

SERVICE INFORMATION

SY800 POWER AMPLIFIER

CONTENTS:

OPERATION MANUAL

SCHEMATIC DIAGRAMS



Professional Audio Amplifier

SY 400

SY 800

SY 1200

SY 1600

SY 400V

SY 800V

SY 6125

SY 4200

Operation Manual

IMPORTANT!

Please read carefully.

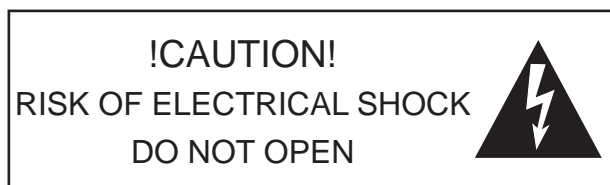
This operation manual contains important information regarding safety precautions, installation, performance, operation and maintenance of your Synergy-Series power amplifier. You should familiarize yourself with the contents of this manual **before** operating your amplifier.

Safety Precautions and Labelling

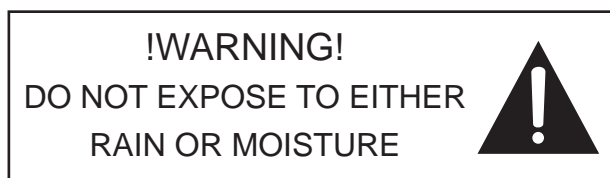
The rear panel of this amplifier has a number of markings and internationally recognized symbols relating to the hazards and precautions that should be taken when operating MAINS connected equipment.

The presence of a LIGHTNING FLASH with an arrowhead contained within the boundaries of an equilateral triangle is intended to alert the user that dangerous uninsulated voltages may exist within the amplifiers enclosure. These voltages may be of a sufficient magnitude as to constitute the risk of an electrical shock.

This symbol is reinforced with the text:



The presence of an EXCLAMATION MARK contained within the boundaries of an equilateral triangle is intended to alert the user that there is important operating and maintenance literature that accompanies the amplifier.



The amplifier should not be operated in a situation where it may encounter the entry of water, rain, or any fluids. To expose the unit to the above conditions may make the operation of the unit hazardous and increase the risk of electrical shock.

REFER SERVICING TO
QUALIFIED PERSONNEL.
NO USER SERVICEABLE
PARTS INSIDE.

The user should not attempt to service the amplifier. Only qualified and knowledgeable personnel familiar with the internal workings of the unit should attempt any repair, servicing or authorized modification to the unit. The unit does not contain any parts which the user can service or re-use in this or any other product.

If you are in need of special assistance and the information you require is outside the scope of this manual, please contact your nearest service agent or Australian Monitor direct:

THE TECHNICAL OFFICER
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Rev 2 16/06/04
Rev 3 26/06/04
Rev 4 28/06/04
Rev B 28/06/04



Features:

- ▶ Custom designed, 2RU heavy duty steel chassis.
- ▶ Open, modular construction for ease of servicing.
- ▶ Symmetrical layout - even weight distribution.
- ▶ High current power supply.
- ▶ High efficiency toroidal mains transformer.
- ▶ Binding post and 4 pole speaker output connection (no 4 pole speaker outputs on SY400V, SY800V, SY4200 & SY6125).
- ▶ Stereo or bridged operation (no bridging available on SY400V & SY800V).
- ▶ Input signal strapping (loop through) connectors (not available on SY6125).
- ▶ Balanced inputs and buffered attenuators.
- ▶ 1 Watt output indication (2.828 volts).
- ▶ 1 dB below output clip indication.
- ▶ Efficient front to back cooling.
- ▶ Dual, twin speed axial fans.
- ▶ Multi-role output fault indication.
- ▶ Front carry handles. Rear rack mount ears.
- ▶ Signal ground lift switch.
- ▶ Built in limiter circuit.
- ▶ High-quality, close-tolerance components throughout.

Protection Features

- ▶ Suppression of inrush current at mains turn-on.
- ▶ Input muting at turn-on.
- ▶ Input overvoltage protection.
- ▶ Radio-frequency interference suppression.
- ▶ Short-circuit protection and indication.
- ▶ High overload mains fuse.
- ▶ Internal, independent DC supply rail fuses.
- ▶ Layout, grounding, decoupling and componentry have been optimized to provide the user with **stability, reliability and longevity.**



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1. Introduction

Congratulations on choosing Australian Monitor for your professional amplification requirements.

The design of our Synergy-Series Audio Power Amplifiers embraces all the aspects of a well designed amplifier. The visual design, mechanical, electrical and sonic parameters, along with our dedicated manufacturing process, have all been optimized to provide a professional tool that exhibits quality, reliability and longevity.

The Synergy-Series amplifiers are 2 unit (3.5") high, 19" wide, rack mountable units.

Each channel of the amplifier comprises a balanced active input with a buffered attenuator driving a differential class A drive stage which in turn drives a fan-cooled, class AB, BJT output stage configured as an emitter follower. The amplifier operates from a high current-capable linear power supply.

These amplifiers have been specifically designed to deliver their high power output with minimal distortion, and provide the critical degree of control required by your speakers, at high duty cycles for extended periods.

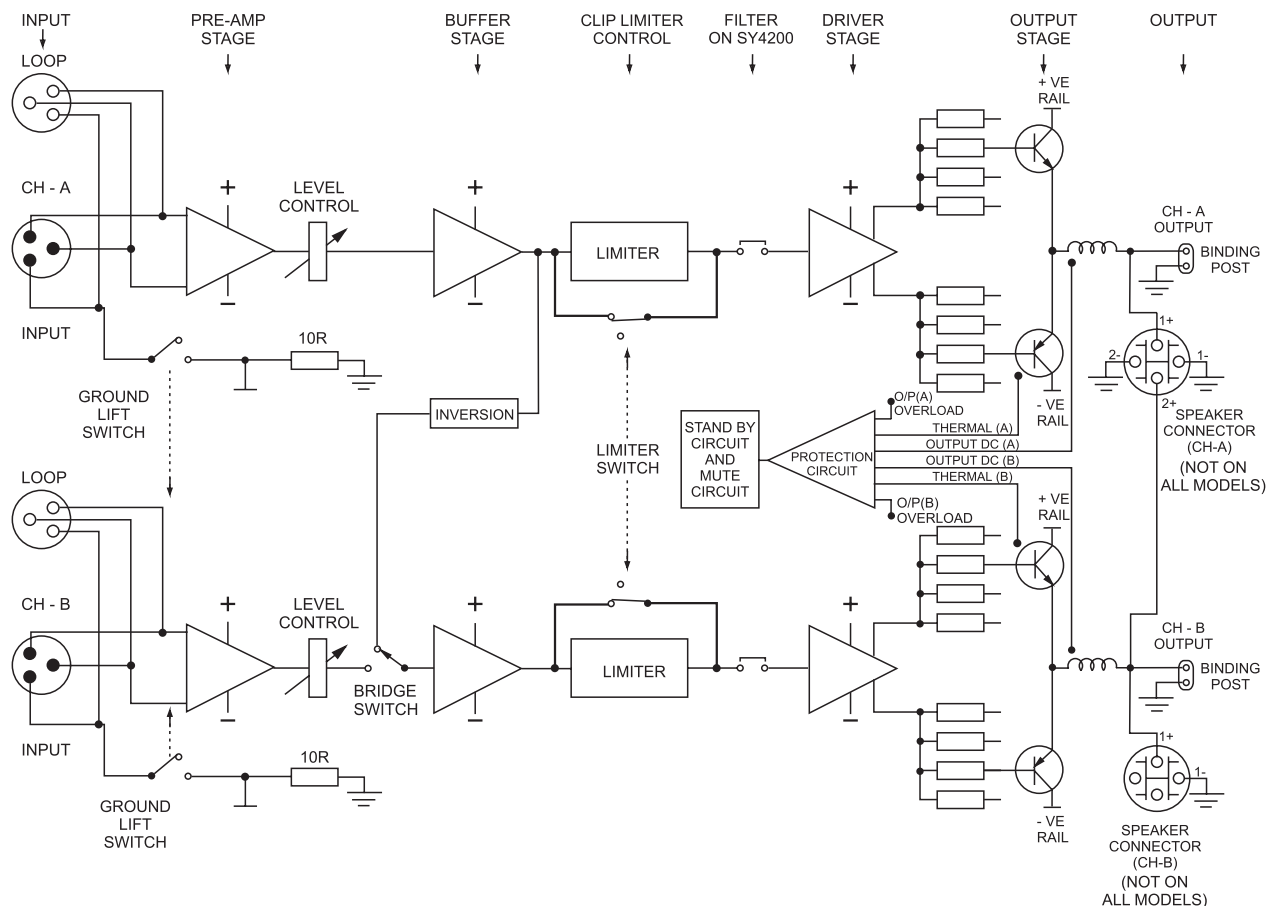


Figure 1 Amplifier Block Diagram

2. Controls, Connectors & Indicators

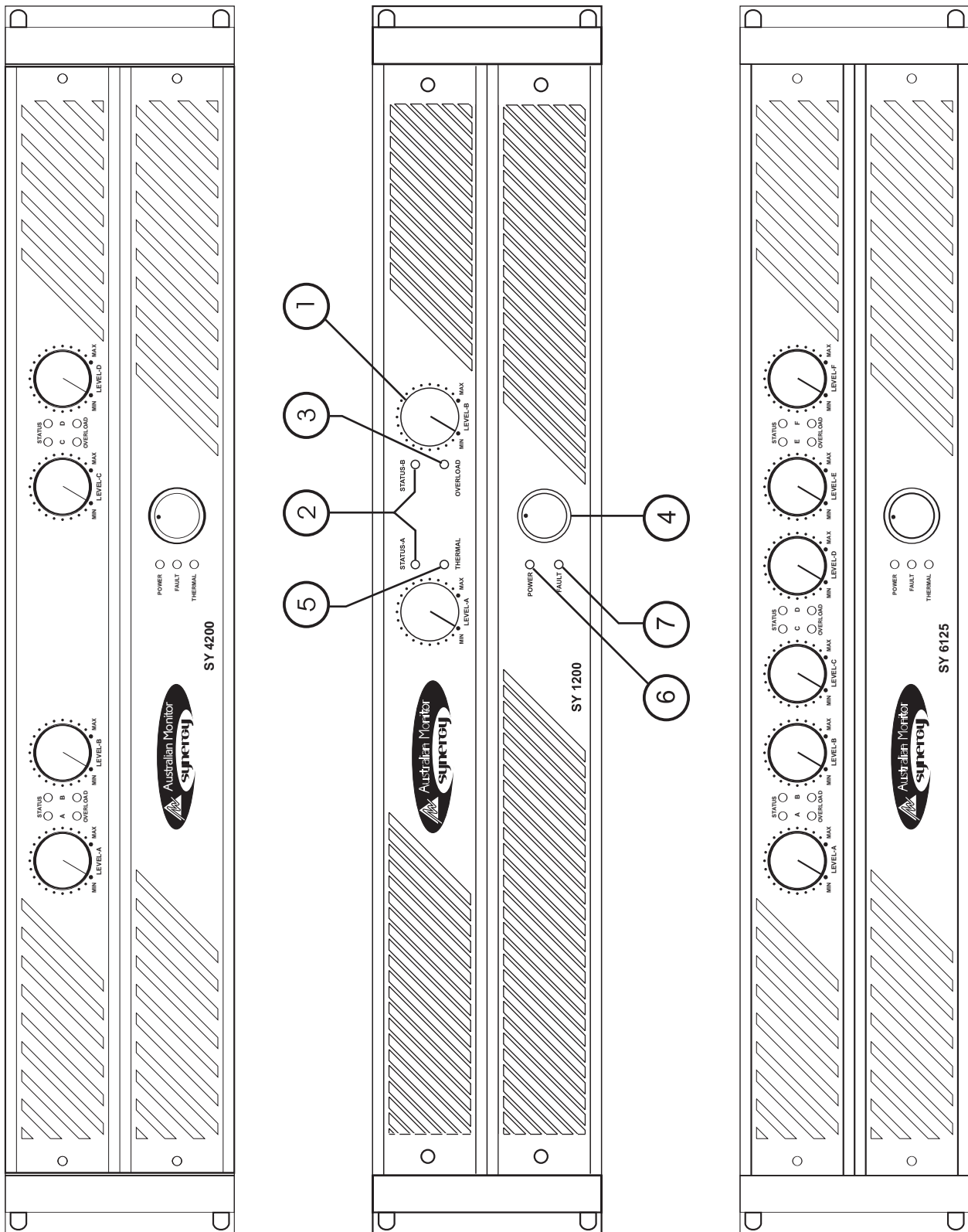


Figure 2 Front Panel Layout (left to right - SY4200, SY1200, SY6125)



Front Panel

The Synergy Series differ only slightly across all models and all share the same features on their front panels.

Figure 1 shows the panel layout of three Synergy amplifiers, SY4200, SY1200 & SY6125. The SY1200 looks the same as the SY400, SY800, SY1600, SY400V & SY800V. The functions of the controls and indicators are as follows:

1 Attenuator

Level control for your amplifier is provided by a potentiometer on the front panel and indicates gain. There are 2 controls on all Synergy models except the SY4200 which has 4 controls and the SY6125 which has 6 controls. Each control is labelled for the channel which it controls.

2 Status Indicator

This is a dual colour LED which displays the status of the output stage and displays three levels of operation.

These levels are:

Below 1 watt	(unlit)
1 watt and above	(green)
1dB below actual clipping	(red)

The LED will turn green once the output voltage exceeds 2.828 volts (1 watt re 8 ohms or 2 watts re 4 ohms). For the SY400V & SY800V the output voltage is 10 volts & 7.070 volts (2 watts re 50ohm & 25ohm) respectively

The LED will change to red once the output exceeds the -1dB point before actual clipping of the amplifier's output stage. The threshold of the -1dB point is referred to the amplifier supply rails and alters with changes in the mains supply, changes in the load and duty cycle fluctuations.

The attack and decay time (ballistics), of the status circuit are those of a Peak Programme Metre (P.P.M.)

If using this indicator to line up sensitivities, apply a steady state tone (e.g. slate on a mixing console). The 1 watt level is the mid-point between the indicator illuminating and extinguishing green.

NOTE: The amplifier is not damaged by running into clipping, **but speakers may be**. To maximise the life of your speakers, try to keep clipping infrequent. Clipping on the SY400V & SY800V may cause speaker transformers to saturate causing the amplifier to shut down. For this reason the voltage limiters should always be engaged on the SY400V & SY800V (see Rear Panel-Limiter Switch on page 11).

3 Overload Indicator

This **amber** LED will illuminate when an overload condition exists.

Overload conditions can occur under extreme operating conditions such as:

- complex or very low loads
- over driving the amplifier
- speaker transformer saturation

It should be noted that the minimum load for the amplifier is 4 ohms per channel (8 ohm bridged) except the SY400V which has a minimum load of 50 ohms per channel and the SY800V which has a minimum load of 25 ohms per channel. (The SY400V & SY800V cannot be bridged).

If an overload occurs, the amplifier will shut down and mute all outputs except the SY6125 & SY4200 which will only mute the channel with the overload. If the overload is only transitory, then the amplifier will resume normal operation after approximately 7 secs. If the fault is continuous, then the amplifier will remain muted.

4 Power Switch

Press the switch to **up** for power **on (I)** and **down** for power **off (O)**. At start-up (turn-on), the input to the amplifier is muted for approximately two seconds.

5 Thermal Indicator

In the advent of a thermal overload, this LED will turn **red**, indicating that the internal operating temperature of one or both amplifier channels has exceeded a safe level of operation and the channels will be automatically muted. The fans will continue to run and once the effected channel/s have had a cool-down period, they will un-mute and return to normal operation.

NOTE: You should always ensure that the fan grille is kept clean and free from the build up of dust and lint. This will ensure longer operation of your amplifier and reduce the possibility of it prematurely going into thermal shutdown mode. See the section "Installation - Cooling " on page 14 for recommended cooling procedures.

6 On Indicator

This LED will illuminate **blue** and indicates that the amplifier is on and receiving mains power.

7 Fault Indicator

This **red** LED indicates a significant problem with the amplifier and the amplifier should be returned to an authorised technician for servicing.



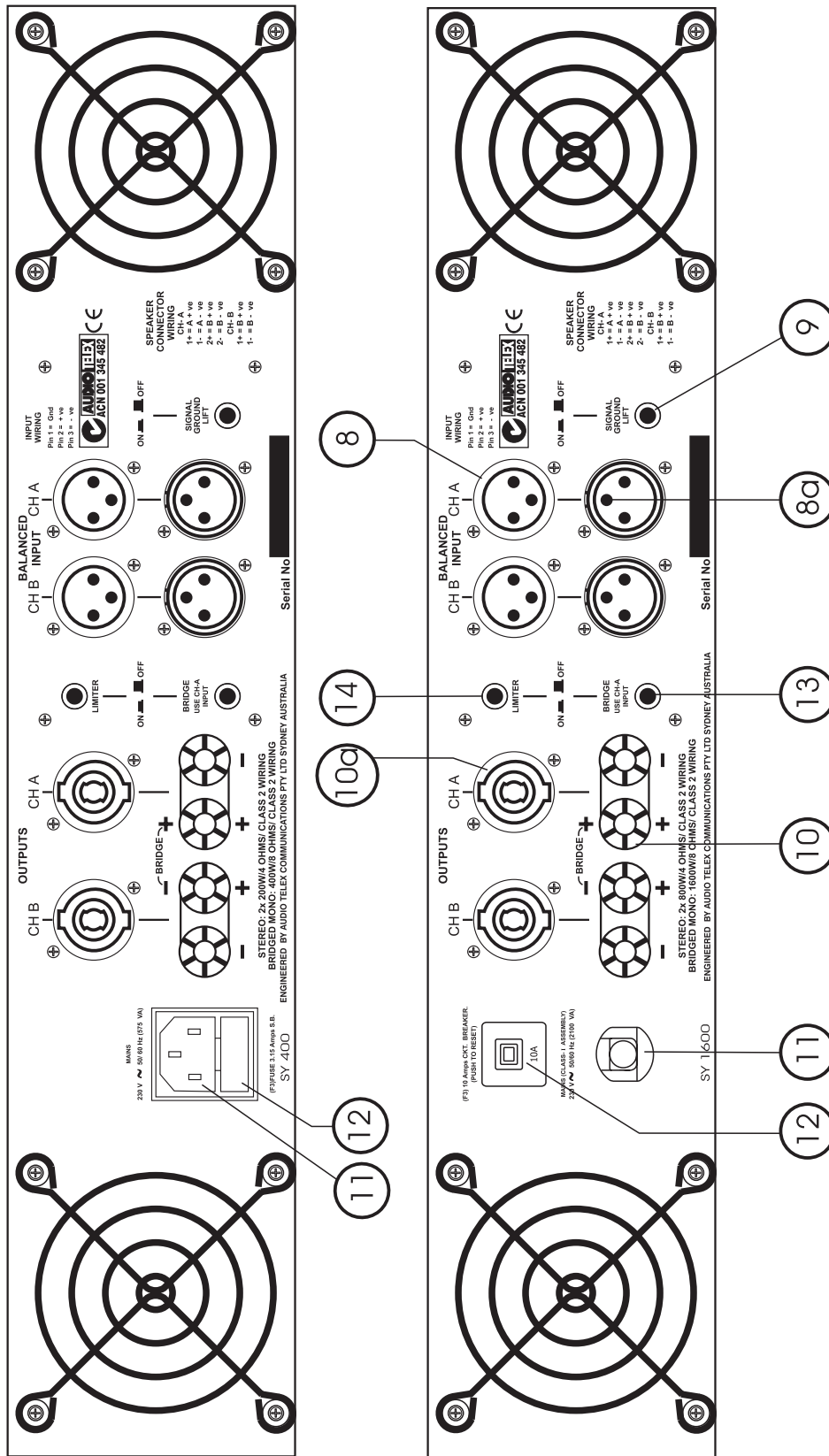


Figure 3 Rear Panel Layout (left to right - SY400, SY1600)



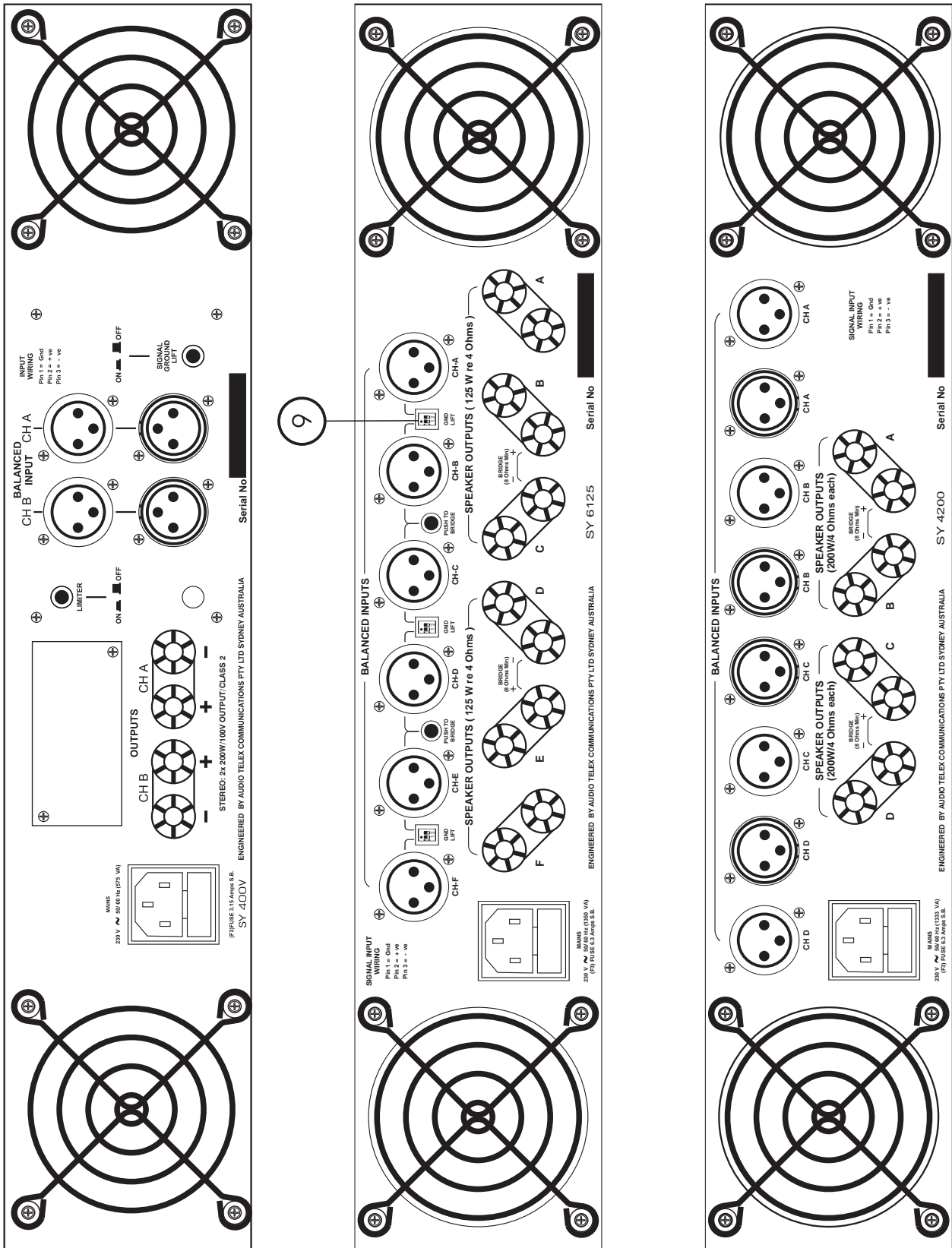


Figure 4 Rear Panel Layout (left to right) - SY400V, SY6125, SY4200



Rear Panel

8 Balanced Input

A female 3-pin XLR type connector is provided on each input:

Pin 1 = Signal Ground;

Pin 2 = Hot (non-inverting or in phase);

Pin 3 = Cold (inverting or reverse phase).

8a Signal Strapping

A male 3-pin XLR type connector is provided (not on SY6125) and wired in parallel with the female input XLR for strapping / looping signal between amplifiers.

9 Signal Ground Lift Switch

When this switch is engaged it disconnects signal ground from the input connectors on both channels. It is intended to be used when "hum" is caused by earth loops (due to different ground potentials between source equipment and the amplifier) or stray magnetic field pick up on the input ground/shield wiring. (It does not interrupt signal ground continuity on the strapping connector). **The amplifier should be turned off before engaging this switch!**

The ground lift for the SY6125 is a DIP switch and is located on the rear panel, one switch per channel. It should be slid up to lift the ground. The ground lift for the SY4200 is a DIP switch and is located inside the amplifier and accessed through the lid, one switch per channel. It should be slid to the rear to lift the ground.

10 Binding Post Outputs

Touch proof binding posts (banana jacks) are provided for speaker output termination with banana plugs or bare wire. The red post is used as **positive** and the black post is used as **negative**. For bridge connection, use only the red posts. (The SY400V & SY800V cannot be bridged).

10a Speaker Output Connector

A 4 pole speaker connector is provided (not on SY400V, SY800V, SY6125, SY4200) as an additional speaker output. This standard of loudspeaker-to-amplifier connection allows access to both channels of the amplifier via the one connector for bi-amp applications. Channel-

A is considered the dominant channel and has both channels wired to the speaker connector. See the installation section of this manual for detailed information on speaker connector wiring.

11 Mains Connection

Your amplifier is fitted with either an internationally recognised IEC mains inlet connector (SY400, SY800, SY1200, SY400V, SY800V, SY6125, SY4200) or has an internally connected mains lead (SY1600).

Please ensure that the connecting mains lead for use with the IEC connector is of an approved type and is of sufficient current carrying ability.

NOTE: Your unit must always be earthed!

12 Mains Fuse or Circuit Breaker

Either a 20mm x 5mm fuse drawer is provided within the housing of the IEC mains connector (SY400, SY800, SY1200, SY400V, SY800V, SY6125, SY4200) or the amplifier is fitted with a resettable circuit breaker (SY1600).

Fuse:

When you receive your amplifier it will have a working fuse and a spare fuse inside the fuse drawer. The drawer can only be opened once the mains lead is removed from the connector. The fuse is provided to protect both the mains and your amplifier as well as reduce the degree of damage if an internal fault exists.

When replacing the fuse, replace with an anti-surge (slow blow) type of the current rating indicated on the back panel above the fuse holder.

Warranty does not cover a blown fuse or any resulting damage due to the use of an incorrect fuse rating or type.

Breaker:

If the circuit breaker trips, allow 3 mins for the contacts to reset thermally before pushing the reset button to reset it mechanically.

13 Bridge Switch

Pushing this switch **in** engages the BRIDGED/MONO mode of operation. In this mode your amplifier will only accept signal applied to channel A's input XLRs and the level of both channels will be controlled by channel A's



attenuator. The output from channel B will automatically be of the opposite polarity (reversed phase) and speaker termination should be sourced from the red binding-post outputs. Alternatively, the speaker could be connected to poles 1+ & 2+ of the 4 pole speaker connector (see Installation - Output Wiring on page 11).

The SY400V & SY800V cannot be bridged.

The SY6125 allows bridging of channels B & C and channels D & E. The bridge switch is located on the rear panel. When channels B & C are bridged, channel B input should be used and the red binding post of channel B is positive while the red binding post of channel C is negative. When channels D & E are bridged, channel E input should be used and the red binding post of channel E is positive while the red binding post of channel D is negative.

The SY4200 allows bridging of channels A & B and channels C & D. This is done through the lid with a switch. Sliding the switch toward the rear enables bridging. When channels A & B are bridged, channel A input should be used and the red binding post of channel A is positive while the red binding post of channel B is negative. When channels C & D are bridged, channel C input should be used and the red binding post of channel C is positive while the red binding post of channel D is negative.

14 Limiter Switch

Pushing this switch in engages the clip limiter circuitry. On the SY6125 & SY4200 the limiter switch is located inside the amplifier and is accessed through the lid. Slide the DIP switch up/towards rear of amplifier to engage the limiter. The threshold level is referenced to the supply rail and the output voltage is sampled allowing true clip detection and limiting.

NOTE: It is important to always operate your SY400V or SY800V amplifier **with the limiter switch engaged.**

The nature of transformers means that peaks in program music could saturate the internal transformer and/or the speaker transformers attached to the amplifier. When a transformer saturates, it no longer acts as a transformer but rather as a thick piece of wire. This appears to your amplifier as a short circuit so it will protect

itself and shut down. This is worst at lower frequencies. Engaging the limiter helps control this problem.

15 Filter Switch

The SY4200 and SY6125 have low pass filters included on-board the amplifier. The filters are preset to 125Hz with 18dB/octave roll off.

On the SY4200 the filter is only on channel C but will also affect the bridged configuration. This arrangement is suitable for 2.1 systems with the stereo left/right pair on channels A & B and the sub on the bridged channels C & D. The channel C input should be used. The filter is engaged by sliding the switch located through the top lid to the rear of the amplifier.

On the SY6125 there are two filters. One filter is on channel B but will also affect the bridged channels B & C. Channel B input should be used. The other filter is on channel E but will also affect the bridged channels D & E. Channel E input should be used. Many configurations are possible with this amplifier. An example would be in a 5.1 system. Channels A & B running the left and right, channel C running the centre speaker, channel E bridged with channel D running the sub and channel F running the rear surrounds. The filters are engaged by sliding the DIP switch located through the top lid to the rear of the amplifier.



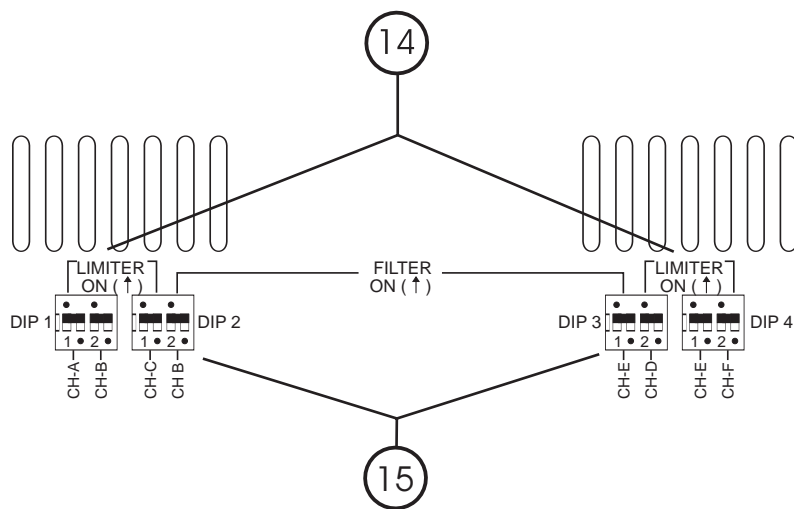
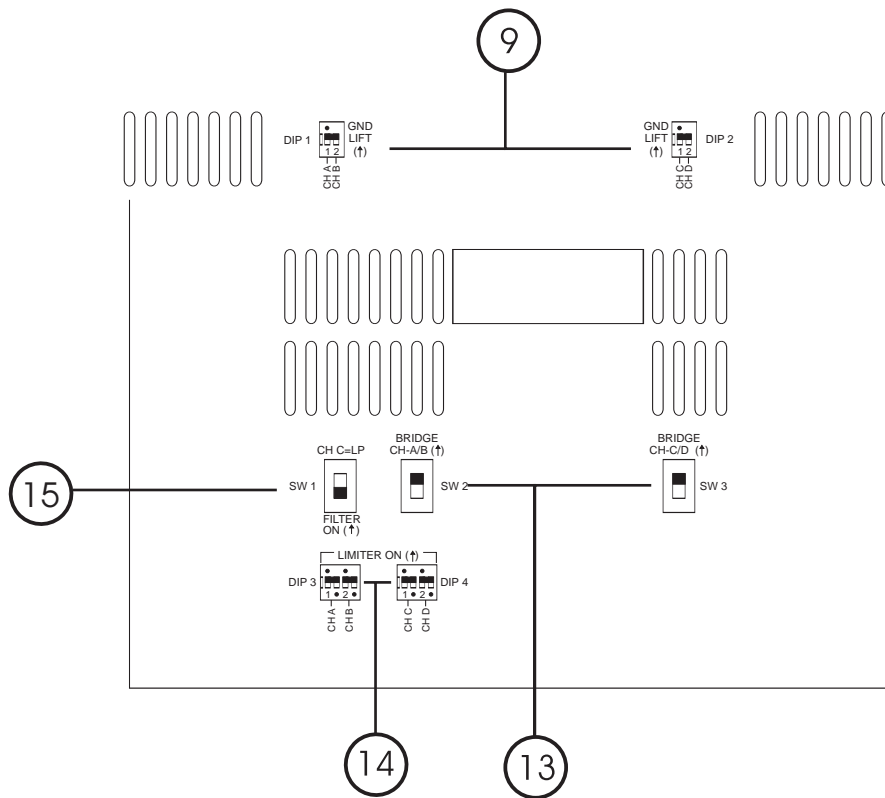


Figure 5 Top Lid Layout (top to bottom - SY4200, SY6125)



3. Installation

Power Requirements

Power consumption for your model of the Synergy Series amplifier is indicated on the rear panel for maximum output.

Ensure that **your** mains voltage is the same as the rear panel mains voltage marker (+/- 10%).

Mounting

Your amplifier is designed for standard 19" rack mounting and occupies 2 EIA rack units (3.5"). The mounting centres are:

Vertical: 3.0" (76.2mm)

Horizontal: 18.2" (461.2mm) to 18.7" (473.8mm).

The slots in the mounting flange will accept bolt diameters up to 1/4" (6.35mm).

We recommend that you provide additional support for the amplifier, especially if road use is planned, as the weight could bend some rack frames. This support can be provided by secure shelving, support rails or a rear rack mounting strip to match up with the rear rack mount ears provided on your Synergy Series amplifier.

Cooling

Each channel of your Synergy Series amplifier is cooled by an axial fan which draws cool air from the front of the amplifier and expels the heated air out the rear of the amplifier. These amplifiers offer two speed fans which run at half speed, switching to full speed when the internal heatsink temperature exceeds 60°C (128°F).

An unrestricted airflow into and out from the amplifier must be provided. Any restriction of the air flow will cause heat to build up within the unit and possibly force the unit into its thermal shutdown mode.

If the amplifiers are to be operated in an environment where the airflow is restricted such as sealed racks, the cooling should be supplemented by extra cooling

fans to evacuate the heated air and aid the flow of cool air through the unit.

Input Wiring

IMPORTANT

Do not directly connect pin 1 on the amplifier's input or strapping XLR, to the amplifier's chassis, speaker ground or power ground!

NOTE

Input signal ground is not to be used as a safety ground (earth).

The input to your amplifier is a balanced 3-pin configuration and requires all three pins to be connected. Only high quality twin-core shielded cable should be used.

When wiring for a balanced source, the connector going to the input of your amplifier should be wired as follows:

Pin 1 = GROUND / SHIELD.

Pin 2 = HOT (In Phase - non inverting).

Pin 3 = COLD (Reverse Phase - inverting).

When wiring from an unbalanced source you **must** ensure that pin 3 is connected to pin 1 (input ground), either by linking the pins in the input connector or by the source equipment's output wiring.

When wiring for an unbalanced source:

Pin 1 = GROUND/SHIELD

Pin 2 = HOT (in phase with the amplifier's output),

Pin 3 = GROUND/SHIELD (joins to pin 1).

NOTE:

In-line XLR connectors often have a termination lug that connects directly to the chassis of the connector. Do **not** link this lug to pin 1 at the amplifier's input as it will defeat the amplifier's input grounding scheme.

Output Wiring

When wiring to your speakers always use the largest gauge wire your connector will accept. The longer the speaker lead, the greater the losses will be, resulting in reduced power and less damping at the load. We recommend using a heavy duty, two core flex (four core flex if bi-amping) 10 to 12 gauge (2mm² to 2.5mm² or 50/0.25 or equivalent) as a minimum.



Binding Post Outputs

When terminating to the 4 mm binding post (banana jack) output connectors, banana plugs or bare wires can be used. The red terminal is **positive** and the black terminal is **negative** (ground).

If running in BRIDGE mode, only the **red** binding posts are used.

For the SY400, SY800, SY1200, SY1600:

When bridging, Channel A provides the positive output to the load and channel B provides the negative output to the load.

For the SY6125:

When bridging B & C, channel B provides the positive output and channel C provides the negative output to the load.

When bridging D & E, channel E provides the positive output and channel D provides the negative output to the load.

For the SY4200:

When bridging A & B, channel A provides the positive output and channel B provides the negative output to the load.

When bridging C & D, channel C provides the positive output and channel D provides the negative output to the load.

There exists no means of bridging your SY400V or SY800V amplifier.

Speaker Outputs

(NOTE: There are no 4 pole speaker connectors on the SY400V, SY800V, SY6125 or SY4200).

When using the 4 pole speaker connector for speaker output, use only the mating 4 pole in-line connector. This connector is designed so that both channels can be fed from a single connector.

Two speaker connectors are provided on the amplifier.

The "Channel A" speaker connector actually carries both channel A & channel B outputs (see *Figure 6: Speaker Connector Wiring Diagrams*).

The "Channel B" speaker connector carries the Channel B output only.

This arrangement allows you the option of

connecting to the outputs separately or together. Connecting through a single connector has the advantage of minimising connections, preserving phasing and simplify channel allocation, which is particularly important when **bi-amping** or in **bridge** mode.

IMPORTANT

Do not overload your amplifier by connecting the channel B output twice!

Channel A is used as the "dominant" channel and when sourcing a dual output from Channel A, the following standard should normally be used (depending on speaker system wiring):

Channel A = Left or Low Frequencies.

Channel B = Right or High Frequencies.

When in **bridge** mode:

Pin 1+ = Bridge Output Positive

Pin 2+ = Bridge Output Negative.

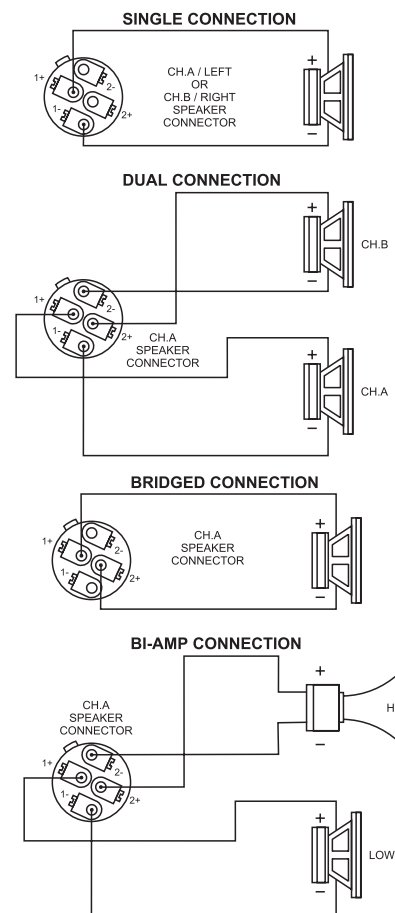


Figure 6. Speaker Connector Wiring Diagram



4. Operation



IMPORTANT

All signal source equipment should be adequately earthed. This not only ensures **your** safety but everybody else's as well. Faults can and do occur in mains connected equipment where the chassis can become "live" if it is not properly earthed. In these instances, the fault in a "floating" (ungrounded) piece of equipment will look for the shortest path to ground, which could possibly be your amplifier's input. If the fault current is large enough, it will destroy the input to your amplifier and look for the next available path, which **may be you!**

Before making any connections to your Synergy Series amplifier, observe the following:

Ensure the mains voltage supply matches the label on the rear panel of your amplifier (+/- 10%).

Ensure that the power switch is OFF.

Ensure that all system grounds (earth) are connected from a common point. Avoid powering equipment within a system from multiple power sources that may be separated by large distances.

Check the continuity of all interconnecting leads to your amplifier; ensure that there are no open or short circuited conductors.

Ensure that the power handling of your load (speakers) can adequately cope with the power output of the amplifier.

Before operating your Synergy Series amplifier, ensure that:

- The attenuators are at the "OFF" position (fully anticlockwise).
- The GROUND LIFT Switch is not engaged (should be in the "out" position).
- The BRIDGE Switch is not engaged if you are not running the amp in bridged mode.

Powering Up

REMEMBER

The amplifier should be the **last** piece of equipment that you turn **on** and the **first** piece of equipment that you turn **off**.

We recommend turning the attenuators on your amplifier **down** when turning the unit on.

When you power up your Synergy Series, your

amplifier goes through an initialising period before it will accept signal. The Inrush Current Suppression (ICS) circuit is in operation for the first 0.5 seconds. This limits the mains current, to prevent "nuisance-tripping" of circuit breakers.

During this period you will hear a couple of relays "click", indicating mains is now directly applied to the amplifier and the signal path is connected.

While the ICS circuit operates there is also a 30dB mute on the signal input. After two seconds this mute will release, allowing any applied signal to pass un-attenuated.

When switching the amplifier off, **wait** a couple of seconds before switching the amplifier on again. This allows the ICS circuit to reset.

Level Matching

The normal operating position for the attenuator is the max position (fully clockwise, no attenuation). In this position the amplifier operates at full gain. Turning the attenuator back (anticlockwise) reduces the input sensitivity.

NOTE:

If full power output is required, you should operate your amplifier with the front panel attenuator above the half way (12o'clock) position, otherwise clipping of the input circuitry and its resultant distortion will occur before full output power is achieved.

Sensitivity

Your amplifier is a linear device operating with a fixed input to output voltage gain (less attenuation). The maximum output voltage swing is determined by the applied mains voltage, load, load type and the duty cycle of the applied signal.

The **input sensitivity** for your Synergy Series amplifier when the attenuator is at maximum position (fully clockwise) is nominally:

+2.2dBu (1.0 volts in) for rated power into a 4 ohm load.

Each channel of your Synergy Series amplifier has a nominal balanced **input impedance** of 20kOhms (@1kHz) and should not present a difficult load for any signal source.

Your signal source (i.e. the equipment feeding signal to the amplifier) should have an **output impedance**



of 600 Ohms or lower to avoid unwanted high frequency loss in the cabling.

Input overload occurs at +20.5dBu (8.25 volts).

Hum Problems

Most equipment is designed for minimum hum when used under ideal conditions. When connected to other equipment, and to a safety earth in an electrically noisy environment, problems may occur.

The three "E"s of hum and hum related noise which can plague your audio system are:

- a) Electrostatic radiation,
- b) Electromagnetic radiation, and
- c) Earth loops

Electrostatic radiation capacitively couples to system elements, causing an interference voltage that mainly affects higher impedance paths, such as amplifier inputs. The source is generally a nearby high voltage, such as a mains lead or a speaker lead. The problem can usually be reduced by moving the offending lead away, or by providing additional electrostatic shielding (i.e. an earthed conductor which forms a barrier to the field).

Electromagnetic radiation induces interference currents into system elements that mainly effect lower impedance paths. Radio transmitters or stray magnetic fields from mains transformers are often the cause of this problem. It is generally more difficult to eliminate this kind of interference, but again, moving the source away or providing a magnetic shield (i.e. a steel shield) should help.

Earth loops can arise from the interfacing of the various pieces of equipment and their connections to various safety earths.

This is by far the most common cause of hum, and it occurs when source equipment and the amplifier are plugged into different points along the safety earth where the safety earth wiring has a current flowing through it. The current flowing through the wire produces a voltage drop due to the wire's resistance. This voltage difference between the amp earth and source equipment earth appears to the amplifier's input as a signal and is amplified as hum.

There are three things you can do to avoid earth loop problems:

Ensure the mains power for the audio system is "quiet" i.e. without equipment on it such as air-conditioning, refrigeration or lighting which may generate noise in the earth circuit.

Ensure all equipment within the system shares a common ground/ safety earth point. This will reduce the possibility of circulating earth currents, as the equipment will be referenced to the same ground potential.

Ensure that balanced signal leads connecting to the amplifier are connected to earth at one end only.

Signal Ground-Lift Switch

When proper system hook-up has been made, you may still have some hum or hum related noise. This may be due to any of the previously mentioned gremlins.

Your Synergy Series amplifier has a "Signal Ground Lift" switch which disconnects the input ground wiring from the amplifier. A substantial drop in hum and/or hum related noise can result from the judicious use of this switch.

NOTE

If the input ground lift switch is used, you must ensure adequate shielding of the input wiring. If the signal source equipment does not provide adequate shielding (i.e. a definitive connection to ground), you must disconnect the shield from the input connector's ground pin (Pin-1) and re-connect it to the "drain" contact on the input connector. This will ensure the shield on your input wiring actually goes to the amplifier chassis and subsequently to earth.

DO NOT CONNECT PIN-1 DIRECTLY TO THE DRAIN CONNECTION.

You will defeat the amplifiers internal grounding scheme and possibly cause instability to the amplifier.

Always ensure that your amplifier is **off** and the attenuators are **down** when you engage this switch. This switch should only be used when the amplifier is operated from a **balanced** signal source.

NOTE: Be wary of **quasi-balanced** outputs, these are often no more than floating **unbalanced** outputs.



5. Maintenance



Only **competent** or **qualified** persons should attempt any service or maintenance of your amplifier.

Your Synergy Series amplifier will need minimal maintenance. No internal adjustments need to be made to the unit to maintain optimum performance.

To provide years of unhindered operation we suggest a maintenance inspection be carried out on a regular basis, say every 12 months or so.

Fans

Due to the openness of the air path through your Synergy Series amplifier, very little dust should settle within the amplifier. The unit has been designed so that any dust and/or foreign particles that do settle within the amplifier will not unduly hinder the cooling of the amplifier.

The grille in front of the fans will act to limit the amount of dust and lint entering the amplifier. You will find in time that there will be a build up of dust and lint on the grille which may start to hinder the airflow through the amplifier. You should periodically remove the dust and keep the grille clean. Removal of dust from the rear grille will also aid cooling.

Over time, dust may build up on the leading edge of the fan blades and reduce their cooling efficiency. The time taken for this to happen will depend on the environment and the amount of use.



The fan blades are accessible once the lids are removed and can be easily cleaned. You need only hold the fan rotor still and wipe the dust off the blades. Many users **stall** the fan and use compressed air to blow the dust off the fan blades. It is important to note that the fan blades must be held still whilst blowing air over the blades otherwise you may burn out the bearings in the fan.

Fuses



Along with rear panel mains fuse, there are four (4) rail fuses provided internally in the unit. These rail fuses are in series with the positive and negative output supply to each amplifier channel and provide overall protection for the output stage. If the amplifier is subjected to heavy use such as short circuits, 2 ohm or bridged 4 ohm loads, these fuses will eventually fatigue and may require replacing to ensure they do not fail at an inconvenient time.

NOTE



Make sure the unit is **off** and is unplugged from the mains. Give the main filter capacitors time to discharge before removing lids and inspecting the fuses.

You should replace the fuse if the element is **sagging or discoloured**. Only ever replace with the same type fuse and current rating.

When checking for a failed fuse, do not rely on visual inspection alone. You should use an ohm meter to check continuity.





Model: SY400		Model: SY800	
Output Power		Output Power	
Per Channel @ 4 ohms 0.1% THD		Per Channel @ 4 ohms 0.1% THD	
Single channel driven	240W	Single channel driven	430W
Both channels driven (2 ohm loads not recommended)	200W	Both channels driven (2 ohm loads not recommended)	375W
Bridge mode 8 ohm load (4 ohm bridging not recommended)	400W	Bridge mode 8 ohm load (4 ohm bridging not recommended)	750W
Voltage Gain	28.3	Voltage Gain	38.7
Output Impedance @ 1kHz	<0.021ohms	Output Impedance @ 1kHz	<0.019 ohms
Damping factor (@ 1kHz re 8 ohms)	> 375:1	Damping factor (@ 1kHz re 8 ohms)	> 430:1
Slew rate	>40 V/μs	Slew rate	>40 V/μs
Frequency response @ 1KHz Rated Power into 4 ohm (-3dB)	15 Hz- 80 kHz	Frequency response @ 1KHz Rated Power into 4 ohm (-3dB)	15 Hz- 70 kHz
Dimensions H,W,D = (87 x 482x400) mm Shipping Weight = 12 Kg		Dimensions H,W,D = (87 x 482x400) mm Shipping Weight = 15 Kg	
Input Power	575 VA	Input Power	1065 VA

Common Specifications

(To all SY Amplifiers)

Distortion (re 4ohm, 1dB below clip)		Signal/Noise Ratio	
THD (@ 1kHz)	<0.02%	Linear	>97dB
IMD SMPTE (60Hz : 7kHz 4:1)	<0.03%	A-Weighted	>104dB
Input Impedance	20kohms	Crosstalk	>70dB
Input Sensitivity	1Vrms	Indicators	Power, Status/Clip (L/R), Overload, Thermal, Fault
Input CMRR	>80dB		



Model: SY1200		Model: SY1600	
Output Power		Output Power	
Per Channel @ 4 ohms 0.1% THD		Per Channel @ 4 ohms 0.1% THD	
Single channel driven	710W	Single channel driven	920W
Both channels driven (2 ohm loads not recommended)	600W	Both channels driven (2 ohm loads not recommended)	800W
Bridge mode 8 ohm load (4 ohm bridging not recommended)	1200W	Bridge mode 8 ohm load (4 ohm bridging not recommended)	1600W
Voltage Gain	49.0	Voltage Gain	56.5
Output Impedance @ 1kHz	<0.018 ohms	Output Impedance @ 1kHz	<0.019 ohms
Damping factor (@ 1kHz re 8 ohms)	> 450:1	Damping factor (@ 1kHz re 8 ohms)	> 430:1
Slew rate	>41 V/μs	Slew rate	>41 V/μs
Frequency response @ 1KHz Rated Power into 4 ohms (-3dB)	15 Hz- 75 kHz	Frequency response @ 1KHz Rated Power into 4 ohms (-3dB)	15 Hz- 62 kHz
Dimensions H,W,D = (87 x 482x450) mm Shipping Weight = 17 Kg		Dimensions H,W,D = (87 x 482x450) mm Shipping Weight = 20 Kg	
Input Power	1650 VA	Input Power	2100 VA

Features of the SY Series

- Forced air cooled
- Equipped with XLR male/female inputs
- Dual output connectors, binding posts and 4 pole speaker connectors
- GND lift facility
- Clip limiter circuit provided standard
- Toroidal mains transformer
- CE Approved (EMC & LVD)



Model: <i>S46125</i>		Model: <i>S44200</i>	
Output Power		Output Power	
Per Channel @ 4 ohms 0.1% THD		Per Channel @ 4 ohms 0.1% THD	
Single channel driven	130W	Single channel driven	210W
All channels driven (2 ohm loads not recommended)	6 x 125W	All channels driven	4 x 200W
Bridge mode		Bridge mode	
8 ohm load	2 x 250W	8 ohm load	2 x 400W
(4 ohm bridging not recommended)		4 ohm load	2 x 600W
Voltage Gain	22.3	Voltage Gain	28.3
Output Impedance @ 1kHz	<0.030 ohms	Output Impedance @ 1kHz	<0.020 ohms
Damping factor (@ 1kHz re 8 ohms)	> 250:1	Damping factor (@ 1kHz re 8 ohms)	> 400:1
Slew rate	>40 V/μs	Slew rate	>40 V/μs
Frequency response @ 1KHz Rated Power into 4 ohms (-3dB)	15 Hz- 80 kHz	Frequency response @ 1KHz Rated Power into 4 ohms (-3dB)	15 Hz- 60 kHz
Dimensions H,W,D = (87 x 482x450) mm Shipping Weight = 17 Kg		Dimensions H,W,D = (87 x 482x400) mm Shipping Weight = 14 Kg	



Model: <i>S4400V</i>		Model: <i>S4800V</i>	
Output Power		Output Power	
Per Channel @ 50 ohms 0.1% THD		Per Channel @ 25 ohms 0.1% THD	
Single channel driven	240W	Single channel driven	430W
Both channels driven	200W	Both channels driven	375W
Bridge mode	Not available	Bridge mode	Not available
Voltage Gain	100	Voltage Gain	100
Frequency response @ 1KHz Rated Power into 50 ohm (-3dB)	50 Hz- 30 kHz	Frequency response @ 1KHz Rated Power into 25 ohm (-3dB)	50 Hz- 30 kHz
Dimensions H,W,D = (87 x 482x400) mm Shipping Weight = 18 Kg		Dimensions H,W,D = (87 x 482x400) mm Shipping Weight = 22 Kg	





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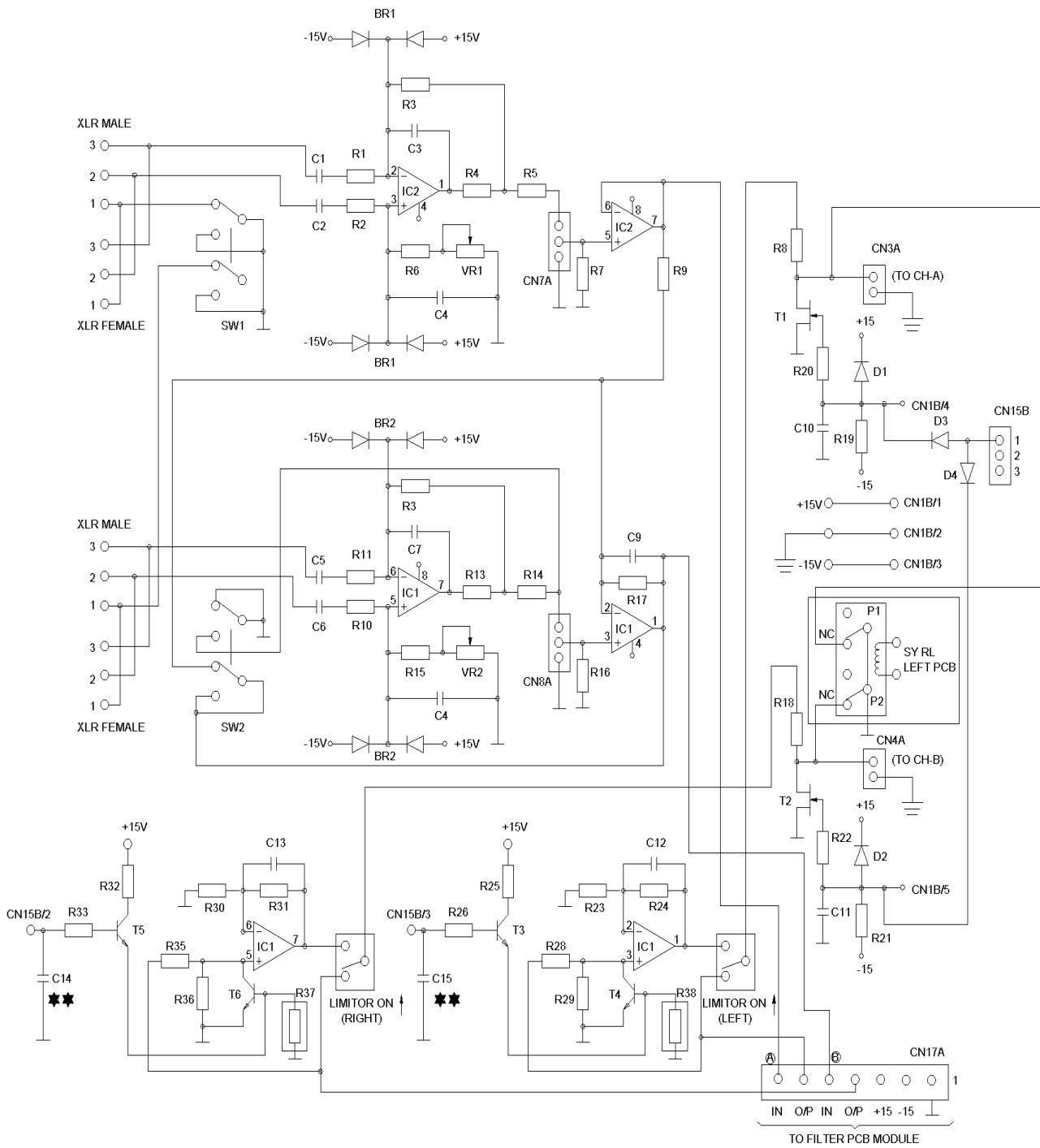
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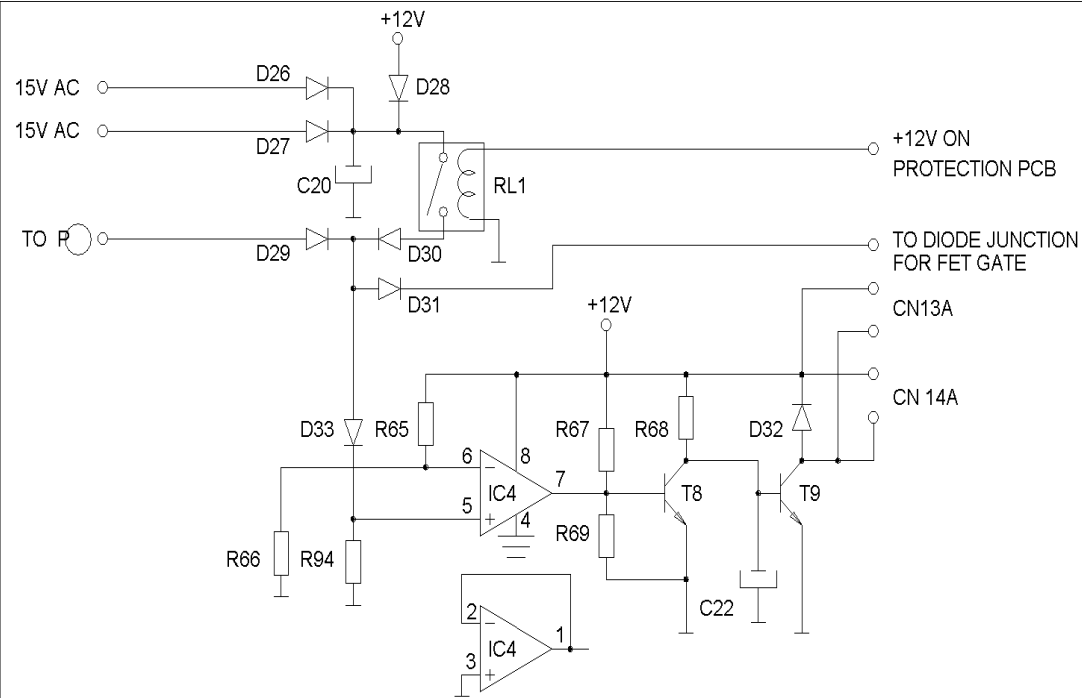
NOS	VALUES	NOS	VALUES	NOS	VALUES
R1	★	R35	2K2	BR1	RB154
R2	★	R36	100E	BR2	RB154
R3	18K	R37	-----		
R4	100E	R38	-----		
R5	1K5			T1	-----
R6	15K			T2	-----
R7	68K	C1	10MF/50V NP	T3	2SC 1815Y
R8	3K3	C2	10MF/50V NP	T4	2SC 2240
R9	3K3	C3	33PF	T5	2SC 1815Y
R10	★	C4	33PF	T6	2SC 2240
R11	★	C5	10MF/50V NP		
R12	18K	C6	10MF/50V NP		
R13	100E	C7	33PF		
R14	1K5	C8	33PF		
R15	15K	C9	100PF		
R16	68K	C10	-----		
R17	3K3	C11	-----		
R18	3K3	C12	330PF		
R19	-----	C13	330PF		
R20	-----				
R21	-----	D1	-----		
R22	-----	D2	-----		
R23	100E	D3	-----		
R24	2K2	D4	-----		
R25	10K				
R26	10K				
		IC1	NE 5532		
R28	2K2	IC2	NE 5532		
R29	100E	IC3	NE 5532		
R30	100E				
R31	2K2	RL7	TR2-12V		
R32	10K				
R33	10K	VR1	5K		
		VR2	5K		

ALL RESISTOR ARE 1/8 WATTS.

★ R1,R2,R10,R11-SY400 SY800 SY1200 SY1600 SY2000
 12K 10K 6K8 10K 10K

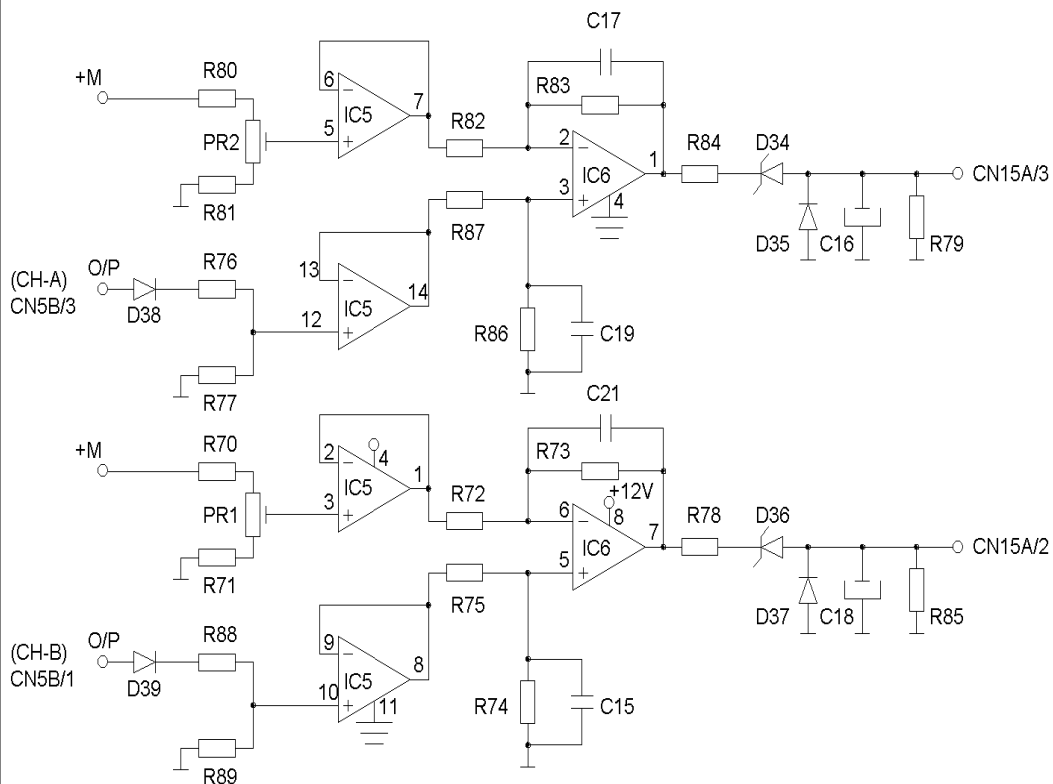
★★ C14 AND C15 - - - 3K3PF -

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 SY800 Input Stage



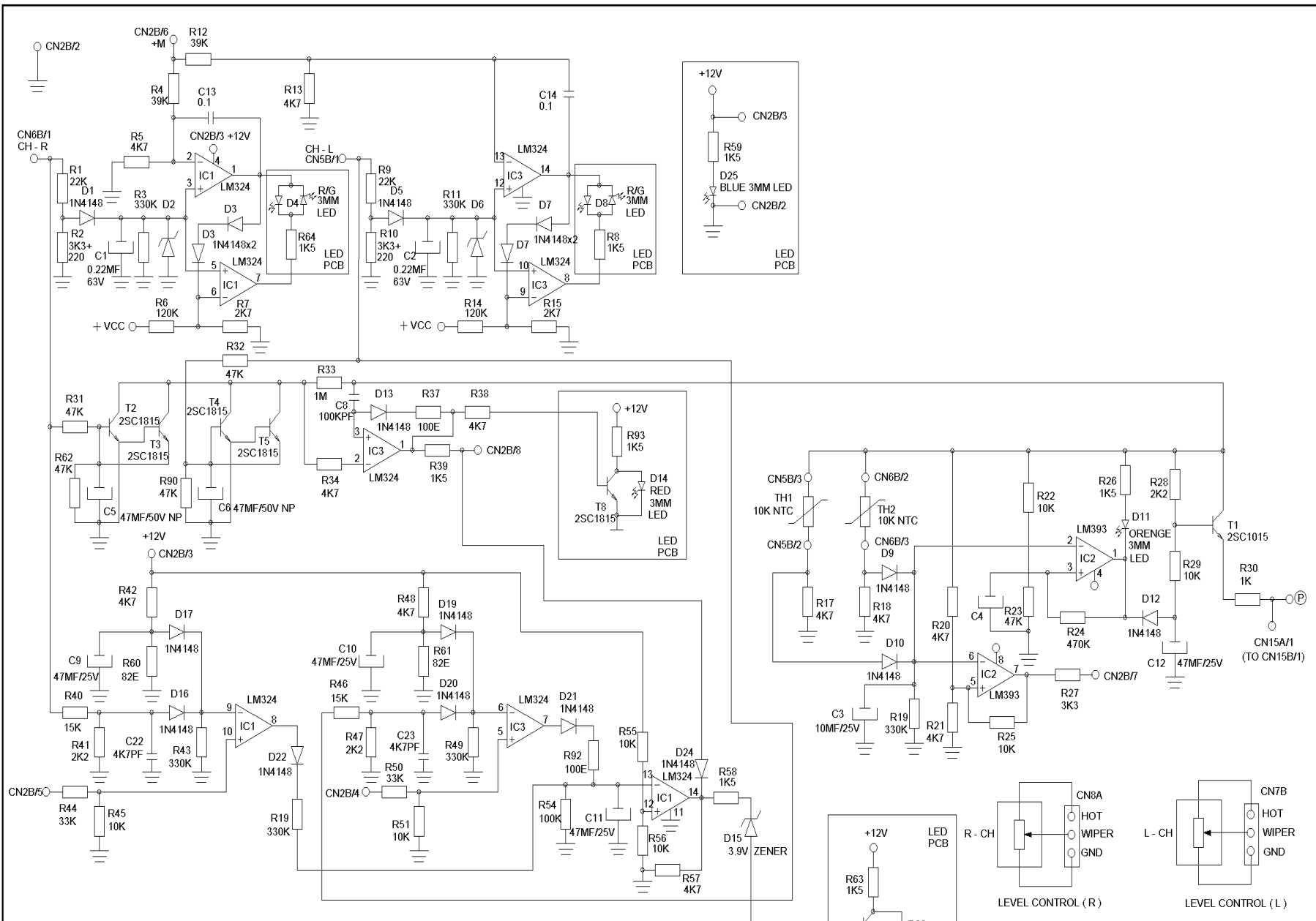
NOS.	VALUES	NOS.	VALUES	NOS.	VALUES
R65	10K	R94	100K	D26	-----
R66	3K3			D27	-----
R67	10K	RL1	-----	D28	-----
R68	2K7			D29	1N4148
R69	100K	C15	5P6	D30	-----
		C16	10MF/25V	D31	1N4148
R72	47K	C17	5P6	D32	1N4007
R73	1M	C18	10MF/25V	D33	1N4148
R74	1M	C19	5P6	D34	3.9V
R75	47K	C20	-----	D35	1N4148
		C21	5P6	D36	3.9V
R78	100E	C22	470MF/16V ELCO.	D37	1N4148
R79	100K			D38	1N4148
				D39	1N4148
R82	47K	T8	1815Y	PR1	220E
R83	1M	T9	BD139	PR2	220E
R84	100E				
R85	100K			IC4	LM339
R86	1M			IC5	LM324
R87	47K			IC6	LM1458

ALL RESISTORS ARE 1/4 WATTS.



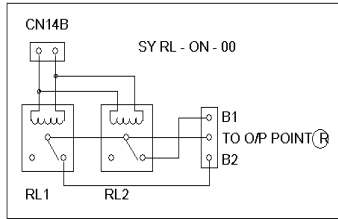
NOS.	SY400	SY800	SY1200	SY1600	SY2000
R70	35.2K	47K	150K	68K	
R71	4K7	4K7	12K	4K7	
R76	5K6	39K	12K	60K7	
R77	1K	4K7	1K	4K7	
R80	35.2	47K	150K	68K	
R81	4K7	4K7	12K	4K7	
R88	5K6	39K	12K	60K7	
R89	1K	4K7	1K	4K7	

Australian Monitor
SY800 De-thump &
Limiter

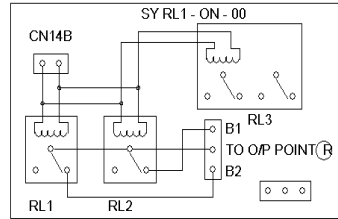


ALL RESISTOR ARE 1/8 WATTS.

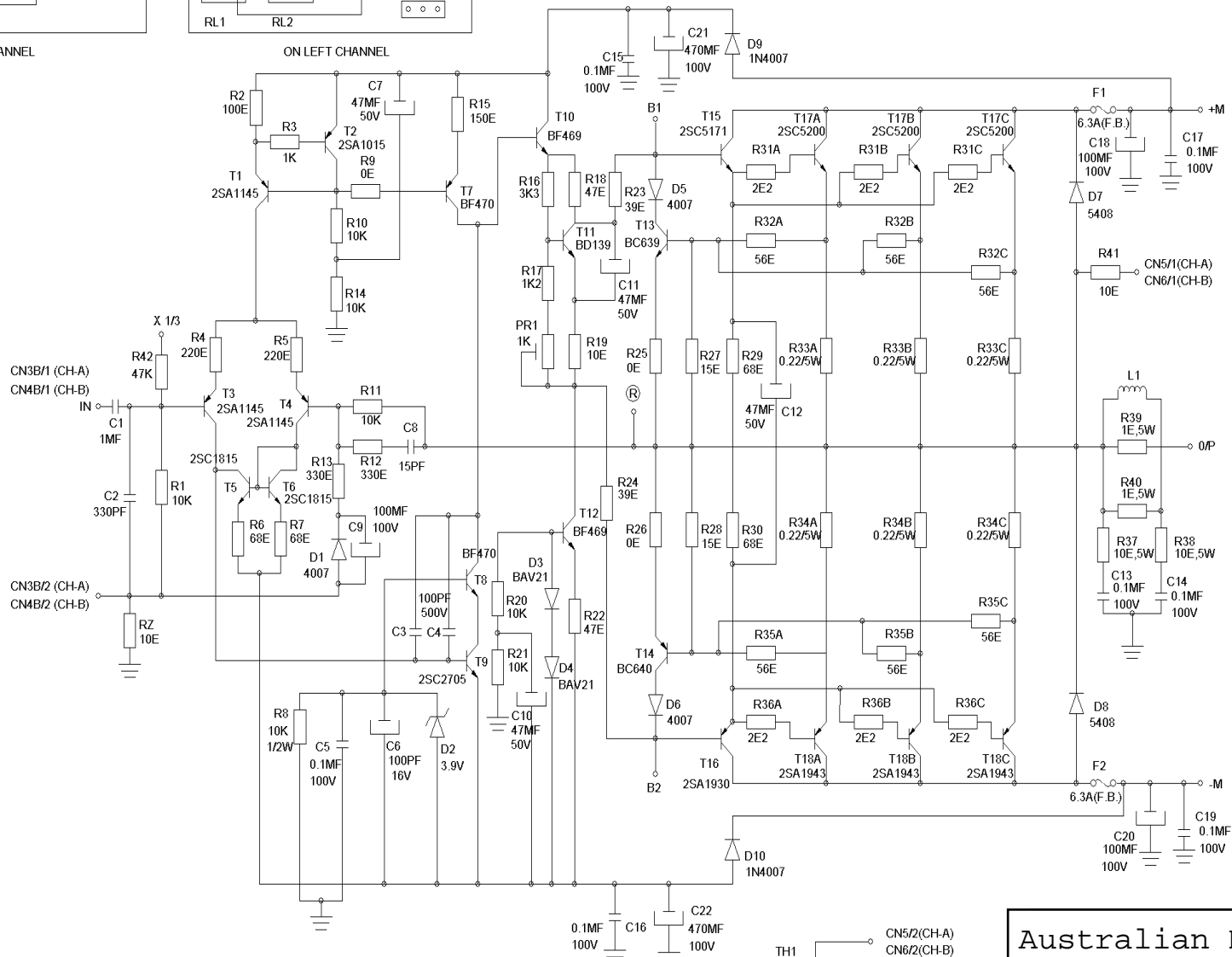
Australian Monitor
SY800 Protection



ON RIGHT CHANNEL

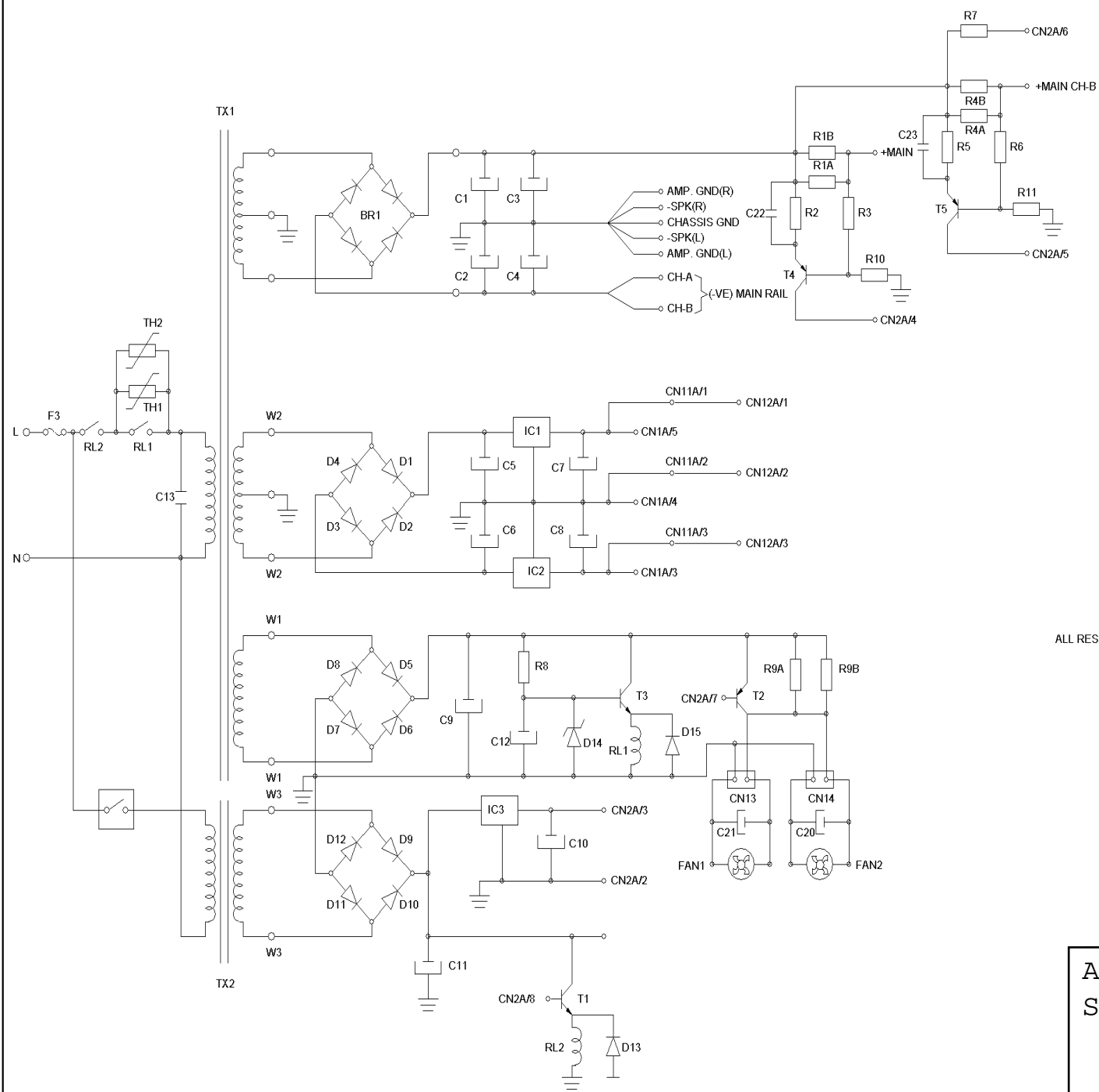


ON LEFT CHANNEL



ALL RESISTOR ARE 1/2 WATTS UNLESS OTHERWISE SPECIFIED.

Australian Monitor
SY800 Output Stage



NOS.	VALUES	NOS.	VALUES
R1A	0.1E/10W	D1	1N4007
R1B	0.1E/10W	D2	1N4007
		D3	1N4007
R2	470E	D4	1N4007
R3	470E	D5	1N4007
R4A	0.1E/10W	D6	1N4007
R4B	0.1E/10W	D7	1N4007
		D8	1N4007
R5	470E	D9	1N4007
R6	470E	D10	1N4007
R7	10E	D11	1N4007
R8	10K	D12	1N4007
R9A	47E/5W	D13	1N4007
R9B		D14	1N5242
R10	150K	D15	1N4007
R11	150K		
C1	6800MF/80V		
C2	6800MF/80V		
C3	6800MF/80V		
C4	6800MF/80V		
C5	1000MF/25V		
C6	1000MF/25V	T1	BD139
C7	47MF/25V	T2	BD140
C8	47MF/25V	T3	BD139
C9	1000MF/25V	T4	2SA1145
C10	470MF/25V	T5	2SA1145
C11	1000MF/25V		
C12	47MF/25V	IC1	7815
C13	0.1MF/275V(X2)	IC2	7915
		IC3	7812
		TH1	22E/4A
		TH2	
		BR1	KBPC 3504
C20	10MF/16V		
C21	10MF/16V	RL1	801H-1C-C,12V
C22	22KPF/100V	RL2	801H-1C-C,12V
C23	22KPF/100V		

ALL RESISTOR ARE 1/2 WATTS UNLESS OTHERWISE SPECIFIED.

VALUE OF (F3) INPUT FUSE

F3 - FOR 230V 50/60Hz
OPERATION
6.3A SLOW BLOW FUSE

Australian Monitor
SY800 Power Supply