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Multi Button multi function Wall Switch

AL-WS-8B



Product Description - wall switch with up to 8 buttons

This wall switch has these applications

- up to 8 individual fixtures can be controlled
- up to 8 groups can be controlled
- up to 8 scenes can be recalled.
- the above can be mixed
- using our ZWD software package – each button can be configured to “trigger” complex actions
- On / Off / Dimming is supported

On-Add to the Legrand Wattstopper switch with momentary action

Once the AL-WS-8B has received an address from the DALI bus, each button will send its address when pushed. Press and release to change On -> Off or Off -> On. Press and hold to dim.

Virtual 3-way supported.

Each button recalls the state of the associated individual address or group. Therefore proper On and Off controls will be sent.

DALI interface for proven reliability, Works with any DALI master

Uses the robust and proven DALI bus for controls Address, Group, Scene assignment is possible with any DALI configuration tool.

1, 2, 3, 4 and 8 button options, OEM Option, Relay Option

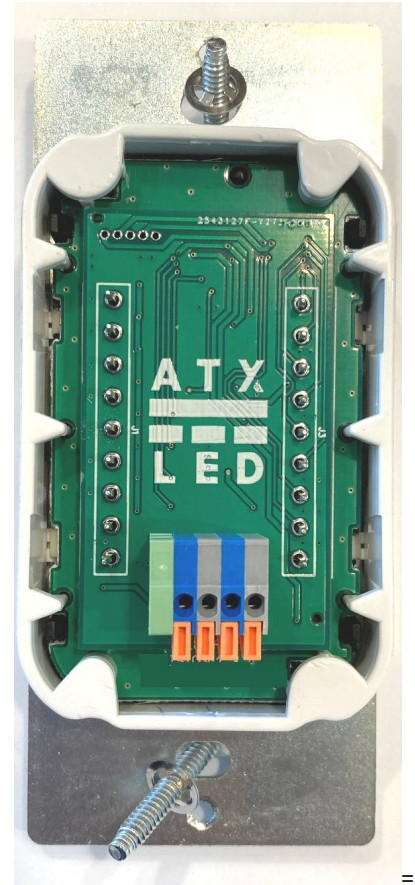
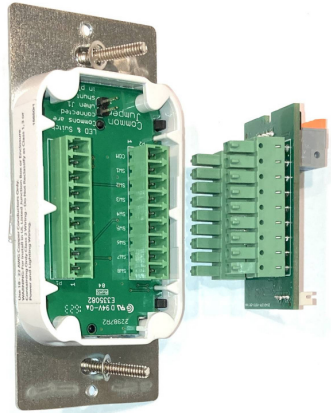
Any Legrand LVSW switch can be converted to DALI operation with our device. The device is available also without the LVSW switch. Please see the AL-DA-IO16 for general purpose relay operation.

Dimming operation

Press and hold to dim. Dimming level stored for next use..

Specifications with Legrand LVSW

Power requirements	DA pins - DALI bus – 8 ma max (all LEDs on)
Input Voltage (DALI bus)	14 to 24 volts – (DALI Bus)
Power consumption	120 milliwatts @ 15 volts (all leds on)
Protection	Reverse protection and static protection on all pins
Static Electricity	Ground Metal plate to protect from Static Discharge – please ground it.
Operating Temperature	0°C ~ 50°C
Size	108H (metal) 70H x 34 D x 42 W mm
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 AWG 18-24 gauge wire, spring terminals
Connectors	KF141V type – color coded



Powering the AL-WS-8B

Power the switch via the DA pins, it needs about 1.5 mA to operate, plus about 2 mA for each LED that is fully on, minimum 13 volts. Connect your powered DALI bus to the DA Gray and Blue pins (polarity is not significant). Our implementation allows multiple masters – we use collision detection to avoid conflicts on the bus.

Buttons on the AL-WS-8B

Each button can be assigned an individual function – see the commands shown below. You can set individual, group, scene or broadcast actions to each button. You can also change the buttons to simply send their On/Off status. By default – all buttons operate in Broadcast mode.

Display LEDs on the AL-WS-8B

Each LED can be controlled using the DALI address of the button. By default, these LEDs stay on for 4 seconds after a button is pressed, at the brightness of the destination driver.

Relay option: AL-DA-IO16 (sml version)

See our AL-DA-IO16 in the structured media enclosure sml© case. This allows a voltage or contact to be monitored, and a relay output to be activated

DALI Operation – Base Address

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

- Set LED on time in seconds, including always ON
- Set LED brightness including OFF
- Change from default sequential address to sequential group
- Set the operating mode of each button
- Change the address of each button
- reset the device to defaults

The device responds to the provisioning commands from a DALI controller. In order for individual, scenes and group 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 Bus. Once a short address is assigned – the device can be understood to operate as nine devices in one. This is only used to write and store configuration commands. A DALI master can write the configuration commands using the DALI write user memory commands.

DALI Operation – Button Example

Each buttons mode can be can be changed – for example:

- 1) top left button is broadcast ON (dim up) and next one down is broadcast Off (dim down)
- 2) top right button is ON for address 3, pres to dim up. Button below that is OFF for address 3, press to dim down.
- 3) next 2 rows are group 0 and 1 (On, Off, dim)
- 3) the bottom two are left = scene 0 recall and right is scene 1 recall

DALI Operation – Simple Button Programming

After the Base address is assigned a Short DALI Address, buttons 1 to 8 are set to generate sequential addresses up from the base address +1. On, Off, and press to dim is supported. If the base is 20, then the top left transmits to SA 21, the bottom right to SA 28. If this is acceptable to you – nothing more needs to be done.

Assigning the base address to a group, will cause the buttons to be programmed to that group number + n. A 4 button switch, with the base set to group 5, will assign button 1 to group 5, 2 to 6, 3 to 7 and 4 to 8.

These individual button functions can be changed on a per button basis – no sequence is required. You can set any individual address, group DALI address or a unique Scene recall function, in any order to any button.

DALI Operation – values learned from Drivers

At the first time a button is pressed (after power up, or when the address is changed) the AL-WS-8B will read the Minimum and Maximum dim levels, the current level, and the group associations from the driver at each address to learn the range for the dimming function. The level at that address is saved for the next dimming action starting point.

Advanced DALI Operation – paired Button Programming

In 2 button per address mode – Buttons 1, 3, 5, 7 can be assigned as UP only (with Dim Up only), while buttons 2, 4, 6, 8 can be assigned as Off (with dim down only). This is called the Pairwise setting.

Advanced Individual Button Programming

Using memory locations 21 thru 36 addressed by the DALI protocol in the AL-WS-8B, we can assign a function and address to each button and LED. A button has a number (btn) between 1 and 8. If only one button is set to an address – then the button is in single button mode (On/Off toggle, Press to dim down, then up: If two buttons are set to an address, then one is On/Up dim and the other is Off / Down dim.

Mode Bits: (bank address 19 + button*2)

7	6	5	4	3	2	1	0
Momentary	LED Mode A	LED Mode B	Pairwise / Vacancy	Send Broadcast	Send Scene	Send Group	Send Single

Momentary	Pairwise/ Vacancy	Function
0	0	For use with On/Off switches
0	1	When input goes from 0->1, ignored: each 1->0 transition re-triggers a turn off after 20 seconds of no activity
1	0	For use with LVSW switches, up to 8 toggle push buttons
1	1	Odd numbered buttons press to turn ON – hold to dim up. Even numbered buttons press to turn OFF – hold to dim down

Led Mode	Led On/ Off	Dimming	On Time
A=0, B=0	Off	-	-
A=0, B=1	Dimmable	Individual	DALI command 46*
A=1, B=0	Dimmable	Global	DALI command 46*
A=1, B=1	On/OFF	-	DALI command 46*
* when set to 15 – LED matches Address On/Off , otherwise the ON time is according to DALI standards.			

Address: (bank address 20 + button*2)

7	6	5	4	3	2	1	0
		SA5	SA4	SA3	SA2	SA1	SA0
				G3	G2	G1	G0
				S3	S2	S1	S0

Virtual 3-Way Operation

The Virtual method listens to DALI bus traffic in the same short or group address. Using the Virtual method just means that each AL-WS-8B will use the existing On/Off state of the driver before sending an On/Off command when a button is pressed. The result allows unlimited numbers of switches to dim and control a common light. All ATX LED switches support Virtual 3-way.

The level recorded is either the level sent to the short address of the button, or to a group containing that short address.

Push Button vs On/Off mode

Most users should use Push Button Toggle mode. This supports 3-Way and other features.

If you prefer that the buttons are controlled by your DALI master instead of by the logic in the switch – then disable the push button toggle mode – each switch will send a DALI ARC level command of 0 or non-zero for off and On. The non-zero value will be the last ARC level sent to that address. When Push Button mode is disabled (On/Off) mode – the buttons do not control the LED outputs directly. the LED outputs respond only to ARC commands from the DALI bus.

LED timeouts on the AL-WS-8B

Each button has an LED. These default to be set to display the brightness of the LED driver at that address. The ON time is programmable, default is 4 seconds – then the LED turns off. Set the DALI command “Fade Time” using the base address to set the ON time. See Brightness for ON/Off/Dim levels.

LED brightness modes

There are 4 brightness options in addition to the On time option. The brightness is controlled by PWM to the LED at a rate of 125 Hz with 8 steps. The On time is defined by the DALI Fade Time command.

- The LEDs can be set to be OFF all the time
- Local mode - The brightness of the LED will track the levels sent by the button to the destination address, or by the ARC level sent by a DALI master to the address or group assigned to the button.
- Common mode - ALL LEDs can be set to a common brightness level defined by the level sent to the base address
- The LEDs can be On/Off only without dimming

Note: the LEDs will follow the state of the button inputs in momentary mode only. If the AL-WS-8B-OEM is used in rocker mode – the LEDs will not track the input switches – send level commands to that DALI address to control the outputs.

AL-DA-IO16 Relay output, USB input device

The AL-DA-IO16 version has 8 Relay contacts instead of 8 LEDs. This device has 60 volt, AC/DC outputs that are available in On/Off or PWM mode – it has 8 USB inputs connectors to detect voltage or a switch contact. It will send ARC On/Off levels to the DALI bus, and the Relay outputs are controlled by DALI ARC commands.

There are two versions – both support 60 volt, AC/DC loads

- AL-DA-IO16 – this has 8 high speed PWM capable 300 mA outputs using the TLP172
- AL-DA-Relay8 – this has 8 high power 1 amp On/Off outputs using the Panasonic AQT212GS

In the IO16 model – the input micro USB connector can be used either to detect +5v power on pins 1 and 5, or to detect a contact between pins 3 and 5.

DALI Commands Supported Base Address

Notes: * = must be sent twice in 100ms,

ARC	ARC level 0-254		See LED brightness if Global
32	Reset to defaults (don't change Short Address)		
42	Set all 8 buttons to this Max level		Default 254
43	Set all 8 buttons to this Min level		Default 0
46	Set LED On Time in seconds (See DALI fade time table)		0= Off, 15 = always on
47	Set Vacancy Detection time (DALI fade time table, x 40)		0 to 3600 seconds
128	Set Short Address		
129	Enable Memory Write		
144	Read Status		
145	Ping address	255	
147	Query On/Off of button # 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		
160	Query ARC Level global LED		
161	Query Max level global LED		
162	Query Min level global LED		
165	Query LED On Time and Vacancy time		Bits 0-3 = Vacancy
166	ATX LED HW Type	10	Bits 4-7 = LED
192	Query Group 0-7 for Global LED control		
193	Query Group 8-15 for Global LED control		
194/5/6	Query Random High/Middle/Low bits		
197	Query Memory Bank address DTR1:DTR		
	Global DALI commands		Hex
256	Terminate		A1
257	Set DTR		A3
258	Initial Addressing Mode		A5
259	Randomize		A7
260	Compare Random Address		A9
261	Withdraw from Random Addressing		AB
264 / 265 266	Set High / Middle / Low Byte		B1
267	Set Short Address if match		B7
268	Query Short Address		B9
269	Query Long Address Match		BB
273 / 274	Set DTReg1 / DTReg2		C3
275	Write Data at Memory Bank DTR1:DTR	Send confirm	C7
276	Write Data at Memory Bank DTR1:DTR	no response	C9
96-111	Add to Group		For Global LED Control
112-127	Remove from Group		For Global LED Control

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	
16	# of buttons	1, 2, 3, 4, or 8
21-36	Button Mode	See table
37-63	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 (read only)

Address	Name	Value
3	Up Time	Hours / 256
4	Up Time	Hours (8 years max)

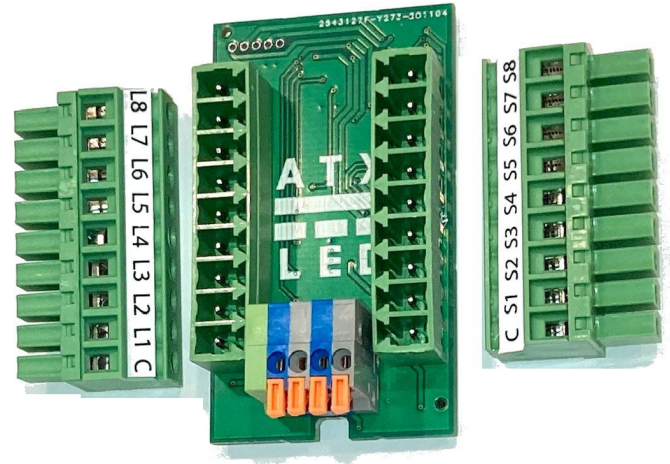
Advanced individual Button Modes

DALI Commands Supported at address/groups assigned to buttons

ARC	Copy ARC Level for 3-way processing for Address, Groups, Broadcast	
0	Status LED Off	
1	Status LED UP 8 steps	
2	Status LED Down 8 steps	
3	Status LED UP one step but don't turn on	
4	Status LED Down one step but not off	
5	Status LED Set to MAX level	
6	Status LED Set to Min level	
7	Status LED Down one step and Off if needed	
8	Status LED Up one step or on if needed	
33	Save level in DTReg	
42	Store DTR as new Max Level	
43	Store DTR as new Min Level	
96-111	Add to Group	For 3-way sync
112-127	Remove from Group	For 3-way sync
171	Query presence of AL-WS-8B at this address, report level	
257	Load DTR	

Ordering part numbers

Model	Number of Buttons
AL-WS-010v	1
AL-WS-2B	2
AL-WS-3B	3
AL-WS-4B	4
AL-WS-8B	8
AL-WS-DIY	8
AL-WS-8B-OEM	Module only
AL-DA-IO16	SML version
AL-DA-Relay8	SML – high current



AL-WS-8B-OEM

Size is 52 x 30 x 28

input: contacts

output: +12v 2 mA drivers