g GE Energy	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GED-IS200EXIB**

Test Procedure for a bridge interface for a IGCT Exciter

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	J. Madden	8/3/2007
B			
C			

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
J. Madden	F. Howard		Charlie Wade
DATE	**DATE**	**DATE**	**DATE**
8/3/2007	3/18/2010		8/3/2007

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 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)
1	H188505	Fluke 5500A Calibrator
1		O-scope
1		EXIB Test Kit
1		Dual Power Supply
1		3 Phase extension cord (w/female spade ends) and power source.

6. TESTING PROCESS

6.1 Setup

6.1.1 Setup shall be performed as explained per each step of the test procedure.

Note: Look for the EXIB test kit above the test fixture shelves, in a brown cardboard shipping box, labeled EXIB Test Kit. Be careful with the FTVA card and the delicate wires that connect it to the J1 adaptor board, since some of the channels are already blown on our test card and there aren't many of these cards to be found. They're out of production as of the time of this writing.

6.2 Testing Procedure

6.2.1 Data ID Chip Test

6.2.1.1 Take the board over to the Chip ID computer and read the ID chip per the instructions given during the test. The easiest way to do this is to use the J1 connector adapter found in the EXIB Test Kit. Data will be J1-43, and Gnd will be J1-44. Once you're done verifying/programming the chip ID, you are finished using this PC. Disconnect J1 temporarily for the following test steps, until it is called for again.

6.2.2 Resistance checks of attenuator circuits

6.2.2.1 Using your Fluke meter, measure the following points in the table below and make sure the resistances are within 1% of tolerance.

Point to Point	Resistance
E1 to J1-1	1.245M Ohm
E1 to J1-2	1.25M Ohm
E2 to J1-3	1.245M Ohm
E2 to J1-4	1.25M Ohm
E3 to J1-5	1.245M Ohm
E3 to J1-6	1.25M Ohm
E4 to J1-7	1.245M Ohm
E4 to J1-8	1.25M Ohm
E5 to J1-9	1.245M Ohm
E5 to J1-10	1.25M Ohm

6.2.3 700V Break-over Diodes

6.2.3.1 There are four diodes used to automatically trigger SCR operation when a certain voltage is attained. To test these break-over (avalanche) diodes, simply set up the Fluke 5500A Calibrator to output 680VDC, but leave it in standby mode for the moment.

6.2.3.2 As you connect to each of the following points on the table below, you will start out at 680VDC, select "OPR" (operate), then move the cursor under the tens place so you can use the thumbwheel to step the voltage up to 690, and then 700.

6.2.3.3 Once you reach 700VDC, the 5500A should go into overload protection (reset). This indicates the diode operated properly. For the test to work, you musty connect the 5500A to the diode so that the polarity is forward biased. Once again, connect according to the following table and repeat the step for each connection.

Diode Number	Positive Lead	Negative Lead
D101	TP101	TP102
D102	TP102	TP103
D103	TP104	TP105
D104	TP105	TP106

6.2.4 Power up and On Board Voltage Outputs

6.2.4.1 Connect the transformer supplied in the EXIB Test Kit to connector J12 and plug the 110VAC cord into an outlet. This should power up the board with several green LEDs illuminating. Use the following table to confirm proper DC Voltage outputs.

Common	Test Points	Expected Voltage
DCOM (tp613)	P5 (TP612)	+5VDC
PCOM (TP602)	P24 (TP604)	>+24VDC
PCOM (TP602)	N24 (TP605)	>-24VDC
COMH (TP73)	P12H (TP72)	+12VDC
COMH (TP73)	N12H (TP74)	-12VDC
COMH (TP73)	P5H (TP75)	+5VDC

6.2.5 Blown Fuse Detection

6.2.5.1 With board still powered up, you should noticed that the green LED "MOK" switched off and the red LED "MNOK" switch on after a few seconds; this is normal.

6.2.5.2 Connect the spade terminals of your extension cord to the stab-on terminals E6, E7, and E8.

6.2.5.3 Plug the cable into a 3-phase 240VAC outlet and turn the power on. This should cause the "MOK" LED to switch back on, green. If LED's switched, then you are done with the 3-phase power. Remove it, but leave the rest of the board powered up.

6.2.6 Shunt Voltage to Frequency and back to Voltage Output.

6.2.6.1 For this test, you will use the Fluke 5500A or an equivalent millivolt source for 0-100mVDC input to the card at J2-1 (-) and J2-2 (+)

6.2.6.2 Connect the J1 adapter with the IS200FTVA card attached to J1. Observe the voltage connections listed on the blue adapter panel, and make the appropriate connections to power up the FTVA card. This card is used simply to take the frequency output of the EXIB and turn it into a predictable test reference voltage.

6.2.6.3 Now connect your Fluke DVM leads to ACOM (-) test point on the FTVA card and either FIN5 or FIN6 test points (+) for a voltage reading. FIN5 and FIN6 are scaled differently (within the EXIB card) and shall read as follows.

mVDC Input to J2	FTVA Output Voltage
0.0mV input	FIN6 = -10VDC
0.0mV input	FIN5 = -10VDC
100mVDC	FIN6 = -2VDC approx
100mVDC	FIN5 = -6VDC approx

Note: With section 6.2.6, you are entering a voltage to simulate what would be seen across a shunt resistor. The EXIB converts this to a frequency, between 0 and 2MHz. Since it is very difficult to observe and measure this frequency accurately with an o-scope or counter, we use the FTVA card to convert this frequency back to a readable voltage. This is the only step that uses the FTVA card.

6.3 SCR Gating

6.3.1 These steps use the Fluke 5500A, an O-scope, and a muffin cooling fan. The fan needs to be big enough to cool the big 5W resistors in the gating section.

6.3.2 First set the 5500A up to output 10Vp-p @ 14.5KHz. Notice on the J1 adapter board that even pins 20-30 have been tied together, just as odds pins 19-29 have been tied together.

6.3.3 Connect the positive of the 5500A to the even pins 20-30 and the negative to the odd pins 19-29.

6.3.4 Notice the little brown 10K resistor on pin 41 of the J1 adapter. Connect this to the 5V output on your Tenma power supply, while connecting pin 45 to COM of the same supply.

6.3.5 DO NOT apply 5V power until AFTER the 5500A is engaged, or you will burn up the 5W resistors, regardless of whether or not you have the fan blowing across them.

6.3.6 With your O-scope set for 5V/div @ 50uSec/div, observe each of the gate outputs 1-6, pins 1 & 3 of each, for the signal seen in photo in attachment 8.1. If the output matches the photo, then the board has passed.

6.4 ***TEST COMPLETE ***

7. NOTES

7.1 This unit has two of the now infamous three legged 100uf capacitors, in addition to many other electrolytic caps. Be sure to change these out.

8. ATTACHMENTS

8.1