Test Procedure for a Multi-purpose Option Card

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A	Initial release	Steve Pharris	4/22/2010
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C			

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1. SCOPE

1.1 This is a functional testing procedure for a DS3800NFOA.

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
2		Fluke 87 DMM (or Equivalent)
2		Rainbow Box
1		DS3800 Power Supply
1		DS3800 Dual Connector Box
1		Fluke 5500A Calibrator
1		O-Scope
1		Daughter Board Emulator
1		10K Ohm Resistor
1		270 Ohm Resistor

6. <u>TESTING PROCESS</u>

6.1 Setup

6.1.1 Connect Dual DS3800 Connector box to rainbow boxes

6.1.2 Connect DS3800 Power Supply to either rainbow box (the dual connector box applies the proper voltages to all points on the card.)

6.1.3 Attach daughter card emulator to UUT

6.1.4 Connect PA1-PA9 and PB1-PB9

6.2 Testing Procedure

6.2.1 Apply power to UUT

6.2.2 Verify the following tables. (The following tables are read vertically. Meaning, once you meet the input requirements of the first vertical column the outputs of that column should match.)

INPUTS										
PA78 (VDC)	8	8	8	8	8	11.5	11.5	13.5	13.5	8
PA32	1	0	0	1	1	1	0	0	1	1
PA28	0	0	1	1	1	1	1	0	0	1
PA26	0	0	1	1	1	1	0	0	0	1
PA70	1	1	1	1	1	1	1	1	1	1
PB28	0	1	1	0	1	1	1	0	0	0
OUTPUTS										
TA2	0	0	0	0	0	0	0	1	1	0
PA24	0	0	1	0	0	0	1	0	1	0
PA21	0	0	1	0	0	1	0	0	1	0
TA1	0	0	0	0	0	1	1	1	1	0
PA14 (VDC)	0	0	23	0	0	23	23	0	23	0

6.2.3 Remove Power and all previous connections

6.2.4 Connect TB1-H

6.2.5 Connect PB46-H

6.2.6 Connect PB28-H

6.2.7 Connect PB18-L

6.2.8 Connect PB70-H

6.2.9 Apply Power

6.2.10 Verify PB16=L (if not toggle SW1)

6.2.11 Momentarily remove then reconnect PB18

6.2.12 Verify PB16=H

6.2.13 CR65=Off

6.2.14 Momentarily connect PB28 to L then tie H

6.2.15 Verify PB16=L

6.2.16 Connect TB1-L

6.2.17 Connect PB46-L

6.2.18 Connect TB1-H

6.2.19 Connect PB46-H (this sets the flip flop to "last state")

6.2.20 Connect PB46-L

6.2.21 Momentarily remove then reconnect PB18

6.2.22 Verify PB16=H

6.2.23 Toggle SW1

6.2.24 Verify PB16=L

6.2.25 Verify PB26=H

6.2.26 Connect PB28-L

6.2.27 Verify PB26=L

6.2.28 Connect PB28=H

6.2.29 Verify PB30=H

6.2.30 Connect PA30-L

6.2.31 Connect PA42-L

6.2.32 Verify PB30=L

6.2.33 Connect TB1-L

6.2.34 Connect PB46-L

6.2.35 Connect TB1-H

6.2.36 Momentarily connect PB46-H then reconnect to L

6.2.37 Momentarily remove then reconnect PB18

6.2.38 Verify PB30=H

6.2.39 Toggle SW1

6.2.40 Verify PB30=L

6.2.41 Using the fluke 5500A Calibrator apply a 5V RMS sine wave to JA01 at 60Hz

6.2.42 Verify JA04 = 14V p-p sine wave in phase with input

6.2.43 Using the fluke 5500A Calibrator apply a 5V RMS sine wave to JA06 at 60Hz

6.2.44 Verify JA07 = 14V p-p sine wave in phase with input

6.2.45 Using the fluke 5500A Calibrator apply a 5V RMS sine wave to JA17 at 60Hz

6.2.46 Verify JA18 = 14V p-p sine wave in phase with input

6.2.47 Using the fluke 5500A Calibrator apply a 5V RMS sine wave to JA10 at 60Hz

6.2.48 Verify JA11 = 14V p-p sine wave in phase with input

6.2.49 Using the fluke 5500A Calibrator apply a 5V RMS sine wave to JA13 at 60Hz

6.2.50 Verify JA12 = 14V p-p sine wave in phase with input

6.2.51 Verify JA23 = H

6.2.52 Verify PB24 = L

6.2.53 Verify LED CR71 (tst) is off

6.2.54 Connect JA23 to JA21

6.2.55 Verify PB24 = H

6.2.56 Verify LED CR71 (tst) is on

6.2.57 Verify JA24 is a 6V p-p sine wave +/- 1.5V

6.2.58 Verify JA25 is a 6V p-p sine wave +/- 1.5V

6.2.59 Verify JA26 is a 7V p-p sine wave +/- 1.5V

6.2.60 Verify that adjusting R290 varies the frequency at JA24 from 61Hz to 56Hz

6.2.61 Set R290 so JA24 = 60Hz +/- 2Hz

6.2.62 Verify JA25 is also 60Hz sine wave and lags JA24 by 120 degrees

6.2.63 Verify JA26 is also 60Hz sine wave and lags JA24 by 240 degrees

6.2.64 Connect JA01, JA06, JA10, JA13 to Common

6.2.65 Apply 10.5V to JA17

6.2.66 Verify CR69 (imok) is on

6.2.67 Increase voltage at JA17 to 12.5

6.2.68 Verify CR69 (imok) is off

6.2.69 Remove ground connections at JA01 and JA06

6.2.70 Connect JA24 to JA1

6.2.71 Connect JA25 to JA6

6.2.72 Verify TB25 is a 13V p-p 60Hz sine wave

6.2.73 Verify TB24 is an 8V p-p 60Hz sine wave and leads TB25 by 90 degrees

6.2.74 Verify TB1 is a 60Hz signal switching from L to H

6.2.75 Connect PA72 to Common

6.2.76 Apply a 151mV 60Hz sine wave to PB2

6.2.77 Toggle SW1

6.2.78 Verify TA27 = -15VDC

6.2.79 Verify TA6 = 0V

6.2.80 Verify TA21 = 0V

6.2.81 Verify PB25 = L

6.2.82 Verify TA19 = H

6.2.83 Verify CR66 (puls) is on

6.2.84 Increase voltage at PB2 to 604mV

6.2.85 Verify CR66 (puls) is off

6.2.86 Verify TA27 is oscillating from +4V to –15V at 60Hz (DC coupling on scope)

6.2.87 Verify TA6 is a 20V p-p 60Hz sine wave

6.2.88 Verify TA19 = L

6.2.89 Verify PB25 = H

6.2.90 Remove connection from PA72 to Common

6.2.91 Repeat steps **6.2.37** to **6.2.48** using a 50Hz frequency and verify all 60Hz signals are now 50Hz.

6.2.92 Apply .4VDC to JA01, JA06, and JA17

6.2.93 Connect JA11 and JA12 to Common

6.2.94 Verify TB12 = 4.8VDC

6.2.95 Verify TB17 = -4.8VDC

6.2.96 Verify TB20 = 4.8VDC

6.2.97 Verify TB23 = -4.8VDC

6.2.98 Verify TB14 = 4.8VDC

6.2.99 Verify TB13 = -4.8VDC

6.2.100 Verify TB6 = -.5VDC

6.2.101 Verify TB10 = -.5VDC

6.2.102 Verify TB5 = -.5VDC

6.2.103 Verify TB3 = -.5VDC

6.2.104 Verify TB2 = -.5VDC

6.2.105 Verify PB23 = -.5VDC

6.2.106 Verify PA34 = H

6.2.107 Verify PA36 = H

6.2.108 Verify PA38 = L

6.2.109 Increase the input voltage to **.**5VDC

6.2.110 Verify outputs at **6.2.55** - **6.2.60** = 6VDC

6.2.111 Verify outputs at **6.2.61** - **6.2.66** = H

6.2.112 Verify PA34 = L

6.2.113 Verify PA36 = L

6.2.114 Verify PA38 = H

6.2.115 Apply 165mV RMS 60Hz sine wave to JA01, JA06, and JA17

6.2.116 Verify outputs at **6.2.55** - **6.2.60** = 6V p-p sine wave at 60Hz

6.2.117 Verify outputs at **6.2.61** - **6.2.66** = L

6.2.118 Verify PA34 = H

6.2.119 Verify PA36 = H

6.2.120 Verify PA38 = L

6.2.121 Increase the voltage at **6.2.76** to 530mV RMS

6.2.122 Verify outputs at **6.2.55** - **6.2.60** = 18V p-p sine wave at 60Hz

6.2.123 Verify outputs at **6.2.61** - **6.2.66** are switching from -.4V to +5V

6.2.124 Verify PA34 and PA36 are switching from L – H

6.2.125 Verify PA38 is also switching from L – H but inversely of PA34 and PA36

6.2.126 Toggle SW1

6.2.127 Connect 270 Ohm resistor between PB72 and Common

6.2.128 Connect a 10K ohm resistor between PB6 and PB36

6.2.129 Connect PA78 to Common

6.2.130 Connect PA76 to +15V

6.2.131 Apply 1VDC to PA80

6.2.132 Verify TA20 = H

6.2.133 Verify PB72 = 23VDC

6.2.134 Verify PB4 to PB34 = 0VDC

6.2.135 Verify CR70 (dcf) is on

6.2.136 Increase voltage at PA80 to 3.5VDC

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6.2.137 Verify TA20 = -15VDC

6.2.138 Verify PB72 = 0

6.2.139 Verify CR70 (dcf) is off

6.2.140 Verify PB4 to PB34 = 32VDC

6.2.141 Decrease voltage at PA80 to 1VDC

6.2.142 Toggle SW1

6.2.143 CR70 (dcf) is on

6.2.144 Verify PB72 = 23VDC

6.2.145 Verify PB4 to PB34 = 0VDC

6.2.146 Connect DMM to PA61

6.2.147 Connect DMM to TA15

6.2.148 Verify PA61 = 3.5VDC

6.2.149 Verify TP6 = -5.9VDC

6.2.150 (READ FIRST) Apply –18VDC to PA20 and –15VDC to PA44 simultaneously

6.2.151 Verify PA61 increases to –9.5VDC +/- 2VDC

6.2.152 Verify TA15 increases to 13VDC +/- 2VDC

6.2.153 Verify PA40 = -1.7VDC

6.2.154 Verify TA4 = -13VDC

6.2.155 Verify TP11 = 7VDC

6.2.156 Verify CR67 (tof)= off

6.2.157 Change –18VDC at PA20 to +15VDC

6.2.158 Verify TP11 = 0VDC

6.2.159 Verify PA61 = -6.3VDC

6.2.160 Reduce voltages at PA20 and PA44 to 0VDC and allow one minute reset time

6.2.161 Toggle SW1

6.2.162 Verify PA74 = 3.5VDC

6.2.163 Verify TA24 = -5.9VDC

6.2.164 (READ FIRST) Apply 10VDC to PA20 and –15VDC to PA44 simultaneously

6.2.165 Verify PA74 increases to –9.5VDC +/- 2VDC

6.2.166 Verify TP1 increases to 13VDC +/- 2VDC

6.2.167 Verify PB78 = 7VDC

6.2.168 Verify PA67 = -1.7VDC

6.2.169 Verify TA22 = -13VDC

6.2.170 Verify CR68 (tor) = Off

6.2.171 Change 10VDC at PA20 to −15VDC

6.2.172 Verify PB78 = L

6.2.173 Verify PA74 = -6.34VDC

6.2.174 Verify PA67 = 0VDC

6.2.175 Remove connection at PA20

6.2.176 Apply .5VDC to PA54

6.2.177 Verify PA55 = -11VDC

6.2.178 Change voltage at PA54 to -.5VDC

6.2.179 Verify PA55 = 11VDC

6.2.180 Move -.5VDC from PA54 to PA52

6.2.181 Verify PA55 = 11VDC

6.2.182 Remove voltage at PA52

6.2.183 Toggle SW1

6.2.184 Verify all LED's are on except IMOK and TST

*6.3 ***TEST COMPLETE ****

7. NOTES

7.1 None at this time.

8. ATTACHMENTS

8.1 None at this time.