ABB	Functional Testing Specification
Parts & Repair Services **Louisville, KY**	**LOU-GED-DS3800NGTA**

Test Procedure for a DS3800NGTA General Test Signals

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	Steve Pharris	02/24/2014
B	Updated setup steps 6.1.5 & 6.1.6 to clarify	JCW/LFG	4/3/2019
C			
D			
E			

PREPARED BY Steve Pharris	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL *Charlie Wade*
DATE 2/24/2014	DATE	DATE	DATE 6/12/2014

1. **SCOPE**

    1.1 This is a functional testing procedure for a DS3800NGTA.

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		Oscilloscope
1		Millivolt Source
1		Rainbow Box
1		DS3800 Power Supply
1		DS3800 Connector Box
1		10K Ohm Resistor
1		22.1K Ohm Resistor
1		DS3800DGTA Daughter Card Emulator
1		Function Generator

6. Testing Process

6.1 Setup

6.1.1 Connect DS3800 power supply, rainbow box and connector box together

6.1.2 Connect PA1 to PA9

6.1.3 Connect PA8 to PA10 thru a 10K ohm resistor

6.1.4 Attach Daughter Card

6.1.5 Attach the following components:

R26, 10K resistor (68A7035P100F),

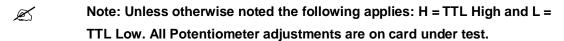C7, .22MFD cap (68A7052P22C),

C6, .33MFD CAP(68A7052P33C)

6.1.6 Set pots as follows,

R1, CW

R2, R4, and R7, CCW

R5, Remove pot -install 4.75K resistors (68A7035P475E) from each end to wiper.

6.1.7 Verify Jumper BJ1 on Daughter Card is set to "DIS"

✎ **Note: Unless otherwise noted the following applies: H = TTL High and L = TTL Low. All Potentiometer adjustments are on card under test.**

6.2 Testing Procedure

6.2.1 Connect PA46 to SW81 and PA48 to SW82 and set switches H

6.2.2 Connect PA36 to PA9

6.2.3 Adjust R3 for 0VDC +/- .01V at PA19

6.2.4 Remove connection between PA36 and PA9

6.2.5 Apply 10VRMS @ 3KHz to PA36

6.2.6 Verify PA19 = 4.7VDC +/- .4V

6.2.7 Verify PA2 = -3.9VDC +/- .4V

6.2.8 Toggle SW81 L-H

6.2.9 Verify "OSB" CR2 is Extinguished

6.2.10 Verify PA34 = H

6.2.11 Verify PA35 = L

6.2.12 Verify "IMOK" CR27 is Illuminated

6.2.13 **(Read entire step before continuing)** Increase frequency of signal at PA36 to 8Khz.

While frequency is increasing verify that at 4.4KHz +/- 400Hz "OSB" CR2 Illuminates.

When CR2 Illuminates Verify PA34 = L and PA35 = H. While still increasing frequency Verify at 7.5KHz +/- 600Hz "IMOK" CR27 Extinguishes.

6.2.14 Verify when frequency reaches 8KHz PA19 = 12.5VDC +/- .5V

6.2.15 Verify PA2 = -10.3VDC +/- .6V

6.2.16 Decrease frequency to less than 4KHz and toggle SW81 L-H

6.2.17 Verify "OSB" CR2 Extinguishes

6.2.18 Verify PA34 = H

6.2.19 Verify PA35 = L

6.2.20 Remove signal at PA36

6.2.21 Apply a TTL Square wave at 300Hz to PA15

6.2.22 Verify PA19 = 0VDC +/-.1V

6.2.23 Change Jumper on Daughter card from "DIS" to "EN"

6.2.24 Verify PA19 = 4.4VDC +/-.4V

6.2.25 Increase frequency from 300 Hz to 720Hz

6.2.26 Verify PA19 = 10.5VDC +/- .8V

6.2.27 Remove signal from PA15

6.2.28 Move Jumper on Daughter card back to "DIS"

6.2.29 Verify SW81 is set H

6.2.30 Toggle SW82 L-H

6.2.31 Verify "OSA" CR3 is Extinguished

6.2.32 Verify PA62 = H

6.2.33 Verify PA57 = L

6.2.34 Toggle SW82 L-H

6.2.35 Apply 10VRMS @ 70Hz to PA41

6.2.36 Verify "OSA" CR3 is Still Extinguished

6.2.37 Increase frequency of signal at PA41 to 105Hz

6.2.38 Verify "OSA" CR3 is Illuminated

6.2.39 Verify PA62 = L

6.2.40 Verify PA57 = H

6.2.41 Reduce frequency at PA41 to 70Hz

6.2.42 Toggle SW81 L-H

6.2.43 Verify "OSA" CR3 is Extinguished

6.2.44 Verify PA62 = H

6.2.45 Verify PA57 = L

6.2.46 Increase frequency of signal at PA41 to 105Hz

6.2.47 Verify PA62 = L

6.2.48 Reduce frequency at PA41 to 70Hz

6.2.49 Toggle SW82 L-H

6.2.50 Verify PA62 = H

6.2.51 Remove signal at PA41

6.2.52 Apply 10VRMS @ 60Hz between PA26 and PA4

6.2.53 Verify PA8 = -8.2VDC +/- .2V

6.2.54 Verify PA10 = 0VDC +/- .1V

6.2.55 Move Signal from PA26 to PA6 so that now the incoming signal is across PA4 and PA6

6.2.56 Verify PA8 = -8.2VDC +/- .2V

6.2.57 Remove Signal from Across PA4 and PA6

6.2.58 Connect PA32 and PA20 to PA1

6.2.59 Verify TP1 = 0VDC +/- .1V

6.2.60 Remove connection between PA32 and PA1 and apply 10VDC to PA32

6.2.61 Verify TP1 = -10VDC +/- .2V

6.2.62 Remove connection between PA20 and PA1

6.2.63 Move 10VDC from PA32 to PA20 and reconnect PA32 to PA1

6.2.64 Verify TP1 = 10VDC +/- .2V

6.2.65 Change polarity of voltage at PA20 to -10VDC

6.2.66 Verify TP1 = -10VDC +/- .2V

6.2.67 Remove connections at PA32 and PA20

6.2.68 Connect PA67, PA68, and PA70 to PA1

6.2.69 Verify TP3 = 0VDC +/- .1V

6.2.70 Verify PA61 = L

6.2.71 Remove connection between PA68 and PA1 and apply 5.1VDC to PA68

6.2.72 Verify TP3 = 1.86VDC +/- .1V

6.2.73 Verify PA61 = L

6.2.74 Increase voltage at PA68 to 5.65VDC

6.2.75 Verify TP3 = 2.06VDC +/- .1V

6.2.76 Verify PA61 = H

6.2.77 Change polarity of voltage at PA68 to -5.65VDC

6.2.78 Verify TP3 = 2.06VDC +/- .1V

6.2.79 Remove -5.65VDC from PA68

6.2.80 Remove connection between PA67, PA68, PA70 and PA1

6.2.81 Apply 10VDC to PA67, PA68, and PA70

6.2.82 Verify TP3 = 11VDC +/- .3V

6.2.83 Remove voltage and connections from PA67, PA68, and PA70

6.2.84 Apply 2.2VRMS @ 10Hz to PA68

6.2.85 Verify TP3 = 1.5VDC +/- .5V

6.2.86 Increase frequency of signal at PA68 to 150Hz

6.2.87 Verify TP3 = 6VDC +/- .5V

6.2.88 Increase frequency of signal at PA68 to 2.5KHz

6.2.89 Verify TP3 = 1VDC +/- .5V

6.2.90 Remove signal at PA68

6.2.91 Connect PA40 to SW83 and PA42 to SW84 and set to H

6.2.92 Verify SW81-SW84 = H

6.2.93 Connect PA38 and PA39 to PA1

6.2.94 Toggle SW84 L-H

6.2.95 Verify U17 Pin 8 = H

6.2.96 Verify U16 Pin 9 = 5.3VDC +/- .2V

6.2.97 Verify "NOST" CR12 is extinguished

6.2.98 Verify PA60 and PA50 = H

6.2.99 Verify PA59 and PA51 = L

6.2.100 Remove connection between PA38 and PA1

6.2.101 **NOTE* Read the following steps before continuing due to timing in step 6.2.104*

6.2.102 Apply -6.4VDC to PA38

6.2.103 Verify U17 Pin 8 = L

6.2.104 Verify after approximately 60 seconds "NOST" CR12 is Illuminated

6.2.105 U16 Pin 9 = L

6.2.106 Verify PA60 = L

6.2.107 Verify PA59 = H

6.2.108 With -6.4VDC still applied to PA38 remove connection between PA39 and PA1

6.2.109 Apply .40VDC to PA39

6.2.110 Verify U17 Pin 8 = H

6.2.111 Verify U16 Pin 9 = 5.3VDC +/- .2V

6.2.112 Verify PA51 = H

6.2.113 Verify PA50 = L

6.2.114 Verify "NOST" CR12 is still Illuminated

6.2.115 Verify PA60 = L

6.2.116 Toggle SW84 L-H

6.2.117 Verify "NOST CR12 is extinguished

6.2.118 Verify PA60 = H

6.2.119 *NOTE* Read the following steps before continuing due to timing in step 6.2.121

6.2.120 Reduce .40VDC at PA39 to .15VDC

6.2.121 Verify after approximately 60 seconds "NOST" CR12 is Illuminated

6.2.122 Verify PA60 = L

6.2.123 Remove signal from PA39

6.2.124 Set SW83 – L

6.2.125 Toggle SW82 L-H

6.2.126 Verify PA60 = H

6.2.127 *NOTE* Read the following steps before continuing due to timing in step 6.2.129

6.2.128 Set SW83 – H

6.2.129 Verify after approximately 60 seconds "NOST" CR12 is Illuminated

6.2.130 Verify PA60 = L

6.2.131 Set SW83 – L

6.2.132 Toggle SW81 L-H

6.2.133 Verify PA60 = H

6.2.134 Connect PA63 to PA1

6.2.135 Close SW1 (On Card)

6.2.136 Verify U19 Pin 1 = 6.6Vpk-pk Sine Wave and adjust R6 for 60Hz

6.2.137 Adjust R8 for 0VDC at U19 Pin 1

6.2.138 Verify same waveform at the following points:

      U19 Pin 8

      U19 Pin 7

      PA76

      PA78

      PA71

      PA72

      PA69

      PA74

6.2.139 Verify PA66 = H

6.2.140 Verify PA65 = L

6.2.141 Open SW1 (On Card)

6.2.142 Verify waveform is no longer present at the points listed above

6.2.143 Verify PA66 = L

6.2.144 Verify PA65 = H

6.2.145 Close SW1 (On Card)

6.2.146 Verify waveform reappears at points listed above

6.2.147 Connect PA63 to PA3

6.2.148 Verify waveform is no longer present at the points listed above

6.2.149 Move connection between PA63 and PA3 and connect PA63 to PA1

6.2.150 Verify waveform reappears at points listed above

6.2.151 Open SW1 (On Card)

6.2.152 Make the following connections:

PA64 to SW86

PA47 to SW87

PA52 to SW88

6.2.153 Set SW86 and SW87 – L and SW88 – H

6.2.154 Verify the following:

PA55 = H

PA56 = H

PA54 = L

TP4 = -2.4VDC +/- .5V

6.2.155 Set SW86 – H

6.2.156 Verify the following:

PA55 = L

PA56 = H

PA54 = L

TP4 = -3.9VDC +/- .5V

6.2.157 Set SW88 – L

6.2.158 Verify the following:

PA55 = L

PA56 = H

PA54 = H

TP4 = -5.2VDC +/- .5V

6.2.159 Set SW87 – H

6.2.160 Verify the following:

PA55 = L

PA56 = L

PA54 = H

TP4 = -6.0VDC +/- .5V

6.2.161 Set SW86 – L

6.2.162 Verify the following:

TP4 = -7.2VDC +/- .5V

6.2.163 Set SW88 – H

6.2.164 Verify the following:

TP4 = -8.5VDC +/- .5V

6.2.165 Make the following connections and set all switches H:

PA13 – SW89

PA12 – SW90

PA11 – SW91

PA37 – SW92

PA16 – SW93

PA14 – SW94

6.2.166 Verify TP2 = -.5VDC +/- .3V

6.2.167 Set SW89 – L

6.2.168 Verify TP2 = -1.3VDC +/- .3V

6.2.169 Set SW89 – H and SW90 – L

6.2.170 Verify TP2 = -1.8VDC +/- .3V

6.2.171 Set SW90 – H and SW91 – L

6.2.172 Verify TP2 = -2.2VDC +/- .3V

6.2.173 Set SW91 – H and SW92 – L

6.2.174 Verify TP2 = -2.6VDC +/- .3V

6.2.175 Set SW92 – H and SW93 – L

6.2.176 Verify TP2 = -3.2VDC +/- .3V

6.2.177 Set SW93 – H and SW94 – L

6.2.178 Verify TP2 = -4.1VDC +/- .3V

6.2.179 Remove connections from SW86 thru SW94

6.2.180 Connect PA22 and PA21 to PA1

6.2.181 Verify PA17 = 0VDC +/- .5V

6.2.182 Remove connection between PA22 and PA1

6.2.183 Apply 10VDC to PA22

6.2.184 Verify PA17 = -10VDC +/- .2V

6.2.185 Reverse polarity of PA22 to -10VDC

6.2.186 Verify PA17 = 10VDC +/- .2V

6.2.187 Remove signal from PA22

6.2.188 Apply 10VDC thru 22.1K Ohm Resistor to PA18

6.2.189 Verify PA17 = -10VDC +/- .2V

6.2.190 Remove signal from PA18

6.2.191 Remove Connection between PA21 and PA1

6.2.192 Apply 3VRMS @ 70Hz to PA21

6.2.193 Verify PA17 = 3VRMS +/- .5V

6.2.194 Increase frequency at PA21 from 70Hz to 200Hz

6.2.195 Verify PA17 = 8.6VRMS +/- .5V

*6.3   ***TEST COMPLETE ****

7. **Notes**

   7.1   None at this time

8. **Attachments**

   8.1   None at this time