Limiter:

Peak Full-Wave Rectifier:

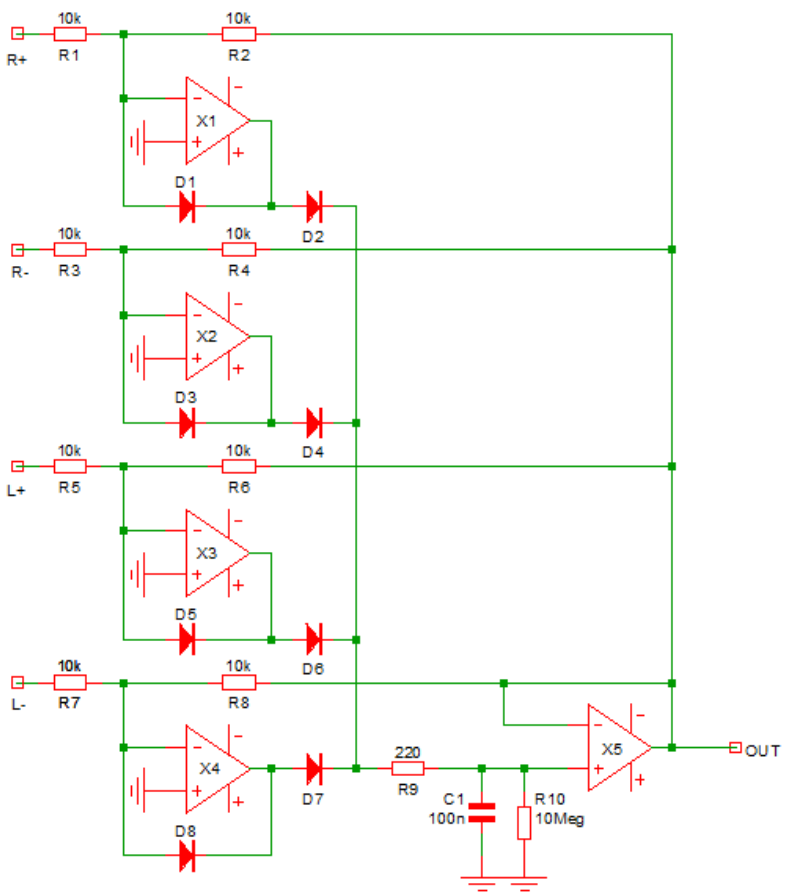
X1 to X4 are inverting and charge capacitor C1 to the highest positive voltage at any ± input.

R10 discharges C1 slowly.

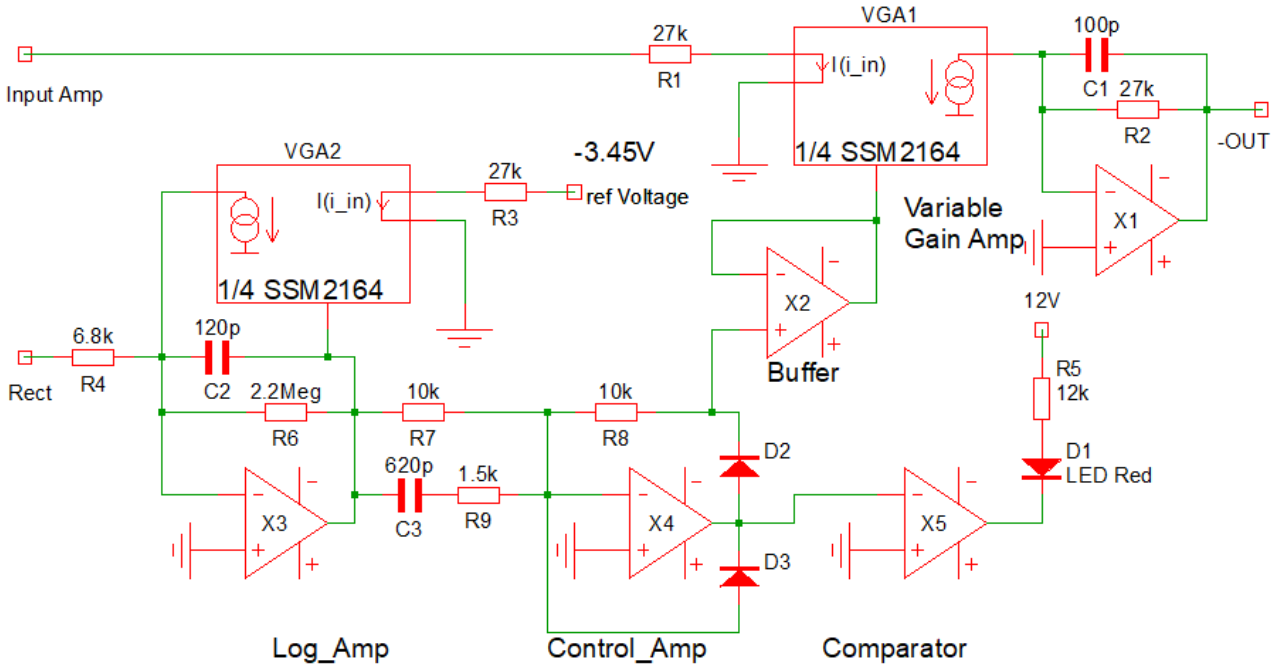
D1,3,5,8 avoid the saturation of the opamps at negative rail speeding up response.

ADA4177-4 precision opamp

X5 is a BiFet opamp with high input impedance.



The rest of the Limiter circuit.

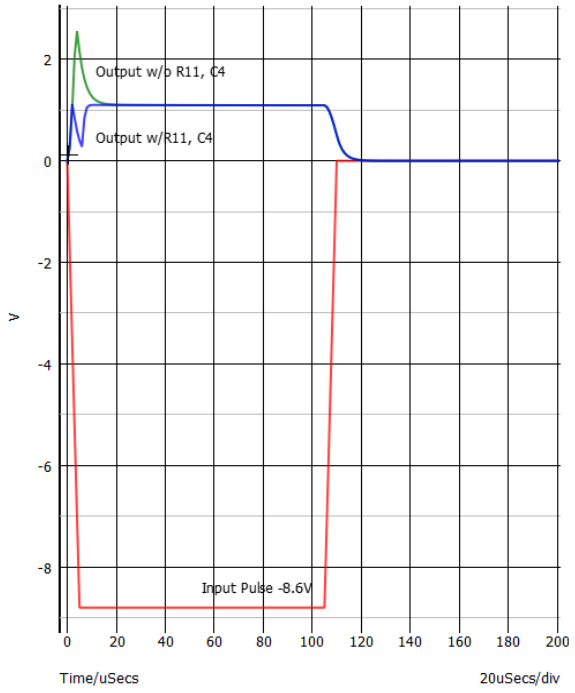


Log Amp:

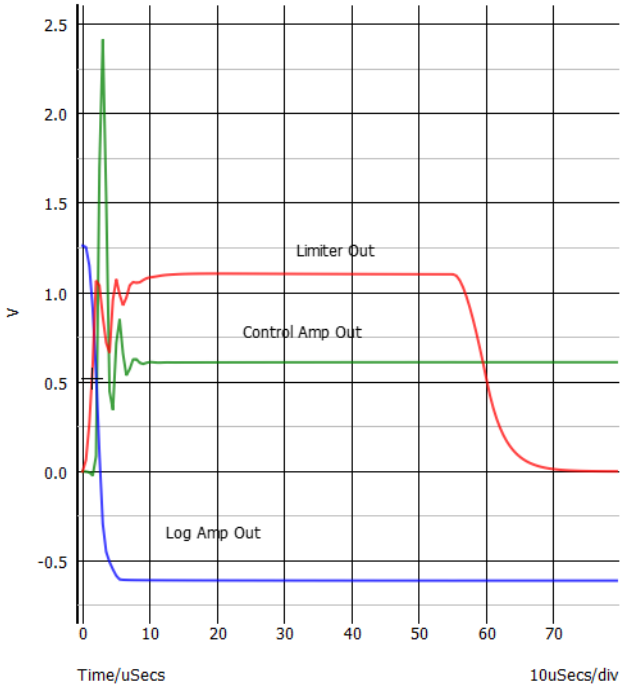
At maximum overload the rectifier will output a DC signal jumping from 0V to +8.8V with 2.2us rise time and injects a current of +130uA into R4.

Opamp X2 out (blue right pic) moves negative until the negative current out of VGA2 equals -130uA being 10x the reference current

through R3.
With a sensitivity of -33mV/dB this is 20*-33= -660mV.
When the Rect is 0V, X2_out goes positive and settles at +1.8V due to the leakage through R5 and max. –55nA output offset of VGA2.



Limiter response to overload



enlarged, higher resolution

Control Amp:
Inverts the X2 signal and adds a differential part through C3 R9 (green) speeding up the attenuation of VGA1.
Only positive polarity out.
The comparator activates a red LED when attenuation is applied.

Variable Gain Amp: SSM2164
The heart of the limiter: VGA1 input audio alternating current gets amplified or attenuated by control voltage CV. Positive values attenuate(-100dB max), 0 unchanged,negative amplify(+20dB max).
In our application we only need to lower the input signal when overload, the control voltage is 0V (normal) or positive (overload). Control voltage needs a low impedance driving source (Buffer).