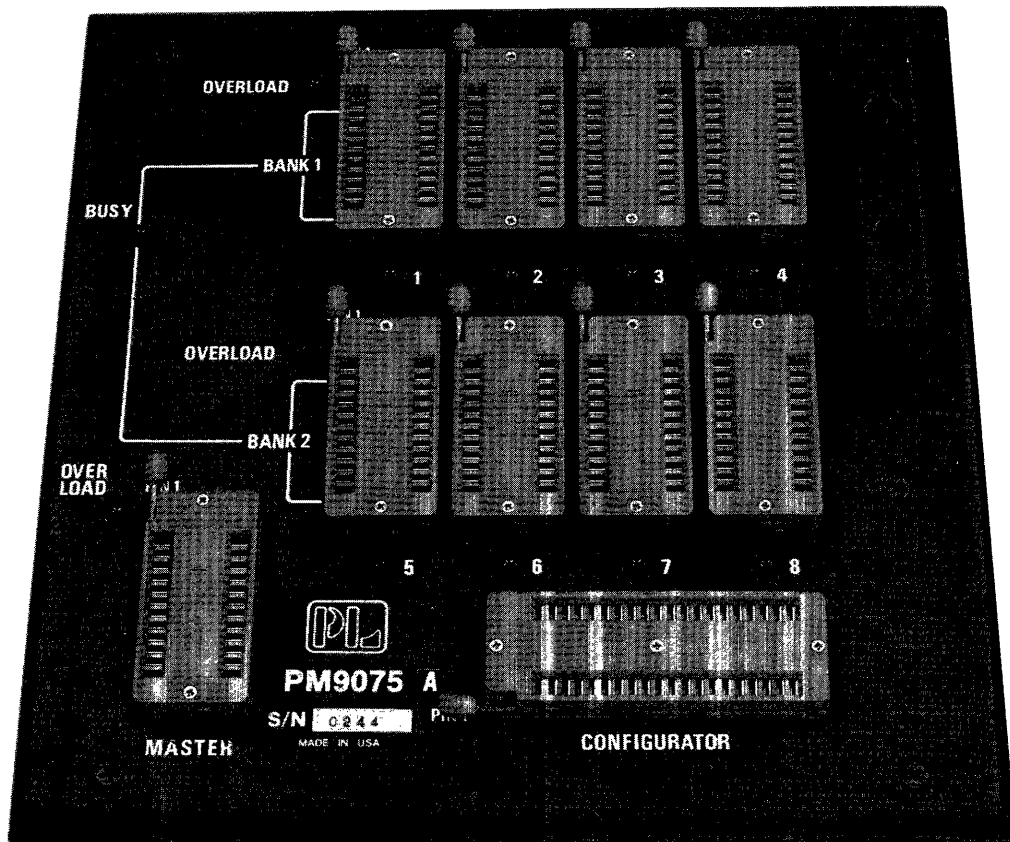




# PM9075A GENERIC GANG PERSONALITY MODULE

## USER'S MANUAL



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# PM9075A GENERIC GANG PERSONALITY MODULE

## *USER'S MANUAL*

### **Summary**

The PM9075A is a generic gang personality module for 24-pin, 5V MOS PROMs designed to operate with the series M980 and M910A PROM programmer control units. It can be configured to program 5V MOS PROMs by plugging in one of several gang configurators. These gang configurators are available for most currently available 5V NMOS or HMOS EPROMs and E<sup>2</sup>PROMs. (See Gang Configurator Selection Guide on page 3.) The PM9075A can program up to 8 devices simultaneously. Programming is performed in parallel. Verification is sequential and compares each device, independently, against the data source.

### **Features**

- Separate MASTER and COPY sockets protect the master device.
- High and low Vcc device test, following programming.
- Shorted device detection circuits for both master and copy PROMs.
- Overload detection circuits automatically shut down Vpp and limit Vcc current.
- Overload detection LED indicators.
- Upside-down PROM detection to protect the EPROMs.
- Built-in self-test and diagnostics.
- Individual pass/fail LED for each COPY socket.
- Gang configurators to accommodate different programming algorithms.



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# SECTION 1

## Introduction

The PM9075A accommodates eight 5V EPROMs for programming, comparing, or blank checking. Also, it includes a separate socket for a master EPROM.

### NOTE

The PM9075A operates only with the M980 and M910A control units.

The copy EPROMs are arranged in two banks of four PROMs each. During any operation, if a malfunction is detected in a PROM, the programming voltages are shut down only in the bank of PROMs where the malfunction occurs (see Section 6). The other bank of four PROMs continues its operation until completed. The PM9075A has separate fail indicators (LEDs) for each copy PROM, which will illuminate if that PROM fails to program, blank check, or compare properly.

The configurators contain the software routines needed to operate with a particular PROM or family of PROMs. Connections to accommodate the various pinout and programming waveforms are also contained in the configurator.

### Front Panel (Fig. 1)

**MASTER Socket:** Accepts previously programmed PROMs that are to be duplicated. Programming voltage  $V_{pp}$  is not connected to the MASTER socket, so that it is impossible to accidentally alter the master PROM. A zero-insertion-force (ZIF) socket is used for operator convenience.

**MASTER Socket OVERLOAD LED:** Illuminates if a PROM is inserted in the MASTER socket upside down, or if the master PROM draws excessive  $V_{cc}$  current.

**COPY Sockets:** These eight sockets accept the PROMs to be programmed. They are arranged into two banks of four sockets each. Each bank has separate  $V_{cc}$  and  $V_{pp}$  voltage regulators. After RESET, or when the selected function is finished,  $V_{cc}$  is reduced to less than 0.8V. This "cold socket" condition is necessary to prevent damage to some EPROMs. ZIF sockets are used for ease of PROM insertion and removal.

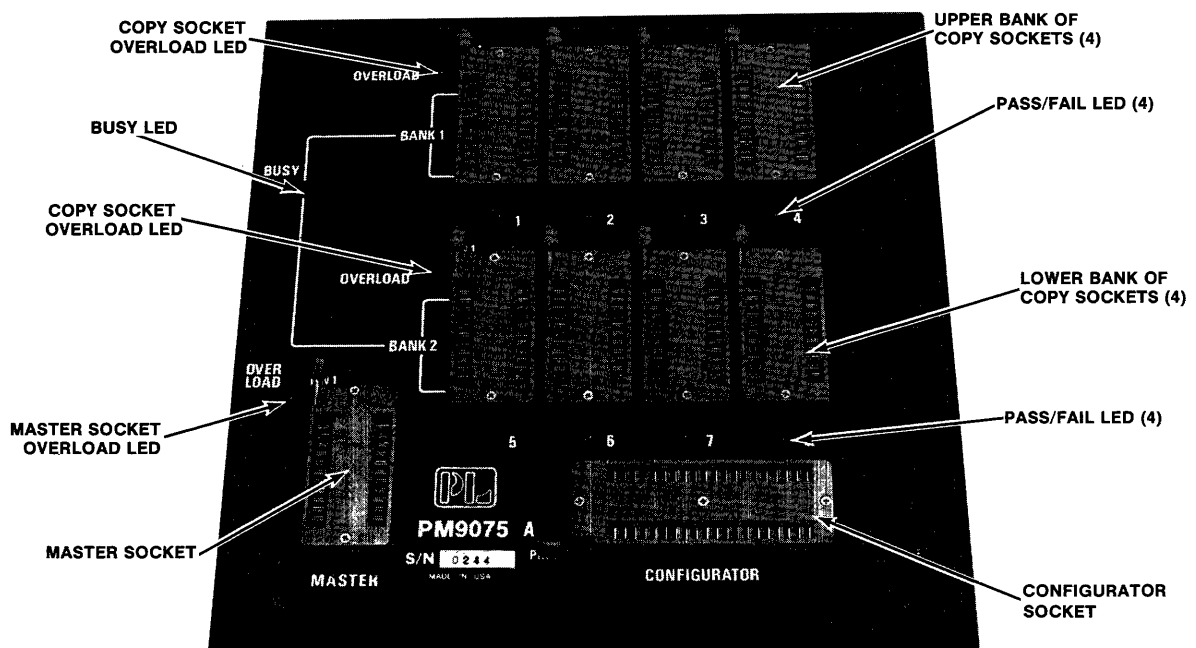


Figure 1. Front Panel of PM9075A Generic Gang Personality Module.

**COPY Socket OVERLOAD LEDs:** An LED indicator is provided for each bank of COPY sockets. If a copy PROM is drawing excessive Vpp or Vcc current, the overload indicator for the bank that the PROM is in illuminates and the Vpp voltage in that bank shuts down.

**BUSY LED:** This indicator illuminates whenever Vpp is applied to the COPY sockets. It illuminates continuously during the duplication operation.

**WARNING**

EPROMs should not be inserted or removed when the BUSY LED is illuminated as this may damage some EPROMs.

**PASS/FAIL LEDs:** An LED is located under each COPY socket to indicate whether the PROM in the COPY socket passes or fails the performed operation. The LED illuminates if its associated PROM fails the operation.

**CONFIGURATOR Socket:** This ZIF socket accepts gang configurators that allow programming of PROMs with common algorithms.

### Gang Configurator

The gang configurator (GC) consists of firmware and hardware that configures the MASTER socket and eight COPY sockets for the specific EPROM(s) to be programmed (Fig. 2). The programming algorithm is contained in this device. Pin 1 of the configurator is indicated by a solid dot in the corner.

### Preliminary Self-Tests

**COPY Sockets:** When entering the program or duplicate mode, the PM9075A automatically tests for a backward copy PROM, for an overload current on Vcc or Vpp (COPY sockets), and for shorted address lines. If all tests pass successfully, the mode that was selected continues normally. If Vcc<sup>1</sup>, Vcc<sup>2</sup>, Vpp<sup>1</sup>, or Vpp<sup>2\*</sup> has a short or is drawing excessive current, or if an address line has a short, or if a PROM is put in any of the COPY sockets backwards, the display on the control unit shows an error message.

**MASTER Socket:** When entering the duplicate or compare mode, the PM9075A automatically tests for a backward master PROM and for an overload condition on Vcc. The MASTER socket has a high and low Vcc current limit that can protect the master PROM from damage if it is inserted backwards. When an operation begins, the master PROM is placed in the power-down mode, the low Vcc current limit is set, and Vcc is raised. If the low Vcc current limit is reached within 10 $\mu$ s, which can result from a backward master PROM or a short, the OVERLOAD LED illuminates and the low Vcc current limit is maintained during the operation. If the low Vcc current limit is not exceeded, the master PROM powers up and the Vcc current rises to the high limit. If the Vcc current exceeds the high limit at any time, the OVERLOAD LED illuminates and the Vcc current returns to its low limit. If this occurs, replace the master PROM and erase and reprogram the copy PROMs.

### Overload

During all operations, Vcc<sup>1</sup>, Vcc<sup>2\*</sup>, and the MASTER socket Vcc voltages are current-limited. During programming, Vpp<sup>1</sup> and Vpp<sup>2\*</sup> are also current-limited. When either the COPY socket Vcc<sup>1</sup>, or Vcc<sup>2</sup> current limit is exceeded, the current limit lowers automatically and the OVERLOAD LED illuminates. Should a copy Vcc overload be detected during a programming sequence, the control unit is alerted, and the Vpp circuit for that bank shuts down. During a programming sequence, if either the Vpp<sup>1</sup> or Vpp<sup>2</sup> current limit is exceeded, the control unit is alerted and the OVERLOAD LED for that bank illuminates. The control unit then shuts down Vpp on the bank in which the current limit is exceeded. In either case, the operation continues for the other bank of copy PROMs. The self-test mode may be used to isolate the faulty PROMs (see Section 6).

### Tests to Detect Faulty PROMs

Following the programming of each address in the copy PROMs, Vcc is raised to the high limit of 5.20 $\pm$ 0.05V. The data in this address is read at the high limit of Vcc and it is compared to the data source. Vcc is then lowered to the low limit of 4.80 $\pm$ 0.05V and the data is read and compared again. These tests are performed to detect faulty PROMs.

\* Vcc<sup>1</sup> and Vpp<sup>1</sup> are for bank 1 of the copy PROMs. Vcc<sup>2</sup> and Vpp<sup>2</sup> are for bank 2.



MANU-FACTURER	TYPE	GC#	MANU-FACTURER	TYPE	GC#
<b>AMD</b>	Am2716	GC-03	<b>Motorola †</b>	MCM2716/L16	GC-03
	Am2732	GC-05		MCM2532/L32**	GC-04
<b>Fairchild</b>	F2716	GC-03	<b>National</b>	MM2758Q-A	GC-01
	F2532**	GC-04		MM2758Q-B	GC-02
	F2732**	GC-05		MM2716	GC-03
<b>Fujitsu</b>	MBM2716	GC-03		NMC2532**	GC-04
	MBM2732	GC-05		NMC2732**/L32**	GC-05
<b>Hitachi</b>	HN462716	GC-03		NMC2732A**/L32A**	GC-06
	HN462532	GC-04	<b>NEC</b>	$\mu$ PD2716	GC-03
	HN462732	GC-05		<b>OKI</b>	MSM2758
	HN48016	GC-23	MSM2716		GC-03
<b>Intel</b>	2758	GC-01	MSM2532AS**		GC-04
	2716	GC-03	<b>Synertek</b>	SY2716	GC-03
	2732	GC-05		<b>TI</b>	TMS2758-JLO
	2732A	GC-06	TMS2758-JLI		GC-01
	2808	GC-21**	TMS2508		GC-01
2816	GC-22**	TMS2516	GC-03		
<b>Maruman</b>	2716	GC-03	TMS2532	GC-04	
	<b>Mitsubishi</b>	M5L2716K	GC-03	<b>Toshiba</b>	TMM323
M5L2732K		GC-05			
<b>Mostek</b>	MK2716	GC-03			

NOTE: For the most recent selection, request the latest revision of the Personality Module Selection Guide (PMSG).

\* As of April 10, 1981.

\*\* Under development.

† These Motorola EPROMs can also be programmed on the PM9077 Motorola EPROM gang module. The Motorola 68764 and 68766 EPROMs can only be programmed on the PM9077 and the PM9064C.

**Figure 2. Gang Configurator Selection Guide\* for 5V EPROM Generic Gang PM9075A.**

**Typical Duplication Time for Eight EPROMs**

EPROM Type	Time (min)
<b>2758 (1K)</b>	<b>1.2</b>
<b>2716 (2K)</b>	<b>2.4</b>
<b>2732 (4K)</b>	<b>4.8</b>



## SECTION 2

# Operating Modes with M980

### NOTE

The start/end address shown in the M980 display is always eight digits, regardless of the PROM size. Example: For a 2716 PROM (2Kx8), the start/end address is "0000-07FF."

### Read

In this mode, the contents of the PROM in COPY socket 1 or the contents of the master PROM are displayed in hexadecimal form in the M980 display.\*

### Blank Check

In this mode, the PROMs in each of the eight COPY sockets or the master PROM are checked to see if they are totally erased. If any copy PROM is not totally blank, the fail indicator beneath that COPY socket illuminates and the M980 displays an error message ("E1"). To clear the fail indicators on a blank check failure, reset the M980 and reselect the mode you desire. If the master PROM is not blank, the M980 displays the address and data of the failed location. You can blank check all or part of the PROMs.\*

### Checksum

In this mode, the 8-bit data at each location is arithmetically added, and the sum is displayed in hexadecimal form in the M980 display (six digits). A checksum can be performed on the master PROM, on the RAM buffer, or on the PROM in COPY socket 1.\*

### NOTE

To assure proper insertion of the master PROM, perform a checksum on the master PROM immediately after its insertion and before performing the compare or duplicate mode.

### Compare

In this mode, the data in the master PROM (or in the M980 RAM buffer) is compared to the data in each of the eight copy PROMs. The operation continues until the end address is reached. If any copy PROM fails to compare properly, the M980 displays the error message ("E1") and the indicator beneath the failed PROM illuminates. If all PROMs pass, an "F" is displayed.\*\* To clear the fail indicators on a compare failure, reset the M980.

### Program

In this mode, data is manually entered from the keyboard and programmed into each of the eight COPY sockets. When data is being programmed, the BUSY LED illuminates.

### NOTE

Do not insert or remove PROMs while the BUSY LED is illuminated.

A high-Vcc and low-Vcc compare operation is performed after programming each address in the copy PROMs. If an address in the copy PROM fails to program properly, the fail indicator beneath that COPY socket illuminates. You may still continue to program the remaining copy PROMs until the end address is reached. At that time, if any PROM has failed, the error message "E1" is displayed. If all PROMs have passed, an "F" is displayed\*. To clear the fail indicators on a program failure, reset the M980.

\* See Section 5, *User's Manual, M980 Control Unit*, Vol. I, Doc. No. 106829A, Oct. 1980.

\*\* See Sections 5 & 6 *User's Manual, M980 Control Unit*, Vol I, Doc. No. 106829A, Oct. 1980.

**Duplicate**

In this mode, the contents of the master PROM or of the M980 RAM buffer are programmed into each of the eight copy PROMs. When entering the duplicate mode, the PM9075A automatically tests for a backward PROM (master or copy), and tests for shorted lines (see page 2). If a short is detected, or if a copy PROM is put in any socket backwards, the M980 displays "E8" and sounds the fail tone. When data is being programmed, the BUSY LED illuminates (see NOTE above). A high -Vcc and low -Vcc compare operation is performed after programming each address in the copy PROM. If any of the copy PROMs fails to program any location properly, the fail indicator beneath that copy PROM illuminates. The operation continues until the end address is reached. If any copy PROM has failed, the M980 displays an error message "E1." If all PROMs have passed, the M980 displays an "F." To clear the fail indicators on a duplicate failure, reset the M980.

**Auto**

In this mode, the M980 automatically sequences through the blank check, duplicate, and compare modes. If an error occurs during the duplicate mode, the LED beneath the failed EPROM illuminates, but no error message is displayed on the control unit until the compare mode is completed. If an error occurs in the blank check mode, the operation stops and an error message "E1" is displayed.

# SECTION 3

## Self-Test with M980

### How to Select the Self-Test

To enter the PM9075A self-test, first select the self-test mode of the M980, i.e., hold any key down, depress and release the RESET key, and release the depressed key.\* The M980 display shows "0 0 0 0" (M980 self-test selected). Then press key F to enter the PM9075A self-test (display shows "F0").

Keys 0 through 9 select the PM9075A self-tests. (Don't press RESET between tests.) Press one of these keys and then ENTER, to execute a test. (To repeat a test, press ENTER.) Note that keys A through F when pressed, result in an "E0" error (invalid test) and the M980 must be reset.

### Vpp Test

Connect the DVM ground (-) lead to pin 12 of any COPY socket. Connect the DVM positive (+) lead to the Vpp pin of any COPY socket according to Fig. 3.

**Key 0.** Press key 0 and ENTER. This sets Vpp<sup>1</sup> and Vpp<sup>2</sup> to TTL"0." The M980 display shows "FO F."

**Key 1.** Press key 1 and ENTER. This sets Vpp<sup>1</sup> and Vpp<sup>2</sup> to Vcc ±0.6V. The M980 display shows "F1 AAA." To exit test, press CLEAR. The display shows "F1 F."

**Key 2.** Press key 2 and ENTER. This sets Vpp<sup>1</sup> and Vpp<sup>2</sup> to program voltages. The M980 shows "F2 F" (see Fig. 3).

PROM TYPE	Vpp PIN	PROGRAM VOLTAGE
2716	21	25 ± 1
2732	20	25 ± 1
2732A	20	21 ± 0.5
2508/2758	21	25 ± 1
2516	21	25 ± 1
2532	21	25 ± 1

**Figure 3. Vpp Test Pin Assignments and Voltages.**

### Vcc Test

Vcc<sup>1</sup> is pin 24 of upper bank COPY sockets and Vcc<sup>2</sup> is pin 24 of lower bank COPY sockets. Connect positive (+) lead of DVM to pin 24 of any COPY socket in the bank.

**Key 3 (High Verify).** Press key 3 and ENTER. This sets Vcc<sup>1</sup> and Vcc<sup>2</sup> to 5.20 ±0.05V. The M980 display shows "F3 AAA." To exit test, press CLEAR. Display shows "F3 F."

**Key 4 (Nominal - Program).** Press key 4 and ENTER. This sets Vcc<sup>1</sup> and Vcc<sup>2</sup> to 5.00 ±0.05V. The M980 display shows "F4 AAA." To exit test, press CLEAR. Display shows "F4 F."

**Key 5 (Low Verify).** Press key 5 and ENTER. This sets Vcc<sup>1</sup> and Vcc<sup>2</sup> to 4.80 ±0.05V. The M980 display shows "F5 AAA." To exit test, press CLEAR. Display shows "F5 F."

### Indicator Test

**Key 6.** Press key 6 and ENTER. The indicators beneath the COPY sockets illuminate for about 0.5s and rotate from COPY socket 1 to COPY socket 8. The M980 display shows "F6 AAA." When COPY socket 8 indicator goes off, the M980 display shows "F6 F."

### Address Line Test

**Key 9.** Press key 9 and ENTER. (The M980 display shows "F9 AAA.") The address lines (see Fig. 4) toggle from TTL"0" to a TTL "1" level. Check with an oscilloscope set to 50 μs/div (see Fig. 5). To exit from the address test, press CLEAR. The M980 display shows "F9 F."

\* See Section 14, *User's Manual M980 Control Unit*, Vol. I, Doc. No. 106829A, Oct. 1980.

<b>A0</b> -Pin 8	<b>A7</b> -Pin 1
<b>A1</b> -Pin 7	<b>A8</b> -Pin 23
<b>A2</b> -Pin 6	<b>A9</b> -Pin 22
<b>A3</b> -Pin 5	<b>A10</b> -Pin 19 (2K devices)
<b>A4</b> -Pin 4	<b>A11</b> -Pin 18 (2532)
<b>A5</b> -Pin 3	<b>A11</b> -Pin 21 (2732/32A)
<b>A6</b> -Pin 2	

Figure 4. Pin Assignments for Address Lines.

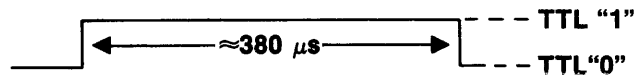


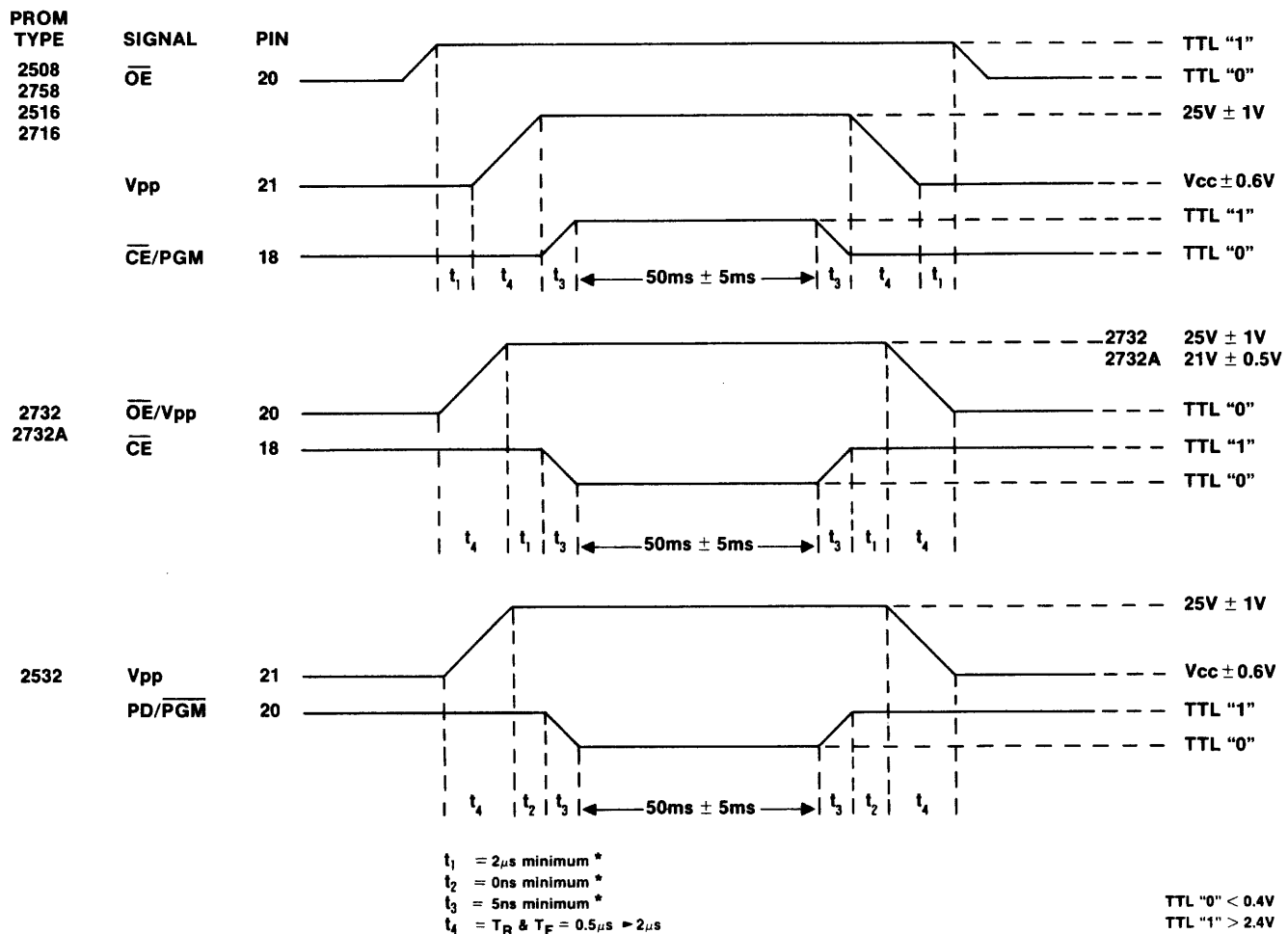
Figure 5. Address Lines Toggle.

### Dynamic Test

**Key 7.** Press key 7 and ENTER. The M980 display shows "F7 AAA," and the BUSY indicator on the PM9075A illuminates. This test puts the PM9075A into a continuous programming cycle. Check the appropriate pins for the programming waveforms (Fig. 6). The gang configurator determines which waveform will be generated. To exit test, depress CLEAR. The M980 display shows "F7 F."

### Preliminary Test

**Key 8.** Press key 8 and ENTER. The M980 display shows "F8 AAA." This test checks for Vcc and Vpp shorts and for address line shorts. If there are any shorts, the display shows "F8 E8" for error. The OVERLOAD LED illuminates if the short is on Vcc or Vpp. To repeat this test after an error is found, depress ENTER. To exit test, depress CLEAR. The M980 display shows "F8 F."



\* Minimum times are given. Typical times are much greater and are not critical for a proper programming sequence.

Figure 6. Programming Waveforms for Dynamic Test.

# SECTION 4

## Operating Modes with M910A

### Blank Check

In this mode, the PROMs in each of the eight COPY sockets are checked to see that they are totally erased. If any copy PROM is not totally blank, the fail indicator beneath that COPY socket illuminates and, upon completion, the M910A sounds the fail tone (alternating soft and shrill tones) and the M910A FAIL indicator illuminates. If all eight Copy PROMs are blank, the M910A sounds a pass tone (constant soft tone) and the M910A PASS indicator illuminates. To repeat the blank check, press RUN. To clear the COPY socket fail indicators, depress RESET.

#### NOTE

Do not insert or remove PROMs while the BUSY LED is illuminated.

### Duplicate

In this mode, the contents of the master PROM are transferred to each of the eight copy PROMs. When entering the duplicate mode, the PM9075A automatically tests for a backward PROM (master or copy), and tests for shorted lines (see page 2). If a short is detected, or if a copy PROM is put in any socket backwards, the FAIL indicator on the M910A illuminates and the fail tone sounds. If all tests pass successfully, the duplication continues. When data is being programmed, the BUSY indicator on the PM9075A illuminates. If any copy PROM fails to properly program the data at any address location, the fail indicator beneath that COPY socket illuminates. The operation continues until the last address of the PROMs is programmed. Then, if any copy PROM has failed to program, the M910A sounds a fail tone and the FAIL indicator illuminates (see Section 6 for other failure modes.) To clear the COPY socket fail indicators, depress RESET. If all copy PROM locations program successfully, the M910A sounds a pass tone and the PASS indicator illuminates. To repeat the duplicate mode, depress RUN.

#### NOTE

Do not repeat the duplicate mode on PROMs that contain data.

### Compare (Formerly Verify)

In this mode, the contents of the master PROM are compared to each of the eight copy PROMs. If any copy PROM fails to compare data at any address, the fail indicator beneath that COPY socket illuminates. The operation continues until the last address of the PROM is compared. If any copy PROM failed to compare at any address, the M910A sounds the fail tone and the FAIL indicator on the control unit illuminates. To clear the copy PROM fail indicators, depress RESET. If all copy PROMs compare successfully, the M910A sounds a pass tone and the PASS indicator illuminates. To repeat this mode, press RUN.

### Auto

In this mode, the M910A sequences through the blank check, duplicate, and compare modes. If there is a failure during the blank check mode, the indicator beneath the failed copy PROM illuminates. If any copy PROMs fail to blank check, the M910A halts at the end of the blank check mode, and the FAIL indicator illuminates. If blank check is successful, the M910A automatically proceeds into the duplicate mode. If failure occurs during the duplicate mode, the indicator beneath the failed copy PROM illuminates. The M910A automatically sequences into the compare mode. To clear the copy PROM fail indicators, depress RESET. To repeat the auto mode, press RUN. Do not repeat the auto mode on PROMs that contain data.





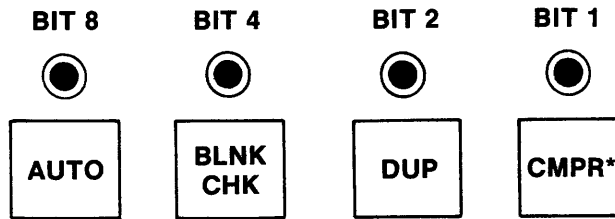
# SECTION 5

## Self-Test with M910A

### How to Select the Self-Test

To select the PM9075A self-test with the M910A, hold the RUN key down and depress and release the RESET key. This places the M910A in the self-test mode, and the PASS, FAIL, and RUN indicators on the M910A illuminate.

The four indicators above the mode keys on the M910A indicate a binary pattern to show which PM9075A self-test is selected (test 1 through test A).



To exit from the self-test mode, press RESET.

### Indicator Test

**Test 1.** Press RUN (binary "1" shown in indicators). This test illuminates one copy indicator at a time, starting at COPY socket 1 and rotating through COPY socket 8 (PASS/FAIL indicators are beneath each COPY socket). Each indicator stays on approximately 0.5s. When the test is complete, the COPY socket indicators go off.

### Vpp Test

Connect the DVM ground (-) lead to pin 12 of any COPY socket. Connect the DVM positive (+) lead to the Vpp pin of any COPY socket according to Fig. 7.

**Test 2.** Press CMPR (binary "2" shown in indicators). Measure Vpp<sup>1</sup> and Vpp<sup>2</sup> to Vcc ± 0.6V.

**Test 3.** Press RUN (binary "3" shown in indicators). Note that the BUSY indicator on the PM9075A is illuminated. Measure Vpp<sup>1</sup> and Vpp<sup>2</sup> using voltages in Fig. 7.

PROM TYPE	Vpp PIN	PROGRAM VOLTAGE
2716	21	25 ± 1
2732	20	25 ± 1
2732A	20	21 ± 0.5
2508/2758	21	25 ± 1
2516	21	25 ± 1
2532	21	25 ± 1

**Figure 7. Vpp Test Pin Assignments and Voltages.**

**Test 4.** Press RUN (binary "4" shown in indicators). Measure Vpp<sup>1</sup> and Vpp<sup>2</sup> to approximately TTL "0."

\* On earlier models of the M910A this key says "VER."

### Vcc Test

Vcc<sup>1</sup> is pin 24 of upper bank COPY sockets. Vcc<sup>2</sup> is pin 24 of lower bank COPY sockets. Connect positive (+) lead of DVM to pin 24 of any COPY socket in the bank.

**Test 5 (High Verify).** Press RUN (binary "5" shown in indicators). Measure Vcc<sup>1</sup> and Vcc<sup>2</sup> to  $5.20 \pm 0.05V$ .

**Test 6 (Nominal - Program).** Press RUN (binary "6" shown in indicators). Measure Vcc<sup>1</sup> and Vcc<sup>2</sup> to  $5.00 \pm 0.05V$ .

**Test 7 (Low Verify).** Press RUN (binary "7" shown in indicators). Measure Vcc<sup>1</sup> and Vcc<sup>2</sup> to  $4.80 \pm 0.05V$ . To exit from the Vcc test, depress RUN.

### Address Line Test

**Test A.** Press AUTO (binary "A" shown in indicators). The address lines (see Fig. 8) toggle from TTL "0" to a TTL "1" level. Check with an oscilloscope set to  $50 \mu s/div$  (see Fig. 9). To exit from the address test, press RUN.

<b>A0</b> -Pin 8	<b>A7</b> -Pin 1
<b>A1</b> -Pin 7	<b>A8</b> -Pin 23
<b>A2</b> -Pin 6	<b>A9</b> -Pin 22
<b>A3</b> -Pin 5	<b>A10</b> -Pin 19 (2K devices)
<b>A4</b> -Pin 4	<b>A11</b> -Pin 18 (2532)
<b>A5</b> -Pin 3	<b>A11</b> -Pin 21 (2732/32A)
<b>A6</b> -Pin 2	

Figure 8. Pin assignments for Address Lines.

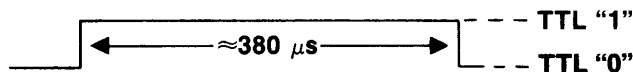


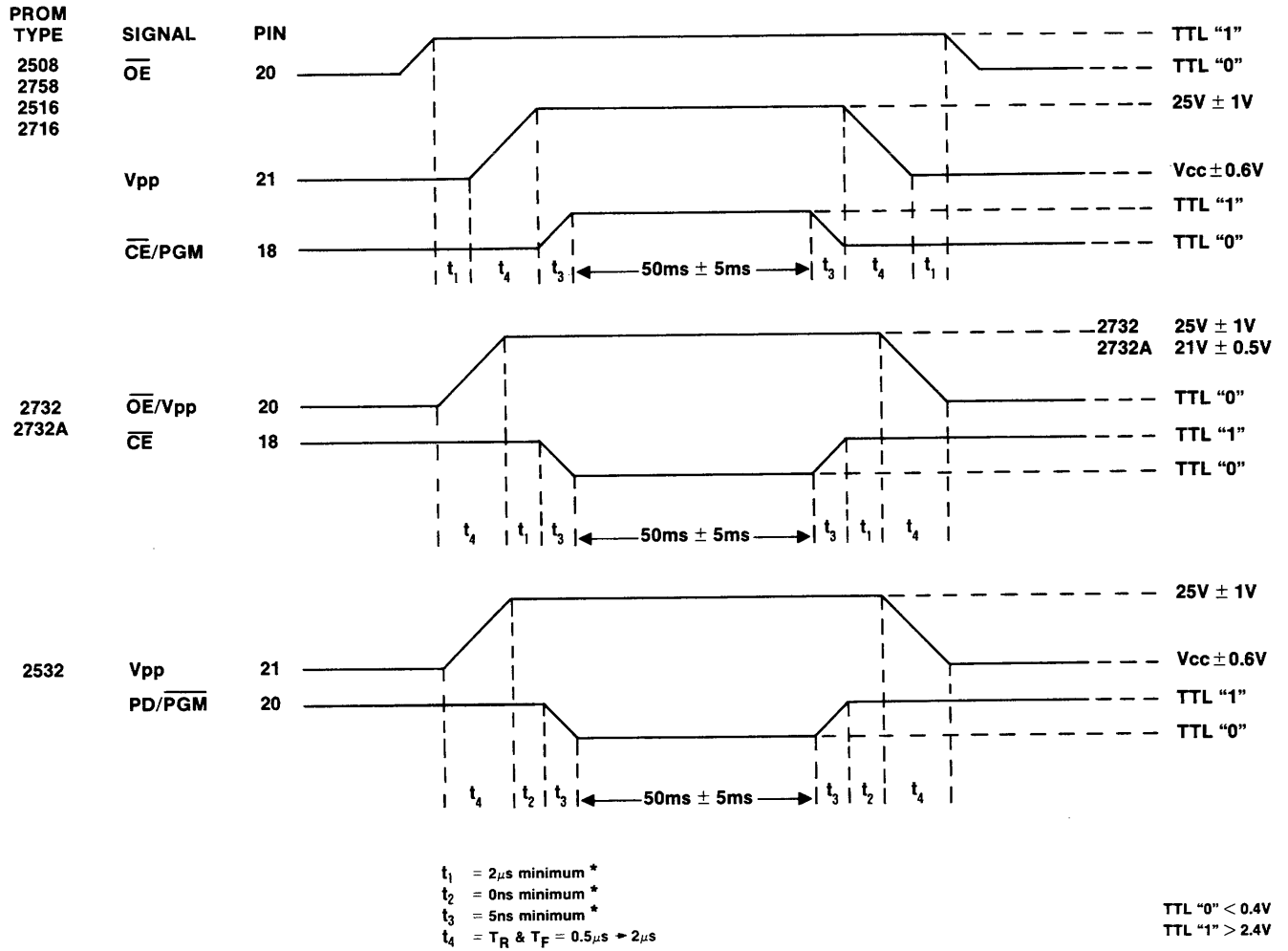
Figure 9. Address Lines Toggle.

### Dynamic Test

**Test 8.** Press DUP (binary "8" shown in indicators). The BUSY indicator on the PM9075A illuminates. This test puts the PM9075A into a continuous programming cycle. Check the appropriate pins for the programming waveforms (Fig. 10). The installed gang configurator determines which waveform will be generated. To exit test, depress RUN.

### Preliminary Test

**Test 9.** Press BLNK CHK (binary "9" shown in indicators). This test checks for Vcc and Vpp shorts and for address line shorts. If a short is detected, the M910A sounds the fail tone and the PASS LED goes off. When the short is removed, press RUN to continue the test. To exit preliminary test, press RUN and hold it down for approximately one second. For an explanation of preliminary tests, see page 2.



\* Minimum times are given. Typical times are much greater and are not critical for a proper programming sequence.

Figure 10. Programming Waveforms for Dynamic Test.



# SECTION 6

## Diagnostics

### Overload Detection

The PM9075A is designed with two separate Vcc regulators and two separate Vpp regulators. One regulator is for bank 1 and the second is for bank 2. If an overload condition is detected, i.e., the current exceeds the preset limit or the voltage drops below the minimum specification, the Vpp regulator for that bank shuts down. The programming operation normally continues in the unaffected bank. However, if the short circuit occurs far enough into the programming pulse for the current address, the data being programmed into the bank in which the short circuit did not occur may be affected. In this event, the PM9075A fails all of the PROMs in the bank in which the short did not occur. The PM9075A verifies each address after it is programmed and detects that the incorrect data has been programmed. The OVERLOAD LED illuminates on the bank containing the short and all of the PASS/FAIL LEDs illuminate on the other bank.

To isolate the defective PROM(s), proceed as follows:

1. Remove all of the PROM(s) in the bank in which the OVERLOAD LED is **not** illuminated. These PROM(s) may be erased and reprogrammed.
2. Take half of the PROM(s) from the bank that had the overload condition and place them in the empty bank.
3. Perform the preliminary test (see self-test instructions for the control unit you are using). This test illuminates the OVERLOAD LED for the bank that contains the defective PROM(s).
4. Repeat steps 2 and 3 until the defective PROM(s) are isolated. The remaining PROM(s) may be erased and reprogrammed as in step 1.

### Large Failure Rate (after self-test)

A large failure rate may have many causes. The most common cause is that the PROMs being programmed were not thoroughly erased before programming. EPROMs are programmed by applying a charge to a cell. The charge must be large enough to be recognized as a programmed bit. The EPROMs are erased by exposing them to UV light, which removes this charge. A partially erased EPROM may still have a residual charge, left in the cell, that is not detectable under best-case conditions. During programming, the charge in the partially erased cell may be detected as a programmed bit.

The PM9075A performs a high and low Vcc test after each address is programmed (Vcc is raised to  $5.20 \pm 0.05V$ , and the data is read and compared to the data that is to be programmed into that address. Vcc is then lowered to  $4.80 \pm 0.05V$  and the same test is performed). During this test, these residual charges may be detected and the PROM fails.

There is an easy test for this PROM failure. First, take the failed PROM and erase it for the recommended length of time. Second, try reprogramming the PROM. If the problem has been one of partially-erased PROMs, most, if not all of the PROMs will pass.



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