

iSkyHub-B Instruction

REV 2.1
Hubble Optics

12-01-2016

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It supports USB to MS Windows XP/Vista/7/8 and MacOS (Mac Book).

It supports Bluetooth connection to MS Windows and Android devices.

Thanks to David Ek's wonderful DSC ASCOM driver, you can now enjoy numerous wonderful Windows based planetarium software such as TheSky 5/6, Starry Night Pro, Sky Map Pro, MegaStar, Earth-Centered Universe, and Cartes du Ciel, Stellarium, and etc., with iSkyHub-B.

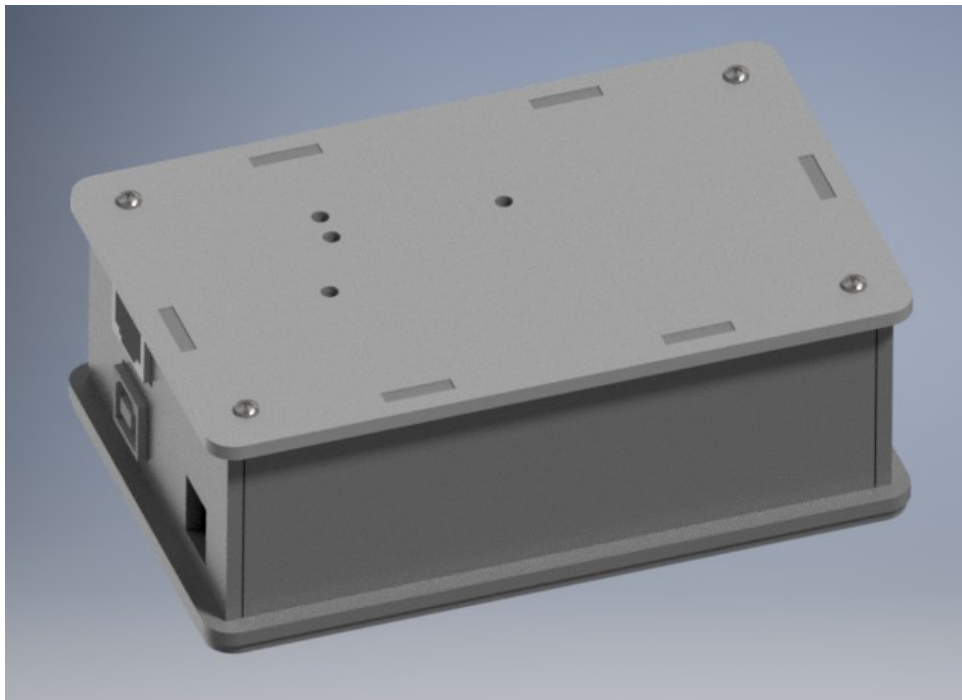
However, we can only provide very limited technical support for all these very powerful but sophisticated third party software. **So this function is provided "AS IS".**

iSkyHub-B has an state of art built-in high resolution digital inclinometer to replace the external ALT encoder. You can easily mount the iSkyHub-B on either side of the Dobsonian scope, it will automatically sense the scope movement around the ALT axis.

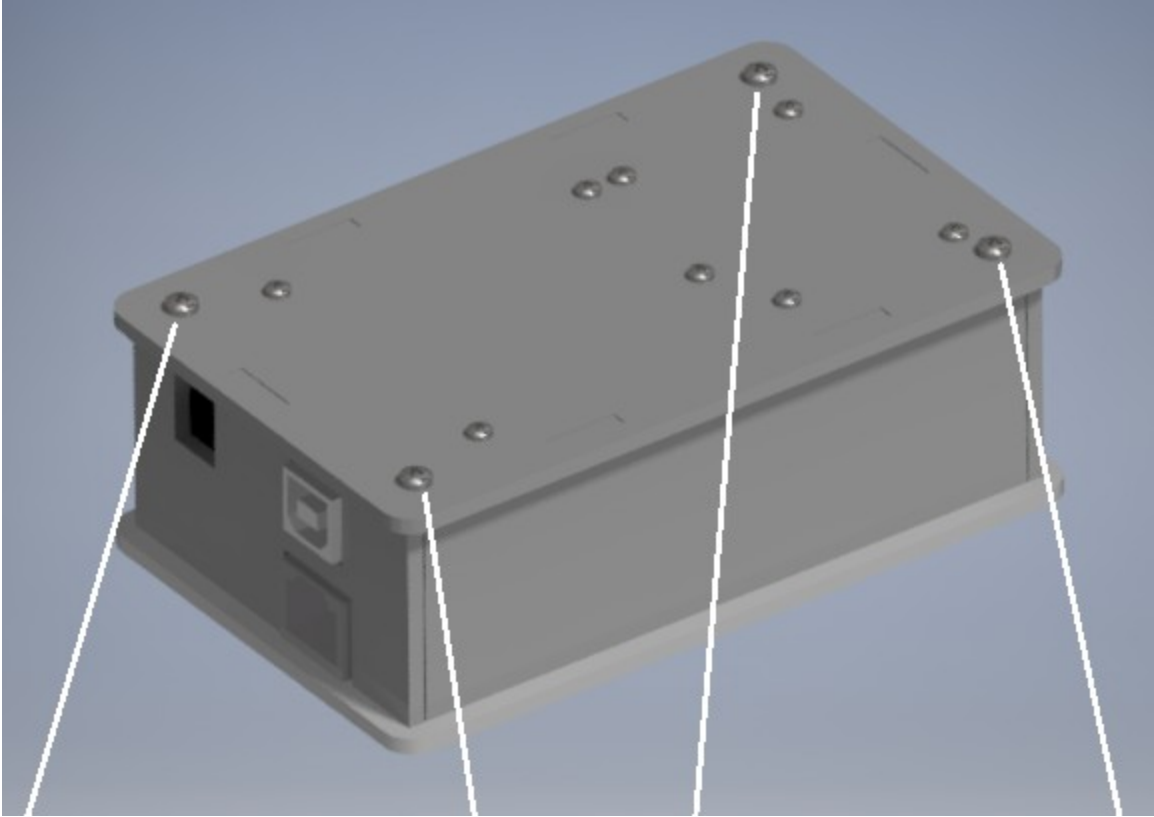
1. Assembly and Installation

1.1 iSkyHub-B

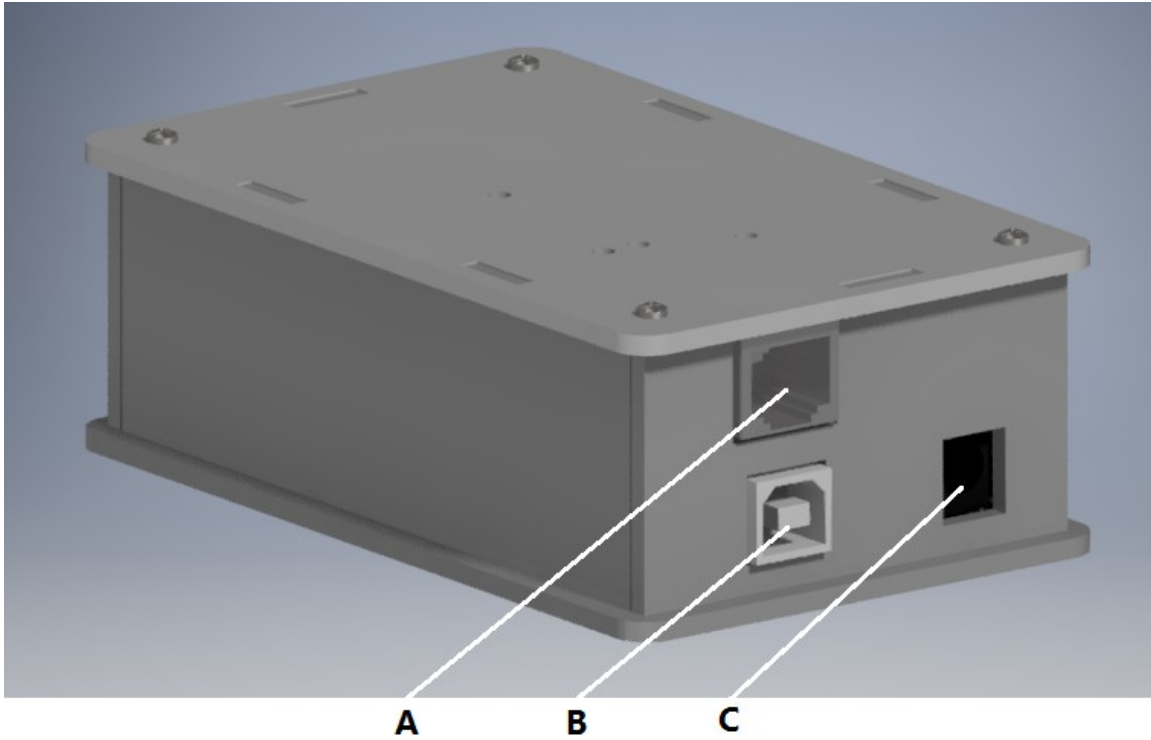
The iSkyHub-B Receiver is shipped as a Kit. You need to install the CPU board into the case. **Note that you should only open the iSkyHub-B by loosening the 4 screws on the bottom of the iSkyHub-B when needed. Never loose the 4 screws on the top of the iSkyHub-B when ever possible.**



Top of the iSkyHub-B: Do not loose the screws on this side

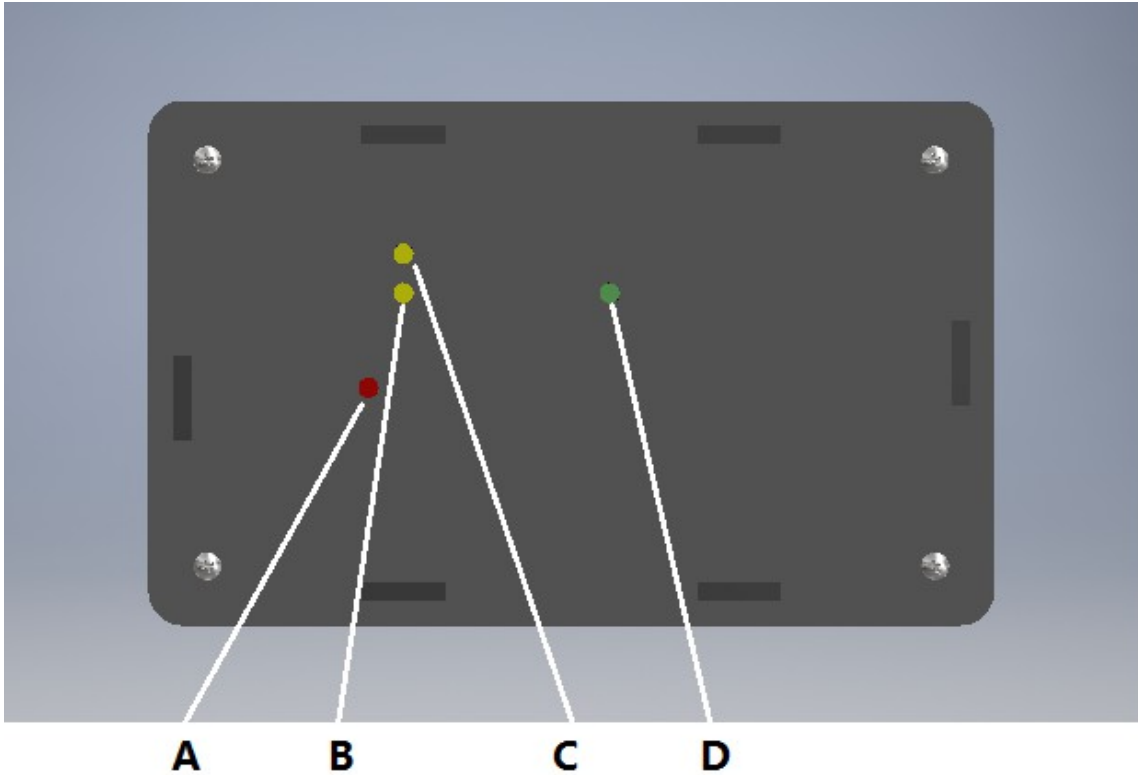


Loose these screws on the bottom of the iSkyHub-B to open the case when needed



- A: RJ45 Encoder Jack**
- B: USB port**
- C: 7-12VDC connector, center positive**

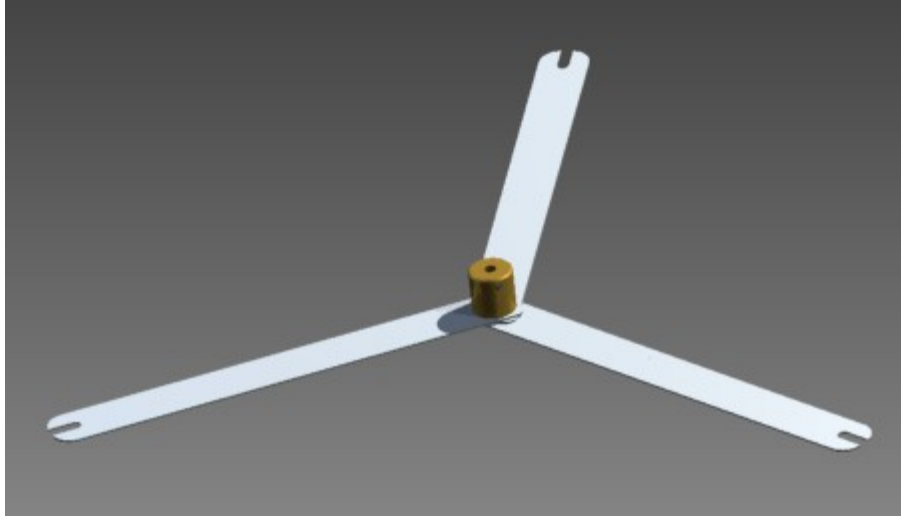




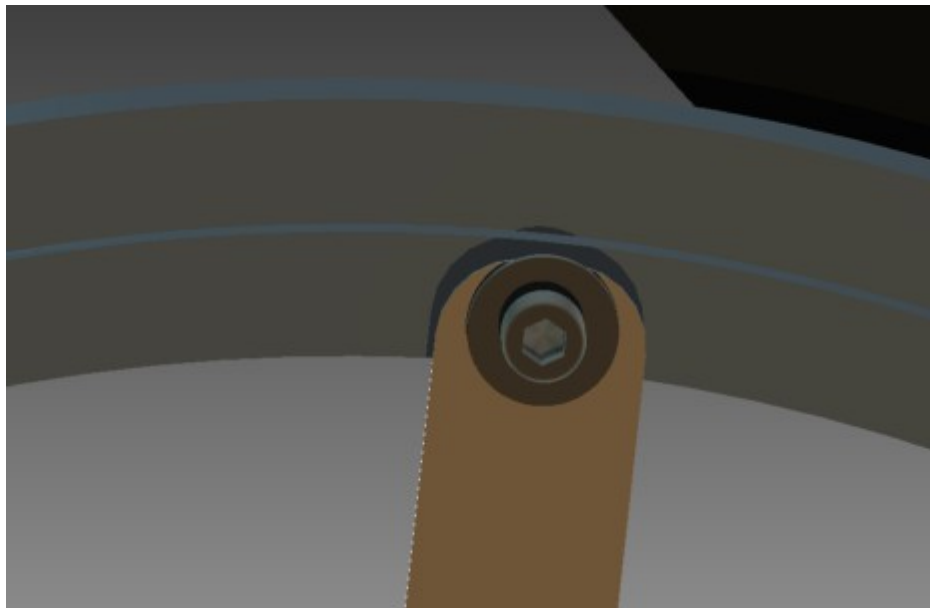
- A: Bluetooth Status LED**
- B: Data Communication Status LED**
- C: Information LED**
- D: Power Status LED**

1.2 AZM Encoder Installation

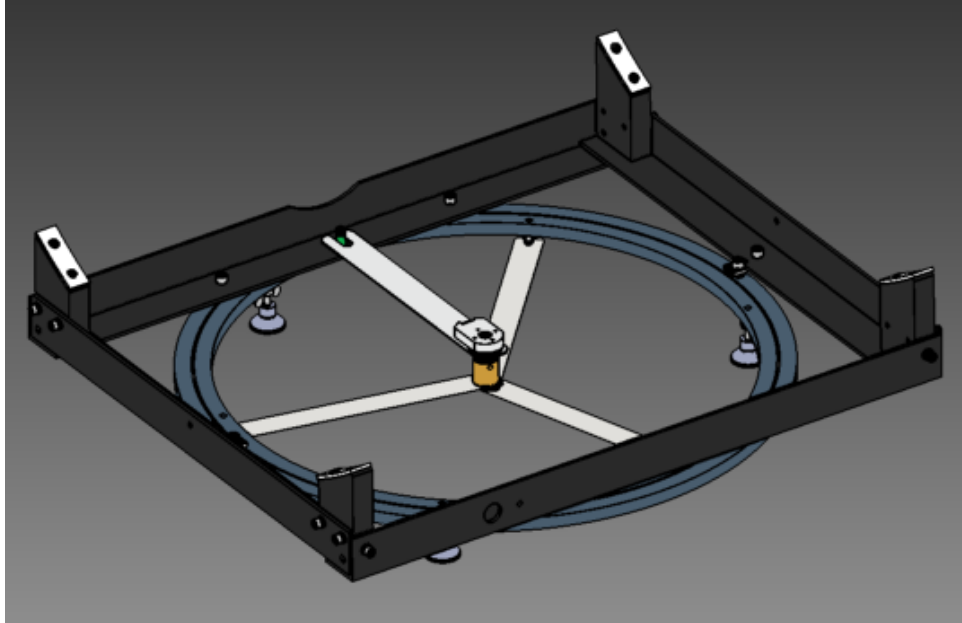
Install the 1" diameter brass Azm encoder housing onto the center holes of the three stainless steel Azimuth spoke arms as shown below using a M6 x10 hex screw. Do not tighten them completely yet.



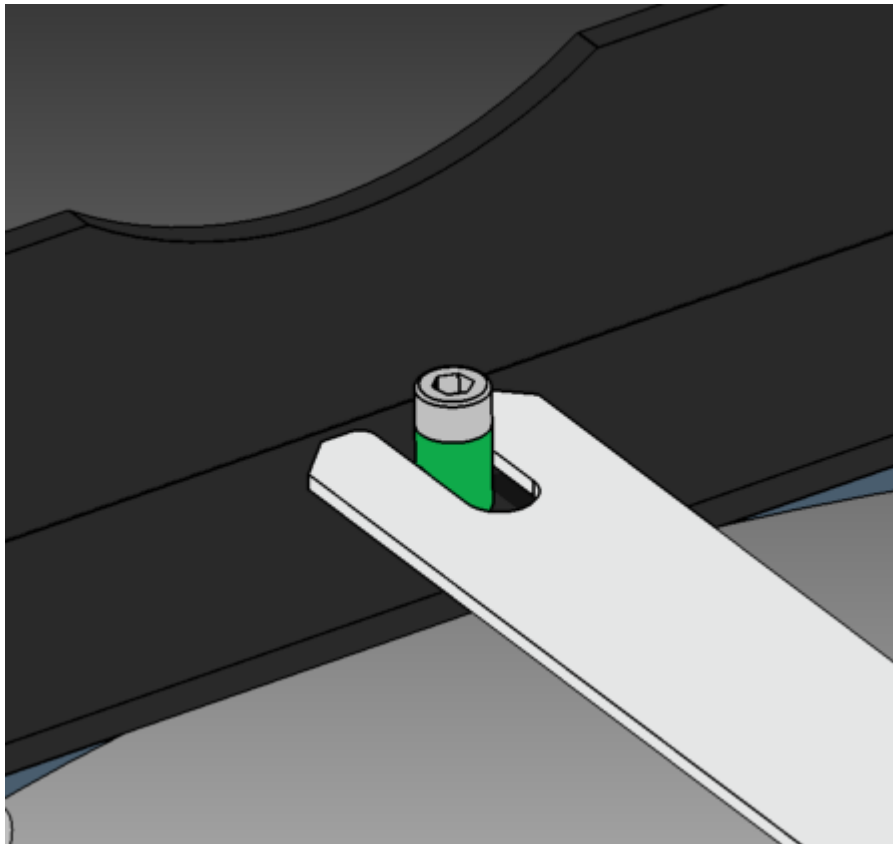
Install the three stainless steel Azimuth spoke arms to the inner Azm bearing ring with three M6 screws. The encoder housing should be precisely placed at the Azm bearing center by making sure the scale readings on all three AZ spoke arms are exactly the same at the edge of the Azm inner bearing. Tighten the M6 screw and the center screw to lock the encoder housing to the Azm spoke arms. If there are no additional holes on your Azm bearing, **you can install the AZ spoke arms in the same three holes used by the footers, and use the same wing nuts to lock the spoke arms.**



Install the Azm encoder arm assembly by carefully inserting the encoder shaft into the center hole of the brass encoder housing. Adjust the depth so the threaded shank of the encoder does not touch the housing. **Tighten the Nylon setscrew on the side of the brass housing onto the shaft.**



The AZM encoder pivoting arm is restricted by the plastic wrapped M6 screws

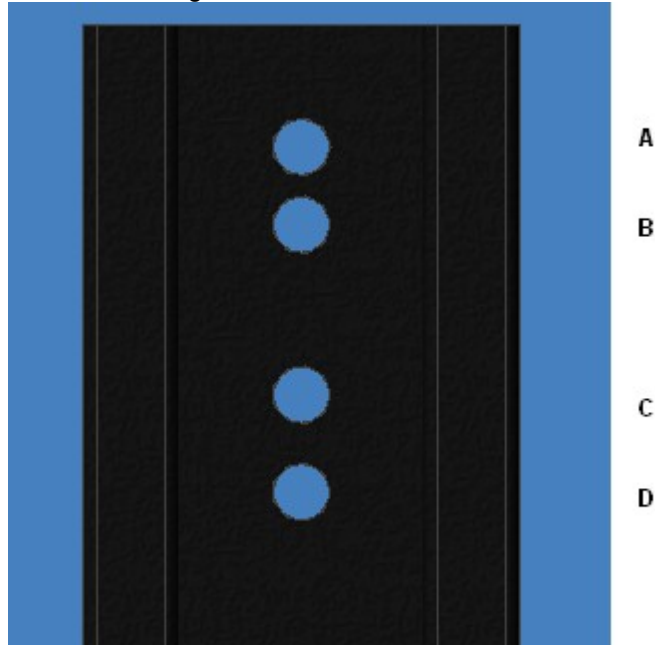


The plastic wrapped M6 pivoting screw

1.3 External ALT Encoder Installation

This step is not needed if the internal inclinometer is used.

Install the 1" diameter brass AZ encoder housing into the one of center holes of the ALT encoder holder bracket as shown below using a M6 x10 hex screw.



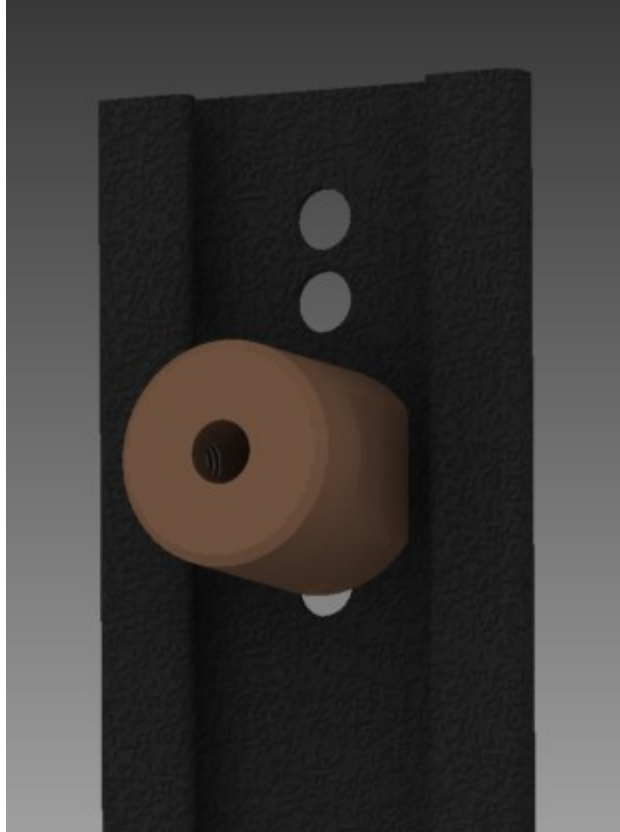
A: for UL14

B: for UL16

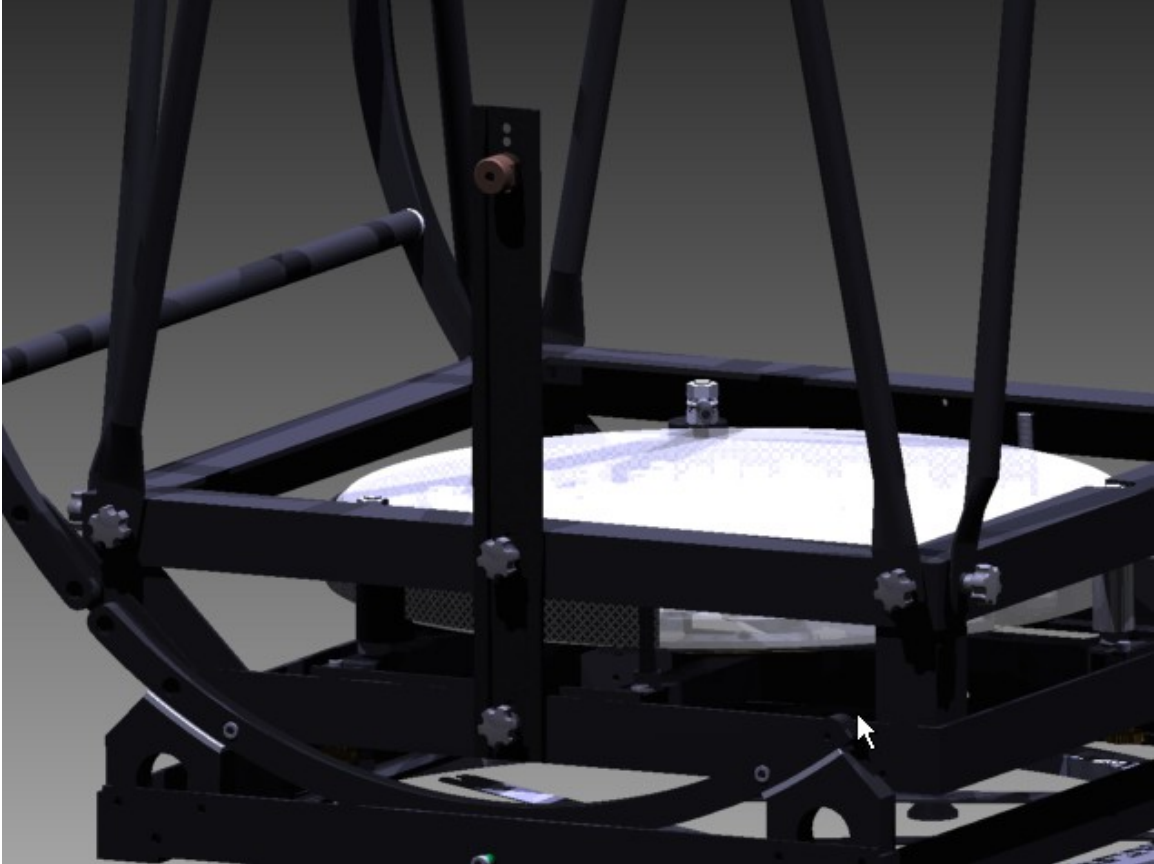
C: for UL18

D: for UL20

These are recommended positions only; however you may use different position for your scope to make sure that the encoder is indeed centered at the ALT axis

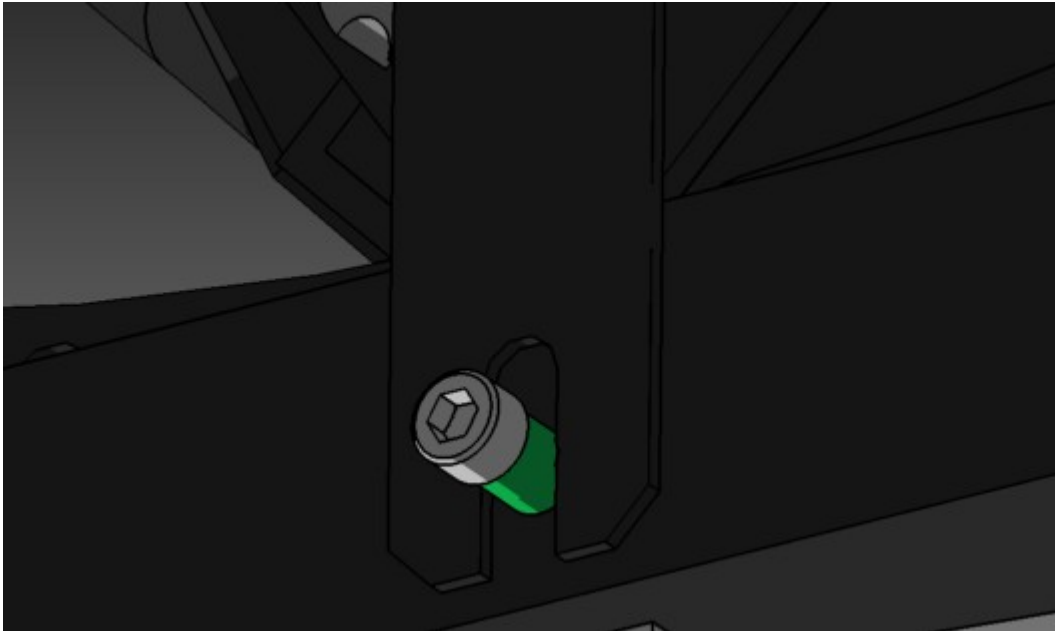
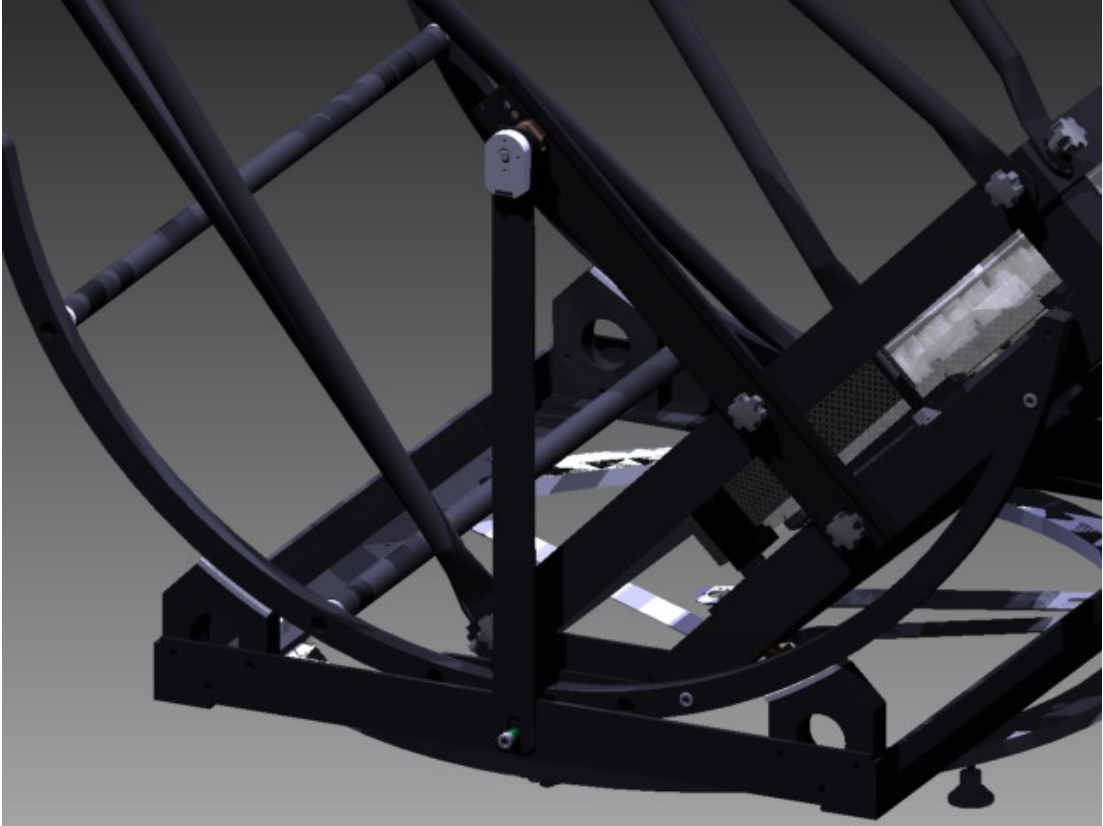






Bolt the ALT encoder holder to the mirror box with the M6 knob screws

Install the Azm encoder&arm assembly by carefully inserting the encoder shaft into the center hole of the brass encoder housing. Adjust the depth so the threaded shank of the encoder does not touch the housing. **Tighten the Nylon setscrew on side of the brass housing onto the shaft.**

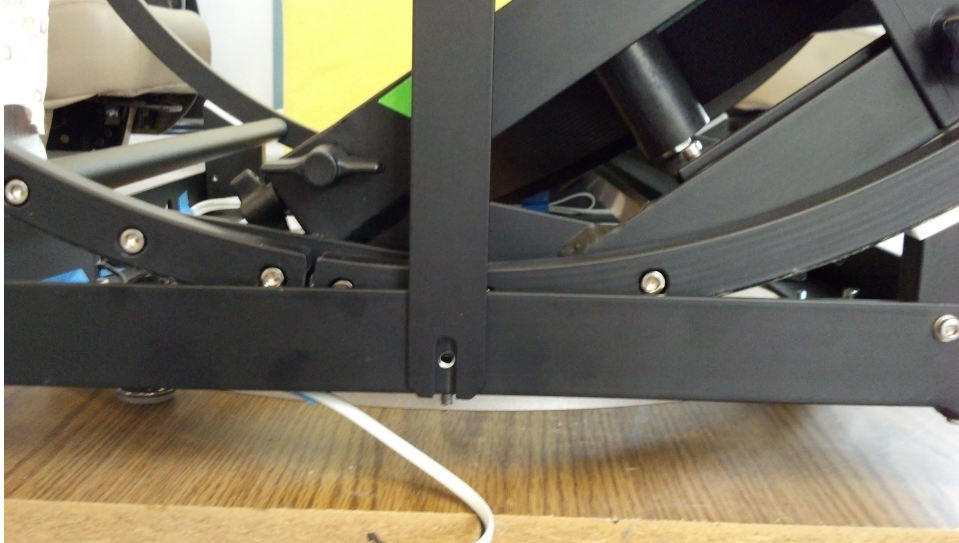


Adjust the ALT encoder bracket position to make sure the encoder is centered at the ALT bearing axis. Here is how to verify that the ALT encoder is perfectly centered:

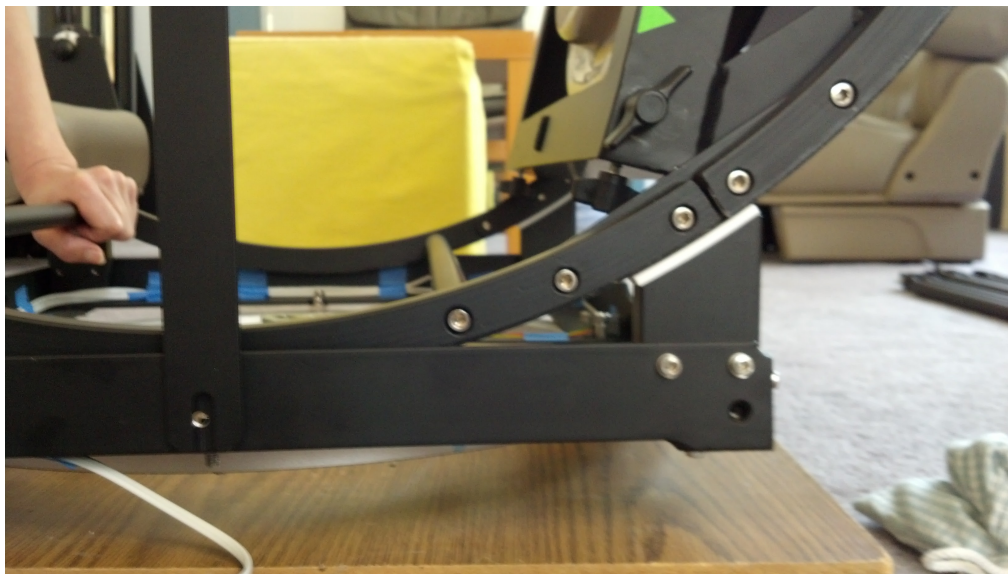
Once the encoder is perfectly centered to the ALT axis, then set the mirror box to zenith, 45 degree, and then 90 degree orientations; you should then see the pivoting screw hole at the bottom remain at the same location relative to the ALT encoder bracket.



Mirror Box at Zenith



Mirror Box at 45 degree



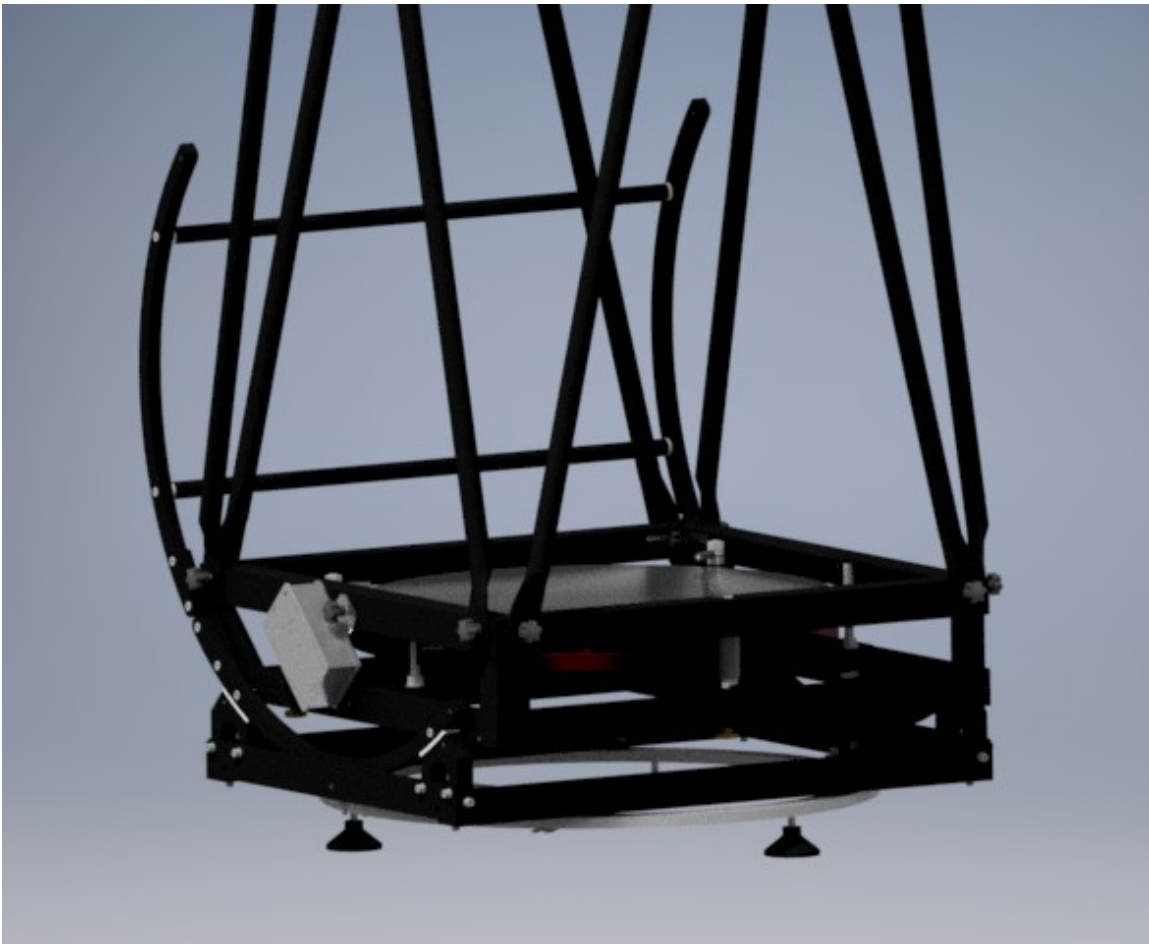
Mirror Box close to 90 degree

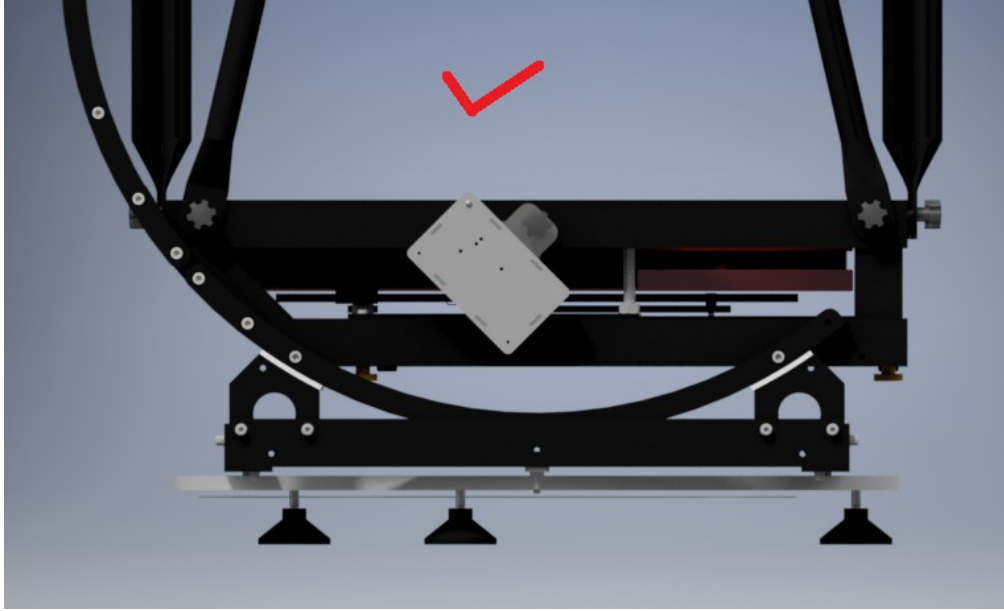
1.4 Mounting the iSkyHub-B when the internal inclinometer is used.

If you use an external encoder, then you can mount the iSkyHub-B any way you want. However, you will need to follow this section if the internal inclinometer is used.

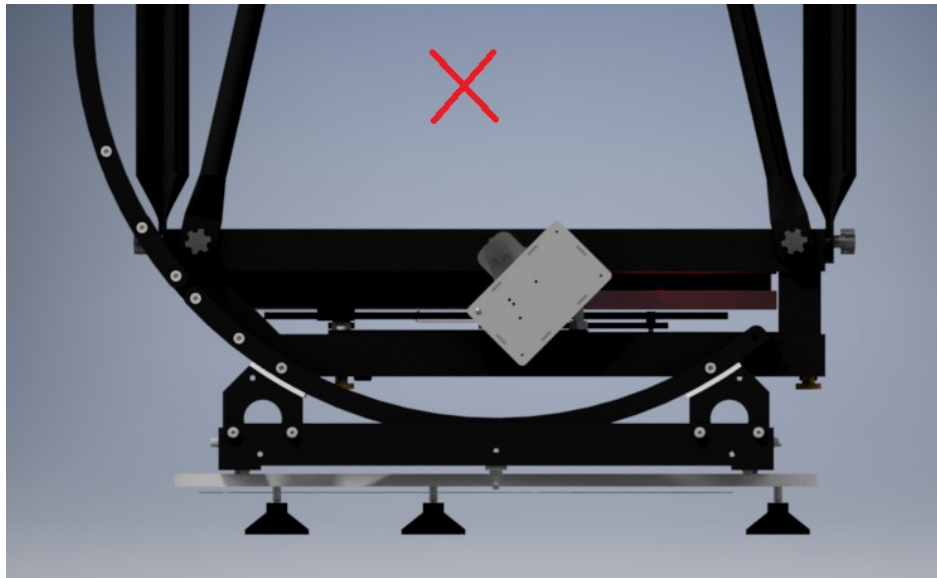
You should first use a bubble level to make sure that the ground board is leveled.

You must mount the iSkyHub-B anywhere on either left or right side of your scope's mirror box, pointing up-forward roughly 45 degree (no need to be exactly) relative to the mirror box.

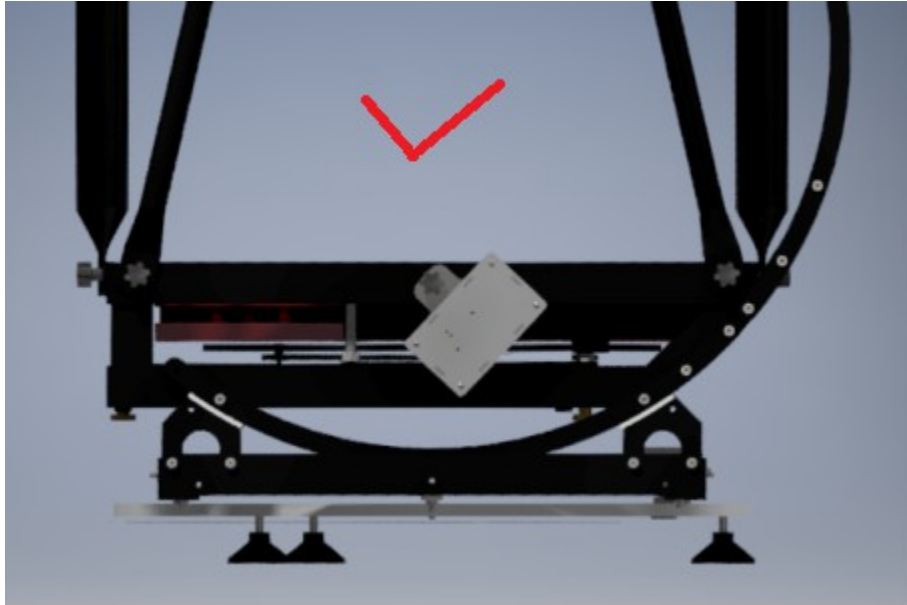




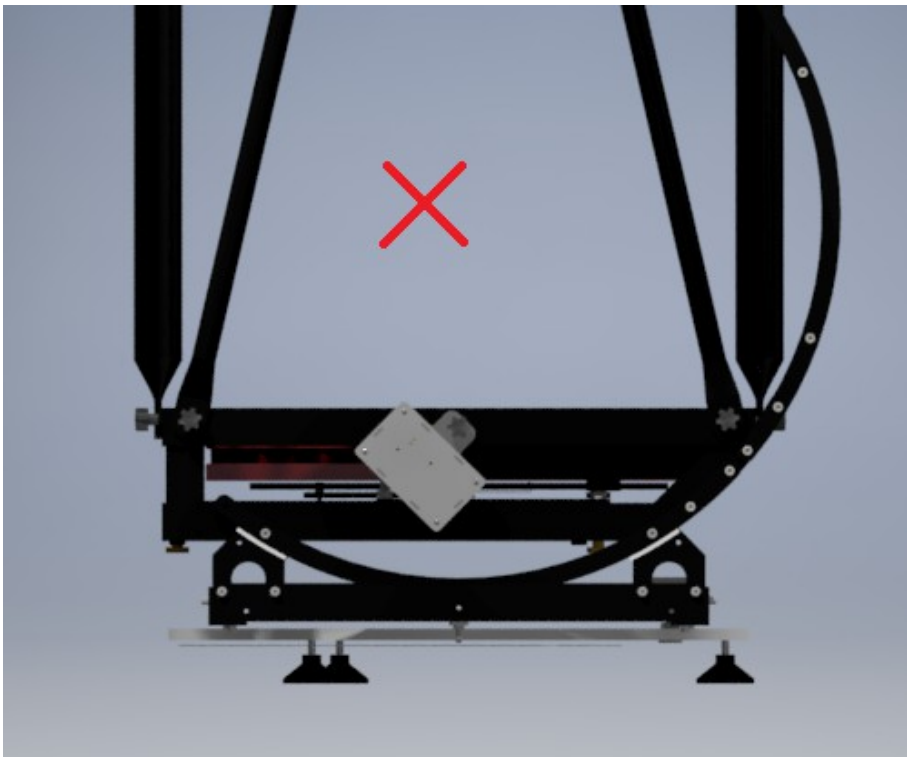
Right Mounting Orientation



WRONG Mounting Orientation



Right Mounting Orientation



WRONG Mounting Orientation

Note, the iSkyHub-B should be mounted on either left or right side of the scope, with roughly 45 degree angled from the mirror box, always being vertical to the ground.

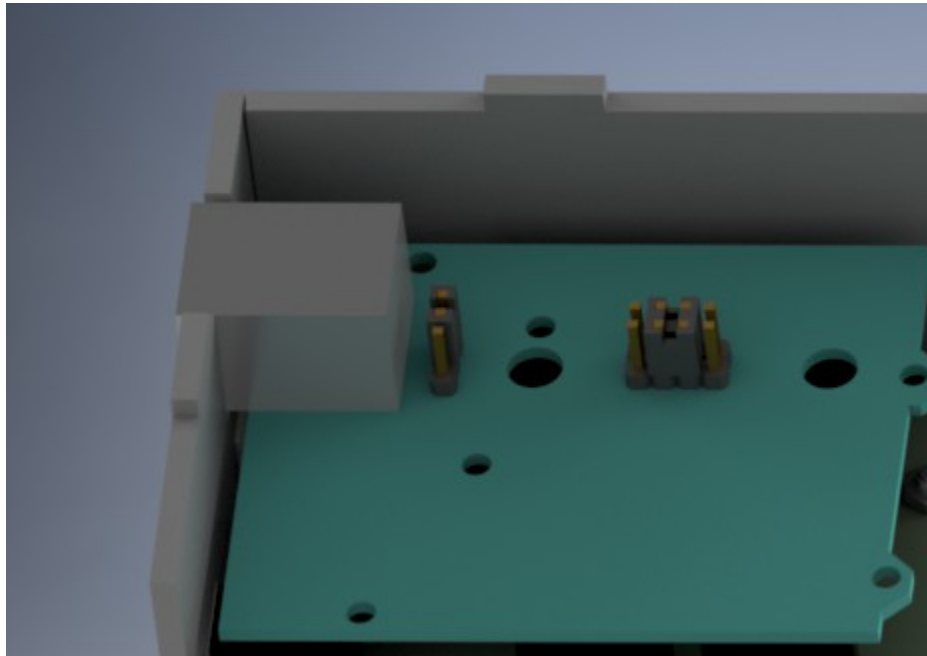
Note that you should make every effort to make sure that the ground board is leveled and the iSkyHub-B is mounted to the system in such way that the **bottom (and top) surface** of the iSkyHub-B unit is always vertical to the ground.

During the startup, iSkyHub-B will automatically detects if it is vertically to the ground, and reports the result by the number of slow blinks of the info LED; ignoring the initial flush of quick blinks, after that, each slow blink indicate 0.1 degree deviation from the vertical position. For example, if the iSkyHub-B slowly blinks 10 times during the startup (after some initial quick blinks), then it indicates the iSkyHub-B is about 1 degree deviation from the vertical position relative to the ground.

Note that the iSkyHub-B will flash about 900 times if iSkyHub-B is started while laid flat on the ground.

A few slow blinks will not impact the pointing accuracy that much.

2. Configuration of iSkyHub-B



iSkyHub-B Jumper Setting for Bluetooth Interface using the built-in inclinometer.

If your laptop or Android device has a built-in Bluetooth capability (or with an external USB Bluetooth Dongle Adapter for Windows Laptop); then you can connect your device to iSkyHub-B over Bluetooth; which is the default setting when shipped. A 7-12VDC power supply is required for iSkyHub-B to operate in Bluetooth mode.

The iSkyHub-B and SkyHub-B Bluetooth interface is pre-configured with the following parameters:

For the iSkyHub-B:

Device Name: **iSkyHub-B**

PassKey: **1234**

Baud Rate: **9600**

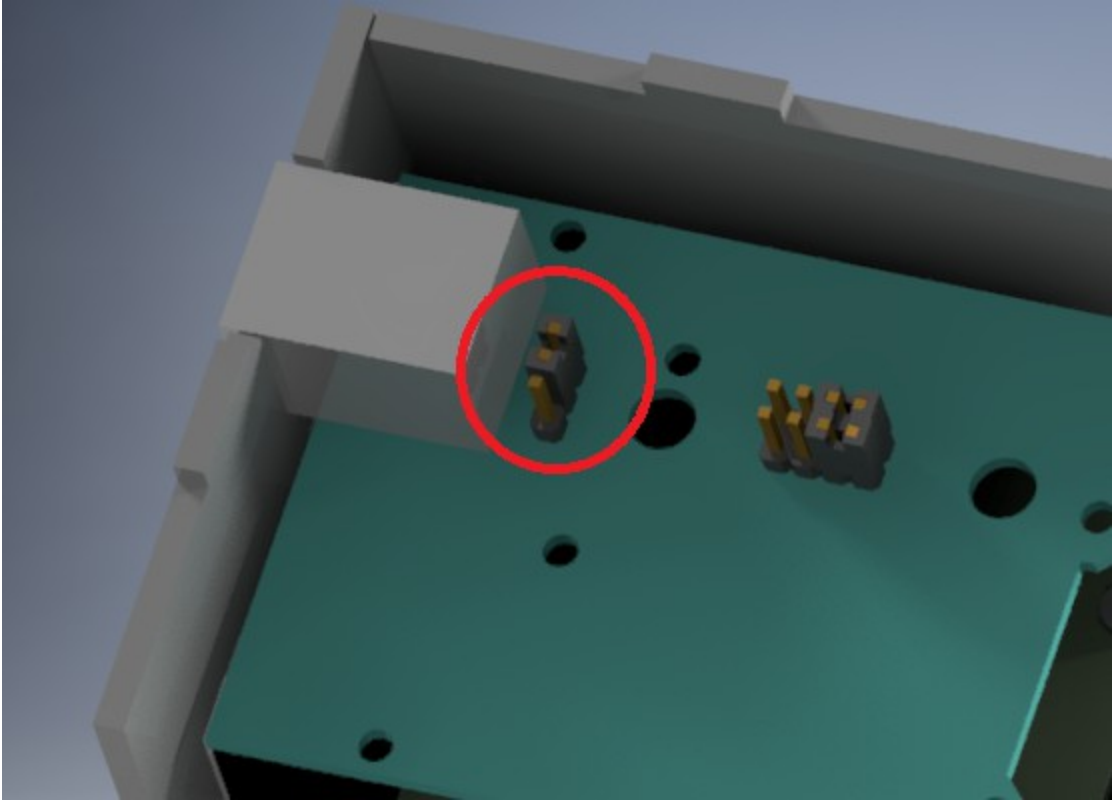
Note for the original SkyHub:

Device Name: **SkyHub**

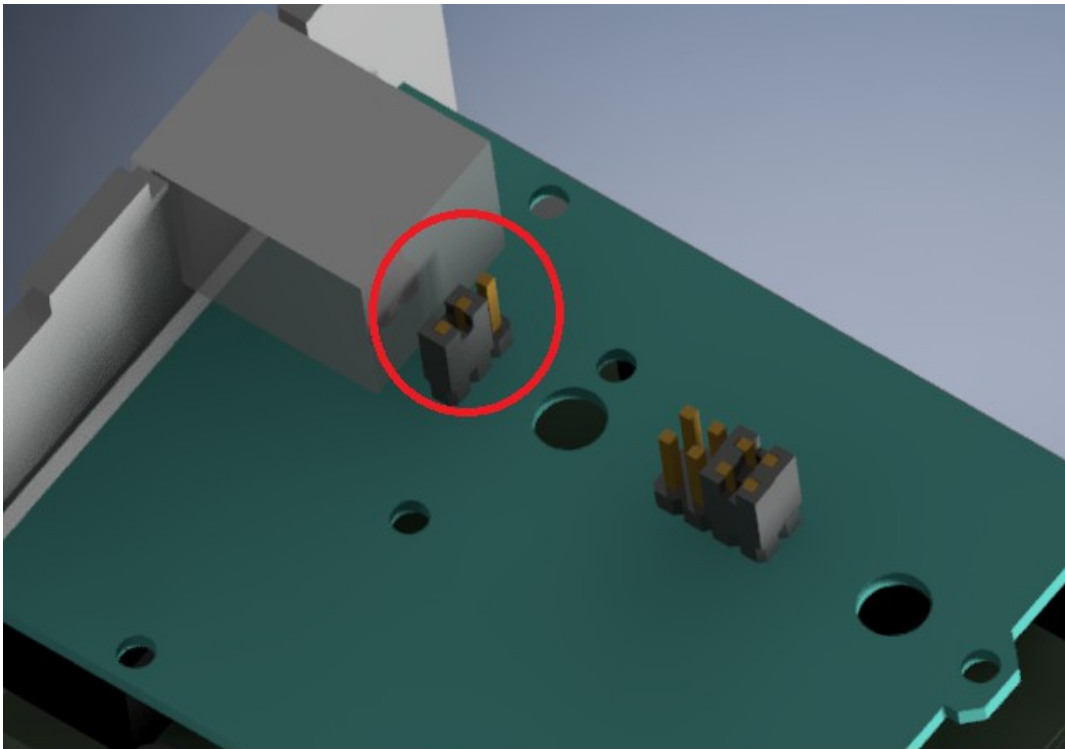
PassKey: **1234**

Baud Rate: **9600**

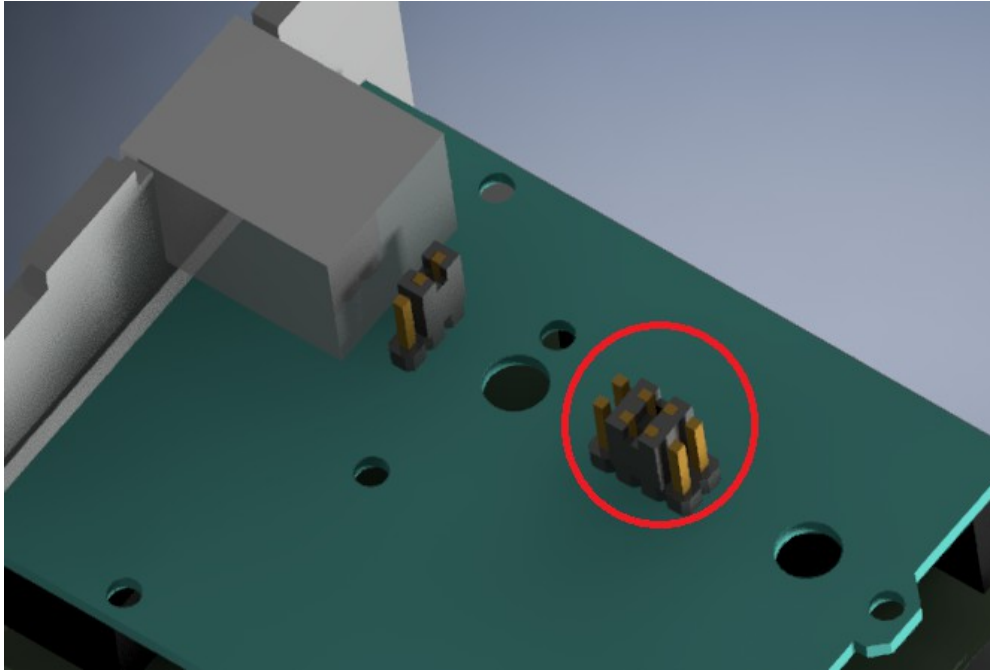
The above setting cannot be changed!



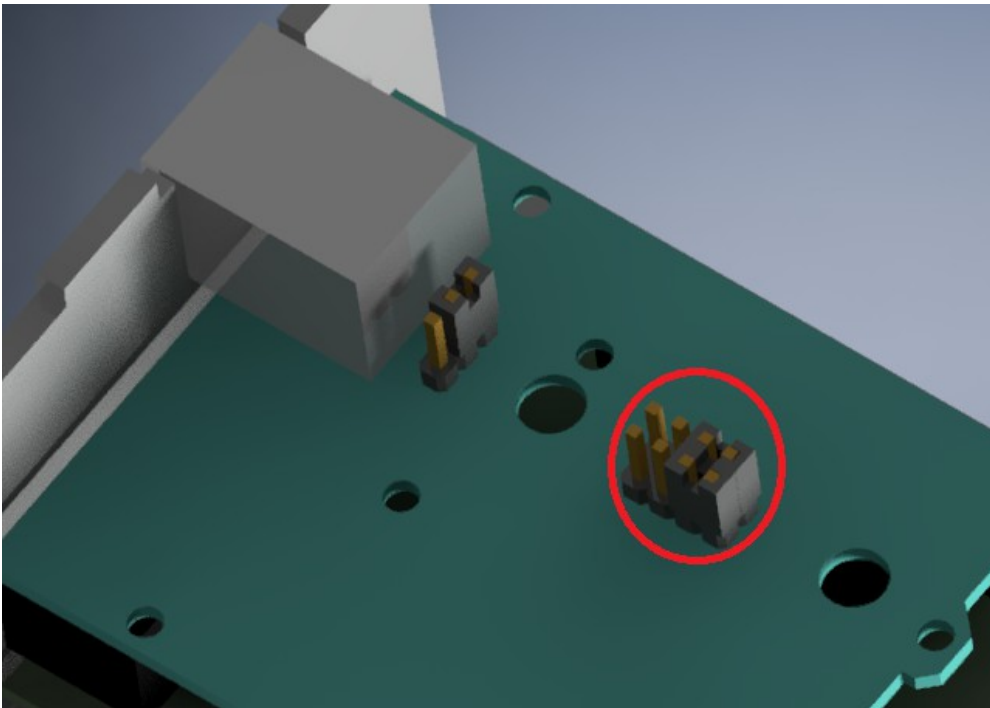
Jumper setting to use the internal ALT inclinometer (default)



Jumper setting to use the external ALT encoder



Jumper Setting to use Bluetooth interface(Default)



iSkyHub-B Jumper Setting to use the USB interface.

You **must** set the jumper as shown in the above picture if you want to use USB connection to a Windows system. There is no battery needed when used with USB connection. Please note that the USB interface works for Windows platforms and Mac Book. The USB interface is **NOT** supported for the Android devices.

2.1 Bluetooth Configuration on Android

Please refer the manual of your Android devices for Bluetooth configuration on your device.

2.2 Bluetooth Configuration on Windows

You can connect the iSkyHub-B to your Windows system via the Bluetooth wireless connection.

Please refer the manual of your Windows platforms for the detailed instructions.

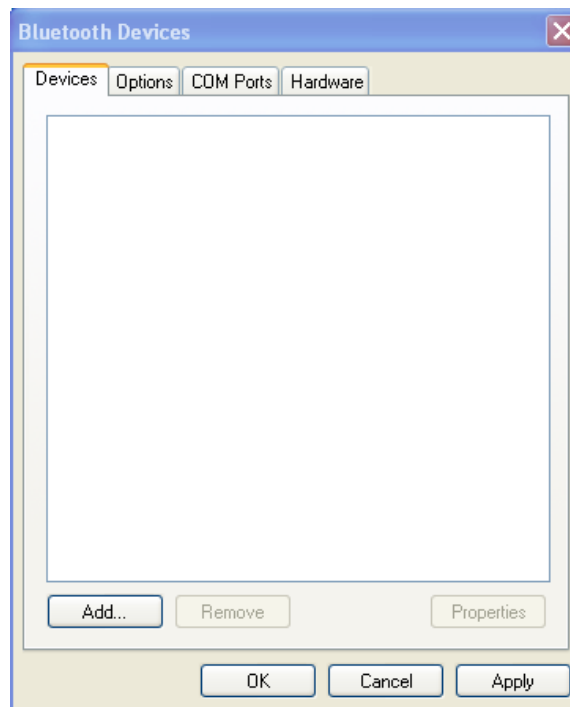
<http://windows.microsoft.com/en-us/windows-vista/set-up-a-bluetooth-enabled-device>

<http://www.youtube.com/watch?v=uFG3h6xyVeo>

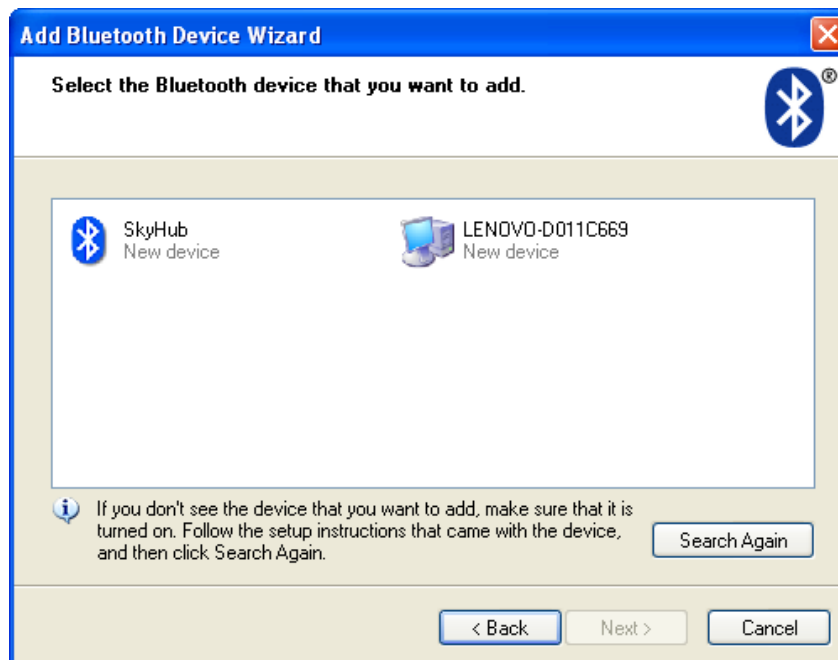
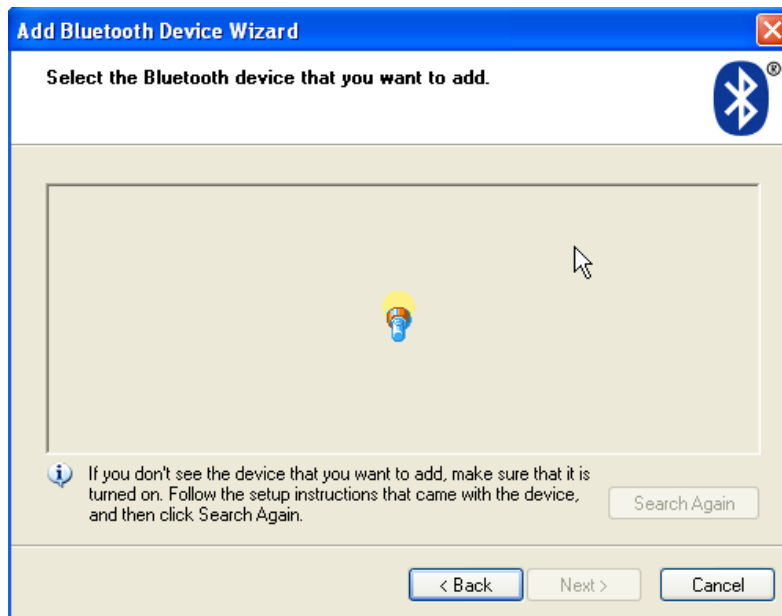
http://www.metacafe.com/watch/1186986/how_to_set_up_a_bluetooth_device/

The following procedure is for Windows XP only.

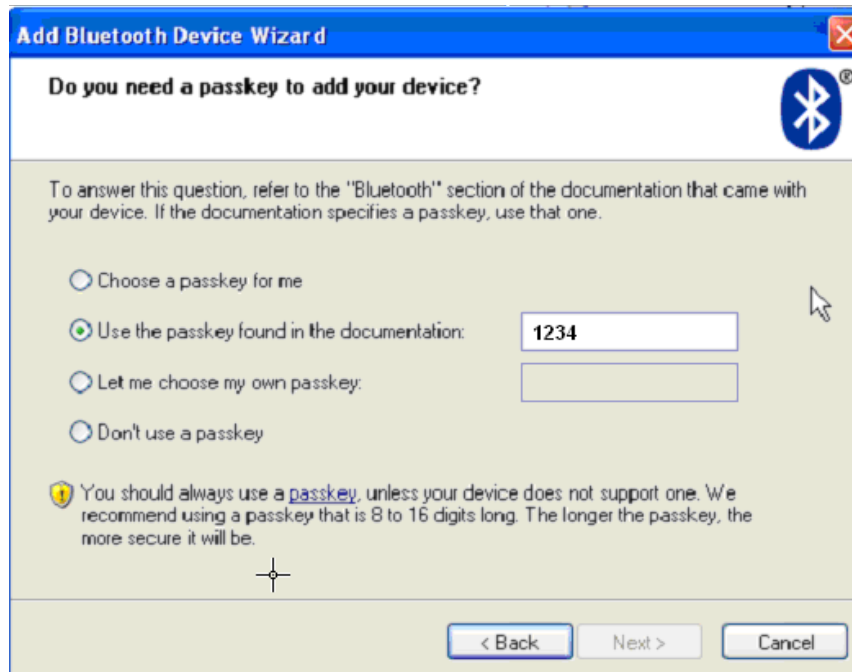
First, launch the Windows XP Bluetooth Devices Manager.



Then Click the “Add” button to search the iSkyHub-B.

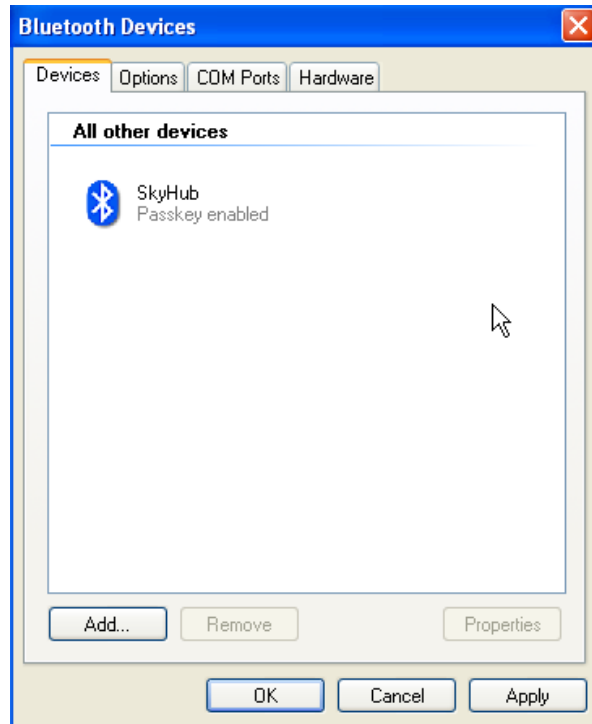


You should be able to find a device named iSkyHub-B.



Use 1234 as the passkey, and then press “Next” button. You should see something like:





You will use the outgoing port, COM8 in this case, to communicate with iSkyHub-B.

2.3 Installation of USB serial Driver on Windows

You can also connect the iSkyHub-B to your Windows system via the USB port. When you connect the iSkyHub-B to your system, Windows should initiate the driver installation process (if you haven't used the computer with a iSkyHub-B before). On Windows Vista and 7, the driver should be automatically downloaded and installed.

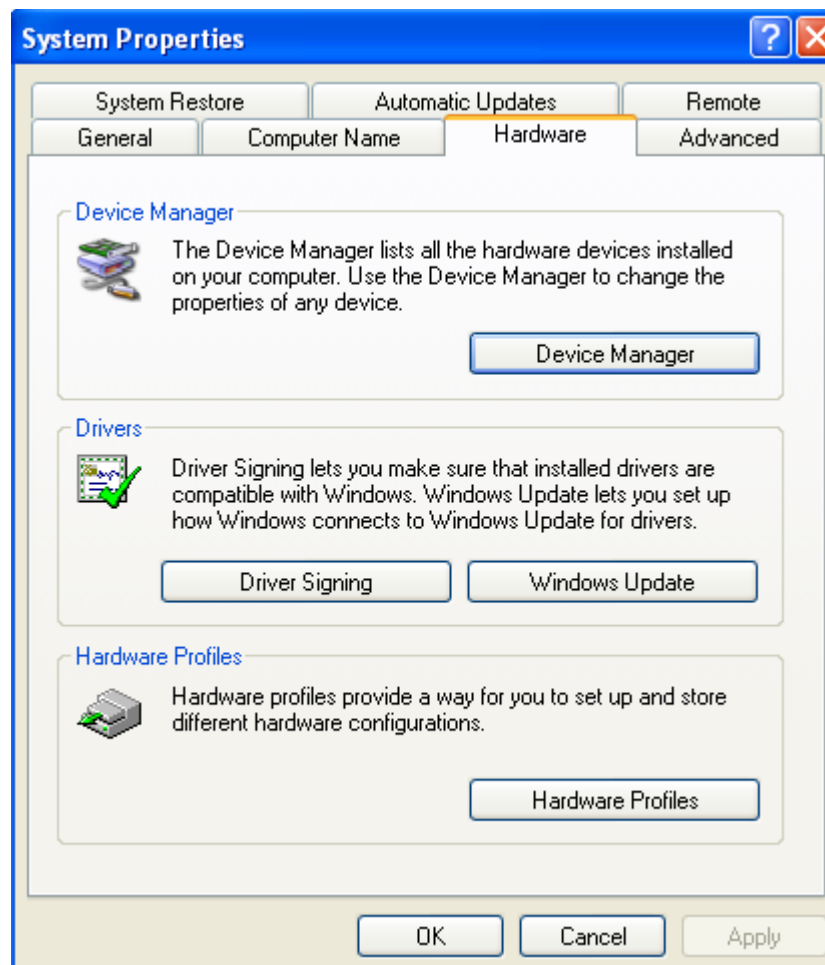
On Windows XP, the Add New Hardware wizard will open:

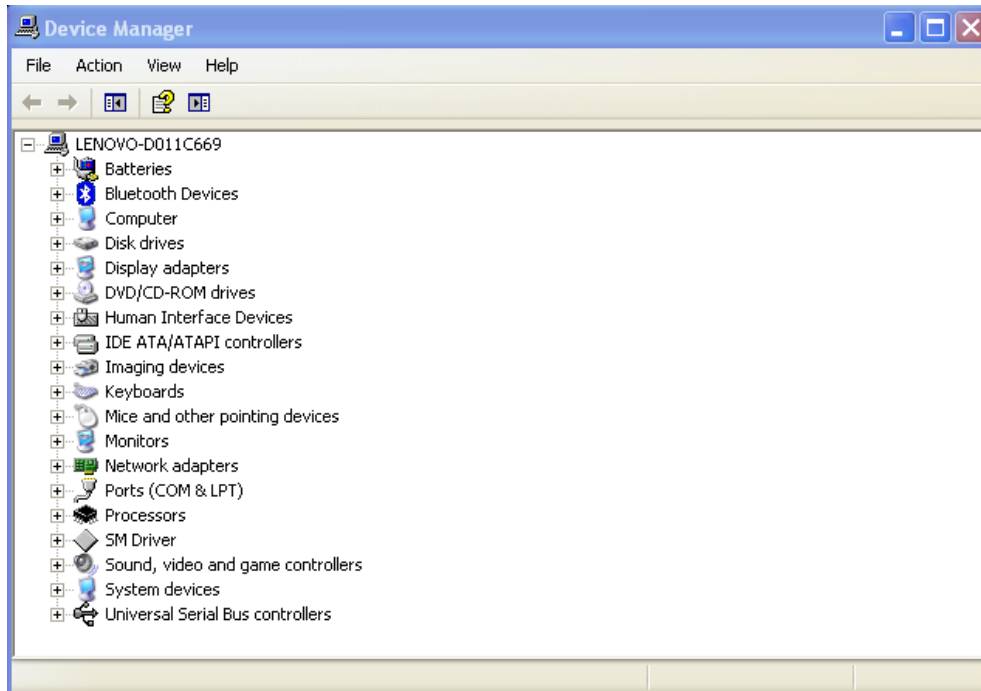
- When asked **Can Windows connect to Windows Update to search for software?** select **No, not this time**. Click next.
- Select **Install from a list or specified location (Advanced)** and click next.
- Make sure that **Search for the best driver in these locations** is checked; uncheck **Search removable media**; check **Include this location in the search** and browse to the **CDM 2.08.28 WHQL Certified/ CDM 2.08.28 Certified** directory of the FTDI driver distribution. (The latest version of the drivers can be found on the [FTDI website](#).) Click next.
- The wizard will search for the driver and then tell you that a "USB Serial Converter" was found. Click finish.

- The new hardware wizard will appear again. Go through the same steps and select the same options and location to search. This time, a "USB Serial Port" will be found.

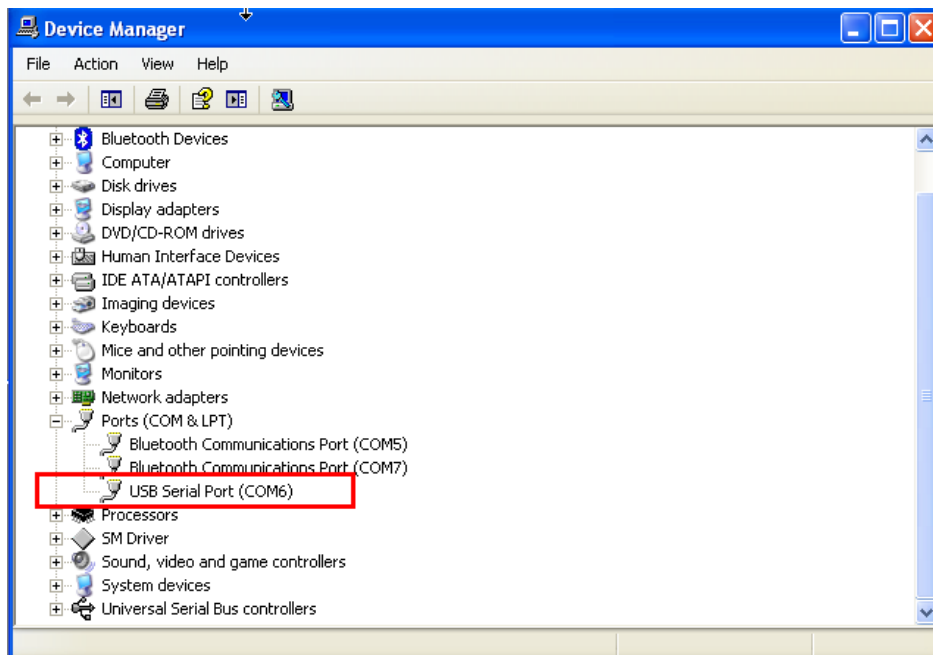
Once the USB driver is installed, you will need to find COM port associated with the USB interface.

To find the right com port, you need to open (on Windows XP) the System Properties from My Computer. Then open Device Manager,





Then click Ports (COM & LPT), you should see the USB serial port in your system (e.g., COM6 in the following system, as an example):



2.4 Installation of USB serial Driver on Mac Book and Linux systems

No driver is needed for the MacOS or Linux system

3. Installation of EK ASCOM driver.

If you want use iSkyHub-B with your Windows system, then you must install the ASCOM driver regardless of which interface, Bluetooth or USB interface, will be used. Please download (<http://eksfiles.net/digital-setting-circles/ascom-driver-for-digital-setting-circles/>) and install EK ASCOM Driver for Digital Setting Circle.

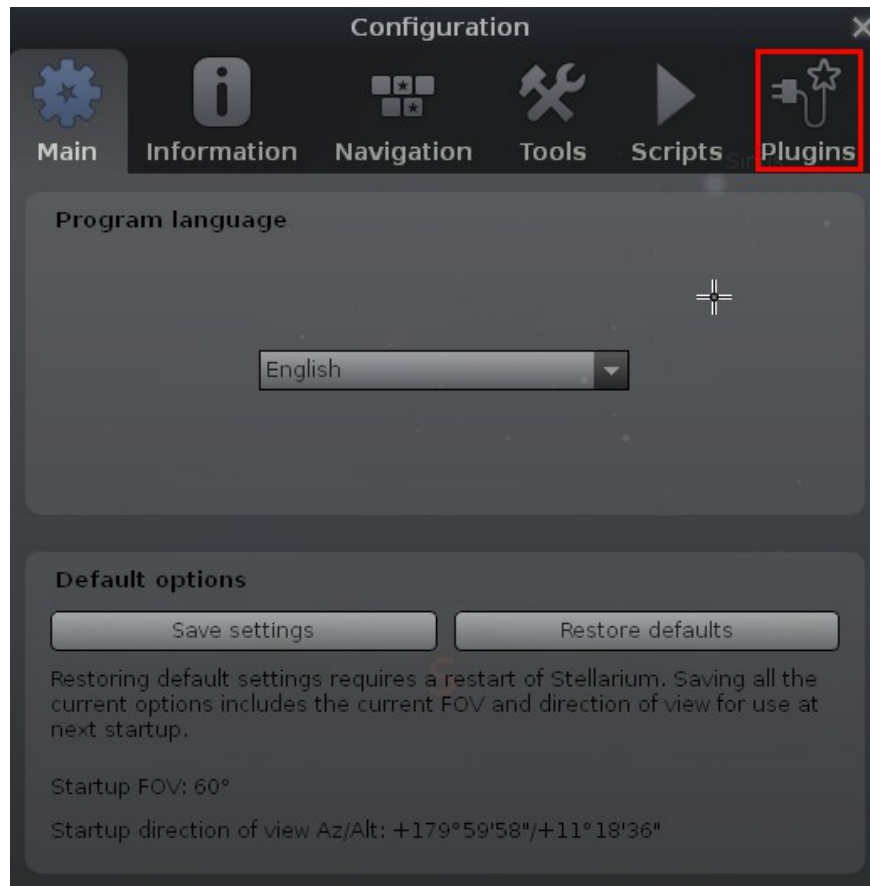
The driver requires that [ASCOM Platform 6](#) (or newer) to be installed on your computer. It also requires [Microsoft .Net 3.5](#) or higher.

4. Stellarium

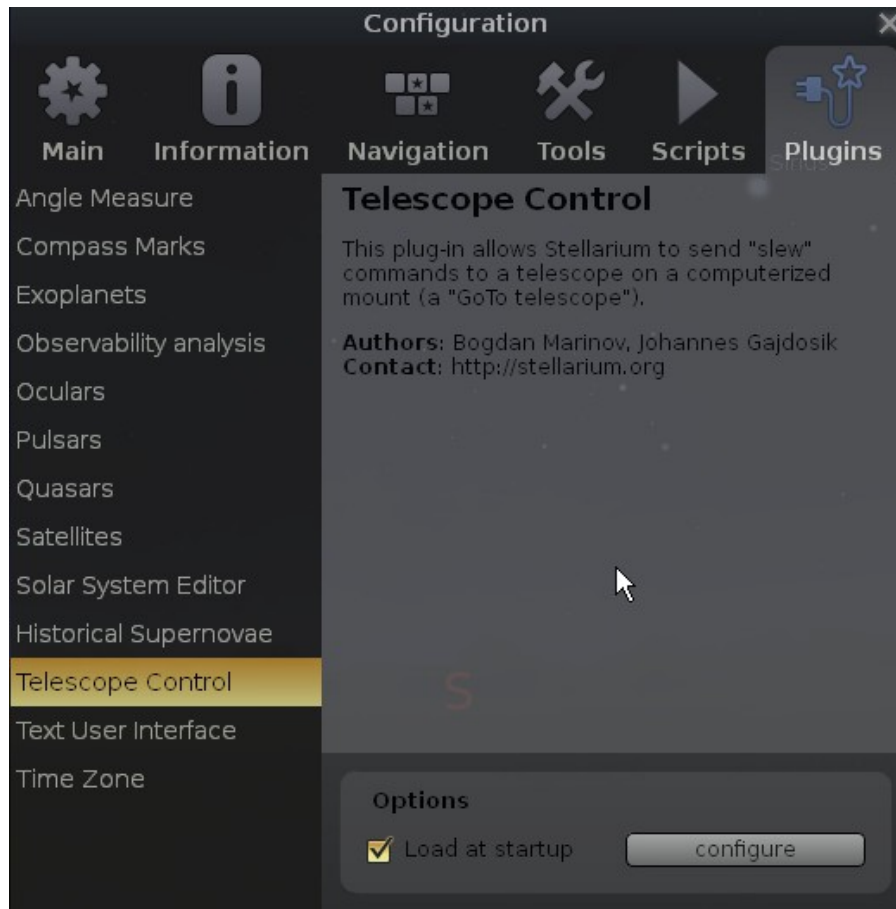
4.1 Installation of Stellarium

Download and Install the Stellarium. Then open Stellarium, and click Configuration window.

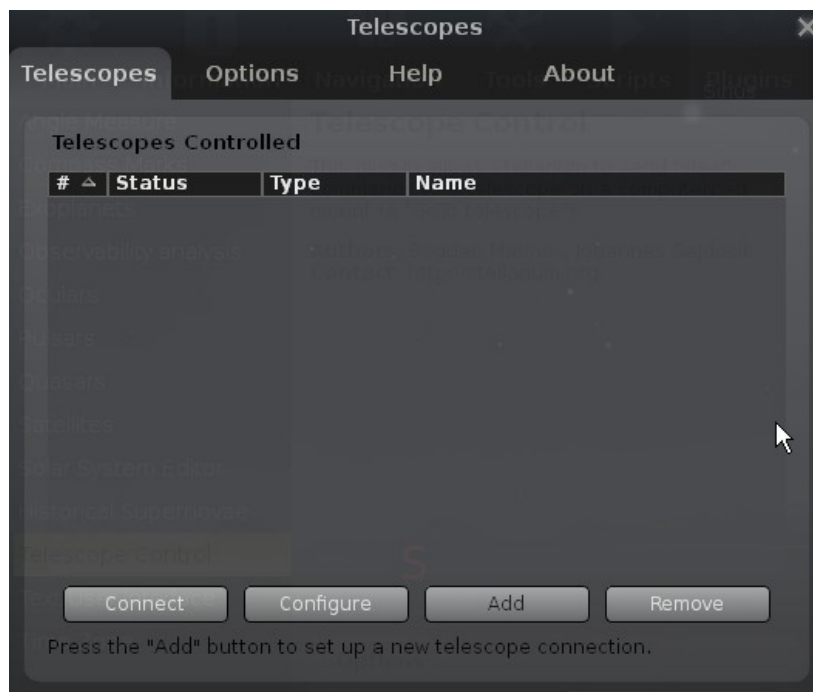




Then click Plugins.



Then choose Telescope Control, and then click “configure” button.



Then choose “Telescope” tab, and then click “Add” button to add a telescope.

Then, add the following information in the Telescope windows: you must choose “External software or a remote computer”

Add New Telescope [X]

Telescope controlled by:

- Stellarium, directly through a serial port
- External software or a remote computer
- Nothing, just simulate one (a moving reticle)

Telescope properties

Name:

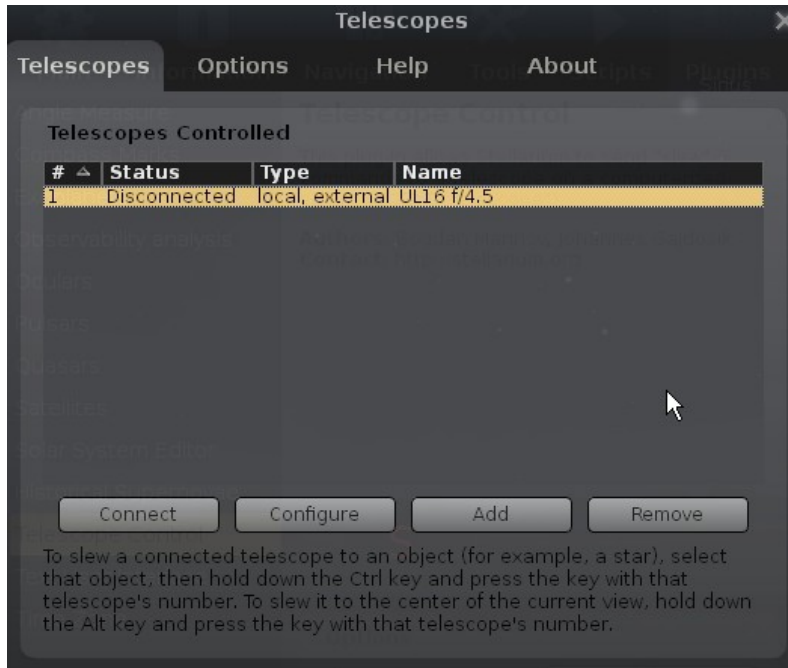
Connection delay: [▲▼]

Coordinate system: J2000 (default) Equinox of the date (JNow)

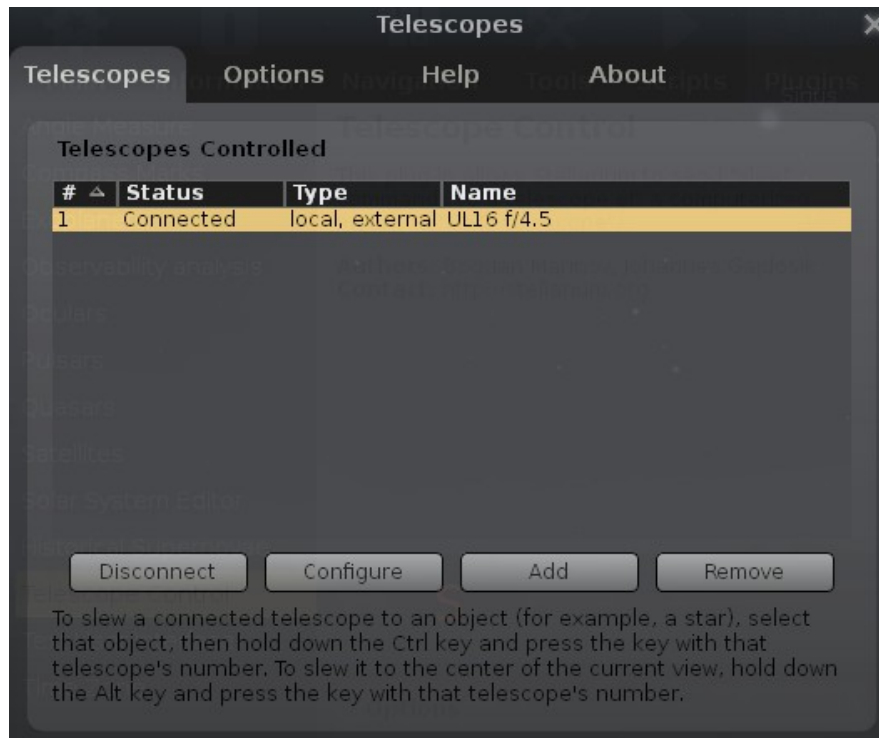
Start/connect at startup

Device settings

[OK] [Cancel]



Then click “Connect” button, the Status should become “Connected”. Please install StellariumScopeWD first before connecting to your Scope.

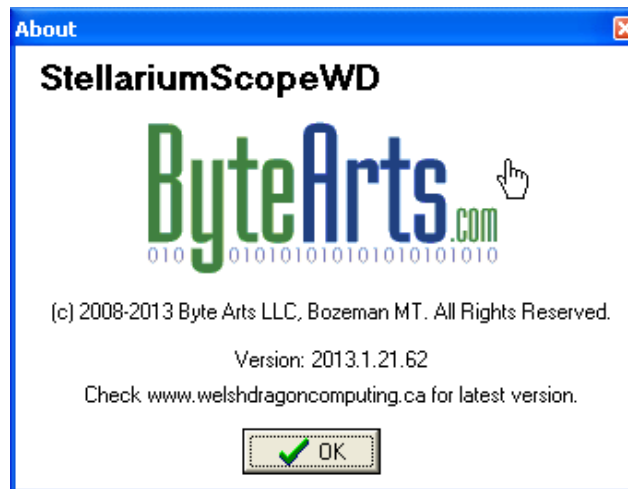


4.2 Configuration of StellariumScopeWD

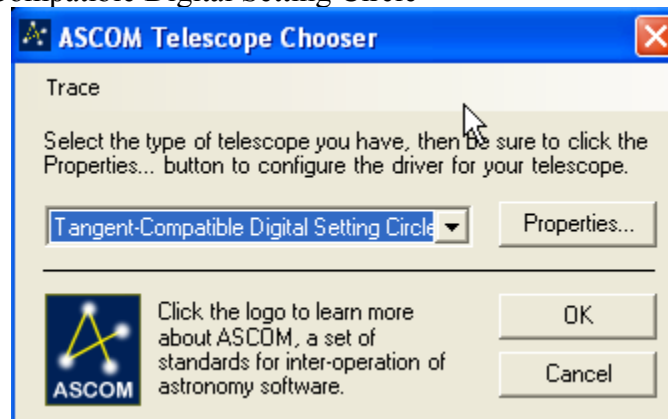
You will need StellariumScopeWD (by Scott of ByteArts and Welsh Dragon Computing) to use Stellarium with iSkyHub-B.

Please download and install StellariumScope from http://www.welshdragoncomputing.ca/index.php?option=com_content&view=category&layout=blog&id=31&Itemid=39

Please use the latest version (We have only tested 2013.1.21.62), and follow the mini installation instruction outlined there.

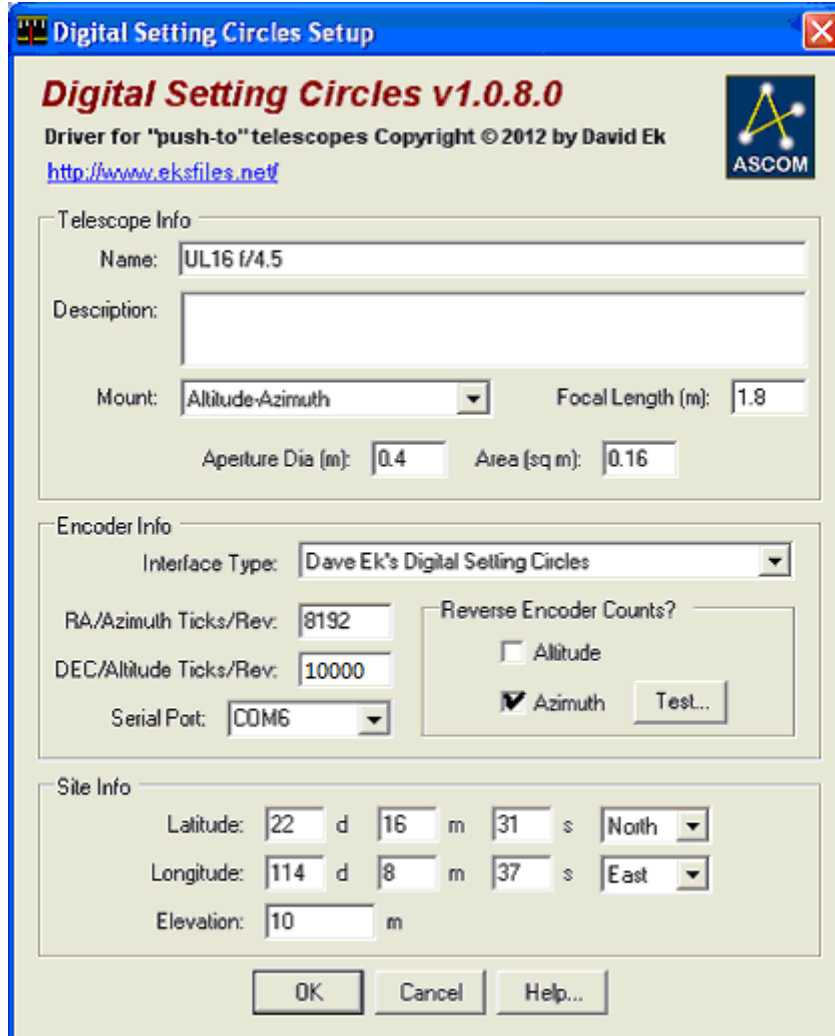


Click **Select mount**,
Select "Tangent-Compatible Digital Setting Circle"

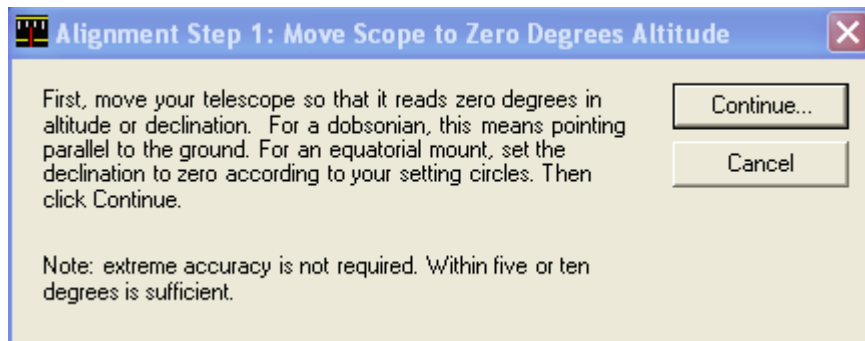


Then click the "**Properties**" button, and set the following options to:
Interface Type: Dave EK's Digital Setting Circles.
RA/Azimuth Ticks/Rev: 8192
DEC/Altitude Ticks/Rev: 10000 (8192 if the 8192 PPR external encoder is used)
Reverse the encoder count for the Azimuth

Serial Port: COM6 (as an example)



Then, click “Connect” button, and follow the procedure prompted on the screens:



Alignment Step 2: Move Scope to Ninety Degrees Altitude

Next, move your telescope so that it reads ninety degrees in altitude or declination. For a dobsonian, this means pointing at the zenith. For an equatorial mount, this means pointing at Polaris (assuming you're roughly polar-aligned). Then click Continue.

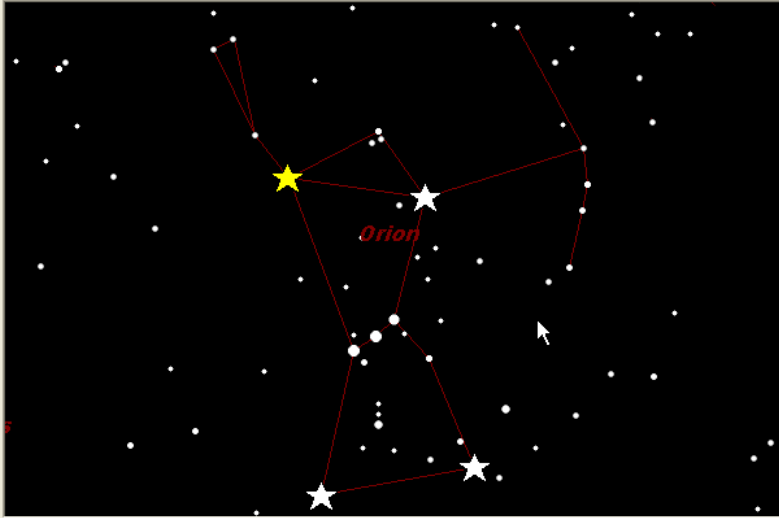
Note: extreme accuracy is not required. Within five or ten degrees is sufficient.

Continue...
Cancel

Select First Alignment Star

1. Select a constellation: Orion

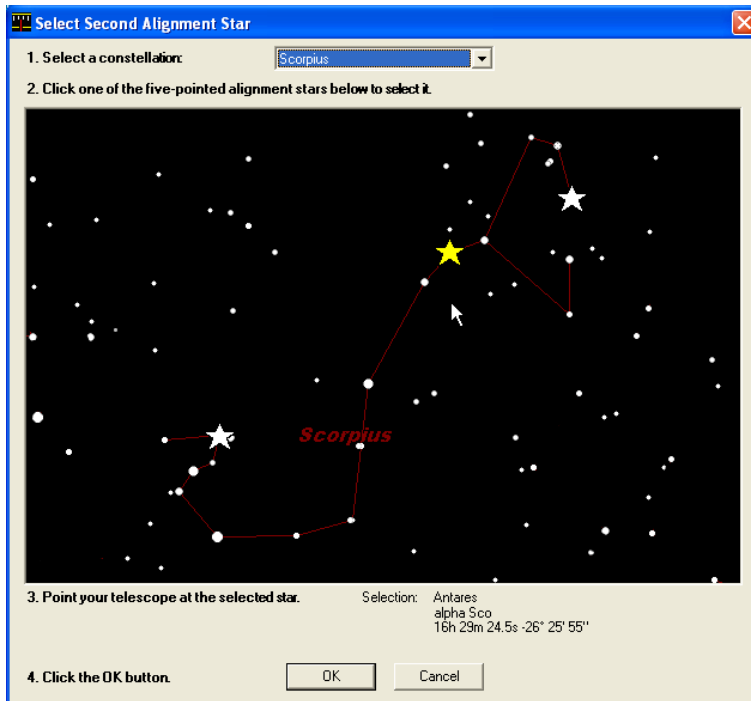
2. Click one of the five-pointed alignment stars below to select it.



3. Point your telescope at the selected star. Selection: Betelgeuse
alpha Ori
05h 55m 10.3s +07° 24' 25"

4. Click the Continue button.

Continue... Cancel

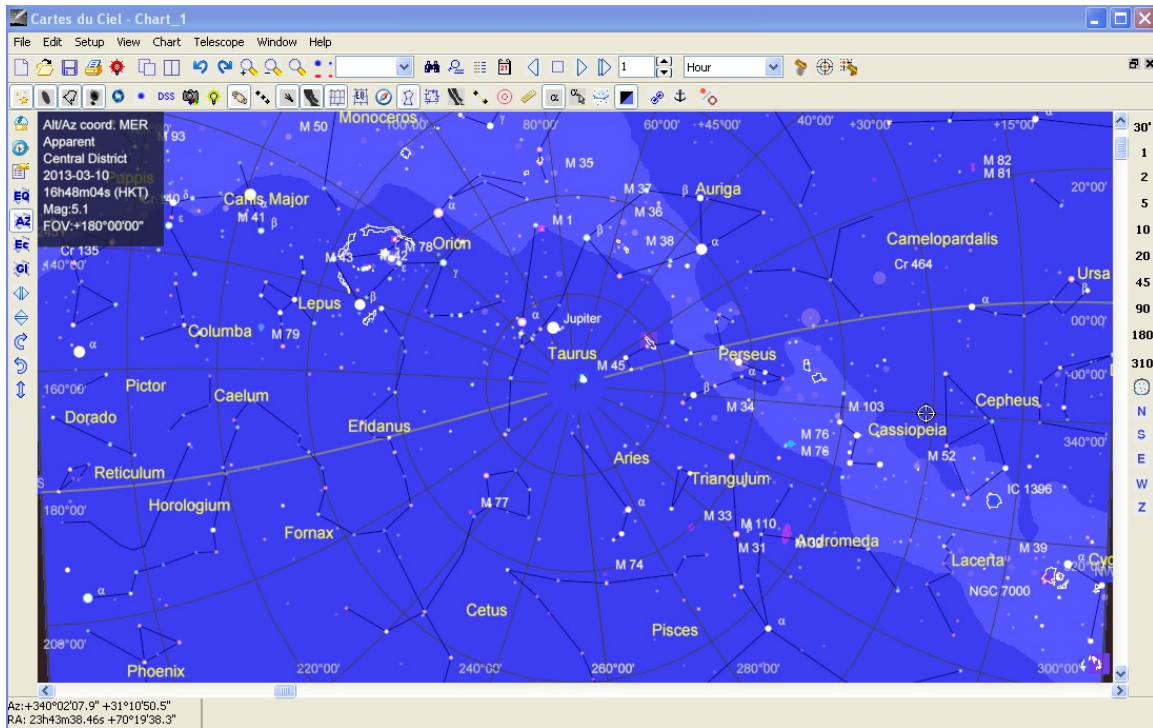


Once you complete the alignment procedure, you are ready to use Stellarium with your iSkyHub-B!

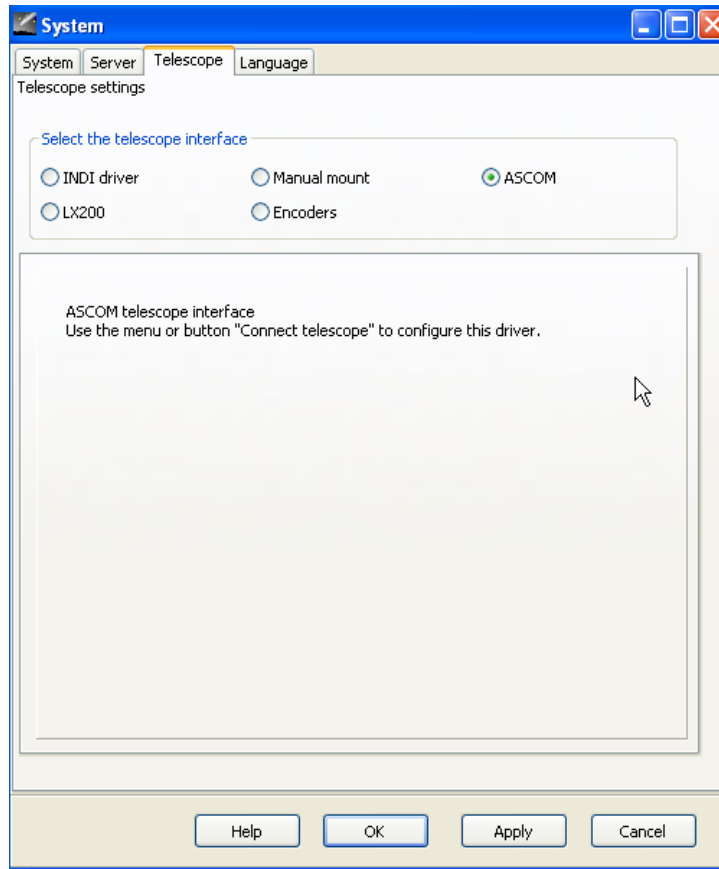


5. Cartes du Ciel

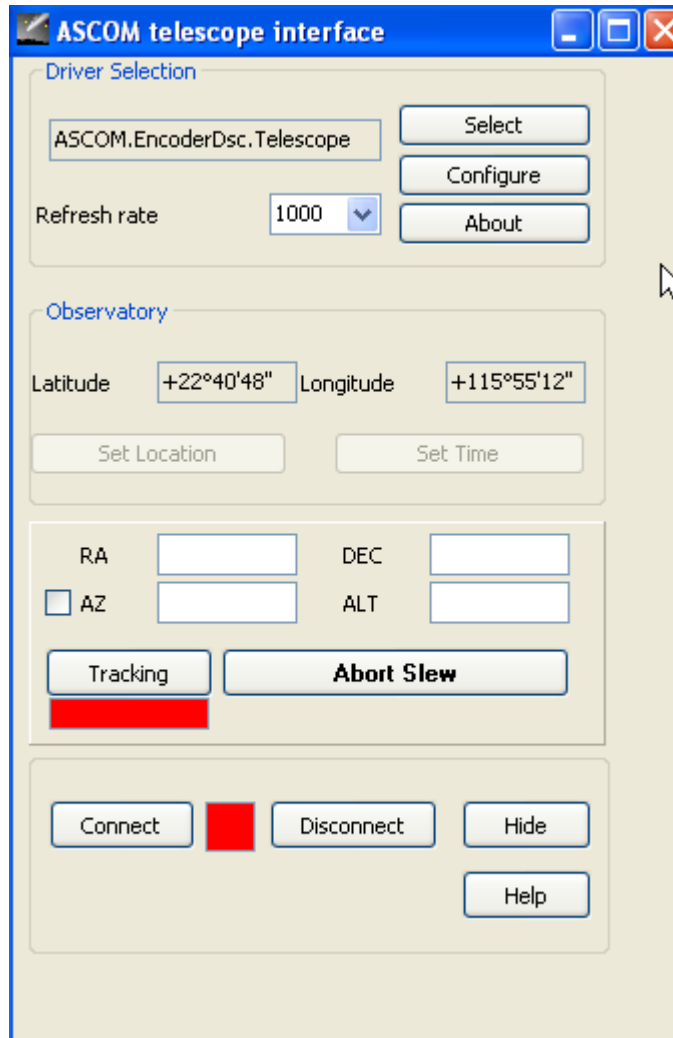
Cartes du Ciel requires the ASCOM platform in order to work with iSkyHub-B. You need to install the ASCOM platform and EK DSC ASCOM driver as outlined in section 2.



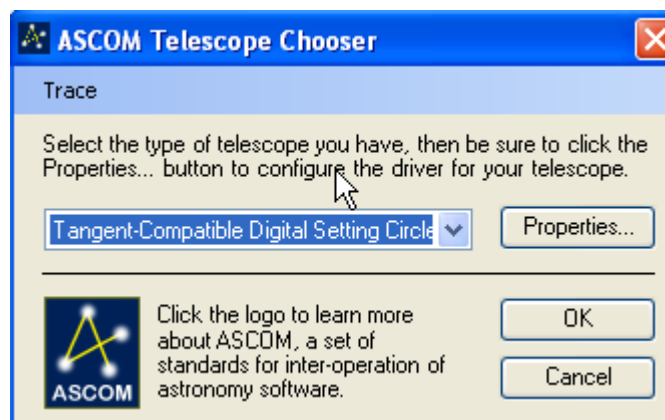
Then download and install the latest Cartes du Ciel (3.8 at this time). After you start Cartes du Ciel, choose “Telescope settings...” from the Telescope menu and then click on “ASCOM” on the “Telescope” tab.



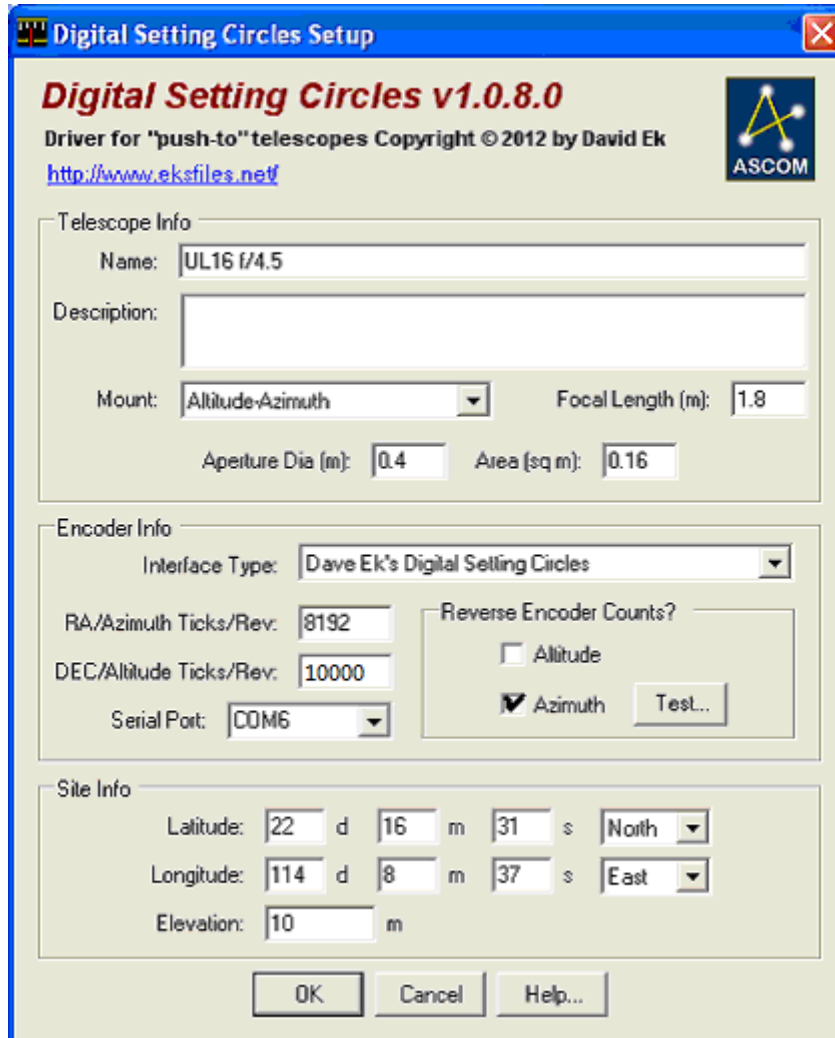
Next, select “Control panel...” from the Telescope menu. The Control panel will appear:



In this window, you should click the Select button to access the ASCOM Telescope Chooser to choose “Tangent-Compatible Digital Setting Circle”.



Then click the “**Properties**” button, and set the following options to:
Interface Type: Dave EK’s Digital Setting Circles.
RA/Azimuth Ticks/Rev: 8192
DEC/Altitude Ticks/Rev: 10000 **(8192, if the 8192 PPR external encoder is used)**
Reverse the encoder count for the Azimuth
Serial Port: COM6 (an example)



Then, click “Connect” button, and follow the procedure prompted on the screens:

Alignment Step 1: Move Scope to Zero Degrees Altitude

First, move your telescope so that it reads zero degrees in altitude or declination. For a dobsonian, this means pointing parallel to the ground. For an equatorial mount, set the declination to zero according to your setting circles. Then click Continue.

Continue...
Cancel

Note: extreme accuracy is not required. Within five or ten degrees is sufficient.

Alignment Step 2: Move Scope to Ninety Degrees Altitude

Next, move your telescope so that it reads ninety degrees in altitude or declination. For a dobsonian, this means pointing at the zenith. For an equatorial mount, this means pointing at Polaris (assuming you're roughly polar-aligned). Then click Continue.


Continue...
Cancel

Note: extreme accuracy is not required. Within five or ten degrees is sufficient.

Select First Alignment Star

1. Select a constellation: Orion

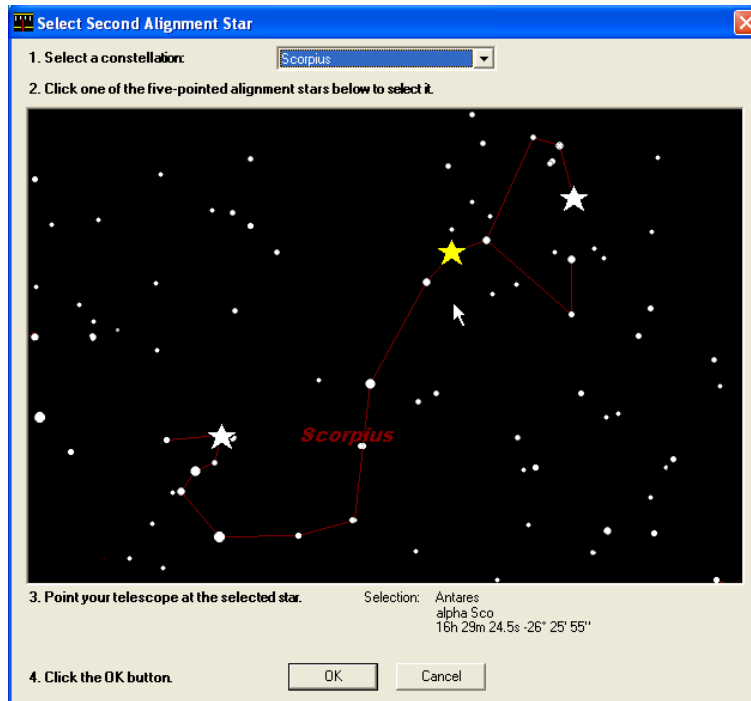
2. Click one of the five-pointed alignment stars below to select it.



3. Point your telescope at the selected star. Selection: Betelgeuse
alpha Ori
05h 55m 10.3s +07° 24' 25"

4. Click the Continue button.

Continue... Cancel



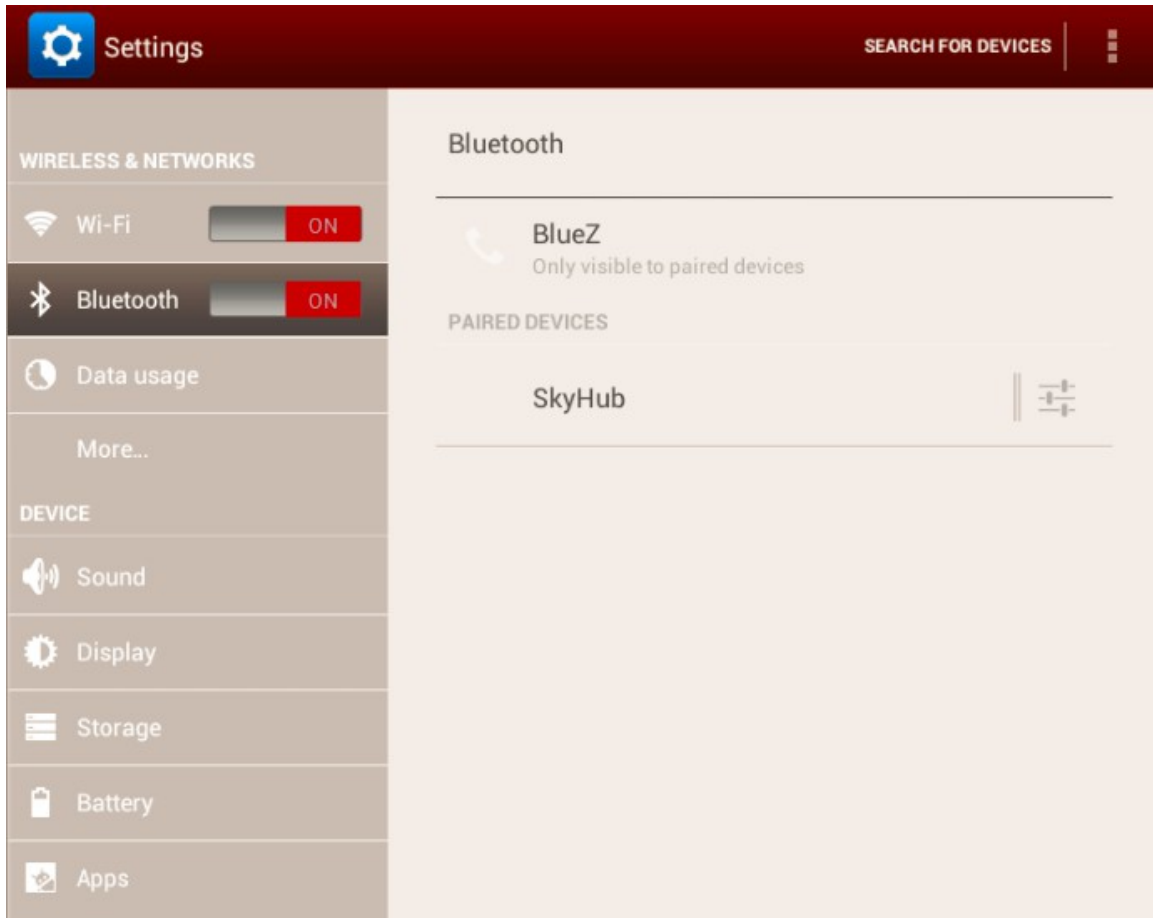
Once you complete the alignment procedure, you are ready to use Cartes du Ciel with your iSkyHub-B!

6. SkySafari for Android

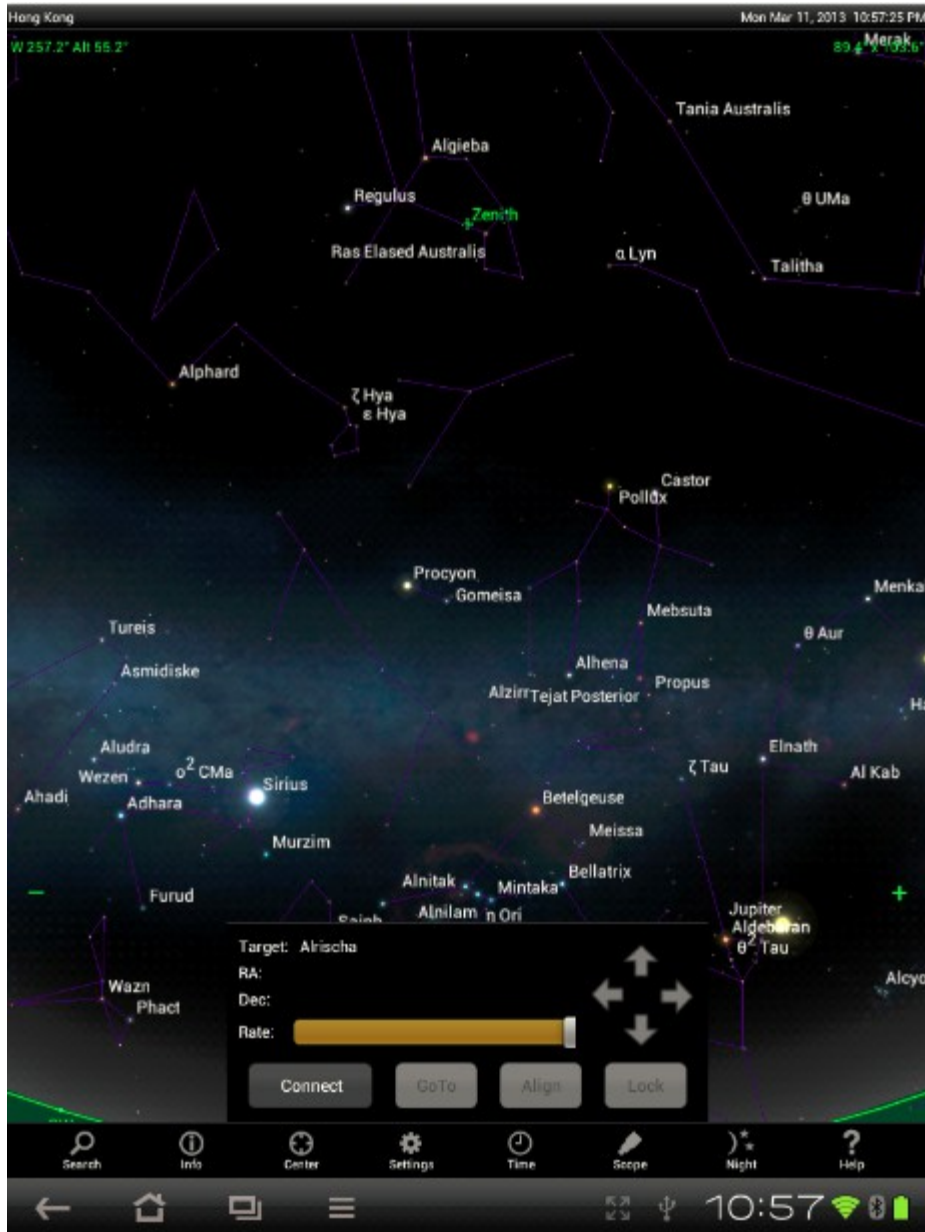
Here is the online Sky Safari Manual:

<http://www.southernstars.com/support/manual/index.html>

First that you need make sure that your Android device has the built in Bluetooth support. Go to the System Setting menu of your device to turn on the Bluetooth, then try to find and pair with iSkyHub-B.

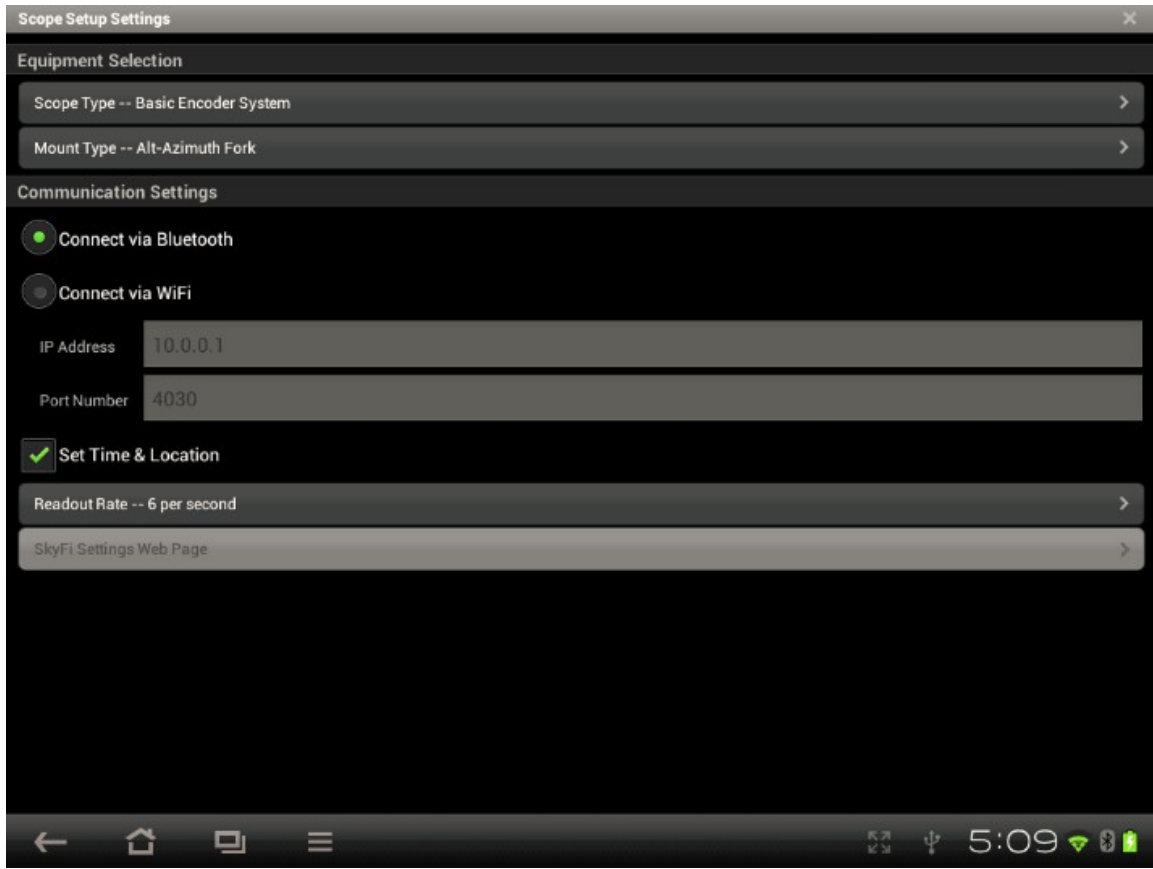


After you have installed the Sky Safari on your Android device. You need to change the **Settings** of the Sky Safari. Open the Sky Safari **Setting** menu, and open the **Telescope Setup** sub menu.



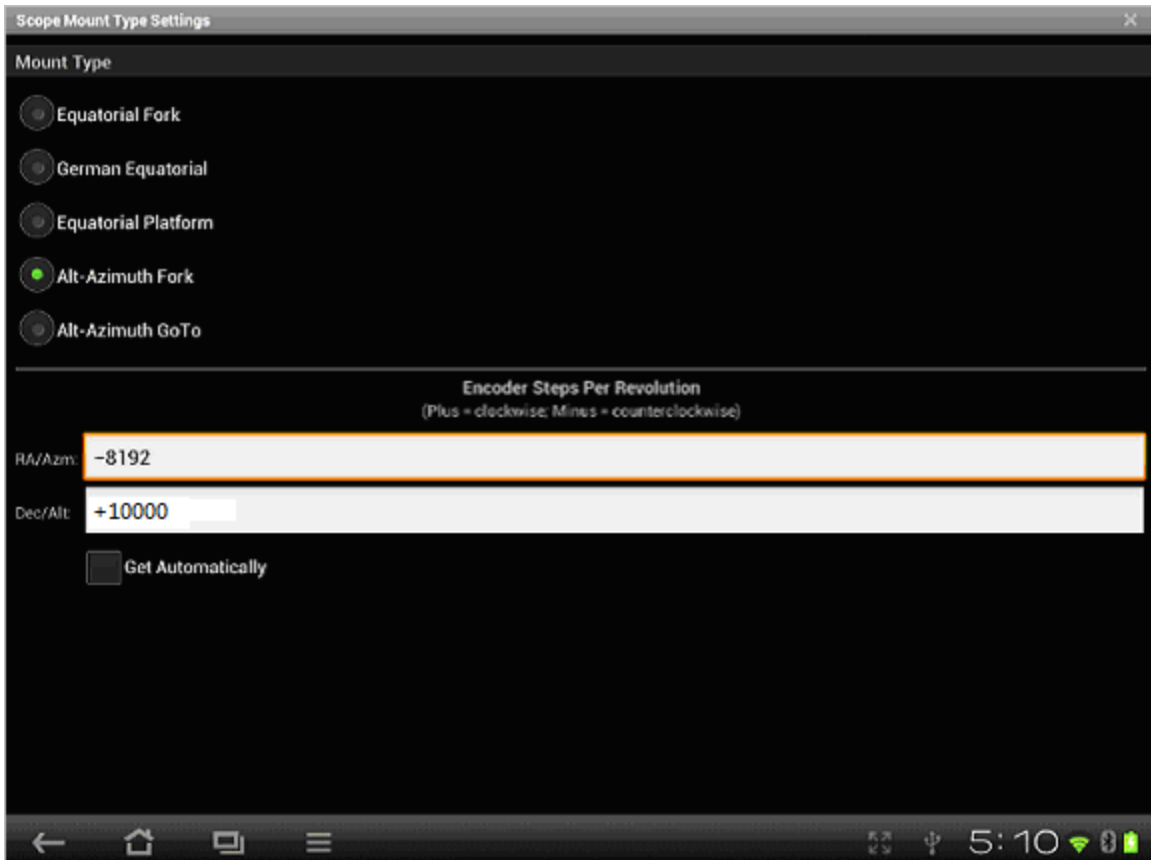
Change the **Scope Type** to: Basic Encoder System

Change the Communication Settings to “**Connect via Bluetooth**”

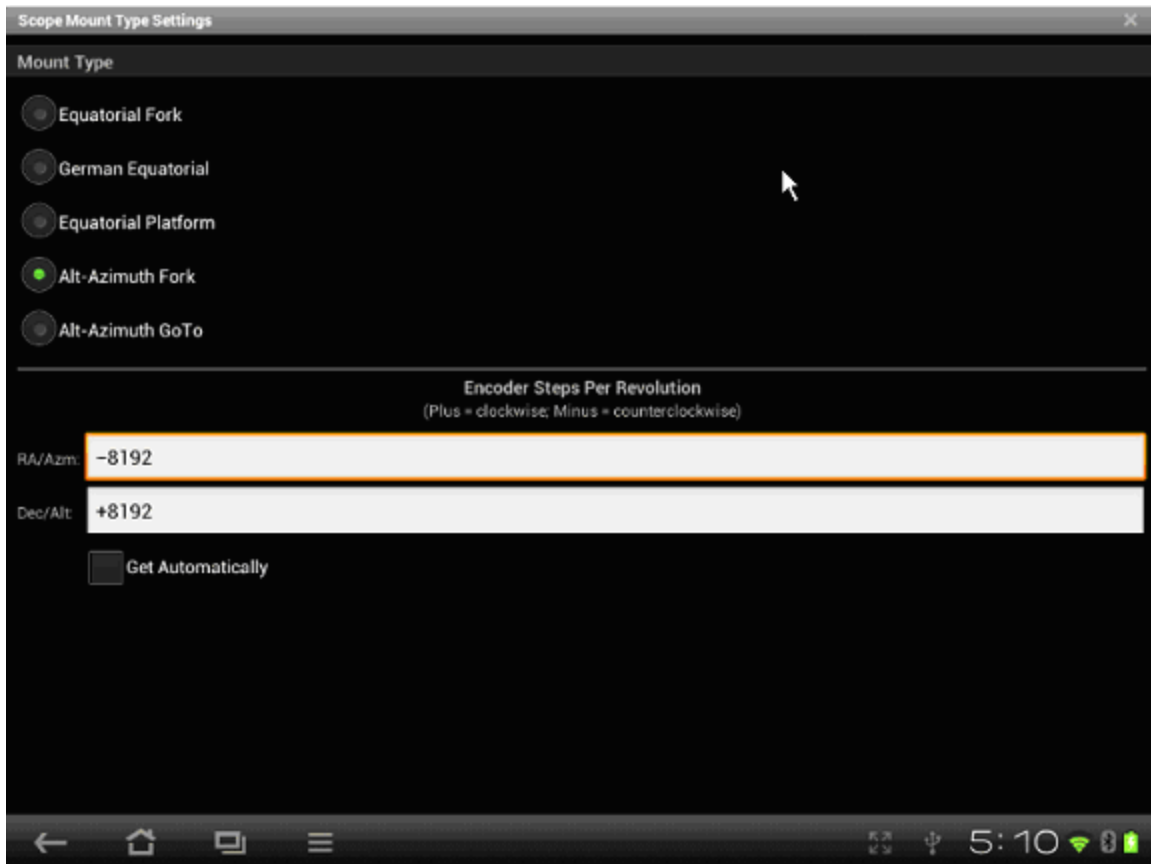


In the Mount Type sub menu, choose Alt-Azimuth Fork for Hubble UL. However, if your scope is not a Dobsonian, you will need to change it to other appropriate type.

Then enter the encoder resolution as -8192 for RA/Aam and +8192 Dec/Alt (external encoder), or +10000 Dec/Alt if the inclinometer is used. Make sure that you un-check the “Get Automatically”!

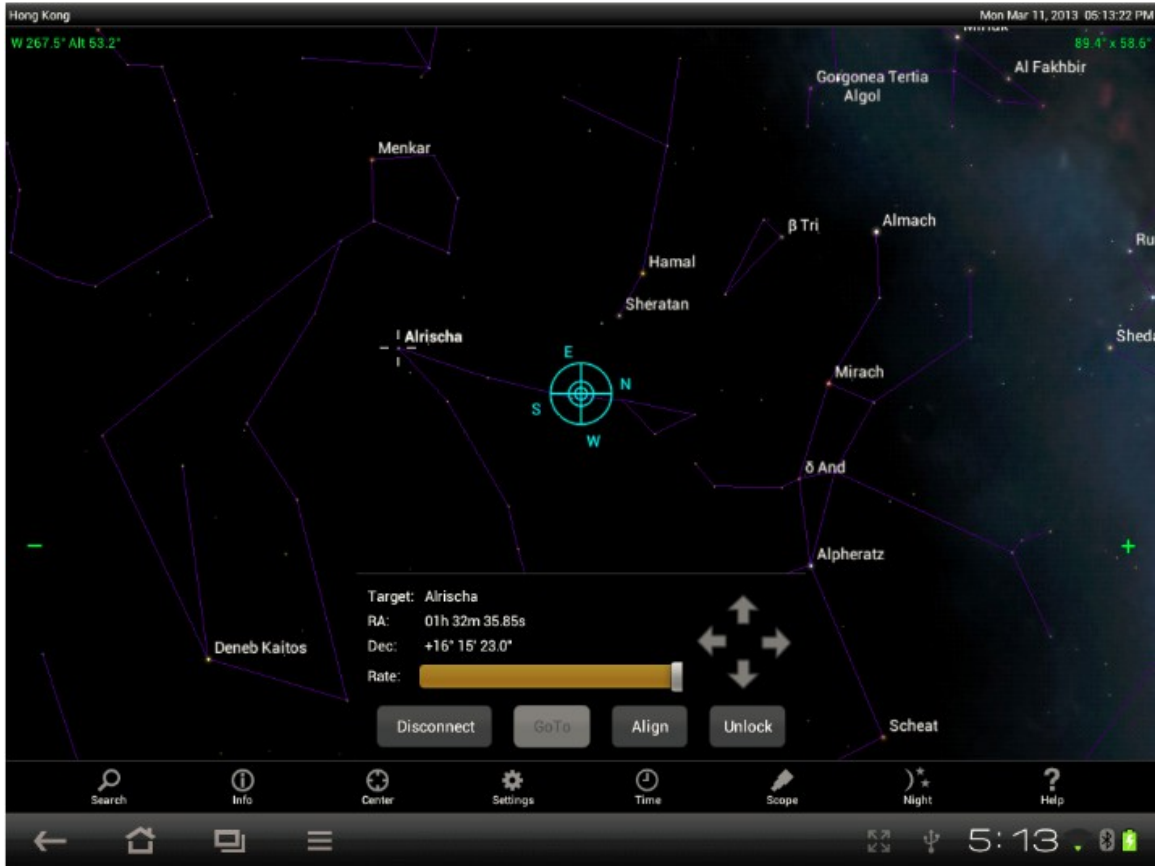


External AZM encoder & The Internal ALT inclinometer



External AZM & ALT encoders

Then back to the main screen of the Sky Safari and press **“Connect”**, you should hear a “Ding” after a little while and the scope icon should appear. Now your scope has been connected to Sky Safari, and you are ready to do Alignment. You should do a single star alignment, and then optionally a two star alignment. Then you are ready to have to use the Sky Safari to double your enjoyment and fun with Heavens.



7. Used with the Equatorial Platform

When used with the Equatorial Platform, you should set the initial platform position to be perfectly leveled as much as you can, do the star alignment, and push the scope to find the targets at this position only. Then you should start the tracking right away; you will need to ignore the screen display on the computer during the tracking, because it will not be correct. When you reset the platform, you should always reset it back to the same initial leveled position to find another or the same target. **There is no need to do star alignment again after each platform reset.**

If you use the iSkyHub-B with the Sky Safari, you should choose "ALT AZ Push To", not the "ALT AZ Push To on Equ Platform".

8. Specification

Power Supply: USB/DC power.

7(min)-12(max)VDC, center positive (+). 9VDC is recommended.



9VDC (6 x AA) external battery box is included. It also works with an internal 9V battery. Battery is not included.

The iSkyHub-B **Bluetooth interface** is pre-configured with the following parameters:

Device Name: **iSkyHub-B**

PassKey: **1234**

Baud Rate: **9600**

8 data bits, 1 stop bit and no parity

USB interface:

Default External Encoders: 8192 Tick/Revolution

Revolutionary, 8192 PPR, low power consumption, ball bearing encoders. Come with encoder cables, encoders adapters brackets for Hubble UL14, 16, 18 and 20.

High Resolution Digital Inclinometer: High resolution (0.01 degree) digital inclinometer. 10000 PR.

Bluetooth V2.0 compatible.

It support USB connection with MS Windows XP/Vista/7/8 and iOS (Mac Book)

Four LEDs: Power LED, Bluetooth Status LED, Communication LED, and Information LED .

9VDC (6 x AA) external battery box. It also works with an internal 9V battery. Battery is not included.

Sky Fox LT: a simple but powerful (free download) Android based Digital Setting Circle software. It includes all Solar planets, 250 named stars, complete Messier (110), NGC/IC (7840/5382), Washington Catalog of Double Stars (WDS), Yale Bright Star catalog and the entire SAO catalogs (258,996 stars), free of charge (not supported).

It works with **Sky Safari** on Android devices (with Bluetooth). Sky Safari (Pro) features 15.3 million stars, 740,000 galaxies, and 550,000 solar system objects, including all the comets and asteroids ever discovered. **Not included.**

Items included in the complete iSkyHub-B package:

#1: iSkyHub-B Receiver CPU Board, QTY:1

#2: iSkyHub-B Controller Box, QTY:1

#3: Encoder Y Cable, QTY:1

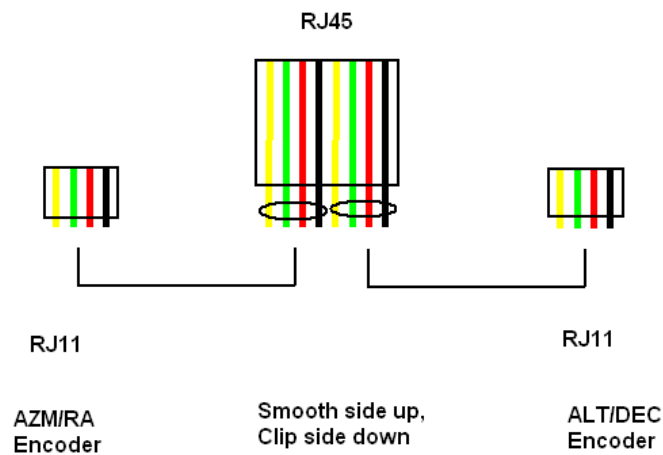
#4: ALT encoder and pivoting arm assembly with cable, QTY: 1 **(Not provided if ordered with the internal inclinometer)**

#5: AZM encoder pivoting arm assembly with cable, QTY:1

#6: ALT encoder holder bracket, QTY:1 1 **(Not provided if ordered with the internal inclinometer)**

- #7: AZM encoder holder brackets, QTY :1
- #8: ALT encoder M6 knob screws, QTY:2 1 **(Not provided if ordered with the internal inclinometer)**
- #9: ALT/AZM encoder plastic wrapped M6 pivoting screws, QTY:2
- #10: AZM encoder bracket installation screws (M6 X 16), QTY:3
- #11: External 9VDC Power Cage, QTY:1
- #12: External 9VDC Power Cable , QTY:2
- #13: Power Extension Cable, QTY:2
- #14: The iSkyHub-B mounting base

Encoder Y Cable Pin Out:



Encoder Connections

- G: Black, Ground**
- X: Not used**
- A: Red, A Channel**
- 5V: Green, +5V**
- B:, Yellow: B Channel**

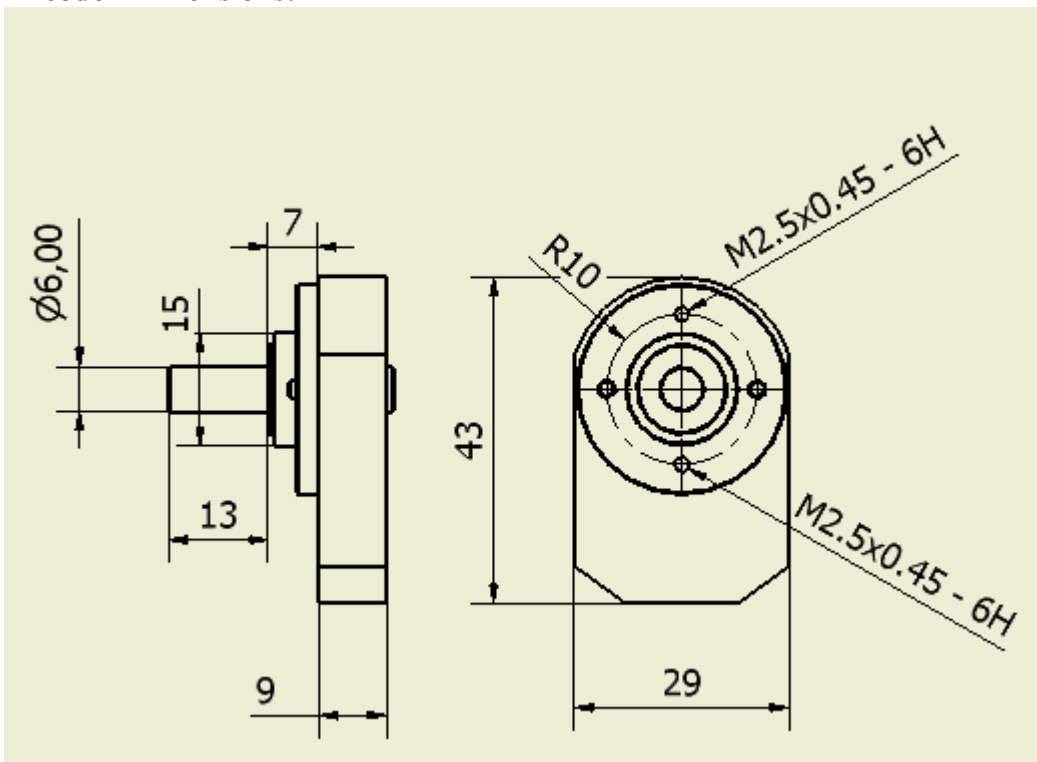
The ALT/DEC cable/connector will not be used if the internal inclinometer is used.

Encoder Specification:

- CPR: 8192
- Operating Temperature: -40°C - 100°C
- Max humidity: 95%
- Supply Voltage: 3.6-5.5 V
- Current Consumption: typical ~6 mA, max 10mA

PIN-OUT	
PIN	DESCRIPTION
B	B CHANNEL
5V	+5VDC POWER
A	A CHANNEL
X	INDEX OUPUT
G	GROUND

Encoder Dimensions:



9. Limited Warranty

Optel Engineering Group Inc. (Hubble Optics), Seller, warrants to the original purchaser only, that goods sold will be free of material defects in design, materials and workmanship for a period of 6 months following the date of shipment by Seller to Buyer. Seller will repair or replace, or refund the purchase price as to, goods that do not conform to the foregoing warranty, provided the cause of the nonconformity does not arise from or relate to modification, misuse, or abuse by the customer, and provided a warranty claim. Repair or replacement of the product or refund of the purchase price, at Seller's sole option, shall be the

Buyer's exclusive remedies. Seller shall not be responsible for any indirect, special or consequential damages arising from use of the products. Goods subject to this warranty must be shipped postage pre-paid by Buyer to the Seller.

If the products have been damaged by modification, lightning, faulty wiring, moisture, or other misuse, the warranty is void.

Appendix A: FAQ and Troubleshooting

1. Why it works with Bluetooth Connection, but does not works with USB with my PC.
A: Please check the Jumper setting to make sure they in the right position

2. Why it works with USB Connection, but does not works with the Bluetooth with my PC/Tablet
A: Please check the Jumper setting to make sure they are in right position

3. Why it worked on my PC over Bluetooth/USB before, but stops working now?
A: Please check COM port is correctly set in the ASCOM driver. Please understand, the USB/COM port number might be changed after the reboot, or reconnected; so you need to make sure the COM port is always set correctly in ASCOM driver.

4. Does iSkyHub-B work with my non Hubble UL telescope?
A: Yes, it should work with any kind of telescope supported by your planetarium software, such as German EQ Mount, Equatorial Fork, Alt-Az Fork (Dobsonian) and EQ platform.

5. Does Sky Hub work with my own encoders?
A: It should work with any TTL-compatible quadrature encoders such any of these Single-ended US digital encoders:
<http://www.usdigital.com/products/encoders/incremental/rotary/shaft>

By default, our encoder housing and bracket supports metric 6mm diameter encoder shaft.

6. Does iSkyHub-B work with iPad, iPod, iPhone, or MacBook?
A. Sorry, but No. iSkyHub-B does not work with any Apply device. In theory, with an USB-Wifi converter, the iSkyHub-B will work with an Apply device, however, this is not supported.

Specifications subject to change without notice.