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SERVICE MANUAL
AUDIOLAB 8000A
MODEL 207
SERIAL NOS 87.. & 89..

CONTENTS

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- 2. Bias setting
- 3. Transistor outlines
- 4. Muting circuit
- 5. Transformer colour code and fuse ratings
- 6. Independent operation of pre/power amplifier

7. Drawing (Issue) Description

CST207-022	(1)	MC AMPLIFIER CIRCUIT		
CST207-023	(2)	MM AMPLIFIER CIRCUIT		
CST207-024	(3)	LINE/TONE AMPLIFIER CIRCUIT		
CST207-025	(4)	POWER AMPLIFIER CIRCUIT		
CST207-026	(5)	PROTECTION AND RELAY DRIVE CIRCUIT		
CST207-027	(3)	POWER SUPPLY CIRCUIT		
CST207-028	(4)	CIRCUIT AND WIRING SCHEMATIC		
CST207-036	(3)	COMPONENT SIDE PCB	CST207-016	ISSUE 3
CST207-036	(4)	COMPONENT SIDE PCB	CST207-016	ISSUE 4
CST207-037	(3)	TRACK SIDE ... PCB	CST207-016	ISSUE 3
CST207-037	(4)	TRACK SIDE ... PCB	CST207-016	ISSUE 4

1. POWER AMPLIFIER

1.1 It is unlikely that an output transistor will fail unless other components are defective.

1.2 If output transistors have failed check Q501, Q503 (L.Ch), and Q502, Q504 (R.Ch), dual emitter resistor R493 (L.Ch) and R494 (R.Ch), and other suspect components.

1.3 Do not re-set bias current unless amplifier is working correctly.

2. BIAS SETTING

2.1 The bias current is set by resistors R809, R811 (L.Ch) and R810, R812 (R.Ch). The original resistors must be removed from the PCB before re-biasing. New resistor values are chosen by measuring the voltage across dual emitter resistors R493 (L.Ch) and R494 (R.Ch). Resistors are selected to give a voltage reading of 22mV for a bias current of 50mA.

2.2 Ensure driver heatsinks (Driver heatsink 207/209) securely fixed with thermally conducting grease (eg. Dow Corning DC340).

2.3 Connect bias test leads by temporarily soldering to the PCB test pads (TP1-TP8). See drawing CST207-036.

LEFT CHANNEL

TP1 to +ve DC voltmeter
TP3 to -ve DC voltmeter
TP5 to R809, R811
TP7 to R809, R811

RIGHT CHANNEL

TP2 to +ve DC voltmeter
TP4 to -ve DC voltmeter
TP6 to R810, R812
TP8 to R810, R812

Note: Voltmeter inputs must not be grounded, use high input impedance meter.

2.4 Amplifier baseplate and cover should be in place, fixing screws need not be fitted. Test leads can be passed out under rear of cover or through slots in baseplate.

2.5 Select range on DC voltmeter to read 22mV $\pm 20\%$

2.6 Resistors R809/R810 are generally selected from the range 2K0, 2K4, 2K7, 3K3, 3K9, 4K7, 6K8, 12K. R811/R812 are selected from the range 16K to 150K or O/C. Use good quality metal film resistors.

2.7 When changing bias resistors do not let the bias current exceed 100mA - a voltmeter reading of 44mV.

2.8 Connect correct voltage mains supply and switch on power.

2.9 After about 1 minute the bias current should be set to 100mA (44mV), after a few minutes it will fall to a steady value. Select resistors R809/R811 (L.Ch) and R810/R812 (R.Ch) to give a bias current of 50mA (Voltage reading 22mV). Generally the voltage can be set quite close to 22mV, but a tolerance of 20% is acceptable. Any sudden variations in bias current caused by changing the resistors must be allowed to stabilise before choosing the final resistor values.

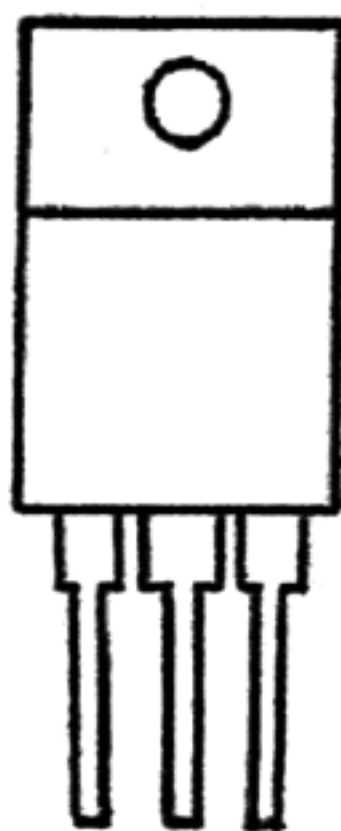
2.10 Ensure bias current remains stable for 4-5 mins.

2.11 Disconnect mains power. Remove baseplate and cover.
Disconnect test leads. Solder selected resistors onto rear of
amplifier PCB.

3. TRANSISTOR OUTLINES

Replacement parts may use a different package to the type originally fitted, check the lead-out connections against the drawing below:

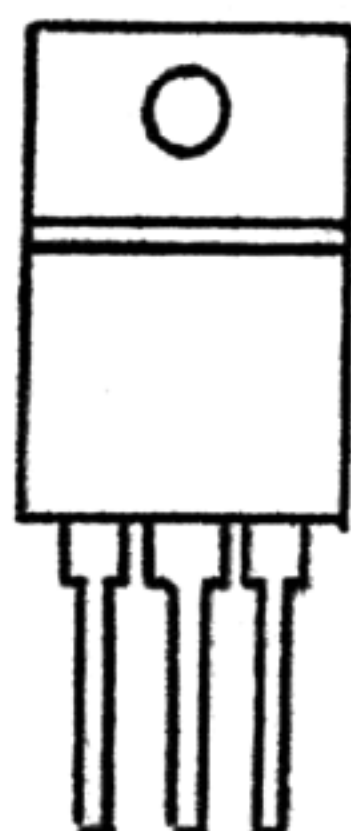
TO220



B C E

2SC2168
2SA958

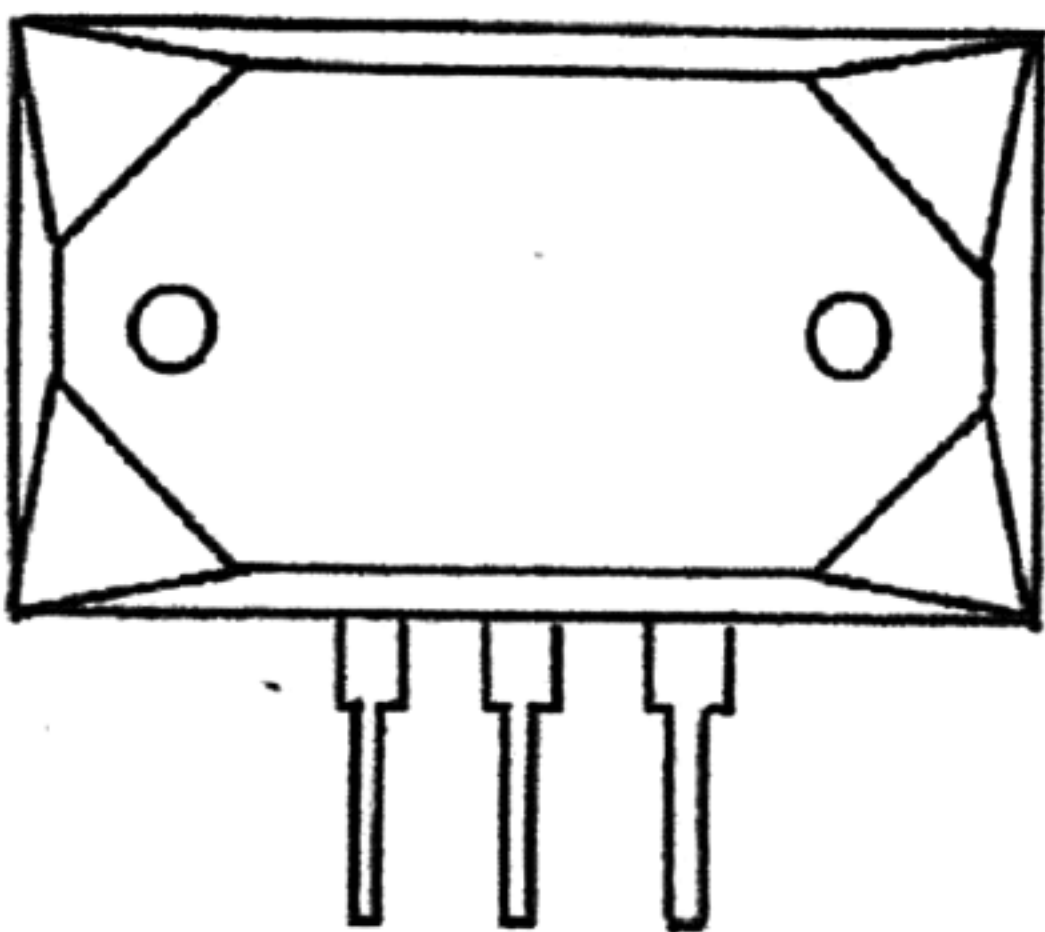
TO220 FULL MOLD



B C E

2SC3851
2SA1488
2SC4382
2SA1668

MT200



B C E

2SC2922
2SA1216

TO92



C B E

BC550B
BC560B
BC546B
BC556B

E-LINE



E B C

BC550B
BC560B
BC546B
BC556B
ZTX653
ZTX753
MPSA42
MPSA92

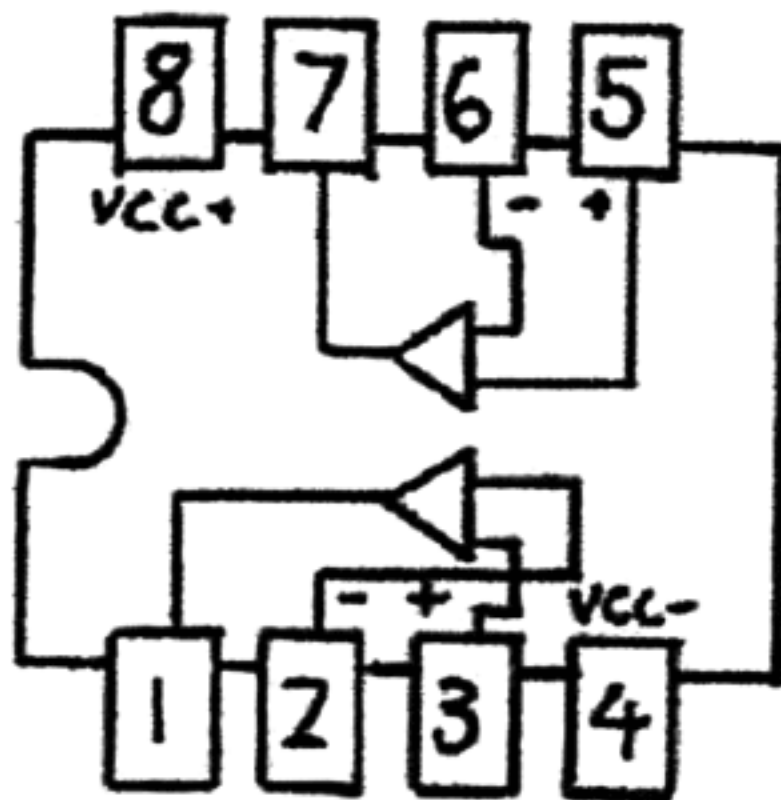
TO92



E B C

MPSA42
MPSA92

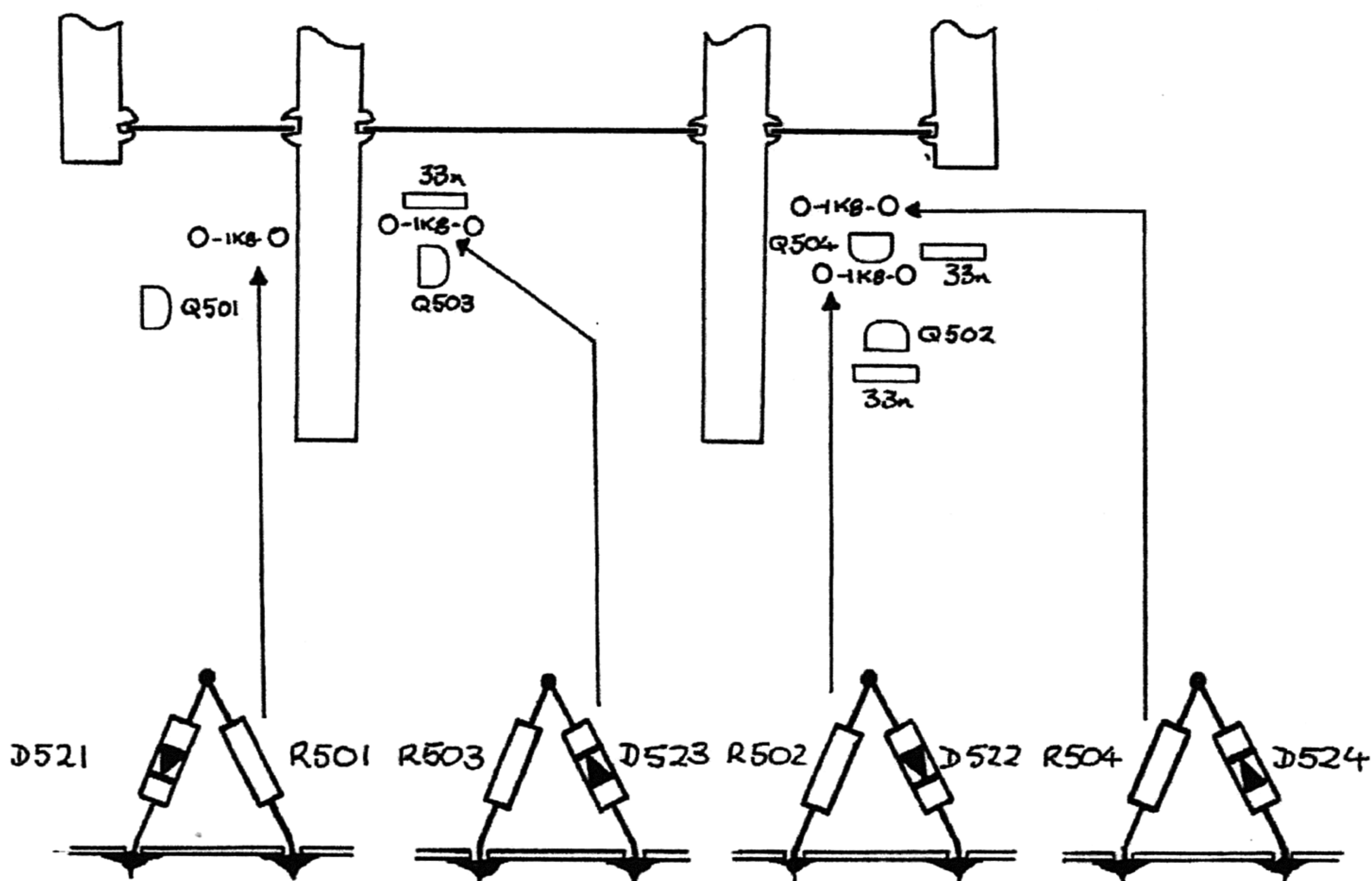
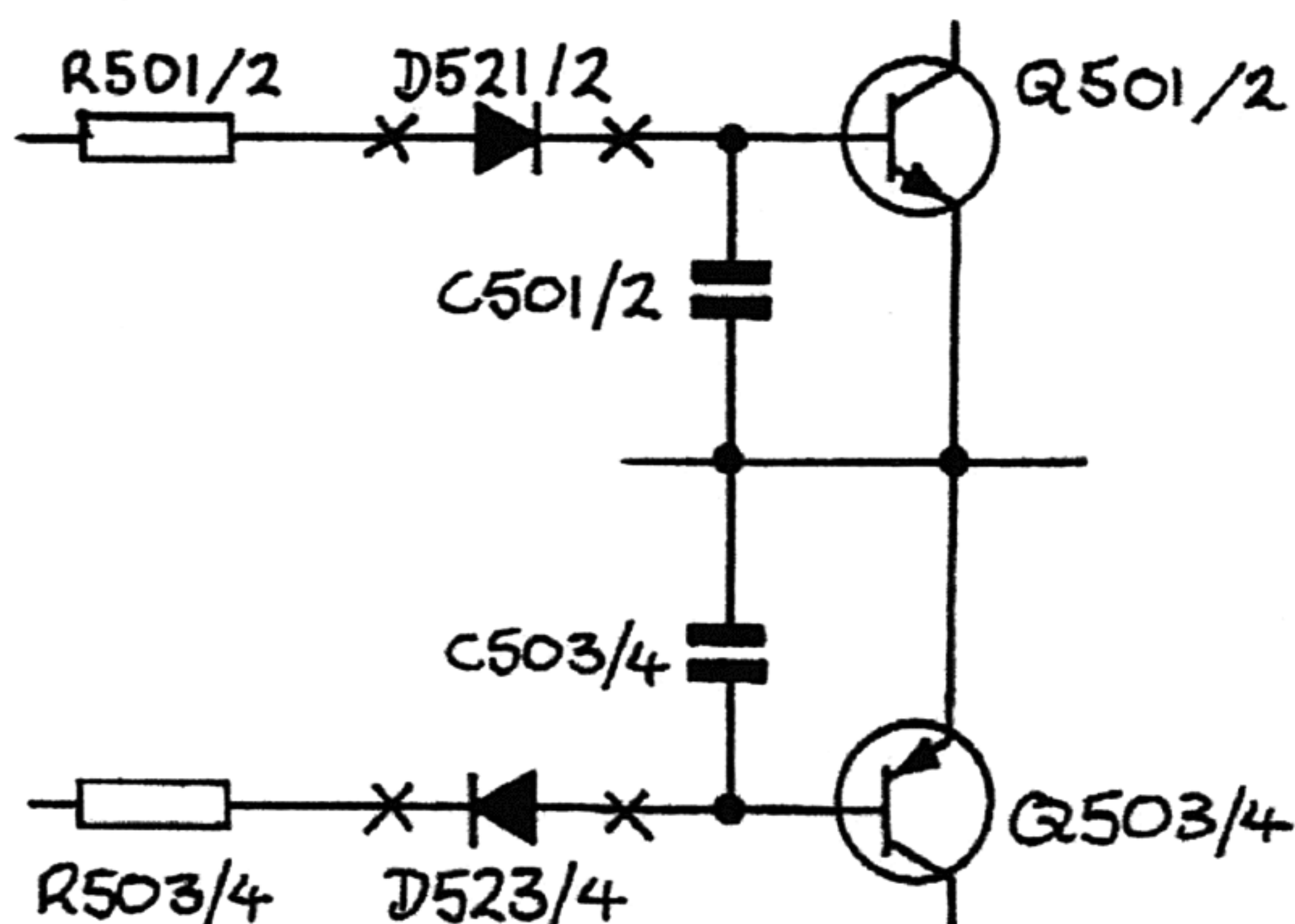
TL072



4. MUTING CIRCUIT

Note: applies only to amplifiers with serial no 87 ..

If muting circuit trips on bass transient when driving 4ohm speaker at very high level, fit diodes D521, D522, D523, D524 (1N4148 or 1N914) in series with R501, R502, R503, R504 (1K8) as shown below.



5. TRANSFORMER COLOUR CODE & FUSE RATINGS

5.1 TRANSFORMER COLOUR CODE

***	(L)		Black	<u>Voltage</u>	***
				240V	BROWN
				230V	ORANGE
				220V	WHITE
			Red	200V	GREEN
			Orange	120V	VIOLET
				110V	GREY
				100V	BLACK
Blue	(N)		Yellow		

Early production models only:

			<u>240V*</u>	<u>220V</u>	<u>120V</u>	<u>110V</u>
Brown	(L)		Black	Black	Black	Black
			Red	White	Red	Red
			Orange	Orange	Orange	Grey
Blue	(N)		Yellow	Yellow	Violet	Violet

* except CE734 - 100V

5.2 FUSE RATINGS

The fuse is a 20x5mm (T) time-lag type with plated wire element.

<u>VOLTAGE</u>	<u>FUSE RATING</u>	
240V	T2.5A	(Note chassis label shows T2.0A)
230V	T2.5A	(Note chassis label shows T2.0A)
220V	T2.5A	(Note chassis label shows T2.0A)
200V	T3.15A	
120V	T3.15A	
110V	T4.0A	
100V	T4.0A	

6. INDEPENDENT OPERATION OF PRE/POWER AMPLIFIER

NOTE 1. The pre-amp output is not muted at switch on/off. If the 8000A is used to drive another power amplifier, always SWITCH THE 8000A ON FIRST (before the power amp) and always SWITCH THE 8000A OFF LAST (after the power amp).

NOTE 2. For amplifiers with Serial numbers 89 .. it is possible to fit a PCB mounted pre-amp output muting relay, see 6.3.

6.1 PCB ISSUE 3 - Serial nos 87 .. Separate pre-power amp.
Remove links L701/L702. Fit links L703/L704. If any DC or sub-sonic signals might be fed to power amplifier fit C701/C702 (1.0 μ F/160V 10% polypropylene capacitor) in place of links L703/L704. See drawing CST207-036 Issue 3.

6.2 PCB ISSUE 4 - Serial nos 89 .. Separate pre-power amp.
Remove R711/R712 (560R). Fit R713/R714 (560R) - use good quality metal film resistors. If any DC or sub-sonic signals might be fed to power amplifier fit C701/C702 (1.0 μ F/160V 10% polypropylene capacitor) in place of R713/R714. See drawing CST207-036 Issue 4.

6.3 PCB ISSUE 4 - Serial nos 89 .. Pre-amp output muting.
If automatic pre-amp output muting is required fit RL2 (48V 2PCO relay) to PCB. Two wires are required to energise the coil. The two points marked RL2+ and RL2- (adjacent to the relay RL2) must be wired to the corresponding points marked RL2+ and RL2- adjacent to the main relay RL1. See drawing CST207-036 Issue 4.

Each time mains power is switched on the pre-amp outputs will be muted for approx. 8 seconds. When mains power is switched off the pre-amp outputs will mute. The pre-amp output will also mute while headphones are connected.

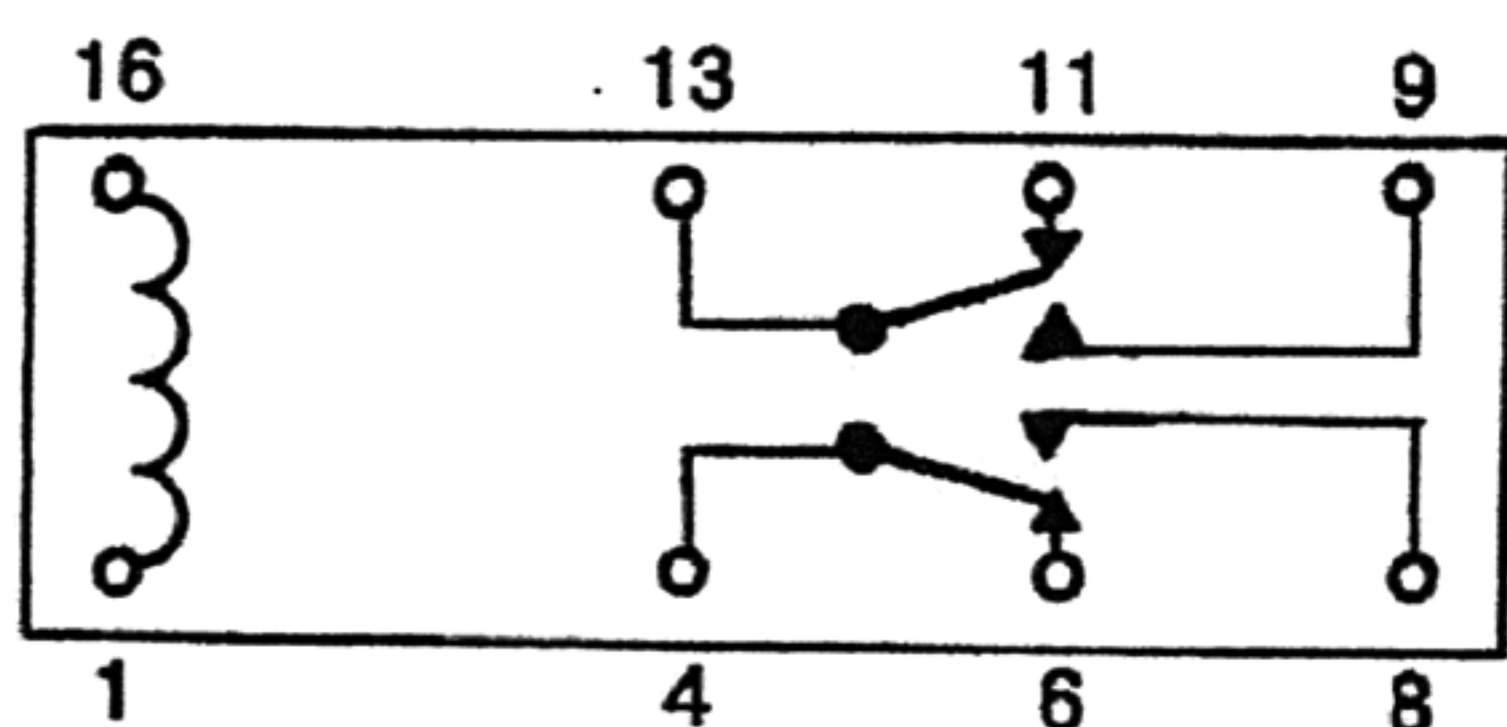
RL2 SPECIFICATION

Contacts: 2 pole change over (2PCO)

Coil: 48V DC/4000 ohms.

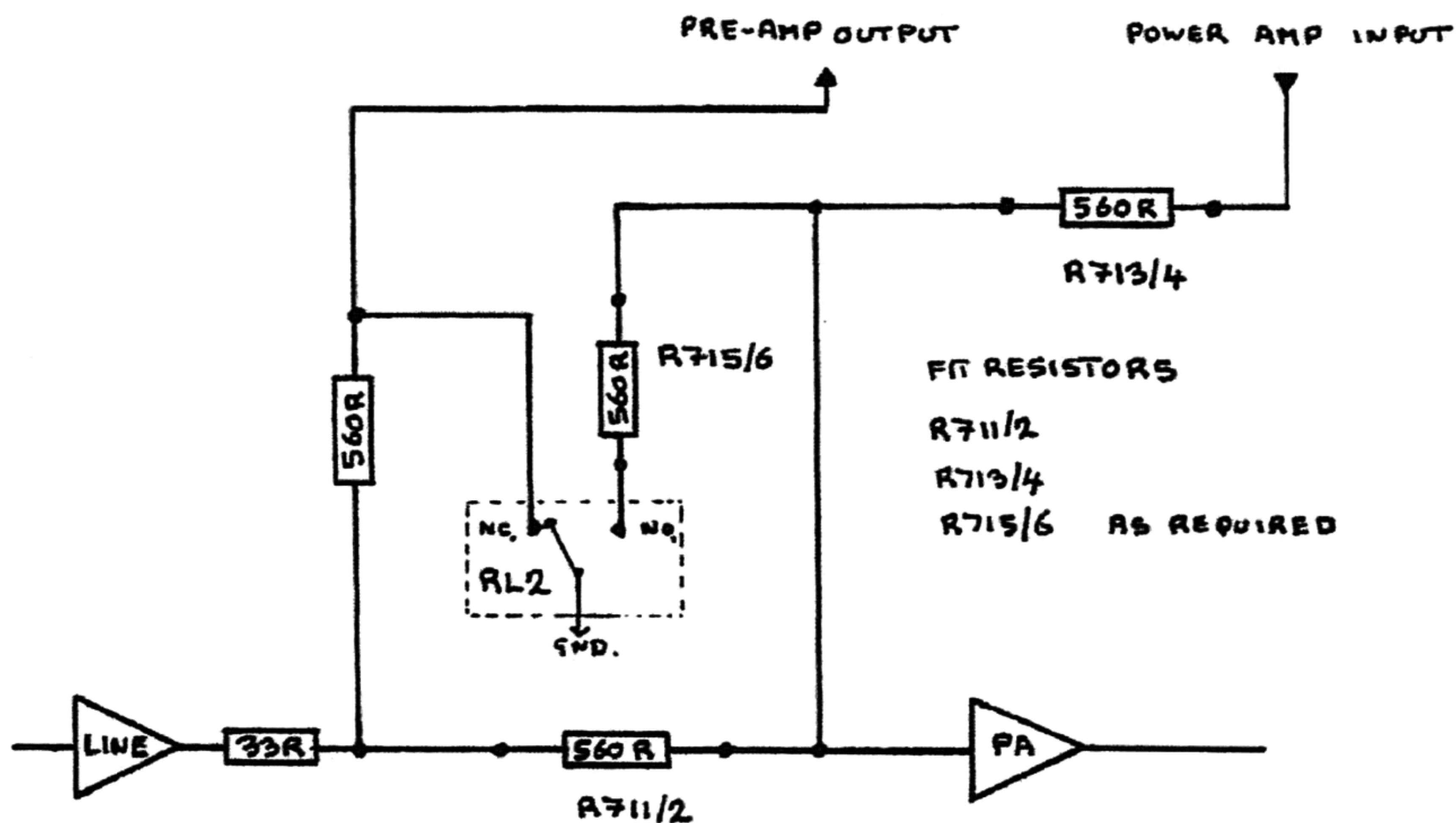
Case: DIL

Pin layout: as below.



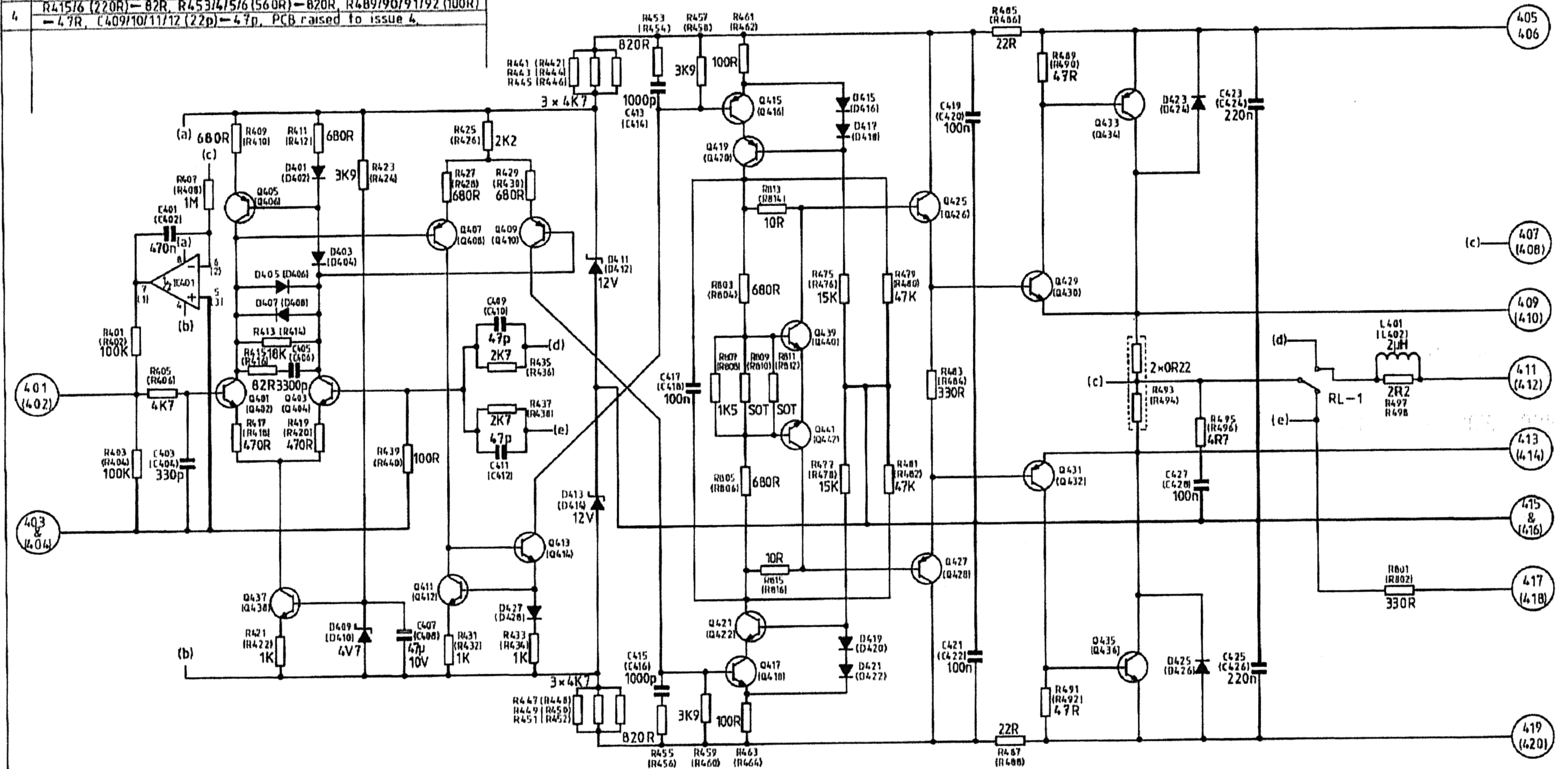
6.4 PCB ISSUE 4 - Serial nos 89 .. Use 8000A power amp as headphone amp (without external pre-power connections) when pre-amp section is used to drive external power amp eg. Audiolab 8000P power amplifier.

- * Muting relay RL2 must be fitted as per 6.3.
- * Separate pre-power amp sections as per 6.2.
- * Fit R715/R716 (560R).
- * When headphones are connected pre-amp output will automatically mute.
- * For optimum sound quality, gain of 8000A power amp is reduced by 6dB so that internal power amp is not driven into clipping earlier than external Audiolab 8000P power amplifier.
- * This setting is not recommended for bi-amped speaker system.



WIRING DIAGRAM PCB ISSUE 4

Modification	Details
2	From PCB No. 849 Q425/6 changed from MPSA 42 to ZTX 653, Q427/8 changed from MPSA 92 to ZTX 753 N/A.
3	From PCB No. 5151 biasing and driver transistors altered PCB issue raised to 3
4	R415/6 (220R) - 82R, R453/4/5/6 (560R) - 820R, R489/90/91/92 (100R) - 47R, C409/10/11/12 (22p) - 47p, PCB raised to issue 4.



D401/2/3/4/5/6/7/8/15/16/17/18/19/20/21/22/27/28:- 1N4148 D423/24/25/26:- 1N4002 D409/10:- BZY88 4V7 D411/12/13/14:- BZY88 12V
 Q401/2/3/4/11/12/13/14/17/18/37/38:- BC 546B Q405/6/7/8/9/10/15/16:- BC 556B Q421/22/39/40:- ZTX 653 Q419/20/41/42:- ZTX 753
 Q425/26:- MPSA 42 Q427/28:- MPSA 92 Q429/30:- 2SC2168 Q431/32:- 2SA958 Q433/34:- 2SA 1216 Q435/36:- 2SC 2922
 IC401: TL072CP OR 2SC4382 OR 2SA1668

4	From Serial No. 8934001, see Mod.4			9-388
3	Circuit & component changes, see Mod.3			29-7-86
2	Component change, see Mod.2			4-2-85
No.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

CAMBRIDGE SYSTEMS TECHNOLOGY LTD.

POWER AMPLIFIER CIRCUIT MODEL 8000A (Type 207)

DRAWN	TRACED	CHECKED	APPROVED	DATE	SCALE
TDSS				13-10-84	

DRAWING No. CST 207 - 025

DRG No.

D201/2/3/4:-

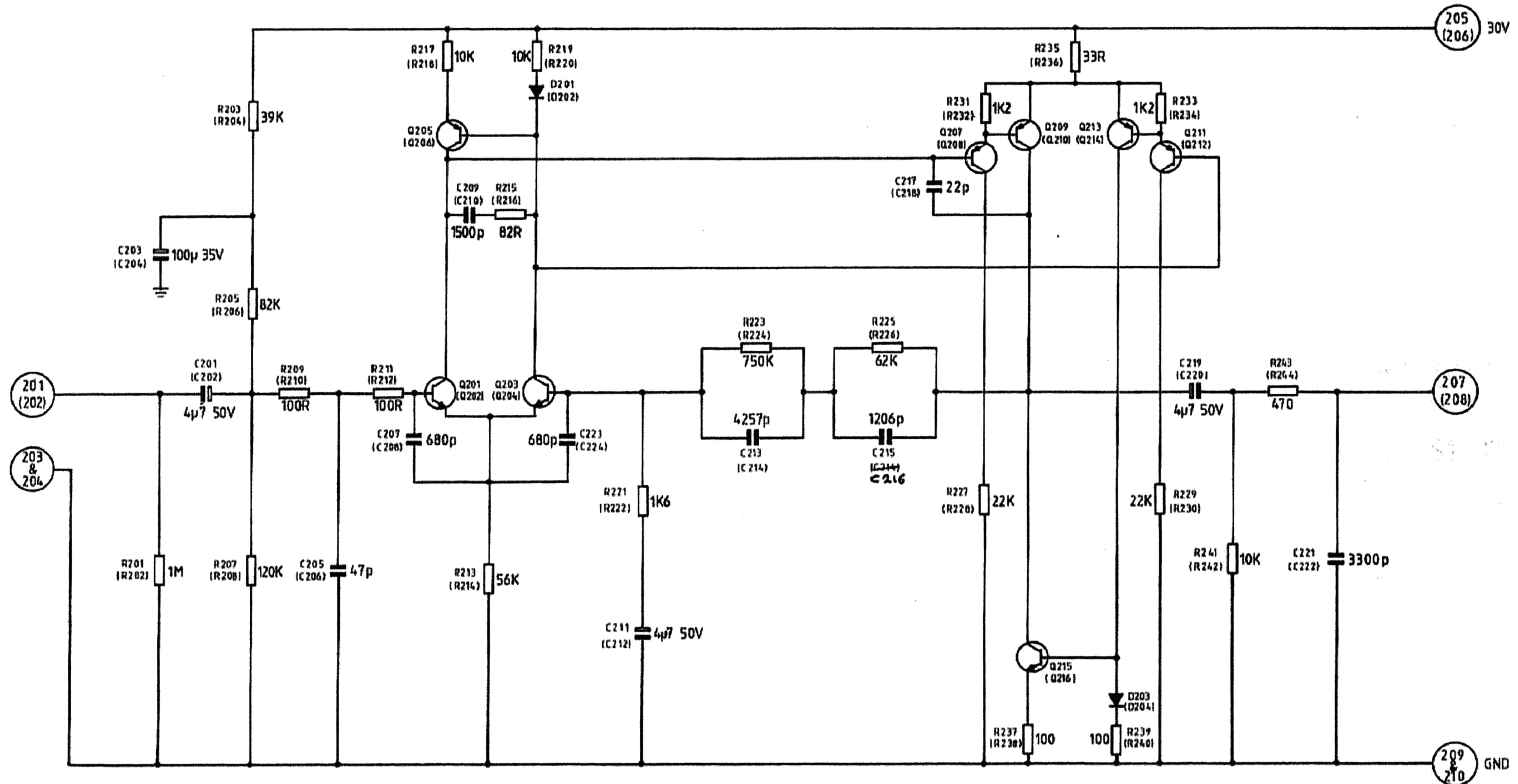
1N4148

Q201/2/3/4/15/16:-

BC 550B

Q205/6/7/8/9/10/11/12/13/14:-

BC 560B



DRG No.

2	Mods from PCB No. 3051 inc.			22-1-84
"	C217/8(10p) = 22p, C223/4 added, R215/8(150R) = 82R			
"	C207/8(100p) = 680p, C209/10(680p) = 1500p			
No.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				
[Previous value] - New value				

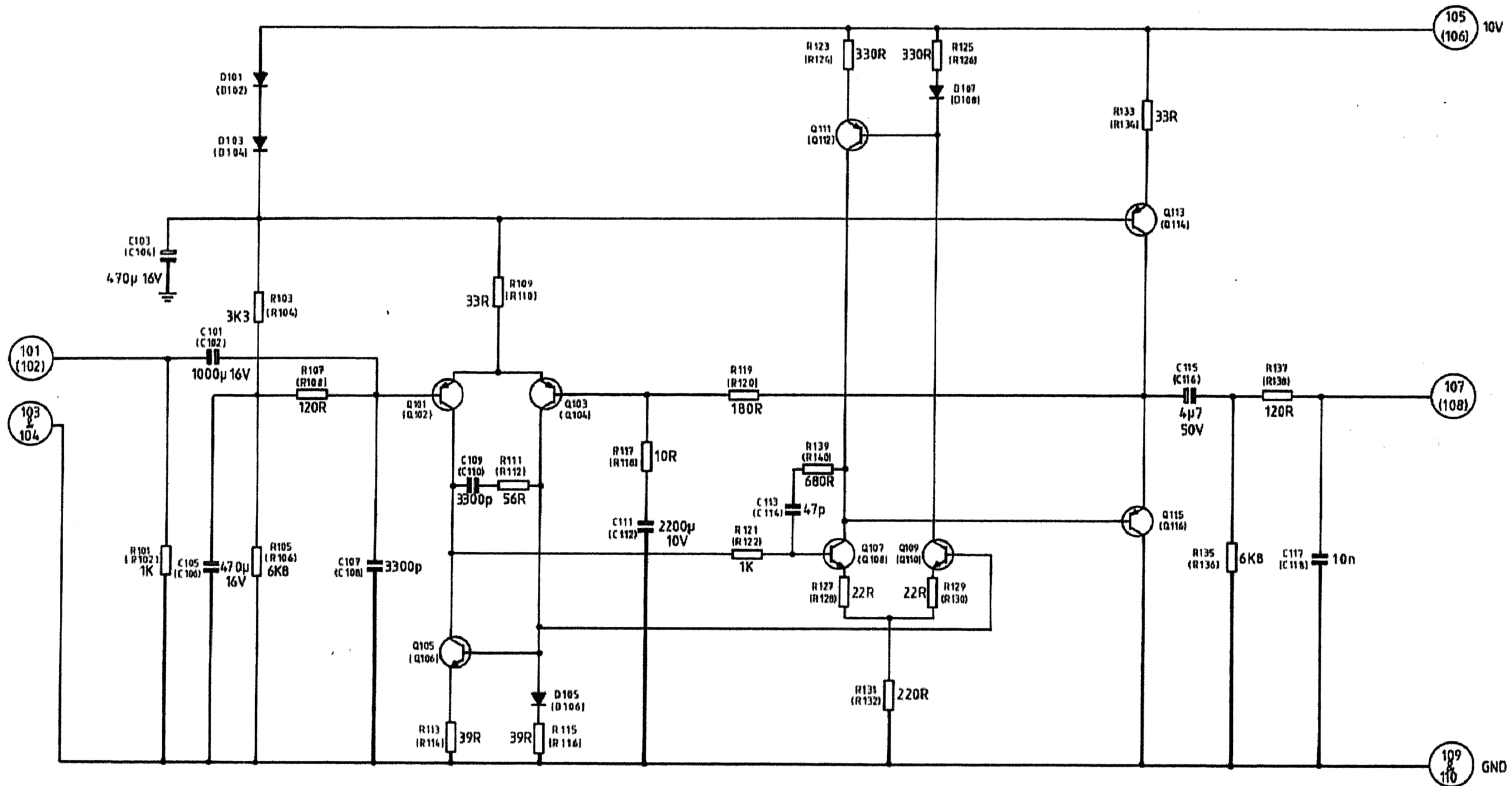
CAMBRIDGE SYSTEMS TECHNOLOGY LTD.

MM AMPLIFIER CIRCUIT MODEL 8000A [Type 207]

DRAWN	TRACED	CHECKED	APPROVED	DATE	SCALE
TDSS.				5-10-84	

DRAWING No. CST207 - 023

D101/2/3/4/5/6/7/8 :- 1N4148 Q101/2/3/4 :- ZTX 753 Q105/6/7/8/9/10 :- BC 550B Q111/12/13/14/15/16 :- BC 560B
(Selected low noise)



DRG No.

CAMBRIDGE SYSTEMS TECHNOLOGY LTD.

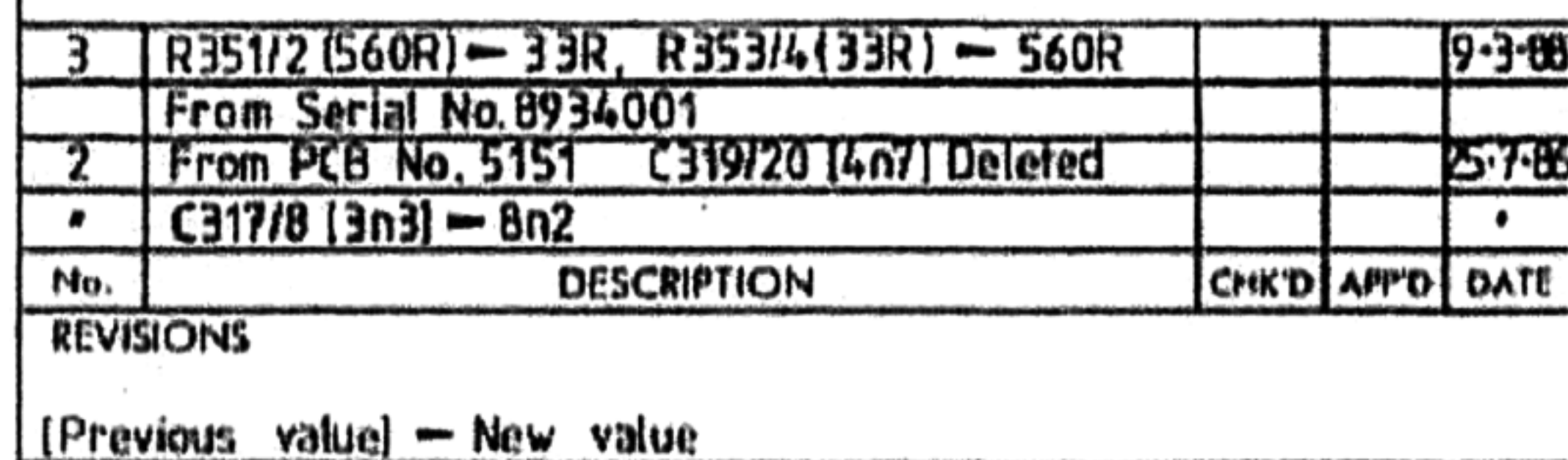
MC AMPLIFIER CIRCUIT MODEL 8000A [Type 207]

DRAWN	TRACED	CHECKED	APPROVED	DATE	SCALE
TDSS				2-10-84	

DRAWING No. CST207-022

No.	DESCRIPTION	CHK'D	APP'D	DATE

DRG No.

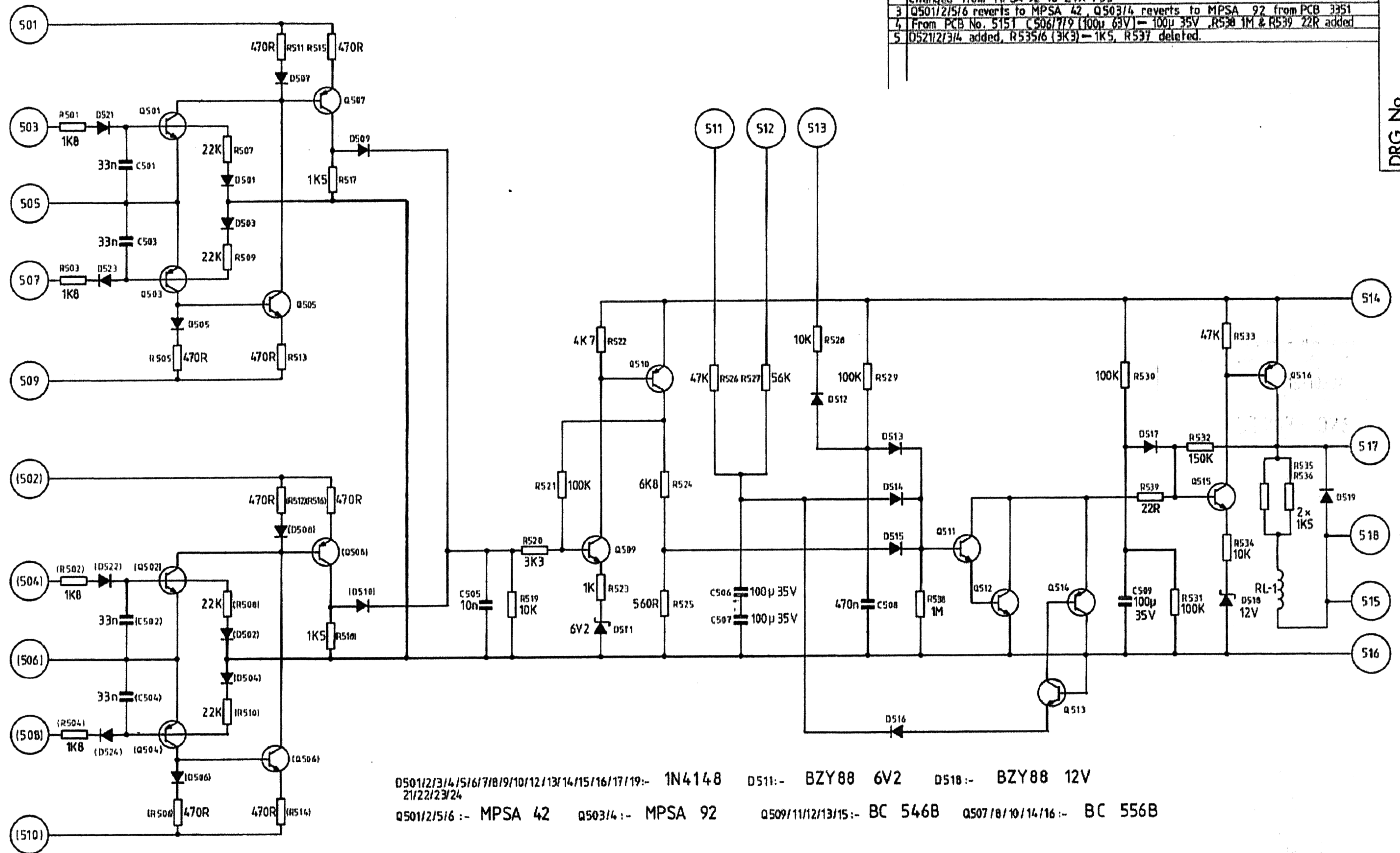


DRAWN	TRACED	CHECKED	APPROVED	DATE	SCALE
TDSS				9-10-84	

DRAWING No. CST207 - 024

Modification	Details
2	From PCB No. 849 Q501/2/5/6 changed from MPSA 42 to ZTX 653, Q503/4 changed from MPSA 92 to ZTX 753
3	Q501/2/5/6 reverts to MPSA 42, Q503/4 reverts to MPSA 92 from PCB 3351
4	From PCB No. 5151 C506/7/9 (100µ 63V) = 100µ 35V, R538 1M & R539 22R added
5	D521/2/3/4 added, R535/6 (3K3) = 1K5, R537 deleted.

DRG No.



D501/2/3/4/5/6/7/8/9/10/12/13/14/15/16/17/19:- 1N4148 D511:- BZY88 6V2 D518:- BZY88 12V
 21/22/23/24
 Q501/2/5/6:- MPSA 42 Q503/4:- MPSA 92 Q509/11/12/13/15:- BC 546B Q507/8/10/14/16:- BC 556B

No.	DESCRIPTION	CHK'D	APP'D	DATE
5	From Serial No. 8934001, see Mod 5			9-3-88
4	Components changed and additions, see mod 4			30-7-86
3	Component changes, see Mod 3			8-8-85
2	Component changes, see Mod 2			4-2-85

REVISIONS

CAMBRIDGE SYSTEMS TECHNOLOGY LTD.

PROTECTION & RELAY DRIVE CIRCUIT MODEL 8000A(207)

Drawn	Traced	Checked	Approved	Date	Scale
TDSS				15-10-84	

DRAWING No. CST207-026

