Clause 98 for 10SPE@15m

5.7.2017

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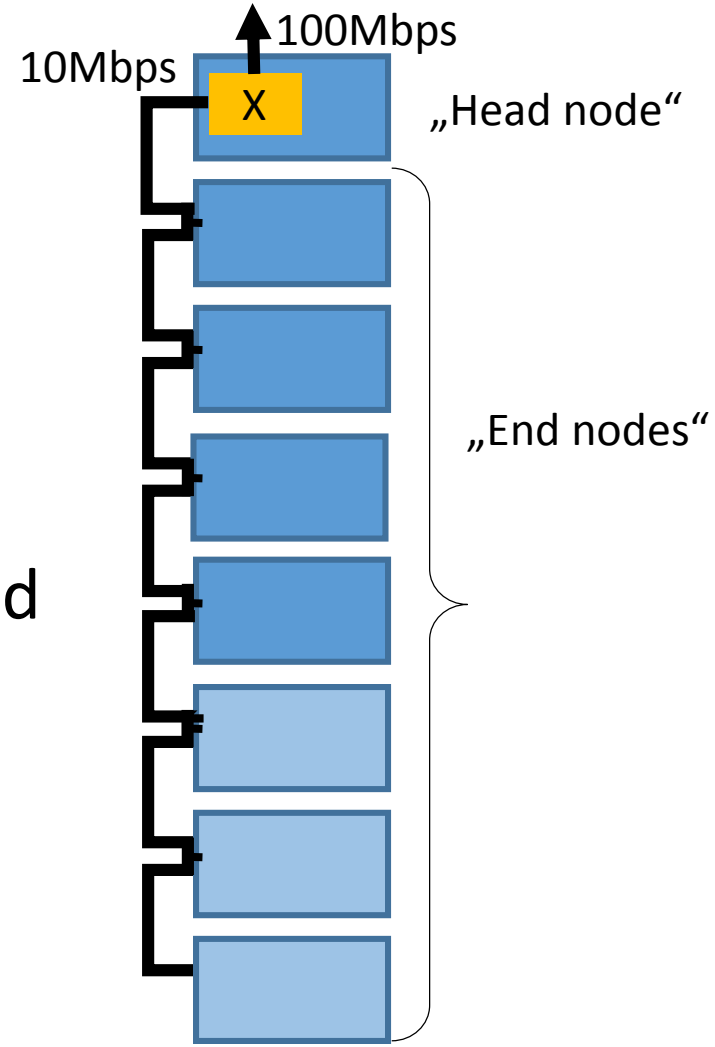
Starting point

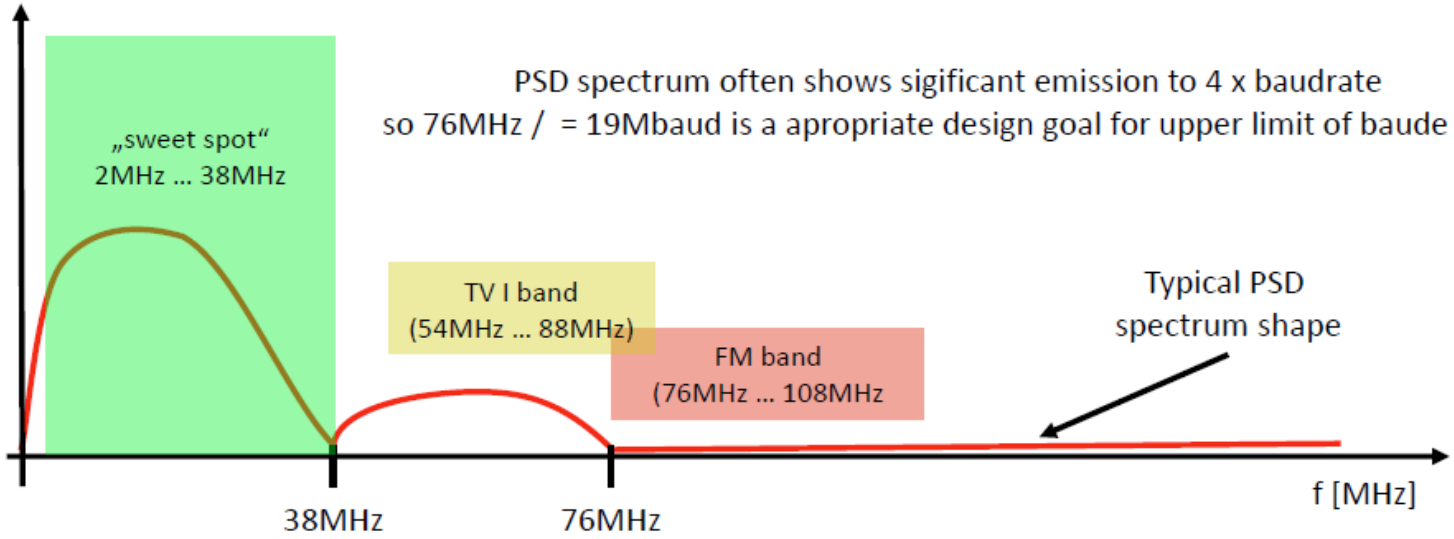
Assuming

- A full and half duplex channel (P2P and P2MP)
- A TDMA multidrop scheme (e.g. EPON) can be utilized
- 10Mbps for P2P or a fraction of 10Mbps for shared medium → total line rate of 20Mbps (+overhead)
- Supporting passive linear topology (min 5 nodes, max 8)



Channel considerations

choose appropriate frequency range to ease implementation



→ A frequency range between roughly 2MHz...38MHz seems to be a „sweet spot“ for 10SPE in terms of emission and low frequency immunity/PoDL. This range would also allow for acceptable relaxation of limits in the higher frequencies to allow freedom of implementation for channel (connector). Remark: Immunity and basic emission requirements still apply.

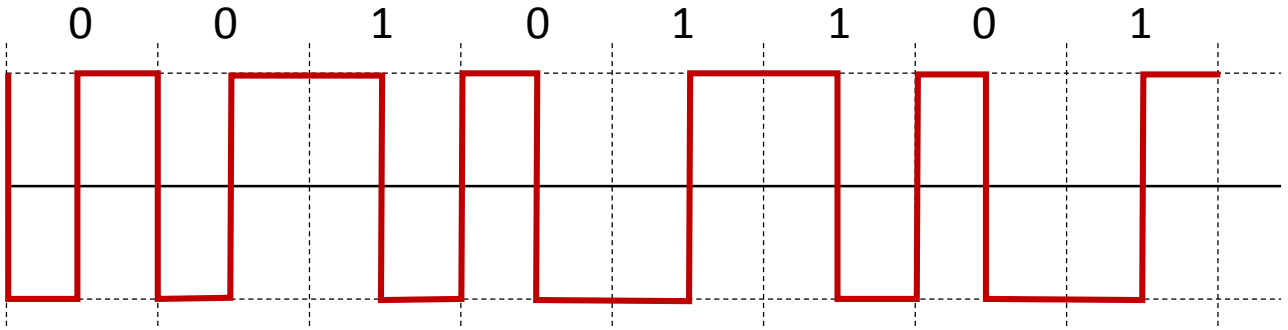
Use the “sweet spot” between **2 MHz and 38MHz** for PSD and design 10 SPE PCS/PMA accordingly.

Source http://www.ieee802.org/3/cg/public/adhoc/buntz_10SPE_04_0308.pdf

→ **DME**

Modulation option (1)

Differential Manchester Encoding (DME)



Is defined in clause 98:

- Expected to work with the P2P and P2MP channels
  - To transmit “0” the polarity is not changed
  - To transmit “1” the polarity is changed
  - The polarity is inverted at least once per symbol interval
- Performance is improved by differential signaling

Modulation option (2)

Differential Manchester Encoding

(DME)

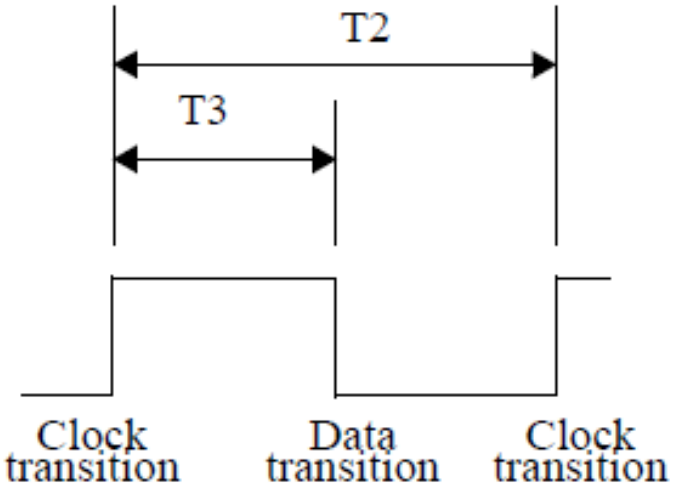


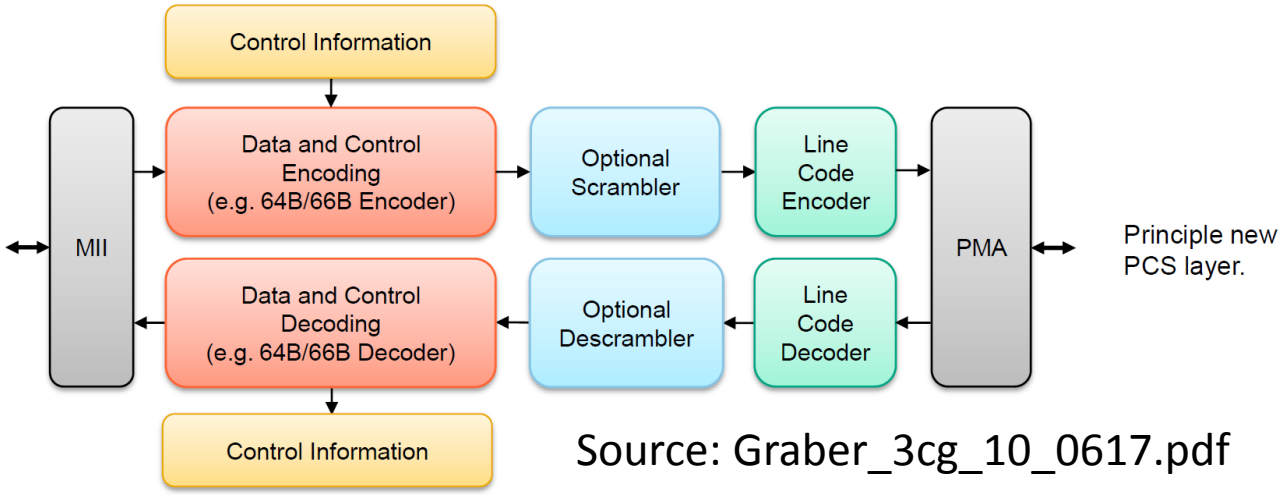
Figure 98–5—DME page transition timing

In order to achieve 20Mbps line rate:

- Shorten T2 from 60ns to approx. 50ns (actual time dependent on PCS encoding).
- Shorten T3 from 30ns to approx. 25ns (actual time dependent on PCS encoding).
- Will robustly work over UTP channels with margin (example FlexRay).
- Further study is needed for use over passive linear multidrop channels.

PCS considerations

- High pass of DME is significantly higher than 200kHz high-pass described for coupling network in Graber_3cg_09b_0617.pdf
- Can use 64/66B PCS for encoding of control symbols, similar to use described in Graber_3cg_10_0617.pdf
  - Unlikely to require FEC due to short distances and low rate



Source: Graber_3cg_10_0617.pdf

Summary

DME provides:

- Compatibility with clause 98 autoneg signaling
- Good EMC performance (fits to the ‘sweet spot’)
- Low TX complexity
- Low RX complexity
- Low power
- PoDL compatibility