iOptron^{TM} Telescope RS-232 Command Language

Version 1.2

August 3rd, 2012

Abbreviations used:

DD or DDD	degrees or day of the month depending on the context
HH	hours
MM	minutes or month depending on the context
s	+ or– sign, assumed to be + if omitted
SS	seconds
YY	last two digits of the year (only for 21st century)
XXXXX	milliseconds
nn.nnnn	digits

All above including leading zeros to match the same length of the command.

Version History

Feb. 2nd, 2012	1.0	Initial release.
Feb. 27th,2012	1.1	Added command about Daylight Saving Time.
Aug. 3rd, 2012	1.2	Added command about Movement and Alt-Azi Mounts, modified definition of ":Q#"

General Telescope Information

Command: ":SG sHH:MM#"

Response: "1"

Sets the offset from Greenwich Mean Time(Exclude Daylight Saving Time). Data entered with this command will be "remembered" through a power cycle and automatically re-applied on the next power up. The offset can only be entered in the range of -12 to +12 hours.

Command: ":SDS0#",":SDS1#"

Response: "1"

Sets the status of Daylight Saving Time. ":SDS1#" enables Daylight Saving Time, ":SDS0#" disables Daylight Saving Time.

Command: ":Sg sDDD*MM:SS#"

Response: "1"

Sets the current longitude. Data entered with this command will be "remembered" through a power cycle and automatically re-applied on the next power up. The longitude can only be entered in the range of -180 to 180, East is positive.

Command: ":St sDD*MM:SS#"

Response: "1"

Sets the current latitude. Data entered with this command will be "remembered" through a power cycle and automatically re-applied on the next power up. The latitude can only be entered in the range of -90 to 90, North is positive.

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

Response: "1"

Sets the current local time. Data entered with this command will be "remembered" through a power cycle and automatically re-applied on the next power up. The time can only be entered in the range of 00:00:00 to 23:59:59.

Command: ":SC MM/DD/YY#"

Response: "1"

Sets the current date. Note that year fields are assumed to be 21st century.

Command: ":GG#"

Response: "sHH:MM#"

Gets the offset from Greenwich Mean Time(Exclude Daylight Saving Time).

Command: ":GDS#"

Response: "0"or"1"

Gets the status of Daylight Saving Time. "1" means Daylight Saving Time enabled, "0" means Daylight Saving Time disabled.

Command: ":Gg#"
Response: "sDDD*MM:SS#"
Gets the current longitude. Note the return value will be in signed format, East is positive.

Command: ":Gt#"
Response: "sDD*MM:SS#"
Gets the current latitude. Note the return value will be in signed format, North is positive.

Command: ":GL#"
Response: "HH:MM:SS#"
Gets the current local time in 24 hour format. Overflows from 23:59:59 to 00:00:00. Updates calendar day on overflow.

Command: ":GS#"
Response: "HH:MM:SS#"
Gets the current sidereal time in 24 hour format.

Command: ":GR#"
Response: "HH:MM:SS#"
Gets the current Right Ascension.

Command: ":GD#"
Response: "sDD*MM:SS#"
Gets the current Declination.

Command: ":GA#"
Response: "sDD*MM:SS#"
Gets the current Altitude.

Command: ":GZ#"
Response: "DDD*MM:SS#"
Gets the current Azimuth.

Command: ":GC#"
Response: "MM:DD:YY#"
Gets the current calendar day.

Telescope Motion

Command: ":MS#"
Response: "1"   if command accepted,
          "0"   The desired object is below 0 degrees altitude.
Slew to the most recently defined RA and DEC coordinates or most recently defined ALT and AZI coordinates. Slewing is performed at the currently selected slew rate. If the object is below the horizon, this will be stated, and no slewing will occur.

Command: ":SE?#"
Response: "0"   not in slewing,
          "1"   in slewing.
This command get the slewing status.

Command: ":Q#"
Response: "1"
This command will stop slewing. Tracking and moving by arrow keys will not be affected.

Command: ":MnXXXXX#" ":MsXXXXX#" ":MeXXXXX#" ":MwXXXXX#"
Response: (none)
Command motion for XXXXX milliseconds in the direction specified at the currently selected guide rate. If XXXXX has a value of zero, motion is continuous and requires a ":Mx00000#" command to terminate. x is the same direction of the previous command. XXXXX is in the range of 0 to 32767.

Command: ":AG#"
Response: "n.nn#"
This command returns the guide rate.

Command: ":RGnnn#"
Response: "1"
Selects guide rate nnn*0.01x sidereal rate. nnn is in the range of 10 to 90, and 100.

Command: ":ST0#" ":ST1#"
Respond: "1"
These command sets tracking state. ":ST0#" indicates stop tracking, ":ST1#" indicates start tracking.

Command: ":AT#"
Respond: "0"   The telescope is not tracking,
         "1"   The telescope is tracking.
This command returns whether the telescope is tracking.

Command: ":QT#"

Response: "0"   Sidereal rate

         "1"   Lunar rate

         "2"   Solar rate

         "3"   King rate

         "4"   Custom rate

This command gets the tracking rate.

Command: ":RT0#" ":RT1#" ":RT2#" ":RT3#" ":RT4#"

Response: "1"

This command selects the tracking rate. It selects sidereal (:RT0#), lunar (:RT1#), solar (:RT2#), King (:RT3#), or custom(":RT4#"). The sidereal rate is assumed as a default by the next power up. This command has no effect on the use of the N-S-E-W buttons.

Command: ":AP#"

Response: "0"   Un-parking state,

         "1"   Parking state.

This command gets the parking status.

Command: ":MP0#"

Response: "1"

This command un-parks the telescope.

Command: ":MP1#"

Response: "1"

This command invokes the parked mode. In parked mode, the telescope cannot slew, track, and guide unless a un-park command is issued.

Caution: Any movement caused by hand controller will make the telescope into un-park state.

Command: ":pS#"

Response: "0"   East,

           "1"   West.

This command returns the side of the pier on which the telescope is currently positioned. It is useful for remote observatories where it is not possible for the viewer to see the mount. Initially, the mount must be manually positioned on the proper pier side for the calibration object and calibrated using the :CM# command.

Command: ":MH#"

Respond: "1"

This command will slew to the "home" position immediately.

Command: ":AH#"

Respond: "0"   The telescope is not at "home" position,

      "1"   The telescope is at "home" position.

This command returns whether the telescope is at "home" position.

Command: ":SRn#"

Response: "1"

Sets the slew rate used by the telescope move functions. This command has no effect on the use of the N-S-E-W buttons. For n, specify an integer from 1 to 9. 1 stands for 1x sidereal tracking rate, 2 stands for 2x, 3 stands for 8x, 4 stands for 16x, 5 stands for 64x, 6 stands for 128x, 7 stands for 256x, 8 stands for 512x, 9 stands for maximum speed(larger than 512x).

Command: ":RR snn.nnnn#"

Response: "1"

"Custom Tracking Rate"(":RT4#") must be selected before this command to take effect.

The command selects the tracking rate in the RA axis to nn.nnnn. The rate added to the standard sidereal rate and can be positive or negative. In equatorial mounts, snn.nnnn is limited to the range of -0.0100 to +0.0100.

Command: ":RD snn.nnnn#"

Response: "1"

This command only works with Alt-Azi Mounts. "Custom Tracking Rate"(":RT4#") must be selected before this command to take effect.

The command selects the tracking rate in the DEC axis to nn.nnnn. The rate added to the standard sidereal rate and can be positive or negative.

Command: ":mn#" ":me#" ":ms#" ":mw#"

Response: (none)

These commands have identical function as pressed arrow key. They will move mounts to N-E-S-W direction at specified speed(may change by ":SRn#"). The mount will keep moving until a ":q#" sent.

Command: ":q#"

Response: (none)

This commands will stop moving by arrow keys or ":mn#", ":me#", ":ms#", ":mw#" command. Slewing and tracking will not be affected.

Position

Command: ":CM#"
Response: "1"
Calibrate mount (Sync). If in equatorial mounts or in RA-DEC mode with Alt-Azi mounts, Current Right Ascension and Declination become the commanded Right Ascension and Declination respectively. If in Alt-Azi mode (only works with Alt-Azi mounts), then the commanded Altitude and Azimuth become the current. This command assumes that the mount has been manually positioned on the proper pier side for the calibration object. This command is ignored if slewing is in progress. This command should be used for initial calibration. It should not be used after the mount has been tracking unless it is known that it has not tracked across the meridian.

Command: ":Sr HH:MM:SS#"
Response: "1"
Defines the commanded Right Ascension, RA. This command automatically selects RA-DEC mode. Move and calibrate commands operate on the most recently defined RA.

Command: ":Sd sDD*MM:SS#"
Response: "1"
Defines the commanded Declination, DEC. This command automatically selects RA-DEC mode. Move and calibrate commands operate on the most recently defined DEC.

Command: ":Sa sDD*MM:SS#"
Response: "1"
This command only works with Alt-Azi Mounts. Defines the commanded Altitude, ALT.
Move and calibrate commands operate on the most recently defined ALT.
This command automatically selects Alt-Azi mode, however tracking rate is unaffected.

Command: ":Sz DDD*MM:SS#"
Response: "1"
This command only works with Alt-Azi Mounts. Defines the commanded Azimuth, AZI.
Move and calibrate commands operate on the most recently defined AZI. This command automati cally selects Alt-Azi mode, however tracking rate is unaffected.

Miscellaneous

Command: ":FW1#"
Response: "YYMMDDYYMMDD#"
Gets the date of the mainboard's and the hand controller's firmware. The first "YYMMDD" indicates the date of the mainboard's firmware, the second "YYMMDD" indicates the date of the hand controller's firmware.

Command: ":FW2#"
Response: "YYMMDDYYMMDD#"
Gets the date of the RA motor board's and the DEC motor board's firmware. The first "YYMMDD" indicates the date of the RA motor board's firmware, the second "YYMMDD" indicates the date of the DEC motor board's firmware.

Command: ":V#"
Response: "V1.00#"
This command is the first initialization command of iOptron products.

Command: ":MountInfo#"
Response: "8407"

Miscellaneous information

The command set is written in ASCII character format and can be used to write your own programs. The commands are case sensitive.

Initialization sequence

In order to properly initialize the mount with your software, you must issue the following commands when you establish your link:
:V#
:MountInfo#

RS-232 Port Settings

Baud Rate: 9600
Parity: none
Data bits: 8
Flow Control: none (does not support Xon/Xoff or hardware flow control)
Start Bits: 1
Stop Bits: 1