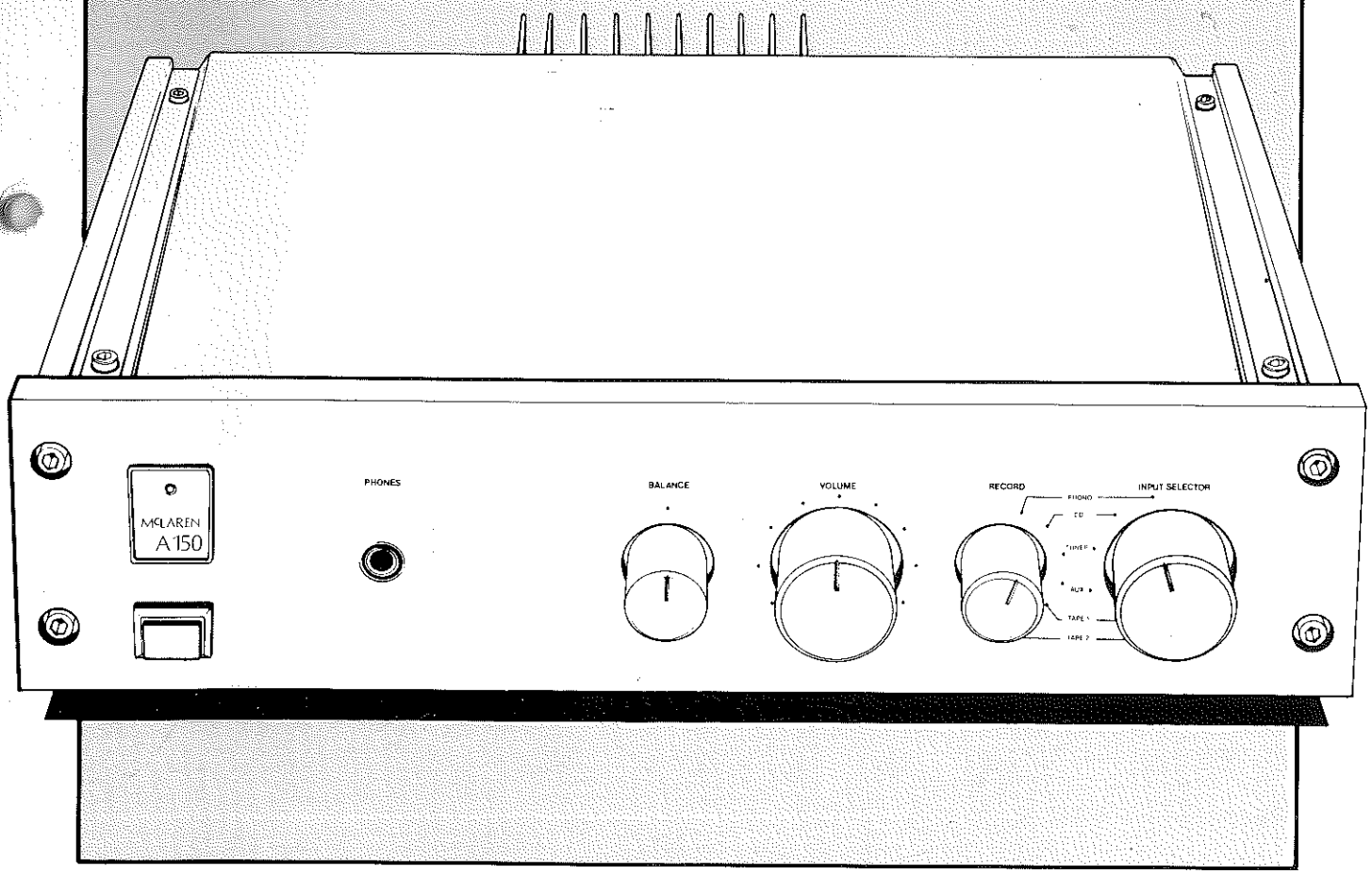
McLAREN A150

Integrated Amplifier



McLAREN A150 Integrated Amplifier

The McLaren A150 represents a unique synthesis of art, science and technology — the realisation of a design philosophy dedicated simply to the accurate reproduction of music. Form, function and performance specifications all express and testify to this basic ideal. But most important is its ability to recreate a true musical experience.

FEATURES

- Phono gain and loading switching for MC or MM.
- Two-stage RIAA equalisation - passive high frequency, followed by active low frequency equalisation.
- Five high level inputs - CD, Tuner, Aux., Tape 1 & 2 (all direct to the power amplifier section).
- Input/Record switching for recording from any input, while listening independently to any other.
- Muting relay to avoid on/off switching transients.
- Headphone socket.
- Two sets of speakers outputs - one muted when headphone plug is inserted.
- Power amplifier stages employ a new, fully symetrical, complementary design operating in a special quasi-class A mode with very low negative feedback.
- Power MOSFET output stages optimised and critically damped for fast and accurate transient response, while unconditionally stable into any load.
- Massive toroidal power transformer - individual regulated power supplies for all low level stages of each channel.
- Highest quality components and materials including:
  - gain-selected semiconductors
  - polypropylene/polystyrene capacitors
  - metal film resistors
  - conductive film potentiometers
  - gold plated input sockets
- Star grounding system.

SPECIFICATIONS

Continuous Power Output (both channels driven)	75W RMS per channel into 8 ohms 90W RMS per channel into 4 ohms
Dynamic Power (IHF) (both channels driven)	100W per channel into 8 ohms 110W per channel into 4 ohms
Power Bandwith	20 Hz - 50 kHz
Harmonic Distortion	Less than 0.1% THD up to rated output at 1 kHz, 0.01% at 50Hz, 0.5% at 10kHz
Frequency Response: Phono (RIAA)	+ 0.15dB 50Hz - 20kHz (1-dB at 20Hz)
High Level	+0, -1dB 20Hz - 30kHz (-3dB at 10Hz and 50kHz)
Rise Time	5µS at rated power
Channel Separation	70dB at 1kHz, 50dB 20Hz - 20kHz
Noise (A-Wtd/Unwtd)	Phono MC (ref. 0.5mV) 75dB/70dB MM (ref. 5mV) 83dB/74dB High Level (ref. 500mV) 96dB/86dB
Input Sensitivities (for rated output at 1kHz)	
Phono MC	160µV
MM	2.7mV
High Level	210mV
Input Impedances: Phono	47 k or 100 ohms
High Level	50 k ohms
Input Overload Levels (at 1 kHz):	
Phono MC	7mV (+33dB)
MM	120mV (+33dB)
High Level	Infinite
Phase	Noninverting throughout
Power Requirements	110-120/220-240 VAC, 50-60Hz, 300VA max.
Dimensions (mm/inches)	420/16.5(W), 105/4.1(H), 305/12.0(D)
Weight (kg/lb)	8.0/17.6

McLAREN AUDIO

A division of **Zetka Industries Limited,** PO Box 30-406, Lower Hutt, New Zealand. Telephone (04) 683-903. Telex NZ 31668 ZETKA

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Introduction

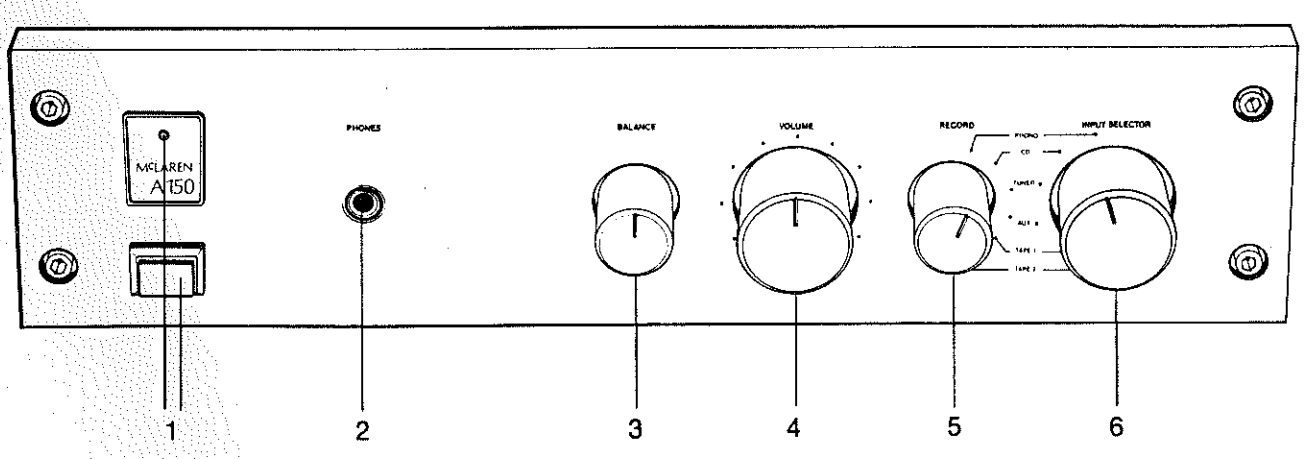
The McLaren A150 is a true audiophile integrated amplifier, with input facilities for moving coil or moving magnet phono cartridges, as well as five high level sources including two tape inputs and a dedicated CD input.

The phono input provides 78 db(MM) or 103 dB (MC) of gain (from input to speaker output of the amplifier) at 1kHz. The phono stage is split into two active gain blocks, the first an input buffer stage with a flat frequency response and switchable gain. The second stage incorporates the RIAA equalization and additional gain.

The high level inputs have 42 dB of gain (max) with a flat frequency response. Volume and balance controls are also provided in this stage.

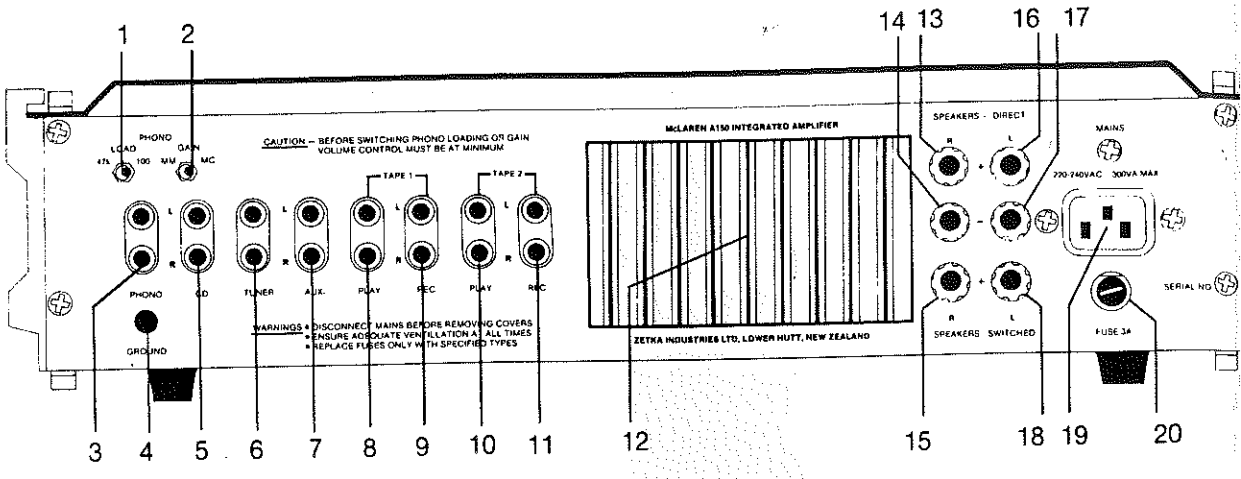
Two tape record outputs are also provided. Record signal is selected by a second 6-position rotary switch completely independent of the input selector. This switching is done at high level no amplification is provided between Tuner, CD, Aux or Tape inputs, and record output.

Control Diagram A150



1 Power switch and On indicator
2 Head phone socket
3 Balance control
4 Volume control
5 Record selector
6 Input selector

Input Output Diagram A150



1 Phono loading switch
2 Phono gain switch
3 Phono input sockets
4 Turntable earth nut
5 Compact Disc input
6 Tuner input
7 Auxiliary input
8 Tape 1 - Play input
9 Tape 1 - Record output
10 Tape 2 - Play input
11 Tape 2 - Record input
12 Amplifier heatsink
13 Direct + speaker output right channel
14 Direct/Indirect - speaker output right channe
15 Indirect + speaker output right channel
16 Direct + speaker output left channel
17 Direct/Indirect - speaker output left channel
18 Indirect + speaker output left channel
19 Mains appliance connector socket
20 Mains fuse

OPERATING INSTRUCTIONS.

1. Phono
2. Line Level
3. Tape Record Output

1,Phono operation
Gain-MC/MM

NOTE The McLaren A150 is normally shipped set for moving magnet (MM) operation.

Changing the gain of the A150 is simply a matter of operating the gain switch located on the extreme right of the back panel as viewed from the front.

WARNING: Ensure that the volume control is set at minimum before changing the loading to avoid switching transients which may damage speakers.

Cartridge Loading

The A150 is provided with two loading options, one for moving magnet cartridges and one for moving coils. The correct load for most moving magnet cartridges (and some moving coils) is 47kohms. For moving coil cartridges a suitable load is 100 ohms. This is set by the switch located next to the gain switch.

WARNING: Ensure that the volume control is set to minimum before changing the loading to avoid switching transients which may damage speakers.

Once the phono gain and loading are correct proceed as follows...

a. Connect the speaker wiring to the colour coded binding posts, being careful to get the phasing correct.

The positive speaker leads should be connected to the RED terminals.(The top two red terminals are directly connected, while the lower two are switched via the headphone socket,being muted when a headphone plug is inserted).

The negative speaker leads should be connected to the BLACK terminals.

Left output is on the left hand side as viewed from the front of the unit while the right is on the right hand side viewed from the front.

b. Connect a turntable to the phono input sockets (located on the right hand end of the unit viewed from the front). Connect the turntable earth (ground) lead to the terminal provided.

c. Connect the unit to the mains and switch it on. After approximately 5 seconds a slight click should be heard from the muting relay, indicating that it has opened, allowing signals to pass.

d. Set the volume control to a low listening level (about 8o'clock).

e. Select PHONO on the input selector.

f. Adjust the volume to the desired listening level.

2. High Level Operation

a. Connect the speaker wiring to the colour coded binding posts, being careful to get the phasing correct.

The positive speaker leads should be connected to the RED terminals. (The top two red terminals are directly connected while the lower two are switched via the headphone socket, being muted when a headphone plug is inserted).

The negative speaker leads should be connected to the BLACK terminals.

Left output is on the left hand side as viewed from the front of the uni while the right is on the right hand side viewed from the front.

b. Connect the output from the CD Player, Tuner or Tape Deck etc, to the appropriate input sockets with a high quality interconnecting cable taking care not to reverse the channels.

c. Connect the unit to the mains and switch on. After approximately 5 seconds a slight click may be heard from the muting relay, indicating that it has opened allowing signals to pass.

d. Set the volume control to a low listening level, (about 8o'clock).

e. Select the appropriate input on the input selector switch.

f. Adjust the volume to the desired listening level.

3. Tape Record Outputs

These outputs provide a line level recording signal of whichever source is selected on the RECORD selector switch.

a. Connect the tape RECORD outputs on the McLaren A150 to the record inputs of the tape deck and the tape PLAY sockets to the play output of t tape deck.

b. Connect the programme source you wish to record following the instructions in the appropriate section above.

c. Select the required source on RECORD selector, turn the tape deck o and begin recording.

NOTE Any source may be selected on the INPUT SELECTOR while recording th same or any other source with no affect on the recording.

Control Description

ON/OFF Switch

The on/off switch on the McLaren A150 applies mains voltage to the primary side of the mains transformer, and so power to the unit. It also controls the muting relay,so clamping the preamplifier section output to earth immediately after switch off.

Balance

The BALANCE control allows either channel to be cut with respect to the other. Clockwise rotation or this control progressively cuts the left hand channel . Anticlockwise rotation of this control progressively cuts the right hand channel.

Volume Control

This is a passive attenuator control which with clockwise rotation progressively increases the gain of the preamplifier from minus infinity dB to +104 dB (MC operation),+79 dB (MM operation) or +42 dB (High level inputs).

Record Selector

The RECORD rotary switch selects any of the inputs to the preamplifier for recording purposes,directing whichever input source is selected to both tape 1 & 2 Record outputs.
NOTE The Record selector operates independently of the Input selector, so that any input may be selected while recording the same or any other input.

Input Selector

The INPUT rotary switch selects whichever programme source is required for listening purposes.
NOTE The input selector operates independently of the record selector, so that any input may be recorded while listening to the same or any other input.

Headphone Socket

The headphone socket can be used in two ways dependent on the way the speakers are connected. Firstly if the speakers are connected to the DIRECT speaker terminals ,plugging a set of headphones in will provide signal to the headphones and also allow the speakers to continue operating. If however the speakers are connected to the INDIRECT output terminals, the output to the speakers will be automatically muted whenever the headphones are plugged in.

Mechanical Description

The construction of the McLaren A150 comprises seven major mechanical/electrical modules. These are...

1. The main PC board, which carries all the electronic components, including control potentiometers, switches, input sockets and output devices.
2. Front Panel. Made from extruded and drilled aluminum, with a light bronze anodised finish.
3. Back Panel. The back panel carries the mains fuse, earthing(grounding input and output sockets. This panel is made from punched sheet aluminum and finished in black. The finned heatsink protrudes through it.
4 Top Cover. Made from sheet aluminum and finished in black

NOTE Removal of the top cover gives access to the component side of the Board.

5. Bottom Cover. Made from sheet aluminum and finished in black .

NOTE Removal of the bottom cover gives access to the solder side of the Board.

6. and 7. Left and right hand side rails. Made from extruded aluminum an finished in black

Access for servicing is by removing the top and bottom panels which ar secured by 3/16inch cap screws.

NOTE Care should be taken to not mix top and bottom screws as top cover screws are LONGER and may damage the pretapped threads provided for the bottom cover screws.

Electrical Description

The McLaren A150 consists of 8 stages (4 per channel) and a power supply. Fig 1.
From input to output these are (description for one channel only)...

Phono Input Stage Fig 3

This stage consists of two differential pairs made up of 2SC2546 transistors and BC560 transistors, The input pair (2SC2546) are run at a current of 5mA per transistor to ensure a low noise figure when the circuit is driven from very low impedance sources (3-100ohms). The output differencial pair (BC560) are run with a total current of 20ma, this allows the circuit to drive the 680 ohm feedback loop. A current sorce in the form of a BF245B has been used to load the output side of the BC560 pair thus allowing the output to swing from rail to rail.
Another BF245B has been used to regulate the current in the input differencial pair, this also provides high rejection of power supply noise thus allowing a high quality, but noisy supply to be used.
The stage has a flat frequency response with gains of 146 times (43dB) of 11.9 (21.5dB) dependent on the phono gain setting. Output impedance is less than 50 ohms at 1kHz.
The input to the stage is DC coupled with loading switchable between 47kohms and 100ohms, DC coupling of the input ensures that distortion is minimised at this critical interface. The output from the stage is AC coupled via 1uF polypropylene capacitor to avoid DC offsets being amplified by consequent stages.

RIAA Equalization Stage Fig 4

The active part of this stage is formed by an NE5534 IC, this is a low noise, high speed operational amplifier providing very good sonic results at a minimal cost.
At the input to the stage there is a passive RC filter using a 4K7 resistor and a 15nF capacitor. This provides the high frequency RIAA equalization. The low frequency section of the characteristic is formed by the 3n3 capacitor, 91K and 1MO resistors in the feedback loop.
The input is coupled to the output capacitor of the input stage and the output is AC coupled through a 1uF polypropylene capacitor. Gain of the section is 100 times (40dB) at 1KHz. The input impedance of the stage is 12Kohms and the output impedance is 150 ohms.
The RIAA stage has its own regulated power supply consisting of two three terminal regulators.

Switching Stage Fig 5

This is a totally passive stage consisting of two "flex" switches. The flex switches provide for the selection of program material on the inputs of the preamplifier for either auditioning or recording.
The two "flex" selector switches are connected in such a way that they function independently of one another, allowing any input to be selected while recording the same or any other input.

Line and Power Stage Fig 6

The first part of the line stage is the volume control, which is a 50Kohm potentiometer operating as a passive attenuator.
The active part of the line stage follows the volume control,and consists of three stages per channel. The input stage is an integrated circuit whic provides a current modulated signal to the emitters of the driver stage transistors. The driver transistors provide a voltage shift (BC639 and 64(transistors) . The modulated current is then imposed across a resistor providing the voltage drive for the output devices (n and p channel power mosfets), with the sorces connected to the supply rail and drain to the output they provide a high voltage gain and good supply rejection. The output is the feedback to the IC.
The input is DC coupled and is fed to the input of the IC. The output stage is then followed by an inductor and RC network which ensure that the amplifier is stable into highly reactive loads and preventing capacitive loads effectively becoming a short circuit at high frequencies.
This stage has a flat frequency response with a gain of 41 times (114dB) with the balance at the mid point. Input impedance to the stage is 50Kohms and the output impedance is 0.22ohms at 100Hz.

Functional Check Procedure

The following is a full functional check procedure for the McLaren A150, some of which may not be required for checking specific problems.

Check Procedures

1. Noise.....(i) phono
   .(ii) high level
2. Input Sensitivity.....(i) phono
   (ii) high level
3. Input Overload.....phono
4. Distortion and Power
5. RIAA response.....phono
6. Bandwidth.....high level
7. Crosstalk.....all inputs
8. Relay Operation
9. Balance Control
10. Quiesent Current
11. D.C. Offset
12. Rise Time

1. Noise Check

(i) Phono

NOTE Check the gain setting of the phono stage, following the operating instructions Pg 2.

High Gain

a. Load the phono input by using pole 1 of the gain selector switch set to 100ohms (pole 1 ON), and a further 100ohm loading plug.
b. Plug a measuring instrument (preferably an audio volt meter) into the pre out sockets taking care to avoid hum loops. Set the volume control to maximum.
c. Set the input selector to PHONO .
d. Plug the unit into the mains and switch on.
e. Read the measuring instrument used.

NOTE At this sensitivity the preamplifier is sensitive to stray magnetic and electric fields, so care should be taken to keep transformers etc well away from the unit under test.

Noise for the McLaren A150 Phono high gain should be ...

Unweighted -33dB ref 1V at the output = -70dB ref 500uV at the input.

Weighted -39dB ref 1V at the output = -76dB ref 500uV at the input.

Low Gain

a.Load the input by using pole 1 of the gain selector switch set to 47Kohms (pole 1 OFF), and a further 1Kohms loading plug.
b.Plug a measuring instrument (preferably an audio volt meter) into the pre out sockets taking care to avoid hum loops set the volume control to maximum.
c.Set the input selector to PHONO.
d. Plug the unit into the mains and switch on.
e. Read the measuring instrument used.

NOTE At this sensitivity the preamplifier is sensitive to stray magnetic and electric fields, so care should be taken to keep transformers etc away from the unit under test.

Noise for the McLaren A150 Phono low gain should be...
Unweighted -41dB ref 1V at the output = -74dB ref 5mV at the input.
Weighted -50dB ref 1V at the output =-83dB ref 5mV at the input.

(ii) High Level

a. Load the appropriate input sockets with loading plugs with 10Kohm resistors in them.
b. Plug a measuring instrument (preferably an audio volt meter) into the pre out sockets, and set the volume control to maximum.
c. Set the input selector to the input being measured.
d. Plug the unit into the mains and switch on.
e. Read the measuring instrument used.

High level input noise for the preamplifier should not exceed...
Unweighted -51dB ref 1V at the output = -86dB ref 500mV at the input.
Weighted -61dB ref 1V at the output = -96dB ref 500mV at the input.

2. Input Sensitivity

(i) Phono

NOTE Check the gain setting of the phono stage, using the instructions in the operating instructions Pg 2

NOTE Take care to avoid hum loops when measuring phono sensitivity as the hum will lead to an incorrect measurement

High Gain

a. Connect a signal generator to the left hand PHONO input socket.
b. Connect a measuring instrument (preferably an audio voltmeter) to the left hand output speaker post.
Set the volume control to maximum, and the input selector to the PHONO input.
.d. Ensure that the input impedance is set at 47Kohms .
e. Plug the unit into the mains and switch on.
f. Set the signal generator to a 1KHz sine wave and adjust its level to give full output (24vrms).
g. Measure the signal level at the PHONO input.
The input signal for full output should be 160uV rms.
h. Repeat the procedure for the other channel.

Low Gain

a. Connect a signal generator to the left hand PHONO input socket.
b. Connect a measuring instrument (preferably an audio voltmeter) to the left hand speaker post.
c. Set the volume control to maximum, and the input selector to the PHONO input.
d. Ensure that the input impedance is set at 47Kohms .
e. Plug the unit into the mains and switch on.
f. Set the signal generator to a 1KHz sine wave and adjust its level to give full output (24v).
g. Measure the signal level at the PHONO input.
The input signal for full output should be 2.7mVrms.
h. Repeat the procedure for the other channel.

High Level

a. Connect a signal generator to the left hand input socket on the appropriate input.
b. Connect a measuring instrument (preferably an audio voltmeter) to t left hand speaker post.
c. Set the volume control to maximum, and the input selector to the appropriate input.
e. Plug the unit into the mains and switch on.
f. Set the signal generator to a 1kHz sine wave and adjust its level to give full output(24vrms).
g. Measure the signal level at the appropriate input.
The input signal for full output 210mV rms.
h. Repeat the procedure for the other channel.

Record Outputs

(1) Phono

NOTE Check the gain setting of the phono stage, using the instructions in the operating instructions Pg 2

NOTE Take care to avoid hum loops when measuring phono sensitivity as the hum will lead to an incorrect measurement.

High Gain

a. Connect a signal generator to the left hand PHONO input socket.
b. Connect a measuring instrument (Preferably an audio voltmeter) to the left hand REC socket.
c. Set the Record selector to the PHONO input and volume to min.
d. Ensure that the input impedance is set at 47Kohms (Pole 1 OFF).
e. Plug the unit into the mains and switch on.
f. Set the signal generator to a 1kHz sine wave and adjust its level to give 1Vrms at the record output.
g. Measure the signal level at the PHONO input.
The input signal for 1Vrms output should be 760uVrms.
h. Repeat the procedure for the other channel.

Low Gain

a. Connect a signal generator to the left hand PHONO input socket.
b. Connect a measuring instrument (preferably an audio voltmeter) to the left hand REC socket.
c. Set the Record selector to the PHONO input.
d. Ensure that the input impedance is set at 47Kohms and the volume set to min.
e. Plug the unit into the mains and switch on.
f. Set the signal generator to a 1KHz sine wave and adjust its level to give 1Vrms at the record output.
g. Measure the signal level at the PHONO input.
The input signal for 1Vrms output should be 12.9mV rms.
h. Repeat the procedure for the other channel.

High Level

a. Connect a signal generator to the left hand input socket on the appropriate input.
b. Connect a measuring instrument (preferably an audio voltmeter) to the left hand REC socket.
c. Set the record selector to the appropriate input and set the volume to min.
d. Plug the unit into the mains and switch on.
e. Set the signal generator to a 1KHz sine wave and adjust its level to give 1Vrms at the record output.
f. Measure the signal level at the appropriate input.
The input signal for 1Vrms output should be 1Vrms.
h. Repeat the procedure for the other channel.

3. Input Overload Phono

NOTE Check the gain setting of the phono stage, using the instructions in the operating instructions Pg 2.

High Gain

a. Connect a signal generator to the left hand PHONO input socket.
b. Connect an oscilloscope to the left hand record-out socket.
c. Set the record selector to the PHONO input.
d. Ensure that the input impedance is set at 47Kohms and the volume set t min.
e. Plug the unit into the mains and switch on.
f. Set the signal generator to a 1KHz sine wave and adjust its level gradually . Continue increasing the input level until clipping becomes visible.
g. Measure the signal level at the PHONO input.
Input overload should be 7mV at 1KHz.

Low Gain

a.Connect a signal generator to the left hand PHONO input socket.
b. Connect an oscilloscope to the left hand record out socket.
c. Set the input selector to the PHONO input
d. Ensure that the input impedance is set at 47Kohms and the volume set t min.
e. Plug the unit into the mains and switch on.
f. Set the signal generator to a 1KHz sine wave and adjust its level gradually. Continue increasing the input level until clipping becomes visible.
g. Measure the signal level at the PHONO input.
Input overload should be 120mV at 1KHz.

4. Distortion (THD)

All Inputs

a. Connect a low distortion signal generator to the left hand input socket of the appropriate input.
b. Connect a distortion analyser and an eight ohm to the left hand speaker posts being careful to observe the correct polarity.
RED should be connected to the positive meter lead.
BLACK should be connected to the negative meter lead..
c. Set the input selector to the appropriate input.
d. Ensure that the input impedance is set at 47Kohms(pole 1 OFF) if measuring the phono input.
e. Plug the unit into the mains and switch on.
f. Adjust the analyser using the manufacturer's instructions to give the required measurements.
g. Repeat the above procedure for the right hand channel.

NOTE Avoid running the amplifier at levels at which the input may become overloaded or noise may make a significant contribution to measured distortion. Also do not run the amplifier at high output above 20Khz as this may damage the output R.F. suppression network.

NOTE Take care to avoid hum loops when measuring distortion as the hum will lead to an incorrect measurement.

Distortion of less than 1.0% should be achieved from 20Hz to 20KHz. and less than 0.1% at 1Khz

Maximum output

a. Connect a signal generator to the left hand high level input socket of the amplifier.
b. Connect either a distortion analyser or an oscilloscope to the left channel output terminals being careful to observe the correct polarity.
RED should be connected to the positive meter lead.
BLACK should be connected to the negative meter lead.
Also connect an 8ohm 100watt load across the output terminals.
c. Connect the unit to the mains and switch on.
d. Slowly increase the signal generator output until.
i. Distortion analyser, a steep rise in distortion is noted indicating clipping.
ii. Clipping is visible on the oscilloscope screen.
Maximum output should be greater than...
8ohm load..24.5Vrms...75Watts
4ohm load..19.0Vrms...90Watts
Note. To measure the 4ohm performance repeat procedures a to d but connect a suitable 4ohm load to the output terminals.
e. Repeat the above procedure for the right hand channel.

5. RIAA Response

a. Connect a signal generator to the left hand PHONO input socket.
b. Connect a measuring instrument (preferably an audio voltmeter) to the left hand record out socket.
c. Set the input selector to the PHONO input.
d. Ensure that the input impedance is set at 47Kohms and the volume to min.
e. Plug the unit into the mains and switch on.
f. Set the signal generator to a 1KHz sine wave and adjust its level unt a convenient reference output level is reached.
g. Sweep the signal generator frequency up and or down to the spot frequencies below and measure the output with respect to the 1KHz reference.
h. Repeat the above procedure for the right hand channel.

NOTE Take care to avoid hum loops, and overloading the input when measuring RIAA response, as the hum or an overload will lead to an incorrect measurement.

RIAA Response

FREQUENCY	OUTPUT ref 1KHz
50Hz	+17.0dB
100Hz	+13.1dB
500Hz	+2.6dB
1KHz	+0.0dB
2KHz	-2.6dB
5KHZ	-8.2dB
10KHz	-13.7dB
15KHz	-17.2dB
20KHz	-19.6dB

The preamplifier should conform to this response to within + or - 0.2dB

6. Bandwidth

a. Connect a signal generator to the left hand input socket of one of t high level inputs.
b. Connect a measuring instrument (preferably an audio voltmeter) to th left hand speaker posts.
c. Plug the unit into the mains and switch on.
d. Set the signal generator to 1Khz and a level so that the preamplifi output level is at a convenient reference.
e. Now sweep the frequency up or down to find the -1dB and -3dB points These should be at...-1dB at 30KHz and 20Hz
-3dB at 60KHz and 10Hz
f. Repeat the procedure for the other channel.

7. Crosstalk

Phono

a. Connect a signal generator to the left hand input socket of the PHONO input.
b. Connect a measuring instrument (preferably an audio voltmeter) and an eight ohm load to the left hand speaker posts being careful to observe the correct polarity.
RED should be connected to the positive meter lead.
BLACK should be connected to the negative meter lead..
c. Set the volume control to about 12 O'Clock.
d. Plug the unit into the mains and switch on.
e. Set the signal generator to 1KHz and a level so that the output level is at a convenient reference.
f. Measure the output from the right hand channel by connecting a measuring instrument to the right hand output socket.
g. Repeat steps b,e and f for spot frequencies across the audio band. Substitute the measuring frequency for 1KHz in step e.
Crosstalk should be better than...
20Hz to 2KHz better than -65dB ref the driven channel.
2KHz to 20KHz better than -50dB ref the driven channel.
h. Repeat the above procedure for the other channel.

High Level

a. Connect a signal generator to the left hand input socket of a high level input.
b. Connect a measuring instrument (preferably an audio voltmeter) and an eight ohm load to the left hand speaker posts being careful to observe the correct polarity.
RED should be connected to the positive meter lead.
BLACK should be connected to the negative meter lead..
c. Set the volume control to about 12 O'Clock.
d. Plug the unit into the mains and switch on.
e. Set the signal generator to 1KHz and a level so that the preamplifier output level is at a convenient reference.
f. Measure the output from the right hand channel by connecting a measuring instrument to the right hand output socket.
g. Repeat step f for spot frequencies across the audio band. There is no need to re adjust the input level.
Crosstalk should be better than...
20Hz to 2KHz better than -80dB ref to the driven channel.
2KHz to 20KHz better than -60dB ref to the driven channel.
h. Repeat the above procedure for the other channel.

8. Relay Operation

a. Connect a signal generator to the left hand input socket of a high level input.
b. Connect a measuring instrument (preferably an audio voltmeter) to the left hand speaker posts.
c. Set the volume control to about 12 O'Clock.
d. Set the signal generator to give a preamplifier output of 50 mV approx
e. Plug the unit into the mains and switch on.
f. Output should not immediately appear, there should be a 10 second delay, then a slight click will be heard and the signal will be present at the output.
g. Repeat the above procedure for the other channel.

NOTE Output should be muted immediately on switch off.

9. Balance Control

a. Connect a signal generator to the left hand input socket of a high level input.
b. Connect a measuring instrument (preferably an audio voltmeter) to the left hand pre out socket.
c. Set the volume control to about 12 O'Clock.
d. Plug the unit into the mains and switch on.
e. Set the signal generator to 1KHz and a level so that the amplifier output level is at a convenient reference.
f. Rotate the balance control clockwise. The output from the left channel should fall to zero. Anticlockwise rotation will cause no change.
g. Repeat the above procedure for the right hand channel.
For the right hand channel anticlockwise rotation will fall to zero. Clockwise rotation will cause no change.

2. Quiescent Current (IQ)

WARNING: This procedure should only be attempted by a qualified person as it involves adjustments being made while the amplifier is running.

WARNING: Some internal parts are live. Do not set the IQ trinpot so that its resistance is less than 20Kohms

a. Ensure unit is disconnected from the mains supply and no input or load is connected.
b. Using the 5/32" Allen key provided unscrew the four cap screws which secure the top cover and slide it back.
c. Locate the mosfet output devices.
d. Carefully remove one of the screws closest to the back from a 2SK135 see fig , on one channel only and place a current meter(preferably a fused type) in place of the screw(observe polarity shown in fig when using an analog meter), set the meter range 400mA or greater.
e. Ensure that there are no short circuits to chassis or other components.
f. Plug the unit into the mains and switch on. The IQ should increase rapidly then gradually to a maximum of 100mA after 5 minutes. If the IQ is not set at 100mA it will be necessary to adjust the trimpot until a reading of 100mA is obtained.
Left channel, clockwise rotation will increase IQ Anticlockwise will decrease IQ.
Right channel, clockwise rotation will decrease IQ. Anticlockwise rotation will increase IQ.
g. Once the IQ has been set turn the power off and disconnect the amplifier from the mains, wait for the current to drop, then remove the meter and replace the fuse. Repeat procedures a-f for the other channel.

11. DC Offset

The D.C. offset on the Mclaren A150 cannot be reset but should be expected to fall within +or- 10 mV of 0V

12. Rise Time

a. Connect a signal generator to a left hand input socket of the amplifier.
b. Connect an oscilloscope and 8ohm load to the left hand output binding posts of the amplifier being careful to observe the correct polarity.
RED should be connected to the positive scope lead.
BLACK should be connected to the negative scope lead.
c. Connect the unit to the mains and switch on.
d. Set the signal generator to give a 1KHz square wave, and adjust the level to give a 100V peak to peak output.
e. Read off the oscilloscope the time taken to go from 10% to 90% output as shown below in fig 6.

The rise time should not exceed 5 micro seconds.
f. Repeat the above procedure for the right hand channel.

RTS LIST	DESCRIPTION	SUPPLIER PART No
	RESISTORS	
(R1,RIL1	RESISTOR MRS25 100e	2322-156-11001
(R2,RIL2	RESISTOR MRS25 47K	2322-156-14703
(R3,4,RIL3,4	RESISTOR MRS25 330e	2322-156-13301
(R5,RIL5	RESISTOR MRS25 6e8	2322-156-16808
(R6,RIL6	RESISTOR MRS25 91e	2322-156-19109
(R7,RIL7	RESISTOR MRS25 4.7e	2322-156-14708
(R8,RIL8	RESISTOR MRS25 680e	2322-156-16801
(R9,RIL9	RESISTOR MRS25 47e	2322-156-14709
(R11,RIL11	RESISTOR MRS25 1K	2322-156-11003
(ER1,REL1	RESISTOR MRS25 330	2322-156-13301
(ER2,REL2	RESISTOR MRS25 4K7	2322-156-14702
(RER4,REL4	RESISTOR MRS25 91K	2322-156-19103
(ER5,REL5,	RESISTOR MRS25 10K	2322-156-11003
(ER6,REL6	RESISTOR MRS25 1M	2322-156-11005
(ER7,REL7	RESISTOR MRS25 27K	2322-156-12703
(ER8,REL8	RESISTOR MRS25 15K	2322-156-11503
(LR1,RLL1	RESISTOR MRS25 2K2	2322-156-12202
(LR2,7,RLL2,7	RESISTOR MRS25 10K	2322-156-11003
(LR3,4,RLL3,4	RESISTOR MRS25 47K	2322-156-14703
(LR5,6,RLL5,6	RESISTOR MRS25 2K7	2322-156-13302
(LR8,RLL8	RESISTOR MRS25 82e	2322-191-38209
(LR9,RLL9	RESISTOR PR37 2e2	2322-191-32208
(LR10,11,12,RLL10,11,12	RESISTOR PR37 22e	2322-191-32209
(LR13,RLL13	RESISTOR PR37 390e	2322-191-13901
(P1,RP2	RESISTOR PR37 180e	2322-191-31501
(P3	RESISTOR MRS25 91K	2322-156-19103
(P4	RESISTOR MRS25 220K	2322-156-12204
(P5	RESISTOR PR37 680e	2322-191-38201
(P6	RESISTOR MRS25 2K2	2322-156-12202
	CAPACITORS	
(IR1,CIL1,CIR6,CIL6	150pF POLYSYRENE 630V	2222-427-41501
(IR2,CIL2	6n8 POLYSTYRENE 63V	2222-424-46802
(IR3,CIL3,	1uF POLYPROPYLENE 160V	WIMA 1uF 160V
(IR4,5,CIL4,5	100uF ELECTROLYTIC 63V	2222-037-5801
(ER1,CEL1	15n POLYSTYRENE 63V	2222-424-41503
(ER2,CEL2,CSR1,CSL1	3n3 POLYSTYRENE 63V	2222-424-43302
(ER3,CEL3	1uF POLYPROPYLENE 160V	WIMA 1uF 160V
(ER4,5,CEL4,5	100uF ELECTROLYTIC 63V	2222-037-5801
(LR2,3,CLL2,3	1000uF 10V ELECTROLYTIC	2222-037-54102
(LR4,CLL4,CP15	220uF ELECTROLYTIC 25V	2222-037-55221
(LR6,7,CLL6,7	0.33uF POLYESTER 250V	2222-368-41334
(LR8,9,CLL8,9	1uF POLYESTER 100V	2222-368-21105
(LRI0,CLL10	330pF POLYSYRENE 630V	2222-427-43301
(P,1,2,3,4,5,6,7,8,9,10	2200uF ELECTROLYTIC 63V	SHAMWA 2200uF 63V
(P17	0.047uF POLY 240 VAC	2222-330-00473
(P,11,12,13,14,18	100uF ELECTROLYTIC 63V	2222-037-5801
(P16	0.0047uF CERAMIC	2023-999-10012

SEMICONDUCTORS

TIR1,2,TIL1,2 TIR3,4,TIL3,4 TIR5,6,TIL5,6 (RIR10)	2SC2546 TRANSISTOR BC560 NPN TRANSISTOR BF245B JUNCT/FET	2SC2546E B560 BF245B
GIR1,GIL1 GIR2,GIL2	7815 REGULATOR 7915 REGULATOR	7815 7915
RER1,IER2 GER1,GEL1 GER2,GEL2	NE5534 OP AMP 7815 REGULATOR 7915 REGULATOR	NE5534 7815 7915
TLR1,TLL1,TP1 TLR2,TLL2 TLR3,TLL34 TLR4,TLL4 ILR1,ILL1 DLR1,2,DLL1,2,DLR5,6,DLL5,6 DLR3,4,DLL3,4,	BC639 NPN TRANSISTOR BC640 PNP TRANSISTOR 2SJ50 POWER MOSFET 2SK135 POWER MOSFET ZK150IC 5V6 ZENER DIODE 12V ZENER DIODE	BC639 BC640 2SJ50 2SK135 ZK150 BZX79C 5.6 BZX85C 12
DP1,DP2 DP3 DP4 BP1 GP1 GP2	15V ZENER DIODE 12V ZENER DIODE SUPER BRIGHT LED BRIDGE RECTIFIER 7815 REGULATOR 7915 REGULATOR	BZX79C 15V BZX85C 12 HLMP-1401 YELLOW BR104 7815 7915

POTENTIOMETERS

PL1	50KLOG DUAL POT (TEMP)	K272A002K-50KDX2
PLR3,PLL3	470K TRIMPOT	2322-410-03363
PL2	100K LIN POT (TEMP)	

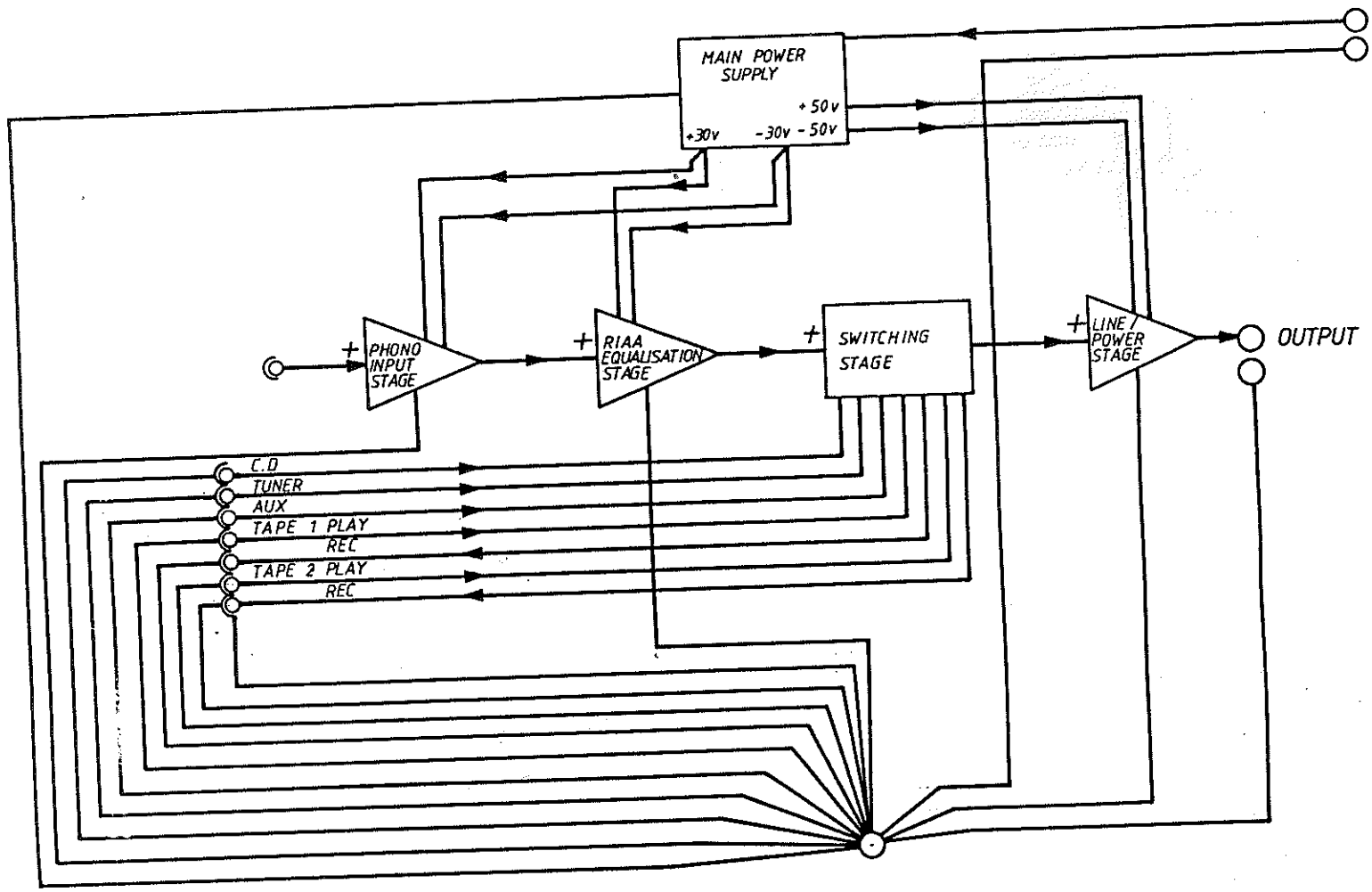
INPUT OUTPUT CONNECTORS FRONT/BACK/PCB BITS

	SPKR POSTS-RED	T23ARD
	SPKR POSTS-BLACK	T23ABK
	NYLON T03 SPACER	
	SILPADS	IN706B
	ROTARY SWITCH 6 WAY	SRBU06
	ROTARY SWITCH 6WAY	SSSR24
	PRINTED CIRCUIT BOARD	XXX-1-2987
SW3	MAINS SWITCH	SW160
	MAINS POWER TRANSFORMER	TD475
AP1	APPLIANCE CONNECTOR	8843 ZPL 40
	FUSE HOLDER (MAINS)	3032210
	FUSE CLIPS PC MNT	FH11
	TOGGLE SWITCH DPDT	MS341F
	CORDSET ?	CORDSET
	4WAY PHONE SOCKETS	T-5941
	20mm 3AMP FUSES	FSS2
	20mm 3AMP FUSE	FSL3

HARDWARE

	1/4 x 3/4CAP SCREW GOLD	1/4x3/4CAP SCREW
	KNURLED EARTH NUT	05-300-M4

TRANSFORMER SPACER	11-150-T1
SIDE RAIL - L/S	08-402-LIP
SIDE RAIL - R/S	08-402-RIP
FRONT PANEL	08-150-1A
BOTTOM COVER	16-150-BC1P
A150 BACK PANEL	16-150-BP1PS
TOP COVER	16-402-TC1P
BADGE 1102	18-150-1
PLASTIC FEET PLASTIC	20-402-2
LARGE KNOBS	21-402-L1A
SMALL KNOBS	21-402-S1A
WASHER PLATE	WASHER PLATE
	FOR PACKING
POLYSTYRENE TOP/BOTTOM	90-500-4021
POLYSTYRENE END BLOCKS	90-500-402
McLAREN BOX (BROWN)	McLAREN BOX (BROWN)
LEAFLETS (INFO)	91-150-1
ALLEN KEY 5/32	
3A FUSE 32mm	62-300-FSL3
3A FUSE 20mm	62-200-FSS3
RED BANANA PLUGS	
BLACK BANANA PLUGS	



NOTE

ONLY ONE CHANNEL IS SHOWN, ALL SECTIONS EXCEPT THE MAIN POWER SUPPLY ARE REPEATED FOR THE OTHER CHANNEL

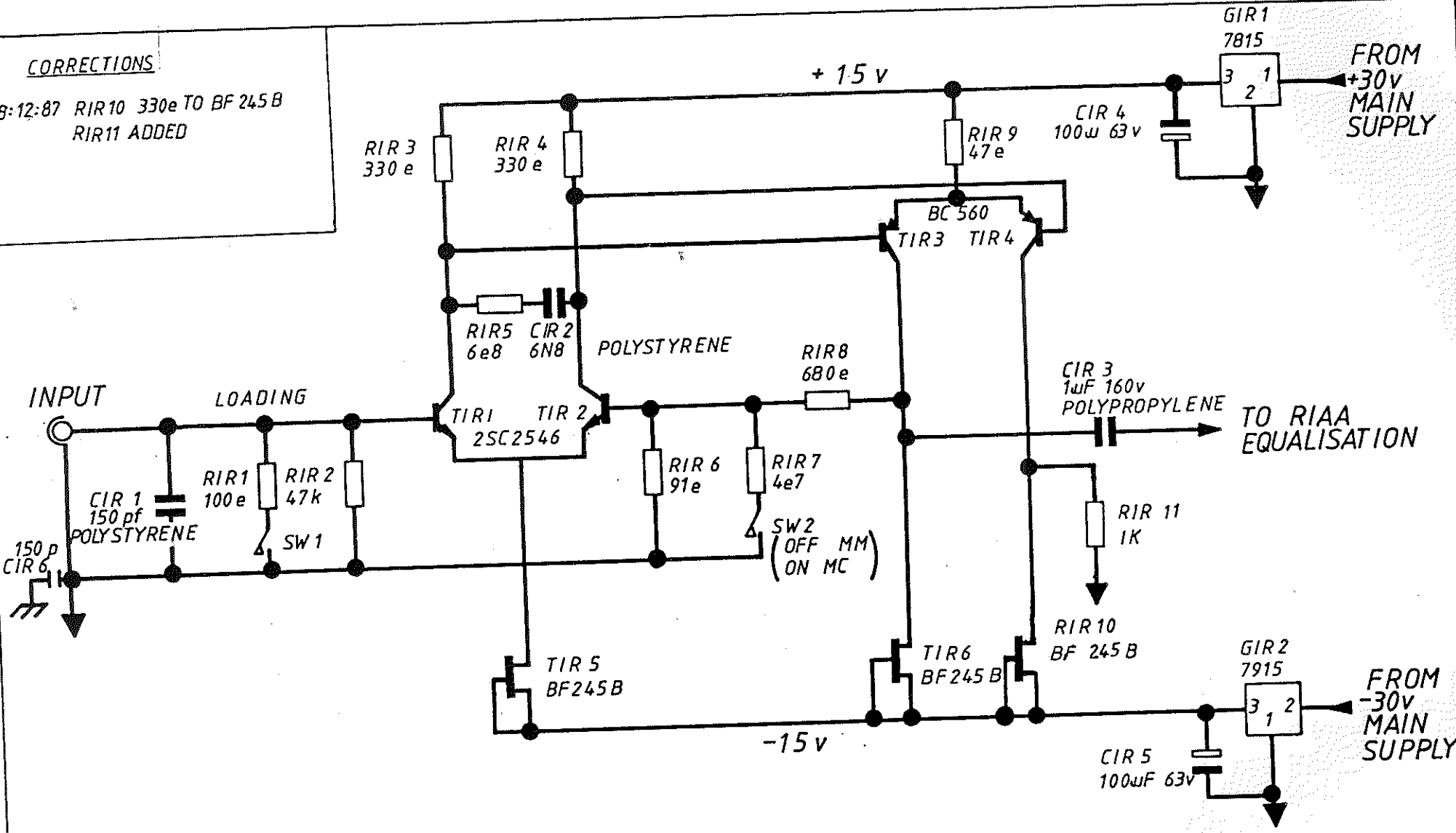
McLAREN A150 INTERGRATED AMPLIFIER — Fig 1 SCHEMATIC DIAGRAM

14-9-87

			SHEET
DRAWN	CHECKED	SCALES	SERIES OF
TRACED	DATE		REF

CORRECTIONS

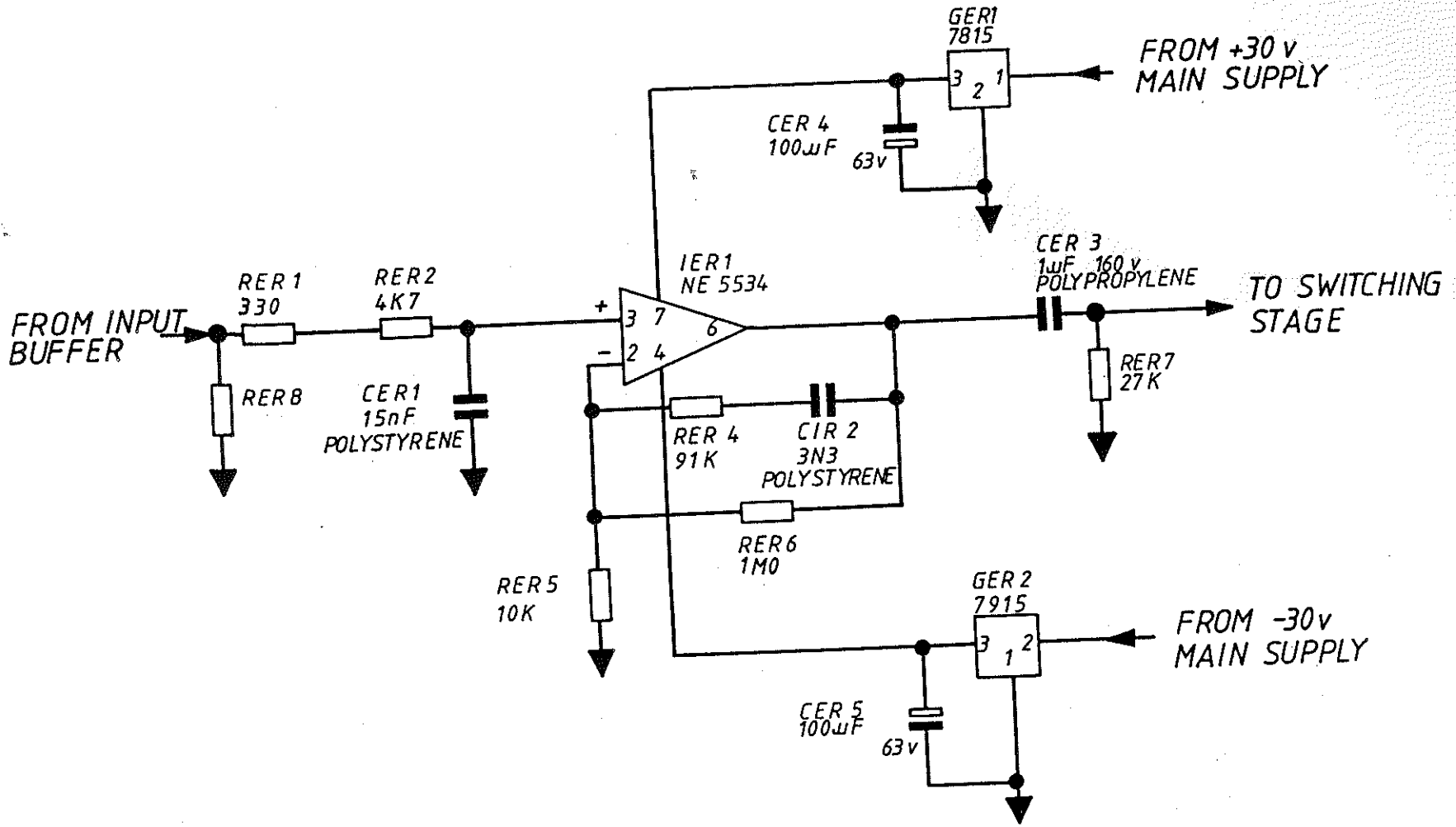
18:12:87 RIR10 330e TO BF 245B
RIR11 ADDED



McLAREN A150 INTERGRATED AMPLIFIER – Fig 2 INPUT BUFFER

14-9-87

SCALE:	
DRAWN:	BC
APPROVED:	
DATE: 14:9:87	



DRAWN:

APPROVED:

SCALE:

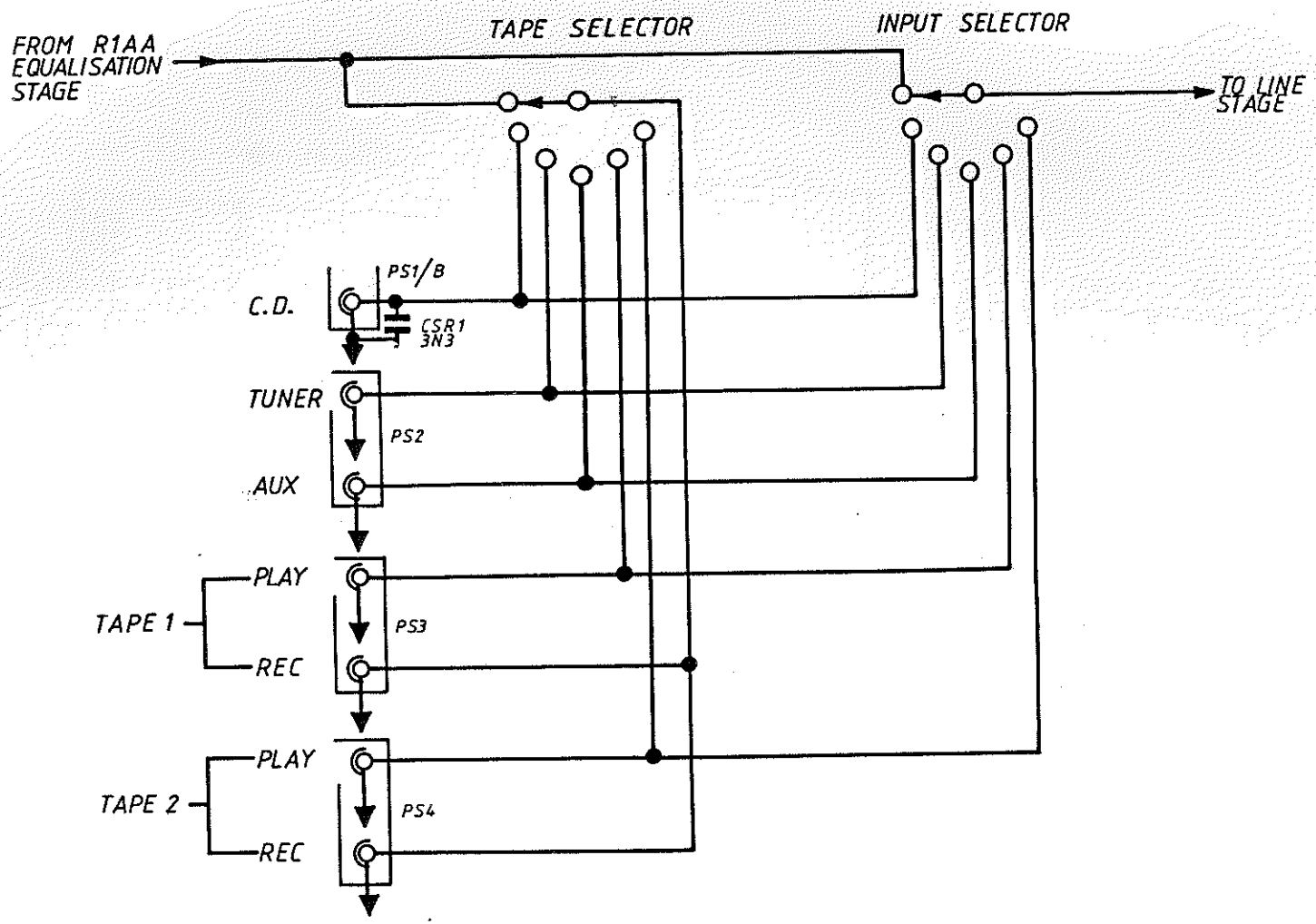
DATE:

McLAREN A150 INTERGRATED AMPLIFIER

Fig 3 — RIAA EQUALISATION STAGE

14-9-87

18:12:87 CP16 0·047uF TO 4N7 250VAC

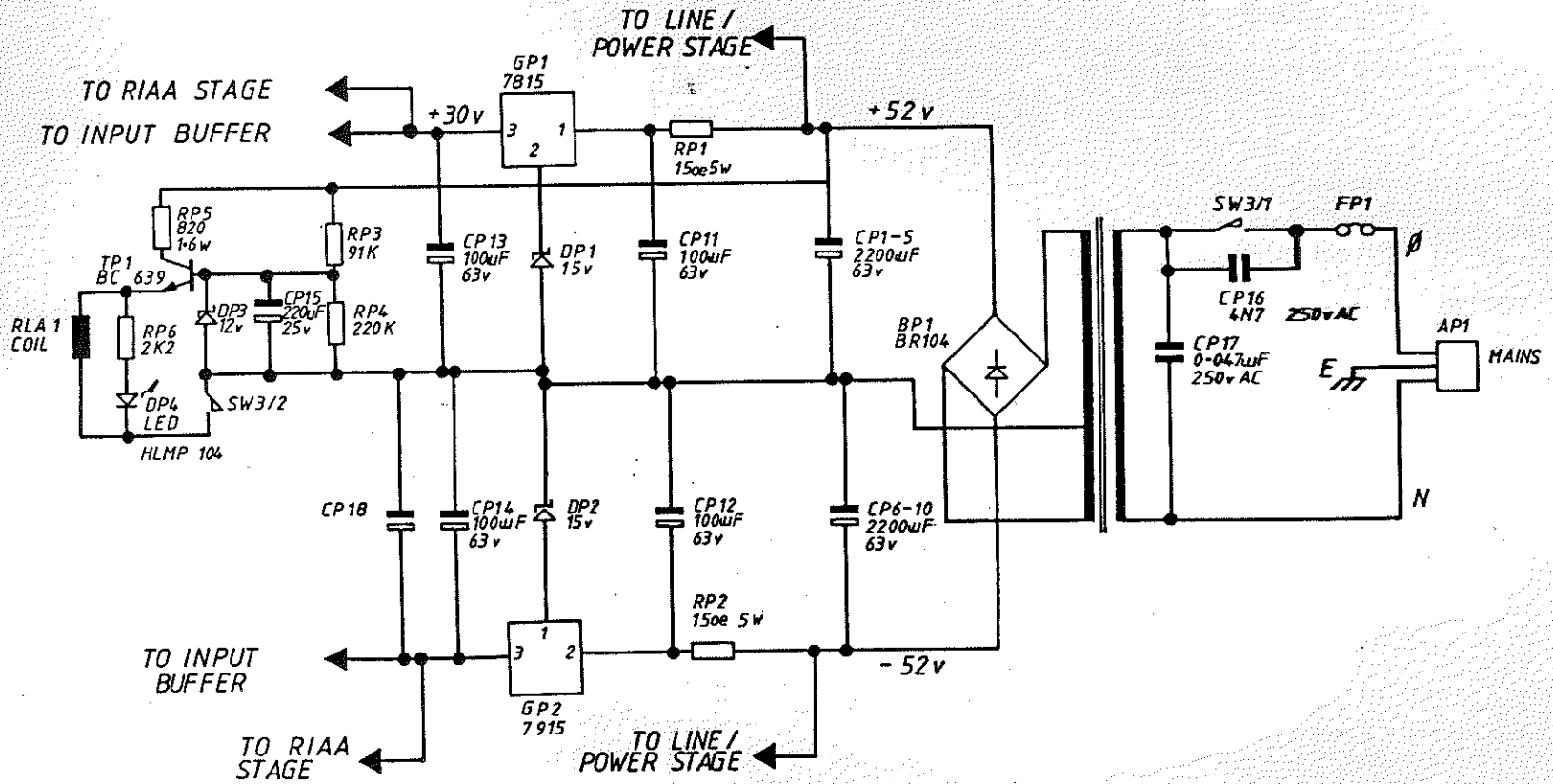


McLAREN A150 INTERGRATED AMPLIFIER — Fig 4 SWITCHING SCHEMATIC

			SHEET
DRAWN	CHECKED	SCALES	SERIES OF
TRACED	DATE		REF

CORRECTIONS

18:12:87 CP16 0·047uF TO 4N7 250VAC



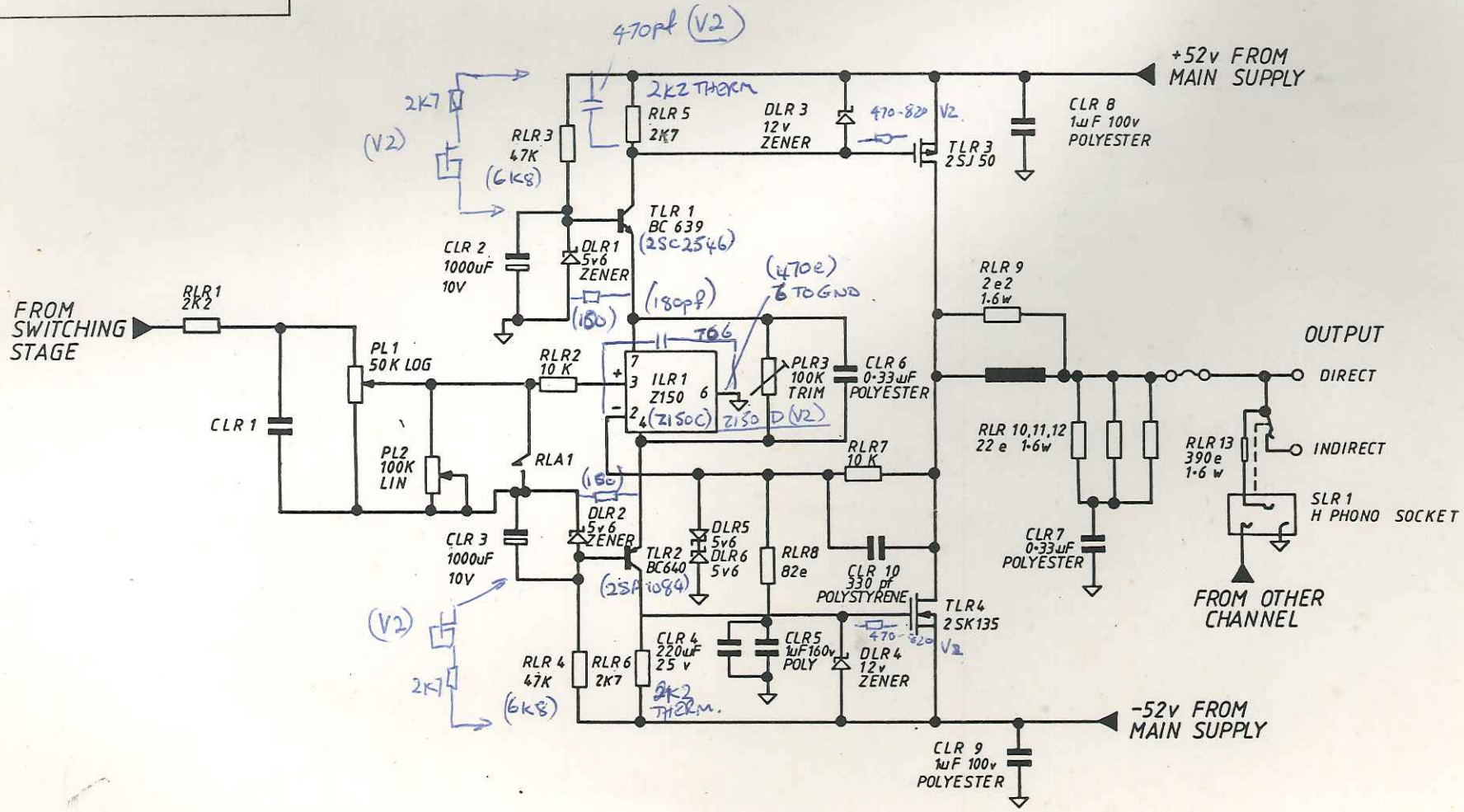
McLAREN A 150

INTERGRATED AMPLIFIER — Fig 6 MAIN POWER SUPPLY

			SHEET
	CHECKED RC	SCALES	SERIES OF
	DATE 14·9·87		REF

CORRECTIONS

18:12:87 RLR 3 AND RLR4 8K2 TO 47K
CLR2 AND CLR3 220uF TO 1000uF 10V
RLR5 AND RLR6 3K3 TO 2K7



McLAREN A 150 INTERGRATED AMPLIFIER

Fig 5 VOLUME / BALANCE AND POWER AMP

14-9-87

ADJUST TO 03 PERFORMANCE BLUE (VALUES)
V2 MODIFICATION FOR MORE.
16/9/87 FOUND GATE RESISTOR REQUIRED FOR STABILITY. 470-820Ω.

				SHEET
DRAWN	CHECKED BC	SCALES		SERIES OF
TRACED	DATE			REF