Minutes of T11.1 Ad Hoc meeting on HIPPI-6400 Optics
December 9, 1997
Orlando, FL

## 1. Opening remarks and introductions

The Chairman, Don Tolmie of Los Alamos National Laboratory, opened this meeting at 6 PM and thanked Roger Cummings and DPT for hosting this meeting. Don lead a round of introductions. The list of attendees is at the end of these minutes.

## 2. Selection of secretary

Joe Parker volunteered to take the meeting notes. Don Tolmie will produce the final HIPPI-6400 Optical minutes separate from the other HIPPI minutes.

## 3. Review / modify the draft agenda

Draft agendas were distributed via e-mail before the meeting and hard copies were distributed at the meeting. Robert Clarkson asked for item to discuss male/female connector orientation, and Mark Donhowe asked for an item on fiber bandwidth; both were included under item 10.

## 4. Document distribution

Don described the HIPPI web page at http://www.cic-5.lanl.gov/~det/, stated that the appropriate documents would be placed there, and encouraged people to pick up the documents before the meeting as extra documents would not be available at the meeting. Schelto van Doorn said that T11.2 was setting up their own reflector, and we should provide cross indexes to guide the user.

## 5. Review minutes of previous meeting

The minutes of the October 7 meeting in Tucson were reviewed. Thanks went to Mark Donhowe of Gore for providing the notes that were used to produce the minutes.

It was noted that in 7.1, first paragraph, last sentence, the 0 dBm was OK for a single fiber but was not correct for a group of fibers in a ribbon. It was also agreed to delete the last sentence of 7.1, third paragraph, about target prices.

Schelto van Doorn moved, and Michael Griffin seconded, to approve the October 7 minutes as corrected. Motion passed unanimously. Don took an action item to update the copy of the October 7 minutes on the web page.

## 6. Review of old action items

The action items were reviewed:

1. Greg Chesson, Steve Joiner, and Dan Schwartz to come up with a pulse width distortion number for HIPPI-6400-PH table 9, or something equivalent, e.g., jitter. (Carry over)
2. Dan Brown to provide new text for the signals used in OFC. (Carry over)
3. Greg Chesson to provide text for pulse width distortion and jitter, and what they include. (Carry over)
4. Dan Schwartz to provide new text specifying the optical receptacle and optical plug. (Carry over)
5. Ron Kleckowski to provide a connector drawing in electronic format. (Carry over, and reassigned to John Keesee)
6. Don Tolmie to update HIPPI-6400-OPT Rev 0.1 with the changes agreed to at the October meeting. (Done)
7. Greg Chesson to send SuMAC jitter spread sheet to Steve Joiner, Dan Schwartz, Dan Brown, and Schelto van Doorn. (Carry over)
8. Toshi Uchida and Optobahn to provide 1300 nm specifications and text for inclusion in the document. (Done)
9. Don Tolmie to authorize a special open-fiber-control working group meeting to be hosted and chaired by Dan Schwartz. (Done)
10. Dan Brown to start an annex on optical modulation amplitude definition and testing. (Done)
11. Ribbon cable manufacturers to provide recommendations on bandwidth, and to a lesser extent, skew. (Carry over)
12. Quentin Tan to provide Don Tolmie with an electronic copy of Optobahn presentation for posting on the HIPPI web site. (Done)

13. Robert Clarkson to provide Don Tolmie with an electronic copy of Raytheon E-System presentation for posting on the HIPPI web site. (Carry over)

## 7. Presentations

### 7.1 Optical Modulation Amplitude Measurement

Dan Brown described a proposed measurement procedure using a 500 MHz oscilloscope, a signal generator for a 50 MHz square wave, an O/E converter with 500 MHz bandwidth, and a 4th order Bessel-Thompson filter with a 3 dB electrical 750 MHz bandwidth.

Greg Chesson and Ali Ghiasi questioned testing at 50 Mhz. The discussion centered on the fact that this measurement was of amplitude; rise and fall times were separately specified, and this matched the worst case disparity. The measurement procedure was equivalent to a DC measurement of optical power. Don Tolmie questioned its use if the coding had been 8B/10B instead of the 4B/5B. Steve Joiner suggested that using 1/5 of the fundamental frequency in that case, but expected to see no significant difference. Don Tolmie took an action item to add Dan's annex to the document.

## 8. Jitter discussion

Greg Chesson has an action item to provide the SuMAC spread sheets to the optical guys. Nothing new as done at this meeting.

## 9. Open Fiber Control (OFC)

An interim HIPPI-6400 Optical working meeting was held November 4, 1997, in Chandler, AZ. Dan Schwartz reported that AMP, HP, Motorola, and Siemens converged on one approach combining coded word handshake and pulsed operations. The OFC signalling would be at 1/4 of the bit rate (i.e., 250 MBaud), to be compatible with any AC coupling used. The single OFC signalling channel would be made class 1 eye-safe by enabling it periodically with a low duty cycle, similar to FC-PH 4.3. Indications are that with this approach the launch power into the fiber can easily exceed 0 dBm. Dan Schwartz has an action item to supply presentations and a summary to Don Tolmie for the web site and minutes.

Robert Clarkson asked about the OFC control signals on the electrical side. For now it looks like the OFC signals will be internal to the optical modules. Hence, the Transmitter_enable signal in figure 1 of HIPPI-6400-OPT Rev 0.2 may be removed at a future meeting. It was noted that it may be needed to respond to an over-voltage situation. Everyone was actioned to come to the next meeting prepared to defend the Transmitter_enable signal, or it will be removed.

It was suggested that the OFC signalling be done on the edge fibers since they are most likely to be damaged first.

## 10. Review HIPPI-6400-OPT Rev 0.2

Rev 0.2 contained the changes from the Tucson meeting plus the proposed text and table information for 1300 nm optics provided by Quentin Tan of Optobahn.

The definitions of electrical rise and fall times will be changed from 10% and 90% to 20% and 80% for consistency with the rest of the document. It was noted that the definition of jitter for the parallel link will be different from the jitter for a serial link. Steve Joiner suggested that the parallel jitter may be the sum of the CLOCK channel jitter and the jitter on a data channel. The jitter definition in 3.1.19 was changed by deleting the two middle sentences. A definition of optical passive loss will be added (based on text in 7.2).

Some text in 7.1 was inadvertently deleted by Don Tolmie – he will put it back in the next revision (with apologies to Dan Brown who provided the original text).

Dan Brown said that he had modeled the 1300 nm single mode variant as specified in Rev. 0.2 using the accepted Gigabit Ethernet link model. With the specified 6 dB link power budget, and assuming 1.5 dB connector/splice losses, the link would not operate to 10 km. The worst case limitation is around 6.5 km. To reach 10 km would require an additional 2.5 dB of budget which could be acquired by increasing the receiver sensitivity and/or launching more power. The link model was developed for serial links and does not account for the effects of skew or crosstalk; additional power may be needed to account for these power penalties.

Quentin Tan gave the basis of his calculations as:

5 dB fiber attenuation
2 dB connector loss
1 dB system penalty

for a total loss of 8 dB. Trying to shoe-horn both the 850 nm and 1300 nm optics into one table caused problems. Quentin Tan took an action item to provide input for a new separate table for the 1300 nm variant. It will be similar to table 4 but based on receiver sensitivity and extinction ration measurements.

Don Tolmie questioned the connector layout, asking if there is some connector keying that should be noted. He also asked if we should specify a "podded pair" or let them be simplex, and if a podded pair is used then are there special dimensions that need to be included. No resolution at this meeting. The text in clause 8 describing a "half-twist" in the cable was not well received, and will be removed in the next revision.

Robert Clarkson raised the issue of the connector alignment pins, i.e., should they be in the cable side of the connector or in the module side. It used to be that it didn't matter since the pins would not stay in place anyway. Robert suggested that the cables be male and the modules be female. The industry seems to be going the other way. It was agreed that HIPPI-6400-OPT will have the alignment pins in the modules.

John Keesee took over Ron Kleckowski's action item to provide a connector drawing in electronic form that can be included in the document.

## 11. Call for patents

Don issued a call for disclosure of the existence of patents required to implement any and all HIPPI standards. It is necessary for the patent holders to agree to license those patents in conformance with the ANSI patent policy if the project on which they apply is to proceed. T11 and its Task Groups are not involved in this process at all other than to issue the call and forward paperwork.

The contact at ANSI is the General Counsel, Ms. Amy Marasco - (212) 642-4954 or amarasco@ansi.org. A patent policy description is at www.ansi.org/proctbl.html, section 1.2.11.

No new patent claims were made at this meeting.

## 12. Planning for future work

Don Tolmie asked for suggestions on moving the document along, i.e., how can we bring it to closure faster. There are some action items that have been hanging fire for some time that need to be completed. (Note that at the T11.1 Plenary meeting the following day people stated that they did not feel a great urgency, and a crash program was not warranted.)

## 13. Future meeting schedule

The HIPPI Optical group will continue to meet only during plenary weeks for the foreseeable future.

The next meeting will be on Tuesday, February 10, from 6 PM to 9 PM. The location is the Hyatt Islandia (Mission Bay), 1441 Quivira Road, San Diego, CA 92109, phone (619) 224-1234. Skip Jones and QLogic are the host. The group name for reservations is American National Standards Institute and the group room rate is $123 plus 10.5% tax. The reservation cutoff date is January 9, 1998. (See the meeting announcement on the web page at http://www.cic-5.lanl.gov/~det/ for further details.)

The agenda will be essentially the same as the agenda for this meeting.

## 14. Review action items

1. Greg Chesson, Steve Joiner, and Dan Schwartz to come up with a pulse width distortion number for HIPPI-6400-PH table 9, or something equivalent, e.g., jitter.
2. Dan Brown to provide new text for the signals used in OFC.
3. Greg Chesson to provide text for pulse width distortion and jitter, and what they include.
4. Dan Schwartz to provide new text specifying the optical receptacle and optical plug.
5. John Keesee to provide a connector drawing in electronic format.
6. Greg Chesson to send SuMAC jitter spread sheet to Steve Joiner, Dan Schwartz, Dan Brown, and Schelto van Doorn.
7. Ribbon cable manufacturers to provide recommendations on bandwidth, and to a lesser extent, skew.

8. Robert Clarkson to provide Don Tolmie with an electronic copy of Raytheon E-System October presentation for posting on the HIPPI web site.
9. Don Tolmie to update the copy of October 7, 1997, minutes on the web page.
10. Don Tolmie to add Dan Brown's optical modulation amplitude measurement technique material to the next revision of HIPPI-6400-OPT.
11. Dan Schwartz to provide copies of minutes, notes, or other presentation material from the November OFC meeting in Phoenix to Don Tolmie for posting on the web page.
12. Everyone to come prepared to defend the Transmitter-Enable OFC signal at the Februray meeting or it will be removed.
13. Quentin Tan to provide a separate table for the 1300-nm parameters.
14. Don Tolmie to update HIPPI-6400-OPT Rev 0.2 with the changes agreed to at the December meeting.

## 13. Adjournment

The meeting adjourned at 8:20 PM on December 9.

## Attendance

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|---|---|---|---|
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