

About FilterLinc's Certification

FilterLinc 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

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FilterLinc™

Plug-in noise filter home automation applications

For models:

1626 FilterLinc (5-Amp)
1626-10 FilterLinc (10-Amp)

READ ALL INSTRUCTIONS BEFORE INSTALLING

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Congratulations and Introduction

Thank you for purchasing the FilterLinc Plug-In Noise Filter. The FilterLinc is designed to:

1. Prevent noisy electrical devices from polluting onto the power lines.
2. Prevent PLC/X10 signals from being absorbed into appliances.

Electrical noise on the powerline generally includes spikes, clutter, waveform disturbances, and sags. Sometimes the noise will not affect the home automation system. But the frequency may be close to that of the PLC/X10 signals. The noise makes it difficult for receivers to differentiate between the PLC/X10 signal and background noise. Some receivers may have special circuitry to help them detect the signals when noise is on the line, but even these modules may benefit from the presence of a filter on a noisy device.

Signal attenuation by electrical devices is a more common source of problems for PLC/X10 products. Some electrical devices, when they are plugged in (and not necessarily turned on), may absorb PLC/X10 signals. Using a FilterLinc between these devices will prevent the signals from being lost. Read more about this and electrical noise problems in the section below.

Key Features

- 2 stage modified pie filter centered at 120 kHz
- 49.4 dB attenuation at 120 kHz
- Safety tested and approved by ETL
- Rated for up to 10 Amps (model #1626-10) or 5 Amps (#1626)
- Feed-through unfiltered outlet on the front for PLC/X10 receivers or transmitters
- Does not effect higher frequencies on the AC line like FM Intercoms and HomePNA devices

How to use

FilterLinc is installed between the offending device (noise maker or signal sucking appliance) and the home's AC outlet. Follow these steps to install your FilterLinc:

1. Turn off the device to be filtered (i.e. TV or computer).
2. Unplug the electricity cord from the receptacle.
3. Plug the cord into the FilterLinc Module's bottom "Filtered" outlet.
4. Optional: Plug a PLC/X10 transmitter, receiver, or another device that doesn't harm PLC/X10 signals into the front "Always On" socket.
5. Plug the FilterLinc into the wall receptacle.

Now, the device that was causing PLC/X10 reliability problems will be isolated from the AC lines and your home's automation system will be more reliable.

About Electrical Noise and Attenuation

Electrical Noise

These devices may emit electrical noise only when operating, so they can be difficult to detect. Some of the common noise producers are:

- HID lighting
- Motorized devices (refrigerator, pumps, electric razors, hair dryers)
- Transformer-based lighting that use solid state transformers
- Fluorescent-based lighting and ballast transformers
- Failed or failing X10 transmitters

In most cases, this problem may have resulted from an electrical device that you have recently plugged in or an existing device if you are just starting with X10. There may be a device in the home that is beginning to fail or is wearing out and it is putting noise on the line.

The best way to determine the offending device is to isolate the circuits one at a time. Start by turning off all the circuit breakers except one circuit for testing. Attach a transmitter and an appliance module (both known good units). Attach a radio to the appliance module and turn it up. If you are sending signals from one room to another on the same circuit, you will be able to hear the radio turn on and off. By using an extension cord for the transmitter, you can stand at the circuit breaker box and easily send the ON and OFF signals. Most likely, with only one circuit active, the initial testing will be successful. Continue testing by turning on a second circuit breaker and send some test signals to the appliance module, do you still hear the radio turning on and off? Continue to turn on circuit breakers one at a time. Each time a new breaker is switched on, send some ON and OFF signals to the test module.

There will come a time when a circuit is turned on that the test fails. At this point, you have identified the circuit that is causing the problem. Turn off all the circuit breakers except that last one that caused the signals to fail. Plug your transmitter and appliance module into that circuit. Then, begin to unplug electrical devices on that circuit one at a time. Don't just turn off each device; unplug them! Each time a device is unplugged, do a signal test to the appliance module. Again, there will come a time when something you unplugged makes the signal test work. The last device that was unplugged is the one that is killing off X10 signals. To fix the problem, install a filter between the electrical outlet and the offending device.

Another approach to find these noise emitters is to use a portable AM radio. Start outside your home and away from the interference. Turn the radio on, adjust the frequency dial to the lowest setting, 550 KHz, or lower, and adjust the volume level. Now move inside the home and use the radio the same way someone looking for radiation would use a Geiger counter. As the radio moves near the interference, an increase in noise will be noticed. The louder the noise, the stronger the signal, and the closer you are getting. Once you find a location with a strong signal, begin unplugging electrical cords. For example, if the noise is loudest in the kitchen, unplug the refrigerator, turn off all the lighting, and unplug the coffee pot. You'll soon find something that is causing the noise. Put a FilterLinc noise filter on that device.

Signal Attenuation

FilterLinc will also dramatically lessen the effect of non-X10 products on the signal. When a signal is transmitted it goes everywhere in the home. PLC/X10 signals are like water pressure in pipes, it actually goes everywhere it can, not just to the receiving module. Some electrical devices will have more of an effect on the signal strength than other devices.

In the last 20 years, an explosion of electrical devices has invaded our homes. Computers, video gear, and other high-end electronics are more present than in years past. Some of these products contain complicated electrical power supplies that are designed to provide clean electricity to the devices they serve. Engineers design power supplies build in traps to filter out and kill electrical noise on the AC line. Unfortunately, the PLC/X10 signal looks like electrical noise to these devices. The result is that a large percent of the transmitted signal is lost, which leaves less for the receivers. The most common sources of signal loss are:

- Televisions, stereo components, satellite and cable receivers
- Computer systems, monitors, printers
- Computer UPS's
- Power strips
- Power supplies for laptops and cell phones

Testing for the problem is pretty simple. If a device is suspected of causing signal absorption, unplug the device and then re-transmit the signal. It is very important that the device is unplugged and not just turned off; if the PLC/X10 controlled product begins working after the appliance is unplugged, then a filter will be needed on that device to keep PLC/X10 signals from being absorbed and raise the signal strength of the entire home.

An average home will need between three and five filters. If you are in the business of installing automation systems and not in the 'call back' business, include some of these in your bid as part of the standard package.