

Cambridge Audio

Service Manual

651A



Specifications

Technical specifications

Power output	75 watts (into 8Ω)
THD (unweighted)	<0.002% @ 1kHz, 80% of rated power <0.03% 20Hz - 20kHz, 80% of rated
power	<0.02% 20Hz - 20kHz @ 10W
Frequency response (-1dB)	5Hz - 50kHz
S/N ratio (ref 1W)	>92dB (unweighted)
Input impedances	47kohms
Power Amp damping factor	>100
Max. power consumption	600W
Standby power consumption	<0.5W @ rated mains
Bass/Treble controls	Shelving, ultimate boost/cut +/- 7.5dB @ 20Hz and 20kHz
USB input	USB Audio 1.0 16 bit 32kHz, 44.1kHz, 48kHz.
USB maximum current rating	500mA
Dimensions (H x W x D)	120 x 430 x 350mm (4.7 x 16.9 x 13.8")
Weight	8.4kg (18.5lbs)

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This guide is designed to make installing and using this product as easy as possible. Information in this document has been carefully checked for accuracy at the time of printing; however, Cambridge Audio's policy is one of continuous improvement, therefore design and specifications are subject to change without prior notice.

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Important safety instructions

For your own safety please read the following important safety instructions carefully before attempting to connect this unit to the mains power supply. They will also enable you to get the best performance from and prolong the life of the unit:

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including other amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use with only the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over. 
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as the power-supply cord or plug having been damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING

- To reduce the risk of fire or electric shock, do not expose this unit to rain or moisture.
- Batteries (battery pack or batteries installed) shall not be exposed to excessive heat such as sunshine, fire or the like.

The unit is of Class 1 construction and must be connected to a mains socket outlet with a protective earthing connection.

The unit must be installed in a manner that makes disconnection of the mains plug from the mains socket outlet (or appliance connector from the rear of the unit) possible. Where the mains plug is used as the disconnect device, the disconnect device shall remain readily operable. Only use the mains cord supplied with this unit.

Please ensure there is ample ventilation. We recommend that you do not place the unit in an enclosed space; if you wish to place the unit on a shelf, use the top shelf to allow maximum ventilation. Do not put any objects on top of this unit. Do not situate it on a rug or other soft surface and do not obstruct any air inlets or outlet grilles. Do not cover the ventilation grilles with items such as newspapers, tablecloths, curtains, etc.

This unit must not be used near water or exposed to dripping or splashing water or other liquids. No objects filled with liquid, such as vases, shall be placed on the unit.



The lightning flash with the arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of un-insulated '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 the user to the presence of important operating and maintenance instructions in the service literature relevant to this appliance.



WEEE symbol

The crossed-out wheeled bin is the European Union symbol for indicating separate collection for electrical and electronic equipment. This product contains electrical and electronic equipment which should be reused, recycled or recovered and should not be disposed of with unsorted regular waste. Please return the unit or contact the authorised dealer from whom you purchased this product for more information.



CE mark

This product complies with European Low Voltage (2006/95/EC), Electromagnetic Compatibility (2004/108/EC) and Environmentally-friendly design of Energy-related Products (2009/125/EC) Directives when used and installed according to this instruction manual. For continued compliance only Cambridge Audio accessories should be used with this product and servicing must be referred to qualified service personnel.



C-Tick mark

This product meets the Australian Communications Authority's Radio communications and EMC requirements.



Gost-R stamp

This product meets Russian electronic safety approvals.

FCC regulations

NOTE: THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER AUTHORITY TO OPERATE THE EQUIPMENT.



This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Ventilation

IMPORTANT – The unit will become hot when in use. Do not place anything on top of the unit. Do not place in an enclosed area such as a bookcase or in a cabinet without sufficient ventilation.

Ensure that small objects do not fall through any ventilation grille. If this happens, switch off immediately, disconnect from the mains supply and contact your dealer for advice.

Positioning

Choose the installation location carefully. Avoid placing it in direct sunlight or close to a source of heat. No naked flame sources, such as lighted candles, should be placed on the unit. Also avoid locations subject to vibration and excessive dust, cold or moisture. The unit can be used in a moderate climate.

This unit must be installed on a sturdy, level surface. Do not place in a sealed area such as a bookcase or in a cabinet. Do not place the unit on an unstable surface or shelf. The unit may fall, causing serious injury to a child or adult as well as serious damage to the product. Do not place other equipment on top of the unit.

Due to stray magnetic fields, turntables or CRT TVs should not be located nearby due to possible interference.

Electronic audio components have a running in period of around a week (if used several hours per day). This will allow the new components to settle down and the sonic properties will improve over this time.

Power sources

The unit should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power-supply to your home, consult your product dealer or local power company.

This unit can be left in Standby mode when not in use and will draw <0.5W in this state. To turn the unit off, switch off at the rear panel. If you do not intend to use this unit for a long period of time, unplug it from the mains socket.

Overloading

Do not overload wall outlets or extension cords as this can result in a risk of fire or electric shock. Overloaded AC outlets, extension cords, frayed power cords, damaged or cracked wire insulation and broken plugs are dangerous. They may result in a shock or fire hazard.

Be sure to insert each power cord securely. To prevent hum and noise, do not bundle the interconnect leads with the power cord or speaker leads.

Cleaning

To clean the unit, wipe its case with a dry, lint-free cloth. Do not use any cleaning fluids containing alcohol, ammonia or abrasives. Do not spray an aerosol at or near the unit.

Battery disposal

Please dispose of any discharged batteries according to local environmental/electronic waste disposal guidelines.

Loudspeakers

Before making any connections to loudspeakers, make sure all power is turned off and only use suitable interconnects.

Servicing

These units are not user serviceable. Never attempt to repair, disassemble or reconstruct the unit if there seems to be a problem. A serious electric shock could result if this precautionary measure is ignored. In the event of a problem or failure, please contact your dealer.

Limited warranty

Cambridge Audio warrants this product to be free from defects in materials and workmanship (subject to the terms set forth below). Cambridge Audio will repair or replace (at Cambridge Audio's option) this product or any defective parts in this product. Warranty periods may vary from country to country. If in doubt consult your dealer and ensure that you retain proof of purchase.

To obtain warranty service, please contact the Cambridge Audio authorised dealer from which you purchased this product. If your dealer is not equipped to perform the repair of your Cambridge Audio product, it can be returned by your dealer to Cambridge Audio or an authorised Cambridge Audio service agent. You will need to ship this product in either its original packaging or packaging affording an equal degree of protection.

Proof of purchase in the form of a bill of sale or receipted invoice, which is evidence that this product is within the warranty period, must be presented to obtain warranty service.

This Warranty is invalid if (a) the factory-applied serial number has been altered or removed from this product or (b) this product was not purchased from a Cambridge Audio authorised dealer. You may call Cambridge Audio or your local country Cambridge Audio distributor to confirm that you have an unaltered serial number and/or you made a purchase from a Cambridge Audio authorised dealer.

This Warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of, or to any part of, the product. This Warranty does not cover damage due to improper operation, maintenance or installation, or attempted repair by anyone other than Cambridge Audio or a Cambridge Audio dealer, or authorised service agent which is authorised to do Cambridge Audio warranty work. Any unauthorised repairs will void this Warranty. This Warranty does not cover products sold AS IS or WITH ALL FAULTS.

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Some countries and US states do not allow the exclusion or limitation of incidental or consequential damages or implied warranties so the above exclusions may not apply to you. This Warranty gives you specific legal rights, and you may have other statutory rights, which vary from state to state or country to country.

For any service, in or out of warranty, please contact your dealer.

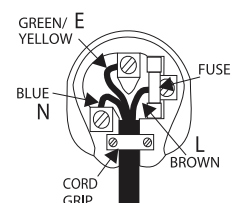
Plug-fitting Instructions (UK only)

The cord supplied with this appliance is factory-fitted with a UK mains plug fitted with a 5-amp fuse inside. If it is necessary to change the fuse, it is important that a 5-amp fuse is used. If the plug needs to be changed because it is not suitable for your socket, or becomes damaged, it should be cut off and an appropriate plug fitted following the wiring instructions below. The plug must then be disposed of safely, as insertion into a mains socket is likely to cause an electrical hazard. Should it be necessary to fit a 3-pin BS mains plug to the power cord, the wires should be fitted as shown in this diagram. The colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug. Connect them as follows:

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter 'N' or coloured BLACK.

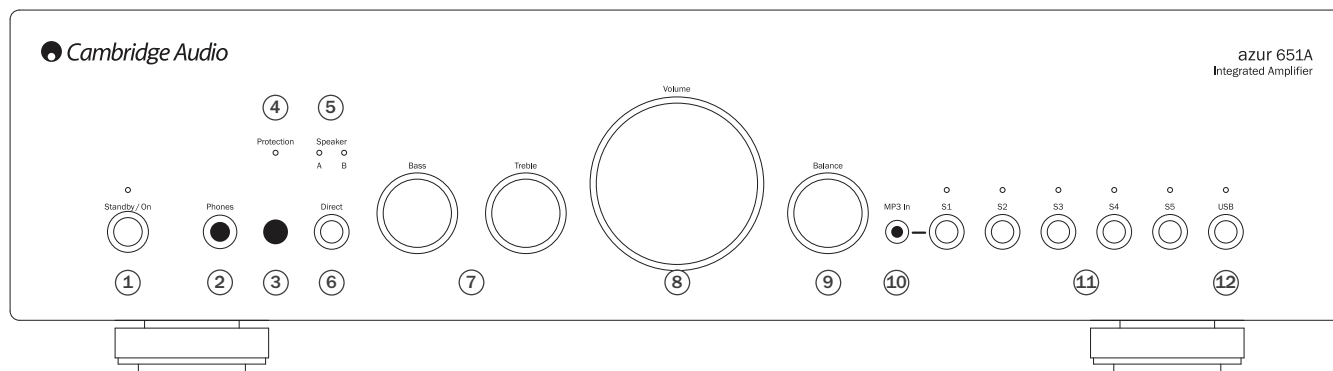
The wire which is coloured BROWN must be connected to the terminal which is marked with the letter 'L' or coloured RED.

The wire which is coloured GREEN/YELLOW must be connected to the terminal which is marked with the letter 'E' or coloured GREEN.



If a standard 13-amp (BS 1363) plug is used, a 5-amp fuse must be fitted or, if any other type of plug is used, a 5-amp fuse must be fitted, either in the plug or adaptor, or on the distribution board.

Front panel controls



① Standby/On

Switches the unit between Standby mode (indicated by dim power LED) and On (indicated by bright power LED). Standby is a low power mode where the power consumption is less than 0.5 Watts. The unit can be left in Standby mode when not in use.

This product has a permanent APD (Auto Power Down) function. After inactivity of 30 minutes, the product will automatically switch to Standby.

② Phones

Allows for the connection of headphones with a ¼" jack plug connector. Headphones with an impedance of between 32 and 600 ohms are recommended. When the headphones are connected, the output to the loudspeakers is switched off (both speakers A and B).

③ Infrared sensor

Receives IR commands from the supplied Azur remote control. A clear, unobstructed line of sight between the remote control and the sensor is required.

④ Protection

LED flashes to indicate activation of CAP5 protection system. Refer to the CAP5 section of this manual for more information.

⑤ Speaker LEDs

Indicator shows the speaker terminals that are selected. The speaker terminals selected are changed with the remote control.

⑥ Direct

This control gives the audio signal a more direct path to the power amplifier stage of your amplifier, bypassing the bass and treble control circuits for the purest possible sound quality.

⑦ Bass and Treble

These controls allow subtle adjustments to the tonal balance of the sound. In the central position these controls have no effect. They only modify the sound through your loudspeakers and the Pre-Out sockets, and do not affect the signals sent through the Rec Out connections. With well-produced source material and a good system, the tone controls are unnecessary and can be switched out by the 'Direct' switch. If the musical recording is of poor quality or other factors are affecting the sound quality, it may be necessary to adjust the tone controls to compensate.

⑧ Volume

Use to increase or decrease the level of the sound from the outputs of the amplifier. This control affects the level of the loudspeaker output, the pre-amp output and the headphone output. It does not affect the Rec Out connections. It is advisable to turn the Volume control fully anti-clockwise before switching the amplifier on.

⑨ Balance

This control allows you to adjust the relative output levels of the left and right channels. In the central position the output from each channel is equal. This control only modifies the sound through your loudspeakers and the Pre-Out sockets – it does not affect the signals sent through the Rec Out connections.

⑩ S1/MP3 input

This source input allows you to connect a portable audio device such as an MP3 player, plugged into either the rear panel 'S1' Phono/RCA input pair or the front panel 3.5mm stereo-jack input (labelled 'MP3 In').

Press the S1 button on the front panel to select the input, or insert a device into the front panel socket which automatically selects the input and overrides the rear Phono/RCA sockets.

Note: Whilst plugging a device into the front panel automatically selects the MP3 input, any other input can still be selected once this has been done. As a result you may, if desired, leave a device permanently plugged into the front panel.

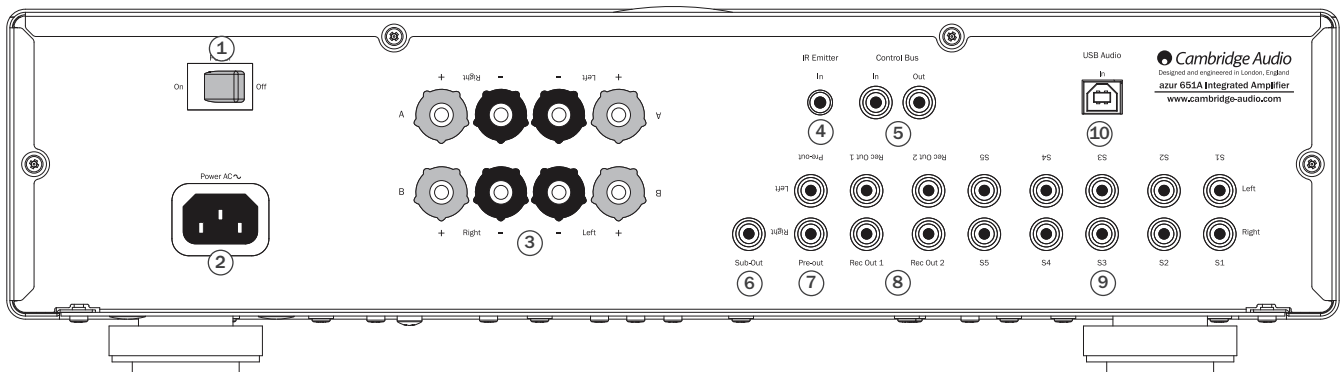
⑪ S2-S5 Source inputs

Push the appropriate input selection button to select the source component that you wish to listen to. The signal selected is also fed to the Rec Out sockets so that it may be recorded. The input should not be changed whilst recording.

⑫ USB

This source input allows connection of a personal computer via USB.

Rear panel connections



① Power On/Off

Switches the unit on and off. This switch is a master on/off control that completely powers down the unit.

② AC power socket

Once you have completed all connections to the amplifier, plug the AC power cable into an appropriate mains socket and turn the unit on. Your amplifier is now ready for use.

③ Loudspeaker terminals

Two sets of loudspeaker terminals are available, **A** (main loudspeaker terminals, top row) and **B** (secondary switchable loudspeaker terminals, bottom row). Connect the wires from your left channel loudspeaker to the LEFT positive and negative terminals, and the wires from the right channel loudspeaker to the RIGHT positive and negative terminals. In each case, the red terminal is the positive output and the black terminal is the negative output.

Care should be taken to ensure no stray strands of wire are shorting speaker outputs together. Please ensure that the loudspeaker terminals have been tightened adequately to provide a good electrical connection. It is possible for the sound quality to be affected if the screw terminals are loose.

The use of A and B speakers affords you an easy and inexpensive way to create a simple multi-room system.

Note: When using two pairs of speakers, use speakers with a minimum nominal impedance of 8 ohms.

④ IR (Infrared) Emitter In

Allows modulated IR commands from multi-room systems or IR repeater systems to be received by the amplifier. Commands received here are not looped out of the Control Bus. Refer to the 'Custom Installation' section for more information.

⑤ Control Bus

In Allows un-modulated commands from multi-room systems or other components to be received by the unit.

Out Loop out for control bus commands to another unit.

⑥ Sub-Out

This output can be used to connect to a subwoofer, if desired.

⑦ Pre-Out

These outputs can be used to connect to the inputs on an external power amplifier or an active subwoofer, etc.

⑧ Record Out 1/2

These two identical output sockets can be connected to a tape deck or to the analogue Record In sockets on a MiniDisc or CD recorder etc.

⑨ S1-S5

These inputs are suitable for any 'line level' source equipment such as BD/DVD players, DAB or FM/AM tuners, CD players, Network Players, iPod docks, MP3 players, etc.

Note: These inputs are for analogue audio signals only. They should not be connected to the digital output of a CD player or any other digital device.

Connecting a turntable

If it is desired to connect a turntable without a built-in phono stage, an external phono stage such as our 551P or 651P models should be used. Contact your Cambridge Audio dealer for more details.

Note: A very few turntables have built-in phono stages, in which case it is not necessary to use a separate phono stage amplifier. If you're unsure, please consult your turntable user manual.

⑩ USB interface

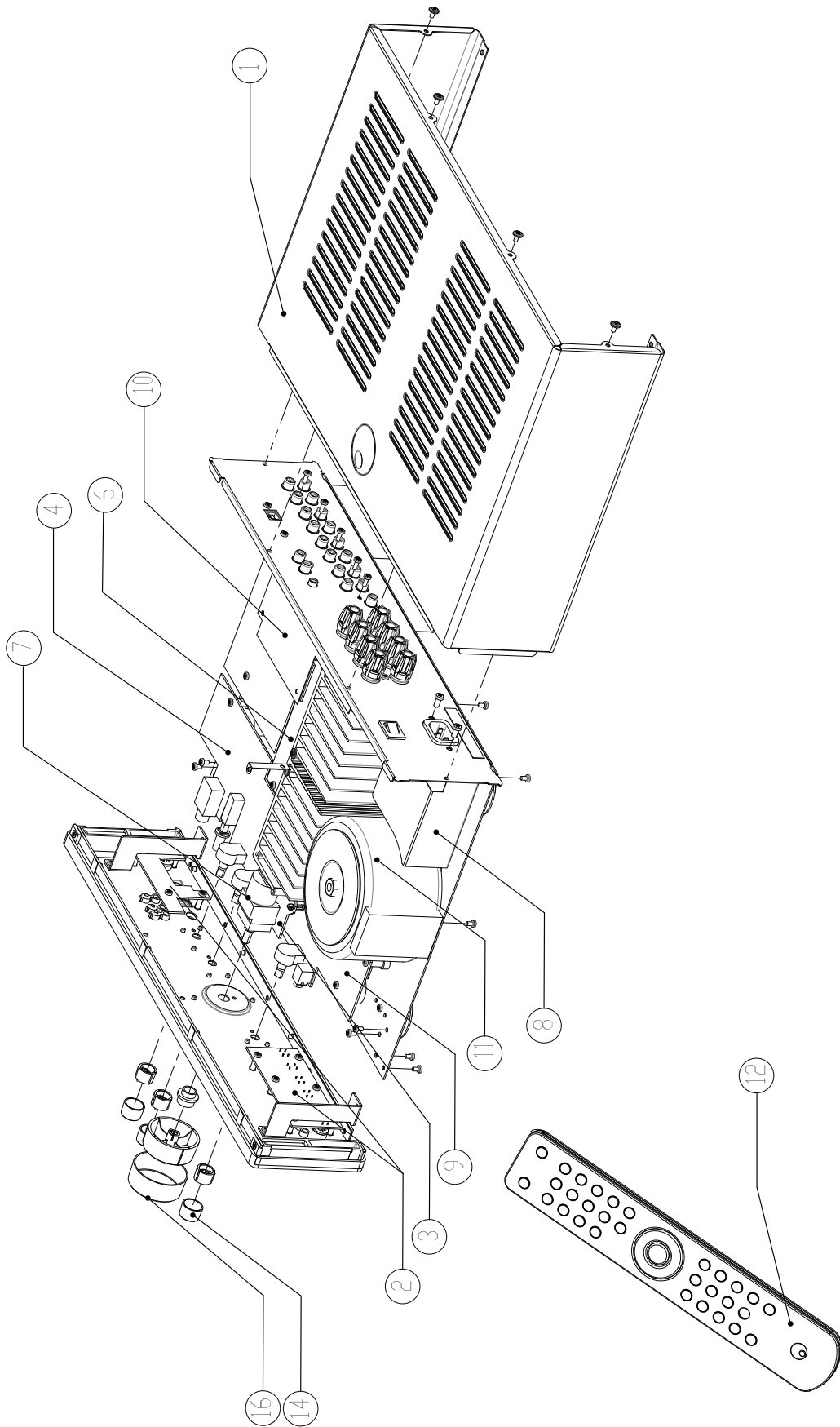
A USB B type socket is fitted to the 651A to enable the playback of audio from a personal computer running either Microsoft Windows or Apple Mac OS X operating systems. Some builds of Linux are also suitable.

Note: Always use a certified cable for USB Audio preferably one that displays an official mark. USB cable connections longer than 3m may result in inconsistent audio performance.



Always turn the Volume to minimum, or turn the 651A off before plugging/unplugging cables to the USB input or whilst booting up your PC/Mac.

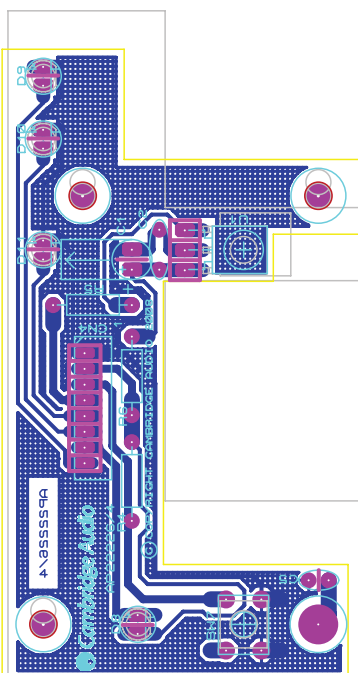
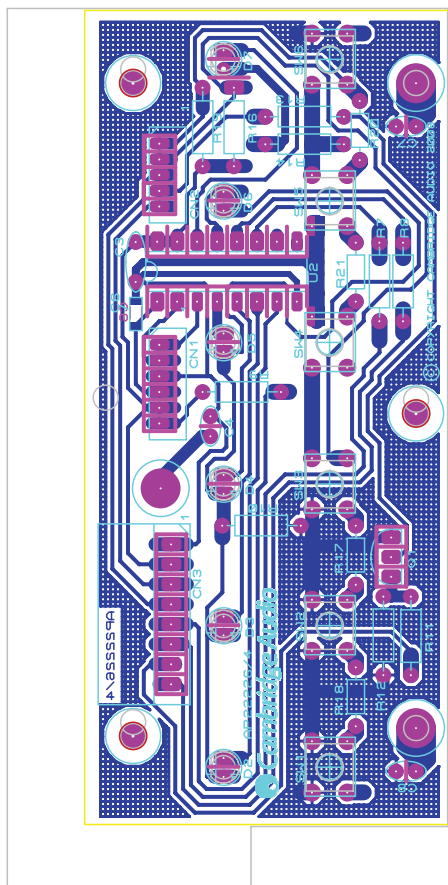
Exploded Diagram



Spares Table

Drawing ref	AP part number	Factory part number	Description
	PF432		Front panel (metalwork) Silver
	PF433		Front panel (metalwork) Black
1	PF434	6161-1010-0000	AZUR 651A WRAPOVER LID SILVER ASSY REV.A
1	PF435		AZUR 651A WRAPOVER LID BLACK ASSY REV.A
8	PY1590	9465-015000E071	Azur 550A/650A/651A(230V) POWER INPUT BOARD ASSY REV
9	PF429		Azur 651A INPUT BOARD ASSY REV A
10	PY1592	9465-015001E541	Azur 550A/650A/651A SPEAKER BOARD ASSY REV A
<i>not shown</i>	PY1718	3200-087071E002	STANDBY TRANS. 230VAC/50Hz 9VAC@25mA T08707A 550A/650A/651A
<i>not shown</i>	PY1724	3200-087071E003	STANDBY TRANS. 115VAC/60Hz 9VAC@25mA T08707B 550A/650A/651A
11	PY1481	3200-073322E000	TOROID TR. 230VAC@50Hz TI-073322 NORATEL FOR 650A/651A
11	PY1482	3200-073324E000	TOROID TR. 115VAC@60Hz TI-073324 NORATEL FOR 650A/651A
2	PY1597	9465-015000E041	Azur 550A/650A/651A Front Panel CONTROL BOARD ASSY (TWO BOARDS)
4	PF427		Azur 651A Preamp+MCU BOARD ASSY REV A
3	PY1599	9465-015000E311	Azur 550A/650A/651A VOLUME BOARD ASSY REV A
6	PF426		Azur 651A AMP BOARD ASSY REV A
not shown	PF428		Azur 651A PROTECT PCBA REV A
not shown	PF430		Azur 651A USB audio input PCBA
7	PY1603	1065-003500E113	VR W/MOTOR 50KAX2 +-20% (L=20) RK16812MG082 ALPS
not shown	PF431		Azur 651AC REMOTE CONTROL ASSY REV A
14	PZ160		Azur 650A/651A Tone Knob (Silver) AP21541B
14	PZ161		Azur 650A/651A Tone Knob (Black) AP21541B
16	PZ162		Azur 650A/651A Volume Knob (Silver) AP21538C
16	PZ163		Azur 650A/651A Volume Knob (Black) AP21538C
not shown	PZ164		Azur 650A/651A Volume Pot Skirt (Silver) AP21554A
not shown	PZ165		Azur 650A/651A Volume Pot Skirt (Black) AP21554A
not shown	PZ166		Azur 650A/651A Tone Pot Skirt (Silver) AP21555A
not shown	PZ167		Azur 650A/651A Tone Pot Skirt (Black) AP21555A

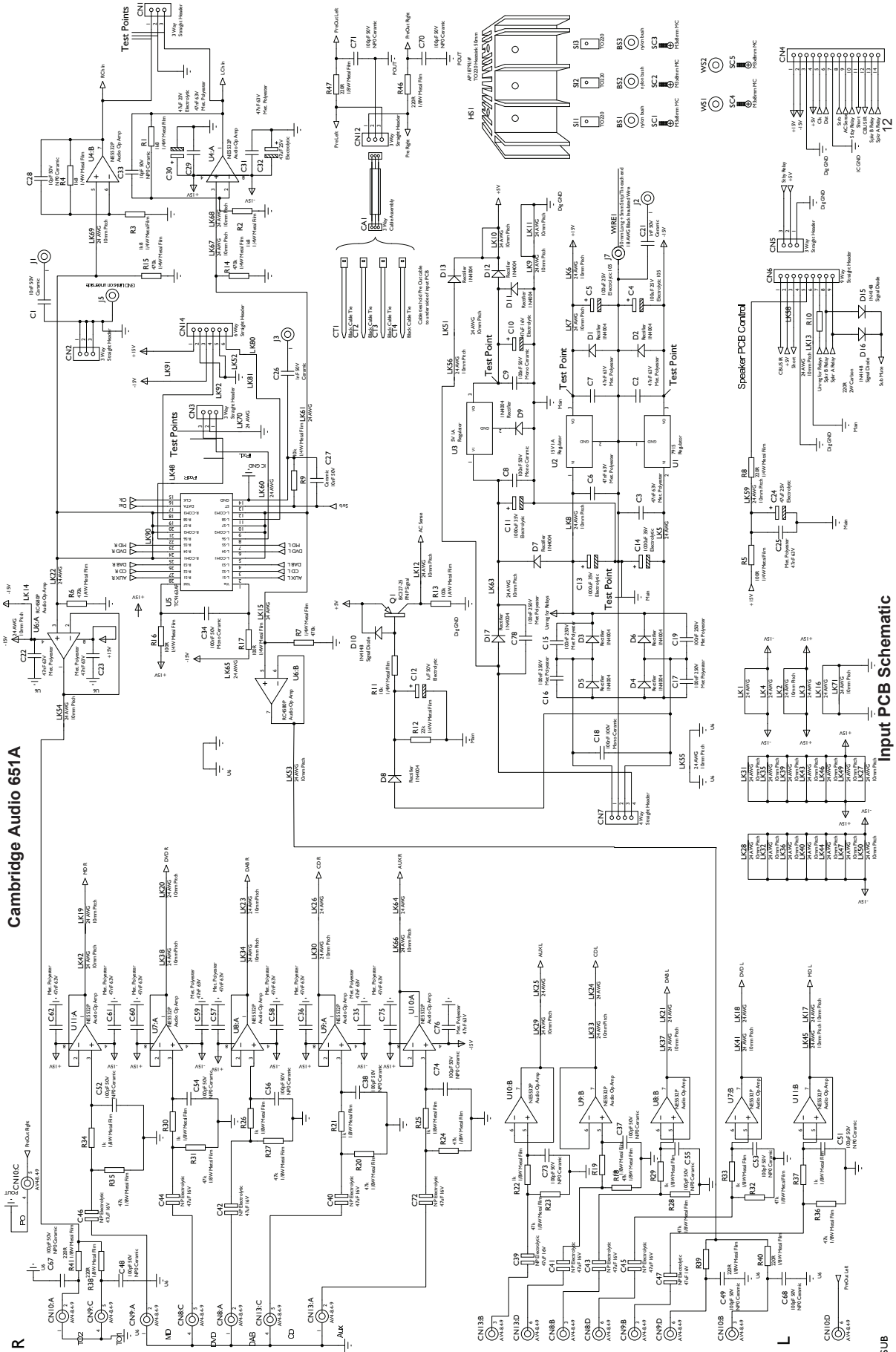
Front Panel PCB Layout



Front Panel PCB BOM

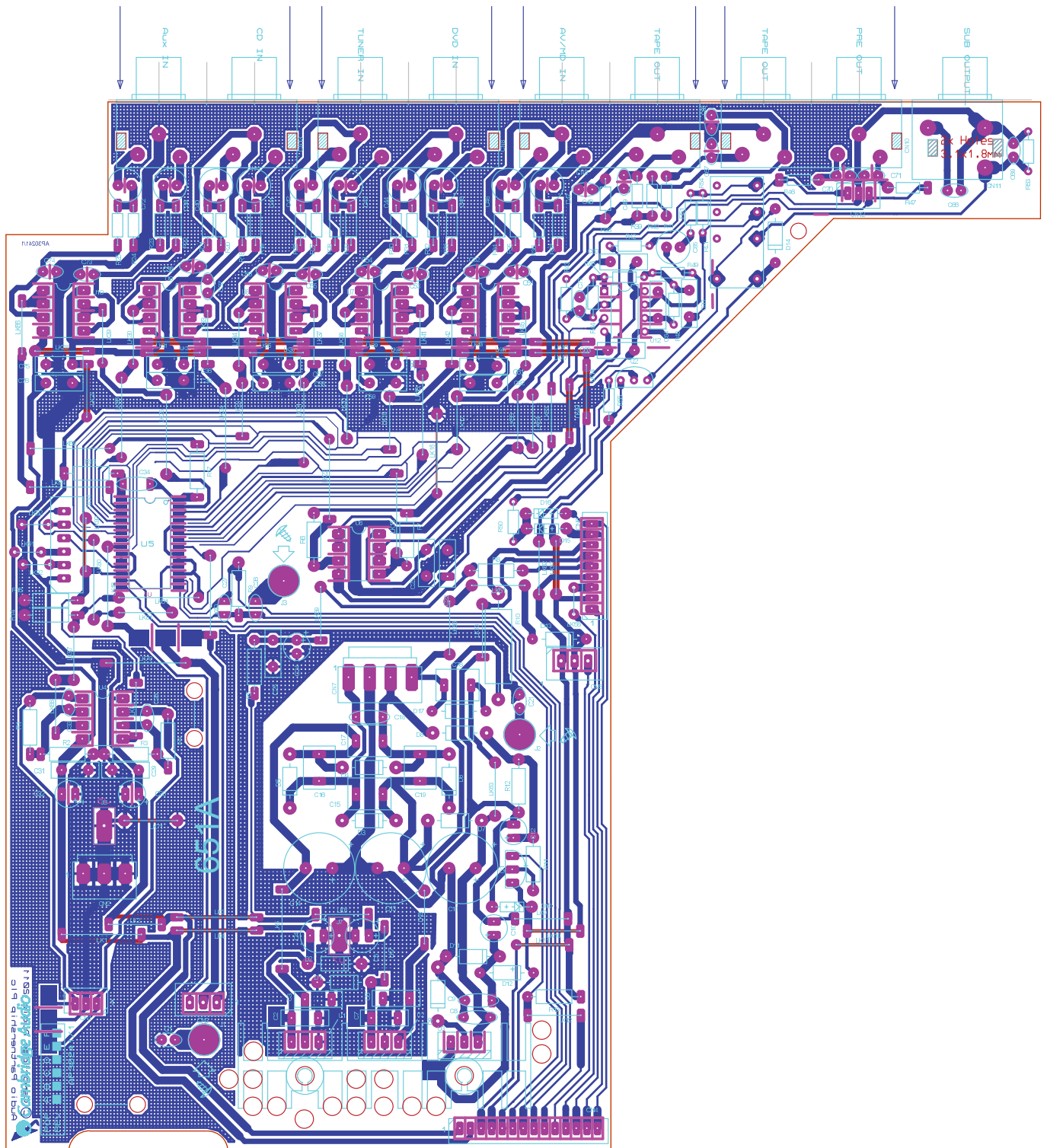
Value	Description/Type	Qty	Component Ident	ManPN	Tolerance	PackageInfo	Factory Part Number	AP Part Number
RESISTORS								
1	47R	1/4W Metal Film	2	R5, R6	1%	10mm Pitch		
2	220R	1/4W Metal Film	7	R7-R12, R14	1%	10mm Pitch		
3	10k	1/4W Metal Film	2	R4, R13	1%	10mm Pitch		
4	10k	1/8W Metal Film	2	R17, R20	1%	7.5mm Pitch		
5	22k	1/4W Metal Film	2	R16, R19	1%	10mm Pitch		
6	33k	1/8W Metal Film	2	R18, R21	1%	7.5mm Pitch		
CAPACITORS								
7	10nF 50V	Ceramic	4	C4, C5, C7, C8	10%	2.5mm Pitch	1100-103043-000	
8	10nF 50V	X7R Ceramic	1	C6	10%	1206		
9	100nF 50V	Mono Ceramic	2	C2, C3	10%	5mm Pitch	1100-104043-000	
10	10uF 16V	Electrolytic	1	C1	20%	5.2mm Diameter	1102-100014-000	Lay Flat
DIODES								
15	Blue Azur LED	3mm	9	D2-D10	HFB963M-130		3100-000030-003	
16	Red LED	3mm	1	D11				
INTEGRATED CIRCUITS								
17	36KHz	IR Receiver	1	U1	TSOP34836	Through Hole	3001-348360-000	PY755
18	M74HC4094B	8 Bit Shift Register	1	U2	M74HC4094B1R	DIL16	4174-409052-600	PY524
SWITCHES								
19		Tactile	7	SW1-SW7	KPT-1105A	Through Hole	2400-020200-000	PY043
TRANSISTORS								
20	45V 300mA	NPN Signal	1	Q1	BC337-25	TO92	1300-337000-100	PY214

Input PCB Schematic



Input PCB Layout

Please add 8x Routed holes 1.8mm x 3mm



Value	Description/Type	Qty	Component Ident	ManPN	Tolerance	PackageInfo	Factory Part Number	AP Part Number
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RESISTORS

1	100R	1/4W Metal Film	3	R5, R16, R17		1%	10mm Pitch	
2	220R	1/4W Metal Film	1	R8		1%	10mm Pitch	
3	220R	2W Carbon	1	R10		10%	20mm Pitch	Raise off PCB
4	220R	1/8W Metal Film	7	R38-R41, R46, R47, R51		1%	7.5mm Pitch	
5	6.80k	1/8W Metal Film	1	R45		1%	7.5mm Pitch	
6	13.0k	1/8W Metal Film	1	R49		1%	7.5mm Pitch	
7	1k	1/8W Metal Film	11	R19, R21, R22, R25, R26, R29, R30, R33, R34, R37, R50		1%	7.5mm Pitch	
8	1k8	1/4W Metal Film	4	R1-R4		1%	10mm Pitch	
9	10k	1/4W Metal Film	2	R9, R11		1%	10mm Pitch	
10	22k	1/4W Metal Film	1	R12		1%	10mm Pitch	
11	22k	1/8W Metal Film	1	R48		1%	7.5mm Pitch	
12	47k	1/8W Metal Film	16	R18, R20, R23, R24, R27, R28, R31, R32, R35, R36, R42-R44, R53-R55		1%	7.5mm Pitch	
13	100k	1/4W Metal Film	1	R13		1%	10mm Pitch	
14	470k	1/4W Metal Film	4	R6, R7, R14, R15		1%	10mm Pitch	

CAPACITORS

15	10pF 50V	NP0 Ceramic	3	C28, C33, C77		5%	2.5mm Pitch	
16	100pF 50V	NP0 Ceramic	17	C37, C38, C48, C49, C51-C56, C67-C71, C73, C74		5%	2.5mm Pitch	
17	1nF 50V	Ceramic	3	C21, C26, C66		10%	2.5mm Pitch	
18	10nF 50V	Ceramic	2	C1, C27		10%	2.5mm Pitch	
19	15.0nF 63V	Polyester	1	C64			5mm Pitch Box	
20	47nF 63V	Met. Polyester	19	C2, C3, C6, C7, C22, C23, C25, C29, C31, C35, C36, C57-C62, C75, C76		10%	5mm Pitch Box	
21	100nF 50V	Mono Ceramic	3	C8, C9, C34		10%	5mm Pitch	
22	100nF 250V	Met Polyester	5	C15-C17, C19, C78	CMEB104M250Rxxxx	20%	5mm Pitch Box	
23	100nF 100V	Mono Ceramic	1	C18		10%	5mm Pitch	
24	100nF 63V	Met. Polyester	2	C50, C63		10%	5mm Pitch Box	
25	150nF 63V	Polyester	1	C20			5mm Pitch Box	
26	1uF 50V	Electrolytic	1	C12		20%	5mm Dia	
27	47uF 16V	Electrolytic	1	C10		20%	5mm Dia	
28	47uF 25V	Electrolytic	3	C24, C30, C32		20%	5mm Dia	
29	47uF 16V	NP Electrolytic	11	C39-C47, C65, C72		20%	6mm Dia	
30	100uF 25V	Electrolytic 105	2	C4, C5		20%	6mm Dia	

31	1000uF 35V	Electrolytic	3	C11, C13, C14		20%	13mm Dia		
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DIODES

41	400V 1A	Rectifier	11	D1-D8, D11,D14, D17	1N4004		DO41		
42			2	D9,D12	Link		DO41		24 AWG
43			1	D13	NP		DO41		Not Populated
44	75V 150mA	Signal Diode	3	D10, D15, D16	1N4148		D035		

INTEGRATED CIRCUITS

45	-15V 1A	Regulator	1	U1	7915		Through Hole		PF274
46	15V 1A	Regulator	1	U2	7815		Through Hole		PF273
47	5V 1A	Regulator	1	U3	7805		Through Hole		PF272
48	Dual	Audio Op Amp	7	U4, U7-U12	NE5532P		DIL08		PY1604
49	16 Way	Input Switch	1	U5	TC9163AF		SOP28		PY476
50	Dual	Audio Op Amp	1	U6	RC4580P		DIL08		PY1604

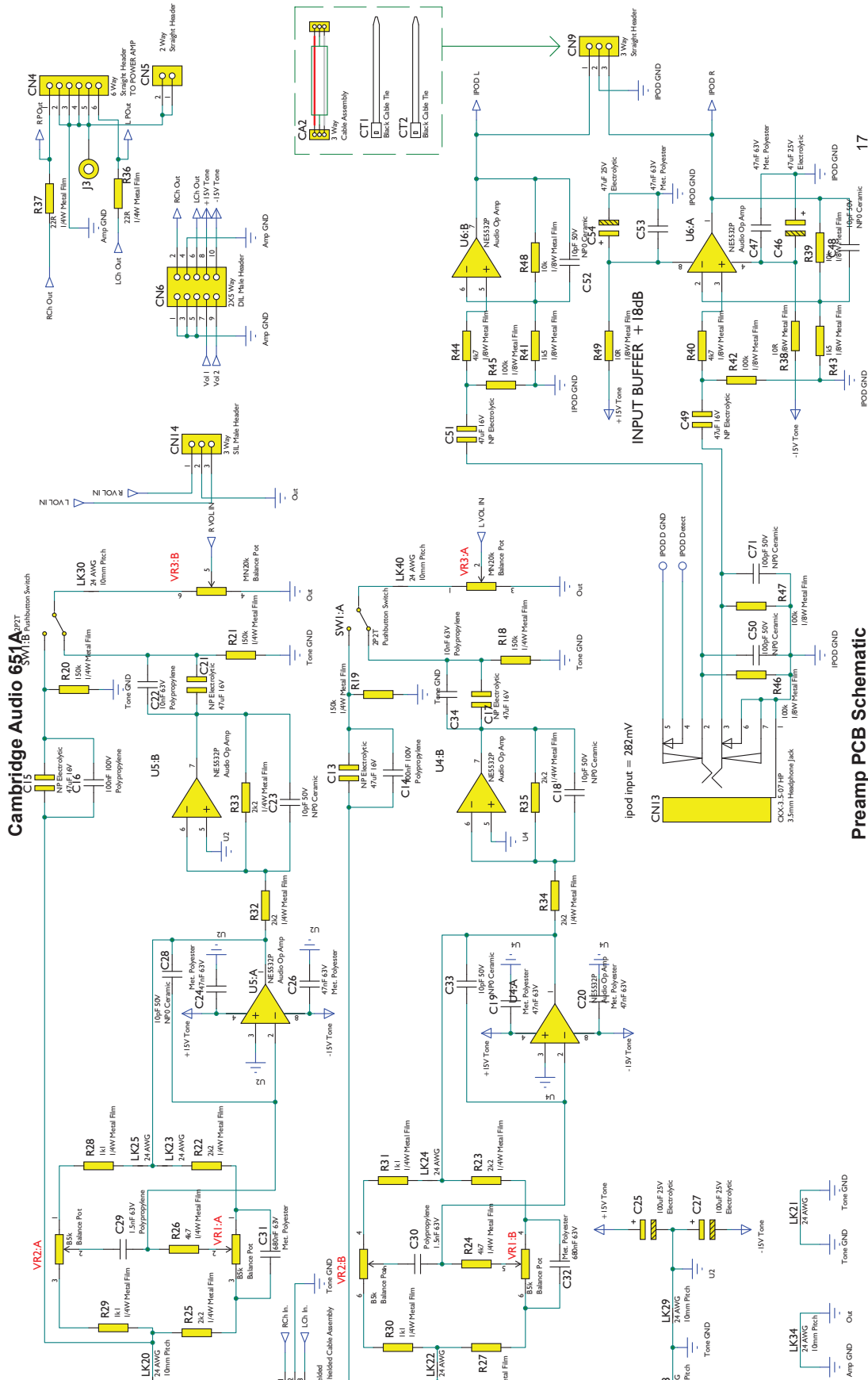
RELAY

51	5V 2A	2P2T Relay	1	RL1	ME2-5S		Through Hole		PF392
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TRANSISTORS

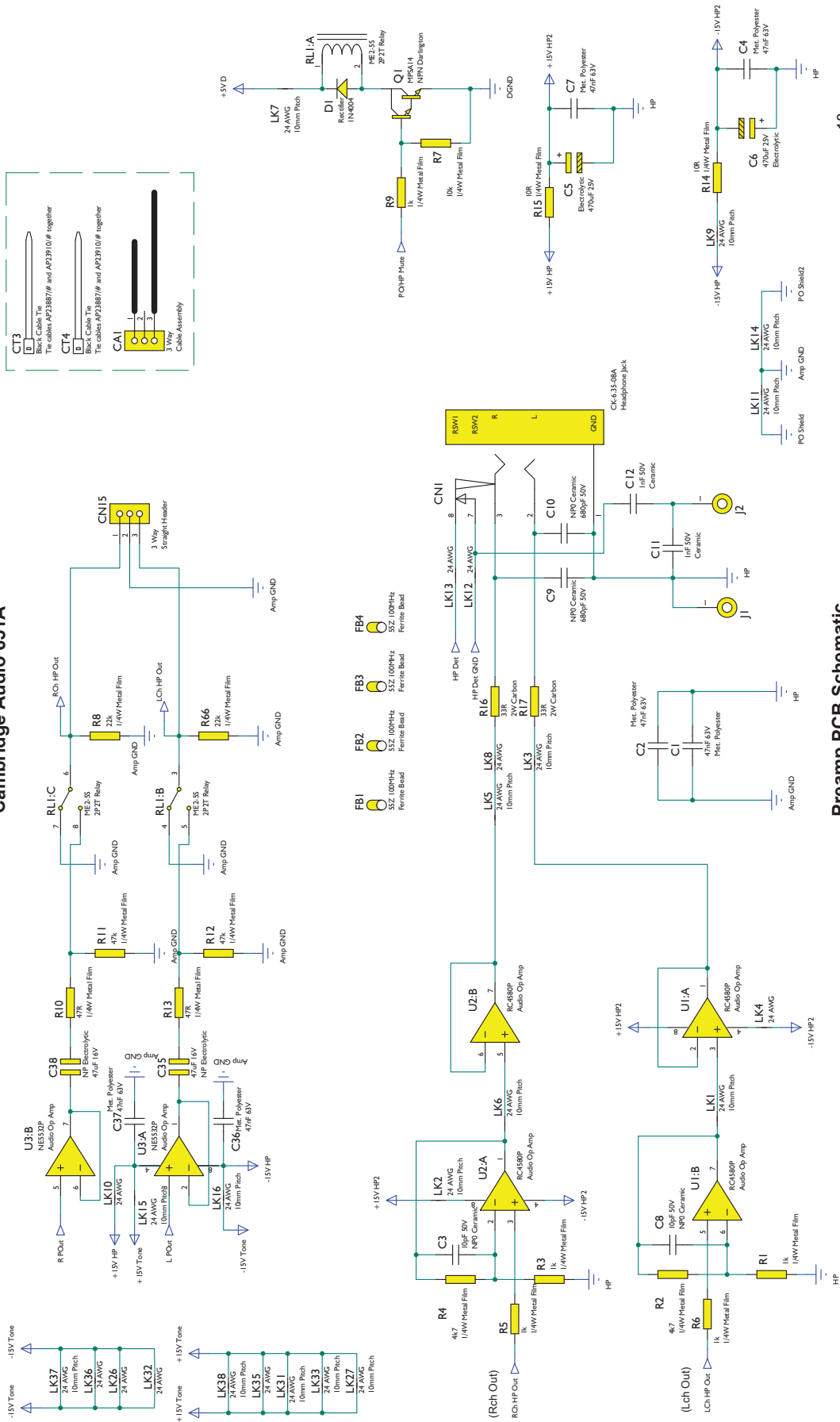
52	-45V 500mA	PNP Signal	1	Q1	BC327-25		TO92		PY219
53	30V 500mA	NPN Darlington	1	Q2	MPSA14		TO92		PY1211

Preamp PCB Schematic

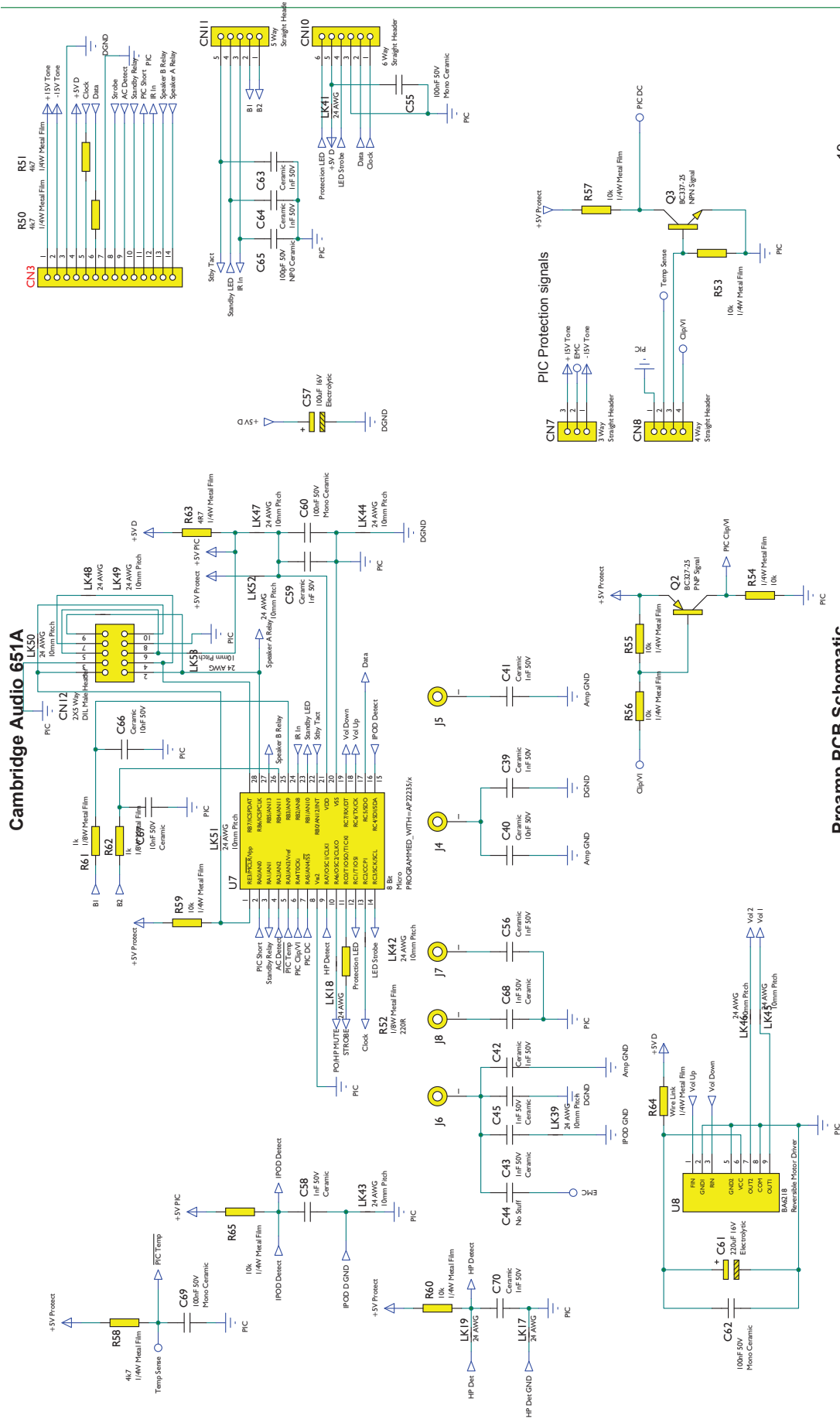


Preamp PCB Schematic

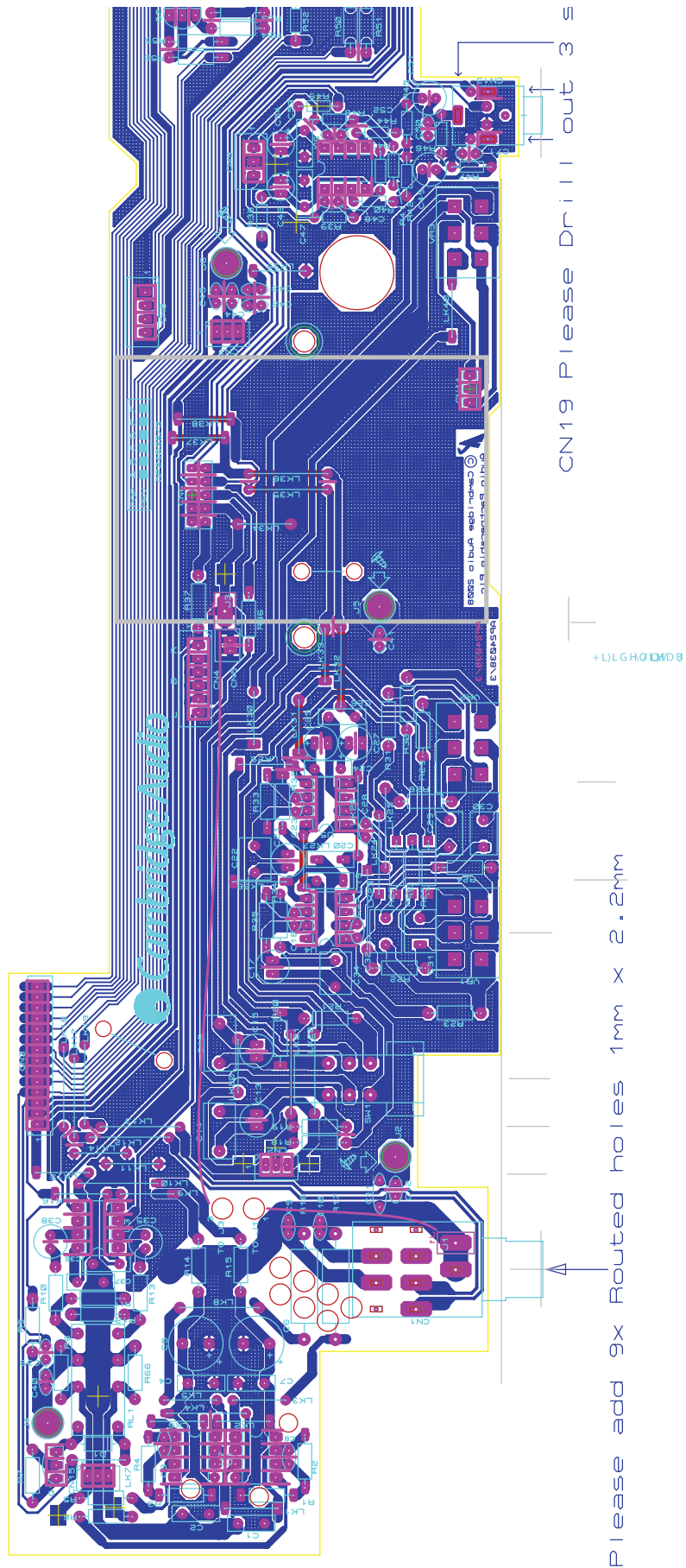
Cambridge Audio 651A



Preamp PCB Schematic



Preamp PCB Layout



Preamp PCB BOM

Value	Description/Type	Qty	Component Ident	ManPN	Tolerance	PackageInfo	Factory Part Number	AP Part Number
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RESISTORS

1	4R7	1/4W Metal Film	1	R63	1%	10mm Pitch		
2	10R	1/4W Metal Film	2	R14, R15	1%	10mm Pitch		
3	10R	1/8W Metal Film	2	R38, R49	1%	7.5mm Pitch		
4	22R	1/4W Metal Film	2	R36, R37	1%	10mm Pitch		
5	33R	2W Carbon	2	R16, R17	10%	20mm Pitch		Add ferrite beads FB1-4 to resistor legs for EMC
6	47R	1/4W Metal Film	2	R10, R13	1%	10mm Pitch		
7	220R	1/8W Metal Film	1	R52	1%	7.5mm Pitch		
8	Wire Link	1/4W Metal Film	1	R64	1%	10mm Pitch		Use 24AWG wire link
9	1k	1/4W Metal Film	5	R1, R3, R5, R6, R9	1%	10mm Pitch		
10	1k	1/8W Metal Film	2	R61, R62	1%	7.5mm Pitch		
11	1k1	1/4W Metal Film	4	R28-R31	1%	10mm Pitch		
12	1k5	1/8W Metal Film	2	R41, R43	1%	7.5mm Pitch		
13	2k2	1/4W Metal Film	8	R22, R23, R25, R27, R32-R35	1%	10mm Pitch		
14	4k7	1/4W Metal Film	7	R2, R4, R24, R26, R50, R51, R58	1%	10mm Pitch		
15	4k7	1/8W Metal Film	2	R40, R44	1%	7.5mm Pitch		
16	10k	1/4W Metal Film	9	R7, R53-R57, R59, R60, R65	1%	10mm Pitch		
17	10k	1/8W Metal Film	2	R39, R48	1%	7.5mm Pitch		
18	22k	1/4W Metal Film	2	R8, R66	1%	10mm Pitch		
19	47k	1/4W Metal Film	2	R11, R12	1%	10mm Pitch		
20	100k	1/8W Metal Film	4	R42, R45-R47	1%	7.5mm Pitch		
21	150k	1/4W Metal Film	4	R18-R21	1%	10mm Pitch		

RESISTORS VARIABLE

22	B5k	Balance Pot	2	VR1, VR2	VR162G1-B5K-L15F/CC/LD-100/GN	Dual	1065-002518E131	PF423
23	MN20k	Balance Pot	1	VR3	VR162G1-MN20K-L15F/CC/LD-100/GN	Dual	1062-003518E161	PF424

CAPACITORS

24	No Stuff	Ceramic	1	C44		2.5mm Pitch		No Stuff
25	10pF 50V	NP0 Ceramic	8	C3, C8, C18, C23, C28, C33, C48, C52	5%	2.5mm Pitch	1181-100042-000	
26	100pF 50V	NP0 Ceramic	3	C50, C65, C71	5%	2.5mm Pitch	1181-101042-000	
27	680pF 50V	NP0 Ceramic	2	C9, C10	5%	2.5mm Pitch	1181-681042-000	
28	1nF 50V	Ceramic	1	C11	10%	5mm Pitch		
29	1nF 50V	Ceramic	13	C12, C39, C41-C43, C45, C56, C58, C59, C63, C64, C68, C70	10%	2.5mm Pitch	1100-102043-000	
30	1.5nF 63V	Polypropylene	2	C29, C30	5%	5mm Pitch Box	1114-152052E000	
31	10nF 63V	Polypropylene	2	C22, C34	5%	5mm Pitch Box		

32	10nF 50V	Ceramic	3	C40, C66, C67		10%	2.5mm Pitch	1100-103043-000	
33	47nF 63V	Met. Polyester	12	C1, C2, C4, C7, C19, C20, C24, C26, C36, C37, C47, C53		10%	5mm Pitch Box	1117-473053E000	
34	100nF 100V	Polypropylene	2	C14, C16	CMPA104K100RB075	10%	7.5mm Pitch Box	1114-104063E000	
35	100nF 50V	Mono Ceramic	4	C55, C60, C62, C69		10%	5mm Pitch	1100-104043-000	
36	680nF 63V	Met. Polyester	2	C31, C32		10%	5mm Pitch Box	1117-684053E000	
37	47uF 16V	NP Electrolytic	8	C13, C15, C17, C21, C35, C38, C49, C51		20%	6mm Dia	1105-470014-000	
38	47uF 25V	Electrolytic	2	C46, C54		20%	5mm Dia	1102-470024-000	
39	100uF 25V	Electrolytic	2	C25, C27		20%	6mm Dia	1102-101024-000	
40	100uF 16V	Electrolytic	1	C57		20%	5.2mm Dia	1102-101014-000	
41	220uF 16V	Electrolytic	1	C61		20%	6mm Dia		
42	470uF 25V	Electrolytic	2	C5, C6		20%	10mm Dia		

CONNECTORS

43	Stereo 6.35mm	Headphone Jack	1	CN1	CK-6.35-08A		Through Hole	2330-005901-300	PY646
55	Stereo 3.5mm	3.5mm Headphone Jack	1	CN13	CKX-3.5-07 HP		Through Hole	2330-005901-300	PY646

DIODES

57	400V 1A	Rectifier	1	D1	1N4004		DO41	1401-140040-000	
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INDUCTORS

58	55Z 100MHz	Ferrite Bead	4	FB1-FB4	742 70010		FERRITE BEAD		
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INTEGRATED CIRCUITS

59	Dual	Audio Op Amp	2	U1, U2	RC4580P		DIL08		PY1064
60	Dual	Audio Op Amp	4	U3-U6	NE5532P		DIL08	4155-320052-900	PY108
61	8 Bit	Micro	1	U7	PIC16F882		28 Pin DIL		Program with software: AP22235/# Please add version label!
62	Driver	Reversible Motor Driver	1	U8	BA6218		Through Hole	4162-180002-300	PZ260

RELAY

63	5V 2A	2P2T Relay	1	RL1	ME2-5S		Through Hole	4050-000005-002	PY584
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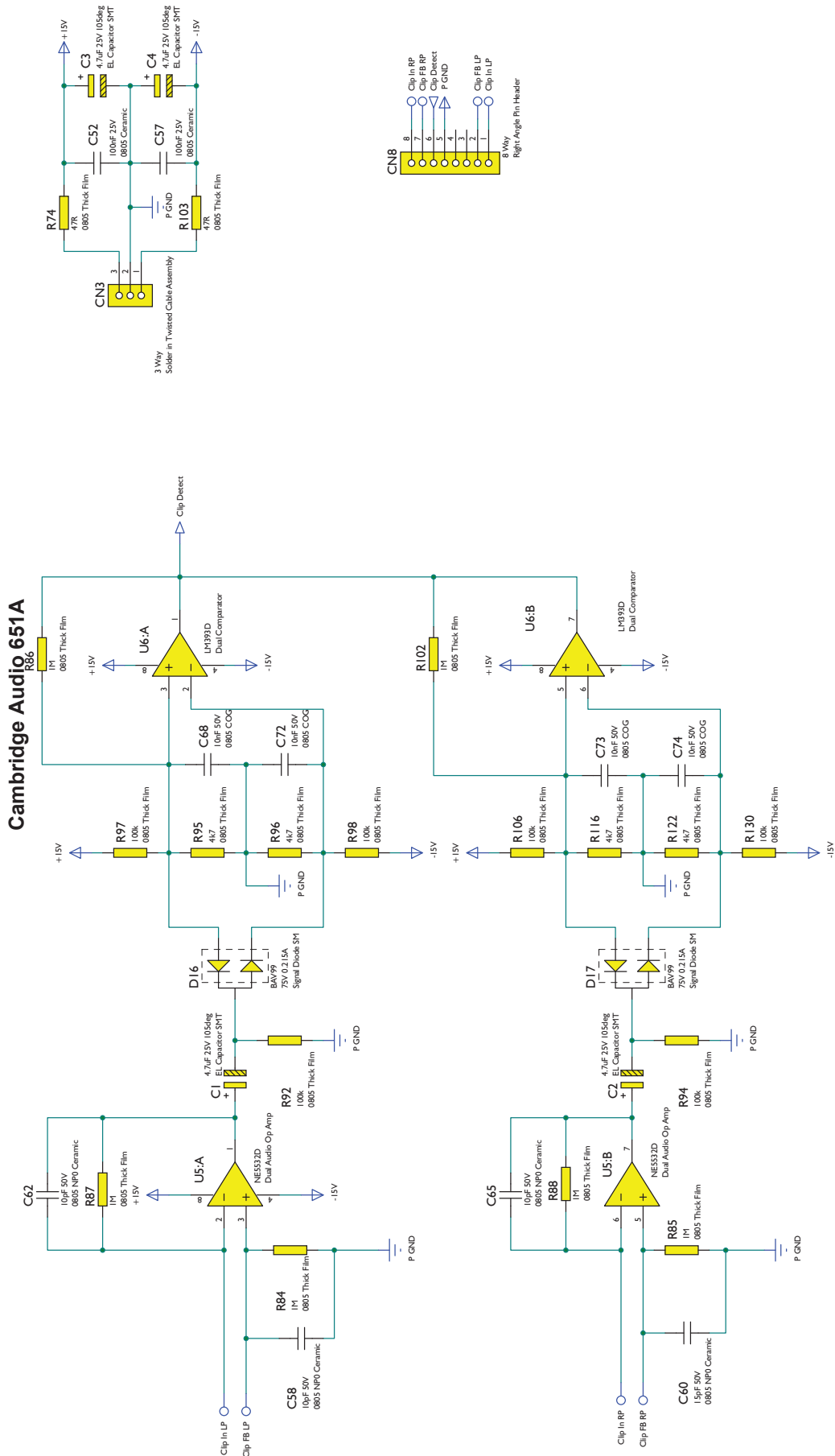
SWITCHES

64	2P2T	Pushbutton Switch	1	SW1	PBS-22H01-T18-SL		Through Hole	2402-020200-010	PY645
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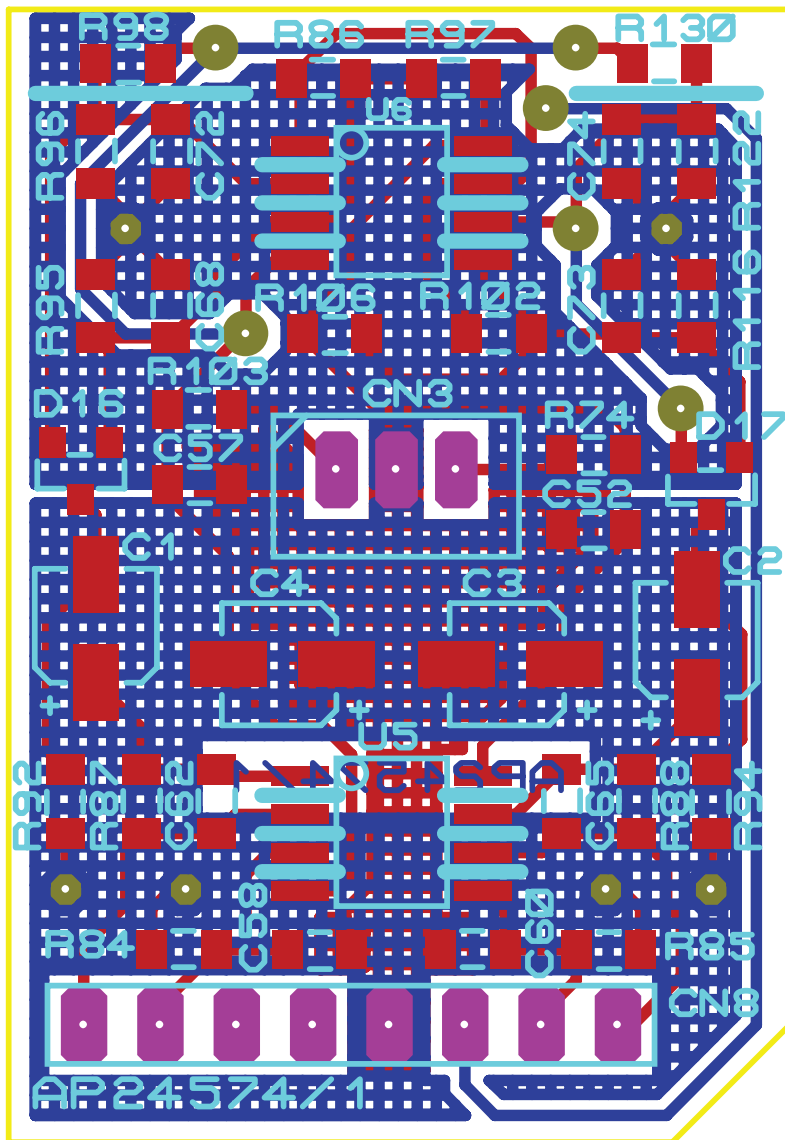
TRANSISTORS

65	30V 500mA	NPN Darlington	1	Q1	MPSA14		TO92	1300-140000-100	PY1211
66	-45V 500mA	PNP Signal	1	Q2	BC327-25		TO92	1301-327000-100	PY219
67	45V 300mA	NPN Signal	1	Q3	BC337-25		TO92	1300-337000-100	PY214

Protection PCB Schematic



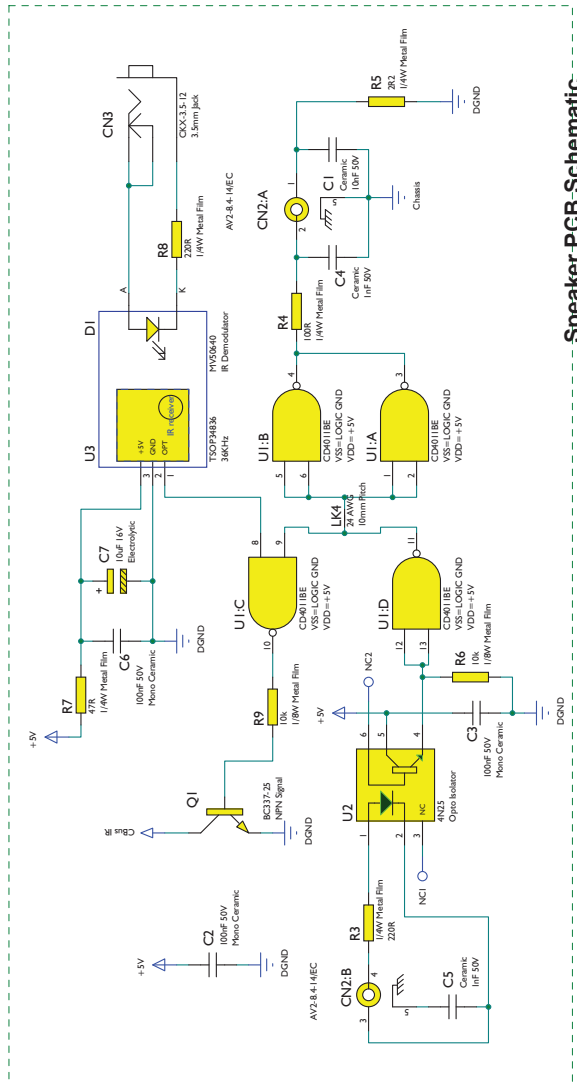
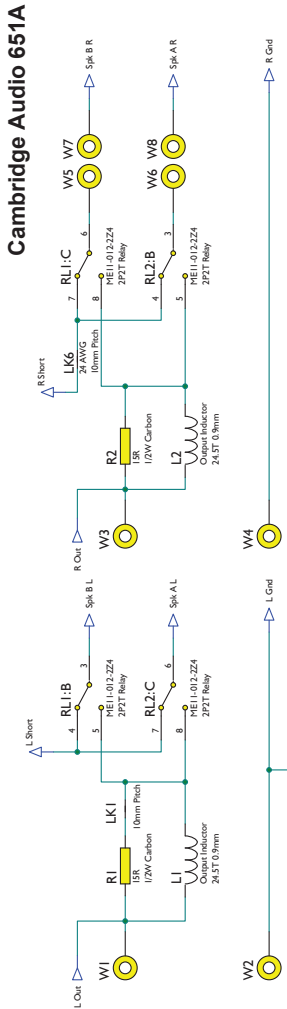
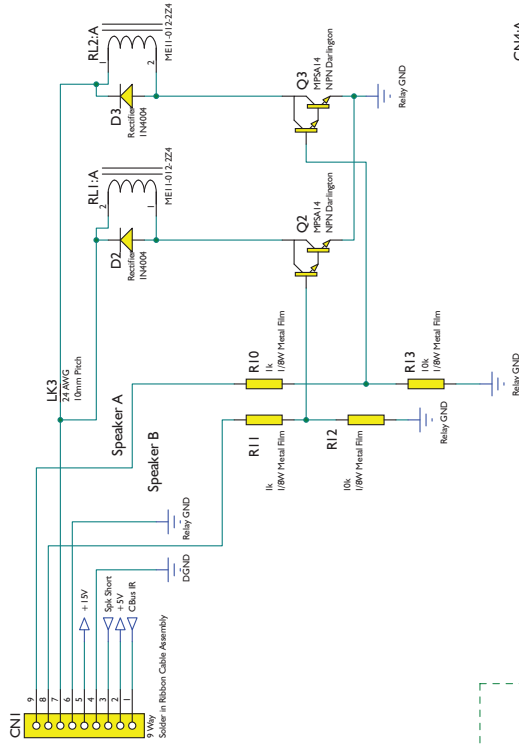
Protection PCB Layout



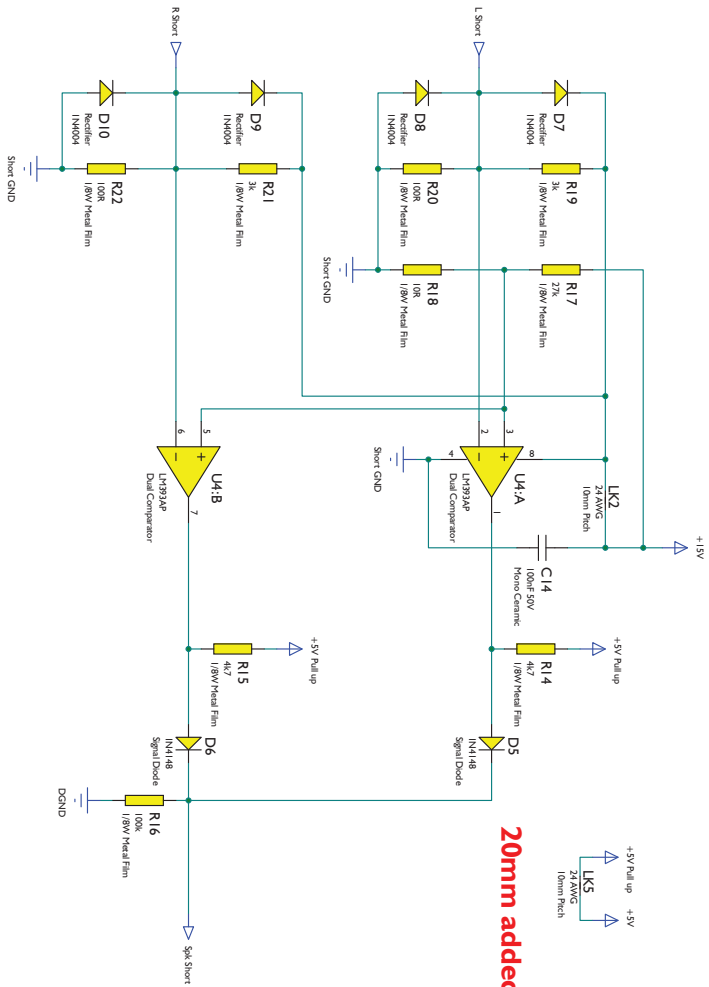
Protection PCB BOM

Value	Description/Type	Qty	Component Ident	ManPN	Tolerance	PackageInfo	Factory Part Number	AP Part Number
RESISTORS								
1	47R	0805 Thick Film	2	R74, R103	1%	805		
2	4k7	0805 Thick Film	4	R95, R96, R116, R122	1%	805		
3	100k	0805 Thick Film	6	R92, R94, R97, R98, R106, R130	1%	805		
4	1M	0805 Thick Film	6	R84-R88, R102	1%	805		
CAPACITORS								
5	10pF 50V	0805 NP0 Ceramic	3	C58, C62, C65	5%	805		
6	15pF 50V	0805 NP0 Ceramic	1	C60	5%	805		
7	10nF 50V	0805 COG	4	C68, C72-C74	5%	805		
8	100nF 25V	0805 Ceramic	2	C52, C57	10%	805		
9	4.7uF 25V 105deg	EL Capacitor SMT	4	C1-C4	10%	SMT 4mm dia (Case B)		Must be 105deg and 4mm dia
DIODES								
12	75V 0.215A	Signal Diode SM	2	D16, D17	BAV99	SOT23		
INTEGRATED CIRCUITS								
13	Dual	Dual Audio Op Amp	1	U5	NE5532D	SOIC08		PY1162
14	Low Offset	Dual Comparator	1	U6	LM393D	SO8		Solder on copper side of Protection PCB

Speaker PCB Schematic



Cambridge Audio 651A



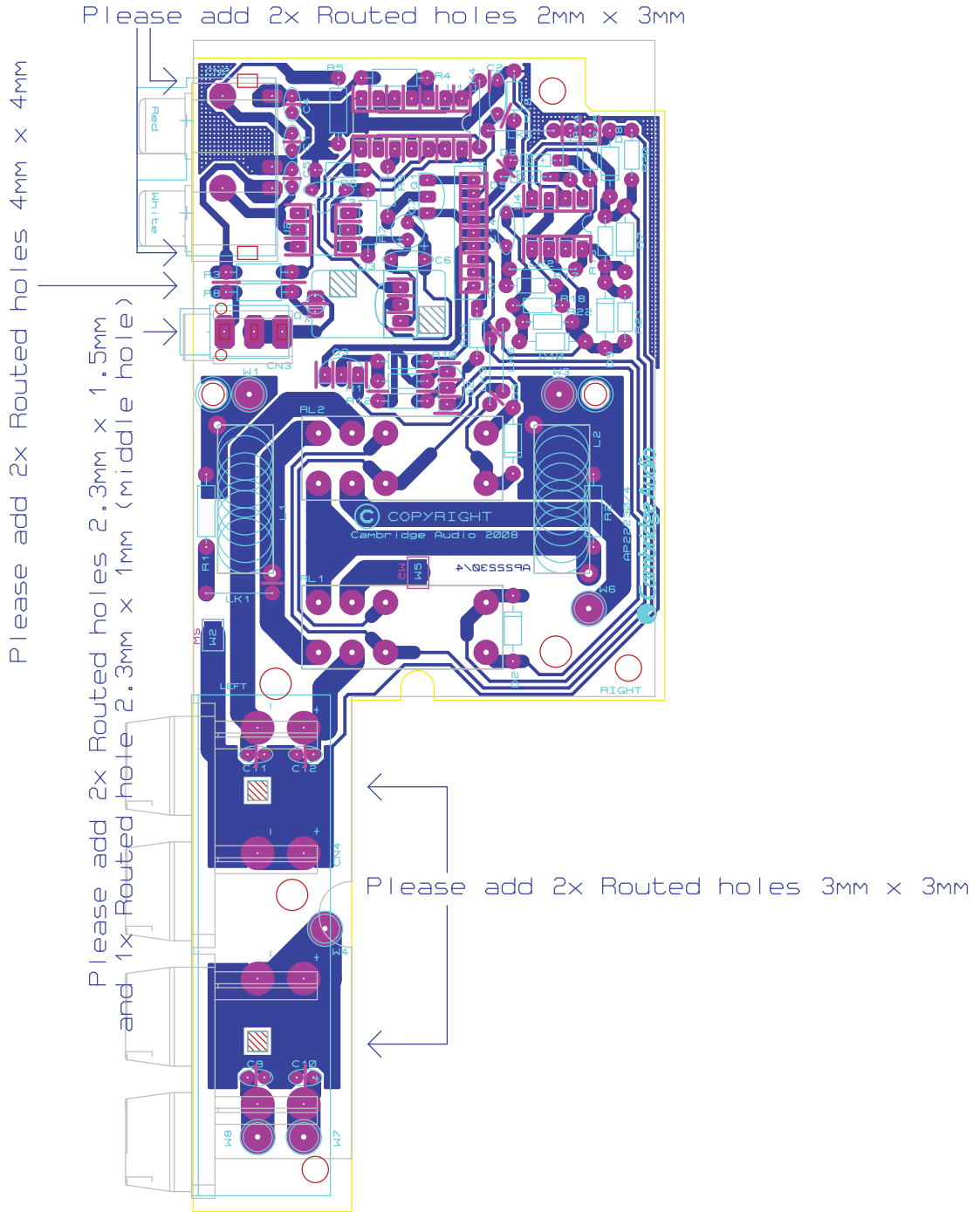
Speaker PCB Schematic



- WIRE1
120 mm Long + 5mm Strip/Tin each end
18 AWG Black Insulated Wire
Solder to Pad W1 and twist with WIRE2
- WIRE2
165 mm Long + 5mm Strip/Tin each end
18 AWG Black Insulated Wire
Solder to Pad W2 and twist with WIRE1
- WIRE3
165 mm Long + 5mm Strip/Tin each end
18 AWG Black Insulated Wire
Solder to Pad W3 and twist with WIRE4
- WIRE4
280 mm Long + 5mm Strip/Tin each end
18 AWG Black Insulated Wire
Solder to Pad W4 and twist with WIRE3
- WIRE5
120 mm Long + 5mm Strip/Tin each end
18 AWG Black Insulated Wire
Solder between Pad W5 and Pad W7
- WIRE6
120 mm Long + 5mm Strip/Tin each end
18 AWG Black Insulated Wire
Solder between Pad W6 and Pad W8

For soldering the wires please copy sample

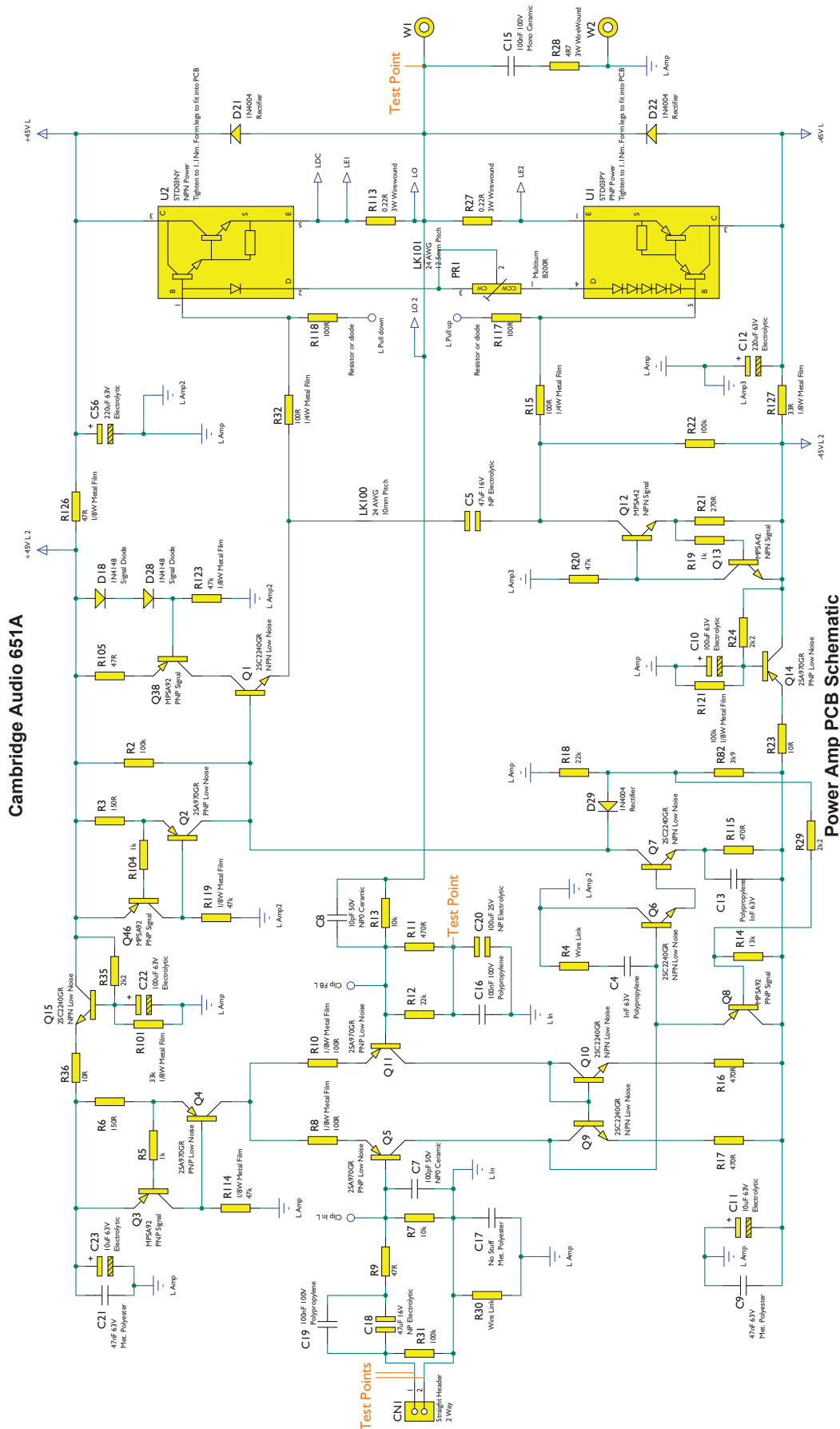
Speaker PCB Layout



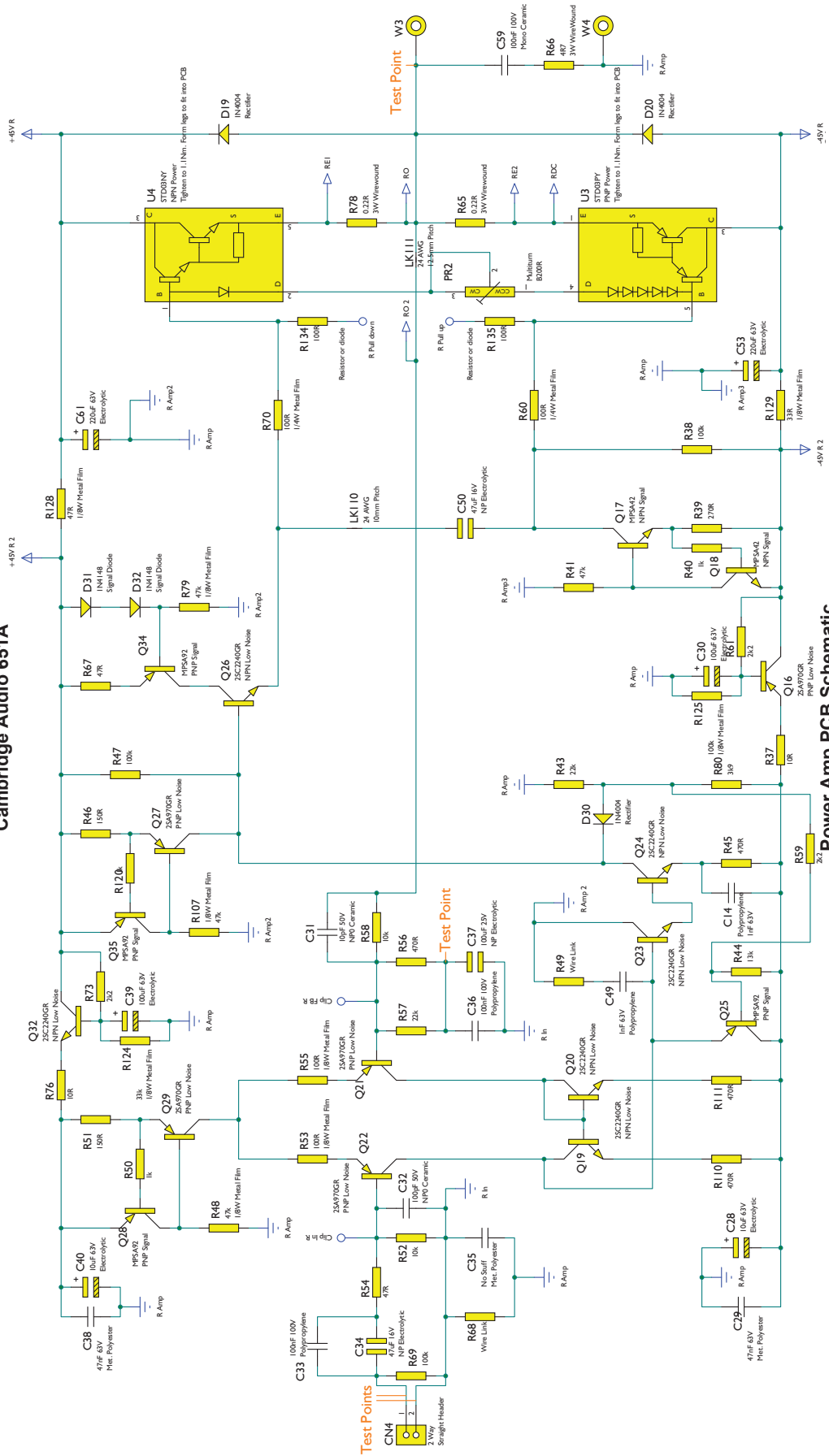
Speaker PCB BOM

Value	Description/Type	Qty	Component Ident	ManPN	Tolerance	PackageInfo	Factory Part Number	AP Part Number
RESISTORS								
1	2R2	1/4W Metal Film	1	R5	1%	10mm Pitch		
2	10R	1/8W Metal Film	1	R18	1%	7.5mm Pitch		
3	15R	1/2W Carbon	2	R1, R2	10%	12mm Pitch		
4	47R	1/4W Metal Film	1	R7	1%	10mm Pitch		
5	100R	1/4W Metal Film	1	R4	1%	10mm Pitch		
6	100R	1/8W Metal Film	2	R20, R22	1%	7.5mm Pitch		
7	220R	1/4W Metal Film	2	R3, R8	1%	10mm Pitch		
8	1k	1/8W Metal Film	2	R10, R11	1%	7.5mm Pitch		
9	3k	1/8W Metal Film	2	R19, R21	1%	7.5mm Pitch		
10	4k7	1/8W Metal Film	2	R14, R15	1%	7.5mm Pitch		
11	10k	1/8W Metal Film	4	R6, R9, R12, R13	1%	7.5mm Pitch		
12	27k	1/8W Metal Film	1	R17	1%	7.5mm Pitch		
13	100k	1/8W Metal Film	1	R16	1%	7.5mm Pitch		
CAPACITORS								
14	330pF 50V	Ceramic	4	C9-C12	5%	2.5mm Pitch	1100-331042-000	
15	1nF 50V	Ceramic	2	C4, C5	10%	2.5mm Pitch	1100-102043-000	
16	10nF 50V	Ceramic	1	C1	10%	2.5mm Pitch	1100-103043-000	
17	100nF 50V	Mono Ceramic	4	C2, C3, C6, C14	10%	5mm Pitch	1100-104043-000	
18	10uF 16V	Electrolytic	1	C7	20%	5.2mm Diameter	1102-100014-000	
CONNECTORS								
21	Mono 3.5mm	3.5mm Jack	1	CN3	CKX-3.5-12	Through Hole	2320-003911E007	
22	8 Way	Loudspeaker	1	CN4	WP8-22	Red Outer/ Black Middle		PY1322
DIODES								
23	3mm Red LED	IR Demodulator	1	D1	MV50640			IR Housing (AP17339/3)
24	400V 1A	Rectifier	6	D2, D3, D7-D10	1N4004	DO41	1401-140040-000	
25	75V 150mA	Signal Diode	2	D5, D6	1N4148	D035	1401-141480-000	
INDUCTORS								
26	24.5T 0.9mm	Output Inductor	2	L1, L2	CS79-874967	Through Hole	3203-874801-000	AP13772/1
INTEGRATED CIRCUITS								
27	Quad 2 Input	NAND Gate	1	U1	CD4011BE	DIL14	4140-110052E900	
28	Opto IC	Opto Isolator	1	U2	4N25	DIL06	4142-500050-001	
29	36KHz	IR Receiver	1	U3	TSOP34836	Through Hole	3001-348360-000	
30	Low Offset	Dual Comparator	1	U4	LM393AP	DIL08	4139-300052E900	PY1152
RELAY								
31	12V 8A	2P2T Relay	2	RL1, RL2	ME11-012-2Z4	Through Hole	4050-110122-001	PY594
TRANSISTORS								
32	45V 300mA	NPN Signal	1	Q1	BC337-25	TO92	1300-337000-100	PY214
33	30V 500mA	NPN Darlington	2	Q2, Q3	MPSA14	TO92	1300-140000-100	PY1211

Power AMP PCB Schematic



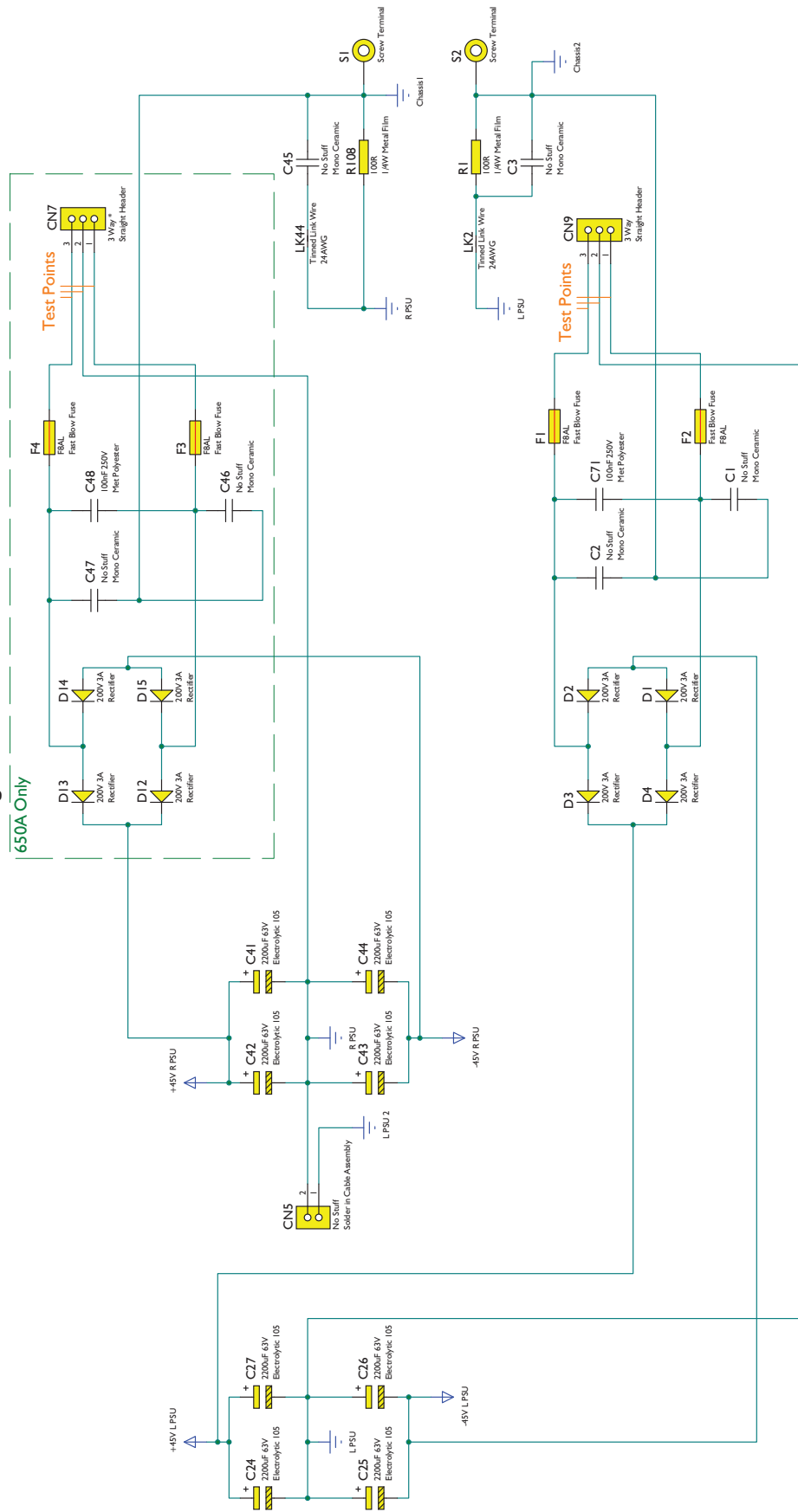
Cambridge Audio 651A



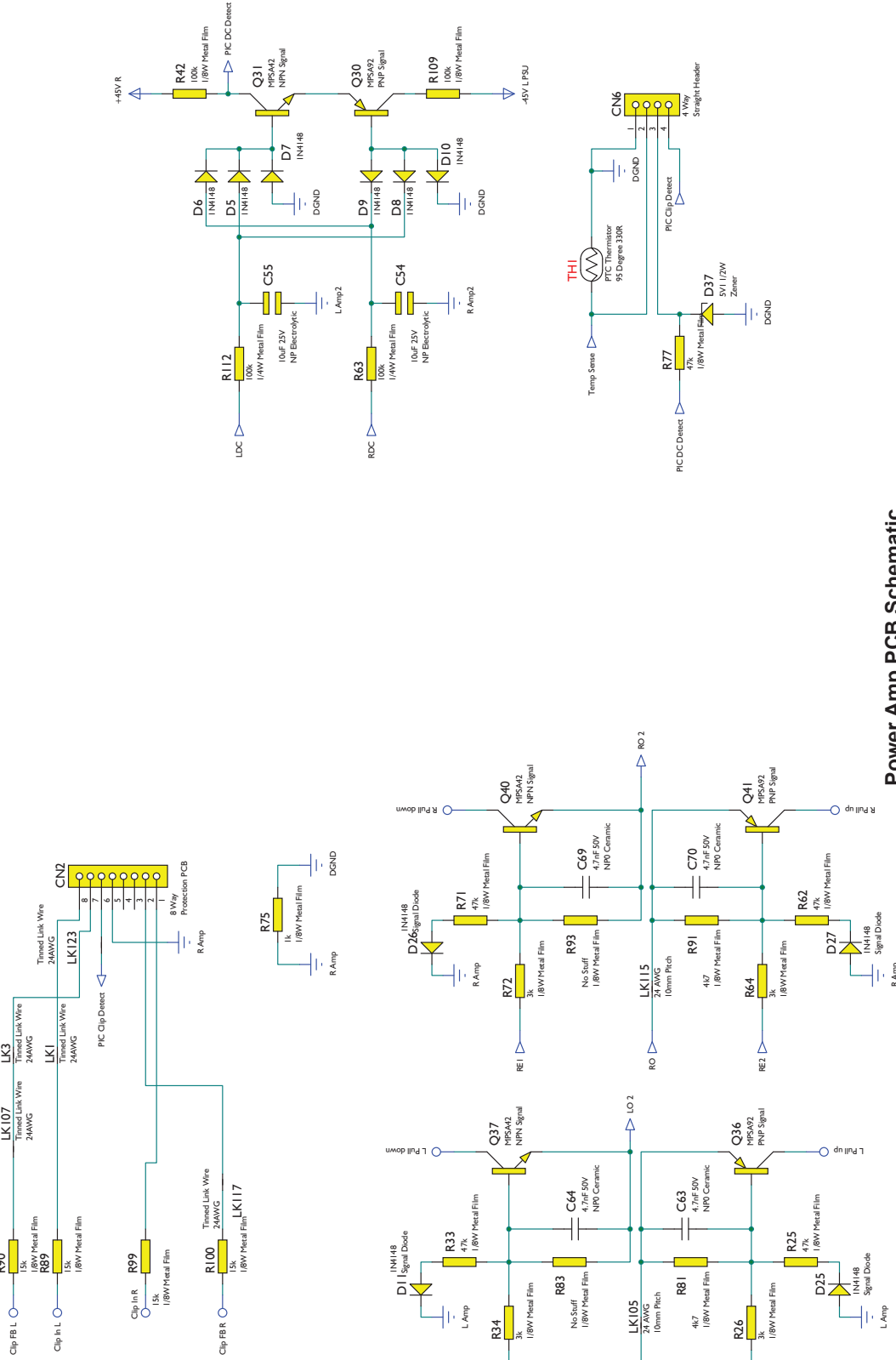
Power Amp PCB Schematic

Cambridge Audio 651A

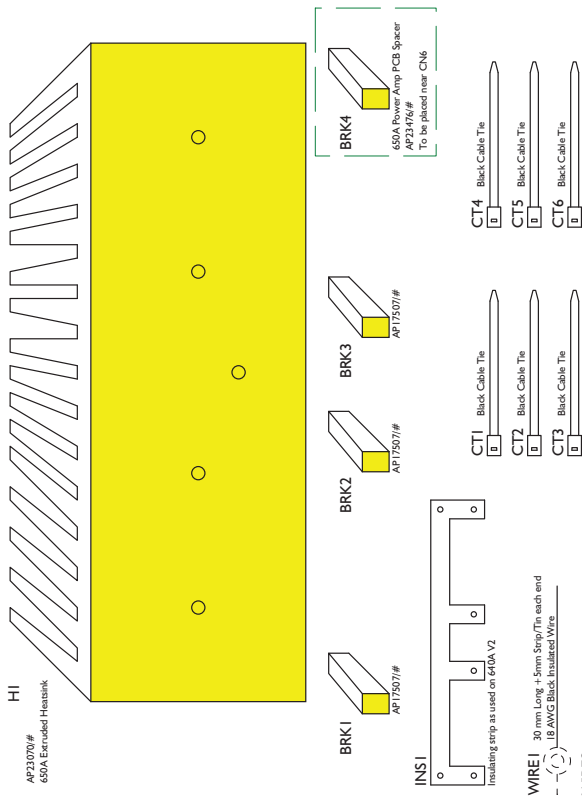
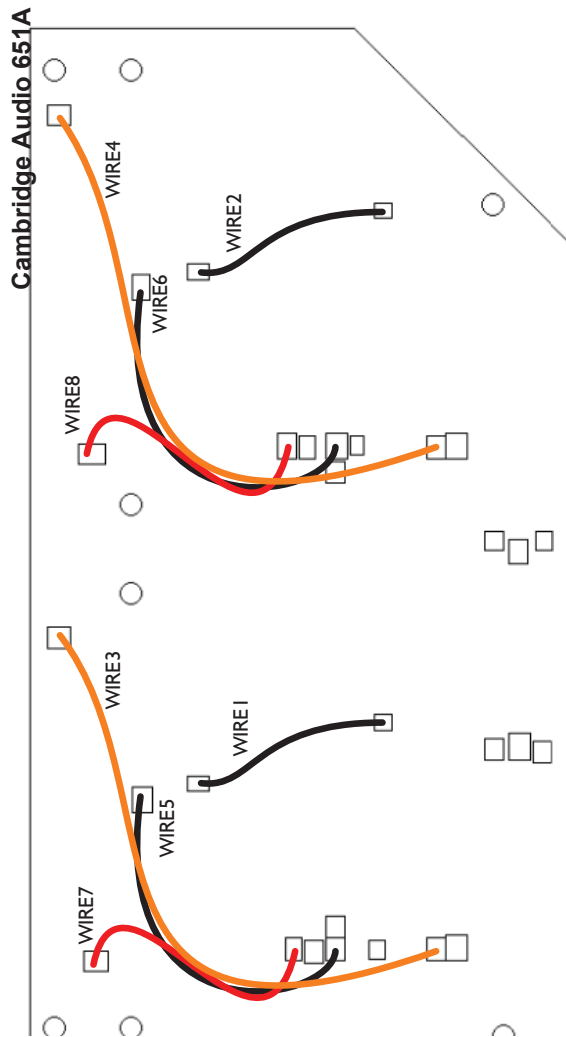
650A Only



Cambridge Audio 651A

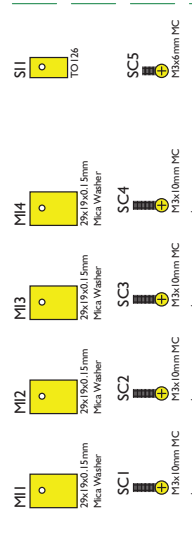


Power Amp PCB Schematic

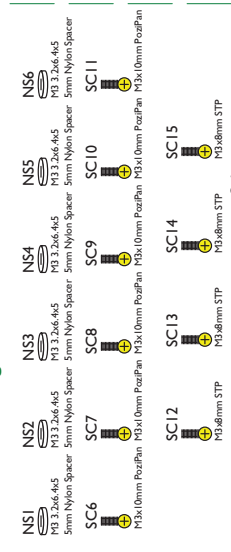


- WIRE1** 30 mm Long +5mm Strip/Tin each end
18 AWG Black Insulated Wire
- WIRE2** 30 mm Long +5mm Strip/Tin each end
18 AWG Black Insulated Wire
- WIRE3** 120 mm Long +5mm Strip/Tin each end
18 AWG Orange Insulated Wire
- WIRE4** 120 mm Long +5mm Strip/Tin each end
18 AWG Orange Insulated Wire
- WIRE5** 70 mm Long +5mm Strip/Tin each end
18 AWG Black Insulated Wire
- WIRE6** 70 mm Long +5mm Strip/Tin each end
18 AWG Black Insulated Wire
- WIRE7** 40 mm Long +5mm Strip/Tin each end
18 AWG Red Insulated Wire
- WIRE8** 40 mm Long +5mm Strip/Tin each end
18 AWG Red Insulated Wire

Transistor pads and screws



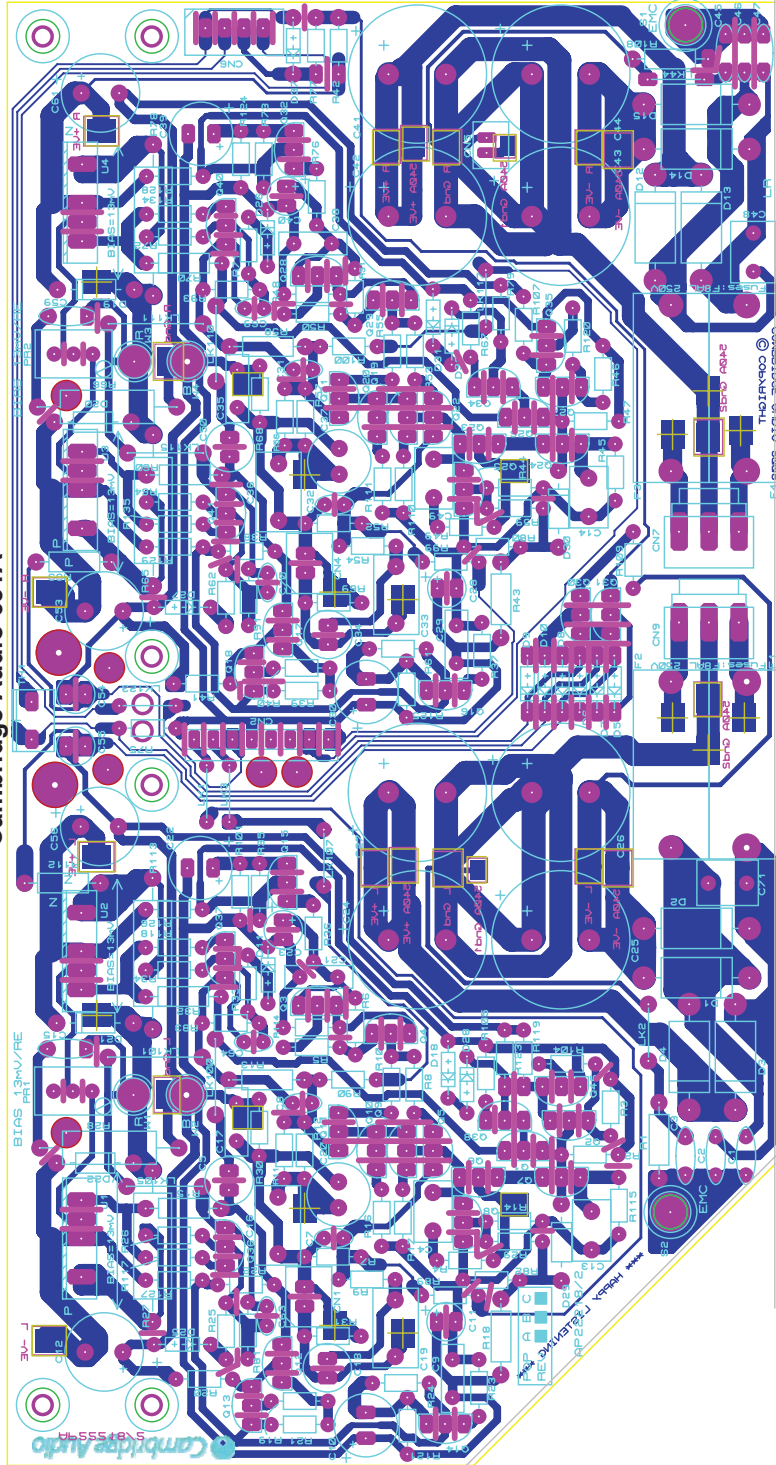
Screws for mounting brackets



Power Amp PCB Schematic

Power AMP PCB Layout

Cambridge Audio 651A



Power AMP PCB BOM

Value	Description/Type	Qty	Component Ident	ManPN	Tolerance	PackageInfo	Factory Part Number	AP Part Number	
RESISTORS									
1	0.22R	3W Wirewound	4	R27, R65, R78, R113	5%	20mm Pitch	1072-208330E000	Raise off PCB	
2	4R7	3W WireWound	2	R28, R66	5%	20mm Pitch	1074-707330E000	Raise off PCB	
3	10R	1/8W Metal Film	4	R23, R36, R37, R76	1%	7.5mm Pitch			
4	47R	1/8W Metal Film	6	R9, R54, R67, R105, R126, R128	1%	7.5mm Pitch			
5	100R	1/4W Metal Film	6	R1, R15, R32, R60, R70, R108	1%	10mm Pitch			
6	100R	1/8W Metal Film	8	R8, R10, R53, R55, R117, R118, R134, R135	1%	7.5mm Pitch			
7	150R	1/8W Metal Film	4	R3, R6, R46, R51	1%	7.5mm Pitch			
8	270R	1/8W Metal Film	2	R21, R39	1%	7.5mm Pitch			
9	470R	1/8W Metal Film	8	R11, R16, R17, R45, R56, R110, R111, R115	1%	7.5mm Pitch			
10	Wire Link	1/8W Metal Film	4	R4, R30, R49, R68	1%	7.5mm Pitch		Use 24AWG wire link	
11	No Stuff	1/8W Metal Film	2	R83, R93	1%	7.5mm Pitch		No Stuff	
12	33R	1/8W Metal Film	2	R127, R129	1%	7.5mm Pitch			
13	1k	1/8W Metal Film	7	R5, R19, R40, R50, R75, R104, R120	1%	7.5mm Pitch			
14	2k2	1/8W Metal Film	6	R24, R29, R35, R59, R61, R73	1%	7.5mm Pitch			
15	3k	1/8W Metal Film	4	R26, R34, R64, R72	1%	7.5mm Pitch			
16	3k9	1/8W Metal Film	2	R80, R82	1%	7.5mm Pitch			
17	4k7	1/8W Metal Film	2	R81, R91	1%	7.5mm Pitch			
18	10k	1/8W Metal Film	2	R7, R52	1%	7.5mm Pitch			
19	10k	1/4W Metal Film	2	R13, R58	1%	10mm Pitch			
20	13k	1/8W Metal Film	2	R14, R44	1%	7.5mm Pitch			
21	15k	1/8W Metal Film	4	R89, R90, R99, R100	1%	7.5mm Pitch			
22	22k	1/8W Metal Film	2	R12, R57	1%	7.5mm Pitch			
23	22k	1/4W Metal Film	2	R18, R43	1%	10mm Pitch			
24	33k	1/8W Metal Film	2	R101, R124	1%	7.5mm Pitch			
25	47k	1/8W Metal Film	13	R20, R25, R33, R41, R48, R62, R71, R77, R79, R107, R114, R119, R123	1%	7.5mm Pitch			
26	100k	1/8W Metal Film	10	R2, R22, R31, R38, R42, R47, R69, R109, R121, R125	1%	7.5mm Pitch			
27	100k	1/4W Metal Film	2	R63, R112	1%	10mm Pitch			
RESISTORS VARIABLE									
28	B200R	Multiturn	2	PR1, PR2	WI3296NOX0X-WA2-019	10%	Top Adjust	1062-001412E000	
CAPACITORS									
29	No Stuff	Mono Ceramic	6	C1-C3, C45-C47		10%	5mm Pitch	1106-104064-001	No Stuff

30	No Stuff	Met. Polyester	2	C17, C35		10%	5mm Pitch Box		No Stuff
31	10pF 50V	NP0 Ceramic	2	C8, C31		5%	2.5mm Pitch	1181-100042-000	
32	100pF 50V	NP0 Ceramic	2	C7, C32		5%	2.5mm Pitch	1181-101042-000	
33	1nF 63V	Polypropylene	4	C4, C13, C14, C49		5%	5mm Pitch Box	1114-102052E000	
34	4.7nF 50V	NP0 Ceramic	4	C63, C64, C69, C70		10%	2.5mm Pitch		
35	47nF 63V	Met. Polyester	4	C9, C21, C29, C38		10%	5mm Pitch Box	1117-473053E000	
36	100nF 100V	Mono Ceramic	2	C15, C59		10%	5mm Pitch	1106-104064-001	
37	100nF 100V	Polypropylene	4	C16, C19, C33, C36	CMPA104K100RB075	10%	7.5mm Pitch Box	1114-104063E000	
38	100nF 250V	Met Polyester	2	C48, C71	CMEB104M250Rxxxx	20%	5mm Pitch Box		
39	10uF 63V	Electrolytic	4	C11, C23, C28, C40		20%	5mm Dia	1102-100054-000	Rated to 105 degrees
40	10uF 25V	NP Electrolytic	2	C54, C55		20%	5mm Dia	1105-100024-000	Rated to 105 degrees
41	47uF 16V	NP Electrolytic	4	C5, C18, C34, C50		20%	6mm Dia	1105-470014-000	Rated to 105 degrees
42	100uF 63V	Electrolytic	4	C10, C22, C30, C39		20%	8mm Dia	1102-101054-000	Rated to 105 degrees
43	100uF 25V	NP Electrolytic	2	C20, C37		20%	8mm Dia	1105-101024-000	Rated to 105 degrees
44	220uF 63V	Electrolytic	4	C12, C53, C56, C61		20%	10mm Dia		Rated to 105 degrees
45	2200uF 63V	Electrolytic 105	8	C24-C27, C41-C44		20%	16m Dia		Screened for CA.

DIODES

52	200V 3A	Rectifier	8	D1-D4, D12-D15	1N5402		DO27	1401-154020-000	Raise off PCB
53	75V 150mA	Signal Diode	14	D5-D11, D18, D25-D28, D31, D32	1N4148		DO35	1401-141480-000	
54	400V 1A	Rectifier	6	D19-D22, D29, D30	1N4004		DO41	1401-140040-000	
55	5V1 1/2W	Zener	1	D37	BZX55C5V1		DO35	1402-511201E200	

FUSES

56	F8AL	Fast Blow Fuse	4	F1-F4			20mm		
57		Fuse Holder Base	4	F1-F4	PTF78 (or equivalent)	20mm Pitch	4031-780000E000		
58		Fuse Holder Cover	4	F1-F4	PTF78 (or equivalent)	20mm Pitch	4034-780000E000		

INTEGRATED CIRCUITS

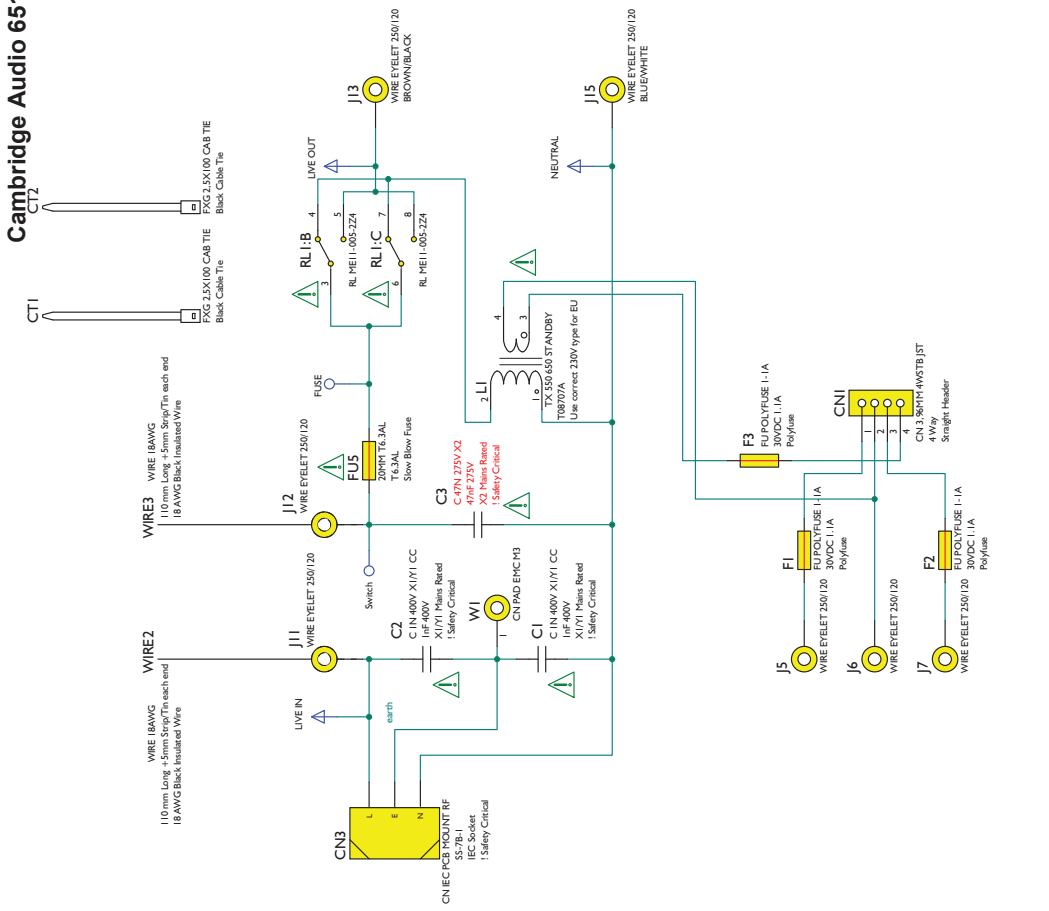
59	-160V 15A	PNP Power	2	U1, U3	STD03PY		STD03P		PY1606
60	160V 15A	NPN Power	2	U2, U4	STD03NY		STD03N		PY1605

TRANSISTORS

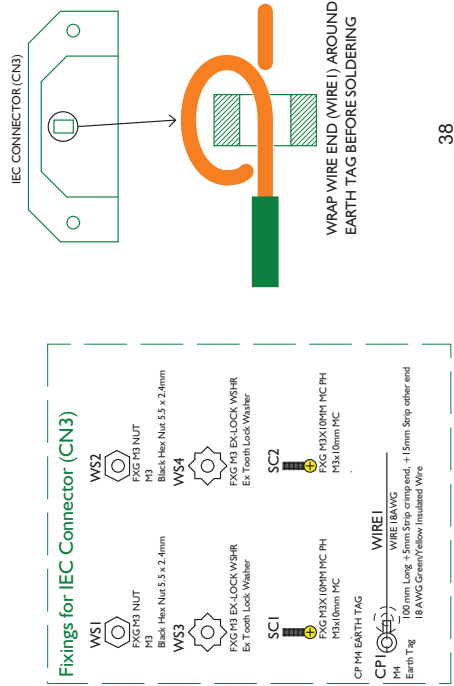
61	120V 100mA	NPN Low Noise	8	Q1, Q6, Q7, Q15, Q23, Q24, Q26, Q32	2SC2240GR		TO92	1300-224000E100	PY910
62	-120V -100mA	PNP Low Noise	6	Q2, Q4, Q14, Q16, Q27, Q29	2SA970GR		TO92	1301-970000-100	PF147
63	-300V -500mA	PNP Signal	11	Q3, Q8, Q25, Q28, Q30, Q34-Q36, Q38, Q41, Q46	MPSA92		TO92	1301-920000-100	PY220
64	-120V -100mA	PNP Low Noise	4	Q5, Q11, Q21, Q22	2SA970GR		TO92	1301-970000-100	PF147
65	120V 100mA	NPN Low Noise	4	Q9, Q10, Q19, Q20	2SC2240GR		TO92	1300-224000E100	PY910
66	300V 500mA	NPN Signal	7	Q12, Q13, Q17, Q18, Q31, Q37, Q40	MPSA42		TO92	1300-420000-100	PY537

Mains PCB (EU) Schematic

Cambridge Audio 651A



Mains PCB Schematic (EU)



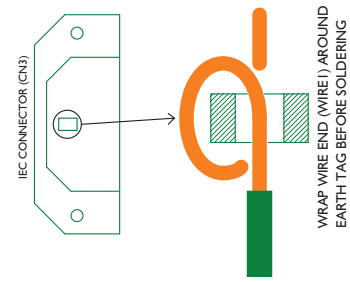
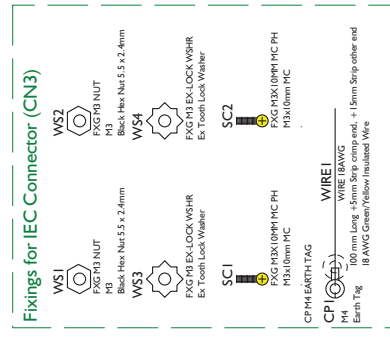
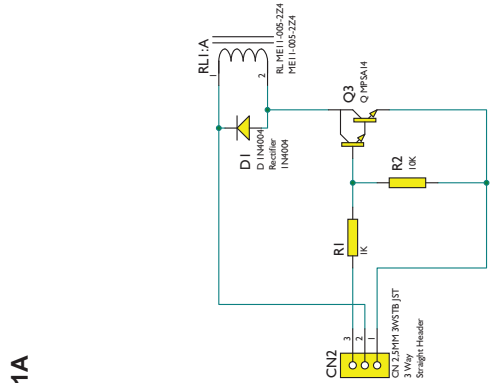
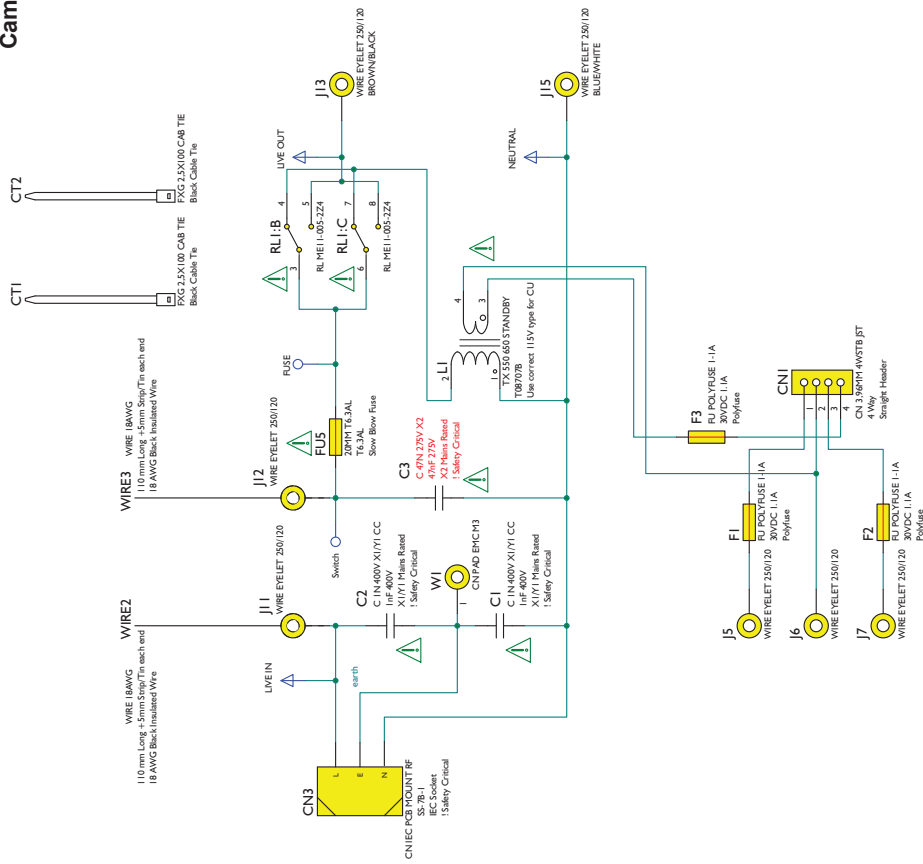
Mains PCB (EU) BOM

651A EU 230V Mains PCB BOM

Value	Description/Type	Qty	Component Ident	ManPN	Tolerance	PackageInfo	Factory Part Numer	AP Part Number
RESISTORS								
1	1K	1/8W Metal Film	1	R1	1%	7.5mm Pitch		
2	10K	1/8W Metal Film	1	R2	1%	7.5mm Pitch		
CAPACITORS								
3	1nF 400V	X1/Y1 Mains Rated	2	C1, C2	20%	9.5mm Pitch	1119-102104-000	
4	47nF 275V	X2 Mains Rated	1	C3	20%	15mm Pitch		
CONNECTORS								
5	4 Way	Straight Header	1	CN1	B4P-VH	3.96mm Pitch		
6	3 Way	Straight Header	1	CN2	B3B-XH-A	2.5mm Pitch	2300-003100-004	
7	3 Pin	IEC Socket	1	CN3	SS-7B-1	PCB Mount	2336-003910-002	
DIODES								
8	400V 1A	Rectifier	1	D1	1N4004	DO41	1401-140040-000	
FUSES								
9	30VDC 1.1A	Polyfuse	3	F1-F3		5mm Pitch	4030-301100-001	
10	T6.3AL	Slow Blow Fuse	1	FU5		20mm	4030-632500-000	
11		Fuse Holder Base	1	FU5	PTF78 (or equivalent)	20mm Pitch	4031-780000E000	(alt. Camden YN:4031-140000E000)
12		Fuse Holder Cover	1	FU5	PTF78 (or equivalent)	20mm Pitch	4034-780000E000	(alt. Camden YN:4034-140000E000)
INDUCTORS								
13	Standby Transformer	Standby Transformer	1	L1	T08707A	PCB Mount		Use correct 230V type for EU
RELAY								
14	5V 8A	2P2T Relay	1	RL1	ME11-005-2Z4	Through Hole		PY1607
TRANSISTORS								
15	30V 500mA	NPN Darlington	1	Q3	MPSA14	TO92	1300-140000-100	PY1211

Mains PCB (CU) Schematic

Cambridge Audio 651A



Mains PCB Schematic (CU)

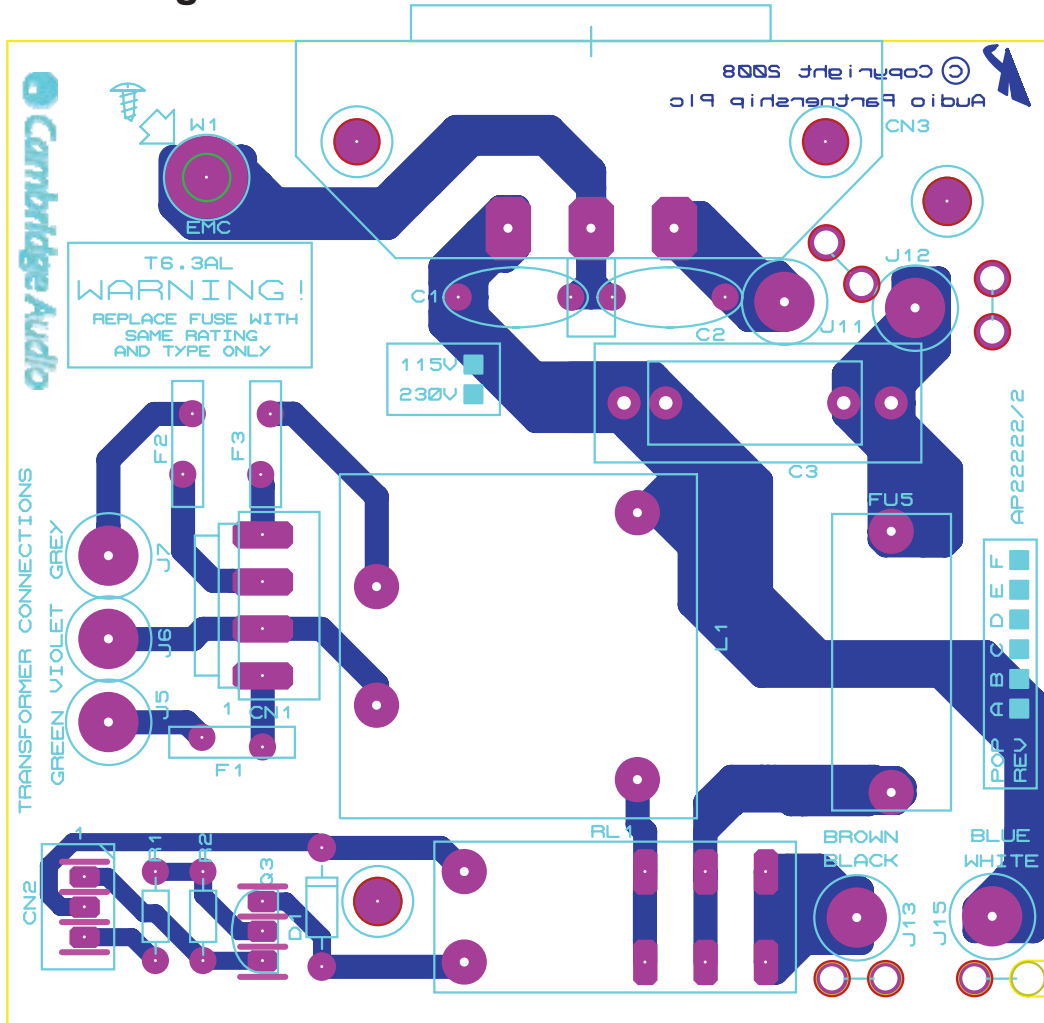
Mains PCB (CU) BOM

651A Mains CU 115V PCB BOM

Value	Description/Type	Qty	Component Ident	Manufacturer	ManPN	Tolerance	PackageInfo	Yanion P/N	NOTES
RESISTORS									
1	1K	1/8W Metal Film	1	R1		1%	7.5mm Pitch		
2	10K	1/8W Metal Film	1	R2		1%	7.5mm Pitch		
CAPACITORS									
3	1nF 400V	X1/Y1 Mains Rated	2	C1, C2	C & C Capacitors	CCDE102MBV09	20%	9.5mm Pitch	1119-102104-000
4	47nF 275V	X2 Mains Rated	1	C3	Captop Elec Ltd		20%	15mm Pitch	
DIODES									
8	400V 1A	Rectifier	1	D1		1N4004		DO41	1401-140040-000
FUSES									
9	30VDC 1.1A	Polyfuse	3	F1-F3				5mm Pitch	4030-301100-001
10	T6.3AL	Slow Blow Fuse	1	FU5				20mm	4030-632500-000
11		Fuse Holder Base	1	FU5	Pioneer Tech	PTF78 (or equivalent)	20mm Pitch	4031-780000E000	(alt. Camden YN:4031-140000E000)
12		Fuse Holder Cover	1	FU5	Pioneer Tech	PTF78 (or equivalent)	20mm Pitch	4034-780000E000	(alt. Camden YN:4034-140000E000)
INDUCTORS									
13	Standby Transformer	Standby Transformer	1	L1	Wah Hing	T08707B		PCB Mount	Use correct 115V type for CU
RELAY									
14	5V 8A	2P2T Relay	1	RL1	Massuse	ME11-005-2Z4		Through Hole	PY1607
TRANSISTORS									
15	30V 500mA	NPN Darlington	1	Q3	On Semi	MPSA14		TO92	1300-140000-100 PY1211

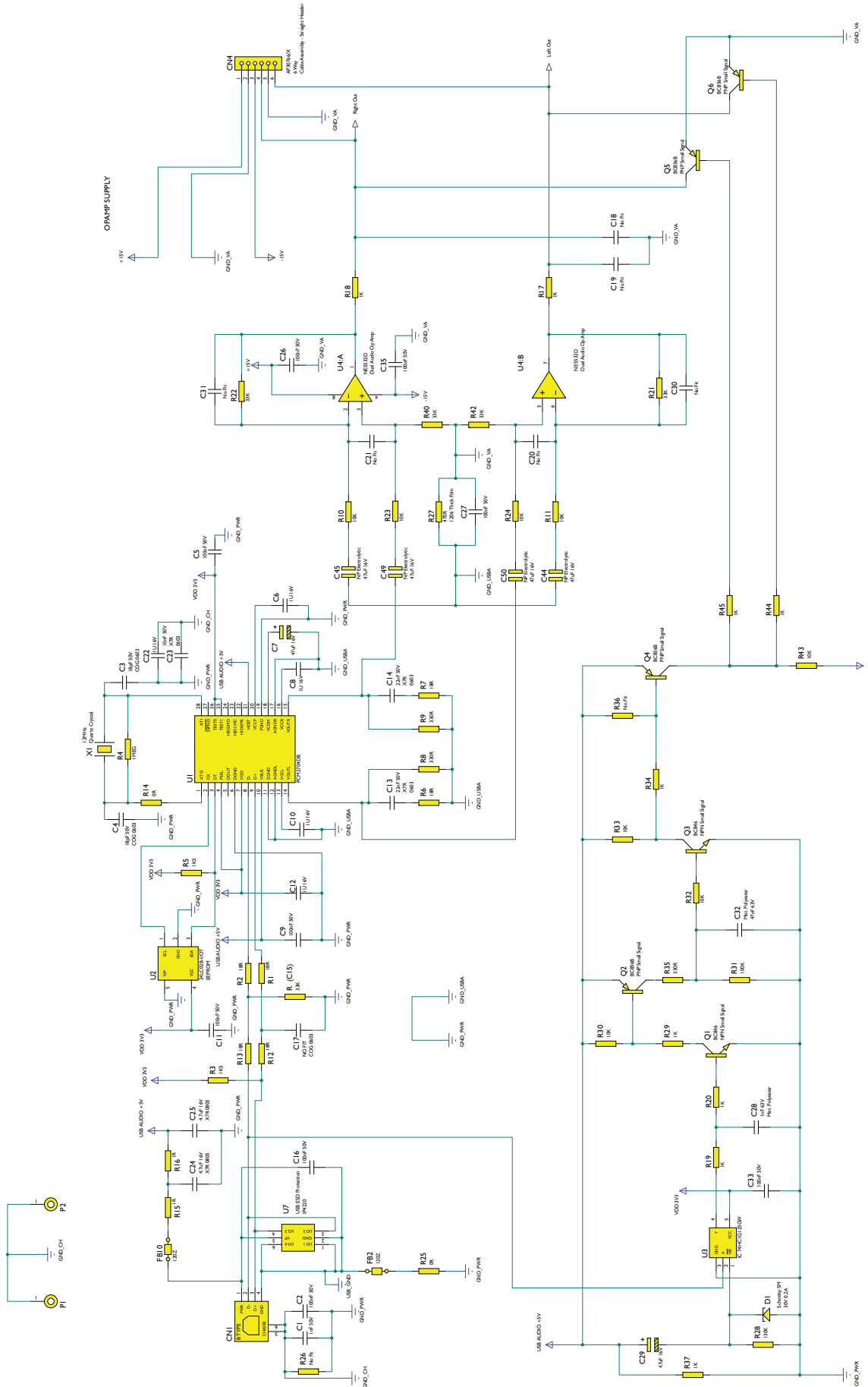
Mains PCB Layout

Cambridge Audio 651A

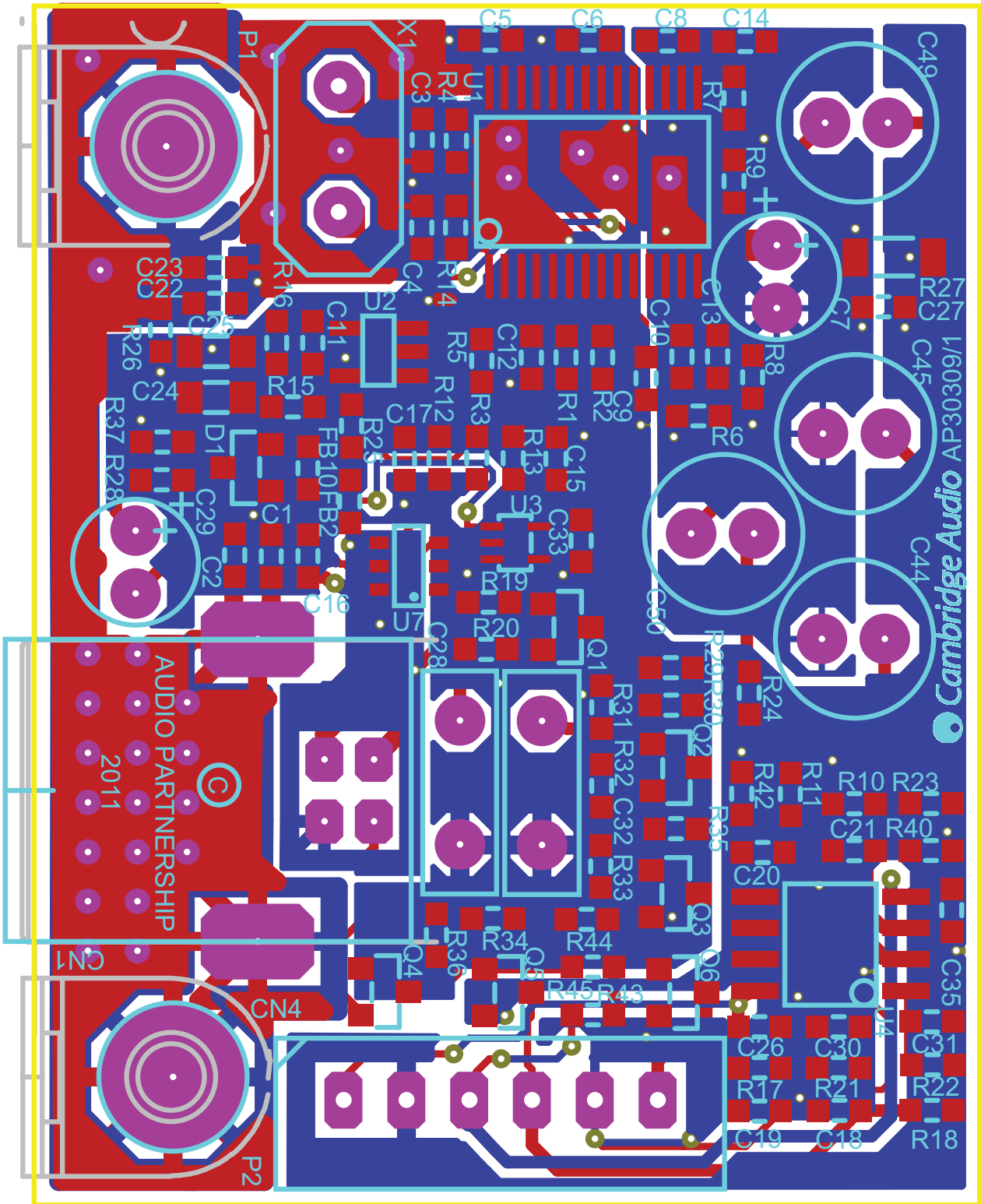


Mains PCB Layout

USB Input Audio PCB Schematic



USB Input Audio PCB Layout



USB Input Audio PCB BOM

	Value	Description/Type	Qty	Component Ident	ManPN	Tolerance	PackageInfo	Factory Reference Number	Service Part Number
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RESISTORS

1	0R	0603 Thick Film	2	R14, R25		1%	0603		
2	No Fit		2	R26, R36					
3	1R	0603 Thick Film	2	R15, R16		1%	0603		
4	18R	0603 Thick Film	6	R1, R2, R6, R7, R12, R13		1%	0603		
5	330R	0603 Thick Film	3	R8, R9, R35		1%	0603		
6	470R	1206 Thick Film	1	R27		1%	1206		
7	1K	0603 Thick Film	9	R17-R20, R29, R34, R37, R44, R45		1%	0603		
8	1K5	0603 Thick Film	2	R3, R5		1%	0603		
9	10K	0603 Thick Film	8	R10, R11, R23, R24, R30, R32, R33, R43		1%	0603		
10	33K	0603 Thick Film	4	R21, R22, R40, R42		1%	0603		33K also used for C15
11	100K	0603 Thick Film	1	R31		1%	0603		
12	130K	0603 Thick Film	1	R28		1%	0603		
13	1MEG	0603 Thick Film	1	R4		1%	0603		

CAPACITORS

14	33K RESISTOR	0603 Thick Film	1	C15		1%	0603		As per R21, R22, R40, R42
15	NO FIT		1	C17					
16	No Fit		2	C18, C19					
17	No Fit		4	C20, C21, C30, C31					
18	18pF 50V	COG 0603	2	C3, C4		5%	0603		
19	1nF 50V	NPO	1	C1		5%	0603		
20	1nF 63V	Met. Polyester	1	C28		10%	5mm Pitch Box	1117-102052-900	
21	10nF 50V	X7R	1	C23		10%	0603		
22	22nF 50V	X7R	2	C13, C14		10%	0603		
23	47nF 63V	Met. Polyester	1	C32		10%	5mm Pitch Box	1117-473053E000	
24	100nF 50V	X7R	9	C2, C5, C9, C11, C16, C26, C27, C33, C35		10%	0603		
25	1U 16V	X5R CER 0603	5	C6, C8, C10, C12, C22		10%	0603		
26	4.7uF 16V	X7R 0805	2	C24, C25			0805		
27	47uF 16V	Electrolytic	2	C7, C29		20%	5mm Dia	1102-470014-000	
28	47uF 16V	NP Electrolytic	4	C44, C45, C49, C50		20%	6mm Dia	1105-470014-000	

CONNECTORS

29		USB B Type	1	CN1	USB B Type 90°		Through Hole		
30	6 Way	Cable Assembly - Straight Header	1	CN4	AP30766/X		2.5mm Pitch		

CRYSTALS

31	12MHz	Quartz Crystal	1	X1			HC49U		
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DIODES

32	30V 0.2A	Schottky SM	1	D1	BAT54		SOT23		
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INDUCTORS

33	120Z	Ferrite Bead 0603	2	FB2, FB10	BLM18KG121TN1D		0603		120Z @100MHZ
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**INTEGRATED
CIRCUITS**

34	PCM2704	16-BIT, 32/44.1/48-kHz STEREO DAC WITH USB	1	U1	PCM2704DB		SSOP 28		
35	2k	EEPROM	1	U2	24LC02B-I/OT		SOT23-5		Preload with AP30822/X HEX code
36		Buffer IC	1	U3	74HC1G125GW		SOT-353		
37		Dual Audio Op Amp	1	U4	NE5532D		SOIC08		
38	IP4220	USB ESD Protection	1	U7	IP4220CZ6		SOT457		

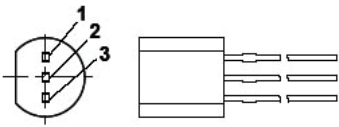
TRANSISTORS

39	65V 100mA	NPN Small Signal	2	Q1, Q3	BC846		SOT23	1300-846000-500	
40	-65V 100mA	PNP Small Signal	4	Q2, Q4-Q6	BC856B		SOT23	1301-856000-500	

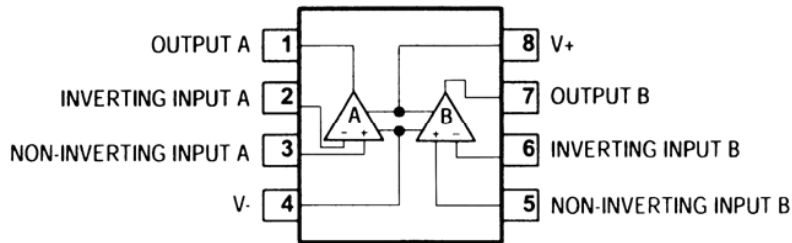
IC Pin Layouts for the Cambridge Audio Azur 550A/650A Amplifier

Input PCB

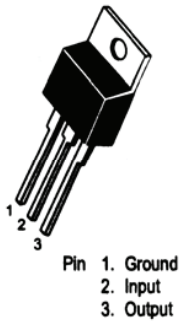
BC327 (Q1)



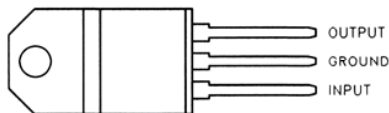
NE5532 (U4, U7, U8, U9, U10, U11 & U12)



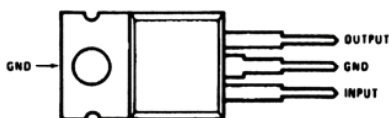
7915 (U1)



7805 (U3)

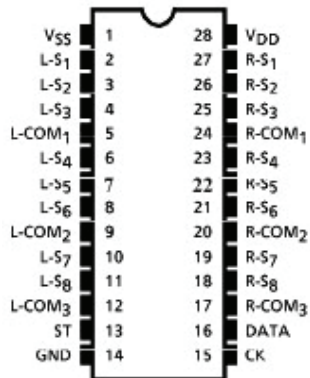


7815 (U2)

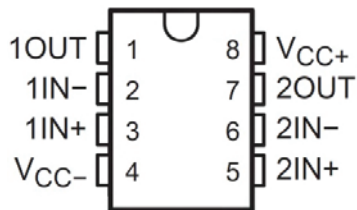


IC Pin Layouts for the Cambridge Audio Azur 550A/650A Amplifier

TC9163AF (U5)

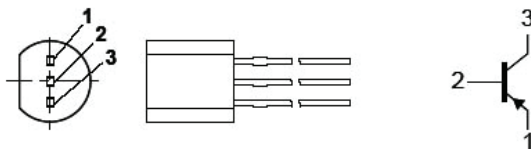


RC4580P (U6)

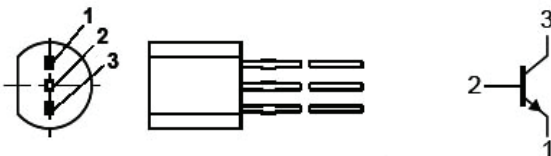


Preamp PCB

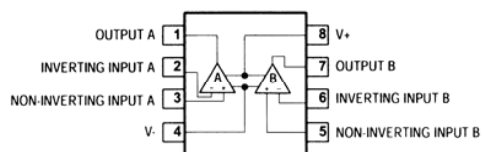
BC327 (Q2)



BC337 (Q3)

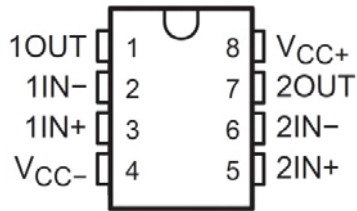


NE5532 (U3, U4, U5 & U6)

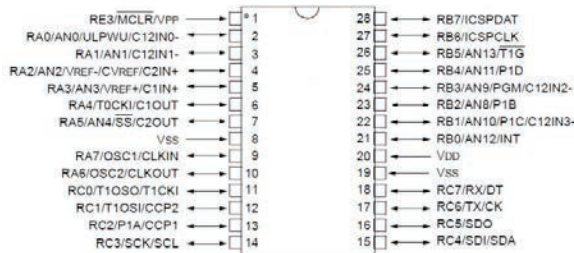


IC Pin Layouts for the Cambridge Audio Azur 550A/650A Amplifier

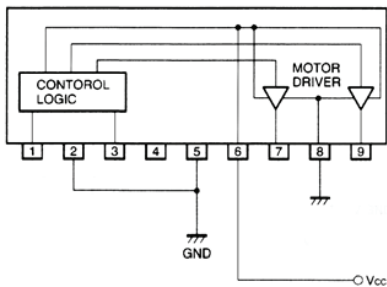
RC4580P (U1 & U2)



PIC16F882 (U7)

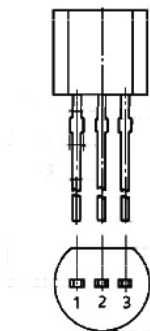


BA6218 (U8)



Power Amp PCB

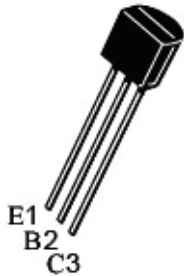
2SC2240GR (Q1, Q6, Q7, Q9, Q10, Q15, Q19, Q20, Q23, Q24, Q26 & Q32)



1. EMITTER
2. COLLECTOR
3. BASE

IC Pin Layouts for the Cambridge Audio Azur 550A/650A Amplifier

MPSA92 (Q3, Q8, Q25, Q28, Q29 (650A ONLY) Q30, Q34, Q35, Q36, Q38, Q41 & Q46)

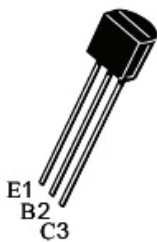


2SA970GR (Q2, Q4, Q5, Q11, Q14, Q16, Q21, Q22, Q27 & Q29)

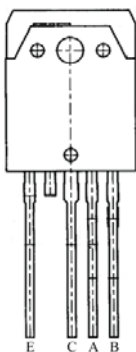


- 1. EMITTER
- 2. COLLECTOR
- 3. BASE

MPSA42 (Q12, Q13, Q17, Q18, Q31, Q37 & Q40)

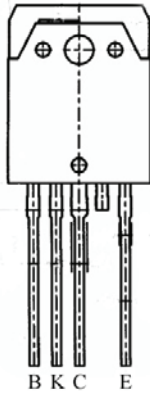


STD03PY (U1 & U3)



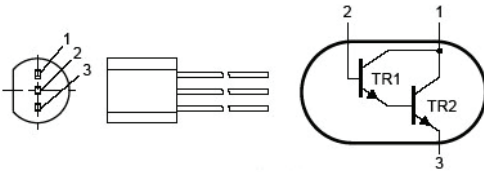
IC Pin Layouts for the Cambridge Audio Azur 550A/650A Amplifier

STD03NY (U2 & U4)



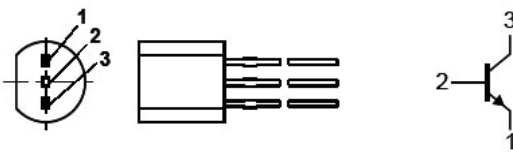
Mains PCB

MPSA14 (Q3)

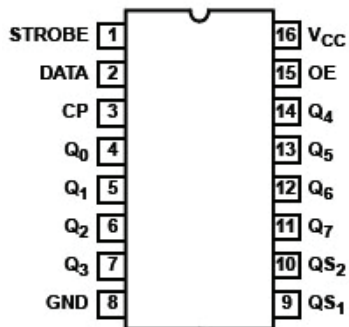


Front Panel PCB

BC337 (Q1)

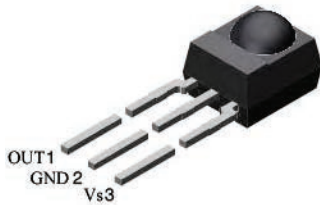


M74HC4094B1R (U2)



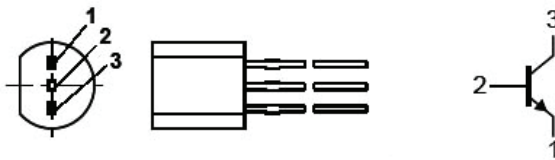
IC Pin Layouts for the Cambridge Audio Azur 550A/650A Amplifier

TSOP34836 (U1)

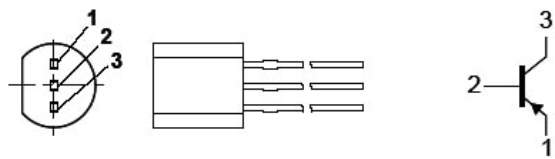


Speaker PCB

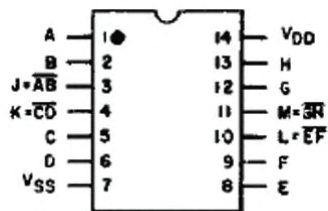
BC337 (Q1)



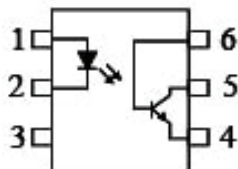
BC327 (Q4)



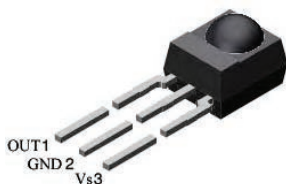
CD4011BE (U1)



OP4N25 (U2)

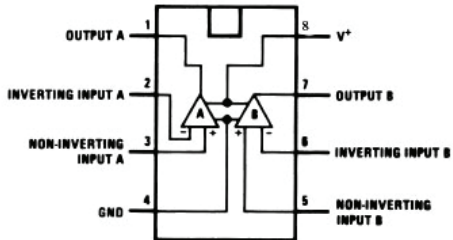


TSOP34836 (U3)

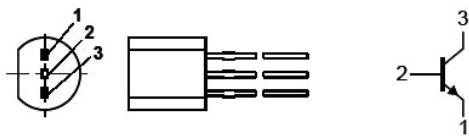


IC Pin Layouts for the Cambridge Audio Azur 550A/650A Amplifier

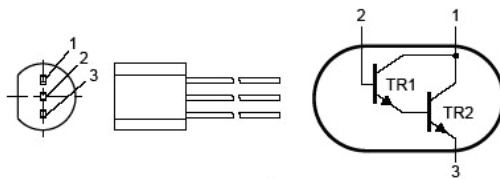
LM393AP (U4)



BC337 (Q1)

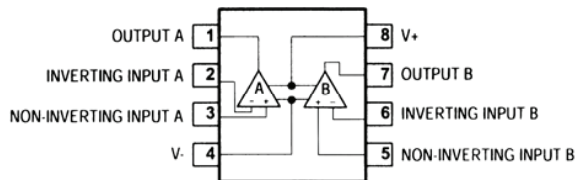


MPSA14 (Q2 & Q3)



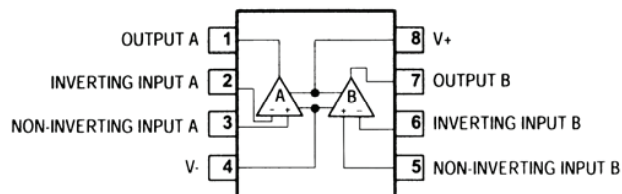
Volume PCB

NE5532D (U1 & U2)



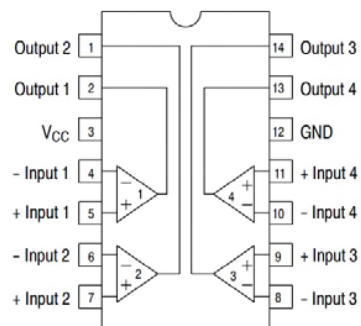
Protection PCB

NE5532D (U5)



IC Pin Layouts for the Cambridge Audio Azur 550A/650A Amplifier

LM393D (U6)



Revised Part Table and explanation of APD changes

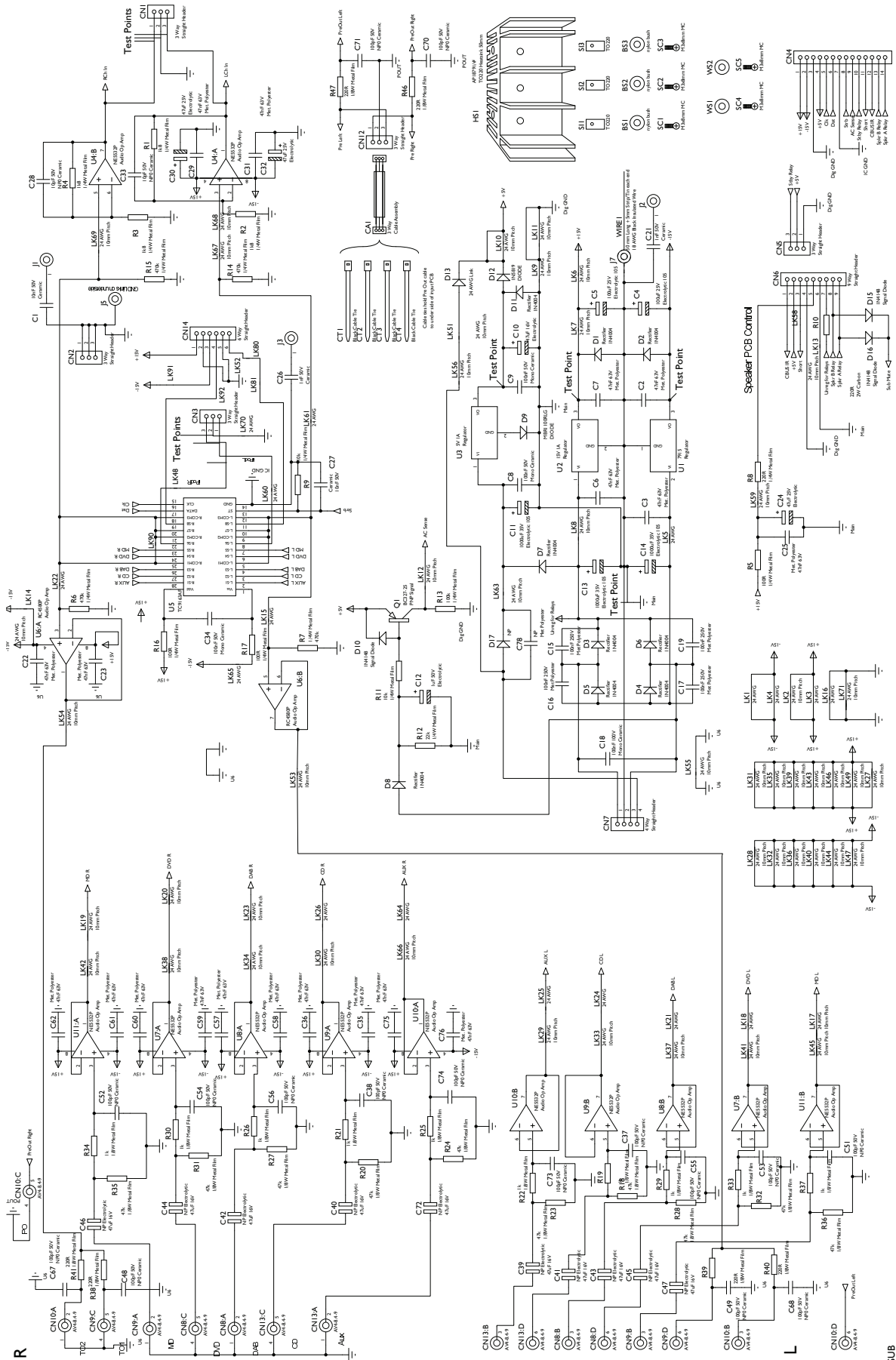
Drawing ref	AP part number	Factory part number	Description	Revised Auto Power Down part	
	PF432		Front panel (metalwork) Silver		
	PF433		Front panel (metalwork) Black		
1	PF434	6161-1010-0000	AZUR 651A WRAPOVER LID SILVER ASSY REV.A		
1	PF435		AZUR 651A WRAPOVER LID BLACK ASSY REV.A		
8	PY1590	9465-015000E071	Azur 550A/650A/651A(230V) POWER INPUT BOARD ASSY REV		
9	PF429		Azur 651A INPUT BOARD ASSY REV A	PF571	Azur 651A INPUT BOARD AP302413 with APD
10	PY1592	9465-015001E541	Azur 550A/650A/651A SPEAKER BOARD ASSY REV A		
not shown	PY1718	3200-087071E002	STANDBY TRANS. 230VAC/50Hz 9VAC@25mA T08707A 550A/650A/651A		
not shown	PY1724	3200-087071E003	STANDBY TRANS. 115VAC/60Hz 9VAC@25mA T08707B 550A/650A/651A		
11	PY1481	3200-073322E000	TOROID TR. 230VAC@50Hz TI-073322 NORATEL FOR 650A/651A		
11	PY1482	3200-073324E000	TOROID TR. 115VAC@60Hz TI-073324 NORATEL FOR 650A/651A		
2	PY1597	9465-015000E041	Azur 550A/650A/651A Front Panel CONTROL BOARD ASSY (TWO BOARDS)		
4	PF427		Azur 651A Preamp+MCU BOARD ASSY REV A	PF570	Azur 651A PRE-AMP BOARD AP240385 with APD
3	PY1599	9465-015000E311	Azur 550A/650A/651A VOLUME BOARD ASSY REV A		
6	PF426		Azur 651A AMP BOARD ASSY REV A	PF569	Azur 651A AMP BOARD AP222183 with APD
not shown	PF428		Azur 651A PROTECT PCBA REV A		
not shown	PF430		Azur 651A USB audio input PCBA		
7	PY1603	1065-003500E113	VR W/MOTOR 50KAX2 +-20% (L=20) RK16812MG082 ALPS		
not shown	PF431		Azur 651AC REMOTE CONTROL ASSY REV A		
14	PZ160		Azur 650A/651A Tone Knob (Silver) AP21541B		
14	PZ161		Azur 650A/651A Tone Knob (Black) AP21541B		
16	PZ162		Azur 650A/651A Volume Knob (Silver) AP21538C		
16	PZ163		Azur 650A/651A Volume Knob (Black) AP21538C		
not shown	PZ164		Azur 650A/651A Volume Pot Skirt (Silver) AP21554A		
not shown	PZ165		Azur 650A/651A Volume Pot Skirt (Black) AP21554A		
not shown	PZ166		Azur 650A/651A Tone Pot Skirt (Silver) AP21555A		
not shown	PZ167		Azur 650A/651A Tone Pot Skirt (Black) AP21555A		
not shown				PF572	Azur 651A SWITCHED MODE POWER SUPPLY
not shown				PF573	Azur 651A AUTO POWER DOWN BOARD

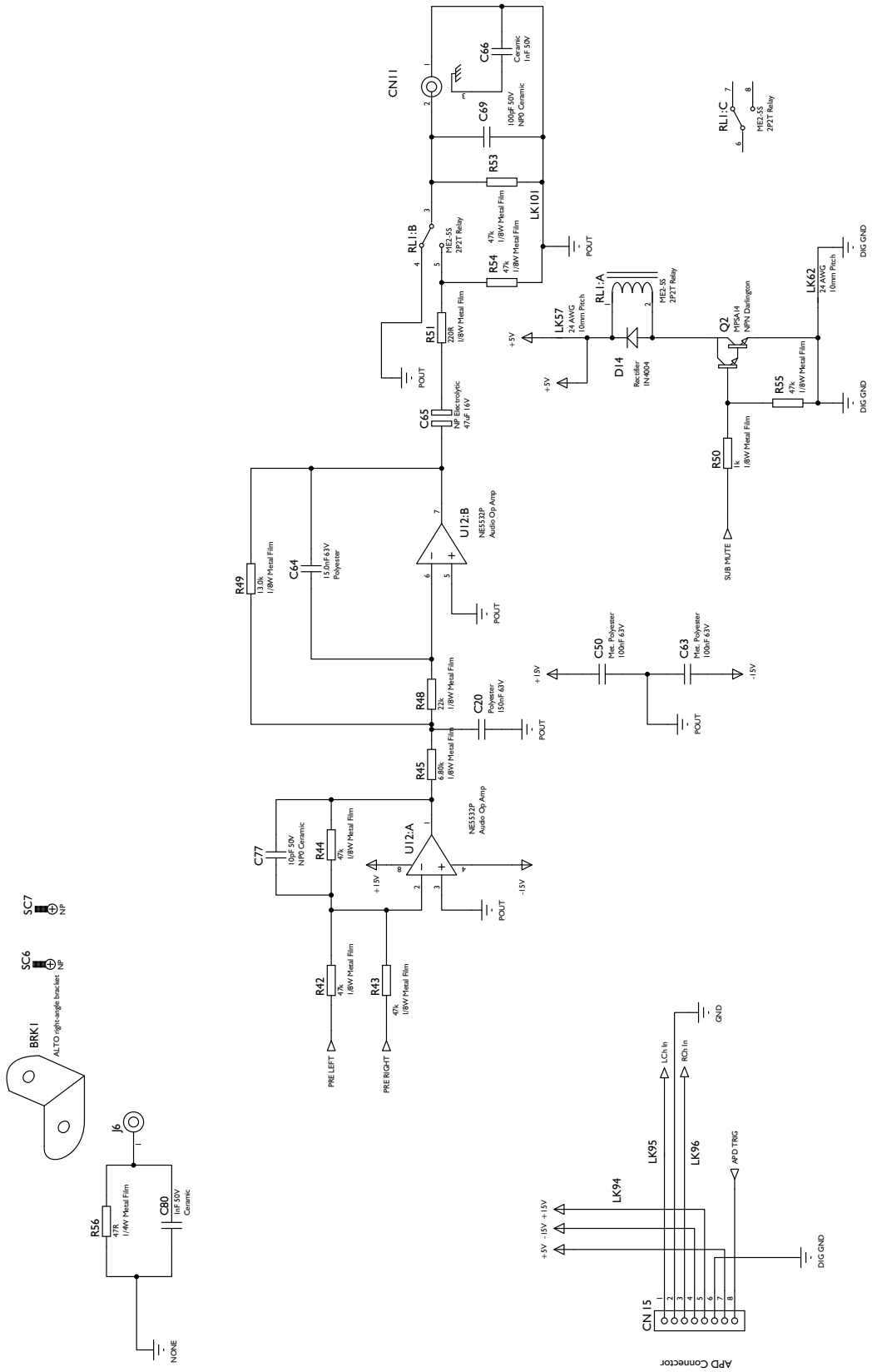
Explanation of APD changes

Beginning serial 1302 0001 (Feb 2013) APD was introduced:

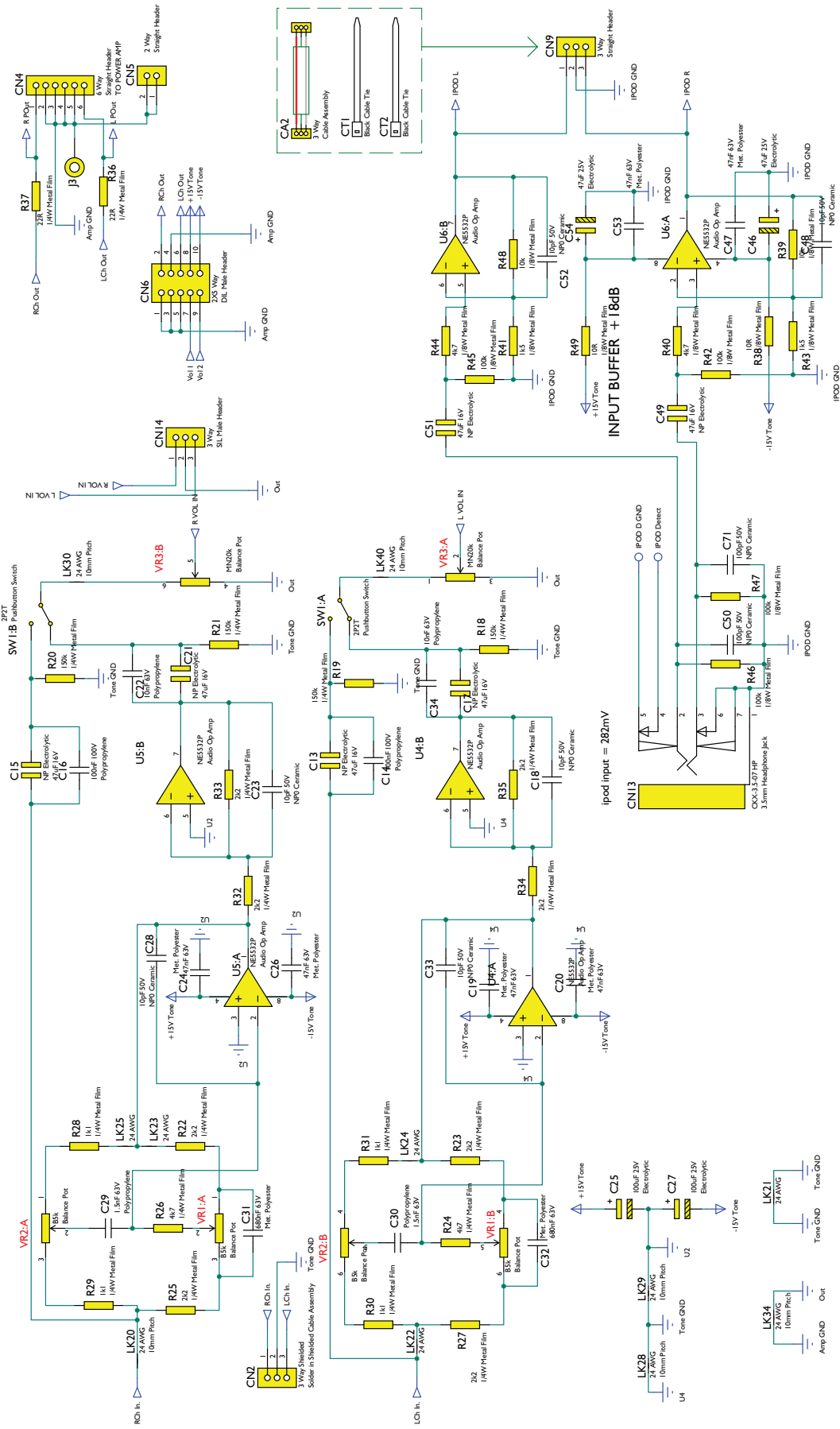
- 1 Input PCB has CN15 added
- 2 Pre-amp PCB has CN17 added
- 3 SMPS power supply added
- 4 Auto power down (trigger) board added
- 5 Stability improvements and component changes made to AMP board - revised schematic

Input PCB Schematic with APD

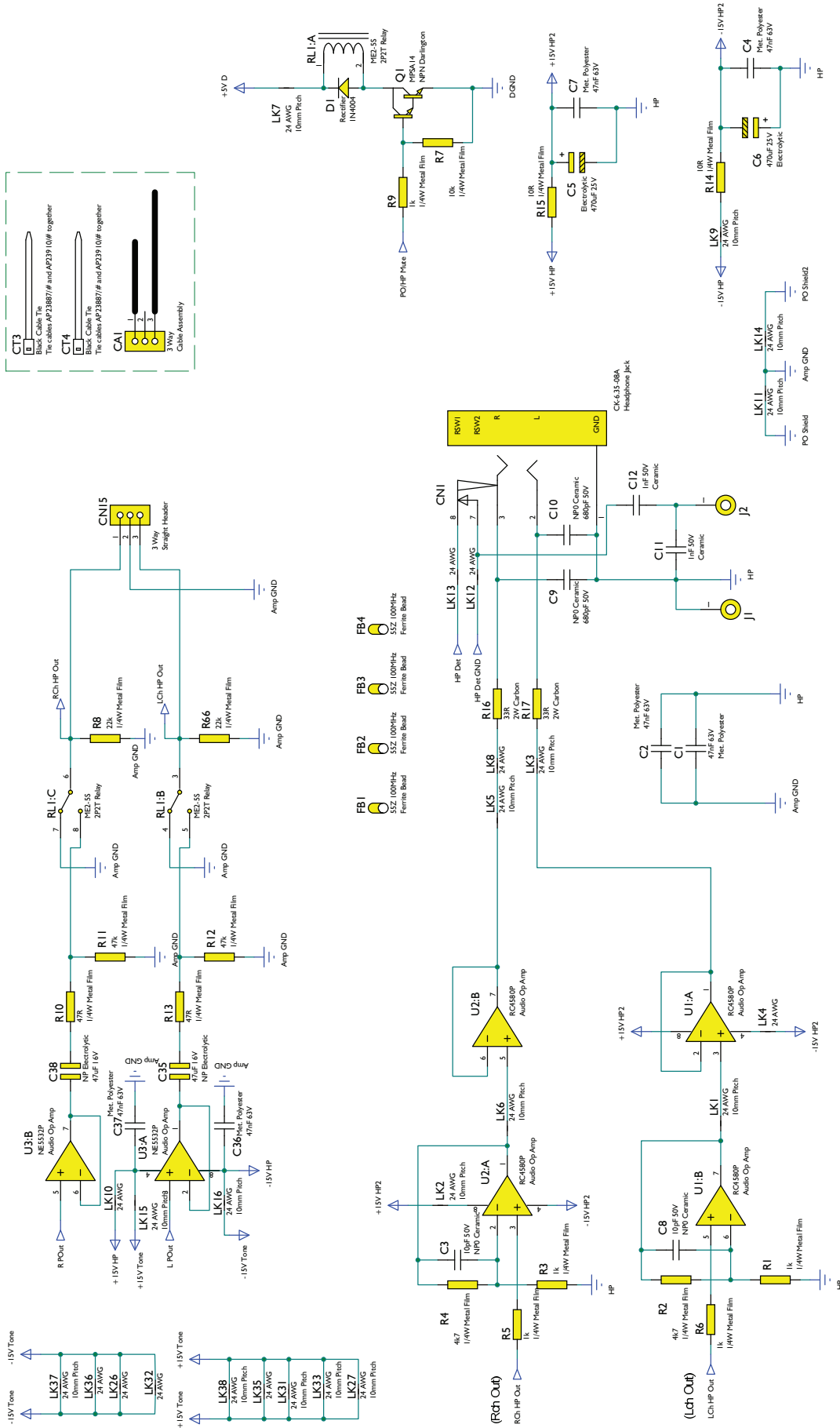




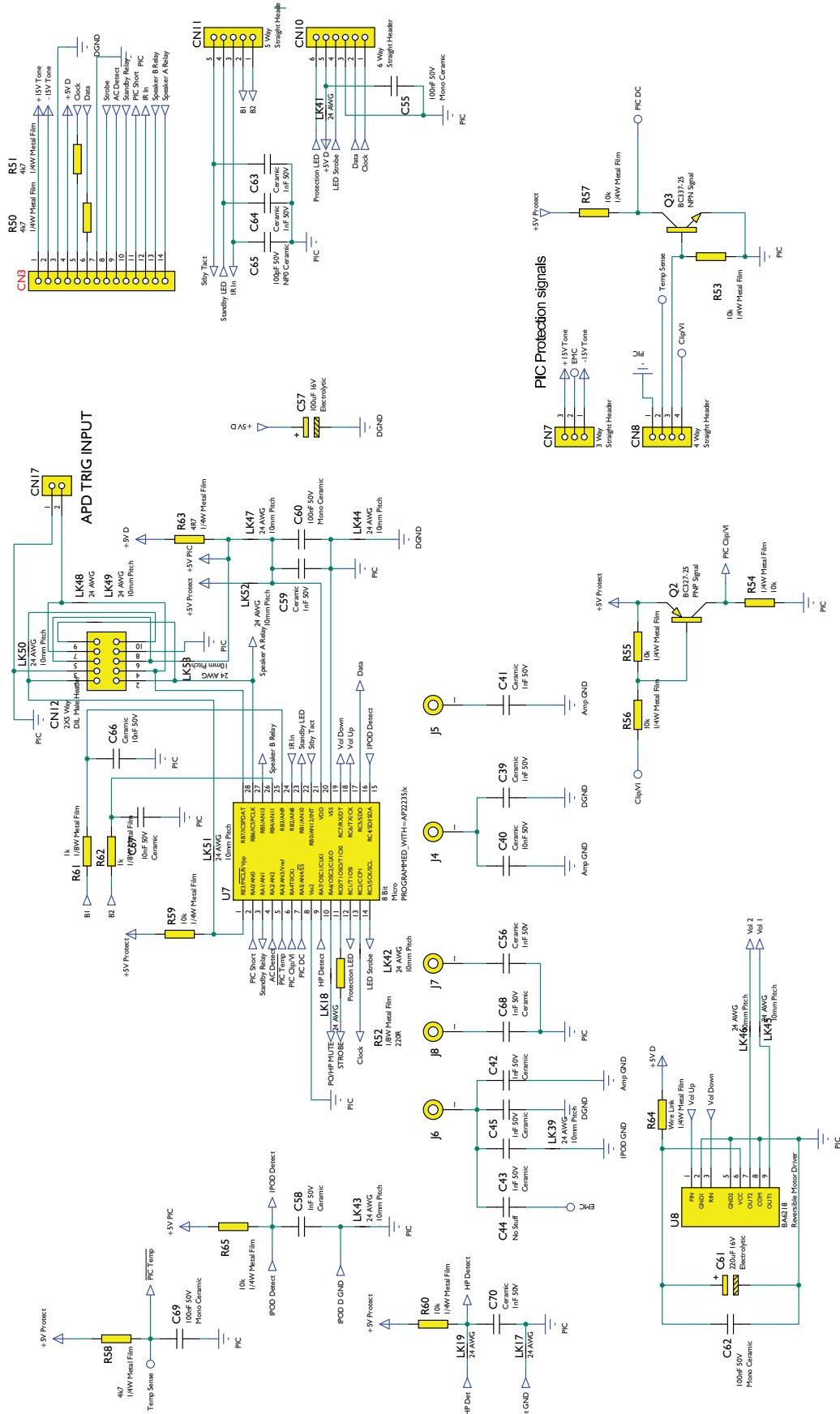
Preamp PCB Schematic with APD Tone Control and iPod Input



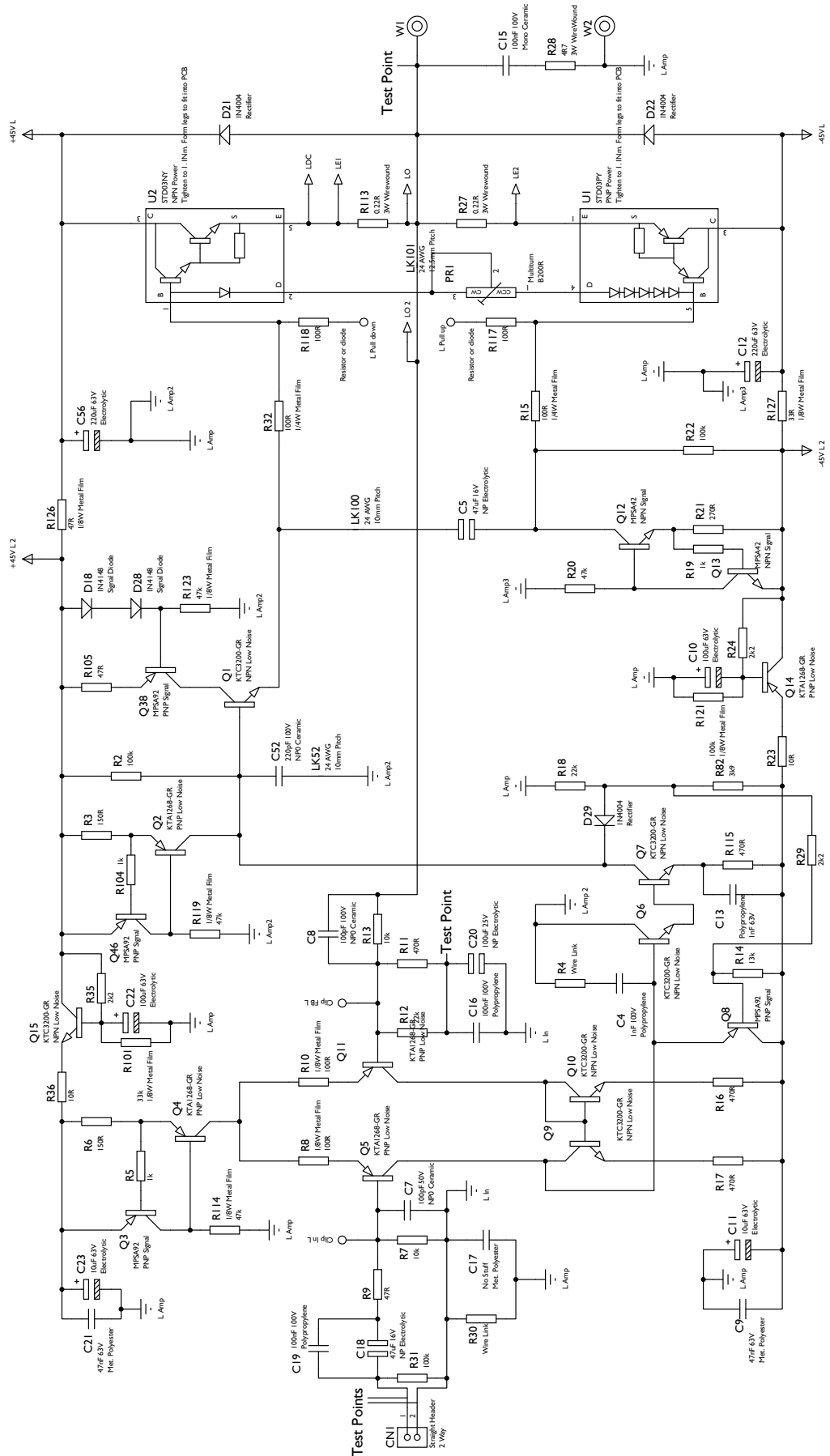
Headphone Driver and Pre Out Mute circuit



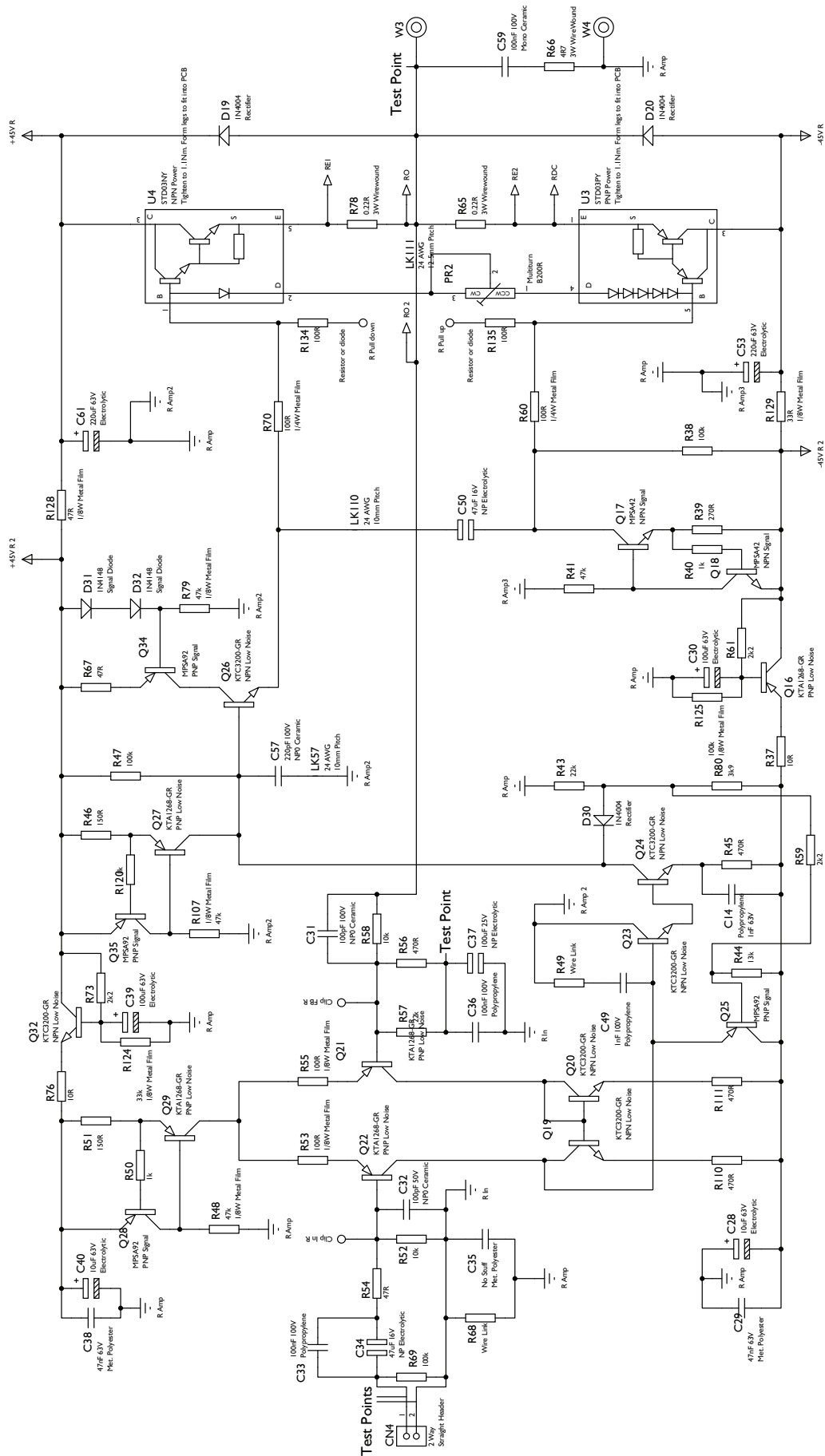
PIC, Logic and EMC points



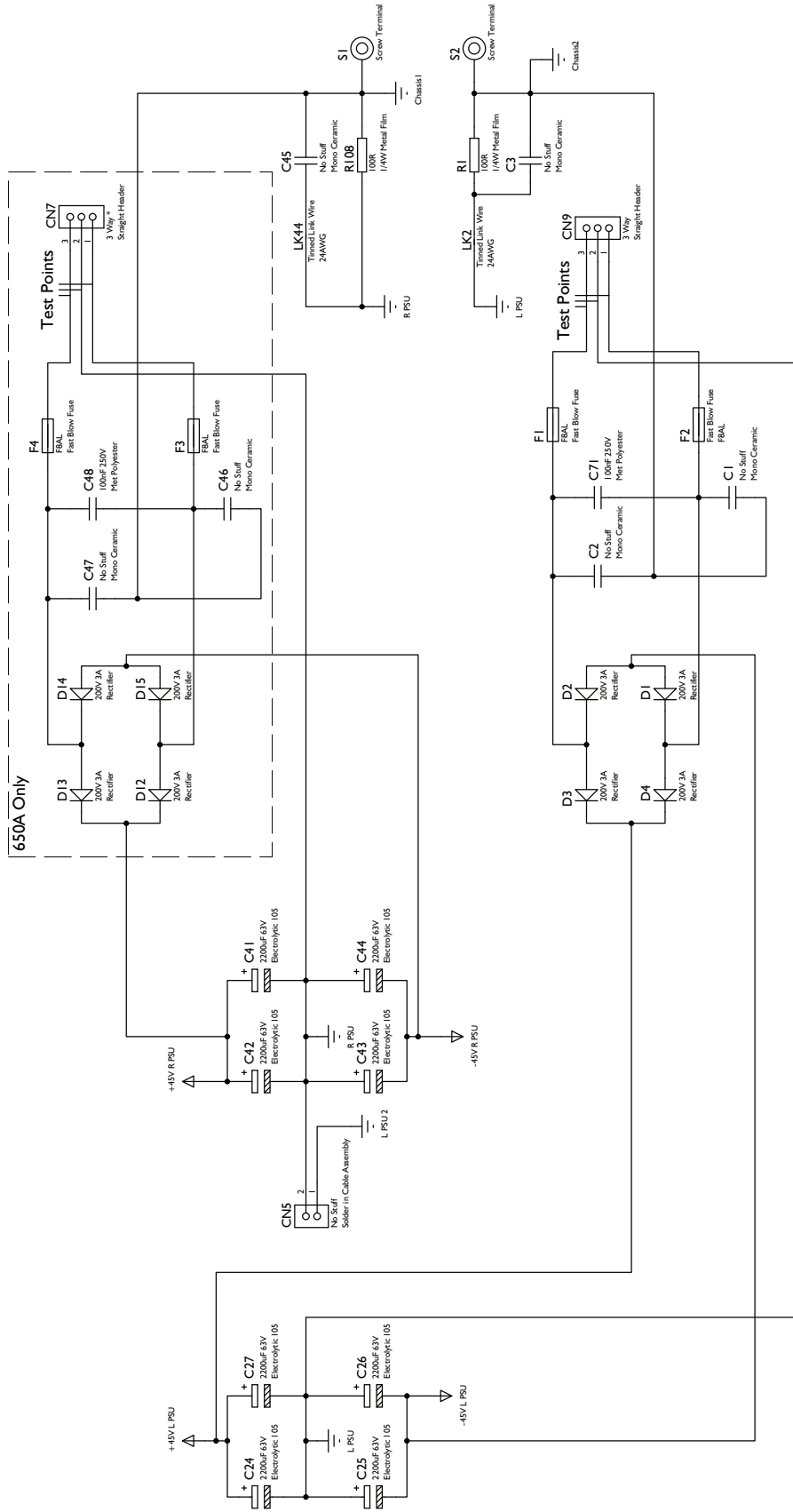
AMP PCB - Schematic



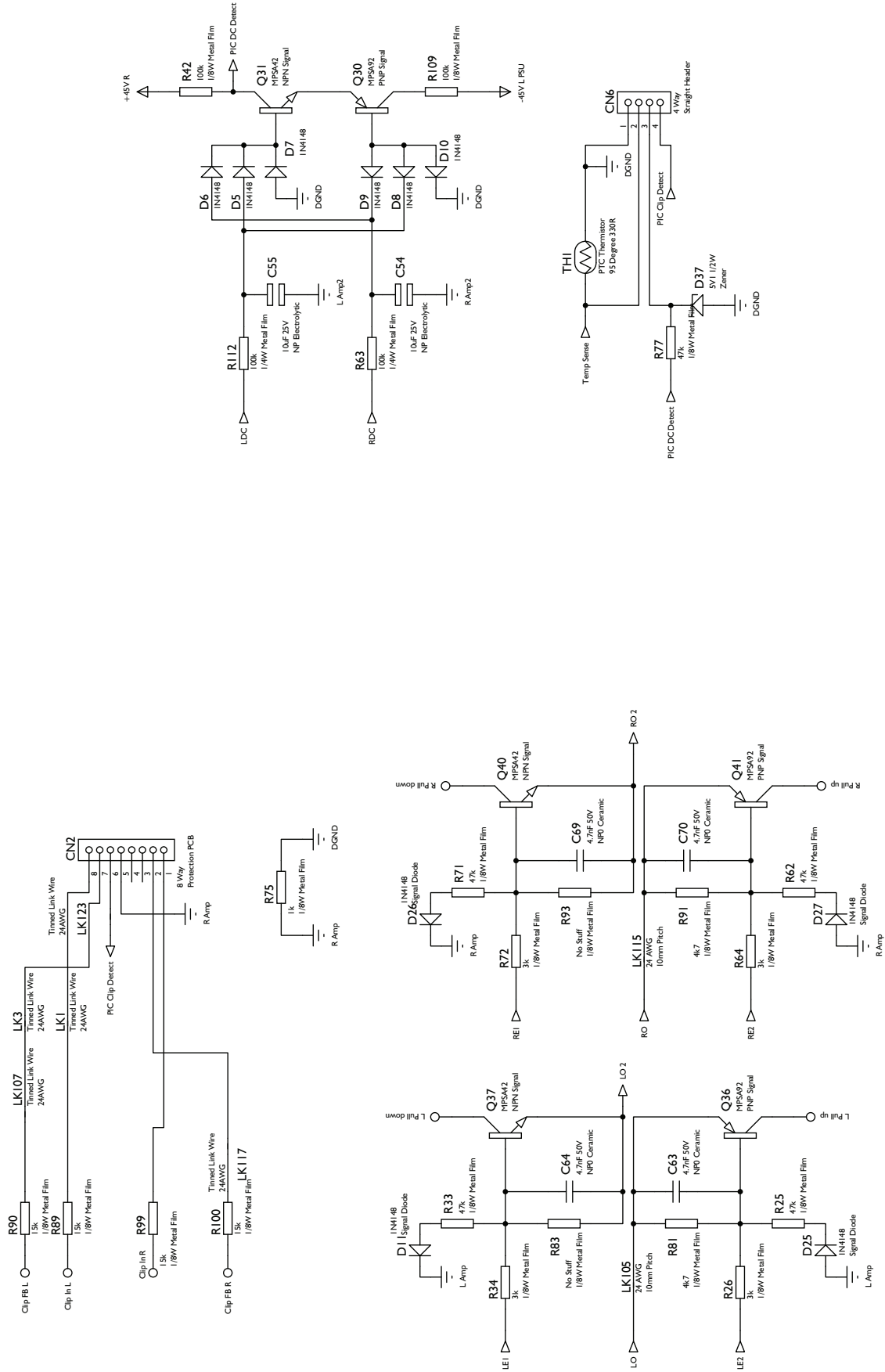
Right Audio Channel



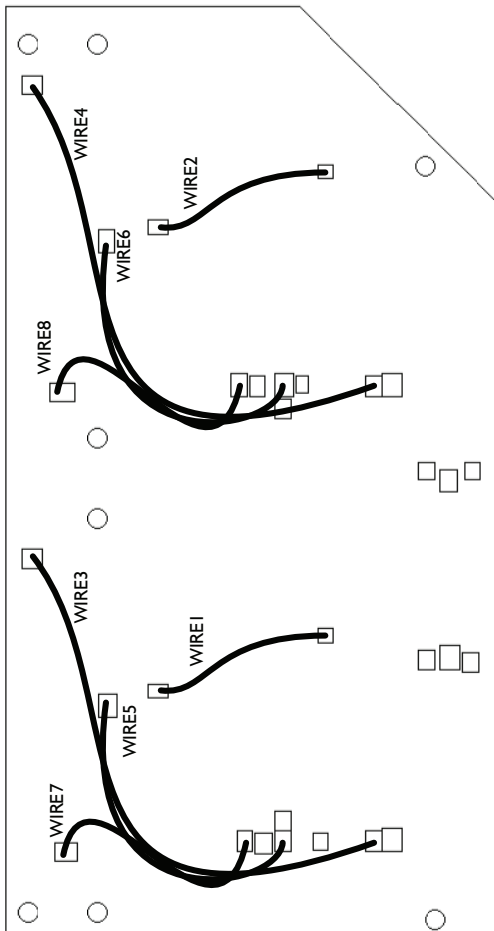
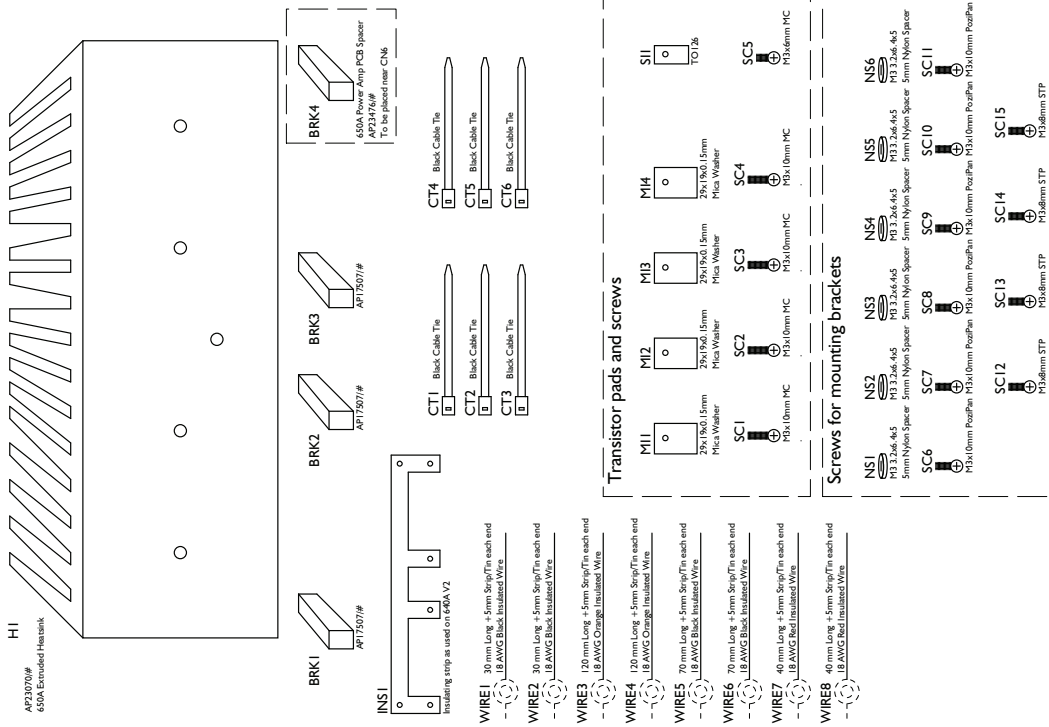
Power Supply



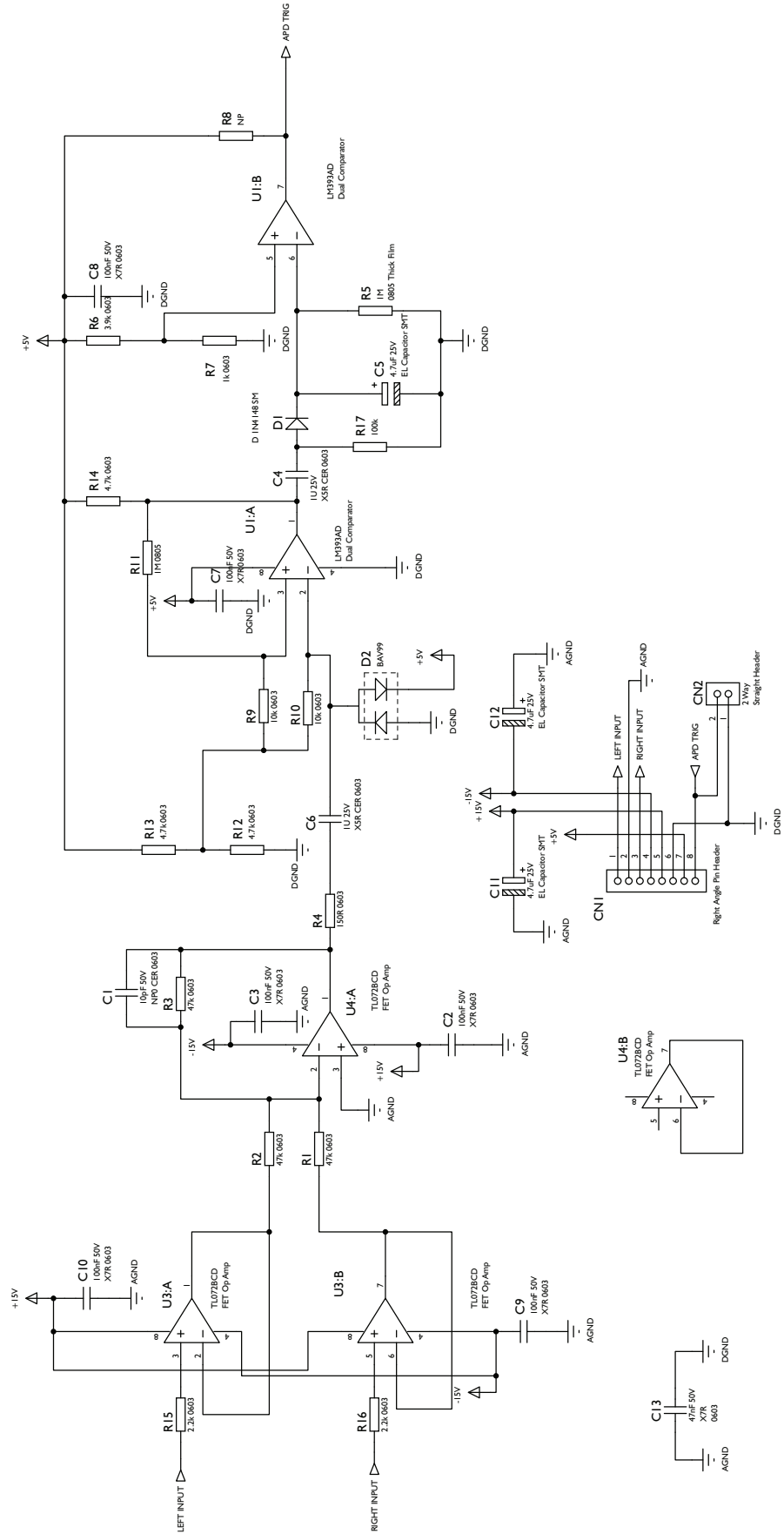
VI Protection



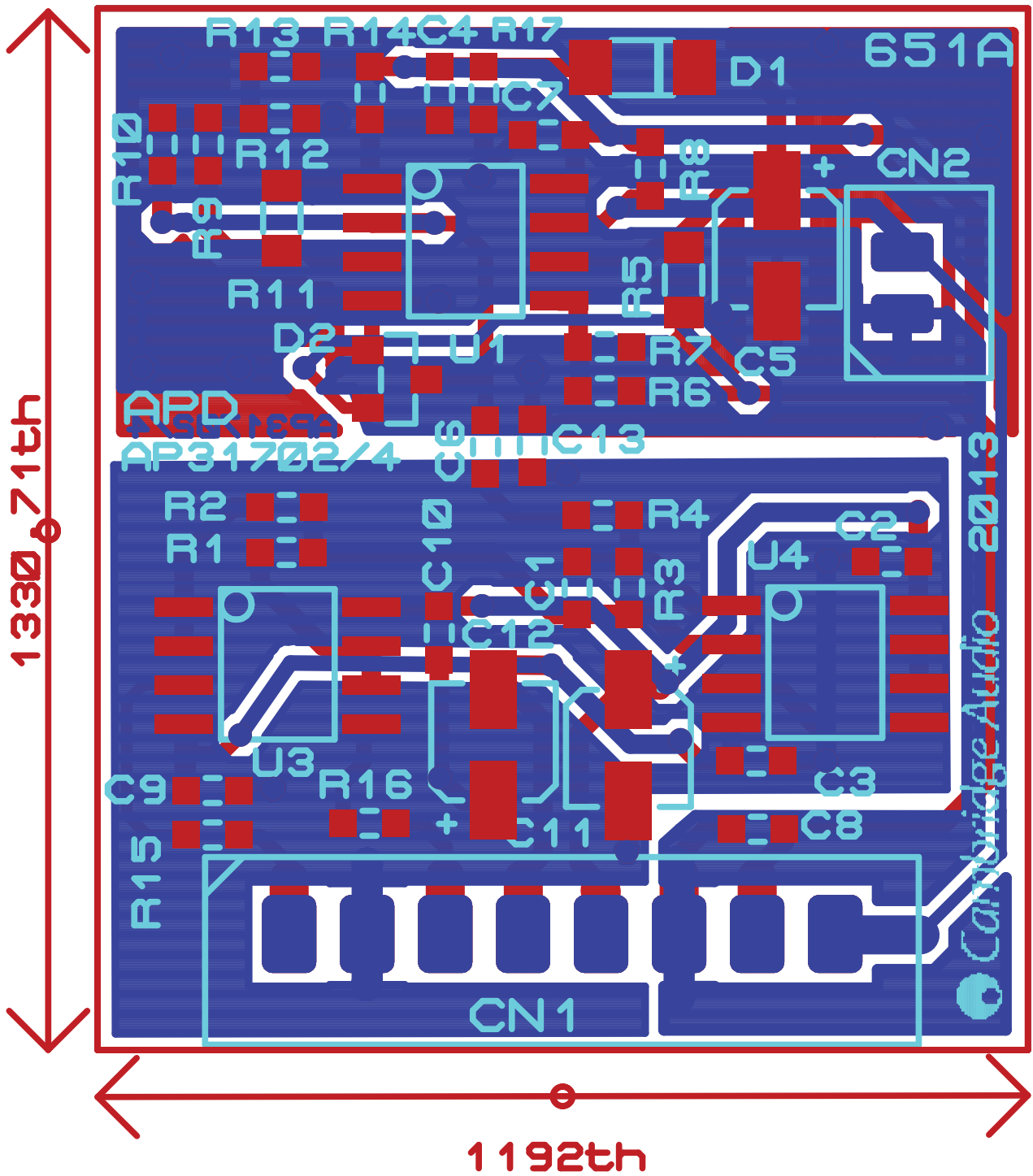
Wires

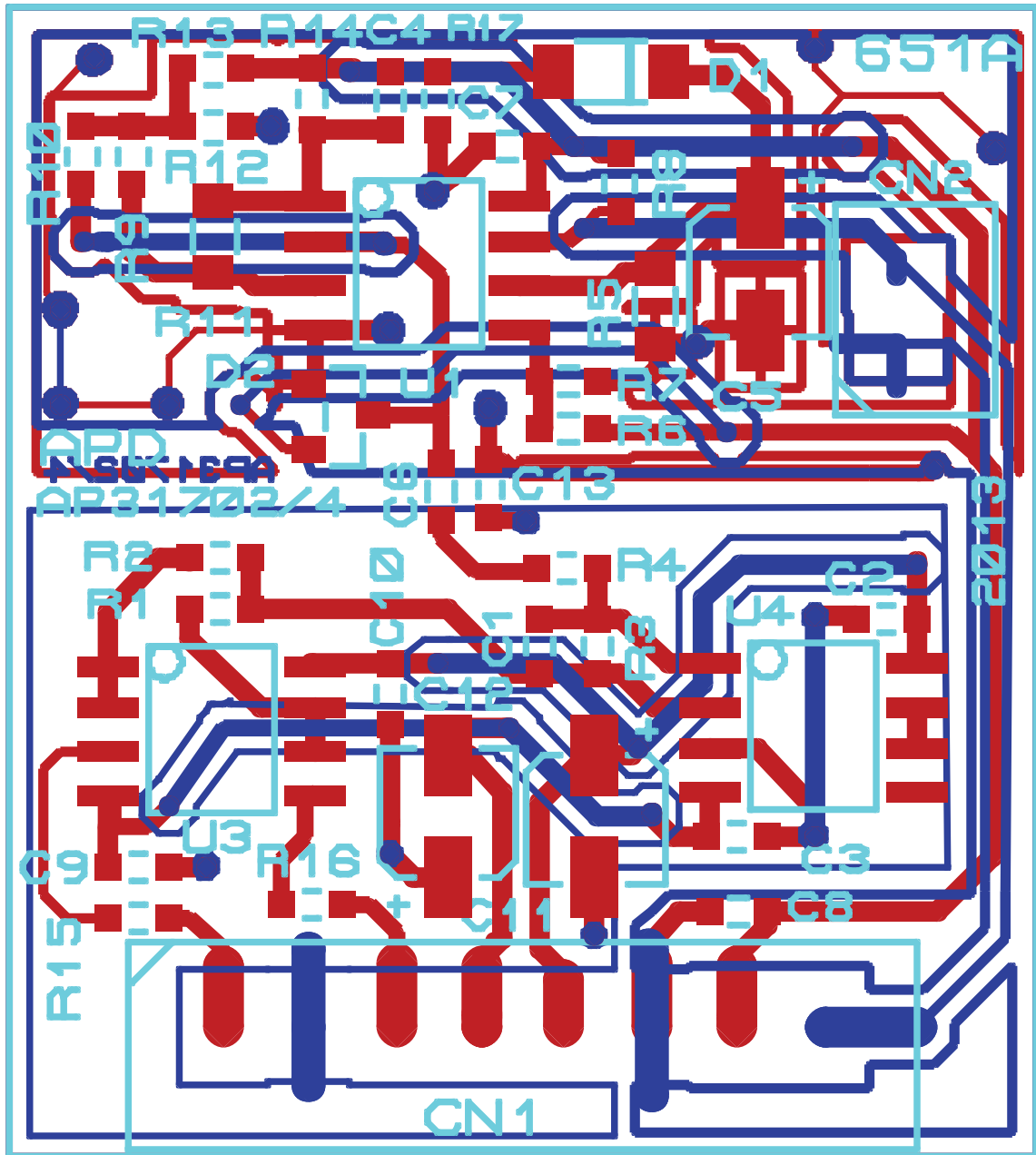


Auto Power Down Trigger board schematic

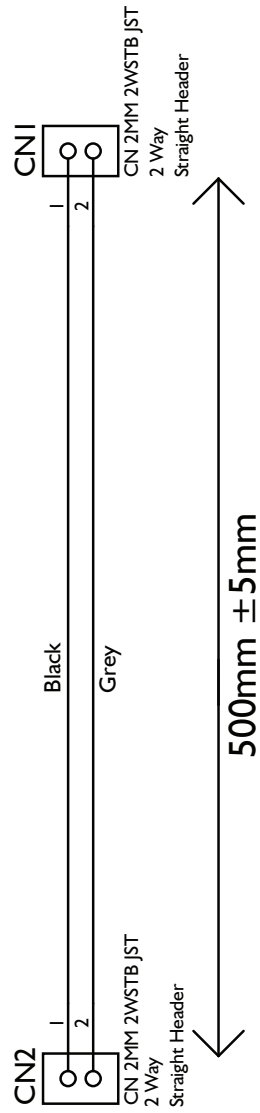


Auto Power Down(Trigger) Gerbers





APD Trigger Cable



ALL CABLES 24AWG

Connector are 2mm JST cable plug on both ends of the cable