

SERVICE MANUAL



SPECIFICATIONS:

Power Output	120W RMS into 8 Ohms 200W RMS into 4 Ohms
THD (unweighted)	< 0.0015% 1 kHz at 80% of rated power < 0.015% 20Hz – 20kHz at 80% of rated power
Frequency Response	10Hz – 50kHz +/- 1dB
S/N ratio (ref 1W/8 Ohm)	>83dB
Input Impedances	Input 1 (balanced) 10 kOhm Inputs 2-7 68 kOhm Tape Input 68 kOhm
Power Amp damping factor	> 110 at 1kHz
Max power consumption	800W
Minimum power consumption	Active (no signal) 70W Standby 7W
Bass & Treble controls	Shelving type Max bass boost/cut +/- 10dB at 10Hz Max treble boost/cut +/- 7.5dB at 20Hz
Dimensions (H x W x D)	115 x 430 x 385mm (4.5 x 16.9 x 15.2")
Weight	15.0kg (33Lbs)

API9597/I

Gallery Court Hankey Place London SE1 4BB UK
Tel: +44 (0)20 7940 2200 Fax: +44 (0)20 7940 2233

840A SERVICE MANUAL

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SAFETY PRECAUTIONS & IMPORTANT NOTES

1. Check that the rear of the product indicates the correct supply voltage for your area.



2. The lightning flash with the arrowhead within an equilateral triangle is intended to alert the user or service agent to the presence of dangerous voltages within the product enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



3. The exclamation point within an equilateral triangle is intended to alert the user or service agent to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the appliance.

4. This product complies with EEC Low Voltage (73/23/EEC) and Electromagnetic Compatibility (89/336/EEC) Directives when used and serviced in accordance with this manual. For continued compliance all components marked safety and EMC critical must only be replaced by Cambridge Audio approved parts.

5. Any unauthorised design alterations or additions will void the manufacturer's warranty; furthermore the manufacturer cannot accept responsibility for personal injury or property damage resulting therefrom.

6. When servicing, care should be taken to observe the original routing and dressing of the leads and it should be confirmed that they have been returned to normal after re-assembly.

Notes on chip component replacement

Never reuse a component that has been removed from a PCB

Notice that the minus side of a tantalum capacitor may be damaged by heat

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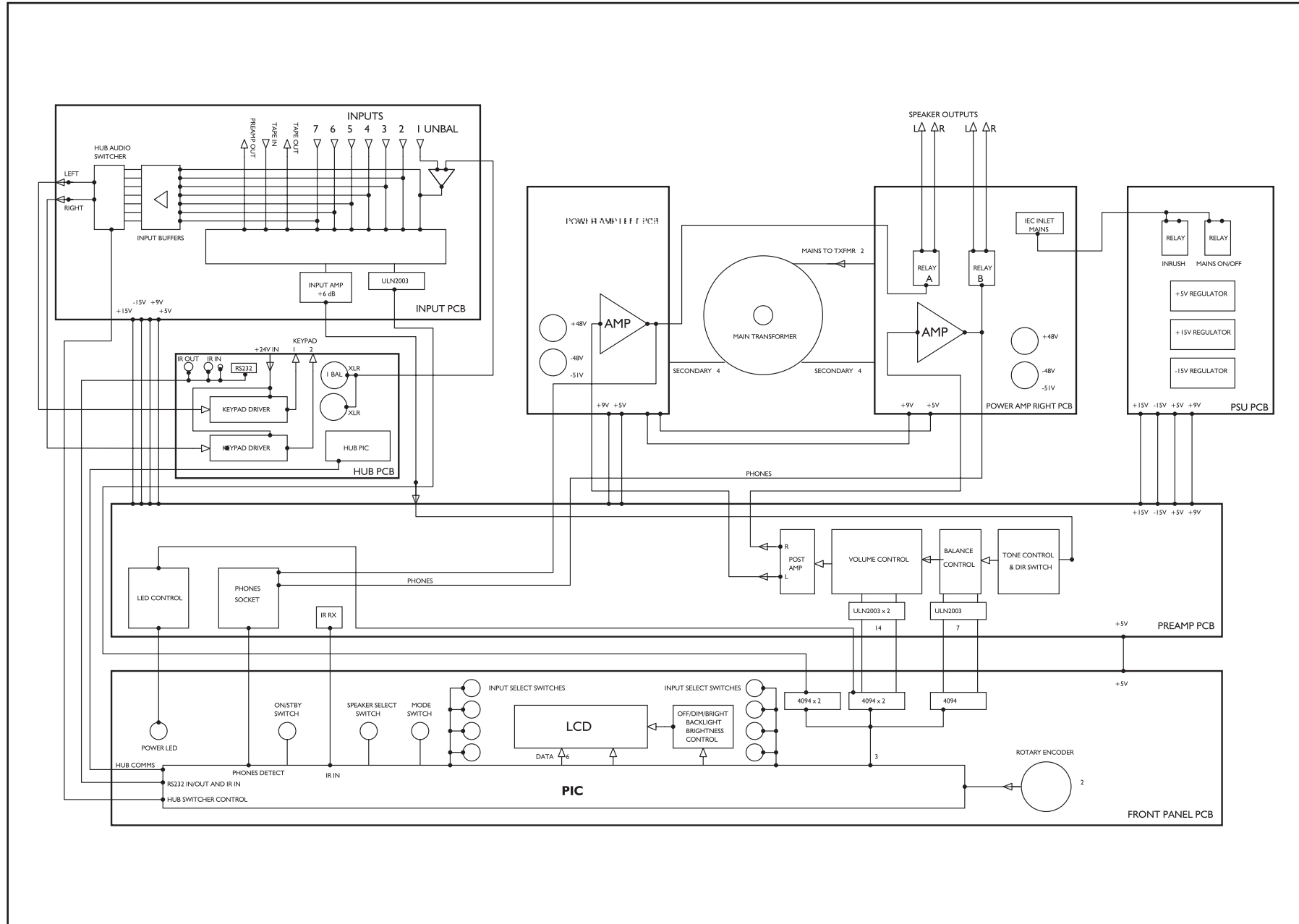
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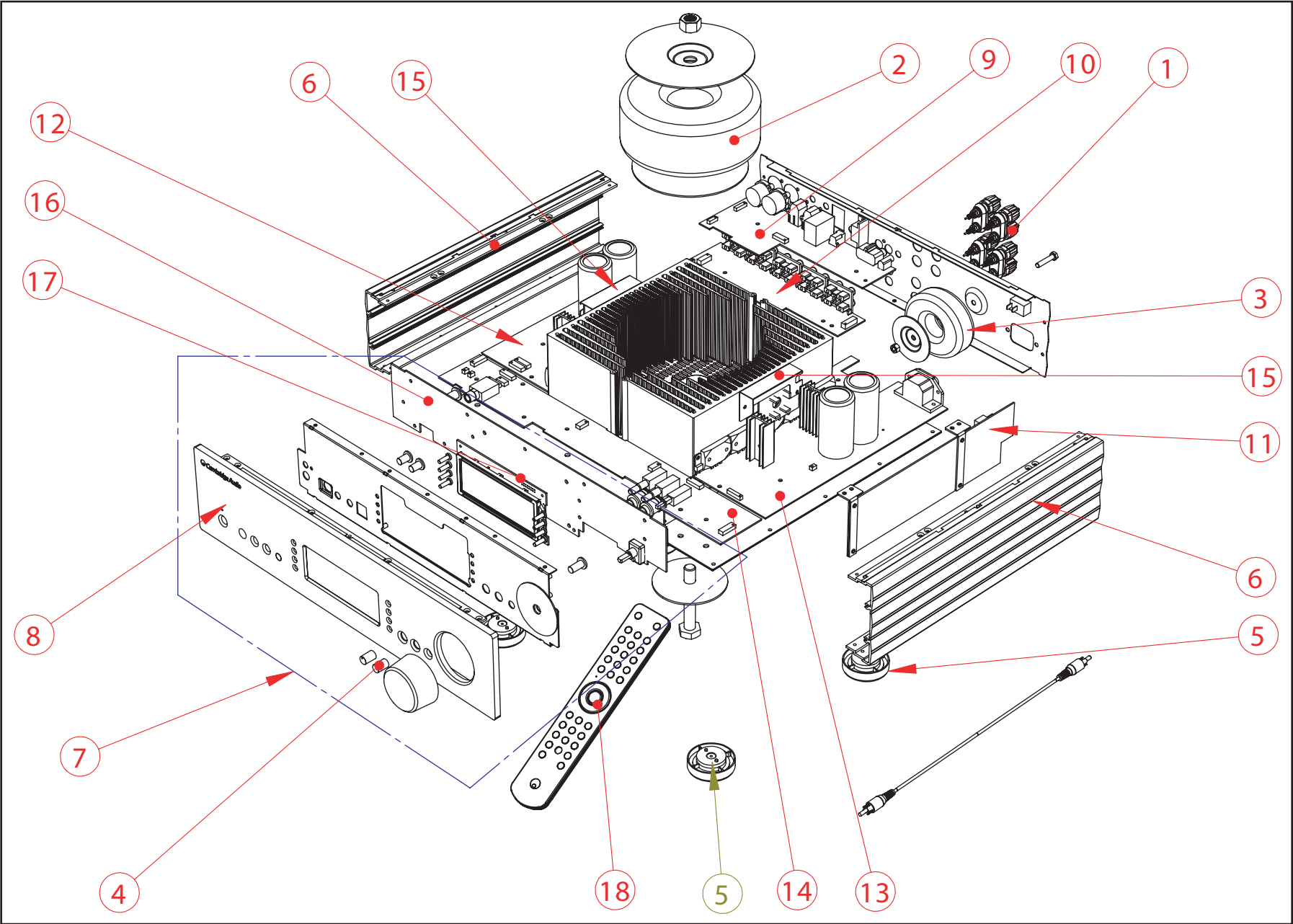
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840A Block Diagram

Cambridge Audio Azur 840A Amplifier



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840A Exploded Diagram

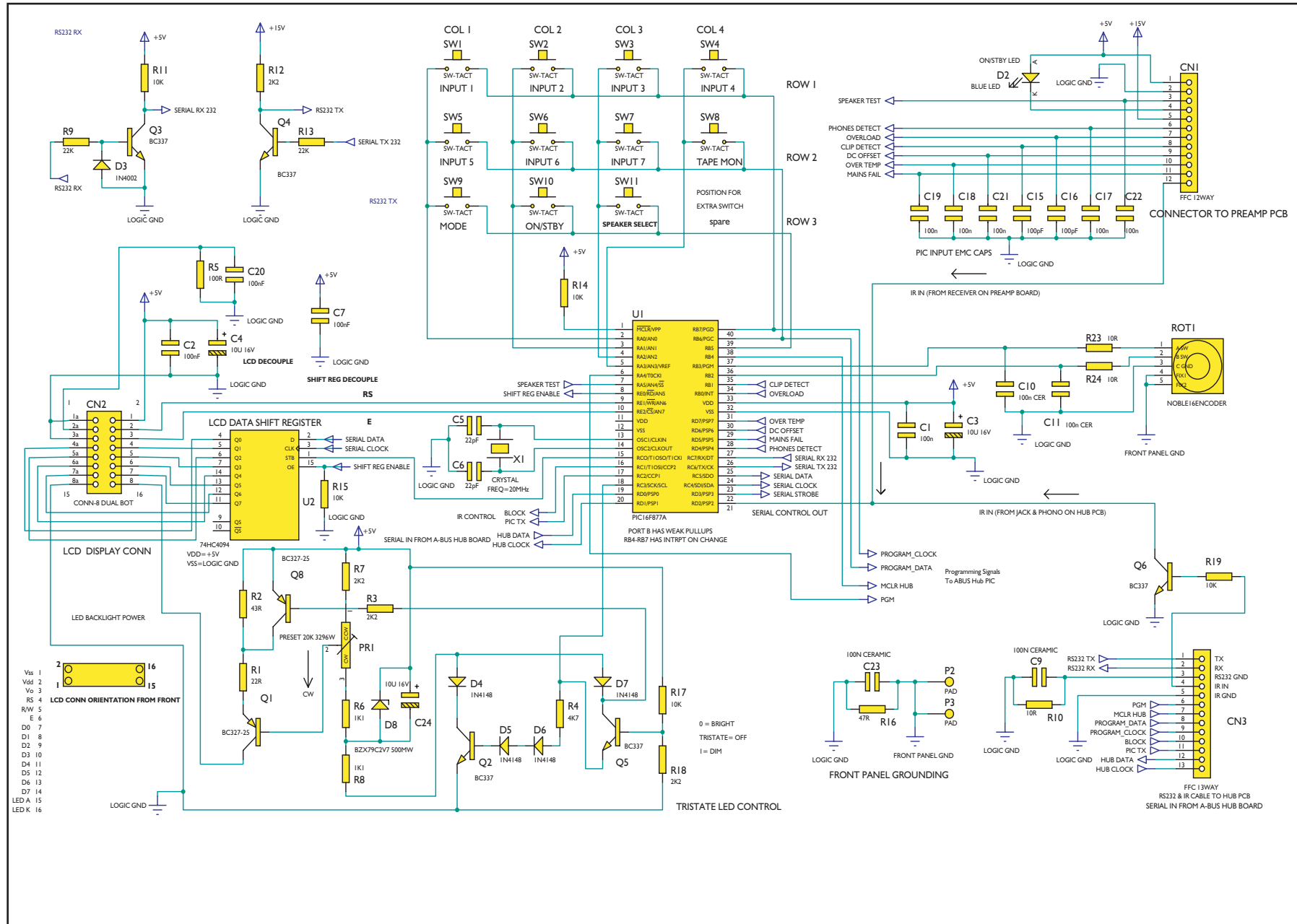
Cambridge Audio Azur 840A Amplifier

Drawing Ref:	AP Part Number	Factory Ref:	Description
1	PY1118	2331-004909E301	Speaker Binding Post BP331 (Black) Red & Black
2	PY1019	3200-053044E000	Toroid 230V/50Hz 36.5VACx4 5.5A TI-053044C
2	PY1020	3200-053045E000	Toroid 115V/50Hz 36.5VAC 5.5A TI-0853045C for 840A
3	PY1119	3200-074051E001	Toroid 230V/50Hz 7.5VAC750MA 17VAC*2 TO7405B STB
3	PY1120	3200-077811E000	Toroid 115V/50Hz 7.5VAC750MA 17VAC*2 STB
4	PY1121	6074-150003E000-01	840A Bass / Treble Knob (Black) Painted Black
4	PY1123	6074-150003E001A01	840A Bass / Treble Knob (Silver) Painted Silver
5	PY1122	6074-150004E000	Azur 840A Plastic Foot (Black) API6837*
5	PY1124	6074-150004E000A01	Azur 840A Plastic Foot (Silver) API6837*
	PY1125	6574-150009E000-01	Azur 840A Top Panel Black Painted
	PY1126	6574-150009E000-02	Azur 840A Top Panel Silver
6	PY1127	6574-150013E000-01	Azur 840A Side Panel, Black Painted
6	PY1128	6574-150013E000A01	Azur 840A Side Panel, Silver
7	PY1129	8584-015010E301	Azur 840A Black Front Panel Assy
7	PY1130		Azur-840A Silver Front Panel Assy
8	PY1131	6574-150012E000-01	Azur 840-A B Front Panel Artwork API86371/186381 (Metalwork Only)
8	PY1132		Azur 840-A Silver Front Panel Artwork API86371/186381 (Metalwork Only)
	PY1133	6074-150005E000	Azur 840A Volume Knob Plastic Insert (API743*)
		6574-150015E000	Azur 840A Volume Knob Skin, Black
			Azur 840A Volume Knob Skin, Silver
	PY1135	3110-840000E000	LCD Display Highly Transflective DC00003E02 840A
	PY1136	6600-990112E000	Azur 840A Display Backlight (API6841*)
	PY1138	2409-010200E001	Rotary Encoder Switch REBG161(9*7)PVB20FHINB1-2-24E
9	PY1139	9484-015000E041	Azur-840A AMP-Hub Control PCB Assy Rev A
10	PY1159	9484-015000E341	Azur-840A Amp Input PCB Assy Rev A
11	PY1153	9484-015000E141	Azur-840A EU/UK PSU Power Control PCB Assy Rev A
12	PY1146	9484-015000E091	Azur-840A Main-Amp Left PCB Assy Rev A
13	PY1163	9484-015001E091	Azur-840A Main-Amp Right PCB Assy Rev A
14	PY1155	9484-015000E331	Azur-840A Pre-Amp Board Rev A
15	PY1145	9484-015000E071	Azur-840A Amp-Rectifier PCB Rev A
16	PY1137	9484-015000E111	Azur-840A Amp Front Control PCB Assy Rev A
17	PY1134	9484-015000E061	Azur-840A LCD Display Board Assy Rev A
18	PY1165	9805-084000E001	Azur-840A Remote Control Assy Rev A

All spare parts should be ordered from AP Hong Kong office

Exploded Diagram Parts List

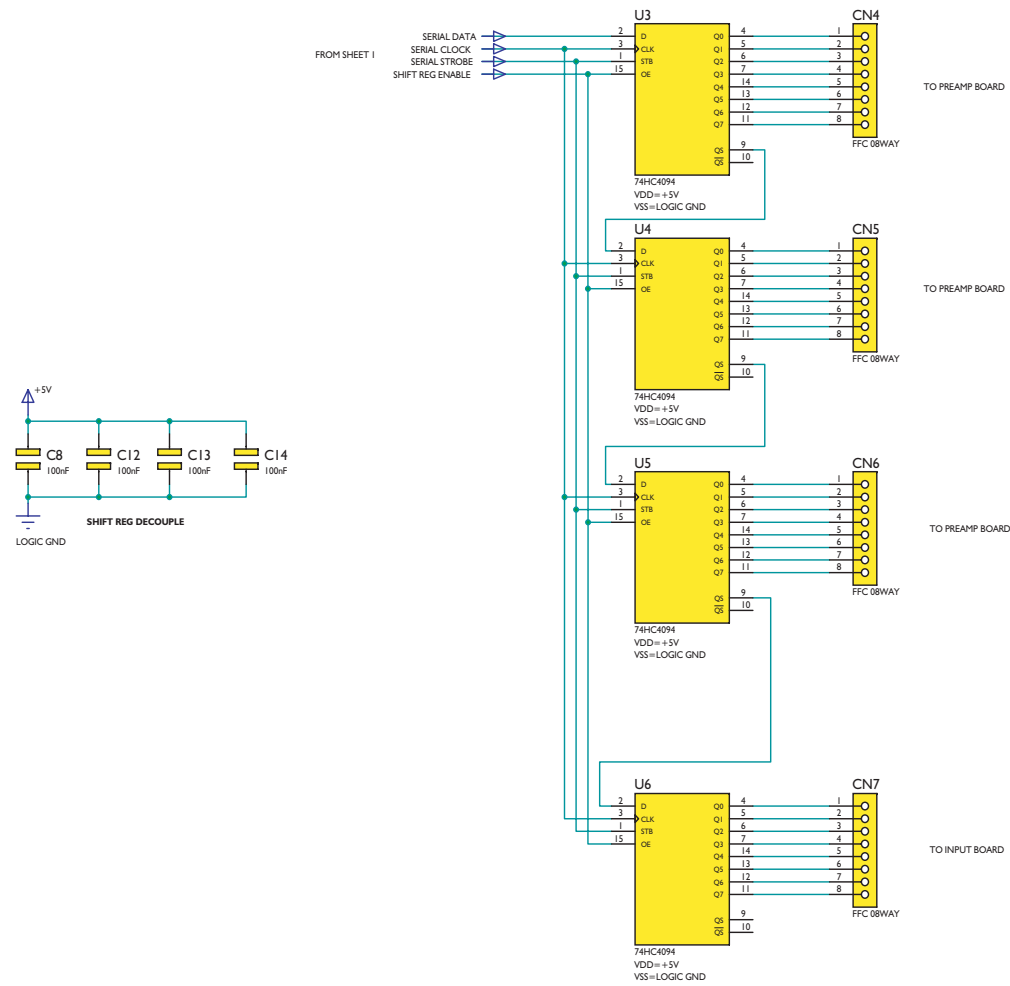
Cambridge Audio Azur 840A Amplifier



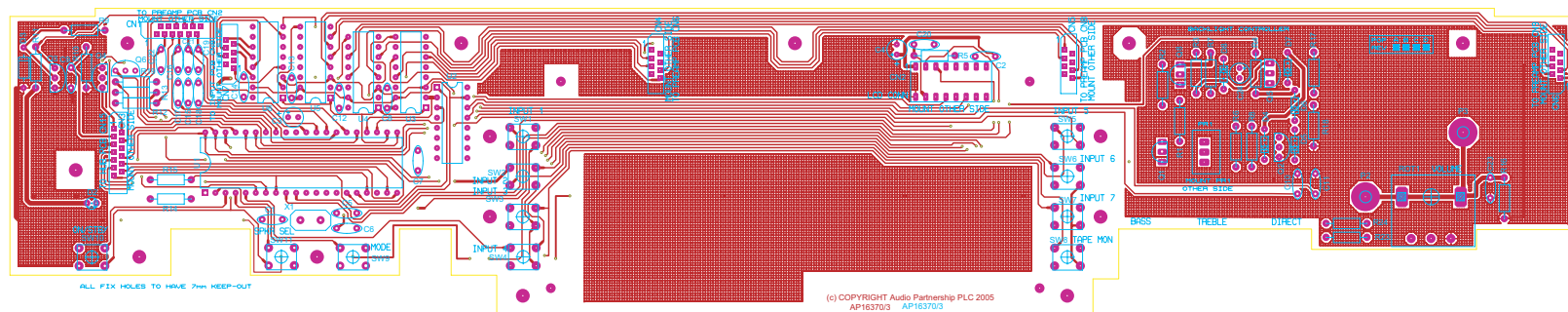
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AP16369/3 Front Panel PCB Schematic (Microcontroller & LCD)

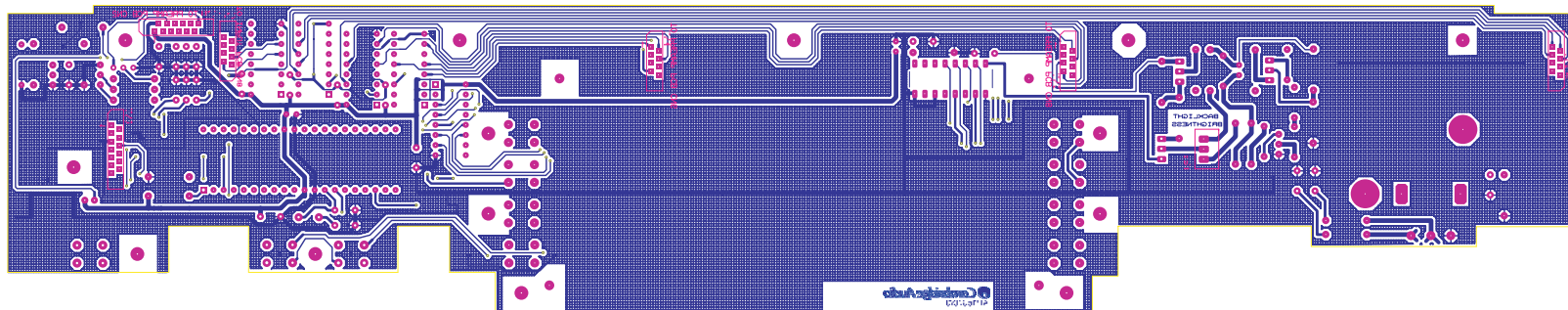
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API6369/3 Front Panel PCB Layout (Bottom Side)

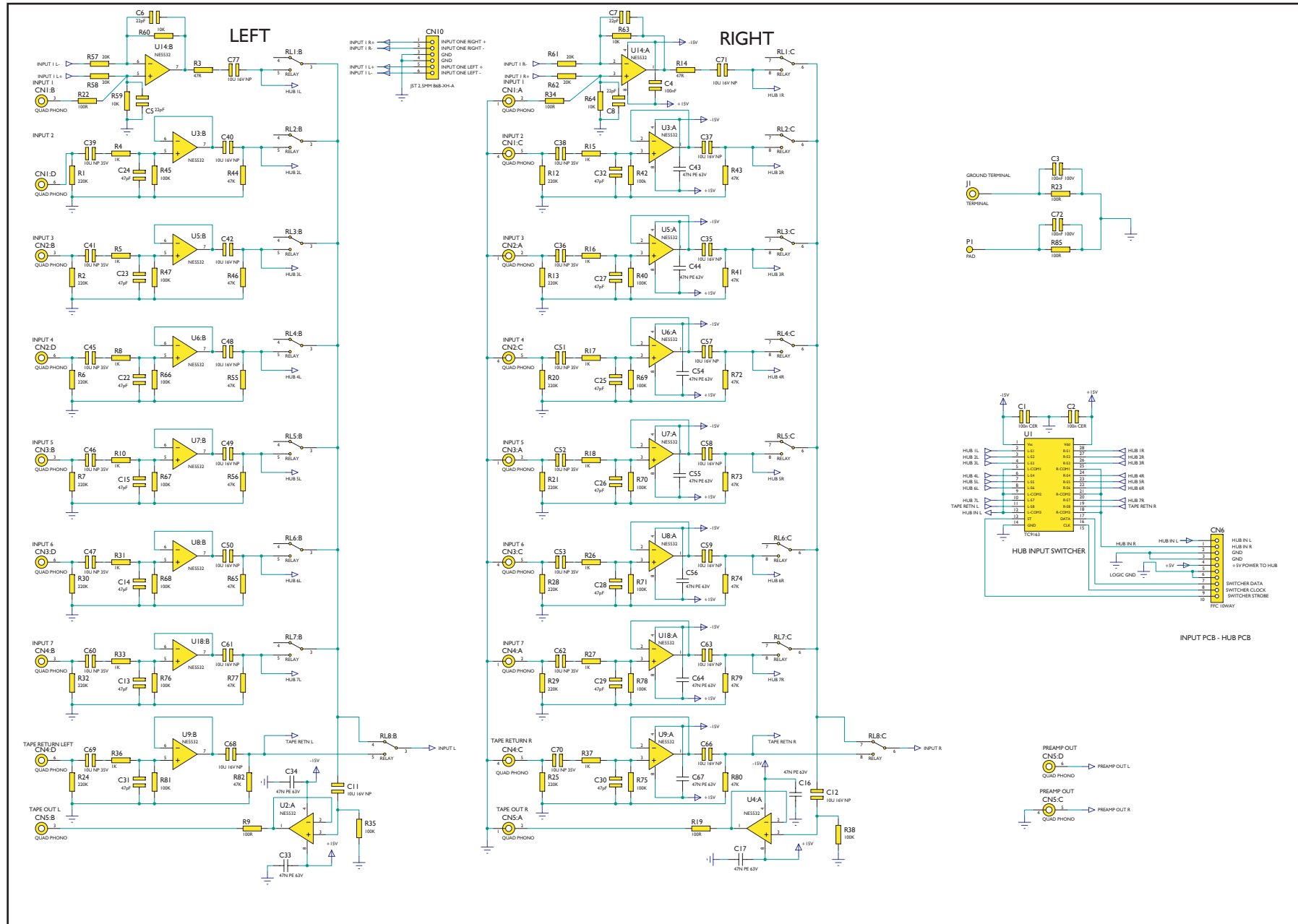
Cambridge Audio Azur 840A Amplifier Front Panel PCB BOM

AP16372/5

AP No	Value	Description/Type	Qty	Component Ident	Notes
	RESISTORS				
	10R	0.25 W 1% Metal Film	3	R10, R23, R24	
	22R	0.25 W 1% Metal Film	1	R1	
	43R	0.25 W 1% Metal Film	1	R2	
	47R	0.25 W 1% Metal Film	1	R16	
	100R	0.25 W 1% Metal Film	1	R5	
	1K1	0.25 W 1% Metal Film	2	R6, R8,	
	2K2	0.25 W 1% Metal Film	4	R3, R7, R12, R18,	
	4K7	0.25 W 1% Metal Film	1	R4	
	10K	0.25 W 1% Metal Film	5	R11, R14, R15, R17, R19	
	22K	0.25 W 1% Metal Film	2	R9, R13	
	CAPACITORS				
	22pF	Ceramic 50V 10% Pitch=5mm	2	C5, C6	
	100pF	Ceramic 50V 10% Pitch=5mm	2	C15, C16	
	100nF	Ceramic 50V 10% Pitch=5mm	17	C1, C2, C7, C8, C9, C10, C11, C12-C14, C17 - C21, C22, C23	
	10uF	16V Electrolytic Radial (Height =5.2mm) Pitch=2.5mm	3	C3, C4, C24	Note: Low profile electrolytic
	SEMICONDUCTORS				
	PIC16F877A - I/P	PIC Flash Microcontroller 40 pin DIL	1	U1	Contact Audio Partnership Service Department
PY1100	74HC4094	Shift register 16 pin DIL	5	U2 - U6	
	TRANSISTORS				
PY219	BC327-25	PNP Small Signal TO92	2	Q1, Q8	
PY214	BC337-25	NPN Small Signal TO92	4	Q2, Q3, Q4, Q5	
	DIODES				
	BLUE LED	Blue LED 3mm UNI flat top	1	D2	
	1N4148	General purpose diode	4	D4,D5, D6,D7	
	BZX 79C -2V7	Zener diode 2V7 400mW	1	D8	400mW DO 35 Case.
	1N4002	General Purpose Rectifier	1	D3	
	MISCELLANEOUS				
PY1141	D100-SSV-12	12-WAY FFC reverse-needle type, single-row contacts	1	CN1	
PY1142	D100-SSV-13	13-WAY FFC reverse-needle type, single-row contacts	1	CN3	
PY1140	D100-SSV-08	8-WAY FFC FRONT-PREAMP CONNS, reverse-needle type single-row contacts	4	CN4, CN5, CN6, CN7	
PY1138	REB161(9x7)PVB20FHIN B 1-2-24E	Noble ROTARY ENCODER	1	ROT1	
PY043	2400-020200-000	Tact switch	11	SW1-SW11	
	20MHz CRYSTAL	HC49/4H	1	X1	
	MULTITURN PRESET 20K	Side adjust. Foot print 9.5 x 4.5 mm	1	PR1	

Note: resistors, capacitors and other 'generic' electronic components are not usually stocked by the manufacturer. Please obtain these locally.

Cambridge Audio Azur 840A Amplifier

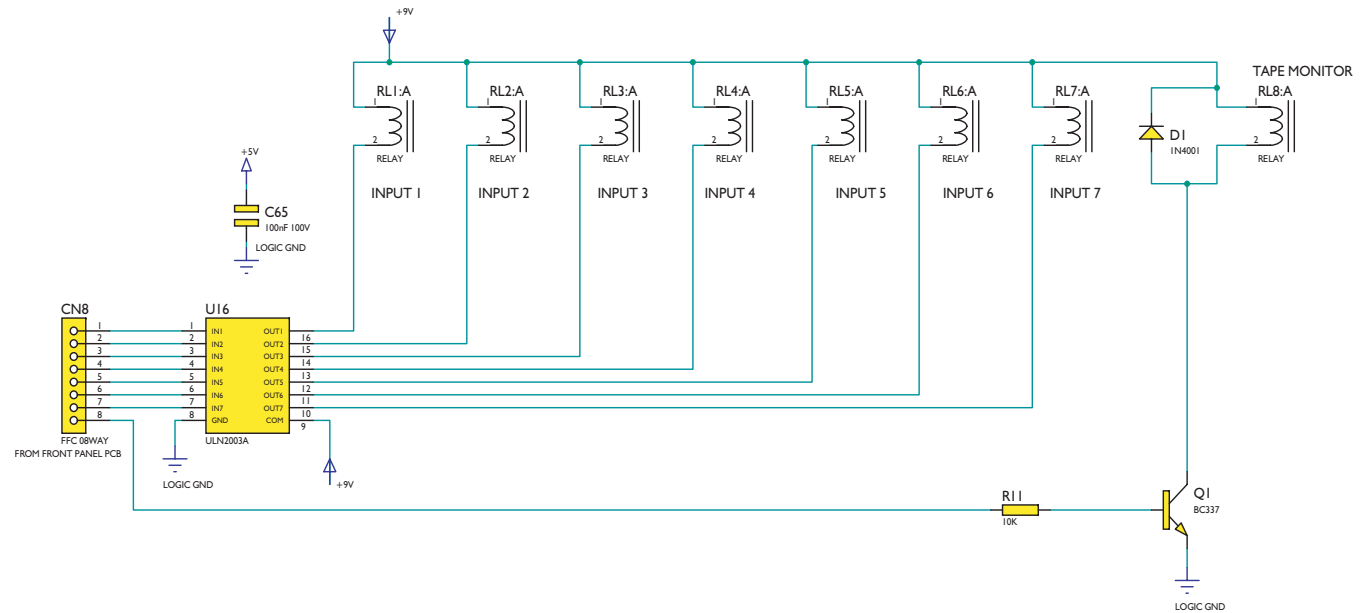
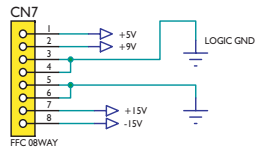
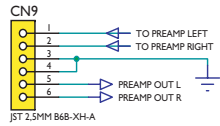


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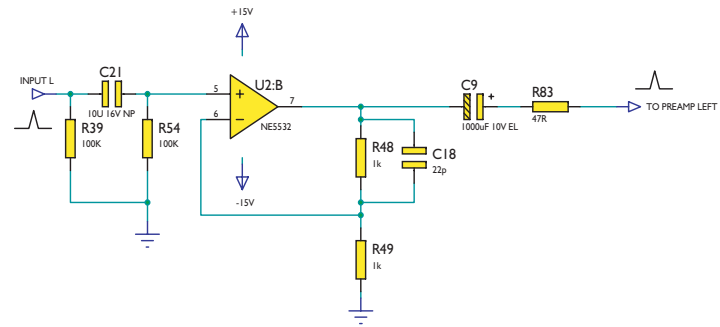
API6361/3 Input PCB Schematic (Input Select)

Cambridge Audio Azur 840A Amplifier

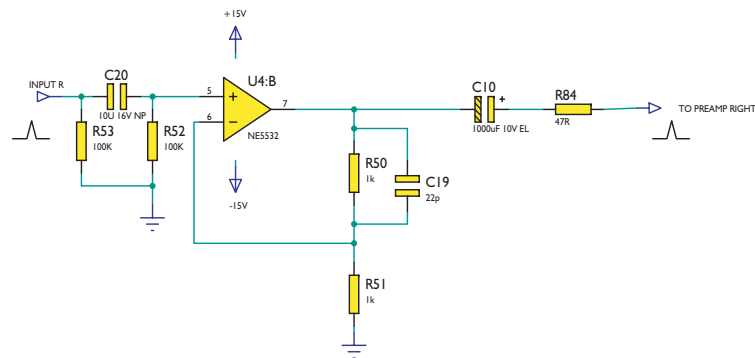
INPUT PCB - PREAMP PCB



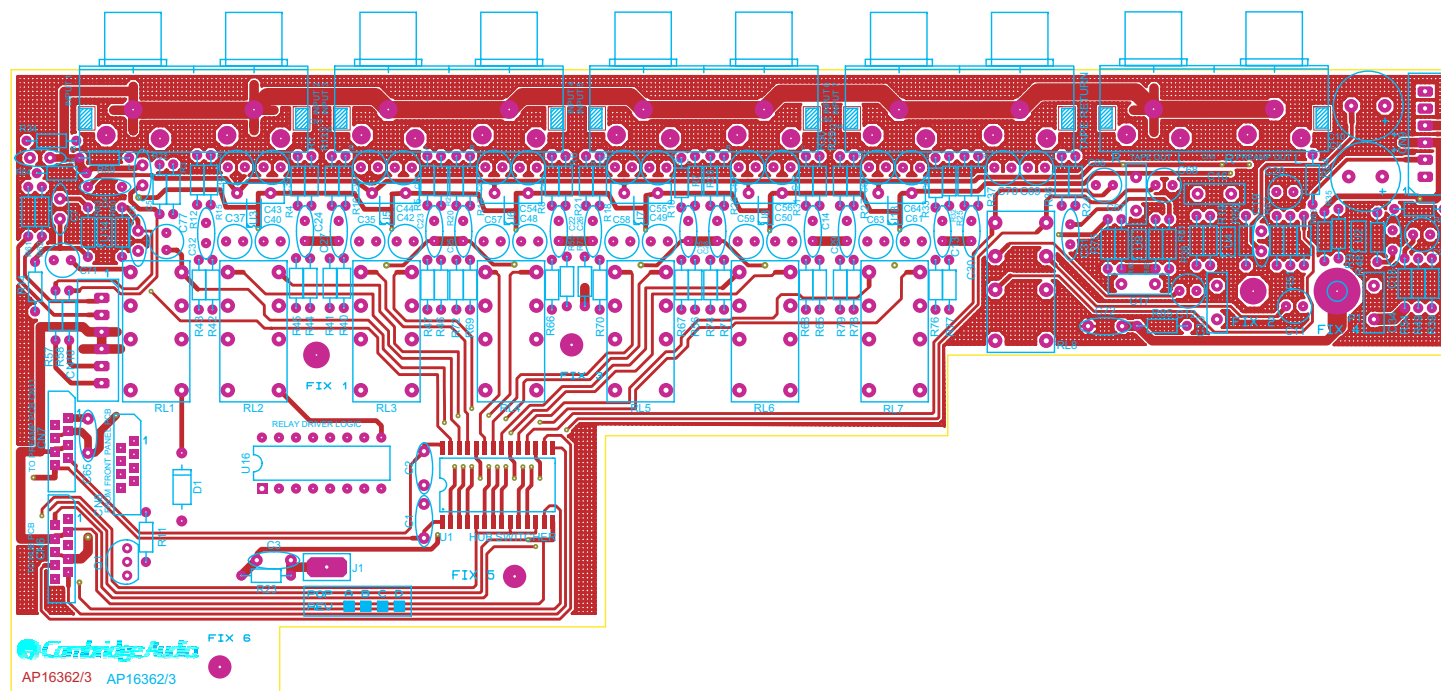
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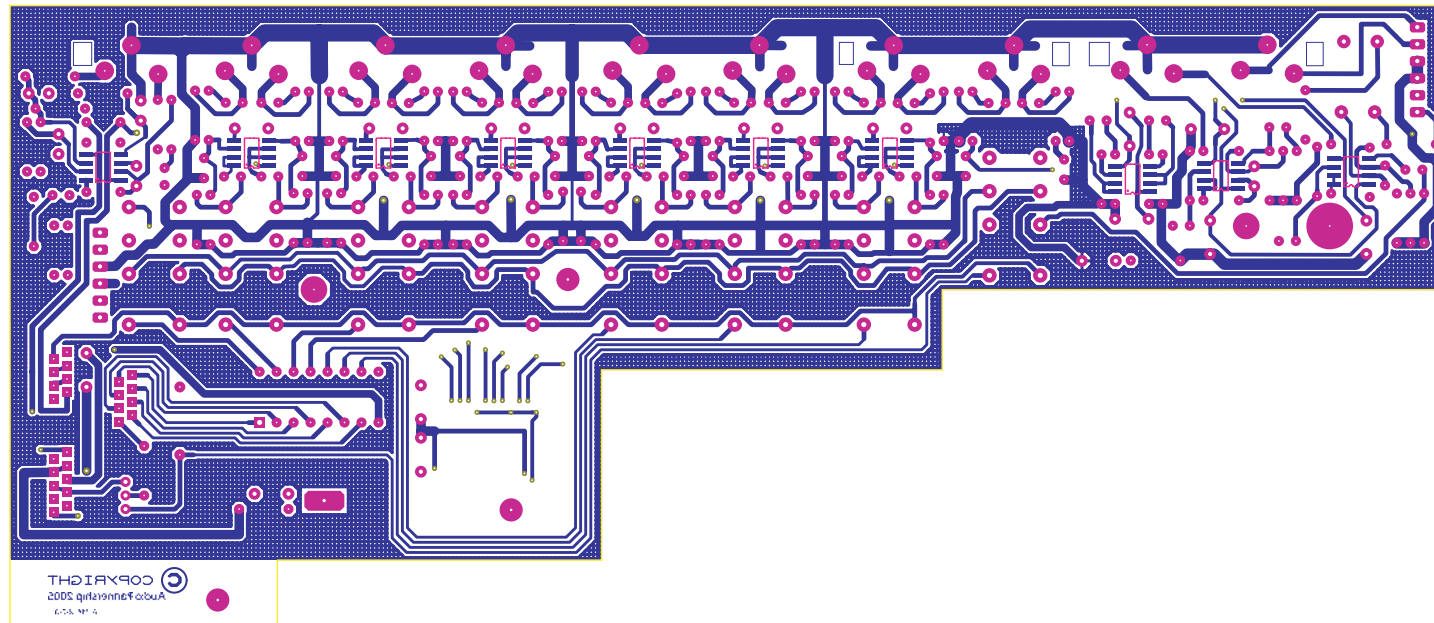
INPUT AMPLIFIER
+ 6 dB



Cambridge Audio Azur 840A Amplifier



Cambridge Audio Azur 840A Amplifier



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API6361/3 Input Board PCB Board Layout (Bottom Side)

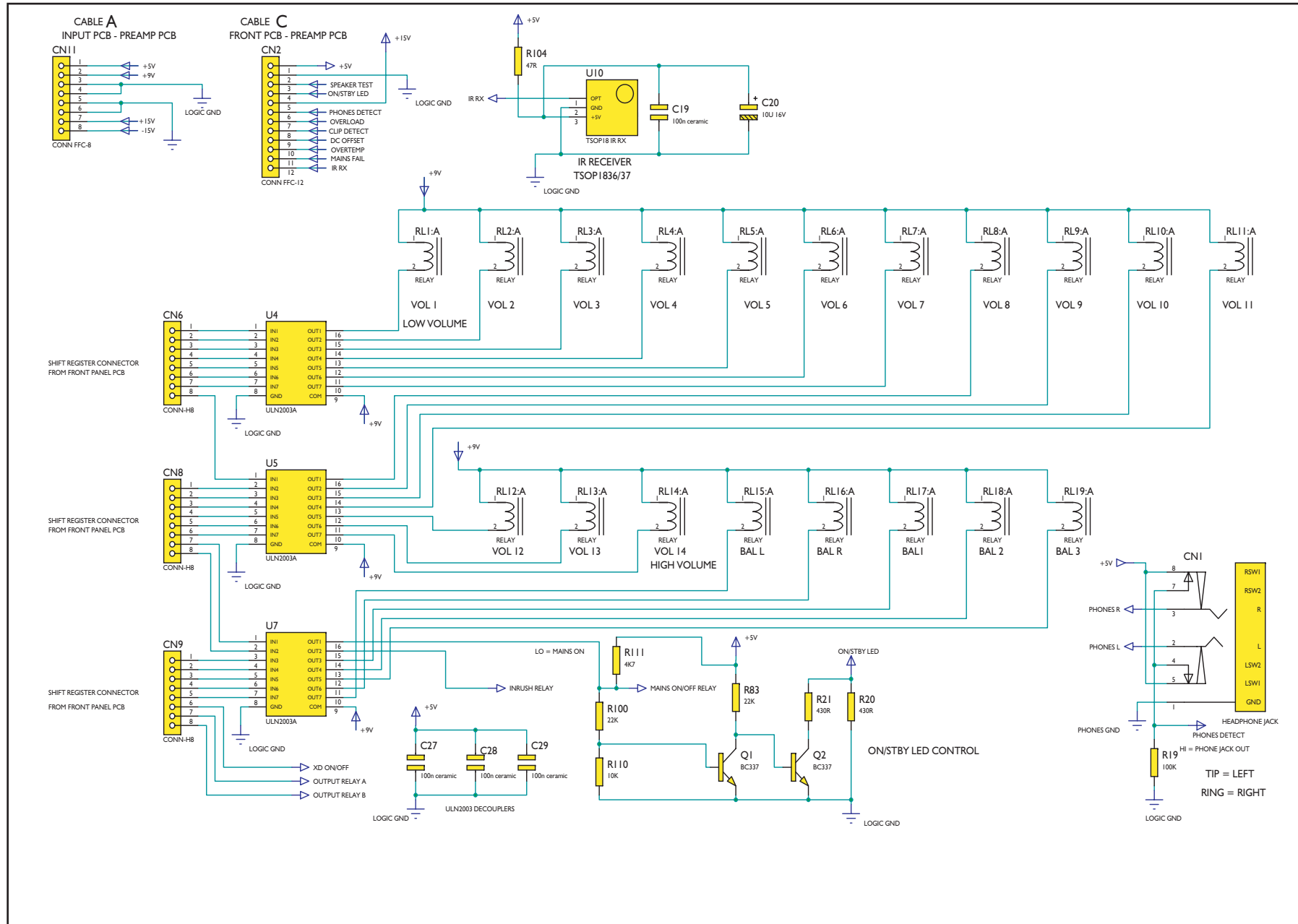
Cambridge Audio Azur 840A Amplifier Input PCB BOM

AP16364/3

AP No	Value	Description/Type	Qty	Component Ident	Notes
	RESISTORS				
	47R	0.125 W Metal Film	4	R3, R14, R83, R84	
	100R	0.125 W Metal Film	6	R9, R19, R22, R23, R34, R85	
	1K	0.125 W Metal Film	18	R4, R5, R8, R10, R15-R18, R26, R27, R31, R33, R36, R37, R48-R51	
	10K	0.125 W Metal Film	5	R11, R59, R60, R63, R64	
	20K	0.125 W Metal Film	4	R57, R58, R61, R62	
	47K	0.125 W Metal Film	13	R41, R43, R44, R46, R55, R56, R65, R72-R74, R77, R79, R80, R82	
	100K	0.125 W Metal Film	20	R35, R38-R40, R42, R45, R47, R52-R54, R66-R71, R75, R76, R78, R81	
	220K	0.125 W Metal Film	14	R1, R2, R6, R7, R12, R13, R20, R21, R24, R25, R28-R30, R32	
	CAPACITORS				
	22pF	Ceramic 50V 10% Pitch= 3mm	6	C5-C8, C18, C19	
	47pF	Ceramic 50V 10% Pitch= 3mm	14	C13-C15, C22-C32	
	47nF	63V 10% Polyester Pitch= 5mm	11	C16, C17, C33, C34, C43, C44, C54 - C56, C64, C67	
	100nF	Ceramic 50V 10% Pitch= 5mm	6	C1, C2, C4, C3, C65, C72	
	10uF	16V Non Polarised Electrolytic Radial (5.2mm) Pitch= 2.5mm	20	C11, C12, C20, C21, C35, C37 C40, C42, C48-C50, C57-C59, C61, C63, C66, C68, C71, C77	
	10uF	35V Non Polarised Electrolytic Radial (5.2mm) Pitch= 2.5mm	14	C36, C38, C39, C41, C45-C47, C51-C53, C60, C62, C69, C70	
	1000uF	10V Electrolytic Radial (10mm) Pitch= 5mm	2	C9, C10	
	SEMICONDUCTORS				
PY476	TC9163AF	Analogue Switch Array	1	U1	SOP28 Package
PY1162	NE5532	Low Noise Dual Audio Op-Amp (SMT)	10	U3, U5-U9, U18, U2, U4, U14	SO8 Package
PY1158	ULN2003A	7 Darlington Drivers	1	U16	DIL16 Package
	TRANSISTORS				
PY214	BC337-25	NPN Small Signal	1	Q1	TO92 Package
	DIODES				
	1N4001	Diode	1	D1	DO41
	MISCELLANEOUS				
	QUAD PHONO SOCKET	PHONO	5	CN1-CN5	
	JST 2.5MM B6B-XH-A	Vertical header	2	CN9, CN10	Input 1 audio conn, i/o conn
PY1140	FFC 8-WAY	D100-SSV-08	2	CN7, CN8	Vertical FFC conn, reverse-needle type
PY1143	FFC 10-WAY	D100-SSV-10	1	CN6	Vertical FFC conn, reverse-needle type
	RELAY ME-2-9 9V DC		8	RL1-RL8	

Note: resistors and other 'generic' electronic components are not usually stocked by the manufacturer. Please obtain these locally.

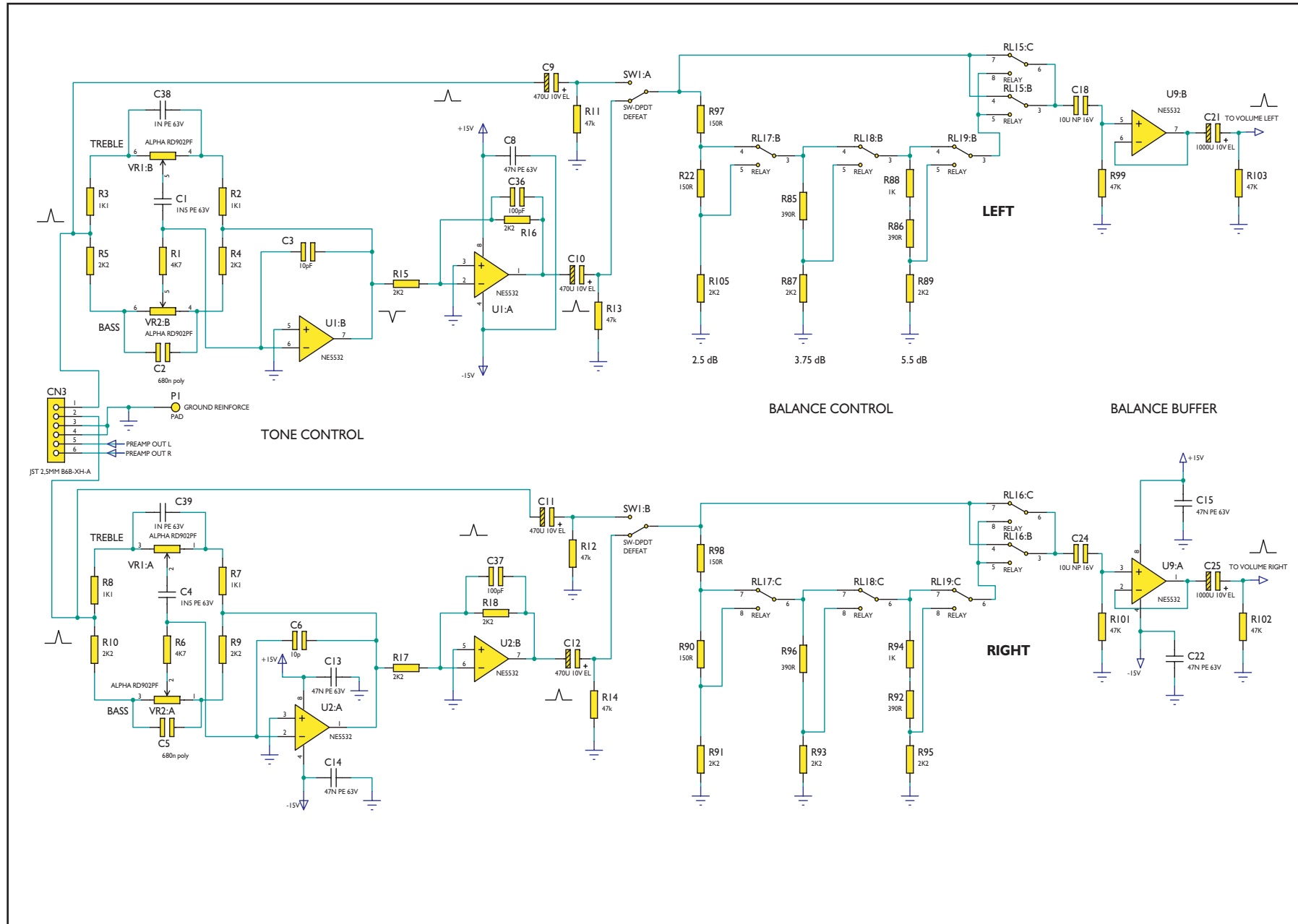
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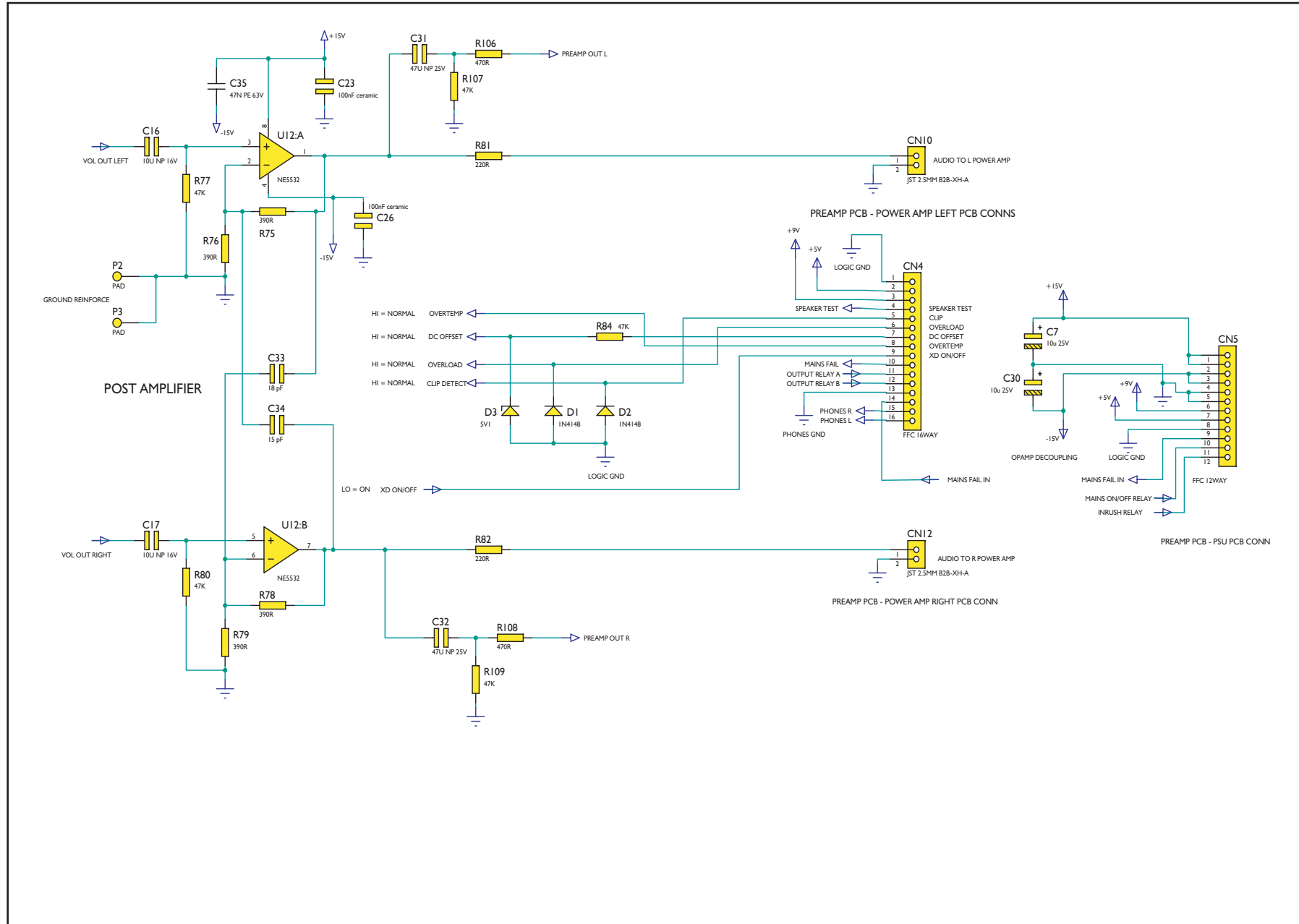
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API6365/4 Preamp PCB Schematic (Relay Logic)

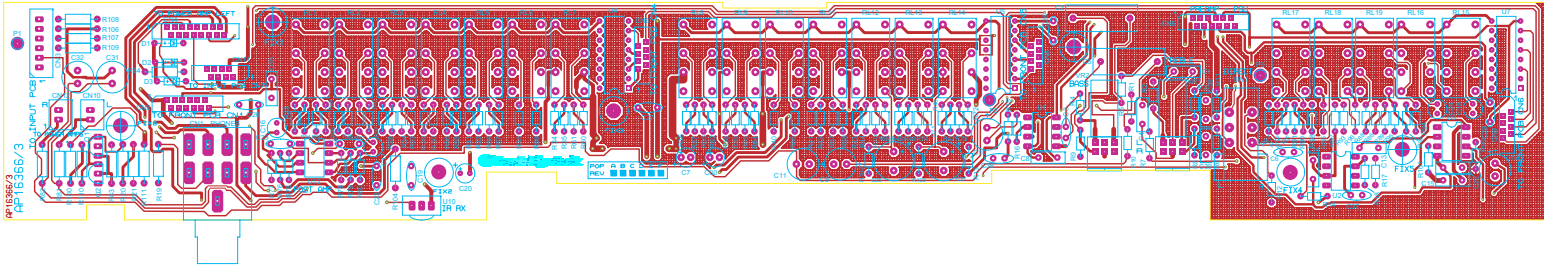
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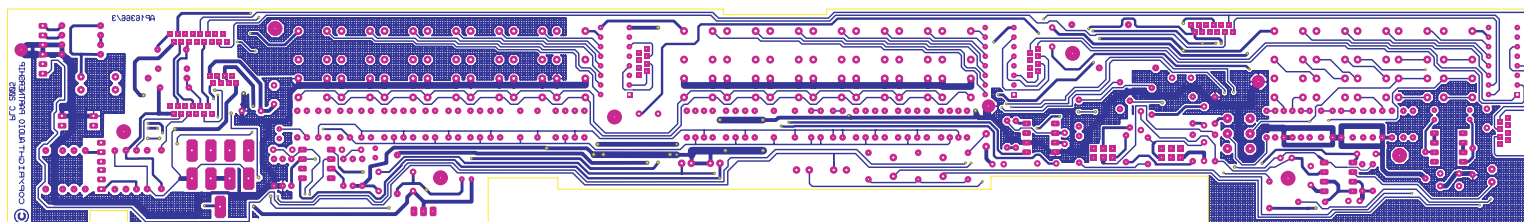
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API6365/3 Pre-amp PCB Layout (Bottom Side)

Cambridge Audio Azur 840A Amplifier Preamp PCB BOM

AP16368/4

AP No	Value	Description/Type	Qty	Component Ident	Notes
	RESISTORS				
	5R1	0.125 W Metal Film	2	R47, R73	
	51R	0.125 W Metal Film	2	R48, R74	
	150R	0.125 W Metal Film	4	R22, R90, R97, R98	
	300R	0.125 W Metal Film	2	R44, R70	
	390R	0.125 W Metal Film	8	R85, R86, R92, R96, R75, R78, R76, R79	
	620R	0.125 W Metal Film	2	R46, R72	
	1K	0.125 W Metal Film	4	R37, R63, R88, R94	
	1K1	0.125 W Metal Film	4	R2, R3, R7, R8	
	1K2	0.125 W Metal Film	2	R45, R71	
	2K2	0.125 W Metal Film	10	R4, R5, R9, R10, R15-R18, R43, R69, R87, R89, R91, R93, R95, R105	
	4K7	0.125 W Metal Film	3	R1, R6, R111	
	5K1	0.125 W Metal Film	2	R35, R61	
	10K	0.125 W Metal Film	11	R38-R42, R64-R68	
	20K	0.125 W Metal Film	4	R30, R32, R56, R58	
	39K	0.125 W Metal Film	2	R36, R62	
	47K	0.125 W Metal Film	9	R11-R14, R77, R80, R99, R101, R102, R103,	
	75K	0.125 W Metal Film	2	R34, R60	
	82K	0.125 W Metal Film	2	R28, R54	
	160K	0.125 W Metal Film	2	R33, R59	
	200K	0.125 W Metal Film	2	R24, R50	
	300K	0.125 W Metal Film	2	R31, R57	
	620K	0.125 W Metal Film	2	R29, R55	
	820K	0.125 W Metal Film	2	R26, R52	
	1M2	0.125 W Metal Film	4	R25, R27, R51, R53	
	5M1	0.125 W Metal Film	2	R23, R49	
	47R	0.25 W Metal Film	3	R81, R82, R104	
	430R	0.25 W Metal Film	2	R20, R21	
	470R	0.25 W Metal Film	2	R106, R108	
	10K	0.25 W Metal Film	1	R110	
	22K	0.25 W Metal Film	2	R83, R100	
	47K	0.25 W Metal Film	3	R84, R107, R109	
	100K	0.25 W Metal Film	1	R19	
	CAPACITORS				
	10pF	Ceramic 50V 10% Pitch= 3mm	2	C3, C6	
	15pF	Ceramic 50V 10% Pitch= 3mm	1	C34	
	18pF	Ceramic 50V 10% Pitch= 3mm	1	C33	
	100pF	Ceramic 50V 10% Pitch=3mm	2	C36, C37	
	1nF	Polyester 63V 10% Pitch=5mm	2	C38, C39	
	1n5	Polyester 63V 10% Pitch=5mm	2	C1, C4	
	47nF	63V 10% Polyester Pitch= 5mm	6	C8, C13, C14, C15, C22, C35	
	100nF	Ceramic 50V 10% Pitch= 5mm	6	C19, C23, C26-C29	
	680nF	Polyester 100V 5% Pitch= 15mm	2	C2, C5	
	10uF	25V Electrolytic Radial (5mm) Pitch= 2.5mm	2	C7, C30	
	10uF	16V Electrolytic Radial (5.2mm) Pitch= 2.5mm	1	C20	
	10uF	16V Electrolytic NP Radial (5.2mm) Pitch= 2.5mm	4	C16, C17, C18, C24,	
	47uF	25V Electrolytic NP Radial (8.4mm) Pitch= 3.5mm	2	C31, C32	
	470uF	10V Electrolytic Radial (8.4mm) Pitch= 3.5mm	4	C9-C12	
	1000uF	10V Electrolytic Radial (10.4mm) Pitch= 5mm	2	C21, C25	
	SEMICONDUCTORS				
PY259	NE5532	Low Noise Dual Audio Op-Amp	4	U1, U2, U9, U12	DIL08 Package
	TSOP18 IR RX	IR Receiver Module	1	U10	Replaces TSOP18
PY1158	ULN2003A	7 Darlington Drivers	3	U4, U5, U7	DIL16 Package
	TRANSISTORS				
PY214	BC337-25		2	Q1, Q2	TO92
	DIODES				
	1N4148	Small Signal Diode	2	D1, D2	

Note: resistors, capacitors and other 'generic' electronic components are not usually stocked by the manufacturer.
Please obtain these locally.

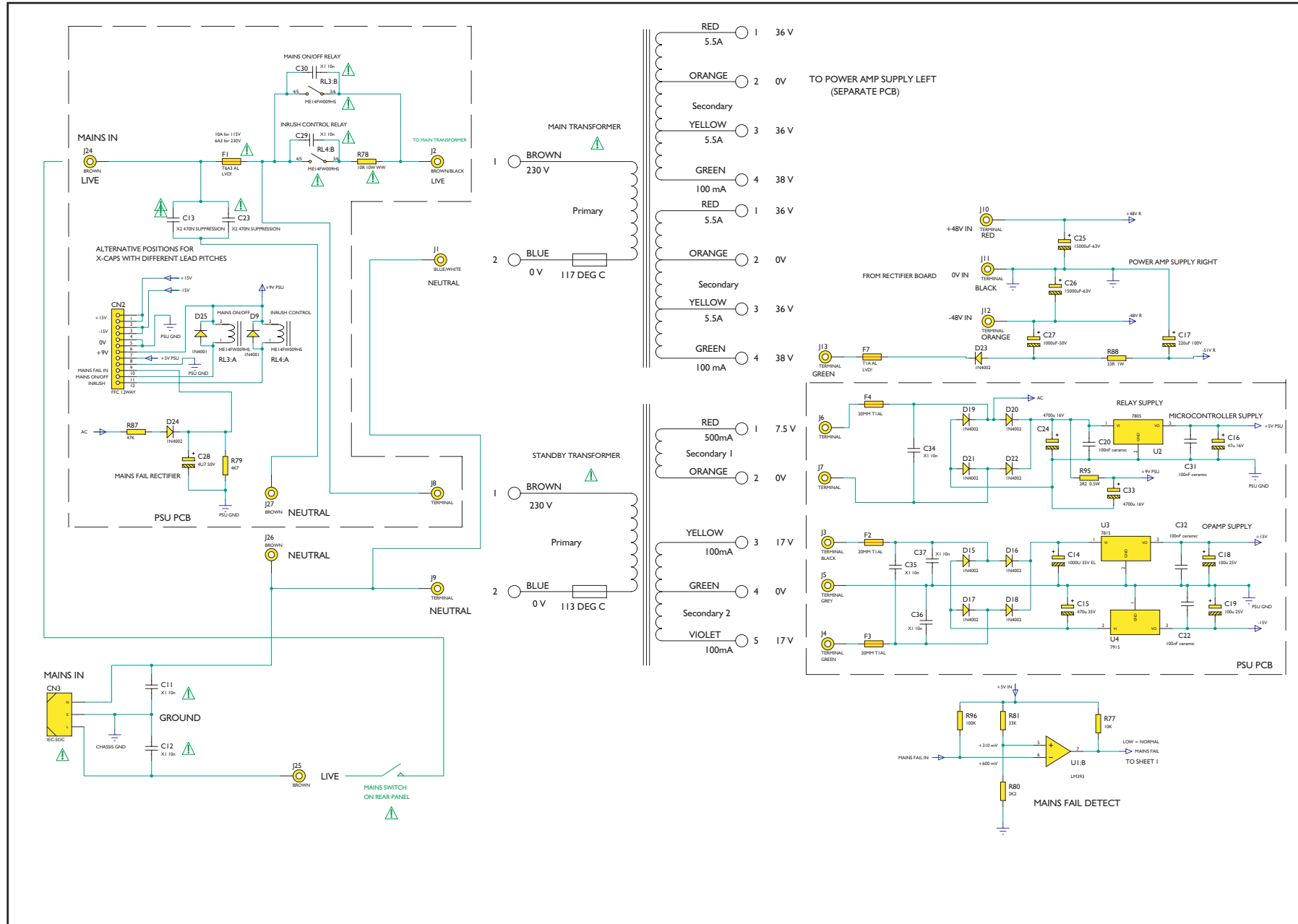
Cambridge Audio Azur 840A Amplifier Preamp PCB BOM

AP16368/4

AP No	Value	Description/Type	Qty	Component Ident	Notes
	BZX 79-C5V1	Zener diode 5V1 400mW	1	D3	400mW DO35 Case.
	MISCELLANEOUS				
PY1156	RD902PF-20B6-30F-B5K-0C	ALPHA B5K LINEAR POT	2	VR1, VR2	Retractable 9mm pot. With centre detent.
	CK-6.35-04 7P	HEADPHONE JACK SKT	1	CN1	
	JST 2,5MM B2B-XH-A	2-way vertical header	2	CN10, CN12	
	JST 2,5MM B6B-XH-A	6-way vertical header	1	CN3	
PY1141	D100-SSV-12	Flat-film connector 12-way, reverse-needle type Single row contacts	2	CN2, CN5	
PY1140	D100-SSV-08	Flat-film connector 8-way, reverse-needle type Single row contacts	4	CN6, CN8, CN9, CN11	
PY1157	D100-SSV-16	Flat-film connector 16-way, reverse-needle type Single row contacts	1	CN4	
	ME-2-9 9V DC	9V DC Relay	19	RL1-RL19	
PY645	Push switch -DPDT	2402-020200-010	1	SW1	As used in 340A

Note: resistors, capacitors and other 'generic' electronic components are not usually stocked by the manufacturer.
Please obtain these locally.

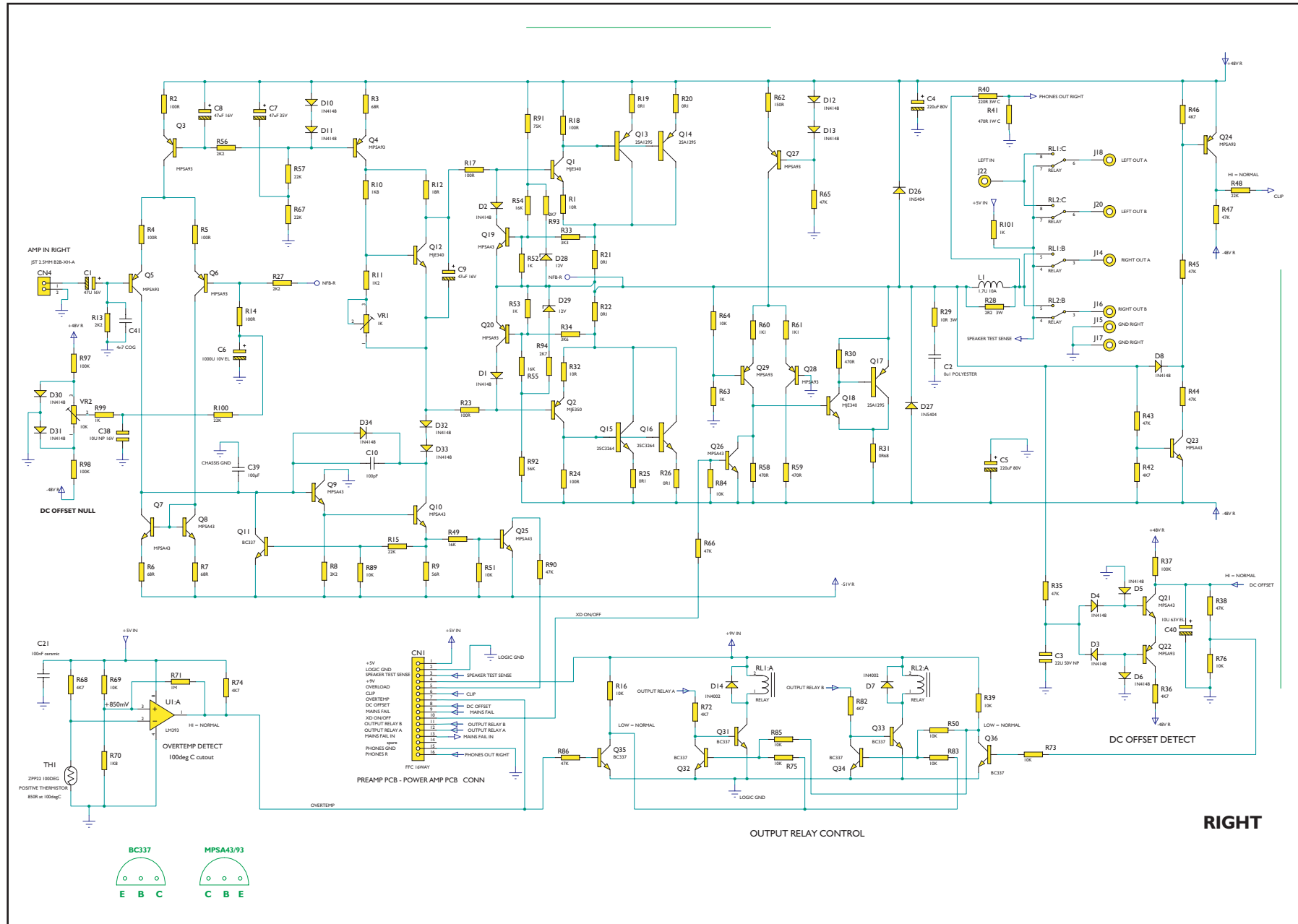
Cambridge Audio Azur 840A Amplifier



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API637/3/4 Power Amplifier (Right) Power Supplies & PSU PCB Schematic

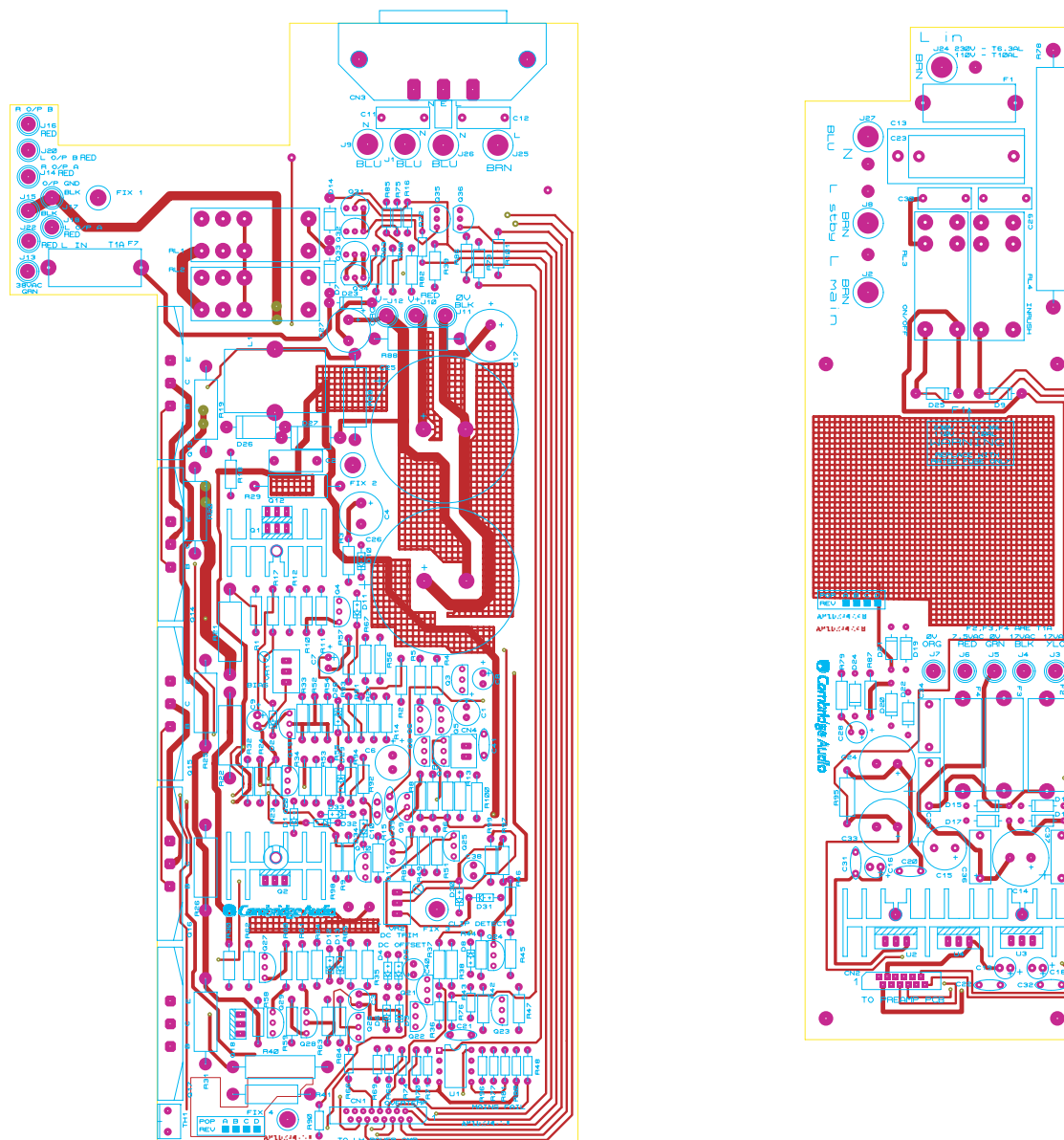
Cambridge Audio Azur 840A Amplifier



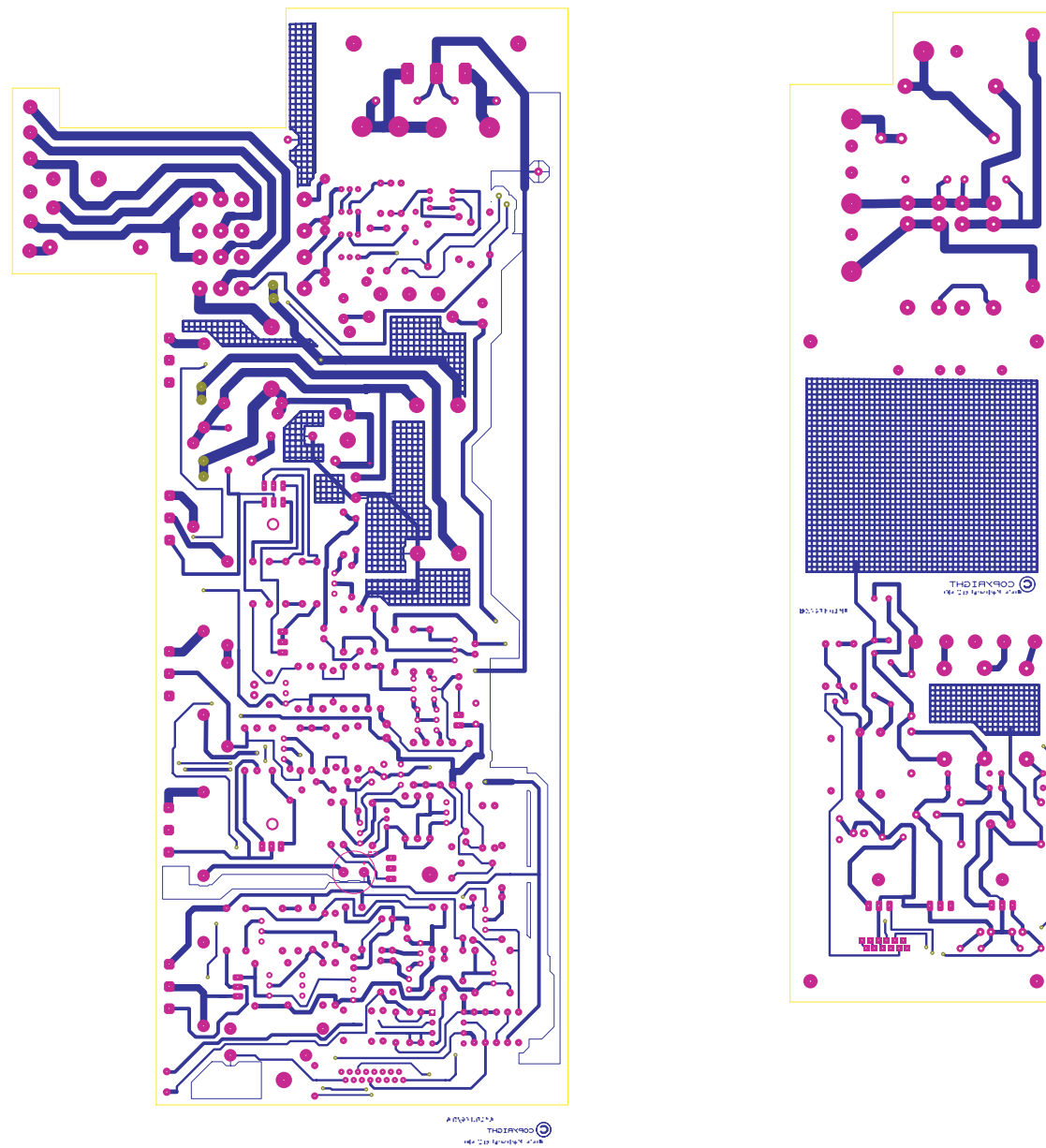
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API6373/4 Power Amplifier Right Channel

Cambridge Audio Azur 840A Amplifier



Cambridge Audio Azur 840A Amplifier



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AP16373/3 Power Amp Right & PSU PCB Layout (Bottom Side)

AP No	Value	Description/Type	Qty	Component Ident	Notes
	RESISTORS				
	910R	0.125 W Metal Film	1	R70	
	2K2	0.125 W Metal Film	1	R80	
	4K7	0.125 W Metal Film	5	R36, R66, R68, R72, R74,	
	10K	0.125 W Metal Film	6	R16, R69, R75, R76, R77, R85,	
	22K	0.125 W Metal Film	1	R48	
	33K	0.125 W Metal Film	1	R81	
	47K	0.125 W Metal Film	2	R43, R90,	
	100K	0.125 W Metal Film	1	R96	
	1M	0.125 W Metal Film	1	R71	
	10R	0.25 W Metal Film	2	R1, R32	
	18R	0.25 W Metal Film	1	R12	
	56R	0.25 W Metal Film	1	R9	
	68R	0.25 W Metal Film	3	R3, R6, R7	
	100R	0.25 W Metal Film	9	R2, R4-R5, R14, R17, R18, R23, R24,	
	150R	0.25 W Metal Film	1	R62	
	470R	0.25 W Metal Film	3	R30, R58, R59	
	1K	0.25 W Metal Film	6	R52-R53, R63, R80, R99, R101	
	1K1	0.25 W Metal Film	2	R60, R61	
	1K2	0.25 W Metal Film	1	R11,	
	1K8	0.25 W Metal Film	1	R10,	
	2K2	0.25 W Metal Film	4	R8, R13, R27, R56,	
	2K7	0.25 W Metal Film	2	R93, R94	
	3K3	0.25 W Metal Film	1	R34	
	3K6	0.25 W Metal Film	1	R33	
	4K7	0.25 W Metal Film	3	R42, R46, R82	
	10K	0.25 W Metal Film	8	R39, R50, R51, R64, R73, R83, R84, , R89,	
	16K	0.25 W Metal Film	3	R49, R54, R55	
	22K	0.25 W Metal Film	5	R15, R57, R67, R81, R100	
	47K	0.25 W Metal Film	8	R35, R38, R44, R45, R47, R65, R66, R86	
	56K	0.25 W Metal Film	1	R92	
	75K	0.25 W Metal Film	1	R91	
	100K	0.25 W Metal Film	4	R37, , R97, R98	
	33R	1 W Metal Film	1	R88	Space off PCB
	470R	1 W Carbon	1	R41	Space off PCB
	0R1	3 W Wire Wound	6	R19-R22, R25, R26	Space off PCB
	1R5	3 W Wire Wound	1	R31	Space off PCB
	2R2	3 W Wire Wound	1	R28	Inductor damping res. No need to stand off PCB
	10R	3 W Wire Wound	1	R29	
	220R	3 W Carbon	1	R40	
	CAPACITORS				
	100pF	Ceramic 100V 10% Pitch= 3mm	1	C10, C39	
	10nF X1 CAP	MEX103K300A02 Pitch =10mm	3	C11, C12, C20	
	100nF	Ceramic 100V 10% Pitch= 5mm	2	C18, C21	
	100nF	Polyester Pitch= 10mm	1	C2	
	10uF	16V Electrolytic Radial Non Polarised (6.4mm) Pitch= 5mm	2	C20, C38	
	10uF	63V Electrolytic Radial (5mm diam) Pitch= 3.5mm	1	C40	
	22uF	50V Non Polarised Electrolytic Radial (5.2mm) Pitch= 2.5mm	1	C3	

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AP No	Value	Description/Type	Qty	Component Ident	Notes
	47uF	16V Electrolytic Radial (5mm) Pitch= 2.5mm	3	C1, C8, C9	
	47uF	35V Electrolytic Radial (10mm) Pitch= 2.5mm	1	C7	
	220uF	100V Electrolytic Radial (12.5mm) Pitch= 5mm	1	C17	
	220uF	80V Electrolytic Radial (10.4mm) Pitch= 5mm	2	C4	
	1000uF	10V Electrolytic Radial (10.4mm) Pitch= 5mm	1	C6	
	1000uF	50V Electrolytic Radial (13.4mm) Pitch= 5mm	1	C27	
	15000uF	63V Electrolytic Radial (35.4mm) Pitch= 10mm	2	C25, C26	
	SEMICONDUCTORS				
PY1152	LM393AP	Low-offset dual Comparator, A-version for low offset voltage	1	U1	DIL08 Package
	TRANSISTORS				
PY1148	MJE340	NPN Driver Transistor	3	Q1, Q12, Q18	TO126
PY1150	MJE350	PNP Driver Transistor	1	Q2	TO126
PY021	MPSA93	PNP Small Signal	10	Q3-Q6, Q20, Q22, Q24, Q27-Q29	TO92WIDE MPSA92 may be used
PY013	MPSA43	NPN Small Signal	8	Q7-Q10, Q19, Q21, Q23, Q26, Q25,	TO92WIDE MPSA42 may be used
PY214	BC337-25	NPN Small Signal	9	Q11, Q31-Q36	TO92
PY1149	2SA1295	PNP Power Audio	3	Q13, Q14, Q17	MT200
PY1147	2SC3264	NPN Power Audio	2	Q15, Q16	MT200
	DIODES				
	1N4148	Small Signal Diode	18	D1-D6, D8, D10-D13, D17, D18, D30-D34	DIODE-IN4148
	1N4002	General Purpose Rectifier	3	D7, D14, D23,	DO41 Package
	1N5404	General Purpose Rectifier	2	D26, D27	DO27 Package Clamp diodes
	BZX79-C12	12V Zener diode 400mW	2	D28, D29	400mW DO35 Case.
	MISCELLANEOUS				
	ZP221A501E	POSITIVE THERMISTOR	1	TH1	Nominal operating temp 100 deg C
	08-1950100-150	1.7uH 10A INDUCTOR	1	L1	10 turns of 1.5mm copper wire, diameter 20mm, length approx 20mm
	MULTITURN PRESET 1K	Top adjust. Footprint 9.5 x 4.5 mm	1	VR1	Set quiescent current. Insert so adj screw next to R17
	MULTITURN PRESET 10K	Top adjust. Footprint 9.5 x 4.5 mm	1	VR2	DC trim Insert so adj screw next to Q11
	SS-7B-1	WongFeng IEC-SOCKET	1	CN3	
PY1151	D100-SSV-16	FFC CONNECTOR 16-WAY, Vertical "Reverse needle" type, Single row of contacts	1	CN1	
	4031-050100-001	Fuseholder 20mm	1	F7	
	T1A AL	FUSE-20MM 1A anti surge,	1	F7	WMZ12A(IV)-100S80FLS

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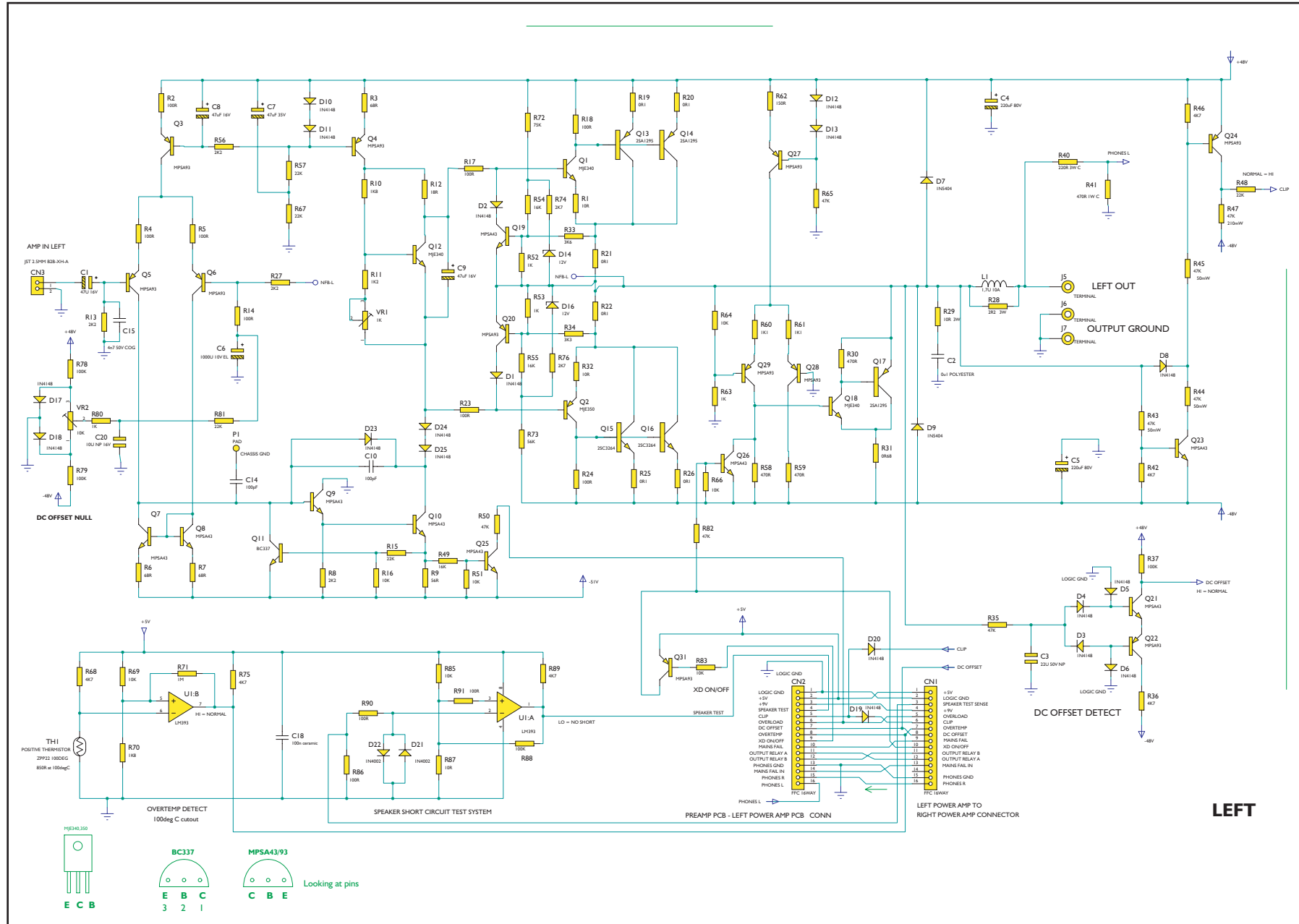
Cambridge Audio Azur 840A Amplifier PSU PCB BOM

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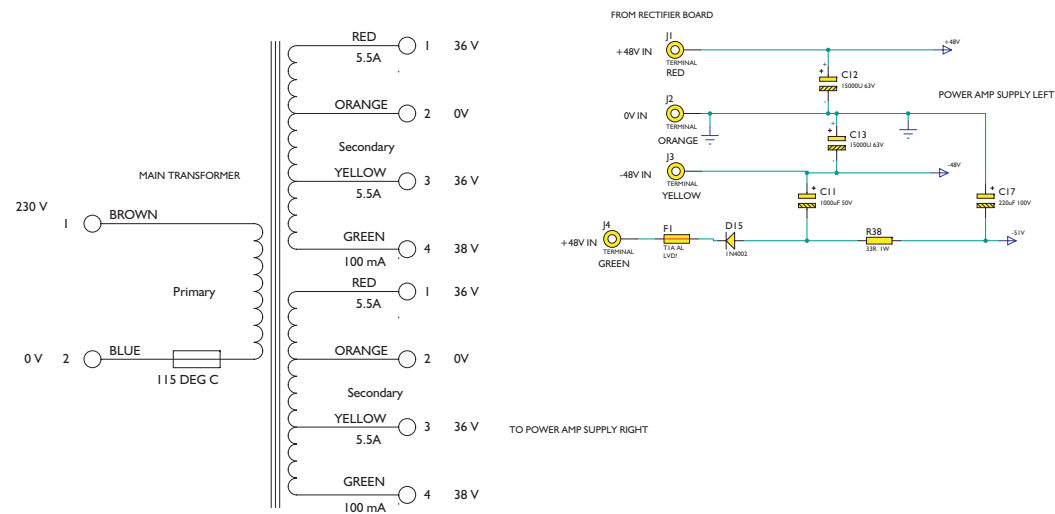
AP No	Value	Description/Type	Qty	Component Ident	Notes
	RESISTORS				
	2R2	0.5 W Metal Film	1	R95	Space off PCB
	10R 10W 8.5X53MM WireWound	KN 10W J 100hm B	1	R78	Inrush resistor. Space off PCB
	4K7	0.25 W Metal Film	1	R79	
	47K	0.25 W Metal Film	1	R87	
	CAPACITORS				
	10nF X1 Capacitor	MEX103K300A02 Pitch = 10mm	6	C29, C30, C34-C37	
	100nF	Ceramic 100V Pitch= 5mm	4	C20, C22, C31, C32	
	470nF	X2 Suppression CAP BOX 27.5X13 Pitch= 27.5mm or BOX 22.5X10 Pitch= 22.5mm	1	C13 or C23 dependant on pitch	
	4u7	50V Electrolytic Radial (5.2mm) Pitch= 2.5mm	1	C28	
	47uF	16V Electrolytic Radial (5mm) Pitch= 2.5mm	1	C16	
	100uF	25V Electrolytic Radial (6mm) Pitch= 2.5mm	2	C18,C19	
	470uF	35V Electrolytic Radial (10.4mm) Pitch= 5mm	1	C15	
	1000uF	35V Electrolytic Radial (10.4mm) Pitch= 5mm	1	C14	
	4700uF	16V Electrolytic Radial (16.4mm) Pitch= 5mm	2	C 24, C 33	MAXIMUM HEIGHT 25 mm
	SEMICONDUCTORS				
	7805	5 Volt 1A Linear Regulator	1	U2	TO 220 Package
	7815	15 Volt 1A Linear Regulator	1	U3	TO 220 Package
	7915	-15 Volt 1A Linear Regulator	1	U4	TO 220 Package
	DIODES				
	1N4002	General Purpose Rectifier	9	D15-D22, D24	DO41 Package
	1N4001	General Purpose Rectifier	2	D9, D25	DO41 Package
	MISCELLANEOUS				
	T1AL	1A antisurge fuse 20mm (low breaking capacity)	3	F2 - F4	
	T6.3 AL or T10A	6.3A or 10A antisurge fuse 20mm (low breaking capacity)	1	F1	T6A3 for 230V T10A for 115V
	4031-050100-001	Fuseholder 20mm	4	F1, 2, 3, 4,	
	4034-000030-000	Fuseholder cover	1	F1	Place on mains fuse holder F1
	D100-SSV-12	FFC CONNECTOR 12-WAY, Vertical "Reverse needle" type, Single row of contacts	1	CN2	
PY1154	RELAY ME14F	RELAY ME14F-9H16S SPST 16A 250 Vac 9V coil	2	RL3, RL4	Mains & inrush control relays.

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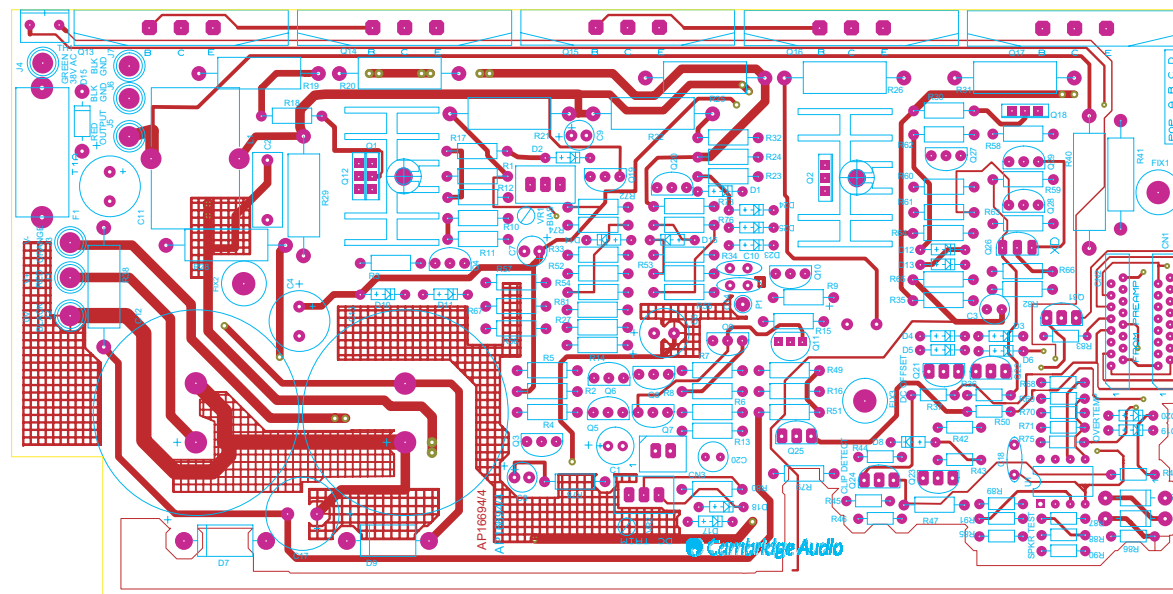
Cambridge Audio Azur 840A Amplifier



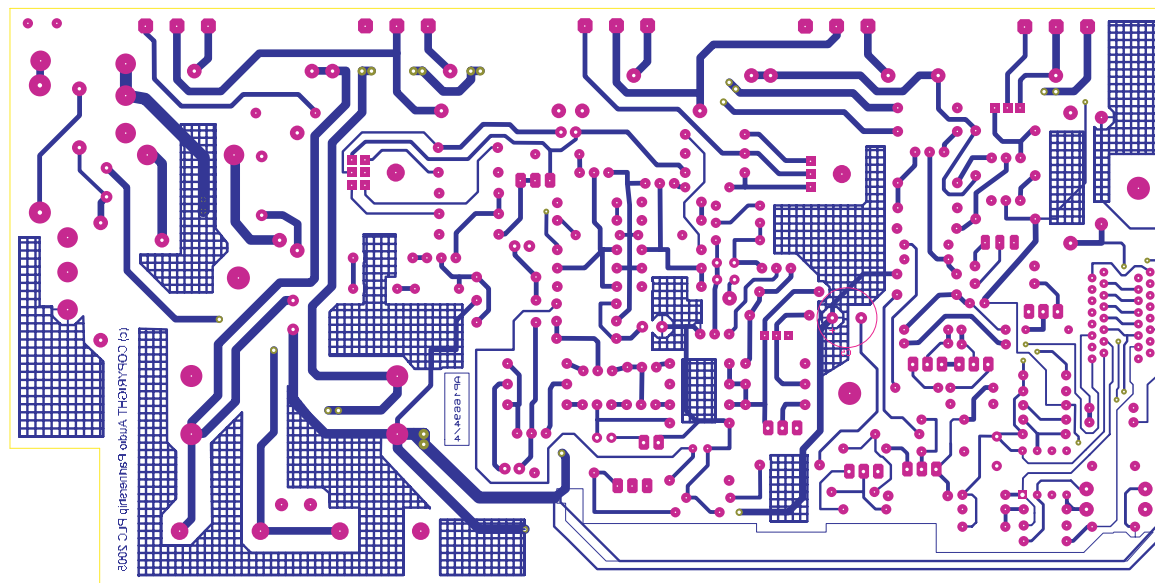
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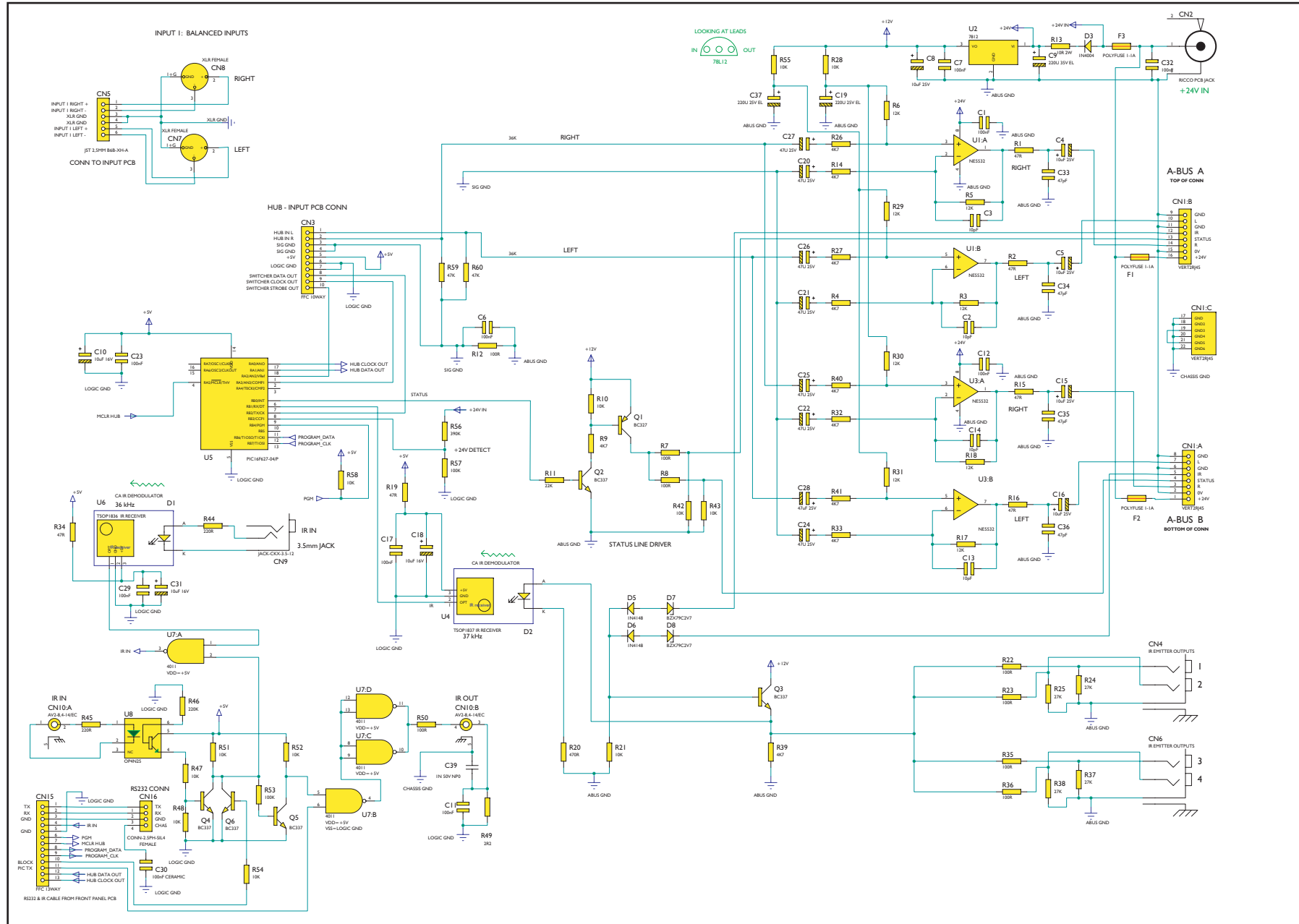
AP No	Value	Description/Type	Qty	Component Ident	Notes
	RESISTORS				
	10R	0.125 W Metal Film	1	R87	
	100R	0.125 W Metal Film	3	R86, R90, R91	
	910R	0.125 W Metal Film	1	R70	
	4K7	0.125 W Metal Film	6	R36, R42, R46, R68, R75, R89	
	10K	0.125 W Metal Film	3	R69, R83, R85	
	22K	0.125 W Metal Film	1	R48,	
	47K	0.125 W Metal Film	4	R43, R44, R45, R50	
	100K	0.125 W Metal Film	2	R37, R88	
	1M	0.125 W Metal Film	1	R71	
	10R	0.25 W Metal Film	2	R1, R32,	
	18R	0.25 W Metal Film	1	R12	
	56R	0.25 W Metal Film	1	R9	
	68R	0.25 W Metal Film	3	R3, R6, R7	
	100R	0.25 W Metal Film	10	R2, R4, R5, R14, R17, R18, R23, R24,	
	150R	0.25 W Metal Film	1	R62	
	470R	0.25 W Metal Film	3	R30, R58, R59	
	1K	0.25 W Metal Film	4	R52, R53, R63, R80,	
	1K1	0.25 W Metal Film	2	R60, R61	
	1K2	0.25 W Metal Film	1	R11,	
	1K8	0.25 W Metal Film	1	R10	
	2K2	0.25 W Metal Film	4	R8, R13, R27, R56	
	2K7	0.25 W Metal Film	2	R74, R76	
	3K3	0.25 W Metal Film	1	R34	
	3K6	0.25 W Metal Film	1	R33	
	10K	0.25 W Metal Film	4	R16, R51, R64, R66,	
	16K	0.25 W Metal Film	3	R49, R54, R55	
	22K	0.25 W Metal Film	4	R15, R57, R67, R81	
	47K	0.25 W Metal Film	5	R35, R47, R65, R73, R82	
	56K	0.25 W Metal Film	1	R73	
	75K	0.25 W Metal Film	1	R72	
	100K	0.25 W Metal Film	2	R78, R79,	
	33R	1W Metal Film	1	R38	Space off PCB
	470R	1 W Carbon Pitch = 18mm	1	R41	Space off PCB
	0R1	3 W Wire Wound	6	R19-R22, R25, R26	Space off PCB
	1R5	3 W Wire Wound	1	R31	Space off PCB
	2R2	3 W Wire Wound	1	R28	Inductor damping res. No need to stand off PCB
	10R	3 W Wire Wound	1	R29	ZOBEL RES. Space off PCB
	220R	3 W Carbon Pitch = 22.5mm	1	R40	Space off PCB
	CAPACITORS				
	100pF	Ceramic 100V 10% Pitch= 3mm	2	C10, C14	
	100nF	Ceramic 100V 10% Pitch= 5mm	1	C18	
	100nF	Polyester 10% Pitch= 10mm	1	C2	
	10uF	16V Non Polarised Electrolytic Radial (5.2mm) Pitch= 2.5mm	1	C20	
	22uF	50V Non Polarised Electrolytic Radial (5.2mm) Pitch= 2.5mm	1	C3	

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AP No	Value	Description/Type	Qty	Component Ident	Notes
	47uF	35V Electrolytic Radial (10mm) Pitch= 2.5mm	1	C7	
	47uF	16V Electrolytic Radial (5mm) Pitch= 2.5mm	3	C1, C8, C9	
	220uF	80V Electrolytic Radial (10.4mm) Pitch= 5mm	2	C4, C5	
	220uF	100V Electrolytic Radial (12.5mm) Pitch= 5mm	1	C17	
	1000uF	10V Electrolytic Radial (10.4mm) Pitch=5 mm	1	C6	
	1000uF	50V Electrolytic Radial (13.4mm) Pitch= 5mm	1	C11	
	15000uF	63V Electrolytic Radial (35.4mm) Pitch= 10mm	2	C12, C13	
	SEMICONDUCTORS				
PY1152	LM393AP	Dual differential comparator, A-version for low offset voltage	1	U1	DIL08
	TRANSISTORS				
PY1148	MJE340	NPN Power Transistor	4	Q1, Q12, Q18, Q30	TO126
PY1150	MJE350	PNP Power Transistor	1	Q2	TO126
PY021	MPSA93	PNP High Voltage	11	Q3-Q6, Q20, Q22, Q24, Q27-Q29, Q31	TO92WIDE MPSA92 may be used
PY013	MPSA43	NPN High Voltage	9	Q7-Q10, Q19, Q21, Q23, Q25, Q26	TO92WIDE MPSA42 may be used
PY214	BC337-25	NPN Small Signal	1	Q11	TO92
PY1149	2SA1295	PNP Power Audio	3	Q13, Q14, Q17	MT200
PY1147	2SC3264	NPN Power Audio	2	Q15, Q16	MT200
	DIODES				
	1N4148	Small Signal Diode	18	D1-D6, D8, D10-D13, D17-D20, D23-D25	
	1N5404	General Purpose Rectifier	2	D7, D9	DO27
	1N4002	General Purpose Rectifier	3	D15, D21, D22	DO41
	ZENER 12V 400mW	Zener BZX79-C12	2	D14, D16	400mW DO35 Case.
	MISCELLANEOUS				
	ZP221A501E	POSITIVE THERMISTOR	1	TH1	Nominal operating temp 100 deg C
	MULTITURN PRESET 1K	Top adjust. Footprint 9.5 x 4.5 mm	1	VR1	Set quiescent current. Insert so adj screw next to R12
	MULTITURN PRESET 10K	Top adjust. Footprint 9.5 x 4.5 mm	1	VR2	DC trim Insert so adj screw next to R78
PY1151	D100-SSV-16	FFC CONNECTOR 16-WAY, Vertical "Reverse needle" type, Single row of contacts	2	CN2	
	T1A AL	1 Amp 20mm antisurge fuse	1	F1	
	4031-050100-001	Fuseholder 20mm	1	F1	
	08-1950100-150	1.7uH 10A INDUCTOR	1	L1	10 turns of 1.5mm copper wire, diameter 20mm, length approx 20mm
	AP16831/3	To drawing Main heatsink	1	Q13, 14, 15, 16, 17	

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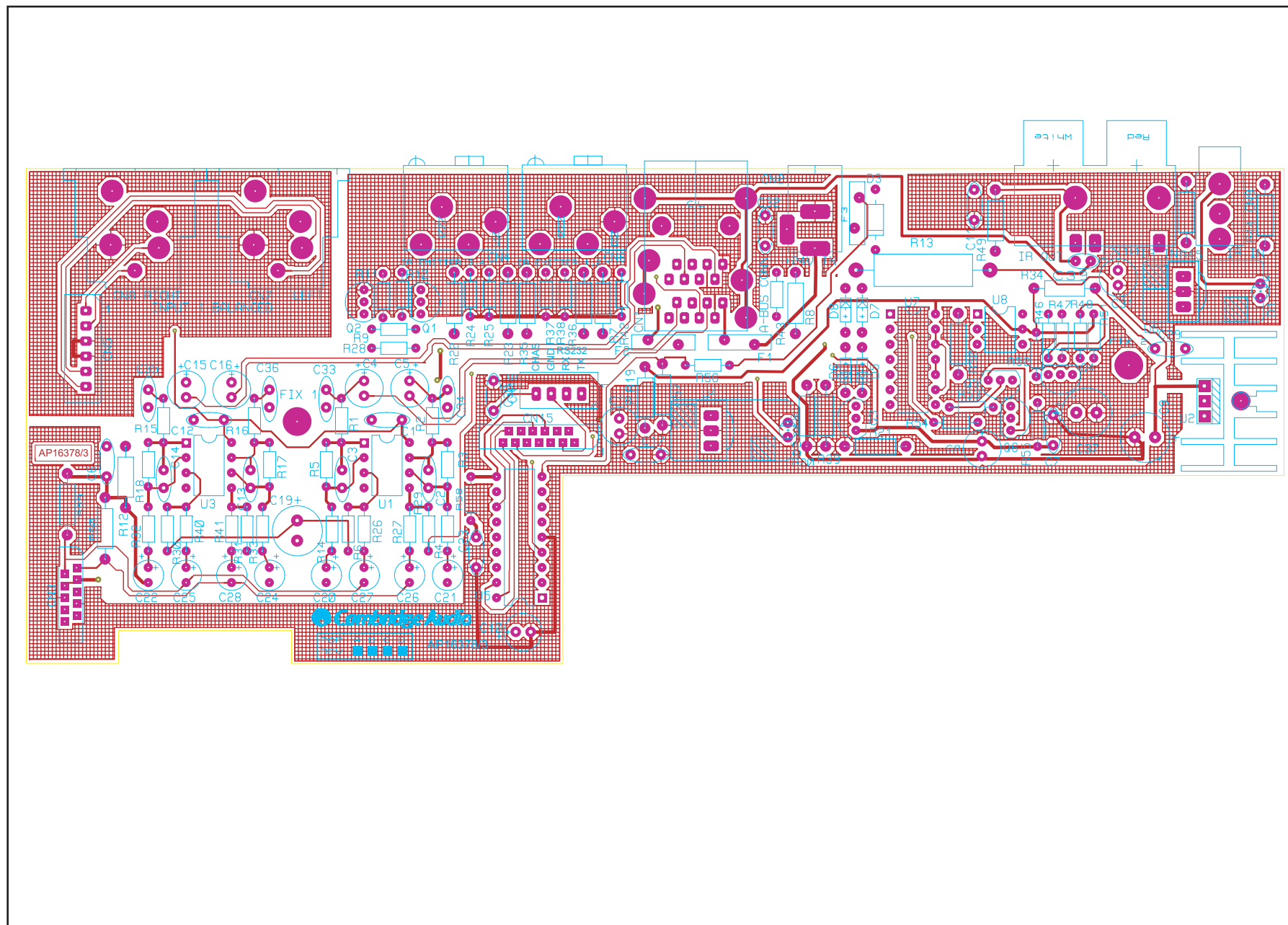
Cambridge Audio Azur 840A Amplifier



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API63771/3 Hub PCB Schematic

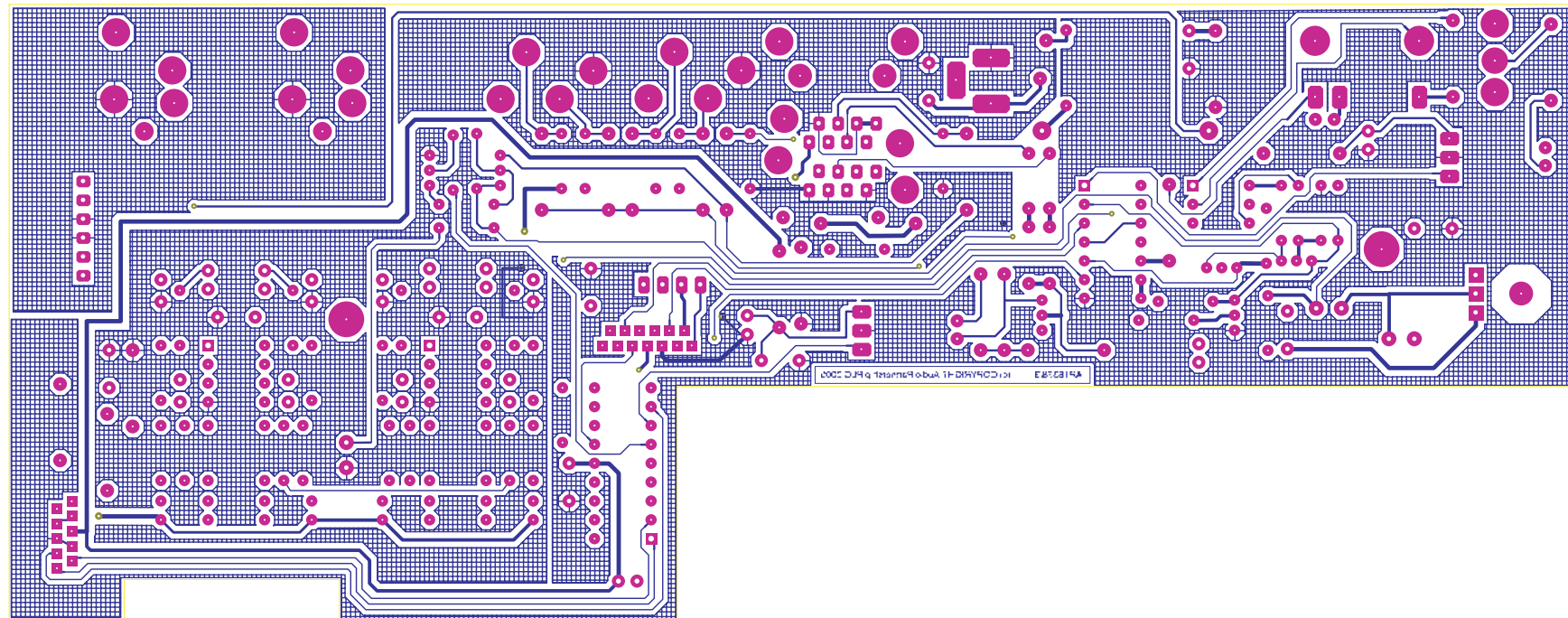
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API6377/3 Hub PCB Layout (Top Panel)

Cambridge Audio Azur 840A Amplifier



AP No	Value	Description/Type	Qty	Component Ident	Notes
	RESISTORS				
	47R	0.125 W Metal Film	4	R1, R2, R15, R16	
	4K7	0.125 W Metal Film	9	R4, R9, R14, R26, R27, R32, R33, R40, R41	
	10K	0.125 W Metal Film	10	R10, R28, R42, R43, R47, R48, R51, R52, R54, R55	
	12K	0.125 W Metal Film	8	R3, R5, R6, R17, R18, R29-R31	
	22K	0.125 W Metal Film	1	R11	
	27K	0.125 W Metal Film	4	R24, R25, R37, R38	
	100K	0.125 W Metal Film	2	R53, R56	
	390K	0.125 W Metal Film	1	R57	
	2R2	0.25 W Metal Film	1	R49	
	47R	0.25 W Metal Film	2	R19, R34	
	100R	0.25 W Metal Film	8	R7, R8, R12, R22, R23, R35, R36, R50	
	220R	0.25 W Metal Film	2	R44, R45	
	470R	0.25 W Metal Film	1	R20	
	4K7	0.25 W Metal Film	1	R39	
	10K	0.25 W Metal Film	3	R21, R51, R58	
	47K	0.25 W Metal Film	2	R59, R60	
	10R	2 W Wire Wound	1	R13	Space off PCB
	CAPACITORS				
	10pF	Ceramic 50V 10% Pitch = 3mm	4	C2, C3, C13, C14	
	47pF	Ceramic 50V 10% Pitch = 3mm	4	C33-C36	
	100nF	Ceramic 50V 10% Pitch = 5mm	10	C1, C6, C7, C11, C12, C17, C23, C29, C30, C32	
	10uF	16V Electrolytic Radial (6.4mm) Pitch =2.5mm	3	C10, C18, C31	
	10uF	25V Electrolytic Radial (6.4mm) Pitch =2.5mm	5	C4, C5, C8, C15, C16	
	47uF	25V Electrolytic Radial (5.2mm) Pitch =2.5mm	8	C20-C22, C24-C28	
	220uF	25V Electrolytic Radial (5.2mm) Pitch =2.5mm	2	C19, C37	
	220uF	35V Electrolytic Radial (8.4mm) Pitch =3.5mm	1	C9	
	SEMICONDUCTORS				
PY259	NE5532	Low noise dual Op Amp	2	U1, U3	DIL08
	CD4011BE	Texas Instruments Quad NAND gate IC	1	U7	Alternative is National semi CD4011BCN
	7812	12V, 1A regulator, TO220	1	U2	TO220
PY1144	OP4N25	Optoisolator	1	U8	DIL06
	PIC16F627 -04/P	PIC Microcontroller	1	U5	DIL18 Contact Audio Partnership Service Department
PY1007	TSOP34837	37Khz IR Receiver Module	1	U4	TSOP18V (Replaces TSOP1837)
PY755	TSOP34836	36Khz IR Receiver Module	1	U6	TSOP18V (Replaces TSOP1836)
	TRANSISTORS				
PY219	BC 327-25	PNP Small Signal	1	Q1	TO92
PY214	BC 337-25	NPN Small Signal	5	Q2-Q6	TO92
	DIODES				
	1N4004	General Purpose Rectifier diode	1	D3	
PY962	MV50640	Red LED	2	D1, D2	NO ALTERNATIVE LED TO BE USED Fitted as part of assembly with AP17339/3
	1N4148	Small Signal Diode	2	D5, D6	
	BZX79C2V7	Zener Diode 2.7 Volts	2	D7, D8	
	MISCELLANEOUS				
	AJ-600-21-F-4-B	Allsun Dual vertical RJ45	1	CN1	
	RDC-020-05	DC power in connector	1	CN2	
	CKX-3.5-10	Dual 3.5mm jack socket (green)	2	CN4, CN6	IR EMITTER OUTPUTS
	JY-5033P*030	Female XLR socket with gold pins	2	CN7, CN8	
	CKX-3.5-12	Single 3.5mm jack socket (black)	1	CN9	

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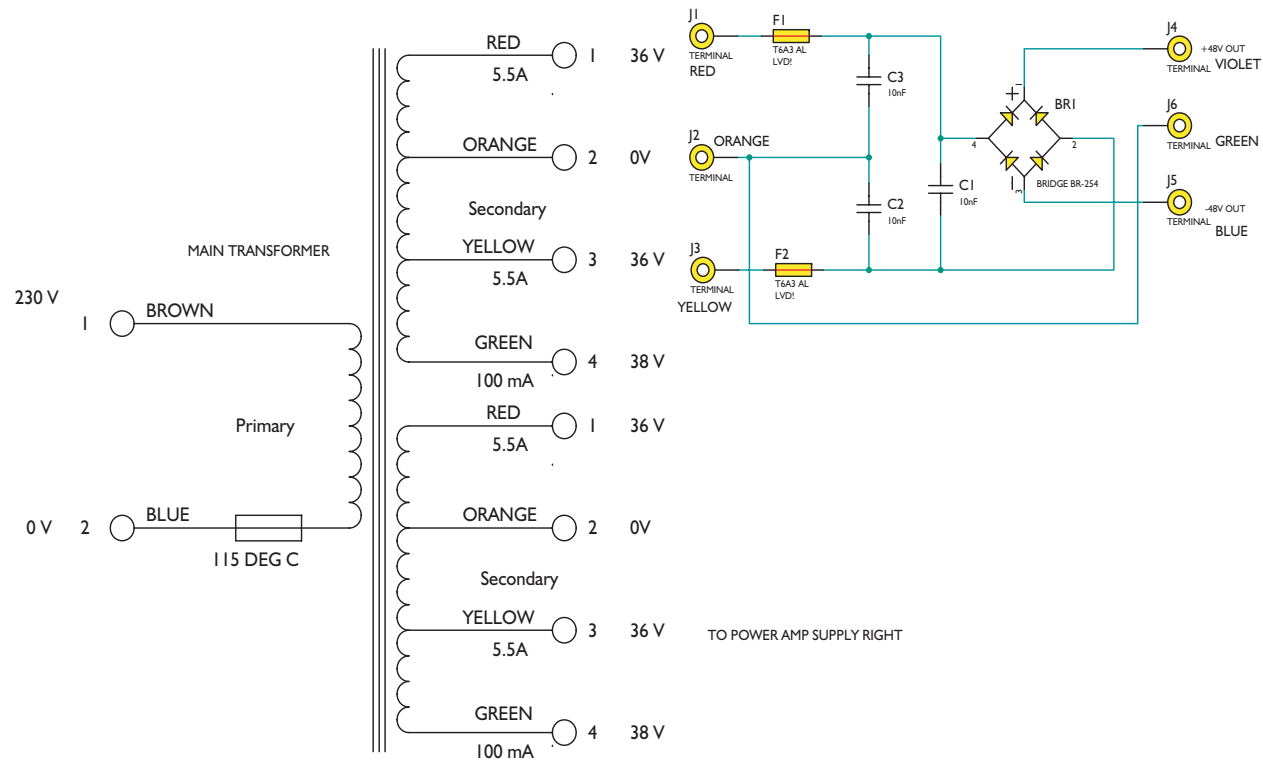
Cambridge Audio Azur 840A Amplifier Hub Board BOM

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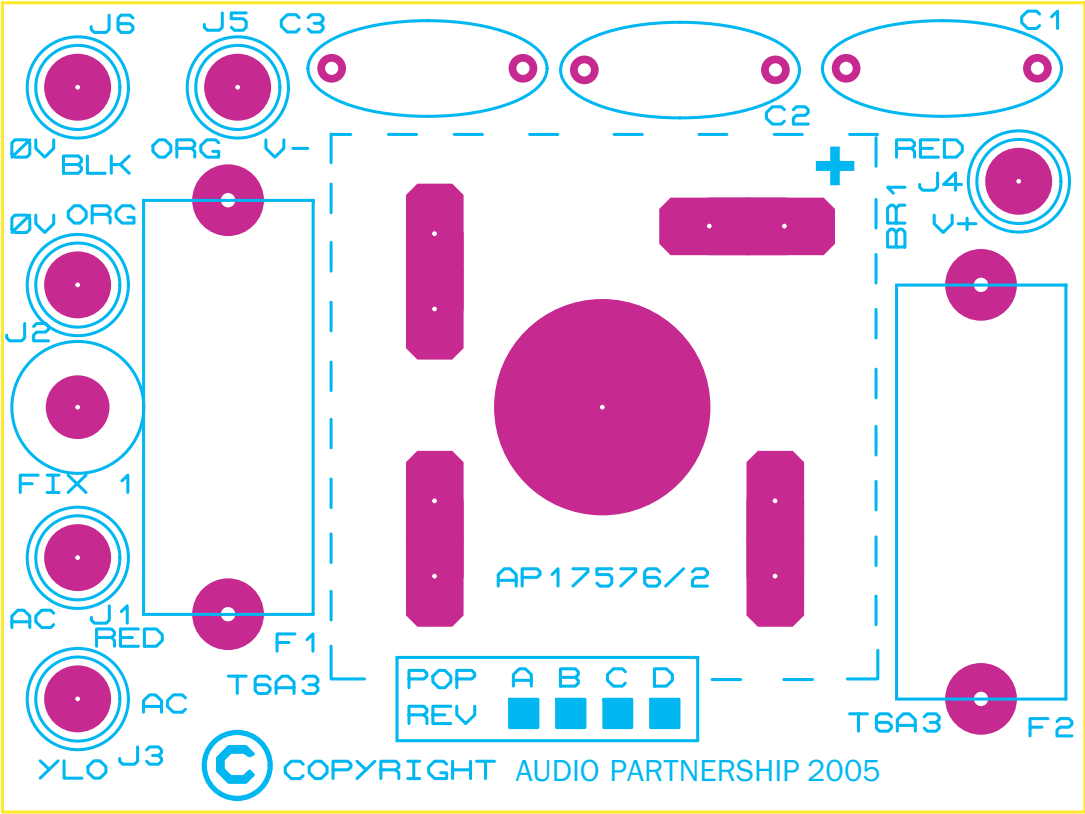
AP No	Value	Description/Type	Qty	Component Ident	Notes
	AV2-8,4-14/EC	Dual phono socket with EMC gnd Orange inserts	1	CN10	
PY1143	D100-SSV-10	Vertical FFC conn, reverse-needle type single-row contacts 10-way	1	CN3	
PY1142	D100-SSV-13	Vertical FFC conn, reverse-needle type single-row contacts 13-way	1	CN15	
	CONN-2.5PH-SIL4	JST vertical header type XH	1	CN16	For RS232 conn cableform
	CONN-2.5PH-SIL6	JST vertical header type XH	1	CN5	For balanced input
	AP17339/3	IR Receiver Housing	2	Fit over D2/U4 and D1/U6	
	POLYFUSE 1-1A	RLD30P110U	3	F1, F2, F3	POLYFUSE 1.1A 30Vdc 7.4*14.2*3MM 6.6Sec

Note: resistors, capacitors and other 'generic' electronic components are not usually stocked by the manufacturer. Please obtain these locally.

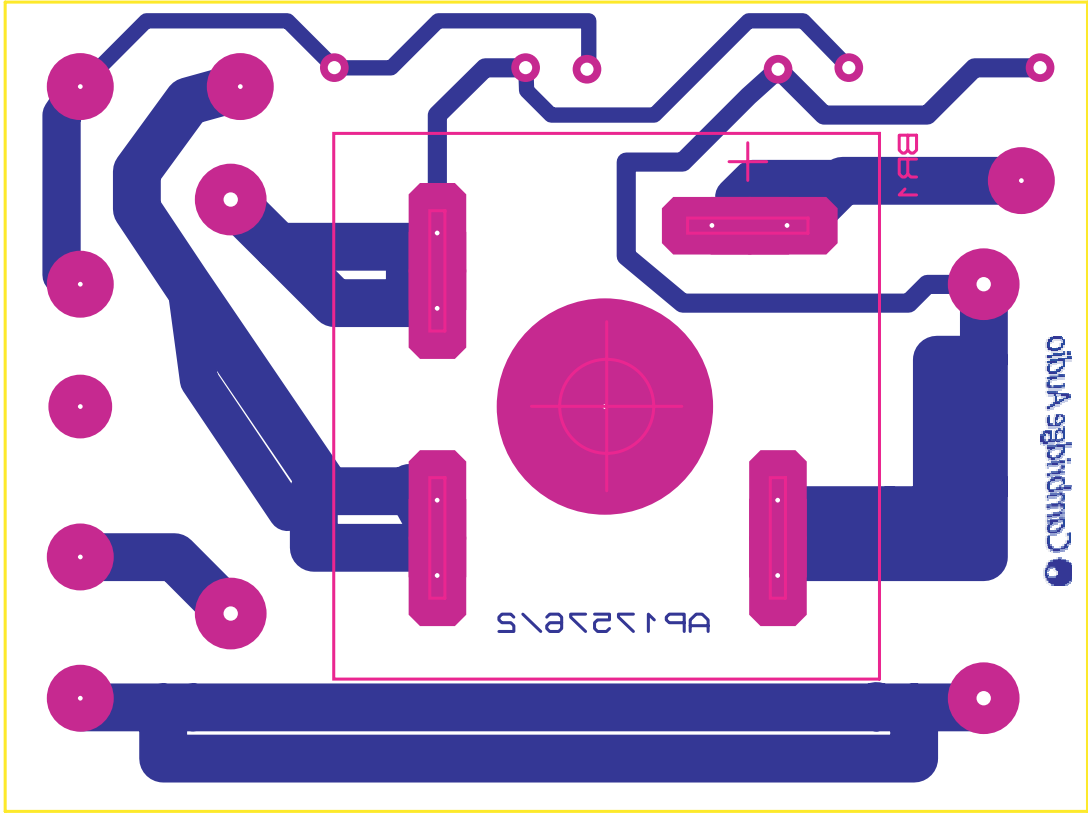
Cambridge Audio Azur 840A Amplifier



Cambridge Audio Azur 840A Amplifier



Cambridge Audio Azur 840A Amplifier



Cambridge Audio Azur 840A Amplifier, Rectifier PCB BOM

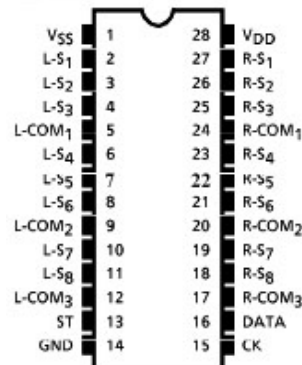
AP17578/2

AP No	Value	Description/Type	Qty	Component Ident	Notes
	CAPACITORS				
	10nF X1 Capacitor	MEX103K300A02 Pitch =10mm	3	C14-C16	
	DIODES				
	Bridge Rectifier BR254	400PIV 25A blk metal case	1	BR1	Rectifier is not soldered to PCB until PCB is fixed to amplifier heatsink
	MISCELLANEOUS				
	T6A3 AL	6.3 Amp 20mm anti surge Fuse, low breaking capacity	2	F1, F2	
	4031-050100-001	Fuseholder 20mm	2	F1, F2	

Note: resistors, capacitors and other 'generic' electronic components are not usually stocked by the manufacturer.
Please obtain these locally.

Cambridge Audio Azur 840A Amplifier IC Pin Layout Details

TC9163AF – Input PCB (U1)

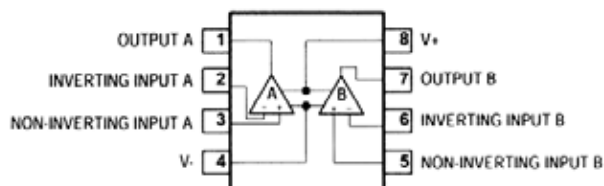


NE5532

Input PCB - (U2, U3, U4, U5, U6, U7, U8, U9, U14 & U18)

A-BUS PCB – (U1 & U3)

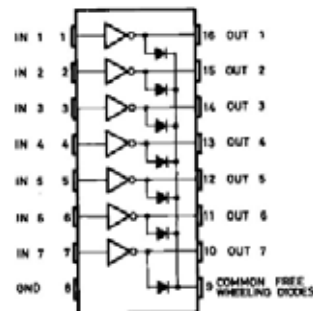
Pre-Amp PCB – (U1, U2, U9 & U12)



ULN2003A

Input PCB - (U16)

Pre-Amp PCB – (U4, U5 & U7)



BC337

Input PCB - (Q1)

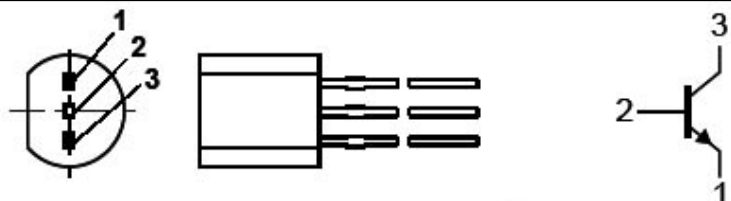
Pre-Amp PCB – (Q2, Q3, Q4 & Q5)

Front Panel PCB – (Q2, Q3, Q4 & Q5)

Right Hand Power Amp PCB – (Q11, Q31, Q32, Q33, Q34, Q35 & Q36)

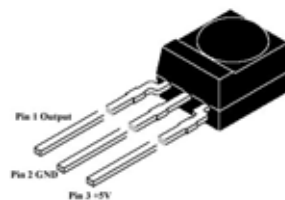
A-BUS PCB – (Q2, Q3, Q4, Q5 & Q6)

Left Hand Power Amp – (Q11)



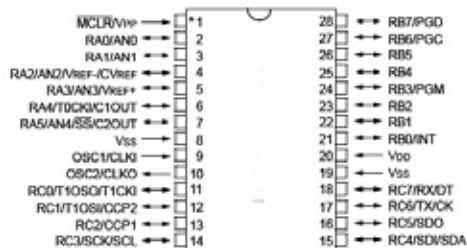
TSOP18

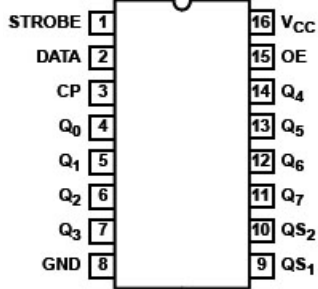
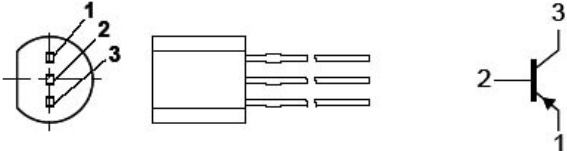
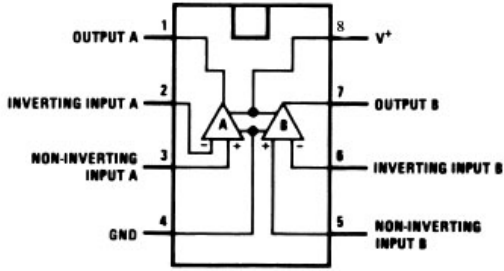
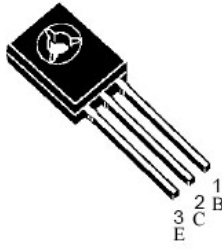
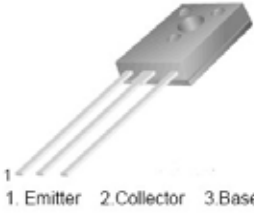
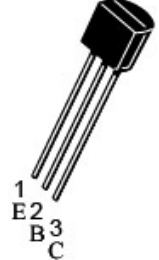

Pre-Amp PCB - (U10)

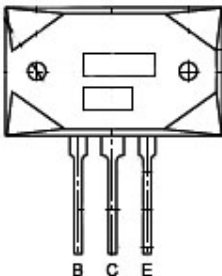
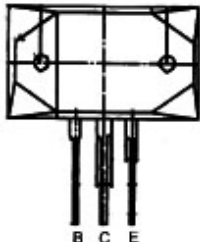
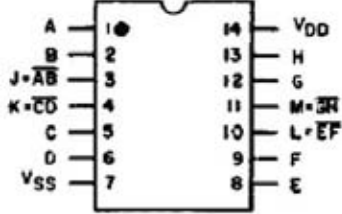
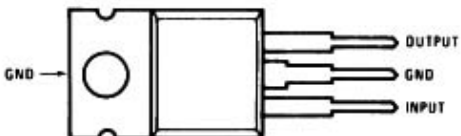
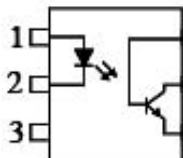
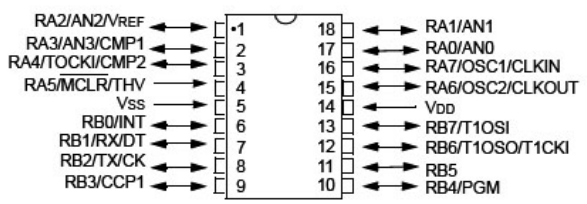




PIC16F877A-I/SP

Front Panel PCB



<p>74HC4094 Front Panel PCB - (U2, U3, U4, U5 & U6)</p>	
<p>BC327 Front Panel PCB - (Q1 & Q8) A-BUS PCB - (Q1)</p>	
<p>LM393AP Right Hand Power Amp PCB - (U1) Left Hand Power Amp PCB - (U1)</p>	
<p>MJE340 Right Hand Power Amp PCB - (Q1, Q12 & Q18) Left Hand Power Amp PCB - (Q1, Q12, Q18 & Q30)</p>	
<p>MJE350 Right Hand Power Amp PCB - (Q2) Left Hand Power Amp PCB - (Q2)</p>	
<p>MPSA93 Right Hand Power Amp PCB - (Q3, Q4, Q5 Q6, Q20, Q22, Q24, Q27, Q28 & Q29) Left Hand Power Amp PCB - (Q3, Q4, Q5, Q6, Q20, Q22, Q24, Q27, Q28, Q29, Q31)</p>	
<p>MPSA43 Right Hand Power Amp PCB - (Q7, Q8, Q9, Q10, Q19, Q21, Q23, Q25 & Q26) Left Hand Power Amp PCB - (Q7, Q8, Q9, Q10, Q19, Q21, Q23, Q25, Q26)</p>	

<p>2SA1295 Right Hand Power Amp PCB - (Q13, Q14 & Q17) Left Hand Power Amp PCB - (Q13, Q14 & Q17)</p>	
<p>2SC3264 Right Hand Power Amp PCB - (Q15 & Q16) Left Hand Power Amp PCB - (Q15 & Q16)</p>	
<p>CD4011BE A-BUS PCB - (U7)</p>	
<p>7812 A-BUS PCB - (U2)</p>	
<p>OP4N25 A-BUS PCB - (U8)</p>	
<p>PIC16F627-04/P A-BUS PCB - (U5)</p>	
<p>TSOP34837 A-BUS PCB - (U4)</p>	
<p>TSOP34836 A-BUS PCB - (U6)</p>	

AP16396/2 Azur 840A Amplifier Technical Description

Start: 11 Aug 05 Version 2
Updated: 29 Nov 05

Revision history
V1->V2 More info added to operating instructions summary

This document gives a concise guide to the operation of the 840A XD amplifier.

CONTENTS

Azur 840A power supply PCB	AP16373/3_B
Azur 840A front panel PCB	AP16369/3
Azur840A input board PCB	AP16361/3
Azur 840A preamp PCB	AP16365/3
Azur 840A power amp Left PCB	AP16693/4
Azur 840A power amp Right PCB	AP16373/3_A
Azur 840A A-BUS Hub PCB	AP16377/3
Azur 840A Rectifier PCB	AP17575/2

Operating instructions summary

Service Menu

NOTES
Logic signals are in upper case, thus; MAINS FAIL
References to "the PIC" or "the main PIC" are to the main housekeeping PIC on the front panel PCB unless otherwise stated.

The Power Supply PCB

This carries:

- Power supplies for everything except power amps
- Mains on/off and inrush control switching relays
- X2 capacitor
- The mains-fail detect circuit

There are four power supply rails:

- +15V Opamp supply
- 15V Opamp supply
- +9V Relay supply
- +5V Microcontroller, logic and comparator supply

The power supply board also carries the mains switching relays that control the supplies to the power amplifiers. When the amplifier goes from standby to ON, the inrush control relay RL4 closes first with R78 limiting the inrush current. After 3 seconds (while speaker-short testing is going on- see below) the On/Off relay RL3 closes. 100 msec later (to ensure no break in the supply) RL4 opens. When the amplifier goes from ON to standby, RL3 simply opens.

The front panel PCB

This carries:

- The main PIC
- The volume rotary encoder and control switches.
- The LCD display
- Shift registers for driving the relays
- The RS232 interface for control and software updates

U1 is the main housekeeping microcontroller for the amplifier; it is a 16F977A PIC running at 20 MHz. It handles all the control functions of the amplifier except for those on the A-BUS hub PCB, which are dealt with by another PIC on that board.

PIC pins handling amplifier conditions:

	Pin	Normal	Active
Speaker short-circuit detect	7	LOW	HIGH Active= short found
Phones detect	27	HIGH	LOW Active= Phone jack in
Mains fail	28	LOW	HIGH
DC offset protection	29	HIGH	LOW
Overtemperature protection	30	HIGH	LOW
Overload protection	33	HIGH	LOW
Clip detection	34	HIGH	LOW

The LCD display module interfaces to the front panel PCB through CN2. Display data from the PIC is clocked serially into shift register U2 and sent to the LCD module in byte-wide parallel format. The LCD module is powered from the +5V rail.

The relays on the other PCBs are controlled by a set of shift registers that convert serial data from the PIC into 32 latched outputs. Four shift registers (U3,U4,U5,U6) are connected so that the serial input enters the first register and is clocked through and out of its serial output into the serial input of the second register. Changing any output requires 32 bits to be clocked through the registers by the SERIAL CLOCK signal. When SERIAL STROBE goes high the data is latched in each register to give a static output. Data appears at the outputs only when the SHIFT REG ENABLE line is high. This line is kept low at start-up to prevent random data at the outputs, and only goes high when the PIC has initialised the shift registers.

The RS232 interface is used to control the amplifier and can also be used to reprogram the main PIC. The interface consists of Q3 and Q4. Q3 handles incoming RS232 data, providing a level-shift from RS232 levels (nominally +/-9V) to PIC levels (+5V/0V). Q4 handles outgoing RS232 data, level shifting it to give a +15V/0V output.

The main PIC is reprogrammed by holding the standby/ON button in when the mains power is turned on. The word DOWNLOAD appears on the LCD. A PC running a Windows program is used to download the program.

The Hub PIC can in turn be reprogrammed by the main PIC. This is done by the PGM, MCLR HUB, PROGRAM_DATA, and PROGRAM_CLOCK lines that go to the Hub PCB via CN3.

The Input PCB

The input PCB carries:

- Input buffers
- Input select relays
- Tape out buffer
- Input amplifier +6 dB
- Hub input switcher
- Relay drivers

The input PCB has one stereo input (Input 1) that accepts both balanced and unbalanced signals, and six more unbalanced stereo inputs. There is a further input for tape monitor use. There is a tape output, taken from before the tone and volume controls, and a preamp output taken from after the tone and volume controls.

All component numbers here refer to the Left channel.

The A-BUS hub also uses the amplifier inputs. The required input is selected separately from the main amplifier input by the CMOS switching IC U1. This is controlled by serial data from the microcontroller on the hub PCB, in response to switch presses or IR commands.

The relays are driven from an 8-bit serial-in parallel-out (SIPO) shift register on the front panel PCB. The eight logic signals come in on CN8 and control the 7-way open-collector relay driver U16. The eighth relay is controlled by Q1.

The Preamplifier PCB

The preamplifier PCB carries:

- The tone controls and DIRECT switch
- Relay balance control
- Balance control buffer Amplifier
- Relay volume control
- Volume control post amplifier
- Relay drivers
- ON/standby LED control
- The IR receiver
- Headphone socket

All component numbers here refer to the Left channel.

The balance control operates in discrete steps selected by relays. There are eight steps on each side of the central position. This is implemented by switching in combinations of three attenuator sections; the first is R97,R22,R105, the second R85,R87 and the third R88,R86,R89. These are switched in or out by relays RL17, RL18 and RL19. When none of these relays are energised the balance network gives the first step of attenuation due to R97.

When RL15 is energised the balance attenuator network is inserted into the left channel and the stereo image is shifted to the right. When RL16 is energised the balance attenuator network is inserted into the right channel and the stereo image is shifted to the left.

The balance control attenuation steps are:

Step	Nominal dB
0	0
1	-1.3
2	-2.5
3	-3.4
4	-4.5
5	-5.5
6	-6.8
7	-7.7
8	-8.8

The volume control is a relay-driven stepped attenuator that gives 1 dB steps from 0 dB to -64 dB.

There are 2 dB steps from -64 dB to -76 dB, and two final steps of -84 dB and -infinity. The final step also opens the power amplifier output relays to ensure that "off" is well and truly off,

The volume control has an array of 14 resistances connected to an output rail. Each resistance is connected to either the input signal rail or ground by its associated relay. (RL1 to RL14) The resistances are typically made up two resistors to obtain the exact desired value. This represents a potential divider that allows very fine control of attenuation. The 1 db steps are accurate to within +/-0.2 dB.

The volume network has a constant output impedance of 312 Ohms, independent of volume setting.

The volume setting is stored in non-volatile memory when the unit is switched off at the mains. The volume control can be set to ramp up from zero to the stored setting at power-up, and to ramp down on going to standby; this is an option on the configuration menu.

The volume control and balance relays are driven from three 8-bit serial-in parallel-out (SIPO) shift registers on the front panel PCB. The logic signals come in on CN6, CN8 and CN9, and control the 7-way open-collector relay drivers U4,U5,U7. Driver U7 also controls the mains on/off and inrush relays, (on the PSU PCB) the two amplifier output relays, (on the right amplifier PCB).

R111 is a pull-up resistor which allows MAINS ON/OFF RELAY to go high during testing if the PSU board is not being used to power front-panel and preamp PCBs, and thus permits the LED control to work properly in this condition.

Headphone socket

The phones Left and Right signals come in from the two amplifier PCBs. When a jack is inserted in to the phones socket, the normally-closed contacts open, and the PHONES DETECT signal goes low, signalling the PIC to open the output relays and disconnect the loudspeakers.

Power Amplifier PCBs

The power amplifier boards are very similar. The left channel is described in detail, and the right channel description deals only with the differences.

Power Amplifier Left PCB

This description is subdivided as follows:

Input stage

DC trim system.

The Voltage Amplifier Stage

Biasing system

Output stage

The XD Crossover Displacement system

Power supplies

Overload protection

Clip detection

DC offset protection

Over-temperature protection

Speaker short-circuit detection

Headphone output attenuator

DC trim system.

VR2 and its associated components make up the DC trimming network; this allows to output DC offset to be reduced to less than 1mV.

The XD Crossover Displacement system.

The essence of the Crossover Displacement principle is the injection of an extra current, varying with the signal, into the output point of a conventional Class-B output stage, with the result that the crossover point is displaced away from the no-signal voltage. The displacement current is made proportional to the output voltage. For example, if the displacement current is 1 Amp with the output at quiescent at 0V, it is set to increase to 2 Amps with the output fully negative, and to reduce to zero with the output fully positive.

The XD control circuit is a differential pair of transistors with one input grounded and the other driven by the main amplifier output voltage, scaled down appropriately by R63, R64. The drive to the displacer is taken from collector load R58, to give the required phase inversion. R59 is present simply to equalise the dissipation in the differential pair transistors to maintain their balance.

The tail of the differential pair is fed by constant-current source Q27. Since half of the standing current through the differential pair flows through R58, the value of the tail current-source sets the quiescent displacement current. Q27 is a simple current-source biased by silicon diodes D12, D13.

The displacement current itself is handled by the voltage-controlled current source Q18, Q17. The Q18, Q17 structure acts as a unity-gain voltage stage with 100% voltage feedback from Q17 collector to Q18 emitter, and it sets up the voltage across R58 as a voltage across the low-value resistor R31, minus the V_{be} drop of Q18.

There is provision for turning off the XD system under PIC control, to make servicing easier. This is done by Q26. Normally the XD ON/OFF signal coming in on Pin 9 of CN2 is high, (+5V) so Q31 is held off and Q26 is off. When XD is disabled, XD ON/OFF goes low and Q31 is turned on via R83. Q26 is then turned on via R82. The equivalent to Q26 on the right power amp PCB is also turned on by the connection through Pin 10 of CN1.

Power supplies

The power supply for the power amplifier consists of three rails. The voltages given here are nominal as they depend on the exact value of the mains supply voltage

The +48V rail supplies all the positive power to the amplifier.

The -48V rail powers only the amplifier output stage, including the XD Crossover Displacement system.

The -51V rail provides negative power for the small-signal circuitry. This permits greater output as without it the negative-going voltage-swing of the voltage-amplifier stage is limited, and negative clipping occurs before positive clipping.

Overload protection.

The amplifier is protected against short-term overloads by dual slope VI limiting. The upper half of the output stage is protected by Q19 and associated components.

When overload occurs Q19 conducts and shunts current away from the base of Q1, limiting the amplifier output. The current so shunted is limited in magnitude by the current-source Q4.

D2 prevents Q19 conducting backwards on negative output excursions.

The protection of the lower half of the output stage is very similar, Q20 being the VI limiter. However, in this case the current shunted away when Q20 conducts is not inherently limited; this is done by the extra current-limiting circuit Q11, R15, R16. When the voltage across R9 becomes excessive, Q11 turns on and shunts the base drive away from Q9.

The amplifier is protected against long-term overloads by the PIC opening the output relay. Operation of the VI limiter Q20 draws extra current through R9 and turns on Q25 via R49; this happens at a lower current than that at which Q11 limits the VAS current.

Q25 collector is wire-ORed with the equivalent transistor on the right-hand amplifier PCB, and the OVERLOAD SIGNAL goes to the preamp PCB via CN2, pin6.

Clip detection.

When it is enabled, the clip-detect system turns down the volume when excess clipping of either amplifier output occurs. Very brief episodes of clipping are ignored. The volume stays reduced and does not ramp back up in the absence of clipping.

The clip detect system is based on Q23, Q24 and associated components. Normally both transistors are on, and the CLIP signal at Q24 collector is high.

Since the circuit operates by monitoring how far the output is from the supply rails, variations in supply voltage are compensated for.

DC offset protection:

The output of the Left amplifier is filtered by R35 and C3 to remove audio content. If a DC voltage of either polarity exists Q21, Q22 turn on and the voltage on Q21 collector falls. This point is wire-ORed with the DC offset detector voltage on the right power amplifier PCB via CN1.

Detailed operation is as follows:

+ve DC offset: D4, Q21, Q22, D6 conduct. Other diodes reverse-biased.

-ve DC offset: D3, Q21, Q22, D5 conduct. Other diodes reverse-biased.

Overtemperature protection

Positive thermistor TH1 is mounted on the main amplifier heat-sink. At approx 100degC, its resistance has risen to the point that the voltage on pin 6 of comparator U1:B exceeds the reference voltage of +850 mV set up by R69, R70, and the comparator output goes low to 0V. R71 provides a small amount of hysteresis to give clean switching. The comparator has an open-collector output and R75 is the external pull-up resistor. The output signal is passed to the main PIC.

Speaker short-circuit detection

When the amplifier goes from standby to ON, the speaker outputs are checked for short-circuits before the output relays are closed. This system is centred on comparator U1:A but also involves circuitry on the Right Amplifier PCB.

Short-circuits are checked for by passing a small current through the loudspeaker impedances and monitoring the resulting voltage. A DC current of 5mA is injected through R101 on the Right Amplifier PCB, via the normally-closed contacts of RL1 and RL2. This places all connected loudspeakers, left and right, A and B, in parallel so the resulting voltage is not large. It is sent to the left amplifier PCB, where comparator U1:A compares it with a reference voltage of 5mV set up by potential divider R85, R87. If the combined loudspeaker resistance is below 1 Ohm, the output of U1:A goes high, signalling a short condition to the main PIC.

Headphone output attenuator

The headphone output attenuator comprises R40 and R41. The headphone socket is on the preamp PCB.

Power Amplifier Right PCB

This description is subdivided as follows:

The right power amplifier

The output relays

Output relay control system

Mains-fail detect system

The right power amplifier and its various protection systems operate identically to those on the left amplifier PCB, except for the following differences:

Mains-fail detect system

The mains-fail detect system is based on comparator U1:B. It takes the MAINS FAIL IN signal from the PSU board (see above) and compares it with a reference voltage of +310 mV set up by potential divider R81,R80. When MAINS FAIL IN drops below this threshold, the output goes high. This signal, MAINS FAIL, is sent to the PIC via CN1, pin 9.

A-BUS Hub Board

This board carries the following functions:

- The XLR sockets for the balanced input mode of Input 1
- Two A-bus outputs
- Hub IR input
- Hub microcontroller
- Hub Power supply
- IR in/out interface

The XLR sockets simply pass the Input 1 signals down to the input board via screened cables.

The A-bus outputs take an input selected by the hub input switcher, amplify it by 2.5 times, and send it to the remote keypads. R59,R60 are DC drain resistors that minimise clicks shortly after power-up. The output amplifiers U1,U2 work from a single +24V rail, and so are biased to sit at +12V. The bias supply is derived from the +12V supply rail.

The hub amplifiers have their own ground (ABUS GND) to prevent ground loops, and this use of the differential amplifier performs a change of reference so a clean signal reaches the hub amplifier even if the two grounds have noise voltage between them.

The hub microcontroller U5 is a PIC16F72. This performs the following tasks:

- Control Hub input switcher from IR commands
- Send input select data to main PIC
- Control Hub input switcher to prevent thumps on 840A output
- Control A-bus status line

IR commands to the A-bus keypads are sent to the hub so that the required input can be selected and external equipment controlled. Thus, for example, a tuner station can be changed from the keypad; the IR comes to the hub, is sent out again via the IR emitter outputs, and activates emitters pointing at the tuner unit.

Modulated IR signals coming in from the keypads are diode-ORed together by D5, D6. The Zener diodes D7, D8 reject low-level noise on the incoming IR lines. The combined IR signals are buffered by emitter-follower Q3, and sent out via CN4, CN6 to drive external IR emitters. Incoming modulated IR signals for input select are also sent to the Hub PIC U5; LED D2 is driven from Q3, and points at IR receiver U4, the pair being housed in a small light-tight enclosure. The demodulated IR is then applied to Pin 7 of Hub PIC U5, which sends appropriate commands to the hub input selector IC on the input PCB, over the strobe, clock and data lines.

Information on which Hub input is selected (or if no input is selected) is sent from the Hub PIC to the main PIC by the two lines HUB CLOCK OUT and HUB DATA OUT. This is then displayed on the LCD. The active 840A input is denoted by a round marker; the active Hub input is denoted by a circle around it.

The Hub PIC controls the A-bus status line so that it is high when the 840A is powered and low when it is not. It also implements the “all off” feature; when this command is received from one keypad the Hub PIC ensures that both are turned off.

The Hub PIC can be reprogrammed by the main PIC. This is done by the PGM, MCLR HUB, PROGRAM_DATA, and PROGRAM_CLOCK lines that come from the front panel PCB via CN15.

IR in/out interface

The other IR system on the Hub PCB is wholly concerned with control of the 840A amplifier itself, and has no connection with the Hub IR system.

Modulated IR data (as an electrical signal) enters via 3.5mm jack CN9, and drives LED D1, which illuminates IR receiver U6, the pair being housed in a small light-tight enclosure. This demodulates the IR and passes it on to U7:A, which ORs it with the data from the unmodulated IR input, and sends the IR IN signal to the main PIC via CN15. When it reaches the front panel PCB (see above) it is further OR-ed with the IR data from the receiver on the front of the 840A unit.

The unmodulated IR signals enter via phono connector CN10:A, and drive optocoupler U8; this isolates the grounds and prevents ground loops. The optocoupler output drives Q4 through R47. Q4 collector, if Q6 is off, provides the IR signal to U7:A as mentioned above, and also drives Q5 via R53, to re-invert the signal and preserve its phase. It is then OR-ed with the PIC TX signal by U7:B, and buffered by U7:C and U7:D to provide enough drive for the IR output. R50 protects the output and C11,R49 isolate the IR output ground.

IR commands can also be generated by the 840A itself. These come from the main PIC as the signal PIC TX on CN15, and are combined into the IR output as described above. When such commands are being sent, it is important to disable any external IR commands from being sent through as they will combine to give garbled data. This is done by the BLOCK signal from the main PIC, coming in via CN15. When this is high it turns on Q6 and prevents external IR commands from reaching Q5.

The Rectifier PCB

This board mounts on the main heat-sink of each amplifier module. It consists of the rectifier itself, three suppression capacitors to reduce RF noise created by rectifier commutation, and two fuses in the incoming AC lines from the transformer.

Operating Instructions Summary

This is a very brief guide to enable all the controls and menus of the 840A to be accessed if the full manual is not available. (see www.cambridge-audio.com for a downloadable user manual).

To adjust the balance:

Briefly press the Mode button. The balance display appears and can be changed using the volume knob. To return to volume mode, give the Mode button another quick press. The 840A will automatically return to volume mode after 5 seconds.

To rename inputs:

Press and hold the relevant input select button. Letters in the name are selected by turning the volume knob.

To access the configuration menu:

Press and hold the Mode button. These are the menu options:

- Clip detector on/off
- LCD brightness (off/dim/bright)
- Input gain trim menu access
- Volume ramp on/off
- Volume display: -84 to 0 dB or 0 to 72 units
- Fixed input gain menu access

To adjust the gain of an input:

- Press the button next to INP TRIM
- Select the input required
- Use volume knob to set gain between 0 and -12 dB
(the available range is restricted if the volume is set very low)
- Press Mode button to return to volume display

To set up fixed input gain

- Press the button next to FIXED INP
- Select the input required
- Set the fixed gain using the volume control.
(the OFF setting does not disable the input- it leaves the input gain subject to the volume control)
- Press Mode button to return to volume display

To access the service menu:

Hold in the Mode button when mains power is switched on. These are the menu options:

- Speaker short detection on/off
- DC offset detect on/off
- XD system on/off
- Counter access
- Press Mode button to return to volume display

The counter page keeps a total of the number of times these events have occurred:

- | | |
|--------------------------|----|
| Clipping detected | CL |
| DC offset detected | DC |
| Overload protection | OV |
| Overtemperature shutdown | TM |
| Speaker short detected | SH |
| Time on in hours | ON |

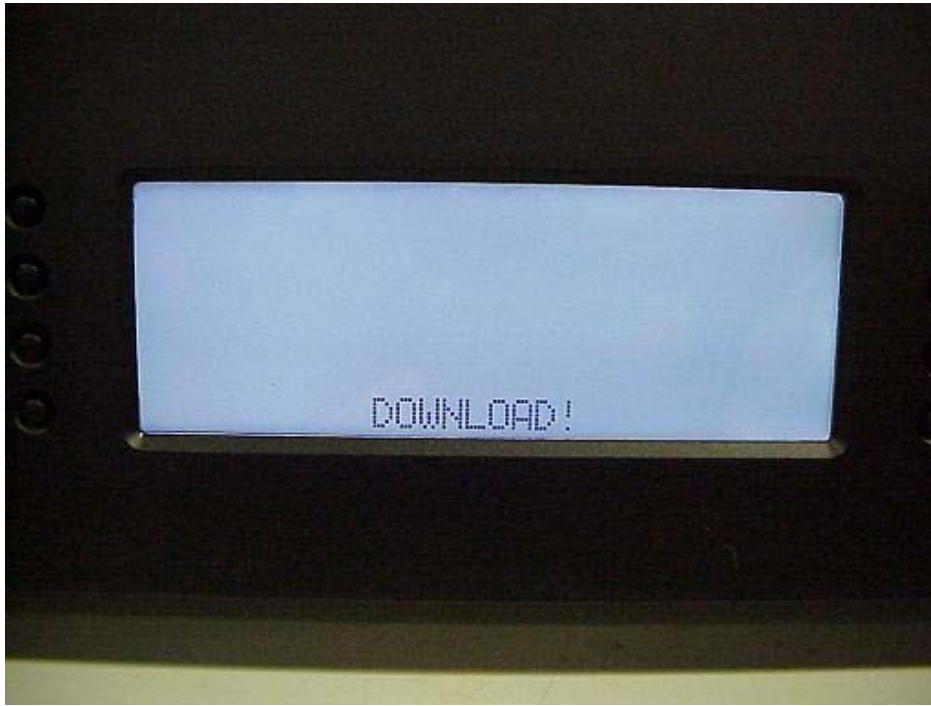
Press Mode button to return to service menu

To reprogram the PICs:

Hold in the ON/standby button when mains power is switched on. The word DOWNLOAD appears on the LCD.

840A Software Loading Instructions

1) Push and hold the "Standby / On" on the front of the 840A whilst turning on the power switch at the rear. After about 4 seconds the following should be displayed on the LCD:



2) Connect a Null Modem RS232 cable from the 840A to the PC's comm port.

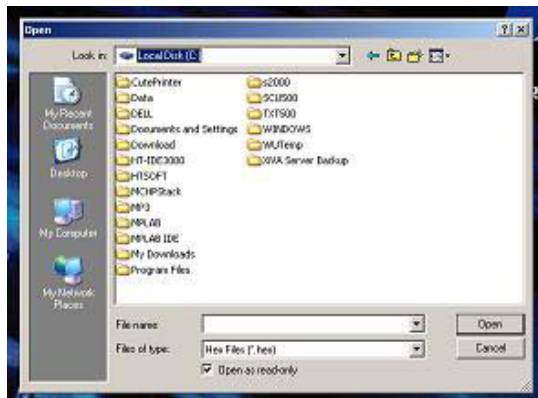
3) Run the Loader program from the Azur 840A program group in the start menu. The following window will be displayed:



4) Choose the comm port the RS232 cable is attached to and click OK. The following window will be displayed:



5) Click the Load File button, the following window will be displayed:



Locate the file "840A.hex" and click open. The following window should be displayed:



6) Click the Download Code button, "Loading..." will be displayed on the LCD. The ABUS processor will be programmed followed by the Main processor. Once the programming has finished, "Programming Completed!" will be displayed and the 840A will reset.

Notes.