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GE Industrial Systems

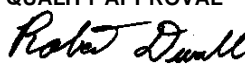
**Functional Testing Specification***Renewal Services  
Louisville, KY***LOU-GED-193X546xx****Test Procedure for a 193X546xx Card****DOCUMENT REVISION STATUS: Determined by the last entry in the "REV" and "DATE" column**

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	P. Kelley	6/25/01
B	Moved to new format and approved.	R. Duvall	07/01/02
C	Clarified resistor tolerance in 6.2.52 and corrected 6.2.53 pin #	D. Laemmle	08/08/03
D	Added notes to steps 6.1.1, 6.1.2, and 6.2.20.	D. Laemmle	06/02/06
E	Arranged resistance checks to step 6.3 from 6.2.2 to make test easier to follow and test.	J. Barton	05/24/10

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<p><b>LOU-GED-193X546xx REV. E</b></p>	<p><b>g</b></p> <p><b>GE Industrial Systems</b> Renewal Services Louisville, KY</p>	<p><b>Page 2 of 6</b></p>
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## Functional test procedure for a 193X546xx card

### 1. SCOPE

1.1 This is a functional testing procedure for a 193X546xx 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 **QSI # 2846 – SAMs test Instruction**

3.1.2 **36C764188AE - Schematic**

### 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
1		Fluke 85 DMM (or Equivalent)
1		Rainbow box
1		193X card adapter
3		0-20 VDC Power Supplies

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## 6. TESTING PROCESS

### 6.1 Setup

**Note: When applying voltages as indicated, don't remove unless directed.**

- 6.1.1** Connect 20 volt Power Supply # 1 to pins 40 and 9 ( polarity does not matter at this point)
- 6.1.2** Connect 20 volt Power Supply # 2 to pins 8 and 6 ( polarity does not matter at this point, Must be isolated from Power Supply # 1)

### 6.2 Testing Procedure

- 6.2.1** Verify ZERO potentiometer adjustments for a range of at least +1.8 volts to – 1.8 volts on pin 10 (pin 15 common). Note: Some cards will only go from –1.2 volts to +1.2 volts.
- 6.2.2** Adjust ZERO pot for 0.0 volt on pin 10.
- 6.2.3** Reverse polarity of supplies 1 & 2. Repeat previous two steps.
- 6.2.4** Remove Supply # 1 & # 2
- 6.2.5** Connect pins 3, 37, and 30 together.
- 6.2.6** Connect common for the following voltages to pin 15.
- 6.2.7** Connect pin 51 to –20 volts.
- 6.2.8** Connect pin 42 to –30 volts and pin 11 to +20 volts
- 6.2.9** Adjust MAXN potentiometer on front of card to read –16.0 volts on pin 3.
- 6.2.10** Remove +20 volts from pin 11.
- 6.2.11** Verify that pin 3 drops to 0.0 volts.
- 6.2.12** Remove –20 volts from pin 51 and connect pin 51 to +20 volts.
- 6.2.13** Connect +20 volts to pin 13.
- 6.2.14** Adjust MAXP potentiometer on front of card to read +16.0 volts on pin 3.
- 6.2.15** Adjust SLOW potentiometer on front of card to read +8.0 volts on pin 5.
- 6.2.16** Remove +20 volts from pin 13.
- 6.2.17** Verify 0.0 volts on pin 5.
- 6.2.18** Remove all connections from UUT.
- 6.2.19** Simultaneously connect +20 volts to pin 31, -20 Volts to pin 2, and common to pin 15.
- 6.2.20** Before applying –20 volts to pin 14, check to see if R64 is a diode. Older cards had a diode while newer ones had a 1.5K resistor. If –20 volts is applied to

<b>LOU-GED-193X546xx REV. E</b>	<div data-bbox="548 205 581 254" data-label="Image"></div> <div data-bbox="737 258 1018 333" data-label="Text"> <p><b>GE Industrial Systems</b> Renewal Services Louisville, KY</p> </div>	<b>Page 4 of 6</b>
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cards with a diode, T5 transistor will blow. Permanently replace the diode with a 1.5K resistor at R64. Apply –20 volts to pin 14 (PRE Input)

**6.2.21** Connect Pins 29, 28, and 61 together.(Voltage applied to pin 29 is now applied to all three)

**6.2.22** Apply +1.0 volt to pin 29

**6.2.23** Verify Approximately +6.3 volts on pin 60

**6.2.24** Apply +1.0 volt to pin 44.

**6.2.25** Verify Approximately +4.1 volts on pin 60

**6.2.26** Reverse polarity on pins 29 and 44 and verify –1.0 volt is now applied.

**6.2.27** Verify Approximately –4.1 volts on pin 60

**6.2.28** Apply –20 volts to pin 43.

**6.2.29** Verify Approximately +5.2 volts on pin 60

**6.2.30** Remove applied voltages from pins 43 and 44.

**6.2.31** Change pin 29 voltage from –1.0 volt to 0 volt.

**6.2.32** AB versions and above.

**6.2.32.1** Apply +10 volts to PIN 46

**6.2.32.2** Verify +8.0 to +9.5 volts on pin 50

**6.2.32.3** Verify –4.0 to –7.0 volts on pin 60

**6.2.32.4** Reverse polarity on pin 46 so it now has –10 volts applied.

**6.2.32.5** Verify –8.0 to –9.5 on pin 50.

**6.2.33** Remove applied voltages from pin 14.

**6.2.34** Verify 0 volts on pin 60.

**6.2.35** Apply –20 volts to pin 14

**6.2.36** Remove applied voltages from pin 46.

**6.2.37** Apply 0 volts to pin 41.

**6.2.38** Apply 0 volts to pin 23 for 2 seconds. (This will reset the LED circuit)

**6.2.39** Verify OCK LED is off.

**6.2.40** Apply +2.0 volts to pin 41 (DO NOT EXCEED +2.2 volts while adjusting or test is invalid)

**6.2.41** Verify OCK LED is off.

**6.2.42** Apply +3.0 volts to pin 41 (DO NOT EXCEED +3.5 volts while adjusting or test is invalid)

**6.2.43** Verify OCK LED is on.

**6.2.44** Apply 0 volts to pin 41.

**6.2.45** Apply 0 volts to pin 23 for 2 seconds.

**6.2.46** Apply -2.0 volts to pin 41 (DO NOT EXCEED -2.2 volts while adjusting or test is invalid)

**6.2.47** Verify OCK LED is off.

**6.2.48** Apply -3.0 volts to pin 41 (DO NOT EXCEED -3.5 volts while adjusting or test is invalid)

**6.2.49** Verify OCK LED is on.

**6.2.50** Remove -3.0 volts from pin 41 and apply -3.0 volts to pin 59.

**6.2.51** Verify +3.0 volts on pin 58.

**6.2.52** Connect pins 18 and 21 together.

**6.2.53** Connect pin 26 to 0 volts.

**6.2.54** Verify +6.2 volts on pin 18.

**6.3** Verify the following resistance checks. Note: Earlier versions of card had 10% resistors while later versions had 5% resistors.

From Pin	To Pin	Value
21	26	10K +/- ____ %
12	49	22K +/- ____ %
12	48	39K +/- ____ %
12	45	56K +/- ____ %

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

## 7. NOTES

