

0-10V Dimmer Engineering Specifications



The Dimmer based on Z-Wave™ Slave library of V7.16.03. This Dimmer integrated Z-Wave communication module to connect with Z-Wave gateway.

The Dimmer can be included and operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers and/or other applications. All non-battery operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network. The Dimmer is a security Z-Wave device (S2), so a security enabled controller is needed for take full advantage of all functionality for the Dimmer.

Features:

- Manual or Z-Wave Dimmer control with instant status updates.
- Installs behind your existing wall Dimmer (single pole or 3-way).
- 700 series Z-Wave chip for better range and faster control.
- Support new features for Z-Wave Long Range, including 4x wireless range, 10x node scalability for larger network.
- Scene control: trigger actions with multi-tap (select hubs only).
- Built-in Z-Wave timer functionality and signal repeater.
- Works with LED bulbs.
- SmartStart and S2 Security for a safer network.

1 Technical Specifications

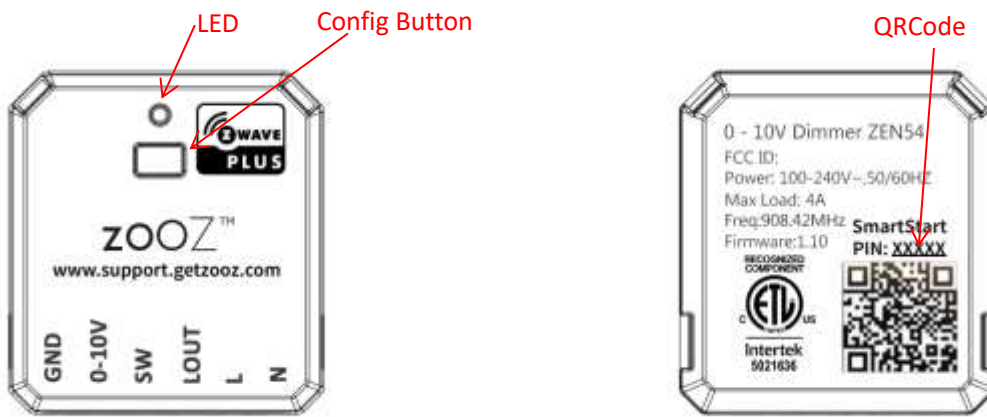
Model Number	ZEN54
Communication Protocol	Z-Wave
Radio Frequency	908.42MHz
Z-Wave LR Radio Frequency	912.00 MHz(default channel) 920.00 MHz(back up channel)
Wireless Range	Up to 300 feet line of sight
Input Voltage	100-240V~,50/60Hz
Max Load Current	4A
Operating Temperature	32-104° F (0-40° C)
Operating Humidity	Up to 85% non-condensing

2 Z-Wave Specifications

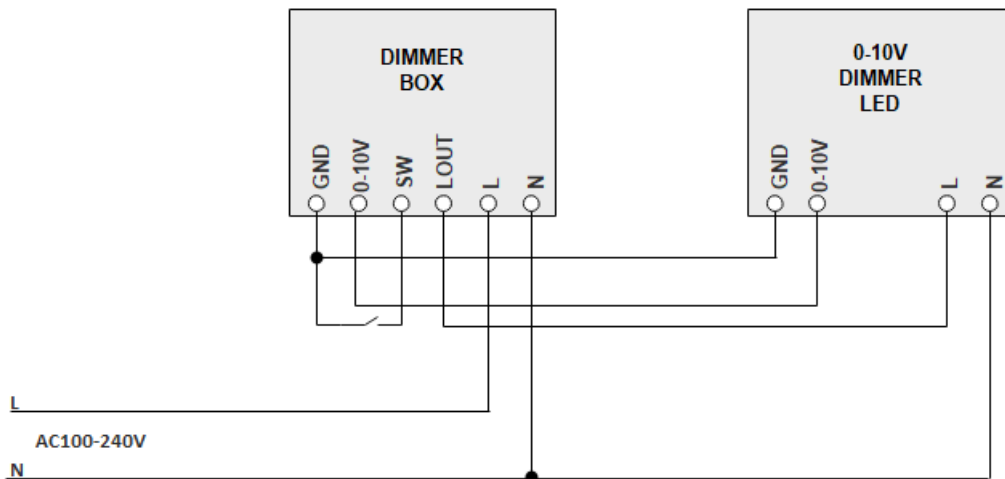
SDK Version	7.16.03
SDK Library	libZWWaveSlave
Explorer Frame Support	Yes

Routing	Yes
SmartStart	Yes
Device Type	Multilevel Switch
Basic Device Class	BASIC_TYPE_ROUTING_SLAVE
Generic Device Class	GENERIC_TYPE_SWITCH_MULTILEVEL
Specific Device Class	SPECIFIC_TYPE_NOT_USED
Role Type	Always On Slave (AOS)

3 Familiarize yourself with Dimmer



3.1 Installation



4 Security and non-Security features

This device is a security enabled Z-Wave Plus™ product that is able to use encrypted Z-Wave Plus messages to communicate to other security enabled Z-Wave Plus products.

When a node includes into a S2 Z-Wave network, the node supports S2 unauthenticated class, S2

authenticated and so do the supported CCs.

This product can be operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers. All mains operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

4.1 Supported Security Levels

- SECURITY_KEY_S2_AUTHENTICATED_BIT
- SECURITY_KEY_S2_UNAUTHENTICATED_BIT

4.2 Commands List

Command Classes	Version	Required Security Class
COMMAND_CLASS_ZWAVEPLUS_INFO_V2	2	None
COMMAND_CLASS_TRANSPORT_SERVICE_V2	2	None
COMMAND_CLASS_SECURITY_2_V1	1	None
COMMAND_CLASS_SUPERVISION_V1	1	None
COMMAND_CLASS_APPLICATION_STATUS_V1	1	None
COMMAND_CLASS_BASIC_V2	2	Highest granted Security Class
COMMAND_CLASS_SWITCH_MULTILEVEL_V4	4	Highest granted Security Class
COMMAND_CLASS_CONFIGURATION_V4	4	Highest granted Security Class
COMMAND_CLASS_ASSOCIATION_V2	2	Highest granted Security Class
COMMAND_CLASS_ASSOCIATION_GRP_INFO_V3	3	Highest granted Security Class
COMMAND_CLASS_VERSION_V3	3	Highest granted Security Class
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2	2	Highest granted Security Class
COMMAND_CLASS_DEVICE_RESET_LOCALLY_V1	1	Highest granted Security Class
COMMAND_CLASS_POWERLEVEL_V1	1	Highest granted Security Class
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V5	5	Highest granted Security Class
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3	3	Highest granted Security Class
COMMAND_CLASS_INDICATOR_V3	3	Highest granted Security Class

5 All functions of each trigger

5.1 SmartStart

SmartStart enabled products can be added into a Z-Wave network by scanning the Z-Wave QR Code present on the product with a controller providing SmartStart inclusion. No further action is

required and the SmartStart product will be added automatically within 10 minutes of being switched on in the network vicinity.

Add the Dimmer into the Z-Wave network via SmartStart (SmartStart Inclusion):

a. Add Dimmer DSK into the primary controller SmartStart Provisioning List (If you don't know how to do this, refer to its manual, DSK usually print on the main body).

b. Reconnect Power in the Dimmer.

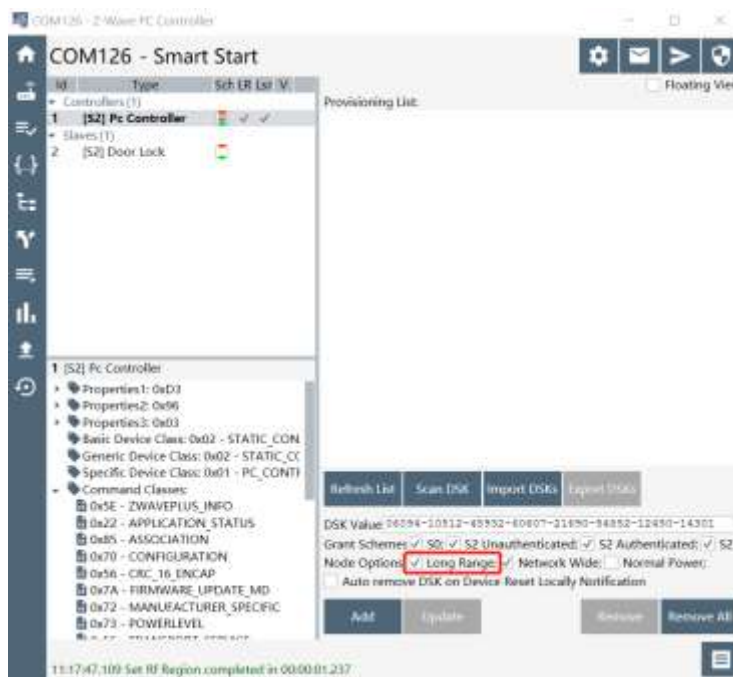
c. The Dimmer will send "Z-Wave protocol Command Class" frame to start SmartStart Inclusion.

LED will blink green during the inclusion, and then solid green for 2 seconds to indicate that the inclusion is successful, otherwise the LED will solid red for 2 seconds in which you need to repeat the process from step b

Note:

Z-Wave Long Range device can only support be included via SmartStart.

Extract the DSK from end device and paste it into the DSK Value in PC Controller, make sure the 'Long Range' option is ticked.



In the scanning process when using US_LR frequency, the end device will switch between 2 PHY setups, the classic US PHY and the LR PHY with both LR channels active. When the inclusion of end device starts, it will settle on using the PHY that was used by the controller for inclusion. In other words, during learn mode, a end node that support LR will send SmartStart Prime on both classic Z-Wave and Z-Wave LR PHY, both request are send up to the host on the controller and it is the host's responsibility to determine which PHY is used for inclusion.

The controller doesn't do channel scanning the same way as in end device. The controller will scan 4 channels, including 3 classic Z-Wave channels 9.6/40/100 kbps and 1 LR channel, using US_LR frequency will scan at 912 MHz while using US_LR_BACKUP will scan at 920 MHz during startup.

The active LR channel can be switch at runtime.

5.2 Power on

In the network:

LED Following load state.

Not in the network:

LED will keeps green slow blink and start SmartStart.

5.3 Short press Z-Wave Button three times

Add the Dimmer into the Z-Wave network (Manual Inclusion):

- a. Power on your **Dimmer**, set your Z-Wave controller into add/inclusion mode.
- b. Short press Z-Wave Button three times.
- c. LED will fast blink green during the inclusion, and then solid green for 2 seconds to indicate the inclusion is successful, otherwise the LED will solid red for 2 seconds in which you need to repeat the process form step a

Remove Dimmer from a Z-Wave network (Manual Exclusion):

- a. Power on your **Dimmer**, and let the Z-Wave primary controller into remove/exclusion mode.
- b. Short press Z-Wave Button three times.
- c. LED will fast blink green during the exclusion, and then solid green for 2 seconds to indicate that the exclusion is successful, otherwise the LED will solid red for 2 seconds in which you need to repeat the process form step a.

5.4 Reset Dimmer to factory default

Click Z-Wave button 2 times quickly, and hold for at least 15 seconds > LED start blinking quickly once tapped twice, then after 15s confirmed reset with 3 seconds. The Dimmer will reset itself to factory default by sending a "Device Reset Locally Notification" to gateway when the button is released.

Note: Please use this procedure only when the network primary controller is missing or otherwise inoperable.

6 Special Rule of Each Command

6.1 Basic Command Class

Basic CC is maps to Switch Multilevel CC

6.2 Z-Wave Plus Info Report Command Class

Z-Wave Plus Version: 0x02

Role Type: 0x05 (ZWAVEPLUS_INFO_REPORT_ROLE_TYPE_SLAVE_ALWAYS_ON)

Node Type: 0x00 (ZWAVEPLUS_INFO_REPORT_NODE_TYPE_ZWAVEPLUS_NODE)

Installer Icon Type: 0x1C00 (ICON_TYPE_GENERIC_DIMMER_WALL_SWITCH)

User Icon Type: 0x1C00 (ICON_TYPE_GENERIC_DIMMER_WALL_SWITCH)

6.3 Association Command Class

The Dimmer support 2 association groups and max 5 nodes.

Grouping Identifier	Max Nodes	Send Commands
Group 1(Lifeline)	0x05	1. Basic Report. Dimmer will send Basic Report(Configurable) when Switch status changed. 2. Switch Multilevel Report. Dimmer will send Switch Multilevel Report(Configurable) when Dimmer status changed. 3. Device Reset Locally Notification. The Dimmer will send Device Reset Locally Notification when Click Config button 2 times quickly, and hold for at least 15. 4.Indicator Report.
Group 2(On/Off Control)	0x05	Basic Set a. The Dimmer will send Basic Set when Config Button Short pressed. b. The Dimmer will send Basic Set when External Switch Short pressed.
Group 3(Multilevel Set)	0x05	Switch Multilevel Set a. The Dimmer will send Switch Multilevel Set when Config Button Short pressed. b. The Dimmer will send Switch Multilevel Set when External Switch Short pressed.
Group 4(Multilevel Start/Stop)	0x05	Switch Multilevel Start Level Change/ Switch Multilevel Stop Level Change a. The Dimmer will send Switch Multilevel Start Level Change when External Switch press and hold. b. The Dimmer will send Switch Multilevel Stop Level Change when External Switch release. c. The Dimmer will send Switch Multilevel Stop Level Change when Config Button Short pressed and Dimmer is running. d. The Dimmer will send Switch Multilevel Stop Level Change when External Switch Short pressed and Dimmer is running.

6.4 Indicator Command Class

The Receptacle support the Indicator Command Class, version 3 and support the Indicator ID 0x50 (Identify) and Properties ID 0x03, 0x04 and 0x05

6.5 Configuration Command Class

#	Name	Size	Range	Description	Default
1	Restores state after power failure	1	0~100	The state the Dimmer should return to once power is restored after power failure. 0 = off 1~99 = level is 1~99% 100 = output the state after power	100
2	Led indicator load status	1	0~1	Led indicator load status. 0 = Disable 1 = Enable	1
3	Dimming speed time	2	0~100	Set the speed time for Dimmer. 0~100 =0s~100s	3
4	Minimum dim level	1	1~45	Lowest moving level of the Dimmer.	1
5	Maximum dim level	1	55~99	Highest dimming level of the Dimmer.	99
6	Kick start level	0	0~99	This feature ensures lamp start-up even at low dim levels. 0= Disable 1~99= Kickstart level 1%~99%	0
7	Enable External Switch Pair	1	0~1	Enable External Switch Pair 0 = disable 1 = enable	1
8	Auto turn-off timer	4	0~4294967295	Automatically turns the Dimmer off after this many minutes. When the Dimmer is turned on a timer is started that is the duration of this setting. When the timer expires, the Dimmer is turned off. 0 = timer disabled 1 ~ 4294967295 = (seconds)	0

				timer enabled	
9	Auto turn-on timer	4	0~4294967295	Automatically turns the Dimmer on after this many minutes. When the Dimmer is turned off a timer is started that is the duration of this setting. When the timer expires, the Dimmer is turned on. 0 = timer disabled 1 ~ 4294967295 = (seconds) timer enabled	0
10	Auto turn-on/off timer units	1	0~1	Timer for auto up seconds or minutes 0 = seconds 1 = minutes	0
11	Enable or Disable Output control	1	0~2	Enable or Disable Output control (disable LOAD ONLY, ON/OFF works) relay 1. 0 = disable local button and External Switch control enable Z-Wave control (reports on hub ON/OFF) 1 = enable local button and External Switch control enable Z-Wave control 2 = disable local button and External Switch control disable Z-Wave control (reports on hub ON/OFF)	1
12	External switch type	1	0~3	External switch type. 0 = toggle switch (device changes status when switch changes status) 1 = Momentary switch 2 = Switch ON ->always ON. Switch OFF->always OFF 3 = 3-way impulse control	2
13	Association reports	1	0~1	To set which report would be sent to the associated nodes in association group 1 when the state of output load is changed.	1

				0 = Z-Wave control: Switch Multilevel Report Manual control: Basic report 1 = Z-Wave control: Switch Multilevel Report Manual control: Switch Multilevel Report	
14	Enable cut the power	1	0~1	To set cut the power when turn 0-10 dimmer to 0. 0 = Keep the power ON when turn 0-10 dimmer to 0 1 = Cut the power when turn 0-10 dimmer to 0	1

Name	Info	Parameter Number	Default Value(dec)	Max Value(dec)	Min Value(dec)	Size	Read Only	Format	Altering capability
Restores state after power failure	Restores state after power failure	0x01	100	100	0	1	No read-only	Unsigned integer	false
Led indicator load status	Led indicator load status	0x02	1	1	0	1	No read-only	Unsigned integer	false
Dimming speed time	Dimming speed time	0x03	3	100	0	1	No read-only	Unsigned integer	false
Minimum dim level	Minimum dim level	0x04	1	45	1	1	No read-only	Unsigned integer	false
Maximum dim level	Maximum dim level	0x05	99	99	55	1	No read-only	Unsigned integer	false
Kick start level	Kick start level	0x06	0	99	0	1	No read-only	Unsigned integer	false
Enable External Switch Pair	Enable External Switch Pair	0x07	1	1	0	1	No read-only	Unsigned integer	false
Auto turn-off timer	Auto turn-off timer	0x08	0	0xFFFFFFF	0	4	No read-only	Unsigned integer	false
Auto turn-on timer	Auto turn-on timer	0x09	0	0xFFFFFFF	0	4	No read-only	Unsigned integer	false
Auto turn-on/off timer units	Auto turn-on/off timer units	0x0A	0	1	0	1	No read-only	Unsigned integer	false
Enable or Disable Output control	Enable or Disable Output control	0x0B	1	2	0	1	No read-only	Unsigned integer	false
External switch type	External switch type	0x0C	2	3	0	1	No read-only	Unsigned integer	false
Association reports	Association reports	0x0D	1	1	0	1	No read-only	Unsigned integer	false
Enable cut the	Enable cut the	0x0E	1	1	0	1	No	Unsigned	false

power	power						read-only	ed integer	
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