

1394 PWG Meeting Minutes

October 27-28, 1997

1. Attendees

Because of a severe snow storm in Denver, many of usual attendees were not able to attend. The list of attendees included:

		Day 1	Day 2
Harry Lewis	IBM	x	x
Randy Turner	Sharp	x	x
Yoshinori Murakami	Epson	x	x
Atsushi Uchino	Seiko Epson	x	x
Fumio Nagasaka	Seiko Epson	x	x
Steve Scott	Granite System	x	
Kerry Lee	Granite Systems	x	
Dan Bye	SGS Thompson	x	
Dave Doman	Motorola	x	x
Osamu Hirata	Canon	x	x
Lee Farrell	Canon Information Systems	x	x
Greg LeClair	Epson	x	x
Alan Berkema	Hewlett Packard		x
Ron Sherer	Peerless		x

2. Administrivia

Before the 1394 activity began, Harry Lewis—acting as PWG Chairman for Don Wright—quickly discussed the next few PWG meetings:

- Dec 1-5 Los Angeles, CA
 - * Crown Plaza Hotel
 - * \$79/night, \$6 parking
 - * Make reservations by Nov 7
- Jan 19-23, Hawaii
 - * Maui Marriott on Kaanapali Beach
 - * \$179/night
- Mar 2-6, San Antonio
- Apr 6-10, Portland, OR
- May 18-22, Baltimore, MD

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

- 1394 TA Review
- 1284.3/4 Meeting Review
- 1394 PWG Printer Protocol
 - * Requirements
 - * Proposal Review
 - * IEEE xxxx Working Group effort
- 1394 PWG Printer Installation
 - * Review of FDS / SDD / IEEE-1212 WG

- * Requirements
- * Proposal Review
- * IEEE 1212 Working Group effort
- Action Items

3. 1394 TA Review

The 1394 TA meeting was held two weeks ago. According to Greg, Intel gave presentations on Power Management at the TA Architecture group. Sony made a presentation on their SDD proposal and the PWG/PWG-C gave a presentation on the Function Discovery Standard. The IEEE 1212 document was also discussed at the meeting.

At the DSI Working Group, the PWG-C presented their Direct Print proposal. Sony made a presentation on their SDD proposal and the PWG/PWG-C gave a presentation on the Function Discovery Standard.

4. 1284.3/4 Meeting

A meeting was held last week at Microsoft to discuss plans to include 1284.3 and 1284.4 support in the Windows Operating Systems. Brian Batchelder is expected to post meeting minutes.

5. IEEE 1212 Re-affirmation Meeting

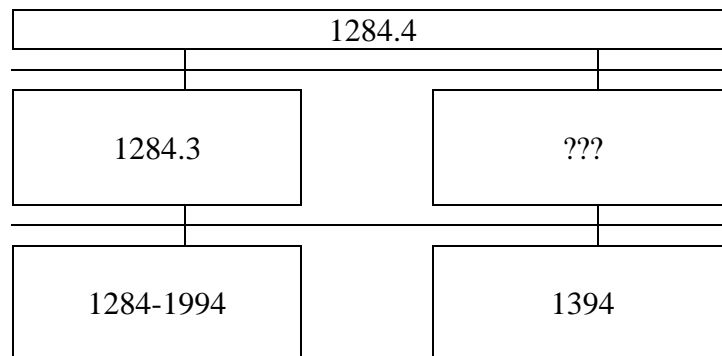
The IEEE 1212 Working Group will meet to discuss the possible update of the 1212 standard on November 11-12 at Sun Systems in Mountain View, CA.

[ACTION ITEM: Greg said he will post an announcement of the IEEE 1212 meeting details on the 1394 PWG reflector as soon as he has the information available.]

6. 1394 PWG Printer Protocol Requirements

Greg observed that there may be more than one stack used for different 1394 Printer devices. The Function Discovery Standard (FDS) has been defined to determine the different device/function types. Currently, there are different proposals being considered for different protocol stack requirements. So far, these proposals include methods based on SBP-2 or AV/C and FCP.

Greg pointed out that there is a strong preference to create a stack element which will maintain the same interfaces that currently exist for 1284.4 and 1284-1994:



The group reviewed an October 17 e-mail message from Brian Batchelder that discussed Requirements for the “Thick Transport Stack.”

6.1 Client Requirements

Each of the proposed requirements were categorized as either 1284.4 or datalink (DL) layers:

MUSTS:

- Support multiple, concurrent, independent, symmetrical connections – 1284.4
- Provide in-order, byte-stream and in-order, buffer (datagram?) services – DL
- Provide a directory service – 1284.4. (Randy felt that Brian’s inclusion of a directory service as a “Must” was too strong. Randy thought it should only be a “Want”)
- Transparently handle transient link interruptions – DL
- Reliability – this could occur at any layer, but it should guarantee absolute data accuracy. Randy suggested two additional (sub-)requirements for inclusion in the requirements list: Detection, and Correction.

WANTS:

- Connectionless service – it was suggested that this item be re-considered by the group because it is so difficult to implement.
- Multi-casting – it was suggested that this item be re-considered by the group because it is so difficult to implement.
- Data tagging – there was a question about the merit of this requirement. Is it *really* a “Want”?

6.2 Internal Thick Transport Stack Requirements

The group continued to review the proposed requirements.

MUSTS:

- Be data, application and O/S independent – Randy indicated that we need to agree on what “the appropriate interfaces” are. The upper and lower interfaces need to be well defined. Also, the use of the term “data” in Brian’s message needs to be clarified and made more specific.
- Do not preclude concurrent operation of other protocol stacks – agreed.
- Provide efficient data transmission – this should be re-stated as a requirement to provide flow control.

WANTS:

- Bus-independent transport layer – Randy suggested that this be restated as “Link-independent transport layer.”
- Reuse existing protocols – agreed.

6.3 1284.3/4 Datalink Interface

In an attempt to identify additional characteristics that the proposed protocol must support, Randy listed the existing 1284.3/4 Datalink Interface:

- DL_Register
- DL_Indication (read)
- DL_Confirmation (write)
- DL_Error (link error)

7. Function Discovery Standard

Greg LeClair described the feedback provided at the 1394 TA about the FDS presentation. Evidently, some people did not like the concept of having a Function Directory pointing to a separate Function

Description Directory. According to Greg, they recommended that the Function Description Directory be referenced from the Unit Directory. (Note: this is possible without changing the FDS proposal)

After discussing the feedback received at the TA, several people agreed that the suggested modification is acceptable.

Greg indicated that he would like to present the FDS details to the IEEE 1212 Working Group meeting in November. He also suggested that we propose specific key values for use by different architectures.

Greg referenced the 1212 standard, and reviewed the unit directory information and current key values. The current existing keys include:

- 12 Unit_spec_id
- 13 Unit_sw_version
- 14 Unit_dependent_info
- 15 Unit_location
- 16 Unit_poll_mask

SBP-2 keys include:

- 38 Command_set_spec_id
- 39 Command_set
- 3A Logical_unit_characteristics
- 3B Command_set_revision
- 3C Firmware_revision

SBP-2 Unit Dependent keys include:

- 14 Logical_unit_number
- 54 Management_agent_offset
- D4 Logical_unit_directory

To define a 1284.4 architecture, the group proposed to use the following SBP-2 key values:

- 38 Command_set_spec_id will be used to assign the IEEE RAC OUI value
- 39 Command_set will be used to define a RAC-assigned number for IEEE 1284.4
- 3B Command_set_revision will be used to define the revision of the 1284.4 stack

[ACTION ITEM: Larry Stein (chairman of the 1284.4 Committee) was assigned two tasks. He will need to formally request a RAC-assigned number for 1284.4 to fill out the Command_set key value. He will also find out the RAC number for IEEE used by Command_set_spec_id and CMDSet.]

The group walked through a proposed Unit Directory and Function Descriptor Directory content:

Function Directory		
Function Class	Pointer	(pointer to Unit Directory)
Textual Descriptor		“Printer”, “Scanner”, “Fax”, “MFP”, etc...
Unit Directory		
Unit_spec_id		
Textual Descriptor		“SBP-2”, “FCP”, etc...
Unit_dependent_info		(pointer to Function Descriptor Directory)
Unit_vendor		(proposed key)

Textual Descriptor
Unit_model_id
Textual Descriptor

Two new keys were proposed for the Unit Directory:

- Unit_vendor_id key
- Unit_model_id key

Much discussion resulted in the following content proposal for the Function Descriptor Directory:

Function Descriptor Directory
Manufacturer
Model Number

Randy suggested that Manufacturer should be included in the Unit Directory. He feels that this should be proposed at the IEEE 1212 meeting.

[ACTION ITEM: Greg LeClair will propose this at the IEEE 1212 meeting.]

If it is not accepted, however, Manufacturer will need to be placed in the Function Descriptor Directory. It was also discussed that Manufacturer and Model Number could be represented in a single “Device ID String.” (For example: Manufacturer:Model:Class:???)

After much discussion, it was decided that the specific content for the Function Descriptor Directory would not be specified in this meeting. Instead, the group agreed that “Appropriate information that should be necessary for interoperability, but not already included in other directories” will be defined and included in the Function Descriptor Directory.

Randy suggested that the interpretation of the Function_desc_dir_spec_id is defined by the Cmd_set_spec_id.

The concept of describing Service_channel assignments was discussed. Part of the Function Descriptor Directory would include a list of service channel assignments, using the channel number as the key value. An additional three bytes would point to a text leaf which contained the IANA-registered service string which is assigned to that channel.

7.1 Function Class List

Atsushi Nakamura had suggested (via e-mail) that the 1394 PWG group should come up with a proposed list of function classes. However, this was not accomplished during the meeting.

8. IEEE PAR for 1394 Printing

At the last IEEE MSC meeting, Don Wright volunteered the 1394 PWG group to propose a PAR for 1394 Printing. The group must determine who will participate, and who will write the PAR. Anyone interested in participating in this effort should contact Greg LeClair via e-mail—preferably before the next PWG meeting.

9. Epson SBP-2 Protocol Presentation

Fumio Nagasaka presented a proposal that offers SBP-2 as a Data Link for IEEE 1284.4. To simplify the design, only one type of the SBP-2 target agents is used: the type that executes a *single* request at a time. The proposal does not support target agents that can manage queues (linked lists) of requests. His presentation described a 1284.4 Management ORB—using a new function code—and its associated Status Block. He also presented diagrams that described the flow of a Command/Data transaction and a Load/Unload transaction.

A concern was raised that Nagasaka-san's proposal is not fully symmetric. Also, Randy wondered if the simplified "single request only" agent approach might create a potential blocking condition for multiple 1284.4 channels. (If there is no timeout on the completion of a single request process, is it possible to block the activity of another channel?)

Nagasaka-san explained that one Login would be executed for each separate 1284.4 channel, enabling multiple ORBs per device. Randy noted that this approach might require different "shims" in the protocol stack for different media types.

Nagasaka-san highlighted his proposal's design features:

- pure data link
- bus reset only affects a single data link transaction
- uses an existing standard

Randy asked if the proposal could guarantee "in-order delivery" of data. Greg believed that by implementing an in-order processing of the ORBs, the data will also end up in the correct order. It should be evaluated if it *might* be possible to deliver ORBs in a non-sequential order, especially when delivered over bridge connections. (Note: issue is whether bus packets may be delivered in sequence)

[ACTION ITEM: Greg LeClair will ask the 1394.1 (Bridge) Working Group if they can ensure sequential delivery of packets.]

Nagasaka-san described how ORB consumption notification was accomplished in the ORB response. He also pointed out that the notification could be achieved even when no response data is required.

The group reviewed the requirements list and evaluated Nagasaka-san's proposal against each of the "MUST" requirements.

MUSTS:

- Support multiple, concurrent, independent, symmetrical connections – These requirements are achieved, but in order to provide "symmetrical connections," a set of both initiator and target SBP-2 capability code would have to be implemented at each endpoint. [Randy noted that these implementations must be well-specified as part of the standard. This would ensure that a commercially-supplied implementation (in an operating system) will work properly with the code developed by a device vendor.]
- Provide in-order, byte-stream and in-order, buffer (datagram?) services – Achieved.
- Provide a directory service – Achieved by 1284.4
- Transparently handle transient link interruptions – Achieved.
- Reliability – Achieved at transaction layer.
- Be data, application and O/S independent – ???

- Do not preclude concurrent operation of other protocol stacks – Achieved.
- Provide efficient data transmission – Achieved.

10. HP SBP-2 Presentation

Alan Berkema briefly referenced a Request/Reply ORB proposal he had been considering in July and reviewed the other ideas that have been proposed to date. He mentioned two requirements that he has become concerned about:

- Supporting a PostScript capability which obtains information from a printer device. By issuing a <control-t> to a printer, it will cause the device to return status information of an unknown length.
- Supporting an “unsolicited data” notification from the printer

Alan also referenced the Microsoft WDM plans for the 1394 Bus Class, but admitted that he is not yet clear just how Microsoft expects to implement it.

[ACTION ITEM: Greg will request O/S vendors to add installable SBP-2 target functionality on the host side if we need fully symmetrical connection capability. (Note: it’s in the must list of requirements – however, this is actually ‘faked’ for 1284.3/4 – via a polling mechanism in the datalink.)]

Alan mentioned his Data FIFO Address (DFA) proposal that he had given at the last meeting, but says he has decided to put that proposal “on hold” for a while. Because it requires sequence numbering, he feels that it is more complex than he would like.

Alan also presented his previous Request/Reply ORB proposal. This resulted in the Bi-D ORB proposal before the SBP-2 group. The PWG was requested to justify the need for the Bi-D ORB at the next T10 meeting. Based on the recent discussions about how we might use the SBP-2 stack, it was decided that the current requirements could be met without use fo the Bi-D ORB.

[ACTION ITEM: Greg LeClair will put out a notice via e-mail asking if anyone in the PWG would like to attend the T10 meeting and present the proposal.]

[ACTION ITEM: Greg will publish a BiD ORB resolution by the 1394 PWG. He will post it to the list and inform the T10 group.]

Nagasaka-san referenced the “unsolicited status” requirement raised earlier by Alan. He suggested that in his proposal, the Management ORB could use the `output_buffer_offset` pointer and set it to a null or invalid value to handle such a condition.

11. Proposal Review and Next Steps

Randy asked if an “initiator-only” proposal can actually support all the features required for 1284.4. He suggested that this type of approach may still need some additional review and consideration.

Randy wondered if Microsoft would be implementing any drivers over SBP-2 other than a Disk class. He suggested that we should define an Imaging profile over SBP-2. Greg was concerned that this might be beyond the group’s current scope. He proposed that we should limit our activity to generating a *recommended* profile, delivered to the 1394 DSI WG (or other group.) After a bit of discussion, it was agreed that we should try to define a generic 1284.4 over 1394 transport—independent of device class.

MOTION: Alan made a motion that the group come up with a device profile that specifies how to use 1284.4 over SBP-2. Randy seconded. The motion passed without objection.

Greg asked for volunteers to actively participate in generating a draft proposal of the device profile. He said that a first draft document should be posted to the group before the December meeting. The following people volunteered:

- Randy Turner
- Greg LeClair
- Alan Berkema
- Fumio Nagasaka

Greg requested that any other interested individuals notify him via e-mail.

[ACTION ITEM: The sub-group listed above will draft a Printer device profile for using 1284.4 over SBP-2 before the December meeting. They will publish and distribute the draft copy at least one week before the meeting.]

Meeting adjourned.