

## Deflection amplifier for oscilloscopes

The circuit combines the advantages of a differential output stage and a high-impedance j.f.e.t. input stage. The silicon input diodes form a crude overload protection for the input of the f.e.t. amplifier. Transistors  $Tr_1$  and  $Tr_2$  act together as both an amplifier and a level shifter, the quiescent output voltage of  $Tr_2$  being set by  $R_1$  to approximately 15V. This also sets the gain of the amplifier unfortunately. A multi-turn preset was used for this purpose as the setting can be quite critical.

Transistors  $Tr_3$  and  $Tr_4$  form a differential output stage enabling an output swing of about 400V pk-pk. Feedback

is introduced through the 220 ohm emitter resistors and high-frequency compensation is brought about by  $R_2$  and  $C_1$ . Resistor  $R_3$  forms the Y-shift control.

To set up for operation, set  $R_2$  and  $C_1$  to their maximum values. Set +15V at the collector of  $Tr_2$  using  $R_1$ . Inject a 10kHz square wave into the amplifier and increase  $C_1$  to give the sharpest possible corner to the display without overshoot. Then increase  $R_2$  as far as possible without losing too much of the squareness of the display.

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