

TEXT ONLY

**300B PSE
MONOBLOC
INSTRUCTION
MANUAL**

SAFETY WARNING

Lethal voltages exist in this amplifier. This is one of our harder kits, in terms of construction, please do not attempt to build it unless you have an understanding of valve circuitry and can follow safety precautions.

We do provide a back-up service, a help-line is manned from 9.00am to 5.00pm Monday to Friday, should you run into any problems. Additionally, if the worst comes to the worst and you cannot get your amplifier going, or simple want it checked, for a nominal charge, we will get your amplifier up and running.

For safety, never hold earthed metal work when testing. Make sure your body is isolated by rubber soled shoes. To aid construction use a multimeter, one capable of reading up to 1000 volts dc. **YOU MUST WEAR THE RUBBER SAFETY GLOVES PROVIDED** when testing, since the greatest danger comes from a slip at this time. Always remove the mains plug when you are soldering after switch on. The larger power supply capacitors will hold a nominal charge after switch off, so wear your gloves at all times when working internally.

Additionally be aware that the valves do get very hot and will burn skin on contact, therefore please position in a safe place, away from children and animals. Due to the compact size of the amplifier the chassis's top surface does get hot and the front panel will be warm to the touch.

FUSE

This amplifier consumes 1A from the mains and must be fitted with a 1.6A SLOW-BLOW fuse. If this blows, then there is a fault and it must be cleared before another fuse is re-inserted.

Do not use a higher rated fuse as you may burn out your transformers and always use the slow-blow type.

OUTPUT TRANSFORMERS

When it comes to switch on you should always have your output transformers connected up to a 8 ohm load, be it a dummy load (high power 8 ohm resistor) or a pair of speakers. This is because the load is an integral part of the circuit, unlike most transistor amplifiers. Switch on without a load will cause unnecessary distress to the output transformers and failure if left in this state for a long time.

READING

Before you start building read through the instruction at least twice to avoid any mistakes.

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World Audio Publishing Ltd.
Suite G4
Imex House
Kilburn Park Road
London, NW6 5LF
HELP-LINE 01908 218836

SKILL LEVEL

To build this amplifier you must be able to:

- a) solder to a good standard.
- b) have some knowledge of valve circuitry.
- c) possess an understanding of electricity and electronics.
- e) have a multimeter and be able to use it.
- f) have access to a dummy load or an old pair of speakers.
- g) know the precautions necessary to avoid electric shocks from the mains and amplifier power lines.

MEASURED PERFORMANCE

power.....	20watts into 8 ohms
frequency response.....	20Hz-34kHz
hum (feedback/no feedback).....	2mV/4mV
noise (CCIR wtd).....	98dB
distortion (feedback/no feedback).....	0.2%/0.8%
sensitivity (feedback/no feedback).....	1V/380mV

BUILD SEQUENCE

Before you start building it is a good idea to check the parts supplied against your parts list. Use the **ixi** column on the parts list to cross off your components. To help you through the build process you will find at the rear of the manual diagrams labelled fig. 1, fig. 2 and so on. These will bear correlation to the text and a note in bold type after each section, will tell you which diagram to refer to.

FIXING OF THE HARDWARE

- 1) Front plate - Fit the front plate to the chassis using the M4 hex bolts and M4 nuts provided.
- 2) IEC mains input socket - this snaps easily in place. Orientate so that tray sits near the base plate.
- 3) Rotary mains switch - cut 10mm off the top of the shaft using a hacksaw. Clamp the shaft when sawing.
- 4) Knob - fit the chrome knob to the front panel. When fitting, do not apply a great force onto the shafts as it will brake. Insert the grub screws into the knob and tighten with an Allen key.
- 5) Speaker binding posts - see fig. 12 p.9
- 6) Phono socket - these need to be isolated from the chassis, hence the need for isolation washers. Fit the phono socket in this sequence: phono socket (female) - washer - chassis - washer - solder tag - nut. see fig. 10 p.9
- 7) Earth post - To achieve a good chassis earth, scuff the paint away internally around the hole, the solder tag should be internally accessible for soldering later.
- 8) L1, choke - Pay careful attention to fig. 13 p.9 as correct orientation is essential. The choke is fitted in place by 4 fixing screws. 2 x M4 x 10 screws passing through the chassis top surface and 2 x M4 x 60 coming through the chassis side. It is good practice to fit all 4 fixing screws loosely to start then tighten when you are happy with the positioning.
- 9) Valve bases - Refer closely to p.10 as all 5 bases need to be orientated correctly. Use the M3 metal washers when fitting the UX4 (300B bases)
- 10) Capacitor fitting clips - These hold C9 & C10 firmly in place. Using M3 x 10 screws, you will need to use the M3 metal washers provided to fit securely. Fit C9 & C10 in place, orientate as shown in p. 10 hold the clips fast using the M3 x 10 screws & nuts provided.
- 11) Feedback switch - this is located at the back of the chassis. Orientate so that the toggle follows an up - down motion when switched.

- 12) VR1, humbucker - this is also located at the back of the chassis. Also, fit the associated black knob.
- 13) Fit all six M3 x 25mm spacers, using the M3 x 10 screws provided. fit the tag boards later, after all the wire routing has been done.
- 14) Output transformer - Orientation is important as is insulation from the chassis, so pay careful attention to fig. 11 & 13 p. 9
- 15) Mains transformer - Again, orientation is important as is insulation from the chassis, so pay careful attention to fig. 11 & 13 p. 9

WIRE ROUTING

- 1) Paying close attention to fig. 13 p. 9 & p. 10 it is an idea to lay all leads and wire up leads where possible, using the self adhesive clips provided fit the leads along their suggested routes. Please note that the tag boards have yet to be fixed in place, this is to ease routing underneath the board position. Where leads are to be solder to the tag board, or to components not yet fitted, gauge the correct length and cut back and prepare for soldering later. Also note, that for ac carrying leads the associated wires are twisted together to reduce hum pick up this is not the case for dc carrying leads.
- 2) Route A - mains transformer primary - brown, blue (be 100% sure this is from the primary winding as there is also a blue lead on the secondary winding), orange & red leads- for 230/240Vac (UK/EEC) operation solder together the orange & red leads and isolate with PTFE tape. Twist all 4 wires together, solder the blue & brown wires to the power switch. see fig. 2 p. 8
- 3) Route A - IEC socket to power switch - brown & blue loose wire - wire up to the IEC socket, twist together and wire up to the power switch. see fig. 1 & 2 p. 7
- 4) Route B - output transformer primary - black & red leads - wire the black lead to the \hat{i} terminal of C9 and the red lead to the anode pin of V3. Connect V3 anode to V4 anode with PTFE wire. As these leadouts carry dc there is no need to twist the wires together.
- 5) Route C - output transformer secondary - green & purple leads - twist the leads together, connect the green lead to the black speaker post (0ohms) and the purple lead to the red speaker post(8ohms)
- 6) Route D - mains transformer secondary, V4 heaters - 2 x pink leads - twist the leads together, connect one to V4, h1 and the other to V4, h2.
- 7) Route E - mains transformer secondary, V3 heaters - 2 x purple leads - twist the leads together, connect one to V3, h1 and the other to V3, h2.
- 8) Route F - humbucker wiring - 2 x blue, 1 x brown loose wire - refer to fig. 9 p. 8, wire up the 2 x blue wires to pin 1 & 3, and solder the brown wire to pin 2, twist together, wire one blue to R15, the other to R16 and the brown to R14/C6 \hat{i} connection.
- 9) Route G - mains transformer secondary, V2 heaters & ac supply to BR2 - 2 x grey leads - twist the wires together. Wire one grey wire to pins 4 & 5 and the other to pin 9 on V2. Using the PTFE wire connect pin 4 & 5 to Tag R1 and connect pin 9 to Tag R4 (twist the PTFE wires together on their journey).
- 10) Route H - mains transformer secondary, V5 heaters - 2 x orange leads - twist together and wire one to pin 2 and the other to pin 8, using the excess connect pin 8 to the choke, pin 2.
- 11) Route I - mains transformer secondary, V5 anodes - 2 x black leads - twist together and wire one to pin 4 and the other to pin 6 of V5.
- 12) Route J - mains transformer secondary, earth wiring - green, blue (be 100% sure this is from the secondary winding), white & yellow leads - wire up to the star earth.
- 13) Route J - mains transformer primary, earth wiring - green/yellow lead - wire up to the star earth.

- 14) Route K - earth wiring - green/yellow loose wire - wire up the star earth to one end of R24 and connect the other end to the earth connection of the IEC socket. Also connect the earth of the IEC to the earth post. Taking care not to create any contact with the live & neutral points of the IEC socket - this would be very dangerous.
- 15) Route L - mains transformer secondary, ac supply to BR1 - 2 x yellow leads - twist together and wire one to Tag L44 and the other to Tag R44 of the tag boards.
- 16) Route M - signal input to V1 - single screened wire loose - connect up the signal portion (red) to the central spigot and the screened portion (braid) to the solder tag of the phono input. At the other end - connect up the signal to the join of R1 & R2 (when fitted) and the screen to the central spigot of V1. Take a length of PTFE wire and wire up V1, spigot to Tag L7.
- 17) Route M - feedback wire - single screened wire loose - connect up the signal to the Tag L9 and the screen to Tag L7 wire up the other end to the feedback switch. Using PTFE wire connect up the feedback switch to the red speaker post. see fig. 8 p. 8

FITTING THE TAG BOARDS & COMPONENTS

- 1) Fit the three tag boards in place using the circled cross-hairs guide holes, see diagram on p. 10. Once in place drop one M3 fibre washer over each stud and bolt firmly in place with the M3 nuts provided.
- 2) Paying close attention to p. 10 and the parts list / bag label for component identification and solder in all components.
- 3) Note well - Those components that are represented by broken lines lie underneath the tag board.
- 4) Note well - All bridge rectifiers see fig. 6 & 7 p. 8 and capacitors see fig. 3, 4 & 5 p. 8 need to be located the correct way round otherwise you will component destruction will result.
- 5) Solder in all inter tag board links, using the PTFE wire provided, following the shortest route. A tip for stripping the silver plated PTFE wire - using snipe nose pliers squeeze the end of the wire, the sheath will split, now peel it back like a banana and voila.
- 6) Solder all external links using PTFE wire. Where the occasion rises the use of 1/1.2 wire (thick single core wire) a note is made next to the link on the diagram.
- 7) Solder in all wires prepared from the wire routing section.
- 8) Note well - some of the neighbouring tag points are to be joined together this is represented by a line joining them together.
- 9) All arrows with a text location, signify a connection from that point to the text location, use PTFE unless stated otherwise.
- 10) Some connections shown in p. 10 are duplicated in fig. 13, p. 9
- 11) There is a lot of wiring to be done in this section, thus it is vital you cover every inch of the diagram on p. 10

TIME TO CHECK

- 1) You may feel that the amplifier is ready for switch on, but you are at least an hour from this.
- 2) The 300B PSE is more complicated to build than our PCB based products in that it is up to you to do all inter-component connections there are no copper PCB tracks to rely on. So with the circuit diagram in front of you start at R1 and trace every single component, where does it come from? Where is it going? Is it correctly orientated? Is it going to the correct valve pin? Check everything.
- 3) There are over 100 solder points in this amplifier and nobody is perfect, I failed on 5% of the joins, but I caught them second time round, thus the amp. worked on first switch on. It saves a lot of messing around later, so check and check again.

FIRE UP TIME

- 1) Insert all valves. Now you are ready to fire her up. A useful piece of equipment to use at this stage is a Variac (rated at 2 Amps or over), to limit the initial voltage input. If you cannot get one do not worry most budding kit builders are armed with only a multimeter, this is sufficient. You must have a dummy load, a 8 ohm high wattage resistor, or an old pair of speakers connected up to the speaker binding posts.
- 2) The next step is to **PUT ON THE SAFETY GLOVES PROVIDED TO PREVENT ANY RISK OF RECEIVING ANY ELECTRIC SHOCKS.**
- 3) Switch her on and step back, do not be put off by a slight tinkering sounds this is the noise of the valves warming up. You should see one/two small red points of light in each valve, these are the valve heaters. The 300B heaters show themselves are dull red glowing diagonal lines running down the centre of the valve.
- 4) When the amplifier is working, measure all voltages to ensure they are correct, measure with 0 volts signal input, bearing in mind that a degree of variation (around 15%) is to be expected due to dependence upon the mains voltage. **KEEP YOUR GLOVES ON.**
- 5) Once fully tested fix the chassis base plate, using the screws provided, then fit the self adhesive feet in place.
- 6) Now you can enjoy the wonders of the 300B PSE. Remember, you will need a preamp.

FAULTS AND HOW TO CLEAR THEM

- 1) Any serious faults will blow the mains fuse immediately. That is your guarantee. Do not squander it by fitting a larger fuse in frustration, because the situation will get worse not better.
- 2) The most common mistake will be one of the following:
 - a) a wrongly placed component
 - b) a solder link forgotten
 - c) a component not soldered in place
 - d) an external to tag board connection wrongly placed
- 3) To start with turn the power switch off and pull the mains plug out. A way to remedy these possible faults is to go through the instructions and visually check everything again. Always wear your gloves even though the power is off as some residual charge may be held within the power supply capacitors.
- 4) If you are still having problems then call the helpline.

PARTS LIST(for 2 monoblocs)

component description	X	quantity	bag No.	location in amp
R1/7/22 - 100K, 0.5W(small)		6	1	V1 valve base
R2 - 10K, 0.5W(small)		2	2	V1 valve base
R3 - 100K, 1W(medium)		2	1	tag board
R4 - 33R, 0.5W(small)		2	3	tag board
R5 - 680R, 0.5W(small)		2	4	tag board
R6 - 150K, 0.5W(small)		2	5	tag board
R8 - 1M, 0.5W(small)		2	6	tag board
R9/10 - 33K, 3W(large)		4	2	tag board
R11/14 - 470R, 7W(large)		4	1	tag board
R12/13 - 15R, 3W(large)		4	3	tag board
R15/16 - 4.7R, 2W(large)		4	4	tag board
VR1 - 20R potentiometer		2	3	back panel
R17/18 - 220K, 2W(large)		4	5	tag board
R19 - 15K, 1W(medium)		2	4	between C9 & C10 (positives)
R20/R21 - 1K, 1W(medium)		4	5	tag board
R23 - 330K, 0.5W(small)		2	7	tag board
R24 - 10R, 2W(large)		2	6	between IEC socket & earth post
C1 - 470uF, 6.3V(small, black)		2	1	tag board
C2 - 0.22uF, 400V(orange)		2	2	tag board
C3 - 2.2nF(grey)		2	3	tag board
C4 - 0.47uF, 400V(orange)		2	4	tag board
C5/6 - 100uF, 100V		4	5	tag board
C7/8 - 47uF, 350V		4	6	tag board
C9/C10 - 100uF, 500V		4	7	tag board
C11/12/13/14 - 100uF, 250V		8	8	tag board
C15 - 10uF, 250V(black)		2	2	tag board
C16 - 4700uF, 16V(black)		2	4	tag board
BR1 - WO4(round)		2	1	tag board
BR2 - 2KBP02(rectangular)		2	2	tag board
mains rotary switch		2	9	front panel
IEC mains input socket & tray		2	9	back panel
1.6A fuse (slow blow)		2	9	IEC socket
hum-bucker knob		2	9	back panel
4mm speaker fittings		2	9	back panel
feedback switch		2	9	back panel
red & black phono socket		1	9	back panel
M4 x 12 hex bolt		8	9	fitting of front panel

PARTS LIST(for 2 monoblocs)

component description	X	quantity	bag No.	location in amp
M4 nut		16	9	fitting of front plate & choke, L1
grub screw & earth post		2	9	fitting power switch shaft to knob
M3 x 25 stand off		12	9	fitting of tag boards
M3 nut		40	9	fitting of bases,tag boards & clips
M3 fibre washers		12	9	fitting of tag boards
M3 black screws		40	9	fitting of bases, tag boards & clips
M4 black screws		2	9	fitting of choke, L1
self adhesive feet		8	10	base plate
M4 long screw		2	10	fitting of choke, L1
tie wraps & clips		10	10	cleanup wiring
M3 metal washers		16	10	fitting of UX4s & cap. clips
B7G & B9A valve base		2	11	chassis
octal valve base		2	11	chassis
UX4 valve base		4	11	chassis
yellow/green wire		1m	12	earth wiring
single screened wire		1.5m	12	input & feedback wiring
PTFE wire		6m	12	all other wiring
1/1.2 black wire		1m	12	see fig. 13, p. 8
brown & blue wire		2m	12	mains & humbucker wiring
chrome knobs			2	Front panel
chrome caps			4	Fit onto mains & output trans.
valve kit only				
ECC82, 6AU6, 5U4		2		
300B		4		
output & mains transformer		2		plus fittings
tag board		6		
safety gloves		1 pair		
IEC mains lead		2		
chassis (3 parts)		6		
instruction manual		1		