



GE Energy

Functional Testing Specification

Parts & Repair Services
Louisville, KY

LOU-GED-DS200TGDBG1

Test Procedure for a Bridge Interface Board

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A	Initial release	G. Chandler	6/5/2014
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DATE 6/5/2014	DATE	DATE	DATE 6/5/2014

<p>LOU-GED-DS200TGDBG1 REV. A</p>	<p>g</p> <p>GE Energy Parts & Repair Services Louisville, KY</p>	<p>Page 2 of 5</p>
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1. SCOPE

1.1 This is a functional testing procedure for a Bridge Interface 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
2		Fluke 87 DMM (or Equivalent)
1		+30VDC Power Supply
1		Frequency Counter
1		mV Source
1		+100DC Power Supply
1		O-Scope
1		Signal Generator

<p>LOU-GED-DS200TGDBG1 REV. A</p>	<p>g</p> <p>GE Energy Parts & Repair Services Louisville, KY</p>	<p>Page 3 of 5</p>
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6. Modifications/Upgrades

6.1 INITIAL SETUP

- 6.1.1 JP102, 103, 202, 203, 302, 303, 402, 403, in the default setting as indicated by the silk screening on the PCB.
- 6.1.2 JP12 and JP52 in the in the non-default setting as indicated by the silk screening on the PCB. JP13 and JP53 installed.
- 6.1.3 Switches SW10 and SW50 all in the off position.
- 6.1.4 With and ohm meter, verify connectors GPXPL and GPWPL are connected in parallel.
- 6.1.5 Verify 2.2meg ohms +/- 1% across resistors R125, R225, R325, & R425.
- 6.1.6 This card consists of 2 identical VCO circuits and 4 identical gate driver circuits. Each of the 6 circuits has their own power supply and are electrically isolated from each other. When testing each circuit make sure your using the corresponding ground.
- 6.1.7 There is a test adaptor card made for this test. Is made up of a fiber optic receiver and transmitter used to verify the fiber optic inputs and outputs.
- 6.1.8 Apply +30VDC to pin 1 and common to pin 4 of the GPXPL connector. Verify four green LEDs (one for each gate driver circuit) illuminate.

6.2 Testing - VCO CIRCUITS 1 and 2

6.2.1 VCO CIRCUIT 1

- 6.2.2 Connect the fiber optic test adaptor card from VCO1 of the UUT to the blue fiber optic connector of the test card. Connect 5VDC to the test card. Connect a frequency counter to the pin marked SIG1 on the test card referenced to com of the test card.
- 6.2.3 Verify a reading of 1 meg HZ on the frequency counter.
- 6.2.4 Using a precision mv source apply 100mVDC to connector P10. Positive to pin 1 and negative to pin 2.
- 6.2.5 Verify 1.2meg HZ on the frequency counter.
- 6.2.6 Increase the mv source to 500mv.
- 6.2.7 Verify 2meg HZ on the frequency counter.
- 6.2.8 2 meg HZ is the saturation point of the VCO. Increasing the mv source above 500mv will not result in an increase of frequency of the output. Verify this by increasing the mv source to 600mv.
- 6.2.9 Remove the mv source and test adaptor card from the UUT.
- 6.2.10 Connect a volt meter between empty pin of JP12 (+) and pin 2 of P10.
- 6.2.11 Apply 100VDC+/- .1VDC between spade connector E10 (+) and E11 (-).

<p>LOU-GED-DS200TGDBG1 REV. A</p>	<p>g</p> <p>GE Energy Parts & Repair Services Louisville, KY</p>	<p>Page 4 of 5</p>
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6.2.12 With all switches on SW10 in the “off” position, verify volt meter reads .5108VDC +/- 2mv.

6.2.13 Switch all switches on SW10 to the “on” position and verify volt meter reads 0.1188VDC +/- 2mv dc.

6.2.14 VCO CIRCUIT 2

6.2.15 Connect the fiber optic test adaptor card from VCO2 of the UUT to the blue fiber optic connector of the test card. Connect 5VDC to the test card. Connect a frequency counter to the pin marked SIG1 on the test card referenced to com of the test card.

6.2.16 Verify a reading of 1 meg HZ on the frequency counter.

6.2.17 Using a precision mv source apply 100mVDC to connector P50. Positive to pin 1 and negative to pin 2.

6.2.18 Verify 1.2meg HZ on the frequency counter.

6.2.19 Increase the mv source to 500mv.

6.2.20 Verify 2meg HZ on the frequency counter.

6.2.21 2 meg HZ is the saturation point of the VCO. Increasing the mv source above 500mv will not result in an increase of frequency of the output. Verify this by increasing the mv source to 600mv.

6.2.22 Remove the mv source and test adaptor card from the UUT.

6.2.23 Connect a volt meter between empty pin of JP52 (+) and pin 2 of P50.

6.2.24 Apply 100VDC +/- .1VDC between spade connector E50 (+) and E51 (-).

6.2.25 With all switches on SW50 in the “off” position, verify volt meter reads 0.5108VDC +/- 2mv.

6.2.26 Switch all switches on SW50 to the “on” position and verify volt meter reads 0.1188VDC +/- 2mv dc.

6.2.27 This completes the testing of the 2 VCO circuits. Remove the 100VDC power supply, volt meter, mv source and frequency counter from the UUT.

6.3 GATE DRIVER CIRCUIT:

6.3.1 There are 4 identical gate driver circuits. They will be tested individually, one at a time. The procedure is written for gate circuit 1. The other three circuits will be tested same as circuit 1 except the reference points for the circuits will change. Example: circuit 1 R125 = circuit 2 R225 = circuit 3 R325 and so on.

6.3.2 Note: A good place to reference ground for each circuit is on the (-) side of capacitor C128, C228, C328, & C428 respectively.

6.3.3 Connect a scope between the spade connector G1 (+) and spade connector K1 (-). Connect a signal generator between the terminal marked SIG2 (+) and com (-) of the test adaptor card. Set the scope for 2v per division and 25usec, internal trigger on channel 1 and probe set at

X10. Set the signal generator for 5V p/p at 10KHZ square wave signal. Connect the gray fiber optic connector of the test adaptor card to the GATE1 connector on the UUT.

- 6.3.4** Verify that the red LED illuminates and the scope displays the signal of figure 1 (approx. 40v p/p at 10KHZ).

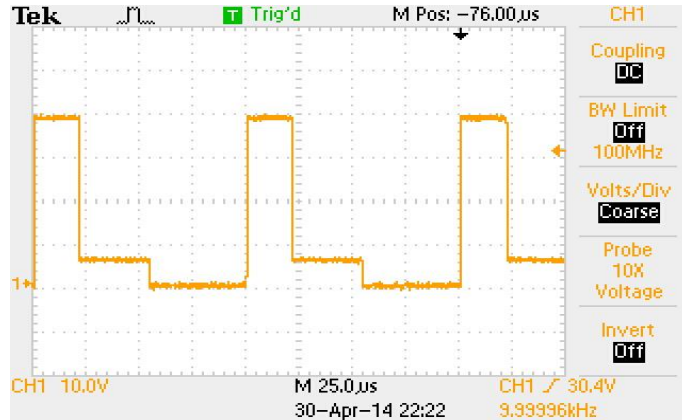


Figure 1

- 6.3.5** Connect a mv source between the side of resistor R125 (large power resistor) which is away from the spade connector and ground (- side of capacitor C128). Connect NEG of the mv supply to the resistor and POS to ground. Increase the mv source and at 2.5VDC +/- .25VDC, the wave form on the scope should disappear and go to 0VDC. The yellow LED should illuminate.
- 6.3.6** Move the jumper JP102 to the non-default position and the wave form should reappear. Move JP102 back to the default position.
- 6.3.7** Move the jumper JP103 to the non-default position and fiber optic output "STAT1 OUT" should illuminate. Move JP103 back to the default position.
- 6.3.8** Remove the fiber optic cable connected to GATE1 and insert it into "STAT1 IN". Verify STAT1 OUT illuminates.
- 6.3.9** Reduce the mv source to 0VDC. Verify yellow LED and STAT1 OUT remains illuminated. Move the fiber optic cable from STAT1 IN and insert it GATE1. Verify yellow LED goes out and red LED illuminates. The wave form should reappear on the scope.
- 6.3.10** Repeat the test for the remaining gate driver circuits.

6.4 *TEST COMPLETE *****

7. Notes

- 7.1** None at this time.