g GE Energy ***Parts & Repair Operations*** ***Louisville, KY***	**Functional Testing Specification** **LOU-GEF-BUBBLE** **BUB & RMM**

Test Procedure for BUBBLE and RMM01 Printed Circuit Boards

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Functional test procedure for BUB & RMM01 Printed Circuit Boards

1. SCOPE

1.1 This is a functional test procedure for testing the Bubble memory boards.

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 GIT-200

3.1.2 GEK-25382

4. ENGINEERING REQUIREMENTS

4.1 Description

4.1.1 The Intel Bubble board or the GE RMM01 board are interchangeable. These cards are use to store the application files for the control. They provide the storage memory space needed by the MC2000 control to run.

4.2 Equipment Cleaning

4.2.1 Equipment should be clean and free of debris prior to applying power unless performing an initial check. Refer to the local documented procedures for cleaning guidelines.

4.3 Equipment Inspection

4.3.1 Equipment should be visually inspected for any defects prior to applying power. This inspection should include the following as a minimum:

4.3.1.1 Wires broken or cracked

4.3.1.2 Terminal strips / connectors broken or cracked

4.3.1.3 Loose wires

4.3.1.4 Components visually damaged

4.3.1.5 Capacitors leaking

4.3.1.6 Solder joints damaged or cold

4.3.1.7 Circuit board burned or de-laminated

4.3.1.8 Printed wire runs burned or damaged

EQUIPMENT REQUIRED

4.4 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	MC2000 Standup Control	Test Fixture
1	Fluke 77 or equivalent	Multimeter

5. Setup

5.1 Be sure the board is strapped correctly, otherwise it can damage itself or another card. Strap this board to MB3.

6. Testing Process

6.1 Diagnostic Test

6.1.1 Be sure power is OFF by depressing the red OFF push button on the NCS.

6.1.2 Insert the Bubble Board to be tested in MC2000 Board Rack in Yellow Slots ONLY! Be sure there is ONLY ONE OTHER BUBBLE BOARD IN RACK MB1: FACTORY DIAGNOSTIC BOARD.

6.1.3 Set CPU14 Switch in up position

6.1.4 Turn the system on by pressing the Green ON push button. Wait until the system has booted, you will see "Mark Century 2000 Service Diagnostics Initialization. All power up LED should come on, if it fails to come on, board failed and must be fixed before proceeding. You should get an Error message on Monitor Screen.

6.1.5 If LED is on and Factory Diagnostic is Loaded, Depress any key to enter the "manual/menu mode" should come up with message Press Return Key.

6.1.6 Select "BUBBLE MEMERY TEST".

6.1.6.1 Do all 8 tests, do 1 repetition for each test.

6.1.6.1.1 Unique Addressing Test
6.1.6.1.2 Strip Out Test
6.1.6.1.3 Bubble Collapse Test
6.1.6.1.4 Self Generation Test
6.1.6.1.5 Self Replication Test
6.1.6.1.6 Data Replication Test-Load Phase
6.1.6.1.7 Data Replication Test-Verify Phase
6.1.6.1.8 Format Utilities.

6.1.7 When all tests are finished get out of "BUBBLE MEMERY TEST" push Cancel Button.

6.1.8 Select "EXECUTE AUTOMACTIC TEST CYCLE". Enter name of test cycle to be executed Type in BUB then press enter or return key. Do 5 or more Repetitions.

6.1.9 After BUBBLE CYCLE TEST is done Shut down the MC2000 Control. Remove Bubble Board under Test.

6.1.10 Jumper board for MB2: and place back it MC2000 Control.

6.1.11 Remove Bubble MB1: Factory Diagnostic.

6.1.12 Place in Bubble Boards MB1: Support 8 and MB3: 7.59MC into rack.

6.1.13 Turn on the MC2000 Control it will Load Support Program

6.1.14 After program is finished loading Support Utilities will be displayed on screen.

6.1.15 Select "BUBBLE UTILITIES.

6.1.16 Then select FORMAT A BUBBLE". "ENTER BUBBLE TO BE FORMATTED" will come up enter MB2: Board will be tested and formatted after it is done press return to exit Format a Bubble.

6.1.17 Select "COPY AN ENTIRE BUBBLE" press return screen will display "ENTER NAME TO COPY "FROM" type MB3: press return screen will display "ENTER NAME TO COPY "TO" type MB2: press return.

6.1.18 Bubble MB2: will be loaded with MB3: 7.59MC Software.
6.1.19 When the Copying is completed press Cancel to exit Bubble Utilities and shut down MC2000 Control.
6.1.20 Remove Bubbles MB1: Support 8 and MB3: 7.59MC.
6.1.21 Remove the Bubble Board under test and jumper it for MB3:
6.1.22 Place back the Bubble Board and Set CPU switch to the middle position.
6.1.23 Turn on the MC2000 the MC3: 7.59MC software will load when it is finish loading Select the Part Program to be run
6.1.24 Press “index” key and select “MCLOOP THREE AXIS LOOP PROGRAM” by Pressing “SELECT” key then press “POSN” key to go to the Position screen.
6.1.25 Turn on AXIS CART
6.1.26 Push Control ON button on MC2000 the press AUTO button then CYCLE START Button. Part Program should run AXISES. Run for 4 to 6 hours then stop Program by pressing the CANCEL button then turn off the AXIS CART and then the MC2000 Control.
6.1.27 Put the MB1: SUPPORT 8 Bubble back into the Control Rack and place CPU Switch in the UP Position.
6.1.28 Turn on the MC2000 Control it will load the SUPPORT 8 Software when Program come up on screen select “BUBBLE UTILITIES. Then select Format a Bubble.
6.1.29 “ENTER BUBBLE TO BE FORMATTED” will come up enter MB3:
6.1.30 Board will be tested and formatted after it is done press return to exit Format a Bubble. Shut down MC2000 Control and remove the Bubble Board under test.

6.2 ***TEST COMPLETE ***

7. NOTES