SPECIFICATION

AND PERFORMANCE CHARACTERISTICS

OF "SCA-2"

CONNECTOR SERIES

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1.0 SCOPE

1.1 This specification defines the physical interface and performance requirements for SCA-2 (Single Connector Attach –2) connectors and retention schemes to be used for SCSI and FC-AL unshielded device connections.

1.2 Description:

SCA-2 connectors are based on 0.05" ribbon-style technology. These connectors come in sizes 40 and 80 circuits with two profile styles: Regular – 11.50mm and Extended – 17.50mm. The Regular profile consists of two different styles, Press Fit, and Solder Tail, whereas the Extended Height profile comes in Solder Tail style only. The mating sides (including retention) are the same for all versions of complete connector.

SCA-2 connectors are compatible with SCA-1 connectors in the sense they will physically intermate. SCA-1 connectors are not suitable for blind mating and hot plugging.

2.0 APLICABLE DOCUMENTS:

Reference documents listed below shall be the latest revision unless otherwise specified. Should a conflict occur between this specification and any of the listed documents then this specification shall prevail.

2.1 Regulatory Requirements

- Be a UL, C-UL listed or UL, C-UL Recognized Communication Circuit Accesory
- Be molded of plastics rated UL 94V-2 or less flammable when tested to UL 94

2.2 Industry Standards

- X3.131T-1994 SCSI-2 Small Computer System Interface
- X3.253-1995 SPI (SCSI-3 Parallel Interface) and subsequent extensions
- X3T10/1071 SCSI-3 Fast 20
- EIA PN-3651 Detail specification for Trapezoidal Connector 0.50" Pitch used with Single Connector Attach –2
- X3.230-1994 FC-PH (Fibre Channel Physical Interface) and Subsequent extensions
- ANSI-Y14.5M Dimension and Tolerancing
- ANSI SCSI Parallel Interface-3 (SPI-3) and latter
- EIA-7000000 Standard for connectors with assessed quality, for use in dc, low frequency analog and digital high speed data application – Generic Specification
- EIA-700A000 Generic Specification (Same as above)
- EIA-364 Electrical Connector Test Procedures
- SFF-8451 Specification for SCA-2 Unshielded Connections, Rev. 10.1
- FC-AL Specification
- CA-SCA-2 DRAWINGS

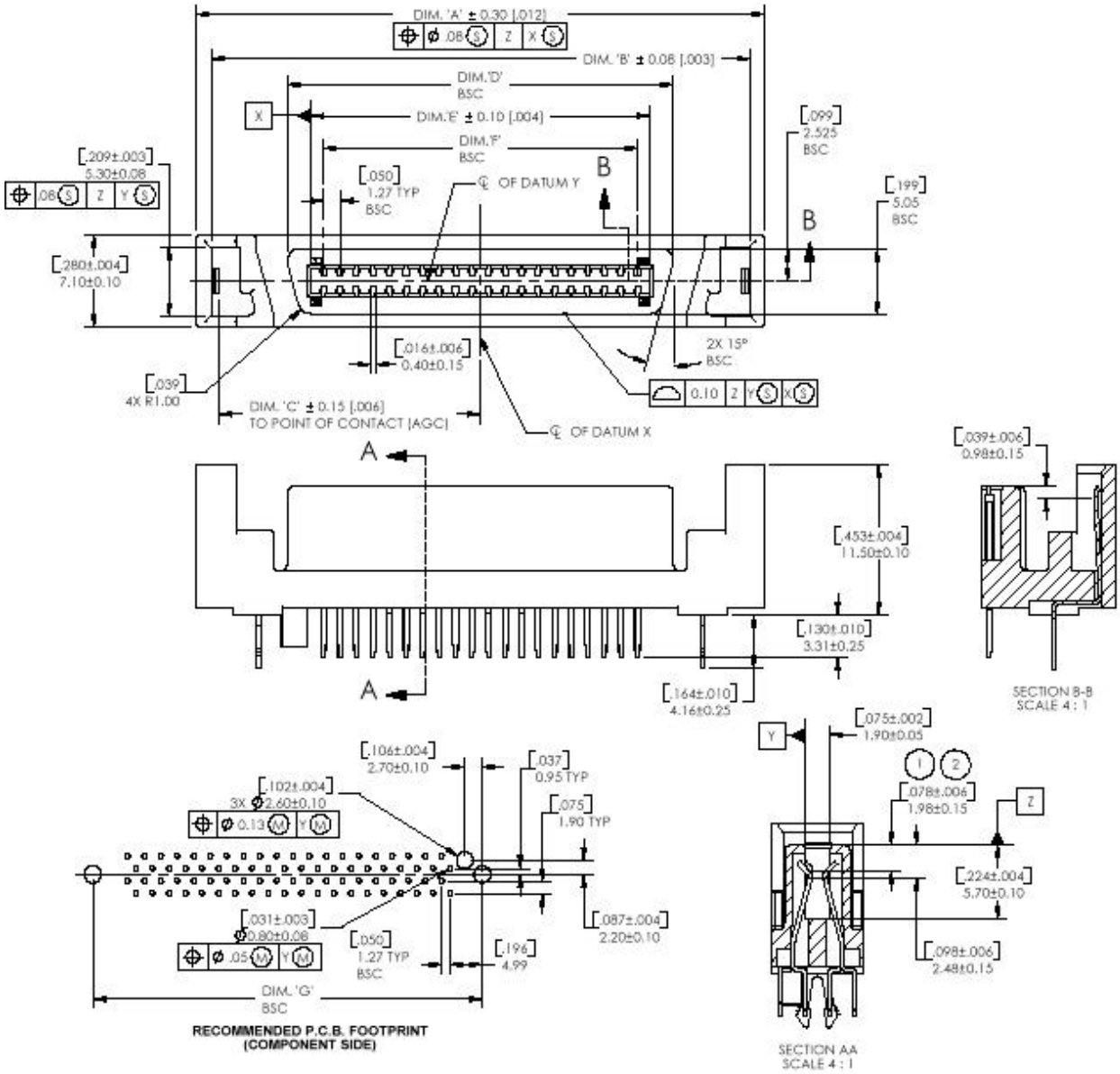
CA-XXSCA2-F-11

NO. OF CONTACT POSITIONS:
40
80

SINGLE CONNECTOR ATTACHMENT:

PLATING:
F= MATING AREA : .76µm [30µin] GOLD
TAIL AREA : 3.81µm [150µin] TIN
UNDERPLATE : 1.27µm [50µin] NICKEL
CLIP : 3.81µm [150µin] TIN OVER
1.27µm [50µin] NICKEL

TAIL CONFIGURATION:
REGULAR HEIGHT
CONFORMS TO SFF-8451 SPECIFICATIONS FOR SCA-2
UNSHIELDED CONNECTORS



CA-XXSCA2-XF-12X

NO. OF CONTACT POSITIONS
40
80

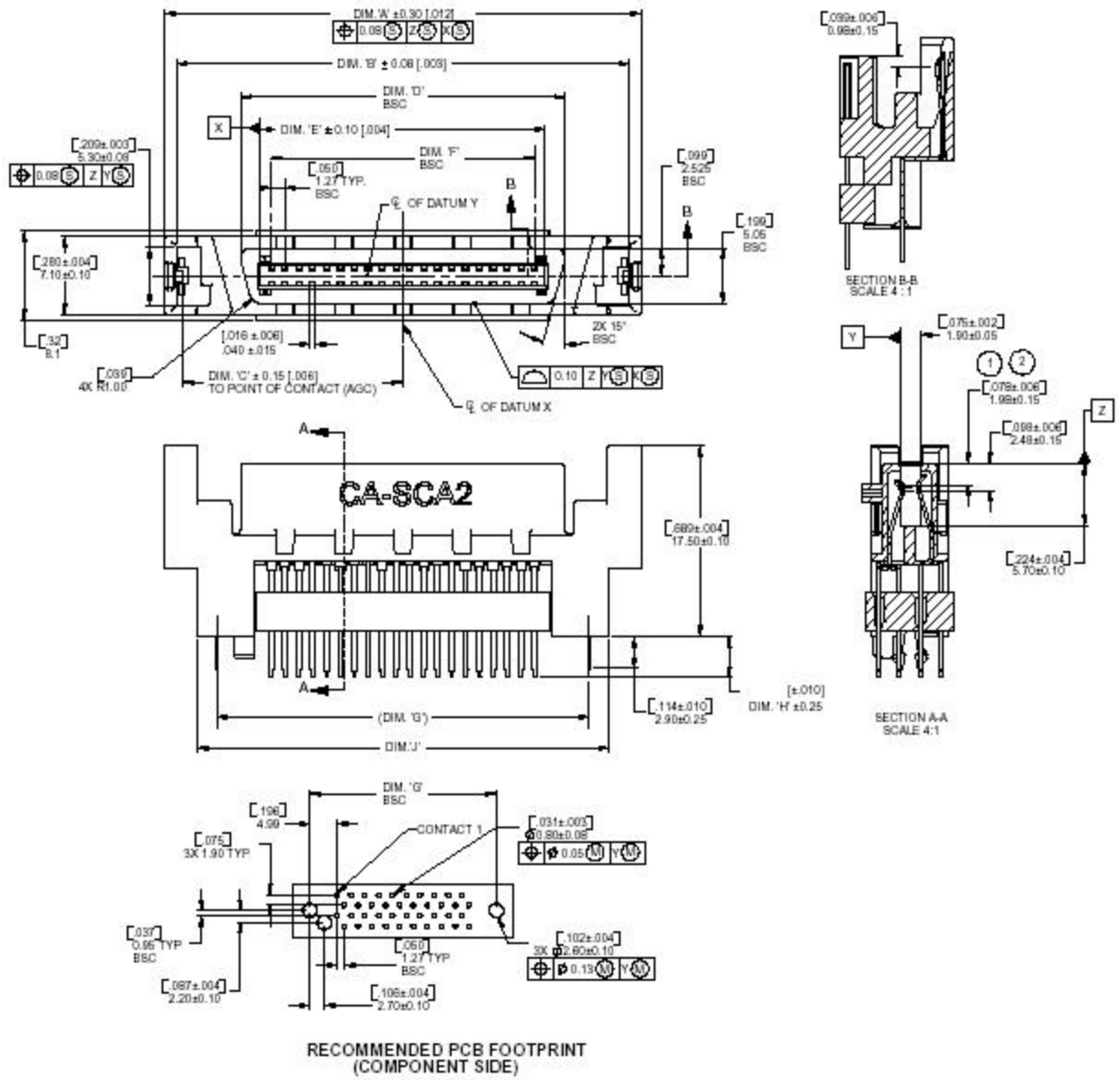
SINGLE CONNECTOR ATTACHMENT

TAIL LENGTH (DIM 'H')
BLANK = 3.18 [.125]
3 = 4.60 [.181]

PLATING
CONTACT :
F = MATING AREA : .76µm [30µin] GOLD
TAIL AREA : 3.81µm [150µin] TIN
UNDERPLATE : 1.27µm [50µin] NICKEL MIN.
CLIP : 3.81µm [150µin] TIN OVER
1.27µm [50µin] NICKEL MIN.

TAIL CONFIGURATION
EXTENDED HEIGHT, SOLDER

LOGO OPTION
BLANK = WITH LOGO
2 = NO LOGO



RECOMMENDED PCB FOOTPRINT
(COMPONENT SIDE)

CA-XXSCA2-F-21-X

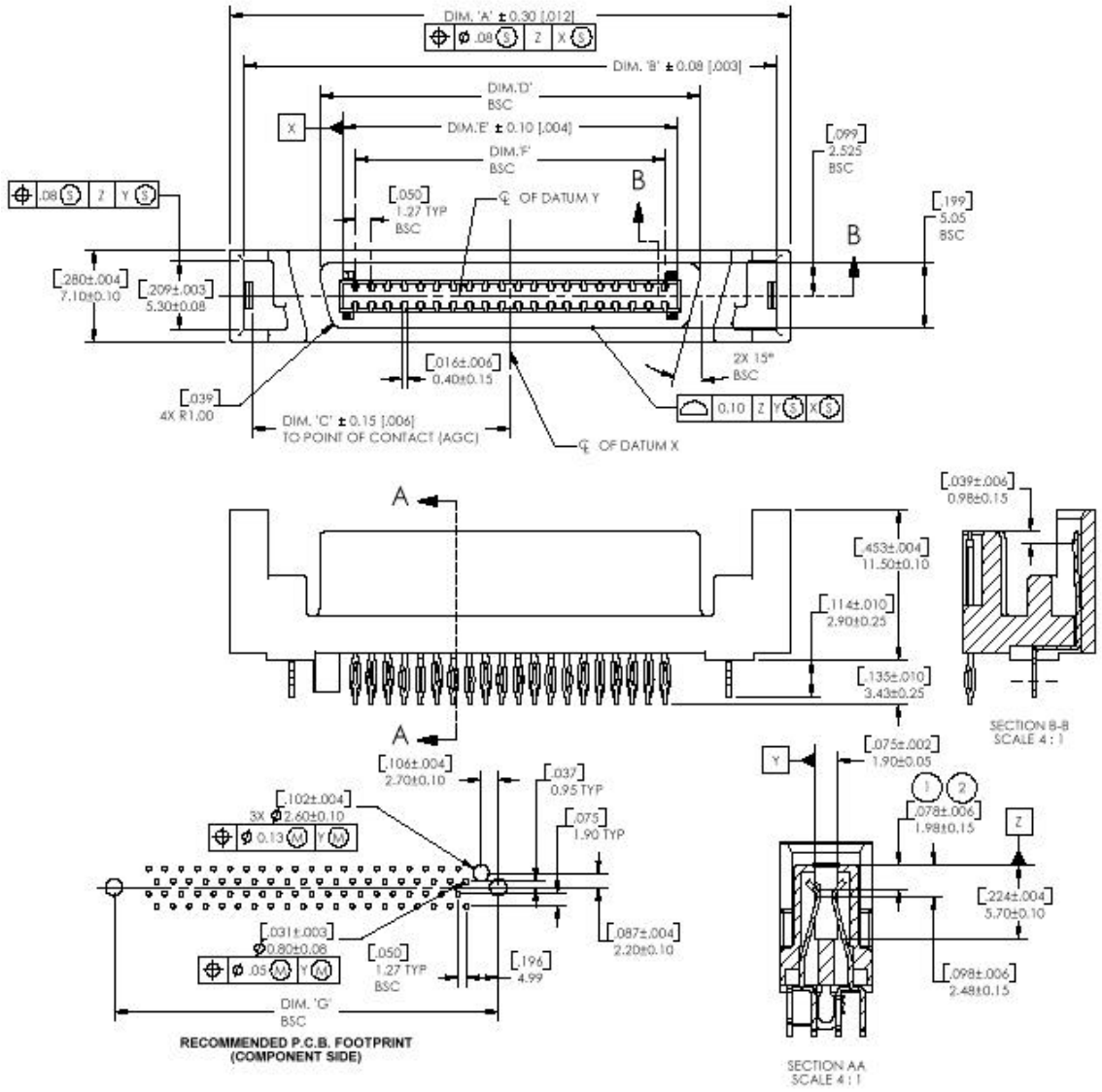
NO. OF CONTACT POSITIONS:
40
80

SINGLE CONNECTOR ATTACHMENT:

PLATING:
F= MATING AREA : .76µm [30µin] GOLD
TAIL AREA : 3.81µm [150µin] TIN
UNDERPLATE : 1.27µm [50µin] NICKEL
CLIP : 3.81µm [150µin] TIN OVER 1.27µm [50µin] NICKEL

TAIL CONFIGURATION:
PRESS FIT

OPTIONS:
BLANK = NYLON INSULATOR, COLOR BLACK
L = LCP INSULATOR, COLOR BLACK



3.0 APPLICATION FEATURES:

3.1 Environmental
Temperature Range: -55°C to 105°C

3.2 Mechanical
Insulator Material: High Temperature Thermoplastic, UL94V-0 Black
Contact Material: Phosphor Bronze
Clip Material: Brass
Contact Plating F = -Mating Area 30µ in. [.76µm] Gold
-Tail Area 150µ in [3.81µm] Tin
-Underplate 50µ in [1.27µm] Nickel
Clip Plating -150µ in [3.81µm] Tin over
50µ in [1.27µm] Nickel

3.3 Durability
500 cycles min.

3.4 Mating Force
90g maximum per contact

3.5 Unmating Force
15g minimum per contact

3.6 Electrical
Dielectric Withstanding Voltage: 500V DC for 1 minute
Insulation Resistance: >1000 MΩ @ 250 Vrms
Contact Resistance: <35mΩ
Current Rating: 1 AMP
Voltage Rating: 250 V AC

NUMBER OF CONTACTS	CURRENT AMPS	VOLTAGE VOLTS	VOLTAGE CONTACT NO.	GROUND CONTACT NO.
40	2	5	19, 20	32, 35
40	2, 5	12	2, 3, 4	22, 23, 26, 29
80	2	5	34, 35	75, 76
80	3	12	2, 3, 4	41, 42, 43

Table 3.6.1 – Current,Voltage Ratings per Contact No.

3.7 Recognition and Certification
UL, C-UL listed or UL, C-UL Recognized Communication Circuit Accessory (Certification in process).

4.0 CONNECTOR PERFORMANCE CRITERIA
Unless otherwise specified, all tests shall be performed at standard atmospheric conditions

4.1 Climatic Category

PERFORMANCE LEVEL	TEMPERATURE, °C (°F)	RELATIVE HUMIDITY, %
PL1	-55 (-67) to 105 (221)	95

4.1.1 Thermal Shock
Condition: EIA 364-32, subject mated connectors to 5 cycles between –55°C (-67°F) to 105°C (221°F).
There shall be no physical damage and shall meet requirements of subsequent tests.

4.1.2 Humidity-Temperature Cycling
Condition: EIA 364-31, method III, test condition B, subject mated connectors to 10 cycles between 25°C (77°F) and 65°C (149°F) at 95% relative humidity.
There shall be no physical damage and shall meet requirements of subsequent tests.

4.1.3 Temperature Life
Condition: EIA 364-17, test condition 4, subject mated connectors to 105°C (221°F) for 1000 hours.
There shall be no physical damage and shall meet requirements of subsequent tests.

4.1.4 Mixed Flowing Gas
Condition: EIA 364-65, environmental class II, for 14 days, mated connectors.
There shall be no physical damage and shall meet requirements of subsequent tests.

4.1.5 Resistance to Soldering Heat
Condition: EIA 364-56, subject unmated surface mount connectors to procedure 5, re-flow level # 2 at 235 °C + 10 °C (455 °F + 18 °F, - 0 °F); and all other connectors to procedure 3, Test Condition F, dip solder at 260°C ± 5 °C (500 °F ± 9 °F), immersion duration 20 ± 1 second.
There shall be no physical damage and meet dimensional requirements.

4.1.6 Resistance to Solvents
Condition: EIA 364-11, class I, subject unmated connectors to trichloroethylene.
There shall be no physical damage and meet dimensional requirements.

4.2 ELECTRICAL

4.2.1 Withstanding Voltage
Condition: EIA 364-20, method B
Between adjacent contacts of mated and unmounted connectors: 500 V DC at sea level

4.2.2 Current vs Temperature Rise
Conditions: EIA 364-70, method 1
Current rating 1 AMP
Refer to Standard EIA-700A0AE for the values at 75 degrees C shown in figure 47 in the standard.

4.2.3 Contact Resistance
Conditions: EIA 364-23
Mated connectors: 15 mΩ maximum increase

4.2.4 Insulation Resistance
Conditions: EIA 364-21, test voltage 250 Vrms
Between adjacent contacts of mated and unmounted connectors: 1000 MΩ minimum

4.3 MECHANICAL

4.3.1 Durability Cycling

Conditions: EIA 364-09, mate and unmate connectors for 500 cycles at a maximum rate of 600 cycles per hour.
There shall be no physical damage and shall meet requirements of subsequent tests.

4.3.2 Mating and Unmating Force

Conditions: EIA 364-13, at a rate of 12.7 mm (.5 inch) per minute
Force necessary to mate connectors: .88 N (90gf) maximum per contact.
Force necessary to unmate connector assemblies: 0.15N (15 gf) minimum per contact.

4.3.3 Vibration

Conditions: EIA 364-28, test condition VII, letter D, subject mated connectors to random vibration applied only between the frequency limits of 20 Hz and 500 Hz at a power spectral density (psd) of 0.02 G^2/Hz for 1 hour in each of 3 mutually perpendicular planes.
There shall be no discontinuities of 1 microsecond duration or longer.

4.3.4 Physical Shock

Condition: EIA 364-27, test condition H, subject mated connectors to 30 g_n peak acceleration, half sine shock pulses of 11 milliseconds, 3 shocks applied along 3 mutually perpendicular planes, total 18 shocks.
There shall be no discontinuities of 1 microsecond duration or longer.

5.0 TEST SCHEDULE

5.1.1 General

This test schedule shows the tests and the order in which they shall be carried out as well as the requirements to be met.

Unless otherwise specified, mated sets of connectors shall be tested. A mated set of connectors is called a "specimen". When the initial tests have been completed, all specimens are divided up according to the test groups. Care shall be taken to keep a particular combination of connectors together during the complete test sequence, i.e. when unmating is necessary for a certain test, the same connectors as before shall be mated for the subsequent tests.

Before testing commences, the connectors shall have been stored for at least 24 hours in the non-inserted state under normal climatic conditions for testing.

In the following test sequence tables, where and EIA test is specified without a letter suffix, the latest approved version of that test shall be used.

5.2 TEST SEQUENCES

5.2.1 Minimum Test Sequences for Product Qualification

5.2.1.1 Test group P – Preliminary

Representative specimens should be subjected to the following tests to verify that the connectors are acceptable to go through the remaining AP-FP tests.

Table 5.2.1.1 – Test group P – General examination

Test Phase	Test			Measurement to be performed		Comments
	Title	EIA 364 Test No.	Severity or condition of test	Title	EIA 364 Test No.	
P1	General Examination		Unmate connectors	Visual and dimensional inspection	18	There shall be no defects that would impair normal operations
				Examination of dimensions, mass, and plating thickness	18	Dimensions shall comply with CA's drawings

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5.2.1.2 Test group AP – Mating force, durability, vibration, shock and unmating force

Table 5.2.1.2 – Test group AP

Test Phase	Test			Measurement to be performed		Comments/Requirements
	Title	EIA 364 Test No.	Severity or condition of test	Title	EIA 364 Test No.	
AP1	Mating Force	13	Measure force to mate at a rate of 12.7mm (.5 in) per min. max.			.88 N (90gf) max per contact
AP2			20mV max. open circuit at 100mA max.	Love-level contact resistance	23	Measure initial resistance, see note below
AP3	Durability	09	500 cycles at a maximum rate of 600 cycles per hour			No physical damage and shall meet requirements of subsequent tests
AP4	Shock	27	30 g_n peak acceleration half sine 11 ms 3 shocks applied along 3 mutually perpendicular planes total 18 shocks	Continuity	46	No discontinuities of 1µs or longer duration, see note below
AP5	Vibration	28	15-500-15 Hz random at a power spectral density of 0.02 G^2/Hz for 1 hr in each of 3 mutually perpendicular planes	Continuity	46	No discontinuities of 1µs or longer duration, see note below
AP6			Same as AP2	Low-level contact resistance	23	15 mΩ maximum increase, see note below
AP7	Unmating force	13	Measure force to unmate at a rate of 12.7 mm (.5 in) per min. max			0.15 N (15gf) minimum per contact
AP8	General examination		Unmated connectors	Visual and dimensional inspection	18	There shall be no defects that would impair normal operations
				Examination of dimensions, mass, and plating thickness	18	Dimensions shall comply with applicable CA's drawings

NOTE – During vibration and shock perform discontinuity on two specimens in the group. Low-level contact resistance shall be performed on 30 random contacts from the remaining three specimens.

5.2.1.3 Test group PB – Temperature life, mixed flowing gas, vibration and temperature rise versus current

Table 5.2.1.3 – Test group BP

Test Phase	Test			Measurement to be performed		Comments/Requirements
	Title	EIA 364 Test No.	Severity or condition of test	Title	EIA 364 Test No.	
BP1			20mV max open circuit at 100mA max sec	Low-level contact resistance	23	Measure initial resistance
BP2	Durability (pre-conditioning)	09	10 cycles at a maximum rate of 600 cycles per hour			No physical damage and shall meet requirements of subsequent tests
BP3	Mixed flowing gas	65	Class II for 14 days			No physical damage and shall meet requirements of subsequent tests
BP4			Same as BP1	Low-level contact resistance	23	15 mΩ maximum increase
BP5	Temperature life	17	105°C for 1000hours			No physical damage and shall meet requirements of subsequent tests
BP6			Same as BP1	Low-level contact resistance	23	15 mΩ maximum increase
BP7	Vibration	28	15-500-15 Hz random at a power spectral density of 0.02 G^2/Hz for 1 hr in each of 3 mutually perpendicular planes	Continuity	46	No discontinuities of 1µs or longer duration
BP8			Same as BP1	Low-level contact resistance	23	15 mΩ maximum increase
BP9	Current vs temperature rise	70	30° C temperature rise, Method 1			See Table 3.6.1 for current parameters Record specimen, wire, & local ambient temps. Record current
BP10			Same as BP1	Low-level contact resistance	23	15 mΩ maximum increase
BP11	General examination		Unmated connectors	Visual and dimensional inspection	18	There shall be no defects that would impair normal operations
				Examination of dimensions, mass, and plating thickness	18	Dimensions shall comply with applicable CA's drawings

5.2.1.4 Test group CP – Thermal shock and humidity-temperature cycling

Table 5.2.1.4 – Test group CP

Test Phase	Test			Measurement to be performed		Comments/Requirements
	Title	EIA 364 Test No.	Severity or condition of test	Title	EIA 364 Test No.	
CP1			Test voltage 250 Vrms	Insulation resistance	21	1000 MΩ min
CP2			Test voltage 500 VDC for 60 seconds	Dielectric withstanding voltage	20	No breakdown or flashover
CP3	Thermal shock	32	5 cycles between – 55°C (-67°F) and 105°C (221°F) mated connectors			No physical damage and shall meet requirements of subsequent tests
CP4	Humidity-temperature cycling	31	10 cycles between 25°C (77°F) and 65°C (149°F) at 95% rh 240 hours duration, mated connectors			No physical damage and shall meet requirements of subsequent tests
CP5			Test voltage 250 Vrms	Insulation resistance	21	1000 MΩ min
CP6			Test voltage 500 VDC for 60 seconds	Dielectric withstanding voltage	20	No breakdown or flashover
CP7	General examination		Unmated connectors	Visual and dimensional inspection	18	There shall be no defects that would impair normal operations
				Examination of dimensions, mass, and plating thickness	18	Dimensions shall comply with CA's drawings

5.2.1.5 Test group DP – Solderability

Table 5.2.1.5 – Test group DP

Test Phase	Test			Measurement to be performed		Comments/Requirements
	Title	EIA 364 Test No.	Severity or condition of test	Title	EIA 364 Test No.	
DP1	Solderability	52	Category 1 no steam age RMA class 1 flux immerse in molten solder at temperature of 245°C ± 5°C (473°F ± 9°F) at rate of 25.4 mm ± 6.35 mm (1.00 in ± .25 in) per sec hold in solder for 5 +0 –5 sec			Solderable area shall have a minimum of 95% solder coverage when testing 30 random loose contacts
DP2	General examination		Unmated connectors	Visual and dimensional inspection	18	There shall be no defects that would impair normal operations
				Examination of dimensions, mass, and plating thickness	18	Dimensions shall comply with CA's drawings
NOTE – This test group is for solder tails contacts only and is not required for compliant pins.						

5.2.1.6 Test group EP – Resistance to Soldering Heat

Table 5.2.1.6 – Test group EP

Test Phase	Test			Measurement to be performed		Comments/Requirements
	Title	EIA 364 Test No.	Severity or condition of test	Title	EIA 364 Test No.	
EP1	Resistance to soldering heat	56	Surface mount re-flow level #2, at 235°C + 10°C, -0 °C (455°F + 18°F, –0 °F); all other specimens are dip soldered based on test condition F, at 260 °C ± 5 °C (500 °F ± 9 °F), 20 ± 1 second			There shall be no physical damage and meet dimensional requirements
EP2	General examination		Unmated connectors	Visual and dimensional inspection	18	There shall be no defects that would impair normal operations
NOTE – This test group is for solder tails contacts only and is not required for compliant pins.						

5.2.1.7 Test group FP – Resistance to Solvents

Table 5.2.1.7 – Test group F

Test Phase	Test			Measurement to be performed		Comments/Requirements
	Title	EIA 364 Test No.	Severity or condition of test	Title	EIA 364 Test No.	
FP1	Resistance to solvents	11	Trichloroethylene			
FP2	General examination		Unmated connectors	Visual and dimensional inspection	18	There shall be no defects that would impair normal operations

6.0 QUALITY ASSESSMENT PROCEDURES

6.1 Qualification Approval Testing

The following number of specimens shall be subjected to the tests under the conditions as specified in clause 5. The specimens shall meet the requirements with not more than the number of defectives permitted in accordance with the following table.

Table 6.1 – Qualification Test Sequence

Test or Examination	Test Groups			
	1	2	3	4
	Test Sequence			
Examination of Product	1,9	1,8	1,8	1,3
Termination Resistance, Dry Circuit	3,7	2,6		
Dielectric Withstanding Voltage			3,7	
Insulation Resistance			2,6	
Temperature Rise $_{VS}$ Current		7		
Solderability				2
Vibration	5	5		
Physical Shock	6			
Mating Force	2			
Unmating Force	8			
Durability	4			
Thermal Shock			4	
Humidity – Temperature Cycling			5	
Mixed Flowing Gas		3(b)		
Temperature Life		4		

(a) The numbers indicate sequence in which tests were performed.
(b) Precondition with 10 cycles of Durability

6.2 Re-inspection

For inspection group C1 the number of specimens/terminals shall be shown at "d" and the number of defective terminals allowed shown at "e".

Connectors stored for a period of more than 36 months after the release of the lot shall be tested prior to delivery according to the table below. Once a lot has been satisfactorily re-inspected, the quality is assessed for a further 36 months.

Table 6.2 – Re-inspection

Inspection group	Test phase as in subclause 5.1	Test or measurement to be performed per requirements and severities in 5.1	EIA 364 Test No.	Comments
A1	P1	Visual examination	18	There shall be no defects that would impair normal operations
C1	DP	Solderability	52	Number of terminals: d=20 Number of defectives: e=1 terminal

Initiated By:	Date:	Engineering Approval	Date:	Quality Approval	Date:
Carmen C. Long	8/02/01	A.Jochen	8/2/01	Ian Morrell	8/2/01

REV.	DESCRIPTION	DATE	INITIALS
A	INITIAL RELEASE SEE DO 3956	6/16//00	C.C.
B	SEE DO 4476	5/09/01	C.C.L.
C	SEE DO 4522	6/08/01	C.C.L.
D	SEE DO 4534	7/16/01	C.C.L
E	SEE DO 4575	8/02/01	C.C.L
F	SEE DO 4596	8/24/01	C.P.
G	SEE DO 5682	1/17/05	A.J.
H	SEE DO 6418	5/14/07	A.J.