOS

Now you can control the mount via your phone/tablet.

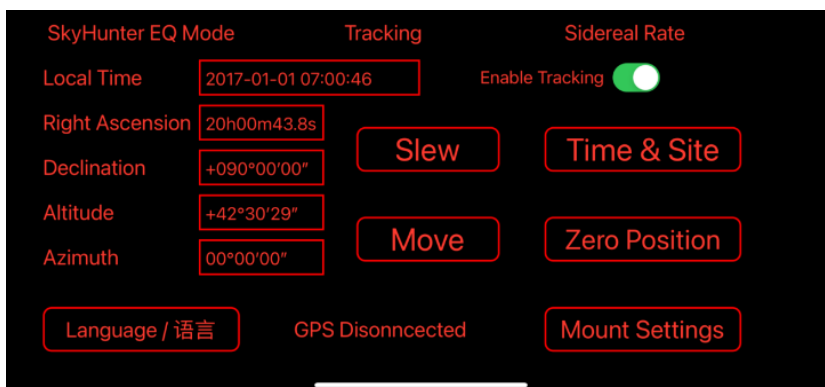


Figure 24 SkyHunter Commander Lite control panel

Please refer to online Commander Lite Application Note for more detail.

<https://www.ioptron.com/v/ASCOM/iOptronCommanderLiteAppNote.pdf>

3.5. Control SkyHunter Mount Using a Hand Controller

A SkyHunter mount can be controlled by an optional Go2Nova® 8410 hand controller.

3.5.1. Go2Nova® 8410 Hand Controller

The Go2Nova® 8410 hand controller (HC) shown in Figure 25 is the optional controller used on the SkyHunter mount. It has a large LCD screen, function, direction, and number keys on the front; and an HBX (6-pin) at the bottom.

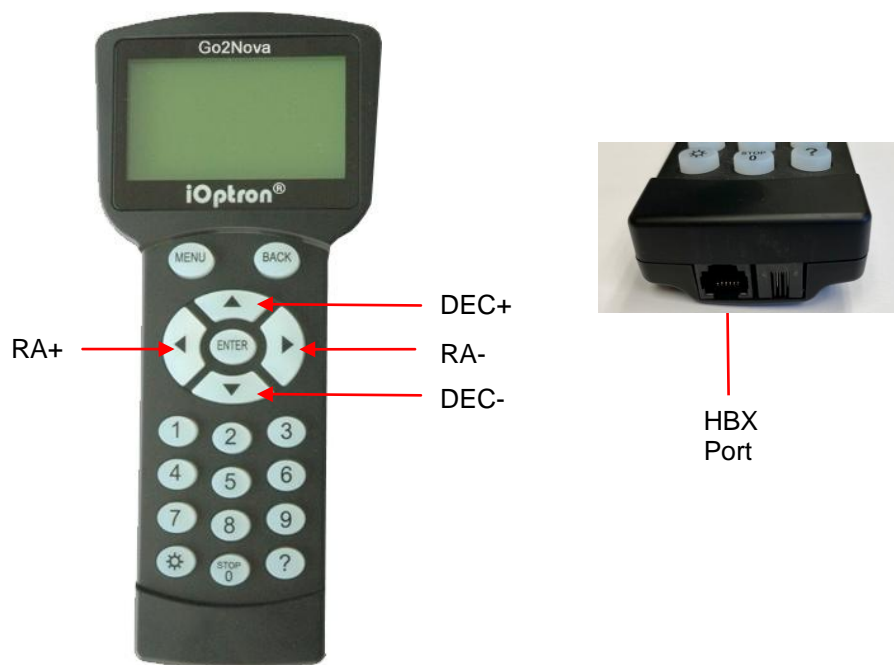


Figure 25. Go2Nova® 8410 hand controller

3.5.1.1. Key Description

- MENU Key: Press “MENU” to enter the Main Menu.
- BACK Key: Move back to the previous screen, or end/cancel current operation, such as slewing.
- ENTER Key: Confirm an input, go to the next menu, select a choice, or slew the telescope to a selected object.
- Arrow (▲▼◀▶) Keys: The arrow keys are used to control the movement of DEC and R.A. axes. Press and hold ▲(DEC+), ▼(DEC-) buttons to move a telescope along the DEC direction, ◀(R.A.+), ▶(R.A.-) to move a telescope along the R.A. direction. They are also used to browse the menu or move the cursor while in the menu. Press and holding an arrow key for a fast scrolling.
- Number Keys: Input numerical values. Also used to adjust speeds (1: 1X; 2: 2X; 3: 8X; 4: 16X; 5: 64X; 6: 128X; 7: 256X; 8: 512X; 9: MAX)
- Light Key(☀): Turns on/off the red LED reading light on the back of the controller.
- Help (?) Key: Identify and display bright stars or objects that the telescope is pointing to.
- STOP/0 Key: Stop the mount during GOTO. Also toggle between starting and stopping tracking.
- HBX (Handbox) port: connect the HC to the SkyHunter mount using a 6P6C RJ11 cable.

3.5.1.2. The LCD Screen

The 8410 HC has a large 8-line, 21-character per line LCD screen. The user interface is simple and easy to learn.

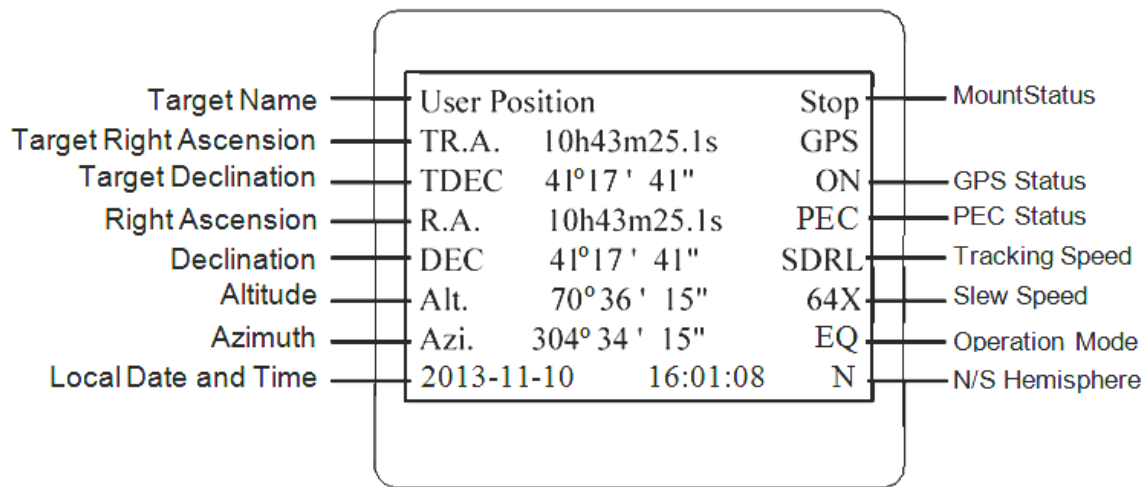


Figure 26. 8410 HC LCD Information Screen

1. Target Name/Mount Position: displays the name of the target that telescope is currently pointed to or the current mount position.
 - Zero Position: The reference position for GOTO. The mount can move to Zero Position using “**Goto Zero Position**” or “**Search Zero Position**” command;
 - User Position: The mount is pointed to a user defined position, which could be a particular celestial object or simply a position determined by pressing an arrow key;
 - An object name, such as “Mercury” or “Andromeda Galaxy”: Name of the star or celestial object that the mount is currently slewing to or tracking.
2. Target R.A.: Right Ascension (R.A.) of the target object.
3. Target Declination: Declination (DEC) of the target object.
4. Right Ascension: Current R.A. of the telescope.
5. Declination: Current DEC of the telescope.
6. Altitude: Altitude of the telescope (degrees vertical from the local horizon - zenith is 90°).
7. Azimuth: Azimuth of the telescope (north is 0°, east is 90°, south is 180°, and west is 270°).
8. Local Date and Time: displays the local time in a format of YY-MM-DD HH:MM:SS.
9. Mount Status: Displays the current operational status of the mount.
 - Stop: mount is not moving;
 - Slew: mount is moving with an arrow key is pressed or a GOTO command, such as “**Select and Slew**” or “**Goto Zero Position**”;
 - Tracking: mount is at a tracking status.
10. GPS Status: not available for a SkyHunter
11. PEC Status: not available for a SkyHunter
12. Tracking speed: Displays the current tracking rate of the mount.
 - SDRL: mount is tracking at sidereal speed;
 - Solar: mount is tracking at solar speed;
 - Lunar: mount is tracking at lunar speed;
 - HALF: mount is tracking at ½ sidereal speed;

13. Slew speed: The mount has 9 slew speeds: 1X, 2X, 8X, 16X, 64X, 128X, 256X, 512X, MAX(3.75°/sec).
14. Operation Mode: EQ indicates that the mount is operating in an equatorial mode, AA for altazimuth mode.

3.5.1.3. Install and Check the Hand Controller Battery

The hand controller uses a button battery to keep the Real Time Clock running. The battery is a CR2032 Lithium battery, which is not included due to shipping restrictions.

Open the HC back cover with a good, size 1 (4mm) Phillips Screw Driver. With battery + sign facing up, slide the battery under two small metal hooks on the positive side first. Then push the battery down to make a good contact. Make sure that two spring contacts on the negative side are underneath the battery. If none of the metal pins in battery holder can be seen after battery installed, the battery is not installed properly.

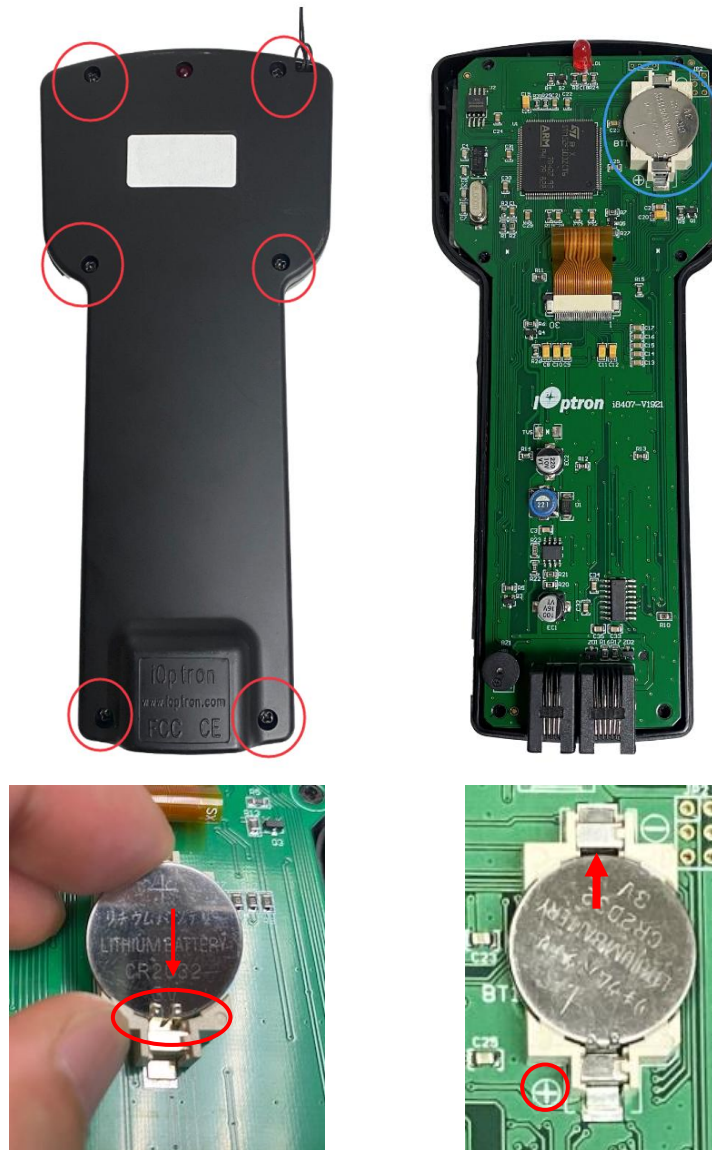


Figure 27. Install a CR2032 battery

If the hand controller can't display the correct date and time, most likely the battery is installed wrong, or power is low and needs be replaced.

3.5.2. Go2Nova® 8410 Hand Controller Function

EQ and AA mode displays different MENU on LCD. Here lists all the functions in the 8410HC for a SkyHunter mount.

3.5.2.1. Slew to an Object

Press **MENU** => “**Select and Slew.**” Select an object that you would like to observe and press the **ENTER** key.

The Go2Nova® 8410 hand controller has a database of over 212,000 objects. Use the ► or ◀ buttons to move the cursor. Use the number buttons to enter the number, or the ▼ or ▲ buttons to change the individual number. Hold on a button to fast scroll through the list. The “☉” indicates the object is above the horizon, and a cross mark “⊕” means it is below the horizon. In some catalogs those stars below the horizon will not display on the hand controller.

Solar System

There are 9 objects in the Solar system catalog.

Deep Sky Objects

This menu includes objects outside our Solar system such as galaxies, star clusters, quasars, and nebulae.

- Named Objects: consists of 60 deep sky objects with their common names. A list of named deep sky objects is included in Appendix.
- Messier Catalog: consists of all 110 Messier objects.
- NGC Catalog: consists of 7,840 objects in NGC catalog.
- IC Catalog: consists of 5,386 objects in IC catalog.
- UGC Catalog: consists of 12,921 objects.
- Caldwell Catalog: consists of 109 objects.
- Abell Catalog: consists of 4076 objects.
- Herschel Catalog: consists of 400 objects.

Stars

- Named Stars: consists of 259 stars with their common names. They are listed alphabetically. A list is included in Appendix.
- Binary Stars: consists of 208 binary stars. A list is attached in Appendix.
- Hipparcos Catalog: the new HIP catalog consists of 120,404 records (2008).

Constellations

This catalog consists of 88 modern constellations with their names. They are listed alphabetically.

Comets

This catalog contains 15 comets.

Asteroids

This catalog contains 116 asteroids.

User Objects

It can store up to 60 used entered objects, including comets.

Enter R.A. DEC

Here you can go to a target by entering its R.A. and DEC numbers.

3.5.2.2. Sync to Target

This operation will match the telescope's current coordinates to Target Right Ascension and Declination. After slewing to an object, press **MENU** => "**Sync to Target**" => **ENTER**. Follow the screen to perform the sync. Using this function will re-calibrate the computer to the selected object. Multiple syncs can be performed if needed. This operation is most useful to find a faint star or nebula near a bright star.

"**Sync to Target**" will only work after "**Select and Slew**" is performed. You can change the slewing speed to make the centering procedure easier. Simply press a number (1 through 9) to change the speed. The default slew speed is 64X.

"**Sync to Target**" will improve the local goto accuracy around the synced star.

3.5.2.3. Alignment (only for EQ mode)

Pole Star Position

This function displays the position of the Pole Star. In the Northern Hemisphere the position of Polaris is displayed, while in the Southern Hemisphere the position of Sigma Octantis is shown.

Polar Iterate Align

This alignment method allows you to polar align the mount even if you cannot view the Celestial Pole. Press the **MENU** => "**Alignment**" => "**Polar Iterate Align**". The HC will display a list of bright alignment stars near the meridian as Alignment Star A. Follow the HC instructions to move Alignment Star A to the center of the eyepiece using a combination of the Latitude Adjustment Knob and the "◀" and "▶" buttons. Press **ENTER** to confirm the settings. Next, select a bright star that is close to the horizon as Alignment Star B. Center it using the Azimuth Adjustment Knobs and the "◀" and "▶" buttons (*the "▲" and "▼" buttons will not function*). Press **ENTER** to confirm the settings.

The telescope will now slew back to Alignment Star A to repeat the above steps. The iteration can be stopped when it is determined that the alignment error has been minimized. Press the **BACK** button to exit the alignment procedure.

NOTE: It is highly recommended to use an eyepiece with illuminated crosshairs for accurate centering.

NOTE: The movement of the alignment star in your eyepiece may not be perpendicular depending on its location in the sky.

3.5.2.4. Settings

Set Time and Site

SkyHunter mount does not have a GPS receiver. Hence one needs to manually enter the GPS location or sync it from the App

To set up the controller, turn the mount power ON. Press **MENU**=> "**Settings**":

```
Select and Slew
Sync. to Target
Alignment
Settings
Park Telescope
Edit User Objects
Firmware Information
Zero Position
```

Press **ENTER** and select “**Set Time and Site**”

```
Set Time and Site
Beep Settings
Display Settings
Set Guiding Rates
Set Tracking Rate
Set Parking Position
Meridian Treatment
Set Altitude Limit
```

Press **ENTER**. A time and site information screen will be displayed:

```
Daylight Saving Time      Y
UTC -300 Minute(s)
2014-03-09 10:19:18

Longitude:W071°08'50"
Latitude:  N42°30'32"

Northern Hemisphere
```

Set Local Time

Use the ◀ or ▶ key to move the cursor █ and use the number keys to change the numbers. Use the ▲ or ▼ button to toggle between “Y” and “N” for Daylight Saving Time, or “+” and “-” for UTC (Coordinated Universal Time) setting. Hold the arrow key to fast forward or rewind the cursor.

In order to make the hand controller reflect your correct local time, **time zone information has to be entered**. Press the ◀ or ▶ key, move the cursor to the third line “**UTC -300 Minute(s)**” to set the time zone information (add or subtract 60 minutes per time zone). For example:

- Boston is “UTC -300 minutes”
- Los Angeles is “UTC -480 minutes”
- Rome is “UTC +60 minutes”
- Beijing is “UTC +480 minutes”
- Sydney is “UTC +600 minutes”

All the time zones in North America are “UTC -”, as shown in the following table, so ensure the display shows “**UTC -**” instead of “**UTC +**” if in North or South America.

| Time Zone | Hawaii | Alaska | Pacific | Mountain | Central | Eastern |
|----------------|--------|--------|---------|----------|---------|---------|
| Hour behind UT | -10 | -9 | -8 | -7 | -6 | -5 |
| Enter UTC | -600 | -540 | -480 | -420 | -360 | -300 |

To adjust minutes, move the cursor to each digit and use the number keys to input the number directly. Use ▲ or ▼ key to toggle between “+” and “-”. When the time information entered is correct, press **ENTER** and go back to the previous screen. **Note that fractional time zones can be entered.**

Do not manually add or subtract an hour from displayed time to reflect Daylight Saving Time (DST). Instead please select “Y” for DST when daylight saving time begins.

| | |
|-----------------------|----------|
| Daylight Saving Time | Y |
| UTC -300 Minute(s) | |
| 2014-03-09 10:19:18 | |
| Longitude:W071°08'50" | |
| Latitude: N42°30'32" | |
| Northern Hemisphere | |

Daylight Saving Time

Y

←

For other parts of the world you can find your “time zone” information from internet.

Set Observation Site Coordinate

The third and fourth lines display the longitude and latitude coordinates, respectively. The longitude and latitude coordinates will be automatically updated when the GPS picks up satellite signals. “W/E” means western/eastern hemisphere; “N/S” means northern/southern hemisphere; “d” means degree; “m” means minute; and “s” means second.

Press ◀ or ▶ key to move the cursor and using ▲ or ▼ key to toggle between “W” and “E”, “N” and “S”, using number key to change the numbers. It is always a good idea to do your home work to get the GPS coordinates before traveling to a new observation site.

The site coordinates information can be found from your smart phone, GPS receiver or via the internet. Site information in decimal format can be converted into d:m:s format by multiplying the decimal numbers by 60. For example, N47.53 can be changed to N47°31'48": $47.53^\circ = 47^\circ + 0.53^\circ$, $0.53^\circ = 0.53 \times 60' = 31.8'$, $0.8' = 0.8 \times 60'' = 48''$. Therefore, $47.53^\circ = 47^\circ 31' 48''$ or 47d31m48s.

Select N/S Hemisphere

The northern/southern hemisphere will be determined by your latitude coordinate, with one exception. If you are near the equator (within +/- 10°), you can choose your own N/S setting.

If the polar axis is aligned to the North Celestial Pole, then set the mount to Northern Hemisphere. If the polar axis is pointing to the South Celestial Pole, set the mount to Southern Hemisphere. Press the ◀ or ▶ key to move the cursor and use the ▲ or ▼ key to toggle between “Northern Hemisphere” and “Southern Hemisphere”.

The site information is stored inside the hand controller’s memory chip. If you are not traveling to another observation site, they do not need to be changed.

Beep Settings

The Hand Controller allows a user to turn off the beep partially, or even go to a silent mode. To change this setting press **MENU** => “**Settings**” => “**Set Beep**”,

| |
|----------------------|
| Set Up Time and Site |
| Beep Settings |
| Display Settings |
| Set Guiding Rates |
| Set Tracking Rate |
| Set Parking Position |
| Meridian Treatment |
| Set Altitude Limit |

Select one of three available modes:

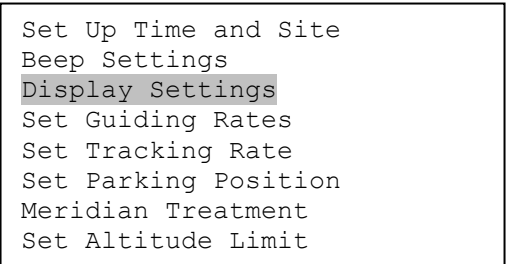
“**Always On**” – a beep will be heard on each button operation or mount movement;

“On but Keyboard” – a beep will be heard only when the mount is slewing to the object or there is a warning message;

“Always Off” – all sounds will be turned off, including the SUN warning message.

Display Settings

Press **MENU** => **“Settings”** => **“Set Display,”**



```
Set Up Time and Site
Beep Settings
Display Settings
Set Guiding Rates
Set Tracking Rate
Set Parking Position
Meridian Treatment
Set Altitude Limit
```

Use the arrow keys to adjust LCD display contrast (**LCD contrast**), LCD backlight intensity (**LCD light**), and keypad's backlight intensity (**Key light**).

Set Guiding Rate (EQ Mode Only)

This is an advanced function for autoguiding. It allow one to set the R.A. and DEC guiding speed differently. The R.A. guiding speed can be set between $\pm 0.01X$ to $\pm 0.90X$ sidereal rate. The DEC guiding speed can be set between $\pm 0.10X$ to $\pm 0.99X$ sidereal rate. The default number is 0.5X.

Set Tracking Rate

You can set up the mount tracking rate by selecting **“Set Tracking Rate”**. Then the user can select **“Automatic Speed”** to let the mount choose a proper Solar/Luna/Sidereal tracking rate based on the goto target. The **“Half Sidereal Speed”** if for sky and landscape imaging.

Set Parking Position

There are six parking positions you can set. Two positions that park the scope horizontally (**Horizon Position**). Two positions that park the scope vertically (**Zenith Position**). **“Current Position”** will park the scope at its current position. When the mount is turned on, it will use the last parking position setting as the default setting.

Meridian Treatment (EQ Mode Only)

This function tells the mount what to do when it tracks past the meridian. You can tell the mount if it needs a meridian flip and when to do it.

- **“Set Position Limit”** will tell the mount when to stop tracking or to do a meridian flip. The limit can be set at from 0° to 15° (60 minutes) pass meridian.
- **“Set Behavior”** will determine if the mount will stop tracking or perform a meridian flip at the set position limit.

Set Altitude Limit

This function allows the mount to keep tracking an object even if it is below the horizon but can still be seen, for example from an elevated observation site, such as a hill. The range can be set from -89° to +89°. The default limit is 00°. **Be careful when setting this limit.** It may cause mount goto problems.

Enable CW Up Position (EQ Mode Only)

This setting will allow the CW moving to an up position. The upward angle limit is same as the meridian flipping setting, or 14 degree at maximum. When this set is enabled, the mount will goto pass the

meridian if an object is close to the meridian, within the angle limit. There will be no meridian flip when pass the meridian.

HC Heating Switch

Turn on/off the controller LCD back heater. When “**Heating ON**” is selected, the heater will automatically be turned on when the ambient temperature reaches 0°C (32°F) and shut off at 10°C.

Set Maximum Slew Rate

This function will help the mount to slew properly under low temperature or extreme payload condition (extra long or large diameter scope). Press **MENU** => “**Settings**” => “**Set Maximum Slew Rate,**” You can select one of three slew rates. The default is MAX.

Switch to AA Mode/Switch to EQ Mode

Switch the mount between EQ and AA modes.

Reset All Settings

Reset all settings to factory default.

Language

Select one of supported menu languages. Currently it has English and Chinese.

3.5.2.5. Park Telescope

This function parks the scope to one of four preset park positions.

3.5.2.6. Edit User Objects

Besides various star lists available in the hand controller, you can add, edit or delete your own user-defined objects. This is especially useful for newly found comets. You can also add your favorite observation object into the user object list for easy sky surfing. Up to 60 comets and other user objects can be stored.

Enter a New Comet

Press **MENU** => “**Edit User Objects**” to set user objects.

User Defined Comet

Other Objects

Select “**User Defined Comet**” to add/browse/delete the user-defined comet list. Find the orbit parameters of a comet in the SkyMap format. For example, the C/2012 ISON has an orbit parameter:

| No. | Name | Year | M | Day | q | e | ω | Ω | I | H | G |
|--------|---------|------|----|---------|-----------|-----------|----------|----------|---------|-----|-----|
| C/2012 | S1 ISON | 2013 | 11 | 28.7960 | 0.0125050 | 1.0000030 | 345.5088 | 295.7379 | 61.8570 | 6.0 | 4.0 |

Select “**Add a New Comet**” to add a new one:

Add a New Comet

Browse Comets

Delete a Comet

Clear All Comets

The hand controller will display the parameter entry screen:

```
Enter Comet Parameter
Date: 0000-00-00.0000
q: 0.000000
e: 0.000000
ω: 000.0000
Ω: 000.0000
i: 000.0000
```

Enter the parameters using the arrow buttons and number keys. Press **ENTER** and a confirmation screen will be displayed. Press **ENTER** again to store the object under the assigned user object number, or press **BACK** button to cancel.

Enter Other Objects or Observation List

Press **MENU** => “**Edit User Objects**” to set user objects.

```
User Defined Comet
Other Objects
```

Select “**Other Objects**” to enter you own object:

```
Add a New Object
Browse Objects
Delete an Object
Clear All Objects
```

Select “**Add a New Object**”. A screen will be displayed asking you to Enter R.A. and DEC coordinates:

```
Enter R.A. and DEC

R.A.: 00h00m00s
DEC: +00d00m00s
```

You may enter the R.A. and DEC coordinates of the object you want to store, and press **ENTER** to confirm.

A more useful application of this function is to store your favorite viewing objects before heading to the field. When the “**Enter R.A. and DEC**” screen appears, press the **MENU** button. It brings up the catalogs that you can select the object from. Follow the screen instructions to add your favorite objects. Press **BACK** button to go back one level.

Press the **BACK** button to go back to the object entry submenu. You may review the records or delete those that are no longer wanted. Press the **BACK** button to finish the operation. Now you can slew to your favorite stars from “**Custom Objects**” catalog using “**Select and Slew**.”

3.5.2.7. Firmware Information

This option will display the mount type, firmware version information for the hand controller (HC), main board (Main), R.A. board (RA), and DEC board (DEC).

3.5.2.8. Zero Position

Goto Zero Position

This moves your telescope to its Zero Position. When the power is turned on, the mount assumes the Zero Position. This is the reference point for alignment and GoTo functions.

Set Zero Position

This set the Zero Position for the firmware.

The Zero Position reference will be an undefined value before the first time power on the mount, after firmware upgrade, or HC battery replacement. You can use this function to set the zero position reference.

Press the **ENTER** after moving the mount to Zero Position either manually or with the hand controller.

3.5.3. Star Identifying Function

The 8410 hand controller has a star identifying function. After **Polar Alignment** and **Set Up Time and Site**, slew the telescope to an bright star, manually or using GOTO. Press ? button to identify the star name telescope is pointing to, as well as nearby bright stars if there are any.

3.6. Autoguiding and Install iOptron iGuider

A SkyHunter mount can be autoguided when it is operated at an EQ mode. However, the mount only support pulse guiding via ASCOM. It does not support guiding via ST-4 port. **Please DO NOT plug an ST-4 guiding cable from a guiding camera into the mount HBX port.**

There are two M3 threaded holes on the side of the dovetail saddle for mounting an iOptron mini autoguiding system, iGuider. Refer to iOptron website for more information on #3360.

<https://www.ioptron.com/product-p/3360.htm>

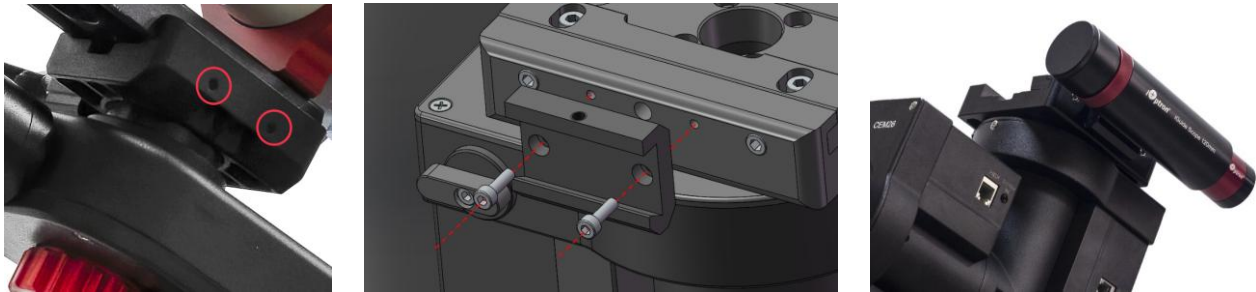


Figure 28. iGuider mini-autoguiding system

4. Maintenance and Servicing

4.1. Maintenance

Do not overload the mount. Do not drop the mount as this will damage the mount and / or permanently degrade GoTo performance and tracking accuracy. Use a wet cloth to clean the mount and hand controller. Do not use solvent.

The mount worm/gear meshing can be adjusted to accommodate payload or temperature changing. Please refer to the instruction in Appendix.

The real time clock battery in the hand controller needs be replaced if it can't keep the time after power off the mount.

If your mount is not to be used for an extended period, dismount the OTAs and counterweight(s).

4.2. iOptron Customer Service

If you have any question concerning your mount, please contact iOptron Customer Service Department. It is strongly suggested to send technical questions to support@ioptron.com for prompt response during off hour. Customer Service hours are 9:00 AM to 5:00 PM, Eastern Time, Monday through Friday. Call in the U.S. 1.781.569.0200.

In the unlikely event that the mount requires factory servicing or repairing, write or call iOptron Customer Service Department first to receive a RMA# before returning the mount to the factory. Please provide details as to the nature of the problem as well as your name, address, e-mail address, purchase info and daytime telephone number. We have found that most problems can be resolved by e-mails or telephone calls. So please contact iOptron first to avoid returning the mount for repair.

4.3. Product End of Life Disposal Instructions



This electronic product is subject to disposal and recycling regulations that vary by country and region. It is your responsibility to recycle your electronic equipment per your local environmental laws and regulations to ensure that it will be recycled in a manner that protects human health and the environment. To find out where you can drop off your waste equipment for recycling, please contact your local waste recycle/disposal service or the product representative.

4.4. Battery Replacement and Disposal Instructions



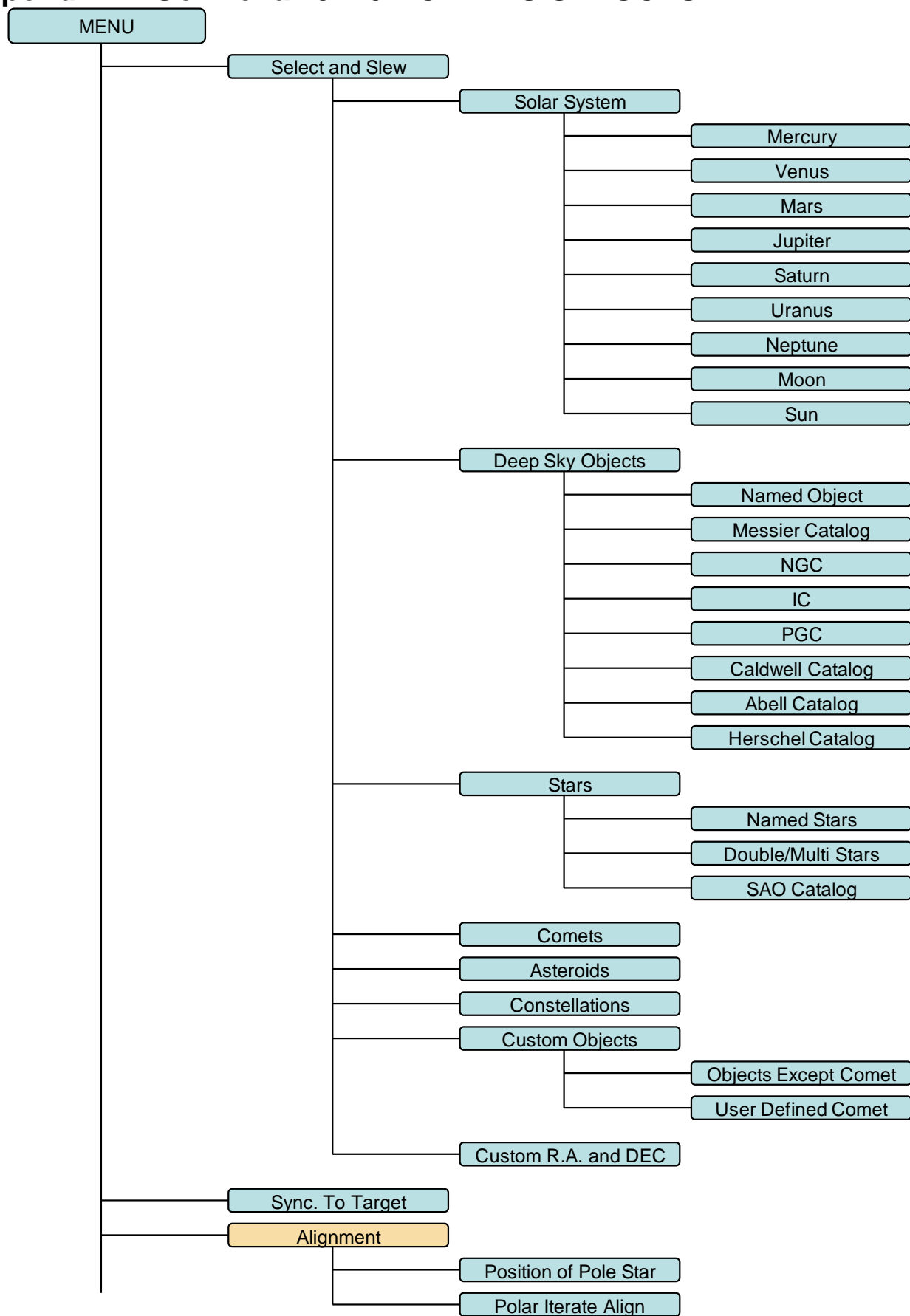
Battery Disposal- Batteries contain chemicals that, if released, may affect the environment and human health. Batteries should be collected separately for recycling, and recycled at a local hazardous material disposal location adhering to your country and local government regulations. To find out where you can drop off your waste battery for recycling, please contact your local waste disposal service or the product representative.

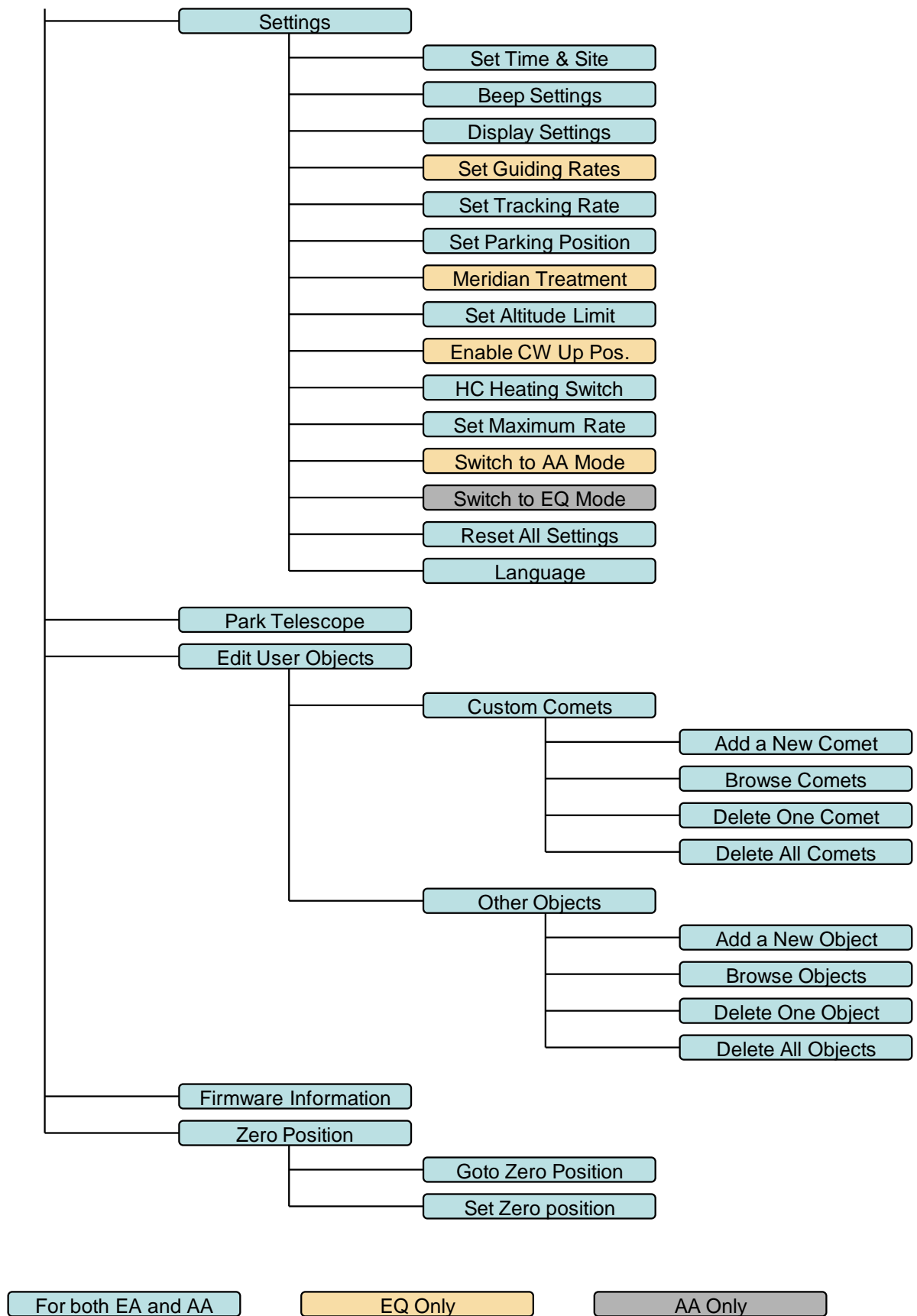
Appendix A. Technical Specifications

| | |
|-----------------------------|---|
| Mount | Ultracompact GOTO EQ/AZ mount |
| Payload* | 7 lbs (3.2 kg), balanced |
| Mount weight | 2.9 lbs (1.3 kg) with battery |
| Structure Material | Metal frame structure |
| Motor drive | Dual-axis DC servo motor with optical encoder |
| Transmission | Synchronous belt |
| Tracking speed | Solar, Lunar, Cel, ½ Cel, and N/S |
| Maximum slew speed | 4.5°/sec (1080X) |
| Worm periodic | 600 second |
| RA/DEC Worm wheel | Φ77 mm, 144 teeth |
| Hand controller | Yes (with optional 8410HC) |
| EQ base altitude adj. range | 0° ~ 80° |
| EQ base Azimuth adj. range | ± 5° |
| Power requirement | Internal rechargeable battery |
| Battery type | Li-Poly, 3.7V, 2000mAh |
| Duration of operation | Up to 10 hours at 20°C |
| Counterweight shaft | Φ20mmX200mm, 3/8" thread, stainless steel |
| Counterweight | 3 lbs (1.3 kg) |
| Dovetail saddle | Vixen-type |
| Body to base connection | Vixen dovetail or 3/8" socket |
| Polar Scope | iPolar™ electronic polar scope (for A version) |
| Level indicator | Level bubble |
| Wi-Fi | Built-in |
| Communication port | Yes (USB and Wi-Fi) |
| Autoguide | Optional external iGuider (ASCOT only) |
| Firmware upgrade | Yes |
| Computer control | Yes |
| Tripod | #3221 Stainless Steel, optional carbon fiber tripod |
| Pier extension | Φ80x190 mm |
| Operation temperature | -10°C ~ 40°C |
| Warranty | One year limited (90 day on battery) |

* OTA size and length dependent.

Appendix B. Go2Nova[®] 8410 HC MENU STRUCTURE





Appendix C. Firmware Upgrade

The firmware of a SkyHunter and 8410 HC can be upgraded by a customer. It is only support Windows OS. Please check iOptron's website, www.iOptron.com, under SkyHunter product page or Support Directory.

If your optional 8410 hand controller does not show SkyHunter when connected to the mount, please upgrade the mount/HC firmware

Appendix D. Computer Control a SkyHunter Mount

The SkyHunter mount can be controlled by a SmartPhone, a Tablet or a computer. It is supported by two types of computer connections:

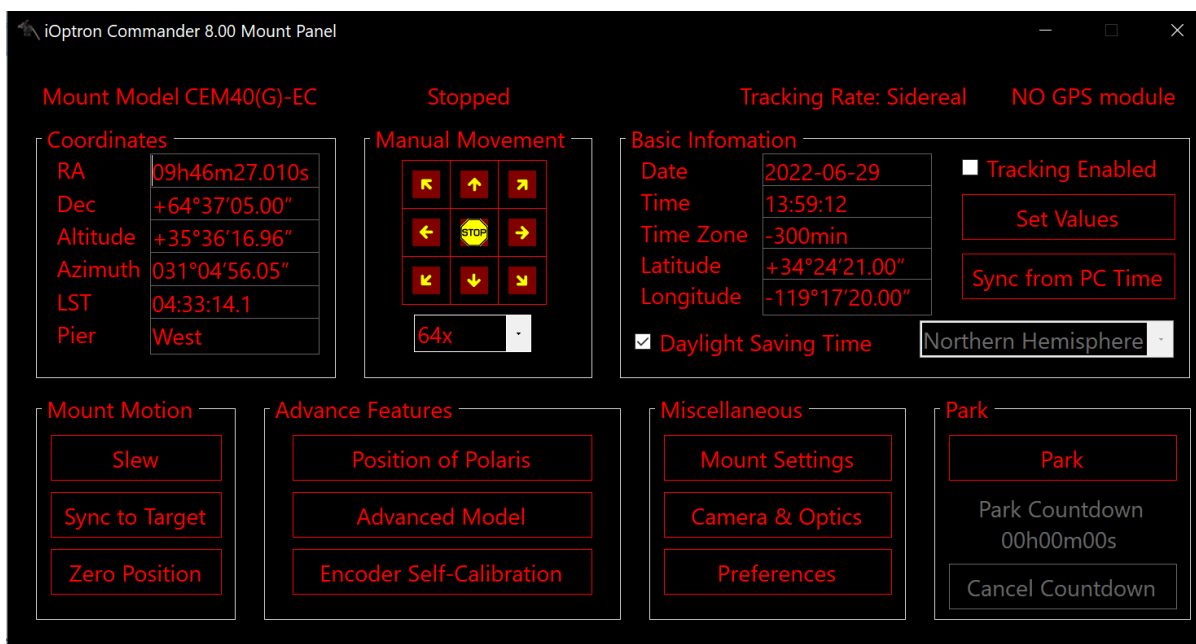
- Connect to a computer via mini USB port on the mount. The mount can be controlled via ASCOM protocol (Windows OS), or directly by some software, such as Sky Safari (Mac OS)
- Connect wirelessly via built-in wireless connection. The mount can be controlled via ASCOM protocol (Windows OS), SmartPhone/Tablet and MacOS wirelessly.

To control the mount via ASCOM protocol, you need:

1. Download and install the latest ASCOM Platform from <http://www.ascom-standards.org/>. Make sure your PC meets the software requirement.
2. Download and install the latest iOptron Commander/ASCOM drive for SkyHunter from iOptron website. The SkyHunter uses Commander V8.0 or later.
3. Planetarium software that supports ASCOM protocol. Follow software instructions to select the iOptron Telescope.

Please refer to iOptron website, www.iOptron.com, under the product page, or Support Directory, *Computer Control and iOptron Commander Driver* for more detail.

iOptron Commander 8.0 for Windows



iOptron Commander Lite for iOS

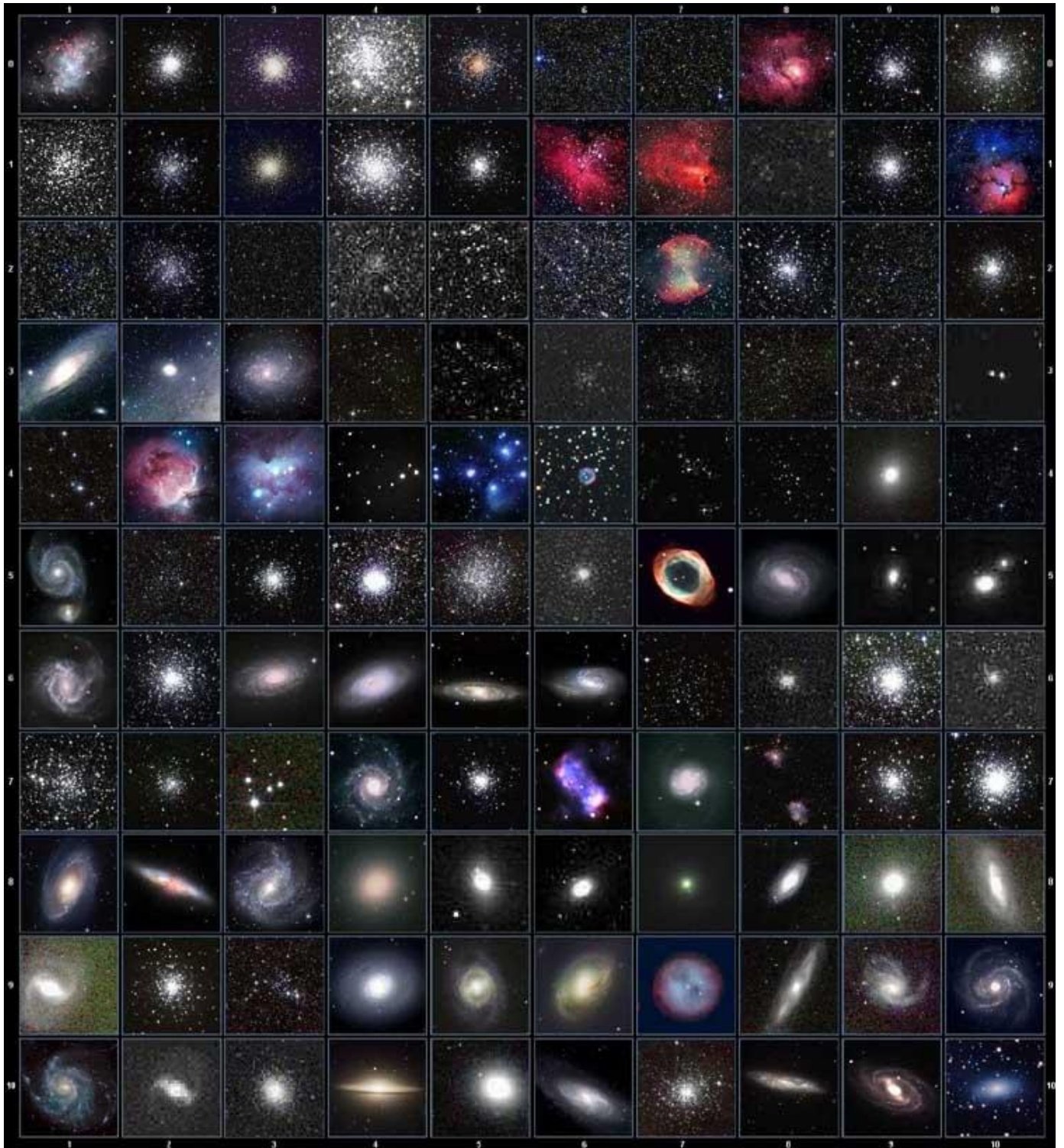


Appendix E. Go2Nova[®] Star List

Named Deep Sky Object

| | | | |
|----|---------------------------|----|--------------------------|
| 1 | 47 Tucanae | 47 | Integral Sign Galaxy |
| 2 | Andromeda Galaxy | 48 | Iris Nebula |
| 3 | Antennae Galaxies | 49 | Jellyfish Nebula |
| 4 | Barnard's Galaxy | 50 | Jewel Box Cluster |
| 5 | Bear-Paw Galaxy | 51 | Lagoon Nebula |
| 6 | Beehive Cluster | 52 | Lambda Centauri Nebula |
| 7 | Black Eye Galaxy | 53 | Large Magellanic Cloud |
| 8 | Blinking Planetary | 54 | Leo Triplet |
| 9 | Blue Flash Nebula | 55 | Little Dumbbell Nebula |
| 10 | Blue Planetary | 56 | Little Gem Nebula |
| 11 | Blue Snowball Nebula | 57 | Little Ghost Nebula |
| 12 | Bode's Galaxy | 58 | Mice Galaxies |
| 13 | Box Nebula | 59 | Monkey Head Nebula |
| 14 | Bubble Nebula | 60 | North America Nebula |
| 15 | Bug Nebula | 61 | Northern Jewel Box |
| 16 | Butterfly Cluster | 62 | Omega Nebula |
| 17 | Butterfly Galaxies | 63 | Orion Nebula |
| 18 | California Nebula | 64 | Owl Nebula |
| 19 | Carina Nebula | 65 | Pacman Nebula |
| 20 | Cat's Eye Nebula | 66 | Pelican Nebula |
| 21 | Cave Nebula | 67 | Phantom Streak Nebula |
| 22 | Christmas Tree Cluster | 68 | Pinwheel Galaxy |
| 23 | Cigar Galaxy | 69 | Pleiades |
| 24 | Cocoon Nebula | 70 | Ring Nebula |
| 25 | Coma Pinwheel | 71 | Rosette Nebula |
| 26 | Copeland Septet | 72 | Saturn Nebula |
| 27 | Crab Nebula | 73 | Sextans B |
| 28 | Crescent Nebula | 74 | Small Magellanic Cloud |
| 29 | Draco Dwarf Galaxy | 75 | Sombrero Galaxy |
| 30 | Dumbbell Nebula | 76 | Soul Nebula |
| 31 | Eagle Nebula | 77 | Southern Pinwheel Galaxy |
| 32 | Eight-Burst Nebula | 78 | Spindle Galaxy(3115) |
| 33 | Elephant Trunk Nebula | 79 | Spindle Galaxy(5866) |
| 34 | Eskimo Nebula | 80 | Stephan's Quintet |
| 35 | Eyes Galaxies | 81 | Sunflower Galaxy |
| 36 | Flame Nebula | 82 | Tarantula Nebula |
| 37 | Flaming Star Nebula | 83 | The Witch Head Nebula |
| 38 | Ghost of Jupiter | 84 | The Wizard Nebula |
| 39 | Heart Nebula | 85 | Thor's Helmet |
| 40 | Helix Nebula | 86 | Triangulum Galaxy |
| 41 | Hercules Globular Cluster | 87 | Trifid Nebula |
| 42 | Hind's Variable Nebula | 88 | Ursa Minor Dwarf Galaxy |
| 43 | Hockey Stick Galaxies | 89 | Veil Nebula |
| 44 | Horsehead Nebula | 90 | Whale Galaxy |
| 45 | Hubble's Variable Nebula | 91 | Whirlpool Galaxy |
| 46 | Hyades Cluster | 92 | Wild Duck Cluster |

Messier Catalog



This table is licensed under the [GNU Free Documentation License](#). It uses material from the [Wikipedia article List of Messier objects](#)

Named Star

| | | | | | | | |
|----|------------------|----|-----------------|-----|------------------------|-----|---------------|
| 1 | Acamar | 50 | Alrescha | 99 | Deneb el Okab | 148 | Lalande 21185 |
| 2 | Achernar | 51 | Alshain | 100 | Deneb Kaitos | 149 | Lesath |
| 3 | Achird | 52 | Altair | 101 | Denebakrab | 150 | Mahasim |
| 4 | Acrab | 53 | Altais | 102 | Denebola | 151 | Maia |
| 5 | Acrux A | 54 | Alterf | 103 | Dschubba | 152 | Marfik |
| 6 | Acrux B | 55 | Aludra | 104 | Dubhe | 153 | Marfikent |
| 7 | Acubens | 56 | Alula Australis | 105 | Edasich | 154 | Markab |
| 8 | Adhafera | 57 | Alula Borealis | 106 | El Rehla | 155 | Markeb |
| 9 | Adhara | 58 | Alya | 107 | Electra | 156 | Matar |
| 10 | Adid Australis | 59 | Ancha | 108 | Elnath | 157 | Mebsuta |
| 11 | Ahadi | 60 | Ankaa | 109 | Eltanin | 158 | Megrez |
| 12 | Al Dhanab | 61 | Antares | 110 | Enif | 159 | Meissa |
| 13 | Al Dhibain Prior | 62 | Apollyon | 111 | Errai | 160 | Mekbuda |
| 14 | Al Kab | 63 | Arcturus | 112 | Fomalhaut | 161 | Menkalinan |
| 15 | Al Nair | 64 | Arkab Prior | 113 | Furud | 162 | Menkar |
| 16 | Al Nair al Baten | 65 | Arneb | 114 | Gacrux | 163 | Menkent |
| 17 | Al Niyat(Sigma) | 66 | Ascella | 115 | Gatria | 164 | Menkib |
| 18 | Al Niyat(Tau) | 67 | Asellus Austral | 116 | Giasar | 165 | Merak |
| 19 | Albaldah | 68 | Asellus Boreali | 117 | Gienah Cori | 166 | Merope |
| 20 | Albali | 69 | Aspidiske | 118 | Gienah Cygni | 167 | Mesartim |
| 21 | Albireo | 70 | Atik | 119 | Girtab | 168 | Miaplacidus |
| 22 | Alchiba | 71 | Atlas | 120 | Gliese 1 | 169 | Mimosa |
| 23 | Alcor | 72 | Atria | 121 | Gomeisa | 170 | Mintaka |
| 24 | Alcyone | 73 | Avior | 122 | Graffias(Zeta) | 171 | Mira |
| 25 | Aldebaran | 74 | Azha | 123 | Groombridge 1830 | 172 | Mirach |
| 26 | Alderamin | 75 | Barnard's Star | 124 | Gruid | 173 | Mirfak |
| 27 | Alfirk | 76 | Baten Kaitos | 125 | Grumium | 174 | Mirzam |
| 28 | Algenib | 77 | Beid | 126 | Hadar | 175 | Mizar |
| 29 | Algenubi | 78 | Bellatrix | 127 | Hamal | 176 | Mu Velorum |
| 30 | Algieba | 79 | Beta Hydri | 128 | Han | 177 | Muhlifain |
| 31 | Algiedi Secunda | 80 | Betelgeuse | 129 | Hatsya | 178 | Muphrid |
| 32 | Algol | 81 | Betria | 130 | Head of Hydrus | 179 | Muscida |
| 33 | Algorab | 82 | Biham | 131 | Homam | 180 | Naos |
| 34 | Alhakim | 83 | Birdun | 132 | Iritjinga(Cen) | 181 | Nashira |
| 35 | Alhena | 84 | Canopus | 133 | Izar | 182 | Navi |
| 36 | Alioth | 85 | Capella | 134 | Kakkab Su-gub Gud-Elim | 183 | Nekkar |
| 37 | Alkaid | 86 | Caph | 135 | Kapteyn's Star | 184 | Nihal |
| 38 | Alkalurops | 87 | Castor A | 136 | Kaus Australis | 185 | Nunki |
| 39 | Alkes | 88 | Castor B | 137 | Kaus Borealis | 186 | Nusakan |
| 40 | Almaaz | 89 | Cebalrai | 138 | Kaus Media | 187 | Palida |
| 41 | Almach | 90 | Chara | 139 | Keid | 188 | Peacock |
| 42 | Alnasi | 91 | Chertan | 140 | Kekouan | 189 | Phact |
| 43 | Alnilam | 92 | Choo | 141 | Kitalpha | 190 | Phecda |
| 44 | Alnitak | 93 | Cor Caroli | 142 | Kochab | 191 | Pherkad |
| 45 | Alpha Muscae | 94 | Cursa | 143 | Koo She | 192 | Polaris |
| 46 | Alpha Tucanae | 95 | Dabih | 144 | Kornephoros | 193 | Pollux |
| 47 | Alphard | 96 | Deltotum | 145 | Kraz | 194 | Porrina |
| 48 | Alphecca | 97 | Deneb | 146 | Kurhah | 195 | Procyon |
| 49 | Alpheratz | 98 | Deneb Algedi | 147 | Lacaille 9352 | 196 | Propus |

| | | | | | | | |
|-----|-------------------|-----|------------|-----|-------------------|-----|----------------|
| | | | | | | | |
| 197 | Proxima Centauri | 213 | Sadalbari | 229 | Sulafat | 245 | Vindemiatrix |
| 198 | Rasalas | 214 | Sadalmelik | 230 | Syrma | 246 | Vrischika |
| 199 | Rasalgethi | 215 | Sadalsuud | 231 | Talitha | 247 | Wasat |
| 200 | Rasalhague | 216 | Sadr | 232 | Tania Australis | 248 | Wazn |
| 201 | Rastaban | 217 | Saiph | 233 | Tania Borealis | 249 | Wei |
| 202 | Regor | 218 | Sargas | 234 | Tarazed | 250 | Wezen |
| 203 | Regulus | 219 | Scheat | 235 | Taygeta | 251 | Yed Posterior |
| 204 | Rigel | 220 | Schedar | 236 | Tejat Posterior | 252 | Yed Prior |
| 205 | Rigel Kentaurus A | 221 | Seginus | 237 | Thuban | 253 | Zaniah |
| 206 | Rigel Kentaurus B | 222 | Shaula | 238 | Thusia | 254 | Zaurak |
| 207 | Ruchbah | 223 | Sheliak | 239 | Tien Kwan | 255 | Zavijava |
| 208 | Rukbat | 224 | Sheratan | 240 | Turais | 256 | Zeta Persei |
| 209 | Rukh | 225 | Sirius | 241 | Unukalhai | 257 | Zosma |
| 210 | Rutilicus | 226 | Skat | 242 | Vasat-ul-cemre | 258 | Zubenelgenubi |
| 211 | Sabik | 227 | Spica | 243 | Vathorz Posterior | 259 | Zubeneschamali |
| 212 | Sadachbia | 228 | Suhail | 244 | Vega | | |

Modern Constellations

| No. | Constellation | Abbreviation |
|-----|------------------|--------------|
| 1 | Andromeda | And |
| 2 | Antlia | Ant |
| 3 | Apus | Aps |
| 4 | Aquarius | Aqr |
| 5 | Aquila | Aql |
| 6 | Ara | Ara |
| 7 | Aries | Ari |
| 8 | Auriga | Aur |
| 9 | Boötes | Boo |
| 10 | Caelum | Cae |
| 11 | Camelopardalis | Cam |
| 12 | Cancer | Cnc |
| 13 | Canes Venatici | CVn |
| 14 | Canis Major | CMA |
| 15 | Canis Minor | CMi |
| 16 | Capricornus | Cap |
| 17 | Carina | Car |
| 18 | Cassiopeia | Cas |
| 19 | Centaurus | Cen |
| 20 | Cepheus | Cep |
| 21 | Cetus | Cet |
| 22 | Chamaeleon | Cha |
| 23 | Circinus | Cir |
| 24 | Columba | Col |
| 25 | Coma Berenices | Com |
| 26 | Corona Australis | CrA |
| 27 | Corona Borealis | CrB |
| 28 | Corvus | Crv |
| 29 | Crater | Crt |
| 30 | Crux | Cru |
| 31 | Cygnus | Cyg |
| 32 | Delphinus | Del |
| 33 | Dorado | Dor |
| 34 | Draco | Dra |
| 35 | Equuleus | Equ |
| 36 | Eridanus | Eri |
| 37 | Fornax | For |
| 38 | Gemini | Gem |
| 39 | Grus | Gru |
| 40 | Hercules | Her |
| 41 | Horologium | Hor |
| 42 | Hydra | Hya |
| 43 | Hydrus | Hyi |
| 44 | Indus | Ind |

| No. | Constellation | Abbreviation |
|-----|---------------------|--------------|
| 45 | Lacerta | Lac |
| 46 | Leo | Leo |
| 47 | Leo Minor | LMi |
| 48 | Lepus | Lep |
| 49 | Libra | Lib |
| 50 | Lupus | Lup |
| 51 | Lynx | Lyn |
| 52 | Lyra | Lyr |
| 53 | Mensa | Men |
| 54 | Microscopium | Mic |
| 55 | Monoceros | Mon |
| 56 | Musca | Mus |
| 57 | Norma | Nor |
| 58 | Octans | Oct |
| 59 | Ophiuchus | Oph |
| 60 | Orion | Ori |
| 61 | Pavo | Pav |
| 62 | Pegasus | Peg |
| 63 | Perseus | Per |
| 64 | Phoenix | Phe |
| 65 | Pictor | Pic |
| 66 | Pisces | Psc |
| 67 | Piscis Austrinus | PsA |
| 68 | Puppis | Pup |
| 69 | Pyxis | Pyx |
| 70 | Reticulum | Ret |
| 71 | Sagitta | Sge |
| 72 | Sagittarius | Sgr |
| 73 | Scorpius | Sco |
| 74 | Sculptor | Scl |
| 75 | Scutum | Sct |
| 76 | Serpens | Ser |
| 77 | Sextans | Sex |
| 78 | Taurus | Tau |
| 79 | Telescopium | Tel |
| 80 | Triangulum | Tri |
| 81 | Triangulum Australe | TrA |
| 82 | Tucana | Tuc |
| 83 | Ursa Major | UMa |
| 84 | Ursa Minor | UMi |
| 85 | Vela | Vel |
| 86 | Virgo | Vir |
| 87 | Volans | Vol |
| 88 | Vulpecula | Vul |

Double/Multi Stars

| No. | HC Item | | Constellation | Name | HIP | WDS | SAO |
|-----|-------------------|-------------------------|----------------|-----------------|-------|------------|--------|
| 1 | Rigel Kentaurus A | Alpha Centauri | Centaurus | | 71683 | 14396-6050 | 252838 |
| 2 | Rigel | Beta Orionis | Orion | | 24436 | 05145-0812 | 131907 |
| 3 | Gacrux | Gamma Crucis | Crux | | 61084 | 12312-5707 | 240019 |
| 4 | Sargas | Theta Scorpii | Scorpius | | 86228 | 17373-4300 | 228201 |
| 5 | Castor A | Alpha Geminorum | Gemini | | 36850 | 07346+3153 | 60198 |
| 6 | Mizar | Zeta Ursae Majoris | Ursa Major | | 65378 | 13239+5456 | 28737 |
| 7 | Almach | Gamma Andromedae | Andromeda | | 9640 | 02039+4220 | 37735 |
| 8 | Algieba | Gamma Leonis | Leo | | 50583 | 10200+1950 | 81298 |
| 9 | Aludra | Eta Canis Majoris | Canis Major | | 35904 | 07241-2918 | 173651 |
| 10 | Iritjinga (Cen) | Gamma Centauri | Centaurus | Muhlifain | 61932 | 12415-4858 | 223603 |
| 11 | Zubenelgenubi | Alpha Librae | Libra | | 72603 | 14509-1603 | 158836 |
| 12 | Alcyone | Eta Tauri | Taurus | | 17702 | 03475+2406 | 76199 |
| 13 | Cor Caroli | Alpha Canum Venaticorum | Canes Venatici | | 63125 | 12560+3819 | 63257 |
| 14 | Acamar | Theta Eridani | Eridanus | | 13847 | 02583-4018 | 216113 |
| 15 | Adhafera | Zeta Leonis | Leo | | 50335 | 10167+2325 | 81265 |
| 16 | Rasalgethi | Alpha Herculis | Hercules | | 84345 | 17146+1423 | 102680 |
| 17 | Meissa | Lambda Orionis | Orion | | 26207 | 05351+0956 | 112921 |
| 18 | Graffias | Beta1 Scorpii | Scorpius | | 78820 | 16054-1948 | 159682 |
| 19 | Alya | Theta Serpentis | Serpens | | 92946 | 18562+0412 | 124068 |
| 20 | HIP 48002 | Upsilon Carinae | Carina | Vathorz Prior | | 09471-6504 | 250695 |
| 21 | HIP 95947 | Beta1 Cygni | Cygnus | Albireo | | 19307+2758 | 87301 |
| 22 | HIP 20894 | Theta2 Tauri | Taurus | | | 04287+1552 | 93957 |
| 23 | HIP 74395 | Zeta Lupi | Lupus | | | 15123-5206 | 242304 |
| 24 | HIP 27072 | Gamma Leporis | Lupus | | | 05445-2227 | 170759 |
| 25 | HIP 26549 | Sigma Orionis | Orion | | | 05387-0236 | 132406 |
| 26 | HIP 85667 | HD 158614 | Ophiuchus | | | 17304-0104 | 141702 |
| 27 | HIP 74376 | Kappa1 Lupi | Lupus | | | 15119-4844 | 225525 |
| 28 | HIP 34481 | Gamma2 Volantis | Carina | | | 07087-7030 | 256374 |
| 29 | HIP 53253 | Upsilon Carinae | Carina | | | 10535-5851 | 238574 |
| 30 | HIP 99675 | Omicron1 Cygni | Cygnus | 31 Cyg | | 20136+4644 | 49337 |
| 31 | HIP 63003 | Mu1 Crucis | Crux | | | 12546-5711 | 240366 |
| 32 | HIP 43103 | Iota Cancr | Cancer | 48 Cnc | | 08467+2846 | 80416 |
| 33 | HIP 110991 | Delta Cephei | Cepheus | 27 Cep | | 22292+5825 | 34508 |
| 34 | HIP 20635 | Kappa1 Tauri | Taurus | 65 Tau | | 04254+2218 | 76601 |
| 35 | HIP 88601 | 70 Ophiuchi | Orion | | | 18055+0230 | 123107 |
| 36 | HIP 2484 | Beta1 Tucanae | Horologium | | | 00315-6257 | 248201 |
| 37 | HIP 91971 | Zeta1 Lyrae | Cygnus | 6 Lyr | | 18448+3736 | 67321 |
| 38 | HIP 79374 | Nu Scorpii | Scorpius | Jabbah | | 16120-1928 | 159764 |
| 39 | HIP 102532 | Gamma2 Delphini | Pegasus | 12 Del | | 20467+1607 | 106476 |
| 40 | HIP 52154 | Xi Velorum | Vela | | | 10393-5536 | 238309 |
| 41 | HIP 37229 | HD 61555 | Canis Major | | | 07388-2648 | 174198 |
| 42 | HIP 30419 | Epsilon Monocerotis | Orion | 8 Mon | | 06238+0436 | 113810 |
| 43 | HIP 108917 | Xi Cephei | Cepheus | Al kurhah | | 22038+6438 | 19827 |
| 44 | HIP 53417 | 54 Leonis | Leo | | | 10556+2445 | 81584 |
| 45 | HIP 65271 | J Centauri | Centaurus | | | 13226-6059 | 252284 |
| 46 | HIP 67669 | 3 Centauri | Centaurus | | | 13518-3300 | 204916 |
| 47 | HIP 105319 | Theta Indi | Indus | | | 21199-5327 | 246965 |
| 48 | HIP 80582 | Epsilon Normae | Norma | | | 16272-4733 | 226773 |
| 49 | HIP 8832 | Gamma Arietis | Aries | | | 01535+1918 | 92680 |
| 50 | HIP 69483 | Kappa Boötis | Boötes | Asellus Tertius | | 14135+5147 | 29045 |
| 51 | HIP 92946 | Theta Serpentis | Serpens | | | 18562+0412 | 124068 |
| 52 | HIP 86614 | Psi1 Draconis | Draco | 31 Draconis | | 17419+7209 | 8890 |

| No. | HC Item | | Constellation | Name | HIP | WDS | SAO |
|-----|------------|-----------------------|-----------------|---------------------|-----|------------|--------|
| 53 | HIP 95771 | Alpha Vulpeculae | Vulpecula | Anser | | 19287+2440 | 87261 |
| 54 | HIP 30867 | Beta Monocerotis | Monoceros | | | 06288-0702 | 133316 |
| 55 | HIP 35363 | NV Puppis | Puppis | | | 07183-3644 | 197824 |
| 56 | HIP 94761 | Gliese 752 | Aquila | Wolf 1055, Ross 652 | | 19169+0510 | |
| 57 | HIP 21683 | Sigma2 Tauri | Taurus | | | 04393+1555 | 94054 |
| 58 | HIP 8497 | Chi Ceti | Cetus | 53 Cet | | 01496-1041 | 148036 |
| 59 | HIP 26199 | HD 36960 | Orion | | | 05350-0600 | 132301 |
| 60 | HIP 104521 | Gamma Equulei | Equuleus | 5 Equ | | 21103+1008 | 126593 |
| 61 | HIP 116389 | Iota Phoenicis | Phoenix | | | 23351-4237 | 231675 |
| 62 | HIP 17797 | HD 24071 | Eridanus | | | 03486-3737 | 194550 |
| 63 | HIP 21036 | 83 Tauri | Taurus | | | 04306+1343 | 93979 |
| 64 | HIP 107310 | Mu1 Cygni | Cygnus | 78 Cyg | | 21441+2845 | 89940 |
| 65 | HIP 72659 | Xi Boötis | Boötes | 37 Boo | | 14514+1906 | 101250 |
| 66 | HIP 21029 | HD 28527 | Taurus | | | 04306+1612 | 93975 |
| 67 | HIP 42726 | HY Velorum | Vela | | | 08424-5307 | 236205 |
| 68 | HIP 18255 | 32 Eridani | Eridanus | | | 03543-0257 | 130806 |
| 69 | HIP 9153 | Lambda Arietis | Aries | | | 01580+2336 | 75051 |
| 70 | HIP 88267 | 95 Herculis | Hercules | | | 18015+2136 | 85648 |
| 71 | HIP 85829 | Nu2 Draconis | Draco | 25 Dra | | 17322+5511 | 30450 |
| 72 | HIP 43937 | V376 Carinae | Carina | b1 Carinae | | 08570-5914 | 236436 |
| 73 | HIP 71762 | Pi2 Boötis | Boötes | 29 Boo | | 14407+1625 | 101139 |
| 74 | HIP 80047 | Delta1 Apodis | Apus | | | 16203-7842 | 257380 |
| 75 | HIP 58484 | Epsilon Chamaeleontis | Chamaeleon | | | 11596-7813 | 256894 |
| 76 | HIP 25142 | 23 Orionis | Orion | | | 05228+0333 | 112697 |
| 77 | HIP 54204 | Chi1 Hydrae | Hydra | | | 11053-2718 | 179514 |
| 78 | HIP 76669 | Zeta Coronae Borealis | Corona Borealis | 7 CrB | | 15394+3638 | 64833 |
| 79 | HIP 99770 | b3 Cygni | Cygnus | 29 Cyg | | 20145+3648 | 69678 |
| 80 | HIP 101027 | Rho Capricorni | Capricornus | 11 Cap | | 20289-1749 | 163614 |
| 81 | HIP 74911 | Nu Lupi | Lupus | | | 15185-4753 | 225638 |
| 82 | HIP 35210 | HD 56577 | Canis Major | | | 07166-2319 | 173349 |
| 83 | HIP 26235 | Theta2 Orionis | Orion | 43 Ori | | 05354-0525 | 132321 |
| 84 | HIP 40321 | OS Puppis | Puppis | | | 08140-3619 | 198969 |
| 85 | HIP 70327 | HD 126129 | Boötes | | | 14234+0827 | 120426 |
| 86 | HIP 26221 | Theta1 Orionis | Orion | Trapezium | | 05353-0523 | 132314 |
| 87 | HIP 80473 | Rho Ophiuchi | Ophiuchus | 5 Oph | | 16256-2327 | 184381 |
| 88 | HIP 78105 | Xi1 Lupi | Lupus | | | 15569-3358 | 207144 |
| 89 | HIP 79043 | Kappa Herculis | Hercules | 7 Her | | 16081+1703 | 101951 |
| 90 | HIP 61418 | 24 Comae Berenices | Coma Berenices | | | 12351+1823 | 100160 |
| 91 | HIP 91919 | Epsilon Lyrae | Lyra | 4 Lyr | | 18443+3940 | 67309 |
| 92 | HIP 41639 | HD 72127 | Vela | | | 08295-4443 | 219996 |
| 93 | HIP 104214 | 61 Cygni | Cygnus | | | 21069+3845 | 70919 |
| 94 | HIP 23734 | 11 Camelopardalis | Camelopardalis | | | 05061+5858 | 25001 |
| 95 | HIP 60189 | Zeta Corvi | Corvus | 5 Crv | | 12206-2213 | 180700 |
| 96 | HIP 66821 | Q Centauri | Centaurus | | | 13417-5434 | 241076 |
| 97 | HIP 14043 | HD 18537 | Perseus | | | 03009+5221 | 23763 |
| 98 | HIP 5737 | Zeta Piscium | Pisces | 86 Psc | | 01137+0735 | 109739 |
| 99 | HIP 84626 | Omicron Ophiuchi | Ophiuchus | 39 Oph | | 17180-2417 | 185238 |
| 100 | HIP 60904 | 17 Comae Berenices | Coma Berenices | | | 12289+2555 | 82330 |
| 101 | HIP 58684 | 67 Ursae Majoris | Ursa Major | | | 12021+4303 | 44002 |
| 102 | HIP 5131 | Psi1 Piscium | Pisces | 74 Psc | | 01057+2128 | 74482 |
| 103 | HIP 115126 | 94 Aquarii | Aquarius | | | 23191-1328 | 165625 |
| 104 | HIP 62572 | HD 112028 | Camelopardalis | | | 12492+8325 | 2102 |

| No. | HC Item | | Constellation | Name | HIP | WDS | SAO |
|-----|------------|-----------------------|------------------|----------|-----|------------|--------|
| 105 | HIP 40167 | Zeta1 Cancr | Cancer | Tegmen | | 08122+1739 | 97645 |
| 106 | HIP 40817 | Kappa Volantis | Volans | | | 08198-7131 | 256497 |
| 107 | HIP 81292 | 17 Draconis | Draco | | | 16362+5255 | 30013 |
| 108 | HIP 80197 | Nu1 Coronae Borealis | Corona Borealis | | | 16224+3348 | 65257 |
| 109 | HIP 88060 | HD 163756 | Sagittarius | | | 17591-3015 | 209553 |
| 110 | HIP 42637 | Eta Chamaeleontis | Chamaeleon | | | 08413-7858 | 256543 |
| 111 | HIP 21039 | 81 Tauri | Taurus | | | 04306+1542 | 93978 |
| 112 | HIP 100965 | 75 Draconis | Draco | | | 20282+8125 | 3408 |
| 113 | HIP 25768 | HD 36553 | Pictor | | | 05302-4705 | 217368 |
| 114 | HIP 93717 | 15 Aquilae | Aquila | | | 19050-0402 | 142996 |
| 115 | HIP 79980 | HD 148836 | Scorpius | | | 16195-3054 | 207558 |
| 116 | HIP 12086 | 15 Trianguli | Triangulum | | | 02358+3441 | 55687 |
| 117 | HIP 90968 | Kappa2 Coronae Austr | Corona Australis | | | 18334-3844 | 210295 |
| 118 | HIP 22531 | Iota Pictoris | Pictor | | | 04509-5328 | 233709 |
| 119 | HIP 34065 | HD 53705 | Puppis | | | 07040-4337 | 218421 |
| 120 | HIP 79607 | Sigma Coronae Boreali | Corona Borealis | | | 16147+3352 | 65165 |
| 121 | HIP 109786 | 41 Aquarii | Aquarius | | | 22143-2104 | 190986 |
| 122 | HIP 56280 | 17 Crateris | Hydra | | | 11323-2916 | 179968 |
| 123 | HIP 51561 | HD 91355 | Vela | | | 10320-4504 | 222126 |
| 124 | HIP 107930 | HD 208095 | Cepheus | | | 21520+5548 | 33819 |
| 125 | HIP 97966 | 57 Aquilae | Aquila | | | 19546-0814 | 143898 |
| 126 | HIP 117218 | 107 Aquarii | Aquarius. | | | 23460-1841 | 165867 |
| 127 | HIP 82676 | HD 152234 | Scorpius | | | 16540-4148 | 227377 |
| 128 | HIP 111546 | 8 Lacertae | Lacerta | | | 22359+3938 | 72509 |
| 129 | HIP 29151 | HD 42111 | Orion | | | 06090+0230 | 113507 |
| 130 | HIP 107253 | 79 Cygni | Cygnus | | | 21434+3817 | 71643 |
| 131 | HIP 88136 | 41 Draconis | Draco | | | 18002+8000 | 8996 |
| 132 | HIP 81702 | HD 150136 | Ara | | | 16413-4846 | 227049 |
| 133 | HIP 97423 | HD 186984 | Sagittarius | | | 19480-1342 | 162998 |
| 134 | HIP 30444 | HD 45145 | Columba | | | 06240-3642 | 196774 |
| 135 | HIP 66400 | HD 118349 | Hydra | | | 13368-2630 | 181790 |
| 136 | HIP 17579 | 21 Tauri | Taurus | Asterope | | 03459+2433 | 76159 |
| 137 | HIP 35785 | 19 Lyncis | Lynx | | | 07229+5517 | 26312 |
| 138 | HIP 81641 | 37 Herculis | Hercules | | | 16406+0413 | 121776 |
| 139 | HIP 7751 | p Eridani | Eridanus | | | 01398-5612 | 232490 |
| 140 | HIP 21148 | 1 Camelopardalis | Camelopardalis | | | 04320+5355 | 24672 |
| 141 | HIP 9021 | 56 Andromedae | Andromeda | | | 01562+3715 | 55107 |
| 142 | HIP 97816 | HD 187420 | Telescopium | | | 19526-5458 | 246311 |
| 143 | HIP 88818 | 100 Herculis | Hercules | | | 18078+2606 | 85753 |
| 144 | HIP 36817 | HD 60584 | Puppis | | | 07343-2328 | 174019 |
| 145 | HIP 25695 | HD 35943 | Taurus | | | 05293+2509 | 77200 |
| 146 | HIP 98819 | 15 Sagittae | Sagitta | | | 20041+1704 | 105635 |
| 147 | HIP 61910 | VV Corvi | Corvus | | | 12413-1301 | 157447 |
| 148 | HIP 111643 | Sigma2 Gruis | Grus | | | 22370-4035 | 231217 |
| 149 | HIP 80399 | HD 147722 | Scorpius | | | 16247-2942 | 184368 |
| 150 | HIP 83478 | HD 154228 | Hercules | | | 17037+1336 | 102564 |
| 151 | HIP 101123 | Omicron Capricorni | Capricornus | | | 20299-1835 | 163626 |
| 152 | HIP 28271 | 59 Orionis | Orion | | | 05584+0150 | 113315 |
| 153 | HIP 64246 | 17 Canum Venaticoru | Canes Venatici | | | 13101+3830 | 63380 |
| 154 | HIP 96895 | 16 Cygni | Cygnus | | | 19418+5032 | 31898 |
| 155 | HIP 35564 | HD 57852 | Carina | | | 07204-5219 | 235110 |
| 156 | HIP 37843 | 2 Puppis | Puppis | | | 07455-1441 | 153363 |

| No. | HC Item | | Constellation | Name | HIP | WDS | SAO |
|-----|------------------|--------------------|----------------|------|-----|------------|--------|
| 157 | HIP 28790 | HD 41742 | Puppis | | | 06047-4505 | 217706 |
| 158 | HIP 4675 | HD 5788 | Andromeda | | | 01001+4443 | 36832 |
| 159 | HIP 31676 | 8 Lyncis | Lynx | | | 06377+6129 | 13897 |
| 160 | HIP 10176 | 59 Andromedae | Andromeda | | | 02109+3902 | 55330 |
| 161 | HIP 25950 | HD 36408 | Taurus | | | 05322+1703 | 94630 |
| 162 | HIP 117931 | AL Sculptoris | Sculptor | | | 23553-3155 | 214860 |
| 163 | HIP 81914 | HD 150591 | Scorpius | | | 16439-4107 | 227123 |
| 164 | HIP 21242 | m Persei | Perseus | | | 04334+4304 | 39604 |
| 165 | HIP 86831 | 61 Ophiuchi | Ophiuchus | | | 17446+0235 | 122690 |
| 166 | HIP 115272 | HD 220003 | Grus | | | 23208-5018 | 247838 |
| 167 | HIP 46657 | Zeta1 Antliae | Antlia | | | 09308-3153 | 200444 |
| 168 | HIP 41404 | Phi2 Cancr | Cancer | | | 08268+2656 | 80188 |
| 169 | HIP 29388 | 41 Aurigae | Auriga | | | 06116+4843 | 40925 |
| 170 | HIP 49321 | HD 87344 | Hydra | | | 10040-1806 | 155704 |
| 171 | HIP 84054 | 63 Herculis | Hercules | | | 17111+2414 | 84896 |
| 172 | HIP 39035 | HD 66005 | Puppis | | | 07592-4959 | 219249 |
| 173 | HIP 25303 | Theta Pictoris | Pictor | | | 05248-5219 | 233965 |
| 174 | HIP 52520 | HD 93344 | Carina | | | 10443-7052 | 256750 |
| 175 | HIP 95398 | 2 Sagittae | Sagitta | | | 19244+1656 | 104797 |
| 176 | UCAC4 277-135548 | | | | | | |
| 177 | HIP 32609 | HD 48766 | Lynx | | | 06482+5542 | 25963 |
| 178 | HIP 101765 | 48 Cygni | Cygnus | | | 20375+3134 | 70287 |
| 179 | HIP 24825 | YZ Leporis | Lepus | | | 05193-1831 | 150335 |
| 180 | HIP 31158 | 21 Geminorum | Gemini | | | 06323+1747 | 95795 |
| 181 | HIP 3885 | 65 Piscium | Pisces | | | 00499+2743 | 74295 |
| 182 | HIP 93371 | HD 176270 | Australis | | | 19011-3704 | 210816 |
| 183 | HIP 36345 | HD 59499 | Puppis | | | 07289-3151 | 198038 |
| 184 | HIP 108364 | HD 208947 | Cepheus | | | 21572+6609 | 19760 |
| 185 | HIP 50939 | HD 90125 | Sextans | | | 10242+0222 | 118278 |
| 186 | HIP 76603 | HD 139461 | Libra | | | 15387-0847 | 140672 |
| 187 | HIP 32269 | HD 49219 | Carina | | | 06442-5442 | 234683 |
| 188 | HIP 42516 | 39 Cancr | Cancer | | | 08401+2000 | 80333 |
| 189 | HIP 62807 | 32 Comae Berenices | Coma Berenices | | | 12522+1704 | 100309 |
| 190 | UCAC4 226-128246 | | | | | | |
| 191 | HIP 94913 | 24 Aquilae | Aquila | | | 19188+0020 | 124492 |
| 192 | HIP 94336 | HD 179958 | Cygnus | | | 19121+4951 | 48193 |
| 193 | HIP 107299 | HD 206429 | Indus | | | 21440-5720 | 247151 |
| 194 | HIP 59984 | HD 106976 | Virgo | | | 12182-0357 | 138704 |
| 195 | HIP 16411 | HD 21743 | Taurus | | | 03313+2734 | 75970 |
| 196 | HIP 23287 | HD 32040 | Orion | | | 05006+0337 | 112305 |
| 197 | HIP 105637 | HD 203857 | Cygnus | | | 21238+3721 | 71280 |
| 198 | HIP 108925 | HD 209744 | Cepheus | | | 22039+5949 | 34016 |
| 199 | HIP 103814 | HD 200011 | Microscopium | | | 21022-4300 | 230492 |
| 200 | HIP 58112 | 65 Ursae Majoris | Ursa Major | | | 11551+4629 | 43945 |
| 201 | HIP 109354 | V402 Lacertae | Lacerta | | | 22093+4451 | 51698 |
| 202 | HIP 43822 | 17 Hydrae | Hydra | | | 08555-0758 | 136409 |
| 203 | HIP 21986 | 55 Eridani | Eridanus | | | 04436-0848 | 131442 |
| 204 | HIP 17470 | HD 23245 | Taurus | | | 03446+2754 | 76122 |
| 205 | HIP 35960 | V368 Puppis | Puppis | | | 07248-3717 | 197974 |
| 206 | HIP 42936 | HD75086 | Carina | | | 08451-5843 | 236241 |
| 207 | HIP 19272 | SZ Camelopardalis | Camelopardalis | | | 04078+6220 | 13031 |
| 208 | HIP 76143 | HD 138488 | Libra | | | 15332-2429 | 183565 |

IOPTRON WARRANTY

- 1. iOptron battery has 90 day limited warranty**
- 2. iOptron SkyHunter mount and accessories have One (1) year limited warranty**

A. iOptron warrants your telescope, mount, or controller to be free from defects in materials and workmanship for one year. iOptron will repair or replace such product or part which, upon inspection by iOptron, is found to be defective in materials or workmanship. As a condition to the obligation of iOptron to repair or replace such product, the product must be returned to iOptron together with proof-of-purchase satisfactory to iOptron.

B. The proper Return Merchant Authorization Number must be obtained from iOptron in advance of return. Contact iOptron at support@ioptron.com to receive the RMA number to be displayed on the outside of your shipping container.

All returns must be accompanied by a written statement stating the name, address, and daytime telephone number of the owner, together with a brief description of any claimed defects. Parts or product for which replacement is made shall become the property of iOptron.

The customer shall be responsible for all costs of transportation and insurance, both to and from the factory of iOptron, and shall be required to prepay such costs.

iOptron shall use reasonable efforts to repair or replace any telescope, mount, or controller covered by this warranty within thirty days of receipt. In the event repair or replacement shall require more than thirty days, iOptron shall notify the customer accordingly. iOptron reserves the right to replace any product which has been discontinued from its product line with a new product of comparable value and function.

This warranty shall be void and of no force of effect in the event a covered product has been modified in design or function, or subjected to abuse, misuse, mishandling or unauthorized repair. Further, product malfunction or deterioration due to normal wear is not covered by this warranty.

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Some states do not allow the exclusion or limitation of incidental or consequential damages or limitation on how long an implied warranty lasts, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

iOptron reserves the right to modify or discontinue, without prior notice to you, any model or style telescope.

If warranty problems arise, or if you need assistance in using your telescope, mount, or controller contact:

iOptron Corporation
Customer Service Department
6E Gill Street
Woburn, MA 01801
www.ioptron.com
support@ioptron.com
Tel. (781)569-0200
Monday-Friday 9AM-5PM EST

NOTE: This warranty is valid to U.S.A. and Canadian customers who have purchased this product from an authorized iOptron dealer in the U.S.A. or Canada or directly from iOptron. Warranty outside the U.S.A. and Canada is valid only to customers who purchased from an iOptron Distributor or Authorized iOptron Dealer in the specific country. Please contact them for any warranty.