

Accredited Standards Committee\*  
**NCITS, Information Technology**



**Doc. No.:** T11.2/01-013v0  
**Date:** December 04, 2000  
**Project:** FC0 MJS ad hoc  
**Ref. Doc.:**  
**Reply to:** Dennis Petrich  
Schelto Van Doorn  
Bill Ham

To: Membership of T11.2

From: Dennis Petrich, chair MJS working group  
Bill Ham, Secy MJS working group

Subject: Approved minutes of T11.2 FC0 MJS working group on  
October 02 and October 05, 2000

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**Agenda**

1. Opening remarks and introductions
2. Attendance and membership
3. Approve agenda
4. Document distribution
5. Review minutes of previous meeting
6. Review old action items
7. Call for patents
8. Call for MJS-2 vice chair
9. FC-PI comment resolution
10. Discussions/presentations
  - 10.1 Possible missing parameter in jitter specs - Dave Instone
  - 10.2 FC pattern generator for TIA use - John Patrin, Wavecrest
11. Reexamine the name of the group, Ham
12. Status of MJS-2 sections - Ham
  - 12.1 Creation of the structure of the MJS-2 document - Ham
  - 12.2 MJS-2 section assignment summary
  - 12.3 MJS-2 pilot sections
13. Old Business
  - 13.1 Error rate thresholding - Dave Instone, Xyratex
14. New Business
  - 14.1 Presentation to GEA meeting in Austin - Schelto, Infineon
15. Review action items
  - 15.1 Old action items from past meetings
  - 15.2 New action items from this meeting
16. Next meetings
17. Adjourn

## Results of Meeting

### 1. Opening remarks and introductions

In the absence of Dennis Petrich, Bill Ham led the meeting. He opened the meeting at 9:00 AM and thanked the host, Zane Daggett of Hitachi Cable, for hosting the meeting. Bill Ham took these minutes. This meeting was split between Monday, October 02, 2000 and Thursday, October 05, 2000. These minutes cover both days.

### 2. Attendance and membership

Attendance at plenary meetings does count toward minimum attendance requirements for T11.2 membership. Working group meetings are open to any person or organization directly and materially affected by T11.2's scope of work but do not count toward minimum attendance for T11.2 membership.

The following people attended the meeting:

Name	st Company	Tel
Allan Liu	a AGILENT	408-435-6193
Bill Ham	p COMPAQ	508-841-2629
Bill Pagano	o COMPAQ	719-548-3096
Greg McSorley	a EMC	(508) 480-8050
Hossein Hashemi	p EMULEX	714-513-8226
Hari Naidu	p FUJIKURA AMERICA	408-988-7420
Clint Schow	o IBM	507-253-8954
Schelto Van Doorn	p INFINEON	408-501-5665
John Pfeil	o LSI LOGIC	(719) 533-7436
Michael Jenkins	p LSI LOGIC	408-433-7901
Rich Taborek	o NSERIAL	408-845-6102
Craig Zajac	o ON_SEMI	602.244.5401
Dean Wallace	p QLOGIC	949-389-6480
Allen Kramer	p SEAGATE	612-402-2624
John Schroeder	p SMITHS INDUSTRIES	(616) 241-7574
Tom Lindsay	p VIXEL	425-806-4074
John	o WAVECREST	952.857.1849
David Instone	p XYRATEX	01705-486363

Total: 18 attendees

### 3. Approve agenda

Schelto moved and Bill Ham seconded that the agenda as shown above be approved. The motion passed without objection.

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#### 4. Document distribution

This section describes the availability of draft documents that are intended to be published as a result of work by the MJS committee.

Document distribution is now being done over the web. Documents relating to MJS work can be found on the T11 web site ([www.t11.org](http://www.t11.org)) by going to "documents" and searching on the key words "jitter" and/or "MJS".

The only active document in this working group is the MJS-2 technical report presently at rev 0.0.

A summary of the presently active policy to document distribution is included for reference.

All presentations are posted electronically at the approved ftp within two weeks after the meeting. Format must be an approved electronic file format. While we are still paper based, a paper copy must also be given to the secretary at the working group meeting.

(Presentations are defined as material shown publicly in the Plenary or authorized working group meetings.)

#### Submission of Documents for T11 Document Numbers:

A online system is now available to provide document numbers and accept the submission of documents. The system is accessed via the t11 web page at <http://www.t11.org>. Follow the "docs" link in the left-hand frame, or at the bottom, and fill in a form giving details about the document. In order to complete the form, it will be necessary to enter a password. The password is given out at T11 meetings, or can be obtained from the T11 Chair. Instructions will then be given about uploading the file to the ftp site at [ftp.t11.org](ftp://t11.org).

We now use all electronic document distribution.

A T11.2 reflector is operational over the T11 site.

The committee forms its agenda by the following:

1. A call (reminder) for presentations by the chair 3 weeks in advance
2. Those wanting to be on the agenda submit request including:  
title

presenter  
time required  
abstract

3. Chair creates agenda and posts 2 weeks in advance of the meeting
4. At the meeting it is the chairs's discretion to allow additional presentations

5. Review minutes of previous meeting

The minutes of the last MJS working group were reviewed with some minor editorial changes. Bill Ham moved and Schelto seconded that the minutes as modified be accepted. Motion passed without objection. The amended minutes will be posted to the ftp site under a document number with an "ap" in the document name.

Action item: Ham will get the document number and do the posting.

6. Review old action items

The old action items were reviewed and the status was updated.

7. Call for patents

Below is the formal call for patents which was issued by Dennis at the meeting:

**PATENTS**

- A call is hereby issued for the existence of patents required to implement the results of any & all T11 projects to be disclosed  
It is necessary for the holders to agree to license those patents in conformance with the ANSI patent policy if the project on which they read is to proceed  
T11.2 is not involved in this process @ all !*
- The contact @ ANSI is the General Counsel, Ms. Amy Marasco -(212)642-4954 or amarasco@ansi.org*
- Patent policy description @ [www.ansi.org/proctbl.html](http://www.ansi.org/proctbl.html), section 1.2.11*
- IBM has declared that it has patents which apply to the practice of FC & SBCON. The contact is:  
Tom Slattery, Program Director, IBM Corporation, North Castle Drive, Armonk, New York 10504  
Tel: (914) 765-4351, Fax: (914) 765-4390, Email: tmslatt@us.ibm.com*

*Thanks to Stuart Berman of Vixel for tracking down this new contact*

There was no response to this call for patents.

#### 8. Call for MJS-2 vice chair

A call is hereby issued for a vice chair for the MJS-2 ad hoc. No one responded immediately to this call.

#### 9. FC-PI comment resolution

Schelto led the process for recommending MJS ad hoc responses to the T11 letter ballot for FC-PI. All the comments that were assigned to the MJS group were addressed and specific resolutions were suggested.

Bill Ham moved and Schelto seconded that the resolutions for the jitter-related comments against FC-PI rev 9.0 documented in the comments resolution data base be accepted by the MJS ad hoc.

Motion passed 17/0/0.

#### 10. Discussions/presentations

##### 10.1 Possible missing parameter in jitter specs - Dave Instone

Dave Instone went through the material in 00-462v0. The essence of the issue is the relationship between the peak to peak measured jitter and the biasing that can occur in the jitter population due to the specific data pattern. This produced an increased understanding for some that there is a real need to separate the DJ from the RJ.

Mike Jenkins agreed to write up some material for the reflector. This needs to be put into MJS-2 in some form.

This subject is related to the use of the same specific data pattern and specific signal degradation mechanisms for all jitter related tests.

After some discussion there seemed to be agreement that all jitter output tests apply for ALL complaint data patterns. Different implementations may show the most degraded performance with different data patterns.

In a more general view the positioning of the mask with respect to the jitter population (at the nominal switching threshold) is not presently well specified or uniformly practiced. Some folks are using the features of the distribution that best suits their application.

Several distributions were schematically drawn for comment as follows:

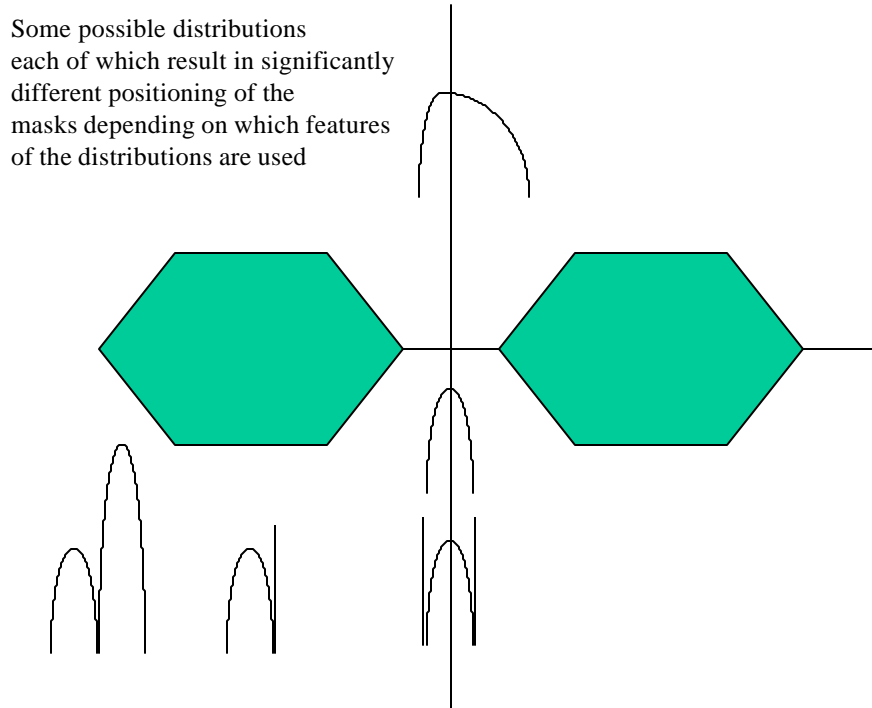


Figure 1 - Features of jitter distribution to be used for mask placement

There are basically two schools of thought: (1) use the mean of the distribution to define the position of the mask and (2) center the mask around the extremes (or fit the mask within the distribution).

The choice of method is expected to have major consequences on actual pass/fail for several practical applications. How the receiver centers itself is a key part of this issue.

This subject needs more discussion at the next meeting.

#### 10.2 FC pattern generator for TIA use - John Patrin, Wavecrest

John presented technology that uses a pattern marker as the start of the TIA measurement. The claim was made that using a pattern marker is more accurate than using a non-marker method. This increase in accuracy may

be due to better calibration from a known pattern where every edge is known.

This pattern marker example shown was a CRPAT.

Excellent correlation was found between triggers derived from the trigger extractor equipment and from the trigger delivered directly from the pattern generator source.

A clear application for the triggered measurement technique is diagnostic for specific edges and data structure dependencies.

The equipment for extracting the trigger from the data stream is in beta test now - AG-100 ARM generator.

The presentation will be uploaded.

#### 11. Reexamine the name of the group, Ham

Following a brief review of the original discussion at the June meeting the group reconsidered the vote with the following result:

The new name for the group is: Methodologies for Jitter and Signal Quality Specification - MJS/SQS  
Motion passed 12/2

End of retained material from the June meeting:

#### 12. Status of MJS-2 sections - Ham

##### 12.1 Creation of the structure of the MJS-2 document - Ham

Thursday AM:

An attempt was made to reduce the scope of the MJS-2 document by identifying sections that are presently not being actively supported. Some of those sections are identified by the blue highlight in the list below.

Following is the presently agreed organization of the MJS-2 document with names of those responsible for specific sections:

Sections 1 thru 5 - Ham

1. Introduction
  - 1.1. Document scope and purpose
  - 1.2. Document organization
2. T11.2 Membership
3. References
4. Definitions and conventions
  - 4.1. Conventions
  - 4.2. Acronyms
  - 4.3. Definitions
5. Scope
  - 5.1. Motivation and goals
  - 5.2. Authority
6. Jitter overview
  - 6.1. FC-0 and MJS (-1) interface overview - Ham
  - 6.2. Fibre channel storage implementation - copy if possible
  - 6.3. Jitter contribution elements - [Ham]
    - 6.3.1. Reference times - TBD
    - 6.3.2. Signal amplitude effects - TBD
    - 6.3.3. 9.6. Amplitude to phase conversion - TBD
    - 6.3.3. Generalized jitter concepts - TBD
    - 6.3.4. Deterministic contributors (copy)
    - 6.3.5. Random contributors (copy)
  - 6.4. Improved Bit Error Rate vs. Jitter Model (copy from MJS-1) - Tom Lindsay if mods needed
    - 6.4.1. Description of Mathematical Model
    - 6.4.2. Random Jitter
    - 6.4.3. Addition of Deterministic Jitter
  - 6.5. Equalization - Mike Jenkins
    - 6.5.1. Filtering
    - 6.5.2. Pre-emphasis
    - 6.5.3. Adaptive transmitters
    - 6.5.4. Adaptive receivers
    - 6.5.5. Distributed
  - 6.6. Separation of jitter components - Tom Lindsay
    - 6.6.1. Need to separate components
    - 6.6.2. General considerations
    - 6.6.3. Mathematical basis
    - 6.6.4. Accuracy and precision
    - 6.6.5. Tools
  - 6.7. Jitter accumulation and transfer- Tom Lindsay
  - 6.8. Data rate considerations
  - 6.9. Effects of parallel lanes/paths - skew, cross talk - Kevin Demsky
  - 6.10. Pattern dependent random jitter - Mike Jenkins
  - 6.11. Jitter methodologies (copy from MJS if relevant)
    - 6.11.1. Current practice and specifications
    - 6.11.2. Jitter measurement definitions
7. Jitter test methodologies - Ham
  - 7.1. Goals - Ham

- 7.2. Level 1 and level 2 tests - Ham
- 7.3. System considerations - TBD
- 7.4. Component considerations - TBD
- 7.5. Instrumentation considerations - TBD
  - 7.5.1. LESB
  - 7.5.2. BER
  - 7.5.3. FC compliant
  - 7.5.4. Non-FC compliant
  - 7.5.5. Built in test features
- 7.6. Test fixture considerations - Ham
- 7.7. System / environmental noise considerations
- 7.8. Reference standards / calibration considerations
- 7.9. Data output format considerations
- 7.10. Jitter output test methodologies (copy from MJS)  
(need effect of high pass filter discussion)
- 7.10. Jitter tolerance test methodologies (copy from MJS)  
(need reference to jitter output section for tolerance test conditions)
- 8. Requirements for specific tests  
[Only one example is shown for simplicity - need to generate a comprehensive list - this will be a very long section]
  - 8.1. Optical Gamma T output (started already)
    - 8.1.1. FC device (requires full protocol signals to work) - Rich Feldman  
(Bert and scope methods only)
      - 8.1.1.1. Overview
      - 8.1.1.2. Test Fixtures
      - 8.1.1.3. Instrumentation
      - 8.1.1.4. Calibration
      - 8.1.1.5. Test execution
      - 8.1.1.6. Data output formats
      - 8.1.1.7. Acceptable values
    - 8.1.2. FC protocol neutral component - TBD
      - 8.1.2.1. Overview
      - 8.1.2.2. Test Fixtures
      - 8.1.2.3. Instrumentation
      - 8.1.2.4. Calibration
      - 8.1.2.5. Test execution
      - 8.1.2.6. Data output formats
      - 8.1.2.7. Acceptable values
  - 8.2. Copper Gamma T output
    - 8.2.1. FC device transmitter (requires full protocol signals to work) -  
Dave Instone?
      - 8.2.1.1. Overview
      - 8.2.1.2. Test Fixtures
      - 8.2.1.3. Instrumentation
      - 8.2.1.4. Calibration
      - 8.2.1.5. Test execution
      - 8.2.1.6. Data output formats
      - 8.2.1.7. Acceptable values
    - 8.2.2. FC protocol neutral component - TBD
      - 8.2.2.1. Overview

- 8.2.2.2. Test Fixtures
- 8.2.2.3. Instrumentation
- 8.2.2.4. Calibration
- 8.2.2.5. Test execution
- 8.2.2.6. Data output formats
- 8.2.2.7. Acceptable values
- 8.3. Copper Beta R tolerance (already started)
- 8.3.1. FC device (requires full protocol signals to work) - Allen Kramer
  - 8.3.1.1. Overview
  - 8.3.1.2. Test Fixtures
  - 8.3.1.3. Instrumentation
  - 8.3.1.4. Calibration
  - 8.3.1.5. Text execution
  - 8.3.1.6. Data output formats
  - 8.3.1.7. Acceptable values
- 8.4. Optical Gamma R tolerance - Tom Lindsay
  - 8.4.1. FC device (requires full protocol signals to work)
    - 8.4.1.1. Overview
    - 8.4.1.2. Test Fixtures
    - 8.4.1.3. Instrumentation
    - 8.4.1.4. Calibration
    - 8.4.1.5. Text execution
    - 8.4.1.6. Data output formats
    - 8.4.1.7. Acceptable values
  - 8.4.2. FC protocol neutral component
    - 8.4.2.1. Overview
    - 8.4.2.2. Test Fixtures
    - 8.4.2.3. Instrumentation
    - 8.4.2.4. Calibration
    - 8.4.2.5. Test execution
    - 8.4.2.6. Data output formats
    - 8.4.2.7. Acceptable values

Further sections will be added to section 8 for all interoperability points and all versions - these sections will re-use major parts of the above sections

## 9. 10 Examples

- 9.1. Jitter budget allocations - TBD
- 9.2. Jitter tolerance specification - TBD
- 9.3. Revised jitter output allocation tables - TBD
- 9.4. Separation of jitter components - Dennis Petrich
- 9.5. Jitter accumulation (+ or-) - Mike Jenkins
- 9.7. Proper use of eye diagrams and masks - TBD

Annex A - Implementation strategies - TBD

- A.1 Repeaters
- A.2 Latency
- A.3 Bandwidth

[These following annexes are extracted from MJS-1 for reference - need to consider what we need for MJS-2.]

## Annex B

### Improved Test Bit Sequences

- B.1 Test bit sequence characteristics
  - B.1.1 Low Frequency Pattern
  - B.1.2 Low transition density patterns
    - B.1.2.1 Half-rate square pattern
    - B.1.2.2 Quarter-rate square pattern
    - B.1.2.3 Ten contiguous runs of 3
  - B.1.3 Composite patterns
- B.2 Compliant jitter test bit sequences
  - B.2.1 Random test bit sequence
    - B.2.1.1 Background - fibre channel frame
    - B.2.1.2 Original RPAT
    - B.2.1.3 Compliant RPAT (CRPAT)
  - B.2.2 Compliant Receive Jitter Test Bit Sequence
    - B.2.2.1 Receive Jitter Tolerance Pattern
    - B.2.2.2 Compliant Receive Jitter Tolerance Pattern
  - B.2.3 Supply Noise Test Bit Sequences
    - B.2.3.1 Supply Noise SPAT
    - B.2.3.2 Supply Noise CSPAT
- B.3 System Jitter Testing Issues

## Annex C

### Jitter Tolerance Test Methodologies

- C.1 Calibration of a Signal Source using the BERT Scan Technique
- C.2 Sinusoidal Jitter Modulation
- C.3 Direct Time Synthesis

## Annex D

### Jitter Output Test Methodologies

- D.1 Jitter Output Test Methodologies
- D.2 Time Domain Measurement - Scope and BERT Scan
  - D.2.1 Overview
  - D.2.2 Golden PLL
  - D.2.3 Time Domain Scope Measurement
  - D.2.4 BERT Scan
- D.3 Time Interval Analysis
  - D.3.1 Introduction
  - D.3.2 "Clock-less" Jitter Measurement
  - D.3.3 TIA Data Reduction Procedure
  - D.3.4 Total Jitter Calculation
  - D.3.5 Power Density Spectrum of Jitter
  - D.3.6 Data Dependent (ISI) Jitter Measurement
  - D.3.7 Jitter Measurements with a "Pattern Marker and known pattern"
  - D.3.8 Jitter Measurement Using a Sampling Oscilloscope (DDJ and PWD)
- D.4 Frequency Domain Measurement (Spectrum Analyzer)

## Annex E

### Practical Measurements

- E.1 Introduction
- E.2 Basic architecture

- E.3 Instrumentation interface adapters
  - E.3.1 Balanced copper
    - E.3.1.1 Source and sink adapters for balanced copper variants
      - E.3.1.1.1 Balanced-unbalanced
      - E.3.1.1.2 Balanced - balanced (alternative 1)
      - E.3.1.1.3 Balanced - balanced (alternative 2)
    - E.3.1.2 Tap adapters for balanced copper variants
      - E.3.1.2.1 Balanced-balanced (alternative 1)
      - E.3.1.2.2 Balanced - balanced (alternative 2)
      - E.3.1.2.3 Balanced-Unbalanced
    - E.3.1.3 Extracting a balanced trigger signal
  - E.3.2 Unbalanced copper
    - E.3.2.1 Source and sink adapters for unbalanced copper variants (alternative 1)
    - E.3.2.2 Source and sink adapters for unbalanced copper variants (alternative 2)
    - E.3.2.3 Tap adapters for unbalanced copper variants (alternative 1)
    - E.3.2.4 Tap adapters for unbalanced copper variants (alternative 2)
  - E.3.3 Optical
    - E.3.3.1 Source interface adapters
    - E.3.3.2 Sink interface adapter
    - E.3.3.3 Optical tap
  - E.3.4 Specific tests
  - E.3.5 Description of baluns
    - E.3.5.1 Balun requirements
      - E.3.5.1.1 Core and transmission-line requirements
      - E.3.5.2 Specific wound core construction details
        - E.3.5.2.1 Alternative 1 - wound toroid construction
        - E.3.5.2.2 Alternative 2 - wound toroid construction
        - E.3.5.2.3 Alternative 3 - wound bead construction
      - E.3.5.3 Connection of wound cores into baluns
      - E.3.5.4 Other source/sink adapter components

#### Annex F

##### Practical Examples for Jitter Compliance

- F.1 Introduction
- F.2 Elements contributing to jitter
- F.3 Hubs
- F.4 Retiming hubs
- F.5 Repeating hubs

#### Annex G

Choosing the Corner Frequency:  $f_c / 1\ 667$

## 12.2 MJS-2 section assignment summary

The following people have signed up for specific sections:

Allen Kramer, Seagate  
Tom Lindsay, Vixel  
Bill Ham, Compaq  
Mike Li, Wavecrest  
Mike Jenkins, LSI  
Rich Feldman, Gadzoox  
Dennis Petrich, Wavecrest  
Brian Herzing, Methode

The following people have indicated that they would be willing to contribute to specific sections of the document but do not have specific sections assigned yet:

Douglas Nast, Boeing  
Ron Miller, Brocade  
Ed Grivna, Cypress Semiconductor

Summary of MJS-2 sections and owners with percentage completion ( ):

Sections 1 thru 6.2 - Ham (20%)  
[6.0 is the overview section]  
6.3. Jitter contribution elements - Wavecrest Mike Li (0%)  
6.4. Improved Bit Error Rate vs. Jitter Model (copy from MJS-1) - Tom Lindsay if mods needed (95%)  
6.5. Equalization - Mike Jenkins (10%)  
6.6. Decomposition of jitter components from total jitter - Tom Lindsay (50%)  
6.7. Jitter accumulation and transfer- Tom Lindsay (50%)  
6.8. Budget allocation for components - Tom Lindsay (0%)  
6.9. Data rate considerations  
6.10. Effects of parallel paths - skew, cross talk, imbalance - TBD  
6.11. Pattern dependent random jitter - Mike Jenkins (0%)  
    7.1. Goals - Ham (10%)  
    7.2. Level 1 and level 2 tests - Ham (80%)  
    7.6. Test fixture considerations - Ham (50%)  
    7.7. System / environmental noise considerations  
    7.8. Reference standards / calibration considerations - Dennis Petrich (0%)  
    7.9. Data output format considerations  
  
7.10. Jitter tolerance test methodologies (copy from MJS)  
7.11. Jitter output test methodologies (copy from MJS)  
    8.1.1. Optical Gamma T FC device (requires full protocol signals to work) - Rich Feldman (Bert and scope methods only) (20%)  
    8.1.1. Optical Gamma T FC device (requires full protocol signals to work) - Dennis Petrich (TIA methods) (0%)  
    8.1.2. Optical Gamma T FC protocol neutral component - Brian Herzing (0%)  
    8.2. Copper Gamma T output - Robert Mejia (5%)

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- 8.2. Copper Gamma R output.- FC device transmitter (requires full protocol signals to work) - Dave Instone?
- 8.3.1. Copper Beta R tolerance FC device (requires full protocol signals to work) - Allen Kramer (20%)
- 8.4. Delta T output - Tom Lindsay (0%)
- 8.4.2.1. 8.4. Delta R output - Tom Lindsay (0%)
- 9. Examples
  - 9.1. Jitter budget allocations for components - TBD
  - 9.2. Jitter tolerance specification - TBD
  - 9.3. Revised jitter output allocation tables - TBD
  - 9.4. Separation of jitter components - Mike Li (20%)
  - 9.5. Jitter accumulation (+ or -) - Mike Jenkins (0%)
  - 9.6. Amplitude to phase conversion - TBD
  - 9.7. Proper use of eye diagrams and masks - TBD

Annex assignments are still TBD.

### 12.3 MJS-2 pilot sections

No new activity in this area.

### 13. Old Business

#### 13.1 Error rate thresholding - Dave Instone, Xyratex

00-385v0 was thoroughly discussed and revised. Carl Zeitler agreed to take the revised document 00-385v1 to FC-FS for consideration of inclusion in the upcoming FC-FS letter ballot.

A new document, 00-614v0, based on work started by Dave Instone, was created with significant refinement aimed at creating a new error reporting ELS for FC-FS. Bill Ham is actioned to post this document.

### 14. New Business

#### 14.1 Presentation to GEA meeting in Austin - Schelto, Infineon

Ham or Dennis to determine how to cover the request of 802.3AE for an update on the FC jitter activity. Austin, TX October 24, 2000 ½ day.

## 15. Review action items

[Note: section was not discussed in detail at the meeting but describes the practice being used in the MJS-2 minutes for presenting and reporting status on the action items. The practice is straightforward but has not previously been written down.]

This section contains the action items agreed during the meeting. Only action items with identified people who are responsible to do the action are recorded. Once an action item has been created there are two ways to get an action item removed from this list: (1) complete the action item - preferred method - and (2) the action item has become no longer relevant or appropriate because events have changed since the action item was created. It is possible for an action item to be transferred to another person but that will not remove it from the list and the new owner will be listed along with the record that the ownership has changed.

There are two divisions under this item: (1) old action items which were created in earlier meetings and (2) new action items which were created during this meeting. There is no tracking of the meeting where the action item was originally created (other than by looking back at previous minutes.)

All action items that were completed by the time the action items were reviewed are given the designation "done". The done action items will remain on the list in the draft and approved minutes for the meeting in which the action item was reported to have been completed. This is to ensure that the person responsible for the action item get the credit/blame for the work. Action items which were reported done in one meeting will be removed from the list for the minutes of the next meeting.

### 15.1 Old action items from past meetings

Status as of this meeting is shown:

1. Dennis to create a proposal for a technique for generating an arming signal from a serial bit stream and the software to deal with the random insertion or deletion of fill words.  
Status: transferred to John Patrin - still not uploaded
2. Ham will get the document number for the minutes and do the posting to the web site  
Status: done

3. Ham to post a reflector note soliciting comment to develop a more acceptable name for the present MJS group.  
Status: overcome by events - see minutes above on related topic
4. Tom Waschura to put his presentation on Error positioning on web site  
Status: done (by Rich Feldman - thanks)
5. Tom Waschura to provide a copy of Neil Bergano's paper relating to signal to noise eye diagrams  
Status: partly done still needs to be posted ("Margin Measurements in Optical Amplifier Systems", N. Bergano, F. Kerfoot, C. Davidson, IEEE Photonics Technology Letters, Vol. 5, No. 3, March 1993)
6. Tom Waschura to provide a copy of the Digital Video jitter specs  
Status: done (pointer was provided)

Here are the relevant documents from SMPTE. These are copyrighted, so I'll give you the references and you can get the CD from SMPTE at [www.smpte.org](http://www.smpte.org)

SMPTE259M and SMPTE292M call give parameters to the jitter model and measurement method defined in RP184

#### Recommended Practices:

RP 184-1995: Measurement of Jitter in Bit-Serial Digital Interfaces  
This practice describes techniques for specifying and measuring output jitter from self-clocking bit-serial digital sources. It is specifically intended for, but not limited to, ANSI/SMPTE 259M-1993 serial systems.

#### Engineering Guidelines

EG 33-1998: Jitter Characteristics and Measurements  
This guideline presents some of the special aspects of working with digital video signals that have been serialized in accordance with ANSI/SMPTE 259M, ANSI/SMPTE 292M, or ANSI/SMPTE 294M.  
EG 34-1999: Pathological Conditions in Serial Digital Video Systems  
This guideline examines the types of jitter in directly transmitted data signals, the methods for measuring each one, and some of the impacts they can have on system operation.

#### SMPTE Standards

SMPTE 292M-1998: for Television - Bit-Serial Digital Interface for High-Definition Television Systems  
This standard defines a bit-serial digital coaxial and fiber-optic interface for HDTV component signals operating at data rates in the range of 1.3 Gb/s to 1.5 Gb/s. Bit-parallel data derived from a specified source format are multiplexed and serialized to form the serial data stream. A common data format and channel coding are used based on modifications, if necessary, to the source format parallel data for a given high-definition television system. Coaxial

\*Operating under the procedures of The American National Standards Institute.

cable interfaces are suitable for application where the signal loss does not exceed an amount specified by the receiver manufacturer. Typical loss amounts would be in the range of up to 20 dB at one-half the clock frequency. Fiber optic interfaces are suitable for application at up to 2 km of distance using single-mode fiber.

SMPTE 259M-1997: for Television - 10-Bit 4:2:2 Component and 4fsc NTSC Component

Digital Signals - Serial Digital Interface

This standard describes a serial digital interface system M (525/60) digital television equipment operating with either 4:2:2 component signals or 4fsc NTSC composite digital signals. (For 625-line PAL composite implementation, see annex E.) This standard has application when the signal loss at 70 MHz (4fsc) or 135 MHz (4:2:2) due to coaxial cable characteristics does not exceed approximately 30 dB.

Ham to put pointer in minutes)

7. Bill Ham to determine how to document the Link Error Rate reporting standard.  
Status: assigned to Carl Zeitler and carried over
8. Bill Ham to post the error rate parameter recommendations from the MJS group  
Status: done 00-385v0 (document is on the web site)
9. Mike Jenkins to write up some material relating to data pattern biasing for the reflector  
Status: carried over - remanded back to the group for refinement

#### 15.2 New action items from this meeting

Ham or Dennis to determine how to cover the request of 802.3AE for an update on the FC jitter activity. Austin, TX October 24, 2000 ½ day.  
Status: new

Carl Zeitler to take the revised document for setting error reporting parameters (00-385v1) to FC-FS for consideration of inclusion in the upcoming FC-FS letter ballot.  
Status: new

Bill Ham to post 00-614v0.  
Status: new

#### 16. Next meetings

The next working group meeting will be requested for Monday December 04, 2000, in Austin, TX from 9AM to 5PM. A second meeting on Thursday AM from 10:00 AM to 12:30 PM will be focused on editing the MJS-2 document.

No interim meetings are presently planned.

17. Adjourn

The meeting adjourned at 11:50 on Thursday.