

LED Bargraph Indicator

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The LED bargraph indicator uses a modification of a circuit by Dave Robinson¹, WW2R. The basic circuit is used in the model RFPM from Down East Microwave (www.downeastmicrowave.com). The modification is for compatibility with RF detector ICs like those from Linear Technologies (www.linear.com) and Analog Devices (www.analog.com) which have an output voltage greater than zero with no RF applied. Fortunately, the LM3914 bargraph chip can be configured to deal with this voltage offset. In my prototype Portable RF Sniffer and Power Meter², I hacked up an RFPM board to provide an LED readout with voltage offset. More recently, when I was assembling the Homebrew Antenna Ratiometer³, the RFPM board did not fit in the available space, so I made a smaller PC board with only the components required for the power detector application.

The circuit is shown in the schematic diagram, Figure 1. There are two trimpots: one sets the zero offset, so that the first LED bar does not light until RF is detected, and the other sets the full scale reading. In some places, I prefer to set the zero so that the first LED bar is always lit, as a free pilot light, and the second bar lights at the first hint of RF.

LED BARGRAPH DISPLAY from WW2R

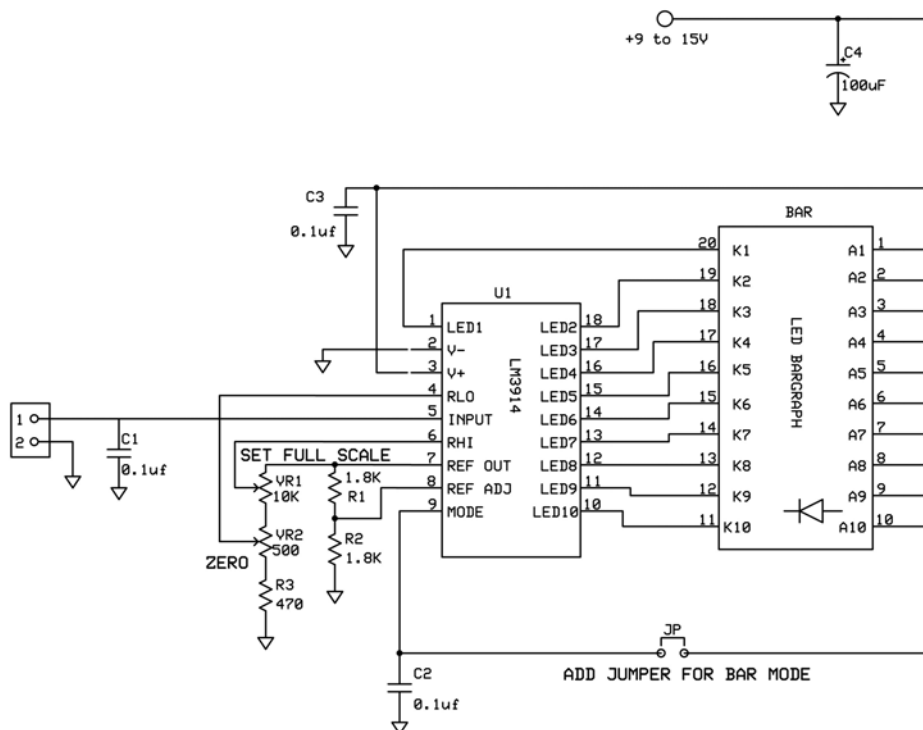


Figure 1

LED brightness is controlled by R1 and R2, which should be of equal resistance: make them a little smaller for more brightness, or a bit larger to dim the display and reduce current drain. A larger power savings is possible by using dot mode – with the jumper JP removed, only one LED lights at a time, like a meter pointer; I prefer the continuous bar display.

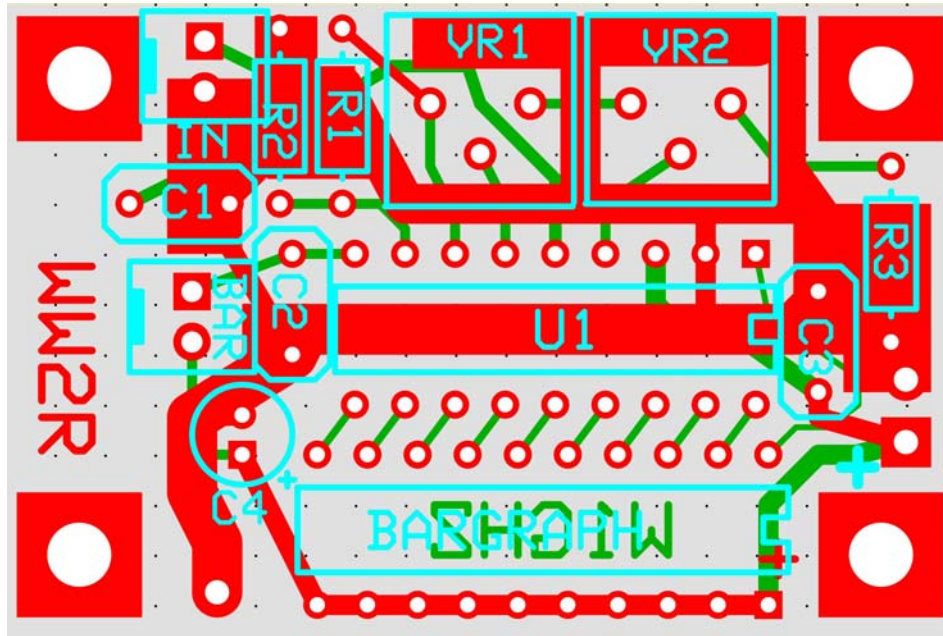
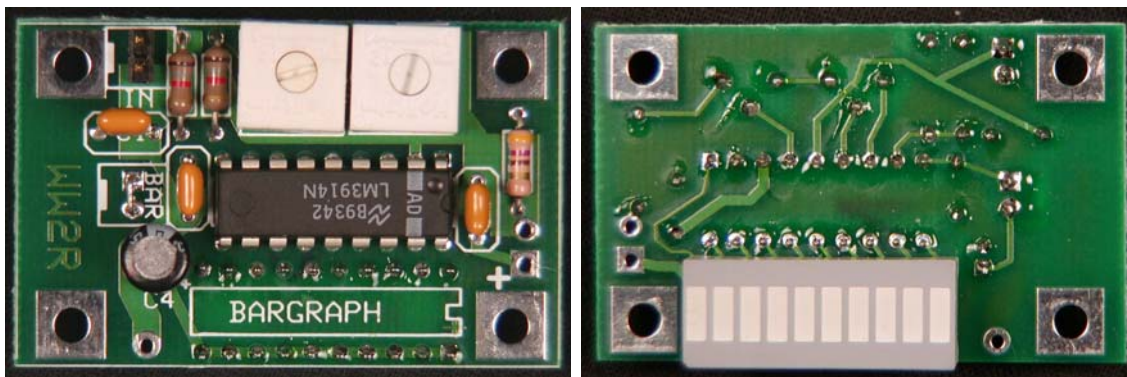


Figure 2

The ExpressPCB layout is shown in Figure 2, and a photo of the completed unit is shown in Figure 3. Figure 4 shows another unit installed in the Homebrew Antenna Ratiometer, with all parts except the trim pots on the far side of the board, and a corner trimmed to fit in the available space. Depending on how you wish the bars to display, the LED bargraph and the trim pots may be mounted on either side of the board – just make sure that the pin 1 side of the bargraph is at the edge of the PC board. If the bargraph LEDs are all red, then orientation doesn't matter, but the multi-color version will reverse colors depending on orientation (I haven't figured out which way is which).



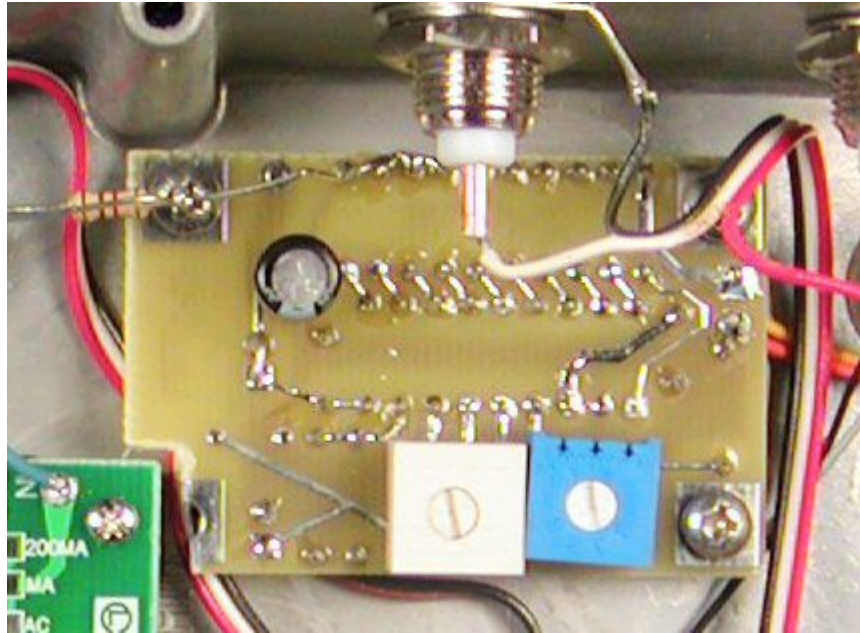


Figure 4

Unless you need the offset voltage feature or the small size, the RFPM kit from DEMI is probably a more convenient way to make an LED bargraph display.

References:

1. Dave Robinson, WW2R, "A LED Power Meter for Roving Operations," *Proceedings of the 29th Eastern VHF/UHF Conference*, ARRL, 2003.
2. Paul Wade, W1GHZ, "Portable RF Sniffer and Power Meter," *Proceedings of the 30th Eastern VHF/UHF Conference*, ARRL, April 2004, pp. 60-69.
3. Paul Wade, W1GHZ, "Antenna Ratiometry Measurements For the 21st Century Using a Homebrew Ratiometer," *Proceedings of the 30th Eastern VHF/UHF Conference*, ARRL, April 2004, pp. 60-69.