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ECEN 2420
On-Site Homework 9
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1 Driver Amplifier

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

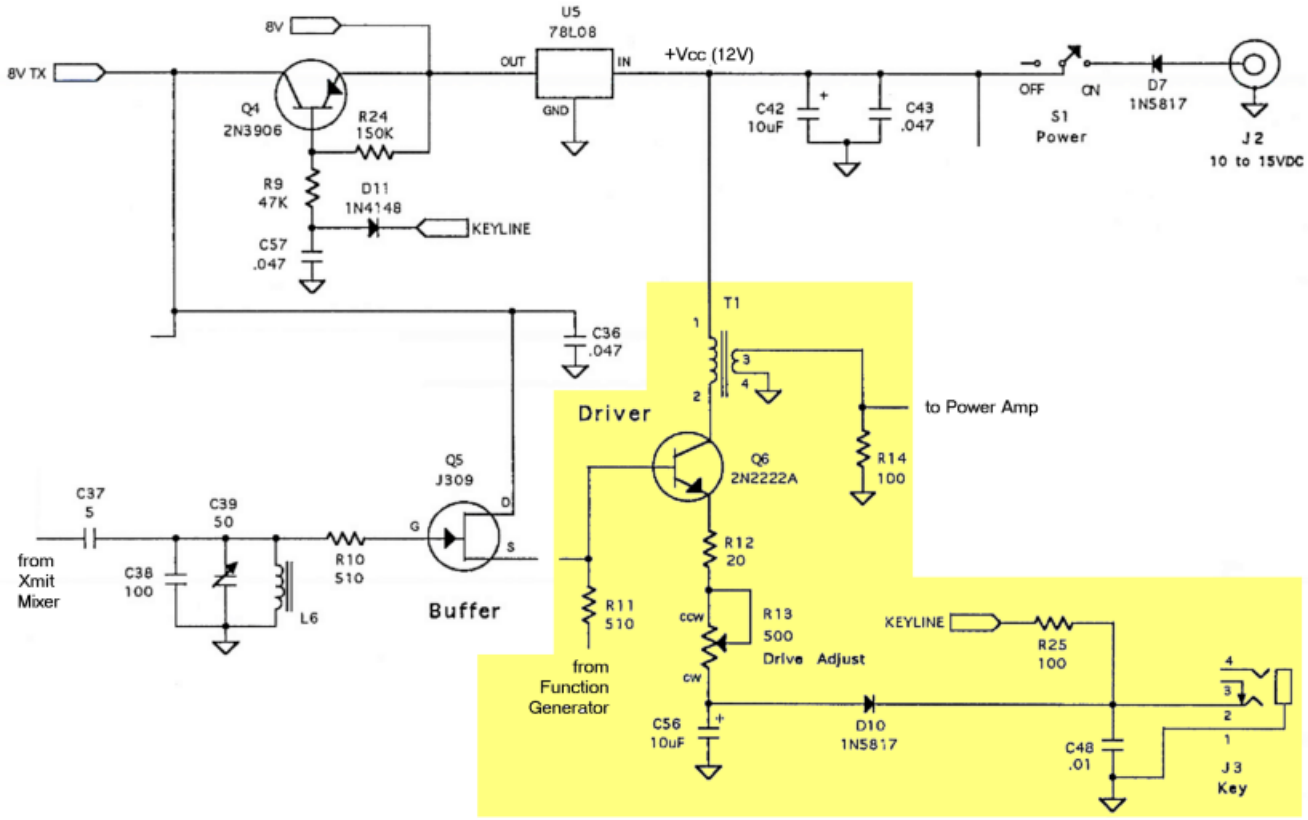

Figure 1: Circuit Schematic for the Driver Amplifier

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:

$$G = 10log\left(\frac{P}{P_+}\right)\text{dB}$$
$$P_+ = \frac{V_{+pp}^2}{8R_s}$$
$$V_{+pp} \equiv \text{Function Generator Amplitude}$$
$$R_s = 50\Omega$$
$$\therefore G = \boxed{\text{dB}}$$

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.

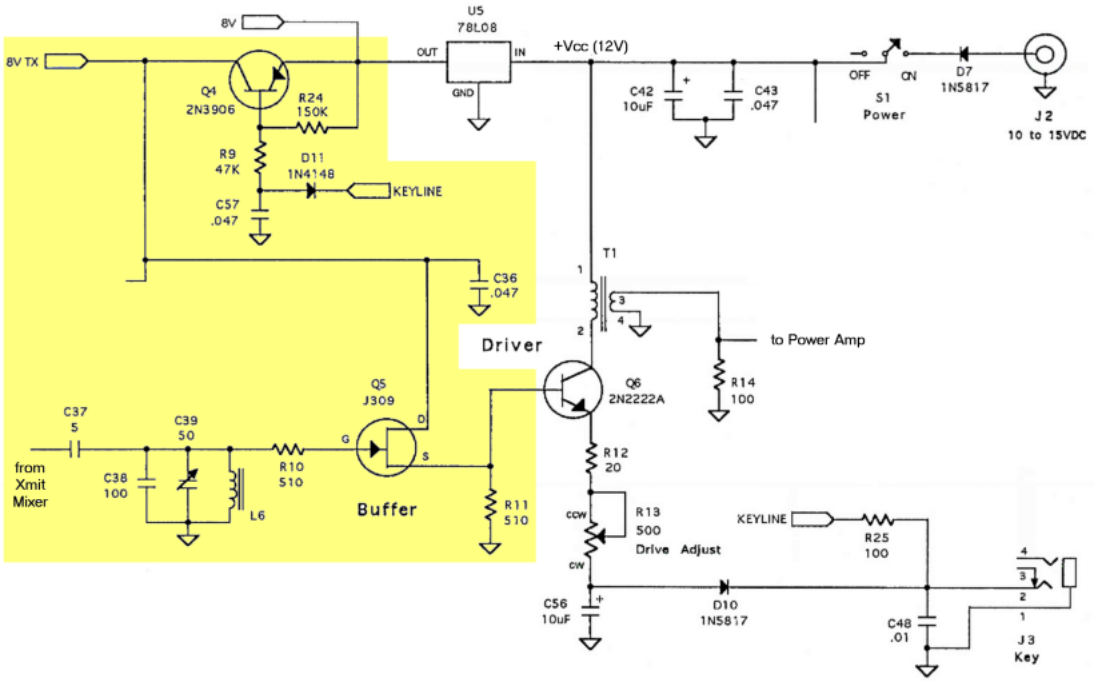

Figure 2: Circuit Schematic for the Buffer Amplifier