

Developer Notes

INSTEON Thermostat

Version 012

June 19, 2012

Revision History

Rev	Date	Comments
001	10/28/11	Initial Release
002	11/4/11	Updated formatting in some sections for easier reading
003	11/4/11	Fixed examples and editing
004	12/13/11	Added commands
005	1/24/12	Added commands
006	2/1/12	Added yellow filter updates
007	2/2/12	Updated command list.
008	4/19/12	Changed status report group flag to check EF group
009	4/20/12	Added example for adding a device to the status reporting group
010	5/8/12	...
011	5/8/12	Added 2 byte CRC calculations
012	6/19/12	Updated product name

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1 Firmware Description

1.1 INSTEON Commands Supported

1.1.1 Standard length common INSTEON commands:

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

Assign to ALL-Link Group Command

Description: Sent when holding down the SET Button for 3 seconds on the device. Blinks the LED green for 4 minutes or until linked to another device.

Example (Hex): AA BB CC 05 0B 99 CF 01 01 (where AA.BB.CC is the Thermostat's ID)

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Assign to ALL-Link Group	From Device	Device's ID	0x05, 0x0B, 0xXX (firmware revision)	Broadcast	0x01	0x00	Sent when holding down SET Button for 3 seconds. Group number for Thermostat is 0x01

Delete from ALL-Link Group Command

Description: Blinks the LED red for 4 minutes or until unlinked from another device.

Example (Hex): AA BB CC 05 0B 99 CF 02 01 (where AA.BB.CC is the Thermostat's ID)

Delete from ALL-Link Group	From Device	Device's ID	0x05, 0x0B, 0xXX (firmware revision)	Broadcast	0x02	0x00	Group number for Thermostat is 0x01
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INSTEON Engine Version Command

Description: Returns the INSTEON Engine version in the acknowledgement.

INSTEON Engine Version	To device	Sender's ID	Device's ID	Direct	0x0D	0x00	
	Response	Device's ID	Sender's ID	Ack	0x0D	0x02	Indicate i2CS engine version

Ping Command

Description: Returns the exact same message with an acknowledgement.

Ping	To device	Sender's ID	Device's ID	Direct	0x0F	0x00 -> 0xFF (Don't Care Value)	
	Response	Device's ID	Sender's ID	Ack	0x0F	Same as sent	

ID Request Command

Description: Same as holding down the SET Button for 3 seconds on the device, but without going into linking mode

Example (Hex): AA BB CC DD EE FF 0F 0A 01 (where DD.EE.FF is the Sender's ID, AA.BB.CC is the Devices's Id)

ID Request	To device	Sender's ID	Device's ID	Direct	0x10	0x00 -> 0xFF (Don't Care Value)	
	Response	Device's ID	Sender's ID	Ack	0x10	Same as sent	
	Sent from Device	Device's ID	0x05 0x0B 0xZZ (firmware revision)	Broadcast	0x01	0x00	Same as holding down SET Button for 3 seconds, but device not in linking mode

Success Report Broadcast

Description: Sent at the end of a group broadcast

Example (Hex): AA BB CC 11 03 01 CF 06 01 (where AA.BB.CC is the Device's ID, cleanup of cmd1 = 0x11, group = 0x01, 1 out of 3 devices failed to cleanup correctly)

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Broadcast cleanup	To device	Sender's ID	Hi byte = cmd1 being Cleaned up Med byte = Number of devices to be cleaned up Lo byte = Group Number	Group Broadcast	0x06	0x00 -> 0xFF (Number of Failed Cleanups)	

1.1.2 Standard length Thermostat INSTEON commands:

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Thermostat Temperature Up	To device	Sender's ID	Device's ID	Direct	0x68	0x00 -> 0xFF (Temperature Change x 2)	Increase current temperature setting by Temperature Change x 0.5
	Response	Device's ID	Sender's ID	Ack	0x68	Same as sent	

Thermostat Temperature Down	To device	Sender's ID	Device's ID	Direct	0x69	0x00 -> 0xFF (Temperature Change x 2)	Decrease current temperature setting by Temperature Change x 0.5
	Response	Device's ID	Sender's ID	Ack	0x69	Same as sent	

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Thermostat Set Cool set point	To device	Sender's ID	Device's ID	Direct	0x6C	0x00 -> 0xFF (Temperature x 2)	change current temperature cool set point to Temperature x 0.5
	Response	Device's ID	Sender's ID	Ack	0x6C	Same as sent	

Thermostat set heat set point	To device	Sender's ID	Device's ID	Direct	0x6D	0x00 -> 0xFF (Temperature x 2)	change current temperature heat set point to Temperature x 0.5
	Response	Device's ID	Sender's ID	Ack	0x6D	Same as sent	

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Thermostat Status	To device	Sender's ID	Device's ID	Direct	0x6A	See Thermostat Status Info	
	Response	Device's ID	Sender's ID	Ack	0x6B	Same as sent	

Thermostat Status Info

Cmd2	Description	Thermostat Support	Comments
0x00	Temperature returned in ACK	yes	In 1 degree units
0x20	Setpoint returned in ACK	yes	In 1 degree units
0x60	Humidity returned in ACK	yes	In 1 percent units

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Thermostat Control	To device	Sender's ID	Device's ID	Direct	0x6B	See Thermostat Control Info	
	Response	Device's ID	Sender's ID	Ack	0x6B	Same as sent	

Thermostat Control Info

Cmd2	Description	Thermostat Support	Comments
0x04	set mode to heat and returns 04 in ACK	yes	On Heat
0x05	set mode to cool and returns 05 in ACK	yes	On Cool
0x06	set mode to manual auto and returns 06 in ACK	yes	Manual Auto
0x07	Turn fan on and returns 07 in ACK	yes	On Fan
0x08	Turn fan auto mode and returns 08 in ACK	yes	Off Fan
0x09	Turn all off and returns 09 in ACK	yes	Off All
0x0A	set mode to auto and returns 0A in ACK	yes	Auto

To set a device to get status reporting add a controller of device link with group 0xEF and set 0x2E to 0x08.

Example: (Thermostat INSTEON ID: 0x01 78 5A; PLM INSTEON ID: 0x14 82 86

```

02 62 01 78 5A 1F 2F 00 00 02 1F FF 08 E2 EF 14 82 86 00 00 EF CD
02 62 01 78 5A 1F 2F 00 00 02 1F FF 08 E2 EF 14 82 86 00 00 EF CD 06  INSTEON EXT TX
Set Database
02 50 01 78 5A 14 82 86 2B 2F 00  INSTEON STD RX
02 62 01 78 5A 1F 2E 00 00 08 00 00 00 00 00 00 00 00 00 00 CA
02 62 01 78 5A 1F 2E 00 00 08 00 00 00 00 00 00 00 00 00 CA 06 Check FE Group
and Set FE Group Flag
02 50 01 78 5A 14 82 86 2B 2E 00  INSTEON STD RX

02 50 01 78 5A 14 82 86 01 70 03  Status Reporting Mode Status
    
```

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Status Reporting Temperature	From device	Device's ID		Direct	0x6E	0x00 -> 0xFF (Temperature Change x 0.5)	
Status Reporting Humidity	From device	Device's ID		Direct	0x6F	0x00 -> 0xFF (Humidity)	
Status Reporting Mode/Fan Status	From device	Device's ID		Direct	0x70	0x00 = Off 0x01 = Heat 0x02 = Cool 0x03 = Auto 0x04 = Fan 0x05 = N/A 0x06 = N/A 0x07 = N/A 0x08 = Fan Always On 0x09=> 0xFF Unused (Mode Status)	
Status Reporting Cool set point	From device	Device's ID		Direct	0x71	0x00 -> 0xFF (Cool set point)	
Status Reporting Heat set point	From device	Device's ID		Direct	0x72	0x00 -> 0xFF (Heat set)	

1.1.3

Extended length Thermostat INSTEON commands:

Extended Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Data 1 (1 byte)	Data 2 (1 byte)
Get Database	To device	Sender's ID	Device's ID	Extended Direct	0x2F	0x00	0x00 -> 0xFF (Don't Care Value)	See Get Database Info
	Response	Device's ID	Sender's ID	Standard Ack	0x2F	0x00	N/A	N/A
	From device	Device's ID	Sender's ID	Extended Direct	0x2F	0x00	Same as sent	See Returned Extended Get Database Info

Get Database Info									
Data 2 (1 byte)	Data 3	Data 4	Data 5	Data 6	Data 7	Data 8	Data 9	Data 10	Data 11
0x00	0x00 -> 0xFF (Hi Byte Address)	0x00 -> 0xFF (Lo Byte Address)	0x00 -> 0xFF (# of Records, 0x00 dumps all records)	N/A	N/A	N/A	N/A	N/A	N/a

Returned Extended Get Database Info (will continue to be sent until # of records is sent or until the first never been used record is sent)									
Data 2 (1 byte)	Data 3	Data 4 (1 byte)	Data 5	Data 6	Data 7	Data 8	Data 9	...	Data 13
0x01	0x00 -> 0xFF (Hi Byte Address)	0x00 -> 0xFF (Lo Byte Address)	0x00	Byte 1 of record	Byte 2 of record	Byte 3 of record	Byte 4 of record		Byte 8 of record

Extended Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Data 1 (1 byte)	Data 2 (1 byte)
Set Database	To device	Sender's ID	Device's ID	Extended Direct	0x2F	0x00	0x00 -> 0xFF (Don't Care Value)	See Set Database Info
	Response	Device's ID	Sender's ID	Standard Ack	0x2F	0x00	N/A	N/A

Set Database Info									
Data 2 (1 byte)	Data 3	Data 4 (1 byte)	Data 5	Data 6	Data 7	Data 8	Data 9	Data 13	Data 14
0x02	0x00 -> 0xFF (Hi Byte Address)	0x00 -> 0xFF (Lo Byte Address)	0x01 -> 0x08 (# of bytes to write, over 0x08 is an error and ignored)	Byte 1 of data	Byte 2 of data	Byte 3 of data	Byte 4 of data	Byte 8 of data	Checksum

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Increase Set Points by 1 Degree	From device	Device's ID		Direct	0x15	0x00 -> 0xFF (Don't Care Value)	

Decrease Set Points by 1 Degree	From device	Device's ID		Direct	0x16	0x00 -> 0xFF (Don't Care Value)	
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On Status	From device	Device's ID		Direct	0x11	0x00 -> 0xFF (Don't Care Value)	
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Off Status	From device	Device's ID		Direct	0x13	0x00 -> 0xFF (Don't Care Value)	
-------------------	-------------	-------------	--	--------	------	---------------------------------	--

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Read Operating Flags	To device	Sender's ID	Device's ID	Direct	0x1F	Operating Flags Command	See Read Operating Flags Table
	Response	Device's ID	Sender's ID	Ack	0x1F	Same as sent	

Read Operating Flags Table	
0	bit 0 = Plock bit 1 = LED on TX bit 2 = Resume Dim bit 4 = LED OFF bit 5 = LoadSense

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Set Operating Flags	To device	Sender's ID	Device's ID	Extended	0x20	Operating Flags Command	See Set Operating Flags Table below Data 14 to contain Checksum
	Response	Device's ID	Sender's ID	Ack	0x20	Same as sent	

Set Operating Flags Table	
0	Programming Lock On
1	Programming Lock Off
2	Button Beep On
3	Button Beep Off
4	Button Lock On
5	Button Lock Off
6	Temperature Format in Celsius
7	Temperature Format in Fahrenheit
8	Time Format in 24 Hours
9	Time Format in 12 Hours
0x0A	Software Lock Button On
0x0B	Software Lock Button Off
0x0C	Enable LED on/off for heating/cooling on/off
0x0D	Disable LED on/off for heating cooling

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Beep	From device	Device's ID		Direct	0x30	0x00 -> 0xFF (Don't Care Value)	Beep once, same as the press button beep sound
	Response	Device's ID	Sender's ID	Ack	0x30	Same as sent	

Extended Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Data 1 (1 byte)	Data 2 (1 byte)
Read and Set Data	To device	Sender's ID	Device's ID	Extended Direct	0x2E	0x00	0x00 -> 0xFF (Group/Button)	See Read and Set Data Info and Read and Set Data Info
	Response	Device's ID	Sender's ID	Standard Ack	0x2E	0x00	Same as sent	N/A

Read and Set Data Info

Data 2	Description
0x00	Data 2: 0 is for Read Data (Responder unit will send back a Data 2: 1 below)
0x01	Data2: 1 return of data Data3: LocalTempHighByte Data4: LocalTempLowByte Data5: Humidity Data6: TempOffset Data7: HumiOffset Data8 : System Mode Data9 Fan Mode Data10: Backlight Seconds Data11: Hysteresis minutes to turn on AC Data12: Energy set back point Data 13: ACKByte Data 14: FWRev
0x02	Data 2: 2 Set Temperature Offset Data3: Temperature Offset (From -50 to +50 in 0.1C degree unit)
0x03	Data 2: 3 Set Humidity Offset Data3: Humidity Offset (From -100 to +100 in 0.1% unit)
0x04	Data 2: 4 Set flags: Data 4: Flag bytes - Bit0: linking lock - Bit1: button beep enable - Bit2: button lock - Bit3: temperature format: 1=C; 0=F - Bit4: time format: 1: 24 hour; 0 12 hours
0x05	Data 2: 5 set the backlight seconds: - 0: always off - 0xff: always on - Others: in seconds
0x06	Data 2: 6 set the on/off min change time in minutes
0x07	Data 2: 7 set the energy saving mode set back degree
0x08	Data 2: 8 To check EF group and set the EF group flag in firmware
0x09	Data 2: 9 To set the master; Data 3: 0: Set thermostat as master; 1: Thermostat 1 as master; 2 Thermostat 2 as master
0x0A	Data 2: 0x0A set the stage 1 on minutes before enabling the stage 2 in minutes - 1 -> 60 - default: 10 minutes
0x0B	Data 2: B set the humidity high point
0x0C	Data 2: C set the humidity low point
...	

0x10	Data 2: 0x10 is for read set 2 data
0x11	Data 2: 0x11 is for return of set 2 data Data3: stage 1 on minutes Data4: humidity high Data5: humidity low Data6: Firmware version Data7: Cool set point Data8: Heat Set point Data9: RF offset

Read and Set Data Info								
Data 3	Data 4 (1 byte)	Data 5	Data 6	Data 7	Data 8	Data 9	...	Data 14
0x00	0x00	0x00	0x00	0x00	0x00	0x00		Checksum

The Read and Set Data 2 command and Set Time and Schedule command both require a two byte CRC which differs from the one byte CRC in other extended commands. This CRC calculation is the same CRC that the iMeter INSTEON device uses.

Read and Set Data 2 CRC Calculation

16 bit CRC calculation of payload for checking data involves data bytes from command 1 to data 12 byte

Calculation

Sample Source Code:

```

unsigned int MyFrame::crc16(unsigned char *msgbuf,int count)
{
    int loop,bit;
    unsigned int fb;
    unsigned char byte;
    unsigned int crc;

    crc = 0;

    for(loop = 0;loop < count;loop++)
    {
        byte = msgbuf[loop];
        for(bit = 0;bit < 8;bit++)
        {
            fb = byte & 1;
            fb = (crc & 0x8000) ? fb ^ 1 : fb;
            fb = (crc & 0x4000) ? fb ^ 1 : fb;
            fb = (crc & 0x1000) ? fb ^ 1 : fb;
            fb = (crc & 0x0008) ? fb ^ 1 : fb;
            crc = (crc << 1) | fb ;
            byte = byte >> 1;
        }
    }
    return crc;
}

```

Extended Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Data 1 (1 byte)
Read and Set Data 2	To device	Sender's ID	Device's ID	Extended Direct	0x2E	0x02	See Read and Set Data 2 Info
	Response	Device's ID	Sender's ID	Standard Ack	0x2E	0x02	Same as sent

Read and Set Data 2 Info

Data 1	Description
0x00	Data 2: 0 is for Read Data (Responder unit will send back a Data 2: 1 below) Data 13: CRCHigh Data 14: CRCLow
0x01	Data1: 1, Return Data Data2: status flag Data3: hour Data4: minute Data5: second Data6: SysMode ... Data13: CRCHigh Data14: CRCLow
0x02	Data1: 2, SysMode changed

	Data2: status flag Data3: hour Data4: minute Data5: second Data6: SysMode ... Data13: CRCHigh Data14: CRCLow
0x03	Data1: 3, Set point changed Data2: status flag Data3: hour Data4: minute Data5: second Data6: SysMode ... Data13: CRCHigh Data14: CRCLow Offset
0x04	Data1: 4, Energy pressed Data2: status flag Data3: hour Data4: minute Data5: second Data6: SysMode ... Data13: CRCHigh Data14: CRCLow
0x05	Data1: 5, Master hold 3 Seconds Data2: status flag Data3: hour Data4: minute Data5: second Data6: SysMode ... Data13: CRCHigh Data14: CRCLow
0x06	Data1: 6, Temperature changed Data2: status flag Data3: hour Data4: minute Data5: second Data6: SysMode ... Data13: CRCHigh Data14: CRCLow
0x07	Data1: 7, Hold pressed Data2: status flag Data3: hour Data4: minute Data5: second Data6: SysMode ... Data13: CRCHigh Data14: CRCLow

Extended Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)
Set Time and Schedule	To device	Sender's ID	Device's ID	Extended Direct	0x2E	See Set Time and Schedule Info
	Response	Device's ID	Sender's ID	Standard Ack	0x2E	Same as sent

Set Time and Schedule Info

Cmd 2	Description
0x02	Cmd2: 2 Data 1: 0, Read data (Responder unit will send back a Data 2: 1 below) ... Data 13: CRC high Data 14: CRC low
0x02	Cmd2: 2 Data1: 1, Return data Data2: day Data3: hour Data4: minute Data5: second Data6: Sys Mode*16 + Fanmode Data7: current cool set point Data8: humidity Data9: temp High byte Data10: temp low byte Data11: status flag Data12: current heat set point Data 13: CRC high Data 14: CRC low
0x02	Cmd2: 2 Data1: 2, Set data command Data2: day Data3: hour Data4: minute Data5: second Data6: Sys Mode*16 + Fanmode Data7: current cool set point Data8: humidity Data9: temp High byte Data10: temp low byte Data11: status flag Data12: current heat set point Data 13: CRC high Data 14: CRC low
0x03	Cmd2: 3, Set Sunday schedule Data1: wake time Data2: wake cool Data3: wake heat Data4: leave time Data5: leave cool Data6: leave heat ... Data13: CRCHigh Data14: CRCLow
0x04	Cmd2: 4, Set Monday schedule: Same as Set Sunday schedule
0x05	Cmd2: 5, Set Tuesday schedule: Same as Set Sunday schedule
0x06	Cmd2: 6, Set Wednesday schedule: Same as Set Sunday schedule
0x07	Cmd2: 7, Set Thursday schedule: Same as Set Sunday schedule
0x08	Cmd2: 8, Set Friday schedule: Same as Set Sunday schedule
0x09	Cmd2: 9, Set Saturday schedule: Same as Set Sunday schedule

Cmd 2	Description
0x10	Cmd2: 10, Read Sunday schedule ... Data 13: CRC high Data 14: CRC low
0x11	Cmd2: 11, Return Sunday schedule Data1: wake time Data2: wake cool Data3: wake heat Data4: leave time Data5: leave cool Data6: leave heat ... Data13: CRCHigh Data14: CRCLow
0x12	Cmd2: 10, Read Monday schedule ... Data 13: CRC high Data 14: CRC low
0x13	Cmd2: 13, Return Monday schedule: Same as Return Sunday schedule
0x14	Cmd2: 10, Read Tuesday schedule ... Data 13: CRC high Data 14: CRC low
0x15	Cmd2: 13, Return Tuesday schedule: Same as Return Sunday schedule
0x16	Cmd2: 10, Read Wednesday schedule ... Data 13: CRC high Data 14: CRC low
0x17	Cmd2: 13, Return Wednesday schedule: Same as Return Sunday schedule
0x18	Cmd2: 10, Read Thursday schedule ... Data 13: CRC high Data 14: CRC low
0x19	Cmd2: 13, Return Thursday schedule: Same as Return Sunday schedule
0x1A	Cmd2: 10, Read Friday schedule ... Data 13: CRC high Data 14: CRC low
0x1B	Cmd2: 13, Return Friday schedule: Same as Return Sunday schedule
0x1C	Cmd2: 10, Read Saturday schedule ... Data 13: CRC high Data 14: CRC low
0x1D	Cmd2: 13, Return Saturday schedule: Same as Return Sunday schedule

Checksum Information

Data14 will contain a 2s compliment of cmd1 through 2nd to last data record in the last data record.

Example of Checksum:

01 02 03 04 05 06 1F 2F 00 01 02 0F FF 08 E2 01 08 B6 EA 00 1B 01 11
From 01.02.03 to 04.05.06
a record at 0FFF (A valid boundary)
08 bytes a record that 04.05.06 will control
Group 1 the responder is 08.B6.EA (00 1B 01 DNC)
11 is the check sum

Int	Hex	
47	2F	
0	00	
1	01	
2	02	
15	0F	
255	FF	
8	08	
226	E2	
1	01	
8	08	
182	B6	
234	EA	
0	00	
27	1B	
1	01	
1007	3EF	Sum
	10	Compliment (Last byte)
	11	Add 1

1.2 Memory Map

1.2.1 All-Link Database (AL /L) Overview

The AL /L starts at the top of external (serial) EEPROM and grows downward. In the Thermostat, 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*.

1.2.2 Thermostat External EEPROM Structure Overview

Location		Comments
0x0FF8	0xA2 01 AA BB CC FF FE 00	All-Link Database Record
0x0FF0		
0x0FD8		
.....		
0x0300		Last Record, 416 total links allowed
0x02XX	N/A	Addressing below 0x0300 is ignored by database

1.2.3 AL /L Record Format

Thermostat AL Record Format

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

Linear ALL-Link Database (AL /L) Record Format		
Field	Length (bytes)	Description
Record Control	1	Record Control Flag Bits: Bit 7: 1 = Record is in use, 0 = Record is available Bit 6: 1 = Controller (Master) of Device ID, 0 = Responder to (Slave of) Device ID Bit 5: Not used Bit 4: Not used Bit 3: Not used Bit 2: Not used Bit 1: 1 = Record has been used before, 0 = 'High-water Mark' Bit 0: Not used
Group	1	ALL-Link Group Number this Device ID belongs to
ID	3	Device ID (ID2, ID1, ID0 in that order)
Data 1	1	Not used
Data 2	1	Not used
Data 3	1	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.

1.2.4 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.

1.2.5 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.