1. Opening remarks and introductions

The Chairman, Don Tolmie of Los Alamos National Laboratory, opened this meeting and thanked Skip Jones and QLogic for hosting this meeting. This group is constituted as both the HIPPI Working Group under T11.1, and the HIPPI Networking Forum (HNF) - Technical Committee (TC).

Don lead a round of introductions. The list of attendees is at the end of these minutes.

2. Review / modify the draft agenda

Draft agendas were distributed via e-mail before the meeting and hard copies were distributed at the meeting. No additions or changes were made at the meeting. These minutes reflect the approved agenda.

3. Review minutes of previous meeting

The minutes of the February 10-11, 1998, working meeting in Mountain View were reviewed.

Don noted that item 5.4 was written for HIPPI-6400-SC when it should have been for HIPPI-6400-PH. Only a few of the vote numbers are off. Don will correct this in the minutes and put a corrected copy on the web page.

Roger Ronald moved, and Bob Willard seconded, to approve the February 10-11, 1998 working meeting minutes as corrected. Motion passed unanimously.

4. Review old action items

1. Everyone to review the HIPPI-800 Switch MIB and pass comments to Marck Doppke. (Carryover)

2. Von Welch to contact HIPPI-6400 MIB users and developers for comments on the current draft, and to prepare a presentation on the MIB for a future meeting. (Carryover)

3. Von Welch to look at developing a HIPPI-6400 host system MIB (for a NIC), to be done now as an annex of the present MIB with the possibility of splitting it out as a separate document at a later date. (Carryover)

4. Everyone to review the HIPPI-6400 MIB. (Carryover)

5. Kevin Lahey, Jeff Young, Jean-Michel Pittet, and Greg Chesson to begin an IP and ARP over HIPPI-6400 RFC. (In process)

6. Jeff Young to check into the status of the HIPPI end-point MIB that had been started by Mark Kelley. (Not found - see item 8.2)

7. Jean-Michel Pittet to update his HIPPI-800 ARP document, and provide it to Don Tolmie for posting on the HIPPI web page. (Done)

8. Greg Chesson to contact Bob Snively of Sun about material and format for an IEEE tutorial on HIPPI-6400 ULA usage, and the ULAs special to HIPPI-6400. (Carryover)

9. Doug Johnescu to determine the stack-up of the BGA version of the Berg connector and post the results in an e-mail. (Done)

10. Roger Ronald to have Bill McCoy investigate the possibilities of using 55 ohm traces on the received signal lines. (Done)

11. Greg Chesson and Jeffrey Chung to consider developing "reason codes" to explain why a particular ST Operation was rejected. (In process)

12. Jeffrey Chung to develop state tables for inclusion as an ST annex. (In process, transferred to Jim Pinkerton)

13. Greg Chesson to send e-mail detailing reasons for not doing a queue for client/server applications, and suggesting how they could be done in ST. (Carryover)

14. Jim Pinkerton to do a rewrite of ST Annex C. (Carryover)

15. Bob Willard to write up something on big/little endian issues for inclusion in the document. (Carryover)

16. Greg Chesson to collect text for a "folklore" annex in the document. (In process)

17. Greg Chesson to draft text describing how you differentiate duplicate operations from legal operations. (Carryover)

18. Don Tolmie to extract information from Jim Pinkerton's Aliasing presentations of 1/98 for inclusion in ST clause 9. Jim should review the material for correctness before posting the next revision on the web. (Done)

19. Jerry Leitherer to update his ST over FC document with the changes agreed to at the January meeting, and forward a copy to Don for inclusion in the next ST revision. (Done)

20. Don Tolmie to update ST Rev 1.4 with the changes agreed to at the January meeting. (Done)

21. Michael McGowen to collect and tabulate everyone's requirements for HIPPI-800 and HIPPI-6400 translation environments. (In process)

5. HIPPI-6400-PH (ref: Rev 2.1, December 2, 1997)

5.1 Review SuMAC test results

Greg Chesson said that Hansel Collins was working on what needs to be done to the SuMAC to make the de-skew logic work at the operating frequency. Also, the 20 meter cable (assembled by Berg, using Tensolite cable, without an equalizer), tested successfully. Greg said that the SGI test board is a high-noise high-skew environment, i.e., whatever works in this environment should work anywhere. No tests have been made with a longer cable or an equalizer, neither of which are presently available. The 20 meter cable tests run error-free for long times. The SuMAC functionality has been checked; a few minor errors found but nothing requiring HIPPI-6400-PH specification changes.

5.2 Connector and cable issues

At the January meeting Berg was encouraged to develop a ball-grid array attachment for the connector. Questions were raised at that time about the thickness of the resultant connector. At this meeting Barbara Weber reported that the thickness was less than 0.47" and the group said that this was OK. Ed Cady said that Berg is working with a high-volume application for the same 50 Ω, 100-pin connector. The other application also wants a BGA attachment, hence Berg has high incentive to

complete it. Berg felt that they could get some hand-crafted sample BGA connectors in 4-6 weeks; production quantities in 4-6 months.

Roger Ronald said that E-Systems had had some problems with the current connector's mechanical parts, e.g., backshells and jackscrew alignment. Ed Cady said that the connector was proving to be more difficult to build than they had ever thought. Greg Chesson asked if the connector would be easier to build if we changed the pinout; the answer was "no".

It will be about 6-8 weeks before we can test with a cable that has an equalizer. Roger Ronald said that E-Systems has confidence that Berg will deliver satisfactory cables. Since the SuMAC functionality is proving OK, the biggest unknown is the cable testing.

Barbara Weber asked if we had a specific mounting method that we wanted, and described "harpoon" and "bear-claw" schemes. The committee did not recommend a specific method, but did express a desire for through hole and tapped hole availability. The HIPPI-6400 document currently shows a 4-40 tapped hole, but does not preclude other attachment methods. There were concerns about holding a BGA connector to the board while soldering – allowing freedom of movement while still holding it in place.

Berg was requested to provide a drawing of the BGA connector so that it could be added to the document. Berg also got some Amphenol spectrastrip cable and will try connectorizing it. If the Amphenol cable works OK, then that cable is available in bulk quantities.

At the January meeting it had been suggested that we investigate using all 55 Ω board traces, rather than the 75 Ω Rx and 55 Ω Tx currently in the specification. Bill McCoy was asked to simulate the resultant circuit. Roger Ronald reported that Bill's simulations were not encouraging. 55 Ω on both Rx and Tx worked poorly. 75 Ω on both Rx and Tx was much better, and probably OK. Greg Chesson said that SGI might make another test board and try 75 Ω for both. SGI is waiting for the BGA connector.

5.3 Proposed document changes

Carlin Otto, of SGI, and Don Tolmie exchanged some e-mail concerning bit and byte ordering. The

resolution was to expand the "Naming conventions" notes in Figure 3 on page 5. Specifically, in the second line change "...multiple bytes..." to "...multiple Data bytes...". Add a new line reading "Within each Data byte, the most-significant bit is the highest-numbered bit, i.e., d*nn*.7.". Changed the last line from "...multiple bits..." to "...multiple Control bits...". Don showed a slide with these changes implemented, and they were accepted as written.

No other changes to Rev 2.1 were proposed, or made.

5.4 Plan for forwarding

HIPPI-6400-PH Rev 1.9 passed its T11 Letter Ballot on November 21 with a vote of 68 for, 0 opposed, and 16 not voting. Comments were received with three of the "for" votes. The comments were resolved and approved at the December meeting. At the December meeting we also voted to hold the document to resolve the connector issues and allow more SuMAC testing.

The document is now at Rev 2.1, and still being held to allow more time for SuMAC testing and for coming up with a good solution for the connector and cable problems. At this point in the meeting we agreed that we should test a cable with an equalizer before forwarding the document.

__NOTE__ – Later in the meeting this decision was reversed based on the fact that the testing to date had positive results, and it was extremely unlikely that any future testing would result in any document changes. The connector is currently specified as "Berg xxx" or equivalent, and the cable equalizer is not specified in the document. Hence, HIPPI-6400-PH Rev 2.2 and HIPPI-6400-SC Rev 1.9 were both forwarded by T11.1.

6. HIPPI-6400-SC (ref: Rev 1.9, January 5, 1998)

6.1 Review changes

There were no changes to HIPPI-6400-SC since those made in December and reviewed at the January meeting.

6.2 Plan for forwarding

It was agreed that the document will be kept in step with HIPPI-6400-PH, and forwarded for first public review at the same time. i.e., forward at the June meeting. (Also forwarded at the February 11, 1998, T11.1 Plenary.)

7. Scheduled Transfer (ref: Rev 1.5, February 4, 1998)

Executive summary of ST work at this meeting:

– Most of the document changes were accepted as written, and some more (mostly editorial), changes were made.

– There were NO changes to the ST operations in Tables 4-8. **People felt that we were getting some stability!**

– The summary of aliasing tools will be moved from 9.2 to 10.4.

– For anti-aliasing, the Key and Port fields will be taken together to provide a validity check.

– Some justification will be added for the 10 minute non-reuse time.

– A format for the 32-byte optional payload was reviewed and accepted. It will be documented in normative Annex B.

7.1 Schedule header field changes

The D_id and S_id fields had been moved to the end of the Schedule Header, and the Cksum and B_id fields replaced them. In Tables 4 - 8 the fields were also shuffled accordingly. These changes were reviewed and accepted.

7.2 Changes for anti-aliasing

The anti-aliasing changes made were based on Jim Pinkerton's presentation, and papers, at the January meeting.

7.2.1 Review summary

Don had put some draft text in 9.2 and Table 3, trying to capture the essence of Jim Pinkerton's proposal. The first paragraph in 9.2 (to become 10.4) will be changed to better explain what we are doing and why. Text describing the basis for the 10 minute non-reuse of Keys will also be added. Some changes

were agreed to for Table 3, but it was mostly accepted as is.

7.2.2 -id's expanded from 16 to 32 bits

In 6.2, the -id's were renamed from "Transfer identifiers" to "Sequence identifiers" since Transfers are only associated with Read and Write sequences. This same change was made globally in the individual operation descriptions. In Figure 12, the D_id and S_id fields are now 32 bits in length. All of these changes were accepted as written.

7.2.3 Keys and id's monotonically increase

In an intermediate document, the Keys were specified as monotonically increasing, but this drew flack from Roger Ronald. His contention was that a Key with a known algorithm was an "identifier" and not a Key, and did not provide even a minimal level of security. In Rev 1.5, Don changed the wording to specify that a Key value should not duplicate a Key value active within the last 10 minutes. This allowed the user to use any algorithm to select the Key values, but provided a degree of anti-aliasing. It was agreed that it was really the Key and Port combination that we were protecting, and the parameters should be combined in the anti-aliasing operations. Don's 10-minute (out of the hat), number will be justified with some supporting text, but people agreed that it was about the right value.

Having the -id values monotonically increase was accepted as written.

7.2.4 STU_num does not wrap with a Block

Requiring the 16-bit STU_num to not wrap within a Block prevents STU aliasing. This also helps put an upper limit on the Block size. This was accepted as written.

7.2.5 Possibility of B_num wrapping

There is the possibility (albeit slim), of wrapping the 32-bit B_num parameter. Don had put a limit of 2^{16} outstanding CTS's in the interim document, and ran into some flack from Jim Pinkerton. Jim's point was that even with this restriction it was possible to alias B_num, and suggested that we just point out the problem and leave it to the implementer to solve. Don changed the text accordingly. At the meeting we further refined the text to specify that "An

implementation should avoid aliasing". Otherwise, the text was accepted as written.

7.2.6 R-id added to Get and FetchOp sequences

At Jim Pinkerton's suggestion, Don added the R-id parameter in the S_id field of the Get and FetchOp sequences. This provides an additional anti-aliasing check. The text was reviewed and accepted as written.

7.3 Opaque data

7.3.1 Opaque shortened from 6 bytes to 4 bytes

When we moved the fields around to accommodate the 32-bit id's the Opaque data shrank from 6 bytes to 4 bytes. Don asked if this small amount was still useful, or if we should just remove it entirely. It is sort of a wart in that it carries information that is not concerned with this protocol layer. The committee's response was to keep the Opaque data parameter.

7.3.2 Opaque removed from Read, Get, and FetchOp sequences

At Greg Chesson's suggestion, Don removed the Opaque data from the Read, Get, and FetchOp sequences. The rationale was that when data is being sent to the Initiator, there is no reason to carry any Opaque data. I.e., Opaque data should only be generated at the Initiator and sent to the Responder, not the other way around. Hence, Opaque data is now only in the Write and Put sequences. This makes the Data operation different depending upon the sequence it is a part of, but that was not deemed to be a large problem. This was reviewed, and accepted as written.

7.4 Max_Block size moved to Transfer setup

The Max_Block negotiation had originally been done during the Virtual Connection setup. Don moved the negotiation to the Transfer setup while trying to solve the problem posed by Jim Pinkerton at the January meeting (i.e., the data Destination setting up a larger Block (with a CTS), than the data Source can fill as a single Block). Don said that it was necessary to have it in the Transfer setup since the Max_Block size depended upon the Max_STU size passed during Virtual Connection setup. If we used Max_Block in the Virtual Connection setup (as originally done), then the parameter would have to passed twice.

In Figure 5, moving the Max_Block parameter from the Virtual Connection Descriptors to the Transfer Descriptor was accepted.

The text in 6.2.5 and 6.2.6 was reviewed and some editorial changes made to improve clarity.

7.5 ST over Fibre Channel

Don based the text and figure in A.5 on Jerry Leitherer's revised proposal, and some back and forth e-mail with Jerry. A.5 and figure A.7 were reviewed and essentially accepted as written. In the third paragraph, changed "...Blocksize should be the same..." to "...Blocksize shall be the same...". In the bullet describing the Class 1 operation, added a sentence reading "It may be desirable to use small STUs to avoid having a large STU delay a Control operation.".

7.6 Review other changes

A page-by-page review was made. The changes that had not been previously discussed are reported here. Unless otherwise noted, the changes with margin bars and highlights in Rev 1.5 were accepted as written.

The new definition for "segment" was augmented by adding "A segment consists of one or more STUs." .

The new acronyms for VC will be changed to "HIPPI-6400 Virtual Channel". A new acronym for VC meaning an ATM Virtual Circuit will be added. The possibility of using "VC" instead of spelling out "Virtual Connection" throughout the document was discussed; it was agreed to leave it as is, i.e., not to change to the abbreviation.

Several places were found where the maximum STU was noted as 2^{31} bytes, e.g., in figure 4 and the paragraph immediately preceding figure 4. These will be changed to 2^{32} bytes. A global search will be done for "31".

The sentence in 5.2.2 for "Keys" stating that they should not be duplicated within 10 minutes had considerable discussion. Greg Chesson agreed to draft some new text off-line. In the last paragraph of 5.2.2 the words "...except for Disconnect sequences" will be added.

In 6.2.4, 3rd paragraph, the last sentence about "A user sending more than 2^{32} Blocks in a Transfer..." was changed to "An implementation should avoid aliasing.".

In 6.2.5 on Max_Block, the sentence about how you determine the maximum size was rewritten by Roger Ronald to be more readable.

In 6.2.6, the first sentence was changed from "...in a Clear_To_Send operation when..." to "...in the first Clear_To_Send operation of...".

In 6.3, second paragraph deleted "...the issuer could have used multiple STUs, but the STUs cannot be larger than Max_STU. In this example, the STU boundaries (except the first and the last) all line up with the Block and buffer boundaries. However, ..." as being extraneous.

In 8.3.1, first bullet, changed "...shall be used as the pad in the last 16-bit integer." to "...shall be appended as the last byte of the data stream for the checksum calculation.".

In 8.3.3, first sentence, changed "...calculate checksums the same as specified in..." to "...calculate checksums as specified in...". Changed "A received Cksum = x'0000' shall be ignored." to "An end device receiving Cksum = x'0000' shall continue checksum accumulation but not do the check.".

As mentioned earlier, clause 9.2 was moved to 10.4. The title of 9 was then changed from "Operations summary" to "Operations sequence tables" and the title for 9.1 was deleted. In the text to be moved, 9.2, second paragraph, changed the example to "I-id" instead of "Virtual Connections" and "Keys". In table 3 (which will also be moved to clause 10), bullets 1 and 2 of the "Connection operations" will be changed to "The 32-bit Key and 16-bit Port numbers, taken together, provide a validity check.". In bullet 2 of "Block operations" changed "The user should consider B_num..." to "An implementation should avoid B_num...".

The title of 10.3 will be changed from "Duplicate operations" to "Duplicated operations". There is still no text for this clause.

In 10.4, the action for checksum errors was changed from "...shall be discarded..." to "...should be discarded...".

In 10.6.4, the maximum Bufsize was changed from 2^{63} to 2^{32} several places in the text. A global search will be done for "63".

In figures A.1 and A.2, the ST payload will be changed from 2^{31} bytes to 2^{32} bytes. In A.3, deleted the sentence that had been added, i.e., "It may be desirable to use small STUs to avoid having a large STU delay a Control operation.". In A.4, changed "...ATM Virtual Connections..." to "...ATM Virtual Circuits...".

In A.4.2, coding the eight bytes of fill as octal representations for "A", "T", "M", "s", "u", "c", "k", "s" (as requested at the January meeting but not included in the document), was replaced with a fill of all zeros (to be more politically correct).

In A.5, third paragraph, changed "...Blocksize shall be the same..." to "...Blocksize should be the same...". Added to the first bullet "It may be desirable to use small STUs to avoid having a large STU delay a Control operation.".

7.7 Duplicate operations actions

Greg Chesson has an action item to generate something for 10.3, and Don said at the January meeting that he would also try to generate something. Don ran out of time, and Greg didn't get to it either.

7.8 Connection Management and Write sequence state tables

Jim Pinkerton presented draft state tables for "Connection management", "Initiator Write sequence", and "Responder Write sequence". Jim was looking for feedback on the nomenclature and presentation method. The tables are very complex and take quite a while to digest. He took the group through the "normal" path for a connection setup, and then we explored some of the error cases. Jim was encouraged to develop similar state tables for the other portions of the protocol. The resultant state tables will need to be reviewed in detail by the group.

It was agreed that the state tables would be in an informative annex. They are very useful for an implementer, but overly detailed for the casual reader. Adding the sequence examples, e.g., figures 6 through 10, and labeling the transition end points with the corresponding state was suggested as a way to point readers to the "normal" path.

7.9 Optional payload format

The Control operations have an optional 32-byte payload, but no specified format. Jim Pinkerton proposed a format based on an adaptation of the existing TCP options specifications. The proposal used a 1-byte opcode, and optional 1-byte option-length and n-byte option-data. Jim proposed two opcodes: End_of_Option_List = x'00', and No-Operation = x'01'. Jim listed 20 other opcodes used by IP, but did not feel that any of them warranted inclusion in ST now. Jim considered using a compressed coding, e.g., 5-bit opcode and 3-bit option-length, but felt that it was too restrictive.

Allowing vendors or users to define new opcodes was discussed. It was agreed that opcode Experimental = b'1xxxxxxx' would be added, and all other opcode values would be reserved by the committee. A vendor could experiment with an opcode using one of the Experimental values, and propose it for standardization if they felt it was generally applicable. If the committee agreed, then an opcode value in the reserved area could be assigned by the committee, and documented in an addendum to the standard.

7.10 Annex C draft

The previous annex C had been removed as being horribly out of date. Jim Pinkerton previously took an action item to draft a new annex C based on some of his work, but did not have anything for this meeting. Don Tolmie said that he was working an some text and figures to help explain the Max_STU and Max_Block usage.

8. Other HIPPI items

8.1 ARP over HIPPI-800

Jean-Michel Pittet presented a proposal with an expiration date of 2 April 1998. Jean-Michel is trying to make the pre-draft RFC easily converted to HIPPI-6400 (mainly by deletions). Rather than worry about the front text now, Jean-Michel walked the group through some of the examples in clause 10. Some of the operations were felt to be redundant. Editorial comments were made to help clarify the text. It was agreed that "multicast"

should be changed to "broadcast" throughout the document. With the magnitude of work remaining it seemed unlikely that this document would be ready to submit to the IETF at their spring meeting.

8.2 HIPPI end-point MIB

Jeff Young looked through Mark Kelley's left-overs and was not able to find the MIB that Mark had worked on. Don Tolmie thought that he might have a hard copy. Don took an action item to forward whatever he could find to Jeff.

8.3 HIPPI switch MIB

Marck Doppke of Essential Communications has a draft document out for comment. Marck was not at this meeting and nothing new was reported.

8.4 HIPPI-6400 MIB

Von Welch of NCSA has a draft document, based on HIPPI-6400-PH Rev 1.4, out for comment. Von was not at this meeting and nothing new was reported.

8.5 HIPPI-6400 ARP and IP RFC

Jean-Michel said that he is also working on this document, and it would essentially be a cut-and-paste of the ARP over HIPPI-800 document. He is concentrating on the -800 document since it is the harder one; the -6400 version should be a subset. He hopes to be able to take both documents to the IETF meeting later in the year.

8.6 IEEE Tutorial for HIPPI-6400 ULA usage

Greg Chesson is drafting an IEEE Tutorial for HIPPI-6400 ULA use. Nothing new was reported at this meeting.

9. Future meeting schedule

9.1 Interim meeting, March 10-12, Minneapolis, MN

The next interim working meeting will be hosted by Jeff Young and Cray Research in Minneapolis/St. Paul, MN. The meeting will be held at the Cray facility, and Jeff has set up a block of rooms at the Hampton Inn. See the HIPPI Standards Activities web page at www.cic-5.lanl.gov/~det/ for further details and travel directions.

We had originally planned for a 3-day meeting, but with the current work load have cancelled the third day. The meetings now are:

Tuesday - March 10 : 2 PM - 9 PM
Wednesday - March 11 : 8 AM - 9 PM

9.2 Plenary week, April 21-22, Palm Springs, CA

The April working meeting will be April 21-22, 1998. The location is the Hyatt Regency Suites Palm Springs, 285 North Palm Canyon Drive, Palm Springs, CA 92262, phone 760-322-9000 or 800-233-1234. Jeff Stai and Brocade Communications Systems are the host. The group name for reservations is "Brocade", and the group room rate is $122 per night including tax and parking. The reservation cutoff date is March 20, 1998. (See the meeting announcement on the web page at http://www.cic-5.lanl.gov/~det/ for further details.)

Tuesday - April 21 :
    9 AM – 6 PM : HIPPI working meeting
    6 PM – 9 PM : HIPPI-6400 Optical

Wednesday - April 22 :
    9 AM – 6 PM : HIPPI working meeting
    6 PM – 8 PM : T11.1 Plenary

9.3 Future meeting dates and locations

The T11.1 (i.e., HIPPI), Plenary meeting will be on Wednesday evening of the T11 Plenary week, following the HIPPI working meetings.

The 1998 schedule is firm. Note that T11 schedules the plenary meetings. Hopefully HIPPI-6400 will be far enough along that we will not continue to need interim working meetings after May; the May date was firmed up since we now see the need. Recent additions and changes are underlined and bold.

1998 –

Date	Type	Location	Host
Apr 21-22	Plenary	Palm Springs, CA	Brocade
May 12-13	Interim	Mt. View, CA	SGI
Jun 9-10	Plenary	St. Petersburg Beach, FL	AMP
Aug 11-12	Plenary	Portsmouth, UK	Xyratex
Oct 6-7	Plenary	Ft. Lauderdale, FL	Adaptec
Dec 14-18	Plenary	Tucson	FSI

All of the 1999 schedule is new, and just includes the Plenary weeks; no interim working meetings are scheduled yet. Meeting locations and hosts marked with (?) are tentative at this time. The meetings in **bold underline** without a (?) have been firmed up. Note that the HIPPI and T11.1 meeting days are not specified; they will be somewhere within the Plenary week.

1999 –

Feb 8-12	Plenary	San Diego, CA	Qlogic
Apr 5-9	Plenary	Palm Springs, CA	Brocade
Jun 7-11	Plenary	Minneapolis, MN (?)	Ancor
Aug 2-6	Plenary	**Minneapolis, MN**	ENDL
Oct 4-8	Plenary	Ft. Lauderdale, FL	Adaptec
Dec 6-10	Plenary	Reno, NV (?)	Solution

2000 Proposed dates –

Feb 7-11	Plenary	San Diego, CA (?)	QLogic
Apr 3-7	Plenary	Palm Springs, CA (?)	Brocade
Jun 5-9	Plenary	(?)	(?)
Aug 7-11	Plenary	(?)	(?)
Oct 2-6	Plenary	San Diego, CA (?)	QLogic
Dec 6-10	Plenary	(?)	(?)

12. Review action items

(The action items are grouped by project or category to hopefully make them easier to find.)

1. Everyone to review the HIPPI-800 Switch MIB and pass comments to Marck Doppke.

2. Von Welch to contact HIPPI-6400 MIB users and developers for comments on the current draft, and to prepare a presentation on the MIB for a future meeting.

3. Von Welch to look at developing a HIPPI-6400 host system MIB (for a NIC), to be done now as an annex of the present MIB with the possibility of splitting it out as a separate document at a later date.

4. Everyone to review the HIPPI-6400 MIB.

5. Kevin Lahey, Jeff Young, Jean-Michel Pittet, and Greg Chesson to begin an IP and ARP over HIPPI-6400 RFC.

6. Don Tolmie to forward whatever he can find of Mark Kelley's HIPPI end-point MIB to Jeff Young.

7. Jean-Michel Pittet to update his HIPPI-800 ARP document, and provide it to Don Tolmie for posting on the HIPPI web page.

8. Greg Chesson to contact Bob Snively of Sun about material and format for an IEEE tutorial on HIPPI-6400 ULA usage, and the ULAs special to HIPPI-6400.

9. Greg Chesson and Jeffrey Chung to consider developing "reason codes" to explain why a particular ST Operation was rejected.

10. Jim Pinkerton to develop state tables for inclusion as an ST annex.

11. Greg Chesson to send e-mail detailing reasons for not doing a queue for client/server applications, and suggesting how they could be done in ST.

12. Jim Pinkerton to do a rewrite of ST original Annex C (now annex D).

13. Bob Willard to write up something on big/little endian issues for inclusion in the document.

14. Greg Chesson to collect text for a "folklore" annex in the document.

15. Greg Chesson to draft text describing how you differentiate duplicate operations from legal operations.

16. Don Tolmie to update ST Rev 1.4 with the changes agreed to at the January meeting.

17. Michael McGowen to collect and tabulate everyone's requirements for HIPPI-800 and HIPPI-6400 translation environments.

18. Don Tolmie to correct the January 13-14 minutes and replace the copy on the web page.

13. Adjournment

The meeting adjourned at 6:00 PM on February 11, and was immediately followed by the HIPPI-6400 Optical working meeting. The participants didn't even get any supper break – this is a dedicated bunch!

Attendance

Ed Cady	Berg	503-359-4556	edcady@aol.com
Austin Washington	Berg Electronics	510-683-0700	washimal@bergelect.com
Barbara Weber	Berg Electronics	510-683-0700 x304	weberbl@bergelect.com
Wally Larson	C&M Corporation	408-268-7548	wblarson@aol.com
Jeff Young	Cray Research Inc.	612-683-5536	jsy@cray.com
Gordon Boyd	Digital Equipment Corp.	603-884-1309	boyd@solvit.enet.dec.com
Bob Willard	Digital Equipment Corp.	978-493-5482	bob.willard@digital.com
Greg Huff	Hewlett-Packard	972-497-4530	huff@convex.hp.com
Don Tolmie	Los Alamos National Lab	505-667-5502	det@lanl.gov
Steve Miller	Montrose / CDT	302-369-5503	teetdining@aol.com
James Parker	Pulse Components	215-781-6400 #230	jamesparker@pulseeng.com
Robert Clarkson	Raytheon E-Systems	972-205-6475	robertc@esy.com
Roger Ronald	Raytheon E-Systems	972-205-8043	rronald@esy.com
Greg Chesson	Silicon Graphics	650-933-3496	greg@sgi.com
James Pinkerton	Silicon Graphics	650-933-4943	jimp@sgi.com
Jean-Michel Pittet	Silicon Graphics	650-933-6149	jmp@sgi.com