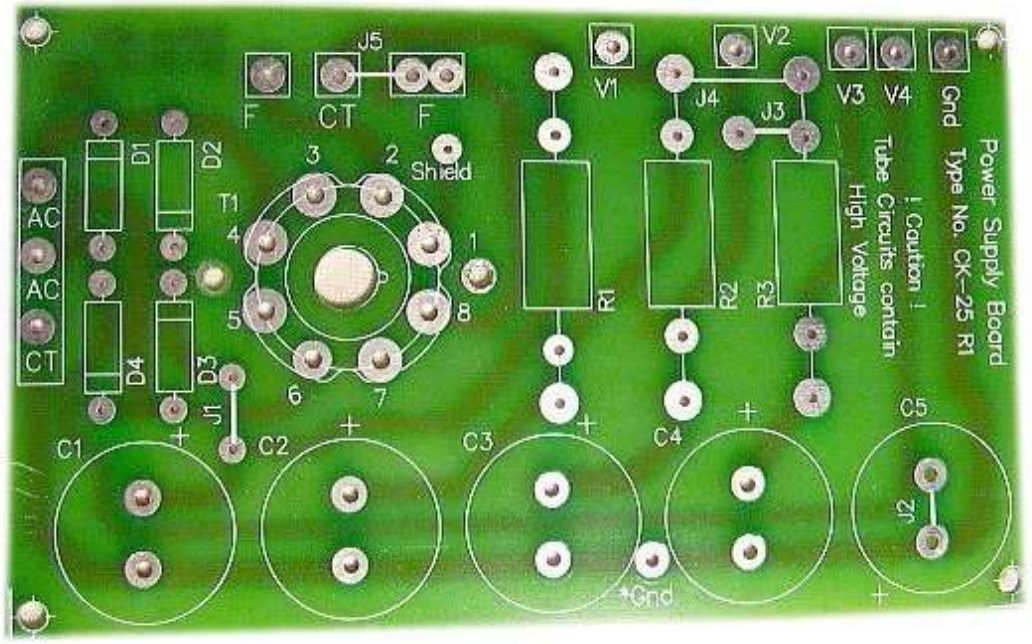
CK-25

Combination Power Supply PCB



For Revision 1 (CK-25 R1)

Documentation and images by Gregg van der Sluys

Vacuum tube projects contain potentially lethal voltages.
DO NOT attempt to use this board unless you are
familiar with safe high voltage handling techniques.

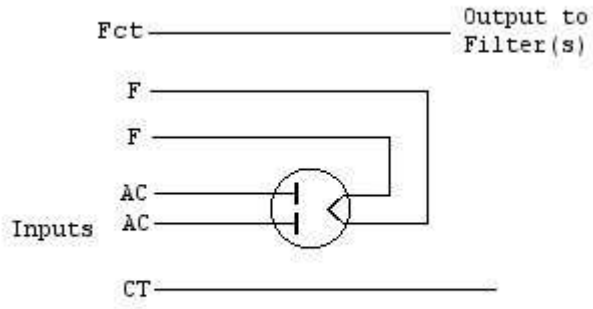
Power supplies, every electronic item has one. Yet it is often one of the most overlooked items in designs. This power supply PCB is designed to help take some of the chore out of making a simple power supply for your vacuum tube designs. Features include:

- Choice of vacuum, solid state or hybrid rectification
- Use of centre tapped or bridge transformer design
- Single or split supply
- Versatile filter combinations
- Pads for various power resistor sizes
- Pads for commonly available radial capacitors – leaded or snap-in
- Heavy duty 2mm FR4 fiberglass for long operating life
- Plated through holes

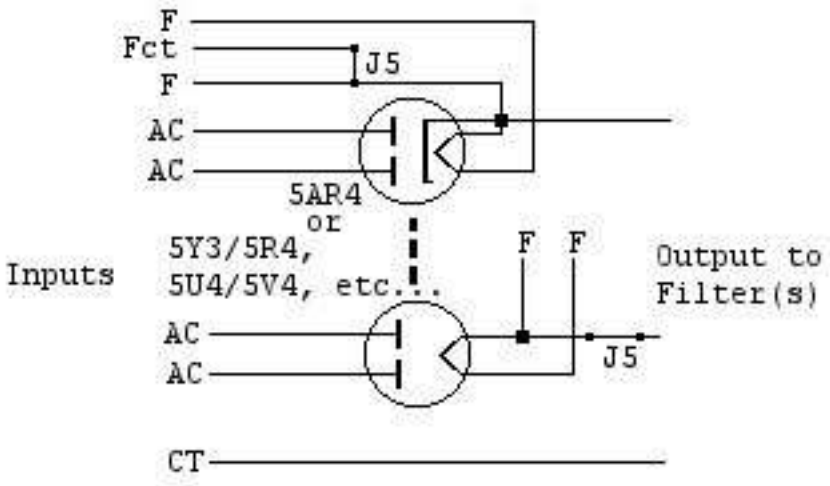
Below are examples of the various rectifier and filter configurations your CK-25 Power Supply PCB is capable of. Its flexible design should enable you to expand its usefulness even further.

Rectifier Combinations

For those with the new version of the boards, this allows for the use of a rectifier filament transformer with a centre tap. Jumper “J5” only pertains to this new board and can be configured as follows:



Fullwave Vacuum Rectifier
Using a Centre Tapped Filament

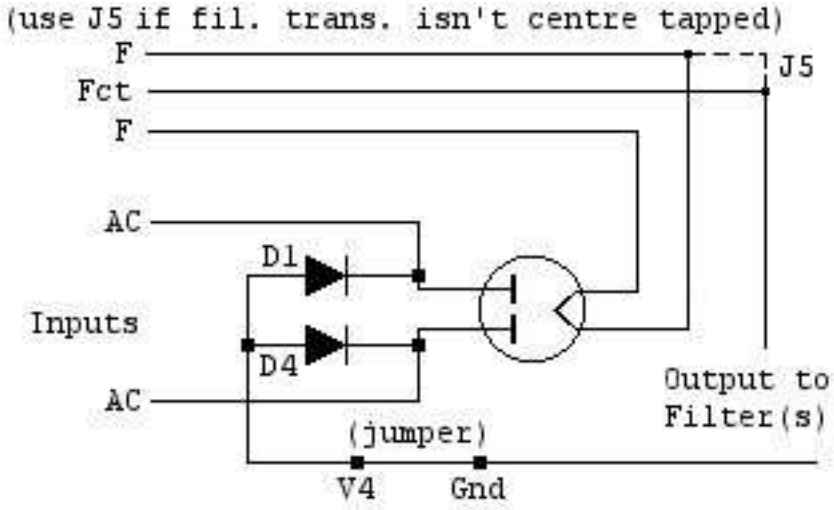


Fullwave Vacuum Rectifier
Using the Centre Tap

The layout of the vacuum rectifier allows for several types of tubes to be used, both directly and indirectly heated cathode types. Basically, any vacuum rectifier with an EIA standard basing of **5T** for directly heated types, or **5DA** for indirectly heated types can be used.

Some tube rectifiers, like the 5AR4/GZ34 have an internal shield connected to pin 1. There is a separate pad should you wish to utilize this.

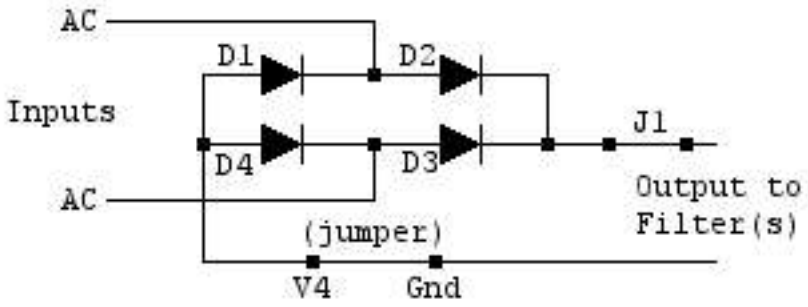
Sometimes a centre tapped transformer is not available, or not desired. A hybrid rectifier scheme is available on the PCB:



Hybrid Fullwave Bridge

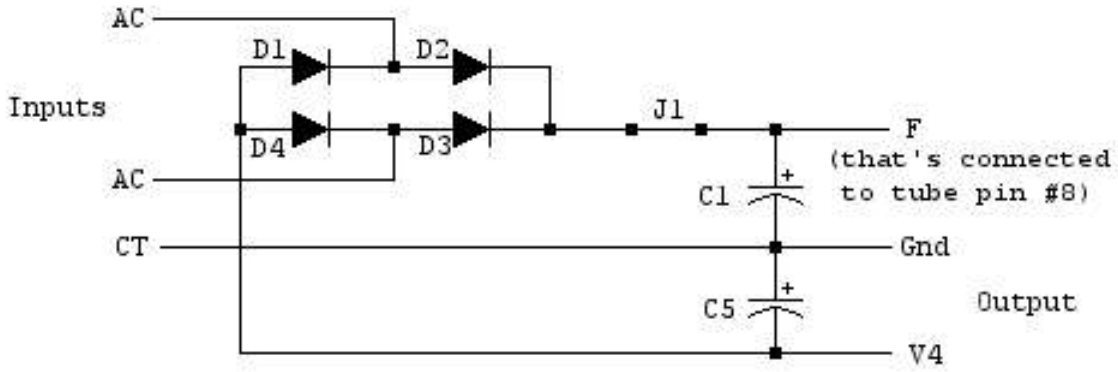
The advantage of this configuration is you can use a simpler transformer design with lower inherent internal resistance, hence larger current output for a given size. Also, it gives us a controlled warm up time, eliminating the need for a turn on delay circuit.

Of course, the option for a solid state full wave bridge is available to the designer as well, as shown below:



Solid State Fullwave Bridge

If one is in need of a split supply for a solid state amplifier design, or a balanced vacuum tube design:

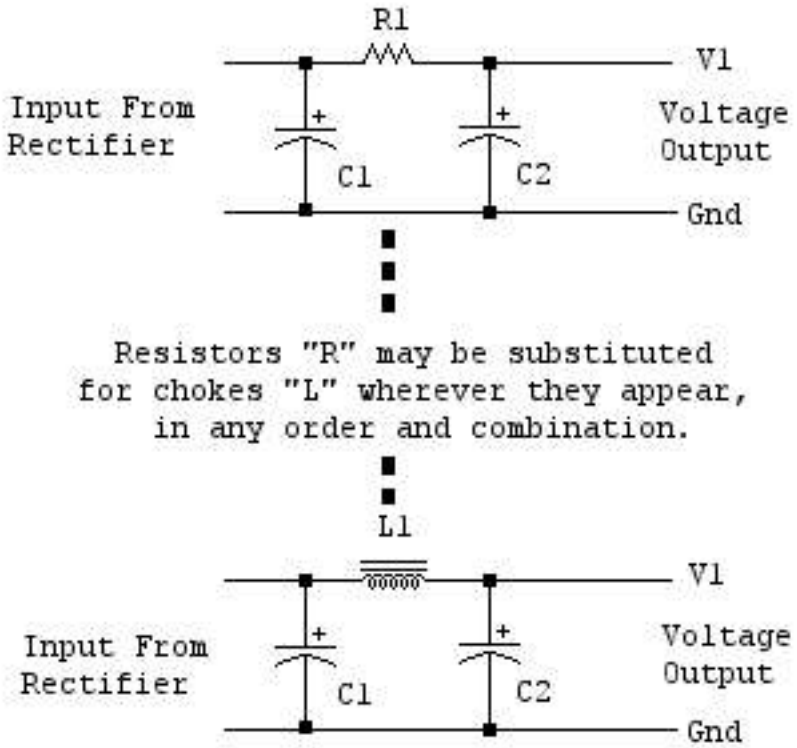


Solid State Split Supply with Filter Shown

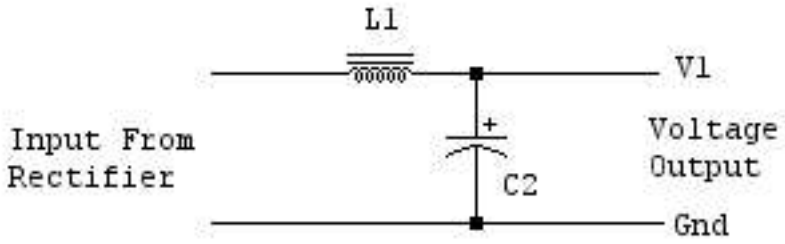
Notice we have not listed a hybrid split supply – one where a tube is used for the positive rail and solid state for the negative. The reason is unless your design calls for such a unique supply, from a safety standpoint, it's ill advised.

Filter Combinations

Input to the filters will be always from the “CT” between the filament inputs. Therefore either a centre tapped filament transformer must be used to complete the circuit OR a jumper (J5) made to the “F” terminal as indicated on the board. **NEVER USE J5 TOGETHER WITH A CENTRE TAPPED TRANSFORMER** – you will short out your filament transformer, possibly ruining it and cause a fire.

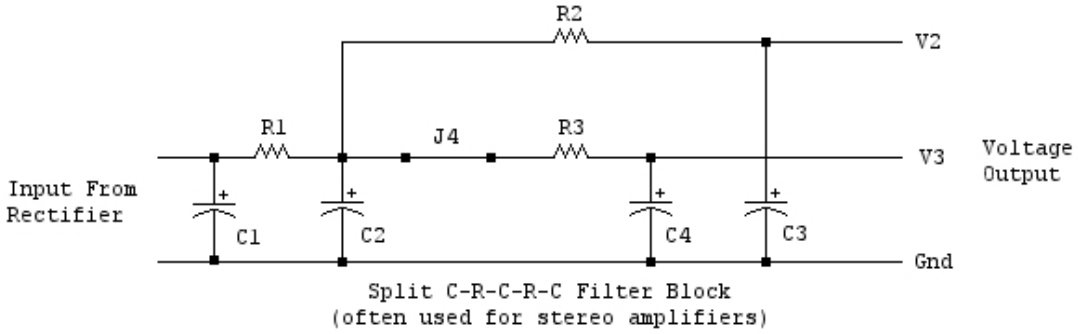


Basic C-R-C or C-L-C Filter Block

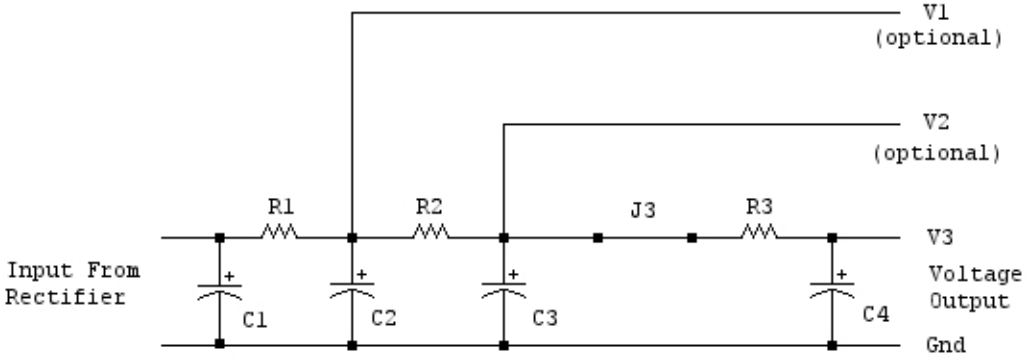


Choke Input Filter

More complex filter blocks can of course be created:



Split C-R-C-R-C Filter Block
(often used for stereo amplifiers)



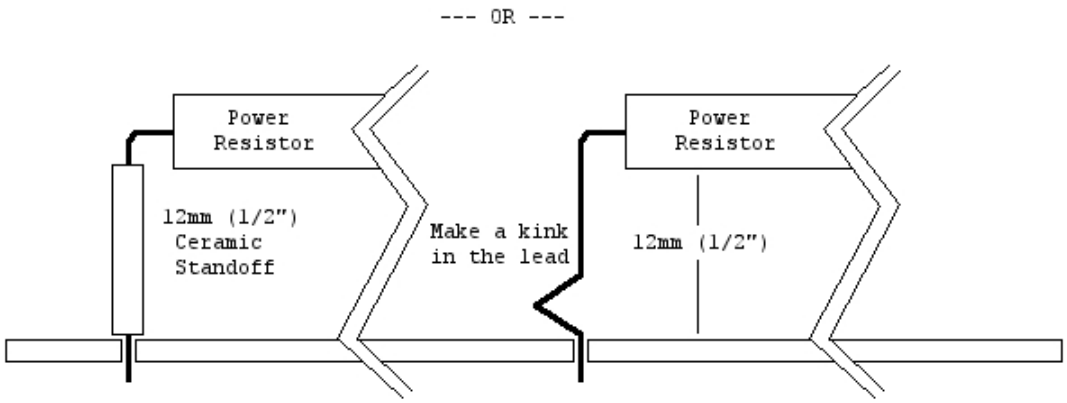
C-R-C-R-C-R-C Filter Block
(optional taps as shown)

Power Resistor Consideration

There is space on the boards for three power resistors. If you chose to use chokes instead of resistors, this section does not apply.

Power resistors used in supplies can dissipate a lot of heat. Not only must the power resistor have adequate ventilation all around it to make use of its entire wattage rating, the heat can damage the fiberglass PCB.

The graphics below are the suggested mounting method for 2, 5 and 10 watt power resistors:



Method of mounting power resistors to the PCB for maximum life and minimum damage from resistor heating.

Please keep in mind also a respectable clearance between the PCB and chassis when mounting to avoid arcing from the pads or component leads to ground. Trimming the leads so there are no sharp points will also reduce the possibility of high voltage arcs and increase safety.

Enjoy your power supply circuit board and always keep an open mind to safe experimentation beyond these guidelines!