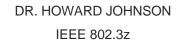# IEEE P802.3z/D1 Overview

❖ Overall Block Diagram

❖ Outline of Standard

Prepared for Packet Engines
by Dr. Howard Johnson
howiej@sigcon.com
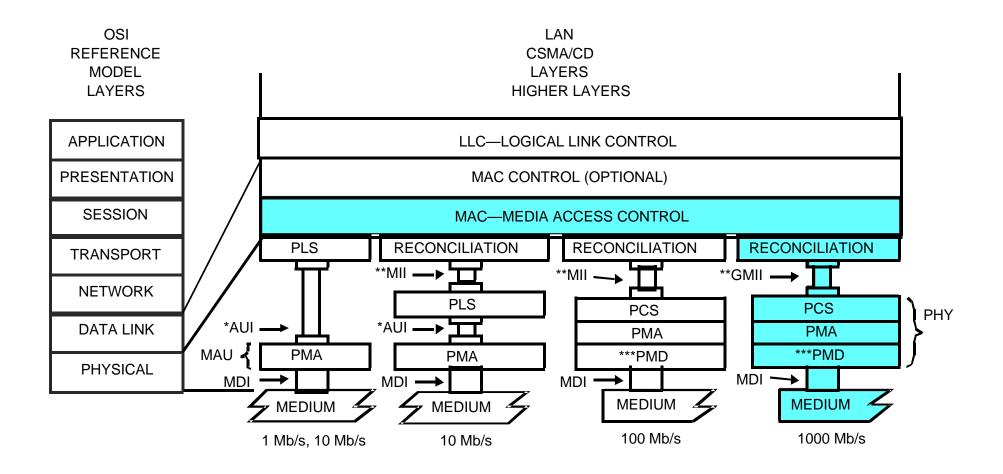U.S. (206) 556 0800

802 ATM   802 MPEG   802 FDDI   802 SCSI

P A C K E T   E N G I N E S   I N C O R P O R A T E D

DR. HOWARD JOHNSON

IEEE 802.3z

G I G A B I T   E T H E R N E T

<1>

JAN 23, 1997

Relation to Other 802.3 Standards

OSI REFERENCE MODEL LAYERS

LAN CSMA/CD LAYERS HIGHER LAYERS

LLC—LOGICAL LINK CONTROL

MAC CONTROL (OPTIONAL)

MAC—MEDIA ACCESS CONTROL

| APPLICATION |
| PRESENTATION |
| SESSION |
| TRANSPORT |
| NETWORK |
| DATA LINK |
| PHYSICAL |

PLS | RECONCILIATION | RECONCILIATION | RECONCILIATION

**MII → | **MII → | **GMII →

PLS | PCS | PCS

PHY

*AUI → | *AUI → | PMA | PMA

MAU { | PMA | PMA | ***PMD | ***PMD

MDI → | MDI → | MDI → | MDI →

MEDIUM | MEDIUM | MEDIUM | MEDIUM

1 Mb/s, 10 Mb/s | 10 Mb/s | 100 Mb/s | 1000 Mb/s

Outline of Standard

Naming Conventions

1000 Mb/s MAC
1000 Mb/s operation

1000BASE-X family
(8B10B coding)

1000BASE-LX	1000BASE-SX	1000BASE-CX	1000BASE-T
LWL fiber	SWL fiber	Short copper	Cat. 5 UTP
SM and MM	MM only	jumpers	*(future)*

1000BASE-X Block Diagram

MAC

CSMA/CD with carrier extension and bursting

RECONCILIATION

PLS service interface (Clause 6)

GMII (Gigabit Medium Independant Interface logical definition)
  - Could use 8B10B PMA service interface electrical specification

PCS (coding)

PCS service interface = GMII
  - Fiber and short copper use 8B10B coding

PMA (serializing)

PMA service interface
  - For 8B10B, electrically similar to FC 10bit

PMD (electrical)

PMD service interface
  - For 8B10B, use serial PECL

Medium Dependent Interface

MEDIUM

1.00 Gb/s delivered data <= => 1.25 Gbaud in 8B10B format

01-4
Changes to existing clauses 1-4

Use as is, with amendments for

★ Full-duplex, and with

★ Extensions to provide carrier extension and bursting

34 Introduction

Overview

Abbreviations used

Relation to other standards

MAC delay constraints

35
Reconciliation sublayer and GMII

Analogous to 100BASE-T clause 22 but *without electrical/physical definitions*

Defines a common logical service interface that must be supported by all gigabit PCS devices

Maps the PLS service primitives to logical signals like TXD, TX_EN, TX_ER, RXD, RX_DV, and RX_ER
(see figure 22-3 in 802.3u)

The GMII could be conveyed using the same electrical definitions defined in the 8B10B PMA service interface (with appropriate pin mappings) - this would make possible devices that implement either the GMII or the 8B10B PMA service interface.

36
8B10B PCS and PMA layers

8B10B PCS sublayer

   ★ Analogous to the PCS layer in 100BASE-X (clause 24)

   ★ Contains 8B10B coder for use with optical or short copper links

8B10B PMA service interface

   ★ Similar to FC 10-bit serializer interface (scaled up to 1.25 Gbaud)

   ★ 10-bits parallel, at 125 MHz

8B10B PMA sublayer

   ★ Similar to ANSI 10-bit SERDES chip

   ★ Used for all 8B10B-coded physical interface types

37
Link Configuration

Link configuration system specified for all 100BASE-X devices

Long-haul 1000 Mb/s UTP will likely use clause 28 Auto-
  Negotiation

38
PMD: LWL and SWL optics

8B10B PMD service interface

    ✦ Serial interface

    ✦ Used for all 8B10B-coded physical interface types

SWL

    ✦ Wavelength range of 770-860 nm

    ✦ Works on 50 or 62.5 um MMF

LWL

    ✦ Wavelength range of 1270-1355 nm

    ✦ Works on SMF

    ✦ Also works on 50 or 62.5 um MMF

39
PMD: Short copper jumpers

Uses 8B10B PMD service interface specified in clause 38

    ★ Serial interface

    ★ Used for all 8B10B-coded physical interface types

25-meter lengths

TW-style cable (two individually shielded balanced pairs—*not the same as Type 1 STP*)

40

Reserved for Cat. 5 UTP PHY

41 Repeater

GMII-based repeater

Similar to clause 27 repeater, but a simplified case

42
System considerations (topology)

Discussion of topology limitations for links, repeaters, and
buffered distributors