



# Line coder

Teleinstallationstekniker

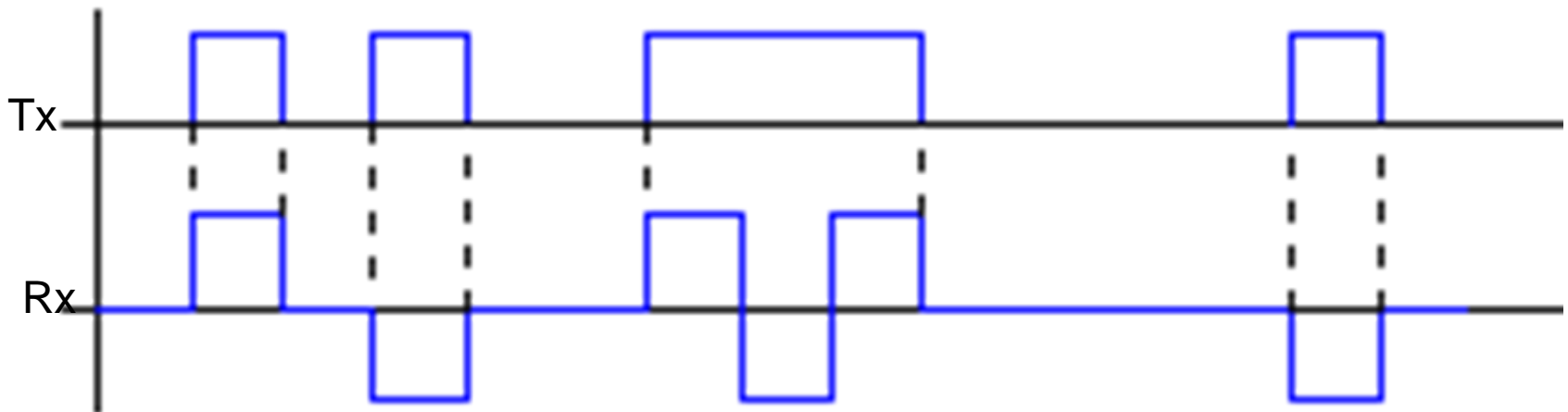
H1 2009

Lkaa

# Clock



- Transmissions udstyr benytter clock information til "læse" bittene op det rigtige tidspunkt!



# Line koder

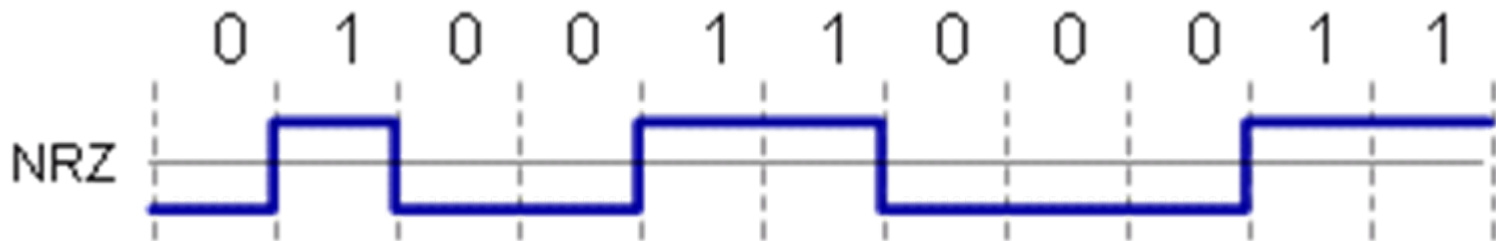


- ITU-T G703 beskriver digitale line koder
- Følgende koder gennemgås
  - NRZ
  - NRZI
  - HDB3
  - CMI
  - 2B1Q

# NRZ



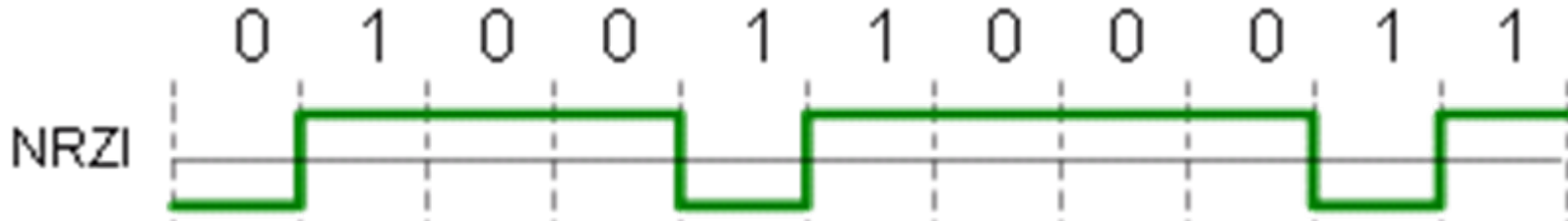
- NRZ = Nonreturn to zero
- Lave bit hastigheder (seriel)
- Dårlig clockrecovery!!!



# RZ



- **NRZI Nonreturn to Zero Inverted**
- Ved lange 1 strenge af 1 taller kan clocken uddrages ikke ved 0'er
- Benyttes ved Ethernet



# HDB3



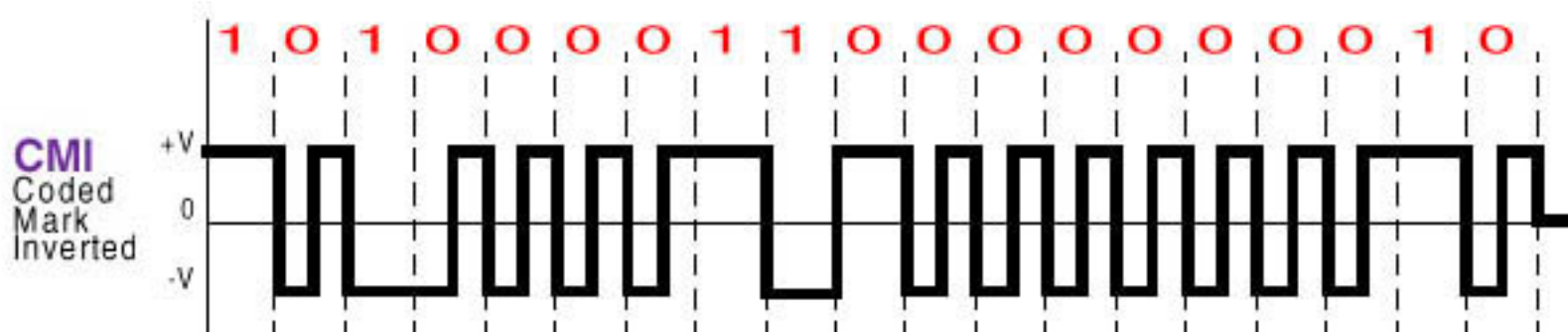
- HDB3 = High Density Bipolarity
- Max 3 stk. 0 efter hinanden derefter et 1
- 1001 erstatning
- 0001 erstatning
- Benyttes på 2,8,34 Mbit/s elkabelsystemer



# CMI



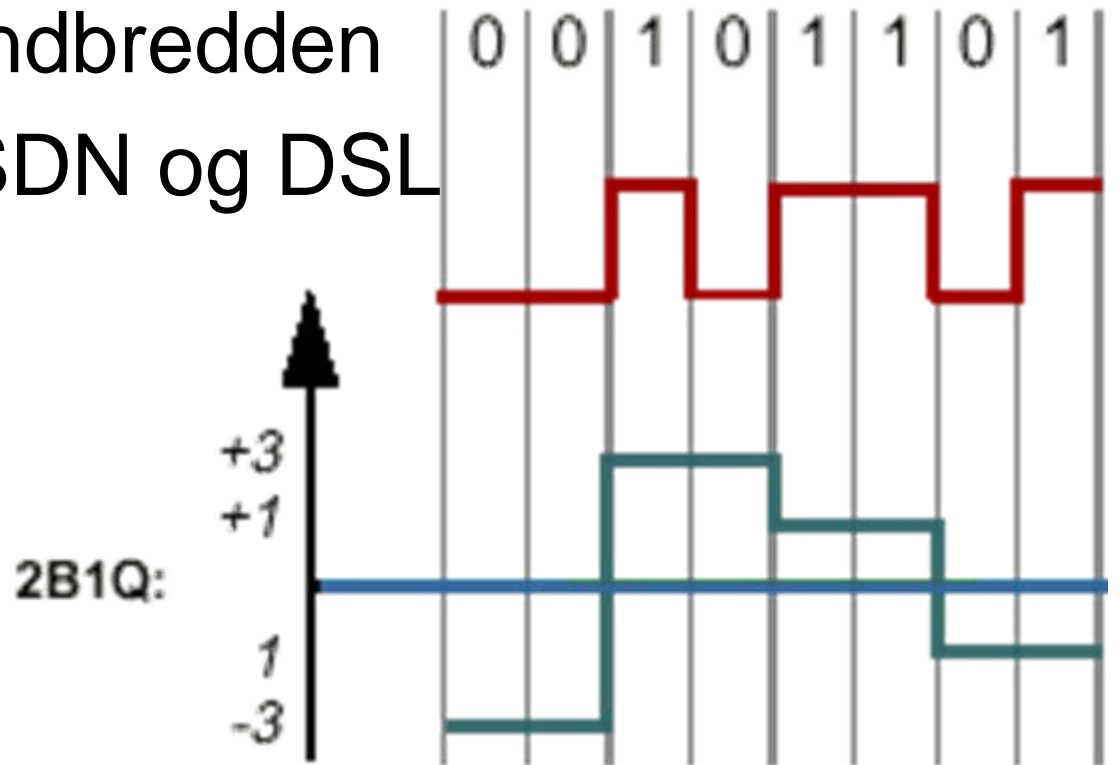
- CMI = Coded Mark Inversion
- 2 nivauer
- Non-return-to-zero kode



# 2B1Q



- 2 bit i en bit (4 niveauer)
- Reducere båndbredden
- Benyttes til ISDN og DSL





# 2B1Q

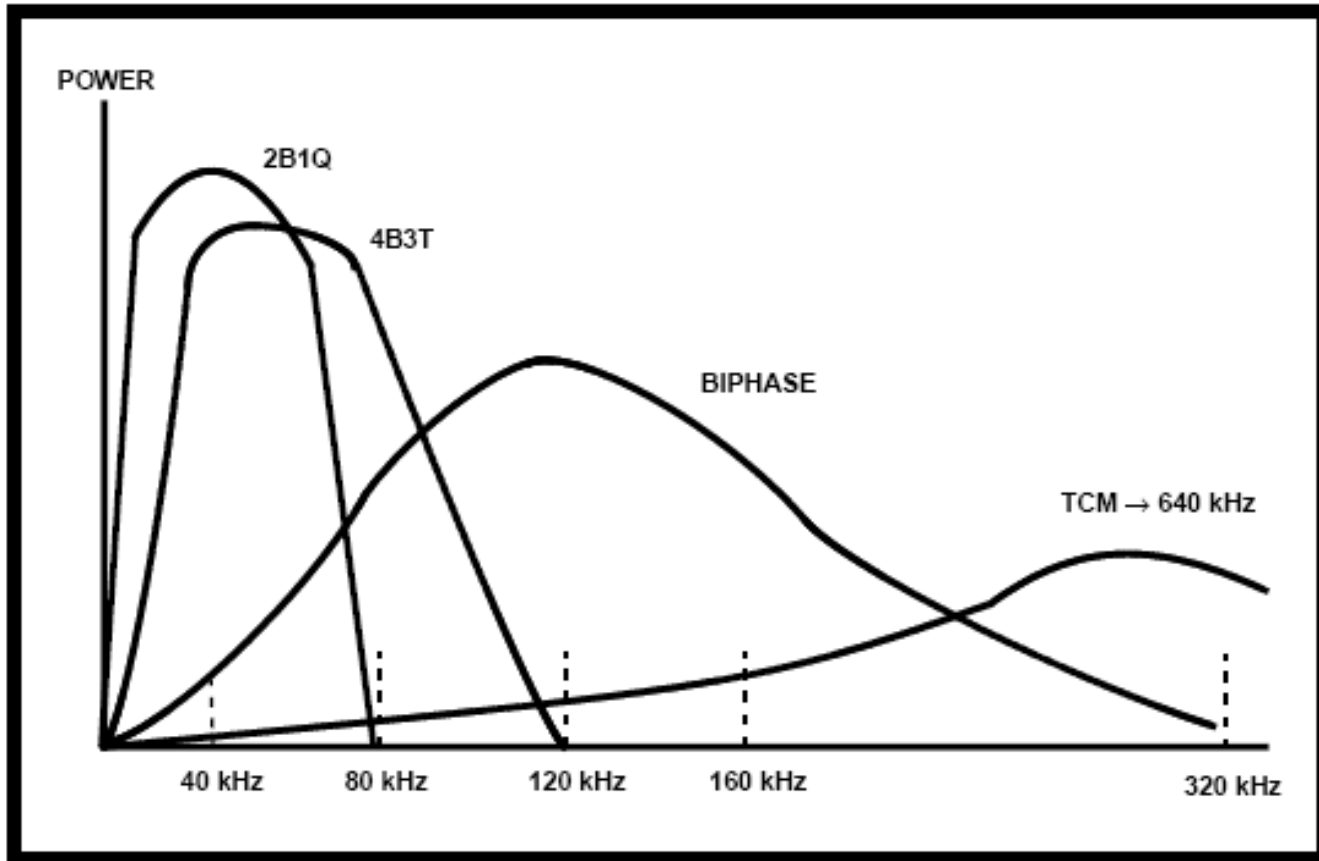


Figure 3 - 2B1Q Power Spectral Density Comparison