ASTRO-PHYSICS
1200GTO German Equatorial Mount (1200GTO)
with GTOCP3 Control Box

Includes GTO Keypad and CD with PulseGuide and PEMProAP software

Click photos for more information

New in 2006

The only significant change to the 1200GTO in 2006 is the redesign of the counterweight shaft. The end of the new 19.5" shaft is machined to accept 9" extensions (M12675) so that you don't have to order the 28" shaft for a larger scope. The new shaft also features a large diameter machined safety knob (the washer is no longer needed). The new counterweight shaft, extensions and safety knob will be available as upgrades for all older 1200 and 900 mounts. The new extensions and safety knob will NOT fit onto the original counterweight shafts. The photographs on this page do not show this change.

Changes made in 2004 that continue in 2006

For the 2004 and later production runs, we incorporated a number of design changes based on our own experiences with the demands of imaging, customer suggestions and available technology. A brief summary of the changes follows below.

- **Mechanical improvements.** New azimuth adjusters provide smoother, easier adjustment; increased height of the polar forks allow more room for your hand when making altitude adjustments and tightening knobs; improved gear train in the motor gearbox for quieter operation and reduced backlash and additional changes to the internal construction. More ...
- **Two Pier Adapter choices.** The Standard Pier Adapter is no longer included as a component of the 1200GTO. You now have your choice of the Standard version or the new Precision-Adjust Rotating Pier Adapter with Azimuth Bearing. More ...
- **GTOCP3 Servo Motor Control Box.** The new control box has increased protection on all input lines,

larger memory chip, and additional commands for mount control. More ...

- **GTO Keypad.** Our unique keypad has evolved over the last year or so to include a new circuit board with larger memory capacity, LED fiber optic backlit panel for greater longevity and quieter operation and epoxy coated elastomeric keys. We include the Keypad Protector with all keypads. More ...
- **PulseGuide Software CD.** This powerful utility provides complete remote control of all Astro-Physics GTO mounts, from the 400GTO to the 1200GTO. More ...
- **PEMProAP Software CD.** PEMProAP (Periodic Error Management Professional - Astro-Physics version) is a Windows software application that makes it easy to characterize and reduce periodic error. While the periodic error of your 1200GTO will be 5 arc seconds or less, you can reduce it even further to maximize performance without auto-guiding. PEMProAP is a version of PEMPro specifically for Astro-Physics go-to mounts and cannot be used with other mounts. The software CD is included with the 1200GTO mounts shipping in December 2004 and later. An evaluation copy will be provided to owners of mounts shipped earlier in 2004. More ...

All of these enhancements are described in detail in 1200GTO German Equatorial 2004 Improvements. Best of all, many of these improvements can be made to previous GTO mounts and some of them to all 1200 models produced in the past. These and other upgrades to mounts already in the fields are described in 1200GTO Mount Upgrades and Spare Parts.

Why a 1200GTO?

With the advent of the CCD camera, amateurs are exploring the skies to an ever increasing level of precision, easily exceeding the image quality of large observatories using film techniques decades ago. This new level puts a higher demand on the precision of the equatorial mounting. Many of the finest imagers today have been using our GTO mounts as a solid platform for a wide variety of instruments. The largest of these is our 1200GTO.

Since its introduction in 1998, the 1200GTO has gained a reputation for both tracking and pointing accuracy, essential to casual visual observation as well as advanced imaging. Quite a few 1200GTO and 900GTO (smaller cousin) mounts can be found at Mount Pinos in California, favorite observing site of many advanced photographers and imagers. Visit the Cool Sites and Gallery sections of our web site to see photos of the mount in action and images taken while using the 1200GTO.

These mounts are truly a marvel of engineering - maximum strength and rigidity with minimum weight. Our CNC lathes and mills carve out the excess material in both axes of the 1200 and 900 German Equatorials while retaining a heavily ribbed structure for internal strength and rigidity. A unique dovetail was machined into the mating surfaces of the R.A. and Dec axes. This feature allows quick and easy assembly in the field without any tools.

The 1200 equatorial is equally at home in a permanent observatory or as a portable mounting for remote star parties thanks to the ease with which the two axes come apart. You CAN have it all. This is the perfect mount for a large refractor, Newtonian, Cassegrain or astrograph. Telescopes commonly used include Astro-Physics 155-206mm refractors, 12-14" Schmidt-Cassegrains and 10-16" Ritchey-Chretiens.

The 1200GTO mount is built from the ground up to be a precision imaging platform while still remaining totally user friendly. Consider these advantages and features:

Flexibility

Portable.
Extremely solid, rugged, high payload mount, yet the equatorial head comes apart in two reasonably light-weight components for hassle-free field setup. No tools needed to assemble the mount in the field.

Operate with 12V battery.
You can take it to the darkest skies and power it with a commonly available 12V battery. In the observatory, we suggest a minimum 5

amp filtered, regulated power supply.

Clutches and setting circles.
Allow manual operation if power is not available.

Image past the meridian.
The mount will track and guide well past the meridian in either direction if the object is located such that the telescope will clear the pier. This allows the user to set up the mount for a long series of exposures without stopping in the middle to flip sides. One can start the telescope under the mount while pointing at an object in the eastern part of the sky and track it all the way deep into the western sky. This is very useful for long exposure H-alpha or in cases where a large number of individual exposures are needed for stacking.

Easy alignment for non-critical viewing.
Can align with a polar alignment scope to quickly zero in on the pole for most non-critical observing or to get close before tweaking in for CCD. You can even align in the daytime for solar observing or viewing planets at twilight.

External computer not needed.
The keypad is a handheld computer with all of the features, functions and databases you need to tour the universe night after night. The unique firmware allows you to precisely polar align your mount in the field, even in broad daylight! The vacuum-fluorescent display with a temperature range of -40 degrees F (and C, they are the same in this instance), allows hardy observers to use this mount on cold winter nights. You can't do that with a PC or PDA! As new firmware versions are released in the future, you can upgrade your keypad directly from the download section of our website - free of charge!

Control with personal computer, if desired.
All functions of the servo drive can be commanded from a laptop or desktop computer using popular planetarium software. Depending on the features of the program, you can position your telescope, center your image and control tracking rate, remote focusing, reticle brightness and park at the end of your observing session. Examples of currently available software:

- PulseGuide by Ray Gralak (included with the 1200GTO)
- Software Bisque's suite which includes TheSky Astronomy Software, CCDSoft CCD Astronomy Software, TPoint Telescope Pointing Analysis Software and Orchestrate Scripting Software.
- Desktop Universe by Main Sequence Software
- Earth Centered Universe (ECU) by David Lane of Nova Astronomics
- SkyMap Pro by Chris Marriot
- Starry Night Pro by Space.com Canada
- DigitalSky Voice Software by Charles Sinsofsky
- Any software that is ASCOM compliant.

Write your own computer program.
The Astro-Physics GTO protocol for the GTOCP3 Control Box is freely available to those who would like to write their own computer program for controlling the mount.

Precise Mechanical Fabrication.

Highly accurate mechanics.
Using modern CNC machining techniques, we make all components to a high precision level, which results in a final package that is solid and accurate in all respects. The critical angles are accurately machined so that the

mount is orthogonal to a very high degree. This results in pointing accuracies well below 1 arc minute for a properly aligned mount.

Worm gear accuracy.
Critical worm gear accuracy is maintained by special machining techniques developed at Astro-Physics after extensive studies and actual field operation. Our worm accuracies are second to none and are guaranteed to be 5 arc seconds or less, peak-to-peak. The periodic error of each mount is verified during our extensive testing procedures. With good alignment and PEM training with the Keypad or PEMPro or PEMProAP, it is quite practical now to achieve unguided CCD images with today's hi-resolution cameras coupled to a 6" to 16" telescope.

Mechanical Features

- All machined mounting made from aluminum bar stock and stainless steel. All fasteners are stainless steel.
- Motors and all electronic components are enclosed.
- Each shaft is supported by 5 bearing elements, two preloaded ball bearings and 3 sets of massive thrust bearings. The result is very low friction, which is constant with the load.
- 19.5" (18.5" useable length) removable 1.875" diameter counterweight shaft can hold up to six 18 lb. counterweights and one 10 lb. counterweight. Optional 9" Extension or 28" counterweight shaft (M12661-A) with 27" usable length also available.
- Polar and declination axes come apart quickly without tools for light-weight, easy handling and ease of transport.
- Fine altitude and azimuth adjustments for quickly and accurately zeroing in on the pole in the field.
- Engraved setting circles are Porter Slip Ring Design.
- Electronic components rated for industrial and automotive applications.
- Base fits into 10" diameter pier with 0.094" wall thickness.

Specifications of Equatorial Head

R.A. worm wheel	10.3" (26.2cm), 225 tooth aluminum
Declination worm wheel	7.2" (18.3cm), 225 tooth aluminum
Worm gears	Brass
R.A. shaft	3.35" (8.5cm) diameter
R.A. thrust bearings	9.5" (24.1cm) diameter
Dec. shaft	2.36" (6.0cm)diameter
Dec. thrust bearings	6.5" (16.5cm) diameter
Latitude range	21.5 to 68 degrees
Azimuth adjustment	Approximately 14 degrees
Right ascension	4-minute increments, pointer, engraved both
Declination	1 degree increments, engraved, pointer
Setting circles	Porter Slip Ring design, engraved, pointer
Capacity	Approximately 140 lb. (63.6kg) scope and accessories, depending on length. Will accommodate Astro-Physics and

	similar refractors up to 206mm f8, 16" Cassegrains and Ritchey-Chretiens These are only guidelines. Some telescopes are very long for their weight or heavy for their size and will require a larger mount.
Weight	Equatorial head: 81 lbs. (36.7 kg), Dec axis is 31 lbs. (14.1kg), RA axis is 50 lbs. (22.7kg) Counterweight shaft: 14 lbs. (6.4kg)

Servo Motor Drive

The drive system uses a high-quality Swiss DC servo motor controlled by a microprocessor to an accuracy of 0.05 arc seconds per step. Tracking is very smooth, noticeably smoother than any stepper motor drive or inexpensive servo drive. The system can be accurately controlled over a speed range of 4800:1 which allows 0.25x sidereal for guiding to 1200x sidereal for 5 degrees per second. The circuit draws only 0.4 amps when tracking the stars, 2 amps with both motors slewing and requires only 12 volts to operate. This servo drive will satisfy the requirements of the sophisticated, advanced astrophotographer, yet is easy for the casual, visual observer to use. Please refer to GTOCP3 Control Box and Keypad for Servo Drive for additional information.

Pier Adapter Options

In previous production runs, the Standard Pier Adapter was included with the mount, however there are now two options available for your consideration. If you plan to have multiple pier installations, perhaps one permanent and another portable, you may wish to purchase an extra adapter to install on the the second pier. This will make your setup and switchover much quicker. Many customers have found this to be advantageous.

If you do not purchase one of our pier adapters described below, for instance, if you purchase the Monolith Pier from Particle Wave Technologies, you will need to purchase the Pier Adapter Knob Kit (part# 12KBKIT) in order to attach your mount to the Monolith.

Standard Pier Adapter (1200SPA)

This 1200 Pier Adapter is similar to those that we have included with mounts in the past, however the azimuth adjustment block is slightly taller to accommodate the new azimuth adjustor assembly. If you have a permanent installation, this base is a good choice since you will not have to set up every session.

The adapter includes the machined flat plate, four machined aluminum lock knobs with washers, the azimuth adjuster block, center pivot screw and six 5/16-18 x 5/8 side bolts and washers. All machined parts are black anodized and the fasteners are stainless steel. The adapter plate will either fit into your Astro-Physics Portable Pier and be bolted from the side or you can bolt it to the top of a flat surface. Refer to the diagram for bolt pattern information. If we ship an Astro-Physics pier to you at the same time that your mount is shipped, the Pier Adapter will be installed on the pier prior to shipment for your convenience. If you plan to use an ATS pier, the O.D. of the plate will need to be modified by ATS for an additional charge.

Precision-Adjust Rotating Pier Adapter with Azimuth Bearing (1200RPA)

This pier adapter was designed for very accurate and smooth adjustment of the azimuth angle without loosening the lock-down knobs on the base of the mount. Upgrade your previous model 1200 mount (any version) and enjoy the ease of use.

The adapter includes two machined flat plates, four machined aluminum lock knobs with washers, a tall version of the azimuth adjuster block, center pivot screw and six 5/16-18 x 5/8 side bolts and washers. All machined parts are black anodized and the fasteners are stainless steel. The adapter plate will fit into your Astro-Physics Portable Pier and be bolted from the side. If we ship an Astro-Physics pier to you at the same time that your mount is shipped, the Pier Adapter will be installed on the pier prior to shipment for your convenience.

The Precision-Adjust Rotating Pier Adapter must fit inside another part and be bolted from the side. It cannot be

bolted through the top as you can with the Standard Pier Adapter. If you plan to use an ATS pier, the O.D. of the plate will be modified by ATS for an additional charge.

PulseGuide™ Software

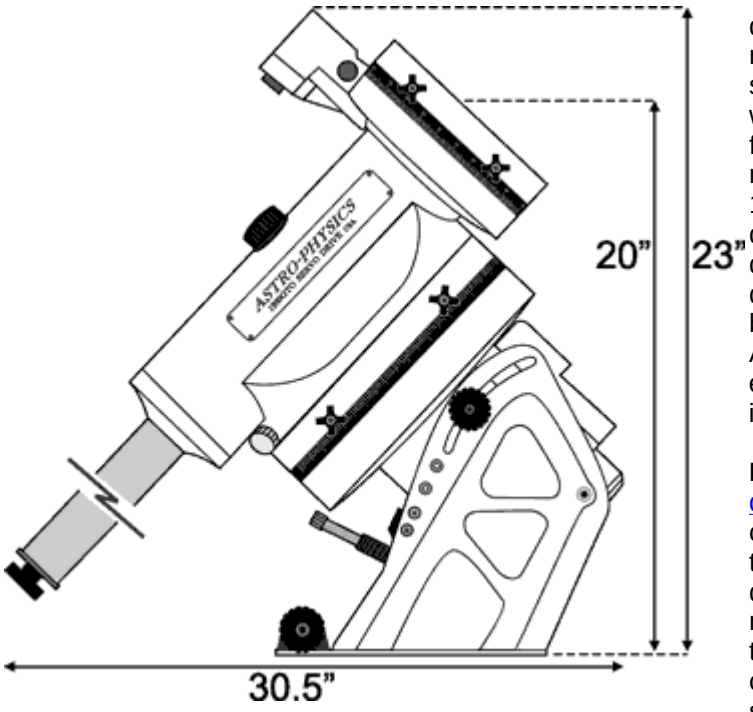
PulseGuide is a stand-alone Windows (98, ME, 2000, NT4, XP only) utility that provides complete remote control of Astro-Physics GTO400, GTOE600, GTO900, and GTO1200 mounts. It derives its name from its most distinctive feature, pulse guiding, which can improve unguided tracking. Specifically, it can help correct tracking errors caused by polar misalignment and atmospheric refraction. You can also train PulseGuide to track objects moving relative to the stars, such as asteroids, comets, and the moon. In addition to pulse guiding, PulseGuide also has many useful utility features. With just a few exceptions, it supports the entire serial Astro-Physics command protocol. More ....

PulseGuide was written by Ray Gralak of Sirius-Imaging. Please refer to his web site http://www.pulseguide.com for further developments and enhancements. The software will be provided on a CD-ROM with your 1200GTO mount. Previous owners of any Astro-Physics mounts can download the software free-of-charge, courtesy of Ray. Many, many thanks to Ray for this powerful program.

PEMProAP Software

PEMProAP (Periodic Error Management Professional - Astro-Physics version) is a Windows software application that makes it easy to characterize and reduce periodic error. While the periodic error of your 1200GTO will be 5 arc seconds or less, you can reduce it even further to maximize performance without auto-guiding. PEMProAP is a version of PEMPro specifically for Astro-Physics go-to mounts and cannot be used with other mounts. The software will be included with the 1200GTO mounts shipping in December 2004 and later. An evaluation copy was provided to owners of mounts shipped earlier in 2004. More ...

Dimensions



The diagram shows several dimensions that are commonly requested. In addition, if the scope is horizontal and pointing west or south, the measurement from the top of the pier to the middle of the cradle plate is 11.25." Please note that these dimensions will vary somewhat depending on your latitude. We quote them for 42 degrees because that is the latitude of Astro-Physics and all of our equipment is set up that way. It is also a good average value.

Please refer to this PDF document of you are planning an observatory and need to know the variations in the horizontal distance from the center of the mount base plate to the center of the declination axis that are caused by different latitude settings.

1200GTO **$9,400.00**

Recommended Accessories

- Kendrick Astro Instruments Kendrick 18 Amp-hr. 12 Volt Rechargeable Battery Pack (KDR181)
- Mounting Plates- FP1800, DOVE15, DOVELM2, DOVELM16, 1200RP,1200RP15
- Astro-Physics Portable Pier - 10" diameter, heights 24",32",42",48",54",62"
- 13.8V 5-Amp Regulated Power Supply with Cigarette Adapter (PS138V5A)
- Santa Barbara Instrument Group All CCD Star Tracker/Imaging Systems
- Cable for SBIG Autoguiders and CCD Imaging Cameras
- Precision-Adjust Rotating Pier Adapter with Azimuth Bearing (1200RPA)
- Advanced Telescope Systems (ATS) Portable Piers
- Encoders for Digital Setting Circles (ENC1200)
- Stainless Steel Counterweights - 10, 18 lbs
- Special 28" Counterweight Shaft (M12661)
- Cord for Pentax 6x7 Camera (CORD01)
- Jim's Mobile Inc. Digital Setting Circles
- Pier Accessory Trays and Support Bar
- Pier Adapter Knob Kit for 1200 Mounts
- 9" Counterweight Shaft Extension
- Polar Alignment Scope (PASILL4)
- Standard Pier Adapter (1200SPA)
- Mounting Rings

Price and availability
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