

1 Driver Amplifier

First, the Driver Amplifier was built. The associated schematic can be seen in Figure 1.

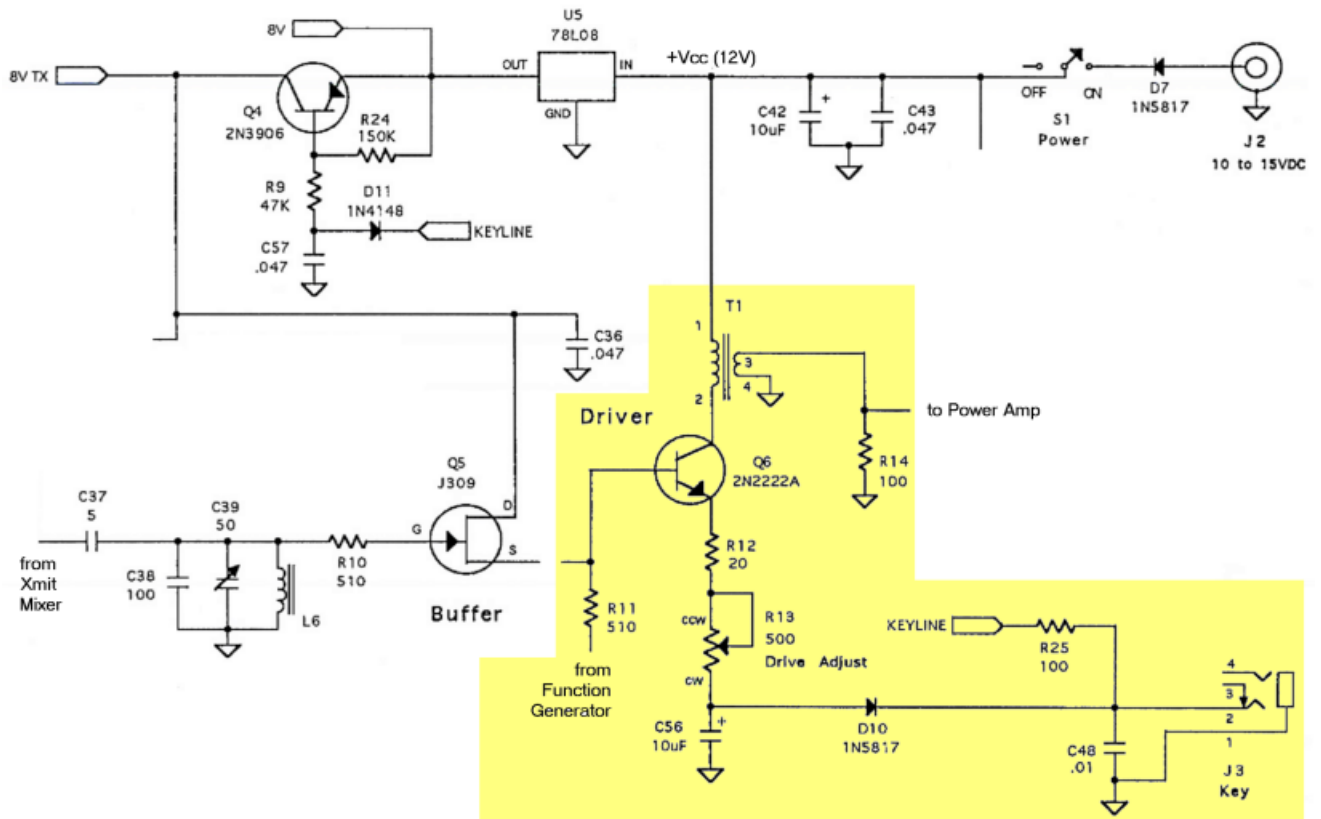


Figure 1: Circuit Schematic for the Driver Amplifier

1.1 Measured Output Voltage: V_{pp}

With the function generator set to 7.04MHz, and with an offset of 0.5V. The output voltage across R_{14} was measured to be \boxed{V} .

1.2 Calculated Output Power: P

P is calculated using the following:

$$P = \frac{V_{pp}^2}{8(50\Omega || R_{14})} \approx \frac{V_{pp}^2}{267\Omega}$$

$$\therefore P = \boxed{mA}$$

1.3 Calculated Supply Power: P_0

1.3.1 $V_{R_{12}}$

The DC voltage across R_{12} , $V_{R_{12}}$ was recorded to be \boxed{V} .

1.3.2 i_E

The emitter current, i_E , was found by:

$$i_E = \frac{V_{R_{12}}}{R_{12}} = \boxed{mA}$$

1.3.3 Supply Power: P_0

V_{cc} was measured at the 1Ω resistor across S_1 , and found to be \boxed{V} . Therefore, the DC supply power $P_0 = (V_{cc} \cdot i_E) = \boxed{mW}$

1.4 System Efficiency: η

The efficiency η was calculated to be:

$$\eta = \frac{P}{P_0} = \square = \boxed{\%}$$

1.5 Amplifier Gain: G

The gain G was found to be:

$$G = 10 \log \left(\frac{P}{P_+} \right) \text{dB}$$

$$P_+ = \frac{V_{+pp}^2}{8R_s}$$

$$V_{+pp} \equiv \text{Function Generator Amplitude}$$

$$R_s = 50\Omega$$

$$\therefore G = \boxed{\text{dB}}$$

1.5.1

When R_{13} is fully clockwise (max), the voltage gain was found to be: $G_{v(Max)} = \left(\frac{v}{v_i} \right) = \square$.

1.5.2

When R_{13} is fully counter-clockwise (min), the voltage gain was found to be: $G_{v(Min)} = \left(\frac{v}{v_i} \right) = \square$.

1.6 Miller Capacitance, C_M

Using $G_{v(Max)}$, the Miller Capacitance, C_M was found using:

$$C_M =$$

(Note: At the end of this step, the other end of R_{11} was soldered).

2 Buffer Amplifier

Figure 2 shows the schematic of the Buffer amplifier

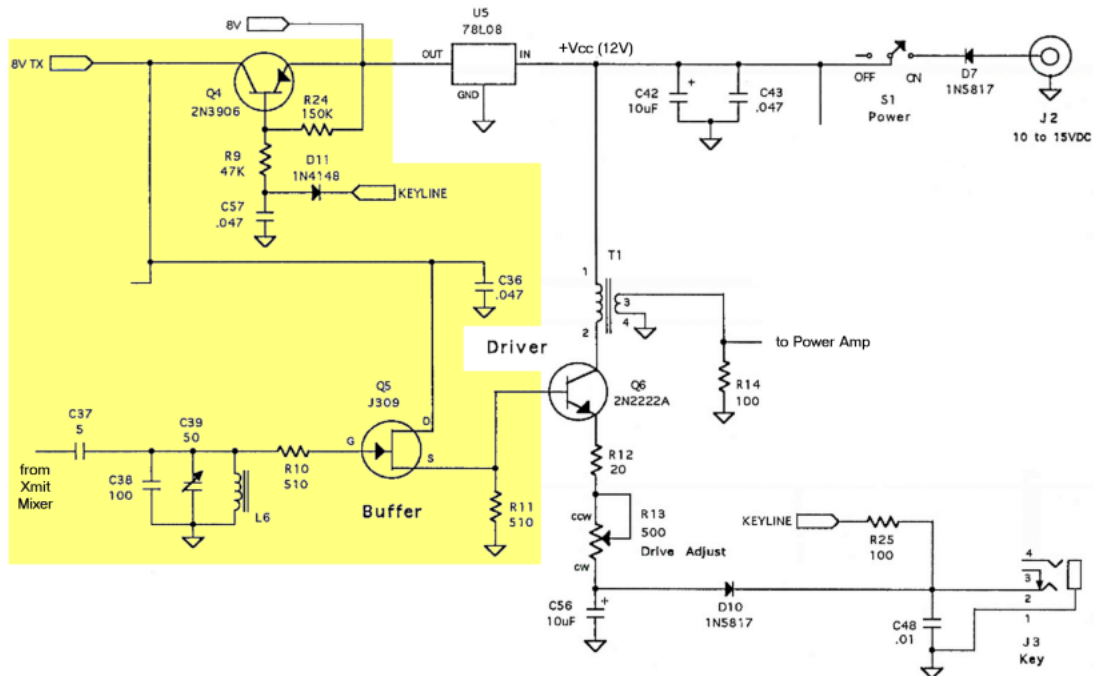


Figure 2: Circuit Schematic for the Buffer Amplifier

Such a circuit is a source-follower, and therefore has no impedance gain and a high input impedance. The function generator was connected to C_{37} with the $1.5k\Omega$ resistor. The frequency used was $7.04V$ and the amplitude was $1V_{pp}$.

2.1 Max Voltage Across R_{10}

C_{39} was adjusted for maximum voltage. The measured maximum value was V .

2.2 Voltage Gain across R_{11}

The voltage gain was measured to be dB .

2.3 Power Gain

Given that a $1.5k\Omega$ resistor is at the input and a 510Ω is at the load, the power gain was calculated to be dB