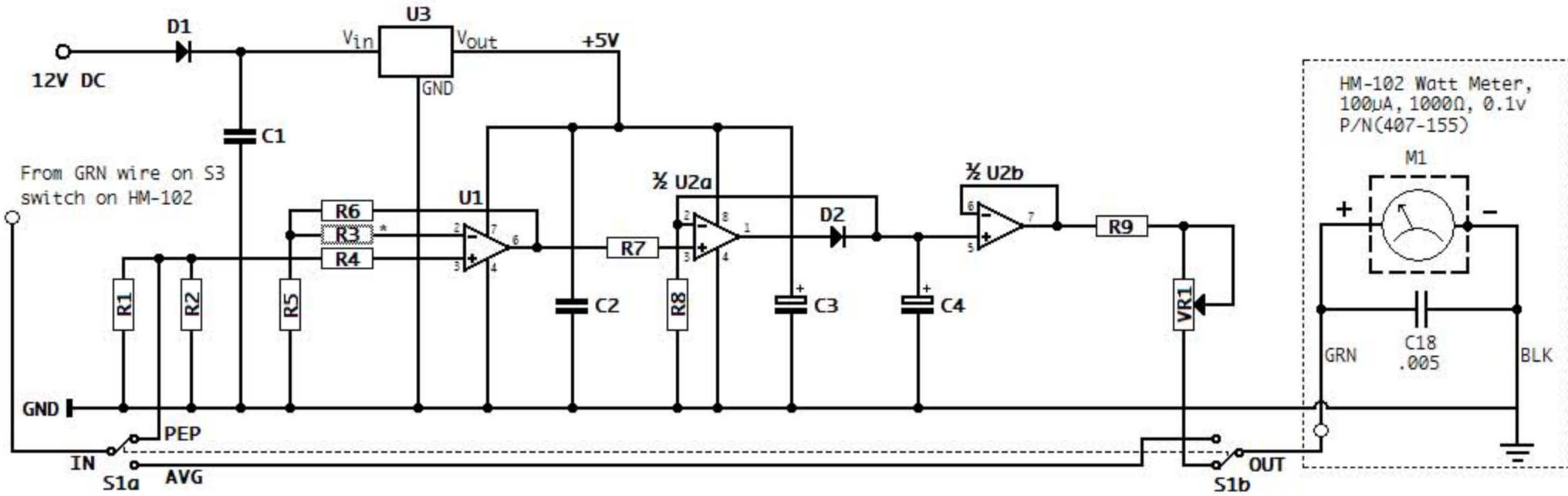
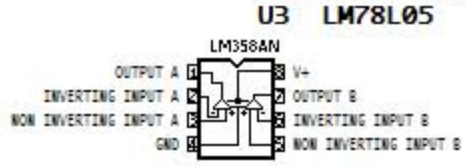
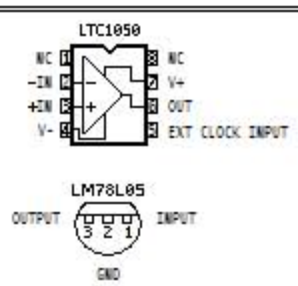
Peak Envelope Power Meter Circuit for HEATHKIT HM-102 SWR/Power meter



R1 1K	C1 0,1uF	D1 1N914	
R2 1M	C2 0,1uF	D2 1N914	
* R3 0R	C3 22uF	U1 LTC1050	
* R4 1K5	C4 46uF	U2a ½ LM358AN	
R5 2K7		U2b ½ LM358AN	
R6 100K		U3 LM78L05	
R7 100K			
R8 100K			
R9 33K			
VR1 5K			





The amplifier could be interposed between existing circuitry and a low voltage moving coil meter movement; or the amplifier could be inserted at a point where higher voltage is available to drive the amplifier input.

This circuit is originating from VK1OD website.
For design details please refer to:
http://vk1od.net/
Thank you kindly for the design!

The LTC1050 output is not able to source sufficient current to charge the peak hold capacitor sufficiently quickly, so the design uses a LTC1050 stage with voltage gain to raise the input signal to around 3V peak, followed by an LM358 unity gain / peak hold stage, then another LM358 stage as a voltage follower to drive the meter.

The first stage provides a gain controlled amplifier capable of sensing down to ground, and raising the signal to around 3V, sufficient to mask the input offset voltage of the next stage. The second stage is a unity gain peak hold amplifier with the diode drop eliminated from the output as the diode is within the feedback loop. The output impedance of the second stage is low, allowing rapid charging of C4 for fast attack. The decay time constant is determined by C4 and R8.

The LTC1050 has very low, temperature compensated input bias current. In this case and due to the resistances used, there is no real benefit in balancing the resistance in the inverting and non-inverting input paths, though this may be wise for some other types of op amp. Values are given for R3 and R4 where input balancing is desired.

If the instrument has multiple ranges, careful attention needs to be given to a value of R1 that is very close to the resistance of the meter movement. The design tool calculates values for two parallel resistors, R1 and R2, which should allow sufficient accuracy using standard E12 preferred range resistors.

The next stage is a LM358 voltage follower with high input impedance (for minimal loading of the capacitor), and a series resistor to drive the meter movement. VR1 is trimmed to obtain the same deflection on a constant carrier as obtained with the amplifier bypassed.

The entire circuit consumes about 7mA.

Model	Bird 43	Collins 312-B4	Drake W4	Revex W560	Heathkit HM-102	Your Design
Meter FSD (uA)	30	200	200	200	100	50
Meter resistance (ohms)	1400	1000	1250	750	1000	1000
Meter FSD (mV)	42	200	250	150	100	
Decay time constant (s)	5	5	5	5	5	5
Target gain	83	18	14	23	35	70
R1 (ohms)	1800	1000	1200	1000	1000	1000
R2 (ohms)	6800	1000000	1000000	3300	1000000	1000000
R3 (ohms) *	220	0	0	0	0	0
R4 (ohms) *	0	4700	6800	3900	1500	470
R5 (ohms)	1200	5600	8200	4700	2700	1500
R6, R7, R8 (ohms)	100000	100000	100000	100000	100000	100000
R9 (ohms)	100000	15000	12000	15000	33000	56000
VR1 (ohms)	20000	2000	2000	2000	5000	10000
C1 (uF)	0,1	0,1	0,1	0,1	0,1	0,1
C2 (uF)	0,1	0,1	0,1	0,1	0,1	0,1
C3 (uF)	22	22	22	22	22	22
C4 (uF)	47	47	47	47	47	47