

# HALCRO ECLIPSE

Reviewer Greg Borrowman

STEREO POWER AMPLIFIER



**W**e don't imagine many people would contradict us if we said that Halcro's Eclipse power amplifier — in either its mono or stereo version — is the most immediately recognisable amplifier in the world. It is so recognisable that in a pitch-black room it can quickly and easily be identified by touch alone. The Halcro Eclipse is also — albeit this time arguably — the most beautiful amplifier in the world, which is undoubtedly one of the reasons it has featured on the front covers of so many hi-fi magazines around the world, including here in Australia.

The story behind the amplifier's design is also one of the most interesting and unusual in audio. The intellect behind Halcro's creation, and indeed the brand's name, was South African physicist and engineer Dr Bruce Halcro Candy (you can see why he used his middle name!), who after founding the company and becoming world-famous for the very first amplifier he built (the Halcro dm58) was then head-hunted by Minelab, famous for its hand-held metal detectors, after which the company languished as no more than a listing in the Australian government's official register of company names.

It languished on that list until one sunny Saturday morning, when Lance Hewitt, who had been Candy's lead engineer, was adding to his collection of vinyl at a South Australian record store. The store's owner, who knew that Hewitt had formerly worked for Halcro, introduced him to Mike Kirkham of Magenta Audio, an Australian audio equipment importer, retailer and distributor who also happened to be at the record store buying vinyl that very same morning. Hewitt told Kirkham not only that he had been personally responsible for building and testing Halcro amplifiers but also that he happened to know that all of the circuit diagrams, PCBs and tooling required to build them were gathering dust in a storage facility not far from where the two were chatting.

The result of this serendipitous Saturday morning meet is that Halcro was resurrected as a going entity. Kirkham phoned Dr Peter Foster, a friend of his who holds a PhD in physics from the

University of Adelaide and was formerly a Senior Laser Physicist at Norseld Pty Ltd and a Guest Scientist at the University of Bayreuth, Germany. The result was the trio founding a new company, Longwood Audio, which in 2015 acquired all of Halcro's assets, including the brand name, the company's portfolio of patents and the all-essential machine tooling along with a batch of unsold mothballed stock.

Foster is now Longwood Audio's CEO, Kirkham is its Head of Sales and Marketing, and Hewitt is in charge of development and manufacturing.

### THE EQUIPMENT

The 'look' of the Eclipse Stereo is directly copied from the design of the original dm38, which was the work of Adelaide designers Tony Kearney and Max Dickison. Candy's brief to them was that, 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.

Those very design elements have been incorporated in the Eclipse Stereo. One important change, however, has been in the execution of the heatsink design. The original's design was microphonic so that at certain frequencies it could vibrate so significantly that its resonances were audible in the listening room. The heatsinks on the Eclipse Stereo, however, are non-resonant by virtue of being completely redesigned. The new design sees each section fabricated from up to 10mm-thick folded aluminium, with the winged sections fully damped and the joins connecting the horizontal chambers to the wing sections. Also, the non-wooden sections of the chassis are now available in either a 'Standard' powder-coat finish or a premium hand-painted 'Signature' finish.

If you are at all familiar with Halcro amplifiers, you will already have an inkling of how large the Eclipse Stereo's chassis is; if you're not, let us point out that a person of average height, when standing upright, will not need to lean down to touch one of the amplifier's vertical wings. Checking out the amplifier's proportions

in the images accompanying this review should also give you an idea of how wide the amplifier is, but just to make it perfectly clear, the Halcro Eclipse Stereo power amplifier is not only 79cm tall but also as wide as it is deep (40cm). It's not lightweight either, tipping the scales at 62kg. (And, when eyeing the images, don't miss the fact that the shape of the chassis actually forms the capital letter 'H', which is pretty clever!)

The internal circuitry of the Halcro Eclipse Stereo inherits DNA from the original Halcro dm38, as well as from the Eclipse Mono, but according to Hewitt, while some things have been lost (such as the current mode inputs), many other aspects of the circuitry have been improved — some are the natural result of improvements in technology, some are the result of improvements in circuit layouts, and some are the result of research and development by Longwood Audio itself, for which Hewitt says the company has been awarded four patents.

Candy was always secretive about the circuitry of the Halcro dm38, and Longwood Audio is continuing this tradition. CEO Peter Foster told Paul Miller of *Hi-Fi News*, "We never release schematics [and] every circuit has the component designators engraved off and the boards are coated in an epoxy layer to further mask what's going on".

Miller says he was nonetheless able to glean the following information about the Eclipse Stereo: "The power supply is



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a two-stage switch-mode design with power factor correction. The first switch-mode power supply buffers the amplifier from the AC mains by generating a very high DC voltage from which the second power supply delivers the rail voltages for the power amplifier, [and] although the building blocks of the amplifier are conventional — a differential voltage-to-current input stage, current mirror, voltage line/preamp stage and, crucially, a unity-gain power output stage employing 12 (V)FETs — the way they are implemented, all on six-layer PCBs, is where the proprietary thinking resides.”

Further details of how the circuit might work are revealed in US Patent 6,600,367, which was granted to Candy and is currently assigned to Longwood Audio. This patent is for: ‘An electronic amplifier providing very low distortion which includes an output stage with an output error correction stage containing two amplifiers and wherein there are at least four local negative feedback paths, an output of the first amplifier being connected to an input of output stage transistor buffers or output stage transistors through a first network, an

output of the second amplifier being connected to an input of output stage transistor buffers or output stage transistors through a second network, where components of the first and second amplifier the local negative feedback paths, first and second networks and output stage transistor buffers are selected to form substantially second order local dominant pole. Also disclosed is the supply of power to said first and second amplifiers from a floating power supply means coupled to either an or the output of the output stage so that the voltage of the floating power supply will follow substantially an output voltage of the output stage.’

Also interesting are some of the patent’s citations, which reference an active bias circuit for operating push-pull amplifiers in Class A mode (granted to one Nelson Pass), a distortion-free complemented error feedback amplifier method (granted to James Strickland), and reducing amplifier distortion by comparison of input and feedback from output (granted to Barry Elliot Porter). The patent also directly cites one Douglas H. Self. (For readers who are unfamiliar with

these names, any audio engineer asked to name the world’s top five audio amplifier designers of the last 50 years would include three of those names.)

Input and output connections are made on the module at the top of the amplifier, at the rear. The Eclipse Stereo has both unbalanced (via gold-plated RCA) and balanced (via gold-plated XLR) inputs, plus a ‘low gain’ unbalanced input. The speaker cable terminals are absolutely huge, and while they’re supposed to be combination spade/banana types, the only way we could see to use banana plugs was to remove the screw-down knob that you’d use if you were using spades or bare wire. Perhaps the rubberised cap on the knob is removable, but we weren’t prepared to risk damaging it trying to pry it off!

Halcro has built several sophisticated automated protection systems into the Eclipse Stereo to prevent it from being damaged by a variety of issues that could impact its performance, covering everything from power supply stability to problems that could affect the output stages. It’s good that there’s such a high level of overkill on the protection front, because the company’s secrecy about its circuits, including the values of the components used in those circuits, would mean that any fault could only be addressed by a technician with insider knowledge. Otherwise, the amplifier would need to be returned to South Australia — and given its size and weight, that would be an expensive exercise!

Longwood Audio says that the Halcro Eclipse Stereo amplifier “is short-circuit proof, has over-current limiting, has gradual power limiting if amplifier becomes too hot, will cut out if a continuous DC offset appears on its output, will cut out if output current exceeds 12 amperes average continuously over a period of a few minutes, is protected against most input overloads, has power supply protection that will cut out if faults are detected in the power supply (such as over-voltage, master clock at incorrect frequency, excessive temperatures), and is protected against most mains transients”.

THERE ARE THREE INPUT MODES: UNBALANCED (22-KOHM IMPEDANCE); BALANCED (22-KOHM + 22-KOHM); AND MINIMAL PATH (660-OHM)





**IN USE AND LISTENING SESSIONS**

Our first audio experience of the Halcro Eclipse Stereo during testing was by way of an initial warm-up using music from a band with which we have a love/hate relationship: GoGo Penguin. Delivering amazing sound for what is essentially just a trio (percussion, bass and keys), the band’s music has been described as a form of jazz for the modern age — but then again, is it? We love the sound but hate not being able to define exactly why it’s so mesmerizingly great and find the group hard to recommend to others because their music is so polarising.

What we can say with certainty is that it really helps if you are listening to their music through an amplifier with the high performance of the Eclipse Stereo. For example, the double-bass on *Raven* (from the album ‘A Humdrum Star’) is

not only beautifully captured in terms of sounding just like a double-bass should, but it’s also just a lovely bass line — so inventive that you really can’t foretell the next note, as you can with performances by many lesser bassists. In delivering this line so well, Nick Blacka provides a unique counterpoint to Chris Illingworth’s gloriously grand pianism, even though you can sometimes foretell what note Illingworth is going to play next because he plays so many that are the same! The complexity of the sound is jaw-dropping, and the scattergun drumming of Rob Turner (who’s since been replaced by Jon Scott) is epic and beautifully delivered by the Halcro Eclipse.

On *Bardo*, the following track, you’ll hear Blacka’s double-bass sounding like nothing you’ve ever heard before, as he delivers miraculous high-frequency overtones that make a mockery of the

MIKE KIRKHAM (LEFT) IS A SELF-PROFESSED OBSESSIVE COLLECTOR AND LISTENER OF MUSIC, WITH HIS CD AND RECORD COLLECTION SPANNING TWO ROOMS

instrument’s normally accepted frequency range. The Eclipse Stereo delivers the entire gamut perfectly — the delivery is sonically contiguous, despite the rarity of the nature of the sound. When the drum kit comes in, at about 1:30, the accuracy with which the amplifier delivers the kick drum sound in exact syncopation with the high-hat strikes, all while keeping each in its own sonic envelope, and with no unwanted overhang, is an object lesson in the importance of state-of-the-art amplification in an audio reproduction chain. The Halcro Eclipse also maintained the ‘airiness’ of the acoustic as a constant throughout — a subtlety that eludes lesser amplifiers.



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and bass delivery with music that's not so 'out there,' we'd recommend revisiting — or listening to for the first time! — Talking Heads' 1983 classic album 'Speaking In Tongues.' The funky bass sound is deep and tight, and Chris Frantz's drum, beautifully captured on this recording, sounds as real as can be. Obviously, you'd listen to opener *Burning Down The House* at a high volume, but you should also crank up the dial while listening to *Girlfriend Is Better* in order to hear how well the Eclipse Stereo can deliver the eclectic and varied synthesizer sounds on this track at any volume level you care to listen at. Listen, too, to how well the left and right channels are separated. Indeed the separation between the channels is so complete that we could easily have been convinced that we were auditioning a pair of Eclipse Monos instead!

You can hear not only the channel separation but also the beautiful stereo imaging of the Eclipse Stereo on *This Must Be The Place*, where the vocals are trademark Talking Heads timbre and the purity of the percussion sound is exemplary, particularly the 'found instrument' sounds delivered by David Van Tieghem. We had lots of fun arguing about the various 'found instruments' he was playing.

We have often written in the pages of *Audio Esoterica* magazine that the piano is the best instrument with which to evaluate audio components due to its enormous pitch compass, supreme dynamics and the fact that it's a stringed percussive instrument, and you could have no better music to hear all of this than that on French pianist Alexandre Tharaud's 2009 recording of more than 70 works by Erik Satie. This, of course, includes the famous Gnossiennes, but here they are strangely interweaved with other, lesser-known works in such a way that it's as if you're hearing them for the first time.

Indeed some of these works you may actually be hearing for the first time, because it was Satie, not John Cage, who invented the 'prepared piano,' and unlike many pianists, Tharaud follows Satie's instructions to the letter in *Le Piège de Méduse* by placing sheets of paper on the upper octave strings. We can't say we liked the result, but the Eclipse Stereo certainly

reproduced it faithfully. Elsewhere on this recording, Tharaud's playful execution of Satie's more conventional scores is more entertaining than the performances delivered by more sedate pianists.

### CONCLUSION

The Halcro Eclipse Stereo is not only the most recognisable amplifier in the world, along with being one of the most beautiful, but it is also the quietest and has the lowest distortion of all.

If you think that is part and parcel of what makes it one of the best-sounding amplifiers in the world, we're not about to disagree. You may, however, be surprised to learn that the Eclipse Stereo is not one of the most expensive hi-fi amplifiers in the world. In fact, it's not even close — dozens of its competitors have price tags in excess of \$150,000!

In light of this information, you should realise that the Halcro Eclipse Stereo could be considered good value even at twice its price! 

The buzzy, insect-like opening to *One Hundred Moons* highlighted for us the complete lack of background noise from the Eclipse Stereo's circuitry — the amplifier makes no noise at all other than what is actually in the audio signal delivered to it. There is no low-frequency hum, no high-frequency hiss, and absolutely no modulation of the lowest-level background sounds on a track. Such sounds issue from an inky-black silence that is so silent it's almost mesmerising in and of itself. The simplicity of the percussion and piano on this track is a musical antidote to what has gone before, and the crystalline clarity of the sound we heard from the Eclipse Stereo was simply amazing, a testament to the complete lack of audible distortion.

We do need to warn you that we think GoGo Penguin has gone somewhat off-piste with their latest album, 'Everything Is Going To Be OK' — both sonically and musically — so if you want to hear what we heard, we'd recommend sticking with the four albums the band recorded with Blue Note, which include 'Man Made Object' and the aforementioned 'A Humdrum Star'.

If you'd rather test out the Halcro Eclipse Stereo's enormous power reserves

## SPECIFICATIONS

### Halcro Eclipse Stereo

**Power Output (4Ω):**

>350 watts per channel (1kHz)

**Power Output (8Ω):**

>180 watts per channel (1kHz)

**Frequency Response (-3dB):**

3Hz-215kHz

**Frequency Response (-1dB):**

7Hz-90kHz

**Noise:** 5nV/sqrt(Hz)

(Equivalent Input Noise)

**THD:** <-120dB (20Hz-20kHz)**THD @ 1kHz:** <-134dB**IMD:** <-120dB (SMPTE & TT)**Slew Rate:** 100V/μS**Overload Recovery:** <1mS**Dimensions (HWD):**

79×40×40cm

**Weight:** 85kg**Warranty:** Five Years**Price:** \$66,990

(Standard Finish)

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