X3T9.2/92-0[illegible]

To: X3T9.2 -- Connectors

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SUBJECT: SCSI-3 Connectors Framework

DATE: April 27, 1992

BACKGROUND:

For various reasons we seem to be having difficulty in keeping the requirements for an effective standard and the desires of integrators, cable assembly vendors, and connector vendors pointing in the same direction. A framework that may help in refocussing us towards a common path is suggested below. This is only a framework and will need to be fleshed out through cooperation and participation from all affected. The value of this framework is directly related to the data that can be found to put in it.

HIGH LEVEL FRAMEWORK:

There are four points that seem to cover most of the issues:

(1) True compatibility for both connector sides in a multivendor environment

(2) Different application requirements

(3) Availability and multisourcing

(4) Real technical properties

True compatibility means that all of the requirements needed by the application are satisfied: continuity and isolation, service life, shielding, mechanical interfacing including all securing devices, cost, and simultaneous availability of both sides when needed.

Different applications have different requirements.

The breadth of compatible types available now for different styles is probably very different. This feature has major impact to total design freedom for devices, adapters, terminators, and cables

Real technical properties -- this must include both the intrinsic design style properties and the performance properties in a multi vendor environment.

With all these variables a framework appears essential to construct an effective standard.

LOWER LEVEL FRAMEWORK:

Another level of detail is given for (2), (3) and (4) above. Compatibility is the result of (2), (3) and (4).

A six level division of the basic applications is suggested.

BASIC APPLICATIONS FEATURES (2):

(A) Mating cycles

Presently there is an agreed minimum requirement of 50 cycles. There is much discussion about needing up to 3000 cycles for certain laptop/notebook applications. Clearly these two applications are vastly different and may require different connector solutions.

(B) Shielding

Presently there are only two options: shielded or unshielded. It has long been recognized that these two require different solutions. However, if friction securing is adequate shielded and unshielded can intermate.

(C) Mounting/support mechanism

There are three main types: bulkhead, free floating on a cable, or PWB.

(D) Back side connections

These include IDC, thru hole, SMT, compliant pin, straight, right angle and others.

(E) Securing mechanism

Jack screws and friction seem to be the options here. The thread on the jack screws is likely to be considered a variable however by some.

(F) Physical access

This refers to blind, open, external, internal and the like.

AVAILABILITY AND MULTISOURCING (3):

A matrix of the present types is constructed below. Some data generated in a meeting with Amp is shown as a starting point. Even this data may not be complete or accurate. The data shown illustrates how this matrix would look. This matrix needs to be filled out completely by connector suppliers in order to be fully useful.

MATRIX OF PRESENTLY AVAILABLE HIGH DENSITY 68 PIN CONNECTORS
(SUPPLIERS NAME GIVEN IF PRODUCTION TOOLED TODAY, X = NOT TOOLED)

| STYLE => | TAB AND RECEPTICLE | | RIBBON STYLE A (3M) | | RIBBON STYLE B (BURNDY) | |
|---|---|---|---|---|---|---|
| BACK END TYPE | SHIELD | UNSHIELD | SHIELD | UNSHIELD | SHIELD | UNSHIELD |
| THRU HOLE PWB VERTICAL | AMP | AMP | AMP | AMP | ? | ? |
| RT ANGLE | AMP | AMP | AMP | AMP | ? | ? |
| SMT PWB VERTICAL | AMP | X | X | X | ? | ? |
| RT ANGLE | ? | HONDA? | X | X | ? | ? |
| COMPLIANT PIN (VERTICAL) | AMP | X | ? | ? | ? | ? |
| STRADDLE MOUNT (SMT) | X | AMP | X | X | ? | ? |
| PANEL/BULKHEAD 0.025 RIBBON | AMP | X | X | X | ? | ? |
| 0.050 RIBBON | AMP | X | X | X | ? | ? |
| INTERNAL CABLE 0.025 RIBBON | X | AMP | X | X | ? | AMP? |
| 0.050 RIBBON | X | AMP | X | X | ? | ? |
| EXTERNAL CABLE | AMP | X | AMP | X | ? | ? |

When filled out this matrix will clearly show where the industry is today in terms of style and type availability. The style with the fewest "X's offers ~~less~~ design flexibility.

GREATER

REAL TECHNICAL PROPERTIES:

Following is a collection of the technical properties that appear to be the most important based on numerous discussions.

(a) Mating cycles to failure:

If the connector is infrequently mated/demated the main concern seems to be noble metal wear thru. Failure will be caused by corrosion. If the connector is frequently mated corrosion is much less of a concern. Failure here is more likely due to mechanical wear or handling damage. Failure data in both modes seems essential to objective reaction.

(b) Mechanical robustness:

There are three stress conditions that apply:

(1) Handling and plugging -- both blind and open
(2) Torque on jack screws
(3) Stress transmitted through the cable

(c) Defect detectability and repairability:

Some defects can be visually detected, others will only be operationally visible. The visual defects are generally much easier to deal with. Some defects can be repaired by the user, others require significant hardware replacement.

(d) Ability to deal with dirt

The effectiveness of the connector wipe in moving "dirt" out of the way is a key parameter.

(e) Tolerance differences between suppliers

(f) ESD exposure

A second matrix is suggested to map these technical features with the connector styles.

# TECHNICAL PROPERTIES OF 68 PIN SCSI CONNECTORS

| STYLE => | TAB AND RECEPTICLE | RIBBON STYLE A (3M) | RIBBON STYLE B (BURNDY) |
|---|---|---|---|
| TECHNICAL PROPERTY | | | |
| CORROSION LIMITED MATING CYCLES | | | |
| WEAR LIMITED MATING CYCLES | | | |
| ROBUSTNESS HANDLING/MATING | | | |
| JACK SCREW TORQUE SENSITIVITY | | | |
| CABLE STRESS SENSITIVITY | | | |
| VISIBLE DEFECTS | | | |
| OPERATIONAL DEFECTS | | | |
| REPAIRABLE DEFECTS | | | |
| EFFECTIVENESS IN DIRT | | | |
| TOLERANCE SENSITIVITY | | | |
| ESD EXPOSURE | | | |