

Subject:
SBIG Optical Telescope Installation
Guide, GLT
To:
Nimesh Patel

Date:
2012 June 28, revision1
DK002_2012v1
cc:
Ming-Tang Chen
Rob Christenson

From:
Derek Kubo

Location/Phone:
Hilo Office/
808-961-2926

Filename: Memo_DK002_2012.doc

I. Mechanical interface to optical telescope base plate

The adapter assembly is shown in [Fig. 1](#). The honeycombed aluminum base plate of the telescope structure will be sandwiched between the Y-plate and the 3 aluminum spacers positioned as shown in the figure. This assembly should be mounted to the structure prior to installing the SBIG camera. **Since the Y-plate is constructed out of aluminum please take caution to not exceed 12 ft-lbs of torque.**

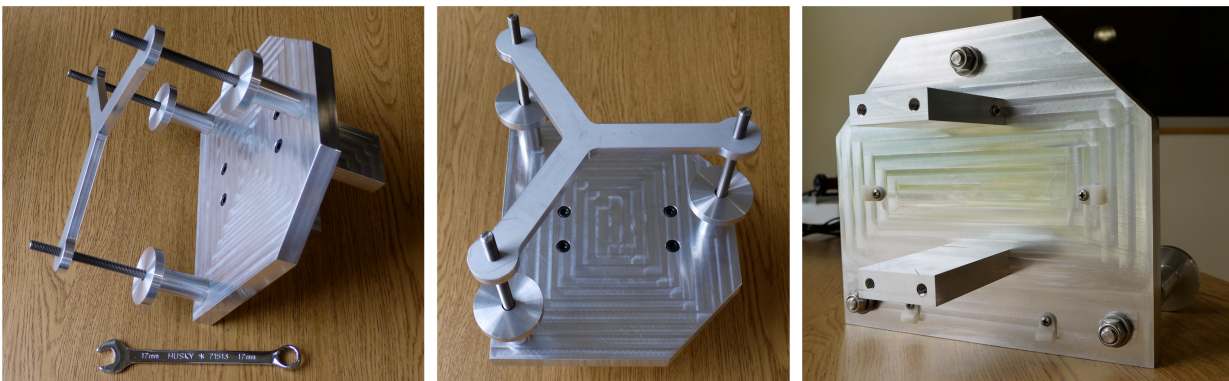


Fig. 1 – Aluminum adapter plate assembly. Left and center – views of plate assembly with 3 aluminum spacers on M10 bolts. The Y-plate is threaded to accept the M10 bolts (max torque 12 ft-lbs). Note that this Y-plate goes above the base plate of the structure when the telescope is in the stow position (looking toward horizon). Right – view bottom of adapter plate assembly without SBIG camera.

II. Installation of SBIG camera

With the aluminum adapter assembly already mounted to the telescope structure, mount the camera + small aluminum adapter plate to the assembly using the 4 black M8 bolts provided with the kit. Refer [Fig. 2](#). If you have the UV in hand, this will be a good time to install it. Note that the SBIG camera will be hanging upside down when the telescope structure is looking toward the horizon. I have oriented the camera to produce right side up images when mounted upside down.

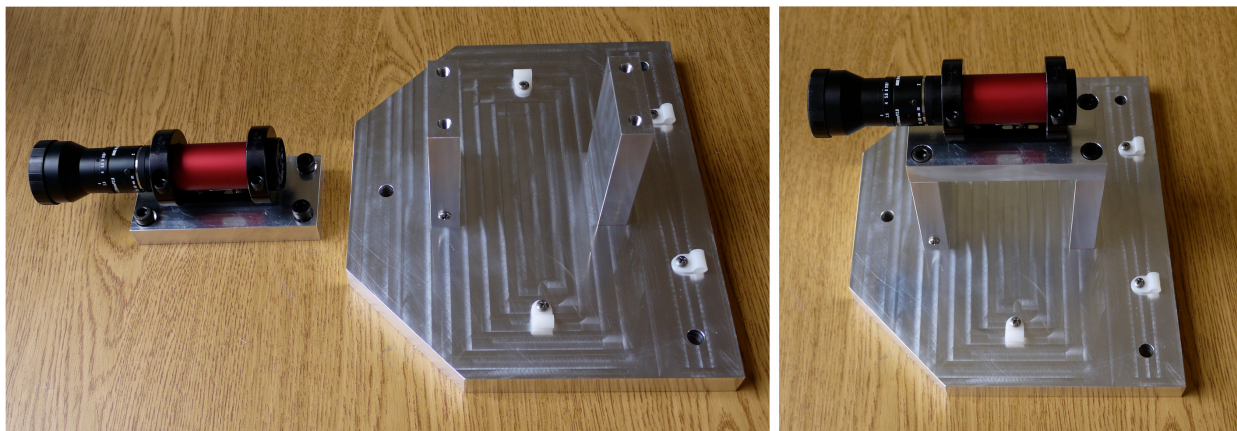


Fig. 2 – Installation of SBIG camera to adapter assembly. Note the direction of the camera WRT to the plate.

III. Electrical Interconnections between Mac Mini and SBIG camera

Fig. 3 represents the electrical interconnect diagram. We have made accommodations for two 20-meter extension segments that may be connected in cascade if necessary. Each USB extension cable contains an active repeater and support USB 2.0 data transfer speeds (480 Mbps). Both the 20-meter and 40-meter links have been tested to be reliable with the SBIG camera.

Important items to note:

- If using a single 20-meter segment, it is sufficient to use the small DVE switching power adapter that plugs into a 120 VAC outlet. However, when using two 20-meter segments in cascade, it is necessary to use the external Agilent supply as indicated in *Fig. 3*¹. When using either the 20-meter or 40-meter extension segments, please use the external Agilent power supply as shown in *Fig. 3*.
- When initially connecting the cables at the Mac Mini end, **it is very important to connect the power first, then USB cable last**. If you connect the USB cable first the Mac Mini provides just enough DC power over the USB cable to hang the SBIG camera into an invalid state.
- If using two cascaded sets of 20-meter extension cables, please use the supplied black heatshrink tubing (one each for USB and +5V cables) to provide watertight and mechanically secure connections in the exposed section. Verify camera operation prior to applying heat to the heatshrink tubing.

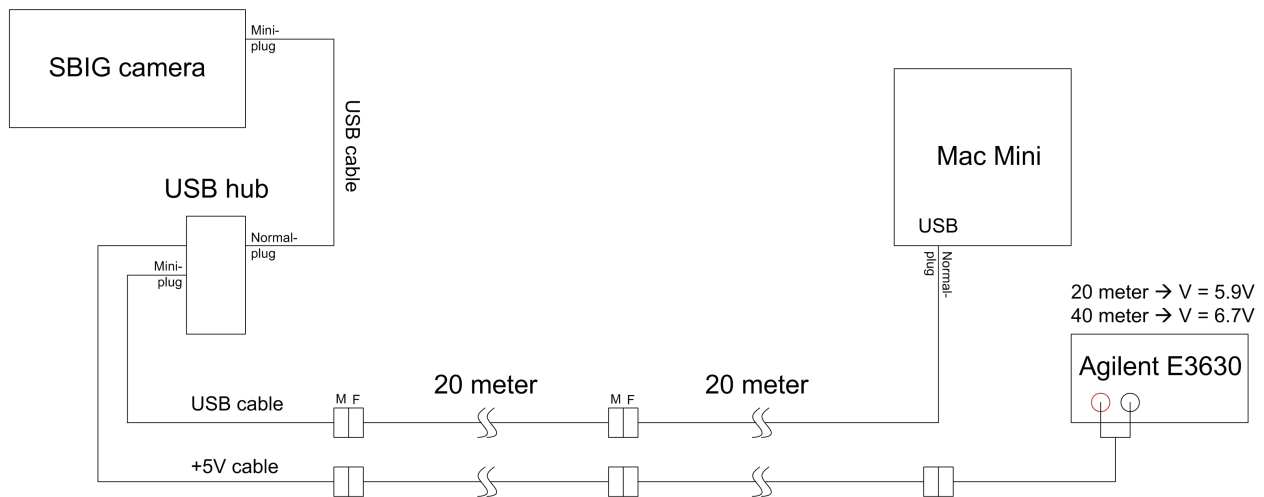


Fig. 3 – Mac Mini to SBIG camera interconnect diagram. Note the different voltage settings for 20m and 40m.



Fig. 4 – Photo of completed interconnects to SBIG camera (only one 20-meter extension cable shown). Note the USB hub is wire tied to the right vertical support plate and barely visible in the left photo. Both the USB (black) and +5V power (white) extension cables are wire tied together.

¹ The white 20-meter power cable consists of 20 AWG wire with a resistance of 11.35 Ohms/1000 feet at 50 degrees C. Total round trip resistance for 20-meters is 1.5 Ohms corresponding to a voltage drop of 0.75V for 0.5A current draw.

IV. Final installation of weather cover and lens hood

After verification of the camera operation, the final step will consist of the installation of the translucent milk jug onto the camera support followed by the installation of the lens hood. The milk jug is attached to the front vertical support via two 8-32 screws, one on each side. Refer to [Fig 5](#).



Fig. 5 Photo of completed camera assembly with cover and lens hood. The cover is held to the assembly with two 8-32 Phillips head screws. The lens hood is held to the lens with three white plastic blade head screws.

V. Hardware inventory

We have shipped the following hardware to Socorro, NM, addressed to Jon Thunborg.

<u>Qty</u>	<u>Description</u>	<u>Provided by</u>
1	SBIG model ST-i mono chrome camera with guider kit and 100mm lens	Nimesh
1	Mac Mini	SMA
1	Agilent E3630 DC power supply	SMA
1	Fluke 177 digital volt meter	SMA
1	Fluke 123 oscilloscope and meter	SMA
1	Aluminum mounting plate assembly	ASIAA
2	Belkin USB 2.0 hub, 4-ports, with external power supply	ASIAA
3	Monoprice USB 2.0 extension cables, 20m	ASIAA
2	DC power cables with keyed Molex connectors, 20m	ASIAA
1	Husky tool bag (with various tools)	ASIAA
1	Miscellaneous hardware (spare bolts, screws, wire ties, tape, etc.)	ASIAA

Acknowledgements: Ryan Chilson for assembling the cables, Ranjani Srinivasan for generating the C-code and testing the camera with the extension cables at Hale Pohaku, Rob Christenson for providing technical advice.