

# DMX protocol

MAC Ultra Wash firmware version 1.5.0.

Channel	DMX Value	Function	Fade type	Default value
<b>Strobe / Intensity</b>				
<b>1</b>	0 - 19	<b>Strobe/shutter effect</b> Shutter closed	Snap	30
	20 - 49	Shutter open		
	50 - 200	Strobe, slow → fast		
	201 - 210	Shutter open		
	211 - 255	Random strobe, slow → fast		
<b>2</b>	0 - 65535	<b>Dimmer (16-bit)</b>	Fade	0
<b>3</b>		Closed → open		
<b>Color</b>				
<b>4</b>	0 - 65535	<b>Cyan (16-bit)</b>	Fade	0
<b>5</b>		0 → 100%		
<b>6</b>	0 - 65535	<b>Magenta (16-bit)</b>	Fade	0
<b>7</b>		0 → 100%		
<b>8</b>	0 - 65535	<b>Yellow (16-bit)</b>	Fade	0
<b>9</b>		0 → 100%		
<b>10</b>	0 - 65535	<b>CTC (16-bit)</b>	Fade	0
<b>11</b>		0 → 100%		
<b>12</b>		<b>Color wheel Indexing</b>	Snap	0
	0	<i>Split colors (continuous color wheel indexing)</i> Open		
	1 - 14	Open → Color 1		
	15	Color 1 (Spectral enhancement)		
	16 - 29	Color 1 → Color 2		
	30	Color 2 (Blue)		
	31 - 44	Color 2 → Color 3		
	45	Color 3 (Deep Green)		
	46 - 59	Color 3 → Color 4		
	60	Color 4 (Orange)		
	61 - 74	Color 4 → Color 5		
	75	Color 5 (Navy Blue)		
	76 - 89	Color 5 → Color 6		
	90	Color 6 (Deep Red)		
	91 - 104	Color 6 → Open		
	105 - 160	Open		
		<i>Solid colors</i>		
	161 - 163	Color 1 (Spectral enhancement)		
	164 - 166	Color 2 (Blue)		
	167 - 169	Color 3 (Deep Green)		
	170 - 172	Color 4 (Orange)		
	173 - 175	Color 5 (Navy Blue)		
176 - 178	Color 6 (Deep Red)			
179 - 192	Open			
	<b>Continuous rotation</b>			
193 - 214	CW, fast → slow			
215 - 221	Stop (wheel stops at current position)			
222 - 243	CCW slow → fast			
	<b>Random colors</b>			
244 - 247	Fast			
248 - 251	Medium			
252 - 255	Slow			

Table 2: MAC Ultra Wash DMX Protocol

Channel	DMX Value	Function	Fade type	Default value
<b>Beam effects</b>				
13	0 - 255	<b>Frost</b> No frost → full frost	Fade	0
14	0 - 200 201 - 225 226 - 230 231 - 255	<b>Iris</b> Open → closed Animate fast → slow Iris stops at current position Animate reverse slow → fast	Fade	0
<b>Zoom / Focus</b>				
15	0 - 65535	<b>Zoom (16-bit)</b> Wide → narrow	Fade	32768
16				
17	0 - 65535	<b>Focus (16-bit)</b> Infinity → near	Fade	32768
18				
<b>Movement</b>				
19	0 - 65535	<b>Pan (16-bit)</b> Left → right	Fade	32768
20				
21	0 - 65535	<b>Tilt (16-bit)</b> Forward → backward	Fade	32768
22				
<b>Control / Settings</b>				
23	0 - 9 10 - 14 15 16 17 18 19 - 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41- 51 52 53 54 55 56 57 58 59 - 60	<b>Fixture control/settings</b> <i>(hold for number of seconds indicated to activate)</i> Exit calibration adjustment and return to normal control – 5 sec. Reset entire fixture – 5 sec. <i>No function</i> Reset color – 5 sec. Reset beam only – 5 sec. Reset pan and tilt only – 5 sec. <i>No function</i> Linear dimming curve – 1 sec. (menu override, setting unaffected by power off/on) Square law dimming curve – 1 sec. (menu override, default setting, setting unaffected by power off/on) Inverse square law dimming curve – 1 sec. (menu override, setting unaffected by power off/on) S-curve dimming curve – 1 sec. (menu override, setting unaffected by power off/on) Standard pan and tilt speed – 1 sec. (default setting) Fast pan and tilt – 1 sec. (menu override - setting returns to <i>Standard pan and tilt speed</i> after power on/off) Smooth pan and tilt – 1 sec. (menu override - setting returns to <i>Standard pan and tilt speed</i> after power on/off) Effect shortcuts on (default setting) Effect shortcuts off Disable focus tracking – 1 sec. Focus tracking = Near distance – 1 sec. Focus tracking = Medium distance (default setting) – 1 sec. Focus tracking = Far distance – 1 sec. Enable video tracking Disable video tracking (default setting) <i>No function</i> Calibrated color mode – 1 sec. Raw color mode (default setting) – 1 sec. <i>No function</i> Control panel display on (default setting) – 1 sec. Control panel display off – 1 sec. Regulated fan speed, fixed light output intensity (default setting) – 1 sec. Full fan speed, regulated light output intensity – 1 sec. Medium fan speed, regulated light output intensity – 1 sec. Low fan speed, regulated light output intensity – 1 sec. Ultra-low fan speed, regulated light output intensity – 1 sec. <i>No function</i>	Snap	0

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<b>23</b> contd.	61	Hibernation mode on – 1 sec.	Snap	0
	62	Hibernation mode off (default setting)– 1 sec.		
	63	Followspot mode on – 5 sec.		
	64	Followspot mode off (default setting) – 5 sec.		
	65	Pan and tilt limits on – 1 sec.		
	66	Pan and tilt limits off (default setting) – 1 sec.		
	67	Pan limit low – 1 sec.		
	68	Pan limit high – 1 sec.		
	69	Tilt limit low – 1 sec.		
	70	Tilt limit high – 1 sec.		
	71	Reset pan and tilt limits – 1 sec.		
	72	Tungsten emulation on – 1 sec.		
	73	Tungsten emulation off (default setting) – 1 sec.		
	74	Scene capture record – 5 sec.		
	75	Scene capture playback on – 5 sec.		
	76	Scene capture playback off (default setting) – 5 sec.		
	77 - 80	<i>No function</i>		
	81	Enable Hyperzoom		
	82	Disable Hyperzoom (default setting)		
	83 - 86	<i>No function</i>		
	87	Keylight calibration disabled – 1 sec.		
	88	Keylight calibration manual – 1 sec.		
	89	Keylight calibration automatic (default setting) – 1 sec.		
	90 - 99	<i>No function</i>		
	100	Enable calibration adjustment – 5 sec.		
	101	Store pan and tilt calibration – 5 sec.		
	102	Store dimmer calibration – 5 sec.		
	103	Store Cyan calibration – 5 sec.		
	104	Store Magenta calibration – 5 sec.		
	105	Store Yellow calibration – 5 sec.		
	106	Store CTC calibration – 5 sec.		
	107	Store all CMYC calibration – 5 sec.		
	108 - 111	<i>No function</i>		
112	Store iris calibration – 5 sec.			
113	Store edge control calibration – 5 sec.			
114	Store zoom calibration – 5 sec.			
115	Store color wheel calibration – 5 sec.			
116 - 193	<i>No function</i>			
194	<i>Start CTO keylight calibration – 5 sec.</i>			
195	<i>Start spectral enhancement keylight calibration – 5 sec.</i>			
196	<i>Store CTO keylight enhancement keylight calibration – 5 sec.</i>			
197	<i>Store spectral enhancement keylight calibration – 5 sec.</i>			
198	<i>Store all calibration settings (except keylight settings) – 5 sec.</i>			
199	<i>Return all calibration settings (except keylight settings) to factory defaults – 5 sec.</i>			
200 - 255	<i>No function</i>			
<b>P3 Mix</b>				
<b>24</b>	0 - 26	<b>P3 Mix</b> <i>DMX Mode</i> Intensity and colors fully controlled by DMX, P3 pixel data ignored	Snap	0
	27 - 228	<i>Mixed Mode</i> Cross-fade from DMX control of intensity and colors to P3 control of intensity and colors: <ul style="list-style-type: none"> <li>• At 27, intensity and colors are still fully controlled by DMX.</li> <li>• Between 27 and 228, you mix/crossfade from DMX to P3 control.</li> <li>• At 228, the Intensity of each of the 10 x Animation segments is controlled by 10 x separate P3 pixels and color is controlled by P3 Pixel 1 (the black pixel on the P3 map).</li> </ul>		
	229 - 255	<i>Video Mode</i> Intensity of 10 x Animation segments controlled by P3, color controlled by DMX (DMX channels 'color' the P3 pixel data)		

Table 2: MAC Ultra Wash DMX Protocol

Channel	DMX Value	Function	Fade type	Default value
<b>Pre-programmed FX</b>				
<b>25</b>	0	<b>FX1 selection (see FX table on page 27)</b>	Snap	0
	1 - 254	No effect		
	255	Effect selection (adjust speed and direction on channel 26) Enable PWM frequency adjustment (adjust frequency on channel 26)		
<b>26</b>	0 - 126	<b>FX1 speed and direction</b>	Fade	128
	127 - 129	Effect reversed fast → slow		
	130 - 255	Effect stops Effect forward slow → fast		
<b>27</b>	0	<b>FX2 selection (see FX table on page 27)</b>	Snap	0
	1 - 254	No effect		
	255	Effect selection (adjust speed and direction on channel 28) Enable PWM frequency adjustment (adjust frequency on channel 28)		
<b>28</b>	0 - 126	<b>FX2 speed and direction</b>	Fade	128
	127 - 129	Effect reversed fast → slow		
	130 - 255	Effect stops Effect forward slow → fast		
<b>29</b>	0	<b>FX synchronization</b>	Snap	36
	1	No sync		
	2	Offset shift 10°		
	3	Offset shift 20°		
	4	Offset shift 30°		
	5	Offset shift 40°		
	6	Offset shift 50°		
	7	Offset shift 60°		
	8	Offset shift 70°		
	9	Offset shift 80°		
	10	Offset shift 90°		
	11	Offset shift 100°		
	12	Offset shift 110°		
	13	Offset shift 120°		
	14	Offset shift 130°		
	15	Offset shift 140°		
	16	Offset shift 150°		
	17	Offset shift 160°		
	18	Offset shift 170°		
	19	Offset shift 180°		
	20	Offset shift 190°		
	21	Offset shift 200°		
	22	Offset shift 210°		
	23	Offset shift 220°		
	24	Offset shift 230°		
	25	Offset shift 240°		
	26	Offset shift 250°		
	27	Offset shift 260°		
	28	Offset shift 270°		
	29	Offset shift 280°		
	30	Offset shift 290°		
	31	Offset shift 300°		
	32	Offset shift 310°		
	33	Offset shift 320°		
	34	Offset shift 330°		
	35	Offset shift 340°		
	36	Offset shift 350°		
37 - 100	Synchronized: all fixtures start FX cycles at same time <i>No function</i>			
101 - 120	<i>No function</i>			
121 - 140	Random start (Channel 25 controls overall speed)			
141 - 255	Random duration <i>No function</i>			

Table 2: MAC Ultra Wash DMX Protocol

# FX: pre-programmed effects

***FX are implemented in the MAC Ultra Wash firmware version 1.5.0. You can quickly check which firmware version a fixture is running using INFORMATION → FW VERSION in the fixture's control menus. For information on updating firmware, see the MAC Ultra Wash Safety and Installation Manual supplied with the fixture and available for download from [www.martin.com](http://www.martin.com).***

The table on the following pages lists the pre-programmed dynamic FX (effect macros) available in the MAC Ultra Wash. To control the FX you can:

- Select an effect, or two effects that can run simultaneously, on DMX channels 25 and 27 by sending the values listed in the table.
- Adjust effect speed on channels 26 and 28.
- Adjust synchronization of effects across different fixtures on channel 29.

## Effects types

### ***Intensity FX (1-15)***

These effects modulate the intensity of the output while keeping the color(s) set on the CMY and color wheel channels and any other effects applied.

### ***Animation effects (32-46)***

The MAC Ultra Wash's Animation effects modulate the ten individual segments of the fixture's LED engine individually, leading to unique animated effects.

### ***Color FX (64-91)***

These effects override the color(s) set on the CMY and color wheel channels.

### ***Beam shaping FX (96-110)***

These effects use the fixture's iris and zoom to dynamically change the shape of the beam.

### ***Pan and tilt FX (224-235)***

These effects use pan and tilt to move the beam following pre-programmed shapes.

### ***PWM Tune (255)***

Sending DMX value 255 on one of the FX selection channels 25 or 27 lets you adjust the LED PWM frequency. See "LED PWM frequency control" on page 8 for details.

## Effects types

Available in MAC Ultra Wash firmware version 1.5.0.

DMX value	Effect
0	No FX
Intensity FX	
1	Strobe Pulse Width (when Strobe is activated on Channel 1)
2	Wave (sine wave)
3	Step (50/50 on/off)
4	Pulse
5	Blackout Strobe
6	2x Strobe
7	3x Strobe
8	4x Strobe
9	Up, Down, Flash
10	Up, Flash, Down, Flash
11	Random Levels
12	Electric Arc
13	Atomic Lighting
14	Thunderstorm
15	Welding
16 - 31	No function
Animation FX	
32	Stop Motion
33	Movie Flicker
34	Random Dimmers
35	Shakey Dimmers
36	Negative Pulse
37	Positive Pulse
38	Radar Wave
39	Radar Step
40	Radar Pulse
41	Odd/Even Wave
42	Odd/Even Step
43	Odd/Even Pulse
44	5-Step Wave
45	5-Step Step
46	5-Step Pulse
47 - 63	No function
Color FX	
64	Rainbow Wave
65	Rainbow Step
66	Rainbow Pulse
67	RGB Wave
68	RGB Step
69	RGB Pulse
70	CMY Wave
71	CMY Step
72	CMY Pulse
73	Mix to White Wave
74	Mix to White Step

Table 3: FX in the MAC Ultra Wash

75	Mix to White Pulse
76	Random Mix Wave
77	Random Mix Step
78	Random Mix Pulse
79	Random Subtle Wave
80	Red White Blue Fade
81	Red White Blue Snaps
82	Full Bumps
83	All Bumps
84	Split Bumps
85	Random Split Bumps
86	Color Shaker
87	Fire
88	Water
89	Ice
90	Hot and Cold
91	Warm and Fuzzy
91 - 95	<i>No function</i>
Beam Shaping FX	
96	Iris Wave (sine wave)
97	Iris Step (50/50 on/off)
98	Iris Pulse
99	Zoom Wave (sine wave, keeps current speed mode)
100	Zoom Step (50/50 on/off, keeps current speed mode)
101	Zoom Pulse (keeps current speed mode)
102	Random Size Wave
103	Random Size Step
104	Random Size Pulse
105 - 107	<i>No function</i>
108	Beam Splash
109	Beam Splash Invert
110	Pin to Flood (keeps current speed mode)
111 - 223	<i>No function</i>
Pan/Tilt FX	
224	Pan and Tilt Circle Small
225	Pan and Tilt Circle Medium
226	Pan and Tilt Circle Large
227	Pan and Tilt Figure 8 Small
228	Pan and Tilt Figure 8 Medium
229	Pan and Tilt Figure 8 Large
230	Pan and Tilt Diagonal Line Small
231	Pan and Tilt Diagonal Line Medium
232	Pan and Tilt Diagonal Line Large
233	Pan and Tilt Square Small
234	Pan and Tilt Square Medium
235	Pan and Tilt Square Large
236 - 254	<i>No function</i>
Full fixture	
255	PWM Tune

**Table 3: FX in the MAC Ultra Wash**