

FMJ

Service Manual

Issue 1.0

P1 Amplifier



ARCAM
Bringing music & movies to life

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 - L962AY amplifier main PCB

Fmj P1 Amplifier circuit description by A.Moore

Product description

The P1 has been designed to provide unsurpassed sound quality, the main design features are as follows.

- **Gain switchable between Arcam gain and THX gain (29dB closed loop) a 0dB signal equates to 100 watts into 8 ohms.**
- **Input switchable between unbalance phono and balance XLR.**
- **The amp is capable of producing >180 watts of sinusoidal output into an 8 ohm load and greater than 300 watts into a 3.2 ohm load (subject to thermal dissipation limits).**
- **Relay coupled for silent on/off operation.**
- **Opto-isolated fault and control lines to the control PCB.**
- **DC coupled signal path with integrating servo to remove residual DC errors.**
- **Instantaneous safe operating area protection.**
- **Exceptionally low harmonic and intermodulation distortion.**
- **Flat frequency response.**
- **Fast and asymmetric slew rate.**
- **High damping factor**
- **Unconditionally stable into loads of upto +/- 90-degree phase.**

Power supply/Control description

The mains input is applied via SKT1. Y capacitors C1 and C2 and X capacitor, C5 provide filtering and EMC suppression R2 provides a discharge path for the capacitors.

SW1 allows the selection of the mains voltage that the unit will operate from, the main standby transformer TX1 and the main transformer TX2 have dual primary windings, these windings are connected in parallel for 115v operation and in series for 230v operation.

TX1 is powered at all times when a mains voltage is applied to the mains input socket the secondary of this transformer is fused by via FS3 and rectified by diode bridge DBR1 and regulated to 5V by low dropout regulator at location REG2 to provide a constant +5v(D) supply for the micro.

Please note: the digital supply ground is connected to the chassis ground via a 100-ohm resistor.

Relay RLY1 provides a means of powering the main transformer for normal operation (as opposed to standby operation where only TX1 is powered) this relay is under the control of the Micro IC1 and SW3 on the control board the relay contacts of RLY1 are suppressed by C3 and C4 these prevent sparking and increase the relay life span.

The circuitry around TR10 functions as a mains present detection circuit A.C is feed into this circuit before the Bridge network at location DBR1 when mains is present the circuit drives HI via opto-coupler TR11.

Relay 2 is the speaker output control relay this is used to prevent clicks and pops at power/power down and to disconnect the speaker output under a fault condition, this relay is controlled by the Micro at location IC1 as the P1 has no manual speaker switching capabilities the micro will automatically initialise the speaker relay 3 seconds after power up, the control line SPKR1 on pin 5 of CON 4 switches high to switch the relay ON via TR9.

The P1 has two trigger inputs these are applied by SKT2 and are wire OR-ed by D5 and D6. The single trigger signal is clamped to 4v7 by DZ1 and fed to the control card by CON4. Applying a 12v trigger signal to either (or both) trigger inputs on the SKT2 instructs the microcontroller to enable or disable the power amplifier. The trigger will be seen as a HI line on Pin 11 of CON 4.

The P1 also provides two 2 triggered outputs. These are current limited 12v D.C levels, which are used to provide trigger signals to other units within the customer's installation. The 12v output is present when transformer TX2 is live i.e. when the unit is not in standby.

TX2 has a Low voltage secondary winding that supplies the trigger outputs only via bridge rectifier DBR4 this is fed into REG1 (7812) regulator, TR1 and TR2 offer a 60mA current limit for both trigger outputs and the entire circuit stage is fused by FS6 (T315mA) in case of overload.

The P1 utilizes a fairly unique **main power amp** power supply configuration these include.

Fig 1. Power amp power supplies.

| Power supply | Powers |
|--------------|----------------------|
| +/- 67v D.C | VAS stage. |
| +/- 58v D.C | Output driver stage. |

The two sets of supplies are driven from their own secondary windings and bridge rectifier circuits DBR5 and DBR6 Rectify the +/- 58v rails these are smoothed by 20,000uf of capacitance per phase. DBR2 and DBR3 are supplying the +/- 70v rails these are dropped to +/- 67 by the Network of R5, R6, R7, R8 and TR3, TR4, TR5, TR6 this is not a regulated supply as the rails need to track the +/- 58v rails under mains power fluctuations.

Please note: The +/- 70v rails are individually fused by 315mA(T) fuses at locations FS4 and FS5.

The VAS stage is supplied by higher voltage rails than the following output driver stage, this allows the driver stage to fully saturate the output driver stage without the use of a boot strap circuit. This supply is exceptionally quite and is critical to the sound quality of the P1.

Amplifier Stage

The XLR connector at CON100 allows balanced inputs to be applied to the amplifier and CON101 allows for the balanced signal to be daisy chained to a second P1.

The signal from CON100 is driven into IC100 this is a Balanced to single ended converter it supplies a signal-ended output from a single XLR input. The IC derives it power supply rails from the +/- 67v rails these are dropped to +/- 15v by the TR100 and TR114.

The unbalanced inputs signal arrives at SKT100; the selection between the two input options is accomplished by SW100. The selected signal is clamped +/- 5v3 by the series Zeners at location DZ103 and DZ104 this is to prevent damage to the input of op-amp IC200, due to leaky source signal or electrostatic discharges.

SW101 allows for the selection of two gain settings these are 28.3 for "THX" and 37.5 for the Arcam setting. The roll off setting is 340Khz.

The main power amplifier circuit is a classic current feed-back design and can be thought of as a large current feed-back op-amp the topology is a refined high power output variant of the A90/P7 design.

Op-amp IC101 is configured as a non-inverting amplifier with a gain of 2. It's purpose is to provide current outputs (via it's own power supply pins) and a current input via it's output pin, the Op-amp performs the voltage to current conversion (I-V) and phase splitting necessary to drive the voltage gain stage. The current feed-back occurs because the output of IC101 drives into a 44 ohm load formed by the two 22 ohm resistors R142 and R143 down to ground, the power

supply pin currents are half wave-rectified versions of the drive current of the amplifier. This causes the voltage gain, which is buffered and passed on to the outputs. The feedback from pin 1 of IC101 acts to reduce the gain of the amplifier; when this current is roughly equal to the current required to drive the input signal into 44-ohm's equilibrium is reached and the closed loop gain is defined. The output stage provides the vast majority of the current required to drive the 44-ohm load. The op-amp only needs to provide a very small error current to give the required voltage magnification.

Transistors TR101 and TR116 are common base amplifiers their purpose is to provide the +/- 15v rails necessary to drive the op-amp whilst allowing the power supply currents that are drawn to pass through into the Wilson current mirror stage, this is formed by PNP transistors TR102, TR104 and TR122 the NPN mirror is formed by TR115, TR117 and TR122.

TR103 combines the two current mirrors to provide a very high-gain current to voltage (transresistance) gain stage roughly 80dB at low frequency C114 and C132 with R149, R150 combine to give a open-loop pole at roughly 10Khz and a corresponding open-loop zero around 500Khz. This allows for good time domain performance and clean square wave reproduction with no sign of ringing or overshoot.

Diodes D100 and D101 act to limit the current through TR115 and TR112, if the input current exceeds 14mA the diodes conduct and the transresistance stage becomes a constant current source killing the open loop gain and preventing damage to the transistors.

IC101 forms a D.C intergrating servo. Its purpose is to remove residual D.C errors due to slight device mismatch and component tolerances. It is configured as an inverting intergrator with a time constant of <0.5 seconds. Any D.C offset at the output of the amplifier will cause the output if the op-amp to go negative increasing the current in the negative supply pin and thus pulling the output down to ground (and vice versa). D108 protects the inverting input of the op-amp under fault condition.

TR103 provides a 4.7v bias voltage to allow the following pre-driver stage to operate in Class A.

TR123 and TR125 form a Class A pre-driver emitter follower stage to boost the current gain and isolate the transresistance stage from the output transistors. TR105 and TR118 act as a 30mA current limit and prevent the destruction of TR123 and TR125 under a fault condition.

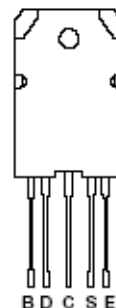
R109, R164, R110 and R165 loosely decouple the emitters of TR123 and TR125 from the output stage.

TR128, TR129 and TR126, TR127 are Sanken SAP 15N and SAP 15P Bi-polar output drivers RV100 is the Bias adjust preset D104 protect the Output drivers from destruction if RV100 goes open circuit.

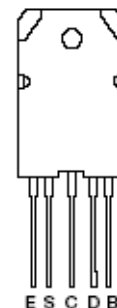
C144 to C147 provide local R.F stability and prevent oscillation. D111 and D112 are catch diodes to reduce the effects of back-EMF from the loudspeaker coils/load.

R164, R183, C150 and L100 form the Zobel network, these components ensure that the amplifier sees a constant load of 4.7 ohms at high at very high frequencies and improve stability – reduce H.F noise. L100 and R183 decouple the load at high frequencies to ensure amplifier stability into capacitive loads.

SAP 15NY



SAP 15PY



S-E 0.22 Ohm

Under output driver failure conditions the 0.22 internal emitter resistor will usually go open, the resistor should be measured between pins S and E.

Protection circuit block

The P1 Power amplifier incorporates 4 modes of protection these are as follows.

- **Instantaneous VI current limiting.**
- **D.C offset protection.**
- **Over-Temperature.**
- **Insulation failure.**

The **VI current** limit circuit is built around TR106 and TR119 they sense the voltage across the 0.22-emitter resistors (hence emitter current) and the collector emitter current or device power dissipation exceeds a preset limit.

The circuit is designed to allow large unrestricted currents into loads of 3 ohms and above but limit the current into a short circuit or very low impedance loads.

C141, C142 and R162, R163 form a 2.2ms time constant, which will allow larger transients of current delivery for a few milliseconds, to ensure that the amplifier has a sufficiently large transient capability to drive “difficult” loudspeaker loads.

TR106 senses positive current surges and TR119 senses negative surges these intern activate TR107 and switch the optocoupler OPTO100A this fault notification is sent to the microcontroller and the output relay is switched off to protect the amplifier/loudspeaker coils.

The **D.C offset** protection is built around TR108 and TR109 a positive D.C offset will switch TR108, a negative D.C offset will switch TR120 this will intern switch TR110 and TR109 on in either case this causes the optocoupler at location OPTO100B to transmit a fault line signal to the micro.

The Thermistor RTH100 provides **Thermal protection** and is connected to the positive supply rails adjacent to the collector leg of the output driver at location TR125 this allow the thermistor to sense the temperature of the output device. The output impedance of

RTH100 is low when the amplifier is cool typically a few hundred ohms, in the event of a thermal overload situation (Above 110 c) RTH100 will go into a high impedance state this will switch TR121 on and intern this will switch TR111 on and cause OPTO 100C to send a fault line flag to the micro.

The remaining protection stage is an **insulation breakdown** detect circuit this is essentially looking for a breakdown of the insulating pad between the output devices and the heatsinks thus +60v path to ground.

The protection is formed around bridge rectifier package DBR100, this will route current through the LED in optocoupler OPTO 100D in the event that the DGND and AGND ground planes move apart by more than 10v. When the transistor in the Opto conducts the thyristor formed by TR112 and TR132 is turned On.

Once the Thyristor conducts it pulls the SHUTDOWN* signal low and turns TR8 (Sheet 2) off thus opening both Speaker relays and the Power relay.

Please note: The unit can only be reset once the mains power supply to the unit has been removed and the Amplifiers own power supplies have been given sufficient time to discharge +30 secs. The standby transformer of course remains active.

TR130 asserts the microprocessor fault line DCPROT so that the micro can indicate the fault via the front panel mounted LED.

Fig 2 Fault line location and operational status.

Please note: Con 4 is the connector between the main board and the display board, use Pin 2 of Con 4 as a reference (DGND).

| Fault line | Location | Status |
|-------------------|--------------------|-----------------|
| D.C offset | Con 4 Pin 9 | LOW (0v) |
| V/I Prot | Con 4 Pin 8 | LOW (0v) |
| Thermal | Con 4 Pin 7 | LOW (0v) |

Test Specification

Frequency response. 8-ohm load

Input set to 1v rms

20Hz – 20kHz = +/- 0.5 dB.

Distortion. THD+N 0dBR 4-ohm load.

Input set to 1v rms.

20Hz – 20Khz = <0.02%

Maximum output into an 8-ohm load.

Input level set to 1.34 rms 1Khz = 180 watts
distortion should be below 0.05% THD+N

Bias setting notes

The bias of the P1 is set using an Audio precision audio analysis package and we calibrate the power stage for minimum THD the bench set up procedure follows.

- Set the input signal to 150mv rms, frequency to 10kHz. Induce a 4-ohm load at the speaker output.
- Rotate preset RV100 clockwise and observe that the THD falls. Continue to rotate the preset until the THD falls to a minimum level and just starts to clime again.
- Switch input signal off and allow the amplifier the Quiesce +30secs
- Measure the bias level at test point Con 103 (Bias read) and confirm the reading is below the absolute max of 35mV.

Major component identification.

FMMT 497/597

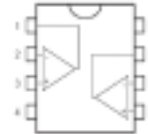


BC849/BC859

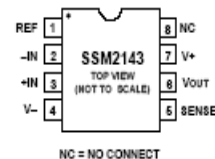


1=Base
2=Emitter
3=Collector

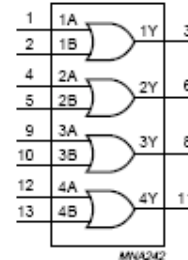
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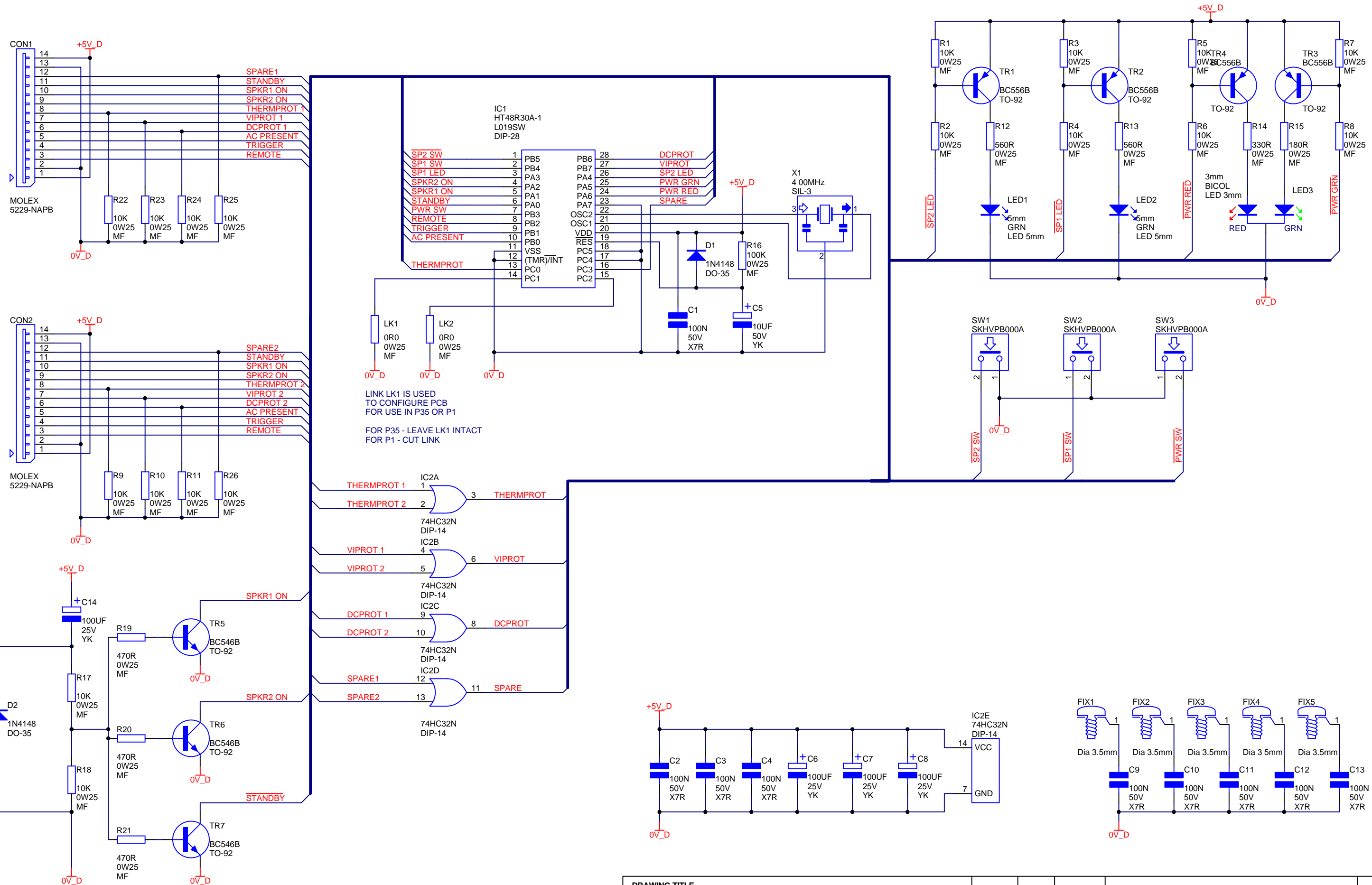


SSM2143



74HC32N

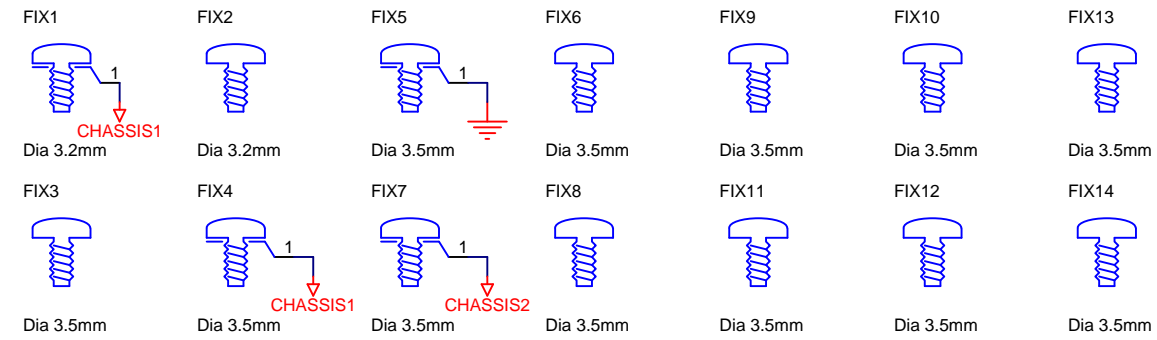
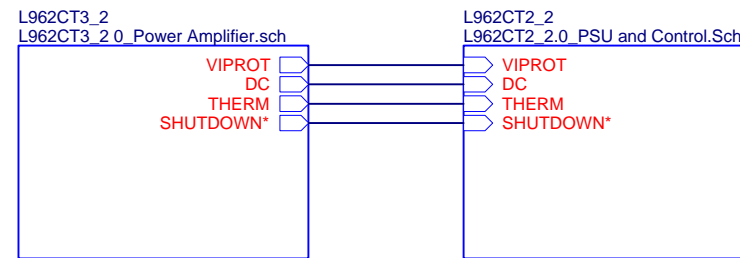




TOOL1 TOOL2

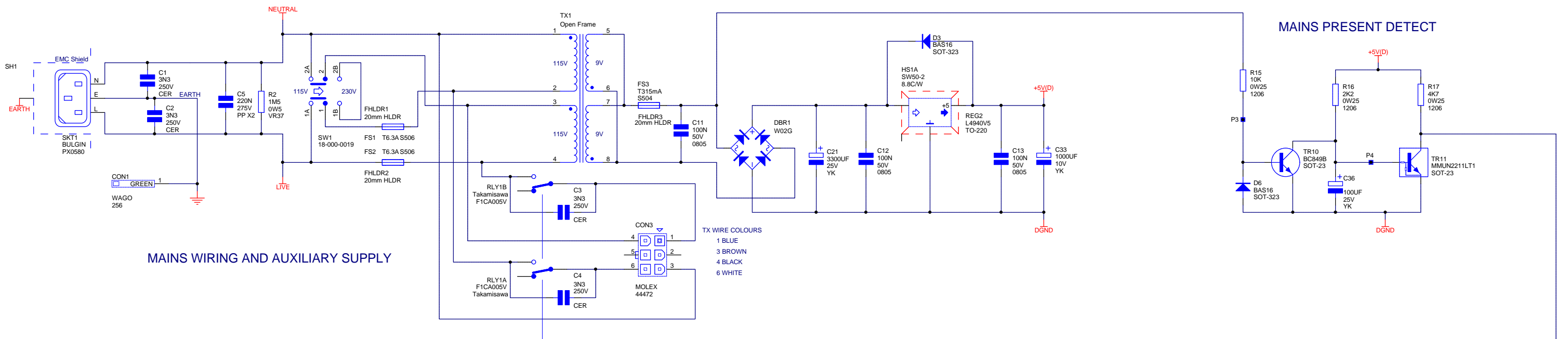
| DRAWING TITLE | | | | | | | | |
|--|------------|----------------|----------------|----------|------------------------------|--|-----|--------------------|
| P35 / P1 Switch PCB | | | | | | | | |
| ARCAM A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9PB | Filename: | L929CT_1.0.sch | 03_E125 | KAL | 8/05/03 | Redrawn, LED1, 2 swapped, Connectors rewired, LK1, 2 added | 1.0 | |
| | Notes: | | 03_E001 | WAF | 2/01/02 | HOLTEK, Z1 UPDATED | B.1 | |
| | | | JR | 1/11/01 | LEDS TO 5MM AND MAINS SWITCH | | B.0 | |
| Contact Engineer: | Kevin Lamb | Contact Tel: | (01223) 203243 | Printed: | 13-May-2003 | Sheet 1 of 1 | A3 | DRAWING NO. L929CT |

| ITEM | QTY | PART No. | DESCRIPTION | NOTES |
|--------|-----|----------|--------------------------------------|-------------------------------|
| ITEM1 | 1 | F006 | Clip For SW Profile Heatsink | Clip for REG1 |
| ITEM2 | 1 | F022 | Fuseholder Cover For 20mm Fuseholder | Cover For FHLDR1 |
| ITEM3 | 1 | F022 | Fuseholder Cover For 20mm Fuseholder | Cover For FHLDR2 |
| ITEM4 | 1 | F022 | Fuseholder Cover For 20mm Fuseholder | Cover For FHLDR3 |
| ITEM5 | 1 | F022 | Fuseholder Cover For 20mm Fuseholder | Cover For FHLDR4 |
| ITEM6 | 1 | F022 | Fuseholder Cover For 20mm Fuseholder | Cover For FHLDR5 |
| ITEM7 | 1 | F022 | Fuseholder Cover For 20mm Fuseholder | Cover For FHLDR6 |
| ITEM8 | 1 | L962PB | Blank PCB P1 Amplifier Main Board | |
| ITEM9 | 2 | E802AP | Pad Damping 15x6x3MM Sorbo hane | See Assy Drawing for location |
| ITEM10 | 3 | E826AP | Pad Damping 7 5x6x3 Sorbo hane | See Assy Drawing for location |
| ITEM11 | 1 | 8M101 | Earth Lead Assy 75MM | |

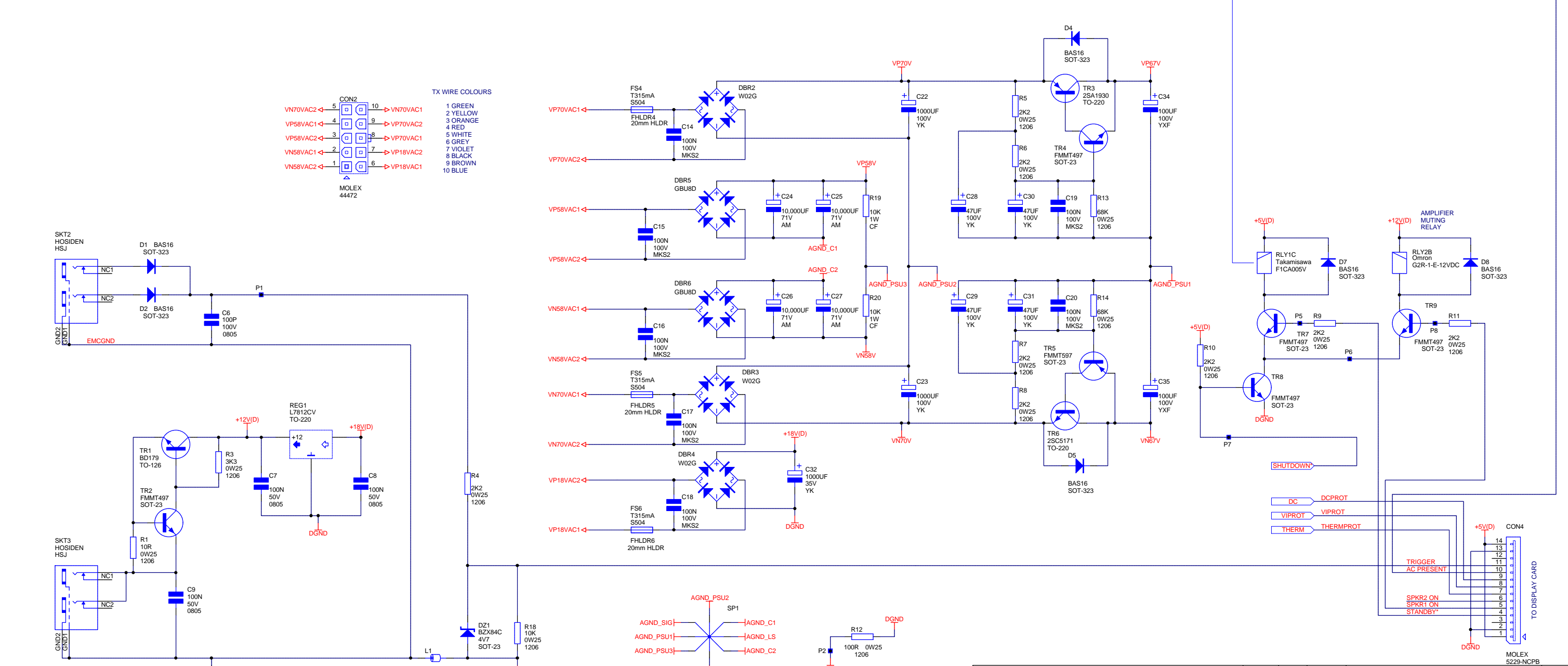


- FD1
- FD2
- FD3
- FD4
- TOOL1
- TOOL2
- TOOL3
- TOOL4

| DRAWING TITLE | | ECO No. | INITIALS | DATE | DESCRIPTION OF CHANGE | ISSUE |
|--|------------------------------|-----------------------------|----------------------|--------------|---|-------|
| P1 Amplifier Main PCB 23425 A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9PB | | 03_E249 | KAL | 22/08/03 | Stability mods | 2.0 |
| | | 03_E203 | KAL | 16/07/03 | Production Release, VI Limi ing changes | 1.0 |
| | | 03_E184 | KAL | 23/06/03 | Changed sorbothane part numbers, corrected R179-182, R185-187 | B.1 |
| | | 03_E111 | KAL | 11/04/03 | Corrected CON4, Redesigned protection cct and voicing mods | B.0 |
| | | 03_E055 | KAL | 18/02/03 | Minor Change to re-label gain switch posi ions | A.1 |
| Filename: L962CT1_2.0.Sch | Contact Engineer: Kevin Lamb | Contact Tel: (01223) 203243 | Printed: 22-Aug-2003 | Sheet 1 of 1 | DRAWING NO. L962CT1 | |



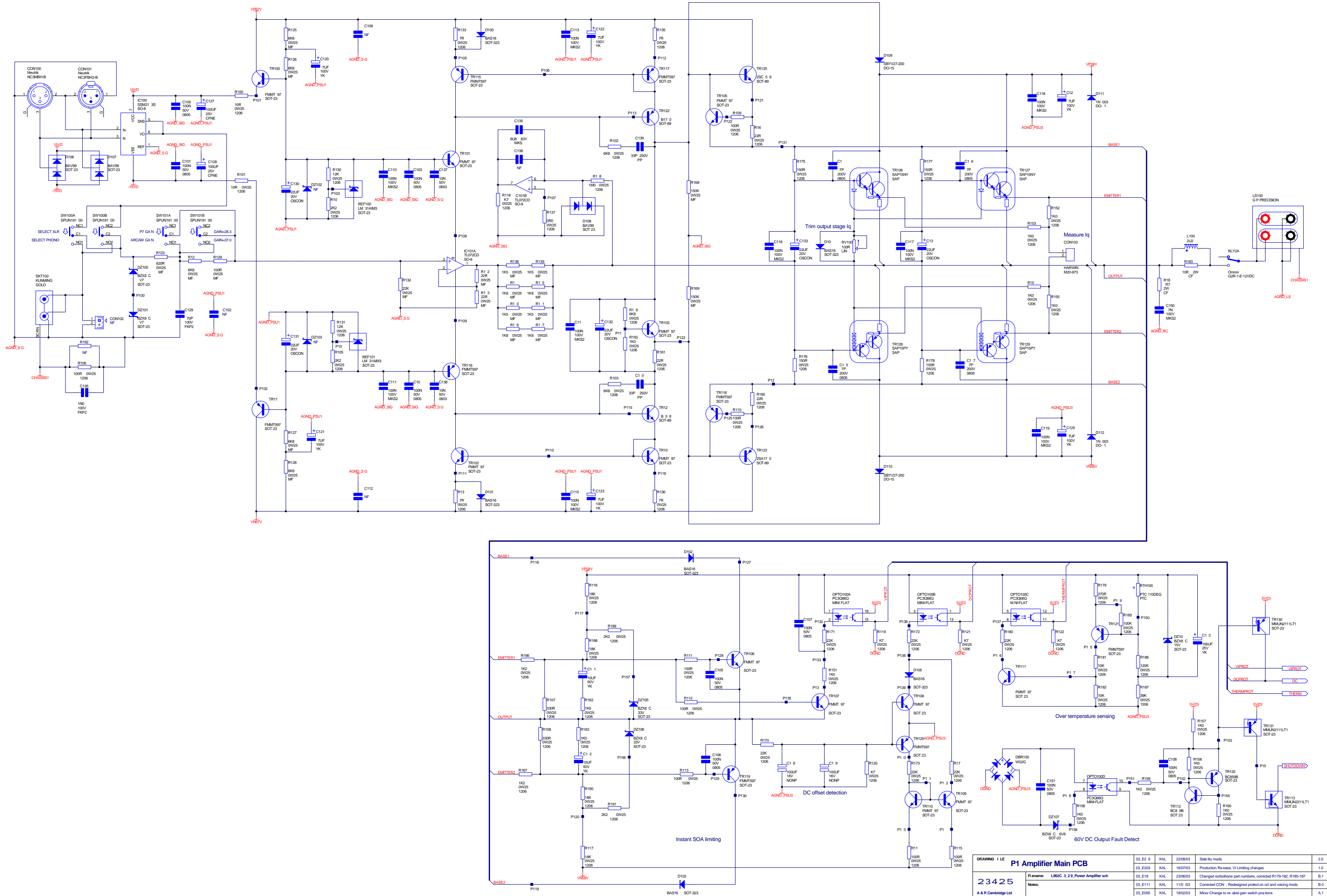
MAINS WIRING AND AUXILIARY SUPPLY



TX WIRE COLOURS

- 1 GREEN
- 2 YELLOW
- 3 ORANGE
- 4 RED
- 5 WHITE
- 6 GREY
- 7 VIOLET
- 8 BLACK
- 9 BROWN
- 10 BLUE

| DRAWING TITLE | | 03_E249 | | KAL | | 22/08/03 | | Stability mods | | 2.0 | |
|--|--|------------------------------|--|-----------------------------|--|----------------------|--|---|--|---------------------|--|
| P1 Amplifier Main PCB | | 03_E203 | | KAL | | 16/07/03 | | Production Release, VI Limiting changes | | 1.0 | |
| | | 03_E184 | | KAL | | 23/06/03 | | Changed sorbothane part numbers, corrected R179-182, R185-187 | | B.1 | |
| 23425 | | 03_E111 | | KAL | | 11/04/03 | | Corrected CON4, Redesigned protection cct and voicing mods | | B.0 | |
| | | 03_E055 | | KAL | | 18/02/03 | | Minor Change to re-label gain switch positions | | A.1 | |
| A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9PB | | Contact Engineer: Kevin Lamb | | Contact Tel: (01223) 203243 | | Printed: 22 Aug 2003 | | Sheet 2 of 3 | | DRAWING NO. L962CT1 | |



| DRAWING 1 LE | | | | P1 Amplifier Main PCB | | | |
|--------------|-----|----------|---|-----------------------|-----------|----------|--|
| 03_E2_9 | KAL | 22/08/03 | Stability mods | 03_E2_9 | KAL | 22/08/03 | Stability mods |
| 03_E203 | KAL | 16/07/03 | Production Release, VI Limiting changes | 03_E118 | KAL | 23/06/03 | Production Release, VI Limiting changes |
| 03_E118 | KAL | 23/06/03 | Changed software part numbers, corrected R179-182, R185-187 | 03_E111 | KAL | 11/0_03 | Connected CON - Redesigned pot on ozt and wicking mods |
| 03_E055 | KAL | 18/02/03 | Minor Change to re-ideal gain switch positions | 03_E055 | KAL | 18/02/03 | Minor Change to re-ideal gain switch positions |
| 030 No | N | 14/03 | DA E | DESCR P | DR OF CHG | | |

23425
A & R Cambridge Ltd
Pembroke Avenue
Waterbeach
Cambridge CB5 9PB

File name: L962C 3.2.0 Power Amplifier sch
Notes:
Contact Engineer: Kevin Lamb
Contact tel: 01223 203343
P/n ref: 27 Aug 2003
Sheet 3 of 3
DRAWING NO: L962CT

Transformer Specification For 115/230V P1 transformer

Arcam Part Number L926TX

Material Safety Specification

- Winding Wire to be Grade 2 (130C rating) to BS 60317-4 1995
- Mylar Polyester Insulator 130C Rated
- Potting Compound PC3502 E135297(M) or equivalent.

Mechanical Specification

- Centre of transformer to be potted (as shown).
- Primary windings connect to 6 way MOLEX connector 39-01-2065. Secondary windings connect to 10 way molex connector 39-01-2105. Use MOLEX pin 44476-3112. MOLEX connectors have pin numbers indicated on them. Connectors to be UL94V0 rated.

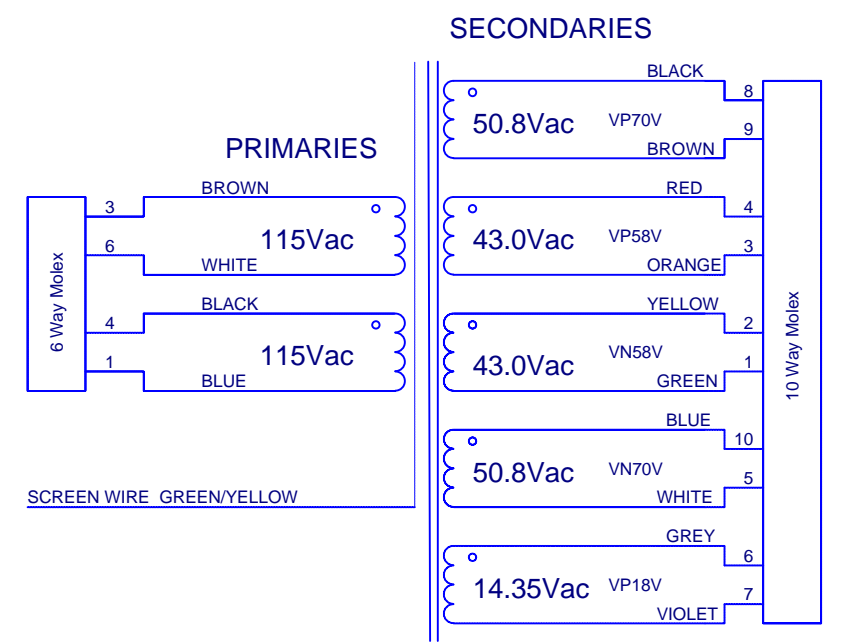
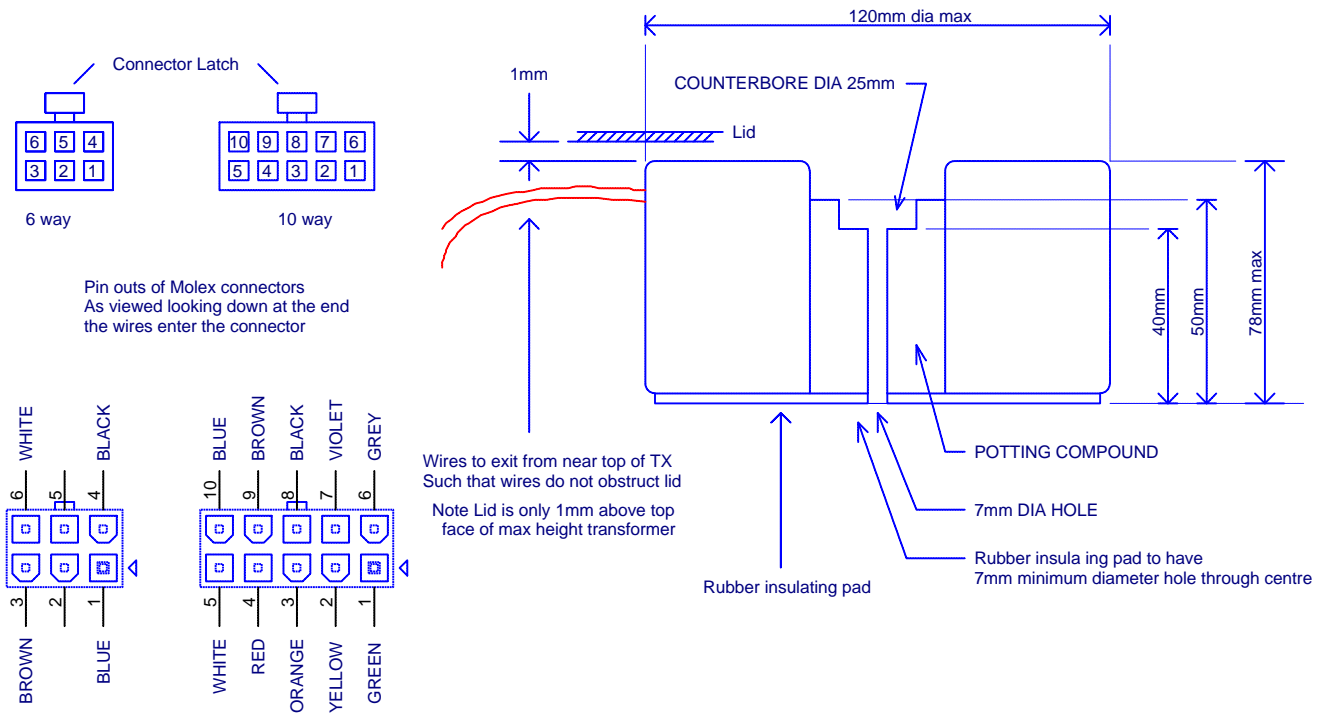
Note Molex UL94V0 receptacles may be long lead time items.

Equivalent Conexcon 6740 Series UL94V0 parts may be used.
 6 Way receptacle 6740-1060
 10 Way receptacle 6740-1100

- Primary wires are enclosed in a common sleeve. Secondary wires are enclosed in a common sleeve. Use UL rated sleeving.
- All wire lengths in mm. Lengths are +5.0, -0
- Please adhere rubber insulating pad to bottom of transformer as shown.

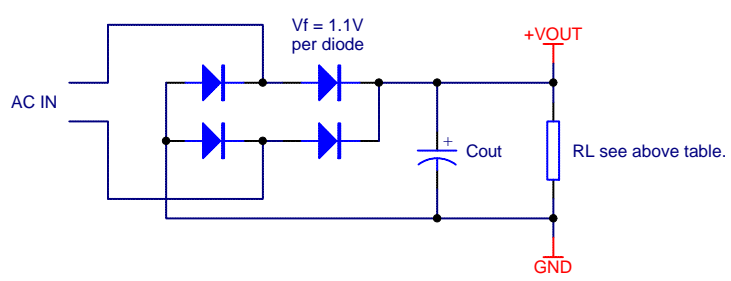
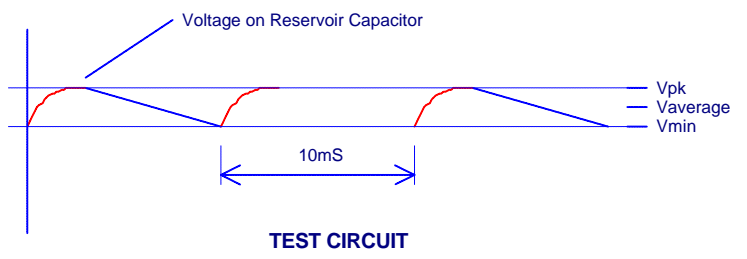
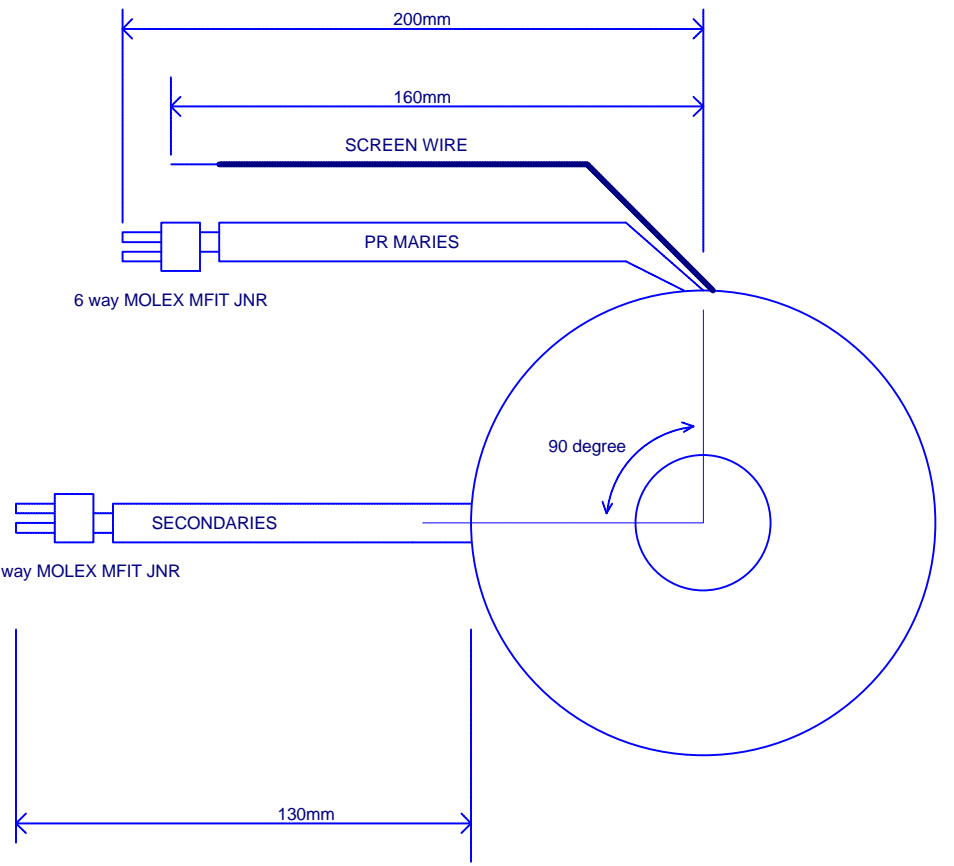
Electrical Specification

- Transformer to have dual 115V primaries to allow parallel operation for 115V input and series operation with 230V input.
- Transformer input voltage range
 115V -18% +14% (97.5V to 132.5V)
 230V -18% +14% (195V to 265V)
- Transformer to have 5 secondary windings as shown in the adjacent drawing.
- Loaded DC voltages specified at 230V AC in (with transformer primaries in series)
- Each secondary winding to have a full wave (4diode) bridge to produce a single DC rail.
 (AS shown in diagram)
- Output Capacitance to be as specified per rail.
- Output voltages to be as specified in table and as shown in diagram.
- Note. Transformer to be used in a power amplifier. The specified load currents on the high power rails (VP58V, VN58V) represent the effective current drawn when the amplifier is loaded to full rated power (200W) into an 8ohm load and operated continuously. This load current is not typical of normal operation which is considered to be 1/8th of full rated power.



Secondary Winding Voltage and Current Specs
 Bridge Rectifier V_f diode = 1.1V per leg = 2.2V Total
 (ideal TX assumed)

| AC Winding Label | Capacitor Cout (uF) | Effective DC Load Current (mA) | Secondary Voltage (V r.m.s.) | Capacitor Peak Voltage Vpk (Volt) | Capacitor Min Voltage Vmin (Volt) | Capacitor Average Voltage (Volt) | Load Resistor to simulate Load RL (Ohm) | Secondary Winding r.m.s. Current (A r.m.s.) |
|------------------|---------------------|--------------------------------|------------------------------|-----------------------------------|-----------------------------------|----------------------------------|---|---|
| VP70V | 1000 | 50 | 50.8 | 70.2 | 69.8 | 70.0 | 1400 | 0.25 |
| VP58V | 20,000 | 2250 | 43.0 | 58.8 | 57.8 | 58.3 | 25.6 | 8.0 |
| VN58V | 20,000 | 2250 | 43.0 | 58.8 | 57.8 | 58.3 | 25.6 | 8.0 |
| VN70V | 1000 | 50 | 50.8 | 70.2 | 69.8 | 70.0 | 1400 | 0.25 |
| VP18V | 1000 | 175 | 14.35 | 18.75 | 17.25 | 18.0 | 102.8 | 0.52 |



| DRAWING TITLE | | POWER TX FOR P1 115/230V | | 03_E240 | KAL | | Reduced VP58V, VN58V to 43.0Vac | 1.0 |
|--|------------|--------------------------|----------------|----------|-----------------------|--------------|---|--------------------|
| ARCAM A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9PB | | Filename: | L926TX_1.0.sch | 03_E193 | SLS | | 'UL rated sleeving' was 'UL94-V0' | B.3 |
| | | Notes: | | 03_E192 | KAL | | Added note about UL94-V0 sleeving | B.2 |
| | | | | 03_E158 | KAL | | Corrected Schematic Symbol pin numbers | B.1 |
| | | | | 03_E141 | KAL | | Changed Pri wire colours, VP58 and VN58 +1V, lead out forms | B.0 |
| | | ECO No. | INITIALS | DATE | DESCRIPTION OF CHANGE | | ISSUE | |
| Contact Engineer: | Kevin Lamb | Contact Tel: | (01223) 203243 | Printed: | 7-Aug-2003 | Sheet 1 of 1 | A3 | DRAWING NO. L926TX |

Transformer Specification For 100V P1 transformer

Arcam Part Number L927TX

Material Safety Specification

- Winding Wire to be Grade 2 (130C rating) to BS 60317-4 1995
- Mylar Polyester Insulator 130C Rated
- Potting Compound PC3502 E135297(M) or equivalent.

Mechanical Specification

- Centre of transformer to be potted (as shown).
- Primary windings connect to 6 way MOLEX connector 39-01-2065. Secondary windings connect to 10 way molex connector 39-01-2105. Use MOLEX pin 44476-3112. MOLEX connectors have pin numbers indicated on them. Connectors to be UL94V0 rated.

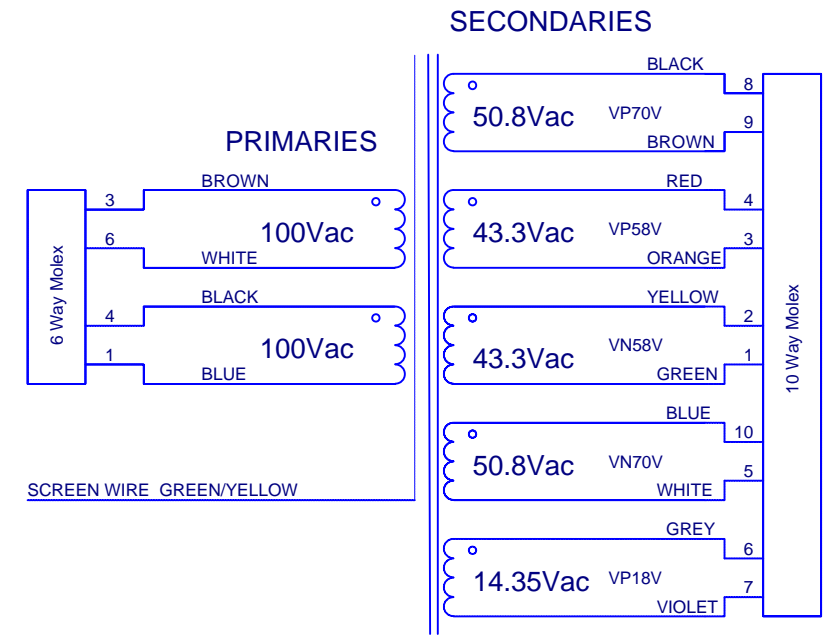
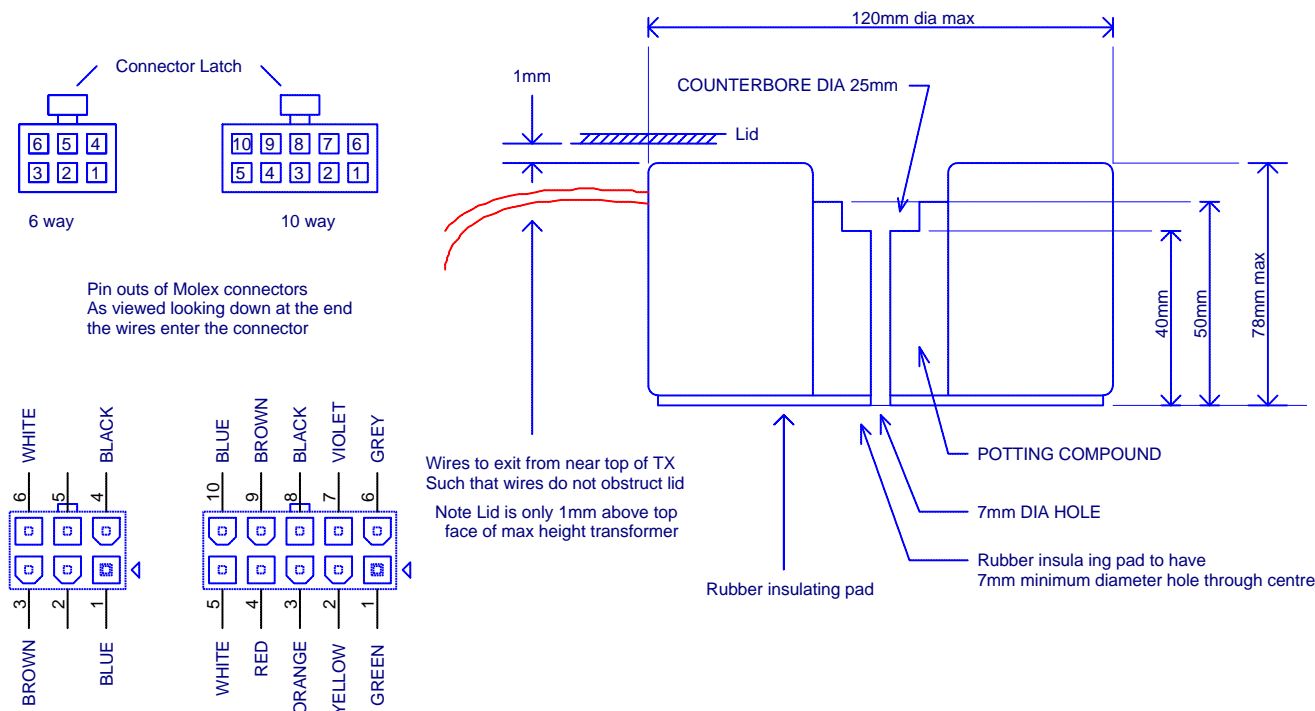
Note Molex UL94V0 receptacles may be long lead time items.

Equivalent Conexcon 6740 Series UL94V0 parts may be used.
 6 Way receptacle 6740-1060
 10 Way receptacle 6740-1100

- Primary wires are enclosed in a common sleeve. Secondary wires are enclosed in a common sleeve. Use UL rated sleeving.
- All wire lengths in mm. Lengths are +5.0, -0
- Please adhere rubber insulating pad to bottom of transformer as shown.

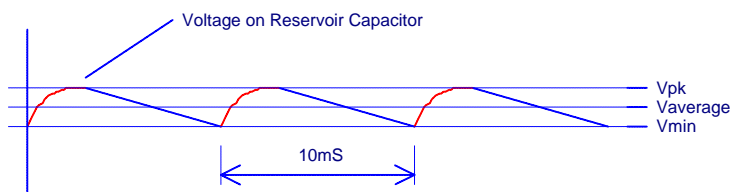
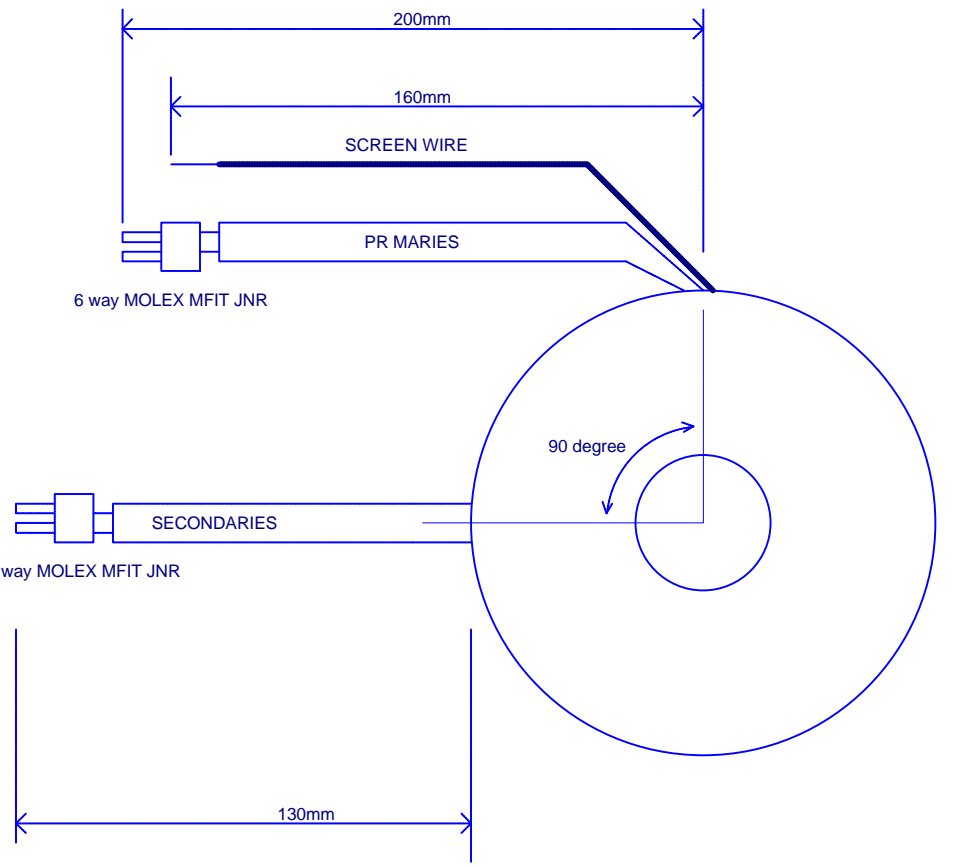
Electrical Specification

- Transformer to have dual 100V primaries to allow parallel operation for 100V input.
- Transformer input voltage range
100V -15% +15% (85V to 115V)
- Transformer to have 5 secondary windings as shown in the adjacent drawing.
- Loaded DC voltages specified at 100V AC in (with transformer primaries in parallel)
- Each secondary winding to have a full wave (4diode) bridge to produce a single DC rail.
(AS shown in diagram)
- Output Capacitance to be as specified per rail.
- Output voltages to be as specified in table and as shown in diagram.
- Note. Transformer to be used in a power amplifier. The specified load currents on the high power rails (VP58V, VN58V) represent the effective current drawn when the amplifier is loaded to full rated power (200W) into an 8ohm load and operated continuously. This load current is not typical of normal operation which is considered to be 1/8th of full rated power.

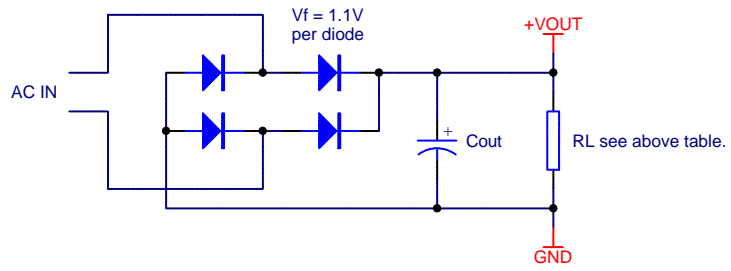


**Secondary Winding Voltage and Current Specs
 Bridge Rectifier Vf diode = 1.1V per leg = 2.2V Total
 (ideal TX assumed)**

| AC Winding Label | Capacitor Cout (uF) | Effective DC Load Current (mA) | Secondary Voltage (V r.m.s.) | Capacitor Peak Voltage Vpk (Volt) | Capacitor Min Voltage Vmin (Volt) | Capacitor Average Voltage (Volt) | Load Resistor to simulate Load RL (Ohm) | Secondary Winding r.m.s. Current (A r.m.s.) |
|------------------|---------------------|--------------------------------|------------------------------|-----------------------------------|-----------------------------------|----------------------------------|---|---|
| VP70V | 1000 | 50 | 50.8 | 70.2 | 69.8 | 70.0 | 1400 | 0.25 |
| VP58V | 20,000 | 2250 | 43.0 | 58.8 | 57.8 | 58.3 | 25.6 | 8.0 |
| VN58V | 20,000 | 2250 | 43.0 | 58.8 | 57.8 | 58.3 | 25.6 | 8.0 |
| VN70V | 1000 | 50 | 50.8 | 70.2 | 69.8 | 70.0 | 1400 | 0.25 |
| VP18V | 1000 | 175 | 14.35 | 18.75 | 17.25 | 18.0 | 102.8 | 0.52 |



TEST CIRCUIT



| DRAWING TITLE | | POWER TX FOR P1 100V | | | | | |
|--|------------|----------------------|----------------|-----------------------|---|--------------|-----------------------|
| ARCAM A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9PB | Filename: | L927TX_1.0.sch | 03_E240 | KAL | Reduced VP58V, VN58V to 43.0Vac | 1.0 | |
| | Notes: | | 03_E193 | SLS | '100V' text was '115/230V', 'UL rated sleeving' was 'UL94-V0' | B.1 | |
| | | | 03_E192 | KAL | Changed voltages as per L926TX, sleeving to be UL94-V0 | B.0 | |
| | | | 03_E006 | KAL | Prototype Release | A.0 | |
| | ECO No. | INITIALS | DATE | DESCRIPTION OF CHANGE | ISSUE | | |
| Contact Engineer: | Kevin Lamb | Contact Tel: | (01223) 203243 | Printed: | 7-Aug-2003 | Sheet 1 of 1 | A3 DRAWING NO. L927TX |

ELECTRICAL SPECIFICATION

1. FREQUENCY :- 50 - 60Hz
2. INTERWINDING SCREEN :-
3. SECONDARY WINDING :-
 - a. Regulation (AC)/load current -
 - b. Continuous VA rating - 4VA @ 100V
 - c. Voltage unbalance -

4. GENERAL

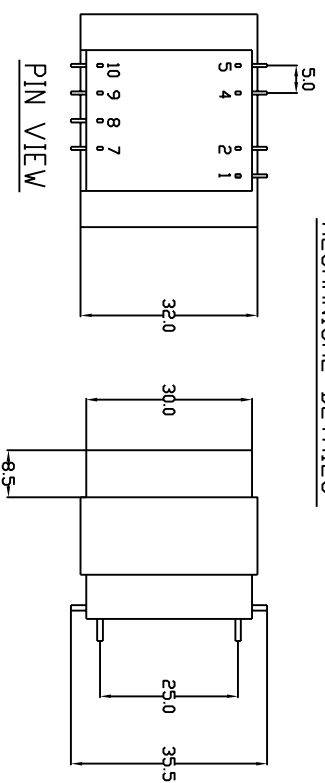
- a. Magnetic radiation - VERY LOW & CONSISTENT
- b. Acoustic noise - THE DEVICE SHOULD BE DESIGNED TO BE AS QUIET AS POSSIBLE
- c. Maximum ambient temperature - 50 C
- d. Application -

POWER SUPPLY FOR DIGITAL LOGIC IN AMPLIFIER USING FULL WAVE BRIDGE RECTIFIER AND 3300uF RESERVOIR CAPACITOR. QUIESCENT LOAD 100mA DC.

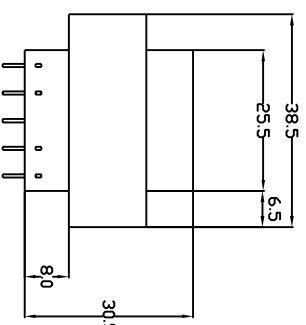
Voltages shown when used at 100V.

5. SAFETY APPROVAL :- To meet BS415/IEC65

MECHANICAL DETAILS



PIN DIMENSIONS 1.0 x 0.6mm NOMINAL
PIN LENGTH 5.0mm TYP.

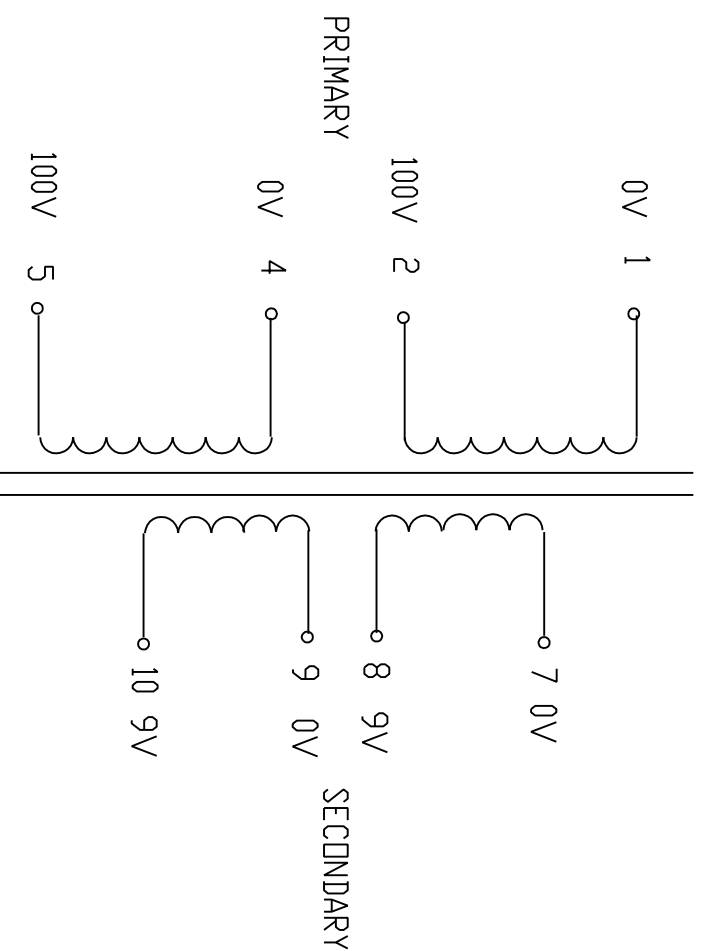


DIMENSIONS SHOWN, EXCEPT THOSE DETAILING
PIN SPACING, ARE NOMINAL ONLY

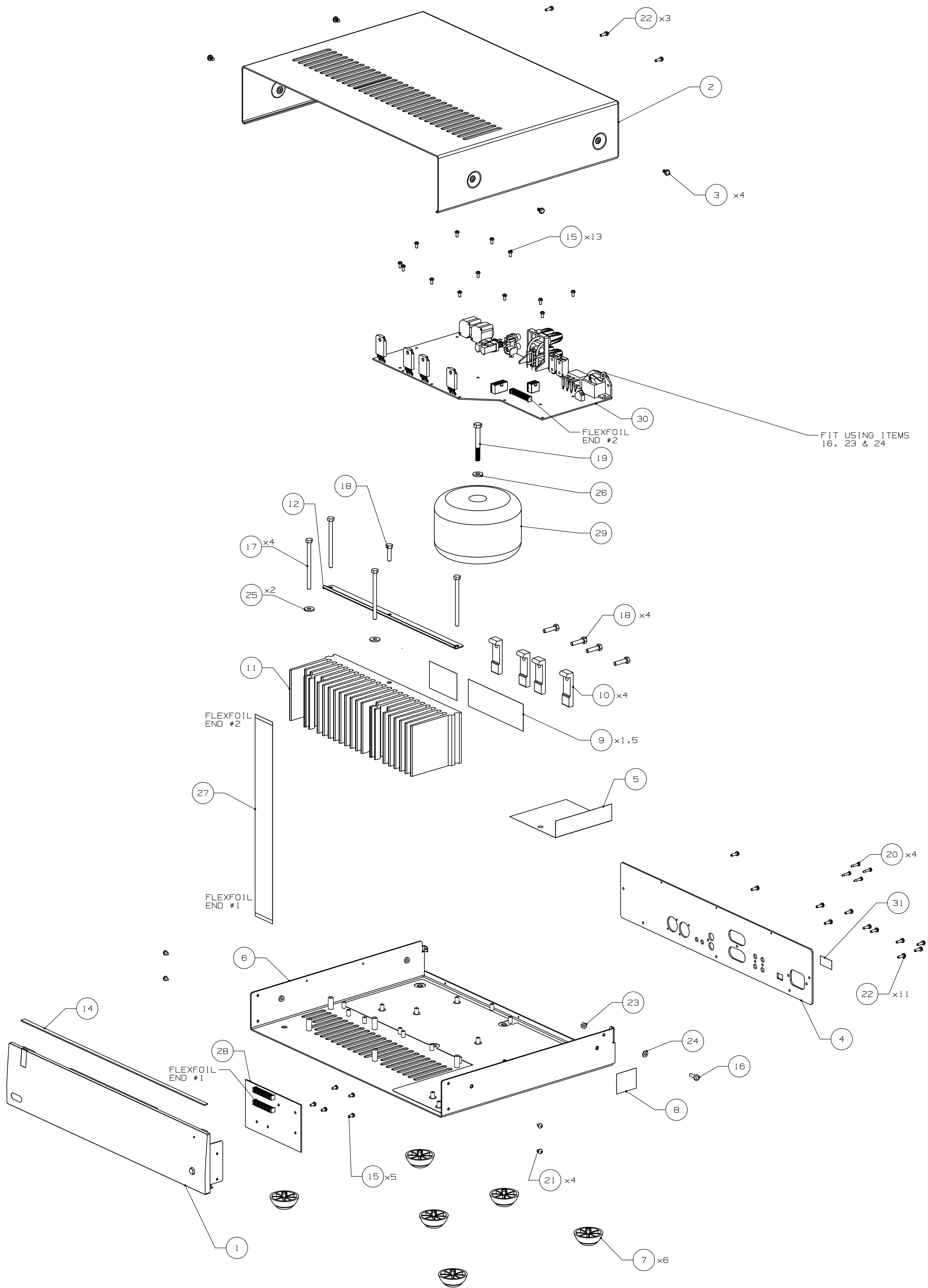
NOTES
PINS NOT SPECIFIED IN TABLE ON SHEET TWO
SHOULD NOT BE INCLUDED

| | | | | | | | |
|---|---|--------------------------|----------|------------|----|--------------------------------|--|
| ARCCAM A & R CAMBRIDGE LTD DRAWN TO THIRD ANGLE PROJECTION TOLERANCES UNLESS OTHERWISE STATED MATERIAL FINISH | DRAWING TITLE A85/A90 AMPLIFIER DIGITAL TRANSFORMER 100V | DRAWN BY | CL | | | | |
| | | DATE | 18-09-00 | | | | |
| | | CHECKED BY | | | | | |
| | | ANGULAR TOL. ± 2 DEGREES | | | | | |
| | | ORIGINAL SCALE | NTS | PLOT SCALE | 1X | ECD NUMBER | 03_E336 |
| | | SHT | 1 OF 2 | SHT SIZE | A3 | DATE | 17-12-03 |
| | | | | | | DESCRIPTION OF CHANGE | A90 ADDED TO DRAWING TITLE BLOCK PRODUCTION RELEASE |
| | | | | | | PART NUMBER AND DRAWING NUMBER | L907TX |
| | | | | | | ISSUE | 1 |

| | | |
|-----|------|---------|
| 1,4 | 0V | |
| 5 | 100V | +/- 15% |
| 2 | 100V | +/- 15% |
| 7,9 | 0V | |
| 8 | 9V | |
| 10 | 9V | |
| 3,6 | N.C. | NO PIN |

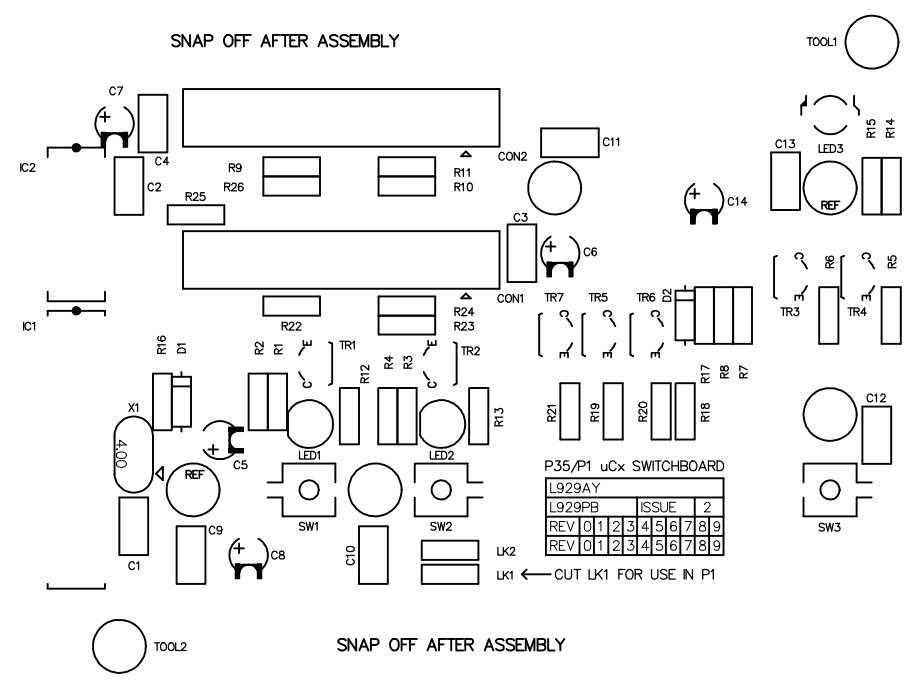


| | | | | | | | |
|---|---|--------------------------|----------|------------|----|--------------------------------|--|
| ARCCAM A & R CAMBRIDGE LTD DRAWN TO THIRD ANGLE PROJECTION TOLERANCES UNLESS OTHERWISE STATED MATERIAL FINISH | DRAWING TITLE A85/A90 AMPLIFIER DIGITAL TRANSFORMER 100V | DRAWN BY | CL | | | | |
| | | DATE | 18-09-00 | | | | |
| | | CHECKED BY | | | | | |
| | | ANGULAR TOL. ± 2 DEGREES | | | | | |
| | | ORIGINAL SCALE | NTS | PLOT SCALE | 1X | ECD NUMBER | 03_E336 |
| | | SHT | 2 OF 2 | SHT SIZE | A3 | DATE | 17-12-03 |
| | | | | | | DESCRIPTION OF CHANGE | A90 ADDED TO DRAWING TITLE BLOCK PRODUCTION RELEASE |
| | | | | | | PART NUMBER AND DRAWING NUMBER | L907TX |
| | | | | | | ISSUE | 1 |



P1 Mechanical and packing parts list

| Part No | Item no | Description |
|----------------|----------|---|
| | | GENERAL MECHANICAL PARTS |
| E200AY | 4 | Rear Panel Assembly FMJ P1 |
| E212AY | 6 | FMJ A32 Chassis Assembly |
| E822PM1 | 7 | Foot Black Alpha |
| E907MC | 9 | Koolpad O/P Device Diva A85 |
| E912MC | 10 | Clamp 85 Amp Transistor |
| E918HK | 11 | Heatsink FMJ P1 |
| E921MC | 12 | Clamp Heatsink Diva P85 3RD Channel |
| HA3V06A | 15 | M Screw Torx P/H M3x6MM ST ZP |
| HA4A12B | 16 | M Screw Pan Supa M4x12MM ST BLK |
| HA5K70A | 17 | Bolt Hex HD M5x70MM ST ZP |
| HA5L20B | 18 | M/C Hex HD. Bolt M5-0.8X20MM Steel - Zinc Black Passivate |
| HA6K50A | 19 | Bolt Hex HD M6x50MM Mczp |
| HB25V12B | 20 | Screw Taptite M2.5X12MM Pan Torx(T8) Steel Zinc Plate Black |
| HE6V06B | 21 | Screw Sftp Torx No.6x6MM BLK |
| HF4V09B | 22 | Screw Self-Tapping-Sems NO.4 X 9MM Pan Torx-Slot Steel Zinc-Plate BLK |
| HJ4A00A | 23 | Nut M4 Full ST ZP |
| HL4SB | 24 | Washer M4 Int Shakeproof BLK |
| HL5CA | 25 | Bright Washer M5 (Form C) to BS 4320 |
| HL6MA | 26 | Bright Washer M6 (Mudguard O.D. 20mm) |
| L915CA | 27 | Cable FFC 0.1" 14WAY A85 Disp - Pwr |
| L929AY | 28 | P35/P1 FMJ Amp Microcontroller Board Assembly |
| L926TX | 29 | 115/230 VAC Toroid transformer |
| L927TX | 29 | 100 VAC only Toroid transformer |
| | | BLACK CASE PARTS |
| E210AYB | 2 | FMJ P1/P35-3 Black Cover Assembly |
| HA4V06B | 3 | M Screw Torx M4x6MM Stainless Steel Black |
| E189AYB | 1 | FMJ Black P1 Fascia Complete Assembly |
| | | Made up of the following parts :- |
| 8Q006 | | 8Q006 FMJ Tact Button Spring |
| E083AY | | FMJ A32 Sub-Panel Assy |
| E199AYB | | Front Panel Assembly Black FMJ P1 |
| E830MC | | Badge Metal Arcam FMJ |
| E847PM | | Lightpipe FMJ |
| E894PMB | | Button Power FMJ A32 Black |
| HL25AB | | HL25AB FMJ Tact Button Fastener |
| E933AY | | FMJ I/R Window Assy (STD. SCREENED) |
| HA3A04A | | M/C Pan Supa M3X4 Stzp |
| | | SILVER CASE PARTS |
| E210AY | 2 | FMJ P1/P35-3 Silver Cover Assembly |
| HA4V06S | 3 | M Screw Torx M4x6MM Stainless Steel Silver |
| E189AY | 1 | FMJ Silver P1 Fascia Complete Assembly |
| | | Made up of the following parts :- |
| 8Q006 | | 8Q006 FMJ Tact Button Spring |
| E083AY | | FMJ A32 Sub-Panel Assy |
| E199AY | | Front Panel Assembly Silver FMJ P1 |
| E830MC | | Badge Metal Arcam FMJ |
| E847PM | | Lightpipe FMJ |
| E894PM | | Button Power FMJ A32 Silver |
| HL25AB | | HL25AB FMJ Tact Button Fastener |
| E933AY | | FMJ I/R Window Assy (STD. SCREENED) |
| HA3A04A | | M/C Pan Supa M3X4 Stzp |
| | | PACKAGING MATERIAL |
| E827PK | | Carton Printed FMJ |
| E828PK | | End Caps Pair FMJ A22 / P25 / DT26 |
| E826PK | | Carton Plain FMJ |
| E967SL | | FMJ P1 Carton Label |
| SH139 | | Handbook FMJ C30/P35/P1 Multi |
| E888PM | | Blanking Plug For 4MM Binding Post |



| | |
|-----------------|-------------|
| MECHANICAL DATA | |
| | |
| LAYER STACKUP | |
| L929PB_2.GTO | Top Overlay |
| | |
| | |

| | | |
|---------------|-----------------------|---|
| MATERIAL | FR4 | NOTES:-- 1/ Manufacture in accordance with IPC-A-600F Class 1. 2/ Always use NC drill file as reference. 3/ All routing 2.0mm unless otherwise shown on drill drawing. 4/ Mark month/year of manufacture on ident layer. 5/ Scoring denoted by →→→ on drill drawing. |
| COPPER WEIGHT | 1oz | |
| HOLE SIZES | FINISHED (SEE NOTE 2) | |
| ROUTING | SEE NOTE 3 | |
| COPPER LAYERS | TWO | |
| MINIMUM WIDTH | 10 ML | GENERAL TOLERANCES PCB Dims. +/- 0.2mm Routing +/- 0.1mm All holes +/- 0.08mm ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED |
| MINIMUM GAP | 10 ML | |
| RESIST | GREEN | |
| IDENT | WHITE | |
| VENDOR CODES | SEE NOTE 4 | |
| FINISH | HASL | |
| SCORING | SEE NOTE 5 | |

| | | | | | | |
|--|------------------------|------------|----------------------------------|----------|---|--------------|
| DRAWING TITLE P35/P1 SWITCH BOARD | | -- | -- | -- | -- | -- |
| Top Overlay | | 03_E241 | KAL | 7/08/03 | Removed Spare1,2 from CON1,2 to fix 50V logic error | 2 |
| ARCAM A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9PB | Filename: L929PB_2.PCB | 03_E125 | KAL | 8/05/03 | Moved Connectors, added LK1,2. | 1 |
| | DRAWING NO. L929PB | -- | JR | 2/11/01 | SW3 CHANGED + GROUND PLANES | B |
| | | -- | CL | 24/09/01 | INITIAL PROTOTYPE | A |
| | | E.C.O. No. | INITIALS | DATE | DESCRIPTION OF CHANGE | ISSUE |
| Contact Engineer: Kevin Lamb | | | Contact Tel: +44 (0) 1223 203200 | | Printed: 8-Aug-2003 | Sheet 2 of 8 |

P1 Amplifier display cct board L929AY issue 2.0

| Designator | Part | Description |
|------------|---------|---|
| C1 | 2A410 | Capacitor Ceramic 5mm Pitch 50V 10% 100nF |
| C2 | 2A410 | Capacitor Ceramic 5mm Pitch 50V 10% 100nF |
| C3 | 2A410 | Capacitor Ceramic 5mm Pitch 50V 10% 100nF |
| C4 | 2A410 | Capacitor Ceramic 5mm Pitch 50V 10% 100nF |
| C5 | 2N610 | Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 10UF 50V |
| C6 | 2N710 | Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V |
| C7 | 2N710 | Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V |
| C8 | 2N710 | Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V |
| C9 | 2A410 | Capacitor Ceramic 5mm Pitch 50V 10% 100nF |
| C10 | 2A410 | Capacitor Ceramic 5mm Pitch 50V 10% 100nF |
| C11 | 2A410 | Capacitor Ceramic 5mm Pitch 50V 10% 100nF |
| C12 | 2A410 | Capacitor Ceramic 5mm Pitch 50V 10% 100nF |
| C13 | 2A410 | Capacitor Ceramic 5mm Pitch 50V 10% 100nF |
| C14 | 2N710 | Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V |
| CON1 | 8K7014A | Con Series 2.54MM Horiz FFC 14WAY |
| CON2 | 8K7014A | Con Series 2.54MM Horiz FFC 14WAY |
| D1 | 3A4148 | Diode Small Signal 1N4148 DO-35 Package |
| D2 | 3A4148 | Diode Small Signal 1N4148 DO-35 Package |
| IC1 | L019AY | Programmed HT48R30A-1 With Software For P35 |
| IC2 | 5J7432 | IC Quad 2 Input OR Gate 74HC32N |
| ITEM1-1 | L929PB | Blank PCB P35/P1 FMJ Amp Microcontroller Board |
| ITEM2-1 | 8S028N | IC Skt 28PIN 0.3IN |
| LED1 | 3D001 | LED 5mm Green SLR-56MGT32 |
| LED2 | 3D001 | LED 5mm Green SLR-56MGT32 |
| LED3 | 3D006 | LED 3mm Red/Green Tri-Colour L-93WEGW |
| LK1 | 1H000 | Resistor Metal Film 0.25W 0R0 |
| LK2 | 1H000 | Resistor Metal Film 0.25W 0R0 |
| R1 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R2 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R3 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R4 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R5 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R6 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R7 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R8 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R9 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R10 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R11 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R12 | 1H156 | Resistor Metal Film 0.25W 1% 560R |
| R13 | 1H156 | Resistor Metal Film 0.25W 1% 560R |
| R14 | 1H133 | Resistor Metal Film 0.25W 1% 330R |
| R15 | 1H118 | Resistor Metal Film 0.25W 1% 180R |
| R16 | 1H410 | Resistor Metal Film 0.25W 1% 100K |
| R17 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R18 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R19 | 1H147 | Resistor Metal Film 0.25W 1% 470R |
| R20 | 1H147 | Resistor Metal Film 0.25W 1% 470R |
| R21 | 1H147 | Resistor Metal Film 0.25W 1% 470R |
| R22 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R23 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R24 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R25 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| R26 | 1H310 | Resistor Metal Film 0.25W 1% 10K |
| SW1 | A1504 | Switch Tact 2-PIN Low Prof With Gnd Pin |
| SW2 | A1504 | Switch Tact 2-PIN Low Prof With Gnd Pin |
| SW3 | A1504 | Switch Tact 2-PIN Low Prof With Gnd Pin |
| TR1 | 4A556 | Transistor BC556B TO92 Package |
| TR2 | 4A556 | Transistor BC556B TO92 Package |
| TR3 | 4A556 | Transistor BC556B TO92 Package |
| TR4 | 4A556 | Transistor BC556B TO92 Package |
| TR5 | 4A546 | Transistor BC546B TO92 Package |
| TR6 | 4A546 | Transistor BC546B TO92 Package |
| TR7 | 4A546 | Transistor BC546B TO92 Package |
| X1 | 7W005 | Ceramic Resonator 4.00MHz |

P1 Amplifier main cct board L962AY issue 2.1

| Designator | Part | Description |
|------------|---------|---|
| C1 | 2K233 | Capacitor X1 Y2 Rated Ceramic 7.5mm Pitch 3N3 250V |
| C2 | 2K233 | Capacitor X1 Y2 Rated Ceramic 7.5mm Pitch 3N3 250V |
| C3 | 2K233 | Capacitor X1 Y2 Rated Ceramic 7.5mm Pitch 3N3 250V |
| C4 | 2K233 | Capacitor X1 Y2 Rated Ceramic 7.5mm Pitch 3N3 250V |
| C5 | 2D422 | Capacitor X2 Boxed Polypropylene 22.5mm Pitch 275V 220NF |
| C6 | 2L110 | Capacitor SM 0805 NPO Ceramic 5% 100V 100P |
| C7 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C8 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C9 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C10 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C11 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C12 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C13 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C14 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C15 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C16 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C17 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C18 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C19 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C20 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C21 | 2N833 | Capacitor Radial Electrolytic Dia 16mm Pitch 7.5mm 3300UF 25V |
| C22 | 2N810D | Capacitor Radial Electrolytic Dia 18mm Pitch 7.5mm 1000UF 100V |
| C23 | 2N810D | Capacitor Radial Electrolytic Dia 18mm Pitch 7.5mm 1000UF 100V |
| C24 | 2P910AM | Capacitor Radial Electrolytic Dia 40mm PCB Mount 10,000uF 71V |
| C25 | 2P910AM | Capacitor Radial Electrolytic Dia 40mm PCB Mount 10,000uF 71V |
| C26 | 2P910AM | Capacitor Radial Electrolytic Dia 40mm PCB Mount 10,000uF 71V |
| C27 | 2P910AM | Capacitor Radial Electrolytic Dia 40mm PCB Mount 10,000uF 71V |
| C28 | 2N647B | Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 47UF 100V |
| C29 | 2N647B | Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 47UF 100V |
| C30 | 2N647B | Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 47UF 100V |
| C31 | 2N647B | Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 47UF 100V |
| C32 | 2N810C | Capacitor Radial Electrolytic Dia 12.5mm Pitch 5mm 1000UF 35V |
| C33 | 2N810A | Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 1000UF 10V |
| C34 | 2Z710F | Capacitor Low Impedance Radial Electrolytic Dia 12.5mm Pitch 5mm 100UF 100V |
| C35 | 2Z710F | Capacitor Low Impedance Radial Electrolytic Dia 12.5mm Pitch 5mm 100UF 100V |
| C36 | 2N710 | Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V |
| C100 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C101 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C102 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C103 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C104 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C105 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C106 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C107 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C108 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| C109 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C110 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C111 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C112 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C113 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C114 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C115 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C116 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C117 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C118 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C119 | 2KA410 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N |
| C120 | 2N647B | Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 47UF 100V |
| C121 | 2N647B | Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 47UF 100V |
| C122 | 2N647B | Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 47UF 100V |
| C123 | 2N647B | Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 47UF 100V |
| C124 | 2N647B | Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 47UF 100V |

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| Designator | Part | Description |
|------------|---------|--|
| C125 | 2N647B | Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 47UF 100V |
| C126 | 2DA210 | Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 1N0 |
| C127 | 2P710AC | Capacitor Radial Electrolytic Elna ROA Series 100UF 25V |
| C128 | 2P710AC | Capacitor Radial Electrolytic Elna ROA Series 100UF 25V |
| C129 | 2DA147 | Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 470P |
| C130 | 2P622P | Capacitor Radial Electrolytic Oscon SP 22UF 20V |
| C131 | 2P622P | Capacitor Radial Electrolytic Oscon SP 22UF 20V |
| C132 | 2P622P | Capacitor Radial Electrolytic Oscon SP 22UF 20V |
| C133 | 2P622P | Capacitor Radial Electrolytic Oscon SP 22UF 20V |
| C134 | 2P622P | Capacitor Radial Electrolytic Oscon SP 22UF 20V |
| C135 | 2KB568 | Capacitor Boxed Polyester 22.5mm Pitch 10% 63V 6U8 |
| C136 | 2KA447 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 470N |
| C137 | 2JC310 | Capacitor SM 0603 X7R Ceramic 10% 50V 10N |
| C138 | 2JC310 | Capacitor SM 0603 X7R Ceramic 10% 50V 10N |
| C139 | 2D033W2 | Capacitor Boxed Polyprop 5mm Pitch 250V 5% 33P |
| C140 | 2D033W2 | Capacitor Boxed Polyprop 5mm Pitch 250V 5% 33P |
| C141 | 2N610 | Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 10UF 50V |
| C142 | 2N610 | Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 10UF 50V |
| C143 | 2N710 | Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V |
| C144 | 2C047B | Capacitor SM 0805 NPO Ceramic 200V 5% 47PF |
| C145 | 2C047B | Capacitor SM 0805 NPO Ceramic 200V 5% 47PF |
| C146 | 2C047B | Capacitor SM 0805 NPO Ceramic 200V 5% 47PF |
| C147 | 2C047B | Capacitor SM 0805 NPO Ceramic 200V 5% 47PF |
| C148 | 2V710 | Capacitor Non-Polar Radial Electrolytic 100UF 16V |
| C149 | 2V710 | Capacitor Non-Polar Radial Electrolytic 100UF 16V |
| C150 | 2KA347 | Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 47N |
| C151 | 2J410 | Capacitor SM 0805 X7R Ceramic 10% 50V 100N |
| CON1 | 8Q003 | Con Cage Clamp 1WAY |
| CON2 | 8K2310 | Con Minifit HCS 10WAY |
| CON3 | 8K2306 | Con Minifit HCS 6WAY |
| CON4 | 8K7014 | Con 2.54MM Vertical FFC 14WAY |
| CON100 | 8K3101 | XLR PCB Male Neutr k NC3MBH-B |
| CON101 | 8K3001 | XLR PCB Female Neutrik NC3FBH2-B |
| CON102 | 8K2402 | Con CT Series Vertical 2WAY |
| CON103 | 8K6201 | Con Single ROW Hdr 0.1IN Vertical 2WAY |
| D1 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D2 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D3 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D4 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D5 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D6 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D7 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D8 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D100 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D101 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D102 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D103 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D104 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D105 | 3AS16W | Diode Surface Mount Small Signal BAS16W SOT-23 Package |
| D106 | 3AV99W | Diode Dual Surface Mount Small Signal BAV99 SOT-23 Package |
| D107 | 3AV99W | Diode Dual Surface Mount Small Signal BAV99 SOT-23 Package |
| D108 | 3AV99W | Diode Dual Surface Mount Small Signal BAV99 SOT-23 Package |
| D109 | 3BYV27 | Diode SBYV27-200 DO-15 Package |
| D110 | 3BYV27 | Diode SBYV27-200 DO-15 Package |
| D111 | 3B4003 | Diode 1N4003 DO-41 Package |
| D112 | 3B4003 | Diode 1N4003 DO-41 Package |
| DBR1 | 3BW02 | Diode Bridge Rectifier W02G Plastic Package |
| DBR2 | 3BW02 | Diode Bridge Rectifier W02G Plastic Package |
| DBR3 | 3BW02 | Diode Bridge Rectifier W02G Plastic Package |
| DBR4 | 3BW02 | Diode Bridge Rectifier W02G Plastic Package |
| DBR5 | 3GBU8D | Diode Bridge Rectifier GBU8D Plastic Package 8A 200V |

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| Designator | Part | Description |
|------------|---------|--|
| DBR6 | 3BGBU8D | Diode Bridge Rectifier GBU8D Plastic Package 8A 200V |
| DBR100 | 3BW02 | Diode Bridge Rectifier W02G Plastic Package |
| DZ1 | 3CW34V7 | Zener Diode 0.25W Surface Mount BZX84C4V7 SOT-23 Package |
| DZ100 | 3CW34V7 | Zener Diode 0.25W Surface Mount BZX84C4V7 SOT-23 Package |
| DZ101 | 3CW34V7 | Zener Diode 0.25W Surface Mount BZX84C4V7 SOT-23 Package |
| DZ102 | 3CW315V | Zener Diode 0.25W Surface Mount BZX84C15V SOT-23 Package |
| DZ103 | 3CW315V | Zener Diode 0.25W Surface Mount BZX84C15V SOT-23 Package |
| DZ104 | 3CW315V | Zener Diode 0.25W Surface Mount BZX84C15V SOT-23 Package |
| DZ105 | 3CW333V | Zener Diode 0.25W Surface Mount BZX84C33V SOT-23 Package |
| DZ106 | 3CW333V | Zener Diode 0.25W Surface Mount BZX84C33V SOT-23 Package |
| DZ107 | 3CW310V | Zener Diode 0.25W Surface Mount BZX84C10V SOT-23 Package |
| FHLDR1 | 8S004 | Fuseholder 20MM PCB |
| FHLDR2 | 8S004 | Fuseholder 20MM PCB |
| FHLDR3 | 8S004 | Fuseholder 20MM PCB |
| FHLDR4 | 8S004 | Fuseholder 20MM PCB |
| FHLDR5 | 8S004 | Fuseholder 20MM PCB |
| FHLDR6 | 8S004 | Fuseholder 20MM PCB |
| FS1 | C56263 | Fuse Bussmann S506 T6.3A |
| FS2 | C56263 | Fuse Bussmann S506 T6.3A |
| FS3 | C54132 | Fuse Bussmann S504 T315mA |
| FS4 | C54132 | Fuse Bussmann S504 T315mA |
| FS5 | C54132 | Fuse Bussmann S504 T315mA |
| FS6 | C54132 | Fuse Bussmann S504 T315mA |
| HS1 | F008 | Heatsink TO-220 SW50-2 8.8 Deg C/W |
| IC100 | 5A2143 | IC Balanced Line Receiver AD SSM2143S SO-8 Package |
| IC101 | 5B072D | Opamp TL072CD SO-8 Package |
| ITEM1-1 | F006 | Clip For SW Profile Heatsink |
| ITEM2-1 | F022 | Fuseholder Cover For 20mm Fuseholder |
| ITEM3-1 | F022 | Fuseholder Cover For 20mm Fuseholder |
| ITEM4-1 | F022 | Fuseholder Cover For 20mm Fuseholder |
| ITEM5-1 | F022 | Fuseholder Cover For 20mm Fuseholder |
| ITEM6-1 | F022 | Fuseholder Cover For 20mm Fuseholder |
| ITEM7-1 | F022 | Fuseholder Cover For 20mm Fuseholder |
| ITEM8-1 | L962PB | Blank PCB P1 Amplifier Main Board |
| ITEM9-1 | E802AP | Pad Damping 15x6x3MM Sorbothane |
| ITEM9-2 | E802AP | Pad Damping 15x6x3MM Sorbothane |
| ITEM10-1 | E826AP | Pad Damping 7.5x6x3 Sorbothane |
| ITEM10-2 | E826AP | Pad Damping 7.5x6x3 Sorbothane |
| ITEM10-3 | E826AP | Pad Damping 7.5x6x3 Sorbothane |
| ITEM11-1 | 8M101 | Earth Lead Assy 75MM |
| L1 | 7F004 | Ferrite Bead SM1206 70R@100MHZ |
| L100 | 7D002C | Inductor AC 2u2 Self Bonded |
| LS100 | 8D420G | Connector 4mm 4 Way Vertical |
| OPTO100 | 5T3Q66 | Opto Isolator Quad PC3Q66Q |
| R1 | 1A010 | Resistor 1206 Surface Mount 0.25W 1% 10R |
| R2 | 1KA515 | Resistor Metal Glazed 0.5W 5% 1M5 |
| R3 | 1A233 | Resistor 1206 Surface Mount 0.25W 1% 3K3 |
| R4 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R5 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R6 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R7 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R8 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R9 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R10 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R11 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R12 | 1A110 | Resistor 1206 Surface Mount 0.25W 1% 100R |
| R13 | 1A368 | Resistor 1206 Surface Mount 0.25W 1% 68K |
| R14 | 1A368 | Resistor 1206 Surface Mount 0.25W 1% 68K |
| R15 | 1A310 | Resistor 1206 Surface Mount 0.25W 1% 10K |
| R16 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R17 | 1A247 | Resistor 1206 Surface Mount 0.25W 1% 4K7 |

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| Designator | Part | Description |
|------------|-------|---|
| R18 | 1A310 | Resistor 1206 Surface Mount 0.25W 1% 10K |
| R19 | 1E310 | Resistor Carbon Film 1W 5% 10K |
| R20 | 1E310 | Resistor Carbon Film 1W 5% 10K |
| R100 | 1A010 | Resistor 1206 Surface Mount 0.25W 1% 10R |
| R101 | 1A010 | Resistor 1206 Surface Mount 0.25W 1% 10R |
| R102 | 1A268 | Resistor 1206 Surface Mount 0.25W 1% 6K8 |
| R103 | 1A268 | Resistor 1206 Surface Mount 0.25W 1% 6K8 |
| R104 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R105 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R106 | 1A110 | Resistor 1206 Surface Mount 0.25W 1% 100R |
| R107 | 1A133 | Resistor 1206 Surface Mount 0.25W 1% 330R |
| R108 | 1A133 | Resistor 1206 Surface Mount 0.25W 1% 330R |
| R109 | 1A110 | Resistor 1206 Surface Mount 0.25W 1% 100R |
| R110 | 1A110 | Resistor 1206 Surface Mount 0.25W 1% 100R |
| R111 | 1A110 | Resistor 1206 Surface Mount 0.25W 1% 100R |
| R112 | 1A110 | Resistor 1206 Surface Mount 0.25W 1% 100R |
| R113 | 1A110 | Resistor 1206 Surface Mount 0.25W 1% 100R |
| R114 | 1A110 | Resistor 1206 Surface Mount 0.25W 1% 100R |
| R115 | 1A110 | Resistor 1206 Surface Mount 0.25W 1% 100R |
| R116 | 1A318 | Resistor 1206 Surface Mount 0.25W 1% 18K |
| R117 | 1A318 | Resistor 1206 Surface Mount 0.25W 1% 18K |
| R118 | 1A247 | Resistor 1206 Surface Mount 0.25W 1% 4K7 |
| R119 | 1A247 | Resistor 1206 Surface Mount 0.25W 1% 4K7 |
| R120 | 1A247 | Resistor 1206 Surface Mount 0.25W 1% 4K7 |
| R121 | 1A247 | Resistor 1206 Surface Mount 0.25W 1% 4K7 |
| R122 | 1A247 | Resistor 1206 Surface Mount 0.25W 1% 4K7 |
| R123 | 1H182 | Resistor Metal Film 0.25W 1% 820R |
| R124 | 1H268 | Resistor Metal Film 0.25W 1% 6K8 |
| R125 | 1H268 | Resistor Metal Film 0.25W 1% 6K8 |
| R126 | 1H268 | Resistor Metal Film 0.25W 1% 6K8 |
| R127 | 1H268 | Resistor Metal Film 0.25W 1% 6K8 |
| R128 | 1H268 | Resistor Metal Film 0.25W 1% 6K8 |
| R129 | 1H110 | Resistor Metal Film 0.25W 1% 100R |
| R130 | 1A312 | Resistor 1206 Surface Mount 0.25W 1% 12K |
| R131 | 1A312 | Resistor 1206 Surface Mount 0.25W 1% 12K |
| R132 | 1H322 | Resistor Metal Film 0.25W 1% 22K |
| R133 | 1A047 | Resistor 1206 Surface Mount 0.25W 1% 47R |
| R134 | 1A047 | Resistor 1206 Surface Mount 0.25W 1% 47R |
| R135 | 1A047 | Resistor 1206 Surface Mount 0.25W 1% 47R |
| R136 | 1A047 | Resistor 1206 Surface Mount 0.25W 1% 47R |
| R137 | 1A000 | Resistor 1206 Surface Mount 0.25W 1% 0R0 |
| R138 | 1H215 | Resistor Metal Film 0.25W 1% 1K5 |
| R139 | 1H215 | Resistor Metal Film 0.25W 1% 1K5 |
| R140 | 1H215 | Resistor Metal Film 0.25W 1% 1K5 |
| R141 | 1H215 | Resistor Metal Film 0.25W 1% 1K5 |
| R142 | 1H022 | Resistor Metal Film 0.25W 1% 22R |
| R143 | 1H022 | Resistor Metal Film 0.25W 1% 22R |
| R144 | 1H218 | Resistor Metal Film 0.25W 1% 1K8 |
| R145 | 1H218 | Resistor Metal Film 0.25W 1% 1K8 |
| R146 | 1H218 | Resistor Metal Film 0.25W 1% 1K8 |
| R147 | 1H218 | Resistor Metal Film 0.25W 1% 1K8 |
| R148 | 1A510 | Resistor 1206 Surface Mount 0.25W 1% 1M0 |
| R149 | 1A268 | Resistor 1206 Surface Mount 0.25W 1% 6K8 |
| R150 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R151 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R152 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R153 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R154 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R155 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R156 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R157 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |

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| Designator | Part | Description |
|------------|-----------|---|
| R158 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R159 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R160 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R161 | 1A022 | Resistor 1206 Surface Mount 0.25W 1% 22R |
| R162 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R163 | 1A210 | Resistor 1206 Surface Mount 0.25W 1% 1K0 |
| R164 | 1A022 | Resistor 1206 Surface Mount 0.25W 1% 22R |
| R165 | 1A022 | Resistor 1206 Surface Mount 0.25W 1% 22R |
| R166 | 1A212 | Resistor 1206 Surface Mount 0.25W 1% 1K2 |
| R167 | 1A212 | Resistor 1206 Surface Mount 0.25W 1% 1K2 |
| R168 | 1H415 | Resistor Metal Film 0.25W 1% 150K |
| R169 | 1H415 | Resistor Metal Film 0.25W 1% 150K |
| R170 | 1A322 | Resistor 1206 Surface Mount 0.25W 1% 22K |
| R171 | 1A322 | Resistor 1206 Surface Mount 0.25W 1% 22K |
| R172 | 1A322 | Resistor 1206 Surface Mount 0.25W 1% 22K |
| R173 | 1A322 | Resistor 1206 Surface Mount 0.25W 1% 22K |
| R174 | 1A322 | Resistor 1206 Surface Mount 0.25W 1% 22K |
| R175 | 1A115 | Resistor 1206 Surface Mount 0.25W 1% 150R |
| R176 | 1A115 | Resistor 1206 Surface Mount 0.25W 1% 150R |
| R177 | 1A115 | Resistor 1206 Surface Mount 0.25W 1% 150R |
| R178 | 1A115 | Resistor 1206 Surface Mount 0.25W 1% 150R |
| R179 | 1A127 | Resistor 1206 Surface Mount 0.25W 1% 270R |
| R180 | 1A322 | Resistor 1206 Surface Mount 0.25W 1% 22K |
| R181 | 1A310 | Resistor 1206 Surface Mount 0.25W 1% 10K |
| R182 | 1A310 | Resistor 1206 Surface Mount 0.25W 1% 10K |
| R183 | 1C010 | Resistor Carbon Film 2W 5% 10R |
| R184 | 1C847 | Resistor Carbon Film 2W 5% 4R7 |
| R185 | 1A410 | Resistor 1206 Surface Mount 0.25W 1% 100K |
| R186 | 1A412 | Resistor 1206 Surface Mount 0.25W 1% 120K |
| R187 | 1A339 | Resistor 1206 Surface Mount 0.25W 1% 39K |
| R188 | 1A318 | Resistor 1206 Surface Mount 0.25W 1% 18K |
| R189 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R190 | 1A318 | Resistor 1206 Surface Mount 0.25W 1% 18K |
| R191 | 1A222 | Resistor 1206 Surface Mount 0.25W 1% 2K2 |
| R192 | 1C047 | Resistor Carbon Film 2W 5% 47R |
| REF100 | 5D431SM | Voltage Reference Adjustable Zener Shunt LM431AIM3 SOT-23 Package |
| REF101 | 5D431SM | Voltage Reference Adjustable Zener Shunt LM431AIM3 SOT-23 Package |
| REG1 | 5D7812 | IC Voltage Regulator +12V L7812CV TO-220 Package |
| REG2 | 5D4940V5 | IC Voltage Regulator +5V L4940V5 TO-220 Package LDO |
| RLY1 | A219 | Relay 2P2T 5V |
| RLY2 | A222 | Relay 1P2T 12V |
| RTH100 | 1T007 | Thermistor Ptc SM 110 Degrees C |
| RV100 | 6F110 | Preset H Mounting 100R Lin |
| SH1 | E5402 | Shield EMC IEC Inlet Mains |
| SKT1 | 8A001 | Mains IEC Inlet 3PIN PCB Ins |
| SKT2 | 8D302 | Con Jack 3.5mm Dual Mono |
| SKT3 | 8D302 | Con Jack 3.5mm Dual Mono |
| SKT100 | 8D226 | Phono Skt 2-WAY Vert Gold |
| SW1 | A1404 | Switch Slide Volt Sel |
| SW100 | A1008 | SW Push 2PCO Alps |
| SW101 | A1008 | SW Push 2PCO Alps |
| TR1 | 4B179 | Transistor BD179 TO126 Package |
| TR2 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR3 | 4B1930 | Transistor 2SA1930 TO220 Package |
| TR4 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR5 | 4AFMMT597 | Transistor FMMT597 SOT23 Package |
| TR6 | 4B5171 | Transistor 2SC5171 TO220 Package |
| TR7 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR8 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR9 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR10 | 4A849B | Transistor BC849B SOT23 Package |

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| Designator | Part | Description |
|-------------------|-------------|--|
| TR11 | 4D10KN | Digital Transistor MMUN2211LT1 SOT23 Package |
| TR100 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR101 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR102 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR103 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR104 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR105 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR106 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR107 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR108 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR109 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR110 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR111 | 4AFMMT497 | Transistor FMMT497 SOT23 Package |
| TR112 | 4A849B | Transistor BC849B SOT23 Package |
| TR113 | 4D10KN | Digital Transistor MMUN2211LT1 SOT23 Package |
| TR114 | 4AFMMT597 | Transistor FMMT597 SOT23 Package |
| TR115 | 4AFMMT597 | Transistor FMMT597 SOT23 Package |
| TR116 | 4AFMMT597 | Transistor FMMT597 SOT23 Package |
| TR117 | 4AFMMT597 | Transistor FMMT597 SOT23 Package |
| TR118 | 4AFMMT597 | Transistor FMMT597 SOT23 Package |
| TR119 | 4AFMMT597 | Transistor FMMT597 SOT23 Package |
| TR120 | 4AFMMT597 | Transistor FMMT597 SOT23 Package |
| TR121 | 4AFMMT597 | Transistor FMMT597 SOT23 Package |
| TR122 | 4B1740 | Transistor 2SA1740 SOT-89 Package |
| TR123 | 4B1740 | Transistor 2SA1740 SOT-89 Package |
| TR124 | 4B4548 | Transistor 2SC4548 SOT-89 |
| TR125 | 4B4548 | Transistor 2SC4548 SOT-89 |
| TR126 | 4CSAP15N | Transistor SAP15NY |
| TR127 | 4CSAP15N | Transistor SAP15NY |
| TR128 | 4CSAP15P | Transistor SAP15PY |
| TR129 | 4CSAP15P | Transistor SAP15PY |
| TR130 | 4D10KP | Digital Transistor MMUN2111LT1 SOT23 Package |
| TR131 | 4D10KP | Digital Transistor MMUN2111LT1 SOT23 Package |
| TR132 | 4A859B | Transistor BC859B SOT23 Package |
| TX1 | 7A9301 | 115/230 vac only transformer 9V + 9V 3VA |
| TX1 | L907TX | 100 vac only transformer 9V + 9V 3VA |

ARCAM

All parts can be ordered via spares@arcam.co.uk

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