g GE Energy	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GED-DS3800NSFA1D1E**

Test Procedure for a DS3800NSFA card

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1. SCOPE

1.1 This is a functional testing procedure for a DS200PTBAG.

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		Tektronix 2 channel scope
1		Test fixture
2		Dual Tenma Power Supplies

6. TESTING PROCESS

6.1 Setup

6.1.1 Setup and connect power supplies to test fixture. Connect commons.

6.1.2 Insert UUT into fixture and connect TA connector and daughter board connector.

6.1.3 Set R1-5 to full clockwise.

6.2 Testing Procedure

6.2.1 Check digital output per the following charts paying attention to the notes for each test line. Set switches per the chart and check outputs per the chart going top to bottom. T0 is test zero and the switch numbers are on the left. The green dot on the switches denote the "0" position. On the led's at the bottom of the list D=off and L=On.

	Test Number																				
Switch	T0	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
6	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
12	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
13	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
14	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0
15	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	0	1	0	0	0	0	0	1	1	1	1	1	0	1	0	1
17	1	1	1	1	1	1	0	1	1	0	0	0	1	1	1	1	0	0	0	1	0
18	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1	1
19	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
21	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1
23	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1
25	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1
26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1
27	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	1
28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
29	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	1	1	1
30	1	1	1	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1
31	1	1	1	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1

32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1
33	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	1
34	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
35	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	1	1	1
36	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	11
37	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
38	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1
39	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
40	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
41	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1
42	1	1	1	0	0	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	0
43	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
45	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
46	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
47	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
48	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
49	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
51	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0

Output Results

TP7	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
TP8	0	0	1	0	1	0	0	0	0	0	0	1	0	1	1	0	1	1	1	1	1
TP9	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
TP10	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0	1
TP11	1	1	1	0	1	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0
TP12	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TP13	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
TP15	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0
TP16	1	1	1	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	0
TP17	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	0	0	1	1	1
TP18	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	0	1	1	1
TP20	1	1	1	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0
TP21	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
TP22	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	1	1
TP23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1
TP24	11v	11v	11v	0	0	0	0	0	0	0	0	11v	0	11v	11v	11v	11v	11v	11v	1	0
TP25	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	0	0	1	1	1
UV	D		L																		
PERM	D		L																		
MSA	D							L													
MSB	D																L				
SUIC	L							D													
MX	D							L													
UVA	D		L																		
UVB	D		L																		

NOTES **1** **2** **3** **4** **5** **6** **7** **8**

Test notes

1 Cycle SW51 before checking outputs.
2 Cycle SW51 before checking outputs .
3 Cycle SW6 twenty seconds after completing switch settings, then cycle SW51 and check outputs.
4 Cycle SW51 before checking outputs.
5 Cycle SW51 before checking outputs.
6 Cycle SW51 before checking outputs.
7 Cycle SW51 before checking outputs.
8 Cycle SW51 before checking outputs.

6.3 Set dipswitches for test 3 again. Attach two channels of scope to PA46 and TP11 and ground to dcom. Set scope channels to 5V per division and sweep to 1 second per division. Set R5 to 100 to start. Now switch SW42 and watch how the two channels change. They should change simultaneously. Repeat moving scope from TP11 to TP16.

6.4 Set SW42 back to original position and set R5 to 50. Repeat changing of SW42 and again watch to see how long it takes TP 11 to change after PA46 changes. Should be 3 seconds +/- .5 seconds. Repeat moving from TP11 to TP16.

6.5 Set SW42 back to original position and set R5 to 0. Repeat changing of SW42 and watch to see how long it takes TP11 to change after PA46 changes. Should be 4.8 seconds +/- .5 seconds. Repeat moving from TP11 to TP16.

6.6 Repeat steps 6.3 through 6.5 with dip switches set for test 20.

6.7 Set dip switches for test 7 and set R5 to 50. Connect scope to TP11 and PA80. Now change SW16 from hi to low. There should have been a 3 second delay between switching of TP 11 and PA80. When SW16 is reset they will switch simultaneously.

6.8 Set dip switches for test 12 and set R5 to 50. Connect scope to TP11 and PA34. Now change SW16 from hi to low. There should have been a 3 second delay between switching of TP 11 and PA34. When SW16 is reset they will switch simultaneously.

6.9 Check the suicide flip flop per the table below. Only switch setting that matter are listed.

	Test 1	Test 2	Test 3	Test 4
SW42	0	1	1	1
SW6	0	0	1	0
SW15	0	0	0	0
SW11	1	1	1	1
SW40	0	0	0	0
RESULTS				
TP20	0	0	1	1
TP19	0	0	1	1

6.10 For the following analog tests set SW4 through SW51 “0” to start.

6.11 Run reference test.

6.12 Apply +10 vdc to PA12 on the TP connector. Set SW51, SW5, and SW49 “0”. Set SW6 to “1”. Verify 0 vdc +/- .1 at TP2.

6.13 Change SW49 to hi and TP2 should go to 10 vdc +/- .05 vdc.

6.14 Change PA12 to -10 vdc and the output at TP2 should be -10 vdc +/- .05 vdc.

6.15 Speed point reference test

6.16 Reset SW4 through SW51 “0” to start.

6.17 Verify TP2 is at 0 vdc +/- .05 vdc.

6.18 Set SW19, SW17, SW40, SW18 and SW5 to “1”.

6.19 Set SW27, SW41, SW20, SW30 and SW21 to “0”.

6.20 Now check TP2 for between 6.2 vdc and 7.0 vdc.

6.21 Reset SW4 through SW51 to “0”.

6.22 Set SW40, SW21, SW5, SW19, SW17 and SW18 to “1”.

6.23 Set SW27, SW23, SW20, SW30, and SW41 to “0”.

6.24 Now check TP2 for between 8 vdc and 9 vdc.

6.25 Reset SW4 through SW51 to “0”.

6.26 Set SW21, SW20, SW19, SW18, SW40, SW5 and SW17 to “1”.

6.27 Set SW27, SW25, SW23, SW41 and SW30 to “0”.

6.28 Check TP2 for between 10.3 vdc and 10.8 vdc.

6.29 Reset SW4 through SW51 to “0”.

6.30 Set SW30, SW5, SW31, SW40 and SW17 to “1”.

6.31 Set SW29, SW21, SW41, SW18, SW19 and SW20 to “0”.

6.32 Check TP2 for between -6.2 vdc and -7.0 vdc.

6.33 Auxiliary Speed Reference Test

6.34 Reset SW4 through SW51 to “0”.

6.35 Apply +10 vdc to TP36.

6.36 Set SW40, SW5 and SW17 to “1”.

6.37 Set SW41, SW39, SW31, SW21, SW20 and SW18 to “0”.

6.38 Check TP4, TP5 and TP6 for between +10 vdc.

6.39 Inhibit Time Delay Test

6.40 Connect two scope channels to PA57 and TP14. Make sure SW50 is set to “1”. Now switch SW50 to “0” and check how long it takes for TP14 to change after PA57 goes “0”. Should take between 10 and 15 seconds.

7. NOTES

7.1 Fixture built to add to UTS. Has external board to bench test that connects where UTS would.

8. ATTACHMENTS

8.1 None at this time.