The fan runs constantly in many PCs, which may not even be necessary. A simple controller circuit can regulate the fan speed according to demand. This not only saves energy, it also reduces irritation from the fan noise.

Design by Joachim Holzhauer

PC fan speed controller

for a low-noise PC

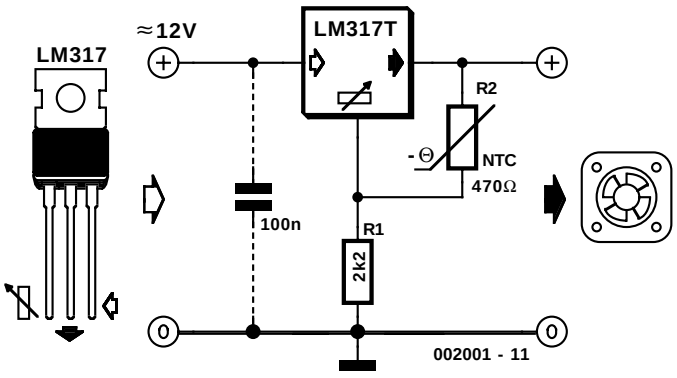
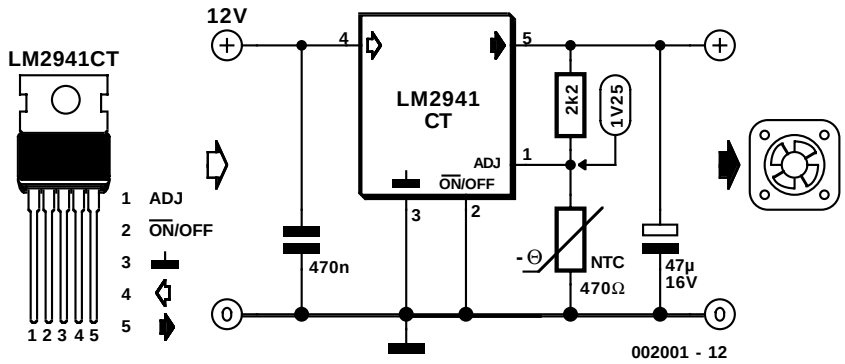


Figure 1. The fan speed controller can be built using a standard voltage regulator ...

Figure 2. ... or a low-drop voltage regulator.



Only three components are needed to allow the fan speed to be controlled according to the actual demand: one adjustable voltage regulator and two resistors that form a voltage divider. One of the resistors is a NTC thermistor (temperature-sensitive resistor), while the other is a normal resistor. If the 12-V power supply is not located close to the regulator, a decoupling capacitor is also required (see **Figure 1**).

The thermistor has a rated value of 470 Ω. It sets the output voltage of the LM317T to approximately 7 V at 25 °C. This should ensure reliable starting of the fan. If the temperature rises to roughly 40°C, the output voltage of the regulator reaches its maximum value and the fan runs at its maximum speed. The voltage drop across the regulator is at least 1.75 V for a motor current of (for example) 300 mA, and in any case 2 V at the maximum current level of 1 A. You thus might want to consider using a low-drop regulator, such as the National Semiconductor LM2941CT. To be sure, this increases the size of the circuit to a full five components, which are arranged as shown in **Figure 2**. However, this approach reduces the voltage drop to 0.2 V at 300 mA or 0.5 V at 1 A. By the way, low-drop voltage regulators are not available in a three-lead package.

The circuit can be constructed as a well-insulated 'free-standing' assembly, or it can be built on a small piece of prototyping board. In either case, it should be fixed to one of the mounting holes of the fan body (via the cooling tab of the TO-220 regulator package for the free-standing construction). The circuit board should be mounted out of the air stream, but the NTC thermistor must extend into the air stream.

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