



GE Energy

Functional Testing Specification

*Parts & Repair Services
Louisville, KY*

LOU-GED-DS3800NFCE

Test Procedure for a DS3800NFCE Card

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

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A	Initial Release	J. Francis	02/05/2010
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C			

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DATE 02/05/2010	DATE	DATE	DATE 2/8/2010

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1. SCOPE

1.1 This is a functional testing procedure for a DS3800NFCExxx.

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 85 DMM (or Equivalent)
2	*	Tenma Laboratory DC Power Supplies
1	H188853	DS3800 Test Box
2	*	Rainbow Box
1	*	Tenma Function Generator
1	H188840	DS3800DFCA Daughter Card
1	*	Tektronics TBS 2012B O-Scope

* Any equipment of same type will suffice.

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6. TESTING PROCESS

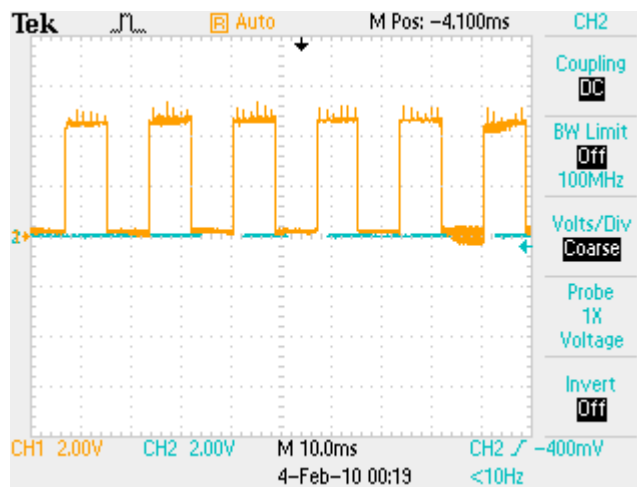
6.1 Setup



Note: If any circuit fails during testing process, repair the malfunctioning circuit, retest, and then continue with test.

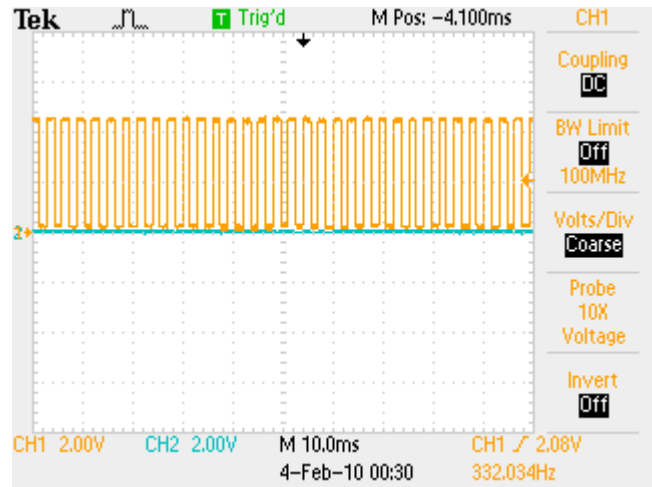
- 6.1.1 Remove existing proms from sockets U68 and U21. Verify both chips have correct checksum results. U68 checksum = 00028230, Device part # 82S181. U20 checksum = 00039C3B, Device part # 82S181. Replaced verified good proms into appropriate sockets.
- 6.1.2 Attach DS3800NFCE Unit Under Test (**UUT**) to DS3800NFCE Test Box, component side up.
- 6.1.3 Attach JA Cable to JA plug on UUT.
- 6.1.4 Connect +5 VDC to red connector on DS3800 Test Box.
- 6.1.5 Connect +5 VDC return to black power connector on DS3800 Test Box. For the remainder of this testing process, "black power connector on DS3800 Test Box" will be referred to as **(-) common**.
- 6.1.6 Connect +15 VDC to yellow power connector on DS3800 Test Box.
- 6.1.7 Connect +15 VDC return to black power connector on DS3800 Test Box.
- 6.1.8 Connect -15 VDC to green power connector on DS3800 Test Box.
- 6.1.9 Connect -15 VDC return to black power connector on DS3800 Test Box.
- 6.1.10 Connect 1st Rainbow Box to PBA connector on DS3800 Test Box.
- 6.1.11 Connect 2nd Rainbow Box to PBB connector on DS3800 Test Box.
- 6.1.12 Attach DS3800DFCA Daughter Card.
- 6.1.13 Adjust R85, R168, and R46 on the DS3800DFCA Daughter Card fully counterclockwise.
- 6.1.14 Adjust R49 on the DS3800DFCA Daughter Card Clockwise.
- 6.1.15 Adjust R155 on the DS3800NFCE Card fully clockwise.
- 6.1.16 Attach 6 12K Ohm 2 Watt resistors to the standoffs at the top of the Rainbow Box.
- 6.1.17 Connect pin 81 of Rainbow Box to the black post of first 12K Ohm resistor.
- 6.1.18 Connect pin 82 of Rainbow Box to the black post of second 12K Ohm resistor.
- 6.1.19 Connect pin 83 of Rainbow Box to the black post of third 12K Ohm resistor.
- 6.1.20 Connect pin 84 of Rainbow Box to the black post of fourth 12K Ohm resistor.
- 6.1.21 Connect pin 85 of Rainbow Box to the black post of fifth 12K Ohm resistor.
- 6.1.22 Connect pin 86 of Rainbow Box to the black post of sixth 12K Ohm resistor.
- 6.1.23 Connect all 6 red posts of the 12K Ohm resistors together in parallel.

- 6.1.24 Connect + 28 VDC to the orange power connector on DS3800 Test Box.
- 6.1.25 Connect +28 VDC to the red posts of all 12K Ohm resistors.
- 6.1.26 Connect 28 VDC return to the black power connector on the DS3800 Test Box.
- 6.1.27 Jumper PB-4 to PB-8 and jumper PB-6 to PB-10.
- 6.1.28 Apply power to unit, watching lights as unit powers up. IMOK, SUP, and PLL lights should all come on, and PLL light should go out after approximately 1 second.
- 6.1.29 Set O-Scope for 2 V/Div and 10 mSec time/Div.
- 6.1.30 Apply 2 VRMS @ 60 Hz to PB-8 and PB-10 from the Function Generator.
- 6.1.31 Connect 1st channel of O-Scope to PB-70. Check for square wave of the same frequency as the input frequency at 4 Volts with approximately 50 % duty cycle as follows:



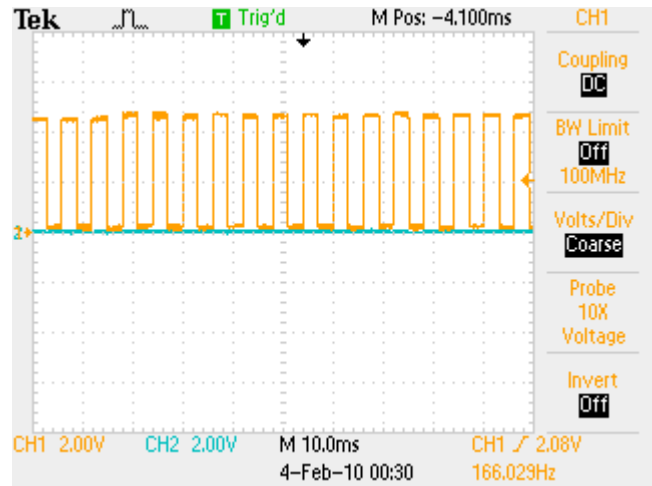
- 6.1.32 Apply 2 VRMS @ 55 Hz to PB-8 and PB-10 from the Function Generator.
- 6.1.34 Connect negative Multimeter lead to (-) common.
- 6.1.35 Connect positive Multimeter lead to TP11 (VCO). Set Multimeter to read DC Volts.
- 6.1.36 Adjust Potentiometer R184 to 2.5 VDC +/- .1 VDC at TP11 (VCO). Apply Torque Seal to Pot R184 when complete.
- 6.1.37 Disconnect Multimeter positive lead from TP11 (VCO).

6.1.38 Using 1st channel of O-Scope, check PA-61 for square wave approximately 4 V @ 330 Hz, to verify switching is occurring as follows:



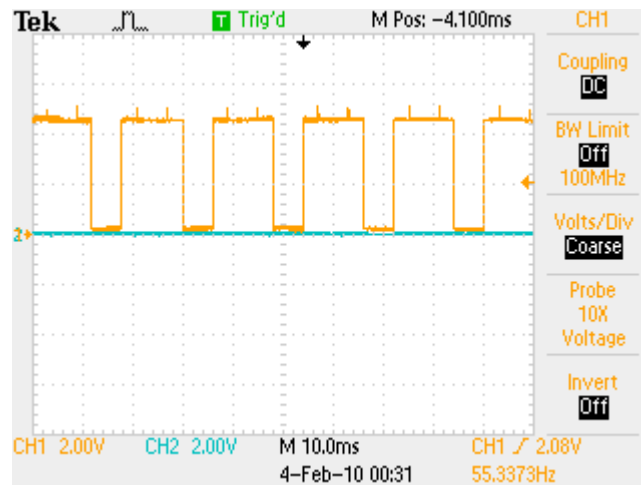
6.1.39

6.1.40 Using 1st channel of O-Scope, check PB-20 for square wave approximately 4 V @ 165 Hz, to verify switching is occurring as follows:



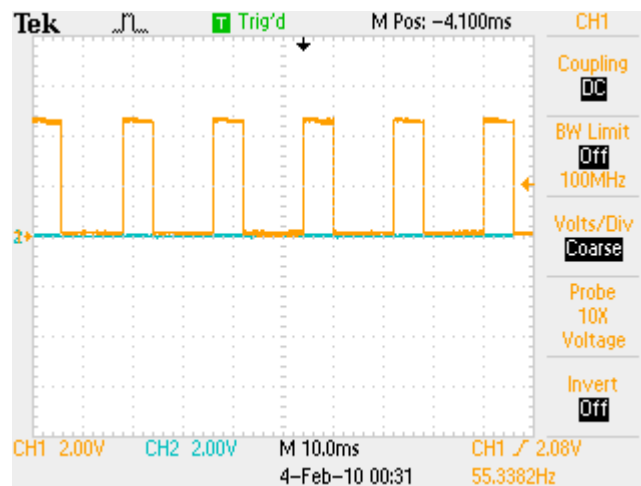
6.1.41

6.1.42 Using 1st channel of O-Scope, check PB-13 for square wave approximately 4 V @ 55 Hz, to verify switching is occurring as follows:



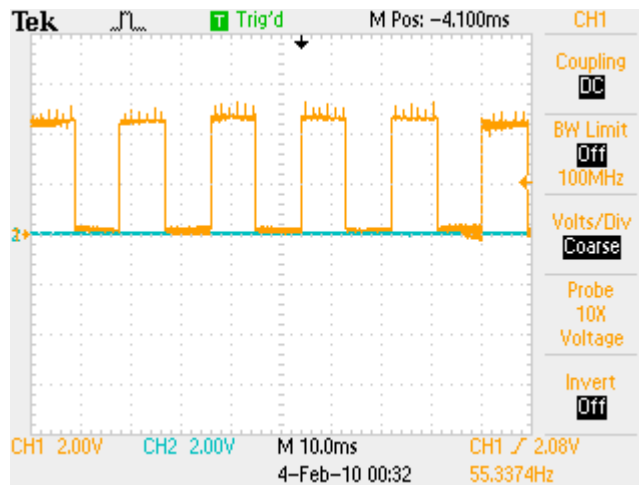
6.1.43

6.1.44 Using 1st channel of O-Scope, check PB-18 for square wave approximately 4 V @ 55 Hz, to verify switching is occurring as follows:



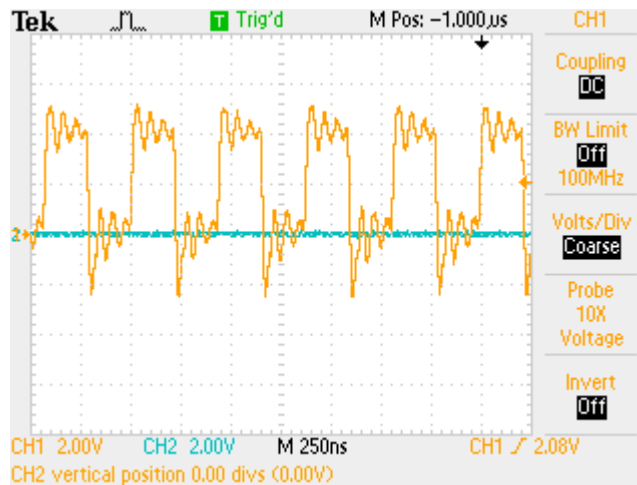
6.1.45

- 6.1.46** Using 1st channel of O-Scope, check PB-70 for square wave approximately 4 V @ 55 Hz, to verify switching is occurring as follows:

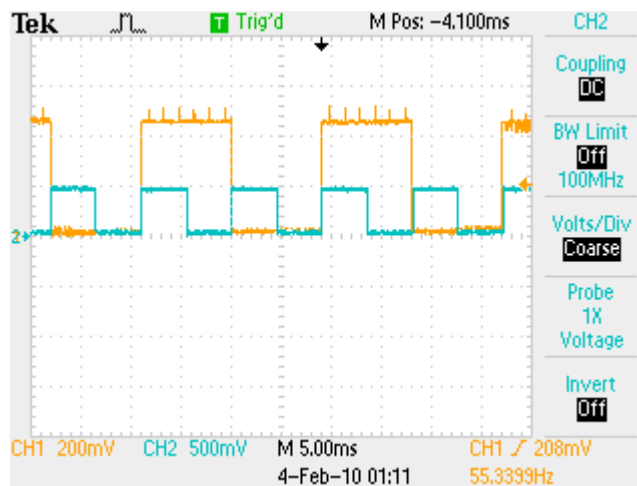


- 6.1.47**
- 6.1.48** Using 1st channel of O-Scope, check PB-71 for square wave approximately 4 V @ 55 Hz, to verify switching is occurring as in step **6.1.47**.
- 6.1.49** Connect 1st channel of O-Scope to PB-72. Should display logic low.
- 6.1.50** Momentarily connect PA-76 to (-) common) while observing O-Scope display. When connected the O-Scope should display logic high, and when removed O-Scope should return to logic low.
- 6.1.51** Disconnect 1st channel of O-Scope from PA-71.
- 6.1.52** Disconnect 1st channel of O-Scope from PB-71 and connect to PB-59, should display logic high.
- 6.1.53** Connect right side of R188, located between U42 and U28, to (-) common. PLL light will come on and stay on as long as this connection is made. O-Scope should still be displaying logic high.
- 6.1.54** Connect PA-78 to (-) common. O-Scope should display logic low as long as this connection is made.
- 6.1.55** Disconnect PA-78 from (-) common and O-Scope should display logic high.
- 6.1.56** Disconnect right side of R188 from (-) common. PLL light should go out.
- 6.1.57** Disconnect 1st channel of O-Scope from PB-59.
- 6.1.58** Connect the following points to (-) common: PB-48, PB-58, PB-80, PB-78, PB-36, and PA-76.

- 6.1.59** Connect 1st channel of O-Scope to PB-76. Set O-Scope for 2 V/Div and 250 nSec/Div. Look for a waveform of approximately 6 Vp-p at a frequency of 2.3 MHz as follows:



- 6.1.60** CH2 vertical position 0.00 divs (0.00V)
- 6.1.61** Connect left side of resistor R196, located behind 0V light, to (-) common. PLL light should come on and stay on as long as this connection is made.
- 6.1.62** Disconnect resistor R196. PLL light should go out after approximately 1 second.
- 6.1.63** Connect 1st channel of O-Scope to PB-67 and verify a logic low. Set 1st channel of O-Scope for 200 mV/Div and 2nd channel of O-Scope for 500 mV/Div and 5 mSec/Div.
- 6.1.64** Connect 1st channel of O-Scope PB-70 and 2nd channel of O-Scope, using probe, to U9 pin 6. Verify that channel 2 is twice the frequency as channel 1 as follows:



- 6.1.65**

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- 6.1.66** Apply 2 VRMS @ 40 Hz to PB-8 and PB-10 from the Function Generator. PLL light should stay off.
- 6.1.67** Apply 2 VRMS @ 70 Hz to PB-8 and PB-10 from the Function Generator. PLL light should stay off.
- 6.1.68** Apply 2 VRMS @ 60 Hz to PB-8 and PB-10 from the Function Generator. PLL Light should be off.
- 6.1.69** Disconnect both channels of O-Scope.
- 6.1.70** Connect negative Multimeter lead to (-) common.
- 6.1.71** Connect positive Multimeter lead to TP11 (VCO). Set Multimeter to read DC Volts.
- 6.1.72** Apply 2 VRMS @ 40 Hz to PB-8 and PB-10 from the Function Generator. PLL Light should be off. Multimeter should read approximately 2.1 VDC.
- 6.1.73** Apply 2 VRMS @ 30 Hz to PB-8 and PB-10 from the Function Generator. PLL Light should be off. Multimeter should read approximately 1.9 VDC.
- 6.1.74** Apply 2 VRMS @ 15 Hz to PB-8 and PB-10 from the Function Generator. PLL Light should be on. Multimeter should read approximately 1.3 VDC. Note the frequency that the PLL light comes on.
- 6.1.75** Apply 2 VRMS @ 5 Hz to PB-8 and PB-10 from the Function Generator. PLL Light should be on. Multimeter should read 0 VDC.
- 6.1.76** For the next step, note the frequency that the PLL light goes out. The light should go out within 15 Hz of the frequency the light came on.
- 6.1.77** Apply 2 VRMS @ 40 Hz to PB-8 and PB-10 from the Function Generator. PLL Light should be off. Multimeter should read 2.2 VDC.
- 6.1.78** Apply 2 VRMS @ 60 Hz to PB-8 and PB-10 from the Function Generator. PLL Light should be off. Quickly adjust the input frequency from 40 to 70 Hz multiple times. The PLL light should stay of during this test.
- 6.1.79** Disconnect the following points from (-) common: PB-48, PB-58, PB-80, PB-78, PB-36, and PA-76.
- 6.1.80** Connect +8 VDC to PA-24.
- 6.1.81** Connect 8 VDC return to (-) common.
- 6.1.82** Connect PA-48 to (-) common.
- 6.1.83** Connect negative Multimeter lead to (-) common.
- 6.1.84** Connect positive Multimeter lead to TP9 (COS). Set Multimeter to read DC Volts.
- 6.1.85** Attach 16-pin chip clip to U21.

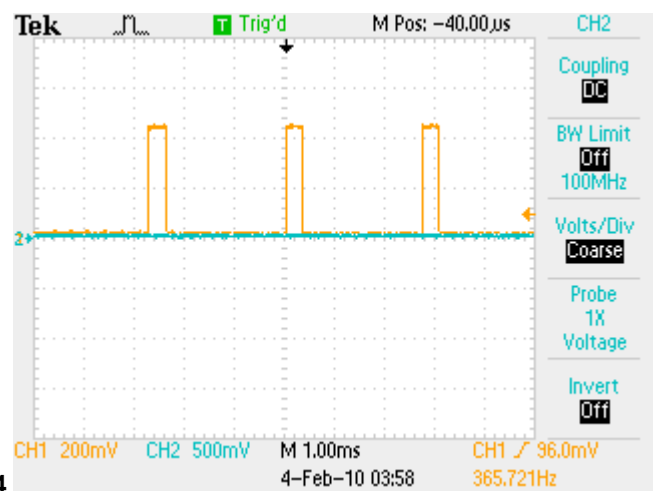
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- 6.1.86** Connect U21 pins 5 through 12 to (-) common.
- 6.1.87** Disconnect U21 pin 5 from (-) common and connect U21 pin 5 to +5 VDC red power connector on the DS3800 Test Box.
- 6.1.88** Adjust Potentiometer R155 so Multimeter to reads -0.4 VDC +/- .025 VDC. Apply Torque Seal to Pot R155 when complete.
- 6.1.89** Disconnect U21 pin 12 from (-) common and connect to +5 VDC red power connector on the DS3800 Test Box. Multimeter should read -0.34 VDC +/- .07 VDC.
- 6.1.90** Disconnect U21 pin 12 from + 5 VDC red power connector on the DS3800 Test Box and reconnect to (-) common.
- 6.1.91** Disconnect U21 pin 11 from (-) common and connect to +5 VDC red power connector on the DS3800 Test Box. Multimeter should read -0.28 VDC +/- .075 VDC.
- 6.1.92** Disconnect U21 pin 11 from +5 VDC red power connector on the DS3800 Test Box and reconnect to (-) common.
- 6.1.93** Disconnect U21 pin 10 from (-) common and connect to +5 VDC red power connector on the DS3800 Test Box. Multimeter should read -0.15 VDC +/- .08 VDC.
- 6.1.94** Disconnect U21 pin 10 from +5 VDC red power connector on the DS3800 Test Box and reconnect to (-) common.
- 6.1.95** Disconnect U21 pin 9 from (-) common and connect to +5 VDC red power connector on the DS3800 Test Box. Multimeter should read +0.1 VDC +/- .12 VDC.
- 6.1.96** Disconnect U21 pin 9 from +5 VDC red power connector on the DS3800 Test Box and reconnect to (-) common.
- 6.1.97** Disconnect U21 pin 8 from (-) common and connect to +5 VDC red power connector on the DS3800 Test Box. Multimeter should read +0.6 VDC +/- .17 VDC.
- 6.1.98** Disconnect U21 pin 8 from +5 VDC red power connector on the DS3800 Test Box and reconnect to (-) common.
- 6.1.99** Disconnect U21 pin 7 from (-) common and connect to +5 VDC red power connector on the DS3800 Test Box. Multimeter should read +1.6 VDC +/- .27 VDC.
- 6.1.100** Disconnect U21 pin 7 from +5 VDC red power connector on the DS3800 Test Box and reconnect to (-) common.
- 6.1.101** Disconnect U21 pin 6 from (-) common and connect to +5 VDC red power connector on the DS3800 Test Box. Multimeter should read +3.6 VDC +/- .47 VDC.
- 6.1.102** Disconnect U21 pin 6 from +5 VDC red power connector on the DS3800 Test Box and reconnect to (-) common.

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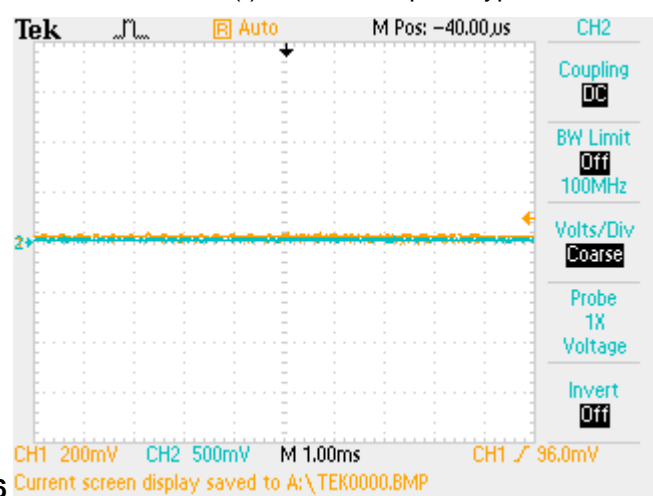
- 6.1.103** Disconnect U21 pin 5 from +5 VDC red power connector on DS3800 Test Box and connect to (-) common. Multimeter should read $-8.40 \pm .87$ VDC.
- 6.1.104** Disconnect PA-48 from (-) common.
- 6.1.105** Leave PA-24 connected to +8 VDC. Make sure the PLL light is still out.
- 6.1.106** Disconnect all pins of U21.
- 6.1.107** Connect U21 pin 5 to +5 VDC red power connector on the DS3800 Test Box.
- 6.1.108** Disconnect Multimeter positive lead from TP9 (COS) and connect to Diode CR13, located between U4 and U22, cathode. Should read less than .2 VDC.
- 6.1.109** Connect 1st channel of O-Scope to left side of resistor R34, located between U1 and U65, should display logic high.
- 6.1.110** Connect PA-16 to PA-24 (+ 8 VDC). The O-Scope should display logic low and Multimeter should read approximately +8 VDC as long as this connection is made.
- 6.1.111** Disconnect PA-16 from PA-24 and connect to (-) common. O-Scope should display logic high and Multimeter should read approximately 0 VDC.
- 6.1.112** Connect PA-6 to +5 VDC red connector on DS3800 Test Box. O-Scope should display logic high and Multimeter should read -5 VDC.
- 6.1.113** Disconnect Multimeter from Diode CR13 cathode.
- 6.1.114** Disconnect U21 pin 5 and remove chip clip.
- 6.1.115** Disconnect PA-6 from +5 VDC red connector on DS3800 Test Box.
- 6.1.116** Disconnect PA-16 and PA-48 from (-) common.
- 6.1.117** Connect PA-53, PA-76, and PB-36 to (-) common.
- 6.1.118** Disconnect 1st channel of O-Scope from resistor R34 and then connect to PB-40, should display logic high.
- 6.1.119** Momentarily connect PB-48 to (-) common. O-Scope display should toggle low as long as this connection is made.
- 6.1.120** Disconnect PB-48 from (-) common. O-Scope should display logic high.
- 6.1.121** Disconnect PA-76, PB-48, and PB-36 from (-) common.
- 6.1.122** Disconnect 1st channel of O-Scope from PB-40 and connect to PA-70. Set O-Scope for 2 V/Div and 1 mSec/Div, should display logic low.

6.1.123 Connect PA-76 to (-) common. Should see 3 square waves as follows:



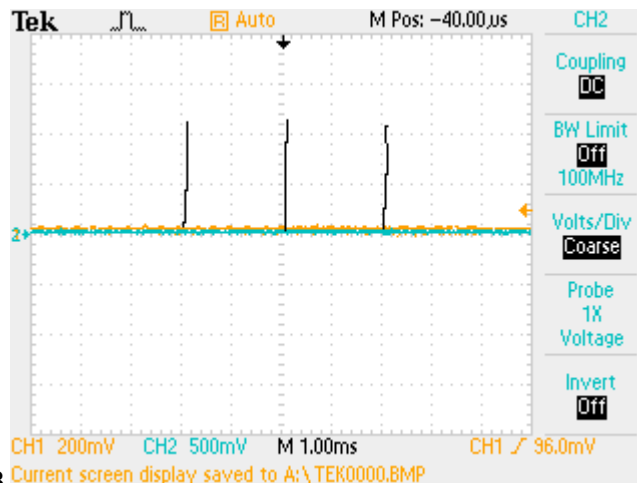
6.1.124

6.1.125 Connect PB-36 to (-) common. Square type waves should disappear as follows:



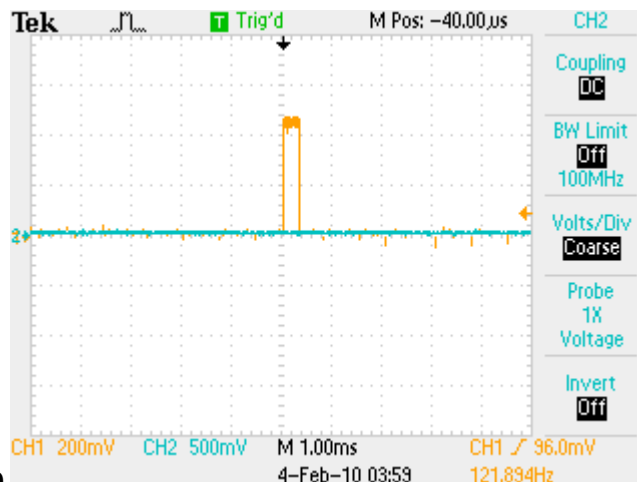
6.1.126 Current screen display saved to A:\TEK0000.BMP

6.1.127 Connect PB-48 to (-) common. Should see 3 spikes as follows:



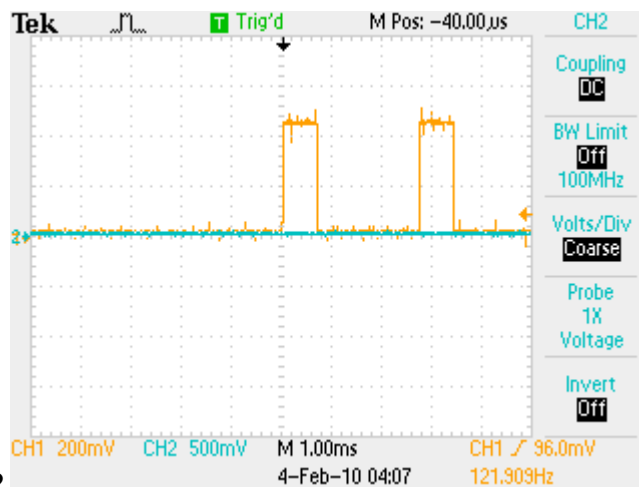
6.1.128 Current screen display saved to A:\TEK0000.BMP

6.1.129 Disconnect PB-36 from (-) common. Should see 1 square wave as follows:



6.1.130

6.1.131 Disconnect 1st channel of O-Scope from PA-70 and connect to PA-74. Should display 2 square waves as follows:



6.1.132

6.1.133 Disconnect PB-48, PA-53, and PA-76. Square type waves should disappear.

6.1.134 Disconnect 1st channel of O-Scope from PA-74.

6.1.135 Connect PA-18 to (-) common. Make sure the PLL light is out.

6.1.136 Connect Multimeter negative lead to (-) common.

6.1.137 Connect Multimeter positive lead to PA-12, should read 0 VDC +/- .05 VDC.

6.1.138 Disconnect PA-18 from (-) common.

6.1.139 Apply +1.0 VDC +/- .1 VDC to PA-18, meter should read -1.0 +/- .09 VDC.

6.1.140 Disconnect PA-18.

6.1.141 Apply -1.0 VDC +/- .1 VDC to PA-14, meter should read +1.0 +/- .09 VDC.

6.1.142 Disconnect PA-14.

6.1.143 Disconnect Multimeter positive lead from PA-12.

6.1.144 Connect PA11 and PA13 to +5 VDC through 4.7 K Ohm pull-up resistors, each line should have it's own pull-up resistor.

6.1.145 Connect PA-10 to +5 VDC.

6.1.146 Connect PA-19 to +8 VDC.

6.1.147 Connect PA-18 to adjustable power supply. Set power supply output to + 13.5 VDC, IMOK light should go out.

6.1.148 Connect Multimeter positive lead to PA-20, should read more than +13.7 VDC.


6.1.149 Connect 1st channel of O-Scope to PA-13, should display logic low.

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- 6.1.150** Adjust Potentiometer R49 on daughter card counter clockwise to 13.2 VDC as read on Multimeter, 1st channel of O-Scope should display logic high.
- 6.1.151** Adjust Potentiometer R49 on daughter card fully clockwise. Multimeter should read more than +13.7 VDC and 1st channel of O-Scope should display logic low.
- 6.1.152** Set power supply output connected PA-18 to + 0 VDC, IMOK light should come back on.
- 6.1.153** Disconnect 1st channel of O-Scope from PA-13 and connect to PA-11, should display logic low.
- 6.1.154** Disconnect Multimeter positive lead from PA-20 and connect to PA-18.
- 6.1.155** Adjust Potentiometer R85 clockwise until PLL and 0V lights come on, and then adjust counter clockwise 1 full turn and PLL and 0 V lights should go out.
- 6.1.156** Make sure that the adjustable power supply connected to PA-18 is set power supply output to 0 VDC as read on Multimeter. Tolerance for input voltage on PA-18 is -/+ .01 VDC.
- 6.1.157** Connect PA-53 to (-) common.
- 6.1.158** Connect 2nd channel of O-Scope to PA-67.
- 6.1.159** Adjust PA-18 input voltage to .05 VDC -/+ .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.160** Adjust PA-18 input voltage to .25 VDC -/+ .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.161** Adjust PA-18 input voltage to 1.5 VDC -/+ .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.162** Adjust PA-18 input voltage to 2.6 VDC -/+ .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.163** Adjust PA-18 input voltage to 4.0 VDC -/+ .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.164** Adjust PA-18 input voltage to 5.3 VDC -/+ .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.165** Adjust PA-18 input voltage to 5.8 VDC -/+ .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.166** Adjust PA-18 input voltage to 14.0 VDC -/+ .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.167** Disconnect PA-53 from (-) common and connect to +5 VDC, 2nd channel of O-Scope should display logic low.

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- 6.1.168** Disconnect PA-53 from +5 VDC and reconnect to (-) common, 2nd channel of O-Scope should display logic high.
- 6.1.169** Connect 1st channel of O-Scope to left side of resistor R57 (U4 pin 14 output).
- 6.1.170** Adjust PA-18 input voltage to .05 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.171** Adjust PA-18 input voltage to .25 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.172** Adjust PA-18 input voltage to 1.5 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.173** Adjust PA-18 input voltage to 2.6 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.174** Adjust PA-18 input voltage to 4.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.175** Adjust PA-18 input voltage to 5.3 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.176** Adjust PA-18 input voltage to 5.8 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.177** Adjust PA-18 input voltage to 14.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.178** Disconnect PA-53 from (-) common and connect to +5 VDC, 2nd channel of O-Scope should display logic low.
- 6.1.179** Disconnect PA-53 from +5 VDC, and connect to (-) common, 2nd channel of O-Scope should display logic high.
- 6.1.180** Connect 1st channel of O-Scope to PA-40.
- 6.1.181** Adjust PA-18 input voltage to .05 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.182** Adjust PA-18 input voltage to .25 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.183** Adjust PA-18 input voltage to 1.5 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.184** Adjust PA-18 input voltage to 2.6 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.185** Adjust PA-18 input voltage to 4.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.

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- 6.1.186** Adjust PA-18 input voltage to 5.3 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.187** Adjust PA-18 input voltage to 5.8 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.188** Adjust PA-18 input voltage to 14.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.189** Disconnect PA-53 from (-) common and connect to +5 VDC, 2nd channel of O-Scope should display logic low.
- 6.1.190** Disconnect PA-53 from +5 VDC, and connect to (-) common, 2nd channel of O-Scope should display logic high.
- 6.1.191** Connect 1st channel of O-Scope to PA-13.
- 6.1.192** Adjust PA-18 input voltage to .05 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.193** Adjust PA-18 input voltage to .25 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.194** Adjust PA-18 input voltage to 1.5 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.195** Adjust PA-18 input voltage to 2.6 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.196** Adjust PA-18 input voltage to 4.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.197** Adjust PA-18 input voltage to 5.3 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.198** Adjust PA-18 input voltage to 5.8 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.199** Adjust PA-18 input voltage to 14.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.200** Disconnect PA-53 from (-) common and connect to +5 VDC, 2nd channel of O-Scope should display logic low.
- 6.1.201** Disconnect PA-53 from +5 VDC, and connect to (-) common, 2nd channel of O-Scope should display logic high.
- 6.1.202** Connect 1st channel of O-Scope to PA-27.
- 6.1.203** Adjust PA-18 input voltage to .05 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.

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- 6.1.204** Adjust PA-18 input voltage to .25 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.205** Adjust PA-18 input voltage to 1.5 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.206** Adjust PA-18 input voltage to 2.6 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.207** Adjust PA-18 input voltage to 4.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.208** Adjust PA-18 input voltage to 5.3 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.209** Adjust PA-18 input voltage to 5.8 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.210** Adjust PA-18 input voltage to 14.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.211** Disconnect PA-53 from (-) common and connect to +5 VDC, 2nd channel of O-Scope should display logic low.
- 6.1.212** Disconnect PA-53 from +5 VDC, and connect to (-) common, 2nd channel of O-Scope should display logic high.
- 6.1.213** Connect 1st channel of O-Scope to left side of resistor R97, located near U52.
- 6.1.214** Adjust PA-18 input voltage to .05 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.215** Adjust PA-18 input voltage to .25 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.216** Adjust PA-18 input voltage to 1.5 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.217** Adjust PA-18 input voltage to 2.6 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.218** Adjust PA-18 input voltage to 4.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.219** Adjust PA-18 input voltage to 5.3 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.220** Adjust PA-18 input voltage to 5.8 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.

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- 6.1.221** Adjust PA-18 input voltage to 14.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.222** Disconnect PA-53 from (-) common and connect to +5 VDC, 2nd channel of O-Scope should display logic low.
- 6.1.223** Disconnect PA-53 from +5 VDC, and connect to (-) common, 2nd channel of O-Scope should display logic high.
- 6.1.224** Connect 1st channel of O-Scope to PA-22.
- 6.1.225** Adjust PA-18 input voltage to .05 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.226** Adjust PA-18 input voltage to .25 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.227** Adjust PA-18 input voltage to 1.5 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.228** Adjust PA-18 input voltage to 2.6 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.229** Adjust PA-18 input voltage to 4.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.230** Adjust PA-18 input voltage to 5.3 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.231** Adjust PA-18 input voltage to 5.8 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.232** Adjust PA-18 input voltage to 14.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.233** Disconnect PA-53 from (-) common and connect to +5 VDC, 2nd channel of O-Scope should display logic low.
- 6.1.234** Disconnect PA-53 from +5 VDC, and connect to (-) common, 2nd channel of O-Scope should display logic high.
- 6.1.235** Connect 1st channel of O-Scope to PA-66.
- 6.1.236** Adjust PA-18 input voltage to .05 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.237** Adjust PA-18 input voltage to .25 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.238** Adjust PA-18 input voltage to 1.5 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.

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- 6.1.239** Adjust PA-18 input voltage to 2.6 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.240** Adjust PA-18 input voltage to 4.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.241** Adjust PA-18 input voltage to 5.3 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.242** Adjust PA-18 input voltage to 5.8 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.243** Adjust PA-18 input voltage to 14.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.244** Disconnect PA-53 from (-) common and connect to +5 VDC, 2nd channel of O-Scope should display logic low.
- 6.1.245** Disconnect PA-53 from +5 VDC, and connect to (-) common, 2nd channel of O-Scope should display logic high.
- 6.1.246** Connect 1st channel of O-Scope to PA-65.
- 6.1.247** Adjust PA-18 input voltage to .05 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.248** Adjust PA-18 input voltage to .25 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.249** Adjust PA-18 input voltage to 1.5 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.250** Adjust PA-18 input voltage to 2.6 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.251** Adjust PA-18 input voltage to 4.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.252** Adjust PA-18 input voltage to 5.3 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.253** Adjust PA-18 input voltage to 5.8 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.254** Adjust PA-18 input voltage to 14.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.255** Disconnect PA-53 from (-) common and connect to +5 VDC, 2nd channel of O-Scope should display logic low.

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- 6.1.256** Disconnect PA-53 from +5 VDC, and connect to (-) common, 2nd channel of O-Scope should display logic high.
- 6.1.257** Disconnect 2nd channel of O-Scope from PA-67.
- 6.1.258** Connect 1st channel of O-Scope to PA-67.
- 6.1.259** Adjust PA-18 input voltage to .05 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.260** Adjust PA-18 input voltage to .25 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.261** Adjust PA-18 input voltage to 1.5 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.262** Adjust PA-18 input voltage to 2.6 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.263** Adjust PA-18 input voltage to 4.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.264** Adjust PA-18 input voltage to 5.3 VDC +/- .01 VDC. 1st channel of O-Scope should display logic low.
- 6.1.265** Adjust PA-18 input voltage to 5.8 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.266** Adjust PA-18 input voltage to 14.0 VDC +/- .01 VDC. 1st channel of O-Scope should display logic high.
- 6.1.267** Disconnect PA-53 from (-) common and connect to +5 VDC, 2nd channel of O-Scope should display logic low.
- 6.1.268** Disconnect PA-53 from +5 VDC, and connect to (-) common, 2nd channel of O-Scope should display logic high.
- 6.1.269** Disconnect PA-53, PA-67, PA-18, PA-10, PA-19, PA11, and PA-13.
- 6.1.270** Connect JA-29 to JA-32, and then connect these points to +5 VDC +/- .1 VDC.
- 6.1.271** Connect Multimeter positive lead to right side of resistor R192, located near U3, should read 0 VDC +/- .03 VDC.
- 6.1.272** Connect Multimeter positive lead to PA-80, should read 0 VDC +/- .05 VDC.
- 6.1.273** Connect Multimeter positive lead to PA-64, should read more than + 4.8 VDC +/- .01 VDC.
- 6.1.274** Disconnect +5 VDC from JA-29 and JA-32.
- 6.1.275** Disconnect JA-29 from JA-32.
- 6.1.276** Connect JA-32 to (-) common.

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- 6.1.277** Connect JA-29 to positive of adjustable power supply set to 0 VDC.
- 6.1.278** Connect negative side of same adjustable power supply to TP17 (ACOM).
- 6.1.279** Apply + .35 VDC \pm .002 VDC to JA-29.
- 6.1.280** Connect Multimeter positive lead to PA-80, should read + .231 VDC \pm .05 VDC.
- 6.1.281** Connect Multimeter positive lead to right side of resistor R192, located near U3, should read - .158 VDC \pm .015 VDC.
- 6.1.282** Connect positive Multimeter lead to PA-64, should read more than + 4.8 VDC \pm .1 VDC.
- 6.1.283** Apply - .35 VDC \pm .002 VDC to JA-29.
- 6.1.284** Connect Multimeter positive lead to PA-80, should read - .231 VDC \pm .05 VDC.
- 6.1.285** Adjust Potentiometer R168 until output on PA-80 is -.231 VDC.
- 6.1.286** Connect Multimeter positive lead to right side of resistor R192, located near U3, should read + .158 VDC \pm .015 VDC.
- 6.1.287** Connect positive Multimeter lead to PA-64, should read more than + 4.8 VDC \pm .1 VDC.
- 6.1.288** Apply + 4.4 VDC \pm .002 VDC to JA-29.
- 6.1.289** Connect Multimeter positive lead to PA-80, should read + 2.92 VDC \pm .05 VDC.
- 6.1.290** Connect Multimeter positive lead to right side of resistor R192, located near U3, should read – 2.92 VDC \pm .015 VDC.
- 6.1.291** Connect positive Multimeter lead to PA-64, should read more than + 4.8 VDC \pm .1 VDC.
- 6.1.292** Apply – 4.4 VDC \pm .002 VDC to JA-29.
- 6.1.293** Connect Multimeter positive lead to PA-80, should read –2.92 VDC \pm .05 VDC.
- 6.1.294** Connect Multimeter positive lead to right side of resistor R192, located near U3, should read + 1.99 VDC \pm .015 VDC.
- 6.1.295** Connect positive Multimeter lead to PA-64, should read more than + 4.8 VDC \pm .1 VDC.
- 6.1.296** Apply + 15.5 VDC \pm .002 VDC to JA-29, 0 V (CR50) light should come on.
- 6.1.297** Connect Multimeter positive lead to PA-80, should read + 10.3 VDC \pm .1 VDC.
- 6.1.298** Connect Multimeter positive lead to right side of resistor R192, located near U3, should read – 7.01 VDC \pm .015 VDC.
- 6.1.299** Connect positive Multimeter lead to PA-64, should read - .43 \pm .1 VDC.
- 6.1.300** Apply - 15.5 VDC \pm .002 VDC to JA-29. 0 V (CR50) light should come on.
- 6.1.301** Connect Multimeter positive lead to PA-80, should read - 10.3 VDC \pm .1 VDC.

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- 6.1.302** Connect Multimeter positive lead to right side of resistor R192, located near U3, should read + 7.01 VDC +/- .015 VDC.
- 6.1.303** Connect positive Multimeter lead to PA-64, should read - .43 +/- .1 VDC.
- 6.1.304** Disconnect JA-29, JA-32, and Multimeter positive lead from right side of R192, located near U3. 0 V (CR50) light should go out.
- 6.1.305** Connect PA-76 to (-) common.
- 6.1.306** Connect PA-18 to positive of adjustable power supply set for 0 VDC.
- 6.1.307** Connect 1st channel of O-Scope to PB-54, should display logic high.
- 6.1.308** Momentarily push switch SW1 to the left, O-Scope should display logic low as long as switch is pushed to the left. When switch is released O-Scope should return to logic high.
- 6.1.309** Connect PB-57 to (-) common, O-Scope should display logic low.
- 6.1.310** Apply + 1 VDC to PA-18, O-Scope should display logic high.
- 6.1.311** Apply 0 VDC to PA-18, O-Scope should display logic low.
- 6.1.312** Connect left side of resistor R52, located between U32 and U27, and PB-57 to + 5 VDC.
- 6.1.313** SUP (CR4) light should be on.
- 6.1.314** Use 2nd channel of O-Scope to check logic levels on PB63 (should display logic low), PB68 (should display logic high), and PB-54 (should display logic high).
- 6.1.315** Disconnect left side of resistor R52 from + 5 VDC and connect left side of resistor R52, located between U32 and U27, to (-) common.
- 6.1.316** Use 2nd channel of O-Scope to check logic levels on PB63 (should display logic low), PB68 (should display logic high), and PB-54 (should display logic high).
- 6.1.317** Connect PA-76 to + 5 VDC.
- 6.1.318** SUP (CR4) light should be off.
- 6.1.319** Use 2nd channel of O-Scope to check logic levels on PB63 (should display logic high), PB68 (should display logic low), and PB-54 (should display logic low).
- 6.1.320** Connect 2nd channel of O-Scope to PB-66, should display logic high.
- 6.1.321** Push switch SW2 (TUNSU) to the left, O-Scope should display logic low as long as switch is pushed to the left.
- 6.1.322** Release switch SW2, O-Scope should display logic high.
- 6.1.323** Disconnect 2nd channel of O-Scope from PB-66.
- 6.1.324** Disconnect PA-76, PB-57, PA-18, and left side of resistor R52.
- 6.1.325** SUP (CR4) light should come on.
- 6.1.326** Connect JA-29 to (-) common.
- 6.1.327** Connect Function Generator to JA-29 and JA-32, set output to .7 Vrms at 60 Hz.

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6.1.328 Connect Multimeter positive lead, set for AC Volts, to right side of resistor R192, should read .317 Vrms +/- .009 Vrms.

6.1.329 Connect Multimeter positive lead to PA-80, should read .465 Vrms +/- .02 Vrms.

6.1.330 Connect Multimeter positive lead, set for DC Volts, to PA-64, should read + 5 VDC +/- .1 VDC.

6.1.331 Disconnect Multimeter positive lead, JA29 and JA32.

6.1.332 Disconnect all connections made during tests.

6.2 Integrated Systems Tests

6.2.1 Connect +5 VDC to red connector on DS3800 Test Box.

6.2.2 Connect +5 VDC return to black power connector on DS3800 Test Box. For the remainder of this testing process, "black power connector on DS3800 Test Box" will be referred to as **(-) common**.

6.2.3 Connect +15 VDC to yellow power connector on DS3800 Test Box.

6.2.4 Connect +15 VDC return to black power connector on DS3800 Test Box.

6.2.5 Connect -15 VDC to green power connector on DS3800 Test Box.

6.2.6 Connect -15 VDC return to black power connector on DS3800 Test Box.

6.2.7 Connect 1st Rainbow Box to PBA connector on DS3800 Test Box.

6.2.8 Connect 2nd Rainbow Box to PBB connector on DS3800 Test Box.

6.2.9 Attach DS3800DFCA Daughter Card.

6.2.10 Adjust R85, R168, and R46 on the DS3800DFCA Daughter Card fully counterclockwise.

6.2.11 Adjust R49 on the DS3800DFCA Daughter Card Clockwise.

6.2.12 Adjust R155 on the DS3800NFCE Card fully clockwise.

6.2.13 Attach 6 12K Ohm 2 Watt resistors to the standoffs at the top of the Rainbow Box.

6.2.14 Connect pin 81 of Rainbow Box to the black post of first 12K Ohm resistor.

6.2.15 Connect pin 82 of Rainbow Box to the black post of second 12K Ohm resistor.

6.2.16 Connect pin 83 of Rainbow Box to the black post of third 12K Ohm resistor.

6.2.17 Connect pin 84 of Rainbow Box to the black post of fourth 12K Ohm resistor.

6.2.18 Connect pin 85 of Rainbow Box to the black post of fifth 12K Ohm resistor.

6.2.19 Connect pin 86 of Rainbow Box to the black post of sixth 12K Ohm resistor.

6.2.20 Connect all 6 red posts of the 12K Ohm resistors together in parallel.

6.2.21 Connect +28 VDC to the orange power connector on the DS3800 Test Box.

6.2.22 Connect +28 VDC to the red post of all 12K Ohm resistors.

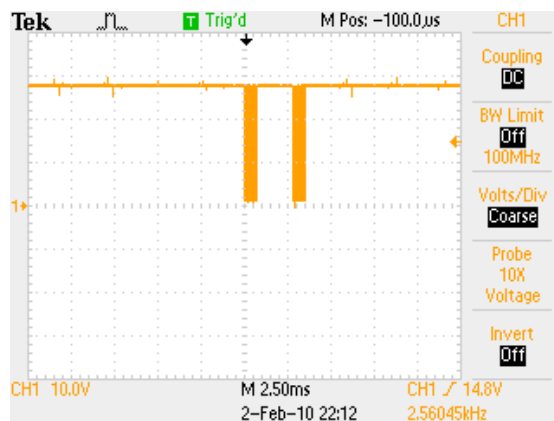
6.2.23 Connect 28 VDC return to the black power connector on the DS3800 Test Box.

6.2.24 Jumper PB-4 to PB-8 and jumper PB-6 to PB-10.

- 6.2.25** Make sure PA-48 is disconnected.
- 6.2.26** Connect PA-18 to ACOM reference point on UUT.
- 6.2.27** Connect PA-16 to + 5 VDC.
- 6.2.28** Connect PA-76, PB-48, PB-58, PB-80, and PB-36 to (-) common.
- 6.2.29** Connect O-Scope to PA-81 and set for 10 V/div at 2.5 mSec/div.
- 6.2.30** Apply 2 VRMS @ 60 Hz to PB-8 and PB-10 from the Function Generator.
- 6.2.31** Apply power to unit, watching lights as unit powers up. IMOK and PLL lights should come on, and PLL light should go out after approximately 1 second.
- 6.2.32** Using 1st channel of O-Scope connected to each of these connections, PA-81, PA-82, PA-83, PA-84, PA-85, PA86, should display an approximately +28 VDC signal as follows:

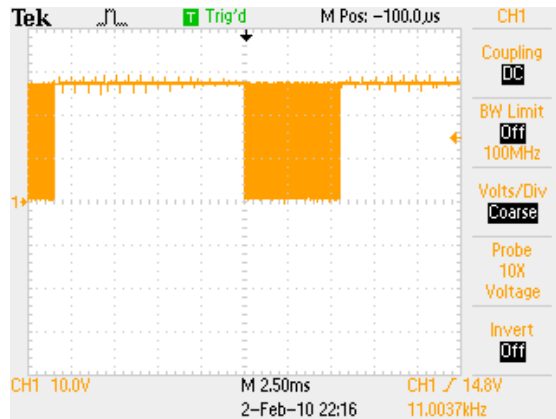


- 6.2.33**
- 6.2.34** Connect PB-78 to (-) common.
- 6.2.35** Using O-Scope connected to each of these connections, PA-81, PA-82, PA-83, PA-84, PA-85, PA86, should display the following waveform:



- 6.2.36**
- 6.2.37** Connect PB-62 to (-) common.

6.2.38 Using O-Scope connected to each of these connections, PA-81, PA-82, PA-83, PA-84, PA-85, PA86, should display the following waveform:



6.2.39

6.2.40 Disconnect PB-62.

6.2.41 Connect PA-18 to +5 VDC.

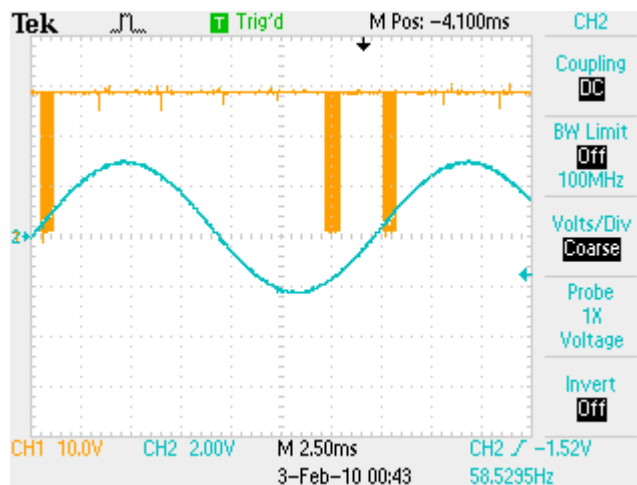
6.2.42 Connect positive lead of adjustable DC power supply, set for 0 VDC, to PA-16.

6.2.43 Connect negative lead of same adjustable power supply to ACOM reference point on UUT.

6.2.44 Connect 1st channel of O-Scope to PA-81. Set 1st channel of O-Scope to 10 V/div, and 2nd channel to 2 V/div, and 2.5 mSec/div.

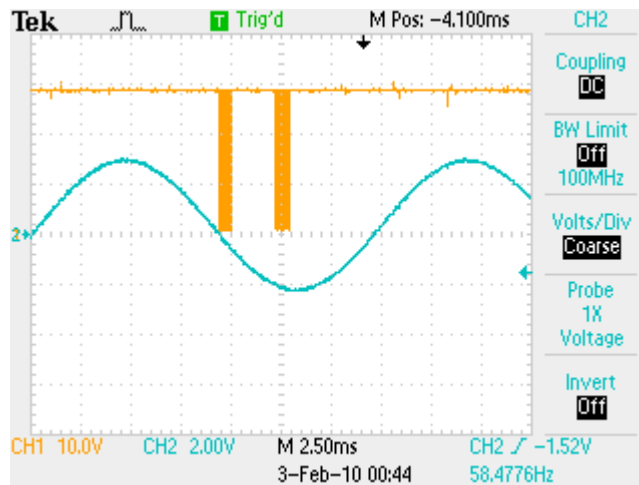
6.2.45 Connect 2nd channel of O-Scope to output of Function Generator, which should still be set for 2 Vrms at 60 Hz.

6.2.46 O-Scope should display the following:



6.2.47

- 6.2.48** Adjust power supply connected to PA-16 to + 8 VDC, O-Scope should display the following (note pulse position has shifted 90 degrees):



6.2.49

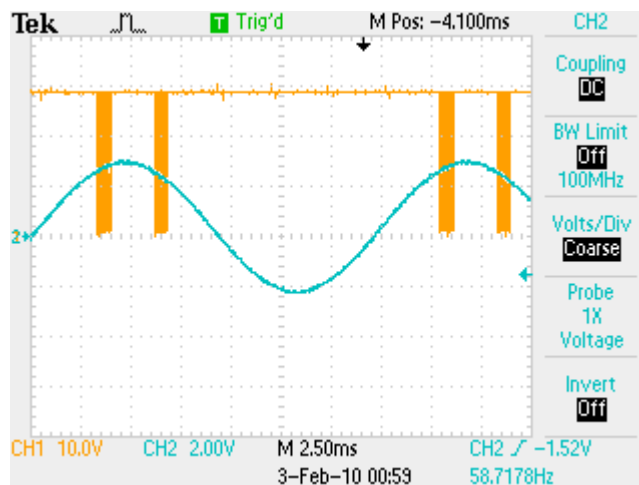
- 6.2.50** Adjust power supply connected to PA-16 to 0 VDC, O-Scope should display as in step **6.2.48** (note pulse position has shifted back 90 degrees).

- 6.2.51** Reverse polarity on adjustable power supply, set to 0 VDC.

- 6.2.52** Adjust power supply connected to PA-16 to - 8 VDC, O-Scope should display as in **6.2.50** (note pulse position has shifted 90 degrees).

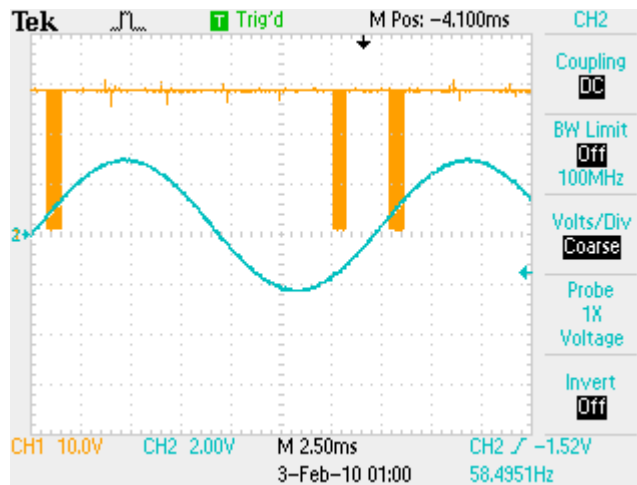
- 6.2.53** Reverse polarity on adjustable power supply back to original, set to 0 VDC.

- 6.2.54** Connect 1st channel of O-Scope to PA-82, O-Scope should display the following:



6.2.55

- 6.2.56** Adjust power supply connected to PA-16 to + 8 VDC, O-Scope should display the following (note pulse position has shifted 90 degrees):



6.2.57

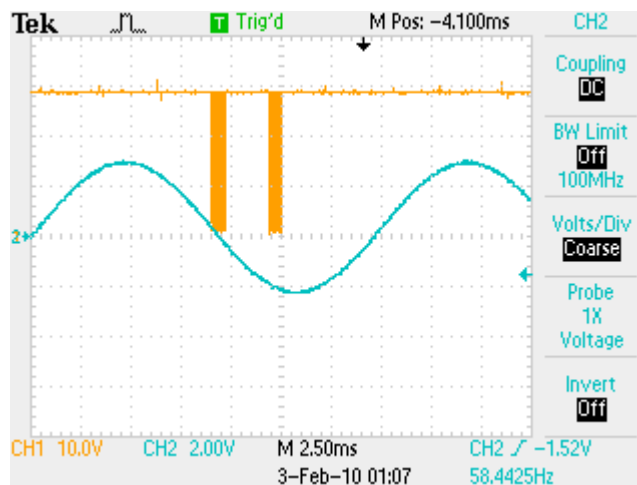
- 6.2.58** Adjust power supply connected to PA-16 to 0 VDC, O-Scope should display as in step **6.2.56** (note pulse position has shifted back 90 degrees).

- 6.2.59** Reverse polarity on adjustable power supply, set to 0 VDC.

- 6.2.60** Adjust power supply connected to PA-16 to - 8 VDC, O-Scope should display as in **6.2.58** (note pulse position has shifted 90 degrees).

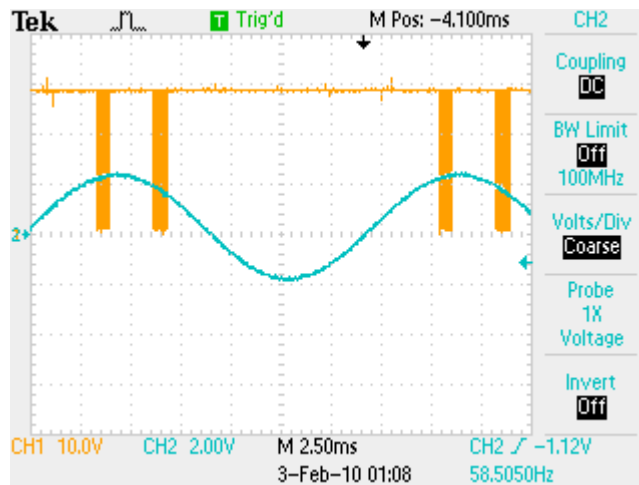
- 6.2.61** Reverse polarity on adjustable power supply back to original, set to 0 VDC.

- 6.2.62** Connect 1st channel of O-Scope to PA-83, O-Scope should display the following:



6.2.63

- 6.2.64** Adjust power supply connected to PA-16 to + 8 VDC, O-Scope should display the following (note pulse position has shifted 90 degrees):



6.2.65

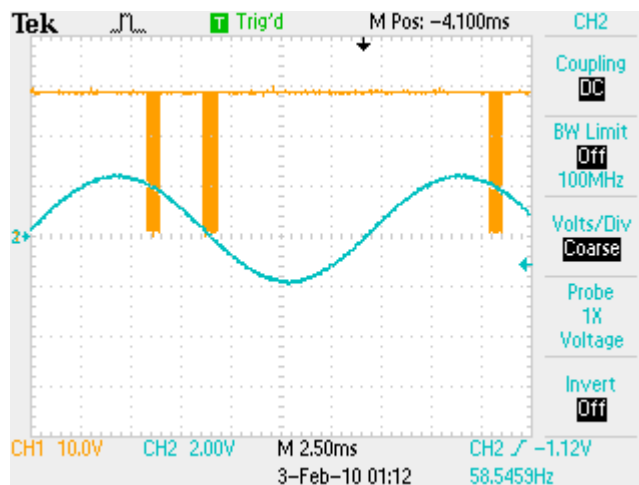
- 6.2.66** Adjust power supply connected to PA-16 to 0 VDC, O-Scope should display as in step **6.2.64** (note pulse position has shifted back 90 degrees).

- 6.2.67** Reverse polarity on adjustable power supply, set to 0 VDC.

- 6.2.68** Adjust power supply connected to PA-16 to - 8 VDC, O-Scope should display as in **6.2.66** (note pulse position has shifted 90 degrees).

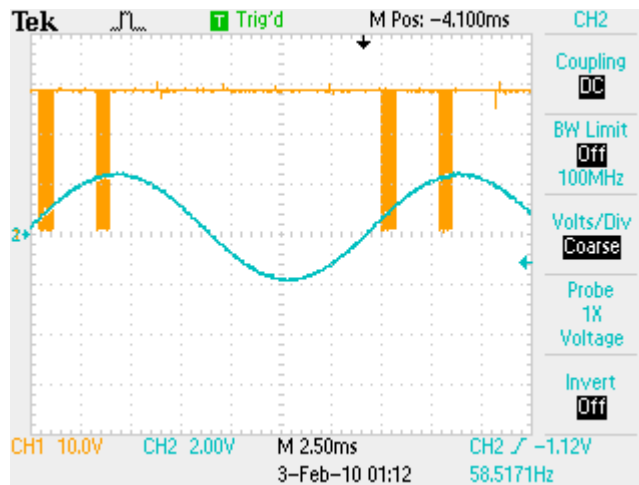
- 6.2.69** Reverse polarity on adjustable power supply back to original, set to 0 VDC.

- 6.2.70** Connect 1st channel of O-Scope to PA-84, O-Scope should display the following:



6.2.71

- 6.2.72** Adjust power supply connected to PA-16 to + 8 VDC, O-Scope should display the following (note pulse position has shifted 90 degrees):



6.2.73

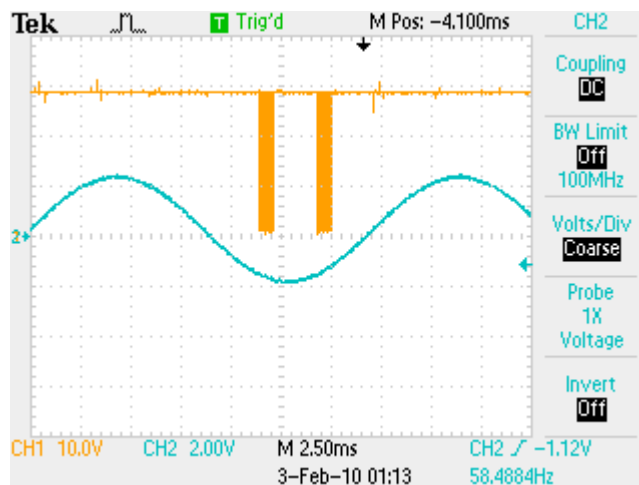
- 6.2.74** Adjust power supply connected to PA-16 to 0 VDC, O-Scope should display as in step **6.2.72** (note pulse position has shifted back 90 degrees).

- 6.2.75** Reverse polarity on adjustable power supply, set to 0 VDC.

- 6.2.76** Adjust power supply connected to PA-16 to - 8 VDC, O-Scope should display as in **6.2.74** (note pulse position has shifted 90 degrees).

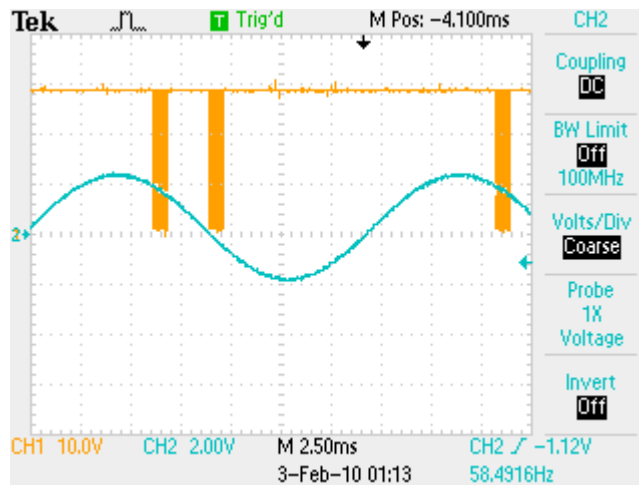
- 6.2.77** Reverse polarity on adjustable power supply back to original, set to 0 VDC.

- 6.2.78** Connect 1st channel of O-Scope to PA-85, O-Scope should display the following:



6.2.79

- 6.2.80** Adjust power supply connected to PA-16 to + 8 VDC, O-Scope should display the following (note pulse position has shifted 90 degrees):



6.2.81

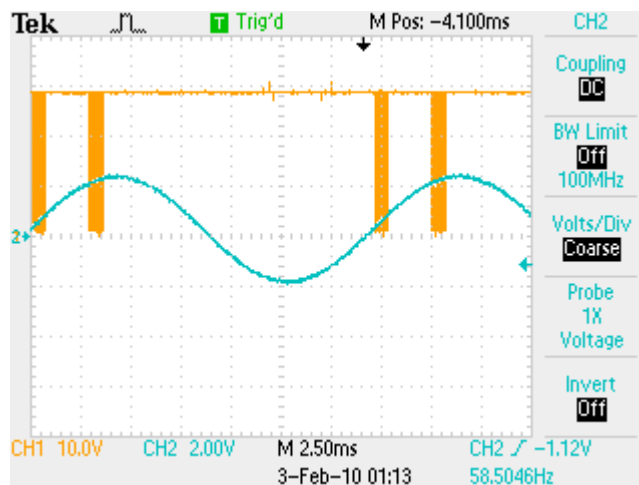
- 6.2.82** Adjust power supply connected to PA-16 to 0 VDC, O-Scope should display as in step **6.2.80** (note pulse position has shifted back 90 degrees).

- 6.2.83** Reverse polarity on adjustable power supply, set to 0 VDC.

- 6.2.84** Adjust power supply connected to PA-16 to - 8 VDC, O-Scope should display as in **6.2.82** (note pulse position has shifted 90 degrees).

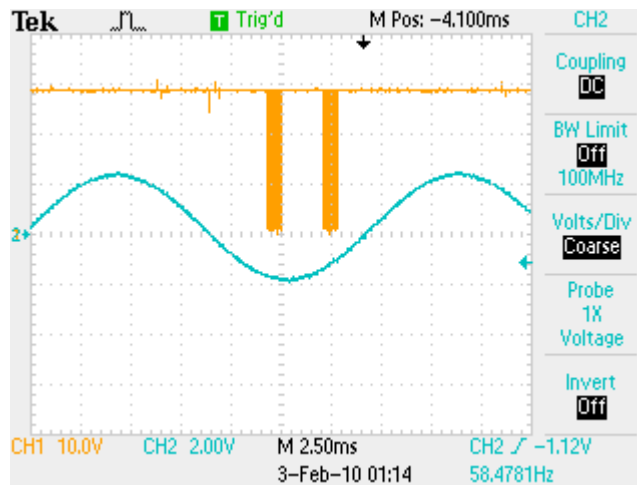
- 6.2.85** Reverse polarity on adjustable power supply back to original, set to 0 VDC.

- 6.2.86** Connect 1st channel of O-Scope to PA-86, O-Scope should display the following:



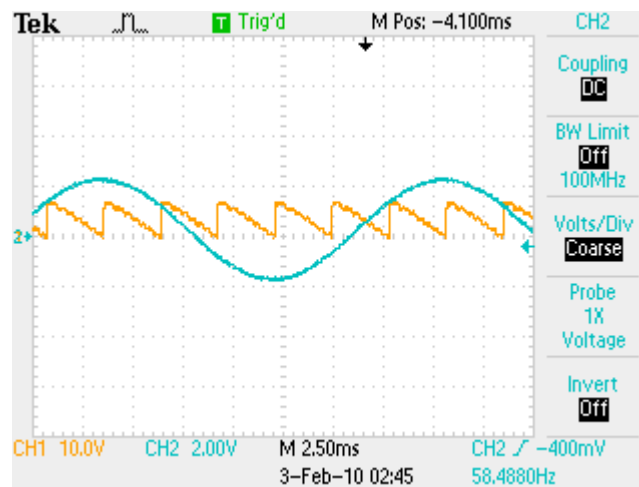
6.2.87

- 6.2.88** Adjust power supply connected to PA-16 to + 8 VDC, O-Scope should display the following (note pulse position has shifted 90 degrees):



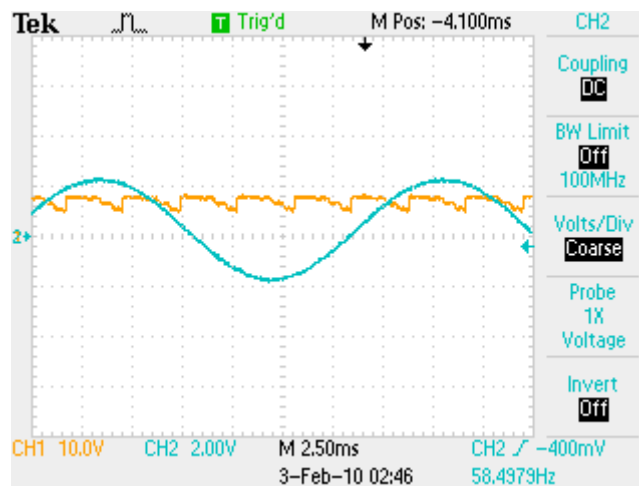
- 6.2.89**
- 6.2.90** Adjust power supply connected to PA-16 to 0 VDC, O-Scope should display as in step **6.2.88** (note pulse position has shifted back 90 degrees).
- 6.2.91** Reverse polarity on adjustable power supply, set to 0 VDC.
- 6.2.92** Adjust power supply connected to PA-16 to - 8 VDC, O-Scope should display as in **6.2.90** (note pulse position has shifted 90 degrees).
- 6.2.93** Reverse polarity on adjustable power supply back to original, set to 0 VDC.
- 6.2.94** Disconnect 1st channel of O-Scope from PA-86 and connect to TP9 (COS) on UUT.
- 6.2.95** Connect + 8 VDC to PA-24.
- 6.2.96** Connect Multimeter positive lead to Anode (left) side of CR10, located between U4 and U22.
- 6.2.97** Connect Multimeter negative lead to (-) common (connection should already have been made previously in testing process).

- 6.2.98** Adjust power supply connected to PA-16 to 0 VDC, as measured on Multimeter, O-Scope should display the following wave form:



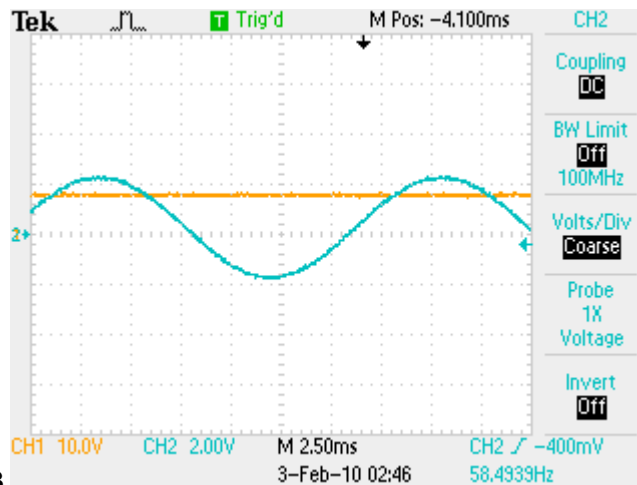
6.2.99

- 6.2.100** Adjust power supply connected to PA-16 to + 5 VDC, as measured on Multimeter, O-Scope should display the following wave form:



6.2.101

6.2.102 Adjust power supply connected to PA-16 to + 8.1 VDC, as measured on Multimeter, O-Scope should display the following wave form:



6.2.103

6.2.104 Adjust power supply connected to PA-16 to + 12 VDC, as measured on Multimeter, IMOK (CR49) light should go out at approximately + 11.5 VDC.

6.2.105 Adjust power supply connected to PA-16 to 0 VDC, as measured on Multimeter, IMOK (CR49) light should turn on at approximately + 11.5 VDC.

6.2.106 Adjust power supply connected to PA-16 to - 12 VDC, as measured on Multimeter, IMOK (CR49) light should go out at approximately - 11.5 VDC.

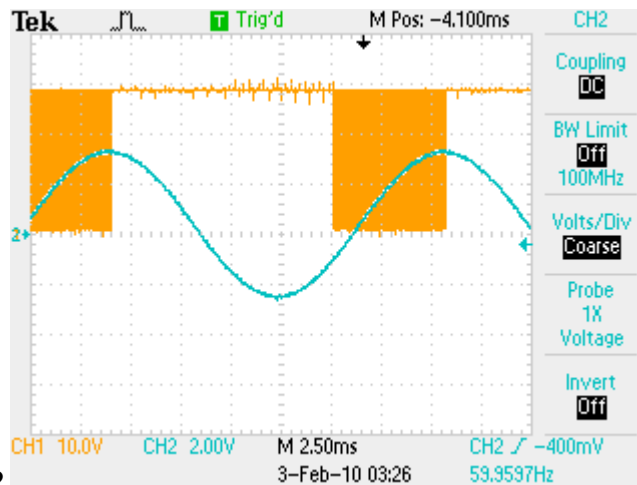
6.2.107 Adjust power supply connected to PA-16 to 0 VDC, as measured on Multimeter, IMOK (CR49) light should turn on at approximately - 11.5 VDC.

6.2.108 Disconnect 1st channel of O-Scope from TP9 (COS).

6.2.109 Disconnect Multimeter positive lead from Anode (left) side of CR10 and connect to PB-50. Should be reading less than + .8 VDC (logic low).

6.2.110 Connect PB-62 to (-) common.

6.2.111 Using 1st channel of O-Scope, check PA-81, PA-82, PA-83, PA-84, PA-85, and PA-86 to verify that each connection has the following wave form:

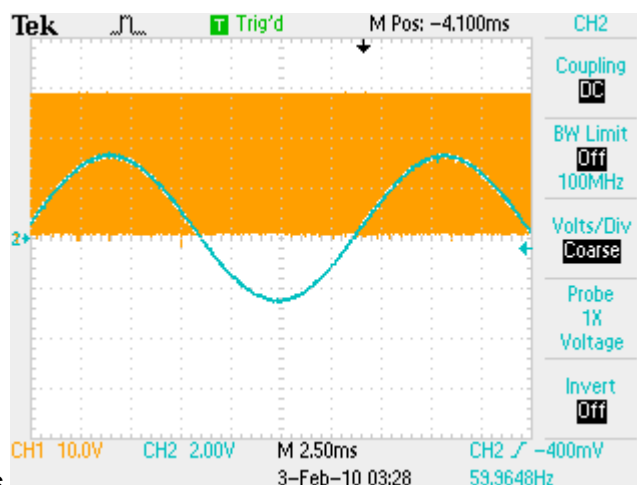


6.2.112

6.2.113 The next step in this procedure is to check that only one set of outputs will produce firing pulses, while the other 2 sets of outputs will be latched high and will not produce any firing pulses. The sets are arranged as follows; PA-81 and PA84, PA-82 and PA-85; PA-83 and PA-86. Example, if PA-82 is producing firing pulses, PA-85 should also produce firing pulses, while all others will not produce firing pulses and are latched high at + 28 VDC.

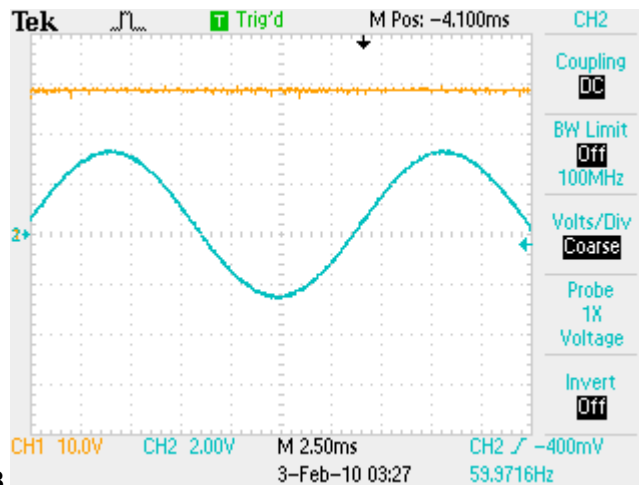
6.2.114 Disconnect PB-36.

6.2.115 Using 1st channel of O-Scope, check connections PA-81 through PA-86. 1 set of outputs (as described in step 6.2.114) will produce all firing pulses with the following wave form:



6.2.116

6.2.117 Using 1st channel of O-Scope, verify that the other two sets of outputs do not produce any firing pulses and are latched high with the following wave form:



6.2.118

6.2.119 Reconnect PB-36.

6.2.120 Using 1st channel of O-Scope verify that all outputs, PA-81 through PA-86, should now be producing firing pulses as shown in step **6.2.113**.

6.3 Continuity Tests

- 6.3.1** Remove all cable connections from both rainbow boxes and unplug JA Cable from JA plug on UUT.
- 6.3.2** Using Multimeter set for Ohm's, check for continuity between PA-55 and PA-57.
- 6.3.3** Using Multimeter set for Ohm's, check for continuity between PA-49, PB-49, JA-1, and JA-2.
- 6.3.4** Using Multimeter set for Ohm's, check for continuity between JA-30, JA-31, JA-33, TP12 (ACOM), PA-9, PB-9, and TP17 (ACOM).
- 6.3.5** Using Multimeter set for Ohm's, check for continuity between JA-3, JA-5, JA-7, JA-9, JA-11, JA-13, and JA-25.
- 6.3.6** Using Multimeter set for Ohm's, check for continuity between TP1 (CFB) and right side of resistor R301, located near TP17 (ACOM).
- 6.3.7** Using Multimeter set for Ohm's, check for continuity between TP8 (PIA) and PA-18.
- 6.3.8** Using Multimeter set for Ohm's, check for continuity between TP3 (TIA) and PA-14.
- 6.3.9** Using Multimeter set for Ohm's, check for continuity between TP2 (TREG) and PA-06.
- 6.3.10** Using Multimeter set for Ohm's, check for continuity between TP5 (CLP) and PA-10.
- 6.3.11** Using Multimeter set for Ohm's, check for continuity between TP13 (VFB) and PA-80.
- 6.3.12** Using Multimeter set for Ohm's, check for continuity between TP4 (SUP) and PA-20.

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- 6.3.13 Using Multimeter set for Ohm's, check for continuity between TP14 (INF) and PB-40.
- 6.3.14 Using Multimeter set for Ohm's, check for continuity between PA-50 and PA-60.
- 6.3.15 Using Multimeter set for Ohm's, check for continuity between PA-5 and PB-5.
- 6.3.16 Using Multimeter set for Ohm's, check for continuity between PA-7 and PB-7.
- 6.3.17 Using Multimeter set for Ohm's, check for continuity between PA1, PA43, PA-79, PB-1, PB-43, PB-79, TP18 (DCOM), and TP6 (DCOM).
- 6.3.18 Using Multimeter set for Ohm's, check for continuity between PA-3, PA-45, PA-77, PB3, PB-45, and PB77.
- 6.3.19 Using Multimeter set for Ohm's, check for continuity between TP10 (HVNY) and JA-29.
- 6.3.20 Using Multimeter set for Ohm's, check for continuity between TP15 (INL) and PB-59.
- 6.3.21 Using Multimeter set for Ohm's, check for continuity between TP16 (ZCD) and PB-70.
- 6.3.22 Remove UUT from DS3800NFCE Test Box.
- 6.3.23 Remove DS3800DFCA Daughter Card from UUT.

6.4 *******TEST COMPLETE*******

7. NOTES

7.1 None at this time?

8. ATTACHMENTS

8.1 None at this time?