g	GE Energy	**Functional Testing Specification**
	Parts & Repair Services *Louisville, KY*	**LOU-GED-115D2277Gxxx**

Test Procedure for a board.

DOCUMENT REVISION STATUS: Determined by the last entry in the "REV" and "DATE" column

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Copied pre-written procedure over to this format.	C. Wade	5/14/2009
B			
C			

PREPARED BY G. Chandler	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL Charlie Wade
DATE 5/14/2009	DATE	DATE	DATE 5/14/2009

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 P3K-AL-0401-A01

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, 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)
3		0-30 Power supplies
1		Mark II breakout box

6. TESTING PROCESS

6.1 Setup

6.1.1 Power Inputs

    6.1.1.1 +22 VDC to pin 37.

    6.1.1.2 –22 VDC to pin 41.

    6.1.1.3 Common to pin 39.

6.1.2 Power Supplies

    6.1.2.1 VTP1 = 15.7 +/- 1 VDC.

    6.1.2.2 VTP2 = -15.7 +/- 1 VDC.   VR1 Full CW

    6.1.2.3 I Pin 37 = 63 +/- 15ma DC.

    6.1.2.4 I Pin 41 = 62 +/- 15ma DC.

6.1.3 IC1 Voltages

    6.1.3.1 VTP50(Violet) = 1.45 to 1.9 VDC.   VR8 CW

    6.1.3.2 VTP50(Violet) = -7.5 to -6.2 VDC.   VR8 CCW

6.1.4 IC1 Gains

    6.1.4.1 Adjust VR8 for VTP50(Violet) = 0 VDC

    6.1.4.2 Ground pin 33

    6.1.4.3 +1 VDC to pin 35 (VR9 CCW)   TP7 = -5 VDC +/- .1 VDC

    6.1.4.4 Move input to pin 36 = +5.0 VDC   TP7 = -2.55 to -2.48 VDC

    6.1.4.5 Move input to pin 33 = +1.0 VDC

        6.1.4.5.1 Move ground from pin 33 to pin 35   TP7 = -4.9 to -5.1 VDC

    6.1.4.6 Move input to pin 32 = +5.0 VDC   TP7 = -2.48 to -2.55 VDC

    6.1.4.7 Remove voltage from pin 32.

        6.1.4.7.1 Ground pin 33.

    6.1.4.8 VR8 CW   TP7 = -1.56 to -2.04 VDC.

    6.1.4.9 VR8 CCW   TP7 = 6.0 to 7.0 VDC.

    6.1.4.10 Set VR8 = 0.0 VDC.

6.1.5   Meter Amplifier (IC3)

6.1.5.1 VTP53(Black) = -22 VDC   VR10 CW

6.1.5.2 VTP53(Black) = -5.8 to -6.85 VDC   VR10 CCW

6.1.5.3 Attach a milli-ammeter from pin 24 to ground.

    6.1.5.3.1   Ground TP5 and null IC3.   TP4 = 0.0 VDC.

    6.1.5.3.2   Insure that VR50 runs TP4 through zero.

    6.1.5.3.3   Remove ground at TP5.

6.1.5.4 Apply 10.0 VDC to pin 6.

    6.1.5.4.1   Amp Meter = 1.5 to 1.6 ma DC   VR5 CW

    6.1.5.4.2   Amp Meter = 0.82 to 0.92 ma DC   VR5 CCW

    6.1.5.4.3   Remove amp meter from pin 24.

6.1.6   Summing Amplifier (IC2)

6.1.6.1 Voltage Ranges

    6.1.6.1.1   VTP60(Violet) = 0.0 VDC   VR4 CCW

    6.1.6.1.2   VTP60(Violet) = -5.0 to -6.0 VDC   VR4 CW

    6.1.6.1.3   VTP55(Green) = 0.0 VDC   VR7 CCW   VR53 CCW

    6.1.6.1.4   VTP55(Green) = -12 to -14.1 VDC   VR7 CW

    6.1.6.1.5   VTP51(White) = 5.42 to 5.58 VDC   VR1 CCW   VR2 CW

    6.1.6.1.6   VTP51(White) = 19.02 to 19.49 VDC   VR1 CW

6.1.6.2 G3 only

    6.1.6.2.1   VTP51(White) = 7.26 to 7.3 VDC   VR1 CCW   VR2 CW

    6.1.6.2.2   VTP51(White) = 17.28 to 16.7 VDC   VR1 CW

    6.1.6.2.3   VTP61 should read one diode drop less than VTP51 (White) = approx. .6 VDC.

    6.1.6.2.4   VTP64(Brown) = 0.0 VDC   VR3 CCW   VR54 CCW

    6.1.6.2.5   VTP64(Brown) = -14.17 to -15.17 VDC VR3 CCW

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6.1.6.3 Amplifier Gains

6.1.6.3.1 Release input to pin 6.

6.1.6.3.2 VR7 = CCW

6.1.6.3.2.1 Ground TP63(Black) TP66(Orange) TP62(Red) TP67(Blue)

6.1.6.3.2.2 TP57(Blue) TP52(Red) – Shorted

6.1.6.3.2.3 TP58(Yellow) to TP59(Gray) – Shorted

6.1.6.3.2.4 Set VTP61 to 5.0 VDC with VR1

6.1.6.3.2.5 VTP3 = -4.05 to -4.21 VDC   VR2 CW

6.1.6.3.2.6 VTP3 = -4.06 to -3.87 VDC   VR2 CCW

6.1.6.3.2.7 Remove all grounds TP63(Black) TP66(Orange) TP62(Red) TP67(Blue) and the short between TP57(Blue) & TP52(Red).

6.1.6.3.2.8 Ground TP7, TP54(Brown), TP61(White), TP5, TP66(Orange), TP65(Green).

6.1.6.3.2.9 Input 1 VDC to TP56(Orange)

6.1.6.3.2.10 VTP3 = -1.23 to -1.27 VDC   VR55 & VR6 CCW

6.1.6.3.2.11 Reduce input TP56(Orange) = .2 VDC

6.1.6.3.2.12 VTP3 = -9.54 to -11.86 VDC   VR55 & VR6 CW

6.1.6.3.2.13 Put a negative voltage into TP56(Orange) until TP3 stops changing. Final value (limit) is 5.79 to 5.96 VDC. Input will be about -4.5 VAC. Pull jumper between TP58(Yellow) and TP59(Gray). Voltage at TP3 will be about 0.33 VDC.

6.1.6.3.2.14 Replaced jumper TP58(Yellow) and TP59(Gray).

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6.1.6.3.3 Remove grounds then

6.1.6.3.3.1 TP57(Blue) to TP52(Red) shunted.

6.1.6.3.3.2 TP66(Orange), TP63(Black), TP61(White) grounded.

6.1.6.3.3.3 Input +5.0 VDC to TP56(Orange).

6.1.6.3.3.4 Set TP54 for –5.0 VDC with VR7. (Note TP55(Green) is one diode drop more than TP54(Brown) = approx. –5.7 VDC).

6.1.6.3.3.5 Read TP3 = -0.97 VDC +/- .14 VDC.

6.1.6.3.3.6 Set VR53 full CW. TP3 = -4.025 to -4.38 VDC.

6.1.6.3.3.7 Read TP7 = approx. 0 VDC (no inputs)

6.1.6.3.3.8 Set VR7 full CCW.

6.1.6.3.3.9 Set TP7 for +5.0 VDC with VR8. Remove +5.0 VDC from TP56(Orange).

6.1.6.3.3.10 Set VR51 full CCW.

6.1.6.3.3.11 Read TP3 = -9.85 to -10.25 VDC.

6.1.6.3.3.12 Set VR51 full CW.

6.1.6.3.3.13 Read TP3 = -.342 to -.432 VDC.

6.1.6.3.3.14 Read TP54(Brown) = approx. 0.0 VDC

6.1.6.3.3.15 Remove grounds.

6.1.6.3.3.16 Ground TP61(White), TP62(Red), TP67(Blue).

6.1.6.3.3.17 Re-apply +5 VDC to TP56(Orange).

6.1.6.3.3.18 Set TP65(Green) for -5.0 VDC with VR3.

6.1.6.3.3.19 Read TP63(Black) = Approx. 0 VDC.

6.1.6.3.3.20 VR54 full CW

6.1.6.3.3.21 Read TP3 = -0.75 to -1.05 VDC.

6.1.6.3.3.22 VR54 full CCW.

6.1.6.3.3.23 TP3 = -4.5 to -4.82 VDC.

6.1.6.3.3.24 Set VR3 full CCW and Set VR52 CW.

6.1.6.3.3.25 Move the +5.00 VDC input from TP56(Orange) to pin 6.

6.1.6.3.3.26 TP65(Green) = approx. 0 VDC

6.1.6.3.3.27 TP3 = -9.85 to -10.25 VDC

6.1.6.3.3.28 VR52 full CCW.

6.1.6.3.3.29 TP3 = -0.338 to -0.435 VDC

6.1.6.3.3.30 Remove all power input from the card

6.1.6.3.3.31 End of Test

6.2 Post Testing Burn-in   Required   ___ Yes   ___ No

✍   **Note:** All MARK I, II, & III Turbine related cards require a post testing burn-in of 100 hours.

6.2.1   Apply BUS or Operational power to the card for a period of 100 hours.

6.2.2   Re-test card while warm using the above procedure.

*6.3   ***TEST COMPLETE ****

7.   <u>NOTES</u>

7.1   None at this time

8.   <u>ATTACHMENTS</u>

8.1   None at this time