

TEST REPORT Tyco Electronics Corporation Engineering Assurance Product Testing Laboratory	Requester Dick Defibaugh	Report Number CTLB021367-059	
	Preparer Barry L. Ressler	Mail Stop 18-01	Phone 810-2309
Title MultiGig Tier 1 Connector Testing to COTS & Military Requirements for MultiGig RT-3		Date June 24, 2002	

INTRODUCTION

MultiGig Tier 1 Signal Connectors were tested to the Dynamic test sequence (Group B) of the COTS and Military Test Requirements for MultiGig RT-3 (Rev. 1.0, dated June 3, 2002) for committee acceptance of MultiGig product design. The Test Plan follows the VME64X Test Plan COTS/Military, Table 1: Test Methods and Severities.

The specimens submitted were three MultiGig RT-1, 25.4mm Vertical Receptacle Backplanes (P/N 1410210-1) and Right Angle Daughtercard Assemblies (P/N 1410215-1). The contacts were P/N 1410531-2 & 1410650-2. Tier 1 specimens were submitted because of their similarity and because Tier 3 specimens were unavailable.

RESULTS

Table 1 Low Level Resistance Summary (milliohms)

	Row A		Row E		Row J	
	Initial	Final	Initial	Final	Initial	Final
Min	30.406	30.623	38.109	37.445	52.849	52.119
Max	33.927	34.332	43.334	42.988	61.345	60.844
Avg	32.160	32.129	40.472	40.230	56.108	55.833
STD	0.720	0.787	1.083	1.031	1.743	1.723

Complete resistance measurements are listed on pages 3 – 5.

No arcing or flashover occurred during initial or final Dielectric Withstanding Voltage measurements.
(Initial = 6/10/02, 23.4°C, 55.1% RH, 29.74 in/Hg – Final = 6/24/02, 24.1°C, 56.1% RH, 29.78 in/Hg)

All Insulation Resistance measurements were greater than 100 Mohms.

Table 2 Insulation Resistance (Mohms)

	101		102		103	
	Initial	Final	Initial	Final	Initial	Final
Row A	4.4E4	3.3E4	1.0E4	4.0E3	5.0E4	2.5E4
Row E	7.0E4	1.0E5	1.0E4	6.5E4	1.1E5	1.0E5
Row J	1.0E5	1.8E5	6.5E4	7.5E4	8.0E4	1.0E5

(Initial = 6/10/02, 23.4°C, 55.1% RH, 29.74 in/Hg – Final = 6/24/02, 24.1°C, 56.1% RH, 29.78 in/Hg)

No discontinuities of 10 nanoseconds or greater occurred during vibration or physical shock testing.

There was no apparent damage to the specimens when examined at 8X.

PROCEDURE

Three MultiGig Tier 1 connectors mounted to PC board numbers 60-469998-2 REV A and 60-469991-1 REV O were tested to the following test sequence:

Low Level Contact Resistance (LLCR) – Insulation Resistance (IR) – Dielectric Withstanding Voltage (DWV) – Sinusoidal Vibration – Random Vibration – Physical Shock – LLCR – IR – DWV-Visual examination

DWV was performed between signal and ground contacts @ 500 VAC for one minute per MIL-STD-1344A, Method

3001.1.

Insulation Resistance was measured between signal and ground @ 500VDC for two minutes per MIL-STD-1344A, Method 3003.1.

Low Level Contact Resistance was measured with a 20 millivolts open circuit voltage @ 100 milliamps per MIL-STD-1344A, Method 3002.1

Sinusoidal vibration was performed according to MIL-STD-1344A, Method 2005.1, Test Condition III.

Random vibration was performed according to MIL-STD-1344A, Method 2005.1, Test Condition V, Test Condition D.

Physical Shock testing was performed according to MIL-STD-1344A, Method 2004.1, Test Condition A.

Discontinuity monitoring during vibration and physical shock testing was done using Nanosecond-Event Detection per EIA-364-87, Test Condition D, Test Method 1.

EQUIPMENT LIST

All equipment containing an E3897-, E4997- or E9100- number is calibrated and traceable through Tyco Electronics Metrology Department to the National Institute of Standards and Technology (NIST).

<u>NAME</u>	<u>Mfr/Mod</u>	<u>E#</u>
Weather Station	Solomat	4997-0572
Dielectric Tester	Vitrek/944I	9100-1279
High Resistance Meter	HP/4329A	9100-1279
Low Level Resistance Console	HP	4997-0390

Table 3 Low Level Resistance (milliohms)

Row A					
ID#	Initial	Final	ID#	Initial	Final
101 1	32.389	32.184	101 9	31.195	31.608
102 1	31.664	31.501	102 9	32.478	32.609
103 1	32.211	31.839	103 9	31.521	31.732
101 2	32.415	32.344	101 10	32.037	32.344
102 2	32.032	31.906	102 10	31.662	31.473
103 2	32.777	32.182	103 10	33.148	32.864
101 3	32.938	33.801	101 11	32.087	32.170
102 3	31.762	32.021	102 11	31.722	31.638
103 3	31.618	31.109	103 11	31.288	31.264
101 4	30.406	30.724	101 12	31.686	31.566
102 4	32.461	33.054	102 12	32.035	31.786
103 4	32.504	32.516	103 12	32.739	32.756
101 5	32.236	32.396	101 13	31.832	31.796
102 5	31.489	31.561	102 13	31.417	31.213
103 5	33.528	33.600	103 13	30.818	30.623
101 6	31.731	32.083	101 14	32.228	32.245
102 6	33.927	34.332	102 14	33.757	33.526
103 6	32.633	31.534	103 14	33.345	32.822
101 7	32.115	32.525	101 15	31.909	31.937
102 7	31.813	32.262	102 15	32.811	32.291
103 7	31.602	31.760	103 15	31.827	31.838
101 8	32.160	32.707	101 16	32.083	31.412
102 8	33.382	33.725	102 16	32.422	31.944
103 8	31.744	31.243	103 16	32.075	31.804
Min	30.406	30.623	Initial 6/10/02 – 23°C – 54% RH Final 6/24/02 – 23°C – 58% RH		
Max	33.927	34.332			
Avg	32.160	32.129			
STD	0.720	0.787			

Table 4 Low Level Resistance (milliohms)

Row E					
ID#	Initial	Final	ID#	Initial	Final
101 1	40.990	41.310	101 9	39.477	40.174
102 1	40.636	40.186	102 9	40.618	40.541
103 1	41.230	40.698	103 9	40.167	39.838
101 2	40.161	40.589	101 10	39.606	40.121
102 2	40.720	40.039	102 10	39.951	40.073
103 2	41.297	40.935	103 10	41.402	40.761
101 3	39.862	40.090	101 11	39.931	40.241
102 3	41.142	40.340	102 11	39.55	39.013
103 3	38.852	38.423	103 11	40.221	39.246
101 4	38.888	39.128	101 12	39.825	40.115
102 4	40.129	39.888	102 12	39.614	39.403
103 4	40.372	40.059	103 12	42.317	40.840
101 5	40.820	41.164	101 13	39.478	39.523
102 5	40.534	39.820	102 13	39.375	39.384
103 5	41.538	41.256	103 13	38.109	37.445
101 6	40.213	40.509	101 14	40.416	40.609
102 6	43.167	42.988	102 14	43.334	42.789
103 6	39.527	38.780	103 14	42.993	41.384
101 7	40.505	40.967	101 15	40.371	40.425
102 7	39.556	39.318	102 15	40.779	40.509
103 7	39.656	38.946	103 15	41.014	39.882
101 8	40.131	40.860	101 16	40.491	40.220
102 8	42.580	42.681	102 16	40.358	40.111
103 8	40.023	39.537	103 16	40.752	39.878
Min	38.109	37.445	Initial 6/10/02 – 23°C – 54% RH Final 6/24/02 – 23°C – 58% RH		
Max	43.334	42.988			
Avg	40.472	40.230			
STD	1.083	1.031			

Table 5 Low Level Resistance (milliohms)

Row J					
ID#	Initial	Final	ID#	Initial	Final
101 1	56.930	59.390	101 9	54.903	54.866
102 1	56.576	55.602	102 9	56.507	55.696
103 1	56.016	55.960	103 9	55.963	56.091
101 2	55.297	56.516	101 10	55.138	54.885
102 2	56.902	55.710	102 10	56.006	55.299
103 2	56.663	56.681	103 10	57.672	57.201
101 3	54.594	54.416	101 11	56.043	56.138
102 3	56.243	55.729	102 11	53.973	53.438
103 3	54.809	54.600	103 11	55.122	54.684
101 4	53.949	54.098	101 12	53.924	54.336
102 4	55.740	55.700	102 12	53.919	53.509
103 4	56.442	56.407	103 12	57.632	56.971
101 5	56.367	56.267	101 13	54.182	53.892
102 5	56.455	55.777	102 13	54.029	53.575
103 5	57.401	57.231	103 13	52.849	52.119
101 6	56.438	56.457	101 14	56.213	55.988
102 6	61.345	60.844	102 14	61.160	59.989
103 6	54.176	53.784	103 14	59.091	58.046
101 7	56.685	56.791	101 15	56.290	55.614
102 7	55.509	54.971	102 15	57.089	56.354
103 7	55.426	55.194	103 15	56.123	55.737
101 8	55.771	56.103	101 16	55.805	55.709
102 8	60.483	60.029	102 16	56.124	54.986
103 8	56.199	55.798	103 16	55.004	54.783
Min	52.849	52.119	Initial 6/10/02 – 23°C – 54% RH Final 6/24/02 – 23°C – 58% RH		
Max	61.345	60.844			
Avg	56.108	55.833			
STD	1.743	1.723			

TEST RECORD Tyco Electronics Corporation Engineering Assurance Product Testing Laboratory	Title of Test Physical Shock	Test Number CTLB021367-059	
	Tester Michael Wolfe	Date Started 6-21-2002	Date Complete 6-21-2002
Control Document VME64x Test Plan		Ambient Temp 23 °C	Relative Humidity 52%
Product Description MultiGig T1		Test Group 1A	Seq No 7

The three MultiGig test specimens were subjected to a physical shock test as stated in the VME64x Test Plan, in accordance with specification MIL-STD-1344A, Method 2004.1, Test Condition "A".

Procedure

The parameters of this test condition are a half-sine waveform with an acceleration amplitude of 50 gravity units (g's peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the three mutually perpendicular axes of the test specimens, for a total of eighteen shocks.

The test specimens were monitored for discontinuities of 10 nanoseconds or greater using an energizing current of 100 milliamperes.

Results

PULSE VELOCITY CHANGE: 128.8 INCHES/SECOND

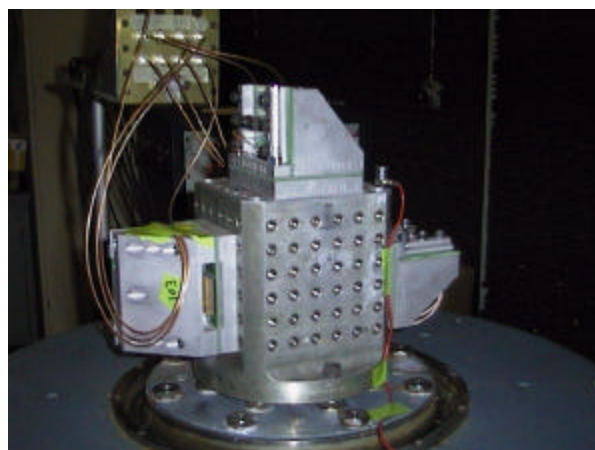
No discontinuities of 10 nanoseconds or greater occurred during testing.

EQUIPMENT LIST:

CONTROL ACCELEROMETER
 CHARGE AMPLIFIER
 VIBRATION CONTROLLER
 DISCONTINUITY MONITOR
 VIBRATION TABLE & AMPLIFIER
 DATA PRECISION STORAGE SCOPE
 DATA PRECISION INPUT CHANNELS
 CUBE
 TEST FIXTURE
 TEST FIXTURE
 TEST FIXTURE
 TEST FIXTURE
 TEST FIXTURE
 COMMON SHIELD PLATE
 COMMON SHIELD SUPPORT

LAB NO:

E9100-0861
 E9100-1243
 E9100-1306
 E9100-1276
 X0085-045
 E9100-1331
 E9100-1332
 92-466484-1
 39-468910-1
 39-468911-1
 39-468912-1
 39-468913-1
 39-469848-1
 92-467074-1
 92-467076-1



TEST RECORD Tyco Electronics Corporation Engineering Assurance Product Testing Laboratory	Title of Test Random Vibration	Test Number CTLB021367-059	
	Tester Michael Wolfe	Date Started 6-15-2002	Date Complete 6-16-2002
Control Document VME64x Test Plan	Ambient Temp 21.7 °C	Relative Humidity 56%	
Product Description MultiGig T1	Test Group 1A	Seq No 6	

The three MultiGig test specimens were subjected to a random vibration test as stated in the VME64x Test Plan, in accordance with specification MIL-STD-1344A, Method 2005.1, Test Condition V, Test Condition Letter "D".

Procedure

The parameters of this test condition are specified by a random vibration spectrum with excitation frequency bounds of 50 and 2000 Hertz (Hz). The power spectral density (PSD) at 50 Hz is 0.025 G²/Hz. The spectrum slopes up at 6 dB per octave to a PSD of 0.1 G²/Hz at 100 Hz. The spectrum is flat at 0.1 G²/Hz from 100 Hz to 1000 Hz. The spectrum slopes down at 6 dB per octave to a PSD of 0.025 G²/Hz at the upper bound frequency of 2000 Hz. The root-mean square amplitude of the excitation was 11.95 GRMS.

The specimens were subjected to this test for 1.5 hours in each of the three mutually perpendicular axes, for a total test time of 4.5 hours per specimen.

The test specimens were monitored for discontinuities of 10 nanoseconds or greater using an energizing current of 100 milliamperes.

Results

No discontinuities of 10 nanoseconds or greater occurred during testing.

EQUIPMENT LIST:

LAB NO:

CONTROL ACCELEROMETER	E9100-1001
CHARGE AMPLIFIER	E9100-1304
VIBRATION CONTROLLER	E9100-1284
VIBRATION TABLE & AMPLIFIER	EM-1029
DISCONTINUITY MONITOR	E9100-1276
CUBE	92-467383-1
TEST FIXTURE	39-468910-1
TEST FIXTURE	39-468911-1
TEST FIXTURE	39-468912-1
TEST FIXTURE	39-468913-1
TEST FIXTURE	39-469848-1
BRAID CLAMP	92-467101-1
BRAID CLAMP	92-467077-1
COMMON SHIELD PLATE	92-467074-1
COMMON SHIELD SUPPORT	92-467076-1
ORTHOGONAL ANTENNA	



TEST RECORD Tyco Electronics Corporation Engineering Assurance Product Testing Laboratory	Title of Test Sinusoidal Vibration	Test Number CTLB021367-059	
	Tester Michael Wolfe	Date Started 6-15-2002	Date Complete 6-16-2002
Control Document VME64x Test Plan	Ambient Temp 21.7 °C	Relative Humidity 56%	
Product Description MultiGig T1	Test Group 1A	Seq No 5	

The three MultiGig test specimens were subjected to a sinusoidal vibration test as stated in the VME64x Test Plan, in accordance with specification MIL-STD-1344A, Method 2005.1, Test Condition III.

Procedure

The parameters of this test condition are a simple harmonic motion having an amplitude of either 0.06 inch double amplitude (maximum total excursion) or 15 gravity unit (g's peak) whichever is less.

The vibration frequency was varied logarithmically between the approximate limits of 10 to 2000 Hertz (Hz). The entire frequency range of 10 to 2000 Hz and return to 10 Hz was traversed in approximately 20 minutes. This cycle was performed 12 times in all three mutually perpendicular axes (total of 36 times), so that the motion was applied for a total period of approximately twelve hours.

The test specimens were monitored for discontinuities of 10 nanoseconds or greater using an energizing current of 100 milliamperes.

Results

No discontinuities of 10 nanoseconds or greater occurred during testing.

EQUIPMENT LIST:

LAB NO:

CONTROL ACCELEROMETER	E9100-1001
CHARGE AMPLIFIER	E9100-1304
VIBRATION CONTROLLER	E9100-1284
VIBRATION TABLE & AMPLIFIER	EM-1029
DISCONTINUITY MONITOR	E9100-1276
CUBE	92-467383-1
TEST FIXTURE	39-468910-1
TEST FIXTURE	39-468911-1
TEST FIXTURE	39-468912-1
TEST FIXTURE	39-468913-1
TEST FIXTURE	39-469848-1
BRAID CLAMP	92-467101-1
BRAID CLAMP	92-467077-1
COMMON SHIELD PLATE	92-467074-1
COMMON SHIELD SUPPORT	92-467076-1
ORTHOGONAL ANTENNA	

