g GE Energy	**Functional Testing Specification**
Parts & Repair Services *Louisville, KY*	**LOU-GED-DS200LRPBGxA**

Test Procedure for a DS200LRPB LAN RESOLVER

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	Jimmy Morgan	2-7-2018
B			
C			

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DATE 02/07/2018	DATE	DATE	DATE 2/8/2018

1. SCOPE

1.1 This is a functional testing procedure for a DS200LRPB Card.

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		LRPA Test Fixture
1		Dual trace Oscilloscope
1		0-120 VARIAC
1		Digital Multimeter
1		(roger) Test PC & RS232 Cable (serial 1 on pc)
1		UGENI Module (IC660ELB912)

6. Modifications/Upgrades

6.1 None

7. Testing Process

7.1 Setup

7.1.1

<mark>WARNING!!!</mark>

<mark>THE VOLTAGE AND CURRENT SOURCES APPLIED TO THIS BOARD EXCEED 100VAC. THEREFORE EVERY PRECAUTION SHOULD BE TAKEN TO PREVENT EITHER THE TEST OPERATOR OR PASSERBY FROM COMING IN CONTACT WITH THE ENERGISED PORTIONS OF THE CARD OR TEST EQUIPMENT BEING USED DURING THE TEST PROCEDURE.</mark>

NOTE: The DS200LRPB is used to gage rolling thickness, among other applications, accuracy is critical. Test limits absolute.

7.1.2   JUMPER SETTINGS

JUMPER	POSITION	LOC	JUMPER	POSITION	LOC	JUMPER	POSITION	LOC
JP58	1-2	[G2]	JP6	IN	[A8]	JP5	IN	[B8]
JP55	1-2	[G2]	JP7	IN	[A8]	JP3	IN	[C7]
JP68	1-2	[G6]	JP8	IN	[A8]	JP54	1-2	[E4]
JP65	1-2	[G7]	JP9	IN	[A8]	JP56	10 KHZ	[D5]
JP1	1-2	[A1]	JP3	IN	[C7]	JP57	10 KHZ	[E5]
JP2	1-2	[A1]	JP54	1-2	[E4]	JP64	1-2	[D9]
JP14	1-2	[A6]	JP9	IN	[A8]	JP66	10KHZ	
JP15	1-2	[A6]				JP67	10KHZ	
JP16	1-2	[A6]				JP4	IN	
JP17	1-2	[A6]						
JP18	1-2	[A6]						
JP10	SER	[A7]						

7.1.3

Adjust POTS RV1, RV2, RV3, and RV4 to Maximum CCW.
SW1, all closed.

7.1.4

1. Connect test fixture connectors TB1 through TB4, LNTB, LVTB and FXTB to UUT.
2**.** Connect COMP (RS232) connector to P.C. (MUST be COM1).
3. Set test fixture power switch in the OFF position.
4. Connect test fixture power cable to Variac.
5. Connect Variac to 115VAC outlet.
6. Insert Test Prom (DS200LRPBF1AAA OR GREATER) into U8 socket.
7. Connect DVM and scope (-) to fixture COM.
8. Set variac to 0VAC.

7.2 Testing Procedure

7.2.1 Turn fixture power switch on.

7.2.2 Increase Variac until TP24 (P24) is 5.1VDC

7.2.3 Verify the following supply voltages are present.

7.2.3.1 TN24   -4.5 TO -6.5 VDC

7.2.3.2 TP15   3.0 TO 5.5VDC

7.2.3.3 TN15   -3.0 TO -5.5VDC

7.2.3.4 TN5   -2.5 TO -4.5VDC

7.2.3.5 TP5   2.5 TO 4.5 VDC

7.2.4 Leave DVM on TP5.

7.2.5 Slowly increase Variac to 115VAC while monitoring TP5. TP5 should never go above 5.05VDC. If this occurs stop increasing the variac and troubleshoot.

7.2.6 Verify the following supply voltages with respect to COM.

7.2.6.1 TP5 4.95 TO 5.05VDC

7.2.6.2 TN5 -4.75 TO -5.25VDC

7.2.6.3 TP24 24.0 TO 26VDC

7.2.6.4 TN24 -24 TO -26VDC

7.2.6.5 TP15 13.5 TO 16.5VDC

7.2.6.6 TN15 -13.5 TO -16.5VDC

7.2.7 Verify both UUT and fixture A15N and B15N led's are lit.

7.3 Gain tests.

7.3.1 Note: we are measuring precision amplifier circuit gains, values must be within tolerance.

7.3.2 Connect DVM + TO AEXP on fixture. Adjust pot RV1 CW until you read 6.7Vrms +/- 0.01Vrms.

7.3.3 Move DVM + to BEXP on fixture. Adjust pot RV2 CW until you read 6.7Vrms   +/- 0.01Vrms.

**7.3.4 Verify the following TP on the UUT reads 1.975 to 2.025 Vrms.**

7.3.4.1 ASIN [E2]

7.3.4.2 ACOS [E2]

7.3.4.3 BSIN [E7]

      7.3.4.4 BCOS [D8]

7.4 Phase shift adjustment.

    7.4.1 **Power fixture off, set jumpers JP56, JP57,JP66, JP67 to 5KHZ position.**

    7.4.2 **Power unit back on.**

    7.4.3 **Connect Ch1 probe of oscilloscope to TP3A [AREF1].**

    7.4.4 **Connect Ch2 probe to oscilloscope TP1A [ASIN1].**

    7.4.5 **Set both scope channels in the center of the CRT.**

    7.4.6 **Verify waveform per FIGURE #1.**
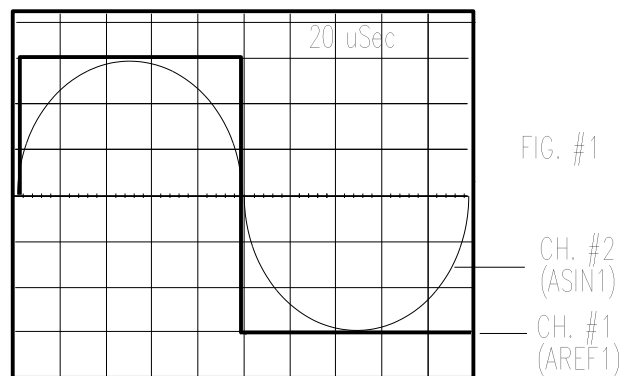
    7.4.7 **Move Ch1 probe** to **TP3B [E4] (BREF1**).

    7.4.8 **Move Ch 2 probe to TP1B [E2] (BSIN1).**

    7.4.9 **VERIFY WAVEFORM PER FIGURE #A.**
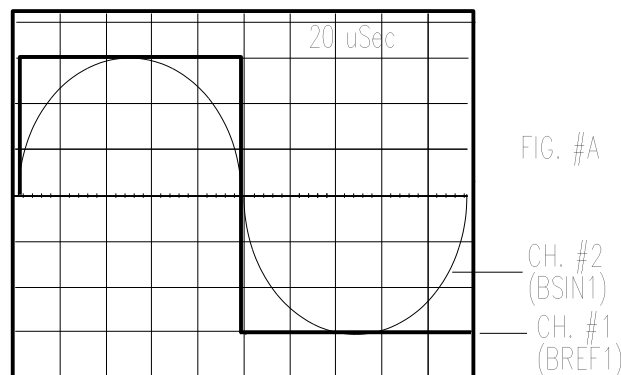
7.5 Lan Test.

7.5.1 On the P.C. select "LRPAG1A", <ENTER>

7.5.2 Select   (File====>LRPA) <ENTER>

7.5.3 Select   (TSTGN.HEX) <ENTER>

7.5.4 Wait until the menu returns.

7.5.5 Turn off test fixture power.

7.5.6 Move JP10 to LAN position.

7.5.7 Power fixture back on.

7.5.8 On the fixture, momentarily press "Lan Fault"

    7.5.8.1 Verify LED CR1 blinks off and on.

7.5.9 Turn off test fixture power.

7.5.10 Move JP10 to SER position.

7.5.11 Power fixture back on.

7.5.12 On the card, momentarily press SW21.

    7.5.12.1 Verify CR1, CR6, CR11, AOK, BOK, fixture AOK, and fixture BOK are on steady.

7.6 Single Step Spin Test.

7.6.1 Type "1" on the PC to select the "single step spin test". <enter>

7.6.2 By momentarily pressing <enter> on the PC to receive a new position count, verify both channel A and channel B position count, in decimal is within Limits and the last digit does not jump by more than one count, see Fig#2.
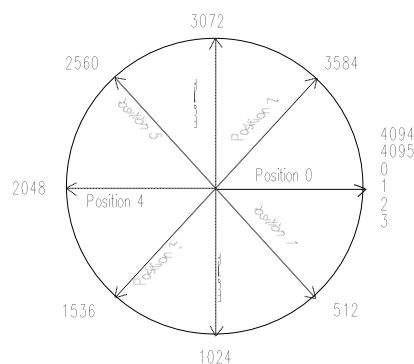

Fig. #2

    7.6.2.1 Position 1 – 510 to 515

    7.6.2.2 Position 0 – 4095 to 3

    7.6.2.3 Position 1 – 510 to 515

    7.6.2.4 Position 2 – 1022 to 1027

7.6.2.5 Position 3 – 1534 to 1539

7.6.2.6 Position 4 – 2046 to 2051

7.6.2.7 Position 5 – 2558 to 2563

7.6.2.8 Position 6 – 3070 to 3075

7.6.2.9 Position 7 3582 to 3587

7.6.2.10 Position 0 4095 to 3

7.6.3 Press <q> on the pc to exit this test and return to the menu.

7.7 High speed spin test.

7.7.1 Set up scope

7.7.1.1 Trigger ch-1

7.7.1.2 Trigger pos edge
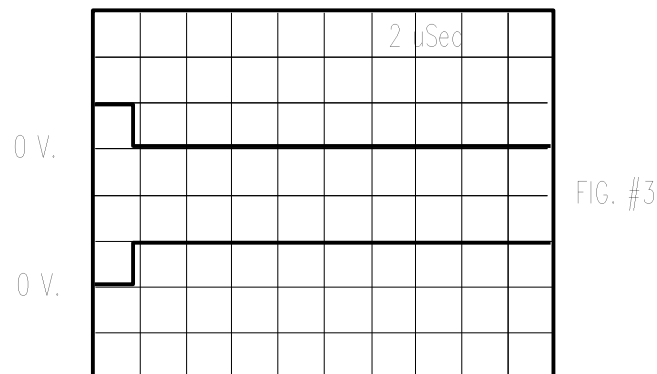
7.7.1.3 Sweep 2uSec/div

7.7.1.4 Ch1 and CH2 DC couple

7.7.1.5 Ch1 and Ch2 5V/div

7.7.2 Connect Ch1 probe to test fixture "AMPP"

7.7.3 Connect CH2 probe to test fixture "APULSES"

7.7.4 TYPE <3><ENTER> on the pc to select "high speed spin test"

7.7.5 On the test fixture, select "Position1" with rotary switch A.

7.7.5.1 Verify marker pulses AMPP and AMPN as shown in Fig #3.
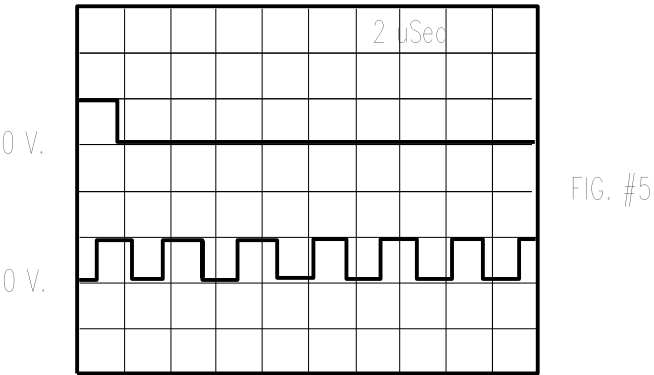

FIG. #3

7.7.6 On the test fixture, select "Position 2" with rotary switch A.
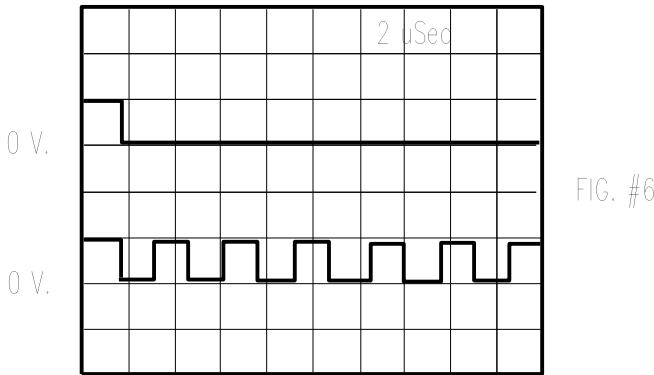
7.7.6.1 Verify AAPP signal as shown in Fig #4.

FIG. #4
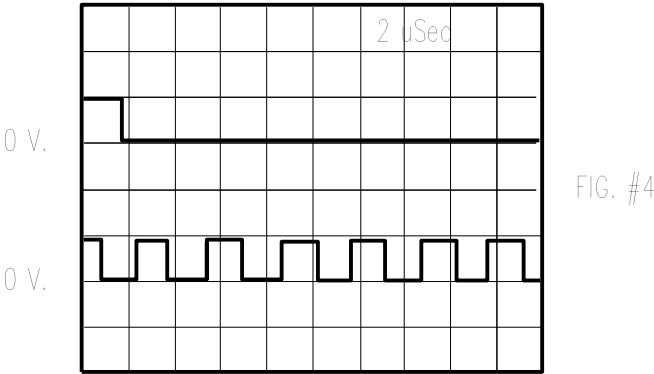
7.7.7 On the fixture, select "Position 3" with rotary switch A.

7.7.7.1 Verify AAPN signal as shown in Fig #5.

FIG. #5

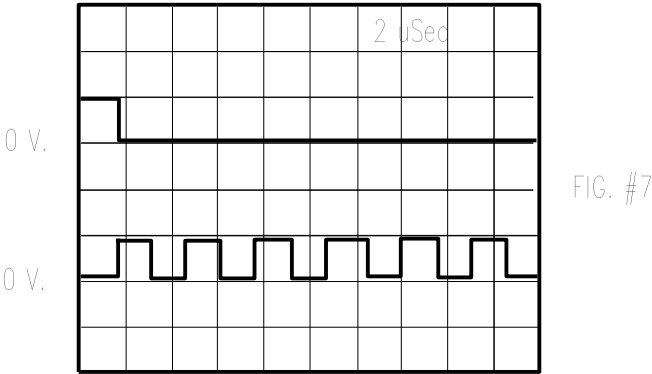**7.7.8 On the fixture, select "Position 4" with rotary switch A.**

7.7.8.1 Verify ABPP signal as shown in Fig #6.

FIG. #6

7.7.9 On the fixture, select "Position 5" with rotary switch A.

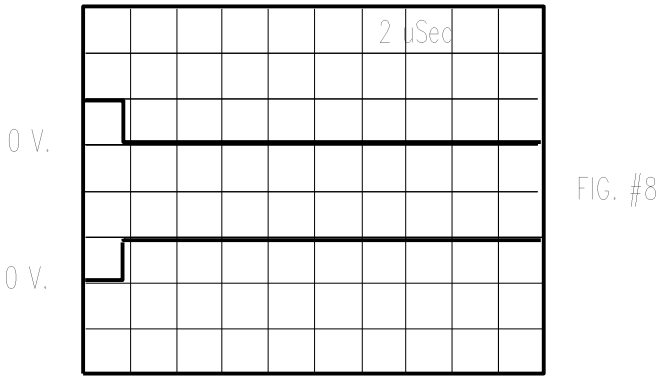**7.7.9.1 Verify ABPN signal as shown in Fig #7.**

FIG. #7

7.7.10 Move Ch1 probe to test fixture "BMPP"

7.7.11 Move CH2 probe to test fixture "BPULSES"
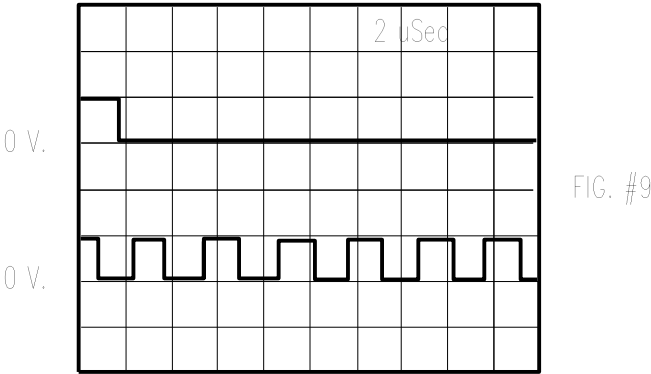
7.7.12 On the test fixture, select "Position 1" with rotary switch B.

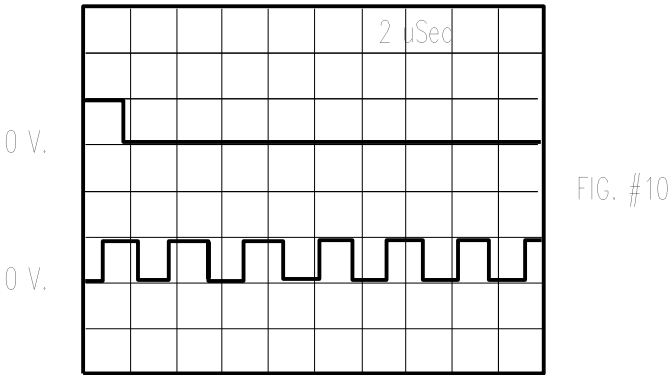**7.7.12.1 Verify marker pulses, BMPP and BMPN as shown in Fig #8.**

FIG. #8

7.7.13 On the test fixture, select "Position 2" with rotary switch B.
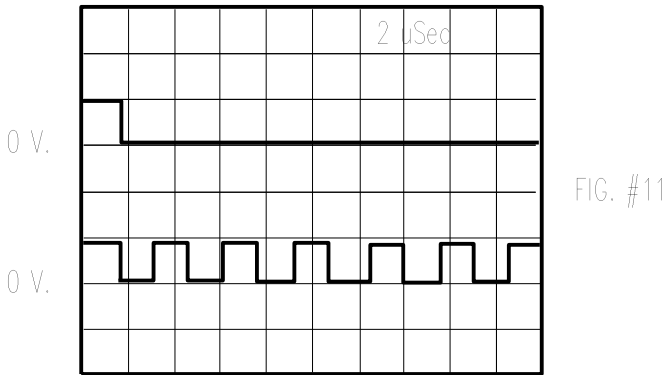
7.7.13.1 Verify BAPP signal as shown in Fig #9.

FIG. #9

7.7.14 On the test fixture, select "Position 3" with rotary switch B.

7.7.14.1 Verify BBPN signal as shown in Fig #10.
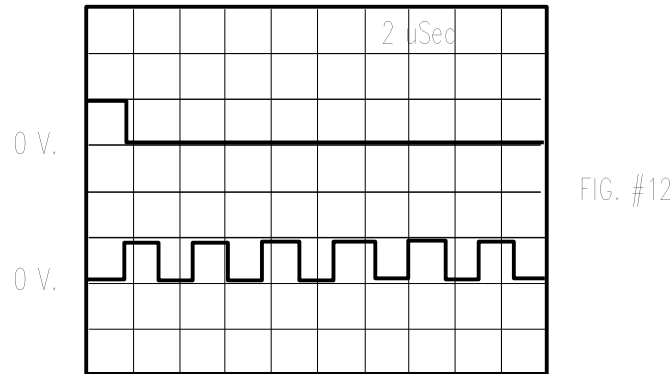

FIG. #10

7.7.15 On the test fixture, select "Position 4" with rotary switch B.

7.7.15.1 Verify BBPP signal as shown in Fig #11.

FIG. #11

7.7.16 On the test fixture, select "Position 5" with rotary switch B.

7.7.16.1 Verify BBPN signal as shown in Fig #12.

FIG. #12

7.7.17 Turn test fixture off.

7.7.18 Move JP55 and JP65 to the 2-3 position.

7.7.19 Turn test fixture on.

7.7.19.1 Verify previous waveforms now have an amplitude of 14.5 to 15.2V on BPulse, BMPP, AMPP, and APulse.

7.7.20 Turn test fixture off, move jumpers JP55 and JP65 back to the 1-2 position.

7.7.21 Turn test fixture back on.

7.8 Forced signal loss.

7.8.1 On the pc, type <5><enter> to select "force signal loss".

7.8.1.1 Wait 5 seconds.

7.8.1.2 Verify Led CR1 blinks off and on.

7.8.1.3 Verify LED CR6, CR11 are not lit.

7.8.1.4 Verify fixture LED "AOK" and "BOK" are not lit.

7.8.2 Type <7><enter> on the pc to select "read fault and status word"

7.8.2.1 Verify that status word as Bit 0 and 1 set to a "1", the other bits do not matter in this test.

7.8.2.2 Type <enter> to exit

7.8.3 On the card, momentarily press SW21.

7.8.3.1 Verify LED CR1, and fixture led's "AOK" and "BOK" are on steady.

7.9 Forced tracking loss/ Re-init/ soft reset.

7.9.1 Type <6><enter> on the pc to select "force tracking loss".

7.9.1.1 Verity LED CR1 blinks off and on.

7.9.2 Type <4><enter> on the pc to select "soft reset"

7.9.3 Type <8><enter> on the pc to select "re-init and clear status word".

7.9.4 Type <7><enter> on the pc to select "read fault and status word".

7.9.4.1 Verify LED CR1 is on steady.

7.9.4.2 Verify fixture led's "AOK" and "BOK" are on steady.

7.9.4.3 Verify that the status word as all "bits" set to a "0".

7.9.4.3.1 Example: 0000000000000

7.9.4.4 Type <enter> on the pc to exit.

7.9.5 Remote reset

7.9.5.1 Connect a test jumper from fixture "JP58" to card JP58-3

7.9.5.2 Connect a test jumper from fixture "JP63" to card JP68-3.

7.9.5.3 On the pc type <5><enter>, wait 5 seconds and type <5><enter> to select "forced signal loss".

7.9.5.3.1 Verify CR1 blinks off and on, fixture LED AOK and BOK are not lit.

7.9.5.4 On the fixture momentarily press "RESET A".

7.9.5.4.1 Verify CR1 blinks off and on and fixture LED AOK is on steady.

7.9.5.5 On the fixture momentarily press "RESET B".

7.9.5.5.1 Verify CR1 , fixture LED "AOK" and fixture LED "BOK" are on steady.

7.9.5.6 Type <999><enter> on the pc to exit to the main menu.

7.10 UGENI TEST

7.10.1 Switch test fixture off.

7.10.1.1 Install the UGENI MODULE (IC660ELB912) TO P1 and P5 connectors on the card.

7.10.1.2 Turn fixture power on.

7.10.1.3 Wait 10 seconds.

7.10.1.3.1 Verify LED's AOK,BOK,FBLINK on LRPB and LED1,LED2 on the UGENI module are on. GENACT LED on LRPB should be on <u>VERY DIM</u>.

7.11 Download default parameters.

7.11.1 On the pc, select (File==➜LRPA) press <enter>

7.11.2 Select DEFLT.HEX, press <enter>

7.11.3 Wait until the menu screen returns.

7.12 Power down and final settings.

7.12.1 Turn fixture off.

7.12.2 Remove test prom.

7.12.3 Remove UGENI module.

7.12.4 Replace all green connectors on the card.

7.12.5 Seal all pots

7.13 Post Testing Burn-in   Required   ___ Yes   __X_ No

✎   **Note:** All MARK I, II, & III Turbine related cards require a post testing burn-in of 100 hours.

7.14 ***TEST COMPLETE ***

8. **Notes**

   8.1 None at this time.

9. **Attachments**

   9.1 None at this time.