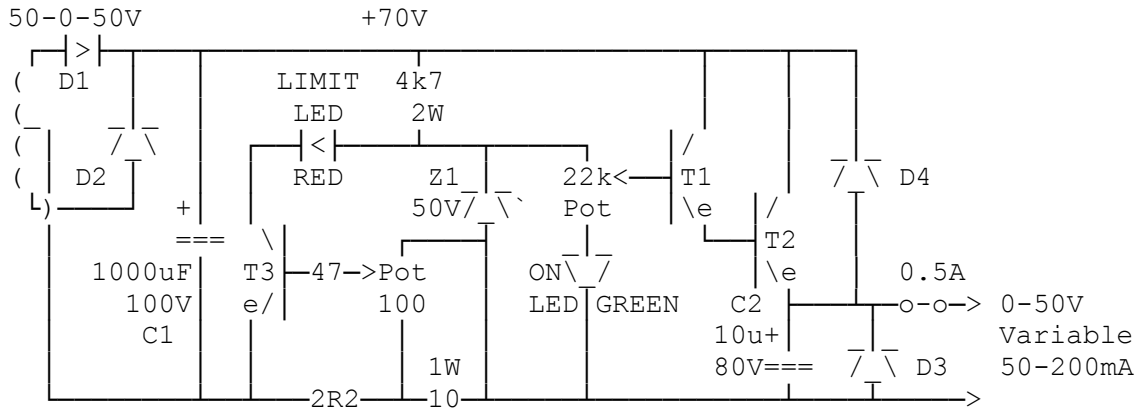Simple Variable PSU

By G8MNY   (New Nov 06)
(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

This is a simple circuit that can go to quite high voltage & currents depending
on the values used.

```
50-0-50V                 +70V
  ┌─┤>├──┬───────────────┬───────────┬──────┬─────┬──────┐
  ┌─┤>├─┐ │               │           │      │     │      │
 (   D1   │      LIMIT   4k7          │      │     │      │
 (_     │ │      LED     2W           │      │     /      │
 (    ┌─┤_│_     ┌─┤<├──┤             │      │    /  _    _
 (    │ /_\      │ RED    Z1_│    22k<─┤ T1   │   / \ D4
 (│  D2  ┘ +     │         50V/_\` Pot │  \e  │  /
  L)    ┌─┐      │                     │      │ / T2
       ===  \    │         _│_         │      │ \e        0.5A
   1000uF │  T3─47─>Pot   ON\_/       │     C2 \e   ┌─o-o─> 0-50V
   100V   │  e/     100   LED│GREEN    │    10u+│    │      Variable
    C1    │              │             │    80V===  _│_    50-200mA
          │              1W            │           / \ D3
  └───────┴──2R2────10───┴─────────────┴───────────────────────>
```

T2 2N3055 on a heatsink, or other 100V 50W NPN TAB or MOSFET instead of T1 & T2
T1 & T3 BFX84 or other 100V 500mA NPN
Diodes all 1N4003
Zener 50V 1W (can be several diodes in series)

HOW IT WORKS
The transformer & rectifier diodes D1 & D2 charge up C1 to 30% more than the
zener voltage. The 4k7 puts current into the zener Z1, the 22k voltage setting
pot pick a fraction of this voltage & feds it to the high gain darlington T1 &
T2.

The ON LED voltage drop compensates for the darlington loss, giving approx 0V
at the low end of the voltage pot. A voltage scale can be drawn for the pot if
additional metering is not needed.

T2 emitter is the O/P voltage & the circuit is protected from sudden load with
output capacitor C2 & reverse diode D3 & load greater than supply by D4.

Output current is limited by T3, it is turned on when 0.5V is across the 2R2
(Max current) plus the set fraction across the 100R pot (down to 50mA). T3 on
reduces the voltage until the limiting current is reached & also lights the
warning LIMIT LED. In addition if T3 turned hard on e.g. a shorted O/P, then
the ON LED is extinguished! As with the voltage pot, a current pot scale can be
drawn up if additional current metering is not used.

LED MEANING
Green only = Output at set voltage.
Red & Green = Output less than set voltage & current at set limit value.
Red ON only = Output heavily overloaded, NO O/P volts, PSU overheating?

USEFUL TIPS
The current pot is connected to the O/P 0V, with the ON LED then to the voltage
pot.
C2 & D3 connect between the 0V & the O/P fuse holder.
D4 needs to be wired across T2.
T2 case is not exposed, as it is at +70V!
Use a sensible mains fuse. e.g. 100mA slow blow.
Why Don't U send an interesting bul?
73 De John, G8MNY @ GB7CIP