SETTING UP YOUR SYSTEM: AC POLARITY

By Martin G. DeWulf

From: http://boundforsound.com/tweak.htm
Originally published February of 1997 in Issue #96

This is our first re-run of an article in Bound For Sound (BFS). Oddly enough, while I had been fretting the consequences of running an article first released back in 1992, once people heard that I would be doing the same over the telephone and internet, the response was overwhelming. You want this information. So, here is the old article, though not in exactly the same form as it was originally printed. As time has passed I have come to know a few more things, and I have incorporated a few of those things into the article where appropriate. That way, the folks who were around then and paid for the article once already will be getting some new information not included before. Herein is some extremely important material, especially if you are one of the few full-time-ten-percenters who can't settle for a weak musical imitation of the real thing.

For the second article in our series on system set-up, I wanted to talk about a tweak that costs little or nothing to do, while having the potential of paying big dividends in terms of sonic improvement. It involves a simple test (with some sophisticated test equipment) that will allow you to determine if your equipment, and wall outlets, are "polarity correct".

WHAT YOU NEED TO BE AN OBJECTIVE SCIENTIST. Almost all of your audio equipment has a transformer in it that serves as a source of power for the circuits inside. Not all manufacturers hook up their transformers so as to minimize voltage leakage to the chassis, otherwise called the "chassis to ground potential". One can measure this by purchasing some of the most expensive objective testing equipment known to man and Julian Hirsh. What you will be measuring is the amount of voltage running around in the chassis of your audio stuff. The preferred voltage is the lowest voltage, which will save you from making dreadful subjective decisions such as "which polarity is more tuneful and in touch with the liquid euphony of my BAD SELF?" None of that craziness in BFS.

What's needed to do high-tech objective equipment polarity testing just like Robert Harley? First thing you will need is a polarity testing plug which will set you back about $3.99. The second piece of test gear is a multimeter (VOM) which reads AC volts below 500; mine cost all of $35.00, but I went all the way by getting the IM, TM, ICBM, Crosstalk Spectral MELISA Cranial Analyzer which was a $10.00 add-on (only real experts like me and Bob need this latter option).

The polarity testing plug can be purchased in almost any store that carries even the most meager line of home electronics. It's a 3-prong plug with three little lights on the back. You take the plug and insert it into each of your wall outlets, and the lights on the back will tell you if your outlets are wired properly in the wall. Many outlets, even in new digs and mobile homes, have the positive and neutral taps wired in reverse and grounds are oftentimes left open. The polarity plug will let you properly assess the orientation of the outlets that you use and make any necessary adjustments. This is the first step toward proper polarity.

The next thing to do is check the chassis voltage of your equipment. Now, put on your white lab coat and buy some white rats (which will have special meaning for St. Louis Cardinal baseball fans), for now you will wallow into the turgid waters of scientific testing, into a realm previously occupied by Mr. Wizard and Matthew Polk . . . you have arrived!

THE BIG TEST. With your multimeter in hand proceed as directed. Each component to be tested must be totally isolated. Disconnect interconnects, antennas, power cords and grounds. If the

component to be tested has a two prong directional cord, plug it in. If the component to be tested has a three prong cord, steal a "cheater plug" from wife's mixer and use it to float (lift) the ground of the chosen piece of equipment. Set your multimeter to AC volts, connecting the probe to a true ground (I use a true earth ground consisting of an outdoor earth rod with a cable running from it into my listening room). You can also go to the ground connection of the outlet if you have three prong outlets, or you can run to a drain pipe as I had to in my bedroom. NEVER connect to a pipe carrying electrical wiring or anything flammable like natural gas, and NEVER NEVER connect to an antenna which can be struck by lightning.

Connect the red probe to the chassis ground terminal if it is a preamp you are testing, or to a sheet metal screw on the chassis on almost everything else. With the screws you may have to scrape a little paint off the screw to make good contact. Good contact is essential to an accurate volt reading off the chassis. Now plug the component in and turn it on. If you haven't been electrocuted, you should have a voltage reading on your meter. Write it down. Turn the component off and reverse the AC power cord in the wall outlet. With a cheater plug, the neutral side of the plug is usually wider than the hot side and reversing can be difficult. In the past I have taken a pair of metal snips and cut the neutral side down so that it will fit into the hot side of the outlet. In my system today, I have the TG Audio Bybee-Sucker AC line conditioner. With it I ordered two outlets with reverse polarity so all that I have to do is go from a regular outlet in the Bybee-Sucker to one of the reversed outlets to reverse AC polarity to any component. Once the polarity is reversed, turn the component back on and make a second reading. Choose the power orientation that reads the lowest. (Note: Some equipment, especially power amplifiers, should be left off a few minutes before firing them back up with the AC polarity reversed.) Simple ain't it? And with some experience you'll get to the point where you will be able to tell the proper AC orientation by simply listening to the equipment; the meter won't be necessary. At that point you will have earned your golden ear.

Some audiophiles, when reversing a power cord, choose to leave the ground open or floating, alleging that the system sounds better that way. In some cases it is true, but remember, by floating the ground you may be defeating the UL rating for the device and maybe even voiding the warranty, which could be disastrous if for some reason a fire results. Play it safe.

YOU ARE DONE. The real trick here is to get each and every component in a system oriented properly. If your system has two components oriented wrong, the correction of one may not be enough to bring on earth shaking improvements - get the entire system right before passing judgment. Proper orientation makes one's system generally sound fuller in the midrange and more dimensional in the lower midrange. Clarity and depth of image will increase in good ways. Look for less strident and cleaner highs. If on the other hand you test everything and find all the plugs properly oriented already, you could consider the entire ordeal as time wasted, or, you might consider it an average day for an audio reviewer.

AN ALTERNATE VIEW. After the above was written, a reader proposed that the lowest reading for every component in a system may not be the way to go. His theory is that what a person wants to do is average out the readings so that each component is relatively close to every other component in terms of measuring the voltage to ground potential. And I have seen occasions where the low reading off of one component was higher than the high reading off of another. According to this alternate theory then, one would leave the higher voltage reading in place even though that would be leaving the component in the wrong AC phase. I must admit that I haven't had the time to try out such a scheme, but there may be some validity to it. If you try it and have some definitive results, write me and we'll consider the matter further.