

Service manual

HHB Circle 5A

Powered Monitor speaker



This manual is subject to change without notice.
Always check with HHB that you are using the latest version.

Also available as an Adobe Acrobat V3 file.

When printing this file, for clear sharp pictures on a black & white laser, it may be necessary to adjust your printer driver's 'Print half tone' settings. If you have a 600dpi printer, setting the half tone to around 45 lines per inch will give a clean sharp image, where as the default - around 60lpi may give a dark image to pictures..

WARNING! DANGER OF ELECTRICAL SHOCK

Opening mains operated equipment like the HHB Circle5A incurs a risk of electric shock.

DO NOT attempt to open this equipment unless you are qualified to do so, have the necessary test equipment and are operating the Circle 5a from an ISOLATED POWER SUPPLY.

Ensure that only the correct mains voltage is applied, as marked on the module.

NEVER OPERATE OR OPEN THIS SPEAKER IN DAMP OR WET CONDITIONS AND NEVER ALLOW IT TO BE USED OUTSIDE.

ENSURE THAT ALL POWER AND SIGNAL CABLES ARE IN PERFECT CONDITION AND ARE CORRECTLY FUSED.

IF IN DOUBT, CONTACT HHB IMMEDIATELY BEFORE PROCEEDING.

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THIS INDEX IS UNDER REVISION DUE TO THE
INTRODUCTION OF EARTHED, CLASS 2 VERSION

1.0 Externals

This is a view of the external controls on the Circle5A.

The function of the Master Volume control is to scale down excessive input signals. In a set-up where the signal level is scaled so that set to maximum (fully clockwise) an input of 0.775vdBv, on the loudest peaks, will fully drive the power amplifiers.

Since many studios use the '+4' signal reference as the maximum, it may be an idea to reduce the Master Volume to, say, '6' and control the signal at the mixer.

There are two input connectors: a master input, an isolated XLR following the normal European wiring convention:

- Pin 1 = shield (ground)
- Pin 2 = Live, hot, + signal
- Pin 3 = Cold, -, return signal

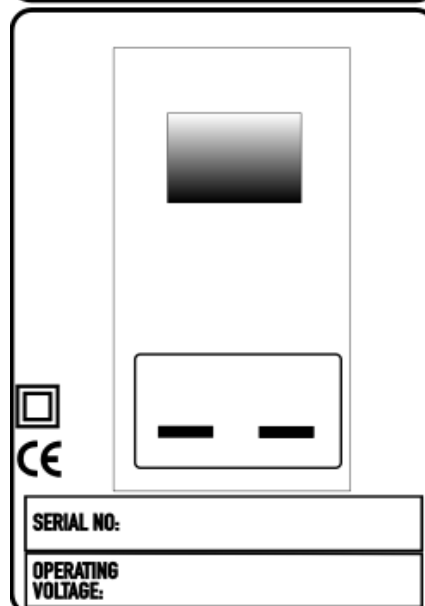
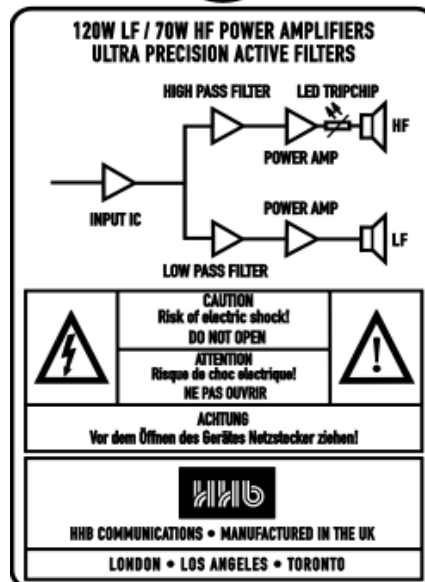
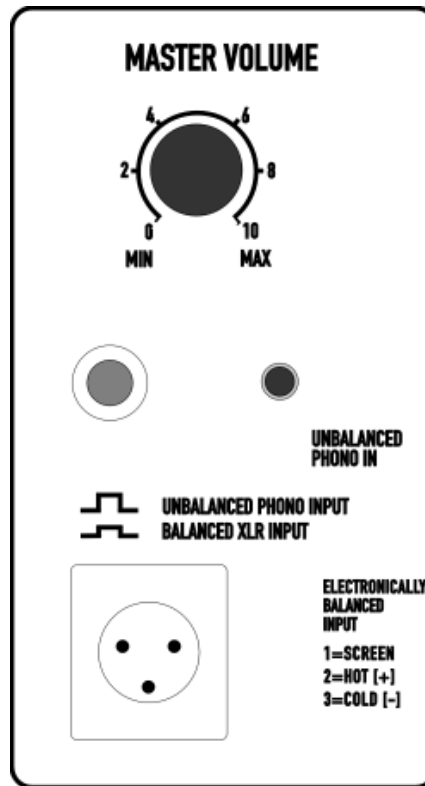
Also provided is a secondary input: a Phono (Cinch, RCA) connector for unbalanced systems. The centre pin is signal +, and the connector case is the ground.

The selector switch converts the master input (the XLR) to unbalanced mode suitable for the phono input - it does not switch between the two inputs.

Connect to EITHER the XLR or the phono, not both.

The metal parts of the panel are isolated from mains ground - the so called double isolation standard.

Only use the mains cable supplied. Replace the mains fuse with the correct type.



Removing the Circle 5a active module from the cabinet

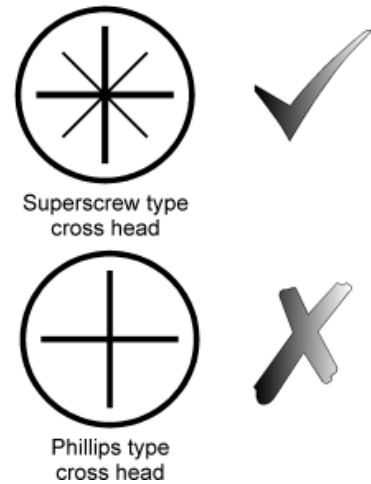
It is absolutely essential that before removing the module you have the necessary tools, a clear space, and sufficient uninterrupted time to work. Rushing leads to mistakes, and mistakes can be dangerous and impair the excellent performance of your Circle 5a speakers.

Ensure that the mains supply is disconnected and removed from the module, and is not reconnected until the module has been fully refitted.

Please cover your work bench with a soft material to protect the underside of your Circle 5's from scuffing during removal/replacement of the module. Also be aware that the module is heavy and that once the screws are loosened, it will tend to drop downwards, and that the heavy aluminium panel of the module will readily chip the softer wood of the cabinet, exposing the white MDF board under the black paint.

You will need one two screwdrivers:

1. A 3.0mm cross head screwdriver of the



'Superscrew' or 'Pozidrive' **NOT** Phillips type. The Superscrew type has 4 thin grooves into which the Superscrew screw driver securely locates. If the Phillips type is used, the screwdriver will 'mash' the heads, and then it may not be possible to remove the module from the cabinet.

2. A larger size (M4, 4mm, No.2) 'Superscrew' or 'Pozidrive' screwdriver.



Removing the screws

Please follow these instructions exactly. Failure to do so may well destroy your cabinet and/or module.

First, using your **smaller** Superscrew driver, check that the screwdriver makes a positive fit to the screws marked 1,2,3,4. Applying as little force as necessary, unscrew (anti-clockwise) the four corner machine screws in the order 1, 2, 3, 4.

These screws locate in metal inserts trapped in the inside of the cabinet, and the alignment of the module and the cabinet is precise.

Then, using the larger screw driver, remove the screws A, B, C, D, E and, as you loose screw F, expect the module to drop down. Be ready to catch it!

The module can then be removed a short distance from the cabinet, as the internal connections to the module are on short flexible wires.

2.0 General arrangement

All the signal processing circuitry of the Circle5A amplifier module is contained on one double-sided plated-through PCB. There are no user-adjustable parts.

Although mains voltages do not appear on the PCB, but care should be taken when examining and working on the module, since the secondary of the mains transformer (25-0-25 AC) is connected to the bridge rectifiers and smoothing capacitors on the board.

A mute relay prevents power on and power off 'thumps' appearing at the drive units, and gives a silent switch on and off. The correct operation of the mute relay can be detected by carefully listening to the module as the speaker is powered-up: after approx. 3 seconds a small mechanical 'click' should be heard in the vicinity of the heat sink (from the outside of the speaker), or from the relay, when the module has been removed.

The very low level of self noise generated in the circuitry means that, at idle, the best indication that the speaker is powered and awaiting a signal is the illuminated power on LED, fixed in the tweeter face plate.

The power-on LED is driven from the rectified unregulated transformer secondary, and is a positive indication that the transformer, rectifiers and smoothing capacitors are functioning correctly. (It does not, directly, confirm that the 12v regulated supply is functioning).

Provision is allowed for optional physical isolation of the audio grounds by use of an input transformer. Fitting the transformer requires removal of the PCB.

Two presets - one for bass drive level, the other tweeter drive level, and both with a range of approx. ± 2 dB are pre-set at the factory and should not be adjusted.

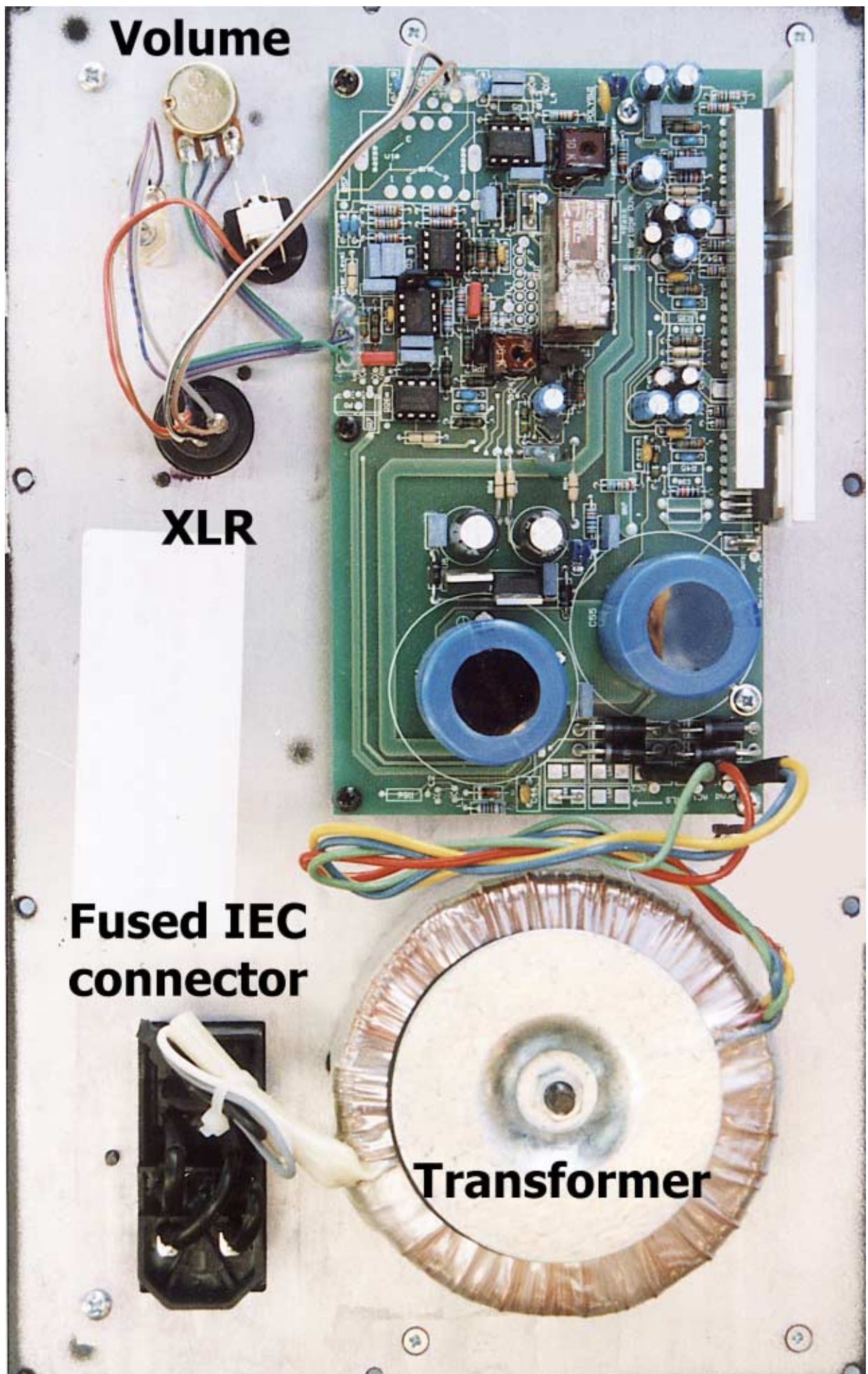
The bass unit is directly driven from a pair of IC power amplifiers in bridge push-pull mode. The tweeter is driven from one IC.

NOTE CAREFULLY:

DO NOT CONNECT EITHER OF THE BASS OUTPUT TERMINALS TO GROUND SINCE THIS WILL INSTANTANEOUSLY DESTROY ONE OR BOTH BASS POWER IC'S. THIS WILL REQUIRE THE REMOVAL AND REPLACEMENT OF ONE OR MORE POWER IC'S, A DIFFICULT AND EXPENSIVE TASK.

USE ONLY BATTERY OPERATED OR BALANCED AND FLOATING INPUT ISOLATION TO MAINS OPERATED EQUIPMENT.

Photograph of the amp module viewed from the inside

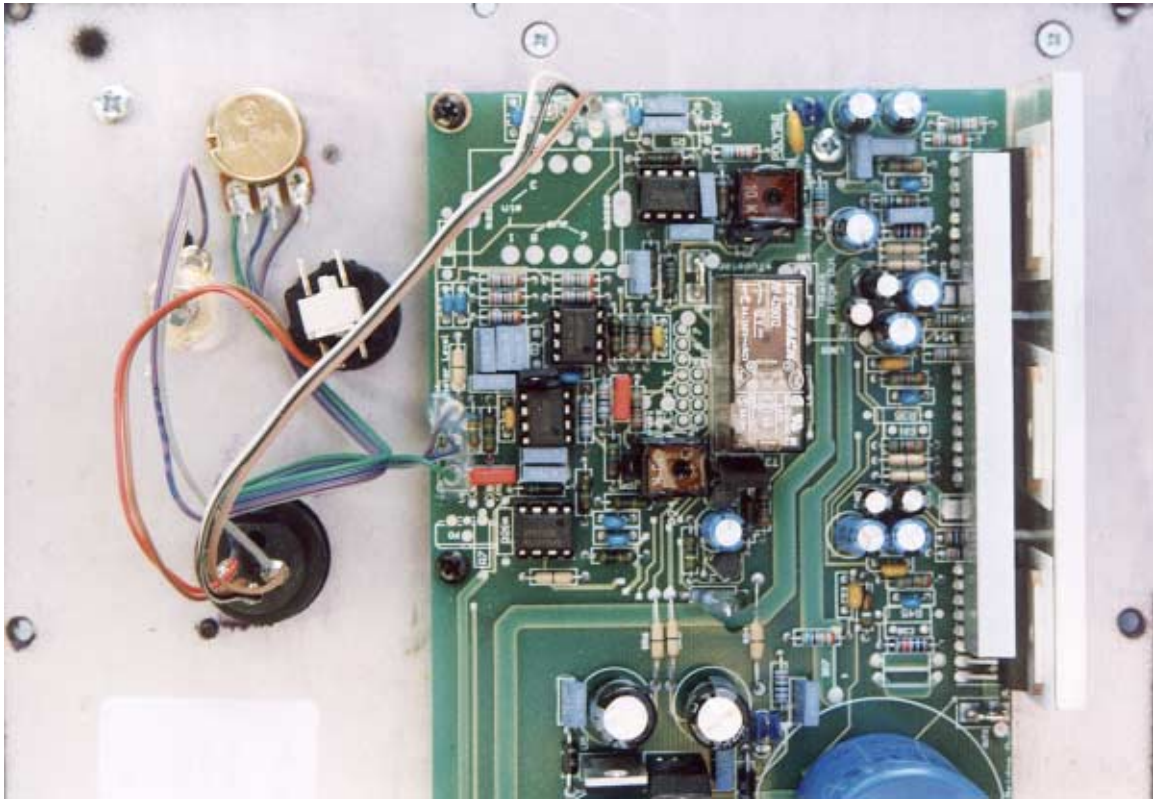


Volume

XLR

**Fused IEC
connector**

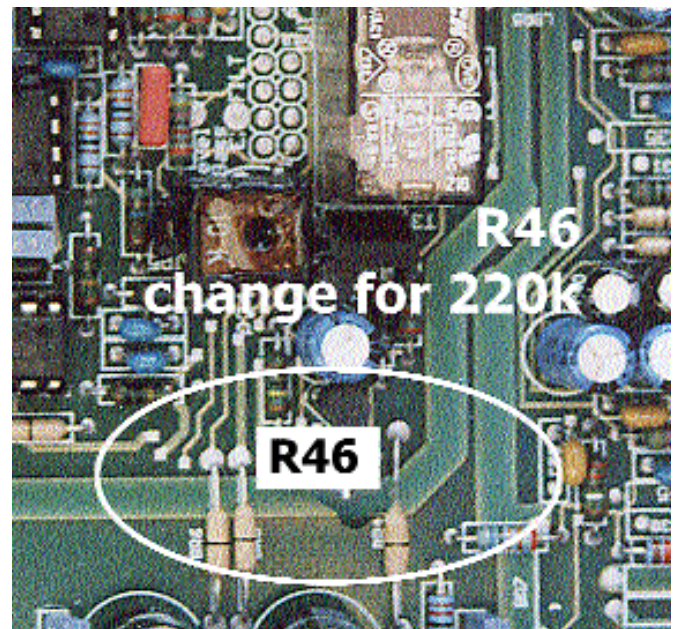
Transformer



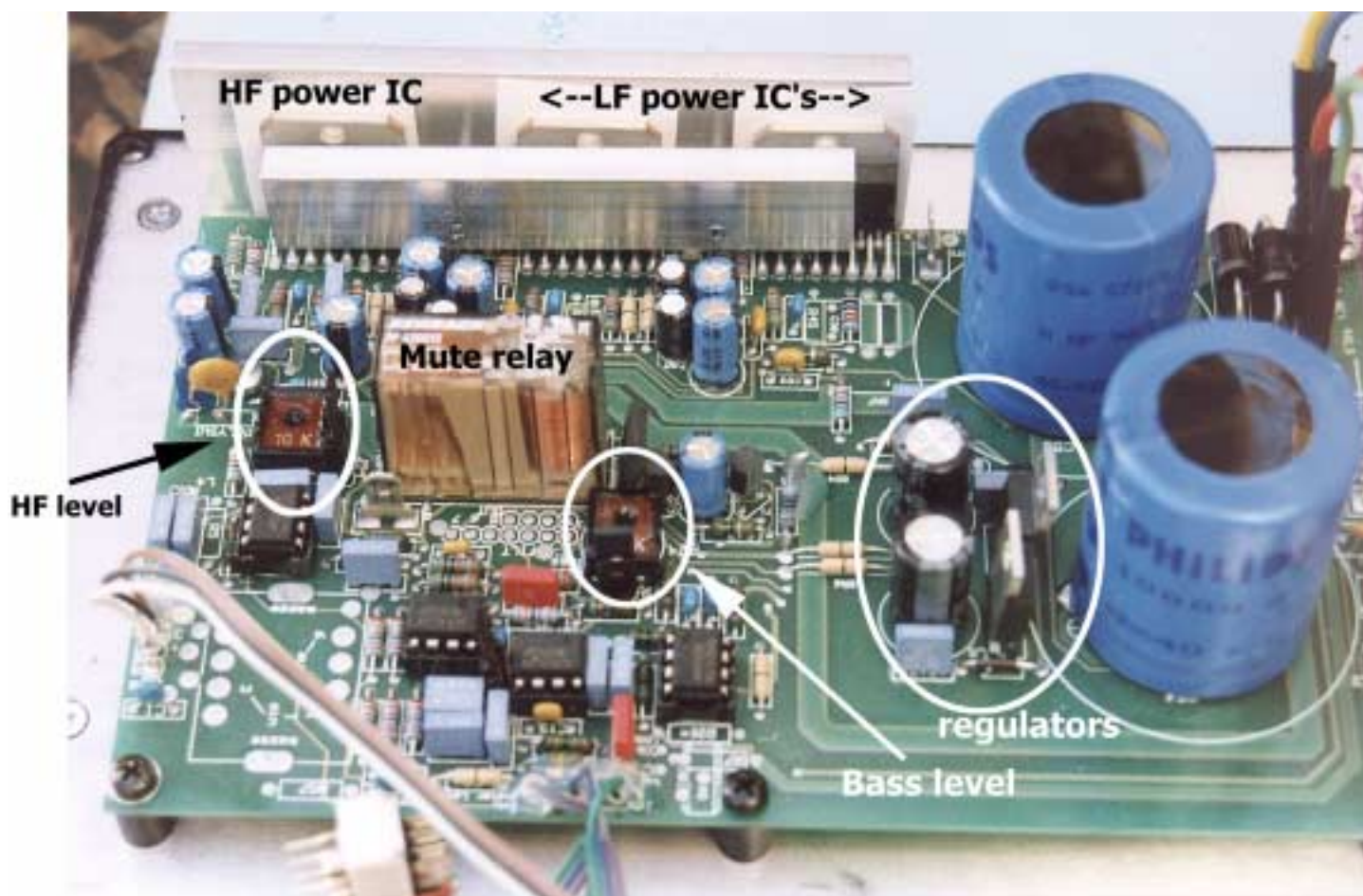
Mute-relay modification

A modification involving improving the switch on/off threshold of the mute relay was introduced shortly after production commenced.

This involves the changing of resistor R46, initially fitted as 100kR to 200k or 220kR. It is not practical or necessary to remove the PCB, and the fitted resistor can be cut out, and a substitute resistor carefully soldered in it's place.



Photograph of the amp module viewed from the inside



Tweeter level (HF level) reduction

Under normal operation, the two presets, one for HF level and the other for bass level should not be adjusted as these are individually set at the factory. It is not possible to change these drive levels unless audio signal analysis equipment is available.

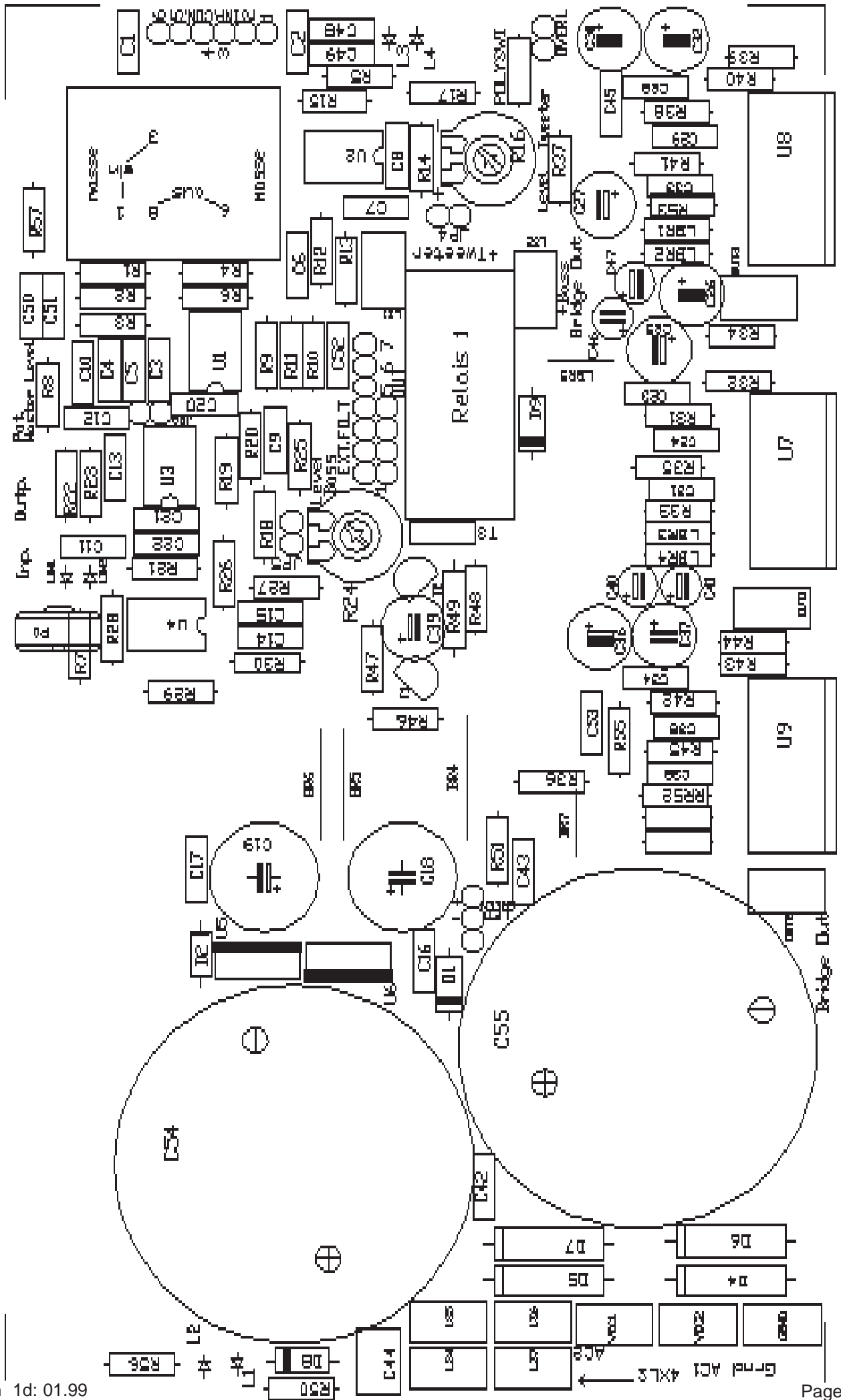
As despatched, the tweeter control is normally fully clockwise (viewed from the perspective as shown above).

Imagining that one of the arms of the preset's X is pointing to 5 o'clock (fully clockwise). Turning this arm anticlockwise until it points to 1 o'clock (i.e nearly half way anti clock-

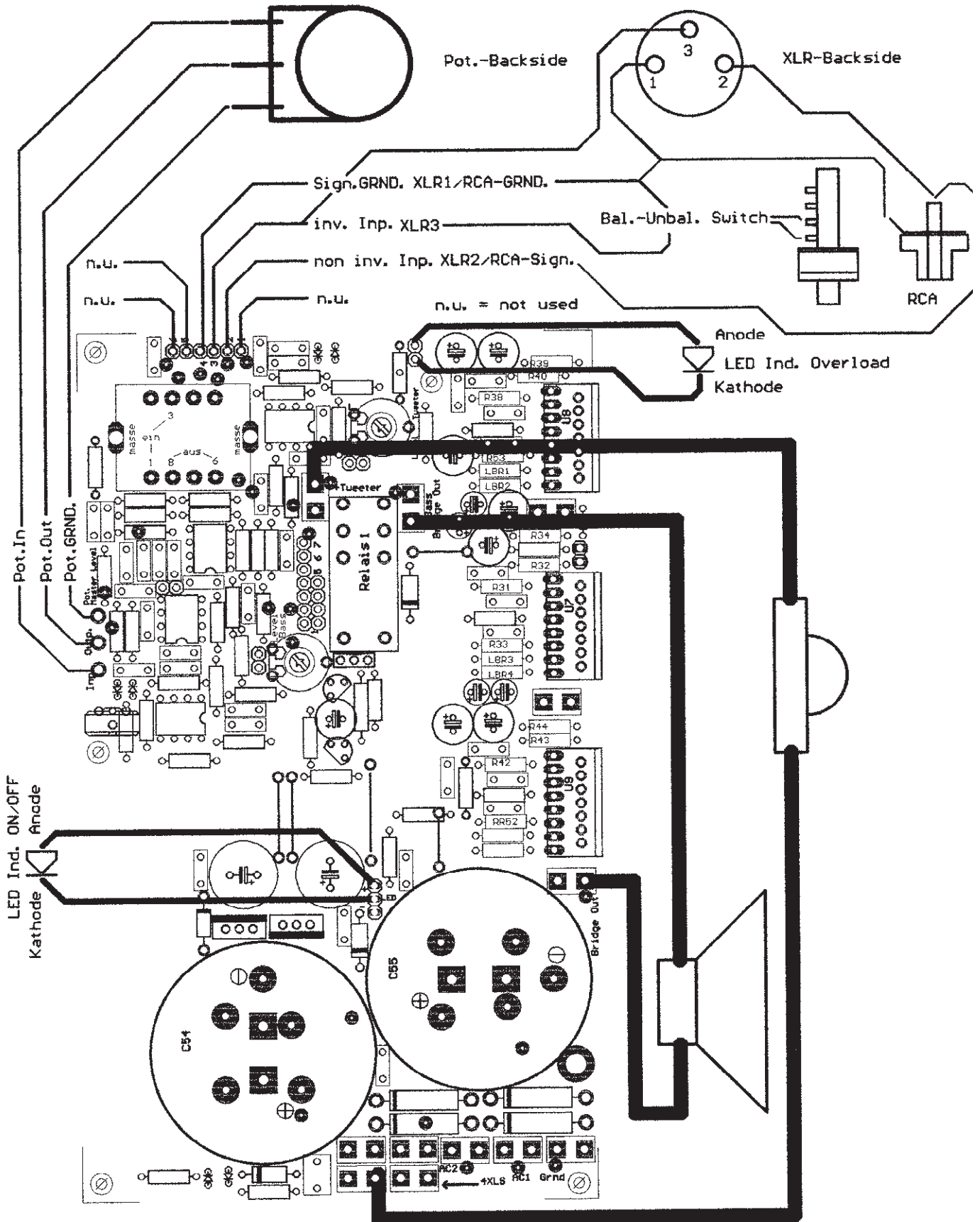
wise) reduces the tweeter level by 1dB; turning the arm until it points to 12 o'clock reduces the tweeter by 1.5dB and turning fully anticlockwise reduces the tweeter level by approx. 2.5dB, a very noticeable reduction across the tweeter's operating range.

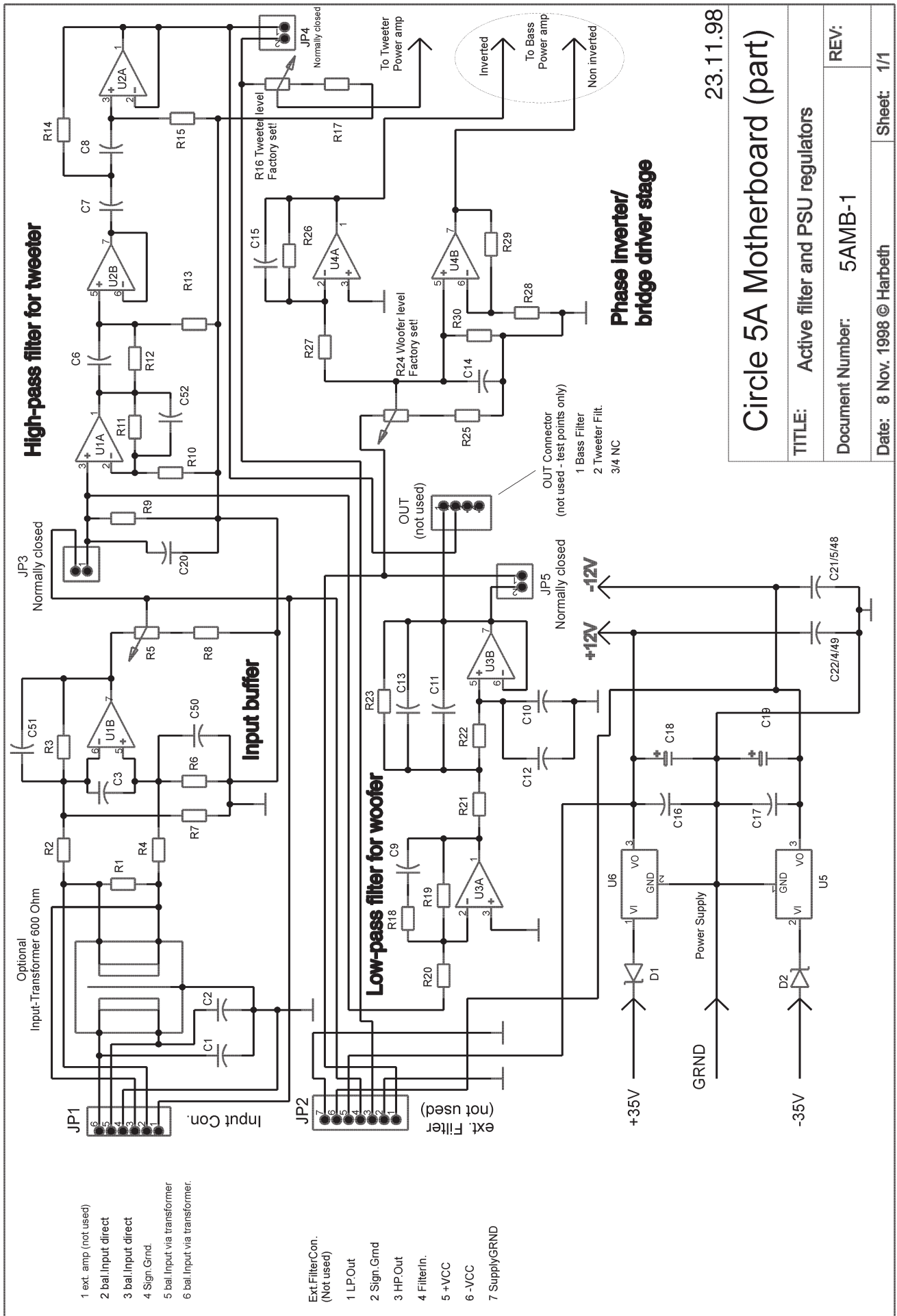
Be sure to return the preset adjuster to the original level or to make a note on the outside of the module that the Circle 5a is no longer standard.

DO NOT ADJUST THE BASS LEVEL ADJUSTER as this is individually calibrated, and as shipped will be set and sealed to a unique position.



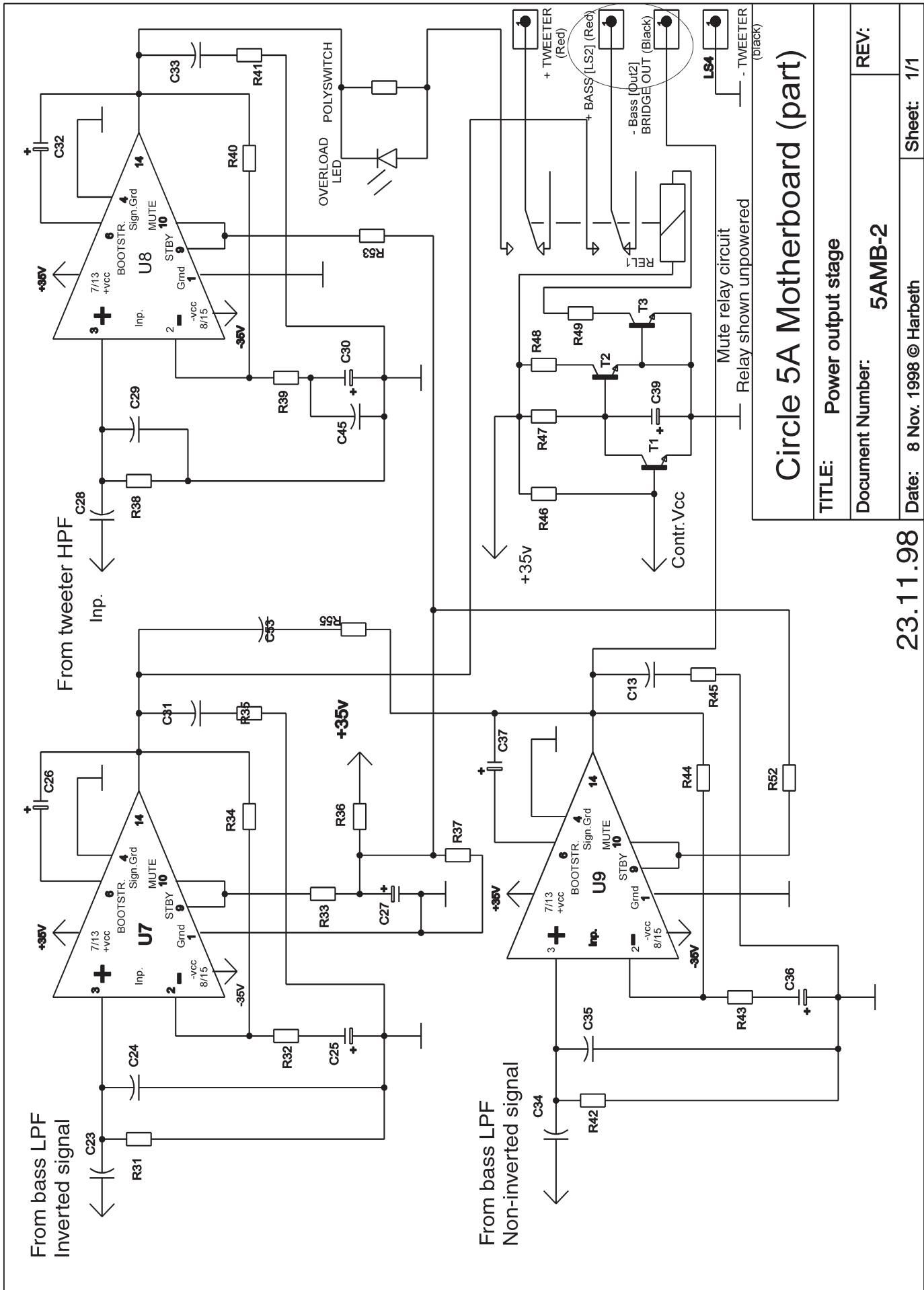
Connections to the Circuit board





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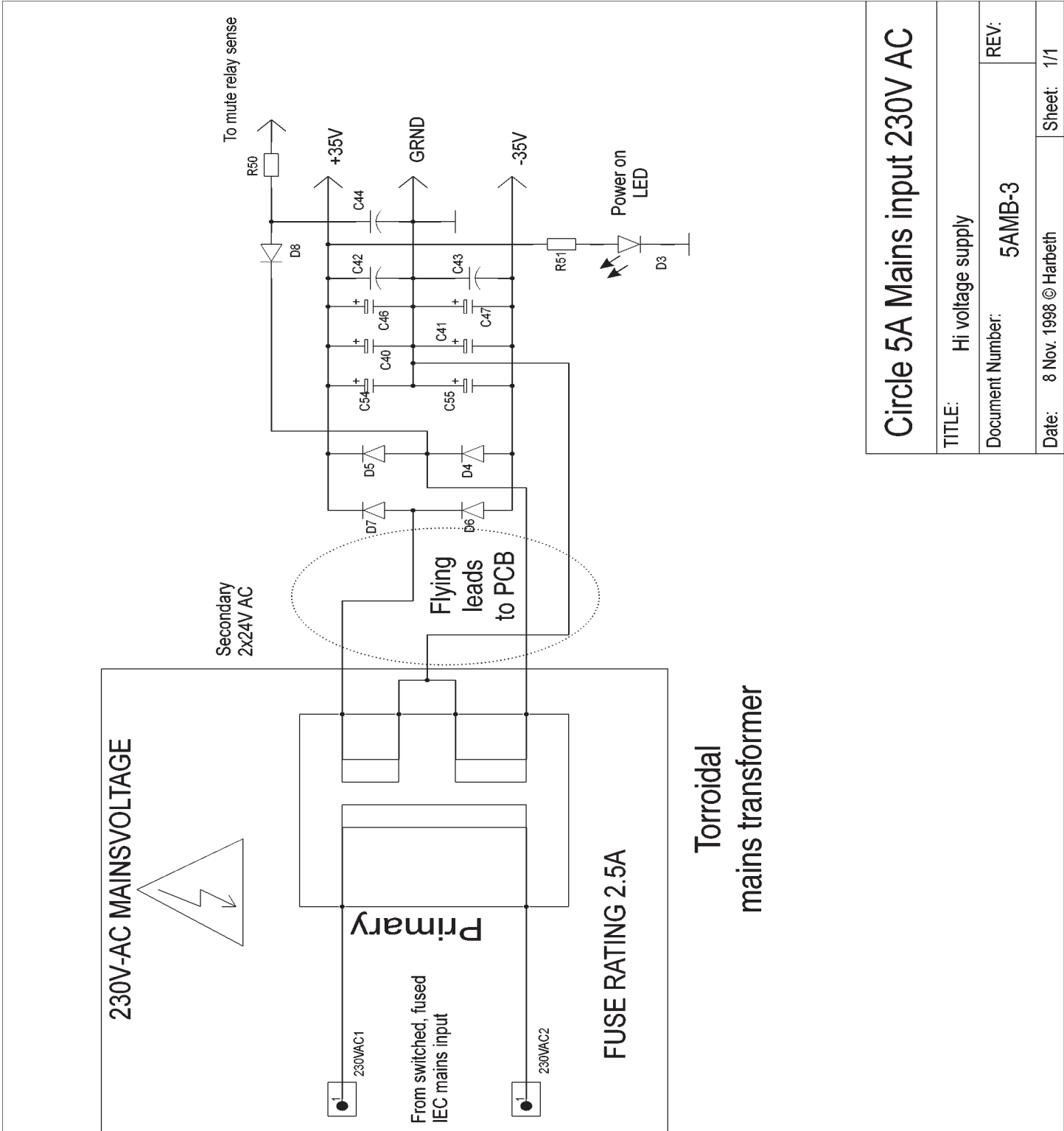
| | |
|--|-------------------|
| Circle 5A Motherboard (part) | |
| TITLE: Active filter and PSU regulators | REV: |
| Document Number: 5AMB-1 | |
| Date: 8 Nov. 1998 © Harbeth | Sheet: 1/1 |



Circle 5A Motherboard (part)

| | |
|------------------|-----------------------|
| TITLE: | Power output stage |
| Document Number: | 5AMB-2 |
| Date: | 8 Nov. 1998 © Harbeth |
| REV: | 1/1 |

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Circle 5A Mains input 230V AC

| | |
|-----------------------------|------------|
| TITLE: Hi voltage supply | |
| Document Number: 5AMB-3 | REV: |
| Date: 8 Nov. 1998 © Harbeth | Sheet: 1/1 |

Harbeth HHB Circle 5 Power
amplifier parts list 1.1999

Bez. Wert

R1 27 K
R2 27 K
R3 27 K
R4 27 K
R5
R6 27 K
R7
R8 0 Ohm
R9 100 K
R10 10 K
R11 10 K
R12 130 k / 1%
R13 5,76 K / 1 %
R14 7,32 K / 1%
R15 25,5 K / 1%
R16 Trimmer 10 K
R17 56 K
R18 5,32 K / 1%
R19 3,3 K / 1%
R20 3,3 K / 1%
R21 6,8 K / 1%
R22 6,34 K / 1%
R23 130 K / 1%
R24 Trimmer 10 K
R25 47 K
R26 100 K
R27 100 K
R28
R29 0 Ohm
R30 100 K
R31 47 K
R32 27 K
R33 10 K
R34 1 K
R35
R36 56 K
R37 56 K
R38 47 K
R39 1 K
R40 27 K
R41 10 Ohm
R42 47 K
R43 27 K
R44 1 K
R45
R46 220 K (formerly 100k)
R47 1 M
R48 10 K
R49 680 Ohm

R50 16 K
R51 2,2 K
R52 10 K
R53
R54
R55 2,2 Ohm
R56
R57
C1 68 pF Keramik
C2 68 pF Keramik
C3
C4 100 nF Folie
C5 100 nF Folie
C6 4,7 nF MKT / 5%
C7 4,7 nF MKT / 5%
C8 4,7 nF MKT / 5%
C9 47 nF MKT / 5%
C10 3,3 nF MKT / 5%
C11 15 nF MKT / 5%
C12 4,7 nF MKT / 5%
C13 1 nF MKT / 5%
C14 68 pF Keramik
C15 68 pF Keramik
C16 100 nF Folie
C17 100 nF Folie
C18 1000 uF/16 V Elko
C19 1000 uF/16 V Elko
C20 68 pF Keramik
C21 100 nF Folie
C22 100 nF Folie
C23 470 nF Folie
C24 68 pF Keramik
C25 47 uF / 50V ELKO
C26 47 uF / 50V ELKO
C27 47 uF / 50V ELKO
C28 100 nF Folie
C29 68 pF Keramik
C30 47 uF / 50V ELKO
C31
C32 47 uF / 50V ELKO
C33 100 nF Folie
C34 470 nF Folie
C35 68 pF Keramik
C36 47 uF / 50V ELKO
C37 47 uF / 50V ELKO
C38
C39 47 uF / 50V ELKO
C40 4,7 uF / 50V ELKO
C41 4,7 uF / 50V ELKO
C42 100 nF Folie
C43 100 nF Folie
C44 470 nF Folie

C45 100 nF Folie
C46 4,7 uF / 50V ELKO
C47 4,7 uF / 50V ELKO
C48 100 nF Folie
C49 100 nF Folie
C50 68 pF Keramik
C51 68 pF Keramik
C52 1 nF MKT
C53 470 nF Folie
C54 4.700 uF / 40V ELKO
(Philips; Pan)
C55 4.700 uF / 40V ELKO
(Philips; Pan)

D1 BZY 18V
D2 BZY 18V
D3
D4 BY 500 oder BY 550
D5 BY 500 oder BY 550
D6 BY 500 oder BY 550
D7 BY 500 oder BY 550
D8 1N4148
D9 1N4148

T1 BC546
T2 BC546
T3 BD135, inverser
Einbau

V1 NE5532
V2 NE5532
V3 NE5532
V4 NE5532
V5 7912
V6 7812
V7 TDA7294V
V8 TDA7294V
V9 TDA7294V

Poly-Switch Poly-Switch RM
5mm

BR4 Brücke oder 0 Ohm
BR5 Brücke oder 0 Ohm
BR6 Brücke oder 0 Ohm

LBR1 0 Ohm
LBR2 0 Ohm
LBR3 0 Ohm
LBR4 0 Ohm

Relay YW2-SN12

JP3 Jumper
JP4 Jumper
JP5 Jumper

LED green 2-pol. Berg-Stiftleiste 76384-302
Overload 2-pol. Berg-Stiftleiste 76384-302

LS1 4,8mm Flachstecker
LS2 4,8mm Flachstecker
LS4 4,8mm Flachstecker
OUT2 4,8mm Flachstecker
VCC1 4,8mm Flachstecker
VCC2 4,8mm Flachstecker
GRND4,8mm Flachstecker

Mechanical parts

Kühlblech 315 x 196 x 4 mm
Cinchbuchse Monacor T-706G
Kabelsatz Kaltgeräte, Poti; XLR
Lackierung Platte , Kühlk. , Bügel
Kühlkörper SK 81-300-AL
Isolierfolie 25 x 50mm keraterm
Trafo 120VA , 2x25V
Netzanschl. 6762B , Heil
Sicherung 1,6 A träge
Poti Monacor VRB-141M50
Knöpfe Monacor KN-11/SW
XLR-Anschl. 3 pol Buchse
Schrauben M3x16 , M3x8 , M4x8, M6x70
Schalter Schadow ZFAFA200BKGN2UEE
Bügel 272 x 30 mm 8Q
Abstand-Metall
Abstandshalter 3 x 10, DR701P
Aluwinkel 2 St.
Bearbeitung Kühlkörper
Montage

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