

## Keeping things in Focus Part II

Rick Saunders

In a previous article I talked about building a simple variable-speed controller for a DC focus motor. In this article I'll show how I put that controller to use on my recently purchased Astro-Tech 8" f/4 Imaging Newtonian.

While most visual observers don't really need powered focusing; if you are an astro-photographer and work a lot from a computer then powered focusing is, in my mind, a 'must have' accessory. Even if you don't use a computer at the telescope powered focusing makes life very easy if you have one of the latest crop of DSLR cameras with some form of live display.



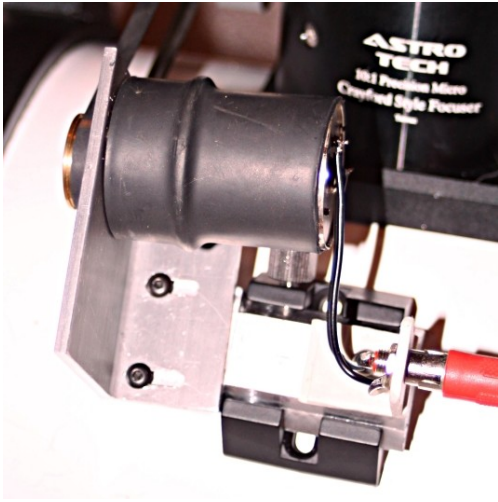
There are many commercial powered focusing units on the market for just about any focuser you might have but, being a tinkerer at heart, I generally like build my own. I also prefer to go the low-tech, simple route for ease of build while not giving up much in the way of function.

For the Newtonian I didn't want to have to modify the optical tube in any way and I almost succeeded (more later). As the telescope will be almost purely used for DSLR imaging I decided that instead of adding a motor mount to the optical tube I would just make use of the dovetail mount intended for the finder; something that will probably never be used anyway.

The motor that I chose was one I had used previously. When I modified the gearboxes on my HEQ5 mount I had left over two DC motors and two 132:1 gearboxes that fit them. This motor turns nicely at around 60 rpm when supplied 12v. The only thing I modified on the motor was to wrap it with some 2" heat-shrink, just to keep out some of the weather. Now off to the machine shop.

*A quick aside here. This project was done in aluminum and brass in a small machine shop. If you don't have access to the tools and/or expertise to work with metals but can work with wood then most of this can be done in a half-decently equipped wood shop. The machined dovetail fitting works just as well in birch as it does in metal and the other parts could just as well be fabricated from wood or plastic.*

The first thing that had to be fabricated for the project was to a suitable pulley for the motor. The output shaft from the gearhead was 6mm with a flat. My best friend and astronomer/machinist Dave Rubenhagen, whose shop I invaded, pulled a scrap brass bar from his supply and chucked it into the lathe. The belt I had on hand was 1/4" wide so Dave turned the bar down to a suitable diameter and cut a slot in the circumference just over that width. Then he bored the central hole and drilled/tapped it for an 8-32 setscrew.



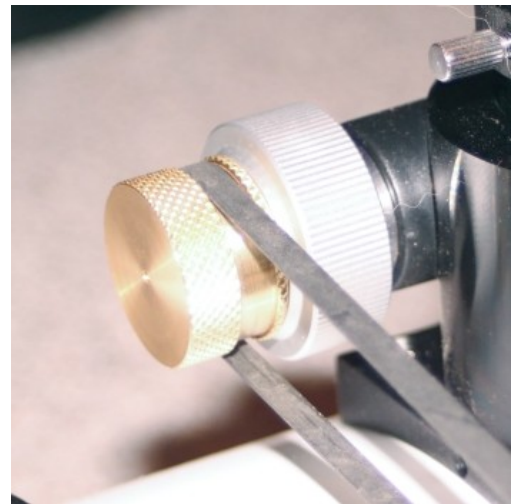
The only 'tricky' part of this came next, the part that would fit into the finder mount. The dovetail used by GSO to mount their finders is a fairly simple 30 degree dovetail. A piece of ½ inch aluminum bar was pulled from the scrap drawer and Dave cut the dovetail angles on a mill using an adjustable-angle vise set to 30 degrees. We left one end of the part square. This would be where the motor bracket would mount. Once shaped everything was squared off and dressed up.

A piece of 1/8<sup>th</sup> inch 90 degree angle aluminum was pressed into service for the motor bracket. This was cut to length on the band-saw and then dressed up on the mill. Three holes were drilled on one arm of the bracket to take the motor's mounting screws and to let the output shaft through.

Countersink the screw holes and use flat-head screws. You don't want the screw heads standing proud of the bracket. Slots were milled into the opposite arm that would allow mounting the bracket to the dovetail part. The slots would allow for adjustment. Properly spaced holes were drilled and tapped in the dovetail block to allow for mounting.

This was the state of the build when it was first mounted on the telescope. I had figured on just letting the belt ride on the fine-focus knob. After a lot of cussing trying to get the thing to work without the belt sliding off the focuser or the motor pulley I threw in the towel and headed back to the machine shop with the focuser knob in hand.

The plan was to cut a 1/4" slot into the knob on the lathe but after looking at the size of the knob and the chuck on the lathe I decided that a new pulley was in order. This would have to do double duty as the fine-focus knob on the GSO 10:1 focuser. The piece of brass from the first pulley was still in the lathe so we just used that first knurling it to aid grip and then cutting the slot for the belt. A hole in the centre for the focuser shaft and another tapped for an 8-32 setscrew and the knob/pulley was done.



The last little bit was to mount a connector to the dovetail bar so that the motor wire wouldn't trail around with me everywhere as it had on my C8. I cut a 90 degree angled piece of plastic out of an old project case with my Dremel tool and mounted an RCA jack on one arm and drilled a hole on the other. Dave drilled and tapped a hole in the dovetail block and this was screwed in place. Now the motor wire would be detachable.

For all that it doesn't look 'fancy' the unit works absolutely perfectly. There is just enough tension on the belt to turn the focuser and keep it from moving much. The focuser can be used manually by simply taking off the belt, or... the motor unit can be removed from the finder mount in seconds and stowed away if the scope is to be used visually.

Dave still wants to 'sculpt' the motor bracket so that it isn't so ugly and I offered to hollow out the knob/pulley (brass is darned heavy); but that's for later. For now it's time to start catching photons. I

hope the weather smartens up as it's currently dark of the moon.