

THINK SMALL: EICHMANN CONNECTORS

Everything about the cables from Eichmann, an upstart manufacturer in Australia, is...well, different. And that goes right down to its connectors. Eichmann was the first manufacturer to design most of the metal out of its phono plugs and bananas. Of course there's a theory behind the design. We talk with Eichmann's Managing Director, Rob Woodland.

UHF: Tell us about first meeting Keith Eichmann.

Woodland: I met Keith Eichmann by chance in 1997 when sourcing material from a local cable manufacturer in Brisbane. It appeared we were the two people in Brisbane prototyping high end cables, so the manufacturer put us together. As it turned out, Keith's theories on cable and connector design were more compelling than mine.

We collaborated for a couple of years to turn theory into practice, and in 1999 Keith proposed an arrangement whereby I would license his technology and commercialize the products. Hence the start of Eichmann Technologies International.

The Company now exports products to over 30 countries, and our connectors are used by over 60 cable manufacturers around the world.

UHF: Eichmann's designs are certainly more unusual than those of most other cable designers. What convinced you that he was right, and that so many others are wrong? If "wrong" is the word.

Woodland: Keith Eichmann's philosophy is to preserve electron flow from wall socket to loudspeaker. For example, our AC cable incorporates a unique fractal shape that reduces resonance and provides a cleaner flow of electrons to the power supplies of components. The interconnect and speaker cables incorporate an EMF buffer system to protect electrons in the signal carrying conductors, while our Bullet Plug and Bayonet Plug connectors deliver electrons in the most efficient manner to sockets and binding posts.

The philosophy involves thinking



small. *Very* small! At the electron level, and then designing a methodology to enhance electron flow. However, the proof is always in the listening, and this is where I was convinced the Eichmann philosophy is correct. In fact, the first time I listened to a prototype Bullet Plug, I was amazed by the detail, dynamics and transparency that was completely hidden when using standard RCA connectors.

In a similar sense, the initial Eichmann cable designs also provided more musical information and holographic imaging when compared to many other High-End cables. I recall telling Keith that his cable was the great "untangler," where separation of detail was better than anything previously encountered.

UHF: Was the idea behind the Bullet plug and the Bayonet plug — that is, using a minimum amount of metal — part of Keith's original designs?

Woodland: To a certain extent this is correct, however our objective is always to use the "optimum" rather than "minimum" amount of metal. That is, the right mass and thickness of material to support current flow but to minimise skin effect problems. When I mention skin

effect, hackles will raise on the half of the audiophile community that believes skin effect is not a concern at audio frequencies. This may be so, however when you listen to music via an optimum thickness of metal connector rather than a *large* thickness of metal connector, it is evident that *some* electrical phenomenon is taking place.

In the Bullet Plug, the hollow signal pin not only allows for an optimum thickness of metal to be achieved, but also allows for connection of the signal wire at the "tip" of the pin, which is beneficial for many cable designs. The hollow pin isn't a new idea, as SME (and perhaps other companies) adopted the same principal for tonearm lead RCA connectors decades ago.

In the Bayonet Plug (banana) connector, we again use the optimum amount of metal — but this time to support genuine current flow provided by the amplifier. One of the more popular banana plug designs on the market is a laboratory connector with an extremely thin metal contact pin. This is an example of *too little* mass, where the contact pin doesn't support current flow. The result is a thin sound, lacking in bass foundation. On the other side of the coin we have huge connectors that sound slow, colored and bloated.

In most standard RCA and banana plug designs, electrons have to travel through large amounts of metal, in many cases poor conductive brass. During that process electrons are impacted in a negative sense. For optimum electron flow, we require an optimum mass and thickness of the metal.

UHF: But hold on, high metal mass doesn't necessarily mean that the electrons have to travel through a large amount of metal. The signal path in many connectors may be broad, but it isn't necessarily long. Is that still a problem?

Woodland: This is a good point. However, when I say electrons travel "through" metal, this encompasses travel *on the surface* of the metal, and at depth depending on frequency. When you have a broad section of metal, electrons don't just go *through* the metal to reach the

contact point on the other side — they also travel on the skin.

To take an absurd example, let's look at a plate a foot across and a quarter inch across. If you apply a signal to the centre of the plate, electrons will move *through* the plate and also *around the surface* of the plate, to join up on the other side. The arrival time of electrons will vary, and sound quality will be poor. If we reduce the plate to a quarter inch diameter, then life for electrons becomes much easier. If we *hollowed out* the plate to form a tube with optimum wall thickness, then the result would be improved further.

Over the years audiophiles have been conditioned to think that a quality connector needs to be large and chunky with a layer of thick gold plate, the bigger-is-better philosophy. When people hear the Bullet Plug and Bayonet Plug connectors, they hear their cables in a new light, and realize that “optimum” mass is perhaps a better philosophy.

UHF: *You've done listening tests against more traditional connectors?*

Woodland: Yes, comparison testing plays a big part in the process, and helps in the understanding of how different shapes and thicknesses of metal impact on sound quality.

UHF: *Can you be specific? What sort of differences could you hear?*

Woodland: The issue of connectors having an influence on sound is the new frontier of audio. Most people, including manufacturers, have never extensively listened to connectors. We all agree capacitors, resistors, transistors, tubes etc have a sonic signature, however we overlook the importance of connectors. Anyone who has hardwired a system will attest to the sonic improvements achievable with connectors removed. But in real life, we need connectors.

Most connectors rob the music of detail and add coloration and texture to the sound. Large-mass connectors tend to have a bloated, sluggish bass with an overlay of dark coloration that extends into the midrange. They sound veiled and congested with limited separation and sound staging properties. Music lacks excitement. Some low mass banana plug connectors sound thin, bright and flat with a lack of bass foundation and dimensionality.

In comparison, a hardwired system is likely to sound clean, transparent and open, with a wealth of detail. Images are separated and solid in a three-dimensional sound stage. The stopping and starting of notes is more precise, leading to an engaging, exciting sound.

In the development of our connectors, we set out to design “no plug” at all.

UHF: *Well, as you mention, low metal mass isn't the whole story, and minimizing metal can actually get you in trouble. Where is the golden mean?*

Woodland: The golden mean is the “optimum” thickness and mass of metal to suit the application. And determining the optimum thickness is where the hard work comes in. It means putting theories into practice, multiple prototypes and long listening sessions.

One theory used with great effect in our Bullet Plug design is replacing the standard RCA ground collar that surrounds the socket with a pin-like ground that makes single point contact with the side wall of the socket. We immediately eliminate eddy type distortion where the signal enters and exits the collar from multiple directions.

We also place a great deal of importance on the conductivity of material. For example, most connectors are made from brass, due to low cost and ease of machining. Brass offers around 28% the conductivity of 100% IACS copper. Cable manufacturers and audiophiles take great pride in the use of high conductive wire for cables, yet terminate the cables with a lump of low-conductive brass. It defeats the purpose!

In our connectors, we use either high conductive tellurium copper, which is 99.5% oxygen-free with the addition of 0.5% tellurium for hardness, to allow machining, or hard drawn 4-nines pure silver. Both materials offer huge sound quality advantages over brass.

UHF: *Are you among those who believe that a connection must be made under pressure?*

Woodland: Yes, a certain amount of pressure is necessary to provide secure contact between conductive elements, and to avoid capacitive problems. For example, the Bullet Plug is a firm fit onto RCA sockets, so the polymer collar can

force the ground pin against the side wall of the socket. A loose connection inevitably means poor performance.

UHF: *Does the plastic material used play a sonic role as well? Of course it has to resist melting, but beyond that?*

Woodland: The plastic material is used sparingly to hold the contact pins in place and provide compression forces. We select engineering grade polymers that exhibit good dielectric qualities plus high temperature deflection. So to answer your question, we work to ensure the plastic has minimal contact with the conductive element and minimal effect on the sonics.

You also mention the “M” word, *melting*. Audiophiles need to realize that even the strongest polymer will melt in prolonged contact with high heat. When soldering the Bullet Plug we recommend inserting the plug into a discarded RCA socket, which acts as a heat sink and deflects heat away from the plastic.

In saying that, it takes around 15 seconds for a soldering iron at 425° C in contact with the signal pin before melting occurs. Most soldering can be achieved within five seconds.

UHF: *The banana plug seems fragile...it bends easily. Do you see a way around that problem?*

Woodland: The challenge we face with the Bayonet banana plug is really the crimp ring. To allow the crimp ring to work, we anneal — heat in a vacuum — the contact pin following machining. This makes the copper quite soft and therefore prone to bending. If we did away with the crimp option, then we wouldn't have the problem, but there's some advantage to crimping larger diameter speaker cables.

The good news is we're working on a solution that will offer will best of both worlds. Meanwhile, if the contact element does bend, it is quite easy to bend back into shape, and the motion of bending actually hardens the metal at this point.

UHF: *Will you be developing other connectors, for instance RCA jacks?*

Woodland: The next product due for release in September is a binding post for amplifiers and speakers. We're confident it will provide a sonic improvement over any binding post now available.

