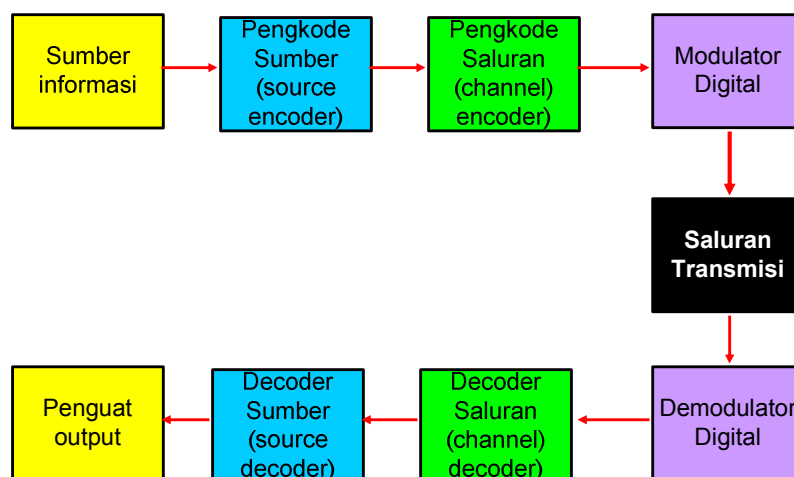


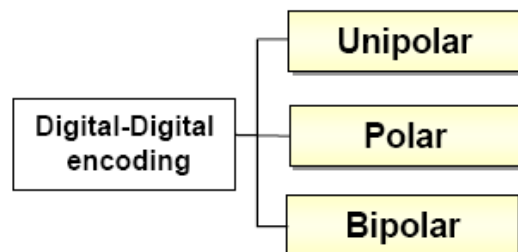
LINE ENCODING

Blok Diagram Transmisi Data

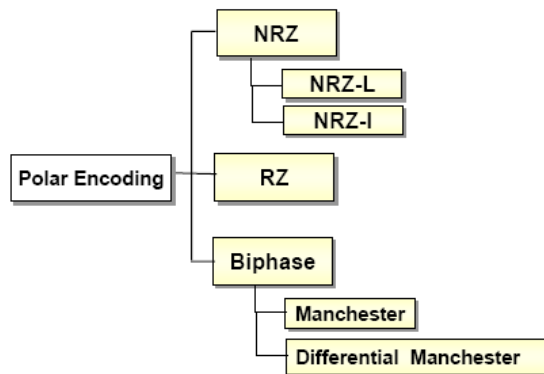


- Source Coding :
untuk kompresi
- Channel coding :
untuk kehandalan/
meminimalisir error

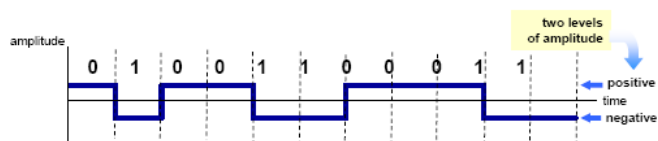
Types of Digital-Digital Encoding



Polar Encoding

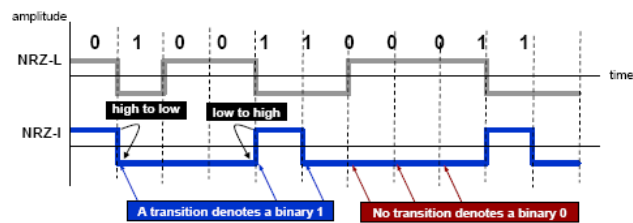


NRZ-L



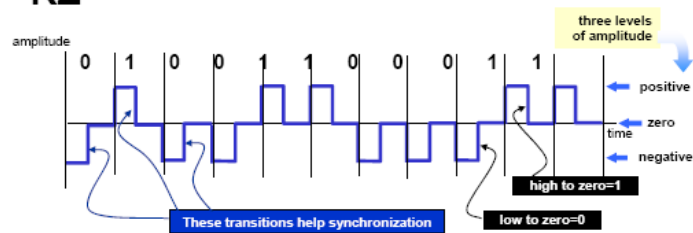
- NRZ : no signal changing inside a bit
- NRZ-L : Nonreturn to zero, Level
- The signal level represents the bit value ; 0=positive, 1=negative
- Same problems with unipolar (DC and Synchronization)

NRZ-I



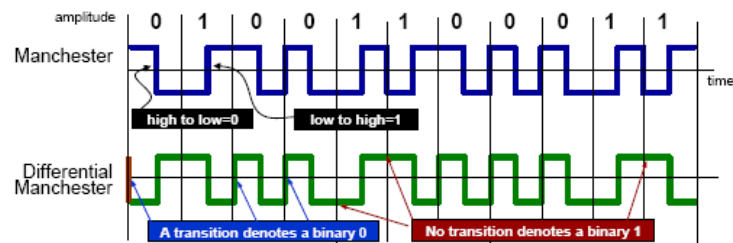
- NRZ-I : Nonreturn to zero, Invert
- 1 = transition at beginning of interval;
0 = no transition at beginning of interval
- better synchronization by the changing of a binary 1; a string 0s can still cause problems

RZ



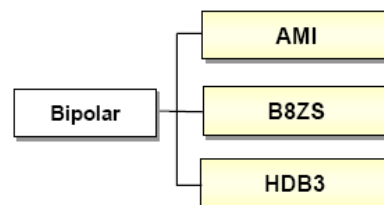
- The signal returns to zero level at the middle of each bit
- High to zero =1; low to zero=0
- better synchronization than NRZ-L and NRZ-I
- need more bandwidth to encode signal

Biphase

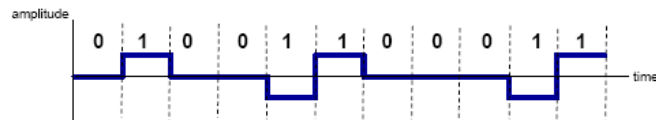


- The signal changes at the middle of each bit but does not return to zero
- Manchester : low-to-high =1; high-to-low=0
- Differential Manchester : absence of a transition =1; presence of a transition=0
- Self-clocking codes and no dc component

Bipolar

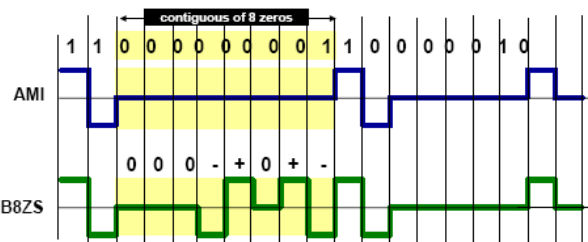


Bipolar AMI



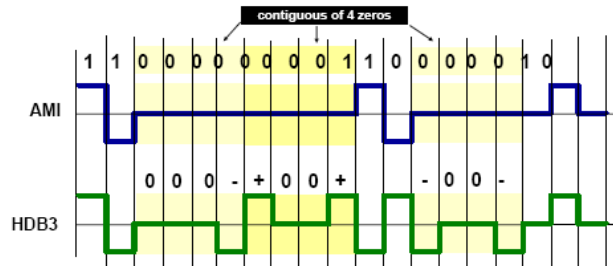
- AMI = Alternate Mark Inversion = Alternate 1 Inversion
- a binary 1 must alternate in polarity;
no line signal represents a binary 0
- pseudoternary : a variation of AMI, in which binary 0 alternates in polarity
- Advantages :
 - no net dc component
 - no loss of synchronization for a long string of 1s;

B8ZS



- B8ZS=Bipolar 8-zeros substitution
- commonly used in North America
- Provide synchronization of long string of 0s
- Force signal changes when eight 0s occur in succession

HDB3



- HDB3=High-Density Bipolar 3
- commonly used in Europe and Japan
- Provide synchronization of long string of 0s
- Force signal changes when four 0s occur in succession

HDB3 encoding

Number of bipolar pulses since last substitution is ODD

polarity of the last pulse is positive

+ 0 0 0 0

+ 0 0 0 +

polarity of the last pulse is negative

- 0 0 0 0

- 0 0 0 -

Number of bipolar pulses since last substitution is EVEN

polarity of the last pulse is positive

+ 0 0 0 0

+ - 0 0 -

polarity of the last pulse is negative

- 0 0 0 0

- + 0 0 +