

ARCAM

ALPHA 5/6 AMPLIFIER SERVICE MANUAL

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Issue 1 (Paul Newton January '94)

Arcam Drawing No. HO4/0021

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CIRCUIT DESCRIPTION

The Alpha 5 and 6 share a common pcb. The circuits are very similar and the main differences are the remote volume facility, extra power output and switch to bypass the phono stage to enable its use as an extra line level input on the Alpha 6.

Power Supplies (Circuit Diagram Sheet 1)

The toroidal mains transformer supplies +/-37V d.c. when rectified and smoothed by D203-206 and C210, 211.

This is then regulated to +/-15V by IC201, 202 to power the phono and tone control stages and the d.c. servo.

The Alpha 6 transformer has an extra tapping which is used for the remote volume circuit. The ac in is regulated to 5V by zener D902 and associated components and this is then used to power the microcontroller Z901 and remote receiver.

Phono Stage (Circuit Diagram Sheet 2)

The phono stage consists of a dual opamp Z303, one opamp per channel. The RIAA equalization is achieved by the feedback components R703, 704, 702 and C704, 705, 702. R703 determines the gain and C703 the low frequency roll off.

On the Alpha 6 this stage can be bypassed by use of switch SW301 to enable use as an extra line input.

Tone Controls (Circuit diagram sheet 2)

The tone control stage is based around Z302 a dual op amp. On the Alpha 5 this is a NE5532 but is an OP275 on the Alpha 6.

The range of the controls is set by R507, 508 for the bass pot RV302 and R504, 505 for the treble pot RV303.

The tone controls and balance pot can be bypassed by use of the direct switch, SW304.

Power Amplifier (Circuit diagram Sheet 3)

The input to the power amplifier from previous stages is fed to the differential input of Q12 and 13. Q10 and 11 form a constant current source for the differential input.

The output devices are 'n' channel mosfets SMF045.

Zener diodes D3, 4 limit the voltage swing within safe limits for the output devices & fusible resistors R5, 6 provide overcurrent damage to the devices.

The shoot-through limiter Q14 prevents both output devices being turned on simultaneously. This could occur if the output is clipping.

ALPHA 5/6 DISASSEMBLY

1. Remove the **cover** by removing the 4 side screws and 4 rear screws. Slide the cover backwards and up.

The amplifier assembly, (i.e. pcb, rear, front sub panel, and transformer) should then be removed from the chassis in one piece in the following way;

2. Pull the **control knobs** off the unit. The volume knob may be a bit stiff.
3. Undo 5 screws holding the **front panel**, 2 at each end, plus one above the volume pot. Remove the front panel elsewhere to avoid cosmetic damage.
4. Undo 2 screws holding the **rear panel** to the chassis at the bottom of the rear.
5. Undo the **transformer bolt** using a 10mm spanner.

The transformer will remain fixed to the pcb with adhesive.

The **amplifier assembly** should now be removable from the chassis by lifting up on the transformer and sub panel and easing out upwards.

REMOVING THE ALPHA 5/6 TRANSFORMER

The toroidal transformer is extremely well secured to the main pcb with a double sided adhesive gasket. To remove the transformer you must break this adhesive bond by cutting through the gasket. This will be easier if the transformer is warm.

Use a cheese wire under the transformer, pulling backwards and forwards under tension to gradually cut through. Once most of the adhesive is cut, you should be able to pull the transformer away from the pcb.

A less satisfactory substitute for cheese wire is to use some 22 gauge tinned copper wire, stretched first to remove kinks, and two temporary handles.

CHANGE OF MAINS VOLTAGE

WARNING - the unit **must** be unplugged from the mains when replacing the fuse as the mains inlet and fuse are at mains potential even with the unit switched off.

The Alpha 5/6 amplifiers can be set for use on 230v or 115v mains supplies.

There are 2 mains fuseholders in the unit - one marked 230v & the other 115v and the fuseholder with the fuse fitted to it determines the working voltage.

To change voltage remove the fitted fuse and fit the correct fuse to the other fuseholder.

The correct fuses are: 1.0A antisurge for 230v
 2.0A antisurge for 115v

CIRCUIT DIAGRAMS
Power Supplies
Preamplifier Stages
Power Amplifier Stages
Remote Control Circuitry (Alpha 6)

ALPHA 5 PLUS & 6 PLUS AMPLIFIER SERVICE SHEET

(to be read in conjunction with the Alpha 5/6 amplifier service manual)

Issue 1 Serial number AL5020214 onwards (Alpha 5 Plus)
 Serial number AL6007272 onwards (Alpha 6 Plus)

Paul Newton July '95

The Alpha 5 Plus and 6 Plus amplifiers are "tweaked" versions of the previous Alpha 5 & 6 models and the basic circuitry remains the same. For this reason this service sheet has been produced including the new circuit diagrams and a list of the differences between the old and new models.

The changes are as follows:

Electrostatically screened transformers to prevent interference pickup from fridges, light switches etc.

2oz copper tracks on printed circuit board instead of 1oz.

Speaker fuses updated to 3.15A (F) from 2.5 A (F).

Mains fuse updated to 1.25A(T) from 1A(T) for 230v units and 2.5A(T) from 2A(T) for 115v units.

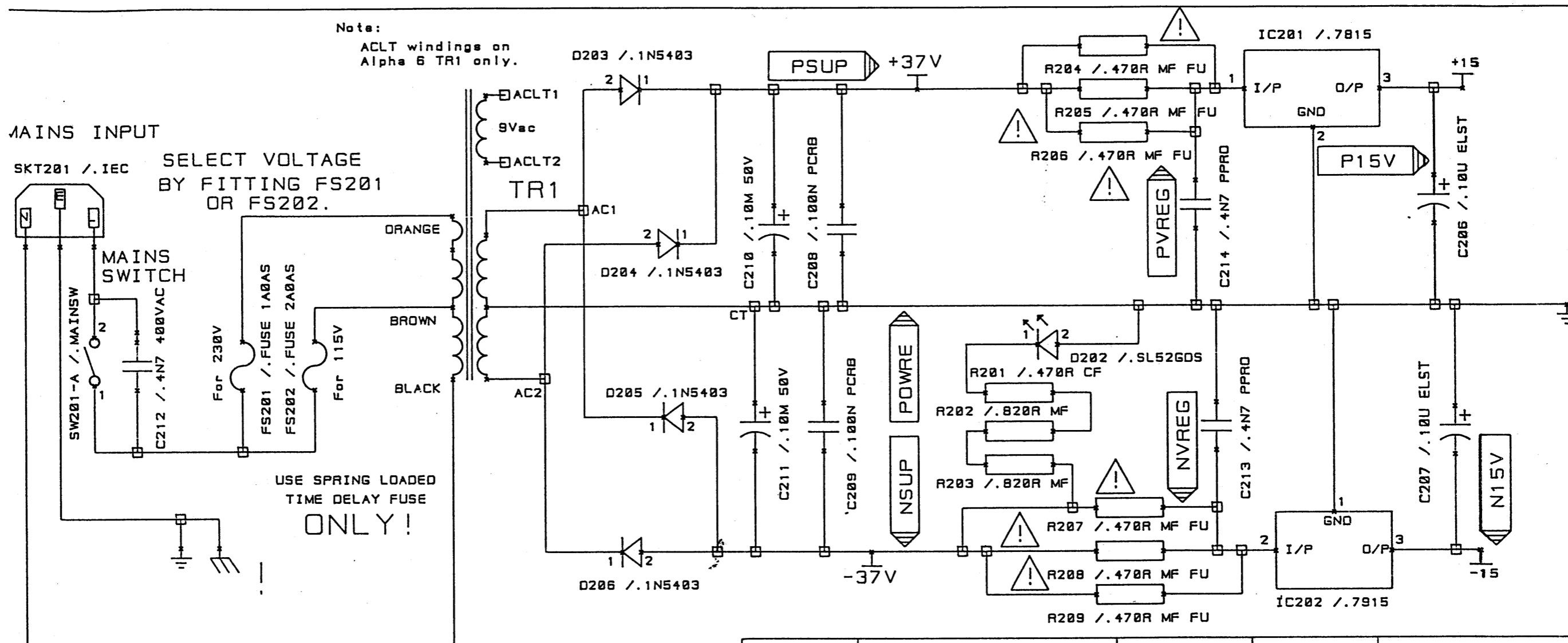
Capacitors C16, 116, 17, 117,18, 118 added on the speaker outputs to improve RF rejection.

Capacitors C10, 110 are a new type with a very linear response.

A filter formed by R39, C15 and R139, C115 gives better power supply rejection for the current source on the long tailed pair input stage.

Some of the resistors were changed from carbon film types to 1% metal film types.

The spacing between the left and right speaker terminal blocks was reduced to standardise the spacing on all our new products.

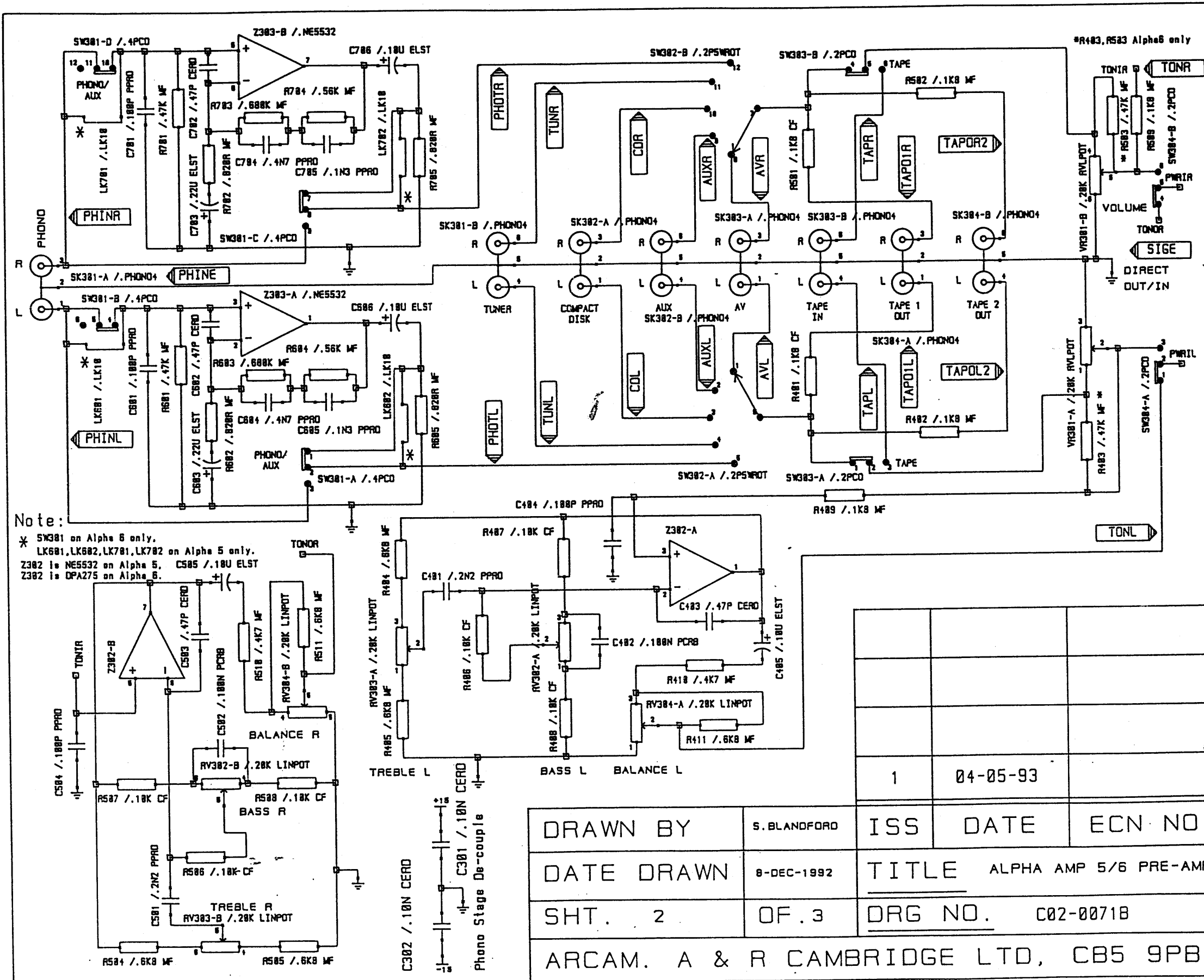


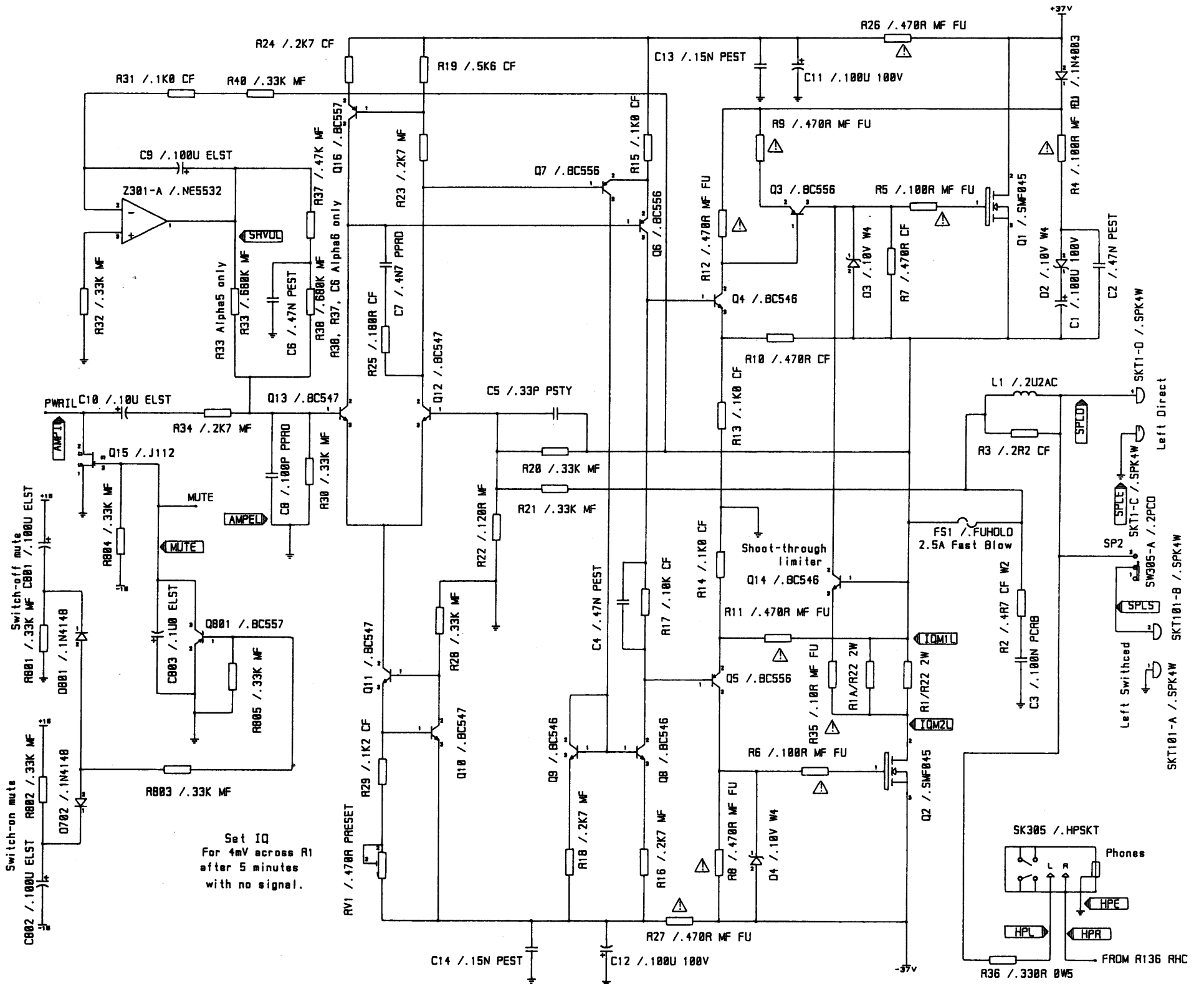
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DRAWN BY	SJB	ISS	DATE ECN NO.
DATE DRAWN	11-12-92	TITLE .Alpha Amp 5/6 PSU	
SHT. 1	OF. 3	DRG NO. C02-0071A	
SERVICE MANUAL DRW NO. H04/		SHT.	OF
ARCAM. A & R CAMBRIDGE LTD, CB5 9PB			

2057

W2

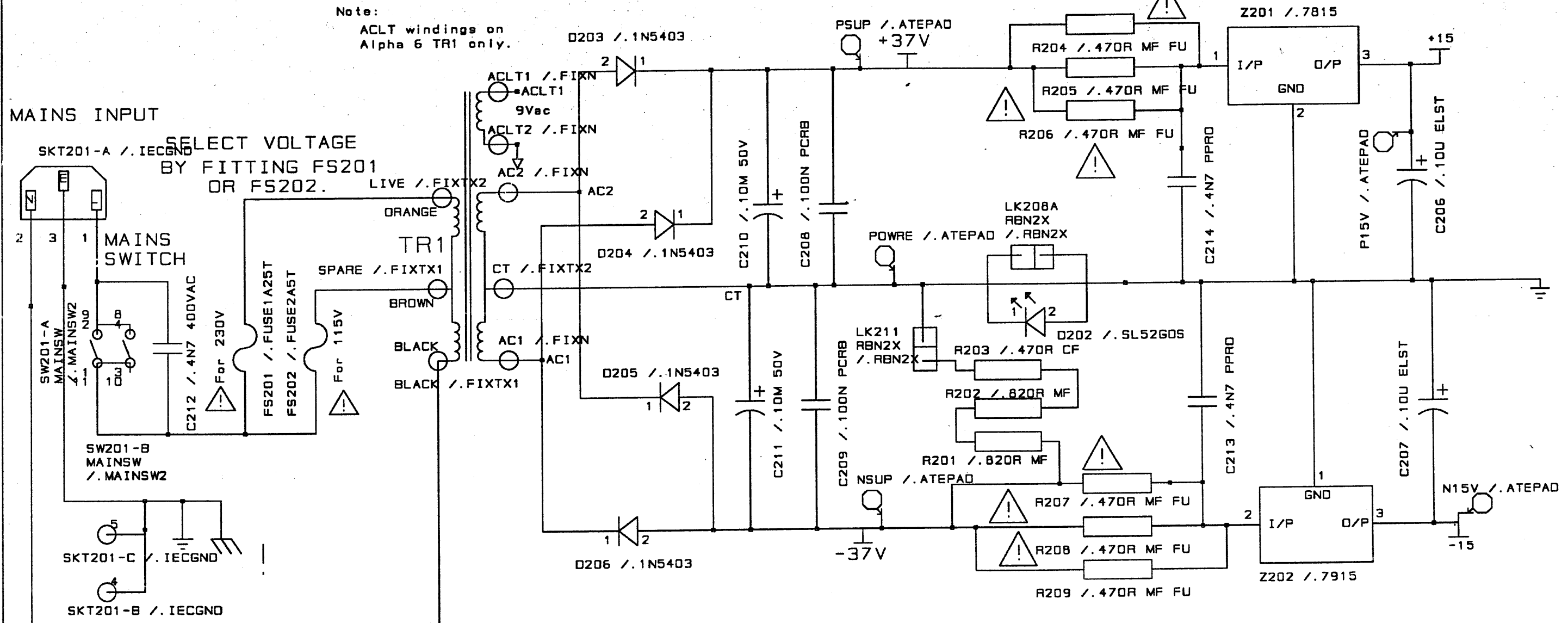
00/10



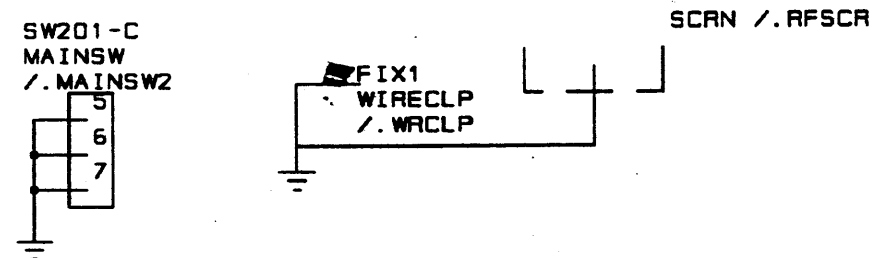


LEFT HAND CHANNEL ONLY SHOWN.
 FOR RIGHT HAND CHANNEL COMPONENTS ADD 100 to R127, C114

1	04-5-93			
DRAWN BY	SJB	ISS	DATE	ECN NO.
DATE DRAWN	16-12-92	TITLE	ALPHA 5/6 AMP STAGE	
SHT. 3	OF. 3	DRG NO.	C02-0071C	
SERVICE MANUAL DRW. NO. H04/ 0021 SHEET 3 OF 4				
ARCAM. A & R CAMBRIDGE LTD, CB5 9PB				

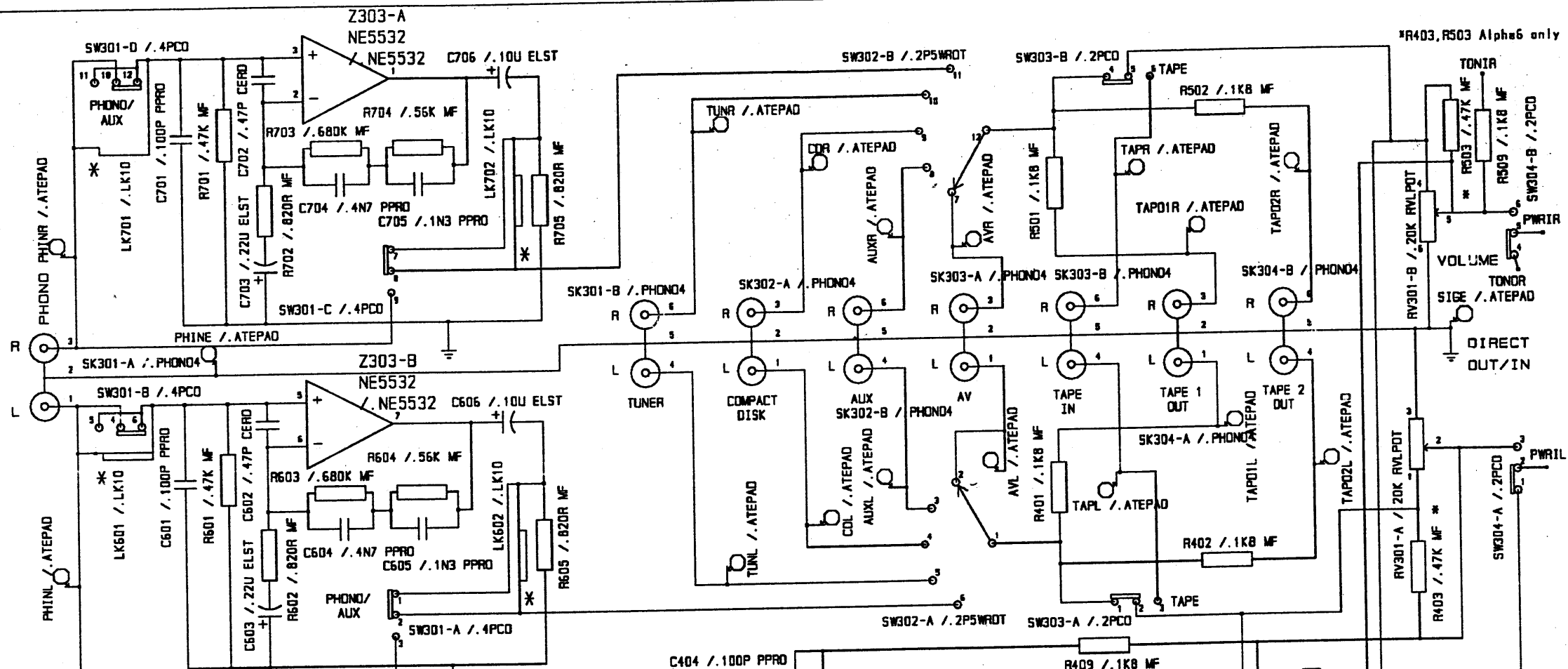


⚠ SAFETY CRITICAL COMPONENT
REPLACE WITH SAME TYPE PART



FILE		4	4-8-95	95/089
		3	19-6-95	95/070
		2	9-6-95	95/064
DRAWN BY	SJB	ISS	DATE	ECN NO.
DATE DRAWN	11-12-92	TITLE Alpha Amp 5/6 PLUS PSU		
SHT. 1	OF. 3	DRG NO. L808C1		
SERVICE MANUAL DRW NO. H04/		SHT.	OF	
ARCAM. A & R CAMBRIDGE LTD, CB5 9PB				

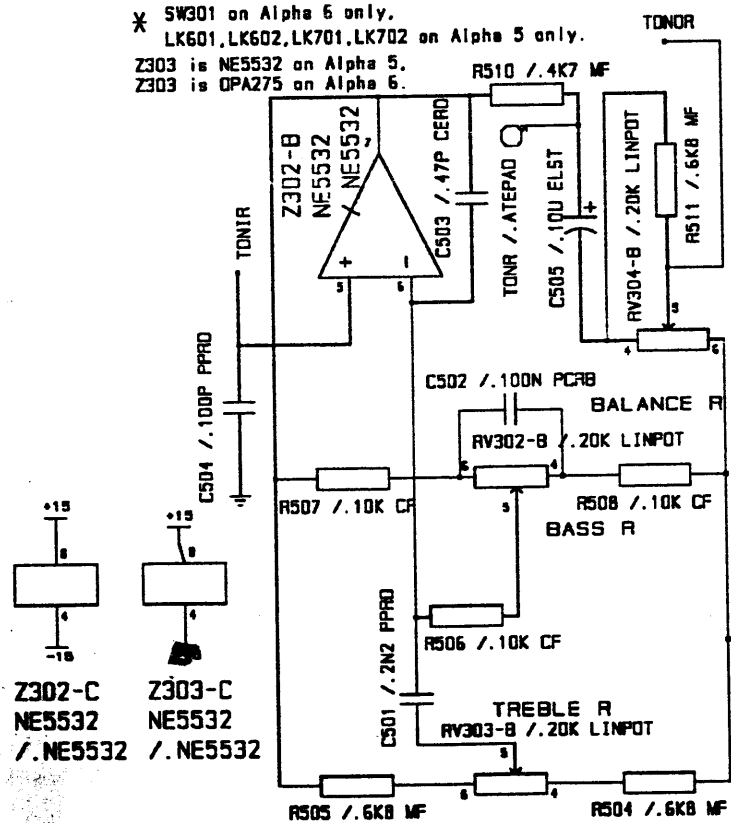
MASTER
IF RED



*R403, R503 Alpha6 only

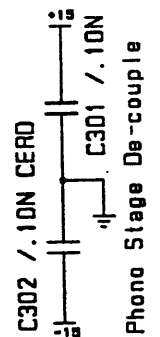
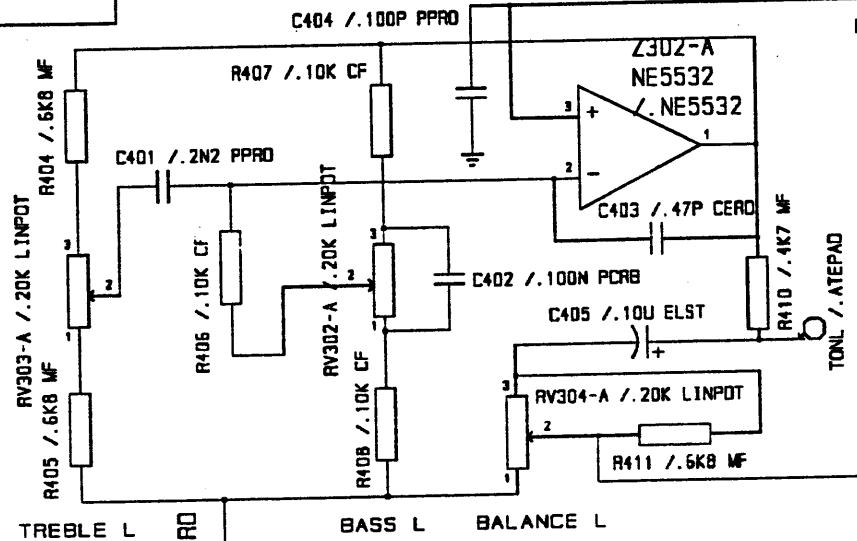
Note:

* SW301 on Alpha 6 only.
 LK601, LK602, LK701, LK702 on Alpha 5 only.
 Z303 is NE5532 on Alpha 5.
 Z303 is OPA275 on Alpha 6.



Z302-C
NE5532
/.NE5532

Z303-C
NE5532
/.NE5532



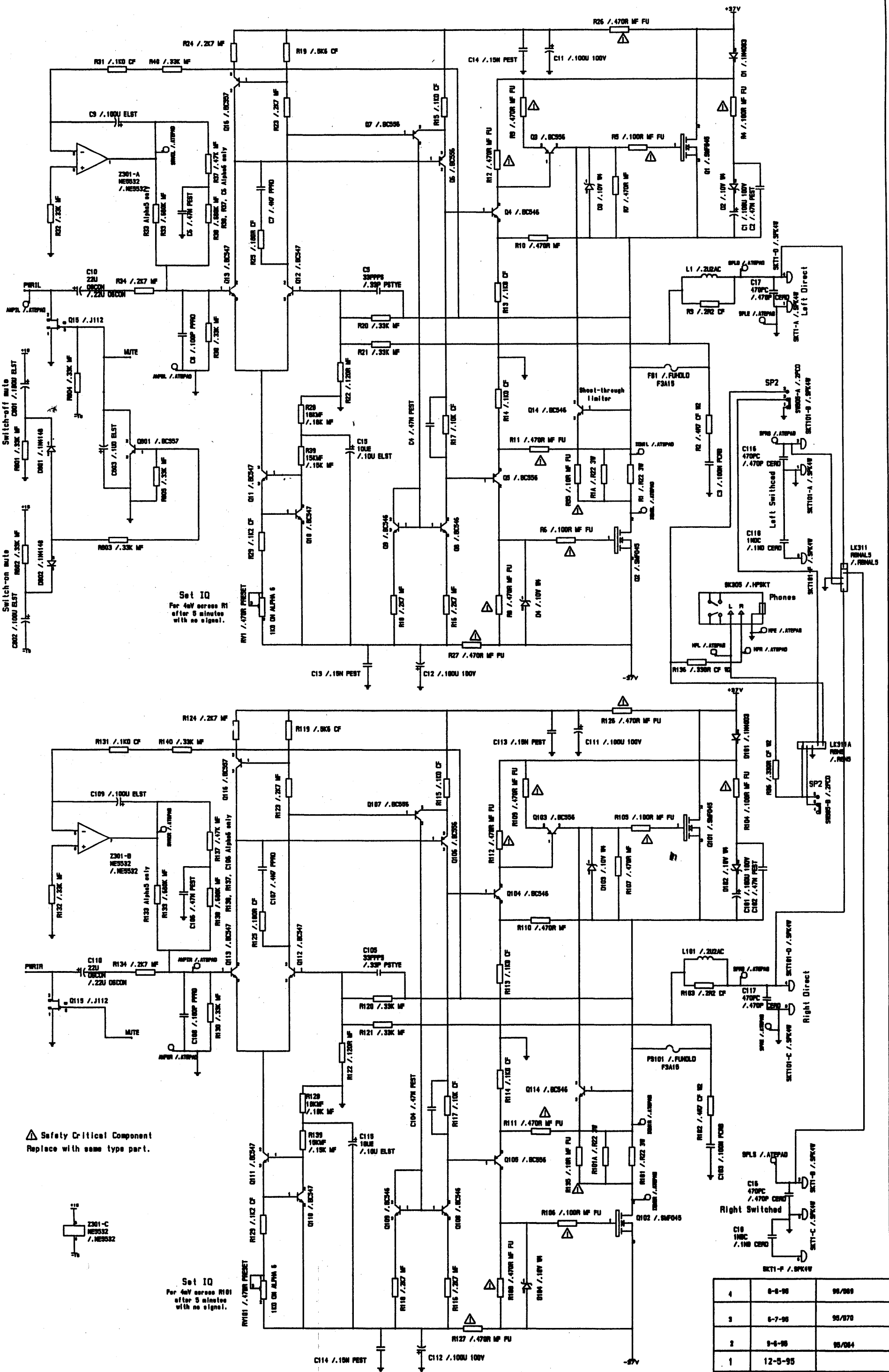
Phono Stage De-couple

4	4-8-95	95/089
3	6-7-95	95/070
2	9-6-95	95/064
1	12-5-95	

DRAWN BY	S. BLANDFORD	ISS	DATE	ECN NO.
DATE DRAWN	8-DEC-1992	TITLE	ALPHA AMP 5/6 PLUS PRE-AMP	
SHT. 2	OF. 3	DRG NO.	L808C2	
ARCAM. A & R CAMBRIDGE LTD, CB5 9PB				

**MASTER
LE RED**

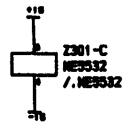
1008
013



Set IQ
For 40V across R1
after 5 minutes
with no signal.

Set IQ
For 40V across R101
after 5 minutes
with no signal.

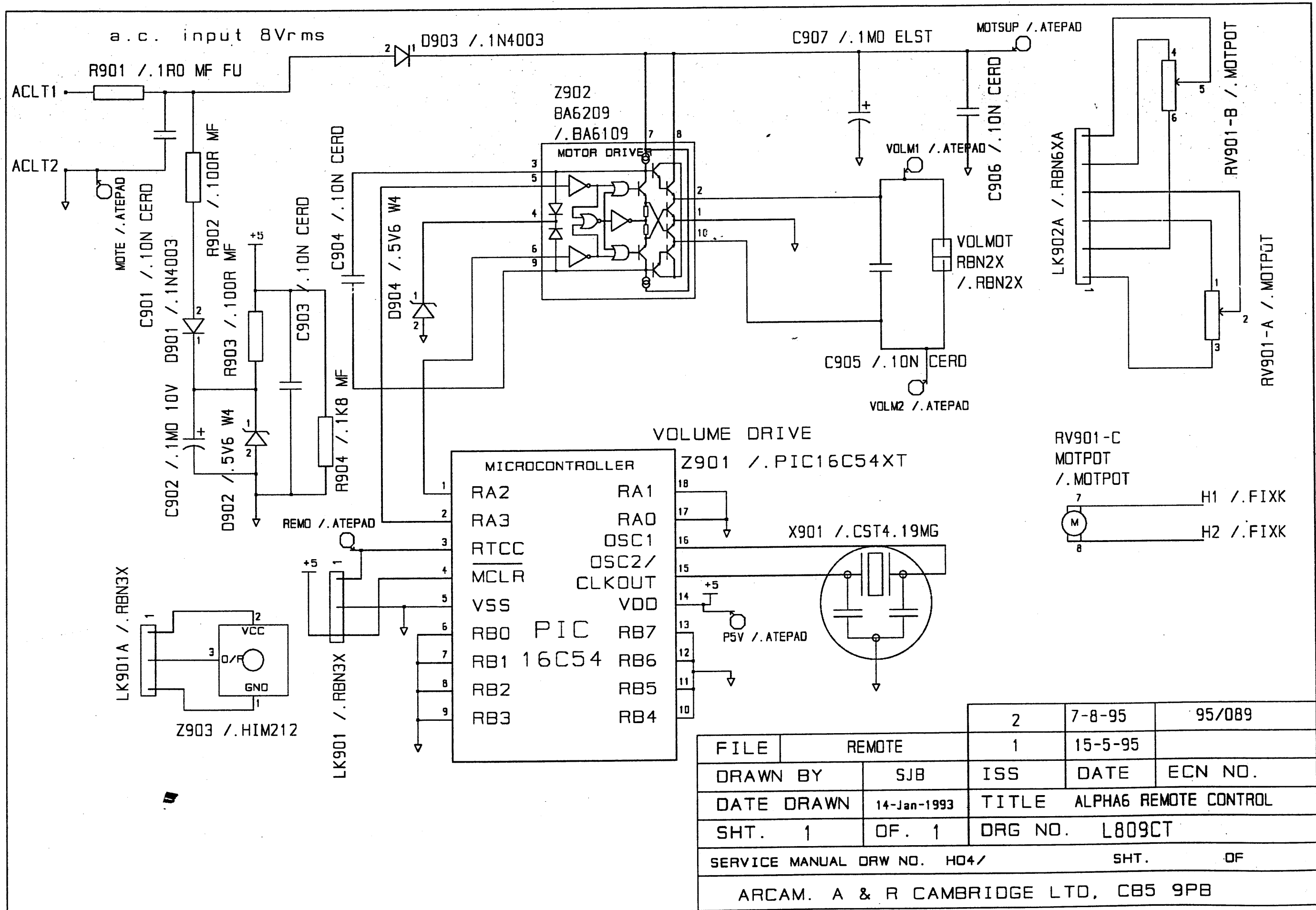
▲ Safety Critical Component
Replace with same type part.



4	8-8-95	95/069
3	6-7-95	95/070
2	9-4-95	95/084
1	12-5-95	

DRAWN BY	SJB	ISS DATE	ECN NO.
DATE DRAWN	16-12-92	TITLE	ALPHA 805 PWR AMP STAGE
SHT.	3	DRG NO.	L808C3
SERVICE MANUAL DRW. NO. H04/		SHEET OF	

MASTER
IF RED



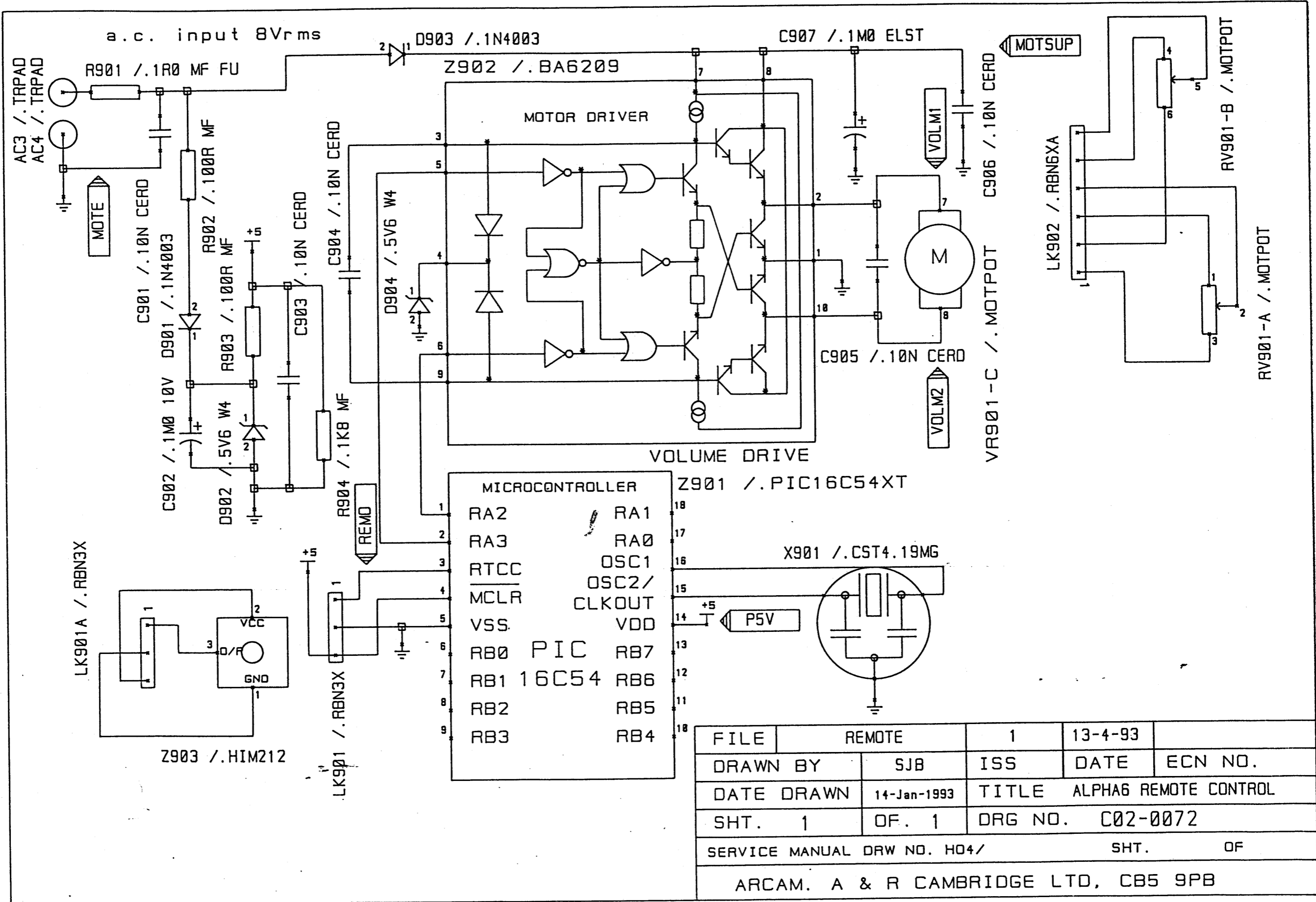
**MASTER
IF RED**

2	7-8-95	95/089
1	15-5-95	
ISS	DATE	ECN NO.
TITLE ALPHA6 REMOTE CONTROL		
DRG NO. L809CT		
SERVICE MANUAL DRW NO. HO4/		SHT. OF
ARCAM. A & R CAMBRIDGE LTD, CB5 9PB		

1051

C02

0012



FILE	REMOTE	1	13-4-93	
DRAWN BY	SJB	ISS	DATE	ECN NO.
DATE DRAWN	14-Jan-1993	TITLE	ALPHA6 REMOTE CONTROL	
SHT. 1	OF. 1	DRG NO.	C02-0072	
SERVICE MANUAL DRW NO. HO4/			SHT.	OF
ARCAM. A & R CAMBRIDGE LTD, CB5 9PB				