

Paramount MyT – Part 8 – Through the Mount Wiring

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Electricity is really just organized lightning.

-George Carlin

A really nice feature of the MyT is the ease of running cables through the mount in order to neatly connect your devices. In fact, many people who use through-the-mount cabling for the first time swear that they'd never buy another mount without it. At the same time, it's important to understand the various options for wiring and consider the best approach for you.

As you would expect from a mount designed for serious astronomers, the Software Bisque Paramounts offer a variety of ways to connect devices. Not all of them, however, will work equally well for every situation so a lot depends on your specific needs. Now that you're familiar with the mount's operation, take some time to think about those needs and design something that works for you.

Your goal should be to put together an electronic support system that is electrically reliable, snag free, does not pull against the mount, is easy to connect and disconnect and simple to troubleshoot in the dark with numb fingers. It should also provide suitable protection for the components. Keeping those goals in mind, there are many options that can work and are facilitated by the MyT's design.

For example, it has become trendy in recent years to attach a control computer and electronics "boxes" to the top of the OTA. Such a design permits the use of shorter cables and allows most of your devices to all be in close proximity. On the other hand, such a design also places more weight on the OTA, which requires additional counterweights (or leverage). Moreover, you will still have to supply power. The OTA-top placement can work very well and is especially useful on over-mounted permanent setups or small OTAs in a field setup. If you need ideas, you can see many pictures of OTA-top rigs on the [Cloudy Nights](#) web site. Although, when perusing photos, take note of how the cables are actually run and remember that the goal should be to limit snags and make setup & troubleshooting easy. You can also compromise by placing some gear on the OTA but leave other off the balanced mass.

My own approach is decidedly unfashionable. My electronics equipment is stored inside of a plastic box with a lid that can be left open during the summer or closed in the winter. The electronics in the box include: A power strip, a 12-volt industrial power supply, the MyT's 48-volt power supply, a "headless" computer, a control box for the electronic focuser and a powered USB hub. I then run a power cable to the MyT, a USB cable from the hub to the MyT, a CAT-6 (aka Ethernet style) cable from the Optec Controller to the focuser motor, a USB cable for the Lodestar X2 and

another USB cable for the QSI camera. Finally, I also run a 12-volt power cable to the MyT's "Aux Power In" power extension cable for use by the QSI camera.



Although the outward appearance might make one cringe, the cables and gear is generally secured and organized. This approach has proven convenient and reliable over the years. The plastic box has an AC power cable that I plug into an extension cord and a short harness that attaches to the pier and plugs into the Paramount. Although the computer is equipped with WiFi, I live in an urban area and find that "powerline Ethernet" provides a more reliable networking solution for screen sharing and file transfer. Because I went ahead and ran my own cables through the mount, I do not use any of the Instrument Panel's built-in power or data connections, but enjoy that they are there for the future.



The focus motor and cameras, in turn, plug into the Paramount. When I setup or teardown, I have three “packages”: The OTA/camera assembly, the Paramount and the electronics box. The connection of all of the necessary cables takes me about thirty seconds.





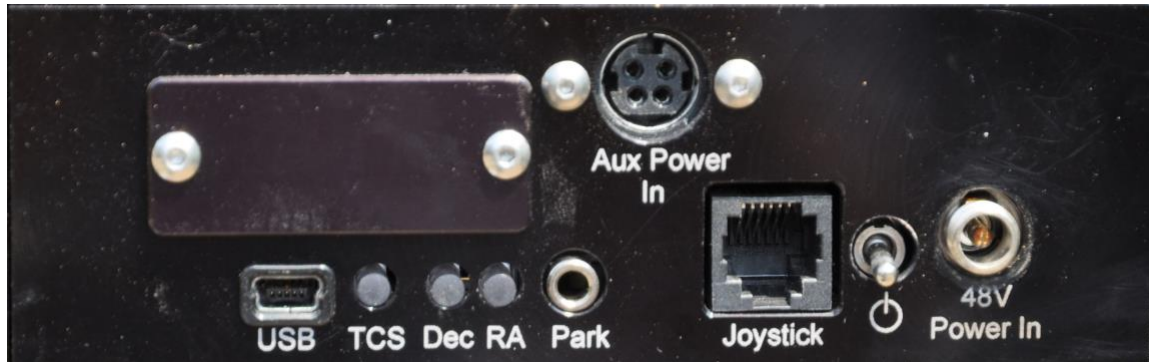
So, how do you get to a cabling layout that works for you? The first thing to understand is that “through-the-mount” cabling can refer to a couple of ideas:

- 1.) Use of the built-in power & data connections included as part of the mount’s electronics box & instrument panel connections. These include the built-in USB connection, focuser control socket and the power connectors.
- 2.) Running your own custom cables. On the MyT, these cables run through the mount’s housing and then through a channel in the bottom of the Versa Plate. The cables can enter the mount through the RA axis access panel. This panel provides both a large round port as well as three “Keystone” panels.

You can use either, or both options depending on your needs.

Let’s talk about the Electronics Box & Instrument Panel, first.

The Electronics Box at the bottom of the mount has an assortment of sockets:



From left -to-right:

- 1.) The USB port is where the control cable to the mount, from the computer, attaches. Please be extremely careful with this socket. The socket is small and is soldered directly to the MKS5000 board. If you attach a long and/or heavy USB cable to the socket and then pull the cable down, up or side-to-side then **you can and will break the socket.**
- 2.) The “Park” socket is for a yet-to-be released external/emergency mount park controller for use in observatories.
- 3.) The Joystick port is where the mount’s hand control (aka paddle) connects. Unless you have a real need to move the mount with the hand controller, please consider leaving it unconnected while you’re imaging.
- 4.) The power switch.
- 5.) The 48-volt power socket, which is used to power the mount electronics.
- 6.) The larger rectangular cover at upper-left is for the antenna of the WiFi daughter card to emerge.
- 7.) The “Aux Power In” socket connects to a four-wire extension cable that is pre-installed in the mount and emerges from the Instrument Panel behind the Versa Plate. The mount does not power this socket. It is an extension cable used to supply devices that require more (or different) power than the Versa Plate’s Instrument Panel can provide. For example, Software Bisque sells cable & plug kits that allow this socket to route power for a wide variety of cameras. There are also part numbers in the manual for the four-wire plug that fits the socket. I use two of the four wires to power my TEC-equipped QSI camera by means of a cable that I fabricated. I will warn you that if you are not accustomed to soldering wires and working with fiddly plastic parts, assembling your own cable may be frustrating.

The Instrument Panel attached to the Vera Plate also has an assortment of sockets:



From left-to-right:

- 1.) The “Out” socket is the top-side companion for the “Aux Power In” socket found on the Electronics Box.
- 2.) The two USB connectors: You can think of the main USB socket in the Electronics Box as leading to a built-in USB (v2) hub inside the mount. That hub then connects to the Paramount but, also, these two USB sockets in the Instrument Panel. While many people use these USB sockets for a variety of purposes, you need to remember that they are connected to a common hub, which also connects to the mount. Although you may be able to control cameras through these USB sockets, they are probably best reserved for less demanding accessories such as focus controllers and rotators.
- 3.) The guider port allows a camera with an ST-4 port to guide the Paramount. Except for something pretty esoteric (or antediluvian), you shouldn’t bother with this approach to guiding. Rather, as described earlier, you should guide the Paramount by means of the Direct Guide protocol.
- 4.) Along with the ST-4 “Guider” port, the “Focus” port is a bit of a historical throw-back. This port is designed to operate older “pulse controlled” focusers. If you have one, you know it.

- 5.) The 5v and 12v ports can power a variety of devices needing those particular voltages. It can be a handy way to power small accessories and gadgets but both ports, combined, are limited to about one amp.

If the built-in Instrument Panel sockets are insufficient or incorrect for your particular application, then you can run your own cabling through the mount. Although the space through the mount is limited, running cables through the MyT is very easy. The simplest way is to remove the RA access rear cover. Then, remove the access panel on the front of the declination housing. Next, remove the Versa Plate to expose the declination cable conduit from the top.

Because the Versa Plate & Instrument Panel are connected to the mount by wires, I usually secure the Versa Plate “off to the side” by screwing one of the Versa Plate mounting screws through the “wrong hole”. For example, I’ll move the Versa Plate to the left of the axis and then attach the Versa Plate back to the mount by passing one of the mounting hex screws through a “right side” Versa Plate mounting hole and into one of the “left side” MyT sockets. This holds the plate and frees up both hands to work.

Once the access covers are removed, you can push the cables (separate or sleeved) down through the declination hole, and then towards the south-side of the mount with the help of a tool pushed through the declination axis hatch. You could also pull the cables through by means of the zip-tie that SB has included for this very purpose. Alternatively, you can also feed the cables through from the south side and then bend them up through the declination axis. Regardless of direction, please remember that there are many wires already running through the inside of the MyT, so be careful, be gentle and go slow.

Once the cables emerge from the top of the mount, you can tuck them into the channel milled into the bottom of the Versa Plate along side the existing sleeved cable bundle.



The next challenge is routing the cables out the “back” of the Versa Plate near the Instrument Panel. While some Paramounts have a “pass through” hole that allows your cables to travel straight through the Instrument Panel and to your equipment, the MyT has no such passage.

One option is to bend the cable through a tight 90-degree bend so that it emerges from the side of the Versa Plate immediately inward from the Instrument Panel. The main concern with this approach is that the clearance at the back of the Versa Plate is very tight and even a standard USB cable might get crushed or abraded at the extreme points of mount movement. You might gain a little extra room by adjusting the Versa Plate backwards, but it isn’t much space.



If you have anything other than a single, small, cable then a more pragmatic approach is to “lower” the Instrument Panel by placing washers around the attachment screws between the panel and the bottom of the Versa Plate. It is also possible to fabricate a spacer from plastic or metal as I did:



The red plastic spacers that I made add a large enough gap to pass my cables straight out the back. If you would like to have a set of these spacers, I have an extra pair and will be happy to send them to the first person (domestic mail only...) who asks for them. Think of it as your reward for reading through all this drivel and pontification.

Once you've solved the top-side cable routing, you'll still have to work out the "south-side" cabling. The easiest method is to run the cables straight through the big round hole in the RA access cover. If, however, you need to run those cables for any distance then you'll have some awkwardly long cables. The more convenient solution is to use the "Keystone" plugs.

Most commonly the keystones are simple two-faced sockets that allow you to plug the interior cable that you ran through the mount into the "back face" of the keystone. The front face of the keystone faces outward and you can plug in the cable that runs to your gear. In addition to simple sockets, there are also keystone plugs wired directly into a cable, which if available in the length and type that you want, provides a simpler and more reliable connection. Be aware, however, that keystones are primarily used in wall sockets and that there is usually more space for a "deep" keystone inside of a wall than inside of a MyT RA axis. Tom Bisque, and others, recommends L-Com brand keystones. Also, learn from my mistake and use USB A to B style cables rather than A to A, which are much less common. When I needed keystones, L-Com was back-ordered, so I bought mine on Amazon. So far, they seem fine.

Finally, regardless of what computing platform you use, and where you mount it, there are benefits to having a dedicated "astronomy control computer" to run your rig. For example, a dedicated machine can be configured for your gear and then "frozen" once it's operational. You can also leave the lower cost dedicated computer outside with your gear and save your nicer machine for [video games](#) and Netflix.

If you run the Windows (or Intel Linux) version of SkyX, there are numerous types of miniature computers that can be used to run SkyX. The acquisition computer need not be particularly powerful because, chances are, that you will not use it for pretty planetarium types of tasks. In the Macintosh world, you're probably best off with a Macintosh Mini, but make sure that you also get a "dummy video adaptor" to ensure that the machine's graphics acceleration is activated for screen sharing.

If you are a Macintosh user, however, you should at least consider trying a Raspberry Pi. The Pi supports many of the same devices as the Macintosh version of the SkyX. Although slow, the Pi is small, reliable, a power miser and cheap. The Raspbian operating system is also less patronizing (although more old-school UNIX) and tends not to break as many things with each update.



Yes. That is a Raspberry Pi on an [espresso cup](#) that will make you look like you have giant hands.

At the end of the day, the cables, ancillary electronics and the computer are vital components of your imaging rig. It is worth investing the effort to make sure that it works as reliably and simply as possible. The need for straightforward design is especially critical for astronomy applications because you will often have to work in the dark, in the cold and under time constraints. I have yet to hear anyone express displeasure for having spent too much money on a high quality cable.

I'd encourage you to think through your needs and consider all of the alternatives provided by this most versatile of mounts. While, for example, the built-in USB hub ports can be very convenient, please don't be afraid to run your own cables if necessary. I remember one Paramount customer whose particular device did not function with the built-in USB port and he declared that his Paramount was "useless" because the only reason he bought the mount was to use the built-in USB hub. While it was disappointing, declaring that a MyT is useless because the USB hub doesn't work for a particular application is akin to discarding a Lotus Exige because your "Big Gulp" doesn't fit in the cup holder.

Now stop fiddling around with the mount and go shoot some pictures!

Best of luck.