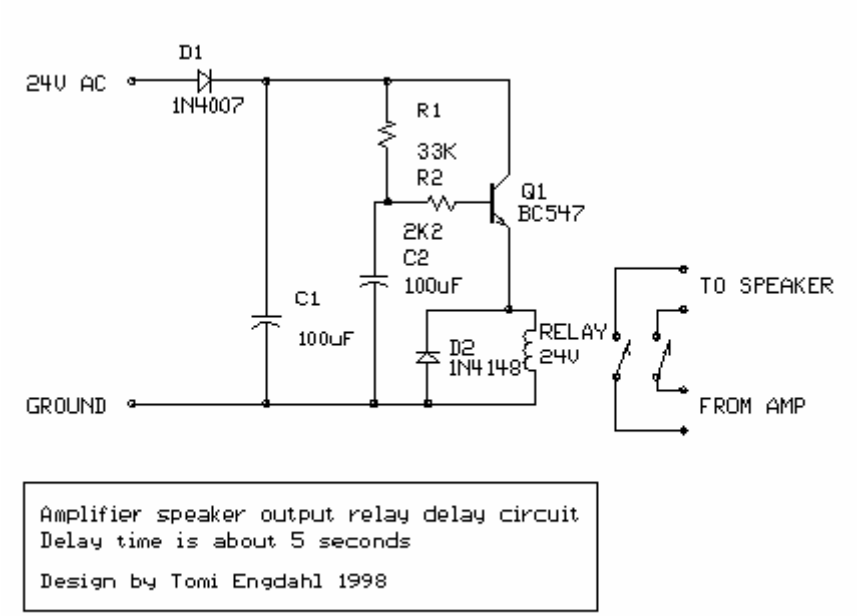
Audio amplifier output relay delay

This is a simple circuit which I built to one of my audio amplifier projects to control the speaker output relay. The purpose of this circuit is to control the relay which turns on the speaker output relay in the audio amplifier. The idea of the circuit is wait around 5 seconds ofter the power up until the spakers are switched to the amplfier output to avoid annoying "thump" sound from the speakers. Another feeature of this circuit is that is disconnects the speaker immdiatly when the power in the amplifier is cut off, so avoinding sometimes nasty sounds when you turn the equipments off.

Circuit diagram



Component list

C1 100 uF 40V electrolytic
C2 100 uF 40V electrolytic
D1 1N4007
D2 1N4148
Q1 BC547
R1 33 kohm 0.25W
R2 2.2 kohm 0.25W
RELAY 24V DC relay, coil resistance >300 ohm

Circuit operation

Then power is applied to the power input of the circuit, the positive phase of AC voltage charges C1. Then C2 starts to charge slowly through R1. When the voltage in C2 rises, the emitter output voltage of Q1 rises tigether with voltage on C2. When the output voltage of Q2 is high enough (typically around 16..20V) the relay goes to on state and the relay witches connect the speakers to the amplifier output. It takes typically around 5 seconds after power up until the relay starts to condict (at absolute time depends on the size of C2, relay voltage and circuit input voltage).

When the power is switched off, C1 will loose it's energu quite quicly. Also C2 will be charged quite quicly through R2. In less than 0.5 seconds the speakers are disconnected from the amplifier output.

Notes on the circuit

This circuit is not the most accurate and elegant design, but it has worked nicely in my small homebuilt PA amplifier. This circuit can be also used in many other applications where a turn on delay of few seconds is needed. The delay time can be increased by using bigger C2 and decreased by using a smaller C2 value. Note that the delay is not very accurate because of simplicity of this circuit and large tolerance of typical electrolytic capacitors (can be -20%..+50% in some capcitors).