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To: X3T9.2 SCSI Committee Members
From: Kurt Chan, Gordon Matheson
Subject: Round 2, SCSI Cable Comparisons

Since the last set of data presented at the April plenary, several flat ribbon cables have been submitted to HP for testing. We ran through our test procedure one more time with the following cables, but this time testing only two topologies and two termination networks. The procedure for these tests is identical to that described in a previous paper (X3T9.2/89-57).

CABLES TESTED			
Vendor	Wire Gauge	Pitch	Dielectric
3M	30 AWG	.050"	TPE (polyethylene)
3M **	28 AWG	.050"	TPE (polyethylene)
AMP 75-ohm	28 AWG	.025"	PVC
AMP 93-ohm	28/30 AWG Hybrid	.025"	PVC
Generic SCSI-1	28 AWG	.050"	PVC
Stewart/T&B	28 AWG(?)	.050" folded	PVC(?)
Temp-Flex	28 AWG	.050"	Teflon FEP

** This cable was not tested due to a defect in one of the samples.

CONFIGURATIONS TESTED	
Abbreviation	Description
A Standard	Driving from end of bus with 220/330 terminators
B Standard	Driving from center of bus with 220/330 terminators
A Active	Driving from end of bus with 110 ohm terminators to 2.85V
B Active	Driving from center of bus with 110 ohm terminators to 2.85V

CABLE RANKINGS				
Rank	A Standard	B Standard	A Active	B Active
1	3M 30AWG	Stewart	Temp-Flex	Stewart
2	Temp-Flex	3M 30AWG	3M 30AWG	3M 30AWG
3	SCSI-1	Temp-Flex	SCSI-1	Temp-Flex
4	Stewart	SCSI-1	Stewart	SCSI-1
5	AMP 93	AMP 93	AMP 93	AMP 93
6	AMP 75	AMP 75	AMP 75	AMP 75

General Conclusions:

- In some cases the rankings are not significant - differences between first and fourth places were as low as 80 millivolts. The resolution of our measurments was only 10 millivolts.
- In our configurations, the .050"-pitch cables fared better than the .025".
- All but the AMP75 cable are considered suitable for HP applications.
- The TPE and Teflon dielectrics generally outperformed PVC, due at least in part to their higher impedance given the same geometries [1]:

Dielectric	Dielectric Constant @ 1 MHz	Normalized Impedance
PVC	3.3	1
Polyethylenes	2.4	1.17
Teflon	2.1	1.25

The normalized impedances were derived from the following relationship:

$$Z_0 \alpha \frac{1}{\sqrt{\varepsilon_r}} \qquad [2]$$

which implies that for the cables of *identical construction*, we can expect Polyethylene and Teflon to yield impedances which are approximately 17% and 25% greater than that of PVC.

[1] *Electronics Designers' Handbook*, McGraw-Hill, 1977, pg 2-64

[2] Corso, Kirrman, and Nicoud, *Microcomputer Buses and Links*, Academic Press Inc., 1986

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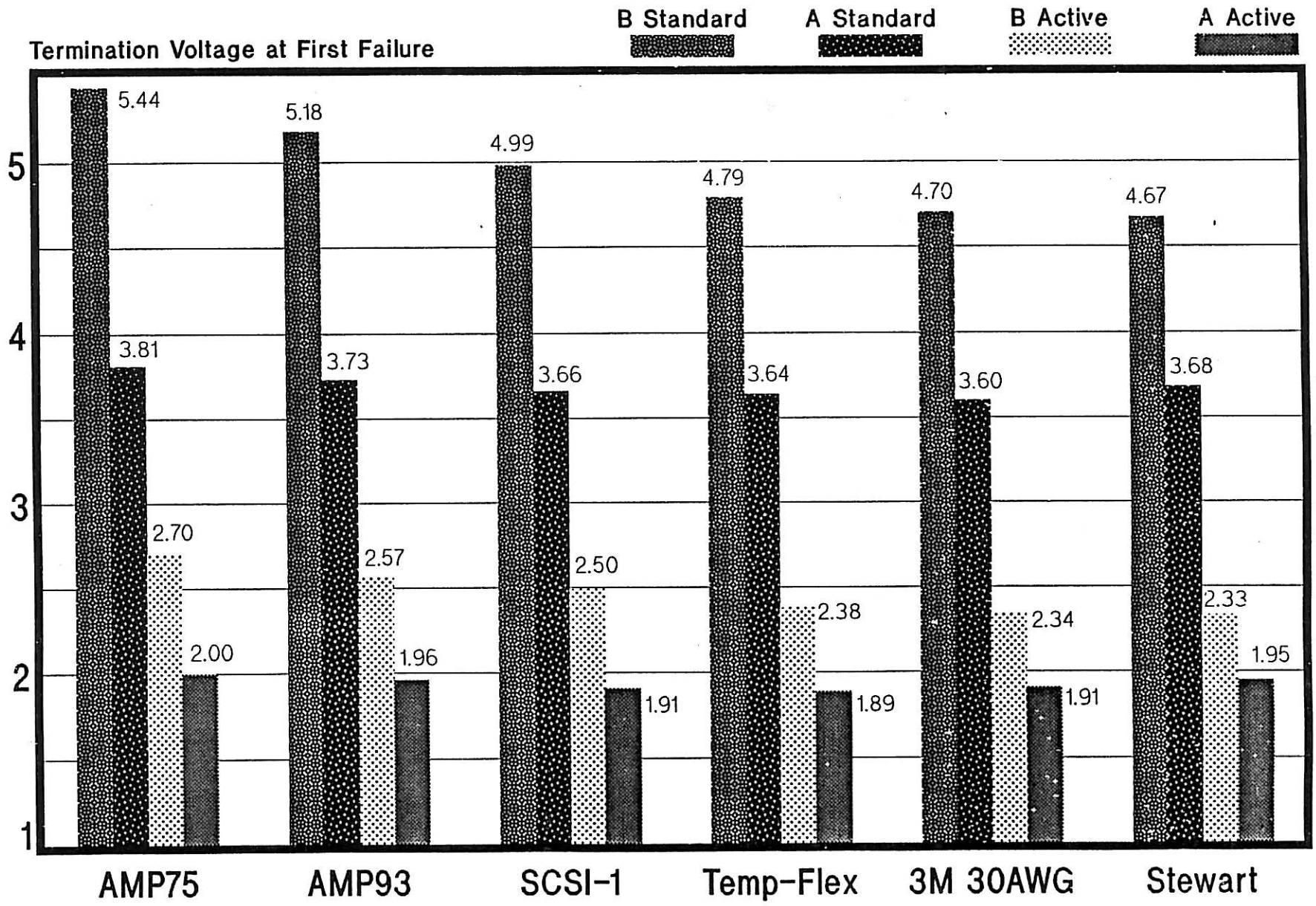
SCSI Cable Comparisons – Raw Data

June 89



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