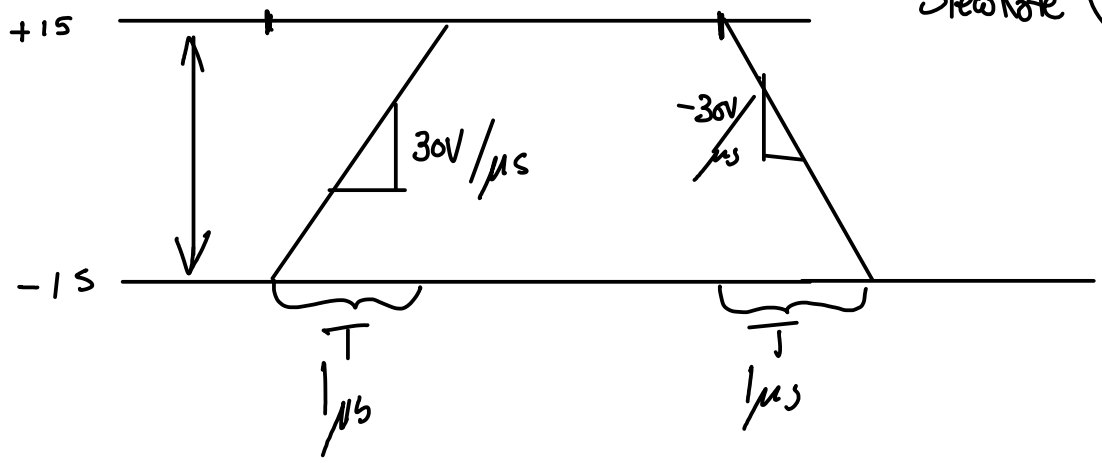
Lecture 6

Exercise 1: The RS-232 standard specifies a maximum slew rate of 30V/μs. Assuming a voltage swing of 30 volts, what is the maximum data rate for which two signal level transitions occupy 10 % of the bit period?

$\frac{V_{swing}}{SlewRate}\left(\frac{V}{V/\mu s}=\mu s\right)$

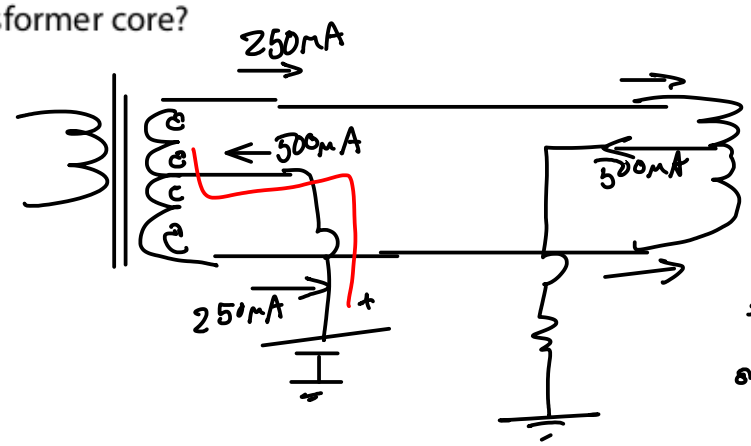


$1\mu s + 1\mu s = 10\%$ of T_{bit}

$2\mu s = 0.1 T_{bit} \quad T_{bit} = 20\mu s.$

$f_{bit} = \frac{1}{T_{bit}} \quad f_{bit} = \frac{1}{20\times10^{-6}} = 50\ kHz$
$50\ kb/s.$

Exercise 2: If the common-mode circuit is used to carry 500mA, how much current flows through each half of the transformer secondary? What is the net effect on the flux in the transformer core?



zero net effect on flux

Exercise 3: When the input to the optocoupler is high, will the output be high or low? Assume a pull-up is connected to the output.

input high → LED ON

LED ON → photo transistor on

transistor on → output pulled low.