i3 Keypad

Changelog

2023-12-12

Fixed

- Mistake regarding **Data 1** in **2E 01** Bulk Get/Set Commands

2023-08-28

- Initial Release

Product Description

Product Name	Insteon i3 Keypad
SKU	KP014
Category	0x01
Sub-Category	0x59
Firmware Version	0x58
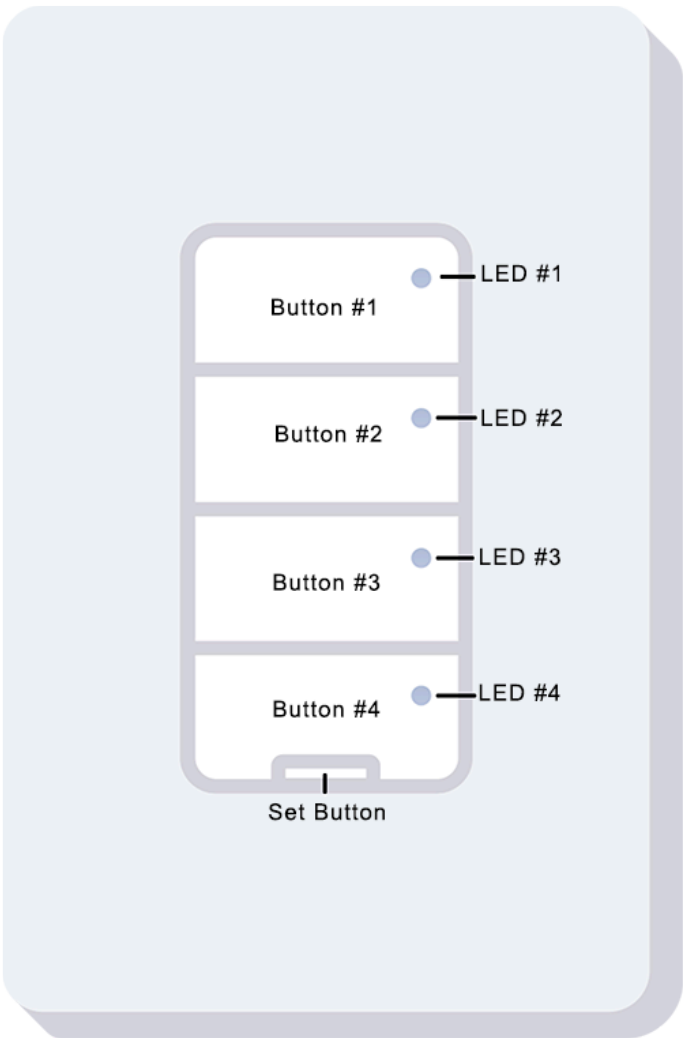
Buttons and LEDs

Hardware Inputs

Input	Function
Set Button	1. Linking / Unlinking

	2. Set On Level
	3. Setting Ramp Rate
	4. Factory Reset
Button #1	Controls local load, load of another device and/or LED #1
Button #2	Controls local load, load of another device and/or LED #2
Button #3	Controls local load, load of another device and/or LED #3
Button #4	Controls local load, load of another device and/or LED #4
White Neutral Wire	Connects device to Neutral
Black Line Wire	Connects device to Line
Green ground Wire	Connects device to Ground

By default, Button #1 controls the local load and Buttons #2, #3 and #4 control nothing until they are linked. Buttons toggle between an "On" and "Off" state each press (this can be changed to just one or the other). These buttons can be configured in many different ways, but in general:

- Single Press – Turns a load on or off
- Double Press – *Quickly* turns a load on or off
- Press and Hold – Brighten or dims a load

Hardware Outputs

Output	Function
Red Load Wire	Connects device to Load
LED #1	Indicates the on/off state of either the local load or load of another device
LED #2	Indicates the on/off state of either the local load or load of another device

LED #3	Indicates the on/off state of either the local load or load of another device
LED #4	Indicates the on/off state of either the local load or load of another device
Beeper	Used as acknowledgement of many different user actions

Device Properties

This section contains descriptions for various properties of the device which persist on power cycle. These properties are configurable by the user and/or developer and define how the switch behaves. If you don't know what something does, its best to keep it at the default value. Property modification is always done using extended messages with the last byte in the message being the extended checksum. The switch will use this checksum to verify the integrity of the command to avoid spontaneous changes to critical properties.

Bit Properties

These properties are represented using binary states such as "on/off" or "enable/disabled" and have dedicated commands to "set" and "clear" their values. When reading bit properties, use the "Get Command" to read the property byte containing the desired bit and mask out all other bits. Unlike byte properties, bit properties always modify how the device behaves globally, i.e. they are never "Per-Group".

In general...

- Bit Properties are read with the **1F** standard command
- Bit Properties are modified with the **20** extended command
- Alternatively, Bit Properties can be read and set in bulk using the **2E 01 00** and **2E 01 02** extended commands respectively

Property Name	Get Command	Set Command	Clear Command	Default	Description
Programming Lock	1F 00 Bit-0	20 00	20 01	0	If set, prevents the user from using the set button to link with other devices.

Resume Dim	1F 00 Bit-2	20 04	20 05	0	If set, the **On Level** of the switch is updated whenever the user brightens or dims the load by pressing and holding the button controlling the local load.
Relay at Full On	1F 07 Bit-6	20 06	20 07	0	If set, the switch will use the relay when at "Full On" to help dissipate heat - even in Dimmer Mode
Key Beep	1F 00 Bit-5	20 0A	20 0B	0	If set, buttons will beep when pressed
Disable RF	1F 00 Bit-6	20 0C	20 0D	0	If set, stops the switch from transmitting messages on RF. This may improve connectivity in some in cases such as multiple switches in a multi-gang box.
Error Blink	1F 05 Bit-2	20 15	20 14	0	If set, local activation will flash the LED either green to indicate no cleanup errors, or red to indicate cleanup errors.
Cleanup Report	1F 05 Bit-3	20 17	20 16	1	If set, **06 - Cleanup Report** will be broadcast after local activation with the number of communication errors.
Button Lock	1F 05 Bit-4	20 19	20 18	0	If set, the buttons do nothing
Detach Load	1F 05 Bit-5	20 1B	20 1A	0	If set, the load is not controlled by the switch and can only be controlled by external devices
Dimmer Mode	1F 05 Bit-7	20 1F	20 1E	1	If set, the switch will use the triac to dim the load as appropriate. If clear, the switch will only use the relay to control the load
Hop Powerline on RF	1F 07 Bit-2	20 2A	20 2B	0	If cleared, this device only hops messages on RF if they were heard on RF or the original powerline message. If set, this device will "push up" messages from

					powerline to RF. If there is an isolated RF only device that can only be reached by a single powerline device, it may be necessary to set this property
Night LED	1F 09 Bit-0	20 2D	20 2C	0	If set, the switch will use night LED color values for On and Off. If clear, the switch will use normal LED color values for On and Off.
Night Mode	1F 05 Bit-1	3B	3C	0	If set, it is nighttime and the **Night Max On Level**, **Night Ramp Rate** and **Night LED Brightness** values will be used where appropriate. If clear, it is daytime and normal values will be used. *NOTE: The 3B/3C commands are control commands. They do not require an extended message with checksum and can additionally be sent as a group broadcast so that devices can be set to Day/Night en masse*

Byte Properties

These properties are represented as a single byte in memory and thus are constrained to the values 0-255. Some of these properties are "Per-Group" meaning there exist 4 copies of the property, one for each Button/LED of the keypad. Group #1 is used for defining behavior regarding the topmost Button/LED, Group #2 second from the top, so on and so forth. The switch may enforce bounds checking on write operations at its discretion. For example, Maximum LED brightness will be clamped to be at most 0x7F, regardless of what is sent in the original command.

In general...

- Byte Properties are written using the **2E 00 XX XX** Extended Command
  - Per-Group Byte Properties specify the Group # like so: **2E 00 <Group #> XX**

- Byte Properties are read in bulk using the **2E 01** Extended Command
- Byte Properties are written in bulk using the **2E 02** Extended Commands
- If a property name ends in "Mask", then the first four bits (bits 0 to 3) correspond to the four LED/Button numbers. e.g. Bit-0 is for the top Button/LED, Bit-1 for 2nd from the top, etc...

Property Name	Set Command	Get Command	Default Value	Per-Group?	Description
LED On Mask	2E 00 XX 02	2E 00 XX 00 00 (Data 3)	00	Yes	Defines if this button turns any of the other LEDs *On* when activated. This is useful for maintaining the correct LED state when multiple buttons control the same load. For example, sending mask 00000110b to Group 0x01 would configure the switch such that Buttons #2 and #3 turn *On* when Button #1 is pressed. Setting a Group's own bit (e.g. Group 0x01 Bit-0) changes nothing about the Keypad's behavior.
LED Off Mask	2E 00 XX 03	2E 00 XX 00 00 (Data 4)	00	Yes	Defines if this button turns any of the other LEDs *Off* when activated. This is useful for maintaining the correct LED state when multiple buttons control the same load. For example, sending mask 00000110b to Group 0x01 would configure the switch such that Buttons #2 and #3 turn *Off* when Button #1 is pressed. Setting a Group's own bit (e.g. Group 0x01 Bit-0) changes nothing about the Keypad's behavior.
LED Group Mask	2E 00 XX 03	2E 00 XX 00 00 (Data 14)	00	Yes	Used in conjunction with LED Off Mask to set up radio buttons. Set both this mask and the off mask if you want radio buttons, only 1 led on at a time.

Ramp Rate	2E 00 XX 05	2E 00 XX 00 00 (Data 7)	1F	Yes	Speed which the local load turns on or off when activated. *Note: Can be modified by the user by double pressing the set button. Doing so uses the current On Level as the new Ramp Rate (Brighter = Faster).*
On Level	2E 00 XX 06	2E 00 XX 00 00 (Data 8)	FF	Yes	Level which the local load turns on to when activated. *Note: Can be modified by the user by pressing the set button*
LED Brightness	2E 00 00 07	2E 00 XX 00 00 (Data 9)	3F	No	Scales the brightness of the LED indicators on the switch. This includes both the On and Off state of the LEDs. Range: 0x11 - 0x7F
NonToggle Mask	2E 00 00 08	2E 00 XX 00 00 (Data 10)	00	No	Defines *if* this button sends only a single command rather than toggling between On and Off. This is useful for using the keypad in a "Radio Button" configuration, among other things. For example, if Bit-1 is set, then Button #2 only ever sends either the On or Off command. To configure which command is sent, see **NonToggle Off Mask**.
LED State Mask	2E 00 00 09	2E 00 XX 00 00 (Data 11)	N/A	No	Used to set the state of all LEDs excluding the LED which reflects the local load as defined in **Load Number**. Since buttons that toggle between On and Off rely on the current LED state, you may affect the next state.
NonToggle Off Mask	2E 00 00 0B	2E 00 XX 00 00 (Data 13)	00	No	Defines *what* this command button sends instead of toggling between On and Off. This is useful for using the keypad in a "Radio Button" configuration, among other things. For example, if bit Bit-1 and **NonToggle Mask**'s Bit-1 is set, then Button

					#2 only ever sends either the On or Off command.
Trigger Group Mask	2E 00 00 0C	1F 08	00	No	Defines which buttons should send the **30 - Trigger Group** extended command on activation. This is useful for making two switches control the same scene without having to maintain two sets of database entries in all involved devices.
Max On Level	2E 00 00 0D	2E 00 00 00 04 (Data 04)	F1	No	The maximum level the load can be set to.
Min On Level	2E 00 00 0D	2E 00 00 00 04 (Data 05)	20	No	The minimum level the load can be set to before committing to fully off. Useful for preventing flicker.
Start On Level	2E 00 00 0D	2E 00 00 00 04 (Data 06)	00	No	The initial level of the load when starting from Off. This is useful for loads which need to have reached a minimum power before they can be dimmed to a lower **Min On Level**.
Night Ramp Rate	2E 00 00 12	2E 00 00 00 04 (Data 11)	1B	No	The Ramp Rate which should be used when **Night Mode** is set
Night LED Brightness	2E 00 00 12	2E 00 00 00 04 (Data 10)	1F	No	The LED Brightness which should be used when **Night Mode** is set

| Night Max On Level | 2E 00 00 12 | 2E 00 00 00 04 (Data 09) | 7F | No | Maximum On Level which should be used when **Night Mode** is set |
| Load Number | 2E 00 00 13 | 2E 00 00 00 04 (Data 12) | 01 | No | Defines which of the four buttons controls the load. Use the **Detach Load** bit property to select none of them. Range: 1 - 4 |

Ramp Rate Conversion Table

Ramp Rate	Ramp Rate (Hex)	Duration (Approx.)
0	00	2s
1	01	8m
2	02	7m
3	03	6m
4	04	5m
5	05	4m30s
6	06	4m
7	07	3m30s
8	08	3m
9	09	2m30s
0	0A	2m
11	0B	1m30s
12	0C	1m
13	0D	47s

14	0E	43s
15	0F	38s500ms
16	10	34s
17	11	32s
18	12	30s
19	13	28s
20	14	26s
21	15	23s500ms
22	16	21s500ms
23	17	19s
24	18	8s500ms
25	19	6s500ms
26	1A	4s500ms
27	1B	2s
28	1C	500ms
29	1D	300ms
30	1E	200ms
31	1F	100ms

Insteon Command Set

This section defines the set of Insteon commands supported to/from the i3 Keypad Switch. Any command sent to the keypad not of this set will be ignored or rejected. Titles in this section will consist of command's name prefixed by its *Command 1* value. Note that the device must be awake or plugged in to receive commands.

Each command definition will contain the following sections:

- **Description** - What does this command do?
- **Request Format** - What does a command to the device look like?
- **Response Format (Optional)** - What does a response to the command look like? If this section is not provided for a given command, assume that the standard ACK contains no additional information. Sometimes this section describes the format of an extended response data format. In these cases, assume a standard ACK first, followed by the described extended message.
- **PLM Example** - Example command which can be sent to a PLM described from the PLM's perspective. Any element of the description that is notated with an <u>underline</u> indicates that it is a variable of that command.

Note that each request/response format described includes an implicit 3-byte "From Address" which will always be the ID of the sender (i.e. your PLM). Command numbers and example data are given in hexadecimal.

For convenience, here's an excerpt from the Insteon protocol specification which describes the format of the Insteon "flags" byte which are used in every Insteon command:

Bit Position	Flag	Meaning
Bit 7 (Broadcast /NAK) (MSB)	Message Type	100 = Broadcast Message
Bit 6 (ALL-Link)		000 = Direct Message 001 = ACK of Direct Message 101 = NAK of Direct Message
Bit 5 (Acknowledgement)		110 = ALL-Link Broadcast Message 010 = ALL-Link Cleanup Message 011 = ACK of ALL-Link Cleanup Message 111 = NAK of ALL-Link Cleanup Message
Bit 4	Extended	1 = Extended-length message 0 = Standard-length Message
Bit 3	Hops Left	00 = 0 message retransmissions remaining 01 = 1 message retransmission remaining 10 = 2 message retransmissions remaining 11 = 3 message retransmissions remaining
Bit 2		
Bit 1	Max Hops	00 = Do not retransmit this message 01 = Retransmit this message 1 time maximum 10 = Retransmit this message 2 times maximum 11 = Retransmit this message 3 times maximum
Bit 0 (LSB)		

Insteon "Flags" Byte

Standard Commands to the Device

Standard length Insteon commands (9 bytes) are used for simple state commands like ON/OFF and querying bit properties of the device. The only bytes that will vary between commands

descriptions in this section are the "Command 1" and "Command 2" bytes.

01 - Assign to Group

Command used by switches to coordinate linkage with one another.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	\<see Insteon documentation\>	05 (direct standard)
Command 1	01 - Assign Group	01
Command 2	Group Number	01

PLM Example

Command	Description
0262AABBCC050101	Add me to your group 0x01

02 - Delete from Group

Command used by switches to coordinate linkage with one another.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	\<see Insteon documentation\>	05 (direct standard)

Command 1	02 - Delete Group	02
Command 2	Group Number	01

Command	Description
0262AABBCC050201	Remove me from your group 0x01

08 - Exit Link Mode

Command used by switches to coordinate linkage with one another.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	08 - Exit Link Mode	08
Command 2	Unused	00

PLM Example

Command	Description
0262AABBCC050800	Exit Link Mode

09 - Enter Link Mode

Command used by switches to coordinate linkage with one another.

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	09 - Enter Link Mode	09
Command 2	Group Number	01

PLM Example

Command	Description
0262AABBCC050901	Enter linking mode for group 0x01

0A - Enter Unlink Mode

Command used by switches to coordinate linkage with one another.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	0A - Enter Unlink Mode	0A
Command 2	Group Number	01

Command	Description
0262AABBCC050A01	Enter unlink mode for group 0x01

0B - Enter Group Mode

Command used by switches to coordinate linkage with one another.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	0B - Enter group mode	0B
Command 2	Unused	00

PLM Example

Command	Description
0262AABBCC050B00	Enter group mode

0D - Get Insteon Version

Requests the Insteon version from the switch. All products except for the very first few will always return 02 as the version. Insteon Version 01 does not support extended messages.

Request Format

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	0D - Get Insteon Version	0D
Command 2	Unused	00

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	0D - Get Insteon Version	0D
Command 2	Insteon Version	02

PLM Example

Command	Description
0262AABBCC05 0D00	What is your Insteon version?

0F - Ping

Utility command which simply requests an Insteon ACK message.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)

Command 1	0F - Ping	0F
Command 2	Unused	00

Command	Description
0262AABBCC05 0F00	Ping

10 - ID Request

Command to make the switch broadcast its identity. This is useful if the only information you have about a device is its Insteon ID and you would like to identify what product the device is. See the **01 - Button Held (Link Mode)** standard broadcast command for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	10 - ID Request	10
Command 2	Unused	00

Response Format

1. Empty ACK
2. **01 - Button Held (Link Mode)** Standard Broadcast

PLM Example

Command	Description
0262AABBCC051000	Identify yourself with a broadcast

11 - On

Enable the switch's load at the provided level. The state change will be smoothed over a period of time defined by the switch's current Ramp Rate.

On Level is the amount of power which to drive the load at between 0x00 (fully off) and 0xFF (fully on).

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	11 - On	11
Command 2	On Level	80

PLM Example

Command	Description
0262AABBCC051180	Elegantly set your load to 0x80 (roughly halfway)

12 - Fast On

Enable the switch's load at the provided level. The state change will be immediate, ignoring the current Ramp Rate.

On Level is the amount of power which to drive the load at between 0x00 (fully off) and 0xFF (fully on).

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	12 - Fast On	12
Command 2	On Level	80

PLM Example

Command	Description
0262AABBCC051280	Instantly set your load to 0x80 (roughly halfway)

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13 - Off

Disable the switch's load. The state change will be smoothed over a period of time defined by the switch's current Ramp Rate.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	13 - Off	13

| Command 2 | Unused | 00 |

Command	Description
0262AABBCC051 300	Elegantly turn off your load

14 - Fast Off

Disable the switch's load. The state change will be instant, ignoring the switch's current Ramp Rate.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	14 - Off	14
Command 2	Unused	00

PLM Example

Command	Description
0262AABBCC051 400	Instantly turn off your load

15 - Brt

Incrementally *increase* the power driven to the load by a constant amount. For each command received, this command brightens the load by 0x08 (3.125%) for a max total of 32 steps from 0x00 to 0xFF.

Note: "Brt" is short for "Brightness"

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	15 - Brt	15
Command 2	Unused	00

PLM Example

Command	Description
0262AABBCC051500	Increase your load by 8

16 - Dim

Incrementally *decrease* the power driven to the load by a constant amount. For each command received, this command reduces the load by 0x08 (3.125%) for a max total of 32 steps from 0xFF to 0x00.

Request Format

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	16 - Dim	16
Command 2	Unused	00

Command	Description
0262AABBCC051600	Decrease your load by 8

17 - Start Manual Change

Start changing the On Level of the load ramping in the provided direction (brt/dim). It takes 4 seconds for a device that is fully off (0x00) to reach fully on (0xFF) and vice versa. This translates to about 1 level change about every 16.67ms. The change is automatically stopped when the min/max On Level is reached.

The most common user action associated with this command "push and hold". Use **18 - Stop Manual Change** to indicate when such an event has concluded.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	17 - Start Manual Change	17
Command 2	Direction:	01

| | 00 - Dim |
| | 01 - Brighten |

Command	Description
0262AABBCC051701	Begin <u>increasing</u> On Level until I say "stop"

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18 - Stop Manual Change

Stops any ramping initiated by **17 - Start Manual Change**.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	18 - Stop Manual Change	18
Command 2	Unused	00

PLM Example

Command	Description
0262AABBCC051800	Stop increasing/decreasing On Level

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19 00 - Get Status | Database Delta + On Level

Requests the current On Level from the switch. Included in the response is Database Delta, which can be used as an indicator when monitoring if a switch has had any new change in linkage.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	19 - Get Status	19
Command 2	00 - Database Delta + On Level	00

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	Database Delta	A8
Command 2	On Level	80

PLM Example

Command	Description
0262AABBCC051900	What is your On Level and Database Delta?

19 01 - Get Status | Database Delta + LED State

Requests the status of the LEDs from the switch. Included in the response is Database Delta, which can be used as an indicator when monitoring if a switch has had any new change in linkage.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	19 - Get Status	19
Command 2	01 - Database Delta + LEDs	01

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	Database Delta	A8
Command 2	LED State Mask: • Bit-0 - LED #1 On • Bit-1 - LED #2 On • Bit-2 - LED #3 On • Bit-3 - LED #4 On	08

PLM Example

Command	Description

0262AABBCC051901	What is the status of your LEDs and Database Delta?

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19 02 - Get Status | Target On Level

Requests the Target On Level status of the switch. Most of the time this is the same as On Level, however, if the load is actively changing (e.g. due to a long Ramp Rate) then this command will return the "target" level as opposed to current.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	19 - Get Status	19
Command 2	02 - Target On Level	02

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	19 - Get Status	19
Command 2	Target On Level	80

PLM Example

Command	Description

0262AABBCC051 902	What is your Target On Level?

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19 04 - Get Status | RF Version

Requests the RF Firmware Version of the switch. This version is different from the switch's base firmware version.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	19 - Get Status	19
Command 2	04 - RF Firmware Version	04

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	19 - Get Status	19
Command 2	RF Firmware Version	33

PLM Example

Command	Description

0262AABBCC0 51904	What is your RF Firmware Version?

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19 05 - Get Status | Lighting Director Index

Returns the switch's current On Level interpreted as the corresponding index into the switch's local lighting director profile. Register the a local lighting director profile using the **2F 00 00 02 - Write Database Record** extended command before using this one.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	19 - Get Status	19
Command 2	05 - Lighting Director Index	05

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	19 - Get Status	19
Command 2	Lighting Director Index Range: 0x00 - 0x0F	03

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19 07 - Get Status | Database Checksum

Requests the device's current Database Checksum. Unlike other **Get Status** commands, the requested status is not returned in the ACK of this message. Instead, this triggers a **3A -**

Database Checksum Standard Broadcast from the device which contains the requested information as the checksum is too large to fit in a standard ACK.

See **3A - Database Checksum** for more information regarding the checksum itself.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	19 - Get Status	19
Command 2	07 - Database Checksum	07

Response Format

1. Empty ACK
2. **3A - Database Checksum** Standard Broadcast

PLM Example

Command	Description
0262AABBCC051F1907	Broadcast your Database Checksum

1F 00 - Get Property | Bit Properties (00)

Requests various boolean persistent properties of the switch.

Request Format

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	1F - Get Property	1F
Command 2	00 - Bit Properties (00)	00

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	1F - Get Property	1F
Command 2	Bit Properties (00): • Bit-0 - Programming Lock • Bit-1 - <reserved> • Bit-2 - Resume Dim • Bit-3 - <reserved> • Bit-4 - <reserved> • Bit-5 - Key Beep • Bit-6 - RF Disable • Bit-7 -<reserved>	A4

PLM Example

Command	Description
0262AABBCC051F00	What are your 00 bit properties?

1F 01 - Get Database Delta

Returns the current Database Delta of the switch. This value is incremented every time the database is modified. Database Delta starts at 0x00 on reset, and rolls over to 0x00 from 0xFF.

*Note: This is an inferior method of tracking database coherence when compared to the more robust option **19 09 - Get Status | Database Checksum**.*

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	1F - Get Property	1F
Command 2	01 - Database Delta	01

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	1F - Get Property	1F
Command 2	Database Delta	A3

PLM Example

Command	Description
0262AABBCC051F01	What is your Database Delta?

1F 02 - Get Health Info (CRC Count)

Returns the number of invalid messages due to CRC error which this switch has observed. If the count reaches 255, it will roll over to 0 and start again. Sampled and plotted over time, this number can provide insight into the quality of the switch's communication environment (it includes erroneous messages not addressed to this switch).

Messages which are complete enough to be recognized as a standard/extended message but fail the CRC check are likely legitimate messages which have been corrupted due to poor Insteon network conditions.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	1F - Get Property	1F
Command 2	02 - Health Info (CRC Count)	02

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	1F - Get Property	1F
Command 2	CRC Count	19

PLM Example

Command	Description
0262AABBCC051F02	What is your current number of CRC failures?

1F 03 - Get Health Info (Failure Count)

Returns the number of times the switch has observed something which looks like the start of an Insteon message but was not. If the count reaches 255, it will roll over to 0 and start again. Sampled and plotted over time, this number can provide insight into the quality of the switch's communication environment.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	1F - Get Property	1F
Command 2	03 - Get Health Info (Failure Count)	03

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	1F - Get Property	1F
Command 2	Failure Count	09

Command	Description
0262AABBCC051 F03	What is your current failure count?

1F 05 - Get Property | Bit Properties (05)

Requests various boolean persistent properties of the switch.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	1F - Get Property	1F
Command 2	05 - Bit Properties (05)	05

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	1F - Get Property	1F
Command 2	Bit Properties (05): • Bit-0 - <reserved> • Bit-1 - Night Mode • Bit-2 - Error Blink • Bit-3 - Cleanup Report • Bit-4 - Button Lock	A5

- Bit-5 - Detach Load
- Bit-6 - <reserved>
- Bit-7 - Dimmer Mode

PLM Example

Command	Description
0262AABBCC051F05	What are your 05 bit properties?

1F 07 - Get Property | Bit Properties (07)

Requests various boolean persistent properties of the switch.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	1F - Get Property	1F
Command 2	07 - Bit Properties (07)	07

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	1F - Get Property	1F
Command 2	Bit Properties (07): • Bit-0 - <reserved>	1C

- Bit-1 - <reserved>
- Bit-2 - Hop Powerline on RF
- Bit-3 - <reserved>
- Bit-4 - <reserved>
- Bit-5 - <reserved>
- Bit-6 - Relay at Full On
- Bit-7 - <reserved>

PLM Example

Command	Description
0262AABBCC051F07	What are your 07 bit properties?

1F 08 - Get Property | Trigger Group Mask

Returns the current value of the **Trigger Group Mask** property. See **Byte Properties** for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	1F - Get Property	1F
Command 2	08 - Trigger Group Mask	08

Response Format

Name	Description	Example

Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	1F - Get Property	1F
Command 2	Trigger Group Mask	04

Command	Description
0262AABBCC051F08	What is your **Trigger Group Mask**?

1F 09 - Get Property | Bit Properties (09)

Requests various boolean persistent properties of the switch.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	1F - Get Property	1F
Command 2	Bit Properties (09)	09

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)

Command 1	1F - Get Property	1F
Command 2	Bit Properties (09): • Bit-0 - Night LED • Bit-1 - <reserved> • Bit-2 - <reserved> • Bit-3 - <reserved> • Bit-4 - <reserved> • Bit-5 - <reserved> • Bit-6 - <reserved> • Bit-7 - <reserved>	01

PLM Example

Command	Description
0262AABBCC051F09	What are your 09 bit properties?

21 - Instant On/Off

Sets the device to the specified On Level instantly, ignoring any configured Ramp Rate.

Request Format

Name	Description	Example
To **Address (x3)**	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	21 - Instant On/Off	21
Command 2	On Level	FF

Command	Description
0262AABBCC052 1FF	Set your load to 0xFF immediately

30 - Beep

Make an auditory beep.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	30 - Beep	30
Command 2	Unused	01

PLM Example

Command	Description
0262AABBCC053 001	Make a beep sound

31 - Get Success Report

Queries the device for the number of errors of its last manual activation.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	31 - Success Report	31
Command 2	Unused	00

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	25 (direct standard ACK)
Command 1	31 - Success Report	31
Command 2	Error Count	02

PLM Example

Command	Description
0262AABBCC053100	How many errors were encountered in your last cleanup?

---

32 - Direct Group On

Used to remotely simulate a group On activation from the switch. When this command is received, the switch will broadcast and cleanup the specified group the same as if it were due to a local activation. See **11 - Group On** Group Broadcast for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	32 - Direct Group On	32
Command 2	Group #	01

PLM Example

Command	Description
0262AABBCC053 201	Activate your Group 0x01 with an On command

---

33 - Direct Group Off

Used to remotely simulate a group On activation from the switch. When this command is received, the switch will broadcast and cleanup the specified group the same as if it were due to a local activation. See **13 - Group Off** Group Broadcast for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	33 - Direct Group Off	33
Command 2	Group #	01

Command	Description
0262AABBCC0533 301	Activate your Group 0x01 with an Off command

34 - Ramp Rate On

On command which set the switch's load to a specific On Level, but instead of using the preconfigured **Ramp Rate** property, the Ramp Rate is instead passed as a parameter in the command. Note that the number of possible On Level and Ramp Rate values exposed by this command are compromised to make the data fit into a single byte.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	34 - Ramp Rate On	34
Command 2	On Level and Ramp Rate: • Bits 0-3 - (Ramp Rate - 1) / 2 • Bits 4-7 - On Level / 16	A7

PLM Example

Command	Description
0262AABBCC0534 4A7	Go to On Level 0xA0 using Ramp Rate 0x0F (slow)

35 - Ramp Rate Off

Same as above, but On Level is always 0x00.

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	35 - Ramp Rate Off	35
Command 2	(Ramp Rate - 1) / 2	0x07

PLM Example

Command	Description
0262AABBCC053 50F	Turn Off using Ramp Rate 0x0F (slow)

---

38 - Brt/Dim (Relative)

Sets a new On Level relative to the current level. The value specified is a signed 8-bit integer, so:

- 0x00 - 0x7F, will brighten the load by 0-127
- 0x80 - 0xFF, will dim the load by 0-127

If the current On Level + the Relative Level is less than 0x00 or greater than 0xFF, then the switch will stop there and not roll over.

Request Format

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	38 - Brt/Dim (Relative)	38
Command 2	Relative Level	

Command	Description
0262AABBCC053 889	Add -9 to your current On Level

39 - On (Percentage)

Set the switch's On Level scaled as a percentage between the **Minimum On Level** and **Maximum On Level**.

See command **19 06 - Get Status | On Level (Percentage)** to read the current On Level as a percentage.

Note: Much precision is lost over the usual 0-255 range of values.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)

| Command 1 | 39 - On (Percentage) | 39 |
| Command 2 | On Level (Percentage) • Range 0x00 - 0x64 | 32 |

PLM Example

Command	Description
0262AABBCC053 932	Turn on at 50%

3B - Night Mode On

Sets the **Night Mode** property of the switch. See **Bit Properties** for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	3B - Night Mode On	3B
Command 2	Unused	00

PLM Example

Command	Description
0262AABBCC053 B00	It is nighttime; Set your **Night Mode** bit

---

3C - Night Mode Off

Clears the **Night Mode** property of the switch. See **Bit Properties** for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	05 (direct standard)
Command 1	3B - Night Mode On	3B
Command 2	Unused	00

PLM Example

Command	Description
0262AABBCC053C00	It is daytime; Clear your **Night Mode** bit

---

Extended Commands to the Device

In addition to containing a larger payload, **Extended Messages** come with extra built-in protection against data corruption. As such, all commands which have the potential to modify persistent data use them - even if the payload would otherwise fit in the standard format.

The checksum is always the last byte in an extended message, Data 14. To calculate the extended checksum, simply sum the bytes from Command 1 to Data 13, modulo by 256, and then subtract from 256.

Some extended commands are used to query relatively large amounts of data from the switch. In these cases expect a Standard ACK message followed by the provided extended response format.

---

09 - Enter Link Mode

Make the switch enter Link Mode and behave similarly to if its set button was press and held.

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	09 - Enter Link Mode	09
Command 2	Group #	01
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	F6

PLM Example

Command	Description
0262AABBCC150901000000000000000 000000000000F6	Enter Link Mode for Group 0x01

0A - Enter Unlink Mode

Make the switch enter Unlink Mode and behave similarly to if its set button was press and held twice in a row.

Request Format

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	0A -Enter Unlink Mode	0A
Command 2	Group #	01
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	F5

Command	Description
0262AABBCC150A0100000000000000 000000000000F5	Enter Unlink Mode for Group 0x01

20 00 - Modify Bit Property | Set "Programming Lock"

Sets the property "Programming Lock". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20

Command 2	00 - Set "Programming Lock"	00
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	E0

Command	Description
0262AABBCC152000000000000000000 000000000000E0	Set "Disable Property Lock"

20 01 - Modify Bit Property | Clear "Programming Lock"

Clears the property "Programming Lock". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	01 - Clear "Programming Lock"	01
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	DF

Command	Description
0262AABBCC1520010000000000000000000000000DF	Clear "Programming Lock"

20 04 - Modify Bit Property | Set "Resume Dim"

Sets the property "Resume Dim". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	04 - Set "Resume Dim"	04
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	DC

Command	Description
0262AABBCC1520040000000000000000000000000DC	Set "Resume Dim"

20 05 - Modify Bit Property | Clear "Resume Dim"

Clears the property "Resume Dim". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	05 - Clear "Resume Dim"	05
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	DB

PLM Example

Command	Description
0262AABBCC15200500000000000000 000000000000DB	Clear "Resume Dim"

---

20 06 - Modify Bit Property | Set "Relay at Full On"

Sets the property "Relay at Full On". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	06 - Set "Relay at Full On"	06
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	DA

Command	Description
0262AABBCC15200600000000000000 000000000000DA	Clear "Relay at Full On"

20 07 - Modify Bit Property | Clear "Relay at Full On"

Clears the property "Relay at Full On". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To **Address (x3)**	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20

Command 2	07 - Clear "Relay at Full On"	07
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	D9

Command	Description
0262AABBCC15200700000000000000 000000000000D9	Clear "Relay at Full On"

---

20 0A - Modify Bit Property | Set "Key Beep"

Sets the property "Key Beep". See the table in the **Bit Properties** section of this document for details.

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	0A - Set "Key Beep"	0A
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	D6

Command	Description
0262AABBCC15200A00000000000000 000000000000D6	Set "Key Beep"

20 0B - Modify Bit Property | Clear "Key Beep"

Clears the property "Key Beep". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	0B - Clear "Key Beep"	0B
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	D5

PLM Example

Command	Description
0262AABBCC15200B00000000000000 000000000000D5	Clear "Key Beep"

20 0C - Modify Bit Property | Set "Disable RF"

Sets the property "Disable RF". See the table in the **Bit Properties** section of this document for details.

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	0C - Set "Disable RF"	0C
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	D4

PLM Example

Command	Description
0262AABBCC15200C0000000000000 0000000000000D4	Set "Disable RF"

20 0D - Modify Bit Property | Clear "Disable RF"

Clears the property "Disable RF". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	0D - Clear "Disable RF"	0D
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	D3

PLM Example

Command	Description
0262AABBCC15200D00000000000000 000000000000D3	Clear "Disable RF"

---

20 14 - Modify Bit Property | Clear "Error Blink"

Clears the property "Error Blink". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	14 - Clear "Error Blink"	14

Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	CC

Command	Description
0262AABBCC152014000000000000000 000000000000CC	Clear "Error Blink"

---

20 15 - Modify Bit Property | Set "Error Blink"

Sets the property "Error Blink". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	15 - Set "Error Blink"	15
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	CB

PLM Example

Command	Description
0262AABBCC1520150000000000000000000000000000CB	Set "Error Blink"

---

20 16 - Modify Bit Property | Clear "Cleanup Report"

Clears the property "Cleanup Report". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	16 - Clear "Cleanup Report"	16
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	CA

PLM Example

Command	Description
0262AABBCC1520160000000000000000000000000000CA	Clear "Cleanup Report"

20 17 - Modify Bit Property | Set "Cleanup Report"

Sets the property "Cleanup Report". See the table in the **Bit Properties** section of this document for details.

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	17 - Set "Cleanup Report"	17
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C9

PLM Example

Command	Description
0262AABBCC15201700000000000000 000000000000C9	Set "Cleanup Report"

20 18 - Modify Bit Property | Clear "Button Lock"

Clears the property "Button Lock". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	18 - Clear "Button Lock"	18
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C8

PLM Example

Command	Description
0262AABBCC1520180000000000000000 000000000000C8	Clear "Button Lock"

---

20 19 - Modify Bit Property | Set "Button Lock"

Sets the property "Button Lock". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	19 - Set "Button Lock"	19

Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C7

Command	Description
0262AABBCC1520190000000000000000000000000000C7	Set "Button Lock"

20 1A - Modify Bit Property | Clear "Detach Load"

Clears the property "Detach Load". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	1A - Clear "Detach Load"	1A
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C6

PLM Example

Command	Description
0262AABBCC15201A00000000000000000000000000C6	Clear "Detach Load"

---

20 1B - Modify Bit Property | Set "Detach Load"

Clears the property "Detach Load". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	1B - Set "Detach Load"	1B
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C5

PLM Example

Command	Description
0262AABBCC15201B00000000000000000000000000C5	Set "Detach Load"

---

20 1E - Modify Bit Property | Clear "Dimmer Mode"

Clears the property "Dimmer Mode". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	1E - Clear "Dimmer Mode"	1E
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C2

PLM Example

Command	Description
0262AABBCC15201E00000000000000 000000000000C2	Clear "Dimmer Mode"

20 1F - Modify Bit Property | Set "Dimmer Mode"

Sets the property "Dimmer Mode". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	1F - Set "Dimmer Mode"	1F
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C1

PLM Example

Command	Description
0262AABBCC15201F00000000000000 000000000000C1	Set "Dimmer Mode"

---

20 2A - Modify Bit Property | Set "Hop Powerline on RF"

Sets the property "Hop Powerline on RF". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20

Command 2	2A - Set "Hop Powerline on RF"	2A
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	B6

Command	Description
0262AABBCC15202A00000000000000 000000000000B6	Set "Hop Powerline on RF"

20 2B - Modify Bit Property | Clear "Hop Powerline on RF"

Clears the property "Hop Powerline on RF". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	2B - Clear "Hop Powerline on RF"	2B
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	B5

Command	Description
0262AABBCC15202B00000000000000 000000000000B5	Clear "Hop Powerline on RF"

20 2C - Modify Bit Property | Clear "Night LED"

Clears the property "Night LED". See the table in the **Bit Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	2C - Clear "Night LED"	2C
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	B4

PLM Example

Command	Description
0262AABBCC15202C00000000000000 000000000000B4	Clear "Night LED"

20 2D - Modify Bit Property | Set "Night LED"

Sets the property "Night LED". See the table in the **Bit Properties** section of this document for details.

Name	Description	Example
To **Address (x3)**	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	20 - Modify Bit Property	20
Command 2	2D - Set "Night LED"	2D
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	B3

PLM Example

Command	Description
0262AABBCC15202D00000000000000 000000000000B3	Set "Night LED"

---

20 2E - Set Property Macro | Lighting Director Controller

Due to the Keypad's large breadth of configuration options, setting up the Keypad as the controller of a Lighting Director Scene would ordinarily require dozens of commands. In an effort to expedite this process and reduce risk of misconfiguration, this convenience command is provided to set the following properties:

Action	Reason

Detach Load	Configure Button #4 to control the lighting director scene instead of local load
Set Lighting Director Mask	Configure Button #2 and #3 to send **Ramp Rate On** to control lighting director scene
Set Lighting Director Index	Configure Button #2 and #3 to send a lighting director index
Set On Mask	Configure all buttons to control each other and the local load wen pressed
Set Off Mask	Configure all buttons to turn each others off when pressed
Set Group Mask	See above
Set NonToggle Mask	Configure all buttons to be non-toggle
Set NonToggle Off Mask	Configure Buttons #1, #2 and #3 to send **On** and Button #4 to send **Off**
Set Ramp Rate for all buttons	Pressing the button should change the local load
Set On Level for all buttons	Pressing the button should change the local load
Setup Button Profiles	Configure the LEDs to turn On/Off at the right time
Setup Load Profile	Configure a profile for the local load as it is part of the Lighting Director Scene

Request Format

Name	Description	Example
To **Address (x3)**	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)

Command 1	20 - Modify Bit Property	20
Command 2	2E - Set Property Macro | Lighting Director	2E
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	B2

Command	Description
0262AABBCC15202E00000000000000 000000000000B2	Set the all the properties needed to setup this keypad as a lighting director controller

---

2E 00 XX 00 00 - Get Properties | Buttons and LEDs

This command is used to query the state of several properties relating to the behavior of each of the 4 Button/LED groups. There are four instances of the property set described by this command. Send four commands, iterating through group numbers 1 through 4 to read them all. See **Byte Properties** for details regarding a particular property.

Note: Not all properties returned by this command are per-group, so for these properties, the value will ignore the provided Group #. Such properties are marked with an asterisk *.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)

Command 1	2E - Get/Set Properties	2E
Command 2	00 - Get/Set Properties	00
Data 1	Group # • Range: 1-4	01
Data 2	00 - Get Properties	00
Data 3	00 - Buttons and LEDs	00
Data 4-14	Unused	00 00 00 00 00 00 00 00 00 00 00

Response Format

Standard ACK followed by:

Name	Description	Example
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Group # • Range: 1-4	01
Data 2	01 - Return of Requested Data	01
Data 3	LED On Mask	00
Data 4	LED Off Mask	00
Data 5	<Reserved>	00
Data 6	<Reserved>	00
Data 7	Ramp Rate	1F
Data 8	On Level	FF

Data 9	LED Brightness*	3F
Data 10	NonToggle Mask*	00
Data 11	LED State Mask*	00
Data 12	<reserved>	00
Data 13	NonToggle Off Mask*	00
Data 14	LED Group Mask	00

*Property is not Per-Group

Command	Description
0262AABBCC152E000100000000000 000000000000000	What are your Button/LED properties for Group 0x01?

2E 00 00 00 04 - Get Properties | Load Calibration and Night Mode

This command is used to query the state of several properties relating to the calibration of the attached load and the switch's behavior during **Night Mode**. See **Byte Properties** for details regarding a particular property.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Unused (Group #)	00

Data 2	00 - Get Properties	00
Data 3	04 - Load Calibration and Night Mode	04
Data 4-14	Unused	00 00 00 00 00 00 00 00 00 00 00

Response Format

Standard ACK followed by:

Name	Description	Example
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Group # • Range: 1-4	01
Data 2	01 - Return of Requested Data	01
Data 3	<reserved>	05
Data 4	Max On Level	F1
Data 5	Min On Level	20
Data 6	Start On Level	00
Data 7, 8	<reserved>	12 34
Data 9	Night Max On Level	7F
Data 10	Night LED Brightness	1F
Data 11	Night Ramp Rate	1B
Data 12	Load Number	01

Data 13	<reserved>	00
Data 14	<reserved>	00

Command	Description
0262AABBCC152E0000000400000 000000000000000	What are your Load Calibration and Night Mode properties?

2E 00 XX 02 - Set Byte Properties | LED On Mask

Sets the value of the "LED On Mask" property. See the table in the **Byte Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Group # • Range: 1-4	01
Data 2	02 - Set "LED On Mask"	02
Data 3	Value	03
Data 4-13	Unused	00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	CC

Command	Description
0262AABBCC152E0001020300000000000 000000000CC	Set "LED On Mask" for LED/Button #1 to 03

2E 00 XX 03 - Set Byte Properties | LED Off Mask and LED Group Mask

Sets the value of the "LED Off Mask" and "LED Group Mask" properties. See the table in the **Byte Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Group # • Range: 1-4	01
Data 2	03 - Set "LED Off Mask" and "Group Mask"	03
Data 3	LED Off Mask	03
Data 4	Group Mask	05
Data 5-13	Unused	00 00 00 00 00 00 00 00 00
Data 14	Checksum	C8

Command	Description
0262AABBCC152E0001030303000000000000000000C8	Set "LED Off Mask" and "Group Mask" of LED/Button #1 to 03 and 05

"

2E 00 XX 05 - Set Byte Properties | Ramp Rate

Sets the value of the "Ramp Rate" property. See the table in the **Byte Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Group # • Range: 1-4	01
Data 2	05 - Set "Ramp Rate"	05
Data 3	Value	1F
Data 4-13	Unused	00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	AD

Command	Description
0262AABBCC152E0001051F000000000000 00000000AD	Set "Ramp Rate" of LED/Button #1 to 1F

2E 00 XX 06 - Set Byte Properties | On Level

Sets the value of the "On Level" property. See the table in the **Byte Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Group # • Range: 1-4	01
Data 2	06 - Set "On Level"	06
Data 3	Value	B5
Data 4-13	Unused	00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	16

PLM Example

Command	Description
0262AABBCC152E000106B500000000000 00000000016	Set "On Level" of LED/Button #1 to B5

2E 00 00 07 - Set Byte Properties | LED Brightness

Sets the value of the "LED Brightness" property. See the table in the **Byte Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Unused (Group #)	00
Data 2	07 - Set "LED Brightness"	07
Data 3	Value	3F
Data 4-13	Unused	00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	8C

PLM Example

Command	Description
0262AABBCC152E0000073F00000000000 0000000008C	Set "LED Brightness" to 3F

2E 00 00 08 - Set Byte Properties | NonToggle Mask

Sets the value of the "NonToggle Mask" property. See the table in the **Byte Properties** section of this document for details.

Name	Description	Example
To **Address (x3)**	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Unused (Group #)	00
Data 2	08 - Set "NonToggle Mask"	08
Data 3	Value	02
Data 4-13	Unused	00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C8

PLM Example

Command	Description
0262AABBCC152E0000080200000000000 000000000C8	Set "NonToggle Mask" to 02

2E 00 00 09 - Set LED State Mask

Sets the state of the LEDs. See the table in the **Byte Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	\<see Insteon documentation\>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Unused (Group #)	00
Data 2	09 - Set "LED State Mask"	09
Data 3	Value	03
Data 4-13	Unused	00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C6

PLM Example

Command	Description
0262AABBCC152E0000090300000000000 000000000C6	Set "LED State Mask" to 03

2E 00 00 0B - Set Byte Properties | NonToggle Off Mask

Sets the value of the "NonToggle Off Mask" property. See the table in the **Byte Properties** section of this document for details.

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Unused (Group #)	01
Data 2	0B - Set "NonToggle Off Mask"	0B
Data 3	Value	03
Data 4-13	Unused	00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C4

PLM Example

Command	Description
0262AABBCC152E00000B0300000000000000000000C4	Set "NonToggle Off Mask" to 03

2E 00 00 0C - Set Byte Properties | Trigger Group Mask

Sets the value of the "Trigger Group Mask" property. See the table in the **Byte Properties** section of this document for details.

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Unused (Group #)	00
Data 2	0C - Set "Trigger Group Mask"	0C
Data 3	Value	03
Data 4-13	Unused	00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C3

PLM Example

Command	Description
0262AABBCC152E00000C0300000000000 000000000C3	Set "Trigger Group Mask" to 03

2E 00 00 0D - Set Byte Properties | Load Calibration

Sets the value of several properties related to the calibration of the attached load. See the table in the **Byte Properties** section of this document for details.

Request Format

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Unused (Group #)	01
Data 2	0D - Set Load Calibration Properties	0D
Data 3	Max On Level	F1
Data 4	Min On Level	17
Data 5	Start On Level	25
Data 6-13	Unused	00 00 00 00 00 00 00 00
Data 14	Checksum	98

PLM Example

Command	Description
0262AABBCC152E00000DF1172500000000 0000000098	Set "Max On Level" to F1, "Min On Level" to 17 and "Start On Level" to 25

2E 00 XX 11 - Set Byte Properties | LED Flags

Sets the value of the "LED Flags" property. See the table in the **Byte Properties** section of this document for details.

Request Format

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Group #	01
Data 2	11 - Set "LED Flags"	11
Data 3	Value	00
Data 4-13	Unused	00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	C0

PLM Example

Command	Description
0262AABBCC152E00011100000000000000 00000000C0	Set "LED Flags" to <u>00</u>

2E 00 00 12 - Set Byte Properties | Night Mode

Sets various properties regarding how the switch behaves when in **Night Mode**. See the table in the **Byte Properties** section of this document for details.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC

Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Unused (Group #)	00
Data 2	12 - Set Night Mode properties	12
Data 3	Night Max On Level	7F
Data 4	Night LED Brightness	1F
Data 5	Night Ramp Rate	1B
Data 4-13	Unused	00 00 00 00 00 00 00 00
Data 14	Checksum	07

Command	Description
0262AABBCC152E0000121B1F7F00000000 0000000007	Set "Night Ramp Rate" to 1B, "Night LED Brightness" to 1F and "Night Max On Level" to 7F

2E 00 00 13 - Set Byte Properties | Load Number

Sets the value of the "Load Number" property. See the table in the **Byte Properties** section of this document for details.

Name	Description	Example

To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	00 - Byte Properties	00
Data 1	Unused (Group #)	00
Data 2	13 - Set "Load Number"	13
Data 3	Value • Range: 1-4	1
Data 4-13	Unused	00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	BE

PLM Example

Command	Description
0262AABBCC152E00001301000000000000 00000000BE	Set "Load Number" to 01

2E 01 00 - Bulk Get Properties

A convenience command for quickly querying many properties at once.

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E

Command 2	01 - Bulk Operation	01
Data 1	00 - Get Properties	00
Data 2-14	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	01 - Bulk Get Properties	01
Data 1	01 - Get Properties (Return Data)	01
Data 2	Bit Properties (00)* *See 1F 00 for details*	A2
Data 3	Bit Properties (05)* *See 1F 05 for details*	03
Data 4	Bit Properties (Misc.) • Bit-0 - <reserved> • Bit-1 - <reserved> • Bit-2 - <reserved> • Bit-3 - Dimmer Mode • Bit-4 - Night Mode • Bit-5 - Disable Database Cache	13
Data 5	Current Ramp Rate	1F
Data 6	Current On Level	FF
Data 7	LED Brightness	3F

Data 8	Min On Level	F1
Data 9	Max On Level	20
Data 10	Start On Level	00
Data 11	Night Max On Level	7F
Data 12	Night LED Brightness	1F
Data 13	Night Ramp Rate	1B
Data 14	Checksum	C2

Command	Description
0262AABBCC152E0010000000000000000000000000000C2	Read Request for Properties

2E 01 02 - Bulk Set Properties

A convenience command for quickly setting many properties at once. These are the same properties which can be read in bulk with **2E 01 00**.

Request Format

Name	Description	Example
To **Address (x3)**	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2E - Byte Properties	2E
Command 2	01 - Bulk Operation	01
Data 1	02 - Set Properties	02

Data 2	Bit Properties (00)* *See 1F 00 for details	A2
Data 3	Bit Properties (05)* *See 1F 05 for details	03
Data 4	Bit Properties (Misc.) • Bit-0 - \<reserved\> • Bit-1 -\<reserved\> • Bit-2 - \<reserved\> • Bit-3 - Dimmer Mode • Bit-4 - Night Mode • Bit-5 - Disable Database Cache	13
Data 5	Current Ramp Rate	1F
Data 6	Current On Level	FF
Data 7	LED Brightness	3F
Data 8	Min On Level	F1
Data 9	Max On Level	20
Data 10	Start On Level	00
Data 11	Night Max On Level	7F
Data 12	Night LED Brightness	1F
Data 13	Night Ramp Rate	1B
Data 14	Checksum	B2

PLM Example

Command	Description
0262AABBCC152E0102000000000000000000000000000CF	Bulk set a bunch of properties

Database Format

Database Layout

Section Name	Start Address	End Address	Entry Size	Max Entries
Device Records*	0xFFF	0x300	8	416
Lighting Director Profiles**	0x100	0x200	16	16

*The switch consumes it's device record address space in descending order which is why the start address is higher than end.

**The first profile entry (profile index = 0) is dedicated to the local profile.

Device Record Format

The 2F commands below all reference a common data structure used by many Insteon devices, the "Database Record". For the sake of brevity, "Database Record" will henceforth be used to represent the following format

	Description	Example

Database Flags	Database Flags:
	
	• Bit-0 - Fast Fail
	• Bit-1 - High Water Mark
	• Bit-2 - Lighting Director
	• Bit-3-4 - Smart Hops
	• Bit-5 - 1
	• Bit-6 - Control Direction:
	   ◦ 0 - It controls this device
	   ◦ 1 - This device controls it
	• Bit-7 - Active
		A2

	Note: Some flags may be modified at the switch's discretion. As such, they are excluded from database checksum calculation.	
Group Number	Group number to associate with record	01
ID (x3)	Other device's ID	AA BB CC
On Level	On Level to go to during a group activation event Note: If this is a controller record (Control Direction = 1), then this byte is unused	FF
Ramp Rate	Ramp Rate to use during a group activation event Note: If this is a controller record (Control Direction = 1), then this byte is unused	1F
Group Number (Internal)	The LED/Button of the Keypad which should be controlled by group activation events Note: If this is a controller record (Control Direction = 1), then this byte is unused	01

2F 00 XX 00 - Read Database Record(s)

Read one or more records from the switch's database. Among other things, database records are primarily used for defining controller and responder records amongst devices.

Request Format

Name	Description	Example

To	Switch ID	AABBCC
Address (x3)		
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2F - Database Record Management	2F
Command 2	00	00
Data 1	00	00
Data 2	00 - Read	00
Data 3-4	Address	0F FF
Data 5	Number of Records	01
Data 6-13	Unused	00 00 00 00 00 00 00 00
Data 14	Checksum	C2

Response Format

Name	Description	Example
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2F - Database Record Management	2F
Command 2	00	00
Data 1	00	00
Data 2	01 - Return Data	01
Data 3-4	Record Address • Range: 0x0FFF–0x0407 • Must be a multiple of 8	0F FF

Data 5-6	00 or #of bytes	00
Data 6	Record Flag	AA
Data 7-13	Database Record	01 AA AA 02 FF 1C 01
Data 14	Checksum	C2

Note: Additional extended responses will be sent out until the number of records requested is met or if the database address highwater mark is met.

PLM Example

Command	Description
0262AABBCC152F000000FFF00000000000000000C2	Read 1 database record starting at address 0FFF

2F 00 00 02 - Write Database Record(s)

Used to write a record (or part of a record) into the switch's database at a specific address.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2F - Database Record Management	2F
Command 2	00	00
Data 1	00	00
Data 2	02 - Write	02
Data 3-4	Write Address	FF F0

Data 5	Bytes to Write: • Range: 1-8	08
Data 6-13	Write Data	A2 05 00 5E 5D FE 1F 01
Data 14	Checksum	58

PLM Example

Command	Description
0262AABBCC152F000002FFF008A2 05005E5DFE1F0158	Write A205005E5DFE1F01 starting at address FFF0

2F 00 00 03 - Modify Database Record

Add, modify or delete a single record matching the provided data.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	2F - Database Record Management	2F
Command 2	00	00
Data 1	00	00
Data 2	03 - Modify	03
Data 3	Keypad DevCat	01
Data 4	Keypad SubCat	59

Data 5	08	08
Data 6-13	Record Data • If "Active=0", the operation will be *Delete* • If "Active=1" and a record matching the provided Insteon ID and Control Direction bit is found, then the operation will be *Update* • If "Active=1" and a record matching the provided Insteon ID and Control Direction bit is not found, then the operation will be *Add*	A2 05 00 5E 5D FE 1F 01
Data 14	Checksum	EC

PLM Example

Command	Description
0262AABBCC152F000003015908A2 05005E5DFE1F01EC	Update or add record <u>A205005E5DFE1F01</u>

30 - Trigger Another Device's Group

When the switch receives this command, it will behave as if the button specified in *Data 1* has been pressed. This includes local activation, group broadcast, cleanups, etc

Note: The recipient must be linked to the sender for this command to function

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	30 - Trigger Another Device's Group	30
Command 2	00	00
Data 1	Group #	01
Data 2	On Level Mode: • 00 - Use On Level specified in *Data 3* • 01 - Use local On Level	01
Data 3	On Level (ignored if *Data 2 = 01*)	00
Data 4	Broadcast Command 1	11
Data 5	Broadcast Command 2	00
Data 6	Ramp Rate Mode: • 00 - Use local Ramp Rate • 01 - Use instant Ramp Rate	00
Data 7-13	Unused	00 00 00 00 00 00 00
Data 14	Checksum	BD

PLM Example

Command	Description

0262AABBCC153000010100110000000 00000000000BD	Trigger Group <u>On</u> to group #<u>01</u> using the <u>local On Level</u> and <u>local Ramp Rate</u>

34 - Factory Reset

Resets the switch's properties back to factory default. This is the same as long pressing the set button after power cycle.

Request Format

Name	Description	Example
To Address (x3)	Switch ID	AABBCC
Flags Byte	<see Insteon documentation>	15 (direct extended)
Command 1	36 - Factory Reset	36
Command 2	Unused	Unused
Data 1-13	Unused	00 00 00 00 00 00 00 00 00 00 00 00 00
Data 14	Checksum	CC

PLM Example

Command	Description
0262AABBCC153600000000000000000 0000000000000CC	Factory reset

Standard Broadcasts

These are the standard-length broadcast messages which the device may send, or which the device may react to. By definition, these broadcasts have no specific target device or group of devices, but are public announcements on the Insteon network and thus are not ACK'd. Standard Broadcasts can be identified by their Insteon flags byte **0x8X**.

01 - Button Held (Link Mode)

Sent by a switch when its Set Button is pressed and held. The purpose of this broadcast is twofold: it serves a role in completing user-initiated manual linking and it helps automation controllers identify switches and their model number. The broadcast is sent regardless of **Programming Lock** being set/clear.

This broadcast can also be triggered remotely using the **10 - ID Request** standard command.

Broadcast Format

Name	Description	Example
Broadcast Data 1	Device Category	3C
Broadcast Data 2	Device Subcategory	4A
Broadcast Data 3	Version	13
Flags Byte	<see Insteon documentation>	8F (Standard Broadcast)
Command 1	01 - Button Held (Link Mode)	01
Command 2	Hardware Version	06

03 - Test RF

This is a diagnostic command sent from the switch in one second intervals after the set button has been pressed three times rapidly and "Programming Lock" is set. Press the set button a fourth time at any point to stop these broadcasts. Unlike all other communication, this broadcast is *only* transmitted on the radio band. Any devices which are close enough to hear this command will flash their LED once to indicate they are within "zero hop" radio range of the device being tested. This message is never hopped.

Broadcast Format

Name	Description	Example
Broadcast Data 1	Unused	00
Broadcast Data 2	Unused	00
Broadcast Data 3	Unused	00
Flags Byte	<see Insteon documentation>	8F (Standard Broadcast)
Command 1	03 - Test RF	03
Command 2	Unused	00

3A - Database Checksum

This broadcast from the switch contains a checksum which can be used to identify a snapshot of a switch's database. Controller software may wish to know when a device's database has been modified for any reason. Using software, controllers can "subscribe" to these broadcasts to be notified when a database has changed. This checksum excludes variable data including smarthop count, fastfail flag and non-active records.

This broadcast is sent as a result of **19 07 - Get Status | Database Checksum**.

Broadcast Format

Name	Description	Example
Checksum (x3)	3-Byte Fletcher Checksum	1C 4A 93
Flags Byte	<see Insteon documentation>	8F (Standard Broadcast)
Command 1	3A - Database Checksum	3A
Command 2	Unused	00

Group Broadcasts

Similar to Standard Broadcasts, Goup Broadcasts are also standard-length commands which do not specify a single device as the "To Address". Rather, Group Broadcasts are announcements targeted towards a group of devices setup ahead of time. They can be identified by their Insteon flags byte **0xCX**. Groups can be set up either using linking mode or by modifying device databases directly with **2F** command(s). Group Broadcasts always specify the target group # in the "Broadcast Data 3" byte of the insteon message.

For control group broadcasts sent from the switch such as **11 - Group On**, the switch will automatically follow up the broadcast with a series of cleanup messages to each known responder for that group and finally with a cleanup report. Cleanup messages, identified by Insteon flags byte **0x4X**, are a necessary redundancy to ensure responders are in the correct state following the activation.

06 - Cleanup Report

After a group activation, the switch will directly ask all known responders in its database to confirm its state. This is called a cleanup and helps correct for when a responder misses the original broadcast. The Cleanup Report is sent after all Cleanup attempts have concluded and conveys information regarding the success rate of the activation. Software subscribed to this broadcast will have insight into the health of the Insteon ecosystem.

Since Cleanup Reports contain the subset of information as the original Group Broadcast, they serve as the final opportunity for a problematic device to react to a group activation event.

Broadcast Format

Name	Description	Example
Broadcast Data 1	Original Command	11 (On)
Broadcast Data 2	Number of Responders	03
Broadcast Data 3	Group #	01
Flags Byte	<see Insteon documentation>	CF (Group Broadcast)
Command 1	06 - Cleanup Report	06
Command 2	Cleanup Fail Count	01

---

11 - Group On

Broadcast used to control to a group of devices so they may change state in unison. Responders will react by going to the On Level at the Ramp Rate specified in their controller record for the provided group.

This command is sent by the keypad when a button is tapped a single time and either:

- The Button/LED is in the Off state and the Button is configured to toggle state
- The Button/LED is configured to always send the On command

The button # pressed corresponds to which Group # is provided in Command 2. After the keypad sends this broadcast, it will clean up all devices which are present as a responder record in the keypad's database for this group.

Broadcast Format

Name	Description	Example

Broadcast Data 1	Unused	00
Broadcast Data 2	Unused	00
Broadcast Data 3	Group #	01
Flags Byte	<see Insteon documentation>	CF (Group Broadcast)
Command 1	11 - Group On	11
Command 2	Group #	01

PLM Example

Command	Description
0262000001C511 01	Group 01: Turn On

---

12 - Group Fast On

Broadcast used to control to a group of devices so they may change state in unison. Responders will react by going to the On Level specified in their controller record for the provided group with an instantaneous Ramp Rate.

This command is sent by the keypad when a button is double tapped and either:

- The Button/LED is in the Off state and the Button is configured to toggle state
- The Button/LED is configured to always send the [Fast] On command

The button # pressed corresponds to which Group # is provided in Command 2. After the keypad sends this broadcast, it will clean up all devices which are present as a responder record in the Keypad's database for this group.

Name	Description	Example
Broadcast Data 1	Unused	00
Broadcast Data 2	Unused	00
Broadcast Data 3	Group #	01
Flags Byte	<see Insteon documentation>	CF (Group Broadcast)
Command 1	12 - Group Fast On	12
Command 2	Group #	01

PLM Example

Command	Description
0262000001CF12 01	Group 01: Turn On instantly

13 - Group Off

Broadcast used to control to a group of devices so they may change state in unison. Responders will react by going to On Level 00 at the Ramp Rate specified in their controller record for the provided group.

This command is sent by the keypad when a button is pressed a single time and either:

- The Button/LED is in the On state and the Button is configured to toggle state
- The Button/LED is configured to always send the Off command

The button # pressed corresponds to which Group # is provided in Command 2. After the keypad sends this broadcast, it will clean up all devices which are present as a responder record in the keypad's database for this group.

Broadcast Format

Name	Description	Example
Broadcast Data 1	Unused	00
Broadcast Data 2	Unused	00
Broadcast Data 3	Group #	01
Flags Byte	<see Insteon documentation>	CF (Group Broadcast)
Command 1	13 - Group Off	13
Command 2	Group #	01

PLM Example

Command	Description
0262000001C513 01	Group 01: Turn Off

---

14 - Group Fast Off

Broadcast used to control to a group of devices so they may change state in unison. Responders will react by going to On Level 00 with an instantaneous Ramp Rate.

This command is sent by the keypad when a button is double tapped and either:

- The Button/LED is in the On state and the Button is configured to toggle state

- The Button/LED is configured to always send the [Fast] Off command

The button # pressed corresponds to which Group # is provided in Command 2. After the keypad sends this broadcast, it will clean up all devices which are present as a responder record in the keypad's database for this group.

Broadcast Format

Name	Description	Example
Broadcast Data 1	Unused	00
Broadcast Data 2	Unused	00
Broadcast Data 3	Group #	01
Flags Byte	<see Insteon documentation>	CF (Group Broadcast)
Command 1	14 - Group Fast Off	14
Command 2	Group #	01

PLM Example

Command	Description
0262000001C514 01	Group 01: Turn Off instantly

15 - Group Brt

Broadcast used to control to a group of devices so they may change state in unison. Responders will react by *increasing* their brightness by 08.

They keypad cannot be configured to send this broadcast, but it may respond to other devices which may.

Note: It is unwise to cleanup broadcast commands which lack idempotency as the cleanups can brighten the switch even further when being cleaned up.

Broadcast Format

Name	Description	Example
Broadcast Data 1	Unused	00
Broadcast Data 2	Unused	00
Broadcast Data 3	Group #	01
Flags Byte	<see Insteon documentation>	CF (Group Broadcast)
Command 1	15 - Group Brt	15
Command 2	Group #	01

PLM Example

Command	Description
0262000001C515 01	Group 01: Brighten by 08

---

17 - Group Dim

Broadcast used to control to a group of devices so they may change state in unison. Responders will react by *decreasing* their brightness by 08.

They keypad cannot be configured to send this broadcast, but it may respond to other devices which may.

Note: It is unwise to cleanup broadcast commands which lack idempotency as the cleanups can brighten the switch even further when being cleaned up.

Broadcast Format

Name	Description	Example
Broadcast Data 1	Unused	00
Broadcast Data 2	Unused	00
Broadcast Data 3	Group #	01
Flags Byte	<see Insteon documentation>	CF (Group Broadcast)
Command 1	17 - Group Dim	17
Command 2	Group #	01

PLM Example

Command	Description
0262000001C517 01	Group 01: Dim by 08

---

18 - Group Start Manual Change

Broadcast used to control to a group of devices so they may change state in unison. Responders will react by starting to change the On Level of their load in the provided direction (brt/dim). It takes 4 seconds for a device that is fully off (0x00) to reach fully on (0xFF) and vice

versa. This translates to about 1 level change about every 16.67ms. The change is automatically stopped when the min/max On Level is reached, or manually with a follow-up **19 - Group Stop Manual Change** broadcast.

This command is sent by the keypad when a button is pressed and held. The button # pressed corresponds to which Group # is provided in Broadcast Data #3.

The direction specified in Command 2 is determined by the state of the button pressed and how the button is configured.

The keypad will not cleanup this broadcast.

Broadcast Format

Name	Description	Example
Broadcast Data 1	Unused	00
Broadcast Data 2	Unused	00
Broadcast Data 3	Group #	01
Flags Byte	<see Insteon documentation>	CF (Group Broadcast)
Command 1	18 - Group Start Manual Change	18
Command 2	Direction: • 0 - Dim • 1 - Brighten	01

PLM Example

Command	Description
0262000001C518 01	Group 01: Begin increasing your load

---

19 - Group Stop Manual Change

Follow broadcast to **18 - Group Start Manual Change**.

This broadcast is sent by the keypad if when the user releases a button after having pressed and held it. This command simply halts the brightening/dimming of the load granted the responder(s) haven't already reached their min/max On Level.

Broadcast Format

Name	Description	Example
Broadcast Data 1	Unused	00
Broadcast Data 2	Unused	00
Broadcast Data 3	Group #	01
Flags Byte	<see Insteon documentation>	CF (Group Broadcast)
Command 1	19 - Group Off	19
Command 2	Group #	01

PLM Example

Command	Description
0262000001C513 01	Group 01: Stop brightening/dimming your load

3B – Night Mode On

Inform a group of devices to set their "Night Mode" property. See the table in the **Bit Properties** section of this document for details.

The keypad cannot be configured to send this broadcast, but will respond to switches which may.

Broadcast Format

Name	Description	Example
Broadcast Data 1	Unused	00
Broadcast Data 2	Unused	00
Broadcast Data 3	Group	01
Flags Byte	<see Insteon documentation>	CF (Group Broadcast)
Command 1	3B – Night Mode On	3B
Command 2	Group	01

PLM Example

Command	Description
0262000001C53B 01	Group 01: Set **Night Mode**

3C - Night Mode Off

Inform a group of devices to clear their "Night Mode" property. See the table in the **Bit Properties** section of this document for details.

The keypad cannot be configured to send this broadcast, but will respond to switches which may.

Broadcast Format

Name	Description	Example
Broadcast Data 1	Unused	00
Broadcast Data 2	Unused	00
Broadcast Data 3	Group	01
Flags Byte	<see Insteon documentation>	CF (Group Broadcast)
Command 1	3C - Night Mode Off	3B
Command 2	Group	01

PLM Example

Command	Description
0262000001C53 C01	Group 01: Clear **Night Mode**