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TWO CHANNEL HIGH PERFORMANCE POWER AMPLIFIER

OPERATING INSTRUCTIONS

Quested Monitoring Systems

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Product compliance to EC Directives

This product conforms to the relevant Directives, Regulations and Standards for electronic and associated apparatus. The equipment is CE marked both on the apparatus and the packaging. A product "Declaration of Conformity" statement and information regarding auxiliary apparatus and specifications required to meet conformity is available on request from our Customer Service Department on:

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This amplifier will only operate to its very high specification if it is installed and operated as described in this manual.

1. Introduction

Your AP800 two channel digitally controlled power amplifier represents the latest technology in control circuitry coupled to a no compromise high quality class AB power amplifier. There is no dynamic switching of the audio or power rails (a very common method of achieving extra power at the expense of audio quality) thus ensuring optimum sonic performance.

The digital control monitors the operating parameters and adjusts the amplifier to suit the conditions. Fan speed and supply rails are varied as required to keep the amplifier within its temperature limits. Signal limiters are included, the attack and release times of which can be adjusted internally by the bit switches on the control PCB (printed circuit board).

The amplifiers include full DC and short circuit protection, which automatically re-connects when the fault is cleared. Remote control is easily achieved by installing the appropriate interface/drive board, without any change to the amplifiers performance.

2. Installation

2.1 Electrical

The amplifier has been manufactured to comply with your local power supply requirements, but before connecting the unit to the supply, ensure that the voltage (printed on the rear panel) is correct and that a mains fuse of the correct type and rating has been fitted.

SAFETY WARNING

This unit is fitted with a 3 wire power cord. For safety reasons, THE EARTH LEAD SHOULD NOT BE DISCONNECTED IN ANY CIRCUMSTANCE. If ground loops are encountered consult the section on input connections later in this manual. For those units not supplied with an integral moulded plug the wiring colour code is:

| | |
|-------------------|------------------------------------|
| Brown wire | Live connection |
| Blue wire | Neutral connection |
| Green/Yellow wire | Ground and Safety Earth connection |

TO PREVENT THE LIKELIHOOD OF SHOCK OR FIRE HAZARD, DO NOT EXPOSE THE UNIT TO RAIN OR MOISTURE.

TO AVOID ELECTRICAL SHOCK DO NOT REMOVE COVERS. REFER ALL SERVICING TO QUALIFIED PERSONNEL.

2.1.1 AC Power Voltage

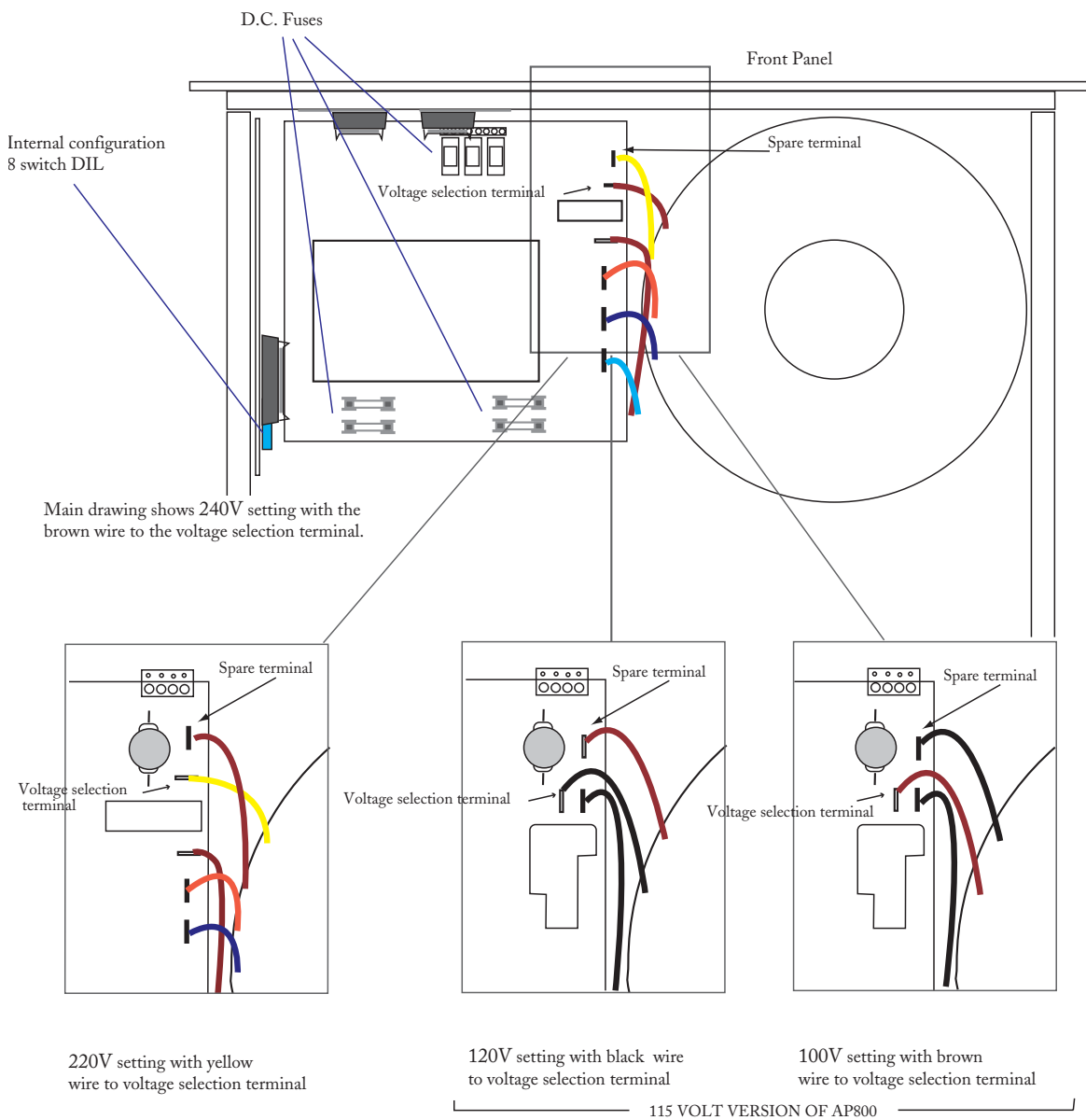
The 220/240v 50/60Hz version has internal wire jumpers to enable full power performance to be obtained on a 220v mains supply.

The 100/120v 50/60Hz version has internal wire jumpers to enable full power performance to be obtained on a 100v mains supply.

To alter the mains voltage setting, disconnect the power cord and remove the top cover. Locate the power supply board and reconnect the wires as indicated below:

2.1.2 AC Power Fusing

The incoming line power passes through either a fuse or circuit breaker dependent on the model. All 100/120v versions use a resettable circuit breaker located on the rear panel. All 220/240v versions use a fuse located on the rear panel. The fuse rating is T10amp (antisurge). Always replace with an identical 20mm x 5mm T rated fuse for continued protection from equipment damage and fire.



2.2 Mechanical

To ensure that this equipment performs to specification, it should be mounted in a suitable rack or enclosure as described below. Like all high power amplifiers, it should be kept away from other equipment, which is sensitive to magnetic fields. Also, this amplifier may suffer a substantial reduction in performance if it is subjected to, or mounted close to equipment, which radiates high R.F. fields.

When mounting the amplifier in a rack or enclosure, ensure that :-

1. The rear of the unit is adequately supported. The brackets, which are supplied, fit standard 19 inch (483mm) rack mounting systems. **THE FRONT PANEL IS NOT CAPABLE OF SUPPORTING THE UNIT ON ITS OWN.**

2. **THERE IS ADEQUATE VENTILATION.** The cooling fans suck cool air in through the front air filter and blow hot air out at the sides of the unit through the ventilating grills. **IF THIS AIR IS NOT ALLOWED TO ESCAPE, OVERHEATING WILL OCCUR.** Take care when mounting other equipment in the same rack. The air filter must be kept clean and free from dust. It is easily removed by pulling it through the front. Dust can usually be shaken out, or if necessary the filter can be washed.

3. Connections

3.1 Inputs

The inputs are made via 2 separate 3 pin XLR connectors wired in parallel, one marked input the other link. Either socket can be used as the input, the other one can be used to link to other amplifiers ('daisy chain') or connected to the other channel input for mono signals.

They are electronically balanced and should be connected via a high grade twin core screened cable, as follows :-

PIN1 - Screen (see note)
PIN2 - Hot (signal +)
PIN3 - Cold (signal -)

The amplifier is designed to operate with fully balanced equipment and ground loops or loss of performance may be experienced if connected to unbalanced sources. If it is unavoidable however, the following wiring should be used. The cable should still be twin core plus screen.

PIN1 - Screen - connected to the chassis of the unbalanced equipment - or left disconnected at the unbalanced end.
PIN2 - Signal Hot
PIN3 - Signal Cold

With the input level control fully clockwise the amplifier gain is 31dB requiring +6dBv input level for maximum output.

NOTE: This amplifier is wired to the latest industry recommendations. PIN1 is connected directly to the chassis/mains earth. If ground loops (mains hum) are encountered, remove the screen connection from the other end of the cable and leave it open circuit. If problems persist, consult your dealer/supplier, **DO NOT TAMPER WITH OR ALTER ANY GROUND (EARTH) CONNECTIONS INSIDE THE AMPLIFIER.**

BRIDGED OPERATION

In Bridged mode input A is fed to both channels. Channel B will be out of phase with channel A.

3.2 Outputs

The speaker outputs are via 4 mm shrouded binding posts. They can be used with 4 mm plugs or plain wires, which can be inserted in the sides of the terminals.

Terminations are as follows :- Hot Red
 Cold Black

NOTE 1. Although the "cold" output terminals are nominally at 0V., they should not be joined together, otherwise cross-talk may be introduced.

NOTE 2. The currents involved are very high, especially when using 2 ohm. loads. The speaker cables should be capable of carrying the currents, otherwise the losses will cause the cables to get hot and audio power will be reduced. The minimum rating should be 15 amps for 4 ohm and 20 amps for 2 ohm loads.

3.3 Rear Panel Switches

BRIDGED (MONO) OPERATION

Connect as follows : HOT Channel A Hot
 COLD Channel B Hot

Leave both COLD connections open circuit, they are internally joined.

NOTE: The load impedance changes when operating in the bridged mode. (See Load/Power section below.)

LOAD/POWER SWITCH 2/4 ohm and 4/8ohm

In the 4/8 ohm position, the amplifier supply voltages are set up for loads of 4 ohms and above. Lower impedance loads can be connected but the internal current limit circuit could cause clipping, and unless the signal is very dynamic, the internal temperature rise will automatically reduce the supply voltages and set the amplifier to the 2 ohm position. In the 2/4 ohm position, the supply voltages are reduced and the level (overload) indicators and limiters are re-referenced accordingly.

When operating in bridged mode, the minimum impedances are doubled, i.e. for 4 ohm loads use the 2 ohm position and for 8 ohm loads use the 4 ohm position. The minimum load in bridged mode is 4 ohms.

4. Operation

4.1 Switching On

When the amplifier is switched on, the outputs will be muted and the controller will check for any faults. It then goes through a power up routine and finally connects the speakers to the output stages and fades up the signal to the level at which the amplifier was previously set.

PANEL CONTROLS AND INDICATORS

4.2 Level controls

A continuous rotary level control is provided for each channel. When fully clockwise the amplifier gain is set to 31dB. Fully anticlockwise the output signal will be reduced to zero.

4.3 Mute Switches

These are self explanatory, and require one push to mute the signal and one to un-mute - toggle action. The LEDs indicate their status and when "un-muting" the signal is ramped (faded) up.

4.4 Level Indicators

These are peak reading signal level meters, which show the headroom before clipping. The 0dB led is set at approximately 0.5dB below clip. The first led is set to -25dB below the 0dB point.

4.5 Limiters

The AP800 incorporates digitally controlled signal limiters and introduce virtually no distortion. The attack time, release time, threshold level and stereo linked operating mode can be set internally via the programming switches on the control PCB. (See the Internal Configuration section.). All amplifiers are dispatched with limiters not linked.

The amplifiers leave the factory with the limiters set up in the OVER CLIP PROTECTION mode. The threshold is set just below the clipping point, with fast attack and release times. This is the most sonically transparent configuration, transients are allowed to go into clipping for a few milliseconds, but if large amounts of overdrive are applied, the limiter will attenuate the signal back to the clipping point. Low frequency signals will be clipped as normal because of the fast release time, changing the release time to slow will prevent low frequencies from being clipped but will change the mid and high frequency dynamics.

The threshold can be adjusted in 1dB steps up to 3dBs below the clipping point. The limiter then behaves like a conventional limiter, transients will be allowed to go above the threshold level but the average peak level will be kept to the threshold point.

The release time can be set to infinity, which changes the limiter to function as an AUTOMATIC GAIN CONTROL. In this mode, if the signal goes above the threshold level, the gain of the amplifier will be reduced. This reduction will remain until amplifier is switched off.

NOTE: All levels are referenced to the clipping point of the amplifier and not an actual output voltage or power level. If the mains power drops or increases then the limit threshold will also change, thus maintaining maximum output level.

4.6 Temperature Control

Each power module has two fans to assist in temperature control. These are set to run at their slowest speed at switch on, and will remain in the slow idle speed even when the amplifier is cold. As the amplifier warms up the speed will increase, being controlled by the temperature of the power module heat sinks. If the heat sinks get excessively hot, the controller will automatically reduce the supply voltages to the power devices. This is totally inaudible, it does not effect the levels, but merely reduces the amplifier headroom by about 1.5dBs. The heat generated by the heat sinks is reduced by 30%. If the amplifier is still getting too hot there will be a further reduction. If the temperature still continues to rise the controller will disconnect the outputs. Just before this “shutdown” point, the temperature LED will start flashing, and it will stay on permanently whilst the amplifier is “shutdown”.

The operation of the temperature LED can be changed (see Sw1, internal configuration switches below). In the alternative position, the LED will come on as soon as the first headroom reduction point is reached. In certain applications it is important for the user to know this. All other functions remain the same.

Normal dynamic signals will not cause the amplifier to overheat unless the air filter is clogged or the ventilation is inadequate. (See installation section.)

4.7 Fault Indicators

If the outputs are shorted or if DC is present, the control circuit will disengage the outputs and the fault LED will illuminate. The controller will keep monitoring the amplifier and will reconnect the outputs and fade up the signal when the fault is cleared.

The controller also monitors all supply voltages and the mains transformer temperature, any fault with these will cause the amplifier to shut down and both fault LEDs will show.

4.8 2 ohm & Bridged LEDs

These indicate the position of the switches on the rear panel. The 2-ohm LED will also illuminate if the controller senses a low impedance load (excessive temperature rise).

5. Internal configuration switches

The control PCB is located on the side of the unit behind the front panel. The switches are an 8-switch DIL package at the rear of the PCB (see drawing on page 4). For full description of the switches consult the Service manual.

The standard configuration is for all switches to be ON except 6, which is normally OFF.

Sw 1 Temp LED operation. ON = Standard position, OFF = alternative position. (See Temperature control section above.)

Sw 2 (Normally ON) This selects the auto reconnect mode. If switched OFF when a fault has been detected, the amplifier will not reconnect the outputs even when the fault is cleared. This is a safety requirement in certain applications.

Sw 3 (Normally ON) Signal limiters separate. When OFF both channels limiters will be linked for stereo operation.

Sw 4 & 5 These select the threshold level as follows:-

| Sw4 | Sw5 | |
|-----|-----|----------------------------|
| ON | ON | Just below clipping point. |
| ON | OFF | 1dB below clipping point. |
| OFF | ON | 2dB below clipping point. |
| OFF | OFF | 3dB below clipping point. |

Sw 6 & Sw 7 operate together, they determine the operating mode and release time of the limiter as follows:-

| Sw6 | Sw7 | |
|-----|-----|---|
| OFF | OFF | Release time = slow |
| OFF | ON | Release time = fast |
| ON | OFF | Automatic Gain Control mode. (Once the level has been reduced it will remain at that level until changed manually). |
| ON | ON | Limiter disabled. |

Sw 8 (Normally ON) This sets the attack time of the limiter. ON = Fast OFF = Slow

6. Faults & Fuses

There are internal secondary (low voltage) fuses on all the internal supply rails. If one of them blows the amplifier will indicate a fault on both channels and the unit will power down. If the controller (5 volt) supply fails all LEDs will go out and the unit will shut down.

The unit must be disconnected from the mains supply, and the fuses replaced before switching the unit back on. They should be replaced with the same type fuses only.

THIS SHOULD BE CARRIED OUT BY QUALIFIED PERSONS ONLY.

WARNING

When replacing the high current power output fuses, ensure that the supply capacitors are FULLY DISCHARGED before inserting the new ones.

If the replaced fuse blows again then there is a serious fault within the unit. Refer to a service engineer or contact your dealer. NEVER INCREASE THE RATING OF THE FUSE.

7. Remote Control

The AP800 amplifiers are internally wired for remote control. All the front panel functions can be remote controlled. An interface card is necessary to communicate with the external controller. This plugs into the control PCB. Consult your dealer for the available interfaces.

8. Technical Specification

Front Panel Controls

Power: On/Off rocker
Level: 2 rotary potentiometers
Mute: 2 mute buttons (fade on release)

Front Panel Indicators

Peak Meters: 2 x 8 Led peak meters
2 x LED's (each channel) indicates Mute, Fault/DC & Limit Single LED's Indicates 2 ohm, Bridged, Power, & Temp Warning

Rear Panel Settings

Impedance 2/4 or 4/8 switch
Mono Stereo or Bridged mono switch

Output RMS (per channel)

450W into 8Ω
770W into 4Ω

Frequency Response

20Hz-20kHz +0/-0.5dB

Amplifier Gain

31dB

Amplifier Sensitivity

+7dBu input for full power output into 4Ω

Load Impedance

Switchable 2/4Ω & 4/8Ω

Input Impedance

10kohm actively balanced

Input CMRR

>90dB

Slew Rate

50V per micro second

Damping Factor

>400 at 8Ω 1kHz

T.H.D

<0.005% @ 1kHz [20Hz -20kHz < 0.02%

Hum & Noise

- 105dB

Power Requirements

230v AC at 10 amps max
120v AC at 20 amps max

Input Connectors

XLR 3 pin Pin 1 Ground
Pin 2 Hot
Pin 3 Cold

Outputs

Shrouded 4mm binding posts

Dimensions

Width 482mm (19" rack mount)
Height 88mm (1³/₄" 2U)
Depth 381mm (15")

Weight

23kgs (51)lbs

9. Front & rear panel drawing

