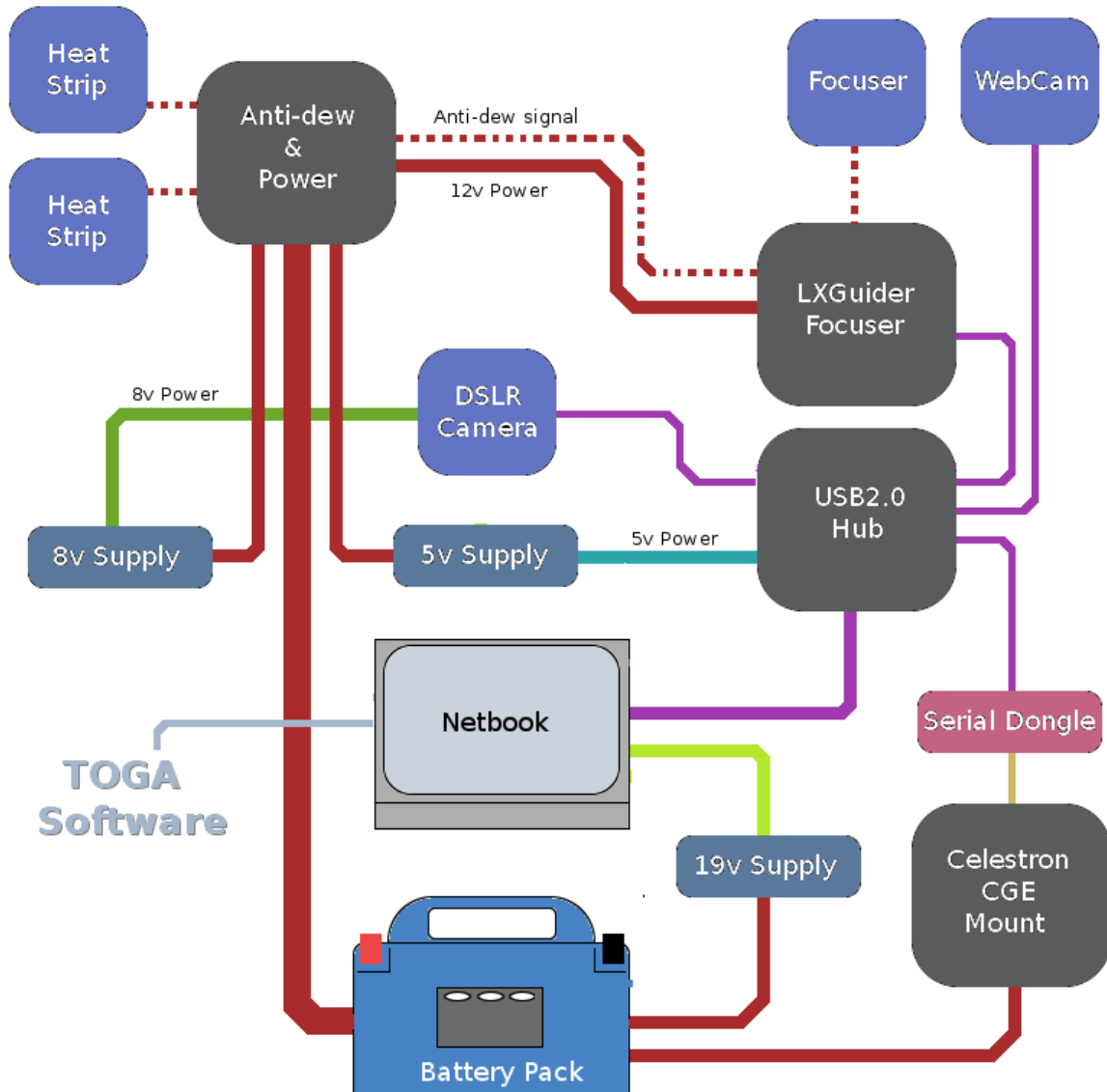


# Rick's World of Wires

A few of the habitués of Fingal have, after looking at my setup, called what I have out there 'Rick's World of Wires'. This is due to the large number of cables that lead to, or are strung over and around, my telescope mount. Here is a schematic illustration of what I mean. All of the peripheral's and wires or cables are shown.



In this schematic the 12v source (whether a battery, my car or an AC/DC supply) is shown as the Canadian Tire Nautilus booster pack that I employ. This has been modified with a set of banana plugs and three decent quality cigarette lighter plugs.

The 12v that is provided has to be further reduced to provide 8v for my DSLR camera and 5v for my USB 2.0 hub. The converters that perform this were built by your humble documentarist and are described more fully on my website: <http://www.togastro.com/ozzzy>. One further power supply is in use with this configuration, a 12v to 19v commercial unit that powers the netbook. If I'm running on mains power then the 19v that it requires are provided by the Acer power supply.

The heart of the system is the TOGA LX-Guider/Focuser. This little unit is USB powered and connects the netbook to just about ALL of the remaining equipment. It provides two ports to drive DC focus motors with 'pulse-focus' capability that is almost the equal to a stepper motor setup. It can power a cooling fan with variable speed OR it can interface with an anti-dew heat controller to keep optics dew free. A port is provided for the control of a DSLR's shutter for exposure control and lastly (as indicated in the name) it acts as an interface to a telescope mount's ST-4 autoguider port.



The webcam that I use to guide (when I'm not using my SBIG ST-4) is a Celestron NexImage unit that is, at heart, a ToUCam of some form. This allows me to guide on 9<sup>th</sup> magnitude stars with my 80mm guide scope and down to 10.5 magnitudes with my 8" f/4 newtonian. The drivers are mature and are supplied with the camera.

The imaging camera that I use is a Hutech modified Canon T1i (Rebel 500D) model. The Canon cameras have become the de-facto standard for DSLR astro-imaging in the past few years. The modifications done to the camera are simply to remove the Canon IR/UV cut filter and replace it with a filter that has greater response in the red part of the spectrum; particularly in the area of the H-alpha band. The Canon Rebel series cameras are compact and very functional. While the prosumer and professional cameras may have larger sensors and more terrestrial photography functions they also have a lot more avoir-dupois that has to be counterbalanced. I prefer the smaller, lighter offerings myself.

The USB hub that I use is a standard 4-port model that I bought for around \$10 at the local liquidation store. It is very compact and runs on 5v, for which I've built the above-mentioned 5v power supply. This is connected to the Acer netbook through two 5m USB cables; one which is powered and the second which is just an extension. The powered cable allows full USB 2.0 speeds between the netbook and the telescope mount while exceeding the USB 5m cable length limit.

I have two USB-to-serial dongles that I can use. Both are inexpensive, generic parts and both function perfectly in Windows XP without the need of installing any drivers that aren't shipped with the operating system. Both also work perfectly with Linux (an important specification for me).

The software that I run on the netbook to do my imaging is all either supplied with my equipment or is available as a free download on the internet.

Telescope control is handled through a free-ware planetarium program called Cartes-du-Ciel (french for Sky Charts). This is a very full-featured package that allows me to use custom catalogues and move the telescope's orientation with point and click. It uses ASCOM to talk to my CGE and in this capacity it functions flawlessly. I use Ver 2.76 but I'm told that Ver 3.0 is now available.

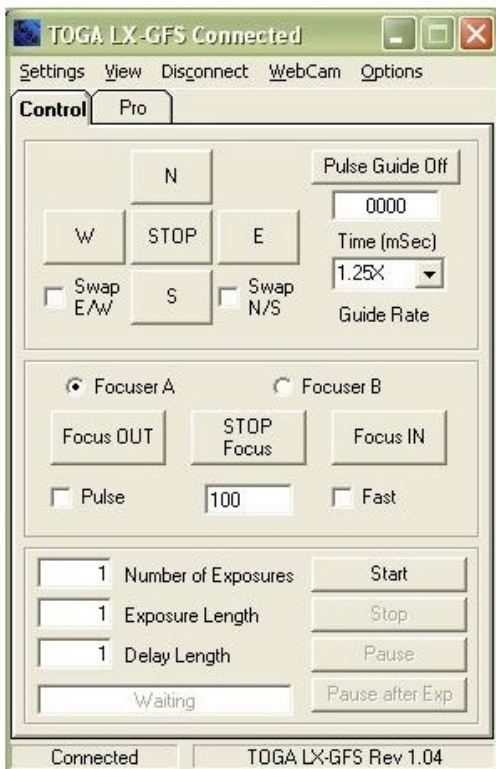


Image capture and exposure control are performed using the software that Canon shipped with my T2i. This allows complete control of the camera via USB including LiveView for framing and focusing and scheduling and timer modules to act let me take sequences of long-exposure images. When a single sub is finished it is displayed on screen allowing me to check it for drift etc.

The TOGA LX-Guider/Focuser is controlled using custom software shipped with the device which allows the netbook to control all of the features of the unit from focusing to guiding. The software is as intuitive as any astronomical software (which means you'll cuss and swear a bit the first few times you use it) but once the initial learning-bump has been crossed it becomes almost second nature.

That is about all I can say about the world of wire that I call my astro-imaging setup. Sometimes I think that all of the voltages running willy-nilly around the mount are going to get mixed up but they never do. Like all things astro-imaging some days my compatriots learn new words when the gods of astronomy decide that THAT night isn't THE night for capturing pretty pictures. Those things happen.

Clear skies and happy shooting

**Rick Saunders**  
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