1 Firmware Description

The FanLinc contains both a dimmable load and a 4 mode fan controller. The dimmable load is controlled in same way as a KeypadLinc Dimmer's local load. There are additional commands in the FanLinc to control the fan. The dimmer control is on Group 1 as in a KeypadLinc, the fan control is on Group 2, all other groups are ignored.

1.1 INSTEON Commands Supported

1.1.1 Standard length common INSTEON commands:

ID Request Command
Description: Same as holding down the SET Button for 3 seconds on the device.
Example (Hex): AA BB CC DD EE FF 0F 0A 01 (where AA.BB.CC is the Device's ID, DD.EE.FF is the Sender'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	0x01 0x2E 0xXX (firmware revision)	Broadcast	0x01	0x00	Same as holding down SET Button for 3 seconds, but device not in linking mode

Standard length FanLinc INSTEON commands:

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Status Request - Dimmer	To device	Sender's ID	Device's ID	Direct	0x19	0x00	
	Response	Device's ID	Sender's ID	Ack	Database Delta	Dimmer On level	

SD Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Notes
Status Request - Fan	To device	Sender's ID	Device's ID	Direct	0x19	0x03	
	Response	Device's ID	Sender's ID	Ack	Database Delta	Fan speed: 00 = Off; FF = hi ;01-7F = Lo; 80-FE = med	

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 = Key Beep, bit 6 = RF Disable, bit 7 = Insteon Disable
1	Data Base Delta flag….gets incremented with any change in the Database
2	RED (CRC error) Count

3	Signal to noise ratio failure count
5	bit 0 = Reserved, bit 1 = NX10Flag, bit 2 = blinkonError, bit 3 = CleanupReport: 0 = off, 1 = On

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	Direct	0x20	Operating Flags Command	See Set Operating Flags Table below
	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	LED on with Insteon TX
3	**LED off with Insteon TX**
4	Resume Dim On
5	**Resume Dim Off**
…	
..	
8	Led Backlight Off
9	**Led Backlight On**
0x0A	KeyBeep On
0B	**KeyBeep Off**
0C	Rf Off… as an originator, will still hop messages
0D	**Rf On**
0E	Insteon Off
0F	**Insteon On…will go back to on every power cycle**
..	
..	
12	X10Offflag On, Disables all X10 rx and tx
13	**X10Offflag Off**
…	

1.1.2 Extended length FanLinc INSTEON commands:

ED Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Data 1	Data 2->14
On - Fan	To device	Sender's ID	Device's ID	Extended Direct	0x11	Fan speed: 00 = Off; FF = hi ;01-7F = Lo; 80-FE = med	0x02	0x00
	Response	Device's ID	Sender's ID	Ack	0x11	Same as sent		

ED Command	Message Direction	From Address (3 bytes)	To Address (3 bytes)	Message type	Cmd1 (1 byte)	Cmd2 (1 byte)	Data 1	Data 2->14
Off - Fan	To device	Sender's ID	Device's ID	Extended Direct	0x13	0x00	0x02	0x00
	Response	Device's ID	Sender's ID	Ack	0x13	Same as sent		

Note: Initial shipping version currently also turns off light. Not working as documented.

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 for Group/Button	To device	Sender's ID	Device's ID	Extended Direct	0x2E	0x00	0x01 = dimmer; 0x02 = fan	0x00
	Response	Device's ID	Sender's ID	Standard Ack	0x2E	0x00	N/A	N/A
	From device	Device's ID	Sender's ID	Extended Direct	0x2E	0x00	Same as sent	See Returned Extended Get Message Info

Returned Extended Get Message Info									
Data 2 (1 byte)	**Data 3**	**Data 4**	**Data 5**	**Data 6**	**Data 7**	**Data 8**	**Data 9**	**Data 10**	**Data 11**
0x01			X10 House code (0x20 = none)	X10 Unit	Ramp Rate	On-Level			See Returned Extended Get Message Info 2

Returned Extended Get Message Info 2									
Data 11 (1 byte)	**Data 12**	**Data 13**	**Data 14**						
LED State									

Extended Command	Message Direction	From Address	To Address	Message type	Cmd1 (1	Cmd2 (1 byte)	Data 1 (1 byte)	Data 2 (1 byte)

		(3 bytes)	(3 bytes)		byte)			
Set X10 Address	To device	Sender's ID	Device's ID	Extended Direct	0x2E	0x00	0x01 = dimmer; 0x02 = fan	See Set X10 Address Info
	Response	Device's ID	Sender's ID	Standard Ack	0x2E	0x00	N/A	N/A

Set X10 Address Info									
Data 2 (1 byte)	**Data 3**	**Data 4**	**Data 5**	**Data 6**	**Data 7**	**Data 8**	**Data 9**	**…**	**Data 14**
0x04	House (note: 0x20 = no X10 address)	Unit	0x00	0x00	0x00	0x00	0x00	0x00…	0x00

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 Ramp Rate	To device	Sender's ID	Device's ID	Extended Direct	0x2E	0x00	0x01	See Set Ramp Rate Info
	Response	Device's ID	Sender's ID	Standard Ack	0x2E	0x00	N/A	N/A

Set Ramp Rate Info									
Data 2 (1 byte)	**Data 3**	**Data 4**	**Data 5**	**Data 6**	**Data 7**	**Data 8**	**Data 9**	**…**	**Data 14**
0x05	0x00 -> 0x1F (0.1 sec to 2 sec)	0x00 (See appendix for times)	0x00	0x00	0x00	0x00	0x00	0x00…	0x00

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 On Level	To device	Sender's ID	Device's ID	Extended Direct	0x2E	0x00	0x01	See Set On Level Info
	Response	Device's ID	Sender's ID	Standard Ack	0x2E	0x00	N/A	N/A

Set On Level Info									
Data 2 (1 byte)	**Data 3**	**Data 4**	**Data 5**	**Data 6**	**Data 7**	**Data 8**	**Data 9**	**…**	**Data 14**
0x06	0x00 -> 0xFF (Off to full bright)	0x00	0x00	0x00	0x00	0x00	0x00	0x00…	0x00

1.1.3 Extended length FanLinc INSTEON database 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	0x2E	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**
0x02	0x00 -> 0xFF (Hi Byte Address)	0x00 -> 0xFF (Lo Byte Address)	0x01 -> 0x08 (# of bytes to write, over 0x08 is an	Byte 1 of data	Byte 2 of data	Byte 3 of data	Byte 4 of data		Byte 8 of data

			error and ignored)						

1.2 Memory Map

1.2.1 All-Link Database (ALDB/L) Overview

The ALDB/L starts at the top of external (serial) EEPROM and grows downward. In the device, top of memory is 0x0FFF. Each ALDB/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 FanLinc External EEPROM Structure Overview

Location		Comments
0x0FF8	0xA2 01 AA BB CC FF FE 01	All-Link Database Responder Record
0x0FF0	0xE2 01 AA BB CC 00 00 01	All-Link Database Controller Record
0x0FD8		
……		
0x0300		Last Record, 416 total links allowed
0x02XX	N/A	Addressing below 0x0300 is ignored by database

1.2.3 ALDB/L Record Format

FanLinc ALDB Record Format

Database entries with Record Control Bit 6: 0 = Responder and Group 1 will control the local load, Group 2 will control the fan.

Linear ALL-Link Database (ALDB/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	On-Level (0x00 -> 0xFF)
Data 2	1	Ramp Rate (0x00 -> 0xFF) See the Ramp Rate Table for values
Data 3	1	**Button Number (0x01 -> 0x02)**

To add a record to an ALDB/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 ALDB/L.

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

1.2.4 Overwriting an Empty ALDB/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 ALDB/L is an INSTEON Controller of the INSTEON Responder Device whose *ID* is in the record. If instead the device containing the ALDB/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 ALDB/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 ALDB/L Record

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

1.3 Appendix

1.3.1 Ramp Rate times

Ramprate conversion(in approximate time):

0x00='2 sec';
0x01='8 min'; (longest ramp rate)
0x02='7 min';
0x03='6 min';
0x04='5 min';
0x05='4.5 min';
0x06='4 min';
0x07='3.5 min';
0x08='3 min';
0x09='2.5 min';
0x0A='2 min';
0x0B='1.5 min';
0x0C='1 min';
0x0D='47 sec';
0x0E='43 sec';
0x0F='38.5 sec';
0x10='34 sec';
0x11='32 sec';
0x12='30 sec';
0x13='28 sec';
0x14='26 sec';
0x15='23.5 sec';
0x16='21.5 sec';
0x17='19 sec';
0x18='8.5 sec';
0x19='6.5 sec';
0x1A='4.5 sec';
0x1B='2 sec';
0x1C='0.5 sec'; (default after factory reset)
0x1D='0.3 sec';
0x1E='0.2 sec';
0x1F='0.1 sec';