ASTRO-PHYSICS

Revisions to ROM Chip of GTOCP3 Control Box

These chip versions pertain only to GTOCP3 Control Box. Please check the front panel of your control box to verify that you have a GTOCP3.

Determine your ROM chip version: There are several ways to check the version letter and date of the microprocessor ROM chip

- Open the top of the GTOCP3 control box and look for a label on one of the large, square chips.
- The chip version can be found in several places in the Astro-Physics V2 ASCOM Driver. In the Setup Telescope window, click the "Check Port" button. Assuming you have a good connection, a popup window will appear saying: "Mount found! Firmware Rev: V " (or whatever firmware is in the GTOCP3). The virtual keypad also displays the firmware version in the upper right: "FW:V", and the status window displays the version in the center column of information.
- Astro-Physics Command Center (APCC) software. The chip version can be queried in the Trial Registration window. If APCC is installed, connect to the mount. The chip version will display in the Setup tab.
- PulseGuide software by Ray Gralak. Simply connect to the mount with PulseGuide, and the chip version will be displayed in the connect window.

All new versions include all of the changes in prior versions. All chips are backward compatible for GTOCP3 control boxes. The latest version can be used in all GTOCP3 control boxes that are used on German Equatorial mounts. Rev. U and Rev. V should NOT be used with fork mounts, or on astrographic mounts set up in fork mode. (There is one GTOCP3 used by the University of Maryland Equatorial Fork Mount that requires its own custom chip).

Version V

This chip is available for upgrade of the GTOCP3 control box and comes with an extraction tool and instructions. Please specify part # CHIPKITV.

All GTOCP3 owners with version R, S, S1, T or U versions can upgrade to this chip for free. You must provide the serial # of your mount and GTOCP3 Control Box when ordering. If you do not wish to extract and replace the chip yourself, please call Astro-Physics to arrange for return of your control box.

All GTOCP3 owners with version Q or earlier versions can upgrade to this chip for $80 plus shipping. You must provide the serial # of your mount and GTOCP3 Control Box when ordering. If you do not wish to extract and replace the chip yourself, please call Astro-Physics to arrange for return of your control box.

- Fixed a minor bug in the power-down routine (used to store information for the next initialization) that could result in an incorrect pier side if meridian delays were being used.
- Improved the performance of the absolute encoder-based adjustments that occur in guiding movements.
- Fixed a bug in the ReCalibrate function that could result in a logically incorrect pier side on a mount that had tracked past the meridian. The reported pier side was correct, but the next slew direction was likely to be wrong.
- DO NOT use this chip in a mount that is configured as a fork mount!

Version U

- New meridian swap logic utilized in APCC. The logical process used before a GoTo slew to determine whether a pier-flip is required was changed. The old logical algorithm, which had been in place from the beginning of the Astro-Physics servo system in the 1990's was replaced with a

more efficient algorithm that solved several issues with APCC and other external software and also fixed an internal issue with long slews involving RA changes greater than 12 hours.

- Fixed bug to prevent repeating previous command on the GTOCP3's lower COM port from executing when a fault character, "X", "Y", or "Z", is transmitted by the servo. The three fault characters should stop all further servo activity as a safety measure. The lower COM port, however, had been echoing its last command after any fault character transmission which could cause a problem, depending on the last command in the queue.
- Modify time overflow to iterate the date at the 24/0 rollover. Mounts that were left powered but were parked in a dormant state were not iterating the date at the rollover from 23:59:59 to 0:00:00 until reactivated with servo time commands. If several days had passed, this could be problematic for external software.
- DO NOT use this chip in a mount that is configured as a fork mount!

Version T

- Added functionality for GTOAE box, including new commands.
- Added safety timer (also called a "Park Timer). This is a countdown timer that puts the mount into a parked state once the timer counts down to zero. Software can be configured to reset this timer at defined intervals to protect the mount from an external computer-related problem. For example: The timer can be set to expire in 2 minutes, and can be reset by the computer software every minute. As long as the computer and the COMs are functioning properly, the timer will be reset every minute, and the 2 minute countdown will never expire. However, if the computer crashes, the reset will not occur, and the mount will park at the end of the 2 minute countdown preventing an eventual pier crash.
- Meridian Delay no longer requires calibration before accepting command.
- Invoke King Rate
- Added commands that utilize Hour Angle (HA) coordinates (along with Declination coordinates) to supplement and complement normal RA and Dec coordinates. Hour Angle is converted to RA inside the GTOCP3 which minimizes timing errors.
  Hour Angle compliments RA in this way:
  - On a tracking mount, RA remains constant while HA changes with time. RA coordinates are the appropriate choice for normal astronomy.
  - On a stopped mount, HA remains constant while RA changes with time. HA coordinates are the appropriate choice for parking, terrestrial viewing and pointing recovery.
  - As with RA coordinates, HA coordinates can be used in GoTo slews, Syncs and ReCalibrates.
- Default/power up guide rate is 1.0x, not 0.5x
- Above hour (LST or meridian) calculation improved. The new calculation algorithm is more accurate by > 10x
- Fixed bug in time roll-over from 23:59:59 to 0:00:00, Dec 31st rolls over to 1/1/, Feb 28 rolls over on all but leap years.

Version S1

- Fixed bug in Rev S that disabled encoder corrections. This bug only affected 3600GTOPE owners and the first few 1600GTO owners until their Rev T chips were ready.

Version S

- Added functions that are utilized in Astro-Physics Command Center (APCC) software.

- Corrected inconsistency in the mathematical sign (+ or -) applied to the relative variable tracking rates between hemispheres. Southern hemisphere now operates same way as the northern hemisphere. This bug existed in all versions of GTOCP3,

Version R

- Provide support for the GTOELS control box provided with the 3600GTOPE German Equatorial Mounts. Includes commands for the Precision Encoder of the 3600GTOPE and the optional limit/home switches.
- Corrected bug that caused intermittent audible click heard from the motors when external software communicated with lower COMM port of GTOCP3. This issue was present in all prior versions of GTOCP3 firmware.

Version Q

- Southern hemisphere bug: Corrected bug in LST (local sidereal time, also known as above hour or meridian time) calculation that causes the LST to be computed about 4 minutes ahead (about 1 solar day equivalent) when time zone plus local time is a negative number. Bug shows up in southern hemisphere when parking in Park 1 position with a negative time zone when local time plus time zone is less than zero. Bug has been in place in all prior firmware versions.

Version P

- Corrected bug that affected OEM equatorial fork mounts only. Bug introduced in rev N while attempting to fix another problem. Description of bug: When mount tracks through zero hour, next go-to will likely slew 360 degrees in RA if new position is NOT on the other side of the zero hour.

Version O

- The change to this version only applies to the slew speed of the 3600GTO mount. Rev O reduces the slew rates of the 3600GTO by half (0.500), allowing the 3600GTO to slew quieter and smoother. We call this “slew scaling.” In the 3600GTO, the command for 600x will give you 300x, 900x is really 450x, and 1200x is really 600x. A user with a mount other than the 3600GTO gains nothing and loses nothing by changing to Rev O.

  The control box with serial #CP3-0792 was shipped with the original 3600GTO prototype (known at that time as Mach4GTO or informally as the “Big One”). If the “O” chip version is installed in this control box, it will function the same as the original chip. It will not slew at the slower speeds. This is because there is another setting in the control box that must change in order for the “slew scaling” to occur.

Version N

- Corrected bug that affected OEM equatorial fork mounts only: corrected bug in fork mode that rotates mount 360 degrees on "go-to" following above hour passing the 12 hour mark.

Version M

- This version was developed so that we could use a new lead-free focus motor driver in the control box. The prior focus motor driver could not be obtained in a lead-free version. This version can also control earlier versions of the lead-free focus motor driver.

Version L

- Corrected bug that relates to the few Mathis Instruments fork mounts with the I and J chips. If a glitch occurred during power down, there was a possibility that the stored PEM data would be out of phase with the worm position.

Version K

This version number was not used to avoid confusion with the GTOCP1 and GTOCP2 chip versions.

Version J

- PEM playback is disabled during slew to avoid small arc second pointing errors with PEM playback turned on.

Version I

This version started shipping 05-17-05.

- Variable Slew Rate supported with new command: :Rs xxxx#
- Default value of RA backlash set to zero. Was previously 00:00:15 (same as 00*03:50), but never discovered because, in the early days, the keypad was always used to start the mount and it always sent the correct zero values. The error in the default value of RA caused a problem when the mount was used to start the system (EXT command is used). If the 3rd party software does not set RA backlash to zero, the incorrect default value would be used. This could cause strange motion in certain circumstances.
- Corrected interactions of backlash with PEM and smaller (<1x) tracking rates.
- Autoguide port always runs on most recent guide rate, never on centering rate.
- COMM Port buffering changed, each port has non-interruptible circular buffer. RX strings copies into original buffer prior to parsing. Should eliminate "timeouts".
- DEC park error fixed.
- Corrected potential keypad N-S-E-W button lockups w/ PEM. Previously, while making small movement corrections with TheSky (with PEM enabled), the mount would not think that it had reached its destination. This caused the keypad to ignore N-S-E-W commands.
- Brownout detect turned ON during chip programming. This eliminates potential future corruption of mount characteristic information. Corruption, which can occur after months or years of use, can cause major performance problems including tracking rate.

Version H

- This is the same as version G with the addition of a no meridian feature required by OEM fork mounts. These were shipped only with fork mounts.

Versions F& G

Version F was shipped with only 12 mounts from 05-26-04 to 6-08-04. Version G chips were provided to all of those customers to replace the F chip. Mounts shipped between 06-22-04 and 04-11-05 contained G chips.

- Corrected bug with time overflow from 23:59:59 to 0:00:00. The calendar day is also updated.

New commands:

- Gets the current calendar day :GC#
- Command motion for xxx milliseconds in the direction specified at the currently selected guide rate :Mnxxx# :Msxxx# :Mexxx# :Mwxxx#
- Sets the centering rate for the N-S-E-W buttons to xxx :Rcxxx#
- Selects the tracking rate in the RA axis to xxx.xxx :RR sxxx.xxxx#
- Selects the tracking rate in the Dec axis to xxx.xxxx :RD sxxx.xxxx#
- Default command for an equatorial fork mount, which eliminates the meridian flip :FM#
- Default command for A German equatorial mount that includes the meridian flip :EM#

Reinstated command that did not work properly in earlier chip versions.

- Horizon check during slewing functions :ho# and :hq#

Changes from version F to version G:

- Error in reading PEM memory was corrected.
- Error in the transformation from Alt-Az coordinates to RA-DEC coordinates was corrected. The error produced incorrect positioning or calibration when Alt-Az coordinates are entered followed by a go-to (move) or calibrate command.
- Corrected the tracking rate adjustments for Lunar, Solar and No Tracking.
- Reinstated the command to read the pier side.
- Removed an invalid command that caused the mount to reset due to an infinite loop and watchdog timeout.
- Corrected bug with the variable rate that caused parking errors.
- Fixed bug that caused return of Dec values to be corrupted.

Disclaimer

Astro-Physics makes every effort to release chips that are free from bugs. However due to complex interactions and situational variables, we might not catch them all. If new bugs are discovered, we will make every effort to fix the error quickly and offer replacement chips at a reasonable cost.