1. Meeting Attendees

The list of attendees included:

Nobuhiko Shinoda	Canon (BJ Printer System Development)
Atsushi Nakamura	Canon (BJ Printing Technology Development)
Takashi Isoda	Canon (DO Project)
Akihiro Shimura	Canon (Office Imaging Products Development)
Osamu Hirata	Canon Business Machines
Lee Farrell	Canon Information Systems
Yoshinori Murakami	Epson
Atsushi Uchino	Seiko Epson
Yasuhiko Nakano	Fujitsu
Brian Batchelder	Hewlett Packard
Alan Berkema	Hewlett Packard
Dave Kuntz	Hewlett Packard
Laurie Lasslo	Hewlett Packard
Kris Schoff	Hewlett Packard
Greg Shue	Hewlett Packard
Henrik Holst	i-data International
Brian Nagy	Kodak
Jerry Thrasher	Lexmark
Don Wright	Lexmark
Frank Zhao	Panasonic
Roberto Sannino	SGS Thompson
Satoshi Terada	Sharp
Randy Turner	Sharp
??? Hirata	Sony
Larry Stein	Warp Nine

Note: Greg LeClair, 1394 PWG Chairman, was unable to attend

2. Detailed Activity

2.1 Administrivia

Larry Stein opened the meeting. He presented the meeting goals and proposed agenda topics for the two-day session:

- 1394 PWG – 1 year review
- 1394 PWG-C Status
- Direct Print Protocol Presentation
- “Tabled Motion”
- IEEE 1212 WG Status on FDS
- Imaging Profile Spec

2.2 1394 PWG – 1 year review

Brain and others tried to recollect the past history. The first meeting at Adobe in December 96 was mentioned. Our coordination with PWG-C (starting in June) was mentioned. May was first time that

1284.4 over SBP-2 was raised. Several individuals commented that our efforts have taken longer than originally expected. Since the Imaging Profile was generated, things are moving more quickly. Seven or eight people are now making more rapid progress by participating in teleconferences between meetings. It was suggested that we attempt to generate a framework or schedule for a more clear direction in future, including milestones.

Major accomplishments: Who we were, what our charter is, two goals: FDS and Imaging Profile. PWG-C has worked on DPP.

2.3 1394 PWG-C Status

Shinoda-san gave a presentation on the PWG-C. He provided a brief historical background on the group and an overview of their recent activity:

[Please see slides for details. Following items are very sketchy.]

Established on 12/17/96.
Monthly Meetings. more than 30 companies focusing on consumer "peer to peer" printing.
Election of Steering Committee and Board Members in March 97. 11 famous companies on Steering Committee.
PWG Joint Discussion since Mar 97.
[Showed diagram of PWG and PWG-C relationships with other groups.]
DPP – Target for "light" implementation – a new transport and command set.
SWG1 schedule Jul 97 kickoff
Jan 20 98 DPP ver 0.71
Jan 22 PWG-C/SC approval
Jan 26 PWG Maui Discussion
Jan 29 1394 TA DSI Discussion
SWG1 DPP Document diagram
SWG2 Status
Direct Print using AV/C – extension from AV/C
Jan 20 SWG2 kickoff
Jan 22 PWG-C/SC Discussion
Jan 26 PWG Maui Discussion
Jan 27 1394 TA DSI Discussion
[SWG1/SWG2 relationship diagram]
[DPP Status diagram]
Matsushita will present on SWG2 at 1394 TA

2.4 Direct Print Protocol Presentation

2.4.1 Thin Layer Transport

Satoshi Terada (Sharp) then gave presentation slides on details of DPP ver 0.71. *[He essentially read the slide content, so refer to slides for details.]*

Direct Print Model ensures…
Requirements
Symmetric communication

Mandatory and option…
…
Multiple Layer model…
"Layer Model" …
Thin Protocol…
[Connect diagrams]
Command…
[Command diagrams]
Disconnect…
[Disconnect diagrams]
Register space… - SDU management register is used to control segment data. Segment Data Unit size is negotiated during connection. The number of bits to define the SDU size has not yet been established.
Segmentation and Reassemble…
Connection information…
Reconnect…
Error Processing…
Format…
Open Issues…
Summary

Questions:

(Shue) Q: Makes very good sense. Addresses many issues. "Why *this* proposal as opposed to SBP-2?"
(Terada) A: SBP-2 is not symmetrical. DPP is symmetrical – no distinction between initiator and target. Very important to play either (both) roles without additional weight for distinction.

Terada also claimed that SBP-2 is "heavier"—but specific measurements have not been evaluated for exactly "how much heavier" (i.e. number of bytes difference.) Shue and Turner are not yet convinced that there is truly a *significant* savings in "weight" of implementation. If there is really no significant savings, perhaps other factors—such as proven solution robustness—*might* be reasons to choose other alternatives.

(Shue) Q: Do we *really* need a symmetric protocol? Are the layers above really peer-to-peer? Or aren't we really pushing the "weight" of the master/slave support to the application layer?
(Turner) A: It's much easier to constrain the transport rather than the application. Doing so is generally better in terms of offering flexibility for the application layer.

(Turner) Q: Is segmentation and reassembly is being done by SBP-2?
A: Not at the Application data to Segment data layer. But it does handle it at the Segment data to Transaction layer.

Shue once again raised the question of "is symmetry (for opening connections) *really* a reasonable requirement?". He is very convinced that there is major benefit to be realized by adopting SBP-2. Because it has been well exercised, tested, and "shaken out", he feels that much development time can be saved over developing a new protocol. (And this would There was additional discussion, but Larry cut it short, saying that previous discussions have resolved that symmetry should be a requirement. Further debate will be deferred.

2.4.2 DPP Command Set

Atsushi Nakamura presented slides on the Application Command Set

[Command Set diagram]
CS Objectives… – Want to assure connections with both simple *and* complex printers
Basic DP scheme… [diagram]
Basic DP step-1, 2, 3…
DPCS key points…
CS categorization… -- The print command is embedded in the Send command.
Commands…
Negotiation Parameters…
Negotiation Parameter Image… -- should also add column for vendor unique items. Noted that image size assumes square pixels—no means for specifying aspect ratio. There was a question about "indexed printing" capability. Ats said that it had been discussed by the PWG-C, and they decided to categorize it as a vendor unique item.
Command Set Open Issues…

Shue: Will DPP have milestones and schedule plans? Shinoda says plan is to have 0.9 version by end of March timeframe.

Zhao: Different commands for different device types? How does an application make the distinction?
Ats: Since we proposed FDS, you can find the functionality through that. At that point you can tell "Printer using DPP", and make connection based on that knowledge.

2.5 IEEE 1212 WG Status on FDS

Ats gave overview on 1212 reaffirmation.

5th year for reaffirmation. Now decided to update spec.
Reflector info…
First meeting Nov 11-12. Identified goals and schedules and technical issues.
Technical issues identified included FDS incorporation, vendor info enhancement, extended key values, textual descriptor enhancement, clarification of current document.
Function description enhancement…
Dedicated directories in ROM…
…
3 Main Contents of FDS…
Function List directory… -- Ats now considers usage of extended key values to be more risky approach. He wants to go back to more compact approach—will be proposed at 1394TA meeting.
FDS Structure addition…
Vendor Description Enhancement… (originally Sony SDD proposal)
VDE SDD phase 1…
VDE [diagram] – a vendor directory will be added to include model name, brand, corporate id, etc.
Extended key values…-- use *two* quadlets to represent 1 entry.

Others…

Time slot at 1394 TA meeting on Wednesday January 28. Also meeting of 1212 WG on Friday.

web: http://www.zayante.com/p1212r/
ftp: ftp://ftp.zayante.com/p1212r/
reflector: p1212r@zayante.com

2.6 "Tabled Motion"

Before the end of the December meeting, Larry made a motion that the PWG should adopt 1284.4 over SBP-2 as our basis for defining a standard. (He wanted to get agreement on continuing with the effort on the imaging device profile/specification.) Instead, it was decided that the motion would be tabled (delayed) until the January meeting—and any alternative proposals must be submitted for review *before* the next meeting.

As background, Larry reviewed a diagram discussed at the previous meeting:

<table>
<tr><td colspan="5">Client Applications</td></tr>
<tr><td colspan="2">1284.4</td><td>New Transport "Stuff"</td><td>TCP</td><td>New Transport "Stuff"</td></tr>
<tr><td>New Datalink (DFA)</td><td>Datalink "Glue"</td><td></td><td>IP</td><td></td></tr>
<tr><td></td><td>SBP-2</td><td>SBP-2</td><td>IP "Glue"</td><td>FCP</td></tr>
<tr><td colspan="5">1394 Transaction, Link, Physical</td></tr>
</table>

Existing Specification

New Specification

As worded, the motion was "That the 1394 PWG adopt as its goal the use of IEEE 1284.4 as the transport protocol and SBP-2 as the underlying datalink for the thick transport. Our effort will be to determine the requirements and implementation details for the glue layer between the 1284. If at a later date it is determined that this is not a suitable solution then we will need to make appropriate changes at that time. The suitability of the stack will be determined by gauging it against the Requirements document that has been developed and noted in the minutes…" *[I missed the rest.]*

The group decided to defer the vote until after more discussions on the Imaging Profile specification.

2.7 Imaging Profile Specification

Alan Berkema gave a presentation on the IPS. He provided a bit of history on the evolution of the specification.
Boulder – voted to choose SBP-2 and craft a 1394 IP ala the Mass Storage Profile

LA – First revision of the IP discussed. 1284.4 was mentioned in the document, but should it be? (current revision 0.1c does not include it.)
Maui – Focus on SBP-2 Transport/Data Link Layer, consider absence of 1284.4.

Name of document no longer includes word "profile" in title. Now called "IEEE 1394 High Speed Bus Imaging Device Communications *Specification*." However, Alan wanted the group to reconsider if they preferred to have the word "profile" back in the title. The decision was deferred.

[There was a side discussion about the logistics that should be followed when revising a document for easy review at a subsequent meeting.]

Ats asked what was meant by "Imaging Device." This question led to an acknowledgement that the group definitely needs to identify the target devices intended for the protocol.

Greg Shue then gave a presentation on the PWG 1394 Imaging Device proposal, "How far have we come?" He reviewed the highlights of the proposed specification document.

Key Features

- Transport-only Command Set
- Extended Access Control Policy
- Ordered Task Processing Model
  - Confirmed Buffer Transfers
  - Unsolicited Buffer Available indication
- Built upon stable SBP-2 protocol
- Does not preclude Function Discovery Mechanism

Command Set

- Send Data-in
- Receive Data-out
- Max buffer transfer sizes negotiated per direction
- Reserved fields for future extensions
- Buffers tagged as out-of-band in CDB
- Target may "ping" the initiator

Access Control Extensions

- Policy mirrors Login behavior
- Reservation keys exist for verification
- Resumption timeout negotiated during Login
- Resumption timer takes effect upon a failed reconnect

Ordered Processing Model

- Initiator manages sequencing of transfers
- Target may abort the task set to avoid deadlock
- Task completion notification required
- Buffer Available indicated
  - synchronously with task completion
  - asynchronously with Unsolicited Status

What's New?

- Command Set and Unsolicited Status defined
- Transient Link Interruption support specified
- Task request processing …
- Mechanism to verify initiator is alive specified

Differences

- IEEE 1284.4 transport protocol not required
- Ambiguous Out-of –order model removed
- Each service modeled as a separate Unit

Proposal Supports

- Multiple, Concurrent, Independent, Symmetrical Connections
- In-order Byte- and Buffer-mode data delivery
- Data, App, and O/S independent
- Transient Link Interruptions
- Data Tagging

Proposal Lacks

- Directory Service Support (but doesn't *preclude* it)
- Connectionless Service
- Multi-casting Service
- Bus-independent Protocol
- Fair Access Management
- Selectable Quality of Service

Pending Issues

- How to provide a Directory Service
- How to encode transport client command set in Unit Directory structure?
- How to resolve issues w/ Microsoft's SBP-2 Login policy?
- How does Plug-n-Play work with this proposal?
  [The last two items could be addressed as an "informative annex" to the specification

Larry reviewed a list of requested changes to the document to confirm whether or not they had been made. *[I didn't have Larry's list, and I couldn't capture them fast enough as he was reading them.]* Some were put into the document, some were not, and some are no longer relevant.

Brian Batchelder suggested that those people that are interacting with Microsoft on 1284 should take an action item to discuss 1394 as well.

Ats asked about how the proposal addresses Isochronous support. Greg Shue said that the document really does not address it at all. Several people felt that Isochronous support should not be considered critical for the specification, and be deferred as a later topic.

Before the end of the first day, the charter of the group was questioned. Randy suggested that as an end-product, "we should be able to print" over 1394. So far, the Imaging Device Communications Specification does not define enough to meet this goal.

2.8 Symmetry – What is really required?

The group revisited Greg Shue's question about "symmetry requirements." The requirements list includes the term "symmetrical connections." This was defined as "either endpoint can open or close a connection," but Greg Shue still had a question on the definition. The group confirmed that this means either side (any node) can initiate a transport-level connection. Further discussion occurred with regard to whether we really require "top-to-bottom" symmetry (at all layers), or just to provide symmetry to the *client*. The group decided that the requirement should be refined to say that symmetry is a MUST at the client level ("first-order symmetry"), but any symmetry at lower layers will only be a *desirable* feature—not essential. This clarification seemed to satisfy Shue.

Randy Turner then wondered if one device that was implemented with "top-to-bottom" symmetry would have any interoperability problems with a device that was only implemented with client-level symmetry. Some of the HP attendees said that this would not be a problem, but Turner did not seem convinced. They did agree that at *some* level(s), two such implementations would need to somehow detect each other's specific behaviors. The topic of addressing this detection/communication was deferred for later discussion. Turner still believes that "top-to-bottom" symmetry should be pursued as a "basic goal" if at all possible. He would prefer to see any proposal for asymmetry—at any layer—should be strongly justified from a technical basis. After further debate, both Turner and the HP attendees agreed (or seemed to agree) that the *primary* goal is that observable behavior across the 1394 bus ("wire protocol") should be symmetrical.

The idea of defining "conformance levels" was raised, to allow different implementations to be initiators, targets, or both. However, this topic was deferred until later.

2.9 "Page-by-Page" Specification Review

Alan Berkema led the group in a review of the proposal (rev 0.1c). This version of the document excludes any reference to 1284.4, and is submitted as a *different* proposal to the previous version (rev 0.05)—not just an update. Based on the review results, the two proposals will either be maintained separately, or merged into one proposal.

[HP apologized that they did not update the 0.05 document and distribute it for review during the meeting. The group was expecting several updates based on the previous meeting activity and a few teleconferences that occurred since then.]

During the review, the following comments were made:

- § 10.1 – The question about symmetry will be removed and replaced by a new definition of symmetrical based on the previous discussion results.
- § 10.2 – This section may need to be revisited based on activity of the 1394 bridging group. Alan Berkema will review their results and update the specification for consistency (as needed.)
- § 11 – The comment of how the Symmetrical Connections requirement is met will be modified to address the new definition.

§ 11 – The requirement for supporting “in-order data delivery” implies an additional (logical) layer below the application that handles segmentation and reconstruction. This will be addressed in more detail later.

§ 11 – Directory service comment needs to reference FDS (now included in IEEE 1212 update.)

§ 11.1 – This section should not be a *normative* part of the document. Because we have a requirement to be O/S independent, Microsoft-related issues should only be included as informative comments.

§ 12 – Any references to Plug-n-Play issues should be informative comments.

§ 18.1 – The assumptions of how SBP-2 provides a capability to determine if a transport is still alive needs to be re-examined. Greg was not confident of his understanding in this area.

§ 18.1 – The term “credit” should not be used in the last paragraph. Another term will be defined.

§ 18.1 – Randy Turner suggested that a clarification be added to better explain the handling of in-bound ORB lists vs. out-bound ORB lists. He feels uncomfortable with the proposal’s method of the target aborting tasks on the task list. However, after much discussion, the topic was deferred to e-mail after the meeting.

§ 19 – This section will be removed. All relevant comments are addressed in other sections that discuss symmetrical connections.

§ 20 – The last sentence of this section will be removed.

§ 21 – This section should better clarify which items are identical with the SBP-2 specification and which items are customized for our use.

§ 21 – Brian Batchelder suggested that we use different terms other than SND and RCV—something that is “easier to understand.”

§ 21.1 – The term “payload” should be defined or replaced. (In other contexts it has a different meaning.)

§ 21.2 – The description for Data Available Code will be changed to “No *more* target data exists for initiator” and “*More* target data exists for the initiator.”

§ 25.1 – The topic of extended access control and resumption raised a concern about security. However, the group could not agree if this protocol *should* address security issues. The observation will be noted for future consideration.

§ 25.2 – Randy feels that the *target* should specify the timeout interval for unsolicited status credit.

§ 25.3 – A discussion of maximum task data payload size (and granularity) will occur via e-mail.

Don Wright suggested that the authors of the document add some sample scenarios that illustrate the process flow.

It was noted that *whatever* the group develops, it needs to offer more functionality than DPP and be “less weight” than IP over 1394. Otherwise, we will not be providing anything desirable.

2.10 IEEE PAR Document

The next IEEE MSC meeting is in April. If the group is going to develop an IEEE standard, we need to creating a Project Authorization Request (PAR) for the IEEE meeting some time before that meeting. However, because we now seem to be basing our efforts on SBP-2, there is a question as to whether we should go through the IEEE process or just develop an “annex” to an existing standard. To help make the decision, Larry Stein suggested that we should re-examine the group charter and either confirm or update our goals.

2.11 Charter Review

Larry started to lead the group in a review of the Charter that was previously developed (in February 97.) However, some people were worried that this activity could take too long. Instead, it was suggested that some Goals and Milestones be identified first.

2.12 Goals and Milestones

Brian suggested an effort to identify various "short-term tasks" that the group should schedule:

- Review and update charter – for submission as a PAR (first draft written at next meeting)
  - list of deliverables
- Review and understand the DPP specification
  - provide feedback to PWG-C
  - does it work?
  - can we use it?
- Move Imaging Specification to contain both "1284.4 over SBP-2" *and* "SBP-2+" proposals
- Continue with phone conferences
- Choose a path forward (soon)
- Update on IP over 1394 activities
  - Analysis of TCP/IP1394 solution

2.13 "Tabled Motion" – revisited

After a very long discussion of procedural issues, Larry Stein withdrew his original motion. (A similar motion may re-surface in the near future.)

2.14 Teleconference

Next teleconference is scheduled for Feb 18, 4:00pm PST.

Next Joint meeting on July 20-21???

Meeting adjourned.

3. Future Activity

Upcoming 1394 PWG-related meetings are scheduled as follows:

Feb 18	1394 PWG Teleconference	4:00pm PST
Mar 2-3	1394 PWG Meeting	Austin, TX
Apr 6-7	1394 PWG Meeting	Portland, OR
May 18-19	1394 PWG Meeting	Baltimore, MD
July 6-7	1394 PWG Meeting	San Francisco, CA