Project Number:	Tracking Code: TC0631--1120		
Requested by: John Riley	Date: 7/31/2006	Product Rev: A	
Part #: SMB5-P-C-H-ST-CA1	Lot #: 99999	Tech: Tony Wagoner, Tori Meek	Eng: John Riley
Part description: SMB5			Qty to test: 25
Test Start: 9-17-2007	Test Completed: 12/6/2007		

SMB5-P-C-H-ST-CA1
DESIGN VERIFICATION REPORT

Mated with SMB5-J-C-H-ST-BH1

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to IS0 10012-l and ANSI/NCSL 2540-1, as applicable.

SCOPE

To perform the following tests: Match RF DVT's and spec sheets provided. Mates with SMB5-J-C-H-ST-BH1

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to TLWI-0001.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information:
9) Re-Flow Time/Temp: See accompanying profile.
10) Samtec Test PCBs used:

TYPICAL OVEN PROFILE (Soldering Parts to Test Boards) – None Required

FLOWCHARTS

IR / DWV

TEST STEP	GROUP B1 1 Board - 4 Samples Ambient	GROUP B2 1 Board - 4 Samples Thermal	GROUP B3 1 Board - 4 Samples Humidity
01	Initial IR/DWV	Thermal Aging	Humidity
02	DWV/Working Voltage	IR	IR
03		DWV/Working Voltage	DWV/Working Voltage
04			
05			
06			
07			

Thermal Aging = EIA-364-17, Test Condition 4,105 deg C;
Time Condition'B' (250 hours)
Humidity =EIA-364-31, Test Condition 4,105 deg C;
and Method III (+25° C to +65° C @ 90%RH/98% RH)
ambient pre-condition and delete steps 7a and 7b
IR = EIA-364-21
DWV = EIA-364-20

Durability/Thermal Age/Cyclic Humidity

TEST STEP	GROUP A 16 Points 100 Cycles
01	LLCR-1
02	Data Review
03	100 Cycles
04	LLCR-2
05	Data Review
06	Thermal Age
07	LLCR-3
08	Data Review
09	Cyclic Humidity
10	LLCR-4

TEST STEP	GROUP B 16 Points 500 Cycles
01	LLCR-1
02	Data Review
03	500 Cycles
04	LLCR-2
05	Data Review
06	Thermal Age
07	LLCR-3
08	Data Review
09	Cyclic Humidity
10	LLCR-4

Thermal Aging = EIA-364-17, Test Condition 4, 105 deg C;
Time Condition 'B' (250 hours)
Humidity =EIA-364-31, Test Condition 'B' (240 Hours)
and Method III (+25° C to +65° C @ 90%RH/98% RH)
ambient pre-condition and delete steps 7a and 7b
LLCR = EIA-364-23, LLCR
use Keithley 580 in the dry circuit mode, 10 mA Max

FLOWCHARTS Continued

Contact Retention

TEST STEP	GROUP A 10 Assy (min) Contact (Center Conductor) Retention Ambient
01	Pull on Contact
02	Data Review

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL:

1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors.*
2) Test Condition 4 at 105° C.
3) Test Time Condition B for 250 hours.
4) All test samples are pre-conditioned at ambient.
5) All test samples are exposed to environmental stressing in the mated condition.

HUMIDITY:

1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors.*
2) Test Condition B, 240 Hours.
3) Method III, +25° C to + 65° C, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
4) All samples are pre-conditioned at ambient.
5) All test samples are exposed to environmental stressing in the mated condition.

CONTACT RETENTION: The minimum force required to move the center conductor

1) Reference document: EIA-364-29, *Contact Retention Test Procedure for Electrical Connectors*

INSULATION RESISTANCE (IR):

To determine the resistance of insulation materials to leakage of current through or on the surface of these materials when a DC potential is applied.

1) PROCEDURE:
    a. Reference document: EIA-364-21, *Insulation Resistance Test Procedure for Electrical Connectors*.
    b. Test Conditions:
        i. Between Signal-to-Ground
        ii. Electrification Time 2.0 minutes
        iii. Test Voltage (500 VDC) corresponds to calibration settings for measuring resistances.
2) MEASUREMENTS:
3) When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 5000 megohms.

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

To determine if the sockets can operate at its rated voltage and withstand momentary over potentials due to switching, surges, and other similar phenomenon. Separate samples are used to evaluate the effect of environmental stresses so not to influence the readings from arcing that occurs during the measurement process.

1) PROCEDURE:
    a. Reference document: EIA-364-20, *Withstanding Voltage Test Procedure for Electrical Connectors*.
    b. Test Conditions:
        i. Between Signal-to-Ground
        ii. Rate of Application 500 V/Sec
        iii. Test Voltage (VAC) until breakdown occurs

2) MEASUREMENTS/CALCULATIONS
    a. The breakdown voltage shall be measured and recorded.
    b. The dielectric withstanding voltage shall be recorded as 75% of the minimum breakdown voltage.
    c. The working voltage shall be recorded as one-third (1/3) of the dielectric withstanding voltage (one-fourth of the breakdown voltage).

LLCR:

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms: ---------- Stable
    b. +5.1 to +10.0 mOhms:---------- Minor
    c. +10.1 to +15.0 mOhms: ---------- Acceptable
    d. +15.1 to +50.0 mOhms: ---------- Marginal
    e. +50.1 to +2000 mOhms: ---------- Unstable
    f. >+2000 mOhms:---------- Open Failure

RESULTS

Insulation Resistance minimums, IR

- **Initial**
  - **Mated ---------- 100,000 Meg Ω ---------- Pass**
  - **Unmated - Jack ---------- 50,000 Meg Ω**
  - **Unmated – Plug ---------- 50,000 Meg Ω**
- **Thermal**
  - **Mated ---------- 50,000 Meg Ω**
  - **Unmated - Jack ---------- 50,000 Meg Ω**
  - **Unmated – Plug ---------- 50,000 Meg Ω**
- **Humidity**
  - **Mated ---------- 50,000 Meg Ω**
  - **Unmated - Jack ---------- 50,000 Meg Ω**
  - **Unmated – Plug ---------- 50,000 Meg Ω**

Dielectric Withstanding Voltage minimums, DWV

- **Initial**
  - **Breakdown**
    - **Mated ---------- 480 VAC**
    - **Unmated - Jack ---------- 1300 VAC**
    - **Unmated - Plug ---------- 620 VAC**
  - **DWV**
    - **Mated ---------- 360 VAC**
    - **Unmated - Jack ---------- 975 VAC**
    - **Unmated - Plug ---------- 465 VAC**
  - **Working voltage**
    - **Mated ---------- 120 VAC**
    - **Unmated - Jack ---------- 325 VAC**
    - **Unmated - Plug ---------- 155 VAC**
- **Thermal**
  - **Breakdown**
    - **Mated ---------- 520 VAC**
    - **Unmated - Jack ---------- 1500 VAC**
    - **Unmated - Plug ---------- 440 VAC**
  - **DWV**
    - **Mated ---------- 390 VAC**
    - **Unmated - Jack ---------- 1125 VAC**
    - **Unmated - Plug ---------- 330 VAC**
  - **Working voltage**
    - **Mated ---------- 130 VAC**
    - **Unmated - Jack ---------- 375 VAC**
    - **Unmated - Plug ---------- 110 VAC**
- **Humidity**
  - **Breakdown**
    - **Mated ---------- 1500 VAC**
    - **Unmated - Jack ---------- 800 VAC**
    - **Unmated - Plug ---------- 1400 VAC**

RESULTS Continued

Dielectric Withstanding Voltage minimums, DWV CONT:

- **DWV**
  - **Mated ---------- 1125 VAC**
  - **Unmated - Jack ---------- 600 VAC**
  - **Unmated - Plug ---------- 1050VAC**
- **Working voltage**
  - **Mated ---------- 375 VAC**
  - **Unmated - Jack ---------- 200 VAC**
  - **Unmated - Plug ---------- 350 VAC**

LLCR Durability (8 LLCR test points) – Ground (100 Cycles)

- **Initial ----------8.7 mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ----------8 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**
- **Thermal**
  - **<= +5.0 mOhms ---------- 8 Points---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**
  -
- **Humidity**
  - **<= +5.0 mOhms ----------8 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

LLCR Durability (8 LLCR test points) – Signal (100 Cycles)

- **Initial ---------- 73.2 mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ---------- 8 Points---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**
- **Thermal**
  - **<= +5.0 mOhms ---------- 8 Points---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

DATA SUMMARIES

CONTACT RETENTION:

	Plug	Jack
Min	18.03	18.77
Max	20.40	19.81
Avg	19.61	19.31

INSULATION RESISTANCE (IR):

Initial, Meg Ohms

	Mated	Unmated	Unmated Plug
	Insulation Resistance	Insulation Resistance	Insulation Resistance
Average	100000	50000	50000
Min	100000	50000	50000
Max	100000	50000	50000

Thermal, Meg Ohms

g

	Mated	Unmated Jack	Unmated Plug
	Insulation Resistance	Insulation Resistance	Insulation Resistance
Average	50000	50000	50000
Min	50000	50000	50000
Max	50000	50000	50000

	Mated	Unmated Jack	Unmated Plug
	Insulation Resistance	Insulation Resistance	Insulation Resistance
Average	50000	50000	50000
Min	50000	50000	50000
Max	50000	50000	50000

DATA SUMMARIES Continued

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

				Jack			Plug		
	Initial, VAC Mated			Initial, VAC Unmated			Initial, VAC Unmated		
	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage
Average	480	360	120	1300	975	325	620	465	155
Min	480	360	120	1300	975	325	620	465	155
Max	480	360	120	1300	975	325	620	465	155

	Mated			Jack			Plug		
	Thermal, VAC Mated			Thermal, VAC Unmated			Thermal, VAC Unmated		
	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage
Average	520	390	130	1500	1125	375	440	330	110
Min	520	390	130	1500	1125	375	440	330	110
Max	520	390	130	1500	1125	375	440	330	110

	Mated			Jack			Plug		
	Humidity, VAC Mated			Humidity, VAC Unmated			Humidity, VAC Unmated		
	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage
Average	1500	1125	375	800	600	200	1400	1050	350
Min	1500	1125	375	800	600	200	1400	1050	350
Max	1500	1125	375	800	600	200	1400	1050	350

DATA SUMMARIES Continued

LLCR (100 and 500 CYCLES):

1) A total of 8 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

	Date	9/12/2007	11/7/2007	11/26/2007	11/6/2007
	Room Temp C	23	23	22	21
	RH	45%	24%	38%	34%
	Name	Tori Meek	Tori Meek	Tori Meek	Tori Meek
	mOhm values	**Actual Initial**	**Delta Cycling**	**Delta Thermal**	**Delta Humidity**
Signal-100	Average	71.9	0.9	0.6	0.1
	St. Dev.	0.8	1.1	1.2	1.0
	Min	71.0	0.1	-0.9	-1.1
	Max	73.2	3.4	2.7	1.9
	Count	8	8	8	8
Ground-100	Average	8.1	0.4	0.6	1.1
	St. Dev.	0.3	0.4	0.5	1.1
	Min	7.6	0.0	0.1	-0.4
	Max	8.7	1.1	1.3	2.7
	Count	8	8	8	8
Signal-500	Average	67.1	0.2	0.9	0.4
	St. Dev.	5.8	0.4	1.1	0.7
	Min	59.7	-0.6	-0.2	-0.3
	Max	71.6	0.6	3.3	1.6
	Count	8	8	8	8
Ground-500	Average	7.5	-0.3	0.6	0.0
	St. Dev.	1.0	0.4	1.4	0.8
	Min	6.2	-1.1	-1.0	-1.3
	Max	8.8	0.2	3.5	1.3
	Count	8	8	8	8

DATA

CONTACT RETENTION:

	Plug	Jack
1	20.4	19.36
2	18.03	19.81
3	20.4	18.77

INSULATION RESISTANCE (IR):

Initial, Meg Ohms

Sample #	Mated Insulation Resistance	Unmated Jack Insulation Resistance	Unmated Plug Insulation Resistance
1	100000	50000	50000
2			

Thermal, Meg Ohms

Sample #	Mated Insulation Resistance	Unmated Jack Insulation Resistance	Unmated Plug Insulation Resistance
1	50000	50000	50000
2			

Humidity, Meg Ohms

Sample #	Mated Insulation Resistance	Unmated Jack Insulation Resistance	Unmated Plug Insulation Resistance
1	50000	50000	50000
2			

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

	Jack			Plug		
	Initial, VAC Mated			Initial, VAC Unmated			Initial, VAC Unmated		
Sample #	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage
1	480	360	120	1300	975	325	620	465	155
2									

	Mated			Jack			Plug		
	Thermal, VAC Mated			Thermal, VAC Unmated			Thermal, VAC Unmated		
Sample #	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage
1	520	390	130	1500	1125	375	440	330	110
2									

	Mated			Jack			Plug		
	Humidity, VAC Mated			Humidity, VAC Unmated			Humidity, VAC Unmated		
Sample #	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage	Breakdown Voltage	DWV	Working Voltage
1	1500	1125	375	800	600	200	1400	1050	350
2									

DATA Continued

LLCR (100 and 500 CYCLES):

mOhm values		Actual	Delta	Delta	Delta
Board	**Position**	**Initial**	**100 Cycles**	**Thermal**	**Humidity**
Signal-100	P1	71.5	0.5	0.8	0.1
Signal-100	P2	71.2	0.8	0.8	1.5
Signal-100	P3	71.9	0.2	1.6	-0.2
Signal-100	P4	72.4	0.2	-0.9	-0.8
Signal-100	P5	72.9	1.1	-0.6	-1.1
Signal-100	P6	73.2	3.4	2.7	1.9
Signal-100	P7	71.0	0.6	0.4	-0.1
Signal-100	P8	71.1	0.1	-0.3	-0.2
Ground-100	P1	7.9	1.1	1.3	1.8
Ground-100	P2	8.1	0.3	0.1	1.9
Ground-100	P3	8.3	0.1	0.5	1.4
Ground-100	P4	8.2	0.1	0.7	-0.4
Ground-100	P5	8.7	0.0	0.3	0.9
Ground-100	P6	8.1	0.4	1.2	2.7
Ground-100	P7	7.7	0.8	0.2	0.4
Ground-100	P8	7.6	0.3	0.3	0.0
Signal-500	P1	59.7	0.3	1.2	0.7
Signal-500	P2	60.7	-0.6	-0.2	-0.3
Signal-500	P3	71.4	0.4	0.6	1.6
Signal-500	P4	71.5	0.0	0.9	0.0
Signal-500	P5	71.6	0.5	1.1	0.0
Signal-500	P6	71.5	0.6	0.5	0.2
Signal-500	P7	70.4	0.0	0.1	-0.2
Signal-500	P8	60.1	0.2	3.3	1.4
Ground-500	P1	6.7	-0.5	-0.3	-0.1
Ground-500	P2	6.2	-0.1	1.4	1.1
Ground-500	P3	7.8	0.0	0.0	-0.3
Ground-500	P4	8.4	-0.7	-0.3	-0.5
Ground-500	P5	8.8	-1.1	-1.0	-1.3
Ground-500	P6	8.1	-0.1	1.1	-0.2
Ground-500	P7	7.5	0.2	0.7	0.1
Ground-500	P8	6.5	-0.3	3.5	1.3

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: STG-01
Description: Hipot Megomter Safety Test Cage
Manufacturer: Hipotronics
Model: TC-25
Serial #: M9910141
Accuracy: N/A
… Last Cal: No Calibration Required, Next Cal:

Equipment #: HPM-01
Description: Hipot Megommeter
Manufacturer: Hipotronics
Model: H306B-A
Serial #: M9905004
Accuracy: 2 % Full Scale Accuracy
… Last Cal: 06/22/07, Next Cal: 06/22/08

Equipment #: OV-03
Description: Cascade Tek Forced Air Oven
Manufacturer: Cascade Tek
Model: TFO-5
Serial #: 0500100
Accuracy: Temp. Stability: +/-.1C/C change in ambient
… Last Cal: 06/62/07, Next Cal: 06/22/08

Equipment #: THC-01
Description: Temperature/Humidity Chamber
Manufacturer: Thermotron
Model: SM-8-7800
Serial #: 30676
Accuracy: See Manual
… Last Cal: 9/21/2007, Next Cal: 9/21/2008

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 03/8/07, Next Cal: 03/8/08

Equipment #: MO-05
Description: Digital Multimeter (7.5 Digits)
Manufacturer: Keithley
Model: KEI 2001
Serial #: 0649520
Accuracy: See Manual
… Last Cal: 02/12/2007, Next Cal: 02/12/2008

Equipment #: TCT-04
Description: Dillon Quantrol TC21 25-1000 mm/min series test stand
Manufacturer: Dillon Quantrol
Model: TC2 I series test stand
Serial #: 04-1041-04
Accuracy: Speed Accuracy: +/- 5% of indicated speed; Speed Accuracy: +/- 5% of indicated speed;
… Last Cal: 05/18/2007, Next Cal: 05/18/2008

Equipment #: LC-1000N (icell)
Description: 1000 N icell load cell for Dillon Test stand
Manufacturer: Mecmesin (Dillon/Quantrol)
Model: icell
Serial #: 06-0052-12
Accuracy: .10 % of capacity
… Last Cal: 04/16/2007, Next Cal: 04/16/2008

Equipment #: DFT-10
Description: Chatillon Remote Load Gage
Manufacturer: Chatillon
Model: DFT-10 (SENT TO COSTA RICA)
Serial #: H00160
Accuracy: +/- 0.01% of Full Scale (10lb) Not Used - Same gage as FG-8
… Last Cal: 01/15/05, Next Cal: 04/01/2099

…