Zigbee Gateway Command Manual V1.2.1

About this Document

This document supports “RT58x_SDK_v1.2.0” and later version.

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1. Introduction

This document is the command sets for implementing the Zigbee gateway function with coordinator module. It includes the Zigbee network management and application service commands.

2. Hardware Interface Setup

The coordinator module is connected to host control unit by UART port. The default baud rate is 115200 with 8-bit data length, no parity bit, and 1 stop bit format.

3. Command Data Format

3.1. Command Structure

The Zigbee gateway command is constructed as the following format. It uses the little endian format:

Header	Length	Comm-and Id	Address	Address mode	Endpoint	Param-eter	Checks-um
4 octets	1 octet	4 octets	2 octets	1 octets	0/1 octet	n octets	1 octet

3.1.1. Header field

The command header is 4 bytes long and should be formatted as 0xFF 0xFC 0xFC 0xFF.

3.1.2. Length field

The command data length value is the length sum of command id, address, address mode, endpoint(if present) and parameter.

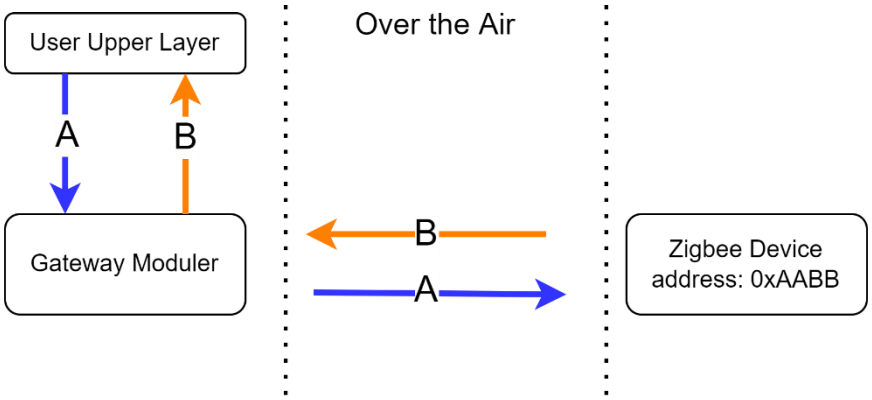
3.1.3. Command id field

The command id is 4 bytes long and will be defined in the following command description.

3.1.4. Address field

Address data is 2 bytes long and could be unicast or group address identified by address mode field.
Some special addresses are defined as broadcast address and the address mode data will be ignored if these addresses are used.
0xFFFF: Broadcast to all devices in PAN.
0xFFFE: Reserved.
0xFFFD: Broadcast to devices which Rx are on when in idle state (macRxOnWhenIdle = TRUE).
0xFFFC: Broadcast to all routers and coordinator.
0xFFFB: Broadcast to all low power routers only.
0xFFF8 – 0xFFFA: Reserved

Please note that the ‘Address field’ here will represent different meanings depending on the direction of the command transmission: When the command is initiated by the user and sent to the gateway module, the 'Address field’ represents the address of the target device(destination address); when the gateway receives the relevant message and reports back to the user's upper layer, the 'Address field’ represents the address of the issuer device(source address).



Direction A: Address field is 0xAABB (destination address to the zigbee device)
Direction B: Address field is 0xAABB (source address from the zigbee device)

3.1.5. Address mode field

Address mode is 1-byte long. Mode value is defined as follow.
Mode value 0: the address field is a unicast address.
Mode value 1: the address field is a group address.

3.1.6. Endpoint field

For “Device and Network Management Service”, the “Endpoint” filed will not present.
For “Application Management Service”, the “Endpoint” field should present for specific endpoint and its application.

3.1.7. Parameter field

The parameter is variable bytes and used for command to configure the devices. The following command description has more detail information.

3.1.8. Checksum field

The checksum is 1-byte long and to confirm the received data correctly. Its value is bitwise not(~) of the sum of all command data fields but header field excluded.
Checksum value = ~(length[0]+command id[0]+ command id[1]+ command id[2]+ command id[3]+address[0]+address[1]+address mode[0]+enpoint[0]+ parameter[0]+parameter[1]+…….+parameter[n-1]).

3.2. Command Example

Assume host sends a “Device and Network Management Service” command to group devices with group address is 0x5566, command id is 0x12005678, parameter is 2-octet short integer 0x3567.
The command data should be formatted as flowing byte stream in little endian style. The endpoint field is not presented.
Header: 0xFF 0xFC 0xFC 0xFF
Length: 0x09
Command id: 0x78 0x56 0x00 0x12
Address: 0x66 0x55

Address Mode: 0x01
Parameters: 0x67 0x35
Checksum: ~(0x09+0x78+0x56+0x00+0x12+0x66+0x55+0x01+0x67+0x35) = 0xBE
Then the command should be
{0xFF 0xFC 0xFC 0xFF 0x09 0x78 0x56 0x00 0x12 0x66 0x55 0x01 0x67 0x35 0xBE}

Assume host sends an “Application Management Service” command to single device with address is 0x5566, command id is 0x12005678, endpoint is 0x0c, parameter is 2-octet short integer 0x3567.
The command data should be formatted as flowing byte stream in little endian style. The endpoint field must be presented.
Header: 0xFF 0xFC 0xFC 0xFF
Length: 0x0A
Command id: 0x78 0x56 0x00 0x12
Address: 0x66 0x55
Address Mode: 0x00
Endpoint: 0x0C
Parameters: 0x67 0x35
Checksum:
~(0x0A+0x78+0x56+0x00+0x12+0x66+0x55+0x00+0x0C+0x67+0x35) = 0xB2
Then the command should be
{0xFF 0xFC 0xFC 0xFF 0x0A 0x78 0x56 0x00 0x12 0x66 0x55 0x00 0x0C 0x67 0x35 0xB2}

4. Device and Network Management Service

4.1. Device and Service Discovery

4.1.1. Network address request (0x0000-0000)

The network address request is generated for wishing to inquire as to the 16-bit address of the Remote Device based on its known IEEE address. The destination addressing on this command shall be unicast or broadcast to all devices for which macRxOnWhenIdle = TRUE.

- Command Id
  0x0000-0000

- Parameter

8 octets	1 octet	1 octet
IEEEAddr	RequestType	StartIndex

Name	Type	Valid Range	Description
IEEEAddr	IEEE Address	A valid 64-bit IEEE address	The IEEE address to be matched by the Remote Device
RequestType	Integer	0x00-0xff	Request type for this command: 0x00 – Single device response 0x01 – Extended response 0x02-0xFF – reserved
StartIndex	Integer	0x00-0xff	If the Request type for this command is Extended response, the StartIndex provides the starting index for the requested elements of the associated devices list

Request type: Single device response
A NWK_addr_resp command shall be generated and sent back to the local device

with the Status field set to SUCCESS, the IEEEAddrRemoteDev field set to the IEEE address of the request; the NWKAddrRemoteDev field set to the NWK address of the discovered device; and the NumAssocDev, StartIndex, and NWKAddrAssocDevList fields shall not be included.

Request type: Extended response
The Remote Device is either the ZigBee coordinator or router, a NWK_addr_resp command shall be generated and sent back to the local device with the Status field set to SUCCESS, the IEEEAddrRemoteDev field set to the IEEE address of the device itself, and the NWKAddrRemoteDev field set to the NWK address of the device itself. The Remote Device shall also supply a list of all 16-bit NWK addresses in the NWKAddrAssocDevList field, starting with the entry StartIndex and continuing with whole entries until the packet maximum length reached.

4.1.2. Network address response (0x0000-8000)

The network address response is a Remote Device in response to a network address request command inquiring as to the NWK address of the Remote Device or the NWK address of an address held in the neighbor table

- Command id
  0x0000-8000

- Parameter

1 octet	8 octets	2 octets	0/1 octet	0/1 octet	variable
Status	IEEEAddr RemoteDev	NWKAddr RemoteDev	Num AssocDev	StartIndex	NWKAddr AssocDevList

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, INV_REQUESTTYPE, or DEVICE_NOT_FOUND	The status of the NWK_addr_req command.
IEEEAddrRemoteDev	Device Address	An extended 64-bit, IEEE address	64-bit address for the Remote Device

NWKAddrRemoteDev	Device Address	A 16-bit, NWK address	16-bit address for the Remote Device
NumAssocDev	Integer	0x00-0xff	Count of the number of 16-bit short addresses to follow. If the RequestType in the request is Extended Response and there are no associated devices on the Remote Device, this field shall be set to 0. If an error occurs or the Request Type in the request is for a Single Device Response, this field shall not be included in the frame.
StartIndex	Integer	0x00-0xff	Starting index into the list of associated devices for this report. If the RequestType in the request is Extended Response and there are no associated

			devices on the Remote Device, this field shall not be included in the frame. If an error occurs or the Request Type in the request is for a Single Device Response, this field shall not be included in the frame.
NWKAddrAssocDevList	Device Address Lis	List of NumAssocDev 16-bit short addresses, each with range 0x0000 - 0xffff	A list of 16-bit addresses, one corresponding to each associated device to Remote Device; The number of 16-bit network addresses contained in this field is specified in the NumAssocDev field. If the RequestType in the request is Extended Response and there are no associated devices on the Remote Device,

			this field shall not be included in the frame. If an error occurs or the Request Type in the request is for a Single Device Response, this field shall not be included in the frame.

4.1.3. IEEE address request (0x0000-0001)

The IEEE address request is generated for wishing to inquire as to the 64-bit IEEE address of the Remote Device based on their known 16-bit address. The destination addressing on this command shall be unicast or broadcast to all devices for which macRxOnWhenIdle = TRUE.

- Command id
  0x0000-0001

- Parameter

2 octets	1 octet	1 octet
NWKAddrOfInterest	RequestType	StartIndex

Name	Type	Valid Range	Description
NWKAddrOfInterest	Device Address	16-bit NWK address	NWK address that is used for IEEE address mapping
RequestType	Integer	0x00-0xff	Request type for this command: 0x00 – Single device response 0x01 – Extended

			response 0x02-0xFF – reserved
StartIndex	Integer	0x00-0xff	If the Request type for this command is Extended response, the StartIndex provides the starting index for the requested elements of the associated devices list

4.1.4. IEEE address response (0x0000-8001)

The IEEE address response is in response to an IEEE address request command inquiring as to the 64-bit IEEE address of the Remote Device or the 64-bit IEEE address of an address held in the neighbor table.

- Command Id
  0x0000-8001

- Parameter

1 octet	8 octets	2 octets	0/1 octet	0/1 octet	variable
Status	IEEEAddr RemoteDev	NWKAddr RemoteDev	Num AssocDev	StartIndex	NWKAddr AssocDevList

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, INV_REQUESTTYPE, or DEVICE_NOT_FOUND	The status of the NWK_addr_req command.
IEEEAddrRemoteDev	Device	An extended 64-bit,	64-bit address

	Address	IEEE address	for the Remote Device
NWKAddrRemoteDev	Device Address	A 16-bit, NWK address	16-bit address for the Remote Device
NumAssocDev	Integer	0x00-0xff	Count of the number of 16-bit short addresses to follow. If the RequestType in the request is Extended Response and there are no associated devices on the Remote Device, this field shall be set to 0. If an error occurs or the Request Type in the request is for a Single Device Response, this field shall not be included in the frame.
StartIndex	Integer	0x00-0xff	Starting index into the list of associated devices for this report. If the RequestType in the request is Extended Response and

			there are no associated devices on the Remote Device, this field shall not be included in the frame. If an error occurs or the Request Type in the request is for a Single Device Response, this field shall not be included in the frame.
NWKAddrAssocDevList	Device Address Lis	List of NumAssocDev 16-bit short addresses, each with range 0x0000 - 0xffff	A list of 16-bit addresses, one corresponding to each associated device to Remote Device; The number of 16-bit network addresses contained in this field is specified in the NumAssocDev field. If the RequestType in the request is Extended Response and there are no associated

			devices on the Remote Device, this field shall not be included in the frame. If an error occurs or the Request Type in the request is for a Single Device Response, this field shall not be included in the frame.

4.1.5. Node descriptor request (0x0000-0002)

The Node descriptor request command is generated for wishing to inquire as to the node descriptor of a remote device. This command shall be unicast either to the remote device itself or to an alternative device that contains the discovery information of the remote device.

- Command id
  0x0000-0002

- Parameter

2 octets
NWKAddrOfInterest

Name	Type	Valid Range	Description
NWKAddrOfInterest	Device Address	16-bit NWK address	NWK address for the request

4.1.6. Node descriptor response (0x0000-8002)

The node descriptor response is in response to a node descriptor request directed

to the remote device. This command shall be unicast to the originator of the node descriptor request command.

- Command id

0x0000-80002

- Parameter

1 octet	2 octets	Variable
Status	NWKAddrOfInterest	Node Descriptor

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, DEVICE_NOT_FOUND, INV_REQUESTTYPE, or NO_DESCRIPTOR	The status of the command
NWKAddrOfInterest	Device Address	16-bit NWK address	NWK address for the request
NodeDescriptor	Node Descriptor		This field shall only be included in the frame if the status field is equal to SUCCESS

Node Descriptor

The node descriptor contains information about the capabilities of the ZigBee node and is mandatory for each node. There shall be only one node descriptor in a node.

Field Name	Length(bits)
Logical type	3
Complex descriptor available	1
User descriptor available	1
Reserved	3
APS flags	3
Frequency band	5

MAC capability flags	8
Manufacturer code	16
Maximum buffer size	8
Maximum incoming transfer size	16
Server mask	16
Maximum outgoing transfer size	16
Descriptor capability field	8

4.1.7. Power descriptor request (0x0000-0003)

The Power descriptor request command is generated for wishing to inquire as to the power descriptor of a remote device. This command shall be unicast either to the remote device itself or to an alternative device that contains the discovery information of the remote device.

- Command id
  0x0000-0003

- Parameter

2 octets
NWKAddrOfInterest

Name	Type	Valid Range	Description
NWKAddrOfInterest	Device Address	16-bit NWK address	NWK address for the request

4.1.8. Power descriptor response (0x0000-8003)

The power descriptor response is in response to a power descriptor request directed to the remote device. This command shall be unicast to the originator of the power descriptor request command.

- Command id
  0x0000-8003

- Parameter

1 octet	2 octets	Variable
Status	NWKAddrOfInterest	Power Descriptor

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, DEVICE_NOT_FOUND, INV_REQUESTTYPE, or NO_DESCRIPTOR	The status of the command
NWKAddrOfInterest	Device Address	16-bit NWK address	NWK address for the request
PowerDescriptor	Power Descriptor		This field shall only be included in the frame if the status field is equal to SUCCESS

Power Descriptor
The node power descriptor gives a dynamic indication of the power status of the node and is mandatory for each node. There shall be only one node power descriptor in a node.

Field Name	Length(bits)
Current power mode	4
Available power sources	4
Current power source	4
Current power source level	4

4.1.9. Simple descriptor request (0x0000-0004)

The Simple descriptor request command is generated for wishing to inquire as to the simple descriptor of a remote device on a specified endpoint. This command shall be unicast either to the remote device itself or to an alternative device that contains the discovery information of the remote device.

- Command id
  0x0000-0004

- Parameter

2 octets	1 octet
NWKAddrOfInterest	EndPoint

Name	Type	Valid Range	Description
NWKAddrOfInterest	Device Address	16-bit NWK address	NWK address for the request
Endpoint	8 bits	1-254	The endpoint on the destination

4.1.10. Simple descriptor response (0x0000-8004)

The simple descriptor response is in response to a simple descriptor request directed to the remote device. This command shall be unicast to the originator of the simple descriptor request command.

- Command id
  0x0000-80004

- Parameter

1 octet	2 octets	1 octet	Variable
Status	NWKAddrOfInterest	Length	Simple Descriptor

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, DEVICE_NOT_FOUND, INV_REQUESTTYPE, or NO_DESCRIPTOR	The status of the command
NWKAddrOfInterest	Device Address	16-bit NWK address	NWK address for the request

Length	Integer	0x00-0xff	Length in bytes of the Simple Descriptor to follow.
SimpleDescriptor	Simple Descriptor		This field shall only be included in the frame if the status field is equal to SUCCESS

Simple Descriptor
The simple descriptor contains information specific to each endpoint contained in this node. The simple descriptor is mandatory for each endpoint present in the node.

Field Name	Length(bits)
Endpoint	8
Application profile identifier	16
Application device identifier	16
Application device version	4
Reserved	4
Application input cluster count	8
Application input cluster list	16*i (where i is the value of the application input cluster count)
Application output cluster count	8
Application output cluster list	16*o (where o is the value of the application output cluster count)

4.1.11. Active endpoint request (0x0000-0005)

The Active endpoint request command is generated for wishing to acquire the list of endpoints on a remote device with simple descriptors. This command shall be unicast either to the remote device itself or to an alternative device that contains

the discovery information of the remote device.

- Command id
  0x0000-0005

- Parameter

2 octets
NWKAddrOfInterest

Name	Type	Valid Range	Description
NWKAddrOfInterest	Device Address	16-bit NWK address	NWK address for the request

4.1.12. Active endpoint response (0x0000-8005)

The active endpoint response is in response to an active endpoint request directed to the remote device. This command shall be unicast to the originator of the active endpoint request command.

- Command id
  0x0000-8005

- Parameter

1 octet	2 octets	1 octet	Variable
Status	NWKAddrOfInterest	ActiveEPCount	ActiveEPList

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, DEVICE_NOT_FOUND, INV_REQUESTTYPE, or NO_DESCRIPTOR	The status of the command
NWKAddrOfInterest	Device Address	16-bit NWK address	NWK address for the request
ActiveEPCount	Integer	0x00-0xff	The count of

			active endpoints on the Remote Device.
ActiveEPList			List of bytes each of which represents an 8-bit endpoint

4.1.13. Device announce indication (0x0000-0013)

The Device announce indication is provided to notify upper layer that the device has joined or re-joined the network, identifying the device's 64-bit IEEE address and new 16-bit NWK address, and informing the Remote Devices of the capability of the ZigBee device

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- Command id
  0x0000-0013

- Parameter

2 octets	8 octets	1 octet
NWKAddr	IEEEAddr	Capability

Name	Type	Valid Range	Description
NWKAddr	Device Address	16-bit NWK address	NWK address for the Local Device
IEEEAddr	Device Address	64-bit IEEE address	IEEE address for the Local Device
Capability	Bitmap		Capability of the local device

MAC Capability Flags Field

Bit 0	Bit 1	Bit 2	Bit 3	Bit 4-5	Bit 6	Bit 7
Alternate PAN coordinator	Device type	Power source	Receiver on when idle	Reserved	Security capability	Allocate address

Bit 0: 1, node is capable of becoming a PAN coordinator. Otherwise, 0.
Bit 1: 1, node is full function device(FFD). 0, node is reduced function device.
Bit 2: 1, the power source is mains power. Otherwise, 0.
Bit 3: 1, the device does not disable its receiver to conserve power during idle periods. Otherwise, 0.
Bit 6: 1, the device is capable of sending and receiving frames secured using the security suite specified in IEEE 802.15.4-2015. Otherwise, 0.
Bit 7: 1, the device is wishing to allocate a network address. Otherwise, 0.

4.2. Device Bind Management

4.2.1. Bind request (0x0000-0021)

The bind request is for wishing to create a Binding Table entry for the source and destination addresses contained as parameters. The destination addressing on this command shall be unicast only.

- Command id
  0x0000-0021

- Parameter

8 octets	1 octet	2 octets	1 octet	2/8 octets	0/1 octet
SrcAddress	SrcEndp	ClusterID	DstAddrMode	DstAddress	DstEndp

Name	Type	Valid Range	Description
SrcAddress	IEEE Address	A valid 64-bit IEEE address	The IEEE address for the source.
SrcEndp	Integer	0x01-0xfe	The source endpoint for the binding entry.
ClusterID	Integer	0x0000-0xffff	The identifier of the cluster on the source device that is bound to the destination
DstAddrMode	Integer	0x00-0xff	The addressing

			mode for the destination address used in this command. This field can take one of the non-reserved values from the following list: 0x00 = reserved 0x01 = 16-bit group address for DstAddress and DstEndp not present 0x02 = reserved 0x03 = 64-bit extended address for DstAddress and DstEndp present 0x04 – 0xff = reserved
DstAddress	Address	As specified by the DstAddrMode field	The destination address for the binding entry.
DstEndp	Integer	0x01-0xfe	This field shall be present only if the DstAddrMode field has a value of 0x03 and, if present, shall be the destination endpoint for the binding entry

4.2.2. Bind response (0x0000-8021)

The bind response is in response to a bind request. If the bind request is processed and the Binding Table entry committed on the Remote Device, a Status of SUCCESS is returned.

- Command id
  0x0000-8021

- Parameter

1 octet
Status

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, NOT_SUPPORTED, INVALID_EP, TABLE_FULL or NOT_AUTHORIZED	The status of the command

4.2.3. Unbind request (0x0000-0022)

The unbind request is for wishing to remove a Binding Table entry for the source and destination addresses contained as parameters. The destination addressing on this command shall be unicast only.

- Command id
  0x0000-0022

- Parameter

8 octets	1 octet	2 octets	1 octet	2/8 octets	0/1 octet
SrcAddress	SrcEndp	ClusterID	DstAddrMode	DstAddress	DstEndp

Name	Type	Valid Range	Description

SrcAddress	IEEE Address	A valid 64-bit IEEE address	The IEEE address for the source.
SrcEndp	Integer	0x01-0xfe	The source endpoint for the binding entry.
ClusterID	Integer	0x0000-0xffff	The identifier of the cluster on the source device that is bound to the destination
DstAddrMode	Integer	0x00-0xff	The addressing mode for the destination address used in this command. This field can take one of the non-reserved values from the following list: 0x00 = reserved 0x01 = 16-bit group address for DstAddress and DstEndp not present 0x02 = reserved 0x03 = 64-bit extended address for DstAddress and DstEndp present 0x04 – 0xff = reserved
DstAddress	Address	As specified by the DstAddrMode field	The destination address for the binding entry.

DstEndp	Integer	0x01-0xfe	This field shall be present only if the DstAddrMode field has a value of 0x03 and, if present, shall be the destination endpoint for the binding entry

4.2.4. Unbind response (0x0000-8022)

The unbind response is in response to an unbind request. If the unbind request is processed and the corresponding Binding Table entry is removed from the Remote Device, a Status of SUCCESS is returned.

- Command id
  0x0000-8022

- Parameter

1 octet
Status

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, NOT_SUPPORTED, INVALID_EP, TABLE_FULL or NOT_AUTHORIZED	The status of the command

4.3. Network Management

4.3.1. Neighbor information request (0x0000-0031)

The device link quality indicator (Mgmt_Lqi_req) is for wishing to retrieve the contents of the Neighbor Table from the Remote Device. The destination

addressing on this command shall be unicast only.

- Command id
  0x0000-0031

- Parameter

1 octet
StartIndex

Name	Type	Valid Range	Description
StartIndex	Integer	0x00-0xff	Starting Index for the requested elements of the Neighbor Table.

4.3.2. Neighbor information response (0x0000-8031)

The routing information response (Mgmt_LQI_rsp) is in response to a device Routing Table information request.

- Command id
  0x0000-8031

- Parameter

1 octet	1 octet	1 octet	1 octet	variable
Status	NeighborTable Entries	Start Index	NeighborTable ListCount	NeighborTable List

Name	Type	Valid Range	Description
Status	Integer	NOT_SUPPORTED or any status code	The status of the command
NeighborTableEntrie	Integer	0x00-0xff	Total number of Neighbor Table entries within the Remote Device.

StartIndex	Integer	0x00-0xff	Starting index within the Neighbor Table to begin reporting for the NeighborTableList.
NeighborTableListCount	Integer	0x00-0xff	umber of Neighbor Table entries included within NeighborTableList.
NeighborTableList	List of Neighbor Descriptors	The list shall contain the number elements given by the BindingTableListCount	A list of descriptors, beginning with the StartIndex element and continuing for NeighborTableListCount, of the elements in the Remote Device's Neighbor Table including the device address and associated LQI.

NeighborTableList Record Format.

Name	Type	Valid Range	Description
Extended PAN Id	PAN identifier	A 64-bit PAN identifier	The 64-bit extended PAN identifier of the neighboring device
Extended address	IEEE addres	An extended 64-bit, IEEE addres	The source endpoint for the binding entry.
Network address	Address	Network address	The 16-bit network address of the neighboring device.
Device type	2 Bits	0x00 - 0x03	The type of the neighbor device: 0x00 = ZigBee coordinator 0x01 = ZigBee

			router 0x02 = ZigBee end device 0x03 = Unknown
RxOnWhenIdle	2 Bits	0x00 - 0x02	Indicates if neighbor's receiver is enabled during idle portions of the CAP: 0x00 = Receiver is off 0x01 = Receiver is on 0x02 = unknown
Relationship	3 Bits	0x00 - 0x04	he relationship between the neighbor and the current device: 0x00 = neighbor is the parent 0x01 = neighbor is a child 0x02 = neighbor is a sibling 0x03 = None of the above 0x04 = previous child
Reserved	1 Bit		This reserved bit shall be set to 0.
Permit joining	2 Bits	0x00 - 0x02	An indication of whether the neighbor device is accepting join requests: 0x00 = neighbor is not accepting join

			requests 0x01 = neighbor is accepting join requests 0x02 = unknown
Reserved	6 Bits		Each of these reserved bits shall be set to 0.
Depth	8 Bits	0x00 - nwkcMaxDepth	The tree depth of the neighbor device. A value of 0x00 indicates that the device is the ZigBee coordinator for the network.
LQI	8 Bits	0x00 - 0xff	The estimated link quality for RF transmissions from this device. (Note. RSSI value)

4.3.3. Routing information request (0x0000-0032)

The device routing information request (Mgmt_Rtg_req) is for wishing to retrieve the contents of the Routing Table from the Remote Device. The destination addressing on this command shall be unicast only.

- Command id
  0x0000-0032

- Parameter

1 octet
StartIndex

Name	Type	Valid Range	Description
StartIndex	Integer	0x00-0xff	Starting Index for the requested

			elements of the Routing Table.

4.3.4. Routing information response (0x0000-8032)

The routing information response (Mgmt_Rtg_rsp) is in response to a device Routing Table information request.

- Command id
  0x0000-8032

- Parameter

1 octet	1 octet	1 octet	1 octet	variable
Status	RoutingTable Entries	Start Index	Routing Table ListCount	RoutingTable List

Name	Type	Valid Range	Description
Status	Integer	NOT_SUPPORTED or any status code	The status of the command
RoutingTableEntries	Integer	0x00-0xff	Total number of Routing Table entries within the Remote Device.
StartIndex	Integer	0x00-0xff	Starting index within the Routing Table to begin reporting for the RoutingTableList.
RoutingTableListCount	Integer	0x00-0xff	Nmber of Routing Table entries included within RoutingTableList.
RoutingTableList	List of Routing Descriptor	The list shall contain the number elements given by the	A list of descriptors, beginning with the StartIndex element

	s	RoutingTableListCount	and continuing for RoutingTableListCount, of the elements in the Remote Device's Routing Table .

RoutingTableList Record Format.

Name	Type	Valid Range	Description
Destination address	Address	16-bit network address of this route.	Destination address.
Status	3 Bits	The status of the route.	0x0=ACTIVE. 0x1=DISCOVERY_UNDERWAY. 0x2=DISCOVERY_FAILED. 0x3=INACTIVE. 0x4=VALIDATION_UNDERWAY 0x5-0x7=RESERVED
Memory Constrained	1 Bit		A flag indicating whether the device is a memory constrained concentrator.
Many-to-one	1 Bit		A flag indicating that the destination is a concentrator that issued a many-to-one request.
Route record required	1 Bit		A flag indicating that a route record command frame should be sent to the destination prior to the next data packet.
Reserved	2 Bits		
Next-hop address	Address	The 16-bit network address of the next hop on the way to the destination.	The 16-bit network address of the next hop on the way to the destination.

4.3.5. Device binding information request (0x0000-0033)

The device binding information request is for wishing to retrieve the contents of

the Binding Table from the Remote Device. The destination addressing on this command shall be unicast only.

- Command id
  0x0000-0033

- Parameter

1 octet
StartIndex

Name	Type	Valid Range	Description
StartIndex	Integer	0x00-0xff	Starting Index for the requested elements of the Binding Table.

4.3.6. Device binding information response (0x0000-8033)

The device binding information response is in response to a device binding information request. If this management command is not supported, a status of NOT_SUPPORTED shall be returned and all parameter fields after the Status field shall be omitted.

- Command id
  0x0000-8033

- Parameter

1 octet	1 octet	1 octet	1 octet	variable
Status	BindingTable Entries	Start Index	BindingTable ListCount	BindingTable List

Name	Type	Valid Range	Description
Status	Integer	NOT_SUPPORTED or any status code	The status of the command
BindingTableEntries	Integer	0x00-0xff	Total number of

			Binding Table entries within the Remote Device.
StartIndex	Integer	0x00-0xff	Starting index within the Binding Table to begin reporting for the BindingTableList.
BindingTableListCount	Integer	0x00-0xff	Number of Binding Table entries included within BindingTableList
BindingTableList	List of Binding Descriptors	The list shall contain the number elements given by the BindingTableListCount	A list of descriptors, beginning with the StartIndex element and continuing for BindingTableListCount, of the elements in the Remote Device's Binding Table

BindingTableList Record Format.

Name	Type	Valid Range	Description
SrcAddr	IEEE address	A valid 64-bit IEEE address	The source IEEE address for the binding entry.
SrcEndpoint	Integer	0x01-0xfe	The source endpoint for the binding entry.
ClusterId	Integer	0x0000-0xffff	The identifier of the cluster on the source device that is bound to the destination de-vice.
DstAddrMode	Integer	0x00-0xff	The addressing mode for the destination address. This field

			can take one of the non-reserved values from the following list: 0x00 = reserved 0x01 = 16-bit group address for DstAddr and DstEndpoint not present 0x02 = reserved 0x03 = 64-bit extended address for DstAddr and DstEndp present 0x04 – 0xff = reserved
DstAddr	Address	As specified by the DstAddr-Mode field	The destination address for the binding entry.
DstEndpoint	Integer	0x01-0xff	This field shall be present only if the DstAddrMode field has a value of 0x03 and, if present, shall be the destination endpoint for the binding entry.

4.3.7. Device leave request (0x0000-0034)

The device leave request is for requesting that a Remote Device leave the network.

- Command id

0x0000-0034

- Parameter

8 octets	1 octet	1 octet
Device Address	Remove Children	Rejoin

Name	Type	Valid Range	Description
DeviceAddress	Device Address	An extended 64-bit, IEEE address	Device IEEE address
Remove Children	Bool	0/1	This field has a value of 1 if the device being asked to leave the network is also being asked to remove its child devices, if any. Otherwise, it has a value of 0.
Rejoin	Bool	0/1	This field has a value of 1 if the device being asked to leave from the current parent is requested to rejoin the network. Otherwise, it has a value of 0.

4.3.8. Device leave response (0x0000-8034)

The device leave response is in response to a device leave request. If this management command is not supported, a status of NOT_SUPPORTED shall be returned.

- Command id
  0x0000-8034

- Parameter

1 octet
Status

Name	Type	Valid Range	Description
Status	Integer	NOT_SUPPORTED, NOT_AUTHORIZED or any status code	The status of the command

4.3.9. Permit join request (0x0000-0036)

The permit join request is requesting that a remote device or devices allow or disallow association. If the remote device is the Trust Center and TC_Significance is set to 1, the Trust Center authentication policy will be affected. The addressing may be unicast or broadcast to all routers for request remote device, unicast with address value 0x0000 to request Zigbee coordinator enable permit duration.

- Command id
  0x0000-0036

- Parameter

1 octet	1 octet
PermitDuration	TC_Significance

Name	Type	Valid Range	Description
PermitDuration	Integer	0x00-0xff	The length of time in seconds during which the ZigBee coordinator or router will allow associations. The

			value 0x00 indicate that permission is disabled.
TC_Significance	Bool	0/1	This field shall always have a value of 1, indicating a request to change the Trust Center policy. If a frame is received with a value of 0, it shall be treated as having a value of 1.

4.3.10. Permit join response (0x0000-8036)

The permit join response is in response to a unicast permit join request. In the description which follows, note that no response shall be sent if the permit join request was received as a broadcast to all routers.

- Command id

0x0000-8036

- Parameter

1 octet
Status

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, INVALID_REQUEST, NOT_AUTHORIZED or any status code	The status of the command

4.3.11. Permit join timeout notification (0x0000-8037)

When the user receives this command, it indicates that the previously executed permit join request has expired, and the device currently has its permit join set to disabled.

- Command id
  0x0000-8037

- Parameter

None

4.3.12. Network update request (0x0000-0038)

This command is provided to allow updating of network configuration parameters or to request information from devices on network conditions in the local operating environment. The destination addressing on this primitive shall be unicast or broadcast to all devices for which macRxOnWhenIdle = TRUE.

- Command id
  0x0000-0038

- Parameter

4 octets	1 octet	0/1 octet	0/1 octet	0/2 octet
ScanChannels	ScanDuration	ScanCount	nwkUpdateId	nwkManagerAddr

Name	Type	Valid Range	Description
ScanChannels	Bitmap	32-bit field	The five most significant bits (b27,..., b31) represent the binary encoded Channel Page. The 27 least significant bits (b0, b1,... b26) indicate which channels are

			to be scanned (1 = scan, 0 = do not scan) for each of the 27 valid channels
ScanDuration	Integer	0x00-0x05 or 0xfe or 0xff	0x00-0x05: A value used to calculate the length of time to spend scanning each channel. If ScanDuration has a value of 0xfe this is a request for channel change. If ScanDuration has a value of 0xff this is a request to change the apsChannelMaskList and nwkManagerAddr attributes.
ScanCount	Integer	0x00-0x01	This field represents the number of energy scans to be conducted and reported. This field shall be present only if the ScanDuration is within the range of 0x00 to 0x05.
nwkUpdateId	Integer	0x00 - 0xFF	The value of the nwkUpdateId contained in this request. This value is set by the Network Channel Manager prior to sending the

			message. This field shall only be present of the ScanDuration is 0xfe or 0xff. If the ScanDuration is 0xff, then the value in the nwkUpdateID shall be ignored.
nwkManagerAddr	Device Address	16-bit NWK address	This field shall be present only if the ScanDuration is set to 0xff, and, where present, indicates the NWK address for the device with the Network Manager bit set in its Node Descriptor.

4.3.13. Network update notify (0x0000-8038)

The network update notify is provided to enable ZigBee devices to report the condition on local channels to a network manager.
When sent in response to a network update request command the status field shall represent the status of the request.

- Command id
  0x0000-8038

- Parameter

1 octet	4 octets	2 octets	2 octets	1 octet	variable
Status	Scanned Channels	TotalTransmissions	TransmissionFailures	ScannedChannelsListCount	EnergyValues

Name	Type	Valid Range	Description

Status	Integer	SUCCESS, INVALID_REQUEST, NOT_SUPPORTED or any status values	The status of this command
ScanChannels	Bitmap	32-bit field	The five most significant bits (b27,..., b31) represent the binary encoded Channel Page. The 27 least significant bits (b0, b1,... b26) indicate which channels are to be scanned (1 = scan, 0 = do not scan) for each of the 27 valid channels
TotalTransmissions	Integer	0x0000 -0xffff	Count of the total transmissions reported by the device
TransmissionFailures	Integer	0x0000 -0xffff	Sum of the total transmission failures reported by the device
ScannedChannelsListCount	Integer	0x00 - 0xff	The list shall contain the number of records

			contained in the EnergyValues parameter.
EnergyValues	Integer	List of ED values each of which can be in the range of 0x00 - 0xff	The result of an energy measurement made on this channel

4.3.14. Gateway start (0x0000-0039)

Start the Gateway to from a network.

Please be noted that when constructing this command, the “Address” and “Address mode” fields should set to 0x0000 and 0x00, and it should not contain the “Endpoint” information in the command struct.

- Command id
  0x0000-0039

- Parameter

1 octet	2 octets	1 octet
Channel (11-26)	PanID	ResetFlag (0/1)

4.3.15. Gateway start response (0x0000-8039)

The gateway start response is in response to a gateway start. If this command is sent before, a status of FAILURE shall be returned.

- Command id
  0x0000-8039

- Parameter

1 octet
Status

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, FAILURE	The status of the command

4.3.16. Gateway reset (0x0000-0040)

Software reset Gateway.

Please be noted that when constructing this command, the “Address” and “Address mode” fields should set to 0x0000 and 0x00, and it should not contain the “Endpoint” information in the command struct.

- Command id
  0x0000-0040

- Parameter

1 octet
MagicNumber = 0x88

4.3.17. Gateway reset response (0x0000-8040)

The gateway start response is in response to a gateway start. If this command is sent before, a status of FAILURE shall be returned.

- Command id
  0x0000-8040

- Parameter

1 octet
Status

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, FAILURE	The status of the command

4.3.18. Gateway extended address request (0x0000-0041)

The Gateway extended address request command is generated for obtaining gateway its own extended address

Please be noted that when constructing this command, the “Address” and “Address mode” fields should set to 0x0000 and 0x00, and it should not contain the “Endpoint” information in the command struct.

- Command id
  0x0000-0041

- Parameter
  None

4.3.19. Gateway extended address response (0x0000-8041)

The Gateway extended address response is in response to a Gateway extended address request.

- Command id
  0x0000-8041

- Parameter

1 octet	8 octets
Status	Extended Address

Name	Type	Valid Range	Description
Status	Integer	SUCCESS, FAILURE	The status of the command

4.3.20. Gateway permit join status request (0x0000-0042)

The Gateway permit join status request command is generated for obtaining gateway its own association permit status.

Please be noted that when constructing this command, the “Address” and “Address mode” fields should set to 0x0000 and 0x00, and it should not contain the “Endpoint” information in the command struct.

- Command id
  0x0000-0042

- Parameter
  None

4.3.21. Gateway permit join status response (0x0000-8042)

The Gateway permit join status response is in response to a Gateway permit join status request.

- Command id
  0x0000-8042

- Parameter

1 octet	1 octet
Status	Remaining Time

Name	Type	Valid Range	Description
Status	Boolean	TRUE, FALSE	The status of association permit
Remaining Time	Integer	0x00~0xFE	The remaining time of association permit

4.4. Device and Network Management Service Status

Enumeration Description

Enumeration	Value	Description
SUCCESS	0x00	The requested operation or transmission was completed successfully.
INV_REQUESTTYPE	0x80	The supplied request type was invalid.
DEVICE_NOT_FOUND	0x81	The requested device did not exist on a device following a child descriptor request to a parent.
INVALID_EP	0x82	The supplied endpoint was equal to 0x00 or 0xff.
NOT_ACTIVE	0x83	The requested endpoint is not described by a simple descriptor.
NOT_SUPPORTED	0x84	The requested optional feature is not supported on the target device.
TIMEOUT	0x85	A timeout has occurred with the requested operation.
NO_MATCH	0x86	The end device bind request was unsuccessful due to a failure to match any suitable clusters.
NO_ENTRY	0x88	The unbind request was unsuccessful due to the coordinator or source device not having an entry in its binding table to unbind.
NO_DESCRIPTOR	0x89	A child descriptor was not available following a discovery request to a parent.
INSUFFICIENT_SPACE	0x8a	The device does not have storage space to support the requested operation.

NOT_PERMITTED	0x8b	he device is not in the proper state to support the requested operation.
TABLE_FULL	0x8c	The device does not have table space to support the operation.
NOT_AUTHORIZED	0x8d	The device has rejected the command due to security restrictions.
DEVICE_BINDING_TABLE_FULL	0x8e	The device does not have binding table space to support the operation.
INVALID_INDEX	0x8f	The index in the received command is out of bounds.

5. Application Service Management

5.1. Device Information

5.1.1. Get device version info (0x0001-0000)

- Command id
  0x0001-0000

- Parameter
  None

5.1.2. Get device version info response (0x0001-8000)

- Command id
  0x0001-8000

- Parameter

1 octet	1 octet	1 octet	1 octet
ZCLVersion	ApplicationVersion	StackVersion	HWVersion

Name	Type	Valid Range	Description
ZCLVersion	Uint8	0x00-0xff	ZCL version number
ApplicationVersion	Uint8	0x00-0xff	Application version number
StackVersion	Uint8	0x00-0xff	Stack version number
HWVersion	Uint8	0x00-0xff	Hardware version number

5.1.3. Get device manufacture name (0x0001-0001)

- Command id
  0x0001-0001

- Parameter
  None

5.1.4. Get device manufacture name response (0x0001-8001)

- Command id
  0x0001-8001

- Parameter

1 octet	variable
String Length	String value

5.1.5. Get device model id (0x0001-0002)

- Command id
  0x0001-0002

- Parameter
  None

5.1.6. Get device model id response (0x0001-8002)

- Command id
  0x0001-8002

- Parameter

1 octet	variable
String Length	String value

5.1.7. Get device date code (0x0001-0003)

- Command id
  0x0001-0003

- Parameter

None

5.1.8. Get device date code response (0x0001-8003)

- Command id
  0x0001-8003

- Parameter

1 octet	variable
String Length	String value

5.1.9. Get software build id (0x0001-0004)

- Command id
  0x0001-0004

- Parameter
  None

5.1.10. Get software build id response (0x0001-8004)

- Command id
  0x0001-8004

- Parameter

1 octet	variable
String Length	String value

5.1.11. Default Response (0x0001-8800)

- Command id
  0x0001-8800

- Parameter

1 octet	1 octet
Command identifier	Status

5.1.12. Read device attributes (0x0002-0000)

- Command id
  0x0002-0000

- Parameter

2 octets	2 octets
ClusterID	AttributeIdentifier

5.1.13. Read device attributes response (0x0002-8000)

- Command id
  0x0002-8000

- Parameter

2 octet	2 octet	1 octet	1 octet	Variable
ClusterID	AttributeIdentifier	Status	AttributeDataType	AttributeData

AttributeDataType & AttributeData field only be included when Status field is the value of Success. AttributeDataType filed use to indicate the data type of AttributeData field. The definition of AttributeDataType field were list in following table:

Data Type	Type	Attribute Data Type	Valid Value
Boolean	bool	0x10	0xff
Unsigned 8-bit integer	uint8	0x20	0xff
Unsigned 16-bit integer	uint16	0x21	0xfff
Unsigned 32-bit integer	uint32	0x23	0xffffffff

5.1.14. Write device attributes (0x0002-0001)

- Command id
  0x0002-0001

- Parameter

2 octets	2 octets	1 octets	variable
Cluster ID	Attribute Identifier	Data type	Data value

Length of data value field depends on data type
If data type is 0x41 or 0x42(octet string or character string), the first byte in data value filed is the length of the string
If data type is 0x43(long octet), the first two bytes in data value filed is the length of the string

5.1.15. Write device attributes response (0x0002-8001)

- Command id
  0x0002-8001

- Parameter

1 octets	2 octets
status	Attribute ID

Attribute id field is omitted if status=0(success)

5.1.16. Configure reporting (0x0002-0002)

- Command id
  0x0002-0002

- Parameter

2 octets	2 octets	1 octets	2 octets	2 octets	variable
Cluster ID	Attribute Identifier	Attribute data type	Min report interval	Max report interval	Reportable change

Reportable change field represent minimum changes to the attributes that would reports.

For attributes with analog data type, data length is the same as the attribute data type (e.g. current level).
For attributes of 'discrete' data type, this field is omitted (e.g. onoff).

5.1.17. Configure reporting response (0x0002-8002)

- Command id
  0x0002-8002

- Parameter

1 octets	1 octets	2 octets
status	Direction	Attribute ID

Direction and attribute id field are omitted if status=0(success)

5.1.18. Report attribute data (0x0002-8800)

- Command id
  0x0002-8800

- Parameter

2 octets	Variable octets	Variable octets	….	Variable octets
Cluster ID	Report 1	Report 2	….	Report n

Format of the attribute report

2 octets	1 octets	Variable octets
Attribute identifier	Attribute data type	Attribute data

5.2. Device Identify

5.2.1. Identify (0x0004-0000)

- Command id
  0x0004-0000

- Parameter

1 octet	2 octets
DefRspFlg	Identify Time

5.2.2. Identify query (0x0004-0001)

- Command id
  0x0004-0001

- Parameter
  None

5.2.3. Identify trigger effect (0x0004-0002)

- Command id
  0x0004-0002

- Parameter

1 octet	1 octets	1 octets
DefRspFlg	Effect identifier	Effect variant

Effect identifier	Effect variant	Effect
0x00	0x00(default)	Blink
0x01		Breathe
0x02		Okay
0x0b		Channel change
0xfe		Finish effect
0xff		Stop effect

5.2.4. Identify query response (0x0004-8001)

- Command id
  0x0004-8001

- Parameter

2 octet
Timeout

5.3. Group Management

5.3.1. Add group (0x0005-0000)

- Command id
  0x0005-0000

- Parameter

2 octet
Group ID

5.3.2. Add group response (0x0005-8000)

- Command id
  0x0005-8000

- Parameter

1 octet	2 octets
Status	Group ID

5.3.3. View group (0x0005-0001)

- Command id
  0x0005-0001

- Parameter

2 octet
Group ID

5.3.4. View group response (0x0005-8001)

- Command id
  0x0005-8001

- Parameter

1 octet	2 octets
Status	Group ID

5.3.5. Get group membership (0x0005-0002)

- Command id
  0x0005-0002

- Parameter

1 octet	variable
Group count	Group list

5.3.6. Get group membership response (0x0005-8002)

- Command id
  0x0005-8002

- Parameter

1 octet	1 octet	variable
Capacity	Group count	Group list

5.3.7. Remove group (0x0005-0003)

- Command id
  0x0005-0003

- Parameter

2 octet
Group ID

5.3.8. Remove group response (0x0005-8003)

- Command id
  0x0005-8003

- Parameter

1 octet	2 octets
Status	Group ID

5.3.9. Remove all groups (0x0005-0004)

- Command id
  0x0005-0004

- Parameter

1 octet
DefRspFlg

5.3.10. Add group if identifying (0x0005-0005)

- Command id
  0x0005-0005

- Parameter

1 octet	2 octets
DefRspFlg	Group ID

5.4. Scene Management

5.4.1. Add scene (0x0006-0000)

- Command id
  0x0006-0000

- Parameter

The scene name is omitted and set the string length is “0”. For different device, the scene parameter is different. Currently this gateway will support the scene functions of the following devices.

Device ID: 0x0100 On/Off light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets
On/Off State

Device ID: 0x0101 Dimmable light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level

Device ID: 0x0102 Color dimmable light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets	2 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level	0x0300 (Color)	0x0D (length)

2 octets	2 octets	2 octet	1 octets	1 octets	1 octets	2 octets
CurrentX	CurrentY	Enhanced CurrentHue	Current Saturation	ColorLoop Active	ColorLoop Direction	ColorLoop Time

2 octets
ColorTemperature Mireds

Device ID: 0x010A On/Off plug-in unit

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets
On/Off State

Device ID: 0x010B Dimmable plug-in unit

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level

5.4.2. Add scene response (0x0006-8000)

- Command id
  0x0006-8000

- Parameter

1 octet	2 octets	1 octet
Status	Group ID	Scene ID

5.4.3. View scene (0x0006-0001)

- Command id
  0x0006-0001

- Parameter

2 octets	1 octet
Group ID	Scene ID

5.4.4. View scene response (0x0006-8001)

- Command id
  0x0006-8001

- Parameter
  All devices will receive first status byte and following the different response parameters by different device.

First byte:

1 octets
Status

Device ID: 0x0100 On/Off light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets
On/Off State

Device ID: 0x0101 Dimmable light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level

Device ID: 0x0102 Color dimmable light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets	2 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level	0x0300 (Color)	0x0D (length)

2 octets	2 octets	2 octet	1 octets	1 octets	1 octets	2 octets
CurrentX	CurrentY	Enhanced CurrentHue	Current Saturation	ColorLoop Active	ColorLoop Direction	ColorLoop Time

2 octets
ColorTemperature Mireds

Device ID: 0x010A On/Off plug-in unit

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets
On/Off State

Device ID: 0x010B Dimmable plug-in unit

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level

5.4.5. Remove scene (0x0006-0002)

- Command id
  0x0006-0002

- Parameter

2 octets	1 octet
Group ID	Scene ID

5.4.6. Remove scene response (0x0006-8002)

- Command id
  0x0006-8002

- Parameter

1 octet	2 octets	1 octet
Status	Group ID	Scene ID

5.4.7. Remove all scene (0x0006-0003)

- Command id
  0x0006-0003

- Parameter

2 octets
Group ID

5.4.8. Remove all scene response (0x0006-8003)

- Command id
  0x0006-8003

- Parameter

1 octet	2 octets
Status	Group ID

5.4.9. Store scene (0x0006-0004)

- Command id
  0x0006-0004

- Parameter

2 octets	1 octet
Group ID	Scene ID

5.4.10. Store scene response (0x0006-8004)

- Command id
  0x0006-8004

- Parameter

1 octet	2 octets	1 octet
Status	Group ID	Scene ID

5.4.11. Recall scene (0x0006-0005)

- Command id
  0x0006-0005

- Parameter

1 octet	2 octets	1 octet	0/2 octets
DefRspFlg	Group ID	Scene ID	Transition Time

5.4.12. Get scene membership (0x0006-0006)

- Command id
  0x0006-0006

- Parameter

2 octets
Group ID

5.4.13. Get scene membership response (0x0006-8006)

- Command id
  0x0006-8006

- Parameter

1 octet	1 octet	2 octet	0/1 octet	variable
Status	Capacity	Group ID	Scene count	Scene list

5.4.14. Enhanced add scene (0x0006-0040)

- Command id
  0x0006-0040

- Parameter

The scene name is omitted and set the string length is “0”. For different device, the scene parameter is different. Currently this gateway will support the scene functions of the following devices.

Device ID: 0x0100 On/Off light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets
On/Off State

Device ID: 0x0101 Dimmable light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level

Device ID: 0x0102 Color dimmable light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets	2 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level	0x0300 (Color)	0x0D (length)

2 octets	2 octets	2 octet	1 octets	1 octets	1 octets	2 octets
CurrentX	CurrentY	Enhanced CurrentHue	Current Saturation	ColorLoop Active	ColorLoop Direction	ColorLoop Time

2 octets
ColorTemperature Mireds

Device ID: 0x010A On/Off plug-in unit

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets
On/Off State

Device ID: 0x010B Dimmable plug-in unit

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level

5.4.15. Add scene response (0x0006-8040)

- Command id
  0x0006-8040

- Parameter

1 octet	2 octets	1 octet
Status	Group ID	Scene ID

5.4.16. Enhanced view scene (0x0006-0041)

- Command id
  0x0006-0041

- Parameter

2 octets	1 octet
Group ID	Scene ID

5.4.17. Enhanced view scene response (0x0006-8041)

- Command id
  0x0006-8041

- Parameter
  All devices will receive first status byte and following the different response parameters by different device.

First byte:

1 octets
Status

Device ID: 0x0100 On/Off light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets
On/Off State

Device ID: 0x0101 Dimmable light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level

Device ID: 0x0102 Color dimmable light

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets	2 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level	0x0300 (Color)	0x0D (length)

2 octets	2 octets	2 octet	1 octets	1 octets	1 octets	2 octets
CurrentX	CurrentY	Enhanced CurrentHue	Current Saturation	ColorLoop Active	ColorLoop Direction	ColorLoop Time

2 octets
ColorTemperature

Mireds

Device ID: 0x010A On/Off plug-in unit

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets
On/Off State

Device ID: 0x010B Dimmable plug-in unit

2 octets	1 octets	2 octets	1 octets	2 octets	1 octets
Group ID	Scene ID	Transition Time	0x00 (Name)	0x0006 (On/Off)	0x01 (length)

1 octets	2 octets	1 octets	1 octets
On/Off State	0x0008 (Level)	0x01 (length)	Current Level

5.4.18. Copy scene (0x0006-0042)

- Command id
  0x0006-0042

- Parameter

1 octets	2 octet	1 octets	2 octet	1 octets
Mode	Group ID from	Scene ID from	Group ID to	Scene ID to

Mode bit map	
Bit 0	Copy all scenes
Bit 1-7	Reserved

5.5. On/Off Control

5.5.1. Off (0x0007-0000)

- Command id
  0x0007-0000

- Parameter

1 octet
DefRspFlg

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

5.5.2. On (0x0007-0001)

- Command id
  0x0007-0001

- Parameter

1 octet
DefRspFlg

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

5.5.3. Toggle (0x0007-0002)

- Command id
  0x0007-0002

- Parameter

1 octet
DefRspFlg

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

5.5.4. Off with effect (0x0007-0003)

- Command id
  0x0007-0003

Parameter

1 octet	1 octet	1 octet
DefRspFlg	Effect identifier	Effect variant

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

Effect identifier value	Effect variant value	Description
0x00(Delayed All Off)	0x00	Fade to off in 0.8 seconds
	0x01	No fade
	0x02	50% dim down in 0.8 seconds then fade to off in 12 seconds
	0x03 to 0xff	Reserved
0x01(Dying Light)	0x00	20% dim up in 0.5s then fade to off in 1 second
	0x01 to 0xff	Reserved
0x02 to 0xff	Reserved	Reserved

5.5.5. On with recall global scene (0x0007-0004)

- Command id
  0x0007-0004

- Parameter

1 octet
DefRspFlg

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

5.5.6. On with timed off (0x0007-0005)

- Command id
  0x0007-0005

- Parameter

1 octet	1 octet	2 octets	2 octets
DefRspFlg	On/Off Control	On time	Off Wait time

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

5.6. Level Control

5.6.1. Move to level (0x0009-0000)

- Command id
  0x0009-0000

- Parameter

1 octet	1 octet	2 octets	1 octet	1 octet
DefRspFlg	Level	Transition time	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
On receipt of this command, a device SHALL move from its current level to the value given in the Level field.
The movement SHALL be as continuous as technically practical, i.e., not a step function, and the time taken to move to the new level SHALL be equal to the value of the Transition time field, in tenths of a second, or as close to this as the device is able.

5.6.2. Move (0x0009-0001)

- Command id
  0x0009-0001

- Parameter

1 octet	1 octet	1 octet	1 octet	1 octet
DefRspFlg	Move mode	Rate	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

Move mode value	Description	Action
0x00	Up	Increase the device’s level at the rate given in the Rate field. If the level reaches the maximum allowed for the device, stop.
0x01	Down	Decrease the device’s level at the rate given in the Rate field. If the level reaches the minimum allowed for the device, stop.

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
The Rate field specifies the rate of movement in units per second. The actual rate of movement SHOULD be as close to this rate as the device is able.

5.6.3. Step (0x0009-0002)

- Command id
  0x0009-0002

- Parameter

1 octet	1 octet	1 octet	2 octets	1 octet	1 octet
DefRspFlg	Step mode	Step size	Transition time	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

Step mode value	Description	Action
0x00	Up	Increase CurrentLevel by 'Step size' units, or until it reaches the maximum level allowed for the device if this reached in the process. In the latter case, the transition time SHALL be proportionally reduced.
0x01	Down	Decrease CurrentLevel by 'Step size' units, or until it reaches the minimum level allowed for the device if this reached in the process. In the latter case, the transition time SHALL be proportionally reduced.

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
The Transition time field specifies the time that SHALL be taken to perform the step, in tenths of a second. A step is a change in the CurrentLevel of 'Step size' units.

5.6.4. Stop (0x0009-0003)

- Command id
  0x0009-0003

- Parameter

1 octet	1 octet	1 octet
DefRspFlg	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
Upon receipt of this command, any Move to Level, Move or Step command currently in process SHALL be terminated.

5.6.5. Move to level (with On/Off) (0x0009-0004)

- Command id
  0x0009-0004

- Parameter

1 octet	1 octet	2 octets	1 octet	1 octet
DefRspFlg	Level	Transition time	OptionsMask	OptionsOverride

Same command usage as “Move to level” command.

5.6.6. Move (with On/Off) (0x0009-0005)

- Command id
  0x0009-0005

- Parameter

1 octet	1 octet	1 octet	1 octet	1 octet
DefRspFlg	Move mode	Rate	OptionsMask	OptionsOverride

Same command usage as “Move” command.

5.6.7. Step (with On/Off) (0x0009-0006)

- Command id
  0x0009-0006

- Parameter

1 octet	1 octet	1 octet	2 octets	1 octet	1 octet
DefRspFlg	Step mode	Step size	Transition time	OptionsMask	OptionsOverride

Same command usage as “Step” command.

6. Lighting Application Service

6.1. Color Control

6.1.1. Move to hue (0x0021-0000)

- Command id
  0x0021-0000

- Parameter

1 octet	1 octet	1 octet	2 octets	1 octet	1 octet
DefRspFlg	Hue	Direction	Transition time	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
The Hue field specifies the hue to be moved to.
The Direction field:

Direction	Description
0x00	Shortest distance
0x01	Longest distance
0x02	Up
0x03	Down

The Transition Time field specifies, in 1/10ths of a second, the time that SHALL be taken to move to the new hue.

6.1.2. Move hue (0x0021-0001)

- Command id
  0x0021-0001

- Parameter

1 octet	1 octet	1 octet	1 octet	1 octet
DefRspFlg	Move mode	Rate	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
The Move mode:

Move mode value	Description	Action on Receipt
0x00	Stop	If moving, stop, else ignore the command (i.e., the command is accepted but has no effect). NB This MAY also be used to stop a Move to Hue command, a Move to Saturation command, or a Move to Hue and

		Saturation command.
0x01	Up	Increase the device's hue at the rate given in the Rate field. If the hue reaches the maximum allowed for the device, then proceed to its minimum allowed value.
0x02	Reserved	
0x03	Down	Decrease the device's hue at the rate given in the Rate field. If the hue reaches the minimum allowed for the device, then proceed to its maximum allowed value.

The Rate field specifies the rate of movement in steps per second. A step is a change in the device's hue of one unit.

6.1.3. Step hue (0x0021-0002)

- Command id
  0x0021-0002

- Parameter

1 octet	1 octet	1 octet	1 octet	1 octet	1 octet
DefRspFlg	Step mode	Step size	Transition Time	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to "0" as the default value to interpret missing fields from legacy device.
The Step mode:

Step mode value	Description	Action on Receipt
0x00	Reserved	
0x01	Up	Increase the device's hue by one step, in a continuous fashion. If the hue

		value reaches the maximum value then proceed to the minimum allowed value.
0x02	Reserved	
0x03	Down	Decrease the device's hue by one step, in a continuous fashion. If the hue value reaches the minimum value then proceed to the maximum allowed value.

The Step size field specifies, to be added to (or subtracted from) the current value of the device's hue.
The Transition Time field specifies, in 1/10ths of a second, the time that SHALL be taken to perform the step. A step is a change in the device's hue of 'Step size' units.

6.1.4. Move to saturation (0x0021-0003)

- Command id
  0x0021-0003

- Parameter

1 octet	1 octet	2 octet	1 octet	1 octet
DefRspFlg	Saturation	Transition Time	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to "0" as the default value to interpret missing fields from legacy device.
On receipt of this command, a device set the ColorMode attribute to the value 0x00 and SHALL then move from its current saturation to the value given in the Saturation field.
The movement SHALL be continuous, i.e., not a step function, and the time taken to move to the new saturation SHALL be equal to the Transition Time field, in 1/10ths of a second.

6.1.5. Move saturation (0x0021-0004)

- Command id
  0x0021-0004

- Parameter

1 octet	1 octet	1 octet	1 octet	1 octet
DefRspFlg	Move mode	Rate	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
The Move mode field:

Move mode value	Description	Action on Receipt
0x00	Stop	If moving, stop, else ignore the command (i.e., the command is accepted but has no affect). NB This MAY also be used to stop a Move to Saturation command, a Move to Hue command, or a Move to Hue and Saturation command.
0x01	Up	Increase the device’s saturation at the rate given in the Rate field. If the saturation reaches the maximum allowed for the device, stop.
0x02	Reserved	
0x03	Down	Decrease the device’s saturation at the rate given in the Rate field. If the saturation reaches the minimum allowed for the device, stop.

The Rate field specifies the rate of movement in steps per second. A step is a change in the device’s saturation of one unit.

6.1.6. Step saturation (0x0021-0005)

- Command id
  0x0021-0005

- Parameter

1 octet	1 octet	1 octet	1 octet	1 octet	1 octet
DefRspFlg	Step mode	Step size	Transition Time	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
The Step mode field:

Step mode value	Description	Action on Receipt
0x00	Reserved	
0x01	Up	Increase the device’s saturation by one step, in a continuous fashion. However, if the saturation value is already the maximum value then do nothing.
0x02	Reserved	
0x03	Down	Decrease the device’s saturation by one step, in a continuous fashion. However, if the saturation value is already the minimum value then do nothing.

The Step size change to be added to (or subtracted from) the current value of the device’s saturation.
The Transition Time field specifies, in 1/10ths of a second, the time that SHALL be taken to perform the step. A step is a change in the device’s saturation of ‘Step size’ units.

6.1.7. Move to hue and saturation (0x0021-0006)

- Command id
  0x0021-0006

- Parameter

1 octet	1 octet	1 octet	2 octet	1 octet	1 octet
DefRspFlg	Hue	Saturation	Transition Time	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
On receipt of this command, a device shall move from its current hue and saturation to the values given in the Hue and Saturation fields.
The movement SHALL be continuous, i.e., not a step function, and the time taken to move to the new color SHALL be equal to the Transition Time field, in 1/10ths of a second.

6.1.8. Move to color (0x0021-0007)

- Command id
  0x0021-0007

- Parameter

1 octet	2 octet	2 octet	2 octet	1 octet	1 octet
DefRspFlg	ColorX	ColorY	Transition Time	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
On receipt of this command, a device SHALL move from its current color to the color given in the ColorX and ColorY fields.
The movement SHALL be continuous, i.e., not a step function, and the time taken to move to the new color SHALL be equal to the Transition Time field, in 1/10ths of a second.

6.1.9. Move color (0x0021-0008)

- Command id
  0x0021-0008

- Parameter

1 octet	2 octet	2 octet	1 octet	1 octet
DefRspFlg	RateX	RateY	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
The RateX field specifies the rate of movement in steps per second. A step is a change in the device's CurrentX attribute of one unit.
The RateY field specifies the rate of movement in steps per second. A step is a change in the device's CurrentY attribute of one unit.

6.1.10. Step color (0x0021-0009)

- Command id
  0x0021-0009

- Parameter

1 octet	2 octet	2 octet	2 octet	1 octet	1 octet
DefRspFlg	StepX	StepY	Transition Time	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
The StepX and StepY fields specify the change to be added to the device's CurrentX attribute and CurrentY attribute respectively.
The Transition Time field specifies, in 1/10ths of a second, the time that SHALL be taken to perform the color change.

6.1.11. Move to color temperature (0x0021-000A)

- Command id
  0x0021-000A

- Parameter

1 octet	2 octet	2 octet	1 octet	1 octet
DefRspFlg	Color Temperature Mireds	Transition Time	OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
On receipt of this command, a device SHALL move from its current color to the color given by the Color Temperature Mireds field.
The movement SHALL be continuous, i.e., not a step function, and the time taken to move to the new color SHALL be equal to the Transition Time field, in 1/10ths of a second.

6.1.12. Move color temperature (0x0021-004B)

- Command id
  0x0021-004B

- Parameter

1 octet	1 octets	2 octets	2 octets	2 octets
DefRspFlg	Move Mode	Rate	Color Temperature Minimum Mireds	Color Temperature Maximum Mireds

1 octet	1 octets
OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
The Move mode field:

Move mode value	Description	Action on Receipt
0x00	Stop	If moving, stop the operation, else ignore the command (i.e., the command is accepted but has no effect).
0x01	Up	Increase the ColorTemperatureMireds attribute (≡ decrease the color temperature in kelvins) at the rate given in the Rate field. If the ColorTemperatureMireds attribute reaches the maximum allowed for the device (via either the Color Temperature Maximum Mireds field or the ColorTempPhysicalMaxMireds attribute), the move operation SHALL be stopped.
0x02	Reserved	
0x03	Down	Decrease the ColorTemperatureMireds attribute (≡ increase the color temperature in kelvins) at the rate given in the Rate field. If the ColorTemperatureMireds attribute reaches the minimum allowed for the device

		(via either the Color Temperature Minimum Mireds field or the ColorTempPhysicalMinMireds attribute), the move operation SHALL be stopped.

The Rate field is 16-bits in length and specifies the rate of movement in steps per second. A step is a change in the color temperature of a device by one unit.
The Color Temperature Minimum Mireds field is 16-bits in length and specifies a lower bound on the ColorTemperatureMireds attribute.
The Color Temperature Maximum Mireds field is 16-bits in length and specifies an upper bound on the ColorTemperatureMireds attribute.

6.1.13. Step color temperature (0x0021-004C)

- Command id
  0x0021-004C

- Parameter

1 octet	1 octet	2 octets	2 octets	2 octets	2 octets
DefRspFlg	Step Mode	Step Size	Transition Time	Color Temperature Minimum Mireds	Color Temperature Maximum Mireds

1 octet	1 octets
OptionsMask	OptionsOverride

Name	Type	Valid Range	Description
DefRspFlg	Bool	0/1	Enable/Disable the default response

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.

The Step mode field:

Step mode value	Description	Action on Receipt
0x00	Reserved	
0x01	Up	Increase the ColorTemperatureMireds attribute (≡ decrease the color temperature in kelvins) by one step. If the ColorTemperatureMireds attribute reaches the maximum allowed for the device (via either the Color Temperature Maximum Mireds field or the ColorTempPhysicalMaxMireds attribute), the step operation SHALL be stopped.
0x02	Reserved	
0x03	Down	Decrease the ColorTemperatureMireds attribute (≡ increase the color temperature in kelvins) by one step. If the ColorTemperatureMireds attribute reaches the minimum allowed for the device (via either the Color Temperature Minimum Mireds field or the ColorTempPhysicalMinMireds attribute), the step operation SHALL be stopped.

7. Sensor Application Cluster Information

7.1. Illuminance Measurement (Cluster ID: 0x0400)

- Cluster ID: 0x0400
- Attribute Set

Id	Name	Type	Range	Acc	Def	MO
0x0000	MeasuredValue	uint16	0x0000-0xffff	RP	0x0000	M
0x0001	MinMeasuredValue	uint16	0x0001-0xfffd	R	ms	M
0x0002	MaxMeasuredValue	uint16	0x0002-0xfffe	R	ms	M
0x0003	Tolerance	uint16	0x0000-0x0800	R	ms	O
0x0004	LightSensorType	enum8	0x00-0xff	R	0xff	O

➢ MeasuredValue

MeasuredValue represents the Illuminance in Lux (symbol lx) as follows:
MeasuredValue = 10,000 x $\log_{10}$ Illuminance + 1
Where 1 lx <= Illuminance <=3.576 Mlx, corresponding to a MeasuredValue in the range 1 to 0xfffe.
The MeasuredValue attribute can take the following values.

- 0x0000 indicates a value of Illuminance that is too low to be measured.
- MinMeasuredValue ≤ MeasuredValue ≤ MaxMeasuredValue under normal circumstances.
- 0xffff indicates that the Illuminance measurement is invalid.

MeasuredValue is updated continuously as new measurements are made.

- MinMeasuredValue
  The MinMeasuredValue attribute indicates the minimum value of MeasuredValue that can be measured. A value of 0xffff indicates that this attribute is not defined
- MaxMeasuredValue
  The MaxMeasuredValue attribute indicates the maximum value of MeasuredValue that can be measured. A value of 0xffff indicates that this attribute is not defined
- Tolerance
  The Tolerance attribute SHALL indicate the magnitude of the possible error that is associated with MeasuredValue, using the same units and resolution
- LightSensorType
  The LightSensorType attribute specifies the electronic type of the light sensor. This attribute shall be set to one of the non-reserved values listed in the following table.

Attribute Value	Description
0x00	Photodiode
0x01	CMOS
0x40-0xfe	Reserved for manufacturer specific light sensor types
0xff	Unknown

7.2. Temperature Measurement (Cluster ID: 0x0402)

- Cluster ID: 0x0402
- Attribute Set:

Id	Name	Type	Range	Acc	Def	MO
0x0000	MeasuredValue	int16	MinMeasuredValue – MaxMeasuredValue	RP	non	M
0x0001	MinMeasuredValue	int16	0x954d-0x7ffe	R	non	M
0x0002	MaxMeasuredValue	int16	0x954e-0x7fff	R	non	M
0x0003	Tolerance	uint16	0x0000-0x0800	R		O

- *MeasuredValue*
  MeasuredValue represents the temperature in degrees Celsius as follows:
  MeasuredValue = 100 x temperature in degrees Celsius.
  Where -273.15°C <= temperature <= 327.67 ºC, corresponding to a MeasuredValue in the range 0x954d to 0x7fff. The maximum resolution this format allows is 0.01 ºC.
  A MeasuredValue of 0x8000 indicates that the temperature measurement is unknown
  MeasuredValue is updated continuously as new measurements are made.
  MinMeasuredValue and MaxMeasuredValue define the range of the sensor.
- MinMeasuredValue
  The MinMeasuredValue attribute indicates the minimum value of MeasuredValue that is capable of being measured. A MinMeasuredValue of 0x8000 indicates that the minimum value is unknown
- MaxMeasuredValue
  The MaxMeasuredValue attribute indicates the maximum value of MeasuredValue that is capable of being measured. A MaxMeasuredValue of 0x8000 indicates that the maximum value is unknown.
- Tolerance
  The Tolerance attribute SHALL indicate the magnitude of the possible error that is associated with MeasuredValue, using the same units and resolution

7.3. Pressure Measurement (Cluster ID: 0x0403)

- Cluster ID: 0x0403
- Attribute Set:

Id	Name	Type	Range	Acc	Def	MO
0x0000	MeasuredValue	int16	MinMeasuredValue – MaxMeasuredValue	RP	0x8000	M
0x0001	MinMeasuredValue	int16	0x8001-0x7ffe	R	0x8000	M
0x0002	MaxMeasuredValue	int16	0x8002-0x7fff	R	0x8000	M
0x0003	Tolerance	uint16	0x0000-0x0800	R		O

7.4. Flow Measurement (Cluster ID: 0x0404)

- Cluster ID: 0x0404
- Attribute Set:

Id	Name	Type	Range	Acc	Def	MO
0x0000	MeasuredValue	uint16	MinMeasuredValue – MaxMeasuredValue	RP	0xffff	M
0x0001	MinMeasuredValue	uint16	0x0000-0xfffd	R	0xffff	M
0x0002	MaxMeasuredValue	uint16	0x0001-0xfffe	R	0xffff	M
0x0003	Tolerance	uint16	0x0000-0x0800	R		O

➢ MeasuredValue

MeasuredValue represents the pressure in kPa as follows:
MeasuredValue = 10 x Pressure
Where -3276.7 kPa <= Pressure <= 3276.7 kPa, corresponding to a MeasuredValue in the range 0x8001 to 0x7fff.
MinMeasuredValue and MaxMeasuredValue define the range of the sensor
A MeasuredValue of 0x8000 indicates that the pressure measurement is unknown
MeasuredValue is updated continuously as new measurements are made.

➢ MinMeasuredValue

The MinMeasuredValue attribute indicates the minimum value of MeasuredValue that can be measured. A value of 0x8000 means this attribute is not defined

- MaxMeasuredValue
  The MaxMeasuredValue attribute indicates the maximum value of MeasuredValue that can be measured. A value of 0x8000 means this attribute is not defined
- Tolerance
  The Tolerance attribute SHALL indicate the magnitude of the possible error that is associated with MeasuredValue, using the same units and resolution

7.5. Relative Humidity Measurement (Cluster ID: 0x0405)

- Cluster ID: 0x0405
- Attribute Set:

Id	Name	Type	Range	Acc	Def	MO
0x0000	MeasuredValue	uint16	MinMeasuredValue – MaxMeasuredValue	RP	0xffff	M
0x0001	MinMeasuredValue	uint16	0x0000-0x270f	R	0xffff	M
0x0002	MaxMeasuredValue	uint16	0x0001-0x2710	R	0xffff	M
0x0003	Tolerance	uint16	0x0000-0x0800	R		O

- MeasuredValue
  MeasuredValue represents the water content in % as follows:
  MeasuredValue = 100 x water content
  Where 0% <= water content <= 100%, corresponding to a MeasuredValue in the range 0 to 0x2710.
  The maximum resolution this format allows is 0.01%
  MinMeasuredValue and MaxMeasuredValue define the range of the sensor
  A MeasuredValue of 0xffff indicates that the measurement is unknown
  MeasuredValue is updated continuously as new measurements are made
- MinMeasuredValue
  The MinMeasuredValue attribute indicates the minimum value of MeasuredValue that can be measured. A value of 0xffff means this attribute is not defined

- MaxMeasuredValue
  The MaxMeasuredValue attribute indicates the maximum value of MeasuredValue that can be measured. A value of 0xffff means this attribute is not defined.
- Tolerance
  The Tolerance attribute SHALL indicate the magnitude of the possible error that is associated with MeasuredValue, using the same units and resolution

7.6. Occupancy Sensing (Cluster ID: 0x0406)

- Cluster ID: 0x0406
- Attribute Set:

Id	Name	Type	Range	Acc	Def	MO
0x0000	Occupancy	map8	0b0000 000x	RP		M
0x0001	OccupancySensorType	enum8		R	ms	M
0x0002	OccupancySensorType Bitmap	Map8	0000 0xxx	R		M

- Occupancy
  The Occupancy attribute is a bitmap.
  Bit 0 specifies the sensed occupancy as follows: 1 = occupied, 0 = unoccupied.
  All other bits are reserved
- OccupancySensorType
  The OccupancySensorType attribute specifies the type of the occupancy sensor. This attribute shall be set to one of the non-reserved values listed in the following table.

Attribute Value	Description
0x00	PIR
0x01	Ultrasonic
0x02	PIR and ultrasonic
0x03	Physical contact

- OccupancySensorTypeBitmap
  The OccupancySensorTypeBitmap attribute specifies the types of the occupancy sensor, as listed below; a ‘1’ in each bit position indicates this type is implemented.

Bit	Description

Bit0	PIR
Bit1	Ultrasonic
Bit2	PIR and ultrasonic

The value of the OccupancySensorTypeBitmap attribute and the OccupancySensorType attribute SHALL be aligned as defined below.

Description	OccupancySensorType attribute	OccupancySensorTypeBitmap attribute
PIR	0x00	0000 0001
Ultrasonic	0x01	0000 0010
PIR and ultrasonic	0x02	0000 0011
Physical contact and PIR	0x00	0000 0101
Physical contact and ultrasonic	0x01	0000 0110
Physical contact and PIR and ultrasonic	0x02	0000 0111

- Cluster ID: 0x0406
- PIR Configuration Attribute Set

Id	Name	Type	Range	Acc	Def	MO
0x0010	PIROccupiedToUnoccupiedDelay	uint16	0x0000-0xfffe	RW	0x0000	O
0x0011	PIRUnoccupiedToOccupiedDelay	uint16	0x0000-0xfffe	RW	0x0000	O
0x0012	PIRUnoccupiedToOccupiedThreshold	uint8	0x01-0xfe	RW	0x01	O

- PIROccupiedToUnoccupiedDelay
  The PIROccupiedToUnoccupiedDelay attribute is 16 bits in length and specifies the time delay, in seconds, before the PIR sensor changes to its unoccupied state after the last detection of movement in the sensed area.
- PIRUnoccupiedToOccupiedDelay
  The PIRUnoccupiedToOccupiedDelay attribute is 16 bits in length and specifies the time delay, in seconds, before the PIR sensor changes to its

occupied state after the detection of movement in the sensed area. This attribute is mandatory if the PIRUnoccupiedToOccupiedThreshold attribute is implemented.

- PIRUnoccupiedToOccupiedThreshold
  The PIRUnoccupiedToOccupiedThreshold attribute is 8 bits in length and specifies the number of movement detection events that must occur in the period PIRUnoccupiedToOccupiedDelay, before the PIR sensor changes to its occupied state. This attribute is mandatory if the PIRUnoccupiedToOccupiedDelay attribute is implemented.

- Cluster ID: 0x0406
- Ultrasonic Configuration Attribute Set

Id	Name	Type	Range	Acc	Def	MO
0x0020	UltrasonicOccupiedToUnoccupiedDelay	uint16	0x0000-0xfffe	RW	0x0000	O
0x0021	UltrasonicUnoccupiedToOccupiedDelay	uint16	0x0000-0xfffe	RW	0x0000	O
0x0022	UltrasonicUnoccupiedToOccupiedThreshold	uint8	0x01-0xfe	RW	0x01	O

- UltrasonicOccupiedToUnoccupiedDelay
  The UltrasonicOccupiedToUnoccupiedDelay attribute is 16 bits in length and specifies the time delay, in seconds, before the Ultrasonic sensor changes to its unoccupied state after the last detection of movement in the sensed area.
- UltrasonicUnoccupiedToOccupiedDelay
  The UltrasonicUnoccupiedToOccupiedDelay attribute is 16 bits in length and specifies the time delay, in seconds, before the Ultrasonic sensor changes to its occupied state after the detection of movement in the sensed area. This attribute is mandatory if the UltrasonicUnoccupiedToOccupiedThreshold attribute is implemented.
- UltrasonicUnoccupiedToOccupiedThreshold
  The UltrasonicUnoccupiedToOccupiedThreshold attribute is 8 bits in length and specifies the number of movement detection events that must occur in the period UltrasonicUnoccupiedToOccupiedDelay, before the Ultrasonic sensor changes to its occupied state. This attribute is mandatory if the UltrasonicUnoccupiedToOccupiedDelay attribute is implemented.

- Cluster ID: 0x0406

- Physical Contact Configuration Set

Id	Name	Type	Range	Acc	Def	MO
0x0030	PhysicalContactOccupiedToUnoccupiedDelay	uint16	0x0000-0xfffe	RW	0x0000	O
0x0031	PhysicalContactUnoccupiedToOccupiedDelay	uint16	0x0000-0xfffe	RW	0x0000	O
0x0032	PhysicalContactUnoccupiedToOccupiedThreshold	uint8	0x01-0xfe	RW	0x01	O

- PhysicalContactOccupiedToUnoccupiedDelay
  The PhysicalContactOccupiedToUnoccupiedDelay attribute is 16 bits in length and specifies the time delay, in seconds, before the physical contact occupancy sensor changes to its unoccupied state after detecting the unoccupied event. The value of 0xffff indicates the sensor does not report occupied to unoccupied transition.
- PhysicalContactUnoccupiedToOccupiedDelay
  The PhysicalContactUnoccupiedToOccupiedDelay attribute is 16 bits in length and specifies the time delay, in seconds, before the physical contact sensor changes to its occupied state after the detection of the occupied event.
  The value of 0xffff indicates the sensor does not report unoccupied to occupied transition.
- PhysicalContactUnoccupiedToOccupiedThreshold
  The PhysicalContactUnoccupiedToOccupiedThreshold attribute is 8 bits in length and specifies the number of movement detection events that must occur in the period PhysicalContactUnoccupiedToOccupiedDelay, before the PIR sensor changes to its occupied state. This attribute is mandatory if the PhysicalContactUnoccupiedToOccupiedDelay attribute is implemented.

8. Closures

8.1. Door Lock (Cluster ID: 0x0101)

- Cluster ID: 0x0500
- Basic Information Attribute Set for reference

Id	Name	Type	Range	Access	Default	M/O
0x0000	LockState	enum8	All	R	-	M
0x0001	LockType	enum8	All	R	-	M
0x0002	ActuatorEnabled	bool	All	R	-	M
0x0003	DoorState	enum8	All	R	-	O
0x0004	DoorOpenEvents	uint32	All	RW	-	O
0x0005	DoorClosedEvents	uint32	All	RW	-	O
0x0006	OpenPeriod	uint32	All	RW	-	O

- User, PIN, Schedule, Log Information Attribute Set for reference

Id	Name	Type	Range	Access	Default	M/O
0x0010	NumberOfLogRecordsSupported	uint16	All	R	-	O
0x0011	NumberOfTotalUsersSupported	uint16	All	R	-	O
0x0012	NumberOfPINUsersSupported	uint16	All	R	-	O
0x0013	NumberOfRFIDUsersSupported	uint16	All	R	-	O
0x0014	NumberOfWeekDaySchedulesSupportedPerUser	uint8	All	R	-	O
0x0015	NumberOfYearDaySchedulesSupportedPerUser	uint8	All	R	-	O
0x0016	NumberOfHolidaySchedulesSupported	uint8	All	R	-	O
0x0017	MaxPINCodeLength	uint8	All	R	-	O

0x0018	MinPINCodeLength	uint8	All	R	-	O
0x0019	MaxRFIDCodeLength	uint8	All	R	-	O
0x001A	MinRFIDCodeLength	uint8	All	R	-	O

- Operational Settings Attribute Set for reference

Id	Name	Type	Range	Acc	Def	MO
0x0020	EnableLogging	bool	All	RW	-	O
0x0021	Language	String (3bytes)	All	RW	-	O
0x0022	LEDSettings	uint8	All	RW	-	O
0x0023	AutoRelockTime	uint32	All	RW	-	O
0x0024	SoundVolume	uint8	All	RW	-	O
0x0025	OperatingMode	enum8	All	RW	-	O
0x0026	SupportedOperatingModes	map16	All	R	-	O
0x0027	DefaultConfigurationRegister	map16	All	R	-	O
0x0028	EnableLocalProgramming	bool	All	RW	-	O
0x0029	EnableOneTouchLocking	bool	All	RW	-	O
0x002A	EnableInsideStatusLED	bool	All	RW	-	O
0x002B	EnablePrivacyModeButton	bool	All	RW	-	O

- Operational Settings Attribute Set for reference

Id	Name	Type	Range	Acc	Def	MO
0x0030	WrongCodeEntryLimit	uint8	All	RW	-	O
0x0031	UserCodeTemporaryDisableTime	uint8	All	RW	-	O
0x0032	SendPINOverTheAir	bool	ALL	RW	-	O
0x0033	RequirePINforRemoteOperation	bool	ALL	RW	-	O
0x0034	SecurityLevel	enum8	ALL	R	-	O

- Operational Settings Attribute Set for reference

Id	Name	Type	Range	Acc	Def	MO
0x0040	AlarmMask	map16	All	RW	-	O
0x0041	KeypadOperationEventMask	map16	All	RW	-	O
0x0042	RFOperationEventMask	map16	All	RW	-	O
0x0043	ManualOperationEventMask	map16	All	RW	-	O
0x0044	RFIDOperationEventMask	map16	All	RW	-	O
0x0045	KeypadProgrammingEventMask	map16	All	RW	-	O
0x0046	RFProgrammingEventMaskRemoteProgrammingEventM	map16	All	RW	-	O
0x0047	RFIDProgrammingEventMask	map16	All	RW	-	O

8.1.1. Lock Door (0x0024-0000)

This command causes the lock device to lock the door. As of HA 1.2, this command includes an optional PIN/RFID code for the lock.

- Command id
  0x0024-0000
- Parameter

1 octet	N octets
PIN/RFID code length	PIN/RFID code

Gateway command Example:
Header: 0xFFFCFCFF
Lengthe:0x0F
Command id: 0x00240000
Device address: 0x4721
PIN code:
0x52 0x61 0x66 0x61 0x65 0x6C (String data type, in ASCII code: Rafael)

Checksum:
~(0x0F+0x00+0x00+0x24+0x00+0x21+0x47+0x00+0x02+0x06+0x52+0x61+0x66+0x61+0x65+0x6C) = 0x11
The gateway command will be:
FF FC FC FF 0F 00 00 24 00 21 47 00 02 06 52 61 66 61 65 6C 11

Field name	Value
Header	0xFF 0xFC 0xFC 0xFF
Length	0x0F
Command id	0x00 0x00 0x24 0x00
Address	0x21 0x47
Address mode	0x00
Endpoint	0x02
PIN/RFID code length	0x06
PIN/RFID code	0x52 0x61 0x66 0x61 0x65 0x6C
Checksum	11

8.1.2. Lock Door Response (0x0024-8000)

This command is sent in response to a Lock command with one status byte payload. The Status field SHALL be set to SUCCESS or FAILURE.

- Command id
  0x0024-8000
- Parameter

1 octet
Status

Status: 0x00, SUCCESS
0x01, FAILURE

8.1.3. Unlock Door (0x0024-0001)

This command causes the lock device to unlock the door. As of HA 1.2, this command includes an optional PIN/RFID code for the lock.

- Command id
  0x0024-0001
- Parameter

1 octet	N octets
PIN/RFID code length	PIN/RFID code

8.1.4. Unlock Door Response (0x0024-8001)

This command is sent in response to the unlock command with one status byte payload. The Status field SHALL be set to SUCCESS or FAILURE.

- Command id
  0x0024-8001
- Parameter

1 octet
Status

Status: 0x00, SUCCESS
0x01, FAILURE

8.1.5. Toggle (0x0024-0002)

This command causes the lock device to toggle the door lock. As of HA 1.2, this command includes an optional PIN/RFID code for the lock.

- Command id
  0x0024-0002
- Parameter

1 octet	N octets
PIN/RFID code length	PIN/RFID code

8.1.6. Toggle Response (0x0024-8002)

This command is sent in response to the toggle command with one status byte payload. The Status field SHALL be set to SUCCESS or FAILURE.

- Command id
  0x0024-8002
- Parameter

1 octet
Status

Status: 0x00, SUCCESS
0x01, FAILURE

8.1.7. Set PIN Code (0x0024-0005)

Set a PIN into the lock.

- Command id
  0x0024-0005
- Parameter

2 octets	1 octet	1 octet	1 octet	N octets
User ID	User status	User type	PIN code length	PIN code

8.1.8. Set PIN Code Response (0x0024-8005)

This command is sent in response to the set pin code command with one status byte payload. The Status field SHALL be set to SUCCESS or FAILURE.

- Command id
  0x0024-8005
- Parameter

1 octet
Status

Status: 0x00, SUCCESS
0x01, FAILURE

8.1.9. Get PIN Code (0x0024-0006)

Set a PIN into the lock.

- Command id
  0x0024-0006
- Parameter

2 octets
User ID

8.1.10. Get PIN Code Response (0x0024-8006)

This command is sent in response to the get pin code command with following payload.

- Command id
  0x0024-8006

- Parameter

2 octets	1 octet	1 octet	1 octet	N octets
User ID	User status	User type	PIN code length	PIN code

8.1.11. Clear PIN Code (0x0024-0007)

Delete a PIN code associated with a specific user ID from the lock.

- Command id
  0x0024-0007
- Parameter

2 octets
User ID

8.1.12. Clear PIN Code Response (0x0024-8007)

This command is sent in response to the clear pin code command with one status byte payload. The Status field SHALL be set to SUCCESS or FAILURE.

- Command id
  0x0024-8007
- Parameter

1 octet
Status

Status: 0x00, SUCCESS
0x01, FAILURE

8.1.13. Clear All PIN Code (0x0024-0008)

Delete all PIN codes from the lock.

- Command id
  0x0024-0008
- Parameter
  None.

8.1.14. Clear All PIN Code Response (0x0024-8008)

This command is sent in response to the clear all pin code command with one status byte payload. The Status field SHALL be set to SUCCESS or FAILURE.

- Command id
  0x0024-8008
- Parameter

1 octet
Status

Status: 0x00, SUCCESS
0x01, FAILURE

8.1.15. Operating Event Notification (0x0024-8020)

The door lock server sends out operation event notification when the event is triggered by the various event sources. The specific operation event will only be sent out if the associated bitmask is enabled in the various attributes in the Event Masks Attribute Set.

- Command id
  0x0024-8020
- Parameter

1 octet	1 octet	2 octet	1 octet	4 octet	0/N octet
Operation Event Source	Operation Event Code	User ID	PIN	ZigBeeLocalTime	Data

Operation Event Source:
This field indicates where the event was triggered from.

Value	Operation Event Source
0x00	keypad
0x01	RF
0x02	Manual
0x03	RFID
0xFF	Indeterminate

Operation Event Code:
The door lock optionally sends out notifications (if they are enabled) whenever there is a significant opera tional event on the lock. When combined with a source from the Event Source table above, the following operational event codes

Value	Code
0x00	UnknownOrMfgSpecific
0x01	Lock
0x02	Unlock
0x03	LockFailureInvalidPINorID
0x04	LockFailureInvalidSchedule
0x05	UnlockFailureInvalidPINorID
0x06	UnlockFailureInvalidSchedule
0x07	OneTouchLock
0x08	KeyLock
0x09	KeyUnlock
0x0A	AutoLock
0x0B	ScheduleLock
0x0C	ScheduleUnlock
0x0D	Manual Lock (Key or Thumbturn)
0x0E	Manual Unlock (Key or Thumbturn)
0x0F	Non-Access User Operational Event

User ID: The User ID who performed the event.

PIN: The PIN that is associated with the User ID who performed the event.

LocalTime: The ZigBee LocalTime that indicates when the event is triggered.

Data: The operation event notification command contains a variable string, which can be used to pass data asso ciated with a particular event. Generally this field will be left empty. However, manufacturer can choose to use this field to store/display manufacturer-specific information.

9. Security and Safety

9.1. IAS Zone (Cluster ID: 0x0500)

- Cluster ID: 0x0500
- Attribute Set

Id	Name	Type	Range	Access	Default	M/O
0x0000	ZoneState	Enum8	All	R	0x00	M
0x0001	ZoneType	Enum16	All	R	-	M

0x0002	ZoneStatus	Map16	All	R	0x00	M

■ Zone State Attribute

Attribute Value	Meaning
0x00	Not enrolled
0x01	Enrolled

■ Zone Type Attribute

Value	Zone Type	Alarm1	Alarm2
0x0000	Standard CIE	System Alarm	-
0x000d	Motion sensor	Intrusion indication	Presence indication
0x0015	Contact switch	1st portal Open-Close	2nd portal Open-Close
0x0028	Fire sensor	Fire indication	-
0x002a	Water sensor	Water overflow indication	-
0x002b	Carbon Monoxide (CO) sensor	CO indication	Cooking indication
0x002c	Personal emergency device	Fall/Concussion	Emergency button
0x002d	Vibration/Movement sensor	Movement indication	Vibration
0x010f	Remote Control	Panic	Emergency
0x0115	Key fob	Panic	Emergency
0x021d	Keypad	Panic	Emergency
0x0225	Stand Warning Device	-	-
0x0226	Glass break sensor	Glass breakage detected	-
0x0229	Security repeater	-	-
0x8000-0xffe	Manufacturer specific types	-	-
0xffff	Invalid Zone Type	-	-

9.1.1. Zone Status Change Notification (0x0023-0000)

- Command id
  0x0023-0000

- Parameter

2 octets	1 octet	1 octet	2 octets
Zone Status	Extended Status	Zone ID	Delay

  - Zone Status Attribute

Attribute Bit Number	Meaning	Values
0	Alarm1	1 – opened or alarmed 0 – closed or not alarmed
1	Alarm2	1 – opened or alarmed 0 – closed or not alarmed
2	Tamper	1 – Tampered 0 – Not tampered
3	Battery	1 – Low battery 0 – Battery OK
4	Supervision Reports (Note 1)	1 – Reports 0 – Does not report
5	Restore reports (Note 2)	1 – Reports restore 0 – Does not report restore
6	Trouble	1 – Trouble/Failure 0 – OK
7	AC (mains)	1 – AC/Mains fault 0 – AC/Mains OK
8	Test	1 – Sensor is in test mode 0 – Sensor is in operation mode
9	Battery Defect	1 – Sensor detects a defective battery 0 – Sensor battery is functioning normally

  - The Extended Status field is reserved for additional status information and SHALL be set to zero

10. Application Service Management Status Enumeration Description

Enumeration	Value	Description
SUCCESS	0x00	Operation was successful.
FAILURE	0x01	Operation was not successful.
NOT_AUTHORIZED	0x7E	The sender of the command does not have authorization to carry out this comma
MALFORMED_COMMAND	0x80	The command appears to contain the wrong fields, as detected either by the presence of one or more invalid field entries or by there being missing fields. Command not carried out. Implementer has discretion as to whether to return this error or INVALID_FIELD.
UNSUP_COMMAND	0x81	The specified command is not supported on the device. Command not carried out.
INVALID_FIELD	0x85	At least one field of the command contains an incorrect value, according to the specification the device is implemented to.
UNSUPPORTED_ATTRIBUTE	0x86	The specified attribute does not exist on the device.
INVALID_VALUE	0x87	Out of range error or set to a reserved value. Attribute keeps its old value. Note that an attribute value may be out of range if an attribute is related to another, e.g., with minimum and maximum attributes. See the individual attribute descriptions for specific details
READ_ONLY	0x88	Attempt to write a read-only attribute.

INSUFFICIENT_SPACE	0x89	An operation failed due to an insufficient amount of free space available.
NOT_FOUND	0x8B	The requested information (e.g., table entry) could not be found.
UNREPORTABLE_ATTRIBUTE	0x8C	Periodic reports cannot be issued for this attribute.
INVALID_DATA_TYPE	0x8D	The data type given for an attribute is incorrect. Command not carried out.
INVALID_SELECTOR	0x8E	The selector for an attribute is incorrect.
TIMEOUT	0x94	The exchange was aborted due to excessive response time.
ABORT	0x95	Failed case when a client or a server decides to abort the upgrade process.
INVALID_IMAGE	0x96	Invalid OTA upgrade image (ex. failed signature validation or signer information check or CRC check)
WAIT_FOR_DATA	0x97	Server does not have data block available yet
NO_IMAGE_AVAILABLE	0x98	No OTA upgrade image available for the client
REQUIRE_MORE_IMAGE	0x99	The client still requires more OTA upgrade image files to successfully upgrade
NOTIFICATION_PENDING	0x9A	The command has been received and is being processed
UNSUPPORTED_CLUSTER	0xC3	The cluster is not supported

Revision History

Revision	Description	Owner	Date
0.1	1. Initial version.	Joshua	2022/04/21
0.2	1. Pretest and remove invalid commands. 2. Add BindingTableList record format. 3. Modify “5.1.11 Default Response”.	George	2022/05/25
0.3	1. Add “4.3.1 Neighbor information request”. 2. Add “4.3.2 Neighbor information response”. 3. Add “4.3.3 Routing information request”. 4. Add “4.3.4 Routing information response”.	George	2022/06/03
0.4	1. Add “5.1.12. Read device attributes”. 2. Add “5.1.13. Read device attributes response”.	George	2022/07/07
0.5	1. Add “4.3.15. Gateway reset”. 2. Add “4.3.16. Gateway reset response”.	George	2022/07/29
0.6	1. Add identify trigger effect command, optional scenes command, off with effect command	Randy	2022/09/19
0.7	1. Add “5.1.18” Report Attribute Data command 2.Add “7“ Sensor related cluster information	Joshua	2023/10/18
0.8	1. Add “8.1.1” Zone Status Change Notification 2. Add “4.3.17” Gateway extended address request 3. Add “4.3.18” Gateway extended address response	Stanley	2023/10/30
0.9	1. Add “4.3.19” Gateway permit join status request 2. Add “4.3.20” Gateway permit join status response	Stanley	2024/01/19
1.0	1. Add “8.1” door lock	Justin	2024/05/08
1.1	1. Add OptionsMask & OptionsOverride field. 2. Add Permit join timeout notification	Justin	2024/05/24
1.2	1. Add “cluster ID” field in Report attribute data cmd	Justin	2024/06/13
1.2.1	1. Add “Operating Event Notification” for door lock cluster	Justin	2024/06/14