RainbowAstro Mount Protocol

mount firmware version 200625 or higher

baudrate : 115200

Must be case sensitive. Keep the number of letters. Be sure to use +/- signs for DEC / ALT.

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Contents	Send command	Return	Remarks
unpark, tracking on	:CtA#	N/A	
tracking off	:CtL#	N/A	
get current RA	:GR#	:GR09:14:46.1#	09hour 12min 46.1sec
get current DEC	:GD#	:GD+05*01'10.5#	+05deg 01min 10.5sec
get current altitude	:GA#	:GA+10*20'30.0#	+10deg 20min 30.0sec
get current azimuth	:GZ#	:GZ270*10'20.0#	270deg 10min 20.0sec (0deg - north, 90deg - east, 180deg - south, 270deg - west)
get local date	:GC#	:GC02/10/20#	month/day/year
set local date	:SC*MM/DD/YY*#		ex) :SC02/19/20# (month/day/year)
get local time	:GL#	:GL00:09:47#	0hour 9min 47sec
set local time	:SL*HH:MM:SS*#		ex) :SL14:30:00# (PM 2hour 30min 00sec)
get time offset	:GG#	:GG-09#	The sign is opposite to the hand controller. If GMT +09 in the hand control, it returns -09 #.
set time offset	:SG*sHH*#		ex) :SG-09# The sign is opposite to the hand controller. If GMT +09 in the hand control, it returns -09 #.
set target RA	:Sr*HH:MM:SS.S*#	1	ex) :Sr01:20:30.4#
set target DEC	:Sd*sDD*MM:SS.S*#	1	ex) :Sd+10*20:30.0#
slew to target(by RA,DEC)	:MS#	:MM0#	Before sending this, you must set target RA, set target DEC. After slewing is completed, MM0 is returned. If slewing fails, a value other than MM0 is returned.
set target altitude	:Sa*sDD*MM:SS.S*#	N/A	ex) :Sa+10*20:30.5#

set target azimuth	:Sz*DDD*MM:SS.S*#	N/A	ex) :Sz100*20:30.5# (0deg - north, 90deg - east, 180deg - south, 270deg - west)
slew to target(by alt,az)	:MA#	:MM0#	Before sending this, you must set target alititude, set target azimuth. After slewing is completed, MM0 is returned. If slewing fails, a value other than MM0 is returned.
		:MML#	The altitude of the target is lower than the lower limit.
		:MMU#	The altitude of the target is higher than the upper limit.
		:MME#	Slewing was canceled by the user.
find home	:Ch#	:CHO#	Mount is to find the mechanical origin. If the mount succeeds in homing, it returns CHO. If homing fails, a value other than CHO is returned. The reason for the failure of homing is that it started from a distance from home position. Try homing again and you will succeed.
		:CH0#	ra axis homing failed. (number 0. not alphabet O)
		:CH<#	dec axis homing failed.
stop slewing, stop homing	:Q#	N/A	
set speed "max"	:RS#	N/A	
set speed "find"	:RM#	N/A	
set speed "centering"	:RC#	N/A	
set speed "guide"	:RG#	N/A	
get "max" speed (speed 3 of H.C.)	:CU3#	:CU3=1200#	1200x speed
get "find" speed (speed 2 of H.C.)	:CU2#	:CU2=0300#	300x speed
get "centering" speed (speed 1 of H.C.)	:CU1#	:CU1=0020#	20x speed
get "guide" speed	:CU0#	:CU0=1.0#	1.0x speed
set "max" speed (speed 3 of H.C.)	:Cu3=*DDDD*#	N/A	ex) :Cu3=1200#
set "find" speed (speed 2 of H.C.)	:Cu2=*DDDD*#	N/A	ex) :Cu2=0300#
set "centering" speed (speed 1 of H.C.)	:Cu1=*DDDD*#	N/A	ex) :Cu1=0020#
set "guide" speed	:Cu0=*D.D*#	N/A	ex) :Cu0=1.0#
manual DEC + move	:Ms#	N/A	Must send either :Q# or :Qs# for stop
manual DEC - move	:Mn#	N/A	Must send either :Q# or :Qn# for stop
manual RA + move	:Me#	N/A	Must send either :Q# or :Qe# for stop

manual RA - move	:Mw#	N/A	Must send either :Q# or :Qw# for stop
stop DEC + move	:Qs#	N/A	
stop DEC - move	:Qn#	N/A	
stop RA + move	:Qe#	N/A	
stop RA - move	:Qw#	N/A	
change guide speed	:Cu0=*D.D*#	N/A	(number 0) value range : 0.1 ~ 1.0 ex) :Cu0=0.1# - guide speed 0.1x ex) :Cu0=1.0# - guide speed 1.0x
get guide speed	:CU0#	:CU0=1.0#	(number 0) value range : 0.1 ~ 1.0 ex) :CU0=0.1# - guide speed 0.1x ex) :CU0=1.0# - guide speed 1.0x
check slewing, parking	:CL#	:CL0#	not slewing (number 0). Slew is complete. firmware version 190322 or higher
		:CL1#	under slewing. Slewing did not complete.
star sync	:Ck*DDD.DDD+DD.DDD*#	N/A	star's RA deg, Dec deg ex) :Ck100.000+10.000# - Ra 100.000 deg, Dec +10.000 deg
star alignment	:CN*DDD.DDD+DD.DDD*#	N/A	star's RA deg, Dec deg ex) :CN100.000+10.000# - Ra 100.000 deg, Dec +10.000 deg
check tracking	:AT#	:AT0#	tracking off state (number 0)
		:AT1#	tracking on state
check homing	:AH#	:AH0#	not under homing (number 0). or Fine home is complete. If you want check homing result, please use " :GH# "
		:AH1#	under homing. Homing did not complete.
get homing status	:GH#	:GHO#	Mount found home. (alphabet O, not number 0)
		:GH0#	did not fine home yet. or ra axis homing failed. (number 0. not alphabet O)
		:GH<#	dec axis homing failed.
get observer's longitude	:Gg#	:Gg-127*20'10.0#	deg, min, sec, EAST -, WEST +
get observer's latitude	:Gt#	:Gt+36*20'60.0#	deg, min, sec

set observer's longitude	:Sg*sDDD*MM'SS*#	N/A	ex):Sg-127*30'20# deg, min, sec, EAST -, WEST +
set observer's latitude	:St*sDD*MM'SS*#	N/A	ex):St+37*20'30# deg, min, sec
set traking rate sidereal	:CtR#	N/A	
set traking rate sun	:CtS#	N/A	
set traking rate lunar	:CtM#	N/A	
set traking rate user(guide speed)	:CtU#	N/A	Use the set guide speed as the tracking rate.
get tracking rate	:Ct?#	:CT0#	traking rate sidereal
		:CT1#	traking rate sun
		:CT2#	traking rate lunar
		:CT3#	traking rate user(guide speed)
get version	:AV#	:AV190905#	version 190905
Set USB mode on	:AU#	N/A	
Set WiFi mode on	:AW#	N/A	
Set Protocol LX200	:AL#	N/A	
Set Protocol Rainbow	:AR#	N/A	

For auto guide use :RG#, manual move and stop slewing protocol.
If you want to ignore the ACK, empty the receive buffer immediately before sending the protocol.
Please distinguish between the number 0 and the letter O.