**Telink Semiconductor**

**Gateway Host Interface**

**V0.1Sep26, 2013**

# Introduction

This document defines the product requirements for Telink BLE Link Layer Baseband. The PRD includes all significant requirements including but not limited to functionality, performance, design constraints, and external interfaces.

## Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as following:

1. MUST This word, or the terms "REQUIRED" or "SHALL", mean that the definition is an absolute requirement of the specification.
2. MUST NOT This phrase, or the phrase "SHALL NOT", mean that the definition is an absolute prohibition of the specification.
3. SHOULD This word, or the adjective "RECOMMENDED", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
4. SHOULD NOT This phrase, or the phrase "NOT RECOMMENDED" mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
5. MAY This word, or the adjective "OPTIONAL", mean that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option MUST be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides.)

Imperatives of the type defined in this memo must be used with care and sparingly. In particular, they MUST only be used where it is actually required for interoperation or to limit behavior which has potential for causing harm (e.g., limiting retransmissions). For example, they must not be used to try to impose a particular method on implementers where the method is not required for interoperability.

## Definitions

This subsection provides the definitions of all terms, acronyms, and abbreviations required to properly interpret the PRD.

## References

[1] ZigBee Cluster Library Specification

[2] ZigBee Light Link Profile 1.0 Specification

[3] ZigBee Lighting Gateway SW: <http://processors.wiki.ti.com/index.php/ZigBee_Lighting_Gateway_SW#MT_APP_HEADER>

[4] ZStack-Lighting-1.0.1 Host Interface C Example: <http://processors.wiki.ti.com/index.php/ZStack-Lighting-1.0.1_Host_Interface_C_Examples>

## Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Date | Author | Comments |
| 0.1 | Sep/26/13 | Kanjie | First draft. |
| 0.2 |  |  |  |
| 0.3 |  |  |  |

# Interface command format

## General Format

### Control pipe command

|  |  |  |
| --- | --- | --- |
| Field | Bytes | Description |
| Len | 1 | Total length except itself |
| Cmd0 | 1 | Always be 0x49 |
| Cmd1 | 1 | 0x00 when host to gateway; 0x80 and 0x81 when gateway to host |
| Endpoint | 1 | 0x0B in current application |
| NwkAddr | 2 | The short addr parameter for some command |
| Reserve | 1 | All reserved bytes should be set to 0x00 |
| clusterID | 2 | should be set to 0xFFFF |
| dataLen | 1 | This should be (3 + the number of payload field) |
| reserve | 3 | All reserved bytes should be set to 0x00 |
| CmdID | 1 | @ref zll\_ctrl\_command\_id |
| reserve | 2 | All reserved bytes should be set to 0x00 |
| payload | n | Payload to different command |

### Data pipe command

Data pipe command including all ZCL command, such as ON/OFF, Level Contrl.

|  |  |  |
| --- | --- | --- |
| Field | Bytes | Description |
| Len | 1 | Total length except itself |
| Cmd0 | 1 | Always be 0x49 |
| Cmd1 | 1 | Always be 0x00 |
| endpoint | 1 | 0x0B in current application |
| Dstnwkaddr | 2 | Network Address (or groupId depending on address mode) of the device to send the ZCL message to |
| Dst endpoint | 1 | 0x0B in current application |
| ClusterID | 2 | Cluster ID of the ZCL Command to be sent |
| dataLen | 1 | This should be (3 + the number of payload field) |
| addrMode | 1 | The address mode of the ZCL message. 0x02 indicating network address. |
| zclFrameCtrl | 1 | ZCL Frame Control Field. 0x01 in most case. |
| zclTransSeqNo | 1 | The transaction ID should be incremented for each ZCL message |
| cmdID | 1 | Command ID of the ZCL Command to be sent. According to ZCL spec. |
| payload | n | Payload of the ZCL Command to be sent |

## From host to gateway

### Command On, Data Pipe

0D 49 00 0B 01 00 0B 06 00 03 02 01 00 01

|  |  |  |
| --- | --- | --- |
| Field | Bytes | Content |
| Len | 1 | 0x0D |
| Cmd0 | 1 | 0x49 |
| Cmd1 | 1 | 0x00 |
| endpoint | 1 | 0x0B |
| Dstnwkaddr | 2 | 0x0001 could be different |
| Dst endpoint | 1 | 0x0B |
| ClusterID | 2 | 0x0006 |
| dataLen | 1 | 0x03 |
| addrMode | 1 | 0x02 (network address mode) |
| zclFrameCtrl | 1 | 0x01 |
| zclTransSeqNo | 1 | 0x00 (incremented every packet) |
| cmdID | 1 | 0x01 |

### Command Off, Data Pipe

0D 49 00 0B 01 00 0B 06 00 03 02 01 00 00

|  |  |  |
| --- | --- | --- |
| Field | Bytes | Content |
| Len | 1 | 0x0D |
| Cmd0 | 1 | 0x49 |
| Cmd1 | 1 | 0x00 |
| endpoint | 1 | 0x0B |
| Dstnwkaddr | 2 | 0x0001 could be different |
| Dst endpoint | 1 | 0x0B |
| ClusterID | 2 | 0x0006 |
| dataLen | 1 | 0x03 |
| addrMode | 1 | 0x02 (network address mode) |
| zclFrameCtrl | 1 | 0x01 |
| zclTransSeqNo | 1 | 0x00 (incremented every packet) |
| cmdID | 1 | 0x00 |

### Command Toggle, Data Pipe

0D 49 00 0B 01 00 0B 06 00 03 02 01 00 02

|  |  |  |
| --- | --- | --- |
| Field | Bytes | Content |
| Len | 1 | 0x0D |
| Cmd0 | 1 | 0x49 |
| Cmd1 | 1 | 0x00 |
| endpoint | 1 | 0x0B |
| Dstnwkaddr | 2 | 0x0001 could be different |
| Dst endpoint | 1 | 0x0B |
| ClusterID | 2 | 0x0006 |
| dataLen | 1 | 0x03 |
| addrMode | 1 | 0x02 (network address mode) |
| zclFrameCtrl | 1 | 0x01 |
| zclTransSeqNo | 1 | 0x00 (incremented every packet) |
| cmdID | 1 | 0x02 |

### Level Up with Step, Data Pipe

11 49 00 0B 01 00 0B 08 00 07 02 01 00 06 00 19 0A 00

|  |  |  |  |
| --- | --- | --- | --- |
| Field | | Bytes | Content |
| Len | 1 | | 0x11 |
| Cmd0 | 1 | | 0x49 |
| Cmd1 | 1 | | 0x00 |
| endpoint | 1 | | 0x0B |
| Dstnwkaddr | 2 | | 0x0001 could be different |
| Dst endpoint | 1 | | 0x0B |
| ClusterID | 2 | | 0x0008 |
| dataLen | 1 | | 0x07 (3 +4) |
| addrMode | 1 | | 0x02 (network address mode) |
| zclFrameCtrl | 1 | | 0x01 |
| zclTransSeqNo | 1 | | 0x00 (incremented every packet) |
| cmdID | 1 | | 0x06 |
| Payload[0]: sub cmd | 1 | | 0x00 |
| Step size | 1 | | 0x19 |
| duration | 2 | | 0x000A |

### Level Down with Step, Data Pipe

11 49 00 0B 01 00 0B 08 00 07 02 01 00 06 00 19 0A 00

|  |  |  |  |
| --- | --- | --- | --- |
| Field | | Bytes | Content |
| Len | 1 | | 0x11 |
| Cmd0 | 1 | | 0x49 |
| Cmd1 | 1 | | 0x00 |
| endpoint | 1 | | 0x0B |
| Dstnwkaddr | 2 | | 0x0001 could be different |
| Dst endpoint | 1 | | 0x0B |
| ClusterID | 2 | | 0x0008 |
| dataLen | 1 | | 0x07 (3 +4) |
| addrMode | 1 | | 0x02 (network address mode) |
| zclFrameCtrl | 1 | | 0x01 |
| zclTransSeqNo | 1 | | 0x00 (incremented every packet) |
| cmdID | 1 | | 0x06 |
| Payload[0]: sub cmd | 1 | | 0x01 |
| Step size | 1 | | 0x19 |
| duration | 2 | | 0x000A |

### Move to Level with ONOFF, Data Pipe

10 49 00 0B 01 00 0B 08 00 06 02 01 00 04 E0 0A 00

|  |  |  |  |
| --- | --- | --- | --- |
| Field | | Bytes | Content |
| Len | 1 | | 0x10 |
| Cmd0 | 1 | | 0x49 |
| Cmd1 | 1 | | 0x00 |
| endpoint | 1 | | 0x0B |
| Dstnwkaddr | 2 | | 0x0001 could be different |
| Dst endpoint | 1 | | 0x0B |
| ClusterID | 2 | | 0x0008 |
| dataLen | 1 | | 0x06(3 +3) |
| addrMode | 1 | | 0x02 (network address mode) |
| zclFrameCtrl | 1 | | 0x01 |
| zclTransSeqNo | 1 | | 0x00 (incremented every packet) |
| cmdID | 1 | | 0x04 |
| Payload[0]: level | 1 | | 0xe0 (could be 0x00~0xff) |
| duration | 2 | | 0x000A |

### Get Nodes List, Control Pipe

0F 49 00 0B 00 00 00 FFFF 03 00 00 00 08 00 00

|  |  |  |
| --- | --- | --- |
| Field | Bytes | Content |
| Len | 1 | 0xF |
| Cmd0 | 1 | 0x49 |
| Cmd1 | 1 | 0x00 |
| Endpoint | 1 | 0x0B |
| NwkAddr | 2 | Not used here |
| Reserve | 1 | 0x00 |
| clusterID | 2 | 0xFFFF |
| dataLen | 1 | 0x03 (3) |
| reserve | 3 | 0x000000 |
| CmdID | 1 | 0x08 |
| reserve | 2 | 0x0000 |

### Reset Flash, Data Pipe

0D 49 00 0B 01 00 0B 06 00 03 02 01 00 04

|  |  |  |
| --- | --- | --- |
| Field | Bytes | Content |
| Len | 1 | 0x0D |
| Cmd0 | 1 | 0x49 |
| Cmd1 | 1 | 0x00 |
| endpoint | 1 | 0x0B |
| Dstnwkaddr | 2 | 0x0000Always send to Coorinator |
| Dst endpoint | 1 | 0x0B |
| ClusterID | 2 | 0xffff |
| dataLen | 1 | 0x03 |
| addrMode | 1 | 0x02 (network address mode) |
| zclFrameCtrl | 1 | 0x01 |
| zclTransSeqNo | 1 | 0x00 (incremented every packet) |
| cmdID | 1 | 0x04 |

### End Device Bind, Control Pipe

0F 49 00 0B 00 00 00 FFFF 03 00 00 00 09 00 00

|  |  |  |
| --- | --- | --- |
| Field | Bytes | Content |
| Len | 1 | 0xF |
| Cmd0 | 1 | 0x49 |
| Cmd1 | 1 | 0x00 |
| Endpoint | 1 | 0x0B |
| NwkAddr | 2 | Not used here |
| Reserve | 1 | 0x00 |
| clusterID | 2 | 0xFFFF |
| dataLen | 1 | 0x03 (3) |
| reserve | 3 | 0x000000 |
| CmdID | 1 | 0x09 |
| reserve | 2 | 0x0000 |

### Leave device, Control Pipe

0F 49 00 0B \*\* \*\* 00 FFFF 03 00 00 00 0D 00 00

|  |  |  |
| --- | --- | --- |
| Field | Bytes | Content |
| Len | 1 | 0xF |
| Cmd0 | 1 | 0x49 |
| Cmd1 | 1 | 0x00 |
| Endpoint | 1 | 0x0B |
| NwkAddr | 2 | The device which need to leave |
| Reserve | 1 | 0x00 |
| clusterID | 2 | 0xFFFF |
| dataLen | 1 | 0x03 (3) |
| reserve | 3 | 0x000000 |
| CmdID | 1 | 0x0D |
| reserve | 2 | 0x0000 |

### Get neighbor information, Control Pipe

0F 49 00 0B \*\* \*\* 00 FFFF 03 00 00 00 0F 00 00

|  |  |  |
| --- | --- | --- |
| Field | Bytes | Content |
| Len | 1 | 0xF |
| Cmd0 | 1 | 0x49 |
| Cmd1 | 1 | 0x00 |
| Endpoint | 1 | 0x0B |
| NwkAddr | 2 | The device which will report its neighbor info |
| Reserve | 1 | 0x00 |
| clusterID | 2 | 0xFFFF |
| dataLen | 1 | 0x03 (3) |
| reserve | 3 | 0x000000 |
| CmdID | 1 | 0x0F |
| reserve | 2 | 0x0000 |

## From Gateway to Host

### New Light Join, Control Pipe

1A 49 81 00 00 00 00 00 00 0B 00 00 00 07 00 00 01 00 0E 70 5A 01 00 46 12 00 8E

|  |  |  |
| --- | --- | --- |
| Field | Bytes | Content |
| Len | 1 | 0x1A |
| Cmd0 | 1 | 0x49 |
| Cmd1 | 1 | 0x81 |
| Endpoint | 1 | 0x00 |
| Reserve | 3 | 0x000000 |
| clusterID | 2 | 0xffff |
| dataLen | 1 | 0x0E (11+3) |
| reserve | 3 | 0x000000 |
| CmdID | 1 | 0x07 |
| reserve | 2 | 0x0000 |
| Payload[0]: nwkaddr | 2 | 0x0001 |
| Ext addr | 8 | 0E 70 5A 01 00 46 12 00 |
| capability | 1 | 0x8E |

### ZCL command response, Control Pipe

0F 49 80 0B 01 00 0B 06 00 05 02 18 00 0B 02 00

|  |  |  |  |
| --- | --- | --- | --- |
| Field | | Bytes | Content |
| Len | 1 | | 0x0F |
| Cmd0 | 1 | | 0x49 |
| Cmd1 | 1 | | 0x80 |
| endpoint | 1 | | 0x0B |
| Dstnwkaddr | 2 | | 0x0001 could be different |
| Dst endpoint | 1 | | 0x0B |
| ClusterID | 2 | | 0x0006 could be different |
| dataLen | 1 | | 0x05 |
| addrMode | 1 | | 0x02 (network address mode) |
| zclFrameCtrl | 1 | | 0x18 |
| zclTransSeqNo | 1 | | 0x00 (indicate the transSeqNo in previous ZCL command) |
| cmdID | 1 | | 0x0B (default response) |
| Payload[0]: sub cmd | 1 | | 0x02 |
| status | 1 | | 0x00 (not 0x00 means error code) |