

770 – 30 V regulated supply

This laboratory power supply offers excellent line and load regulation and an output voltage continuously variable from 0 to 30 V at output currents up to one amp. The output is current limited and protected against output fault conditions such

as reverse voltage or overvoltage applied to the output terminals. The circuit is based on the well-known 723 IC regulator. As readers who have used this IC will know, the minimum output voltage normally obtainable from this IC

is +2 V relative to the V– terminal of the device (which is normally connected to 0 V). The problem can be overcome by connecting the V– pin to a negative potential of at least –2 V, so that the output voltage can swing down to +2 V

7-72 – elektor july/august 1978

relative to this, i.e. to zero volts. To avoid the necessity for a transformer with multiple secondary windings the auxiliary negative supply is obtained using a voltage doubler arrangement comprising C1, C2, D1 and D2 and is stabilised at –4.7 V by R1 and D4. The use of –4.7 V rather than –2 V means that the differential amplifier in the 723 is still operating well within its common-mode range even when the output voltage is zero.

The main positive supply voltage is obtained from the transformer via bridge rectifier B1 and reservoir capacitor C3. The supply to the 723 is stabilised at 33 V by D3 to prevent its maximum supply rating being exceeded and a Darlington pair T2/T3 boosts the output current capability to 1 A. The current limit

is continuously variable by means of P3.

The output voltage may be adjusted using P2, while preset P1 is used to set zero output voltage.

The supply is protected against reverse polarity being applied to the output terminals by D7, and against overvoltages up to 63 V by D6.

To set the output voltage to zero P2 is first turned anticlockwise (wiper towards R8) and P1 is then adjusted until the output voltage is zero.

With P2 turned fully clockwise the

output voltage should then be approximately 30 V. If, due to component tolerance, the maximum output is less than 30 V the value of R6 may require slight reduction. When constructing the circuit particular care should be taken to ensure that the 0 V rail is of low resistance (heavy gauge wire or wide p.c.b. track) as voltage drops along this line can cause poor regulation and ripple at the output.

