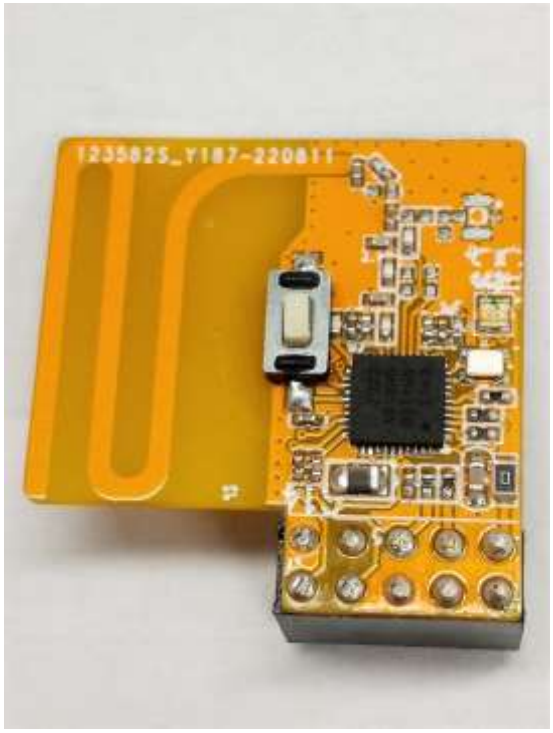
Zooz 800 Series LR Z-Wave Plus™ GPIO Module Engineering Specifications



The Z-Wave Plus GPIO Module is a Z-Wave™ interface module that's designed to send and receive wireless Z-Wave commands to and from compatible smart home products in the home. It is to assemble to Raspberry Pi to act as a Z-Wave controller to control the Z-Wave sensors and actuators. This module is designed in Z-Wave 800 series SiP to adopt standard S2 and SmartStart native protocols.

The Z-Wave Plus GPIO Module that can include other nodes using Z-Wave Long Range MUST indicate how to change the bootstrapping mode (Z-Wave SmartStart vs. Z-Wave Long Range SmartStart) of provisioning list entries.

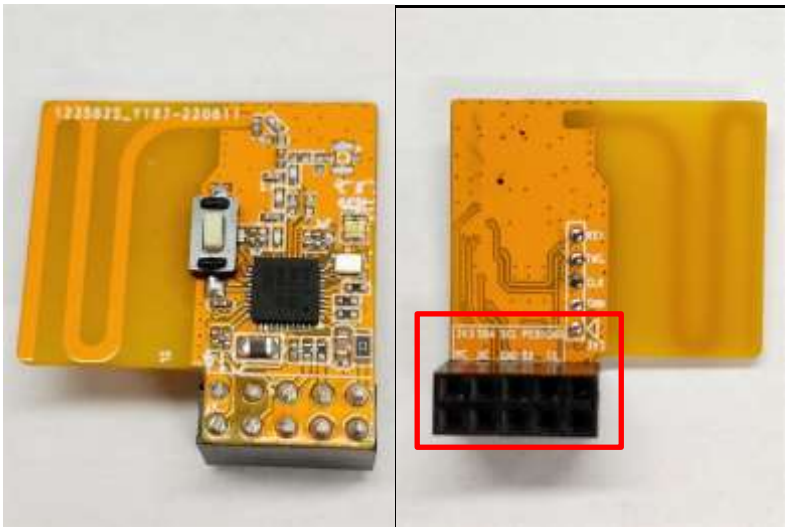
Features:

- Z-Wave Plus™ Static Controller.
- support new features for Z-Wave Long Range, including 4x wireless range, 10x node scalability for larger network.
- Latest S2 security protocol for a truly private network.
- Works with SmartStart Z-Wave devices.
- New 800 chip for batter performance than ever.
- Extended range up to 2500 feet in open space.
- Faster, more secure, and lower power than 500 series.

1 Technical Specifications

Model Number	ZAC93
Communication Protocol	Z-Wave Plus
Z-Wave Radio Frequency	908.42MHz
Z-Wave LR Radio Frequency	912.00 MHz(default channel) 920.00 MHz(back up channel)
SDK Version	7.18.01
Wireless Range	Up to 400 feet line of sight
Power&Data	UART
Operating Temperature	32-104° F (0-40° C)
Operating Humidity	Up to 85% non-condensing

2 Familiarize yourself with Z-Wave Plus GPIO Module



3 Security and non-Security features

3.1 Supported Security Levels

- SECURITY_KEY_S0
- SECURITY_KEY_S2_UNAUTHENTICATED
- SECURITY_KEY_S2_AUTHENTICATED
- SECURITY_KEY_S2_ACCESS

3.2 Commands List

Command Classes	Version	Required Security Class
COMMAND_CLASS_ZWAVEPLUS_INFO_V2	2	None
COMMAND_CLASS_TRANSPORT_SERVICE_V2	2	None
COMMAND_CLASS_SECURITY_V1	1	None
COMMAND_CLASS_SECURITY_2_V1	1	None
COMMAND_CLASS_SUPERVISION_V1	1	None
COMMAND_CLASS_APPLICATION_STATUS_V1	1	None
COMMAND_CLASS_INCLUSION_CONTROLLER_V1	1	None
COMMAND_CLASS_CRC_16_ENCAP	1	None
COMMAND_CLASS_BASIC_V2	2	Highest granted Security Class
COMMAND_CLASS_CONFIGURATION_V4	4	Highest granted Security Class
COMMAND_CLASS_ASSOCIATION_V2	2	Highest granted Security Class
COMMAND_CLASS_ASSOCIATION_GRP_INFO_V3	3	Highest granted Security Class

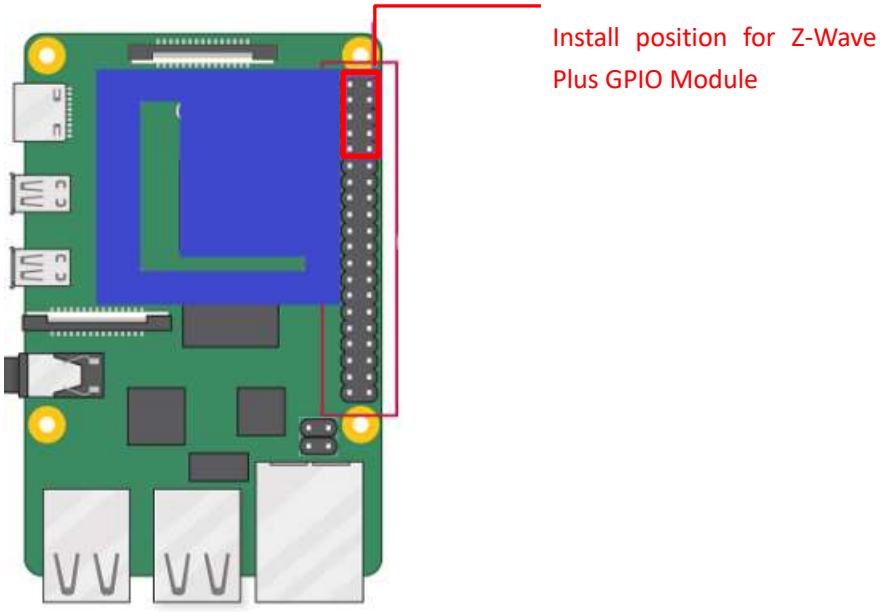
COMMAND_CLASS_VERSION_V3	3	Highest granted Security Class
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2	2	Highest granted Security Class
COMMAND_CLASS_DEVICE_RESET_LOCALLY_V1	1	Highest granted Security Class
COMMAND_CLASS_POWERLEVEL_V1	1	Highest granted Security Class
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V5	5	Highest granted Security Class
COMMAND_CLASS_INDICATOR_V3	3	Highest granted Security Class

4 Quick Start

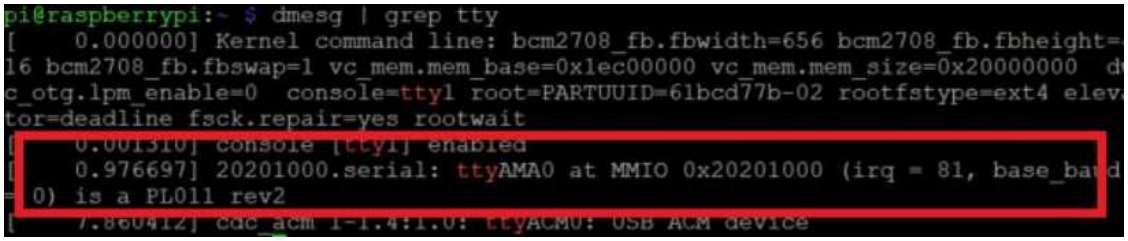
Use this Z-Wave Plus GPIO Module as a Z-Wave radio for your DIY smart home system. Simply connect it to a Raspberry Pi and match it with home automation software (host software) of your choice to enjoy a fully secure, private Z-Wave Plus mesh network.

4.1 Set up Respberry Pi

a. Install Z-Wave Plus GPIO Module into RespBerry Pi via the 10-pin connector.



b. Determine the virtual port that your Z-Wave Plus GPIO Module is connected to. If using Linux executing“dmesg | grep tty” through cmd prompt will give you a list of all tty devices connected. Usually Z-Wave Plus GPIO Module shows as a /dev/ttyAMA0 device.



c. Open the selected third party software.

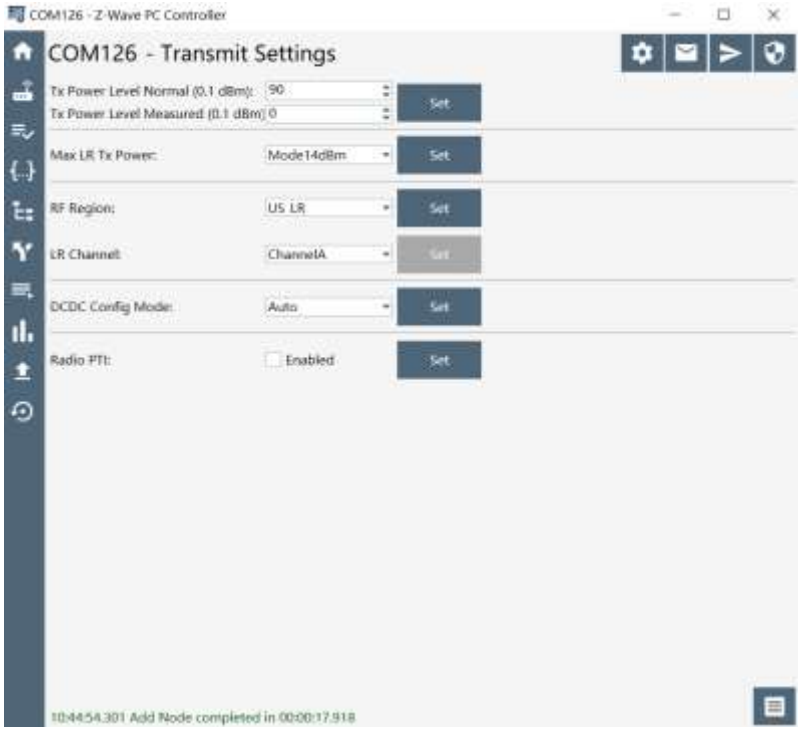
d. Follow that software's instructions for connecting a Z-Wave adapter. Select the COM or the virtual port Z-Wave Plus GPIO Module is associated with.
In most cases, any devices already paired with Z-Wave Plus GPIO Module network will automatically show up in the software's interface.

To include a new device into the system.
1. Set your automation software into its 'add device' mode in order to connect a Z-Wave device. Refer to the software's instructions if you are unsure of how to perform this step.
2. On Z-Wave devices, press the Pair Button on the device which you want to add into the Z-Wave network. Please refer to the device's manual for inclusion operation.
3. You will see the name of the device on the software's interface when it is successfully added.
4. Repeat the previous to include any further devices.

Reset the Z-Wave Plus GPIO Module.
To reset your Z-Wave Plus GPIO Module please refer to the automation software of your host PC. Please use this procedure only when the network primary controller is missing or otherwise inoperable.
Note: If you reset your Z-Wave Plus GPIO Module, it will disconnect from all your Z-Wave nodes.

4.2 Set up Z-Wave Long Range

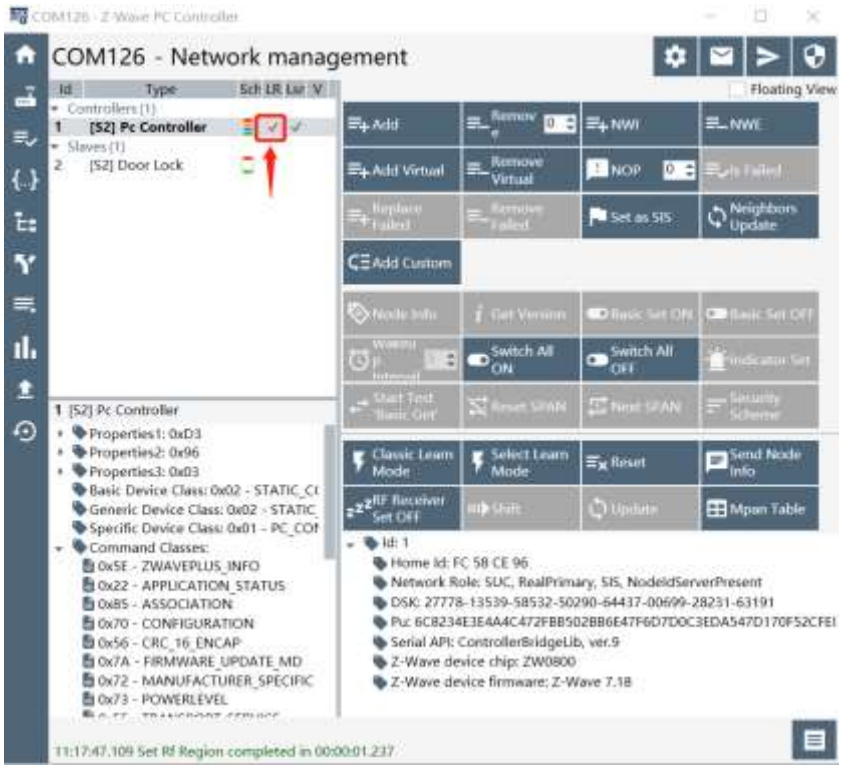
Connect the Z-Wave Plus GPIO Module to your windows computer via USB-UART tool.
There are 2 channel for Z-Wave Long Range, 912 MHz default channel and 920 MHz back up channel. PC Controller provides a 'Transmit Settings' View which can be used to change the frequency easily.



Setting Region to "US_LR" will enable the Long Range capability for the controller. For further LR

Channel selection, you can configure it through the LR Channel option. ChannelA represents the 912 MHz and it is used by default while ChannelB represents the 920 MHz back up Z-Wave Long Range channel.

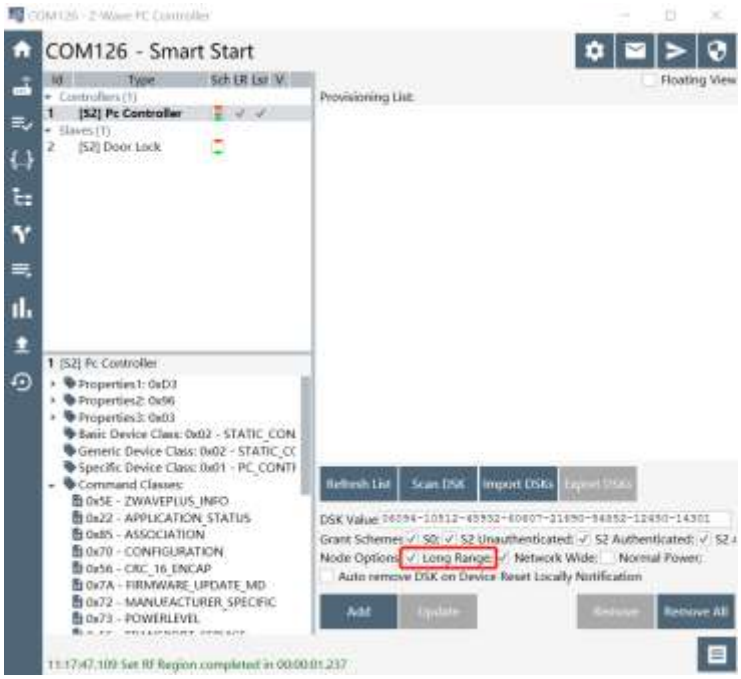
After connecting the Z-Wave Controller to PC Controller, you are expected to see the red tick below 'LR', indicating that the controller can support Z-Wave Long Range.



Joining Network

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

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



In the scanning process when using US_LR frequency, the end device will switch between 2 PHY setups, the classic US PHY and the LR PHY with both LR channels active. When the inclusion of end device starts, it will settle on using the PHY that was used by the controller for inclusion. In other words, during learn mode, a end node that support LR will send SmartStart Prime on both classic Z-Wave and Z-Wave LR PHY, both request are send up to the host on the controller and it is the host's responsibility to determine which PHY is used for inclusion.
The controller doesn't do channel scanning the same way as in end device. The controller will scan 4 channels, including 3 classic Z-Wave channels 9.6/40/100 kbps and 1 LR channel, using US_LR frequency will scan at 912 MHz while using US_LR_BACKUP will scan at 920 MHz during startup. The active LR channel can be switch at runtime.

5 Special Rule of Each Command

5.1 Basic Command Class

Basic CC not maps to any CC

5.2 Association Command Class

The Stick support 1 association groups and max 232 nodes.

Grouping Identifier	Max Nodes	Send Commands
Group 1(Lifeline Group)	232	Basic Report.

5.3 Indicator Command Class

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