The RaZberry Smart Home Controller （user manual）

Version 2.1

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.
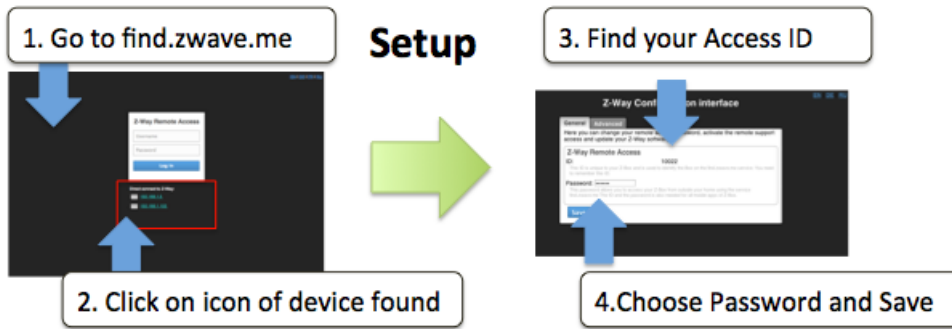
Quick Start for the rest of us

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 raspberry.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 raspberry.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.

1. Go to find.zwave.me

Setup

3. Find your Access ID

2. Click on icon of device found

4. Choose Password and Save

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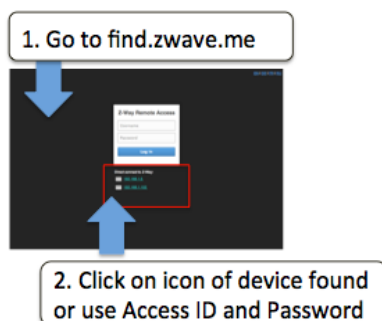
1. Find your RaZberry ID and remember it for remote access to your system.
2. Choose a password that will be used to authenticate for the remote access in the future. Whenever you access your RaZberry within your local network (as the first time) you will not need a password.

The Configuration service uses the cloud infrastructure on find.zwave.me for the following functions:
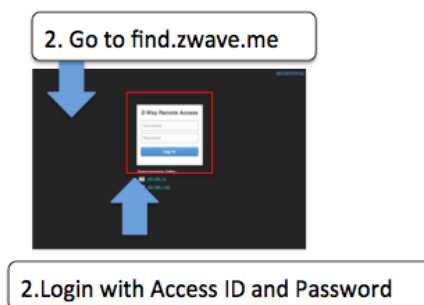
- **Find the IP Address** of your RaZberry. You just used this function.
- **Remote Access** when you are outside your home. For this a valid password is required – see above.
- **Firmware Update**: Just click on the firmware update tab and follow the instructions
- **Remote Support**: This function 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

1. Go to find.zwave.me

2. Click on icon of device found or use Access ID and Password

Access on the road

2. Go to find.zwave.me

2.Login with Access ID and Password

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.
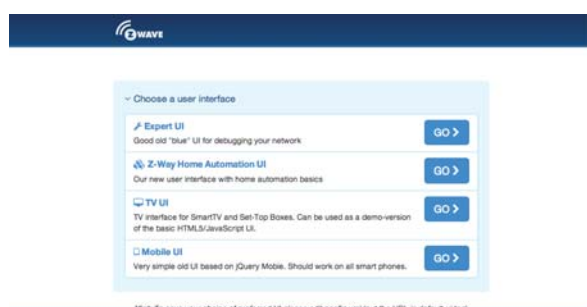
In case there is more than one controller in the network the controllers need to be kept synchronous in regard to their knowledge of the network. This is called *Controller Replication* and the following policy applies: (a) in case there is a *SIS* in the network (check in Controller Info menu) every 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.

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

# ▾	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

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.

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		Check all
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** (#8) CP Jal **Double press and press-hold of up/down buttons** (#8) CP Jal	Change
14	SL Deckenlicht	**Single press and hold of up/down buttons** (#15) SL Schrank **Double press and press-hold of up/down buttons** (#15) SL Schrank	Change

Configuration

The Configuration Tab allows configuring the functions of the device. Pick the device to be configured from the drop down list to access four tabs.

Interview

Configuration for CP Deckenlicht (#3) ▾

Interview　　Configuration　　Association　　Expert commands

Change device name ✏

Node Id	3
Name	CP Deckenlicht
Brand	Z-Wave.Me
Device type	Binary Power Switch
Product	Flush-Mountable Switch v1.3
Description	One paddle wall switch
To (re-)include	Button triple press
Interview stage	Interview complete + +++ ++++++++++
Device state	✔ Device is operating
Application version	1.3
SDK version	4.52.01
Command Class	Basic, SwitchBinary, SwitchAll, Configuration, ManufacturerSpecific, PowerLevel, Protection, NodeNaming, Association, Version, Indicator, MultiChannelAssociation

The device interview section shows the result of the device interview. In this process the controller tries to get information about the device. In case the controller find a device description record for the device it will display further information about the device that can not be obtained from the device itself. If the software will not automatically recognize the device and load the description record a button "Choose Device Description Record" allows to do this manually.

The interview stage line gives information about the progress of the device interview by splitting it into the different command classes supported by the device. '+' indicate a successful interview, 'O' a permanent fail and a '.' that this command class is still in the waiting queue to be completed. There are a few reasons why an interview is not complete: In most cases the devices went to deep sleep too early to has some problems. The button "Force Interview" allows re-doing the whole interview. The button "Request NIF" requests a Node Information Frame from the device and the Button "Show interview results" allows displaying the information about the different command classes found during the interview. It is also possible to force the interview of a certain command class only.

Interview results

Interview results for device CP Deckenlicht

Instance	CommandClass	Result
0	Basic	Done
	SwitchBinary	Done
	SwitchAll	Done
	Configuration	Done
	ManufacturerSpecific	Done
	PowerLevel	Done
	Protection	Done
	NodeNaming	Done
	Association	Done
	Version	Done
	Indicator	Done
	MultiChannelAssociation	Done

Close

The only configuration option on this tab is to change the given name of the device. During inclusion the software generated a generic name but it is highly recommended to change this name. The given name should be descriptive bit not too long.

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 where received from the device (Beware, that an update may be delayed if the device if battery operated an in deep sleep state)

- **Wakeup:** Define the wakeup interval and the node is of the main controller taking care of the wakeup sequence. The controller will set a standard wakeup time of 1800 seconds unless the devices 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.

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.

Expert Commands

In case the device supports a firmware update 'over the air' this dialog is shown to perform such a firmware update. A URL in the format http://IP:PORT/file for the new firmware file needs to be provided. The firmware file must be available in a raw 'BIN' format. The common 'HEX' format common for the firmware file will not be sufficient. 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.

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.

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 mays 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.

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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.

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 stays 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)
ZWaveChip: 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: 2,3,4,5,6,7,8,18,19,21,32,35,36,65,66,70,71,72,73,74,75,77,80,81,83,84,8
5,86,87,96,97,98,99,128,210,240,241,242,243 (18.08.2014)
controllerState: 0 (12:27)
nonManagmentJobs: 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.

FCC STATEMENT :

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.