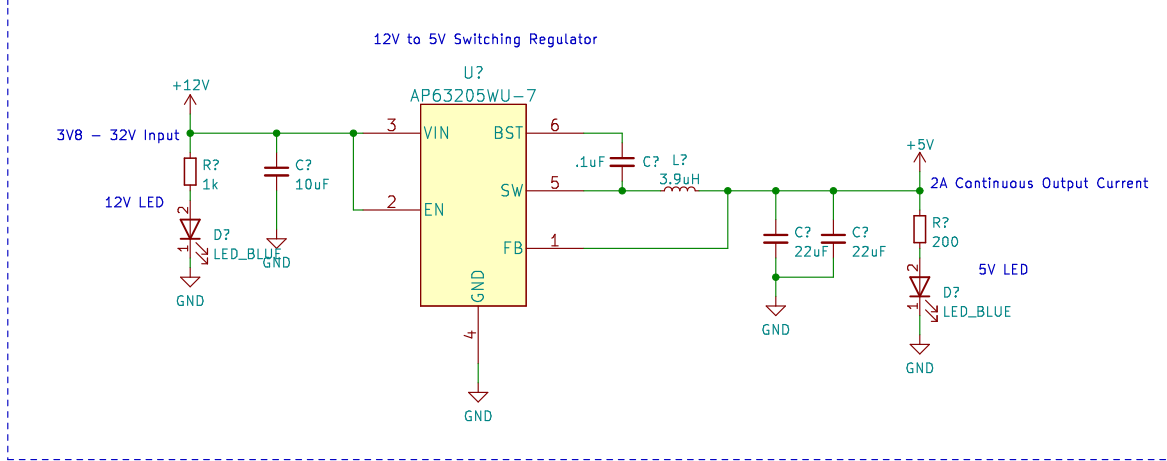
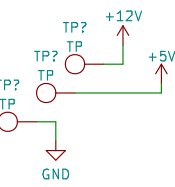


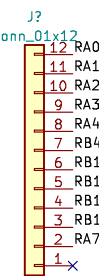
Power



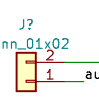
Power Test Points



Unused Pins

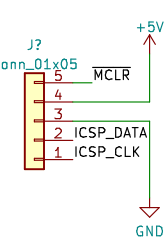


Audio Input

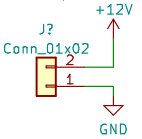


Connector Notes:
--> screw hole terminals for Audio, 12V, and Speaker Connectors
--> male or female pin headers for the remaining connectors

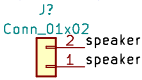
Programming Header



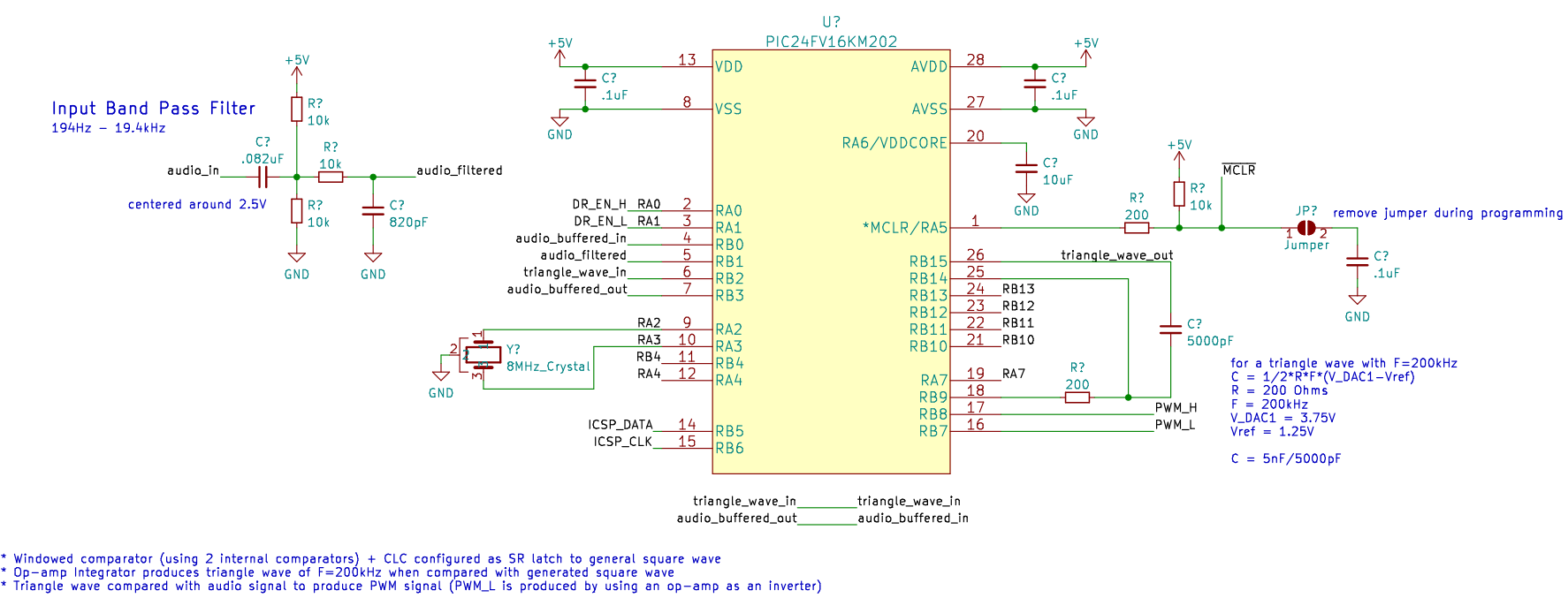
12V Input



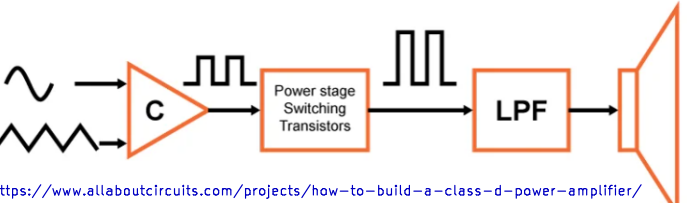
Speaker Output



MCU

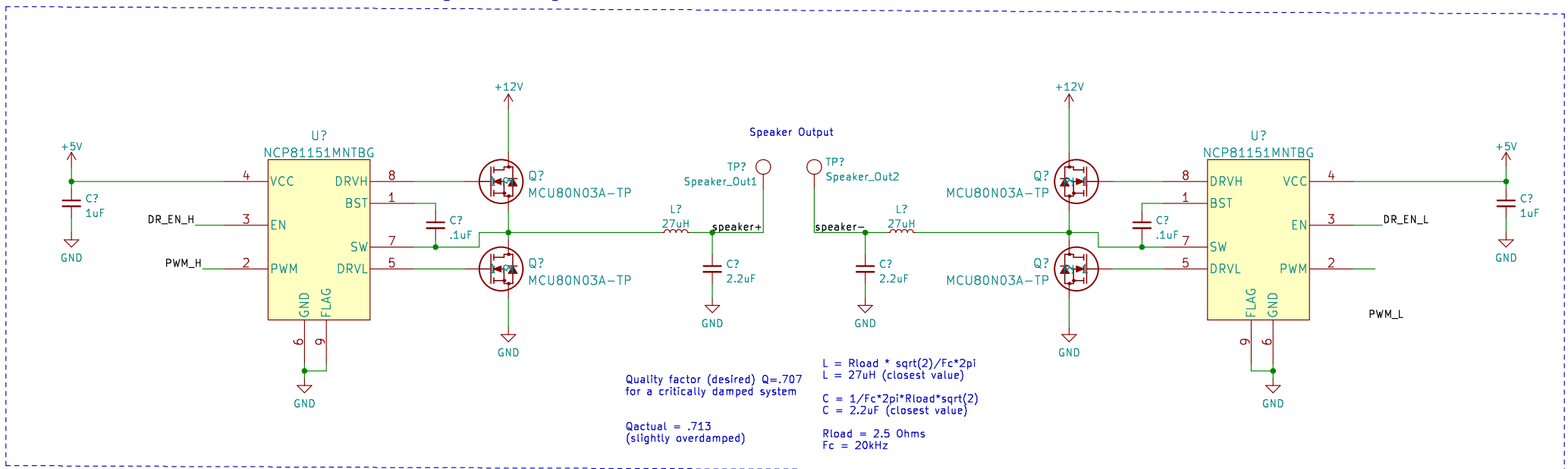


- * Windowed comparator (using 2 internal comparators) + CLC configured as SR latch to generate square wave
- * Op-amp integrator produces triangle wave of F=200kHz when compared with generated square wave
- * Triangle wave compared with audio signal to produce PWM signal (PWM_L is produced by using an op-amp as an inverter)



<https://www.allaboutcircuits.com/projects/how-to-build-a-class-d-power-amplifier/>

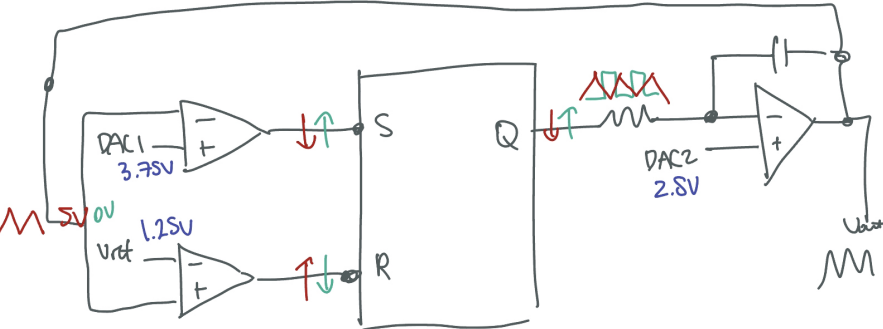
Gate Driver and Full-Bridge Stage



Quality factor (desired) Q=.707 for a critically damped system

Qactual = .713 (slightly overdamped)

$L = R_{load} * \sqrt{2} / F_c * 2\pi$
 $L = 27\mu H$ (closest value)
 $C = 1 / F_c * 2\pi * R_{load} * \sqrt{2}$
 $C = 2.2\mu F$ (closest value)
 $R_{load} = 2.5 \text{ Ohms}$
 $F_c = 20 \text{ kHz}$



Windowed comparator: 1.25V — 3.75V

