Welcome to SAGE Home Automation

Contents

Purpose:

The document describes basic and advanced features of the SAGE Home Automation system using Z-Wave technology. The document covers INCLUSION and EXCLUSION modes as well as ADVANCED MODES including REPLICATION, LEARN MODE, and FACTORY RESET. Also included are CONTROLLED COMMANDS for different devices.

Acronyms and Definitions:

Home Automation – "HA"
Popup – "PU"
Pairing – When a device or controller is placed in INCLUSION mode.
Un-Pairing – When a device or controller is place in EXCLUSION mode.
Tile(s) – synonymous with icons
SAGE – SAGE Home Automation controller

SAGE Home Automation Setup

Connect the SAGE board to the TV using a HDMI cable. Plug in the network cable in the designated Ethernet port on the SAGE. Press the button on the back of the SAGE to pair the remote. You will see a "Searching" message on screen. Now press and hold the Thermostat+Camera buttons together to pair the remote. Do not release until the pairing is complete. Once paired you should be able to navigate through the tiles on the user interface.

NOTE: Currently the remote is in beta and you may face difficulty pairing or using the remote. To ensure that the remote wasn't previously paired press and hold the Lights+Back button for 15 seconds. Take out the batteries, wait for a few seconds and then put them back in. Try the pairing process again. On SAGE reboots the remote may be unresponsive. In this case, take out the batteries, wait for a few seconds and then put them back into the remote. This should make the remote function once again.

Introduction:

Screen Layout:

The screen contains tiles, icons and sub-menus for various devices, including: Cameras, Locks, Lights, Thermostats and Sensors. A Rules and a Settings tile are also included. To access Z-Wave home network setup, press the Settings tile. There are 4 main tiles on the left of the screen each containing sub-tiles. Navigate to System Settings -> Diagnostics and press the tile to access the.

The Advanced Z-Wave tile contains all the network management features of the Z-Wave controller. To ensure that the controller is correctly setup, verify that the HomeID and the controller Status is visible on screen.

If these two fields do not show up try restarting the controller.

ADD (INCLUSION):

This controller is a Z-Wave security enabled controller and can perform secure inclusion of security - enabled Z-Wave products into the network.

- Enter the Advanced Z-Wave tile using the instructions at the top.
- To add a device, press the Add Other Device tile. Place the device in inclusion mode by using the device's Z-Wave Network button. (Refer to product documentation of the device for more details.). This will put the controller into inclusion mode.
- To cancel the inclusion process, simply press the Add Other Device tile again.

- You should see "Inclusion – Started" message in the message box. *"Inclusion – Canceled"* message is displayed if you cancel inclusion mode*.
- On successful inclusion of a device you will see an "Inclusion – Success" message.
- In case you see "Inclusion – Failed! Not_primary" message, ensure that the controller's status is primary. A secondary controller cannot include or exclude devices.
- A "rejoin:<number>" message denotes that the device you are trying to include is already a part of the network.
- After adding the device, it will be accessible through the appropriate device category in the HA main screen. E.g. if a light is included, it will be accessible through the "Lights" section of the HA main menu. You can also use the quick navigation buttons on the remote to go into the device list.
- After adding an unknown device, it will be accessible through the "Other Devices" tile in the Advanced Z-Wave screen.
  - Unknown devices will be given a default name such as "unknown_device_xx" where xx is a number starting from 0 and incremented each time an unknown device is added.
  - The only operation that can be performed on an unknown device is a "Basic Set" and a "Basic Get", where only the values 0x00 and 0xFF are supported.
  - These operations can be triggered by selecting and pressing the device action button.
  - The interpretation of these values is completely up to the device, and may or may not perform meaningful actions.

The following device categories are supported by the controller:

- Light (On/Off and dimmable)
- Thermostat
- Lock
- Contact sensor
- Any Z-Wave device from any manufacturer can be included in the SAGE Z-Wave network.
- If the device category is not supported (**e.g**. if the device is a metering device), the device can only perform a basic set and get.
- This is usually a symbolic operation performed to demonstrate bare minimum device compatibility; it is a useful operation depending on the device type.

- A device that is "always powered" (i.e. plugged into a power source or always on) can act as a repeater for other nodes in the Z-Wave network and allowing interaction with end devices which would otherwise be outside the controller's range.
- Devices that support repeater functionality can relay messages from the controller to the end device, to another device that may be able to reach the end device, or forward it to another device.

Please note that this will cancel inclusion only if inclusion has not been triggered already on another device. Once triggered, attempting to cancel inclusion on the device to be included produces an undefined result.

REMOVE (EXCLUSION):

- Enter the Advanced Z-Wave tile using the instructions at the top.

- To remove a device, press the Remove Other Device tile. Place the device in exclusion mode by using the device's Z-Wave Network button. (Refer to product documentation of the device for more details.). This will put the controller into inclusion mode.
  - To cancel the exclusion process, simply press the Remove Other Device tile again.
  - You should see "Exclusion – Started" message in the message box. *"Exclusion – Canceled"* message is displayed if you cancel exclusion mode.
  - On successful exclusion of a device you will see an "Exclusion – Success" message.
- In case you see "Exclusion – Failed! Not_primary" message, ensure that the controller's status is primary. A secondary controller cannot include or exclude devices.
- In case you see a "Device unpaired or in factory default state" message, the device you tried to exclude was not a part of the network or was factory reset.
- If the device cannot be excluded, first cancel exclusion mode*, then try controlling the device to ensure it can be controlled. If it cannot be controlled, use the Remove failed device option as explained below.

Please note that attempting to control a device when the SAGE is a network operation mode may result in undefined results. It is suggested to cancel the network operation and then try to control the device

LEARN MODE:

- Enter the Advanced Z-Wave tile using the instructions at the top
- Prior to proceeding with Learn Mode ensure that there are no devices in the network.
- Pressing the "Learn mode" tile will put the controller into learn mode. You should see a "Learn mode – Started" message in the box.
  - To cancel learn mode, simply press the Learn tile button again. You should see a "Learn mode canceled" message in the box.
  - On successful completion of learn mode, a "Learn mode – Success" message is displayed

- Learn mode is used when the controller is to be included into another Z-Wave network as a secondary controller or inclusion controller in the presence of a SUC/SIS. It inherits the including controller's network through replication of protocol data.
  - The Home ID and controller status may change after learn mode is complete.
  - Return to the Advanced Z-Wave tile to see if the status of the controller has changed. This may take a couple of minutes.
  - Network information of the new primary controller is replicated to the included controller.
- This controller supports secure inclusion of the host controller into another Z-Wave network.
- After regular inclusion has finished, there is a 10-second window during which secure inclusion is attempted.
- If the including controller does not support secure inclusion, the process will time out and the device list will be updated as before. Learn Mode can be cancelled during this time.
  - If secure inclusion times out or is canceled by the user, the host controller is still part of the primary controller's network. Secure operations cannot be performed. Secure devices like locks cannot be included into the network at this point.
- Attempting to cancel Learn Mode during any other time window, produces undefined results.
- Learn mode is also used to exclude the controller from another network.
  - Activate exclusion on the primary controller in the network and start learn mode on the host controller to exclude the host controller from the network.
- If the primary controller has activated controller shift, learn mode allows the host controller to accept primary control along with replication of protocol data.

COPY (REPLICATION):
- Replication is the process of copying or transferring a Z-Wave network from one controller to another.
- The controller is capable of replicating its network to an including controller, as well as accepting the network of another including controller.
  - This is possible through the "Learn mode" and "Inclusion" operations already described above.
- Your controller is capable of inheriting the network of another controller when included by that controller when in learn mode
- Another controller is capable of getting network replication when the SAGE includes another controller through inclusion process.

FAILED DEVICES:
- If the controller cannot communicate with a device included in the network, the device is put on the Failed Devices list in the Advanced Z-Wave screen.
- This can occur when the device is out of range, has been factory reset, is not powered and other cases.

- If the device communicates to the controller at a later time, the device is taken off the failed list.
- The user also has the option to Remove a failed device or Replace a failed device.
  - These options are only available for failed devices.
  - In case the user wants to remove an active device, he/she has to use the exclusion mode option as described above.

REMOVE FAILED:
- To remove a failed device, first ensure that the device is listed in the Failed Devices screen. Otherwise follow the normal process for exclusion of a device.
- In the Failed Devices screen, navigate to the device you want to remove from the network.
- Select the Remove button in front of the device.
- The device should disappear from the list. This can imply two things:
  - The device has been removed from the network and is not available to control.
  - The device is active and can be controlled using the HA main menu device listings.

REPLACE FAILED:
- Replace is the process of removing a failed device and replacing it with an equivalent device.
- It is not a valid operation to replace one type of device with another type of device. E.g. replacing a basic light with a dimmer module.
- It is suggested that the failed device is replaced with an equivalent device type. Any deviation to this norm may lead to undefined results.
- Ensure that the replacement device is not a part of the network. It is suggested that you first exclude the replacement device from the network. Replacing a failed device with a device already included in the network or a device not in factory reset condition may lead to undefined results.
- To replace a failed device, ensure that the device is listed in the Failed Devices screen.
- In the Failed Devices screen, navigate to the device you want to replace.
- Select the Replace button. This removes the failed device and the controller is ready to accept the replacement device. You can cancel replacement of the failed device by pressing the Replace button once again.
- Place the replacement device in inclusion mode by using the device's Z-Wave Network button. (Refer to product documentation of the device for more details.).
- This failed device should disappear from the Failed Devices list at this point. You should be able to see the replacement device in the HA main screen device list or the Other Devices screen based on the type of the replacement device.

FACTORY RESET:

Important: *Perform this operation with care. Use the reset procedure only when the primary controller is missing or inoperable.*

- To access the factory reset function, navigate to the Advanced Z-Wave tile.

- Press these buttons on the remote in sequence: **<332211>.**
- This will display hidden tiles in the tile list. Navigate to the Factory Reset tile.
- Select/Press the System Reset option to initiate a factory reset of the controller.
  - A popup will be displayed to confirm your desire to reset.
- The factory reset (reset dongle) button is used to recover the controller from situations that cannot be recovered from by normal means.
- The factory reset button will:
  - Reset the controller
  - Obtain a new home ID if the old home ID was in the randomizing range
  - Remove all devices from the network (devices will need to be factory reset if they were not excluded properly before the reset.)
  - Designate the controller as the primary SUC/SIS controller
  - The status of the controller, after a factory reset, will change to Primary: SUC/SIS.
  - After performing the factory reset, the SAGE Home Automation controller will reboot.
  - You will have to reset the remote and pair is once again. To reset the remote hold down the Lights and Back buttons together for 15 seconds.

CONTROLLED COMMANDS AND FUNCTIONS:

- The Z-Wave controller is capable of controlling the following types of devices with some specific functions:

Basic (On/Off) lights
- To set the level to on or off, press the light in the Lights device list.
- This light graphics denote the current level. If the light graphic is yellow in the center, this means that the light is on, and you can switch it off by pressing it. The status will update automatically to reflect the light's new state.
- Currently the SAGE controller can only set all the endpoints of a power strip on or off, provision to control individual endpoints is unavailable.
- The SAGE HA controller does not support Basic Commands. All ***Basic Commands are ignored*** by the controller

Dimmable lights
- Set the level from 0-100, with increments of 10 (i.e. you can set the level to 0,10,20…and so on till 100.)
- Set the level to On. This will set the level to "restore last non-zero level", which will get set to the last non-zero level of the light (if the light supports this), or to 100.
- Set the level to Off. This will set the level to 0. The "restore" level (last non-zero level) of the dimmer is preserved, if the light has support for it.

Locks

- Set the lock to Locked or Unlocked and get lock updates* when manually locked or unlocked.
- Updates from the lock that cannot be parsed puts the lock in a jammed state.
- Jammed state implies that the lock is actually jammed and the status is unknown. It can also occur when the lock is not securely included into the network.

Contact sensors

- Get updates* when the sensor is opened or closed. The battery level of the contact sensor is queried when it is added and when it sends a wake up notification.

Thermostats

- Set the system mode to heat, cool, or off, and get updates* when manually changed.
- Set the set point (target) temperatures for heat and cool modes, and get updates* when manually changed.
- Set the fan mode to auto or on, and get updates* when manually changed.
- View the current temperature and get updates* when temperature changes.

Multichannel Devices

- Endpoints of multichannel devices show up as individual devices.*
- If the endpoint is a known device like on/off switch, dimmer, thermostat etc. then the endpoint will appear in the relevant device screen.
- If the endpoint is unknown it will show up in the Other Devices tab in the Advanced Z-Wave menu. Control of unknown devices is limited to on/off.
- Removing any one endpoint device results in removal of all the devices of that multichannel device.
- If one endpoint of a multichannel device fails, removing or replacing the failed device will results in removal of all the devices of that multichannel device as well.

* Note: The root device itself does not show up in the device list. Only the endpoints of the root device are exposed to the user

All other devices

- Set the "Basic set" value to 0x00 or 0xFF. The interpretation of these values is completely up to the device.

* Note: Updates received from the device if the controller is primary and it has an association with the device. When the controller is an Inclusion controller it does not associate with the groups in the devices and hence does not receive updates

ASSOCIATION GROUPING:

- The SAGE Home Automation controller supports Association command class.
- It only supports one association group with GROUP_IDENTIFIER = 1.
- A maximum of 5 devices can be added to group 1 named "Lifeline"

- The controller sends a Device Reset Notification to all the members of the Association Group 1.
- If a device wants to receive a reset notification from the SAGE HA controller, it can send an Association Set command with Group Identifier = 1.
- The SAGE also queries the association groups of a device during inclusion.
- If the association group contains a command class that is relevant to the SAGE, it sends an Association Set command with the SAGE node id and the association group number to that device.
- If the device is a multichannel device, a Multi-Channel Association Set command is sent with the SAGE controller node id.

ADDITIONAL INFORMATION:

- While most of the controlled commands are self-evident while controlling the devices, some commands are restricted to the behavior of the devices.
- The controller supports Power level command class which lets another device control the power level of the device.
    - The SAGE HA controller can be set to a certain power level with a timeout.
    - In case the SAGE is set to normal power, the timeout field is ignored
- The SAGE can also parse certain messages sent by a Multichannel device. If the end-point is of a device that the SAGE can control, the message is un-encapsulated and treated as a message from the root device.
    - If the command is a valid command for the root device it will be parsed and correctly reflected.
    - E.g. If a Thermostat has a Sensor Multilevel type endpoint and the endpoint sends and encapsulated Multichannel command of Sensor Multilevel Report, the command is un-encapsulated and treated as a Sensor Multilevel Report from the root Thermostat device and the temperature change is reflected.
    - If the encapsulated command is not a valid command for the endpoint or something that cannot be controlled, the SAGE ignores the command. E.g. The Multichannel encapsulated Sensor Multilevel Report is for humidity, something that is currently not shown in the user interface, the command is ignored.
- The SAGE also supports CRC encapsulated commands.
    - Note that Security encapsulation and CRC encapsulation is mutually exclusive. It not valid to send a Security CC command with CRC encapsulation.
    - Any other command supported by the SAGE can be sent using CRC encapsulation.
    - The SAGE responds to an encapsulated command with an encapsulated response