



AV220 DIGITAL SURROUND HOME THEATRE AMPLIFIER

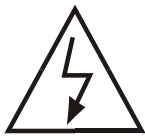
SERVICE MANUAL



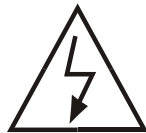
BBK ELECTRONICS CORP., LTD.

SM 001/03

SAFETY PRECAUTIONS & IMPORTANT NOTES!



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT
REMOVE COVER (OR BACK) NO USER - SERVICEABLE
PARTS INSIDE



The lightning flash with arrowhead symbol, with an equilateral triangle, is intended to alert you to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert you to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Voltages :220V AC,50/60Hz.

Av220 HOME THEATRE AMPLIFIER

SPECIFICATIONS

Output Power(RMS)	
Standard Stereo:(20-20KHz, 0.1%THD 6ohm)	130W+130W
All six channel state	110W×5
Distortion of Total Harmonic	
All channel	<0.1% 1kHz 10W 8ohm
Signal-to-Noise Ratio	
All channel	>85dB
Frequency Responce	
All channel	20Hz-20kHz +0.5,-0.5dB
Input Sensitivity/Impedance	
Microphone	0.5mv-100mv/2kohm
Line in	0.707v/51kohm
Input Sensitivity/Impedance	
Radio	0.707v/51kohm
Out impedance	
Recommended impedance	4-8ohm
The Separation Degree of All Channel	
	>45dB
Power	
	AC220V/50Hz
Max Power Consumption	
	1000W

Bill of Material AV220 DXSOALL.PCB

No.	description			quantity /unit	components position no.	additional explanation
	component name	specification	package			
1	1/4W resistor	10R	J10	4	JM4 JM5 JM12 JM14	length 10MM crooked
2	1/4W resistor	1.5K	R10A	5	R8 R9 R21 R23 R32	length 10MM crooked
3	1/4W resistor	10	R10A	2	R25 R26	length 10MM crooked
4	1/4W resistor	100R	R10A	9	RG1 RG2 RG3 RG4 R1 R2 R3 R2 R3	length 10MM crooked
5	1/4W resistor	10K	R10A	6	R9 R10 R11 R25 R34 R35	length 10MM crooked
6	1/4W resistor	150K	R10A	1	R10	length 10MM crooked
7	1/4W resistor	1K	R10A	10	R11 R12 R13 R14 R15 R16 R17 R24 R812 R912	length 10MM crooked
8	1/4W resistor	1R	R10A	1	R7	length 10MM crooked
9	1/4W resistor	20K	R10A	2	R30 R31	length 10MM crooked
10	1/4W resistor	220	R10A	1	R33	length 10MM crooked
11	1/4W resistor	22R	R10A	1	R6	length 10MM crooked
12	1/4W resistor	2K	R10A	2	R18 R19	length 10MM crooked
13	1/4W resistor	2K2	R10A	9	R19 R20 R21 R22 R23 R24 R6 R7 R1	length 10MM crooked
14	1/4W resistor	4.7K	R10A	1	R20	length 10MM crooked
15	1/4W resistor	470K	R10A	2	R2 R11	length 10MM crooked
16	1/4W resistor	470R	R10A	9	R1 R10	length 10MM crooked
17	1/4W resistor	47K	R10A	5	R8 R9 R10 R11 R12 R4 R5 R6 R4 R5 R6 R7	length 10MM crooked
18	1/4W resistor	4K7	R10A	2	R7 R26	length 10MM crooked
19	1/4W resistor	4K7	R10A	1	R8	length 10MM crooked
20	1/4W resistor	56	R10A	1	R29	length 10MM crooked
21	1/4W resistor	68	R10A	2	R22 R27	length 10MM crooked
22	1/4W resistor	68R	R10A	12	R3 R4 R5 R8 R9 R13 R14 R15 R16 R17 R811 R911	length 10MM crooked
23	1/4W resistor	910	R10A	1	R28	length 10MM crooked
24	ceramic cap.	22P	C3	1	C9	span 2.5MM
25	ceramic cap.	56P	C3	1	C22	span 2.5MM
26	ceramic cap.	75P	C3	1	C8	span 2.5MM
27	ceramic cap.	101	C3	1	C15	span 2.5MM
28	ceramic cap.	470p	C3	1	C16	span 2.5MM
29	ceramic cap.	103	C0.2	4	C18 C19 C20 C21	span 5MM
30	ceramic cap.	104	C0.2	5	C4 C5 C6 C7 C24	span 5MM
31	ceramic cap.	220p	C0.2	1	C9	span 5MM
32	ceramic cap.	104/50V/CP	C0.2	2	CG1 CG2	span 5MM
33	ceramic cap.	22p	C0.1	3	C3 C4 C5	span 2.5MM
34	ceramic cap.	104	C0.2	4	C1 C7 C8 C11	span 5MM
35	CBB cap.	224	C0.2	1	C13	span 5MM
36	elect. Cap.	10u/16V	C2.54	4	CE1 CE2 CE805 CE905	span 2.5MM,diameter 5MM
37	elect. Cap.	220u/16V	C2.54	2	CE807 CE907	span 2.5MM,diameter 8MM
38	elect. Cap.	22u/16V	C2.54	2	CE808 CE908	span 2.5MM,diameter 5MM
39	elect. Cap.	10u/16V	C2.54	1	C14	span 2.5MM,diameter 5MM
40	elect. Cap.	22u/16V	C2.54	2	C11 C12	span 2.5MM,diameter 5MM
41	elect. Cap.	47u/16V	C2.54	5	C1 C2 C3 C17 C25	span 2.5MM,diameter 5MM
42	elect. Cap.	100u/16V	C2.54	2	C10 C26	span 2.5MM,diameter 5MM
43	elect. Cap.	220u/16V	C2.54	1	C23	span 2.5MM,diameter 8MM
44	elect. Cap.	10u/16V	C2.54	1	C4	span 2.5MM,diameter 5MM
45	elect. Cap.	10u/50V	C2.54	2	C5 C6	span 2.5MM,diameter 5MM
46	elect. Cap.	47u/16V	C2.54	1	C8	span 2.5MM,diameter 5MM
47	elect. Cap.	47u/50V	C2.54	1	C7	span 2.5MM,diameter 5MM
48	elect. Cap.	100u/16V	C2.54	2	C9 C10	span 2.5MM,diameter 6MM
49	elect. Cap.	10u/16V	C2.54	1	C6	span 2.5MM,diameter 5MM
50	DIP transistor	A8550	TO-100	1	Q5	DIP package
51	diode	1N4004	D10A	1	D21	length 10MM crooked
52	diode	1N4148	D10A	8	D1 D13 D14 D15 D16 D17 D18 D19	length 10MM crooked
53	diode	1N4148	DIODE7.5	2	D1 D2	length 10MM crooked
54	LED	LED	LED	6	LED1 LED2 LED3 LED4 LED5 LED6	
55	zenzer diode	30C/1/2W	D10A	1	D22	length 10MM crooked
56	zenzer diode	7V5/1/2W	D10A	1	D23	length 10MM crooked
57	zenzer diode	5V6/1/2W	D10A	2	D1 D2	length 10MM crooked
58	optical receiver head	TX178	RX178	1	OP1	
59	IC	UPD16311	52P-QFP	1	IC1	SMT package
60	IC	74HCU04	DIP14	1	U3	DIP package14P

61	IC	HC4052	DIP16a	1	U1	DIP package16P
62	IC	CD4052	DIP16	1	2IC901	DIP package
63	IC	CD4052	SOP16	1	U1	chip package
64	IC	JP007-02	SSOP20A	1	U2	chip package
65	color code inductor	22uH	R10A	1	L1	length 10MM crooked
66	DIP transistor	C9014	XEBCA	2	Q803 Q903	DIP package
67	DIP transistor	CS9014	TO-99	4	Q6 Q7 Q8 Q9	DIP package
68	DIP transistor	CS9015	TO-99	2	Q1 Q2	DIP package
69	DIP transistor	CS9018	TO-99	3	Q3 Q4 Q5	DIP package
70	crystal	3.58MHZ	XTAL	1	XT1	DIP package
71	touch key-press	KEY	K	7	S1 S2 S3 S4 S5 S6 S7	
72	stand type S terminal	S-VID	S-W02	5	SVDOUT SVID1 SVID2 SVID3 SVID4	
73	AV3(black)	BNC3Z	AV3-8.4-14Z	1	B1	clubfoot,lie type
74	AV2(yellow)	BNC2Z	AV2-8.4-14Z	1	S2	clubfoot,lie type
75	AV3(yellow)	BNC3Z	AV3-8.4-14Z	1	S1	clubfoot,lie type
76	four holes connected pillar		JXZ4Z	3	S3 S4 S5	clubfoot,lie type
77	vacuum display screen	SVA11MM14	SVA-11MM14	1	VFD4	
79	remote controller receiver head	PHOTO NPN	REMOTLT	1	RMT2	HE83380L
80	terminal	5PIN	SIP5	1	JP903	stand type terminal 5P 2.54
81	terminal	2.5MMX5	ZZ5A	1	J2	stand type terminal 5P 2.54
82	terminal	2.5MMX12	ZZ12A	1	JP1	stand type terminal 12P 2.54
83	terminal	2.5MMX5	ZZ5A	1	JP2	stand type terminal 5P 2.54
84	terminal	3.96X6	ZZ6Z	2	JP3 JP4	stand type terminal 6P 3.96
85	terminal	CON12	SIP12	1	J2	stand type terminal 12P,2.54
86	terminal	CON3	SIP3	2	J3 J4	stand type lead wire 3P
87	terminal	5PIN	ZZ5.08-5	1	CB2	lie type terminal5P, 5.08
88	jumper line	5MM	5MM	1	JM13	length 5MM crooked
89	jumper line	10mm	J10A	10	4 5 6 12 15 16 17 GX9 R40 GX8	length 10MM crooked
90	jumper line	15mm	J15A	17	11 GX1 GX2 GX3 GX4 GX5 GX6 GX7 GX10 GX11 GX12 JAD1 JAD2 JAD3 JAD4 JAD5 JAD6	length 15MM crooked
91	jumper line	20mm	J20A	5	1 2 3 10 22	length 20MM crooked
92	jumper line	5mm	J5A	1	23	length 5MM crooked
93	jumper line	10mm	J10	1	J13	length 10MM crooked
94	jumper line	15mm	J15	6	J14 J15 J16 J16 J17 J7	length 10MM crooked
95	jumper line	5MM	J5	6	J4 J8 J10 J11 J12 J19	length 10MM crooked
96	jumper line	8MM	J8	6	J3 J5 J6 J9 J18 J20	length 10MM crooked
97	jumper line	10mm	J10A	5	3 5 6 7 9	length 10MM crooked
98	jumper line	5mm	J5B	1	8	length 5MM crooked

Bill of Material AV220 ACIN.PCB

No.	description			quantity /unit	components position no.	additional explanation
	component name	specification	package			
1	jumper line	10MM	J10	4	J2 J4 J6 J8	diameter0.6MM hard bare wire
2	jumper line	20MM	J20	2	J17 J20	diameter0.6MM hard bare wire
3	jumper line	8MM	J8	8	J1 J3 J5 J7 J9 J10 J18 J19	diameter0.6MM hard bare wire
4	common mode inductor (with magnetic loop, four lead leg)		L-DUBLE	1	L1	
5	lead wire		SIP2	1	JCD1	lead pin with wire
6	high voltage cap.	0.1UF/275V	POW-C	2	CK1 CK2	10MM
7	high voltage cap.	4700PF/!!!	FILTERC	2	C6 C10	span 10MM
8	high voltage cap.	4700PF/250V ~	FILTERC	2	C2 C11	span 10MM
9	fuse socket	FUSE	FUSE2	1	F801	
10	fuse (5A T)	FUSE				
11	power output jack	PEXT	PEXT	2	OUT1 OUT2	single hole power output jack
12	relay DC12V 1group	REDAY12V	JDQ-ZF1	1	K1	
13	power switch	SW	SW1	1	PSW1	general switch
14	power tag socket	ZZ3D	ZZ3D	3	JC1 JC2 JC3	span 10.16MM,2P

Bill of Material AV220 amplifier.PCB

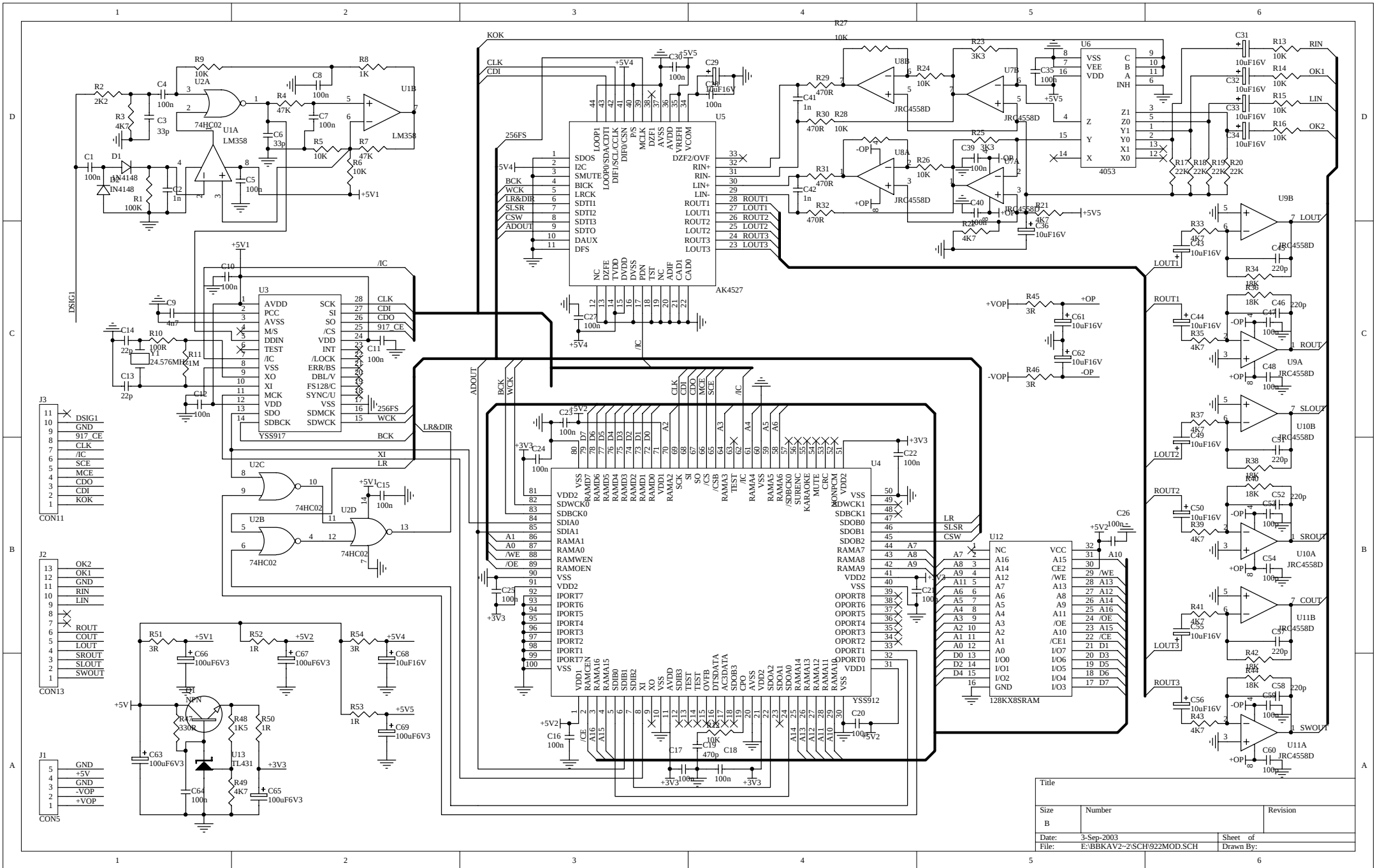
No.	description			quantity /unit	components position no.	additional explanation
	component name	specification	package			
1	1/6W resistor	100	R6.5MM	3	R1 R63 R64	length 6.5MM
2	1/6W resistor	470	R6.5MM	4	R900 R901 R986 R987	length 6.5MM
3	1/6W resistor	1K5	R6.5MM	2	R990 R991	length 6.5MM
4	1/6W resistor	4K7	R6.5MM	2	R964 R965	length 6.5MM
5	1/6W resistor	10K	R6.5MM	2	R944 R945	length 6.5MM
6	1/6W resistor	22K	R6.5MM	2	R992 R993	length 6.5MM
7	1/4W resistor	33	R0.4S	12	R110 R111 R210 R211 R310 R311 R410 R411 R510 R511 R610 R611	length 10MM
8	1/4W resistor	100	R0.4S	35	R104 R105 R117 R118 R204 R205 R217 R218 R304 R305 R317 R318 R404 R405 R417 R418 R504 R505 R517 R518 R604 R605 R617 R618 R128 R228 R328 R428 R528 R628 R2 RD12 RS3 RD3 RD4	length 10MM
9	1/4W resistor	150	R10A	2	R46 R47	length 10MM
10	1/4W resistor	220	R10A	4	R17 R18 R60 R61	length 10MM
11	1/4W resistor	270	R0.4S	12	R113 R116 R213 R216 R313 R316 R413 R416 R513 R516 R613 R616	length 10MM
12	1/4W resistor	390	R0.4S	6	R119 R219 R319 R419 R519 R619	length 10MM
13	1/4W resistor	470	R0.4S	12	R102 R120 R202 R220 R302 R320 R402 R420 R502 R520 R602 R620	length 10MM
14	1/4W resistor	680	R10A	1	R57	length 10MM
15	1/4W resistor	1K	R0.4S	19	R109 R112 R124 R209 R212 R224 R309 R312 R324 R409 R412 R424 R509 R512 R524 R609 R612 R624 R56	length 10MM
16	1/4W resistor	1K8	R10A	2	R59 R62	length 10MM
17	1/4W resistor	2K2	R10A	2	R49 R54	length 10MM
18	1/4W resistor	3K3	R10A	4	R45 R51 R55 R58	length 10MM
19	1/4W resistor	6K8	R0.4S	2	RD1 RS1	length 10MM
20	1/4W resistor	10K	R0.4S	15	R107 R108 R207 R208 R307 R308 R407 R408 R507 R508 R607 R608 R48 R50 R66	length 10MM
21	1/4W resistor	15K	R0.4S	7	R125 R225 R325 R425 R525 R625 RS5	length 10MM
22	1/4W resistor	18K	R0.4S	1	RS9	length 10MM
23	1/4W resistor	22K	R0.4S	6	R126 R226 R326 R426 R526 R626	length 10MM
24	1/4W resistor	39K	R0.4S	30	R101 R103 R106 R114 R115 R201 R203 R206 R214 R215 R301 R303 R306 R314 R315 R401 R403 R406 R414 R415 R501 R503 R506 R514 R515 R601 R603 R606 R614 R615	length 10MM
25	1/4W resistor	56K	R0.4S	11	R132 R232 R332 R432 R532 R632 RD2 RS2 RS6 RS7 RS8	length 10MM
26	1/2W resistor	330 1/2W	R0.6S	6	R121 R221 R321 R421 R521 R621	length 15MM amplifier board□ 1%
27	1W resistor	2K7/1W1%	R0.6S	6	R127 R227 R327 R427 R527 R627	metal film15MM , dimension 3.5X11mm
28	2W resistor	1K2/2W	R0.6S	6	R129 R229 R329 R429 R529 R629	metal 15MM , dimension 4.2X11mm
29	2W resistor	10/2W	R0.6S	6	R130 R230 R330 R430 R530 R630	metal 15MM , dimension 4.2X11mm
30	2W resistor	330R/2W	R0.6S	1	RS4	metal 15MM , dimension 4.2X11mm
31	5W resistor	0R22/5W	R0.4W	12	R122 R123 R222 R223 R322 R323 R422 R423 R522 R523 R622 R623	10MM
32	DIP transistor	9014	XEBC	6	Q101 Q201 Q301 Q401 Q501 Q601	
33	DIP transistor	9015	XEBC	6	Q102 Q202 Q302 Q402 Q502 Q602	
34	DIP transistor	C1815	ECBA	2	QS2 QS3	
35	DIP transistor	5401	XEBC	8	Q104 Q204 Q304 Q404 Q504 Q604 QD1 QS1	
36	DIP transistor	5551	XEBC	18	Q103 Q107 Q113 Q203 Q207 Q213 Q303 Q307 Q313 Q403 Q407 Q413 Q503 Q507 Q513 Q603 Q607 Q613	
37	DIP transistor	A1013	ECBY	6	Q106 Q206 Q306 Q406 Q506 Q606	
38	DIP transistor	C2383	ECBY	6	Q105 Q205 Q305 Q405 Q505 Q605	
39	DIP transistor	B649	ZECBA	6	Q108 Q208 Q308 Q408 Q508 Q608	
40	DIP transistor	D669	ZECBA	6	Q109 Q209 Q309 Q409 Q509 Q609	
41	ceramic cap.	15P	C0.2S	12	C107 C108 C207 C208 C307 C308 C407 C408 C507 C508 C607 C608	span 5MM

42	ceramic cap.	22P	C0.15A	2	C932 C933	span 5MM
43	ceramic cap.	100P	C0.15A	2	C920 C921	span 5MM
44	ceramic cap.	100P	C0.2S	12	C110 C111 C210 C211 C310 C311 C410 C411 C510 C511 C610 C611	span 5MM
45	ceramic cap.	470P	C0.2S	6	C102 C202 C302 C402 C502 C602	span 5MM
46	ceramic cap.	223	C0.2S	6	C114 C214 C314 C414 C514 C614	span 5MM
47	ceramic cap.	104	C0.2S	6	CD2 CD3 CD13 CS4 C1 C4	span 5MM
48	ceramic cap.	104/100V	C0.2S	12	C112 C113 C212 C213 C312 C313 C412 C413 C512 C513 C612 C613	span 5MM,
49	CBB cap.	15N	C0.2A	2	C17 C18	span 5MM
50	CBB cap.	47N	C0.2A	2	C21 C24	span 5MM
51	CBB cap.	68N	C0.2A	2	C22 C23	span 5MM
52	CBB cap.	100N/100V	C0.3	6	C117 C217 C317 C417 C517 C617	span7.5MM
53	CBB cap.	104CBB	C0.2S	6	C115 C215 C315 C415 C515 C615	span 5MM
54	CBB cap.	220n/50V/CB B	C0.2S	1	CS8	span 5MM
55	elect. Cap.	0.22u/16V	C2.54	2	C25 C26	span 2.5MM,diameter 5MM,height8MM
56	elect. Cap.	4u7/16V	C2.54	2	C934 C936	span 2.5MM,diameter 5MM
57	elect. Cap.	4u7/50V	E.1/.2S	1	CS10	span 2.5MM,diameter 5MM
58	elect. Cap.	10u/16V	C2.54	1	C3	span 2.5MM,diameter 5MM,height8MM
59	elect. Cap.	10u/16V	C2.54	2	C935 C937	span 2.5MM,diameter 5MM
60	elect. Cap.	10u/50V	E.1/.2S	20	C101 C103 C104 C201 C203 C204 C301 C303 C304 C401 C403 C404 C501 C503 C504 C601 C603 C604 CD6 CS6	span 2.5MM,diameter 5MM
61	elect. Cap.	33u/50V	E.1/.25S	1	CS7	span 2.5MM,diameter 5MM
62	elect. Cap.	47u/25V	E.1/.2S	6	C109 C209 C309 C409 C509 C609	span 2.5MM,diameter 5MM
63	elect. Cap.	100u/16V	C2.54	3	C5 C7 C13	span 2.5MM,diameter 5MM,height8MM
64	elect. Cap.	100u/16V	C2.54	2	C28 C29	span 2.5MM,diameter 5MM
65	elect. Cap.	100u/50V	E.2/.4S	12	C105 C106 C205 C206 C305 C306 C405 C406 C505 C506 C605 C606	span 5MM,diameter 10MM
66	elect. Cap.	330u/16V	E.15/.32S	1	CS9	span 4MM,diameter 8MM
67	elect. Cap.	2200u/6.3V	E.2/.5S	6	C116 C216 C316 C416 C516 C616	span5MM,diameter13MM
68	diode	1N4004	D0.4	1	DS1	length 10MM
69	diode	1N4148	D0.25DS	1	DS2	length 6.5MM
70	diode	1N4148	D10AAMP	6	D101 D201 D301 D401 D501 D601	length 7.5MM
71	zener diode	18V 0.5W	D10AAMP	12	WD101 WD102 WD201 WD202 WD301 WD302 WD401 WD402 WD501 WD502 WD601 WD602	length 7.5MM
72	power terminal	JZ3(5.08)	JZ3(5.08)	1	JZS1	span 5.08MM,3P
73	output terminal	insertion	JZ6V(3.96)	2	SPD SPS	span3.96MM,6P
74	terminal	CON3	SIP3	4	JP5 JP6 JP7 JP8	terminal crooked pin
75	terminal	CON3	SIP5	1	J5	lie type terminal5P
76	terminal	CON4	JZ4W	2	JPD1 JPS1	stand type terminal4P
77	terminal	CON5	SIP5	2	J1 J6	lie type terminal5P
78	terminal	CON6	ZZ6A	1	JP3	lie type terminal6P
79	clubfoot terminal		SIP3A	2	JP4 JP9	lie type terminal3P
80	IC	NJU4558D	DIP8	1	IC16	DIP package
81	IC	uPC1237	JT8	1	ICS1	DIP package
82	adjustable resistor	501R	VR	6	VR101 VR201 VR301 VR401 VR501 VR601	stand type adjustable
83	stand type loop inductor	1uH	L0.4	6	L101 L201 L301 L401 L501 L601	
84	bridge rectifier	8A	BRITP	1	BRIDGS1	flat,model(RS808)
85	rectifier bridge radiator					
86	jumper wire	20MM	J20W	33	GX4 GX11 GX16 GX20 GX21 GX22 GX25 GX26 GX27 GX41 GX52 GX53 GX54 GX55 GX66 GX67 GX68 GX75 GX86 GX93 GX96 GX97 GX103 GX104 GX105 GX106 GX118 GX124 GX126 GX127 GX128 GX129 GX139	length 20MM

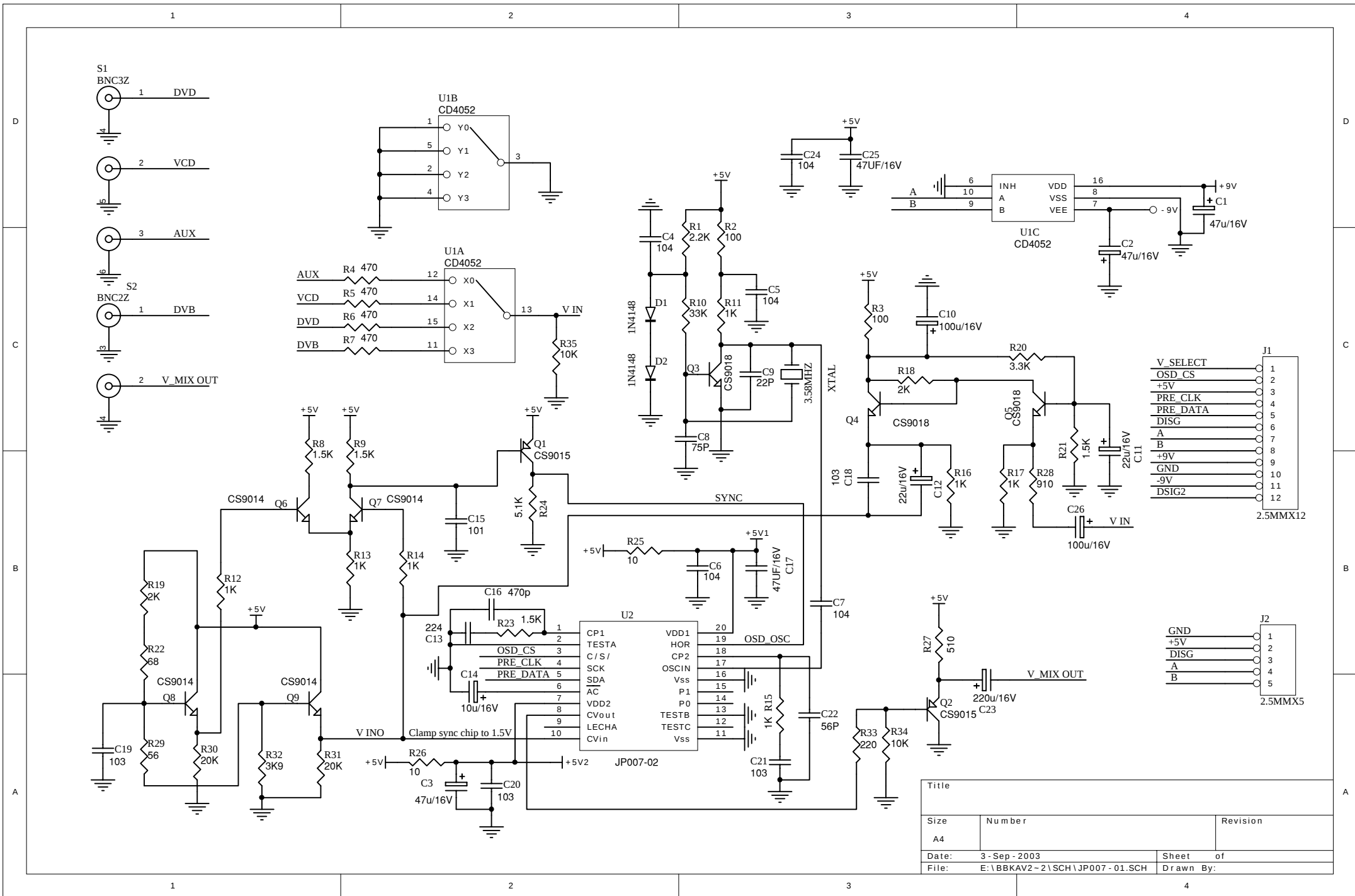
87	jumper wire	10MM	J10A	70	2 111 GX6 GX7 GX8 GX9 GX10 GX12 GX17 GX18 GX19 GX31 GX32 GX33 GX37 GX40 GX59 GX62 GX63 GX69 GX82 GX83 GX85 GX88 GX89 GX90 GX107 GX111 GX112 GX113 GX115 GX119 GX125 GX132 GX134 GX135 GX136 GX137 GX2 GX3 GX23 GX24 GX42 GX56 GX57 GX58 GX60 GX65 GX71 GX72 GX73 GX101 GX108 GX109 GX110 GX121 GX130 GX131 GX133 GX5 GX138 GX13 GX15 GX28 GX36 GX43 GX87 GX92 GX116 GX117	length 10MM
88	jumper wire	15MM	J15A	22	GX1 GX14 GX29 GX30 GX34 GX38 GX39 GX44 GX45 GX61 GX70 GX78 GX79 GX80 GX81 GX91 GX95 GX98 GX100 GX122 GX123 GX120	length 15MM
89	jumper wire		J5	8	GX94 1 211 112 212 GX76	length 5MM
90	elect. Cap.	10000u/50V	E.9/1.4	2	CS2 CS3	span 10MM,diameter 35MM
91	encoder	BMQ	BMQ	2	BMQ1 BMQ2	ALPS half axis length 20MM
92	big radiator					AV220
93	relay DC24V 3 group	RELAY 3PST	REL3	2	RELS1 RELS2	YL330
94	mic socket	MICJACK	JACK3	2	JACK2 JACK4	short9 feet long mouth mic socket
95	lie type potentiometer	VRDB	DWQLS	2	VR3 VR4	lie type
96	DIP transistor	A1943	DBCE	6	Q110 Q210 Q310 Q410 Q510 Q610	
97	DIP transistor	C5200	DBCE	6	Q111 Q211 Q311 Q411 Q511 Q611	

Bill of Material for AV220 main board						
No.	description			quantity /unit	components position no.	additional explanation
	component name	specification	package			
1	1/4W carbon film resistor	0R5	R0.4	3	R144 R145 R146	length 10 MM crooked
2	1/5W carbon film resistor	680	R0.4	2	R138 R141	length 10 MM crooked
3	1/4W carbon film resistor	100R	R0.3	3	R132 R133 R115	length 7.5 MM crooked
4	1/6W carbon film resistor	150R	R0.3	1	R51	length 7.5 MM crooked
5	1/6W carbon film resistor	1K	R0.3	36	R3 R4 R7 R8 R11 R12 R15 R16 R17 R18 R20 R21 R23 R24 R26 R27 R29 R30 R32 R33 R35 R36 R47 R48 R64 R65 R80 R82 R85 R88 R91 R94 R97 R102 R105 R117	length 7.5 MM crooked
6	1/6W carbon film resistor	1K5	R0.3	1	R124	length 7.5 MM crooked
7	1/6W carbon film resistor	2K	R0.3	1	R140	length 7.5 MM crooked
8	1/6W carbon film resistor	3K	R0.3	2	R120 R121	length 7.5 MM crooked
9	1/6W carbon film resistor	3K9	R0.3	2	R139 R143	length 7.5 MM crooked
10	1/6W carbon film resistor	4K7	R0.3	16	R43 R44 R49 R50 R79 R122 R137 R142 R155 R156 R157 R158 R160 R161 R162	length 7.5 MM crooked
11	1/6W carbon film resistor	10K	R0.3	30	R54 R55 R56 R57 R58 R59 R60 R61 R71 R72 R78 R83 R89 R95 R103 R114 R116 R123 R125 R126 R127 R128 R129 R130 R131 R74 R75 R76 R134 R135	length 7.5 MM crooked
12	1/6W carbon film resistor	22K	R0.3	24	R41 R42 R62 R63 R66 R67 R68 R69 R70 R77 R81 R84 R86 R87 R90 R92 R93 R96 R98 R101 R104 R106 R73 R118	length 7.5 MM crooked
13	1/6W carbon film resistor	33K	R0.3	6	R107 R108 R109 R110 R111 R112	length 7.5 MM crooked
14	1/6W carbon film resistor	47K	R0.3	19	R1 R2 R5 R6 R9 R10 R13 R14 R19 R22 R25 R28 R31 R34 R45 R46 R99 R147 R148	length 7.5 MM crooked
15	1/6W carbon film resistor	100K	R0.3	4	R37 R38 R39 R40	length 7.5 MM crooked
16	1/6W carbon film resistor	470K	R0.3	1	R113	length 7.5 MM crooked
17	1/6W carbon film resistor	1M	R0.3	3	R52 R53 R119	length 7.5 MM crooked
18	ceramic cap.	22P	C0.2	4	C14 C15 C66 C67	span 5 MM
19	ceramic cap.	100p	C0.2	4	C12 C13 C55 C82	span 5 MM
20	ceramic cap.	220P	C0.2	5	C43 C44 C45 C46 C53	span 5 MM
21	ceramic cap.	103	C0.2	2	C72 C73	span 5 MM
22	ceramic cap.	104	C0.2	18	C2 C3 C5 C6 C16 C17 C29 C30 C31 C39 C40 C51 C52 C64 C65 C68 C70 C83	span 5 MM
23	CBB cap.	6n8	C0.2	1	C56	span 5 MM
24	CBB cap.	10n	C0.2	1	C32	span 5 MM
25	CBB cap.	15n	C0.2	1	C34	span 5 MM
26	CBB cap.	224n	C0.2	1	C33	span 5 MM
27	elect. Cap.	10uF16V	E.1/2	12	C18 C19 C20 C21 C22 C23 C47 C48 C49 C50 C63 C69	span 2.5mm,diameter 5mm
28	elect. Cap.	2.2uF16V	E.1/2	18	C1 C4 C7 C8 C9 C10 C24 C25 C26 C27 C28 C35 C36 C37 C38 C54 C61 C62	span 2.5 MM ,diameter 5 MM
29	elect. Cap.	100uF16V	E.1/25	2	C81 C84	span 2.5 MM ,diameter 5 MM
30	elect. Cap.	100uF16V	e.1/25	1	C76	span 2.5 MM ,diameter 5 MM
31	elect. Cap.	100uF6V3	E.1/25	1	C11	span 2.5 MM ,diameter 5 MM
32	elect. Cap.	1000uF16V	E.2/3	2	C77 C78	span 4.5 MM ,diameter 8 MM
33	elect. Cap.	2200uF25V	E.2/5	2	C74 C75	span 5 MM ,diameter 13 MM
34	elect. Cap.	3300uF16V	E.2/5	1	C80	span 5 MM ,diameter 13 MM
35	DIP IC	CD4094	DIP16C	1	U13	DIP package 16P
36	DIP IC	MC4052	DIP16C	2	U1 U2	DIP package 16P
37	DIP IC	MC4053	DIP16C	1	U6	DIP package 16P
38	DIP IC	ATMEL89C58	DIP40C	1	U12	DIP package 40P
39	DIP IC plug		DIP40C			DIP package 40P

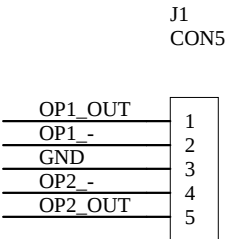
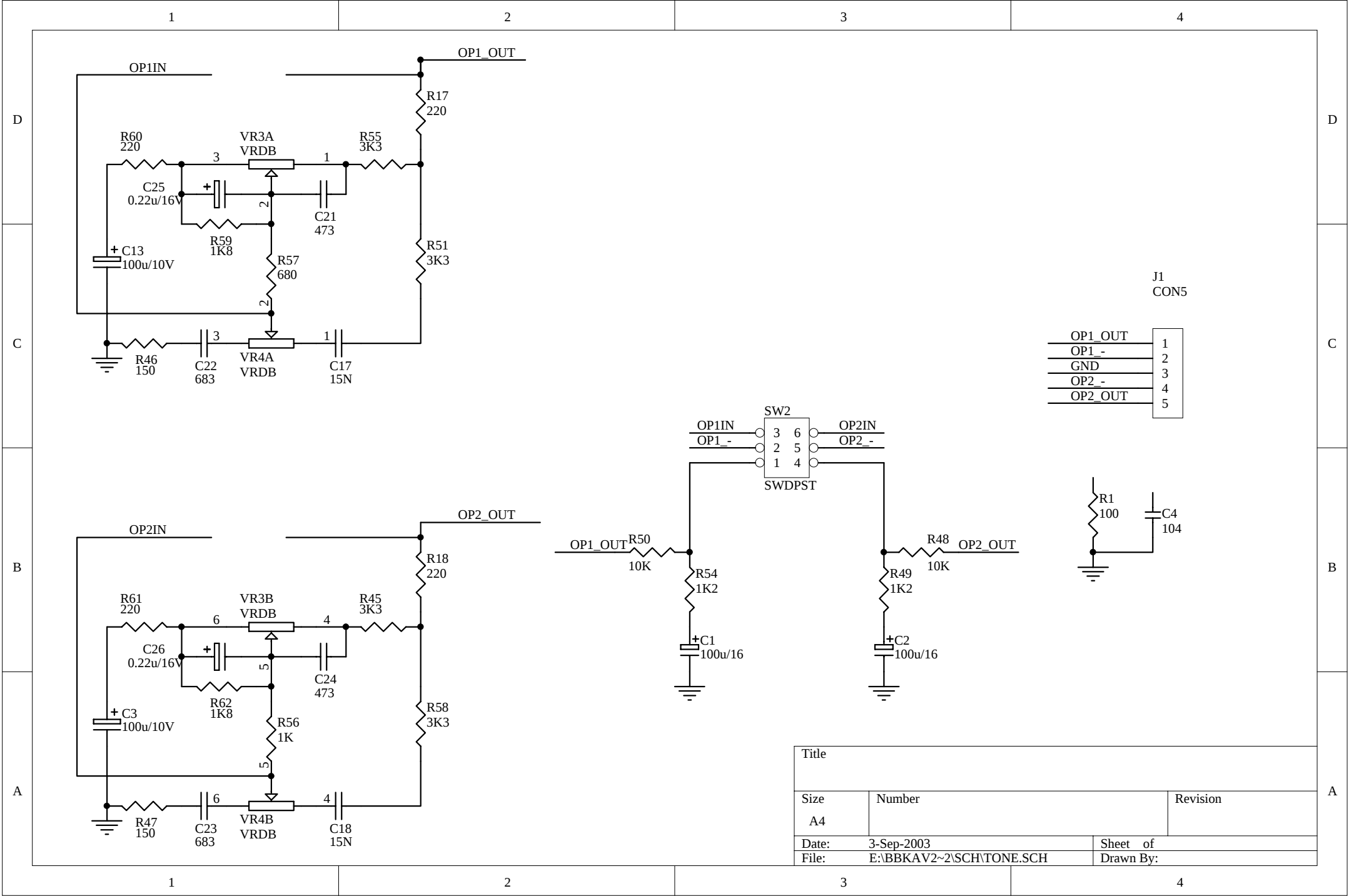
40	DIP IC	ATMEL24C02	DIP8C	1	U14	DIP package 8P
41	DIP IC	JRC072D	DIP8C	2	U4 U5	DIP package 8P
42	DIP IC	JRC4558D	DIP8C	4	U8 U9 U10 U11	DIP package 8P
43	DIP IC	M62429	DIP8C	1	U3	DIP package 8P
44	smt IC	M62446FP	SSOP42	1	U7	chip package 42P
45	DIP transistor	8050	EBC	1	Q19	DIP package 3P
46	DIP transistor	9014	EBC	11	Q1 Q3 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14	DIP package 3P
47	DIP transistor	9015	EBC	5	Q2 Q4 Q5 Q15 Q16	DIP package 3P
48	DIP transistor	B649(PNP)	Q220	1	Q18	DIP package 3P
49	DIP transistor	D669(NPN)	Q220	1	Q17	DIP package 3P
50	small radiator	use forB649				see the sample
51	small radiator	use forD669				see the sample
52	medium radiator	use for7805				see the sample
53	diode	1N4148	D0.3	4	D1 D2 D3 D5	length 7.5 MM crooked
54	diode	1N4148	D0.3	1	D4	length 7.5 MM crooked
55	diode	1N4004	D0.4	8	D7 D8 D9 D10 D11 D12 D13 D14	length 10 MM crooked
56	three feet zenzer IC	TL431	ECB	2	U15 U16	DIP package 3P
57	three feet zenzer IC	7805	TOP220	1	U17	DIP package 3P
58	lotus flower 4 holes		AV4-8.4-13Z	1	BNC4	4 holes, clubfoot, red and white
59	lotus 6holes		AV6-8.4-13	3	BNC1 BNC2 BNC3	6holes, clubfoot, red and white
60	25 pins R232 crooked socket	HEADER25	25P-COMPUTER	1	J1	crooked socket
61	terminal	CON11	11P24182	1	J15	straight socket11P
62	terminal	CON12	12P24182	2	J6 J7	straight socket11P
63	terminal	CON13	13P24182	1	J14	straight socket11P
64	terminal	CON2	2P24182	1	J12	straight socket11P
65	terminal	CON5	5P24182	2	J4 J13	straight socket11P
66	terminal	CON5	5P24396	1	J11	straight socket11P
67	terminal	CON6	6P24182	1	J3	straight socket11P
68	terminal	CON7	7P24182	2	J5 J9	straight socket11P
69	crystal	12MHz	XT-L	1	Y1	DIP package
70	screw	BTB 3X6		1		triangle joint,black nickel,strengthen hard
71	screw	BTB 3X8		3		triangle joint,black nickel,strengthen hard
72	jumper wire	hz	J10	40	13 26 27 34 56 60 61 70 71 72 73 74 76 77 78 82 83 84 85 86 91 92 102 111 115 116 117 119 120 121 122 134 135 136 138 146 148 149 150 155	length 10 MM crooked
73	jumper wire	hz	J12.5	12	28 75 80 81 90 98 99 100 101 107 137 143	length 12.5 MM crooked
74	jumper wire	hz	J5	28	1 14 19 23 32 33 37 40 42 43 54 65 66 106 108 109 110 130 132 140 142 154	length 5 MM crooked
76	jumper wire	hz	J7.5	89	2 4 6 7 8 9 10 11 12 15 16 17 18 20 21 22 24 25 29 30 31 36 38 39 44 45 46 47 48 49 50 51 52 53 55 57 58 59 62 64 67 68 69 79 87 88 89 93 94 95 96 97 103 104 105 113 114 118 123 124 125 128 129 131 133 139 141 144 145 147 151 152 153 156 158 159 160 161 63 112 157	length7.5 MM crooked
77	three feet zenzer IC	7810*b	TOP220	1	U18	DIP package 3P
78	elect. Cap.	100uF16V*b	E. 1/25	1	C79	span 2.5 MM ,diameter5 MM
79	1/6W carbon film resistor	4K7*c	R0.3	3	R151 R153 R154	length7.5 MM crooked
80	1/6W carbon film resistor	1K5*c	R0.3	2	R150 R152	span 7.5 MM crooked
81	elect. Cap.	10uF16V*c	E. 1/2	1	C71	span 2.5 MM ,diameter5 MM
82	DIP transistor	9014*c	EBC	1	Q20	DIPpackage 3P
83	DIP transistor	9015*c	EBC	1	Q21	DIPpackage 3P
84	diode	1N4148*c	D0.3	1	D15	length7.5 MM crooked
85	diode	1N4148*c	D0.3	1	D16	length7.5 MM crooked
86	9 pins R232 cooked socket	HEADER 9*c	9P-COMPUTER	1	J2	crooked socket
87	terminal	CON4	4P24182	2	J8 J10	straight socket4P
88	terminal	CON7	7P24182	1	JJ9	straight socket7P



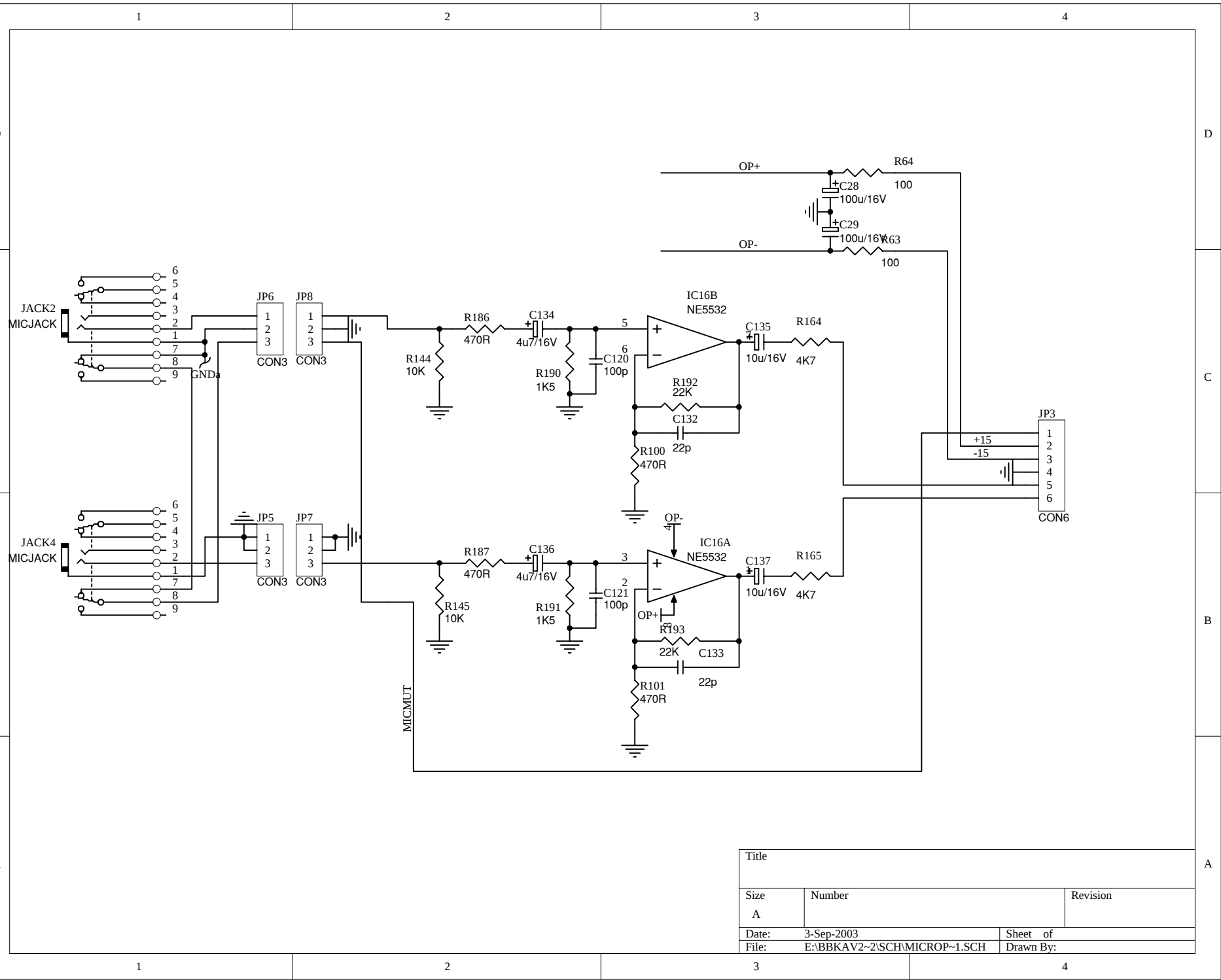
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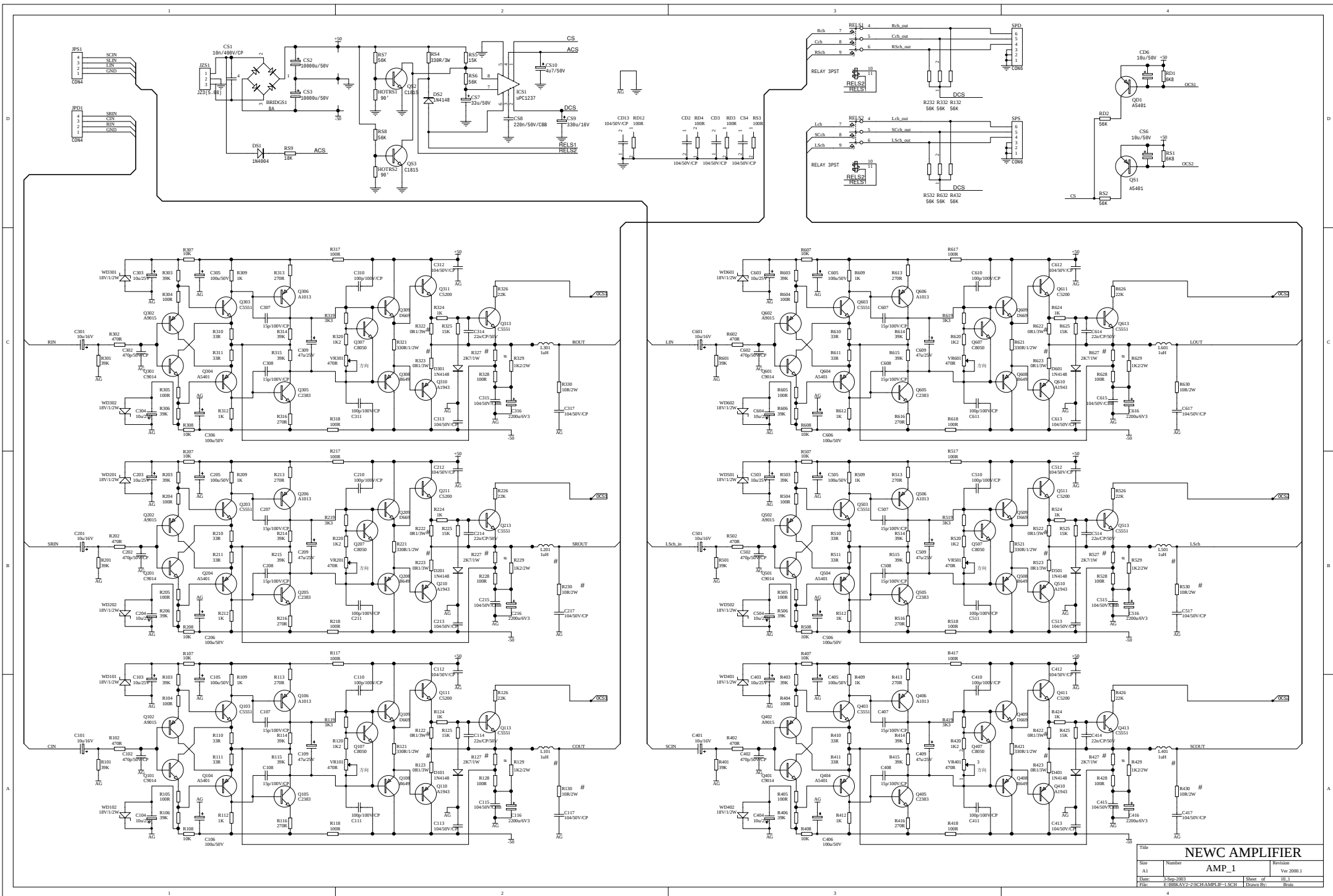
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