

Fibre Channel Industry Association

Speed Forum

14 November 2003

9:30AM PST Conference Call

Minutes: Along with my editing and notes, these minutes encompasses the collective merger of Mark and Tom's notes of the conference call. Please forward any comments specifically regarding these minutes to me via the speed forum reflector or directly to skip.jones@qlogic.com. Please note that these minutes are a best effort at fairly and accurately capturing the discussions by the participants, and do not necessarily reflect one way or the other the views of those of us hosting the meeting, taking the minutes and assembling this document.

Attendees:

Skip Jones	QLogic	Host, Minutes
Tom Hammond-Doel	Emulex	Minutes
Richio Aikawa	Emulex	
Michelle Ng	Emulex	
Sam Ajjawi	Emulex	
Werner Glinka	Hitachi GST	
Ali Ghiasi	Broadcom	
Dave Anderson	Seagate	
Mike Heumann	AMCC	
Tom Harrington	Cisco	
Tom Linnell	EMC2	
Bruce Johnson	Seagate	
Bill Pagano	Seagate	
Nigel Alvares	PMC-Sierra	
Mark Hamel	HP	Minutes
Dan Reno	Hitachi GST	
Bob Snively	Brocade	
?	Cisco	
Kevin Sherman	IBM	
Bill Ham	HP	
Vit Novak	Sun	

Review Agenda

Ask for Volunteer/s to Take Minutes

Roll Call

FC Disk Drives Beyond 4G

- 1) SCA2 Connector 10G requirements
- 2) 8B/10B at 10G
- 3) Werner's Tracking Spreadsheet
- 4) Roadmap Review
- 5) Conclusions Thus Far

10G Copper

- 1) T11 already has 10G copper
- 2) Is something different needed?
 - a. Instead of current T11 standard
 - b. In addition to current T11 standard
- 3) CAT5? – IEEE

Set Next Meeting

Meeting Overview

On past calls the “10G Copper” part of the agenda has received the short end of the stick since the agenda item regarding “FC Drives Beyond 4G” takes up all the time. So this time we discussed 4G copper fabrics briefly before delving into disk drive speeds. Following the 10G copper fabric discussion, we took on “FC Drives Beyond 4G” by discussing SCA2 connector capabilities. Then the encoding scheme discussion entailed which raised concerns that any and all 10G discussions should assume 64B/66B encoding, thereby eliminating the need to further analyze 10G on the backend. The remainder of the discussion was dominated by debating the merits of 6G versus 8.5G versus 10G, and a moment was even spent on 12G disk drives.

The meeting ended with a plan to have a formal FCIA member vote on accepting or rejecting 8.5G as the FC drive IO speed following 4G. The vote will open shortly following 12/8/3 and will close sometime in January '04. On Monday night, 12/8/3, during the FCIA roadmap session at the T11 meeting week in the Bahamas, we are inviting people to present their position on accepting or rejecting 8.5GFC as the disk drive IO speed following 4GFC. Thus far, the presenters are Seagate, Broadcom, and HP. If you would like to request a slot for that night, please contact me, Skip Jones (skip.jones@qlogic.com) or Chris Lyon (Clyon870@cs.com).

10G Copper

Quad-lane is PI-2. Serial is PI-3. PI-2 has been stable since April. PI-3 is pretty much done.

Copper breaks down into three types of 10G:

- Cat 5E
- Serial
- Parallel

Need to generate an MRD for 10G to establish connector choices.

PI-2 is strictly box-box and is same as Enet CX4, SAS and Infiniband. Uses HSSDC connector.

XFI has no connector established yet.

Ethernet space has two characteristics: 1) Doesn't have to work with loops. 2) Constrained to CAT 5 or 6 environments with encoding schemes to take overcome of the CAT limitations.

10G ethernet uses 0.6 micron at 6W to 15W over Cat 5E. Probably needs to be CAT 6. 100M lengths. Enet's RJ45 is not compatible with FC.

10G issues prompted IEEE committee to consider 2.5G. Primarily cable/cable-related companies that want to replace current cable-plant infrastructure rejected proposal.

XFI first showing will be 0.13 micron. Serial FC 10G power will be 400-500 mW. 12" range. XFP cables have shown 10 meters. Cables are friendlier than a board. The 10 meters is a proprietary cable scheme. This has not been spec'd and may be feasible to do it with passive cables.

FC Disk Drives Beyond 4G

SCA2 Connector. Broadcom can provide more data at the December meeting on the feasibility of the SCA2 connector at 8.5G and possibly 10G. Ali also will contact Tyco for possible joint presentation. The SCA2 connector can be preserved, albeit with "minor" changes.

8B/10B at 10G. Previous assumptions that any notion of 10G drives use 8B/10B were swiftly repealed today. From multiple angles there was considerable resistance to the notion of having two different encoding schemes for 10G; as there also was against the notion of a drive incorporating dual encoders. Cost and simplicity were the two key points that continued to resurface as a non-negotiable requirement for the disk drive

industry. This discussion quickly circled back to the question of maintaining identical technologies for the disk and fabric.

8.5GFC versus 10GFC. Overall, backend-centric representatives such as drive suppliers and storage system suppliers resisted the need for the two ends (drive enclosures and fabrics) to track together and insisted that the two, by the nature of their markets and differing evolution, have autonomy. Yet a frontend-centric representative such as a switch supplier will point to historical developments that indicate eventually, as disks go so the fabric goes, and that in their direct markets, having both 8.5GFC and 10GFC fabrics would be unacceptable.

This discussion has been repeated numerous times over the past few months. Last summer, when mostly backend-centric interests were involved in the discussion, the conclusion was reached in favor of 8.5GFC. That result precipitated a wider attendance from frontend-centric interests that challenged the 8.5GFC decision in favor of 10GFC disks. This development has now attracted a wider attendance by more backend-centric interests that reiterate the 8.5GFC direction.

8.5GFC versus 6GFC. One drive supplier reiterated their desire to consider 6GFC as the next step for disk drives due to less technology costs and multiple IO technology convergence. The notion here is to use 2 oscillators to handle the non-modulo speeds of 4G (for backward compatibility) and 6G. This was countered by another drive company on the basis of adding cost and complexity that offsets any lesser cost in less PCB technology or gain from multiple IO convergence offered by 6G. As in past debates on this subject, it was again pointed out the importance in past speed debates and ballots the need to “double or nothing”. It was countered that the delta between 2G and 3G was not significant to warrant a change, but that the 2G delta between 4G and 6G would be enough to be attractive. This was refuted by storage system OEMs on the call. Then a discussion ensued on how much later in time 8G would be than 6G, but then a drive company countered by targeting 8.5GFC for 2006/2007, which meets the MRD requirement for storage system availability in 2008.

Call the Question. After some circling on the debate of speed, Seagate motioned and Sun seconded a ballot for a yes or no vote on accepting/rejecting 8.5G as the next disk drive speed following 4GFC.

Because the previous consensus for 8.5G reached during the past summer was recalled into debates during the recent months, a formal vote appears to be the prudent method to bring closure on this subject. All of the other sub-parts of the discussion hinge on this important decision, so it is common sense to nail the speed down. It was determined that without data coming in to the contrary, it seems reasonable to forward a formal vote on this subject following position presentations Monday night, 12/8/3, at the T11 meeting venue in the Bahamas. The ballot will open immediately following 12/8/3 and close in January '04. The ballot will be conducted and administered by the Executive Director of FCIA, Chris Lyon and L&M Associates.

If you would like to submit a presenter, please contact me, Skip Jones (skip.jones@qlogic.com) or Chris Lyon (Clyon870@cs.com) by 11/25/3. Thus far, the presenters are Seagate, Broadcom, and HP.

Next Meeting

January 8, 2003. This will be a face-to-face meeting at the T11 meeting venue in Bahamas. (See above).

Reference Material:

MRD (Market Requirements Document):

- Downward compatibility to 4Gb/s, possibly 2Gb/s (e.g. 8B/10B, FC-FLA compliant and same connector as present connector.) is essential
- Copper cable length 1 m from drive inside cabinet, 10m through line extenders
- Price same at comparable premium drive today
- 2.5-inch FF
- 2008 products ship
- 8Gb/s

FCIA Roadmap – 10/10/3

Product Naming	Throughput (MBps)	Line Rate (Gbaud)	T11 Spec Completed (Year)
1GFC	200	1.0625	1996
2GFC	400	2.125	2000
4GFC	800	4.25	2002
8GFC *	1600	8.5	2005
10GFC	2400	10.51	2003
40GFC	9600	10.51/42.04	2005
100GFC	24000	105.1	2008

* Disk Drives and Copper
