

It has taken two years and the generous contributions of leading reviewers, distributors and dealers from around the world to design, then create, the Halcro preamplifiers. We are confident that this combination of expertise, along with the know-how of the high-end audio industry's leading Research and Development team will ensure the success of the Halcro preamplifiers.

The brief given to our R&D team, headed by Bruce Candy, was to produce two models of preamplifier to satisfy the needs of every connoisseur of sound;

- Lowest distortion specifications of any preamplifier in the world

- Physical dimensions to suit a standard domestic equipment rack, while retaining the stunning Halcro industrial design signature

- Tractable controls

- Superior reliability

- Innovation in design

Halcro is extremely proud of the result of the past two years of Research and Development

The Halcro dm8 & dm10 preamplifiers will add no colorations to the music. If used in-conjunction with Halcro power amplifiers, all you will hear is the original recording reproduced the way the artist intended it to sound. No transistor or valve-added sounds are present, just a level of musical purity that was thought impossible until now.

Please read on to discover why the Halcro dm8 & dm10 preamplifiers are setting the new standard to which other manufacturers can only aspire.

electronic design

by Bruce Candy

In keeping with my philosophy of design, my basic aim was to produce a preamplifier with which I, personally, am quite satisfied. I sincerely hope that others will share my satisfaction with these products.

As I saw it, the major issues were:

- Zero compromise on Transparency

- Flexibility

- Ease of use

- Progressive design concepts

In order to meet this challenge, the resulting circuits have particular characteristics:

First, all circuits in the preamp have distortion so low that it is immeasurable, whether THD, IM etc..

Second, all circuits in the preamp exhibit exceptionally low noise (see specifications).

Third, there is no compromise whatever with the choice of components (Vishay resistors, FKP1 capacitors etc).

Fourth, the circuits are highly immune to electromagnetic interference. Some inputs and outputs include both first order filters and common mode chokes.

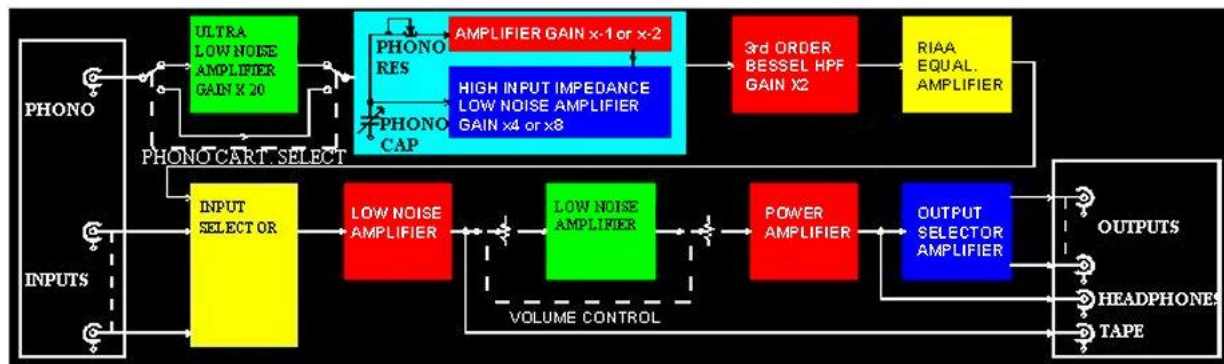
Fifth, the power supply and microprocessor circuits are designed for minimal electromagnetic emissions (extensive 2nd to 6th order filters).

Sixth, the power supply switching frequency was chosen to be much higher than the audio band (>200kHz).

Seventh, the power supply rails are exceptionally well regulated; double regulation in fact (switch-mode and linear servo loops).

Eighth, components and design are selected for high reliability.

The figure below shows a functional block diagram of the preamplifier. As can be seen, the phono stage has 4 stages. Firstly, there is an ultra low noise input stage with a gain of x 20 for moving coil cartridges. This can be switched out of the circuit train.



The first stage is followed by a high input impedance (FET input) low noise amplifier with a gain selectable to x4 or x8. The output of the stage is fed to an inverting amplifier with a gain selected to be x-2 if the high input impedance amplifier stage gain is selected to be x4, or x-1 if the high input impedance amplifier stage is selected to be x8. (The “minus” indicates inverting). The output of the inverting amplifier is connected back to the high input impedance amplifier stage input via a continuously variable potentiometer. A continuously variable capacitor is also connected to this input and to ground. The variable resistor and capacitor set the load impedance of the high input impedance amplifier stage and act to load moving magnet cartridges.

This configuration forms an active load. The variable capacitance sets the load capacitance and the load resistance is 1/8th of the value of the potentiometer resistance. This configuration lowers the noise floor at high frequency, and its attributes are described below.

The output of the high input impedance amplifier stage is, as well, fed to a 15Hz 3rd order high-pass Bessel filter. This acts as a “rumble-filter”. Following this is the RIAA equalization stage. The RIAA equalisation adheres to the RIAA specification within 0.25dB at all frequencies.

The output of this RIAA stage is fed to a low noise input selector stage which has a gain of 2. In truth, if a phono input input is selected, this gain can be set to either 1 or 2, depending upon the gain of the selected phono input. Some inputs are balanced inputs and one input is a current input with a load impedance of 51 ohms, for optimal inter-connect load matching. The equivalent input noise of the voltage is approximately 3.5nV/sqrt(Hz), and that of the current input is 13pA/sqrt(Hz).

The volume control is implemented so as to include two identical stages in series. This minimises output noise.

The preamplifiers feature balanced, unbalanced, current mode and bridged current mode outputs. The later consists of a non-inverted and inverted current output. There is also an unbalanced output for tape and headphones.

The audible relay noise of the dm10 & dm8 is due to the use of mechanical relays in all switching including the volume control because they exhibit the following ideal characteristics;

- zero on resistance
- infinite off impedance
- very low off capacitance
- zero distortion

In contrast, the now universally popular solid state relays/switches exhibit none of these ideal properties and detract from performance. Hence, sonically, Halcro feels that it is worth the side effect of mechanical clicking sounds when parameters are changed.

microprocessor control

by Paul Rainbow

The excellent audio electronics are complemented and controlled by a number of highly integrated micro-controllers located close to the electronics they serve. Being as near as possible to the controlled electronics allows short control paths and virtually eliminates internal connectors, thereby greatly increasing system reliability.

Each amplifier channel has its own micro-controller; the front panel display and user interface has another. A fourth micro-controller, located on the rear connector panel, co-ordinates the activity of the others. The four micro-controllers are linked via only four interconnections each.

A unique programming feature of the microprocessor has been developed which allows the user to dedicate a particular pair of input sockets to a specific input device. This feature provides the user with great flexibility for connecting input devices to the preamplifier. The rear panel has provision to accommodate six potential input devices into nine physical pairs of input sockets. There are two pairs of dedicated phono inputs, one pair of current inputs, three pairs of balanced inputs and three pairs of unbalanced inputs. Phono inputs do not require programming as they are permanently allocated to the phono source.

mechanical design

by Lance Hewitt

That the Halcro dm8 & dm10 can boast their spectacularly low noise and distortion specifications while their cases contain inherently noisy digital circuitry, including a switch-mode power supply, is partly due to the mechanical design of their circuit boards and the boxes that contain them. Supports of folded aluminum serve not only as bases to which the electronics are anchored, but also to shield different sections of the circuitry from one another.

Each of the audio, panel and display, and power supply sections is contained within its own internal aluminum enclosure. Cables connecting the separate sections are few and short, minimizing both radiation and reception of unwanted signals.

industrial design

by Max Dickison & Tony Kearney

Product Form

The aim when designing the dm10 was to create a preamplifier that was unmistakably part of the Halcro product family but at the same time a component that would compliment any high end audio system.

The preamplifier had to sit comfortably within a contemporary domestic environment, retain the visual signature of the Halcro family of products, which differentiates them from other high end audio products, and has an appearance that reflected the high level of technical innovation. As with other Halcro products, softer forms and textures are used, all fasteners are concealed and the heatsinks are integrated into the external form to maintain simple, clean lines.

Whilst the unique pillar forms of the power amplifiers have been carried through to the preamp, proportions have been reworked to allow this component to be either freestanding or housed within a standard 10" racking system.

Control Interface

Knobs and buttons

The volume and input selector knobs use a unique magnetic incremental indexing mechanism developed to provide a very subtle and reliable indexing action. The knobs and buttons are finished in the same soft textural finish as the pillars.

Display

A high-resolution display was chosen in order to provide clean simple graphics without the rough edges associated with displays of lesser quality. The graphic layout of the display has been optimized to give prominence to the functions that are viewed most often. These include volume levels, balance and input selection. Functions that are accessed less often are displayed in smaller type along the bottom of the screen. These include stereo/mono and phase in/phase out. The volume levels for each channel are displayed side-by-side so that when the levels are not balanced the user will easily notice it.

Remote control

When designing the Halcro Remote Control, we aimed to reflect the quality and forms of the Halcro preamplifiers.

Machined from solid aluminum extrusion the remote rests comfortably in the hand with its minimalist array of buttons falling within the natural sweep of the thumb. Simple and logical to operate, every effort has been made to keep this product free of unnecessary complexity.

Detailed product specification and features information is available in a separate document.