To: SPI-4 working group   01-149r0
From: SDV working group via Bill Ham
Date: May 01, 2001
Subject: Specific changes to SPI-4 recommended by SDV

This document contains the recommendations of the SDV working group for
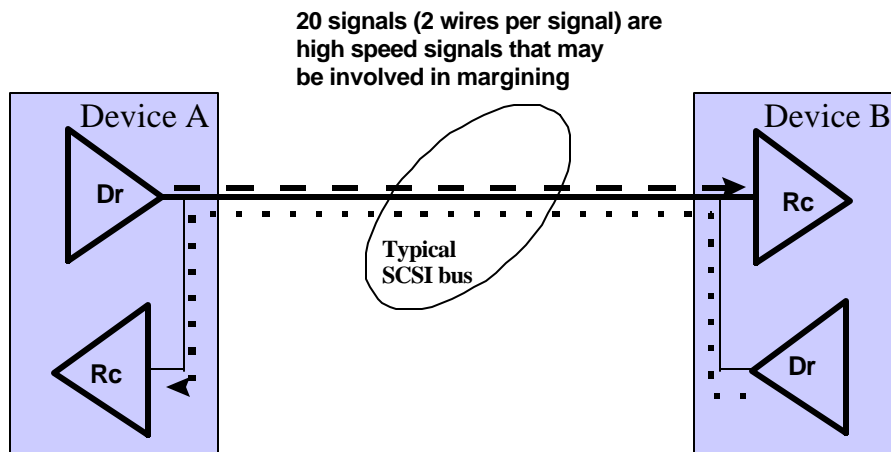changes to SPI-4 rev 04.

1. Change 1

Add the definition for a "driver-receiver connection" to section 18.1.4
of SPI-4.

Driver-receiver connections for signal margining

Figure 1 shows a portion of a single SCSI bus segment between two SCSI
devices or simple expanders illustrating the driver receiver connections
that may be affected by signal margining. Each device has a Driver, Dr,
and a Receiver, Rc.for each signal. For purposes of signal margining
all signal drivers and receivers within the same SCSI device or simple
expander use the same control information obtained from a mode page or
ECP. No means is provided for controlling individual signals in the
SCSI device or simple expander. There may be other SCSI devices, simple
expanders, or terminators not shown in Figure 1 that are connected to
the path between the driver and the receiver. Two driver receiver
connections exist between any two SCSI devices or simple expanders, one
for each direction.

Dr = Driver Circuit

Rc = Receiver Circuit

20 signals (2 wires per signal) are high speed signals that may be involved in margining

Device A

Dr

Rc

Typical SCSI bus

Device B

Rc

Dr

Device A to Device B driver-receiver connection

Device B to Device A driver-receiver connection

Figure 1 - Device to device driver-receiver connections

2. Change 2

In Table 84 clause 18.1.4.1:

Change: ~~"SIGNAL GROUND BIAS"~~
To: "DRIVER ASYMMETRY"

3. Change 3

In the text following Table 84 clause 18.1.4.1 Change:

~~The margin control fields shall be implemented as two's complement values with 0000b being the nominal value. The maximum supported setting for each field shall be 0111b and the minimum supported setting for each field shall be 1000b. Up to 16 distinct values are available for each field, representing monotonically changing device response. Devices that support fewer than 16 distinct values for a field should round non-supported settings to a supported value.~~

For SIGNAL GROUND BIAS fields, values 0000b through 0111b shall enable the bias cancellation circuit and values 1000b through 1111b shall disable the bias cancellation circuit, if disabling of this circuit is supported.

To:

The following parameters are controllable via the values in the control fields:

DRIVER STRENGTH - The magnitude of the signal launched from the driver circuit, both the strong and weak drivers are affected by this parameter

DRIVER PRECOMPENSATION - The magnitude of the cut back used by the driver in a paced transfer

DRIVER ASYMMETRY - The difference between the assertion magnitude and the negation magnitude launched from the driver circuit into a segment with non biased terminators.

SLEW RATE - The absolute value of the difference between the assertion magnitude +20% and the negation magnitude -20% divided by the time required to transition between an assertion (negation) to a negation (assertion). Both assertion to negation and negation to assertion have the same control value. Note: Rise and Fall times are specified between the 20% and 80% of the full driver swing. (See Annex A.2.6)

The margin control fields shall indicate absolute conditions centered around the value as shipped by the supplier represented as 0000b in the field. Absolute conditions means that the previous history of the parameter has no relevance to the value of the parameter. The fields shall be implemented as two's complement values as shown in Table 1. The maximum supported setting for each field shall be 0111b and the minimum supported setting for each field shall be 1000b. Up to 16 distinct values are available for each field, representing monotonically changing device response. Devices that support fewer than 16 distinct values for a field should round non-supported settings to a supported value.

The actual value of the device response to a field value is vendor specific and calibration of the actual minimum and maximum response to different field values is not defined in this standard.

For the DRIVER ASYMMETRY field, values 0000b through 0111b shall enable the circuitry in the driver that compensates for terminator negation bias and values 1000b through 1111b shall disable the circuitry in the driver that compensates for terminator negation bias, if disabling of this circuit is supported.

Table 1 - Summary of margin field settings

Field value	Parameter values for DRIVER STRENGTH, DRIVER PRECOMP, DRIVER ASYMMETRY, and SLEW RATE	Terminator negation bias compensation circuit in the driver
0111b (+7)	maximum setting	enabled
0110b (+6)		enabled
0101b (+5)		enabled
0100b (+4)		enabled
0011b (+3)		enabled
0010b (+2)		enabled
0001b (+1)		enabled
0000b (0)	as shipped	enabled
1111b (-1)		disabled
1110b (-2)		disabled
1101b (-3)		disabled
1100b (-4)		disabled
1011b (-5)		disabled
1010b (-6)		disabled
1001b (-7)		disabled
1000b (-8)	minimum setting	disabled

4. Change 4

In Table G.6 MARGIN CONTROL SEDB in clause G.6.1.3 MARGIN CONTROL

Change: "SIGNAL GROUND BIAS (near port)"
To: "DRIVER ASYMMETRY (near port)"

Change: "SIGNAL GROUND BIAS (far port)"
To: "DRIVER ASYMMETRY (far port)"

5. Change 5

In the text following Table G.6 MARGIN CONTROL SEDB in clause G.6.1.3
MARGIN CONTROL

Change:

Two duplicate sets of margin control fields (i.e., DRIVER STRENGTH,
SIGNAL GROUND BIAS, DRIVER PRECOMPENSATION, and SLEW RATE) are provided,
one set for the near port and another set for the far port.

If the first SEDB is used for the initiator settings, only the far port
fields are used and the near port fields are reserved. The margin

~~control fields shall be implemented as two's complement values with 0000b being the nominal value. The maximum supported setting for each field shall be 0111b and the minimum supported setting for each field shall be 1000b. Up to 16 distinct values are available for each field, representing monotonically changing device response. Devices that support fewer than 16 distinct values for a field should round non-supported settings to a supported value.~~

~~For SIGNAL GROUND BIAS fields, values 0000b through 0111b shall enable the bias cancellation circuit and values 1000b through 1111b shall disable the bias cancellation circuit , if disabling of this circuit is supported.~~

~~For a description of the DRIVER STRENGTH, SIGNAL GROUND BIAS, and DRIVER PRECOMPENSATION fields see 18.1.4.1.~~

To:

Two duplicate sets of margin control fields (i.e., DRIVER STRENGTH, DRIVER ASYMMETRY, DRIVER PRECOMPENSATION, and SLEW RATE) are provided, one set for the near port and another set for the far port.

The margin control fields shall indicate absolute conditions centered around the value as shipped by the supplier represented as 0000b in the field. Absolute conditions means that the previous history of the parameter has no relevance to the value of the parameter. The fields shall be implemented as two's complement values as shown in Table 2. The maximum supported setting for each field shall be 0111b and the minimum supported setting for each field shall be 1000b. Up to 16 distinct values are available for each field, representing monotonically changing device response. Devices that support fewer than 16 distinct values for a field should round non-supported settings to a supported value.

The actual value of the device response to a field value is vendor specific and calibration of the actual minimum and maximum response to different field values is not defined in this standard.

For the Driver Asymmetry field, values 0000b through 0111b shall enable the circuitry in the driver that compensates for terminator negation bias and values 1000b through 1111b shall disable the circuitry in the driver that compensates for terminator negation bias, if disabling of this circuit is supported.

Table 2 - Summary of SEDB margin field settings

Field value	Parameter values for DRIVER STRENGTH, DRIVER PRECOMP, DRIVER ASYMMETRY, and SLEW RATE	Terminator negation bias compensation circuit in the driver
0111b (+7)	maximum setting	enabled
0110b (+6)		enabled
0101b (+5)		enabled
0100b (+4)		enabled
0011b (+3)		enabled
0010b (+2)		enabled
0001b (+1)		enabled
0000b (0)	as shipped	enabled
1111b (-1)		disabled
1110b (-2)		disabled
1101b (-3)		disabled
1100b (-4)		disabled
1011b (-5)		disabled
1010b (-6)		disabled
1001b (-7)		disabled
1000b (-8)	minimum setting	disabled

For a description of the DRIVER STRENGTH, DRIVER ASYMMETRY, DRIVER
PRECOMPENSATION, and SLEW RATE fields see 18.1.4.1.