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ALL PURPOSE METERING CIRCUIT

The builder of more complex equipment is often faced with a choice of three evils, whether to meter all circuits which should be metered with individual meters, with a single switched meter or forget the whole thing and trust the equipment to perform in a satisfactory manner after initial adjustment. Individual metering is rather expensive and space-consuming and must in most instances be confined to "price is no object" projects. Obviously, lack of metering is an invitation to trouble, expense, and work, repairing and replacing ruined components. Switched metering too has its shortcomings, but when used in conjunction with full-time metering of the most important circuits it serves well.

As a typical example, a linear amplifier might well have a plate current meter plus a second switchable meter which could be used to monitor filament, screen, plate, and bias voltage, screen current, relative power or any desired combination. It will be noted that these voltages and currents are of various polarities and magnitudes and may (as in tetrode screen current) be both positive and negative depending upon operating conditions. It would not be easy to design a conventional switching circuit capable of measuring all these parameters.

The easiest method of attacking this problem is to install the meter in a diode bridge in such a way as to cause an upscale deflection no matter which polarity is applied. By proper selection of component values it is possible to use the basic meter scale times a factor for each function. By this I mean the meter/bridge assembly is made to read a set value (one volt is handy) and all inputs to the switch are arranged to produce this voltage under full scale conditions of the range desired. In the example, this system is used in conjunction with a 0–1 mA meter movement to read ± 50 mA screen current, + 500V screen voltage, + 2500 high voltage, and –100V bias, not to mention relative power. The switch is a simple single pole, five-position type. In your design let Ohms Law be your guide and be sure to use a voltage divider where required to keep surges out of the meter. Remember too to use a non-shorting switch to prevent connecting adjacent circuitry together while switching.

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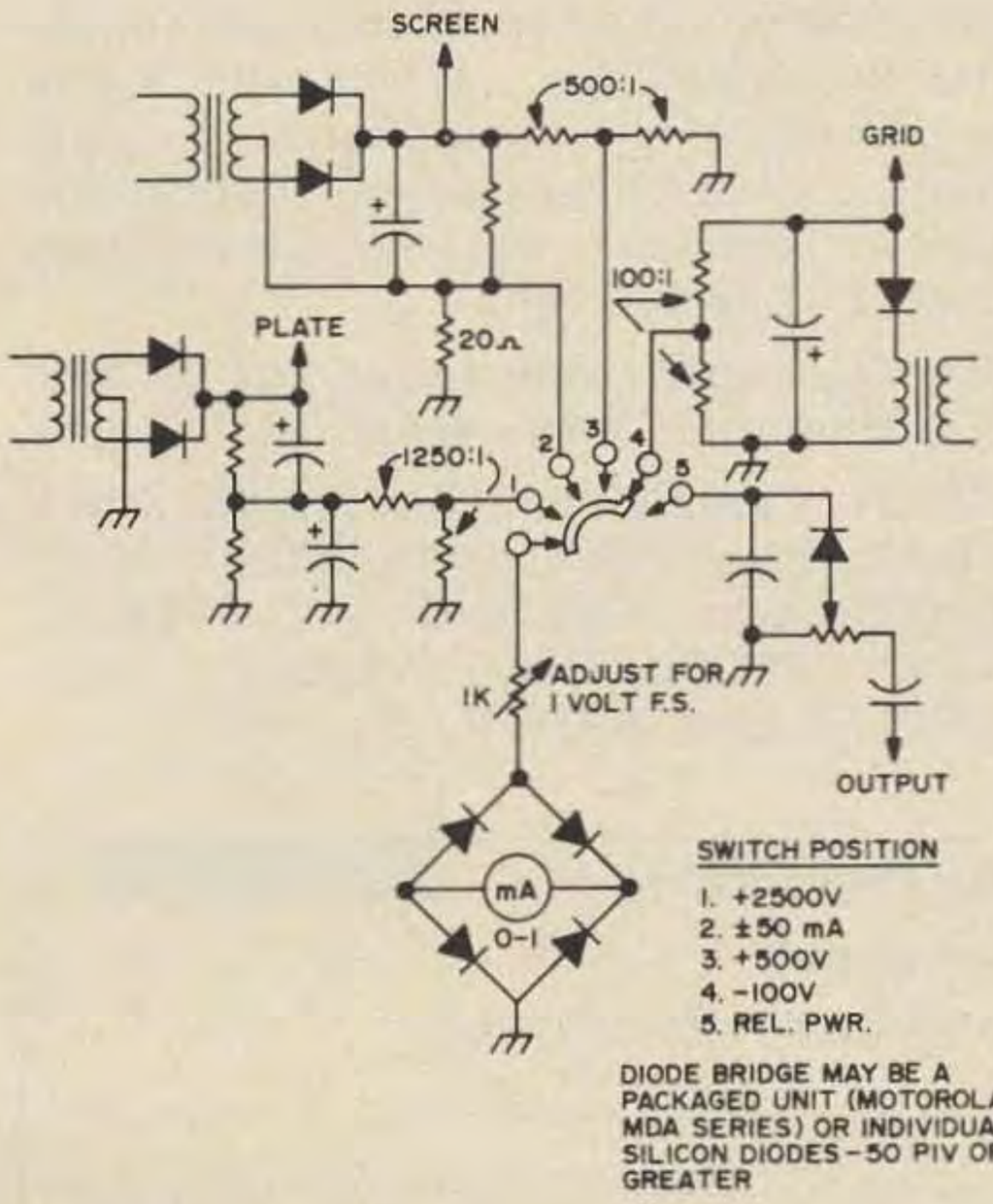

Fig. 1. Diode bridge may be a packaged unit (Motorola MDS series) or individual silicon diodes of > 50 PIV.