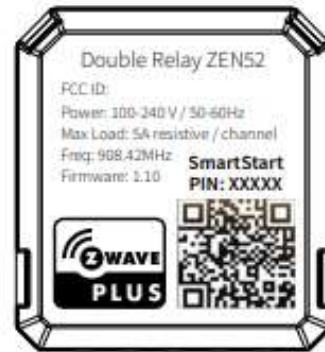


Double Relay Engineering Specifications



The Switch based on Z-Wave™ Slave library of V7.15.04. This Switch integrated Z-Wave communication module to connect with Z-Wave gateway.

The Switch 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 Switch is a security Z-Wave device (S2), so a security enabled controller is needed for take full advantage of all functionality for the Switch.

Features:

- The Switch Support SmartStart.
- Manual or Z-Wave on/off control of 2 electrical loads up to 5A.
- Add Z-Wave to two wall switches with a single device.
- Installs behind your existing wall switch (single pole or 3-way).
- New 800 chip for better performance than ever.
- 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).
- Remembers and restores on/off status after power failure.
- Built-in Z-Wave timer functionality and signal repeater.
- Works with LED and incandescent bulbs.
- SmartStart and S2 Security for a safer network.

1 Technical Specifications

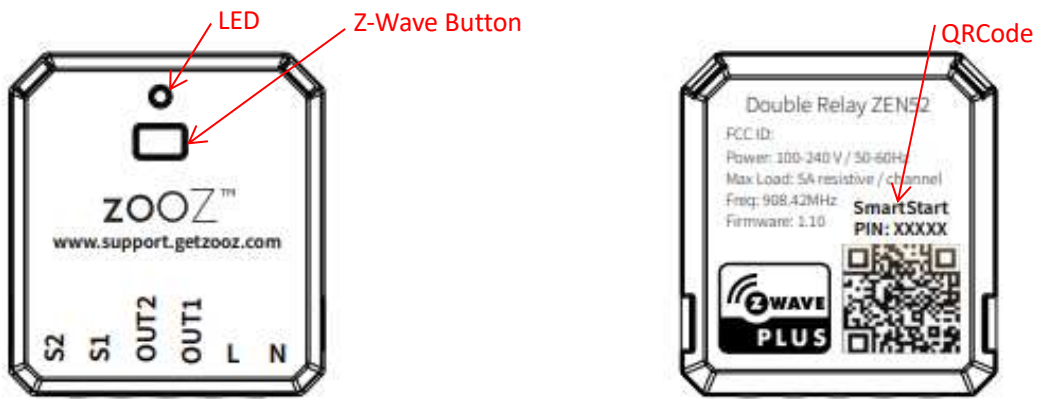
| | |
|---------------------------|--|
| Model Number | ZEN52 |
| Z-Wave Signal Frequency | 908.42MHz |
| Z-Wave LR Radio Frequency | 912.00 MHz(default channel) 920.00 MHz(back up channel) |
| Range | Up to 300 feet line of sight |
| Power | 120VAC,60Hz |
| Maximum Load | 100W LED bulbs,500W incandescent,5A resistive per relay |
| Operating Temperature | 32-104° F (0-40° C) |
| Operating Humidity | Up to 85% non-condensing |

2 Z-Wave Specifications

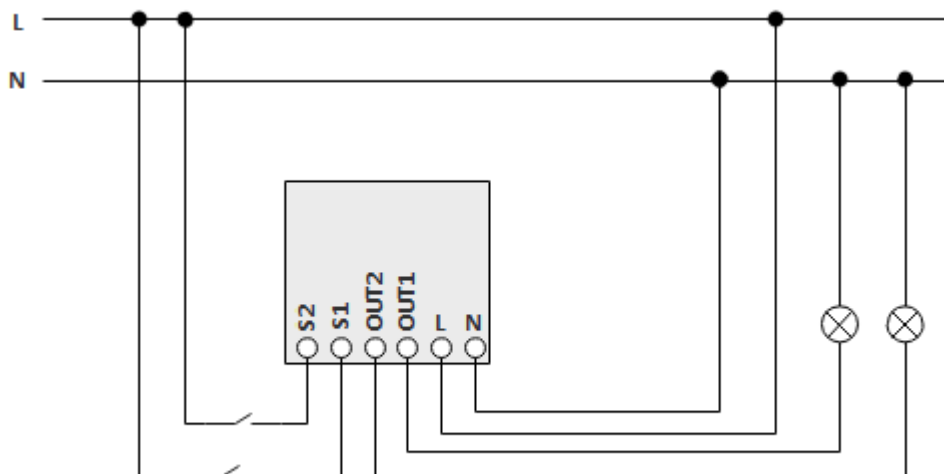
| | |
|-------------|---------------|
| SDK Version | 7.15.04 |
| SDK Library | libZWaveSlave |

| | |
|------------------------|----------------------------|
| Explorer Frame Support | Yes |
| Routing | Yes |
| SmartStart | Yes |
| Device Type | Binary Switch |
| Basic Device Class | BASIC_TYPE_ROUTING_SLAVE |
| Generic Device Class | GENERIC_TYPE_SWITCH_BINARY |
| Specific Device Class | SPECIFIC_TYPE_NOT_USED |
| Role Type | Always On Slave (AOS) |

3 Familiarize yourself with Switch



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.

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_BINARY_V2 | 2 | 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_CENTRAL_SCENE_V3 | 3 | Highest granted Security Class |
| COMMAND_CLASS_MULTI_CHANNEL_V4 | 4 | Highest granted Security Class |
| COMMAND_CLASS_INDICATOR_V3 | 3 | Highest granted Security Class |
| ENDPOINT 1/2 | | |

| | | |
|--|---|--------------------------------|
| COMMAND_CLASS_ZWAVEPLUS_INFO_V2 | 2 | None |
| COMMAND_CLASS_SUPERVISION_V1 | 1 | None |
| COMMAND_CLASS_SECURITY_2_V1 | 1 | None |
| COMMAND_CLASS_SWITCH_BINARY_V2 | 2 | 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_MULTI_CHANNEL_ASSOCIATION_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 Switch into the Z-Wave network via SmartStart (SmartStart Inclusion):

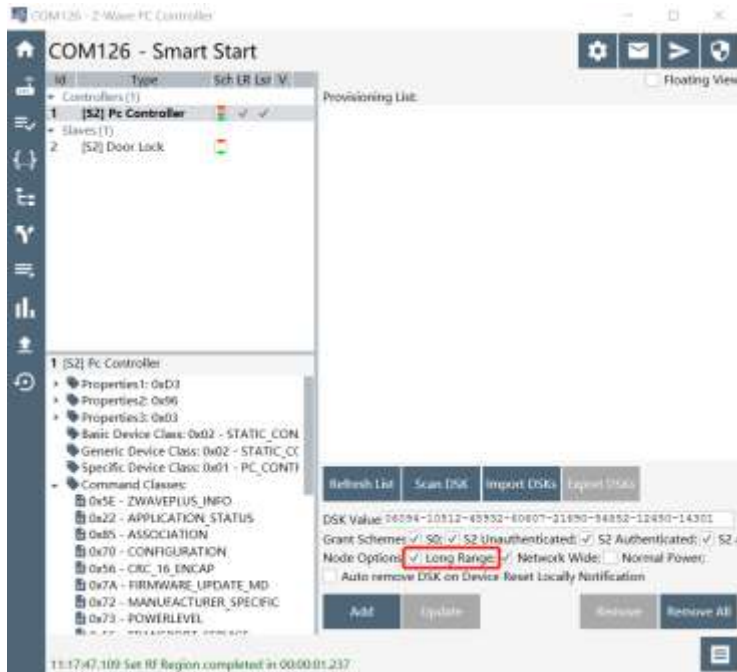
- a. Add Switch DSK into the primary controller SmartStart Provisioning List (If you don't know how to do this, refer to its manual, DSK usually print on the main body).
- b. Remove the battery from the Switch. A few seconds later, reinsert battery in the DUT.
- c. The Switch will send "Z-Wave protocol 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, an end node that supports LR will send SmartStart Prime on both classic Z-Wave and Z-Wave LR PHY, both requests are sent 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 switched at runtime.

5.2 Power on

In the network:

LED Following load state.

Not in the network:

LED will keep green slow blink and start SmartStart.

5.3 Short press Z-Wave Button three times

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

- a. Power on your Switch, 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 from step a

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

- a. Power on your Switch, 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 from step a.

5.4 Reset Switch 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 Switch 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 Binary 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: 0x0700 (ICON_TYPE_GENERIC_ON_OFF_POWER_SWITCH)

User Icon Type: 0x0700 (ICON_TYPE_GENERIC_ON_OFF_POWER_SWITCH)

6.3 Association Command Class

Below is an overview of the different association groups for each the endpoints.

| Endpoint | Grouping Identifier | Max Nodes | Mapping | Send Commands |
|-------------|---------------------|-----------|------------------------|---|
| Root Device | 1(Lifeline Group) | 0x05 | Endpoint1 Endpoint2 | 1. Basic Report. Switch will send Basic Report(Configurable) when Switch status changed. 2. Switch Binary Report. Switch will send Switch Binary |

| | | | | |
|------------|---|------|-----------|--|
| | | | | Report(Configurable) when Switch status changed. 3. Device Reset Locally. Click Z-Wave button 2 times quickly, and hold for at least 15. 4. Central Scene Notification. Switch will send Central Scene Notification (Configurable) when Button action. |
| | 2 | 0x05 | Endpoint1 | 1. Basic Set. Switch will send Basic Set when Switch status changed. |
| | 3 | 0x05 | Endpoint2 | 1. Basic Set. Switch will send Basic Set when Switch status changed. |
| Endpoint 1 | 1 | 0x00 | | |
| | 2 | 0x05 | | 1. Basic Set. Switch will send Basic Set when Switch status changed. |
| Endpoint 2 | 1 | 0x00 | | |
| | 2 | 0x05 | | 1. Basic Set. Switch will send Basic Set when Switch status changed. |

6.4 Central Scene Capability

Switch should send the following **CentralSceneNotification** Reports when the indicated button is pressed the indicated number of times

External Button 1

| Action | Report Content |
|----------|----------------------------------|
| Held | keyAttributes: 2, sceneNumber: 1 |
| Released | keyAttributes: 1, sceneNumber: 1 |
| 1x | keyAttributes: 0, sceneNumber: 1 |
| 2x | keyAttributes: 3, sceneNumber: 1 |
| 3x | keyAttributes: 4, sceneNumber: 1 |
| 4x | keyAttributes: 5, sceneNumber: 1 |
| 5x | keyAttributes: 6, sceneNumber: 1 |

External Button 2

| Action | Report Content |
|--------|----------------|
|--------|----------------|

| | |
|----------|----------------------------------|
| Held | keyAttributes: 2, sceneNumber: 2 |
| Released | keyAttributes: 1, sceneNumber: 2 |
| 1x | keyAttributes: 0, sceneNumber: 2 |
| 2x | keyAttributes: 3, sceneNumber: 2 |
| 3x | keyAttributes: 4, sceneNumber: 2 |
| 4x | keyAttributes: 5, sceneNumber: 2 |
| 5x | keyAttributes: 6, sceneNumber: 2 |

6.5 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

6.6 Configuration Command Class

| # | Name | Size | Range | Description | Default |
|---|-----------------------------|------|---------|--|---------|
| 2 | Led indicator load status | 1 | 0~1 | Led indicator load status. 0 = Disable 1 = Enable | 1 |
| 3 | Auto turn-off timer Relay 1 | 2 | 0~65535 | Automatically turns the switch off after this many minutes. When the switch is turned on a timer is started that is the duration of this setting. When the timer expires, the switch is turned off. 0 = timer disabled 1 ~ 65535 = (minutes) timer enabled | 0 |
| 4 | Auto turn-on timer Relay 1 | 2 | 0~65535 | Automatically turns the switch on after this many minutes. When the switch is turned off a timer is started that is the duration of this setting. When the timer expires, the switch is turned on. 0 = timer disabled | 0 |

| | | | | | |
|----|---|---|---------|--|---|
| | | | | 1 ~ 65535 = (minutes) timer enabled | |
| 5 | Auto turn-off timer Relay 2 | 2 | 0~65535 | Automatically turns the switch off after this many minutes. When the switch is turned on a timer is started that is the duration of this setting. When the timer expires, the switch is turned off. 0 = timer disabled 1 ~ 65535 = (minutes) timer enabled | 0 |
| 6 | Auto turn-on timer Relay 2 | 2 | 0~65535 | Automatically turns the switch on after this many minutes. When the switch is turned off a timer is started that is the duration of this setting. When the timer expires, the switch is turned on. 0 = timer disabled 1 ~ 65535 = (minutes) timer enabled | 0 |
| 7 | Timer for relay 1 seconds or minutes | 1 | 1~2 | Timer for relay 1 seconds or minutes 1 = minutes 2 = seconds | 1 |
| 8 | Timer for relay 2 seconds or minutes | 1 | 1~2 | Timer for relay 2 seconds or minutes 1 = minutes 2 = seconds | 1 |
| 14 | Restores state after power failure, relay 1 | 1 | 0~2 | The state the switch should return to once power is restored after power failure, relay 1. 0 = output off 1 = output on 2 = output the state after | 2 |

| | | | | | |
|----|---|---|-----|--|---|
| | | | | power | |
| 15 | Restores state after power failure, relay 2 | 1 | 0~2 | The state the switch should return to once power is restored after power failure, relay 2. 0 = output off 1 = output on 2 = output the state after power | 2 |
| 16 | Enable or Disable Scene | 1 | 0~1 | Enable/disable to send scene notification command when the switches external action. 0 = disable 1 = enable | 1 |
| 17 | Enable or Disable Output control relay 1 | 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 |
| 18 | Enable or Disable Output control relay 2 | 1 | 0~2 | Enable or Disable Output control (disable LOAD ONLY, ON/OFF works) relay 2. 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 |

| | | | | | |
|----|------------------------------|---|-------|--|----|
| 20 | External switch type input 1 | 1 | 0~4 | External switch type input 1. 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 4 = Garage Mode | 2 |
| 21 | External switch type input 2 | 1 | 0~4 | External switch type input 2. 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 4 = Garage Mode | 2 |
| 22 | Impulse time for par 20=3 | 1 | 2~200 | Impulse time for par 20=3. | 10 |
| 23 | Impulse time for par 21=3 | 1 | 2~200 | Impulse time for par 21=3. | 10 |
| 24 | Association reports | 1 | 0~1 | Association reports. 0 = Z-Wave control: Binary switch report Manual control: Basic report 1 = Z-Wave control: Binary switch report Manual control: Binary switch report | 1 |
| 25 | Relay 1 type behavior | 1 | 0~1 | Relay 1 type behavior. 0 = NO 1 = NC | 0 |

| | | | | | |
|----|-----------------------|---|-----|--|---|
| 26 | Relay 2 type behavior | 1 | 0~1 | Relay 2 type behavior. 0 = NO 1 = NC | 0 |
|----|-----------------------|---|-----|--|---|

| Name | Info | Parameter Number | Default Value(dec) | Max Value(dec) | Min Value(dec) | Size | ReadOnly | Format | Altering capability |
|---|---|------------------|--------------------|----------------|----------------|------|--------------|------------------|---------------------|
| Led indicator load status | Led indicator load status | 2 | 1 | 1 | 0 | 1 | No read-only | Unsigned integer | false |
| Auto turn-off timer Relay 1 | Auto turn-off timer Relay 1 | 3 | 0 | 0xFFFF | 0 | 2 | No read-only | Unsigned integer | false |
| Auto turn-on timer Relay 1 | Auto turn-on timer Relay 1 | 4 | 0 | 0xFFFF | 0 | 2 | No read-only | Unsigned integer | false |
| Auto turn-off timer Relay 2 | Auto turn-off timer Relay 2 | 5 | 0 | 0xFFFF | 0 | 2 | No read-only | Unsigned integer | false |
| Auto turn-on timer Relay 2 | Auto turn-on timer Relay 2 | 6 | 0 | 0xFFFF | 0 | 2 | No read-only | Unsigned integer | false |
| Timer for relay 1 seconds or minutes | Timer for relay 1 seconds or minutes | 7 | 1 | 2 | 1 | 1 | No read-only | Unsigned integer | false |
| Timer for relay 2 seconds or minutes | Timer for relay 2 seconds or minutes | 8 | 1 | 2 | 1 | 1 | No read-only | Unsigned integer | false |
| Restores state after power failure, relay 1 | Restores state after power failure, relay 1 | 14 | 2 | 2 | 0 | 1 | No read-only | Unsigned integer | false |
| Restores state after power failure, relay 2 | Restores state after power failure, relay 2 | 15 | 2 | 2 | 0 | 1 | No read-only | Unsigned integer | false |
| Enable or Disable Scene | Enable or Disable Scene | 16 | 1 | 1 | 0 | 1 | No read-only | Unsigned integer | false |
| Enable or Disable Output control relay 1 | Enable or Disable Output control relay 1 | 17 | 1 | 2 | 0 | 1 | No read-only | Unsigned integer | false |
| Enable or Disable Output control relay 2 | Enable or Disable Output control relay 2 | 18 | 1 | 2 | 0 | 1 | No read-only | Unsigned integer | false |
| External switch type input 1 | External switch type input 1 | 20 | 2 | 4 | 0 | 1 | No read-only | Unsigned integer | false |
| External switch type input 2 | External switch type input 2 | 21 | 2 | 4 | 0 | 1 | No read-only | Unsigned integer | false |
| Impulse time for par 20=3 | Impulse time for par 20=3 | 22 | 10 | 200 | 2 | 1 | No read-only | Unsigned integer | false |
| Impulse time for par 21=3 | Impulse time for par 21=3 | 23 | 10 | 200 | 2 | 1 | No read-only | Unsigned integer | false |
| Association reports | Association reports | 24 | 1 | 1 | 0 | 1 | No read-only | Unsigned integer | false |
| Relay 1 type behavior | Relay 1 type behavior | 25 | 0 | 1 | 0 | 1 | No read-only | Unsigned integer | false |
| Relay 2 type behavior | Relay 2 type behavior | 26 | 0 | 1 | 0 | 1 | No read-only | Unsigned integer | false |