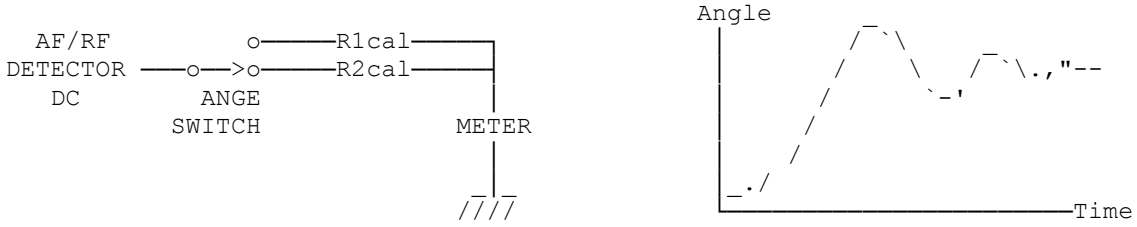
Meter Damping and Speed up Circuits

By G8MNY (Corrections Jan 06)

(8 Bit ASCII Graphics use code page 437 or 850)

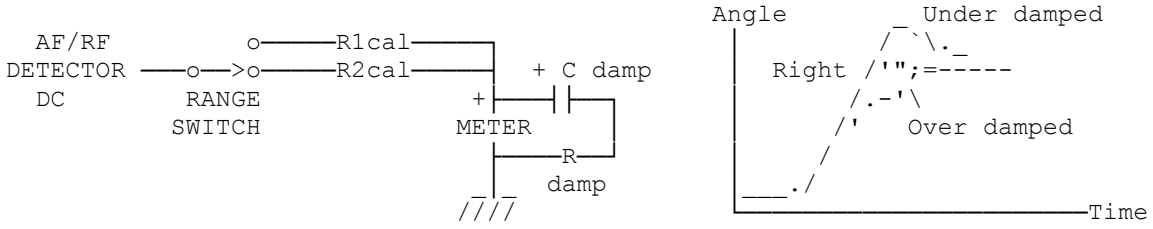
Here are two methods to damp & speed up moving coil meters movements that swing wildly or need speeding up in Pulsed DC, Audio, Modulation & RF applications (eg. cheap DC meters, VU meters, PPM, Modulation meters, RF SWR bridges etc.)

TYPICAL METER CIRCUIT



DAMPING

As the meter has a spring & mass the overshoot oscillations have a time constant, normally damped by the air flowing over the needle & possibly eddy current damping in a short circuit turn of a metal coil bobbin. Since the moving meter also acts as a generator additional external damping can be used using a matching RC time constant.

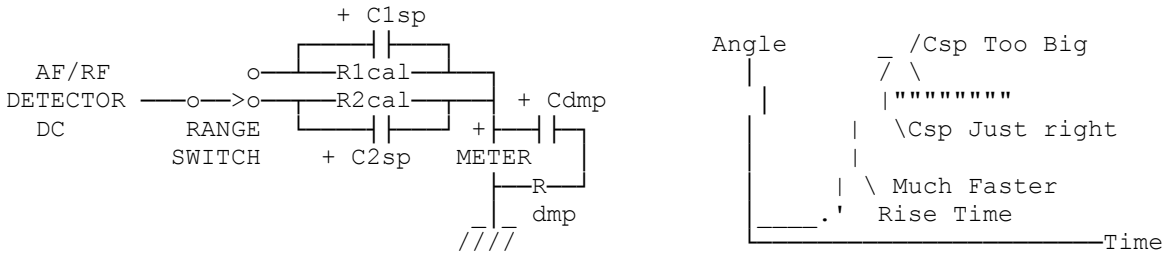


For the R damp initially use a 10K pot, & Caps in the range of 10u-220u (10v). Then apply a known step pulse (DC/tone/RF) that should not have an overshoot but does on the meter. Adjust the R damp for minimum overshoot, then swap the C damp for other values. You will soon get a feel for the action of the R & C on the ballistics of the meter. When you have decided on the best value R, try the nearest fixed value to see if it is OK.

You should be able to get a fairly fast immediate 100% reading of the correct value with no overshoot.

SPEEDING UP

Now that the meter is properly damped, speed up Capacitors can be added across the series Rcals until the meter shows signs of a faster overshoot. A different value is needed for each Rcal multiplier arm.



The value of Csp is dependent on value on the Rcal multiplier arm & the source voltage impedance. Start with values in the range 0.2uF to 10uF at a suitable voltage. (N.B. if the C is leaky it may alter the calibration on a high value

multiplier arm!). If the value is too big the meter will over read & then settle, if too small there is little effect.

Typically the rise time can be halved when the right value is found.

RESULTS
With the 2 modifications the ballistics of the overall meter will give the performance of much more expensive movement.

Why Don't U send an interesting bul?

73 De John, G8MNY @ GB7CIP
/EX