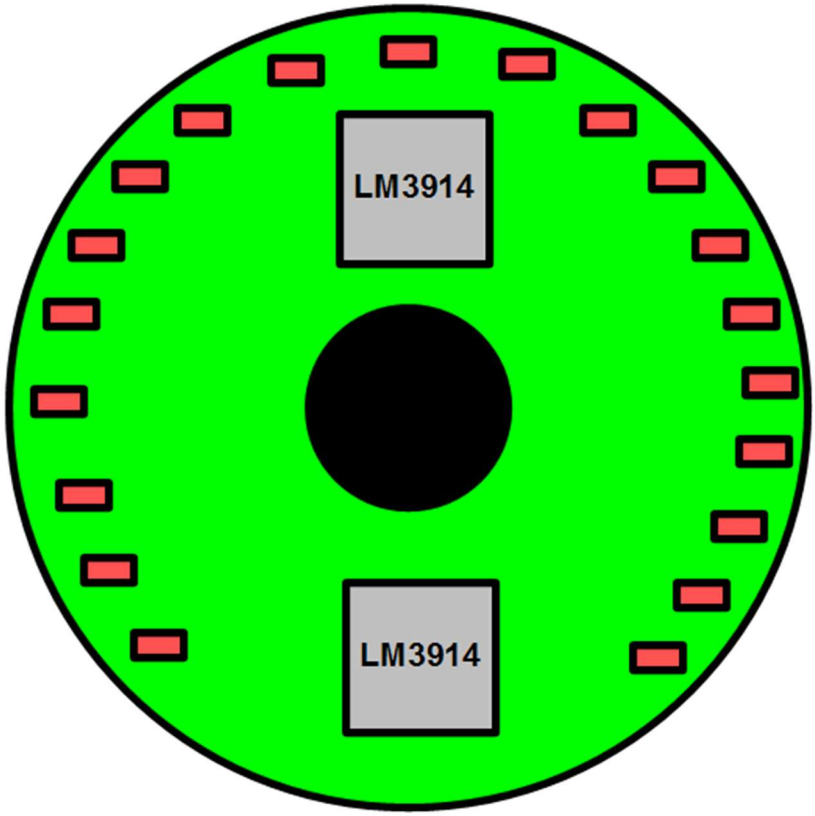
Regarding your design challenge for the potentiometer display, I have a suggestion. The technique involves using the LM3914 bar/dot LED driver. I don't have any schematic capture or drawing resources here at work, so this is just a partial solution derived from a couple of design guides, but I think you will get the idea. I suspect I'm not the only person suggesting the LM3914 - it is a venerable old chip and it even has a Wikipedia page [LINK]

Here are some relevant design ideas:

http://www.learningaboutelectronics.com/Articles/LM3914-dot-bar-display-driver-circuit.php
https://learn.sparkfun.com/tutorials/dotbar-display-driver-hookup-guide
http://www.nutsvolts.com/magazine/article/led-graph-circuits

The LM3914 is a bar/dot display driver that has 10 internal linear comparators with an LED output for each comparator level. Each LM3914 will drive 10 LEDs, so for >16, you'd need 2x LM3914 ICs. Texas Instruments still makes the LM3914 and it is available in 18 pin DIP or 20 pin PLCC [LINK][DataSheet].

Two DIPs might be oversized for your project, but the PLCCs (about 1cm square) should fit on the board with the LEDs - certainly if it were double-sided. All I have is MS Paint (I'm a Systems Engineer, so they don't let me have any fun tools except Excel, Word, and Project), so here's all I can make, a cartoon of a possible board layout:



To meet the current requirement, the LEDs need to be driven from a less-than-100% duty cycle supply. The LM3914 probably does not care if the LEDs are driven with DC or pulses, since the comparators provide current-mode outputs. Alternatively, you could use the low-current mode built into the LM3914, but the LEDs might be too dim if you're trying to run all 10 on less than 60mA. Ten (10) LEDs at 20mA would draw about 60mA with a 30% duty cycle. The LM3914 draws ~5mA max, so drop the duty cycle to 27% and you're under 60mA total.

There are certainly more elegant solutions, such as this one [LINK in Greek] that uses only 4 pins on a PIC 12F675 and Charlieplexing to drive 12 LEDs. With a little ingenuity, a similar circuit could be built using an ATtiny40 (or similar), since that device has 12 GPIO pins, PWM outputs (for LED duty cycling), and an A/D converter to read the potentiometer - and it's cheap, small, and versatile. With 12 GPIO pins available, you could use 6 to drive 30 LEDs, or 7 to drive 42 LEDs - since only 6 are needed, using the multi-channel A/D, a single ATtiny40 could drive 2 potentiometers. Come to think of it, a single microcontroller could drive the whole array if it was multiplexed, but that's getting more complex than necessary, since these chips cost <$1 each. A big advantage to using a microcontroller over a linear IC is that you could feed the digital values over SPI to other circuitry in your synthesizer if that might be needed for later expansion.

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