ASTRO-PHYSICS COMMAND PROTOCOL FOR GTO MOUNTS
Shipped prior to 11-13-00

Protocol Last Modified: 5/17/99
Mounts shipped later than 11-13-00 have additional commands.
Refer to Astro-Physics Command Protocol for GTO Mounts - Version D or KD - a PDF file.

These commands are based on the Meade LX200 protocol:

Command: :Sr HH:MM.S# or :Sr HH:MM:SS#
Response: "1"

Defines the commanded Right Ascension (RA). Must be issued in order for the calibrate mount command to be accepted. Command may be issued in long or short format regardless of whether long format has been selected. Move and calibrate commands operate on the most recently defined RA.

Command: :Sd sDD*MM# or :Sd sDD*MM:SS#
Response: "1"

Defines the commanded Declination (DEC). Must be issued in order for the calibrate mount command to be accepted Command may be issued in long or short format regardless of whether long format has been selected. Move and calibrate commands operate on the most recently defined DEC.
Note: We use "" as an asterisk. The Meade manual states that this symbol represents ASCII 223 in their command language.*
TheSky software appears to recognize it either way.

Command: :SG sHH#
Response: "1"

Sets the offset from Greenwich mean time. Must be issued in order for the calibrate mount command to be accepted.

Command: :Sg DDD*MM# or :Sg DDD*MM:SS#
Response: "1"

Sets the current longitude. Must be issued in order for the calibrate mount command to be accepted. Command may be issued in long or short format regardless of whether long format has been selected.

Command: :St sDD*MM#
Response: "1"

Sets the current latitude. Must be issued in order for the calibrate mount command to be accepted. Command may be issued in long or short format regardless of whether long format has been selected.

Command: :SL HH:MM:SS#
Response: "1"

Sets the current local time. Must be issued in order for the calibrate mount command to be accepted. Command may be issued in long or short format regardless of whether long format has been selected.

Command: :SC MM/DD/YY#
Response: 16 spaces followed by "#", followed by 16 spaces, followed by "#"

Sets the current date. Note that year fields equal to or larger than 97 are assumed to be 20th century, year fields less than 97 are assumed to be 21st century. Must be issued in order for the calibrate mount command to be accepted.

Command: :GG#
Response: sHH

Gets the offset from Greenwich mean time.

Command: :Gg#
Response: DDD*MM# or DDD*MM:SS# if long format

Gets the current longitude.

Command: :Gt#
Response: sDD*MM# or sDD*MM:SS# if long format

Gets the current latitude.

Command: :GL#
Response: HH:MM.S# or HH:MM:SS# if long format

Gets the current local time.

Command: :GS#
Response: HH:MM.S# or HH:MM:SS# if long format

Gets the current sidereal time.

Command: :GR#
Response: HH:MM.S# or HH:MM:SS# if long format

Gets the current Right Ascention.

Command: :GD#
Response: sDD*MM# or sDD*MM:SS# if long format

Gets the current Declination.

Command: :CM#
Response: "Objects Coordinated#"

Calibrate mount. Current Right Ascension and Declination become the commanded Right Ascension and Declination respectively. This command must precede the first :MS# because it enables slewing motion. This command will be ignored if any one or more of the following has not been set since powerup: offset from Greenwich, latitude, longitude, local time, date, commanded RA, or commanded DEC.

Command: :Mn# :Ms# :Me# :Mw#
Response: (none)

Command motion in the direction specified (n=north, s=south, e=east, w=west) the currently selected guide or centering rate. Motion will continue until a quit command is issued.

Command: :MS#
Response: "0" if command accepted,
(none) if command not accepted,
"1 Object is below horizon. #" (total length of this string is 33 characters) if the horizon check is turned on and the desired object is below 0 degrees altitude.

Slew to the most recently defined RA and DEC coordinates. A calibrate mount command must have been previously issued else this command is ignored. Slewing is performed at the currently selected slew rate. If the horizon check is turned on, and the object is below the horizon, a string containing the appropriate message will be returned, and no slewing will occur.

Command: :Qn# :Qs# :Qe# :Qw#
Response: (none)

Stop motion in the specified axis. Note that :Qn# is identical to :Qs#, and :Qe# is identical to :Qw#. Motion is terminated only if it was not started by a slew (:MS#) command.

Command: :Q#
Response: (none)

Motion in both axes is stopped, regardless of how the motion was invoked.

Command: :P#
Response: "HIGH PRECISION# " or " LOW PRECISION# "

Inquire format. If long format has been set on the communication port currently receiving the :P# command, then "HIGH PRECISION#" is returned. If long format has not been selected, then "LOW PRECISION#" is returned. This command has a slightly different function than described in the Meade protocol.

Command: :U#
Response: (none)

Select long format, valid only for the communication port through which this command is issued, ports are controlled independently. Unlike the Meade definition, though, once long format has been selected it cannot be deselected without powering down the unit. Only the first occurrence of :U# acts upon the port in question. Long format only defines the format of the return strings, Input data (using the set command) will be recognized in any format whether or not long format has been selected.

Command: :B+# :B-#
Response: none

Incrementally increases (B+) or decreases (B-) reticle brightness. Command to be sent over RS-232 each time a button is pressed to increase or decrease brightness. When the brightness is at the maximum, subsequent :B+# commands are ignored. When the brightness is at the minimum, subsequent :B-# commands are ignored. On powerup, the brightness is at the minimum (off).
The Meade commands :B0# :B1# :B2# :B3# are not implemented.

Command: :F+# :F-# :FF# :FS# :FQ#
Response: none

Advances (F+) or retracts (F-) focus adjust motor on the eyepiece. F+ or F- commands commence adjustment and :FQ# stops it. This works the same way the N-S-E-W keypad works (it may even be an operating mode of the same keys). If :FS# has been issued previously, then the focus adjustment will be slow. If the :FF# command has been issued, then the adjustment will be fast. If neither FF nor FS is specified, the powerup default of FS is assumed.

Command: :RG# :RG0# :RG1# :RG2#
Response: none

Selects guide rate for the N-S-E-W buttons. Optionally selects 0.25x (:RG0#), 0.5x (:RG1#), or 1.0x (:RG2#). If no index is provided (:RG#), the previously selected guide rate will be used, else the power up default of 0.5x will be assumed by the motor drive. The indexes are extensions of the Meade protocol.

Command: :RC#; :RC0# :RC1#; :RC2# :RC3#
Response: none

Selects centering rate for the N-S-E-W buttons. Optionally selects a rate of 12x (:RC0#), 64x (:RC1#), 600x (:RC2#), or 1200x (:RC3#). If no index is provided (:RC#), then the previously selected speed will be used, else the power up default of 64x will be assumed by the motor drive. The indexes are extensions of the Meade protocol.

Command: :RS# :RS0# :RS1# :RS2#
Response: none

Selects the slew speed used by the telescope move functions. This command has no effect on the use of the N-S-E-W buttons (therefore, :RS# has no effect). The default slew speed is 1200x. Slewing can be done at 1200x (:RS2#), 900x (:RS1#), or 600x (:RS0#). The indexes are extensions of the Meade protocol.

Non-Meade commands:

Command: :RT0# :RT1# :RT2#
Response: none

This command selects the tracking rate. It selects lunar (:RT0#), solar (:RT1#), or sidereal (:RT2#). The sidereal rate is assumed as a default by the motor drive if nothing is specified. This command has no effect on the use of the N-S-E-W buttons. This command is not in the Meade manual.

Command: :NS#
Response: none

This command swaps the functions of the north and south buttons. Subsequent commands :Mn# and :Ms# are affected. This command is not in the Meade manual.