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GE Energy Services

**Functional Testing Specification**

*Inspection & Repair Services  
Louisville, KY*

**LOU-GED-531X153DDCA**

**Test Procedure for a 531X153DDCA Dual Discriminator Card**

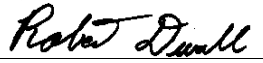
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REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	F. Howard	7/14/04
B	Corrected pin numbers in step 6.2.15	F. Howard	3/25/05
C	Added comment on PWB modification, Special Note page 3	C. Wade	4/21/2009

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<b>DATE</b> 7-14-2004	<b>DATE</b> 4/21/2009	<b>DATE</b>	<b>DATE</b> 3/27/05

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## Functional test procedure for a Card

### 1. SCOPE

1.1 This is a functional testing procedure for a Card.

### 2. STANDARDS OF QUALITY

2.1 Refer to the current revision of the IPC-A-610 standard for workmanship standards.

### 3. APPLICABLE DOCUMENTS

3.1 The following document(s) shall form part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue shall apply.

3.1.1

### 4. ENGINEERING REQUIREMENTS

#### 4.1 Equipment Cleaning

4.1.1 Equipment should be clean and free of debris prior to applying power unless performing an initial check. Refer to the local documented procedures for cleaning guidelines.

#### 4.2 Equipment Inspection

4.2.1 Equipment should be visually inspected for any defects prior to applying power. This inspection should include the following as a minimum:

4.2.1.1 Wires broken or cracked

4.2.1.2 Terminal strips / connectors broken or cracked

4.2.1.3 Loose wires

4.2.1.4 Components visually damaged

4.2.1.5 Capacitors leaking

4.2.1.6 Solder joints damaged or cold

4.2.1.7 Circuit board burned or de-laminated

4.2.1.8 Printed wire runs burned or damaged

### 5. EQUIPMENT REQUIRED

5.1 The following equipment is required to perform the process requirements. Equipment may be substituted provided that all accuracy's and test ratios are equivalent or better.

Qty	Reference #	Description
2		Fluke 85 DMM (or Equivalent)
2		Variac
1		120VAC Isolation Box
1		Thin 193X Rainbow Box

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## 6. TESTING PROCESS


**Special Note: During capacitor installation mount capacitors C3, C4, C9, and C10 opposite of what is shown on the board's mark stamp. See ECN 531X153DCCAE.pdf file in the 531x153DDC directory for more information.**

### 6.1 Setup

- 6.1.1 Set all potentiometers mid-range.
- 6.1.2 Set jumpers J1-J4 in 1-2 position.
- 6.1.3 Static check all bridges and diodes before applying power to card.
- 6.1.4 Variacs will be described as Variac #1 and Variac #2 in test. They must be isolated from each other.

### 6.2 Testing Procedure

- 6.2.1 Connect Variac #1 to 120VAC isolation box. Connect Variac #2 to any 120V outlet. Set both for an output of 30VAC +/-1VAC. Do not apply power to UUT until instructed to do so.
- 6.2.2 Connect Variac #1 to pins 4 and 5 and Variac #2 to pins 2 and 3 of UUT.
- 6.2.3 Connect positive of DVM to pin 8 and common to positive side of C3 or C4 of UUT. Turn on #1 and read +4VDC(+/-0.5V) on meter.
- 6.2.4 Turn off #1, turn on #2 and read -4VDC(+/-0.5V) on meter.
- 6.2.5 Turn on #1 (both on now) and meter should read 0V. If not, adjust P1 for 0V.
- 6.2.6 Increase output of #1 until meter reads approximately +2V (+/-0.1V). Adjust P2 and verify it will adjust voltage from +1.5V to +3.3V, returning output to +2V. Adjust P4 and verify a range of +1.5V to +2.2V, returning output to +2V. Decrease #1 until meter reads 0V.
- 6.2.7 Increase output of #2 until meter reads -2VDC (+/-0.1V). Adjust P3 and verify a range of -1.5V to -3.3V, return voltage to -2V. Adjust P5 and verify a range of -1.5V to -2.2V, returning output to -2V. Decrease #2 until meter reads 0V. Turn both Variacs off.
- 6.2.8 Move #1 to pins 36 and 37 and #2 to pins 34 and 35 of UUT. Move positive meter lead to pin 40 and common to positive side of C9 or C10. Turn on #1 on read +4V(+/-0.5V).
- 6.2.9 Repeat step 6.2.4.

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- 6.2.10** Repeat step 6.2.5 using P7 for zero adjust.
- 6.2.11** Repeat step 6.2.6 using P8 and P10 to achieve voltage range.
- 6.2.12** Repeat step 6.2.7 using P9 and P11 to achieve voltage range. Variacs are not need for remainder of test.
- 6.2.13** Verify a short between pin 8 and anode of D12 and cathode of D10. Read 20K ohms (+/-10%) between pin 8 and anode of D14 and cathode of D13. Apply 115VAC to pins 10 and 19, LED 1 should come on, pin 8 and D12 and D10 should read 20K and pin 8 and D14 and D13 should read short. Remove voltage from pins 10 and 19.
- 6.2.14** Verify a short between pin 40 and anode of D26 and cathode of D24. Read 20K ohms (+/-10%) between pin 40 and anode of D28 and cathode of D27. Apply 115VAC to pins 42 and 11, LED 3 should come on, pin 40 and D24 and D26 should read 20K ohms and pin 40 and D28 and D27 should be shorted. Remove voltage from pins 42 and 11.
- 6.2.15** Verify a short between pins 58 and 59, an open between 58 and 60, a short between 28 and 27, an open between 28 and 26. Apply 115VAC to pins 51 and 13, LED 2 turns on and pins 58 and 59 are open, 58 and 60 are shorted, 28 and 27 are open and 28 and 26 are shorted. Remove voltage from pins 51 and 13.
- 6.2.16** Verify a short between 61 and 62, an open between 61 and 63, a short between 31 and 30 and an open between 31 and 29. Apply 115VAC to pins 45 and 43, LED 4 turns on, 61 and 63 are shorted, 61 and 62 are open, 31 and 29 are shorted and 31 and 30 are open. Remove voltage from pins 45 and 43.
- 6.2.17** Verify 10K (+/-10%) between pins 20 and 52.
- 6.2.18** Turn P6 full CCW and read 30K(+/-10%) between pins 16 and 22, 10K between 16 and 18 and 10K between 16 and 17. Turn P6 full CW and read 20K between 16 and 22, 10K between 16 and 18 and a short between 16 and 17.
- 6.2.19** Turn P12 full CCW and read 10K between 48 and 49, 10K between 48 and 50, 30K between 48 and 54. Turn P12 full CW and read a short between 48 and 49, 10K between 48 and 50 and 20K between 48 and 54.

### 6.3 \*\*\*TEST COMPLETE\*\*\*

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**7. NOTES**

**7.1** If you get this card and need AC cords that will plug into a rainbow box, see Frank.

**8. Oscilloscope Verification Examples:**

**8.1** None at this time