INSTEON

INSTEON Developer Notes
LED Bulb (2672-xxx)

Table of Contents

Revision History

Release Date	Author	Description
09/24/2013	jtalmich	V0.1 for LED Bulb
09/25/2013	canchia	V0.2 for LED Bulb – format changes
10/04/2013	jtalmich	V0.3 for LED Bulb – format changes
05/07/2014	jtalmich	V0.4 for LED Bulb – update/add command(s)

Device Description

Details

Device Name	LED Bulb
Product SKU	2672-XXX
Product Website	http://www.smarthome.com/2672-222/INSTEON-LED-Bulb/p.aspx
Category	0x01 – Dimmable Lighting Control
Subcategory	0x3B (240V – 869.85 MHz RF Frequency – EUR – Edison) 0x3C (240V - 921 MHz RF Frequency – AUS – Edison) 0x49 (PAR38 – 915 MHz RF Frequency – USA – Edison) 0x4A (PAR38 – 869.85 MHz RF Frequency – EUR – Edison) 0x4B (PAR38 – 921 MHz RF Frequency – AUS – Edison) 0x4C (240V – 869.85 MHz RF Frequency – EUR – Bayonet) 0x4D (240V – 921 MHz RF Frequency – Australia – Edison) 0x4E (PAR38 – 869.85 MHz RF Frequency – EUR – Bayonet) 0x4F (PAR38 – 921 MHz RF Frequency – AUS – Bayonet)
Tested Firmware Version	C7
Supports SD Messaging	YES
Supports ED Messaging	YES
I2CS enabled (CS)	YES

Additional Details

The INSTEON LED Bulb does not contain a SET Button, status LED, or Beeper. On power-up, the INSTEON LED Bulb will go into Responder-only Linking Mode for 5 seconds. To link to the INSTEON LED Bulb, place the controller, such as the PLM, into Linking Mode first, and then power-up the INSTEON LED Bulb. The Ramp Rate and relative On Level of the INSTEON LED Bulb are different from other INSTEON dimming devices. See the Appendix for differences.

All direct commands will be ignored if the sender's ID is not in the I2CS device's database with the exceptions below. The Door Sensor will reply with a NAK and 0xFF in cmd2 to indicate that the ID is not in the database.

Example Standard Length Message

A Standard Length Message (SD) is comprised of exactly nine (9) bytes.

Byte(s)	Description	Example
1-3	Transmitting INSTEON Device ID	AA BB CC
4-6	Receiving INSTEON Device ID (Target Device)	11 22 33
7	Flag Byte (Message Type)	0F
8	Command 1	11
9	Command 2	FF

Standard Message Formatted	AA BB CC 11 22 33 0F 11 FF

The above example will send an ON(11) at Full(FF) command to device 11 22 33.*

*For a detailed explanation of INSTEON Messaging, please see the INSTEON Manual

Example Extended Length Message

An Extended Length Message (ED) is comprised of exactly nine (23) bytes.

Byte(s)	Description	Example
1-3	Transmitting INSTEON Device ID	AA BB CC
4-6	Receiving INSTEON Device ID (Target Device)	11 22 33
7	Flag Byte (Message Type)	1F
8	Command 1	20
9	Command 2	01
10-22	Data1 – Data13	00 00 00 00 00 00 00 00 00 00 00 00 00
23	Data14 (Checksum)	DF

Extended Message Formatted	AA BB CC 11 22 33 1F 20 01 00 00 00 00 00 00 00 00 00 00 00 00 00 DF

The above example will send an Set Operating Flags (20) of Programming Lock Off(01) command to device 11 22 33.*

*For a detailed explanation of INSTEON Messaging, please see the INSTEON Manual

Messages Sent From – LED Bulb

When an INSTEON device is active to trigger a group message the messages are sent in the following order *depending on flag options for some devices

Message Sent (Type)	Example
Group Broadcast Message on Activation	AA BB CC 00 00 01 CF 11 01
Direct Message for CleanUp	AA BB CC 11 22 33 40 11 01
Group Broadcast Message Success Report	AA BB CC 11 01 01 CF 06 00

All INSTEON Devices will send a group message for a particular activation. For Multi Group devices, the Group number will change depending on the group that was activated. The CleanUp messages and Success Reports will be the same with exception to the Group Number.

Assign to ALL-Link Group

This command is sent on power up. Only Responder Linking is supported

Command Name	Assign to ALL-Link Group
Message Length	Standard Message (SD)
Message Type	Broadcast
To Address (Hi Byte)	0x01
To Address (Mid Byte)	Device Subcategory
To Address (Low Byte)	Firmware Revision
Command 1	0x01
Command 2	Hardware Revision

Command Example:

Assign to ALL-Link Group	**AA BB CC 01 3B C7 8F 01 00**

The above example is the command an LED Bulb sends when it goes into Linking Mode on power up. The To Address contains the Device Category (0x01), Device Subcategory (0x3B), and Firmware Revision (0xC7). Command 2 conatins the Hardware Revision (0x00).

Messages Sent To – LED Bulb

Ping

This command checks that the device is able to respond over INSTEON.

Command Name	Ping
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x0F
Command 2	Ignored Value

Command Name	Ping Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x0F
Command 2	Same as what was received in Command 2

Command Example:

Ping **Ping Response**	**AA BB CC 11 22 33 0F 0F 00** **11 22 33 AA BB CC 2B 0F 00**

The above example is the communication that goes on between a Controller and the LED Bulb when it is sent a Ping command. The device 11 22 33 is sent a Ping Command (0x0F). The device 11 22 33 then responds back to device AA BB CC with a Ping Response of the exact same thing it received in Command 1 and Command 2.

Docklight Example:

```
9/11/2013 16:11:22.616 [TX] - 02 62 29 70 02 0F 0F 00
9/11/2013 16:11:22.636 [RX] - 02 62 29 70 02 0F 0F 00 06  INSTEON STD TX
                              02 50 29 70 02 1A 77 7B 2B 0F 00  INSTEON STD RX Ping Response
```

ID Request

This command asks for the device's Device category, Device Subcategory, Firmware Revision, and Hardware Revision. It is the same info the device sends when it goes into Linking Mode.

Command Name	ID Request
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x10
Command 2	Ignored Value

Command Name	ID Request Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x10
Command 2	Same as what was received in Command 2

Command Name	ID Request Data
Message Length	Standard Message (SD)
Message Type	Broadcast
Transmitting Device ID	LED Bulb
To Address (Hi Byte)	Device Category
To Address (Mid Byte)	Device Subcategory
To Address (Low Byte)	Firmware Revision
Flags Byte	Message Type
Command 1	0x01
Command 2	Hardware Revision

Command Example:

ID Request **ID Request Response** **ID Request Data**	**AA BB CC 11 22 33 0F 10 00** **11 22 33 AA BB CC 2B 10 00** **11 22 33 01 3B C7 8B 01 00**

The above example is the communication that goes on between a Controller and the LED Bulb when it is sent an ID Request command. The device 11 22 33 is sent an ID Request Command (0x10). The device 11 22 33 then responds back to device AA BB CC with a ID Request Response of the exact same thing it received in Command 1 and Command 2. The device 11 22 33 then responds back with the ID Request Data of Device category (0x01), Device subcategory (0x3B), Firmware Revision (0xC7), and the Hardware Revision (0x00). Essentially the devices sends out the exact same thing it sends out when it goes into Linking Mode without going into Linking Mode.

Docklight Example:

```
9/11/2013 16:47:29.022 [TX] - 02 62 29 70 02 0F 10 00
9/11/2013 16:47:29.045 [RX] - 02 62 29 70 02 0F 10 00 06  INSTEON STD TX
                              02 50 29 70 02 1A 77 7B 2B 10 00  INSTEON STD RX ID Request
                              02 50 29 70 02 01 3B C7 8B 01 00  INSTEON STD RX
```

Status Request

This command asks the device for its Database Delta and Current On-Level

Command Name	Status Request
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x19
Command 2	0x00

Command Name	Status Request Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	Database Delta
Command 2	LED Bulb On-Level

Command Example:

Status Request **Status Request Response**	**AA BB CC 11 22 33 0F 19 00** **11 22 33 AA BB CC 2B 01 FF**

The above example is the communication that goes on between a Controller and the LED Bulb when it is sent a Status Request command. The device 11 22 33 is sent a Status Request Command (0x19). The device 11 22 33 then responds back to device AA BB CC with its Database Delta(0x01) and its On-Level(0xFF = Full On)

Note: See below for definition of Database Delta

Docklight Example:

```
9/12/2013 10:32:45.059 [TX] - 02 62 29 70 02 0F 19 00
9/12/2013 10:32:45.082 [RX] - 02 62 29 70 02 0F 19 00 06  INSTEON STD TX Status Request
                              02 50 29 70 02 1A 77 7B 2B 01 FF  INSTEON STD RX
```

Light ON

This command tells the device to turn its load ON to the specified On-Level at its Local Ramp Rate (Ramp Rate only used for dimmable devices).

Command Name	Light ON
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x11
Command 2	0x00 -> 0xFF (On Level)

Command Name	Light ON Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x11
Command 2	Same as what was received in Command 2

Command Example:

Light ON **Light ON Response**	**AA BB CC 11 22 33 0F 11 FF** **11 22 33 AA BB CC 2B 11 FF**

The above example device 11 22 33 is sent a command that tells it to turn its load ON (0x11) to full bright (0xFF).

Docklight Example:

```
9/12/2013 10:45:44.232 [TX] - 02 62 29 70 02 0F 11 7F
9/12/2013 10:45:44.257 [RX] - 02 62 29 70 02 0F 11 7F 06  INSTEON STD TX
                              02 50 29 70 02 1A 77 7B 2B 11 7F  INSTEON STD RX Light ON (50%)
```

Light ON Fast

This command tells the device to turn its load to Full ON at its fastest ramp rate.

Command Name	Light ON Fast
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x12
Command 2	Ignored Value

Command Name	Light ON Fast Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x12
Command 2	Same as what was received in Command 2

Command Example:

Light ON Fast	**AA BB CC 11 22 33 0F 12 00**
Light ON Fast Response	**11 22 33 AA BB CC 2B 12 00**

The above example device 11 22 33 is sent a command that tells it to turn its load to Full On at its fastest Ramp Rate (0x12).

Docklight Example:

```
9/12/2013 10:45:54.264 [TX] - 02 62 29 70 02 0F 12 FF
9/12/2013 10:45:54.287 [RX] - 02 62 29 70 02 0F 12 FF 06  INSTEON STD TX
                              02 50 29 70 02 1A 77 7B 2B 12 FF  INSTEON STD RX Light ON Fast
                     (Full On)
```

Light OFF

This command tells the device to turn its load OFF at its Local Ramp Rate (Ramp Rate only used for dimmable devices).

Command Name	Light OFF
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x0F
Command 2	Ignored Value

Command Name	Light OFF Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x13
Command 2	Same as what was received in Command 2

Command Example:

Light OFF **Light OFF Response**	**AA BB CC 11 22 33 0F 13 00** **11 22 33 AA BB CC 2B 13 00**

The above example device 11 22 33 is sent a command that tells it to turn its load OFF (0x13).

Docklight Example:

```
9/12/2013 10:45:49.336 [TX] - 02 62 29 70 02 0F 13 00
9/12/2013 10:45:49.360 [RX] - 02 62 29 70 02 0F 13 00 06  INSTEON STD TX
                              02 50 29 70 02 1A 77 7B 2B 13 00  INSTEON STD RX Light OFF
```

Light OFF Fast

This command tells the device to turn its load to Full OFF at its fastest ramp rate.

Command Name	Light OFF Fast
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x14
Command 2	Ignored Value

Command Name	Light OFF Fast Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x14
Command 2	Same as what was received in Command 2

Command Example:

Light OFF Fast **Light OFF Fast Response**	**AA BB CC 11 22 33 0F 14 00** **11 22 33 AA BB CC 2B 14 00**

The above example device 11 22 33 is sent a command that tells it to turn its load to OFF at its fastest Ramp Rate (0x14).

Docklight Example:

```
9/12/2013 10:46:00.392 [TX] - 02 62 29 70 02 0F 14 00
9/12/2013 10:46:00.414 [RX] - 02 62 29 70 02 0F 14 00 06  INSTEON STD TX
                              02 50 29 70 02 1A 77 7B 2B 14 00  INSTEON STD RX Light OFF Fast
```

Read Operating Flags 1

This command asks the device for its Operating Flags 1 Byte.

Command Name	Read Operating Flags 1
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x1F
Command 2	0x00

Command Name	Read Operating Flags 1 Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x1F
Command 2	Operating Flags 1 Byte: bit 0 = Programming Lock On/**Off** bit 1 = N/A bit 2 = Power Up to **On**/Last State bit 3 = N/A bit 4 = N/A bit 5 = N/A bit 6 = N/A bit 7 = N/A (0x00 is the default Config Byte. Default settings are in Bold.)

Command Example:

Read Operating Flags 1 **Read Operating Flags 1 Response**	`AA BB CC 11 22 33 0F 1F 00` `11 22 33 AA BB CC 2B 1F 00`

The above example device 11 22 33 is sent a command that asks it for its Operating Flags 1(Command 1 = 0x1F, Command 2 = 0x00). Device 11 22 33 then responds back with its Operating Flags 1 Byte (0x00). This means that device 11 22 33 has Programming Lock Off, and Powers Up to ON always.

Docklight Example:

```
9/13/2013 10:16:04.198 [TX] - 02 62 29 70 02 0F 1F 00
9/13/2013 10:16:04.214 [RX] - 02 62 29 70 02 0F 1F 00 06  INSTEON STD TX
                      02 50 29 70 02 1A 77 7B 2B 1F 00  INSTEON STD RX Read Operating Flags 1
```

Database Delta

This command asks the device for its current Database Delta Number. The Database Delta increments with any database write. The Database Delta is cleared on power cycle.

Command Name	Database Delta
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x1F
Command 2	0x01

Command Name	Database Delta Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x1F
Command 2	Database Delta

Command Example:

Database Delta **Database Delta Response**	**AA BB CC 11 22 33 0F 1F 01** **11 22 33 AA BB CC 2B 1F 02**

The above example device 11 22 33 is sent a command that asks it for its Database Delta (Command 1 = 0x1F, Command 2 = 0x01). Device 11 22 33 then responds back with its Database Delta (0x02). This means that device 11 22 33 has had two Database writes since its last power cycle.

Docklight Example:

```
9/13/2013 10:21:54.135 [TX] - 02 62 29 70 02 0F 1F 01
9/13/2013 10:21:54.161 [RX] - 02 62 29 70 02 0F 1F 01 06  INSTEON STD TX
                              02 50 29 70 02 1A 77 7B 2B 1F 01  INSTEON STD RX Database Delta
```

CRC Error Count

This command asks the device for its current CRC Error Count. The CRC Error Count increments with every CRC Error it hears. The CRC Error Count resets on power cycle and the count will wrap back to zero after reaching 255(0xFF) errors.

Command Name	CRC Error Count
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x1F
Command 2	0x02

Command Name	CRC Error Count Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x1F
Command 2	CRC Error Count

Command Example:

CRC Error Count **CRC Error Count Response**	**AA BB CC 11 22 33 0F 1F 02** **11 22 33 AA BB CC 2B 1F 01**

The above example device 11 22 33 is sent a command that asks it for its CRC Error Count (Command 1 = 0x1F, Command 2 = 0x02). Device 11 22 33 then responds back with its CRC Error Count (0x01). This means that device 11 22 33 has seen two CRC Errors since its last power cycle.

Docklight Example:

```
9/13/2013 10:29:47.073 [TX] - 02 62 29 70 02 0F 1F 02
9/13/2013 10:29:47.087 [RX] - 02 62 29 70 02 0F 1F 02 06  INSTEON STD TX
                              02 50 29 70 02 1A 77 7B 2B 1F 07  INSTEON STD RX

9/13/2013 10:30:17.568 [TX] - 02 62 29 70 02 0F 1F 02

9/13/2013 10:30:17.590 [RX] - 02 62 29 70 02 0F 1F 02 06  INSTEON STD TX

                              02 50 29 70 02 1A 77 7B 2B 1F 00  INSTEON STD RX
```

Signal/Noise Failure Count

This command asks the device for its current Signal/Noise Failure Count. The Signal/Noise Failure Count increments with every Signal/Noise Error it hears. The Signal/Noise Failure Count resets on power cycle and the count will wrap back to zero after reaching 255(0xFF) errors.

Command Name	Signal/Noise Failure Count
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x1F
Command 2	0x03

Command Name	Signal/Noise Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x1F
Command 2	Signal/Noise Failure Count

Command Example:

Signal/Noise Failure Count **Signal/Noise Failure Count Response**	**AA BB CC 11 22 33 0F 1F 03** **11 22 33 AA BB CC 2B 1F 4F**

The above example device 11 22 33 is sent a command that asks it for its Signal/Noise Failure Count (Command 1 = 0x1F, Command 2 = 0x03). Device 11 22 33 then responds back with its Signal/Noise Failure Count (0x4F). This means that device 11 22 33 has seen 79 Signal/Noise Errors since its last power cycle.

Docklight Example:

```
9/13/2013 10:36:12.636 [TX] - 02 62 29 70 02 0F 1F 03
9/13/2013 10:36:12.659 [RX] - 02 62 29 70 02 0F 1F 03 06  INSTEON STD TX
                              02 50 29 70 02 1A 77 7B 2B 1F F8  INSTEON STD RX

9/13/2013 10:36:17.340 [TX] - 02 62 29 70 02 0F 1F 03

9/13/2013 10:36:17.364 [RX] - 02 62 29 70 02 0F 1F 03 06  INSTEON STD TX

                              02 50 29 70 02 1A 77 7B 2B 1F 46  INSTEON STD RX
```

Instant ON/OFF

This command tells the device to turn its load to the specified On Level at its fastest ramp rate.

Command Name	Instant ON/OFF
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x21
Command 2	0x00 -> 0xFF (On-Level)

Command Name	Instant ON/OFF Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x21
Command 2	Same as what was received in Command 2

Command Example:

Instant ON/OFF **Instant ON/OFF Response**	**AA BB CC 11 22 33 0F 21 7F** **11 22 33 AA BB CC 2B 21 7F**

The above example device 11 22 33 is sent a command that tells it to turn its load to 50% On (0x7F) at its fastest Ramp Rate (0x21).

Docklight Example:

```
9/13/2013 14:05:01.444 [TX] - 02 62 29 70 02 0F 21 FF
9/13/2013 14:05:01.461 [RX] - 02 62 29 70 02 0F 21 FF 06  INSTEON STD TX
                              02 50 29 70 02 1A 77 7B 2B 21 FF  INSTEON STD RX Instant On
```

Ramp Rate ON

This command tells the device to turn its load to a specified on-level at a specified ramp rate.

Command Name	Ramp Rate ON
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x34
Command 2	On Level = 0x10 * High Byte + 0x0F Ramp Rate = 0x02 * Low Byte + 0x01

Command Name	Ramp Rate ON Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x34
Command 2	Same as what was received in Command 2

Command Example:

Ramp Rate ON **Ramp Rate ON Response**	**AA BB CC 11 22 33 0F 34 FC** **11 22 33 AA BB CC 2B 34 FC**

The above example device 11 22 33 is sent a command that tells it to turn its load to Full On (0x10 * 0x0F + 0x0F = 0xFF) at a Ramp Rate of about 8 seconds (0x02 * 0x0C + 0x01 = 0x19, which is about 8 seconds).

Docklight Example:

```
9/18/2013 14:48:43.644 [TX] - 02 62 29 70 02 0F 34 FC
9/18/2013 14:48:43.663 [RX] - 02 62 29 70 02 0F 34 FC 06  INSTEON STD TX
                              02 50 29 70 02 1A 77 7B 2B 34 FC  INSTEON STD RX
```

Ramp Rate OFF

This command tells the device to turn its load to OFF at the specified ramp rate.

Command Name	Ramp Rate OFF
Message Length	Standard Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x35
Command 2	High Byte is ignored Ramp Rate = 0x02 * Low Byte + 0x01

Command Name	Ramp Rate OFF Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x35
Command 2	Same as what was received in Command 2

Command Example:

Ramp Rate OFF **Ramp Rate OFF Response**	**AA BB CC 11 22 33 0F 35 FC** **11 22 33 AA BB CC 2B 35 FC**

The above example device 11 22 33 is sent a command that tells it to turn its load to OFF at a Ramp Rate of about 8 seconds (0x02 * 0x0C + 0x01 = 0x19, which is about 8 seconds).

Docklight Example:

```
9/18/2013 15:03:31.344 [TX] - 02 62 29 70 02 0F 35 FC
9/18/2013 15:03:31.367 [RX] - 02 62 29 70 02 0F 35 FC 06  INSTEON STD TX
                      02 50 29 70 02 1A 77 7B 2B 35 FC  INSTEON STD RX Ramp Rate Off (8 Seconds)
```

Remote Enter Linking Mode

This command puts the device into Linking Mode

Command Name	Remote Enter Linking Mode
Message Length	Extended Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x09
Command 2	Ignored Value (LED Bulb Always enter group 0x01 Linking Mode)
Data 1 – Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Remote Enter Linking Mode Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x09
Command 2	Same as what was received in Command 2

Command Name	Assign to ALL-Link Group
Message Length	Standard Message (SD)
Message Type	Broadcast
Transmitting Device ID	LED Bulb
To Address (Hi Byte)	Device Category
To Address (Mid Byte)	Device Subcategory
To Address (Low Byte)	Firmware Revision
Flags Byte	Message Type
Command 1	0x01
Command 2	Hardware Revision

Command Example:

Remote Enter Linking Mode **Remote Enter Linking Mode Response** **Assign to ALL-Link Group**	**AA BB CC 11 22 33 1F 09 00 00 00 00 00** **00 00 00 00 00 00 00 00 00 F7** **11 22 33 AA BB CC 2B 09 00** **11 22 33 01 3B C7 8B 01 00**

The the above example, device 11 22 33 is sent a command that tells it to go into Linking Mode (0x09). Device 11 22 33 will ACK the command and then goes into Linking Mode.

Docklight Example:

```
9/18/2013 18:04:11.656 [TX] - 02 62 29 70 02 1F 09 00 00 00 00 00 00 00 00 00 00 00 00 00 00 F7
9/18/2013 18:04:11.685 [RX] - 02 62 29 70 02 1F 09 00 00 00 00 00 00 00 00 00 00 00 00 00 00 F7
                              06  INSTEON EXT TX
                              02 50 29 70 02 1A 77 7B 2B 09 00  INSTEON STD RX Enter Linking Mode
```

Remote Exit Linking Mode

This command tells the device to exit linking mode.

Command Name	Remote Exit Linking Mode
Message Length	Extended Message (SD)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x08
Command 2	Ignored Value

Command Name	Remote Exit Linking Mode Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x08
Command 2	Same as what was received in Command 2

Command Example:

Remote Exit Linking Mode	**AA BB CC 11 22 33 0F 08 00**
Remote Exit Linking Mode Response	**11 22 33 AA BB CC 2B 08 00**

The above example device 11 22 33 is sent a command that tells it to exit Linking Mode (0x08).

Docklight Example:

```
9/19/2013 10:26:57.901 [TX] - 02 62 29 70 02 1F 08 00
9/19/2013 10:26:57.926 [RX] - 02 62 29 70 02 1F 08 00 06  INSTEON EXT TX
02 50 29 70 02 1A 77 7B 2B 08 00 INSTEON STD RX
```

Programming Lock On

This command tells the device to NOT enter into Linking Mode on Power Up.

Command Name	Programming Lock On
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x20
Command 2	0x00
Data 1 – Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Programming Lock On Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x20
Command 2	0x00

Command Example:

Programming Lock On **Programming Lock On Response**	**AA BB CC 11 22 33 1F 20 00 00 00 00 00 00 00 00 00 00 00 00 00 00 E0** **11 22 33 AA BB CC 2B 20 00**

The above example device 11 22 33 is sent a command that tells it to NOT enter into Linking Mode on power up (0x20 0x00).

Docklight Example:

```
9/19/2013 10:44:40.362 [TX] - 02 62 29 70 02 1F 20 00 00 00 00 00 00 00 00 00 00 00 00 00 00 E0

9/19/2013 10:44:40.378 [RX] - 02 62 29 70 02 1F 20 00 00 00 00 00 00 00 00 00 00 00 00 00 00 E0
                              06  INSTEON EXT TX
                              02 50 29 70 02 1A 77 7B 2B 20 00  INSTEON STD RX Set Operating
                              Flags (Programming Lock On)
```

Programming Lock Off

This command tells the device to enter Linking Mode on Power Up.

Command Name	Programming Lock Off
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x20
Command 2	0x01
Data 1 – Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Programming Lock OFF Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x20
Command 2	0x01

Command Example:

Programming Lock OFF **Programming Lock OFF Response**	**AA BB CC 11 22 33 1F 20 01 00 00 00 00 00** **00 00 00 00 00 00 00 00 DF** **11 22 33 AA BB CC 2B 20 01**

The above example device 11 22 33 is sent a command that tells it to Enter into Linking Mode on Power Up (0x20 0x01).

Docklight Example:

```
9/18/2013 18:13:37.279 [TX] - 02 62 29 70 02 1F 20 01 00 00 00 00 00 00 00 00 00 00 00 00 DF
9/18/2013 18:13:37.291 [RX] - 02 62 29 70 02 1F 20 01 00 00 00 00 00 00 00 00 00 00 00 00 DF
                              06  INSTEON EXT TX
                              02 50 29 70 02 1A 77 7B 2B 20 01 INSTEON STD RX Set Operating Flags
                              (Programming Lock Off)
```

Power Up to Last State

This command tells the LED Bulb to always power up to its last state.

Command Name	Power Up to Last State
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x20
Command 2	0x04
Data 1 – Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Power Up to Last State Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x20
Command 2	0x04

Command Example:

Power Up to Last State **Power Up to Last State Response**	**AA BB CC 11 22 33 1F 20 04 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 DC** **11 22 33 AA BB CC 2B 20 04**

The above example device 11 22 33 is sent a command that tells it to return to its last state on power up (0x20 0x04).

Docklight Example:

```
9/19/2013 10:44:40.362 [TX] - 02 62 29 70 02 1F 20 04 00 00 00 00 00 00 00 00 00 00 00 00 00 DC

9/19/2013 10:44:40.378 [RX] - 02 62 29 70 02 1F 20 04 00 00 00 00 00 00 00 00 00 00 00 00 00 DC
                              06  INSTEON EXT TX
                              02 50 29 70 02 1A 77 7B 2B 20 04
```

Power Up to ON

This command tells the LED Bulb to power up to ON if its last state was OFF, otherwise power up to last state.

Command Name	Power Up to ON
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x20
Command 2	0x05
Data 1 – Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Power Up to ON Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x20
Command 2	0x05

Command Example:

Power Up to ON **Power Up to ON Response**	**AA BB CC 11 22 33 1F 20 05 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 DB** **11 22 33 AA BB CC 2B 20 05**

The above example device 11 22 33 is sent a command that tells it on power up to go to full ON if it was OFF, otherwise power up to its last On-Level state (0x20 0x05).

Docklight Example:

```
9/18/2013 18:13:37.279 [TX] - 02 62 29 70 02 1F 20 05 00 00 00 00 00 00 00 00 00 00 00 00 00 DB
9/18/2013 18:13:37.291 [RX] - 02 62 29 70 02 1F 20 05 00 00 00 00 00 00 00 00 00 00 00 00 00 DB
                              06  INSTEON EXT TX
                              02 50 29 70 02 1A 77 7B 2B 20 05
```

INSTEON Use Only

Test Operating Flag 1

This operating flag should be left at its default setting. Used for internal testing purposes only.

Command Name	Test Operating Flag 1
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x20
Command 2	0x26
Data 1 – Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Test Operating Flag 1 Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x20
Command 2	0x26

Test Operating Flag 2

This operating flag should be left at its default setting. Used for internal testing purposes only.

Command Name	Test Operating Flag 2
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x20
Command 2	0x27
Data 1 – Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Test Operating Flag 2 Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x20
Command 2	0x27

Test Operating Flag 3

This operating flag should be left at its default setting. Used for internal testing purposes only.

Command Name	Test Operating Flag 3
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x20
Command 2	0x28
Data 1 – Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Test Operating Flag 3 Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x20
Command 2	0x28

Test Operating Flag 4

This operating flag should be left at its default setting. Used for internal testing purposes only.

Command Name	Test Operating Flag 4
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x20
Command 2	0x00
Data 1 – Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Test Operating Flag 4 Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x2F
Command 2	Same as what was received in Command 2

Test Operating Flag 5

This operating flag should be left at its default setting. Used for internal testing purposes only.

Command Name	Test Operating Flag 5
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x20
Command 2	0x00
Data 1 – Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Test Operating Flag 5 Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x2F
Command 2	Same as what was received in Command 2

Test Operating Flag 6

This operating flag should be left at its default setting. Used for internal testing purposes only.

Command Name	Test Operating Flag 6
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x20
Command 2	0x2B
Data 1 – Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Test Operating Flag 6 Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x20
Command 2	0x2B

Get for Group/Button

This command asks the device for its Group/Button Data

Command Name	Get for Group/Button
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x2E
Command 2	0x00
Data 1	0x00 -> 0xFF (Group/Button)
Data 2 – Data 14	0x00

Command Name	Get for Group/Button Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x2E
Command 2	0x00

Command Name	Get for Group/Button Data
Message Length	Extended Message (ED)
Message Type	Broadcast
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x2E
Command 2	0x00
Data 1	Same as what was received in Data 1
Data 2	0x01
Data 3 – Data 6	N/A
Data 7	Ramp Rate
Data 8 - 14	N/A

Command Example:

Get for Group/Button **Get for Group/Button Response** **Get for Group/Button Data**	**AA BB CC 11 22 33 1F 2E 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00** **11 22 33 AA BB CC 2B 2E 00** **11 22 33 AA BB CC 11 2E 00 01 01 00 00 20 20 1F FF 3F 00 01 00 00 00**

The above example, device 11 22 33 is sent a command that asks for its Get for Group/Button Data for Group 1(0x2E 0x00 0x01). Device 11 22 33 responds back with the fastest Ramp Rate (0x1F).

Docklight Example:

```
9/19/2013 11:21:19.008 [TX] - 02 62 29 70 02 1F 2E 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00
9/19/2013 11:21:19.025 [RX] - 02 62 29 70 02 1F 2E 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00
                              06  INSTEON EXT TX
                              02 50 29 70 02 1A 77 7B 2B 2E 00  INSTEON STD RX
                              02 51 29 70 02 1A 77 7B 11 2E 00 01 01 00 00 20 20 1F FE 3F 00 01
                              00 00 00  INSTEON EXT RX Get for Group/Button Response
```

Set Ramp Rate

This command sets the device's Ramp Rate.

Command Name	Set Ramp Rate
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x2E
Command 2	0x00
Data 1	0x00
Data 2	0x05
Data 3	0x00 -> 0x1F (Ramp Rate: 0x00 = ~2 sec. 0x01 = slowest -> 0x1F = fastest)
Data 4 – Data 13	0x00
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Set Ramp Rate Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x2E
Command 2	0x00

Command Example:

Set Ramp Rate **Set Ramp Rate Response**	`AA BB CC 11 22 33 1F 2E 00 00 05 00 00 00 00 00 00 00 00 00 00 CD` `11 22 33 AA BB CC 2B 2E 00`

The above example, device 11 22 33 is sent a command that sets its Ramp Rate to about 2 seconds (0x2E 0x00 0x00 0x05 0x00).

Docklight Example:

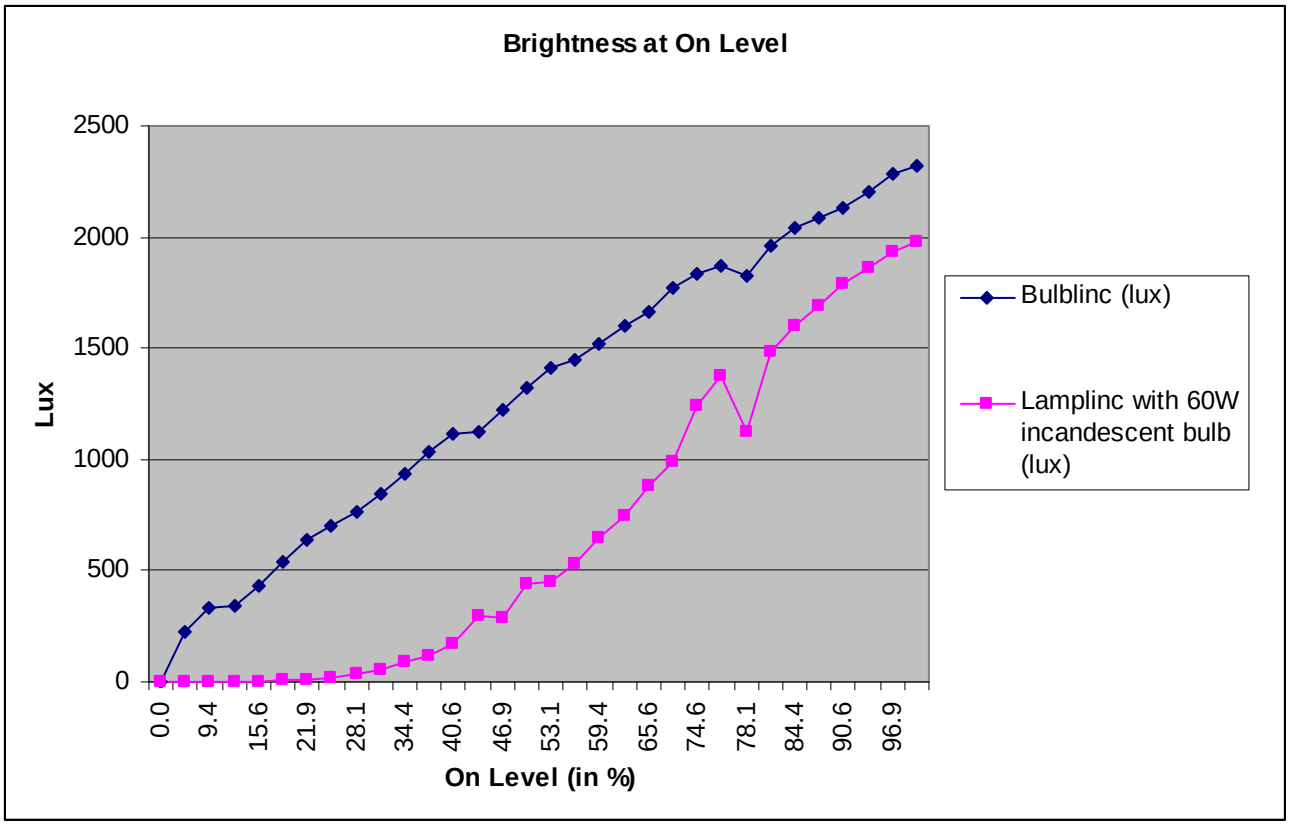
```
9/19/2013 12:03:22.167 [TX] - 02 62 29 70 02 1F 2E 00 00 05 00 00 00 00 00 00 00 00 00 00 CD
9/19/2013 12:03:22.195 [RX] - 02 62 29 70 02 1F 2E 00 00 05 00 00 00 00 00 00 00 00 00 00 CD
                              06  INSTEON EXT TX Set Ramp Rate
                              02 50 29 70 02 1A 77 7B 2B 2E 00  INSTEON STD RX
```

Appendix

INSTEON LED Bulb on levels compared to LampLinc Dimmer Dual Band with a 60 watt incandescent bulb.

Brightness at On Levels

Hex value	On level (%)	INSTEON LED Bulb (lux)	Lamplinc with 60W incandescent bulb (lux)
0	0.0	2.1	2.1
0F	5.9	227	2.1
18	9.4	333	2.4
1F	12.1	345	4
28	15.6	435	4
2F	18.4	538	6.2
38	21.9	642	12.5
3F	24.6	705	21
48	28.1	768	37
4F	30.9	841	53
58	34.4	936	86.5
5F	37.1	1030	120
68	40.6	1118	172
6F	43.4	1124	293
78	46.9	1225	291
7F	49.6	1320	445
88	53.1	1414	450
8F	55.9	1444	532
98	59.4	1516	648
9F	62.1	1602	750
A8	65.6	1660	885
AF	68.4	1774	985
BF	74.6	1831	1240
C8	78.1	1875	1375
C8	78.1	1822	1126
CF	80.9	1958	1480
D8	84.4	2041	1600
DF	87.1	2082	1690
E8	90.6	2135	1790
EF	93.4	2205	1860
F8	96.9	2280	1930
FF	100.0	2322	1980



Ramp Rate

INSTEON LED Bulb Ramp Rates

Ramp Rate (in decimal)	Ramp Rate (in hex)	Approximate Time (in secs)	Approximate Time (in mins)
0	0	540	9
1	1	480	8
2	2	420	7
3	3	360	6
4	4	300	5
5	5	270	4.5
6	6	240	4
7	7	210	3.5
8	8	180	3
9	9	150	2.5
10	A	120	2
11	B	90	1.5
12	C	60	1
13	D	47	
14	E	43	
15	F	38.5	
16	10	34	
17	11	32	
18	12	30	
19	13	28	
20	14	26	
21	15	23.5	
22	16	21.5	
23	17	19	
24	18	8.5	
25	19	6.5	
26	1A	4.5	
27	1B	2	
28	1C	0.5	
29	1D	0.3	
30	1E	0.2	
31	1F	0.1	

Checksum Information

For Set Database, Set Properties and 0x20, Data14 will contain a 2s compliment of cmd1 through 2nd to last data record in the last data record.

Example of Checksum:

Message for Checksum Example	**AA BB CC 11 22 33 1F 2E 00 01 05 FF 00 00 00 00 00 00 00 00 00 00 DD**

The above example, device 11 22 33 is sent a command that requires a checksum in Data 14. The checksum is calculated by summing all the values from Command 1 to Data 13(0x2E + 0x01 + 0x05 + 0xFF = 0x133). We then calculate the compliment of the last byte(0x33 compliment = 0xCC). Then we add 1(0x01) to find the checksum for Data 14(0xCC + 0x01 = checksum = 0xCD).

Memory Map

All-Link Database (AL /L) Overview

The AL /L starts at the top of external (serial) EEPROM and grows downward. In the INSTEON LED Bulb, top of memory is 0x0FFF. Each AL /L Record is 8 bytes long, so the first record starts at 0x0FF8, the second record starts at 0x0FF0, and so on down to 0x0300 for a total of 416 links. In what follows, the 3-byte INSTEON Address contained in a record is called the *Device ID* or sometimes just the *ID*. The high byte (MSB) of the Device ID is *ID2*, the middle byte is *ID1*, and the low byte (LSB) is *ID0*.

EEPROM Structure Overview

Location	Comments
0x0FF8	All-Link Database Record
0x0FF0	Ack
0x0FD8	Open/Close Sensor
.....	Controller
0x0300	Last Record, 416 total links allowed
0x02xx	Addressing below 0x0300 is ignored by the database

AL /L Record Format

INSTEON Open/Close Sensor AL Record Format

Database entries with Record Control Bit 6: 0 = Responder and Group 1 will control the local load.

Field	Description
Record Control	Record Control Flag Bits: Bit7: 1 = Record is in use, 0 = Record is available Bit 6: 0 = Responder to (Slave of) Device ID Bit 5: Not Used Bit 4 & Bit 3: SmartHops (Keeps track of what the start hop should be) Bit 2: Not Used Bit 1: 1 = Record has been used before, 0 = High Water Mark Bit 0: Not Used
Group	All-Link Group Number this Device ID belongs to
ID	Device ID
Data 1	On Level
Data 2	Ramp Rate
Data 3	Not Used

To add a record to an AL /L, you search for an existing record that is marked available. (Available means the same as empty, unused or deleted.) If none is available, you create a new record at the end of the AL /L.

An unused record will have bit 7 of the *Record Control* byte set to zero. The last record in an AL /L will have bit 1 of the *Record Control* byte set to zero.

Overwriting an Empty AL /L Record

If you found an empty record, you simply overwrite it with your new record data.

Change bit 7 of the *Record Control* byte from zero to one to show that the record is now in use.

Set bit 6 of the *Record Control* byte to one if the device containing the AL /L is an INSTEON Controller of the INSTEON Responder Device whose *ID* is in the record. If instead the device containing the AL /L is an INSTEON Responder to the INSTEON Controller Device whose *ID* is in the record, then clear bit 6 of the *Record Control* byte to zero. In other words, within an AL /L, setting bit 6 means “I’m a Controller,” and clearing bit 6 means “I’m a Responder.”

Put the ALL-Link Group number in the *Group* field, and put the *Device ID* in the *ID* field. Finally, set the *Data 1*, *Data 2*, and *Data 3* fields appropriately for the *Record Class* you are storing.

Creating a New AL /L Record

To create a new record at the end of the AL /T, find the record with bit 1 of the *Record Control* byte set to zero, indicating that it is the last record in the AL /L. Flip that bit to one.

On Level

The on level values are stepped differently compared to another INSTEON dimmer with an incandescent load. See appendix for a comparison with an incandescent load.

Ramp Rate

The Ramp Rate values are similar to other dimming INSTEON devices. See Appendix for conversion table.

Get Database

This command asks the device for a record in its database or the entire database.

Command Name	Get Database
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x2F
Command 2	0x00
Data 1	Ignored Value
Data 2	0x00
Data 3	0x00 -> 0xFF (Hi Byte Address)
Data 4	0x00 -> 0xFF (Lo Byte Address)
Data 5	0x00 -> 0xFF (# of Records, 0x00 dumps all records)
Data 6 – Data 14	Ignored Value

Command Name	Get Database Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x2F
Command 2	0x00

Command Name	Get Database Data
Message Length	Extended Message (ED)
Message Type	Broadcast
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x2F
Command 2	0x00
Data 1	0x00
Data 2	0x01
Data 3	0x00 -> 0xFF (Hi Byte Address)
Data 4	0x00 -> 0xFF (Lo Byte Address)
Data 5	0x00
Data 6	Link Type Byte: Bit 0 = 0 Bit 1 = High Water (Marks the highest record used in the database) Bit 2 = 0 Bit 3 & Bit 4 = SmartHop (Keeps track of what the start hop should be) Bit 5 = 1 Bit 6 = Controls Me=0; I Control=1 Bit 7 = Inactive=0; Active=1
Data 7	Group Number of Link
Data 8	Linked Device ID (Hi Byte)
Data 9	Linked Device ID (Mid Byte)
Data 10	Linked Device ID (Lo Byte)
Data 11	On-Level of Link
Data 12	Ramp Rate of Link
Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Empty Record
Message Length	Extended Message (ED)
Message Type	Broadcast
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x2F
Command 2	0x00
Data 1	0x00
Data 2	0x01
Data 3	0x00 -> 0xFF (Hi Byte Address)
Data 4	0x00 -> 0xFF (Lo Byte Address)
Data 5	0x00
Data 6	0x00
Data 7	0x00
Data 8	0x00
Data 9	0x00
Data 10	0x00
Data 11	0x00
Data 12	0x00
Data 13	0x00
Data 14	Calculated Checksum (See below in Checksum Information)

Command Example:

Get Database **Get Database Response** **Get Database Data** **Empty Record**	**AA BB CC 11 22 33 1F 2F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00** **11 22 33 AA BB CC 2B 2F 00** **11 22 33 AA BB CC 11 2F 00 00 01 0F FF 00 A2 00 11 CC AB FF 1F 01 79** **11 22 33 AA BB CC 11 2F 00 00 01 0F F7 00 00 00 00 00 00 00 00 00 CA**

The above example, device 11 22 33 is sent a command that asks it for its entire database (0x2F 0x00 0x00 0x00 0x00 0x00 0x00). Device 11 22 33 Acks the command then sends out its first database record (0x0F 0xFF). The next spot is an empty record so the device stops sending out its database (0x0F 0xF7).

Docklight Example:

```
9/23/2013 16:29:24.266 [TX] - 02 62 29 70 02 1F 2F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
9/23/2013 16:29:24.279 [RX] - 02 62 29 70 02 1F 2F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
                              06  INSTEON EXT TX Get Database
                              02 50 29 70 02 1A 77 7B 2B 2F 00  INSTEON STD RX
                              02 51 29 70 02 1A 77 7B 11 2F 00 00 01 0F FF 00 A2 00 11 CC AB FF
                              1F 01 79  INSTEON EXT RX
                              02 51 29 70 02 1A 77 7B 11 2F 00 00 01 0F F7 00 AA 00 1C 30 B4 00
                              1C 00 04  INSTEON EXT RX
                              02 51 29 70 02 1A 77 7B 11 2F 00 00 01 0F EF 00 AA 01 18 94 F1 00
                              1F 00 6B  INSTEON EXT RX
                              02 51 29 70 02 1A 77 7B 11 2F 00 00 01 0F E7 00 AA 01 1A 77 7B 00
                              00 00 23  INSTEON EXT RX
                              02 51 29 70 02 1A 77 7B 11 2F 00 00 01 0F DF 00 00 00 00 00 00 00
                              00 00 E2  INSTEON EXT RX
```

Set Database

This command sets the device's On-Level

Command Name	Set Database
Message Length	Extended Message (ED)
Message Type	Direct
Transmitting Device ID	Controller
Receiving Device ID	LED Bulb
Flags Byte	Message Type
Command 1	0x2F
Command 2	0x00
Data 1	Ignored Value
Data 2	0x02
Data 3	0x00 -> 0xFF (Hi Byte Address)
Data 4	0x00 -> 0xFF (Lo Byte Address)
Data 5	0x01 -> 0x08 (# of bytes to write, over 0x08 is an error and ignored)
Data 6	
Data 7	Group Number of Link
Data 8	Linked Device ID (Hi Byte)
Data 9	Linked Device ID (Mid Byte)
Data 10	Linked Device ID (Lo Byte)
Data 11	On-Level of Link
Data 12	Ramp Rate of Link
Data 13	Ignored Value
Data 14	Calculated Checksum (See below in Checksum Information)

Command Name	Set Database Response
Message Length	Standard Message (SD)
Message Type	Ack
Transmitting Device ID	LED Bulb
Receiving Device ID	Controller
Flags Byte	Message Type
Command 1	0x2F
Command 2	0x00

Command Example:

Set Database **Set Database Response**	**AA BB CC 11 22 33 1F 2F 00 00 02 0F F7** **08 AA 00 18 A1 C5 00 1C 00 7D** **11 22 33 AA BB CC 2B 2F 00**

The above example, device 11 22 33 is sent a command that writes a record to its database at location 0x0F 0xF7 (0x2F 0x00 0x00 0x02 0x0F 0xF7)

Docklight Example:

```
9/24/2013 09:41:43.127 [TX] - 02 62 29 70 02 1F 2F 00 00 02 0F F7 08 AA 00 18 A1 C5 00 1C 00 7D
9/24/2013 09:41:43.146 [RX] - 02 62 29 70 02 1F 2F 00 00 02 0F F7 08 AA 00 18 A1 C5 00 1C 00 7D
                              06  INSTEON EXT TX Set Database
                              02 50 29 70 02 1A 77 7B 2B 2F 00  INSTEON STD RX
```