Contents:

1 Safety and warranty

1.1 Safety

-Warning
Inside the PPA 1200, AC voltages up to 240 V may be present !

-Connection to the mains voltage
The PPA 1200's chassis is connected to ground by the grounding conductor in the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle. When this ground connection is not present or interrupted, all accessible parts of the amplifier can cause an electrical shock.

-Fuses
To avoid fire hazard, only replace fuses by the same type and value.

-Servicing
Do not perform internal service or adjustments unless there is another person present, capable of rendering first aid and reanimation.
Try to perform all service work with mains power off. Remove mains plug to be sure that there are no internal voltages present.

1.2 Warranty

SUMMARY

Stage Accompany warrants to the original commercial purchaser of each new Stage Accompany product, from the date of purchase by the original purchaser until the end of the warranty period, that the product is free of defects in materials or workmanship.

WARRANTY PERIOD

The warranty period on all Stage Accompany products is five years from the date of the first consumer purchase, with the exception of:
- all electrical products: three years from the date of the first consumer purchase;
- cone assemblies in the loudspeaker and diaphragms in the Compact Drivers: one year from the date of the first consumer purchase;
- movable parts, such as castors, locks, handles, hinges, fans, etc: one year from the date of the first consumer purchase;
- computers and associated peripherals: six months from the date of the first consumer purchase.

HOW TO VALIDATE THE WARRANTY

To validate warranty, fill out the enclosed warranty card and return it to Stage Accompany within ten days of the purchase date.
The purchaser must always keep the original bill of sale to establish the date of purchase.

ITEMS EXCLUDED FROM WARRANTY

Appeal on warranty will be voided in case :

- of defects caused by influence from the outside, accident, misuse, neglect or influence of water;
- the serial number on the warranty and/or product has been defaced, altered or removed;
- of damage due to shipment;
- of damage resulting from neglection of instructions listed in the user manual;
- of damage caused by incorrect, abnormal or abuse during delivery;
- the unit has been repaired (or shown signs of repair) by someone not authorised by Stage Accompany;
- if the warranty registration card has not been returned to Stage Accompany within 10 days of purchase;
- the original bill of sale can not be presented whenever warranty service is required;
- the cause of damage is unknown

WHAT WE WILL DO

Shipment of the product to a Stage Accompany dealer is at the risk and responsibility of the customer.
Stage Accompany will pay all labour and material expenses for all repairs covered by this warranty. Stage Accompany will not pay the cost of shipment to the Stage Accompany dealer or to the factory. However Stage Accompany will pay the return shipping charges if repairs are covered by the warranty.

CAUTION

Warranty work can only be performed at our authorised service centers or at our factory. Every repair or attempted repair by a non authorised party will void the warranty.

Stage Accompany reserves the right to alter specifications without prior notice.

2 Description of the amplifier

The PPA 1200 is a microprocessor controlled power amplifier with the following features:

-high output power
12 output devices per channel with a dissipation capacity of 2400 W provide for an output power of 350 W into 8 Ω, 600 W into 4 Ω or 900 W into 2 Ω.

-low distortion
Typical distortion is less than 0.008 % at 1 kHz.

-high speed
Fast circuitry results in a slew rate of more than 40 V/uS.

-seperate power supplies
Each channel has its own high power supply to ensure a high channel separation and full power output at any time.

-dynamic damping control
The output signal can be monitored through sensor lines to obtain a maximal damping and a minimal source impedance at the loudspeaker terminals. The PPA 1200 has a typical damping factor of 10000 at 1 kHz which is about 50 times higher than any conventional amplifier.

-dc servo circuitry
A special DC circuit reduces output offset to a minimum.

-processor control
A microprocessor controls and guards the amplifier functions and status. Input attenuation is also controlled by the uP which results in high accuracy (linearity ≤0.05 dB between 0 and -20 dB) and no loss of performance caused by potentiometers.

-auto energy control
The average output power to the loudspeaker can be limited to a factory preset or user adjustable level without hardly changing the dynamic behaviour of the program material.

-new heavy duty output connectors
The amplifier is provided with two four terminal Neutrik XLR speakon connectors with a rating of 30 A per contact to ensure a solid connection between amplifier and load.

3 Taking the PPA 1200 apart

In most servicing cases, it will be sufficient to remove the amplifier modules. After this you will have access to all other boards.
First be sure that the mains plug is removed from the receptacle.
Then remove the eight top panel screws (fig 1). Now the top panel can be removed and the two heatsinks of the poweramp modules will be visible.

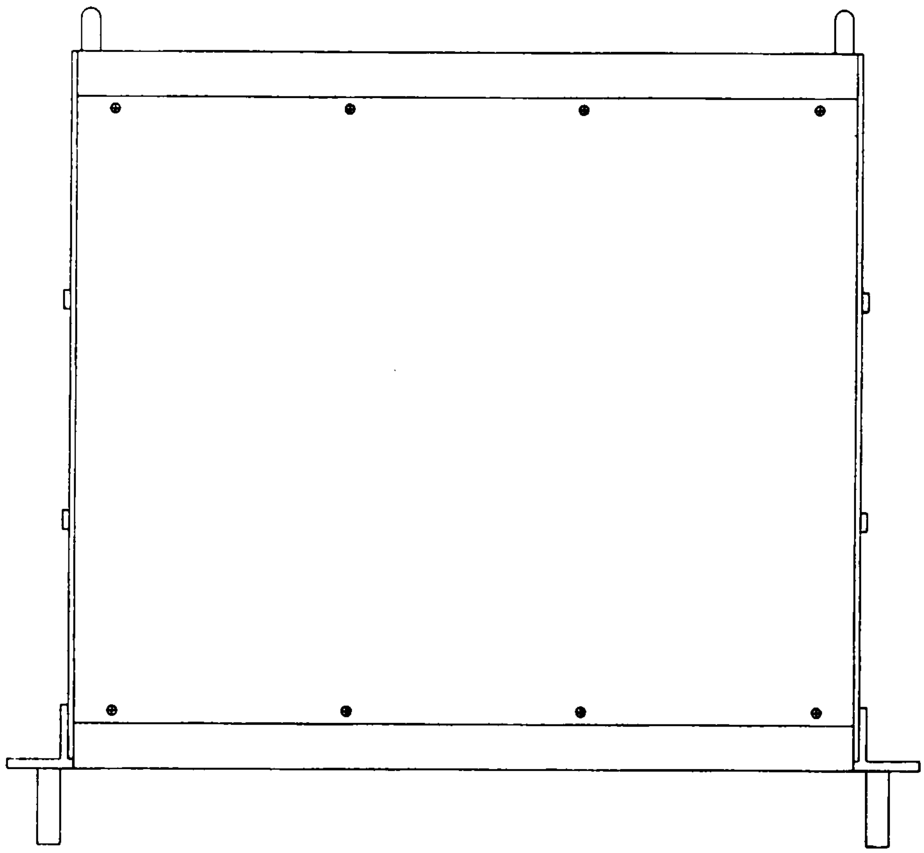


Fig 1 Top side of the PPA 1200

The poweramp modules can be taken out by removing the six screws on top of the heatsink and the two screws in the side panel of the amplifier (fig 2).
If you want to take out the complete module, remove all connectors to the preamp and poweramp board.
Access to the front board can be obtained by removing the two screws of the front bar at the side panels of the PPA 1200 (fig 3). After removing the bar the front panel can be taken out.
Fig 4 shows the best way to do adjustments to the preamp and poweramp boards. The heatsinks are placed vertically on the front and back bar. Fasten the heatsinks solidly so they will not fall over while servicing.

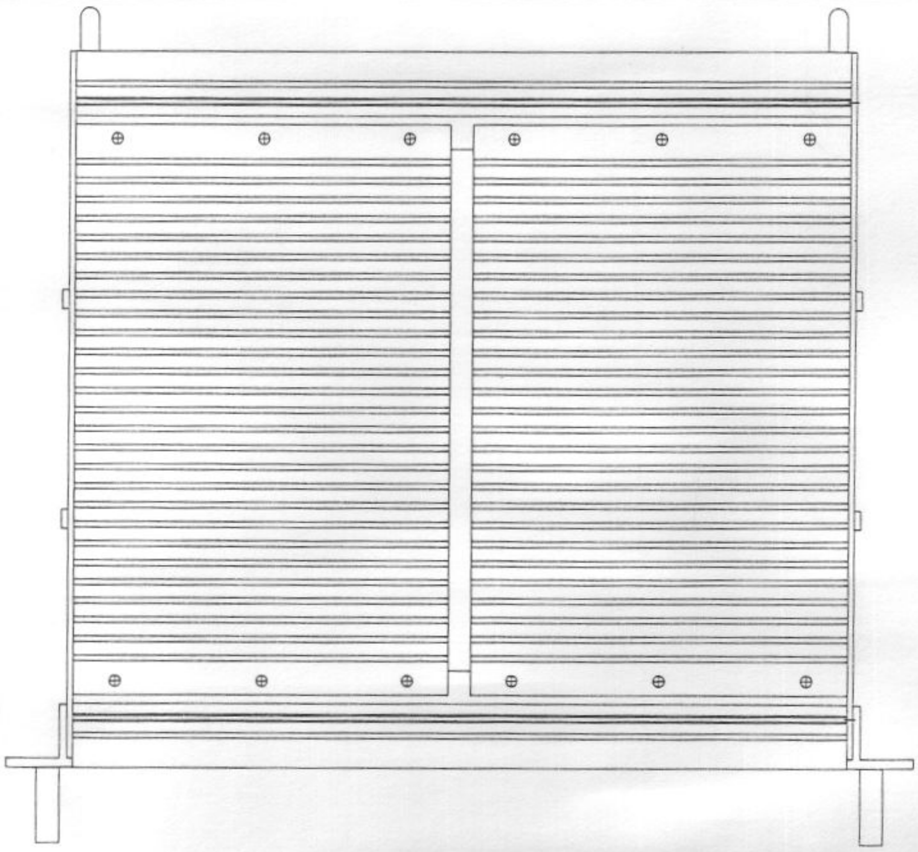


Fig 2 PPA 1200 with removed top panel

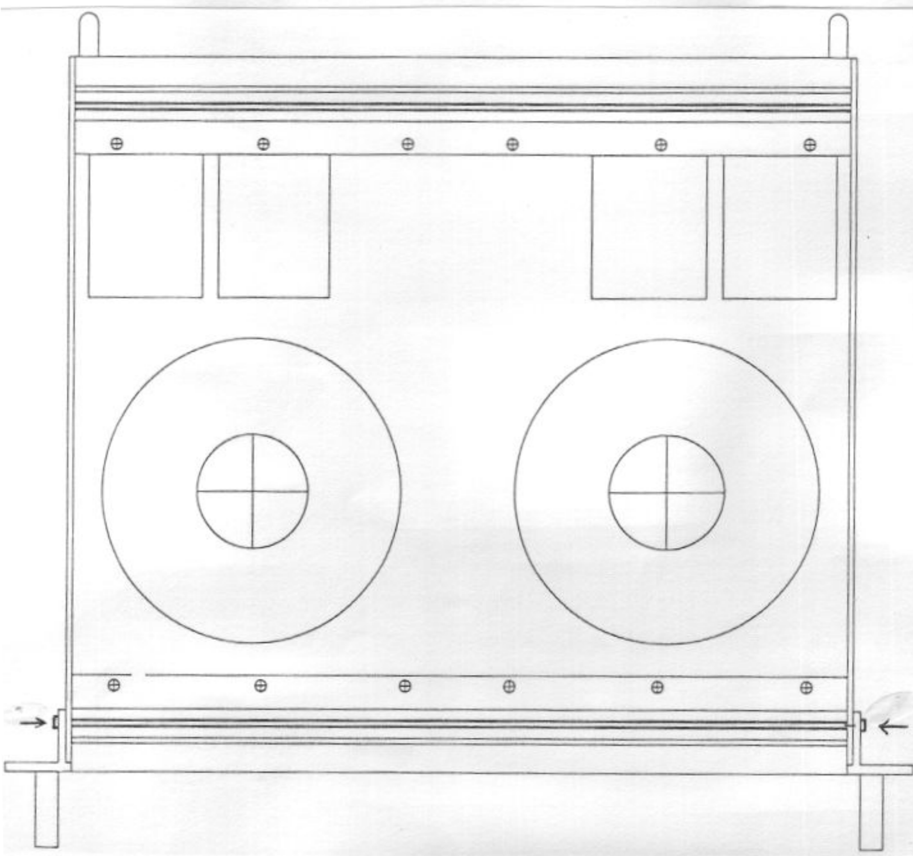


Fig 3 PPA 1200 with removed amplifier modules

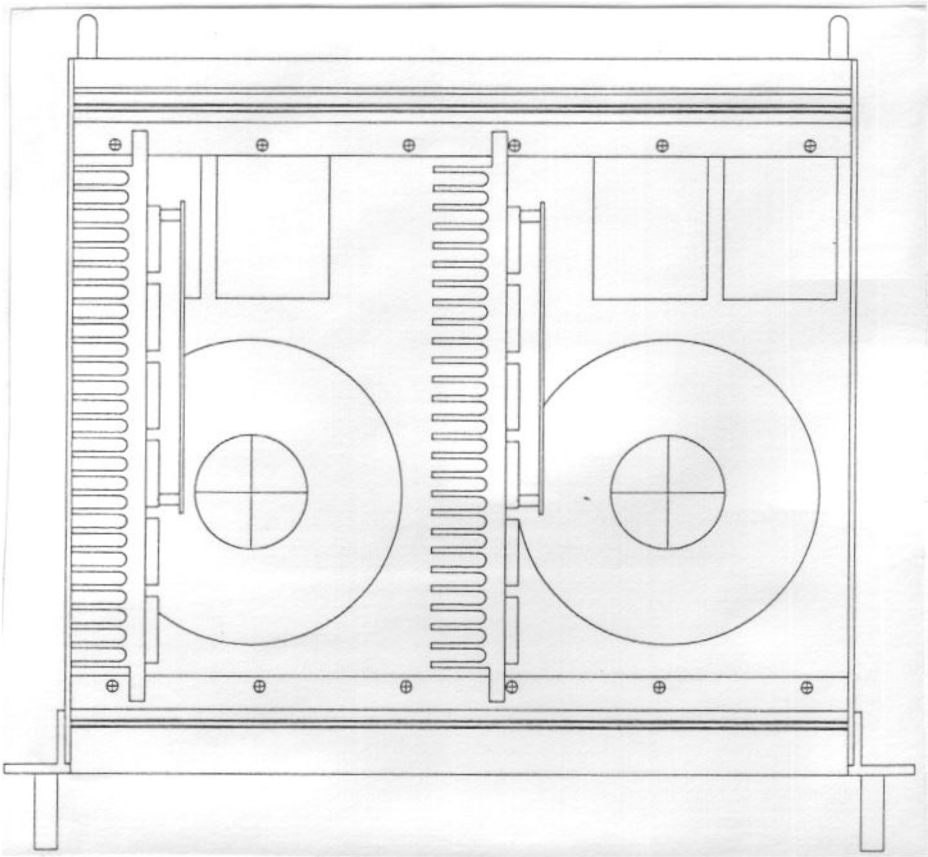
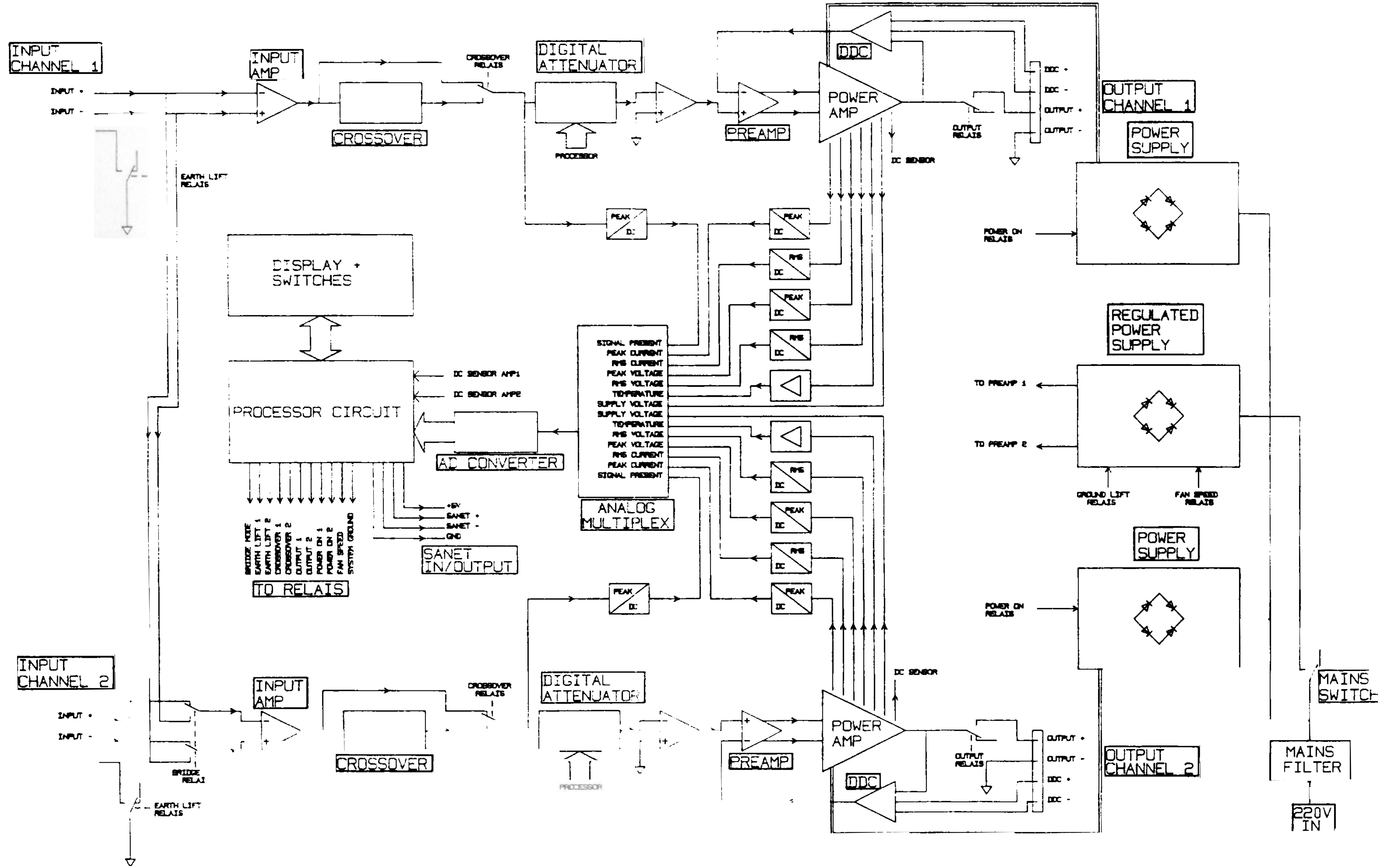


Fig 4 Set up for adjustments



4.1 BASIC DIAGRAM

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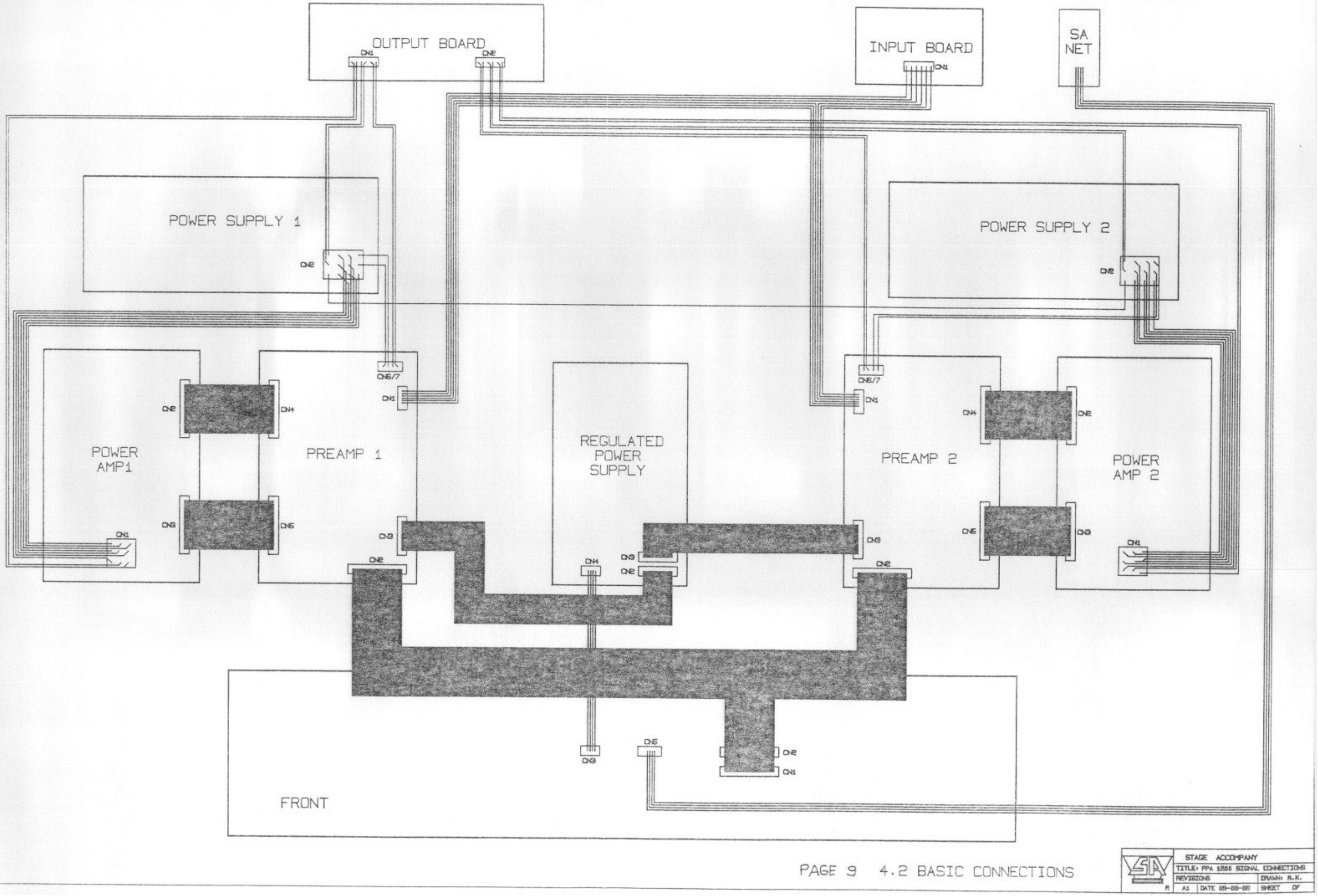
REVISIONS		DRAWN R.K.
A1	DATE 04-08-88	SHEET OF



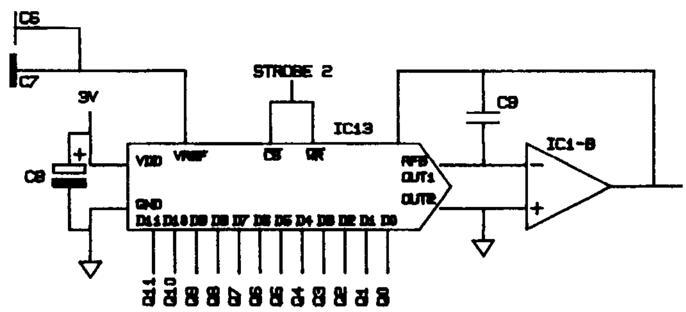
PAGE 9 4.2 BASIC CONNECTIONS

In a standard amplifier the low pass amplifier (channel 1) contains a high pass filter at 20 Hz and a low pass filter at 1 kHz.
The high pass amplifier contains a high pass filter at 1 kHz.
However, there are two dedicated versions of the PPA 1200 available to drive the SA4549 studiomonitor. Both the amplifiers only have one preset marked 4549 low and 4549 high.
The low version is equiped with a 100 Hz, 6 dB/oct low pass filter (channel 1 as well as channel 2) and the high version is a standard amplifier equiped with a special frequency correction for the 4549

opamp
Common mode
three times

The digital attenuator

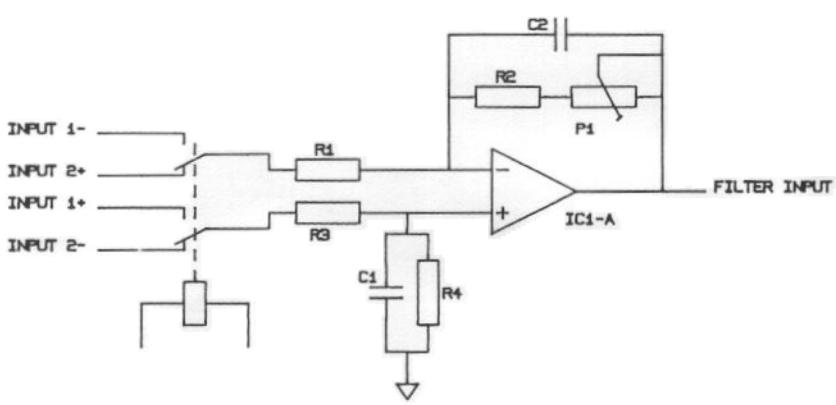
The digital attenuator (Fig 11) i and inputs a DA converter a



l attenuator

determines the level of attenuation. This level can be calculated with the formula

$$A = 20 * \log \underline{n}$$



peak value is storec into C15. This

The circuit a s nearly the
integrate output of IC6-
The outpu crossover circuly situation is he ters can he peak converter
1 V outpu contains the in. pass channel 2
The curr the s.

need normal rectifying. The two signals, current + and current - are substracted in IC7-a and the common mode voltage (that is the output voltage) is being removed. The ouput signal of IC7-a is a negative dc signal proportional to the ouput current.

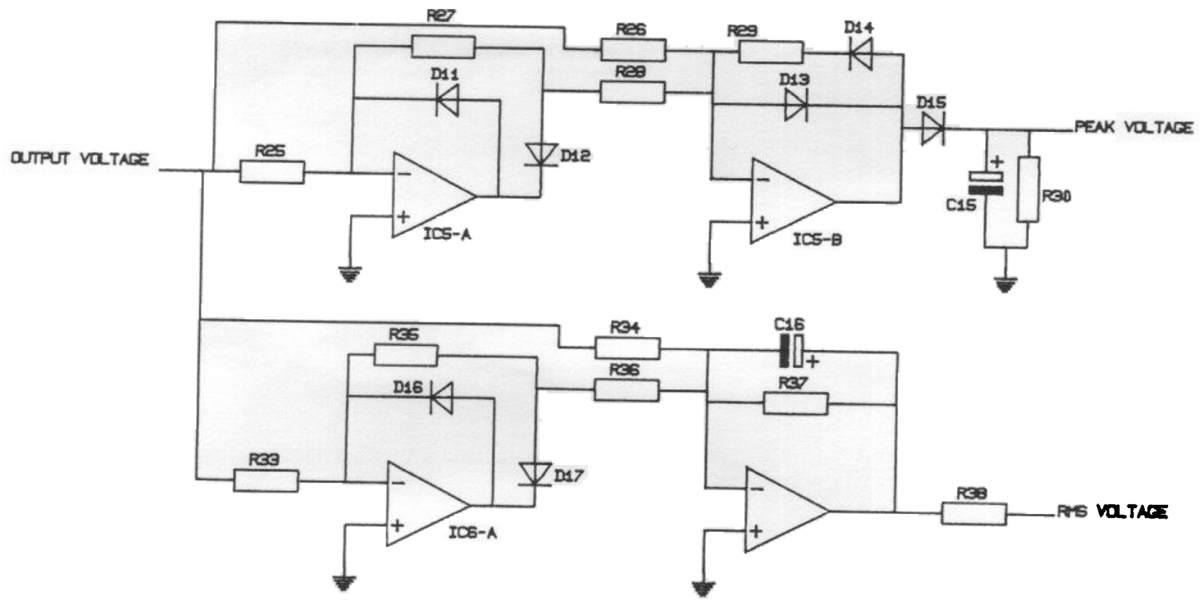


Fig 12 voltage converters

Fig 13 current converters

With trimmer P2 offsets caused by the amplifiers bias current and output offset can be trimmed out of the circuit.
The rest of the converter is dimensioned so that 5 A output current produces 1 V at both the converter outputs.

The DC detector

In fig 14 the DC detector is shown.
The amplifier output voltage is divided by R109 and R40 and integrated by the combination R109 / C17 / C18. The signal, which can be positive or negative, is fed to the window comparator IC10 / IC11. IC10 detects

positive and IC11 negative DC. One of the comparator outputs becomes 0 V when the DC sense level exceeds 3.2 V

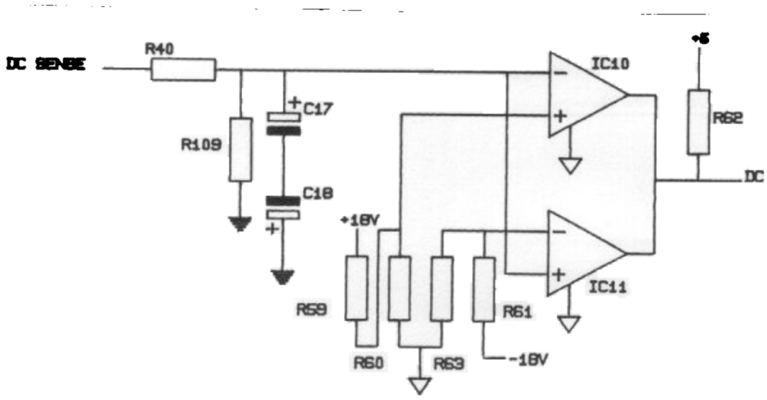


Fig 14 DC detector

The poweramp driver

The basic electronics of the poweramp driver are shown in figure 15.
T9 forms a current source together with R74 and Z5. The collector current is ± 12 mA. This source provides drain current for the dual fet T4.
The input of the amplifier is connected to the gate of the left fet, the feedback network to the gate of the right one. In a steady situation both input and feedback voltages are 0V so both the gate-drain voltages are the same. The current of T9 will be equally divided over the two fets, so I1 = I2 = 6 mA.
I1 passes a current mirror composed with R75, D28 and T11.
I2 passes two current mirrors, one composed with D28, R76, and T10 and the other with T15 and T16.
In a steady situation I1 = I2 so all current pushed out of T11 is pulled into T16 and both the drive currents will be zero.
With a rising input voltage, I1 becomes larger than I2, and not all the current produced by T11 can be pulled into T16. The residual current will be pushed into the power amplifier as drive current.
With a negative input voltage, I2 is larger than I1 and drive current will be pulled out of the power amplifier.
The feedback network is shown in fig 16. The total feedback voltage is composed out of five different signals.
Low frequency feedback is provided by the DDC network. DDC+ represents the voltage at the loudspeaker positive terminal, DDC- the voltage at the negative terminal. These signals pass a differential amplifier and a low pass filter at 3500 Hz.
High frequency feedback is provided directly from the power amplifier's output through R111. This signal has already passed a high pass filter (3500 Hz) on the poweramp board.
DC stability is achieved with the DC servo circuit around IC2.
HF stability is provided by the feedback through C61.

R92 provides additional feedback which is only used when turning the poweramp on. At first, the amplifiers output relays are not activated so the DDC circuit can not be used for LF feedback. Feedback is then achieved through R92. When the output relays are activated, the DDC circuit provides feedback again and relay 4 will be activated, which disables the extra feedback.

5.2 The power amplifier board

Fig. 17 shows the basic setup of the power amplifier.

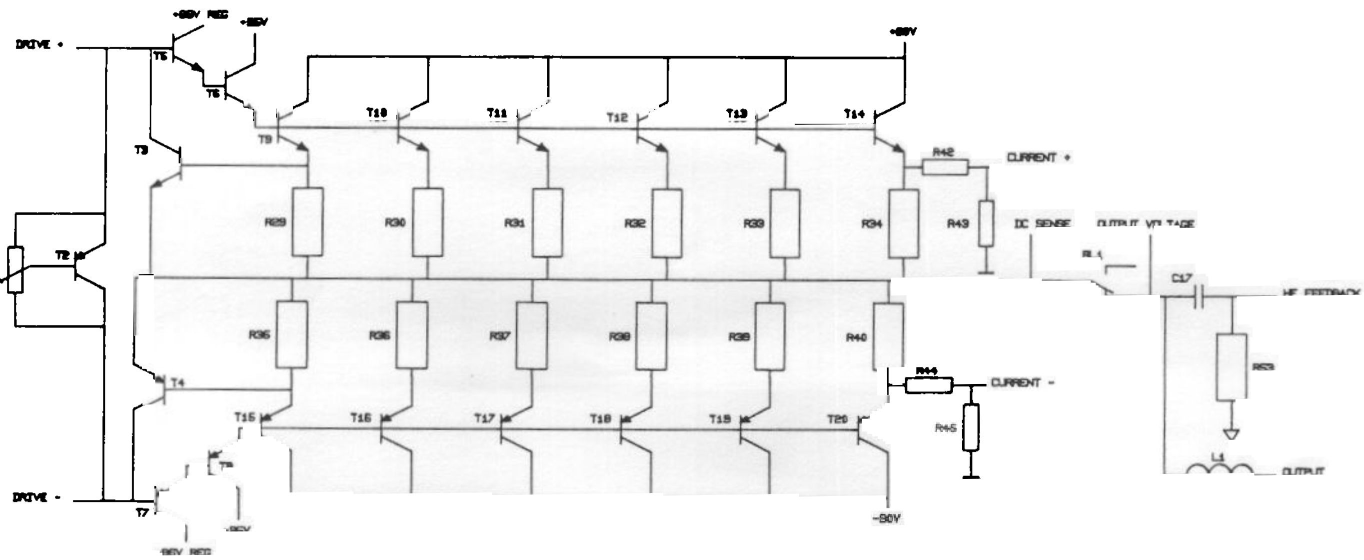


Fig 17 power amplifier

The driver circuit provides two signals, drive + and drive -. The positive drive current is boosted by T5 and T6 and fed to the NPN power transistors T9..T14. The negative drive current is boosted by T7 and T8 and fed to T15..T20.
T2 is set as a constant voltage source and provides the bias current for the amplifier.
Current limiting is handled by T3 and T4. When the current drawn from the amplifier rises, the voltage across R29 and R35 rises too. At the moment this voltage reaches ± 0.65 V, T3 and T4 start to conduct and limit the drive current for the power stage. Current limiting is depending on the output voltage. At 0 V output the maximum current is ± 6 A rising to ± 25 A at 50 V.
The voltage dividers R42/R43 and R44/R45 provide the signal for the current measurement. The voltages across R43 and R45 are proportional to the current drawn out of the amp.

5.3 The power supply board

Each power amplifier has its own unregulated power supply which delivers 4 different voltages.
Two high power 90 V voltages for the amplifiers power stage and two low power 95 V voltages for the drive transistors.
The high power voltages are rectified by a high power bridge which is for dissipation reasons not mounted on the pc board but on the amplifiers bottom panel. The energy is stored in two 10 mF / 100 V

capacitors.
The low power voltages are on board rectified and the capacitive filters are placed on top of the high power voltages.
All capacitors are discharged by resistors when the power has been switched off.
The power supply board also contains two relays that connect the mains voltage to the primary winding of the transformer.

5.4 The regulated power supply board

The regulated power supply provides 6 different low power voltages for both the two preamplifiers, all relays and the digital circuits.
First there are two 86 V voltages to feed the power amplifiers driver circuits.

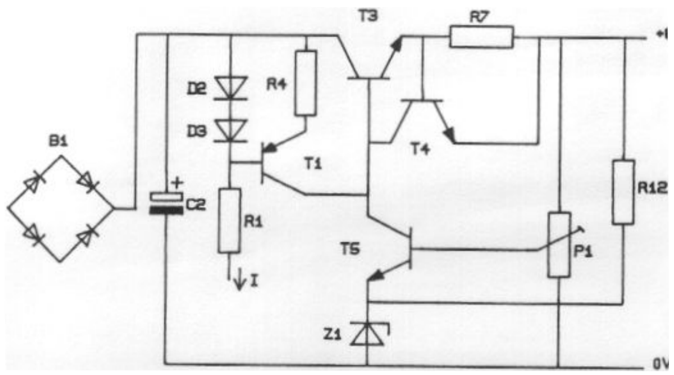


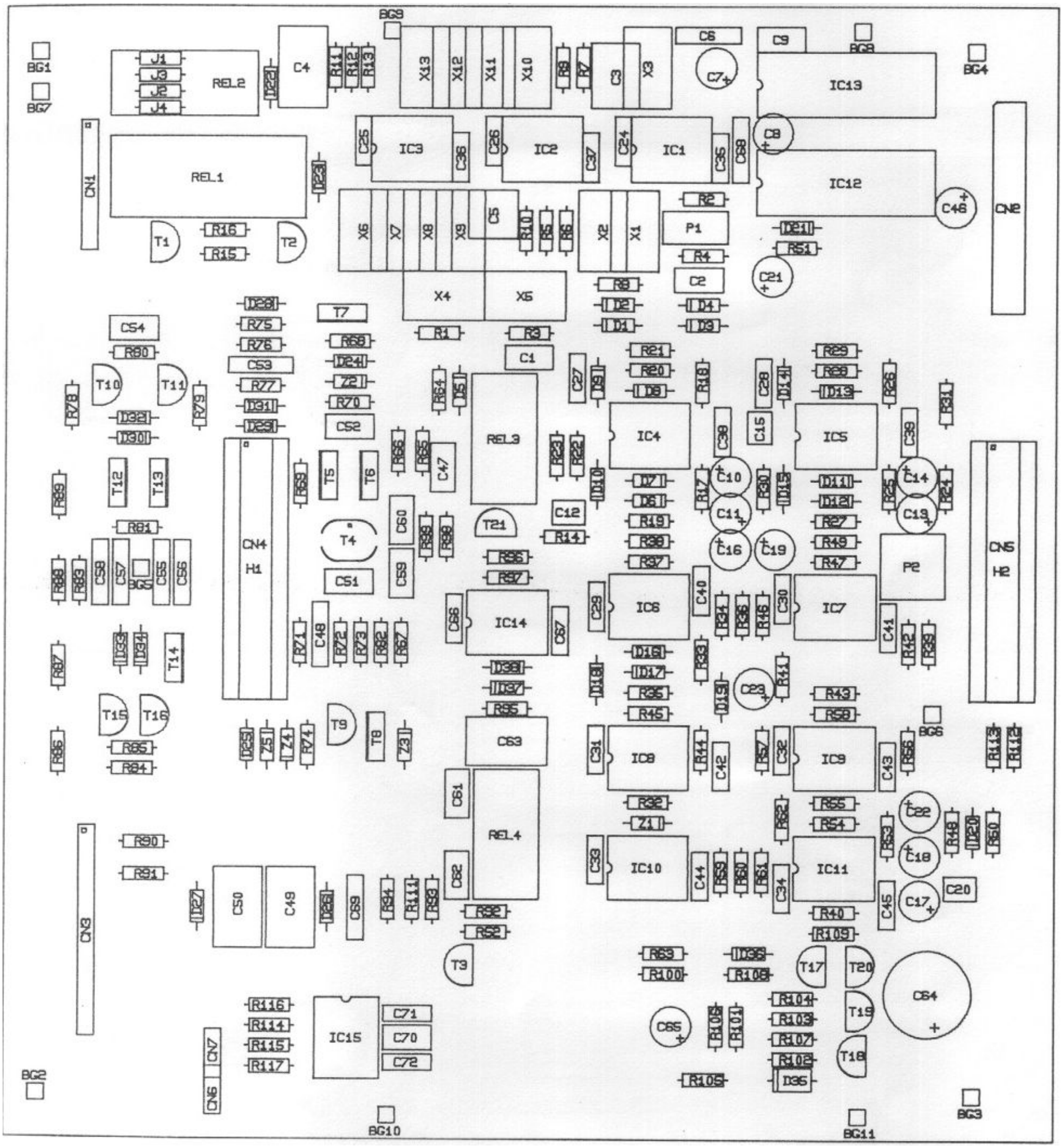
Fig 18 high voltage regulator

In this circuit (fig 18) T3 is the regulating transistor. Its base is fed by a current source build around T1, R4, D2 and D3. The base current is regulated by T5 which senses the output voltage through P1. With P1 the output voltage can be set. Current protection is arranged with T4. With increasing output current, the voltage drop across R7 increases too and T4 will start conducting and deflecting T3's base current.
The negative 86 V supply is build excactly the same.
The 18 V supplies are straightforward with two integrated circuits.
The 5 V digital supply is extended with transistor T11 to make larger currents possible. The unregulated voltage (10 V) is used as relay supply.
The board is also equiped with two relays, one to switch the fan to high speed (rel2) and another (rel1) to connect the amplifiers ground to chassis.

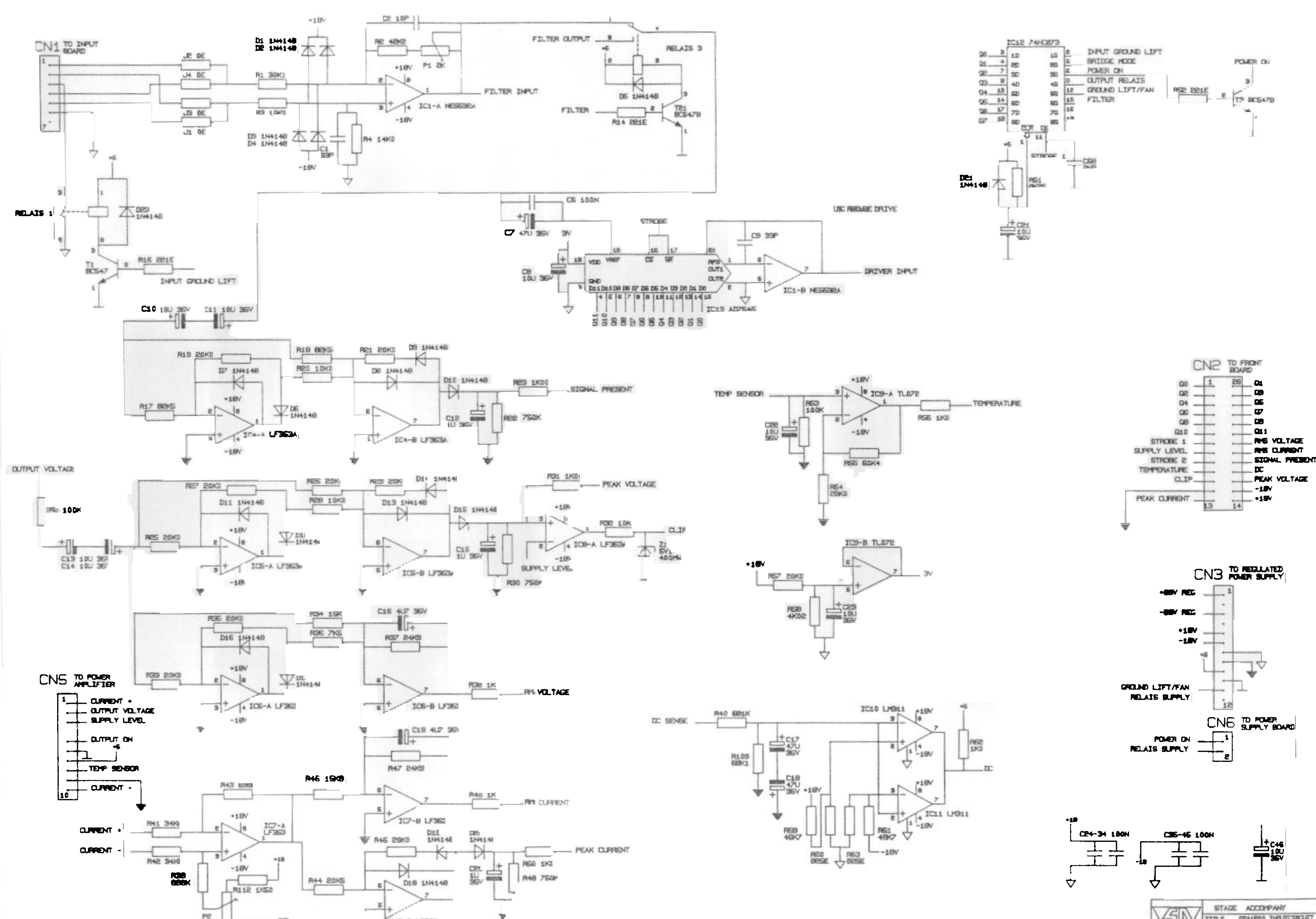
5.5 The front board

The front board contains the processor circuit, the displays the switches and the AD converter.

The processor circuit (see page 30) contains a microprocessor, decoding logic, power down protection, memory and the SAnet interface.
The processor has three different kinds of memory on board. IC3 is an EPROM which contains the software for starting the processor ,testing the other memories and downloading the system software.
IC36, an EEPROM, contains the system software and can be programmed on board without removing it.
IC4 is a RAM which contains program variables, e.g. the settings of the controls of the amplifier. This IC is provided with battery backup to save the settings when the mains power is switched off. The battery has an approximate life time of 10 years.
IC5 and IC6 are protection IC's to save memory contents when power is switched on and off.
IC7 is the SAnet transceiver which is the direct interface between SAnet and the processor.
The rest of the front board circuit is shown at page 29.
IC11..IC18 are the latches that drive the seven segment displays.
IC19..IC21 are the latches that drive the leds.
The latches IC23 and IC24 drive the digital IC's on the preamp boards. This Q(uiet)-bus is only activated when there is data available for the circuits on the preamp board. Other activities off the D(ata)-bus are blocked.
Any changes in the settings of the switches are passed to the D-bus by IC25 and IC26. IC31 passes the clip and DC information.
IC27 and IC28 are decoders that select the appropiate latch to accept data from the D-bus.
The AD converter is build around IC30, IC32, IC33 and IC34. IC30 is a multiplexer that selects the input signal. The signal is then passed to a buffer and comparator IC33 compares the input signal with the reference signal produced by DA converter IC34.



PAGE 18 PREAMP BOARD



PREAMPBOARD

PAGE 19

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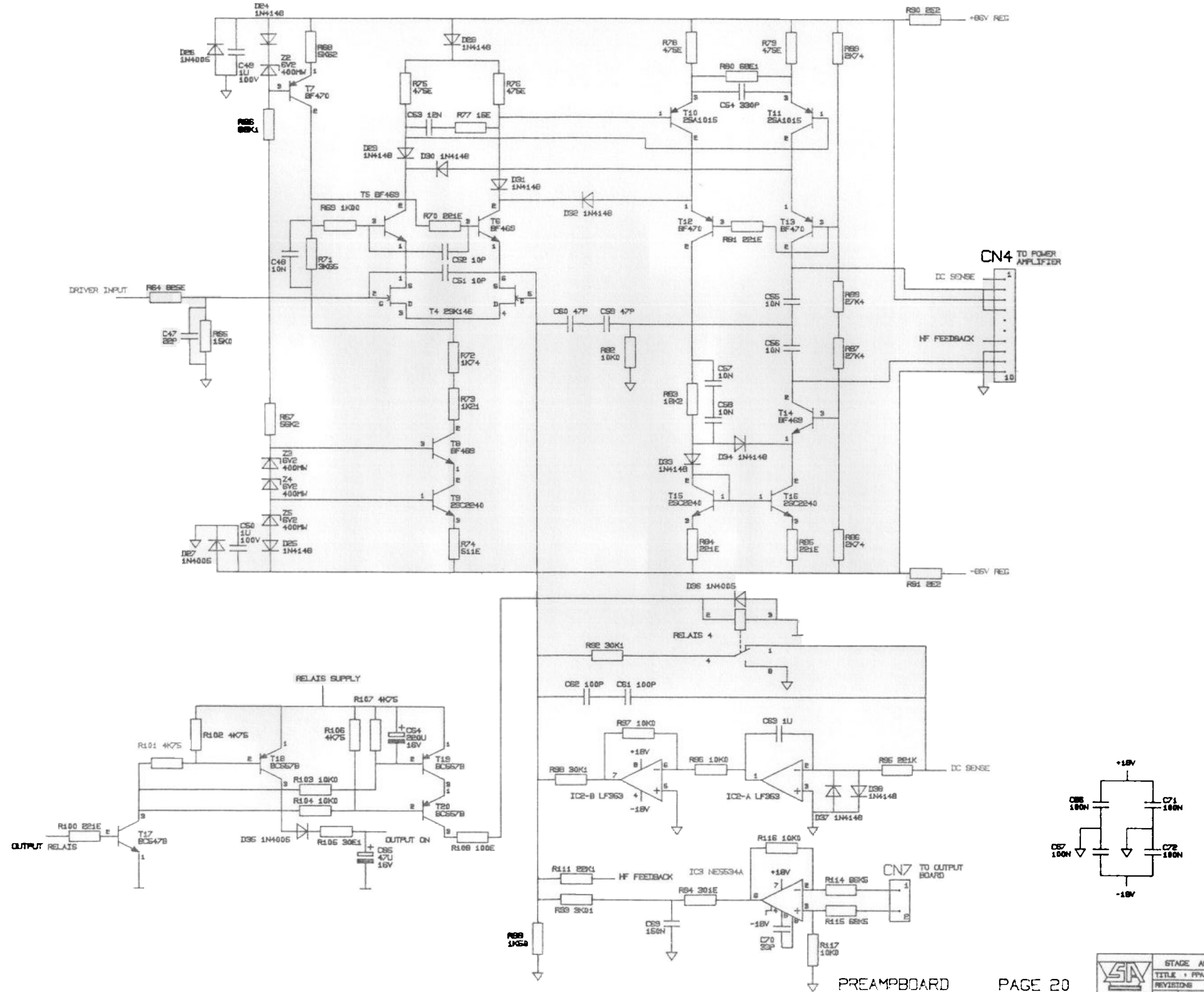
A1 DATE 29-09-87	SHEET OF



PREAMPBOARD PAGE 20

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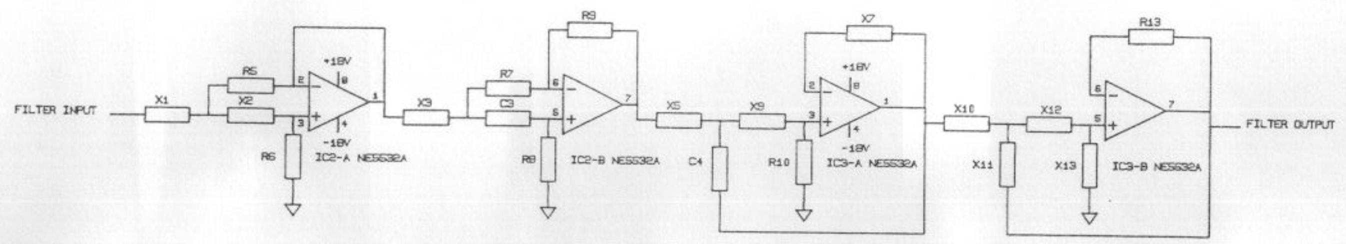

LOW PASS FILTER 1KHZ

COMPONENT	TYPE	VALUE
X1	C MKM	470N
R5	R	28K7
X2	C MKM	470N
X7	R	0E
R6	R	31K6
X3	C MKM	470N
R7	R	21K5
C3	C MKM	470N
R8	R	54K9
R9	R	0E
X5	R	15K4
C4	C FOIL	10N
X9	R	13K0
R10	C FOIL	10N
X10	R	21K5
X11	C FOIL	10N
X12	R	21K5
X13	C FOIL	3N9
R13	R	0E

HIGH PASS FILTER 1KHZ

COMPONENT	TYPE	VALUE
X1	R	0E
R5	/	/
X2	R	0E
X7	R	0E
R6	/	/
X3	R	0E
R7	R	10K0
C3	/	/
R8	/	0E
R9	R	10K0
X5	C FOIL	10N
C4	R	16K5
X9	C FOIL	10N
R10	R	17K8
X10	C FOIL	10N
X11	R	12K1
X12	C FOIL	10N
X13	R	30K1
R13	R	0E

SA 4549 SUB LOW

COMPONENT	TYPE	VALUE
X1	C MKM	470N
R5	R	28K7
X2	C MKM	470N
X7	R	0E
R6	R	31K6
X3	C MKM	470N
R7	R	21K5
C3	C MKM	470N
R8	R	54K9
R9	R	0E
X5	R	0E
C4		
X9	R	0E
R10		
X10	R	0E
X11		
X12	R	16K2
X13	C MKM	150N
R13	R	0E

SA4549 HIGH PASS

COMPONENT	TYPE	VALUE
X1	R	0E
R5	/	/
X2	R + C FOIL	10K0 + 4N7
X7	R	0E
R6	R	10K0
X3	R	0E
R7	R	10K
C3	/	/
R8	/	0E
R9	R	10K0
X5	C FOIL	10N
C4	R	16K5
X9	C FOIL	10N
R10	R	17K8
X10	C FOIL	10N
X11	R	12K1
X12	C FOIL	10N
X13	R	30K1
R13	R	0E

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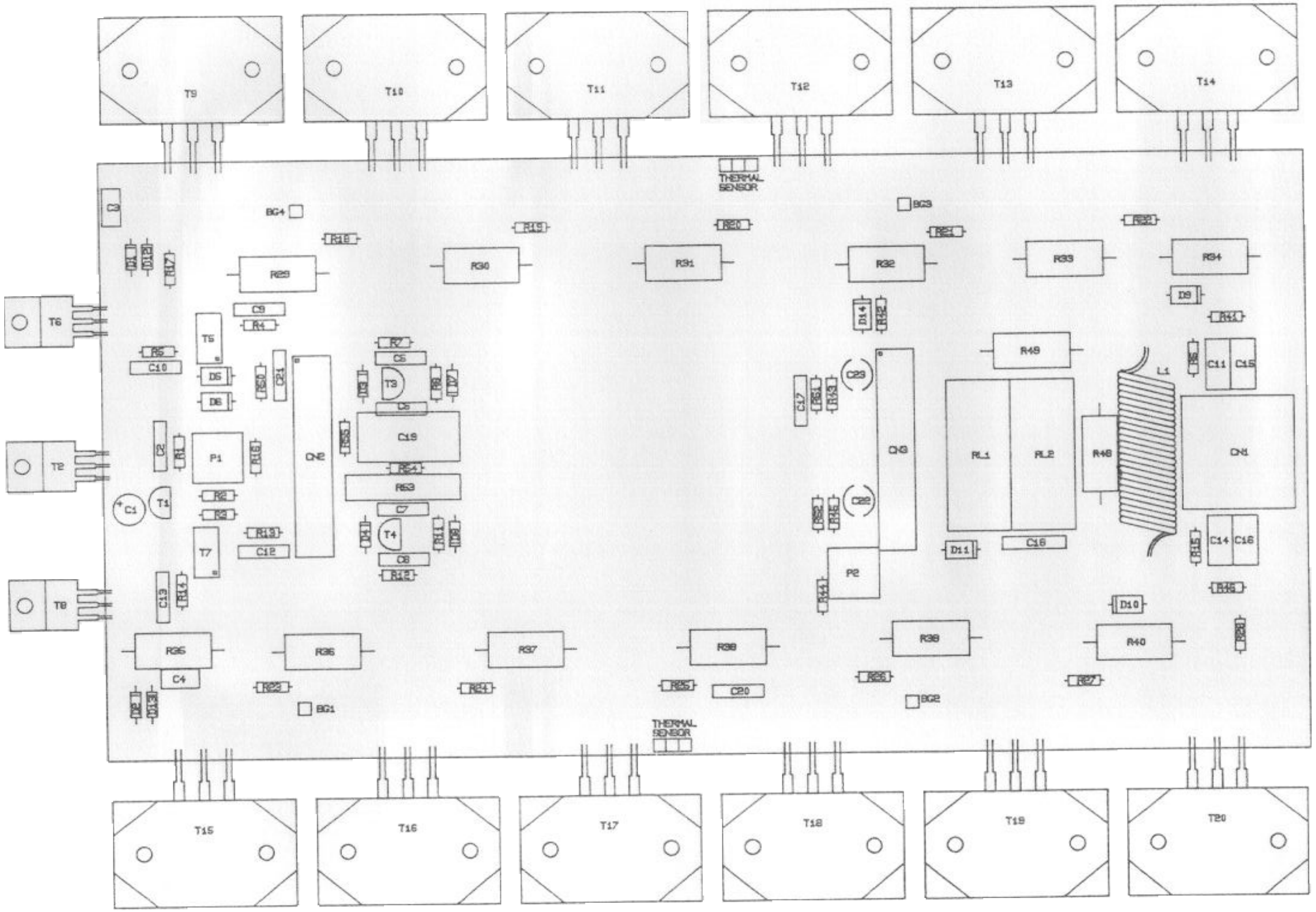
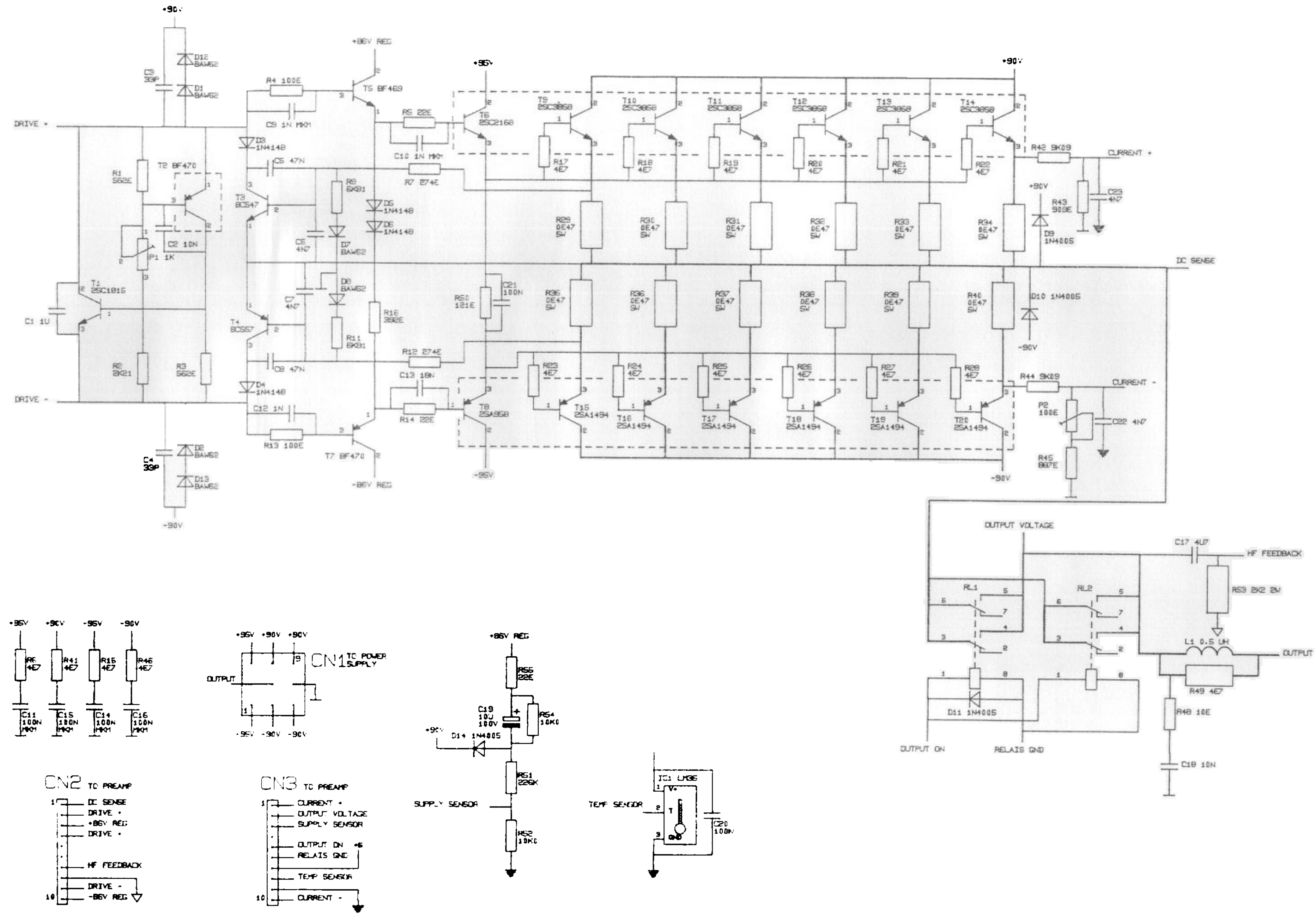


PAGE 22 POWERAMP BOARD



POWERAMP BOARD

PAGE 23

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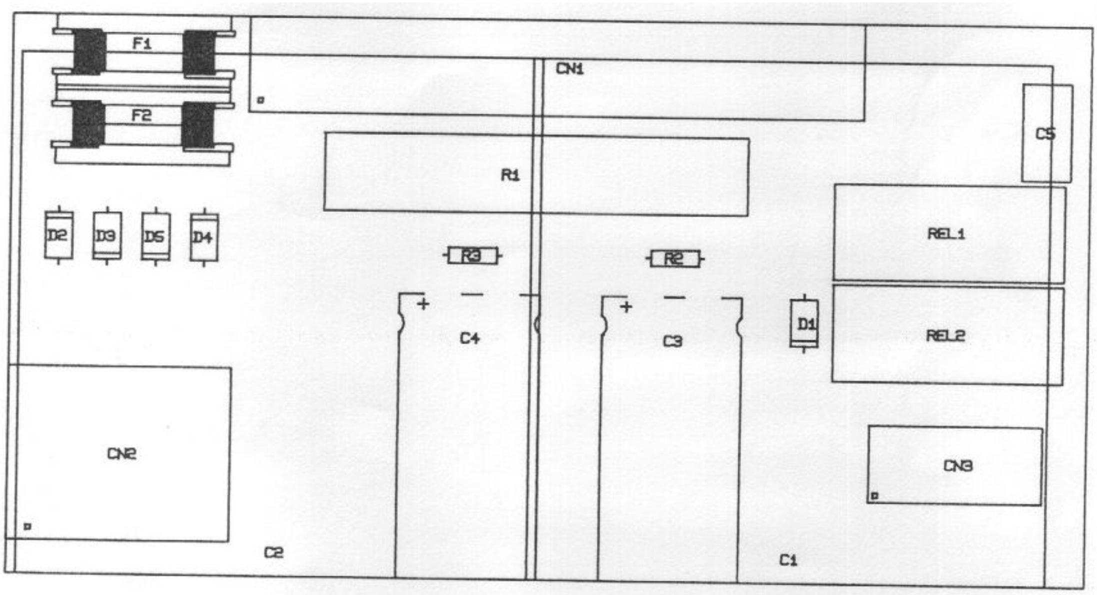
REVISIONS : MOD 1 | DRAWN : RENE
R | A1 | DATE 86-09-08 | SHEET OF



PAGE 24 POWER SUPPLY BOARD