g GE Energy	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GED-DS200FCRR**

Test Procedure for a DS200FCRR

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	John Madden	7-6-06
B	Added data to step 6.2.3	John Madden	8-11-06
C	Added a table for testing the fiber optic circuits, added diagram drawing for connecting power to unit, included some minor details that were left out before	John Madden	9-14-07
D	Corrected misidentified jumper in step 6.2.1	Frank Howard	4-17-2012

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
John Madden	J. Francis		Charlie Wade
DATE	**DATE**	**DATE**	**DATE**
September 14, 2007	4/21/2010		9/18/2007

1. SCOPE

1.1 This is a functional testing procedure for a Firing Circuit Repl. Remote 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 DS200FCRRG#AJ sh4AA-4HA or later revision Schematics

3.1.2 **K:\DS\DS200\DS200F\FCRR\IMPORTANT Test Notes.doc**

3.1.3 **K:\DS\DS200\DS200F\FCRR\ IMPORTANT NOTE(!).PDF (sh4HA w/ power connection note—MUST READ!)**

3.1.4 **K:\DS\DS200\DS200F\FCRR\ AK Bill of materials.PDF1**

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	Ref. #	Description
1		Fluke 87 DMM (or Equivalent)
1		Oscilloscope
1		Standard SCR Firing Box
1		Variac, 0-130Vac
2		Step-up or step-down transformers, w/ center tap.
1		Fiber-optic transmitter board (IS200GGXI test kit)
1		Logic Probe (optional)

6. TESTING PROCESS

6.1 Setup

6.1.1 Connect 1TB of the card as follows to the center tapped output of your transformer: 1TB1 and 1TB3 connect to either side of the 38Vac output. 1TB2 **MUST** connect to the center tap, and the center tap must read approximately 19Vac between it and each of the other two legs of the transformer. How you hook up the input side of this transformer to the variac isn't as important, as long as you are able to get fine-tuning control of the final output voltage to 38Vac (19Vac between each leg and the center-tap). This card will load down the power circuitry some, so you may need to add a little power at the variac once voltage is measured under load to bring it back up to 38Vac. **SEE ATTACHMENT 7.1 FOR DRAWING.**

Note: You **MUST** use a center tap transformer to apply the proper ac voltage to power up this card. If you only use a variac, without a center tap, for whatever reason the dc voltages (+/- 24Vdc) will float wildly, possibly causing damage to zener diodes CR48 & CR49, which are only rated for 36V. On one occasion over -40 volts was measured on the –24V bus. You can use a variac to power up a step-up or step-down transformer (or a series of them) to get the needed 38Vac, but the output that this card ties into **MUST** be center-tapped **and have the center tap tied to DCOM** on this card. This card can load down some transformers, so you may have to fine-tune your variac a little higher to ensure a good 38Vac at connector 1TB.

6.2 Testing Procedure

6.2.1 Make sure all jumpers on the board are in the 1-2 position. With unit powered up with proper voltages supplied as mentioned in Step **6.1.1**, and after having checked Fuses FU1 and FU2, unit should power up and give only the green LED indicator PSOK. If red LED's P24 or N24 are lit, it usually means either FU1 or FU2 is blown. If you get the yellow FRD lit, check the power voltage inputs to make sure they are where they need to be. If NF (green) is lit, check JP15 and make sure it's in the 1-2 position. Measure P5, P24, and N24 voltages to be sure they are where they need to be.

6.2.2 As with any card, check the date on the electrolytic caps to be sure they are within spec. If you are required to bring this unit to an newer revision, do so at this time, once you've verified that the unit powers up properly and all caps are within date (or at least not shorted).

6.2.3 Use the fiber optic transmitters found in the IS200GGXI test kit to fire the optic circuits on this card. The GGXI test kit is in a brown cardboard box located in the cabinet with some of the old DS3800 ATE/Fluke test fixtures. Simply power the modified transmitter card (which happens to made from a scrap FCRR card) with 12Vdc on the pins marked

as such, and connect the optical cables to the blue receivers found on unit under test. With unit under test powered up, the corresponding gray transmitter on the opposite side of card shall light up when a lit cable is plugged into its respective blue receiver if the circuit works properly. Also, When firing each optic circuit, refer to the schematic DS200FCRR#xx **(or the table below)** because circuits RXF1-6 have logic outputs on the 5FAPL and 5FBPL connectors. Circuits RXR1-6 have the same type of logic outputs, but on the 5RAPL and 5RBPL connectors. Simply observe these logic outputs with either a meter or logic probe while plugging and unplugging the fiber optic cables to observe that they transition back and forth between high and low. Also, when you plug a lit cable into receiver FBOK (the only blue receiver on the side with all the gray transmitters), not only will the transmitter NFLT light up, but the green NF led should light up as well.

Input	Lights up…	TTL (LO to HI)
RXF1	TXF1	5FAPL-1 & 5FBPL-1
RXF2	TXF2	5FAPL-3 & 5FBPL-3
RXF3	TXF3	5FAPL-5 & 5FBPL-5
RXF4	TXF4	5FAPL-7 & 5FBPL-7
RXF5	TXF5	5FAPL-9 & 5FBPL-9
RXF6	TXF6	5FAPL-10 & 5FBPL-10
RXR1	TXR1	5RAPL-1 & 5RBPL-1
RXR2	TXR2	5RAPL-3 & 5RBPL-3
RXR3	TXR3	5RAPL-5 & 5RBPL-5
RXR4	TXR4	5RAPL-7 & 5RBPL-7
RXR5	TXR5	5RAPL-9 & 5RBPL-9
RXR6	TXR6	5RAPL-10 & 5RBPL-10

6.2.4 Use a standard SCR firing box set to give positive pulses to fire the gate pulse circuits. With card properly powered up, output of each gate pulse circuit should be at or above 40 volts peak as observed on an oscilloscope. Testing of these circuits will be pretty much straight forward, like testing any other firing card isolation circuit. Connect the firing box "COM" to DCOM of the FCRR board. Use the "Normal" setting on the firing box. Connect "Positive" pulses to point specified in the table below. Observe LED's CR53 to CR64 while ramping the firing box up and be sure they grow brighter as input is cranked up. Refer to the table below:

Transformer	Input	LED	Output
T1	5SAPL-1	CR53	1PL-1 & 2
T2	5SAPL-3	CR54	2PL-1 & 2
T3	5SAPL-5	CR55	3PL-1 & 2
T4	5SAPL-7	CR56	4PL-1 & 2
T5	5SAPL-9	CR57	5PL-1 & 2
T6	5SAPL-10	CR58	6PL-1 & 2
T7	5SBPL-1	CR59	11PL-1 & 2
T8	5SBPL-3	CR60	12PL-1 & 2
T9	5SBPL-5	CR61	13PL-1 & 2
T10	5SBPL-7	CR62	14PL-1 & 2
T11	5SBPL-9	CR63	15PL-1 & 2
T12	5SBPL-10	CR64	16PL-1 & 2

6.3 ***TEST COMPLETE ***

7. NOTES

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