DMX protocol

Applicable when running MAC Quantum Profile firmware version 1.0.0.

Basic 16-bit Mode	16-bit Extended Mode	DMX Value	Function	Fade type	Default value
1	**1**	0 - 19 20 - 49 50 - 200 201 - 210 211 - 255	**Strobe/shutter effect** Shutter closed Shutter open Strobe, slow → fast Shutter open Random strobe, slow → fast	Snap	30
2	**2**	0 - 255	**Dimmer fade (MSB)** Closed → open	Fade	0
	3	0 - 65535	**Dimmer fade (LSB)** Closed → open	Fade	0
3	**4**	0 - 255	**Cyan** 0 → 100%	Fade	0
4	**5**	0 - 255	**Magenta** 0 → 100%	Fade	0
5	**6**	0 - 255	**Yellow** 0 → 100%	Fade	0
6	**7**	0 1 - 14 15 16 - 29 30 31 - 44 45 46 - 59 60 61 - 74 75 76 - 89 90 91 - 104 105 - 160 161 - 163 164 - 166 167 - 169 170 - 172 173 - 175 176 - 178 179 - 192 193 - 214 215 - 221 222 - 243 244 - 247 248 - 251 252 - 255	**Color wheel** *Continuous Scroll (split colors possible)* Open Open → Slot 1 Slot 1 (Blue) Slot 1 → Slot 2 Slot 2 (Green) Slot 2 → Slot 3 Slot 3 (CTC 3200 K) Slot 3 → Slot 4 Slot 4 (Magenta) Slot 4 → Slot 5 Slot 5 (Congo Blue) Slot 5 → Slot 6 Slot 6 (Red) Slot 6 → Open Open *Stepped Scroll (snap to full color positions)* Slot 1 (Blue) Slot 2 (Green) Slot 3 (CTC 3200 K) Slot 4 (Magenta) Slot 5 (Congo Blue) Slot 6 (Red) Open *Continuous Rotation* CW, Fast → Slow Stop (This will stop the color wheel wherever it is at the time) CCW, Slow → Fast *Random color* Fast Medium Slow	Snap	0

Table 1: DMX Protocol

Basic 16-bit Mode	16-bit Extended Mode	DMX Value	Function	Fade type	Default value
7	**8**		**Gobo selection, indexing, shake, rotation**	Snap	0
			Indexed gobo: set indexed angle on channels 9/10 (16-bit) or 10/11 (16-bit ext.)		
		0 - 4	Open		
		5 - 9	Gobo 1 (Spidey)		
		10 - 14	Gobo 2 (Wind My Mill)		
		15 - 19	Gobo 3 (Limbo)		
		20 - 24	Gobo 4 (Ray Brush)		
		25 - 29	Gobo 5 (Whirlpool)		
		30 - 34	Gobo 6 (To Boldly Go)		
			Continuous gobo rotation: set gobo rotation speed on channels 9/10 (16-bit) or 10/11 (16-bit ext.)		
		35 - 39	Gobo 1		
		40 - 44	Gobo 2		
		45 - 49	Gobo 3		
		50 - 54	Gobo 4		
		55 - 59	Gobo 5		
		60 - 64	Gobo 6		
			Gobo shake centered on indexed position: set indexed angle on channels 9/10 (16-bit) or 10/11 (16-bit ext.). Shake angle adjusts in following steps: 360°, 270°, 180°, 135°, 90°, 60°, 45°, 30°, 15° and 10°		
		65 - 88	Gobo 1 shake, 360° slow → 10° fast		
		89 - 112	Gobo 2 shake, 360° slow → 10° fast		
		113 - 136	Gobo 3 shake, 360° slow → 10° fast		
		137 - 160	Gobo 4 shake, 360° slow → 10° fast		
		161 - 184	Gobo 5 shake, 360° slow → 10° fast		
		185 - 209	Gobo 6 shake, 360° slow → 10° fast		
			Continuous gobo wheel scroll with indexed gobo: set gobo indexed angle on channels 8 and 9 (16-bit) or 9 and 10 (16-bit extended)		
		210 - 232	CW gobo wheel scroll, fast → slow		
		233 - 255	CCW gobo wheel scroll, slow* → fast		
8 **9**	**9** **10**		**Gobo indexing angle or rotation speed (16-bit fine, MSB and LSB)**	Fade	32768
			If indexed gobo is selected on channel 7 (16-bit) or 8 (16-bit ext.)		
		0 - 65535	Gobo indexing, -197.5° → +197.5° *(default DMX value 32768 sets gobo to 0°)*		
			If continuous gobo rotation is selected on channel 7 (16-bit) or 8 (16-bit ext.)		
		0 - 600	No gobo rotation, gobo indexed at 0°		
		601 - 32130	CW rotation, fast → slow		
		32131 - 32895	No gobo rotation, gobo stops at current position		
		32896 - 64515	CCW rotation, slow → fast		
		64516 - 65535	No gobo rotation, gobo indexed at 90°		

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Basic 16-bit Mode	16-bit Extended Mode	DMX Value	Function	Fade type	Default value
10	**11**		**Static gobo wheel gobo selection, wheel rotation, random gobo**	Fade	0
			Continuous gobo wheel scrolling		
		0	Open		
		1 - 14	Open → Gobo 1		
		15	Gobo 1		
		16 - 29	Gobo 1 → Gobo 2		
		30	Gobo 2		
		31 - 44	Gobo 2 → Gobo 3		
		45	Gobo 3		
		46 - 59	Gobo 3 → Gobo 4		
		60	Gobo 4		
		61 - 74	Gobo 4 → Gobo 5		
		75	Gobo 5		
		76 - 89	Gobo 5 → Gobo 6		
		90	Gobo 6		
		91 - 104	Gobo 6 → Gobo 7		
		105	Gobo 7		
		106 - 119	Gobo 7 → Gobo 8		
		120	Gobo 8		
		121 - 134	Gobo 8 → Gobo 9		
		135	Gobo 9		
		136 - 149	Gobo 9 → Gobo 10		
		150	Gobo 10		
		151 - 164	Gobo 10 → Open		
		165	Open		
			Stepped gobo wheel scrolling		
		166 - 167	Gobo 1		
		168 - 169	Gobo 2		
		170 - 171	Gobo 3		
		172 - 173	Gobo 4		
		174 - 175	Gobo 5		
		176 - 177	Gobo 6		
		178 - 179	Gobo 7		
		180 - 181	Gobo 8		
		182 - 183	Gobo 9		
		184 - 185	Gobo 10		
		186 - 192	Open		
			Continuous gobo wheel rotation		
		193 - 214	CW gobo wheel rotation, fast → slow		
		215 - 221	Gobo wheel stops at its current position		
		222 - 243	CCW gobo wheel rotation, slow → fast		
			Random gobos		
		244 - 247	Fast		
		248 - 251	Medium		
		252 - 255	Slow		
11	**12**		**Prism rotation**	Snap	0
		0 - 2	Open		
		3 - 126	CW prism rotation, fast → slow		
		127 - 129	Prism stops at its current position		
		130 - 253	CCW prism rotation, slow → fast		
		254 - 255	Open		
12	**13**		**Iris**	Fade	0
		0 - 200	Open → closed		
		201 - 225	Animate fast → slow		
		226 - 230	Iris stops at current position		
		231 - 255	Animate reverse slow → fast		
13	**14**		**Zoom (MSB)**	Fade	
		0 - 255	Wide → narrow		
	15		**Zoom fine (LSB)**	Fade	32768
		0 - 65535	Wide → narrow		
14	**16**		**Focus (MSB)**	Fade	
		0 - 255	Far → near		
	17		**Focus fine (LSB)**	Fade	32768
		0 - 65535	Far → near		

Table 1: DMX Protocol

Basic 16-bit Mode	16-bit Extended Mode	DMX Value	Function	Fade type	Default value
15 **16**	**18** **19**	0 - 65535	**Pan, 16-bit (MSB and LSB)** Left → right (32768 = neutral)	Fade	32768
17 **18**	**20** **21**	0 - 65535	**Tilt, 16-bit (MSB and LSB)** Up → down (32768 = neutral)	Fade	32768
19	**22**		**Fixture control/settings** *(hold for number of seconds indicated to activate)*	Snap	0
		0 - 9	*No function (disables calibration)* – 5 sec.		
		10 - 14	Reset entire fixture – 5 sec.		
		15	*No function*		
		16	Reset color only – 5 sec.		
		17	Reset beam only– 5 sec.		
		18	Reset pan and tilt only – 5 sec.		
		19 - 22	*No function*		
		23	Linear dimming curve – 1 sec. (menu override, setting unaffected by power off/on)		
		24	Square law dimming curve – 1 sec. (menu override, factory default setting, setting unaffected by power off/on)		
		25	Inverse square law dimming curve – 1 sec. (menu override, setting unaffected by power off/on)		
		26	S-curve dimming curve– 1 sec. (menu override, setting unaffected by power off/on)		
		27	*No function*		
		28	Fast pan and tilt speed – 1 sec. (default setting, menu override - setting returns to MENU setting after power on/off)		
		29	Smooth pan and tilt speed – 1 sec. (menu override - setting returns to MENU setting after power on/off)		
		30	Parameter shortcuts = ON (default)		
		31	Parameter shortcuts = OFF		
		32	Disable focus tracking		
		33	Enable focus tracking on near distance		
		34	Enable focus tracking on medium distance		
		35	Enable focus tracking on far distance		
		36 - 51	*No function*		
		52	Turn on control panel display – 1 sec.		
		53	Turn off control panel display – 1 sec.		
		54	Regulated fan speed, fixed light output intensity = full (default)		
		55	Fixed fan speed = full, regulated light output intensity		
		56	Fixed fan speed = medium, regulated light output intensity		
		57	Fixed fan speed = low, regulated light output intensity		
		58	Fixed fan speed = ultra low, regulated light output intensity		
		59 - 99	*No function*		
		100	Enable calibration – 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	*No function*		
		107	Store all CMY calibration – 5 sec.		
		108	Store rot. gobo wheel current slot index calibration – 5 sec.		
		109	*No function*		
		110	Store static gobo wheel calibration – 5 sec.		
		111	*No function*		
		112	Store iris calibration – 5 sec.		
		113	Store focus calibration – 5 sec.		
		114	Store zoom calibration – 5 sec.		
		115 - 198	*No function*		
		199	Reset all calibration values to factory defaults – 5 sec.		
		200 - 255	*No function*		
-	**23**	0 - 255	**FX1 selection (see Table 2)** Effect selection (adjust on DMX channel 24)	Snap	0
-	**24**	0 - 126 127 - 128 129-255	**FX1 adjustment** Effect reversed fast → slow Effect stops Effect slow → fast	Fade	128

Table 1: DMX Protocol

Basic 16-bit Mode	16-bit Extended Mode	DMX Value	Function	Fade type	Default value
-	**25**	0 - 255	**FX2 selection (see Table 2)** Effect selection (adjust on DMX channel 24)	Snap	0
-	**26**	0 - 126 127 - 128 129-255	**FX2 adjustment** Effect reversed fast → slow Effect stops Effect slow → fast	Fade	128
-	**27**	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 - 100 101 - 120 121 - 140 141 - 255	**FX synchronization** No sync Offset shift 10° Offset shift 20° Offset shift 30° Offset shift 40° Offset shift 50° Offset shift 60° Offset shift 70° Offset shift 80° Offset shift 90° Offset shift 100° Offset shift 110° Offset shift 120° Offset shift 130° Offset shift 140° Offset shift 150° Offset shift 160° Offset shift 170° Offset shift 180° Offset shift 190° Offset shift 200° Offset shift 210° Offset shift 220° Offset shift 230° Offset shift 240° Offset shift 250° Offset shift 260° Offset shift 270° Offset shift 280° Offset shift 290° Offset shift 300° Offset shift 310° Offset shift 320° Offset shift 330° Offset shift 340° Offset shift 350° Synchronized *Reserved* Random start (FX 1 adjust controls overall speed) Random duration *Reserved*	Snap	0

Table 1: DMX Protocol

MSB = Most significant byte
LSB = Least significant byte

FX: pre-programmed effects

The table below lists the pre-programmed dynamic effects (macros) that can be controlled using channels 23 - 27 in 16-bit Extended Mode.

You select effects on channels 23 and 25 by sending the values listed in the table. You can adjust effect parameters such as speed and intensity on channels 24 and 26, and you can adjust synchronization of effects across different fixtures on channel 27.

Applicable when running MAC Quantum Profile firmware version 1.0.0.

DMX value	Effect	DMX value	Effect	DMX value	Effect
1	Gobo X-fade	61	Mix to White Pulse	118	Windows
2	Bad Stepper	62	Random Mix Wave	119	Three Ring Circus
3-7	*Reserved*	63	Random Mix Step	120	Flying Bananas
8	Tick Tick Tick	64	Random Mix Pulse	121	Beamage
9	Tick Tock	65	Random Subtle Wave	122	Spider Twist
10	Wave	66	Red White Blue Fade	123	Milling Around
11	Step	67	Red White Blue Snaps	124	Flicker Dots
12	Pulse	68-69	*Reserved*	125	Tick Tock Cone
13	Double Strobe	70	Full Bumps	126	Flap Flap
14	Triple Strobe	71	All Bumps	127	Nervous Dots
15	Up, Down, Flash	72	Split Bumps	128	Chasing Dots
16	Up, Flash, Down, Flash	73	Random Split Bumps	129	Counter Flaps
17	Random Levels	74	Color Shaker	130-159	*Reserved*
18-20	*Reserved*	75	Fire	160	Fire
21	Electric Arc	76	Water	161	*Reserved*
22	Atomic Lightning	77	Ice	162	Water
23	Thunderstorm	78	Hot and Cold	163	*Reserved*
24	Welding	79	Warm and Fuzzy	164	Vertical Scratches
25-29	*Reserved*	80	Iris Wave	165	Horizontal Scratches
30	Stop Motion*	81	Iris Step	166	Box Animation
31	Movie Flicker*	82	Iris Pulse	167	Chasing Worms
32	Cross Chase*	83	Zoom Wave	168	Spidermotion
33	Random Dimmers*	84	Zoom Step	169	Curvy Field
34	Shakey Dimmers*	85	Zoom Pulse	170	Big Balls
35	Center Out Chase*	86	Random Size Wave	171	Veins
36	Negative Pulse*	87	Random Size Step	172	Yellow Veins
37	Positive Pulse*	88-89	*Reserved*	173	Wavy Bones
38-49	*Reserved*	90	Pin to Flood	174	Blubber
50	Rainbow Wave	91	Pounce	175-209	*Reserved*
51	Rainbow Step	92	Splash	210	Zoom Fade
52	Rainbow Pulse	93-109	*Reserved*	211	Fade Spin Zoom
53	RGB Wave	110	Three Beams	212	Gobo Twist
54	RGB Step	111	Small Spidey	213	Expand Twist
55	RGB Pulse	112	Circle Cuts	214	Expand Twist Out
56	CMY Wave	113	Mill Cuts	215-219	*Reserved*
57	CMY Step	114	Dots in Motion	220	Circle Square
58	CMY Pulse	115	Lots of Dots	221	Circle Open
59	Mix to White Wave	116	Moonflower	222	Line By Line
60	Mix to White Step	117	Starlight	223-255	*Reserved*

Table 2: FX in the MAC Quantum Profile

***Animotion effect**

Control panel menus

Applicable when running MAC Quantum Profile firmware version 1.0.0.

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Notes (Default settings in bold print)
DMX ADDRESS	**1** – XXX			DMX address (default address = **1**). The DMX address range is limited so that the fixture will always have enough DMX channels within the 512 available.
CONTROL MODE	BASIC			16-bit basic DMX mode
	EXTENDED			**16-bit extended DMX mode**
FIXTURE ID	0 – 9999	User-settable fixture ID number		**0**
PERSONALITY	PAN/TILT	PAN INVERT	ON/**OFF**	Inverse DMX pan control: right → left
		TILT INVERT	ON/**OFF**	Inverse DMX tilt control: down → up
	SPEED	PAN/TILT	**FAST**	**Optimize pan/tilt movement for speed**
			SMOOTH	Optimize pan/tilt movement for smoothness
		EFFECT	**FOLLOW P/T**	**Effects speed follows the speed setting applied to pan and tilt via DMX or in control menu**
			FAST	Optimize effects movement for speed
			SMOOTH	Optimize effects movement for smoothness
	DIMMER CURVE	LINEAR		Optically linear dimming curve
		SQUARE LAW		**Square law dimming curve**
		INV SQ LAW		Inverse square law dimming curve
		S-CURVE		S-curve (fixture emulates incandescent lamp voltage linear RMS dimming curve)
	FOCUS TRACKING	DISABLED		Focus tracking function disabled
		NEAR		Focus tracking, focus optimized for near distance
		MEDIUM		**Focus tracking, focus optimized for medium distance**
		FAR		Focus tracking, focus optimized for far distance
	VIDEO TRACKING	ENABLED		Color fading optimized for speed (suggested setting for pixelmapping)
		DISABLED		**Color fading optimized for smoothness**
	DMX RESET	**ON**		**Fixture can be reset via DMX**
		OFF		Fixture cannot be reset via DMX (can be overridden: see DMX protocol)
	EFFECT SHORTCUT	**ON**		**Effects take shortest route during changes, crossing open positions if necessary**
		OFF		Effects avoid open positions during effects changes

Table 3: Control menus

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Notes (Default settings in bold print)
PERSONALITY (continued)	COOLING MODE	**REGULATE FANS**		**Fans optimized for light intensity (temperature controlled by regulating fan speed, light output unaffected)**
		CONSTANT FAN ULOW		Fans optimized for maximum quietness (temperature controlled by regulating light output, fan speed fixed at ultra-low)
		CONSTANT FAN LOW		Fans optimized for quietness (temperature controlled by regulating light output, fan speed fixed at low)
		CONSTANT FAN MID		Fans set to quietness/cooling compromise (temperature controlled by regulating light output, fan speed fixed at medium)
		CONSTANT FAN FULL		Fans optimized for cooling (temperature controlled by regulating light output only if required, fan speed fixed at high)
	DISPLAY	DISPLAY SLEEP	ON	Display permanently on
			2 MINUTES	**Display goes into sleep mode 2 minutes after last key press**
			5 MINUTES	Display goes into sleep mode 5 minutes after last key press
			10 MINUTES	Display goes into sleep mode 10 minutes after last key press
		DISPLAY INTENSITY	10 ... **100**	Set display intensity in % (default = **100**)
		DISPLAY ROTATION	**NORMAL** / ROTATE 180	Display orientation **normal** or rotated 180°
		DISPLAY CONTRAST	1 ...100	Adjust contrast of display (default = **41**)
	ERROR MODE	**NORMAL**		**Enable error messages and warnings in display**
		SILENT		Disable error messages and warnings in display (the status LED will still light to indicate fixture status if an error has been detected or the fixture has a warning)
DEFAULT SETTINGS	FACTORY DEFAULT	LOAD	ARE YOU SURE? YES/NO	Return all settings (except calibrations) to factory defaults
	CUSTOM 1	LOAD	ARE YOU SURE? YES/NO	Load Custom Settings 1
		SAVE	ARE YOU SURE? YES/NO	Save fixture's current settings as Custom Settings 1
	CUSTOM 2	LOAD	ARE YOU SURE? YES/NO	Load Custom Settings 2
		SAVE	ARE YOU SURE? YES/NO	Save fixture's current settings as Custom Settings 2
	CUSTOM 3	LOAD	ARE YOU SURE? YES/NO	Load Custom Settings 3
		SAVE	ARE YOU SURE? YES/NO	Save fixture's current settings as Custom Settings 3

Table 3: Control menus

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Notes (Default settings in bold print)
INFORMATION	POWER ON TIME	TOTAL	0 ... XXX HR	Display hours fixture has been powered on since manufacture (not user-resettable)
		RESETTABLE	CLEAR COUNTER? YES/ NO	Display hours fixture has been powered on since last counter reset (user-resettable)
	POWER ON CYCLES	TOTAL	0 ... XXX HR	Display number of times fixture has been powered on since manufacture (not user-resettable)
		RESETTABLE	CLEAR COUNTER? YES/ NO	Display number of times fixture has been powered on since last counter reset (user-resettable)
	SW VERSION*	XX.XX.XX		Displays currently active software version
	RDM UID*	4D50.XXXXXXXX		Displays fixture's unique RDM ID
	FAN SPEEDS*	HEAD FAN 1 ... BASE FAN 3	0 - XXX RPM	Scroll to displays current speed of each cooling fan (head and base)
	TEMPERA-TURES*	EFFECT ... DCDC PCB	X C	Displays temperature in °C of all PCBs
DMX LIVE*	RATE	0 - 44 HZ		DMX transmission speed in packets per second
	QUALITY	0 - 100%		Percent of packets received
	START CODE	0 - 255		Value of the DMX start code
	STROBE ... FX SYNC	XXX		Scroll to see values received on each DMX channel
TEST*	TEST ALL			Run test sequence of all functions To test a specific function, se Up/Down buttons to scroll through functions and pause. Press Enter to restart test sequence. Press Menu button to exit test
	TEST LEDS			Run test sequence of LEDs only. To test a specific LED group, use Up/Down buttons to scroll through groups and pause. Press Enter to restart test sequence. Press Menu button to exit test
	TEST EFFECTS	CYAN ... FOCUS		Run test sequence of each effect. Press Menu button to stop test
	TEST PAN/TILT	PAN		Run test sequence of pan functions. Press Menu button to stop test
		TILT		Run test sequence of tilt functions. Press Menu button to stop test
MANUAL CONTROL*	RESET			Reset fixture
	STROBE ... FX SYNC			Scroll through effects to manually control an effect

Table 3: Control menus

Menu level 1	Menu level 2	Menu level 3	Menu level 4	Notes (Default settings in bold print)
SERVICE	ERROR LIST	Empty or up to 20 errors		Display any errors in memory
	FAN CLEAN	ON/OFF		Activate fan cleaning
	PT FEEDBACK	**ON**		**Enable pan/tilt position feedback systems**
		OFF		Disable pan/tilt position feedback
	CALIBRATION	DIMMER ...	0.00 ...+/- xx%	Define home position of all effects. Plus/minus percentage available depends on effect
		PAN	0.00 ...+/- xx%	Define pan home position
		TILT	0.00 ...+/- xx%	Define tilt home position
		LOAD DEFAULTS	LOAD	Load factory default calibration settings
		SAVE DEFAULTS	SAVE	Replace factory default calibration settings with current calibration settings
	USB	NO DEVICE		No USB device present or no firmware on USB device
		UPDATING FILES		Fixture updating internal memory from USB device
		AVAILABLE FIRMWARE	XX.XX.XX ... XX.XX.XX	Select firmware from versions stored in internal memory. Scroll to select version, then press Enter and confirm your choice to update

Table 3: Control menus

** Menus marked * are available only when the fixture is connected to mains power. All other menus are available in mains- and battery-powered operation.*