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

							Data											
	Notes	Action	Sub-Address	Command	Command (HEX)	Data Length	Byte:1	2	3	4	5	6	7	8	9	10	11	12
Main		NOOP	0	0	0	0												
		Reserve for core protocol	0	1	1	0												
	Starts planned move	Start	0	2	2	0												
		Pause	0	3	3	0												
	Stops planned move. Must be executed before controller will accept other commands.	Stop	0	4	4	0												
	Toggles on/off state of debug LED	Debug LED	0	5	5	0												
		Timing Master	0	6	6	0												
		Set Stored Name	0	7	7	1-10	String [1-10 Characters, Null-terminated, Null padded]											
		Set Device Address	0	8	8	1	2-255											
		Set Common Line for Step Pulsing	0	9	9	1	0,1,2											
		Return Home All Motors	0	10	A	0												
		Motors Max Step Rate	0	11	B	2	Steps/Second [int]											
	Not yet implemented	Alt Input Edge (RISING, FALLING, or CHANGE)	0	12	C	1	0,1,2											
	Not yet implemented	Alt I/O Mode	0	13	D	2	Ring (0-255)	Tip (0-255)										
		Set Manual Move Flag	0	14	E	1	True/False (1,0)											
		Alt Output Before Shot Delay Time	0	15	F	2	Time (ms) [int]											
		Alt Output After Shot Delay Time	0	16	10	2	Time (ms) [int]											
		Alt Output Before Shot Time	0	17	11	2	Time (ms) [int]											
		Alt Output After Shot Time	0	18	12	2	Time (ms) [int]											
		Alt Output Trigger level	0	19	13	1	HIGH/LOW (1,0)											
		Max Program Run Time	0	20	14	4	Max Run Time (mS) [unsigned long]											
		Start Program Delay	0	21	15	4	Start Time Delay (seconds)											
		Set SMS / Continuous Program Mode	0	22	16	1	0 (SMS), 1 (Cont.)											
		Status Request	0	100			<Status Type>	<returns> with header and master address in front (00 00 00 00 00 FF 00 00 01 Length Data)									
		Firmware Version	0	100	64	0	[Byte]											
		Run Status	0	101	65	0	[Byte]											
		Run Time	0	102	66	0	[Unsigned Long]											
		Currently Exposing	0	103	67	0	[Byte]											
		Timing Master Value	0	104	68	0	[Byte]											
		Name	0	105	69	0	String [1-10 Characters, Null-terminated, Null padded]											
		Motors Max Step Rate	0	106	6A	0	Steps/Second [int]											
		Voltage Reading	0	107	6B	0	Voltage (V) [Fixed point – must divide by 100 on master side]											
		Current to Motors	0	108	6C	0	Current (amps) [Fixed point – must divide by 100 on master side]											
	Not yet implemented	Alt Input Edge (RISING, FALLING, or CHANGE)	0	109	6E	0	0,1,2											
	Not yet implemented	Alt I/O Mode	0	110	6F	0	Ring (0-255)	Tip (0-255)										
	Not yet implemented	Limit Switch High/Low Status	0	111	70	0	Ring, High/Low (1,0)	Tip, High/Low(1,0)										
		Alt Output Before Shot Delay Time	0	112	70	0	Time (ms) [int]											
		Alt Output After Shot Delay Time	0	113	71	0	Time (ms) [int]											
		Alt Output Before Shot Time	0	114	72	0	Time (ms) [int]											
		Alt Output After Shot Time	0	115	73	0	Time (ms) [int]											
		Alt Output Trigger level	0	116	74	0	HIGH/LOW (1,0)											
		Start Program Delay	0	117	75	0	Start Time Delay (seconds) [long]											
		SMS / Continuous Program Mode	0	118	76	0	0 (SMS), 1 (Cont.)											
		Controller Power Cycle	0	119	77	0	True/False (1,0)											
Motors		NOOP	1-3	0	0	0												
		Reserve for core protocol	1-3	1	1	0												
General Motor Commands	Cuts power to motor when not executing a move. True by default.	Motor Sleep	1-3	2	2	1	True/False (1,0)											
	Must enabled before executing a move.	Motor Enable	1-3	3	3	1	True/False (1,0)											
	Stops motor, even if a planned move is in 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	1	Steps [byte]											
	Number of microsteps per full motor step. There are 200 full steps per rotation of the motor (and ~3800 full steps per gearbox output shaft rotation)	Set Microstep Value	1-3	6	6	1	1, 2, 4, 8, 16											
		Set Motor Max Step Speed	1-3	7	7	2	Steps/Second											
	Flips motor direction, regardless of current program	Set Direction	1-3	8	8	1	0, 1											
	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												
		Send Motor to Home Limit	1-3	11	B	0												
		Send Motor to End Limit	1-3	12	C	0												
Manual Move Commands	Does not apply to finite manual moves	Set Continuous Speed	1-3	13	D	4	Steps/Second [float]											
	Does not apply to finite manual moves	Set Motor Continuous Motion Accel/Decel Rate	1-3	14	E	4	Steps/Second^2 [float]											
	Direct move command, does not require use of "start" and "stop" commands.	Execute Simple Motor Move	1-3	15	F	5	Dir (0, 1)	Steps										

Programmed Travel Commands		Set Program Start point	1-3	16	10	4	Step position [long]												
		Set Program Stop point	1-3	17	11	4	Step position [long]												
	1 = Linear, 2 = Quadratic, 3 = Inverted Quadratic	Set Easing (Ramping) Mode	1-3	18	12	1	1, 2, 3												
	How many shots should this motor wait before moving?	Set Lead-In Shots	1-3	19	13	2	Shots [int]												
		Set Travel Shots(SMS) / Travel Time (Cont.)	1-3	20	14	4	Shots (SMS) or Total Travel Time (ms) (cont.) (unsigned long)												
		Set Program Accel	1-3	21	15	4	Accel Period – Shots (SMS) or Time in ms (Cont.) [unsigned long]												
		Set Program Decel	1-3	22	16	4	Decel Period – Shots (SMS) or Time in ms (Cont.) [unsigned long]												
		Send Motor to Program Start Point	1-3	23	17	0													
		Send Motor to Program Stop Point	1-3	24	18	0													
Stop-Motion Travel Commands	Manual SMS movement. Not yet implemented.	Advance One SMS Increment	1-3	25	19	0													
	Manual SMS movement. Not yet implemented.	Go Back One SMS Increment	1-3	26	1A	0													
		Status Request	1-3	100			<Status Type>	<returns> with header and master address in front (00 00 00 00 00 FF 00 00 01 Length Data)											
General Motor Query Commands		Motor Enable	1-3	100	64	0	True/False (1,0)												
		Backlash Steps	1-3	101	65	0	Steps [byte]												
		Microstep Value	1-3	102	66	0	1, 2, 4, 8, 16 [byte]												
		Direction	1-3	103	67	0	0, 1												
		Motor Max Step Speed	1-3	104	68	0	Steps/Second [int]												
		End Limit Position	1-3	105	69	0	Position [long]												
		Current Motor Position	1-3	106	6A	0	Position [long]												
		Motor Running	1-3	107	6B	0	True/False (1,0)												
Manual Move Query Commands		Continuous Speed	1-3	108	6C	0	Steps/Second [Fixed point – must divide by 100 on master side]												
		Motor Continuous Motion Accel/Decel Rate	1-3	109	6D	0	Steps/Second^2 [Fixed point – must divide by 100 on master side]												
Programmed Travel Query Commands		Easing (Ramping) Mode	1-3	110	6E	0	1, 2, 3												
		Program Start point	1-3	111	6F	0	Position [long]												
		Program End point	1-3	112	70	0	Position [long]												
		Travel Shots(SMS) / Travel Time (Cont.)	1-3	113	71	0	Shots (SMS) or Total Travel Time (ms) (cont.) [unsigned long]												
		Lead-In Shots	1-3	114	72	0	Shots [int]												
		Program Accel	1-3	115	73	0	Accel Period – Shots (SMS) or Time in ms (Cont.) [unsigned long]												
		Program Decel	1-3	116	74	0	Decel Period – Shots (SMS) or Time in ms (Cont.) [unsigned long]												
Cameras		NOOP	4	0	0	0													
		Reserve for core protocol	4	1	1	0													
		Camera Enable	4	2	2	1	True/False (1,0)												
		Expose Now	4	3	3	4	Exposure Time (mS)												
		Exposure Time	4	4	4	4	Exposure Time (mS)												
		Focus Time	4	5	5	2	Focus Time (mS)												
	The system will stop a move once it reaches the max number of camera exposures.	Max Shots	4	6	6	2	Count												
		Exposure Delay	4	7	7	2	Delay (mS)												
		Focus w Shutter	4	8	8	1	1, 0												
	Number of additional exposures the camera should capture before executing the next SMS move.	Repeat Cycles	4	9	9	1	Count												
	Length of SMS interval	Interval	4	10	A	4	Interval Time (mS)												
		Status Request	4	100			<Status Type>	<returns> with header and master address in front (00 00 00 00 00 FF 00 00 01 Length Data)											
		Camera Enable	4	100	64	0	True/False (1,0)												
		Exposing now?	4	101	65	0	True/False (1,0)												
		Exposure Time	4	102	66	0	Exposure Time (mS)												
		Focus Time	4	103	67	0	Focus Time (mS)												
		Max Shots	4	104	68	0	Count												
		Exposure Delay	4	105	69	0	Delay (mS)												
		Focus w Shutter	4	106	6A	0	1, 0												
		Repeat Cycles	4	107	6B	0	Count												
		Interval Time	4	108	6C	0	Interval Time (mS)												

Broadcasts			**Address**	**Sub-Address**	**Command**	**Data Length**	**Data**
	These function the same as the start, stop, and pause commands above, but can be used to synchronize movement of multiple controllers.	Start	1	0	1	0	
		Stop	1	0	2	0	
		Pause	1	0	3	0	
	Use this to assign an address to a controller with an unknown address. Don't use when controllers are daisy-chained together.	Assign Address	1	0	4	1	2-255

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