

COMP2300

Encoding and Transmission

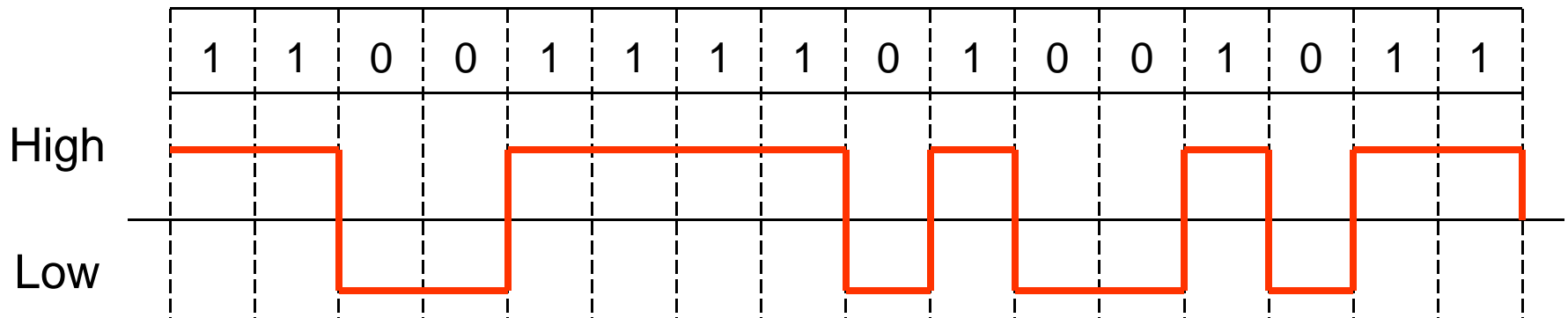
From Computer Organization and
Architecture, Linda Null and Julia
Lobur, ISBN 0 7637 0444 X

Codes for Data Transmission and Recording

- Digital switches, such as memories, are either on or off with nothing in between
- But how do we represent data when transmitted over a network?
 - binary signal can become blurred, particularly for long strings of ones and zeros, due to time drift between sender and receiver
 - also true for data stored on a recording medium like a disk or tape
- Thus ASCII (or other) representations are translated into other codes before transmission
 - user and host computer oblivious to this translation

Non-Return-to-Zero Code

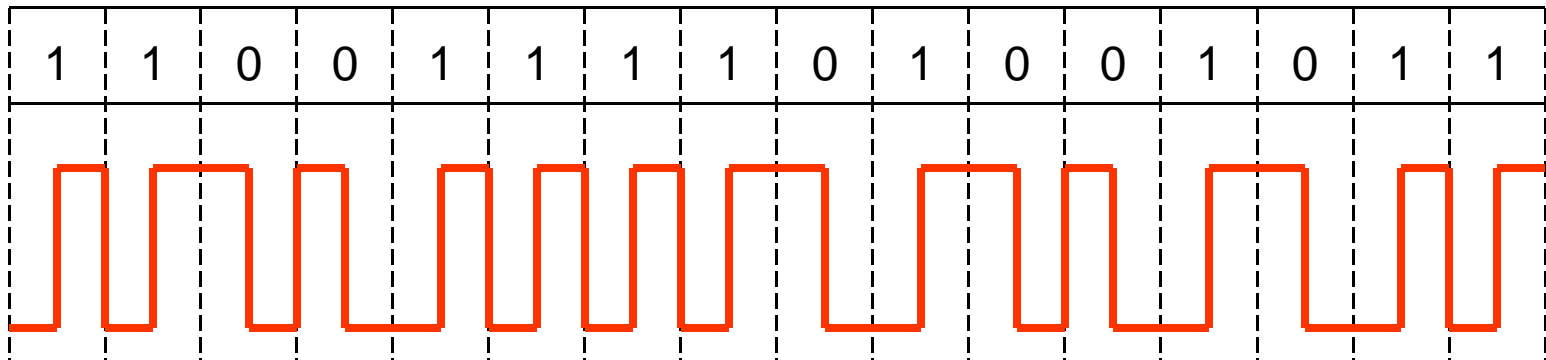
- Highs and lows represent 1s and 0s
 - high 3-5V, low 0-3V
- Consider ASCII code for OK
 - 11001111 01001011
 - What is strange about this ASCII code?
- Each bit occupies an arbitrary period of time on the network



- Long runs of 0's or 1's are difficult to identify unless the sender and receiver are perfectly synchronized

Phase Modulation (Manchester Coding)

- Provide a transition for each bit



- What is the disadvantage?
- Other alternatives include frequency modulation, run-length-limited code etc

Physical Transmission Media

- Physical and electrical properties of guided media (cables) determine their ability to convey signals of a given frequency over various distances
- Attenuation in copper wires results from the interactions of several electrical phenomena
 - resistance and interference
- Electrical phenomena that work against accurate transmission of signal is called noise
 - cables rated according to how well they convey signals at different frequencies

Cables

- Coaxial
 - was medium of choice
 - cable TV transmits at about 2Mbit/sec
- Twisted pair
 - two wires one to send one to receive
 - twisted to reduce inductance, but more expensive as requires more wire
 - capable of >100Mbit/sec
- Fibre optic cable
 - Support Tbit/sec and transmit over 100s of km
 - fibres may support 1 or multiple wavelengths of light

