

The RaZberry Smart Home Controller

Version 2/ Z-Wave Cert No: ZC10-14110009

Super Quick Start for Insiders

1. Create a SD card using the image from the link
<http://razberry.z-wave.me/z-way-server/razberry.img.zip>
2. Go to find.zwave.me, find the IP address of your Pi, click on it
3. Setup your password and remember your RaZberry ID for future remote access
4. Choose http://YOURPI_IP:8083 or use find.zwave.me for remote access to your Smart Home Interface.

Quick Start for the rest of us

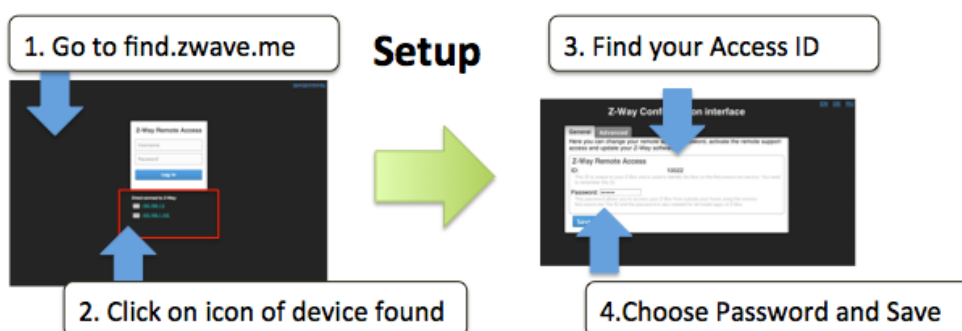
RaZberry is a Z-Wave controller for your Smart Home. A built-in web server allows fast installation and usage without installing further software or apps. Of course there are apps for various mobile platforms that can be downloaded from the various app stores that further enhance the user experience of the solution.

To use the RaZberry solution you need the following parts:

- A Raspberry Pi microcomputer. If you don't have it please refer to raspberrypi.org for sources to buy from
- A SD Card with a minimum size of 4GB
- Power supply and Ethernet cable
- The RaZberry add on module

First prepare your SD Card. Download the complete image including Z-Wave control software and various other tools from the link given in the super quick start section. To prepare the SD Card please refer to the guidance on raspberrypi.org. Install the SD card into the Raspberry Pi and power it up. After about 1 minute open a web browser and point to find.zwave.me

Below the login screen you will see the IP address of your RaZberry system. Click on the IP address link to open the configuration dialog.



The Configuration Service

The configuration service is accessible with any web browser on Port 8084. Whenever you want to change settings this service will be at your service and is available independent of the Z-Wave engine.

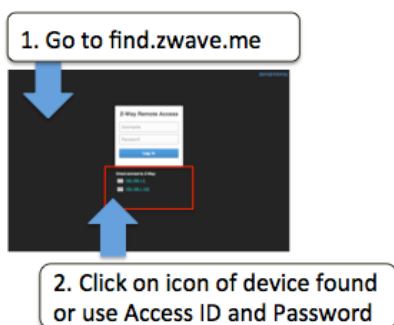
1. Find your RaZberry ID and remember it for remote access to your system.
2. Choose a password that will be used to authenticate for the remote access in the future. Whenever you access your RaZberry within your local network (as the first time) you will not need a password.

The Configuration service uses the cloud infrastructure on find.zwave.me for the following functions:

- **Find the IP Address** of your RaZberry. You just used this function.
- **Remote Access** when you are outside your home. For this a valid password is required – see above.
- **Firmware Update**: Just click on the firmware update tab and follow the instructions
- **Remote Support**: This function is usually disabled. You will need to enable it on request if you desire remote service. Allowing service people to access your RaZberry is 100% under your control.

Once you set your remote access password you are done with the initial configuration.

Access at Home



Access on the road



Whenever you access find.zwave.me again and a local RaZberry is found clicking on the IP address will lead you right to your Smart Home User Interface. If your Pi uses a fixed IP address this address can be used for direct IP access without using the find.zwave.me service. You can even turn off the connection to the find.zwave.me service but be aware that you will not have any remote access capability anymore. Also in case the IP address of your RaZberry changes you may have difficulty to find the new address. Hence we recommend using find.zwave.me. The same time **we want you to have 100 % control** of any cloud service usage of your system.

Z-Wave Product Information

This is a Z-Wave static controller. As a certified Z-Wave Plus device RaZberry communicating with all other Z-Wave certified devices regardless of vendor or year of origin and it implements the enhanced functions of Z-Wave Plus.

This device can communicate in a *secure environment* if the other device supports the secure environment too. If not the controller will fall back to the normal communication mode automatically. During inclusion the use of secure environment can be suppressed for performance reason if desired. In Z-Wave all non-battery powered device such as the RaZberry will act as routers for other devices to form a so-called meshed network.

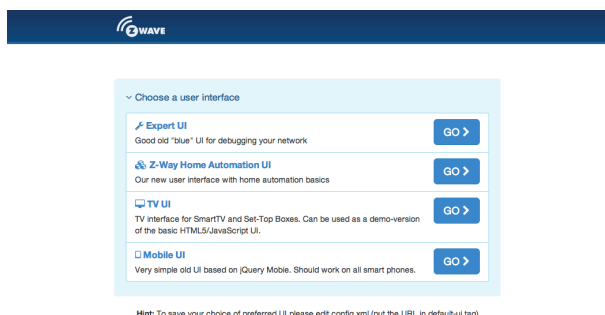
In case there is more than one controller in the network the controllers need to be kept synchronous in regard to their knowledge of the network. This is called *Controller Replication* and the following policy applies: (a) in case there is a *SIS* in the network (check in Controller Info menu) every other controllers will query the SIS for updates. (b) In the rare case that there is no SIS and this device is *Primary Controller* please re-include other controllers to perform a network information update.

The device supports the command classes *'SwitchMultilevel'*, *'SwitchBinary'* and *'Basic'* to catch events from devices using these command classes to trigger actions in the controller. There is no other action performed than changing values in the device data objects.

The device supports lifeline (association group 1, max 3 nodes) and 16 channels (simulating a generic Multilevel Switch) to differentiate receiving commands from devices not able to send modern scene control commands. The channels support the

same command classes (Basic, SwitchBinary, SwitchMultilevel and Scene Activation) that do not perform any real action but allow command reception only.

Various User Interfaces of RaZberry



When going to <http://YOURIP:8083> you will see a selection menu to choose the web based UI you like to work with. The two most interesting UIs are the **Z-Wave Expert UI** (to create and manage the Z-Wave Network) and the **Z-Way Home Automation** user interface for day-by-day usage of the whole system. Above and beyond this you can use various mobile platform native apps you find in the app stores to access the system. Just visit the Google App store or the iOS app store for native apps with the name "Z-Way".

The Z-Wave Expert UI

The Z-Wave Expert User Interface is **designed for installers, technically savvy people** and other users that know how to **built and maintain a Z-Wave** based wireless network. Hence it uses some Z-Wave specific language and offers detailed insight into the work and data structure if the Z-Wave network. It allows to

- **Add (include) and remove (exclude) Z-Wave devices** and manage the network.
- **Configure** Z-Wave devices.
- **Operate** Z-Wave devices.
- **Manage Associations** between wireless devices.
- **Access all data generated** by the devices and perform all kind of functions and actions to the device.
- **Look behind the scene** into the data structures, routing mechanisms and timings of the Z-Wave control stack. This is particularly useful for debugging and software development.

The Z-Wave Expert UI **does not provide any access to higher order business logic and automation**. Please refer to other User Interfaces for these functions.

The UI offers a home screen and four top menu items:

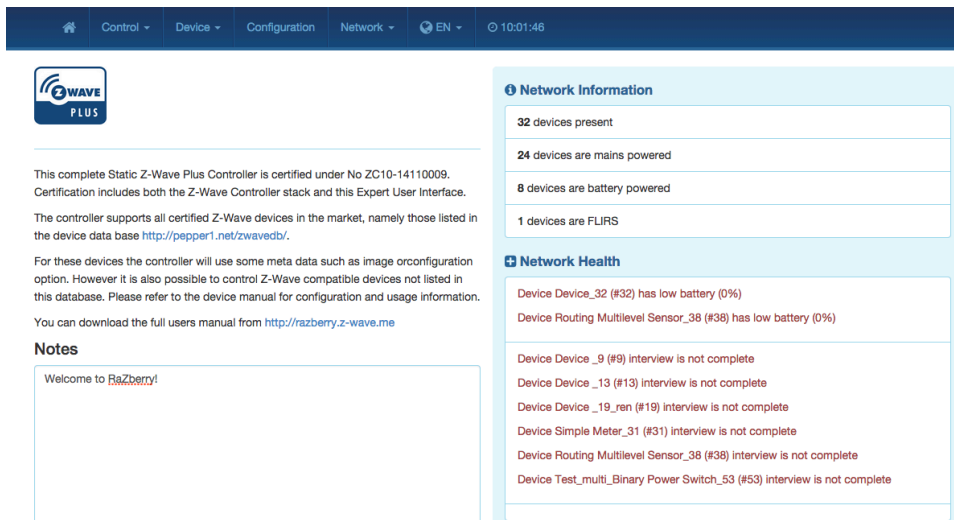
- **Control:** Access to functions of the wireless devices included in the network.
- **Device:** Access to information about devices.
- **Configuration:** Configure the devices after inclusion if needed.
- **Network:** Add and remove devices and manage the network.

The top level also has a language selector. Please we aware that this selection is only valid for the Expert UI and will not be used by other web based or app based UIs. The timing info on the upper right side shows the time on the controller device. Its update serves as a heart beat to the system.

All values shown in the Z-Wave Expert UI are assigned to a time stamp indicating when the value of status information was received from the wireless network. A red color of the time stamp indicates that and update request from the controller for this value is pending.

Home Screen

The home screen offers some high level information about the software and a notepad where the user or installer can leave important information for future use.



The Network Information box offers some statistics about the number of devices in the network and how many of them are mains or battery operated. The network health box will list devices that have problems: the battery is down, the interview is not complete or the device failed. Clicking on the statement will lead to a help page explaining the problems and giving guidance for remediation.

Control

The Control Tab allows operating the various types of devices and shows the reported values in case of sensors or meters. In case the control options offered here are not sufficient please refer to the Expert Command Tab as part of the Configuration menu for a full set of functions supported by the device.

Switch

The switch dialog lists all devices of the network supporting switching, dimmer or motor control capabilities. The device name and Id and the current status of the switch is given and the time of the last status update. The "Update" button forces an immediate update of the switch (if mains powered device). A 'Switch All' Icon shows whether or not the specific device will react on a Switch All ON or Switch All Off command. A green triangle indicates that the device will react to the command shown.

| # | Devices | Level | DateTime | Switch all | Update all | All off | All on | |
|----|----------------|-------|-----------|------------|------------|---------|--------|---|
| 2 | Heizung | On | 18.8.2014 | | Update | Off | On | |
| 3 | CP Deckenlicht | Off | 18.8.2014 | | Update | Off | On | |
| 8 | CP Jal | On | 18.8.2014 | | Update | Off | On | Full 0 <input type="range" value="99"/> |
| 13 | CP Fenster | Off | 18.8.2014 | | Update | Off | On | Full 0 <input type="range" value="0"/> |
| 14 | SL Deckenlicht | Off | 18.8.2014 | | Update | Off | On | Full 0 <input type="range" value="0"/> |
| 15 | SL Schrank | Off | 18.8.2014 | | Update | Off | On | |
| 16 | SL Jal | On | 18.8.2014 | | Update | Off | On | Full 0 <input type="range" value="99"/> |
| 20 | Wasch | On | 18.8.2014 | | Update | Off | On | |
| 21 | Werkstatt | Off | 18.8.2014 | | Update | Off | On | |

All actuators can be switched on or off. Dimmer and motors controls can be operated using a slider. For dimmer there is a button "On" and "Full". "Full" turns the dimmer always to 100 % diming value while "On" will turn to

the last dimming state before the dimmer was turned off. Clicking on the table heads reorders the table view of the data.

Sensors

The sensor dialog lists all devices of the network providing sensor information. Device name and id, the type of the sensor, the actual sensor value and the sensor scale is listed. The Date/time column indicates when the given sensor value was received. Its possible to call for a sensor update but bear in mind that battery operated device will only respond after the next wakeup.

| # | Devices | Device type | Level | Scale | DateTime | Update all |
|----|---------------|-----------------|-----------|--------------|-----------|------------|
| 2 | ⚡ Heizung | Electric | 82.4 | W | 18.8.2014 | Update |
| 2 | ⚡ Heizung | Electric | 234.5 | V | 18.8.2014 | Update |
| 2 | ⚡ Heizung | Electric | 0.38 | A | 18.8.2014 | Update |
| 2 | ⚡ Heizung | Electric | 0.9 | Power Factor | 18.8.2014 | Update |
| 9 | 🕒 CP Heizung | Temperature | 23.27 | °C | 15:46 | Update |
| 10 | 👁️ CP Tür | General purpose | Triggered | | 06:37 | Update |
| 19 | ⚡ Stromzähler | Electric | 130.393 | W | 15:42 | Update |
| 19 | ⚡ Stromzähler | Electric | 232.673 | V | 18.8.2014 | Update |

Meters

The meter dialog lists all devices of the network providing (accumulating) meter information. Device name and id, the type of the meter, the actual meter value and the meter scale is listed. The Date/time column indicates when the given sensor value was received. Its possible to call for a meter update but bear in mind that battery operated device will only respond after the next wakeup. Clicking on the table heads reorders the table view of the data.

| # | Devices | Device type | Level | Scale | DateTime | Update all |
|----|----------------|-------------|---------|-------|-----------|--------------|
| 2 | ⚡ Heizung | Electric | 11.74 | kWh | 18.8.2014 | Update Reset |
| 19 | ⚡ Stromzähler | Electric | 205.237 | kWh | 15:53 | Update Reset |
| 19 | ⚡ Stromzähler | Electric | 58.974 | kWh | 18.8.2014 | Update Reset |
| 19 | ⚡ Stromzähler | Electric | 53.215 | kWh | 17.8.2014 | Update Reset |
| 19 | ⚡ Stromzähler | Electric | 80.797 | kWh | 17.8.2014 | Update Reset |
| 20 | ⚡ Wasch | Electric | 11.4 | kWh | 18.8.2014 | Update Reset |
| 23 | 💡 WO Stehlampe | Electric | 0.2 | kWh | 18.8.2014 | Update Reset |

Thermostats

The thermostat dialog lists all thermostat devices of the network. Device name and id and the current set point temperature is shown. The Date/time column indicates when the given set point temperature was transferred to the device. The set point temperature can be changed using the '+' or '-' buttons or the slider. Clicking on the table heads reorders the table view of the data.

| # | Devices | Temperature | DateTime | | |
|----|------------|-------------|-----------|-----|------|
| 20 | Device _20 | 26 °C | 07:00 | - + | 0 40 |
| 19 | Device _19 | 23 °C | 28.7.2014 | - + | 0 40 |
| 12 | Device _12 | 40 °C | 28.7.2014 | - + | 0 40 |

Attention: The temperature value does not differentiate between heating and cooling devices. If a cooling and a heating function shall have different set points please refer to the expert command section for more precise command settings.

Door Locks

| # | Devices | Devices | DateTime | | |
|----|-----------------|---------|----------|--------|-----|
| 17 | Front Door Name | Open | 7.8.2014 | Update | 🔒 🔓 |

The door lock dialog lists all door lock devices of the network. Device name and id, the current status of the lock and last time of the change of the status is listed.

Clicking on the table heads reorders the table view of the data.

Device

The Device Tab gives access to overview pages with more detailed information about the devices in the network and their actual status.

Status:

This dialog shows the actual network status of all devices. All devices are listed by their node id and name. The date/time indicates the time of the last successful communications between the controller and this device (either confirmed sending or reception). The green checkmark indicates that the device is alive. A red sign indicates that the controller assumes the device not being active anymore. Mains powered devices can be checked for their network availability by hitting the "Check connectivity" button.

| # | Device name | Sleeping | Awake | Date | DDR | |
|----|----------------|-----------------|-------|--------------|-----|--------------|
| 2 | Heizung | | | ✓ 14:24 | ✓ | pingDevice |
| 3 | CP Deckenlicht | | | ✓ 14:24 | ✓ | pingDevice |
| 7 | CP JalSteuer | 14:24 → 14:28 ⌚ | 🌙 | ✓ 14:24 | ✓ | |
| 8 | CP Jal | | | ✓ 14:24 | ✓ | pingDevice |
| 9 | CP Heizung | 14:20 → 14:25 ⌚ | 🌙 | ✓ 14:20 | | |
| 10 | CP Tür | 14:20 → 14:25 ⌚ | 🌙 | ✓ 14:20 | ✓ | |
| 13 | CP Fenster | | | ✓ 27.08.2014 | ✓ | ? pingDevice |
| 14 | SL Deckenlicht | | | ✓ 27.08.2014 | ✓ | pingDevice |
| 15 | SL Schrank | | | ✓ 27.08.2014 | ✓ | pingDevice |

In case the device interview and configuration was not performed properly a little question mark icon will indicate this. Clicking on the question mark will open a window displaying the details of the interview process. The correct loading of a Device Description File is indicated as well. For battery-operated device the time of the last wakeup, the time of the next wakeup and the current wakeup status is shown. Clicking on the table heads reorders the table view of the data. Clicking on the table heads reorders the table view of the data.

Battery

This dialog gives an overview of the battery status of the battery-operated devices in the network. Devices are listed by name and id. The last reported battery level (0...100 %) including update time is shown as well as the number and type of battery if known. The "Update" button will request a status update from the device. The new status will be available after the next wakeup of the device. Clicking on the table heads reorders the table view of the data.

| # | Devices | Battery type ▾ | Level | DateTime | Update all |
|----|-------------------------------|----------------|-------|-----------|------------|
| 21 | Portable Remote Controller_21 | 2*AAAA | 64% ☆ | 31.7.2014 | Update |
| 18 | Device _18 | 2*AAA | 74% ☆ | 11.8.2014 | Update |
| 25 | Routing Binary Sensor_25_aaa | 3*AA | 70% ☆ | 09:16 | Update |
| 20 | Device _20 | | 66% ☆ | 07:00 | Update |
| 10 | SEC_321 | | 0% ☆ | 29.7.2014 | Update |

Type Info

| # | Device name | Security | NWI & EF | Z-Wave Plus | SDK | App version | Device type |
|----|------------------|----------|----------|-------------|----------|-------------|----------------------------|
| 2 | 🔌 Heizung | ✓ | | | 6.02.00 | 1.1 | Binary Power Switch |
| 3 | 🔌 CP Deckenlicht | ✓ | | | 4.52.01 | 1.3 | Binary Power Switch |
| 7 | 👁️ CP JalSteuer | ✓ | | | 5.03 | 1.1 | Portable Remote Controller |
| 8 | 💡 CP Jal | | | | 4.27 | 2.1 | Multiposition Motor Switch |
| 9 | 🌡️ CP Heizung | ✓ | | | 4.55.00 | 0.99 | Thermostat |
| 10 | 👁️ CP Tür | ✓ | | | 4.55.00 | 1.5 | Routing Binary Sensor |
| 13 | 💡 CP Fenster | ✓ | ✓ | | 4.54.01 | 3.10 | Motor Control Device (B) |
| 14 | 💡 SL Deckenlicht | ✓ | | | 4.54.01 | 1.8 | Routing Multilevel Switch |
| 15 | 🔌 SL Schrank | | | | 5.02 pl1 | 1.0 | Binary Power Switch |
| 16 | 💡 SL Jal | | | | 4.27 | 2.1 | Multiposition Motor Switch |
| 19 | Stromzähler | ✓ | | | 4.55.00 | 1.5 | Simple Meter |

The type info dialog lists all devices of the network and indicates if they support enhanced Z-Wave functions such as Security and Z-Wave Plus. Their Z-Wave protocol version, their application version and their device type indicator is shown for information purposes too. Clicking on the table heads reorders the table view of the data.

Association

This overview page shows the current association set in the network. The lifelines (association to the gateway to report status changes and heard beat) can be hidden if needed. A 'Change' button leads right to the Configuration page of the device to change association settings.

| # | Device name | Assoc group name | Show lifeline |
|----|----------------|--|---------------|
| 7 | CP JalSteuer | Single press and hold of up/down buttons <input type="text" value="(8) CP Jal"/> Double press and press-hold of up/down buttons <input type="text" value="(8) CP Jal"/> | Change |
| 14 | SL Deckenlicht | Single press and hold of up/down buttons <input type="text" value="(15) SL Schrank"/> Double press and press-hold of up/down buttons <input type="text" value="(15) SL Schrank"/> | Change |

Configuration

Configuration

The configuration tab allows configuring the device.

There are four more command classes that may need additional configuration work and that are displayed if the certain device supports it. The actual data of the different sections are shown in the UI and can be updated using the button "Update from device" A time indication shows when the time where the values were received from the device (Beware, that an update may be delayed if the device is battery operated and in deep sleep state)

- **Wakeup:** Define the wakeup interval and the node id of the main controller taking care of the wakeup sequence. The controller will set a standard wakeup time of 1800 seconds unless the device sets a different minimal or maximal wakeup time. In most cases the node id of the controller is the correct setting for the target node id and should not be changed. In case this controller is only *secondary controller* this value may change. A tool tip on the input field shows the allowed minimum and maximum wakeup time as reported by the device.
- **Protection:** In case the device supports local protection – means suppressing local use of the device – the behavior of this function can be defined. The protection command class actually offers more options than displayed here, Refer to the 'Expert Commands' tab for a complete set of controls.
- **Switch All configuration:** Z-Wave supports the so called switch all function as a broadcast to all switches and dimmers. This setup defines the reaction of the device to such a "Switch All" command. The setting is also displayed in the "Switches" section as little gray/green icon.
- **Configuration:** In case the controller can identify the device and finds information about further configuration options these options are shown. The little (i) symbol may give more descriptive information about the configuration value. If no device description of the device is found no configuration options are shown. In case the device does have configuration options its possible to set them using the expert command section.

Configuration for CP Deckenlicht (#3) -

Interview Configuration Association Expert commands

Configurations

Update from Device Apply configuration for this device

N° 1 - LED mode

Disabled
 Show switch state
 Night mode (inverted switch state)
 Operated by Indicator Command Class

Updated: 30.7.2014 | ⓘ

N° 2 - Automatically switch off after

Disabled
 sec 1

Updated: 30.7.2014 | Default value: 0 | ⓘ

N° 3 - What to do on RF off command

Switch off
 Ignore
 Switch on

Updated: 30.7.2014 | ⓘ

Note: For mains powered devices and FLIRS device the button "Apply configuration to device" will activate the changes within few seconds. For battery operated devices the commands are stored to the next wakeup. Its possible and recommended to wakeup the device manually to speed up the change of configuration values.

Association

Associations allow switching a Z-Wave device B (target) as a result of an event in Z-Wave device A (source). Z-Wave device A offers lists of devices to switches for each event supported. The list of these events - also called *association groups* - and the devices that are associated with it are shown in the Association tab. In case the information is provided either by the device or by the device record stored in the software the meaning of the events is written. Otherwise only event group is shown unnamed. In this case refer to the devices manual for more information about the association group meaning. The stored devices can be called from the actual device using a button. The buttons '+/-' used to add and remove device from the group. A dialog is opened and a device can be picked. In case this device has multiple instances an instance drop down list will appear allowing to choose the right instance of the target device. The node ID and - if applicable - the instance id are shown in the target device list. Move the mouse over the ID to show the complete given name of this device.

Configuration for ZME_06433 (#4) -

Interview Configuration **Association** Expert commands

Associations

Request current stored values from device

| | | | |
|---|------|---|---|
| Single press and hold of up/down buttons (max 14 nodes) Info from: 24.7. 16:25 | #1.1 | + | - |
| Double press and press-hold of up/down buttons (max 14 nodes) Info from: 24.7. 16:25 | #1.2 | + | - |
| Send Reports on blind state change (max 14 nodes) Info from: 24.7. 16:25 | #1.3 | + | - |

Apply configuration for this device

Expert Commands

The expert command section displays the status values and possible commands in a very generic way. On the left hand side the different channels of the device are listed in a column. In case there is only one channel (that's the case for most devices) only channel 0 is shown. Clicking on the number opens a dialog showing all internal variables for the channel. The next column shows all the command classes exposed by the device. Again clicking on the name opens a dialog with more internal status variable information for this command class. On the right hand side there is a list of commands. This UI is auto-generated from the information provided by the command class itself and not optimized for daily usage.

Interview Configuration Association Expert commands Firmware update

| Instance | CommandClass | Command / Parameter |
|----------|-----------------|--|
| 0 | SwitchBinary | <p>Get</p> <hr/> <p>Level</p> <p><input checked="" type="radio"/> Off</p> <p><input type="radio"/> On</p> <p>Set</p> |
| 0 | SceneActivation | <p>Scene 1</p> <p>Duration</p> <p><input checked="" type="radio"/> immediately</p> <p><input type="radio"/> in seconds 1</p> |

Firmware Update

In case the device supports a firmware update 'over the air' this dialog is shown to perform such a firmware update. The firmware can be provided in two ways: either as URL in the format <http://IP:PORT/file> or as file upload using the file upload dialog. The firmware file must be available in raw 'BIN' format or 'HEX' format. The target field allows specifying the target memory/processor for the update process. For updating the Z-Wave firmware part a '0' must be set. The firmware updating process will take up to 10 minutes. Please don't do any other operation during this time.

It may be required to activate the firmware update mode on the device to be updated. Please refer to the manual for further information about activation.

Interview Configuration Association Expert commands Firmware update

URL Keine ausgewählt

Network

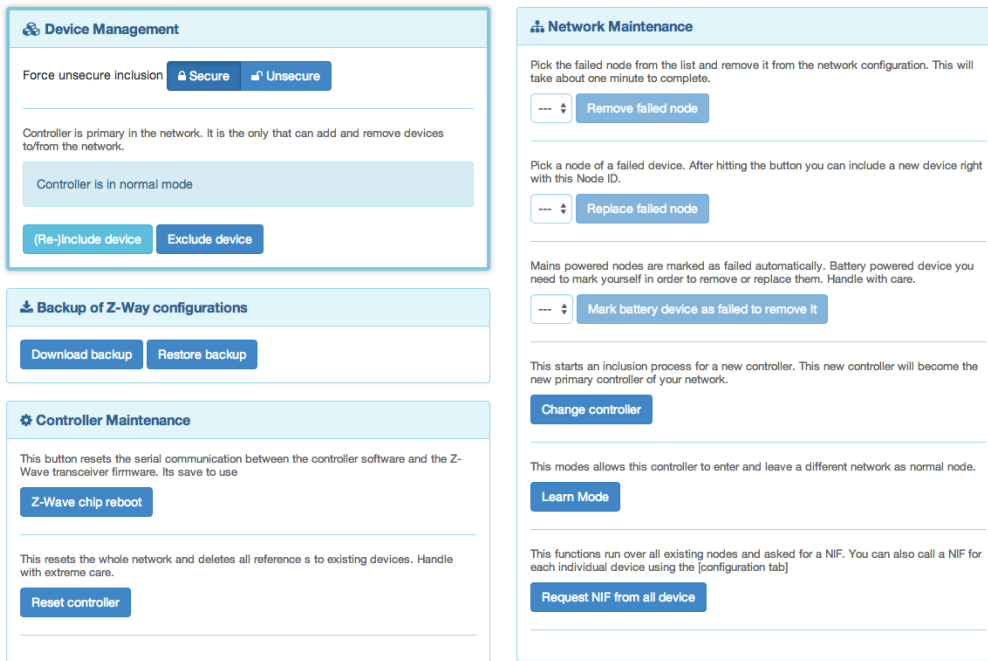
The Network section of the UI focuses on the network as such and offers all controls and information to build, manage and repair the wireless network of the controller.

Control

The network control summarizes all commands needed to manage the network and the controller. The page is structured in four boxes.

The device management box allows including and excluding Z-Wave devices. A status display shows the status of the controller. The "Include Device" resp. "Exclude Device" button turn the controller into the *Inclusion* resp. *Exclusion* mode. In this case the status display changes and the resp. buttons turns into a "Stop" function. The inclusion and exclusion modes will time out after about 20 seconds but can always be terminated using the "Stop" buttons.

Another way to stop the inclusion mode is **to actually include a new device**. In this case the inclusion mode will stop and the node id of the new device is shown. The controller generated a default name of the device as combination of its primary function and the new node id. Clicking on this default name leads to the Configuration page where the name can be changed and other configuration tasks can be performed.



Please refer to the devices manual on how to do an inclusion. In case the inclusion does not work as expected, please exclude the device first. More than 90 % of all inclusion problems are caused by still included in a different network and can then not being included again.

The **Exclusion** mode also stops when one device was successfully excluded. This function can exclude devices from other networks too but the device need be available and functioning. To remove non functioning or disappeared devices please refer to "Replace Failed node" or "Remove Failed node".

In case the new device supports enhanced security function (Security Command Class) this controller will include the device securely. After this all data exchange between the controller and the new device is encrypted using AES encryption. For performance reasons it may be desired not to use the security function. The slider "Force unsecure inclusion" turns the controller into a mode where all security functions are suppressed for the included device. Security functions of other devices are not impacted.

The second box of the page allows **creating and using a backup**. The backup file is stored on the local computer. Please note that any restore will overwrite the existing network. The restore operation must therefore be confirmed in another message box. A checkbox defines if the node information in the z-wave chip itself shall be overwritten as well. This operation result in a possible loss of all network relationships and may require a re-inclusion of devices. Handle with care.

The controller maintenance offers two reset buttons. The "**Z-Wave Chip Reboot**" restarts the operating system of the Z-Wave transceiver chip. This can be done safely all the time.

The "**Reset Controller**" turns the controller back into factory reset. All connections to included devices and all configurations and settings are lost. This function must be handles with extreme case. An additional dialog requires to explicitly confirm the function. **Only use this function if you know what you do!**

The function **Remove Failed Node** allows removing a node that is not longer communicating with the controller. After multiple failed communications with a device the controller will mark this device as failed and avoid further communication. This function finally removes such a device from the network configuration. The drop down list will only show IDs of failed nodes. If this list is empty this is a good sign!

It is also possible to **Replace a Failed node** with a new node. This is a combination of removing the failed node and adding a new node. Using this function makes sure the next included node has the same node ID as the failed node. The drop down list will only show IDs of failed nodes. If this list is empty this is a good sign!

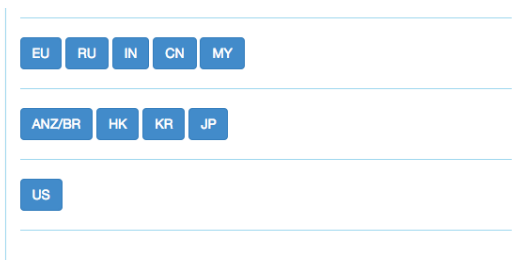
Battery operated devices are mainly in deep-sleep state and will not answer to communication requests. Hence the controller will never automatically detect if a certain device is defect or gone. The function **“Mark battery device as failed”** manually marks battery-operated devices as failed so that they can be removed or replaces. The dropdown list shows all battery operated devices but this does not mean that they are failed.

The next two functions deal with the controller role in the network. With **“Learn”** this controller can become a secondary controller in another network. This is only possible if this controller did not include any other device before. Clicking the **“Learn”** button turns the controller in a function where it will accept inclusion requests from other controllers. The controller status dialog on the upper left hand side shows this status. The Learn mode will time out after about 20 seconds or when the device was included successfully. It is also possible to manually terminate the mode.

The **“Change Controller”** function actively hands over the role of the primary controller of the network to a controller that will be included using the normal inclusion process. The controller status dialog shows the mode and its termination.

The **“Request NIF from all devices”** function is just a convenient way to retrieve a Node Information Frame from all devices of the network.

The frequency change buttons allow changing the operating frequency of RaZberry. Handle with care! Changing the frequency may result in malfunction of your network. If you are uncertain about the consequences of this change, don't touch the buttons!



The RaZberry hardware can be changed into every valid frequency however the antenna filter used with Z-Wave transceivers will attenuate the wireless signal for wrong frequencies. At the moment there are three different types of antenna filters allowing operation in the three frequency groups. Changing the frequency within the line (e.g. from EU to CN) will not result in attenuation of the signal but will stop any communication in a network already established. Changing between the lines will not only result in communication problems with existing included devices but also result is severe attenuation of the wireless signal. It may still be useful to change frequencies for debugging purposes but again: Handle with care!

Routing

| Id | Devices | Type info | 1 | 2 | 3 | 8 | 9 | 10 | 13 | 14 | 15 | 16 | 19 | 20 | 21 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 34 | 36 | 37 | 38 | 39 | 40 | 41 | Last update | |
|----|----------------|-----------|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-------------|------------------------|
| 1 | Device ...1 | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:36:15 | Update |
| 2 | Heizung | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:36:17 | Update |
| 3 | CP Deckenlicht | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:36:25 | Update |
| 8 | CP Jal | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:36:31 | Update |
| 9 | CP Heizung | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 30.7. 18:19 | Update |
| 10 | CP Tür | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 30.7. 18:19 | Update |
| 13 | CP Fenster | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:36:40 | Update |
| 14 | SL Deckenlicht | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:36:46 | Update |
| 15 | SL Schrank | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:36:51 | Update |
| 16 | SL Jal | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:36:58 | Update |
| 19 | Stromzähler | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:37:07 | Update |
| 20 | Wasch | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:37:17 | Update |
| 21 | Werkstatt | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:37:27 | Update |
| 23 | WO Stehlampe | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:37:33 | Update |
| 24 | KU Geschirr | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:37:44 | Update |
| 25 | CP Timecapsule | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:37:47 | Update |
| 26 | KU Temp | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 30.7. 18:19 | Update |
| 27 | KU CO2 | ☐ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 8:37:56 | Update |

This table shows the neighborhood relationship of devices. The id, the name and the type of the node are listed. Dark green indicates that the two devices are in direct wireless neighborhoods and don't need any other device to forward their signals. A Light green connection needs one router between. Yellow color indicates that the communication route is just ok. This can be achieved by longer but multiple routes. A red color between two nodes indicated an insufficient communication link. A little black dot in the colored field indicates that the current configuration of the network requires these two nodes to communicate with each other due to an association relationship. The 'Update' button calls the device to scan its neighborhood and report back the result to update its own line of the routing table.

Reorganization

The reorganization page controls an algorithm that reorganizes the network relationships and fixes problems. With checkboxes different stages of the algorithm can be selected. The result of the reorganization is shown in a log and can be downloaded.

mains powered
 battery powered

Start Reorg **Download Log**

```

8:37:19: reorg 21 .... done
8:37:28: reorg 23 ... done
8:37:36: reorg 24 .... done
8:37:46: reorg 25 .. done
8:37:49: reorg 27 ... done
8:37:56: reorg 28 .... done
8:38:05: reorg 29 ... done
8:38:12: reorg 30 .... done
8:38:21: reorg 34 .. done
8:38:24: reorg 36 .... done
8:38:33: reorg 37 ... done
8:38:41: reorg 39 ... done
8:38:51: reorg 40 ... done
8:39:01: Reorganization completed:
8:39:01: 23 mains powered nodes found and reorganized
  
```

Timing Info

| Node | Device name | Type | Total (pkts) | Ok | Last packets (in 10 ms units) |
|------|----------------|----------------|--------------|------|--|
| 2 | Heizung | Mains | 67 | 100% | 4 3 8 23 15 5 73 11 59 1 17 9 7 33 32 2 52 14 6 6 37 |
| 3 | CP Deckenlicht | Mains | 68 | 100% | 1 4 3 40 5 4 5 14 4 10 7 48 4 15 4 12 13 8 5 37 7 |
| 7 | CP JalSteuer | Battery/Wakeup | 12 | 83% | 7 11 3 11 7 12 10 3 10 15 6 8 |
| 8 | CP Jal | Mains | 34 | 100% | 7 5 3 3 6 6 3 6 7 8 3 3 3 8 3 8 3 4 3 3 8 |
| 9 | CP Heizung | Battery/Wakeup | 16 | 94% | 292 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |
| 10 | CP Tür | Battery/Wakeup | 5 | 80% | 20 3 3 3 9 |
| 13 | CP Fenster | Mains | 1 | 100% | 8 |

The Timing tab shows some very valuable timing information of communications between the controller and other devices. All other devices the controller has communicated with are shown in a list. The number of packets and the percentage of successful communication are shown. This can give an indication about the stability of the communication link between the controller and this device. On the right hand side the timing delay of each communication is shown and color-coded. A red number indicates that this communication finally failed. A communication without rerouting attempts as shown as green and a rerouting attempt is coded in black. The fact that a communication failed (red) may indicate that there is a severe problem in the network or in the device. It is however also possible that a battery operated device just went back to sleep too fast. Z-Wave pros can read a lot out of this timing information particularly when combined with the routing table

Controller Info

This dialog shows some internal technical data of the controller hardware used. The first box offers some deep insight into the dynamics of the controller software. It visualizes the job queue of the system. Every

communication attempt of the controller is queues into a job queue and then handed over to the Z-Wave chip for execution. The list shows the jobs pending and the jobs that are completed or failed.

Legend

n = Send count, W = Wait wakeup, S = Wait security, E = Encapsulated, D = Done, U = Urgent

| n | U | W | S | E | D | Ack | Resp | Cbk | Timeout | NodeId | Description | Progress | Buffer |
|---|---|---|---|---|---|-----|------|-----|---------|--------|----------------------------------|----------|-----------------|
| 0 | | W | | | | - | - | - | 0.20 | 21 | Battery Get | | 15 2 80 2 5 |
| 0 | | | | | | - | - | - | 0.20 | 11 | Meter Version Get | | b 3 86 13 32 25 |
| 0 | | | | | | - | - | - | 0.20 | 11 | Configuration Version Get | | b 3 86 13 70 25 |
| 0 | | | | | | - | - | - | 0.20 | 11 | ManufacturerSpecific Version Get | | b 3 86 13 72 25 |
| 0 | | | | | | - | - | - | 0.20 | 11 | PowerLevel Version Get | | b 3 86 13 73 25 |
| 0 | | | | | | - | - | - | 0.20 | 11 | Association Version Get | | b 3 86 13 85 25 |
| 0 | | | | | | - | - | - | 0.20 | 11 | Version Version Get | | b 3 86 13 86 25 |
| 0 | W | | | | | - | - | - | 0.20 | 22 | Basic Version Get | | 16 3 86 13 20 5 |
| 0 | W | | | | | - | - | - | 0.20 | 22 | SensorBinary Version Get | | 16 3 86 13 30 5 |
| 0 | W | | | | | - | - | - | 0.20 | 22 | Configuration Version Get | | 16 3 86 13 70 5 |
| 0 | W | | | | | - | - | - | 0.20 | 22 | ManufacturerSpecific Version Get | | 16 3 86 13 72 5 |
| 0 | W | | | | | - | - | - | 0.20 | 22 | Battery Version Get | | 16 3 86 13 80 5 |
| 0 | W | | | | | - | - | - | 0.20 | 22 | Wakeup Version Get | | 16 3 86 13 84 5 |
| 0 | W | | | | | - | - | - | 0.20 | 22 | Association Version Get | | 16 3 86 13 85 5 |
| 0 | W | | | | | - | - | - | 0.20 | 22 | Version Version Get | | 16 3 86 13 86 5 |
| 0 | | | | | | - | - | - | 0.20 | 11 | SwitchMultilevel Set | | b 3 26 1 40 25 |

A legend informs about the meaning of the different flags n, U, D, E, S and W. The timeout value counts back from 20 seconds once the job was sent. Even when it was completed the job will stay in the queue marked as done (D) for some more time to allow inspection. The target node ID, a description of the communication message, a information about the process and the real Bytes of the message are shown as well.

| Role in Network | |
|---------------------|--|
| Node Id: | 1 |
| Home Id: | 0xfd294c29 |
| Primary Role: | yes |
| Primary Capability: | yes |
| SUC/SIS in network: | No SUC/SIS present |
| Hardware | |
| Vendor: | RaZberry by Z-Wave.Me |
| Vendors Product ID: | 2 / 3 |
| Z-Wave Chip: | ZW0301 |
| Firmware | |
| Library Type: | Static Controller |
| SDK Version: | 4.54.01 |
| Serial API Version: | 04.02 |
| Z-Way Version | |
| Revision Version: | v1.7.2 |
| Revision ID: | 428d48e765a32b39615c073af93e8666497724c9 |
| Revision Date: | 2014-07-26 15:20:00 +0400 |

The second block gives detailed information about the Role of the controller in the network, the Z-Wave transceiver hardware used, firmware running on the Z-Wave transceiver and the release information of the Z-Way software. This information may be needed during support and debugging.

The controller is a special node in the network but still a node. Therefore buttons allow accessing the device specific data of the controller and issue a Node Information Frame. A third button gives access to the controller specific data. Most of these data is only relevant to developers.

```

controller.data: None (18.08.2014)
nodeId: 1 (18.08.2014)
homeId: -47625175 (18.08.2014)
SUCNodeId: 0 (18.08.2014)
isPrimary: true (18.08.2014)
isInOthersNetwork: false (18.08.2014)
isRealPrimary: true (18.08.2014)
isSUC: false (18.08.2014)
SISPresent: false (18.08.2014)
libType: Static Controller (18.08.2014)
SDK: 4.54.01 (18.08.2014)
ZWlibMajor: 3 (18.08.2014)
ZWlibMinor: 42 (18.08.2014)
ZWVersion: 5 (18.08.2014)
ZWWaveChip: ZW0301 (18.08.2014)
APIVersion: 04.02 (18.08.2014)
manufacturerId: 327 (18.08.2014)
vendor: RaZberry by Z-Wave.Me (18.08.2014)
manufacturerProductType: 2 (18.08.2014)
manufacturerProductId: 3 (18.08.2014)
capabilities: 2,3,4,5,6,7,8,18,19,21,32,35,36,65,66,70,71,72,73,74,75,77,80,81,83,84,85,86,87,96,97,98,99,128,210,240,241,242,243 (18.08.2014)
controllerState: 0 (12:27)
nonManagementJobs: 0 (18.08.2014)
lastIncludedDevice: None (10:03)
lastExcludedDevice: None (10:03)
secureInclusion: true (11:41)
oldSerialAPIAckTimeout10ms: 10 (18.08.2014)
oldSerialAPIByteTimeout10ms: 10 (18.08.2014)
curSerialAPIAckTimeout10ms: 10 (18.08.2014)
curSerialAPIByteTimeout10ms: 10 (18.08.2014)

```

The last block shows the availability of the function calls on the serial API between the Z-Wave transceiver and Z-Way. 'Not implemented' means that Z-Way is either not knowing about the function indicated by the function ID or does not make any use of it. A red function call id or name indicated that Z-Way is able to use this function but the transceivers firmware did not report to offer this service.

Z-Wave Terms

The following Z-Wave terms are used in this manual:

- **Static controller** is a Z-Wave device with capabilities to manage the network available on a fixed location in the home
- **Secure environment**: For sensitive applications like door lock control Z-Wave offers an enhanced encryption wrapping defined in the command class Security.
- **Controller Replication**: *Copy the information of one controller to another controller*
- **SIS**: The central database of nodes and ids.
- **Primary Controller**: If no SIS is present one controller becomes the primary controller only able to include new devices
- **Secondary Controller**: If no SIS is present, all other controllers than the primary controller are called secondary
- **Inclusion**: the process of bringing new Z-Wave devices into a network
- **Exclusion**: the process of removing Z-Wave devices from the network
- **Association** is a control relationship between a controlling device and a controlled device
- **Association Group** is the list of devices controller by association
- **SwitchMultilevel, SwitchBinary and Basic** are certain command classes
- **Node Information Frame** is a special wireless message issued by a Z-Wave device to announce its capabilities and functions.

Command Classes Controlled/Supported:

Alarm V2 Controlled, Alarm Sensor V1 Controlled, All Switch V1 Controlled, Application Status V1 Supported, Association V2 Supported and Controlled, Association Group Information V1 Supported and Controlled, Basic V1 Supported + Controlled, Battery V1 Controlled, Binary Sensor V2 Controlled, Binary Switch V1 Controlled, Central Scene V1 Controlled, Climate Control V1, Controlled, Clock V1 Supported and Controlled, Configuration V1 Controlled, CRC16 V1 Supported + Controlled, Device Reset Supported + Controlled, Door Lock V1 Controlled, Door Lock Logging V1 Controlled, Firmware Update V1 Controlled, Indicator V1 Controlled, Manufacturer Specific V1 Supported + Controlled, Meter V3 Controlled, Meter Table V1 Controlled, Multichannel V3 Controlled, Multichannel Association V2 Controlled, Multicommand V1 Controlled, Multilevel Sensor V6 Controlled, Multilevel Switch V3 Controlled + Supported, Node Naming V1 Controlled + Supported, Powerlevel V1 Supported + Controlled, Protection V2 Controlled, Scene Activation V1 Supported + Controlled, Scene Actuator Conf V1 Controlled, Scene Controller Conf V1 Controlled, Security V1 Supported and Controlled, Sensor Configuration V1 Controlled, Thermostat Fan Mode V3 Controlled, Thermostat Fan State V3 Controlled, Thermostats Mode V3 Controlled, Thermostat Operating State V1 Controlled, Thermostat Setpoint V3 Controlled, Time V2 Supported + Controlled, Time Parameter V1 Controlled, User Code V1 Controlled, Version V2 Supported + Controlled, Wakeup V2 Controlled, Z-WavePlus V1 Supported + Controlled