1. Meeting Attendees

Osamu Hirata	Canon
Akihiro Shimura	Canon
Shigeru Ueda	Canon
Lee Farrell	Canon Information Systems
Peter Johansson	Congruent Software
Greg LeClair	Epson
Fumio Nagasaka	Seiko Epson
Brian Batchelder	Hewlett Packard
Alan Berkema	Hewlett Packard
Scott Bonar	Hewlett Packard
Greg Shue	Hewlett Packard
Brian Nagy	Kodak
Jerry Thrasher	Lexmark
John Fuller	Microsoft
Norimi Kawashima	Ricoh
Randy Turner	Sharp
Mauro De Ponti	ST Microelectronics
Peter Groz	ST Microelectronics

Greg LeClair was not present at the beginning of the meeting (he arrived at 10:30 AM.) The meeting started prior to his arrival, based on the agenda topics that he distributed via e-mail:

- Presentation of Command Set proposal
- Profile 0.52 review
- Config ROM Issues
  - PWG OUI
  - IEEE 1212 Status

2. Command Set Proposal

Fumio Nagasaka discussed his proposal for additions to the transport command set. (This document is available at: “ftp://ftp.pwg.org/pub/pwg/p1394/mtg092898/proposal-cmd-1a.pdf”.)

He says that the existing command set is insufficient for handling dynamic logical channels on one logical unit (LUN.) The proposal attempts to provide a method for dealing with dynamic logical channels.

According to Nagasaka-san, the highlights of the new features in the proposal include the following:

- each queue may contain input ORBs and output ORBs
- single LUN may provide logical channels
- logical channels are allocated dynamically on demand
- the initiator may place parameter in data buffer of an ORB or CDB structure of the ORB
- commands are abstracted from ORB data structure

Alan Berkema pointed out that the proposed method of using two bi-directional queues is similar to having four queues in the existing model. Alan explained that the reason the existing model does not have bi-directional queues is to avoid blocking.

John Fuller noted that the current model is extensible to support more than two queues. (Could the new proposal features be accomplished by using four queues within the existing model?)

Nagasaka-san reviewed the Commands Summary table in his proposal (page 43, Figure 33) and explained the use of the different fields.

Peter Johansson then asked what specific problem (in the existing solution) is the proposal solving? Nagasaka-san said it solves the need for providing multiple channels using one LUN. Peter suggested that the existing model can support multiple LUNs without needing to have multiple entries for each LUN in the Config ROM. According to Peter, the additional channels can be discovered—and/or established—through other means. (However, at least one individual believes that Microsoft's current implementation does not seem to support this.)

Alan suggested that one "interesting" thing about the proposal is the inclusion of several more commands. However, after closer examination of the new commands, it did not appear that any of them offered additional useful capability—at least with regard to the existing requirements.

One part of Nagasaka-san's proposal was to include three Printing Class-specific commands:

- GET_DEVICE_ID
- SET_LEGACY_ENABLE
- SOFT_RESET

The group felt that the command for getting a device id is more appropriate for the O/S to define. It was also suggested that the 1212r group add a "Plug 'n' Play string leaf node to their specification.

Discussions about SOFT_RESET concluded in the observation that there is no standard behavior across current (legacy) implementations. Therefore, there is no "standard" that can be defined in this area. It was suggested that both SET_LEGACY_ENABLE and SOFT_RESET could be implemented as vendor-specific capability.

The discussion led to the general topic of supporting legacy printers for 1394, and the possible use of dongle devices for accomplishing such support. After a long discussion of the issues related to this effort, it was determined that it was out of scope of the current Profile goals.

A suggestion was made that any individual or company that is interested in supporting a (legacy) 1284 device with 1394 should develop a separate Profile document that would specify the appropriate details. The general consensus of the group was that we should not burden the development of the Profile document with the inclusion of legacy support issues. No one volunteered to develop this separate Profile document.

Brian Batchelder summarized the group's conclusion on this topic:

> "We recommend that any legacy support be crafted as a separate Profile. The authoring of such a Profile is currently pending a volunteer."

As a result of the discussions about Nagasaka-san's presentation, the proposal was rejected for inclusion in the existing Profile document.

[During the discussion, Randy Turner raised the question about whether the group should attempt to specify anything about interoperable printing between 1394 devices. He suggests that it would be nice to identify a standard, interoperable scheme for printing services to achieve this. This topic was deferred for later discussion.]

3. Administrivia

When Greg LeClair arrived, he pointed out that the current Secretary (Larry Stein) has not been present at several of the recent meetings. Greg therefore suggested adding another topic to the agenda:

- Establishing a Secretary

4. Profile 0.52 Review

Alan Berkema described the changes that were made to the latest Profile draft:

- removed several items
- added Command Set and related fixes
- added issues from last meeting and e-mail discussions

(This document is available at "ftp://ftp.pwg.org/pub/pwg/p1394/mtg092898/pwgpro52.pdf".)

Alan led the group in a review of the Issues listed in Section 14, commenting on the status of each. It was suggested that the closed issues be collected and moved to a section separate from the open issues. Alan noted that the numbers associated with each of the Issues will change in the next draft.

Issue 14.7 – Much discussion occurred about the behavior and timeout guidelines for a Target to cause a Logout. Essentially, no one could identify a reasonable requirement for this feature. Randy suggested that the entire topic should be left up to the "upper layer(s)". In conclusion, the group agreed to close the topic and not specify any Target Logout behavior in the document. Closed.

Issue 14.8 – The issues about timers are all covered by existing SBP-2 functionality. Closed.

Issue 14.9 – For Discovery details, the specification will contain both normative sections on *what* must be included, and informative sections on *how* that information could be used.

Issue 14.10 – The group held another discussion about the alternatives of having a single Close command for both queues vs. dual Close commands—one for each queue. The discussion also covered the desired behavior(s) associated with supporting a connection termination from either end, and the suggestion of having the Initiator issue an "I'm done" command that would also serve as a Close request to the target.

In conclusion of the discussion, the group decided that there is no need for an explicit TRANSPORT_CLOSE command. This command will be removed. Instead, a Logout command will be sufficient. (When the Target wants to terminate a connection, it will simply return ORBs unprocessed—until the Initiator recognizes that it should issue a Logout command.) Closed.

ISSUE: Do we need a Target to be able to issue a TRANSPORT_OPEN command?

ACTION: (Brian Batchelder) The document should include a section that describes the interface between the transport client and the transport.

Issue 14.11 – After a response to a TRANSPORT_CAPABILITIES command, it was decided that the Target should reserve resources (prior to a TRANSPORT_OPEN) only as long as a reconnect timeout period. This will also require an additional response to the TRANSPORT_OPEN command to indicate that the Target no longer has the resources previously advertised.

Issue 14.13 – a) Greg LeClair provided an explanation for how TARGET RESET is used by drivers in commercial O/Ss. This explanation will be included in the next draft of the Profile document.

b) No, we cannot define how broadly (or narrowly) the TARGET RESET event affects a device using our transport. It is currently defined in SBP-2. The Profile document will specify any additional behavior beyond that which is specified in SBP-2. (Currently, there is no additional behavior identified.)

Issue 14.14 – Use unit unique id.

ISSUE: Do we really need Multiple Unit Directories that are the same?

5. Server Provider Interface for 1394 PWG Transport Protocol

Brian Batchelder shared his progress on an effort to describe the interface characteristics between the transport client and the transport. [He will make his slides available on the 1394PWG Website.]

Brian explained that the Server Provider Interface (SPI) describes the services provided by the transport protocol to its clients. He introduced his definitions of Clients and Servers. Clients are Applications that use the transport; a Server is one of those Applications that provides services.

He pointed out that Clients often reside in a host—while Servers reside in a device. However, this is not always the case.

Clients

- discover and connect to Servers
- transfer data
- disconnect from servers
- monitor errors and asynchronous events

Servers

- identify themselves—usually with a service name
- accept connections from Clients
- transfer data
- disconnect from clients(?)
- monitor errors and asynchronous events

As background information, Brian gave his explanation of a Socket-based Interface:

- a standard API for transport protocols
- a data structure pointing to an application
  - data structure points to only one application
  - application may have more than one data structures pointing to it
- BSD and Winsock-2 are well-known socket interfaces

Suggested Services:

- Socket
- Bind
- Listen
- Accept
- Connect
- Send
- Receive
- Shutdown
- SetSockOpt
- GetSockOpt

Clients

- establish a socket by calling Socket
- once a socket is allocated, Client can request a connection
- when Client is finished using a socket it releases the socket by calling Shutdown
- once a connection is open, Clients can Send and Receive data

Servers

- establish a socket and Bind their service name to that socket
- once allocated, Servers call Listen to establish an incoming request queue
- after requesting a connection, Accept will complete with a new socket for the open connection
- once a connection is open, Servers can Send and Receive data

The group decided to consider further discussions of a socket-based interface as a “case study” for possible implementation. It is believed that this approach should help the group in determining a sufficient list of necessary services for the interface.

Brian then reviewed each of the suggested Services (see above list), and discussed their functional and syntactical descriptions. (He explained that his discussion “borrows heavily” from the Winsock specification.)

Subsequent discussion raised the following points:

- A socket internal data structure will present itself to the bus and indicate its existence as a LUN in the Config ROM
- Each Login is mapped to a socket
- A Login is a pair of connected sockets
- Each LUN is mapped to a Server

ISSUE: How do we support multiple Logins from the same Initiator to the same service? By multiplexing either above or below the LUN layer, but which? Do we want to achieve multiple connections (LUNs?) within a single Login?

It was noted that there would be more effort/overhead to support multiple connections within a single Login to:

- avoid blocking
- handle Abort Task Set

John Fuller pointed out that if the multiplexing were done above the LUN layer, it would work with Microsoft's (current) support implementation.

It was suggested that the group should develop a comparison chart identifying the Pros and Cons of the three alternative approaches being considered:

1. Multiplex using only LUNs ("Pure SBP-2")
   - one Login establishes one connection
   - Login = connection from client to server
2. Multiplex using LUNs and something above ("Hybrid")
   - one Login establishes a session to a service which has or provides a multi-connection interface
   - Login = all connections between all the clients from one Initiator to the Server on one Target
3. Multiplex above LUNs ("1284.4-like")
   - one Login establishes a conversation
   - Login = the connection between all the clients from one Initiator to all the Servers on one Target

As a result of some discussion, the following chart was developed:

Alternative	**1**	**2**	**3**
Pros	• Multiplexing already invented by SBP-2		• Single PWG LUN • Single reconnect • Single Login resources
Cons	• Multiple LUNs/Server		• Login configuration affects all connections • Multiplexing at high level • Flow control on Login
???	• Service discovery via LUNs		• Service discovery at high level

The group did not list any Pros or Cons for Alternative 2.

MOTION: John Fuller made the motion to focus (exclusively) on Alternative 1 for future direction efforts.

VOTE: The motion passed without objection.

The group then had a long discussion on the characteristics and relationships of LUNs, Units, Services and Functions. Several of the concerns discussed were identified as "FDS (IEEE 1212r) issues."

During the discussion, several examples of services were identified for consideration:

- PDL stream
- Postscript stream
- Status stream
- Query response
- "Box" status
- Fax send and receive

[Greg LeClair indicated that he captured several relevant points to the above discussion. He was encouraged to include his notes in the official minutes.]

*** START of text by Greg LeClair ***

Of the three options discussed above, the Group focused on #1. We changed our mind after discussion due to the instability of the 1394 PWG Node Model. The following discussion did not provide any clear answer and the topic was left open until the Tucson meeting.

*** END of text by Greg LeClair ***

As a result of the discussion, the group concluded that Alternative 1 would not be good because its use of LUNs to describe services "seriously conflicts with the understood models of SBP-2." The group could not define a consistent manner to represent services.

Alternative 2.5 was then proposed for consideration:

- Multiplexing via "SHPT-like" mechanism (more than two queues per Login)
  - Function Instance = Unit
  - Login = connections between all clients of one Initiator to all services of one function instance
  - Function discovery via FDS
  - Service discovery via PWG commands

In another discussion, Randy described a mapping of Units to Services (each Service is a Unit), with each LUN being an "instance" of the Service. In his proposal, sample services included:

- LPD
- TIPSI
- Telnet
- SNMP

However, when Alan Berkema asked, "How does this relate to what we're trying to do?", Randy was unsure of a clear relationship.

The group continues to struggle in their efforts to develop (and reach consensus on) a coherent model for defining the relationships of LUNs, Units, Services, and Functions. This topic will continue via e-mail, and will likely be a topic of discussion at the next meeting.

6. Config ROM Issues

Neither the PWG OUI nor the IEEE 1212 Status topics were addressed.

7. Establishing a Secretary

This topic was not addressed.

Meeting adjourned.

8. Action Items -- Summary

ACTION: Brian Batchelder volunteered to write up a description clarifying the differences between datagram- and datastream-based services.

ACTION: Greg LeClair will maintain a prioritized “List of Active Issues” for tracking and reference within the group.

ACTION: (Isoda/Berkema) Figure 3 in Section 8.4, Initiator Model – There was some concern that the diagram might be confusing because it has too much detail. Isoda-san was volunteered to create a sequence of (four?) drawings—each one showing a progression of detail in the communication flow between the client and server: client/server, 1394 PWG, “SBP-2 cloud”, and “SBP-2 details.”

ACTION: (Brian Batchelder) The Profile document should include a section that describes the interface between the transport client and the transport.

ACTION: (Group effort? Canon proposal?) The group needs to agree on a method for encoding a new parameter that indicates that “the Initiator will maintain data buffer content integrity across Bus Resets” (to address the proposal made by Ueda-san on Recovery in August.)

ACTION: (Group) Appoint/coerce/ensnare/handsomely pay/locate a Secretary.

ACTION: Brian Batchelder will post his SPI discussion slides.

9. Future Activity

The next 1394 PWG Meeting is in Tucson, AZ on November 9.