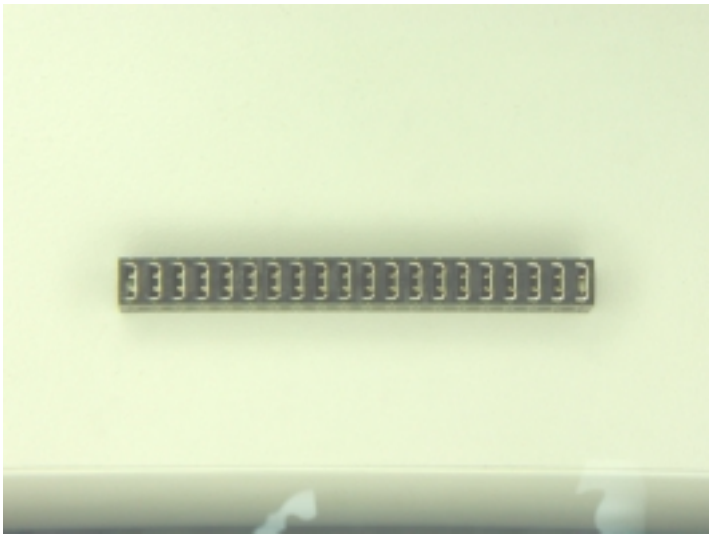
Project Number: 229C	Tracking Code: 0147-229C-0569		
Requested by: W. Ouyang	Date: 11/20/01	Product Rev: F	
Part #: MNT-120-BK-H	Lot #: 11/16/01	Tech: T. Cook	Eng: J. Tozier
Part description: 0.100 C.L. Shunt Strip Assembly			Qty to test: 32
Test Start: 12/03/01	Test Completed: 1/7/02		



CCC/IR/DWV Summary Report

Part Description:

MNT-120-BK-H

Project Number: 229C	Tracking Code: 0147-229C-0569		
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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.

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Part description: 0.100 C.L. Shunt Strip Assembly			Qty to test: 32
Test Start: 12/03/01	Test Completed: 1/7/02		

SCOPE

To perform the following tests: CCC/IR/DWV

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 trace-ability throughout the test sequences.
3) After soldering, the parts to be used for LLCR testing were cleaned according to TLWI-0001:
   a) Sample test boards are to be ultrasonically cleaned after test lead attachment, preparation and/or soldering using the following process.
   b) Immerse the sample test boards into the Branson 3510 cleaner which contains Kyzen Ionox HC1 (or equivalent) cleaning solution with the following conditions:
      i) Temperature: 55 ° C+/- 5 ° C
      ii) Frequency: 40 KHz
      iii) Immersion Time: 5 to 10 Minutes
   c) Sample test boards are then slowly removed and placed into the Branson 3510 cleaner which contains deionized water with the following conditions:
      i) Temperature: 55 ° C +/- 5 ° C
      ii) Frequency: 40 KHz
      iii) Immersion Time: 5 to 10 Minutes
   d) Sample test boards are then removed and placed in a beaker, on a hot plate with a magnetic stirrer containing deionized water warmed to 55 +/- 5 ° C for 1/2 to 1 minute (Use 55 ° C as target)
   e) Upon removal, the sample test boards are then rinsed for 1/2 to 1 minute in room temperature free flowing deionized water.
   f) After the final rinse, the sample test boards are to be dried in an air-circulating oven for 10 to 15 minutes at 50 +/- 5 ° C (Use 50 ° C as target)
   g) Sample test boards are then allowed to set and recover to room ambient condition prior to testing.
4) Parts not intended for testing for LLCR are visually inspected and cleaned if necessary.
5) Any additional preparation will be noted in the individual test procedures.

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FLOWCHART:

TEST STEP	GROUP A, Sequence 1 1 connector min 3 Contacts in series	GROUP A, Sequence 2 2 Connectors Ambient	GROUP B1, Sequence 2 2 Connectors Ambient	GROUP B2, Sequence 2 2 Connectors Thermal	GROUP B3, Sequence 2 2 Connectors Humidity
01	CCC	IR	Breakdown/DWV/WV	Thermal Aging	Humidity
02		Thermal Aging		Breakdown/DWV/WV	Breakdown/DWV/WV
03		IR			
04		Humidity			
05		IR			

Tabulate calculated current at RT, 60 and 75 degrees C
after derating 20% and based on 105 deg C
Thermal Aging = EIA-364-17, Test Condition 4 (105 deg C), Test Time Condition C (500 hours)
Humidity =EIA-364-31, Test Condition B (240 Hours)
and Method III (+25 deg C to +65 deg C @ 90%RH to 98% RH)…

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ATTRIBUTE DEFINITION

Following is a brief, simplified description of each attribute measured.

THERMAL AGING:

1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors.*
   a) Test Condition 4 at 105 ° C.
   b) Test Time Condition C for 500 hours.
2) Connectors are mated.

CYCLIC HUMIDITY:

1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors.*
   a) Test Condition B, 240 Hours.
   b) Method III, +25 ° C to + 65 ° C, 90% to 95% relative humidity excluding sub-cycles 7a and 7b.

TEMPERATURE RISE(Current Carrying Capacity, CCC):

1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets*.
2) When current passes through a contact, the temperature of the contact increases as a result of I^2R (resistive) heating.
3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
4) The size of the temperature probe can affect the measured temperature.
5) Copper traces on PC boards will contribute to temperature rise:
   a) Self heating (resistive)
   b) Reduction in heat sink capacity affecting the heated contacts
6) A de-rating curve, usually 20%, is calculated.
7) Calculated de-rated currents at three temperature points are reported:
   a) Ambient
   b) 60 ^{o} C
   c) 75 ^{o} C
8) Typically, neighboring contacts (in close proximity to maximize heat build up) are energized.
9) The thermocouple (or temperature measuring probe) will be positioned at a location to sense the MAXIMUM temperature in the vicinity of the heat generation area.
10) A computer program, *TR 803.exe*, ensures accurate stability for data acquisition.
11) Hook-up wire cross section is larger than the cross section of any connector leads/PC board traces, jumpers, etc.
12) Hook-up wire length is longer than the minimum specified in the referencing standard.

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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 Adjacent Contacts
      ii) Un-Mated
      iii) Unmounted
      iv) Rate of Application 500 V/Sec
      v) 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).

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 Adjacent Contacts
      ii) Un-Mated
      iii) Unmounted
      iv) Electrification Time 2.0 minutes
      v) Test Voltage (VDC) corresponding to calibration settings for measuring resistances
2) MEASUREMENTS:
   a) When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 5000 megohms.

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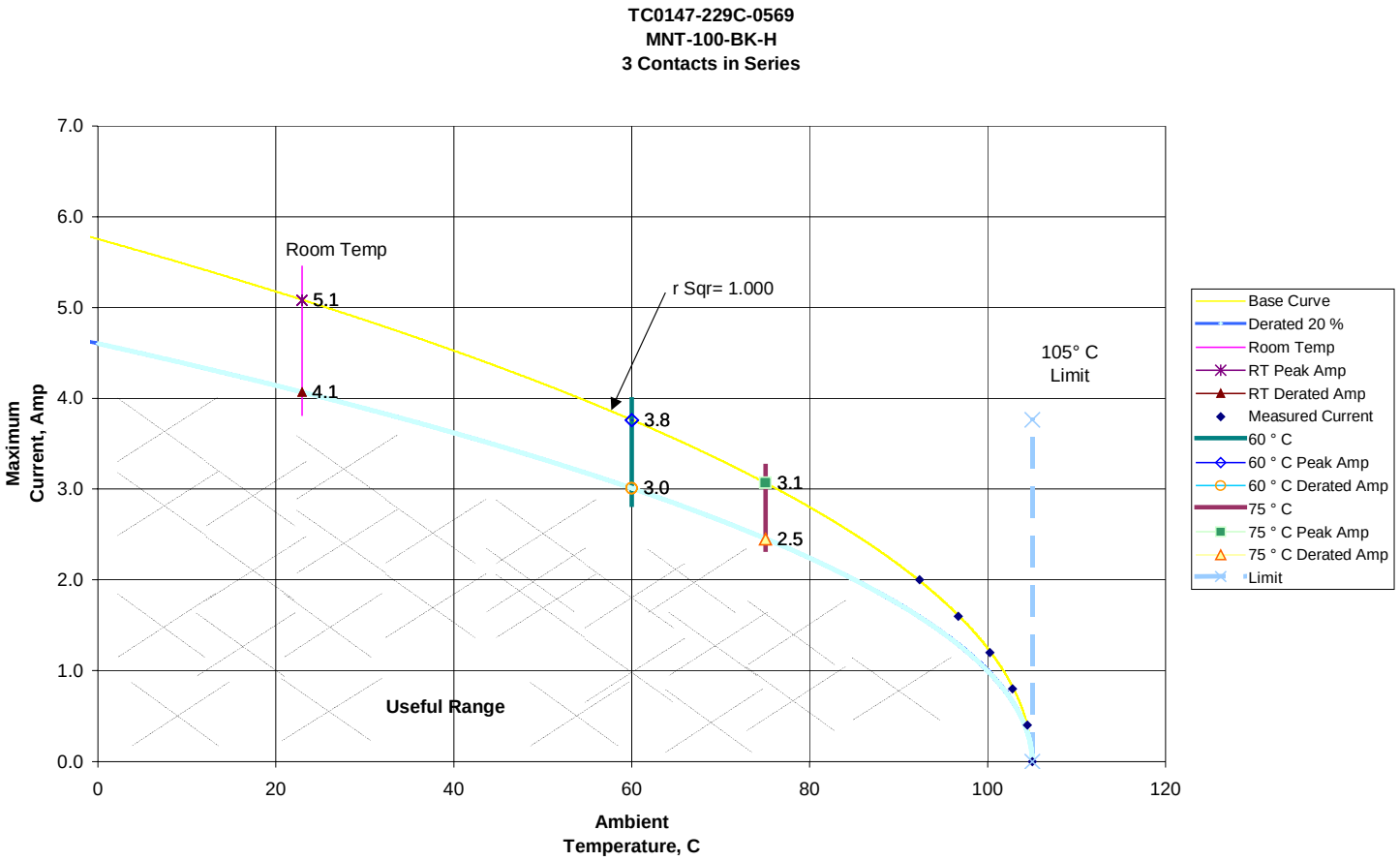
TEST SUMMARIES

TEMPERATURE RISE (Current Carrying Capacity, CCC):

1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
2) The thermocouples were placed at a location to sense the MAXIMUM temperature generated during testing.
3) Temperature readings recorded are those for which three successive readings, 15 minutes apart, differ less than 1 ° C (computer controlled data acquisition).
4) Three contacts were tested.



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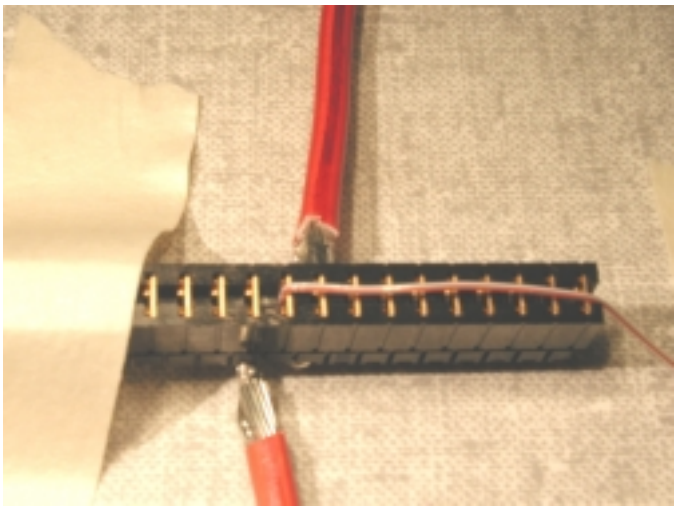
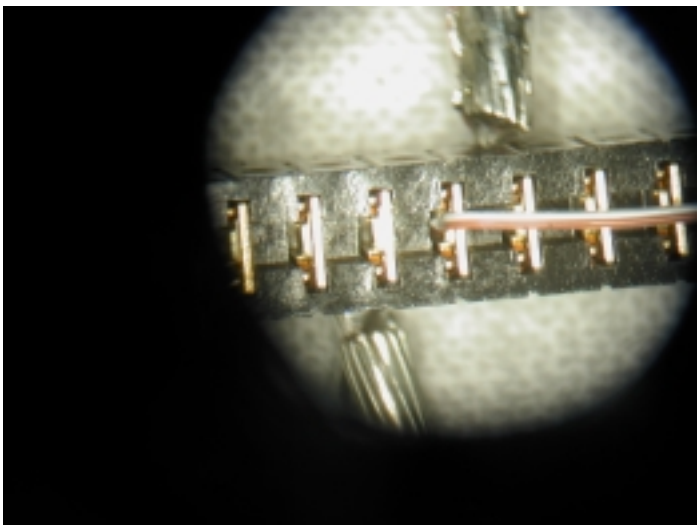


T Rise Setup Photo #1



T Rise Setup Photo #1

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DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Initial VAC

	Breakdown Voltage	DWV	Working Voltage
Average	2967		
Min	2700	2025	675
Max	3300		

After Thermal VAC

	Breakdown Voltage	DWV	Working Voltage
Average	2950		
Min	2700	2025	675
Max	3350		

After Humidity VAC

	Breakdown Voltage	DWV	Working Voltage
Average	3233		
Min	3000	2250	750
Max	3350		

INSULATION RESISTANCE (IR):

Initial Mohms	
Average	
Min	25000
Max	

After Thermal Mohms	
Average	
Min	50000
Max	

After Humidity Mohms	
Average	
Min	100000
Max	

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DATA SECTION

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Contact Description Dual Beam Contact-Shunt Type
1. Contact Part #: C-37-T
2. Series Contact is Used In: MNT

Test Conditions	YES	NO
Between Adjacent Contacts	X	
Mated		X
PC Mounted		X

Rate Of Applied Voltage *500 V Per Sec.*
Test Voltage *Until Breakdown Occurs*

Test Date: 12/3/2001
Operator: TC
Temperature (C): 22
Humidity (RH): 32%
Pressure (In. Hg): 29.45
Equipment Code Number 3

Initial Values in VAC

Board/Sample #	Breakdown Voltage	DWV	Working Voltage
1	2700	2025	675
2	3300	2475	825
3	2900	2175	725

Test Date: 12/27/2001
Operator: TC
Temperature (C): 22
Humidity (RH): 16%
Pressure (In. Hg): 29.45
Equipment Code Number 3

After Thermal Values in VAC

Board/Sample #	Breakdown Voltage	DWV	Working Voltage
1	2800	2100	700
2	2700	2025	675
3	3350	2513	838

Test Date: After Humidity 12/18/2001
Operator: TC
Temperature (C): 22
Humidity (RH): 37%
Pressure (In. Hg): 29.67
Equipment Code Number 19

After Humidity Values in VAC

Board/Sample #	Breakdown Voltage	DWV	Working Voltage
1	3350	2513	838
2	3000	2250	750
3	3350	2513	838

INSULATION RESISTANCE (IR):

Contact Description Dual Beam Contact-Shunt Type
Contact Part #: C-37-T
Series Contact is Used In: MNT

Test Conditions	YES	NO
Between Adjacent Contacts	X	
Mated		X
PC Mounted		X

Electrification Time *Two (2) minutes*

Test Date: 12/3/2001
Operator: TC
Temperature (C): 22
Humidity (RH): 32%
Pressure (In. Hg): 29.45
Equipment Code Number 3

Initial Values in Mohms

Board/Sample #	Insulation Resistance
1	25000
2	50000
3	25000

Test Date: 12/27/2001
Operator: TC
Temperature (C): 22
Humidity (RH): 16%
Pressure (In. Hg): 29.45
Equipment Code Number 3

After Thermal Values in Mohms

Board/Sample #	Insulation Resistance
1	50000
2	100000
3	100000

Test Date: 1/7/2002
Operator: TC
Temperature (C): 23
Humidity (RH): 23%
Pressure (In. Hg): 29.45
Equipment Code Number 3

After HumidityValues in Mohms

Board/Sample #	Insulation Resistance
1	100000
2	100000
3	100000

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EQUIPMENT AND CALIBRATION SCHEDULES

Description: Temperature/Humidity Chart Recorder
Manufacturer: Dickson
Model: THDX
Serial #: 9316255
Accuracy: Temp: +/- 1C; Humidity: +/-2% RH (0 - 60%) +/- 3% RH (61 - 95%).
… Last Cal: 6/15/01, Next Cal: 6/15/02

Description: Digital Thermometer
Manufacturer: Barnant 90
Model: 600-2840
Serial #: 621994
Accuracy: .25% reading +/- 1.0 °ree Celsius
… Last Cal: 6/25/01, Next Cal: 6/25/02

Description: Hipot Megommeter
Manufacturer: Hipotronics
Model: H306B-A
Serial #: M9905004
Accuracy: 2 % Full Scale Accuracy
… Last Cal: 6/14/01, Next Cal: 6/14/02

Description: Cascade Tek Forced Air Oven
Manufacturer: Cascade Tek
Model: TFO-5
Serial #: 0500100
Accuracy: Temp. Stability: +/-.1C/C change in ambient
… Last Cal: 6/14/01, Next Cal: 6/14/02

Description: Temperature/Humidity Chamber
Manufacturer: Thermotron
Model: SM-8-7800
Serial #: 30676
Accuracy: See Manual
… Last Cal: 6/14/01, Next Cal: 6/30/02

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Description: System Power Supply
Manufacturer: Hewlett Packard
Model: HP 6033A
Serial #: (HP) 3329A-07330
Accuracy: See Manual
… Last Cal: 6/14/01, Next Cal: 6/14/02

Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 6/14/01, Next Cal: 6/14/02

Description: IC Thermocouple
Manufacturer: Samtec
Model:
Serial #: N/A
Accuracy: +/- 1 °ree C
… Last Cal: 9/06/01, Next Cal: 8/02

Description: IC Thermocouple
Manufacturer: Samtec
Model:
Serial #: N/A
Accuracy: +/- 1 °ree C
… Last Cal: 9/06/01, Next Cal: 8/02