

Noise Monitor (SigmaNu) Z-Wave™ Specification

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Change Log

Release	Date	Modification
A	April 28, 2021	Draft – initial release
B	April 30, 2021	Added CC Configuration parameter for changing Loudness data reporting period. Added CC Configuration parameters to reset the device, and to query the reset reason. Added CC Notification support to report errors and heartbeat
C	May 4, 2021	Added specifications for various Management command classes Added SmartStart requirement.
D	May 26, 2021	Added configuration parameters for microphone read interval, data aggregation type, and sustain window. Modified configuration IDs to separate data configuration from system-related params.
E	March 14, 2022	Bandwidth Reduction changes
F	April 14, 2022	Bandwidth Reduction – replaced Low Range width with Very-High range width.
G	Sept. 12, 2022	Updated SmartStart requirement section. Updated the manufacturer compatibility section. Added Command Class List. Updated Configuration values to be up to date with the Firmware. Updated and re-organized the Association Command Class section. Updated and moved the Notification Command Class section. Updated the Multilevel Sensor Command class section. Updated the Version Command class section. Added the Indicator Command Class section.
H	Oct. 27, 2022	Some initial cleanup for Technical Cert requirements
K	Nov. 02, 2022	Added Table of Contents Renamed titles to Noise Monitor Added section for Z-Wave Long Range Added statement about Long Range in Association Command Class Lifeline Group Added Smart Start and DSK section
M	Nov 17, 2022	Added statement to 1.4

1 Z-Wave Add and Remove Process

1.1 Adding the Noise Sensor to a Z-Wave network

1. Put Z-Wave controller into Add mode. See Z-Wave controller documentation for further information.
2. Press the pairing button on the side of the control unit. The LED will begin to blink green.
3. The unit has been successfully added to the network when the LED becomes solid green.

1.2 Removing the Noise Sensor from a Z-Wave network

1. Put Z-Wave controller into Remove mode. See Z-Wave controller documentation for further documentation.
2. Press the pairing button on the side of the control unit. The LED will begin to blink green.
3. The unit has been successfully removed from the network when the LED turns off.

1.3 Adding the Noise Sensor to a Z-Wave Network using SmartStart

Noise Sensor is SmartStart enabled and can be added into a Z-Wave network by scanning the Z-Wave QR Code present on the product with a controller providing SmartStart inclusion. No further action is required and the SmartStart product will be added automatically within 10 minutes of being switched on in the network vicinity.

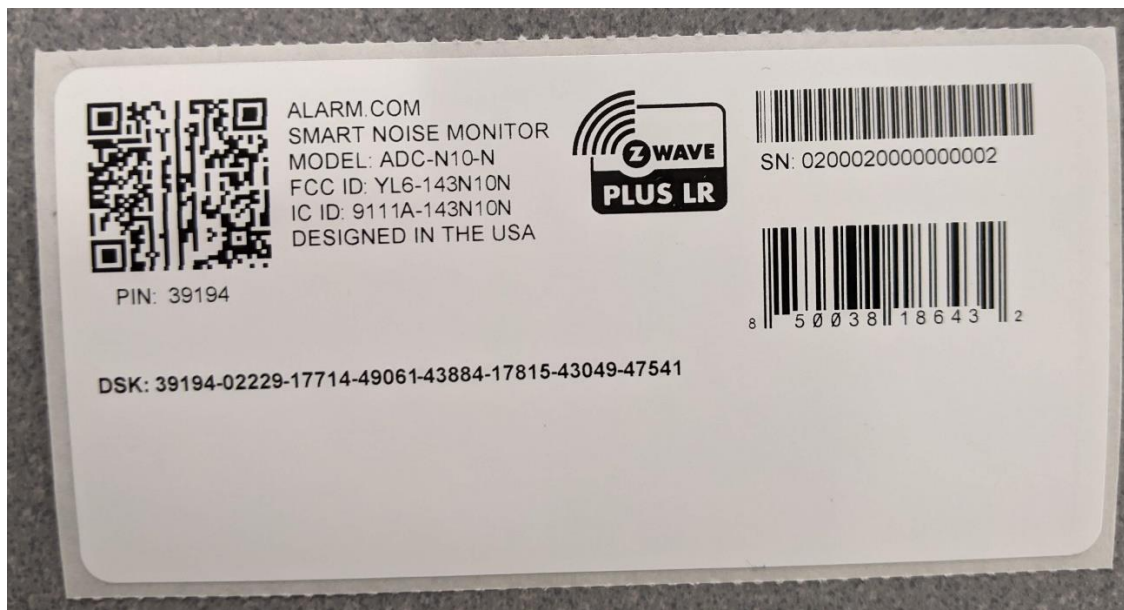
1.4 Reset Noise Sensor to default state

NOTE: This function will forcibly clear the Z-Wave node identification. Please use this procedure only when the network primary controller is missing or otherwise inoperable.

1. Press and hold the pairing button on the side of the control unit 15 seconds. The LED will then alternate red and green until the button is released, at which point the reset process will begin.
2. The device will first send a *Device Reset Locally* notification, which notifies the controller that it should be removed from the Z-Wave network
3. Once the device has been reset, the LEDs will return to their normal state.
4. Device reset will reset NVM, EEPROM, and the Z-Wave chip.

2 Smart Start & DSK

This product can be included into a network using the Smart Start DSK method. The DSK QR code and PIN can be found on the back label of the device and on the box label. The Box label also includes the full DSK string printout.



3 Compatibility with Other Manufactures' Z-Wave Devices

This product can be operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers. All mains operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

4 Z-Wave Long Range

This product supports Z-Wave Long Range and can be included into a Z-Wave network As a node via a controller device. This product does not support including other nodes using Z-Wave Long Range.

5 Command Class List

Command Class	Version	Required Security Class
Association	2	highest granted
Association Group Information	3	highest granted
Configuration	4	highest granted
Device Reset Locally	1	highest granted
Firmware Update Meta Data	5	highest granted
Indicator	3	highest granted
Manufacturer Specific	2	highest granted
Multi-Channel Association	3	highest granted
Notification	8	highest granted
Powerlevel	1	highest granted
Security 2	1	None
Sensor Multilevel	11	highest granted
Supervision	2	None
Transport Service	2	None
Time Parameters	1	highest granted
Version	3	highest granted
Z-Wave Plus™ Info	2	None

6 Configuration Command Class (Version 4)

6.1 Configuration Reset Default

Configuration command CONFIGURATION_DEFAULT_RESET will reset all supported configuration parameters to their factory default settings. This command will not remove the device from the Z-Wave network. Parameter changes made during calibration will get cleared by this call.

6.2 Configuration Parameters:

6.2.1 0x01: Loudness Data Reporting Period – Override

- The time in seconds between Loudness data report when the override is enabled (parameter 0x05)
- Default: 180 seconds (3 minutes)
- Valid Range: 0 – 5400 seconds
- Size: 2 Bytes

6.2.2 0x02: Loudness Data Read Interval

- The time in milliseconds between each read of loudness data from the microphone
- Default: 1000 ms
- Valid Range: 200 – 10000 ms
- Size: 2 Bytes

6.2.3 0x03: Loudness Data Aggregation Type

- The algorithm used for aggregating loudness data
- Default: 4
- Size: 1 Byte - Enumerated
- Valid Values:

1	Instantaneous reading
2	Average of all readings taken during the reporting period
3	Maximum of all readings taken during the reporting period
4	Sustained maximum (over <i>Loudness Data Window</i> seconds)

6.2.4 0x04: Loudness Data Sustain Window

- The time period (seconds) used by “sustained” algorithms to group data.
- Default: 10 seconds
- Valid Range: 2-600 seconds
- Size: 2 Bytes
- Examples:
 - If set to 10, the “Sustained Maximum” algorithm (Aggregation Type set to 4) will return the loudest dB reading that lasted for at least 10 seconds. More precisely, will return the loudest reading among the minimums of every 10-second window in the reporting period.

6.2.5 0x05: Override Loudness Data Reporting Period

- Whether to override the automatic reporting period algorithm with the Universal Loudness Data Reporting Period.
- Default: 0
- Valid Range: 0 - 1
- Size: 1 Byte

6.2.6 0x10: Loudness Data Reporting Period – Low Noise Range

- The time in seconds between Loudness data report, when in the Low Noise Range and the override is disabled.
- Default: 5400 seconds (90 minutes)
- Valid Range: 180 – 5400 seconds
- Size: 2 Bytes

6.2.7 0x11: Loudness Data Reporting Period – Medium Noise Range

- The time in seconds between Loudness data report, when in the Medium Noise Range and the override is disabled.
- Default: 1800 seconds (30 minutes)
- Valid Range: 180 – 5400 seconds
- Size: 2 Bytes

6.2.8 0x12: Loudness Data Reporting Period – High Noise Range

- The time in seconds between Loudness data report, when in the High Noise Range and the override is disabled.
- Default: 600 seconds (10 minutes)
- Valid Range: 180 – 5400 seconds
- Size: 2 Bytes

6.2.9 0x13: Loudness Data Reporting Period – Very High Noise Range

- The time in seconds between Loudness data report, when in the Very High Noise Range and the override is disabled.
- Default: 180 seconds (3 minutes)
- Valid Range: 180 – 5400 seconds
- Size: 2 Bytes

6.2.10 0x16: Medium Noise Range

- Width (dB) of the Medium Noise range.
- Default: 10 dB
- Valid Range: 0-45 dB
- Size: 1 Byte

6.2.11 0x17: High Noise Range

- Width (dB) of the High Noise range.
- Default: 10 dB
- Valid Range: 0-45 dB
- Size: 1 Byte

6.2.12 0x18: Very High Noise Range

- Width (dB) of the Very High Noise range
- Default: 11 dB
- Valid Range: 0-45 dB
- Size: 1 Byte

6.2.13 0x1A: Range Adjust Period

- The duration of recent loudness readings to consider when determining current range
- This parameter only has an effect if the Range Adjust Aggregation Type (parameter 0x1B) is NOT set to Instantaneous (1)
- Default: 10 seconds
- Valid Range: 1 – 65535 seconds
- Size: 2 Bytes

6.2.14 0x1B: Range Adjust Aggregation Type

- Which algorithm to use for determining current range.
- Default: 4 (Sustained Maximum)
- Size: 1 Byte
- Valid Values:

1	Instantaneous reading
2	Average of all readings taken during the reporting period
3	Maximum of all readings taken during the reporting period
4	Sustained maximum (over <i>Loudness Data Window</i> seconds)

6.2.15 0x40: Target Temperature Reporting Period

- The time in seconds between each Multi-Level Sensor report with Temperature data
- Default: 3600 seconds
- Valid Range: 30 – 259200 seconds
- Size: 4 Bytes

6.2.16 0x50: Reset Device (0x0ADC)

- Perform device reset
- Size 2 Bytes
- Write the magic value 0x0ADC to fully reset the device

6.2.17 0x51: ZGM Reset Reason

- Get the reason for last reset of the ZGM130 Z-Wave Radio Chip.
- Size 1 Byte
- Read-only
- Valid Reset Codes:

0	Reset pin
1	Wake-up timer from deep sleep state
3	Watchdog
4	External interrupt event in deep sleep state
5	Power on
7	Software
9	Brownout circuit
0xFF	Other

6.2.18 0x52: Host Reset Reason

- Get the reason for last reset of the device SAMG55 Host chip
- Size 1 Byte
- Read-only
- Valid Reset Codes:

0	Back-up Mode
1	Software Reset
2	Watchdog
3	User/Hardware Reset
6	Power up
7	Other

7 Association Command Class (Version 2)

The Noise Sensor will support a single Association Group (the Lifeline). The maximum number of devices on the lifeline association group is four (4).

7.1 Lifeline Association Group Info

- Name: Lifeline
- Profile: 0x0001 (General Lifeline)
- **Note: If the device is included with Long Range, only one node is supported in the Lifeline Group.**

7.2 Association Reports

- *Sensor Multilevel Report (Loudness – dB)*
- *Notification Report (System Type, Hardware Failure):*
 - When any sensor or actuator loses communication or reports an error code. Payload will describe event.
- *Notification Report (System Type, Software Failure):*
 - When any sensor or actuator loses communication or reports an error code. Payload will describe event.
- *Indicator Report (Changes of the Indicator State)*

8 Notification Command Class (Version 8)

The sensor will periodically send a heartbeat to the hub, as well as power/system error reports. Below are the Notification types and their supported events and parameters.

8.1 Power Management (0x08)

- Power has been applied event (0x01)
- AC mains has disconnected (0x02)

8.2 System (0x09)

- System Hardware Failure with manufacturer code (0x03)
 - Signals a failure of the Hardware
 - Parameters (1 byte):
 - 0x00 – Microphone Failure
- System Software Failure with manufacturer code (0x04)
 - Signals a failure of the software
 - 0x00 – Initialization Error
- Heartbeat (0x05)
 - Advertise the device is still alive
 - Parameters: None

9 Multilevel Sensor Command Class (Version 11)

The unit supports the following Sensor Multilevel Sensor Types and Scales.

9.1 Loudness (0x1E) – V5

Average noise level detected by the microphone since the last report.

- Supported Sensors Mask
 - Byte 4
 - Bit 5
- Scale
 - 0x00 - Decibel (dB)
- Size: 1 byte
- Precision: 0

9.2 Target Temperature (0x22) – V6

Average noise level detected by the microphone since the last report.

- Supported Sensors Mask
 - Byte 5
 - Bit 1
- Scale
 - 0x00 - Celsius
- Size: 2 bytes
- Precision: 1

10 Management Command Classes

10.1 Version Command Class (Version 3)

The Version Command Class will be used to report firmware version of the two chips that run the Noise Sensor application:

- Target 0: ZGM130S Z-wave Radio chip firmware revision
- Target 1: SAMG55 Host chip firmware revision

10.2 Indicator Command Class (Version 3)

The Noise Sensor supports the Indicator Class for controlling the device LED.

LED (0x50)

- Used to identify the node
- Property IDs
 - 0x03 – On/Off Period (required - in 1/10th seconds)
 - 0x04 – On/Off Cycles (required)
 - 0x05 – On time within an On/Off period (in 1/10th seconds)
 - Default 0x00 (special case 50% duty cycle blink)
- Accepted values
 - 0-255