

section 7  
**APPENDICES**

**DMX protocol**

DMX Channel				Start code = 0		
DMX1	DMX2	DMX3	DMX4	Value	Percent	Function
<p style="text-align: center;">1</p> <p><sup>1</sup> If DMX reset is disabled, a reset command may be sent if color wheel 1 set to cyan 401(144-148) and color wheel 2 is set to red 308 (157-160).</p> <p><sup>2</sup> If DMX lamp off is disabled, a lamp off command may be sent if color wheel 1 is set to cyan 401 (144-148) and color wheel 2 is set to red 308 (157-160).</p>				<b>Shutter, Strobe, Reset, Lamp On/Off</b>		
				0 - 19	0 - 7	Shutter closed
				20 - 49	8 - 19	Shutter open
				50 - 72	20 - 28	Strobe, fast→slow
				73 - 79	29 - 31	Shutter open, lamp power reduced (MAC 500 E only)
				80 - 99	31 - 39	Opening pulse, fast →slow
				100 - 119	39 - 47	Closing pulse, fast →slow
				120 - 127	47 - 50	Shutter open
				128 - 147	50 - 58	Random strobe, fast
				148 - 167	58 - 65	Random strobe, medium
				168 - 187	66 - 73	Random strobe, slow
				188 - 190	74 - 75	Shutter open
				191 - 193	75 - 76	Random opening pulse, fast
				194 - 196	76 - 77	Random opening pulse, slow
				197 - 199	77 - 78	Random closing pulse, fast
				200 - 202	78 - 79	Random closing pulse, slow
				203 - 207	80 - 81	Shutter open
				208 - 217	82 - 85	Reset fixture, see note 1
				218 - 227	85 - 89	Shutter open
				228 - 237	89 - 93	Lamp power on
238 - 247	93 - 97	Shutter open				
248 - 255	97 - 100	Lamp power off: time > 5 seconds, see note 2				
2				0 - 255	0 - 100	<b>Intensity</b> 0 → 100%
3				<b>COLOR 1</b>		
				<b>Color Scroll</b>		
				0 - 16	0 - 6	White → Blue 111
				16 - 32	6 - 13	Blue 111 → Red 301
				32 - 48	13 - 19	Red 301 → Magenta 507
				48 - 64	19 - 25	Magenta 507 → Green 202
				64 - 80	25 - 31	Green 202 → Yellow 604
				80 - 96	31 - 38	Yellow 604 → Purple 502
				96 - 112	38 - 44	Purple 502 → Blue 101
				112 - 128	44 - 50	Blue 101 → Pink 312
				128 - 144	50 - 56	Pink 312 → Cyan 401
				<b>Fixed Colors</b>		
				145 - 148	57 - 58	Cyan 401
				149 - 152	58 - 60	Pink 312
				153 - 156	60 - 61	Blue 101
				157 - 160	62 - 63	Purple 502
				161 - 164	63 - 64	Yellow 604
				165 - 168	65 - 66	Green 202
				169 - 172	66 - 67	Magenta 507
				173 - 176	68 - 69	Red 301
177 - 180	69 - 71	Blue 111				
181 - 184	71 - 72	White				
<b>Continuous Rotation</b>						
185 - 215	73 - 84	CW, fast → slow				
216 - 245	85 - 96	CCW, slow → fast				
246 - 255	96 - 100	Enable alternate color functions on channel 4.				

DMX Channel				Start code = 0		
DMX1	DMX2	DMX3	DMX4	Value	Percent	Function
						<b>COLOR 2: Normal Functions</b>
						<b>Color Scroll</b> White → CTC 3200-4100 CTC 3200-4100 → CTC 3200-5600 CTC 3200-5600 → Blue 104 Blue 104 → Blue 108 Blue 108 → Green 206 Green 206 → Red 308 Red 308 → Yellow 603 Yellow 603 → CTC 5500-2900 CTC 5500-2900 → CTC 5500-4200
						<b>Fixed Colors</b> CTC 5500-4200 CTC 5500-2900 Yellow 603 Red 308 Green 206 Blue 108 Blue 104 CTC 3200-5600 CTC 3200-4100 White
						<b>Continuous Rotation</b> CW, fast → slow CCW, slow → fast
						<b>Random Color</b> Fast Medium Slow
						<b>Alternate Functions (Enable on channel 3.)</b> 67 different colors in following order: white, purple, pink, magenta, red, orange, yellow, green, cyan, blue, black
	4			0 - 16 16 - 32 32 - 48 48 - 64 64 - 80 80 - 96 96 - 112 112 - 128 128 - 144  145 - 148 149 - 152 153 - 156 157 - 160 161 - 164 165 - 168 169 - 172 173 - 176 177 - 180 181 - 184  185 - 215 216 - 245  246 - 248 249 - 251 252 - 255  0-255	0 - 6 6 - 13 13 - 19 19 - 25 25 - 31 31 - 38 38 - 44 44 - 50 50 - 56  57 - 58 58 - 60 60 - 61 62 - 63 63 - 64 65 - 66 66 - 67 68 - 69 69 - 71 71 - 72  73 - 84 85 - 96  96 - 97 98 - 98 99 - 100  0 - 100	
						<b>Rotating Gobo Selection</b> <b>Set index, direction, and speed on channel 6.</b> Open gobo Gobo 1 - Indexing Gobo 2 - Indexing Gobo 3 - Indexing Gobo 4 - Indexing Gobo 5 - Indexing  Gobo 5 - Cont. Rotation Gobo 4 - Cont. Rotation Gobo 3 - Cont. Rotation Gobo 2 - Cont. Rotation Gobo 1 - Cont. Rotation
	5			0 - 55 56 - 75 76 - 95 96 - 115 116 - 135 136 - 155  156 - 175 176 - 195 196 - 215 216 - 235 236 - 255	0 - 22 22 - 29 30 - 37 38 - 45 45 - 53 53 - 61  61 - 69 69 - 76 77 - 84 85 - 92 93 - 100	
						<b>Rotating Gobo Index and Rotation</b> <b>Select gobo and function on channel 5.</b>
						<b>Indexing</b> Index CCW Default index Index CW
						<b>Continuous Rotation</b> No rotation CW, slow → fast CCW, fast → slow No rotation
	6			0 - 126 127 128 - 255  0 - 2 3 - 127 128 - 252 253 - 255	0 - 49 50 50 - 100  0 - 1 1 - 50 50 - 98 99 - 100	

DMX Channel				Start code = 0		
DMX1	DMX2	DMX3	DMX4	Value	Percent	Function
				<b>Fixed Gobos</b>		
				<b>Fixed gobo positions</b>		
				0 - 9	0 - 4	Open gobo
				10 - 19	4 - 8	Gobo 1
				20 - 29	8 - 11	Gobo 2
				30 - 39	12 - 15	Gobo 3
				40 - 49	16 - 19	Gobo 4
				50 - 59	20 - 23	Gobo 5
				60 - 69	24 - 27	Gobo 6
				70 - 79	27 - 31	Gobo 7
				80 - 89	31 - 35	Gobo 8
				90 - 102	35 - 40	Gobo 9
7	Gobo mode = fixed (default)					
				<b>Gobo shake, fast → slow</b>		
				103 - 119	40 - 47	Gobo 9
				120 - 136	47 - 53	Gobo 8
				137 - 153	54 - 60	Gobo 7
				154 - 170	60 - 67	Gobo 6
				171 - 187	67 - 73	Gobo 5
				188 - 204	74 - 80	Gobo 4
				205 - 221	80 - 87	Gobo 3
				222 - 238	87 - 93	Gobo 2
				239 - 255	94 - 100	Gobo 1
				<b>Fixed Gobos</b>		
				0 - 180	0 - 70	Continuous scroll
				Full positions:		
				0	0	Open
				20	8	Gobo 1
				40	16	Gobo 2
				60	24	Gobo 3
				80	31	Gobo 4
				100	39	Gobo 5
				120	47	Gobo 6
				140	55	Gobo 7
				160	63	Gobo 8
				180	70	Gobo 9
7	Gobo mode = scroll (optional)					
				<b>Gobo shake</b>		
				181 - 183	71 - 72	Gobo 9 shake
				184 - 186	72 - 73	Gobo 8 shake
				187 - 189	73 - 74	Gobo 7 shake
				190 - 192	74 - 75	Gobo 6 shake
				193 - 195	75 - 76	Gobo 5 shake
				196 - 198	77 - 78	Gobo 4 shake
				199 - 201	78 - 79	Gobo 3 shake
				202 - 204	79 - 80	Gobo 2 shake
				205 - 207	80 - 81	Gobo 1 shake
				<b>Continuous rotation</b>		
				208 - 231	82 - 91	CW, fast → slow
				232 - 255	92 - 100	CCW, slow → fast
8				<b>Focus</b>		
				0 - 255	0 - 100	Infinity → 2 meters
				<b>Iris</b>		
				0 - 199	0 - 78	Open → close
				200 - 215	78 - 84	Close
				216 - 229	85 - 90	Pulse opening, fast → slow
				230 - 243	90 - 95	Pulse closing, fast → slow
				244 - 246	96 - 96	Random pulse opening, fast
				247 - 249	97 - 98	Random pulse opening, slow
				250 - 252	98 - 99	Random pulse closing, fast
				253 - 255	99 - 100	Random pulse closing, slow
9						

DMX Channel				Start code = 0		
DMX1	DMX2	DMX3	DMX4	Value	Percent	Function
10 Fixture type = prism (default)				0 - 19	0 - 7	<b>Prism</b> Prism off
				20 - 79	8 - 31	Rotating prism, CCW fast → slow
				80 - 89	31 - 35	No rotation
				90 - 149	35 - 58	Rotating prism, CW slow → fast
				150 - 215	59 - 84	Prism off
				<b>Combined Rotating Prism and Gobo Macros</b>		
				216 - 220	84 - 86	Macro 1
				221 - 225	87 - 88	Macro 2
				226 - 230	89 - 90	Macro 3
				231 - 235	91 - 92	Macro 4
236 - 240	93 - 94	Macro 5				
241 - 245	95 - 96	Macro 6				
246 - 250	96 - 98	Macro 7				
251 - 255	98 - 100	Macro 8				
10 Fixture type = frost (optional)				0 - 255	0 - 100	<b>Variable Frost</b> No frost → full frost
11	11	11	11	0 - 255	0 - 100	<b>Pan</b> Left → right (128 = neutral)
-	12	-	12	0 - 255	0 - 100	<b>Pan Fine (LSB)</b> Left → right
12	13	12	13	0 - 255	0 - 100	<b>Tilt</b> Up → down (128 = neutral)
-	14	-	14	0 - 255	0 - 100	<b>Tilt Fine (LSB)</b> Up → down
-	-	13	15	0 - 2 3 - 245 246 - 248 249 - 251 252 - 255	0 - 1 1 - 96 96 - 97 98 - 98 99 - 100	<b>Pan/Tilt Speed</b> Tracking Fast → slow Tracking, normal speed (override PTSP FAST) Tracking, fast speed (override PTSP NORM) Blackout while moving
n/a	n/a	14	16	0 - 2 3 - 239 240 - 242 243 - 245 246 - 248 249 - 251 252 - 255	0 - 1 1 - 94 94 - 95 95 - 96 96 - 97 98 - 98 99 - 100	<b>Effects Speed</b> <b>Dimmer, iris, focus and gobo indexing</b> Tracking mode Fast → slow Tracking, normal mode (MOdE = NORM) Tracking, studio mode (MOdE = STUd) Tracking, shortcuts disabled (SCUT = OFF) Tracking, shortcuts enabled (SCUT = ON) Maximum speed  <b>Color 1, color 2, and fixed gobo if gMOd = SCRL</b> Tracking mode Speed, fast → slow Tracking, normal mode (MOdE = NORM) Tracking, studio mode (MOdE = STUd) Tracking with shortcuts disabled, overrides SCUT ON Tracking with shortcuts enabled, overrides SCUT OFF Blackout while moving  <b>Fixed gobo if gMOd = FIX</b> Normal (as set on effect channel), no blackout Tracking, normal mode (MOdE = NORM) Tracking, studio mode (MOdE = STUd) Normal, shortcuts disabled, overrides SCUT ON Normal, shortcuts enabled, overrides SCUT OFF Blackout while moving  <b>Rotating gobo and prism</b> Normal (as set on effect channel), no blackout Blackout while moving  <b>Gobo shake speed if gMOd = SCRL</b> Fast Speed, fast → slow Fast
				0 - 239 240 - 242 243 - 245 246 - 248 249 - 251 252 - 255	0 - 94 94 - 95 95 - 96 96 - 97 98 - 98 99 - 100	
				0 - 251 252 - 255	0 - 98 99 - 100	
				0 - 2 3 - 245 246 - 255	0 - 1 1 - 96 96 - 100	