Friday's Quiz Notes

The baud rate is the number of symbols (signals) per second.

Data Encoding Methods

There are different techniques that are used based on the data you have and the type of transmission (digital vs. analog)

Digital Data / Digital Signal
Digital Data / Analog Signal
Analog Data / Digital Signal
Analog Data / Analog Signal

Non Return to Zero (NRZ) –

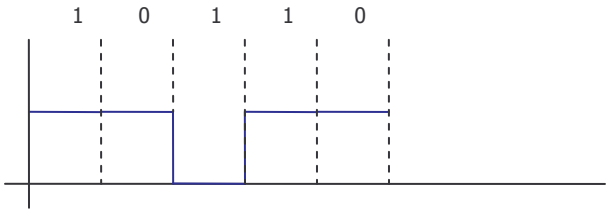
You have a voltage level that remains constant throughout the bit

Disadvantages:
When transmitting long strings of the same value, there are no edges and it becomes difficult for the receiver to distinguish the value being received. It may result in the loss of synchronization between the receiver and the transmitter.

NRZI

The voltage is constant for the duration of the bit.

There will always be a transition at the beginning of a 1.



This is a **differential signaling technique**.

Advantages

- Logical 1 provides edges for synchronizing the transmitter and receiver
- Allows differential signal wires to be swapped

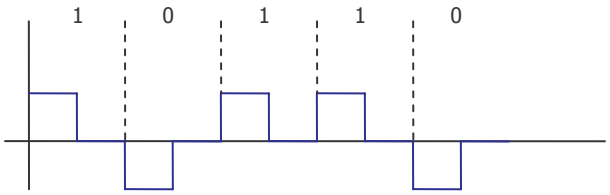
Disadvantages

- Synchronization will still be a problem for a long string of zeros.

Transmitter Details

Return to Zero (RZ)

Between every bit, the signal turns to logical 0



Disadvantages

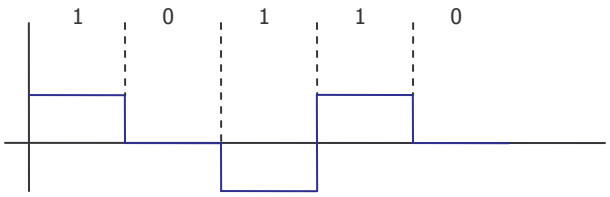
- Three levels, yet encodes only one bit per signal
- Requires more bandwidth

Advantages

- Long string of 1s or 0s
- Does not result in a loss of synchronization

Bipolar AMI (Alternate Mark Inversion)

Mark implies logical 1
A space is a logical 0



Advantages

- Long strings of 1s don't give synchronization a problem
- Gives a way of recognizing an error in the data stream. Eg: 1 0 1. If both 1s are high, there is an error because the mark did not get inverted. Also, if two bit frames in a row are high, there is an error

Disadvantages

- Zeros cause a problem

T1 lines use a variant of this Bipolar AMI called B8ZS, or Bipolar 8-zero substitution. Any times there are 8 zeros in the bit stream, it replaces it with something.

B8ZS – Bipolar 8-zero substitution

Eight zeros in a row are replaced by 0 0 0 V B 0 V B