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# HALCRO ECLIPSE MONO

Reviewer greg borrowman

## POWER AMPLIFIERS

**H**alcro is very likely the most famous Australian hi-fi brand you've never heard of. Indeed you're likely to be more familiar with the name of the company that founded it — Minelab — than you are to be with Halcro, since you can buy a Minelab metal detector almost anywhere in the country... which isn't true of Halcro, at least not yet. Hi-fi and metal detectors — what could these possibly have in common? The answer is quite simple: inventor and physicist Bruce Halcro Candy, who founded both companies.

### EQUIPMENT

Halcro builds the Eclipse in two versions: a monobloc power amplifier (as reviewed here) and a stereo power amplifier. The model name of both amplifiers is the same, so it is important that I differentiate them by referring to the monoblocs as 'Eclipse Monos' and the stereo version as an 'Eclipse Stereo'.

Essentially, other than the obvious fact that you need two monoblocs for stereo, the Eclipse Mono and Eclipse Stereo use similar circuitry, but there are major differences in power output, with the monoblocs being more powerful — 550 watts into 4Ω, versus 350 watts into 4Ω for the stereo version, and the specifications for THD, IMD and TIM are slightly higher than for the Eclipse Mono.

One has to take into account here the word 'slightly', along with the fact that Halcro is claiming the Eclipse Mono has lower distortion than the Halcro dm58, an amplifier that was independently proved to have less of these distortions than any other amplifier in the world. To hang some figures on that claim, Halcro says the THD at 1kHz of the Eclipse Stereo is more than 130dB down (0.00003%) while that of the Eclipse Mono is more than 140dB down (0.00001%). It also says that IM products on the Eclipse Stereo are more than -110dB (0.0003%), down, and that they're more than -126dB (0.00005%) down on the Eclipse Mono.

One significant technical difference between the two amplifiers is that whereas the Eclipse Monos operate at all mains voltages from 85V through to 270V, there are two versions of the Eclipse Stereo, one optimised for mains frequencies between 90–140V and one optimised for mains frequencies between 200–270V. This means that whereas the Eclipse Monos will work in any country in the world, irrespective of its mains voltage or frequency, you have to order the correct version of the Eclipse Stereo according to the power supply of the country in which you intend to use it.

As for the power supply itself, it's an unusual ultra-low noise 'dual' switch-mode design, where the first switch-mode power supply is used for power factor correction, ensuring that the voltage and current drawn from the mains power socket remain in phase. This first supply generates a high direct-current voltage that feeds a second switch-mode power supply, which creates the final d.c. voltages that power the amplifier's circuitry. According to Halcro, as well as the advantages delivered by the power factor correction, the other advantages of its design are that its performance is not affected by load conditions, and that it has much lower noise levels compared with other power factor corrected power supplies. All printed circuit boards in the power supplies are quad-layer types to minimise EMI and voltage transients and improve reliability, and all are populated exclusively by industrial-grade semiconductors and capacitors with 105°C temperature ratings.

The Halcro Eclipse Mono's power supply is not only shielded, it's also kept physically separate from the amplifier circuitry. In fact there are four heavily shielded and damped compartments integrated into the Eclipse Mono chassis. As for the chassis itself, it's still basically the vertical winged chassis originally developed for the very first Halcro amplifier, the dm58, but for this new Eclipse Mono (and, as it happens, the Stereo version

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Halcro is unique. Unique in its imagination of what an amplifier is and in how to push the boundaries of technology.

as well), Halcro has increased the thickness of the casings to eliminate microphonics and resonances, and has improved the connections between the cases and the main heatsink pillars. If you closely compare an early-model Halcro with the new Eclipse Mono and Eclipse Stereo, you will see that the more solid construction has enabled the company to add some extra curves to improve the overall look of the amplifier. However, you certainly won't have to look hard to see the improvement in the quality of the finish on the metalwork, which is now an aerospace-grade wet-sprayed coating. This not only looks fantastic, but is also very tough.

The circuit boards in the audio power amplifier section of the Eclipse Mono have six layers and, like the power supply section, are populated exclusively by industrial-grade semiconductors. All the electrolytic capacitors have 105°C temperature ratings and only low-impedance polypropylene capacitors and highly linear resistors are employed in the critical audio path.

The rear of the Halcro Eclipse Mono has four different inputs: one is a standard unbalanced input (with an impedance of 100kΩ) via a gold-plated RCA terminal, one is a standard balanced input (with an impedance of 100kΩ+100kΩ) via a female XLR socket, then there is a 'minimal path' unbalanced input (with an impedance of 600Ω), again via a gold-plated RCA terminal.



## SPECIFICATIONS

### HALCRO ECLIPSE MONO

#### Output power:

4Ω (resistive): 550 watts

8Ω (resistive): 300 watts

**THD @ 1kHz:** <-140dB  
(<100 parts per billion) at  
550-watts (4Ω)

**THD @ 0-20kHz:** <-126dB  
(< 500 parts per billion) at  
550W (4Ω)

**IMD (CCIF):** <-126dB

**IMD (SMPTE):** <-126dB

**Equivalent input noise:** 5nV/  
sqrt(Hz) for the voltage modes;  
6pA/sqrt(Hz) for the current  
mode.

**Slew rate:** 100V/μs

**Inputs:** Unbalanced voltage  
mode input with an impedance  
of 100kΩ, a balanced voltage  
mode input with an impedance  
of 100kΩ+100kΩ, a current-  
mode input with a 60Ω input  
impedance to minimise cable  
reflections (driven by current  
source), a minimal path voltage  
mode with an input impedance  
of 660Ω.

**Gain:** Balanced and  
unbalanced inputs 60V/V;  
Minimal path input 30V/V,  
Current mode input 9V/mA

**Dimensions (HWD):**

790 × 400 × 400mm

**Weight:** 55kg (each)

**Price:** \$135,000 (per pair)

**Contact:** Halcro on 08 8390  
1673 or visit [www.halcro.com](http://www.halcro.com)

According to Dr. Peter Foster, of Halcro, the minimal path input bypasses one of the internal amplifier gain stages, so whereas the total amplifier gain for the unbalanced input is around 35.6dB, that for the minimal path input is only around 29.5dB. According to Mike Kirkham of Halcro, the minimal path setting “produces great results with higher-efficiency loudspeakers”.

The fourth input is a decidedly non-standard ‘current mode’ input (with an impedance of 60Ω). The three first-mentioned inputs are all ‘voltage mode’ inputs, meaning that when a voltage is applied to any of them, the Halcro amplifies the voltage of the signal to send to the speakers. The fourth ‘current mode’ input requires you to connect a device with a current output to it, and the Halcro then amplifies the signal *current* rather than the signal *voltage*. In current mode, I would expect the amplifier’s bandwidth to be more extended, the slew rate to be faster, and even-lower levels of transient intermodulation distortion. According to Bruce Candy, the current mode input is “*most desirable for minimising earth-loop-generated mains hum and ripple, high frequency interference*” as well as to minimise “*cable, plug and socket-generated interference*”.

The problem with having a current input is that so few audio components have the necessary ‘current output’ required to drive the Halcro’s ‘current input’ that almost all audiophiles will end up having to use one or the other of the voltage mode inputs. As to the suitability of using these, Candy says the balanced connection is to be preferred over the unbalanced connection, but that “*the unbalanced voltage [input] is quite satisfactory as long as earth loop generated mains hum and ripple are not a problem... and they should not be a problem unless the source equipment is poorly designed*”.

(At the time of going to press, Halcro had not signed off on the circuit topology of its new Eclipse Preamplifier, and a final decision had not even been made about whether it will even have a current output... though it seemed likely that it would.)

Switching between inputs is done via a single rotary control which means that you could have up to three different source components connected to the Halcro Eclipse Mono, and select between them, so if all three had their own volume controls, you could eliminate the need for a pre-amplifier or a control amplifier.

The number of inputs is another difference between the Eclipse Mono and the Eclipse Stereo. Whereas the Eclipse Mono has these four inputs, as described, the Eclipse Stereo has only three, with the one missing being the ‘minimal path’ input.

Halcro very cleverly does not have any publicity photographs of the Halcro Eclipse Mono amplifier ‘in situ’ or even with other audio components in the same shot, so it might come as a surprise when you see a pair for the first time and realise how large they are, because the Halcro Eclipse Mono is 790mm high, 400mm wide and 400 deep. And it weighs 55kg. Very obviously the Halcro Eclipse Mono amplifiers are intended to be floor-standing!

## PROTECTION

As befits an amplifier with a rated output of 550 watts into 4Ω, the Halcro Eclipse Mono incorporates comprehensive protection circuitry for both the amplifier itself and its power-factor-corrected power supply. Halcro says the Eclipse Mono amplifier circuit has thermal protection against overheating, will shut it down if the output current exceeds an average of 12 amps continuously, or in the event of a short-circuit or a continuous d.c. offset, plus it has over-current limiting as well as short-circuit protection. Halcro says that the Eclipse Mono’s power supply is “protected against most mains transients”, and “will cut out if most common faults are detected in the power supply (e.g. overvoltage, master clock at incorrect frequency, excessive temperatures etc)”.

## IN USE AND LISTENING SESSIONS

The design of the Halcros — which you can see for yourself from the photographs — is such that they’re very easy to move around... provided that two strong people are doing it. Once they’re in place, hook-up is simple, thanks to the huge, rubber-covered gold-plated speaker terminals (two pairs per amp, to allow bi-wiring). The main 240V power switch is underneath the amplifier, alongside a 3-pin IEC socket and a huge gold-plated, rubber covered earth terminal. The standby power switch is located underneath the uppermost case, in the centre. It has a very odd ‘feel’ when it’s pressed, but it switches reliably every single time. Power status is indicated by two LEDs low down on the front panel of the power supply unit: a large red LED for stand-by and a smaller blue one for ‘on’. Oddly enough, these LEDs are replicated on the rear of the amplifier as well. Presumably some audiophiles install their Halcros with the speaker terminals facing the listening position. And I wouldn’t blame them — the Eclipse amplifiers look stunningly beautiful from all angles.

The words ‘stunningly beautiful’ can also be used to describe the sound of the Halcro Eclipses, because it is simply gorgeous. Effortlessly gorgeous and staggeringly real. Listening



HALCRO Eclipse mono

▲ THE AEROSPACE-GRADE WET-SPRAYED COATING TAKES A WEEK PER AMP PAIR TO APPLY, BUT IT LOOKS FANTASTIC, AND IS ALSO VERY TOUGH.

to Sarah Vaughan singing *Ain't No Use* (from her album 'The Divine One') you can hear instantly why her nickname was 'The Divine One!' (though she's equally well known by her other nickname — 'Sassy'.) But it isn't only Vaughan's voice that the Eclipses illuminate. Listen to the double bass, particularly the differences in tone between high and low-stopped notes. Listen, too, to the haunting sound of Sweets Edison's muted trumpet. Then



I had to pinch myself through my listening sessions to remind myself I was awake... not in some blissful audiophile dream.

there's the tinkling but clear sound of Jimmy Jones' piano, chiming in only as necessary but oh-so-effectively. But while you're hearing all these things, what you don't hear is the Halcro Eclipse. The sound just exists in your room, like magic.

A few tracks on in the same album, *Every Time I See You* has Vaughan demonstrating just some of the vocal gymnastics at her disposal, and at the same time also giving an inkling of where that 'Sassy' nickname came from! And once again the Halcro Eclipse Monos laid bare her talent like no

other amplification I have ever experienced. And I use the word 'experienced' rather than 'heard' deliberately... because the sound of the Halcro Eclipse Monos is truly a unique experience.

An unexpected delight was the precision of the stereo image created by these two monoblocs. The downfall of many monoblocs is imbalances in gain between the two completely different amplifiers, which results in image shifts. Not here! The central image is perfectly stage-centre, and all players are perfectly positioned in their places on the stage. Furthermore the sound-staging itself is also always perfect — never wider than it needs to be, but always exactly as wide as it should be. The soundstage seemed almost to be dynamic in its ability to accommodate the music being played. The ability of the Halcros to be sonically invisible was a constant joy. For example the guitar intro during *Gloomy Sunday* snapped me upright, even though I knew it was coming, because the illusion of there being a guitarist in the room, just in front of me and to the left, was palpable.

Guitar sound continued to captivate on Elliot Maginot's 'Young Old Everything In Between', but on the second track, *Monsters of War*, I marvelled not only at the tone of Maginot's acoustic guitar, but also at the sonic impact of Mathieu Leguerrier's kick drum and the way the tonal quality remained identical irrespective of the volume at which I was listening. Here I confess that I ended up listening at much higher levels than I normally would, because the Halcro Eclipse Monos had that curious ability to play loud without actually sounding loud... an attribute that benefits all music genres, but most particularly full-scale orchestral works. At the same time, the silences are amazing, ably demonstrated by the shockingly short silence between *Monsters of War* and the track that follows, *Djibril*.

While I could hardly say I was surprised that the separation between the two channels of the Eclipse Monos was total — they are monoblocs, after all! — the sonic effect of such total channel separation is always mind-blowing, as was amply demonstrated by the percussion at 2:47 in *Bell*. But it definitely pays dividends when reproducing complex sound fields. For example I always thought that the sonic maelstrom that is Koi Child could never be cleanly (and clearly) reproduced by any hi-fi system, but the combination of the Halcro Eclipse Monos and Vivid Audio Kaya 90s proved me wrong. During the rap of *Cruzy* I could hear Cruz's vocal perfectly, while Van's bass guitar remained super-solid and Christian's tenor sax just sounded superior. The PRAT the Halcro Eclipses Monos exhibited throughout this album — and all of my sessions — was exceptional.

It was also exceptional on the Miles Davis track *Blow* (or, as I like to call it, *Hello, you have no*

messages) from his last studio album 'doo-bop'. The frenetic percussion is faultlessly reproduced, the depthiness of the bass is luminary and the 'fullness' of the sound-field exemplary. I have never heard this track sounding as good before. Listening to Miles' Australian connection (the soundtrack to the film 'Dingo'), the echoed trumpet lines are achingly soulful and, with the bird and cricket noises, the Halcro Eclipse Monos delivered the true sound of the Australian outback. The 'coo-ee' calls that both trumpeters (the other being Chuck Findley) extract from their instruments are so realistic it's almost impossible to believe they're issuing from a trumpet.

**CONCLUSION**

The Halcro Eclipse Mono is a superb amplifier, one whose visual presentation captures the imagination like no other amplifier I have ever seen. Its sound quality is so breathtakingly good that I had to pinch myself through my listening sessions to remind myself I was awake, and not in some blissful audiophile dream. But to describe the performance of the Halcro Eclipse Monos, I can do no better than echo the praise of Paul Bolin, who in turn paraphrased Shakespeare to say: 'feed them the best, and the Halcros will give you an experience that is such stuff as dreams are made on.'



**HALCRO:  
NEW OWNERS,  
NEW MODELS**

Halcro is a company reborn. We interview Mike Kirkham (left) and Dr. Peter Foster (right) who, along with Lance Hewitt, are the new owners of this famous brand, and the trio responsible for the birth of the Eclipse.

**AUDIO ESOTERICA:** *Back in the day, Halcro was probably the most famous high-end amplifier brand in the world, but then it just vanished off the face of the earth. What happened?*

**MIKE KIRKHAM:** Halcro was owned by a company called MineLab, which manufactured metal detectors designed by Bruce Candy, who also designed the Halcro amplifiers. When MineLab was acquired by Codan, Codan simply decided to shelve the Halcro operation because it didn't regard it as the core business.

**AE:** *Surely it would have made more commercial sense to sell off Halcro rather than just shelve it?*

**MK:** The problem with Codan selling off Halcro was that the main reason they purchased MineLab in the first place was so they could keep Bruce Candy designing metal detectors — he was more valuable to them that way. They didn't want him spending any time on Halcro. They did initially licence Halcro to Philip Guttentag, who was Halcro's South African distributor, along with an option to buy the company, but this coincided with the global financial crisis, and one way or the other it all fell through.

**AE:** *So how did it come about that almost a decade later you found out Halcro was for sale?*

**MK:** I was helping a friend out on weekends in his record store up in the Adelaide Hills, and one Saturday he pointed at this guy who was browsing through the records and told me that he was one of the brains behind Halcro. Apparently he was a regular customer. I introduced myself as a fan of Halcro, and it turned out to be Lance Hewitt, who was Halcro's lead engineer and used to work alongside Bruce Candy. He told me that there was a warehouse in Adelaide that was absolutely full of Halcro inventory and that the lease was just about to run out. Mike and I ended up buying not

only all the stock and inventory in the warehouse, but also the Halcro company and all its patents: We gave Lance a third share in it.

**AE:** *So Bruce Candy is no longer part of the company?*

**PETER FOSTER:** We still have access to Bruce's inspiration, and we can call on him for guidance, but he has no ownership. In many ways it's no different than it's ever been. Lance and Bruce were working together before Halcro even started, and both worked together at Halcro from the very beginning. Bruce would have a crazy idea and it was Lance who would figure out how to make it work.

**AE:** *What were the challenges involved in getting Halcro back into production?*

**PF:** The biggest challenge was improving on the 'dm' series: that took us six years. The new Halcro Eclipse Mono and Eclipse Stereo amplifiers have a different sound presentation that gives them a lift in sheer musicality.

**MK:** After that, it was lots of small things, like the finish. It took us ages to find someone who could finish the new amplifiers to the quality we required, and still it takes him a week to paint a single pair. Then there's the timber required for the Eclipse bases. It's now very difficult to get slabs of wood that are large enough, so we've had to employ timber artisans in the Adelaide Hills to source them for us. It's also a continuing challenge to get the high-quality components we need for the circuit boards.

**AE:** *Are Halcro amplifiers still made in South Australia?*

**PF:** Absolutely! Halcro amplifiers are still made right here in South Australia. In fact — and this is sheer coincidence — they're made in

premises situated on the same road where the original Halcro amplifiers were made, at the end of which is the house where Bruce Candy lives.

**AE:** *We saw on your website that you have distributors in more than 18 countries, but the USA is not one of them, and we would have thought the US would have been your largest potential market and therefore been the very first on your list.*

**MK:** You're right, the USA was Halcro's largest market for the dm Series, and we expect that it will be the largest market for the new Eclipse. Actually we already have a US distributor lined up but in our company's current form we're only able to build amplifiers in limited numbers, so we have to stage our growth. We have started shipping amplifiers to distributors, and they've already sold a few — to existing dm88 owners — but at present we can't build amplifiers fast enough to satisfy the demand in a market the size of the US.

**AE:** *Did we just hear you right, that existing dm88 owners are replacing them with Eclipse Monos?*

**PF:** Yes. It's really satisfying, because all of them tell us the new Eclipse is a significant improvement on the old dm88, and the fact that they're buying the Eclipses to replace them is all the proof we need that we're on the right track.

**AE:** *What plans do you have to increase your production capacity to a point where you can meet demand from a country like the US... or China?*

**PF:** Up until now, Halcro has been entirely financed by us personally, as well as by using the proceeds from the sale of the old stock that was languishing in the warehouse. Business is going so well that we'll be injecting more of our own money to increase production, but we are now looking at bringing in a suitable investor... preferably one who already has connections in the audio business.

**AE:** *Yet despite your production limitations you're about to introduce an Eclipse preamp and then a totally new Halcro amplifier...*

**MK:** Eclipse is the higher end of what we're going to do. We're following up with the Leela power amplifier, which will be much more affordable than Eclipse, and a much more user-friendly size. The aim was to

build an amplifier that's more attainable to the wider audiophile community. The core circuitry in Leela is essentially what's in the Eclipse, but Leela is modular, so you have a choice between different power supplies. Leela is a stereo power amplifier, but able to be bridged to mono for those who prefer monoblocs, or want more power.

**AE:** *How advanced are you towards Leela production?*

**PF:** Other than the casework, which has yet to be finalised, we're ready to go.

**AE:** *So far, we've only heard you talk about single and two-channel amplifiers. Do you plan any multi-channel amplifiers, like the old MC series, or any signal processors like the old SSP80 or SSP100?*

**MK:** It's best if we stick to what we're really passionate about, and none of us here at Halcro are really interested in multi-channel or home theatre. Halcro built its reputation with amplifiers: that's what we do better than anyone else.

**AE:** *What about Class-D? Bruce Candy patented and used his own Class-D circuitry, so do you have any plans to build any amps using it?*

**MK:** Bruce's original Lyrus Class-D circuit is better-sounding and more musical than even the newest Class-D technologies — plus we have recently upgraded it — and we're currently negotiating with several manufacturers of active loudspeakers about replacing the Hypex modules they're currently using with Lyrus Class-D amplifiers.

**AE:** *Is that because the Lyrus amplifiers are superior to the Hypex modules sonically... or measurably... or both?*

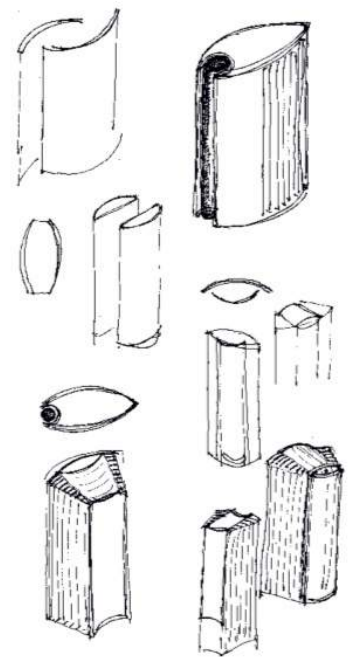
**MK:** Let's just say that the bottom line is that Lyrus is just very musical. It's totally different from all other Class-D designs, and it's protected by patents. As for the specifications, I think that they're important to a point but if the sound does not move you, I don't care about the specs.

**AE:** *Given the difficulties you've had to face bringing Halcro back to life, why ever did you want to do it in the first place?*

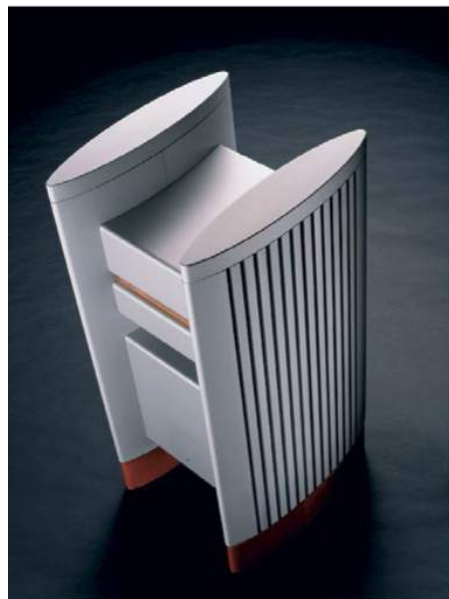
**PF:** Because it was Halcro! Halcro is unique. Unique in its imagination of what an amplifier is and how to push the boundaries of technology. Every other amplifier is a variation on a theme. Then there is Halcro!

# A HISTORY OF HALCRO

**H**alcro's founder, Bruce Halcro Candy, says he's been an audiophile since the age of 13, when he could be found tinkering away in his home workshop aiming to combine his love of music with his technical skills to build the world's 'ultimate' amplifier. In 2001 he told Jon Iverson, of *Stereophile* magazine, that his lifelong love of music and his ability to evaluate audio components were informed by the fact that he had a rare ability to hear frequencies so high that they are inaudible to most other people.



△ EARLY CONCEPTS FOR THE ORIGINAL HALCRO ENCLOSURE; INDUSTRIAL DESIGNERS TONY KEARNEY AND MAX DICKISON WERE COMMISSIONED TO DESIGN THE EXTERNAL CASING.



△ IN ORDER TO REMOVE THE HEAT PASSIVELY WITHOUT USING FANS, THE HALCRO'S HEATSINKS FOR THE OUTPUT DEVICES HAD TO BE EXTRAORDINARILY LARGE.

"I can hear up to 23kHz in one ear and 21kHz in the other, and when I was younger, I could hear much higher frequencies than these," said Candy: "Unlike all my audiophile fashionable friends, I did not convert over to transistors for many years, even when valves were highly *passé*. As you can imagine, I was teased mercilessly about this idiosyncratic behaviour. However, I thought that the transistor sound was ghastly — very harsh. I owned a pair of Mullard 5-20 amps with those well-designed Partridge output transformers."

Initially, Candy's talents led him into a life of academia, with him telling *Stereophile's* Paul Bolin that after obtaining Ph.Ds in physics and applied mathematics, he taught at universities in England, France and, finally, Australia. It was in Australia that Candy's life path changed as a result of him developing a unique and very effective method of detecting metal objects. He founded a company called 'Minelab' to commercialise it and in 1985 launched the Goldseekers 15000, its name a dead giveaway as to the product's primary purpose.

Candy quickly followed up on the Goldseekers 15000 with the world's first automatic ground-tracking metal detector (the GT 16000, in 1987) and then two years later with the world's first twin-frequency metal detector, the Eureka Dual Ace. His most groundbreaking development came in 1996, when he incorporated multi-period sensing (MPS) into Minelab's detectors, which gave them the unique ability to detect metals at great depths even in highly mineralised soils.

It was the development of MPS which launched Minelab onto the global market, a process which led to it establishing subsidiaries in the USA and in Ireland. MPS also brought Minelab to the attention of governments around the world, who realised the potential of Minelab's detectors to detect buried metallic infrastructure and archaeological relics.

But it also brought Minelab to the attention of the world's military, which now uses the company's products to locate unexploded landmines. In Cambodia alone, Minelab metal detectors have so far successfully located more than 500,000 unexploded landmines allowing them to be defused, in turn enabling Cambodian farmers to reclaim their land for agriculture.

The success of the metal detection business allowed Candy to return to his first love — audio and audio electronics — and in July 1996 he and a business partner, David Pope, formed a company called Extraordinary Technology (Hi-Fi) Pty Ltd (trading as Halcro), with the aim of realising Candy's dream as a 13-year-old of building the world's most

advanced, lowest-distortion amplifier. The new company's first hire was engineer Lance Hewitt, who still works for Halcro.

Even before Candy and Hewitt had completed prototypes of what was to become the company's first amplifier, the Halcro dm58, it was decided that having unique circuitry would not be enough to ensure commercial success, and that the exterior design of the amplifier should also be unique. Halcro commissioned industrial designers Tony Kearney and Max Dickison of Adelaide firm Designmakers to design the external casing. Kearney remembers their first project meeting very well. "We sat quietly as we were introduced to three plastic milk crates, each wired to the next and all crammed with assorted electronic components", he said. "Bruce calmly looked us in the eye and announced, 'you are looking at the world's most advanced amplifier.'"

Candy told the two designers that in order to ensure the correct operation of the amplifier, the electronics had to be separated into four heavily shielded modules — an audio power module, an audio drive module, an inductor module and a power supply module and that in order to remove the heat passively, without using fans, the heatsinks for the output devices had to be extraordinarily large. He also told them that because he only expected to build the amplifiers only in relatively small numbers, the casings had to be built in a way that required only minimal capital investment in tooling.

Two years later, the race was on to complete new amplifiers so they could be shown at the Consumer Electronics Show in Las Vegas, and Kearney still remembers how he spent his Christmas holidays back in 2000. "In a shed on a small property in the Adelaide Hills in the middle of one of Adelaide's hottest summers, we assembled the first two pairs of Halcro dm58s," he says. "While Bruce worked on debugging the electronics, Lance Hewitt, Max and I assembled this jigsaw of components to an impending deadline."

History proves that they met that deadline, and the first pair of Halcro dm58 monoblocs was shown at the Alexis Park Hotel, in Las Vegas, at CES 2001. Jon Iverson, who was covering that show for *Stereophile*, reported: "Australian amplifier company Halcro had several of its beautifully built 'H' shaped amplifiers on display, including the \$22,000/pair dm58 220W monoblocs and \$30,000/pair dm68 225W monoblocs. New products for 2001 will be the dm38 stereo amp, available this July for around \$10,000, as well as the dm33 three-channel amplifier, also around \$10,000, and a six-channel amp in a conventional case that is expected to cost around \$6,000 when released next December."



Any sufficiently advanced technology will be indistinguishable from magic.



## HALCRO ECLIPSE MONO POWER AMPLIFIERS



2000 HALCRO DM88



2002 HALCRO DM8



2002 HALCRO DM10



2004 HALCRO DM78



2005 HALCRO MC20

2005 HALCRO DM38



Halcro not only exhibited at the show, it also caused controversy at the show, with Iverson writing in a follow-up report: *"This year, one company that garnered repeated buzz around Alexis Park, and even at the main convention centre, was Australia's Halcro. What has raised the eyebrows of the audio community, however, is a bold claim, repeated on the company website, that it is 'the only amplifier in the world to challenge a theoretical limit'. That limit is the specification for harmonic and IM distortion, which the company claims to have virtually eliminated via its circuitry, whose design is a closely-guarded secret. Halcro says that its dm68: 'produces less than 25 parts per billion harmonic distortion at 1kHz, and the worst result is about 600 parts per billion at 20kHz at full power, a frequency where most amplifiers exhibit very poor behaviour.'"*

When Iverson asked how Halcro achieved such startling figures, Candy told him: "It is extremely difficult to provide you with details without significantly disclosing the patents and intellectual property which are now hidden from public view."

Two years later, that controversial Halcro dm58 was to become the first Australian amplifier ever featured on the front cover of *Stereophile* magazine, where it was accompanied by the shout-line: 'The Best Amplifier Ever.' Inside that issue was a rave review — the first of many around the world — which served to put Australia on the map for audiophiles around the world, and turned Halcro into one of the world's best-known high-end audio manufacturers. In that *Stereophile* review, Paul Bolin wrote of the Halcro dm58: *"It's that rarest of the rare: a truly revolutionary audio product."*

*Stereophile* editor John Atkinson, who tested the Halcro dm58 for the review, said it had *"astonishing measured performance for an amplifier,"* and that he felt that he was measuring the limits of his test equipment instead of the performance of the amplifier. Bolin included commentary in his review to the effect that sonically, the dm58 was far beyond anything he had ever heard — indeed an embodiment of science fiction writer and futurist Arthur C. Clarke's famous maxim that *"any sufficiently advanced technology will be indistinguishable from magic."*

The unusual technology used in Halcro amplifiers continued to be a topic of discussion amongst reviewers and audiophiles. Philip O'Hanlon of the US distributor 'On A Higher Note', which was Halcro's US agent at the time, and thus had unprecedented access

to Halcro's secret circuit diagrams, suggested that: *"were most electrical engineers to examine the [Halcro dm58's] schematic... few would even recognise it as being that of an audio amplifier."*

Halcro made improvements to its existing amplifiers, and added additional products to its line-up including the dm88 monoblocs, dm38 stereo amplifier, dm8 and dm10 preamplifiers and a line of multi-channel 'MC' power amplifiers (see our Timeline, left), this last using proprietary Class-D technology developed by Candy which he trademarked as 'Lyrus' Class-D. According to Dr Peter Foster, of Longwood Audio, the SA company which now owns Halcro: *"A typical Class-D amplifier compares the input signal to a triangular waveform to determine switching time for the output FETs. Lyrus circuitry modifies the triangular carrier signal in proportion to the input signal level to compensate for the phase advancement in switching time. This is a feed forward component that compensates for intrinsic distortion that occurs with negative feedback."*

Longwood Audio's ownership of Halcro is the result of a series of events that was precipitated by Minelab being purchased by Codan, a large military communications company, in 2008. According to Mike Kirkham of Longwood Audio: *"Codan had no interest in Halcro, so the company was retained by the original shareholders and shelved. Halcro briefly licensed their products to be manufactured by Vivid Audio but unfortunately this came to an end with the onset of the global financial crisis, so the Halcro assets were mothballed."*

In 2015, Foster, Kirkham and Lance Hewitt founded Longwood Audio in order to acquire all the assets of Halcro, including the brand, the company's portfolio of patents, the mothballed stock and all its tooling. Hewitt had been with Halcro since its beginning. Foster, who holds a PhD in Physics from the University of Adelaide, was formerly a Senior Laser Physicist at Norsesld Pty. Ltd, an Australian medical laser manufacturer, and a Guest Scientist at the Department of Metallic Materials, University of Bayreuth, Germany; he is the CEO of Longwood Audio. Kirkham, Longwood's Head of Sales and Marketing, is a co-founder of Magenta Audio, the Australian importer and distributor for many famous audio brands, including PS Audio, Zu Audio, Audion and Metrum Acoustics and also the co-owner of The Electric Room, a retail website for professional audio equipment. 