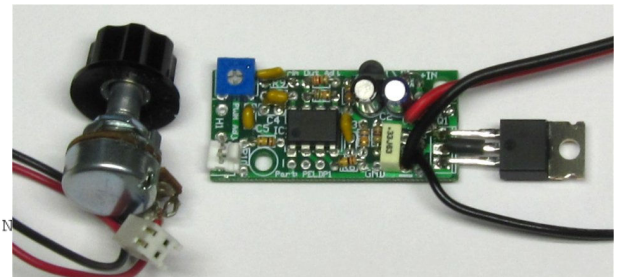
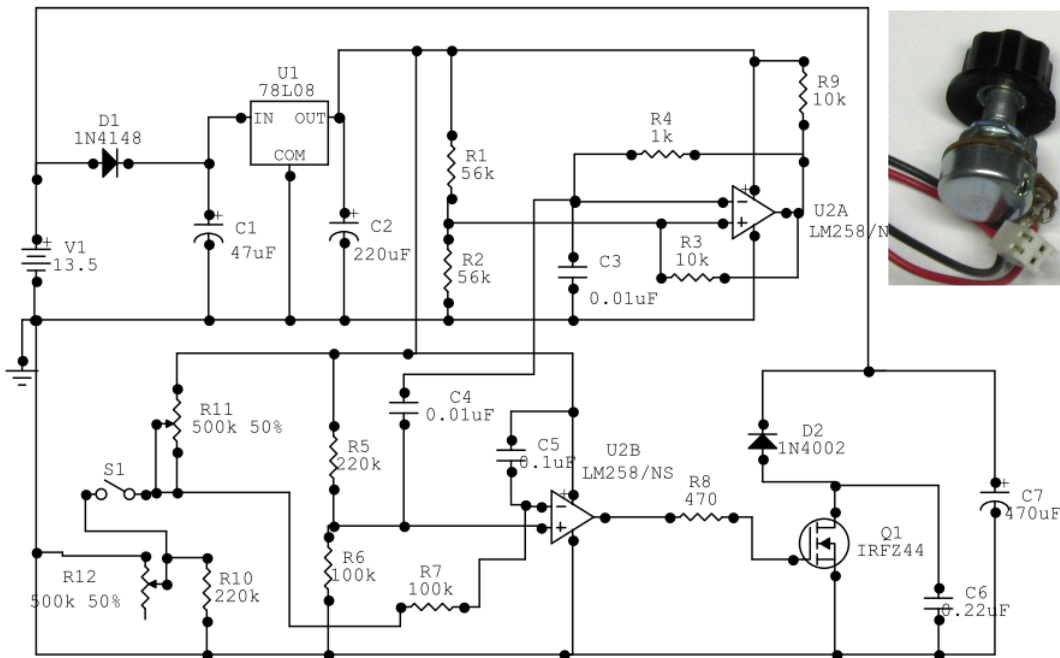


PWM LED Dimmer

Part: PELDP1 Mar. 22, 2014, Onstate Technologies

Manual adjustment high frequency, high power PWM LED dimmer.

Line	Quantity	Value	Designation	Description	Notes
1	1	47uF	C1	35V 47uF ele., 0.1"	20-100uF, input power filter
2	1	220uF	C2	10V 220uF elec, 0.1"	100-300uF, REG1 out filter
3	2	0.01uF	C3,C4	103 ceramic, 0.1"	C3=PWM frequency (10kHz mod. sine)
4	1	0.1uF	C5	104 ceramic, 0.1"	Signal filter/output startup off delay
5	1	0.22uF	C6	224 ceramic, 0.2"	0.1-1.0uF, Q1 output ringing filter.
6	1	470uF	C7	35V 470uF, low ESR	200-1000uF ripple power filter
7	1	0.1uF	R9 (C8)	104 ceramic, 0.2"	oscillator waveform smoothness filter
8	1	1N4148	D1	0.2A, 500mV	
9	1	1N4002	D2	1W, optional.	Output long cable induced noise clamp
10	1	IRFZ44	Q1	N-CH MOSFET, IRZ*	match power requirement
11	2	56k	R1,R2	1/8W carbon, 5%	standard small resistor
12	1	10k	R3	1/8W	
13	1	1.0k	R4	1/8W	
14	1	220k	R5	1/8W	
15	2	100k	R6,R7	1/8W	
16	1	470	R8	1/8W, 470 ohms.	
17	1	100k	R10	1/8W (100k-220k)	100-220k, brightness range trim.
18	1	500k/ 100k VR	R11 (VR)	1/2W, inline PC pins. 100k finer adj.	Adjust for for minimum brightness trim. Do not adj to full +.
19	1	78L08	REG1	TO-92, 8V	
20	1	LM258N	IC1	8-pin, op-amp	On Semi faster than Fairchild 258.
21	1	100k VR	H1/R12	Potentiometer (B100K)	LED Brightness control
22	1	SPST	S1	SPST switch, optional	LED output on/off control



Manual adjustable PWM LED dimmer schematic.

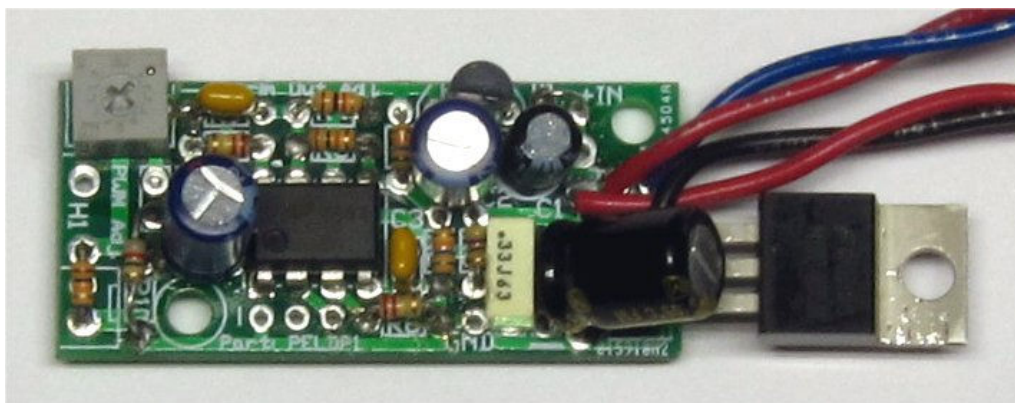
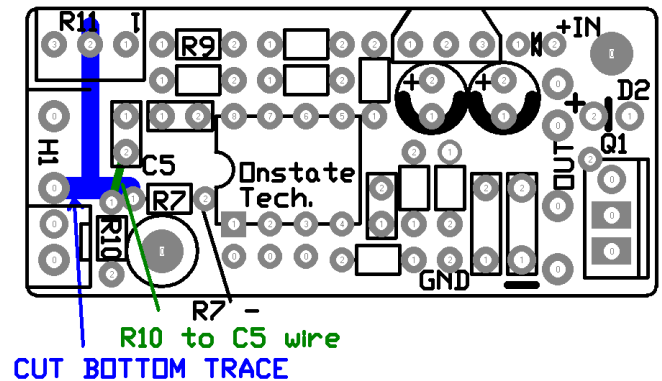
- R12 (VR) to GND= LED full ON. Trim R11 for min. Brightness. R12 max R.
- C2. Op-amp power filter. LED power surge pulses may pass to Q1 if small C2I.
- C5 connected to +power for no output at initial start up. C5 acts as input filter and delay.
- C6 required to filter Q1 output ringing. 0.1-1.0uF.
- C7, 470uF (low ESR). Require high filter capacitance to filter oscillator noise. Higher cap for higher current.

Automatic, gradual increase intensity LED dimmer.

Item	Quantity	Value	Designation	Description	Note
1	1	47uF	C1	35V 47uF ele., 0.1"	20-100uF
2	1	220uF	C2	10V 220uF ele., 0.1"	100-300uF
3	2	0.01uF	C3,C4	103 mono cer., 0.1"	C3=PWM frequency (10kHz)
4	1	0.22uF	C6	224 mono cer., 0.2"	0.1-1.0uF
5	1	470uF	C7	35V 470uF, 0.2"	low ESR, 200-1000uF power filter
6	1	0.1uF	R9 (C8)	104 ceramic, 0.2"	oscillator waveform smoothness filter
7	1	1N4148	D1	500mV	
8	1	1N4002	D2	1W, optional.	long cable noise filter
9	1	IRFZ44	Q1	N-CH MOSFET, IRZ*	match power requirement
10	2	56k	R1,R2	1/8W, carbon, 5%	
11	1	10k	R3	1/8W, carbon, 5%	
12	1	1k	R4	1/8W, carbon, 5%	
13	2	220k	R5,R6	1/8W, carbon, 5%	
14	1	100uF	R7 (Cap)	100uF-220uF Cap.	RC (cap/R10) time charge
15	1	470	R8	1/8W, carbon, 5%	
16	1	2.2M	R10	Charge time R	10k-10M, gradual ON rate delay
17	1	10k var	R11 VR	1/2W, 10k PC pins	LED start brightness trim.
18	1	10k	R12/H1	1/8W resistor	
19	1	78L08	REG1	TO-92, 8V	
20	1	LM258N	IC1	8-pin, op-amp	On Semi faster than Fairchild 258.

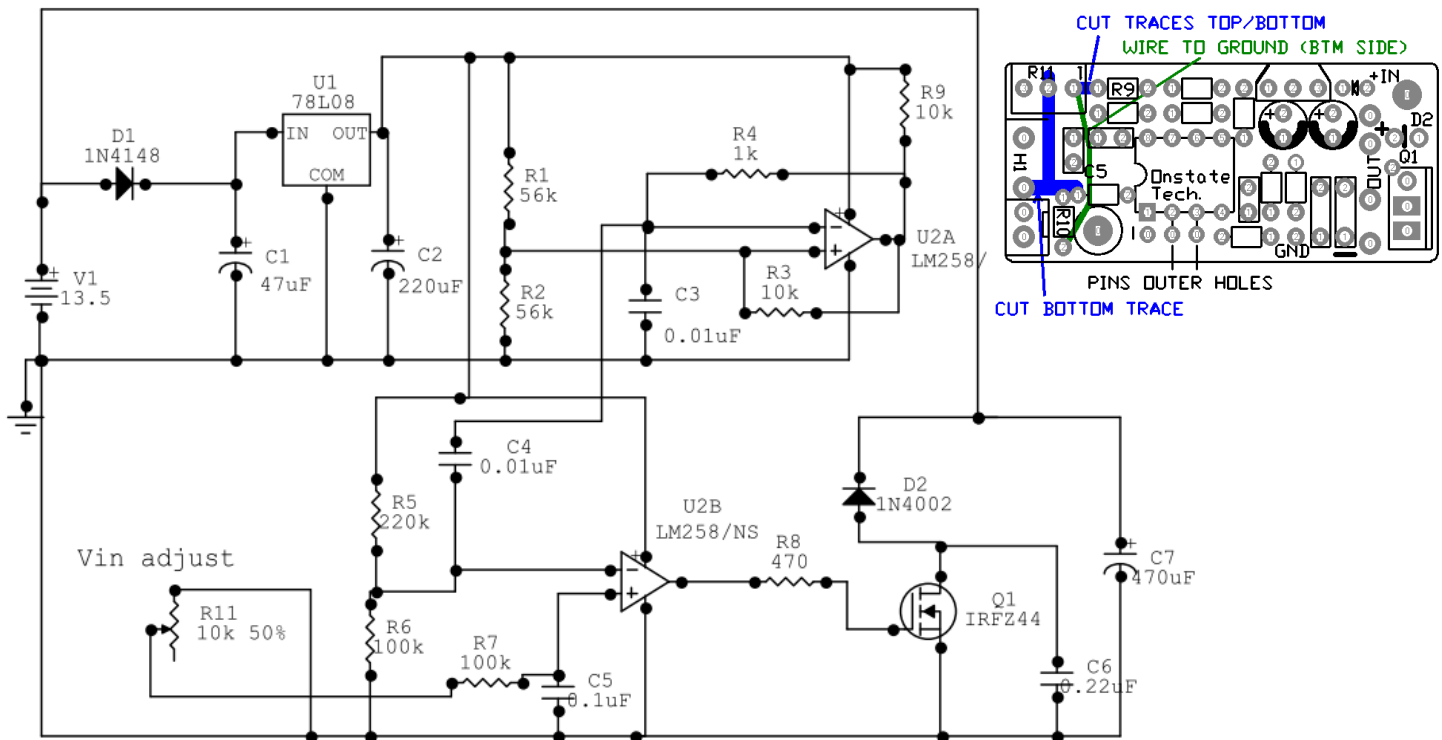
Similar setup to standard adjust LED dimmer.

- Cap (R7) and R10 sets LED gradual brightness rate.
- Adjust R11 (VR) for minimum LED brightness at start. Nominal setting of 0.30Vp-p into Q1 gate.
- Some op-amps may have a high input pin drift voltage and may not trigger a full ON/OFF.
- For gradual decrease in LED brightness, move pins 2 and 3 of the LM258 outer adjacent holes.



External voltage input PWM LED intensity control (0-10V).

Item	Quantity	Value	Designation	Description	Notes
1	1	47uF	C1	35V 47uF ele., 0.1"	20-100uF
2	1	220uF	C2	10V 220uF, 0.1"	100-300uF electrolytic
3	2	0.01uF	C3,C4	103 ceramic, 0.1"	C3=PWM frequency (10kHz)
4	1	0.1uF	C5	104 ceramic, 0.1"	Signal filter/output startup off delay
5	1	0.22uF	C6	224 ceramic, 0.2"	0.1-1.0uF
6	1	470uF	C7	35V 470uF, low ESR	200-1000uF power filter
7	1	0.1uF	R9 (C8)	104 ceramic, 0.2"	oscillator waveform smoothness filter
8	1	1N4148	D1	500mV	
9	1	1N4002	D2	1W, optional.	long cable noise filter
10	1	IRFZ44	Q1	N-CH MOSFET, IRZ*	match power requirement
11	2	56k	R1,R2	1/8W carbon, 5%	
12	2	10k	R3, R9	1/8W	
13	1	1k	R4	1/8W	
14	1	220k	R5	1/8W	
15	2	100k	R6,R7	1/8W	R6 ground offset, min Vin for on
16	1	470	R8	1/8W	
17	1	10k VR	R11 VR	1/2W, 10k trimmer	Adjust for full on at Vin (0-10V/5V)
18	1	2-pin	H1/R12	2-pin header	Vin brightness control input signal.
19	1	78L08	REG1	TO-92, 8V	
20	1	LM258	IC1	8-pin, op-amp	Bend pins 2/3 to outer holes



0-10V/5V input PWM LED intensity control schematic.

Voltage controlled brightness LED dimmer.

NOTE: CUT TRACES.

R11 (VR) pin 1 to + top/bottom.

Add wire R11 pin 1 to ground.

