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## **ax-Amplifier BOM and Supplementary Data Cover Sheet**

Release	Remarks
2/okt/23	Initial release for publication



## ax-Amplifier Power Amplifier Top Level BOM

Items required for a full ax-Amplifier Build (Not exhaustive)

Item	Count	DESCRIPTION	Remarks
1	1	DiyAudio Delux 5U Chassis	Chassis comes with pre-drilled heatsinks that accept the amplifier modules directly; European builders can order this directly from Modushop.com in Italy, specifying 'standard DiyAudio chassis heatsink drilling'; 450mm wide, 400mm deep, 210mm high
2	1	800VA low noise toroid transformer. Tiger Toroids Pt# TT2641	1T flux density, stabilized core, GOSS Band, interwinding screen, cloth bound, double vacuum impregnated, potted transformer; split 2 x 120VA primary, 2 x 31.8VAC @4.5A load secondary. Order from Stephen Foster at tigertoroids(at)btinternet.com phone (44) 01379608868
3	2	Set of 2 off ax-Amplifier amp module PCB's	Order from www.hifisonix.com; 2oz copper, gold flashed THP, silk screened PCB
4	1	Hifisonix Speaker Protection PCB	Order from www.hifisonix.com. BOM, assembly and test details can be found on the hifisonix website
5	2	Neutrik XLR Female panel mount receptacles and associated mounting screws No. 2 x 1/3" self tappers pan head (order separately)	Neutrik Pt #NC3FAH1-D; Mouser 568-NC3FAH-L-1 or similar. Note, this is a PCB mount receptacle;
6	1	ax-Amplifier PSU board PCB	Order from www.hifisonix.com; 2oz copper, gold flashed THP, silk screened PCB
7	1	Soft Start + DCB PCB	Order from www.hifisonix.com
8	1	Loadspeaker Protection PCB	Order from www.hifisonix.com
9	1	Anti-Vandal Switch	50mA DC rating, 220VAC safety rated
10	4	2.54mm Shorting link	RS 251-8575 or equivalent; used for compensation selection and for class A test

11	8	M3 x 20mm Hex Brass Standoffs	To mount PSU Board to chassis base plate
	8	M3 x 12mm Hex Brass Standoffs	To mount iSSDCB and Spkr Prot Board to Rear Panel
		5mm long plastic spacer to accept M3/M4 screw	Used to mount the amplifier PCB to the heatsink. Suitable RS part 136-4226
			See assembly details for how the PSU board must be mounted; Use serrated washers on all PCB mounting.
12	50	M3 Serrated lock washers	
13	4	T1 fuses 5 x 20mm 8A	
14	2	T1 fuses 5 x 20mm 3.15A	for 120 VAC operation, use 5A T1 fuse
		IEC Switched, fused entry receptacle Bulgin	
15	1	part BVA01/Z0000/02;	MSR 161-BVA01/Z0000/02 or RS 352-1803
			On my build I used CMC 878-M-G 100A gold plated terminals available in the UK from HiFi Collective <a href="https://www.hificollective.co.uk/binding_posts/cmc-878-gold-plated-medium-speaker-posts.html">https://www.hificollective.co.uk/binding_posts/cmc-878-gold-plated-medium-speaker-posts.html</a> . US builders can find suitable connectors at <a href="https://partsconnexion.com/">https://partsconnexion.com/</a>
16	2	Sets Speaker Terminals	
			The feet must be at least 30mm high to raise the chassis up off the surface it is standing on for good airflow; the standard Modushop feet are not high enough
17	4	Amplifier feet plus mounting screws	RS 448-0775 or equivalent. Mount the switch centrally on the amplifier base 10mm
18	1	ON-OFF-ON toggle switch or bias selection	back from the front plate.
			RS 228-5770 or equivalent; Kingbright Pt# L-59EGW-CA. NOTE on my build I only brought one of the bias indicator LED's out to the front panel,so only used one bi-colour LED
19	2	Bi-colour LED COMMON ANODE	
20		2.5mm^2 insulated wire	Assorted colours for PSU wiring
21		5mm speaker cale	From Amplifier output to speaker protection board and to output terminals
			For wiring from Neutrik XLR to amplifier input; From bias selection switch to amp modules; from bias indicator LED to amp module
22		2 core 3mm screened cable	
		Insulated 6.3mm push on connectors	<b>DO NOT USE UNINSULATED PUSH ON CONNECTORS;</b> Associated crimp tools for these
23		2.5mm^2	connectors are avaiable on Amazon for c. \$25 and in the UK for about £20
24		Assorted heat-shrink sleeving	5mm, 10mm 20mm
25		Gorilla tape	Cover the tops of the iSSDCB capacitors as these are at mains potential

26	32	M3 x 12mm Machine screws	To mount PSU board to 20mm hex brass standoffs; mount amplifier PCB's to heatsinks
	16	M3 x 6mm Machine screws	To mount iSSDCB and Spkr Prot Bd to chassis rear plate
	12	M3 x 8mm machine screws BLACK	Mount 20mm hex brass standoffs to base plate. These screw in from the bottom;
27	8	TO3P heatsink insulators	mount TO220 and TO126 devices to PCB mount heatsink
28		1mm diamter solid core insulated wire	Thermally conductive heatsink insulation pad - various suppliers Used to make connections under the amplifier module PCB's

## ax-Amplifier Power Amplifier Circuit Sheet 1 BOM

Quantities are shown for 1 channel only. Double quantities shown in the 'Count' column for a stereo amplifier

Item	Count	Label-Value	PACKAGE	DESCRIPTION	Designation	Alternatives	Remarks
1	1	22uF BP	22BP	MSR 647-UES1V220MPM1TA	C1		35V BIP Electrolytic
2	2	4.7uF FLM	RAD.2WIMABOX	MSR 505-MKS2C044701M00KS	C3,C27	also MSR 505-MKS24.7/63/5, MSR 505-MKS2C044701M00JO also MSR 603-AC805JRNPOYBN101, 81- GCM21A5C2E101JX1D	
3	2	100pF COG	805	MSR 80-C0805C101JAGAUTO	C4,C24		250 VDC
4	1	270pF COG	0805B	MSR 603-CC805JRNPO9BN271	C5		
5	4	1uF 50V	1206B	MSR 187-CL31B105KBHNFNE	C6,C8,C10,C11		
6	1	10uF 25V	1206B	MSR 187-CL31B106KAHZW6E	C9		
7	2	47pF COG	805	MSR 80-C0805C470JAGAUTO	C22,C23		250 VDC
8	2	1000uF 16V	RB.2/.4	MSR 80-ESK108M016AH2AA	C25,C26	also MSR 647-UVK1C102MPD, MSR 710-860020375017	
9	6	DIODE	0805D	MSR 771-BAS21J115	D1,D4,D5,D6,D7,D8	also MSR 771-BAS516135	High speed low capacitance diode
10	2	15V	DIODE0.4	MSR 78-BZX85B15	D2,D3		2% or better only
11	3	BC546B	BC5XX	MSR 512-BC546BTA	Q4,Q5,Q9		
12	3	BC556B	BC5XX	MSR 512-BC556BTA	Q7,Q8,Q10		
13	3	2.2k	AXIAL0.7	MSR 273-2.2K-RC	R1,R43,R44	also MSR 303-MF0W2FF2201B00	
14	1	1k var	VR8	MSR 81-PV36W102C01B00	R4		
15	1	10k var	VR8	MSR 81-PV36W103C01B00	R5		
16	1	220k	1206	MSR 603-RT1206FRE07220KL	R8		
17	4	270	1206	MSR 603-RT1206FRE07270RL	R10,R14,R15,R83		
18	1	10k	1206B	MSR 603-RT1206FRD0710KL	R11		
19	1	330	1206B	MSR 603-RT1206FRE07330RL	R12		
20	1	220k	1206B	MSR 603-RT1206FRE07220KL	R13		
21	2	1.8k	1206	MSR 603-RT1206FRE071K8L	R16,R17		
22	2	15k	1206	MSR MSR 603-RT1206FRE0715KL	R18,R19		
23	2	10k	1206	MSR 603-RT1206FRD0710KL	R20,R21		
24	1	100k	AXIAL0.5	MSR 273-100K-RC	R27	also 303-MF0W2FF1003B00	
25	1	270	AXIAL0.5	MSR 273-270-RC	R30	also 303-MF0W2FF2700B00	
26	4	1k	AXIAL0.5	MSR 273-1K-RC	R31,R32,R69,R70	also 303-MF0W2FF1001B00	
27	3	1.8K	AXIAL0.5	MSR 273-1.8K-RC	R36,R47,R48	also 303-MF0W2FF1801B00	
28	1	33	AXIAL0.5	MSR 273-33-RC	R37	also 303-MF0W2FF330JB00	
29	1	1k 5W NI	AXIAL1.1	MSR 71-NS5-1K	R38		5W 1K non-inductive wire wound
30	4	150	AXIAL0.5	MSR 273-150-RC	R39,R40,R49,R50	also 303-MF0W2FF1500B0	
31	1	4.7 1W	2512	MSR 603-RC2512JK-074R7L	R41		
32	3	15k	AXIAL0.5	MSR 273-15K-RC	R42,R45,R46	also 303-MF0W2FF1502B00	
33	1	OPA1642	SMD8A	MSR 595-OPA1642AIDR	U1	SOIC Package	

## ax-Amplifier Power Amplifier Circuit Sheet 2 BOM

Quantities are shown for 1 channel only. Double quantities shown in the 'Count' column for a stereo amplifier

Item	Count	Label-Value	PACKAGE	DESCRIPTION	Designation	Alternatives	Remarks
1	2	220uF 6.3V	RB.2/.1	MSR 80-ESK227M6R3AC3AA or MSR 80-ESE227M6R3AC3AA	C2,C7		
2	6	1uF 50V	1206B	MSR 187-CL31B105KBHNFNE	C12,C13,C14,C15,C16,C28		
3	4	1000uF 50V	RB.55/.2	MSR 80-ESH108M050AL4AA or MSR 667-ECA-1HM102B	C17,C18,C19,C20		
4	1	0.1uF 250V	RAD0.2/3/4	MSR 505-MKS2F031001E00JA	C21		
5	1	4.7uF FLM	RAD.2WIMABOX	MSR 505-MKS2C044701M00KS	C29		
6	1	2.2uF 100V	RAD0.2BOX2	MSR 80-RSBCC4220Z310K or MSR 80-R82CC4220DQ70K	C30		
7	2	BAS21J	BAS21H	MSR 771-BAS21J115	D4,D5		
8	2	1N5407	DO27	863-1N5407RLG	D6,D7		
9	1	15V	DIODE0.4	MSR 78-BZX85B15	D8		
10	1	1N4148	DIODE0.4	MSR 512-1N4148	D9		
11	2	8A	5x20 F/Holder V2	MSR 576-5200001009	F1,F2		
12	1	0.8uH	INDUCTOR2		L1		
13	2	BC847C	BC8XX	MSR 771-BC847C235	Q1,Q2		
14	1	BC546B	BC5XX	MSR 512-BC546BTA	Q3		
15	2	BC556B	BC5XX	MSR 512-BC556BTA	Q6,Q24		
16	1	KSA1381	TO220HSINK	MSR KSA1381ESTU	Q11		
17	1	KSC3503	TO220HSINK	MSR KSC3503DS	Q12		
18	1	MJE15033	TO220BV	MSR 863-MJE15033G	Q13		
19	1	MJE15032	TO220BV	MSR 863-MJE15033G	Q14		
20	4	NJW3281	TO3PFLAT	MSR 863-NJW3281G	Q15,Q20,Q21,Q22		
21	4	NJW1302	TO3PFLAT	MSR 863-NJW1302G	Q16,Q17,Q18,Q19		
22	2	2N7002	2N7002	MSR 757-T2N7002AKLM	Q23,Q25		
23	1	10k var	VR8	MSR 81-PV36W103C01B00	R2		
24	1	1k	AXIAL0.5	MSR 273-1K-RC	R3	also 303-MFOW2FF1001B00	
25	2	33	AXIAL0.5	MSR 273-33-RC	R6,R7	also 303-MFOW2FF330JB00	
26	1	22k	AXIAL0.5	MSR 273-22K-RC	R22	also 303-MFOW2FF2202B00	
27	1	47k	AXIAL0.5	MSR 273-47K-RC	R23	also 303-MFOW2FF4702B00	
28	2	220k	AXIAL0.5	MSR 303-MFOW2FF2203B00	R24, R82		
29	2	4.7k	AXIAL0.5	MSR 273-4.7K-RC	R25,R76	also 303-MFOW2FF4701B00	
30	2	3.9K	AXIAL0.5	MSR 273-3.9K-RC	R26,R81	also 303-MFOW2FF3901B00	
31	1	10 5W	AXIAL1.1	MSR 588-55J10RE or MSR 603-KHS500KBAX10RAA	R28		
32	1	2.2 3W	AXIAL1.1	MSR 660-MOSX3CT631R2R2J	R29		
33	4	1k	AXIAL0.5	MSR 273-1K-RC	R33,R34,R35,R51	also 303-MFOW2FF1001B00	
34	1	68	AXIAL0.5	MSR 273-68-RC	R52	also 303-MFOW2FF680JB00	
35	8	4.7 1W	2512	MSR 603-RC2512JK-074R7L	R53,R55,R58,R59,R65,R66,R67,R68		
36	8	.33 5W	RES7WUP	MSR 588-TWW5JR33E	R54,R56,R57,R60,R61,R62,R63,R64		
37	1	150	AXIAL0.5	MSR 273-150-RC	R71	also 303-MFOW2FF1500B00	Do NOT fit R72 at this stage. See ax-Amp Build and Supplementary Data Presentation
38	3	15k	AXIAL0.5	MSR 273-15K-RC	R73,R79, R80	also 303-MFOW2FF1502B00	
39	2	2.2k	AXIAL0.5	MSR 273-2.2K-RC	R74,R78	also MSR 303-MFOW2FF2201B00	
40	1	100k	AXIAL0.5	MSR 273-100K-RC	R75	also 303-MFOW2FF1003B0	
41	1	4.7M	AXIAL0.5	MSR 594-VR37000004704JA1	R77		
43	2	Spkr ret	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U2,U3		6.3MM Male spade receptacle
44	1	Vpos	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U4		6.3MM Male spade receptacle
45	1	Vneg	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U7		6.3MM Male spade receptacle
46	1	Spkr Out	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U8		6.3MM Male spade receptacle
47	1	OV	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U9		6.3MM Male spade receptacle
48	1	VO617A-2X017T	DIP2WAYSMD	MSR 78-VO617A-2X017T	U10		
49	1	Ilim	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U11		
50	1	VOM1271	TLP191	MSR 78-VOM1271T	U12	Opto photo coupler	
51	2	Heatsink		MSR 532-513102B25		11 C/W verticle Heatsink	

## ax-Amplifier Power Amplifier PSU Circuit BOM

Quantities are shown for a stereo amplifier. Only order the quantity shown in the 'Count' column

Item	Count	Label-Value	PACKAGE	DESCRIPTION	Designation	Remarks
1	4	0.1uF 250VAC	RAD0.2/3/4	MSR 80-PHE426HA6100JR05 or MSR 871-B32621A3104K	C1,C2,C3,C4	I used 4 off 27MFD 80V in my amp. These 30 MFD 63V devices will work
2	4	30MFD 63V	RB1.6 5PIN	MSR 80-ALF80C303EL063	C5,C6,C7,C8	
3	2	PB5010	30ABR	MSR 625-PB5010-E3/45	D1,D2	
4	2	33	AXIAL0.5	MSR 303-MFOW2FF330JB00	R1,R2	
5	1	1k	AXIAL0.5	MSR 303-MFOW2FF1001B00	R3	
6	1	IND V+	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U1	
7	1	PWR IND GND	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U2	
8	1	AC DET	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U3	
9	2		Heatsink5	RS 234-2485	U5,U21	3.3 C/W Heatsink. See drilling in construction details. In class A the
10	2	SPKR Ret	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U6,U9	
11	3	OV	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U7,U8,U10	
12	1	AC3	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U11	
13	1	AC4	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U12	
14	3	V-	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U13,U14,U15	
15	3	V+	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U16,U17,U20	
16	1	AC1	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U18	
17	1	AC2	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U19	
18	1	SPKR PROT OV	SPADE	RS 788-2815 or MSR 571-1217861-1-CT	U22	



ax-Amplifier Power Amplifier Soft Start + DC Blocker BOM

Quantities are shown for a stereo amplifier. Only order the quantity shown in the 'Count' column

Item	Count	Label-Value	PACKAGE	DESCRIPTION	Designation	Alternatives	Remarks
1	4	330nF 250VAC	RAD0.6XYCAP	MSR 710-890324024003CS	C1,C2,C8,C9	MSR 667-EEU-FC0J103S, MSR 647-UPW0J103MHD6, RS 449-0889	105C 3000 Hour full 120 Hz ripple current rating of at least 2.3A
2	4	10000uF 6.3V	RB.3/.75	RS 449-0889	C3,C4,C5,C6		
3	1	2200uF 35V	RB.2/.5	RS 711-1346 or MSR 667-EEU-FR1V222L	C7		
4	1	100uF 35V	RB.1/.3	MSR 80-ESH107M035AG3AA	C10		
5	1	PWR ON	LED15	MSR 859-LTL2R3KRX	D1		
6	2	3A Bridge 600V	3ABR	MSR 621-DBF310-13	D2,D5		
7	1	45A Bridge	DFB2060	MSR 625-GS1B2580-E3	D4		
8	1	10/20 Therm	PTC THERM	MSR 995-AS32-20010	R1		
9	2	10k	AXIAL0.5	MSR 303-MFOW2FF1002B00	R2,R3		
10	2	220k	AXIAL0.5	MSR 303-MFOW2FF2203B00	R4,R8		
11	3	220	AXIAL0.5	MSR 303-MFOW2FF2200B00	R5,R6,R7		
12	1	Power RLY	Tyco RTD3XXX	MSR 655-RT311024	U1	Alternative Relays RS 176-2955, RS 164-0178, RS 163-9659, RS 783-0801	
13	1	AC Neut IN	SPADE	RS 788-2815	U2		
14	1	AC Live_Hot OUT	SPADE	RS 788-2815	U3		
15	2	To PWR Switch	SPADE	RS 788-2815	U4,U5		
16	1	Soft Start RLY	Tyco RTD3XXX	MSR 655-RT311024	U6	Alternative Relays RS 176-2955, RS 164-0178, RS 163-9659, RS 783-0801	
17	1	AC Live_Hot IN	SPADE	RS 788-2815	U7		
18	1	AC Neut OUT	SPADE	RS 788-2815	U8		

Ametherm PTC in-rush current limiter:-

for  
220/240VAC  
use [AS3220010](#) MSR 995-AS32-20010  
for  
110/120VAC  
use [AS3210015](#) MSR 995-AS32-10015

Attention: If you use an alternative relay, make sure it conforms to the pin-out and dimensions shown below

