

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



**Doc. No.:** T11.2/01-142v1  
**Date:** April 09, 2001  
**Project:** FC0 MJSQ ad hoc  
**Ref. Doc.:**  
**Reply to:** Dennis Petrich  
Allen Kramer  
Bill Ham

To: Membership of T11.2

From: Dennis Petrich, chair MJSQ working group  
Allen Kramer, vice chair MJSQ working group  
Bill Ham, Secy MJSQ working group

Subject: Approved minutes of T11.2 FC0 MJSQ working group on  
February 05, 2001

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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. FC-PI comment resolution
9. Discussions/presentations
  - 9.1 Positioning of mask relative to the data
  - 9.2 Two dimensional jitter, Dennis Petrich
10. Schedule / content requirements for MJSQ-2, Petrich / Ham
11. Status of MJSQ-2 sections - Ham
  - 11.1 Creation of the structure of the MJSQ-2 document - Ham
  - 11.2 MJSQ-2 section assignment summary
  - 11.3 MJSQ-2 pilot sections
12. Old Business
13. New Business
14. Review action items
  - 14.1 Old action items from past meetings
  - 14.2 New action items from this meeting
15. Next meetings
16. Adjourn

## Results of Meeting

### 1. Opening remarks and introductions

Dennis Petrich led the meeting. He opened the meeting at 9:00 AM and thanked the host, Skip Jones of Q Logic, for hosting the meeting. Bill Ham took these minutes.

### 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	Company	Tel
Dean Vermeersch	AMP/TYCO	717 986-3143
Dan Harres	BOEING	314 232-5590
Ali Ghiasi	Broadcom	408 922-4723
Robert Dahlgren	BROCADE	408 437-9292
Ronald Miller	BROCADE	408 487-8017
Bill Ham	COMPAQ	508 841-2629
Bill Pagano	COMPAQ	719 548-3096
Edward Grivna	CYPRESS	612 851-5046
Thomas Linnell	EMC	508 435-1000 x2149
Greg McSorley	EMC	508 382-5928
Hossein Hashemi	EMULEX	714-513-8226
Chris Parker	EPSON	845 296 1590
Bruce Schober	HP	208 396 4102
Toan Tran	HP	408 435-6606
Kevin Demsky	IBM	507 253-5799
Thomas Murphy	INFINEON	(49) 3038623281
Michael Jenkins	LSI LOGIC	408 433-7901
David Allen	LSI LOGIC	719 533-7489
Rich Taborek	NSERIAL	408 845-6102
Schelto Van Doorn	NSERIAL	408 505-5725
Bryan Yunker	PICOLIGHT	303 530-3189
Allen Kramer	SEAGATE	612 402-2624
Bill Gintz	SEUS	650 520-4382
Frank Samela	STRATOS	708 867 9600
Luis Torres	STRATOS	708 867-9600
Lee Hu	VIXEL	
Dennis Petrich	WAVECREST	408-436-9000

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Total: 27 attendees

### **3. Approve agenda**

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

### **4. Document distribution**

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

Document distribution is now being done over the web. Documents relating to MJSQ 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 "MJSQ".

The only active document in this working group is the MJSQ-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>.

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 MJSQ working group were reviewed with some minor editorial changes. Bill Ham moved and Dennis 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. FC-PI comment resolution**

FC-PI rev 11 has been submitted for first public review. This seems to have gone out as a T11 letter ballot and the present status is not clear. In any case there are no unresolved comments at the moment.

## **9. Discussions/presentations**

### **9.1 Positioning of mask relative to the data**

This topic was revisited again from the last meeting. The general discussions relate to the positioning of the mask with respect to the data 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:

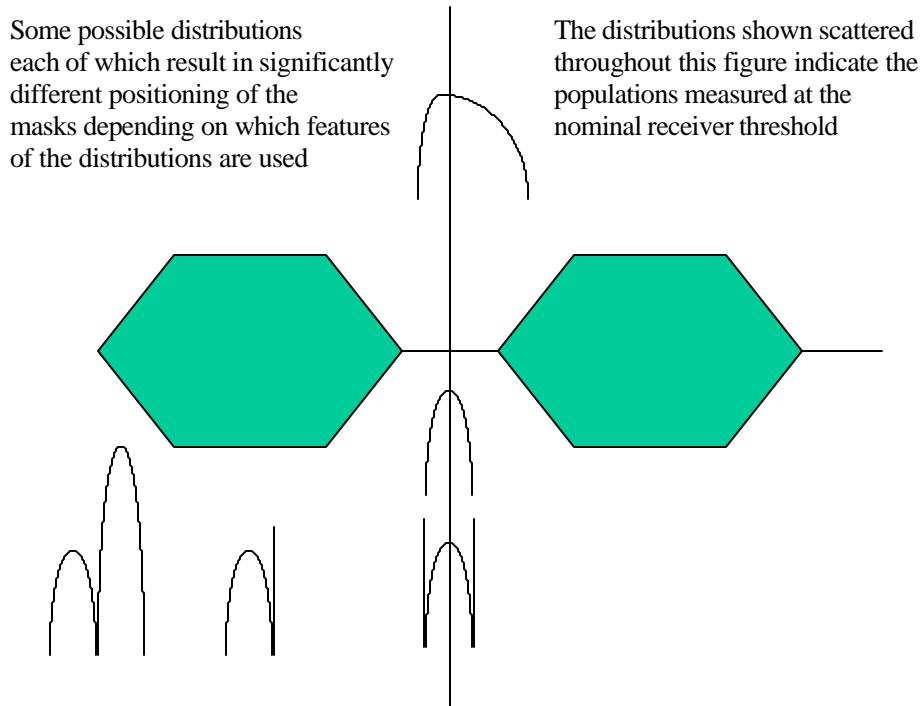


Figure 1 - Features of jitter distribution to be used for mask placement

There were three schools of thought brought forward if using the threshold crossing as the timing event:

- (1) Use the mean of the distribution to define the position of the mask and
- (2) Center the mask around the extremes (10<sup>\*\*</sup>-12 level)
- (3) Fit the mask within the distribution if possible (after discussion this one was determined to be essentially the same as (2) and therefore will not be pursued)

With a more generalized jitter concept where the amplitude is considered the following was also suggested:

- (4) Optimize the position of the mask with respect to the entire data distribution (time axis translations only).

In all cases a specified set of data patterns shall be used to determine compliance.

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.

Al Kramer is actioned to test his system using CJTPAT before the next meeting.

Motion Petrich/Jenkins the MJSQ requires that if the position of the mask with respect to the entire data distribution (time axis translations only) can be adjusted such that there is acceptably low population within the mask then a pass condition exists. This criteria applies to all interoperability points.

Motion passes: 17/1

Motion Ham/xxx that MJSQ requires that an entire mask be specified for each interoperability point. Note: the mask could be the same at different interoperability points and the mask shall be applied according to the measurement requirements appropriate for the point.

Motion fails due to lack of a second. It was noted that the failed motion is unnecessary as it is implicitly contained in the first motion.

Concern was expressed about all the implications of the above motion in that it is different from both SFF-8410 for copper and OFSTP-4 for optical where use of the mean is clearly stated as the means for positioning the mask. It was also noted that the depth of understanding is not adequate at this point to support the motion.

Motion Petrich/Lindsay to reconsider the above motion. [Reconsideration means that the above motion has no effect and the issue is still open.]

Motion to reconsider fails 7/7/8. Having no majority the previous motion stands.

It appears quite clear that this issue of mask placement is not resolved and needs to stay on the active agenda. A core question is: what is the intended use of the measurement?

## **9.2 Two dimensional jitter, Dennis Petrich**

Dennis described an approach being used by Wavecrest using a bit clock for a common timing reference where individual jitter distributions are taken at different input signal levels. Work is underway to develop the math for integrating the measurements at different levels to a single population that exists within the boundaries of the mask being used. Another possibility is to use the measurements at the different levels to define the actual edge profile of the signal populations.

Dennis is actioned to prepare a more complete presentation on this subject. It was agreed that this area will form a key part of the MJSQ-2 document.

The general subject of calculating the number of events when an amplitude scan across a mask is done as compared to taking the total number of samples was discussed. This has been a conceptually difficult point for a while now.

A key observation was noted: each point recorded by a sampling instrument regardless of the amplitude position of the point is the ONLY point recorded for the entire bit time for that particular signal edge. In other words, the number of sampled points accurately reflects the entire population of bit edges and multiple samples within the same signal in the same bit time are not recorded. This means that one may examine the population of points within a narrow band around a particular amplitude level and accurately determine if the number of events in the "forbidden region" meet the "bit error rate" specification.

The general requirement therefore when considering amplitude other than the nominal receiver threshold is what is the amplitude that gives the most population inside the mask? This feature greatly simplifies the mathematical derivation of the relationship between bit errors and signal properties.

#### **10. Schedule / content requirements for MJSQ-2, Petrich / Ham**

It was suggested that MJSQ-2 document proceed by eliminating all sections that are not required to do optical gamma T and copper beta R.

#### **11. Status of MJSQ-2 sections - Ham**

There was no Thursday AM meeting this week due to lack of attendance at several previous Thursday AM meetings and an agreement at the last meeting that we would discontinue attempting to meet in this time slot.

The following material is left in the minutes until such time as the MJSQ-2 document reflects the agreements.

##### **11.1 Creation of the structure of the MJSQ-2 document - Ham**

An attempt was made to reduce the scope of the MJSQ-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 MJSQ-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 - 2D stuff
    - 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 (Mike Li)
    - 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 - Ham from SFF
  - 6.10. Pattern dependent random jitter - Mike Jenkins

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- 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 MJSQ-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: $f_c / 1\ 667$

## 11.2 MJSQ-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 MJSQ-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%)
- 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.

### **11.3 MJSQ-2 pilot sections**

No new activity in this area.

### **12. Old Business**

There was no old business conducted.

### **13. New Business**

No new business was defined.

### **14. Review action items**

[Note: the following material describes the practice being used in the MJSQ-2 minutes for presenting and reporting status on the action items.]

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 that were reported done in one meeting will be removed from the list for the minutes of the next meeting.

#### **14.1 Old action items from past meetings**

Status as of this meeting is shown:

Al Kramer to test his system using CJTPAT before the next meeting.  
Status: carried over

Mike Jenkins to upload his copper tap adapter presentation.  
Status: done

Dennis Petrich to create a more complete presentation on two dimensional signal quality measurements.  
Status: carried over

Bill Ham to post the minutes to the web site.  
Status: done

#### **14.2 New action items from this meeting**

Bill Ham to produce rev 01 of the document.

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Status: new

#### **15. Next meetings**

The next working group meeting will be requested for Monday April 09, 2001, in Toronto ON, Canada from 9AM to 5PM. The second meeting on Thursday AM that had been held for several meeting cycles will not be held until further notice.

No interim meetings are presently planned.

#### **16. Adjourn**

The meeting adjourned at 5:00PM.