Notes on Piezo Driver for Menlo

Input C = 32 nF, bandwidth is 10 kHz, so we'll design circuit for 20 kHz.

How much current?

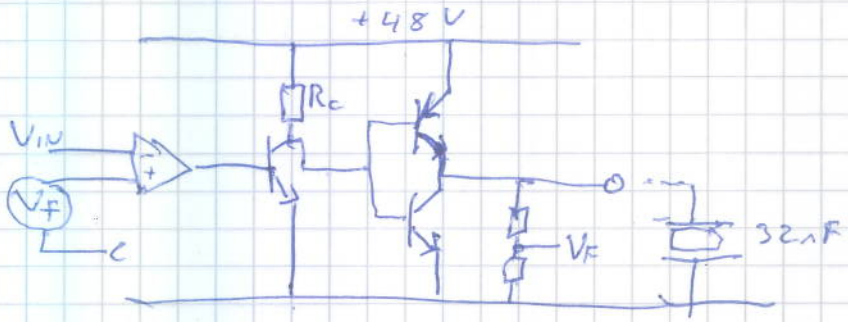
$$I = C\,dV/dt = 3.2\times10^{-8}\cdot 50V/t \times 2.0\times10^{4}$$

$$= 3.2\times10^{-3} = 3.2\,mA$$

Power is $50\times 3.2mA = 0.16W$

We'll use a DC-DC converter to general 48V, eg. RID-0524 (706-3657)RS gives isolated ±24V at 21mA.

Basic Circuit 25



Need push-pull output stage as R_C would dissipate too much power to get acceptable bandwidth:

$$2\pi f C = 1/R \Rightarrow R = 200\Omega \Rightarrow \frac{48^2}{200} = 9W$$

Make divider 10:1 so $5V_{IN} = 50V_{out}$

Transistors KSP2907ATA (PNP -60V/-0.6A) (TO92)
2N4401 (NPN 60V/0.6A) or 2N2905 (TO39)

Current gain ≈ 100
so $R_C = 10^4\Omega$ okay ($P = 1/4\,W$)
Probably use 20K.

Power op-amp off 24V → 12V switching regulator
eg TSR 1-24120 (draws 1mA, 90% eff.)
(666-4385)

Single supply op-amp TI: TLC271A (needs bias connection)
CA3140