g GE Energy	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GED-DS3800DGRD**

Test Procedure for a DS3800DGRD

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

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A	Initial release	Steve Pharris	4/14/2014
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DATE	**DATE**	**DATE**	**DATE**
04/14/2014	5/5/2014		6/11/2014

1. SCOPE

1.1 This is a functional testing procedure for a DS3800DGRD.

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		Sencore LC103

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6. Testing Setup

6.1 *Note* DO NOT ADD OR REMOVE A JUMPER UNLESS INSTRUCTED TO DO SO! Resistance tolerance readings are +/-5% unless otherwise noted. When verifying 0 ohms, anything less than 2 ohms is acceptable.

6.1.1 Set all Potentiometers Fully CCW

6.1.2 Open All Jumpers

6.1.3 Remove any components in the saddle clamps but be sure to make note of where they were so you can reinstall them after testing.

6.2 Testing Procedure

6.2.1 Verify 0 ohms at TP8 and DA19

6.2.2 Install J30

6.2.3 Verify 10K ohms at DB7 and DB3

6.2.4 Verify R16 smoothly adjust from 10K ohms to 0 ohms at DB7 and DB21

6.2.5 Install J31

6.2.6 Verify approx. 700 ohms at DB2 and DB3 (this is across the -15VDC Buss)

6.2.7 Verify 0 ohms at DB27 and TP21

6.2.8 Verify 50K ohms at DA28 and DB3

6.2.9 Install a wire jumper at C23 (Saddle Clamp)

6.2.10 Verify R3 smoothly adjust from 150K ohm and 100k ohm at DA28 and DA13

6.2.11 Remove jumper at C23 and install wire jumper at C23A

6.2.12 Verify 0 ohms at DA29 and DA13

6.2.13 Verify 0 ohms at DA3 and TP1

6.2.14 Verify 0 ohms at DA17 and TP7

6.2.15 Install J1

6.2.16 Verify 0 ohms at DA5 and DB3

6.2.17 Verify J2 is removed and remove C23A

6.2.18 Install a wire jumper at R212 (Saddle Clamp)

6.2.19 Verify 0 ohms at DA7 and DA6

6.2.20 Remove jumper at R212

6.2.21 Install J2

6.2.22 Verify 100K ohms at DA7 and CR27 Cathode

6.2.23 Verify 0 ohms at DA11 and CR26 Anode

6.2.24 Install J5

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6.2.25 Verify 20.6K ohms at DA9 and DA11

6.2.26 Remove J5

6.2.27 Verify 82.5K ohms at DA9 and DA11

6.2.28 Verify 18.2K ohms at DA9 and DA2

6.2.29 Verify 0 ohms at DA10 and TP4

6.2.30 Verify R2 smoothly adjust from 0 ohms to 8K ohms at DA10 and CR26 Cathode

6.2.31 Verify R1 smoothly adjust from 0 ohms to 8K ohms at DA10 and CR27 Anode

6.2.32 Verify 12.6K ohms at DB1 and TP4

6.2.33 Verify 12.6K ohms at DB2 and TP4

6.2.34 Install a wire jumper at C25 (Saddle Clamp)

6.2.35 Verify 0 ohms at DB13 and DB5

6.2.36 Install a wire jumper at R135 and R134 (Saddle Clamp)

6.2.37 Verify 0 ohms at DB13 and R134 (Saddle Clamp post closest to bottom of card)

6.2.38 Move wire jumper at R134 to C24

6.2.39 Verify 0 ohms at DB13 and DB3

6.2.40 Remove wire jumpers at C24 and R135

6.2.41 Verify 50K ohms at DB13 and DB3

6.2.42 Remove wire jumper at C25

6.2.43 Install wire jumper at R137

6.2.44 Verify R21 smoothly adjust from 5K ohms to 0 ohms at DB13 and DB5

6.2.45 Remove wire jumper at R137

6.2.46 Verify at DB5 and DB1 the resistance changes from 1M ohm up to 1.02M ohm at 50% of range then back to 1M ohm using R23

6.2.47 Repeat previous step measuring at DB5 and DB2

6.2.48 Verify 0 ohms at DB30 and TP22

6.2.49 Verify 0 ohms at DB14 and TP25

6.2.50 Install J36

6.2.51 Verify 0 ohms at DB4 and DA12

6.2.52 Remove J36

6.2.53 Verify 0 ohms at DA32 and TP11

6.2.54 Install a wire jumper at C35 and R151 (Saddle Clamps)

6.2.55 Verify 0 ohms at DA12 and DB32

6.2.56 Remove wire jumper at C35 and R151 (Saddle Clamps)

6.2.57 Install wire jumper at C36 and R152 (Saddle Clamps)

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6.2.58 Verify 0 ohms at DA12 and DB34

6.2.59 Remove wire jumpers at C36 and R152 (Saddle Clamps)

6.2.60 Install J34

6.2.61 Verify DB32 and DB33 charges (increases in resistance to overload)

6.2.62 Install J33

6.2.63 Verify DB34 and DB29 charges (increases in resistance to overload)

6.2.64 Verify 10K ohms at DB25 and DB26

6.2.65 Verify R7 smoothly adjust from 0 ohms to 10K ohms at DB24 and DB25

6.2.66 Install J41

6.2.67 Verify 0 ohms at DB40 and DA15

6.2.68 Move J41 to connect J39

6.2.69 Verify 0 ohms at DB4 and DA15

6.2.70 Move J39 to connect J40

6.2.71 Verify 0 ohms at DA27 and DA15

6.2.72 Verify 0 ohms at DA27 and TP10

6.2.73 Verify R11 smoothly adjust from 0 ohms to 10K ohms at DA23 and TP10

6.2.74 Verify 10K ohms at TP10 and TP16

6.2.75 Verify 10K ohms at TP16 and DA4

6.2.76 Verify R14 smoothly adjust from 1K ohms to 4K ohms at 50% of range then back down to 2K ohms at DB1 and TP15

6.2.77 Verify R14 smoothly adjust from 1K ohms to 4K ohms at 50% of range then back down to 2K ohms at DB2 and TP15

6.2.78 Verify 0 ohms at DA8 and TP5

6.2.79 Verify R22 smoothly adjust from 0 ohms to 10K ohms at DA8 and CR28 Anode

6.2.80 Verify 0 ohms at DA1 and CR28 Cathode

6.2.81 Verify R22 smoothly adjust from 0 ohms to 10K ohms at DB2 and CR28 Anode

6.2.82 Verify R10 smoothly adjust from 21K ohms to 13K ohms at DA1 and DA4

6.2.83 Set R10 and R22 Fully CW

6.2.84 Verify R24 smoothly adjust from 13K ohms to 14K ohms at 50% of range then back to 13.3K ohms at TP16 and DA1

6.2.85 Repeat previous step measuring 13.2K ohms to 14K ohms at DA1 and DB2

6.2.86 Set R4 and R5 Fully CW

6.2.87 Verify 100K ohms at DB1 and TP14

6.2.88 While monitoring same points from previous step press SW1 and verify 100K ohms

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6.2.89 While holding SW1 closed verify R5 smoothly adjust from 1K ohms to 100K ohms at DB1 and TP14

6.2.90 Move lead at DB1 to DB2

6.2.91 Release SW1

6.2.92 Set R5 Fully CW

6.2.93 Verify R4 smoothly adjust from 100K ohms to 133K ohms at 50% of range then back to 100K ohms at DB2 and TP14

6.2.94 Install J23

6.2.95 Verify J46 is Removed

6.2.96 Verify 100K ohms at DB16 and DA20

6.2.97 Verify 0 ohms at DB16 and TP3

6.2.98 Verify 200K ohms at DB16 and TP2

6.2.99 Install J3

6.2.100 Verify 0 ohms at DB4 and TP3

6.2.101 Install J48 and Open J4

6.2.102 With DMM set to Diode verify proper diode drop at TP3 (+) and DB4 (-)

6.2.103 Reverse leads from DMM and verify overload

6.2.104 Install J47

6.2.105 With DMM set to Diode verify proper diode drop at TP3 (-) and DB4 (+)

6.2.106 Reverse leads from DMM and verify overload

6.2.107 Verify 0 ohms at TP3 and Left Post of J46

6.2.108 Verify 0 ohms at Right Post of J46 and Right Side of C39

6.2.109 Verify 68.1K ohms at left side of C39 and DA20

6.2.110 Verify 0 ohms at DB15 and TP6

6.2.111 Verify 15K ohms at TP6 and DB23

6.2.112 Install a wire jumper at C37 and R156

6.2.113 Verify 0 ohms at TP6 and DB23

6.2.114 Remove wire jumpers

6.2.115 Verify 1.221M ohms at TP13 and DB19

6.2.116 Verify 100k ohms at DB38 and DB36

6.2.117 Install J45

6.2.118 Verify R18 smoothly adjust from 3.2M ohms to 3.3M ohms at TP13 and DB38

6.2.119 Verify 0 ohms at DA24 and TP9

6.2.120 Verify 182 ohms at DA22 and TP9

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6.2.121 Install J7

6.2.122 Verify 0 ohms at DA22 and DA30

6.2.123 Verify infinite resistance at DA31 and DB9

6.2.124 Verify 0 ohms at DA31 and DB9 if SW2 is toggled either way

6.2.125 Verify 55K ohms at DA14 and DA26

6.2.126 Verify R12 smoothly adjust from 0 ohms to 50K ohms at DA16 and DA26

6.2.127 Verify 3.3K ohms at TP16 and DB37

6.2.128 Verify R17 smoothly adjust from 3.3K ohms to 0 ohms at DB37 and DB28

6.2.129 Verify R6 smoothly adjust from 3.3K ohms to 0 ohms at DB37 and DB22

6.2.130 Verify R15 smoothly adjust from 3.3K ohms to 0 ohms at DB37 and DB10

6.2.131 Install J38

6.2.132 Install a wire jumper at C38 and R166 (Saddle Clamps)

6.2.133 Verify 0 ohms at DB12 and DA34

6.2.134 Move wire jumper at C38 to C38A

6.2.135 Install J37

6.2.136 Verify 0 ohms at DB12 and DB4

6.2.137 Verify 0 ohms at DB4 and TP19

6.2.138 Remove all wire jumpers

6.2.139 Remove J37 so that neither J37 or J38 is installed

6.2.140 Install J21

6.2.141 Verify 400K ohms at DA30 and DB17

6.2.142 Verify 180K ohms at DA30 and DB12

6.2.143 Install J22

6.2.144 Verify 221K ohms at TP16 and DB17

6.2.145 Verify 0 ohms at DB12 and CR29 Anode

6.2.146 Verify 0 ohms at DB12 and CR30 Cathode

6.2.147 Verify 50K ohms at DB1 and TP19

6.2.148 Verify 50K ohms at DB2 and TP19

6.2.149 Verify R26 smoothly adjust from 0 ohms to 35K ohms at TP19 and CR29 Cathode

6.2.150 Verify R27 smoothly adjust from 0 ohms to 35K ohms at TP19 and CR30 Anode

6.2.151 Install J42

6.2.152 Verify 0 ohms at DB38 and TP24

6.2.153 Install J43

6.2.154 Verify 8.25K ohms at DB31 and DB35

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6.2.155 Install J44

6.2.156 Verify 0 ohms at DA25 and TP24

6.2.157 Verify 1.1M ohms at TP12 and TP18

6.2.158 Verify 36K ohms at TP12 and DB3

6.2.159 Verify 1M ohms at TP18 and CR33 Anode

6.2.160 Install J19

6.2.161 Verify 32.2K ohms at DB6 and DB11

6.2.162 Install J18

6.2.163 Verify 0 ohms at TP23 and left side of C43

6.2.164 Verify 0 ohms at TP23 and DB40

6.2.165 Verify R25 smoothly adjust from 50K ohm to 0 ohms at DB35 and CR36 Anode

6.2.166 Verify R25 smoothly adjust from 50K ohm to 0 ohms at DB35 and CR37 Cathode

6.2.167 Set R25 Fully CCW and set R28 Fully CW

6.2.168 Verify 110K ohms at DB3 and DB8

6.2.169 Verify 200 ohms at DB3 and CR36 Cathode

6.2.170 Verify 200 ohms at DB3 and CR37 Anode

6.2.171 Verify R28 smoothly adjust from 134 ohms to 196 ohms at TP16 and CR37 Anode

6.2.172 Verify 1K ohms at DB1 and DB2

6.2.173 Verify 0 ohms at DB8 and CR34 Anode

6.2.174 Verify R8 smoothly adjust from 4.8K ohms to 6.8K ohms at TP16 and CR34 Cathode

6.2.175 Leave R8 Fully CW

6.2.176 Verify R9 smoothly adjust from 6.8K ohms to 8.8K ohms at TP16 and CR34 Cathode

6.2.177 Set R8 Fully CCW

6.2.178 Verify 8K ohms at DB1 and CR34 Cathode

6.2.179 Install J26

6.2.180 Verify 32.2K ohms at CR33 Cathode and DB11

6.2.181 Install J25

6.2.182 Verify 32.2K ohms at DB11 and DB18

6.2.183 Remove J25 and J18

6.2.184 Verify R13 smoothly adjust from 90K ohms to 93K ohms at 50% of range then back to 91K ohms at DB11 and DB2

6.2.185 Verify R13 smoothly adjust from 90K ohms to 93K ohms at 50% of range then back to 91K ohms at DB11 and DB1

6.2.186 Verify 0 ohms at DB8 and CR35 Cathode

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6.2.187 Verify R29 smoothly adjust from 0 ohms to 6.5K ohms at DB40 and CR35 Anode

6.2.188 Verify 5.4K ohms at DB2 and DB40

6.2.189 Install J32

6.2.190 Verify 0 ohms across C44

6.2.191 Remove J32

6.2.192 Verify 5.2K ohms across C44

6.2.193 Install wire jumper at C40 and R196 (Saddle Clamp)

6.2.194 Verify R19 smoothly adjust from 1.8K ohms to 221 ohms then in the last 10% of range jumps to 110K ohm at DB3 and DB8

6.2.195 Move wire jumper at C40 to C40A (Saddle Clamp)

6.2.196 Repeat step 6.2.194

6.2.197 Remove all wire jumpers

6.2.198 Verify 5.1K ohms at DB3 and DB40

6.2.199 Verify R8 smoothly adjust from 5.1K ohms to 7.3K ohms at DB3 and DB40.

6.2.200 Check all diodes using DMM for proper voltage drop

6.2.201 Use Sencore tester to test C39, C42, C43, and C44

6.3 ***TEST COMPLETE ***

7. Notes

7.1 None at this time

8. Attachments

8.1 None at this time

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