

ASTRO-PHYSICS

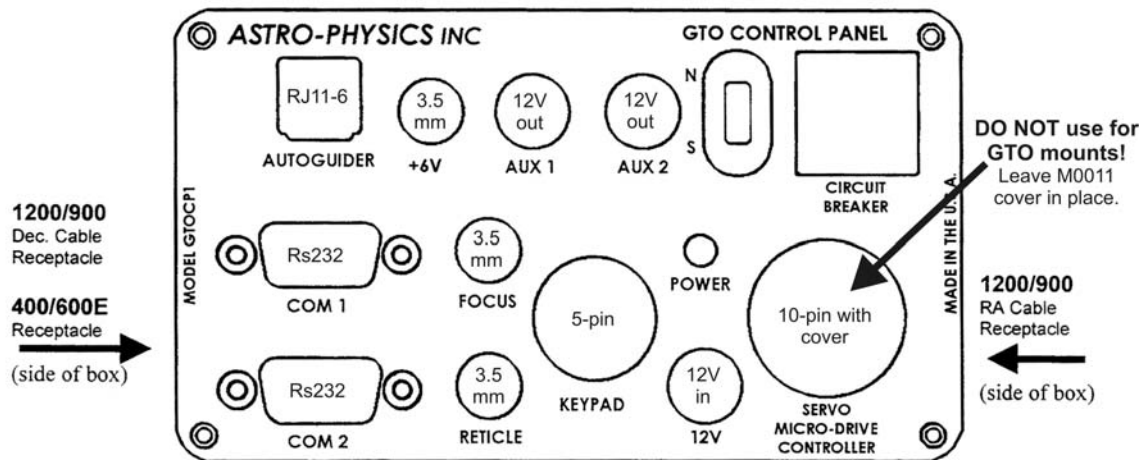
GTO CONTROL BOX FOR SERVO DRIVE

Model GTOCP1

GTO CONTROL BOX – GTOCP1

The GTO control box contains all of the circuitry to drive the two servo motors and the logic required to navigate the sky. It will be operational and track at the sidereal rate when connected to both motors of the mount and a power source. In order to control the movement of the mount, you will need to connect at least one of these:

- GTO Keypad (included with GTO models)
- Computer with *PulseGuide* by Sirius Imaging. For the most updated version of the software, check out the website www.pulseguide.com.
- Computer with a planetarium program such as Software Bisque's *TheSky™*, Imaginova's *Starry Night™*, Nova Astronomics' *The Earth-Centered Universe (ECU)* version 3.1 or later, and Chris Marriot's *Sky Map Pro 6* or any ASCOM compatible telescope software (all purchased separately). Please note: *DigitalSky Voice* was included with many GTO mounts that had the GTOCP1 control box. It is no longer being supported by Astro-Physics, but may still be usable.
- Servo Micro-drive Controller (included with SMD models)



The GTO Control Box is mounted directly onto the polar axis of the 1200 and 900 mounts and is a stand-alone unit for the 400 and 600E mount. Please remember that this box contains advanced electronics and must be treated with the same care given to other fine equipment. Support the stand-alone unit in a secure manner so that it does not fall. Do not place it in the wet grass or dust. You can see that the unit is built to be rugged. However, it is not indestructible.

R.A. and Dec. Cable Connections

VERY IMPORTANT: Do NOT connect the servo cables of a GTO mount to the 10-pin connector on the front panel of the GTOCP1 control box! This connector is for NON-GTO mounts using the Servo Micro-Drive Controller. Cable connections for GTO mounts are on the SIDES of the GTOCP1 control box. Serious damage to the components could result from incorrect cable connections. A protective cover is included and installed on GTO mounts to prevent accidental connection at the front panel. Do not remove this cover. If you are missing this cover, please call Astro-Physics and order part # M0011.

The appropriate cables with 10-pin connectors are included with your mount.

1200 and 900 Mounts: Attach the short R.A. cable to the R.A. motor housing and the side of the GTO servo drive box that is nearest the motor housing. Lock both connectors.

Attach the long Dec cable to the Dec motor housing and the other side of the GTO servo drive box. Lock both connectors.

600E Mount: Attach one end to the 10-pin receptacle on the side of the GTO servo drive box and the other end to the name panel on the mount itself. Lock both connectors.

400 Mount: Attach one end to the 10-pin receptacle on the side of the GTO servo drive box and the other end to the “Y” cable which is attached to the RA and Dec motors. Lock all connectors.

12V Connector

Place the DC power cord (included with your mount) into the DC power plug outlet marked 12V on the GTO Control Panel and lock in place. Plug the cigarette lighter plug end of the cord into your power source. The acceptable voltage range is 11.5 to 16. Suggested power sources include: portable rechargeable battery pack, auto or marine battery, or power supply (filtered and regulated) for standard household AC current (110-115 volt – 60 Hz in the US) with a minimum output of 5 amps at 12V DC. 13 to 16 volts is recommended for best performance. We also recommend that the mount have its own dedicated power supply and that other devices be powered from a separate source or sources.

There is no on-off switch on the mount. We recommend that you connect the GTO keypad to the GTOCP1 before you apply power to the system. It does not matter whether you connect the locking power plug at the GTOCP1 and then plug in the cigarette lighter plug or vice versa. Choose whichever is most convenient. To turn the unit off, simply disconnect the power cable at one end or the other. Many 110 volt AC to 12 volt DC power supplies (including the models that we sell) have handy on/off switches.

Considerations for observatory installations: We suggest that you disconnect your GTO Control Box from 110V and any other device (CCD camera, computer, etc) when you are not using your mount so that if your observatory experiences a power surge or lightning strike, your mount electronics will not be damaged. If you operate your mount remotely, you will have to leave your power cable connected just as you do for the rest of your electronic equipment. You may want to consider surge protectors or other protective measures to protect from voltage spikes. A disconnect relay to remove power from both the 12-volt and ground wire is highly recommended in this situation.

POWER Indicator Light

The red LED will remain illuminated when your power source has sufficient output to drive the motors. If the voltage falls below 10 volts, the power light will go out and the motors will stop. The keypad controller will not function properly.

KEYPAD Connector

Attach the 5-pin male connector of the keypad controller and lock in place (push in the knurled ring, then turn).

SERVO MICRO-DRIVE CONTROLLER Connector

This connection is for customers who originally purchased the 1200SMD, which included the Servo Micro-drive Controller, or for customers who upgraded from the 1200QMD. Since this controller also operates the servo drives, though without the rapid slewing or go-to capabilities, we provided a means to use it with the GTO Control Panel. Plug it in here and lock in place. If you ordered the GTO version of the mount, you will not have this controller.

COM 1 and COM 2 (RS232) Connectors

These serial port connections are used to connect your mount to your PC computer. You may provide your own straight-through (non-crossing) cables with a 9-pin (DB9) male connector to interface with the GTO panel, or you can purchase them directly from us (and be assured that they are the correct type of cable!). We have provided the locking posts to secure the cable firmly onto the control box. If your serial cable does not have a 9-pin connector, you can use a gender changer or adapter to convert it. **Please note:** *the use of “crossing,” “reversing,” “null,” or “null modem” cables is a frequent source of failure and frustration. Make sure that your serial cable is wired straight-through!*

The female connectors on our panel were labeled COM 1 and COM 2, however we should have labeled them simply as "SERIAL" or "RS232." It usually does not matter to which of these ports you attach your cable (e.g. you can use COM 1 on your computer and use the COM 2 connector on the GTO Control Panel). The only exception is when performing keypad firmware upgrades where the top COM 1 port of the GTOCP1 control box must be used.

When you are controlling the position of the mount with a computer program such as *PulseGuide™*, Software Bisque's *TheSky™*, or Imaginova's *Starry Night™*, the microprocessor chip located in the servo drive box will send continual RA and Dec. coordinate data via the cable connections to your computer. When you use the software to instruct the mount to slew to a new object, the commands (new RA and Dec. coordinates followed by the move command) are sent to the mount.

We provide two serial port connections on the mount so that you can use two software programs simultaneously (in addition to any auto-guider software that may be sending signals to the mount through the Auto-guider Connector). For instance, you can use *PulseGuide* for advanced mount control, while using *TheSky* as a planetarium program. The telescope control functions of *TheSky* are more limited so using both in a remote application is advantageous. Since the mount will update the RA and Dec coordinates simultaneously, both programs are continually updated with the data from the mount. You can watch the screen display of *TheSky* to see where your telescope is pointing as it slews. This is most effective if you have a reasonably fast computer with plenty of RAM. If you try this with a 100MHz processor and only 32 MB of RAM, the response time will be slow since both programs must be continuously updated with position data.

You must have two serial ports available on your computer to take advantage of this feature. If you use a laptop or a newer desktop computer, you may need to purchase a USB to Serial Adapter. Starting in the spring of 2008, Astro-Physics began offering single port and four port units made by *Keyspan™* that we have found to work quite well on our own equipment. The serial ports on the GTOCP1 (or GTOCP2 or 3) control box will even allow remote operation of your mount, a handy feature for catching those winter pretties from the warmth of the house. We have tested setups using an Ethernet based USB Server (also from *Keyspan*) coupled to the four port *Keyspan* USB to Serial Converter. The USB Server provided four USB ports, one of which was used by the four port USB to Serial Adapter, leaving 3 available USB and four available Serial ports at the mount. The computer was connected to everything via a single RJ45 Ethernet cable. For a more detailed discussion, go to our website at: http://www.astro-physics.com/products/accessories/software/Serial_USB/serialusb.htm The Yahoo ap-go user's group (access it through our website) also has a wealth of information. Simply type "pcmcia" "serial" or "usb" into the search box. Also, be sure to keep an eye on the "What's New?" pages of the website for further developments in this area.

FOCUS Connector

If you have a motorized focuser with a DC synchronous motor (like the JMI Motofocus), you can attach the 3.5mm phono plug connector here. This connector can NOT be used with motorized focusers that use stepper motors as they require their own separate drivers. Refer to the section regarding focus adjustment in the GTO Keypad Manual for instructions on using the keypad controller to adjust focus.

RETICLE Connector

If you wish to use the illuminator cable for our polar alignment scope or plug-in-type guiding eyepiece with an illuminated reticle (available from several manufacturers), insert the 3.5mm phono plug into this connector for power. Reticle brightness can be adjusted with the hand control. Refer to the section pertaining to reticle illuminator adjustment in the GTO Keypad manual for further information.

AUTOGUIDER Connector

This connector interfaces with the RJ-11-6 modular jack of an autoguider cable, purchased separately or as part of a CCD Imaging Camera or Autoguider. The autoguider will be functional and ready to go as soon as you plug it in. Please refer to the appropriate manual from the manufacturer for operation of the autoguider.

+6V Connector

This 6-volt output accepts 3.5mm phono plugs. It is used primarily to power the Pentax 6x7 camera directly from the mount with a cord sold for that purpose. As of mid 2007, we are no longer able to purchase these cables through Pentax, but they may be available on the internet.

AUX 1 and AUX 2 Connectors

These 12 volt outputs can be used to power various accessories.

CIRCUIT BREAKER Switch

In case of a short circuit or severe overload on AUX 1 or AUX 2, the 5 amp rated breaker will trip. Reset by flipping the switch to the other position.

N and S Switch

Select northern (N) or southern (S) hemisphere as needed. When you slide the switch to the opposite position, the tracking direction of the drive will reverse. The power cord must be removed and re-attached to make this work.

