mode is employed and a relatively high current is drawn from this rail, it is recommended that the simple discrete component series transistor regulator used with the standard display module be replaced with a conventional 5V integrated circuit regulator.

Where the flashing circuit is to be fitted to an existing circuit board it is recommended that the extra components are assembled using a small piece of stripboard. The regulator should be fitted with a suitable heatsink (19°C/W should be adequate) and capacitors C2 and C3 should be fitted as close as possible to the pins of the regulator. The existing transistor series regulator arrangement should be disabled by removing the transistor and associated components from the board. It will also be necessary to modify the board wiring around pins 6 and 7 of the LM3914. R1 and R4 can conveniently be incorporated on the existing board and five connecting wires will be necessary.

DISPLAY RESOLUTION ENHANCEMENT

The basic display module described in this series makes use of a display consisting of 10 l.e.d.s. It is often desirable, however, to know the value of the measured parameter to finer limits than can be read from the basic display module. This means that a greater number of l.e.d.s must be used, for example, to display 0-6000 r.p.m. in steps of 200 r.p.m. requires 30 l.e.d.s.

The design of the LM3914 integrated circuit means that the display is conveniently increased in multiples of 10

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**Fig. 1. Circuit to provide Dot-to-Bar mode changeover triggered by l.e.d. B**

**Fig. 2. Circuit to provide flashing bar display triggered by l.e.d. B**

**Fig. 3. Extended Dot mode display**