dm78 | dm88

Monoblock Power Amplifier

Owner's Manual

HALCRO

www.halcro.com

Contents

Introduction

Congratulations on purchasing the Halcro dm78 or dm88 monoblock amplifiers.

Halcro designs and manufactures the only "Super Fidelity" amplifiers in the world. This "Super Fidelity" amplifier reproduces with better than 99.9997% purity of all tones across the entire audio range.

The concept behind the electronic design was to create an amplifier that did not color the sound with its own electronic characteristics — to recreate the original sound as it was at the time of recording.

Please enjoy the Halcro audio experience.

Halcro has enjoyed creating perfect audio reproduction for the world's music connoisseurs.

If you desire to contact Halcro to give us feedback on your purchase or for general enquiries;

Please feel free to contact us via:

E-mail: admin@halcro.com
Telephone: + 61 8 8238 0807
Facsimile: + 61 8 8238 0852

Important Safety Information

Symbols

The following symbols are used on this equipment:

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated 'hazardous voltage' that may be of sufficient magnitude to constitute a risk of electric shock to a person if exposed or contacted.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the following pages.

The 'CE' symbol indicates compliance of this device with the relevant directives of the European community including the EMC (Electromagnetic Compatibility) and LVD (Low Voltage Directive) standards.

Warning of electrical shock hazard. Do not open cover (or back). There are no user serviceable parts inside. Refer servicing to qualified service personnel.

This symbol is to indicate that the unit is heavy and that precautions are required when lifting or moving the unit.

Electrical safety

WARNING: This product must always be connected to a mains socket outlet with a protective earth connection.

Only use a suitable approved mains cord complying with European individual country requirements in the CE Low Voltage Directive Scheme.

DANGER: Do not open the cover or back, or remove any panels, or try to modify or repair the dm78/88. Opening the dm78/88 may expose you to dangerous voltages and will void the warranty.

WARNING: The Standby/On mode switch does not disconnect the unit from the mains power.

To disconnect the unit from the mains, switch off the unit at the mains socket outlet and withdraw the mains plug from the socket outlet.

The unit should be installed in a position where the mains plug is easily accessible. Disconnect the unit from the mains if it is to be left unused for a long period.

WARNING: No naked flame sources, such as lighted candles, should be placed on the unit.

If naked flame sources tip over they could result in a fire.

Protection from fluids

The Halcro Logic dm78/88 units are designed for indoor use only and are not protected against liquids. They must not be exposed to dripping or splashing and no objects filled with liquids, such as vases, should be placed on them.

If liquid is accidentally spilled on the device, immediately disconnect the unit from the mains. Allow sufficient time for complete evaporation before using the dm78/88 again. If the liquid is anything other than water, do not use the device before a qualified service technician has examined it.

Cleaning may be performed with a slightly damp cloth that has been wrung until nearly dry. Refer to the section on *Cleaning* on page 24.

WARNING: To reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture.

Do not allow liquids to enter the unit or contact electrical terminals.

Service warnings

All compartments are sealed at the factory. If the seals are broken, the warranty will be void and all service costs will be charged to the owner.

DANGER: Contains no user serviceable parts. Do not attempt to open any of the dm78/88 compartments as this may expose you to dangerous voltages and will void the warranty.

Requires F 10 A L 250 V fuse for continued protection against the risk of fire. Never bypass or use any other type of fuse. The fuse is located on the bottom of the lower panel of the power amplifier (13).

WARNING: Always replace the fuse with the same type and rating as specified: F 10 A L 250 V.

DANGER: Always disconnect the unit from the mains before touching the loudspeaker terminals or replacing the fuse.

Protection from overheating

The dm78/88 generates a certain amount of heat and requires ventilation. Slots and ventilation holes are provided for ventilation purposes, and to ensure reliable operation of the product. To prevent fire hazards, these openings must never be blocked or covered.

Follow the precautions listed below. If these precautions are not followed, overheating or failure may result. Overheating also shortens the working life of all components.

- do not block the ventilation slots in the sides of the unit with any object, including paper, cloths or curtains
- avoid placing the unit in a built-in installation place such as a bookcase or a rack unless you can provide proper ventilation
- do not operate the unit inside a cabinet unless it has adequate ventilation (such as an open back panel)
- allow at least 12 in (300 mm) clearance around the unit

WARNING: Do not obstruct ventilation slots in the chassis.

Lifting or moving

WARNING: Weighs 55 kg (120 lb) per unit. Shipping weight is 85 kg (187 lb). Never lift the amplifier by yourself.

Always use two people to unpack or move the amplifier. Always bend at the knees when lifting. Do not strain your back.

Wiring to the loudspeaker terminals to Class 2 wiring (US wiring regulations)

This equipment has been classified as having a Class 2 loudspeaker output requiring wiring to connect the output terminals to class 2 according to the National Electrical Code. Consult a qualified installer or electrical contractor for further information.

Additional Important Safety Instructions for US

The following instructions should be followed by customers in the USA in addition to the safety instructions in the rest of this chapter:

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth or according to the cleaning instructions.
- Do not block any ventilation openings.
- Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug.

  A polarized plug has two blades, with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel.

  Servicing is required when the apparatus has been damaged in any way, such as if the power-supply cord or plug is damaged, liquid has been spilled, or objects have fallen into the apparatus, if the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

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Interference Warning - US FCC Regulations

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the amplifier is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by Halcro could void the user's authority to operate the equipment.

For Consumers within the European Union:

The following instructions should be followed by customers in the EU in addition to the safety instructions in the rest of this chapter:

- Do not dispose of this equipment in general household waste or unsorted municipal waste.

  The crossed out wheeled bin indicated on this equipment is an indicator that this unit should not be disposed of in general household waste, but recycled in compliance with local government regulations or environmental requirements.

- Please dispose of this equipment via a recycling service or centre, or by returning the unit to the local Minelab/Halcro distributor.

  This will enable the equipment to be disposed of in an environmentally safe manner.

- Disposal of unwanted waste electronic equipment in landfilled waste may contribute to adverse long term environmental effects due to the leaching of contaminating and/or toxic substances contained within some electronic equipment.

Installation

Ensure you have read the Important Safety Information on page 3, before installing your Halcro amplifier.

If you require assistance in the unpacking and installation of your Halcro amplifier, please contact your dealer.

NOTE: When lifting the unit, always use two people.

The unit must be lifted by placing your hands under the middle of the bottom compartment. Do not lift the unit under the top compartment.

Unpacking

- Unscrew the four knurled knobs at the base of the container, and then remove the upper part of the container by lifting directly upwards until it clears the top of the amplifier.
- With an assistant, remove the plastic wrapping and foam pieces, then lift the amplifier from the base of the container.
- Remove the plastic covering from the unit.
- Wearing the white cotton gloves provided (to prevent marking the amplifier while moving it into place) move the unit to its final location (see Positioning).

Do not connect to mains power until all the connections are made and checked.

Storing packaging

The packaging is custom designed to prevent damage from occurring during transport. Store the packaging in a dry location.

Positioning

We suggest that the Halcro amplifiers be positioned as near to your loudspeakers as practical. This will reduce the length of the loudspeaker cable required. The sides of the unit house the heat sinks that are used to dissipate heat. The airflow to these should not be interrupted. Ensure there is at least 12 inches (300 mm) clearance around the unit.

Controls and Connections

Connecting the loudspeakers

The dm78 and dm88 have four loudspeaker terminals each:

- 2 x positive + (red bezel)
- 2 x negative - (black bezel)

There may be high voltages present at the loudspeaker terminals, which may present an electric shock hazard if touched. Always ensure the unit is switched to OFF or Standby mode when connecting or disconnecting loudspeakers.

All of the pure copper connections are finished with the highest-grade gold plating.

- Ensure the positive terminal of the amplifier connects to the positive terminal of the loudspeaker to ensure correct phasing of the audio signal.

  The loudspeaker terminals will accept spade or hook terminals. Only fully insulated terminals should be used.

- Ensure the loudspeaker terminals are securely tightened, but do not over tighten or you may damage the terminals.

- When connecting loudspeaker cables always ensure the conductive surfaces are not touching each other.

  DO NOT SHORT-CIRCUIT THE TERMINALS.

Connecting the external ground

The dm78 and dm88 are equipped with a separate ground terminal, which may be used to reduce hum and ripple in some circumstances.

The ground terminal has a green bezel, and is located either under the power supply (dm88) or on the connector panel on the rear of the unit (dm78).

Connecting the mains supply cable

Connect the mains plug into the socket at the rear, on the base of the bottom compartment, which houses the power supply. Ensure the cable exits to the rear of the unit.

Continue to read the following pages before connecting to the mains outlet.

Bridging

You may bridge the Halcro dm78 and dm88 amplifiers, for details please E-mail us at:

service@halcro.com

Break-in period

The dm78 and dm88 electronic break-in period is completed at the factory. A further break-in period is not required.

dm78 Inputs

The dm78 has three switch selectable inputs, each having an associated input socket. Both the input sockets and switch are mounted on the top rear panel, and the switch must be operator set to indicate which input is required. The table below lists the properties of these three inputs.

The balanced voltage input or current-mode input are most desirable for minimizing earth loop generated mains hum and ripple, or high frequency interference. Earth loop generated mains hum and ripple, or high frequency interference should not be a problem unless the source equipment is poorly designed.

Sources with current-mode outputs are rare and are most likely to have an RCA output socket. The advantages of this source are that:

Earth loop generated mains hum and ripple are minimized, and cable, plug and socket generated interference is minimized (from poor connections which may be affected by sound vibration for example).

The unbalanced input is quite satisfactory so long as earth loop generated mains hum and ripple are not a problem.

The input sockets may have active sources simultaneously connected to them. The selector switch selects the input to be amplified.

Input styles	Required output source impedance	Input socket	Input impedance
Balanced voltage input	Low impedance. Standard preamplifier or CD player for example.	XLR	100 kohms + 100 kohms
Unbalanced voltage input	Low impedance. Standard preamplifier or CD player for example.	RCA	100 kohms
Current-mode input	Very high impedance; “infinite.”	RCA	60 ohms

dm88 Inputs

The dm88 has four switch selectable inputs, each having an associated input socket. The input sockets and switch are mounted on the top rear panel, and the switch must be operator set to indicate which input is required. The table below lists the properties of these four inputs.

The balanced voltage input or current-mode input are most desirable for minimizing earth loop generated mains hum and ripple, or high frequency interference. Earth loop generated mains hum and ripple, or high frequency interference should not be a problem unless the source equipment is poorly designed.

Sources with current-mode outputs are rare and are most likely to have an RCA output socket. The advantages of this source are that:

Earth loop generated mains hum and ripple are minimized, and cable, plug and socket generated interference is minimized (from poor connections which may be affected by sound vibration for example).

The unbalanced input is quite satisfactory so long as earth loop generated mains hum and ripple are not a problem.

The minimal path input will result in the most pure sound; unless as above, earth loop generated mains hum and ripple is a problem.

The input sockets may have active sources simultaneously connected to them. The selector switch selects the input to be amplified.

Input styles	Required output source impedance	Input socket	Input impedance
Balanced voltage input	Low impedance. Standard preamplifier or CD player for example.	XLR	100 kohms + 100 kohms
Unbalanced voltage input	Low impedance. Standard preamplifier or CD player for example.	RCA	100 kohms
Minimal path voltage input	Low impedance. Standard preamplifier or CD player for example.	RCA	660 ohms
Current-mode input	Very high impedance; “infinite.”	RCA	60 ohms

Operation

All or some of the input sockets may have active sources simultaneously connected to them. The selector switch selects the input to be amplified.

- Once the external cables are connected to the unit, ensure the master ON/OFF switch is in the OFF position.

  The master ON/OFF switch is on the base of the lower compartment, near the mains socket on the unit. You will have to kneel on the floor at the back of the unit to access the switch.

- Plug the mains plug into a mains outlet.
- Switch the master ON/OFF switch to ON.

  The LEDs on the front and rear of the amplifier will glow red. This indicates the unit is in Standby mode. In this mode a small current is drawn from the mains supply, but the unit will not drive the loudspeakers.

- Press the mode switch once to switch between Standby and ON modes.

  The mode switch is a small pressure switch accessed when standing at the front of the unit. It is located under the bottom lip of the top compartment.

When the amplifier has been switched to ON, the LEDs on the front and rear will glow green.

The amplifier is now ready to drive your loudspeakers.

It is recommended that the unit be switched to Standby when not in use.

It is safer to turn the mains power off when not using the dm78 or dm88 monoblock amplifiers for extended periods. However the amplifier may be left on in the Standby mode for periods between active use. If you wish to turn the mains power off, the amplifier has a minimal warm up period.

Electronic Protection and Reliability

Electronic protection circuitry and amplifier reliability, alas, is an area sadly neglected by many high-end audio amplifier designers. Halcro has paid a great deal of attention to this area.

Components

Our components are selected not only for performance but reliability as well, for example:

- all Halcro electrolytic capacitors are rated at a minimum of 105°C instead of the usual 85°C rating

  The operational life of electrolytic capacitors is severely shortened at temperatures near the maximum temperature rating. This is shown in the table below.

- all Halcro integrated circuits are at least "industrial grade" rather than the usual "commercial grade"

  Industrial grade components are rated at least from –40°C to +85°C whereas commercial grade components are only rated from 0 to 70°C. In addition, the electronic specifications of industrial grade components are superior to commercial grade.

Considering that most amplifiers run at significantly elevated temperatures, it can be seen from the table below that the Halcro high temperature rated capacitors are highly advantageous compared to the standard 85°C rated devices.

Electrolytic capacitor temperature rating	Mean lifetime at 40°C	Mean lifetime at 85°C	Mean lifetime at 105°C
85°C (most commonly used)	50,000 hours	2,000 hours	0 hours
105°C (used in Halcro amplifiers)	180,000 hours	8,000 hours	2,000 hours

Typical data from a highly respected manufacturer

Output Current Limiting

In terms of maximum available output current, there are basically three amplifier type options:

- an amplifier with a reasonable limit placed on the maximum available output current
- an amplifier with no limit placed on the maximum available output current, which will either blow a fuse or self destruct if excessive current is drawn, for example through a dead short
- an amplifier with a very high limit placed on the maximum available output current, but designed not to blow a fuse if this very high current is drawn

If the maximum current drawn from an amplifier with maximum available current limiting is reached under very loud music conditions (the first and third amplifier types above), highly obvious "cracking" overload sounds may be heard. Note that this overload sound may also occur if a loudspeaker overloads or if any amplifier suffers voltage overload.

There is an expectation in the audiophile electronic industry that a high end amplifier should be capable of delivering exactly double the output current for a halving of the loudspeaker impedance (down to 1 ohm) at the maximum output voltage that the amplifier can produce.

This requires an amplifier of the second and third type above. The table below lists an example of an amplifier rated at 150 watts output into 8 ohms.

Loudspeaker load impedance	Output power	Peak output voltage	r.m.s. output current	Peak output current
8 ohms	150 W	49 V	4.33 A	6.12 A
4 ohms	300 W	49 V	8.66 A	12.25 A
2 ohms	600 W	49 V	17.32 A	24.5 A
1 ohm	1200 W	49 V	34.64 A	49.0 A

If the loudspeaker cable is inadvertently shorted out, these sorts of currents are quite capable of causing some cables to catch fire. We know of one such instance with an amplifier rated according to the table!

As we do not wish to set your house on fire we have limited the peak output current to 15 A.

One also has to question the belief that an amplifier should be capable of such unreasonably high output currents. Consider the following facts:

- most loudspeakers have impedances of 4 ohms (not 1 or 2 ohms)
- all valve amplifiers are output current limited, and yet the industry does not consider this a problem, which is inconsistent with the belief that maximum available current limiting is a problem
- all well designed loudspeakers have impedances that do not deviate excessively from their nominal impedances and hence no excessively high currents are required anyway
- if indeed a 4 or 8 ohm loudspeaker does have an impedance of 1 ohm at a particular frequency, one must wonder where the heat generated is dissipated if this load is predominantly resistive or why the coupling is so poor if this load is predominantly reactive

Hence we believe that these excessively high output currents are:

- not required for well designed loudspeakers
- highly dangerous

Many people have listened to maximum available current limited amplifiers played through different loudspeakers without encountering any current limiting problems that is, obvious “cracking” sounds at very loud listening levels, except for loudspeaker or voltage overloads which are independent of current limiting.

Output transistor protection

Halcro uniquely incorporates circuitry that accurately calculates the mean power dissipated in the power output transistors (power FETs). Another calculating circuit then may reduce the maximum available output current according to the heat-sink temperature and calculated average dissipated power in the transistors. The higher the heat-sink temperature, and the higher the mean power dissipated in the output transistors, the greater this reduction. This will only occur at very high heat sink temperatures and very high mean output powers.

Unusual output conditions

The vast majority of amplifier faults show up as high positive or negative DC output voltages. An independent circuit in the Halcro amplifiers senses any unreasonable DC. output voltage and switches the amplifier off if this occurs.

Likewise, if any excessive output current flows for an extended length of time, this also implies a fault and an independent circuit measures this and will shut down the amplifier.

Power supply output current limiting

To further reduce the possibility of fault conditions causing substantial damage, the power supply is limited in its maximum available average output current. Note that this level is higher than the amplifier's normal current limiting conditions. The power supply limit will only cut in under fault conditions.

Internal power supply protection

There are numerous power supply protection circuits, for example:

- two independent over temperature cut outs
- two independent master clock fault sensing circuits
- all power supplies, including those for "housekeeping" Standby, active power factor correction and switch mode power etc check for under/over voltage and over current conditions
- the small signal power supplies have transient diode over-voltage protection.

Mains transient overload protection

The mains input is protected against all but the most severe mains input transients. Three independent circuits achieve this: two surge absorbers and high energy inductive filtering.

Input overload protection

The inputs have over-voltage protection circuits, which will handle most typical input overloads.

Amplifier inter-stage protection

In addition within the amplifier stages, there are more than a dozen protection circuits.

dm78 Specifications

Power

Power output into 4 ohms resistive > 400 W.

Power output into 8 ohms resistive > 225 W.

Distortion (Footnote 1)

At full power output, all harmonic distortion orders

THD <-120 dB (<1000 parts per billion) up to 20 kHz (100 kHz B.W.) at 400 W into 4 ohms.

THD @ 1 kHz <-134 dB (<200 parts per billion).

For sum of 19 and 20 kHz tones, each delivering 100 W into 4 ohms = peak power 400 W, intermodulation products each <-120 dB relative to output.

SMPTE-IM intermodulation products each <-120 dB relative to output.

Inputs

There are three input modes:

- an unbalanced voltage mode input with an impedance of 100 kohms
- a balanced voltage mode input with an impedance of 100 kohms + 100 kohms
- a current-mode input with a 60 ohm input impedance to minimize cable reflections (to be fed from an infinite impedance current source)

The voltage gain of the balanced and unbalanced inputs is 60 V/V. The gain of the current mode is 9 V/mA.

Noise

The equivalent input noise at the input is 5 nV/sqrt(Hz) for the voltage modes and 6 pA/sqrt(Hz) for the current mode.

Slew rate limit

Maximum slew rate for both small signal and maximum output voltage is 100V/μs, (which is equivalent to a maximum output voltage at approximately 250 kHz.)

Power supply (Footnote 2)

Active power factor correction minimizes mains current harmonic distortion

- operates at all voltages from 85 to 270 V r.m.s., 45-65 Hz, without any internal or external switches
- less than 100 parts per million mains hum and ripple on the amplifier power rails
- conforms with PFC and EU emission standards set for 2002

Overload (Footnote 3)

Recovery from hard overload at 20 kHz into 4 ohms is 1 μs.

Protection

The amplifier protection:

- 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 output
- will cut out if output current exceeds 12 A average continuously over a period of a few minutes
- is protected against most input overloads

The power supply protection:

- will cut out if most common faults are detected in the power supply (such as over-voltage, master clock at incorrect frequency, excessive temperatures)
- is protected against most mains transients

Components (Footnote 4)

For reliability, all semiconductors are at least industrial grade. All electrolytics are rated to 105°C.

- only highly linear resistors and MKP10/FKP1 capacitors are employed in the critical audio path
- six-layer PCBs are used in the power amplifier to minimize stray magnetic fields and to accurately define voltages
- four-layer PCBs are used in the power supply to minimize E.M.I. and voltage transients, which improves reliability and power efficiency

Compartments

There are four heavily shielded compartments:

- a power supply unit
- an input amplifier section
- a power amplifier compartment
- an output filter compartment

Filtering

Series and common mode EMI filtering is present:

- on the mains input
- between the amplifier and power supply

High frequency filtering is present at the inputs and output.

Dimensions (per monoblock)

Weight, 120 lb or 55 kg
Height, 31 in or 79 cm
Width, 16 in or 40 cm
Depth, 16 in or 40 cm
Shipping weight, (one pair including pallet)
385 lb or 175 kg

Footnotes

1. THD specifications of our typical best competitors are 200,000 parts per billion.
2. Unique to the best of our knowledge.
3. Indicates no excessive negative feedback.
4. "Industrial" grade is a higher grade than the "commercial" grade used by most manufacturers.

dm88 Specifications

Power

Power output into 4 ohms resistive > 500 W.
Power output into 8 ohms resistive > 270 W.

Distortion (Footnote 1)

At full power output, all harmonic distortion orders:

THD <-126 dB (<500 parts per billion) up to 20 kHz (100 kHz B.W.) at 500 W into 4 ohms.

THD @ 1 kHz <-140 dB (<100 parts per billion).

For sum of 19 and 20 kHz tones, each delivering 100 W into 4 ohms = peak power 500W, intermodulation products each <-126 dB relative to output.

SMPTE-IM intermodulation products each <-126 dB relative to output.

Inputs

There are four input modes:

- an unbalanced voltage mode input with an impedance of 100 kohms
- a balanced voltage mode input with an impedance of 100 kohms + 100 kohms
- a current-mode input with a 60 ohm input impedance to minimize cable reflections (to be fed from an infinite impedance current source)
- a minimal path voltage mode with an input impedance of 660 ohms

The voltage gain of the balanced and unbalanced inputs is 60 V/V and 30 V/V for the minimal path mode. The gain of the current mode is 9 V/mA.

Noise

The equivalent input noise at the input is 5 nV/sqrt(Hz) for the voltage modes and 6 pA/sqrt(Hz) for the current mode.

Slew rate limit

Maximum slew rate for both small signal and maximum output voltage is 100V/µs (which is equivalent to a maximum output voltage at approximately 250 kHz).

Power supply (Footnote 2)

- active power factor correction minimizes mains current harmonic distortion
- operates at all voltages from 85 to 270 V r.m.s. 45-65 Hz, without any internal or external switches
- less than 100 parts per million mains hum and ripple on the amplifier power rails
- conforms with PFC and EU emission standards set for 2002

Overload (Footnote 3)

Recovery from hard overload at 20 kHz into 4 ohms is 1 μs.

Protection

The amplifier protection:

- is short-circuit proof
- has over current limiting
- will cut out if a continuous D.C. offset appears on output
- will cut out if output current exceeds 12A average continuously over a period of a few minutes
- will cut out if temperature is excessive
- is protected against most input overloads

The power supply protection:

- will cut out if most common faults are detected in the power supply (such as over-voltage, master clock at incorrect frequency, excessive temperatures)
- is protected against most mains transients

Components (Footnote 4)

For reliability, all semiconductors are at least industrial grade in both the power supply and amplifier. All electrolytics are rated to 105°C in both the amplifier and power supply.

- only highly linear resistors and MKP10/ FKP1 capacitors are employed in the critical audio path
- six-layer PCBs are used in the power amplifier to minimize stray magnetic fields and to accurately define voltages
- four-layer PCBs are used in the power supply to minimize E.M.I. and voltage transients, which improves reliability and power efficiency

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2. Unique to the best of our knowledge.
3. Indicates no excessive negative feedback.
4. "Industrial" grade is a higher grade than the "commercial" grade used by most manufacturers.

Care and Maintenance

The dm78 and dm88 monoblock amplifiers have been designed for indoor use only. Under no circumstances should the amplifier be allowed to get wet. The only maintenance required is to ensure the unit is kept clean.

Cleaning

Halcro takes no responsibility for any damage caused through careless or improper cleaning techniques.

WARNING: Never use flammable products when cleaning the dm78 or dm88.

The outer surface of the unit is anodized aluminum, which while being very durable, will be marked if rubbed with an abrasive cloth.

Please read the following procedures very carefully:

- Before cleaning, turn the power to the unit off at the mains.

  Use only extremely soft cloths.

- Use a soft dry cloth to remove any dust, particularly from the heat-sink area.
- Add 15 ml (0.5 oz) of very mild household dishwashing detergent to a four-liter (one-gallon) bucket of tepid water.
- Immerse the soft cloth in the bucket of water and then wring the cloth out thoroughly until the cloth is nearly dry.
- Use the slightly damp cloth *only* to clean the anodized aluminum surfaces and timber feet.

  Never clean any electrical fittings, terminals or the front and rear Labels with the damp cloth.

  No moisture should ever be allowed to enter the amplifier's compartments through the joins in the panels.

- After using the slightly damp cloth, wipe over the surfaces with a soft dry cloth.
- Clean the labels using an extremely soft polishing cloth, which must be dry.
- Allow the amplifier to air for at least one hour before turning the power back on.

If you are unsure about the cleaning of the amplifier and require more information, please ask your dealer or contact Halcro at:

service@halcro.com

Troubleshooting

The Halcro dm78 and dm88 contain no user serviceable parts. Please do not attempt to open the unit as this will void the warranty and will expose you to dangerous voltages.

For all service requirements please contact your dealer, or Halcro at service@halcro.com

Symptom	Remedy
No sound or light	Ensure mains cable is plugged in to the amplifier. Ensure the mains cable is plugged into a working wall socket. Ensure the Master Switch is ON. Check fuse.
Red light is on / no sound	Press the Standby / ON switch to ON.
Green light is on, No sound	Ensure Input Selector switch is set to the correct input. Ensure loudspeaker cables are correctly connected (both ends). Ensure the Input cables are correctly connected (both ends). Check preamplifier is on and correctly connected. Check for a signal from the preamplifier (with headphones if available). Check audio source is on and correctly connected. Check for a signal from the audio source (with headphones if available). Try a different audio source.

If none of the above rectifies the problem please contact your dealer.

Service and Warranty Information

Overview

All Halcro products are designed and built to world-class standards of quality, reliability, and performance. Since so much care has gone into our products, we are able to offer a strong warranty that protects your investment in Halcro products for years to come. It is our expressed desire that your Halcro products work flawlessly and that you enjoy music, movies, and audio/video entertainment without interruption or compromise to performance.

It is the goal of Halcro Customer Service to provide efficient and timely service to Halcro owners and to our dealers. In the event of a technical problem or failure, we will work with you and your authorized Halcro dealer to minimize down time and provide expedient service to remedy the situation. We suggest that your Halcro dealer be the first point of contact should you experience any problems. Solutions are often simple and can be handled in the field. Please do not attempt to open up sealed compartments on any Halcro products.

Product warranty

Halcro warrants the dm78 monoblock amplifier to be free from defects in materials and workmanship for a period of five years from the original date of purchase.

Halcro warrants the dm88 monoblock amplifier to be free from defects in materials and workmanship for a period of seven years from the original date of purchase.

During the warranty period, Halcro will remedy all such defects without charge for parts or labor.

Exclusions to the warranty

This warranty does not extend to damage resulting from improper installation or setup, misuse, neglect, or abuse. Changes in the appearance of the product resulting from normal wear and tear, moisture, or atmospheric conditions are not warranted.

The warranty shall be void and of no effect if any of the following occur:

- the defect has resulted from improper, unreasonable, or negligent use
- the defect is a result of accident, tampering, alteration, or modification
- the defect is a result of improper installation or setup by a third party
- the unit's serial number has been removed, altered, or made illegible
- Halcro is not liable for incidental or consequential damage of any kind
- Halcro does not warrant system design or installation

Transferability

Transferability means that the warranty stays with the product from the date of original purchase through the full warranty period, regardless of who owns the product.

The Halcro warranty is transferable, providing that the original sales receipt or proof of purchase is supplied to both subsequent owners and to Halcro when ownership changes.

Warranty verification

It is the owner's responsibility to show proof or purchase verifying that the unit to be serviced is within the warranty period. Proof of purchase options include:

- copy of sales receipt showing name of original owner, dealer, and purchase date
- copy of credit card voucher or cancelled check accompanied by owner's record of purchase date and serial number

Warranty registration

While not required for service, we request that you register your Halcro product as soon as you purchase it. Please use the Halcro Product Warranty Registration form provided, or request a copy from your Halcro dealer.

If service is required

We suggest that you work with your authorized Halcro dealer when the need for technical service, training, or applications advice arises.

To qualify for free warranty service, the following conditions must be met:

- the unit must be returned to Halcro or its authorized repair center in the original packing materials

  This will ensure the safety of the equipment. If you have misplaced or damaged the original packaging, you can purchase new packaging through your dealer or directly from Halcro.

- the unit must be accompanied by a copy of the Halcro Product Warranty Registration card and the original sales receipt
- shipments to Halcro must include a Return Authorization number

  To obtain this authorization, please ask your dealer or E-mail Halcro directly

- Halcro cannot be responsible for any damage caused to your equipment during shipping due to improper packaging
- if the packaging material needs to be replaced on its arrival at the factory, the owner will be informed of the replacement cost

Transportation of products

Halcro pays freight one-way to return product once warranty repair is completed. Halcro requests prepaid shipment to the factory or to a designated repair center or service agency. We are not equipped to accept freight collect shipments.

Halcro is not liable for freight, courier, or other charges incurred in transporting a unit to and from a dealership, service center, or the factory unless written approval and instructions are issued in advance. Such documents must include the Halcro Return Authorization number, a detailed description of the situation, and signature of authorized Halcro representative.

Freight damage claims

If a unit being returned to Halcro is damaged in shipment, Halcro will contact the carrier for inspection. The carrier will contact the shipper regarding the claim. Halcro is not liable for damage or delays caused in shipment to or from Halcro facilities.

If you have moved

In the event that you have changed locations since your original Halcro purchase, we will happily direct you to your nearest authorized Halcro dealer upon request.

Thank you for choosing Halcro!

We trust that you will enjoy the performance of your Halcro equipment long past the warranty period. Thank you for choosing Halcro!

Copyright and acknowledgements