

**DMX/RDM or DALI Type 6 / Type 8
MultiProtocol LED dimmer for Constant Voltage LEDs**

User Manual

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Pictured: SLAMMO V6

Supply for **L**ight Emitting Diodes **A**mplified **M**odulation **M**aximum **O**utput

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SLAMMO V6 – Important Installation Considerations

Power supplies should be separated from each other (refer to the power supply manufacturer's recommendations) and from the SLAMMOs, and in any case separated by at least 50mm from the SLAMMOs. Care should be taken not to create significant EMI (electromagnetic interference) near SLAMMOs, and do not coil any spare wiring from the power supplies – always trim to length. Local interference may limit the number of SLAMMOs on one power supply and in any case a limit of six SLAMMOs powered by the same power supply is recommended. 24V_{DC} LED loads can be up to 6A *per output* of LEDs to a maximum of 15A total load per SLAMMO. These values must be de-rated dependant on air movement/cooling (in air-conditioned environments kept at <40°C for example, the full rating is possible after allowance for any inrush current). The SLAMMO V6 located in an ambient of 40°C or less is suitable for loads up to 360W @24V_{DC} less the power supply inrush headroom.

SLAMMO V6 – Important Connection Polarity and Voltage

The SLAMMO is designed to operate at 7-24V_{DC} (higher voltages will result in damage). The voltage supplied to the SLAMMO should match the V_{DC} of the LEDs to be controlled, and not exceed 24V_{DC}. The SLAMMO V6 has reverse polarity protection, but damage may still occur to the connected load.

SLAMMO V6 – Matched power supplies

DO NOT use any power supply that is not compliant with CISPR15 (EN55015). We recommend approved CISPR 15 compliant power supplies by Meanwell (for example HLG and ELG series). Only one power supply per SLAMMO (or SLAMMOs) can be used – do NOT combine the outputs of more than one power supply.

Important: Temperature/Load

The SLAMMO V6 should not be overloaded – the maximum recommended load is 360W at 24V_{DC} and 180W at 12V_{DC} in environments with ambient temperatures <40°C. No channel should be loaded with more 6A to allow for inrush from the LEDs at start up. The total of all six outputs must not exceed 360W (15A at 24V_{DC} or 15A 180W at 12V_{DC}). It is recommended that channels be evenly loaded where possible. Maximum design temperature of the SLAMMO V6 is 70°C.

Mimic LEDs

Each output has a mimic LED on the SLAMMO V6 front keypad.

SLAMMO V6 - Description

The SLAMMO V6 can be controlled by DALI OR DMX512 and RDM, though only by one of these protocols at a time depending on the type ordered. The currently active protocol is determined by the installed hardware. Inserting a DMX or DALI board into the input slot will set the SLAMMO to that mode on power cycle.



The keypad has two buttons labelled A and B. There are also 6 mimic LEDs and a 3 digit 7-segment display. Pressing the buttons will enter a menu state shown in the following section. After 10 minutes with no button press, the SLAMMO will display the screensaver. If the SLAMMO was in test or override, it will revert to the selected protocol (DALI or DMX)

Button Operation

The buttons on the front of the unit can be used to make quick adjustments to the SLAMMO V6.

Holding down both buttons will increment the menu state through the following options.

State	Description	Flash	Display	Short Press A	Short Press B	IDLE/ Screensaver	STEP
IDLE	Default Mode	No	DMX Address 'XXX' Or DALI Address 'AXX'	Will show '[' and enter a channel cycle test for 10 minutes	Will show '[0]' and enter 100% override for 10 minutes		Press A and B together to go to next menu (CHANNEL SELECT)
Channel Selection	Ignores DALI/DMX.	Yes	DMX Address 'XXX' Or DALI Address 'AXX'	Decrease the address	Increase the address. If DALI unaddressed, this will address the unit from 0-5 which can then be changed by the user	10-minute timeout	Press A and B together to go to next menu (OUTPUT TYPE)
Output Type Selection	Changes the channel type from 0 to 6 devices and DT8. See RDM parameter for more information	Yes	'C01' where the number indicates the number of channels (0 for default)	Decrease the Option	Increase the Option	10-minute timeout	Press A and B together to go to next menu (CURVE)
Curve Selection	Changes the curve between LOG and LIN	Yes	'Log' or 'Lin'	Select Log	Select Lin	10-minute timeout	Press A and B together to go to next menu (IDLE)
Screensaver	Prevents display LED Burn-In after 10 minutes of inactivity	No	Slow Rotate	Back to IDLE	Back to IDLE	None	Press A or B to return to IDLE

DALI Operation

The SLAMMO V6 is compatible with DALI version 2 and implements up to six standard DALI devices (In standard configuration), with one DALI address per output as standard. The amount of DALI devices is selectable from 1, 2, 3, 4, 5 or 6 (default).

The SLAMMO reacts to all DALI Type 6 and Type 8 Commands including fast fade time facilities and dimming curve selection. To receive DALI levels and commands, the DALI terminals of the SLAMMO V6 should be connected to a DALI line that also connects to a DALI power supply unit and one or more DALI controllers.

For more information on the DALI protocol, refer to the DALI Standard documentation. The SLAMMO will react to correct DALI voltage between 9.5V and 22.5V with a threshold of 8.0V. The DALI Receiver will receive messages with a slightly wider timing range than required to prevent missing messages.

DALI Fade Time

The DALI fade time allows for the device to set (per channel) a fade time based on Table 1. *DALI Fade Times*.

Note: A DALI fade time will only be used with **Direct Arc Level** Commands; as per the DALI standard, a MAX, MIN or OFF command will use the device's fast fade time value (Default – Instant).

Table 1. DALI Fade Times

Fadetime Setting	Min fade time (s)	Nominal fade time (s)	Max fade time (s)
0	Uses Extended Fade Time – see Extended Fade Times		
1	0.6	0.7	0.8
2	0.9	1.0	1.1
3	1.3	1.4	1.6
4	1.8	2.0	2.2
5	2.5	2.8	3.1
6	3.6	4.0	4.4
7	5.1	5.7	6.2
8	7.2	8.0	8.8
9	10.2	11.3	12.4
10	14.4	16.0	17.6
11	20.4	22.6	24.9
12	28.8	32.0	35.2
13	40.7	45.3	49.8
14	57.6	64.0	70.4
15	81.5	90.5	99.6

Extended Fade Times

Version 2 of the DALI standard allows for a much greater variety of fadetimes than those shown above for older versions. If the fade time of 0 is selected, then the device will use the extended fade rate to calculate the desired fade. The value that is sent to the device is calculated using the equation (1), where AAAA is the base value, (between 1 and 16) and YYY is the fade time multiplier. The multipliers are shown in Table 2. DALI Extended Fade Multipliers.

$$0YYYYAAAAb \tag{1}$$

Table 2. DALI Extended Fade Multipliers

Multiplier (YYY)	Multiplication Factor		
	Minimum	Nominal	Maximum
000b	0ms	0ms	0ms
001b	95ms	100ms	105ms
010b	0.95s	1s	1.05s
011b	9.5s	10s	10.5s
100b	0.95 min	1 min	1.05 min

Example: If you want to set a fade rate of 6 minutes then you would calculate it as shown below;

$$AAAA = 6 = 0101 \text{ (binary)}$$

$$YYY = 100 \text{ (binary)}$$

$$\text{Byte to send} = 0YYYYAAA = 01000101 = 69 \text{ (Dec)} = 0x45 \text{ (Hex)}$$

This fade rate allows for fades between 100ms to 16 minutes.

Fast Fade Time

If both the fade time and the extended fade time are set to 0, then the device will use its fast fade time. The fast fade times are shown in the Table 3. Fast Fade Times.

Table 3. Fast Fade Times

No#	Time (ms)	No#	Time (ms)	No#	Time (ms)	No#	Time (ms)
0	< 25 (5ms)	7	175	14	350	21	525
1	25	8	200	15	375	22	550
2	50	9	225	16	400	23	575
3	75	10	250	17	425	24	600
4	100	11	275	18	450	25	625
5	125	12	300	19	475	26	650
6	150	13	325	20	500	27	675

The default fast fade time is 0, where the change in light level will be performed at the SLAMMOs highest rate (approx. < 5ms). Note – Fast Fade time will be set to the nearest 10ms.

Dimming Curve

The SLAMMO V6 Type 6 allows for the selection of an appropriate dimming curve; logarithmic or linear. The default mode is logarithmic. The dimming curve can be selected through the device type 6 extended command 227, where a value of 0 represents logarithmic, and a value of 1 represents linear. The difference between the curves is shown in Figure 1. Log and Linear Dimming Curves.

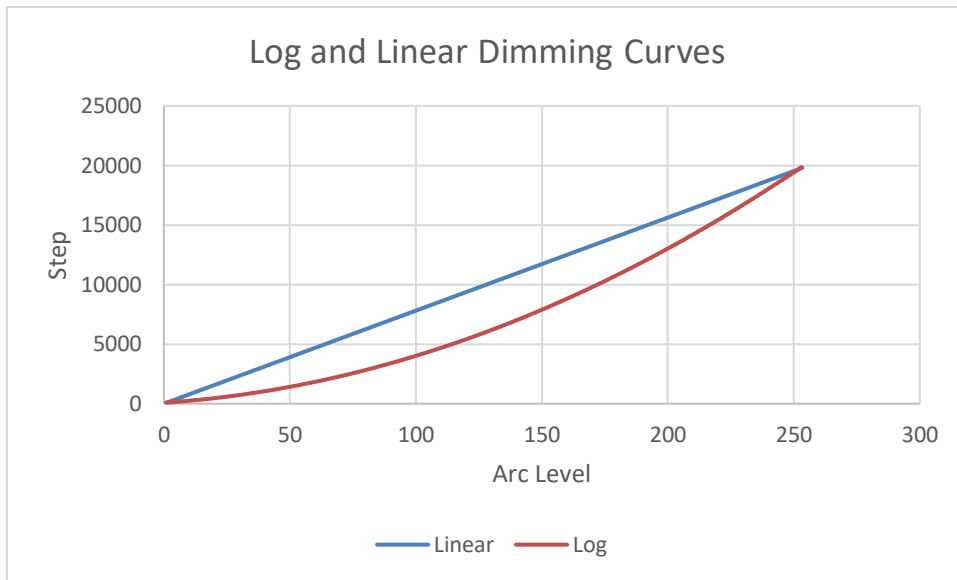


Figure 1. Log and Linear Dimming Curves (Approximate)

Note – The real-world curves have been tailored to provide the best dimming response.

Type 6 DALI

The SLAMMO is designed for DALI Type 6 and follows as per the standard commands in Table 4. Type 6 Commands. The expected responses are outlined, as well as the supported features of type 6.

Command Number	Name	Supported	Response
224	Reference System Power	NO	No Response
225	Enable Current Protection	NO	No Response
226	Disable Current Protection	NO	No Response
227	Select Dimming Curve	YES	No Response
228	Store DTR Fast Fade Time	YES	No Response
229	Reserved		
230-231	Reserved		
232-235	Reserved		
236	Reserved		
237	Query Gear Type	YES	0x08
238	Query Dimming Curve	YES	0 or 1
239	Query Possible Operating Modes	YES	0x01
240	Query Features	YES	0x00
241	Query Failure Status	YES	0x80
242	Query Short Circuit	NO	No Response
243	Query Open Circuit	NO	No Response
244	Query Load Decrease	NO	No Response
245	Query Load Increase	NO	No Response
246	Query Current Protection Active	NO	No Response
247	Query Thermal Shut Down	NO	No Response
248	Query Thermal Overload	NO	No Response
249	Query Reference Running	NO	No Response
250	Query Reference Measurement failed	NO	No Response
251	Query Current Protection Enabled	NO	No Response
252	Query Operating Mode	YES	0x00
253	Query Fast Fade Time	YES	Value 0-27
254	Query Min Fast Fade Time	YES	0x00
255	Query Extended Version Number	YES	0x01
272	Enable Device Type 6	SPECIAL	No Response

Table 4. Type 6 Commands

Type 8 DALI

The SLAMMO is designed for DALI Type 8 and will respond to most DT8 commands and queries. The SLAMMO V6 has two DT8 modes, selectable by RDM or using the Channel Select on the Keypad. DT8 RGB and DT8 RGBW change the output when XY commands are sent, utilising the white channel. CCT and RGBWAF will work the same in either mode.

Supported Modes

- CCT – Using Channels 1, 3, and 5 as the WARM colour Temp, and Channels 2,4, and 6 as the COOL colour temp.
- XY – Outputting either RGB or RGBW.
- RGBWAF – Using all 6 outputs.

Please see the DALI DT8 standard for the full capability list using the above supported modes.

Miscellaneous

The SLAMMO V6 contains a memory bank that has information such as UID (Unique Identifier), DALI version, Hardware version and software version. This information is all available through reading the memory bank through DALI.

Note: The UID number presented in the memory bank is the same as the RDM UID.

DMX₅₁₂ Operation

The SLAMMO V6 implements six DMX₅₁₂ devices in the one SLAMMO to allow individual control over all six outputs.

DMX Signal Conditioning

The DMX signal can be conditioned to improve the signal quality or rectify flashing/faults.

In standard configuration, the DMX cable is connected directly to the DMX+, DMX-, and DMX GND pins using Cat5/6 Ethernet Green/Stripe, Green, and Browns (twisted together) respectively. Note that the standard colour coding + = green with white stripe; - = green; shield brown (and brown and white stripe) assumes T-568A RJ45 (recommended). For T-568B ("Type B"), colours are DMX+ (Orange/White), DMX- (Orange), and DMX GND (Brown + Brown/White)

If there is unavoidable excessive EMI noise interfering with operation, the DMX GND can be connected to the devices Logic Ground PIN.

If this SLAMMO is the last DMX device in the chain, a 120 Ω resistor should be placed between the DMX+ and DMX- pins.

DMX512 Personalities

This section outlines the six personalities that are available for DMX₅₁₂ in the SLAMMO V6, programmable by means of RDM-compliant devices such as the Control Freak ADDICT®.

Depending on its current personality the SLAMMO V6 will have a DMX₅₁₂ footprint (i.e. how many channels it listens to) of 6, 12, 18, 7, 6, or 12 channels as set out below.

Personality 1 – Basic

This personality provides the simplest DMX₅₁₂ functionality for the SLAMMO V6. This is the default personality, which provides simple single channel per output DMX₅₁₂ dimming. The following table lists the DMX₅₁₂ channels that the SLAMMO V6 listens to for the basic personality:

DMX channel if Start Address is DMX Channel 1	Personality 1		
	Offset from Start Address	Channel name	Output
1	+ 0	Coarse	Ch 1
2	+1	Coarse	Ch 2
3	+2	Coarse	Ch 3
4	+3	Coarse	Ch 4
5	+4	Coarse	Ch 5
6	+5	Coarse	Ch 6

Personality 2 – Intermediate (vector)

This personality adds to the functionality of the basic personality, providing a means of achieving smoother dimming. DMX₅₁₂ is limited to a refresh rate of 44HZ as it services all 512 channels 44 times per second. Vector mode removes this limitation by handing over fading to the SLAMMO V6 which increase the refresh rate (fade updates) to 100Hz. (This should not be confused with the on/off frequency of the LEDs). The following table describes the function for each DMX₅₁₂ channel that the SLAMMO V6 listens to for the intermediate personality:

DMX channel if Start Address is DMX Channel 1	Personality 2		
	Offset from Start Address	Channel name	Output
1	+ 0	Coarse	Ch 1
2	+ 1	Vector	Ch 1
3	+ 2	Coarse	Ch 2
4	+ 3	Vector	Ch 2
5	+ 4	Coarse	Ch 3
6	+ 5	Vector	Ch 3
7	+6	Coarse	Ch 4
8	+7	Vector	Ch 4
9	+8	Coarse	Ch 5
10	+9	Vector	Ch 5
11	+10	Coarse	Ch 6
12	+11	Vector	Ch 6

This personality allows for an individual DMX₅₁₂ channel for the vector control of each output. For a global vector mode that allows a single DMX₅₁₂ channel for the vector control of all four outputs, refer to Personality 4 overleaf.

Personality 3 – Advanced

This personality adds to the functionality of the intermediate personality, providing another means of achieving smoother dimming, allowing either vector mode or coarse (8 bit) and fine (16 bit) dimming. The following table describes the function for each DMX₅₁₂ channel that the SLAMMO V6 listens to for the advanced personality:

DMX channel if Start Address is DMX Channel 1	Personality 3		
	Offset from Start Address	Channel name	Output
1	+ 0	Coarse	Ch 1
2	+ 1	Fine	Ch 1
3	+ 2	Vector	Ch 1
4	+ 3	Coarse	Ch 2
5	+ 4	Fine	Ch 2
6	+ 5	Vector	Ch 2
7	+ 6	Coarse	Ch 3
8	+ 7	Fine	Ch 3
9	+ 8	Vector	Ch 3
10	+ 9	Coarse	Ch 4
11	+ 10	Fine	Ch 4
12	+ 11	Vector	Ch 4
13	+ 12	Coarse	Ch 5
14	+ 13	Fine	Ch 5
15	+ 14	Vector	Ch 5
16	+ 15	Coarse	Ch 6
17	+ 16	Fine	Ch 6
18	+ 17	Vector	Ch 6

Personality 4 – Basic with Global Vector

This personality adds to the functionality of the basic personality, providing a means of achieving smoother dimming like Personality 2 but with less control channels required (7 instead of 12). DMX₅₁₂ is limited to a refresh rate of 44Hz as it services all 512 channels 44 times per second. Vector mode removes this limitation by handing over fading to the SLAMMO V6 which increase the refresh rate (fade updates) from 44Hz to 100Hz. The following table describes the function for each DMX₅₁₂ channel that the SLAMMO V6 listens to for the intermediate personality:

Personality 4			
DMX channel if Start Address is DMX Channel 1	Offset from Start Address	Channel name	Output
1	+ 0	Coarse	Ch 1
2	+ 1	Coarse	Ch 2
3	+ 2	Coarse	Ch 3
4	+ 3	Coarse	Ch 4
5	+ 4	Coarse	Ch 5
6	+ 5	Coarse	Ch 6
7	+ 6	Vector	Ch ALL

Personality 5 – Smooth Dimming

This personality internally sets the vector mode to 0.5 seconds, allowing for a smooth transition while setting the level with 8-bit data.

Personality 5			
DMX channel if Start Address is DMX Channel 1	Offset from Start Address	Channel name	Output
1	+ 0	Coarse	Ch 1
2	+ 1	Coarse	Ch 2
3	+2	Coarse	Ch 3
4	+ 3	Coarse	Ch 4
5	+ 4	Coarse	Ch 5
6	+ 5	Coarse	Ch 6

Personality 6 – 16 Bit Dimming

This personality uses 2 DMX channels per output channel to allow for coarse and fine adjust

Personality 6			
DMX channel if Start Address is DMX Channel 1	Offset from Start Address	Channel name	Output
1	+ 0	Coarse	Ch 1
2	+ 1	Fine	Ch 1
3	+ 2	Coarse	Ch 2
4	+ 3	Fine	Ch 2
5	+ 4	Coarse	Ch 3
6	+ 5	Fine	Ch 3
7	+ 6	Coarse	Ch 4
8	+ 7	Fine	Ch 4
9	+ 8	Coarse	Ch 5
10	+ 9	Fine	Ch 5
11	+ 10	Coarse	Ch 6
12	+ 11	Fine	Ch 6

DMX512 Control Channel Functions

This section outlines the functionality for each of the DMX₅₁₂ channels that are available in the SLAMMO V6. Note that the number of channels that is available depends upon the current personality (see previous section).

Coarse Channel

This channel sets the current output intensity. It provides a 0-255 range of levels between 0% and 100% intensity. It is effectively '8-bit', and recommended only when the DMX₅₁₂ controller has limited functionality.

Fine Channel

This channel allows for greater control over the current output intensity. It provides up to a further 0-255 range of intensity levels between the current coarse output level and the next highest coarse output level. When dimming using the fine channel, the coarse and the fine levels should be treated as one value (ranging from 0-65535) and then split into two bytes when sending the DMX₅₁₂ levels. Not all controllers have this functionality (sometimes called 16-bit dimming).

Vector Channel

This channel allows the user to use a DMX₅₁₂ channel to determine the fadetime for the output intensity when the coarse and/or fine channels are changed. The following table outlines the functionality for different vector channel levels:

Channel level	Vector effect
0 – 5	No effect. Output will change as fast as the coarse/fine levels change.
5 – 255	Dimming rate is limited, ranging from fast (5) to slow (255). Exact rates of change are given in the next table.

The following table gives precise rates for each of the vector channel levels. Instead of specifying the rates in terms of something like output levels per second, the table shows how long it would take for the output intensity to change from 0% to 100% (or vice-versa), since this is typically a more useful way of describing the rates of change.

Channel level	Effective full-range time	Increments
0 – 5	Instant	
6 – 44	0.1s – 3.9s	0.1s
45 – 74	4s – 9.8s	0.2s
75 – 114	10s – 29.5s	0.5s
115 – 144	30s – 59s	1s
145 – 174	60s – 118s	2s
175 – 255	120s – 600s	6s

Example 1: You want to dim up over 1 second from 0 to 100% (ie the coarse channel changes from 0 to 255 and you want it to take 1 second). The vector channel would be **15** (falls in the range 0.1s – 3.9s which starts at 6, and it's 9 x 0.1s greater than 0.1s, which gives 6 + 9 = **15**).

Example 2: The coarse channel changes from a DMX₅₁₂ level of 201 to a level of 100 and you want it to take 30 seconds to dim down from 201 to 100. The table above provides times based on a change of 255 (0 to 100%), and you want to work out what vector level to use based on 201 – 100 = 101 out of 255. The closest equivalent in the table of full-range times would be 30 * (255/101) ≈ 76s, so the vector channel would be **153** (falls in the range 60s – 118s which starts at a level of 145, and it's 8 x 2s greater than 60s, which gives 145 + 8 = **153**).

RDM Interface

1 Introduction

Remote Device Management protocol support has been implemented in the Control Freak SLAMMO V6. This document describes specific aspects of the RDM implementation. This document should be read in conjunction with the RDM specification.

2 Commands Supported

The following RDM parameters are implemented by the SLAMMO

RDM Parameter ID	Value	RDM Parameter ID	Value
DISC_UNIQUE_BRANCH	0x0001	DEVICE_LABEL	0x0082
DISC_MUTE	0x0002	FACTORY_DEFAULTS	0x0090
DISC_UN_MUTE	0x0003	SOFTWARE_VERSION_LABEL	0x00C0
SUPPORTED_PARAMETERS	0x0050	DMX_PERSONALITY	0x00E0
PARAMETER_DESCRIPTION	0x0051	DMX_PERSONALITY_DESCRIPTION	0x00E1
DEVICE_INFO	0x0060	DMX_START_ADDRESS	0x00F0
DEVICE_MODEL_DESCRIPTION	0x0080	IDENTIFY_DEVICE	0x1000
MANUFACTURER_LABEL	0x0081		

Additionally, the SLAMMO supports the following non-standard RDM parameters:

RDM Parameter ID	GET Allowed	SET Allowed	Value
Device Mode	✓	✓	0x8000
Device Curve	✓	✓	0x8004
Device Output Type	✓	✓	0x800B
Device Invert	✓	✓	0x8006
Start-up Level	✓	✓	0x8008
Global Max	✓	✓	0x8009
Global Min	✓	✓	0x800A
PWM Dithering	✓	✓	0x800D

3 SLAMMO V6 RDM Specific Parameter Descriptions

3.1 Device Mode

Parameter ID **0x8000**. This parameter sets the operating mode the device will use when not manually selected. When requesting the device mode, the effective device mode is returned.

3.1.1 Get Device Mode

Controller:

(CC) GET_COMMAND	(PID) Device Mode = 0x8000	(PDL) 0x00
(PD) Not Present		

Responder:

(CC) GET_COMMAND_RESPONSE	(PID) Device Mode = 0x8000	(PDL) 0x01
(PD) BYTE[0] 0: DMX512 1: DALI		

3.1.2 Set Device Mode

Controller:

(CC) SET_COMMAND	(PID) Device Mode = 0x8000	(PDL) 0x01
(PD) BYTE[0] 0: DMX512 1: DALI		

Responder:

(CC) SET_COMMAND_RESPONSE	(PID) Device Mode = 0x8000	(PDL) 0x00
(PD) Not Present		

3.2 Device Curve

Parameter ID **0x8004**. This parameter sets the operating curve between linear and logarithmic. The default device mode is logarithmic.

3.2.1 Get Device Curve

Controller:

(CC) GET_COMMAND	(PID) Device Curve = 0x8004	(PDL) 0x00
(PD) 0: Channel		

Responder:

(CC) GET_COMMAND_RESPONSE	(PID) Device Curve = 0x8004	(PDL) 0x01
(PD) BYTE[0] 0: Logarithmic 1: Linear		

3.2.2 Set Device Curve

Controller:

(CC) SET_COMMAND	(PID) Device Curve = 0x8004	(PDL) 0x01
(PD) BYTE[0] 0: Channel BYTE[1] 0: Logarithmic, 1: Linear		

Responder:

(CC) SET_COMMAND_RESPONSE	(PID) Device Curve = 0x8004	(PDL) 0x00
(PD) Not Present		

To see the difference between the curves refer to Figure 1. Log and Linear Dimming Curves

3.3 Device Output Type

Parameter ID **0x800B**. This parameter sets the output type of the SLAMMO V6. The default mode is 6 DALI/DMX Addresses controlling 6 Individual Outputs. Note – This code has changed from the SLAMMO V5.

Output Type	Input	Output	Note
Normal	6	6 Individual	Normal Operation
Single	1	6 Together	Single Address controlling all outputs
Dual Channel	2	2 Triplets	Input 1 controls Output 1,3,5. Inputs 2 controls output 2,4,6
Tri Channel	3	3 Pairs	Input 1 controls Output 1,4. Inputs 2 controls output 2,5. Input 3 controls output 3,6.
RGBW	4		Channels 1, 2, 3, 4 Only (5 th and 6 th output is spare/idle). (Reduces number of DALI addresses to 4)
RGBWA	5		Channels 1, 2, 3, 4, 5 Only (6 th output is spare/idle). (Reduces number of DALI addresses to 5)
DT8 RGB	1		1 DALI Channel IN – Supports CCT, XY (RGB), RGBWAF, N DIM
DT8 RGBW	1		1 DALI Channel IN – Supports CCT, XY (RGBW), RGBWAF, N DIM

3.3.1 Get Output Type

Controller:

(CC) GET_COMMAND	(PID) Device Output Type = 0x800B	(PDL) 0x00
(PD) Not Present		

Responder:

(CC) GET_COMMAND_RESPONSE	(PID) Device Output Type = 0x800B	(PDL) 0x01
(PD) BYTE[0] 0: Normal Operation 1: Single Channel 2: Dual Channel 3: Tri Channel 4: RGBW, 5: RGBW, 6: DT8 RGB, 7: DT8 RGBW		

3.3.2 Set Device Output Type

Controller:

(CC) SET_COMMAND	(PID) Device Output Type = 0x800B	(PDL) 0x01
(PD) BYTE[0] 0: Normal Operation 1: Single Channel 2: Dual Channel 3: Tri Channel 4: RGBW, 5: RGBW		

Responder:

(CC) SET_COMMAND_RESPONSE	(PID) Device Output Type = 0x800B	(PDL) 0x00
(PD) Not Present		

3.4 Device Invert

Parameter ID **0x8006**. This parameter sets the device mode so that the outputs' PWM is inverted. This is for fixtures that requires flipped PWM – i.e. 0 for 100% Brightness, and PWM of 100% for 0% Brightness.

3.4.1 Get Device Invert

Controller:

(CC) GET_COMMAND	(PID) Device Invert = 0x8006	(PDL) 0x00
(PD) Not Present		

Responder:

(CC) GET_COMMAND_RESPONSE	(PID) Device Invert = 0x8006	(PDL) 0x01
(PD) BYTE[0] 0: Normal 1: Inverted		

3.4.2 Set Device Invert

Controller:

(CC) SET_COMMAND	(PID) Device Invert = 0x8006	(PDL) 0x01
(PD) BYTE[0] 0: Normal, 1: Inverted		

Responder:

(CC) SET_COMMAND_RESPONSE	(PID) Device Invert = 0x8006	(PDL) 0x00
(PD) Not Present		

3.5 Device Start-up Level

Parameter ID **0x8008**. This parameter sets the device start-up mode for DMX. The default start-up for DMX is all channels off, however this can be set to any level from 0-254, with 255 as 'last level'.

3.5.1 Get Device Start-up

Controller:

(CC) GET_COMMAND	(PID) Device Start Up = 0x8008	(PDL) 0x00
(PD) Not Present		

Responder:

(CC) GET_COMMAND_RESPONSE	(PID) Device Start Up = 0x8008	(PDL) 0x01
(PD) BYTE[0] 0-254: Level Set. 255: Resume last level received		

3.5.2 Set Device Start-up

Controller:

(CC) SET_COMMAND	(PID) Device Invert = 0x8008	(PDL) 0x01
(PD) BYTE[0] Current Set Level		

Responder:

(CC) SET_COMMAND_RESPONSE	(PID) Device Invert = 0x8008	(PDL) 0x00
(PD) Not Present		

3.6 Device Global Max

Parameter ID **0x8009**. This parameter sets the global device maximum. No channel will be set above the global maximum.

3.6.1 Get Device Max

Controller:

(CC) GET_COMMAND	(PID) Device Invert = 0x8009	(PDL) 0x00
(PD) Not Present		

Responder:

(CC) GET_COMMAND_RESPONSE	(PID) Device Invert = 0x8009	(PDL) 0x01
(PD) BYTE[0] 0-255 – Global Max		

3.6.2 Set Device Max

Controller:

(CC) SET_COMMAND	(PID) Device Invert = 0x8009	(PDL) 0x01
(PD) BYTE[0] Global Max Level		

Responder:

(CC) SET_COMMAND_RESPONSE	(PID) Device Invert = 0x8009	(PDL) 0x00
(PD) Not Present		

3.7 Device Global Min

Parameter ID **0x800A**. This parameter sets the device global minimum. The minimum is the lowest output from the SLAMMO before switching to OFF. This can be used for LED which does not perform at lower voltages.

3.7.1 Get Device Min

Controller:

(CC) GET_COMMAND	(PID) Device Invert = 0x800A	(PDL) 0x00
(PD) Not Present		

Responder:

(CC) GET_COMMAND_RESPONSE	(PID) Device Invert = 0x800A	(PDL) 0x01
(PD) BYTE[0] 0-255 – Global Min		

3.7.2 Set Device Min

Controller:

(CC) SET_COMMAND	(PID) Device Invert = 0x800A	(PDL) 0x01
(PD) BYTE[0] Global Min Level		

Responder:

(CC) SET_COMMAND_RESPONSE	(PID) Device Invert = 0x800A	(PDL) 0x00
(PD) Not Present		

3.8 PWM Dithering

Parameter ID **0x8007**. This parameter changes the output frequency generation mode. Dithering is a technique to increase the resolution of the output channel by modulating the output wave at a lower frequency. The result is a higher resolution with the same frequency. This can provide smoother dimming, but may not look as good depending on the application.

3.8.1 Get PWM Dithering

Controller:

(CC) GET_COMMAND	(PID) Device Dither = 0x8007	(PDL) 0x00
(PD) Not Present		

Responder:

(CC) GET_COMMAND_RESPONSE	(PID) Device Invert = 0x8007	(PDL) 0x01
(PD) BYTE[0] 0: Dithering Disabled 1: Dithering Enabled		

3.8.2 Set PWM Dithering

Controller:

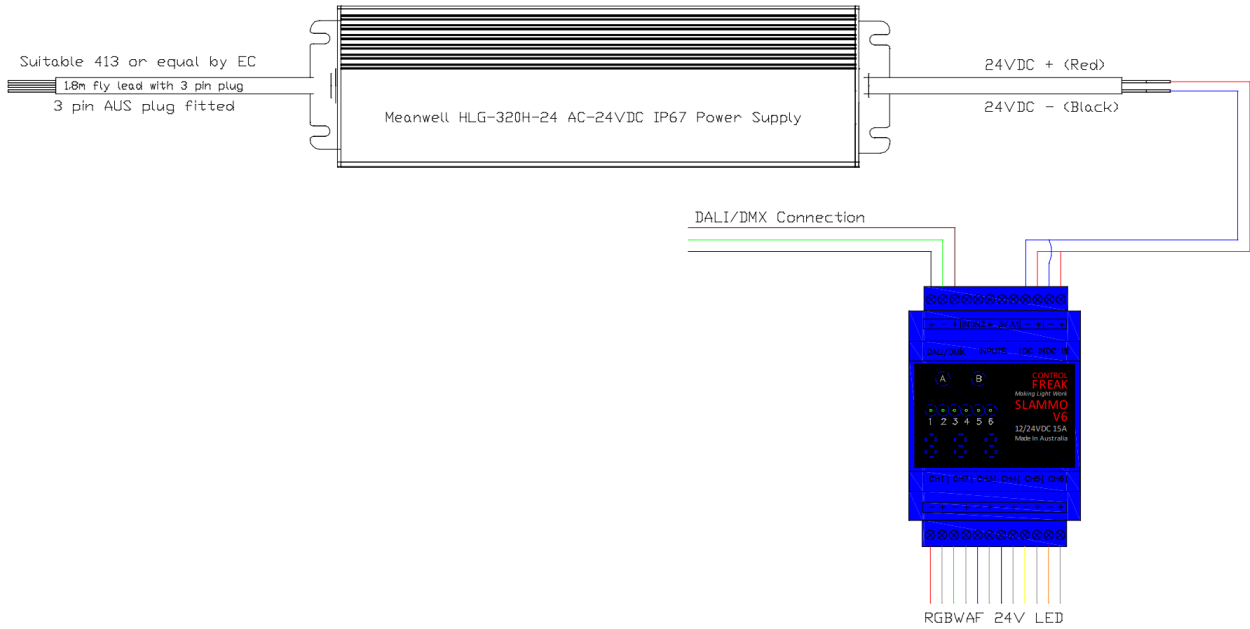
(CC) SET_COMMAND	(PID) Device Invert = 0x8007	(PDL) 0x01
(PD) BYTE[0] 0: Dithering Disabled, 1: Dithering Enabled		

Responder:

(CC) SET_COMMAND_RESPONSE	(PID) Device Invert = 0x8007	(PDL) 0x00
(PD) Not Present		

Electrical Connections

Always ensure that output cables are sized to minimise voltage drop. A VDC drop of <1VDC is recommended, 0.5VDC max preferred.



Specifications

Description	Details
Dimming Type	Pulse width modulation suits common anode bias-resisted LEDs
Physical	
Size (l) x (w) x (h) mm	71mm x 108mm x 60mm (With Terminal Blocks Installed)
Weight (kg)	~165g
Power	
DC Input	7-24V _{DC} match to requirement of LEDs
DC Output	7-24V _{DC} dependent upon input voltage.
Maximum load	In <40 degC max environments (de-rate for hotter environments): 360W @ 24V, 180W @ 12V NOTE: The power supply must be CISPR15/EN55015 compliant. Allow to derate the power supply to suit the LED inrush current (as a general rule, a minimum of 15% derating is recommended for Meanwell HLG series power supplies)
Protection	Immune from accidental DC input reversal 500mA self-resetting polyfuse to DC input Transient protection to DMX transceiver and DC input DALI: Over-voltage /spike protection and mains overvoltage
Data Protocols	DALI OR DMX512 & RDM (auto-sensing of modular daughterboard fitted)
Site considerations – important!	Ensure that adequate air movement and or cooling is provided to maintain SLAMMO V6 board temperature at or below 70°C
EMC	Complies with CISPR15. CE. RCM FCC

Warranty

Control Freak Products Warranty

Congratulations on acquiring this genuine Control Freak® product (“the product”) which is guaranteed to the purchaser for a period of 24 months from the date of original purchase from Creative Lighting and its authorised agents and distributors under this Warranty. The date of original purchase will be as shown on the authorised agents’ / distributors’ invoice / receipt provided to you when you first purchased the product, and you will need to retain this information in order to substantiate your date of purchase in the event that you need to make a warranty claim. Under normal use and for applications for which this product was designed, this Control Freak® product and all component electronics are warranted to be free of defects in material and workmanship. In the unlikely event that the product proves to be defective, Creative Lighting will decide either to repair or to replace the defective components. Before that can happen, the product must first be returned to Creative Lighting at the purchaser’s cost. Liability for goods in transit shall be with the shipping party. Important note: Your authorised distributor or agent can assist you to confirm whether your product is defective or not. As the Control Freak products are uniquely designed to work with a wide variety of third-party products and their correct operation can be dependent upon the correct working operation of such third-party products, as well as being dependent upon the correct user programming of the product in order to work with such third party device(s) where applicable, please ensure that you have properly installed and checked such items, field devices, any other peripherals and your programming to ensure that they are all working properly before pursuing a claim under this Warranty. This Warranty specifically excludes faults which arise as a result of alteration, tampering, misuse, abuse, accident, vandalism, negligence, improper installation, or the use of other manufacturer’s products in combination with the product except where such use of other manufacturers’ goods is authorized by us. All other warranties inclusive of any warranties of merchantability or fitness for any particular purpose whether expressed or implied are hereby expressly negated to the fullest extent permissible by law. Under no circumstances will Creative Lighting be liable for reinstallation or freight except in the case of freight within Australia. In no event shall the manufacturer be liable for consequential damages. This Warranty constitutes the sole and exclusive remedy to the purchaser for proven defects, all other obligations and liabilities are expressly excluded to the full extent permitted by law. Australia only: If we determine that the product is defective, we will not only repair or replace the defective components at no cost to the purchaser; we will also pay the cost to return them to the purchaser by our standard freight method, with any cost to reinstall the product borne by the purchaser. In Australia, you are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure as defined in the Australian Consumer Law. Nothing in this warranty purports to modify or exclude the conditions, warranties and undertakings, and other legal rights, under the Australian Competition and Consumer Act and other Australian laws. International: Please contact your supplier for technical support and instructions in relation to warranty claims.