

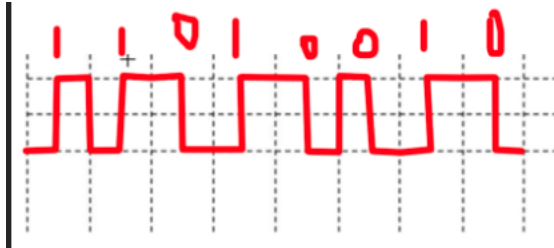
# CS 43I Homework 2

Soham Karanjikar

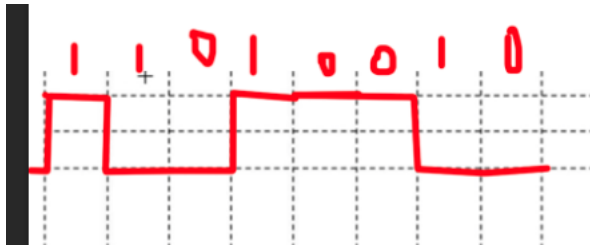
## I ANSWERS

1. a) 784Hz b) 240Hz

2. a)i)Manchester

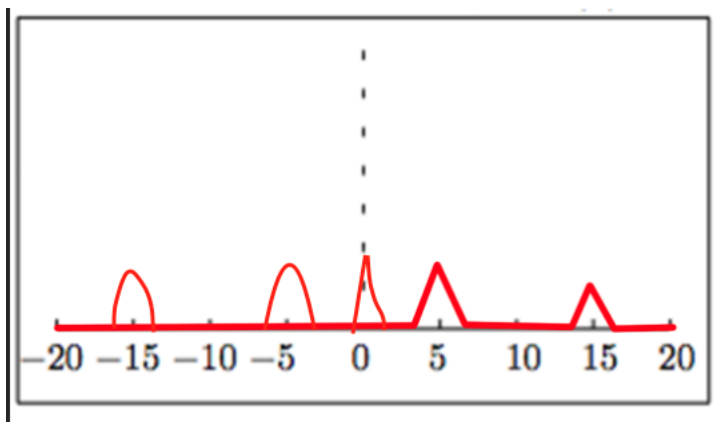


ii)NRZI



b) Manchester coding is clock friendly because the transitions only occur at clock falling edges and their new values can be detected on the rising edge of clock. NRZI is not clock friendly because long series of 1's or 0's can be misread as there is no definite transition.

c) It has higher bandwidths because it only requires half the clock width to send the same data as Manchester. 3. a)



b) Theoretically 30Hz should be minimum of needed sampling rate. However practically you

would want something 60Hz or above.

c)i) 40Hz

ii) butter[2,0.1]

d)order = 3, range of cutoffs (approximately) =  $4301.65782\text{Hz} = 2000\sqrt[6]{99}$  to  $4542.80148\text{Hz} = 2500\sqrt[3]{6}$  Plug into formula given on homework sheet with  $\theta = .1$  for  $w = 2000$  and  $\theta = .8$  for  $w = 5000$

4. a) Shielding cables reduces noise and using twisted pair cables.

b) To reduce deterministic error you can calibrate device and add offsets/estimate a value if what is read is an outlier.