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GE Energy

**Functional Testing Specification***Parts & Repair Services  
Louisville, KY***LOU-GED-531X157APC****Test Procedure for a 531X157APCAMGx****DOCUMENT REVISION STATUS:** Determined by the last entry in the "REV" and "DATE" column

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	Steve Pharris	07/0709
B	Added steps to calibrate and seal P3, Steps 6.2.30 thru 6.2.36	Steve Pharris	8/3/2011
C	Added section 6.3	G. Chandler	9/18/2012

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<b>PREPARED BY</b> Steve Pharris	<b>REVIEWED BY</b> G. Chandler	<b>REVIEWED BY</b>	<b>QUALITY APPROVAL</b> <i>Charlie Wade</i>
<b>DATE</b> 07/07/2009	<b>DATE</b> 9/18/2012	<b>DATE</b>	<b>DATE</b> 8/3/2011

LOU-GED-531X157APC REV. C	g  <b>GE Energy</b> <i>Parts &amp; Repair Services</i> <i>Louisville, KY</i>	Page 2 of 8
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## 1. SCOPE

1.1 This is a functional testing procedure for a 531X157APC 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 Check board's electronic folder for more information.

## 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 site specific SRA's 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, cracked, or loosely connected

4.2.1.2 Terminal strips / connectors - broken or cracked

4.2.1.3 Components - visually damaged

4.2.1.4 Capacitors - bloated or leaking

4.2.1.5 Solder joints - damaged or cold

4.2.1.6 Circuit board - burned or de-laminated

4.2.1.7 Printed wire runs / Traces - 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
1		Fluke 87 DMM (or Equivalent)
2		Power Supplies
1		16K ohm Resistor
1		100K ohm Resistor
1		1K ohm Resistor
1		270 ohm 1/2 watt resistor
1		Scope

<p><b>LOU-GED-531X157APC REV. C</b></p>	<p><b>g</b></p> <p><b>GE Energy</b> Parts &amp; Repair Services Louisville, KY</p>	<p><b>Page 3 of 8</b></p>
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## 6. TESTING PROCESS

### 6.1 Setup

- 6.1.1 Set power supplies to +15VDC, –15VDC and +30VDC
- 6.1.2 Connect +15VDC to 7PL-7
- 6.1.3 Connect –15VDC to 7PL-6
- 6.1.4 Connect common from supplies to 7PL-1
- 6.1.5 Connect fixed 5VDC output from power supply to test point +5V and to 7PL-23
- 6.1.6 Connect common from fixed 5VDC output to test point DCOM and to 7PL-25
- 6.1.7 Connect common from fixed 5VDC output to common of + and – 15VDC
- 6.1.8 Connect +30VDC to 1TB1 and 1TB3 (1TB1 common)
- 6.1.9 Install 100K ohm resistor across CTBA1 and CTBA2
- 6.1.10 Set all jumpers to pos. 1-2
- 6.1.11 Turn all pots full CCW

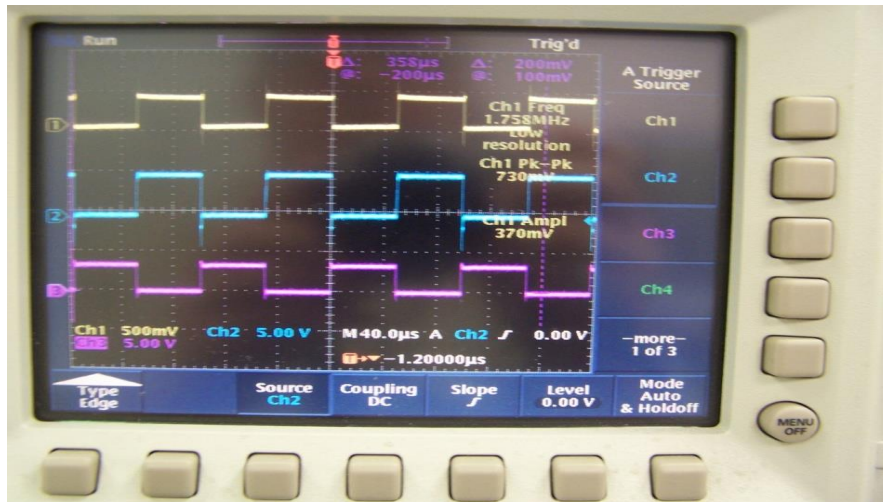
### 6.2 Testing Procedure

- 6.2.1 Apply power to card except 30VDC power supply
- 6.2.2 Verify 0.0 volts at 7PL3
- 6.2.3 Verify 7PL4 is between -.030VDC and -.005VDC
- 6.2.4 Turn P5 fully CW
- 6.2.5 Verify 7PL4 is between +0.005VDC and +0.030VDC
- 6.2.6 Adjust P5 for 0.00VDC at 7PL4
- 6.2.7 Apply 30VDC
- 6.2.8 Verify 2.2VDC to 2.3VDC at 7PL3
- 6.2.9 Turn P8 fully CW
- 6.2.10 Verify 7PL3 is between +14.15 and +14.25
- 6.2.11 Adjust P8 for +4.0VDC at 7PL3
- 6.2.12 Verify +4.0VDC at 10PL11
- 6.2.13 Turn P2 fully CW
- 6.2.14 Verify +10.4VDC to +12.2VDC at 10PL11
- 6.2.15 Connect 7PL10 to common
- 6.2.16 Verify 7PL4 is +3.85VDC to +3.95VDC
- 6.2.17 Turn off 30VDC power supply
- 6.2.18 Connect 10PL1 to common
- 6.2.19 Connect 10PL2 thru 16K ohm resistor to +15VDC

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- 6.2.20** Verify 10PL2 is between +6.1VDC and +6.2VDC
- 6.2.21** Verify 10PL4 is between –5.6VDC and –5.45VDC
- 6.2.22** Verify –1.9VDC to –2.1VDC at R74 (side closest to pot P11)
- 6.2.23** Turn P4 fully CW
- 6.2.24** Verify –3.5VDC to –3.9VDC at R74 (side closest to pot P11)
- 6.2.25** Set jumpers JP17, JP18, and JP19 to 2-3.
- 6.2.26** Connect 10PL2 thru 16Kohm resistor to –15VDC
- 6.2.27** Verify +3.5VDC to +3.9VDC at R74 (side closest to pot P11)
- 6.2.28** Verify 7PL4 is –3.85VDC to –4.15VDC
- 6.2.29** Rotate P4 and verify 7PL4 changes by approx 0.02VDC
- 6.2.30** Remove connections at 10PL1 and 10PL2
- 6.2.31** Apply -15V thru 1K ohm resistor to DVM test point
- 6.2.32** Verify 7PL2 = -1.2V
- 6.2.33** Rotate P3 fully CW
- 6.2.34** Verify 7PL2 = -2.6V
- 6.2.35** Set P3 for -1.83V
- 6.2.36** Seal P3
- 6.3** Install a 270 ohm .5w resistor between 12PL9 and 12PL12.
  - 6.3.1** Apply a 10khz 10Vp/p square wave pulse to 7PL18 referenced to DCOM.
  - 6.3.2** Connect a 3 channel O-scope with channels 1 and 3 at 5V per/div, 40us per/div., channel 2 at 10V per/div as follows and referenced to DCOM..
  - 6.3.3** Channel 1 to 12PL12
  - 6.3.4** Channel 2 to 7PL18
  - 6.3.5** Channel 3 to 12PL9

**6.3.6** Observe the following wave form.



**6.3.6.1**

**6.3.7** Connect a 4.7k ohm resistor between 10PL15 and 10PL13 (dcom).

**6.3.8** Move jumper JP11 to the 2-3 position.

**6.3.9** Move the channel 1 scope lead to 10PL15.

**6.3.10** Observe the following wave form.



**6.3.10.1**

**6.3.11** Move JP1 to the 2-3 position.

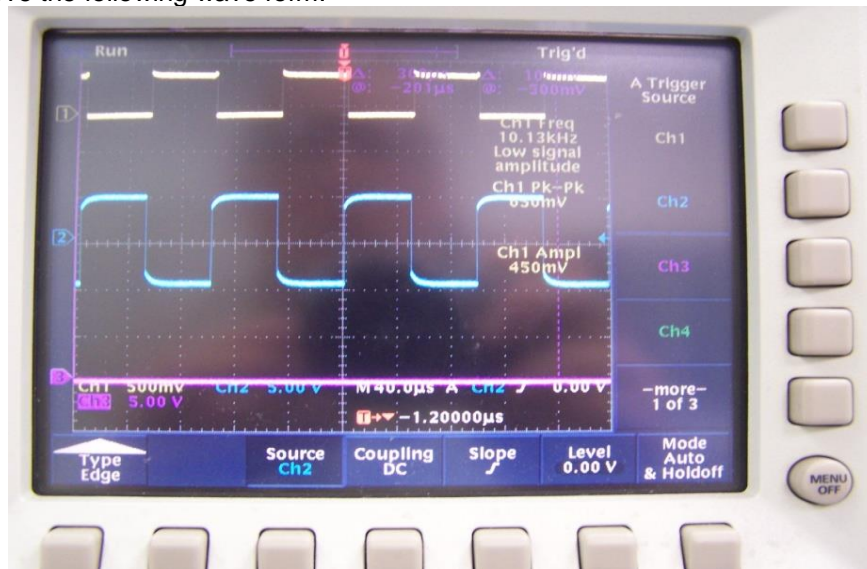
**6.3.12** Apply the previous waveform to 10PL14.

**6.3.13** Connect channel 1 of the scope to 7PL17

**6.3.14** Connect channel 2 of the scope to 10PL14.

**6.3.15** Both channels are set a 5V per/div.

**6.3.16** Observe the following wave form.



**6.3.16.1**

**6.3.17** Move jumper JP1 to the 1-2 position.

**6.3.18** Apply + 5Vdc to 12PL10 and connect 12PL11 to DCOM.

**6.3.19** Measure 7PL17 with a DVM. 0Vdc to .4Vdc

**6.3.20** Reverse polarity of 12PL10 and 12PL11.

**6.3.21** Measure 7PL17 with a DVM. 2.4Vdc to 5.5Vdc.

**6.3.22** Apply a 5V p/p 10 khz square wave to 7PL21.

**6.3.23** Connect channel 1 of the scope to 12PL15.

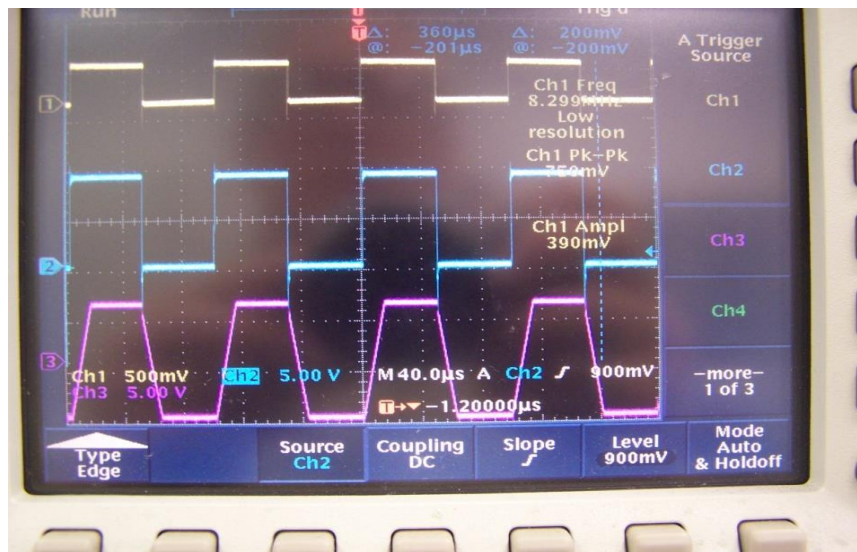
**6.3.24** Connect channel 2 of the scope to 7PL21.





**6.3.32** Move jumpers 12 and 13 to the 2-3 position.

**6.3.33** With the scope as in the previous step, observe the following wave form.



**6.3.33.1**

**6.3.34** Remove the waveform generator and all scope connections.

**6.3.35** Apply a 5Vdc to 12PL14 and connect 12PL7 to COM.

**6.3.36** Measure 7PL20 with a DVM. = 2.4 to 5.5Vdc.

**6.3.37** Reverse the polarity of 12PL14 and 12PL7.

**6.3.38** Again measure 7PL20 with a DVM. =0 to .4Vdc

**6.3.39** Connect a 3.48K ohm resistor from 10PL3 to DCOM.

**6.3.40** Measure the voltage drop across the resistor. = 7.9-8.2Vdc.

**6.3.41**

**6.4 \*\*\*TEST COMPLETE \*\*\***

## 7. NOTES

7.1 None at this time.

## 8. ATTACHMENTS

8.1 None at this time.