GREETINGS

Thank you for purchasing Mark III equatorial mount. The Mark III is a symbol of vitality and modern technology. Meanwhile, it is a lightweight and portable German equatorial mount with a delicate harmonic gear system. Its outstanding payload capacity caters to most desires in sky observation and astrophotography. Mark III boasts quick dynamic response, precise tracking ability, accurate data-transmission and processing. Mark III is easy to operate and extensively compatible with existing astronomy software or applications. It's a great option for astronomy activities, a handy and functional helper along your journey to the universe exploration.

This instruction manual is designed for anyone who use Mark III equatorial mount. The instruction manual will introduce you the proper steps and warn you about the potential improper thus dangerous operations or situations. Please be sure to thoroughly read the instruction manual before you assembly and use Mark III equatorial mount, and strictly follow these steps illustrated in it. Also, you should keep it in a place where you can easily refer to when you operate Mark III equatorial mount. The operator himself should be responsible for any damage to the equipment or personal injury caused by improper operations.

Mark III equatorial mount is powered by Onstep, a fantastic open source software. We would like to express our sincere gratitude to the developers and all relevant contributors who have helped a lot to improve the Onstep software. We will also do our best to make possible improvements and modifications to Onstep based on the practical operations to make this software and thus our equatorial mount perform more smoothly.

If users need Onstep source code, please contact us at:

bonnie@sharpstar-optics

SAFETY PRECAUTIONS

This instruction manual will help you operate the Mark III equatorial mount effectively and safely. Please be sure to read this manual before any operations and strictly follow the steps illustrated in it.

1. MARKIII has a automatic braking system used in accidental power-off situations. Before rebooting the Equatorial mount, it would be better to take down the telescope for safety reasons. After powering on the MARKIII, manually adjust to the “Home “position and reset the “Home” position of the mount.

2. After the MAKRIII is powered on, the automatic tracking will be automatically turned on, if the mount is not used for a long time after opening, it is recommended to manually turn off the tracking to avoid accidental damage due to the mount’s long-term rotation.

3. MARK III GOTO Speed Recommendation:

Name	Symbol	Actual Speed	Recommended Load (without counterweight)
Fastest	2×	4 deg/s	⩽12kg
Faster	1.5×	3 deg/s	⩽22kg
Default Speed	1×	2 deg/s	⩽22kg

Name	Symbol	Actual Speed	Recommended Load (with counterweight)
Fastest	2×	4 deg/s	⩽12kg
Faster	1.5×	3 deg/s	⩽22kg
Default Speed	1×	2 deg/s	⩽28kg

If ignored, it can cause damage to your equipment or personal injury.

More information about the current step.

WARNING!

1. Do not directly look at the sun with your naked eyes through your telescope or finder scope when you use Mark III equatorial mount. Or it can cause permanent and irreversible damage to your eyes. Observe the sun with a dedicated solar filter.

2. Do not place Mark III in places that is wet and damp. Or it may cause erosion to the parts of equatorial mount, which may result in inaccuracy, electrical shock and even fire.

3. Do not try to disassembly any part of Mark III equatorial mount when you can't find any references in the instruction manual. Or it may cause inaccuracy of Mark III equatorial mount and even personal injury.

4. Please be sure to keep children away from counterweight pin, thumb screws, Allen wrench of M1.3 or any other tiny components. Or it may cause suffocation.

5. Do not plug or unplug the power cord, hand controller cable and other cables by force. Or it may cause electrical shock and even personal damage.

6.Please don't plug off the R.A. ,Dec and hand controller connecting

cable when the mount is working, or it may cause the mount to break down

7. Please be careful when you carry, assembly or disassembly the main body, counterweight, counterweight bar and other heavy components. Or it may cause damage to the equipment or even personal injury.

8. Please be sure to place Mark III on flat ground before you observe or astrophotograph. Or the equatorial mount may fall over which may cause damage to the equipment or personal injury.

9. Do not wipe the surface of Mark III with corrosive liquid. Or it may cause damage to the surface painting and the equatorial mount.

STORAGE AND PROTECTION

1. Please be sure to return your equatorial mount to home position if you want to leave your telescope on Mark III equatorial mount after your observation or astrophotography, then cut off the electricity. Or the equatorial mount may fall over which may cause damage to the equipment or even personal injury.

2. Do not expose uncovered telescope to direct sunlight. Or this may cause a fire.

3. Do not expose Mark III equatorial mount to direct sunlight, heavy moisture or dust. Keep Mark III at places that is dry and clean.

4. Keep children away from Mark III equatorial mount. The mount may fall over, which may cause damage to the equipment or even personal injury.

5. If Mark III is stained, please clean Mark III equatorial mount with dedicated cleaning cloth and solvent. Do not clean the surface of Mark III with strong corrosive detergent. Or it may poison the surface painting of Mark III equatorial mount.

6. If Mark III is not used for a long time or for long-distance transportation, please adjust the altitude angle to 30 degree and put it into the original protective box.

BASIC OPERATION STEPS

Users, especially those who first operate Mark III, must follow the steps below. Or it may cause inaccuracy of Mark III equatorial mount.

1. First, users should unpackage and assembly Mark III under the instruction of this manual.

2. Before observation or field astrophotography, point Mark III equatorial mount approximately to North (or South). (See 3.1)

3. Altitude and azimuth adjustment. (See 3.3)

4. Power your Mark III mount (with proper voltage), upload your current time, longitude and latitude to Mark III equatorial mount (See 4.3.1); change your mount's hotspot name (See 5.3.2)

5. N-star alignment. (See 4.3.3)

6. Polar alignment. (See 4.3.4)

7. Reset the home position of Mark III equatorial mount. (See 4.3.2)

CONTENT

1 Components and Specifications

1.1 Basic Function of an Equatorial Mount

When we observe the sky in the northern hemisphere, we can find that all the stars in the sky are constantly rotating around the Polaris, approximately one turn a day. It's an interesting phenomenon caused by the earth rotation which is called diurnal motion. If we need to observe, especially image an object in a quite long time, we have to offset the influence the star rotation, keeping the object staying at the center of our field of view, that's why an equatorial mount is created.

When use Mark III equatorial mount, we polar-align the mount to make sure that its R.A. axis is pointing directly to the Polaris which is near the Northern Celestial Pole or NCP. Mark III will turn around its R.A. axis, tracking an object at a set and constant rate. Thus the object will be kept at the center of our filed of view, achieving long-time exposure.

1.2 Specification of Mark III

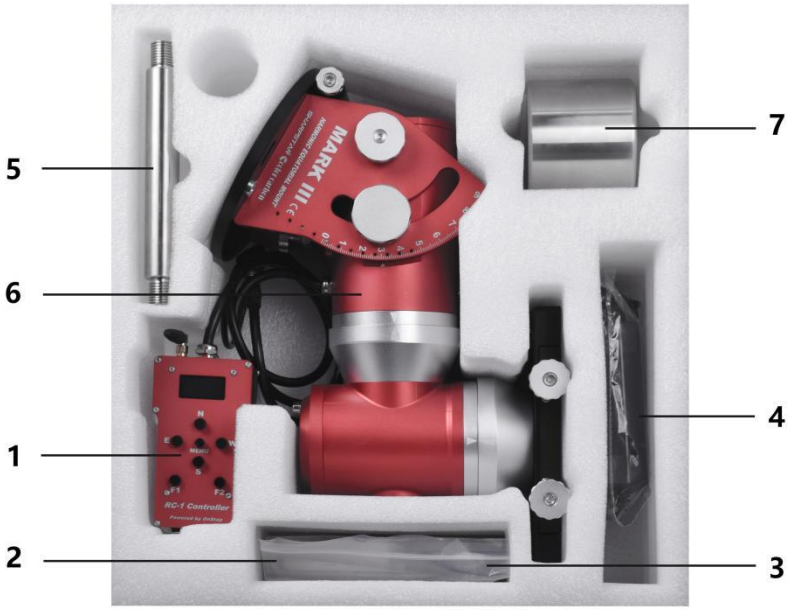
ITEMS	SPECIFICATION
Weight of the main body (without counterweight and counterweight bar)	7.65KG
Weight of special carbon fiber tripod (with extension tube)	4.95KG
Total weight (without counterweight and counterweight bar)	12.6KG
counterweight and counterweight bar	A standard 5KG counterweight and a counterweight bar (304 stainless steel)
Dovetail saddle	Standard 200mm Losmandy & Vixen style dovetail saddle
Dimension	The diameter of the main body's base is 160mm, the maximum height of the main body is 38cm, and the maximum width is 30cm
Dimension of tripod (including a one-stage extension tube)	82cm of height and 98cm of width when expanded, 93cm of height when retracted
Level adjustment of tripod (with a bubble level)	height adjustment within 2.5cm, with fine-tuning and locking system
Latitude adjustment	15-90°（90° is the motorized Alt-Azimuth mode）
Azimuth adjustment	±4°
Effective payload	≤22kg (without counterweight) ≤28kg (with counterweight) Note: these are measured when the distance between telescope' s central axis and the mounting surface of the equatorial mount is less than 150mm
Reduction/Gear Ratio	R.A. axis 1: 1000

	Dec. axis 1: 1000
PE Cycle Error	<±20”
PE Cycle Time	432 seconds
Slew speed	Maximum slew speed:4 deg/s default slew speed: 2 deg/s Note: switch to default or slower slew speed when carrying a heavy or bulky telescope
Guide speed	2x，4x，8x，20x，48x，120x，180x，240x，360x，480x，710x，950x
Harmonic reducer type	20mm 1:100 Harmonic reducer
Motor	42mm stepping motor with automatic braking system (used in power-off situations)
Power enter (with a standard 24V power adapter and 12V to 24V power adapter)	24V stable power supply
Operating voltage	950mA
Standby voltage	475mA
Data transmission	Support WiFi wireless connection and USB wired connection
Guiding Port	Through USB connection
Hand Controller	CNC-machined controller with build-in celestial database
Compatibility	MARK III is perfectly compatible with ASCOM & INDI platforms, various commonly-used astronomy software, mobile phone apps, star atlas software, etc., the mount can be controlled via smartphones/laptops/tablets etc. through WIFI or USB connection
Star alignment	Supports up to 9-star alignment

Home sensor style	Electrical zero position
Working temperature	-25℃-40℃
Polar alignment scope port	Built-in electronic polar alignment scope port with quick-release system
PHD2 guiding test	±0.5”

Note: the specifications are subject to change without notice and all rights are reserved.

1.3 Package Contents



NUMBER	ITEM	NOTE
1	Hand controller	to control and operate Mark III equatorial mount
2	Boost converter	12-24V boost converter×1
3	Tool package	Thumb screw for fixing the mount on the tripod×2; M1.3 Allen wrench×1; altitude adjustment bar×1; M5 Allen wrench×1;
4	Power package	24V power adapter×1; power cable×1
5	Counterweight bar	with a thread at the bottom
6	Main body	
7	Counterweight	to balance the mount

1.4 Components of Main Body

NUMBER	ITEM	NOTE
1	Dovetail saddle	to accommodate a dovetail plate
2	Safety screw	to tighten and secure dovetail plate slid into the dovetail saddle
3	Platform for polar scope	for installing QHY polar scope

NUMBER	ITEM	NOTE
4	Declination axis body	
5	R.A. axis body	
6	“Home” position symbol	When arrows are aligned, here is the home position
7	Altitude coarse-tune shuttle	
8	Bubble level	
9	Installing hole	to install counterweight bar and counterweight
10	Connecting cable	to connect R.A. and Declination axis body
11	Altitude fine-tune screw	

NUMBER	ITEM	NOTE
12	Altitude fixing screw	loosen before adjusting the altitude angle
13	Azimuth adjustment screw	
14	Azimuth adjustment post	
15	Altitude adjustment grub screw	to fix the altitude adjustment shuttle
16	Connecting cable	to connect R.A. and Declination axis body
17	Fixing thumb screw	to fix the main body on the platform of the tripod

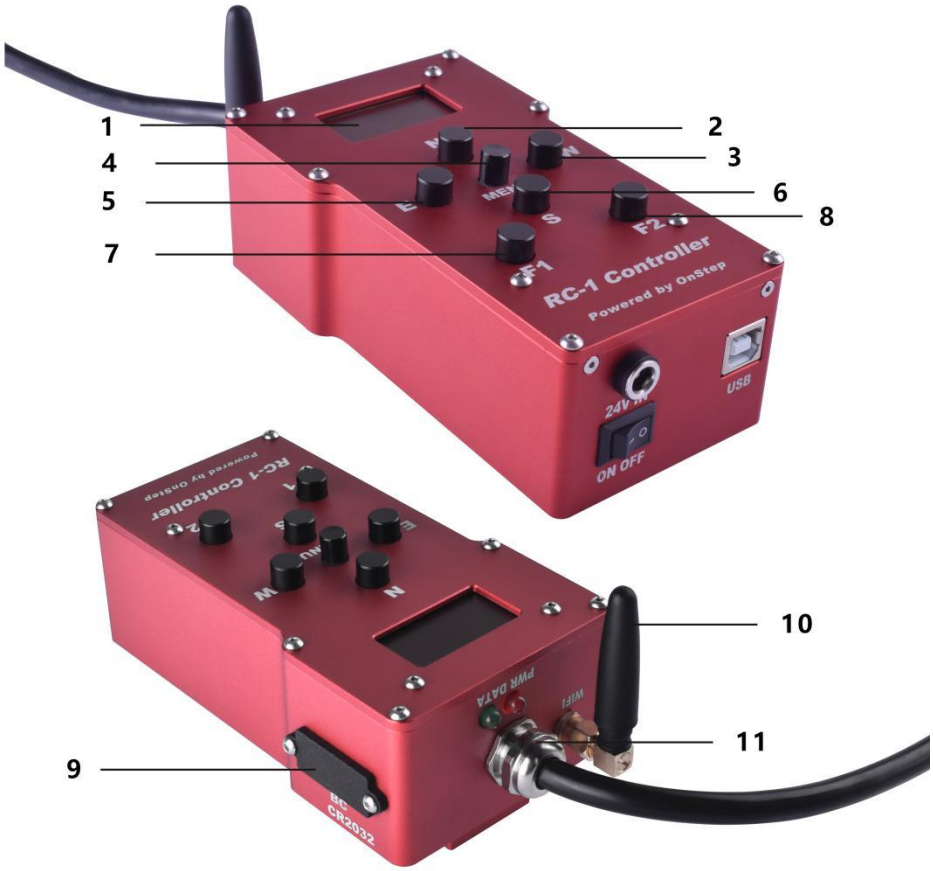
1.5 Ports and lights

NUMBER	ITEM	NOTE
1	Connection port	to connect the Mark III and the hand controller

1.6 Components of Tripod

NUMBER	ITEM	NOTE
1	Tripod head	for installing Mark III main body
2	Leg brace	
3	Stainless ferrule	support tripod; adjust the height of tripod
4	Central column	
5	Tripod leg	

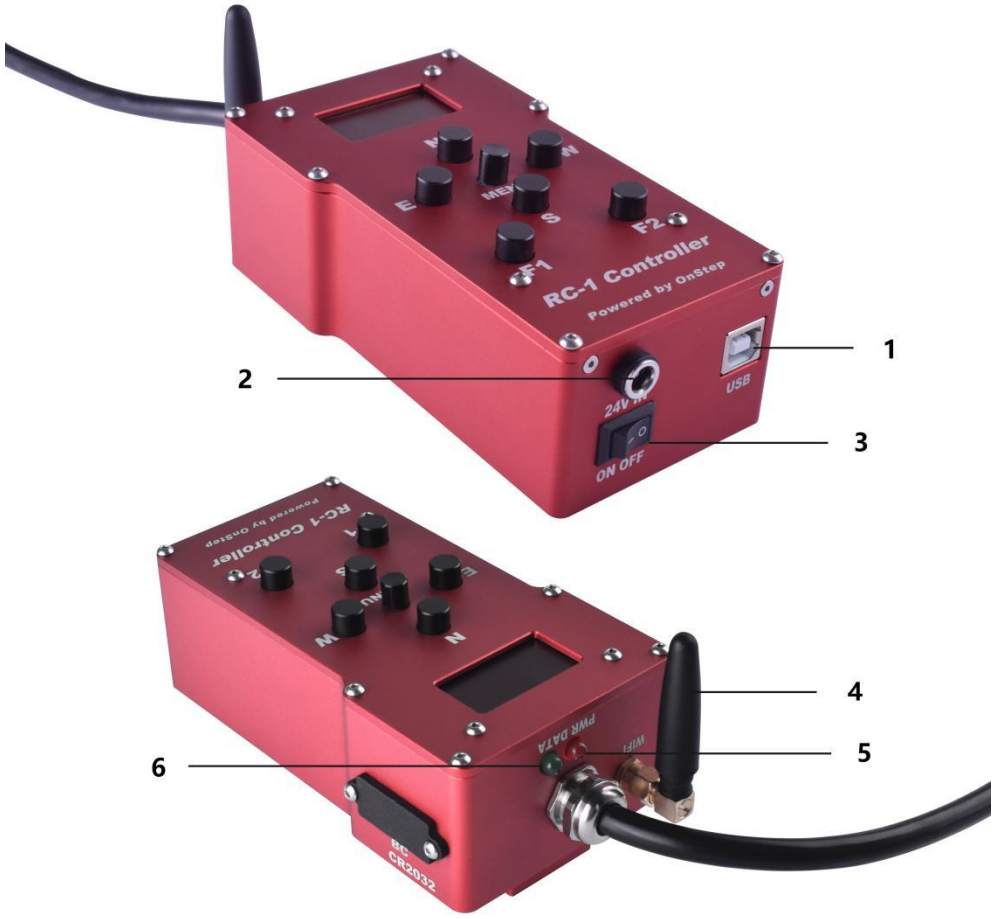
1.7 Basic Information of Hand Controller



NUMBER	ITEM
1	screen
2	direction, page up
3	direction, confirm, enter the next menu
4	long-press or double press to bring up different menus

5	direction, cancel, return to the previous menu
6	direction, page down
7	slower guide speed
8	faster guide speed
9	built-in battery port
10	WIFI hotspot transmitter
11	Connecting line between the hand controller and the mount body

1.8 Diagram of the hand controller connection hole



NUMBER	ITEM	NOTE
1	USB port	to connect Mark III and computer with a USB cable
2	Power supply port	to connect the power cable and Mark III
3	Power switch	
4	Signal emitter	to emit hotspot signal

5	Power light	Power on when the red light is continuously lighting
6	Data light	flashing when the mount is tracking, continuously lighting when untracking

2 Assembly Steps

2.1 How to set up the Tripod

The tripod of Mark III is made of high-quality carbon fiber material, so it's durable and pretty-looking, with amazing supporting performance. Before you start observation or astrophotography, please be sure the ground is firm and level, in order to prevent the equatorial mount from falling over. Besides, after your polar alignment, try to avoid any moving or colliding with the tripod, which may cause the inaccuracy of polar alignment.

STEP 1

Take out the tripod, place the tripod on a firm and level surface.

STEP 2

Stretch out the tripod legs from the top of the tripod. Gently drag three legs apart to thoroughly open the tripod. Three leg braces will descend along the central column to its lowest.

STEP 3

Every tripod leg is supported by a stainless ferrule and they are also used to adjust the height of the tripod within a range of 25mm.

STEP 4

There is a high-precision bubble level on the base of the main body. Observe the bubble in the bubble level to help you level your tripod. Make sure the bubble is staying at the center.

2.2 How to Assemble the Main Body

STEP1

Take out the main body of Mark III equatorial mount. Turn the azimuth adjustment knobs in advance to make a space between the two knobs, which is enough to accommodate the azimuth adjustment post threaded onto the tripod head.

STEP 2

Gently put the main body of Mark III onto the tripod head. The central metal protrusion on the tripod head should fit into the hollow on the bottom of the mount and the azimuth adjustment post should fit into the space between two azimuth adjustment knobs.

STEP 3

Take out two fixing thumb screws (with plastic washers) from the tool package. Thread these two screws to fix the main body on the tripod head. There are holes tapped on the sides of the screws, users can further tighten these screws with the altitude adjustment bar (also in the tool package).

The main body is heavy, please be careful when assembling, or it may cause damage to the equipment or severe personal injury.

2.3 How to Assemble Counterweight

STEP 1

Take out the counterweight bar. Thread the counterweight bar into the screw hole at the bottom of the Declination Axis of the mount body.

STEP 2

Take out the counterweight, screw it onto the thread of the Mark III counterweight bar,tightening it to prevent the counterweight from falling off.

The counterweight and counterweight bar are heavy, please be careful when assembling.

When using MARKIII,if the telescope weighs more than 22kg, it is necessary to assemble a counterweight to prevent overturning.

2.4 Power Connection and controller

STEP 1

Connect R.A. and Declination body with the connecting cable.

Please don’t plug off the R.A. and Dec connecting cable when the mount is working, or it may cause the mount to break down

STEP 2

The standard Mark III configuration has a hand controller. Take out the hand controller, connect one end to the interface on the rear side of the Mark III body.

STEP 3

Take out and connect the power adapter and power cable. If your external power supply is 12V, you should use the 12V-24V boost converter.

STEP 4

Plug the power cable with one end, and connect the other end to the external power supply port at the bottom of the hand controller with a label of [24V IN]. Turn on the power switch【ON】. When the red light is steady on, the power is connected.

After the equatorial mount is powered on, the green light on the hand controller flashes, indicating that the hand controller and the main body is connected and has entered the automatic tracking state. The MARKIII Hand controller has a variety of built-in star charts to meet the user's general operational needs.

When you power up your mount, it is automatically in a tracking state. If you reset Home position or return your mount to Home position, it will not track any more. You have to manually start its tracking mode.

If your mount is in a tracking state, the green light is constantly flashing. If your mount is not in a tracking state, the green light is continuously lighting.

When you successfully connect your hand controller to Mark III equatorial mount, the screen will display [Connection OK!], then enter into the home screen. Users can press key [M] to change the information displayed on the screen.

ICON	MEANING
20x	Guide speed (top left)
▶▶	Goto（top right）

	Ⓔ	East of the Meridian (top right)
	Ⓦ	West of the Meridian (top right)
		At the Home position and stop tracking (top right)
RA	23:19:24	R.A. coordinate (Home screen)
Dec	+89°58' 18	Declination coordinate (Home screen)
Az	000°00' 00	Azimuth coordinate (press [M] key once)
Alt	+30°44' 00	Altitude coordinate (press [M] key once)
UT	01:18:27	Universal time (press [M] key twice)
LST	11:16:14	Local standard time (press [M] key twice)
	T21.1°C	Ambient temperature (press [M] three times)
	P1025mb	Pressure (press [M] key three times)
	H49%	Humidity (press [M] key three times)
	DP10.8°C	Dew point temperature (press [M] key twice)

STEP 5

To cut off the power, turn off the power switch【OFF】 below the hand controller and the red power light on it is off，then turn off the external power supply.

Please pay attention to electrical safety during operation.

Do not plug or unplug the power cable by force, or it may cause electrical shock.

Do not operate in a moist environment, do not operate with wet hands.

Stop operating the equatorial mount and unplug the power cord immediately if there is smoke, strange smell or noise.

3 Mechanical adjustment

3.1 Find the North

Before using Mark III equatorial mount, place the mount on the ground that is firm and level. Point one of the tripod leg to the north (to south if in the southern hemisphere). The dovetail saddle on the mount head will be up and directly point to the north. You can adjust with the help of a compass app in a smartphone. Deviation within ±6°is acceptable.

3.2 How to Level Mark III

Please be sure that Mark III is completely level during its performance with no obvious tilt. Observe the bubble level on the base of the main body. If the bubble is not at the center, please adjust the metal ferrules until the bubble returns to the center.

3.3 How to Adjust Altitude and Azimuth

When you first use Mark III or change your routine observing site, you should readjust its altitude and azimuth angle to ensure that you can carry out accurate polar alignment.

3.3.1 How to Adjust Altitude

Before observation or astrophotography with Mark III, please be sure to adjust its altitude angle. So that the elevation of its R.A. axis matches the latitude of your observing site. For example, if the latitude of your current observing site is N40 degree, you must

adjust your mount's altitude angle to 40 degree; and if the latitude of your current observing site is N50 degree, you must adjust your mount's altitude angle to 50 degree and so on.

Mark III is designed with both coarse-tuning and fine-tuning systems. And before conduct altitude adjustment, you should first loosen the altitude lock screws on the side of the main body.

STEP 1

If the latitude of your observing site has greatly changed (like long-distance expedition or cross-border observation), you have to first coarse-tune your Mark III equatorial mount before observation of astrophotography. There are 10 grooves carved along the inner side of the main body representing 10 brackets of latitude: 15-20 degree, 20-30 degree, 26-35 degree, 32-40 degree, 38-46 degree, 44-53 degree, 51-58 degree, 56-65 degree, 63-72 degree and 69-77 degree. You should choose a proper range (and its default range is 26-35 degree). Take out the M1.3 Allen wrench, loosen two grub screws that fix the altitude coarse-tune shuttle, shift the shuttle to the proper range and fix it again by tightening these two grub screws.

There are 4 grub screws for you to use. One pair is for fixing the altitude coarse-tune shuttle, and the other is for back-up.

Be careful not to lose the M1.3 Allen wrench and the grub screws.

STEP 2

After step 1, you should then fine-tune your altitude angle to exactly match the current latitude of your observing site. Rotate the fine-tune screw under the coarse-tune shuttle, and observe the pointer of the scale (painted along the outer side of the main body). Adjust until the pointer points at the number which exactly equals to your current latitude.

STEP 3

Tighten two altitude lock screws.

3.3.2 How to Adjust Azimuth

If the target deviates to left or right, you have to adjust azimuth of Mark III equatorial mount.

STEP 1

Loosen two fixing screws on the platform of the tripod.

STEP 2

Slightly adjust two azimuth adjustment knobs until the Polaris comes to the center of the field.

STEP 3

Tighten two fixing screws to fix the main body on the platform of the tripod.

3.4 How to Set up a Telescope

STEP 1

Attach the dovetail plate at the bottom of the tube rings.

STEP 2

Assemble the tube ring and dovetail plate together with your telescope. Make sure that your telescope is secured by the tube ring.

STEP 3

Loosen two safety screws on the side of the dovetail saddle.

STEP 4

Gently slide the dovetail plate into the dovetail saddle. Adjust the position of the telescope, then thread the two safety screws to make the dovetail plate tightly clamped by the dovetail saddle.

Users can further tighten the dovetail saddle with an M5 Allen wrench.

Telescope is heavy, please be careful when assembling

When you don’t use Mark III equatorial mount, please do not leave the telescope leaning to one side for a long time. Or the equatorial mount may fall over due to shift of gravity center.

4 Operate with Hand Controller

4.1 Basic Operation of Hand Controller

4.1.1 How to Upload Time, Longitude and Latitude

Before using Mark III for any observation or astrophotography, please be sure to upload your current time, longitude and latitude to your mount. It's critical for the equatorial mount to well behave.

If users don't upload the current time, longitude and latitude to the mount, the mount may lose the key information to operate as intended.

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to page down and move the cursor to [Settings]. Press [▶] to enter the submenu of [Settings].

STEP 3

Press [▼] to page down and move the cursor to [Date/Time]. Press [▶] to change the date/time information.

STEP 4

Press [▲] and [▼] to change the local date. Press and hold [▲] and [▼] to change the numerals in a quicker way. After adjust the date to match your current date, press [▶] to confirm. And the screen will display [Value Set!]. The date information has been successfully uploaded.

STEP 5

Then you enter the time adjustment menu. Press [▲] and [▼] to change the local time. Press and hold [▲] and [▼] to change the numerals in a quicker way. After adjust the time to match your current time, press [▶] to confirm. And the screen displays [Local Time DST? No]. If daylight saving time is applicable in your current site, press [▼] to choose [Yes] and press [▶] to confirm; and if not, directly press [▶] to confirm.

STEP 6

In the submenu of [Settings], press [▼] to move the cursor to [Site] and press [▶] to enter [Menu Site]. Press [▼] to move the cursor to [Latitude] and press [▶] to enter the latitude adjustment menu. Press [▲] and [▼] to change the latitude. Press and hold [▲] and [▼] to change the numerals in a quicker way. Press [▶] to confirm after adjustment. The screen displays [Value Set!] and your current latitude has been successfully uploaded.

STEP 7

Press [▼] to move the cursor to [Longitude] and press [▶] to enter longitude adjustment menu. Press [▲] and [▼] to change the longitude. Press and hold [▲] and [▼] to change the numerals in a quicker way. Press [▶] to confirm after adjustment. The screen displays [Value Set!] and your current longitude has been successfully uploaded.

STEP 8

Press [▼] to move the cursor to [UTC Offset] and press [▶] to enter time zone adjustment menu. Press [▲] and [▼] to set the time different with UTC. Press [▶] to confirm after adjustment. The screen asks [UTC Ofs-?]. If you are in the eastern hemisphere,

choose “yes”, otherwise choose “no” and press [▶] to confirm.

4.1.2 How to Set and Return Home Position

Home is a critical position for a harmonic equatorial mount like Mark III. You should first set Home position for your mount after uploading your local time and geographic coordinates. Home position of Mark III equatorial mount is an initial position where its counterweight bar is directly down pointing to the ground, its R.A. axis is directly pointing to the NCP (or SCP) and the telescope sitting on the dovetail saddle is parallel to the R.A. axis. Mark III is defaulted to be at its Home position.

STEP 1

Press 4 arrow keys to adjust Mark III equatorial mount’s position. Make sure that the Declination axis is directly pointing down to the ground and the dovetail saddle and R.A. axis are directly pointing to the NCP (or SCP) without any obvious deviation.

STEP 2

Press and hold [M] to bring up the [Main Menu].

STEP 3

Press [▼] to page down and move the cursor to [Align], and press [▶] to enter the submenu of [Alignment].

STEP 4

Press [▼] to page down and move the cursor to [Reset Home], and press [▶] to confirm. The screen displays [Reset Move to Home], and press [▶] again to confirm. Then you have successfully reset the current position as the mount's Home position.

After your observation or astrophotography, you should return your mount to its Home position, and then cut off the power.

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to page down and move the cursor to [Goto], press [▶] to enter the submenu of [Goto].

STEP 3

Press [▼] to page down and move the cursor to [Home], press [▶] to confirm. The screen displays [Goto Home will clear the Model, Goto Home?]. Press [▶] to confirm and the equatorial mount will automatically move to its Home position. Then you can cut off the power and take off your telescope from the mount.

If you forget to return your mount to its Home position and cut off the power, the equatorial mount will brake and stop you telescope from moving down. That's why we recommend 24V power supply for the mount.

If you forget to return your mount to Home position and cut off the power, due to safety concerns, please first take off your telescope and manually guide your mount to its Home position and reset its Home position.

If you don't return your mount to its Home position and cut off the power, the gravity center of the whole system may shift which may result in the falling over of your telescope.

4.1.3 N-star Alignment

Users can perform N-star alignment by the hand controller. The purpose of N-star alignment is to pick out a reference point, telling your mount about what's exactly the direction it's pointing. N-star alignment can greatly enhance Mark III equatorial mount's accuracy. Mark III supports 9-star alignment. Generally, the more star you choose to align, the more accurate the mount will be. Besides, it's a good habit to choose stars that are little drifted apart with each other. Short distance between the stars will not really help your accuracy improvement.

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to page down and move the cursor to [Align]. Press [▶] to enter the submenu of [Alignment].

STEP 3

Press [▼] to page down and move the cursor to the alignment methods you prefer. For example, move the cursor to [3-Star Align] and press [▶] to enter the submenu of [Select Star]. In this submenu, you should choose the stars that you would like to align with from the built-in star catalogues.

STEP 4

Press [▲] and [▼] to choose the desired stars. The screen displays the magnitude, the constellation which it belongs and other basic information. Press [M] to demand the screen to display other information about the star you'd like to choose, like its R.A. and Declination coordinates or its azimuth and altitude angles. Press [▶] to choose the current star. The screen displays [Slew to Target?]. Press [▶] to confirm and Mark III will automatically slew to the star that you choose. And the screen shows [Slewing to Star 1].

STEP 5

After slewing to the chosen target, the left bottom area will display the name of the star that the mount is pointing and the screen also displays [Recenter Star 1]. Then you should observe through your telescope or your camera screen to see whether the star is perfectly at the center. If not, press 4 arrow keys to fine-tune your mount until the target is at the center of your field of view. After

adjustment, press and hold [M] until the screen displays [Add Star Success!]. Now move to choose the second star.

STEP 6

Press [▲] and [▼] to choose the desired stars. Repeat STEP 4 and STEP 5 until you finish all the procedures of 3-star alignment. The screen displays [Alignment Success!]. You have successfully performed an N-star alignment.

During your N-star alignment, you can press [◂] to abort the alignment process. And you can redo STEP 1 and STEP 2 to resume the N-star alignment.

If you find the targeted star is not at the center, you can adjust your mount by pressing 4 arrow keys. And if your mount moves so fast that it's impossible to perfectly center the star, you can press [F1] to lower the guide speed.

4.1.4 Polar Alignment

After N-star alignment, you can polar-align your mount to further improve its accuracy. There are two basic methods of polar alignment. The first one is using the built-in Refine Polar Alignment function and the other is asking a electronic polar scope for help. This instruction of manual will introduce you how to polar align with Refine Polar Alignment function.

STEP 1

Be sure that you have finished a 3+-star alignment.

STEP 2

Press and hold [M] to bring up the [Main Menu].

STEP 3

Press [▼] to page down and move the cursor to [Align]. Press [▶] to enter the submenu of [Alignment].

STEP 4

Press [▼] to page down and move the cursor to [Refine PA], press [▶] to confirm. The screen will remind you again that you have to first carry out a N-star alignment which should at least has 3 stars involved. Wait until the screen displays [Refine PA?], choose [Yes] and press [▶] to confirm.

STEP 5

Find a bright star near NCP (or SCP) and make sure that its Declination coordinate is between 50 and 80 degree. The Mark III equatorial mount will slew to the this chosen target.

STEP 6

Make the bright star move to the center of your field of view by manually adjusting the mount's azimuth and altitude angle.

STEP 7

After adjustment, press [▶] to confirm and you have successfully finished the refine polar alignment. You can repeat the above steps until Mark III can perfectly goto a bright star and the star stays exactly at the center of you field of view.

Mark III is equipped with a quick-release system for attaching a QHY polar scope. It's easy for users to install a QHY polar scope on the platform and polar align your mount.

4.1.5 How to Goto

Mark III equatorial mount can execute a Goto command. You can choose a target in the controller's star catalogues, and command the mount to Goto. The mount will automatically slew to the target that you have chosen. You don't need to adjust the R.A. or Declination motion knobs to make the mount move.

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to page down and move the cursor to [Goto] and press [▶] to confirm.

STEP 3

Press [▲] and [▼] to choose a desired target from the built-in star catalogues. Mark III comes with many useful star catalogues:

FIRST LEVEL MENU	SECOND LEVEL MENU
Stars	Bright Stars
	STF STF
	STT STT
	GCVS GCVS

FIRST LEVEL MENU	SECOND LEVEL MENU
Deep Sky	Messier

	Caldwell
	Herschel400
	Collinder
	NGC
	IC
Solar System	Sun
	Mercury
	Venus
	Mars
	Jupiter
	Saturn
	Uranus
	Neptune
	Moon
User	

For example, move the cursor to [Stars] and press [▶] to confirm. Move the cursor again to choose [STF**] and press [▶] to enter the STF star catalogue. Press [▲] and [▼] to choose a desired target from this star catalogue. The screen shows the name, magnitude and other basic information. Press [M] to change the information displayed on the screen, like its R.A. and Declination coordinates or

azimuth and altitude angle. Press [▶] , the screen displays [Slew to Target], Mark III will automatically point to the chosen target.

4.1.6 Tracking

When Mark III is in the tracking state, the equatorial mount will follow and track a target at a set rate. Besides, you cannot manually adjust Mark III with 4 arrow keys unless it's in the tracking state.

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to page down and move the cursor to [Tracking] and press [▶] to enter the submenu of [Tracking].

STEP 3

Move the cursor to [Start] and press [▶] to confirm. The screen shows [Tracking ON]. The green light at the back of the main body will flash and the tracking mode is on.

STEP 4

If you want to turn off its tracking mode, move the cursor to [Stop] and press [▶] to confirm. The screen will display [Tracking OFF]. The green light will be continuously lighting.

STEP 5

You can alter the tracking rate of Mark III under different observing situations. Mark III offers three types of tracking rate: [Sidereal], [Solar] and [Lunar].

Lunar rate is used to track the moon, solar rate is used to track the sun and the solar-system planets, sidereal rate is used to track all the other stars or objects.

When you power up your mount, it is automatically in a tracking state. If you reset Home position or return your mount to Home position, it will not track any more. You have to manually start its tracking mode.

4.1.7 Set Goto Speed

Users can adjust the Goto speed of Mark III. Generally speaking, if your telescope is large and bulky, you should slower your Goto speed and your telescope is quite lightweight and compact, you can increase your Goto speed. And as a rule of thumb, if the total weight of your telescope and other accessories is not more than 12kg, the Goto speed can be 4 deg/s; if the total weight exceeds 12kg, your Goto speed should better be less than 3 deg/s, and 2 deg/s is recommended.

If the telescope weighs more than 22kg, it is necessary to assemble a counterweight to prevent overturning.

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to page down and move the cursor to [Settings]. Press [▶] to enter the submenu of [Settings].

STEP 3

Press [▼] to move the cursor to [Configuration] and press [▶] to enter the submenu of [Configuration].

STEP 4

Press [▼] to move the cursor to [Goto Speed] and press [▶] to adjust your mount's Goto speed. There are 5 types of available speed:

NAME	SYMBOL	ACTUAL SPEED
Fastest	2×	4 deg/s
Faster	1.5×	3 deg/s
Default Speed	1×	2 deg/s
Slower	0.75×	1.3 deg/s
Slowest	0.5×	1 deg/s

STEP 5

Press [▼] to move the cursor to choose [Default Speed], for example. Press [▶] to confirm. The screen displays [Goto Speed 1×] and the Goto speed has been successfully altered.

4.1.8 Set Guide Speed

You can set guide speed with your hand controller. Guide speed is

not the same as Goto speed. It's the speed at which your mount moves when you manually direct it with 4 arrow keys. Press [F1] and [F2] to alter the guide speed. Press [F1] and the screen displays [Guide Slower] which indicates that the guide speed has been slowed. Press [F2] and the screen displays [Guide Faster] which indicates that the guide speed has been increased. There are 7 types of guide speed:

SYMBOL	ACTUAL SPEED
2×	2 times of tracking rate
4×	4 times of tracking rate
8×	8 times of tracking rate
20×	20 times of tracking rate
48×	48 times of tracking rate
1/2 Max	half of the current Goto speed
Max	equals to the current Goto speed

When you fine-tune the position of your mount, you should slow down its guide speed. When you coarse-tune your mount, you can increase its guide speed. When set at slower guide speed, the movement of your mount may not be noticeable.

4.1.9 Display Adjustment

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to move the cursor to [Settings], and press [▶] to enter the submenu of [Settings].

STEP 3

Press [▼] to move the cursor to [Display] and press [▶] to enter the submenu of [Display].

STEP4

Press [▼] to move the cursor to [Turn Off] and press [▶] to confirm. The screen displays [Press any key to turn on]. You can temporarily turn off the screen and press any key to go back to the home screen.

4.1.10 Contrast Adjustment

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to move the cursor to [Settings], and press [▶] to enter the submenu of [Settings].

STEP 3

Press [▼] to move the cursor to [Display] and press [▶] to enter the submenu of [Display].

STEP 4

Move the cursor to [Contrast] and press [▶] to enter the submenu of [Set Contrast]. There are 4 type of contrast:

SYMBOL	MEANING
Min	Minimum

Low	Low
High	High
Max	Maximum

STEP 5

Move the cursor to choose a desired contract and press [▶] to confirm.

4.1.11 Screen Dimming Setting

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to move the cursor to [Settings], and press [▶] to enter the submenu of [Settings].

STEP 3

Press [▼] to move the cursor to [Display] and press [▶] to enter the submenu of [Display].

STEP 4

Move the cursor to [Dim Timeout] and press [▶] to enter the submenu of [Dim Timeout]. There are 3 types of dimming settings:

SYMBOL	MEANING
Disable	The screen will never dim out
30sec	Dim out in 30s
60sec	Dim out in 60s

4.1.12 Backlight Setting

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to move the cursor to [Settings], and press [▶] to enter the submenu of [Settings].

STEP 3

Press [▼] to move the cursor to [Display] and press [▶] to enter the submenu of [Display].

STEP 4

Move the cursor to [Blank Timout] and press [▶] to enter the submenu of [Blank Timeout]. There are 6 types of timing:

SYMBOL	MEANING
Disable	Disable this function
1 min	The backlight dims in 1 minute
2 min	The backlight dims in 2 minute
3 min	The backlight dims in 3 minute

4 min	The backlight dims in 4 minute
5 min	The backlight dims in 5 minute

4.1.13 Meridian Flip

The equatorial mount follows a certain object that is diurnally rotating. Some deep-sky imaging requires long-time exposure, so sometimes when the object passes the meridian line, your mount pay move into an strange and awkward position. If your telescope is quite long or attached with many imaging accessories, the tail of your telescope may collide with your mount or tripod. So an equatorial mount should be capable of meridian flip. And Mark III is designed with 3 meridian flip mode:

SYMBOL	MEANING
Now!	Meridian flip immediately
Automatic	Automatically meridian flip
Pause at Home	meridian flip and stop at Home position

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to move the cursor to [Settings], and press [▶] to enter the submenu of [Settings].

STEP 3

Press [▼] to move the cursor to [Meridian Flip], press [▶] to enter the submenu of [Meridian Flip]. Move the cursor to [Now!], for example, and press [▶] to confirm, Mark III will immediately perform a meridian flip if the target has already passed the meridian line.

4.1.14 Buzzer Setting

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to move the cursor to [Settings], and press [▶] to enter the submenu of [Settings].

STEP 3

Press [▼] to move the cursor to [Buzzer] and press [▶] to confirm. The screen displays [Buzzer On?], you can press [▲] and [▼] to choose [Yes] or [No]. Then press [▶] again to confirm. The screen displays [Value Set!].

4.1.15 Limit Setting

STEP 1

Press and hold [M] to bring up the [Main Menu].

STEP 2

Press [▼] to move the cursor to [Settings], and press [▶] to enter the submenu of [Settings].

STEP 3

Press [▼] to page down and move the cursor to [Configuration], press [▶] to enter the submenu of [Configuration].

STEP 4

Press [▼] to move the cursor to [Limits], and press [▶] to enter the submenu of [Limits].

There are 4 types of limit you can set:

SYMBOL	MEANING
Horizon	The limit of horizon
Overhead	The limit of overhead

Meridian E	The limit of meridian east
Meridian W	The limit of meridian west

The default limit of horizon is -10 degree; the default limit of overhead is 89 degree; the default limit of meridian E and meridian W is 3 degree.

The limit of meridian E and meridian W is 3 degree will affect your practical meridian flip. For example, if you set your limit of meridian east and west as 3 degree, Mark III will perform meridian flip only when the target passes 3 degrees away from the meridian line.

4.2
The battery installation steps for the hand controller

NUMBER	ITEM	NOTE
1	battery switch	

The hand controller has a built-in battery compartment for the CR2302 battery, which can be put in, and the battery can maintain the self-running of the internal time of the mount.

Use a 1.5mm Allen Key to open the battery cover, pull out the battery drawer, open the lid,contain the battery compartment, and put the CR2302 battery（self-purchase）into it.

Turn on the battery switch.

5 Operate with Smartphone

5.1 Operate with Onstep App

Users can connect with and control Mark III equatorial mount with a dedicated Onstep App installed on smartphone or tablet. Compared with operating with a hand controller, users usually have an easier access to controlling their mounts. And its a good choice for those who want to control an outdoor equatorial mount while staying at home or in a tent. The functions of Onstep App is not that different than that of a hand controller. And in this instruction manual, we will introduce how to operate a Onstep App in an Android environment.

5.2 How to Connect

STEP 1

Download and install OnStep (available on the official web of Sharpstar).

STEP 2

Power up Mark III, turn on its power switch. The Red light is continuously lighting and the green light is flashing.

STEP 3

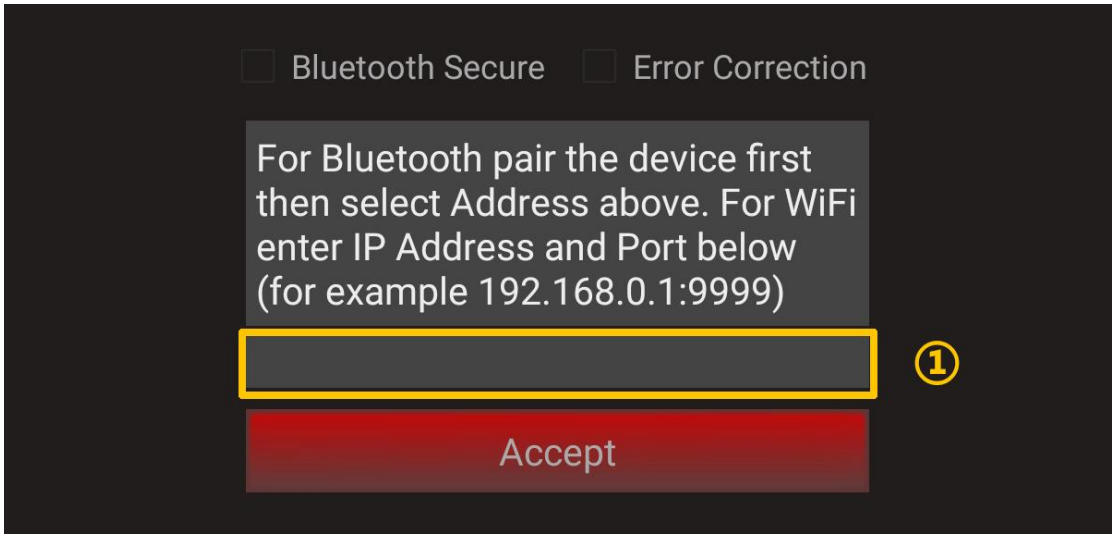
Search hotspot signal of [ONSTEP] in your phone's wireless and networks and connect it. The default password is [password].

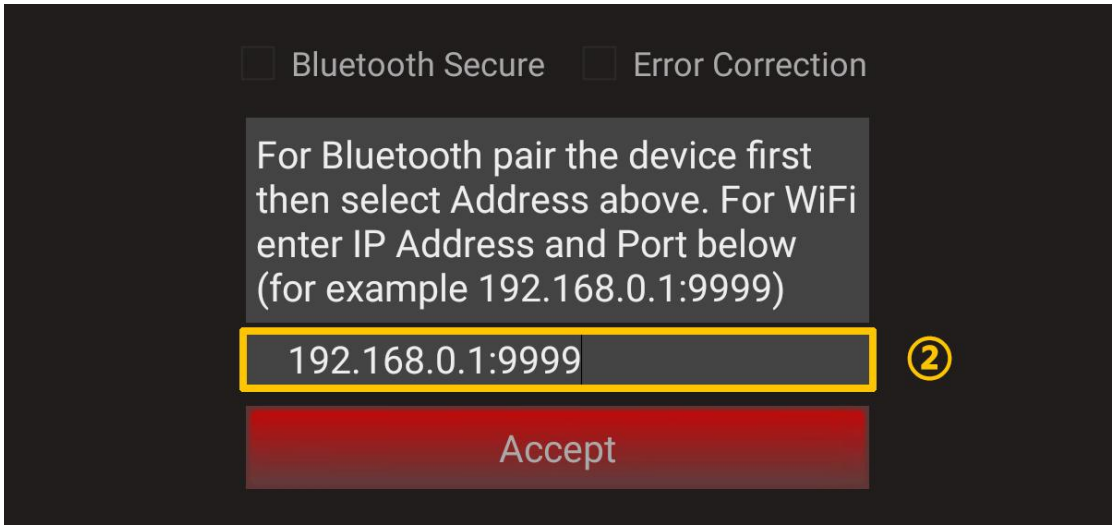
STEP 4

Open OnStep and you can see the home screen. The home screen displays [No Connection], indicating that your phone and Mark III equatorial mount hasn't yet connected. Press [more options] (the three-square icon), and choose [Connection].

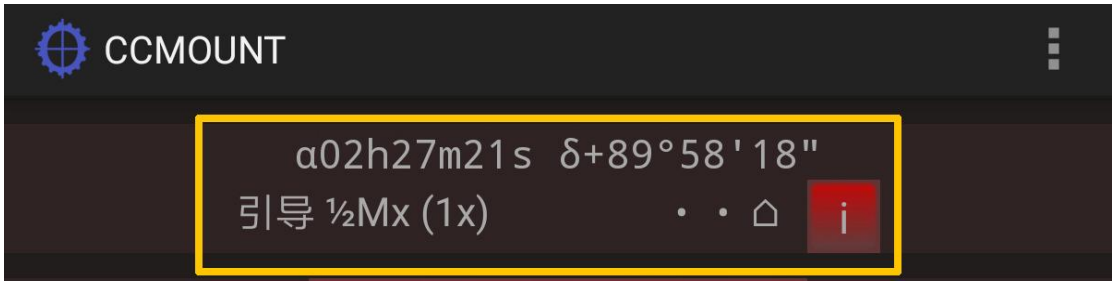
STEP 5

enter [192.168.0.1:9999] in the blank at the bottom and press [Accept]. You can connect your phone with Mark III equatorial mount.



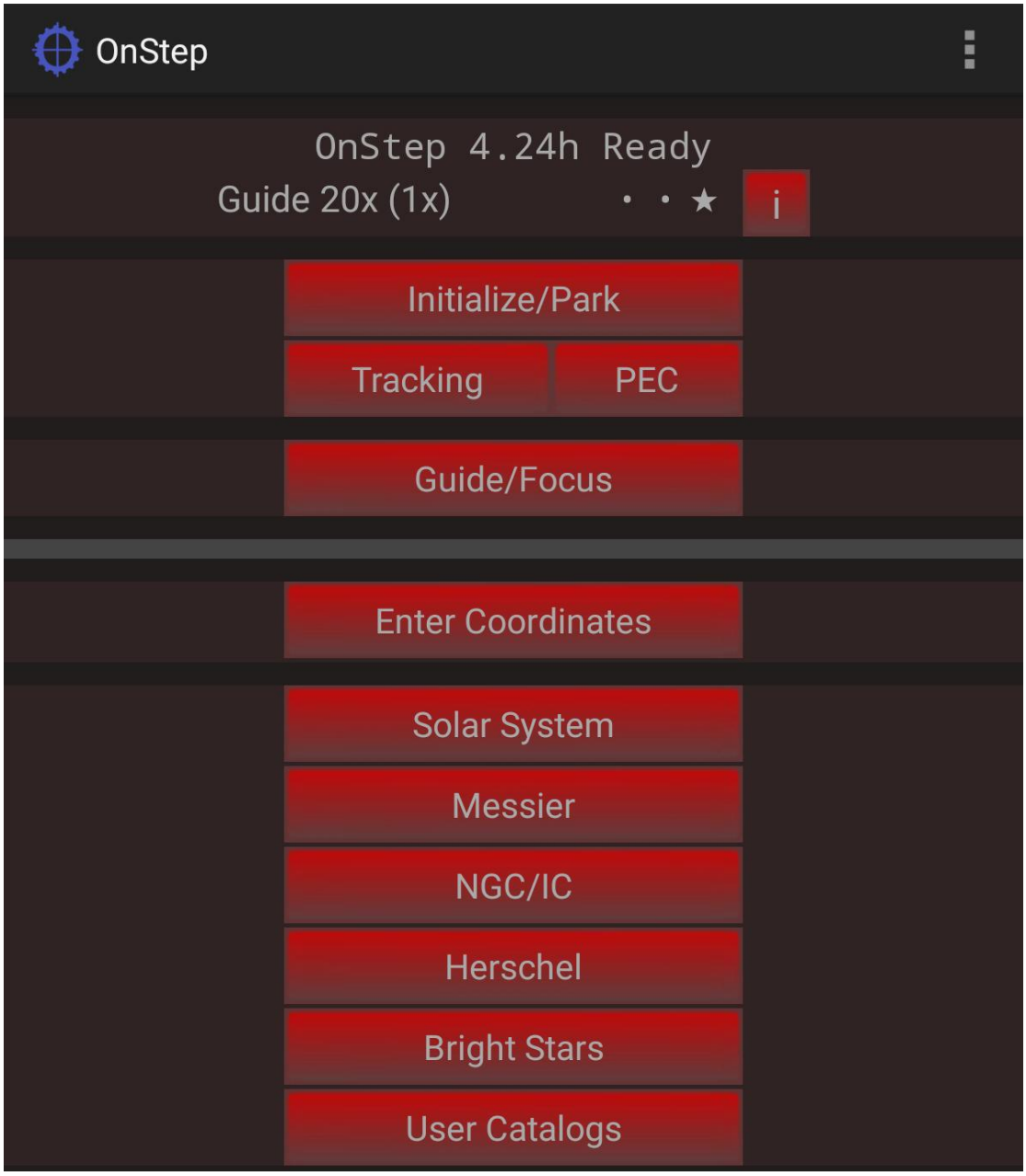


And the home screen will display specific information about the mount if successfully connected.



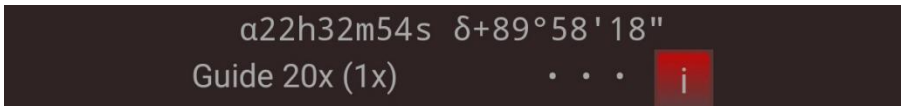
5.3 Information Bar

The home screen looks like this if successfully connected：



You can press the icon of [i] on the right of the information bar to browse different information about your Mark III equatorial mount:

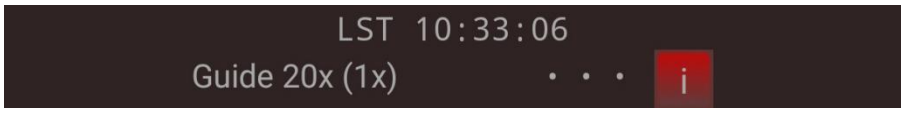
1



2

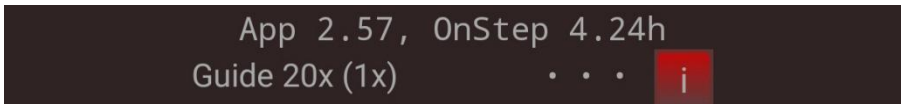
3

4



5

6



5.4 Initial Settings of Time and Location

Like operating with a hand controller, you must first upload your time and geographic coordinates to Mark III equatorial mount.

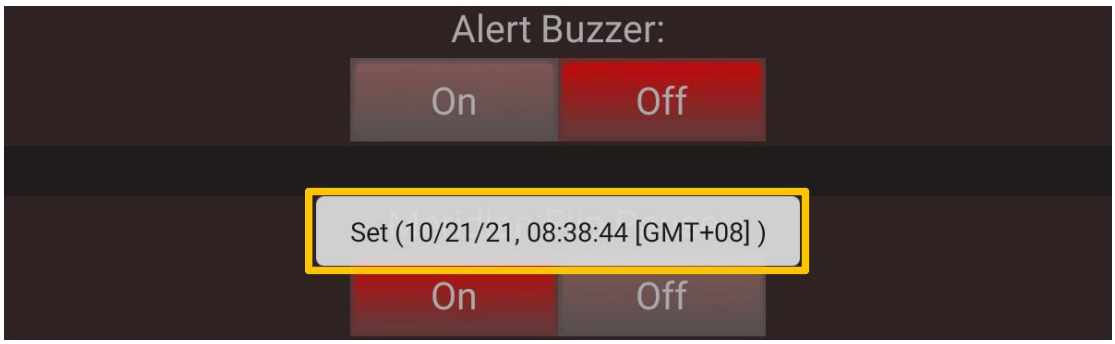
It's a critical setting step before any observation or astrophotography activities. Or the mount will use the factory-set data and its practical performance may not live up to your expectation.

STEP 1

Press [Initialize/Park].

STEP 2

Press [Set Date/Time], and the screen displays that your current time has been successfully uploaded to the mount.

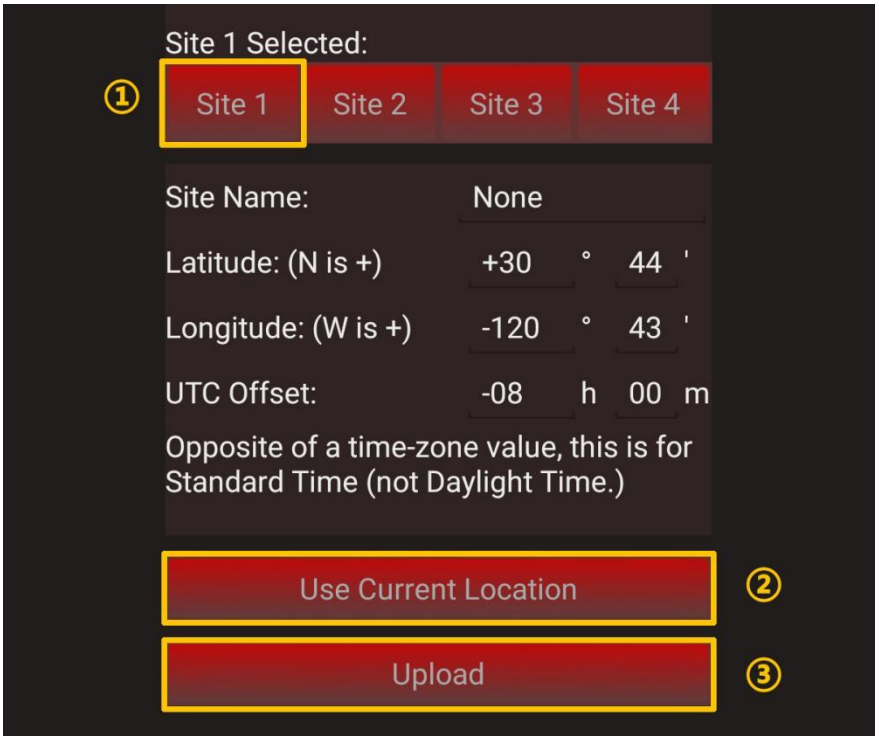


STEP 3

Go back to the home screen, press [more options] and press [Observing Sites].

STEP 4

If the geographic information of Site 1 doesn't match your current situation, press [Use Current Location] to demand the app to acquire your current geographic information from your phone's GPS system. And then press [Upload] to upload this information to Mark III equatorial mount.



There are four sites for users to use. Users can name these sites in [Site Name].

Smartphones and tablets are usually designed with GPS positioning function, so they can automatically obtain user's current time and geographic information. So please be sure that this function has been turned on before you try to obtain the information from your phone or tablet. If you forget to turn on GPS or the signal is weak, you can manually enter your current time and geographic information and upload it to your mount.

When you first obtain GPS information from your phone, it will ask your for the permission to get access to. Be sure to allow.

5.5 Home Position

Before using Mark III to observe, you must set its Home position.

STEP 1

Press [Guide/Focus]. Use direction keys to adjust the direction of the mount's R.A. axis and Declination axis. Home position of Mark III equatorial mount is an initial position where its counterweight bar is directly down pointing to the ground, its R.A. axis is directly pointing to the NCP (or SCP) and the telescope sitting on the dovetail saddle is parallel to the R.A. axis. Mark III is defaulted to be

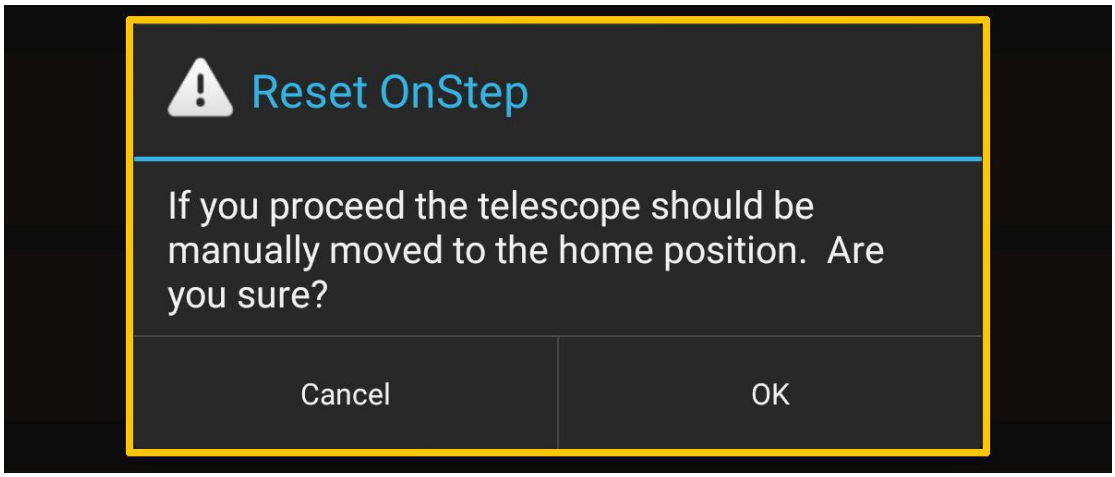
at its Home position.

STEP 2

Go back to the home screen and press [Initialize/Park].

STEP 3

Press [At Home (Reset)] and it will remind you “If you proceed the telescope should be manually moved to the home position. Are you sure?” Choose [OK] to set your mount’s Home position.



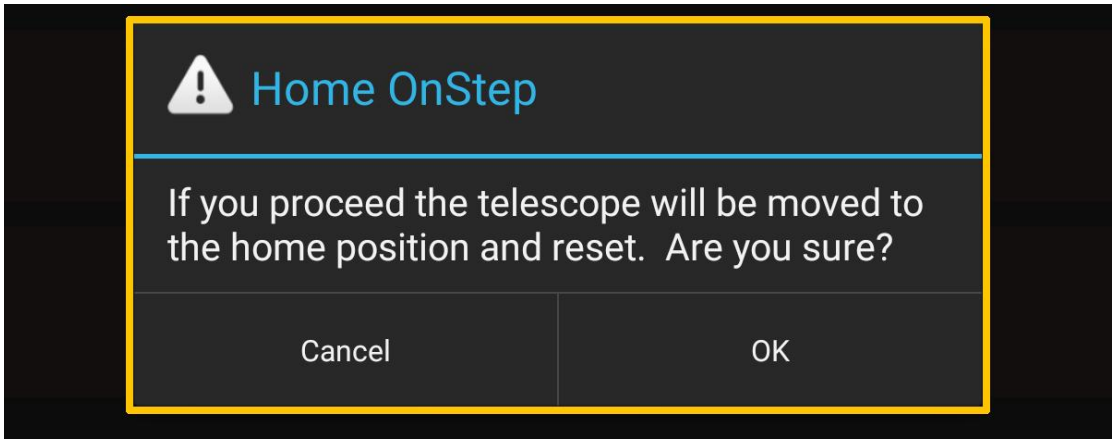
And after you finish your observation or astrophotography, you must return your mount to its Home position and then cut off the power.

STEP 1

Press [Initialize/Park].

STEP 2

Press [Return Home] and it will remind you “If you proceed the telescope will be moved to the home position and reset. Are you sure?” Choose [OK] to demand your mount to return to its Home position.



If you forget to return your mount to its Home position and cut off the power, the equatorial mount will brake and stop you telescope from moving down. That’s why we recommend 24V power supply for the mount.

If you forget to return your mount to Home position and cut off the power, due to safety concerns, please first take off your telescope and manually guide your mount to its Home position and reset its Home position.

If you don’t return your mount to its Home position and cut off the power, the gravity center of the whole system may shift which may result in the falling over of your telescope.

5.6 Other Functions

5.6.1 N-Star Alignment

The purpose of N-star alignment is to pick out a reference point, telling your mount about what’s exactly the direction it’s pointing. N-star alignment can greatly enhance Mark III equatorial mount’s accuracy. Mark III supports 9-star alignment. Generally, the more star you choose to align, the more accurate the mount will be. Besides, it’s a good habit to choose stars that are little drifted apart with each other. Short distance between the stars will not really help your accuracy improvement.

STEP 1

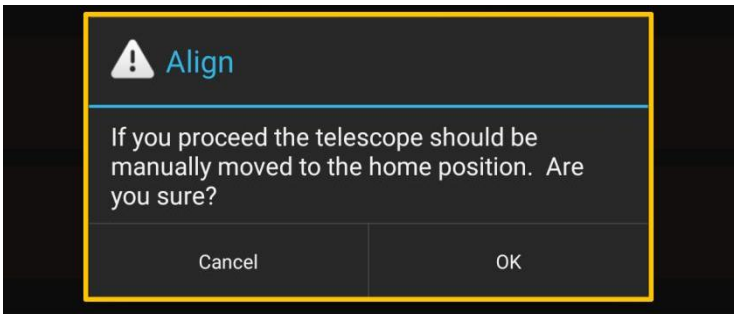
Press [Initialize/Park].

STEP 2

Choose the number of stars that you want to align with. Choose [3], for example.

STEP 3

Press [Start Align] and it will remind you “If you proceed the telescope should be manually moved to the home position. Are you sure?]. If your mount is at its Home position, choose [OK] to start N-star alignment; and if not, please first return your mount to its Home position and then proceed this step.



STEP 4

After choosing [OK], you move on to select the first star to align with.

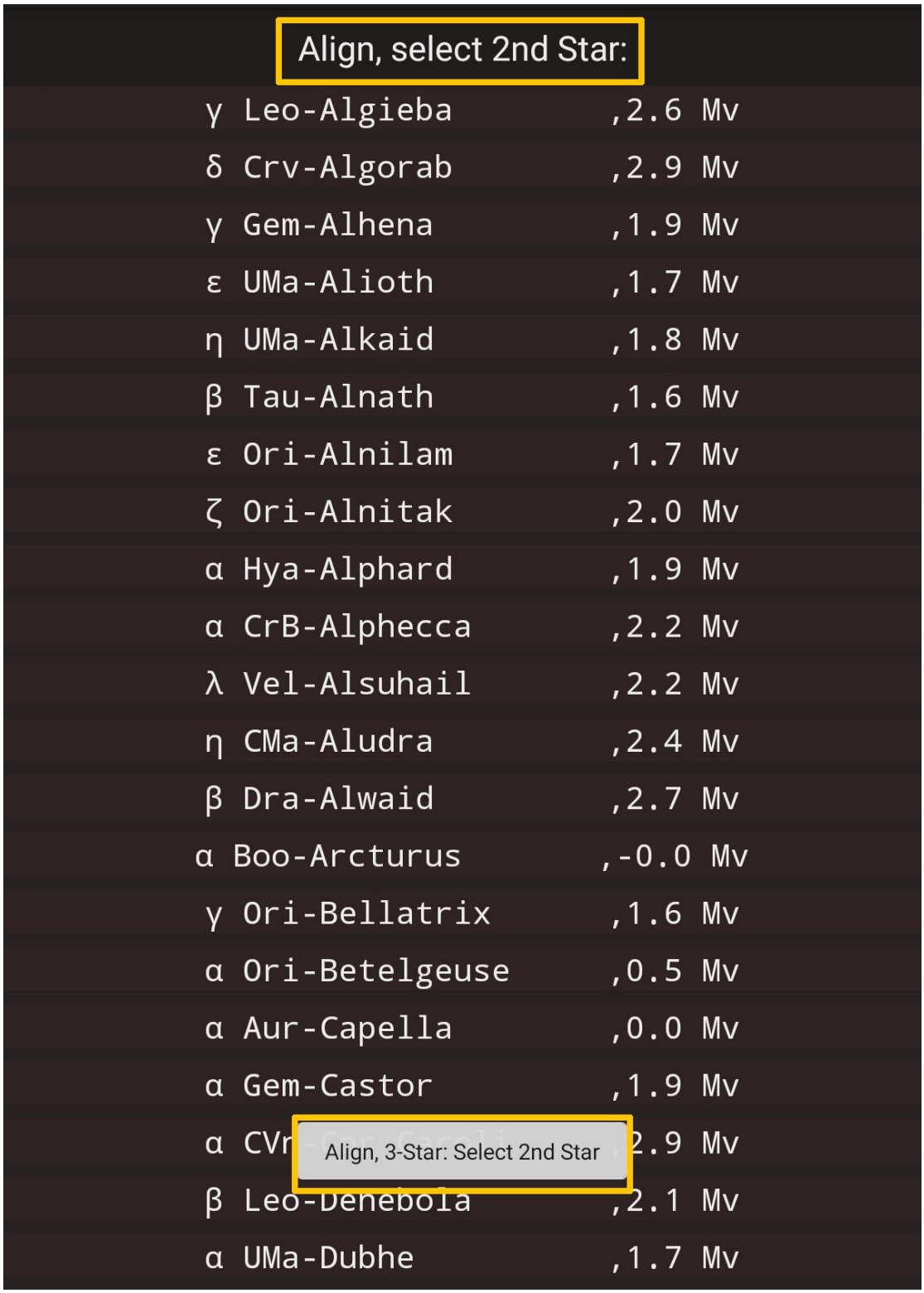
For example, select [γ Leo-Algieba， 2.6Mv] and you can see the detailed information about the star you have selected. Press [GOTO] to confirm and demand your mount to point to this star.

When your mount stops, observe through your telescope or the camera screen to see whether the target is staying at the center of your field of view. If not, press four direction keys to fine-tune your mount and center the star. Touch and hold [Align], it will ask you

“Accept alignment point?” Choose [OK] to align you mount to this star. You’ve done one third of the operation.

STEP 5

Go on to select the second star. Press [GOTO] to demand your mount to move and point to the star that you have selected. When your mount stops, observe through your telescope or the camera screen to see whether the target is staying at the center of your field of view. If not, press four direction keys to fine-tune your mount and center the star. Touch and hold [Align], it will ask you “Accept alignment point?” Choose [OK] to align you mount to this star. You’ve done two thirds of the operation.


Align, select 2nd Star:
γ Leo-Algieba ,2.6 Mv
δ Crv-Algorab ,2.9 Mv
γ Gem-Alhena ,1.9 Mv
ε UMa-Alioth ,1.7 Mv
η UMa-Alkaid ,1.8 Mv
β Tau-Alnath ,1.6 Mv
ε Ori-Alnilam ,1.7 Mv
ζ Ori-Alnitak ,2.0 Mv
α Hya-Alphard ,1.9 Mv
α CrB-Alphecca ,2.2 Mv
λ Vel-Alsuhail ,2.2 Mv
η CMa-Aludra ,2.4 Mv
β Dra-Alwaid ,2.7 Mv
α Boo-Arcturus ,-0.0 Mv
γ Ori-Bellatrix ,1.6 Mv
α Ori-Betelgeuse ,0.5 Mv
α Aur-Capella ,0.0 Mv
α Gem-Castor ,1.9 Mv
α CVn
2.9 Mv
Align, 3-Star: Select 2nd Star
β Leo-Denebola ,2.1 Mv
α UMa-Dubhe ,1.7 Mv

STEP 6

Go on to select the third star. Press [GOTO] to demand your mount to move and point to the star that you have selected. When your mount stops, observe through your telescope or the camera screen to see whether the target is staying at the center of your field of view. If not, press four direction keys to fine-tune your mount and center the star. Touch and hold [Align], it will ask you “Accept alignment point?” Choose [OK] to align you mount to this star. You’ve completed 3-star alignment.

5.6.2 Polar Alignment

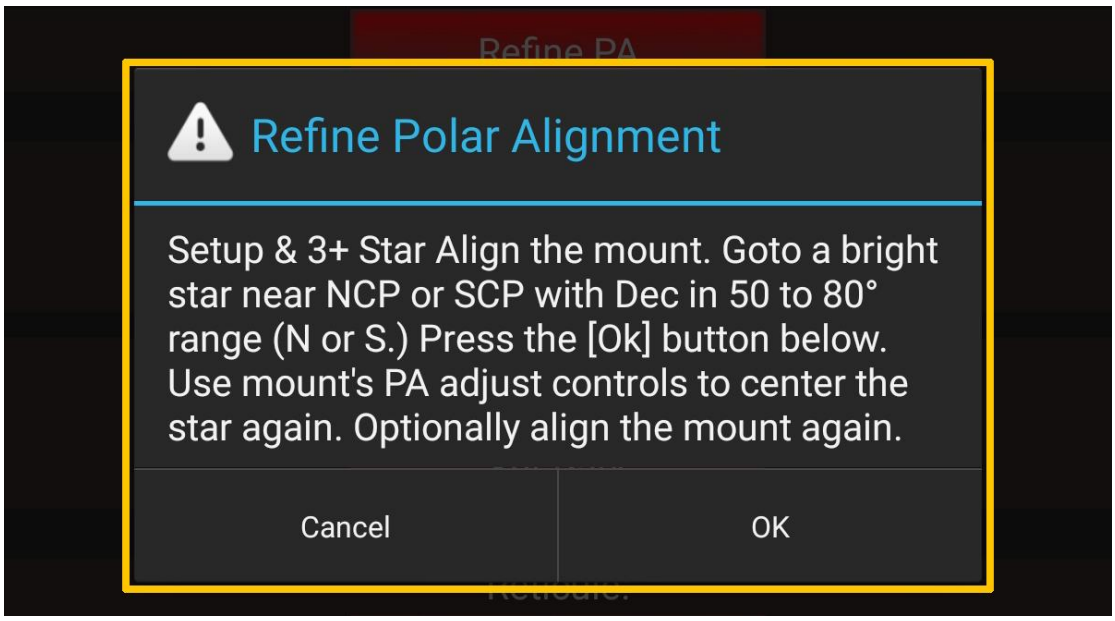
After N-star alignment, you can polar-align your mount to further improve its accuracy. There are two basic methods of polar alignment. The first one is using the built-in Refine Polar Alignment function and the other is asking a electronic polar scope for help. This instruction of manual will introduce you how to polar align with Refine Polar Alignment function.

STEP 1

Be sure that you have completed a 3+-star alignment, Press [Initialize/Park].

STEP 2

Press [Refine PA] and it will remind you “[Setup & 3+ Star Align the mount. Goto a bright star near NCP or SCP with Dec in 50 to 80°range (N or S.) Press the [OK] key below. Use mount’s PA adjust controls to center the star again. Optionally align the mount again.” So find a bright star near NCP (or SCP) and make sure that its Declination coordinate is between 50 and 80 degree. The Mark III equatorial mount will slew to the this chosen target.



STEP 3

Make the bright star move to the center of your field of view by manually adjusting the mount's azimuth and altitude angle.

STEP 4

You can repeat the above steps until Mark III can perfectly goto a bright star and the star stays exactly at the center of you field of view.

Mark III is equipped with a quick-release system for attaching a QHY polar scope. It's easy for users to install a QHY polar scope on the platform and polar align your mount.

5.6.3 How to Goto

STEP 1

Go back to the home screen.

STEP 2

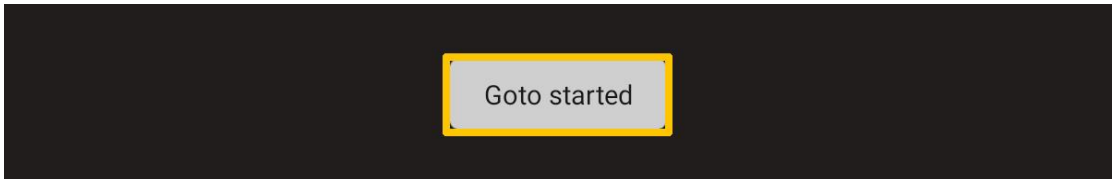
Select desired target from the built-in star catalogues of [Solar System], [Messier], [NGC/IC], [Herschel] and [Bright Stars]. Press [Messier], for example.

STEP 3

Select a desired object from the Messier list. For example, select [M 3-GC in CVn， 6.3Mv]. You can have the detailed information about this star.

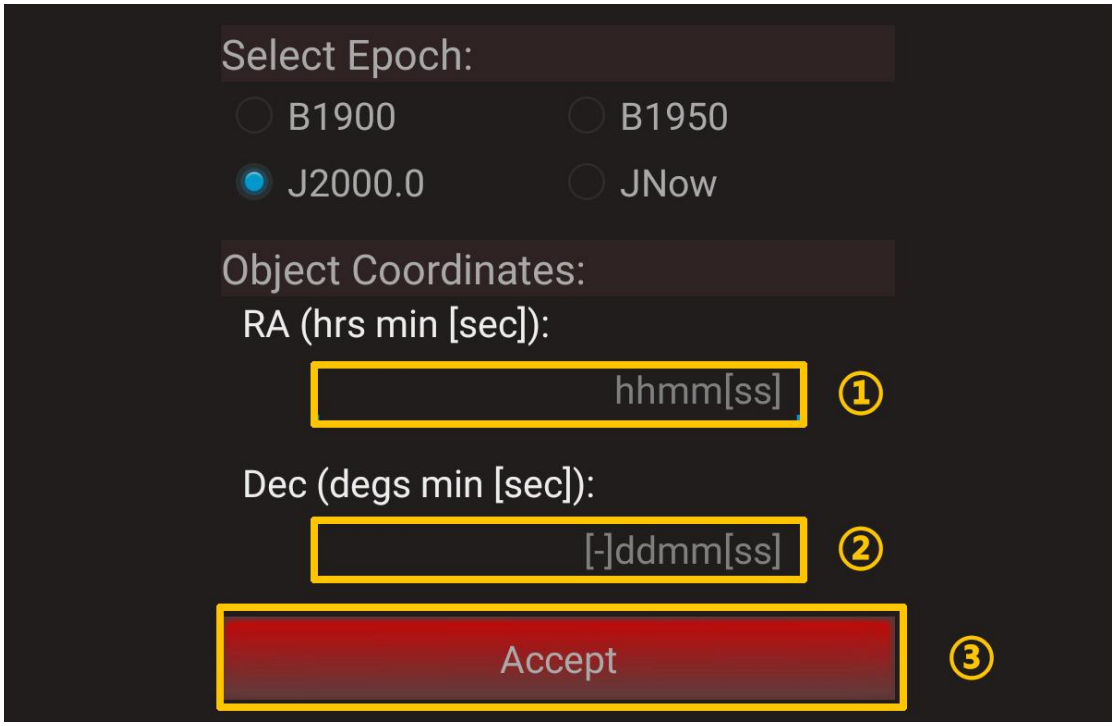
STEP 4

Press [GOTO] and the screen will display [Goto started]. Mark III equatorial mount will automatically move and point to this star.



STEP 5

You can enter coordinates and directly demand your mount to the desired target. Press [Enter Coordinates]. Select epoch first and the default epoch is J2000. Enter your target's coordinates in the blanks of RA and Dec. Press [Accept] and then press [GOTO] to confirm. Your mount will automatically point to the exact object.



The number you enter should be integers. The format of RA axis is hhmm[ss] and the format of Declination axis is [-]ddmm[ss]. For example, if the RA and Declination coordinates of a target is 13h43.2m and +28°16', you should enter 1343 and 2816 respectively.

5.6.4 Tracking

STEP 1

Enter the home screen and press [Tracking].

STEP 2

Press [Star] and you turn on your mount's tracking mode. If you press [Stop], your mount will stop tracking targets.

When you power up your mount, it is automatically in a tracking state. If you reset Home position or return your mount to Home position, it will not track any more. You have to manually start its tracking mode.

If your mount is in a tracking state, the green light is constantly flashing. If your mount is

not in a tracking state, the green light is continuously lighting.

STEP 3

In tracking setting, you can select desired tracking rate for Mark III equatorial mount.

Lunar rate is used to track the moon, solar rate is used to track the sun and the solar-system planets, sidereal rate is used to track all the other stars or objects.

5.6.5 Set Goto Speed

STEP 1

Enter the home screen.

STEP 2

Press [more options] and press [Goto Speed]. There are five types of Goto speed:

NAME	MEANING
Fastest	4 deg/s
Faster	3 deg/s
Default	2 deg/s
Slower	1.3 deg/s
Slowest	1 deg/s

Choose the proper Goto speed. And for example, if you press [Default Speed], the screen displays that [Setting default Goto speed...] and the Goto speed has been successfully reset.

And as a rule of thumb, if the total weight of your telescope and other accessories is not more than 12kg, the Goto speed can be 4 deg/s; if the total weight exceeds 12kg, your Goto speed should better be less than 3 deg/s, and 2 deg/s is recommended.

If the telescope weighs more than 22kg, it is necessary to assemble a counterweight to prevent overturning.

5.6.6 Set Guide Speed

You can set the guide speed of Mark III equatorial mount. It’s the speed at which your mount moves when you manually direct it with the direction keys.

STEP 1

Enter the home screen and press [Guide/Focus].

STEP 2

Press [more options] and choose the proper guide speed. There are 6 guide speed for you to choose:

SYMBOL	MEANING
1/2×- VSlow	half of the tracking rate
1×- Slow	equals to the tracking rate
8×- Center	8 times of the tracking rate
20×- Find	20 times of the tracking rate
48×- Fast	48 times of the tracking rate
1/2Max- VFast	half of the Goto speed

When you fine-tune the position of your mount, you should slow down its guide speed. When you coarse-tune your mount, you can increase its guide speed. When set at slower guide speed, the movement of your mount may not be noticeable.

5.6.7 Meridian Flip

STEP 1

Enter the home screen and press [Initialize/Park].

STEP 2

Press [On] in [Automatic Meridian Flip], and turn on the automatic meridian flip function. When your mount follows and tracks an target that passes the meridian line, your mount will carry out an automatic meridian flip and keeps on tracking your target. Press [Off] to turn off this function.

5.6.8 Limit Settings

STEP 1

Enter the home screen and press [more options].

STEP 2

Press [Limits].

STEP 3

You can set [Overhead Limits], [Horizon Limits], [Meridian Limit E] and [Meridian Limit W].

The default limit of horizon is -10 degree; the default limit of overhead is 89 degree; the default limit of meridian E and meridian W is 3 degree.

The limit of meridian E and meridian W is 3 degree will affect your practical meridian flip. For example, if you set your limit of meridian east and west as 3 degree, Mark III will

perform meridian flip only when the target passes 3 degrees away from the meridian line.

STEP 4

Press [Upload] to set your desired limits.

5.6.9 Buzzer Setting

STEP 1

Enter the home screen and press [Initialize/Park].

STEP 2

Press [On] in [Alert Buzzer] to turn the buzzer on and press [Off] to turn it off.

5.7 How to Connect by Web

5.7.1 Connect by Web

STEP 1

Power up Mark III, turn on its power switch. The Red light is continuously lighting and the green light is flashing.

STEP 2

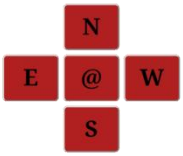
Search hotspot signal of [ONSTEP] in your phone's wireless and networks and connect it. The default password is [password].

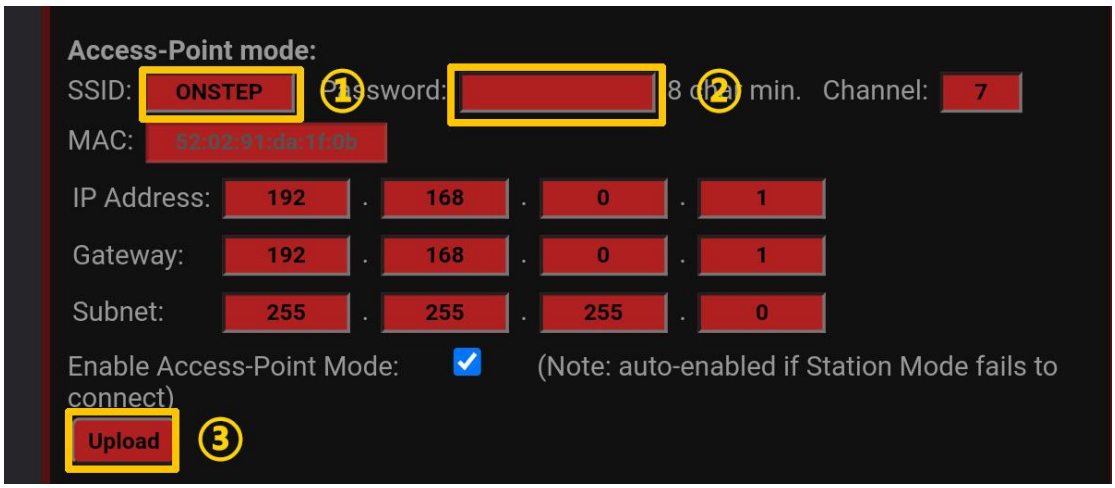
STEP 3

Enter [192.168.0.1] into the address bar of your smartphone's web. And you can successfully connect your phone and mount.

5.7.2 Some Icons

ICON	MEANING
	Refresh
	Return to Home position
	Reset Home position
	Parking settings
	Stop moving
	Tracking on and tracking off
	Sidereal tracking rate
	Lunar tracking rate
	Solar tracking rate

ICON	MEANING
	N-star alignment
	Refine polar alignment
	Direction keys
	Guide speed settings



When your first use OnStep software, it's a good habit to change your mount's hotspot ID in the menu of WiFi. In case that you connect with other OnStep software and cannot properly control your mount.

6 Operate with Computers

Getting good sky pictures involves lots of long-distance expeditions, field observation and real-time astrophotography. And many enthusiasts prefer to operate the mount with their computer. You can connect your PC computer with Mark III equatorial mount and make demands through lots of famous astronomy software.

6.1 How to Connect with Computer

STEP 1

Install [OnStep ascom.exe] and [ASCOMPlatform65SP1.exe] (available on Sharpstar's official website) on your computer.

STEP 2

Power up you mount and turn on the power switch.

STEP 3

Connect Mark III equatorial mount and your computer by using a USB cable.

If your computer is running in Win7 operation system, you have to install an extra driver [MARK III USB DRIVER] (available on Sharpstar's official website).

STEP 4

Open an astronomy software on your computer. Detect and connect Mark III equatorial mount. Control the mount if succeed. Mark III equatorial mount is compatible with lots of astronomy software or star catalogue software like TheSkyX Pro, N.I.N.A or SkySafari and so on.

7 Operate with ASIAIR

As Electronically-Assisted Astronomy (EAA) is becoming more and more popular, ZWO's high quality ASIAIR is more applied than ever before. You can also connect your mount with this sought-after compact controller, and control your mount together with your astronomy camera, guiding camrea, filter wheel and other related astronomy accessories to coordinate with each other.

STEP 1

Download the dedicated app of ASIAIR.

STEP 2

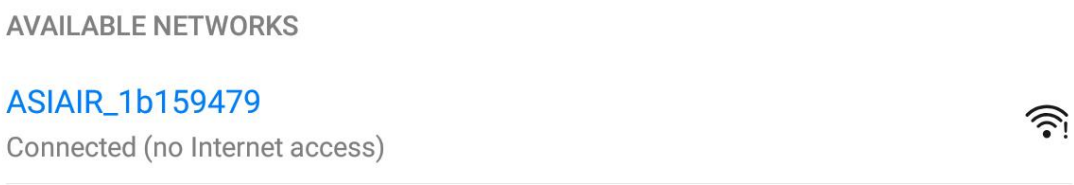
Power up your mount and turn on its power switch.

STEP 3

Connect Mark III equatorial mount and ASIAIR with a USB cable. Power up ASIAIR and turn on its power switch. Wait until the PWR and WIFI indication light are continuously lighting.

STEP 4

Search the hotspot that ASIAIR is sending.

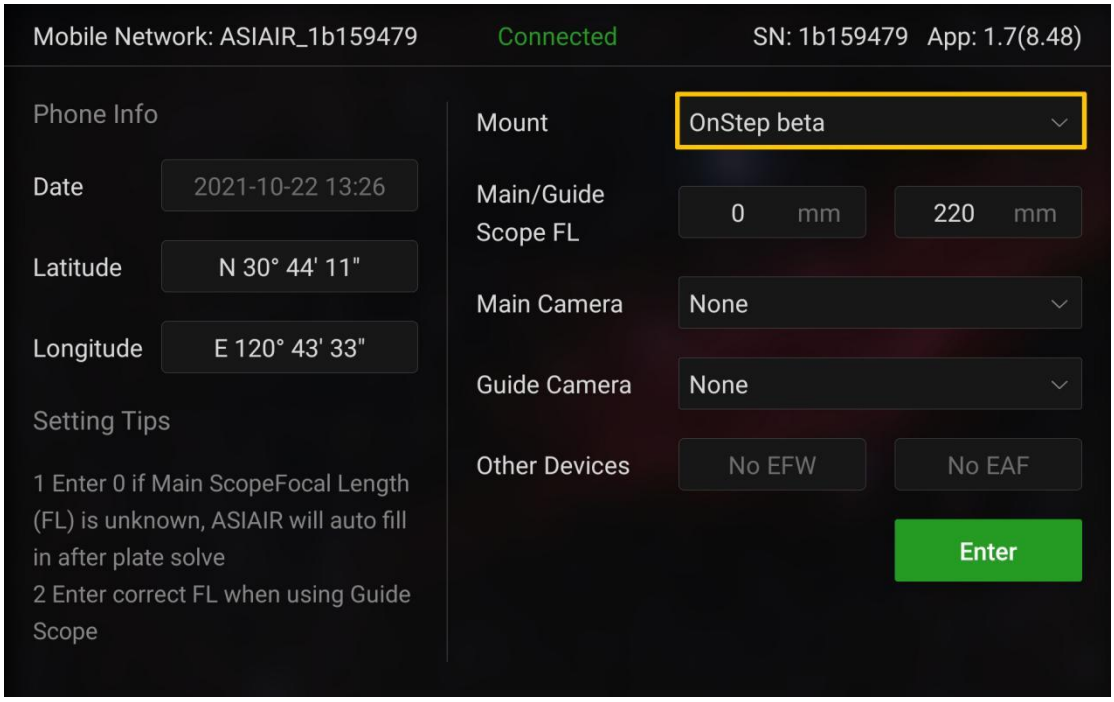


STEP 5

Connect with this hotspot and the initial password is 12345678.

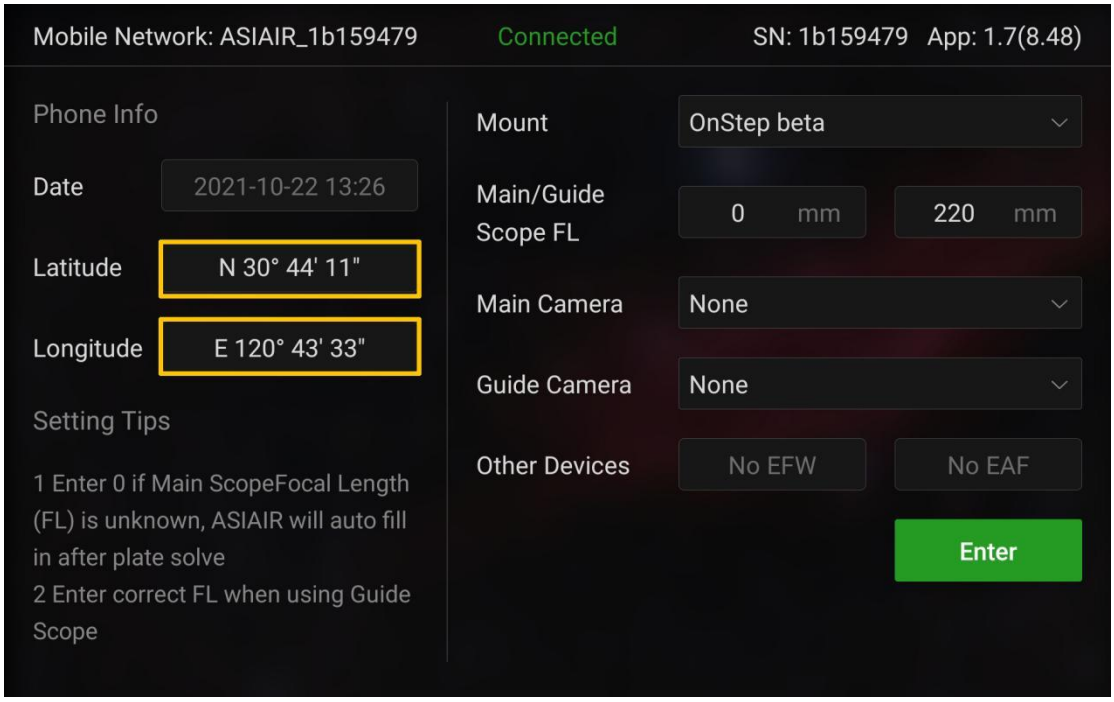
STEP 6

Open the application on your smartphone or tablet, detect and choose your mount.



STEP 7

Enter you longitude and latitude of your current observing site.



STEP 8

Set other parameters and press [Enter], to control and operate your mount.

8 FAQ

Q1: I connect the mount with my tablet. When I try to upload my current geographic information to my mount, the Onstep app fails to obtain the current GPS information.

A: 1. check if you have turned on the positioning function on your tablet; 2. try to manually input your geographic information and upload it to Mark III; 3. try to connect your mount with your smartphone if possible, it's easier to get your current information by using a mobile phone.

Q2： Sometimes the [N] and [S] direction keys behave in an unexpected and reversed way.

A： It doesn't stem from Mark III and it's not even a problem per se. The mount behaves normally when it's pointing to a target near the NCP. Remember the [N] key is always telling the mount to point to the north. So when it's so close to NCP and you press [N] to make it move northward, and then if it pass the NCP, and you press [N] again, it will turn around and keep moving to NCP.

Q3: I cannot do the Meridian flip on Mark III.

A: You have to strictly follow the steps detailed in this instruction manual. If you forget to upload your current time and geographic information to Mark III and skip the N-star alignment, it makes the mount to use the irrelevant data. Mark III cannot carry out a meridian flip if the aimed target has passed the meridian line.

APPENDIX

Menu of Onstep App

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU
More options	Observing sites		
	Goto Speed		
	Limits		
	Backlash		
	Connection		
	Lock Rotation		
	Keep Screen On		

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU
Initialize/Park	Set Date/Time		
	Start Align		
	Refine PA		
	At Home (Reset)		
	Return Home		
	Park		
	Un-Park		
	Set-Park		
	Reticule	Dimmer	
		Brighter	
	Alert Buzzer	On	
		Off	
	Meridian Flip Pause	On	
		Off	
	Automatic	Now	
		On	
		Off	

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU
Tracking	Tracking Control	Start	
		Stop	
	Tracking Rate	Sidereal Rate	
		Lunar Rate	
		Solar Rate	
	Compensated Tracking	Full	
		Refr.	
		Dual Axis	
		Single Axis	
		Off	
	Adjust Rate by	Slower	
		Faster	
	Reset Base Rate		
PEC	PEC Idle	Play	
		Stop	
		Clear	
		Record	
		Save PEC Data	

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU
Guide/Focus	Direction keys		
	Sync		
	More Options	Lock	
		1/2×-VSlow	
		1×-Slow	
		8×-Center	
		20×-Find	
		48×-Fast	
		1/2Max-VFast	
		Swap East/West	
		Swap North/South	
		Spiral Search	
Enter Coordination			
Solar System	More Options	Sort by Name	
		Sort by Constellation	
		Sort by Magnitude	
		Sort by Class	

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU
Messier	More Options	Sort by Name	
		Sort by Constellation	
		Sort by Magnitude	
		Sort by Class	
NGC/IC	More Options	Sort by Name	
		Sort by Constellation	
		Sort by Magnitude	
		Sort by Class	
Herschel	More Options	Sort by Name	
		Sort by Constellation	
		Sort by Magnitude	
		Sort by Class	
Bright Stars	More Options	Sort by Name	
		Sort by Constellation	
		Sort by Magnitude	
		Sort by Class	
User Catalogs	More Options	Hide Unknown Catalogs	

Menu of Hand Controller

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU	FIFTH LEVEL MENU
Main Menu **(Press and Hold [M])**	Goto	Stars	Bright Stars	
			STF**	
			STT**	
			GCVS~*	
		Deep Sky	Messier	
			Caldwell	
			Herschel400	
			Collinder	
			NGC	
			IC	

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU	FIFTH LEVEL MENU
Main Menu (Press and Hold [M])	Goto	Solar System	Sun	
			Mercury	
			Venus	
			Mars	
			Jupiter	
			Saturn	
			Uranus	
			Neptune	
			Moon	

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU	FIFTH LEVEL MENU
Main Menu **(Press and Hold [M])**	Goto	Users		
		Filters ⏄		
		Coordinates		
		Home		
	Sync	Stars	Bright Stars	
			STF**	
			STT**	
			GCVS~*	
		Deep Sky	Messier	
			Caldwell	
			Herschel400	
			Collinder	
			NGC	
			IC	

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU	FIFTH LEVEL MENU
Main Menu **(Press and Hold [M])**	Sync	Solar System	Sun	
			Mercury	
			Venus	
			Mars	
			Jupiter	
			Saturn	
			Uranus	
			Neptune	
			Moon	
		Here		
	Align	1-Star Align		
		2-Star Align		
		3-Star Align		
		4-Star Align		
		5-Star Align		
		6-Star Align		
		7-Star Align		
		8-Star Align		
		9-Star Align		

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU	FIFTH LEVEL MENU
Main Menu (Press and Hold [M])	Align	Show Model		
		Clear Model		
		Reset Home		
		Refine PA		
	Parking	Park		
		Un-Park		
		Set-Park		
	Tracking	Stop/Start		
		Sidereal		
		Solar		
		Lunar		
		Comp Full		
		Comp Refr		
		Comp Off		
		Comp Sngl Ax		
		Comp Dual Ax		
		Rate Reset		
		Rate +0.02Hz		
		Rate -0.02Hz		

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU	FIFTH LEVEL MENU
Main Menu **(Press and Hold [M])**	Settings	Date/Time		
		Site	Select Site	
			Latitude	
			Longitude	
			UTC Offset	
		Display	Turn Off	
			Contrast	
			Dim Timeout	
			Blank Timeout	
		Buzzer		
		Meridian Flip	Now!	
			Automatic	
			Pause at Home	

FIRST LEVEL MENU	SECOND LEVEL MENU	THIRD LEVEL MENU	FORTH LEVEL MENU	FIFTH LEVEL MENU
Main Menu **(Press and Hold [M])**	Settings	Configuration	Goto Speed	Fastest
				Faster
				Default Speed
				Slower
				Slowest
			Backlash	Axis 1 RA/AZ
				Axis 2 Dec/Alt
			Limits	Horizon
				Overhead
				Meridian E
				Meridian W
			Pier Side	Best
				East
				West
		Firmware Version		
Feature Keys **(Double Press [M])**	Guide Rate			
	Pulse Guide Rate			
	Reticle			