

Low Voltage Compressor / Limiter

The following circuit is a standard compressor / limiter adapted to run off +5 volts and -4 volts. A Linear Technology LT1054 is used to generate the -4 volt rail as shown in Figure 2.

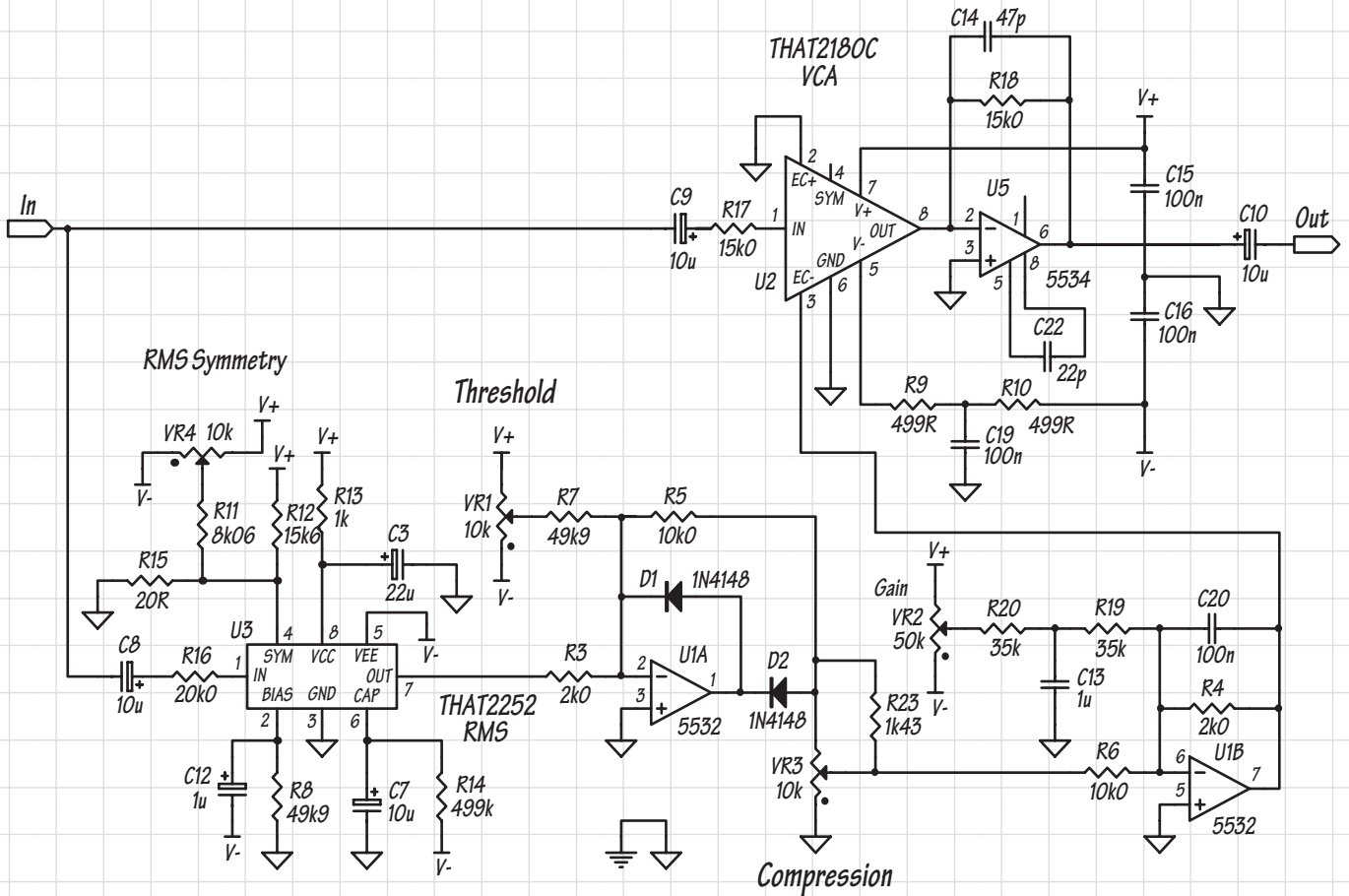


Figure 1: Low-voltage compressor / limiter

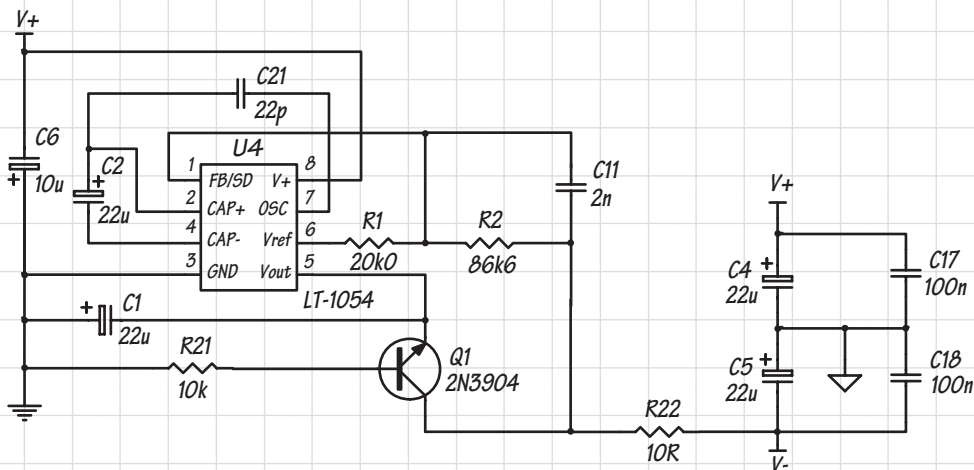


Figure 2: Regulator circuit

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U4 is a switched capacitor voltage inverter that inverts the +5 volt supply. It then regulates that -5 volts down to -4 volts. Q1 is necessary to keep U4's substrate properly biased. The filter formed by R22 and C5 isolates switching spikes from the compressor circuitry. Note: The ground connections around U1 should be kept very short and connected to the compressor's signal ground at only one point.

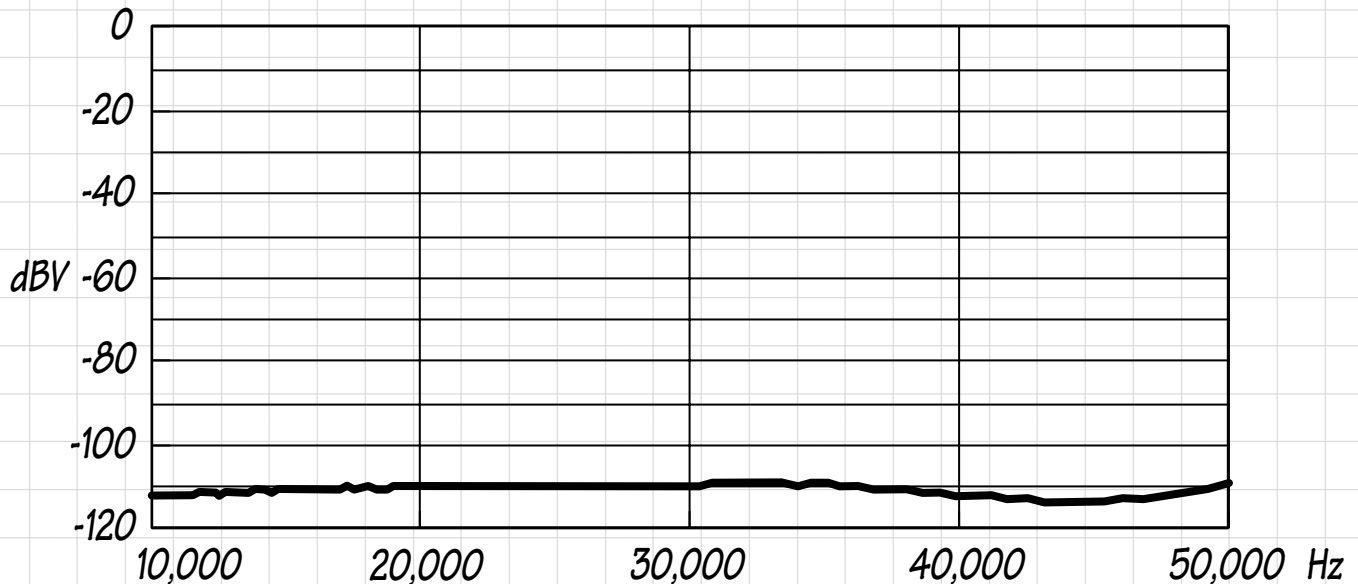


Figure 3: Noise vs Frequency

The remainder of the circuit is a standard compressor / limiter with some minor enhancements. The filter in the VCA biasing, formed by R9, R10, and C19, minimizes noise on the output. In the "gain adjust" portion of the side-chain, the filter formed by R19, R20, and C13 keeps distortion low. For further information on compressor / limiters, see THAT Corporation's Application Note 100A, "Basic Compressor / Limiter Design".

Figures 3 through 5 show the results obtainable with this circuit. Figure 3 shows output noise as a function of bandwidth. The total noise was -98 dBV, a figure which could be reduced further by increasing the value of C14 with some sacrifice in bandwidth.

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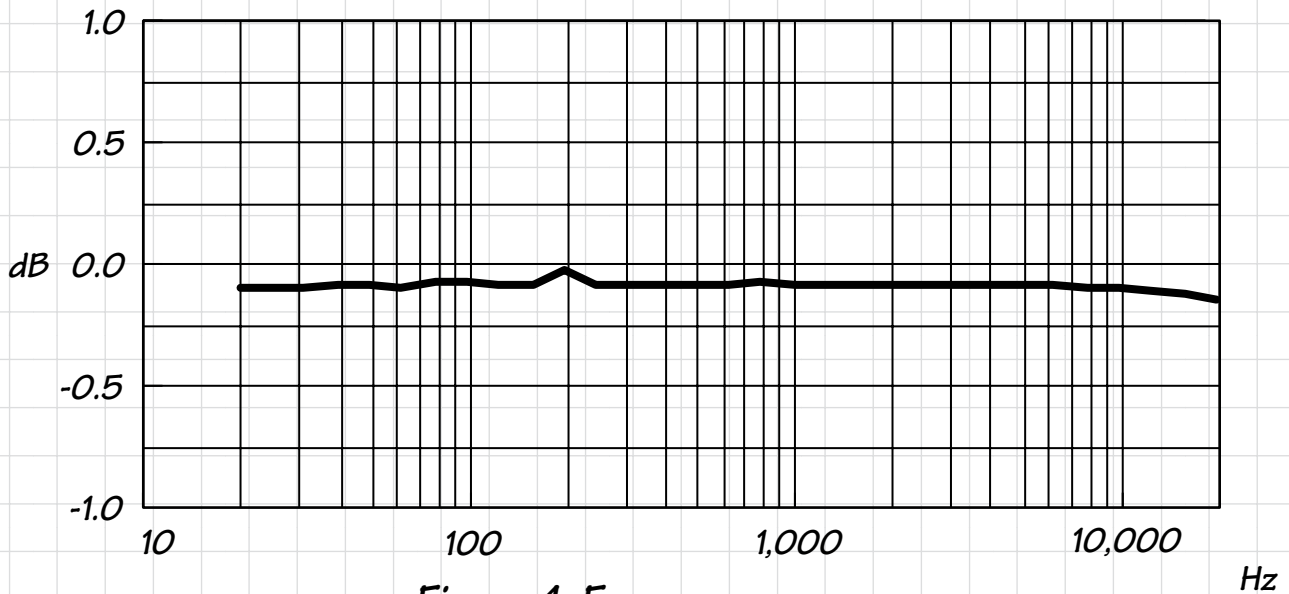


Figure 4: Frequency response

As can be seen from Figure 4, frequency response varies less than 0.25 dB from 20 Hz to 20 kHz.

Figure 5 plots THD+N versus frequency at various gain settings. As can be seen from the graph, this parameter is dominated by noise at lower gain settings.

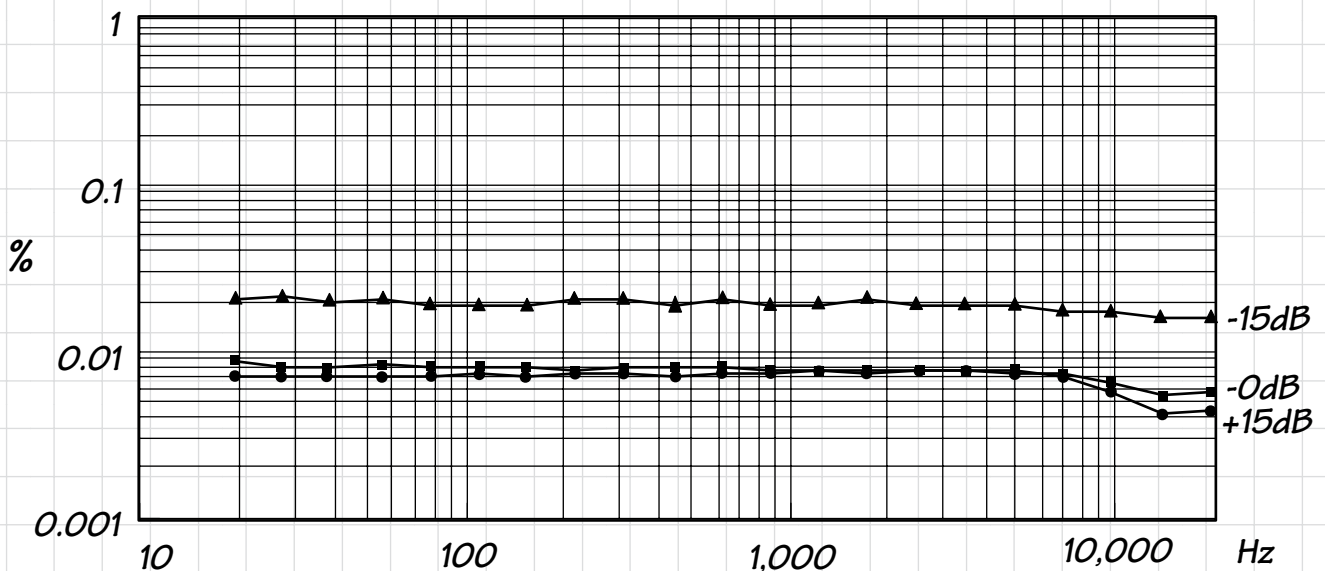


Figure 5: THD+N at various gain settings

THD+Noise at -15 dB, 0 dB, and +15 dB gain