

# **SimpleHomeNet**

Where the smart things are

## **ZigBee Pro PLM Advanced User Guide**

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## 1. Architecture Overview

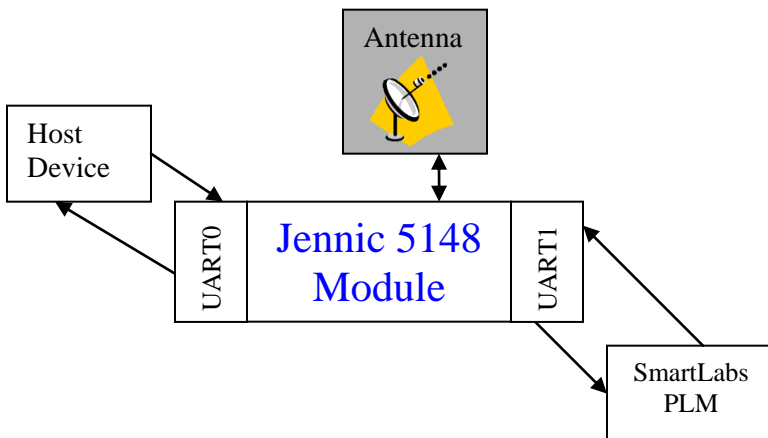
The ZBPLM is based on the Jennic 5148 radio chip and is intended to implement a ZigBee Pro coordinator that optionally bridges communications with a SmartLabs INSTEON powerline modem. In addition to the required ZBP coordinator functions, the device implements an API accessible through UART0 of the JN5148. This API exposes the functionality needed to manage and monitor a ZigBee Pro network that implements the Home Automation profile.

To facilitate communications to/from a host managing multiple protocols, the device implements a message routing scheme that frees the host from having to maintain separate serial interfaces. Intelligence in the packets exchanged with the host determines routing. A SmartLabs PLM may be connected to UART1.

Routing of serial packets is as follows:

- ⇒ ZigBee API messages from UART0 are passed to the ZigBee coordinator
- ⇒ PLM (INSTEON) API messages from UART0 are passed to UART1
- ⇒ PLM messages from UART1 are passed verbatim to UART0
- ⇒ ZigBee responses from the coordinator are passed to UART0

This functionality is implemented per the diagram below.



## 2. Features and Functions

ZBPLM is based on ZigBee Pro and can be used to implement either the HA or SE profiles. In the HA mode, ZBPLM implements the following:

Feature/Function		
ZigBee Pro Function	Coordinator	
Manufacturer ID	4213 (0x1075)	Compacta International, Ltd.
ZBP HA Device ID	0x0007	Combined Interface
Forms ZBP network	Yes	
Allows routers and end devices to join network	Yes	
Indicates device join events	Yes	
Supports pre-configured link keys	Yes	
Responds to Simple Descriptor Request	Yes	Response encrypted with network key
Responds to Match Descriptor Request	Yes	Response encrypted with network key
Performs bind operation	Yes	Returns a Bind Response is SUCCESS or UNSUPPORTED encrypted with the network key
Frequency Agility: Issues Network Update Notify and initiates frequency change.	Yes	
Implements Trust Center	Yes	
Implements End Device Binding	Yes	
Implements Basic Cluster Read Attributes	Yes	
Implements Identify Mode		
Restores to Factory Fresh Settings	Yes	

### 3. HA Supported Clusters

As a host interface into a ZigBee network, ZBPLM has a ready-made repertoire of commands to allow the host to manage and monitor a ZigBee Pro network. Thus, the ZBPLM API allows communications with nodes running any public or private application profile. The following ZCL clusters are implemented:

Domain	CID	Name	Client	Server
HA/General	0x0000	Basic	Yes	Yes
HA/General	0x0001	Power Configuration	Yes	Yes
HA/General	0x0002	Temperature Configuration	Yes	Yes
HA/General	0x0003	Identify	Yes	Yes
HA/General	0x0004	Groups	Yes	No
HA/General	0x0005	Scenes	Yes	No
HA/General	0x0006	On/Off	Yes	No
HA/General	0x0007	On/Off Switch Configuration	Yes	No
HA/General	0x0008	Level Control	Yes	No
HA/General	0x0009	Alarms	Yes	No
HA/General	0x000A	Time	Yes	No
HA/General	0x000B	RSSI Location	Yes	No
HA/General	0x000C	Analog Input (Basic)	Yes	No
HA/General	0x000D	Analog Output (Basic)	Yes	No
HA/General	0x000E	Analog Value (Basic)	Yes	No
HA/General	0x000F	Binary Input (Basic)	Yes	No
HA/General	0x0010	Binary Output (Basic)	Yes	No
HA/General	0x0011	Binary Value (Basic)	Yes	No
HA/General	0x0012	Multistate Input (Basic)	Yes	No
HA/General	0x0013	Multistate Output (Basic)	Yes	No
HA/General	0x0014	Multistate Value (Basic)	Yes	No
HA/Closures	0x0100	Shade Configuration	Yes	No
HA/HVAC	0x0200	Pump Config. & Cntrl.	Yes	No
HA/HVAC	0x0201	Thermostat	Yes	No
HA/HVAC	0x0202	Fan Control	Yes	No
HA/HVAC	0x0203	Dehumidification Control	Yes	No
HA/HVAC	0x0204	Thermostat UI Config.	Yes	No
HA/M&S	0x0400	Illuminance Measurement	Yes	No

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HA/M&S	0x0401	Illuminance Level Sensing	Yes	No
HA/M&S	0x0402	Temperature Measurement	Yes	No
HA/M&S	0x0403	Pressure Measurement	Yes	No
HA/M&S	0x0404	Flow Measurement	Yes	No
HA/M&S	0x0405	Rel. Hum. Measurement	Yes	No
HA/M&S	0x0406	Occupancy Sensing	Yes	No
Sec. & Safety	0x0500	IAS Zone	Yes	No
Sec. & Safety	0x0501	IAS ACE	Yes	No
Sec. & Safety	0x0502	IAS WD	Yes	No
Smart Energy	0x0702	Simple Metering	Yes	No

## 4. Configurations

ZBPLM can be part of gateways, stand-alone coordinators and protocol bridges. While functionality of the ZBP engine remains the same, the physical presence and operation of peripherals such as LEDs and pushbutton switches may be different. The following table outlines these differences.

Configuration	LED indicators	Pushbuttons
Stand-alone Coordinator	One to indicate network formed and join open	One to open and close joining
As part of Gateway (Harmony)	None	None
As part of ZBPLM Interface	None	None

## 5. Operation

Depending on the physical implementation of ZBPLM as discussed in the previous section, the unit may have a different user interface, and thus, different means of performing the various functions. The table below details these interfaces.

Operation	Stand-alone, mains powered Coordinator	Harmony™ gateways	ZBPLM bridge
Power up	LED turns on upon network formation	Message sent on UART0 upon network formation	Message sent on UART0 upon network formation
Power up and factory reset	Hold pushbutton while powering up. LED will flash 6 times.	Message sent on UART0 to indicate cleared settings.	Message sent on UART0 to indicate cleared settings.
Permit Joining	Hold pushbutton for more than 3 seconds. LED will start to flash once per second for next 30 seconds.	Initiated through API via message on UART0.	Initiated through API via message on UART0.

Close Joining	Hold pushbutton for more than 3 seconds. LED will stop flashing.	Initiated through API via message on UART0.	Initiated through API via message on UART0.
Entering Flash (Program) mode	Assert MISO and RESET simultaneously, de-assert RESET.	Initiated through API via message on UART0.	Initiated through API via message on UART0.

## 6. Serial Interfaces

The physical interface to a host system is through a serial UART, which is allocated as UART0 in the Jennic module. UART1 is a pass-thru port that is normally connected to another serial device such as the INSTEON PLM. Commands intended for the Jennic module are interpreted locally in the Jennic module, whereas PLM messages are passed-thru to UART1. Messages coming from the PLM on UART1 are passed-thru verbatim onto UART0. Firmware in the Jennic parses the command fields to differentiate messages for ZigBee versus messages for INSTEON.

UART0 uses a rate of 19.2 kbps, no parity, and 1 stop bit. UART1 uses a rate of 19.2 kbps, no parity, and 1 stop bit.

## 7. Host/ZBPLM Communications Packet Structure

The packet structure supports an API where messages can be routed for execution within the JN5148 or on the attached PLM. The messages are variable in length which is determined by the message ID in the case of the PLM, or a dedicated length indicator byte in the ZigBee messages. Furthermore, in the case of INSTEON extended length messages, the final length is determined from the CMD field and a bit in the FLAGS byte of the message. CRC is built into the ZigBee API messages, but not on the PLM messages. The user needs not be concerned with these differences as the ZBPLM automatically extracts information from each packet and transparently routes it accordingly. The tables below summarize the message structure for both PLM and ZBP:

ZBP Message Structure			
Field	Value	Offset	ZBPLM Use
SOP	0x02	0	Start of packet indicator
CMD	0x0000-0xFFFF	1 (2)	Command identification. The 16-bit number encodes information as follows:

		bytes)	<p>Bit 15 is the negative acknowledge bit. If set it indicates the command was not executed correctly. Normally, a status byte will be present in the message body.</p> <p>Bit 12 is the Response Bit. If set it indicates a response message (from ZBPLM to host.)</p> <p>Bits 11:0 are the Command Number as follows:</p> <p>0x000-0x00F System Commands (Reset, Enter Flash Mode, Set Clock, etc.)</p> <p>0x010-0x01F Device Information and Network Commands</p> <p>0x020-0x02F Binding Commands</p> <p>0x030-0x03F Cluster Commands</p>
LEN	0x00-0xFF	3	The length of the remainder of the message
PYLD		4	This is the message payload which varies in length from 0 to n bytes.
FCS	0x00-0xFF	v	Frame Check Sequence. Computed as the XOR of all the bytes in the message starting with CMD and through the last byte of data. XOR all included bytes, then XOR result with FCS. Result should be zero or the packet is in error.

PLM Message Structure			
Field	Value	Offset	ZBP Use
SOP	0x02	0	Start of packet indicator
CMD	0x00-0xFF	1	Command identification. This 8-bit number determines the length of the message. Please refer to the SmartLabs INSTEON Developer's Guide for details.
PYLD		2-n	This is the message payload which varies in length from 0 to n bytes.
FLGS	0x00-0xFF	5	This byte is significant for the <i>Send INSTEON</i> API. The length of the message is adjusted if bit 4 is set, indicating an extended message.

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## 8. API Sections

The application programming interface to the ZBPLM consists of several functions accessible through the serial port. The INSTEON PLM commands details can be found in the SmartLabs INSTEON Developer’s Guide. The API is broken up into 4 sections as follows:

- **System Commands:** These deal with items local to the ZBPLM Jennic processor such as maintenance and administration
- **Device Information and Network Commands:** This section contains the functions necessary to start and maintain the ZigBee Pro network as well as the commands to interrogate any node for its various parameters and descriptors.
- **Binding Commands:** This section includes the functions necessary to bind endpoints of devices in a client/server relationship.
- **Cluster Commands:** ZigBee endpoints in devices contain clusters which are in turn collections of the attributes and commands that determine the device’s behavior. This section of the API includes the commands for sending and receiving messages to these clusters. The API supports a generalized command frame that can be used to send cluster specific commands, as well as commands that apply across the entire profile (general.)

The remainder of this document details the ZBP API.

SYSTEM PING PING device to verify if it is active and to check its capability		CMD:	0x0000
		LEN:	0x00
Parameter	Description		
None			
SYSTEM PING RESPONSE		CMD:	0x1000
		LEN:	0x03
Parameter	Description		

u8MacFlags	Node capability flags: Bit 0: Coordinator capability Bit 1: FFD Bit 2: Node is mains powered Bit 3: Receiver is enabled during idle periods Bit 6: Capable of high security Bit 7: Network address should be allocated to node		
u8Services	Available services information: Bit 0: Primary Trust Center Bit 1: Backup Trust Center Bit 2: Primary Binding Table Cache Bit 3: Backup Binding Table Cache Bit 4 Primary Discovery Cache Bit 5: Backup Discovery Cache Bit 6: Network Manager		
u8FWVersion	Node firmware version		
<b>SYSTEM RESET REQUEST</b>		<b>CMD:</b>	0x0001
Reset device		<b>LEN:</b>	0x01
Parameter	Description		
u8Type	0x00: Requests target device request 0x01: Enter flash programming mode and reset (serial bootloader reset.) 0x02: Clear flash and reset.		
<b>SYSTEM GET TIME</b>		<b>CMD:</b>	0x0002
Gets time from the RTC chip		<b>LEN:</b>	0x00
Parameter	Description		
None			
<b>SYSTEM GET TIME RESPONSE</b>		<b>CMD:</b>	0x1002
		<b>LEN:</b>	0x08
Parameter	Description		
u8SecTenths	Tenths of Seconds in BCD (00 – 99).		
u8Second	Second in BCD (00 – 59).		
u8Minute	Minute in BCD (00 – 59).		
u8Hour	Hour in BCD (00 – 59).		
u8Day	Day of the Week in BCD (1 – 7).		
u8Date	Day of the Month in BCD (1 – 31).		
u8Month	Month of the year in BCD (1 – 12).		

u8Year	Year in BCD (00 – 99).		
SYSTEM SET TIME		CMD:	0x0003
Sets time in the RTC chip		LEN:	0x08
Parameter	Description		
u8SecTenth	Tenth of Seconds in BCD (00 – 59).		
u8Second	Second in BCD (00 – 59).		
u8Minute	Minute in BCD (00 – 59).		
u8Hour	Hour in BCD (00 – 59).		
u8Day	Day of the Week in BCD (1 – 7).		
u8Date	Day of the Month in BCD (1 – 31).		
u8Month	Month of the year in BCD (1 – 12).		
u8Year	Year in BCD (00 – 99).		
SYSTEM SET TIME RESPONSE		CMD:	0x1003
		LEN:	0x01
Parameter	Description		
u8Status	Indicates success (0) or Failure (1)		
SYSTEM START NETWORK		CMD:	0x0005
Start the network with a given PAN ID		LEN:	0x03
Parameter	Description		
u16PanID	The desired device's PAN ID. If 0x0000, the coordinator chooses the ID.		
u8Channel	Desired channel number. If 0x00, let coordinator decide		
SYSTEM START NETWORK RESPONSE		CMD:	0x1005
		LEN:	0x0B
Parameter	Description		
u8Channel	Channel number that the network was started on		
u16PanID	PAN ID of the current network		
u64ExtPanID	Extended PAN ID of the current network		
SYSTEM UPDATE NETWORK		CMD:	0x0006
Changes Network Parameters		LEN:	0x08
Parameter	Description		
u16DstAdd	Short address of the destination device(s) (0xFFFFD to broadcast to all devices that have their radios on)		
u32ChMask	The desired channel mask		

u8ScanDur	0x00-0x05	Perform radio channel scan on the set of channels specified through u32ChMask. The time, in seconds, spent scanning each channel is determined by the value of u8ScanDur and the number of scans is equal to the value of u8ScanCount. Valid for unicasts only.
	0xFE	Change radio channel to single channel specified through u32ChMask and set the network manager address to that specified through u16NwkMgr. Valid for broadcasts only.
	0xFF	Update the stored radio channel mask with that specified through u32ChMask (but do not scan). Valid for broadcasts only.
u8ScanCount	Number of energy scans to be conducted and reported. Valid only if a scan has been enabled through u8ScanDur.	
<b>SYSTEM UPDATE NETWORK RESPONSE</b>		
		CMD: 0x1006
		LEN: 0x01
Parameter	Description	
u8Status	0 if success, 1 if failure	
<b>MODIFY PERMIT JOIN REQUEST</b>		
Modify the Permit Join Time on a Device		CMD: 0x0010
		LEN: Variable
Parameter	Description	
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x00), or 64 bits IEEEAddress (0x01)	
u16DstAdd or u64DstAdd	Network or IEEE address of the device to be modified. Use 0xFFFC to broadcast request to ALL routers and coordinator.	
u8Duration	The time duration for Permit Joining. 0x00: disabled, 0x01-0xFE: number of seconds to permit joining.	
<b>MODIFY PERMIT JOIN RESPONSE</b>		
		CMD: 0x1010
		LEN: 0x01
Parameter	Description	
u8PermitTime	Number of seconds that joining will be permitted (0x00 – 0xFE) or 0xFF if error.	
<b>DEVICE JOINED</b>		
		CMD: 0x1011

		LEN:	0x0B
Parameter	Description		
u16DevAdd	Network address of the device generating the request		
u64DevAdd	The IEEE address of the device being announced		
u8Capabilities	Bit mask of the operating capabilities of the device		
SHORT NETWORK ADDRESS REQUEST		CMD:	0x0012
Request a device's short network address and its Children's (ShortAddress) list		LEN:	0x0A
Parameter	Description		
u64IEEE	IEEE address of the destination device		
u8ReqType	0x00: Single device response; 0x01: Include associated devices		
u8StartIdx	Starting index into the children list. This is used to get more of the list if the list is too large for one message		
IEEE ADDRESS REQUEST		CMD:	0x0013
Request a device's Network address and its Children's (ShortAddress) list		LEN:	0x04
Parameter	Description		
u16DstAdd	Short address of the destination device		
u8ReqType	0x00: Single device response; 0x01: Include associated devices		
u8StartIdx	Starting index into the children list. This is used to get more of the list if the list is too large for one message		
NETWORK ADDRESS RESPONSE		CMD:	0x1012
Response to IEEE or Short Address Request		LEN:	Variable
Parameter	Description		
u8Status	Indicates success (0) or Failure (1)		
u64IEEE	IEEE address of the source device		
u16NwkAdd	Short network address of responding device		
u8AssocDevs	Number of associated devices		
u8StartIdx	Starting index into the children list. This is used to get more of the list if the list is too large for one message		
u16Assoc[]	Array of network addresses for associated devices		
NODE DESCRIPTOR REQUEST		CMD:	0x0014

Get theDestination's Device Node Descriptor.		LEN:	0x04																
Parameter	Description																		
u16DstAdd	Network address of the device generating the inquiry																		
u16Interest	Network address of the destination device being queried																		
NODE DESCRIPTOR RESPONSE		CMD:	0x1014																
		LEN:	0x10																
Parameter	Description																		
u8Status	Success (0), Failure (non-zero NV error code)																		
u16SrcAddr	The message's source network address																		
u16NodeDsc	<p>(2:0) <b>NodeType</b>: Coordinator = 0, Router = 1, End Device = 2, Reserved = 3-7</p> <p>(3) <b>CDAvail</b>: Indicates if complex descriptor is available for the node</p> <p>(4) <b>UD Avail</b>: Indicates if User Descriptor is available</p> <p>(10:8) <b>APSFlags</b>: Node Flags assigned for APS.</p> <p>(15:11) <b>FreqBand</b>: Identifies node frequency band capabilities</p>																		
u8MacFlags	MAC Capability flags																		
u16MfrCode	Specifies a manufacturer code that is allocated by the ZigBee Alliance, relating to the manufacturer of the device																		
u8BfrSize	Indicates size of maximum NPDU. This field is used as a high level indication for management																		
u16MaxRx	Indicates maximum size of Transfer up to 0x7fff																		
u16SrvrMask	<p>Specifies the system server capability. It is defined as follows:</p> <table border="1"> <thead> <tr> <th>Bit Number</th> <th>Assignment</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Primary Trust Center</td> </tr> <tr> <td>1</td> <td>Backup Trust Center</td> </tr> <tr> <td>2</td> <td>Primary Binding Table Cache</td> </tr> <tr> <td>3</td> <td>Backup Binding table Cache</td> </tr> <tr> <td>4</td> <td>Primary Discovery Cache</td> </tr> <tr> <td>5</td> <td>Backup Discovery Cache</td> </tr> <tr> <td>6-15</td> <td>Reserved</td> </tr> </tbody> </table>			Bit Number	Assignment	0	Primary Trust Center	1	Backup Trust Center	2	Primary Binding Table Cache	3	Backup Binding table Cache	4	Primary Discovery Cache	5	Backup Discovery Cache	6-15	Reserved
Bit Number	Assignment																		
0	Primary Trust Center																		
1	Backup Trust Center																		
2	Primary Binding Table Cache																		
3	Backup Binding table Cache																		
4	Primary Discovery Cache																		
5	Backup Discovery Cache																		
6-15	Reserved																		
u16MaxTx	Indicates maximum size of the ASDU																		
u8Capability	Properties of the node tha can be used by other nodes in network discovery																		

<b>SIMPLE DESCRIPTOR REQUEST</b>		<b>CMD:</b>	0x0015
Get the Destination's Device Simple Descriptor Information		<b>LEN:</b>	0x05
Parameter	Description		
u16DstAdd	Network address of the device generating the inquiry		
u16Interest	Network address of the destination device being queried		
u8EndPoint	The application endpoint that sources the data		
<b>SIMPLE DESCRIPTOR RESPONSE</b>		<b>CMD:</b>	0x1015
		<b>LEN:</b>	Variable
Parameter	Description		
u8Status	Success (0x00), Failure (0x01)		
u16Interest	Network address of the destination queried		
u8Length	Length of the returned simple descriptor		
u8EndPoint	The application endpoint that sources the data		
u16ProfileID	Endpoint profile ID		
u16DeviceID	Endpoint Device ID		
u8EPFlags	(3:0) Version of device description supported		
u8InClstrs	Number of Cluster IDs in the Input Clusters List		
u16InClstrs[]	Array of Input Clusters IDs		
u8OutClstrs	Number of Cluster IDs in the Output Clusters List		
u16OutClstrs[ ]	Array of Output Clusters IDs		
<b>ACTIVE ENDPOINT REQUEST</b>		<b>CMD:</b>	0x0016
Get the Destination's Device Active Endpoint Information		<b>LEN:</b>	0x04
Parameter	Description		
u16DstAdd	Network address of the device generating the request		
u16Interest	Network address of the destination device being queried		
<b>ACTIVE ENDPOINT RESPONSE</b>		<b>CMD:</b>	0x1016
Get the Destination's Device Active Endpoint Information		<b>LEN:</b>	Variable
Parameter	Description		
u8Status	Success (0x00), Failure (0x01)		
u16Interest	Network address of the destination queried		
u8EndPnts	Number of Endpoints in the list		

u8EPLst[]	Byte array of Endpoints in the queried device		
<b>USER DESCRIPTOR REQUEST</b>			
Get the Destination's Device User Descriptor Information		CMD:	0x0017
		LEN:	0x04
Parameter	Description		
u16SrcAdd	Network address of the device generating the inquiry		
u16DstAdd	Network address of the destination device being queried		
<b>USER DESCRIPTOR RESPONSE</b>		CMD:	0x1017
		LEN:	Variable
Parameter	Description		
u8Status	Success (0x00), Failure (0x01)		
u16Interest	Network address of the destination queried		
u8DescLen	Length of descriptor in bytes		
u8Desc[]	User descriptor array (up to 16 bytes)		
<b>USER DESCRIPTOR SET REQUEST</b>			
Set Destination Device's User Descriptor Information		CMD:	0x0018
		LEN:	Variable
Parameter	Description		
u16SrcAdd	The message's source network address		
u16Interest	Network address of the described device		
u8DescLen	Length, in bytes, of the user descriptor		
u8Desc[]	User descriptor array (can be up to 16 bytes)		
<b>USER DESCRIPTOR SET RESPONSE</b>		CMD:	0x1018
		LEN:	0x03
Parameter	Description		
u8Status	Success (0x00), Failure (0x01)		
u16SrcAddr	The message's source network address		
<b>MATCH DESCRIPTOR REQUEST</b>			
Request responses from nodes matching specified criteria in their simple descriptors		CMD:	0x0019
		LEN:	Variable
Parameter	Description		
u16DstAdd	Network address of the device generating the request		
u16Interest	Network address of the device of interest		
u16Profile	Profile ID		
u8InClusters	Number of input clusters		

u8OutClusters	Number of output clusters	
u16InClstrs[]	List of input clusters	
u16OtClstrs[]	List of output clusters	
<b>MATCH DESCRIPTOR RESPONSE</b>		
	CMD:	0x1019
	LEN:	0x03
Parameter	Description	
u8Status	Success (0x00), Failure (0x01)	
u16SrcAddr	The message's source network address	
u8MatchLen	Length of the list of matched endpoints	
u8Matched[]	List of matched endpoints	
<b>NETWORK LEAVE REQUEST</b>		
	CMD:	0x001A
	LEN:	0x09
Parameter	Description	
u64DevAdd	The IEEE address of the device requested to leave	
u8Options	0 – Children not to leave. Do not rejoin the network. 1 – Children not to leave. Rejoin the network immediately 2 – Children to leave. Do not rejoin the network. 3 – Children to leave. Rejoin the network immediately.	
<b>NETWORK LEAVE RESPONSE</b>		
	CMD:	0x101A
	LEN:	0x03
Parameter	Description	
u8Status	Success (0x00), Failure (0x01)	
u16SrcAddr	The message's source network address	
<b>END DEVICE ANNOUNCE</b>		
	CMD:	0x101B
	LEN:	0x0B
Parameter	Description	
u16DevAdd	Network address of the device generating the request	
u64DevAdd	The IEEE address of the device being announced	
u8Capabilities	Bit mask of the operating capabilities of the device: Bit 0 – 1: Node able to act as coordinator Bit 1 – 1: Full function device; 0: Reduced function device Bit 2 – 1: Node is mains powered Bit 3 – 1: Rx enabled during idle periods	

	Bit 6 – 1: High security enabled; 0: Standard security Bit 7 – 1: Network address should be allocated to the node	
<b>BIND REQUEST</b>		
Send Binding Request to a Node Which Hosts a Binding Table		CMD: 0x0021
		LEN: Variable
Parameter	Description	
u8DstAddMode	Indicates if DstAddr is 16 bits ShortAddress (0x00), or 64 bits IEEEAddress (0x01)	
u16DstAdd or u64DstAdd	Address of destination node of request. This is the node holding the binding table or a binding table cache.	
u64SrcAddr	IEEE address of the source node for the binding (client)	
u8SrcEPt	Binding source endpoint	
u16ClstrID	Cluster ID to match	
U16BndgDst	Network address of the binding destination (device to be bound)	
<b>BIND RESPONSE</b>		
		CMD: 0x1020
		LEN: 0x03
Parameter	Description	
u8Status	Status of Bind Request as Success = 0, Not Supported = 1, Table Full = 2, Reserved = 0x03-0xFF	
u16SrcAddr	The message's source network address	
<b>UNBIND REQUEST</b>		
Send Binding or Unbinding Request to a Node Which Hosts a Binding Table		CMD: 0x0022
		LEN: 0x19
Parameter	Description	
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)	
u16DstAdd	Network address of the device generating the Bind Request	
u64SrcAdd	IEEE address of the Binding source node	
u8EndPoint	Binding source endpoint	
u16ClstrID	Cluster ID to match	
u8DstAddMd	01 for Group address; 03 for Extended address.	
u64DstAddr	IEEE of the binding destination. Not to be confused with DstAddr above.	

u8DstEP	Binding destination endpoint. Used only when DstAddrMode is IEEE extended address.		
u8Security	Security options		
None			
<b>UNBIND RESPONSE</b>		<b>CMD:</b>	0x1022
		<b>LEN:</b>	0x03
<b>Parameter</b>	<b>Description</b>		
u8Status	Status of Bind Request as Success = 0, Not Supported = 1, Table Full = 2, Reserved = 0x03-0xFF		
u16SrcAddr	The message's source network address		
<b>BIND TABLE REQUEST</b>		<b>CMD:</b>	0x0023
Request the binding table of the destination device		<b>LEN:</b>	0x04
<b>Parameter</b>	<b>Description</b>		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the device being queried		
u8StartIdx	Starting index in the array list. Since the result may contain more entries than can be reported, this field allows retrieval of entries from anywhere in the array list.		
<b>BIND TABLE RESPONSE</b>		<b>CMD:</b>	0x1023
		<b>LEN:</b>	Variable
<b>Parameter</b>	<b>Description</b>		
u16SrcAddr	The message's source network address		
u8Status	Success, Failure		
u8BindCnt	Total number of entries available in the device		
u8StartIdx	Wherein the total number of entries this response starts		
u8BindLstCnt	Number of entries in this response		
u?BindList[]	An array of BindList items		
<b>CLUSTER COMMANDS</b>		<b>CMD:</b>	0x0030
General format for sending commands to a cluster		<b>LEN:</b>	Variable
<b>Parameter</b>	<b>Description</b>		
u8Mode	Bits 0:1 - Indicate if DstAddr is 16 bits ShortAddress (0x02), or 16 bits GroupAddress (0x01)		

	Bit 4 – If set, disable default response Bit 5 – If set, direction is from server to client Bit 6 – If set, message is manufacturer specific. The manufacturer code is the first 16-bit field in the payload array. Bit 7 – If set, command applies across entire profile.
u16DstAdd	Network address of the device being addressed
u8DstEP	Destination endpoint
u16ClstrID	Cluster ID being addressed
u8Command	Command identifier
u8Flags	Must be 0x00
<Variable>	Parameters specific to a command or none
<b>DEFAULT RESPONSE</b>	
Default Cluster Response Message	
	CMD: 0x1031
	LEN: 8
Parameter	Description
u16SrcAdd	Network address of the source (responding) device
u8SrcEP	Source endpoint
u16ClstrID	Cluster ID
u8Command	0x0B – Default response command identifier
u8CmdID	Command identifier of response
u8Status	Response status code
<b>General - READ ATTRIBUTES</b>	
Read one or more Attribute Values from a Cluster	
	CMD: 0x0030
	LEN: Variable
Parameter	Description
u8Mode	If 0x82, DstAddr is 16 bits ShortAddress. If 0x81 DstAddr is 16 bits GroupAddress.
u16DstAdd	Network address of the device being addressed
u8DstEP	Destination endpoint
u16ClstrID	Cluster ID being addressed
u8Command	Command code: 0x00
u8Attribs	Number of attributes in the list
u16AttrLst[]	Attribute list containing the attributes to be read
<b>READ ATTRIBUTES RESPONSE</b>	
Default Cluster Response Message	
	CMD: 0x1031
	LEN: Variable

Parameter	Description
u16SrcAdd	Network address of the source (responding) device
u8SrcEP	Source endpoint
u16ClstrID	Source wCluster ID
u8Command	0x01 – Read Attributes response command identifier
u8Attributes	Number of Attributes in the list
AttribRec[]	Array (list) of attribute records. Each record consists of: u16AttribID – Attribute identifier u8Status – Attribute read status (SUCCESS or UNSUPPORTED) u8DataType – Type of the attribute AttribData – Attribute data (variable depending on type)
<b>General - WRITE ATTRIBUTES</b>	
Write Attribute Values to a Cluster	
CMD: 0x0030	
LEN: Variable	
Parameter	Description
u8Mode	If 0x82, DstAddr is 16 bits ShortAddress. If 0x81 DstAddr is 16 bits GroupAddress.
u16DstAdd	Network address of the device being addressed
u8DstEP	Destination endpoint
u16ClstrID	Cluster ID being addressed
u8Command	Command code: 0x02
u8Attribs	Number of attributes in the list
u16AttrLst[]	Attribute list containing the attribute records to be written. Each record consists of: u16AttribID – Attribute identifier u8Type – Attribute data type AttribData – Attribute data (variable depending on type)
<b>General - WRITE ATTRIBUTE UNDIVIDED</b>	
Write Attribute Values to a Cluster	
CMD: 0x0030	
LEN: Variable	
Parameter	Description
u8Mode	If 0x82, DstAddr is 16 bits ShortAddress. If 0x81 DstAddr is 16 bits GroupAddress.
u16DstAdd	Network address of the device being addressed
u8DstEP	Destination endpoint
u16ClstrID	Cluster ID being addressed

u8Command	Command code: 0x03		
u8Attribs	Number of attributes in the list		
u16AttrLst[]	Attribute list containing the attribute records to be written. Each record consists of: u16AttribID – Attribute identifier u8Type – Attribute data type AttribData – Attribute data (variable depending on type)		
<b>WRITE ATTRIBUTES RESPONSE</b>		<b>CMD:</b>	<b>0x1031</b>
Write Attributes Response Message		<b>LEN:</b>	<b>Variable</b>
Parameter	Description		
u16SrcAdd	Network address of the source (responding) device		
u8SrcEP	Source endpoint		
u16ClstrID	Cluster ID		
u8Command	0x04 – Write Attributes response command identifier		
u8Attributes	Number of Attributes in the list		
AttribRec[]	Array (list) of attribute records. Each record consists of: u8Status – Attribute read status (SUCCESS or UNSUPPORTED) u16AttribID – Attribute identifier		
<b>General - WRITE ATTRIBUTE NO RESPONSE</b>		<b>CMD:</b>	<b>0x0030</b>
Write Attribute Values from a Cluster		<b>LEN:</b>	<b>Variable</b>
Parameter	Description		
u8Mode	If 0x82, DstAddr is 16 bits ShortAddress. If 0x81 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the device being addressed		
u8DstEP	Destination endpoint		
u16ClstrID	Cluster ID being addressed		
u8Command	Command code: 0x05		
u8Attribs	Number of attributes in the list		
u16AttrLst[]	Attribute list containing the attribute records to be written. Each record consists of: u16AttribID – Attribute identifier u8Type – Attribute data type AttribData – Attribute data (variable depending on type)		
<b>General - CONFIGURE REPORTING</b>		<b>CMD:</b>	<b>0x0030</b>

Configure Reporting Mechanism for Cluster Attributes		LEN:	Variable
Parameter	Description		
u8Mode	If 0x82, DstAddr is 16 bits ShortAddress. If 0x81 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the device being addressed		
u8DstEP	Destination endpoint		
u16ClstrID	Cluster ID being addressed		
u8Command	Command code: 0x06		
u8Attribs	Number of attributes in the list		
u16AttrLst[]	Attribute list containing the attributes to be read		
u8Dir	<p>Specifies whether values of the attribute are to be reported, or whether reports of the attribute are to be received.</p> <p>If this value is set to 0x00, then the minimum reporting interval field and maximum reporting interval field are included in the payload, and the timeout period field is omitted. The record is sent to a cluster server (or client) to configure how it sends reports to a client (or server) of the same cluster.</p> <p>If this value is set to 0x01, then the timeout period field is included in the payload, and the minimum reporting interval field and maximum reporting interval fields are omitted. The record is sent to a cluster client (or server) to configure how it should expect reports form a server (or client) of the same cluster.</p>		
u16MinItvl	<p>Contain the minimum interval, in seconds, between issuing reports for each of the attributes specified in the attribute identifier list field.</p> <p>If this value is set to 0x0000, then there is no minimum limit, unless one is imposed by the specification of the cluster using this reporting mechanism or by the applicable profile.</p>		
u16MaxItvl	<p>Contains the maximum interval, in seconds, between issuing reports for each of the attributes specified in the attribute identifier list field.</p> <p>If this value is set to 0x0000, then the device shall not issue a report for the attributes supplied in the attribute identifier list.</p>		
u8RepChg[]	Contains the minimum change to the attribute that will		

	result in a report being issued.		
u16Timeout	Contains the maximum expected time, in seconds, between received reports for each of the attributes specified in the attribute identifier list field. If more time than this elapses between reports, this may be an indication that there is a problem with reporting. If this value is set to 0x0000, reports of the attributes in the attribute identifier list field are not subject to timeout.		
<b>CONFIGURE REPORTING RESPONSE</b>		<b>CMD:</b>	<b>0x1031</b>
Write Attributes Response Message		<b>LEN:</b>	<b>Variable</b>
Parameter	Description		
u16SrcAdd	Network address of the source (responding) device		
u8SrcEP	Source endpoint		
u16ClstrID	Cluster ID		
u8Command	0x07 – Configure Reporting response command identifier		
u8Attributes	Number of Attributes in the list		
AttribStRec[]	Array (list) of attribute status records. Each record consists of: u8Status – Attribute read status (SUCCESS or UNSUPPORTED) u8Direction – 0x00 if value of the attribute is reported, or 0x01 if received u16AttribID – Attribute identifier		
<b>General - READ REPORTING CONFIGURATION</b>		<b>CMD:</b>	<b>0x0030</b>
Read Reporting Configuration for Cluster Attributes		<b>LEN:</b>	<b>Variable</b>
Parameter	Description		
u8Mode	If 0x82, DstAddr is 16 bits ShortAddress. If 0x81 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the device being addressed		
u8DstEP	Destination endpoint		
u16ClstrID	Cluster ID being addressed		
u8Command	Command code: 0x08		
u8Attribs	Number of attributes in the list		
u16AttrLst[]	Attribute list containing the attributes to be configured		
<b>READ REPORTING CONFIGURATION RESPONSE</b>		<b>CMD:</b>	<b>0x1031</b>
Write Attributes Response Message		<b>LEN:</b>	<b>Variable</b>

Parameter	Description
u16SrcAdd	Network address of the source (responding) device
u8SrcEP	Source endpoint
u16ClstrID	Cluster ID
u8Command	0x07 – Configure Reporting response command identifier
u8Attributes	Number of Attributes in the list
AttribReRec[]	Array (list) of attribute reporting records. Each record consists of: u8Status – Attribute read status (SUCCESS or UNSUPPORTED) u8Direction – 0x00 if value of the attribute is reported, or 0x01 if received u16AttribID – Attribute identifier u8Type – Attribute data type u16MinRepIntvl – Minimum reporting interval in seconds u16MaxRepIntvl – Maximum reporting interval in seconds uRepChange – Reportable change u16Timeout – Timeout period
<b>REPORT ATTRIBUTES MESSAGE</b>	
Attribute Report Message from device bound <i>a priori</i>	
CMD: 0x1031	
LEN: Variable	
Parameter	Description
u16SrcAdd	Network address of the source (responding) device
u8SrcEP	Source endpoint
u16ClstrID	Cluster ID
u8Command	0x0A – Report Attributes command identifier
AttribRec[]	Array (list) of attribute records. Each record consists of: u16AttribID – Attribute identifier u8DataType – Type of the attribute AttribData – Attribute data (variable depending on type)
<b>General - DISCOVER ATTRIBUTES</b>	
Discover Attribute Values from a Cluster	
CMD: 0x0030	
LEN: 0x0A	
Parameter	Description
u8Mode	If 0x82, DstAddr is 16 bits ShortAddress. If 0x81 DstAddr

	is 16 bits GroupAddress.		
u16DstAdd	Network address of the device being addressed		
u8DstEP	Destination endpoint		
u16ClstrID	Cluster ID being addressed		
u8Command	Command code: 0x0C		
u8Flags	Must be 0x00		
u16StartAttr	Specifies the value of the identifier at which to begin the attribute discovery		
u8MaxAttr	Specifies the maximum number of attribute identifiers that are to be returned in the resulting discover attributes response command		
<b>DISCOVER ATTRIBUTES RESPONSE</b>		<b>CMD:</b>	<b>0x1031</b>
Discover Attribute Values from a Cluster		<b>LEN:</b>	<b>Variable</b>
Parameter	Description		
u16SrcAdd	Network address of the attributes source device		
u8SrcEP	Source endpoint		
u16ClstrID	Cluster ID		
u8Command	0x0D – Discover Attributes command identifier		
u8Number	Number of attributes in the list		
u8Complete	If 0x00, there are more attributes to be read. If 0x01, the list is complete		
u16StartAttr	Specifies the value of the identifier at which to begin the attribute discovery		
u8MaxAttr	Specifies the maximum number of attribute identifiers that are to be returned in the resulting discover attributes response command		
<b>RESET TO FACTORY DEFAULTS</b>		<b>CMD:</b>	<b>0x0030</b>
Cause a device to reset to its factory defaults		<b>LEN:</b>	<b>0x06</b>
Parameter	Description		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the device being reset		
u8DstEP	Destination endpoint		
u16ClstrID	0x0000 - Basic Cluster ID		
u8Command	0x00 – Reset to defaults command identifier		

Identify Cluster - IDENTIFY		CMD:	0x0030
Request device to physically identify itself		LEN:	0x09
Parameter	Description		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the device being identified		
u8DstEP	Destination endpoint		
u16ClstrID	0x0003 – Identify Cluster ID		
u8Command	0x00 – Identify command identifier		
u8Flags	Must be 0x00		
u16IDTime	Identify time in tens of seconds (0000 – FFFF)		
Identify Cluster - IDENTIFY QUERY REQUEST		CMD:	0x0030
Request device's identification parameters		LEN:	0x07
Parameter	Description		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the device being identified		
u8DstEP	Destination endpoint		
u16ClstrID	0x0003 – Identify Cluster ID		
u8Command	0x01 – Identify Query command code		
IDENTIFY QUERY RESPONSE		CMD:	0x1030
		LEN:	0x07
Parameter	Description		
u16SrcAddr	Network address of device being identified		
u8SrcEndpoint	The source EndPoint. Represents the application endpoint the data.		
u16Cluster ID	0x0003 – Identify Cluster ID		
u8Command	0x00 – Identify Query response command code		
u16TimeOut	How long the device will continue to identify itself (in seconds). <b>NOTE:</b> No response When Time Out is '0'.		
Groups Cluster - ADD GROUP		CMD:	0x0030
		LEN:	Variable
Parameter	Description		

u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0004 – Group Cluster ID		
u8Command	0x00 – Add group command ID		
u8Flags	Must be 0x00		
u16GroupID	Group ID		
u8GrpNmLen	The number of bytes in the name array		
u8GrpName[]	The name array (Max=16 bytes)		
<b>ADD GROUP RESPONSE</b>		<b>CMD:</b>	0x1030
		<b>LEN:</b>	0x09
Parameter	Description		
u16SrcAddr	Network address of device being identified		
u8SrcEndpoint	The source EndPoint. Represents the application endpoint the data.		
u16ClstrID	0x0004 - Group Cluster ID		
u8Command	0x00 – Add group response command ID		
u8Status	0x00 for Success, or Failure code		
u16GroupID	Group ID		
<b>Groups Cluster - VIEW GROUP</b>		<b>CMD:</b>	0x0030
		<b>LEN:</b>	0x0A
Parameter	Description		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), or 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0004 - Group Cluster ID		
u8Command	0x01 - View Group command identifier		
u8Flags	Must be 0x00		
u16GroupID	Group ID for this Scene		
<b>VIEW GROUP RESPONSE</b>		<b>CMD:</b>	0x1030
		<b>LEN:</b>	Variable
Parameter	Description		

u16SrcAddr	Network address of device being identified		
u8SrcEndpoint	The source EndPoint. Represents the application endpoint the data.		
u16ClstrID	0x0004 - Group Cluster ID		
u8Command	0x01 - View Group response command identifier		
u8Status	0x00 for Success, or Failure code		
u16GroupID	Group ID		
u8GrpNmLen	The number of bytes in the name array		
u8GrpName[]	The name array (Max=16 bytes)		
Groups Cluster - GET GROUP MEMBERSHIP		CMD:	0x0030
		LEN:	Variable
Parameter	Description		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0004 - Group Cluster ID		
u8Command	0x02 – Get Group Membership command identifier		
u8Flags	Must be 0x00		
u8GroupCnt	Number of groups in the list		
u16GrpLst[]	The group list of which device is a member		
GET GROUP MEMBERSHIP RESPONSE		CMD:	0x1030
		LEN:	Variable
Parameter	Description		
u16SrcAddr	Network address of device responding		
u8SrcEndpoint	The source EndPoint. Represents the application endpoint the data.		
u16ClstrID	0x0004 - Group Cluster ID		
u8Command	0x02 – Get Group Membership response command identifier		
u8Capacity	Remaining capacity of the groups list		
u8GroupCnt	Number of groups in the list		
u16GrpLst[]	The group list of which device is a member		
Groups Cluster - REMOVE GROUP		CMD:	0x0030

		LEN:	0x0A
Parameter	Description		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0004 - Group Cluster ID		
u8Command	0x03		
u8Flags	Must be 0x00		
u16GroupID	Group ID		
<b>REMOVE GROUP RESPONSE</b>		CMD:	0x1030
		LEN:	Variable
Parameter	Description		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0004 - Group Cluster ID		
u8Command	0x03 – Remove Group response command identifier		
u8Status	0x00 for Success, or Failure code		
u16GroupID	Group ID		
<b>Groups Cluster - REMOVE ALL GROUPS</b>		CMD:	0x0030
		LEN:	7
Parameter	Description		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0004 - Group Cluster ID		
u8Command	0x04 – Remove All Groups command identifier		
<b>Groups Cluster - ADD GROUP IF IDENTIFYING</b>		CMD:	0x0030
		LEN:	Variable
Parameter	Description		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits		

	GroupAddress (0x01)	
u16DstAdd	Network address of the destination address	
u8DstEP	Destination endpoint	
u16ClstrID	0x0004 - Group Cluster ID	
u8Command	0x05 – Add Group if Identifying command identifier	
u8Flags	Must be 0x00	
u16GroupID	(reverse) Group ID	
u8GrpNmLen	The number of bytes in the name array	
u8GrpName[]	The name array (Max=16 bytes)	
Groups Cluster - ADD SCENE		
	CMD:	0x0030
	LEN:	Variable
Parameter	Description	
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)	
u16DstAdd	Network address of the destination address	
u8DstEP	Destination endpoint	
u16ClstrID	0x0005 – Scenes Cluster ID	
u8Command	0x00 – Add Scene command identifier	
u8ExtLen	Length of the extension fields	
u8SceneID	Scene ID	
u16GroupID	(reverse) Group ID for this Scene	
u16Transition Time	Time to transition to this scene	
u8ScnNmLen	Length of the scene name array	
u8ScnName[]	Scene name array (Max=16 bytes)	
u8ExtFields	Extension fields	
ADD SCENE RESPONSE		
	CMD:	0x1030
	LEN:	0x09
Parameter	Description	
u16SrcAddr	Network address of device being added with the scene	
u16Cluster ID	Scene Cluster ID	
u8Status	Indicates Success or Failure	
u16GroupID	(reverse) The group ID for which this scene applies	
u8Command	0x00 – Add Scene response command identifier	
u8SceneID	To be added	

Scenes Cluster - VIEW SCENE		CMD:	0x0030
		LEN:	0x0B
Parameter	Description		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0005 – Scenes Cluster ID		
u8Command	0x01		
u8Flags	Must be 0x00		
u16GroupID	(reverse) Scene Group ID		
u8SceneID	Scene ID		
VIEW SCENE RESPONSE		CMD:	0x1030
		LEN:	Variable
Parameter	Description		
u16SrcAddr	Network address of device being identified		
u8SrcEndpoint	The source EndPoint. Represents the application endpoint the data.		
u16ClstrID	0x0004 - Group Cluster ID		
u8Command	0x00 – Add group response command ID		
u8Status	0x00 for Success, or Failure code		
u16GroupID	Group ID		
Scenes Cluster - REMOVE SCENE		CMD:	0x0030
		LEN:	0x0B
Parameter	Description		
u8Mode	Indicates if DstAddr is 16 bits ShortAddress (0x02), 16 bits GroupAddress (0x01)		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		

u16ClstrID	0x0005 – Scenes Cluster ID	
u8Command	0x02	
u8Flags	Must be 0x00	
u16GroupID	(reverse) Scene Group ID	
u8SceneID	ID of scene to be removed	
<b>REMOVE SCENE RESPONSE</b>		
	CMD:	0x1030
	LEN:	0x09
Parameter	Description	
<b>Scenes Cluster - REMOVE ALL SCENES</b>		
	CMD:	0x0030
	LEN:	0x0A
Parameter	Description	
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.	
u16DstAdd	Network address of the destination address	
u8DstEP	Destination endpoint	
u16ClstrID	0x0005 – Scenes Cluster ID	
u8Command	0x03	
u8Flags	Must be 0x00	
u16GroupID	Scene Group ID	
<b>REMOVE ALL SCENES RESPONSE</b>		
	CMD:	0x1030
	LEN:	0x08
Parameter	Description	
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.	
u16DstAdd	Network address of the destination address	
u8DstEP	Destination endpoint	
u16ClstrID	(reverse) Scene Cluster ID	
u16GroupID	(reverse) Scene Group ID	
u8Command	0x0 – Remove all scenes command identifier	

Scenes Cluster - STORE SCENE		CMD:	0x0030
		LEN:	0x0B
Parameter	Description		
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0005 – Scenes Cluster ID		
u8Command	0x04		
u8Flags	Must be 0x00		
u16GroupID	(reverse) Scene Group ID		
u8SceneID	Store scene		
STORE SCENE RESPONSE		CMD:	0x1030
		LEN:	0x09
Parameter	Description		
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	Scene Cluster ID		
u16GroupID	Scene Group ID		
u8SceneID	Store scene		
Scenes Cluster - RECALL SCENE		CMD:	0x0030
		LEN:	0x0B
Parameter	Description		
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0005 – Scenes Cluster ID		
u8Command	0x05		
u8Flags	Must be 0x00		
u16GroupID	(reverse) Scene Group ID		
u8SceneID	Recall scene		

RECALL SCENE RESPONSE		CMD:	0x1030
		LEN:	0x09
Parameter	Description		
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0005 – Scenes Cluster ID		
u16GroupID	(reverse) Scene Group ID		
u8SceneID	Recall scene		
Scenes Cluster - GET SCENE MEMBERSHIP		CMD:	0x0030
		LEN:	0x09
Parameter	Description		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0005 – Scenes Cluster ID		
u8Command	0x06		
u8Flags	Must be 0x00		
u16GroupID	Scene Group ID		
GET SCENE MEMBERSHIP RESPONSE		CMD:	0x1030
		LEN:	0x08
Parameter	Description		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0005 – Scenes Cluster ID		
u16GroupID	Scene Group ID		
On/Off Cluster - SEND OFF Send OFF Command to EndPoint		CMD:	0x0030
		LEN:	0x07
Parameter	Description		
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the destination device		
u8DstEP	Destination endpoint		
u16ClstrID	0x0006 – On Off Cluster ID		

u8Command	0x00	
On/Off Cluster - SEND ON Send ON Command to EndPoint		
	CMD:	0x0030
	LEN:	0x07
Parameter	Description	
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.	
u16DstAdd	Network address of the destination device	
u8DstEP	Destination endpoint	
u16ClstrID	0x0006 – On Off Cluster ID	
u8Command	0x01	
On/Off Cluster - SEND TOGGLE Send TOGGLE Command to EndPoint		
	CMD:	0x0030
	LEN:	0x07
Parameter	Description	
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.	
u16DstAdd	Network address of the destination device	
u8DstEP	Destination endpoint	
u16ClstrID	0x0006 – On Off Cluster ID	
u8Command	0x02	
On/Off Cluster - SEND RELAY OFF Send OFF Command to specific relay		
	CMD:	0x0030
	LEN:	0x09
Parameter	Description	
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.	
u16DstAdd	Network address of the destination device	
u8DstEP	Destination endpoint	
u16ClstrID	0x0006 – On Off Cluster ID	
u8Command	0x00	
u8Flags	Must be 0x00	
u8Unit	Unit (relay) number affected (0x01-0xFF)	
On/Off Cluster - SEND RELAY ON Send ON Command to specific relay		
	CMD:	0x0030
	LEN:	0x09
Parameter	Description	

u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the destination device		
u8DstEP	Destination endpoint		
u16ClstrID	0x0006 – On Off Cluster ID		
u8Command	0x01		
u8Flags	Must be 0x00		
u8Unit	Unit (relay) number affected (0x01-0xFF)		
On/Off Cluster - SEND RELAY TOGGLE		CMD:	0x0030
Send TOGGLE Command to specific relay		LEN:	0x09
Parameter	Description		
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the destination device		
u8DstEP	Destination endpoint		
u16ClstrID	0x0006 – On Off Cluster ID		
u8Command	0x02		
u8Flags	Must be 0x00		
u8Unit	Unit (relay) number affected (0x01-0xFF)		
On/Off Cluster - SET IRRIGATION STATUS		CMD:	0x0030
Sets state of relays when in irrigation mode		LEN:	0x09
Parameter	Description		
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the destination device		
u8DstEP	Destination endpoint		
u16ClstrID	0x0006 – On Off Cluster ID		
u8Command	0x02		
u8Flags	Must be 0x00		
u8Unit	Unit (relay) number affected (0x01-0xFF)		
Level Control Cluster - SEND MOVE TO LEVEL		CMD:	0x0030
Device Moves to Level from Current Level		LEN:	0x0B
Parameter	Description		
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr		

	is 16 bits GroupAddress.
u16DstAdd	Network address of the destination address
u8DstEP	Destination endpoint
u16ClstrID	0x0006 – On Off Cluster ID
u8Command	0x00
u8Flags	Must be 0x00
u8Level	The new level to move to (0x00 – 0xFF )
u16TransTime	(reverse) Time, in seconds, to move to the new level. If 0xffff then the time taken to move to the new level is by the <i>OnOffTransitionTime</i> attribute. If <i>OnOffTransitionTime</i> (optional) is not set, the device moves to its new level as fast as possible. If the device is currently powered off, the device shall move from its current level to the value given in the Level field, but shall not be powered on.
Level Control Cluster - SEND MOVE	
Sets Move Value for Level Control	
	CMD: 0x0030
	LEN: 0x08
Parameter	Description
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.
u16DstAdd	Network address of the destination address
u8DstEP	Destination endpoint
u16ClstrID	0x0008 - Level Control Cluster ID
u8Command	0x00
u8Flags	Must be 0x00
u8MoveMde	The Move mode field shall be one of the non-reserved values as 0x00 = move Up, 0x01 = move Down, 0x02-0xff = Reserved
u8Rate	Rate of movement in Steps per second. A Step is a change in the device's level of one unit.
Level Control Cluster - SEND STEP	
Sets Step Value for Level Control	
	CMD: 0x0030
	LEN: 0x0B
Parameter	Description
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.
u16DstAdd	Network address of the destination address

u8DstEP	Destination endpoint		
u16ClstrID	0x0008 - Level Control Cluster ID		
u8Command	0x00		
u8Flags	Must be 0x00		
u8StepMode	The Move mode field shall be one of the non-reserved values as 0x00 = move Up, 0x01 = move Down, 0x02-0xff = Reserved		
u16TransTime	(reverse) Specifies time to perform a single Step		
Level Control Cluster - STOP Stops Level Control		CMD:	0x0030
		LEN:	0x06
Parameter	Description		
u8Mode	If 0x02, DstAddr is 16 bits ShortAddress. If 0x01 DstAddr is 16 bits GroupAddress.		
u16DstAdd	Network address of the destination address		
u8DstEP	Destination endpoint		
u16ClstrID	0x0008 - Level Control Cluster ID		
u8Command	0x00		
u8Flags	Must be 0x00		