10.5 Communications Protocol

10.5.1 Data Packet Types from GUI to Rover

Each command will echo a packet with the same type code if it has been accepted; monitor this return packet to check that the command was received.

Type code	Number of Bytes of data	Description	Detail of data bytes
CMDNULL 0	0	Ask for Null Echo	
CMDGETSW 1	0	Ask for Led and Switch status Packet	
CMDSETLED 2	1	Set LEDs	Bits xxxxxxBA. A=1 for LED 1 on; B=1 for LED 2 on.
CMDGETCOUNT 3	0	Ask for internal counter status Packet	
CMDMOTORSTATUS 4	0	Ask for Motor and Position status Packet	
CMDSETMOTOR1 5	1	Set Motor Speed 1	>0 Forwards, <0 Backwards, 0 = stop
CMDSETMOTOR2 6	1	Set Motor Speed 2	>0 Forwards, <0 Backwards, 0 = stop
CMDSETBOTHMOTORS 7	2	Set Motor Speed 1 & 2	2 bytes defined as commands 5 and 6
CMDGETLINEFOLLOW 8	0	Ask for line following data	
CMDSETLINEFOLLOW 9	5	Set line following thresholds and Leds	Byte 1 bits 0&1 control leds, Byte 2&3 threshold A (high low) bytes 4&5 threshold B (high low)
CMDGETLIGHTTEMP 17	0	Ask for latest values for the outputs of the two buffer amps on the main board (thermistor and photo/audio)	
CMDPOWERSWITCH 21	1	Power board 16bit pic Control power switch	Lower 2 bits control power of RC servos
CMDPOWERSERV01 22	1	Power board 16bit pic – Control RC servo 1	128 = centre
CMDPOWERSERV02 23	1	Power board 16bit pic – Control RC servo 2	128 = centre
CMDPOWERREADAD0 24	0	Power board 16bit pic - Ask for AD0 value	
CMDPOWERREADAD1 25	0	Power board 16bit pic - Ask for AD1 value	
CMDPOWERREADphotodiode 26	0	Power board 16bit pic -Ask for AD6 value	
CMDPOWERREADthermistor 27	0	Power board 16bit pic - Ask for AD7 value	
CMDREADemfs 30	0	Request motor back emf	
CMDRDlightsensors 31	0	Request 2 integrated light sensors	
CMDMyMAC 32	0	Request MAC address	

Type code	Number of Bytes of data	Description	Detail of data bytes
CMDRDMMA8452 40	0	Ask for Accel MMA8452Q	
CMDRDgyro 43	0	Ask for gyro L3G4200D	
CMDMagSTATUS 44	0	Ask for Mag MAG3110 status	
CMDMag 45	0	Ask for Mag MAG3110 6 bytes from reg 1 onwards	
CMDRDgyroSTATUS 46	0	Get Gyro status	
CMDdoSTEP 50	2	do Step. Uses 2 parameters (sample rate in 1 mS intervals and A/D chan)	
CMDStepStatus 51	0	Step status returns 1 byte (0) when ready	
CMDStepRead 52	0	Get step data read returns 64 words of sampled data	
CMDstepInstRead 53	0	Get instant step value of A/D	
CMDreadSounds 54	0	Get sound samples from microphone	
CMDGetMotorSpeedWord 55	0	Get various motor parameters	
CMDMotorSpeedClosed 56	5	Set closed loop speed	16 bit speed (HL), 16 bit speed (HL), 1 (if last byte =0 then disables closed loop)
CMDGETstarpos 57 CMDGETUSGPS 58	0 0	Deprecated Ask for SELS information	

10.5.2 Data Packet Types from Rover to GUI

Type code	Number of Bytes of data	Description	Detail of data bytes NB all words (multiple bytes) are MSB first
CMDNULL 0	0	Null Packet (just type code)	
CMDGETSW 1	1	Led and Switch status Packet	Bits xxDCxxBA. DC = status of LEDs and BA status of switches (1 = pressed)
CMDSETLED 2	0	Null Packet (just type code)	
CMDGETCOUNT 3	2	Internal counter (increments on each send)	2 bytes forming 16 integer.
CMDMOTORSTATUS 4	9	Motor and position status	For each motor 1 byte commanded speed, 2 bytes position. Total 9 bytes (note dummy 3 bytes of zero at end as only 2 motors).
CMDSETMOTOR1 5	0	Null Packet (just type code)	
CMDSETMOTOR2 6	0	Null Packet (just type code)	
CMDSETBOTHMOTORS 7	0	Null Packet (just type code)	
CMDGETLINEFOLLOW 8	5	Ask for line following data	Byte 1 bits 0 & 1 set if over threshold. Bytes 2&3 and 4&5 levels
CMDSETLINEFOLLOW 9	0	Null Packet (just type code)	
CMDGETLIGHTTEMP 17	4	Send latest values for the outputs of the two buffer amps on the main board (thermistor and photo/audio)	2 16 bit values (HLHL)
CMDPOWERSWITCH 21	0	Null Packet (just type code)	
CMDPOWERSERV01 22	0	Null Packet (just type code)	
CMDPOWERSERV02 23	0	Null Packet (just type code)	
CMDPOWERREADAD0 24	2	Power board - Ask for AD0 value	2 *8 bit bytes making up A/D value (high low)
CMDPOWERREADAD1 25	2	Power board - Ask for AD1 value	2 *8 bit bytes making up A/D value (high low)
CMDPOWERREADphotodiode 26	2	Power board - Ask for AD6 value	2 *8 bit bytes making up A/D value (high low)
CMDPOWERREADthermistor 27	2	Power board - Ask for AD7 value	2 *8 bit bytes making up A/D value (high low)
CMDREADemfs 30	4	Request motor back emf	2 16 bit values HLHL
CMDRDlightsensors 31	4	Request 2 integrated light sensors	2 16 bit values HLHL
CMDMyMAC 32	6	Request MAC address	6 bytes which make up the MAC address of the radio module
CMDRDMMA8452 40	0 or 6	Ask for Accel MMA8452Q	If new data then 6 bytes from reg 1 onwards (else no bytes)
CMDRDgyro 43	8	Ask for gyro L3G4200D	8 bytes from address 0x26 onwards (28 onwards adjusted for HL)

Type code	Number of Bytes of data	Description	Detail of data bytes NB all words (multiple bytes) are MSB first
CMDMagSTATUS 44	2	Ask for MAG3110 status	address 0x0 followed by address 0xf
CMDMag 45	6	Ask for MAG3110 6 bytes from reg 1 onwards	6 bytes from reg 1 onwards
CMDRDgyroSTATUS 46	2		Contents of 2 bytes from internal gyro reg 0x26 and 0x27
CMDdoSTEP 50	0	Null Packet (just type code)	
CMDStepStatus 51	1	Step status returns 1 byte (0) when ready	Tells you when the step response has been gathered
CMDStepRead 52	128	Step response data	Returns 128 bytes made up of 64 words of sampled data HL
CMDstepInstRead 53	2	Instant read of step A/D value	1 word HL
CMDreadSounds 54	Variable	Get sound samples from microphone	First byte number of samples in packet (0 to 128) then samples. Poll fast enough to not lose any samples (i.e. n samples <128)
CMDGetMotorSpeedWord 55	12	Get various motor parameters	Pos 1 (16 bit HL), pos 2 (16 bit HL), Speed 1 (16 bit HL), Speed 2(16 bit HL), motor 1 emf (16 bit HL), motor 2 emf (16 bit HL)
CMDMotorSpeedClosed 56	0	Null Packet (just type code)	
CMDGETstarpos 57		Deprecated	
CMDGETUSGPS 58	Opt 1 = 8 Opt 2 = 4	Reply containing SELS information	Option 1: 2 * 8 bit bytes making up distance from Reference 0 (high low) 2 * 8 bit bytes making up distance from Reference 1 (high low) 2 * 8 bit bytes making up distance from Reference 2 (high low) 2 * 8 bit bytes making up distance from Reference 3 (high low) Option 2: 1 16 bit integer representing the X coordinate of the Rover 1 16 bit integer representing the Y coordinate of the Rover