Info on 250VAC capacitors

I refer to your answer to J. K on page 92 of the August 1995 issue in which you state, "provided these capacitors do have the correct 250VAC rating and also a suitably rated limiting resistor is placed in the circuit, such circuits should be safe".

I would like to hear further comment on this practice as it applies to the making and use of mains filters used in the supply leads to computers and hifi sets. The use of a sacrificial resistor in series with the capacitors would appear to reduce their effectiveness as a filter, so should we use, in this case, a series fuse rated just above the load current of the appliance? (B. P., Port Macquarie, NSW).

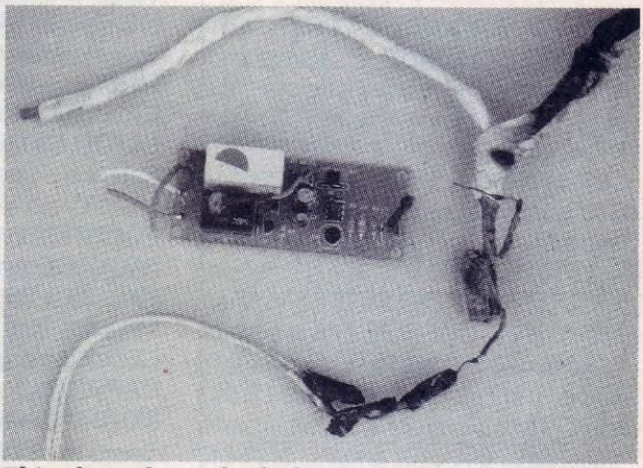
• Generally, the capacitors used in filters are much smaller than in circuits used to derive low voltage rails from the mains. We agree that series resistors would prejudice their operation but fuses would be a problem too since they may be subject to nuisance tripping. In any case, such mains rated capacitors are now very widely used in switchmode power supplies in computers, TV sets and other equipment and they appear to be quite reliable.

More info on 250VAC capacitors

I wrote to "Ask SILICON CHIP" in April 1994 and I told of my bad experience using capacitors to reduce mains voltage to electronic circuits. I am enclosing the original componentry which caught fire. Note that the tape is fibreglass made by 3M as high temperature insulating tape from the USA.

This brings me to the second item enclosed which is a circuit card from a range hood sold on the Australian market – see photo. You will note the resistor (lead broken in handling) and the capacitor used to drop the voltage. In this case the capacitor is rated at 250VAC. The burn marks appear to have been sufficient to start a fire had there been combustible material around. Fortunately, this was enclosed entirely in metal and the range hood was only about 1 year old and had no grease as would typically accumulate with use.

I am not sure of the exact function of the PC board. Resistors R7 & R8 (thermistors?) stick out on opposite sides of the grease filter and I presume it shuts off the fan if insufficient air flow exists or perhaps shuts off the fan on temperature. The active lead is red, neutral blue, and the white lead feeds the switch to the fan motor.



This photo shows the faulty 260VAC circuits. The PC board controls the fan in a range hood.

This was removed from a new apartment in a complex of approximately 100 units. The tenant advised that several of their neighbours had said their range hoods didn't work as well. I would be very interested in your ideas on what the sequence of failure was on both items. (D. H., Annandale, NSW).

• In the circuit with insulation tape around it, it is clear that the capacitor has had a catastrophic short circuit which led to the fire. As far as we can tell, the capacitor in the fan control is intact. Without being able to refer to the circuit, it is difficult to know just what has failed in the unit.

We should point out that today's 250VAC capacitors are supposed to be self-quenching in the event of a short and therefore should not give rise to flames and smoke. **SC**