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3³/₄-DIGIT DPM

Described is a digital panel meter—DPM—which is built around a special meter-IC, Type ADD3701, and may be used for the accurate measuring of voltage from a variety of sources.

A highly stable reference voltage is provided by an LM336. A ULN2003, IC₂ is used to buffer the outputs of the ADD3701, so that the common-cathode displays can be driven direct. The ADD3701 multiplexes the displays so that the number of control lines is kept down. The current through the display segments is limited by resistors R₅ to R₁₅ incl.

The oscillator that determines the conversion rate of the analogue-to-digital converter in IC₁ requires an external RC network (R₇-C₆). Because of the need of adequate suppression of the mains frequency, the oscillator frequency must be exactly 400 Hz (it is very nearly equal

to 0.6R₇C₆). A preset potentiometer may be connected in series with R₇ to adjust the frequency accurately. At this oscillator frequency, there are about 3 conversions per second.

Another possibility of avoiding interference from the mains frequency is to use the DPM for measuring positive voltages only: LD₅ is then not required. The input voltage is applied to V_{IN} (pin 11) via a 100 kΩ resistor. Input terminals V(+) and V(-) are not used in this case. Also, the oscillator frequency need not be exactly 400 Hz.

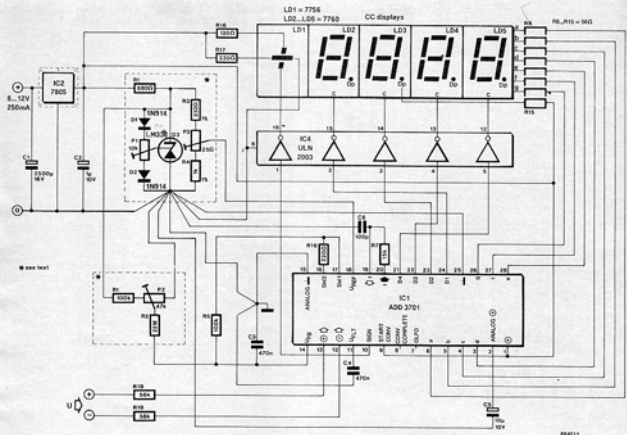
The DPM is calibrated by short-circuiting the input and setting P₂ to a position where the display reads 0.000. Then apply a voltage of 1.900 V to the input and adjust P₂ till the display reads 3.800. An input voltage of 1.999 V will then result in a display reading of 3.999. Take this into account if an input at-

tenuator is contemplated.

The load presented by the input stage to a potential divider at the input is very small: typically, the input current is 1 nA (maximum 5 nA).

The (unregulated) supply should be able to provide 8 to 12 V at a current of 250 mA. The circuit, including the displays, draws about 150 mA.

(National Semiconductor Application)



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