

LED Bar-Graph Compression Indicator

The circuit within this application note features THAT4301 to provide the essential function of an RMS level detector (RMS). Since writing this note, THAT has introduced several Analog Engines®, which combine a VCA and an RMS with optional opamps in one part.. With minor modifications, these newer ICs are generally applicable to the design shown herein, and may offer advantages in performance, cost, power consumption, etc., depending on the design requirements. We encourage readers to consider the following alternatives in addition to the 4301:

- *Low supply voltage and power consumption: 4320*
- *Low cost, supply voltage, and power consumption: 4315*
- *Low cost and power consumption: 4305*
- *Standalone RMS detector: 2252*

For more information about making these substitutions, please contact THAT Corporation's technical support group at apps_support@thatcorp.com.

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The following circuit is a simple schematic for indicating dynamic range compression with an LED bar-graph. It also illustrates the basics of using bar-graph indicators.

The bottom half of the schematic shows a simplified version of the typical side-chain processing often used with the THAT 4301, with a slight change to the gain scaling. The signal that will drive the LED bar-graph is picked off the tap of the Compression Ratio potentiometer. R1 is chosen so that, in parallel with R16, the loading on the potentiometer gives about a 4:1 compression ratio in the center of the pot's adjustment range.

With the gain scaling shown, the gain control constant at the output of the 4558 op amp is 52mV/dB, and the output of U4A will be approximately 1V at 20dB of compression. The output of U4A is connected to the positive inputs of U1A-D, and U5A-C, which are quad comparators manufactured by National Semiconductor. The negative inputs of these devices are connected to the individual taps of the resistor chain composed of R3, R5, R7, R8, R10, R11, and R20, resulting in comparator trip points of 1dB, 2dB, 3dB, 6dB, 9dB, 12dB, and 20dB of compression.

The bar-graph elements are essentially connected in series, with individual taps which can consecutively short out elements of the bar-graph as the level of compression increases. Power for the LEDs is provided by a simple current source formed by Q1, R4, R21, and R26, which is not temperature compensated.

Note that the comparators have no hysteresis. This may result in their oscillating at transitions, a situation which can be ignored, or remedied by adding a small capacitor across the inputs of each comparator. If the problem is ignored, be sure to add plenty of de-coupling (which you would do anyway) and watch your layout so that the currents associated with this "chatter" do not affect the rest of the circuit. You may also need to add some series resistance in the power supplies to effectively isolate this circuit.

