POWER SUPPLY TESTER

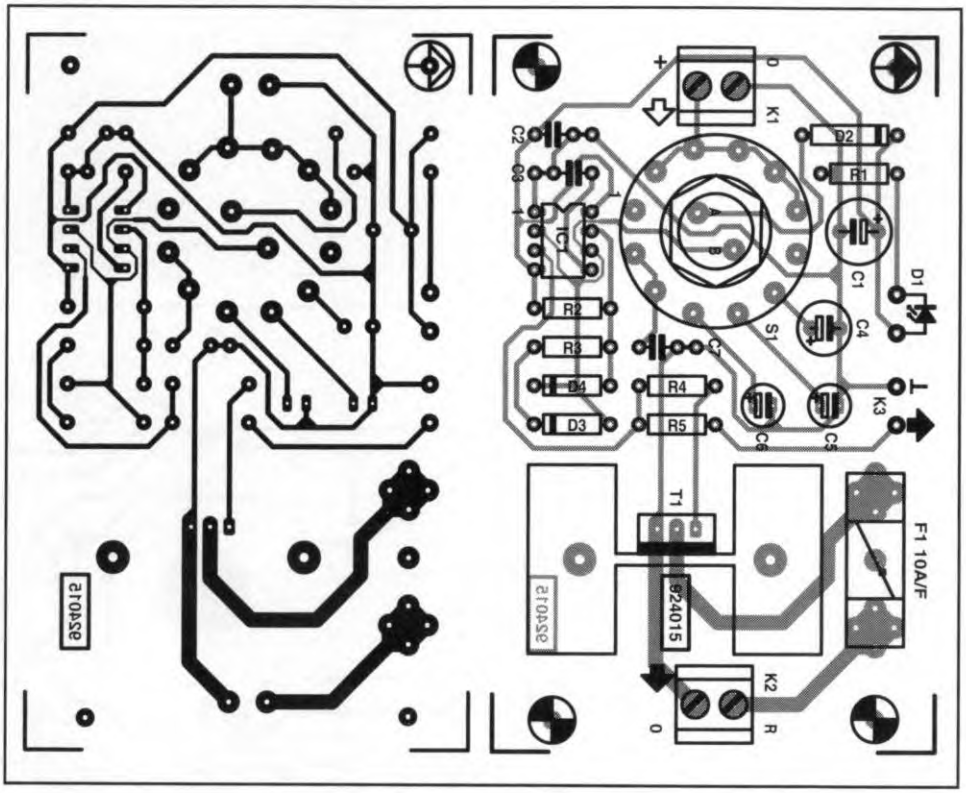
THIS little circuit enables you to measure the so-called dynamic response of a d.c. power supply. A power MOSFET, T_1, is used to switch the supply load on and off at a user selectable rate. The response of the supply to these fast load variations is displayed on an oscilloscope.

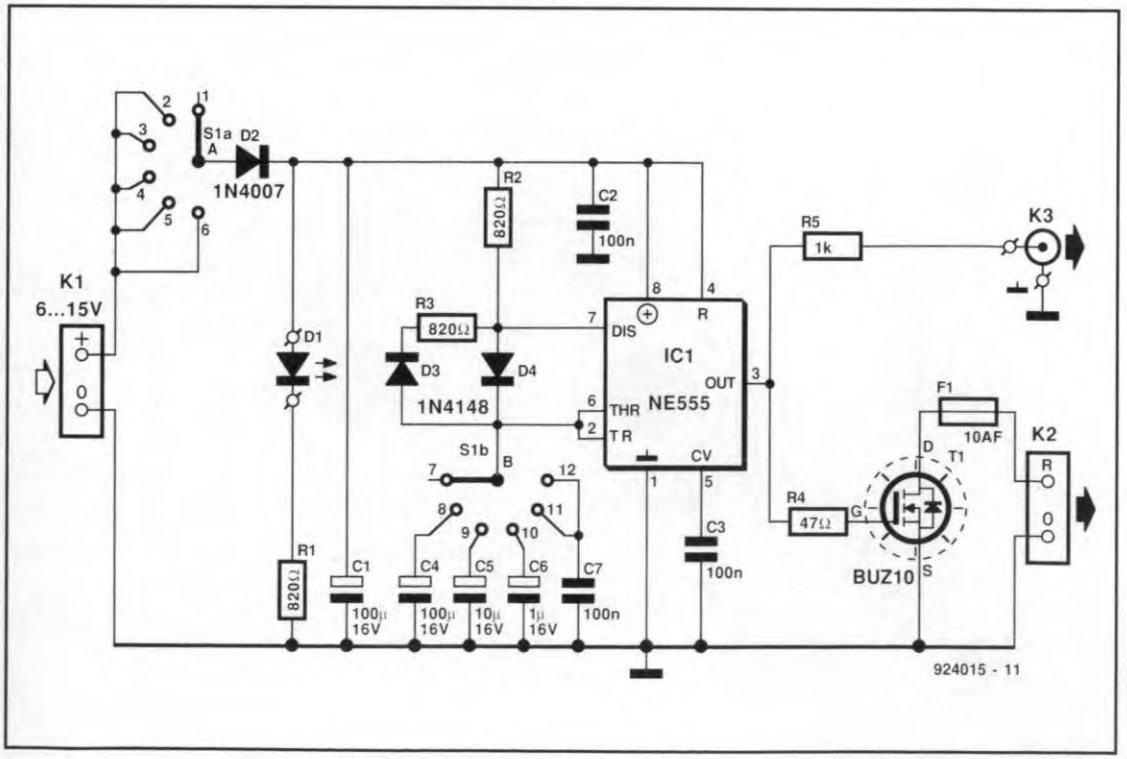
The switching rate is selected with the aid of a rotary switch, S_1, which also serves as the on/off switch. The available switching frequencies are: 10 Hz, 100 Hz, 1 kHz and 10 kHz. The well-known 555 timer IC is used to supply the switching signal. Diodes D_3 and D_4 cause the astable multivibrator to supply an output signal with a duty factor of about 0.5. The switching transistor, T_1, is protected against too high currents by a fast 10-A fuse inserted in the drain line. The tester may be powered by any regulated d.c. supply with an output voltage between 6 V and 15 V. However, this must not be the supply under test! Given the low current consumption of the tester (40 mA max.), a 9-V battery is an excellent power source.

The tester is extremely simple to use. First, select the load resistance of the supply you wish to test; say, 12 Ω/15 W for a 12-V, 1-A PSU. This resistor is connected between output 'R' of the tester, and the '+' output of the PSU. The '0' output of the tester goes to the '-' (or '0') terminal of the PSU. Next, connect the scope input to the PSU outputs, and the trigger input to K_3 of the tester. Switch on the scope, the PSU and the tester. The scope will now display the dynamic regulation characteristic of the PSU at the given output current (1 A) and the selected switching rate (initially, 10 Hz).

Construction of the tester is straightforward on the small printed circuit board shown here. The power MOSFET is bolted on to a small PCB-mount heat sink, and will not run very hot even when the maximum permissible drain current (about 10 A) is approached.

(J. Ruiters – 924015)





PARTS LIST

Resistors:
R1;R2;R3 = 820Ω
R4 = 47Ω
R5 = 1kΩ

Capacitors:
C1 = 100µF 16V radial
C2;C3;C7 = 100nF
C4 = 100µF 16V radial
C5 = 10µF 16V radial
C6 = 1µF 16V radial

Semiconductors:
D1 = LED, red, 5mm
D2 = 1N4007
D3;D4 = 1N4148
T1 = BUZ10
IC1= NE555

Miscellaneous:
K1;K2 = 2-way PCB terminal block; pitch 5mm.
K3 = panel mount BNC socket.
S1 = 2-pole 6-way PCB mount rotary switch.
F1 = 10A fast fuse plus PCB mount holder and cap.
Heat sink 5K/W, e.g. SK129/38.1mm.

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