



Chameleon
power amplifier

The Inside
Story

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READ THIS FIRST

19 Technical Specifications

Located In Pocket Inside Rear Cover:

Service Sheet and Schematic Diagrams
Test Program Sheet
Test Performance Plots
Warranty
Service Centers

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Chameleon's creators have a policy of continual development and reserve the right to alter any details or specifications without notice.

Although every attempt has been made to make this manual as concise as possible, no responsibility is taken for errors or omissions.

No liability is assumed for consequences arising from the operation of the equipment based on the information contained herein.

WARNINGS & CAUTIONS

1. Please read and act upon all of these instructions before proceeding further.
2. Always disconnect the amplifier from the AC supply and wait 10 minutes before attempting to remove the top panel.
3. Do not expose Chameleon to rain or moisture.
4. Chameleon should be operated from the AC power source voltage indicated on the rear panel.
5. Chameleon is equipped with a three wire AC power cable. Please read the installation instructions for correct AC power wiring and grounding (earthing) procedures.
6. **This equipment must be grounded (earthed).**
7. Chameleon should be supported by the back, as well as the front, mounting holes when it is mounted in a rack unit. (See "Installing Chameleon" for details). No responsibility will be accepted for any damage (structural or electronic) caused by inadequate support.
8. With the exception of the inner fan filter, there are no user serviceable parts inside the amplifier. All servicing and repairs should be carried out by authorised service personnel only.
9. **The audio levels generated by Chameleon can cause serious hearing damage. Suitable ear protectors should be used in any high audio level environment.**

M E E T C H A M E L E O N

Congratulations...
...on exercising good judgement in selecting a superior product.

Many years of experience in designing and developing high quality audio power amplifiers, combined with great technical skill and innovation, have produced an amplifier which breaks technological boundaries to create a sophisticated, yet hard working, piece of audio hardware.

Features

Audio Integrity

Ultra-linear, non-switching electronic architecture guarantees true audio transparency. Careful selection of high quality precision components, and a narrow operational temperature band, ensure that each Chameleon sounds the same, and continues to do so throughout its life.

Reliability

The features which guarantee *Audio Integrity* also ensure solid reliability. In addition a carefully devised, totally isolated, 5 mode protection system safeguards the amplifier and loudspeakers from operator misuse and internal failure.

The Chameleon Principle

Under extreme conditions, where conventional amplifiers may shut down completely, Chameleon will automatically shift to "Head Lok" mode. This reduces dynamic headroom, allowing Chameleon to maintain uninterrupted output, but with less dynamic range.

"Soft Start"

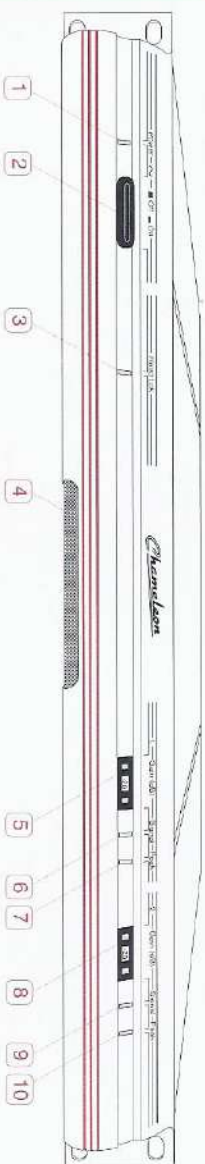
A Soft Start circuit allows Chameleon to be powered from standard or domestic AC outlets.

Cooling

Revolutionary exponential heat sinks and a high efficiency variable speed fan keep components cool. Intrusive noise is kept to a minimum.

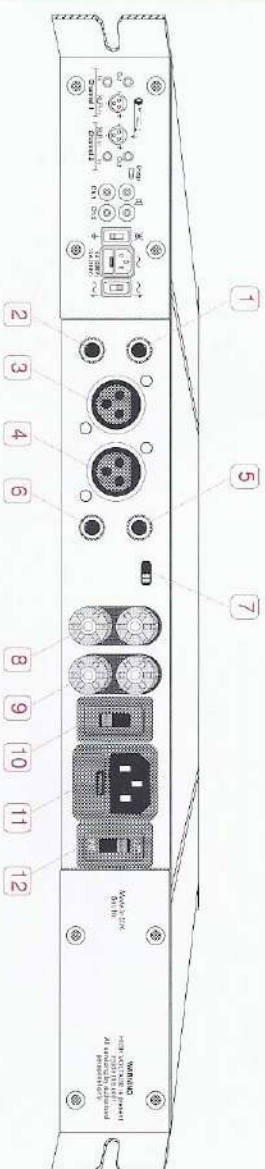
10. Chameleon has been designed for audio applications. Continuous high power sine wave testing may activate temporary thermal protection.
11. Chameleon may also be used for industrial applications subject to a maximum continuous output of 325VA.

Control Panel



- 1: AC Power "On" LED indicator.
- 2: On/Off AC Power Switch.
- 3: Head-Lok LED - active when Chameleon has changed from "Headroom" to "Head-Lok" mode.
- 4: Hand Hold - for extracting Chameleon from the 19" rack unit, (also intake for cool air).
- 5: Digital Illuminated Gain Control - (Channel 1) - push-button, punch-in attenuator settings.
- 6: "Signal" LED - (Channel 1) - activated whenever signal is present at the Output terminals.
- 7: "Peak" LED - (Channel 1) - indicates when the channel output level approaches clipping.
- 8: Digital Illuminated Gain Control - (Channel 2)
- 9: "Signal" LED - (Channel 2)
- 10: "Peak" LED - (Channel 2)

Rear Panel



- 1: 1/4" Line Input Jack (Channel 1) electronically balanced or unbalanced.
- 2: 1/4" Line Output Jack (Channel 1) parallel to Input, allowing amplifiers to be easily cascaded
- 3: XLR Line Input Socket (Channel 1) parallel to Jacks. Electronically balanced to reduce the risk of ground loop hum.
- 4: XLR Line Input Socket (Channel 2)
- 5: 1/4" Line Input Jack (Channel 2)
- 6: 1/4" Line Output Jack (Channel 2)
- 7: Bridged Mono Switch
- 8&9: Heavy Duty 4 Way Binding Posts - allow a variety of loudspeaker terminations to be made.
- 10: Ground (Earth) Lift Switch
- 11: AC Power Module - containing fuse holder and IEC AC inlet.
- 12: Voltage Selector Switch (if fitted)

CHAMELEON LIFE SUPPORT

AC Power Requirements:

Professional power amplifiers which develop large amounts of audio power create a significant current surge at turn-on.

A "Soft Start" circuit avoids this problem, allowing Chameleon to be powered from a domestic AC outlet, or "powered up" from a remote supply.

When using a multi-amplifier system each amplifier requires a supply of at least 10A at 110V-120V (or 5A at 220V - 240V).

Note: The AC power source must have an adequate ground (earth) connection to ensure personal safety and correct amplifier operation. See the chapter titled "Installing Chameleon" for correct AC power connections.

Environment:

Even though Chameleon's mechanical and electronic design ensure very effective cooling, it is still necessary to provide an environment where a through-flow of cool air is available.

Note: Chameleon draws its cool air supply in through the "hand hold" in its front profile. Care should be taken to ensure that this opening is not blocked or restricted in any way during operation.

Chameleon's air intake filters should be cleaned periodically, especially in dusty environments. See the chapter titled "Caring For Chameleon" for details.

When Chameleon is enclosed in a rack unit, there should be adequate ventilation, allowing the heated air to escape from the amplifier's side venturi.

If a quantity of amplifiers are rack mounted together, force ventilating the rack, using suitable blowers, will ensure the heated air is evacuated quickly.

Voltage Setup

Before inserting the IEC plug, make sure that the voltage indicated (or Voltage Selector Switch setting, if fitted) on Chameleon's rear panel, is the same voltage as the local AC power source.

Note:

It is very common for an area's actual supply voltage to be significantly different from the area's nominal voltage (eg 240V in a country with a nominal 220V supply).

It is for this reason that Chameleon is shipped with the voltage selector switch (if fitted) set in the higher voltage position.

The actual supply voltage should be verified at the place where Chameleon is installed.

This should be within 5% of that indicated on the amplifier.



Bridged Mono Operation

Chameleon can be used in bridged mono mode, providing a single 2000 Watt/8 ohm output.

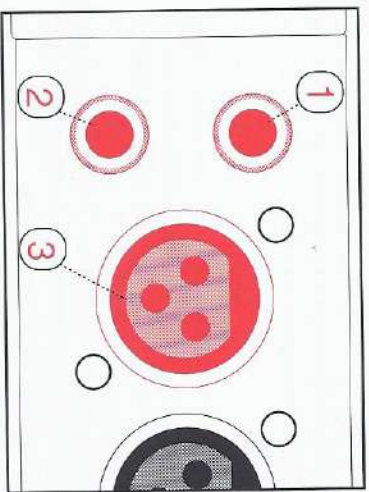
Inputs and outputs are connected as described under "Bridged Mono Terminations" later in this chapter.

Care should be taken to ensure that the load impedance is not less than 8 ohms.

Rear Rack Mounting

Chameleon should be supported by the back, as well as the front, mounting holes when it is mounted in a rack unit.

Two adaptors are available, allowing Chameleon to be mounted in standard enclosures with rack strip spacing between 490 to 530mm front to rear. Bolt the adaptors to the enclosure's rear mounting strips, so that when Chameleon is slid into the enclosure its rear support slots locate onto the adaptor's protruding bolts.



Terminations:

Line Level Inputs/Outputs:

- 1: 1/4" Line Input Jacks** - electronically balanced
 balanced = tip +, ring -, sleeve ground
 unbalanced = tip +, ring and sleeve ground
- 2: 1/4" Line Output Jacks** - parallel to Input,
 balanced = tip +, ring -, sleeve ground
 unbalanced = tip +, ring and sleeve ground
- 3: XLR Line Input Sockets** - parallel to 1/4" jacks.
 Electronically balanced
 pin 2 +, 3 -, 1 ground

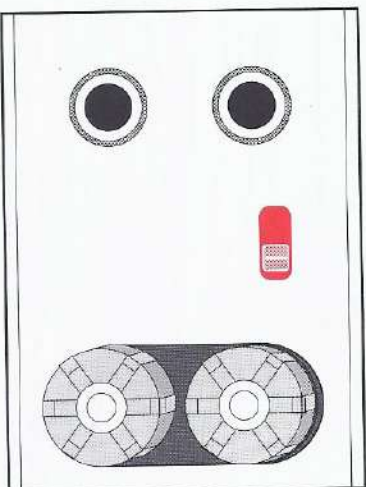
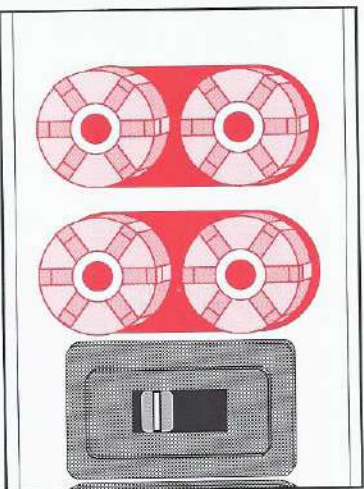
Heavy Duty 4 Way Binding Post Outputs:

Chameleon is capable of powering loads down to 4 ohms per channel.

For normal 2 channel operation: use either spade connectors, clamped beneath the binding post nut or heavy duty 4mm plugs, inserted in the binding post center hole.

If using "bare ends", unscrew the binding post nut to its fullest extent and insert the loud-speaker wire into the hole exposed beneath the nut. Tighten the nut again to firmly clamp the wire.

If this method is used, be careful that loose strands of wire do not touch the other binding posts or speaker wires.



Bridged Mono Terminations

For bridged mono operation:

The signal is applied to Channel 1 'In'.

The recessed "Bridge" slide switch is moved fully to the right.

The output signal is taken from both RED binding post terminals. ('Ch.1' +, 'Ch.2' -).

Both input gain controls are used and must be at the same setting.

Note: Nothing should be inserted into the channel 2 input sockets.

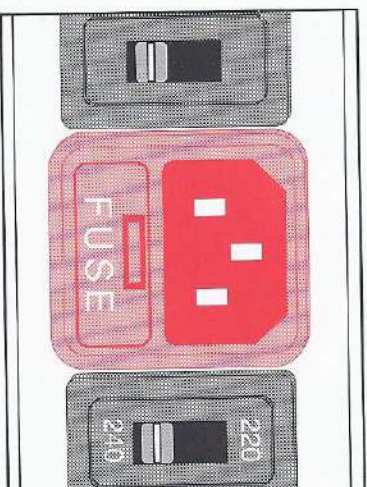
Warning:

In Bridged Mono mode Chameleon can develop a potential of 150V AC across the red binding posts.

AC Power Module

Before inserting the IEC plug provided, make certain that:

- The amplifier Voltage Selector Switch (if fitted) is in the correct position for your actual supply voltage (see note re. voltage on page 7).
- The AC supply provides a clean and substantial path to ground (earth).
- The AC power plug is wired correctly - The power cable supplied with Chameleon consists of three wires -
 - In North America:
 - BLACK wire (live +),
 - WHITE wire (neutral -),
 - GREEN wire (ground \oplus).
 - In Europe:
 - BROWN wire (live +),
 - BLUE wire (neutral -),
 - GREEN and YELLOW wire (earth (ground) \oplus).



Please ensure that the ground wire is connected in all circumstances.

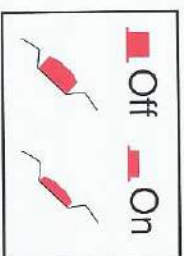
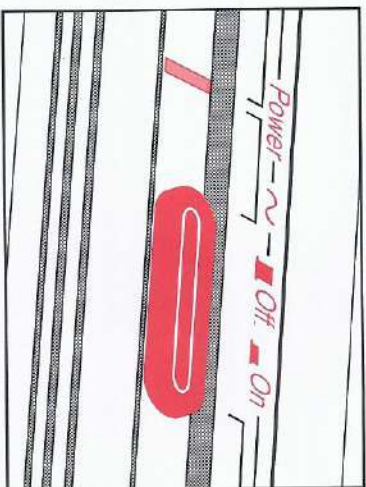
AC Power "On" LED

When AC power is connected to Chameleon, and the Power switch is pushed, this LED is illuminated.

In certain protection modes, the AC Power "On" LED remains on, while all other panel illuminators are off, warning that AC power is present, even though the amplifier has shut down. (see the chapter titled "Chameleon Protection" for details)

AC Power Switch

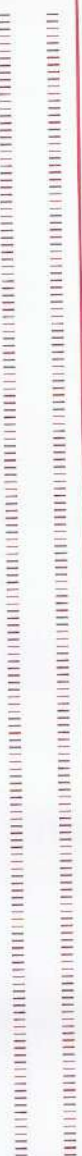
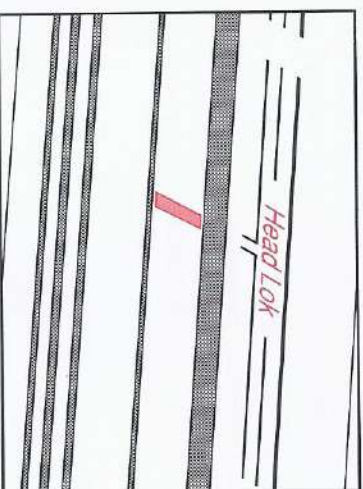
Push in the large, positive click action AC Power Switch to switch Chameleon "On", and push it again to switch it "Off". The switch remains in its "pushed in" position while the amplifier is On, and returns to its original position when switched Off.



Head Lok LED

When conventional amplifiers are driven to a point where they exceed their power delivery limitations, they will normally shut down. In such extreme circumstances Chameleon, however, will automatically enter "Head Lok" mode. This reduces the dynamic headroom, and allows Chameleon to maintain uninterrupted output, but with less dynamic range. "Head Lok" has no audible effect other than the reduction in headroom.

When Chameleon changes to "Head Lok" mode, the Head Lok LED illuminates. When this happens you can either continue in "Head Lok" mode, or you can reduce the signal level slightly and allow Chameleon to return to "Headroom" mode. When Chameleon returns to "Headroom" mode, the LED will stop shining.




The AC Module also contains the AC protection line fuse holder:

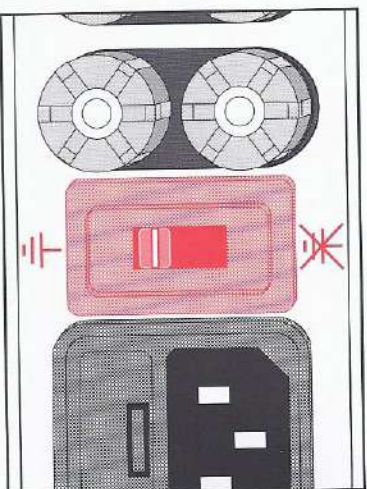
- T10A 20mm (110-120V)
- T5A 20mm (220-240V)

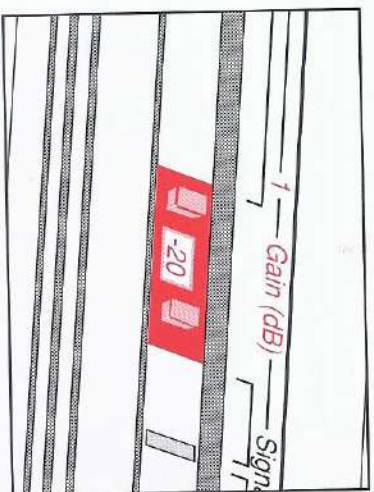
Please ensure that the correct type is fitted.

Ground (Earth) Lift Switch

If a ground loop occurs (normally identifiable by a low frequency hum) switching the Ground Lift switch to the  position isolates the audio (technical) ground from the AC ground (earth).

For safety reasons the AC ground remains connected to the chassis.





Gain Controls
Chameleon's digital, illuminated push-button Gain Controls allow setting up of amplifier levels to be quickly and accurately made, even in dimly lit backstage areas. Pushing the green button decreases the attenuation (increasing the channel's volume level), while pushing the red button increases the attenuation (reducing the level).

The selected gain is indicated in the gain control window (-55 dB is the minimum, and 0dB the maximum).

There is a "stop" position between -55 and 0dB, ensuring that the channel is not accidentally switched to full volume from its "off" (silence) position.

Signal/Peak LEDs

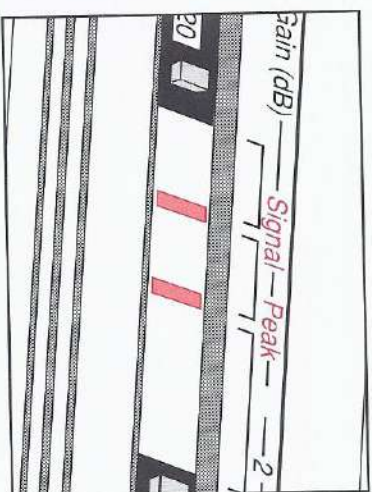
The green "Signal" LED, located nearest to the Gain Control, is activated whenever an adequate signal is present at the output terminals.

The red "Peak" LED is activated when the channel approaches clipping.

If the channel is being overdriven, the "Peak" LED illuminates almost constantly. To ensure distortion free performance it is advisable to reduce either the amplifier gain, or the signal level at the mixing console or other signal source.

The "Peak" LED has a second function:

If individual channel protection is triggered, causing the channel's input to be muted, its "Peak" LED will illuminate continuously. (see chapter 6 for explanation)



Setting Levels

To get the optimum performance from any audio system it is necessary to set up the levels so that each link in the chain is operating without either great restrictions, or excessive amounts of signal which could cause overload.

To ensure that Chameleon is being fed with the optimum signal level:

Amplify a constant level signal (signal generator or pre-recorded tape) through the mixing console or other signal source feeding Chameleon, so that the output level meter on the source reads 0dB. By pushing the green buttons on the gain controls, gradually increase the channel volumes to the desired level.
(N.B. Chameleon's red "Peak" LEDs begin to illuminate at the onset of clipping)

The engineer is then assured that the amplifier is following the output level of the mixing console or output device.

Any adjustments in volume level can then be made on the console.

Chameleon will develop rated output power if fed with an input signal of at least 1.0 volt RMS.

Caution:

Please ensure that the loudspeaker system used is capable of accepting the signal level produced by Chameleon.

If in doubt, run the system well within the capabilities of the loudspeakers, as sudden transients can cause permanent damage.

WARNING:

It should be noted that the audio levels generated by Chameleon running at full power, with a constant signal, could seriously damage hearing. Suitable ear protectors should be worn when setting the signal levels.

CHAMELEON PROTECTION

Cooling Fan

Chameleon is fitted with a high efficiency vari-speed radial blower unit.

The sensing circuit is set so that the fan remains off while the amplifier is "idling" or driven intermittently. This is particularly useful in audiophile/studio applications avoiding obtrusive noise.

In installations where Chameleon is on "standby" (called on occasionally to amplify messages, etc.), this also avoids unnecessary clogging of the air filter.

Above 45° the fan runs at low speed, until the heatsink temperature reaches 60°, at which point it will progress gradually to its higher speed.

Protection

Chameleon's 5 mode protection system ensures that both the amplifier and loudspeaker system are safeguarded against operational misuse and internal failure. The system is totally isolated from the audio path, allowing complete audio integrity to be maintained.

1. Abuse Protection

Chameleon is very tolerant of difficult loads.

However, if the protection system senses,

for example, an actual load error in one of the channels

... caused perhaps by a short-circuit in a loudspeaker

line...the channel input will be muted and the channel "Peak" LED will illuminate constantly.

The input remains muted until the amplifier is turned off, then on again.

The other channel will operate normally.

If the system senses a high heat-sink temperature

...caused perhaps by the cooling fan intake being

obstructed ...the relevant red "Peak" LED will begin to

glow to indicate that the channel is approaching thermal

shutdown. If the temperature continues to rise, the chan-

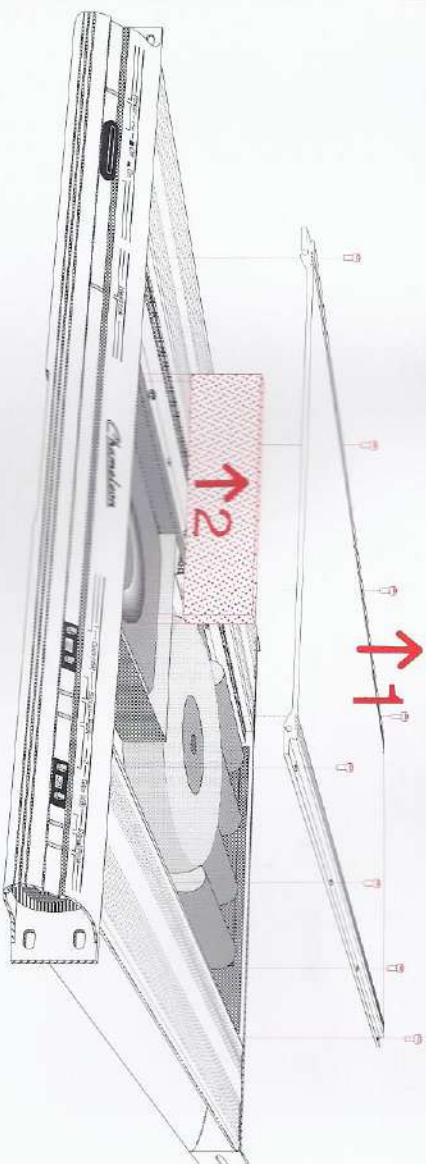
nel input will be muted, allowing the temperature to fall;

having fallen sufficiently, the input will be restored.

The "Peak" LED continues to glow after the channel has

recovered, until it has returned to its normal operating temperature.

Maintenance and Cleaning



In order for Chameleon to perform at its best, it is necessary to keep the air intake free from any form of obstruction.

2 soft foam filters are fitted in front of the air circulation fan, behind the front profile.

The outer filter should be removed via the handhold and cleaned at least every three months in normal working conditions - more often in dusty environments.

Should it become necessary to remove the inner filter, disconnect the AC mains supply (wait 10 minutes to ensure the power supply has discharged), unscrew the 8 hex-socket-head screws and lift off Chameleon's top panel (see illustration).

Having removed the filter from the amplifier, carefully wash it in warm, slightly soapy water and dry it thoroughly.

Be sure to protect the amplifier by replacing the filters in their correct positions. It is much easier to clean the filter than Chameleon's internal components!

2. Loudspeaker Protection

Chameleon's internal voltages are monitored by the protection circuit. If an incorrect voltage is sensed, the loudspeakers will not be connected to the amplifier. This also protects the loudspeakers from "thumps" during On and Off switching.

3. Fault Protection - Thermal

If the ambient temperature inside Chameleon continues to rise, not responding to the protection given by the individual mute system, Chameleon will shut down completely, causing the internal, thermal, AC fuse to destruct.

4. Fault Protection - Circuitry

If a failure occurs in the power section of Chameleon (an unlikely event!), either the AC fuse or an internal circuit board mounted fuse will destruct, and both the loudspeaker outputs will be disconnected.

If an internal fuse destructs, the "Power On" LED will remain illuminated, while all other panel indicators may be extinguished.

AC power voltage is still present inside the amplifier, and no attempt should be made to remove the lid until AC power is disconnected.

These are extreme protection measures, indicating internal component failure. No attempt should be made to replace the fuses until the cause of the problem is found and rectified. Chameleon should be taken to an authorised service agent for repair.

5. AC Power Protection

A rear panel mounted fuse protects the AC power source from overload.

TECHNICAL SPECIFICATIONS

OUTPUT POWER

(both channels driven)
8Ω 4Ω

Transient Power
(RMS 20ms/80ms) 1350W 2200W

Dynamic Power*
(RMS 200ms/800ms) 1000W 1500W

Sinewave Power
(RMS 2M/8M) 800W 1200W

(single channel driven)
8Ω 4Ω

Transient Power
(RMS 20ms/80ms) 700W 1350W

Dynamic Power*
(RMS 200ms/800ms) 625W 1000W

Sinewave Power
(RMS 2M/8M) 500W 800W

* **Dynamic Power** is an indication of Chameleon's continuous power capability when amplifying a music or speech source.

Total Harmonic Distortion (DIN)

typical 1KHz : <0.003%
0.1W - clipping 20Hz-20KHz : <0.025%

Intermodulation Distortion (SMPTE)
0.1W - clipping : <0.01%

Crosstalk
referred to 500W/8Ω : <-80dB
1KHz : <-70dB
20Hz - 20KHz : <-70dB

Noise
referred to 500W/8Ω : <-105dBA

Slew Rate : >100V/ μ s

Rise Time : 2 μ s

Damping Factor
50Hz/8 Ω : >500

Frequency Response
20Hz - 20KHz : +0.1/-0.25dB

Input Sensitivity
referred to 600W/4 Ω : 1.0V

Input Impedance : 20k Ω

Input Gain : 34dB

DIMENSIONS

Height (1U) : 44.25mm (1.74")

Depth
Chassis : 502mm (19.76")
Front to Rear Mountings : 520mm (20.47")
Overall : 569mm (22.4")

Width
Chassis : 438mm (17.25")
Overall : 483mm (19.0")

Weight
Shipping Weight : 13kg(29lbs)
: 15kg(33lbs)

AC Fuse
20mm : TT10A/125V
110/120V : T5A/250V
220/240V



Service Sheet
Component List
Test Sheet
Warranty
Service Centers