

The Astro-Physics 1100GTO

This powerful German equatorial mount offers many features for astrophotographers.



Astro-Physics 1100GTO

U.S. Price: \$7,970.00 (base model)
astro-physics.com

▲ The Astro-Physics 1100GTO mount on an Astro-Physics pier with an AP 130EDFGT telescope on top. The mount weighs 54 pounds and can carry a 100-pound payload.

What We Like:

- Tracking across the Meridian
- Payload capacity
- Command Center software

What We Didn't Like:

- Controller display difficult to read in daylight
- Confusing settings in ASCOM driver and APCC software

HOW WOULD YOU like to have your cake and eat it, too? How about an observatory-class mount that can carry a 100-pound payload and still be portable enough to pop in your car and go to a remote observing site?

You can't say that about many mounts, but you can with the 1100GTO, the Astro-Physics replacement for its venerable 900GTO, which served as one of the company's most-popular mid-range mounts for 20 years. The 1100GTO has some tall shoes to fill; let's find out how it stacks up.

Designed by Robert Watters and Roland Christen at Astro-Physics, the precision CNC-machined 1100GTO has managed the neat trick of keeping the weight of the mount the same as the 900GTO while increasing the payload by 50%. This was accomplished by increasing the diameter of the RA and declination shafts to 3.15 inches and the bearings to 3.94 inches. The declination worm-wheel diameter has also increased from 6 to 7.2 inches.

For astrophotography purposes the 1100GTO will easily bear its rated capacity, and possibly more unless you are using a long telescope in a howling wind. The mount, which is steady as a rock, can also be operated from


a latitude range of 0° to 78° without requiring additional adapters.

The equatorial head weighs in at 54 pounds, including the counterweight shaft. Even at my advanced age and with back problems, I can lift the entire head of the 1100GTO in one piece to move it from the car to its portable pier. If you can't handle that much weight, the mount has a very clever dovetail with a tool-free design that allows you to separate the head into two pieces, with the RA portion weighing 26 pounds, and the declination section and top plate weighing just about 18 pounds.


The mount is offered in three versions: the 1100GTO (borrowed for this review), 1100GTO-AE (\$14,196) with absolute encoders, and the 1100GTO-AEL (\$14,961) with extended-temperature absolute encoders. These allow the mount to unequivocally know its exact pointing position — something that is very useful in a remote observatory. The encoders also nearly eliminate periodic error, reducing it to just 0.2 arcsecond, according to the manufacturer.

The GTO keypad hand controller for the mount is sold separately for \$1,060 for those who intend to only use the mount with an external computer or have a hand controller from another Astro-Physics mount. Additional accessories, including the polar alignment scope, counterweights, and dovetail saddle, are purchased à la carte. The Right-Angle Polar Alignment Scope is invaluable for portable observers and a work of art that will save your neck and get you aligned to within a couple of arcminutes of the pole in roughly 30 seconds. This accuracy is more than adequate for long-exposure astrophotography. The counterweight shaft has been redesigned with a new lead-in thread that greatly reduces the chance of cross threading.

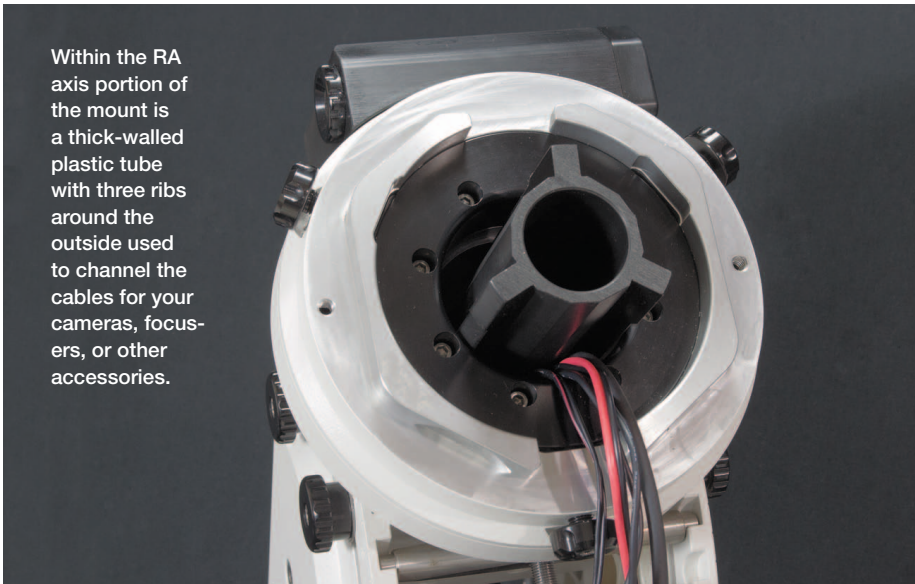
Originally introduced in April, 2013, the latest version of the 1100GTO now sports the new GTOCP4 controller as well as auto-adjusting gearboxes. Its spring-loaded worm gears maintain full engagement with an automatic worm mesh that shouldn't require adjustments. A lever disengages the worm



As supplied by Astro-Physics, the 1100GTO includes a counterweight shaft and GTOCP4 control box, as well as 12-volt power cables and a CD containing the user manual, *PEMPro*, and *PulseGuide* software. The pier shown is sold separately.



The equatorial head can be separated into two pieces with the RA axis and polar base (left) weighing 26 pounds, and the declination axis (right) weighing 18 pounds.



Within the RA axis portion of the mount is a thick-walled plastic tube with three ribs around the outside used to channel the cables for your cameras, focusers, or other accessories.



▲ The new Astro-Physics GTOCP4 control box (which is backwards-compatible with older mounts) offers two full-service RS-232 serial ports, a USB 2.0 port, Ethernet, and WiFi connectivity.

from its worm wheel so the scope can spin freely, making balancing a scope quick and easy, something that will be appreciated by users without a permanent installation.

Tracking Accuracy

The 1100GTO comes with a guaranteed peak-to-peak periodic error of 7

arcseconds or better. In measurements I made with *PEMPro*, the periodic error was 2.9 arcseconds with the Periodic Error Memory (PEM) correction curve turned off.

Astro-Physics also supplies its mounts with a factory-generated correction curve installed, which should improve PE even more, though I had trouble getting it to work. On both a Mach1GTO that I own, as well as this test mount, the factory-installed PEM made the PE worse. I was, however, using beta versions of both *Astro-Physics Control Center* (APCC) and *PEMPro*, but neither I, nor the support staff at Astro-Physics, were able to figure out exactly what went wrong. I ended up recording a new correction curve with *PEMPro* (which is included with the mount), and the periodic error dropped to 1.8 arcseconds. In actual use with autoguiding during long-exposure imaging, I found the guiding accuracy to be better than 0.5 arcseconds in poor seeing. This should improve in better conditions.

Other Features

Astro-Physics mounts can track the sky well past the meridian, and with APCC's new meridian limits you can trust that your equipment won't be damaged if you are inattentive or happen to fall asleep, or if you are using it in a robotic observatory. You can also target a field that is near but has not yet crossed the meridian, so you can start shooting early and continue without requiring a meridian flip — a wonderful feature for astrophotographers.

Another very nice feature of the 1100GTO is its through-the-mount cabling. All of the motor and power cables are internal, and you can run your auxiliary power and camera-control cables through the hollow RA and Dec axes and have them come out under the telescope-mounting plate. This eliminates the possibility of cables getting snagged while slewing or tracking, but can be problematic if you need to break the mount down into two pieces for transport.



▲ An optional GTO Keypad is available for users who prefer to avoid additional computers while operating the mount.

► The 1100GTO with the author's telescope and additional imaging equipment is seen ready for a night of action. Note that the autoguider and camera cables run through the mount axes, exiting near the polar finder.





▲ The 1100GTO tracks effortlessly as seen in this photo of reflection nebula IC 2169 and its surroundings in Monoceros. North is to the right. The image was captured using the setup seen on page 62.

GTOCP4 Control Box

Another new feature with the 1100GTO as well as the company's other mounts is the GTOCP4 control box (\$1,195). This control box includes pretty much every kind of computer interface you could ever want, except maybe direct mind control. You can still connect to the mount using its serial port, as well as Ethernet, USB, and even WiFi. You can perform firmware updates with a direct download.

Note that previously if you planned to control the mount through WiFi with a planetarium app on a mobile device, the mount needed to be initialized with either the keypad or a separate computer using the Astro-Physics ASCOM driver. Both *SkySafari* and *Luminos* apps now incorporate the Astro-Physics mount initialization into their apps.

The GTOCP4 offers safety slew logic and park features for “counterweight-up” positions. Because you can image past the meridian, and pre-flip the mount, the counterweight shaft can be positioned higher than the scope itself. Previously, this start position could be dangerous for your equipment, as your camera or scope could run into the pier or tripod leg. The new safety slew will move the mount in right ascension first, until the scope is in a normal counterweight-down position, and then continue to slew in both axes until the scope reaches the desired pointing position.

Astro-Physics Command Center

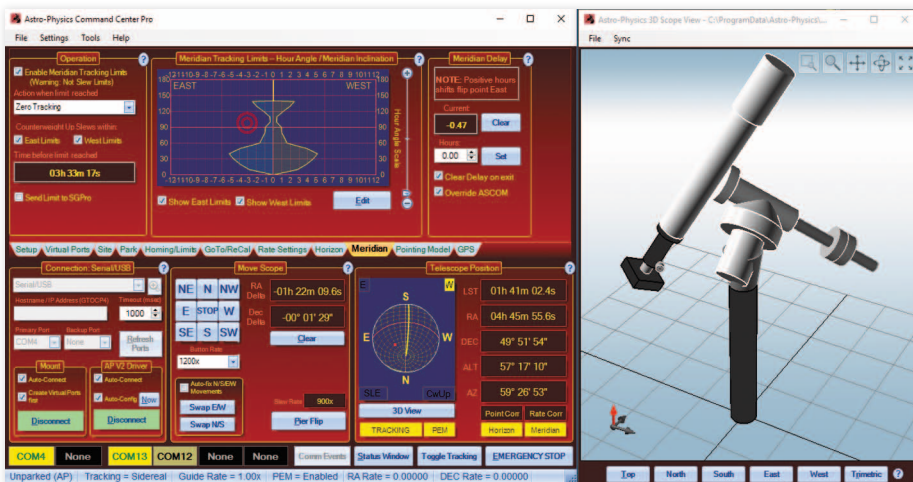
For users who prefer to control the 1100GTO with a computer, the *Astro-Physics Command Center* (APCC)



◀ The counterweight shaft includes a section of lead-in threads designed to lessen the chance of cross-threading when attaching to the mount.

software suite is available in standard (\$249) and pro versions (\$499). Developed by Ray Gralak, *APCC* enables advanced mount-control features such as home and slew limits for non-encoder mounts, user-definable meridian and horizon tracking limits, with custom variable meridian limits for different declinations.

The program also provides the ability to slew to counterweight-up positions, custom tracking rates, savable slew coordinates, and a safety countdown timer that will protect the mount from running into the pier if its computer connection is lost. A virtual 3D



▲ *Astro-Physics Command Center Pro* software showing the Meridian Tracking Limits tab open and with the 3D Scope View window also open and displaying the position of the telescope in relation to the pier. Custom meridian limits can be set for different declinations (represented by the hour-glass figure in the graph) to avoid accidental impacts when tracking your target.

telescope shows simulated views of the scope and mount from various angles to help you visualize its location, which can be useful for remote observatories or if you are sitting in your car on a cold night and running your scope with a remote desktop program.

The pro version of *APCC* offers the ability to build a detailed dual-pointing model (one for each side of the meridian) that works transparently even with the mount in a counterweight-up position, so the model will keep working no matter if you start before, or shoot past, the meridian.

► The edge-on spiral galaxy NGC 891 is seen with nearby galaxy cluster Abell 347 in Andromeda, shot with a 5-inch refractor on the Astro-Physics 1100GTO mount.

▼ Astro-Physics' optional Right-Angle Polar Alignment Scope is a must-have accessory for users who set up and take down their equipment each night.



You can record the pointing and tracking model using *Astro-Physics Point Mapper*, a separate application included with *APCC*. Note that a camera-control program such as *MaximDL* or *Sequence Generator Pro* is required, as well as plate-solving software — all of which are available from third-party vendors.

Included with both versions of *APCC* is *Horizons*, a program that lets you download ephemeris elements for solar

system objects as well as satellites and then automatically track them.

The only issue I had with both *APCC* and the ASCOM driver is that some of the settings are duplicated in multiple locations, and it can be confusing as to which one takes precedent.

In Closing

The 1100GTO offers superlative craftsmanship, design, and execution, but when you buy an Astro-Physics product you're also getting industry-leading support. I can't help but rave about how helpful George and Howard were at Astro-Physics when I had a question or problem with any of the hardware or software. In addition to the traditional online support forums, you can even call and talk to them in person. In this age of automated telephone directories, Astro-Physics support and service are simply remarkable.

When I used the 1100GTO mount, I had to say that I felt, like Oscar Wilde, "always satisfied with the very best."

■ Contributing Editor JERRY LODRIGUSS shoots the sky from rural locations in New Jersey and Pennsylvania.

