INSTEON™ KeypadLinc™ V2 Dimmer

INSTEON Keypad Dimmer

For models:
#2486D   KeypadLinc V2 Dimmer

INSTEON COMPATIBLE

SMARTHOME™
MAKING LIFE MORE CONVENIENT, SAFE AND FUN

INSTEON KeypadLinc V2 Dimmer User's Guide

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ABOUT INSTEON KEYPADLINC DIMMER

Congratulations on purchasing the INSTEON™ KeypadLinc™ Dimmer. With its elegant look, smooth touch, and convenient secondary buttons, you can not only control the lights that you wire it to, but you can remotely control all kinds of other INSTEON and X10 devices in your home to match your lifestyle, all from the same switch. Besides controlling other devices, KeypadLinc Dimmer can itself be remotely operated from other INSTEON or X10 Controllers, including other KeypadLinc Dimmers.
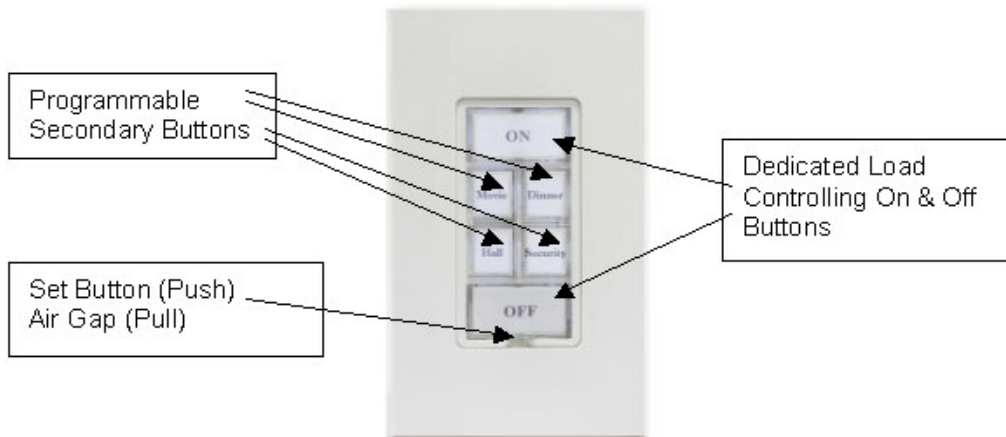
What is INSTEON?

INSTEON is a simple, reliable, and affordable breakthrough in home control. Simple, because Plug-n-Tap™ setup is a breeze, and there are no wires to add – INSTEON uses existing powerline wiring as well as radio-frequency for communication. Reliable, because every INSTEON device is a two-way repeater. And affordable, not just because of low cost, but because INSTEON also works with legacy X10 devices. An INSTEON home grows in value with every INSTEON device you add, making life more convenient, safe and fun.

Key KeypadLinc Dimmer Features

- After installation, setup is easy – links to controlled devices and other controllers in minutes

- Controls all standard incandescent lamps, up to a total load of 600 watts

- Dedicated load controlling buttons, and two included button plates that provide a choice of four or seven secondary buttons.

- Changes brightness at 32 ramp rates

- Includes label inserts for commonly used functions, and templates for printing customized label inserts.

- Responds to commands from X10 controllers and sends X10 commands to X10 devices

- Wires in like a standard wall switch (but also requires a NEUTRAL connection)

- Supports "virtual" 3-, 4-, or more-way circuits with multiple KeypadLinc Dimmers

- Includes white and ivory frames for matching to common trim plates

- Capable of operating in X10 or Insteon mode only, or hybrid mode which sends/receives both X10 and Insteon signals

- Warranted for two years

HOW TO INSTALL KEYPADLINC DIMMER

Caution

Read and understand these instructions before installing, and retain them for future reference.

KeypadLinc Dimmer is intended for installation in accordance with the National Electric Code and local regulations in the United States, or the Canadian Electrical Code and local regulations in Canada. Use indoors only. KeypadLinc Dimmer is not designed nor approved for use on power lines other than 120V 60Hz, single phase. Attempting to use KeypadLinc Dimmer on non-approved powerlines may have hazardous consequences.

Do not install KeypadLinc Dimmer to control a receptacle or fluorescent lighting fixture. Connect only copper or copper-clad wire to KeypadLinc Dimmer. Before installing, disconnect power at the circuit breaker or remove the circuit's fuse to avoid shock or possible damage to KeypadLinc Dimmer. It is recommended that a qualified electrician perform this installation.

To reduce the risk of overheating and possible damage to other equipment, use KeypadLinc Dimmer to control 110V incandescent lamps only. Dimming an inductive load, such as a fan or transformer, could cause damage to the dimmer, the load device, or both. If the manufacturer of the load device does not recommend dimming, use a non-dimming INSTEON switch such as SwitchLinc V2 Relay. USER ASSUMES ALL RISKS ASSOCIATED WITH DIMMING AN INDUCTIVE LOAD.

Proper installation of at least two SignaLinc™ RF Signal Enhancers is required prior to installing and using other INSTEON devices.

Typical Tools You Will Need

- A flat screwdriver to remove the faceplate from the switch junction box.

- A Phillips screwdriver for the screws that hold KeypadLinc Dimmer in the junction box.

- A wire cutter and stripper if the switch you are replacing requires you to cut the wires to remove them.

- A small Phillips screwdriver if you will be changing the color of the trim frame and paddle.

A Helpful Tool – Voltmeter or Voltage Tester

During the installation of KeypadLinc Dimmer, it may be necessary to identify the wires inside the junction box. Knowing for sure which wire is the LINE (sometimes called HOT) can reduce the guesswork when installing a single switch, and it is absolutely necessary when working with multi-way lighting circuits. A voltmeter is ideal for this application. Many of the digital models can also read current so you can measure how much power is being drawn by the switch's load.

A simpler measurement tool, available at most home improvement centers, is a voltage sensor. This device, often costing less than $20, can sense voltage when placed near a wire. The tip of the voltage sensor can tell if voltage is on the wire without touching the bare copper conductor or breaking the insulation.

When using these tools, be certain to read and understand the safety instructions. Often when these tools are used, the power to the circuit will need to be turned on. When working around live electrical wires, take your time and concentrate on the task.

Preparing to Install KeypadLinc Dimmer

> **IMPORTANT!**
>
> If you are not knowledgeable about and comfortable with electrical circuitry, you should have a qualified electrician install KeypadLinc Dimmer for you. If you have any questions, please consult an electrician or call
>
> **Smarthome Tech Support**
> **800-SMARTHOME**
> (800-762-7846)

Prior to installing KeypadLinc Dimmer, please review the entire installation procedure, and take the following precautions:

- Be sure that you have turned off the circuit breaker or removed the fuse for the circuit you are installing KeypadLinc Dimmer in. Installing KeypadLinc Dimmer with the power on will expose you to dangerous voltages.

- KeypadLinc Dimmer requires a small amount of power to operate, which it receives from a connection to the NEUTRAL electrical wire (usually white). If you are replacing a standard mechanical switch with KeypadLinc Dimmer, the switch you are replacing will normally *not* have a connection to the neutral wire. However, most junction boxes will contain a NEUTRAL wire that you can connect KeypadLinc Dimmer to. If your junction box does not contain a neutral wire, please call SmartHome Tech Support at 800-SMARTHOME (800-762-7846), or consult an electrician.

- Don't use KeypadLinc Dimmer to control low-voltage lighting, fluorescent lights, or motors. These are inductive loads, which KeypadLinc Dimmer is not designed to control. Use a Smarthome SwitchLinc V2 Relay instead.

- Don't use KeypadLinc Dimmer to control an electrical outlet, because non-dimmable or inductive loads may be plugged into it.

- KeypadLinc Dimmer may feel warm during operation. The amount of heat generated is within approved limits and poses no hazards. To minimize heat buildup, ensure that the area surrounding the rear of KeypadLinc Dimmer has adequate ventilation by clearing away excess insulation.

Attach Six Button or Eight Button Plate

Each KeypadLinc V2 Dimmer is packaged with a six key and an eight key button plate.

- The six key button plate provides a dedicated load ON button at the top of the switch, a dedicated load OFF button at the bottom, and four programmable secondary keys between the ON and OFF buttons.

- The eight key button plate provides a dedicated load ON/OFF button in the top left-most position of the switch, and seven programmable secondary buttons.

Attach the desired plate to the switch body by aligning the plastic tabs and snap into place. Proceed with the physical installation of KeypadLinc Dimmer.
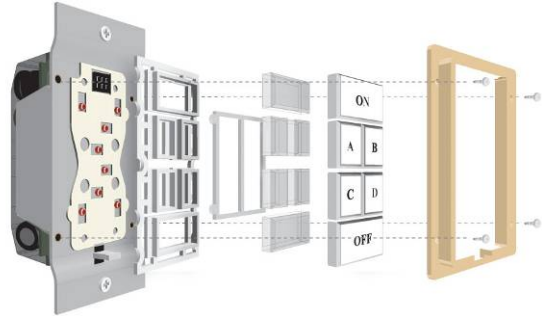
NOTE

Note: For proper operation, KeypadLinc Dimmer must be programmed to operate in six key or eight key mode, corresponding to whichever plate is attached. Factory default is six key mode. Please see section titled **"Configure For Six or Eight Button Operation"** for instructions.

Button Nomenclature

Since KeypadLinc Dimmer has removable button labels, it can become confusing when trying to refer to a specific button of the six available (or eight buttons when the eight button key plate is installed). Refer to the following diagrams for button "names".

SIX BUTTON

EIGHT BUTTON
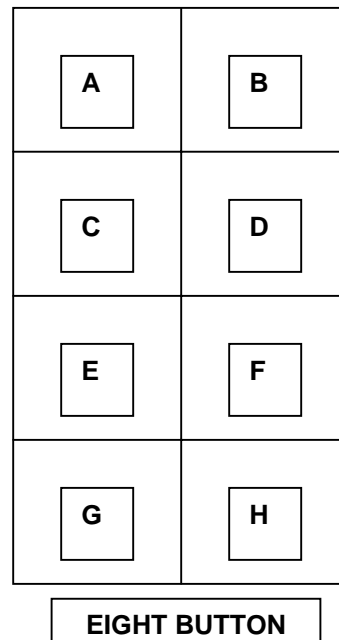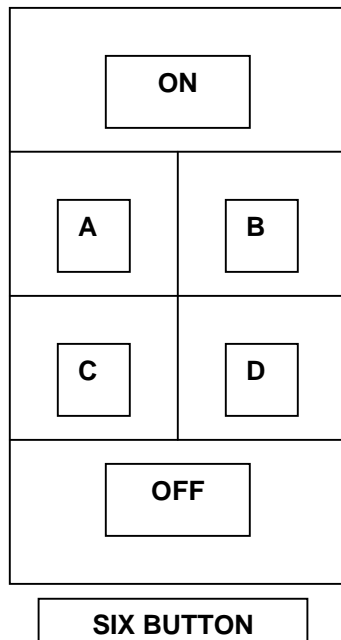
Installing KeypadLinc Dimmer

1. For best INSTEON Network performance, be sure you have properly installed at least two SignaLinc RF Signal Enhancers.

2. At the circuit breaker or fuse panel, disconnect the power for *all* of the circuits in the switch junction box. Verify that power is off by trying to turn on the lights controlled by the switches.

3. Remove the faceplate from the switch junction box, then unscrew the switch you are replacing and pull it out from the junction box.

4. Disconnect the wires from the switch you are replacing. If the wires cannot be detached by unscrewing them, cut the wires where they enter the switch, then strip ½" of insulation off the ends.

5. If you are installing KeypadLinc Dimmer into a standard **two-way circuit** (where only one switch controls the load), follow the diagram below to identify and connect the LINE, LOAD, NEUTRAL, and GROUND wires. If the colors of the wires do not match the diagram, be sure you have identified the wires correctly before connecting them.

6. If you are installing KeypadLinc Dimmer into a **multi-way circuit** (where more than one switch controls the same load), follow the instructions in the section titled *Installing KeypadLinc Dimmer in a Multi-Way Circuit* to identify and connect the LINE, TRAVELER, NEUTRAL, and GROUND wires.
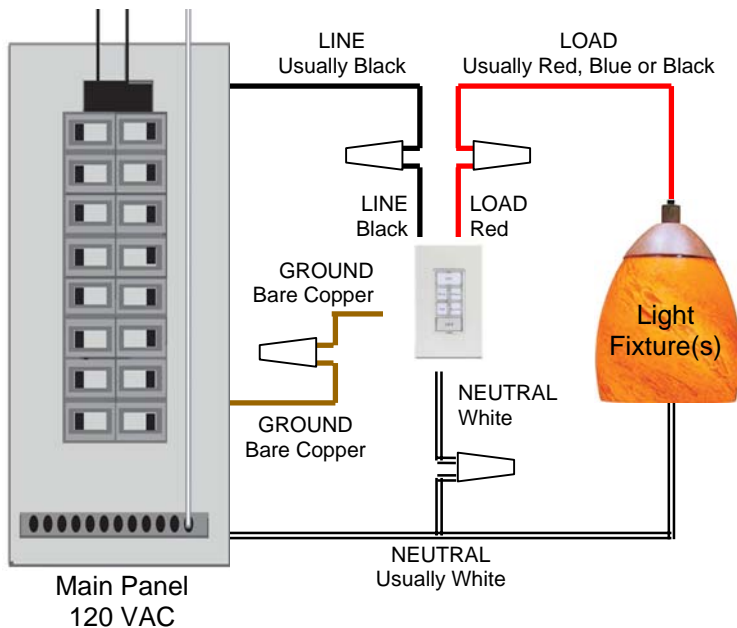
NOTE
The NEUTRAL wire will not normally be connected to the switch you are replacing. If there is no NEUTRAL wire in the junction box, please consult an electrician or call

SmartHome Tech Support
800-SMARTHOME

7. After you have connected all of the wires, ensure that all of the wire connectors are firmly attached and that there is no exposed copper except for the GROUND wire.

8. Orient KeypadLinc Dimmer with the SET button on bottom, gently place it into the junction box, then screw it into place.

9. Turn the circuit breaker back on or re-install the fuse.

10. After the SET button illuminates, verify KeypadLinc Dimmer is working properly by turning the light on and off.

11. Reinstall the trim plate.

Installing KeypadLinc Dimmer in a Multi-Way Circuit

Understanding Multi-Way Circuits

If more than one switch controls a single set of lights (called a LOAD), the switches are part of a multi-way circuit. A 3-way circuit uses two switches to control a LOAD, a 4-way circuit uses three switches, and so forth. Most homes have one or more 3-way circuits, with two switches located in hallways, stairwells, or two different entrances to a room. Less commonly found are circuits that are 4-way or above.
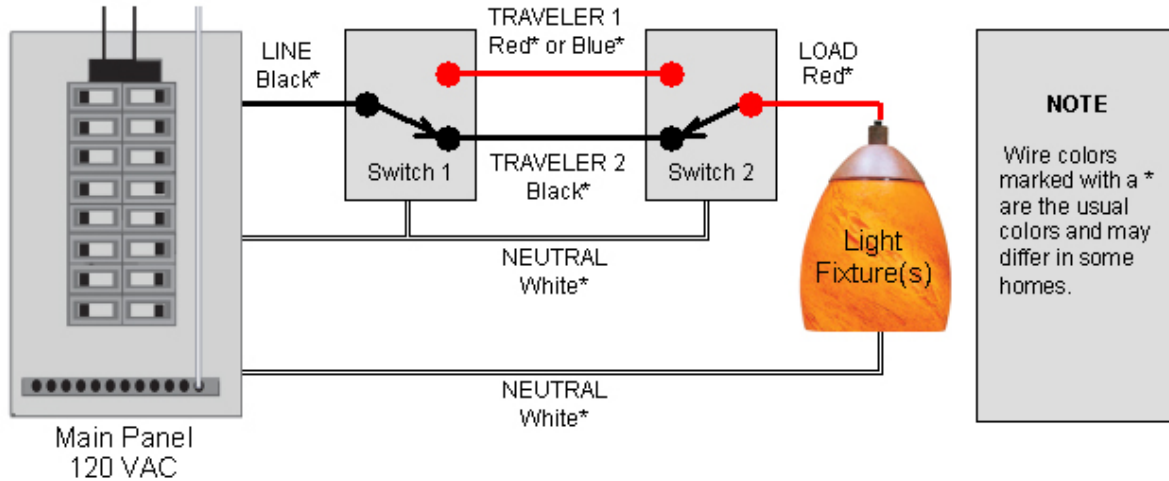
You can use KeypadLinc Dimmers to replace switches in existing multi-way circuits, or you can use them to *create virtual* multi-way circuits without the need to run additional wiring.

Here is how a wired-in three-way circuit (with two switches) works:

A wired-in four- or more-way circuit (with three or more switches) has additional switches added in the middle of the circuit. In the diagram below, the additional switch is shown in one position in the upper box and in the other position below.
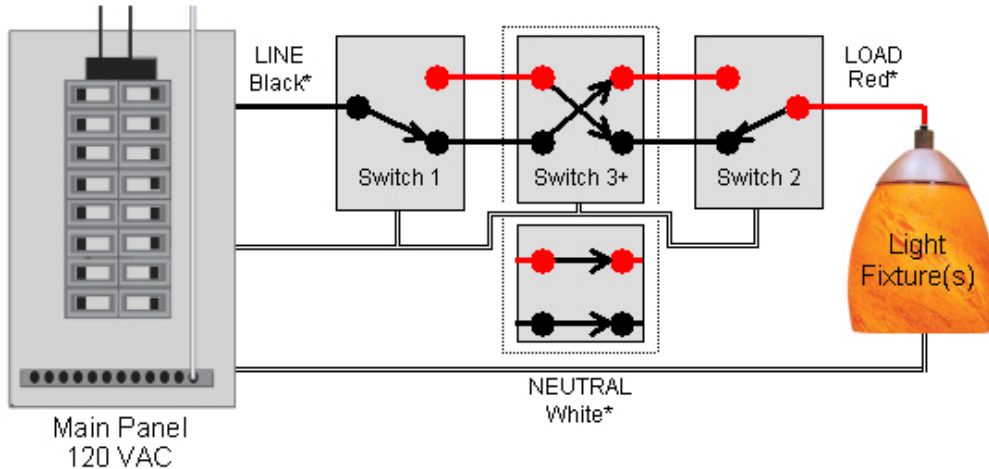
To learn more about multi-way circuits, go to Google.com or another search engine on the Internet and enter the search terms "three-way switch" or "four-way switch."

Using KeypadLinc Dimmers in Virtual Multi-Way Circuits

In a *virtual* multi-way circuit, only one KeypadLinc Dimmer, called the *KeypadLinc Primary*, actually controls the LOAD in the multi-way circuit. Any additional KeypadLinc Dimmers, called *KeypadLinc Secondaries*, are not connected to the LOAD, but only to the powerline (via the LINE and NEUTRAL). All of the KeypadLinc Dimmers can communicate with one another using INSTEON networking on the powerline. After wiring in the KeypadLinc Dimmers, you create the virtual multi-way circuit by setting up all of the KeypadLinc Dimmers to control each other (see *HOW TO SET UP KEYPADLINC DIMMER TO REMOTELY CONTROL AN INSTEON DEVICE*, below).

The diagram below shows how you convert a wired-in three-way circuit into a virtual three-way circuit using two KeypadLinc Dimmers. Step-by-step instructions for wiring in the KeypadLinc Dimmers are in the next section.
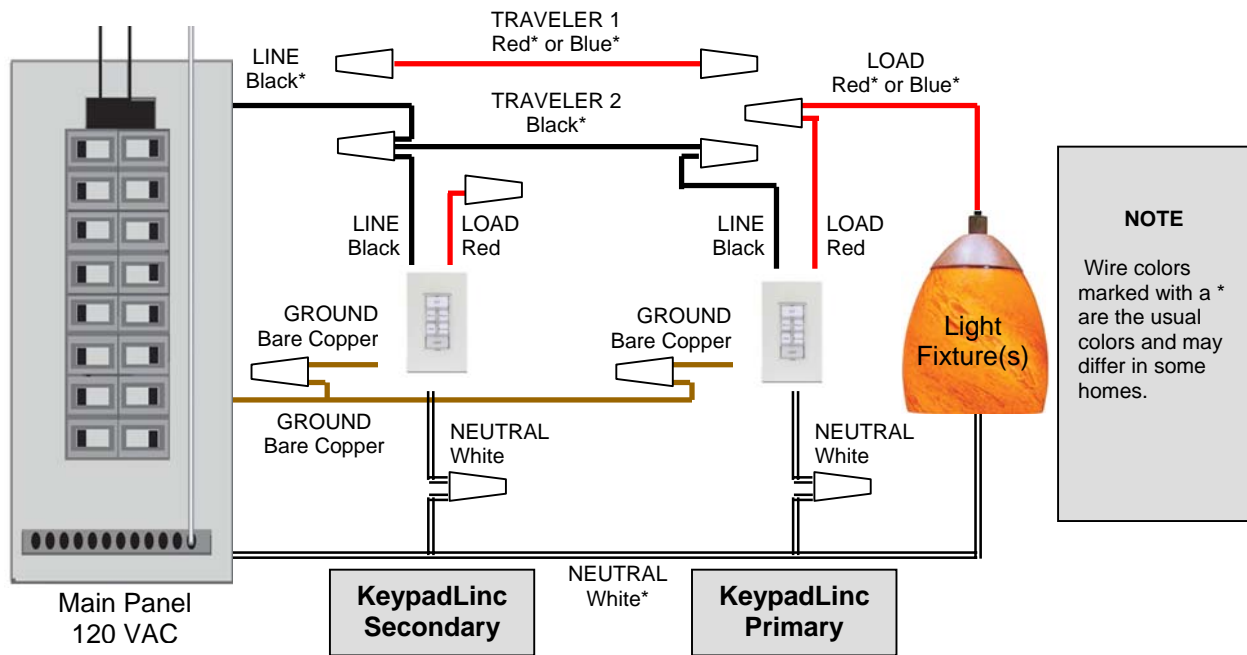
Notice that one of the TRAVELER wires (number 1, the red one) is not used, so you will cap it off at both ends with a wire nut.

The other TRAVELER (number 2, the black one) you will convert to a LINE wire. In the junction box where the KeypadLinc Secondary is, connect TRAVELER 2 to the existing LINE and also to the KeypadLinc Secondary's LINE wire. In the other junction box at the other end, you will connect TRAVELER 2 to the KeypadLinc Primary's LINE wire.

The KeypadLinc Primary's LOAD wire gets connected to the actual lights that are being controlled.

The LOAD wire for any KeypadLinc Secondaries that you will be installing will not be connected to anything, so cap those LOAD wires off with a wire nut.

All KeypadLinc Dimmers, whether they are Primaries or Secondaries, must be connected to NEUTRAL and to GROUND. Note that the switches you are replacing will not normally have a connection to NEUTRAL. If there is no NEUTRAL wire in the junction box, please consult an electrician or call SmartHome Tech Support, 800-SMARTHOME (800-762-7846).

Step-by-Step Instructions for Installing Multi-Way KeypadLinc Dimmers

When replacing a three-way mechanical switch, each switch will have three wires connected to it from the wall box. Four-way or greater circuits will have four wires connected to the switches in the center of the circuit. For this tutorial, we will follow the most commonly used wire colors for homes in North America.

1. **Find the LINE wire.** Your first task is to find out which switch junction box is the one where the electricity comes into the circuit. This box will contain the LINE wire (sometimes called HOT).
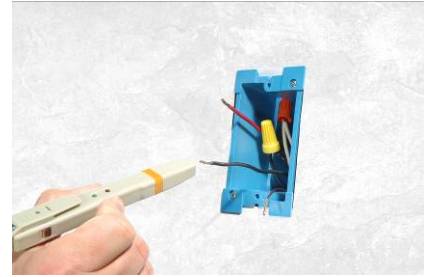
    a. Turn off the electricity at the circuit breaker panel.

    b. Pull all the switches in the multi-way circuit out of their junction boxes. Each switch should have three wires connected to it. If the circuit is a four-way or greater, some of the switches will have four wires.

    c. Disconnect the wires from the old switches. If the wires cannot be detached by unscrewing them, cut the wires where they enter the switch, then strip ½ inch of insulation off the ends.

    d. Making sure that none of the wires are touching anything and that no one is around the wall boxes, turn the electricity back on.

    e. Using a voltmeter or voltage sensor, individually test each wire for voltage. When you measure 120 Volts AC, that wire is the LINE wire. LINE wires are usually black.

    f. The other two wires, usually black and red, are the TRAVELERS and go to the next junction box. TRAVELER wires are usually in the same cable sheath.

    g. Turn off the electricity to resume installing the new KeypadLinc Dimmers.

2. **Connect the KeypadLinc Secondary's LINE Wire.** The KeypadLinc Dimmer that will be the Secondary goes in the junction box where you found the LINE wire. Connect the black LINE wire that you found, the black TRAVELER, and the Black LINE wire on KeypadLinc Dimmer all together with a single wire nut. If another type of Insteon or X10 device is to be installed as the secondary switch, installation is likely as described above, but you should verify the installation instructions specific to that device.
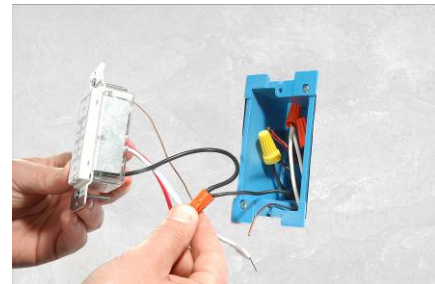
3. **Cap the other TRAVELER house wire.** The other TRAVELER wire, usually red, will not be used, so put a wire nut on the end of it.
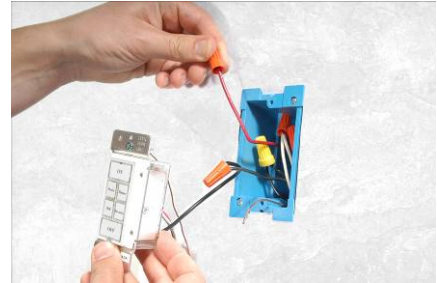
4. **Cap the red LOAD wire from the KeypadLinc Secondary.** Put a wire nut on the end of the KeypadLinc Secondary's LOAD wire to ensure that it won't connect to anything.
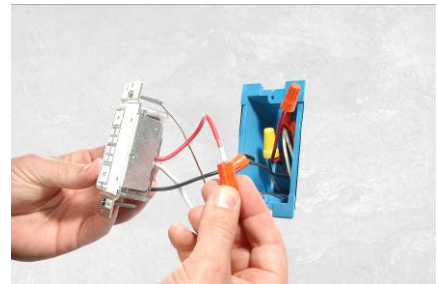
5. **Connect the KeypadLinc Secondary's NEUTRAL Wire.** Locate the group of NEUTRAL wires, usually white, in the rear of the box. The old switch should not have been connected to the NEUTRAL wires, but KeypadLinc Dimmer requires this connection in order to draw a small amount of power for itself. Connect KeypadLinc Secondary's white NEUTRAL wire to the other NEUTRAL wires with a wire nut.
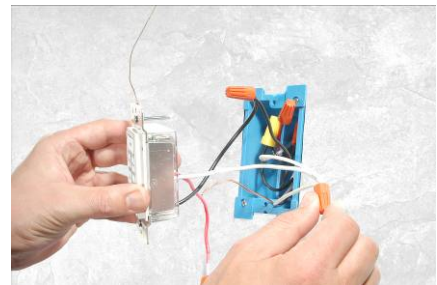
6. **Connect the KeypadLinc Secondary's GROUND Wire.** Connect the bare copper GROUND wire to the other GROUND wires in the junction box.
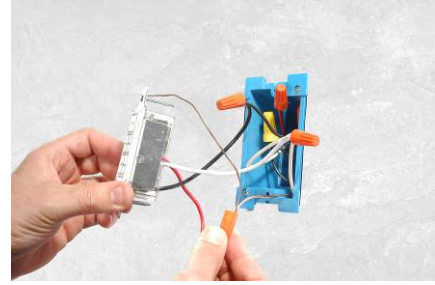
7. **Install Additional KeypadLinc Secondaries.** If you have a four-way or greater switching circuit, see *Special Treatment for Four- or More-Way Circuits* at the end of this section.

8. **Identify the Wires for the KeypadLinc Primary.** The KeypadLinc Primary is the KeypadLinc Dimmer that will actually control the LOAD. In the remaining junction box where you will install the KeypadLinc Primary, find the wire that carries power from the switch to the lights. This wire, called the LOAD wire, is commonly red.

   In the same junction box, there will also be the two TRAVELER wires from the first box, often both in the same cable sheath. Identify the one TRAVELER wire (black) that you connected the LINE wire to in the first junction box.

   If you're not sure which is the TRAVELER wire connected to the LINE wire, you can use the same method described earlier to find it. Turn on the power (taking the same precautions), and use a voltmeter to find the wire with 120 Volts AC on it. This wire is the TRAVELER wire that you connected to the LINE wire in the first junction box.

   Make sure the power is turned off again before proceeding.

9. **Connect the KeypadLinc Primary's LINE Wire.** Use a wire nut to connect the TRAVELER wire, usually black, that you identified as connected to the LINE wire to the KeypadLinc Primary's black LINE wire.
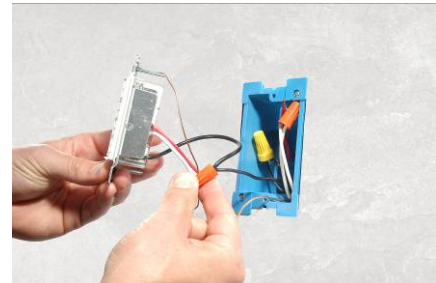
10. **Cap the other TRAVELER wire.** The other TRAVELER wire, usually red, will not be used, so put a wire nut on the end of it.
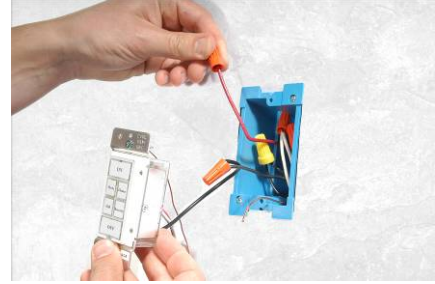
11. **Connect the KeypadLinc Primary's LOAD Wire.** Use a wire nut to connect the LOAD wire, usually red, to the KeypadLinc Primary's red LOAD wire.
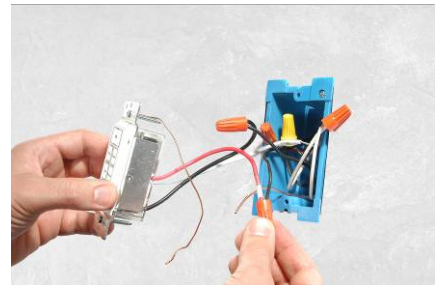
12. **Connect the KeypadLinc Primary's NEUTRAL and GROUND Wires.** Follow the same instructions as before in Steps 5 and 6 for the KeypadLinc Secondary.

13. **Return to the installation instructions on page 8 and continue on with step 7.**

Special Treatment for Four- or More-Way Circuits

If your lighting circuit includes more than two switches controlling a single set of lights, those extra switches will have four wires connected to them. Two of the wires are TRAVELERS from the preceding switch and the other two are TRAVELERS to the next switch in the chain. You will be converting the black TRAVELER wires to LINE wires and replacing the old four-wire switches with KeypadLinc Secondaries.

1. **Connect the KeypadLinc Secondary's LINE Wire.** Use a wire nut to connect both black TRAVELER wires to the KeypadLinc Primary's black LINE wire.

2. **Cap the Two Unused TRAVELERS.** The other two TRAVELER wires, usually red, will not be used, so put wire nuts on the ends of them.

3. **Cap the red LOAD wire from the KeypadLinc Secondary.** Put a wire nut on the end of the KeypadLinc Secondary's LOAD wire to ensure that it won't connect to anything.

4. Connect the KeypadLinc Secondary's NEUTRAL and GROUND Wires. Use the same instructions given previously in Steps 5 and 6.

Configure For Six or Eight Button Operation

- KeypadLinc Dimmer defaults to operation in six button mode. If the eight button plate is attached to KeypadLinc Dimmer, pull the SET button at the bottom of the switch all the way out, and wait 10 seconds. While simultaneously pressing the "A" button (upper left-most button) and "H" button (lower right-most button), push the SET button back in to its normal position (do not press the SET button all the way in, rather let it return to its normal position). KeypadLinc Dimmer is now operating in eight button mode.

- If KeypadLinc Dimmer is to be changed from eight button to six button configuration, replace the eight button plate with the six button plate. Pull the SET button at the bottom of the switch all the way out, and wait 10 seconds. While simultaneously pressing the ON and OFF buttons, push the SET button back in to its normal position (do not press the SET button all the way in, rather let it return to its normal position). KeypadLinc Dimmer is now operating in six button mode.

<div style="border:1px solid">

NOTE

The KeypadLinc Dimmer programming instructions in this manual often require pressing the ON button as part of the process. If installed with the eight button insert, press the "A" button (the upper left-most button) when instructions call for pressing the ON button.

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HOW TO SET UP KEYPADLINC DIMMER TO REMOTELY CONTROL AN INSTEON DEVICE

Linking KeypadLinc Dimmer to a Controlled INSTEON Device

To use KeypadLinc Dimmer as an INSTEON Controller, follow these steps to link the buttons of your KeypadLinc Dimmer and a controlled INSTEON Device together. Refer to your INSTEON Device's User's Guide for detailed instructions on how to properly install it and link it to KeypadLinc Dimmer. The following will work for the most common INSTEON Devices.

1. Set KeypadLinc Dimmer to **Linking Mode** by pressing and holding the desired button for 10 seconds until the LED begins blinking slowly. Don't let up too soon – 10 seconds is a pretty long time!

> **BE CAREFUL**
> Any accidental button press will exit Linking Mode early.

2. Select your INSTEON Device from the list below and follow the linking method for that Device. You have about 4 minutes to perform this step before KeypadLinc Dimmer's Linking Mode times out automatically.

   A. **A SwitchLinc Dimmer** – Press and hold the SwitchLinc Dimmer's **Paddle Top** for 10 seconds, then release. To confirm linking, the SwitchLinc Dimmer will blink the top LED in its LED Bar and flash the light that it is wired to.

   B. **LampLinc™ V2 Dimmer** – Press and hold the **SET Button** on the side of LampLinc V2 Dimmer for 3 seconds, then release. To confirm linking, LampLinc V2 Dimmer will blink its Status LED and flash the lamp that it is controlling.

   C. **ApplianceLinc™ V2** – Press and hold the **SET Button** on the side of ApplianceLinc V2 for 3 seconds, then release. To confirm linking, ApplianceLinc V2 will blink its Status LED.

   D. **A Second KeypadLinc™ V2** – Press and hold the desired button of a second KeypadLinc V2 for 10 seconds, then release. To confirm linking, the second KeypadLinc V2 will blink the ON Button and flash the light that it is wired to.

   E. **Other INSTEON Devices** – See the INSTEON Device's User's Guide.

3. Go back to the KeypadLinc Dimmer that you placed in Linking Mode. If linking was successful, the LED will not be blinking but will remain steadily on.

4. Verify the linking procedure was successful by pressing the appropriate button**.**

Unlinking a Controlled INSTEON Device from KeypadLinc Dimmer

If you are no longer going to use an INSTEON Device that has previously been linked to KeypadLinc Dimmer, it is very important that you unlink it, because otherwise KeypadLinc Dimmer will retry any commands intended for the unused INSTEON Device, thus slowing down your system.

1. Set KeypadLinc Dimmer to **Linking Mode** by pressing and holding the appropriate **Secondary Button** for 10 seconds until the LED begins blinking slowly and the controlled light flashes.

2. Set KeypadLinc Dimmer to **Unlinking Mode** by pressing and holding the same **Secondary button** again for 10 seconds until the controlled light flashes again.

3. Follow the same method given above that you used to link your INSTEON Device to unlink it. On most INSTEON Devices, you just push an **ON Button** for 10 seconds or a **SET Button** for 3 seconds.

4. Go back to the KeypadLinc Dimmer that you placed in Unlinking Mode. If linking was successful, the its LED will not be blinking but will remain steadily on.

Creating an INSTEON Scene

INSTEON Scenes let you activate dramatic lighting moods with the press of just one button. INSTEON Scenes are very easy to set up – just link more than one INSTEON Device to KeypadLinc Dimmer. Then, when you press either the On or Off buttons on the KeypadLinc Dimmer, all of the INSTEON Devices linked in the scene will respond as a group. You can link multiple INSTEON Devices to multiple INSTEON Controllers.

To add an additional INSTEON Device to a scene controlled by KeypadLinc Dimmer, simply follow the same procedure as above in *Linking KeypadLinc Dimmer to a Controlled INSTEON Device*. To remove an INSTEON Device from a scene, see *Unlinking a Controlled INSTEON Device from KeypadLinc Dimmer*.

TIP

You can avoid having to hold KeypadLinc Dimmer's On button down for 10 seconds for each INSTEON Device in a scene by placing KeypadLinc Dimmer in **Scene Setup Mode**, also called **Multilink Mode**.

1. Set KeypadLinc Dimmer to Scene Setup Mode by pressing and holding the desired button for 10 seconds, then pressing the **SET Button** at the bottom of the switch. KeypadLinc Dimmer's LED will blink slowly.

2. Follow the linking method given above for the INSTEON Device you want to include in the scene. On most INSTEON Devices, you just push an ON Button for 10 seconds or a SET Button for 3 seconds. KeypadLinc Dimmer will flash its controlled light to confirm linking, and the LED will continue to blink slowly.

3. On some INSTEON Devices, you may be able to set up additional features, such as On-Levels or Ramp Rates at this time.

4. Continue Steps 2 and 3 for any additional INSTEON Devices you want to link to the scene.

5. When you are finished linking INSTEON Devices to KeypadLinc Dimmer, complete Scene Setup by pressing the **ON Button** (actually, *any* button press will terminate Scene Setup). The KeypadLinc Dimmer's LED will stop blinking and remain steadily on. You have about 4 minutes of inactivity before KeypadLinc Dimmer's Scene Setup Mode times out automatically.

HOW TO SET UP KEYPADLINC DIMMER TO BE REMOTELY CONTROLLED BY AN INSTEON CONTROLLER

Linking an INSTEON Controller to KeypadLinc Dimmer

To remotely control KeypadLinc Dimmer using another INSTEON Controller, follow these steps to link KeypadLinc Dimmer and the INSTEON Controller together. Refer to your INSTEON Controller's User's Guide for detailed instructions on how to properly install it and link it to KeypadLinc Dimmer. The following will work for the most common INSTEON Controllers.

1. Select your INSTEON Controller from the list below and follow the method shown to put it into **Linking Mode**.

   A. **SwitchLinc V2 Dimmer** – Press and hold the Second KeypadLinc Dimmer's **Paddle Top** for 10 seconds, then release. To confirm that it is in Linking Mode, the SwitchLinc Dimmer will flash the light that it is wired to once and begin blinking the top LED in its LED Bar.

   B. **ControLinc™ V2 Tabletop Controller** – Choose the ON/OFF Button Pair you want to use for controlling KeypadLinc Dimmer. Press and hold the **ON Button** of the pair for 10 seconds. To confirm that it is in Linking Mode, ControLinc V2's Status LED will begin blinking.

   C. **Other KeypadLinc™ V2** – Choose the button you want to use for controlling KeypadLinc Dimmer. Press and hold the desired button for 10 seconds. To confirm that it is in Linking Mode, KeypadLinc V2 will flash the light that it is wired to once and begin blinking the button that you pushed.

   D. **Other INSTEON Controllers** – See the INSTEON Controller's User's Guide.

2. Press and hold the **On Button** for 10 seconds on the KeypadLinc Dimmer that is being controlled. To confirm linking, the KeypadLinc Dimmer will blink its LED and flash the light that it is wired to. Depending on the INSTEON Controller, you have about 4 minutes to perform this step before Linking Mode times out automatically.

NOTE
When a KeypadLinc Dimmer secondary button is linked, its LED backlight will toggle on and off to reflect the current state of the device or scene. This functionality is not available for the primary on/off buttons of KeypadLinc Dimmer.

Unlinking KeypadLinc Dimmer from an INSTEON Controller

If you are no longer going to control a KeypadLinc Dimmer with an INSTEON Controller, it is very important that you unlink it, because otherwise the controller will retry any commands intended for the unused KeypadLinc Dimmer, thus slowing down your system.

1. Select your INSTEON Controller from the list below and follow the method shown to put it into **Unlinking Mode**.

   A. **A SwitchLinc V2 Dimmer** – Follow the instructions in the section *Unlinking a Controlled INSTEON Device from KeypadLinc Dimmer*, above. (Briefly, press and hold the SwitchLinc Dimmer's **Paddle Top** for 10 seconds **twice**.)

   B. **ControLinc™ V2 Tabletop Controller** – Press and hold the **OFF Button** of the ON/OFF Button Pair you used for controlling KeypadLinc Dimmer for 10 seconds. To confirm that it is in Unlinking Mode, ControLinc V2's Status LED will begin blinking.

   C. **KeypadLinc™ V2** – Press and hold for 10 seconds the button you used for controlling KeypadLinc Dimmer, then press and hold the same button for 10 seconds **again**. To confirm that it is in Unlinking Mode, KeypadLinc V2 will flash the light that it is wired to once and begin blinking the button that you pushed.

   D. **Other INSTEON Controllers** – See the INSTEON Controller's User's Guide.

2. Press and hold the **On Button** for 10 seconds on the KeypadLinc Dimmer that is being controlled. To confirm unlinking, the KeypadLinc Dimmer will blink its LED and also the light that it is wired to. Depending on the INSTEON Controller, you have about 4 minutes to perform this step before Unlinking Mode times out automatically.

HOW TO SET UP ON-LEVELS AND RAMP RATES

Setting the On-Level

1. Hold down KeypadLinc Dimmer's On Button or Off Button to **adjust the brightness** of the controlled light to the desired On-Level.

2. Press the **SET Button** at the bottom of the switch.

3. KeypadLinc Dimmer will flash the controlled light once to confirm the On-Level setting.

Setting the On-Level and Ramp Rates (Optional)

The **On-Level** is the brightness that the light you are controlling will go to when you turn it on. The On-Level is adjustable from 3% to 100% brightness. The default is 100%.

The **Ramp Rate** sets the time it will take for the light you are controlling to go from OFF to the On-Level brightness, or from the On-Level brightness to OFF. This time is adjustable from 0.1 to 9 seconds to ramp between full-ON and full-OFF. The default is 0.1 second.

KeypadLinc Dimmer can store multiple On-Levels and Ramp Rates in its memory.

Local On-Level and Ramp Rate values apply when you tap the On Button or Off Button on KeypadLinc Dimmer itself.

Remote-Controlled On-Level and Ramp Rate values apply when another INSTEON Controller tells KeypadLinc Dimmer to turn on or turn off. KeypadLinc Dimmer stores *separate* On-Levels and Ramp Rates for each button on each Controller that it is linked to. These On-Levels and Ramp Rates can all be the same, or they can be different.

You establish an On-Level and Ramp Rate by first setting them up and then locking them in. Setting an On-Level and setting a Ramp Rate are always done the same way, but locking them in is different, depending on what you want the On-Level and Ramp Rates to apply to.

You can set up an On-Level or Ramp Rate in any order. When you do the lock-in, the currently-set On-Level and Ramp Rate are locked in together.

CAUTION
If you hold the SET button for more than three seconds you may accidentally put KeypadLinc Dimmer into linking mode (pressing and holding the SET button is an alternate way to activate linking mode). If you find yourself in this situation, exit linking mode by simply pressing the ON button once.

Setting the Ramp Rate

The Ramp Rate sets the time it will take for the light you are controlling to go from OFF to the On-Level brightness, or from the On-Level brightness to OFF. This time is adjustable from 0.1 to 9 seconds to ramp between full-ON and full-OFF. The default is 0.1 second.

1. Adjust the Ramp Rate to be faster by brightening the light, or adjust it to be slower by dimming the light. Hold down KeypadLinc Dimmer's On Button or Off Button to brighten or dim the controlled light. The table below gives the approximate relationship between the brightness you set and the Ramp Rate you get.

Approximate Brightness Level	Ramp Rate in Seconds
90-100%	0.1
77-87%	0.2
65-74%	0.3
52-61%	0.5
39-48%	2.0
26-35%	4.5
13-23%	6.5
1-10%	8.5
1%	9.0

NOTE

If the light is ramping to less than full brightness, then the time it will take will be proportionately less. For instance, if the light is going to half brightness, the time it will take for a given Ramp Rate will be halved.

2. **Double-press** the **SET Button** at the bottom of the switch.

3. KeypadLinc Dimmer will flash the controlled light once to confirm the Ramp Rate setting.

BE CAREFUL

If the attached lighting load flashes twice, you didn't double-press the SET Button fast enough, and KeypadLinc Dimmer incorrectly thought you set up the On-Level twice. Re-set the correct On-Level and try the Ramp Rate setting again.

Locking In a Remote-Controlled On-Level and Ramp Rate

Whenever you link an INSTEON Controller to KeypadLinc Dimmer, the current On-Level and Ramp Rate values are stored in KeypadLinc Dimmer's memory. So, locking in a remote-controlled On-Level and Ramp Rate is really just the same as linking. Just follow the instructions in the section *Linking an INSTEON Controller to KeypadLinc Dimmer*, above.

Linking an INSTEON Controller to KeypadLinc Dimmer restores the previous values for the *Local* On-Level and Local Ramp Rate. So, linking does not affect the Local On-Level and Ramp Rate.

Locking In a Local On-Level and Ramp Rate

To lock in the current On-Level and Ramp Rate as the Local On-Level and Ramp Rate, all you have to do is **not link** KeypadLinc Dimmer to an INSTEON Controller for **four minutes**. After the four-minute timeout, the current On-Level and current Ramp Rate will be permanently locked in as the Local On-Level and Local Ramp Rate.

HOW TO CROSS-LINK MORE THAN ONE KEYPADLINC DIMMER

Cross-Linking in a 3-Way Circuit

The purpose of cross-linking switches allows you to track LED brightness levels as well as on/off levels on both the primary and secondary switches. For this example we will use a Primary switch controlling the load and one keypad dimmer in a virtual 3-way. They will be referred to as: Primary Switch (load controlling) and Secondary Switch (KeypadLinc Dimmer).

Note: If you intend on setting a ramp rate or ON level; this should be done on each switch prior to cross-linking them. Please refer to the section above on How to set up KeypadLinc Dimmer to remotely control an insteon device for instructions on linking switches.

1. Link Primary Switch to Secondary Switch.
2. Cross-link Secondary Switch to Primary Switch.

Upon successful completion, each switch in the above scenario will now track both ON/OFF status and brightness level on the LED bar of the other switches it has been cross-linked to.

Cross-Linking in a Multi-Way Circuit using Multi-Link Mode

For more than two switches or keypadlincs, multi-link mode will allow you to save time. For this example we will use a Primary switch controlling the load and two secondary switches in a virtual 4-way. They will be referred to as: Primary Switch (load controlling), Secondary Switch 1, and Secondary Switch 2.

1. Primary Switch should be put into Multi-Link mode then link to Secondary Switch 1 and Secondary Switch 2. Tap the Primary Switch to go out of Multi-Link mode.
2. Secondary Switch 1 should be put into Multi-Link mode then link to Primary Switch and Secondary Switch 2. Tap the Secondary Switch 1 to go out of Multi-Link mode.
3. Secondary Switch 2 should be put into Multi-Link mode then link to Primary Switch and Secondary Switch 1. Tap the Secondary Switch 2 to go out of Multi-Link mode.

Upon successful completion, each switch in the above scenario will now track both ON/OFF status and brightness level on the LED bar of the other switches it has been cross-linked to.

ADVANCED FEATURES OF KEYPADLINC DIMMER

Restoring Power to KeypadLinc Dimmer

KeypadLinc Dimmer stores all of its settings in non-volatile memory, so they are not lost even when power is removed. In the event of a power loss, KeypadLinc Dimmer will automatically return the light being controlled to the brightness level it had before the power was interrupted.

Resetting KeypadLinc Dimmer to Its Factory Default Settings

The factory reset procedure can be used to clear KeypadLinc Dimmer's memory and restore its factory default settings. This procedure will clear the unit of ALL INSTEON Links, any programmed On-Levels, Ramp Rates, X10 Primary Address and X10 Scene Addresses.

3. Before resetting a KeypadLinc Dimmer that has been linked to an INSTEON Controller, be sure to unlink it from the Controller first. See *Unlinking KeypadLinc Dimmer from an INSTEON Controller*, above.

4. If you are using KeypadLinc Dimmer to control any INSTEON Devices other than the light it is wired to, unlink those Devices from KeypadLinc Dimmer. See *Unlinking a Controlled INSTEON Device from KeypadLinc Dimmer*, above.

5. Gently pull the SET Button at the bottom of the switch out as far as it will go (about 1/8"). This "Air Gap" removes all power to KeypadLinc Dimmer.

6. After 10 seconds, push the **SET Button** all the way down and hold for 3 seconds, then let up.

7. A few seconds after you let up on the SET button, KeypadLinc Dimmer will turn the light it is wired to fully ON, indicating that the factory reset is complete. KeypadLinc Dimmer is now reset to all the default settings and ready for fresh programming and use.

NOTE

Note: Unless they have been unlinked, INSTEON Devices that have been previously linked to KeypadLinc Dimmer will still respond to paddle presses, even after a factory reset. The reason is that the INSTEON Devices themselves have not been unlinked from KeypadLinc Dimmer. Follow the procedure *Unlinking a Controlled INSTEON Device from KeypadLinc Dimmer*, above, to unlink individual INSTEON Devices.

Toggle Mode

Buttons can be configured to act in toggle mode, where successive presses of the same button alternate on and off commands, or non-toggle mode, where repeated presses of the same button always send the same state command (ON or OFF). Buttons default to toggle mode. To alternate between toggle and non-toggle mode, press, hold and release the desired button three times: the first press should last 10 seconds, the second and third presses should be held for 5 seconds. If non-toggle mode is desired, send an ON or OFF command to the button you want non-toggle (For non-toggle off start with the status LED off, for non-toggle on start will the status LED on). For example, if you want a button to always send the OFF command, press and hold 3 times as described above and then link it to another controller or button and send the non toggle button an off command (then unlink it from the button or controller). NOTE: Button LEDs will not indicate device/scene state when configured for non-toggle mode.

Grouping Buttons

Buttons can be grouped in an interdependent, exclusive-OR fashion, where pressing one button in a group triggers an ON command for the devices/scene assigned to that button. Grouping is helpful when you have multiple devices or scenes, and you'd like to be able to easily cycle through these devices/scenes with an LED indicator of which device/scene is active.

Programming groups is much more involved than most Insteon device programming. Following are steps for creating a two button group. When creating groups with more than two buttons, we recommended you contact Smarthome Technical Support for assistance if you have any problems.

For clarity's sake, the following instructions will refer to the two buttons to be added to a group as button A and button B.   The below instructions refer to cross linking buttons A & B twice. First cross link the buttons you want to group then cross link the buttons again but with their status LED's in the off position.
1. You must first cross link button A and Button B.
2. Press and hold Button A for 10 seconds to go into link mode.
3. Press Button B for 10 seconds to link.
4. Next press button B for 10 seconds to go into link mode.
5. Press Button A for 10 seconds to link. These buttons are now cross linked.
6. Next, cross link Button A and Button B but from the OFF position (the status LED should be off on both A and B).
7. Turn off Button A's LED then press and hold Button A for 10 seconds to go into link mode.
8. Press Button B for 10 seconds to link.
9. Turn off Button B's LED then press and hold button B for 10 seconds to go into link mode.
10. Press Button A for 10 seconds to link.

Variable Backlight Brightness

KeypadLinc Dimmer's button backlighting can be set to two different brightness levels.

- If six key button plate is installed, simultaneously press the "A" and "D" buttons to toggle between backlight levels.

- If eight key button plate is installed, simultaneously press the "C" and "F" buttons to toggle between backlight levels.

X10 PROGRAMMING OPTIONS

KeypadLinc Dimmer is backward-compatible with X10, meaning that it can respond to X10 commands from an X10 Controller and it can send X10 commands to X10 devices. However, **to operate KeypadLinc Dimmer in X10 mode**, **you must first set up an X10 Primary Address**. As It ships from the factory, or after a factory reset procedure, KeypadLinc Dimmer will have no X10 Primary Address set up.

Setting the X10 Primary Address

You must do this before KeypadLinc Dimmer will respond to X10 commands. You can use any of the 256 possible X10 addresses for the X10 Primary Address.

1. Set KeypadLinc Dimmer to **Linking Mode** by pressing and holding the **Desired Button** for 10 seconds until the LED begins blinking slowly and the controlled light flashes.

2. Using an X10 Controller, send the **X10 Primary Address** you want to set up **three times**. You have about 4 minutes to perform this step before KeypadLinc Dimmer's Linking Mode times out automatically.

3. Once KeypadLinc Dimmer has received the X10 Address three times, KeypadLinc Dimmer will confirm that it has set its Primary X10 Address by blinking its LED and flashing the light that it is wired to.

> **NOTE**
>
> An X10 Address consists of a House Code followed by a Unit Code. An X10 command, such as X10 ON or X10 OFF, may optionally follow the X10 Address.

Removing the X10 Primary Address

1. Set KeypadLinc Dimmer to **Linking Mode** by pressing and holding the **Desired Button** for 10 seconds until the LED begins blinking slowly and the controlled light flashes.

2. Set KeypadLinc Dimmer to **Unlinking Mode** by pressing and holding the **Desired Button again** for 10 seconds until the controlled light flashes again.

3. Using an X10 Controller, send **any X10 Address three times**. It does not matter what the X10 Address is as long as it is the same one each time. You have about 4 minutes to perform this step before KeypadLinc Dimmer's Unlinking Mode times out automatically.

4. Once KeypadLinc Dimmer has received the X10 Address three times, KeypadLinc Dimmer will confirm that it has removed its Primary X10 Address by blinking its LED and flashing the light that it is wired to.

Setting the X10 On-Level and X10 Ramp Rate for the X10 Primary Address

When an X10 Controller sends an X10 ON or X10 OFF command to KeypadLinc Dimmer's Primary X10 Address, the Local On-Level and Local Ramp Rate apply. In other words, KeypadLinc Dimmer acts the same way as it would if you manually tapped its On Button or Off Button.

See the section *HOW TO SET UP ON-LEVELS AND RAMP RATES*, above, for instructions on setting up the Local On-Level and Local Ramp Rate.

NOTE
If you want an X10 On-Level and Ramp Rate other than the Local values, you can set up one or more X10 Scene Addresses as described in the sections *Remotely Setting an X10 Scene Address and On-Level* and *Remotely Setting the Ramp Rate for an X10 Scene Address* below.

Enabling and Disabling Resume Dim

If Resume Dim is enabled, KeypadLinc Dimmer will remember the last brightness level to which it was set. Then, when an ON command is received from a controller, or the load is turned on from the KeypadLinc, the light will go to the remembered brightness, rather than to the preprogrammed level. Resume dim function is not available if an X10 address is assigned.

To enable Resume Dim, set up a Local On-Level of OFF (or zero). To disable Resume Dim, set up a Local On-Level of anything but OFF.

See the section *HOW TO SET UP ON-LEVELS AND RAMP RATES*, above, for instructions on setting up the Local On-Level.

ADVANCED X10 PROGRAMMING OPTIONS

You can remotely set up X10 Scene Addresses as well as On-Levels and Ramp Rates using an X10 Controller capable of sending an X10 address (house code and unit code) *without* sending X10 ON or OFF commands. The following procedures will not work with a transmitter that sends the X10 address and an X10 command together. X10 Controllers in which one button is pressed to turn an X10 device on or off WILL NOT WORK.

These procedures all begin by sending the same sequence of five X10 addresses, called the CLEAR Sequence. After you send the CLEAR Sequence, you have about 4 minutes to finish the procedure before automatic timeout.

Remotely Setting the On-Level for the X10 Primary Address

This method of setting the On-Level has exactly the same effect as manually setting the Local On-Level as explained in the section *HOW TO SET UP ON-LEVELS AND RAMP RATES*, above.

1. Using an X10 Controller, send the CLEAR Sequence:

O16	N16	M16	P16	M16

2. Send the X10 Primary Address (house code and unit code).

3. Set the On-Level for the X10 Primary Address by adjusting KeypadLinc Dimmer's brightness using its on/off buttons or any Controller. If you skip this step, the current On-Level will be used.

4. Send the following X10 Address sequence to lock in the new On-Level:

P16	N16	M16	O16	M16

5. KeypadLinc Dimmer will flash the light it is wired to and blink its LED, indicating that the On-Level has been set for the X10 Primary Address.

Remotely Setting the Ramp Rate for the X10 Primary Address

If you use this method for setting the Ramp Rate, you can achieve Ramp Rates ranging from 0.1 second to 9 *minutes*. If you use the manual method in the section *HOW TO SET UP ON-LEVELS AND RAMP RATES* above, you can only achieve Ramp Rates ranging from 0.1 second to 9 *seconds*.

This method of setting the Ramp Rate has exactly the same effect as manually setting the Local Ramp Rate as explained in the section *HOW TO SET UP ON-LEVELS AND RAMP RATES*, above.

1. Using an X10 Controller, send the CLEAR Sequence:

O16	N16	M16	P16	M16

2. Send the X10 Primary Address (house code and unit code).

3. Use the on/off buttons or any Controller to adjust KeypadLinc Dimmer's brightness so it corresponds to the Ramp Rate you want in the table below. If you use KeypadLinc Dimmer's buttons and you are careful, you can set one of 32 brightness levels. Brighter is faster.

Bright-ness Level	Ramp Rate in Seconds	Bright-ness Level	Ramp Rate in Seconds	Bright-ness Level	Ramp Rate in Minutes
100%	0.1	65%	26	29%	2.5
97%	0.2	61%	28	26%	3.0
94%	0.3	58%	30	23%	3.5
90%	0.5	55%	32	19%	4.0
87%	2.0	52%	34	16%	4.5
84%	4.5	48%	38	13%	5
81%	6.5	45%	43	10%	6
77%	8.5	42%	47	6%	7
74%	19.0	39%	60	3%	8
71%	21.5	35%	90	0%	9
68%	23.5	32%	120		

4. Send the following X10 Address sequence to lock in the new Ramp Rate:

O16	P16	N16	M16	O16

5. KeypadLinc Dimmer will flash the light it is wired to and blink its LED, indicating that the Ramp Rate has been set for the X10 Primary Address.

About X10 Scene Address Programming

KeypadLinc Dimmer can be a member of up to 255 X10 Scenes. An X10 Scene Address is just another X10 address like the X10 Primary Address. When an X10 ON command is sent to an X10 Scene Address, every X10 Scene-enabled module with that X10 Scene Address will turn on to its independent On-Level at its independent Ramp Rate. Sending an X10 OFF command to an X10 Scene Address will turn off all modules that are members of that X10 Scene, each at its independent Ramp Rate. X10 Scene-enabled modules will react to DIM and BRIGHT commands after the X10 Scene Address is sent. However, they will ignore ALL ON and ALL OFF commands for the X10 Scene Address.

Remotely Setting an X10 Scene Address and On-Level

1. Using an X10 Controller, send the CLEAR Sequence:

O16	N16	M16	P16	M16

2. Set the On-Level for the X10 Scene Address by adjusting KeypadLinc Dimmer's brightness using its on/off buttons or any Controller. If you skip this step, the current On-Level will be used. A scene can trigger KeypadLinc Dimmer to go off by setting the On-Level to 0%.

3. Send the following X10 Address sequence:

M16	N16	O16	P16

4. Send the desired X10 Scene Address (house code and unit code) to lock in the new On-Level and X10 Scene Address.

5. KeypadLinc Dimmer will flash the light it is wired to, indicating that the X10 Scene Address and On-Level have been set up.

Remotely Removing an X10 Scene Address

1. Using an X10 Controller, send the CLEAR Sequence:

O16	N16	M16	P16	M16

2. Send KeypadLinc Dimmer's X10 Primary Address (house code and unit code).

3. Send an X10 ON or OFF command.

4. Send the following X10 Address sequence:

O16	P16	M16	N16

5. Send the X10 Scene Address (house code and unit code) that is to be removed.

6. KeypadLinc Dimmer will flash the light it is wired to, indicating that the X10 Scene Address has been removed.

Remotely Setting the Ramp Rate for an X10 Scene Address

The Ramp Rate of each module in each X10 Scene is adjustable. If this setting is not adjusted, KeypadLinc Dimmer will use the Ramp Rate for its X10 Primary Address.

1. Using an X10 Controller, send the CLEAR Sequence:

O16	N16	M16	P16	M16

2. Send KeypadLinc Dimmer's X10 Primary Address (house code and unit code).

3. Use any controller to adjust KeypadLinc Dimmer's brightness so it corresponds to the Ramp Rate you want in the table below. If you use KeypadLinc Dimmer's on/off buttons and you are careful, you can set one of 32 brightnesses. Brighter is faster.

Brightness Level	Ramp Rate in Seconds	Brightness Level	Ramp Rate in Seconds	Brightness Level	Ramp Rate in Minutes
100%	0.1	65%	26	29%	2.5
97%	0.2	61%	28	26%	3.0
94%	0.3	58%	30	23%	3.5
90%	0.5	55%	32	19%	4.0
87%	2.0	52%	34	16%	4.5
84%	4.5	48%	38	13%	5
81%	6.5	45%	43	10%	6
77%	8.5	42%	47	6%	7
74%	19.0	39%	60	3%	8
71%	21.5	35%	90	0%	9
68%	23.5	32%	120		

4. Send the following X10 Address sequence:

N16	O16	P16	M16

5. Send the X10 Scene Address (house code and unit code).

6. KeypadLinc Dimmer will flash the light it is wired to, indicating that the new Ramp Rate has been set for the X10 Scene Address.

HOW TO USE KEYPADLINC DIMMER

Using the Buttons

The On Button makes your light go ON and the Off Button makes your light go OFF.

- **Tap** the On Button to make your light go at the Local Ramp Rate from whatever brightness it currently has to the Local On-Level brightness.

- **Tap** the Off Button to make your light go at the Local Ramp Rate from whatever brightness it currently has to full-OFF.

- **Double-tap** the On Button to make your light go full-ON quickly.

- **Double-tap** the Off Button to make your light go full-OFF quickly.

- **Press and hold** the On Button to gradually brighten your light from whatever brightness it currently has to full-ON.

- **Press and hold** the Off Button to gradually dim your light from whatever brightness it currently has to full-OFF.

Button	Tap	Double Tap	Press and Hold
On	Ramp to On-Level	Fast ON	Brighten
Off	Ramp to OFF	Fast OFF	Dim

Using the Air Gap

Pulling the SET Button at the bottom of the switch out as far as it will go (about 1/8") opens mechanical contacts that remove all power from KeypadLinc Dimmer and the load that it controls. "Air gapping" can be useful for replacing bulbs or any other time you want the controlled circuit to be unpowered.

Because KeypadLinc Dimmer's settings are stored in non-volatile memory, setup information will not be lost when the unit unpowered.

BE CAREFUL
If you press the SET Button in too far when you undo the air gap, you might inadvertently reset KeypadLinc V2 Dimmer to its factory default settings. Just push the button in until its top is even with the Trim Frame.

Custom Keypad Labels

Use enclosed pre-printed button labels or make your own

The KeypadLinc button labels can be changed so you can customize its appearance. You can use the pre-printed labels that shipped with your KeypadLinc or create your own using the enclosed blank labels.

Visit the Smarthome Web site to download replacement label files or a template to allow label creation in word processors that can read the Microsoft® Word format.

While we encourage you to customize your KeypadLinc, please be gentle in removing the keys. The buttons on the KeypadLinc require extra special care in removing the keycaps. Using a small, flat edged screwdriver, ONLY pry up on the sides of the keys from the middle of the keypad (as shown below). Make sure you are centered on the key as there is a small "lip" to pull up on located there. Should any damage occur to you KeypadLinc during the labeling, please contact Smarthome Customer Service at 1-800-762-7846 and we will be happy to replace your unit.

ABOUT INSTEON

Understanding Why an INSTEON Network Is Reliable

INSTEON messages travel throughout the home via Powerline Carrier (PLC) signals on the existing house wiring, and also via wireless Radio Frequency (RF). As the messages make their way to INSTEON devices being controlled, they are picked up and retransmitted by all other INSTEON devices along the way. This method of communicating, called a *mesh network*, is very reliable because each additional INSTEON device helps to support the overall network.

To further ensure reliability, every INSTEON device confirms that it has received a command. If an INSTEON controller does not receive this confirmation, it will automatically retransmit the command up to five times.

Further Enhancing Reliability

As signals travel via the powerline or RF throughout the home, they naturally become weaker the farther they travel. The best way to overcome signals getting weaker is to increase the coverage of the mesh network by introducing more INSTEON devices.

It is possible that some audio-video products, computers, power strips or other electrical equipment may attenuate INSTEON signals on the powerline. You can temporarily unplug suspected devices to test whether the INSTEON signal improves. If it does, then you can plug in AC line filters available from Smarthome to permanently fix the problem.

#1626 FilterLinc™
Plug-In Filter

Using Smarthome's SignaLinc RF to Upgrade Your INSTEON Network

SignaLinc™ RF Signal Enhancers are ideal for improving signal strength and network coverage throughout your home. SignaLinc RF acts like another member of the dual-band mesh network, tying it together by simultaneously retransmitting INSTEON signals across both radio-frequency and the powerline. It also provides an access point for RF-only INSTEON devices, such as handheld controllers.

In addition, two SignaLinc RFs provide a wireless path for INSTEON signals to travel between the two separate electrical circuits, called *powerline phases*, found in most homes. Without a reliable method for coupling opposite powerline phases, some parts of your home may receive INSTEON signals intermittently. With at least one SignaLinc RF plugged into one of the powerline phases, and at least one more plugged into the opposite powerline phase, INSTEON powerline signals will be strong everywhere in your home.

NOTE

For detailed information and specifications on the Insteon™ technology standard, visit:

http://www.insteon.net

About INSTEON and X10

Possible BoosterLinc Interference with INSTEON

If you have installed older Smarthome Plug-In BoosterLinc™ X10 Signal Boosters or certain other BoosterLinc-enabled products, the older BoosterLinc technology may interfere with INSTEON communications.

Plug-In BoosterLinc X10 Signal Boosters, Smarthome #4827, shipped after February 1, 2005, with V3.0 or later firmware, are fully compatible with INSTEON.

The following Plug-In BoosterLinc X10 Signal Boosters use older firmware that may cause interference with INSTEON:

- White BoosterLinc X10 Signal Boosters, #4827, shipped before February 1, 2005, with V2.5 or earlier firmware

- All Gray BoosterLinc X10 Signal Boosters, #4827

To troubleshoot Insteon/BoosterLinc issues, try unplugging the older BoosterLinc X10 Signal Boosters to see if this helps with INSTEON interference. If it does, please call 800-SMARTHOME (800-762-7846) for help with replacing your older BoosterLinc X10 Signal Boosters with newer INSTEON-compatible ones.

The following pre-INSTEON SmartHome products have BoosterLinc technology that you can turn on or turn off when you set the X10 Address for the product. If turned on, the BoosterLinc technology may interfere with INSTEON.

• KeypadLinc™ 6 with Integrated Dimmer, #12073W, #12073WB and #12073WW	**NOTE** To disable BoosterLinc X10 Signal Amplification on these products: 1. Press and hold the SET Button. 2. Send the X10 Primary Address. 3. Send an X10 OFF command. You can send an X10 ON command in Step 3 to re-enable the BoosterLinc feature.
• SwitchLinc™ Relay 2-Way, #23883 and #23883T	
• ToggleLinc™ 2-Way Dimmer, #23890, and Switch, #23893	

If you have any of these products and the BoosterLinc feature is turned on, please consult your User's Guide or call 800-SMARTHOME (800-762-7846) for help with turning it off. You may then wish to install newer INSTEON BoosterLinc X10 Signal Boosters, which Smarthome can help you with.

How INSTEON May Affect X10

If your existing X10 devices seem to be working less reliably after installing INSTEON devices, remember that INSTEON devices can absorb X10 signals just as X10 devices do, and that INSTEON devices do not repeat X10 signals. Installing INSTEON-compatible BoosterLinc X10 Signal Boosters, Smarthome #4827, or a SignaLinc Plug-In Coupler-Repeater, #4826, can increase X10 signal levels.

Please call 800-SMARTHOME (800-762-7846) if you have any questions or would like more help.

TROUBLESHOOTING

Problem	Possible Cause	Solution
The LED on my KeypadLinc Dimmer is not turning on at all and it won't control my light.	KeypadLinc Dimmer is not getting power.	Make sure the circuit breaker is turned on.
		Make sure the air gap (SET Button) is not pulled out.
		Check junction box wires to ensure all connections are tight and no bare wires are exposed.
		Check the light fixture to ensure all connections are tight and no bare wires are exposed.
The switch I'm replacing only has two wires.	KeypadLinc Dimmer needs a NEUTRAL wire in order to operate.	Look in the rear of the junction box for a group of white wires all tied together with a wire nut. Those are the NEUTRAL wires. Connect KeypadLinc Dimmer's white wire there.
My KeypadLinc Dimmer is not receiving signals from INSTEON or X10 Controllers.	The KeypadLinc Dimmer and the Controller are on opposite powerline phases.	Make sure two SignaLinc RF Signal Enhancers are properly installed to bridge signals between the two powerline phases.
	The Controller is plugged into a power strip.	Powerline signals can't travel through power filters. Plugging the Controller directly into a wall outlet works best.
	Other modules are absorbing the signal.	Move the other modules or the Controller to another outlet.
My KeypadLinc Dimmer is not linking to or working with an INSTEON Controller or Device.	The INSTEON signal may be too weak.	Add new INSTEON devices or move around existing INSTEON devices. All INSTEON devices act as INSTEON Network repeaters.
		Make sure you are not experiencing interference with older X10 BoosterLinc technology. Upgrade to INSTEON BoosterLincs.
My KeypadLinc Dimmer doesn't always respond to an INSTEON Controller.	The INSTEON Controller may have been reset without first unlinking KeypadLinc Dimmer from it.	Re-link KeypadLinc Dimmer to the INSTEON Controller.
The light turned on by itself.	Another Controller, a timer, or stray X10 signals triggered KeypadLinc Dimmer.	Check scene membership and remove any unwanted links from KeypadLinc Dimmer, or perform a Factory Reset to clear it.
		Install a powerline signal blocker in your home to keep X10 signals from neighboring homes from interfering. Consider not using KeypadLinc Dimmer in X10 mode.
		If the above doesn't work, perform a Factory Reset.
The controlled light does not appear to turn on or off right away.	The Ramp Rate may be set too slow.	Set a shorter Ramp Rate.
KeypadLinc Dimmer turns on, but not off, using another Controller.	The load is producing electrical noise that is interfering with KeypadLinc Dimmer's reception of powerline signal.	Install a powerline noise filter like Smarthome's #4835 between the load and KeypadLinc Dimmer.
		Install additional INSTEON Devices to boost the INSTEON signal.
		Increase the X10 signal strength with an INSTEON-compatible X10 booster to overcome the powerline noise.
My light only turns off when I tap the On Button on my KeypadLinc Dimmer, but I can brighten and dim it.	The On-Level may be set to fully-off or very dim.	Set a brighter On-Level. See *HOW TO SET UP ON-LEVELS AND RAMP RATES*, above

Problem	Possible Cause	Solution
When I try to turn on my light with another Controller, the light turns on, then back off.	KeypadLinc Dimmer may be set up with an INSTEON On-Level at a high brightness and an X10 Primary or Scene Address On-Level at a low brightness.	Remove the X10 Primary Address or X10 Scene Address from KeypadLinc Dimmer.
		Remove the X10 Address from the button on your INSTEON Controller so it doesn't send both INSTEON and X10 commands.
When I press a button on my KeypadLinc Dimmer, it takes a long time for other INSTEON Devices it is controlling to respond.	You may have removed an INSTEON Device that your KeypadLinc Dimmer is trying to operate. KeypadLinc Dimmer is re-trying the missing INSTEON Device.	If the INSTEON Device is still available, unlink it from KeypadLinc Dimmer by following the directions in the section *Unlinking a Controlled INSTEON Device from KeypadLinc Dimmer*, above.
		Reset KeypadLinc Dimmer by following the directions in the section *Resetting KeypadLinc Dimmer to Its Factory Default Settings*, above.
My KeypadLinc Dimmer doesn't respond to X10 address A1 when I first set it up.	Unlike previous X10-only products, KeypadLinc Dimmer does not have an X10 Primary Address set up at the factory.	Set up an X10 Primary Address by following the instructions in the section *Setting the X10 Primary Address*.
I'm having difficulty performing advanced X10 programming	The X10 "MNOP" house and unit codes were sent in the wrong order.	Don't hold down the buttons on your X10 controller too long, to avoid duplicate codes being sent.
The load is buzzing when on or dim.	The dimming component inside KeypadLinc Dimmer "chops" the powerline sine wave to reduce the power.	The bulb filaments are vibrating. Use rough-service, 130-volt, or appliance grade bulbs to reduce the noise.
		Run KeypadLinc dimmer in the "full-on" mode or switch to a non-dimming SwitchLinc V2 Relay.
KeypadLinc Dimmer is locked up.	A surge or excessive noise on the powerline may have glitched it.	Pull the SET Button on KeypadLinc Dimmer all the way out for 10 seconds to air-gap it, then push it back in without pushing it all the way down.
		If the above doesn't work, see *Resetting KeypadLinc Dimmer to Its Factory Default Settings*, above.
KeypadLinc Dimmer is getting warm to the touch.	It is normal for wall dimmers to get warm (but not hot).	KeypadLinc Dimmer will dissipate about 1 Watt per 100 Watts controlled. Using metal junction boxes, removing insulation around the outside of the box, or controlling a smaller load can help lessen the heat.

If you have tried these solutions, reviewed this User's Guide, and still cannot resolve an issue you're having with KeypadLinc Dimmer, please:

- Search our online knowledge base at http://smarthome.custhelp.com.

- Call our Support Department at 800-SMARTHOME (800-762-7846).

- Email us at tech@smarthome.comT.

SPECIFICATIONS

KeypadLinc Dimmer Specifications

General	
Smarthome Product Number	2486D, INSTEON KeypadLinc V2 Dimmer Switch
Warranty	2 years
Operation	
On-Levels	32
Ramp Rates (full-ON to full-OFF)	0.125 to 9 seconds if programmed locally, 0.125 seconds to 9 minutes if programmed remotely
LED	Single LED at bottom of unit, indicates supplied power and signals programming cues
Manual Operation Modes	INSTEON only, X10 only, INSTEON and X10 Combo Mode
Combo Mode Message Order	INSTEON, X10, INSTEON cleanup
Multi-Way Circuit Support	One KeypadLinc Dimmer controls load, Cross-Link any number of KeypadLinc Dimmers or other INSTEON Controllers
Setup Memory	Non-volatile EEPROM
INSTEON Features	
INSTEON Addresses	1 hard-coded out of 16,777,216 possible
INSTEON Links	417 out of 16,777,216 possible
INSTEON Powerline Frequency	131.65 KHz
INSTEON Minimum Transmit Level	3.2 V_{pp} into 5 Ohms
INSTEON Minimum Receive Level	1 mV_{pp} nominal
INSTEON Messages Repeated	Yes
X10 Features	
X10 Primary Address	1 optional (comes unassigned)
X10 Scene Addresses	255 possible
X10 Status Response	Supported
X10 Resume Dim	Supported (by setting Local On-Level to zero)
X10 Powerline Frequency	121 KHz
X10 Minimum Transmit Level	3.2 V_{pp} into 5 Ohms
X10 Minimum Receive Level	20 mV_{pp} nominal
X10 Messages Repeated	No

Mechanical	
Button Type	6 or 8 mechanical momentary contact type buttons
Button Appearance	Transparent plastic caps, holding preprinted or custom button labels, with LED backlighting
Wire Nuts	3 included
Mounting	Mounts in single or multiple-ganged junction box. **Controls 200 watts less load for each immediately adjacent electronic dimmer installed. For example, 600 watt load capacity becomes 400 watt with another electronic dimmer installed to the immediate right or left. Use a triple-gang box with a mechanical switch in the center to avoid de-rating.**
Operating Conditions	Indoors, 40 to 104°F, up to 85% relative humidity
Dimensions	4.1" H x 1.8" W x 1.2" D
Weight	3.6 oz
Electrical	
Supply Voltage	120 Volts AC +/- 10%, 60 Hertz, single phase
Surge Protection	MOV rated for 150 Volts
Power Wire Leads	6", 16 AWG, stranded, 600V, 105°C insulation, ends stripped and tinned, LINE (black), LOAD (red), NEUTRAL (white)
Ground Lead	6", 18 AWG, stranded, bare copper
Load Types	Wired-in incandescent lighting devices
Maximum Load	600 Watts (uses 12-Amp triac dimmer)
Minimum Load	No minimum load required
Certification	Safety tested for use in USA and Canada (ETL #3059287-001)

Certification

KeypadLinc V2 Dimmer has been thoroughly tested by ITS ETL SEMKO, a nationally recognized independent third-party testing laboratory. The 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.

Limited Warranty

Seller 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 User's Guide. 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, Seller 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 Seller'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, Inc.
ATTN: Receiving Dept.
16542 Millikan Ave.
Irvine, CA 92606-5027

Limitations

The above warranty is in lieu of and seller disclaims all other warranties, whether oral or written, express or implied, including and warranty or 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 seller or modify the terms of the above warranty and disclaimer. In no event shall seller 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 seller 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 that may vary from state to state.

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