

# *i-LiNE*

## **HAI Integration Application Note**

Revision B

08/12/2005

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## Terms

i-LiNE\*, i-ON, i-ON-D, i-ON-MB and i-PoWER are trade names of EIDeTec Inc. Other brand and product names are registered trademarks or trademarks of their respective companies.

## Statement of Conditions

The information contained in this manual is subject to change without notice. Electronic Design Technology shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this manual or equipment supplied with it.

## Warranty

Electronic Design Technology warrants to the original customer purchaser and not for the benefit of anyone else that this product at the time of its sale by Electronic Design Technology is free of defects in materials and workmanship under normal and proper use for one year from the purchase date. Electronic Design Technology's only obligation is to correct such defects by repair or replacement, at its option, if within such one year period the product is returned prepaid, with proof of purchase date, and a description of the problem to Electronic Design Technology, Attn: Warranty Department, 707 North Green Street, Longview, TX 75601. This warranty excludes and therefore is disclaimed liability for labor for removal of this product or reinstallation. This warranty is void if this product is installed improperly or in an improper environment, overloaded, misused, opened, abused, or altered in any manner, or is not used under normal operating conditions or not in accordance with any labels or instructions. There are no other warranties or implied warranties of any kind, including merchantability and fitness for a particular purpose, but if any implied warranty is required by the applicable jurisdiction, the duration of any such implied warranty, including merchantability and fitness for a particular purpose, is limited to one year. Electronic Design Technology is not liable for incidental, indirect, special, or consequential damages, including without limitation, damage to, or loss of use of any equipment, lost sales or profits or delay of failure to perform this warranty obligation. The remedies provided herein are the exclusive remedies under this warranty, whether based on contract, tort or otherwise.

## Electronic Emission Notice

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

## FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment notwithstanding use in commercial, business and industrial environments. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

## Information to User

Any changes or modifications of equipment not expressly approved by the manufacturer could void the user's authority to operate the equipment.

## Safety Considerations

For the following safety considerations, "Instrument" means the EDT i-LiNE i-ON, i-ON-D, i-ON-MB, or i-PoWER-(x) equipment, components and cables.

## Caution

To avoid shock, do not perform any servicing unless you are qualified to do so.

## Line Voltage

Before connecting this instrument to the power line, make sure that the voltage of the power source matches the requirements of the instrument.

## **IMPORTANT NOTICE**

### **Attention Installers and Inspectors**

This device has been designed to comply with the National Electrical Code concerning the use of low voltage cabling in the same enclosure as 120 VAC cable. The i-LiNE device network connecting cable MUST have a jacket insulation rating of 120 VAC or greater and be UL listed. Please refer to the NEC code Chapter 3 Section 300.3(c)(1) for additional information.

### **NEC 300.3(c)(1)**

(C) Conductors of Different Systems.

(1) 600 Volts, Nominal or Less. Conductors of circuits rated 600 volts, nominal, or less, ac circuits, and dc circuits shall be permitted to occupy the same equipment wiring enclosure, cable, or raceway. All conductors shall have an insulation rating equal to at least the maximum circuit voltage applied to any conductor within the enclosure, cable, or raceway.

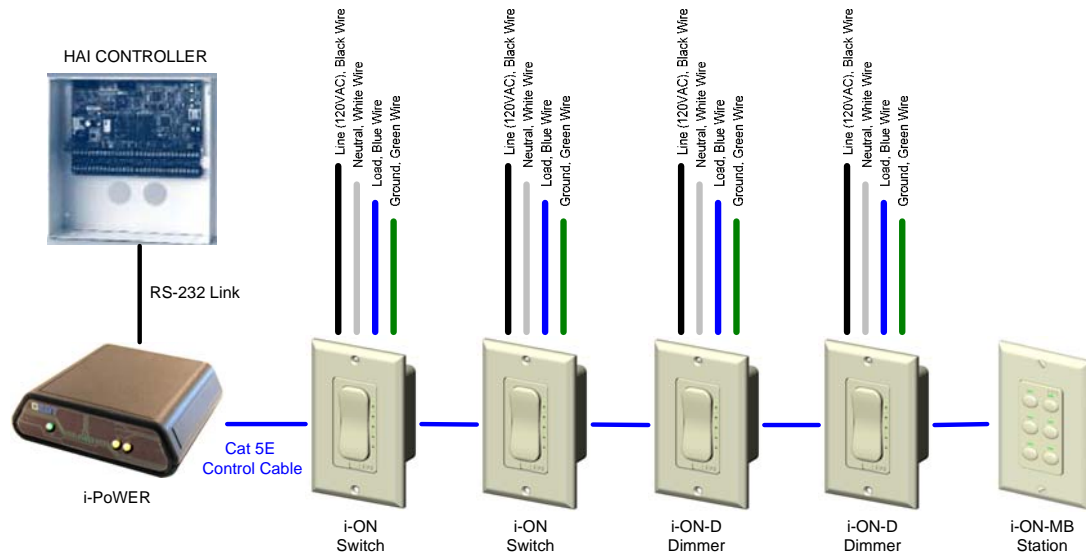
\* The i-LiNE protocol is a patent pending property of EIDeTec Inc.

## SECTION I – INTRODUCTION

### SECTION I- 1. Introduction

This application note describes a method for integrating the i-LiNE Lighting Control by Electronic Design Technology (EDT) with the Home Automation Inc. (HAI) Omni line of controllers. The Omni-Pro unit was used in this example.

The i-LiNE series of products have been designed for ease of installation, simplicity in programming, speed of configuration and reliable operation all at an affordable cost. The i-LiNE products consist of the i-ON Switch, i-ON-D Dimmer Switch, i-ON-MB Multi-Button Switch, and the i-PoWER(x) Interface Power Module. The i-LiNE series of products can operate on its own or can be connected to any serial port controller that can send serial strings. This application note will show how easily i-LiNE can be integrated with the HAI line of controllers. **This application note assumes that the user is familiar with i-LiNE protocol and i-LiNE programming. If not please reference the i-LiNE Integration Specification (EDT Document M-03060768-A).**



**Figure 1: i-LiNE to HAI Connection Diagram**

## SECTION II – INTEGRATION

### SECTION II-1. Requirements

The i-LiNE Lighting Control / Energy Management System is a simple to use lighting control system that operates over CAT 5 cabling using the i-LiNE proprietary protocol. The i-PoWER-(x) Network Interface Module provides a serial interface connection for any controller with an RS232 port that can send serial strings. The HAI Omni controller can be programmed to send such serial strings to activate lighting scenes based on button presses or other controller events.

Required Equipment:

- HAI Omni controller
- HAI Model 10A17 Serial Interface Module (Not required for the OmniPro II which has 3 built-in serial ports)
- i-PoWER-(x) Network Interface Module with an available serial port **or** an i-PoRT-COM
- i-PoWER-(x) 12-volt power supply module (wall transformer)
- At least one i-LiNE switch with lighting load attached.

### SECTION II-2. Network Setup

The system diagram shown in Figure 2, depicts a typical i-LiNE network configuration along with a serial cable connection from the i-PoWER-(x) serial interface (RS232) to the Omni-Pro controller serial interface (RS232). This configuration may be achieved by following the installation instructions for the i-LiNE units.

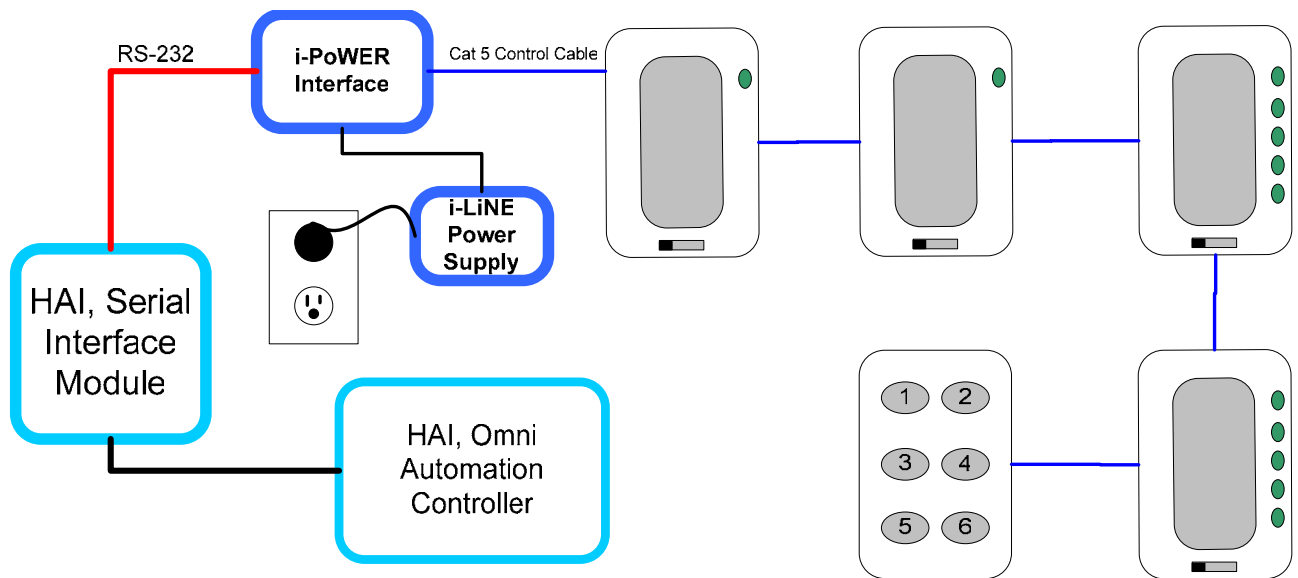


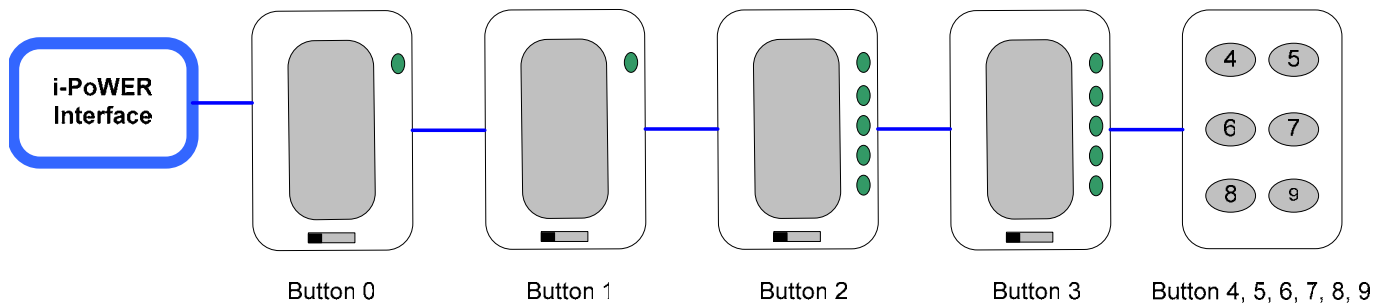
Figure 2: i-LiNE Network Topology

## SECTION II-3. i-LiNE Macros

To turn ON and OFF lights, the Omni controller must be programmed with the correct macro numbers of the desired lights and /or scenes.

If you have a copy of the i-LiNE Installer installed on your PC, you can Read the Network to get a list of all the macros for your system. Record the macros for the lights and/or scenes you desire to control through the Omni.

If you do not have the i-LiNE Installer, you can usually figure out the macro numbers if you know the physical layout of your i-LiNE network. Since the button numbers are automatically configured on the initial power up sequence, the button numbers are assigned in an ascending fashion as you get further away from the i-PoWER-(x) unit. As seen in Figure 3, switch 1 is the first node and is considered to be button 0. This method is continued until the last node on the network is reached. For this example in Figure 3 the last node is a i-ON-MB Multi Button and is assigned button numbers 4, 5, 6, 7, 8, & 9.



**Figure 3: Ascending i-LiNE Button Numbering Scheme**

Since the buttons are automatically addressed by the system on initial power up, it is important to accurately record the position of each i-LiNE Node on the network. This recorded information should be stored in a safe location for easy retrieval in the case where it is required for system modifications or upgrades. Note that if additional switches are inserted into your network after it has been configured the first time, such switches will be assigned the next available macro number regardless of their physical position in the network.

## SECTION II-4. Serial Port Connections

Locate the serial port(s) on the Omni controller. If you have the OmniPro II, use any of the three serial ports located in the upper left hand corner of the panel. Connect the Omni serial port to the i-PoWER-(x)'s 9-pin D-Sub connector interface (RS232) or to an i-PoRT-COM module. The RS-232 port pin-out for the i-PoWER-(x) is given below in Table 1 and should be connected using a straight through serial cable.

i-PoWER-(x) Connector		RS-232	HAI Model 10A17 Connector	Serial Interface
Pin #	Description		Pin #	Description
1	No Connection		1	No Connection Required
2	TX		2	RX
3	RX		3	TX
4	Internal Jumper to Pin 6		4	No Connection Required
5	Gnd		5	Gnd
6	Internal Jumper to Pin 4		6	No Connection Required
7	Internal Jumper to Pin 8		7	No Connection Required
8	Internal Jumper to Pin 7		8	No Connection Required
9	No Connection		9	No Connection Required

**Table 1: i-LiNE and HAI Serial Connector Pin Out Information.**

## SECTION II-5. Communication Configurations

Before making any changes, upload the current configuration of the Omni controller to your PC **if it has been previously configured**. If you do not do this, you will erase the current configuration of the Omni later when you download the programming for i-LiNE. Start up the “Dealer PC Access” software available from HAI and click “File” then “Upload from PC”.

To configure the Omni-Pro there are several parameters which need to be configured for integration. All parameters used to access and configuration were set using the “Dealer PC Access” software. If using the “PC Access” software which is a modified version of the “Dealer PC Access” with fewer options, refer to the user manual for any differences in procedure.

The HAI serial port module needs to be configured to operate in the “Pro-Link” protocol to allow communications with i-LiNE and in the “Omni-Link” to operate with the Dealer PC Access software. This parameter can be set up through the “Dealer PC Access” software or through any keypad.

To change the protocol through the “Dealer PC Access” software, select “Setup”, “Installer”, “Expansion”. Change the “Baud Rate” for “Serial 1” to “9600” and the “Function” to “Omni-Link”.

To change the protocol using a keypad, perform the following steps.

1. On the key pad press “9”
2. Enter the access code
3. Arrow down once and press “#”
4. Arrow down one more time and press “7”
5. Arrow to the correct module 1, 2, 3, or 4
6. Press “#” to change the protocol

7. Use the Arrow keys to select the correct protocol. Pro-Link for communication with i-LiNE. Omni-Link for communication with Dealer PC Access.
8. Press “#” to save.

## SECTION II-6. i-LiNE Protocol (Messages)

Below you will find the serial strings to control each of the switches found in the configuration found in figure 3. Also we programmed button 9 to be an All ON/ All OFF scene. For a complete explanation of the i-LiNE Protocol please see the i-LiNE Integration Specification (EDT Document M-03060768-A).

i-LiNE Button	Function	i-LiNE Serial String
i-ON Button 0	ON	S06M00LFFP06
	OFF	S06M00L00P06
i-ON Button 1	ON	S06M01LFFP06
	OFF	S06M01L00P06
i-ON-D Button 2	ON	S08M02DFFFFP08
	OFF	S08M02D0000P08
	~50%	S08M02D8000P08
i-ON -D Button 3	ON	S08M03DFFFFP08
	OFF	S08M03D0000P08
	~50%	S08M03D8000P08
i-ON-MB		
Button 4	ON	S06M04BFFP06
	OFF	S06M04B00P06
Button 5	ON	S06M05BFFP06
	OFF	S06M05B00P06
Button 6	ON	S06M06BFFP06
	OFF	S06M06B00P06
Button 7	ON	S06M07BFFP06
	OFF	S06M07B00P06
Button 8	ON	S06M08BFFP06
	OFF	S06M08B00P06
Button 9	ALL ON	S06M09BFFP06
	ALL OFF	S06M09B00P06

**Table 2: i-LiNE Serial Strings pertaining to Figure 3**

## SECTION II-7. Programming

Now we need to program the Omni controller to send and receive lighting control commands. To make things simple we will only program the Omni to control i-LiNE Button 9 (All ON & All OFF), we will also program i-LiNE Button 4 to turn on and off a X-10 Lamp module located in House Code A, Unit 1. Finally we will program the HAI to turn Button 0 (i-ON Switch) ON when the security is armed and OFF when the security is disarmed.

First we will assign Omni buttons to control the All ON/OFF scene. To do this, go to the “Dealer PC Access” software. Under “Setup”, “Names/Voice”, select the Buttons tab. Select Button 1 and name it ALL ON, select Button 2 and name it ALL OFF. Now we need to add the i-LiNE serial strings that pertain to these buttons into the Messages. To do this select the Messages tab. Select number one and then type in the ALL ON serial string S06M09BFFP06 found in table 2. Select number 2 and then type in the ALL OFF serial string S06M09B00P06 found in table 2. Once this is complete select “OK”. Note that these serial strings are given as examples only and you will need to use the correct strings for your system.

Now that the buttons and messages are assigned, we will need to write a Program to integrate these buttons to the i-LiNE network. To do this select “Setup”, “Programs” choose the next available programming line and press EDIT. Select “When”, “User Button”, “1. ALL ON”. Select “Command”, “Message”, “Send”, “1”. This tells Omni that when Button 1 is pressed to send the serial string S06M09BFFP06 which turns on the ALL ON scene. We now need to program the other button. Perform the same for each the ALL OFF button; make sure to use the appropriate message.

We will now program i-LiNE Button 4 to turn on and off an X-10 lamp module through the Omni controller. First we need to add the serial strings associated with i-LiNE Button 4 ON & OFF. Select “Setup”, “Names/Voice”, Message tab. Now select message 3 and type in the ON serial string for i-LiNE button 4 (S06M04BFFP06). Then select message 4 and type in the OFF serial string for i-LiNE button 4 (S06M04B00P06). Once this is done then select “OK”. Now select “Setup”, “Programs” then choose the next available programming line and click Edit. Select “When”, “Message”, “3”, “OK”. Select “Command”, “Control”, “UNIT 1”, “ON”, “OK”. Select the next available programming line and click Edit. Select “When”, “Message”, “4”, “OK”. Select “Command”, “Control”, “UNIT 1”, “OFF”, “OK”.

Finally we need to program the HAI to turn on the i-LiNE button 0 (i-ON Switch) when the security system is armed and then off when it is disarmed. First we need to put the correct serial strings into the HAI messages. Select “Setup”, “Names/Voice”, Message tab. Now select Message 5 and type in the ON serial string for i-LiNE button 0 (S06M00LFFP06). Then select Message 6 and type in the OFF serial string for i-LiNE button 0 (S06M00L00P06). Once this is complete we need to program the HAI to perform these commands. To do this select “Setup”, “Programs” choose the next available programming line and click Edit. Select “When”, “Security”, “Away”, “Any Code”, “OK”. Select “Command”, “Message”, “Send”, “5”. Now program the other message. Select the next available programming line and click Edit. Select “When”, “Security”, “OFF”, “Any Code”, “OK”. Select “Command”, “Message”, “Send”, “6”.

Now we need to download the program to the HAI. Select “File”, “Download from PC”. Select all the options and click OK. Once the download is finished, do not forget to change the programming protocol back to “Pro-Link”. Also connect the serial cable from the Omni serial port to the i-PoWER-(x) or i-PoRT-COM serial port.

## SECTION II-8. Testing the System

Now test your system. Follow the steps below.

1. On any HAI keypad press “3” for buttons.
2. Use the arrow keys to select “ALL ON” and press “#”.
  - a. Verify that it performed correctly.
3. Press “3” for buttons.
4. Use the arrow keys to select “ALL OFF” and press “#”.
  - a. Verify this it performed correctly.
5. Now press i-LiNE button 4 (the top left button on the i-ON-MB)

- a. You will need to have an X-10 module with house code A, unit 1 plugged in along with the HAI connected to the X-10 Power Line coupler.
  - b. When i-LiNE button 4 is press this X-10 module should come on and off accordingly.
6. Arm the security and see that i-LiNE button 0 (i-ON Switch) turns ON.
  7. Disarm the security and see that i-LiNE button 0 (i-ON Switch) turns OFF.

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