As delicate as a wisp of smoke

Incredibly Thin Flex Circuits By Q Flex Drive Audeze Stereo Headphones

Tom Woznicki - Flex Circuit Design Company

In only three short years Audeze has set the audiophile world on its ear (bad pun intended) with their LC2 and LC3 planar magnetic headphones. Type “Audeze reviews” in any search engine and you’ll get thousands of stories that just gush over the sound quality of these headphones! Audeze is dominating the worldwide market for headphones over $1,000.

Figure 1. Audeze LC2

An enabling technology of the Audeze headphones is an incredibly thin flex circuit material developed by Q Flex in Santa Ana, CA. Originally created for making multilayer smartcard flex circuits, this incredible flex circuit material is an ultra-thin polyimide, acrylic adhesive base material; the polyimide with adhesive and copper is only a few microns thick.

I picked up a sample of this material on my last trip to Q Flex - wow is it thin! You can see in figure two how the etched material just drapes over a pencil.

Figure 2 Etched flex draped over a pencil.

They currently make single-clad base laminates and coverfilm in various thicknesses and copper weights, as well as laminates using aluminum and silver. They also have the ability to make double-

clad laminates and bondply materials for multilayer flex circuits. With these materials you could build a six copper layer circuit that is less than 4 mils thick!

Figure 3. Just a puff of air moves this soooper thin flex circuit.

Naturally the process for making these materials is a closely guarded secret - it's hidden away in a nondescript building somewhere in Southern California. Q Flex is willing to build flex circuits with this materials for other applications that could benefit from these extremely thin materials. They have no plans to sell these materials to other flex manufacturers at this time.

But there's more - as Paul Harvey used to say, here's the rest of the story!

Pete Uka, owner of Q Flex, is not only skilled at making flex circuits but he donates time and treasure to charitable endeavors in his native India that I greatly admire. One is Sankara Eye Foundation, a series of not-for-profit hospitals that specialize in eye care. They are top-flight hospitals that provide eye surgeries for paying patients, the profits are then used to provide eye care and surgery to poor people in outlying areas, saving them from blindness.

It was while volunteering for Sankara Eye Foundation Pete met another volunteer - Sankar Thiagasamudram. Sankar and fellow audiophile Alexander Rosson were working on speakers for concert sound. Using the experimental material developed by Q Flex they were able to shrink their design for headsets and the Audeze headphones were born.

Don't you love it when good things happen to good people?

You can get more info on Audeze and Q Flex at www.audeze.com and www.qflexinc.com. Info on Sankara Eye Foundation can be found at www.sankaraeye.com and www.giftofvision.org.

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