

Summary of Clauses 61-63

EFM Task Force Plenary
Special Copper Session

Overview

Common Part (PCS and Handshake)

- 61. Physical Coding Sublayer (PCS) and common specifications, type 10PASS-TS and type 2BASE-TL
- Annex 61A (informative) EFM Copper Examples

Short Reach PHY (PMA+PMD)

- 62. Physical Medium Attachment (PMA) and Physical Medium Dependent (PMD), type 10PASS-TS
- Annex 62A (normative) PMD Profiles for 10PASS-TS
- Annex 62B (normative) Performance guidelines for 10PASS-TS PMD profiles
- Annex 62C (informative) 10PASS-TS Examples

Long Reach PHY (PMA+PMD)

- 63. Physical Medium Attachment (PMA) and Physical Medium Dependent (PMD), type 2BASE-TL
- Annex 63A (normative) PMD Profiles for 2BASE-TL
- Annex 63B (normative) Performance guidelines for 2BASE-TL PMD profiles

Diagram (1)

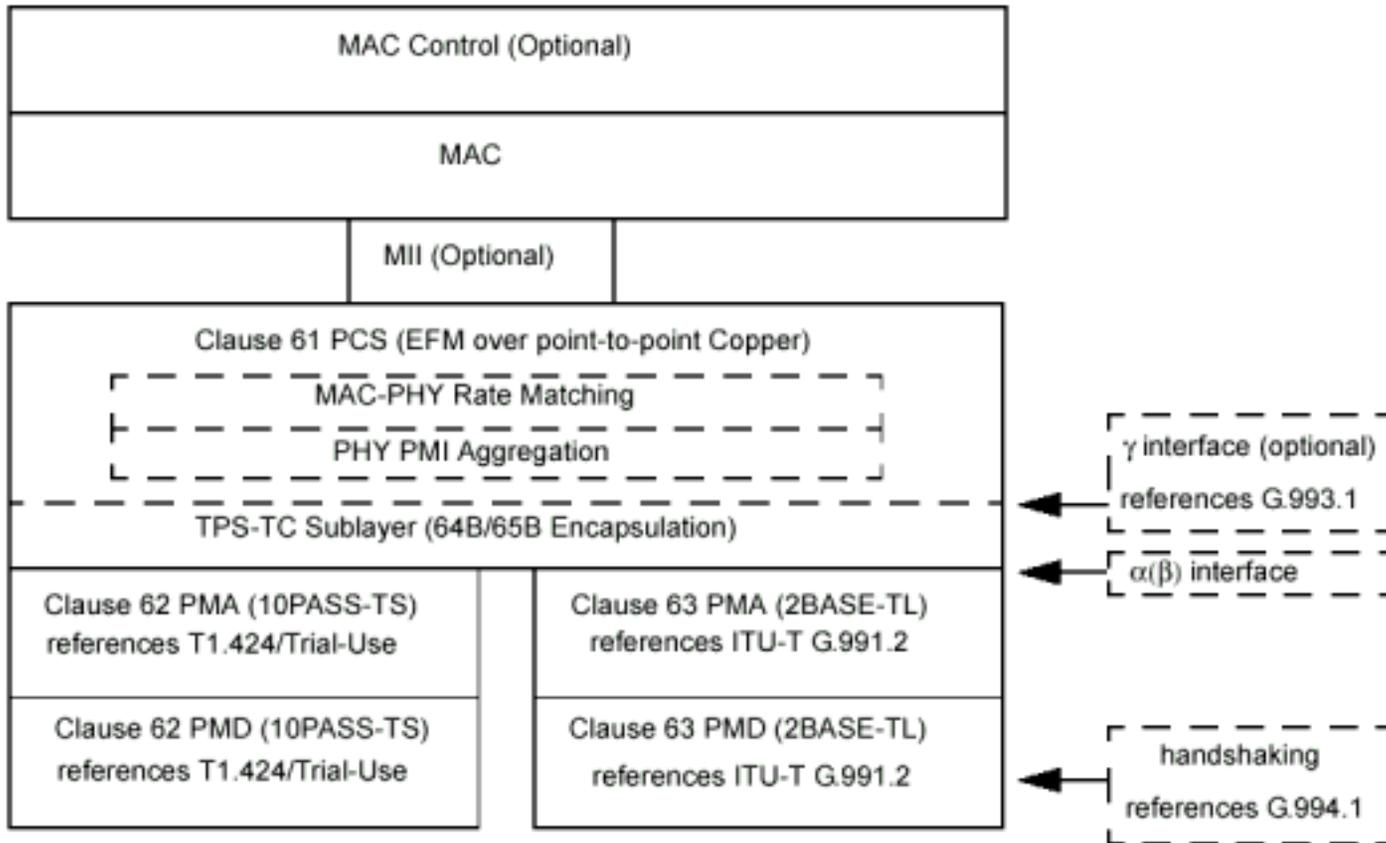
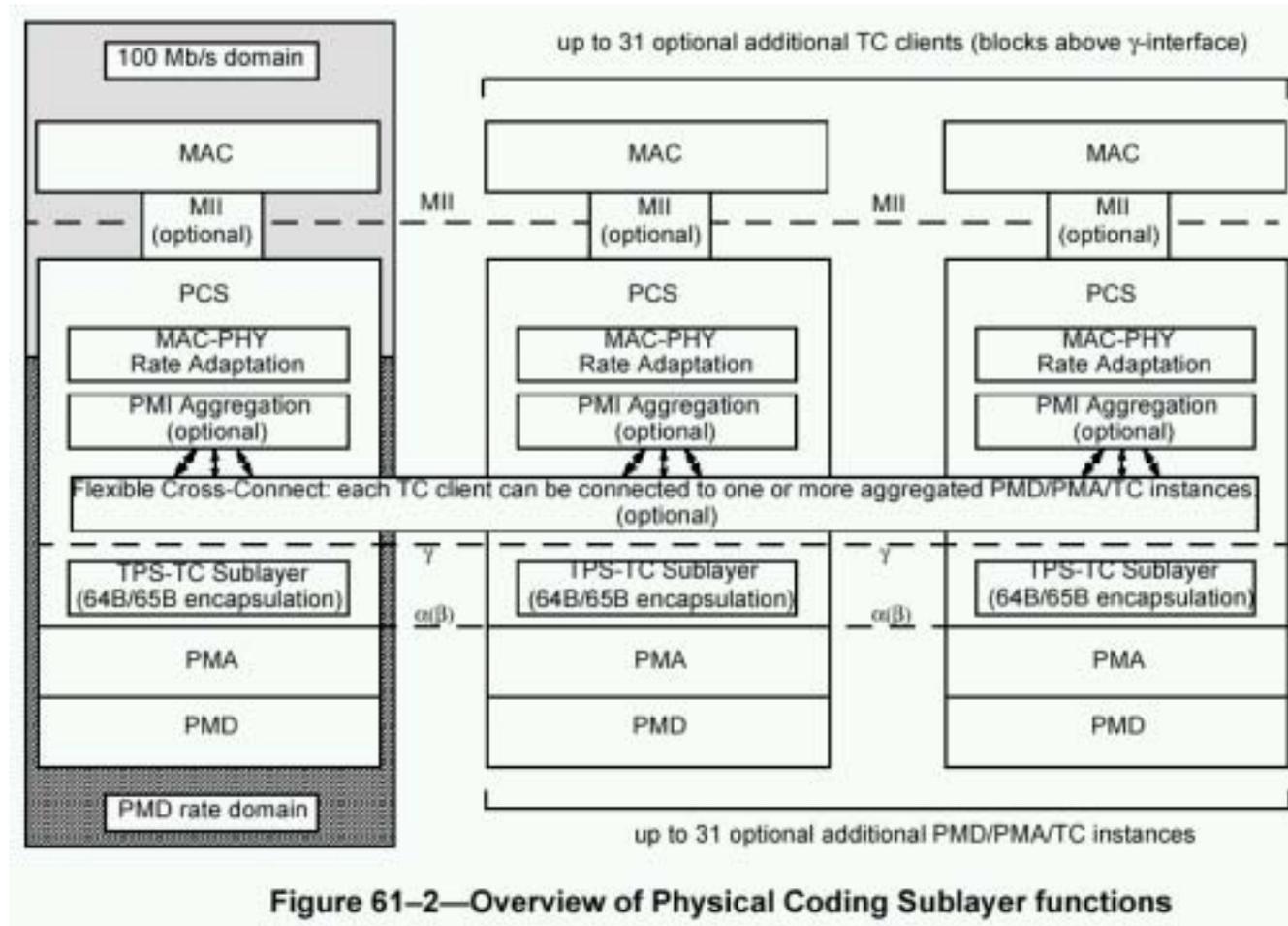


Figure 61-1—Relation of this clause to other standards

Diagram (2)



[61] Physical Coding Sublayer (1/3)

- MAC-PHY Rate Matching

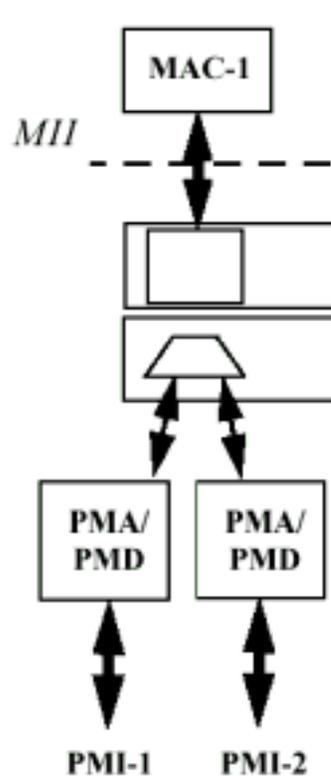
Problem: MII rate is fixed at 10/100 Mb/s, while xDSL rate is determined by medium

⇒ A mechanism is needed for the PHY to slow down transmissions from the MAC.

Solution: PHY shall be able to buffer (at least) one transmit frame, and assert CRS to hold off further frames from the MAC until sufficient buffer space becomes available (MAC in half-duplex mode).

[61] Physical Coding Sublayer (2/3)

- PHY PMI Aggregation

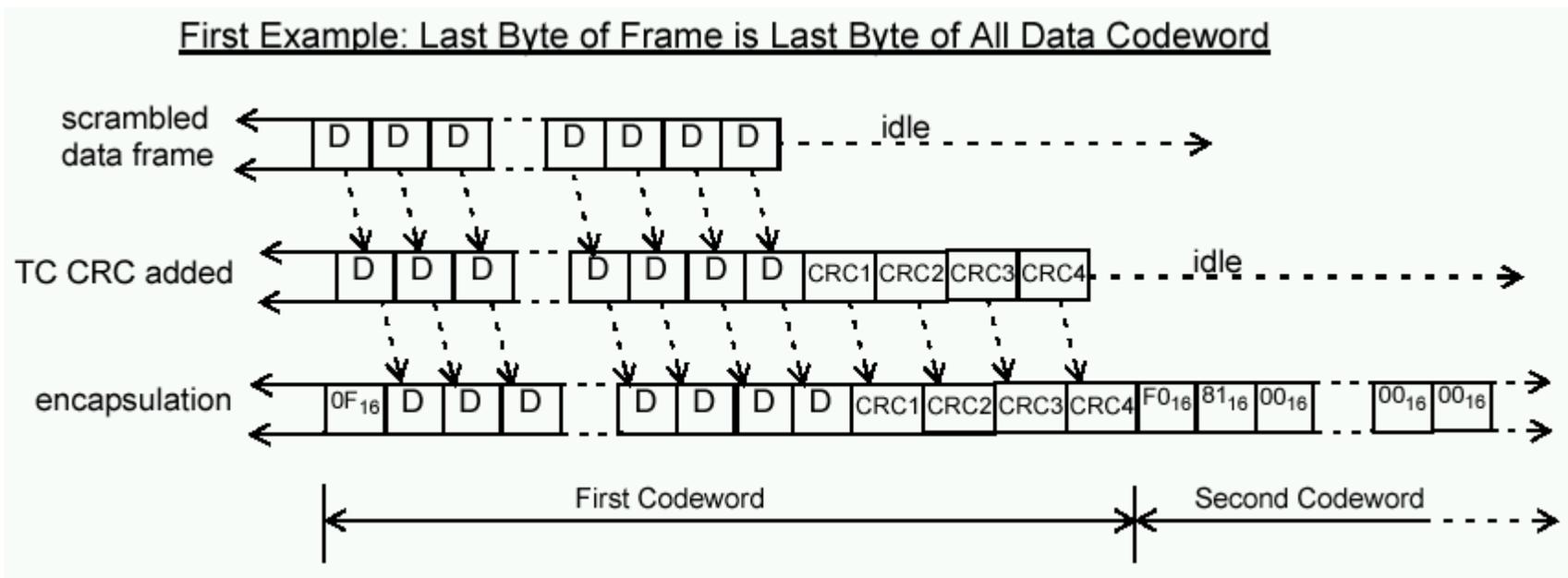


- Supports optional mode of operation over multiple pairs.
- A single MAC can be connected to up to 32 PMA/PMD instances.
- Data frames are fragmented. Fragments are sent over different links. Below the γ -interface, no distinction exists between a frame and a frame fragment.

[61] Physical Coding Sublayer (3/3)

• TPS-TC Functions

64B/65B Encapsulation was defined to replace HDLC
(includes CRC, scrambler)



[61] Common Specifications

- ITU-T Recommendation G.994.1 (a.k.a. “G.handshake”) is used by transceivers to determine common modes of operation.
- G.994.1 allows for mutual identification and exchange of capabilities. It is also used for remote access of management registers.

[61A] EFM Copper Examples

- The purpose of this informative annex is to provide practical examples of the use of Clause 45 registers with respect to the operation of 10PASS-TS PHYs (Clause 62) and 2BASE-TL PHYs (Clause 63).

[62] 10PASS-TS PMD and PMA

- PMA and PMD are based on T1.424/Trial-Use.
- Both linecodes (MCM and SCM) are included; only one will remain in the draft submitted to Working Group Ballot.
- T1.424/Trial-Use is incorporated by reference, with a list of EFM-specific exceptions (narrowing down options).

[62] 10PASS-TS PMD and PMA

- 62.2 MCM PMA
 - 62.3 SCM PMA
- 62.4 MCM PMD
 - 62.5 SCM PMD

[62A] 10PASS-TS Profiles

- To facilitate the selection of operational parameters, profiles have been defined for following settings:
 - Bandplan + PSD Mask
 - Band Notches
 - Upstream/Downstream Payload Rate

[62B] 10PASS-TS Performance

Test	Test Loop	L (km)	Profile	Data Rate D/U	Notch	UPBO	Noise
1	VDSL1, TP1	0.750	8	10/10	Off	On	None
2	VDSL1, TP1	1.600	8	10/10	Off	On	F
3	VDSL1, TP2	1.600	7	10/10	Off	On	A
4	VDSL1, TP1	1.600	2	10/10	Off	On	F
5	VDSL1, TP2	1.600	1	10/10	Off	On	A
6	VDSL1, TP1	1.600	8	10/10	On	On	F
7	VDSL1, TP2	1.600	7	10/10	On	On	A
8	VDSL1, TP1	1.600	2	10/10	On	On	F
9	VDSL1, TP2	1.600	1	10/10	On	on	A

[62C] 10PASS-TS Examples

- This informative annex illustrates the use of Clause 45 registers to control the PMD in more detail than provided by the Annex 62A profiles.

[63] 2BASE-TL PMD and PMA

- PMA and PMD are based on ITU-T Recommendation G.991.2 (a.k.a. G.shdsl).
- Additionally, 32-level TCPAM is specified as a mandatory capability, allowing higher bit rates.
- G.991.2 is incorporated by reference, with a list of EFM-specific exceptions (narrowing down options).

[63A] 2BASE-TL Profiles

Profile	Data rate per pair kb/s	Line rate per pair kb/s	Power (dBm)	Region	Constellation
1	2048	2056	13.5	A	16-TCPAM
2	1024	1032	13.5	A	16-TCPAM
3	704	712	13.5	A	16-TCPAM
4	512	520	13.5	A	16-TCPAM
5	2048	2056	14.5	B	16-TCPAM
6	1024	1032	13.5	B	16-TCPAM
7	704	712	13.5	B	16-TCPAM
8	512	520	13.5	B	16-TCPAM
9	3072	3080	13.5	A&B	16-TCPAM

[63B] 2BASE-TL Performance

- This annex provides performance guidelines for the profiles listed in Annex 63A, under various interference and loop conditions.