



GE Energy Services

Functional Testing Specification

Inspection & Repair Services
Louisville, KY

LOU-GEF-1050-RM

Test Procedure for 1050 memory cards

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DATE 08/06/2008	DATE	DATE	DATE 8/6/2008

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Functional test procedure for 1050 memory cards

1. SCOPE

- 1.1** This specification provides the Engineering Requirements for testing the RM161 44A399771-G04, RM162 44A399771-G08, RM644 294568-G05, R484 44A294568-G06, RM645 44A297098-G01.

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 | GEK-36093 | Diagnostic Software for 1050T Controls |
| 3.1.2 | GEK-71632 | Diagnostic Software for 1050MC Controls |
| 3.1.3 | GEK-45668 | Computer Access Panel |

4. ENGINEERING REQUIREMENTS

4.1 Description

- 4.1.1** The 1050 Control is a solid-state, integrated circuit controller/processor system using LSI circuits for data processing and control. The static logic circuits are arranged on modular, plug in, printed circuit boards, clearly identified by type. The circuit boards are mounted with functional grouping. In addition, a board identification number marks each rack slot. The backplane consists of printed conductors arranged in a busing structure so that each slot is universal and can accept any board type. The 1050 control uses the AXIS2 board for controlling two or more axis drives.

- 4.1.2** The memory system from the Mark Century 1050 Numerical Control is 64K words maximum, implemented with boards of 16K words of 17 bits. Every board contains its own interface control and refreshing circuitry. The RM161 and RM162 boards may be depopulated in 4K increments to a minimum of 4K words. RM644, RM484 boards may be depopulated to a minimum of 16K words. RM645 is an only 64-word board.

- 4.1.3** Input and output data and addresses are multiplexed on a common bi-directional system exchange bus.

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

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	GE 1050T/MC	CPU3 Model
1	GE Computer Access Panel	External Interface
1	Diagnostic Tape Specific to Control	Diagnostic Tape
1	Executive Tape Specific to Control	Executive Tape
1	Part Program Specific to Control	Part Program
1	Axis Cart	Motion Cart for Control

6. TESTING PROCESS

Caution before testing any Memory Board, check 1050 Control requirements if the Memory board goes in a CPU2 or CPU3 Control. Also Check Board Strapping for PCB, GEK71700 to set up board for proper configuration.

6.1 Diagnostic Test

- 6.1.1 Remove existing board from control and insert BUT (Board Under Test).
- 6.1.2 Turn control ON and check CAP Panel, if FFFE does not register on panel with the Display Selector Switch in the "Program Counter" position, do not go any further, troubleshoot board.
- 6.1.3 Load diagnostic tape by holding in the "LOAD TAPE" button and pressing the "CONTROL ON" push button. Tape should begin to load.
- 6.1.4 When the first portion of the tape has finished loading the display should read **"CPU TEST COMPLETE"**. Let test cycle for 30 minutes.
- 6.1.5 Turn Off Control. Remove CPSI1 board and then Press Store Program and Control On at the same time, this runs the next test. When tape stops at Memory Test, run test for at least two hours.
- 6.1.6 Load third portion of the diagnostic tape, by toggling "Load Tape" switch. When tape finishes loading, it should rewind back to the beginning of tape. When displays reads **"TURN CONTROL OFF, THEN CONTROL ON"**. Turn off control. Turn control on and start the last part of the diagnostic program, let it cycle for 30 minutes.

6.2 Running a Part Program

- 6.2.1 Load executive software tape.
- 6.2.2 Power up drive cart and enable drives.
- 6.2.3 Load part program tape and exercise drives.
- 6.2.4 Once control finishes running part program shutdown axis cart and than control.

6.3 *****TEST COMPLETE*****

7. NOTES

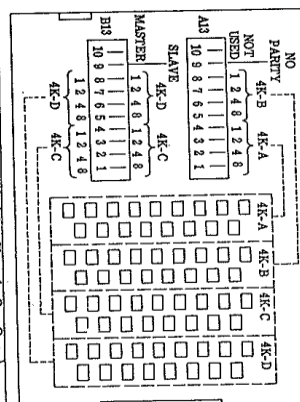
8. REFERENCES

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STRAPPING FOR RM1 AND RM2 SERIES MEMORY BOARDS (4K, 8K, 12K, AND 16K)

FOR CONTROL TYPES WITH CPU2*:		
1050T, 1050TZ, 1050MC, 1050P, 1054T		
G. E. MEMORY BOARD JUMPERS		
BOARD	LOCATION	JUMPERS ALWAYS IN
All	N1	No connection
	M2	A to B
	N12	A to N, F to M, C to L, E to I, E to J, G to H, H to K, F to P, E to P, B to C, D to Q, E to G, E to K, I to O, I to J, L to N, M to N
All	N13	See Note 7
	E12	A to B
	D13	A to B Connection only, if mixed with INTEL RAM
See Note 2	B2	B to C

FOR CONTROL TYPES WITH CPU3*:		
1050T, 1050TZ, 1050MC, 1050P, 1054T		
G. E. MEMORY BOARD JUMPERS		
BOARD	LOCATION	JUMPERS ALWAYS IN
All	N1	A to B
	M2	A to N, B to J, C to L, D to H, F to I, F to P, G to K, M to O, E to K, I to O, I to J, L to N, M to N
All	N13	A to P, B to C, D to Q, E to G, E to K, I to O, I to J, L to N, M to N
	E12	A to B
	D13	No connection
See Note 2	B2	A to C



MEMORY BOARD SWITCHES (X - Closed, O - Open)		SEE		FIGURE 1		AND NOTE 3		SLAVE		MASTER		PARITY	
DESIRABLE POSITION OF 4K INCREMENT	1	2	4	8	16	32	64	128	256	512	1024	2048	4096
A 4K	X	O	O	O	O	O	O	O	O	O	O	O	O
B 8K	X	O	O	O	O	O	O	O	O	O	O	O	O
C 12K	X	O	O	O	O	O	O	O	O	O	O	O	O
D 16K	X	O	O	O	O	O	O	O	O	O	O	O	O
A 20K	X	O	O	O	O	O	O	O	O	O	O	O	O
B 24K	X	O	O	O	O	O	O	O	O	O	O	O	O
C 28K	X	O	O	O	O	O	O	O	O	O	O	O	O
D 32K	X	O	O	O	O	O	O	O	O	O	O	O	O
A 36K	X	O	O	O	O	O	O	O	O	O	O	O	O
B 40K	X	O	O	O	O	O	O	O	O	O	O	O	O
C 44K	X	O	O	O	O	O	O	O	O	O	O	O	O
D 48K	X	O	O	O	O	O	O	O	O	O	O	O	O
A 52K	X	O	O	O	O	O	O	O	O	O	O	O	O
B 56K	X	O	O	O	O	O	O	O	O	O	O	O	O
C 60K	X	O	O	O	O	O	O	O	O	O	O	O	O
D 64K	X	O	O	O	O	O	O	O	O	O	O	O	O

- *NOTE 1 - With CPU2, all Memory Boards can be used. With CPU3, only RM42, 82, 122, and 162 can be used.
- NOTE 2 - Location B2 only applies to RM42, 82, 122 and 162 Memory Boards.
- NOTE 3 - When using a board with less than 16K of memory, the switches for the missing memory must be set the same as any other memory used on that board.
- Example: Assume we have a 12K board and the memory is set for 20K, 24K, and 28K. The remaining switches must be set to 20K, 24K, or 28K, but not 32K.
- NOTE 4 - Any 4K increment, above the initial 4K of memory, may or may not be present on a given memory board.
- (Memory boards are available in only 4K, 8K, 12K, and 16K capacities.)
- NOTE 5 - Each memory board contains a complete memory refresh circuit. However, when more than one board is present, only one refresh circuit is used. This is the "Master" memory board and all others are "Slave" boards.
- NOTE 6 - The switches on the General Electric memory boards allow any 4K increment to be switched to any desired location within the Control's total memory.
- NOTE 7 - For RM41, 81, 121, and 161 boards at loc. N13 remove I to O, J to L, M to N, D to Q. Add I to P, J to O, O to L, D to T.

Board Strapping for 1050 Printed-Circuit Boards

GEK-71700

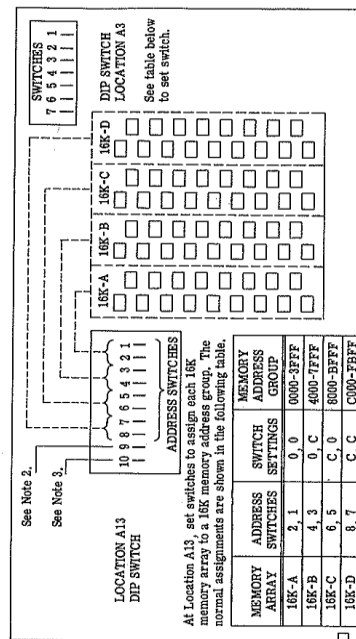
Board Strapping for 1050 Printed-Circuit Boards

GEK-71700

STRAPPING FOR RM484 (48K) AND RM644 (64K) MEMORY BOARDS

NOTE: For SW settings
0 = Open
C = Closed

For control types with CPU3*, see Note 1.	
1050T, 1050TZ, 1054T, 1050MC	
MEMORY BOARD JUMPERS	
BOARD TYPE	JUMPER LOCATION
RM484 and 644	N12
	N13
	J1



To set up slave boards, set switches at location A3 per the table below. There can be up to 7 slave boards.

BOARD NUMBER	
SWITCH NUMBER	SETTING
1	0
2	0
3	0
4	C
5	0
6	0
7	0

To set up the master board, set switches at location A3 per the table below. There can be only one master board.

BOARD NUMBER 0	
SWITCH NUMBER	SETTING
1	0
2	0
3	0
4	C
5	0
6	0
7	0

- NOTE 1. On controls that use extended memory software, the control must have CPU3C revision level or later.
- NOTE 2. To disable an array, assign that array to address group C000-FEFF and close switch 9. To enable this memory address group, open switch 9. For a 48K memory board, switch should be closed.
- NOTE 3. Close switch 10 to turn off XFR LED. Open switch 10 to turn on XFR LED.

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