

# Simple Telephone Filters

*by Andrew Eriksen*

The telephone lines coming into our homes can carry high-frequency EMF, besides the regular speech. This article shows how to set up a simple line filter to lower this unwanted EMF.

## **Why use a phone filter?**

Telephone wires run for long distances before they reach a home or office. Along the way they can pick up EMF from other phone lines and electrical wires, especially if they are also carrying high-frequency signals, as is the case with Internet connections.

Some of these interferences can be heard on the phone, but most are so high a frequency that they cannot be heard and the phone's speaker cannot reproduce them.

The phone wire coming into the building will act as an antenna and radiate out the high-frequency EMF it carries, and so will the telephone itself. For people who are electrically sensitive, this may be a problem, or at least something to avoid.

To find out if there is high-frequency EMF coming from the phone line, use a simple cheap AM radio. The really cheap models are best for this purpose, as they are not so good at filtering out static, and static is what we are interested in here. A digital radio will not work as well.

Simply turn on the radio, make sure it is set for AM reception, and turn the dial to a place where no stations can be heard and there is very little static. Then put the radio close to the phone cord. When I did that, it sounded like a swarm of angry bees.

## **A basic ready-to-plug-in filter**

A very inexpensive DSL line filter is available from some building supply stores, electronics stores, online, and by mail order (like from Digi-Key, see vendor listing). It costs only about five dollars. It is designed to block DSL-signals, for those who have DSL Internet service (called ADSL in some countries) and only want it on some lines in a house. This filter also dampens other high-frequency noise as well. It is very simple to use. It just plugs into a phone outlet and then

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the phone line plugs into it. A variety of styles are available, such as wall mounted filters or filters with extra ports for more than one phone line.



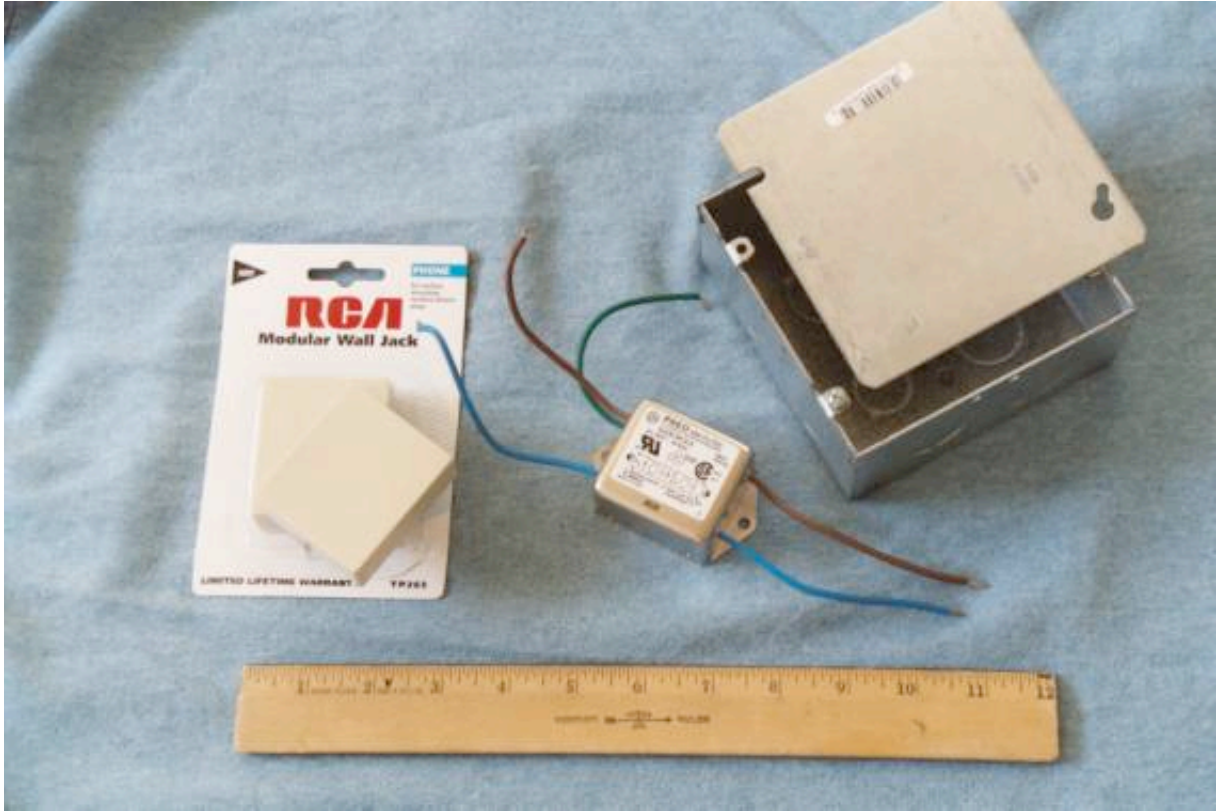
**Figure 1:** *A basic ready-to-plug-in filter*

### **A more fancy filter**

A friend looked around on the web and found that the Swedish company TeLoRay offers a more comprehensive filter. It also has the feature that it completely disconnects the phone line when not in use and reconnects it automatically when a call comes in or the phone is taken off the hook. There was apparently no specific information available about how much the filter dampens unwanted frequencies. It was expensive, and this author has not tried it, nor knows anyone who has.

### **A simple do-it-yourself filter**

It is easy to build a filter yourself with just a screwdriver. No soldering needed. There are a lot of filters available to be built into electronic equipment, if a manufacturer wishes to protect it against EMF. Some come ready to be wired together, like the PREO filter from the Digi-Key electronic supply house (see vendor list). Shown below is a PREO filter with the rest of the parts needed for this little project.

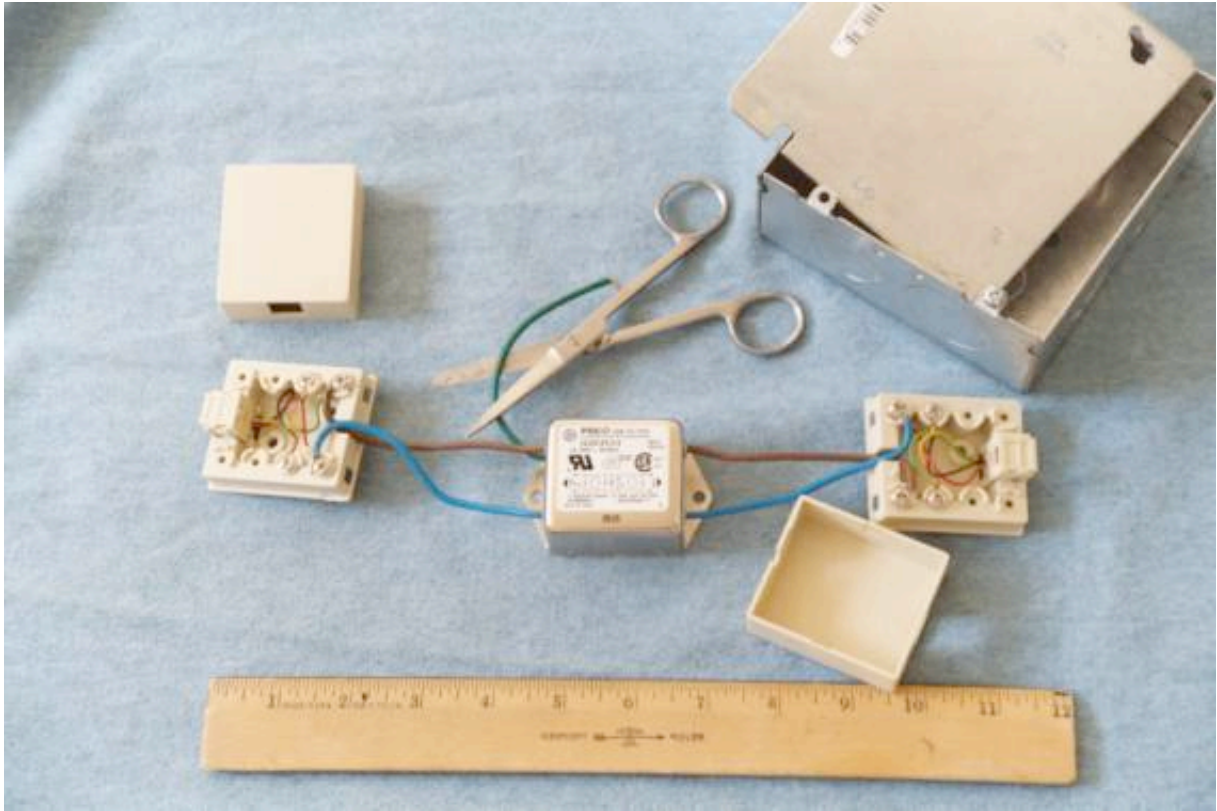


**Figure 2:** *A simple do-it-yourself filter.*  
*Left to Right: Modular wall jack, PREO filter, junction box*

A parts list is provided at the end of this article. This project can be assembled in about ten minutes, using only a screwdriver. The cost of materials (Fall, 2006) was \$31.00.

The filter is assembled as shown on the next picture. Basically, the filter device is just placed between the two telephone jacks. Make sure to use the red and the green wires from each of the jacks, the black and the yellow wires are not used (the standard wire colors may be different in countries outside North America).

Choose a wire color on the filter device and connect it to the green wire on both sides. This way the signals are passed straight through the filter. In this case, I chose the brown wire.



**Figure 3:** *Assembly of PREO filter to two phone jacks*  
*Left to Right: Phone jack (with cover off), PREO filter, phone jack with cover off*  
*Above and to the right is the junction box*

Similarly, I connected the blue wire on the left side of the filter device to the red wire on the left jack, and the blue wire on the right side of the filter to the red wire on the right jack.

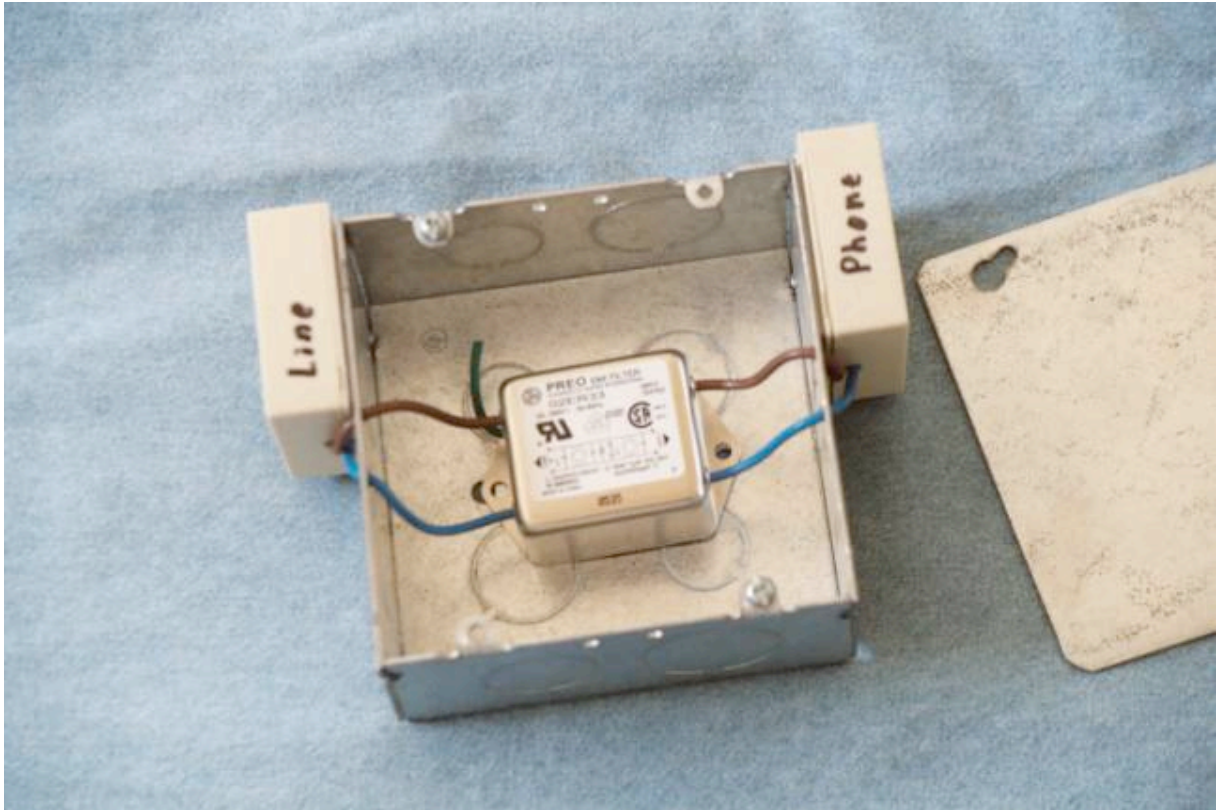
The colors on the wires of the PREO filter may change, but the wire-colors on the jacks will always be green and red, as that is the standard for North America.

The PREO filter also has an extra wire on one side, green in this case. That is a grounding wire. It should not be used and is best simply cut off.

The junction box I bought has some small convenient holes that the wires fit through. Otherwise, use a knock-out. It also needed to be cleaned of manufacturing oils, which was easily done in warm soapy water. A plastic box could also be used. Place the filter inside the junction box as shown below.

The small wall jacks used have a self-adhesive backing, which can be used to attach them to the outside of the junction box. The junction box is not essential

for the filter; it is just a good way to protect it. The wires may work themselves loose over time, if it gets shoved around.



**Figure 4:** Junction box with filter assembly. Phone jacks are attached to outside of junction box with wires running to PREO filter through holes in the sides of the junction box. To the right is the junction box cover.

### Using the filter

Simply connect the assembled filter to a phone outlet using a phone wire, and use a second phone wire to connect a phone to the filter. It should not affect the use of a computer modem, but will probably not work for DSL/ADSL type Internet connections, though it has not been tried.

### Installing filter directly on phone line

It is best to install the filter as the phone line enters the house, perhaps next to the phone service entrance as that will diminish radiation from the line running through the house.

This may require cutting the phone cable and connecting the PREO filter directly on it. There is then no need for using the modular jacks; instead, the wires could be connected using wire nuts (North America) or something similar.

NOTE: Modifying the household telephone wiring may be illegal in some areas. Please check local regulations first.

WARNING: Before cutting the phone line, make sure to disconnect it first-- typically at the service entrance, if there is one. The line can become energized with 40 volt, if someone attempts to call from the outside.

Doing modifications to the household phone line is best done by someone qualified to perform that type of work. The author bears no responsibility for any outcome.

### **Vendor Information**

Digi-Key Corporation  
701 Brooks Avenue South  
Thief River Falls, MN 56701  
USA  
1-800-344-4539  
[www.digikey.com](http://www.digikey.com)

The DSL filter has been seen at Home Depot stores and Radio Shack is also available from Digi-Key as part number 533-1183-ND, "Excelsius DSL single in-line filter".

### **Parts list for filter assembly:**

<b>Count</b>	<b>Item</b>	<b>Vendor</b>	<b>Cost pr each</b>
2	Modular wall jack	Building supply	\$4.99
1	Electrical junction box	Building supply	\$3.49
1	Cover for junction box	Building supply	\$0.99
1	PREO 02ER33 EMI line filter (Digi-Key item 364-1036-ND)	Digi-Key	\$16.28