

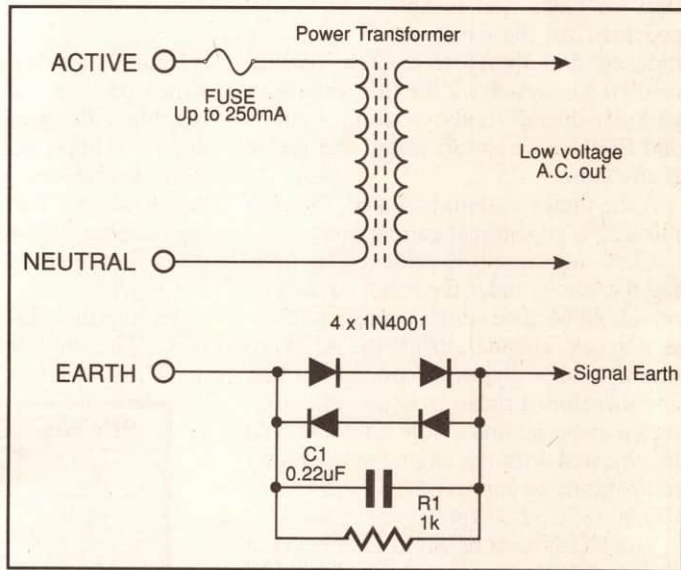
## Earth loop eliminator

A tricky design problem arises when mains powered audio equipment needs to be connected to other mains powered equipment. For safety, all external metalwork should be earthed, but quite often this needs to be connected also to the 'signal' earth return. This can cause mains hum, from currents circulating in the wiring shields via the mains earth wires. These currents are added to the desired signal.

This circuit allows hum free operation, but will not allow a voltage greater than 1V RMS to develop between the mains earth and signal earth. Thus, in the event of a transformer primary winding short, the fuse will blow even if the short is to the secondary winding, rather than the transformer core or metalwork.

The two pairs of back-to-back 1A diodes, D1-D4, allow the signal earth to swing within their 2.8V p-p range when so driven by an external signal earth, and R1 will float it to 0V when the equipment is operated stand-alone. While C1 maintains RF shielding, a smaller capacitor, say 1nF, may be added in VHF applications.

The resistor value should not be reduced, nor the capacitor value increased, as either change can allow the earth loop current to rise to produce a noticeable hum level. If the fuse needs to be heavier than about 250mA, say for a high power amplifier, then this circuit should NOT be used. Use it for the lowest



power equipment in a connected group, but retain the proper, solid ground for anything that has a heatsink or fan.

Jim Sosnin,  
Montmorency, Vic.

**\$30**