Accredited Standards Committee*
NCITS, Information Technology

Doc. No.: T11.2/01-257v1
Date: June 04, 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 April 09, 2001

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

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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, Kumar Malavalli of Brocade, 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
Bill Ham	COMPAQ	508-841-2629
Bill Pagano	COMPAQ	719 548-3096
Bruce Schober	HP	208 396-4102
Bryan Yunker	PICOLIGHT	303-530-3189
Dave Louis	VIXEL	425 806-4096
David Instone	XYRATEX	01705-486363
Dean Wallace	QLOGIC	949 389-6480
Dennis Petrich	WAVECREST	408 436-9000
Ed Jackson	IBM	303 381-4243
Greg McSorley	EMC	508 382-5928
Hossein Hashemi	EMULEX	714-513-8226
John Schroeder	SMITHS INDUSTRIES	616 241-7574
Rich Feldman	GADZOOX	408 360-6048
Richard Lewis	FCI	717 938-7816
Robert Pedersen	GENERAL DYNAMICS	612 921-6287
Thomas Murphy	INFINEON	(49) 3038623281
White Kevin	US CONEC	828 323-8883

3. Approve agenda

Dennis 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 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) 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

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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, 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

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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. Dave Instone noted that several instances exist where the 10^{-12} limit is inconsistently used. One of these was actually an error. Dave Instone is actioned to contact Schelto on section 3.1.82 in FC-PI rev 11 to have the “greater than or equal to” changed to “less than”. This appears to be an editorial issue to be handled between Schelto and the NCITS editor.

9. Discussions/presentations

9.1 Positioning of mask relative to the data

Discussion on this topic continued in the April meeting and the discussion occupied most of the meeting.

The importance of the data pattern was re emphasized.

Dave Instone noted that the presently required data patterns do not include the idle pattern. The idle pattern is frequently the only pattern being transmitted at any point in time.

Motion Instone/Ham that a repeating stream of contiguous idle primitives be added (in MJSQ-2) to the list of required data patterns documented in MJS in Annex B.2.

Motion passes 11/0/3

There was much discussion about how the distribution of jitter could be restricted beyond the boundaries defined by simple peak to peak values at various signal levels. Restriction in this sense means, for example, requiring that the actual distribution have a mean that is approximately the same as the average of the peak to peak values or in another example requiring that the mean not vary more than a certain amount for different data patterns. There was no agreement on any scheme or any way to restrict the distributions that would be practically enforceable.

Numerous examples were shown and discussed where the simple mean of the distribution was meaningless. Further, using a mean of the distribution

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allows some measurement methods to appear to deliver a valid result but do not actually get accurate results at the 10^{-12} level.

It was suggested that it is easier to determine the mean than the peak to peak values and that one would not get very accurate results if the peak to peak were to be required. This view was countered by the view that if the peak to peak is not accurate or measured effectively that the entire result is not addressing requirements at the 10^{-12} level and is therefore not valid. A peak to peak method should be as valid as any based on the mean.

The effect of the distribution on the tolerance test was also discussed. There were no specific distributions mentioned but an examination of MJS-1 provides a possible starting point. In the example given in MJS-1 it is implicitly suggested that there is no DCD and no UDJ (other than the impressed sinusoidal) present in the signal launched toward the receiver in the tolerance test. Further, the DDJ was created by a cable or filter having certain unspecified frequency transfer properties. If the properties of the scheme used to create the DDJ were specified this scheme could provide some starting points for defining the tolerance conditions.

However, by using this as the jitter tolerance specification there is still an issue with the fact that the jitter output does not have any distribution requirements specified. Therefore, one could have a link that passes the jitter tolerance test based on the controlled distribution described above but the same link would fail if using a compliant output signal with a different distribution.

It appears that there are only two approaches that can resolve this conflict:

(1) require the output distribution to be a benign subset of the required jitter tolerance distribution or
(2) require that the tolerance test be done for any physically realizable output distribution with the specified peak to peak properties.

Perhaps there are other possibilities and this subject will be again addressed at the next meeting.

In order to move this forward the group accepted the idea that all measurements and budgeting should be based on the assumption that the receiver sets its internal timing reference at the mean time of the transitions (i.e. the mean of the distribution).

Resolving this issue is at the core of the MJSQ effort. How it is resolved will affect receivers, transmitters, interconnect, and measurement processes.

The present status is:

- that tbe signal output specification allows time translation of the mask to obtain a fit - this implies that the 10^{-12} edges of the distribution are available at different signal amplitude levels

- that the receiver is assumed to set its internal timing references to the mean of the distribution - receivers that do not behave in this manner may not work with the signal budgets developed.

- that there is a need to pick one of the options listed above for matching the output and tolerance specifications (or find a new approach)

Material below this point under this item is retained for continuity from the last minutes.

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:

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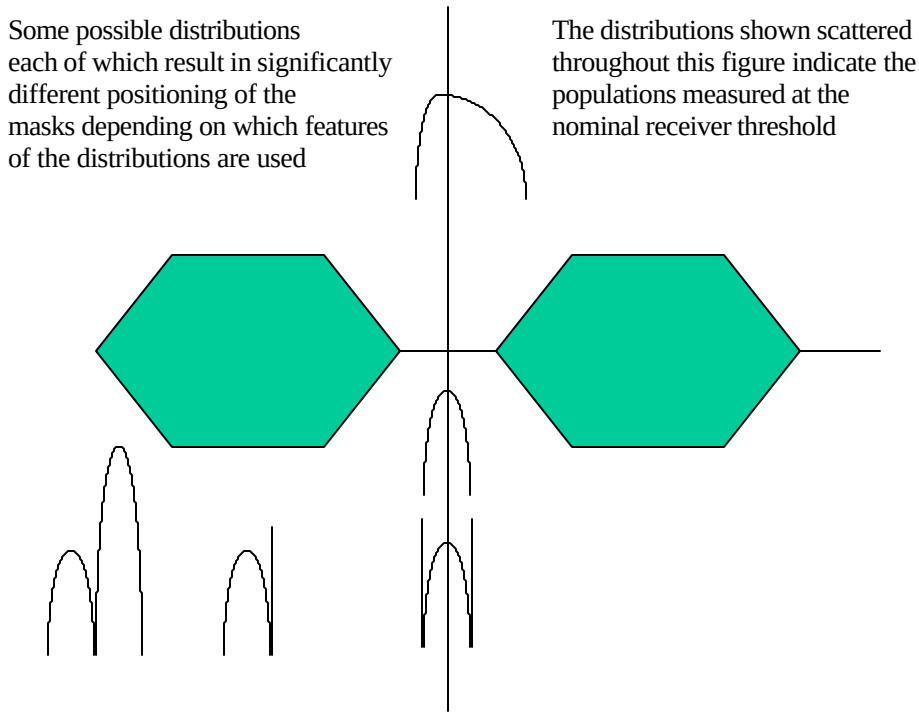

Figure 1 - Features of jitter distribution to be used for mask placement

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**-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.

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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

[this subject was not discussed in this meeting but is retained until it can be transferred into the document.]

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

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.

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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

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

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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

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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)

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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)

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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.]

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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

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

Bill Ham to produce rev 01 of the document.
Status: carried over

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14.2 New action items from this meeting

Dennis to generate transition density plots and eye histogram overlays of the distributions for the data patterns described in MJS-1.
Status: new

15. Next meetings

The next working group meeting will be requested for Monday June 04, 2001, in Minneapolis, MN from 9AM to 5PM.

No interim meetings are presently planned.

16. Adjourn

The meeting adjourned at 5:00PM.

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