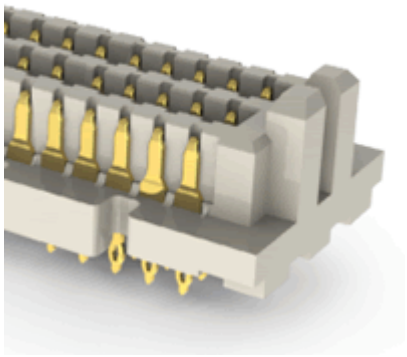
Project Number: Design Verification Test Report	Tracking Code: TC0932—2678_REPORT _REV_3		
Requested by: Kevin Meredith	Date: 5/18/2011	Product Rev: 1	
Part #: SEAMP-40-02.0-L-06	Lot #: na	Tech: Gary Lomax, John Shearer	Eng: Eric Mings
Part description: SEAMP-40-02.0-L-06			Qty to test: 120
Test Start: 10/06/2009	Test Completed: 10/26/2009		



Design Verification Test Report

SEAMP

SEAMP-40-02.0-L-06

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: Design Verification Test , See test plan TC0932-2678

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) Any additional preparation will be noted in the individual test sequences.
4) Samtec Test PCBs used: PCB-101759-TST-0XA (1)/ PCB-101888-TST-0XA (1)/ PCB-101888-TST-0XA (12)
5) PCB’s HASL Sn

FLOWCHARTS

TEST STEP	GROUP A	GROUP B
	90 Points (30 per cycle, individual pins)	**90 Points (30 per cycle, individual pins)**
	Insertion/Retention force Min PTH (016 dia)	**Insertion/Retention force Max PTH (.020 dia)**
01	measure and record the compiant pin (width only)	measure and record the compiant pin (width only)
02	Measure/record PTH hole diameter to determine it is smallest diameter permissible.	Measure/record PTH hole diameter to determine it is largest diameter permissible.
	1st Cycle	**1 Cycle**
03	Fixture and press pin into PTH, Record data	Fixture and press pin into PTH, Record data
04	Fixture and remove pin from PTH, Record data	Fixture and remove pin from PTH, Record data
	2nd Cycle (Use new compliant pin, same hole)	**2nd Cycle (Use new compliant pin, same hole)**
05	measure and record the compiant pin (width only)	Measure Compliant pin size
06	Fixture and press pin into PTH, Record data	Fixture and press pin into PTH, Record data
07	Fixture and remove pin from PTH, Record data	Fixture and remove pin from PTH, Record data
	3rd Cycle (Use new compliant pin, same hole)	**3rd Cycle (Use new compliant pin, same hole)**
08	measure and record the compiant pin (width only)	Measure Compliant pin size
09	Fixture and press pin into PTH, Record data	Fixture and press pin into PTH, Record data
10	Fixture and remove pin from PTH, Record data	Fixture and remove pin from PTH, Record data
11	**photo inspection of vias (check for cracked barrel)**	**photo inspection of vias (check for cracked barrel)**

Insertion/Retention Forces = EIA-364-13

TEST STEP	GROUP A 10 connectors
01	Measure/record Compliant pin size min 10 pins per connector
02	Measure PTH hole diameter to determine it is smallest diameter. (.016 dia)
03	Press fit connectors onto PCB's
04	Visual inspect for buckling or any other deformation

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

Termination/retention to PCB:

1) Reference document: EIA-364-13, *Insertion/retention force and measure the hold diameter*.
2) The full insertion position was to within 0.003” to 0.004” of the plug bottoming out in the receptacle to prevent damage to the system under test.
3) One of the mating parts is secured to a floating X-Y table to prevent damage during cycling.

SUPPLEMENTAL TESTS

1) Measure and record the compliant pin (width only).
2) Measure/record PTH diameter.

RESULTS

Termination/Retention Forces to PCB

Group A

- **1st Cycles**
  - **Mating**
    - **Min ---------- 5.55 Lbs**
    - **Max---------- 6.35 Lbs**
  - **Unmating**
    - **Min ---------- 2.12 Lbs**
    - **Max---------- 3.30 Lbs**
- **2nd Cycles**
  - **Mating**
    - **Min ---------- 5.05 Lbs**
    - **Max---------- 6.01 Lbs**
  - **Unmating**
    - **Min ---------- 2.05 Lbs**
    - **Max---------- 2.99 Lbs**
- **3rd Cycles**
  - **Mating**
    - **Min ---------- 4.87 Lbs**
    - **Max---------- 5.81 Lbs**
  - **Unmating**
    - **Min ---------- 2.00 Lbs**
    - **Max---------- 2.52 Lbs**

Group B

- **1st Cycles**
  - **Mating**
    - **Min ---------- 1.50 Lbs**
    - **Max---------- 3.49 Lbs**
  - **Unmating**
    - **Min ---------- 1.13 Lbs**
    - **Max---------- 2.03 Lbs**
- **2nd Cycles**
  - **Mating**
    - **Min ---------- 2.15 Lbs**
    - **Max---------- 2.93 Lbs**
  - **Unmating**
    - **Min ---------- 1.35 Lbs**
    - **Max---------- 2.11 Lbs**
- **3rd Cycles**
  - **Mating**
    - **Min ---------- 2.40 Lbs**
    - **Max---------- 2.99 Lbs**
  - **Unmating**
    - **Min ---------- 1.23 Lbs**
    - **Max---------- 1.99 Lbs**

RESULTS Continued

Compliant pin (width)

Group A (0.016 dia)

- **Min ---------- 0.02221 Inch**
- **Max---------- 0.02291 Inch**

Group B (0.020 dia)

- **Min ---------- 0.02213 Inch**
- **Max---------- 0.02331 Inch**

Hole diameter

Group A (0.016 dia)

- **Min ---------- 0.01377 Inch**
- **Max---------- 0.01651 Inch**

Group B (0.020 dia)

- **Min ---------- 0.02020 Inch**
- **Max---------- 0.02111 Inch**

DATA SUMMARIES

Termination/Retention Forces to PCB:

Group A:

	1st Cycle				2nd Cycle			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	24.69	5.55	9.43	2.12	22.46	5.05	9.12	2.05
Maximum	28.24	6.35	14.68	3.30	26.73	6.01	13.30	2.99
Average	26.21	**5.89**	11.50	**2.59**	24.58	**5.53**	10.48	**2.36**
St Dev	0.85	0.19	1.14	0.26	0.99	0.22	0.93	0.21
Count	30	30	30	30	30	30	30	30

	3rd Cycle			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	21.66	4.87	8.90	2.00
Maximum	25.84	5.81	11.21	2.52
Average	23.71	**5.33**	9.80	**2.20**
St Dev	1.17	0.26	0.68	0.15
Count	30	30	30	30

Group B:

	1st Cycle				2nd Cycle			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	6.67	1.50	5.03	1.13	9.56	2.15	6.00	1.35
Maximum	15.52	3.49	9.03	2.03	13.03	2.93	9.39	2.11
Average	12.98	**2.92**	7.56	**1.70**	11.71	**2.63**	7.60	**1.71**
St Dev	2.10	0.47	1.16	0.26	0.97	0.22	0.95	0.21
Count	15	15	15	15	15	15	15	15

	3rd Cycle			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	10.68	2.40	5.47	1.23
Maximum	13.30	2.99	8.85	1.99
Average	11.72	**2.63**	6.50	**1.46**
St Dev	0.80	0.18	0.77	0.17
Count	15	15	15	15

DATA SUMMARIES Continued

PTH Diameter (Unit: Inch):

Group	Group A (0.016 dia)	Group B (0.020 dia)
Max	0.0165	0.0211
Min	0.0138	0.0202
Average	0.0162	0.0208
Stdev	0.000413458	0.00019825

Pin Width (Unit: Inch):

Group	GroupA (0.016 dia)	GroupB (0.020 dia)
Max	0.0229	0.0233
Min	0.0222	0.0221
Average	0.0226	0.0227
Stdev	0.00020092	0.00022955

DATA

Termination/Retention Forces to PCB

Group A:

	1st Cycle		2nd Cycle		3rd Cycle	
Sample#	Mating	Unmating	Mating	Unmating	Mating	Unmating
1	6.35	2.27	5.63	2.13	5.01	2.30
2	5.91	2.59	5.29	2.43	5.33	2.11
3	6.17	3.30	5.35	2.24	5.41	2.04
4	6.06	2.87	5.48	2.31	4.98	2.23
5	6.15	2.90	5.61	2.58	5.31	2.08
6	5.64	2.23	5.69	2.05	5.08	2.25
7	6.03	2.51	5.05	2.99	5.49	2.34
8	5.85	2.43	5.32	2.42	4.99	2.42
9	6.16	2.85	5.41	2.52	4.87	2.14
10	6.00	2.71	5.12	2.09	5.05	2.52
11	5.75	2.53	5.55	2.40	4.99	2.01
12	6.05	2.41	5.85	2.55	5.30	2.24
13	5.99	2.68	5.68	2.33	5.24	2.10
14	5.61	2.77	5.34	2.50	5.10	2.08
15	5.88	2.55	5.40	2.60	5.29	2.20
16	5.55	2.88	5.43	2.13	5.11	2.10
17	5.75	2.90	5.32	2.58	5.30	2.43
18	5.84	2.63	5.77	2.42	5.67	2.29
19	5.90	2.84	5.80	2.09	5.77	2.08
20	6.01	2.60	5.60	2.55	5.55	2.51
21	5.63	2.20	5.44	2.44	5.39	2.33
22	5.88	2.40	5.60	2.14	5.57	2.08
23	5.69	2.71	5.37	2.52	5.28	2.41
24	5.83	2.47	5.49	2.28	5.43	2.08
25	5.91	2.12	5.84	2.34	5.70	2.30
26	6.08	2.55	6.01	2.29	5.81	2.24
27	5.90	2.39	5.63	2.20	5.61	2.10
28	5.71	2.44	5.60	2.31	5.44	2.09
29	5.80	2.51	5.78	2.08	5.70	2.00
30	5.69	2.35	5.36	2.20	5.15	2.03

DATA Continued

Group B

	1st Cycle		2nd Cycle		3rd Cycle	
Sample#	Mating	Unmating	Mating	Unmating	Mating	Unmating
1	1.50	1.13	2.93	1.66	2.89	1.50
2	3.21	1.81	2.87	1.78	2.99	1.23
3	2.92	1.54	2.53	2.05	2.49	1.63
4	3.44	1.95	2.55	1.79	2.52	1.40
5	3.49	2.00	2.70	2.11	2.76	1.41
6	3.05	1.73	2.34	1.89	2.71	1.99
7	2.82	1.49	2.15	1.61	2.43	1.30
8	3.17	1.41	2.56	1.56	2.40	1.44
9	2.59	1.75	2.44	1.72	2.55	1.38
10	2.78	2.03	2.87	1.73	2.63	1.47
11	3.10	1.80	2.80	1.51	2.78	1.44
12	2.99	1.86	2.71	1.45	2.65	1.36
13	3.24	1.96	2.85	1.86	2.77	1.50
14	2.78	1.40	2.60	1.35	2.53	1.38
15	2.69	1.63	2.58	1.55	2.41	1.50

Data continued

PTH diameter (Unit: Inch):

GroupA (0.016 dia)	GroupB (0.020 dia)
0.01611	0.02020
0.01598	0.02055
0.01633	0.02060
0.01589	0.02052
0.01622	0.02093
0.01596	0.02076
0.01612	0.02083
0.01604	0.02089
0.01602	0.02072
0.01377	0.02067
0.01619	0.02081
0.01609	0.02089
0.01626	0.02092
0.01617	0.02092
0.01620	0.02105
0.01626	0.02105
0.01616	0.02111
0.01634	0.02105
0.01618	0.02096
0.01615	0.02086
0.01625	0.02088
0.01630	0.02098
0.01651	0.02094
0.01634	0.02094
0.01650	0.02097
0.01631	0.02097
0.01648	0.02089
0.01633	0.02087
0.01627	0.02085
0.01645	0.02071
0.01644	0.02081
0.01646	0.02091
0.01640	0.02090
0.01648	0.02083
0.01626	0.02079
0.01649	0.02083
0.01643	0.02078
0.01651	0.02069
0.01646	0.02061
0.01645	0.02026
0.01644	0.02035
0.01650	0.02056
0.01646	0.02076
0.01645	0.02082
0.01648	0.02077

Data continued

Pin Width (Unit: Inch):

GroupA (0.016 dia)	GroupB (0.020 dia)
0.02260	0.02299
0.02252	0.02299
0.02244	0.02291
0.02276	0.02252
0.02236	0.02268
0.02276	0.02252
0.02221	0.02252
0.02268	0.02252
0.02252	0.02268
0.02252	0.02284
0.02244	0.02268
0.02252	0.02268
0.02260	0.02268
0.02260	0.02268
0.02260	0.02268
0.02252	0.02276
0.02268	0.02268
0.02268	0.02252
0.02276	0.02276
0.02284	0.02268
0.02291	0.02268
0.02260	0.02260
0.02284	0.02315
0.02221	0.02236
0.02252	0.02276
0.02291	0.02260
0.02228	0.02284
0.02276	0.02252
0.02268	0.02268
0.02236	0.02284
0.02291	0.02315
0.02244	0.02213
0.02244	0.02268
0.02260	0.02252
0.02244	0.02331
0.02260	0.02260
0.02244	0.02291
0.02236	0.02291
0.02284	0.02291
0.02228	0.02299
0.02244	0.02323
0.02221	0.02260
0.02252	0.02291
0.02284	0.02252
0.02291	0.02291

EQUIPMENT AND CALIBRATION SCHEDULES

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: 05/07/2009, Next Cal: 05/07/2010

Equipment #: OGP-01
Description: 6"X 6" Video Measuring Machine
Manufacturer: Optical Gauging Products
Model: Smartscope 200 CFOV
Serial #: SF2001956
Accuracy: See Manual
… Last Cal: 03/13/09, Next Cal: 03/13/2010

Equipment #: MV-05
Description: 6" x 6" Video Measuring Machine
Manufacturer: Micro-Vu
Model: M3010838
Serial #: V9344
Accuracy: See Manual
… Last Cal: 01/12/2010, Next Cal: 01/12/2011