Zigbee Gateway Command Manual V2.0

About this Document

This document supports “RT58x_SDK_v2.0” 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.

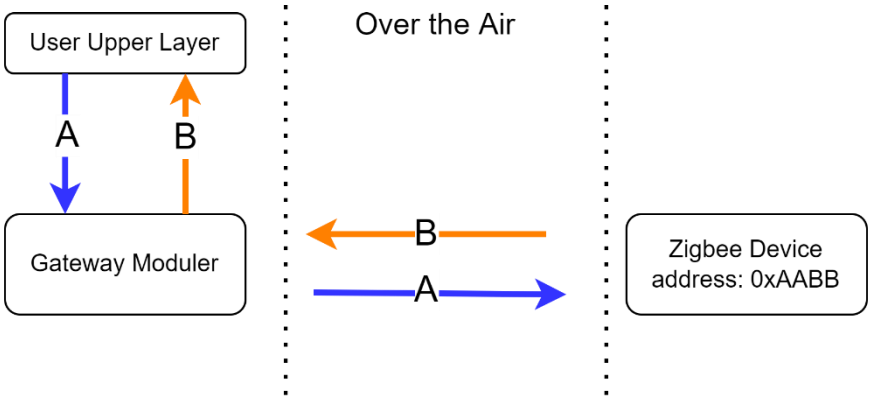
3.1.3. Command id field

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 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.

4.1.5. 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	NWK address for

		address	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.

4.1.14. Device leave indication (0x0000-0014)

The Device leave indication is provided to notify upper layer that the device has permanently leave current network.

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- Command id
  0x0000-0014

- Parameter

2 octets
NWKAddr

Name	Type	Valid Range	Description
NWKAddr	Device Address	16-bit NWK address	NWK address of the Leaved Device

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 Descriptors	The list shall contain the number elements given by the RoutingTableListCount	A list of descriptors, beginning with the StartIndex element 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. Channel energy scan (0x0000-003A)

The user can use this command to check the channel status before the Gateway starting to from a zigbee network. This command performs the energy scan for each zigbee channel from CH11(2405 MHz), CH12(2410 MHz) …. CH26(2480 MHz), and based on the result of Channel energy scan response (0x0000-803A) to help the user to select the suitable channel to start the zigbee network.

Please be noted that this command can only be performed before starting the zigbee network.

- Command id
  0x0000-003A

- Parameter
  None

4.3.17. Channel energy scan response(0x0000-803A)

This command returns the result of executing the "Channel energy scan" command. The response returns the energy level obtained for each Zigbee channel. This value provides a reference for the user on the energy distribution of the channels in the current environment. Please note that the smaller the value, the greater the energy of the corresponding channel. It is recommended to select the channel with the largest value(channel with lower energy distribution) as the channel to be used for the Zigbee network.

- Command id
  0x0000-803A

- Parameter

1 octet	1 octet	1 octet	1 octet	…	1 octet	1 octet	1 octet
Status	CH11	CH12	CH13	…	CH24	CH25	CH26

Name	Type	Valid Range	Description
Status	Integer	0x00 ~ 0xFF	0x00: energy scan succeed Others: energy scan failed
CH11	Integer	0x00 ~ 0xFF	Channel 11(2405 MHz) energy level
CH12	Integer	0x00 ~ 0xFF	Channel 12(2410 MHz) energy level
CH13	Integer	0x00 ~ 0xFF	Channel 13(2415 MHz) energy level
CH14	Integer	0x00 ~ 0xFF	Channel 14(2420 MHz) energy level
CH15	Integer	0x00 ~ 0xFF	Channel 15(2425 MHz) energy level
CH16	Integer	0x00 ~ 0xFF	Channel 16(2430 MHz) energy level
CH17	Integer	0x00 ~ 0xFF	Channel 17(2435 MHz) energy level
CH18	Integer	0x00 ~ 0xFF	Channel 18(2440 MHz) energy level
CH19	Integer	0x00 ~ 0xFF	Channel 19(2445 MHz) energy level
CH20	Integer	0x00 ~ 0xFF	Channel 20(2450 MHz) energy level
CH21	Integer	0x00 ~ 0xFF	Channel 21(2455 MHz) energy level
CH22	Integer	0x00 ~ 0xFF	Channel 22(2460 MHz) energy level
CH23	Integer	0x00 ~ 0xFF	Channel 23(2465 MHz) energy level
CH24	Integer	0x00 ~ 0xFF	Channel 24(2470 MHz) energy level
CH25	Integer	0x00 ~ 0xFF	Channel 25(2475 MHz) energy level
CH26	Integer	0x00 ~ 0xFF	Channel 26(2480 MHz) energy level

4.3.18. Network address table update (0x0000-003B)

This command is used to obtain the network addresses of each node currently present in the Zigbee network. This information will be updated in the address list table. When the user wants to obtain the network address information of the current network nodes, they must first use this command (0x0000003B) to obtain the latest network address information of the current network and then use 0x0000003C command to obtain the network address table content.

Please refer to the latter part of the 'Get network address list response (0x0000-803C)' section, which provides relevant usage examples.

- Command id
  0x0000-003B

- Parameter
  None

4.3.19. Network address table update response (0x0000-803B)

After the device executes the 0x0000003B command, it will return the status of the command execution, including the Addr_count and Group_count. When Addr_count and Group_count are greater than 0, the user can use this information along with the 0x0000003C command to obtain the network address of each node.

- Command id
  0x0000-803B

- Parameter

1 octet	1 octet	1 octet
Status	Addr_count	Group_count

Name	Type	Valid Range	Description
Status	Integer	0x00 ~ 0xFF	0x00: address table update succeeded Others: address table update failed

Addr_count	Integer	0x00 ~ 0xFF	Current number of network nodes.
Group_count	Integer	0x00 ~ 0xFF	Current number of groups, each group can record up to 10 network addresses.

4.3.20. Get network address list (0x0000-003C)

When the user updates the network address table using the 0x0000003B command, they can determine the current number of network nodes based on Addr_count. By using the content of Group_idx along with the command 0x0000-003C from this section, they can obtain the network address list. Each time this command is executed, up to 10 network addresses can be retrieved.
For example, when using the 0x0000003B command to get Addr_count=0x0C and Group_count=0x02, it means there are 12 nodes in the network (with 12 network addresses). You can use the 0x0000003C command with Group_idx=1 to obtain the first 10 network addresses, and use the 0x0000003C command with Group_idx=2 to obtain the remaining 2 network addresses.

- Command id
  0x0000-003C

- Parameter

1 octet
Group_idx

4.3.21. Get network address list response (0x0000-803C)

Using this response message, users can retrieve the network address list corresponding to the specified Group_idx.

- Command id
  0x0000-803C

- Parameter

1 octet	1 octet	1 octet	2 octets	…	2 octets
Status	Addr_count	Group_idx	1st Addr	…	10th Addr

Name	Type	Valid Range	Description
Status	Integer	0x00 ~ 0xFF	0x00: network address available. Others: no network address or invalid Group_idx value.
Addr_count	Integer	0x00 ~ 0xFF	Current number of network nodes set with Group_idx.
Group_idx	Integer	0x00 ~ 0xFF	Current Group_idx.
1st Addr	Integer	0x0000 ~ 0xFFF7	1st network address, not valid if the address is 0xFFFF
2nd Addr	Integer	0x0000 ~ 0xFFF7	2nd network address, not valid if the address is 0xFFFF
3rd Addr	Integer	0x0000 ~ 0xFFF7	3rd network address, not valid if the address is 0xFFFF
4th Addr	Integer	0x0000 ~ 0xFFF7	4th network address, not valid if the address is 0xFFFF
5th Addr	Integer	0x0000 ~ 0xFFF7	5th network address, not valid if the address is 0xFFFF
6th Addr	Integer	0x0000 ~ 0xFFF7	6th network address, not valid if the address is 0xFFFF
7th Addr	Integer	0x0000 ~ 0xFFF7	7th network address, not valid if the address is 0xFFFF
8th Addr	Integer	0x0000 ~ 0xFFF7	8th network address, not valid if the address is 0xFFFF
9th Addr	Integer	0x0000 ~ 0xFFF7	9th network address, not valid if the address is 0xFFFF
10th Addr	Integer	0x0000 ~ 0xFFF7	10th network address, not valid if the address is 0xFFFF

Example of getting the current nodes of network addresses with hex command format:

Step1: send Network address table update command
FF FC FC FF 07 3B 00 00 00 00 00 00 BD

Step2: got Network address table update response

FF FC FC FF 0A 3B 80 00 00 00 00 00 00 02 01 37
→00: status succeeded.
→02: 2 nodes on the netowk
→01: Group count is 1

Step3: get network address list with Group_idx = 1
FF FC FC FF 08 3C 00 00 00 00 00 00 01 BA

Step4: got network address list response
FF FC FC FF 1E 3C 80 00 00 00 00 00 00 02 01 00 00 1C A8 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF 6E
→00 02 01: network address available, 2 network address included, Group_idx=1
→00 00: 1st network address 0x0000
→1C A8: 2nd network address 0xA81C

4.3.22. 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

4.3.23. 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

4.3.24. 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

4.3.25. 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

4.3.26. 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

4.3.27. 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

4.3.28. Gateway PanID Channel request (0x0000-0043)

The Gateway PanID Channel request command is generated for obtaining the gateway firmed PanID and Channel information.

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
  0x0000-0043

- Parameter
  None

4.3.29. Gateway PanID Channel response (0x0000-8043)

The Gateway PanID Channel response is in response to a Gateway PanID Channel request.

- Command id
  0x0000-8043

- Parameter

1 octet	2 octets	1 octet
Status	PanID	Channel number

Name	Type	Valid Range	Description
Status	Boolean	0x00/0x01	0x00: get information success. 0x01: get information fail.

PanID	Integer	0x0000~0xFFFF	Network PanID
Channel number	Integer	0x00 ~ 0xFF	0x0B: channel 11 0x0C: channel 12 0x0D: channel 13 0x0E: channel 14 0x0F: channel 15 0x10: channel 16 0x11: channel 17 0x12: channel 18 0x13: channel 19 0x14: channel 20 0x15: channel 21 0x16: channel 22 0x17: channel 23 0x18: channel 24 0x19: channel 25 0x1A: channel 26

4.3.30. Gateway Install Code Set request (0x0000-0044)

The Gateway Install Code Set request command is generated for setting the installation code for the device to be joined in the zigbee 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
  0x0000-0044

- Parameter

1 octet	8 octets	N octets
IC type	IEEE address	Install code

Name	Type	Valid Range	Description
IC type	Integer	0x00 ~ 0x03	The install code

			type
IEEE address	Integer	8 bytes address	The device IEEE address
Install code	Integer	8 ~ 18 bytes	Install code with 2 bytes CRC

IC type:

IC type	Description
0x00	The length of install code is 6 bytes + 2 Bytes CRC = 8 bytes
0x01	The length of install code is 8 bytes + 2 Bytes CRC = 10 bytes
0x02	The length of install code is 12 bytes + 2 Bytes CRC = 14 bytes
0x03	The length of install code is 16 bytes + 2 Bytes CRC = 18 bytes

IEEE address:
The device IEEE address to be joined.

Install code:
The user select the random number for the install code value, the length is determined by the IC type, the install code test pattern as below:

IC type	Install code value	CRC-16
0x00	0x83, 0xFE, 0xD3, 0x40, 0x7A, 0x93	0x2B, 0x70
0x01	0x83, 0xFE, 0xD3, 0x40, 0x7A, 0x93, 0x97, 0x23	0x97, 0xFC
0x02	0x83, 0xFE, 0xD3, 0x40, 0x7A, 0x93, 0x97, 0x23, 0xA5, 0xC6, 0x39, 0xB2	0xAD, 0x8B
0x03	0x83, 0xFE, 0xD3, 0x40, 0x7A, 0x93, 0x97, 0x23, 0xA5, 0xC6, 0x39, 0xB2, 0x69, 0x16, 0xD5, 0x05	0xC3, 0xB5

The gateway command example:

1. The install code type is 0x00, device IEEE address is 4d:36:6f:30:38:33:39:30 and the install code(8 bytes) is 83 FE D3 40 7A 93 2B 70
   The gateway command will be
   FF FC FC FF 18 44 00 00 00 00 00 00 00 30 39 33 38 30 6F 36 4D 83 FE D3 40 7A 93 2B 70 71
2. The install code type is 0x03, device IEEE address is 4d:36:6f:30:38:33:39:30 and the install code(8 bytes) is 83 FE D3 40 7A 93 97 23 A5 C6 39 B2 69 16 D5 05 C3 B5

The gateway command will be
FF FC FC FF 22 44 00 00 00 00 00 00 03 30 39 33 38 30 6F 36 4D 83 FE D3 40 7A 93 97 23 A5 C6 39 B2 69 16 D5 05 C3 B5 1E

4.3.31. Gateway Install Code Set response (0x0000-8044)

The Gateway Install Code Set response is in response to a Gateway Install Code Set request.

- Command id
  0x0000-8044

- Parameter

1 octet
Status

Name	Type	Valid Range	Description
Status	integer	0x00 ~ 0xFF	0x00: install code set succeeded, other non 0x00 value indicated install code set failed.

4.3.32. Gateway Remove Install Code request (0x0000-0045)

The Gateway Remove Install Code request command is used to remove the install code of specific IEEE 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
  0x0000-0045

- Parameter

8 octet

IEEE address

Name	Type	Valid Range	Description
IEEE address	Integer	8 bytes address	The device IEEE address

4.3.33. Gateway Remove Install Code response (0x0000-8045)

The Gateway Install Code Remove response is in response to a Gateway Remove Install Code request.

- Command id
  0x0000-8045

- Parameter

1 octet
Status

Name	Type	Valid Range	Description
Status	integer	0x00 ~ 0xFF	0x00: install code set succeeded, other non 0x00 value indicated install code set failed.

4.3.34. Gateway Remove All Install Code request (0x0000-0046)

The Gateway Remove All Install Code request command is used to remove install code for all devices.

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
  0x0000-0046

- Parameter
  None

4.3.35. Gateway Remove All Install Code response (0x0000-8046)

The Gateway Remove All Install Code response is in response to a Gateway Remove All Install Code request.

- Command id
  0x0000-8046

- Parameter

1 octet
Status

Name	Type	Valid Range	Description
Status	integer	0x00 ~ 0xFF	0x00: install code set succeeded, other non 0x00 value indicated install code set failed.

4.3.36. Gateway Standard Time Set (0x0000-0047)

The command is used to set time attribute of Time cluster on gateway, after the time is set, the attribute will automatically increment by one every second.

- Command id
  0x0000-0047

- Parameter

4 octet
Time

Name	Type	Valid Range	Description
Time	integer	0x00000000 ~ 0xFFFFFFFE	This time standard is the number of seconds since 0 hrs 0 mins 0 sec on 1st January 2000 UTC

4.4. Device and Network Management Service Status

Enumeration Description

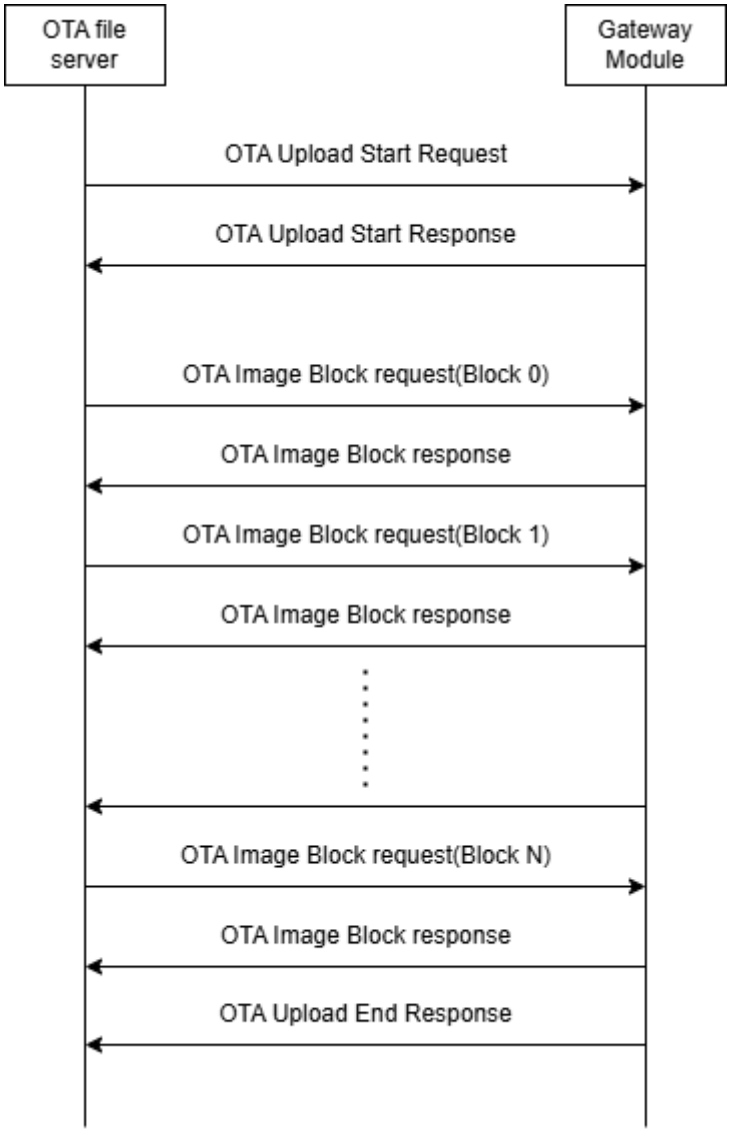
Enumeration	Value	Description
SUCCESS	0x00	The requested operation or transmission was completed successfully.
INV_REQUESTTYPE	0x80	The supplied request type was invalid.
DEVICE_NOT_FOUND	0x81	The requested device did not exist on a device following a child descriptor request to a parent.
INVALID_EP	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. Over the Air(OTA) Upgrade Management

5.1. OTA file upload flow

Following diagram shows how to upload OTA image from server to gateway module. First, file server sends OTA Start Request to gateway module, upon receives the message, gateway module would erase flash bank for the coming OTA image and send OTA Start Response.
After server side receive OTA Start Response, it should start sending OTA Image Block Request, image information (file type, manufacture code...etc.) should be include in first packet. Server side must send next block after receiving OTA Image Response. Notice that the OTA Image Block Request must send in sequence, or the image data might be malformed.
After last block is sent, gateway module would sent OTA end response to server side.



5.2. OTA Upgrade command list

Address field, Address mode field are not cared for commands in this section, End point field should be omitted

5.2.1. OTA Upload Start Request(0xF000-0000)

The command is used to notify gateway to receive OTA image file. Once gateway receive this command, it will erase flash bank for the coming OTA image.

- Command id
  0xF000-0000

- Parameter
  None

5.2.2. OTA Upload Start Response(0xF000-8000)

The command is used to indicate that gateway is ready for receiving OTA image.

- Command id
  0xF000-8000

- Parameter

4 octet
Status

Name	Type	Valid Range	Description
Status	Uint32	0x00000000	0x00000000:Gateway is ready for receiving OTA image

5.2.3. OTA Image Block Request(0xF000-0001)

The command is used to send OTA image blocks to gateway. The OTA image should be split into many blocks and send by this command. Gateway would store the OTA image in flash.

- Command id
  0xF000-0001

- Parameter

2 octet	2 octet	4 octet	4 octet	4 octet	4 octet	2 octet	variable
Image type	Manufacture code	File version	Image size	Total blocks	Current block	Data length	Image data

Name	Type	Description
Image type	Uint16	Image type of the OTA image
Manufacture code	Uint16	Manufacture code of the OTA image
File version	Uint32	File version of the OTA image

Image size	Uint32	Image size of the OTA image
Total blocks	Uint32	Total block number of the OTA image
Current block	Uint32	Current block number of the OTA image
Data length	Uint16	Data size of the OTA image that is being include in this command
Image data	Opaque	The OTA image data with length equals to Data length field

Notice that Current block field should start from 0, ends at Total blocks-1

5.2.4. OTA Image Block Response(0xF000-8001)

The command is sent by gateway module, indicate OTA Image Block Request status.

- Command id
  0xF000-8001

- Parameter

4 octet
Current block

Name	Type	Description
Current block	Uint32	Current block number of the OTA image 0xFFFFFFFF: failed

5.2.5. OTA Upload End Response(0xF000-8002)

The command is sent by gateway module, indicate that OTA Image Block process is finished.

- Command id
  0xF000-8002

- Parameter
  None

5.2.6. OTA File Insert Request(0xF000-0003)

After the OTA image file has been uploaded to the gateway, the user can use this command to configure the gateway to start the entire OTA server update process, including broadcasting the Image Notify packet and responding to the image request packet from the target device. Once the device receives a notification of an available update, the gateway and the device will automatically begin the OTA update process.

- Command id
  0xF000-0003

- Parameter
  None

5.2.7. OTA File Insert Response (0xF000-8003)

The command is in response to OTA File Insert Request command. After verifying the OTA image used in the gateway, reply with the status to notify the user.

- Command id
  0xF000-8003
- Parameter

4 octet
Status

Name	Type	Valid Range	Description
Status	Uint8	0x00000000 ~ 0xFFFFFFFF	0x00000000: SUCCESS 0xFFFFFFFF: failed, the OTA image is invalid.

5.2.8. OTA File Remove Request(0xF000-0004)

The user can use this command to remove inserted OTA file.

- Command id
  0xF000-0004

- Parameter
  None

5.2.9. OTA File Remove response (0xF000-8004)

The command is in response to OTA File Remove Request command.

- Command id
  0xF000-8004
- Parameter

4 octet
Status

Name	Type	Valid Range	Description
Status	integer	0x00000000 ~ 0xFFFFFFFF	0x00000000: succeeded Other value: failed.

5.2.10. Insert OTA Candidate Request (0xF000-0005)

This command allows the user to authorize devices on the Zigbee network to perform firmware updates via OTA (Over-the-Air) upgrade. The candidate address can be set to either a specific unicast address or the broadcast address 0xFFFF. When a unicast address is specified, only the device with that address is permitted to receive the OTA update. When set to 0xFFFF, the OTA Upgrade Server will permit all OTA-capable devices in the network to concurrently initiate the firmware download process.

- Command id
  0xF000-0005
- Parameter

2 octet
Candidate Addr

Name	Type	Valid Range	Description
Candidate Addr	integer	0x0000 ~ 0xFFFF	0x0000: no OTA candidate assigned 0xFFFF: all eligible devices in the network Other value: only for the assigned address.

5.2.11. Insert OTA Candidate response (0xF000-8005)

The command is in response to Insert OTA Candidate Request command.

- Command id
  0xF000-8005

- Parameter

1 octet
Status

Name	Type	Valid Range	Description
Status	integer	0x00 ~ 0xFF	0x00: succeed Other value: failed

5.2.12. Remove OTA Candidate Request (0xF000-0006)

This command is used to clear the OTA candidate setting; the candidate address will be set to 0x0000.

- Command id
  0xF000-0006
- Parameter
  None

5.2.13. Remove OTA Candidate Response (0xF000-8006)

The command is in response to Remove OTA Candidate Request command.

- Command id
  0xF000-8006
- Parameter

1 octet
Status

Name	Type	Valid Range	Description
Status	integer	0x00 ~ 0xFF	0x00: succeed Other value: failed

5.2.14. Get OTA Candidate Request (0xF000-0007)

This command allows the user to query the currently configured OTA candidate address.

- Command id
  0xF000-0007
- Parameter

None

5.2.15. Get OTA Candidate Response(0xF000-8007)

The command is in response to Get OTA Candidate Request, indicated the current candidate address.

- Command id
  0xF000-8007
- Parameter

2 octet
Candidate Addr

Name	Type	Valid Range	Description
Candidate Addr	integer	0x0000 ~ 0xFFFF	0x0000: no OTA candidate assigned 0xFFFF: all eligible devices in the network Other value: only for the assigned address.

5.2.16. OTA Update Status Response(0xF000-8008)

While a device is undergoing the OTA update process, the user may receive this command to monitor the current OTA status of the device. The reported status may include the following:

1. The current completion percentage of the image update
2. Whether the update was successful
3. OTA update was aborted by the OTA server
4. OTA update was aborted by the OTA client

- Command id
  0xF000-8008
- Parameter

2 octet	1 octet	1 octet
Device Address	Status	Progress Percent

Name	Type	Valid Range	Description
Device Address	Integer	0x0001 ~ 0xFFF7	OTA processing device address

Status	Integer	0x00 ~ 0xFF	0x00: device in OTA update progress, the progress in percentage show in “Progress Percent” field. 0x01: device update succeeded, with the “Progress Percent” field set to 0x64 (100%). 0x02: the OTA server has aborted the OTA update for the device. 0x03: the OTA update process has been aborted by the OTA client.
Progress Percent	Integer	0x00 ~ 0xFF	0x00 ~ 0x64: OTA progress percentage 0xFF: OTA process has been aborted Others: reserved

5.2.17. Device Query Image Info(0xF000-8009)

The user can use this command to retrieve the device's current OTA-related information, including the device address, manufacturer code, image type, and image version. When the user identifies that a firmware update is available for the device, they can initiate the OTA update process using the appropriate OTA commands for the target device.

- Command id
  0xF000-8009
- Parameter

2 octets	2 octets	2 octets	4 octets
Device Address	Manufacturer Code	Image Type	Image Version

Name	Type	Valid Range	Description
Device Address	Integer	0x0001 ~ 0xFFF7	device address for query image
Manufacturer Code	Integer	0x0000 ~ 0xFFFF	device manufacturer code
Image Type	Integer	0x0000 ~ 0xFFFF	device image type
Image Version	Integer	0x00000000 ~ 0xFFFFFFFF	device image version

5.2.18. OTA File Info Request(0xF000-000A)

Once the OTA image has been uploaded to the Zigbee gateway, the user can use this command to obtain information about the OTA image currently stored in the gateway and verify the integrity of the OTA image.

- Command id
  0xF000-000A
- Parameter
  None

5.2.19. OTA File Info response (0xF000-800A)

The Gateway Get OTA File Info response is in response to a Gateway Get OTA File Info command. Providing the OTA image information stored in the zigbee gateway.

- Command id
  0xF000-800A
- Parameter

1 octet	1 octet	2 octets	2 octets	4 octets	4 octets
Image Found	Server Ready	Manufacturer Code	Image Type	Image Size	Image Version

Name	Type	Valid Range	Description
Image Found	integer	0x00 ~ 0x01	0x00: image not found in zigbee gateway 0x01: image found in zigbee gateway
Server Ready	integer	0x00 ~ 0x01	0x00: image is not inserted to gateway 0x01: gateway is ready for ota process
Manufacturer Code	Integer	0x0000 ~ 0xFFFE	0x0000: not valid manufacturer code Others: manufacturer code
Image Type	Integer	0x0000 ~ 0xFFFE	0x0000: not valid image type Others: image type
Image Size	Integer	0x00000000 ~ 0x00074000	0x00000000: not valid image size Others: image size
Image Version	Integer	0x00000000 ~ 0xFFFFFFFF	0x00000000: not valid image version Others: image version

5.3. OTA Command Example

5.3.1. Insert/Remove the OTA File

After the OTA image has been uploaded to the Zigbee module, the user can issue the following command to insert the image. Once the image is inserted, the Zigbee module will broadcast an Image_Notify packet to the Zigbee network, announcing the availability of the OTA image to eligible devices. The hex command(0x0000-0048) will be like:
FF FC FC FF 07 48 00 00 00 00 00 00 B0
If the OTA server's candidate address has been configured—either as a specific address or as 0xFFFF—the target device should begin the OTA update process.

The user can send the following hex command(0x0000-0049) to abort the OTA update during the update process:
FF FC FC FF 07 49 00 00 00 00 00 00 AF

When this command is executed, the OTA image file will no longer be recognized as a valid image on the server side, and the ongoing OTA process will be terminated. The user may issue the insert command (0x0000–0048) to restart the OTA process.

5.3.2. Add/Remove the OTA Target

The user can use command 0x0000–004A to designate a specific device on the Zigbee network to perform an OTA update, or use command 0x0000–004B to remove the currently set target device address. Note that commands 0x0000–004A and 0x0000–004B are only used to control which device address is authorized to begin the OTA update (i.e., to allow the device to initiate the update process). If the device is already undergoing the OTA update procedure and needs to abort the current process, command 0x0000–0049 must be used to terminate the update.

The user can use command 0x0000–004C to query the current configuration. A return value of 0x0000 indicates that no device is currently allowed to initiate an OTA update. A value between 0x0001 and 0xFFF7 indicates that only the specified device address is permitted to begin the OTA update process. A value of 0xFFFF means that all eligible devices on the network are allowed to perform the update.

5.3.3. Starting The OTA Firmware Update Process

The following example helps users understand the sequence of commands involved in the OTA update process, from start to finish.

Assuming the target device address is 0xCBA9 and the OTA image has been uploaded to the Zigbee module, the first command can be:

1. Prior to initiating the update process, the OTA server will regularly receive Query_Next_Image_Request commands from devices requesting information about the next available OTA image
   FF FC FC FF 11 4E 80 00 00 00 00 00 A9 CB 7B 00 41 01 01 01 01 01 EB
2. Set up the OTA candidate address with command 0x0000–004A
   FF FC FC FF 09 4A 00 00 00 00 00 00 A9 CB 38
3. Insert the OTA file(the OTA image has been uploaded to the Zigbee module) and the OTA update process should be started
   FF FC FC FF 07 48 00 00 00 00 00 00 B0
4. During the update process, the device reports its status via command 0x0000–804D. For instance, it may report an update completion of 2%
   FF FC FC FF 0B 4D 80 00 00 00 00 00 A9 CB 00 02 B1
5. After the device completes the update, it may receive a command sent from the server.(The update succeeded and is 100% complete.)
   FF FC FC FF 0B 4D 80 00 00 00 00 00 A9 CB 01 64 4E

5.3.4. Aborting the OTA Update Process

During the OTA update process, the server has the ability to abort the ongoing update. The device update can be re-initiated afterward by sending the corresponding command.

1. During the update process, the device reports its status via command 0x0000–804D. For instance, it may report an update completion of 8%
   FF FC FC FF 0B 4D 80 00 00 00 00 00 A9 CB 00 08 AB
2. The user can use this command to abort the update.
   FF FC FC FF 07 49 00 00 00 00 00 00 AF
3. The user will receive a series of responses from the server, including:
   A) After the server terminates the update process, it will continue to receive update requests from the device—typically up to three times. Although

the OTA process has been stopped, the device will still attempt to initiate the update. In this case, the server will send a specific command to notify the user that the OTA process has been terminated and that no further image update service will be provided.
FF FC FC FF 0B 4D 80 00 00 00 00 00 A9 CB 02 FF B2

B) After the device's repeated attempts fail, it will formally send a request to terminate the update process. At this point, the server will issue the following command to notify the user that the OTA update process has been officially terminated.
FF FC FC FF 0B 4D 80 00 00 00 00 00 A9 CB 03 FF B1

4. After the update has been terminated, the user can still initiate the OTA update process again using the following command. Depending on the device's current state, it will either resume or restart the update process until completion.
FF FC FC FF 07 48 00 00 00 00 00 00 B0

6. Application Service Management

6.1. Device Information

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

- Command id
  0x0001-0000

- Parameter
  None

6.1.2. 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

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

- Command id
  0x0001-0001

- Parameter

None

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

- Command id

0x0001-8001

- Parameter

1 octet	variable
String Length	String value

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

- Command id

0x0001-0002

- Parameter

None

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

- Command id

0x0001-8002

- Parameter

1 octet	variable
String Length	String value

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

- Command id

0x0001-0003

- Parameter

None

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

- Command id
  0x0001-8003

- Parameter

1 octet	variable
String Length	String value

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

- Command id
  0x0001-0004

- Parameter
  None

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

- Command id
  0x0001-8004

- Parameter

1 octet	variable
String Length	String value

6.1.11. Default Response (0x0001-8800)

- Command id
  0x0001-8800

- Parameter

2 octets	1 octet	1 octet
Cluster identifier	Command identifier	Status

Cluster identifier: The current cluster ID used for the default response.
Command identifier: The ID of the command to be executed within the corresponding cluster.
Status: The execution status of the command. 0 indicates success; any other value indicates failure.

6.1.12. Read device attributes (0x0002-0000)

- Command id
  0x0002-0000

- Parameter

2 octets	2 octets
ClusterID	AttributeIdentifier

6.1.13. 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

6.1.14. 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

6.1.15. 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)

6.1.16. 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).

6.1.17. Configure reporting response (0x0002-8002)

- Command id
  0x0002-8002

- Parameter

2 octets	1 octets	1 octets	2 octets
Cluster id	status	Direction	Attribute ID

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

6.1.18. 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

6.1.19. Read device custom cluster attributes (0x0002-0003)

- Command id
  0x0002-0003

- Parameter

2 octets	2 octets	2 octets
ClusterID	AttributeIdentifier	Manufacture code

The command is used to read custom cluster attribute

6.1.20. Write device custom cluster attributes (0x0002-0004)

- Command id
  0x0002-0004

- Parameter

2 octets	2 octets	2 octets	1 octets	variable
Cluster ID	Attribute Identifier	Manufacture code	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

6.1.21. APS acknowledge indication (0x0002-8005)

This command is used to determine whether the related ZCL command has been sent to the target device. When the target device receives the ZCL command, it will return this acknowledgment packet to confirm successful receipt of the ZCL command.

- Command id
  0x0002-8005

- Parameter

1 octets
Status

Status: 0 indicates success; any other value indicates failure.

If this acknowledgment message is not received after sending the command, it can be assumed that the device did not successfully receive the command. The upper layer may resend the command based on the situation.

6.2. Device Identify

6.2.1. Identify (0x0004-0000)

- Command id
  0x0004-0000

- Parameter

1 octet	2 octets
DefRspFlg	Identify Time

6.2.2. Identify query (0x0004-0001)

- Command id
  0x0004-0001

- Parameter
  None

6.2.3. 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

6.2.4. Identify query response (0x0004-8001)

- Command id
  0x0004-8001

- Parameter

2 octet
Timeout

6.3. Group Management

6.3.1. Add group (0x0005-0000)

- Command id
  0x0005-0000

- Parameter

2 octet
Group ID

6.3.2. Add group response (0x0005-8000)

- Command id
  0x0005-8000

- Parameter

1 octet	2 octets
Status	Group ID

6.3.3. View group (0x0005-0001)

- Command id
  0x0005-0001

- Parameter

2 octet
Group ID

6.3.4. View group response (0x0005-8001)

- Command id
  0x0005-8001

- Parameter

1 octet	2 octets
Status	Group ID

6.3.5. Get group membership (0x0005-0002)

- Command id
  0x0005-0002

- Parameter

1 octet	variable

Group count	Group list

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

- Command id
  0x0005-8002

- Parameter

1 octet	1 octet	variable
Capacity	Group count	Group list

6.3.7. Remove group (0x0005-0003)

- Command id
  0x0005-0003

- Parameter

2 octet
Group ID

6.3.8. Remove group response (0x0005-8003)

- Command id
  0x0005-8003

- Parameter

1 octet	2 octets
Status	Group ID

6.3.9. Remove all groups (0x0005-0004)

- Command id
  0x0005-0004

- Parameter

1 octet
DefRspFlg

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

- Command id
  0x0005-0005

- Parameter

1 octet	2 octets
DefRspFlg	Group ID

6.4. Scene Management

6.4.1. 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

6.4.2. Add scene response (0x0006-8000)

- Command id
  0x0006-8000

- Parameter

1 octet	2 octets	1 octet
Status	Group ID	Scene ID

6.4.3. View scene (0x0006-0001)

- Command id
  0x0006-0001

- Parameter

2 octets	1 octet
Group ID	Scene ID

6.4.4. 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

6.4.5. Remove scene (0x0006-0002)

- Command id
  0x0006-0002

- Parameter

2 octets	1 octet
Group ID	Scene ID

6.4.6. Remove scene response (0x0006-8002)

- Command id
  0x0006-8002

- Parameter

1 octet	2 octets	1 octet
Status	Group ID	Scene ID

6.4.7. Remove all scene (0x0006-0003)

- Command id
  0x0006-0003

- Parameter

2 octets
Group ID

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

- Command id
  0x0006-8003

- Parameter

1 octet	2 octets
Status	Group ID

6.4.9. Store scene (0x0006-0004)

- Command id
  0x0006-0004

- Parameter

2 octets	1 octet
Group ID	Scene ID

6.4.10. Store scene response (0x0006-8004)

- Command id
  0x0006-8004

- Parameter

1 octet	2 octets	1 octet
Status	Group ID	Scene ID

6.4.11. 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

6.4.12. Get scene membership (0x0006-0006)

- Command id
  0x0006-0006

- Parameter

2 octets
Group ID

6.4.13. 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

6.4.14. 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

6.4.15. Add scene response (0x0006-8040)

- Command id
  0x0006-8040

- Parameter

1 octet	2 octets	1 octet
Status	Group ID	Scene ID

6.4.16. Enhanced view scene (0x0006-0041)

- Command id
  0x0006-0041

- Parameter

2 octets	1 octet
Group ID	Scene ID

6.4.17. 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

6.4.18. 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

6.5. On/Off Control

6.5.1. 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

6.5.2. 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

6.5.3. 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

6.5.4. 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

6.5.5. 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

6.5.6. 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

6.6. Level Control

6.6.1. 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.

6.6.2. 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.

6.6.3. 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.

6.6.4. 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.

6.6.5. 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.

6.6.6. 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.

6.6.7. 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.

6.7. Alarm

6.7.1. Alarm Command (0x000A-8000)

The alarm command signals an alarm situation on the sending device.

- Command id
  0x000A-8000

- Parameter

1 octet	2 octet
Alarm code	Cluster identifier

7. Lighting Application Service

7.1. Color Control

7.1.1. 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.

7.1.2. 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.

7.1.3. 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.

7.1.4. 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.

7.1.5. 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.

7.1.6. 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.

7.1.7. 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.

7.1.8. 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.

7.1.9. 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.

7.1.10. 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.

7.1.11. 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. Stop Move Step (0x0021-0047)

- Command id
  0x0021-0047

- Parameter

1 octet	1 octet	1 octet
DefRspFlg	OptionsMask	OptionsOverride

The OptionsMask & OptionsOverride fields set to “0” as the default value to interpret missing fields from legacy device.
On receipt of this command, any Move to, Move or Step command currently in process SHALL be terminated. The values of the CurrentHue, EnhancedCurrentHue, and CurrentSaturation attributes SHALL be left at their present value upon receipt of the Stop Move Step command, and the RemainingTime attribute SHALL be set to zero.

7.1.12. 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.

7.1.13. 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.

8. Sensor Application Cluster Information

8.1. 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

8.2. 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

8.3. 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

8.4. 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

8.5. 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

8.6. 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.

9. Closures

9.1. 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

9.1.1. 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

9.1.2. 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

9.1.3. 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

9.1.4. 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

9.1.5. 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

9.1.6. 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

9.1.7. 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

9.1.8. 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

9.1.9. Get PIN Code (0x0024-0006)

Set a PIN into the lock.

- Command id
  0x0024-0006
- Parameter

2 octets
User ID

9.1.10. 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

9.1.11. 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

9.1.12. 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

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

Delete all PIN codes from the lock.

- Command id
  0x0024-0008
- Parameter
  None.

9.1.14. 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

9.1.15. 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.

10. Security and Safety

10.1. 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	-	-
0x8000-0xfffe	Manufacturer specific types	-	-
0xffff	Invalid Zone Type	-	-

10.1.1. 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

11. Custom cluster

11.1. Custom command (0xFC00-0000)

The command is used to generate manufacture specific command. Note that gateway must support corresponding cluster to make this command works properly

- Command id
  0xFC00-0000

- Parameter

2 octets	2 octets	1 octet	1 octet	Variable
Cluster Id	Manufacture code	Command ID	Payload length	Payload

11.2. Custom command response (0xFC00-8000)

The command is generated when gateway received manufacture specific command from device. Note that gateway must support corresponding cluster to make this command works properly

- Command id
  0xFC00-8000

- Parameter

2 octets	2 octets	1 octet	1 octet	Variable
Cluster Id	Manufacture code	Command ID	Payload length	Payload

12. 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
1.2.2	1. Add Set/remove/remove all install code command 2. Add custom command request	Justin Randy	2024/09/23
1.2.3	1. Add Set standard time command	Randy	2024/10/07
1.2.4	1. Add OTA server command	Justin	2024/10/15
1.2.5	1. Add alarm command	Randy	2024/11/11
1.2.6	1.Add read/write custom cluster attribute command	Randy	2024/12/10
1.2.7	1. Add channel energy scan(4.3.16) command	Justin	2025/02/13

	2. Add get network address list related command(4.3.18 ~ 4.3.21) 3. Add Device Leave Indication	Randy	
1.2.8	1. Add enhanced mode for color control cluster	Justin	2025/02/14
1.2.9	1. Add OTA server commands (4.3.41 ~ 4.3.48) 2. Annex A: OTA Command Example	Justin	2025/05/08
1.2.10	1. add cluster ID information in Default Response(5.1.11) command 2. add APS acknowledge indication(5.1.21) command	Justin	2025/05/15
2.0	1. Re-define the OTA command ID(in section 5) 2. add “server ready” indication in OTA File Info response(5.2.19)	Randy	2025/06/06