Technical Notes for Smart Plugs

9/4/2012

Firmware Version v4.28

This document describes the product technical note for a GWR Power Nodes

1 CONTENTS

2 INTRODUCTION

This document describes the product technical notes for smart power nodes with wireless control and monitoring.

3 DEVICE INFORMATION

Node Type	Enhanced slave
SDK version	6.01.01
Frequency	US
Device Class	GENERIC_TYPE_SWITCH_BINARY SPECIFIC_TYPE_POWER_SWITCH_BINARY
Command class	COMMAND_CLASS_SWITCH_BINARY COMMAND_CLASS_METER_V2 COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2 COMMAND_CLASS_VERSION COMMAND_CLASS_BASIC COMMAND_CLASS_ALARM COMMAND_CLASS_CONFIGURATION COMMAND_CLASS_SWITCH_ALL COMMAND_CLASS_ASSOCIATION COMMAND_CLASS_INDICATOR COMMAND_CLASS_PROTECTION_V2 COMMAND_CLASS_CRC_16_ENCAP COMMAND_CLASS_MULTI_CHANNEL_V3 (Multi-socket PowerNode only)

4 COMMAND CLASS SPECIFICATION

Command class	**Support Multi-channel?** (Multi-socket PowerNode only)	**Support Endpoint** (Multi-socket PowerNode only)	**Support CRC_16**
COMMAND_CLASS_SWITCH_BINARY	Y	6	Y
COMMAND_CLASS_METER_V2	Y	6	Y
COMMAND_CLASS_MULTI_CHANNEL_V3 (Multi-socket PowerNode only)	n/a	1	Y
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2	N	1	Y
COMMAND_CLASS_VERSION	N	1	Y
COMMAND_CLASS_BASIC	Y	6	Y
COMMAND_CLASS_ALARM	N	1	Y
COMMAND_CLASS_CONFIGURATION	N	1	Y
COMMAND_CLASS_SWITCH_ALL	N	1	Y
COMMAND_CLASS_ASSOCIATION	N	1	Y
COMMAND_CLASS_INDICATOR	N	1	Y
COMMAND_CLASS_PROTECTION_V2	Y	6	Y
COMMAND_CLASS_CRC_16_ENCAP	N	1	n/a

Command class	Description
COMMAND_CLASS_SWITCH_BINARY	Relay on/off control
COMMAND_CLASS_METER_V2	Accumulated and instant power support
COMMAND_CLASS_MULTI_CHANNEL_V3 (Multi-socket PowerNode only)	6 end points support
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2 (Multi-socket PowerNode)	Correct response should be : MANUFACTURER_ID1 = 0x00 MANUFACTURER_ID1 = 0x99 PRODUCT_TYPE_ID1 = 0x00 PRODUCT_TYPE_ID2 = 0x03 PRODUCT_ID1 = 0x00 PRODUCT_ID2 = 0x04
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2 (Single-socket PowerNode)	Correct response should be : MANUFACTURER_ID1 = 0x00 MANUFACTURER_ID1 = 0x99 PRODUCT_TYPE_ID1 = 0x00 PRODUCT_TYPE_ID2 = 0x02 PRODUCT_ID1 = 0x00 PRODUCT_ID2 = 0x02
COMMAND_CLASS_VERSION	Library type = 0x03 Protocol version = 0x03 Protocol subversion = 0x1A

	Application version = 0x04 Application subversion = 0x09
COMMAND_CLASS_BASIC	same as COMMAND_CLASS_SWITCH_BINARY
COMMAND_CLASS_ALARM	1 : RELAY_HEALTH (association group 2) 3 : OVERCURRENT_PROTECTION (association group 4)
COMMAND_CLASS_CONFIGURATION	0 : POWER_DELTA_PERCENT (association group 3) 1 : KEEP_ALIVE_TIME (ref 6.4) 2 : WHEEL_SELECTION (association group 1)
COMMAND_CLASS_SWITCH_ALL	Control device's all relay on/off
COMMAND_CLASS_ASSOCIATION	There are 4 groups : 1 : WHEEL_SELECTION (ref 6.6) 2 : RELAY_HEALTH (ref 6.3) 3 : POWER_LEVEL (ref 6.2) 4 : OVERCURRENT_PROTECTION (ref 6.1)
COMMAND_CLASS_INDICATOR	Circle LEDs flash once if the value is 0x01~0x63 or 0xFF
COMMAND_CLASS_PROTECTION_V2	Lock relay status (ref 6.5)
COMMAND_CLASS_CRC_16_ENCAP	ref 6.7

5 MAIN PROCEDURE AND BASIC FUNCTIONALITY

5.1 BASIC FUNCTIONALITY

There are 3 kinds of interface can receive user input: power button, network button and wheel (room color selector).

Input	function
Power button	control relay ON/OFF
Network button	inclusion/exclusion
wheel	mark which room PowerNode is belonged to or set it into lock mode that relays' status are always on

There is more information in detail about procedure in user manual document.

5.2 FACTORY RESET

User can press power button for few seconds at booting time. There is more information in detail about procedure in user manual document. This operation will reset node Id in association groups and the setting about protection command class.

5.3 INCLUSION AND EXCLUSION PROCEDURE

Please reference to user manual document.

5.4 INSTANT/ACCUMULATED POWER MEASURE

PowerNode can report instant or accumulated power of each port. PowerNode measures power consumption of load on each port and the value of instant power will be updated every 9 seconds (1.5 seconds for Single-socket). Accumulated power increases by time and the value will reset to 0 after METER_RESET command.

6 FUNCTIONALITY

6.1 OVER CURRENT PROTECTION (OCP)

PowerNode will turn the relay off for safety when the port is over-current. And PowerNode will send out unsolicited alarm report if OCP is trigged and also an association relationship exists.

Once this event happens, all commands about relay on/off (basic set, binary switch set, all switch on, all switch off) and PadLock functionality (See Fig 1.) will be ignored. User can set it to normal by pressing power button.

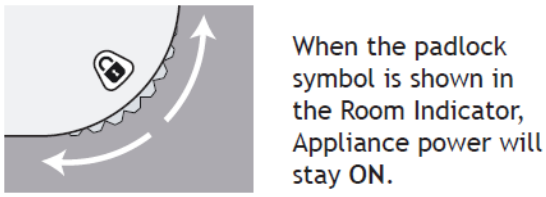


Fig 1. Padlock

6.2 POWER LEVEL CHANGE DETECTION

Each time of instant power reading, PowerNode will calculate the delta with previous one. Once the delta is over the threshold defined by configuration, it will send out unsolicited meter report (multi-channel-encapsulation command for Multi-socket) if an association relationship exists. Controller can use configuration-set command to set power delta value. The unit of power delta is percentage.

6.3 RELAY HEALTH DETECTION

PowerNode will send out unsolicited alarm report when detecting current leakage on relay if an association relationship exists.

6.4 KEEP ALIVE

PowerNode uses LED to indicate the connection status with associated node. The LED will flash (ref to topic “indictor” in user guide) if there has being no any frame transmission for a specific time which can be configured. Default value is 2 minutes.

6.5 PROTECTION COMMAND WITH RELAY LOCK

There are 3 operations can turn on/off relay: power button, wheel and set-relay command (basic-set, binary-switch-set…etc). Each operation will get the different result according to

setting of OCP and protection-command. The following table describes relay state of single endpoint changed by different setting status and operation.

Setting status			**Does endpoint relay state changed by operation ?**			comment
Is OCP ?	Is Local protection ?	Is RF protection ?	Press power button	Turn wheel to Padlock	Set-Relay command	
X	X	O	O	O	X	No RF control
X	O	X	X	X	O	No operation possible
X	O	O	X	X	X	1. No operation possible 2. No RF control
O	X	X	O	X	X	1. OCP priority > Local protection 2. OCP priority > RF protection
O	X	O	O	X	X	1. OCP priority > Local protection 2. OCP priority > RF protection
O	O	X	O	X	X	1. OCP priority > Local protection 2. OCP priority > RF protection
O	O	O	O	X	X	1. OCP priority > Local protection 2. OCP priority > RF protection
X	X	X	O	O	O	Normal

- Relay state (on or off) of port will not change by power button or wheel if “Local-Protection-State” of the port is set to “*No operation possible*”.

- Once “RF-Protection-State” of the port is set to “*No RF control*”, PowerNode will response Application Rejected Request Command when receiving command of basic set, binary switch set, multi-channel basic set and multi-channel binary switch set.

- Once “RF-Protection-State” of all ports are set to “No RF control”. PowerNode will also response Application Rejected Request Command when receiving command of All Switch On or All Switch Off.

- The setting value about Local-Protection-State, RF-Protection-State and relay state will be stored in EEPROM.

6.6 WHEEL

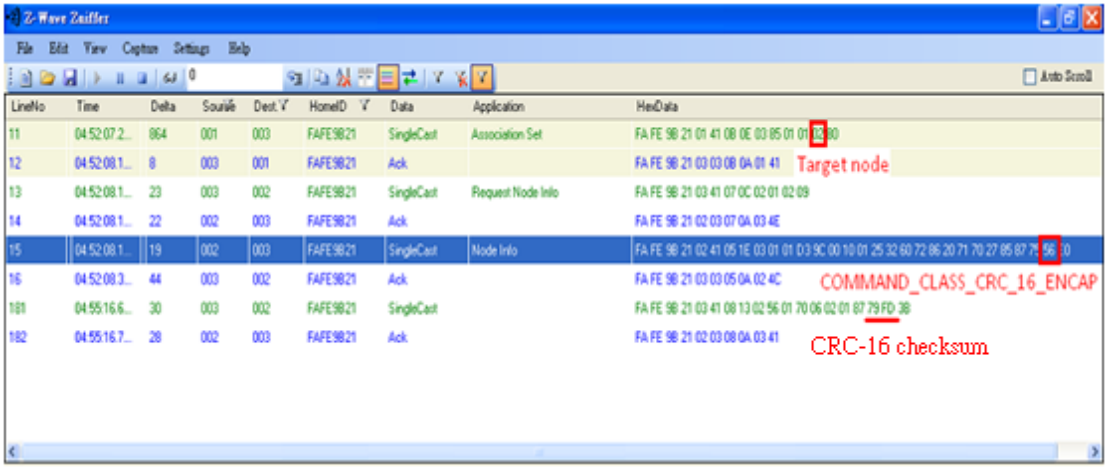
PowerNode uses wheel for Room-Selector functionality. It will ignore command of Basic set, Binary Switch set, All Switch on and All Switch off when the wheel indicates “Lock”. Additionally PowerNode will send out unsolicited Configuration Report if there is an association relationship.

Mapping from wheel color to value received by gateway is described in the following table.

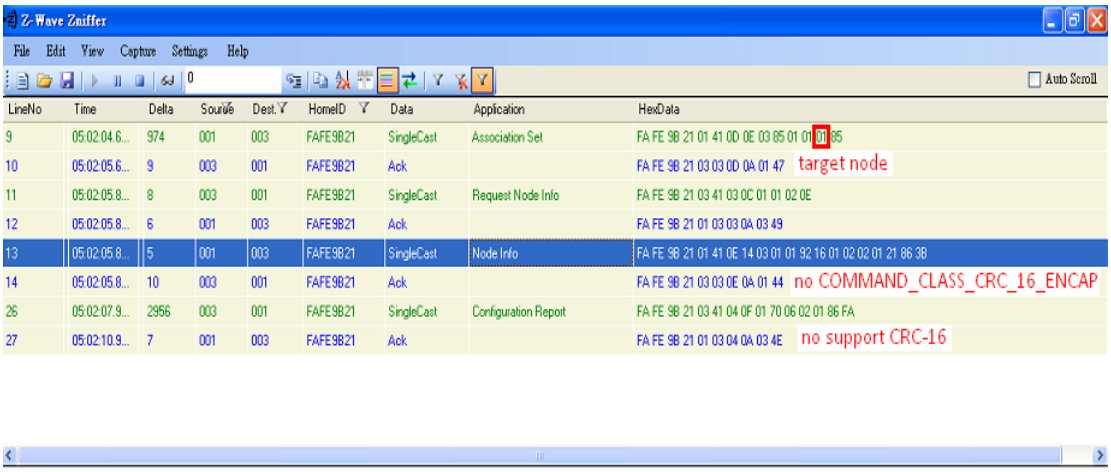
Wheel										
Wheel indicate	1	2	3	4	5	6	7	8	Lock	Black
Switch indicate	81	82	83	84	85	86	87	88	89	80

6.7 CRC16 ERROR CHECK

PowerNode use COMMAND_CLASS_CRC_16_ENCAP to support CRC-16 error check. It will automatically request target to check whether it has CRC-16 error check support in NIF from target or not. After gateway constructs association relationship, PowerNode will send notification with CRC-16 if association target support CRC-16. Otherwise, it will send normal notification (without CRC-16) to target node. The following pictures describe NIF auto-request after association set command.



If Association target Support COMMAND_CLASS_CRC_16_ENCAP



If Association target does not Support COMMAND_CLASS_CRC_16_ENCAP

6.8 POWER ON STATE

If PowerNode is turned off, when it is powered back on, there are 3 different states for the user to select:

- All ON default (the is the 1st boot up default)
- All OFF
- Remember last state

The Protection CC will override the default "ON" state selected.

Example:
Protect CC sets that port 1, 3, 5 as Lock ON. The power on initial state is "All OFF". The final state will be port 1, 3, 5 ON and port 2, 4, 6 OFF.

6.9 CAPABILITY TO SWITCH ON/OFF 'NETWORK ERROR' LED

We can configure the PowerNode to flashing "Network Error" LED when the PowerNode has not received any command from Controller after 2 minutes (default) via the Configuration Command Class.

7 COMMAND FORMAT

7.1 COMMAND_CLASS_SWITCH_BINARY

7.1.1 BINARY SWITCH SET COMMAND

Function	Turn the relay on / off	
Gateway sends	0x25,0x01,0xXX	
Gateway receives	NONE	
Note	XX = 0x00	Turn the 1st relay off
	XX = 0x01~0x63, 0xFF	Turn the 1st relay on

7.1.2 BINARY SWITCH GET COMMAND

Function	Get the relay status	
Gateway sends	0x25,0x02	
Gateway receives	0x25,0x03,0xXX	
Note	XX = 0x00	the 1st relay is off
	XX = 0xFF	the 1st relay is on

7.2 COMMAND_CLASS_METER_V2

7.2.1 METER SUPPORTED GET COMMAND

Function	Get the supported scales
Gateway sends	0x32,0x03
Gateway receives	0x32,0x04,0x81,0x05
Note	NONE

7.2.2 METER RESET COMMAND

Function	Reset all accumulated power consumption stored in the power strip
Gateway sends	0x32,0x05
Gateway receives	NONE
Note	NONE

7.2.3 METER GET COMMAND

Function	Get the accumulated power consumption from the power strip

	(method 1)	
Gateway sends	0x32,0x01,0x00	
Gateway receives	0x32,0x02,0x21,0x84,0xXX,0xXX,0xXX,0xXX,0xYY,0xYY,0xZZ,0xZZ,0xZZ,0xZZ	
Note	XX	4 bytes for watt-hour meter value
	YY	2 bytes for delta time
	ZZ	4 bytes for previous watt-hour meter value

Function	Get the accumulated power consumption from the power strip (method 2)	
Gateway sends	0x32,0x01	
Gateway receives	0x32,0x02,0x01,0x84,0xXX,0xXX,0xXX,0xXX	
Note	XX	4 bytes for watt-hour meter value

Function	Get the instant power consumption from the power strip	
Gateway sends	0x32,0x01,0x10	
Gateway receives	0x32,0x02,0x21,0x34,0xXX,0xXX,0xXX,0xXX,0xYY,0xYY,0xZZ,0xZZ,0xZZ,0xZZ	
Note	XX	4 bytes for instant power value
	YY	2 bytes for delta time
	ZZ	4 bytes for previous instant power value

7.3 COMMAND_CLASS_MULTI_CHANNEL_V3

7.3.1 MULTI CHANNEL END POINT GET COMMAND

Function	Get the number of end points embedded in a single node	
Gateway sends	0x60,0x07	
Gateway receives	0x60,0x08,0x40,0xXX	
Note	XX = 0x01	On 1 port power strip
	XX = 0x06	On 6 port power strip

7.3.2 MULTI CHANNEL CAPABILITY GET COMMAND

Function	Get the capabilities of the end points in a node	
Gateway sends	0x60,0x09,0xXX	
Gateway receives	0x60,0x0A,0xXX,0x10,0x01,0x25,0x32	
Note	XX = 0x01	The 1st end point
	XX = 0x02	The 2nd end point
	XX = 0x03	The 3rd end point
	XX = 0x04	The 4th end point
	XX = 0x05	The 5th end point
	XX = 0x06	The 6th end point

7.3.3 MULTI CHANNEL END POINT FIND COMMAND

Function	Find end points in a device with a given set of generic and specific device class	
Gateway sends	0x60,0x0B,0x10,0x01	
Gateway receives	On 1 port power strip: 0x60,0x0C,0x00,0x10,0x01,0xXX On 6 port power strip: Get data bytes twice 0x60,0x0C,0x00,0x10,0x01,0xXX,0xYY,0xZZ,0xMM,0xNN,0xQQ	
Note	XX = 0x01	The end point 1
	YY = 0x02	The end point 2

	ZZ = 0x03	The end point 3
	MM = 0x04	The end point 4
	NN = 0x05	The end point 5
	QQ = 0x06	The end point 6

7.3.4 MULTI CHANNEL COMMAND ENCAPSULATION COMMAND

Function	Get the number of end points embedded in a single node		
Gateway sends	0x60,0x0D,0xXX,0xYY + Switch Binary Command Class 0x60,0x0D,0xXX,0xYY + Meter Command Class 0x60,0x0D,0xXX,0xYY + Protection Command Class		
Gateway receives	0x60,0x0D,0xYY,0xXX, + Switch Binary Command Class 0x60,0x0D, 0xYY,0xXX, + Meter Command Class 0x60,0x0D, 0xMM,0xXX, + Protection Command Class		
Note	XX	The value indicates the end point from where the command was send	
	MSB of YY	0	The end point is addressed by 7 bits. The valid values are 1 ~ 6
		1	The rest 7 bits are presented a bit address value. Bit 0 is End Point 1, bit 1 is End Point 2 … bit 5 is End Point 6
	MM	The value equals to YY which the MSB is set to 0	

7.4 COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2

7.4.1 MANUFACTURER SPECIFIC GET COMMAND

Function	Get manufacturer specific value	
Gateway sends	0x72,0x04	
Gateway receives	0x72,0x05,0x00,0x99,0x00,0xXX,0x00,0xYY	
	XX = 0x02	For 1P power node
	XX = 0x03	For 6P power node
	YY = 0x02	For 1P power node
	YY = 0x03	For 5P power node

	YY = 0x04	For 6P power node

7.4.2 DEVICE SPECIFIC GET COMMAND

Function	Get device serial number	
Gateway sends	0x72,0x06	
Gateway receives	0x72,0x07,0xXX,0xYY,0xAA,0xBB,0xCC,0xDD,0xEE, ...	
Note	XX = 0x01	Device ID type is serial number
	YY = 0x2F	The serial number is in binary format and its length is 15

7.5 COMMAND_CLASS_VERSION

7.5.1 VERSION COMMAND CLASS GET COMMAND

Function	Get command class version value	
Gateway sends	0x86,0x13,0xXX	
Gateway receives	0x86,0x14,0xXX,0xYY	
Note	XX = 0x25	Query COMMAND_CLASS_SWITCH_BINARY version
	XX = 0x32	Query COMMAND_CLASS_METER_V2 version
	XX = 0x60	Query COMMAND_CLASS_MULTI_CHANNEL_V3 version
	XX = 0x71	Query COMMAND_CLASS_ARALM version
	XX = 0x27	Query COMMAND_CLASS_SWITCH_ALL version
	XX = 0x72	Query COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2 version
	XX = 0x86	Query COMMAND_CLASS_VERSION version
	XX = 0x20	Query COMMAND_CLASS_BASIC version
	XX = 0x87	Query COMMAND_CLASS_INDICATOR version
	XX = 0x75	Query COMMAND_CLASS_PROTECTION_V2 version
	XX = 0x56	Query COMMAND_CLASS_CRC_16_ENCAP version

	YY = 0x01	The command class version is 1
	YY = 0x02	The command class version is 2
	YY = 0x03	The command class version is 3

7.5.2 VERSION GET COMMAND

Function	Get application version	
Gateway sends	0x86,0x11	
Gateway receives	0x86,0x12,0x03,0x03,0x29,0xXX,0xYY	
Note	XX = 0x04	Application version
	YY = 0x1B	Application sub version

7.6 COMMAND_CLASS_BASIC

7.6.1 BASIC SET COMMAND

Function	Turn the relay on / off	
Gateway sends	0x20,0x01,0xXX	
Gateway receives	NONE	
Note	XX = 0x00	Turn the 1st relay off
	XX = 0x01~0x63, 0xFF	Turn the 1st relay on

7.6.2 BASIC GET COMMAND

Function	Get the relay status	
Gateway sends	0x20,0x02	
Gateway receives	0x20,0x03,0xXX	
Note	XX = 0x00	the 1st relay is off
	XX = 0xFF	the 1st relay is on

7.7 COMMAND_CLASS_ALARM

7.7.1 ALARM GET COMMAND

<table>
<tr><td>Function</td><td colspan="2">Get the relay health status(POWER_MANAGEMENT)、packet transmission failure times (WEAK_SIGNAL)、which port occurs OCP (OVERCURRENT_PROTECTION)</td></tr>
<tr><td>Gateway sends</td><td colspan="2">0x71,0x04, 0xXX</td></tr>
<tr><td>Gateway receives</td><td colspan="2">0x71,0x05,0xXX,0xYY</td></tr>
<tr><td rowspan="11">Note</td><td rowspan="8">XX = 0x01</td><td>YY = 0x00; All ports are health</td></tr>
<tr><td>YY = 0x01; Port 1 power leak</td></tr>
<tr><td>YY = 0x02; Port 2 power leak</td></tr>
<tr><td>YY = 0x04; Port 3 power leak</td></tr>
<tr><td>YY = 0x08; Port 4 power leak</td></tr>
<tr><td>YY = 0x10; Port 5 power leak</td></tr>
<tr><td>YY = 0x20; Port 6 power leak</td></tr>
<tr><td>YY = 0x3F; All ports are not health</td></tr>
<tr><td>XX = 0x02</td><td>YY equals packet transmission failure times</td></tr>
<tr><td rowspan="6">XX = 0x03</td><td>YY = 0x01; Port 1 occur OCP</td></tr>
<tr><td>YY = 0x02; Port 2 occur OCP</td></tr>
<tr><td>YY = 0x04; Port 3 occur OCP</td></tr>
<tr><td>YY = 0x08; Port 4 occur OCP</td></tr>
<tr><td>YY = 0x10; Port 5 occur OCP</td></tr>
<tr><td>YY = 0x20; Port 6 occur OCP</td></tr>
</table>

7.8 COMMAND_CLASS_CONFIGURATION

7.8.1 CONFIGURATION SET COMMAND

Function	Set the power delta, keep alive time, power on relay state and LED for network error
Gateway sends	0x70,0x04,0xXX,0xYY,0xAA
Gateway receives	NONE

Note :
 	
XX = index
 	
YY = size
 	
AA = data
	power delta:
	
	XX = 0x00
	
	YY = 0x01
		AA= 0x01 ~0x64 (1% ~ 100%)
		
		If (AA = 0) then AA set to 1
		
		If (AA > 0x63) then AA set to 0x64

	keep alive time: XX = 0x01 YY = 0x01	AA= 0x01 ~0xFF (1 minutes ~ 255 minutes)
	Power on relay state: XX = 0x03 YY = 0x01	AA=0x02 (All ON, this is the 1st boot up default) AA=0x00 (All OFF) AA=0x01(Remember last state)
	LED for network error: XX = 0x04 YY = 0x01	AA=0x00 or 0x01 0x00 Disable the LED for network error 0x01 Enable the LED for network error
	MSB of YY	If this bit is 1, the command is set to the default configuration value. The default value for each configuration Power delta is 10% Keep alive time is 2 minutes Power on relay state is ON LED for network error is Disabled

7.8.2 CONFIGURATION GET COMMAND

Function	Get the power delta, keep alive time, wheel selection, product version, batch number, max number
Gateway sends	0x70,0x05,0xXX
Gateway receives	0x70,0x06,0xXX,0xYY,0xAA

<table>
<tr><td rowspan="11">Note :

XX = index

YY = size

AA = data</td><td>Power delta:

XX = 0x00

YY = 0x01</td><td colspan="2">AA= 0x0A (Default value 10%)

AA= 0x01 ~0x63 (1% ~ 100%)</td></tr>
<tr><td>Keep alive time:

XX = 0x01

YY = 0x01</td><td colspan="2">AA= 0x02 (Default value 2 minutes)

AA= 0x01 ~0xFF (1 minutes ~ 255 minutes)</td></tr>
<tr><td rowspan="10">Wheel selection:

XX = 0x02

YY = 0x01</td><td>AA = 0x80</td><td>BLACK</td></tr>
<tr><td>AA = 0x81</td><td>GREEN</td></tr>
<tr><td>AA = 0x82</td><td>BLUE</td></tr>
<tr><td>AA = 0x83</td><td>RED</td></tr>
<tr><td>AA = 0x84</td><td>YELLOW</td></tr>
<tr><td>AA = 0x85</td><td>VIOLET</td></tr>
<tr><td>AA = 0x86</td><td>ORANGE</td></tr>
<tr><td>AA = 0x87</td><td>AQUA</td></tr>
<tr><td>AA = 0x88</td><td>PINK</td></tr>
<tr><td>AA = 0x89</td><td>WHITE</td></tr>
<tr><td>Power on relay state:

XX = 0x03

YY = 0x01</td><td colspan="2">AA=0x00 All OFF

AA=0x01 Remember last state

AA=0x02 All ON, this is the 1st boot up default</td></tr>
<tr><td>LED for network error:
XX = 0x04

YY = 0x01</td><td colspan="2">AA=0x00 or 0x01

0x00 Disable the LED for network error

0x01 Enable the LED for network error</td></tr>
</table>

7.9 COMMAND_CLASS_SWITCH_ALL

7.9.1 SWITCH ALL SET COMMAND

Function	used to set a device if it should be included or excluded from the all on/all off functionality

Gateway sends	0x27 0x01 0x0XX
Gateway receives	NONE
Note	0xXX = 0x00 : excluded from all on and all off functionality 0xXX = 0x01 : excluded from all on, included all off 0xXX = 0x02 : excluded from all off, included all on 0xXX = 0xFF : included all on and all off functionality

7.9.2 SWITCH ALL GET COMMAND

Function	used to get a device if it is included or excluded from the all on/all off functionality
Gateway sends	0x27 0x02
Gateway receives	0x27 0x03 0xXX
Note	0xXX = 0x00 : excluded from all on and all off functionality 0xXX = 0x01 : excluded from all on, included all off 0xXX = 0x02 : excluded from all off, included all on 0xXX = 0xFF : included all on and all off functionality

7.9.3 SWITCH ALL ON COMMAND

Function	This device can be set all relay on if it is included all on functionality
Gateway sends	0x27 0x04
Gateway receives	NONE
Note	Can be set all relay on if all switch option = 0x01 and 0xFF

7.9.4 SWITCH ALL OFF COMMAND

Function	This device can be set all relay off if it is included all off functionality
Gateway sends	0x27 0x05
Gateway receives	NONE

Note	Can be set all relay off if all switch option = 0x02 and 0xFF

7.10 COMMAND_CLASS_ASSOCIATION

7.10.1 ASSOCIATION SET COMMAND

Function	Build the relation with other node
Gateway sends	0x85,0x01,0xXX,0xYY
Gateway receives	NONE
Note	XX = 0x01 (Wheel group)
	XX = 0x02 (Relay health group)
	XX = 0x03 (Power level group)
	XX = 0x04 (Overcurrent protection group)
	YY = 0x01~ 0xE8 (Group nodeID)

7.10.2 ASSOCIATION GET COMMAND

Function	Get the association groupID node
Gateway sends	0x85,0x02,0xXX
Gateway receives	0x85,0x03,0xXX,0x01,0x00,0xYY
Note	XX = 0x01 (Wheel group)
	XX = 0x02 (Relay health group)
	XX = 0x03 (Power level group)
	XX = 0x04 (Overcurrent protection group)
	YY = 0x01~ 0xE8 (Group nodeID)

7.10.3 ASSOCIATION REMOVE COMMAND

Function	Remove the association groupID node
Gateway sends	0x85,0x04,0xXX,0x0Y
Gateway receives	NONE

Note	XX = 0x01 (Wheel group)
	XX = 0x02 (Relay health group)
	XX = 0x03 (Power level group)
	XX = 0x04 (Overcurrent protection group)
	YY = 0x01~ 0xE8 (Group nodeID) If YY is empty, auto reset the group XX

7.11 COMMAND_CLASS_INDICATOR

7.11.1 INDICATOR SET COMMAND

Function	Set indicator value to detect DUT status
Gateway sends	0x87,0x01,0xXX
Gateway receives	NONE
Note	XX = 0x00 ~ 0xFF (0x01~ 0x63、 0xFF are on/enable, others are off/disable)

7.11.2 INDICATOR GET COMMAND

Function	Get indicator value
Gateway sends	0x87,0x02
Gateway receives	0x87,0x03,0xYY
Note	YY = 0x00 (off/disable) YY = 0xFF (on/enable)

7.12 COMMAND_CLASS_PROTECTION_V2

7.12.1 PROTECTION SET COMMAND

Function	Set local state and RF state of the DUT
Gateway sends	0x75,0x01,0xXX,0xYY
Gateway receives	NONE

Note	XX= 0x00 (local state is “Unprotected”) XX= 0x02 (local state is “No operation possible”) YY = 0x00 (RF state is “Unprotected”) YY = 0x01 (RF state is “No RF control”)

7.12.2 PROTECTION GET COMMAND

Function	Get local state and RF state of the DUT
Gateway sends	0x75,0x02
Gateway receives	0x75,0x03,0xXX,0xYY
Note	XX= 0x00 (local state is “Unprotected”) XX= 0x02 (local state is “No operation possible”) YY = 0x00 (RF state is “Unprotected”) YY = 0x01 (RF state is “No RF control”)

7.12.3 PROTECTION SUPPORTED GET COMMAND

Function	Get the supported of the local state and RF state
Gateway sends	0x75,0x04
Gateway receives	0x75,0x05,0x00,0x05,0x00,0x03,0x00
Note	NONE