



OAG-8300
Off-Axis Guider
Installation Instructions

Santa Barbara Instrument Group

A Division of Aplegen, Inc.

147A Castilian Drive, Santa Barbara, CA 93117 USA

Phone (805) 571-7244 • Fax (805) 571-1147

Email [sbig @ sbig . com](mailto:sbig@sbig.com) • Web [www . sbig . com](http://www.sbig.com)

1. Introduction

SBIG's OAG-8300 Off-Axis Guider assembly is an accessory for the ST-8300 and STF-8300 series of cameras. It may be used with or without a filter wheel. The OAG-8300 is designed to allow guiding on stars off-axis from the imaging CCD using an ST-i camera as the autoguider. Its internal 7-element optical relay system includes 0.7X focal reduction so that the field of view of the guider is effectively doubled, increasing the odds of finding a bright guide star without compromising the centering of the target object on the ST-8300.



Fig. 1 Off-Axis Guider on ST-8300 and CFW-5

When used with an ST-8300 or STF-8300 without a filter wheel, an optional spacer that takes the place of a filter wheel can be purchased that places the OAG-8300 at the correct distance from the focal plane to allow the guide camera to achieve focus.

2. Preliminary Adjustments

Before securing the OAG to the camera or filter wheel, there are two adjustments you should make:

First, you should adjust the pickoff mirror/prism to match your optical system. A small setscrew on one side of the mirror allows it to be loosened and moved in the dovetail (Fig. 2).

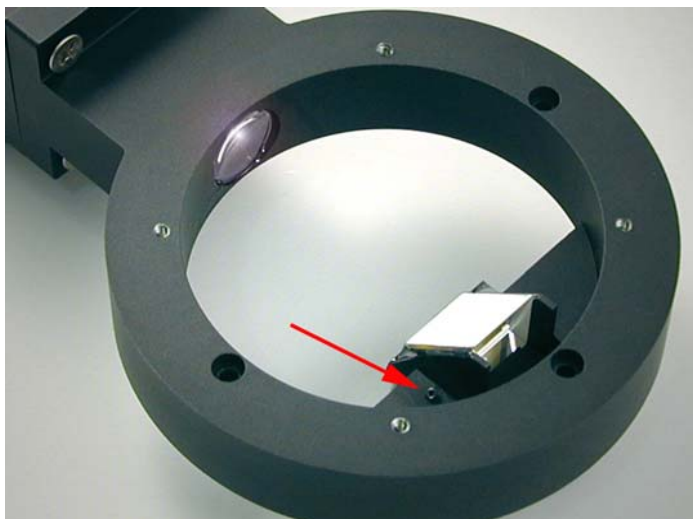


Fig. 2 Mirror Dovetail is secured by Small Setscrew

A mark indicates the proper position for an F/5 optical system. The mark is not easy to see, but for an F/5 system the dovetail will protrude about 0.22 inches (5.6 mm) out from the mating part. If your optical system is F/10 then the mirror needs to be moved toward the centerline about 0.09 inches (2.3 mm), protruding 0.31 inches (7.9 mm). We suggest you start with it in the F/10 position and take a flat field with your imaging system on the telescope. If you see the shadow of the mirror along the edge of the imaging CCD, note how much the shadow protrudes into the image and back the mirror up by a similar amount. A shadow with a width of 185 pixels means you need to back up the mirror by 0.040 inches (1 mm).

This is not supercritical, and a flat field should remove any vignetting that occurs. An iteration or two, tightening the prism slide each time, should achieve a good alignment.

The second adjustment to make is the orientation of the autoguider. The two recommended positions are shown in Fig. 1 (autoguider vertical) and Fig. 11 (autoguider horizontal). You can rotate the off-axis guider's 1.25" drawtube by removing the four socket head screws (two are shown in Fig. 3) and re-orienting the drawtube the way you like. The hole pattern is symmetrical. Simply re-fasten in the new position using same screws.

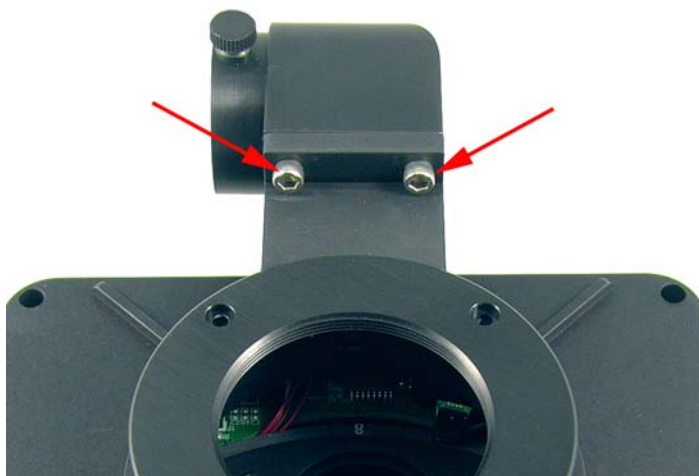


Fig. 3

With a small or ball-head hex wrench this orientation can be changed after the OAG is attached to the camera but it is easier to do it before-hand. Once you have made these preliminary adjustments, you can then attach the OAG to the camera.

3. Attaching the OAG-8300 to a camera with filter wheel

This section describes how to attach the OAG-8300 to cameras equipped with an FW5-8300 or FW80-8300 filter wheel. If you do not have a filter wheel, follow the instructions in Section 4.

- a) Remove the round t-thread adapter plate from the filter wheel by unscrewing the four Philips head screws shown in Fig. 3, below.

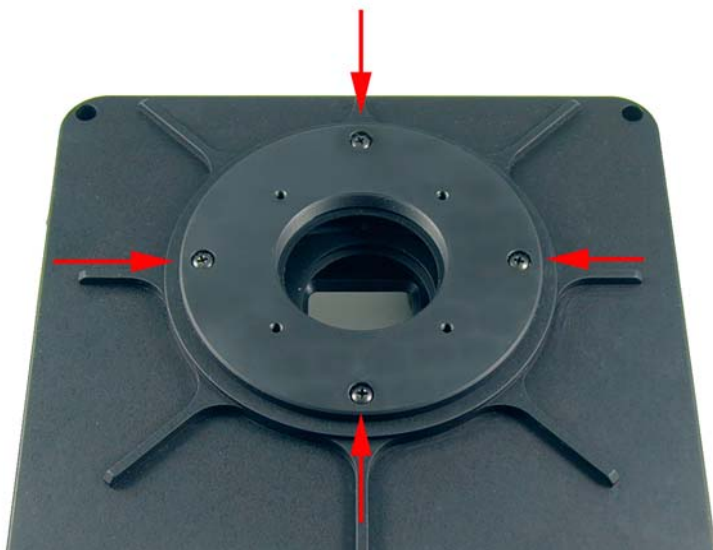


Fig. 3

IMPORTANT: Save this round plate, but **do not use it with the OAG-8300**. There is similar looking round t-thread adapter for the OAG-8300 that is thinner and allows needed space for the OAG pick-off mirror..

- b) If your OAG-8300 already has a T-thread, 2" thread or STL thread adapter plate attached, remove it now in order to complete the rest of the installation.

c) Attach the OAG-8300 to the filter wheel with THREE 4-40 x 1" screws provided making sure that the heads of the screws are completely inside the recesses (Fig 4)



Fig. 4

d) Attach the OAG adapter plate (t-thread, 2" or STL) using the FOUR 4-40 x 1/2" button head screws provided (Fig. 5).



Fig. 5

4. Attaching the OAG-8300 to a camera without a filter wheel

To attach the off-axis guider directly to an ST-8300 or STF-8300 camera without a filter wheel, you must first attach a spacer to the camera body that takes the place of a filter wheel (Fig. 6). This spacer will place the OAG-8300 at the right distance from the focal plane for the ST-i Autoguider to achieve focus.



Fig. 6

a) Attach the spacer to the front plate of the camera using the FOUR 4-40 x 3/8 pan head screws provided with the spacer (Fig. 7).



Fig. 7

b) Attach the OAG to the spacer using the THREE 4-40 x 1" screws provided with the OAG-8300 (Fig. 8)



Fig. 8

c) Attach the adapter plate to the OAG using the four 4-40 x 1/2" screws provided with the OAG-8300 (Fig. 9).



Fig. 9

5. Focusing the ST-i Autoguider

To focus the ST-i Autoguider, insert the ST-i into the OAG-8300 drawtube. Center the imaging CCD on a star cluster and focus it. Next, switch to the ST-i Autoguider and focus it by sliding it in the barrel of its attachment. Lock it in place with the thumbscrews. A pencil mark or piece of tape on the outside of the ST-i will allow you to get close next time if the unit is disassembled. Note: With an off-axis guider, if your filters are different thickness you will have to refocus the imaging chip, and also the guiding path. So it is best if your filters are all the same thickness. Also, with any off-axis guider, the optical quality of the off-axis guiding image may not be as good as the on-axis image on the on the imaging CCD, but this is fine for guiding. The corners of the image may show some coma depending on how fast your optical system is.

6. ST-i Orientation

An optical diagram is shown below in Fig. 10, below. The optics in the OAG-8300 are designed to get the pickoff mirror (actually an aluminized surface of a prism) as close as possible to the imaging CCD centerline without casting a shadow onto its surface (vignetting). This is important for telescopes like Schmidt-Cassegrain designs, where the exit aperture is not large.

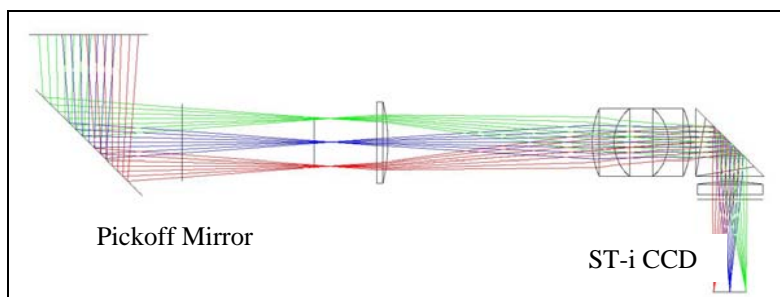


Fig. 10: Off-Axis Guider Optical Diagram

As a result of minimizing that off-axis distance, the ST-i, with its rectangular CCD, has a preferred orientation. If, in Fig. 1, the face of the 8300 with FW-5 is horizontal, then the long dimension of the

ST-i oriented as shown should be horizontal. The final reflecting surface in the off-axis guider can also be oriented so the ST-i is downward, as shown in Fig, 11, below.



Fig. 11: Other Orientation of Off-Axis Guider on Assembly.

In this case the ST-i should be rotated so the long dimension of the CCD is parallel to the short dimension of the filter wheel housing. Other orientations will work, but this will maximize the illumination across the ST-i CCD. Choose an orientation that allows the cables to flow off your telescope most smoothly.

Front adapters are available for T-thread (metric M42x0.75mm), Visual Back threads (2.000 inch by 24), or STL threads (2.156 inch by 24). Use the largest adapter you can accommodate to avoid vignetting.

OAG-8300 Typical Specifications	
Optical Back focus Required	0.9" (22.9 mm) including adapters
Weight	12.6 oz. (356 g.)
Dimensions	6.5 x 3.5 x 0.9" (165 x 89 x 23mm)
Available Front Plate Adapters	T-thread, 2" (SCT) and 2.156" (STL)