

**PCMCIA SCSI Liason Report**

LCB 31694 1

**PCMCIA SCSI Liason Report**

- History
  - PCMCIA I/O Connectors
  - PCMCIA SCSI Working Group
  - Constraints
  - Cable
- Current Status
  - Cable Configuration
  - Connector
  - Signal Placement

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**History**

- PCMCIA I/O Connectors for I/O applications
  - Proposals originated, Fall 1992
  - 9, 15, 28 Position Connectors originally proposed
  - Only 15 Position Connector approved
- PCMCIA/SCSI Working Group - February 1993
  - Limited Space for Cable/Connector
  - PCMCIA Establishes Connector Specification
  - Establish Liason with X3T10 (X3T9.2)
  - Use X3T10 Expertise to Establish Cable Criteria

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**History**

- Constraints
  - PCMCIA Card and Cable  $\leq$  5.0 mm
  - Connector Limited to  $\leq$  33 Pins
  - Cable Length  $\leq$  1.5 meters
  - 3 Drops Maximum
  - Single-Ended Operation
  - 90 Ohms

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**History**

- Cable Parameters - May 1993 X3T10 Plenary
- Flat Cable
  - 31 Conductors
  - 30 AWG, 90 Ohms, 28 AWG Term Power
  - Data, Parity, REQ, ACK paired
  - Remainder single ground
  - Grouped in individual shielded bundles
  - 3 bundles for Data and Parity
  - 1 Bundle Control, Term Power, Ground
  - 1 Bundle REQ, ACK
  - Overall shield widran over shielded bundles

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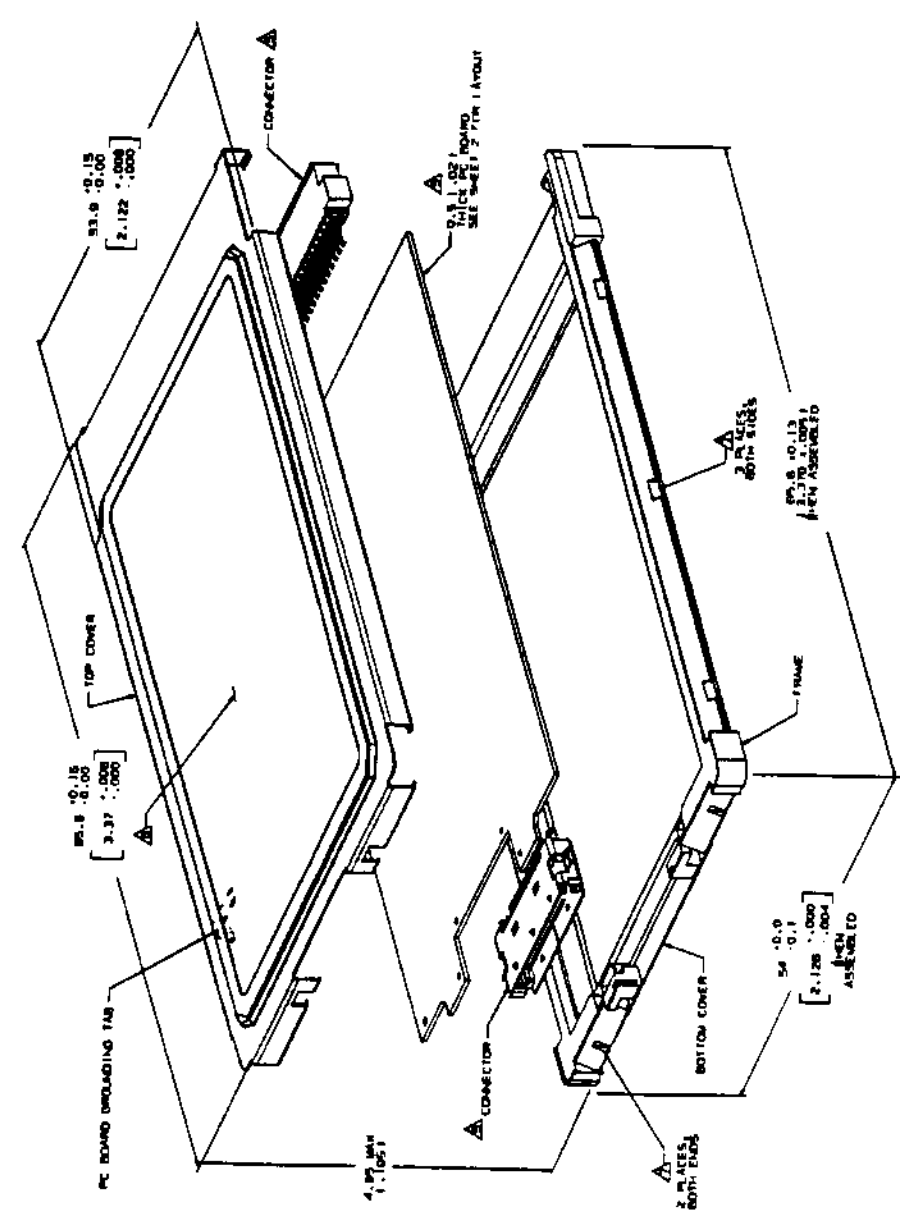
**Current Status**

- Cable
  - Cable sampled by Madison
  - Characteristics
  - 5 bundles
  - Impedance - 40 Ohms Single-Ended, 130 Ohms Differential
  - Capacitance - 11 pF/ft Mutual, 18 pF/ft Single-Ended
  - DC Resistance - 0.10 Ohms/ft
- Connector
  - Proposals by AMP and Hirose
  - Amp 13 Position In-Line
  - Hirose 32 Position In-Line

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AA	1	PROPOSAL
AA	2	PROPOSAL
AA	3	PROPOSAL
AA	4	PROPOSAL
AA	5	PROPOSAL
AA	6	PROPOSAL
AA	7	PROPOSAL

- 1. MATERIALS: COVERS, STAINLESS STEEL, SLICE POLYCARBONATE WELDING COMPOUND.
- 2. FRAME WILL CONFORM TO METRIC DIMENSIONAL STANDARDS.
- 3. DIMENSIONS IN BRACKETS 1 LINE IN INCHES.
- 4. THIS KIT SHIPPED NOT ASSEMBLED.
- 5. ITEMS INDICATED ARE SHOWN FOR REFERENCE ONLY AND NOT INCLUDED IN KIT.
- 6. METRIC DIMENSIONS SHALL ACCOMMODATE A LABEL MOUNTING KIT WITH METRIC DIMENSIONS (SEE LOCATIONS ON TOP AND BOTTOM COVERS).
- 7. BLOTS FOR TOOL TO REMOVE TOP COVER.



NO. RELEASE DATES	32	93-1815-13-5
APPROVAL	15	93-1815-13-5
TESTS/REVISIONS FOR LABEL	22	93-1815-13-5
DESCRIPTION	POSITIONS	DATE
AMP		
FRAME KIT TYPE I IN SHIELDED 3.8 mm		
CUSTOMER DRAWING: 94-077		
FORM TITLE	93-1815	
D	00779	
REV	4:1	

REV	4:1	
DATE		
BY		
CHKD		
APP'D		
DATE		
BY		
CHKD		
APP'D		
DATE		
BY		
CHKD		
APP'D		
DATE		

**METRIC**

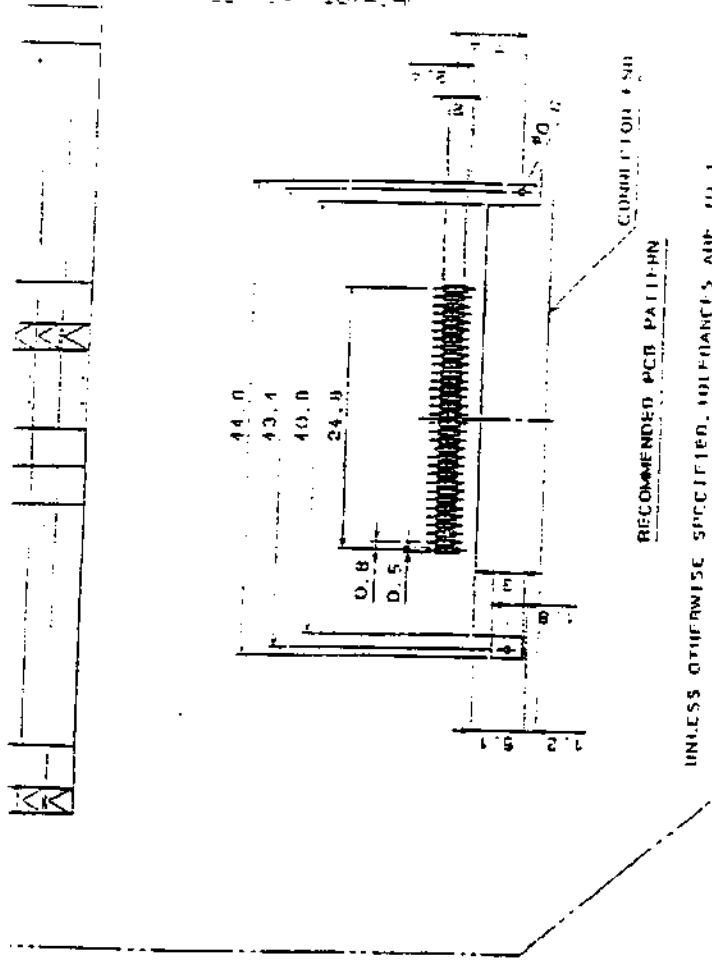
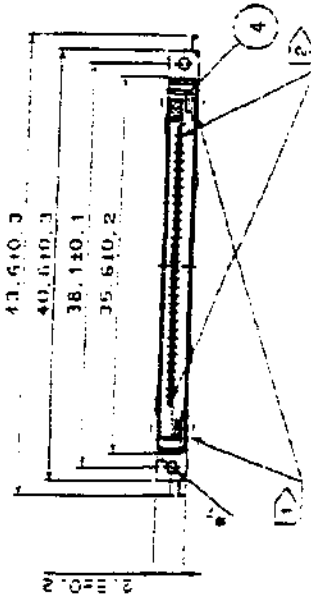
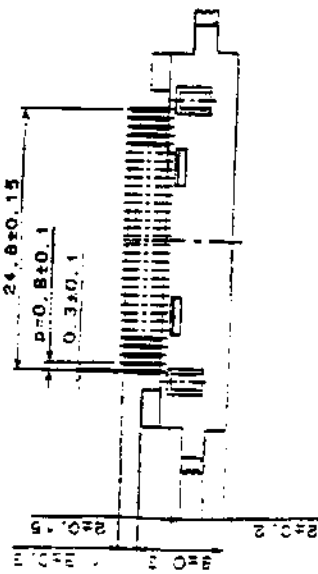
CUSTOMER DRAWING







AA TYPE		DD TYPE	
BB TYPE		EE TYPE	
CC TYPE		FF TYPE	



NOTES: 1) SEE THE TABLE FOR VARIOUS KINDS OF POLARIZATION  
 2) CONTACTS ON BOTH SIDES ARE REFERENCE STRUCTURE (C.O.T.)

2	PPS	(BLANK) UL24V-0	4	STAINLESS STEEL	FIN LEAD PITCH	FINISH
1	PROSPER BRINZE	PONE PLATED & GOLD PLATED	3	SP 2EL		
	NO.	MATERIAL		NO.		
	GROUP NO. (OPTION)					
DRAWING FOR PRELIMINARIES		DESIGNED		CHECKED		APPROVED
DRAWING NO. 1003-29483		BY Engr. J. Enay		BY Engr. J. Enay		DATE 13-9-16
SCALE 1:1		PART NO. HX601 325AA27		COMP. NO. CLP34		
UNITS: mm		HRS		HRS		

94-077<sup>3/10</sup>

Mr. Lawrence J. Lamers	P Maxtor Corp.	71540.2756@compuserve.com
Mr. Ron Roberts	A Maxtor Corp.	ron_roberts@maxtor.com
Thomas Newman	S Mission Peak Designs	71246.1573@compuserve.com
Mr. Joe Dambach	P Molex Inc.	
Mr. Robbie Shergill	P National Semiconductor	
Mr. John Lohmeyer	P NCR Corp.	john.lohmeyer@ftcollinsco.ncr.com
Mr. Charles Binford	S NCR Corp.	Charles.Binford@WichitaKS.NCR.COM
Mr. James McGrath	P Quantum Corp.	
Mr. Gene Milligan	A Seagate Technology	Gene_Milligan@notes.seagate.com
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Mr. Erich Oetting	P Storage Technology Corp.	Erich_Oetting@Stortek.com
Mr. Gary A. Glass	O Storage Technology Corp.	Gary_Glass@Stortek.com
Mr. Robert N. Snively	P Sun Microsystems, Inc.	Bob.Snively@eng.sun.com
Mr. Alan Wetzel	A Texas Instruments	4274968@mcimail.com

5 people present

Status Key: P - Principal  
 A - Alternate  
 O - Observer  
 L - Liaison  
 S,V - Visitor

Approval of Agenda

The proposed agenda was approved.

Physical Topics



3 PCMCIA SCSI connector and cable (X3T9.2/93-023) [Lohmeyer]



Bill Spence reported that the essence of the proposal is to use twisted pairs for the data and clock signals. One shielded bundle contains the REQ and ACK signals. Three more shielded bundles contain data and parity signals. The remaining control signals are in a fifth bundle as single signals with one shared ground. See document 93-093 for details.

# Madison Cable Corporation

MSI 7. 6/73-073A

7/10

May 4, 1993

NCR Corporation  
1635 Aeroplaza Drive  
Colorado Springs, CO 80916

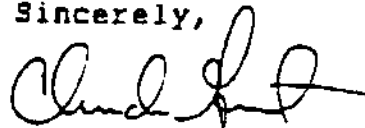
Attention: Larry Barnes, Senior Principal Systems Engineer  
Microperipheral; I/O Products

Dear Larry,

As we discussed, the recommendations of the SCSI committee have been incorporated into the PCMCIA-SCSI cable design. Attached is a new Madison specification (spec #4612). As recommended by the SCSI committee the REQ and ACK pairs have been isolated in a shield by themselves and TERM POWER has been changed to one 28 AWG wire rather than two 30 AWG wires.

If you have any questions, please contact me.

Sincerely,

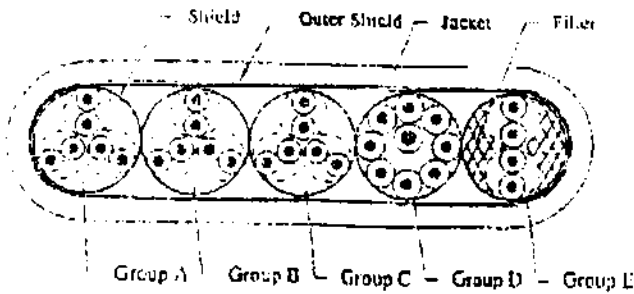


Chuck Grant  
Product Engineering Manager

CG/sh

cc:  R. Bellino  
R. Crouch  
C. Fry, Todd & Fry  
J. Mahall  
B. White





### Construction

#### Component I - REQ and ACK Signal Pairs

Conductor: 30 AWG 7/38 Tin Plated Copper, 0.012 Inch Diameter  
 Insulation: 0.0115 Inches of Foam Polypropylene, 0.035 Inch Diameter  
 Pair: 2 Insulated Conductors Twisted Together

#### Component II - Data Signal Pairs

Conductor: 30 AWG 7/38 Tin Plated Copper, 0.012 Inch Diameter  
 Insulation: 0.010 Inches of Foam Polypropylene, 0.032 Inch Diameter  
 Pair: 2 Insulated Conductors Twisted Together

#### Component III - Control Signals

Conductor: 30 AWG 7/38 Tin Plated Copper, 0.012 Inch Diameter  
 Insulation: 0.0095 Inches of Polypropylene, 0.031 Inch Diameter

#### Component IV - TERM POWER

Conductor: 28 AWG 7/36 Tin Plated Copper, 0.015 Inch Diameter  
 Insulation: 0.008 Inches of Polypropylene, 0.031 Inch Diameter

#### Group A - 3 Data Pairs

Core: 3 Component II (#3-5) Cabled Together  
 Shield: Aluminum/Polyester Tape, Aluminum Side Facing Out, 25% Overlap

#### Group B - 3 Data Pairs

Core: 3 Component II (#6-8) Cabled Together  
 Shield: Aluminum/Polyester Tape, Aluminum Side Facing Out, 25% Overlap

#### Group C - 3 Data Pairs

Core: 3 Component II (#9-11) Cabled Together  
 Shield: Aluminum/Polyester Tape, Aluminum Side Facing Out, 25% Overlap

#### Group D - Control and TERM POWER

Core: 1 Component IV (#20)  
 Layer 1: 8 Component III (#12-19) Cabled Around Core  
 Shield: Aluminum/Polyester Tape, Aluminum Side Facing Out, 25% Overlap

#### Group E - REQ and ACK

Core: 2 Component I (#1-2) and Fibrillated Polypropylene Filler Cabled Together  
 Shield: Aluminum/Polyester Tape, Aluminum Side Facing Out, 25% Overlap

#### Final Assembly

Core: Groups A - E Laid Parallel  
 Outer Shield: Aluminum/Polyester/Aluminum Tape, 0.125 Inch Overlap  
 Jacket: 0.022 Inches of Pressure-Extruded Flexible PVC, Color - Black, Finish - Matte  
 Minor Diameter: 0.165 Inches Nominal, 0.175 Inches Maximum  
 Major Diameter: 0.625 Inches Nominal  
 Print Legend: None

### Color Code

Comp #	Comp/Group	Conductor #1 Insulation Color/Tracer Color	Conductor #2 Insulation Color/Tracer Color
1	I/E	White/Blue	Blue/White
2	I/E	White/Orange	Orange/White
3	II/A	White/Green	Green/White
4	II/A	White/Brown	Brown/White
5	II/A	White/Gray	Gray/White

4	II/B	Red/Blue	Blue/Red
7	II/D	Red/Orange	Orange/Red
8	II/B	Red/Green	Green/Red
9	II/C	Red/Brown	Brown/Red
10	II/C	Red/Gray	Gray/Red
11	II/C	Black/Blue	Blue/Black
12	III/A	Black/Orange	
13	III/D	Orange/Black	
14	III/D	Black/Green	
15	III/D	Green/Black	
16	III/D	Black/Brown	
17	III/D	Brown/Black	
18	III/D	White/Yellow	
19	III/D	Yellow/Blue	
20	IV/D	Blue/Yellow	

### Electrical Characteristics

#### Component I & II - REQ, ACK and Data Signal Pairs

##### Impedance:

Differential: 120 Ohms Nominal @ 1DR

Single-Ended: 80 Ohms Nominal @ 1DR

##### Capacitance:

Mutual: 11 pF/ft Nominal

Single-Ended: 18 pF/ft Nominal

##### Time Delay: 4.39 ns/ft Nominal

Conductor DC Resistance: 0.10 Ohms/ft Nominal @ 20°C

#### Component III - Control Signals

Conductor DC Resistance: 0.10 Ohms/ft Nominal @ 20°C

#### Component IV - TERM POWER

Conductor DC Resistance: 0.065 Ohms/ft Nominal @ 20°C

## Madison Cable Corporation

Specification Number: 4682

Part Number: 31KZV00001

Customer:

Customer #:

31 Conductor 30 AWG Parallel PC SCSI Cable

#### Revision History

1	09/12/93	BH	Initial Release
2	09/14/93	BH	Added P/N
3	11/18/93	BH	Revise O/A shield and color code
4	02/24/94	BH	Release in new format

Approvals		Initials	Date
Prepared By:	G. Harvic	[Signature]	2/24/94
Approved By:	C. Grant	[Signature]	2/24/94

125 Goddard Memorial Drive - Worcester, MA 01603 USA  
 Tel: (508) 752-2884 FAX: (508) 752-4230

## Proposed PCMCIA/SCSI Cable Pin Assignments

## PCMCIA 33 Pin Connector

Pin	Signal
1.	D0
2.	Gnd
3.	D1
4.	Gnd
5.	D2
6.	Gnd
7.	D3
8.	Gnd
9.	D4
10.	Gnd
11.	D5
12.	Gnd
13.	D6
14.	Gnd
15.	D7
16.	Gnd
17.	DPAR
18.	Gnd
19.	Term Power
20.	Term Power
21.	ATN
22.	BSY
23.	RST
24.	Gnd
25.	MSG
26.	SEL
27.	CD
28.	IO
29.	Gnd
30.	REQ
31.	N/C
32.	Gnd
33.	ACK

PCMCIA Pin Number	Centronics Pin Number	Signal
1	26	D0
2	1	Gnd
3	27	D1
4	2	Gnd
5	28	D2
6	3	Gnd
7	29	D3
8	4	Gnd
9	30	D4
10	5	Gnd
11	31	D5
12	6	Gnd
13	32	D6
14	7	Gnd
15	33	D7
16	8	Gnd
17	34	DPAR
18	9	Gnd
19, 20	38	Term Power
21	41	ATN
22	43	BSY
23	45	RST
24	16, 18, 20, 21, 22, 23, 25	Gnd
25	46	MSG
26	47	SEL
27	48	CD
28	50	IO
29	24	Gnd
30	49	REQ
32	19	Gnd
33	44	ACK
Shield	Shield	