

DESIGNS DEPARTMENT HANDBOOK

No. 3.198(80)

Outside Broadcast Loudspeaker, LS3/7

C O N T E N T S

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FREQUENCY SPLITTING AMPLIFIER, AM1/53
(Version A - Ser. Nos. up to 180)
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D R A W I N G S

Version A

LS3/7 Circuit	D 42145 A3
Quad 303 Modifications	DSK 19691 A3
AM1/53 Circuit	D 41826 A1
AM1/53 Response Curve	DSK 19714 A4
Parts List AM8/14	DSK 19222 A4
Parts List AM1/53	D 41827 A4 (11 sheets)
AM1/53 Comp. Loc.	D 41832 A4

Version B

Component Location and Quad 303 Modifications	DSK 20952 A3
Pre-amplifier Circuit AM8/15	E 15310 A2

Version B contd.

Pre-amplifier Comp. Loc.	E 15318 A3
Parts List AM8/15	E 15311 A4 (7 sheets)
AM8/15 Frequency Response Curve	DSK 21960 A4
LS3/7 Parts List	D 42146 A4 (4 sheets)

Drawings Common to Version A and B

Circuit and Component List - Quad 303	DSK 20951 A3
Test Leads	DSK 19713 A4

DESIGNS DEPARTMENT HANDBOOK

No. 3.198(80)

Outside Broadcast Loudspeaker, LS3/7

1. INTRODUCTION

This assembly has been designed to replace the existing O.B. loudspeaker assembly, LS3/1, where relatively high sound levels are required.

It exists with two versions of pre-amplifier and power amplifier.

Version A

An early version, (up to Ser. No. 180), which comprises a low level cross-over, or frequency splitting pre-amplifier, AM1/53, a dual power amplifier, AM8/14, two loudspeaker units, LS2/1 and LS2/8, mounted coaxially, in a cabinet type CT4/15, and their relevant connecting cables.

Version B

A later version which comprises an integral low level cross-over pre-amplifier and dual power amplifier, coded AM8/15. The loudspeakers and cabinet are the same as in Version A.

With both versions, which use the same output connectors, the normal maximum distance between power amplifier and cabinet is 10 metres.

The method of loudspeaker assembly allows close listening to be carried out, down to 0.5 metres, without introducing serious errors.

Maintenance should be confined to the pre-amplifier and power amplifier. No attempt should be made to replace either of the two loudspeaker units on site as these require specialised techniques for correct adjustment.

N.B. The LS3/7 Parts List, D 42146 A4 is for Version B. Version A has an AM1/53 and AM8/14 instead of the AM8/15 and also a six-pin connecting lead for interconnection of these two amplifiers.

2. SPECIFICATION

This applies to both versions referred to in the Introduction.

Continued

Input signal level (minimum for full output)	-20 dB volume
Maximum sound level	104 dB w.r.t. 2×10^{-5} N/m ² at 1.5 metres
Axial frequency response	35 Hz - 20 kHz
Input impedance (nominal)	15 k Ω
Input balance	>50 dB at 10 kHz
Input connections	P.O. Jack or 3-pin XLR3-31
Cabinet finish	Teak veneer with black 'Tygan' grille cloth
Weight of loudspeaker	30 kg approximately
Weight of Power amplifier and pre-amplifier	10 kg approximately
Maximum power consumption	220 W at 240 V A.C.
CT4/15 Cabinet dimensions	470 W x 770 H x 330 D

3. POWER AMPLIFIER, AM8/14 and FREQUENCY SPLITTING AMPLIFIER, AM1/53

Version A (up to Ser. No. 180)

3.1 Power Amplifier, AM8/14

The Power Amplifier, AM8/14 is a modified Quad 303 commercial amplifier.

The modifications are shown on sketch DSK 19691 A3, and the unit is coded, by the manufacturer, as Quad 303A. This amplifier is then further modified by the BBC to mount the pre-amplifier, AM1/53, on the side and is coded AM8/14.

The Quad 303A circuit provides RF filtering across the mains input and loudspeaker output connectors, together with an input filter which attenuates rapidly all signals above 30 kHz.

3.2 Frequency Splitting Pre-amplifier, AM1/53

This low-level cross-over pre-amplifier is mounted in an Eddystone box (220 mm long x 145 mm high x 56 mm wide).

This unit comprises a three transistor pre-amplifier which feeds a low frequency equalising and cross-over filter, IC1 and high pass filter, IC2.

It should be noted that the AM1/53 bass response corresponds

to the 'NORMAL' bass lift of the AM8/15 and that by changing the values of capacitors, C9, C12 and C14, as specified on the circuit, the bass lift will be similar to the 'MAXIMUM' of the AM8/15 (DSK 19714 A4 and DSK 21969 A4).

The low frequency and high frequency outputs thus obtained are connected to the AM8/14 via emitter follower output stages TR5 and TR6 respectively.

N.B. A label will be applied to the AM1/53 to indicate if the amplifier has been set for 'MAXIMUM' bass lift.

4. FREQUENCY SPLITTING POWER AMPLIFIER, AM8/15

Version B

This amplifier comprises a commercial power amplifier, Quad 303A2, integral with a BBC designed low level cross-over pre-amplifier. For convenience these are described separately below.

4.1 Power Amplifier Section (Quad 303A2)

The Power Amplifier is a modified commercial amplifier, Quad 303. The modifications and component location are shown on sketch DSK 20952 A3, and the unit is coded, by the manufacturer, as Quad 303A2. This amplifier is further modified by the BBC to house a low level cross-over pre-amplifier, which is integral with it.

The circuit modifications are the provision of RF filtering across the mains input and loudspeaker output terminals.

4.2 Frequency Splitting Pre-amplifier Section

The low level cross-over pre-amplifier is similar to the AM1/53 (paragraph 3.2) except that it now includes an input filter which rapidly attenuates all signals above 30 kHz.

It also has three degrees of bass lift, 'MINIMUM', 'NORMAL' and 'MAXIMUM'. These are set by links on the pre-amplifier printed circuit board and the setting indicated by a screw fixed via a label fitted on the rear of the pre-amplifier. It is supplied normally with 'MAXIMUM' bass lift.

5. MAINTENANCE

Maintenance must be confined to the amplifiers only; AM1/53 and AM8/14, or AM8/15, depending on version. No attempt should be made to replace either of the loudspeaker units on site as this requires specialised equipment. The overall circuit of the LS3/7

is shown on drawing D 42145 A3. It should be noted that this overall circuit refers to the 'A' version (up to Ser. No. 180).

The 'B' version comprises a combined frequency splitting amplifier and power amplifier, AMS/15 (i.e., no SK.A-PL.A interconnection). Otherwise all external connections are similar to that of Version 'A' (AM1/53 and AMS/14).

5.1 AMS/14 (Circuit to DSK 20951 A3 - modified according to DSK 19691 A3)

If maintenance is required, connect a 16 ohm 45 W load across plug PL.B, pins 2 and 3, and a similar load across pins 4 and 5, using test leads to sketch DSK 19713 A4. Any test apparatus should be earth-free to avoid possible failures inside the power amplifier.

Connect an input test lead (to DSK 191713 A4) to 6-pin input socket.

Power the unit from 240 V A.C. mains and wait about 10 minutes for stabilisation. Check rail volts (67 V D.C.), and adjust, if necessary, with RV 200. The voltage on pins 1 and 3 of the 6-pin input socket should be between 50 and 54 V.

Apply an input signal to each power amplifier in turn, increasing level until output voltage clips. Adjust RV 100, if necessary for symmetrical clipping. The output voltage should clip at a level greater than 21 V r.m.s. into 16 ohms. Reduce input level until the output voltage is 21 V r.m.s. The input voltage should be between 610 and 650 mV r.m.s., that is a gain of 30.25 dB \pm 0.25 dB.

The frequency response should be flat between 30 Hz and 20 kHz. The 3 dB points occur at 10 Hz and 35 kHz approximately and the response should be at least 52 dB down at 200 kHz relative to 1 kHz.

5.2 AM1/53 (Circuit to D 41826 A1)

If maintenance is required connect the AM1/53 to a properly set up AMS/14 via its interconnecting cable.

Check voltage across C1. Should be 24 \pm 1.8 V D.C.

Check voltage across C6. Should be 17.5 \pm 1.8 V D.C.

Check voltage to earth at emitter of TR3. This should be 6.2 V approximately.

Check voltage to earth at emitter of TR5. This should be 3.9 V approximately.

Check voltage to earth at emitter of TR6. This should be 10.9 V approximately.

From a 300 Ω tone source apply a signal of -31 dB to

the input and check output levels into high impedance at PLA3 and 4 (L.F.) and PLA5 and 6 (H.F.). The responses and gains should be as in DSK 19714 A4, with gain control at maximum.

N.B. This response is for the AM1/53 with 'NORMAL' bass lift. For 'MAXIMUM' bass lift the relative response should be similar to that given in DSK 21960 A4 below 500 Hz.

5.3 AM8/15 (Pre-amplifier circuit - E 15130 A2. Power amplifier circuit Quad 303 - DSK 20951 A3 modified to Quad 303A2 to DSK 20952 A3).

5.3.1 AM8/15 - Frequency Splitting Power Amplifier

If maintenance is required a check of overall frequency response and gain should first be carried out.

Connect a 16 ohm 45 watt load across output pins 2 and 3 and a similar load across output pins 4 and 5. The test lead used for the AM8/14 can be employed (DSK 19713 A4).

Any test apparatus connected to the outputs should be earth-free to avoid possible failures within the power amplifier.

Apply test tone from 300 Ω to the input of the pre-amplifier at -31 dB and set the gain control to maximum.

The responses and levels measured at the outputs, into high impedance, should be similar to those shown on DSK 21960 A4.

Note that there are now three degrees of bass lift, 'MINIMUM', 'NORMAL' and 'MAXIMUM', depending on which links are made in the pre-amplifier. The 'BASS LIFT INDICATOR' label on the rear of the pre-amplifier should indicate the internal setting. If there is any doubt the bottom cover on the pre-amplifier can be removed and the links checked. Should further testing be required the output leads 'L.F. O/P' and 'H.F. O/P' can be removed from the pre-amplifier board allowing separate examination of the power amplifier and pre-amplifier.

5.3.2 Power Amplifier (Quad 303A2)

Connect the 16 ohm loads as described in paragraph 5.3.1 above.

Power the amplifier for about 10 minutes to allow stabilisation and check the rail volts (67 V D.C.). Adjust, if necessary, with

RV 200.

Apply tone to the input of each amplifier in turn and increase the level until clipping occurs.

Adjust RV 100, if necessary, for symmetrical clipping. The output voltage should be in excess of 21 V r.m.s. Reduce the input level until the output voltage is 21 V r.m.s. The input voltage should be between 610 and 650 mV r.m.s., i.e., a gain of 30.25 ± 0.25 dB.

The frequency response should be flat between 30 Hz and 20 kHz. It should be -3 dB $\pm \frac{1}{2}$ dB at 14 Hz and -1 dB $\pm \frac{1}{2}$ dB at 40 kHz.

5.3.3 Frequency Splitting Pre-amplifier

Re-connect the pre-amplifier to the power amplifier and check the following:-

Volts across C1. 24 ± 1.8 V D.C.

Volts across C6. 17.5 ± 1.8 V D.C.

TR3 volts emitter to earth. 10.6 V approx.

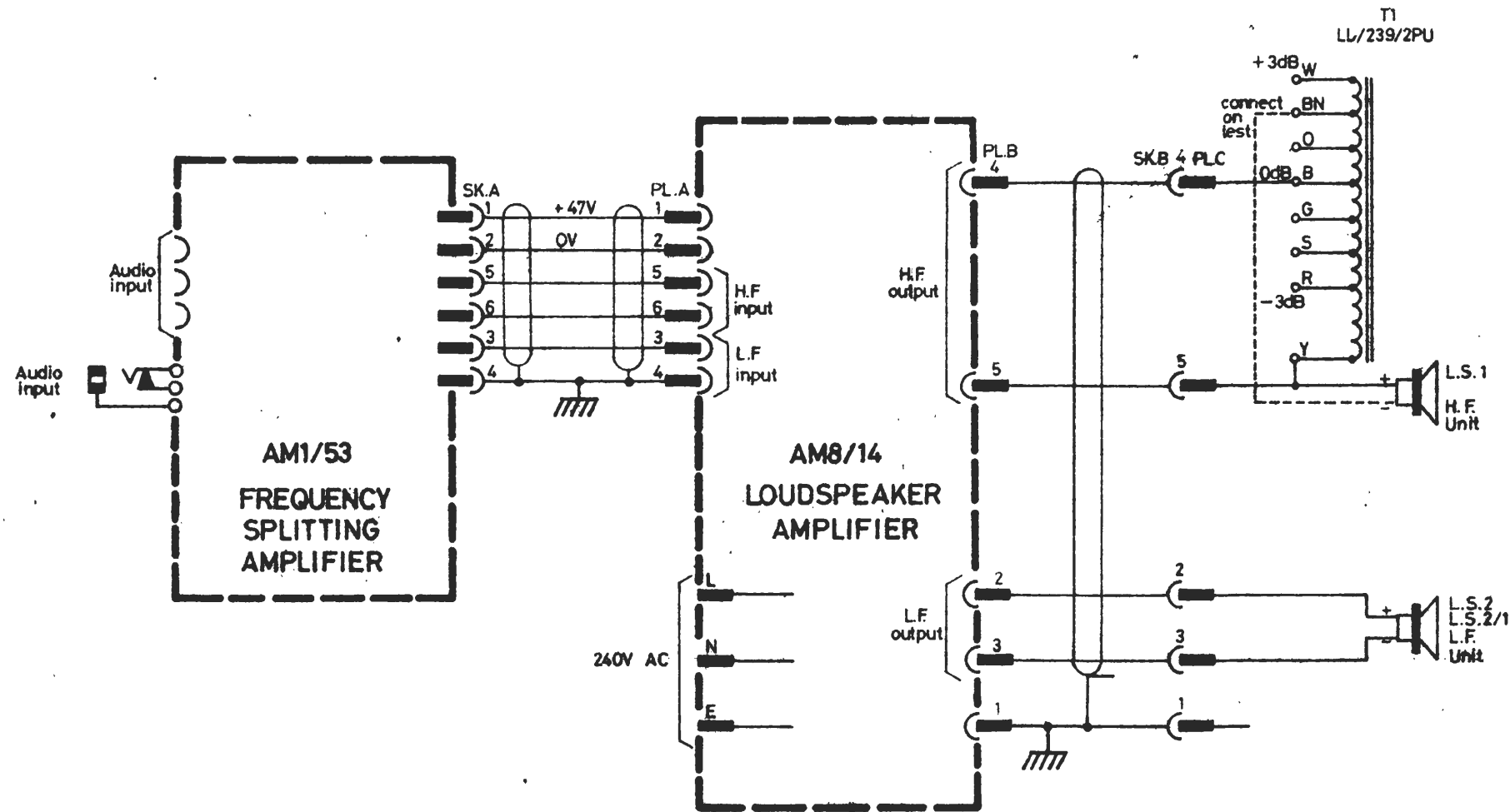
TR5 volts emitter to earth. 5.8 V approx.

TR6 volts emitter to earth. 16.7 V approx.

From a 300Ω tone source apply a signal of -31 dB to the input and check the output levels into high impedance. The response and gain for 'NORMAL' bass lift should be similar to that shown on DSK 191714 A4 (AM1/53).

For 'MAXIMUM' and 'MINIMUM' bass lift settings the deviations from 'NORMAL', below 500 Hz should be similar to those shown on DSK 21960 A4.

D42145A3



UP TO LS3/7 SERIAL NO:-180

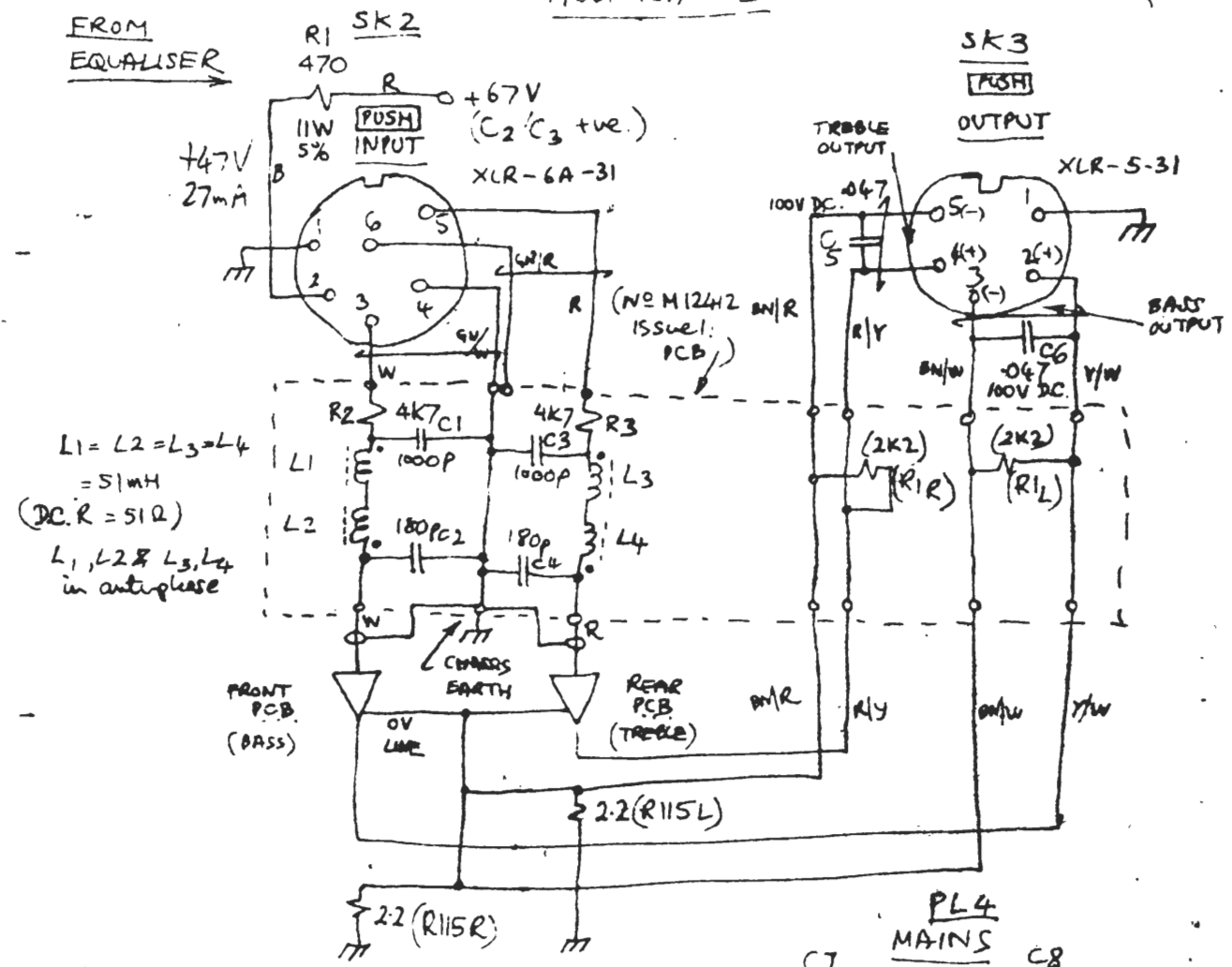
Parts list D42145A4

SCALE:—
S & H LTD L3698

Original Frame Size		BEL	
277mm x 400mm		DS/A3	
CHANGE		ISS	
3-3-77		A	
NOTE ADDED		1.	
K.HILL. J.H. 18-4-80			
THIRD ANGLE PROJECTION			
All dimensions in millimetres unless otherwise stated:			
Normal tolerances			
no decimal place:-	±1 mm		
one decimal place:-	±0.3mm		
two decimal places:-	±0.1mm		
unless otherwise stated			
This drawing/specification is the property of the British Broadcasting Corporation and may not be reproduced or disclosed to a third party in any form without the written permission of the Corporation.			
LS3/7 (O.B. LOUDSPEAKER)			
CIRCUIT			
DRN.	TCD.	CKD.	APPD.
	K.E.C.	nil	
DESIGNS DEPT.			
D42145A3			

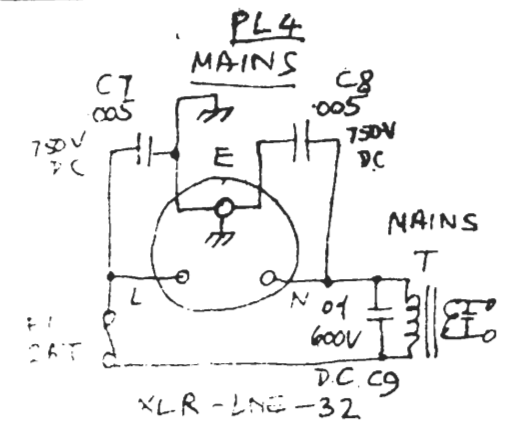
QUAD 303A

AM8/14
MODIFICATIONS



$L1 = L2 = L3 = L4 = 51\text{mH}$
(DC R = 51Ω)
 $L1, L2 \& L3, L4$
in antiphase

(NOTE
REMOVE MAINS TAP PANEL
AND CONNECT PL4 DIRECT
TO TRANSFORMER AS SHOWN,
DRESSING WIRES CLEAR OF
FILTER BOARD)



THIRD ANGLE PROJECTION

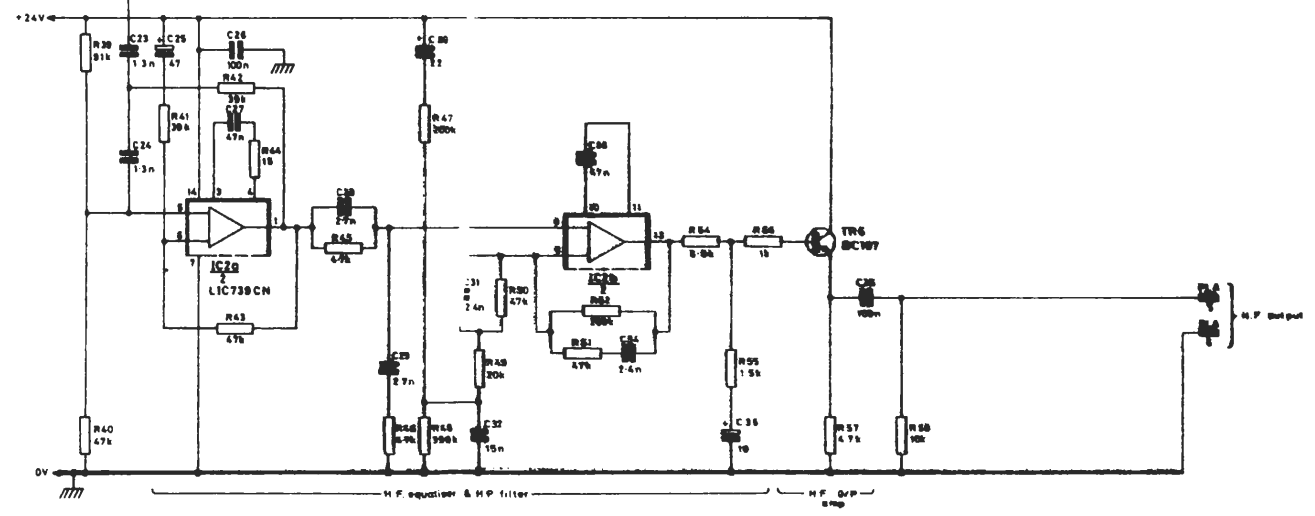
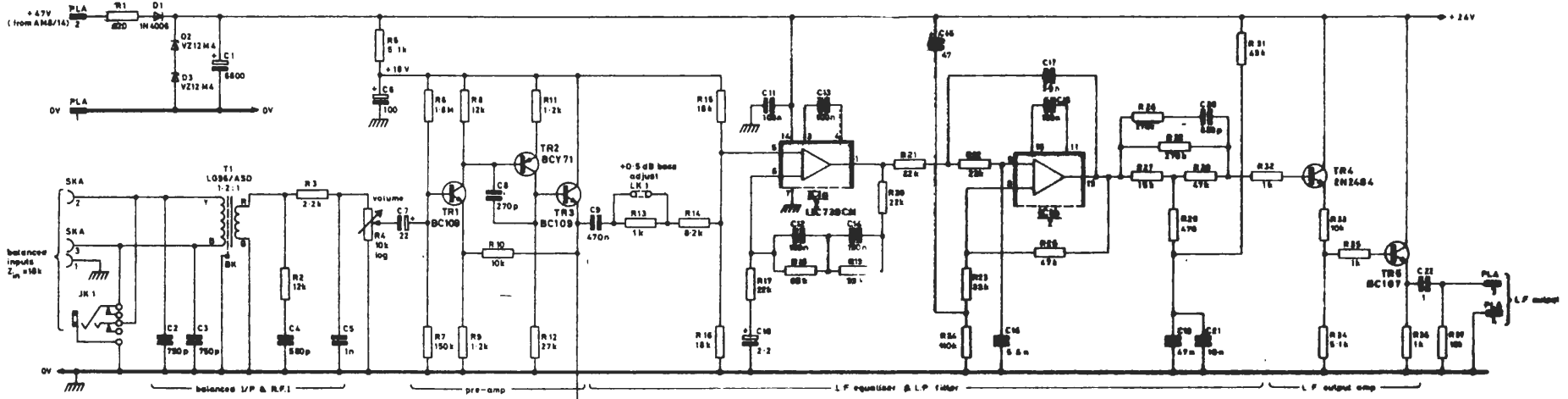
All dimensions in millimetres unless otherwise stated:
Normal tolerances
no decimal place:- ±1 mm
one decimal place:- ±0.3mm
two decimal places:- ±0.1mm
unless otherwise stated

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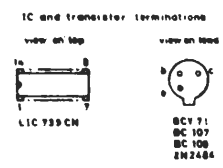
QUAD 303A
(CONVERSION OF QUAD 303)
CIRCUIT

DRN.	TCD.	CKD.	APPD.
DESIGNS DEPARTMENT			

DSK19691A3



FOR MAX BASS LIFT, Change C8 to C8a: $2.2 \mu F \pm 10\%$
 C12 to C12a: $68 \text{ nF} \pm 1\%$
 C14 to C14a: $100 \text{ nF} \pm 1\%$



Original Form No.	D 41826 A1
STANDARD NUMBER	D 41826 A1
CHANGE	1
DATE	10-18-76
DESIGNED BY	W. J. ...
CHECKED BY	...
APPROVED BY	...
DATE	10-18-76
BY	...

THIRD ANGLE PROJECTION

All dimensions in millimeters unless otherwise noted

Normal tolerances
 no decimal places ± 1
 one decimal place ± 0.2
 two decimal places ± 0.1
 unless otherwise noted

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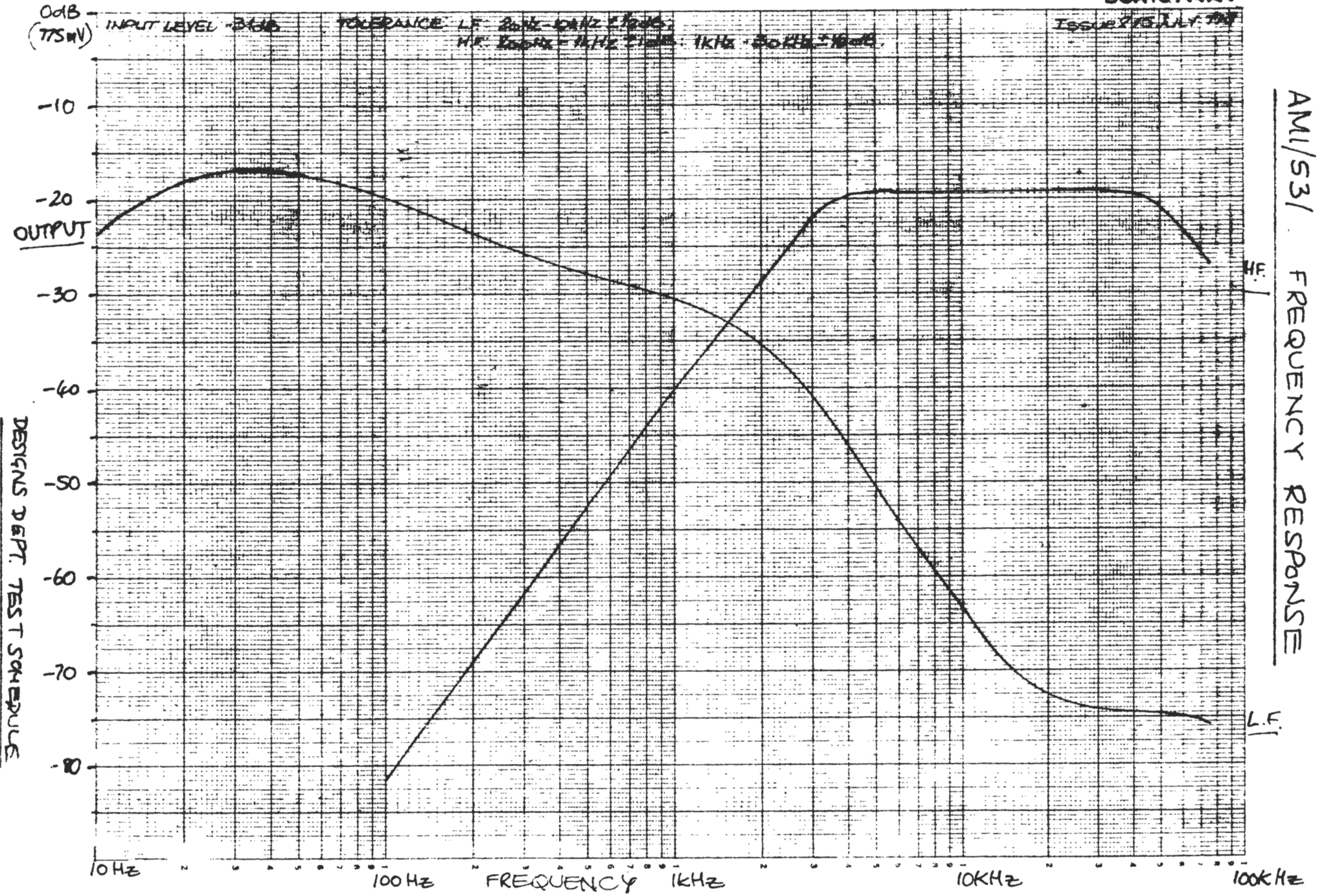
AM1/53
 (LOW LEVEL FREQ.
 SPLITTING AMPLIFIER)
 CIRCUIT

DATE	NO.	REV.	BY
10-18-76	1	1	W. J. ...

D 41826 A1

DSK19742A

ISSUE 213 JULY 74



AM/53/ FREQUENCY RESPONSE

DESIGNS DEPT. TEST SCHEDULE

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AM1/53 PRINTED BOARD COMPONENT LOCATION

D 41832 A 4

MINIMUM SIZE TO CUT NEGATIVE

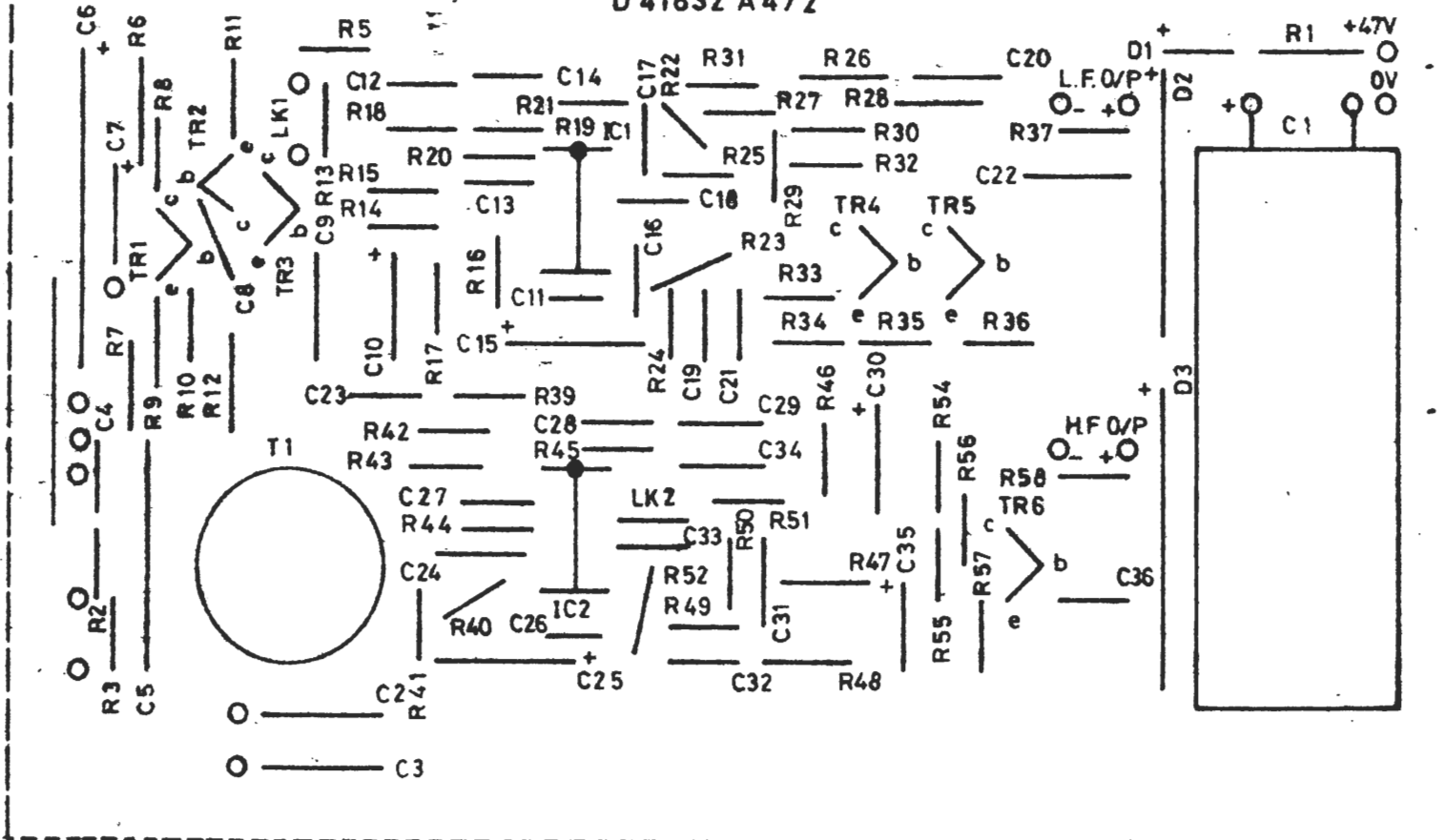
CHANGE

8-12-76

RES DESIGN LK2
 App'd.
 CF 12425th
 J.B.

TOP

AM1/53
 D 41832 A 4/2



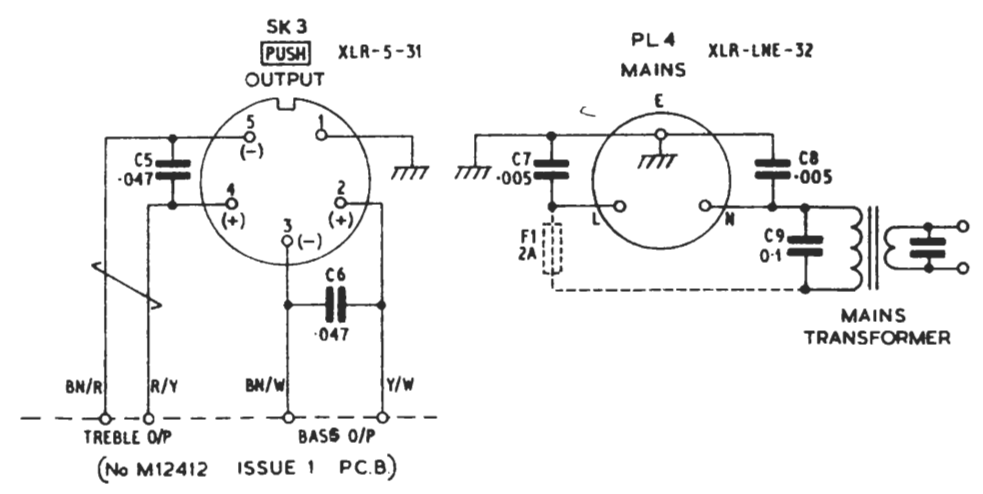
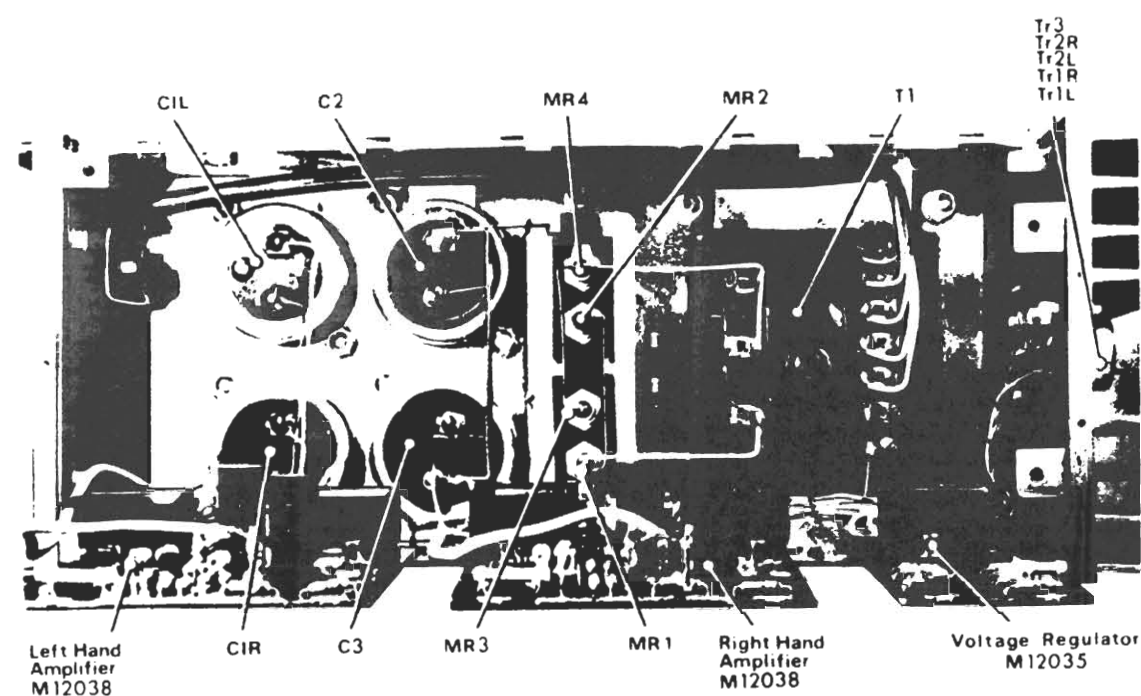
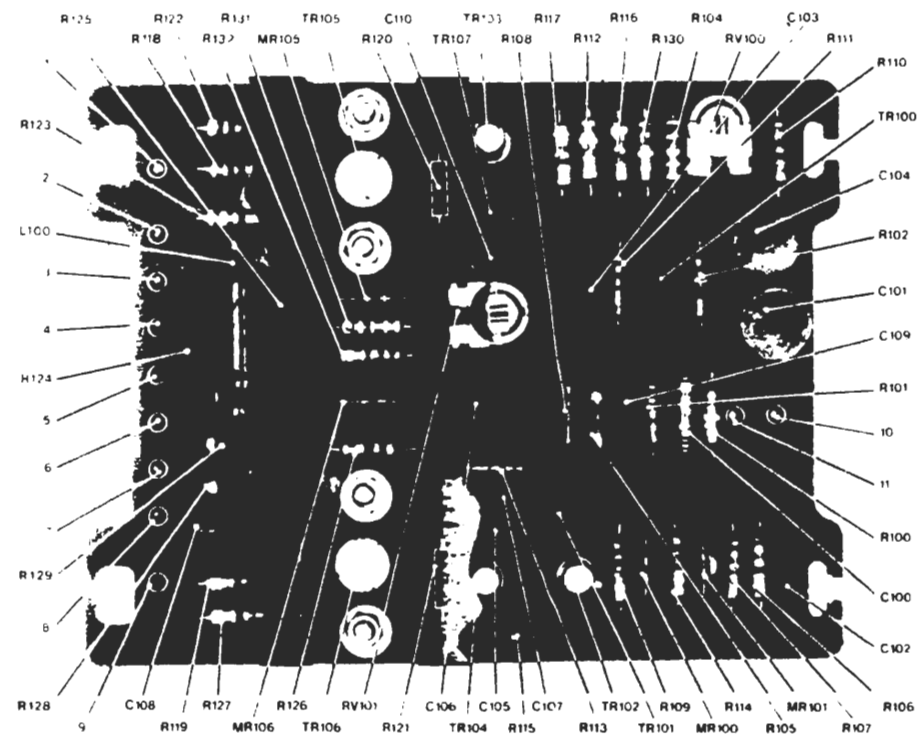
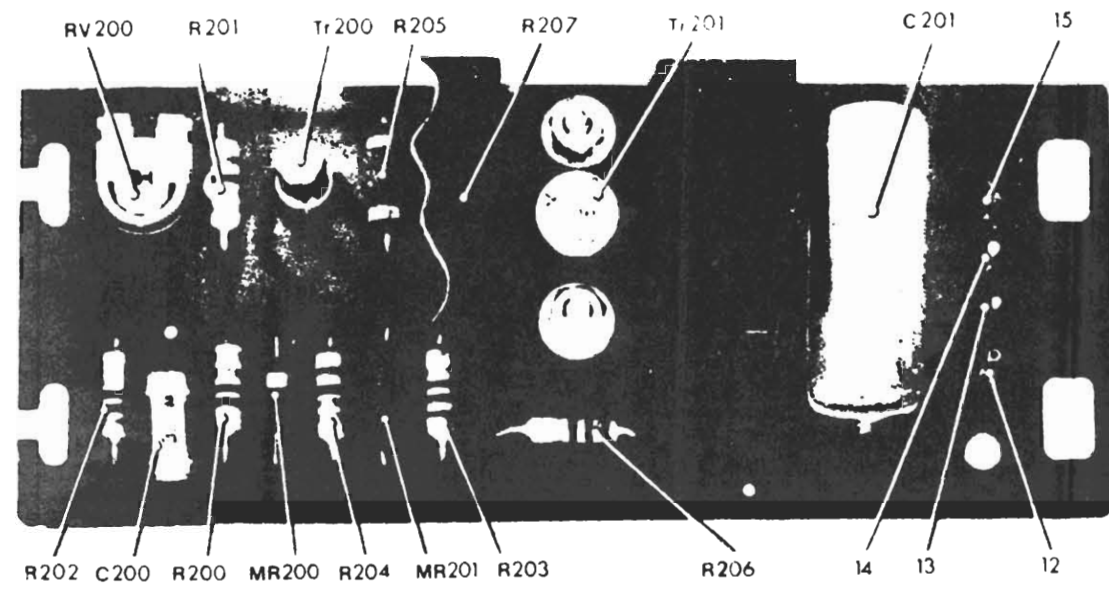
CHARACTERS AND LINES TO BE PRINTED IN WHITE/BLACK:
 PRINTED WIRING ON REVERSE SIDE OF BOARD IS D 41838 A 2

SCALE 1:1

AM1/53 PRINTED BOARD COMPONENT LOCATION

DAN TGD CKD
 DESIGNS DEPT
 D 41832 A 4

DSK 20952 A3



SCALE ?

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 277mm x 400mm

CHANGE 15/12/75

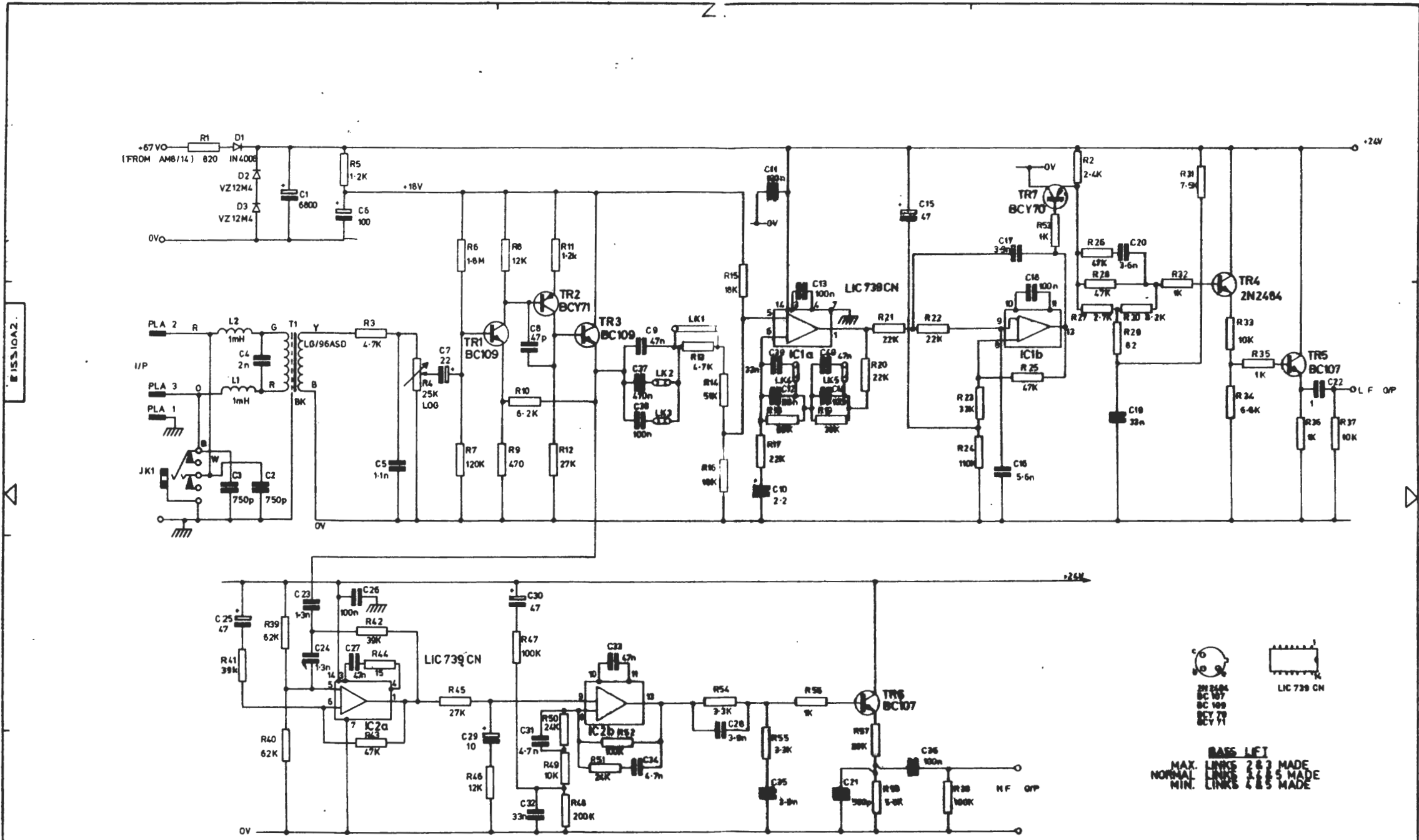
ISS 1

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DS/A3

COMPONENT LOCATION AND CIRCUIT MODIFICATIONS FOR QUAD 303 A2

All dimensions in millimetres unless otherwise stated. Normal tolerances:	DRN	DESIGNS DEPT
no decimal place = 1 mm unless	TCD	
one decimal place = 0.3 mm unless	CXD	DSK 20952 A3
two decimal places = 0.1 mm unless	APPD	



2N2484
 BC 107
 BC 109
 BCY 71

 BASE LEFT
 MAX. LINKS 2 & 3 MADE
 NORMAL LINKS 2 & 3 & 5 MADE
 MIN. LINKS 2 & 5 MADE

SCALE 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 400mm x 574mm

CHANGE

51.3.86

AM8/15 PRE-AMP CIRCUIT

DRN. J.D. EQUIPMENT DEPARTMENT.

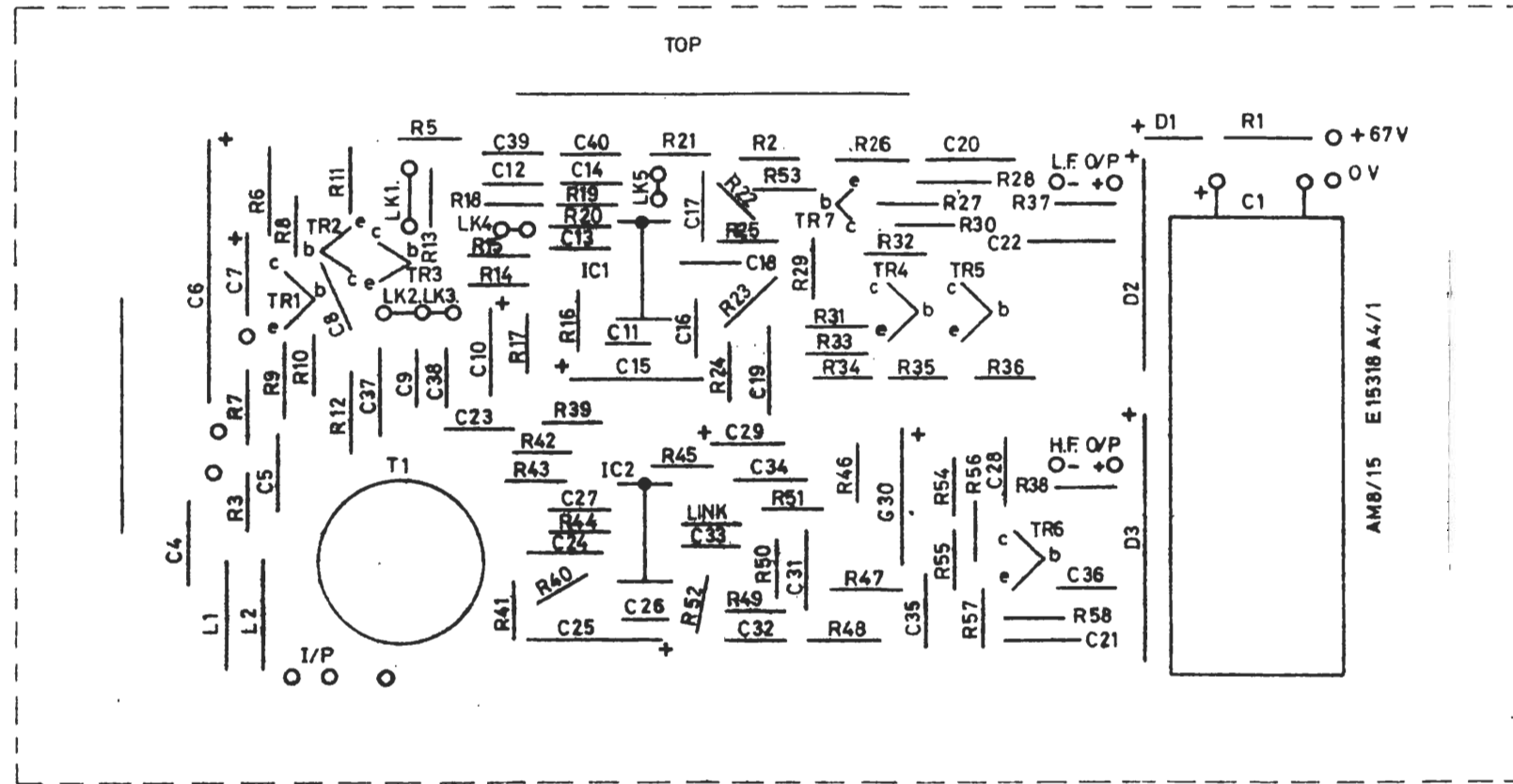
CHKD. W.H. E 15310 A2

APPD.

Normal tolerances:
 no decimal places ± 1 mm unless otherwise stated
 one decimal place ± 0.2 mm unless otherwise stated
 two decimal places ± 0.1 mm unless otherwise stated

861170 L000

E15318 A3



CHARACTERS AND LINES TO BE PRINTED IN WHITE
 PRINTED WIRING ON REVERSE SIDE OF BOARD IS E15317 A2

MINIMUM SIZE TO CUT NEGATIVE

SCALE 1:1

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
 277mm x 400mm

CHANGE
 4-5-78

ISS 7

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DS/A3

AM8/15

PRINTED BOARD COMPONENT LOCATION

All dimensions in millimetres unless otherwise stated: Normal tolerances: no decimal place — ± 1 mm unless one decimal place — ± 0.3 mm otherwise two decimal places — ± 0.1 mm stated	DRN.	BWM	EQUIPMENT DEPARTMENT
	TCD.		
	CKD.	J.H.	E15318 A3
	APPD.		

FREQUENCY RESPONSE OF AMPLIFIER AMB/15. INPUT -31dB (300Ω SOURCE).

ISS. 1. 4. 7. 80.

DRN. R.W.H.
CKD. APPD. M.E.W.

OUTPUT dB

+20

+10

0

-10

-20

-30

-40

10 Hz

100 Hz

FREQUENCY (KHz)

10 KHz

100 KHz

MAX. BASS

MINIMUM BASS LIFT

NORMAL

H.F.

* H.F. OUTPUT (R.F.)

N.B. ABOVE 200 KHz

FOR A 250 mV RMS SIGNAL ON INPUT,
THE OUTPUT SHOULD BE 250 mV RMS
AND SHOULD DECREASE AS THE
FREQUENCY IS INCREASED.

(R.F. SIGNAL SHOULD BE MODULATED
100% BY 1 KHz TONE)

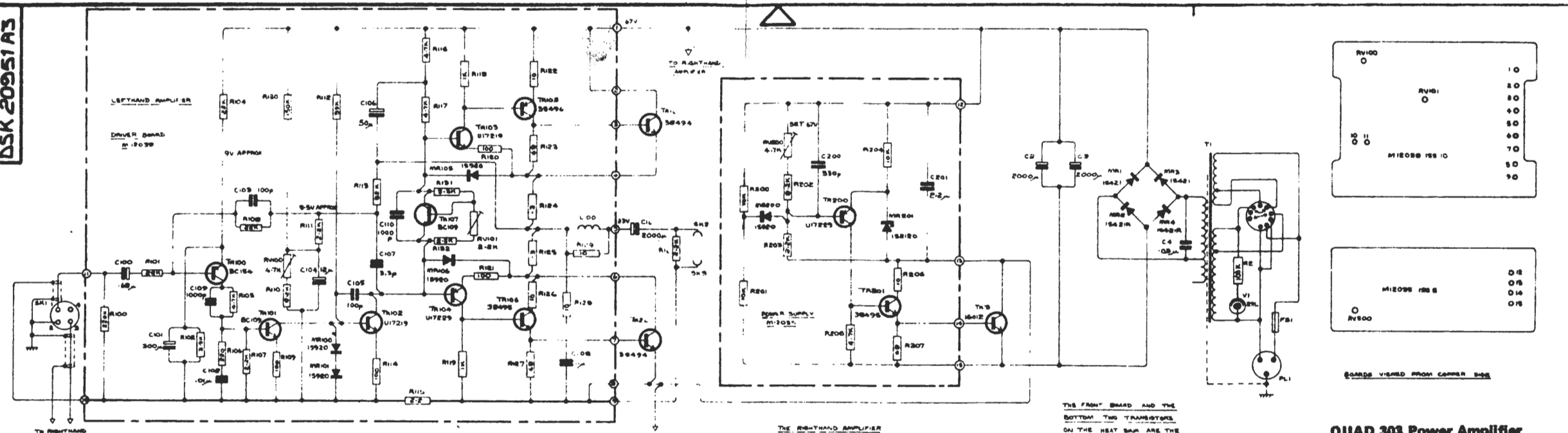
L.F.

AMPLIFIER, AMB/15. FREQUENCY RESPONSE.

DSK 21960 A4.

ISS. 1. 4. 7. 80.

DSK 20951 A3



COMPONENTS LIST
Components and circuit detail may vary slightly depending on the age of the equipment. In case of doubt please refer the query to Acoustical.

Value	Tol.	Makers reference	Stock no
R100	220K	±10% Dubilier BTT or Iskra UPM	187/C
R101	22K	±5% Welwyn F20 or Iskra UPM	217/D
R102	3.9K	±5% Dubilier BTT or Iskra UPM	241/A
R104	22K	±5% Welwyn F20 or Iskra UPM	217/D
R105	4.7K	±10% Dubilier BTT or Iskra UPM	240/F
R106	220	±10% Dubilier BTT or Iskra UPM	285/A
R107	2.2K	±5% Dubilier BTT or Iskra UPM	250/C
R108	22K	±5% Welwyn F20 or Iskra UPM	217/D
R109	100	±10% Dubilier BTT or Iskra UPM	306/F
R110	8.2K	±5% Dubilier BTT or Iskra UPM	232/B
R111	2.2K	±5% Dubilier BTT or Iskra UPM	250/C
R112	39K	±10% Dubilier BTT or Iskra UPM	208/M
R113	82K	±5% Welwyn F20 or Iskra UPM	203/C
R114	100	±10% Dubilier BTT or Iskra UPM	305/F
R115	2.2	±10% Morganite 1W	330/A
R116	4.7K	±10% Dubilier BTT or Iskra UPM	240/F
R117	4.7K	±10% Dubilier BTT or Iskra UPM	240/F
R118	1K	±10% Dubilier BTT or Iskra UPM	258/E
R119	1K	±10% Dubilier BTT or Iskra UPM	258/E
R120	100	±10% Dubilier BTT or Iskra UPM	305/F
R121	100	±10% Dubilier BTT or Iskra UPM	320/D
R122	10	±10% Dubilier BTT or Iskra UPM	307/B
R123	68	±10% Dubilier BTT or Iskra UPM	307/B
R124	3	±5% 3W AMC Ltd	336/A
R125	3	±5% 3W AMC Ltd	336/A
R126	10	±10% Dubilier BTT or Iskra UPM	320/D
R127	68	±10% Dubilier BTT or Iskra UPM	307/B
R128	10	±5% Dubilier BTT	320/E
R129	10	±5% Dubilier BTT	320/E
R130	150K	±10% Dubilier BTT or Iskra UPM	193/A
R131	3.3K	±5% Dubilier BTT or Iskra UPM	244/D
R132	2.2K	±5% Dubilier BTT or Iskra UPM	250/C

Value	Tol.	Makers reference	Stock no
RV100	4.7K	±20% Morganite type 62H	374/A
RV101	2.2K	±20% Morganite type 62H	372/B
C100	64µ	100% Mullard C426/AS/HO-64	489/A
C101	300µ	10% 10V TCC E1070/3 or Callins SPC 9-3/1	454/A
C102	0.01µ	±25% Erie BP	506/H
C103	100p	±20% Erie AP	528/B
C104	12µ	50V TCC E1072/8 or Callins SPC7-9/1	472/B
C105	100p	±20% Erie AP	528/B
C106	50µ	50V TCC E1070/6 or Callins SPC12-9/2	460/B
C107	3.3p	±20% Erie AP	548/H
C108	1µ	±20% 250V TCC PMX4	495/F
C109	1000p	±20% Erie AP	516/J
C110	1000p	±20% Erie AP	516/J
L100		Dubilier 665 or Radiospares T/V 2A 440/B	
Tr100		BC 214C	
Tr101		BC 109 or BC 149 or BC 184K	
Tr102		SGS U17219	
Tr103		SGS U17219	
Tr104		SGS U17229	
Tr105		RCA 38496	
Tr106		RCA 38495	
Tr107		BC 109 or BC 149 or BC 184K	
MR100		Texas Instruments 1S920	
MR101		Texas Instruments 1S920	
MR105		Texas Instruments 1S920	
MR106		Texas Instruments 1S920	

Quad 303—Regulator Board M12035, Fig. 12

Value	Tol.	Makers reference	Stock no
R200	10K	±10% Dubilier BTT or Iskra UPM	230/E
R201	10K	±10% Dubilier BTT or Iskra UPM	230/E
R202	8.2K	±5% Dubilier BTT or Iskra UPM	232/B
R203	2.2K	±5% Dubilier BTT or Iskra UPM	250/A
R204	10K	±10% Dubilier BTT or Iskra UPM	230/E
R205	4.7K	±10% Dubilier BTT or Iskra UPM	240/F
R206	10	±10% Dubilier BTT or Iskra UPM	320/D
R207	68	±10% Dubilier BTT or Iskra UPM	307/B
C200	330p	±20% Erie AP	523/C
C201	2.2µ	±20% 250V Mullard C280AE/A2M2	483/A
Tr200		SGS U17229	
Tr201		RCA 38495	
MR200		Texas Instruments 1S920	
MR201		Texas Instruments 1S2120 or SGS ZE12V7	
RV200	4.7K	±20% Morganite Type 62H	

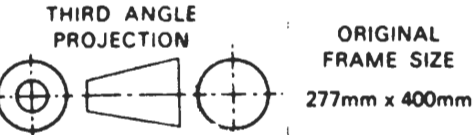
Quad 303: General, Fig. 10

Value	Tol.	Makers reference	Stock no
R1	2.2K	±10% Dubilier BTT or Iskra UPM	250/A
R2	100K	±10% Dubilier BTT or Iskra UPM	200/A
C1	2000µ	100V TCC CE36E PVC/Sleeve or Callins LC13-12/1	448/A
C2	2000µ	100V TCC CE36E PVC/Sleeve or Callins LC13-12/1	448/A
C3	2000µ	100V TCC CE36E PVC/Sleeve or Callins LC13-12/1	448/A
C4	0.3µ	±20+80% Erie CD 18	502/D
MR1		Texas Instruments 1S421	
MR2		Texas Instruments 1S421R	

QUAD 303 Power Amplifier
(Serial No. 11500 and above)

Value	Tol.	Makers reference	Stock no
MR3		Texas Instruments 1S421	
MR4		Texas Instruments 1S421R	
Tr1		RCA 38494	
Tr2		RCA 38494	
Tr3		RCA 16012 (or 40411+)	
V1		Hivac 29L	
FS1		2A Antisurge (20x5mm) Beswick TDC 123	
T1		Mains Transformer (dual voltage) to Drg A12085	

1An alternative for this circuit only



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THIRD ANGLE PROJECTION	ORIGINAL FRAME SIZE	CHANGE
	277mm x 400mm	1 15/12/78
DS/A3		

CIRCUIT AND COMPONENT LIST FOR QUAD 303 A2		
All dimensions in millimetres unless otherwise stated	Normal tolerances	DESIGNS DEPT.
no decimal place	— 1 mm unless	DRN. <input checked="" type="checkbox"/>
one decimal place	— 0.3 mm otherwise	TCO. <input type="checkbox"/>
two decimal places	— 0.1 mm stated	CKD. <input type="checkbox"/>
		APPD. <input type="checkbox"/>
DSK 20951 A3		

DSK 19713 A4

Original Frame Size
190mm x 277mm

THIRD ANGLE PROJECTION

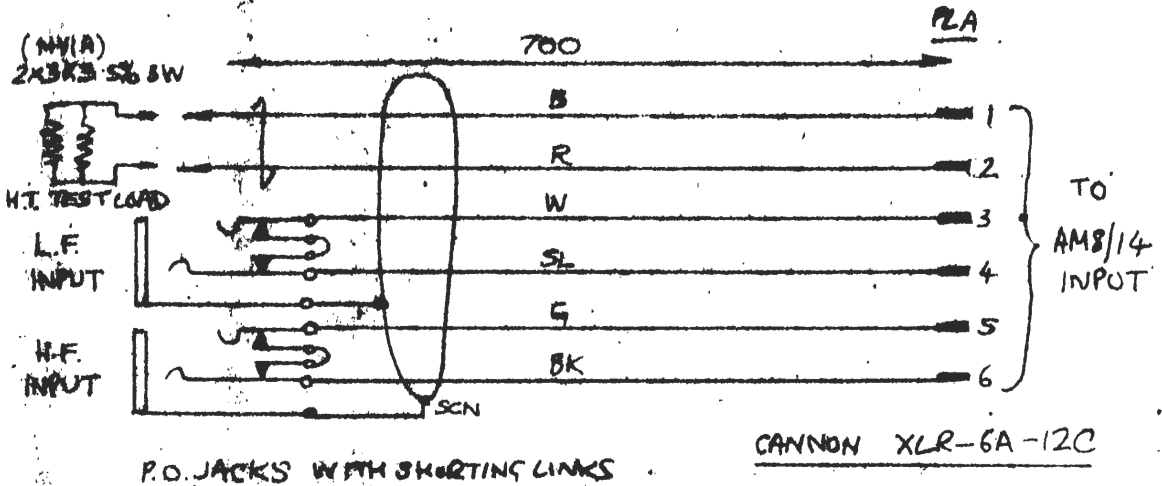
All dimensions in millimetres unless otherwise stated.
Normal tolerances:
no decimal place: ± 1 mm
one decimal place: ± 0.3 mm
two decimal places: ± 0.1 mm
unless otherwise stated.

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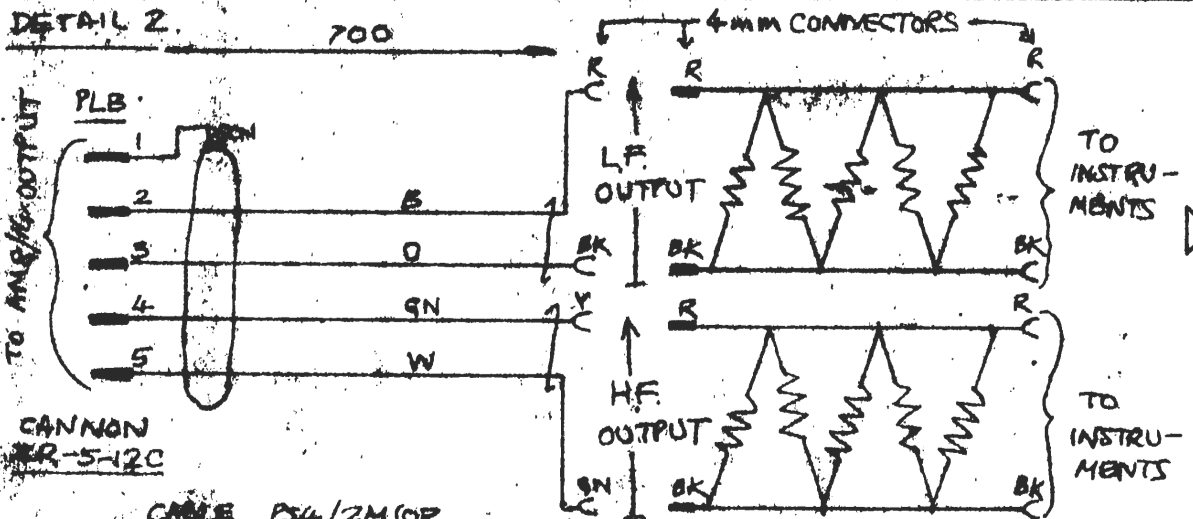
DS/A4

CHANGE ISS
1-8-77



DETAIL 1.

(AFTER D42130/A1 DETAIL 16)



WARNING

PINS 3 & 5 OF OUTPUT SOCKET ON OUTPUT OF AM8/14 MUST NOT BE EARTHED, OTHERWISE THERE IS A DANGER OF SHORTING THE 2R2 RESISTORS INSIDE.

TEST LOADS

EACH: $5 \times 82R 5\% 0.5W$
 $= 16.4R \pm 5\% 4SW$
MOUNTED ON 16SWG (1.6mm)
T.C.W. e.g. PAINTON 301A.

(AFTER D452150/A1 DET.17)

TEST LEADS FOR AM8/14

DRN	ATW	DESIGNS DEPT.
TCD		
CKD		
APFC		

DSK19713A4