Current limiting for the VK Powermate

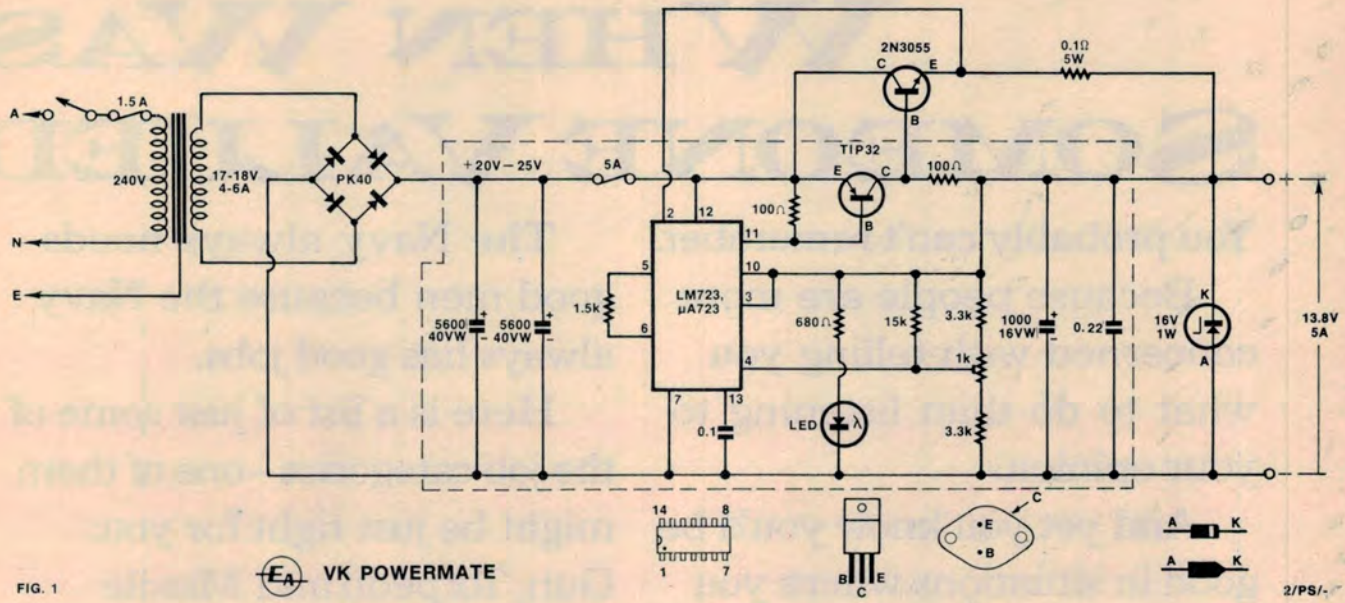

FIG. 1

This simple modification to the "VK Powermate" (EA May 1978) provides a protective current limiting function. The modification involves the addition of a resistor, a link on the printed board, and an extra wire.

The additional circuitry uses the current sense/limit transistor inside the 723 regulator, and a current sensing resistor. The value of this resistor is chosen to suit the current limit required, eg, 0.1Ω for 6A or 0.12Ω for 5A. Thus modified, the power supply will withstand a brief short-circuit on the output, but not a sustained one. This is because the dissipation of the output transistors increases substantially.

In detail, the additions should be made as follows: (1) Mount the 0.1Ω resistor close to the output transistor. (2) Remove the wire from the emitter of the output transistor and connect the 0.1Ω resistor in series with this lead and the emitter. (3) Fit a wire link, under the printed board, between pin 10 and pin 3 of the 723 regulator. (4) Connect a wire from pin 2 of the 723 regulator to the output transistor emitter connection.

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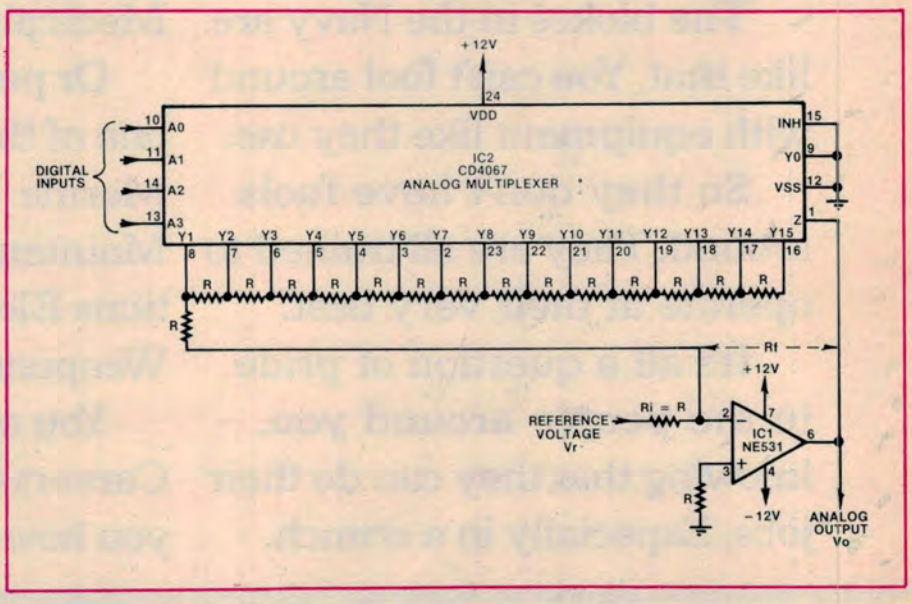
Analog multiplexer and op amp D-A converter

This simple low-cost digital-to-analog converter uses just one operational amplifier and an analog multiplexer to convert a four-bit digital input into an analog output. Cascading an additional 16-channel analog multiplexer will extend the input digital word length of the D-A converter to eight-bits. The accuracy and the stability of the converter depend mainly on the accuracy of the resistors and stability of the reference voltage.

Op amp IC1 operates as an inverting amplifier with a weighted resistor switching network connected in its feedback path. The 16-channel analog multiplexer (made by RCA) switches the resistor network in response to the four-bit digital input on pins 10 to 13. A four-bit input with decimal equivalent N causes IC2 to provide a feedback resistance of NR.

As an example, consider a four-bit input 0101, whose decimal equivalent is N = 5. Using, for simplicity, a reference voltage of $V_R = -1$ volt, the circuit produces an analog output of $V_o = -5(-1)V = +5V$.



Op amp NE531 (made by Signetics) offers a high slew rate for high-speed operation. The circuit may be used as a programmable-gain-control amplifier whose desired gain can be set by thumbwheel switches. In addition, by interchanging input resistor R and multiplexer IC2, the circuit can serve as a programmable attenuator.

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