

SERVICE MANUAL
AUDIOLAB 8000A
MODEL 207

SERIAL NOS 87.. & 89..

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CST207-037	(4)	TRACK SIDE ... PCB	CST207-016 ISSUE 4

AUG 89

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.

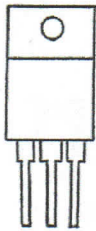
2.10 Ensure bias current remains stable for 4-5 mins.

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:

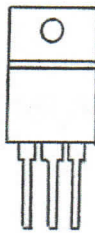
TO220



B C E

2SC2168
2SA958

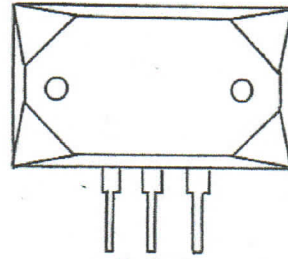
TO220 FULL MOLD



B C E

2SC3851
2SA1488
2SC4382
2SA1668

MT200



B C E

2SC2922
2SA1216

TO92



C B E

BC550B
BC560B
BC546B
BC556B

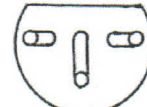
E-LINE



E B C

BC550B
BC560B
BC546B
BC556B
ZTX653
ZTX753
MPSA42
MPSA92

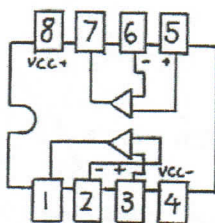
TO92



E B C

MPSA42
MPSA92

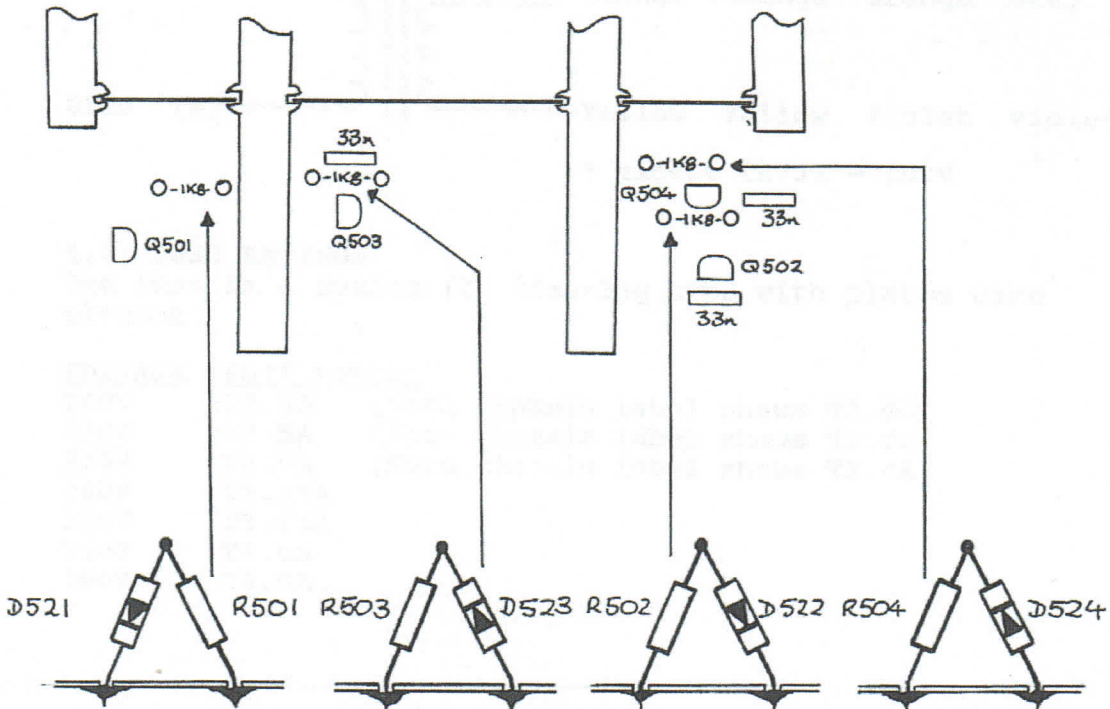
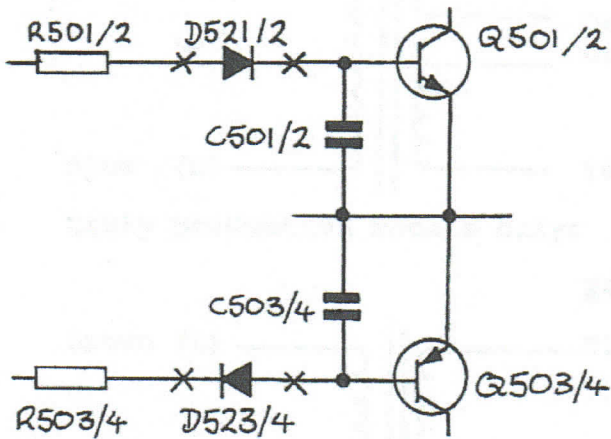
TL072



4. MUTING CIRCUIT

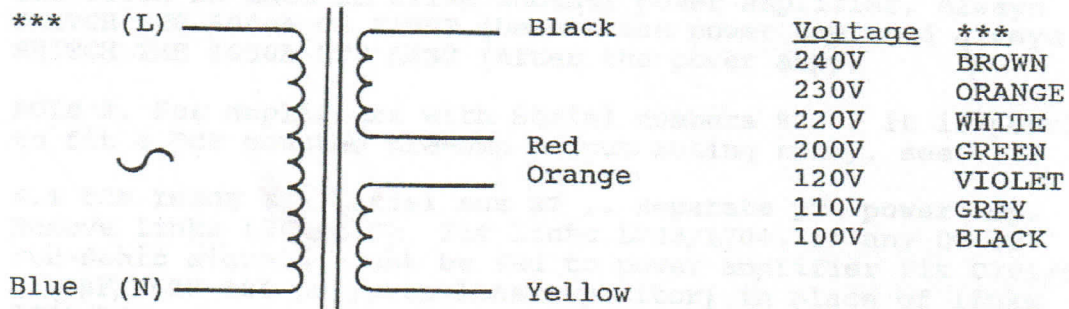
Note: applies only to amplifiers with serial no 87 ..

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.

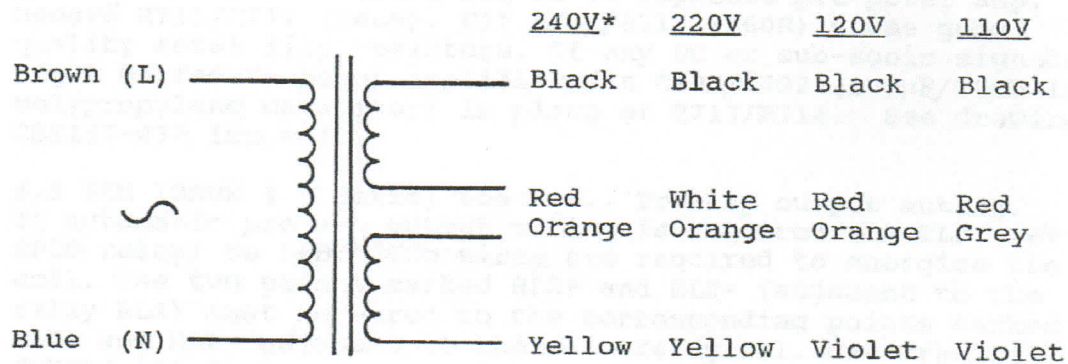


5. TRANSFORMER COLOUR CODE & FUSE RATINGS

5.1 TRANSFORMER COLOUR CODE



Early production models only:



* except CE734 - 100V

5.2 FUSE RATINGS

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

VOLTAGE	FUSE RATING
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.

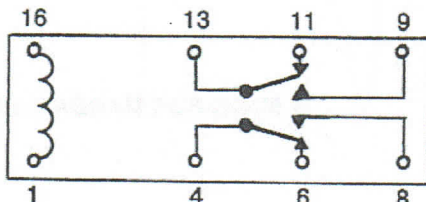
RL2 SPECIFICATION

Contacts: 2 pole change over (2PCO)

Coil: 48V DC/4000 ohms.

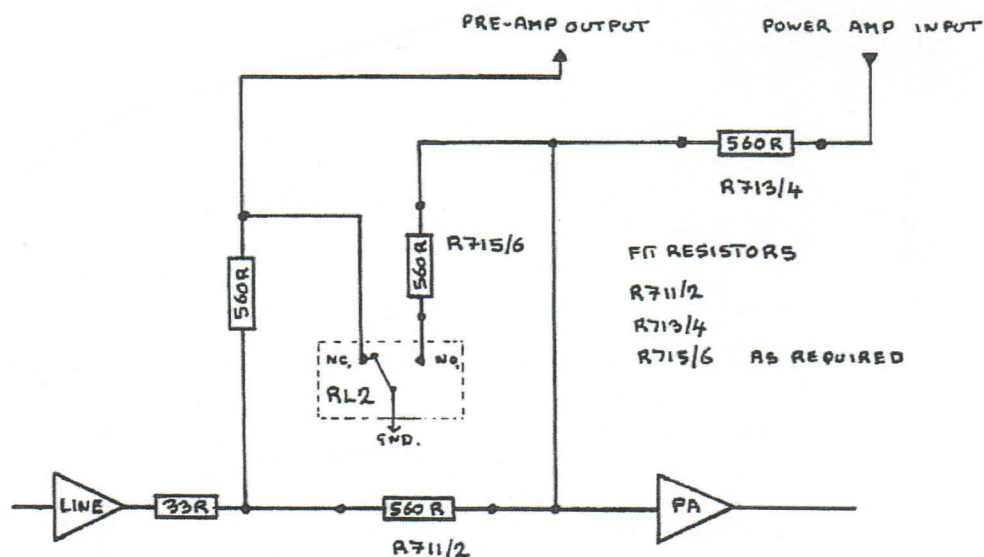
Case: DIL

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.

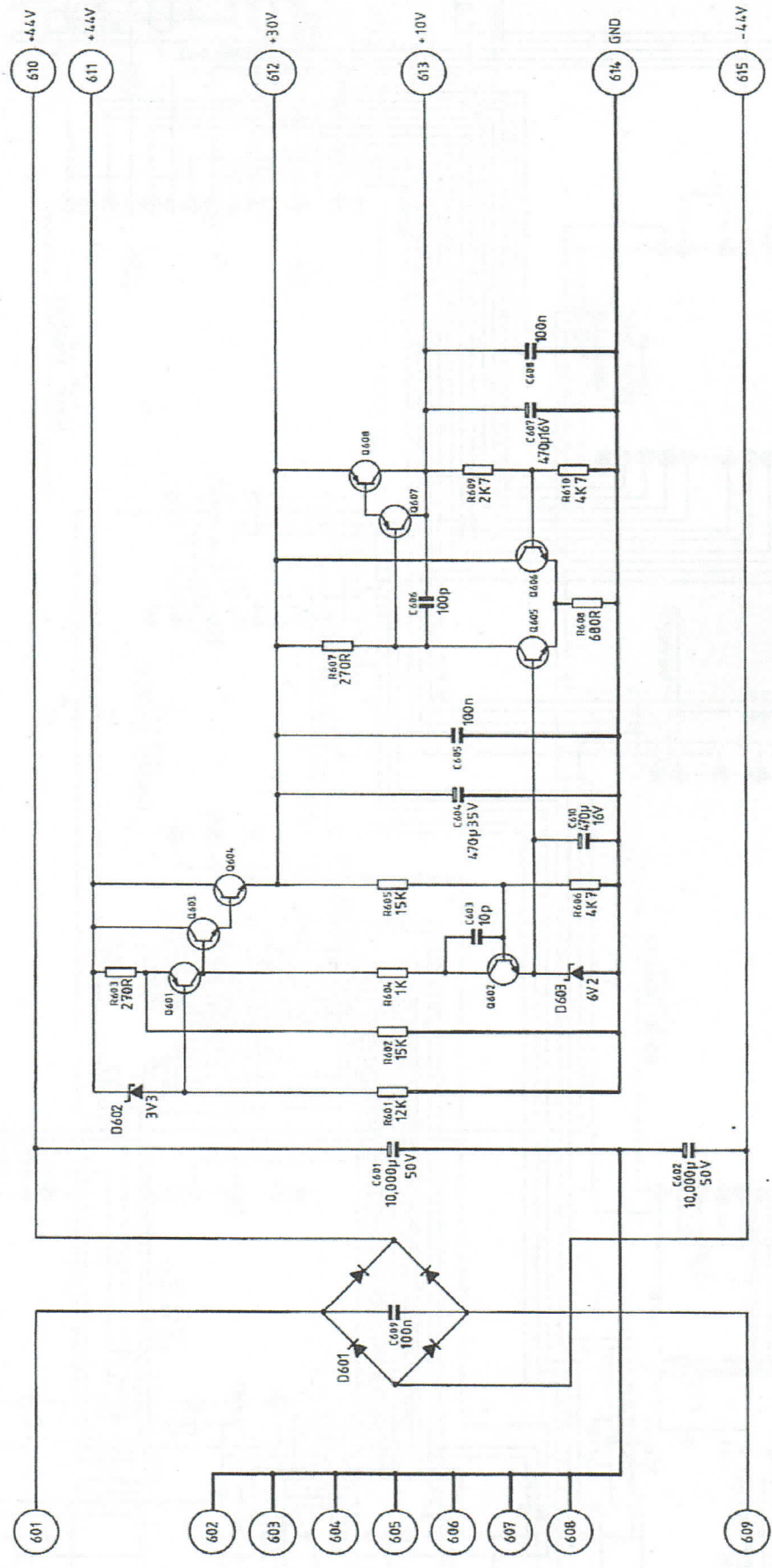


WIRING DIAGRAM PCB ISSUE 4

DRG No.

Modification Details
 2 From PCB No. 5151 0604 (80135) = 25C2168 0608 (80135) = 25A1488
 3 From PCB No. 7851 0604 (25C2168) = 25C3851 0608 (25A1488) = 25A1488

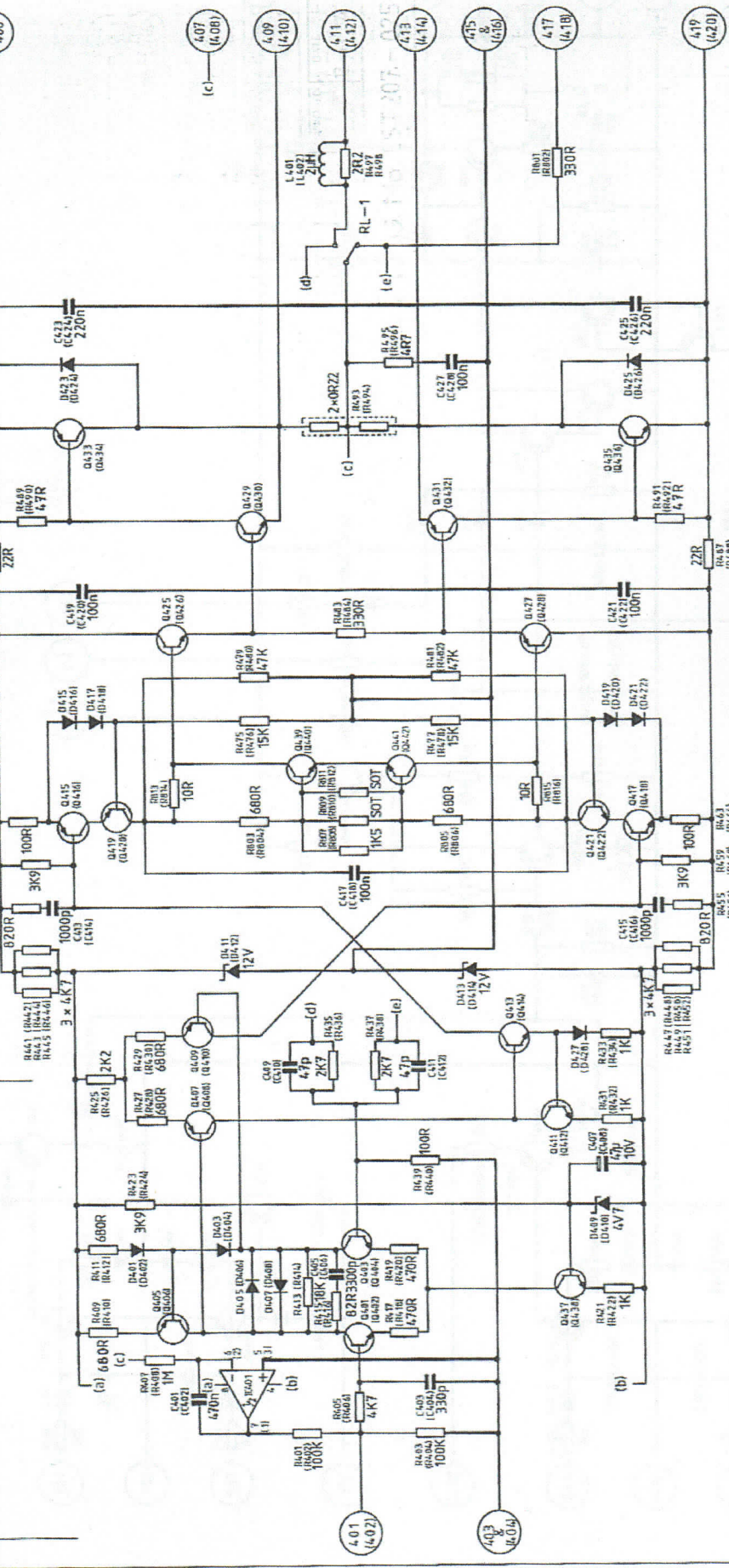
D601 (Bridge):- B80C5000/3300N D602:- BZY 88 3V3 D603:- BZY 88 6V2 Q604:- BC 5468 Q605:- 2SC3851 Q608:- 2SA1488



[Previous Value]		New Value	
DRAWN	TRACED	CHECKED	APPROVED
TDSS			
CAMBRIDGE SYSTEMS TECHNOLOGY LTD.		DATE 18-10-84	
POWER SUPPLIES MODEL 8000A (Type 207)		DRAWING No. CST207-027	
3	11	07/1987	
2	Components changed	07/1986	
No.	DESCRIPTION	CHGD APPD	DATE
REVISIONS			

Modification Details

2	From PCB No. 049 0425/6 changed from MPSA 42 to ZTX 753 - 0427710 changed from MPSA 92 to ZTX 753 N.J.A.
3	From PCB No. 5151 biasing and driver transistors altered
4	PCB issue raised to 3
4	R415(6 220R) - 82R, R453(4 5/6 560R) - 820R, R489(900 91792 1000R) - 4.7R, C409(10 11/12 22P) - 4.7P, PCB raised to issue 4.



D401/2/3/4/5/6/7/8/15/16/17/18/19/20/21/22/22B28:- 1N4148 D423/24/25/26:- 1N4002 D409/10:- BZY88 4V7 D411/12/13/14:- BZY88 12V
 Q405/16/17/18/19/10/15/16:- BC 546B Q405/16/17/18/19/10/15/16:- ZTX 653 Q419/20/41/42:- ZTX 753
 Q425/26:- MPSA 42 Q427/28:- 2SC2168 Q431/32:- 2SA958 Q433/34:- 2SA 1216 Q435/36:- 2SC 2922
 1C401: TL072CP or 25C4302

4	From Serial No. 8934001, see Mod 4	9-388
3	Circuit & component changes, see Mod 3	2-705
2	Component change, see Mod 2	4-2-85
REVISIONS		DATE
DESCRIPTION		DATE
DRAWN		APPROVED
TDSS		DATE
CAMBRIDGE SYSTEMS TECHNOLOGY LTD.		SCALE
POWER AMPLIFIER CIRCUIT MODEL 8000A (Type 207)		B-10-84
DRAWING No. CST207 - 025		

DZ011Z154: -

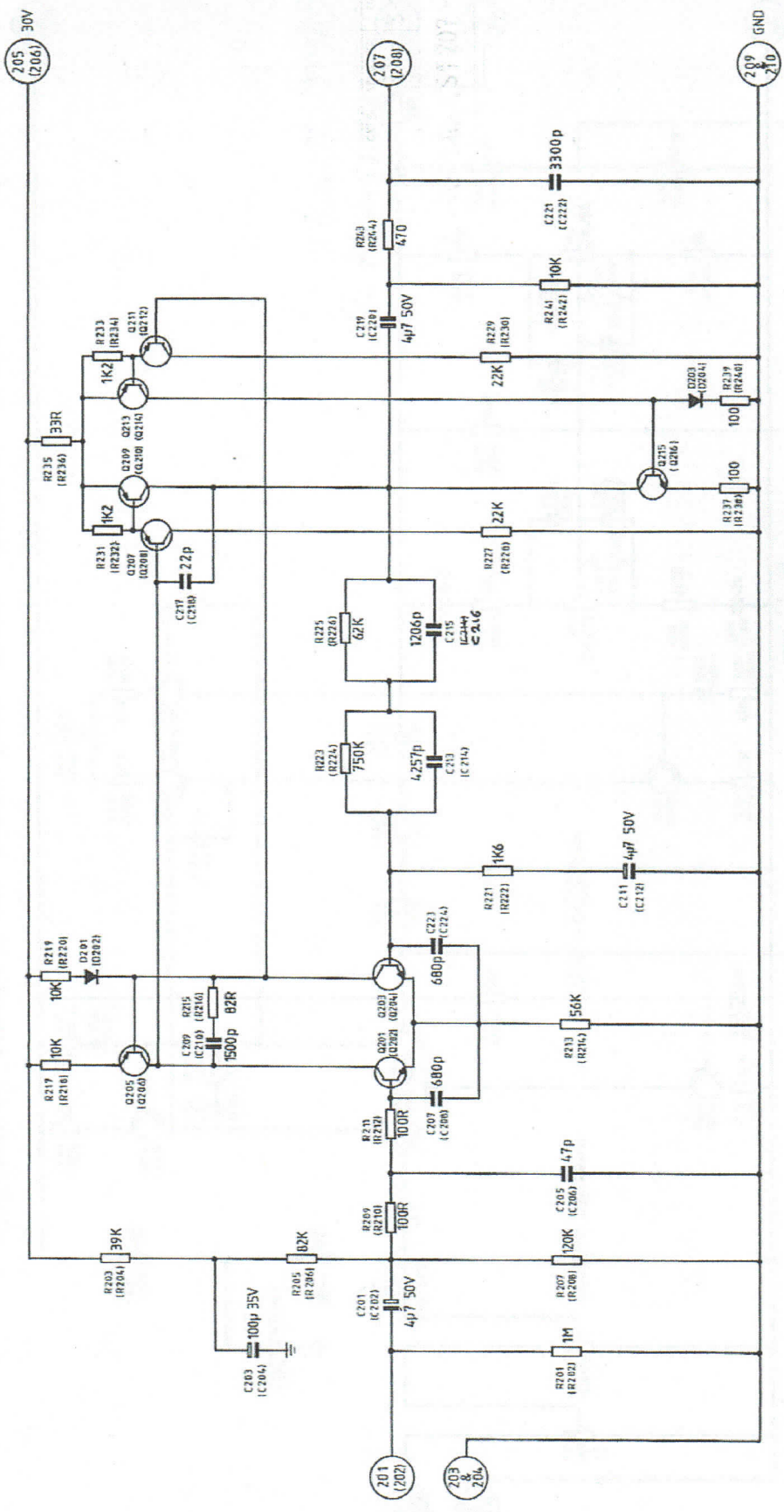
1N4148

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

BC 550B

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

BC 560B



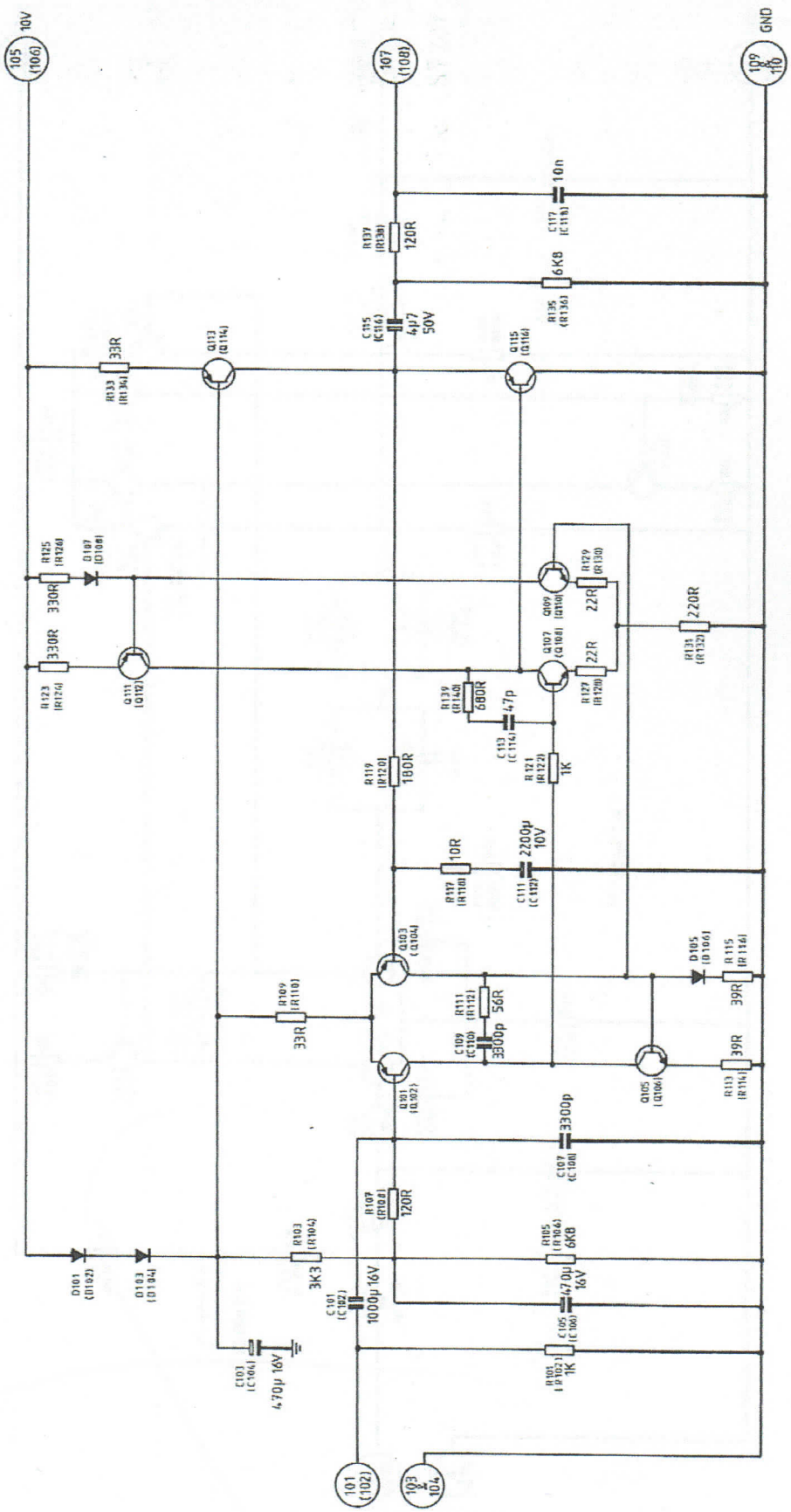
DRG No.

2		Modis from PCB No. 3051 inc.	22-1-86	SCALE	
"		C217/81 (top) - 22p, C223/4 added, R225/26/1500R - 22R		DATE 5-10-84	
"		C207/81 (100p) - 680p, C209/101 (680p) - 1500 p		APPROVED	
REVISONS		DESCRIPTION	CHK'D	APP'D	DATE
[Previous value] - New value					
DRAWING No. CST207 - 023		CAMBRIDGE SYSTEMS TECHNOLOGY LTD.		DRAWING No. CST207 - 023	
MM AMPLIFIER CIRCUIT MODEL 8000A (Type 207)		TDS.		CHECKED	
		TRACED		APPROVED	
		DATE		SCALE	

A MEMBER OF THE BORG ELECTRON TECHNOLOGIES GROUP INC. TORO

DRG No.

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)

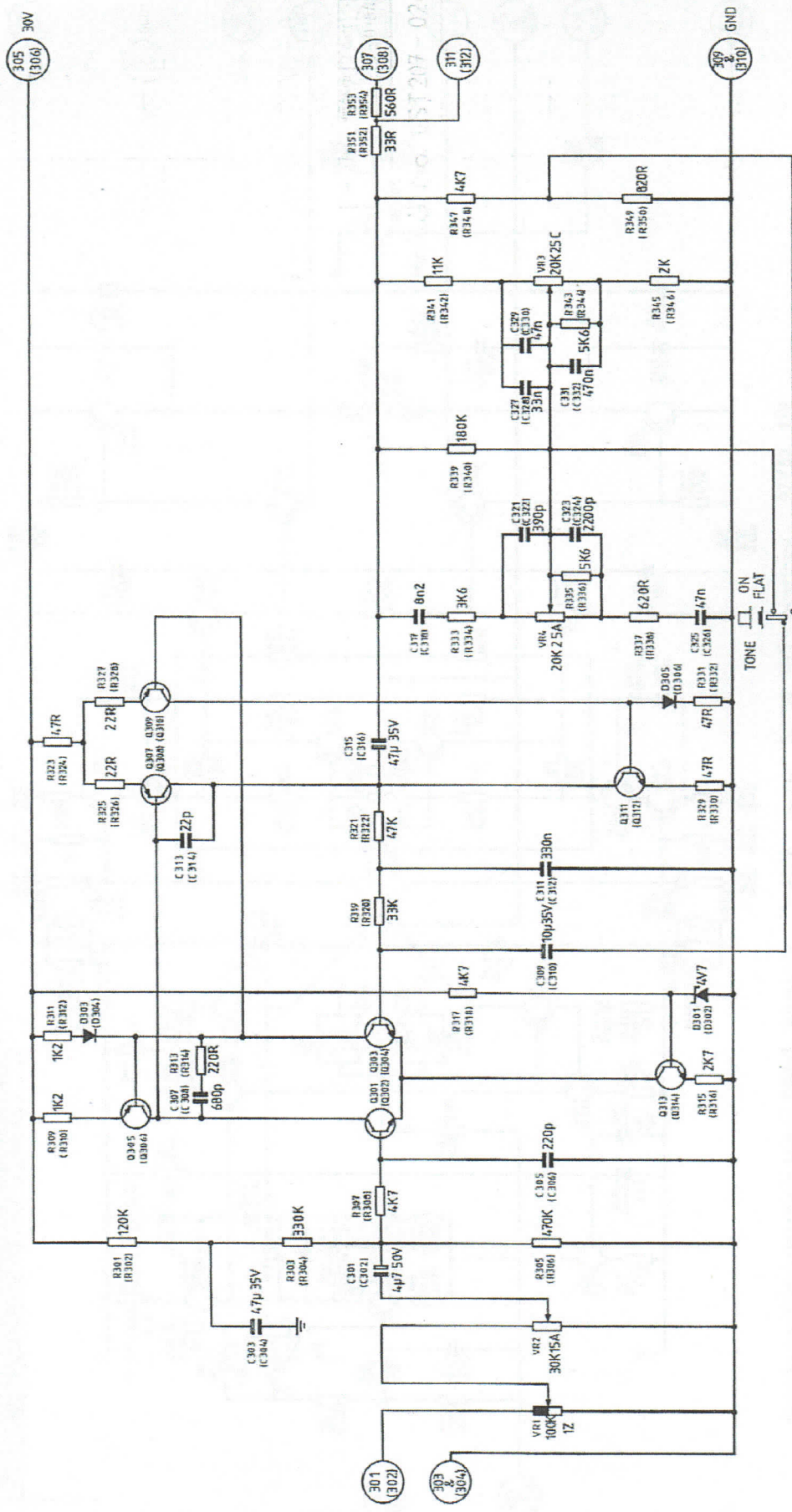


No.	REVISIONS	DESCRIPTION	CHKD	APP'D	DATE

CAMBRIDGE SYSTEMS TECHNOLOGY LTD.	DRAWN	TRACED	CHECKED	APPROVED	DATE	SCALE
MC AMPLIFIER CIRCUIT MODEL 8000A (Type 207)	TDSS				2-10-84	
DRAWING No. CST207 - 022						

D3012 - BZY88 4V7 D3034/5/6 - 1N 4148 Q3012/3/4/11/12/13/14 - BC 550B Q3056/7/8/9/10 - BC 560B

DRG No.



SW4 - 1
- 12)

No.	REVISIONS	DESCRIPTION	CHKD	APPRD	DATE
3	R351/2 (560R) - 33R, R353/4 (33R) - 560R				9-3-88
	From Serial No. B934001				
2	From PCB No. 5151	C319/20 (407) Deleted			25-7-88
	C317/8 (303) - 802				

CAMBRIDGE SYSTEMS TECHNOLOGY LTD.

LINE/TONE AMPLIFIER CIRCUIT MODEL 8000A (Type 207)

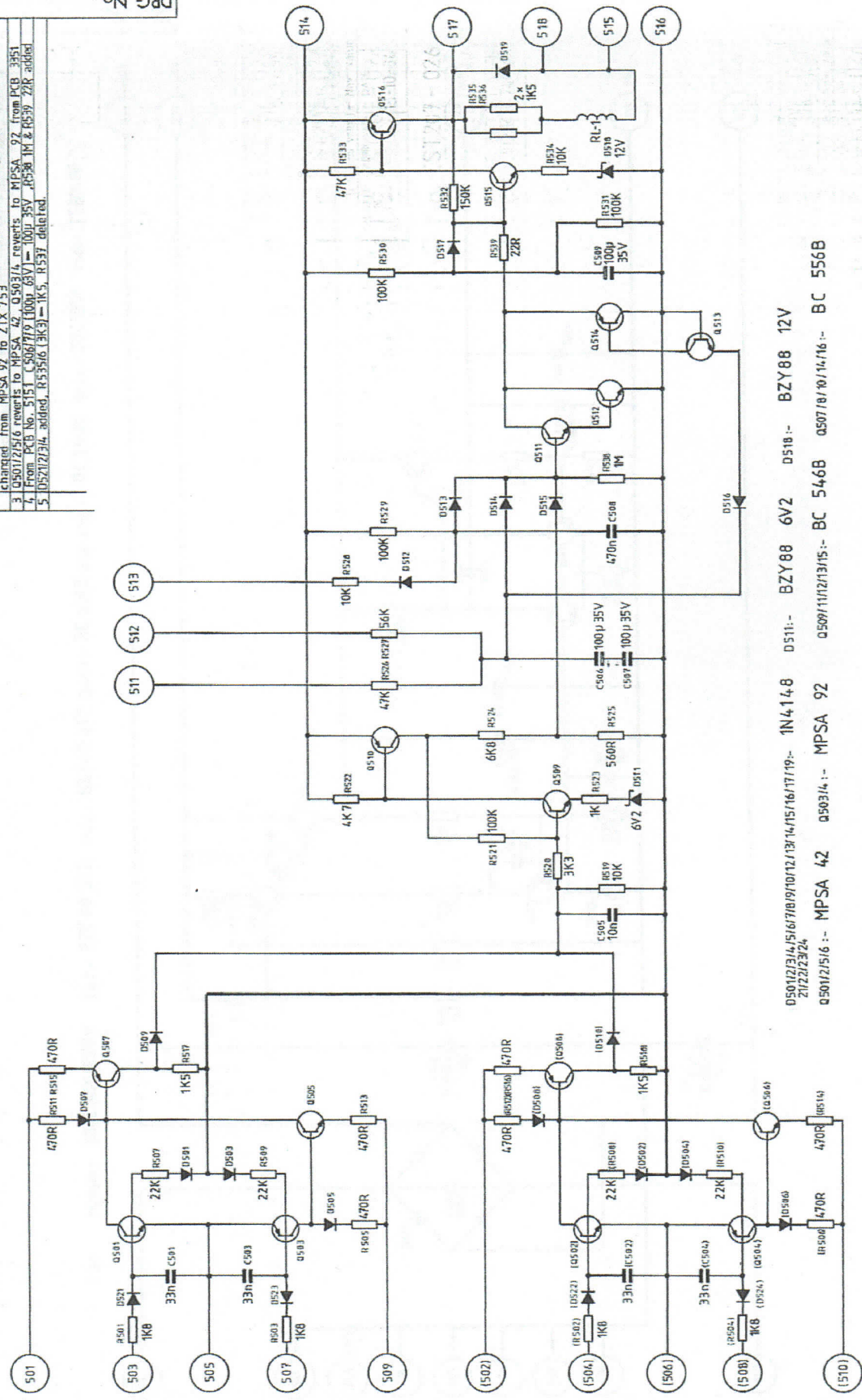
DRAWING No. CST207 - 024

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

(Previous value) - New value

Product of the Cambridge Technology Co. Ltd.

- Modification Details**
- 2 From PCB No. 869 Q501/2/5/6 changed from MPSA 42 to ZTX 653 Q503/4 changed from MPSA 97 to ZTX 743
 - 3 Q501/2/5/6 transistors to MPSA 42 Q503/4 converts to MPSA 97 from PCB 3451
 - 4 From PCB No. 515 C506/7/8 100µ 35V - 100µ 35V R538 1M & R539 22K added
 - 5 Q52/7/3/4 added R535/6 (3K3) - 1K5, R537 deleted



Q501/2/5/6 :- MPSA 42 Q503/4 :- MPSA 92 1N4148 D511:- BZY88 6V2 D518 :- BZY88 12V
 Q502/7/3/4
 Q509/11/12/13/15 :- BC 5468 Q507/8/10/11/16 :- BC 556B

No.	DESCRIPTION	CHK'D.	APP'D.	DATE
5	From Serial No. 8934001, see Mod 5			9-7-88
4	Component's changed and additions, see mod 4			10-7-88
3	Component's changes, see Mod 3			8-8-85
2	Component's changes, see Mod 2			4-2-85

REVISIONS	DESCRIPTION	CHK'D.	APP'D.	DATE
5	From Serial No. 8934001, see Mod 5			9-7-88
4	Component's changed and additions, see mod 4			10-7-88
3	Component's changes, see Mod 3			8-8-85
2	Component's changes, see Mod 2			4-2-85

CAMBRIDGE SYSTEMS TECHNOLOGY LTD.
 PROTECTION & RELAY DRIVE CIRCUIT MODEL 8000A(207)

DRAWING No. CST207 - 026

(Previous value) - New value

SCALE	DATE	APPROVED	CHECKED	TRACED	DRAWN
	15-10-84				TDSS

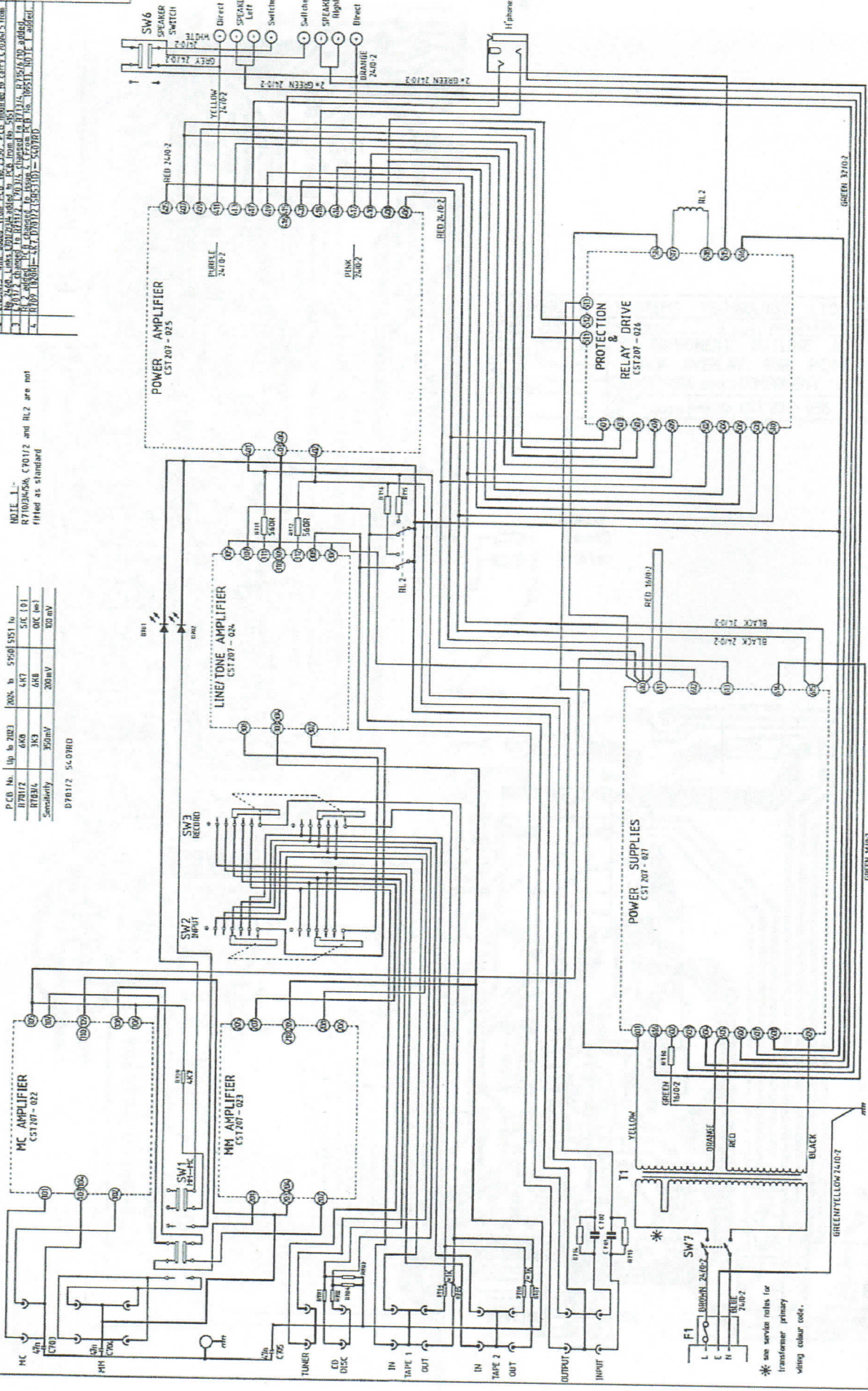
PCB No.	Up to 2003	2005 to 5950	5951 to
DR117	600	407	510 (1)
DR204	303	600	600 (2)
Sensitivity	30mV	20mV	20 mV

NOTE 1 - RY70345K C7012 and RL2 are not fitted as standard

DR117 55-0780

DRG No.

- 1. COVER CASE AND CABLE CONNECTORS TO BE SUPPLIED BY CREST COMPONENTS FROM
- 2. NO. 2400, LARKS ROAD, BURNLEY, LANCASHIRE, ENGLAND. (TELEPHONE: 0524 511111)
- 3. DR117 CHANGED TO DR117A. (TELEPHONE: 0524 511111)
- 4. DR117A CHANGED TO DR117B. (TELEPHONE: 0524 511111)
- 5. DR117B CHANGED TO DR117C. (TELEPHONE: 0524 511111)
- 6. DR117C CHANGED TO DR117D. (TELEPHONE: 0524 511111)
- 7. DR117D CHANGED TO DR117E. (TELEPHONE: 0524 511111)
- 8. DR117E CHANGED TO DR117F. (TELEPHONE: 0524 511111)
- 9. DR117F CHANGED TO DR117G. (TELEPHONE: 0524 511111)
- 10. DR117G CHANGED TO DR117H. (TELEPHONE: 0524 511111)
- 11. DR117H CHANGED TO DR117I. (TELEPHONE: 0524 511111)
- 12. DR117I CHANGED TO DR117J. (TELEPHONE: 0524 511111)
- 13. DR117J CHANGED TO DR117K. (TELEPHONE: 0524 511111)
- 14. DR117K CHANGED TO DR117L. (TELEPHONE: 0524 511111)
- 15. DR117L CHANGED TO DR117M. (TELEPHONE: 0524 511111)
- 16. DR117M CHANGED TO DR117N. (TELEPHONE: 0524 511111)
- 17. DR117N CHANGED TO DR117O. (TELEPHONE: 0524 511111)
- 18. DR117O CHANGED TO DR117P. (TELEPHONE: 0524 511111)
- 19. DR117P CHANGED TO DR117Q. (TELEPHONE: 0524 511111)
- 20. DR117Q CHANGED TO DR117R. (TELEPHONE: 0524 511111)
- 21. DR117R CHANGED TO DR117S. (TELEPHONE: 0524 511111)
- 22. DR117S CHANGED TO DR117T. (TELEPHONE: 0524 511111)
- 23. DR117T CHANGED TO DR117U. (TELEPHONE: 0524 511111)
- 24. DR117U CHANGED TO DR117V. (TELEPHONE: 0524 511111)
- 25. DR117V CHANGED TO DR117W. (TELEPHONE: 0524 511111)
- 26. DR117W CHANGED TO DR117X. (TELEPHONE: 0524 511111)
- 27. DR117X CHANGED TO DR117Y. (TELEPHONE: 0524 511111)
- 28. DR117Y CHANGED TO DR117Z. (TELEPHONE: 0524 511111)



DRAWN	TDS	CHECKED	APPROVED	DATE	TICKET
				20-10-84	
CAMBRIDGE SYSTEMS TECHNOLOGY LTD.			DRAWING No. CST207 - 028		
CIRCUIT AND WIRING SCHEMATIC DIAGRAM		MODEL	8000A (Type 207)		

* See service notes for transformer primary winding colour code.