Serial no.

_____

AD 145

PICO MIXER

HANDBOOK

Manufactured by

Audio Developments Ltd

23 Portland Road, Aldridge,
Walsall, West Midlands,
WS9 8NS England
Tel: 44 (0)1922 457007
Fax: 44 (0)1922 457008
email: sales@audio.co.uk

WARNING

IMPORTANT SAFETY INSTRUCTIONS

The user of electrical products must be familiar with their potential dangers, and fundamental precautions must always be taken. Please read the following text carefully.

A power supply unit manufactured by Audio Developments Ltd is not user serviceable - it has no user-serviceable parts.

THE OUTER COVERS MUST NOT BE REMOVED

Such a power supply unit is solely for use with audio mixers and sound processors - hereafter called the equipment - manufactured by Audio Developments Ltd.
Always use a cord set accepted by a National Approved Body.

EARTHING/GROUNDING: When using an external power supply unit that is connected to the mains supply to drive the mixer it must be CONNECTED TO EARTH.

In certain types of malfunction or breakdown, earthing provides a path of least resistance for electric current and considerably reduces the risk of electric shock.

DANGER: Incorrect connection of the equipment grounding/earthing conductor can result in the risk of electric shock. Where possible obtain a pre-wired mains lead from a reputable supplier with the correctly fitted mains connector for the type of mains outlet in use; otherwise, one correctly wired and checked by a qualified electrical engineer. If your mains lead is not suitable for the mains outlet, have the correct plug fitted by qualified personnel.

The MAINS PLUG of this equipment is the primary disconnect device. Therefore, in final application, ensure it remains close to the equipment and easily accessible.

OTHER PRECAUTIONS

- Read the instructions before using the equipment and its power supply unit.
- The power-supply cords should be unplugged from the outlet when left unused for a long period.
- The equipment, but especially the mains power supply unit, should be serviced by qualified personnel.
- The mains power supply unit should be checked by qualified personnel on a periodic basis to ensure it meets its specifications, especially those associated with SAFETY.
- Electrical and electronic products should definitely be serviced if the power supply cord or plug have been damaged.
  OR
  Objects have fallen on them or they has been dropped, causing physical damage.
  OR
  Liquid has been spilled upon them or they have been exposed to rain.
  OR
  They do not seem to perform at all, or are operating, or appearing to operate, below normal specification.
- Do not use the equipment or a mains power supply unit near water or in rain or in any other areas where the power supply could get wet or exposed to moisture.
- Never locate your equipment and its power supply unit near a source of heat, eg radiator or stove.
- The equipment should only be connected to the type of power supply unit marked on its casework or as described in the operating instructions.

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AD145 PICO MIXER

GENERAL

The AD145 Pico Mixer has been introduced by Audio Developments in a effort to offer even more facilities in a small package. This follows on from the highly successful AD045 range of models.

The features recognisable in Audio Developments products are maintained. The casework is engineered from aluminium extrusions to give it its modular robust design. The extra facilities incorporated over and above that of the AD045 are Talkback and Cue monitoring.

THE SYSTEM:

The Block Diagram, Fig (ii) shows the complete system. The signal path is shown in heavy line.

The input is balanced floating with the pre-amp having a switched gain. In the -40 and -20 (line) position an attenuator is introduced right on the input. In the line position this also changes the input impedance to 10KR.

The mic power switch has three positions. In the mid (OFF) position no d.c. voltage appears a the input connector. This is for when dynamic microphones are being used. The other two positions are for powering condenser microphones. The PH position is the Phantom Powering at 48v, which is applied to Pins 2 and 3 of the XLR. The TA position is for powering Sennheiser type microphones using the Tonader or AB system. 12v is fed to Pin 2 of the XLR. The polarity of this can be changed. (Refer to Connections Section).

The equaliser section is a three band type with a bypass switch allowing the operator to revert quickly to the 'flat' position. The H.P.F. (High Pass Filter) is outside the main EQ and cannot be by-passed. This is used when undesirable low frequencies (e.g. wind noise) need to be removed. Thus the reason why it is right at the input to avoid overloading of the pre-amp stage.

The next section in the signal path is the channel fader. At this point the overload indicator and PFL appear. The overload indicator illuminates 3dB prior to clipping thus giving a warning of impending overload of the pre-amp. The Pre-fade Listen (PFL) is fed through its own independent mixer to the monitor section. When a PFL button is depressed whatever is on the monitor output at the time is muted and the PFL signal fed in its place. The routing of the channel signal is normally achieved by a PAN control but a switch can be fitted to order.

The next stage is the mixer amplifier itself which gives the composite signal. Following this is the 1kHz switch, which when operated, feeds a 1kHz Tone to the two outputs and at the same time breaks the main signal path. The tone is injected pre the main faders and with the faders at their fully open position gives an output level of +10dB. This allows the operator to set an output level anywhere below this. Most operate with a reference level of 0dB which positions the faders at a reasonable operating level, i.e. with 10dB 'in hand'.

The main faders follow, which control the signal level to the output amplifier. The output is also transformer balanced and floating. The monitoring section consists of both aural and visual indication. There are two meters of either the VU or PPM type. The top meter reads 'A' output and by depressing the

'BATT' button gives an indication of the battery status. The bottom meter reads 'B' output and by depressing the B/PFL button ready the PFL level. The two monitor switches determine what is fed to the monitor output. With both buttons out the CUE signal is fed to the headphones. This allows for such as a reverse talkback signal to be returned to the mixer to facilitate two way communication. With either A or B buttons depressed then the relevant output is fed to both sides. With both pressed simultaneously then the stereo image appears at the monitor output, which also has an independent gain control. (A IN THE LEFT EAR AND B IN THE RIGHT).

The TALKBACK section is quite comprehensive for such a small mixer. The microphone is an electret type and has its own gain control with a screwdriver adjustment.

The SLATE switch feed the talkback signal to the two main outputs along with a 45Hz pilot tone. Therefore when marking tapes the cue is easy to find when in fast rewind. The T.B. switch routes the talkback signal to the TALKBACK output. The MON control allows a 'bleed' of the monitor assigned signal to be fed to the talkback output, this being useful for giving an independent feed when the cue input is not being used, such as to the boom operator. The cue is directly linked to the talkback output. When the T.B. button is depressed all other signals on the talkback are muted.

The CUE LAMP is an indicator which can be operated externally with the use of a single pole normally open switch.

SOME POINTS TO CONSIDER BEFORE USING AD145 MIXER

* Ensure correct microphone power is selected before inserting microphones.

* Ensure that microphone power is switched off when inputs are unterminated. If microphone power is on when the input is unterminated it will result in greatly increased inter-channel crosstalk when switched to TA.

* When using AD100-05 Power Supply and Charger Unit with batteries only allow charge switch to operate when using Nickel Cadmium batteries.

* When using AD100-05 Power Supply there is a mains voltage selector. Ensure this is in the correct position for the intended mains voltage.

* On the AD100-05 Power Supply there is a mains voltage selector. Ensure this is in the correct position for the intended mains voltage.

* The AD145 in its standard form has a microphone powering facility when switched to TA +12v hot 0v cold. The procedure for reversing the microphone power is explained on page C27 (sheet 1)

* Do not store the mixer with batteries for long periods. This will result in battery leakage.

* Remove batteries when transporting. Often mixers can accidentally be switched on whilst packing is taking place.

* To clean mixer, do not use solvent cleaners. This may result in the silk screen lifting and/or plastic components suffering. It is best to use a damp cloth and mild detergent. For the paintwork use household furniture polish.

* WARNING - WHEN USING A MAINS POWER SUPPLY TO FEED THE MIXER (E.G. AD100-05 TYPE) THEN THE UNIT MUST BE EARTHED. THIS IS FOR SAFETY REASONS.

CONNECTIONS:

AUDIO INPUT: FEMALE XLR (Male can be fitted to order)

CHANNEL:
1 - EARTH)
2 - LIVE) TRANSFORMER BALANCED/FLOATING
3 - RETURN)

MIC POWER:
PHANTOM - 48v on Pins 2 & 3
TA or AB POWER - 12v Pin 2) Polarity can
0v Pin 3) reversed to order

CUE INPUT - FEMALE XLR

1 - EARTH)
2 - LIVE) ELECTRONIC DIFFERENTIAL BALANCE
3 - RETURN) 10KR INPUT IMPEDANCE LINE LEVEL

AUDIO OUTPUT: MALE XLR (female can be fitted to order)

A & B
1 - EARTH)
2 - LIVE) TRANSFORMER BALANCED/FLOATING
3 - RETURN) (Note - do not connect PINS 3 & 1 together when operating unbalanced. Take output from Pins 2 & 1 with Pin 3 no connection.

MONITOR P.O. Jack Type 'B'
TIP - LEFT
RING - RIGHT
SLEEVE - EARTH

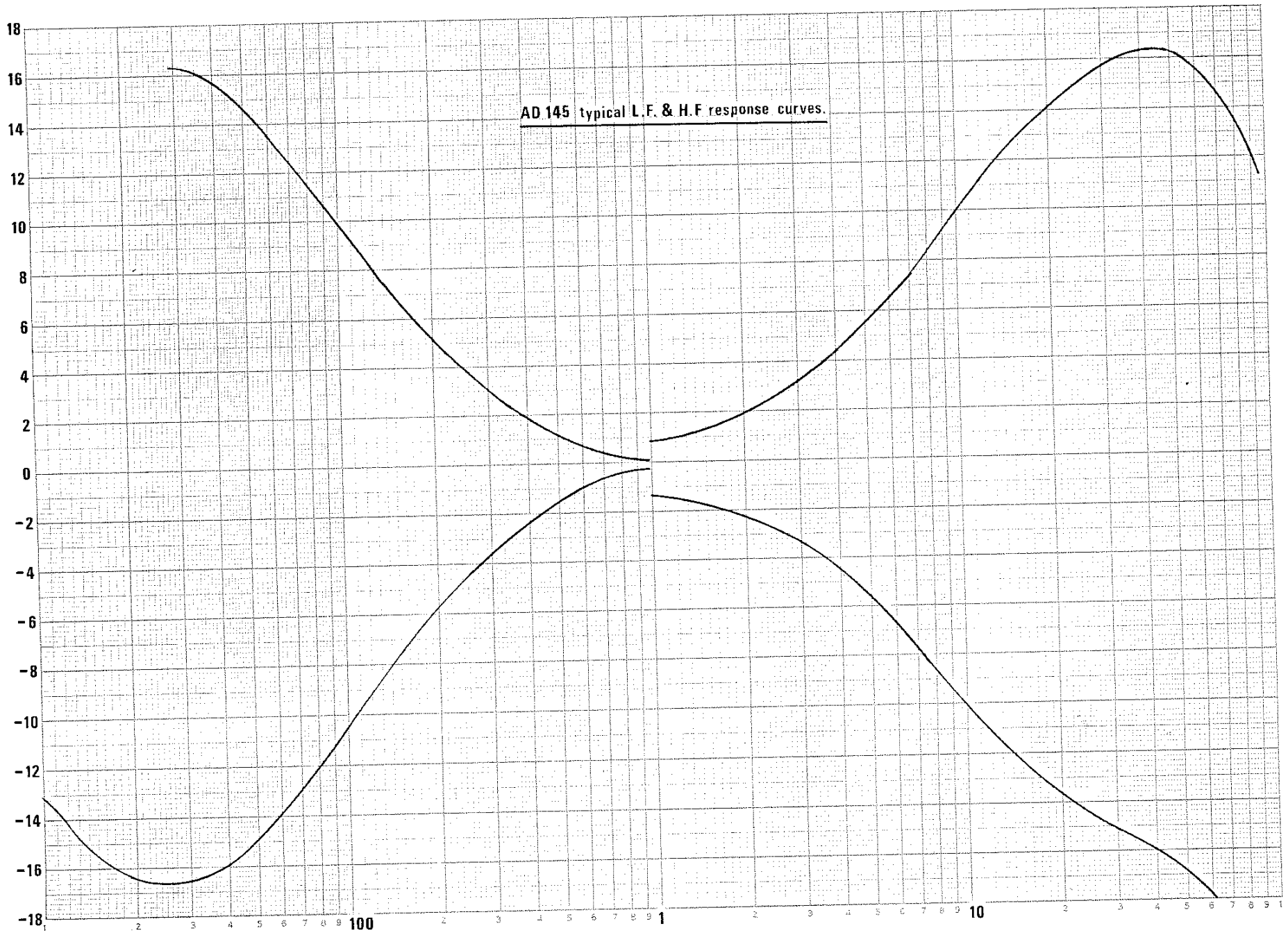
CUE LAMP A short circuit applied between the two connectors will illuminate L.E.D.
(By using single Pole Push to make switch)

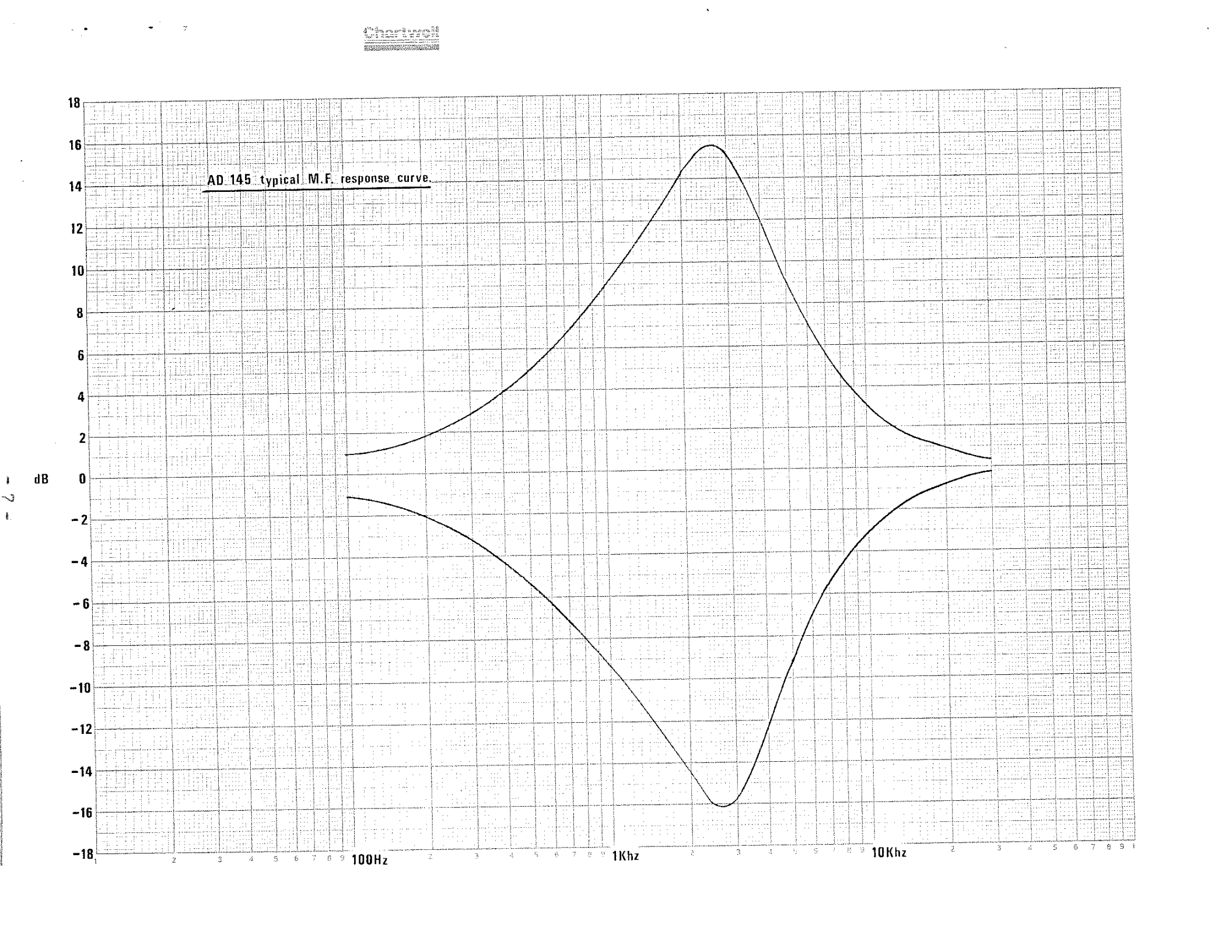
POWERING EXTERNAL 4 Pin XLR MALE
1 - 15-24v DC
2 - 0v
3 - 10-15v DC
4 - Charge input

Any voltage in the range 10-24v can be used to drive the mixer by connections to the appropriate pins.

The supply should be of the regulated type and have a capability of supply 300mA.

CHARGE - When Ni-Cad batteries are fitted they can be charged by connecting a voltage of 17-24v a PIN 4. There is a constant current charger circuit included in the mixer.
INTERNAL 10 X 'c' cell nicad or dry cells


AD 145 typical L.F. & H.F response curves.
dB
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
100
1
10

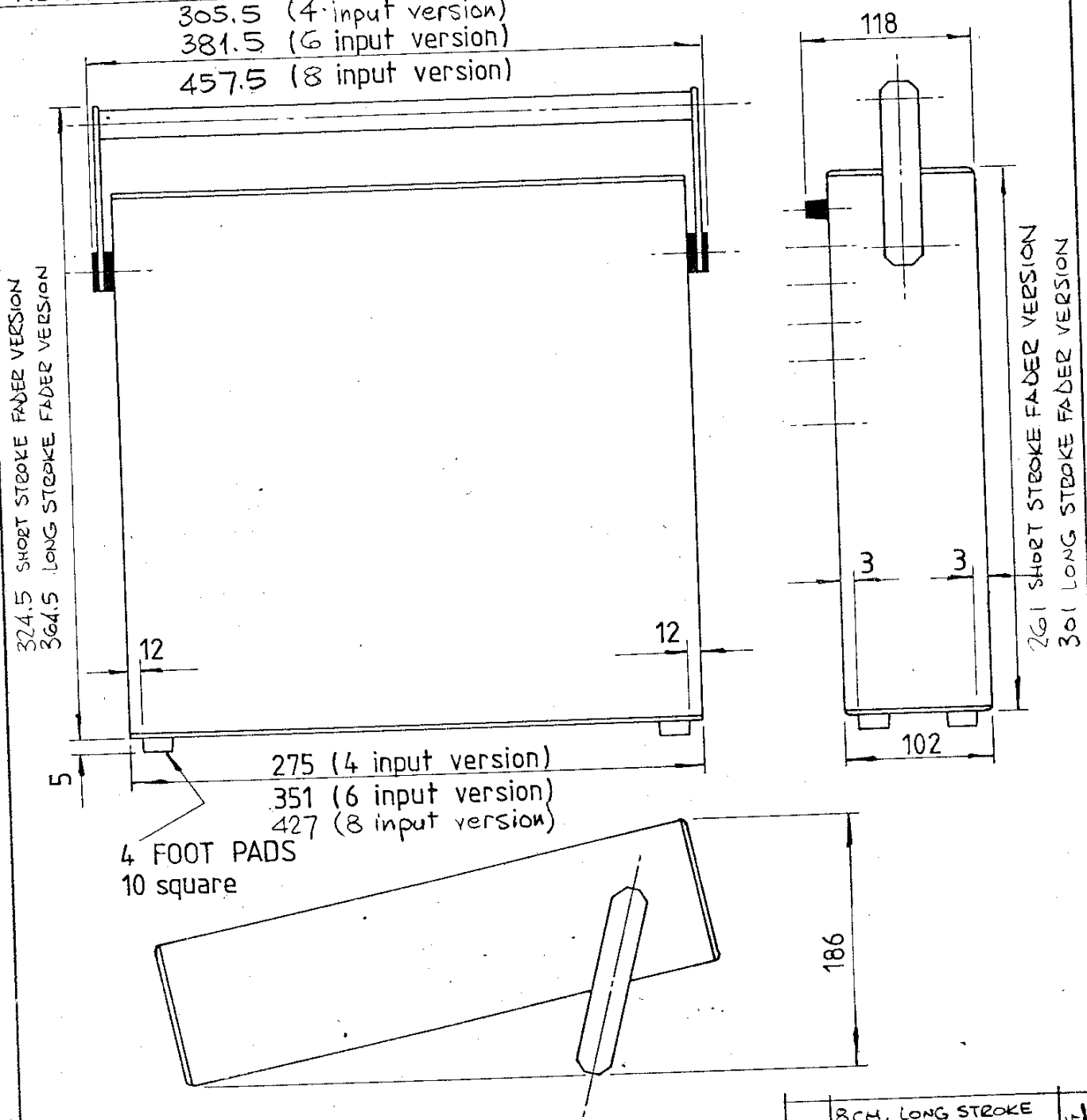

AD 145 typical M.F. response curve.
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
dB
100Hz
1Khz
10Khz

DRG. No:
AD . 145 . D . 13

THIRD ANGLE PROJECTION

DO NOT SCALE

DIMENSIONS IN mm



ISS	DESCRIPTION	SIG.
2	8CH. LONG STROKE FADER INFO. ADDED. 1.10.84	
1	10.5.83	

Drawn jgm	Scale -	Unstated Tolerances	AD.145
Checked	Material	2 Dec Pl. ± 010 3 Dec Pl. ± 005	MAJOR OVERALL DIMENSIONS
Approved	Finish	Fractions ± 1/64 Metric ± 2mm	

Audio Developments,
Hall Lane,
Walsall Wood, Staffs

DRG. No.
AD . 145 . D . 13

MY 26094 R

POWER SUPPLY UNIT
TYPE AD100-09

The AD100-09 mains POWER SUPPLY UNIT is suitable for driving most of AUDIO DEVELOPMENTS' range of portable audio mixers. This PSU is a single-rail device providing 500mA of current at +14v DC potential and is used as a substitute for battery power with mixers containing an internal DC-DC converter.

The AD100-09 may be powered from either a 110/120v AC source or a 220v/240v AC source. Ensure that the AC Voltage Selector Switch on the front panel is in the correct position for the source in use. Operating the equipment at the wrong voltage could be hazardous. Care must be taken to connect the LIVE, NEUTRAL and EARTH pins of the PSU's IEC mains connector to the corresponding terminals associated with the AC source. The ON/OFF switch contains an indicator that illuminates when the PSU is operational.

FOR SAFETY REASONS, AD100-09 POWER SUPPLY UNIT MUST BE CONNECTED TO MAINS EARTH. Any maintenance to the PSU or its mains cable assembly should be performed by a qualified engineer.

CHARGING: If nickel-cadmium cells are fitted in an AD140 series mixer, they may be recharged in situ from AD100-09 power supply - whether the mixer is in use or not. (Maximum current is set at 250mA - in addition to the 500mA of current supplying the audio electronics.) The charging circuit has its own ON/OFF slide switch and LED indicator. DO NOT ACTIVATE THE CHARGE CIRCUIT UNLESS THE MIXER IS FITTED WITH NICKEL-CADMIUM CELLS.

FUSES: Two 20mm ANTI-SURGE fuses protect AD100-09 against fault conditions. Should either fail, it is strongly recommended that the cause be traced. Refer to the TECHNICAL LIBRARY. Only suitably qualified personnel should service the power supply unit. The fuse holder on the front panel contains the mains fuse.

250mA HRC TYPE T 240v AC

For continued safety the specified fuse link must be fitted in the mains fuse holder when a replacement is required. Ensure it is of a type approved by a National Approved Body.

DC-OUTPUT XLR	PIN 1	Ov	PIN 3	NOT CONNECTED
	PIN 2	CHARGE	PIN 4	+14vDC

DO NOT REMOVE THE OUTER COVERS

NOTE: The power supply unit should be serviced by a suitably qualified engineer. Only genuine spare parts with identical specifications must be used.

It is DANGEROUS to change the specification or modify the product in any way.

MAINS POWER SUPPLY TYPES AD100-09

SERVICE SECTION
FOR SUITABLY QUALIFIED PERSONNEL ONLY

WARNING

For SAFETY service must be carried out by suitably Qualified Personnel only.

DANGER
Isolate the power supply unit from the mains supply before removing any covers.

FUSES: Three 20mm ANTI-SURGE (T) fuses protect the AD100-09 against fault conditions. Should one fail, it is strongly recommended that the cause be traced.

The fuse holder on the front panel contains the mains fuse.

250mA HRC TYPE T 240v AC

For continued safety the specified fuse link must be fitted in the mains fuse holder when a replacement is required. Ensure it is of a type approved by a National Approved Body.

The DC fuses are fitted internally to the printed circuit board.

1.0 A HRC TYPE T ■ REGULATED DC OUTPUT

500mA HRC TYPE T ■ BATTERY CHARGE OUTPUT

These are accessed by removing the top cover. Before carrying out this operation, ensure the required SAFETY precautions are taken. ISOLATE the power supply unit from the MAINS SUPPLY.

The regulated section of the power supply unit is of the series type, built around transistor TR1. D1 and D2 create the full wave rectification from the centre tap transformer. C1 acts as the smoothing capacitor. R1 and R2 create the path supplying the current to the base of TR1 and the reference transistor TR2. The output voltage is set by VR1 and the junction of this pre-set with R5 is fed to the base of TR2. This control on TR2 determines the drive to TR1 and thus keeps the output voltage constant.

TR3, R3 and R4 form an overload or short circuit protection. When the current through R3 increases the voltage drop across R3 reaches a sufficient value to turn TR3 on, which then 'bleeds' current from the base of TR1 and turns this device off.

SETTING THE OUTPUT VOLTAGE - With the DC output unloaded monitor the output voltage at Pin 1 (0v) and Pin 4 (+v) of the DC-OUTPUT XLR. The voltage is set to +14v DC ±0.5 by adjusting VR1. For monitoring the voltage use a suitable meter for measuring DC voltage.

HINTS ON FAULT FINDING (All readings DC VOLTS using a DVM)

1. ZD1 should have a potential of 7.5v ±0.3v if the correct reference voltage is to be set up.
2. The base of TR2 should be 0.7v higher than that at the cathode of ZD1. Reference 0v.
3. TR1 base should be 0.7v higher than its emitter.
4. With no load on the power supply the collector of TR1 should be approximately 22v. Reference 0v.
5. If the output voltage is low it could mean TR3 is short circuit. This would cause the base drive current to TR1 to be diverted.

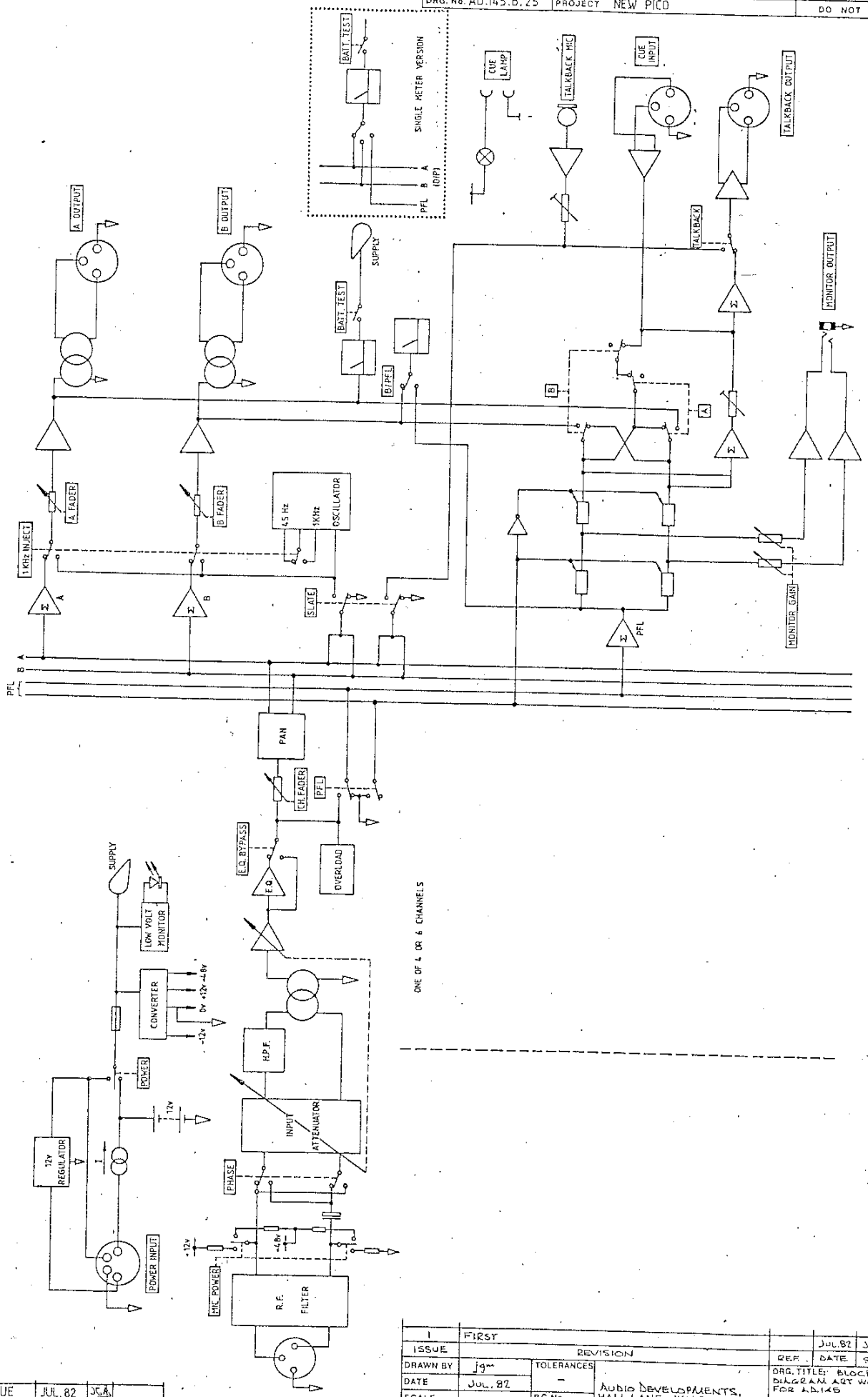
NOTE: The power supply unit should be serviced by a suitably qualified engineer. Only genuine spare parts with identical specifications must be used.

It is dangerous to change the specification or modify the product in any way.

D R A W I N G L I S T

DRAWING TITLE	DRAWING NO.
BLOCK DIAGRAM	AD 145 B.25
MOTHER BOARD	
Circuit Diagram	AD 145 C.104 Sheet 1
Component Location Drawing	AD 145 C.304 Sheet 1
Component Cross Reference List	AD 145 D.304 Sheet 3
INPUT MODULE (Mic. Line)	
Circuit Diagram	AD 145 C.106 Sheet 1
Component Location Drawing	AD 145 C.306 Sheet 1
Component Cross Reference List	AD 145 D.306 Sheets 3 & 4
OUTPUT MODULE	
Circuit Diagram	AD 145 C.105 Sheet 1
Component Location Drawing. Board 'A'	AD 145 C.305 Sheet 1
Component Cross Ref. List. Board 'A'	AD 145 D.305 Sheets 3 & 4
Component Location Drawing. Board 'B'	AD 145 C.37 Sheet 1
Component Cross Ref. List. Board 'B'	AD 145 D.37 Sheets 3 & 4
POWER INPUT	
Circuit Diagram	AD 145 C.39 Sheet 1
Component Location Drawing	AD 145 C.40 Sheet 1
Component Cross Reference List	AD 145 D.40 Sheet 3
CONVERTER	
Circuit Diagram	AD 100 C.67 Sheet 1
Component Location Drawing	AD 100 D.68 Sheet 1
Component Cross Reference List	AD 100 D.68 Sheet 3
LOW IMPEDANCE BUFFER	
Circuit Diagram (Typical Ref. Nos. only)	AD 100 D.66 Sheet 2
Component Loc. Drg.---See OUTPUT MODULE.	
P.P.M. (BBC and N.10)	
Circuit Diagram	AD 043 D.21 Sheet 1
Component Location Drawing	AD 043 D.23 Sheet 1
Component Cross Reference List	AD 043 D.23 Sheet 3
CURVE GENERATOR - P.P.M.(BBC & N.10)	
Circuit Diagram	AD 043 D.25 Sheet 1
Component Location Drawing	AD 043 D.24 Sheet 1
Component Cross Reference List - BBC	AD 043 D.24 Sheet 3
Component Cross Reference List - N.10	AD 043 D.24 Sheet 5
V.U.	
Circuit Diagram	AD 043 D.26 Sheet 1
Component Location Drawing	AD 043 D.28 Sheet 1
Component Cross Reference List	AD 043 D.28 Sheet 3
POWER SUPPLY/CHARGER UNIT	
Circuit Diagram	AD 100-09.C.102 Sheet 2
Component Location Drawing	AD 100-09.C.302 Sheet 1

DRG. NO. AD 145. D 909



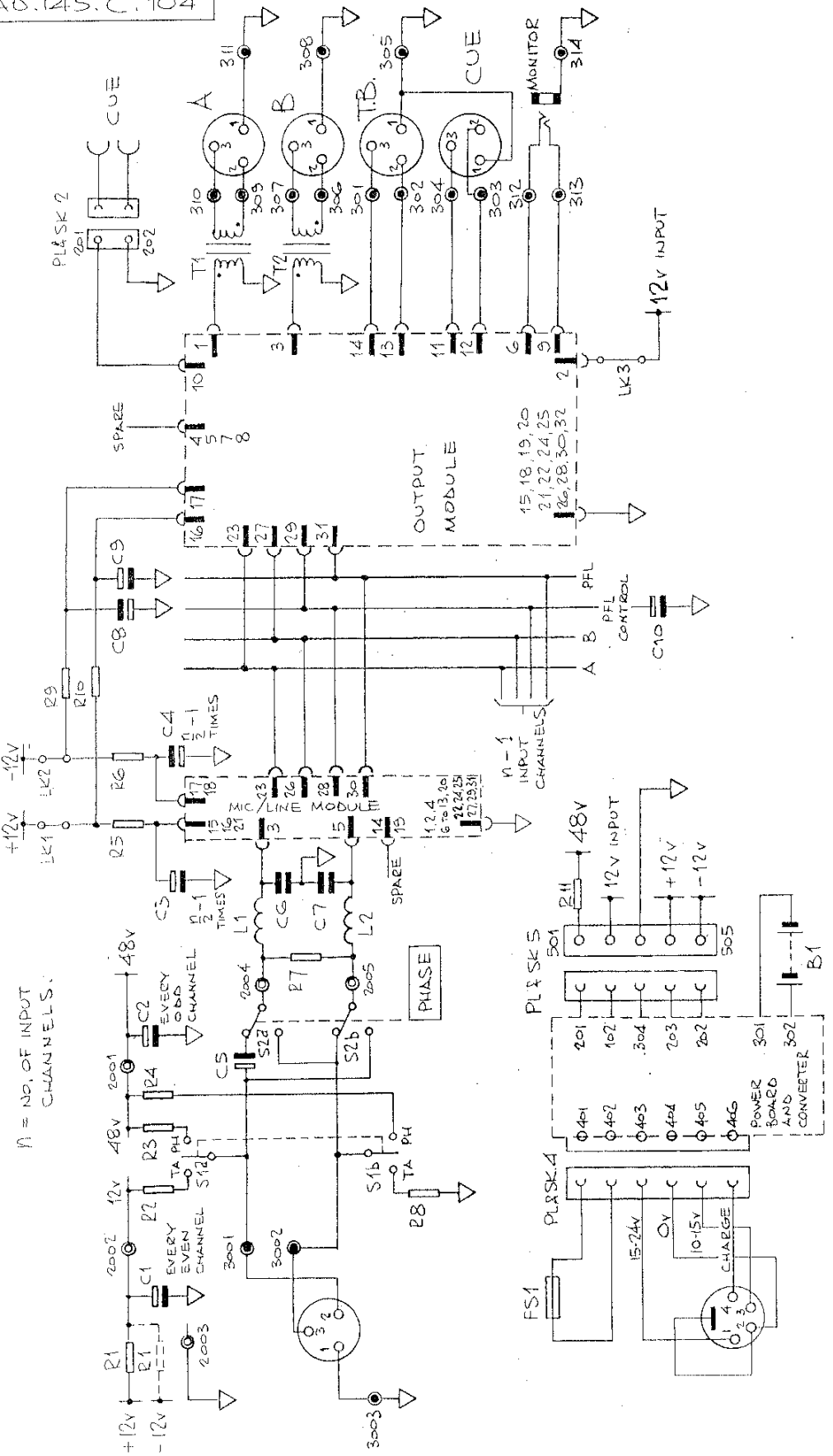
ISS.	DESCRIPTION	DATE	SIG.
A	PRINTER'S ISSUE	JUL. 82	JGA

1	FIRST				
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					JUL.82 / JGA
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DATE	JUL. 82	–			
SCALE	–	P.C. No. –		DRG. No. AD. 145. B. 25	
MATERIAL	–				

DRG. No. SHEET 1 OF 2
AD.145.C.104

THIRD ANGLE PROJECTION

DO NOT SCALE



ISS	DESCRIPTION	SIG.
3	PIN 2 ON PWR I/P NOW WIRED TO XLR CHASSIS EARTH DIF 454 4.7.94	jgm
2	FIRST OFFICIAL ISSUE DIF 001 - 23.1.90	
1	FIRST 1.7.87	jgm

Drawn jgm 1.7.87	Scale N/A	Unstated Tolerances	MOTHER BOARD AND CASE CIRCUIT DIAGRAM (MANUAL)
Checked	Material N/A	2 Dec. Pl. ±.010	
Approved	Finish N/A	3 Dec. Pl. ±.005	
		Fractions ±1/64	
		Metric ±2mm	

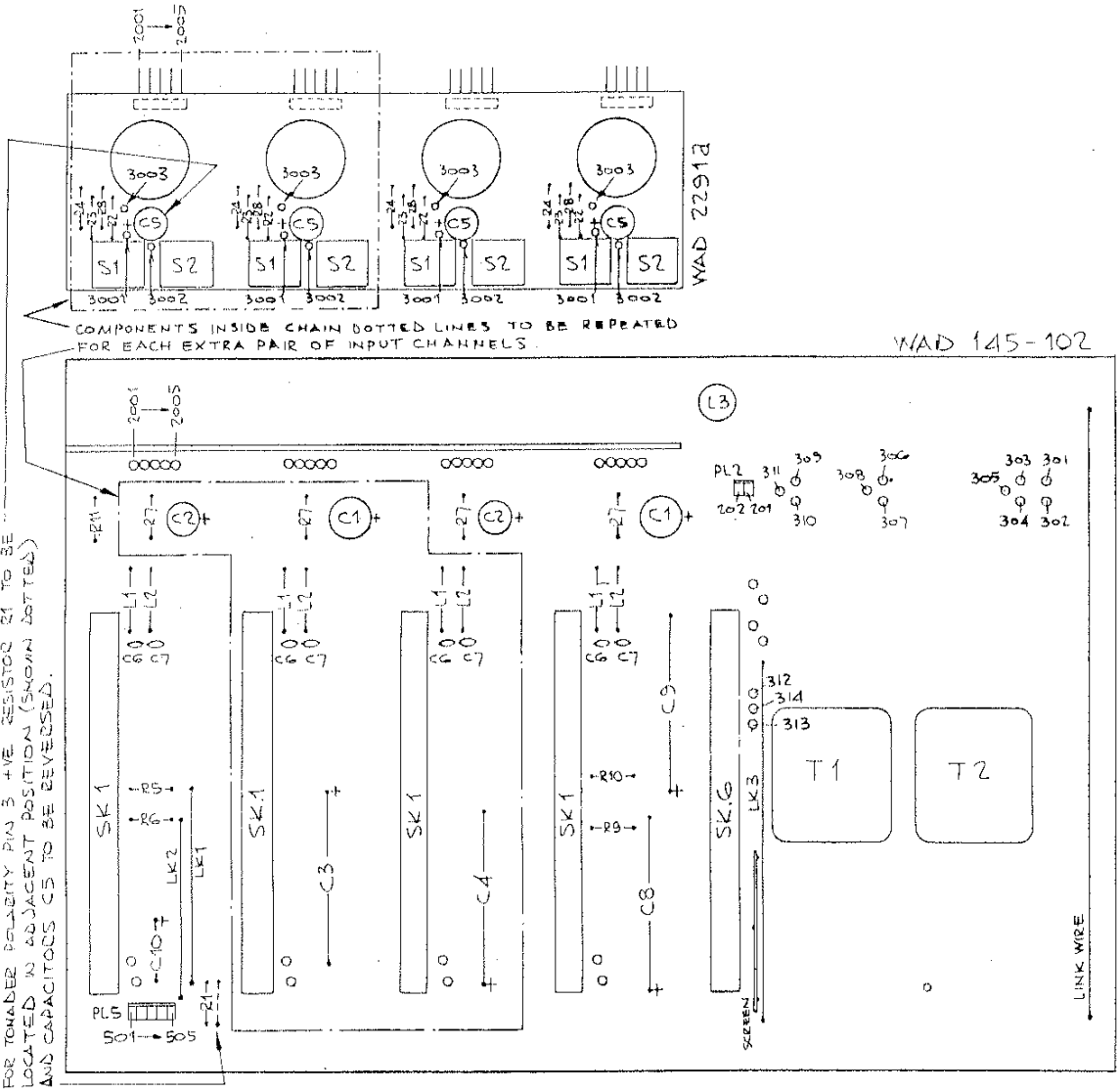
AUDIO DEVELOPMENTS LTD,
Hall Lane,
Walsall Wood, Staffs.

DRG. No. SHEET 1 OF 2
AD.145.C.104

DRG. No. AD. 145 .C. 304 SHT. 1 OF 3

PROJECTION:

DO NOT SCALE



HOLE/ PIN NO.	WIRE COLOUR	CONNECTION
201	RED	CUE LIGHT
202	BLUE	CUE LIGHT
301	BLUE	TALKBACK
302	RED	TALKBACK
303	RED	CUE
304	BLUE	CUE
305	WHITE	CUE
306	RED	O/P 'B'
307	BLUE	O/P 'B'
308	WHITE	O/P 'B'
309	RED	O/P 'A'
310	BLUE	O/P 'A'
311	WHITE	O/P 'A'
312	BLUE	MON. SKT.
313	RED	MON. SKT.
314	SCREEN	MON. SKT.

HOLE/ PIN NO.	WIRE COLOUR	CONNECTION	
501	YELLOW	48V	I/P
502	ORANGE	12V	I/P
503	WHITE	0V	I/P
504	RED	+12V	I/P
505	BLUE	-12V	I/P

HOLE/ PIN NO.	WIRE COLOUR	CONNECTION
3001	RED	I/P SOCKETS
3002	BLUE	I/P SOCKETS
3003	WHITE	I/P SOCKETS

ISS.	REVISION/DATE	SIG.
3	301 & 302 WIRE COLOURS REVERSED. 201 WAS 202 202 WAS 201 21.3.88	jgm
2	C10 WAS 0.47/25 29.2.88	jgm
1	FIRST 15.7.87	jgm

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DRAWN 15.7.87 jgm

CHECKED/APP'D.

SCALE

P.C.B. No. SEE ABOVE

TITLE

MOTHER BOARD
AUDIO MIXER - 4,6 & 8 INPUT
COMPONENT LOCATION DRAWING

Audio Developments Ltd.
Hall Lane, Walsall Wood, Walsall.
West Midlands, WS9 9AU. England
Tel. Brownhills (0543) 375351

PT. No.

DRG. No. AD. 145 .C. 304 SHT. 1 OF 3

AD 145

MOTHER BOARD & SW. BOARD

COMPONENT CROSS REFERENCE LIST

1. **Capacitors**

C1	2200 µF	16v
C2	100 µF	63v
C3	4700 µF	16v
C4	4700 µF	16v
C5	100 µF	25v
C6	2200pF	
C7	2200pF	
C8	2200 µF	16v
C9	2200 µF	16v
C10	1 µF	63v

2. **Inductances**

L1	220 µH
L2	220 µH
L3	220 µH

3. **Switches**

S1	DPDT on-off-on
S2	DPDT on-none-on

4. **Resistors**

R1	47R
R2	180R
R3	10K
R4	10K
R5	82R
R6	82R
R7	1M
R8	180R
R9	22R
R10	22R
R11	100R

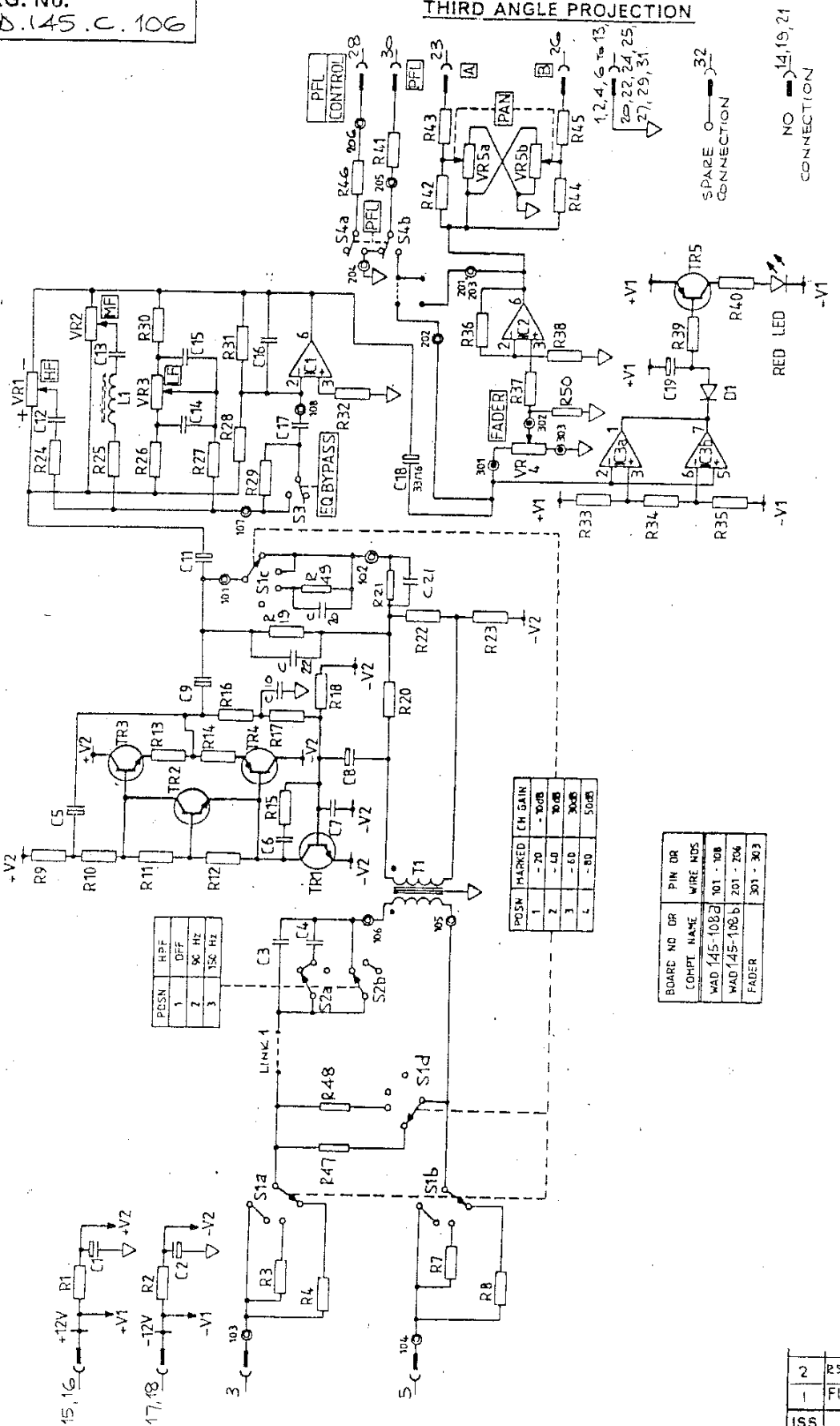
5. **Transformers**

T1	600/600
T2	600/600

DRG. No. AD.145.C.106 SHEET 1 OF 2

THIRD ANGLE PROJECTION

DO NOT SCALE



ISS	DESCRIPTION	SIG.
2	R50 ADDED 13.2.89	jgm
1	FIRST 15.4.87	jgm

Drawn 15.4.87 jgm	Scale	Unstated Tolerances 2 Dec. Pl. ±·010 3 Dec. Pl. ±·005 Fractions ±1/64 Metric ±2mm	AD.145 MC/LINE CIRCUIT DIAGRAM (DIN EDGE CONNECTOR)
Checked	Material		
Approved	Finish		

Audio Developments Ltd.,
Hall Lane,
Walsall Wood, Staffs.

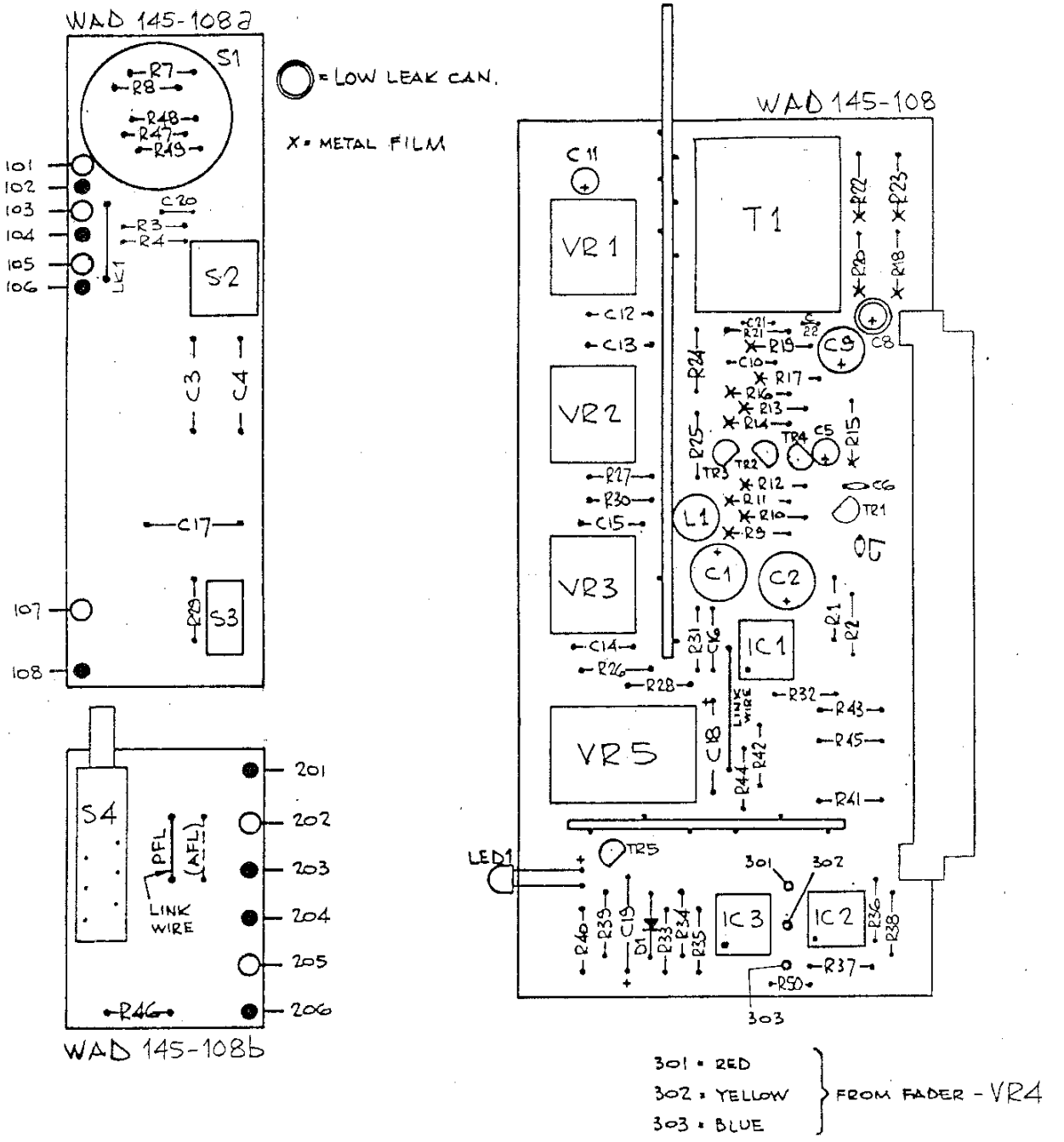
DRG. No. SHEET 1 OF 2
AD.145.C.106

MY 29096 K

DRG. No. AD . 145 . C . 306 SHEET 1 OF 4

THIRD ANGLE PROJECTION

DO NOT SCALE



ISS	DESCRIPTION	SIG.
2	R50 ADDED 13.2.89	jgm
1	FIRST 15.4.87	jgm

ISS	DESCRIPTION	SIG.	ISS	DESCRIPTION	SIG.

Drawn jgm 13.1.84 | Scale 1:1 | Checked | Material | Approved | Finish

Unstated Tolerances
2 Dec. Pl. ±·010
3 Dec. Pl. ±·005
Fractions ± 1/64
Metric ±·2mm

COMPONENT LOCATION DRAWING FOR MIC LINE MODULE
(DIN EDGE CONNECTOR)

Audio Developments Ltd.,
Hall Lane,
Walsall Wood, Staffs

DRG. No. AD . 145 . C . 306 SHEET 1 OF 4

MY 26094 R

AD 145

MIC/LINE MODULE

COMPONENT CROSS REFERENCE LIST

1. Capacitors

C1	330 µF	16v
C2	330 µF	16v
C3	0.68 µF	
C4	0.47 µF	
C5	10 µF	25v
C6	15pF	
C7	220pF	
C8	22 µF	16v
C9	100 µF	25v
C10	0.047 µF	
C11	4.7 µF	35v
C12	0.01 µF	
C13	0.047 µF	
C14	0.1 µF	
C15	0.1 µF	
C16	10pF	
C17	1 µF	
C18	33 µF	16v
C19	1 µF	63v
C20	2n2	
C21	3n3	
C22	22pF	

2. Diodes

D1	1N 4148

3. Inductance

L1	68 mH

4. Op. Amps

IC 1	TL 061
IC 2	TL 061
IC 3	LM 393

5. Switches

S1	4P4W
S2	2 Pole on-on-on
S3	1 Pole on-none-on
S4	2PCO BBM

6. Resistors

R1	470R
R2	470R
R3	620R
R4	5K1
R5	
R6	
R7	620R
R8	5K1
R9	47K
R10	47K
R11	100K
R12	68K
R13	220R
R14	220R
R15	10K
R16	470K
R17	470K
R18	51K
R19	33K
R20	33K
R21	820R
R22	1K
R23	100R
R24	1K
R25	750 R
R26	4K7
R27	1K
R28	100K
R29	10M
R30	4K7
R31	100K
R32	47K
R33	47K
R34	100K
R35	47K
R36	100K
R37	68K
R38	220K
R39	100K
R40	6K8
R41	47K
R42	3Ko
R43	47K
R44	3Ko
R45	47K
R46	10K
R47	180R
R48	300R
R49	1K3
R50	100K - 1/8 watt

AD 145

MIC/LINE MODULE

COMPONENT CROSS REFERENCE LIST (continued)

7. Transistors

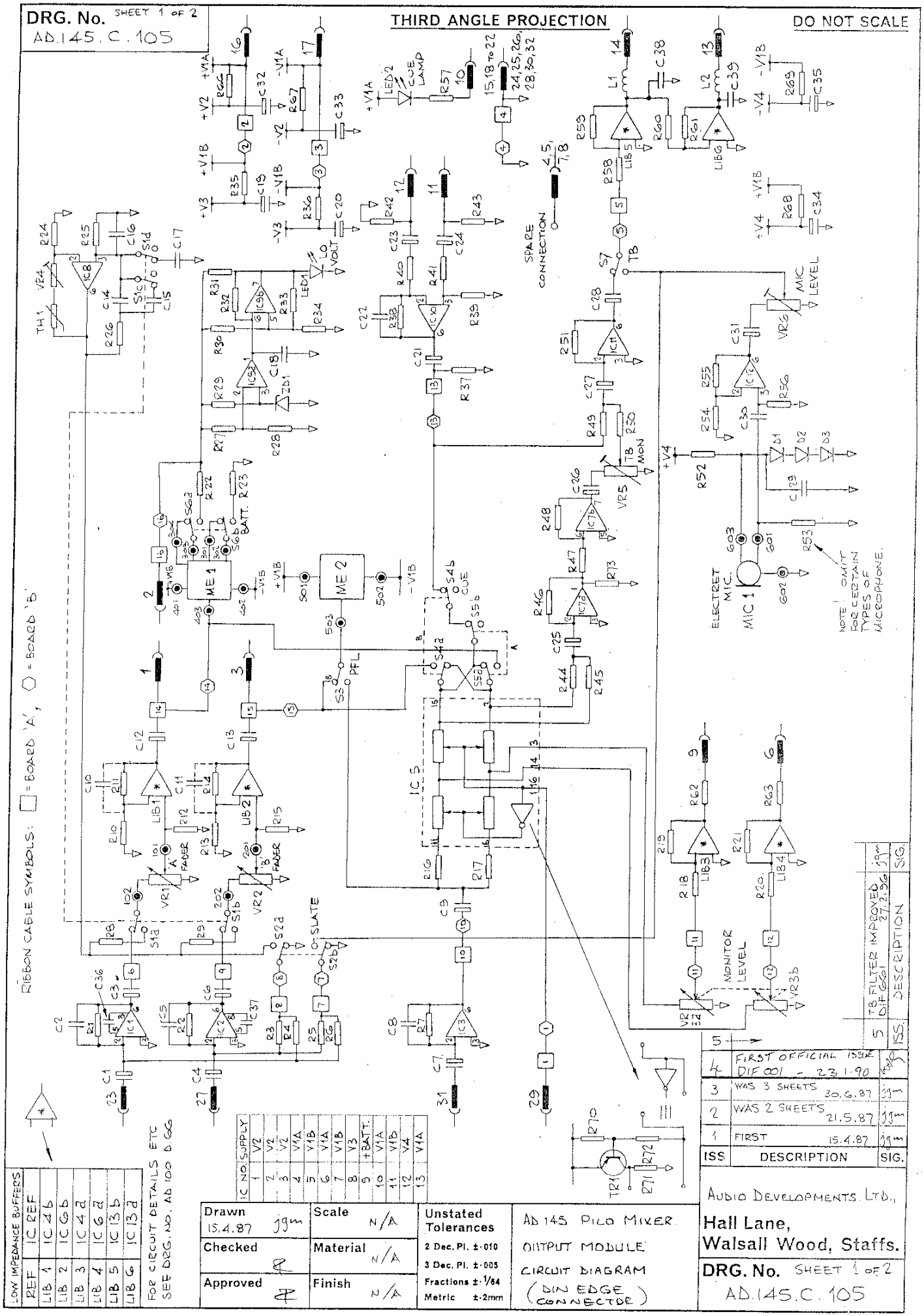
TR1	BC 549
TR2	BC 549
TR3	BC 549
TR4	BC 214
TR5	BC 214

8. Transformer

T1	EN 8303	1:1.66

9. Variable Resistors

VR1	50K Lin
VR2	50K Lin
VR3	50K Lin
VR4	10K Log
VR5	10K DUAL Lin

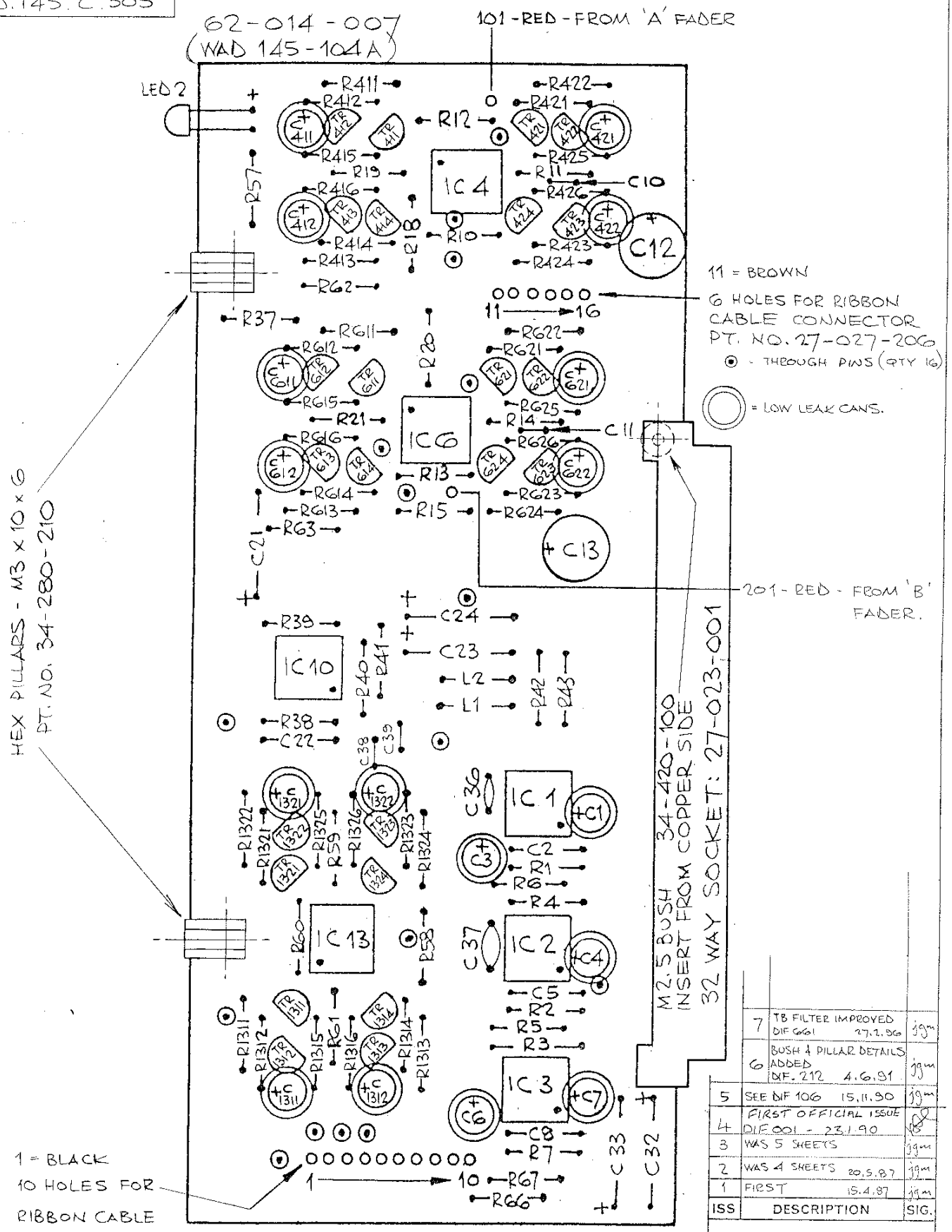

DRG. No. SHEET 1 OF 2
AD.145.C.105
THIRD ANGLE PROJECTION
DO NOT SCALE
RIBBON CABLE SYMBOLS: □ = BOARD 'A', ⬡ = BOARD 'B'
ME 1
ME 2
ELECTRET MIC.
MIC 1
NOTE: OMIT FOR CERTAIN TYPES OF MICROPHONE.
SPARE CONNECTION
IC 5
PFL
CUE
SLATE
FADER
MIC LEVEL
MONITOR LEVEL
TB MON
BATT.
LO VOLT
LED2 CUE LAMP
15,18 TO 22
24,25,26,28,30,32
4,5,7,8
FOR CIRCUIT DETAILS ETC SEE DRG. NO. AD 100 & 66
LOW IMPEDANCE BUFFERS
REF | IC REF
LIB 1 | IC 4 b
LIB 2 | IC 6 b
LIB 3 | IC 4 a
LIB 4 | IC 6 a
LIB 5 | IC 13 b
LIB 6 | IC 13 a
IC NO | SUPPLY
1 | V2
2 | V2
3 | V2
4 | V1A
5 | V1B
6 | V1A
7 | V1B
8 | V3
9 | +BATT.
10 | V1A
11 | V1B
12 | V4
13 | V1A
Drawn 15.4.87 jgm
Checked
Approved
Scale N/A
Material N/A
Finish N/A
Unstated Tolerances
2 Dec. Pl. ±·010
3 Dec. Pl. ±·005
Fractions ±·1/64
Metric ±·2mm
AD 145 PILOT MIXER
OUTPUT MODULE
CIRCUIT DIAGRAM
(DIN EDGE CONNECTOR)
5 TB FILTER IMPROVED DIF 001 27.2.96 jgr
4 FIRST OFFICIAL ISSUE DIF 001 - 23.1.90
3 WAS 3 SHEETS 30.6.87
2 WAS 2 SHEETS 21.5.87
1 FIRST 15.4.87
ISS DESCRIPTION SIG.
AUDIO DEVELOPMENTS LTD.,
Hall Lane,
Walsall Wood, Staffs.
DRG. No. SHEET 1 OF 2
AD.145.C.105

DRG. No. SHEET 1 OF 4
AD.145.C.305

THIRD ANGLE PROJECTION

DO NOT SCALE

62-014-007
(WAD 145-104A)



ISS	DESCRIPTION	SIG.
7	TB FILTER IMPROVED DIF 661 27.2.90	jgm
6	BUSH & PILLAR DETAILS ADDED DIF. 212 4.6.91	jgm
5	SEE DIF 106 15.11.90	jgm
4	FIRST OFFICIAL ISSUE DIF 001 - 23.1.90	
3	WAS 5 SHEETS	jgm
2	WAS 4 SHEETS 20.5.87	jgm
1	FIRST 15.4.87	jgm

Drawn 15.4.87 jgm	Scale 2:1	Unstated Tolerances	COMPONENT LOCATION	Audio Developments Ltd., Hall Lane, Walsall Wood, Staffs.	
Checked	Material N/A	2 Dec. Pl. ±.010 3 Dec. Pl. ±.005	DRAWING FOR OUTPUT	DRG. No. SHEET 1 OF 4	
Approved	Finish N/A	Fractions ±1/64 Metric ±2mm	BOARD 'A' (DIN CONNECTOR)	AD.145.C.305	

AD 145

OUTPUT MODULE. BOARD A.

COMPONENT CROSS REFERENCE LIST

1. Capacitors

C1	22 µF	16v
C2	10pF	
C3	10 µF	25v
C4	22 µF	16v
C5	10pF	
C6	10 µF	25v
C7	22 µF	16v
C8	10pF	
C10	2p2	
C11	2p2	
C12	470µF	10 v
C13	470µF	10 v
C21	10 µF	25v
C22	10pF	
C23	10 µF	25v
C24	10 µF	25v
C32	33 µF	16v
C33	33 µF	16v
C36	22pF	
C37	22pF	
C411	10 µF	25v
C412	10 µF	25v
C421	10 µF	25v
C422	10 µF	25v
C611	10 µF	25v
C612	10 µF	25v
C621	10 µF	25v
C622	10 µF	25v
C1311	10 µF	25v
C1312	10 µF	25v
C1321	10 µF	25v
C1322	10 µF	25v
C38	2 n 2	
C39	2 n 2	

2. Op. Amps

IC 1	NE 5534
IC 2	NE 5534
IC 3	NE 5534
IC 4	TL 062
IC 6	TL 062
IC 10	TL 061
IC 13	TL 062

3. Resistors

R1	47K
R2	47K
R3	10M
R4	10M
R5	47K
R6	47K
R7	47K
R10	47K
R11	330K
R12	100K
R13	47K
R14	330K
R15	100K
R18	100K
R19	330K
R20	100K
R21	330K
R37	100K
R38	100K
R39	100K
R40	100K
R41	100K
R42	22K
R43	22K
R57	2K2
R58	100K
R59	470K
R60	100K
R61	100K
R62	10R
R63	10R
R64	10R
R65	10R
R66	100R
R67	100R
R411	10K
R412	10K
R413	10K
R414	10K
R415	10R
R416	10R
R421	10K
R422	10K
R423	10K
R424	10K
R425	10R
R426	10R

AD 145

OUTPUT MODULE. BOARD A

COMPONENT CROSS REFERENCE LIST (continued)

Resistors (contd.)

R611	10K
R612	10K
R613	10K
R614	10K
R615	10R
R616	10R
R621	10K
R622	10K
R623	10K
R624	10K
R625	10R
R626	10R
R1311	10K
R1312	10K
R1313	10K
R1314	10K
R1315	10R
R1316	10R
R1321	10K
R1322	10K
R1323	10K
R1324	10K
R1325	10R
R1326	10R

4. Variable Resistors

VR1	10K Log
VR2	10K Log

5. Transistors

TR411	BC.109
TR412	BC.214
TR413	BC.109
TR414	BC.214
TR421	BC.109
TR422	BC.214
TR423	BC.109
TR424	BC.214
TR611	BC.109
TR612	BC.214
TR613	BC.109
TR614	BC.214
TR621	BC.109
TR622	BC.214
TR623	BC.109
TR624	BC.214
TR1311	BC.109
TR1312	BC.214
TR1313	BC.109
TR1314	BC.214
TR1321	BC.109
TR1322	BC.214
TR1323	BC.109
TR1324	BC.214

6. Chokes

L1	220µH
L2	220µH

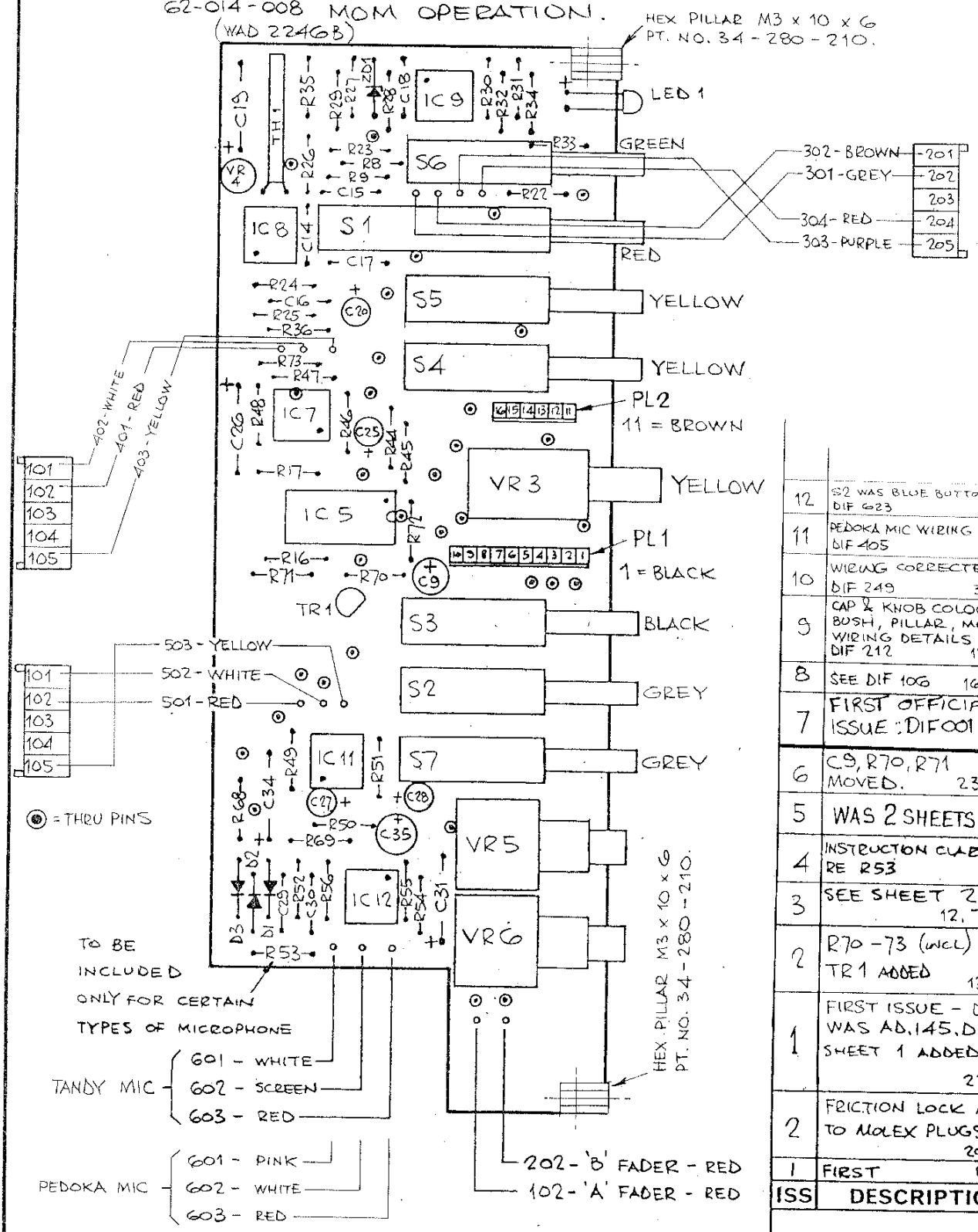
DRG. No. AD.145.C.37 SHEET 1 OF 4

THIRD ANGLE PROJECTION

DO NOT SCALE

SWITCHES S2 & S6:
REMOVE LATCH FOR
MOM OPERATION.

62-014-008
(WAD 22468)



ISS	DESCRIPTION	SIG.
12	S2 WAS BLUE BUTTON DIF 623 16.1.96	jgm
11	PEDOKA MIC WIRING ADDED DIF 405 28.3.94	jgm
10	WIRING CORRECTED DIF 249 3.9.91	jgm
9	CAP & KNOB COLOURS, BUSH, PILLAR, MOLEX WIRING DETAILS ADDED. DIF 212 12.6.91	jgm
8	SEE DIF 106 16.11.90	jgm
7	FIRST OFFICIAL ISSUE: DIF001: 23190	
6	C9, R70, R71 MOVED. 23.11.87	jgm
5	WAS 2 SHEETS 15.4.86	jgm
4	INSTRUCTION CLARIFIED RE R53 4.11.85	
3	SEE SHEET 2 12.7.84	
2	R70-73 (INCL) AND TR1 ADDED 13.2.84	
1	FIRST ISSUE - DEC. NO. WAS AD.145.D.24. SHEET 1 ADDED 23.1.84	
2	FRICTION LOCK ADDED TO MOLEX PLUGS 20:10.83	
1	FIRST 8.9.83	

Drawn jgm 8.9.83	Scale 1:1	Unstated Tolerances	COMPONENT LOCATION DRAWING FOR OUTPUT BOARD 'B'
Checked MK	Material N/A	2 Dec. Pl. ±.010	
Approved MK	Finish N/A	3 Dec. Pl. ±.005	
		Fractions ± 1/64	
		Metric ±.2mm	

AUDIO DEVELOPMENTS LTD.,
Hall Lane,
Walsall Wood, Staffs

DRG. No. AD.145.C.37 SHEET 1 OF 4

AD 145

OUTPUT MODULE. BOARD B

COMPONENT CROSS REFERENCE LIST

1. Capacitors

C9	33 µF	16v
C14	1500 pF	
C15	.033 µF	
C16	1500 pF	
C17	.033 µF	
C18	.022 µF	
C19	100 µF	16v
C20	100 µF	16v
C25	22 µF	16v
C26	33 µF	16v
C27	22 µF	16v
C28	33 µF	16v
C29	0.1 µF	
C30	0.1 µF	
C31	33 µF	16v
C34	150 µF	16v
C35	100 µF	25v

2. Diodes

D1	1N 4148
D2	1N 4148
D3	1N 4148

3. Op. Amps

IC 5	DG 308
IC 7	TL 062
IC 8	TL 061
IC 9	LM 393
IC 11	TL 061
IC 12	TL 061

4. Thermistor

TH1	R53

5. Transistor

TR1	BC 214

6. Resistors

R8	100K
R9	100K
R16	100R
R17	100R
R22	6K8
R23	SOT
R24	680R
R25	100K
R26	100K
R27	47K
R28	100K
R29	15K
R30	470K
R31	2K2
R32	10M
R33	100K
R34	100K
R35	1K
R36	1K
R44	47K
R45	47K
R46	47K
R47	100K
R48	100K
R49	100K
R50	100K
R51	100K
R52	10K
R53	1K
R54	10K
R55	1M
R56	10K
R68	220R
R69	220R
R70	10K
R71	100K
R72	100K
R73	10K

OUTPUT MODULE. BOARD B

COMPONENT CROSS REFERENCE LIST (continued)

7. Switches

S1	4 PCO BBM
S2	2 PCO BBM
S3	2 PCO BBM
S4	2 PCO BBM
S5	2 PCO BBM
S6	2 PCO BBM
S7	2 PCO BBM

8. Variable Resistors

VR3	10K 10K Log
VR4	1K Lin
VR5	50K LIN
VR6	50K LIN

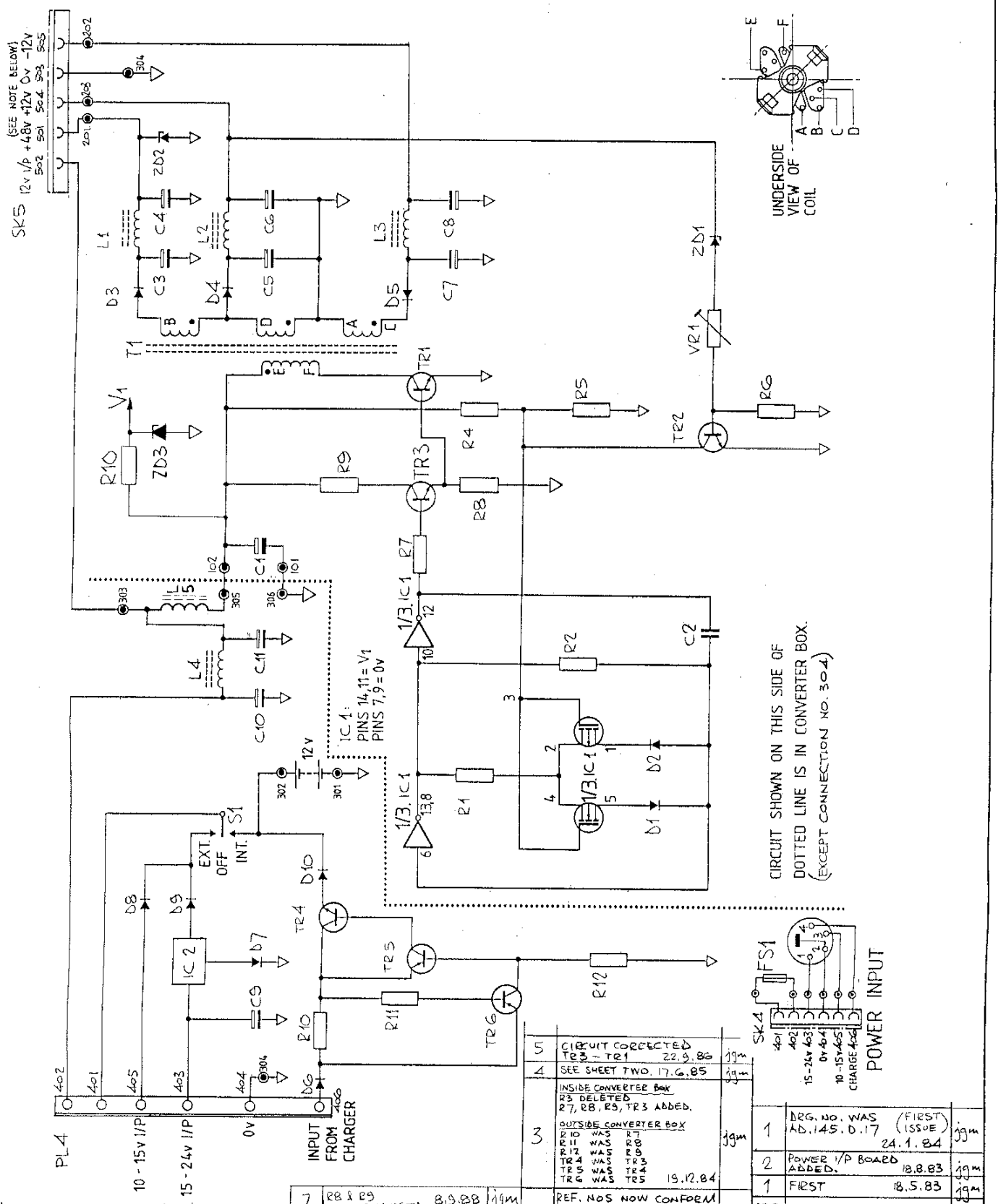
9. Zener Diode

ZD1	7v5

DRG. No. SHT 1 OF 2
AD.145.C.39

THIRD ANGLE PROJECTION

DO NOT SCALE



ISS	DESCRIPTION	SIG.
11	PWR I/P PIN NOS CORRECTED DIF 585 21.9.95	jgm
10	PIN 2 ON PWR I/P NOW WIRED TO XLR CHASSIS EARTH. DIF 454 4.7.94	jgm
9	BROUGHT INTO LINE WITH CONVERTER DRG (AD.100.C.67) DIF 412 20.4.94	jgm
8	FIRST OFFICIAL ISSUE DIF 001 23.1.90	jgm

ISS	DESCRIPTION	SIG.
7	R8 & R9 INTERCHANGED 8.9.88	jgm
6	L5 ADDED 23.2.87	jgm

ISS	DESCRIPTION	SIG.
5	CIRCUIT CORRECTED TR3 - TR1 22.9.86	jgm
4	SEE SHEET TWO. 17.6.85	jgm
3	INSIDE CONVERTER BOX R3 DELETED R7, R8, R9, TR3 ADDED. OUTSIDE CONVERTER BOX R10 WAS R7 R11 WAS R8 R12 WAS R9 TR4 WAS TR3 TR5 WAS TR4 TR6 WAS TR5 19.12.84	jgm
2	REF. NOS NOW CONFORM TO CONVERTER - SEE AD.100.C.67 1.2.84	jgm

ISS	DESCRIPTION	SIG.
1	DRG. NO. WAS AD.145.D.17 (FIRST ISSUE) 24.1.84	jgm
2	POWER I/P BOARD ADDED. 18.8.83	jgm
1	FIRST 18.5.83	jgm

Drawn jgm 18.5.83	Scale N/A	Unstated Tolerances	AD. 145
Checked	Material N/A	2 Dec. Pl. ±.010 3 Dec. Pl. ±.005	POWER I/P & CONVERTER CIRCUIT DIAGRAM (MANUAL)
Approved	Finish N/A	Fractions ±1/64 Metric ±.2mm	

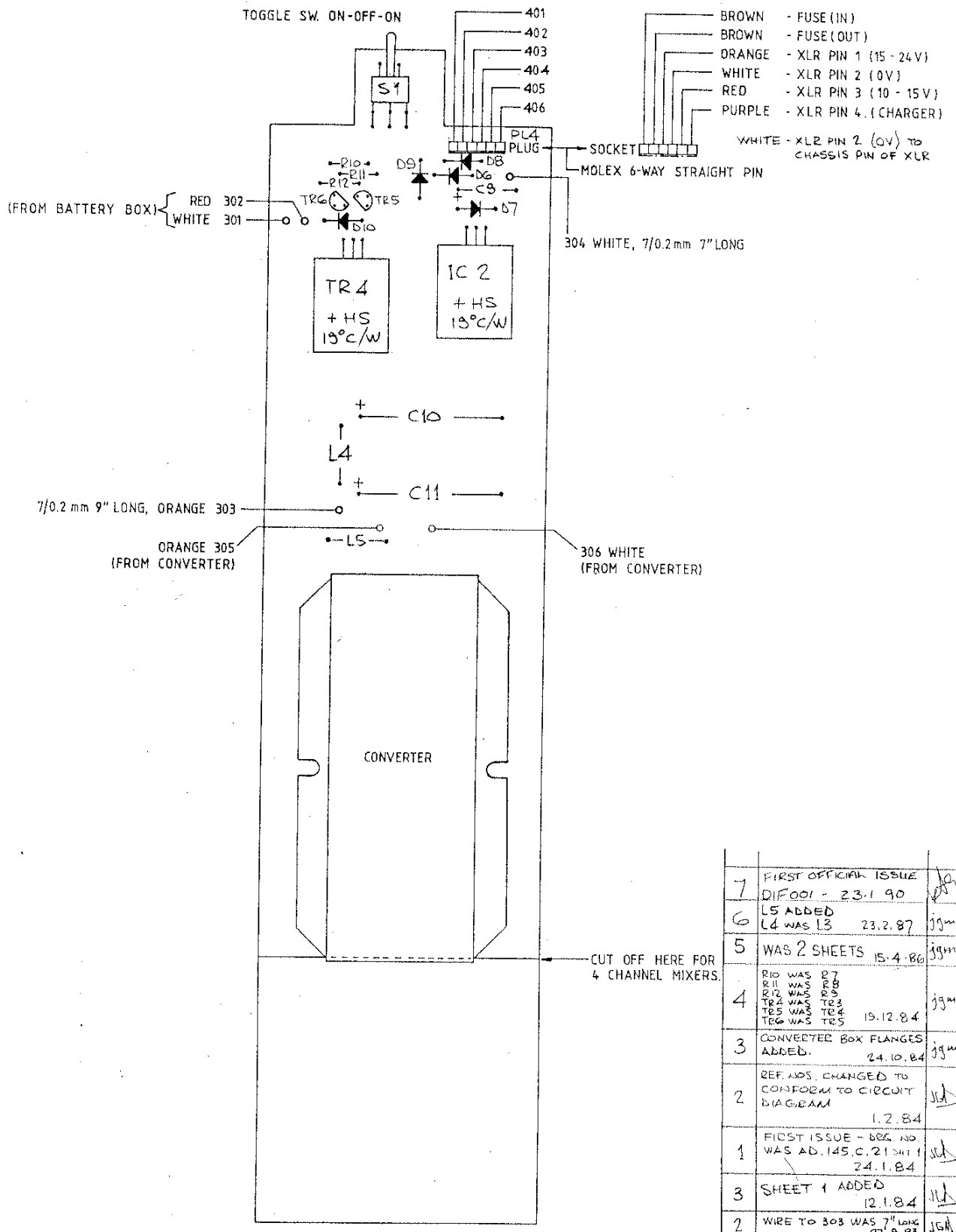
Audio Developments Ltd,
Hall Lane,
Walsall Wood, Staffs.

DRG. No. SHEET 1 OF 2
AD.145.C.39

DRG. No. AD.145.C.40 SHEET 1 OF 3

THIRD ANGLE PROJECTION

DO NOT SCALE



ISS	DESCRIPTION	SIG.
7	FIRST OFFICIAL ISSUE DIF001 - 23.1.90	
6	L5 ADDED L4 WAS L3 23.2.87	jgm
5	WAS 2 SHEETS 15.4.86	jgm
4	R10 WAS R7 R11 WAS R8 R12 WAS R9 TR4 WAS TR3 TR5 WAS TR4 TR6 WAS TR5 19.12.84	jgm
3	CONVERTER BOX FLANGES ADDED. 24.10.84	jgm
2	REF. NOS. CHANGED TO CONFORM TO CIRCUIT DIAGRAM 1.2.84	
1	FIRST ISSUE - DRG. NO. WAS AD.145.C.21 SHT 1 24.1.84	
3	SHEET 1 ADDED 12.1.84	
2	WIRE TO 303 WAS 7" LONG 27.9.83	JGM
1	1st. ISSUE 19.8.83	JGM

Drawn jgm 12.1.84	Scale 1:1	Unstated Tolerances 2 Dec. Pl. ±.010 3 Dec. Pl. ±.005 Fractions ±1/64 Metric ±.2mm	POWER INPUT COMP'T. LOCATION DRAWING (MANUAL)
Checked	Material N/A		
Approved	Finish N/A		

Audio Developments,
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Walsall Wood, Staffs.

DRG. No. AD.145.C.40 SHEET 1 OF 3

MY 29096 B

AD 145

POWER INPUT

COMPONENT CROSS REFERENCE LIST

1. Capacitors

C9	10 µF	25v
C10	2200 µF	16v
C11	2200 µF	16v

2. Diodes

D6	1N 4004
D7	1N 4004
D8	1N 4004
D9	1N 4004
D10	1N 4004

3. Inductance

L4	5 µH
L5	5 µH

4. Op. Amps

IC2	7812

5. Resistors

R10	3 R9
R11	10 K
R12	100 K

6. Transistors

TR4	BD 131
TR5	BC 214
TR6	BC 214

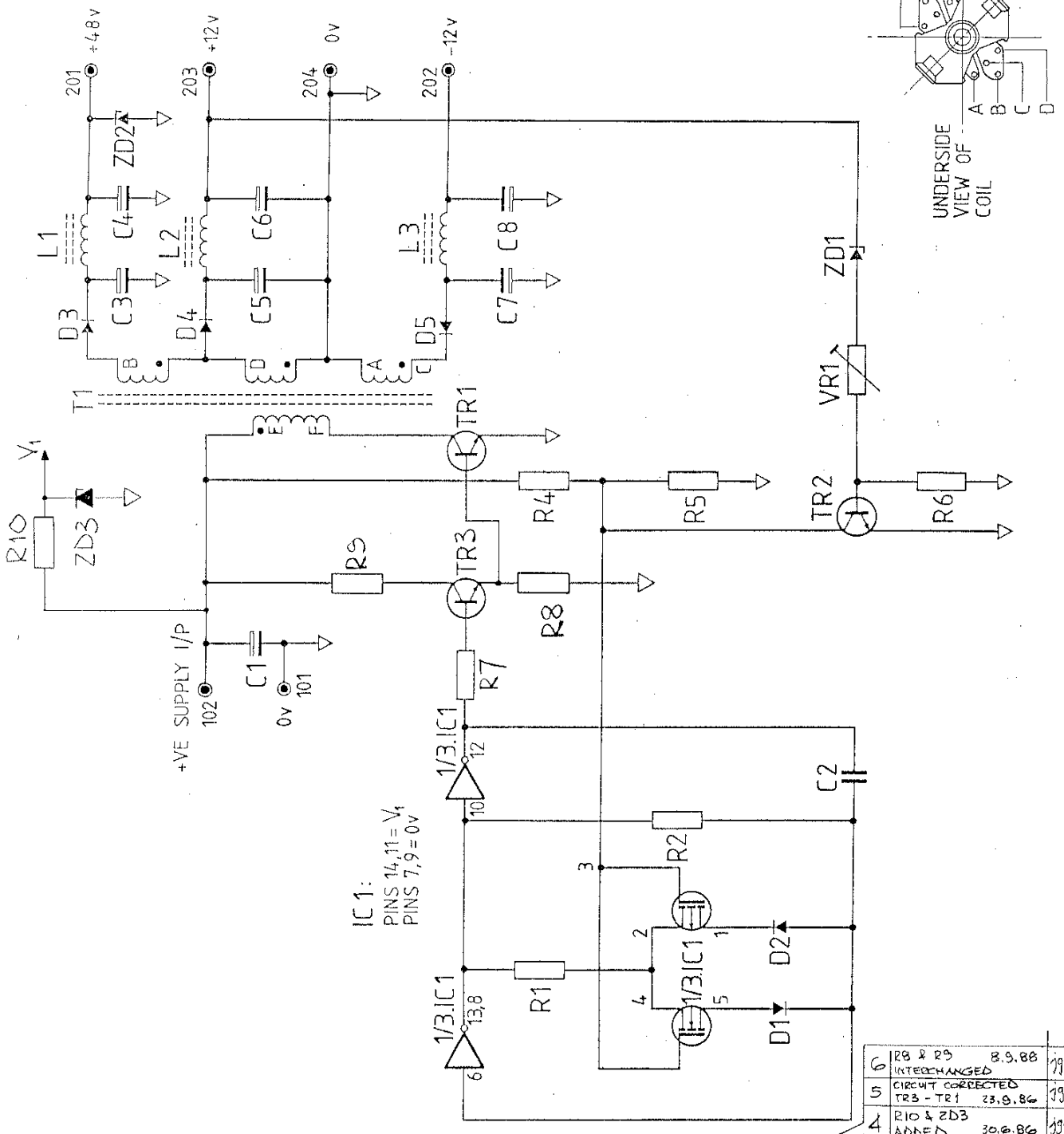
7. Heatsinks

IC2	19°C/W
TR4	19°C/W

DRG. No. SHT 1 OF 2
AD.100.C.67

THIRD ANGLE PROJECTION

DO NOT SCALE



ISS	DESCRIPTION	SIG.
6	R8 & R9 INTERCHANGED 8.5.86	jgm
5	CIRCUIT CORRECTED TR3 - TR1 23.9.86	jgm
4	R10 & ZD3 ADDED 30.6.86	jgm
3	SEE SHEET 2 7.2.85	jgm
2	R3 DELETED. R7, R8, R9, TR3 ADDED 18.12.84	jgm
1	DRG. NO. WAS AD.100.C.68 (FIRST ISSUE) 6.12.83	JGM
1	FIRST 18.5.83	JGM

Drawn jgm 18.5.83	Scale 1	Unstated Tolerances	CONVERTER CIRCUIT DIAGRAM (WITH COMPONENT VALUES)
Checked	Material	2 Dec Pl ± 010 3 Dec Pl ± 005 Fractions ± 1/64 Metric ± 2mm	
Approved	Finish		

AUDIO DEVELOPMENTS,
Hall Lane,
Walsall Wood, Staffs.

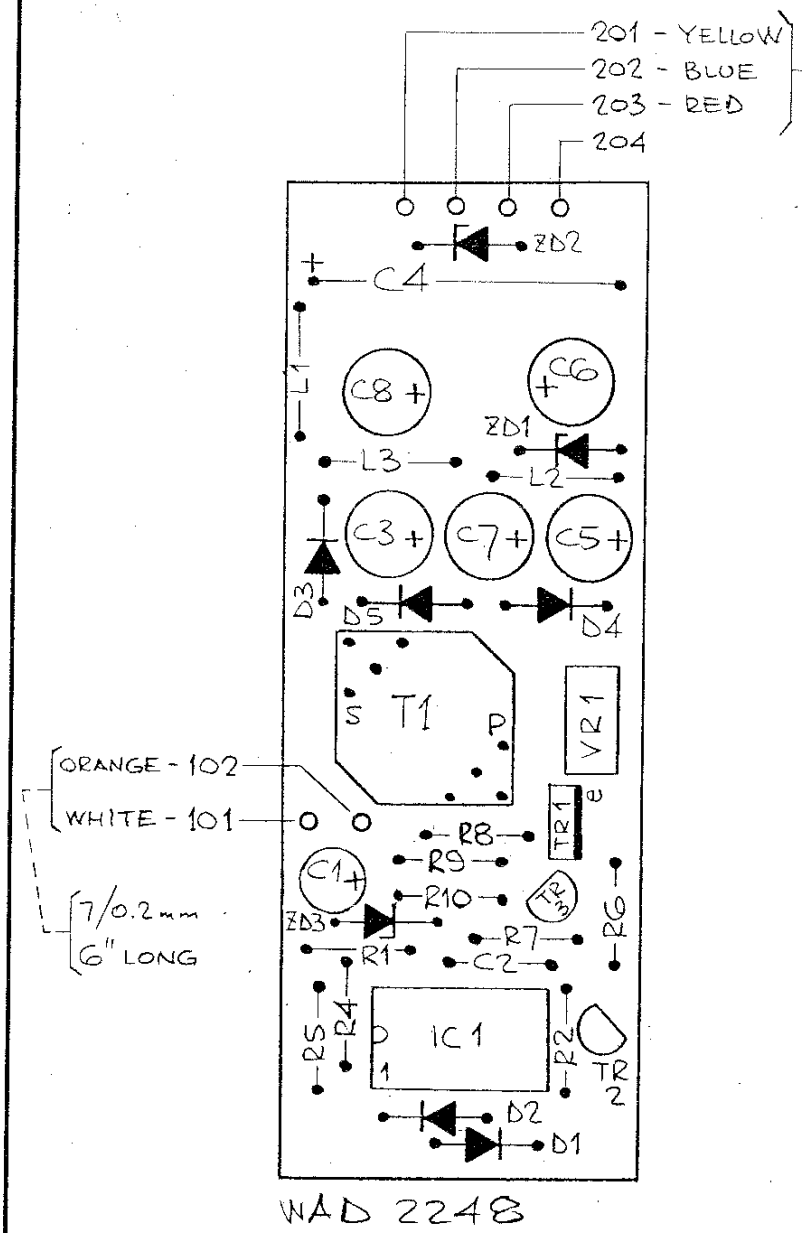
DRG. No. SHT. 1 OF 2
AD.100.C.67

DRG. No. SHT 1 OF 3
AD.100.D.68

THIRD ANGLE PROJECTION

DO NOT SCALE

USED ON:-
AD.145
AD.160



WAD 2248

ISS	DESCRIPTION	SIG.
8	R8 & R9 8.9.88 INTERCHANGED	jgm
7	R10 & ZD3 ADDED 30.6.86	jgm
6	SEE SHEET 2 7.2.85	jgm
5	WIRE LENGTH 12" WAS 9" R8 + R9 INTERCHANGED 4.2.85	jgm
4	R3 DELETED R7, R8, R9, TR3 ADDED 18.12.84	jgm
3	WIRE LENGTHS INCREASED BY 2" 19.4.84	jgm
2	WIRE HOLE NOS. MODIFIED TO CONFORM TO CIRCUIT DIAGRAM 15.12.83	jgm
1	DRG. NO. WAS AD.100.D.65 6.12.83	jgm
1	1ST ISSUE 19.8.83	jgm

Drawn 19.8.83 jgm	Scale	Unstated Tolerances	CONVERTER COMP'T. LOCATION DRG. (MANUAL)
Checked	Material	2 Dec. Pl. ±.010 3 Dec. Pl. ±.005	
Approved	Finish	Fractions ± 1/64 Metric ±.2mm	

Audio Developments Ltd.,
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DRG. No. SHT. 1 OF 3
AD.100.D.68

MY 26094 R

AD 100

CONVERTER

COMPONENT CROSS REFERENCE LIST

1. Capacitors

C1	220 µF 16v
C2	330 pF
C3	47 µF 63v
C4	100 µF 63v
C5	220 µF 16v
C6	220 µF 16v
C7	220 µF 16v
C8	220 µF 16v

2. Diodes

D1	IN 4148
D2	IN 4148
D3	BY 206
D4	BY 206
D5	BY 206

3. Inductances

L1	220 µH
L2	220 µH
L3	220 µH

4. Resistors

R1	4K7
R2	100K
R3	-
R4	12K
R5	39K
R6	1K
R7	1K5
R8	150R
R9	470R
R10	82R

5. Op. Amps

IC1	4007 UB

6. Transistors

TR1	BD 131
TR2	BC 549
TR3	2N 3904

7. Transformer

T1	RM7 250

8. Variable Resistor

VR1	10K

9. Zener Diode

ZD1	BZY 88 C11
ZD2	BZX 61 C56
ZD3	BZY 88 C18

DRG. No. AD.100.D.66 SHEET 2 OF 2

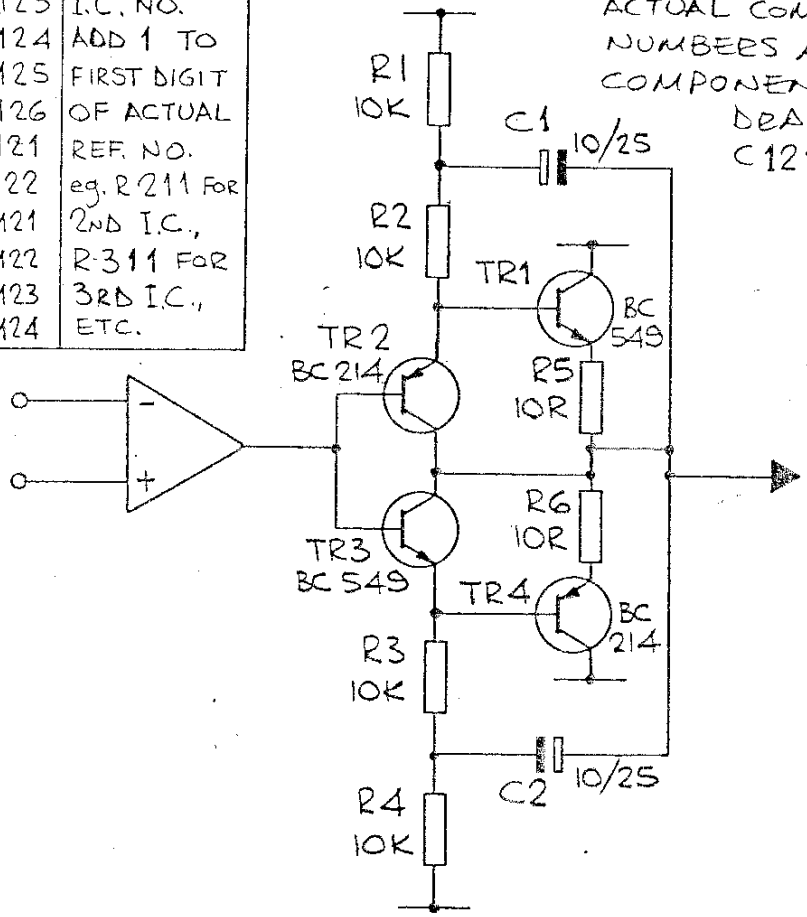
THIRD ANGLE PROJECTION

DO NOT SCALE

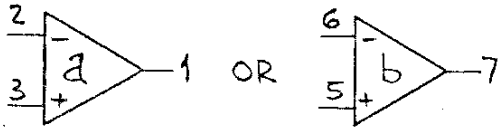
STD. REF. NO.	ACTUAL REF. NO. IC.1a	IC.1b	
R1	R111	R121	FOR EACH
R2	R112	R122	ADDITIONAL
R3	R113	R123	I.C. NO.
R4	R114	R124	ADD 1 TO
R5	R115	R125	FIRST DIGIT
R6	R116	R126	OF ACTUAL
C1	C111	C121	REF. NO.
C2	C112	C122	eg. R211 FOR
TR1	TR111	TR121	2ND I.C.,
TR2	TR112	TR122	R311 FOR
TR3	TR113	TR123	3RD I.C.,
TR4	TR114	TR124	ETC.

THIS CIRCUIT DRAWING SHOWS STANDARD COMPONENT REFERENCE NUMBERS (ie R1, C1, ETC)

ACTUAL COMPONENT REFERENCE NUMBERS ARE SHOWN ON COMPONENT LOCATION DRAWING (ie R111, C121 ETC.)



I.C. PIN NUMBERS

TYPE	PIN NUMBERS
LM 392 LM 393 MC 1458 TL 062 TL 072 TL 082	

ISS	DESCRIPTION	SIG.
3	SHEET 2 ADDED 13.3.84	SGH
2	REFERENCE NUMBER TABLE AND NOTES ADDED - IC TYPE NOS LM 392/3 AND MC 1458 ADDED. 17/1/84	SGH
1	FIRST 18.10.83	SGH

Drawn JM 18.10.83	Scale –	Unstated Tolerances	LOW IMPEDANCE BUFFER CIRCUIT DIAGRAM
Checked	Material	2 Dec. Pl. ±·010 3 Dec. Pl. ±·005	
Approved	Finish	Fractions ± 1/64 Metric ±·2mm	

Audio Developments Ltd,
Hall Lane,
Walsall Wood, Staffs

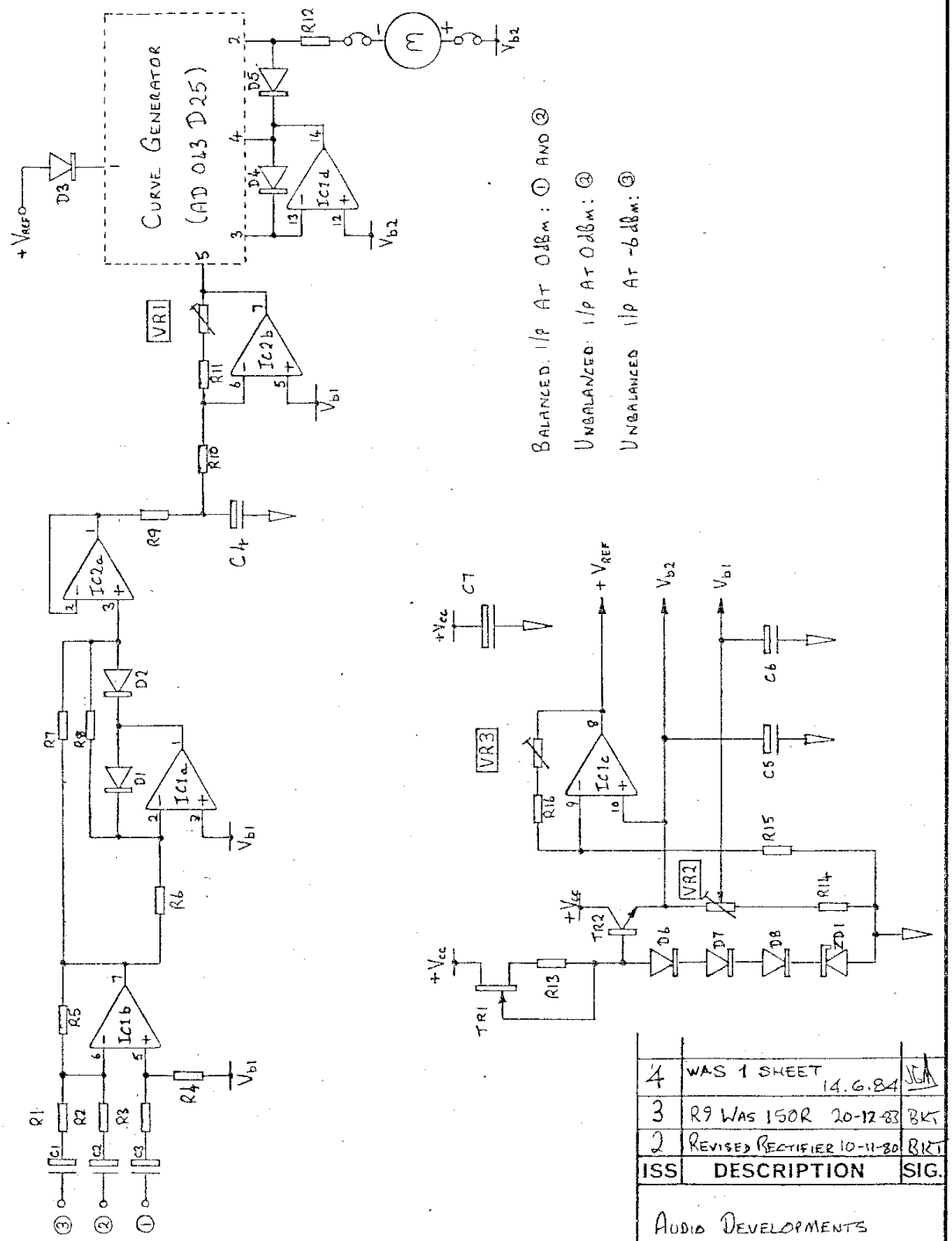
DRG. No. AD.100.D.66 SHEET 2 OF 2

MY 26094 R

DRG. No. SHEEET 1 OF 2
AD043 D21

THIRD ANGLE PROJECTION

DO NOT SCALE



BALANCED I/P AT 0dBm : ① AND ②

UNBALANCED I/P AT 0dBm : ②

UNBALANCED I/P AT -6dBm : ③

ISS	DESCRIPTION	SIG.
4	WAS 1 SHEET 14.6.84	JCA
3	R9 WAS 150R 20-12-83	BKT
2	REVISED RECTIFIER 10-11-80	BKT

Drawn 13/5/80 B.K.Taylor	Scale —	Unstated Tolerances
Checked —	Material —	2 Dec.Pl. ±·010 3 Dec.Pl. ±·005
Approved —	Finish —	Fractions ± 1/64 Metric ±·2mm

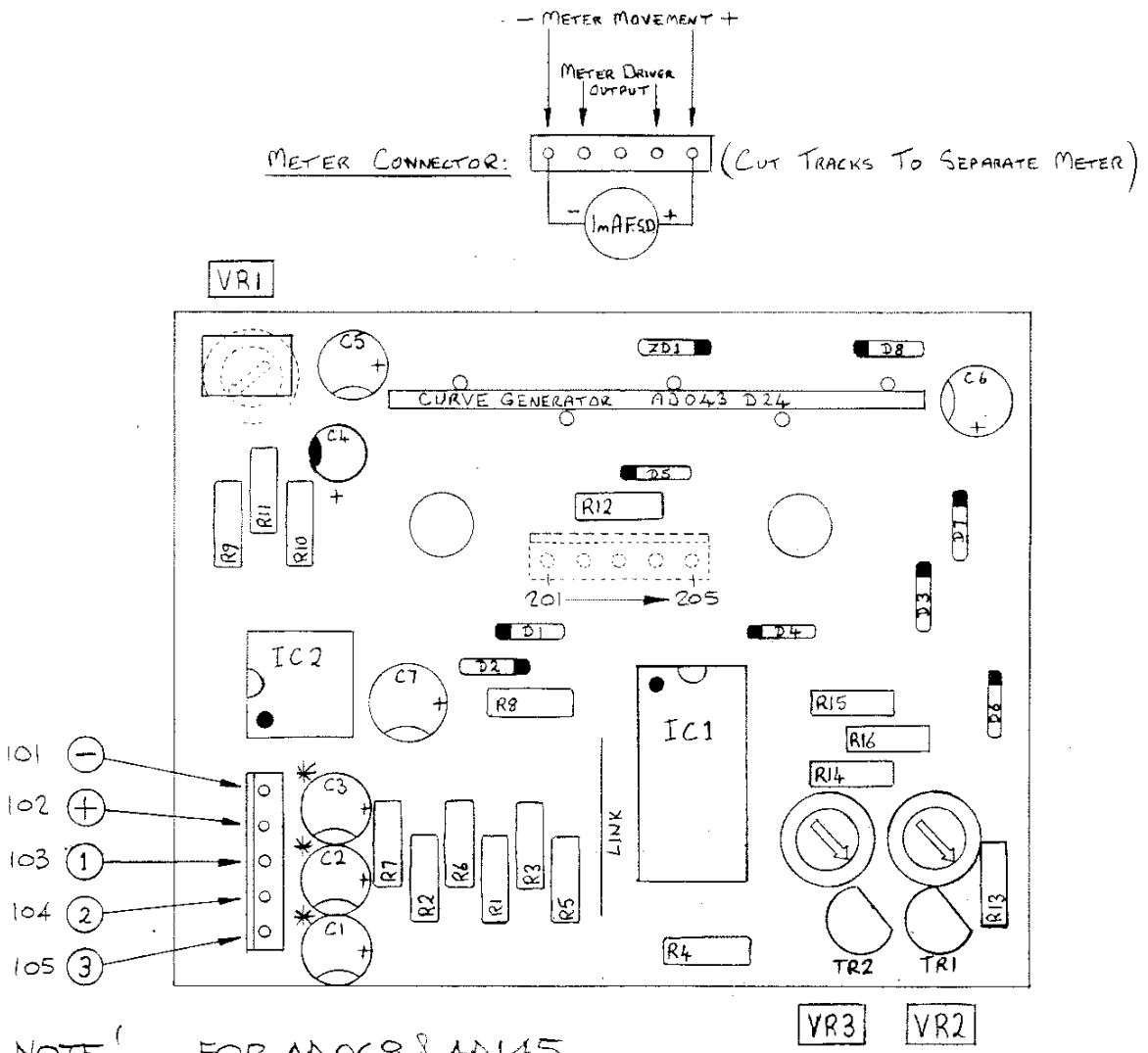
P.P.M. MAIN BOARD CIRCUIT DIAGRAM

AUDIO DEVELOPMENTS
Hall Lane,
Walsall Wood, Staffs

DRG. No. SHEET 1 OF 2
AD043 D21

MY 26094 R

DRG. No. SHEET 1 TO 7 AD 043 D23	THIRD ANGLE PROJECTION	DO NOT SCALE



* NOTE! - FOR AD068 & AD145

REVERSE POLARITY OF C1 OR C2 OR C3 ACCORDING TO PIN NUMBER USED FOR I/P (ie 105 OR 104 OR 103 RESPECTIVELY)

BALANCED I/P AT 0dBm: (1) AND (2)

UNBALANCED I/P AT 0 dBm: (2)

UNBALANCED I/P AT -6dBm: (3)

ISS	DESCRIPTION	SIG.
8	TR2 WAS ZTX 107 DIF 163 27.3.91	jgm
7	105 & 104 WERE 101 & 102 IN NOTE DIF 175 7.3.91	jgm
6	FIRST OFFICIAL ISSUE: DIF001-20.1.90	
5	POLARITY NOTE ADDED. 1.11.84	
4	WAS 1 SHEET 14.6.84	
3	R9 WAS 150R 20-12-83	BKT
2	REVISED RECTIFIER 10-11-80	B.K.T.

PCB NO: WAD.2159/2

Drawn 12/5/80 B.K.Taylor	Scale 2:1	Unstated Tolerances
Checked	Material N/A	2 Dec.Pl. ±·010
Approved	Finish N/A	3 Dec.Pl. ±·005
		Fractions ± 1/64
		Metric ±·2mm

P.P.M MAIN BOARD COMPONENT LOCATION

AUDIO DEVELOPMENTS
Hall Lane, Walsall Wood, Staffs

DRG. No. SHEET 1 OF 7
AD 043 D23

MY 26094 R

AD 043

PPM DRIVER (BBC & N.10)

COMPONENT CROSS REFERENCE LIST

1. Capacitors

C1	1 µF	63v
C2	0.47 µF	100v
C3	0.47 µF	100v
C4	10 µF	16v Tant.
C5	22 µF	16v
C6	22 µF	16v
C7	1 µF	63v

2. Diodes

D1	1N 4148
D2	1N 4148
D3	1N 4148
D4	1N 4148
D5	1N 4148
D6	1N 4148
D7	1N 4148
D8	1N 4148

3. Op. Amps

IC 1	LM 348
IC 2	LM 392

4. Transistors

TR 1	2N 5457
TR 2	BC 549

5. Resistors

R1	100K
R2	200K
R3	200K
R4	200K
R5	200K
R6	20K
R7	10K
R8	10K
R9	47R
R10	100K
R11	150K
R12	3K6
R13	2K2
R14	33K
R15	470K
R16	150K

6. Variable Resistors

VR1	100K	Pre set
VR2	1K	Pre set
VR3	100K	Pre set

Zener Diodes

7. ZD1 C7v5 BZY 88

AD 043

PPM DRIVER (NOB)

COMPONENT CROSS REFERENCE LIST

1. Capacitors

C1	1 µF	63v
C2	0.47 µF	100v
C3	0.47 µF	100v
C4	10 µF	16v Tant.
C5	22 µF	16v
C6	22 µF	16v
C7	1 µF	63v

2. Diodes

D1	1N 4148
D2	1N 4148
D3	1N 4148
D4	1N 4148
D5	1N 4148
D6	1N 4148
D7	1N 4148
D8	1N 4148

3. Op. Amps

IC 1	LM 348
IC 2	LM 392

4. Transistors

TR 1	2N 5457
TR 2	BC 549

5. Resistors

R1	100K
R2	200K
R3	200K
R4	200K
R5	200K
R6	20K
R7	10K
R8	10K
R9	47R
R10	100K
R11	47K
R12	3K6
R13	2K2
R14	33K
R15	470K
R16	150K

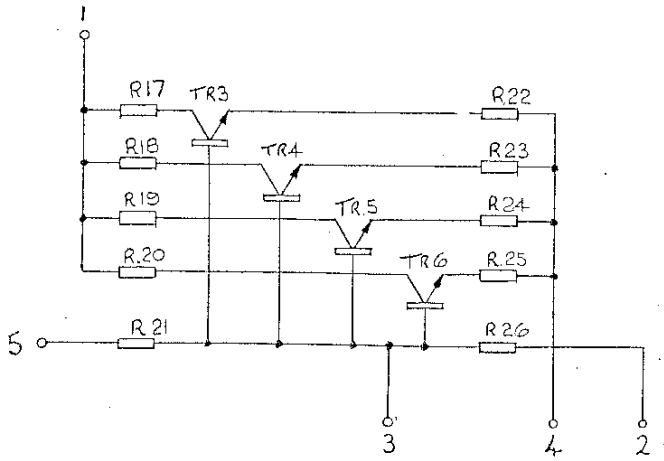
6. Variable Resistors

VR1	100K	Pre set
VR2	1K	Pre set
VR3	100K	Pre set

Zener Diodes

7. ZD1 C7v5 BZY 88

DRG. No. AD 043 D25 SHEET 1 OF 2	THIRD ANGLE PROJECTION	DO NOT SCALE



ISS	DESCRIPTION	SIG.
3	WAS 1 SHEET 1-4-86 COMPONENTS RENUMBERED	jgm
2	RENUMBER CONNECTIONS 10-11-80	B.K.T.

Drawn 13/5/80 B.K Taylor	Scale —	Unstated Tolerances 2 Dec.Pl. ±·010 3 Dec.Pl. ±·005 Fractions ± 1/64 Metric ±·2mm
Checked —	Material —	
Approved —	Finish —	

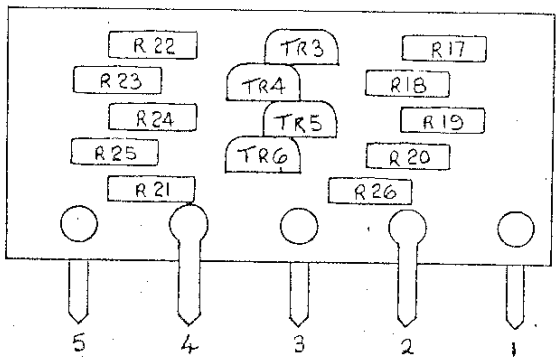
P.P.M. CURVE GENERATOR

CIRCUIT DIAGRAM

AUDIO DEVELOPMENTS
Hall Lane,
Walsall Wood, Staffs

DRG. No. SHEET 1 OF 2
AD 043 D25

DRG. No. SHEET 1 OF 5 AD 043 D24	THIRD ANGLE PROJECTION	DO NOT SCALE



ISS	DESCRIPTION	SIG.
3	DRG. WAS 1 SHEET. 1·4·86	jgm
2	R6R5 INTERPOSED 10-11-80	B.K.T.

WAD 2259/2-a

Drawn 12/5/80 B.K. Taylor	Scale 2:1	Unstated Tolerances 2 Dec. Pl. ±·010 3 Dec. Pl. ±·005 Fractions ± 1/64 Metric ±·2mm	P.P.M. CURVE GENERATOR COMPONENT LOCATION
Checked —	Material —		
Approved —	Finish —		

AUDIO DEVELOPMENTS
Hall Lane,
Walsall Wood, Staffs

DRG. No. SHEET 1 OF 5
AD 043 D24

AD 043

CURVE GENERATOR - PPM (BBC)

COMPONENT CROSS REFERENCE LIST

1. Resistors

R17	22 K
R18	39 K
R19	120 K
R20	390 K
R21	24 K
R22	20 K
R23	30 K
R24	68 K
R25	120 K
R26	82 K

2. Transistors

TR3	ZTX 109C
TR4	ZTX 109C
TR5	ZTX 109C
TR6	ZTX 109C

AD 043

CURVE GENERATOR - PPM (N.10)

COMPONENT CROSS REFERENCE LIST

1. Resistors

R17	30 K
R18	120 K
R19	300 K
R20	1 MO
R21	36 K
R22	33 K
R23	100 K
R24	180 K
R25	330 K
R26	470 K

2. Transistors

TR3	ZTX 109C
TR4	ZTX 109C
TR5	ZTX 109C
TR6	ZTX 109C

CALIBRATION

B.B.C. SCALE

1. Set VR 1 to Mid Position.
2. Set VR 3 to Max
3. Feed -12dBm to Meter and set "1" with VR 2.
4. Feed -8dBm to Meter and set "2" with VR 1.
5. Repeat 3 and 4 till both points are correct.
6. Feed OdBm to Meter and set "4" with VR 3.

N.10 SCALE

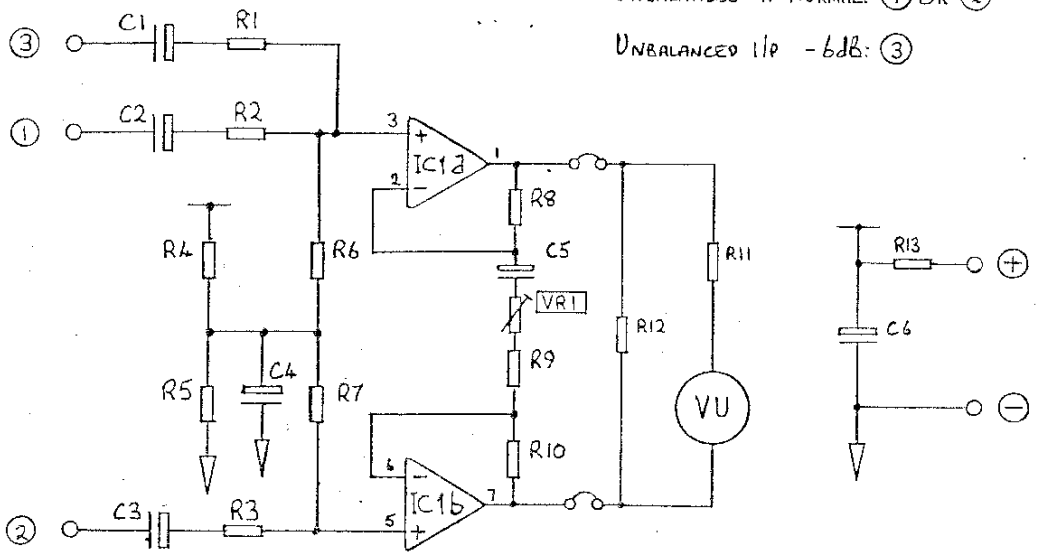
1. Set VR 1 to Mid Position.
2. Set VR 3 to Max.
3. Feed -24dBm to Meter and set "-24" with VR 2.
4. Feed -18dBm to Meter and set "-18" with VR 1.
5. Repeat 3 and 4 till both points are correct.
6. Feed OdBm to Meter and set "TEST" with VR 3.

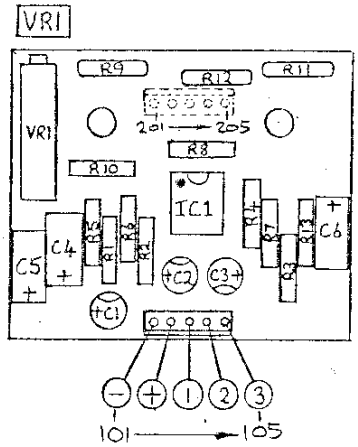
DRG. No. SHEET 1 OF 2 AD043 D26	THIRD ANGLE PROJECTION	DO NOT SCALE

BALANCED INPUT: ① AND ②

UNBALANCED I/P NORMAL: ① OR ②

UNBALANCED I/P -6dB: ③





ISS	DESCRIPTION	SIG.
2	WAS 1 SHEET 14.6.84	SGA
1	FIRST 22.5.80	BKT

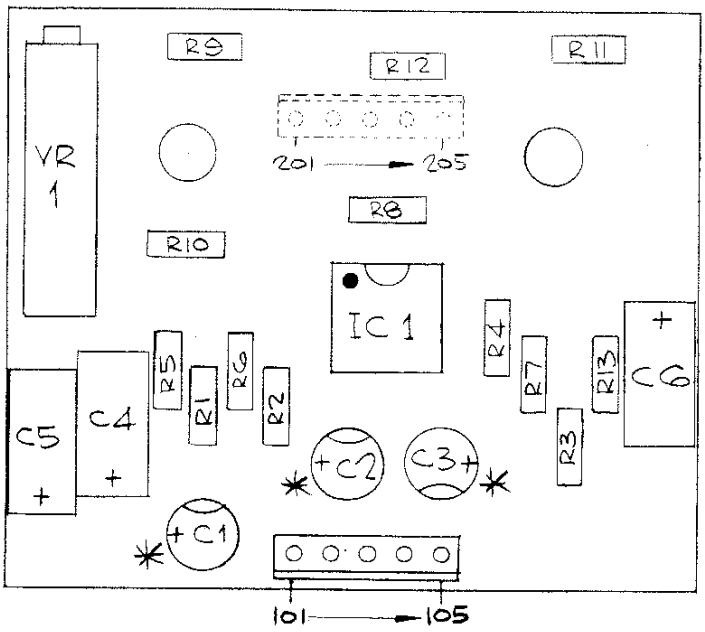
Drawn 22/5/80 B.K. Taylor	Scale 1:1	Unstated Tolerances	V.U. METER DRIVER CIRCUIT DIAGRAM
Checked	Material	2 Dec. Pl. ±·010	
Approved	Finish	3 Dec. Pl. ±·005	
		Fractions ± 1/64	
		Metric ±·2mm	

AUDIO DEVELOPMENTS
Hall Lane, Walsall Wood, Staffs

DRG. No. SHEET 1 OF 2
AD043 D26

MY 26094 R

DRG. No. SHEET 1 OF 3 AD 043 D28	THIRD ANGLE PROJECTION	DO NOT SCALE



C1
C2
C3

* NOTE! - FOR AD.145 ONLY

REVERSE POLARITY OF C1 OR C2 OR C3 ACCORDING TO PIN NUMBER USED FOR I/P (ie 105 OR 103 OR 104 RESPECTIVELY)

ISS	DESCRIPTION	SIG.
5	105/103/104 WERE 101/102/103 IN NOTE DIF 175 7.3.91	jgm
4	FIRST OFFICIAL ISSUE DIF001 - 24.1.90	KG
3	POLARITY NOTE ADDED. 1.11.84	JGM
2	WAS 1 SHEET 13.6.84	JGM
1	FIRST 22.5.80	BKT

PCB NO. WAD 2160

Drawn 22/5/80 B.K. Taylor	Scale 2:1	Unstated Tolerances	V.U METER DRIVER COMPONENT LOCATION
Checked	Material N/A	2 Dec. Pl. ±.010 3 Dec. Pl. ±.005	
Approved	Finish N/A	Fractions ± 1/64 Metric ±.2mm	

AUDIO DEVELOPMENTS
Hall Lane,
Walsall Wood, Staffs

DRG. No. SHEET 1 OF 3
AD 043 D28

MY 26094 R

AD 043

VU DRIVER

COMPONENT CROSS REFERENCE LIST

1. Capacitors

C1	1	µF	63v
C2	1	µF	63v
C3	1	µF	63v
C4	10	µF	25v
C5	10	µF	25v
C6	10	µF	25v

2. Op. Amps

IC 1	MC 1458

3. Resistors

R1	100 K
R2	220 K
R3	220 K
R4	100 K
R5	100 K
R6	22 K
R7	22 K
R8	18 K
R9	1 K
R10	18 K
R11	3 K6
R12	1 K8
R13	1 K

4. Variable Resistors

VR1	10 K Lin

Audio Developments Ltd.

DECLARATION OF CONFORMITY

We Audio Developments Limited, of:

Hall Lane,
Walsall Wood,
Walsall,
West Midlands.
WS9 9AU
ENGLAND.

Declare under our sole responsibility that the product:

AD 145 'Pico' Mixer, all variations.

To which this declaration relates is in conformity with the following; transposing harmonised standards

Directive	Name	Ref	Year
EMC Directive 89/336/EEC	Generic Emission Standard	BS EN 50081-1	1992
	Radiated Emissions	EN 55022 Class B	
	AC Mains Conducted Emissions*	EN 55022 Class B	
	Generic Immunity Standard	BS EN 50082-1	1992
	Radio Frequency EM Field, Unmodulated	IEC 801-3	
	ESD 8kV Air Discharge	IEC 801-2	
	Fast Transients	IEC 801-4	

and therefore is in conformity with the production requirements of Council Directives 89/336/EEC on the approximation of the laws of the member states relating to Electromagnetic Compatibility.

Signed.....

Name Roger F. Tromans

Date 14-12-95

Managing Director

*When used with AD100-09 PSU

Audio Developments Ltd.

DECLARATION OF CONFORMITY

We Audio Developments Limited, of:

Hall Lane, Walsall Wood, Walsall, West Midlands. WS9 9AU ENGLAND.

Declare under our sole responsibility that the product:

AD 100-09 Mains PSU.

To which this declaration relates is in conformity with the following; transposing harmonised standards

Directive	Name	Ref	Year
EMC Directive 89/336/EEC	Generic Emission Standard	BS EN 50081-1	1992
	Radiated Emissions	EN 55022 Class B	
	AC Mains Conducted Emissions	EN 55022 Class B	
	Generic Immunity Standard	BS EN 50082-1	1992
	Radio Frequency EM Field, Unmodulated	IEC 801-3	
	ESD 8kV Air Discharge	IEC 801-2	
	Fast Transients	IEC 801-4	
LV Directive 93/68/EC	Safety requirements for mains operated apparatus	BS EN 60065	1994

and therefore is in conformity with the production requirements of Council Directives 89/336/EEC and 93/68/EC on the approximation of the laws of the member states relating to Electromagnetic Compatibility and Low Voltage powered equipment.

Signed..... Date....24:1:97

Name: Roger F. Tromans
Managing Director

MAINS POWER SUPPLY TYPES AD100-09

SERVICE SECTION
FOR SUITABLY QUALIFIED PERSONNEL ONLY

WARNING

For SAFETY service must be carried out by suitably Qualified Personnel only.

DANGER
Isolate the power supply unit from the mains supply before removing any covers.

FUSES: Three 20mm ANTI-SURGE (T) fuses protect the AD100-09 against fault conditions. Should one fail, it is strongly recommended that the cause be traced.

The fuse holder on the front panel contains the mains fuse.

250mA HRC TYPE T 240v AC

For continued safety the specified fuse link must be fitted in the mains fuse holder when a replacement is required. Ensure it is of a type approved by a National Approved Body.

The DC fuses are fitted internally to the printed circuit board.

1.0 A HRC TYPE T ■ REGULATED DC OUTPUT

500mA HRC TYPE T ■ BATTERY CHARGE OUTPUT

These are accessed by removing the top cover. Before carrying out this operation, ensure the required SAFETY precautions are taken. ISOLATE the power supply unit from the MAINS SUPPLY.

The regulated section of the power supply unit is of the series type, built around transistor TR1. D1 and D2 create the full wave rectification from the centre tap transformer. C1 acts as the smoothing capacitor. R1 and R2 create the path supplying the current to the base of TR1 and the reference transistor TR2. The output voltage is set by VR1 and the junction of this pre-set with R5 is fed to the base of TR2. This control on TR2 determines the drive to TR1 and thus keeps the output voltage constant.

TR3, R3 and R4 form an overload or short circuit protection. When the current through R3 increases the voltage drop across R3 reaches a sufficient value to turn TR3 on, which then 'bleeds' current from the base of TR1 and turns this device off.

SETTING THE OUTPUT VOLTAGE - With the DC output unloaded monitor the output voltage at Pin 1 (0v) and Pin 4 (+v) of the DC-OUTPUT XLR. The voltage is set to +14v DC ±0.5 by adjusting VR1. For monitoring the voltage use a suitable meter for measuring DC voltage.

HINTS ON FAULT FINDING (All readings DC VOLTS using a DVM)

1. ZD1 should have a potential of 7.5v ±0.3v if the correct reference voltage is to be set up.
2. The base of TR2 should be 0.7v higher than that at the cathode of ZD1. Reference 0v.
3. TR1 base should be 0.7v higher than its emitter.
4. With no load on the power supply the collector of TR1 should be approximately 22v. Reference 0v.
5. If the output voltage is low it could mean TR3 is short circuit. This would cause the base drive current to TR1 to be diverted.

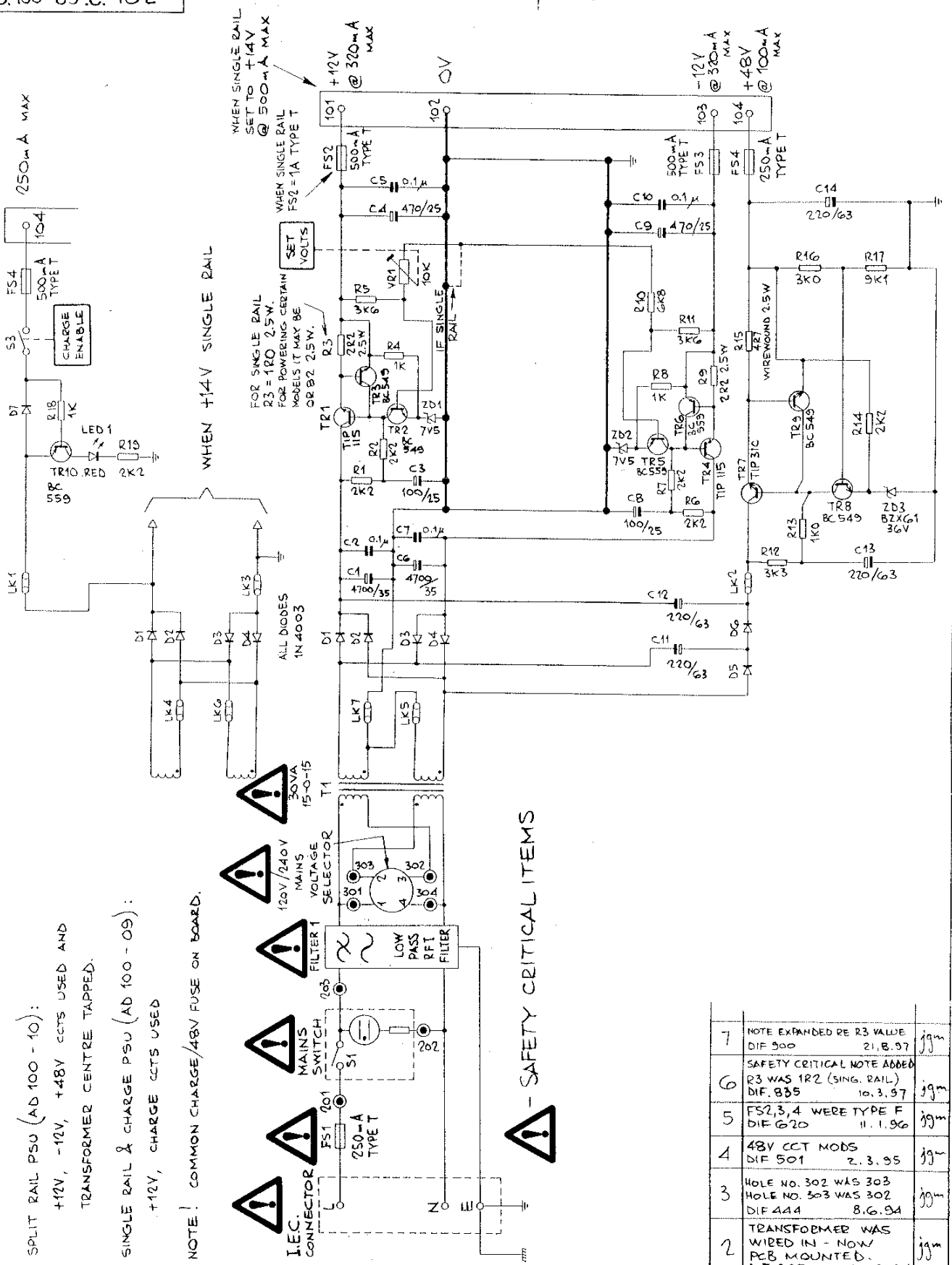
NOTE: The power supply unit should be serviced by a suitably qualified engineer. Only genuine spare parts with identical specifications must be used.

It is dangerous to change the specification or modify the product in any way.

DRG. No. AD.100-09.C.102 SHT. 2 OF 2

PROJECTION:

DO NOT SCALE



ISS.	REVISION/DATE	SIG.
7	NOTE EXPANDED RE R3 VALUE DIF 900 21.8.97	jgm
6	SAFETY CRITICAL NOTE ADDED R3 WAS 1R2 (SING. RAIL) DIF. 835 10.3.97	jgm
5	FS2,3,4 WERE TYPE F DIF 620 11.1.96	jgm
4	48V CCT MODS DIF 501 2.3.95	jgm
3	HOLE NO. 302 WAS 303 HOLE NO. 303 WAS 302 DIF 444 8.6.94	jgm
2	TRANSFORMER WAS WIRED IN - NOW PCB MOUNTED. DIF 395 30.3.94	jgm
1	FIRST DIE 375 27.9.93	jgm

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DRAWN	27.9.93 jgm
CHECKED/APP'D.	RFT.
SCALE	N/A
P.C.B. No.	N/A

TITLE

P.S.U.

SINGLE RAIL + CHARGE AND SPLIT RAIL

Audio Developments Ltd.
Hall Lane, Walsall Wood, Walsall.
West Midlands, WS9 9AU. England
Tel. Brownhills (0543) 375351

PT. No. N/A

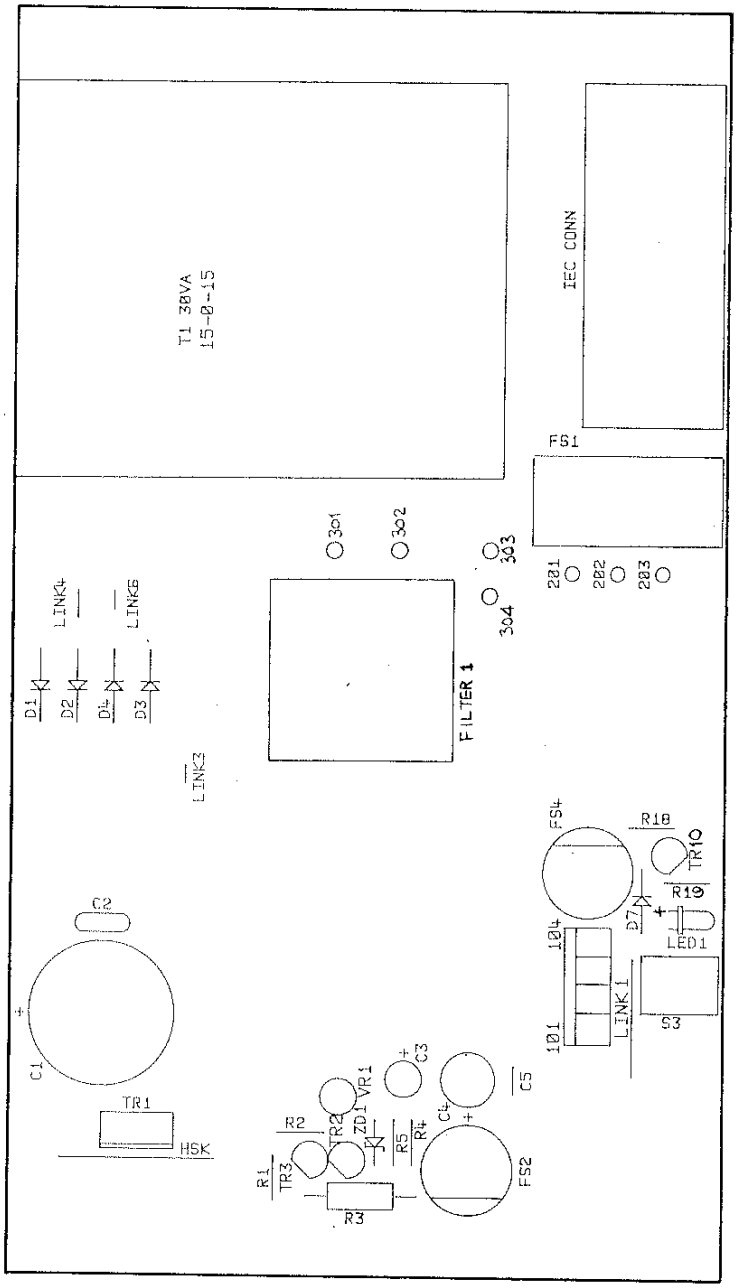
DRG. No. AD.100-09.C.102 SHT. 2 OF 2

DRG. No. AD.100-09.C.302 SHT. 1 OF 4

PROJECTION

DO NOT SCALE

DRG. No. AD.100-09.C.302 SHT. 1 OF 4



ISS.	REVISION/DATE	SIG.
5	TR10 WAS TR9 R19 WAS R17 DIF 501 2.3.95	jgm
4	COMPONENTS DELETED FOR SPLIT RAIL VERSION. DIF 513 9.2.95	jgm
3	TRANSFORMER WAS TOROIDAL DIF 395 29.3.94	jgm
2	FILTER REPOSITIONED DIF 378 7.10.93	jgm
1	FIRST 17.9.93 DIF 375	jgm

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DRAWN 17 SEP. 93 jgm

CHECKED/APP'D. RFT

SCALE (ORIGINAL) 141%

P.C.B. No. 62-010-028

TITLE

P.S.U.

– SINGLE RAIL + CHARGE –

Audio Developments Ltd.
Hall Lane, Walsall Wood, Walsall.
West Midlands, WS9 9AU. England
Tel. Brownhills (0543) 375351

PART No. 88-010-028

DRG. No. AD.100-09.C.302 SHT. 1 OF 4

Serial no.

_____

AD 145
PICO MIXER
HANDBOOK