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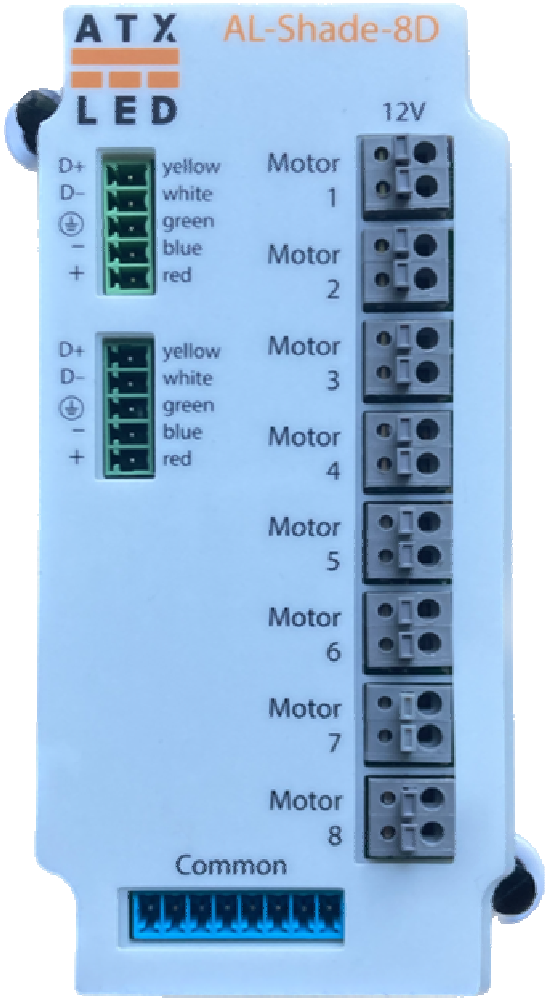
8 Channel Shade Motor Control

AL-Shade-8



Product Description - SML format Shade Motor driver for 8 channels

This product will drive 12v and 24v motors, forward and reverse

- up to 8 2 wire motor controls (Forward voltage, Reversed voltage, Off)
- can also support 8 3 wire motors (Voltage A to ground, Voltage B to ground)
- 800 mAmp per output for one or multiple motors
- Adjustable voltage – to allow speed control
- Pass-thru power from AL-PSE devices
- One DALI control address, up to 8 DALI individual Addresses
- Auto range detection (Shade fully up, fully down, time to travel)
- "level" of 0-100% sets % of Shade total travel

DALI interface for proven reliability, Works with any DALI master

Uses the robust and proven DALI bus for controls Supported by the ATX LED Hub with ZWD

Specifications

Power requirements	Up to 12 watts
Input Voltage (DALI bus)	44-54 volts
Power consumption	20 milliwatts
Protection	Reverse protection and static protection on all pins
Operating Temperature	0°C ~ 50°C
Size	70 mm x 147mm x 30mm plus 2x 10mm interleaving tabs
Receive Addressing	DALI master assigns the address
Transmit addressing	DALI standard 8 and 16 bits.
DALI BUS interface	DA Bus In and Out – 300 mA max
Connectors	Wago 714-105 or KF12EKN-5P
UPC code	850037589258

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Powering the AL-Shade-8

Pass thru the power from an AL-PSE before it goes to wall switches. A 5 pin jumper is required.

Display LEDs

Each output has 2 LEDs that will shine as the motor is being driven forward or backwards

2-Wire Motor Drive method

Each of the 8 outputs has 2 push / pull drivers – setting the top driver to +12v and the bottom driver to gnd, is intended to be motor up. Setting the top driver to Gnd and the bottom driver to +12v, is intended to be motor down. Setting both the same voltage or both off – results in to motor activity. Once the motor hits the limit stop, current flow is interrupted and by measuring the run time between top and bottom we can implement position management. The output voltage is 12v by default – it can be 8 to 24v.

3-Wire Motor Drive method

Each of the 8 outputs has 2 push / pull drivers – setting the top driver to +12v and the bottom driver to gnd, is intended to be motor up. Setting the top driver to Gnd and the bottom driver to +12v, is intended to be motor down. Setting both the same voltage or both off – results in to motor activity. Once the motor hits the limit stop, current flow is interrupted and by measuring the run time between top and bottom we can implement position management.

DALI Operation – Base Address

Using any DALI master, assign the AL-Shade-8 a DALI address. This is not the address of the motors, this is the address of the module that controls the motors. At this address the following functions are supported

- Change the address of each motor (single only, broadcast not supported)
- Set the operating mode of each motor
- reset the device to defaults

The device responds to the provisioning commands from a DALI controller. In order for individual addressable functions to work, a 'short' address [0 thru 63] needs to be assigned. This can be done by a DALI Master such as the ATX LED Hub. Once a short address is assigned – the device can be understood to operate as nine devices in one. The DALI bus address is only used to write and store configuration commands, the 8 additional addresses can be assigned as needed. A DALI master can write the configuration commands using the DALI write user memory commands.

DALI Operation – Simple Motor Programming

- After the Base address is assigned a Short DALI Address (SA), the user can program each motor as needed. Example: if the base address is 20, then the #1 output responds to SA 20 by default, the other motors are not assigned.

These individual motor functions can be changed on a per motor basis. You can set any individual address, in any order to any motor.

The # of attached motors will be detected automatically.

DALI Operation – values learned from Drivers

When Power is applied, each output that has an unknown attached device state, will be tested for the presence of a motor. This can be read back by the DALI bus. If a new device is detected, it will be calibrated.

Advanced Individual Motor Programming

Using memory Bank 0, locations 21 thru 36 addressed by the DALI protocol in the AL-Shade-8, we can assign a function and address to each motor. A motor has a number between 1 and 8.

Memory Locations in the memory bank 0 – Table 1

Motor #	Mode – Table 2	Address - Table 3	Readback
1	21	22	37
2	23	24	39
3	25	26	41
4	27	28	43
5	29	30	45
6	31	32	47
7	33	34	49
8	35	36	51

Mode Bits – Table 2

7	6	5	4	3	2	1	0
		Direction	Motor Mode	N/A	N/A	Group	Single address
						1 = enable 0 = disable	1 = enable 0 = disable
			0	2 Wire (default)			
			1	3 Wire			
		0		Default			
		1		Reverse direction (to allow for installation variances)			
	1			ReRun travel length determination – auto calibrate			

Destination Address – Table 3

Mode	7	6	5	4	3	2	1	0
Single	0	0	SA5	SA4	SA3	SA2	SA1	SA0
Group	0	0	0	0	G3	G2	G1	G0

- **Single** means a motor has one Address 0-63.
  Group means an output is a member of a group 0-15

2 Wire vs 3 Wire

Select 2 wire for motors with 2 wire leads – the AL-Shade-8 will operate up and down as needed by reversing the polarity of the power.

Select 3 wire for motors with 3 wire leads – the AL-Shade-8 will apply up to one side, down to the other, with common as the minus voltage

If the installer reversed a wire pair – use the Reverse option to fix that.

Readback Values

Each motor control has a 2 status bytes.

odd byte (eg 21) is the run time in seconds from top to bottom = 255 means no motor found
even byte (eg 22) is the status:

Bit	7	6	5	4	3	2	1	0
Function	Up OK	Down OK	0	0	P	P	P	P

P = Position now.

0 = Bottom
1-9 = approximate level
10 = top

UP OK = Up Motor Detected
Down OK = Down Motor Detected

Setting Position

Use the ARC level set command to set the Position. 100% is top (open), 0 is down (Closed), and between 1 and 99 is the approximate level.

Setting Motor Voltage and Sequence

The DALI max and min levels are used to set the max voltage of the motor and the minimum voltage – all 8 must be the same. Default is 8 volts min and 12 volts max. You can also set 24v as the max. Note – if the hardware detects excessive current above 12v – it will enter current limiting mode – default current is 1.5 amps at 12v. To reduce the max power for the shades, the motors can be set to operate sequentially or all at the same time. Use command 46. In sequential mode, only one motor can operate at a time, the others will be queued waiting to run. Or, all can be run at the same time. If the value is 2 to 8, that is the number of motors to run at once, 15 represents all. Default is 0.

DALI Commands Supported by the AL-SHADE-8 at it's own short address

			DTR value
ARC		ARC level 0-254	
	32	Reset to defaults (don't change Short Address)	
	42	Set all 8 motors to this Max level	0 – 254 = 0 to 25.4 volts
	43	Set all 8 motors to this Min level	0 – 254 = 0 to 25.4 volts
			0 - 8 – sequential
	46	Store DTR as the Motor sequence.	15 – all at same time
	47	Store DTR as the max Current for all motors	0 – 200 = 0 to 2000 mA
	128	Set Short Address	
	129	Enable Memory Write	
	144	Read Status	
	145	Ping address	255
	147	Query On/Off of motor # from DTReg2	
	149	Query reset state	
	150	Query missing short address	255 is missing
	151	Dali Version	1
	152	Read current DTReg	
	153	Query DALI ballast type supported	6
	155	Query power fail status	255 if rebooted
	156	Query DTReg1	
	157	Query DTReg2	
	161	Query Max level global Motor	
	162	Query Min level global Motor	
	165	Query max current reached	
	166	ATX LED HW Type	11
	194/5/6	Query Random High/Middle/Low bits	
	197	Query Memory Bank	address DTR1:DTR
A1	256	Terminate	
A3	257	Set DTR	
A5	258	Initial Addressing Mode	
A7	259	Randomize	
A9	260	Compare Random Address	
AB	261	Withdraw from Random Addressing	
	264 / 265 266	Set High / Middle / Low Byte	B1, B3, B5
B7	267	Set Short Address if match	
B9	268	Query Short Address	
BB	269	Query Long Address Match	
C3	273 / 274	Set DTReg1 / DTReg2	
C7	275	Write Data at Memory Bank DTR1:DTR	Send Confirm
C9	276	Write Data at Memory Bank DTR1:DTR	No Response

Memory Bank 0

Address	Bank 0 Name	Bank 0 Value
0	Bytes per Bank (minus 1)	63
1	Checksum	Calculated
2	Number of Banks (minus 1)	3
3	UPC code – msb	722512406476
4	UPC code	
5	UPC code	
6	UPC code	
7	UPC code	
8	UPC code – lsb	
9	FW Version	
10	HW Version	
11	Serial Number – msb	Assigned by Master
12	Serial Number	
13	Serial Number	
14	Serial Number – lsb	
21-44	Motor Mode	See table
45-63	User data	

Memory Bank 1-3

Address	Name	Value
0	Bytes per Bank (minus 1)	63
1	Checksum	Calculated
2	Number of Banks (minus 1)	3
3-63	User Storage	

Memory Bank 4

Address	Name	Value
3	Up Time	Hours (LSB)
4	Up Time	Hours (MSB)

Advanced individual Motor Modes

DALI bus Commands interpreted at addresses/groups assigned to motors
allows sync'd and expected actions on motor presses.

	ARC	Execute ARC Level as the Position
	33	Save level in DTReg

Major Revision Changes

Version	New Feature	Previous Action