

ValveWizard Universal Amp PCBs

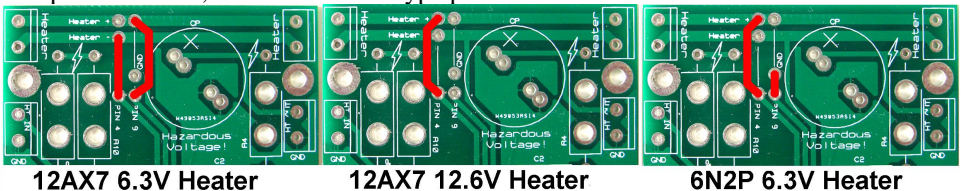
User Manual

ValveWizard, December 2017

① Triode Input PCB

General

- Connect the incoming HT/B+ and ground feeds to the pads labelled **HT IN** and **GND**. You can use 0.2"-pitch power connectors (e.g. Molex[®]) if you wish.
- Outgoing power supply feeds (RC filtered) can be taken from the pads labelled **HT OUT** and **GND**.
- Connect the incoming heater supply feeds (3 amp maximum average) to the pads labelled **Heater**.
- Outgoing heater feeds can be taken from the **Heater** pads on the opposite edge of the PCB.
- If you want to connect the PCB ground to chassis, link the two pads labelled **GND** and **CHASSIS**. This is connected to the adjacent mounting screw hole.
- Spare **GND** pads are also provided if you need them for general connections.
- Use 16mm PCB-mounted pots, or else use chassis mounted pots and free wire onto the PCB.
- Mount power resistors about 5mm up into the air to encourage air flow.
- Connect link wires as show below to configure the PCB for 12AX7/ECC83 type pin-out valves, or 6N2P/ECC88 type pin-out valves with internal screen.



Parallel Inputs

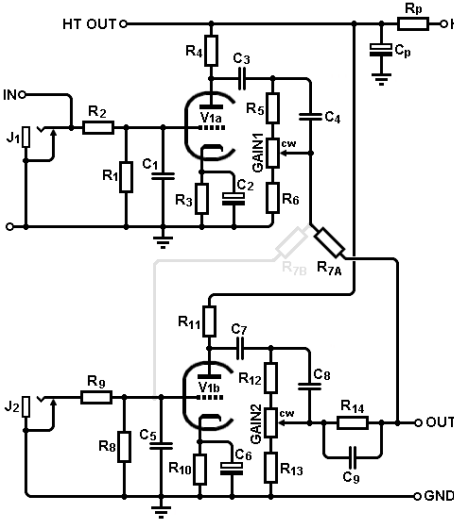
Fit R_{7A} to create two similar input stages with individual gain pots that mix together at the output, like in a 5F6 or classic Marshall amp. Two Cliff-style jack sockets can be mounted on the PCB in an over-under configuration, or you can free wire onto the PCB.

Cascaded Gain Stages

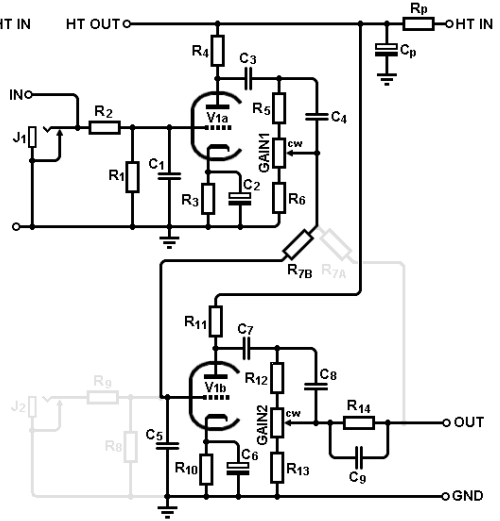
Fit R_{7B} to create one input (J_1) that cascades into another gain stage, each with its own gain pot. Of course, you don't have to use the pots if you don't want to, you can just jumper across the pads to create passive interstage-dividers, or whatever you like. If you

don't want to use a jack socket because you're using the PCB as an intermediate stage in a larger amp design you can inject the input signal to the solder pad labelled **IN**.

Parallel Inputs



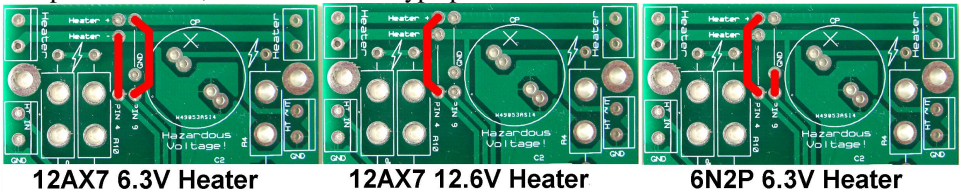
Cascaded Gain Stages



② Cathode Follower / EQ / Cathodyne PCB

General

- Connect the incoming HT/B+ and ground feeds to the pads labelled **HT IN** and **GND**. You can use 0.2"-pitch power connectors (e.g. Molex[®]) if you wish.
- Outgoing power supply feeds (RC filtered) can be taken from the pads labelled **HT OUT** and **GND**.
- Connect the incoming heater supply feeds (3 amp maximum average) to the pads labelled **Heater**.
- Outgoing heater feeds can be taken from the **Heater** pads on the opposite edge of the PCB.
- Connect the incoming audio signal to the pad labelled **IN**.
- If you want to connect the PCB ground to chassis, link the two pads labelled **GND** and **CHASSIS**. This is connected to the adjacent mounting screw hole.
- Spare **GND** pads are also provided if you need them for general connections.
- Use 16mm PCB-mounted pots, or else use chassis mounted pots and free wire onto the PCB.
- Mount power resistors about 5mm up into the air to encourage air flow.
- Connect link wires as show below to configure the PCB for 12AX7/ECC83 type pin-out valves, or 6N2P/ECC88 type pin-out valves with internal screen.

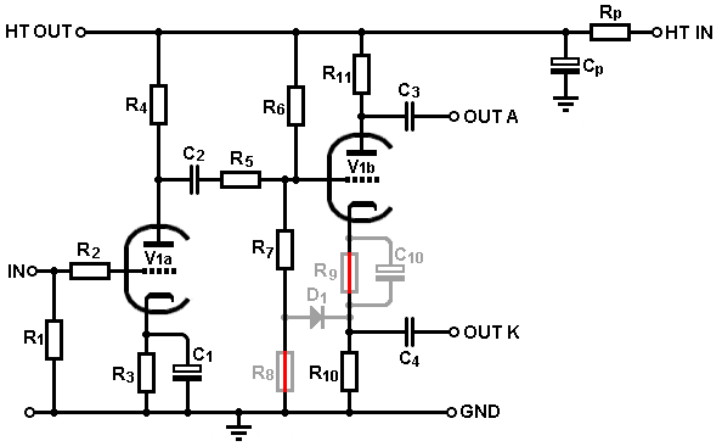


Classic Fender / Marshall Cathode Follower and FMV EQ

Configure the PCB as shown below for a classic DC-coupled cathode follower and FMV tone stack. Link wires are shown in red. If you want a James tone stack instead see the next section. The outgoing audio signal is taken from the pad labelled **EQ OUT**. If you do not want to use the tone stack then the outgoing audio signal can be taken directly from the pad labelled **OUT K**.

Cathodyne Phase Inverter

Configure the PCB as shown below to create a fixed-biased cathodyne phase inverter. Link wires are shown in red. You can alternatively implement a self-biased, DC-coupled, or level shifted circuit if you prefer. The outgoing audio signal is taken from the pads labelled **OUT A** and **OUT K**.

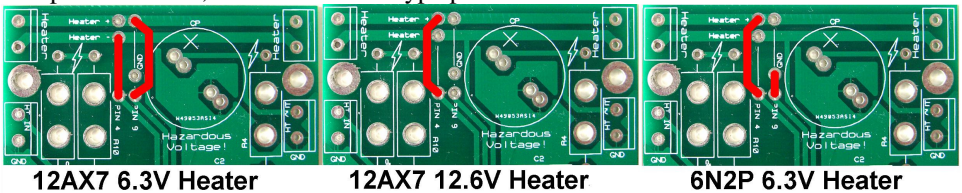


**Fixed Biased Cathodyne
Phase Inverter**

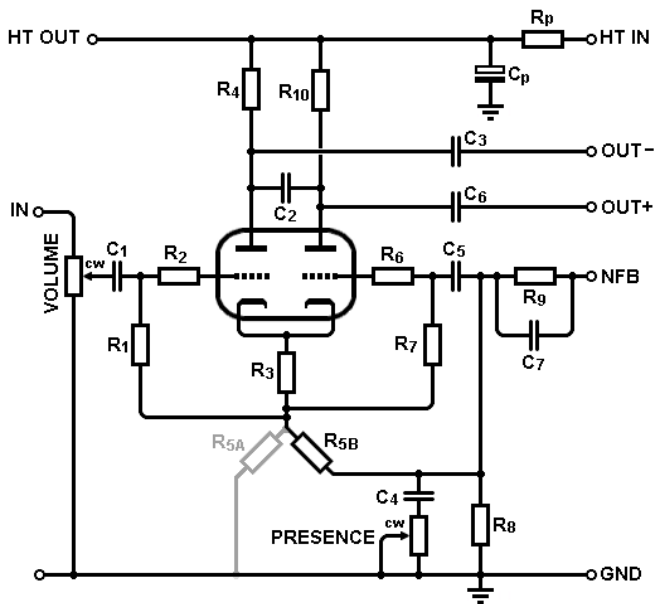
③ Long-Tailed Pair PCB

General

- Connect the incoming HT/B+ and ground feeds to the pads labelled **HT IN** and **GND**. You can use 0.2"-pitch power connectors (e.g. Molex[®]) if you wish.
- Outgoing power supply feeds (RC filtered) can be taken from the pads labelled **HT OUT** and **GND**.
- Connect the incoming heater supply feeds (3 amp maximum average) to the pads labelled **Heater**.
- Outgoing heater feeds can be taken from the **Heater** pads on the opposite edge of the PCB.
- Connect the incoming audio signal to the pad labelled **IN**.
- Outgoing audio signals are taken from the pads labelled **OUT +** and **OUT -**.
- Global negative feedback can optionally be applied to the pad labelled **NFB**.
- If you want to connect the PCB ground to chassis, link the two pads labelled **GND** and **CHASSIS**. This is connected to the adjacent mounting screw hole.
- Spare **GND** pads are also provided if you need them for general connections.
- Use 16mm PCB-mounted pots, or else use chassis mounted pots and free wire onto the PCB.
- Mount power resistors about 5mm up into the air to encourage air flow.
- Connect link wires as show below to configure the PCB for 12AX7/ECC83 type pin-out valves, or 6N2P/ECC88 type pin-out valves with internal screen.



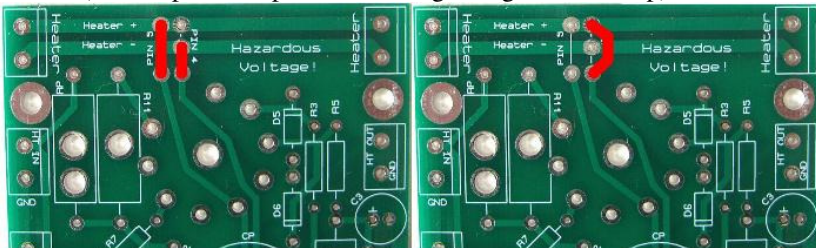
Fit R_{5A} to configure the PCB as a classic guitar-amp long-tailed pair. Global feedback and the presence control can optionally be omitted. The volume control can also be omitted by jumpering it. R_{5A} allows a more textbook/hi-fi phase inverter to be built. The 'SPARE' pot is free to use for whatever you want.



④ EL84 Output PCB

General

- Connect the incoming HT/B+ and ground feeds to the pads labelled **HT IN** and **GND**. You can use 0.2"-pitch power connectors (e.g. Molex®) if you wish.
- Outgoing power supply feeds (RC filtered) can be taken from the pads labelled **HT OUT** and **GND**.
- Connect this incoming negative bias supply (if used) to the pad labelled **BIAS**.
- For cathode bias link the pads labelled **1** and **3** together. For fixed bias link the pads labelled **1** and **2** together.
- Connect the incoming heater supply feeds (3 amp maximum average) to the pads labelled **Heater**.
- Outgoing heater feeds can be taken from the **Heater** pads on the opposite edge of the PCB.
- Cathode current can be monitored by measuring the voltage across a small (e.g. 10Ω) resistor R₅/R₈, using the pads labelled **TEST1** and **TEST2**.
- Connect the incoming audio signals to the pads labelled **IN1** and **IN2**.
- If you want to connect the PCB ground to chassis, link the two pads labelled **GND** and **CHASSIS**. This is connected to the adjacent mounting screw hole.
- Spare **GND** pads are also provided if you need them for general connections.
- Use a 16mm PCB-mounted pot, or else use a chassis mounted pot and free wire onto the PCB.
- Mount power resistors about 5mm up into the air to encourage air flow.
- Connect link wires as show below to configure the PCB for series or parallel heaters (use the parallel option if building a single-ended amp).

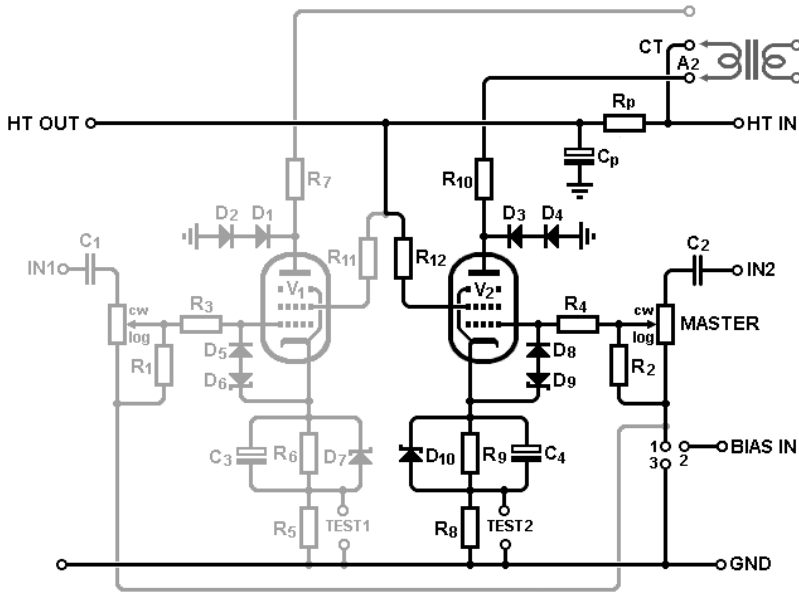


Parallel Heaters 6.3V Series Heaters 12.6V

Single Ended

Use the circuit below to build a single-ended output stage. Connections to the output transformer are made to the pads labelled **CT** (HT/B+) and **A2**. Not all the components shown are necessarily required; this is at the user's discretion.

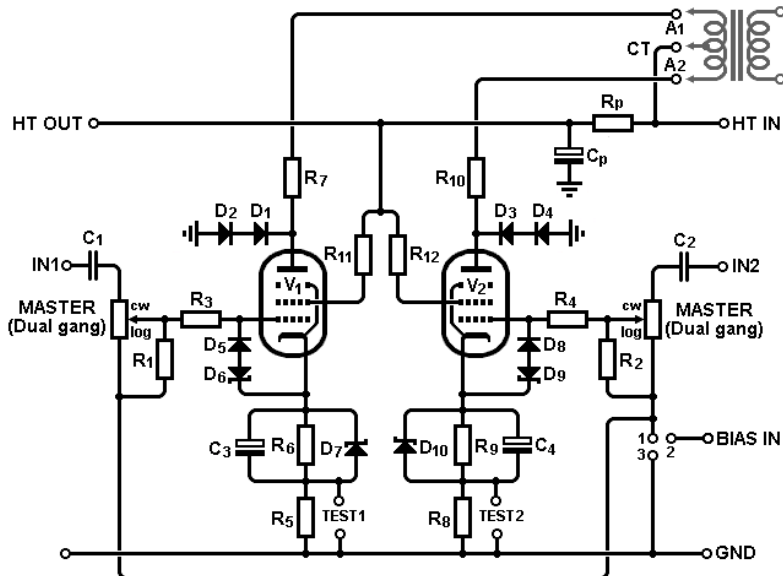
Single Ended



Push Pull

Use the circuit below to build a push-pull output stage. Connections to the output transformer are made to the pads labelled **CT** (HT/B+), **A2** and **A2**. Not all the components shown are necessarily required; this is at the user's discretion.

Push Pull



⑤ Power Supply PCB

The power supply PCB provides a host of options.

HT / B+ Supply:

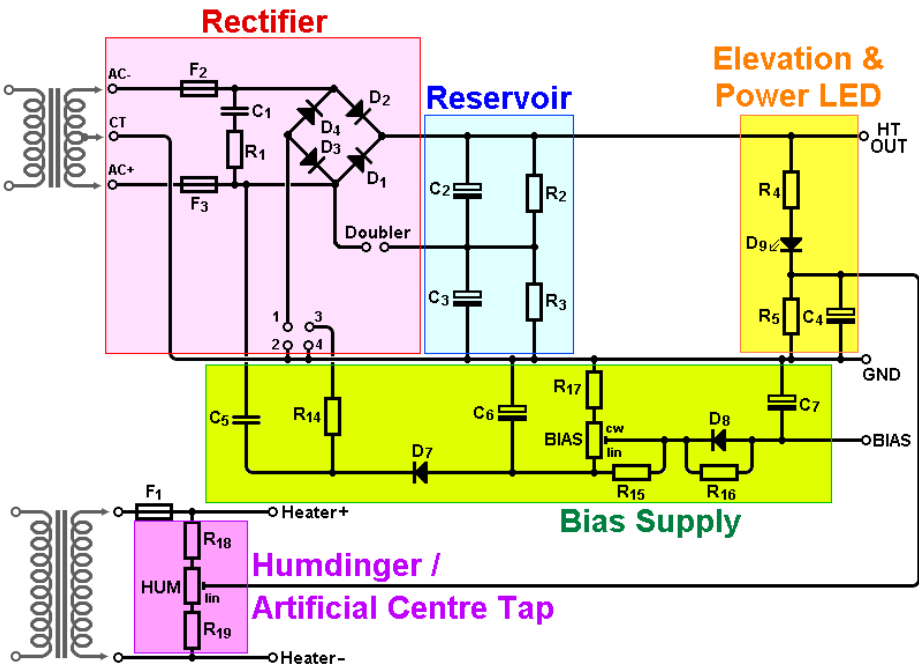
- Can use a two-phase rectifier (centre-tapped transformer);
- Bridge rectifier (single winding transformer);
- Voltage doubler;
- Fully fused (use 20mm glass time delay/slow blow fuses);
- Snubbing network;
- Single reservoir or stacked reservoir capacitors with equalising resistors;
- Power indicator LED.

Bias Supply

- Half-wave or full-wave rectifier (centre-tapped transformer);
- Capacitor-coupled (single winding transformer);
- Slow-discharge network (D₈ and R₁₆).

Heater Supply

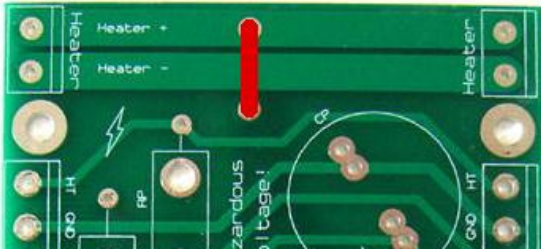
- Fuse (use 20mm glass time delay/slow blow fuse);
- Humdinger or artificial centre tap;
- Elevation.



⑥ Octal Output PCB

General

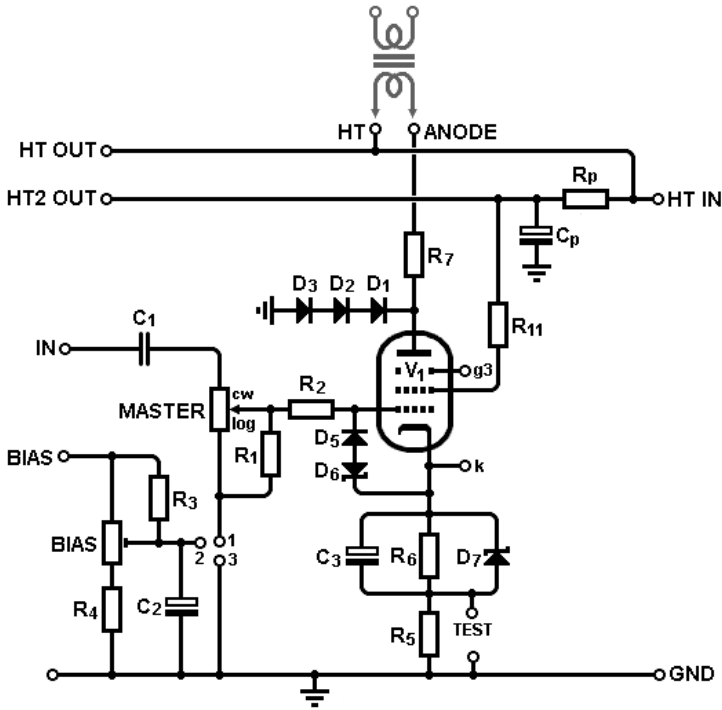
- EL34, 6L6, 5881, 6V6, KT66, KT88 and other pin-compatible valves can be used with this PCB.
- Connect the incoming HT/B+ and ground feeds to the pads labelled **HT IN** and **GND**. You can use 0.2"-pitch power connectors (e.g. Molex[®]) if you wish.
- Outgoing power supply feeds (RC filtered) can be taken from the pads labelled **HT2 OUT** and **GND**.
- Connect this incoming negative bias supply (if used) to the pad labelled **BIAS**.
- For cathode bias link the pads labelled **1** and **3** together. For fixed bias link the pads labelled **1** and **2** together.
- Connect the incoming heater supply feeds (4 amp maximum average) to the pads labelled **Heater**.
- Outgoing heater feeds can be taken from the **Heater** pads on the opposite edge of the PCB.
- Link the two pads as shown below to complete the heater circuit.



- Connect the suppressor grid to the cathode by linking the pads labelled **g3** and **k**.
- Cathode current can be monitored by measuring the voltage across a small (e.g. 10Ω) resistor R₅ using the pads labelled **TEST**.
- Connect the incoming audio signal to the pad labelled **IN**.
- If you want to connect the PCB ground to chassis, link the two pads labelled **GND** and **CHASSIS**. This is connected to the adjacent mounting screw hole.
- Spare **GND** pads are also provided if you need them for general connections.
- Use a 16mm PCB-mounted pot, or else use a chassis mounted pot and free wire onto the PCB.
- Mount power resistors about 5mm up into the air to encourage air flow.

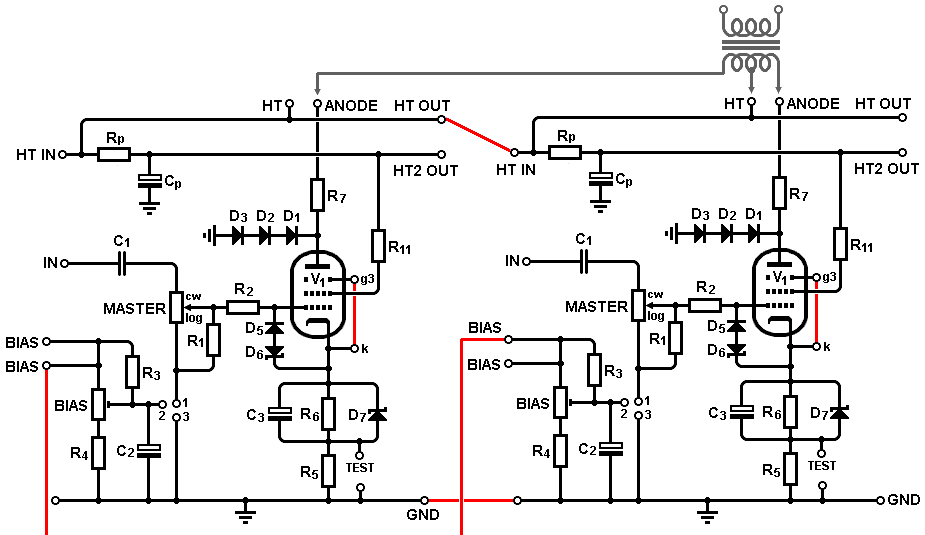
Single Ended

Use the circuit below to build a single-ended output stage. Connections to the output transformer are made to the pads labelled **CT** (HT/B+) and **ANODE**. Not all the components shown are necessarily required; this is at the user's discretion.



Push Pull

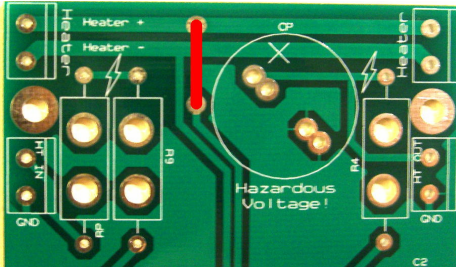
Two PCBs are needed for push-pull. HT, ground and bias feeds can be daisy-chained directly from one board to the next using the corresponding pads on the edge of the PCB, as indicated below. Not all the components shown are necessarily required; this is at the user's discretion.



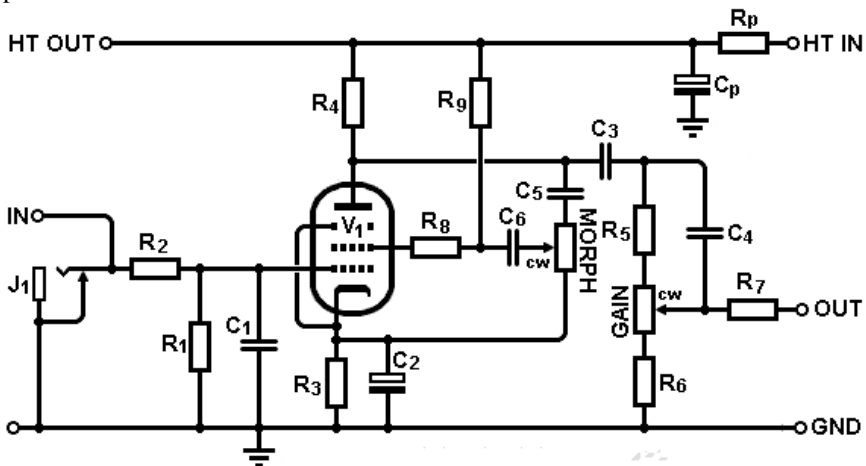
⑦EF86 Pentode Input PCB

General

- Connect the incoming HT/B+ and ground feeds to the pads labelled **HT IN** and **GND**. You can use 0.2"-pitch power connectors (e.g. Molex®) if you wish.
- Outgoing power supply feeds (RC filtered) can be taken from the pads labelled **HT OUT** and **GND**.
- Connect the incoming heater supply feeds (3 amp maximum average) to the pads labelled **Heater**.
- Outgoing heater feeds can be taken from the **Heater** pads on the opposite edge of the PCB.
- If you want to connect the PCB ground to chassis, link the two pads labelled **GND** and **CHASSIS**. This is connected to the adjacent mounting screw hole.
- Spare **GND** pads are also provided if you need them for general connections.
- Use 16mm PCB-mounted pots, or else use chassis mounted pots and free wire onto the PCB.
- Mount power resistors about 5mm up into the air to encourage air flow.
- Link the two pads as shown below to complete the heater circuit.



- If you don't want to use a jack socket because you're using the PCB as an intermediate stage in a larger amp design you can inject the input signal to the solder pad labelled **IN**.



⑧ Effects Loop PCB

General

- Connect the incoming HT/B+ and ground feeds to the pads labelled **HT IN** and **GND**. You can use 0.2"-pitch power connectors (e.g. Molex[®]) if you wish.
- Outgoing power supply feeds (RC filtered) can be taken from the pads labelled **HT OUT** and **GND**.
- Connect the incoming heater supply feeds (3 amp maximum average) to the pads labelled **Heater**.
- Outgoing heater feeds can be taken from the **Heater** pads on the opposite edge of the PCB.
- Connect the incoming audio signal to the pad labelled **IN**.
- The outgoing audio signal is taken from the pad labelled **OUT**.
- If you want to connect the PCB ground to chassis, link the two pads labelled **GND** and **CHASSIS**. This is connected to the adjacent mounting screw hole.
- Spare **GND** pads are also provided if you need them for general connections.
- Use 16mm PCB-mounted pots, or else use chassis mounted pots and free wire onto the PCB.
- Mount power resistors about 5mm up into the air to encourage air flow.
- Connect link wires as show below to configure the PCB for 12AX7/ECC83 type pin-out valves, or 6N2P/ECC88 type pin-out valves with internal screen.

