



Aeon Labs Home Energy Meter (2nd Edition)
(Z-Wave Home Energy Meter (2nd Edition))



Change History

Revision	Date	Change Description
1	5/5/2014	Initial draft.

Aeon Labs Home Energy Meter (2nd Edition)
Engineering Specifications and Advanced Functions for Developers
(V1.17)

Aeon Labs Home Energy Meter is kind of energy meter for the entire home electric power consumption. It can report immediate wattage, KWH, voltage and amperage usage of the AC mains to a Z-Wave gateway wirelessly. It can send Z-Wave REPORTS (Meter v3 Command Class) to response Z-Wave GET command at any time.

HEM can also be configured as sending unsolicited reports periodically to the associated nodes (within an association group). The time interval of reports can also be configured

HEM can also send report of each individual channel with corresponding current clamp via the command of "Multi Channel Command Class Encapsulation".

To reduce the network traffic, HEM shall send reports only if the loads significant change occurred by changing percentage of configured Wattage value.

1. Library and Command Classes

1.1 SDK: 4.55.00

1.2 Library

- Basic Device Class: BASIC_TYPE_ROUTING_SLAVE
- Generic Device class: GENERIC_TYPE_METER
- Specific Device Class: SPECIFIC_TYPE_SIMPLE_METER

1.3 Commands Class

- COMMAND_CLASS_CONFIGURATION V1
- COMMAND_CLASS_METER V3
- COMMAND_CLASS_MULTILEVEL_CHANNEL V3
- COMMAND_CLASS_ASSOCIATION V1
- COMMAND_CLASS_CRC_16_ENCAP V1
- COMMAND_CLASS_MANUFACTURER_SPECIFIC V2
- COMMAND_CLASS_VERSION V1

2. Technical Specifications

Operating Distance: Up to 100 ft / 30 meters indoor and 300 ft / 100 meters outdoor.

Input: 120V~, 60Hz. (USA Version)

230V~, 50Hz. (EU, AU, BR Version)

Rated Current: 200A @120V~, 60Hz, 2 Phase (USA Version).

60/100/200A @230V~, 50Hz, 1 Phase (EU Version) .

60/100/200A @230V~, 50Hz, 1 Phase (AU Version) .

60/100/200A @230V~, 60Hz, 1 Phase (BR version) .

Operating Temperature: -25°C to 40°C.

Relative Humidity: 8-80%

3. Familiarize Yourself with Your HEM

3.1 Interface



4. Functions of Each Trigger

4.1 Function of Z-Wave Button

Trigger	Description
Click one time	<p>Add HEM G2 into an Existing Z-wave Network:</p> <ol style="list-style-type: none"> 1. Connect HEM G2 to power and install the device properly according to the installation instruction (if necessary, please ask an electrician for help).please note that the LED blinks slowly at the very beginning. 2. Let the primary controller of existing Z-Wave network into inclusion mode (If you don't know how to do this, please refer to the manual). 3. Press the Z-Wave button of HEM G2. 4. If learning success, HEM G2 LED will keep on, otherwise the LED will still blink slowly; in which case you need to repeat the process from step 2. <p>Remove HEM G2 from an Existing Z-wave Network:</p> <ol style="list-style-type: none"> 1. Make sure the HEM G2 is powered, the LED be light on steadily. 2. Let the primary controller of existing Z-Wave network into remove mode (If you don't know how to do this, please refer to its manual). 3. Press the Z-Wave button. 4. If exclusion success, HEM G2 LED will blink slowly, otherwise it will keep on, in which case you need to the process from step 2.
Press and hold 10 seconds	<p>Reset HEM G2 to Factory Default:</p> <ol style="list-style-type: none"> 1. Make sure HEM G2 has been connected to the power supply. 2. Press and hold the Z-Wave button for 10 seconds. 3. If HEM G2 LED blinks slowly, it indicates reset success, otherwise please repeat step 2. <p>Note:</p> <p>When reset HEM G2 to factory default settings, it will :</p> <ol style="list-style-type: none"> a), Exclude HEM G2 from Z-Wave network; b),Delete association setting and power measure value; c), Restore the configuration settings to the default.

5. Special Rule of Each Command

5.1 Association Command Class

HEM can also be configured as sending unsolicited reports periodically to the associated nodes within its network via the Association Command Class. There is only 1 associated group supported by HEM, of which with a maximum of 5 associated nodes. HEM sends report of unsolicited single-cast frame to all of the 5 nodes within the associated group. The type of REPORTS (meter, etc.) can be configured via Configuration Command Class (see below section)

5.2 Multilevel Channel Command Class

The Multilevel Channel Command supports 2 end points. End point 1 is clamp 1; End point 2 is clamp 2. The 2 end points package Meter Command Class.

The Multilevel channel CMD encamp command is used to get two clamps been detected of electricity. Include wattage, KWH, voltage and current.

5.3 Configuration Set Command Class

7	6	5	4	3	2	1	0
Command Class = COMMAND_CLASS_CONFIGURATION							
Command = CONFIGURATION_SET							
Parameter Number							
Default	Reserved					Size	
Configuration Value 1(MSB)							
Configuration Value 2							
.....							
Configuration Value n(LSB)							

Parameter Number Definitions (8 bit):

Parameter Number	Description	Default Value	Size
2	For parameters of 101 ~ 103, power, energy detection mode configuration: 0 = report power, report the absolute value of energy; 1 = report positive/negative power, report the algebraic sum of energy;	0	1
3	Enable selective reporting only when power change reaches a certain threshold or percentage set in 4-11 below. This is used to reduce network traffic. (0 == disable, 1 == enable)	1	1
4	Threshold change in wattage to induce a automatic report (Whole HEM). (Valid values 0-60000)	50(W)	2
5	Threshold change in wattage to induce a automatic report (Clamp 1). (Valid values 0-60000)	50(W)	2
6	Threshold change in wattage to induce a automatic report (Clamp 2). (Valid values 0-60000)	50(W)	2

7	Threshold change in wattage to induce a automatic report (Clamp 3). (Valid values 0-60000)	50(W)	2
8	Percentage change in wattage to induce a automatic report (Whole HEM). (Valid values 0-100)	10	1
9	Percentage change in wattage to induce a automatic report (Clamp 1. (Valid values 0-100)	10	1
10	Percentage change in wattage to induce a automatic report (Clamp 2). (Valid values 0-100)	10	1
11	Percentage change in wattage to induce a automatic report (Clamp 3). (Valid values 0-100)	10	1
13	Enable /disable reporting CRC-16 Encapsulation Command. (0 == disable, 1 == enable)	0	1
100	Set 101-103 to default.	N/A	1
101	Which reports need to send in Report group 1 (See flags in table below).	0x00 00 00 02	4
102	Which reports need to send in Report group 2 (See flags in table below).	0x00 00 00 01	4
103	Which reports need to send in Report group 3 (See flags in table below).	0	4
110	Set 111-113 to default.	N/A	1
111	The time interval of sending Report group 1 (Valid values 0x01-0xFFFFFFFF).	0x00 00 00 05	4
112	The time interval of sending Report group 2 (Valid values 0x01-0xFFFFFFFF).	0x00 00 00 78	4
113	The time interval of sending Report group 3 (Valid values 0x01-0xFFFFFFFF).	0x00 00 00 78	4
200	Partner ID (0= Aeon Labs Standard Product, 1= Others).	0	1
252	Enable/disable Configuration Locked (0 =disable, 1 = enable).	0	1
255	Reset configuration parameter to default setting.	N/A	1

Configuration Values for Parameter 101-103:

	7	6	5	4	3	2	1	0
--	---	---	---	---	---	---	---	---

configuration Value 1(MSB)	Reserved					
configuration Value 2	Reserved	Auto send Meter REPORT (for A) at the group time interval (Clamp 2)	Auto send Meter REPORT (for A) at the group time interval (Clamp 1)	Reserved	Auto send Meter REPORT (for V) at the group time interval (Clamp 2)	Auto send Meter REPORT (for V) at the group time interval (Clamp 1)
configuration Value 3	Reserved	Auto send Meter REPORT (for kWh) at the group time interval (Clamp 2)	Auto send Meter REPORT (for kWh) at the group time interval (Clamp 1)	Reserved	Auto send Meter REPORT (for Watt) at the group time interval (Clamp 2)	Auto send Meter REPORT (for Watt) at the group time interval (Clamp 1)
configuration Value 4(LSB)	Reserved	Reserved	Auto send Meter REPORT (for A) at the group time interval (Whole HEM)	Auto send Meter REPORT (for V) at the group time interval (Whole HEM)	Auto send Meter REPORT (for wattage) at the group time interval (Whole HEM)	Auto send Meter REPORT (forKWH) at the group time interval (Whole HEM)

Example:

Auto Report Every 30 seconds for Clamp 1 and Clamp 2:

1. Make report group 3 sends Multi Channel Meter CC (Watts) and Multichannel Meter CC (KWH) of clamp 1 and clamp 2 automatically

```
ZW_SendData(0x70, 0x04, 0x67, 0x04, 0x00,0x00,0x1b,0x00); //Configuration Set
```

2. Set the interval of sending report group 3

```
ZW_SendData(0x70, 0x04, 0x71, 0x04, 0x00,0x00,0x00,0x1E); //Configuration Set
```

3. Associate to node "1"

```
ZW_SendData(0x85, 0x01, 0x01, 0x01); //Association set
```

Note: Meter CC (Watts) and Meter CC (KWH) is of clamp 1 and clamp 2 is packaged in Multi Channel Command.
End point 1 is clamp 1; end point 2 is clamp 2.