P802.3dm proposed outline

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Purpose

P802.3dm is different from other Automotive Ethernet PHY specs

- Asymmetric communication
- Shielded balanced pair (SBP) and coax link segment options

Document structure needs to be in place before first document draft

- Reduces potential rework
- Enables contributors to see how to structure their contributions
- Enables contributors to see what is still needed

This is a draft template. It is subject to change, as needed, based on actual approved baselines!

IEEE 802.3 Restrictions

Limited to 5 heading levels in the document

- Cannot just add new subclauses to separate speeds or cables
- Existing Automotive 802.3 PHY Clauses already use all 5 levels
- Options for separation
  - X Multiple Clauses (high speed / low speed / link segments)
  - √ Single Clause
    - Can separate higher or lower in the structure
    - Need to consider readability
    - Need to consider implementers

PHY/PMD types

Definitions (x/yBASE-T1/V1-H/L)

x/y x is the high transmit speed, y is the low transmit speed

T1 – single shielded balanced pair of conductors (SBP)

V1 – single coaxial cable (Coax)

L – device that transmits at low speed and receives at high speed

H – device that transmits at high speed and receives at low speed

PHY/PMD types table

PHY name	Transmit speed	Receive speed	Cable type
2.5G/100MBASE-T1-L	100M	2.5G	SBP
2.5G/100MBASE-T1-H	2.5G	100M	SBP
5G/100MBASE-T1-L	100M	5G	SBP
5G/100MBASE-T1-H	5G	100M	SBP
10G/100MBASE-T1-L	100M	10G	SBP
10G/100MBASE-T1-H	10G	100M	SBP
2.5G/100MBASE-V1-L	100M	2.5G	Coax
2.5G/100MBASE-V1-H	2.5G	100M	Coax
5G/100MBASE-V1-L	100M	5G	Coax
5G/100MBASE-V1-H	5G	100M	Coax
10G/100MBASE-V1-L	100M	10G	Coax
10G/100MBASE-V1-H	10G	100M	Coax

Document Organization (new Clause)

2xx

This is where we name all of the PHY types being developed.

This could be very long with the number of different PHYs we have.

We may want to consider another way to group them.

2xx Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, type 2.5G/100MBASE-T1-L, 2.5G/100MBASE-T1-H, 5G/100MBASE-T1-L, 5G/100MBASE-T1-H, 10G/100MBASE-T1-L, 10G/100MBASE-T1-H, 2.5G/100MBASE-V1-L, 2.5G/100MBASE-V1-H, 5G/100MBASE-V1-L, 5G/100MBASE-V1-H, 10G/100MBASE-V1-L, and 10G/100MBASE-V1-H

Document Organization (-1)

2xx.1 Overview

- This is where the high level description of the requirements go. This is generally completed later in the process when the details have been placed in their specific subclauses.
- There are some proposed separations for speed and cable type, but these may change based on the actual requirements.

Document Organization (-2)

2xx.2 MULTIG/100MBASE-T1/V1**-H** service primitives and interfaces, downstream channel

2xx.3 MULTIG/100MBASE-T1/V1**-L** service primitives and interfaces, downstream channel

- These subclauses define the transfer of information between the various interfaces within the PHY.
- xMII <-> PCS <-> PMA <-> MDI
- Because the different speeds may use different MII interfaces, only the **high speed** and **low speed** communication are defined in separate subclauses
- Because these subclauses only define the symbols to be sent to the MDI, but not the specific electrical details, the cable types are not separated.

Document Organization (-3)

2xx.4 Physical Coding Sublayer (PCS) functions, -H

This subclause defines the PCS functions of the high speed (fast) communication channel

- This includes a number of functions that are dependent on the MII selected, block size, framing, encoding, etc. which may be different for each speed.

2xx.5 Physical Coding Sublayer (PCS) functions, -L

This subclause defines the PCS functions of the low speed (slow) communication channel

- For functions that are the same as the high speed channel, refer to the 2xx.4.y subclause

These subclauses could be combined if they are substantially the same.

Document Organization (-4)

2xx.6 Physical Medium Attachment (PMA) sublayer, -H

2xx.7 Physical Medium Attachment (PMA) sublayer, -L

- The PMA is the interface between the PCS and the MDI
- This is currently separated by speed, similar to the PCS
- It may be necessary to create separate subclauses for the PMA to MDI functions. This can be done in multiple ways.
  - We can define symbols, with no relation to the output characteristics and define a PMD for the translations, e.g. put a PMD function between the PMA and MDI (currently in the draft)
  - We can have separate subclauses within the PMA subclauses (not currently in the draft)

Document Organization (-5)

2xx.8 Physical Medium Dependent (PMD) sublayer, -T1

2xx.9 Physical Medium Dependent (PMD) sublayer, -V1

The PMD is the interface between the PMA and the MDI

- These subclauses replace the PMA electrical subclause found in existing Automotive PHY specs
- These are separated by cable type, as this determines the actual electrical signals generated for transmission on the link

Document Organization (-6)

2xx.10 Management interface

The subclause defines functions potentially used during startup

This is not expected to be dependent on communication rate or cable type

This subclause does not generally use all 5 levels, so it can be subdivided if there are differences between the PHY types

Document Organization (-7)

2xx.11 Link segment characteristics, -T1

2xx.12 Link segment characteristics, -V1

- Currently, the link segment characteristics are being separated by cable type.
- There has been discussion regarding having the same limit lines for shielded balanced pair and coax. If this happens for some, but not all, characteristics, the later subclause can reference the former.

Document Organization (-8)

2xx.13 MDI specification, -T1

2xx.14 MDI specification, -V1

- Currently, the MDI characteristics are being separated by cable type.
- It is very unlikely that the interfaces to a 2-pin and a 1-pin connection system will be the same.

Document Organization (-9)

2xx.15 Environmental specifications

2xx.16 Delay constraints

- It should be possible to include the requirements for all PHY types in these subclauses

Conclusion

This outline is a draft proposal. Please inform the Editor and TF if you see an issue with the organization or a missing topic.

The proposed draft outline should be considered when proposing baseline text, by informing the Editor of the appropriate subclause for your proposal.

Questions?

Thanks!