"Most likely it will be a generic transfer function, not any one company's favorite transfer function."

Bill Petty (LSI Logic) had taken over the timing budget spreadsheet duties previously held by Gene Milligan. He had done more than just tally up the black and red ink, Bill came in with a proposal to do something about it.

"I've been looking at the way transmit rise and fall time asymmetries are introduced in the system."

Bill showed a schematic diagram of an LVD driver and receiver connected by a cable. He pointed to several components in the driver and receiver which introduce rise and fall time asymmetries.

"Thinking about the problem, it looks as if we can pull some of these asymmetries back out by making some changes in the receiver logic."

Bill's changes were different from those proposed by Russ (we think).

"Right now, we align only the rising data signals to the clock."
"The leaves us with some uncorrected duty cycle errors and we have to adjust our Setup and Hold margins to account for them."
"If we align both the rising and falling data signals to the clock, the duty cycle errors are fully corrected."
"We get more Setup and Hold margin for a very acceptable amount of circuit design."

Bill backed his assertion up with diagrams.

Bruce Leshay kept Bill hopping for several minutes with questions about the specifics of the circuit design that was being proposed. Bill Petty had brought slides for both the circuit and the waveforms which was a wise move, as Bill Ham and Bruce had to alternate between them to sort things out.

When the signal alignment idea was in the bag, Bill turned towards the SPI-5 timing budget spreadsheet and pointed to two values of 0.5 nsec each.

"Notice that in SPI-4 these are uncorrected values which have to go to the bottom line of the budget."
"With the proposed correction logic, these numbers become fixed values that can be removed by the skew compensation logic."
"Best of all, with these changes we don't have a negative number at the bottom of the SPI-5 column."

Bruce was not so sure.

"I think that you've got the spreadsheet set up such a way that some terms are being double counted."

Bill was ready to investigate that possibility offline.

Bill Ham was curious about how far Bill Petty's success could be extended.

"Are you willing to say we are playing this game for the last time?"

"I don't see anywhere else to go."

George Penokie bought it.

"He's not kidding!"
"We're lucky to be getting this far."

Bill Ham played the innocent.

"We keep pulling rabbits out of the hat."
"I'm just wondering how long we can keep doing it."

Mark Evans decided it was time to offer his commentary.

"I'm not sure it's a hat we're pulling rabbits out of."

George followed the bouncing hare.

"There are only so many rabbits."

Bill Petty could see possibilities that the rabbit was really a mouse.

"I'm not sure this solves all the problems."
"We may still have to pull in some cable lengths."

That lit a fire under George.

"Wait a minute, now."
"I'm not ready to agree to reducing cable lengths yet."

"If this is the last round for parallel SCSI, we shouldn't have to worry so much about cutting cable lengths."

"That all depends."
"Generally, we have to be very careful about it."

The issue of cable lengths sent the group into CB Mode, and when a single thread of discussion re-emerged Bill Petty was doing the talking.

"I'm thinking 2m is about the limit for flat ribbon cables."

Faced with hard facts, George was willing to listen.

"Oh? That's okay by me."

"Good! Because that's our serious area of trouble."

The idea was impeccable, but serious problems were nestling quietly in the proposed implementation. Bob, an admitted MIB neophyte, undertook to present his most preliminary ideas to a room in which sat Marjorie Krueger and David Black (EMC).

The MIB wizards dined on the newbie for lunch, dinner, and breakfast the next morning. One cannot help thinking that Bob would have preferred to be boiled in oil.

Knowing even less than Bob about MIBs, your reporter detected about a 50/50 split between comments that might be relevant and comments that make sense in an Internet environment but seem like nonsense in a SCSI Domain.

Trouper that he is, Bob took tons of notes and promised to return with a much better proposal for consideration in March. He may check the attendance list before deciding whether to connect to the video projector or wait for a better alignment of the stars.

RECEPTION JANUARY 16

Compaq hosted at the Marriott Greenspoint in Houston.

You may question why there is a report on a reception, which is nothing more than a gathering with food and spirits offered on occasion by a meeting week host. The point is not to say Compaq did this (very well actually) at the reception, what makes this reception worthy of note in these pages was the after dinner speech.

This was not your average after dinner speech, and no one was whispering to the person next to them that it was a penalty endured for supper.

SAS

The wraps had been on all week but the hallway whispers were certainly equal to the attempted secrecy. Harry Mason (LSI Logic) wasted no time in whipping back the covers.

> "Thank you for coming and thanks to Compaq for arranging the excellent food that drew you here."
> "I want to introduce you to SAS (Serial Attached SCSI), which is an effort to develop a new protocol for SCSI, something to carry SCSI beyond the parallel bus."

Bill Petty (LSI Logic) may be done pulling rabbits out of his hat (see the SCSI Parallel working group report), but Harry was ready to take over where Bill had left off.

> "We've got a lot of good companies working on SAS and I'm pleased to be the group's spokesman."

Contributing Members	Participating Members
Compaq	Adaptec
IBM	Fujitsu
LSI Logic	Hitachi
Maxtor	QLogic
Seagate	ServerWorks
	Western Digital

Harry described the objectives and motivations for SAS.

"Customers continue to demand better reliability and performance for mid-range storage solutions and .technology is continuing to diverge."
"Nothing is emerging that could be called a 'universal' or 'heterogeneous' storage interface technology."
"The SCSI future beyond Ultra640 is unclear, and it looks like parallel SCSI may mature at that point."

In this context, 'mature' is the PC (Politically Correct) word for 'ossify'.

"Customers continue to demand next generation SCSI."
"There is an extensive level of trust in the technology."
"SAS is designed to continue the SCSI tradition, bringing peace of mind to customers."

Comments about universal and heterogeneous storage interface technologies were not being offered lightly and Harry continued by reviewing the storage interfaces some might see as competing with SAS.

First, the low end.

"ATA will continue to be ideal for low cost, non-mission critical bulk storage."
"Serial ATA (AT Attachment) is entering the market from a desktop heritage and it will take time to prove reliability metrics."
"We do not see it satisfying the reliability and performance expectations of the mainstream server/storage market."

Next, the high end.

"Fibre Channel will continue it's focus on the external storage market."
"It will remain pervasive in SAN (Storage Area Network) and NAS (Network Attached Storage) topologies."
"We anticipate that Fibre Channel will continue the drive for greater distances and faster performance but be too expensive for internal storage, leaving that market to the traditional technology of SCSI."
"An industry standard is required to address the opportunity and SAS is working to that end."

The air seemed to be charged with questions but people were holding back, so Skip Jones (QLogic), another master of meeting dynamics broke the ice.

"Exactly how does the SAS group proposed to develop the needed industry standard?"

"We will bring a project proposal to T10 in March."
"The first draft of the first phase of the SAS standard will be handed over to T10 in May."

"Right now the drafting process is limited to SAS members, but in May it will be completely open in T10?"

"Right."

Ed Gardner (Ophidian Designs) joined the friendly questioning.

"I can join SAS now and contribute to the standard in the making or I can wait three months and do the same thing as a regular T10 member."
"Why would I want to join SAS?"

"It all depends on how important you feel it is to participate in the preliminary rounds."

As the questioning died down, Harry returned to the goals of the SAS group.

"One of our goals is to provide customers with unprecedented choice."
"To that end SAS will leverage the Serial ATA connection for SAS storage devices, making it what you might call a universal disk connector."
"This will allow customers to deploy the right solution for their environment:
- low cost Serial ATA or
- highly reliable SAS
- all in the same physical system."
"This is a 'no fork lift upgrade' solution."

Harry next turned to the subject of reliability in SAS.

"SAS will leverage Fibre Channel expertise to ensure a robust specification."
"We will build this solution with the SCSI protocol."
"Our focus will be on designing performance and reliability characteristics that are equal to or better than parallel SCSI architectures."
"The goal for the cost structure is to not exceed parallel SCSI."
"We may even be able to offer a lower solution cost."
"The serial point-to-point interface will provide simplified cabling, and the physical layer is scalable for several generations."

Skip played friendly examiner again.

"What about outside the box scalability?"

"There will be some outside the box scalability but there will be bounds."
"While SAS will be more robust in large configurations than parallel SCSI, there is a hard limit of 128 on the number of devices in one domain."

People were edging back to the bar, so it was clearly summing up time.

"With SAS we maintain the current trio of storage interface options:
- ATA and Serial ATA for low-cost, non-mission critical bulk storage
- Parallel SCSI and SAS for robust enterprise configurations, and
- Fibre Channel for enterprise SAN and NAS environments."

T10 MEETING JANUARY 17

Compaq hosted at the Marriott Greenspoint in Houston.

Company	Name	Company	Name
Adaptec	R. Roberts	Intel	C. Simpson
Amphenol	J. Majernik	Iomega	T. Bradshaw
Andiamo	C. DeSanti	KnowledgeTek	D. Moore
BREA Tech	B. Galloway	LSI Logic	J. Lohmeyer
Brocade	B. Forbes	Maxtor	D. Cressman
	R. Snively		M. Czekalski
CD Edge	W. McFerrin		M. Evans
Compaq	R. Elliott	Microsoft	N. Obr
	W. Ham	Molex	J. Neer
Crossroads	R. Griswold	Nishan	C. Monia
Dallas Semi	J. Lott Jr	Ophidian Designs	E. Gardner
Dell	K. Marks	Panasonic	T. Nelson
	R. Stockford	QLogic	T. Chan
EMC	G. Robinson	Quantum	P. Entzel
Emulex	R. Nixon	Seagate	G. Houlder
ENDL	R. Weber	Silicon Image	M. O'Dell
Exabyte	J. Breher	StorageTek	E. Oetting
FCI	D. Wagner	Sun Microsystems	K. Moe
Fujitsu	E. Lew	Texas Instruments	P. Aloisi
Hewlett Packard	M. Krueger		D. Getty
Hitachi America	W. Glinka	Toshiba America	T. Kasebayashi
Hitachi Cable	R. Wasylak	Veritas	R. Cummings
IBM	D. Colegrove	Vixel	J. Nelson
	G. Penokie	Western Digital	J. Masiewicz

Snapshots

INCITS: T10 chair John Lohmeyer (LSI Logic) reported it is official that NCITS (National Committee for Information Technology Standards) has become INCITS (InterNational Committee for Information Technology Standards).