iSkyHub-B Instruction REV 2.1 Hubble Optics

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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 loosing 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 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 Bluetooh 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. <u>http://windows.microsoft.com/en-us/windows-vista/set-up-a-bluetooth-enabled-device</u> <u>http://www.youtube.com/watch?v=uFG3h6xyVeo</u> <u>http://www.metacafe.com/watch/1186986/how to set up a bluetooth device/</u>

The following procedure is for Windows XP only.

First, launch the Windows XP Bluetooth Devices Manager.

Bluetooth Devices	×
Devices Options COM Ports Hardware	
Add Remove Properties	
OK Cancel Apply	

Then Click the "Add" button to search the iSkyHub-B.

Add	Bluetooth Device Wizard		
Se	elect the Bluetooth device t	hat you w ant to add.	*
	🔊 SkyHub	1000-0011C669	
	🅐 New device	New device	
ų,	 If you don't see the device tha turned on. Follow the setup ins and then click Search Again. 	at you want to add, make sure that it is structions that came with the device,	Search Again
		K Back Next >	Cancel

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

Add Bluetooth Device Wizard	×
Do you need a passkey to add your device?	*
To answer this question, refer to the "Bluetooth" section your device. If the documentation specifies a passkey, us	of the documentation that came with se that one.
O Choose a passkey for me	Ν
\odot Use the passkey found in the documentation:	1234
O Let me choose my own passkey:	
🔿 Don't use a passkey	
You should always use a <u>passkey</u> , unless your device recommend using a passkey that is 8 to 16 digits long more secure it will be.	e does not support one. We g. The longer the passkey, the
< B.	ack Next > Cancel

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

Bluetooth	1 Devices	×
Devices	Options COM Ports Hardware	_
All o	other devices	
	SkvHub	
	Passkey enabled	
	R	
	d Bemove Properties	
	OK Cancel Apply	

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 part 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,

System Properties			? 🛽			
System Restore	e Automati	c Updates	Remote			
General	eral Computer Name Hardware Advance					
Device Manager The Device Manager	evice Manager lists all th r computer. Use the De ies of any device.	ne hardware device vice Manager to ch	es installed hange the			
	,	Device Ma	anager			
Drivers Compation how W	Signing lets you make s ible with Windows. Wir indows connects to Wi Driver Signing	ure that installed dr ndows Update lets y ndows Update for o Windows L	ivers are you set up drivers. Ipdate			
Hardware Profiles Hardwa differen	are profiles provide a wa It hardware configuratio	ay for you to set up ns.	and store			
		Hardware F	Profiles			
	ОК	Cancel	Apply			

🚇 Device Manager	
File Action View Help	
 ENOVO-D011C669 Batteries Bluetooth Devices Obsplay adapters DVD/CD-ROM drives DVD/CD-ROM drives Human Interface Devices IDE ATA/ATAPI controllers IDE ata/ATAPI controllers Main adapters Monitors Monitors Monitors Ports (COM & LPT) Processors Sound, video and game controllers 	
 System devices Get Universal Serial Bus controllers 	

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):

Device Manager	
File Action View Help	
🗄 💈 Bluetooth Devices	^
	-
🕀 🕎 Display adapters	
E W DVD/CD-ROM drives	
Human Interface Devices	
General DE ATA/ATAPI controllers	
Imaging devices Imaging devices	
+ www.keyboards	
H S Monitors	_
E == ■ Network adapters	=
Ports (COM & LPT)	
Bluetooth Communications Port (COM5)	
Bluerooth Communications Port (COM/)	
USB Serial Port (COMb)	
Home Sound, video and game controllers	
Hand System devices	
H. Carlo Controllers	~

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 (<u>http://eksfiles.net/digital-setting-circles/ascom-driver-for-digital-setting-circles/</u>) and install EK ASCOM Driver for Digital Setting Circle.

The driver requires that <u>ASCOM Platform 6</u> (or newer) to be installed on your computer. It also requires <u>Microsoft .Net 3.5</u> or higher.

4. Stellarium

4.1 Installation of Stellarium

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

		Configurati	on		×
	0		*		an <mark>t</mark> }
Main	Information	Navigation	Tools	Scripts	Plugins
Progr	am language				
				=#=	
	Engli	sh			
Dofau	lt options				
Derau	ne opcions				
	Save settings		Resto	ore defaults	
Restorii current next st	ng default settings options includes t artup.	s requires a resta the current FOV a	art of Stella and directio	rium. Saving on of view for	all the use at
Startup	FOV: 60°				
Startup	direction of view	Az/Alt: +179°59'	58"/+11°18	3'36"	

Then click Plugins.

		Configurati	on		×
*	0		*		₽ ℃
Main	Information	Navigation	Tools	Scripts	Plugins
Angle Mea	isure	Telescope	Contr	ol	
Compass	Marks	This plug-in allo	ws Stellariu	um to send "	slew"
Exoplanet	s	mount (a "GoTo	telescope telescope	on a compu "),	terized
Observabi	lity analysis	Authors: Bogda	an Marinov Istellerium	, Johannes G	ajdosik
Oculars		contact: http://	stellarium.	org	
Pulsars					
Quasars					
Satellites					
Solar Syst	em Editor		, D	7	
Historical S	Supernovae				
Telescope	Control				
Text User	Interface				
Time Zone	3	Options ∳ Load at st	artup	config	ure

Then choose Telescope Control, and then click "configure" button.

		Teles	copes			×
Telescopes	Option	s _{Navig} H	elp	Abo	utripts	
Telescopes	Controlle	d	optan	Ferritreit		
# 🗠 Statu	s T	ype	Name			_
oinservahiliru ar						
oculars						
Rusars						
Quasars						
Satellites						k
Solar System &						,
Historical Supe						
Telescope Con						
Connec	t 📃	Configure		Add	Remo	ove
Press the "Ac	d" button t	to set up a n	ew teles	cope conne	ection.	

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"

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

	Tele	escopes		×
Telescopes Op	otions	Help	About	Plugins
Telescopes Cont	rolled			
# A Status 1 Connected	Type local, extern	Name al UL16 f/4.5		
Observability analysi Oculars				
Pulsars				
Satellites Salar System Editor				
Disconnect To slew a connecte that object, then he telescope's numbe the Alt key and pre	Configure d telescope to a old down the Ctr r. To slew it to th ss the key with t	Adv n object (for 1 key and pre the center of th that telescop	d Ren example, a star), iss the key with th he current view, h e's number.	nove select nat iold down

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)

👑 Digital Setting Circles Setup
Digital Setting Circles v1.0.8.0 Driver for "push-to" telescopes Copyright © 2012 by David Ek http://www.eksfiles.net/
Telescope Info
Name: UL16 f/4.5
Description:
Mount: Altitude-Azimuth Focal Length (m): 1.8
Aperture Dia (m): 0.4 Area (sq m): 0.16
Encoder Info
Interface Type: Dave Ek's Digital Setting Circles
RA/Azimuth Ticks/Rev: 8192 Reverse Encoder Counts?
DEC/Altitude Ticks/Rev: 10000
Serial Port: COM6 K Azimuth Test
Site Info
Latitude: 22 d 16 m 31 s North -
Longitude: 114 d 8 m 37 s East 💌
Elevation: 10 m
OK Cancel Help

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

🚾 Alignment Step 1: Move Scope to Zero Degrees Ali	titude 🛛 🔀
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.	

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.

🌠 System			
System Server Teles Telescope settings	cope Language		
Select the telescope ir	nterface		
O INDI driver	🔘 Manual mount	ASCOM	
OLX200	C Encoders		
ASCOM telescope Use the menu or b	interface utton "Connect telescope" to conf	igure this driver.	
			R
	Неір ОК	Apply	Cancel

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

Kara ASCOM telescope interface	
Driver Selection	
ASCOM.EncoderDsc.Telescope Select	J
Configure	1
About About	J
Observatory	6
	_
Latitude +22°40'48" Longitude +115°55'12"	
Set Location Set Time	
RA DEC	
AZ ALT	
Tracking Abort Slew	
Connect Disconnect Hide	
Help	1 L

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

ASCOM Telescope Chooser	×
Trace	
Select the type of telescope you have, then be sure to click the Properties button to configure the driver for your telescope.	
Tangent-Compatible Digital Setting Circle 🗸 Properties]
Click the logo to learn more about ASCOM, a set of standards for inter-operation of astronomy software.)]

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)

Serial Port: COM6 (an example)

👑 Digital Setting Circles Setup
Digital Setting Circles v1.0.8.0 Driver for "push-to" telescopes Copyright © 2012 by David Ek http://www.eksfiles.net/
Telescope Info
Name: UL16 f/4.5
Description:
Mount: Altitude-Azimuth Focal Length (m): 1.8
Aperture Dia (m): 0.4 Area (sq m): 0.16
Encoder Info
Interface Type: Dave Ek's Digital Setting Circles
RA/Azimuth Ticks/Rev: 8192 Reverse Encoder Counts?
DEC/Altitude Ticks/Rev: 10000
Serial Port: COM6 COM6 COM6 COM6 COM6 COM6 COM6 COM6 COM6
Site Info
Latitude: 22 d 16 m 31 s North 💌
Longitude: 114 d 8 m 37 s East 💌
Elevation: 10 m
OK Cancel Help

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

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"

Scope Setup Settings		×
Equipment Selection		
Scope Type Basic Encoder System		>
Mount Type Alt-Azimuth Fork		>
Communication Settings		
Connect via Bluetooth		
Connect via WiFi		
IP Address 10.0.0.1		
PortNumber 4030		
Set Time & Location		
Readout Rate 6 per second		>
SkyFi Settings Web Page		>
	53 4	5:09 💎 🛯 🚺

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"!

Scope Mount Type Settings	_	×
Mount Type		
Equatorial Fork		
German Equatorial		
Equatorial Platform		
Alt-Azimuth Fork		
Alt-Azimuth GoTo		
Encoder Steps Per Revolution (Plus = clockwise; Minus = counterclockwise)		
RA/Azm -8192		
Dec/Alt +10000		
Get Automatically		
	23 P	5:10 🕈 🛯 🗋

External AZM encoder & The Internal ALT inclinometer

Scope Mount Type Settings			×
Mount Type			
Equatorial Fork			
German Equatorial		×	
Equatorial Platform			
Alt-Azimuth Fork			
Alt-Azimuth GoTo			
	Encoder Steps Per Revolution (Plus = clockwise; Minus = counterclockwise)		
RA/Azm: -8192			
Dec/Alt: +8192			
Get Automatically			
		53	🖞 5:10 💎 🛯 🚺

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 ha been connected to Sky Safari, and your 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 **Bluetooh 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:, Yellew: 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		
В	B CHANNEL	
5V	+5VDC POWER	
Α	A CHANNEL	
Х	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.