Header Address Sub-Address Command Data Length	
	Data
0 0 0 0 0 FF 0-FF 0-FF 0-FF 0-FF	

	Notes	Action	Cub Addess	- 0				2		4						
+	Notes				nd Command (I		h Byte:1	2	3	4	5	6	7 8	9	10	11
+		NOOP	0	0	0	0		1			_	\vdash	-		+	
L		Reserve for core protocol	0	1	1	0							_	_		
St	tarts planned move	Start	0	2	2	0										
L		Pause	0	3	3	0										
be	tops planned move. Must be executed efore controller will accept other ommands.	Stop	0	4	4	0										
To	oggles on/off state of debug LED	Debug LED	0	5	5	0										
Н	55	Timing Master	0	6	6	0										
\vdash		Set Stored Name	0	7	7	1-10		String [1-10]	Characters, Null-terminated, Null p	addedl						
Н		Set Device Address	0	8	8	1	2-255 [Byte]	1			$\overline{}$		$\overline{}$	\neg	Т	
\vdash		Set Common Line for Step Pulsing	0	9	9	1	0,1,2 [Byte]				_	_	_		+	
\vdash		Return Home All Motors	0	10	Ā	i i	o, i,z [byto]				_	_	_	_	_	
\vdash		Motors Max Step Rate	0	11	B	2	Cto	ps/Second [Int]			_	_	_	_	_	
_		Microis Max Step Itale					Sie	paraecoria (inti)						_		
		Alt Input Edge (RISING, FALLING, or CHANGE)	0	12	С	1 1	0,1,2 [Byte]		1		_		_	_		_
\vdash		Alt I/O Mode	0	13	D	2	Ring (0-255) [Byte]	Tip (0-255) [Byte]			_		_	_	+	
\vdash		Set Joystick Watchdog	0	14	E	1	True/False (1,0) [Byte]	TIP (0-255) [Byte]			+	-	_	_	+	
\vdash					E F	2					_	_	_	_		
\vdash		Alt Output Before Shot Delay Time	0	15				ime (ms) [int]					_	_		
\vdash		Alt Output After Shot Delay Time	0	16	10	2		ime (ms) [Int]			+	\vdash			_	
\vdash		Alt Output Before Shot Time	0	17	11	2		ime (ms) [Int]			\perp	\vdash	_	-		
\vdash		Alt Output After Shot Time	0	18	12	2		ime (ms) [Int]			_	\vdash	_			
\perp		Alt Output Trigger level	0	19	13	1	HIGH/LOW (1,0) [Byte]					\perp	_			
\perp		Max Program Run Time	0	20	14	4		Max Run Time (mS) [Ulon								
L	<u> </u>	Start Program Delay	0	21	15	4		Start Time Delay (seconds) [L	long]			\Box				
1		Set SMS / Continuous Program Mode	0	22	16	1	0 (SMS), 1 (Time Lapse Cont.),					1 T				
\perp		-					2 (Video Cont.) [Byte]							\perp		
		Set Joystick Mode	0	23	17	1	True/False (1,0) [Byte]									
Ca Be	auses the motors to go back and forth letween the start and stop positions	Set Ping-Pong Flag	0	24	18	1	True/False (1,0) [Byte]									
		Send all Motors to Program Start	0	25	19	0										
Г																
		Set Program Start point	0	26	1A	0										
		Set Program Start point Set Program Stop point	0	26 27	1A 1B	0										
Е																
E																
E							<status td="" type≻<=""><td></td><td><returns> with header</returns></td><td>and master ad</td><td>dress in</td><td>front (00 00 I</td><td>10 00 00 F</td><td>F 00 00 01</td><td>Length Data</td><td></td></status>		<returns> with header</returns>	and master ad	dress in	front (00 00 I	10 00 00 F	F 00 00 01	Length Data	
E		Set Program Stop point	0	27			<status type=""> Value Type [Byte]</status>	Version #	<returns> with header</returns>	and master ad	idress in t	front (00 00 I	10 00 00 F	F 00 00 01	Length Data	
E		Set Program Stop point Status Request	0	100	1B	0	Value Type [Byte]	Version # 0 = Stopped, 1 = Paused, 2 = Running	<returns> with header</returns>	and master ad	idress in t	front (00 00 I	10 00 00 F	F 00 00 01	Length Data	
E		Set Program Stop point Status Request Firmware Version	0 0	100 100	1B	0			<returns> with header Time (ms)</returns>	and master ad	dress in	front (00 00 I	10 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Time	0 0 0	100 100 101	1B 64 65	0 0	Value Type [Byte] Value Type [Byte] Value Type [Ulong]			and master ad	ddress in t	front (00 00 I	10 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Time Currently Exposing	0 0 0 0	100 100 101 102	64 65 66	0 0 0	Value Type (Byte) Value Type (Ulong) Value Type (Byte)	0 = Stopped, 1 = Paused, 2 = Running		and master ad	idress in t	front (00 00)	00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Time	0 0 0 0 0	100 100 101 102 103	1B 64 65 66 67	0 0 0 0	Value Type [Byte] Value Type [Byte] Value Type [Ulong] Value Type [Byte] Value Type [Byte]	0 = Stopped, 1 = Paused, 2 = Running True/False	Time (ms)				10 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Time Currently Exposing Timing Master Value Name	0 0 0 0 0	100 100 101 101 102 103 104 105	64 65 66 67 68	0 0 0 0 0	Value Type [Byte] Value Type [Byte] Value Type [Ulong] Value Type [Byte] Value Type [Byte] Value Type [String]	0 = Stopped, 1 = Paused, 2 = Running True/False True/False	Time (ms) String [1-10 Characters				10 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Ourrein's Epoching Timing Master Value Name Motors Mas Step Rate Motors Mas Step Rate	0 0 0 0 0 0 0	100 100 101 101 102 103 104 105 106	64 65 66 67 68 69 6A	0 0 0 0 0 0	Value Type (Byte) Value Type (Byte) Value Type (Ulong) Value Type (Byte) Value Type (Byte) Value Type (String) Value Type (Ulint)	0 = Stopped, 1 = Paused, 2 = Running True/False True/False Steps/Secs	Time (ms) String [1-10 Characters	Null-terminat			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Time Curretly Exposing Timing Master Value Name Motors Mas Slep Rate Votage Reading	0 0 0 0 0 0	100 100 101 102 103 104 105 106 107	64 65 66 67 68 69 6A 6B	0 0 0 0 0	Value Type [Byte] Value Type (Byte) Value Type (Ulong) Value Type (Byte) Value Type (Byte) Value Type (String) Value Type (String) Value Type (Fixed)	0 = Stopped, 1 = Paused, 2 = Running True/False True/False Steps/Sec Voltage (V) (Fixed poir	Time (ms) String [1-10 Characters and temperature of the temperature	Null-terminati			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Time Currety Exposing Treng Medier Value Motors Mar Step Rate Voltage Reading Curret to Motors	0 0 0 0 0 0 0	100 100 101 102 103 104 105 106 107	64 65 66 67 68 69 6A 6B	0 0 0 0 0 0 0 0	Value Type (Byte) Value Type (Byte) Value Type (Ulong) Value Type (Byte) Value Type (Byte) Value Type (Bytring) Value Type (Firmg) Value Type (Firmd) Value Type (Firmd) Value Type (Firmd)	0 = Stopped, 1 = Paused, 2 = Running True/False True/False Steps/Sec Voltage (V) (Fixed poin Current (amps) (Fixed p	Time (ms) String [1-10 Characters	Null-terminati			0 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Time Curretly Exposing Timing Master Value Name Motors Max Step Rate Voltage Reading Current to Motors Alt Ingut Edge (STM), or CHANGE)	0 0 0 0 0 0 0 0 0	100 100 101 101 102 103 104 105 106 107 108	64 65 66 67 68 69 6A 6B 6C	0 0 0 0 0 0 0	Value Type (Byte) Value Type (Byte) Value Type (Ulong) Value Type (Byte) Value Type (Byte) Value Type (String) Value Type (String) Value Type (Fixed) Value Type (Fixed) Value Type (Fixed) Value Type (Fixed)	0 = Stopped, 1 = Paused, 2 = Running True/False True/False Steps/Sec Voltage (V) (Fixed poin Current (amps) (Fixed poin 0,1,2	Time (ms) String [1-10 Characters and — must divide by 100 on master sint — must divide by 100 on master.	Null-terminati			00 00 00 F	FF 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Status Run Time Currenty Exposing Timing Master Value Motion Mars Step Refe Voltage Reading Current to Midors All Input Edge (RISNIN, EALLING, or CHANGE) All Input Edge (RISNIN, EALLING, or CHANGE) All Input Edge (RISNIN, EALLING, or CHANGE)	0 0 0 0 0 0 0 0 0 0 0	100 100 101 102 103 104 105 106 107 108 109	64 65 66 67 68 69 6A 6B 6C 6D 6E	0 0 0 0 0 0 0 0	Value Type (Byte) Value Type (Sring) Value Type (Fixed) Value Type (Fixed) Value Type (Byte) Value Type (Int) Value Type (Fixed) Value Type (Fixed)	0 = Stopped, 1 = Paused, 2 = Running TrueFalse TrueFalse Steps/Sec Voltage (V) (Foed poin Current (amps) (Foed poin 0,1,2 (Byte 0) Ring (0-255)	Time (ms) String [1-10 Characters and 1- must divide by 100 on master sin - must divide by 100 on master [Byte 1] Tip (0-255)	Null-terminati			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Rom Status Rom Status Rom Status Rom Status Rom Status Rom Status Rom Rom Status Rom	0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 102 103 104 105 106 107 108 109 110	64 65 66 67 68 69 6A 6B 6C 6D 6E	0 0 0 0 0 0 0 0 0	Value Type (Byte) Value Type (Byte) Value Type (Ulong) Value Type (Ulong) Value Type (Byte) Value Type (Byte) Value Type (Lint) Value Type (Fixed) Value Type (Fixed) Value Type (Fixed) Value Type (Int) Value Type (Int) Value Type (Int)	0 = Stopped, 1 = Paused, 2 = Running TrusFalse TrusFalse Steps/Sect Voltage (V) (Fixed poir Current (amps) (Fixed poir 0,1,2 (Byte 0) Ring (0,255) (Byte 0) Ring, Hight Low (1,0)	Time (ms) String (1-10 Characters and IIII - must divide by 100 on master s int — must divide by 100 on master [Byte 1] Tip (0-255) [Byte 1] Tip (1-255)	Null-terminati			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Status Run Tree Currently Exposing Timing Master Value Name Name Note Man Status Name Note Man Status Name Note Man Status All Input Edge (RISING, FALLING, or CHANGE) All Input Edge (RISING, FALLING, or CHANGE) Limit Switch HighTun Status All Output Before Shot Delay Time	0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 101 102 103 104 105 106 107 108 109 110 111 111	64 65 66 67 68 69 6A 6B 6C 6D 6E	0 0 0 0 0 0 0 0 0 0 0	Value Type (Byle) Value Type (Fixed) Value Type (Fixed) Value Type (Byle)	0 = Stopped, 1 = Paused, 2 = Running TrusFalse TrusFalse Steps/Sec Voltage (V) (Fixed por Current (amps) (Fixed pir 0.1.2 [Byte 0] Ring (0.255) [Byte 0] Ring, HighLow (1,0)	Time (ms) String [1-10 Characters and Indiana String Indiana String Indiana String Indiana	Null-terminati			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Ront Status Ront	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 102 103 104 105 106 107 108 110 111 111 111 112	64 65 66 67 68 69 6A 6B 6C 6D 6E 6F 70	0 0 0 0 0 0 0 0 0 0 0 0 0	Value Type (Byle) Value Type (Fixed) Value Type (Fixed) Value Type (Byle) Value Type (Unit) Value Type (Unit) Value Type (Unit)	0 = Stopped, 1 = Paused, 2 = Running TrusFalse TrusFalse Steps/Sec Vottage (V) (Fixed point Current (amps) (Fixed p Byte 0) Ring (0.255) Byte 0) Ring, HighTun (1.0) Trine (m)	Time (ms) String [1-10 Characters and temperature of the content	Null-terminati			00 00 00 F	FF 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Time Currently Exposing Timing Master Value Name Motors Max Stop Fate Voluepe Reading All Input Edge (RISNN) EALLING, or CHANGE) All You Motor Max Stop Fate Voluepe Reading All Input Edge (RISNN) EALLING, or CHANGE) Limit Switch High/Low Status All Output After Shirt Delay Time All Output After Shirt Delay Time All Output After Shirt Delay Time All Output Before Shirt Delay Time	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 101 102 103 104 105 106 107 108 109 111 111 112 113 114	64 65 66 67 68 69 6A 6B 6C 6D 6E 6F 70 71	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Value Type (Byte)	0 = Stopped, 1 = Paused, 2 = Running TrusFalse TrusFalse Steps/Sec Voltage (V) (Fixed poir Current (amps) (Fixed p 0,1,2 [Byte 0] Ring (0.255) [Byte 0] Ring, (HightLow (1,0) Time (mr Time (mr	String (1-10 Characters and — must divide by 100 on master set — must divide by 100 on master set — must divide by 100 on master (Byte 1) Tip (0-256) [Byte 1] Tip . Highi-Low(1,0)	Null-terminati			00 00 00 F	FF 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 101 102 103 104 105 106 107 108 109 110 111 111 112 113 114 114 115	64 65 66 67 68 69 6A 6B 6C 6D 6F 70 71 72 73	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Value Type (Byte)	0 = Stopped, 1 = Paused, 2 = Running Trus/False Trus/False Trus/False Vottage (V) (Fixed point Current (amps) [Fixed p 0,1,2 [Byte 0] Ring, 0-255) [Byte 0] Ring, 1-tight/Low (1,0) True (min True (String (1-10 Characters and — must divide by 100 on master set — must divide by 100 on master set — must divide by 100 on master (Byte 1) Tip (0-256) [Byte 1] Tip . Highi-Low(1,0)	Null-terminati			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Time Currently Exposing Timing Master Value Name Mctors Max Slep Rate Votage Reading Current to Mctors All Inpat Edge (HSNO) A CHANGE) Limit Switch HighTun Vataus Limit Switch FishTun Vataus All Output After Sho Delay Time All Output After Sho Delay Time All Output After Sho Delay Time All Output After Sho Time All Output Finger level	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 100 101 101 102 103 104 105 106 107 107 110 111 111 112 113 113 114 115	64 65 66 67 88 69 6A 6B 6C 6D 6E 6F 71 72 73	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Value Type (Byte) Value Type (Fixed) Value Type (Fixed) Value Type (Fixed) Value Type (Fixed) Value Type (Int) Value Type (Unit)	0 = Stopped, 1 = Paused, 2 = Running TrusFalse TrusFalse TrusFalse StepsTeec Votage (V) (Faed por Current (amps) (Fixed por 0,12 [Byte 0] Ring (0.255) [Byte 0] Ring, Highlow (1) Time (mt Time (mt HIGHLOW (1,0)	Time (ms) String (1-10 Characters and a construction of a constru	Null-terminati			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Time Currently Exposing Timing Name More Status Run Time Status All Count Status All Count After Status Cleay Time All Count After Status Cleay Time All County After Status Run Time All County After Status Run Time All County Times All County T	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 1000 1010 102 1033 104 105 106 107 108 109 110 111 111 112 113 114 115 116	18 64 65 66 67 68 69 6A 6B 6C CC 8D 6F 70 71 72 73 74 75	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Value Type (Byle) Value Type (Food) Value Type (Food) Value Type (Food) Value Type (Byle)	0 = Stopped, 1 = Paused, 2 = Running TrusiFalse TrusiFalse Stopa/Sec Voltage (V) (Flow from Current (amps) (Floot p 0,1,2 Byte 0 (Ring, 14sh)Love (1,0) Trine (m) Trine (m) HiGHILOW (1,0) Start	String (1-10 Characters and — must divide by 100 on master set — must divide by 100 on master set — must divide by 100 on master (Byte 1) Tip (0-256) [Byte 1] Tip . Highi-Low(1,0)	Null-terminati			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Firmware Version Firmware Version Firmware Version Firm Firmware Version Firm Firmware Firmware Version Firm Firmware Motion Mar Step Fate Votage Reading Firming Master Value Name Motion Mar Step Fate Votage Reading All Input Edge (Firmware to Motions All Input Edge (Firmware to Motions All Input Edge (Firmware to Motions All Input Edge Horizon Status All Output Before Shot Delay Time All Output Before Shot Delay Time All Output Before Shot Time All Output Before Shot Time All Output Before Shot Time Status Fireyame Delay Stat Program Delay Stat Program Delay Stat Program Mode	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 116 117	18 64 65 66 67 68 68 69 6A 6B 6C 6E 6F 70 71 72 73 74 75	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Value Type (Byte) Value Type (Fixed) Value Type (Fixed) Value Type (Fixed) Value Type (Byte) Value Type (Byte) Value Type (Byte) Value Type (Byte) Value Type (Unit)	0 = Stopped, 1 = Paused, 2 = Running TrusFalse TrusFalse TrusFalse Steps/Coc Votage (V) (Fixed por Current (range) (Fixed por 0,12 [Byte 0] Ring (0,255) [Byte 0] Ring, Hightow (1,0) Trine (im Firse (im) HIGHLOW (1,0) Stat	Time (ms) String (1-10 Characters and a construction of a constru	Null-terminati			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Run Status Run Time Currerly Exposing Firming Mester Value Firming Mester Value Firming Mester Value Metors Mars Step Rate Voltage Reading Current to Motors All Input Edge (RISHNO, FALLING, or CHANGE) All Input Edge (RISHNO, FALLING, or CHANGE) All Input Before Shot Delay Time All Output After Shot Time All Output After Shot Time All Output After Shot Time All Output Program Mode Shit Program Delay Shit Program Node Controller Power Cycle	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 1000 101 102 103 104 105 106 107 108 109 110 111 111 112 113 114 115 116 117 117 118	64 65 66 67 68 69 68 69 60 60 60 60 67 70 71 72 73 74 75 76	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Value Type (Byle) Value Type (Unit) Value Type (Byle)	0 = Stopped, 1 = Paused, 2 = Running TrusiFalse TrusiFalse Stops/Sec Voltage (V) (Fixed port Current (amps) (Fixed port 0, 1,2 [Byte 0] Ring (0-255) [Byte 0] Ring, HighLow (1,0) Trine (m) Trine (m) HIGHLOW (1,0) Stat 0 (SMS), 1 (Cont.), 2 (Vid. Cont.) Trine (amps)	Time (ms) String (1-10 Characters and a construction of a constru	Null-terminati			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Ron Olatus Ron Olatus Currently Exposing Timing Master Value Name Moran Mars Step Rate Votage Reading Current to Motors All Inguild Edge (Ne March 1997) All Olatus Holder Step Rate Votage Reading Current to Motors All Inguild Edge (Ne March 1997) All Olatus Both Step Rate All Output Before Shot Deley Time All Output Before Shot Time All Output Before Shot Time All Output Step Reserved All Out	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 101 102 103 104 105 106 107 108 110 111 111 112 113 114 115 116 117 117 118 119	18 64 65 5 66 66 67 77 78 78 88	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Value Type (Byte)	0 = Stopped, 1 = Paused, 2 = Running TrussFalse TrussFalse Stepa/Sec Vidage (V) (Trussf poin Current ferancy (Filed poin 0, 1, 2 Byte 0) Ring, High Low (1, 0) Trine (im Time (im HIGHLOW (1, 0) 0 (SMS), 1 (Cont.), 2 (Vid. Cont.) TrussFalse (1, 0) TrussFalse (1, 0) TrussFalse (1, 0) TrussFalse (1, 0)	Time (ms) String (1-10 Characters and a construction of a constru	Null-terminati			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Run Status Medons Marc Step Rate Voltage Reading Current to Motors All Input Edge (RISHNO, FALLING, or CHANGE) All I LO Mode Limit Switch High/Low Status All Output After Shot Delay Time All Output After Shot Delay Time All Output After Shot Delay Time All Output After Shot Time All Output After Shot Time All Output Time Shot Time All Output After Shot Time All Output Fore	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 101 102 103 104 106 107 107 110 111 111 111 111 115 116 117 117 118 119 119 119 119 119 119 119 119 119	64 65 65 66 67 76 68 69 99 60 60 60 60 60 77 71 72 73 74 75 75 76 77 78	0	Value Type (Byte) Value Type (Int) Value Type (Unt) Value Type (Unt) Value Type (Unt) Value Type (Unt) Value Type (Byte)	0 = Stopped, 1 = Paused, 2 = Running TrusFalse TrusFalse TrusFalse Voltage (V) (Fixed pool pool pool pool pool pool pool poo	Time (ms) String (1-10 Characters and a construction of a constru	Null-terminati			00 00 00 F	F 00 00 01	Length Data	
		Set Program Stop point Status Request Firmware Version Ron Olatus Ron Olatus Currently Exposing Timing Master Value Name Moran Mars Step Rate Votage Reading Current to Motors All Inguild Edge (Ne March 1997) All Olatus Holder Step Rate Votage Reading Current to Motors All Inguild Edge (Ne March 1997) All Olatus Both Step Rate All Output Before Shot Deley Time All Output Before Shot Time All Output Before Shot Time All Output Step Reserved All Out	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 101 102 103 104 105 106 107 108 110 111 111 112 113 114 115 116 117 117 118 119	18 64 65 5 66 66 67 77 78 78 88	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Value Type (Byte)	0 = Stopped, 1 = Paused, 2 = Running TrussFalse TrussFalse Stepa/Sec Vidage (V) (Trussf poin Current ferancy (Filed poin 0, 1, 2 Byte 0) Ring, High Low (1, 0) Trine (im Time (im HIGHLOW (1, 0) 0 (SMS), 1 (Cont.), 2 (Vid. Cont.) TrussFalse (1, 0) TrussFalse (1, 0) TrussFalse (1, 0) TrussFalse (1, 0)	Time (ms) String (1-10 Characters and a construction of a constru	Null-terminati			90 00 00 F	F 00 00 01	Length Data	
CU	teports the percentage complete of the urrent program as a whole number	Set Program Stop point Status Request Firmware Version Run Status Medons Marc Step Rate Voltage Reading Current to Motors All Input Edge (RISHNO, FALLING, or CHANGE) All I LO Mode Limit Switch High/Low Status All Output After Shot Delay Time All Output After Shot Delay Time All Output After Shot Delay Time All Output After Shot Time All Output After Shot Time All Output Time Shot Time All Output After Shot Time All Output Fore	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 101 102 103 104 106 107 107 110 111 111 111 111 115 116 117 117 118 119 119 119 119 119 119 119 119 119	64 65 65 66 67 76 68 69 99 60 60 60 60 60 77 71 72 73 74 75 75 76 77 78	0	Value Type (Byte) Value Type (Int) Value Type (Unt) Value Type (Unt) Value Type (Unt) Value Type (Unt) Value Type (Byte)	0 = Stopped, 1 = Paused, 2 = Running TrusFalse TrusFalse TrusFalse Voltage (V) (Fixed pool pool pool pool pool pool pool poo	Time (ms) String (1-10 Characters and a construction of a constru	Null-terminati			00000	FF 00 00 01	Length Data	
Th re of	teports the percentage complete of the unrent program as a whole not so the byte of the program and the progra	Set Program Stop point Status Request Firmware Version Revision R	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 101 102 103 104 105 106 107 107 111 111 112 113 114 115 116 117 117 118 119 119 110 110 110 110 110 110 110 110	18 64 65 56 66 66 67 7 68 88 69 9 60 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Value Type (Byte) Value Type (Int) Value Type (Unt) Value Type (Unt) Value Type (Unt) Value Type (Unt) Value Type (Byte)	0 = Stopped, 1 = Paused 2 = Running TrusFalse TrusFalse TrusFalse Steps/Sec Votage (v) (Tixed por Current (area) (Fined por 0,12 [Byte 0] Ring (0,255) [Byte 0] Ring, Hightow (1,0) Trine (im Tiren (im HIGHLOW (1,0) Goods) (0,5MS), 1 (Cont.), 2 (Vot. Cont.) TrusFalse (1,0) TrusFalse (1,0) TrusFalse (1,0) TrusFalse (1,0) TrusFalse (1,0)	Time (ms) String (1-10 Characters and a construction of a constru	Null-terminati			10 00 00 F	FF 00 00 01	Length Data	
The re of 1, Re the pa	urrent program as a whole number the three least significant bits of the byte expresent the motor attach states for each of the motors. Motor 1 = bit 0, motor 2 = bit	Set Program Stop point Status Request Firmware Version Run Status Run Run Status Run	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 121 122 123	644 655 666 667 677 699 690 690 691 771 721 73 74 78	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Value Type (Byte) Value Type (Int) Value Type (Int) Value Type (Unt) Value Type (Unt) Value Type (Unt) Value Type (Unt) Value Type (Dyte) Value Type (Byte)	0 = Stopped, 1 = Paused, 2 = Running TrusFalse TrusFalse TrusFalse Steps*Sec Votage (V) (Fixed por Current (amps) (Fixed por 0,1.2 [Byte 0] Ring (0.255) [Byte 0] Ring (0.255) [Time (im Time (im Time (im HIGHLOW (1,0) Start 0 (SMS), 1 (Cont.), 2(Vid. Cont.) TrusFalse (1,0) TrusFalse (1,0) TrusFalse (1,0) TrusFalse (1,0) TrusFalse (1,0)	Time (ms) String (1-10 Characters and a construction of a constru	Null-terminati			10 00 00 F	F 00 00 01	Length Data	

Motors		NOOP	1-3	0	0	0								
		Reserve for core protocol	1-3	1	1	_								
	Cuts power to motor when not executing a move. True by default.	Motor Sleep	1-3	2	2	1	True/False (1,0) [Byte]							
	Must enabled before executing a move.	Motor Enable	1-3	3	3	1	True/False (1,0) [Byte]							
	Stops motor, even if a planned move is in			_	_		rider disc (1,0) [byte]							
	progress.	Stop Motor Now	1-3	4	4	0								
	Number of steps the motor should move in addition to the commanded distance when reversing direction.	Set Backlash Steps	1-3	5	5	2	:	Steps [Uint]						
General Motor Commands	Number of microsteps per full motor step. There are 200 full steps per rotation of the motor (and ~3800 full steps per gearbox	Set Microstep Value	1-3	6	6	1	1, 2, 4, 8, 16 [Byte]							
	output shaft rotation)													
		Set Motor Max Step Speed	1-3	7	7	2	Step	s/Second [Uint]						
	Flips motor direction, regardless of current	Set Direction	1-3	8	8	1	0, 1 [Byte]							
	program Saves home limit position	Set Home Limit Here	1-3	9	9	0								
	Saves end limit position	Set End Limit Here	1-3	10	A	0								
	ouves and mine position	Send Motor to Home Limit	1-3	11	В	0								
		Send Motor to End Limit	1-3	12	Č	0								
				•										· ·
	Does not apply to finite manual moves	Set Continuous Speed	1-3	13	D	4		Steps/Second [float]						
Manual Move	Does not apply to finite manual moves	Set Motor Continuous Motion Accel/Decel Rate	1-3	14	E	4		Steps/Second^2 [float]						
Commands	Direct move command, does not require	Execute Simple Motor Move	1-3	15	F	5	Dir (0, 1) [Byte]		Steps [Ulong]					
	use of "start" and "stop" commands.						(-) (-) (-)							
	1	Cat Decrease Start agint	1-3	16	10			Cton and its first						
		Set Program Start point Set Program Stop point	1-3	16	10	4		Step position [long] Step position [long]			+		-	
	1 = Linear, 2 = Quadratic, 3 = Inverted							Step position [long]			+ +			
	Quadratic Quadratic, 3 = Inverted	Set Easing (Ramping) Mode	1-3	18	12	1	1, 2, 3							
Programmed Travel	How many shots should this motor wait before moving?	Set Lead-In Shots / Time	1-3	19	13	2	Shots (SMS or time lapse	cont.) / Time ms (Video cont.) [Uint]						
Commands		Set Travel Shots(SMS) / Travel Time (Cont.)	1-3	20	14	4		Shots (SMS) or Total Travel Time (ms)	(cont.) [Ulong]					
		Set Program Accel	1-3	21	15	4		Accel Period - Shots (SMS) or Time in me	s (Cont.) [Ulong)]					
		Set Program Decel	1-3 1-3	22	16 17	0		Decel Period – Shots (SMS) or Time in m	is (Cont.) [Ulong]				_	
		Send Motor to Program Start Point Send Motor to Program Stop Point	1-3	23	17	0								
		Send Word to Flogram Stop Funt	150	24	10	U	l .							
Stop-Motion Travel	Manual SMS movement. Not yet implemented.	Advance One SMS Increment	1-3	25	19	0								
Commands	Manual SMS movement. Not yet	Go Back One SMS Increment	1-3	26	1A	0								
	implemented.	OU DUCK ONE ONE INCIDING		20	174	ŭ								
	Sets the current position as home, disables limits, and sets start/stop positions to home position.	Reset Limits and Program Start/Stop Positions	1-3	27	1B	0								
	The controller will automatically select the highest resolution microstepping (up to 14 appropria) that can be used pring use the program parameters. It will also report back the setting it uses. 0 will be reported when the command is called at an illegal time (i.e. when the motor is in motion), 255 will be reported when the specif equient du by the current plan parameters exceeds the controller's top speed.	Auto Set Program Microsteps	1-3	28	1C	0	Value Type [Byte]	0, 4, 8, 16, 255						
		Set Start Here	1-3	29	1D	0								
		Set Stop Here	1-3	30	1E	0								
		Status Request	1-3	100			<status type=""></status>		<returns> with header an</returns>	d master address in	n front (00 00 00 0	0 00 FF 00 00	01 Length Data)	
		Motor Enable Backlash Steps	1-3 1-3	100	64 65	0	Value Type [Byte]	True/False (1,0)			+	-		
			1-3	101	66	0	Value Type [Uint] Value Type [Byte]	Steps			+	-		
General Motor		Microstep Value Direction	1-3	102	67	0	Value Type [byte]	1, 2, 4, 8, 16	 		+ +	\vdash		
Query		Motor Max Step Speed	1-3	103	68	0	Value Type [Byte] Value Type [Int]	0, 1 Steps/Seco	ond		+ +			
Commands		Find Limit Position	1-3	104	69	0	Value Type [Long]	Steps/Sect.	Position		 			
		Current Motor Position	1-3	106	6A	0	Value Type [Long]		Position		-			
		Motor Running	1-3	107	6B	0	Value Type [Byte]	True/False (1,0)	1		1			
							, , , , , ,							
Manual Move		Continuous Speed	1-3	108	6C	0	Value Type [Psudo-float-Fixed point – must divide by 100 on master side]		Steps/Second					
Query Commands		Motor Continuous Motion Accel/Decel Rate	1-3	109	6D	0	Value Type [Psudo-float–Fixed point – must divide by 100 on master side]		Steps/Second^2					
		Easing (Ramping) Mode	1-3	110	6E	0	Value Type [Byte]	1, 2, 3						
		Program Start point	1-3	111 112	6F 70	0	Value Type [Long]		Position Position			-		
Programmed		Program Stop point	1-3 1-3	112	70	0	Value Type [Long]	Char (Chic)				-		
Travel Query		Travel Shots(SMS) / Travel Time (Cont.)		113		0	Value Type [Ulong]		r Total Travel Time (ms) (cont.)			-		
Commands		Lead-In Shots / Time Program Accel	1-3	114	72 73	0	Value Type [Int] Value Type [Ulong]	Shots (SMS or time lapse cont.)	/ Time ms (Video cont.) nots (SMS) or Time in ms (Cont.)			\vdash	\rightarrow	
		Program Accel Program Decel	1-3 1-3	115	73	0	Value Type [Ulong] Value Type [Ulong]	Nacel Period - St	hote (SMS) or Time in me (Cont.)					
		Check Motor Sleep State	1-3	117	75	1	Value Type [Oldrig] Value Type [Byte]	True/False (1,0)	hots (SMS) or Time in ms (Cont.)		_			
		Oncor motor orcep orace					Table Type [Dyte]	11001 000 (1,0)				-		

	NOOP	4	0	0	0						- 1				Т
1	Reserve for core protocol	4	1	1	0			1							_
	Camera Enable	4	2	2	1	True/False (1,0) [Byte]				-					_
Triggers exposure with leng "Exposure Time" command.		4	3	3	0										_
	Trigger Time	4	4	4	4		Exposure Time (mS) [Ulon	19]							_
	Focus Time	4	5	5	2	Focus	Time (mS) [Uint]								
The system will stop a move reaches the max number of exposures.	e once it camera Max Shots	4	6	6	2		Count [Uint]								
	Exposure Delay	4	7	7	2	Del	lay (mS) [Uint]								-
	Focus w Shutter	4	8	8	1	True/False (1,0) [Byte]									_
This causes two trigger sign the camera in the event that the camera in "mirror up" me	t the user has Mirror Up (Repeat Shot)	4	9	9	1	True/False (1,0) [Byte]									
Length of SMS interval	Interval	4	10	A	4		Interval Time (mS) [Ulong	3]							
	Camera Test Mode	4	11	В	1	True/False (1,0) [Byte]									7
	Status Request	4	100			<status type=""></status>		<returns> with header</returns>	and master addr	ess in fro	ont (00 00 C	10 00 00 FF	00 00 01 L	ength Data)	
	Camera Enable	4	100	64	0	Value Type [Byte]	True/False (1,0)								
	Exposing now?	4	101	65	0	Value Type [Byte]	True/False (1,0)								
	Trigger Time	4	102	66	0	Value Type [Ulong]		posure Time (mS)							
	Focus Time	4	103	67	0	Value Type [Uint]	Focus Time								
	Max Shots	4	104	68	0	Value Type [Ulong]		Count							
	Exposure Delay	4	105	69	0	Value Type [Uint]	Delay (m:								Ī
	Focus w Shutter	4	106	6A	0	Value Type [Byte]	1, 0								_
	Mirror Up (Repeat Shot)	4	107	6B	0	Value Type [Byte]	True/False (1,0)								
	Interval Time	4	108	6C	0	Value Type [Ulong]	lr.	nterval Time (mS)							_
Number of shots that have to far during the current progra	am.	4	109	6D	0	Value Type [Uint]	Number of shot	ts taken							
	Camera Test Mode	4	110	6E	0	Value Type [Byte]	True/False (1.0)								

			Address	Sub-Address	Command	Data Length	Data
Broadcasts	These function the same as the start, stop, and pause commands above, but can be	Start	1	0	1	0	
	used to synchronize movement of multiple	Stop	1	0	2	0	
	controllers	Pause	1	0	3	0	
	controller with an unknown address. Don't		1	0	4	1	2-255

Note: nodes do not give a response to broadcast commands.

Query Value Types	
0	Byte
1	Unsigned Int
2	Int
3	Long
4	Unsigned Long
5	Float
6	String

The floats are actually fixed points. They are multiplied by 100 and transmitted as longs, so they need to be divided by 100 on the master side to resolve the true value.