Doc #: 87-118

To: X3T9.2 Committee Date: July 13, 1987

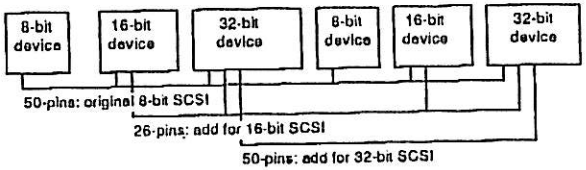
From: Jim Schuessler, National Semiconductor

Subject: Wide SCSI Cabling Proposal

I believe that most of us would agree the market potential for 16-bit SCSI is larger than 32-bit, just as 8-bit SCSI is much larger than potential 16-bit devices. My concern is that many devices which conceivably could use 16-bit SCSI will be precluded from using it simply due to the large connector/cable requirement in the present SCSI-2 document. An additional 60-pin cable is required for either 16 or 32-bit options.

I propose that a smaller 26-pin connector/cable option replace the present 60-pin option for 16-bits and that an additional 50-pin cable replace the 60-pin option for 32-bits. Here is how it could work:

Example SCSI System: 8/16/32-bit width on same system



By adopting this proposal, physically smaller devices could more easily move to 16-bits by adding only a 26-pin instead of a 60-pin connector. Likewise those smaller number of devices which need 32-bits are not paying too large a penalty with the additional 26-pin and 50-pin connectors. They tend to be physically larger and less cost sensitive and thus can absorb the additional board area and cost more easily.

The sample schematics Steve Goldman of DPT provided will extend logically to three REQ's and ACK's just as they work for two. In addition, no changes are necessary to the Wide SCSI Message added to SCSI-2 for arbitration of bus width.

See additional pages for specific changes to SCSI-2 rev. 1.

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Physical Characteristics 7/13/87

Section 4.1. , fourth paragraph:
Eight (8) bit wide SCSI devices and bus utilize a 50 pin interface labeled Cable A. Sixteen (16) bit wide SCSI devices and bus utilize Cable A in addition to a 26 pin interface labeled Cable B. Thirty Two (32) bit wide SCSI devices and bus utilize Cable A and Cable B in addition to another 50 pin interface labeled Cable C.

Section 4.2.2, first paragraph:
A 50-conductor flat cable or 25-signal twisted-pair cable shall be used for Cable A. A 26-conductor flat cable or 13-signal twisted-pair cable shall be used for Cable B. A 50-conductor flat cable or 25-signal twisted-pair cable shall be used for Cable C.

Section 4.3, paragraphs 4 and 5:
The nonshielded SCSI Cable B device connector (figure 4-x) shall be a 26-conductor connector consisting of two rows of 13 male pins with adjacent pins 2.54mm (0.1in) apart. A shroud and header body should be used. The nonmating portion of the connector is shown for referance only.

The nonshielded Cable B cable connector (figure 4-x) shall be a 26-conductor connector consisting of two rows of 13 female contacts with adjacent contacts 2.54 mm (0.1 in) apart. It is recommended that keyed connectors be used.

The nonshielded SCSI Cable C device connector (figure 4-x) shall be a 50-conductor connector consisting of two rows of 25 male pins with adjacent pins 2.54mm (0.1in) apart. A shroud and header body should be used. The nonmating portion of the connector is shown for referance only.

The nonshielded Cable C cable connector (figure 4-x) shall be a 50-conductor connector consisting of two rows of 25 female contacts with adjacent contacts 2.54 mm (0.1 in) apart. It is recommended that keyed connectors be used.

Table 4-x: Single Ended Pin Assignments
Cable B

Signal	Pin Number
SHIELD GND.	2
-DB(8)	4
-DB(9)	6
-DB(10)	8
-DB(11)	10
-DB(12)	12
-DB(13)	14
-DB(14)	16
-DB(15)	18
-DB(P1)	20
TERMPWRB	22
-REQ	24
-ACK	26

NOTES:
(1) All odd pins except pin 21 shall be connected to ground. Pin 21 shall be connected to TERMPWRB.
(2) The minus sign next to the signals indicates active low.

Table 4-x: Single Ended Pin Assignments
Cable C

Signal	Pin Number
SHIELD GND.	2
-DB(16)	4
-DB(17)	6
-DB(18)	8
-DB(19)	10
-DB(20)	12
-DB(21)	14
-DB(22)	16
-DB(23)	18
-DB(P2)	20
TERMPWRC	22
-REQ	24
-ACK	26
SHIELD GND.	28
-DB(24)	30
-DB(25)	32
-DB(26)	34
-DB(27)	36
-DB(28)	38
-DB(29)	40
-DB(30)	42
-DB(31)	44
-DB(P3)	46
SHIELD GND.	48
SHIELD GND.	50

NOTES:
(1) All odd pins except pin 21 shall be connected to ground. Pin 21 shall be connected to TERMPWRC.
(2) The minus sign next to the signals indicates active low.

Table 4-x: Differential Pin Assignments
Cable B

Signal Name	Pin Number		Signal Name
SHIELD GND.	1	2	SHIELD GND.
+DB(8)	3	4	-DB(8)
+DB(9)	5	6	-DB(9)
+DB(10)	7	8	-DB(10)
+DB(11)	9	10	-DB(11)
+DB(12)	11	12	-DB(12)
+DB(13)	13	14	-DB(13)
+DB(14)	15	16	-DB(14)
+DB(15)	17	18	-DB(15)
+DB(P1)	19	20	-DB(P1)
TERMPWRB	21	22	TERMPWRB
+REQ	23	24	-REQ
+ACK	25	26	-ACK

NOTES:
(1) SHIELD GROUND is optional. (Implimentors note: Some shielded flat ribbon cables use pin 1 as a connection to the shield.)

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Table 4-x: Single Ended Pin Assignments
Cable B

Signal Name	Pin Number		Signal Name
SHIELD GND.	1	2	SHIELD GND.
+DB(16)	3	4	-DB(16)
+DB(17)	5	6	-DB(17)
+DB(18)	7	8	-DB(18)
+DB(19)	9	10	-DB(19)
+DB(20)	11	12	-DB(20)
+DB(21)	13	14	-DB(21)
+DB(22)	15	16	-DB(22)
+DB(23)	17	18	-DB(23)
+DB(P2)	19	20	-DB(P2)
TERMPWRB	21	22	TERMPWRB
+REQ	23	24	-REQ
+ACK	25	26	-ACK
SHIELD GND.	27	28	SHIELD GND.
+DB(24)	29	30	-DB(24)
+DB(25)	31	32	-DB(25)
+DB(26)	33	34	-DB(26)
+DB(27)	35	36	-DB(27)
+DB(28)	37	38	-DB(28)
+DB(29)	39	40	-DB(29)
+DB(30)	41	42	-DB(30)
+DB(31)	43	44	-DB(31)
+DB(P3)	45	46	-DB(P3)
SHIELD GND.	47	48	SHIELD GND.
SHIELD GND.	49	50	SHIELD GND.

NOTES:
(1) SHIELD GROUND is optional. (Implimentors note: Some shielded flat ribbon cables use pin 1 as a connection to the shield.)

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Other sections which mention the B cable are:
4.4.3 paragraphs 2 and 3.
4.6 last paragraph
5.1.6.3 throughout
there are most likely others...