

P1394B Working Group Meeting - Plenary
August 19, 1998
Portland, Oregon

1. Get Someone to Take Minutes (Steve Bard (Intel) volunteered)
2. Review Agenda
3. Review of Minutes of June & July
4. Procedures
 - 4.1. Voting
 - 4.2. Price/Pricing
 - 4.3. Call For Patents
 - 4.4. Specification Draft Access (passwords & stuff)
5. Q&A with Thomas Burke of UL
6. Abbreviated Task Group Reports
 - 6.1. Simulation
 - 6.2. Power Mongers
 - 6.3. Accelerated Port Protocol
 - 6.4. Upstarts
 - 6.5. GOF
 - 6.6. PHY/Link
7. Other Items
 - 7.1 S3200 in Specification
8. Meeting Schedule
 - 8.1. September 10 & 11, Chicago, IL
 - 8.2. October 12 & 13, Maui, HI
 - 8.3. December 7 & 8, Monterey, CA
 - 8.4. January -- No decision yet (not Hawaii)
 - 8.5. IEEE P1394b Draft Specification Completion Schedule
9. Review of Action Items
10. Adjournment

Minutes of last minute must have minutes taken for Upstarts and UTP5 corrected (reverse heading (title) to those minutes).

John Fuller moved to accept minutes (as corrected), Steve Bard seconded. Minutes approved without objection..

No corrections to June minutes. John Fuller moved to accept June minutes, Steve Bard seconded. Minutes approved without objection.

Voting, price/pricing, Call for Patents, etc. Yadda, yadda, yadda...

With regard to accessing draft specifications without password... We are not going to do passwords (until they tell us we have to use passwords) at which time we will use

passwords to access the draft, but, then there will be no draft. There will be a document which will be a "proposal" but not necessarily an IEEE draft specification.

Floor was given to Tom Burke - a representative of Under Writers Laboratories. Tom hosted a question/answer session on certification issues with 1394 interconnect.

Tom stated UL's concern regarding a lack of a "compliance" agency which would assure the 1394 ports which are power providers do, indeed, meet current limit specifications. Without such, UL is not in a position to make assumptions about a 1394 LPS when a 1394 peripheral OEM presents a device to them for certification and that the certification must make certain assumptions about the current limit properties of the 1394 LPS.

Another issue surrounds the 1394 cable. Cables of significant length are power limited Class Two (CL2) if either a class two circuit or a UL1950 LPS is used. If the cable is of a shorter length (close proximity - 10 feet or less) then the cable will be evaluated with the equipment, if longer, it must be a "listed" cable (included in the National Electrical Code as a "certified" cable) in order for UL to examine the cable with the equipment. If the cable is not "listed" there will, most likely, be a problem at some point with a regulatory agency. Regulatory agencies are the authorized overseer groups which insure compliance (folks like fire marshals, electrical inspectors, etc.).

PC systems incur cost to include current limiting on a 1394 power provider port so peripheral manufacturers may take advantage of that fact, however, UL states that unless the peripheral and PC are shipped together, they cannot (meaning the peripheral cannot take advantage of the current limit in the PC because UL will not buy into the assumptions the peripheral OEM wants UL to assume - namely: all 1394 LPS have necessary and appropriate current limit implementation appropriate for that peripheral.

Tom will provide Steve Bard with extractions from a document sent out to members of the safety community which request feedback regarding limited power source issues. Steve will include those extractions in these minutes and forward them to David Wooten for distribution to the USB community. The purpose of distributing these extractions is to solicit feedback regarding the impact 1394 has (or does not have) in the subject area. A call to action for all those interested is to take this information to the "safety" folk resident within their own companies and take the feedback to the appropriate safety committees they work with.

Here are the "extractions" Tom provided and the email to which he attached the comments:

From: THOMAS BURKE [<mailto:burket@ul.com>]
Sent: Thursday, August 20, 1998 9:47 AM
To: steve_bard@mail.intel.com
Cc: Kevin Ravo
Subject: IEEE P1394b

August 20, 1998

To:
Steve Bard
Intel Corp.

From:
T. Burke
UL, Santa Clara

Reference:
IEEE P1394b Working Group Meeting on August 19, 1998

Subject:
Implementation of New Electronic Busses under UL 1950

Hello Steve:

Thank you for the invitation to speak to the subject Working Group on Wednesday, August 19th. I believe the interaction was valuable.

As agreed, I am providing you with extracted portions of the June 10, 1998 UL 1950 IAC Meeting Report which address some of the implementation issues being presented to UL by IEEE1394 and USB. Your Working Group's input would be valuable. Also, I would encourage both your Working Group and any parallel USB Working Groups to try to provide input to the U.S. and Canadian industry groups which participate directly in the Bi-National Working Group (BNWG), the working group responsible for UL1950/CSA950. These industry groups are the Information Technology Industry Council (ITI), Information Technology Association of Canada (ITAC), Telecommunications Industry Association (TIA), and Electro-Federation of Canada (EFC).

In summary, some of the implementation issues facing UL are:

- * pressure by 3rd party USB/1394 peripheral manufacturers to allow the use of low flame grade HB materials, which don't meet the UL 1950 Fire Enclosure requirements (i.e., Grade V-1), based on the rationale that ALL USB/1394 constructions inherently meet the UL 1950 definition of a Limited Power Source (LPS).
- * concern whether ALL ports self-certified by manufacturers that they meet the USB/1394 specifications actually do meet the specifications.

- * reliability/safety of new IC-based "electronic switches" designed and used to meet the power limitation requirements in the USB/1394 specifications (and UL 1950 LPS).
- * compatibility of USB/1394 interconnect cables with UL 1950, for short lengths, and the National Electrical Code (NEC), ANSI/NFPA 70, for longer lengths.
- * level of change likely to occur to the USB/1394 specifications, which could result in UL1950-compliant constructions today not being UL1950-compliant in the future.

For reference, I have also attached an extract of sub-clause 2.11 and Tables 8/9 of UL1950.

Any input on the subject may be provided to me directly:

Thomas Burke
Senior Staff Engineer
Engineering Services 313H
(P) 408-985-2400 x32286
(F) 408-556-6055
burket@ul.com

Thank you for your efforts, and the efforts of your Working Group.

file: 1394.doc

Subjects 1950 (1459)
(In reply, refer to Subject 1950)

1655 Scott Blvd.
Santa Clara, CA 95050
June 10, 1998

TO: Industry Advisory Conference of UL for Information Technology and Telecommunications Equipment,
Electrical Council of Underwriters Laboratories Inc.,
Subscribers to UL's Standards Services for Information Technology Equipment
Telephone Equipment

SUBJECT: Report of the Meeting of the Industry Advisory Conference of UL for Information Technology and Telecommunications Equipment; Request for Comments on Proposed Requirements for the Third Edition of the Standard for Information Technology Equipment, CSA C22.2 No. 950-95/UL 1950; PROPOSED EFFECTIVE DATE

SUMMARY OF TOPICS

The following topics were discussed at the meeting:

1. Industry Advisory Conference Restructuring
2. Business Sector Coordinators
3. Bi-National Working Group (BNWG)
4. Industry Review
5. CB-Style UL Report
6. Standardized Procedure Appendix Pages
7. Multi-Media Equipment
8. HAR Flexible Cord
9. Lamps (Risk of Injury to Persons Due to Explosion)
10. New Electronic Busses
11. Identification of Circuits Which are Not a Limited Power Source
12. Outdoor Use Equipment
13. Overvoltage Flowchart (Figure 18b)
14. Uninterruptible Power Supplies (UPS) Integral to ITE
15. X-Radiation Testing
16. Leaking Electricity

Continued

SUMMARY OF TOPICS (Cont'd)

17. Standard for Software in Programmable Components
18. UL 1950 Practical Application Guidelines Online System (PAGOS)
19. Virtual Reality (VR) Equipment
20. Recognized Component Sub-Assembly Program and FUS-ITE Initiative Update
21. National Electrical Code (NEC) Update

COMMENTS DUE: JULY 22, 1998

A meeting of the Industry Advisory Conference of UL for Information Technology and Telecommunications Equipment was held on April 23 and 24, 1998 at the Sunnyvale Hilton Inn. The purpose of the meeting was to discuss topics related to the Bi-National Standard, CSA C22.2 No. 950-95/UL 1950, Third Edition.

Appendixes A – E and G relate to various items as noted in the report. Attached as Appendix F are proposed requirements for UL 1950. Attached as Appendix H is a list of those who attended the meeting. Questions regarding interpretation of requirements should be directed to the responsible UL Staff. Please see Appendix I of this bulletin regarding designated responsibility for the subject product categories.

Please note that proposed requirements are of a tentative and early nature and are for review and comment only. Current requirements are to be used to judge a product until these requirements are published in final form.

PROPOSED EFFECTIVE DATE

These proposed requirements associated with agenda topic number 15 (X-radiation testing) will not necessitate a review or additional testing of currently Listed, Recognized, or Classified products. Therefore, UL proposes that the new requirements become effective upon publication.

* * * * *

The following report is not intended to be a verbatim transcript of the discussions at the meeting, but is intended to record the significant features of those discussions.

10. NEW ELECTRONIC BUSES**DISCUSSION**

Within the last few years two major electronic buses have been introduced as industry standards. The Universal Serial Buss (USB), which was developed by Compaq, Digital Equipment Corporation, IBM PC Company, Intel, Microsoft, NEC and Northern Telecom, addresses traditional PC connections and is used with maximum data rates of 12 Mbps. The IEEE 1394 (Firewire) bus, which was originally developed by Apple Computer, has data rates of 100 to 400 Mbps, and is targeted for high bandwidth consumer electronic devices, such as digital video disc (DVD) players, digital camcorders and similar multi-media equipment. These buses, and their derivatives (such as Device Bay), differ from most traditional electronic buses in that they are designed to have the ability to deliver small amounts of power over the bus to power peripheral devices.

ITE manufacturers, including third party manufacturers of accessories intended to be powered by these busses are requesting that certain assumptions be made about the power limitation and reliability of these busses.

UL solicited industry opinions on these busses and their impact on ITE evaluated to the Bi-National Standard. Ultimately, the application of Bi-National requirements associated with accessory fire enclosures and interconnecting cables may depend on the view taken towards these busses. (See related Item 11.)

At the meeting, an overview of the two major electronic busses [universal serial bus (USB) and IEEE 1394 "Firewire"] and the characteristics of the power transfer capabilities of these busses was provided by Mr. Steve Bard, Senior Staff Engineer, of Intel Corporation, who has been a contributor to the 1394 Trade Association Power Specification, Part 1: Cable Power Distribution. A copy of Mr. Bard's presentation may be reviewed at <http://www.1394-PCWG.ORG/docndx.htm>, under file "usb1394a.pdf". Other general information on these busses may be located at the 1394 Trade Association's website (<http://www.firewire.org>) and the USB Implementor's Forum (<http://www.usb.org>).

At the meeting there were no definitive conclusions reached on the impact of these busses on ITE and accessories evaluated to the Bi-National Standard, partly because the requirements contained in the standards for these busses are still being refined and the physical implementation of these busses by manufacturers is not standardized. UL intends to study the matter further and will introduce the topic to the Bi-National Working Group (BNWG) for further analysis. In the meantime, industry input is welcomed on this topic.

Mr. Bard has offered his assistance with any general inquiries on the power transfer capabilities of these busses. His contact information is provided below:

Steve Bard, Senior Staff Engineer
Intel Corporation
Phone (Work): 503-264-2923
E-Mail: steve.bard@intel.com

11. IDENTIFICATION OF CIRCUITS WHICH ARE NOT A LIMITED POWER SOURCE

DISCUSSION

In the 1996 Edition of the National Electrical Code (NEC), ANSI/NFPA 70, Section 725-41 was revised to equate a UL 1950 Limited Power Source (LPS) to an NEC Class 2 circuit for purposes of allowing the use of Class 2 wiring methods described in Article 725.

Subsequently, based on the work of the Ad Hoc Group of UL for DP Cables Used with Information Technology Equipment, Marking Annex NAA (1.5.5) was revised to state: "The output connectors for other than Limited Power and TNV circuits shall be marked or otherwise described in installation instructions to identify the type of circuit, the intended cable type or the circuit voltage rating." Likewise, the NWGQ Guide Information in the Electrical Appliance and Utilization Equipment (Orange) Directory was revised to state "Unless marked or otherwise identified in the installation instructions with the intended circuit type, cable type or circuit voltage, non-telecommunication-type output connectors are supplied by a Limited Power Source defined in UL 1950." This approach of identifying "non-" LPS rather than LPS circuits was adopted due to the much higher ratio of LPS to non-LPS interconnecting circuits in ITE.

Based on feedback from ITE manufacturers, it has been suggested that there is a growing need for standardization of the identification of output circuits which are non-LPS. Third party manufacturers of accessories, such as keyboards, scanners and similar devices are requesting that these accessories be certified as Listed Accessories and that they be permitted to use HB enclosures to reduce per product costs. However, since such accessories may be connected to a variety of ITE manufactured by a variety of manufacturers, there remains concern that they may be connected to circuits capable of a risk of fire. In fact, since UL 1950 sub-clause 4.4.5, requires, as a general rule, the provision of a fire enclosure for all components unless "supplied by a limited power source," accessories with an HB enclosure may be connected only to ITE with LPS outputs (unless the accessory can be individually tested with a specific power source). Since, for Listed Accessories, selection of a host device with an LPS output is a User decision based on User Installation (Safety) Instructions, HB enclosures generally have not been permitted for such Listed Accessories since there is no standardized method of identifying non-LPS output circuits.

UL solicited industry input on the possible need to standardize marking/identification of non-LPS output circuits and discussed possible options to help resolve the issue. Besides the aforementioned standardized marking, another potential solution is to "require" that all ITE output circuits based on standardized low power protocols, such as USB or Firewire, must demonstrate compliance with the Limited Power Source criteria of sub-clause 2.11, which is not an explicit requirement today (i.e., a marking on the base ITE may replace demonstrated LPS compliance). At the meeting there was no strong or clear industry attitudes on the subject, so the subject will require further study and discussion by the BNWG. In the meantime, UL solicits additional input from industry on the subject.

REQUEST FOR COMMENTS ON PROPOSALS

Please provide the following:

1. Your comments concerning the meeting report and the proposed requirements; and
2. Your comments concerning the proposed effective date, should the proposals be adopted.

Written comments should be sent to the attention of Barbara Dorfman at UL's Santa Clara office, 1655 Scott Blvd., Santa Clara, CA 95050. Comments may be sent by mail or faxed to 408-556-6045. Please reference all correspondence to Subject 1950.

All comments should be sent by July 22, 1998.

Unless specifically requested to do so, UL will not acknowledge comments indicating concurrence with these proposals.

UNDERWRITERS LABORATORIES INC.

REVIEWED BY:

BARBARA DORFMAN (Ext. 32864)
Project Engineer
Standards Department

THOMAS M. BURKE (Ext. 32286)
Senior Staff Engineer
Engineering Services 313B

KEVIN L. RAVO (Ext. 32311)
ITE Business Sector Coordinator
(IAC Chair)

A P P E N D I X H**ATTENDANCE AT THE APRIL 23 AND 24, 1998
MEETING OF THE IAC FOR
INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS EQUIPMENT****Industry Representatives**

Charles M. Bayhi	Electronic Solutions
James L. Bender	Texas Instruments
H. Glen Bolster	Lucent Technologies
Dwayne Campbell	Radio Shack
Daniel Finn	IBM
*Robert Hamilton	Mitel Corporation
Glenn Impal	Canon U.S.A. Inc.
Robert Johnson	Motorola ISG
Victor S. Lee	Matsushita Electric Corporation of
America	
*Steve Ortmann	Compaq Computer Corporation
Rich Pescatore	Hewlett-Packard Company
Douglas L. Probstfeld	Intel Corporation
Manning I. Rose	NCR Corporation
Shoji Takemure	Toshiba Corporation
Peter L. Tarver	Nortel
Tailey Tung	Siemens/Rolm
Joseph Vollmer	Mitsubishi Consumer Electronics
America Inc.	
David A. Zolotar	Storage Technology Corporation

Invited Guests

Steve Bard	Intel Corporation
Jim Brunssen	Bellcore
Bill Bryans	IBM Canada Ltd.
Rick Cooper	Met Labs
Raj Cornelius	Raychem
Josh Dereini	InFocus Systems, Inc.
Bob Griffin	Compaq
David Mascarenhas	CSA
*Alan Mears	Nortel Technology
Yoji Ono	JQA
Jim Saunders	CSA
Chuck Tenorio	Lucent Technologies
*Tiki Wong	Canadian Standards Association

*Not in attendance

UL Staff

Doug Anderson, UL Santa Clara
Lal Bahra, UL Northbrook
Al Brazauski, UL Santa Clara
Tom Burke, UL Santa Clara
Alice Chien, UL Taiwan
Larry Copley, UL Camas
Manoj Desai, UL Research Triangle Park
Barbara Dorfman, UL Santa Clara
Lee Dosedlo, UL Northbrook
Josh Ebert, UL Northbrook
Rich Fardellone, UL Melville
Park

Janet Flynt, UL Research Triangle Park
Keith Gilbert, UL Santa Clara
John Herschbach, UL Santa Clara
Luis Martinez, UL Santa Clara
Mark Penton, ULI-United Kingdom
Kevin Ravo, UL Santa Clara (Chair)
Brad Rowe, UL Northbrook
Eric Ruzicka, UL Santa Clara
Joe Stroder, UL Northbrook
Ramon Torres, UL Europe
Mark Walker, UL Research Triangle

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2.11 *Limited power sources*

A mains-operated limited power source, or a battery-operated limited power source that is recharged from the mains while supplying the load, shall incorporate an isolating transformer.

A limited power source shall comply with one of the following:

- the output is inherently limited in compliance with table 8;
- an impedance limits the output in compliance with table 8. If a Positive Temperature Coefficient device is used, it shall pass the tests specified in IEC 730-1, clauses 15 and 17, and IEC 730-1, amendment 3, clauses J15 and J17;
- an overcurrent protective device is used and the output is limited in compliance with table 9;
- a regulating network limits the output in compliance with table 8, both under normal operating conditions and after any single fault in the regulating network (open circuit or short-circuit);
- a regulating network limits the output in compliance with table 8 under normal operating conditions, and an overcurrent protective device limits the output in compliance with table 9 after any single fault in the regulating network (open-circuit or short-circuit).

Where an overcurrent protective device is used, it shall be a fuse or a non-adjustable non-autoreset electromechanical device.

NOTE 1 - Deleted

Compliance is checked by inspection and measurement and, where appropriate, by examination of the manufacturer's data for batteries. Batteries are to be fully charged when conducting the measurements for U_{oc} and I_{sc} according to the conditions of tables 8 and 9.

Table 8
Limits for inherently limited power sources

Output voltage ¹⁾ (U _{OC})		Output current ²⁾ (I _{SC}) A	VA ³⁾ (VxA)
V a.c.	V d.c.		
≤ 20	≤ 20	≤ 8.0	≤ 5 x U _{OC}
20 < U _{OC} ≤ 30	20 < U _{OC} ≤ 30	≤ 8.0	≤ 100
-	30 < U _{OC} ≤ 60	≤ 150/U _{OC}	≤ 100

Conditions applicable to table 8

- 1) U_{OC}: Output voltage measured in accordance with 1.4.5 with all load circuits disconnected. Voltages are for sinusoidal a.c. and ripple-free d.c. For non-sinusoidal a.c. and for d.c. with ripple greater than 10% peak, the peak voltage shall not exceed 42.4 V.
- 2) I_{SC}: Maximum output current after 60 s of operation with any non-capacitive load, including short circuit.
- 3) VA: Maximum output VA after 60 s of operation with any non-capacitive load including short circuit. Initial transients lasting less than 100 ms are ignored.

Table 8 revised March 1, 1998

NOTE 2- Deleted

Table 9
Limits for power sources not inherently limited
(overcurrent protective device required)

Output voltage ¹⁾ (U _{OC})		Output current ²⁾ (I _{SC}) A	VA ³⁾ (VxA)	Rated current value of overcurrent protective device ⁴⁾ A
V a.c.	V d.c.			
≤ 20	≤ 20	≤ 1000/U _{OC}	≤ 250	≤ 5.0
20 < U _{OC} ≤ 30	20 < U _{OC} ≤ 30			≤ 100/U _{OC}
-	30 < U _{OC} ≤ 60			≤ 100/U _{OC}

Conditions applicable to table 9

- 1) U_{OC}: Output voltage measured in accordance with 1.4.5 with all load circuits disconnected. Voltages are for sinusoidal a.c. and ripple-free d.c. For non-sinusoidal a.c., and for d.c. with ripple greater than 10% peak, the peak voltage shall not exceed 42.4 V.
- 2) I_{SC}: Maximum output current after 60 s of operation with any non-capacitive load, including short circuit, and with any overcurrent protective devices bypassed.
- 3) VA: Maximum output VA after 60 s of operation with any non-capacitive load including short circuit and with overcurrent protective devices bypassed. Initial transients lasting less than 100 ms are ignored.
- 4) The rated current values of overcurrent protective devices are based on fuses and circuit-breakers that break the circuit within 120 s with a current

equal to 210% of the rated current value specified in the table.

Table 9 revised March 1, 1998

NOTE 3 - Deleted

2.11 revised March 1, 1998

MEETING SCHEDULE

September is solid. Must arrive prior to 4:00 PM Tuesday in order to attend game.

October meeting confirmation date has closed (it was August 1st).

December meeting hosted by Zayante on the 7th & 8th in Monterey, California.

January has not yet been decided and a good possibility it will be delayed until February and will (most likely) be in Newport Beach (hosted by Rockwell).

S3200 in P1394b

The PAR includes "faster" with enumeration including S3200. It appears that state-of-the-art of running at 4 gigabaud is insufficient to be successful. David suggested the group may want to eliminate any reference to this speed in the draft EXCEPT in the PHY/Link interface. If the PHY/Link group is not able to determine how to do S3200 either, then, perhaps, it should be removed from their charter as well.

TASK GROUP REPORTS

Simulations - Jerry Hauck

Code has been updated for "Upstarts" which seem to have resolved all of the issues brought up while meeting in Bath, U.K. Speed negotiations should be up and running next time.

Power Mongers - John Fuller

Adopted an "interesting" drawing showing a number of 1394 things attached via a 1394 cable connection topology for the purpose of establishing a common configuration folks may refer to in future 1394 power management discussions. A few more user scenarios are needed and well be held up against the TA 1394 PSM to determine if the PSM document meets the scenario's needs.

B-Port/Accelerations - Alistair Coles/Mike Teener

B-Port looked at changes which have been on in the draft and followed through them spending time on future extensions on request type mappings.

The next step in accelerations work: how to handle and identify isochronous cycles; 2) working on the interface where a nodes and b nodes exist. The goal is to make the "A" nodes work (in anyway (e.g. the most straightforward) we can). A couple of other concerns: 1) services done so the people on the PHY/Link interface know what they are going to do (in particular how to get an "A" link to work with a B PHY; 2) we may want to support PHY's that do not support the BOSS protocol (they only support base "A" level arbitration). September will include an outline of what they believe will work for "A" PHY's. State machine outline will be done by October. The objective is that by December, folks can examine it to the point that they try to break it (or not). Suffice it to say that we all know Jerry will look at it and find the problems. We do hope, however, others will make the same effort.

UPSTARTS

Three things: 1) missed Eric Hannah's unpublished deadline to get the next upstarts draft to him for inclusion in the latest draft revision - which is probably good since some things were decided today which will create a V8; 2) Proposed relaxation of tone frequency was totally overlooked on yesterday's meeting agenda. If no body objects in the Plenary (which they didn't) Colin will incorporate the "relaxation" proposal in V8; 3) The chatter code specification will be proposed from a GBIC specification. This will be an enhancement to the signal detect specification. This will specify the bounds of "yes" there is a signal and "no" there is definitely no signal.

----- Official Upstarts Minutes -----

Upstarts - 18th August 1998

Agenda

1. Welcome, Introductions
2. Review of latest code - v7 (on Web page Monday 17th) incorporates resolution of 8 issues
3. Proposed relaxation of tone frequency
Facilitate use of 98MHz or 122MHz clocks
Propose frequency between 48 - 64MHz
4. Review of open issues

1. Welcome, Introductions

Those present introduced themselves (see list at the end of these minutes).
The agenda was agreed

2. Review of latest code.

CWS reported that v7 was on the P1394b web site, together with a Compare document (with v6). Eric Hannah pointed out that this has missed the deadline for the latest P1394b draft (due to be published next Friday).

The following issues are resolved in this version.

- send_speed contradicts Figure 11-3
- receive_speed_indication() exits early
- Fall back to DS mode if the Beta speeds are totally incompatible (and, of course, the connection is DC coupled)
- add code to use the DC connection detection mechanism from 1394a
- Once we've determined that we are in DS mode, never send a tone, as this can then confuse the other end.
- Document how to do start-up on a beta-mode only port
- Race between receive_speed_indication() and set_beta()
- simple fix introduced further problems
- resolved by setting the receive_speed_indication going once for a complete negotiation and accumulating the speed into a local register
- resume_actions() code - use of connect_timer and receive_ok
- accept Biva's recommendations
- use of local_plug_present did not allow correct handling of disconnection whilst active

JH proposed that receive_speed_indication() be modified to check for a full "half-interval"

3. Open issues

- Code update to be consistent with final version of 1394a
- monitor connection status on a beta_mode disabled port?
- Inhibition of port repeating activity immediately after resume to prevent repetition of partial packets (but need to let resets through)
- Resume latency (constant RESUME_SAMPLING_INTERVAL needs specifying)
- Agreed to allow a range of 1 - 2 ms. It was noted that a port needs to be fully operational within 10ms of receipt of a resume signal.
- Experience of Fibre Channel start-up
- high impedance or static transmitter may produce valid-looking signal at the far end
- NEXT issues - FC indicates NEXT up to 10%
- Refer to Copperheads
- Use connect_detect comparator during suspend if there's a DC connection (see below)
- Why tone two more times on new connect??
- Thought to be fixed, needs double checking
- Toning into TpBIAS (issue for electrical group)
- Chatter code
- suggest updating the SD specification to include response times to $V_{input} < 200mV$

and $V_{input} > 400mV$, and a not to go true more frequently than once per x msec in all other circumstances. (numbers to be taken from GBIC specification).

- Suspend: mechanisms for detecting disconnection and for indicating resume.

- Issues

how to indicate resume?

TpBias needs a bias generator and comparator

- when do you turn it off again and start the port synchronization?

- are all DC connections bi-lingual?

Tone will upset the connect detect comparator

use out of band disconnection detection?

- Scenarios

- AC connection

cannot have DS mode capability

cannot use TpBias

cannot use DC connect_detect mechanism (as defined in 1394a)

intermittent tone for disconnect detection

continuous tone for resume

- DC connection to another device via the standard connector

must have DS mode capability

therefore has a TpBias generator and connect_detector on TPA and bias detector

on TPB

use Bias generation and detection for resume?

No - agreed to use continuous tone for resume

use no connect_detect for disconnect?

Agreed to use no connect_detect plus lack of tone

or we could use the AC mechanism

No, save power by using connect_detect comparator

- DC connection to another device via a different connector

does not have to have DS mode capability

DW:- perhaps have an out-of-band mechanism for disconnect detect??

continuous tone to resume?

(tone will give a false "disconnect" indication on the connect_detect mechanism)

or we could use the AC mechanism

Agreed not to provide any special mechanisms for this case

Present

Steve Bard

Anuradha Bommasi
Rich Bowers
Dao-Long Chen
Alistair Coles
Mike Coletta
Wataru Domon
Firooz Farhoomand
Stephen Finch
John Fuller
Thomas Hami Han
Eric Hannah
Del Hanson
Jerry Hauck
Keith Heilmann
Sean Killeen
James Kuo
Jinghui Lu
Steven D Martinez
James Nave
Bill Northey
Takayuki Nyu
Paul Polishuk
Matt Rooke
Tomoki Saito
Tetsuya Sato
DC Sessions
Jim Skidmore
Ron Soderstrom
Michael Jonas Teener
David Thompson
Duncan Wall
Colin Whitby-Stevens
Paul Wiener
Mark Williams
David Wooten
Shuntaro Yamazaki
Patrick Yu
David Zalatimo

GOF

Colin summarized the liaison with TIA FO2.2 and reported of the passage of a motion to extend the MMF spec. to include S100 through S400. It passed 22 to 5 with 10 abstentions. Colin felt this type of change needs ratification by the Plenary before it can actually become official.

Colin moved that the Plenary decide whether they wish to accept this recommendation from the GOF sub-task group. Seconded by Steve Bard.

David spoke against the motion - he felt it was a step backwards and would result in speed traps (among other things). A short discussion followed.

In that discussion, it was mentioned that, perhaps, such a proposal would be O.K. IF the lowest speed were S400 (instead of S100). The majority would like to see S400 as the minimum speed (as revealed in a straw poll).

Alistair offered a friendly amendment to accept the S400 component of the proposal. Colin accepted the friendly amendment.

Revised motion: That the Plenary accept the proposal but only to include S400 (i.e. NOT the S100 and S200 speed components)? 17 in favor 0 opposed 0 abstained.

----- Official GOF Minutes -----

P1394b GOF Task Group Meeting Report
19th August 1998

1. Welcome, introductions
2. Liaison to TIA FO2.2 for losses using the new proposed conditioned launch with ditto using overfilled launch
 - reply received - indicating that work on this will not be considered until completion of current work next January
 - asks for response
 - noted that the current work is relevant
 - noted that the new work is not critical for S800 and S1600, but will be needed for S3200 (which we are not addressing just yet)
 - decided to request DW to thank FO2.2 and to urge them to start as soon as they can.

3. Motion to extend MMF spec to S100/S200/S400

Extend the current S800-S1600 100m 50 MMF link specifications to include S100, S200 & S400 links and make the corresponding additions to the next draft of P1394b.

Proposed: Tomoki Saito; Seconded: Alistair Coles
Tabled at last meeting

Extensive discussion, particularly on the market aspects.

Noted that the proposed change to the P1394b draft limits this proposal to Long Haul only - this is an update to the presentation as deposited on the web site and to the handouts made available at the meeting.

CWS stated that as there is clearly a significant wider impact of the proposal, the motion is interpreted as a recommendation from the GOF group to the main P1394b group.

As there have not been recent regular meetings of the GOF Task Group, CWS ruled that voting in the Task Group is open to all present.

The recommendation would be voted on in the main P1394b group in the afternoon, where normal voter qualification rules would apply.

Motion accepted For: 22, Oppose: 5; Abstain: 10.

(Note, the P1394b WG meeting in the afternoon decided to accept only the S400 aspect of the recommendation)

Present

Steve Bard
Anuradha Bommasi
Rich Bowers
Charles Brill
Dao-Long Chen
Alistair Coles
Mike Coletta
Wataru Domon
Stephen Finch
Thomas Hami Han
Eric Hannah
Del Hanson
Jerry Hauck
Keith Heilmann
Sean Killeen
James Kuo
Chris Lattig
Jinghui Lu
Steven D Martinez
James Nave
Bill Northey
Takayuki Nyu
Paul Polishuk

Bill Prouty
Matt Rooke
Kyozo Saito
Tomoki Saito
Tetsuya Sato
Jim Skidmore
Ron Soderstrom
Michael Jonas Teener
David Thompson
Duncan Wall
Colin Whitby-Stevens
Paul Wiener
David Wooten
Shuntaro Yamazaki
Len Young
Patrick Yu
David Zalatimo

PHY/LINK INTERFACE - Sean Killeen

The opportunity to provide feedback to all re-opened issues is closing very quickly. The schedule for completion is that there are elements which need closure sooner than others (pin-out, analog and compatibility models requiring support). A lively discussion concerning "B" PHY's supporting "existing" "A" link silicon took place and a straw poll was taken in the Plenary to determine (further) the desire to mandate this. Straw poll: 17 in favor of the group going off and investigating into making "B" PHYs compatible with "A" links while 5 were opposed.

Looked at issues associated with the goodness of the "A" PHY/Link interface and that it was simply an evolution of a prototype interface and was never intended to be a standard interface.

Three generations of data transfer rates will be tasked. With the Plenary decision to have S400 Beta-mode PHY's, the PHY/Link sub-task group needs to take this new information into account.

A review of electricals and signaling with D.C. sessions resulted in an 8 bit data path. A general agreement for 2.5 to 1.8 volt migration. Source synchronous clocking.

→ insert Sean's notes here (when he forwards them to me) ←

PACKET SIZES

Will we continue to double packet size as we continue to go up in speed?

David asked folks to spend some time thinking about this issue and express their opinions on the reflector so we may progress towards resolution at the next meeting.

John Fuller suggested the maximum packet size should be 4K.

MODIFIED IRM BEHAVIOR

Richard Churchill has just posted further information on this subject to the reflector, so, this will be tabled (again) until the Chicago meeting.

Richard Churchill's e-mail message follows:

From: Churchill, Richard [<mailto:Richard.Churchill@COMPAG.com>]
Sent: Tuesday, August 18, 1998 2:34 PM
To: 'p1394b@zayante.com'
Subject: Quality of Service and IRM Transactions

Gentlefolk,

At the July meeting in Bath, U.K., there was an attempt to discuss the issues associated with Isochronous Resource Manager behavior, as presented in a document I previously presented, and come to some conclusions regarding possible changes to the p1394b draft. (Please refer to that previous document, which may be obtained from the p1394b web page at <http://www.zayante.com/p1394b/index.shtml>. Look for "Proposed improvements to the IRM transactions from Richard Churchill," in the section titled "Documents presented at the April 29-30 meeting in Newport Beach:") The discussion never really got off the ground, in part because those present were not familiar with the document or the issues raised. Consequently, I took an action item to more fully discuss the material covered via the reflector ... Hence this first installment of that discussion.

Though subsequent changes to the p1394b draft have altered the circumstances and exact character of some of the points covered in the previous document, the underlying problems remain ... There are a number of places where the behavior of the 1394 bus can take unfortunate turns, leading to some really ugly situations. (Again, please refer to the aforementioned document.)

The first proposed change to the p1394b draft was that p1394b require all IRM and BM capable nodes respond to all request transactions to the BANDWIDTH_AVAILABLE and CHANNELS_AVAILABLE registers as concatenated

responses (unified transactions). The wording of this is in part at the suggestion of Mike Teener, who agreed that this addressed a problem that needed remedy. However, several people have taken exception to this, asserting that it would result in some serious design problems, and in a noticeable expense in terms of gates, etc. Further, people did understand precisely what problem this was intended to remedy.

The problem addressed here is that it is possible, using the present resource allocation technique (a read of a resource register followed by an attempt to allocate the resource via a lock compare-swap transaction), for the compare-swap to fail due to the IRM being busy (assuming that this type of transaction may not be responded to immediately), thus forcing another iteration of the process. In pathological circumstances, with several nodes attempting resource reallocations following a bus reset, it is technically possible for this to result in a complete stand-off on all reallocation attempts, with each compare-swap transaction returning a "busy" response, rather than completing as desired. As previously stated, this is a very unlikely circumstance, yet it is possible. Experience shows that despite being very unlikely, it will eventually occur.

Sample Pathological Case #1 ---

- Node 5 is root, BM and IRM of a five node bus.
- Node 1 through 4 have isochronous resources to reallocate following a bus reset.
- Only a minimal subset of bus transactions, etc., are shown ... others may be occurring on the bus, and may result in the target node being busy more of the time than represented below.

Node 1 issues a quadlet read to the IRM's BANDWIDTH_AVAILABLE register, which is queued

Node 5 responds to node 1's request with the contents of the BANDWIDTH_AVAILABLE register

--- Arb reset gap

Node 2 issues a quadlet read to BANDWIDTH_AVAILABLE, which is queued

Node 1 issues a lock compare-swap to BANDWIDTH_AVAILABLE, which returns 'busy'

Node 5 responds to node 2's request ...

--- Arb reset gap

Node 3 issues a quadlet read to BANDWIDTH_AVAILABLE, which is queued

Nodes 1 and 2 issue lock compare-swaps, which return 'busy'

--- Arb reset gap
Nodes 1 and 2 issue lock compare-swaps, which
return 'busy'
Node 5 responds to node 3's request ...
Node 4 issues a read ...
--- Arb reset gap
Nodes 1, 2 and 3 issue lock compare swap,
which are all 'busied' ...
Node 5 responds to node 4's request,
--- Arb reset gap
Node 1 ends retries and restarts its process by
issuing a quadlet read, which is queued ...
Nodes 2, 3 and 4 issue lock compare swaps,
which are all 'busied' ...
--- Arb reset gap

Note that while we have seen six fairness intervals no node has successfully allocated bandwidth, yet.

In the p1394a balloting process, Peter Johansson has expressed a desire to slightly improve upon the described behavior by taking advantage of the fact that the lock compare-swap transaction returns the contents of the target register. By simply attempting the allocation with a "best guess" at the contents of the target resource register, a node picks up the real chance that it may be able to allocate the resource in a single transaction, while obtaining the effect of a read of the target in the event that the compare fails. Therefore the presently required quadlet read of the target may be omitted from the mandated procedure, provided suitable comments permitting such a change in the p1394a draft appear in the comments resulting from the ballot process. Unfortunately, suitable comments may NOT be found in the balloting process, and so may not be made to the draft.

However, even if the change to the p1394a draft is made, it does not eliminate all the problems that can arise in this context. So long as a transaction allocating or reallocating a resource via one of these registers has a latency sufficiently long as to allow another node to attempt an allocation before the first transaction has completed, and the request queue of the target device is not sufficient to absorb subsequent overlapping requests to the target, there is a small but real chance of the allocation process becoming unpleasantly long.

Personally, I don't believe this is something that should be allowed, as the resultant user experience will be negative at the least, and the prospect of such behavior may be sufficient to preclude use of 1394 for some applications. A specific case where this could be an issue is in p1394b based home networks, where a protracted reallocation process, with a

significant number of failures to reallocate resulting in some streams being disabled until the allocations can in fact be made, can have a noticeable impact on the quality of service by those using the home network, particularly for A/V streaming applications.

Originally, I suggested that we require the BANDWIDTH_AVAILABLE and CHANNELS_AVAILABLE registers be implemented in hardware, making it less likely that the node would be busy when nodes are attempting to manipulate these registers. In conjunction with other elements of the overall recommendation, most problems would be significantly reduced or eliminated. Mike Teener suggested modifying this to requiring that IRM and BM capable nodes respond to transaction to these registers as concatenated responses. This would allow the designer some latitude in implementing a PHY or node, while accomplishing the general goal.

In the little discussion there has been on this, some PHY designers have protested the current phrasing of the proposal. They have asserted that there would be an unreasonable expense entailed in providing an additional pipeline for requests targeted at the registers in question. I will leave it to Mike Teener to deal with that argument, but am willing to retrench to my original proposal -- requiring the implementation of these registers in hardware. This retrenchment reopens the window for requests encountering a busy condition on the IRM, but again, in conjunction with other proposals, the general behavior is improved.

Sincerely,

Richard Churchill,
(281)514-6984,
richard.churchill@compaq.com

Plenary compaction will continue to become short to allow more sub-task group work time.

Adjourned: 5:00 PM

Those in attendance:

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