I/O Linc™

Control and monitor equipment with powerline signals!

Model #1624 I/O Linc
Congratulations!
Congratulations on purchasing I/O Linc™, a small PLC/X10 based input/output controller that can be used to connect non-X10 equipment to the PLC/X10 world. The I/O Linc offers an easy way to monitor and/or control equipment by using the PLC/X10 communications protocol. Until now, many home automation enthusiasts have struggled with controlling and monitoring low-voltage devices.

The I/O Linc comes with four channels that can be set for any combination of input or output. When used as an input, I/O Linc can detect the status of various devices using Smarthome Probes. Probes may be used for many purposes including detecting the power status of an audio or video device.

All the programming is stored in non-volatile memory, which allows the I/O Linc to be programmed in one location and installed somewhere else without losing any settings. Best of all, there is only one connection to the AC lines with the included PowerLinc™ II interface.

Key Features
- 4 input channels for use with Smarthome probes
- 4 output Single-pole, Single-throw (SPDT) relays for controlling low-voltage devices
- 2-Way confirmation of commands and responds to Status Request commands
- PowerLinc II interface provides power and powerline communications
- External power sensing when used with Smarthome Probes
- Small sized with front panel status indicators
- Non-volatile memory. Programming will be retained after a power outage.

Other Complementary Smarthome Products
You I/O Linc is ready to be used by most any powerline-based product on the market. However, when teamed up and used with other Smarthome automation products, you can transform the whole home's automation system to the same level and sophistication normally found in multi-million dollar homes.

IR Linc™
Forget about using multiple remotes to control the stuff in your house. Now you can control everything in your home entertainment center with the same keypads that controls your lights! Most audio/video components won't turn on simply by applying power. But this remarkable unit translates PLC signals into IR codes that your home audio and video components can understand.

Setting up and programming I/O Linc
The I/O Linc is programmed and set up using PLC (X10) commands. It will require the use a X10 Maxi-Controller or an equivalent transmitter capable of sending Housecode and Unit Code without ON or OFF commands. The buttons are separated into Addresses and Command functions. To use this controller, you have to press the address (for example, “5”), then the command (ON, OFF, BRIGHT, etc.). Transmitters in which one button is pressed to turn on or off a receiver will not work.
Parts included with I/O Linc

• The I/O Linc controller box
• PowerLinc II PowerLine Interface
• PowerLinc II connecting cable

Please note that this PowerLinc II interface is designed to only work with the I/O Linc controller. While it resembles our regular #1132B PowerLinc II interface, the two are incompatible and not interchangeable. The included PowerLinc Interface contains special circuitry and programming to support the I/O Linc control box. The AC outlet on the front of the PowerLinc II interface is a pass-through outlet for any 120-volt electrical device. It does not have any automation functions.

Overview

• The "Status" lights are used to indicate when a channel is active. When the channel is configured as an input, the "Status" indicator will illuminate when the probe is active (detecting an "ON" condition). When a channel is configured as an output, it indicates when the relay is closed.
• The "Probe" jacks are to be used with any of the Smarthome probes to indicate status of the equipment. These are used when the channel is configured as an input.
• The "PowerLinc" jack is used to connect the external PowerLinc II interface that was supplied with the kit. It will supply power for the I/O Linc and communications to the powerline.
• The four "Relay" connectors are screw terminals that access the internal relays. There are terminals for common, normally open, and normally closed.

Quick Start Instructions

1. Unplug any probes.
2. Unplug the PowerLinc II from the AC outlet for 10 seconds.
3. Plug in the PowerLinc II into the outlet and wait two seconds.
4. Send unit code 1, 2, 3, or 4 (depending on the channel) three times in a row.
5. The status indicator for that channel will illuminate.
6. To use Probes:
   Send the house/unit code and an "OFF" command.
   or
To use Relays:
   Send the house/unit code and an "ON" command.

(See page 4 for more detailed instructions)
Installation
The I/O Linc should be installed in a location that has a standard 120-volt household receptacle readily accessible. It can be placed on any flat and stable horizontal surface. If there is a need for visual confirmation, the I/O Linc should be installed where the status indicator lights are visible.

1. Place the I/O Linc in the desired position and plug in the cable between the PowerLinc II and the connector on the back of the I/O Linc.
2. Do not plug the PowerLinc II into an electrical socket until the unit is ready for programming (in the next section).
3. If probes are going to be used with the I/O Linc, do not plug them in until after programming is completed. The probe status indicators on the front of the unit are used during programming. During installation and programming, having a probe plugged into one of the probe jacks might give false readings.

The I/O Linc is now ready for programming.

Programming
The I/O Linc comes pre-programmed so that all channels are configured as inputs (for the Smarthome Probes) using PLC/X10 addresses; A1, A2, A3, and A4 for channels 1, 2, 3, and 4 respectively. Programming must begin within 30 seconds after plugging the PowerLinc II interface into the wall receptacle.

To program a channel as an input (for use with Smarthome Probes):

1. Plug in the PowerLinc II interface into an electrical socket
2. Wait two seconds, then send any house code and unit code 1, 2, 3, or 4 (depending on the channel you want to program) three times in a row from any PLC/X10 compatible transmitter (e.g. F1, F1, F1)
3. The status indicator for that channel will illuminate.
4. Send the house/unit code that this channel is to respond to (e.g. G16) and an "OFF" command.

To program a channel as an output (for using the internal relays):

1. Plug in the PowerLinc II interface into an electrical socket
2. Wait two seconds, then send any house code and unit code 1, 2, 3, or 4 (depending on the channel you want to program) three times in a row from any PLC/X10 compatible transmitter (e.g. F1, F1, F1)
3. The status indicator for that channel will illuminate.
4. Send the house/unit code that this channel is to respond to (e.g. G16) and an "ON" command.

Troubleshooting
• If the status indicator does not illuminate after step 2, unplug the PowerLinc for 10 seconds, then plug the PowerLinc back in and repeat the process. Moving the transmitter to the same outlet as the PowerLinc II will insure a strong signal is received.
• The channel will remain in programming mode for about 30 seconds after receiving the three consecutive codes. If no commands are received, the I/O Linc will exit the programming mode and the indicator will turn off.
• You must plug and unplug the PowerLinc II interface from the AC outlet. Disconnecting and re-attaching the cable from the rear of the I/O Linc will not re-start the programming sequence (step 1 above).
Optional Accessories for the I/O Linc

The I/O Linc can use up to four Smarthome Probes, which may be used for many purposes including detecting the power status of an A/V device.

<table>
<thead>
<tr>
<th>TV Detector Probe 8012</th>
<th>Light Detector Probe 8013</th>
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<tbody>
<tr>
<td>Senses the presence of the high frequency RF emissions of a TV when it is on. Place the white “Whip” near the rear of the set.</td>
<td>This sensor can be placed over the location of an LED or any other light source to sense if the A/V device is on.</td>
</tr>
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<thead>
<tr>
<th>Digital Input Low Voltage Detector Probe 8015</th>
<th>Video Detector Probe 8016</th>
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</thead>
<tbody>
<tr>
<td>This probe can be attached to any device that generates a 3-28 volt (AC or DC) signal. Some A/V equipment have low-voltage outputs that may be used to detect the device’s power status.</td>
<td>Detects the presence of a baseband video signal when connected to the VIDEO OUT jack. Can’t be used with video gear that outputs a blank or blue screen when switched off (or in stand-by).</td>
</tr>
</tbody>
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<tr>
<th>Contact Closure Probe 8018</th>
<th>ELK-912 Relay Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>This probe is ideal for detecting the condition of a dry-contact switch. Some A/V receivers have dry-contact relays open or close when powered on or off.</td>
<td>This high quality 12 Volt DC SPDT Form “C” relay allows the I/O Linc to switch heavier loads than the I/O Linc’s internal relays. Rated for 7 Amps @ 30 Volts DC or 10 Amps @ 125 Volts AC.</td>
</tr>
</tbody>
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Connecting the I/O Linc to Probes and External devices

Once all the programming is completed, the probes can be connected and any external devices can be wired to the relay connector terminals. Probes connect by inserting the 1/8” mini plug into the jack on the front of the I/O Linc.

The relay connectors can be connected to any device rated for a maximum of 24 volts AC or DC at 5 amps. The relay connectors have the common connection in the center, a normally open contact on the left side, and a normally closed contact on the right. Normally open and closed refer to the contact position while the channel is off.

PLC/X10 Communications

- The I/O Linc is a two-way PLC/X10 communication device. When a channel is programmed as an input, it will transmit an updated status whenever it senses a change in the probe's state.
  - A. When a probe detects an ON status, I/O Linc will transmit the house/unit code of that channel and an "ON" command (e.g. A5-ON).
  - B. The I/O Linc will send the house/unit code of that channel and an "OFF" command when the probe detects an OFF condition.
  - C. It is also possible to poll or request the status of a probe by sending its house/unit code and house code + status request.
- When a channel is programmed as an output, the relay can be controlled by regular PLC commands. A relay is in its normal position when it is off. To turn the relay on, send the house/unit code of that channel and an "ON" command, (C5-ON). To turn the relay off, send the house/unit code of that channel and an "OFF" command, (C5 OFF). Multiple relays can be turned on or off with multiple base addresses sent before the "ON" or "OFF" command. For example, to turn on relay one, (which has an address of C5), and four, (which has an address of C11), at the same time, send C5, C11, and CON. To turn them off at the same time, send C5, C11, and COFF. The status of a relay can be requested at any time by sending its house/unit code and house code + status request.

Probe Control of a Relay

When a channel is programmed as an input, it reads the status of a probe but cannot accept PLC/X10 commands to control the relay on that channel. The probe, however, does control the status of the relay. When a probe becomes active, the relay on that channel will turn on. When the probe becomes inactive, the relay will turn off. This may be helpful in some cases and not necessary in others. It is something to keep in mind when setting up your I/O Linc.

Relay Commands to the I/O Linc

The I/O Linc is a true two-way enabled device. When PLC commands are received to the unit, it will transmit back the commands once they are executed. This is helpful to the device(s) controlling the I/O Linc. A KeypadLinc Wall-Mounted transmitter’s LED will illuminate when it receives a signal back from the I/O Linc. Some computer interfaces can be programmed to repeat PLC commands to I/O Linc if the first transmissions are unsuccessful.
Tips for Using I/O Linc

- The PowerLinc II interface is designed and approved for use 120V/60Hz. Attempting to use the PowerLinc II on non-approved power-lines may have hazardous consequences.
- Do not plug the PowerLinc II interface into a filter or a power strip.
- Some computer equipment and audio-video products can absorb Power Line Carrier (PLC) signals from the electrical lines. If the PowerLinc II interface will be near this type of equipment, a filtered power strip or a FilterLinc #1626 should be used for that equipment (not the PowerLinc interface) to keep the PLC signals from getting absorbed by the computer or A/V equipment.
- Don't plug other PLC transmitters into the same outlet as the PowerLinc II. Every PLC transmitter may absorb other transmitters’ PLC/X10 signals when they are not transmitting. In some cases, up to half the signal can be lost to the nearby transmitter.

Still having trouble....

If you cannot resolve an issue you’re having with the I/O Linc;
- Search our on-line knowledge base at: http://smarthome.custhelp.com
- E-mail: tech@smarthome.com
- Call our Technical Support Dept. at 949-221-9200

Suggestions and product feedback are welcome

If you would like to suggest a product improvement or tell us about your experience with the I/O Linc, we would like to hear from you. Our Engineering team monitors the feedback we receive at Smarthome. Please send your comments to:

beta at smarthome dot com

Please note that we will not likely be able to respond to your message.

Invest in better Home Automation Products

Unlike most electric items, many PLC-based products haven't changed much over the years. Our Marketing and Customer Service teams surveyed our customers, like you, and our engineers have invented new and better wall switches and plug-in modules. We include more features, higher load handling, and better signal sensitivity for a superior user experience. While in some cases, they cost more; we hope you'll agree that not having to replace a dead module every couple years is worth the added expense and reduced aggravation. Please visit a retailer or distributor for the complete line of automation products from Smarthome Design.
About PowerLinc Interface's Certification
The PowerLinc has been thoroughly tested by ITS ETL SEMKO, a nationally recognized independent third-party testing laboratory. Products bearing North American ETL Listed mark signifies that the product has been tested to and has met the requirements of a widely recognized consensus of U.S. and Canadian product safety standards, that the manufacturing site has been audited, and that the manufacturer has agreed to a program of quarterly factory follow-up inspections to verify continued conformance.

Smarthome Limited Warranty
Smarthome warrants to the original consumer purchaser of this product that, for a period of two years from the date of purchase, this product will be free from defects in material and workmanship and will perform in substantial conformity to the description of the product in this Owner's Manual. This warranty shall not apply to defects or errors caused by misuse or neglect.

If the product is found to be defective in material or workmanship or if the product does not perform as warranted above during the warranty period, Smarthome will either repair it, replace it or refund the purchase price, at its option, upon receipt of the product at the address below, postage prepaid, with proof of the date of purchase and an explanation of the defect or error. The repair, replacement, or refund that is provided for above shall be the full extent of Smarthome's liability with respect to this product.

For repair or replacement during the warranty period, call Smarthome customer service to receive an RA# (return authorization number), properly package the product (with the RA# clearly printed on the outside of the package) and send the product, along with all other required materials to:
Smarthome
ATTN: Receiving Dept.
16542 Millikan Ave
Irvine, CA 92606-5027

Limitations:
The above warranty is in lieu of and Smarthome disclaims all other warranties, whether oral or written, express or implied, including any warranty of merchantability or fitness for a particular purpose. Any implied warranty, including any warranty of merchantability or fitness for a particular purpose, which may not be disclaimed or supplanted as provided above shall be limited to the one year period of the express warranty above. No other representation or claim of any nature by any person shall be binding upon Smarthome or modify the terms of the above warranty and disclaimer.

In no event shall Smarthome be liable for special, incidental, consequential or other damages resulting from the possession or use of this product, including without limitation damage to property and, to the extent permitted by law, personal injury, even if Smarthome knew or should have known of the possibility of such damages.

Some states do not allow limitations on how long an implied warranty lasts and/or the exclusion or limitation of damages, in which case the above limitations and/or exclusions may not apply to you. You may also have other legal rights, which may vary from state to state.

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800.SMART.HOME - 949.221.9200- www.smarthome.com

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