20 Segment Expanded Scale Voltmeter

Created "Nov 07 2002"
Revised "Feb 20 2004"
This is an Expanded Scale Voltmeter based on the National LM3914 chip.
It is a 0.25 volt range between each LED.

I specifically designed this unit for my spare battery in my RV Truck
to continuously monitor its voltage. I did the orgional in a rush and have
now changed a few values for ease of adjustment. Also added a few capacitors
to corrected a few minor hum problems that affected some adjustments.

This Voltmeter it set for a range of: "10.25 to 15 volts".

The 20K resistor across the LED is required to null out the #10 LED.
Leaving this resistor off will cause #10 to light Faintly when LED's above #10 are lit.
This resistor is soldered to the copper side, due to space limitations!

Currently this unit is designed to operate from a 12 volt battery, over the range
specified above. But it can be changed for Other Voltages and/or Ranges.

SETUP:

1) Trimpot VR1 is set to create a 1.200 volt drop between pins 4 and 6 on the adjacent LM3914. Test Point are provided on the board. This Must be set VERY ACCURATELY.
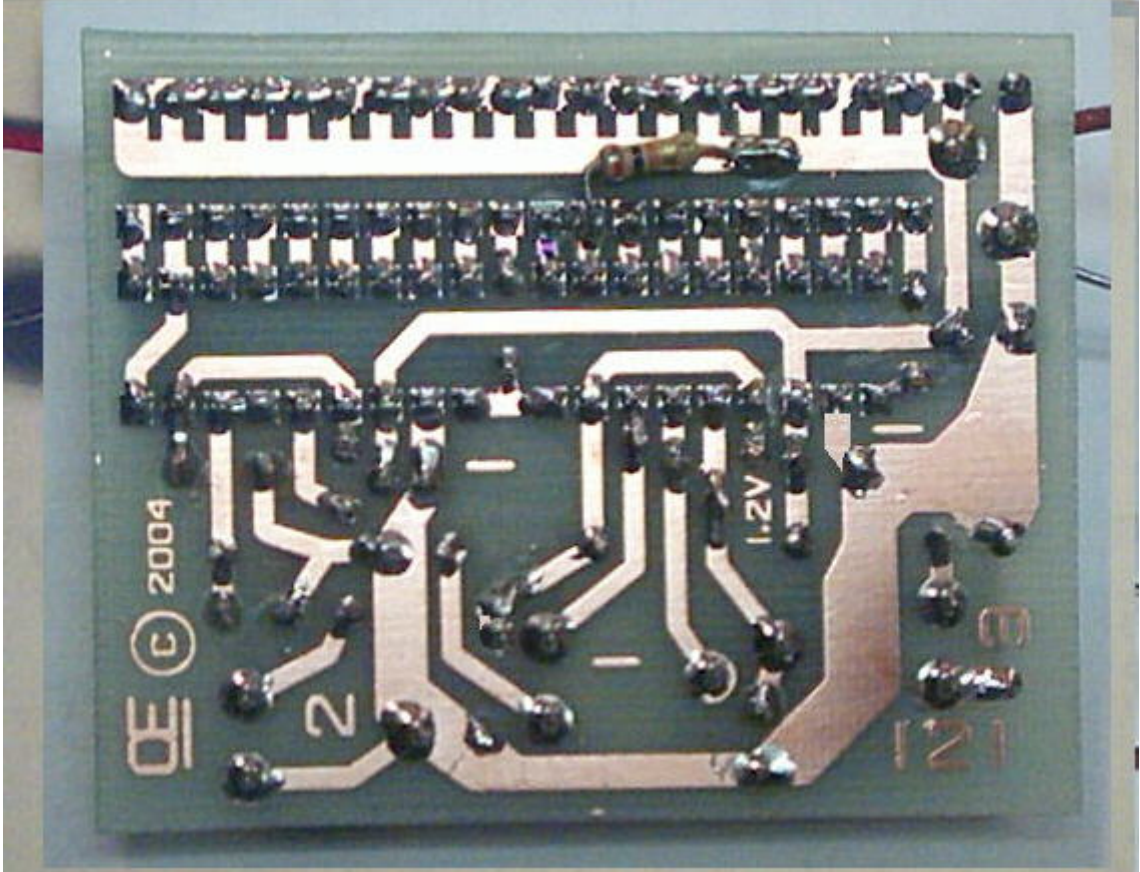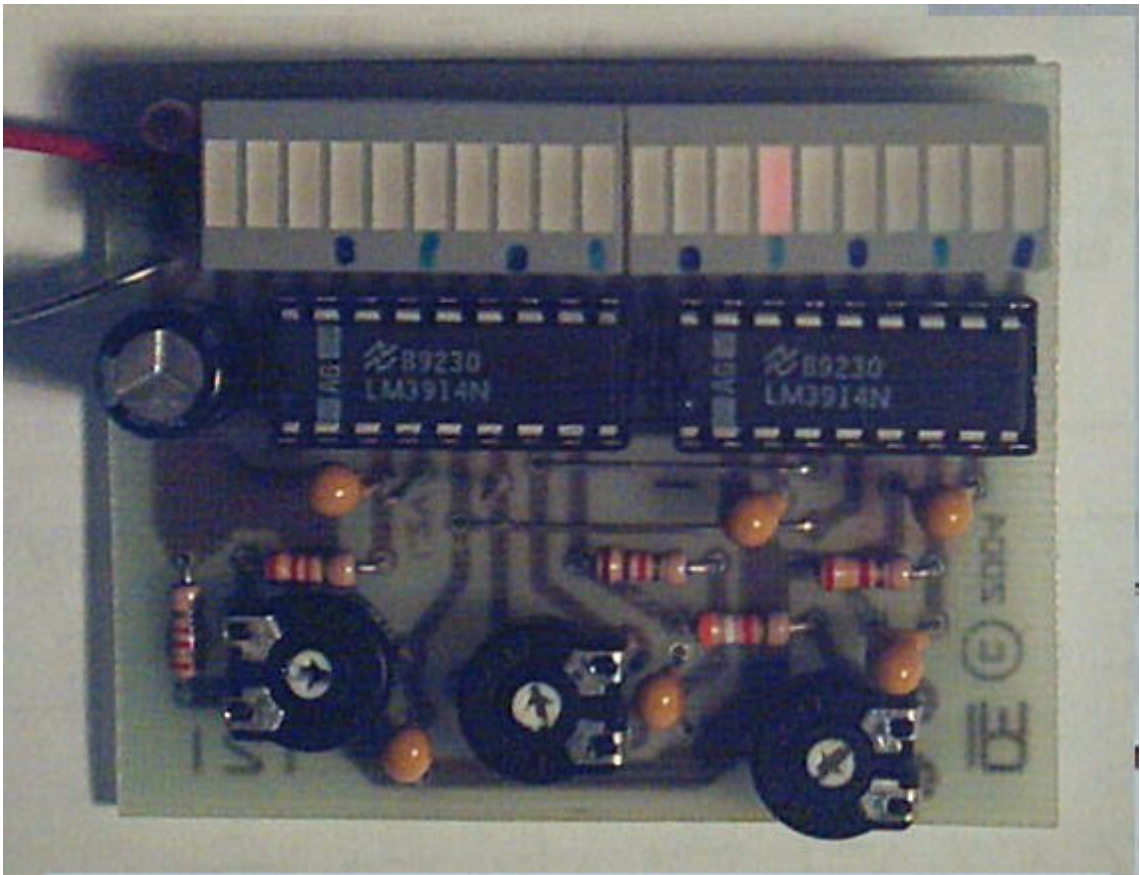
2) Set supply to Precisely 12.500 volts
Using Trimpot VR3, set the voltage at pin 5 of the LM3914's to 6.250 volts
(both pin 5's are connected together)

3) Now Trimpot VR2 is adjusted to set the #10 LED to "JUST BARELY LIGHTING",
(This occurs when Both 9 and 10 are Lit) Representing a voltage at midscale
of the range. (Typical = 12.50 Volts)
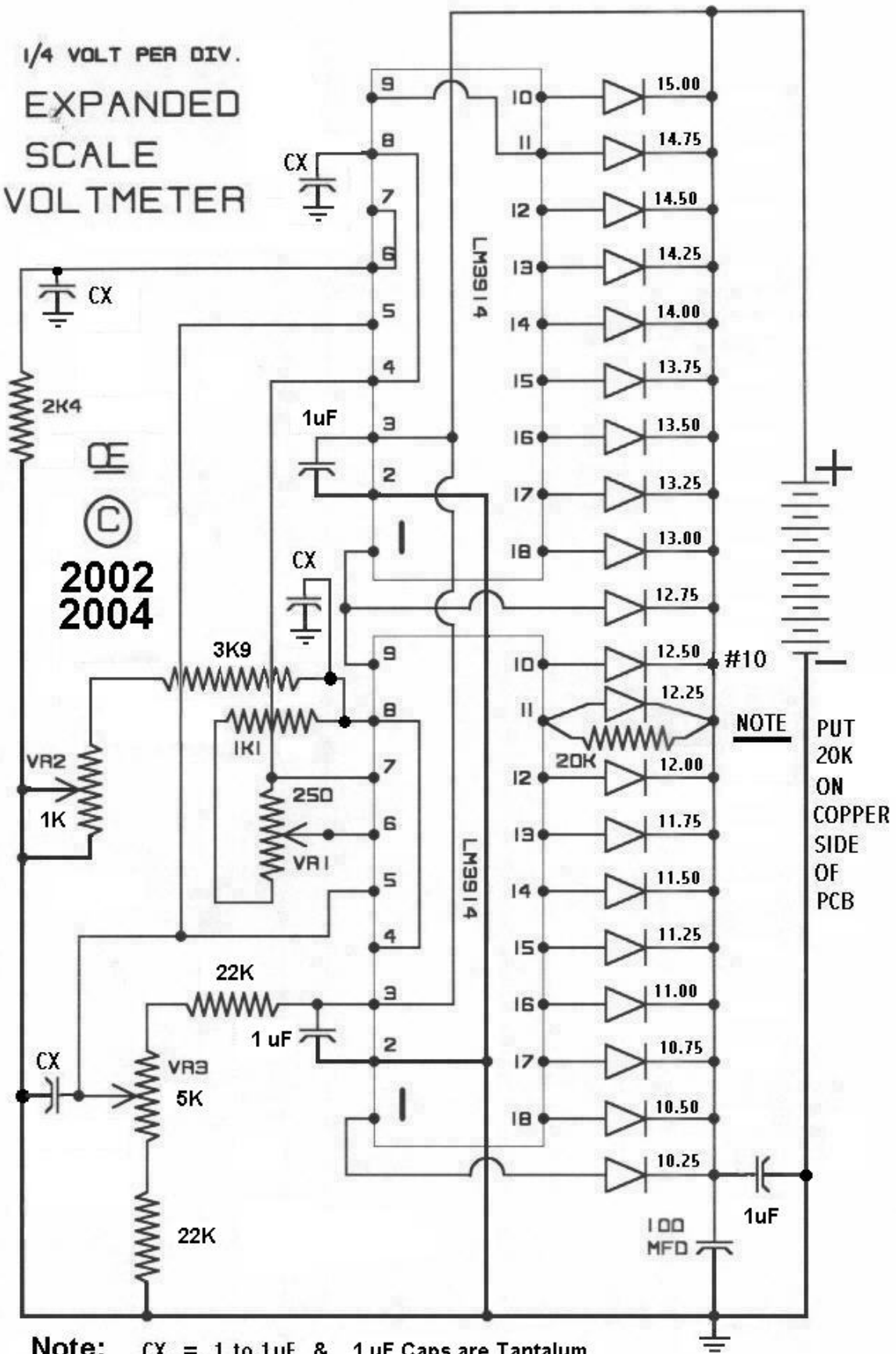**This is the LED marked #10 on the Schematic.**

The Full Scale should now be calibrated from 10.25 to 15 volts!

Calibration Voltage Settings must be Very Precise with a good Digital meter..
Currently this circuit is designed to run in "Dot Mode" to reduce
current consumption.

Breaking the trace between pin 9 and 11 on the top IC and connecting
pin 9 to the supply rail will give a "Bar Display".
"But as the bar length increases, *SO DOES THE CURRENT*, CONSIDERABLY".

EXPANDED SCALE VOLTMETER

1/4 VOLT PER DIV.

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CX

LM3914

9	10	15.00
8	11	14.75
7	12	14.50
6	13	14.25
5	14	14.00
4	15	13.75
3	16	13.50
2	17	13.25
	18	13.00
		12.75

1uF

CX

2K4

VR2 1K

3K9

IKI

250

VR1

LM3914

9	10	12.50 #10
8	11	12.25
7	12	12.00
6	13	11.75
5	14	11.50
4	15	11.25
3	16	11.00
2	17	10.75
	18	10.50
		10.25

20K

NOTE

PUT 20K ON COPPER SIDE OF PCB

22K

1 uF

CX

VR3 5K

22K

100 MFD

1uF

+ −

Note: CX = .1 to 1uF & 1 uF Caps are Tantalum