# IEEE P802.3ae – 10 Gigabit Ethernet Minutes
## Task Force Plenary Meeting
## November 7 - 8, 2000
## Tampa, FL.

Prepared by: Jeff Warren

## Administrative

The meeting convened at 8:35am, November 7th, 2000. Jonathan Thatcher, the 10 GE Task Force chairman, opened the meeting with a presentation of the agenda. Approximately 15% of the 255 people attending this 10 GE Task Force meeting are new attendees. The agenda was reviewed. A motion to approve the agenda passed by acclamation. Jonathan then reviewed all the administrative items such as reflector and web locations, membership, voting and sign-in rules.

This two day meeting was organized with joint sessions during two half days and many break out PMD and logic track sessions. Reference the meeting schedules below.

Some important links:
- Agenda = http://www.ieee802.org/3/ae/public/nov00/index.html
- E-mail Reflector = http://grouper.ieee.org/groups/802/3/10G_study/email/thrd1.html
- Voting Rules = www.ieee802.org/3/rules/member.html
- Typical Plenary Meeting = www.ieee802.org/3/plenary.html
- 802.3ae 5 Criteria = www.ieee802.org/3/ae/criteria.pdf
- 802.3ae PAR = www.ieee802.org/3/rules/member.html
- 802.3 Presentation Policy = www.ieee802.org/3/public/presentproc.html
- Current 10GbE Draft Standard = http://www.ieee802.org/3/ae/private/index.html
- 802.3 Patent Policy www.ieee802.org/3/patent.html

The P802.3ae 10 Gigabit Ethernet Task Force meeting was adjourned at 6:46 pm on November 8th, 2000.

## Goals for this Meeting

This meeting was dedicated primarily to plugging holes in the draft standard, all the final preparations for a Task Force ballot and closing on the features for the specification. To the chairs knowledge there are no new features, just refinements to a few features. The 10 GbE Task Force is in the *"Task Force Draft Review & Editing Phase".* The specific objectives for the week include resolution of the Big-Ticket items, they are Jitter (may not be able to close on this one), Remote Fault & Break Link, Link Status / Signal Detect, Interface Electrical & Specifications, Compliance & Testing, Optical Connector and Polarization Modal Dispersion (PMD).

## *Meeting Accomplishments*

**General Discussion** (moderated by Jonathan Thatcher):
This plenary meeting was organized into three main sections; (1) a general discussion comprised of two half day sessions where all attendees participated, (2) two half day PMA/PMD sessions, and (3) a set of seven logic track breakout sessions. Approximately 40 presentations were given during this plenary meeting, 25 % during the general sessions, 45 % during the logic track sessions and the balance of 30% during the PMD/PMA track sessions. A total of 41 motions were made, they were classified as 7 general motions, 20 PMD track motions, and 14 logic track motions.

**Logic Track Summary** (moderated by Ben Brown):
The significant logic track items covered by motions include the P802.3ae task force authorizing an ad hoc to develop a parallel draft targeted to replace SUPI/SS with an 8b/10b based signaling method, the XGMII reverting back to the Draft 1.0 interface timing (i.e. source centered in both directions), XGMI using HSTL 1.5v Class1 and PCS needing delimiter robustness. The XAUI breakout group closed on an eye diagram definition. Jitter on the other hand did not close, this is still a big ticket item requiring much more work. The common mode sepcs were resolved. Signal detect with regards to XGXS interaction is still an outstanding issue. A test pattern for WIS has been deferred. Some overhead bytes continue to be debated, i.e. Section, Line and Path bytes.

**PMD Track Summary** (moderated by Walt Thirion)
A total of 14 presentations were given during the two ½ day PMD/PMA breakout sessions. These presentations dealt with XSBI issues, 1310nm VCSEL Serial PMD, fiber specifications, revised 1550nm power and channel insertion loss values, ect….In the end Walt reported that specification modifications were made to be more VCSEL friendly, relaxation for 1310nm fiber attenuation, tighten the link loss, method for dispersion measurements, optimization for 1550nm links so that receivers operate in an optimal region, etc….. Examples of specific PMD/PMA clause changes include the addition of a PCS framer spec for clause 51, adoption of a WWDM test measurement methodology based on Tx wavelength and line width specifications. The remaining big ticket issues to be dealt with include Jitter specifications and methodologies, PMD or polarization mode delay – the group has not reached consensus on whether PMD is an issue or not.. Approximately 20 PMD/PMA motions were made.

## *Outline for these Minutes*

## Future IEEE Meetings

| Month | Days | Year | Meeting Type | City | State/Country |
|---|---|---|---|---|---|
| January | 10$^{th}$ – 12$^{th}$ | 2001 | Interim | Irvine | California |
| March | 12$^{th}$ – 16$^{th}$ | 2001 | Plenary | Hilton Head | South Carolina |
| May | 21$^{st}$ – 23$^{rd}$ | 2001 | Interim | *Open* | *Open* |
| July | 9$^{th}$ – 13$^{th}$ | 2001 | Plenary | Portland | Oregon |
| September | 1$^{st}$ half | 2001 | Interim | Copenhagen | Denmark |

Link to the next meeting location: http://grouper.ieee.org/groups/802/meeting/index.html

The next IEEE meeting (an interim meeting) will be held in Irvine, CA. from January 10$^{th}$ – 12$^{th}$ , 2001 at the Hyatt Regency Irvine (949) 975-1234..

## IEEE P802.3ae Objectives

➢ Preserve the 802.3/Ethernet frame format at the MAC Client service interface.
➢ Meet 802 Functional Requirements, with the possible exception of Hamming Distance.
➢ Preserve minimum and maximum FrameSize of current 802.3 Std.
➢ Support full-duplex operation only.
➢ Support star-wired local area networks using point-to-point links and structured cabling topologies.
➢ Specify an optional Media Independent Interface (MII).
➢ Support proposed standard P802.3ad (Link Aggregation)
➢ Support a speed of 10.000 Gb/s at the MAC/PLS service interface
➢ Define two families of PHYs
  • A LAN PHY, operating at a data rate of 10.000 Gb/s
  • A WAN PHY, operating at a data rate compatible with the payload rate of OC-192c/SDH VC-4-64c
➢ Define a mechanism to adapt the MAC/PLS data rate to the data rate of the WAN PHY
➢ Provide Physical Layer specifications which support link distances of:
  • At least 65 meters over MMF**
  • At least 300 meters over installed MMF*
  • At least 2 km over SMF
  • At least 10 km over SMF

- At least 40 km over SMF

> LEGEND:
> \* Installed = all MMF specified in 802.3z (62.5 micron 160/500 MHz*km FDDI-grade is the worst case).
> \*\* Implies that the solution is cost optimized for this distance.

➢ Support fiber media selected from the second edition of ISO/IEC 11801 (802.3 to work with SC25/WG3 to develop appropriate specifications for any new fiber media).

## P802.3ae Contacts

➢ For the latest list of key P802.3ae contacts please reference the IEEE P802.3ae 10Gb/s Ethernet Task Force Chairs and Editors web page located at http://grouper.ieee.org/groups/802/3/contacts.html this web page is maintained by David Law.

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| Bill Lane | Technical Writer | bill_lane@ieee.org |

## *Agenda*

| Speaker | Clause | Topic | Time Req | Time Allc | Start Time |
|---|---|---|---|---|---|
| | | **802.3ae Agenda** | | | |
| **Tue, 12 Sept 2000** | | **Call to Order** | | | **8:30 AM** |
| Jonathan Thatcher | Z | Opening Business | 0:30 | 0:30 | 8:30 AM |
| Chris Diminico | | TIA liaison report | 0:15 | 0:15 | 9:00 AM |
| Rich Taborek | | 10G Fibre Channel liaison report | 0:15 | 0:15 | 9:15 AM |
| Mike Hackert | | FO 2.2.1 liaison report | 0:15 | 0:15 | 9:30 AM |
| Raj Savara | | OIF liaison report | 0:10 | 0:10 | 9:45 AM |
| Vipul Bhatt | | Equalization Ad Hc Progress Report | 0:15 | 0:20 | 9:55 AM |
| Brad Booth | | State of the Standard (Schedule; Hot Ticket Items) | 0:15 | 0:15 | 10:15 AM |
| | | **Break** | **0:20** | **0:20** | **10:30 AM** |
| Rich Taborek | All | Link Initialization & Status Reporting | 0:30 | 0:30 | 10:50 AM |
| Ed Turner | All | MDIO Issues (presentation only) | 0:20 | 0:20 | 11:20 AM |
| | | | | | |
| | | **Lunch** | **0:20** | **0:20** | **12:00 PM** |
| | | | | | |
| | | **Tuesday noon to Wednesday noon: see track map** | | | |
| | | | | | |
| **Wed, 14 July 2000** | | **Recombine Tracks** | | | **1:00 PM** |
| | | Track Reports / Motions | | 4:00 | 1:00 PM |
| | | Closing | | 0:30 | 5:00 PM |
| | | **Adjourn** | | | **5:30 PM** |
| | | | | | |
| Martin Elhoj | 46 | XGMII RS Error Checking/Reporting | 0:15 | | |
| Robert Grow | 46 | Clause 46 Issues | 0:15 | | |
| Ali Ghiasi | 47 | XAUI Electrical Update | 0:20 | | |
| Dawson Kesling | 47 | XAUI Issues | 0:15 | | |
| Richard Dugan | 47 | XAUI Transmit eye masks | 0:20 | | |
| David Martin | 50 | WIS Fault Isolation | 0:30 | | |
| Norival Figueira | 50 | MIB Extensions for WIS Fault Isolation | 0:15 | | |
| Stuart Robinson | 51 | XSBI issues | 0:15 | | |
| David Kabal | 52, 54? | Jitter Methodology | 0:30 | | |
| Jack Jewell | 52 | 850nm Serial Spec Modifications | 0:10 | | |
| Jack Jewell | 52 | 1310nm Serial Spec Modifications for VCSELs | 0:10 | | |
| Ken Herrity | 52 & 54 | Comparing OMA and E/R Measurements | 0:15 | | |
| Mike Dudek | 52, 54 | OMA proposal | 0:20 | | |
| Mike Dudek | 52, 54? | Better way to spec spectral Width and Center Wavelength | 0:15 | | |
| Peter Ohlen | 52 | 1550 nm Power Levels and Insertion Loss | 0:10 | | |
| Peter Ohlen | 52 | OMA Specifications | 0:20 | | |
| Peter Ohlen | 52 | Golden Test for 1550 nm Dispersion | 0:20 | | |
| Piers Dawe | 52 | Reference filter for testing (serial) | 0:10 | | |
| Raj Savara | 52 | 1310 nm Back Reflection | 0:15 | | |
| Raj Savara | 52 | 1550 nm Back Reflection | 0:15 | | |
| Dave Dolphi | 54 | WWDM Measurement Methodology | 0:30 | | |
| David Cunningham | 54 | Eye Masks for WWDM PMD's | 0:15 | | |

| | | | |
|---|---|---|---|
| Eric B. Grann | 54 | Bandpass Specifications for 1300nm WWDM | 0:15 | |
| Jonathan Thatcher | 54 | PMD Management Register Proposal | 0:15 | |
| Rich Taborek | 53, 54 | XAUI as a SUPI Alternative | 0:20 | |
| | | | | |
| Shimon Muller | All | Remote Fault & Break Link Proposal --- Update | 0:30 | |
| Osamu Ishida | All | LSS for Link Status Mechanism | 0:20 | |
| | | | | |
| Herb Congdon | 52 & 54 & All? | 10 Gig Ethernet PHY Layer Considerations (connector?) | 0:20 | |

## *Meeting Room Breakout Details*

| | Regency 1 (150) | Regency 2 (100) | Regency 3 (100) | Parlor # 327 (20) |
|---|---|---|---|---|
| **TUESDAY** **8:30 to 12:00** | **P802.3ae ALL TOGETHER (Presentations)** | | | |
| **1:00 to 6:00** | **PMA/PMD** **Clauses 51, 52** | **Logic 1** **Clause 47, 48** | **Logic 2** **Clause 50** | **Logic 3** **Clause 4** |
| **6:30 to 9:30** | **Call For Interest: Ethernet in the Last Mile** | | | |
| **WEDNESDAY** **8:30 to 12:00** | **PMA/PMD** **Clauses 53, 54** | **Logic 1** **Clause 49** | **Logic 2** **Clause 46** | **Logic 3** **Clause 1,… 45** |
| **1:00 to 6:00** | **P802.3ae ALL TOGETHER (Motion Madness)** | | | |
| **6:30 to 9:00** | **802 Social Reception** | | | |

The following individuals recorded the minutes for the each portion of this 10 GbE Plenary meeting:

General – Two Sessions  Jeff Warren   "Presentations & Motions"
PMA/PMD Track Breakouts
 ❑ Clause 51, 52  Vipul Bhatt   "Serial PMDs & PMAs"
 ❑ Clause 53, 54  Vipul Bhatt   "WWDM PMDs & PMAs"
Logic Track Breakouts
 ❑ Clause 47   Jonathan Greenlaw "XAUI"
 ❑ Clause 48   Rich Taborek  "8b/10b PCS/PMA"
 ❑ Clause 50   Gordon Jacobs  "WAN Interfaces Sublayer"
 ❑ Clause 49   Gordon Jacobs  "64b/66b PCS"
 ❑ Clause 46   Don Pannell  "XGMII"
 ❑ Clause 1,2,….35 Shimon Muller  "Miscellaneous"
 ❑ Clause 30, 33  Ed Turner   "Management/MDC/MDIO"

## Closing Discussions

The most significant goal for this meeting, i.e. to prepare the draft for balloting was achieved. We need pre-approval to distribute drafts to groups we liaison with. The September 2000 minutes were approved by acclimation. The ANSI Fiber Channel group has requested our 10 GbE drafts and password. The IEFT also wants access to our drafts. The IETF needs to make this request. The OIF also wants our drafts (their site is a protected site). We would get their specs that apply to us and post them to our web site. Bob Grow suggested we make drafts available but not passwords. We are moving towards a comment data base. The data base has been distributed. In the future we will use the balloting and comment database to make changes to the draft specification.

## Open Clause Issues and Document Status

❑ **Misc. Clauses** (Shimon Muller)
The current status for the miscellaneous clauses Shimon Muller covers is as follows. There are no open issues, no changes to the document since 2.0 was published, and no Task Force ballot comments received to date.

❑ Clause 30 Management (David Law)

❑ Clause 33 **MDC/MDIO** (Ed Turner)
The only open issue is the selection of a buffer for the electrical interface (ad hoc in progress). As for the document, there are no technical issues, but there are some editorial comments which have been put in.

❑ Clause 46 **XGMII** (Bob Grow)
Clause 46 had no big opens following the closing 802.3 plenary. Subsequent email discussion indicates areas for technical comment likely to include: (1) clarify fault signaling with a state machine, (2) move some end delimiter

robustness check from PCS to RS (would require significant rewrite of clause to add columns), and (3) possible refinement to lane alignment requirements.

- ❑ Clause 47 **XAUI** (Dawson Kesling)
  The XAUI document status is unchanged from the D2.0 release. Open Issues include compliance channel specification, jitter specification (generation, tolerance, measurement), transmit and receive eyes (refine current definitions), load impedance specification, and informative link budget information

- ❑ Clause 48 8b/10b PCS/PMA (Rich Taborek)
  TBD????

- ❑ Clause 49 **64b/66b PCS** (Pat Thaler)
  When D2.0 went out for comments there were no open issues in the 64b/66b PCS Clause 49 section. A couple of comments pointing out editing mistakes regarding the finer details of the frame error checking have surfaced. That could be classed as an open issue but a pretty minor one – it will work either way. Overall clause 49 is in good shape. An issue has recently surfaced, it deals with test pattern support.

- ❑ Clause 50 **WIS** (Tom Alexander)
  The only open item regarding the WIS relates to the jitter test business currently being discussed, which may or may not result in modifications to Clause 50. All other open issues were closed with Draft 2.0, and no new items have come up on the reflector since the Tampa plenary meeting.

- ❑ Clause 51 **XSBI Serial PMA** (Justin Chang)
  Open issues: items that are being discussed offline or on the reflector.
  - table 51-6: TD spec ... there is a discussion about whether it should be reduced (most likely) from the present 10us and to what number present number being proposed is 2us
  - I/O specifications: Presently no I/O type defined for Sync_Err and LOS. I have asked for inputs on the reflector. Present thought is to not have large swings on LOS as it is near the TIA circuits. Sync_Err can still be either.
  - PCS output and PMA input timing budgets: There is a concern that present margin for PC board designers of 500ps is not enough margin. Request has been made to get more inputs from systems designers on this.
  - Loopback mode: The optional loopback mode was accepted. It was not concluded as to what the serial output data should be ... logic one, zero or don't care. A loopback control input was also not specified in the motion, i.e. I/O type.
  Document Status: Revision 2.0 was recently posted. I have no major diagrams or sections to include. Still waiting for clarifications on open issues above. There may still be some nomenclature work to be done as well. Will have to poll helpers to put in technical comments for any and all changes, including minor ones.

❑ Clause 52 **Serial PMD** (David Kabal)
Open Clause 52 issues include replacement of the current jitter specification with results of jitter ad hoc (led by Reysen), add MGC/MDIO and register information to clause (as per Thatcher), add OMA specification to clause (as per Dudek), add triple tradeoff curves (as per Dudek) and add Golden Test for dispersion penalty at 1550 nm (as per Ohlen). The document status includes changes that were voted in or previously noted have been incorporated into D2.0 with a few exceptions. Notably absent are: OMA, MGC/MDIO and management registers, triple tradeoff curves, and golden dispersion test for 1550 nm. Jitter is still the major item hanging over Clause 52, and a quick resolution from the jitter ad hoc is anticipated, as the material in Clause 52 needs to be completely overhauled. Jonathan Thatcher and David Law are working to solve the management, MGC and MDIO issues. The OMA and triple tradeoff curves are minor items requiring many comments from Mike Dudek that will likely be approved. Similarly, the golden dispersion test for 1550 nm requires detailed comments from Peter Ohlen.

❑ Clause 53 WWDM PMA (Paul Bottorff)
TBD ????

❑ Clause 54 WWDM PMD (David Cunningham)
TBD ????

## *Motions*

### Motion # 1    Logic Motion
**Description:** Move that the IEEE P802.3ae task force accept the Link Status Reporting and Initialization protocol as presented by Rich Taborek with refinements to be determined during specific clause discussions.
**Motion Type**: Technical > 75% required
**Moved By**:    Shimon Muller
**Seconded By**: Pat Thaler
**Results**:        802.3 Voters   by acclimation
**Attendees**     by acclimation
**Time**: 12:07pm 11/7/00
P/F: **Passed**
**Discussion:** It was specifically discussed that this motion did not mean we would accept all details of this presentation, that it was just a basis for further work.

### Motion # 2    General Motion
▪ **Description:** Move that the P802.3ae task force authorize an ad hoc to develop a parallel draft targeted to replace SUPI/SS with an 8b/10b based signaling method as proposed in taborek_3_1100.pdf. Final decision to be made at the March Plenary.
▪ **Motion Type**: Technical > 75% required
▪ **Moved By**:    Rich Taborek
▪ **Seconded By**: Tom Dineen

- **Results**:　　　802.3 Voters　Y 76　N 23　A 23
  **Attendees**　Y 114　N 31　A 39
  **Time**: 2:06pm 11/8/00
  　　　　　　　P/F: **Passed 76 %**
- **Discussion:** RF & BL are functions that come down from RS and it's encoded in the 46b/66b stream payload. Putting them in at the XAUI level is redundant and there's no real use for adding them twice. The discussion quickly consumed a significant amount of time and the chair asked that we limit discussion to points of clarification. We don't know all the consequences of getting this into the standard. It appears to be too late for a change of this magnitude. Some people claimed the benefit of fault isolation could be handled at the WIS layer at the far end. There was a claim that the proposal presented here is not exactly XAUI and it is horrendous to even propose it at this late date. Rich claimed that if state machines were needed that they could be produced tomorrow. Get Steve Haddock's point in this discussion………… Correction – The OIF is considering SUPI and is not considering XAUI. Rich was asked to start attending these OIF meetings with a proposal for XAUI. Based on practical implementations this proposal provides tremendous flexibility. PMD manufactures say there are a number of challenges to support SUPI due to speed differences, so some PMD vendors have decided NOT to support SUPI initially. Another comment from PMD transceiver vendor said due to clock recovery issues they decided not to support SUPI now, however they need more time to consider the pitch. Another person spoke in favor of SUPI and its use in OIF.
- **STRAWPOLL:** This motion was presented as a Straw pole, results showed that the motion should be made.
- The use of the term XGXS is too loose, should be a variation of XGXS. There was objection because the 16-bit parallel (OIF) interface is desirable. Against this motion also because it is not really aligned with XGXS, however Rich contents the same components can be used. I'm unsure of this motion, on one had it's nice from a PMD transceiver point of view but on the other hand as a standards expert this is too much too late. We really can't be sure that this goes in clean, perhaps we need an Ad Hoc to study how to shoe-horn it into the standard. The proposal lack adequate definition and it's stupid to change based on an incomplete proposal. We don't have a softcopy or hardcopy of this proposal, it's the first time we've seen it. We need to have this come back in the January time frame with a complete proposal in draft standard form.
- **QUESTION CALLED:**

**Motion # 3　Logic Motion**
**Description:**　Move that an IEEE P802.3ae Task Force Ad Hoc will specify a low voltage electrical specification for the MDIO interface for resolution in January 2001.
**Motion Type**: Technical > 75% required
**Moved By**:　Ed Turner
**Seconded By**: Jonathan Thatcher
**Results**:　　passed by acclimation
**Result**s: Y 9, N 26, A 55

P/F: **Passed**

**Discussion:** The 802.3 chairman asked that this motion and the related text be communicated with 802.3af.

Proposed amendment to read:

Move that an IEEE802.3ae Task Force Ad Hoc will specify a low voltage electrical specification for the MDIO interface for adoption in January 2001, based on the JEDEC 1.5V HSTL standard.

Tom Dineen, Don Pannel

Failed Y 9 / N 26 / A 55

**Discussion**: That is basically what was discussed in the breakout this morning. This is too much too soon to put on the XGMII group because the MDIO is a multi-drop interface. It should be considered separately.


## Motion # 4    Logic Motion

**Description: Motion** that the IEEE P802.3ae Task Force adopt the timing specified in Clause 22 for the MDIO interface.

**Motion Type**: Technical > 75% required

**Moved By**:    Ed Turner

**Seconded By**: Brad Booth

**Results**:        802.3 Voters    Y 51    N 1      A 44

**Time**: 5:03pm 11/8/00

P/F: **Passed**

**Discussion:**


## Straw poll # 5

**Description:** Make the MDIO interface

     Optional                    124
     Mandatory                 0
     A mandatory part of the optional interfaces   0        XGMII, XAUI, XSBI, SUPI

**Discussion:** Since there is no way to test this interface the obvious answer is Optional. This will become a PICS check mark and if you did implement it there is no way to test it.


## Motion # 6    Logic Motion

**Description:** Move that the IEEE P802.3ae Task Force makes the MDIO electrical interface optional.

**Motion Type**: Technical > 75% required

**Moved By**:    Ed Turner

**Seconded By**: David Law

**Results**:        By acclimation

**Time**: 5:17pm 11/8/00

P/F: **Passed**

**Discussion:**


## Motion # 7    PMD Motion

**Description:** Move that the IEEE P802.3ae Task Force clause editors define control bits for PMA/PMD port_type selection.
**Motion Type**: Technical > 75% required
**Moved By**:    Ed Turner
**Seconded By**: David Law
**Results**:        by acclimation
**Time**: 5:26pm 11/8/00
<div align="center">P/F: <b>Passed</b></div>

**Discussion:** 9.9 or 10.3 Gbps. We currently have advertisement bits, not selection bits.

## Motion # 8    General Motion        (TABLED)

**Description:** Move that the IEEE P802.3ae Task Force adopt a 'device in chip' register with a bit per device.
**Motion Type**: Technical > 75% required
**Moved By**:    Ed Turner
**Seconded By**: David Law

| **Results**: | 802.3 Voters | Y | N | A |
|---|---|---|---|---|
| Attendees | Y | N | A | |

**Time**: 5:30pm 11/8/00
<div align="center">P/F: <b>Tabled</b></div>

**Discussion:** There was concern that this will require 75% vote to remove it if it gets into the spec now. How about adding it as a ballot comment. Devices in chip means MDC/MDIO 4 bit addressing. This can be thought of as a conditional package. This definition may be a bit too finite at this time and could need an expanded discussion before voting it in. This has been sent out on the reflector a while back. It's too early, we may dig ourselves into a big hole.
**Motion to Table (Bob Grow & Don Pannell)** Passed by acclimation

## Motion # 9    General Motion

**Description:** Move that the IEEE P802.3ae Task Force change the read access type to a post-write-increment-address access type.
**Motion Type**: Technical > 75% required
**Moved By**:    Ed Turner
**Seconded By**: David Law
**Results**:        Failed by acclimation
**Time**: 5:39pm 11/8/00
<div align="center">P/F: <b>Failed</b></div>

**Discussion:** Same type of comments as before. The detail is too low for this body at this time.

## Motion # 10   General Motion

**Description:** Move that the IEEE P802.3ae Task Force authorize the editor of Clause 33 to re-order the registers and register……
**Motion Type**: Technical > 75% required
**Moved By**:    Ed Turner
**Seconded By**: David Law

**Results**: Passed by Acclamation
**Time**: 5:43pm 11/8/00
                        P/F: **Passed**
**Discussion:**

## Motion # 11   Logic Motion
**Description:** Move that the XGMII revert back to the Draft 1.0 interface timing (i.e. source centered in both directions).
**Motion Type**: Technical > 75% required
**Moved By**:    Ghiasi
**Seconded By**: Dineen
**Results**:        802.3ae Voters:         Y 48    N 16    A 25
**Call the question: Y 43, N 19**
All Votes:                  Y 59    N 27    A 42
**Time**: 6:20pm 11/8/00
                        P/F: **Passed**

## Motion # 12   General Motion
**Description:** Move that P802.3ae Task force requests that the Editors of P802.3ae create *Draft* P802.3ae/D2.0 and that draft be distributed for review and comment. Comment handling and resolution will be done on a basis that is similar to that used by the Working Group.
**Motion Type**: Procedural  > 50% required
**Moved By**:    Brad Booth
**Seconded By**: Steve Haddock
**Results**:        Y 125   N 0      A 0
**Time**: 6:38pm 11/8/00
                        P/F: **Passed**

## Motion # 13   General Motion
**Description:** Move that IEEE 802.3 affirm all motions approved by P802.3ae Task Force Logic Track
**Motion Type:**
**Moved by**: Ben Brown Seconded : Brad Booth
**Second by**:
**Results**: Y : N : A :
                        P/F: **Passed by acclamation**

## Motion # 14   Logic Motion
**Description:** Move that IEEE 802.3 affirm all motions approved by P802.3ae Task Force General Session regarding clauses 33, 46 &51.
**Motion Type:**
**Moved by**: Ben Brown Seconded : Brad Booth
**Second by**:
**Results**: Y : N : A :
                        P/F: **Passed by acclamation**

## Motion # 15    General Motion
**Description:** Move that IEEE 802.3 affirm the motion approved by P802.3ae Task Force regarding parallel Clause 53 Replacement.
**Motion Type:**
**Moved by**: Ben Brown Seconded : Brad Booth
**Second by**:
**Results**: Y : N : A :
P/F: **Failed - I didn't get the numbers!**


## Motion # 16 PMD Motion
**Description:** Add a new column to Table 52-8 for the 1310nm serial PMD for a spectral width of 0.20nm RMS and the wavelength range 1265-1355 nm and change the wavelength range in.
Table 52-9 to 1265-1355 nm
**Motion Type**: Technical (>75%)
**Moved By**: Jack Jewell
**Second By**: Mike Dudek
**Results**: Y: 53 N: 8 A: 33
P/F**: Passed**


## Motion # 17 PMD Motion
**Description:** Move that the IEEE P802.3ae PMD sub task force ask IEEE 802.3 to adopt the proposed clause 52.12.1
content of *kolesar_1_1100* as amended during meeting as a replacement for the existing content of clause 52.12.1 found in Draft 1.1.
**Motion Type**: Technical (>75%)
**Moved By**  Paul Kolesar
**Second By** : Steve Swanson
**Results**: Y: 61 N: 0 A: 19
P/F: **Passed**


## Motion # 18 PMD Motion
**Description**: Motion to table Motion #2
**Motion Type**: Technical > 75% required
**Moved By**:    Jonathan Thatcher
**Seconded By**: Krister Frojdh
**Results**:        Y 49    N 0      A 6
P/F: **Passed**


## Motion # 19 PMD Motion
**Description:** Motion to make changes to clause 52 as specified by ohlen_1_1100 and keep the 40 km distance objective and make the maximum channel insertion loss be 13 dB.
**Motion Type:** Technical (>75%)
**Moved By**: Peter Ohlen
**Second By**: Scott Bradshaw
**Results**: Y: 41 N: 13 A: 24

P/F: **Passed**

## Motion # 20 PMD Motion

**Description:** Move that:
• We adopt the methodology of ohlen_3_1100 in principle
• Direct editor to make necessary changes to draft 1.1
• Create ad-hoc to bring to the January 2001 meeting complete and specific proposals for specification and measurement methodology.
**Motion Type:** Technical (>75%)
**Moved By**: Jonathan Thatcher
**Second By**: Peter Ohlen
**Results**: Y: 52 N: 3 A: 20
P/F: **Passed**

## Motion # 21 PMD Motion

**Description:** Move to incorporate table and figure as shown in bradshaw_1_1100 for attenuation management at 1550 nm
**Motion Type**: Technical (>75%)
**Moved by**: Scott Bradshaw
**Second By**: Piers Dawe
**Results**: Y: 54 N: 0 A: 9
P/F: **Passed**

## Motion # 22 PMD Motion

**Description:** Move that OMA is accepted as a method of specification and that the numbers should be as presented in dudek_2_1100. Also, these numbers should be in both mW and dBm with modifications as appropriate for motions passed at this meeting.
**Motion Type**: Technical (>75%)
**Moved By**: Mike Dudek
**Second By**: Ken Herrity
**Results**: Y: 61 N: 0 A: 5 yes,
P/F: **Passed**

## Motion # 23 PMD Motion

**Description:** Move to accept the ITU-T STM-64 reference receiver (specified in G.691). This represents a 7.5 GHz reference receiver with a fourth order Bessel-Thompson filter.
**Motion Type:** Technical (>75%)
**Moved By**: Piers Dawe
**Second By**: Scott Bradshaw
**Results**: Y: 49 N: 0 A: 19
P/F: **Passed**

## Motion # 24 PMD Motion

**Description:** Move that triple trade off curves as described by dudek_1_1100 are adopted as the method of specification for 850 nm and 1300 nm serial PMDs. The exact curves will be presented next meeting.
**Motion Type:** Technical (>75%)

**Moved By**: Mike Dudek
**Second By**: Vipul Bhatt
**Results**: Y: 44 N: 2 A: 30
<div align="center">P/F: <b>Passed</b></div>


## Motion # 25 PMD Motion

**Description:** Move to adopt savara_1_1100 in order to change clause 52 as follows for 1550 nm:
• Change Table 52-13 "Return Loss" specification to 26 dB (min) • Add to Table 52-14 "Return Loss for any device in the optical link" to 26 dB (min).
• Ensure that the RIN measurement is made with a return loss at 12 dB.
**Motion Type:** Technical (>75%)
**Moved By**: Raj Savara
**Second By**: Scott Bradshaw
**Results**: Y: 38 N: 5 A: 41
<div align="center">P/F: <b>Passed</b></div>


## Motion # 26 PMD Motion

**Description:** Move to adopt savara_1_1100 in order to change clause 52 as follows for 1310 nm:
• Change Table 52-9 "Return Loss" specification to 26 dB (min).
• Add to Table 52-10 "Return Loss of any device in the optical link" to 26 dB (min).
• Ensure that the RIN measurement is made with a return loss at 12 dB.
**Motion Type:** Technical (75%)
**Moved By**: Raj Savara
**Second By**: Scott Bradshaw
**Results**: Y: 17 N: 19 A: 50
<div align="center">P/F: <b>Failed</b></div>


## Motion # 27 PMD Motion

**Description:** Move to adopt changes 1, 2, 3, 5, 7 proposed in Justin Chang's clause editor update at Tampa, FL:
• Remove 3XX mode as option for PMA
• Loopback
    – Remove "shall"… loopback is optional
    – Send out static signal
• Table 51-6 change
    – TD test condition <1kHz to <10kHz
    – CJ test condition > 1kHz to >10 kHz
• Add PCS framer specs for completeness (OIF99.102.x)
• LVDS specs:
    – Reference to TIA/EIA 644Mb/s instead IEEE1596.3 with appropriate modifications
**Motion Type:** Technical (>75%)
**Moved By**: Justin Chang
**Second By**: Henning Lysdal

**Results**: Y: 42 N: 0 A: 38
P/F: **Passed**


## Motion # 28 PMD Motion
**Description:** Move to add optional RX indicator in Clause 51: Loss-of-lock.
**Motion Type:** Technical (>75%)
**Moved by**: Justin Chang
**Second by**: Henning Lysdal
**Results**: Y: 52 N: 0 A: 29
P/F: **Passed**


## Motion # 29 PMD Motion
**Description:** Move to change definition PMA_RX_CLK: in absence of valid serial data input a "valid" clock must be provided to clock the PCS.
**Motion Type:** Technical (>75%)
**Moved By**: Justin Chang
**Second By**: Raj Savara
**Results**: Y: 33 N: 2 A: 41
P/F: **Passed**


## Motion # 30 PMD Motion
**Description:** Move that we adopt Signal_Detect for clause 52 and clause 54 per the recommendations of the Signal_Detect ad hoc as the basis for the draft for TF ballot.
• Signal_Detect will be normative
– Signal_Detect to be a global indication (That is only one Signal_Detect for WWDM PMD, not a per lane Signal_Detect)
• If MDIO is implemented
• Report global Signal_Detect through MDIO
• Optionally, report Signal_Detect through MDIO on a per lane basis
**Motion Type:** Technical (>75%)
**Moved By**: David Cunningham
**Second By**: Jonathan Thatcher
**Results**: Y: 65 N: 0 A: 23
P/F: **Passed**


## Motion # 31 PMD Motion
**Description:** Adopt test points shown in Fig ure
54-3 as basis for TF ballot draft:
TP2 and TP3 are normative, TP1
and TP4 are informative.
**Motion Type:** Technical (>75%)
**Moved By**: David Cunningham
**Second By**: Bill Lane
**Results**: Y: 62 N: 0 A: 20
P/F: **Passed**


## Motion # 32 PMD Motion

**Description:** Move that we adopt the methodology proposed in dolfi_1_1100 in principle with respect to WWDM Tx, Rx measurements and wavelength and linewidth specifications, as the basis for the next Draft of Clause 54.
**Motion Type:** Technical (>75%)
**Moved By**: David Dolfi
**Second By**: Bill Weidemann
**Results**: Y: N: A:

P/F: **Passed by acclamation**

## Motion # 33 PMD Motion
**Description:** Adopt MDIO features in thatcher_1_1100 in principle • Have clause 52 and 54 editors write into draft 2.0.
• Authorize David Law to define the bit allocations.
**Motion Type:** Technical (>75%)
**Moved By**: Jonathan Thatcher
**Second By**: Jack Jewell
**Results**: Y: N: A:

P/F**: Passed by acclamation**

## Motion # 34 PMD Motion
**Description:** Move to affirm the definition of PMA_RX_CLK as written in D1.1.
**Motion Type:** Technical (>75%)
**Moved By**: Walter Thirion
**Second By**: Justin Chang
**Results**: Y: N: A:

## Motion # 35 PMD Motion
**Description:** Move to affirm the motions passed in the P802.3ae PMD sub-task force that have already been affirmed by P802.3ae.
**Motion Type:** Technical (>75%)
**Moved By**: Jonathan Thatcher on behalf of P802.3ae
**Second By**:
**Results**: Y: N: A:

## Motion # 36 Logic Motion
**Description:** Move that IEEE 802.3 affirm all motions approved by P802.3ae Task Force Logic Track.
**Motion Type:**
**Moved By**: Ben Brown Seconded : Brad Booth
**Second By**:
**Results**: Y : N : A :

P/F: **Passed by acclamation**

## Motion # 37 Logic Motion
**Description:** Move that IEEE 802.3 affirm all motions approved by P802.3ae Task Force General Session regarding clauses 33, 46 &51.

**Motion Type:**
**Moved By**: Ben Brown Seconded : Brad Booth
**Second By**:
**Results**: Y : N : A :
<div align="center">P/F: **Passed by acclamation**</div>

## Motion # 38 Logic Motion
**Description:** Move that IEEE 802.3 affirm the motion approved by P802.3ae Task Force regarding parallel Clause 53 Replacement.
**Motion Type:**
**Moved By**: Ben Brown Seconded : Brad Booth
**Second By**:
**Results**: Y : N : A :
<div align="center">P/F: **Failed - I didn't get the numbers!**</div>

## Motion # 39 Logic Motion
**Description:** Introduce informative figures into Clause 50 that show only the supported overhead bytes in the Section, Line and Path Overhead portions of the SONET frame.
**Moved By**: Dave Martin
**Second By**: Roy Bynum
Vote:    Passed by acclamation (no dissent)
<div align="center">P/F: **Passed** (75%)</div>

## Motion # 40 Logic Motion
**Description:** Accept updates to WIS overhead bytes as proposed by martin_1_1100. A service primitive must be added at the WIS service interface to the PCS to allow the PCS to report loss of sync.
**Moved By**: Roy Bynum
**Second By**: Paul Bottorff
802.3 Voters:Y: 13, N: 1, A: 5
All Voters:Y: 15, N: 1, A: 10
<div align="center">P/F: **Passed** (75%)</div>

## Motion # 41 Logic Motion
**Description:** Accept updates to WIS MIB variables as proposed by figueira_1_1100, with the exception of the note on slide 16, and editorial license to incorporate this into Clause 30.
**Moved By**:  Roy Bynum
**Second By**: Dave Martin
802.3 Voters:   Y: 9, N: 0, A: 5
All Voters: Y: 11, N: 0, A: 9
<div align="center">P/F: **Passed** (75%)</div>

1. **Opening Business ( Jonathan Thatcher )**
   http://grouper.ieee.org/groups/802/3/ae/public/sep00/intro_0900.pdf

   Typical introductory material, please reference the presentation for details.

2. **TIA liaison report ( Chris Diminico )**
   No Presentation Available

   TR42 activity related to this group is focused on the 300 meter PMD, e.g. 850nm MMF. There is a ballot being reviewed for this MMF high BW 850nm PMD.

3. **10G Fiber Channel liaison report ( Rich Taborek )**
   No Presentation Available

   The purpose of fiber channel is storage area networks. The 10GFC proposal is in response to the 802.3ae project. This is the next speed up project for Fiber Channel. The 12X speed is the speed that corresponds to our work here in IEEE. There is more focus on shorter distances; therefore a copper solution is being pursued. There is a common component goal between this group and ours. In fact this T11.2/3 working group wants access to our draft standards. Also our standard will be referenced in the Fiber Channel standard. The Fiber Channel group would like our standard to reserve some specific code groups for use in FC applications.

4. **FO 2.2.1 liaison report ( Mike Hackert )**
   http://www.ieee802.org/3/ae/public/nov00/hackert_1_1100.pdf

   Mr. Hackert reported to the group that the FO 2.2.1 plans are clearly on track to deliver experimental results on time considering the 10 GE schedule. The 50 micron demonstration testing is underway. The fibers included are representative of a cross-section of the fiber available. Six labs are underway with the testing. The results are used to verify the system model's EME. An estimate of the risk assessment will follow such that the ability to select transmitters and fibers is doable to reliably deliver 10 Gb…………….. By the next interim meeting this group will have details to deliver from the testing.

5. **OIF liaison report ( Raj Savara )**
   No Presentation Available

   This group is working closely with our group on SFI-4 (i.e. XBI), VSR OC-192 (i.e. 10GBE PMD) and SFI-5 (i.e. XAUI). Plus at the XGMII level this related to the POS-PHY interface. The leadership of the OIF have requested access to our drafts, our TF will draft a motion for consideration of this request and then the 802.3 committee will act on this. Several members of our group requested access to the OIF

drafts if we give access to our drafts. The OIF is working on OC768 (40 Gbps) ………… Straw ballots require 50% and Principle ballots require 75%.

## 6. Equalization Ad Hoc Progress Report ( Vipul Bhatt )
http://www.ieee802.org/3/ae/public/adhoc/equal/AboutAdHoc.html

Mr. Bhatt gave a progress report of the Ad Hoc's efforts from this past Sunday. They are studying the PMD issues on 1550nm links. This polarization effect is only applicable to long links over 1550nm single mode links, here a pulse is split into two parts traveling at a different velocity and is random in nature. Some say just throw more power at the problem, an engineering judgement says a 0.5dB of power penalty would satisfy the eye closure with a high degree of probability. The awareness of PMD was in the 92/93 time frame, this older fiber where PMD issues are a concern represent approximately 2 – 12 %, but even the experts do not agree on the percentage. This non-zero percentages need to be isolated, so we may want to consider other methods such as cable dates (not likely), how about purchase records (this too isn't likely).  In 1997 Bellcore did a field audit of US and non-US fibers, this study supports the claim that there is a higher number of these fibers out there. In fact the study shows that 12 % of the fibers exhibit this PMD problem. This Ad Hoc group is getting close to closing on the recommendations for the 1550nm Serial PMD. They may define a procedure to isolate the bad fiber, however these tests are not inexpensive or easily portable. The survey also shows new fiber also exhibits PMD problems. Vipul defined the statistical nature of the ITU G.650, IEC TR 61941 which specifies the 0.5 ps/sqrt(km) limit use to define bad fiber. There were also concerns that could not be addressed about the long term effects of this PMD problem on links. The Bellcore study is titled, "Bellcore's Fiber Measurement Audit of Existing Cable Plant for use with High Bandwidth Systems", by John Peters, Ariel Dori and Felix Kapron. Today there is no guarantee that the new fibers purchased today will not exhibit this PMD issue.   Our TF chairman reported that after discussions with David Smith, an expert in this optics field who was instrumental in the resolution of DMD issues for 1 Gb Ethernet is not seeing this PMD issue for the OC-192 links in DWDM applications.

## 7. State of the Standard - Schedule; Hot Ticket Items ( Brad Booth )
Presentation was not uploaded to 10GbE Web page

David Kabal is now handling clause 52. Paul Bottorff took over Clause 53. Clause 3 will be removed from future drafts. Brad added Loopback as a Bit Ticket item. Each open issue by clause was defined. There are some BIG issues in Clause 48 & 49 dealing with Break Link and Remote Fault. The Serial PMD has the largest list of open issues to be solved. Additionally the WWDM WAN PMA and PDM have had very little review so they are subject to a lot of scruntinty. Brad stressed the issues that can be closed off and those that will more than likely not close during this meeting, e.g. Jitter, Connector and Compliance Testing.

## 8. Link Initialization & Status Reporting ( Rich Taborek )

http://grouper.ieee.org/groups/802/3/ae/public/nov00/taborek_2_1100.pdf

Mr. Taborek reported on work that has concluded over the past few days. This is a tops down pitch. The Link architecture has many sub layers and must deal with LAN vs WAN versions, much more complexity than 1 GbE. Due to back-plane speeds for 10 GE we need to do retiming at the transceiver level. Link Status tells the MAC it is OK to transmit application packets. This is bi-directional, Link goes up after PHY is reset and operational, we have valid signal not just noise, ……… The signal detection feature is actually a required function. SD helps us determine that the receiver is working properly. The level of the received signal must be above a minimum threshold. This is typically implemented in a TIA for optics. In 10 GE where we have multiple links running across the link there are multiple SD's. The response time is typically in microsec time units. Link Status reporting, e.g. if SD is not activated due to a weak signal this must be reported up through the system to enable rapid link fault detection. SD only detects very bad links, in other words a link with bit errors does not bring the link down. Rich proposed sending a code or protocol across the link for reporting as opposed to an out of band link. MDIO is however adequate for link debug and fault isolation. The codes used can not be bad from an EMI point of view. The protocol should be keep simple, the protocol terminates at the RS. Need to sent different LF and RF messages with the understanding RF may be turned into a LF along the way. RF is issued from RS only and LF from XGXS, retimer and SUPI. From a reliability point of view the messages are considered valid after three consecutive like messages are received. The details of the protocol over 8b/10b were shown because it is more complex and there is concern about keeping the EMI characteristics low. Link Initialization consists of only Link Sequences in the absence of errors, no handshakes or negotiations are used. The sequence of two stations powering up at two different times was reviewed in detail. MAC transmission was only allowed after both ends of the duplex link view the link as operational. Also RF was detailed with a variety of snapshots, for example when we have a link failure such as a cable break. There is an outstanding BL issue. We need to decide if it is needed? This is an important feature is we are communicating with a device that does not have a management stack which can be used to shut down the link. Rich summarized by stating he believes the group has a robust LS design and reporting protocol and thinks his group has reached consensus on this issue. There is a lot of detail missing, however that is a subject for further work. There may be certain intermediate link elements (e.g. repeaters) that don't have the ability to generate SD, however these elements need to be able to propagate SD. The 64/66 code contained in the SPE will contain the protocol in the form of an encoded messages. The insertion of these fault codes is done in the PCS, not the WIS. There was a concern that some 10 GE implementations would be penalized (WAN PHY) because this function would require additional logic that would not otherwise be needed. The RF message is only useful for setting LS and then used to allow or disallow MAC packet services. Don't effect the counters e.g. FCS errors, when Break Link is sent across the link. Below the WIS and PCS we may need a message interface, e.g. pin. A number of people spoke in favor of this proposal and asked for support. Loss of Lock and Loss of Signal both cause similar reporting up the stack, if connected to XAUI build a

message. SD components in the PHY below RS have the ability to communicate up a loss of signal in a variety of ways, like transmit all ones. The chair stepped in to describe the intent of this presentation. He also stressed we have a lot of details to work out so lets not nit pick it to death here and now. This proposal is not meant to be complex, it is a minimalist proposal on how to move forward. Each layer that has a role in this function will have opportunity to refine further as we progress. There was a question on how this proposal plays with OIF's OC-192 solutions. Rich felt that the some of the people here

9.  **MDIO Issues – presentation only ( Ed Turner )**
    http://www.ieee802.org/3/ae/public/nov00/turner_1_1100.pdf
    http://www.ieee802.org/3/ae/public/nov00/turner_2_1100.pdf

A new low voltage electrical interface specification for the MDIO interface is in the works, progress on this interface will be reported at the January 2001 interim meeting. An attempt to base this interface on the JEDEC 1.5V HSTL standard failed. The Clause 22, "Reconciliation Sublayer (RS) and Media Independent Interface (MII)" timing shall be used by this new MDIO low voltage interface. The interface will be optional. A set of control bits for PMA/PDM port type selection will be defined, for example to select 10GBASE-W4, 10GBASE-X4, Serial 10GBASE-w, and 10GBASE-R. Since it is envisioned that 10 GbE devices will contain multiple internal MDIO chips (i.e. devices) Ed suggested we may want to define a 'devices in chip' register with a bit per device used. This 'devices in chip' concept was tabled and a suggestion from the floor was to bring this back up as a ballot comment during the balloting phase of the 10 GbE standardization process. There shall be a re-ordering of the registers and register bits to accommodate bit locations for DTE XGXS that do not match those for the 10GBASE-X PCS. The PICS still needs to be written, separation of the PCS and WIS, PMA/PMD signal detect and get an update of the register bit requirements from all the clause editors.

Editor: **Dawson Kesling**
Clause 47 Minutes Recorded by: **Jonathan Greenlaw**

Clause 47 Minutes

Call to Order - Dawson Kesling
Xaui Electrical - goal - prepare for ballot
Scope -

Resolve electrical interfaces and specs
Roadmap to close jitter
Roadmap to close compaliance/testing

Electrical

Approve receive eye
Approve transmit amplitude - min/max amplitudes
Determine Compliance channel (open issue)
        Agree to method
        Enlist volunteers
Jitter Spec (open issue)
        Form Ad Hoc to parallel to optic Ad Hoc
        Why? -optics wants to split out XAUI
        Enlist volunteers
Approve Common mode specs
PICS
        Not needed until Draft 2.0 (next draft)

Receive Eye - Jeff Porter

Original Diamond changes
        Shape to hexagon for sampling uncertainty
        175mv to 200mv
compatibility with slower interfaces
**Question:** What is amplitude definition?
        **Answer**: Each signal swings +- 50mv (100mv) therefore 200mv differential
**Concern:** Basis for 200mv spec. - Can be tough for CMOS receivers.
Need to be clearer for receive definitions of differential and peak to peak
**Question**: Which clock is the eye measured to?
        **Answer**: Recovered clock
        Receive eyes captured with receiver of correct bandwidth
Any concerns to stop vote? None expressed. Purple eye approved. Motion will be made.
Poll
        Unanimous w/7 abstentions

Transmit Amplitude - Ali Ghiasi

Quick guide, but if not, must meet channel model/receive eye (two ways for drivers to meet spec)
Two major issues
        Increase Amplitude
Must increase to meet spec
        Jitter due to retimers
Overview

24" FR4 plus connectors requires higher amplitude

Propose Vo Dif Min/max to 900/1600 mv

Loss budget

Need to increase connector loss

Break ISI into ISI Loss and LF loss

Added Link Margin

Trace length ~21inches

Explanation of ISI

Equation defined for ISI loss

Chart for ISI and LF losses for 20" for 5mil coupled stripline

Chart for Amplitude vs PCB distance

Implies need for 870mv

Chart for ISI penalty as function of amplitude

Implies need for 900mv

Comment: Rich Taborek: One solution, could use equalization to save power.

**Question**: What is power increase?

**Answer**: 100mWatts

Transmit Amplitude - Rich Dugan - output driver eye mask

Overview - copies will be sent to web

Define TX eye mask

Worst case jitter and rise/fall times

PRBS 2**7-1

Vary trace lengths

Simulation model

Edge coupled striplines

Two loss tangents

Two trace widths

Two peak to peak - 500mv and 800mv

Simulation results

500mv - little hope for bad dielectric

800mv - good chance with good dielectric

Conclusion

20" with 500mv not possible w/o equal.

800mv can be done without eq

~50mWatts per XAUI

EQ. Doesn't really help

Proposal raising to 800/1600mv

Compatible with Infiniband

**Comment**: transmit pre-emphasis burns power also.

**Question**: Differentiate between good/bad dielectric

**Answer**: from various PCB manufacturers

**Question**: Model includes skin-effect, etc.

**Answer:** Yes

**Question**: Is driver ideal or does it drive through packaging

**Answer**: Packaging and connectors are not modeled

**Comment**: Disadvantage of 1600mv max. Short trace causes higher input driver overdrive max.

**Question**: 1600mv from Infiniband. For Cables?

      **Answer**: Yes

      Minimum for cable is 1000mv

Object: Power and dynamic range

**Comment**: Increase Max to allow vendors to get into window.

**Comment** : Mask limits pre-emphasis

**Comment** :

      Do not need this if one uses channel and receive eye.

      This method is much simpler for testing drivers by checking this transmit eye.

      3gbit is hard, to set a transmit limit ignores PCB reality.

      This really applies to the case with no equalization, which is a limited case.

      This can be very confusing to customers to verify compliance

      Can we make the TX eye spec an informative Annex? Yes, but may lose teeth.

      We need to have a transmit template

      RX Equal. Will eventually add another method to measure.

**Spec channel and receive eye. If you pass the TX transmit mask you do not need to pass the far end compliance. This applies to drivers only.**

**Straw Poll** - Do we need this?

      Yea: Unanimous with one abstention

**Straw Poll**: Minimum Transmit Amplitude = 800mv

      Did not do. TDB for the ad hoc

**Straw Poll**: Max Transmit/Reciever Amplitude = 1.6v

      Yea:36,  Nay:1, Abstain:7

<center>Compliance Channel - Dawson</center>

Measurement data

      Diagram of compliance points

At driver and far-end

Trade off can be made with return loss

      PCB board modeled and made

      Results for various lengths/configurations

      500mv does not work

      **Comment**: HSPICE w/w-element not very accurate

      Good correlation with other models/presentations

Specification method

      Propose compliance method in three parts

Minimum loss limit

ISI Loss

Phase linearity

      **Comment**: ISI limit needs to consider higher frequencies then 1/2 baud rate

      **Comment**: Group delay may be a better measurement using a network analyzer

      **Comment** : Should be specifying channel impedance

      **Comment** : Channel impedance specification may be too restrictive.

      **Comment**: Specify upper and lower loss rather than upper loss and ISI.

      **Comment** : Would like more time to study

Method or numbers?

Time is limited.

        **Concerns**:  with lower bound

Upper and lower has more penalty for PCB design

        Max S21 Magnitude limit

        Min ISI loss

Include Fbaud/2

        Group Delay or Phase

        Straw Poll: Correct approach

Correct - Unanimous

Not correct -

        Volunteers for channel ad hoc

                Shurgal

                Sanders

                Taborek

                Ghiazi

                Porter

                Duggan

                Rogers

                Kessling

                Dedrick (dama, bipin)

                      Jitter - Tord Haulin

Jitter decomposition

        Deterministic

        Random

        Must be treated separately

Low bit rates, only need one compliance points

High bit rates - need more compliance points

        Global clock vs. transit times

Synchronize and phase alignment

Suppresses PLL/DLL LF jitter

Requires more compliance points

        Bandwidth Limitations

Pre-emphasis can help with far side ISI

        Impedance Matching

Transmitter/receiver return

        Common mode noise

Fold common mode into transmitter differential signal jitter.

**Question**: Why do we have to do more?

        **Answer**: Interoperability

**Comment**: Need to specify the entire jitter budget.

**Comment**: We have a jitter budget with only two entries

Question: Can we use rms impedance to encompass common mode noise?

        **Answer**: No

Propose jitter mask based on FC and SONET

Appoint jitter ad hoc

Haulin
Porter
Sanders
Ghiasi
Shergill
Taborek TDB
Dama
Duggan

### Common Mode Specs - Dawson

AC CM spec to replace skew spec
   Dropped from agenda
DC CM spec at driver
   Limit AC coupling isolation
   Allow DC coupled design
CM impedance match
   Driver ,receiver, PCB(channel)
Propose start spec.
   Suggestion from infiniband
   Suggestion of 0 to 2v -  transmitter only
Favors internal caps
2.0 Volts is good for integrating caps and newer technology
2.7 Volts is good for older technology

**Straw Poll** - DC window of transmitter to -0.3 to +2 into 100 ohm load
   Nay: 3,Yea: 21, Abs: 13

**Straw Poll** Same except +2 is set to +2.3.
   Nay: 1 (weak), Yea: 21, Abs: 18

**Comments**: Provide a termination for common mode noise. Otherwise a standing wave may be created. Specify in return loss at 6db.

**Straw Poll** - Common mode impedance at driver and receiver at 1 to 2.5 Ghz at high end 30Mhz at low end
   Nay: None, Yea: 14, Abs: 15

Editor: **Rich Taborek**
Clause 48 Minutes Recorded by: **Rich Taborek**

Comparison with 1.0
State Machines completely redone w/few bugs
P139 Line 44 - Randomized on idle code groups not XGMII data
Clock compensation described in code group R. Actually happens in receive or transmit
PCS (optional)
Renamed nomenclature to agree with XGMII
Redid table for column definitions.
Wording for polynomial. Two polynomials left in for examples
Changed skew bit numbers to 18
Need to realign to MDIO Clause
ISSUE: commas may not occur as often as needed (Ks are not guaranteed. Should look at
A s?).
**Issue**: cannot detect/recover if a byte disappears. Add ipg_ok to last align state. If an
invalid IPG, set any_sync_status = FAIL
**Comment**: PCS receive state diagram is too simple.
**Issue**: convert only AKR in the convert_idle function

### Clause 48 Minutes from the Nov 6-9 Tampa meeting:

Rich Taborek summarized the status of clause 48. Most aspects of the clause were felt to
be 90-100% complete, with the exception of the PICS (has template only at this time).
Rich identified four issues that were known to be outstanding at the time:

− Initialization protocol needs to be added.
− Link status and signaling need to be added.
− Signal detect needs to be reviewed to ensure consistency with Clause 54.
− Still open whether the RS or PCS will do packet sequence checking.

Rich reviewed the changes from D1.0 to D1.1. These include:

− A notation change: /x/ is used to refer to a single code-group, and ||x|| refers to a full
column of identical code-groups.
− Table 48-3 (Defined Ordered Sets) was expanded to fully describe the ordered sets
that are used by the PCS.
− Figure 48-6 (PCS Idle Randomizer Example) and associated text were modified to
clarify the PCS idle randomizer operation.
− Section 48.2.5.1 (State Variables) was updated to reflect variables, functions, and
messages used by the PCS state machines.
− The PCS transmit state machine was significantly changed to put it into a standard
IEEE format and to accommodate various potential link signaling methods.
− A PCS receive state machine was added.

- Various minor updates and corrections were made to the previous draft.

During the discussion, the following comments and concerns were raised:

- Figures 48-2 & 3 appear to be [almost] identical. This will be corrected.
- An example polynomial in Figure 48-6 is helpful, but the two shown now yield identical PRBS's. Only one will be shown.
- Portions of the skew budget were questioned. This will be taken off-line.
- The clause needs to be reviewed against the E. Turner's earlier presentation (Clause 33/MDIO Issues).
- The NOCOMMA value of 16k bytes may not be large enough. Rich will check FibreChannel values and make a recommendation.
- The clause needs to be updated to incorporate the Link Status Reporting and Initialization proposal that was approved on Tuesday.
- Once in the ALIGN_ACQUIRED deskew state, there is no detection of deskew status and no way to recover in the event of an alignment problem. The state machine will be modified to correct this problem.
- The PCS receive state diagram appears too simple, and some of the functions may be better shown as additional states. This will be considered for the next draft.
- A PMA signal detect pin and associated PMA primitive for signal detect were requested. The pin is shown in the block diagram, and a primitive was determined to be unnecessary since the signal goes through the PMA.
- There was a question on whether to specify the allowed idle insertion/deletion "frequency". It was decided that this is unnecessary because it happens very infrequently with ±100 ppm clock tolerances.

There were no motions during the Clause 48 breakout meeting.

## Logic Track – Clause 49 '64b/66b PCS' Presentations & Minutes

Editor: **Pat Thaler**
Clause 49 Minutes Recorded by: **Gordon Jacobs**

Clause 49 Status:
- State diagrams have been updated as planned in New Orleans
- Clause 49 contains all features except: support for Fault signaling
- PICS (Protocol Information Statement) must be generated for 2.0 (looking for volunteer to do this)

Clause 49 Issues:
1. Optimization for link sync
   -lower threshold for transition from NO_FRAME_LOCK to SLIP
2. Packet format checks on transmit
   -Currently, transmit and receive state machines perform same tests.
   -T_Type_Next checks could be removed.
3. Do we check unused bits in blocks
4. Hi_ber was left out of conditions for entering and leaving rx_init

#1: discussion:
How many loss of sync preambles should it take to consider a loss of sync condition to happen? Comment was made that the current draft is too many (32). See state diagrams in 49.2.11.2. Comment was to change this to a single bad header (when out of lock), still need 64 to get a "in-sync" condition. When in lock, still need 32 bad syncs to drop out.

| | |
|---|---|
| **Straw Pole** to do so: | |
| 802.3 Voters:  Y: 12  N: 0  A: 0   PASSED | |

#2 Packet format checks discussion: see state diagram in Fig. 49-11.
$T\_TYPE\_NEXT = (E+D+T)$ check protects the hamming distance of the code (state TX_D and TX_E).  Pat suggests removing the T_TYPE_NEXT checks in the TX_D and TX_E states. No real discussion.

#3 Do we check unused bits in blocks? -discussion:
See figure 49-5. Bits in a number of the codes that are not used and a requirement is in draft that they be sent as zero. Many times standard says that bits sent as zero are not checked upon receive.  All of the codes with ODDD have to be added (optional code features from July meeting) for remote/local fault conditions signaling as discussed at recent meetings. In unused bits of those optional codes, they have to be set to all ones or zeros to differentiate between fiber channel or 10GE. Current proposal does not specifically state what the bits will be yet (Rich Taborek). Pat Thaler suggests that the check is required on Receive side (for zero = 10GE).  Ben Brown suggests check for zero everywhere or invalid code group.  Any other opinions?  None given.
Proposal: The unused bits have to be zero (as before) but need to be checked on Receive for valid codes.
Fiber channel sends same codes for start/terminate packet as 10GE. In Fiber channel, which sends in groups of 4, the unused bits are rarely seen (only on a start code with start midway). Fiber channel may use same codes for remote fault and only way to differentiate is with the unused "x" and "y" bits shown in the July presentation (walker). Ben Brown is less inclined to check zero bits in main codes on Rx side. Other comment given: same opinion, not check zero bits in main codes, and check only in optional codes. Pat Thaler agrees about not checking zeros in main codes.  For optional codes, check should be made to differentiate between 10GE/FC in implementations. In future, other K characters might be wanted to be employed so the four bits should be checked as well for that reason (in case they take on other values than 0000 or 1111).
Motion: Do not check unused bits in S and T main codes on receive side, but do check in optional codes.

| | |
|---|---|
| **Motion 1**: For the codes in draft 1.1 Figure 49.5, don't check the unused bits (which are set to zero on the transmit side) on receive. | |
| Made: Pat Thaler    Seconded: Gary Bourque | |
| 802.3 Voters:  Y: 9  N: 0  A: 0          PASSED | |

| | |
|---|---|
| **Motion 2**: For the RF and LF codes which will be encoded as in walker_0700 page 19, "x" and "y" fields will used as in walker. | |

Discussion on Motion 2: In walker_0700, we only need 3 of the first 4 codes shown (ODDD/ODDD not needed). Commenter: PCS needs to know whether it is running in ethernet or fiber channel mode to check these bits, so why check if PCS already knows? Suggests that on receive, PCS be allowed to ignore. Commenter2: The intention of the x,y fields was to be examined upon receive as far as he understands (worked with walker on original presentation).

Made: Pat Thaler     Seconded: Gary Bourque
802.3 Voters:  Y: 10   N: 0   A: 0            PASSED

Note: In walker, intention is to use the values of x,y to decide which of the two shown rs value to use in xgmii code.

#4 Hi_ber was left out of conditions for entering and leaving rx_init state –discussion: (See Figure 49-5)
In frame sync state diagram, high BER should not cause SLIP. There is no equivalent function in 8B/10B code for high BER.  When no valid sync header we error those codes. CRC was designed to protect up to certain BER. Comment1: in high BER channel do not trust packets at all. Pat recommends to put high BER back into diagram for entering and leaving rx_init state. If high BER becomes true, do we wait until end of packet or not? (asks for guidance from group)
Given change made to high BER, Ben Brown suggest we go immediately.

**Motion 3**: OR hi_ber = true with the global conditions to enter Rx_init state.
Made: Gary Bourque     Seconded: Pat Thaler
802.3 Voters:  Y: 11   N: 0   A: 0            PASSED

Clause 49 Work for Draft 2.0:
- Add fault signaling (see slide)
- Identify needed definitions and write, e.g. –character
- Add PCS to MPA bit order diagram to 49.1.4 – with and without WIS
- Add PICS
- Review text – is anything missing?

Calling volunteers to add PICS:  no respondents yet…

WIS group wants signal (for J1) for overhead in path.  If in Rx_init state then PCS sets link status bit (Pat). Comment1: at point of detection, start generating local fault, WIS cannot generate local fault, WIS sets bit and PCS generates local fault, so our link status should not indicate that PCS is source of problem. How to set MDIO bit when error propagates from layer below is at question.

**Motion 4**:

- Add WIS_SIGNAL.indicate(SIGNAL_DETECT) and PMA_SIGNAL.indicate(SIGNAL_DETECT) as conditions causing global transition to NO_FRAME_LOCK state.
- Provide WIS_SIGNAL.request(PCS_LOSS_OF_SYNC) when in Rx_Init and send LF when in Rx_Init.
- Add the codes from walker_0700 page 19 to support LF and RF.

Made: Tom Alexander    Seconded: Romer

802.3 Voters:  Y: 11   N: 0   A: 2          PASSED

Loopback discussion:

In WIS clause: Rx from PMA is ignored, Tx sends all ones or zeros (depending on what PMA people say regarding eye safety) in loopback mode. Might make sense to do something similar here, as opposed to sending what we are looping back (or we could send idle). Comment 1: It is physically possible to create a PCS WIS device where the WIS can be switched in and out, therefore what this group sends out of PCS should be compatible with what WIS is doing. Pat's reply: sending all zeros would cause WIS to encapsulate them in SONET frames.

MDIO register has to be split in case WIS/PCS are in different places.

We send someone to go to Clause 33 meeting to see if they are already considering this (request was made previously).

**Motion 5**:
- Make WIS and PCS separate devices for MDIO interface and authorize Editors to renumber device types and separate maps.
- Add 4-bit clear-on-read sticky counters in this clause and MDIO clause for occurrences of hi_ber=true and loss_of_sync so that flakey links can be identified.
- Add an 8-bit counter of same type for code violations.

Clarification: A sync violation is counted as a code violation but does not count towards high BER calculation. Sticky counters mean that when they are at full count, they do NOT roll over.

Discussion: some discussion on whether length of code violation and BER counters is adequate. Comment: Does PCS need indication of WIS there or not? Pat: should be a separate motion if we want to do that.

Made: Thaler   Seconded: Alexander

802.3 Voters:  Y: 13   N: 0   A: 3          PASSED

Comment from attendee on next topic:

If a PCS is running and there is a WIS in the system that is running, the rate at which the PCS circuitry must delete idles is significantly different and hence PCS must have knowledge of WIS.

Pat: Different service interfaces will differentiate: Ben: PMA signal request would come at a very regular basis, but WIS signal request would not come as often (or with gaps), but it is not defined anywhere in standard. Tom: Service interface between WIS and PCS is not a physically defined interface and hence any implementation can have a signal indicating WIS or not. There is a status bit in the MDIO that says whether WIS is present or not. Since we just split the MDIO registers, this bit should go into PCS to indicate since WIS knows of its own existence. Don: rate adaptation done above. Pat: 64/66 actually adapts between the rates with buffering.  Clock tolerance compensation.  Pat: knowing how fast to feed WIS, as gaps or special clock – implementation issues. Steve: enable/disable WIS bit needed!  Pat: we have a bit already – but some discussion about whether it is a WIS bit or a PCS bit. Let MDIO people do what they are happy with.

Comment: In state machines, "++" was used to increment a variable, and this needs to be checked for acceptability with IEEE standard.
Previous clauses used Pascal, so it would not be legal to use "++".
Will be put on Editor's email reflector.

More descriptive text needed for state diagrams?? (Pat requests comment)

Back to Loopback Discussion:
Ben: should encompass as much functionality as possible. If we include gearbox then on PMA side we are down to 16 bits (past scrambler) and too hard to insert idles. Since we want to include as much logic as possible, we should send zeros or ones as per the recommendation of the PMD people. Comment: PMD people decided to send all zeros an hour ago.

Request for other comments, questions, motions:
NONE.


## Logic Track – Clause 50 'WIS' Presentations & Minutes

Editor: **Tom Alexander**
Clause 50 Minutes Recorded by: **Gordon Jacobs**


**Clause 50 Issues and Resolution**
• MDIO register bits, functions, descriptions
     – Editor will update register descriptions in Clause 50 D2.0 in consultation with Clause 33( 45)
• Signal detect handling, fault reporting
     – Already implemented in Clause 50 D1.1 as per Tuesday's fault reporting presentation, minor clarifications and modifications required to conform completely.
• Loopback

– Editor will clarify text in D1.1 to indicate that the WIS will send either all-zeros or all- ones to the PMA, and ignore received data from the PMA; must consult with PMD group on eye- safety issues
• Clarification of bit ordering between WIS, PCS, PMA
– Informative bit mapping figure will be supplied to Clause 49 editor
• Test patterns for WIS (jitter, etc.)
– Deferred until they become available (contributions solicited)
• Final resolution on overhead bytes (+ related MIB items)
– 2 presentations; motions to accept both (passed by breakout group)
• Informative figures for Section/ Line overhead
– Motion to include these (passed by breakout group)

**CLAUSE 50 (WIS) Breakout, Tom Alexander, PMCC**

Tom presents items for discussion:
1. MBIO register bits, functions and descriptions (changes from 1.0 to 1.1)
2. Signal Detect Handling/Fault Reporting
3. Loopback – some desire by committee members that WIS is testable by loopback testing.
4. Bit ordering clarifications between WIS/PCS/PMA
5. Test Patterns for WIS – requested, what is that, how to construct.
6. Overhead Bytes/MIB items relationship
7. Informative Figures for section and line overhead. Transport overhead too.

Proposed additions to overhead bytes to be presented by Dave, Nortel after 3pm.

1. MBIO Register Bits Discussion:
MDIO registers associated with WIS will be placed in the WIS clause.
One change from 1.0 to 1.1 was movement of these register bits to clause 50. One register shared between WIS and PCS is still not resolved as for its location.
Some register bits having to do with fault reporting are still undefined.
These will get updated in the next draft (forthcoming).
Comments?
Q. Where are bit tables?  A. Tables from Clause 33 will be added to Clause 50.

2. Signal Detect and Fault Handling:
WIS FAULT REPORTING in Draft 1.1 now is (Tom Alexander)
1. Local faults accepted from PNA via SIGNAL_DETECT service primitive
2. Local Faults reported to PCS via SIGNAL_DETECT primitive
PMA SIGNAL_DETECT service primitive indicates error detected by PMA
WIS fails to synchronize to SONET frame stream (equiv to LOS)
PLM-P, AIS-P or LOP-P errors are detected during Receive Process.
3. Remote Fault indications arrive (via PMA) as 64b/66b coding in payload and are passed to PCS

WIS passes remote fault reports directly through to PCS; it does not interpret payload, and is not capable of decoding the 64b/6b line code.
4. Faults reported individually via MDIO register as per WIS clause
Need to add bits to WIS/PCS Status Register, Register #1 (TBD)

**Comment 1**: send all zeros or ones so that WIS will not lock up and report error. Tom replies that sending all zeros was rejected by committee was rejected.

**Comment 2**: Ben Young: Need to define equation or condition to define LOS. Tom Alexander replies that if state machine is not in sync state, then it is LOS.
There is an OR gate that OR together three bullet items above in Number 2 to generate SIGNAL_DETECT primitive to pass up to the PCS.

Primitive passed to PCS is part of logical interface only and not defined as to how it is implemented.

This reporting satisfies Rich Taborek's presentation by passing the signal detect up to the PCS from PMA in some fashion.

NOTE that in item 3 above, add statement that a local fault that is detected by some sublayer below the WIS will also be passed through by the same mechanism. Fault indications encoded in 64B/66B are passed through transparently to PCS.

Clarifications from audience: Local fault goes in the direction of traffic (simplex direction). When it hits the PCS in the receive side, it will generate Remote Fault in the opposite direction.

Technical issue to be resolved: How to handle PMA SIGNAL_DETECT with respect to MDIO register (pass it up or only have local conditions like SONET frame sync loss).

Skip to item #4…

4. Bit Ordering between WIS, PCS, PMA clarification:
How to handle when WIS is present or is not present?
Bit renumbering scheme is now in Draft 1.1.
Similar problem between WIS and PMA. Bit renumbering scheme proposed as well.
Bit ordering – Proposed figures for PCS clause shown.
NO WIS case: PCS to PMA straight bit mapping 0-15.
WAN-PHY case: PCS bit 0 (LSB) renumbered bit 1 in WIS (MSB) to bit 0 after frame generation, mapped to bit 0 in PMA.
Need one more mapping from SONET octets to service interface.
This will be implemented in Clause 49 (Pat Thaler).
Comments? None.

3. Loopback:
Ben: Questions to be answered: In loopback data from PCS is looped back.

What do we do with data to/from PMA?
In loopback bit register 1 => loopback to higher levels.

**Comment 1**: not stated clearly that loopback bit does this (at this point).

Ben: Implementation specific where loopback is performed. Could be either side of WIS.
Tom: This is WIS PCS control bit so it should encompass the PCS and WIS together.
Ben: agrees that as currently defined it loops back PCS and WIS.

**Comment 2**: Roy: Need to have a set point for loopback or there will be problems in practice. Ben: specific vendor will indicate what this test bit does, but standard should not indicate exactly.
**Comment 3**: Loopback should be consistent in terms of testing what is above the layer where the loopback bit is set.
**Comment 4**: Vendor could have various loopback modes in addition to what the standard says.

Tom wants to clarify what the WIS transmits on the medium when loopback is enabled (and what to do with data from the medium). Current statement in Clause 50 is not fully clear. (Send zeros, send frame w/no payload, stop clock, etc.?)

Group agrees to send all zeros or all ones on Tx side and ignore Rx side in loopback mode.

**Comment**: Roy: for issues of eye safety let PMD people decide which of all zeros and all ones to use.
**Discussion:** of using AIS overhead bit during loopback, but AIS is not currently defined for use in WIS.

Changes required to clause:

5. Test Patterns for WIS
Patterns are mainly for use by PMD groups for analyzing jitter, but should not be in the standard unless someone can come up with a specific pattern required.

7. Informative Figures for section and line overhead. Transport overhead
Argument against: minimize content and reduce chance of errors.
Argument for: clarity.

Group agrees that diagram (informative only) will be created and only supported bytes will be shown.

Short break taken…

## MOTION #1

Introduce informative figures into Clause 50 that show only the supported overhead bytes in the Section, Line, and Path Overhead portions of the SONET frame.

**Moved By**: Dave Martin
**Seconded By**: Roy Bynum

      P/F: 802.3: **PASSED** by acclamation (no opposition)

6. Overhead Bytes/MIB items relationship

3:15PM:  Presentation by **Dave Martin** on **WIS Fault Isolation**.
Purpose: to differentiate faults between different administrative domains (enterprise, etc.)
See presentation slides as posted to IEEE web Site.

Enhancements to better isolate errors location.

4:10PM: Presentation by **Norival Figueira** on **MIB Extenstions for WIS Fault Isolation.**

**Discussion**: About whether to put values of x for Line SES in draft or not. Reference ANSI T1.231, 1997 or put in Annex or put in document.
Questions/Answers:
J1 byte values questioned. Delineated by MSB being set, and ASCII-7 stream following. Can WIS report just 16 bytes without delineating header? Higher level software can make this distinction and keep circular buffer for message.
Use ANSI T269 or not?  For 802.3 we could define our own requirements.

## MOTION #2:

Accept updates to WIS overhead bytes as proposed by martin_1_1100. A service primitive must be added at the WIS service interface to the PCS to allow the PCS to report loss of sync.

**Moved By:** Roy Bynum
**Seconded By:** Paul Bottorff
**Result**s: 802.3 Voters: Y: 13   N: 1    A: 5
ALL:   Y: 15, N: 1, A: 10
      P/F:

## MOTION #3:

Accept updates to WIS MIB variables as proposed by figieura_1_1100, with the exception of the note on slide 16, and editorial license to incorporate this into Clause 30.

**Moved By**: Roy Bynum
**Seconded By**: Dave Martin
**Results**: 802.3 Voters:  Y: 9  N: 0  A: 5
ALL:   Y: 11, N: 0, A: 9
      P/F:

**Final Business:**

David Law, "MIB, Registers and Function"

MIB Definition, Register Definition point to function. May have one or the other pointing to function only. May be pointers between MIB and Register defs. If no feature, may need to have registers anyway for conformance.

## Clause 50 Issues and Resolution

MDIO register bits, functions, descriptions

    Editor will update register descriptions in Clause 50 D2.0

Signal detect handling, fault reporting

    Already implemented in Clause 50 D1.1 as per Tuesday's fault reporting presentation, minor modifications required

Loopback

    Editor will clarify text in D1.1 to indicate that the WIS will send either all-zeros or all-ones to the PMA, and ignore received data from the PMA

Bit ordering between WIS, PCS, PMA

    Informative bit mapping figure will be supplied to Clause 49 editor

Test patterns for WIS

    Deferred until they become available (contributions solicited)

Final resolution on overhead bytes (+ related MIB items)

    2 presentations; motions to accept both (passed by breakout group)

Informative figures for Section/Line overhead

    Motion to include these (passed by breakout group)

These three motions were accepted as a bucket of motions and passed by acclamation.

## Motion #1

Introduce informative figures into Clause 50 that show only the supported overhead bytes in the Section, Line and Path Overhead portions of the SONET frame.

**Moved By**: Dave Martin

**Second By**: Roy Bynum

Vote:    Passed by acclamation (no dissent)

                       P/F: **Passed** (75%)

## Motion #2

Accept updates to WIS overhead bytes as proposed by martin_1_1100. A service primitive must be added at the WIS service interface to the PCS to allow the PCS to report loss of sync.

**Moved By**: Roy Bynum

**Second By**: Paul Bottorff

802.3 Voters:Y: 13, N: 1, A: 5

All Voters:Y: 15, N: 1, A: 10

                       P/F: **Passed** (75%)

## Motion #3

Accept updates to WIS MIB variables as proposed by figueira_1_1100, with the exception of the note on slide 16, and editorial license to incorporate this into Clause 30.
**Moved By**: Roy Bynum
**Second By**: Dave Martin
802.3 Voters:   Y: 9, N: 0, A: 5
All Voters: Y: 11, N: 0, A: 9
<div align="center">P/F: <strong>Passed</strong> (75%)</div>

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*PMD / PMA Track Presentations & Minutes for Clauses 51 - 54*

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PMD / PMA Track Chairman: **Walt Thirion**
Editor Clause 51:
Editor Clause 52:
Editor Clause 53:
Editor Clause 54:
PMD / PMA Track Minutes for Clauses 51 – 54 were recorded by: **Vipul Bhatt**

</div>

Recorded by Vipul Bhatt
**Stuart Robinson, XSBI Issues**
Details in the presentation. Explained why an interface specification is needed – leverage existing OIF/SONET work and optimize specs. Showed timing diagrams and proposed specs. Issues to resolve included jitter requirements.
Discussion:
Will you specify Tx CLK? Yes, a relationship between TxSRC and TxCLK is defined. When will we do motions? We will wait for Justin's turn.
**Jack Jewell, VCSEL-friendly 1310 nm Serial PMD spec**
Details in the presentation. Specs need tweaking because VCSELs are significant to this market and cost effective. But they have narrower linewidth and very different side mode characteristics. Proposed: trade off spectral width for wavelength range, relax SMSR and keep return loss spec open. Recommended lower spectral width. SMSR –10 dB in VCSEL column.
Discussion:
What happens to attenuation? It gets a little higher. Why change SMSR if side modes don't couple anyway? Because it's possible for some non-zero value to still show up. What is the physics of mode competition? Standing waves in cavity in DFB can occupy multiple modes, but it can't happen in VCSELs. Spectral width refers to half width but in table it is full width RMS. K factor is not necessarily smaller. Is it necessary to argue for lower SMSR on the grounds of coupling, if patch cord takes care of that? How generally applicable is that for all VCSELs? Quantitative data on reflections is not available, but there is some small sensitivity of VCSELs…We need a different spec because measurement happens on a short 2 meter fiber, and more than 30 dB will show up. If you go through a longer fiber, the SMSR goes away because it is a cladding mode. This applies to all VCSELs.
**Motion #1**
Add a new column to Table 52-8 to the 1310 nm Serial PMD for spectral width 0.20 nm RMS, wavelength range 1265-1355 nm and change the wavelength range in Table 52-9

to 1200-1355 nm.
Moved: Jewell
Mike Dudek seconds, provided we don't go below 1265 nm.

802.3: Y: N: A:
Discussion:
Interesting proposal but in short time, premature to decide, so prefer voting against it. Advisable to quantify cost savings from this proposal. Cost is a subtle issue, spanning testing, yields, package cost, but most people believe there is savings. It is possible to make VCSELs in current wavelength range, but there is a time to market issue….besides, wider window helps utilize fiber bandwidth. Is this like adding another PMD type? No, having multiple solutions that interoperate is not adding a PMD type. Mechanisms of attenuation of side modes? Higher NA and spatial separation, so they don't overlap the core region fully. They are not consistent and predictable. Even if you have RMS spectral width and power specs, then specifying SMSR is unpredictable, so SMSR spec should be tighter….This is a non-issue. We are keeping the same 30 dB SMSR in this motion; that will be a separate motion. Rx wavelength range. One ITU spec gives equally applicable range to both Tx and Rx, another specifies Tx and so Rx by implication. So delete that number. Spec changed from 1200 to 1265.

**Motion #1**
Add a new column to Table 52-8 to the 1310 nm Serial PMD for spectral width 0.20 nm RMS, wavelength range 1265-1355 nm and change the wavelength range in Table 52-9 to 1265-1355 nm.
Moved: Jewell
Mike Dudek seconds, provided we don't go below 1265 nm.
802.3: Y: 53 N: 8 A: 33
Motion passes.
Jewell: I will defer second motion till uncertainty regarding SMSR issue has been discussed and resolved offline.

**Paul Kolesar Contribution to Clause 52**
Details in presentation.
Discussion:
New MMF second window bandwidth is not specified; it should be….Good point, but in this Clause, it is extraneous. Clause 54 is where it should be specified. This motion is purely for Clause 52. Clause 54 can still reference it if we wish.
Jonathan: Thanks…I expect questions from 802.ae…have we been specifying the wrong fiber? Are we now specifying a fiber or referencing a spec?
Responses: In .3z, we were supporting installed base. We changed 3.5 to 3.75 to support a larger installed base. New fibers are better. In our case, we are talking about very short fibers, so it should not be a concern, and we should harmonize to modern specs….
Jonathan: Footnote?
Paul: Footnote can say .."this does not obsolete existing infrastructure"… About Jonathan's second point…We are now moving outside campus to wider networks, so our specs must line up with specs relevant to that part of the industry…
Walt: Move the motion please…
**Motion #2 (tabled, see below):**

Move that the IEEE 802.3ae PMD sub task force ask IEEE 802.3 to adopt the proposed clause 52.12.1 content of kolesar_1_1100 as a replacement for the existing content of clause 52.12.1 found in draft 1.1

Moved: P. Kolesar

Second: S. Swanson

Technical (75%)

Discussion:

These numbers come from existing standards, so we are not supporting a wrong spec set. 0.4 gives us an extra dB in the budget, so let's drop minimum power by 1 dB. To fix the misunderstanding of supporting existing base for 10G applications, let's show two distances in 10G clauses, one for 0.4 and one for 0.5. This will knock down potential resistance to change. How to communicate that clearly in the table, with two competing specs….Re-run calculations and get two distances….But there are splices,connectors… Since 3.75 makes no difference, leave it as is. On 1310 nm link, I would support the change, and put a footnote about 0.5 dB/km cable. 1550 nm attenuation has the same issue as ITU. 0.35 = 14 dB, but ITU uses 0.27=12 dB, so word-smithing is needed.

Kolesar: More aggressive numbers will create a new set of issues….we will need to qualify cable plant for several factors including PMD. I am proposing harmonization of specs here with other standards.

Dawe: Put 0.35 number here and change the words to reflect that this is not the only condition…

[15 minutes Break….]

Jonathan: If we table this for now, and let Peter go next, we will make better progress.

Jonathan: Motion to table Motion #2.

Moved: Jonathan Thatcher

Second: Krister Frojdh

Y: 49 N: 0 A:6

Motion passes

**Peter Ohlen: Revised tables for 1550: power levels and channel insertion loss**

Details in the presentation.

Increase Tx power, degrade receiver sensitivity, both by 2 dB.

Define total channel insertion loss instead of loss per kilometer.

Specify minimum channel insertion loss explicitly.

Discussion:

1550 are engineered links, so it is not unreasonable to expect an engineer to take simple measurements. This proposal allows greater flexibility to customers. But should we extend this concept to other links as well? Or postpone second proposal… Concerns about channel insertion…does not reconcile with numbers achieved with 0.35 dB/km value…. Realistic links perform much better. This is a better way to specify….Let's not change the 13 dB value we have voted in…Confusing to have a dual set of standards – dB/km and end-to-end. End-to-end is the criterion for end decision on a link. Even 10 km links will be engineered in some sense and documented. Let's extend that concept to 1310 nm links. If it's good for 1550, it is for 1310, so support doing it for both.

**PMD Track Motion #3**

Motion to make changes to Clause 52 as specified by Ohlen_1_1100 and keep the 40 km objective and make the maximum channel insertion loss to be 13 dB. [Table Inserted.]

Moved: P. Ohlen

Second: S. Bradshaw

Discussion:

Discussion regarding whether this is the right thing to do, perhaps also for 1310. Will the "ae" accept the concept of engineered links for 1310 as well?…If we are making this change because fiber performs better than specs, then this is a deviation from our standard practice….We are seeing a difference in how telecom specifies vs. how IEEE does. This relates to statistical vs. worst case design approach. If we adopt it for 1550, why not for 1310?…This is a vague proposal. Someone may try to go longer than 40 kms based on power budget. Will the Clause imply that we can go longer than 40 or is 40 the limit?….Loss budget explicitly stated is helpful. Some discussion on whether splices are accounted for and how that can be done properly….It doesn't matter as long as the loss is 13 dB…In engineered links there is provision for repairs. If we go to engineered links, we should tell people to allocate that…In this proposal, we haven't accounted for margins. There are several considerations to engineered links….In concept the group appears to agree, but question the 13 dB number…Discussion on how 13 dB was derived, what Ohlen accounted for..what distance was assumed…details of engineering of the link were discussed and questioned.

Jonathan: We have voted on 13 dB, so we have to stick to it, based on all the assumptions we made, we have validated and tested the model…all this is saying is that model is fine, but spec methodology is wrong. Let's spec the link, not loss per kilometer or loss per splice. Question called.

Votes counted.

Y: 41 N:13 A: 24

Motion passes.

Jonathan: Move to take Kolesar motion off the table.

Second: Steve Swanson

**PMD Track Motion #4**

Move to take Motion #2 off the table

Moved : J. Thatcher

Second: Swanson

Passed by acclamation

**Motion #2:**

Move that the IEEE 802.3ae PMD sub task force ask IEEE 802.3 to adopt the proposed clause 52.12.1 content of kolesar_1_1100 as a replacement for the existing content of clause 52.12.1 found in draft 1.1.

Moved: Kolesar

Second: Swanson

Discussion on how to make the proposal more specific and easier to understand.

Jonathan: Recommend add additional number 0.4 and 0.5 and leave the link specs at that, to allow people to decide on optimization.

Vote taken:

Y: 61 N: 0 A: 19

Motion passes.

Walt: Since golden fiber for 1550 is a new feature, let's deal with it first.

**Peter Ohlen: Golden test for dispersion penalty 1550 nm Serial**

Details in the presentation.

Idea is to simulate worst case condition, add a Tx test, test it with golden fiber (with minimum dispersion) and Rx.

Discussion:

Will we search for golden fiber, or cut back from longer fiber? Answer: buy 50 km and cut back…Then what about fiber loss variation accounting and PMD accounting? Answer: Not accounted for; can simulate for PMD possibly….If you change length, then loss must be accounted for. Attenuator should also be accounted for….To understand exactly what this fiber is, a cable manufacturer will need definitions of all parameters. …Ideal transmitter will have to be high bw, no chirp, moderate power, a clean low chirp transmitter. ….Dispersion penalty's effect depends on other components, so we need all other components at worst case, e.g. receiver bandwidth.

Jonathan: Propose a motion.

**PMD Track Motion #5**

Move that we adopt the methodology of ohlen_3_1100 in principle. Direct editor to make necessary changes to draft 1.1. Create ad hoc to bring to Jan 01 meeting complete and specific proposals for specifications and measurement methodology.

Moved: J. Thatcher

Second: Peter Ohlen

Technical.

Discussion:

We don't have a better substitute than this… Why don't we model this, instead of adopting an artifact based method? Because we don't understand theory enough. This is simple and easy….Link model is the worst choice...physical measurement is much better. …Stressed eye test is similar to this, except for receiver, and both use artifacts. …If you can build by adjusting fiber length, it is not an artifact….

But a cable manufacturer will still have to make a special object…

Votes counted:

Y: 52 N: 3 A: 20

Motion passes.

**Scott Bradshaw: Attenuator Management**

Details in the presentation.

Discussion: Recommend table with just two attenuator values rather than giving a full chart….but that will put a user to risk in some extreme cases…Instead of variable attenuators, an installer can use fixed in-line attenuators….Ability to swap transmitters and receivers is an advantage of this proposal. …Standard attenuators are available in 1,2,3,5, etc. so we should have more flexibility.

**PMD Track Motion #6**

Move to incorporate table and figure as shown in bradshaw_1_1100 for attenuation management at 1550 nm

Moved: S. Bradshaw

Second: Piers Dawe

No discussion

Vote:

Y: 54 N: 0 A: 9

Motion passes.

Straw poll

Start at 7:45 am tomorrow

**Ken Herrity: OMA benefits for WWDM**

Details in the presentation.

**Mike Dudek: OMA Proposal**

Details in the presentation.

Discussion:

OMA values are peak to peak, so $-13$ dBm equals 64 microwatts…How it affects signal detect; it doesn't. …OMA measurement at Rx input, what is the OMA at slanted eye diagram? If eye is slanted, then maximum opening point has to be defined. Answer: all 1 levels minus 0 level, exactly as in z.

**Peter Ohlen: OMA specs**

Details in presentation.

Supports OMA, but suggests keeping the ER specs. And specify OMA in dBm.

Discussion:

Jonathan: Mike, Ken and Peter should come up with a common motion to combine ideas into a single one or tell us why the differences are irreconcilable.

Mike: two differences are – OMA in dB vs. microwatts, and whether to keep ER.

Walt: critical? Can we table them for today?

Jonathan: Numbers in dB and microwatts are exactly the same, in different units, so why not have both? (General agreement in the room)…Let's deal with Extinction Ratio in a separate motion.

**Piers Dawe: Receiver Electrical Reference Filter for Testing (Serial)**

Details in the presentation.

Discussion:

Why was 0.75 used? Due to ROF problems, we need to carefully consider implications. … 0.75 or 0.77 doesn't make a big difference, stick with available equipment. …TIAs have single pole integrating response, so it doesn't make sense…we should have a maximum frequency response of receiver. …Real receivers won't be first order…maybe 2 nd order…Should we decide on whether link model should use 0.75 or 0.8?

Jonathan: Pragmatic perspective… we have talked a lot about this issue in the past several years. Maybe we can't agree or maybe the effect of changing to another value wasn't big enough. In absence of alternative theory or analysis, it's not worth a long enduring religious discussion.

More discussion: we have used 0.8R in model for 1G, but we accounted for DCD, which makes effective baud rate close to 0.75…maybe in the spreadsheet we should use 0.8 then account for DCD, so we get 0.75 in the end…Link model does not use BT filter, so 0.8 will create more problems, more conservative.

**PMD Track Motion #8**

Move to accept the ITU-T STM-64 reference receiver (specified in G.691). This represents a 7.5 GHz reference receiver with a 4 th order BT filter.

Moved: Piers Dawe

Second: S. Bradshaw

Votes counted:

Y: 49 N: 0 A: 19

Motion passes.

**PMD Track Motion #7**

Move that OMA is accepted as a method of specification and that the numbers should be as presented in dudek_2_1100. Also, these numbers should be in both mW and dBm with modifications as appropriate for motions passed at this meeting.

Moved: M. Dudek

Second: K. Herrity

Discussion: It would be good to include these changes in the link model.

Votes counted:

Y: 61 N:0 A:5

Motion passes.

**Wednesday**

**Mike Dudek: A better way to specify…**

Details in presentation…

Triple trade off curves..spectral lwidth, center wavelength and transmit power.

No changes to specs are recommended, only different way to present them.

Discussion:

How to deal with center wavelength shift with temperature? Just as you would with other methods…keep above the line of output power…or measure wavelength at high temperature to stay out of trouble….Surprising that there is more than 2 dB range of output power. K factor is critical here..but 0.5 was used in the model and this presentation, so there appears to be a discrepancy. Resolve off line. The motion will be accept it in principle….Why not recommend it for 1310? Because spectral width expected is so narrow that it won't make a difference, though Jewell's presentation suggests that such an exercise is appropriate….

**Raj Savara: 1550 nm Back Reflection**

Details in presentation.

Include 1310 in the same discussion, to save time.

Discussion:

Lots of lively discussion points on - Better to make transmitter more robust or ensure that every point in the link has low reflections?…

**PMD Track Motion #10**

Move to adopt savara_1_1100 in order to change Clause 52 as follows for 1550 nm: Change Table 52-13 "Return Loss" spec to 26 dB (min). Add to Table 52-14 "Return Loss for any device in the optical link" to 26 dB (min). Ensure that the RIN measurement is made with a return loss at 12 dB.

Moved: Raj Savara

Second: Scott Bradshaw

Technical (75%)

Discussion:

The current cable/connector spec is 26 dB…we will anyway need isolators because multiple reflections will add up to less than 26 dB. Again, is it better to reduce reflections everywhere in the link or to protect the sensitive laser with isolators? Some contention about cost-effectiveness of isolators. Some discussion about interferometric noise. Will compliance to 802.3z cable plant specs be an issue, or are we discussing engineered links, mostly in the telecom plant?

…There is also the RIN issue, will we measure it with 26 dB return loss? Link does not

have to operate at the same RIN level that we measure it with.
Votes counted:
(Technical >75%)
Y: 38 N: 5 A: 41
Motion passes.

**PMD Track Motion #11**
Move to adopt savara_1_1100 in order to change Clause 52 as follows for 1310 nm: Change Table 52-9 "Return Loss" spec to 26 dB (min). Add to Table 52-10 "Return Loss for any device in the optical link" to 26 dB (min). Ensure that the RIN measurement is made with a return loss at 12 dB.
Moved: Raj Savara
Second: Scott Bradshaw
Technical (75%)
Discussion:
This is unlike 1550 nm link…different considerations apply. But interferometric noise can be equally applicable here.
Votes counted:
Y: 17 N: 19 A: 50
Motion fails.
Next, Mike Dudek presented motion.

**PMD Track Motion #9**
Move that triple trade off curves are described by dudek_1_1100 are adopted as the method of specification for 850 nm and 1300 nm serial PMDs. The exact curves will be presented next meeting.
Moved: Mike Dudek
Second: Vipul Bhatt
Technical (75%)
Y: 44 N: 2 A: 30
Motion passes.

**Justin Chang: Clause 51 Review**
Details in the presentation.
Listed all the proposed changes and explained each one in detail.
Discussion:
TD and CJ specs…TD too large? Impacts SerDes design and compatibility. Lower number is desirable to some members. But the only way to change the number is by motions…

**PMD Track Motion #12**
Move to adopt changes 1,2,3,5,7 proposed in Justin Chang's clause editor update at Tampa, FL.
Remove 3xx mode as option for PMA.
Loopback
– remove "shall"…loopback is optional
– send out static signal
Table 51-6 change
-TD test condition <1KHz to <10KHz
- CJ test condition >1KHz to >10KHz

Add PCS framer specs for completeness (OIF99.102.x)

LVDS specs:Reference to TIA/EIA 644Mb/s instead of IEEE 1596.3 with appropriate Modifications

Moved: Justin Chang

Second: Henning Lysdal

(Technical >75%)

Votes counted.

Y:42 N:0 A: 38

Motion passes.

**PMD Track Motion #13**

Move to add optional Rx indicator in Clause 51: Loss-of lock.

Moved: Justin Chang

Second: Henning Lysdal

Discussion:

Do we want to really require it? Is it necessary to separate it from Signal Detect? Some members suggested that this signal is useful enough to be considered required, and it should be distinct from optical signal detect.

Y: 52 N: 0 A: 29

Motion passes.

**PMD Track Motion #14**

Move to change definition PMA_RX_CLK: in absence of valid serial data input a "valid" clock must be provided to clock the PCS.

Moved: Justin Chang

Second: R. Savara

Technical (>75%)

Y:33 N:2 A:41

Motion passes.

**David Kabal: Clause 52 Review**

Details in the presentation.

Discussion: Specify connector? If yes, keep SC? Comments and proposals invited if status quo needs to change. This discussion and motion was tabled earlier in New Orleans…so we should specify a connector today?…we may not have the authority to put one in the standard…have we ever voted on a draft that has this connector specified? Yes. So any new motion must be to remove the SC connector. Perhaps March is a better time to address connector. …Worst case identification…in general, faster line rate is the worst case.

**Paul Bottorff: Clause 53 Review**

Details in the presentation.

Discussion: None.

**David Cunningham: Clause 54 Review**

Details in the presentation.

Discussion:

There are a number of additional parameters that need to be specified in this clause…for example, skew between lanes, impact of SMSR on center wavelengths and allowed power in adjacent channel spce, sensitivity affected by adjacent channels…Perhaps skew specified by XAUI is enough?….Power budget for multimode case is not incorporating

the loss of the mode conditioning patch cord; belongs to list of issues.

**PMD Track Motion #15**

Move that we adopt signal_detect for clause 52 & clause 54 per the recommendations of the signal_detect ad hoc as the basis for the draft for TF ballot:

Signal_detect will be normative.

Signal_detect to be a global indication. (That is only one signal_detect for WWDM PMD, not a per lane signal_detect).

If MDIO is implemented,

Report global signal_detect through MDIO

And optionally, report signal_detect through MDIO on a per lane basis.

Moved: David Cunningham

Second: Jonathan Thatcher

Technical (>75%)

Discussion:

Does failure of one lane in WDM cause a global failure? Yes, it's AND. not OR…Is this signal_detect or loss of signal? Answer: same sense as 802.3z…In Serial, the intent is to allow upper layers to have a simple, single concept of what to do; they should not care about the type of PMD…In Serial, if multiple PMDs exist and they use different wavelengths, the intent here is to have signal_detect independently asserted for each Serial PMD….How is "loss of lock" affected? It's a PMA related issue, so not relevant here.

Votes counted:

Y: 65 N: 0 A: 23

Motion passes.

**PMD Track Motion #16**

Adopt test points shown in Fig. 54-3 as basis for TF ballot draft: TP2 and TP3 are normative, TP1 and TP4 are informative.

Moved: David Cunningham

Second: Bill Lane

Discussion: None.

Votes counted:

Y: 62 N: 0 A: 20

**Dave Dolfi: WWDM Measurement Methodology – Update**

Details in the presentation.

Discussion:

Concern about small change making a large change in measurement, if the side mode is just on the edge…one option is to account for it in the line width, and we have to set the limit somewhere….We also need to change laser specs – not having an SMSR spec isn't the same as specifying it as zero…It doesn't matter whether a side mode belongs to a band under test or adjacent band…Clarification on Rx testing. The channel is 5 dB down, yes….Phrases like out-of-band mode is relevant to a laser; but not in case of a transmitter with 4 channels. All you can do is look at bands, and what matters is that energy from unwanted band is identified if too high. All lasers are on….We need to make sure the Clauses are written consistently, and so we need to adopt only the major direction. Details can be changed later….Walt: we need to move faster….Why not have a different modulation for adjacent lasers?….because the test condition may not emulate real life

situation.

**PMD Track Motion #17**

Move that we adopt the methodology proposed in dolfi_1_1100 in principle with respect to WWDM Tx, Rx measurements and wavelength and linewidth specs, as the basis for the next draft of clause 54.

Moved: David Dolfi

Second: Bill Wiedemann

Technical (>75%)

Passed by acclamation.

Discussion on time being short…let's tackle only those presentations that are "new features".

**Jonathan Thatcher: PMD & MDIO**

Details in the presentation.

Discussion: Inbound loopback definition is generically applicable to any logic layer, not just PMD. Consistent way to test and operate features…Signal_detect of incompatible types (DC vs. AC) may not allow a link to interoperate if we force Tx_Dbl to go into a constant logic state. Suggestion accepted to turn laser off in case of optics….Does inbound loopback mean equivalent of line lock in SONET? Undecided because these are generic proposals.

**PMD Track Motion #18**

Adopt MDIO features in thatcher_1_1100 in principle.

Have clause 52 and 54 editors write into draft 2.0.

Authorize David Law to define the bit allocations.

Moved: Jonathan Thatcher

Second: Jack Jewell

Technical (>75%)

Passed by acclamation.

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**RAN OUT OF TIME TO SORT OUT THE TEXT BELOW**

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**Major Motions**
• MDIO to create an ad hoc for determining the electrical characteristics
• XGMII is using HSTL, 1.5v Class1
• XGMII timing is source centered
• PCS needs delimiter robustness

**XAUI Electrical Results**
• Jitter specification – Formed the *XAUI Jitter Team* to work with the 802.3ae Jitter Ad Hoc and develop a full proposal by January
• Common mode specifications –M5. Agreed on DC limits for Driver output: -0.3 to +2.3 (20: 2: 18)
–M6. Agreed to spec CM return loss at driver and receiver (14: 0: 15)
• Inter- clause issues still outstanding – XGXS Signal Detect
     – Clause 48 squelch

**Clause 49 Work for 2.0**
• Add fault signaling (see slide)
• Add PCS to PMA bit order diagram to 49. 1. 4
      – with and without WIS
• Add PICS


**14 Presentations**
• XSBI Issues—Stuart Robinson

    Presentation not on the Web.


• VCSEL-Friendly 1310nm Serial PMD Specifications—Jack Jewell

    http://www.ieee802.org/3/ae/public/nov00/jewell_2_1100.pdf

• Table 52-17 Fiber Specs—Paul Kolesar


• Revised Tables for 1550: power levels and channel insertion loss—Peter Öhlen

    http://www.ieee802.org/3/ae/public/nov00/ohlen_3_1100.pdf

• Golden test for dispersion penalty – 1550 Serial—Peter Öhlen

    http://www.ieee802.org/3/ae/public/nov00/ohlen_3_1100.pdf


• Attenuation Management—Scott Bradshaw

    http://www.ieee802.org/3/ae/public/nov00/bradshaw_1_1100.pdf


• Comparing OMA and E/R Measurements—Ken Herrity

    Presentation not on the Web.

• OMA Proposal—Mike Dudek

    http://www.ieee802.org/3/ae/public/nov00/dudek_2_1100.pdf

• OMA Specifications—Peter Öhlen

http://www.ieee802.org/3/ae/public/nov00/ohlen_2_1100.pdf

• Better way to spec spectral Width and Center Wavelength—Mike Dudek

http://www.ieee802.org/3/ae/public/nov00/dudek_1_1100.pdf

• Reference Filter for testing (Serial) –Piers Dawe

http://www.ieee802.org/3/ae/public/nov00/dawe_1_1100.pdf

• 1310/1550nm Back Reflection—Raj Savara

http://www.ieee802.org/3/ae/public/nov00/savara_1_1100.pdf

• WWDM Measurement Methodology—Dave Dolfi

http://www.ieee802.org/3/ae/public/nov00/savara_2_1100.pdf

• PMD Management Register Proposal—Jonathan Thatcher

http://www.ieee802.org/3/ae/public/nov00/thatcher_1_1100.pdf

**Major Actions**
• Added column to Table 52-8 to add spectral width and wavelength range to be more VCSEL friendly
• Adopted 0.4 dB/km (vs 0.5) fiber attenuation for 1310nm
• Adopted 13 dB link loss instead of specifying fiber attenuation on a "per km" basis
• Adopted, in principle, Golden Fiber test for dispersion measurement and created ad hoc to bring details to January Interim
• Adopted proposal to insert additional attenuators in 1550nm links to keep receivers operating in optimal region
• Adopted OMA as specification methodology
• Adopted ITU-T STM-64 reference receiver for G.691 7.5GHz reference receiver with a 4th order Bessel-Thompson filter to impose uniform test condition on all transmitters.
• Increased receiver return loss specification for 1550nm links from 12 dB to 26 dB— rejected changefor 1310nm links
• Adopted triple trade off curves as the method of specification for 850 nm and 1300 nm serial PMDs.--The exact curves will be presented next meeting.
• Added *Signal Detect* indication for both serial and WWDM PMDs
  – 1 global signal for all wavelengths in WWDM
  – If MDIO present, indications are through management registers

**Other Clause 51Changes**

Remove 3xx mode for PMA
• Loopback
     – Optional
     – Send out static signal when in loopback
• Change Table 51-6
     – TD test conditions from < 1KHz to <10KHz
     – CJ test conditions from > 1KHz to >10KHz
• Added PCS framer specs
• Changed LVDS spec reference to TIA/EIA-644
• Added optional *Loss of Lock* indication
• Change definition PMA_RX_CLK
     – in absence of valid serial data input a "valid" clock must be
     provided to clock the PCS

**Other Clause 54 Changes**
Kept Test Points 1, 2, 3 and 4
     – 2 & 3 are normative
     – 1 & 4 are informative
Adopted WWDM test measurement methodology based on Tx wavelength and linewidth
     specifications
Adopted Management Register model basis

Big Ticket Items
• Jitter specifications and methodology
     – Test points
     – Compliance
     – patterns
• Polarization Mode Delay
     – Conflicting data indicates either PMD is not an issue or it may be as much as
     12% of installed fibers
     – General feeling is it's a non-issue
     – No known problems for the lengths we're dealing with
• Still reviewing specs, esp. in light of OMA change
• Questions on compliance testing in WWDM where other ? may interfere

We need pre-approval to distribute drafts to groups we liaison with:
1. The Sep 00 minutes were approved by acclimation.
2. Request from Fiber Channel for our 10 GbE drafts and password.
3. The IEFT also wants access to our drafts. The IETF needs to make this request.
4. The OIF also wants our drafts (their site is a protected site). We would get their specs that apply to us and post them to our web site. Bob Grow suggest we make drafts available but not passwords.

We are moving towards a comment data base. The data base has been distributed. In the future we will use the CBD to make changes to the draft specification.

Logic Track Break Out meeting minutes:
P802.3ae TF Logic Track Chair
09- November- 2000

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• Still reviewing specs, esp. in light of OMA change
• Questions on compliance testing in WWDM where other ? may interfere


# Wednesday Afternoon

The chairman felt that as he sat in on each sub-group break-out meeting that a lot of progress was being made. Have not made enough progress on Jitter. Between now an Jan01 there will be a GEA sponsored interim – interim two day meeting dealing only on Jitter. A rough count shows that approximately 30 people would attend.

**ACTION ITEM:** The 7th and 8th of December co-locate in Austin with Fiber Channel, hotel is Double Tree. This is a Thursday and Friday meeting.


## 10. XAUI as a SUPI Alternative ( Rich Taborek )

This proposal addresses the WWDM PHY only. There has been very strong support for XAUI both here in IEEE and other standards bodies. Due to featues deadline this proposal needs to be made now. There is an XGP Ten Gigabit Pluggable effort that uses XAUI as the primary interface. In the past XAUI was not considered for the WAN PHY application. This proposal would not eliminate the WIS sub-layer, it would remove the SUPI and replace it with 8b/10b. From an architectural point of view this proposal seems cleaner. A single serial bus structure that is applicable to both LAN and WAN PHY is desirable. XAUI is scalable to any number of lanes and is being proposed to OIF for SPI-5, SFI-5 and VSR-768.

## 11/07/2000 Meeting Minutes for the Changes to Existing Clauses Sub-Task Force

5 people attending.  Review of the comments from the editors' meeting in Austin:

Re-instate the figure in Clause 6. Make it look as in Clause 7.
> **Accepted.**

Change the labels at the top of all the clauses from 1998 to 2000.
> **Accepted.**

Pat Thaler believes that the changes for FCS Passing are not adequate to make 802.3 conform to 802.1d. Not convinced that we should do that.

> We need a specific comment that addresses the remaining issues.
> We still believe it is a good thing to do.
> Even if it still does not conform to 802.1d, it at least reflects what real implementations do.

Need to make clear that when the FCS is passed from the MAC client to the MAC, the MAC client must make sure that the packet is already padded. Also, when not stripping the FCS on receive, the pad should not be stripped either.
> **Accepted.**

Find the right place where to add the text.
Make sure the Pascal handles these cases correctly.

In 4.2.3.2.2 in the description of InterFrame Spacing, make the stretching applicable to 10Gb/s and above only.
> **Accepted in principle.**

We are not sure that we need to be too specific here. The Pascal code isvery specific that this is applicable to future implementations only. Wewould prefer though that this comment be submitted during the ballot.

In procedure Initialize, in the comment for the assignment of ifsStretchMode, remove the comma after 1000Mb/s.

**Accepted.**

In process Deference, when we are done sending the stretched IPG we decide what to do with the leftover bits. If !frameWaiting, we discard the extra count and presume that the extra IPG that occurs waiting for the next transmit packet will be sufficient to account for the extra count. If the count is high (close to the value of ifsStretchRatio), and the next packet arrives after sending only one bit of IPG, we might not have sent enough IPG.

**Accepted.**

Need to make sure that at least 8 bits were sent.

In process Deference the RealTimeDelay function is called in a while loop. Question is whether in Pascal such a loop will perform this calling correctly.

The editor believes that it will.
However, it would be better to get rid of this function completely, and merge the relevant code into the body of the Deference process. This will be done in the next draft.
Also, update the figure 4-2 appropriately.

Issue regarding the additional increment of ifsStretchSize at the end of packet transmission for minimum IPG transmission adjustment:
What if ifsStretchRatio is not the default value? A better approach would be to continue counting during the normal interFrameSpacing.

**Accepted.**

Rather than letting ifsStretchCount count every bit in a packet, then have to perform a mod operation on it at the end of the IPG if frameWaiting, it would be better to reset the count every time ifsStretchSize is incremented. That way it only holds the remainder count at any given time while ifsStretchSize holds the number of extra bytes of IPG to send.

**Accepted.**

**Additional comments**:
The definition of the variable ifsStretchCount is broken.
It uses variables ifsStretchRatio and headerSize which are in bits, while the other variables used are in octets.

**Accepted.**

Reconsider calling the CRC32 function by specifying all the fields of the frame. May want to limit the change to the CRC32 function only.
**???**

In sub-clause 4.4.2 the minimum value of the IPG is specified as 32 bits.

Should be 40 bits.
>**Accepted.**

In the TransmitLinkManagement procedure the footnote should be 13 rather than 1.
>**Accepted.**

In sub-clause 4.2.3.2.7 fix the typo in the last sentence of the first paragraph.
>**Accepted.**

## MOTION:

**Description:** Affirm the changes to Clauses 4 and 6 as decided by Shimon's Sub-Task Force.
**Motion Type**: Technical > 75% required
**Moved By**: **S. Muller**
**Seconded By**:
**Results**: 802.3 Voters

>P/F: **Passed By Acclamation**

## XGMII minutes for IEEE 802.3ae  November 8th, 2000   Tampa, FL

**Minutes by: Don Pannell**

**Description**: Discussion quickly focused on the 1.8v specification vote made in New Orleans.  It was stated that whatever is chosen for the XGMII electrical specification will likely be used for the MDC/MDIO interface on 10 Gig devices as well (with some tweaks expected).

### Motion # 1
**Description**: Move to select 1.5v HSTL for the XGMII electrical specification per EIA/JESD8-6. Affirm the changes to Clauses 4 and 6 as decided by Shimon's Sub-Task Force.
**Motion Type**: Technical 75% -required
**Moved By**: Don Pannell
**Seconded By**: Tom Dineen
**Results**: Y – 27 N - 0 A - 10

>P/F: Passed

**Discussion**: Ali Ghiasi of Sun Microsystems gave a presentation on 1.5v HSTL electricals and its different classes.

Figure 2.1 of the EIA/JESD8-6 will be included in the IEEE spec for informational purposes. Tables 2.1, 2.2a and 2.2b will be included as well for information only (as one concatenated table).


**Motion #2:**
**Description**: Move to accept HSTL Class 1 per EIA/JESD8-6 (August 1995).
**Motion Type:** Technical 75%
**Moved By**: Lynch
**Seconded By**: Dineen
**Results**: Y 37 N 0 A 2
                    P/F**: Passed**
**Discussion**: Continued on what the example system circuit implementation figure should be. A figure was chosen. Bob is to put in the prose that the XGMII interface is to be single ended.
The clocking decision made in New Orleans with no timing parameters was an issue for the author. Joel Dedrick's New Orleans presentation was given again.


**Motion #3:**
**Description:** Move that XGMII to be sourced centered RXCLK on the RXD/RXC.
**Motion Type:** Technical 75%
**Moved By**: Jeff Porter,
**Seconded By**; Joel Dedrick
**Results** Y 28   N 13   A 5
                    P/F: **Faired**


**Motion #4:**
**Description:** Move that the XGMII revert back to the Draft 1.0 interface timing (i.e. source centered in both directions).
**Motion Type**: Technical 75%
**Moved By**: Jeff Porter
**Seconded By**: Howard Baumer
**Results**: Y 25 N 11 A 12
                    P/F: **Failed**
**Discussion**: Martin Elhoj gave a presentation of XGMII RS Error Reporting and to increase the delimiter robustness. Need to resolve weather the PCS or RS does error checking. Preamble will be defined to just data bytes. Will make DATA_COMPLETE to be Control character not Error.

<h1 style="color:red; text-align:center">XGMII minutes for IEEE 802.3ae  November 8th, 2000   Tampa, FL</h1>

**Minutes by: Don Pannell**

**Discussion**: It quickly focused on the 1.8v specification vote made in New Orleans.  It was stated that whatever is chosen for the XGMII electrical specification will likely be used for the MDC/MDIO interface on 10 Gig devices as well (with some tweaks expected).

## Motion #1
**Description: :**  Move to select 1.5v HSTL for the XGMII electrical specification per EIA/JESD8-6.
**Motion Type**: Technical 75%
**Moved By**: Don Pannell
**Seconded By**: Tom Dineen
**Results**: Y - 27         N - 0   A - 10
                         P/F:**Passed**
**Discussion:** Ali Ghiasi of Sun Microsystems gave a presentation on 1.5v HSTL electricals and its different classes.
Figure 2.1 of the EIA/JESD8-6 will be included in the IEEE spec for informational purposes.  Tables 2.1, 2.2a and 2.2b will be included as well for information only (as one concatenated table).

## Motion #2:
**Description:** Move to accept HSTL Class 1 per EIA/JESD8-6 (August 1995).
**Motion Type**: Technical 75%
**Moved By**: Lynch
**Seconded By**: Tom Dineen
**Results**: Y - 37              N - 0              A - 2
                         P/F:**Passed**
**Discussion**:  Continued on what the example system circuit implementation figure should be.  A figure was chosen.  Bob is to put in the prose that the XGMII interface is to be single ended.
The clocking decision made in New Orleans with no timing parameters was an issue for the author.  Joel Dedrick's New Orleans presentation was given again.

## Motion 3:
**Description:** Move that XGMII to be sourced centered RXCLK on the RXD/RXC.
**Motion Type**: Technical 75%
**Moved By**: Jeff Porter
**Seconded By**: Joel Dedrick
**Results**: Y - 28              N - 13              A - 5

<center>P/F: **Failed**</center>

## Motion 4:

**Description:** Move that the XGMII revert back to the Draft 1.0 interface timing (i.e. source centered in both directions).
**Motion Type**: Technical 75%
**Moved By**: Jeff Porter
**Seconded By**: Howard Baumer
**Results**: Y - 27          N - 0   A - 10
<center>P/F: **Failed**</center>
**Discussion**: Martin Elhoj gave a presentation of XGMII RS Error Reporting and to increase the delimiter robustness.  Need to resolve weather the PCS or RS does error checking.  Preamble will be defined to just data bytes.  Will make DATA_COMPLETE to be Control character not Error.

## Motion #?

There was a motion to accept all six of the Clause 49 motions as a bucket of motions.
<center>P/F: **Passed by a vote of acclimation**</center>

We have no XGMII timing specifications……
Bob asked to affirm Motions # 1 & 2 and the Voice votes of the Clause 46 Breakout Meeting, that passed by acclimation

**Clause 47 Summary Dawson Kesling .**
Dawson asked to affirm his group's Clasue 47 & 48 motions # M1 – M4 and M6, this passed by acclimation.
Move to accept Motion M5 passed by a vote of Y 64 N 3 A 22

Clause 48 Summary Rich Taborek (missing summary Rich & minutes Brik Ovskis )

David Law reported on his Clause, nothing significant and no slides.

Shimon Muller reported on his Clauses, nothing significant and no slides.

Motion is to affirm the changes approved by Shimon's sub-group. Passed by acclimation.

Ed Turner reported on Clause 33 (missing summary & minutes).

## Dawson / Grow XGMII Timing

| TXD                RXD | Source Centered | Edge Aligned |
|---|---|---|
| Source Centered<br>- PLL in MAC ASIC<br>- ASIC tool timing | **1. Original**<br>- MAC ASIC PLL<br>+ Direct connect | - MAC ASIC PLL |

|  | + Have timing spec's |  |
|---|---|---|
| <u>Edge Aligned</u><br>+ ASIC tool timing | **2. Dedrick (M3)**<br>+ MAC ASIC | **3. New Orleans**<br>+ Direct connect |

**Straw poll**

1. 49       1. 65
2. 40       2. 39
3. 10

How did we do (Brad Booth)
**Add his charts here later………**