ASTRO-PHYSICS
GTOCP4 UPGRADE AND INSTALLATION GUIDE

In order to determine which control box you currently have (GTOCP1, GTOCP2 or GTOCP3), look for the model number printed vertically on the left side of the control panel.

(Note: Control boxes are often referred to simply as "CP2 or CP3, etc." in the following text.)

<u>IMPORTANT</u>: Be sure to update your AP V2 ASCOM driver, APCC and APAE Utility software!

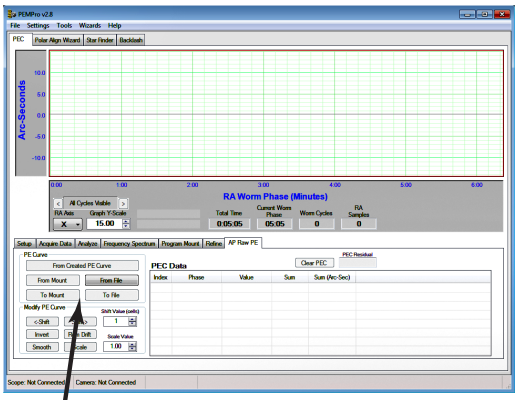
GTOCP3 Mounts: Save your PE Correction Before Changing the Control Box

(GTOCP1 and GTOCP2 mounts will need to run PE curves after GTOCP4 upgrade)

The Periodic Error Curve resides in the control box of your mount. Before you make the change to the CP4 you may wish to save your existing Periodic Error Correction to a file on your computer. If you do not use PE correction or if your PE correction is old, then disregard this procedure and be sure to disable PEM in the Keypad, AP V2 ASCOM driver and APCC.

Using PEMPro, go to the "AP Raw PE" tab and get the curve "From Mount" and save it "To File" on your computer. Be sure to note the location and name. Once you have swapped the control boxes, get the PE "From File" and send it "To Mount" and you are done. *See Illustration at right.*

A new PE curve can always be made later with PEMPro.



GTOCP4 Upgrade for Mach1GTO, 1100GTO, 1600GTO and 3600GTO Mounts

The process of upgrading from a CP3 to a CP4 control box on the *Mach1GTO*, 1100GTO, 1600GTO and 3600GTO mounts is very straight forward. Remove the CP3 and replace with the CP4. Attach all the cables and you are done. It is that easy...though there are a few caveats!

1600GTO:
If you have an earlier 1600 mount, it may be necessary to remove the lanyard post (on the west side of the mount), as the CP4 is slightly wider. Simply unscrew the lanyard post and mount the CP4 in place of the CP3.

1100GTO-AE/L:
If you wish to use your current <u>double</u> Control Box Adapter, you can do so by mounting it off-center and then securing the CP4 to the side. Alternatively, you can switch to the <u>single</u> Control Box Adapter (M11010KIT) as an aesthetic consideration.

Absolute or Precision Encoders:
If your 1100 or 1600 mount has the Absolute Encoders or your 3600 mount has the Precision Encoders (and/or Limit Switches), then the respective GTOAE or GTOELS box will not be used, as the functionality of these boxes has been incorporated into the CP4. Remove these boxes and the cables that connect them to the CP3 box. The 1100 and 1600 Encoder cable from the mount will plug directly into the CP4. The 3600 Encoder cable (and Limit Switches cable) will need to be replaced with longer versions that will then plug directly into the CP4 box.

Parts required:

- ***The GTOCP4 and Power Cable Set (CABPP4SET).***
- ***The 1100GTO-AE or 1100GTO-AEL also may use the Single Control Box Adapter (M11010KIT) in addition to the above.***
- ***The 3600GTOPE also requires a new Encoder Cable (CAB36PEF) in addition to the GTOCP4 and Power Cable Set above.***
- ***3600GTO mounts with Limit Switches will also require a new Limit Switch Cable (CAB36LS4).***

GTOCP4 Upgrade for 900GTO and 1200GTO Mounts

Adapter (CBA912KIT) to Rotate the CP4 90°

The process of upgrading from a CP1, CP2 or CP3 to a CP4 control box on the 900GTO and 1200GTO mounts is a bit more complicated. There are two options open to you for mounting the CP4 control box to these mounts. Because the CP4 is about an inch wider, it cannot mount between the polar forks in the same orientation as the older boxes.

Special Note: *Removal of the CP1 control box requires a specific procedure. Please see the illustrated instructions on the following page. Once the CP1 is removed, then the upgrade path is similar to that of the CP2 and CP3 mounts.*

Mounting to R.A. axis:

If you wish to mount the CP4 between the forks and use the original Y-cable supplied with the mount, then you will need to use the 90° Dovetail Adapter (CBA912KIT) so that the box can be rotated to fit. The 90° Dovetail Adapter attaches to the back of the CP4 and allows it to be fastened to the mount. CP2 and CP3 mounts already have the necessary dovetail bracket attached on the R.A. axis for attaching the CP4. *See photo of the CBA912KIT on the CP4 to the above right.*

The original GTOCP1 box was of a different design that was fixed directly to the R.A. axis. It did not have the convenient dovetail system for easy removal and replacement. Once the CP1 is removed, upgrading from the CP1 mount requires adding a Servo Box Bracket to the R.A. housing in order to hold the control box with its attached CBA912KIT adapter (see part numbers listed below). *See the CP1 control box removal procedure on the following page.*

900GTO **1200GTO**

The upgrade path to R.A. axis mounting for the CP1 to CP4 also requires replacing the separate cables that were provided with the CP1 system. A Y-cable, such as came with the CP2 and CP3 mounts, will be needed to complete your upgrade.

Parts required:

- ***The 900GTO and 1200GTO mounts upgrading from a CP2 or CP3 require the GTOCP4, Power Cable Set (CABPP4SET) and 90° Dovetail Adapter (CBA912KIT).***
- ***The 900GTO upgrading from a CP1 also requires the Servo Box Bracket (9CBKIT) and Y-cable (S900GYCR).***
- ***The 1200GTO upgrading from a CP1 also requires the Servo Box Bracket (12CBKIT) and Y-cable (S1200GYCR).***

Mounting to Pier Bracket:

Alternatively, by using the Control Box Adapter (CBAPT), originally designed for the *Mach1GTO*, the CP4 can be mounted to the south side of the mount's pier. This is a very convenient way to avoid accidental cable entanglements and to simplify cable management. A longer Y-cable will be required for this option.

CP2 and CP3 mount owners should remove the Servo Box Adapter from the R.A. axis (placing the button head screws back in the threaded holes to seal out dust and insects). CP1 mount owners will need to remove their control box. *See the CP1 control box removal procedure on the following page.*

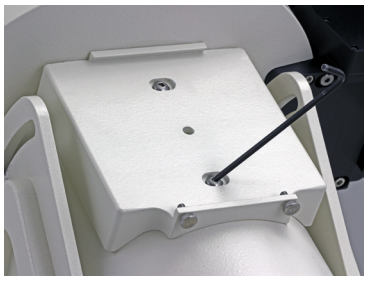
The screw to the lower hole should include the cable clip for safely directing the cable path.

900GTO **1200GTO**

When mounting the CP4 in this lower position you will need to use a longer Y-cable. This applies to all CP1, CP2 and CP3 owners.

Parts required:

- ***The 900GTO requires the GTOCP4, Power Cable Set (CABPP4SET), Pier/Tripod Control Box Adapter (CBAPT) and longer Y-cable (SGYCR2345).***
- ***The 1200GTO requires the GTOCP4, Power Cable Set (CABPP4SET), Pier/Tripod Control Box Adapter (CBAPT) and longer Y-cable (SGYCR2950).***



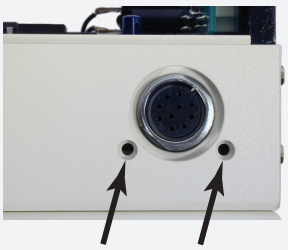
Removing Servo Box Adapter

Installed Cable Clip

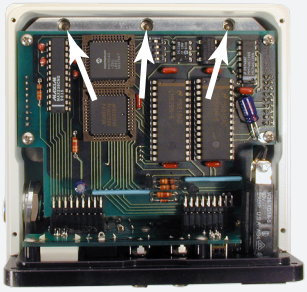
CP4 Attached to CBAPT

GTOCP1 Control Box Removal Procedure:

Remove Front Corner Screws (4)



Remove Screws (2 each side)



Remove Screws in top row (3)

Procedure

1. **Remove all screws shown in the illustration**
2. **Lift off the box's top**
3. **Gently lift out the front panel and internal electronics with the connected side sockets**
4. **Remove the two screws that hold the CP1 housing to the R.A. axis (not shown)**

GTOCP4 Upgrade for 400GTO and 600EGTO Mounts

Both 400GTO and 600EGTO mounts were shipped with two different motor/gear ratios during their production years. These different ratios require that a different "personality" be programmed into the CP4 before it leaves our facilities. The easiest way to know which ratio your mount has is to open the top white panel of your CP1, CP2 or CP3 control box and see what letter(s) are on the square chip inside. It will have either a "K" or "non-K" chip inside (example: "KD" or "D"). We will need this information before we can send your CP4.

Upgrading the 400 and 600 mounts with the CP4 will require using the Pier/Tripod Control Box Adapter (CBAPT) to attach to piers and tripods. There is no Pouch for the CP4 and its larger size will not fit into your current Pouch. When attaching the bracket to tripods you will likely also need to use the Control Box Extension Adapter (Q6280KIT) in order to have clearance.

It will not be necessary to replace the Servo Cable.

Parts required:

- ***The 400GTO and 600EGTO mounts require the GTOCP4, Power Cable Set (CABPP4SET) and Pier/Tripod Control Box Adapter (CBAPT) (if you do not already have one).***
- ***If using a tripod, both mounts may require the Control Box Extension Adapter (Q6280KIT).***

600EGTO

Information to Know When Selling or Purchasing a Used CP2 or CP3 Control Box via the Second-Hand Market

There will be a number of used CP2 and CP3 control boxes becoming available through second-hand markets, such as Astromart, once the CP4 is released. The buyer will need to be aware of a couple things to ensure that it will work with his or her mount.

There are no concerns if the seller's control box is from a *Mach1*, 900, 1100, 1200, or 1600 mount and being used on the buyer's 900 or 1200 mount as the mounts' "personalities" are the same.

However, if the control box is either coming from a 400, 600 or 3600 mount or going to those mounts, then it will be necessary to change the "personality" setting of the control box. Please call Astro-Physics to learn more.

It is recommended that a CP2 or CP3 box have the latest chip installed in order to maximize its performance and safety. Please call Astro-Physics to learn which chip is appropriate for your box, or check the technical support section of our website.

Although a CP3 will perform well with a "Q" and above chip, a "V", "V1" or "V2" chip is recommended to maximize performance, as well as being required to use the APCC software. There is no difference between these chips, except that the "V2" is recommended for an 1100 or 1600 mount with absolute encoders. All of the "V" chips work the same for all other mounts.

Note: A CP1 or CP2 box cannot utilize the APCC software.

Finally, it is very important that PEM is turned off in the Keypad and disabled in the AP V2 ASCOM driver and APCC until a new curve is run. If this is not done, then you will experience large and incorrect surges in the PE of the mount, as you will be entering false PE curves that are from the previous owner's mount into yours. Once you run a new curve, you can turn the PE back on.