Measuring 1 of 3 Resistors

By G8MNY (new Mar 06)

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

I recently bought an old LAB DMM (Datron 1061a) meter. It has an unusual feature, the ability to measure one Resistor R1 in a triangle of 3 (R2 & R3) while all connected.

```
    High
    R1 > Rx
    Low
    Guard
```

As the DMM has uProcessor you might expect the Guard line to be connected to the Low then High & then disconnected, to give 3 values of Rx, then with 3 equations & 3 unknowns all the Rs can be calculated....

1/ Guard connected to Low
   Rx = \frac{R1 + R2}{R1 \times R2}

2/ Guard connected to High
   Rx = \frac{R1 + R3}{R1 \times R3}

3/ Guard not connected
   Rx = \frac{R1 + R2 + R3}{R1 \times (R2+R3)}

But that is not the purpose of the Guard line in a sensitive measuring circuit.

Source across Rx & measures the voltage to get the R1 value. But with R2 + R3 in circuit this will give a wrong reading as some of the accurate current will flow through R2 + R3. But on this meter the Guard line has another current generator with its control arranged to make the Guard the same potential as the Low...

```
    High
    /     /
   /     /
 DVM   R1
 \     \   R2
Stray I> Gu
\     \   No /\ Voltage
 \     \   \ /
 Ref I> Low
```

So as long as the Guard stray current generator can put the error current through R2 the Reading of Rx = R1 & be correct.

Why Don't U send an interesting bug?

73 De John, G8MNY @ GB7CIP