



BY HOWARD JOHNSON, PhD

## OFC madness

**E**rnie, a sometime correspondent, writes: The power cord on my oscilloscope broke because we stepped on it too many times. I heard that OFC cryogenic power cables are really good but expensive (hundreds of dollars). Should I replace my cord with one of those?

**Howard:** In this context, OFC stands for oxygen-free copper. Such copper must smelt in a special oxygen-free atmosphere to reduce the amount of oxygen latent within the copper. Sound expensive? It is. Physicists use the stuff inside vacuum chambers to reduce oxygen outgassing.

The term “cryogenic” implies that the conductors making up the power cable have been cryogenically cooled, probably in liquid nitrogen. That process can in some cases produce large, uniform crystalline grains within the body of the conductor.

What kind of exotic, high-tech application could possibly justify the use of such elaborate techniques for its ac power cable? Several suppliers would have you believe it is something you already own—your audio amplifier.

**Ernie:** You are right; it does seem to be an audio thing. I checked out some audiophile reviews on the Web, and they say that OFC cryogenic power cables can “restore the texture, dimension, and spatial cues in sound and video that EMI and RFI often obscure” and provide “deeper, blacker backgrounds and a richer tonal balance.”

**Howard:** Let’s look at the facts, not the fantasy.

Ordinary 60-Hz power travels miles from the nearest power station over ordinary, oxygen-rich, noncryogenically frozen wires laden with bird

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poop. It goes through a local distribution transformer (gobs more regular wire in there) and then travels hundreds of feet more through your house wiring to a local outlet. Do you think the last 6 ft of cryogenically altered, helically wound, hand-braided, eight-gauge wire makes any sensible difference?

You could probably solder together old, rusty coat hangers and do just as well, provided you don’t have any young children or pets in the house.

So what do you really need in a power cable? Insulation is a good idea. Stranding is good, too. Stranded wire is flexible enough to bend many times without breaking. That’s all the technology you need.

**Ernie:** How about shielding? A lot of high-end audio-power cables are shielded.

**Howard:** It’s a nice idea, but because all the other wires in the house lurking behind the dry wall remain unshielded, it doesn’t help to shield the last little 6-ft chunk.

**Ernie:** OK, how about silver plating? The best power cords have to be silver-plated, don’t they?

**Howard:** Silver plating minutely reduces skin-effect losses at high frequencies. Some RF applications use it. It has no measurable effect on small power cables at 60 Hz.

**Ernie:** What about EMI-noise rejection?

**Howard:** Your equipment, if it is worth its salt, already has a built-in power-line noise filter.

**Ernie:** I’ve heard that a good power cord aligns the flow of electrons into your equipment for maximum performance.

**Howard:** What? That whole idea is bonkers. The mean free path for electrons in copper is about 0.039 microns. Electrons are constantly slamming into something and changing direction. There is no “aligned flow.” Only superconductors can do that. The only super thing about an OFC power cable is the profit margin.

For your application, just get a heavy-duty cable with a thick jacket, and put a rubber floor mat over it. **EDN**

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