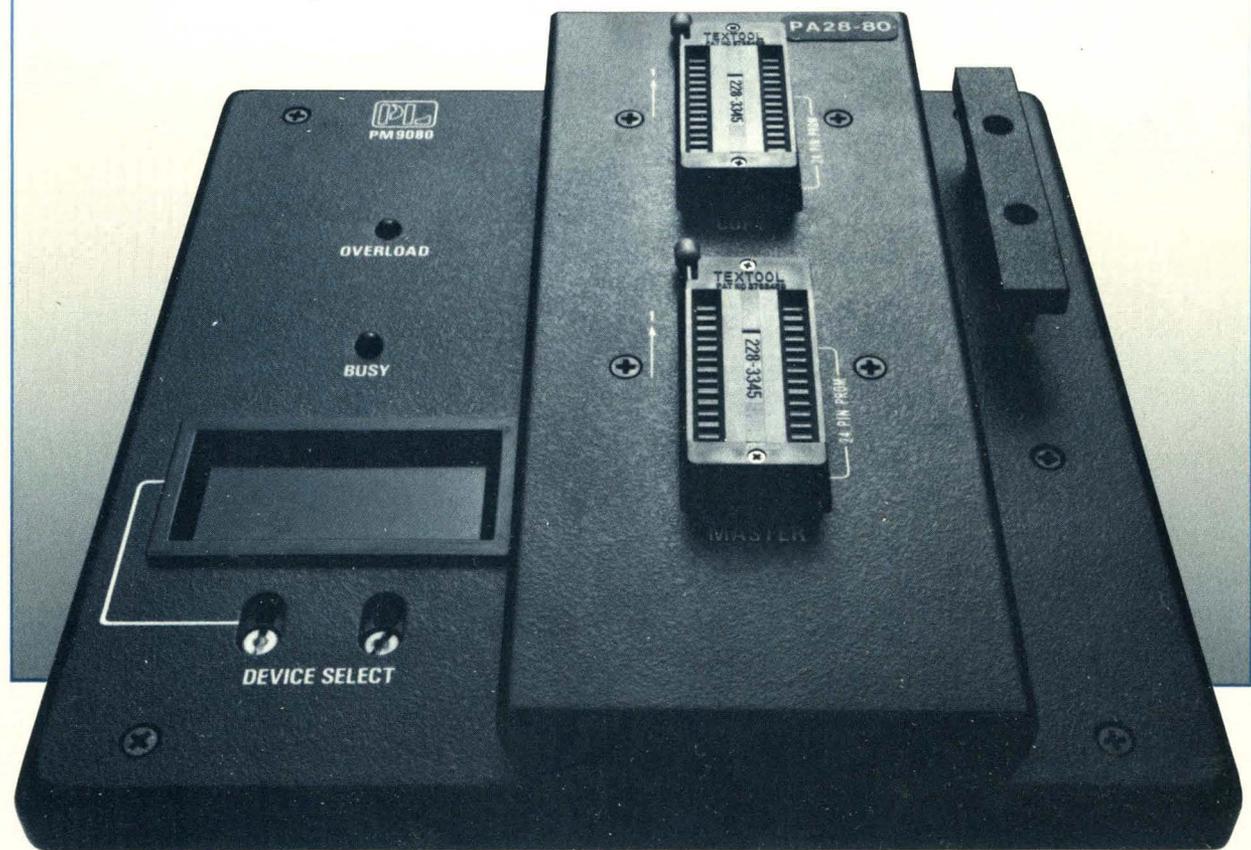


Rev. K

# PM9080 Personality Module

## USER'S MANUAL



The information in this manual has been carefully reviewed and is believed to be entirely reliable. However, no responsibility is assumed for inaccuracies. Furthermore, such information does not convey to the purchaser of the equipment described any license under the patent right of Pro-Log Corporation or others.

The material in this manual is subject to change and Pro-Log Corporation reserves the right to change specifications without notice.

## Warranty

**Warranty:** Seller warrants that the articles furnished hereunder are free from defects in material and workmanship and perform to applicable, published Pro-Log specifications for TWO YEARS FROM DATE OF SHIPMENT for PROM Programmer Control units and Series 7000 Cards. This warranty is in lieu of any other warranty expressed or implied. In no event will Seller be liable for special or consequential damages as a result of any alleged breach of this warranty provision. The liability of Seller hereunder shall be limited to replacing or repairing, at its option, any defective units which are returned F.O.B. Seller's plant. Equipment or parts which have been subject to abuse, misuse, accident, alteration, neglect, unauthorized repair or installation are not covered by warranty. Seller shall have the right of final determination as to the existence and cause of defect. As to items repaired or replaced, the warranty shall continue in effect for the remainder of the warranty period, or for ninety (90) days following date of shipment by Seller or the repaired or replaced part whichever period is longer. No liability is assumed for expendable items such as lamps and fuses. No warranty is made with respect to custom equipment or products produced to Buyer's specifications except as specifically stated in writing by Seller and contained in the contract.

# PM9080 Personality Module User's Manual Update

## USER'S MANUAL UPDATE REVISION B

The PM9080 User's Manual will be revised periodically to reflect new or updated technical information and new pages may be added. The pages in this update packet have been revised — the old pages of the same number should be discarded and replaced by these new pages marked Rev. B. Given here is a list of all the pages which have been replaced by this and all previous updates, and of what revision each page should be. This page replaces the previous title page in the front of the manual.

This update is temporary and provides the user with information on new EPROM types that can be programmed on the PM9080, and also to describe two new features: remote updating and the Signature Mode. A completely revised manual will be available in the near future.

Page	Revision
1-1, 1-2	A
2-1, 2-2	A
6-1, 6-2	A
7-1, 7-2	A
7-3, 7-4	A
7-5, 7-6	A
7-7	A
8-1, 8-2	A
8-3, 8-4	A
8-5, 8-6	A
8-7	A
A-1, A-2,	A
A-3, A-4	B
B-1	B
C-1	B (added)

REV K ADDED 6/14/85 M. DAGUE

# CONTENTS

	Page
<b>Section 1. General Description</b> .....	<b>1-1</b>
Summary .....	1-1
Features .....	1-1
<b>Section 2. Introduction</b> .....	<b>2-1</b>
Front Panel Description .....	2-1
Overload LED .....	2-2
How to Configure the PM9080 for the Proper Device .....	2-3
<b>Section 3. Operating Modes (M980)</b> .....	<b>3-1</b>
Read .....	3-1
Blank Check .....	3-1
Duplicate .....	3-1
Compare .....	3-1
Auto .....	3-1
Program .....	3-2
Checksum .....	3-2
E <sup>2</sup> PROM Erasure .....	3-2
Microcomputer Secure .....	3-2
<b>Section 4. Operating Modes (M910A)</b> .....	<b>4-1</b>
Blank Check .....	4-1
Duplicate .....	4-1
Compare .....	4-2
Auto .....	4-2
E <sup>2</sup> PROM Erasure .....	4-2
Microcomputer Secure .....	4-2
<b>Section 5. PM9080 Diagnostics</b> .....	<b>5-1</b>
High Failure Rate During UV Device Programming .....	5-1
<b>Section 6. Remote Device Selection</b> .....	<b>6-1</b>
Selecting the Remote Function of the PM9080 .....	6-1
Interfacing the Control Unit .....	6-1
Remote Selection of the Device Type to be Programmed .....	6-1
Remote Reset of the PM9080 .....	6-2
Example of Remote Reset and Device Selection .....	6-2
<b>Section 7. PM9080 Field Assurance Confidence Test (M980)</b> .....	<b>7-1</b>
How to Select the Field Assurance Confidence Test (FACT) .....	7-1

	Page
Section 8. PM9080 Field Assurance Confidence Test (M910A) .....	8-1
How to Select the Field Assurance Confidence Test (FACT) .....	8-1
Appendix A. Device Selection Guide .....	A-1
Quick Lookup Table for PM9080 Device Select Switches .....	A-5
Appendix B. PM9080 Software Updating .....	B-1
Introduction .....	B-1
Update Procedure .....	B-1
Remote Updating .....	B-2
Appendix C. Signature Mode .....	C-1
Signature Mode Description .....	C-1
Using the Signature Mode .....	C-1
Appendix D. Self-Test .....	D-1
Programming Waveforms .....	D-1
Timing Notes for Programming Waveforms .....	D-6
Pin Assignments for Address Lines .....	D-6
VPP Test Pin Assignments and Voltages .....	D-7
Return for Repair/Warranty .....	D-8

## FIGURES

Figure	Page
1-1 PM9080 Personality Module .....	1-2
1-2 Error Indications .....	1-4
2-1 PM9080 Front Panel .....	2-1
2-2 Device Selected Display .....	2-2
A-1 28-Pin ZIF Socket .....	A-4

# SECTION 1

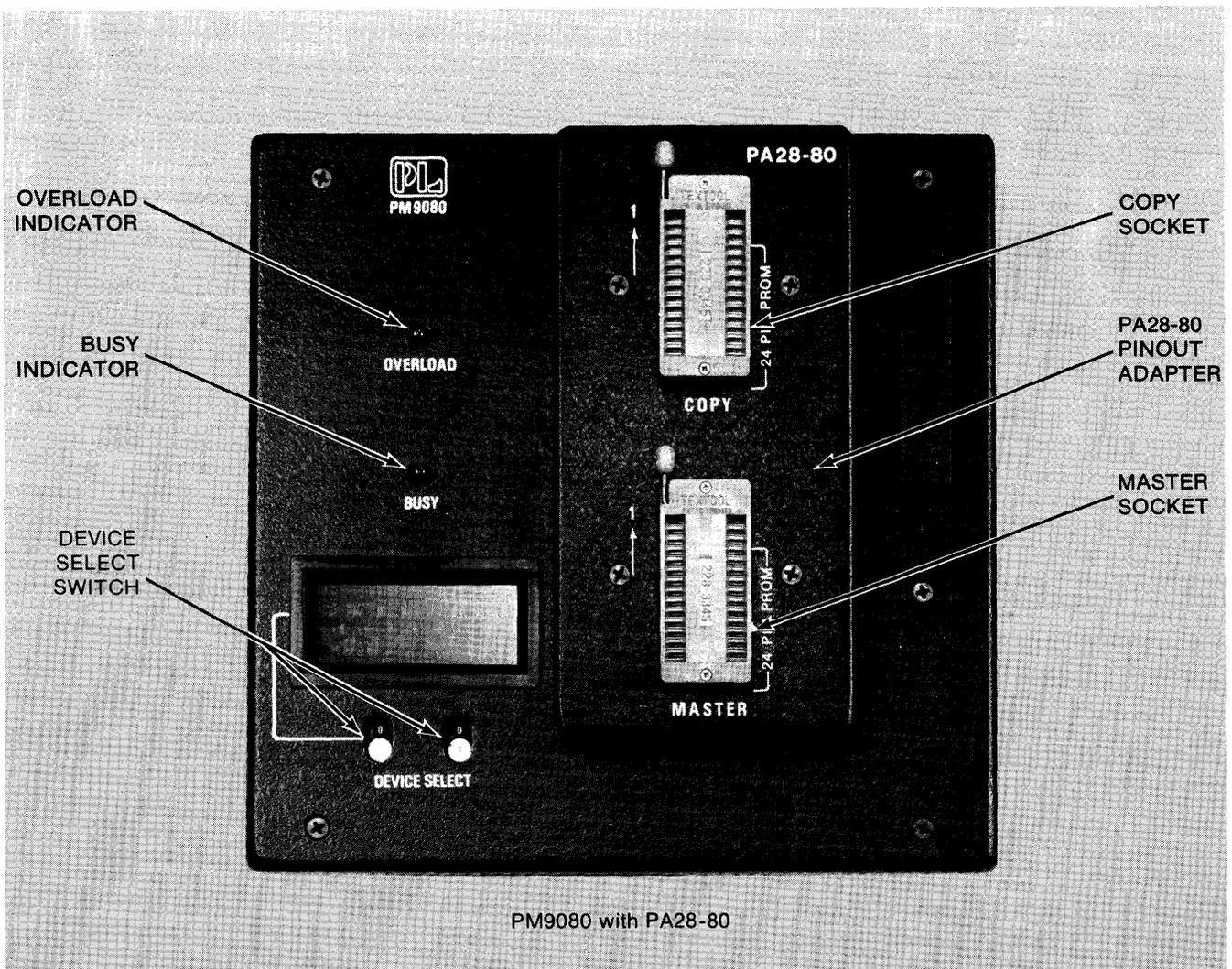
## General Description

### SUMMARY

The PM9080 is a Generic personality module for 5-volt MOS PROMs. It is designed to operate with the series M980 and M910A PROM Programmer control units. The PM9080 with a 28-pin Pinout Adapter can program both 24 and 28-pin devices. Pinout Adapters are available for programming microprocessor and peripheral devices with onboard EPROM. The PM9080 can be configured to program 5-volt MOS devices through onboard switch selection. The device type to be programmed is indicated in an eight-digit alphanumeric display. The PM9080 is capable of programming all popular 5-volt NMOS, CMOS, and HMOS EPROMs and E<sup>2</sup>PROMs. See *Device Selection Guide* for a list of devices that are currently supported.

### FEATURES

- Switch-selectable device programming.
- Cold Sockets.
- Separate MASTER and COPY sockets permit direct duplication and protect the Master device.
- Post-programming High and Low Vcc device test.
- Built-in Field Assurance Confidence Test (FACT) and diagnostics.
- Overload detection circuits and LED indicator.
- Upside-down device detection to protect the devices.
- Capable of supporting Electronic Signature devices.
- Field upgradable software to accommodate additional or revised programming algorithms.
- Optional remote field upgradable capabilities.



## General Description

**Switch-Selectable Device Programming:** Two switches are used to configure the PM9080 to support a particular device. An eight-digit ASCII display will indicate the device selected and can show two messages by alternating between messages every 1.5 seconds. (See Device Selection Guide on page A-1).

**Cold Sockets:** Vcc is never applied to the MASTER or COPY sockets until the function selected is initiated. Vcc is removed immediately after the selected function is completed. This is done to help prevent damage to devices from insertion or removal from hot (Vcc applied) sockets.

**MASTER/COPY Sockets:** These sockets are activated by a handle located adjacent to Pin 1 of the socket. When the handle is raised or in the up position the contacts are open, and the device may be inserted. Lowering the handle engages the contacts and locks the device in place. The MASTER socket is a read-only socket to protect the master device from being accidentally programmed. (See Appendix A for further details).

**High and Low Vcc Compare:** Following the programming of each address in the copy device, Vcc is raised to the high limit of 5.20 V. The data in this address is read and compared to the data source. Vcc is then lowered to the low limit of 4.80V and the data is read and compared again. These tests are performed to detect faulty devices.

**FACT (Field Assurance Confidence Test):** Firmware is included which will allow various voltage levels and dynamic programming waveforms to be applied to the COPY socket. The tests available for each programming algorithm are: a. Vcc HIGH, LOW, and NOMINAL (COPY socket only); b. Vpp HIGH, LOW, and 0 volts (COPY socket only); c. Address Lines; d. Dynamic Vpp programming waveform test (COPY socket only); e. Short Detection Test which tests for Vcc overload and shorted address and data lines.

**Short Detection Tests:** At all times Vcc for the MASTER and COPY sockets is hardware monitored for shorts. During any program sequence, Vpp on the COPY socket is monitored for a short. If Vcc or Vpp has a short, or is drawing excessive current, the PM9080 will illuminate the OVERLOAD indicator and the Control Unit will indicate an error.

When entering the PROGRAM or DUPLICATE mode, the PM9080 automatically implements a test to check for PM address and data lines. If a shorted address or data line is found, a failure is indicated on the control unit and the operation will not be initiated. If all tests pass successfully, the mode that was selected will continue normally. This test will normally detect any device which was inserted into the COPY or MASTER socket upside down.

**Electronic Signature Capability:** To allow for Electronic Signature, address line A9 has the capability of being set high to either TTL V<sub>IH</sub> level or 11.75V. When the device selected is an Electronic Signature part, address line A9 is set to 11.75V by software. The signature (an eight-bit byte) is then read from the device. The correct programming algorithm is determined automatically by the PM9080 using a

lookup table. The PM9080 display will indicate the device for which it is configured to program.

**Field Upgradable Software:** Since programming algorithms are software based, updating the PM9080 when new PROMs are developed is a simple and easy project. The software which controls programming algorithms is located in PROMs (2732 or 2764) that are readily accessible in the PM9080. When you want to program MOS devices introduced after you've purchased your PM9080, simply order the latest set of PROMs for do-it-yourself installation.

**Optional Remote Field Update of Software:** This feature allows remote on-board programming of the PM9080 control PROMs by customers who have a number of programmers in the field. Updating involves adding new device programming algorithms or changing existing algorithms in the software contained in the PM9080. For detailed information on software updating see Appendix B.

### NOTE

**M980 Control Units built prior to April 1982 require a software update to work with the PM9080.**

### ERROR INDICATIONS

Program Mode	Error
<b>M980</b>	
E8 + Overload	Fail LED + Overload Short on Vcc or Vpp
E8 w/o Overload	Fail LED w/o Overload Short on Address or Data line
<b>Update Mode</b>	
E9	Fail LED + Fast Fail tone Algorithm Code not recognized
EA	Fail LED + Slow Fail tone Failure to program the new algorithm code into the PM9080
<b>Others</b>	
E4	Fail LED w/o Overload (After RESET/Power ON) Device Select switches incorrectly set or PM9080 not properly inserted.
E0	(M980 only) MASTER/BUFFER/COPY switches incorrectly set

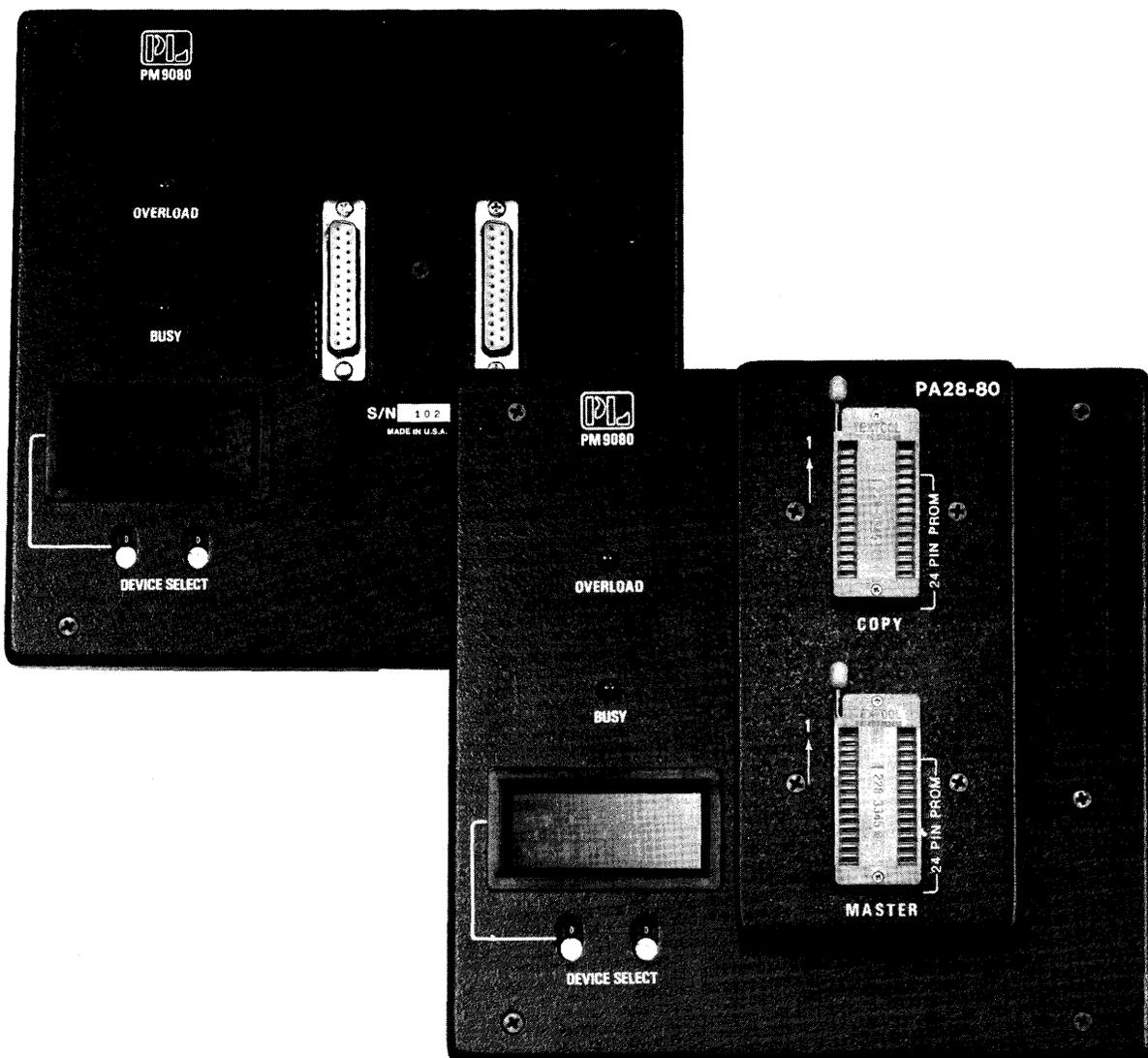
# SECTION 2

## Introduction

### FRONT PANEL DESCRIPTION

**MASTER Socket:** This socket, located on the plug-in Pinout Adapter, accepts previously programmed devices that are to be Duplicated or Compared, Blank Checked, Checksummed, or Read. The programming voltage,  $V_{pp}$ , is not connected to the MASTER socket, so it is impossible to accidentally alter the Master device. A zero insertion force (ZIF) socket is used for ease of device insertion and removal.

**COPY Socket:** This socket accepts the device to be Programmed, Duplicated or Compared, Checksummed, Blank Checked, or Read. After RESET or when the selected function is finished,  $V_{cc}$  is reduced to less than 0.6V. This "cold socket" condition is necessary to prevent damage to some devices. A zero insertion force (ZIF) socket is used for ease of device insertion and removal.



PM9080 with PA28-80 Installed

## Introduction

**BUSY LED:** This indicator is illuminated whenever Vpp is applied to the COPY socket. It is illuminated continuously during the duplication operation. **Warning:** Devices should not be inserted or removed when the BUSY LED is illuminated as this may damage some devices.

**DEVICE SELECT Switches:** These two hexadecimal coded, rotary switches are used to configure the PM9080 to program a particular device. A small flat-head screwdriver is required to change the switch positions.

**Alphanumeric Display:** This 8-digit alphanumeric display indicates the device type to be programmed. When the DEVICE SELECT switches are changed the display will change.

**OVERLOAD LED:** During any operation where they are used, the Vpp voltage supplied to the COPY socket and Vcc for the COPY and MASTER sockets are monitored for excessive current. If an overload should occur, the OVERLOAD indicator will illuminate and shut down Vpp. An overload condition on the M980 will be accompanied with an "E8" displayed and the FAIL tone will sound if enabled. On the M910A control unit the FAIL indicator will illuminate and the FAIL tone will sound.

### HOW TO CONFIGURE THE PM9080 FOR THE PROPER DEVICE

1. First find the device type under its Manufacturer's name using the DEVICE SELECTION GUIDE on page A-1. Note: For user convenience, device part numbers appear in numerical order starting with the device's first digit.
2. Find the two-digit hex number corresponding to that part. This will be located under the column named SWITCH POSITION.
3. Using a small flat-head screwdriver, select this number on the two hex rotary DEVICE SELECT switches located in the lower left-hand corner of the PM9080. When this number is selected, the device type will be displayed in the 8-digit alphanumeric displays above these hex rotary switches. Note: If a new device type is selected immediately after performing a function, depress RESET.
4. Find the Pinout Adapter type for the device to be programmed. This will be located under the column named PINOUT ADAPTER. (NOTE: All 24-pin and 28-pin PROMs use the PA28-80 adapter).
5. Plug the appropriate Pinout Adapter into the PM9080. The PM9080 is now configured for that device type.

#### WARNING

Use only the appropriate pinout adapter as shown in Appendix A, Device Selection Guide. Insertion of a pinout adapter other than those listed may damage the PM9080 and will void the Pro-Log warranty.



Device Select Switch and Display

## OPERATING MODES (M980)

**READ**

In this mode, the contents of the device in the Copy socket are shown hexadecimally in the M980 display. See section 5 of the M980 user's manual.

**BLANK CHECK**

In this mode, the device in the Copy or Master socket is checked to see that it is totally erased. If the Copy or Master device is not unprogrammed, the M980 displays an error message. You can blank check all or part of the device. See section 5 of the M980 user's manual.

**DUPLICATE**

In this mode, the contents of the Master device (or of the M980 RAM buffer) are programmed into the Copy device. While data is being programmed, the BUSY LED is illuminated.<sup>1</sup> Following the programming of each address, the data is read at the high and low VCC limits and compared to the source. When the device passes, an "F" is displayed by the M980. If any location in the Copy device fails to program, the M980 shows an error message. See sections 5 and 6 of the M980 user's manual.

**COMPARE**

In this mode, the data in the Master device (or in the M980 RAM buffer) is compared to the data in the Copy device. When the device compares completely, the M980 displays "F." If the Copy device fails to compare properly, the M980 displays an error message. See sections 5 and 6 of the M980 user's manual.

**AUTO**

In this mode, the M980 automatically sequences through the blank check, duplicate, and compare modes. See the individual mode descriptions for pass and fail indications.

**NOTE**

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

<sup>1</sup>M980 control units built prior to April 1982 require a software update to work with the PM9080.

## PROGRAM

In this mode, data is manually entered from the keyboard and programmed into the Copy socket. While data is being programmed, the BUSY LED is on. See section 5 of the M980 user's manual.

## CHECKSUM

In this mode, the binary sum of the data in all addresses is automatically calculated and shown in hexadecimal form in the M980 display (the least significant six digits). You may checksum the Master or Copy device. To ensure proper insertion and operation of the Master device, a checksum should be performed on the Master device prior to performing the compare or duplicate modes. See section 5 of the M980 user's manual.

### NOTE

The start/end address displayed on the M980 is always eight digits, regardless of the device size. Example: For a 2716 device (2Kx8), the start/end address is "000007FF."

## E<sup>2</sup>PROM ERASURE

Place the E<sup>2</sup>PROM to be totally erased into the Copy socket. Place the Device Select switches into the ERASE position for the Copy device. Use the standard keystrokes to program the erased state (usually FF hex) into the first location of the Copy device. Circuitry and software within the PM9080 erase the entire E<sup>2</sup>PROM.

## MICROCOMPUTER SECURE

Place the device to be secured into the Copy socket. Select position 4C on the Device Select switches. Perform a Duplicate Master to Copy function. The device is now secured. De-activation of the secure feature can only be accomplished by erasing the entire device.

## OPERATING MODES (M910A)

**BLANK CHECK**

In this mode, the Copy device is checked to see that it is blank (unprogrammed). When the Copy device is blank, the M910A sounds a PASS tone (constant soft tone) and the M910A PASS indicator illuminates. If the Copy device is not totally blank, the M910A sounds the FAIL tone (alternating soft and shrill tones) and the M910A FAIL indicator illuminates. To repeat the BLANK CHECK, press RUN.

**DUPLICATE**

In this mode, the contents of the Master device are transferred to the Copy device. When entering the DUPLICATE mode, the PM9080 implements a test to check for an improperly inserted device (Master or Copy), and a test for shorted lines (see Short-Detection Test, page 1-3). If a short is detected, or if a device is put in any socket incorrectly, the FAIL indicator illuminates and the FAIL tone sounds. If all tests pass successfully, the duplication continues. When data is being programmed, the BUSY indicator on the PM9080 illuminates. When all Copy device locations have programmed successfully, the M910A sounds a PASS tone and the PASS indicator illuminates. If the Copy device fails to properly program the data at any address location, the M910A sounds a FAIL tone and the FAIL indicator illuminates.

**CAUTION**

Do not repeat the DUPLICATE mode on devices that contain data.

**NOTE**

Do not insert or remove devices while the BUSY indicator is illuminated.

---

M910A control units built prior to April 1982 require a software update to work with the PM9080.

## **COMPARE**

In this mode, the contents of the Master device are compared to those of the Copy device. The operation continues until the last address of the device is compared. When the Copy device compares successfully, the M910A sounds a PASS tone and the PASS indicator illuminates. If the Copy device fails to compare at any address, the M910A sounds the FAIL tone and the FAIL indicator illuminates. To repeat this mode, press RUN.

## **AUTO**

In this mode, the M910A sequences through the blank check, duplicate, and compare modes. When the blank check is successful, the M910A automatically proceeds into the duplicate mode. When the duplicate mode is successful, the M910A automatically sequences into the compare mode. To repeat the AUTO mode, press RUN. If failure occurs during any mode, the FAIL indicator illuminates, the FAIL tone sounds, and the indicator for the mode which failed remains illuminated.

## **E<sup>2</sup>PROM ERASURE**

Place the E<sup>2</sup>PROM to be totally erased into the Copy socket. Place the device select switches into the ERASE position for the Copy device. Perform a duplication function.

## **MICROCOMPUTER SECURE**

Place the device to be secured into the Copy socket. Select position 4C on the Device Select switches. Perform a Duplicate function. The device is now secured. De-activation of the secure feature can only be accomplished by erasing the entire device.

## SECTION 5

# PM9080 Diagnostics

### **LARGE FAILURE RATE DURING PROGRAMMING OF UV DEVICES**

A large failure rate of UV devices may be caused by many things. The most common failure occurs because these devices being programmed were not thoroughly erased prior to programming. MOS devices are programmed by applying a charge to a cell, large enough to be recognized as a programmed bit. These devices are erased by exposing them to UV light which dissipates this charge. Because of this, a device that is partially erased may still have a residual charge left in the cell that is not detectable under best-case conditions. During programming, these partially erased cells may receive enough charge to be detected as a programmed bit. The PM9080 performs a High and Low Vcc Test (Vcc is raised to 5.20 volts, 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 volts and the same test is performed after each address is programmed). During this test these residual charges may be detected and the device will fail.

There is an easy test for this failure. First, take the failed UV devices and erase them for the recommended length of time. Second, try reprogramming these parts; if the problem has been partially erased devices, most, if not all, of these devices will pass. To see if these devices are coming from the manufacturer with partially erased locations, take a sample of 32 devices and program half of them without erasing. Take the other half and erase them for the recommended time. Program these UV devices. Compare your results.



# SECTION 6

## Remote Device Selection

### SELECTING THE REMOTE FUNCTION OF THE PM9080

- Step #1** Install the appropriate pinout adapter for the device to be programmed. **Note:** See warning, page 2-2 Rev A.
- Step #2** Using a small flat-head screwdriver, turn the DEVICE SELECT Switches to the 00 position.

### INTERFACING THE CONTROL UNIT

**NOTE:** Do not plug in the M304 Adapter with power ON.

- Step #1** Plug the M304 Adapter into the control unit.
- Step #2** Connect the remote unit (i.e., Terminal/Computer) to the M304. (See the RS232 Section in your control unit User's Manual for further information on this connection.)
- Step #3** Turn the Control Unit Power ON. REMOTE is displayed on the PM9080 display.
- Step #4** Select the appropriate RS232 format active to receive data. (See the RS232 Section in your control unit User's Manual for further information on selecting an RS232 format.)

### REMOTE SELECTION OF THE DEVICE TYPE TO BE PROGRAMMED (After manual or power on RESET of the control unit)<sup>1</sup>

- Step #1** Download one byte of data to the control unit's first RAM location (Hex address 0000) using the format selected. This data will be the hex equivalent of the DEVICE SELECT Switch position for the device to be programmed (see Device Selection Guide). Example: To remotely configure the PM9080 to program 2764s, download the data 0B Hex to the control unit RAM location 0000 Hex.
- Step #2** Using the control unit remote control commands (see the Remote Control Section of your control unit User's Manual for further details), program this byte only into the PM9080 by duplicating to the Copy (see Example). **Note:** This will not program this data into the device. This will only select the device type.
- Step #3** The control unit will respond appropriately. The PM9080 is now configured for the device type represented by the 8-bit byte sent to the control unit and PM9080. "2764" is displayed on the PM9080.

### REMOTE RESET OF THE PM9080

The REMOTE RESET of the PM9080 is performed by reading two locations from the Master to the control unit RAM Buffer. This is accomplished by using the control unit remote control commands as follows.

- Step #1** Using the remote control commands, read the Master location E000(H) into the control unit RAM Buffer. The command is QXDME000E000. The control unit will respond appropriately.
- Step #2** Next, read the Master location 0000(H) into the control unit RAM Buffer. This command is QXDM00000000. The control unit will respond appropriately. The PM9080 is now reset. The PM9080 Device Select display will indicate REMOTE if the DEVICE SELECT Switches are in the 00 position. The remote unit may now use the remote device selection sequence described previously in this section. (See example.)

### EXAMPLE OF REMOTE RESET AND DEVICE SELECTION (Using INTEL Hex format)

- Step #1** Power is OFF on the control unit.
- Step #2** Place the PM9080 Device Select Switches in the 00 position.
- Step #3** Install the M304 RS232 Adapter and connect the remote unit.
- Step #4** Turn the control unit POWER ON. The PM9080 will display REMOTE.
- Step #5** Select the RS232 format active using the instructions in the Control Unit's User's Manual. The control unit is now ready to accept remote commands.
- Step #6** Using the control unit remote commands send QXDME000E000. The control unit will respond with "Y" "Bell" "CR" "LF" to acknowledge the completion of this command.
- Step #7** Using the control unit remote commands send QXDM00000000. The control unit will respond with "Y" "Bell" "CR" "LF" to acknowledge the completion of this command. The PM9080 is now ready to accept the device type to be programmed.
- Step #8** Using the selected format (e.g., INTEL), download the Device Selection number for the device to be programmed, into the control unit RAM Buffer location 0000.

:01000000XXCC Where XX=Device Select switch number.  
Where CC=CHECKSUM

<sup>1</sup>If a device type is to be remotely selected and a different device has previously been selected, a MANUAL or REMOTE RESET must be performed to assure proper acceptance of the remote device selection.

## Remote Device Programming

---

**Step #9** Using the control unit remote commands, send QXDB00000000. The control unit will respond with "Y" "Bell" "CR" "LF" to acknowledge the completion of this command. The PM9080 will display the device type selected.

**Step #10** Place the device to be programmed into the COPY socket. Download to the control unit RAM Buffer, the data to be programmed into the device. Then, using the remote control commands, program this data into the selected device. To select another device type, repeat Steps 6 thru 9.

# SECTION 7

## PM9080 Field Assurance Confidence Test (M980)

### HOW TO SELECT THE FIELD ASSURANCE CONFIDENCE TEST (FACT).

To enter the PM9080 confidence test, first select the Device type using the two DEVICE SELECTION switches<sup>1</sup> on the PM9080. Next, select the self-test mode of the M980. Hold any key down while pressing and releasing the RESET key. (See Section 14 of the M980 USER'S MANUAL.) The M980 will display "0 0 0 0" (M980 self-test selected). Press key F to enter the PM9080 confidence-test (the M980 will display "F0").

Keys 0 through 9 select the PM9080 confidence tests. (Do not press RESET between tests or you will exit the entire confidence test.) By pressing one of these keys and then ENTER, the test is executed. Keys A through F and Key 6 will result in an "E0" error (invalid test). To repeat any test, press ENTER.

#### Vpp Test<sup>1</sup>

Connect the DVM ground (-) lead to pin 14 for a 28-pin COPY socket or pin 20 for a 40-pin socket. See Fig.7-1 for pin assignments and voltages.

**Key 0.** Press Key 0 and ENTER. This will set Vpp to less than 0.6V. The M980 will display "F0 F."

**Key 1.** Press 1 and ENTER. This will set Vpp to its low voltage value (see Figure 7-1). The M980 will display "F1 AAA." Press CLEAR to exit this test. The M980 will display "F1 F."

**Key 2.** Press 2 and ENTER. The M980 will display "F2 AAA." This will set Vpp to its high voltage value. (Note: The BUSY indicator is illuminated). Press CLEAR To exit this test. The M980 will display "F2 F."

#### Vcc Test<sup>1,2</sup>

Vcc is pin 26 for 24-pin devices and pin 28 for 28-pin devices when using the PA28-80. Vcc is pin 40 when using the PA40-80/81/82.

**Key 3 (Vcc High).** Press key 3 and ENTER. This will set Vcc to 5.20±0.05V. The M980 will display "F3 AAA." Press CLEAR to exit test. The M980 will display "F3 F."

**Key 4 (Vcc Nominal).** Press key 4 and ENTER. This will set Vcc to 5.00±0.05V. The M980 will display "F4 AAA." Press CLEAR to exit test. The M980 will display "F4 F."

**Key 5 (Vcc Low).** Press key 5 and ENTER. This will set Vcc to 4.80±0.05V. The M980 will display "F5 AAA." Press CLEAR to exit test. The M980 will display "F5 F."

DEVICE TYPE	Vpp PIN	Vpp LOW	Vpp HIGH
2508/16	23	5.00±0.6V	25±1V
2532	23	5.00±0.6V	25±1V
2564	1	5.00±0.5V	25±1V
2716/58	23	5.00±0.6V	25±1V
2732	22	TTL "0"	25±1V
2732A	22	TTL "0"	21±0.5V
2764	1	5.00±0.25V	21±0.5V
MK2764	22	TTL "0"	25±0.5V
27128	1	5.00±0.25V	21±0.5V
2808/2816	23	5.00±1V	21±1V
2817	1	N/A	21±1V
3004/08,3704/08	26	5.00±1V	16±1V
48016	23	5.00±0.5V	25±1V
68764/766	22	TTL "1"	25±1V
8741A	26	5.00±0.25V	25±1.5V
8748	26	5.00±0.25V	25±1.5V
8748H	26	5.00±0.25V	21±0.5V
8749H	26	5.00±0.25V	21±0.5V
8751	31	5.00±0.6V	21±0.5V
8755A	1	5.00±0.6V	25±1V

Note: For 24 and 28-pin devices all pin references are made to a 28-pin socket.

Figure 7-1. Vpp Test Pin Assignments and Voltages

<sup>1</sup> For those devices having two positions (i.e., PROGRAM and ERASE), select the PROGRAM position. The ERASE position need only be used with the dynamic test.

<sup>2</sup> For 24 and 28-pin devices all pin references are made to a 28-pin socket.

**Address Line Test**

**Key 9.** Press key 9 and ENTER. The M980 will display "F9 AAA." The address lines (see Figure 7-2) will toggle

from TTL "0" to a TTL "1" level<sup>1</sup>. Check with an oscilloscope set to 50us/div. Press CLEAR to exit this test. The M980 will display "F9 F."

<b>Pinout Adapter</b> <b>PA28-80</b>	<b>A0</b> Pin 10 (All devices)	<b>A8</b> Pin 25 (All devices)
	<b>A1</b> Pin 9 (All devices)	<b>A9</b> Pin 24 (All devices) <sup>1</sup>
	<b>A2</b> Pin 8 (All devices)	<b>A10</b> Pin 21 (2K and larger devices)
	<b>A3</b> Pin 7 (All devices)	<b>A11</b> Pin 20 (2532/64,68764/66) Pin 23 (2732/64)
	<b>A4</b> Pin 6 (All devices)	<b>A12</b> Pin 23 (2564,68764/66) Pin 2 (2764)
	<b>A5</b> Pin 5 (All devices)	<b>A13</b> Pin 26 (27128)
	<b>A6</b> Pin 4 (All devices)	
	<b>A7</b> Pin 3 (All devices)	
<b>PA40-80/82</b>	<b>A0</b> Pin 12 (All devices)	<b>A6</b> Pin 18 (All devices)
	<b>A1</b> Pin 13 (All devices)	<b>A7</b> Pin 19 (All devices)
	<b>A2</b> Pin 14 (All devices)	<b>A8</b> Pin 21 (All devices)
	<b>A3</b> Pin 15 (All devices)	<b>A9</b> Pin 22 (All devices)
	<b>A4</b> Pin 16 (All devices)	<b>A10</b> Pin 23 (All devices)
	<b>A5</b> Pin 17 (All devices)	<b>A11</b> Pin 24 (2K devices)
<b>PA40-81</b>	<b>A0</b> Pin 39	<b>A6</b> Pin 33
	<b>A1</b> Pin 38	<b>A7</b> Pin 32
	<b>A2</b> Pin 37	<b>A8</b> Pin 21
	<b>A3</b> Pin 36	<b>A9</b> Pin 22
	<b>A4</b> Pin 35	<b>A10</b> Pin 23
	<b>A5</b> Pin 34	<b>A11</b> Pin 24 <b>A12</b> Pin 25

Figure 7-2. Pin Assignments for Address Lines

**Dynamic Test**

**Key 7.** Press key 7 and ENTER. The M980 will display "F7 AAA," and the BUSY indicator on the PM9080 will be illuminated. This test puts the PM9080 into a continuous programming cycle. Check the appropriate pins for the programming waveforms below. The device selected by the hex switches will determine which of the waveforms in Figures 7-3 thru 7-8 will be generated.

**Short Detection Test<sup>2</sup>**

**Key 8.** Press key 8 and ENTER. The M980 will display "F8 AAA." This test checks for shorts on Vcc, Vpp, address and data lines. If there are any shorts, "F8 E8" will be displayed for error. The OVERLOAD LED will illuminate if the short is on Vcc or Vpp. To repeat this test after an error is found, press ENTER. Press CLEAR to exit this test. The M980 will display "F8 F."

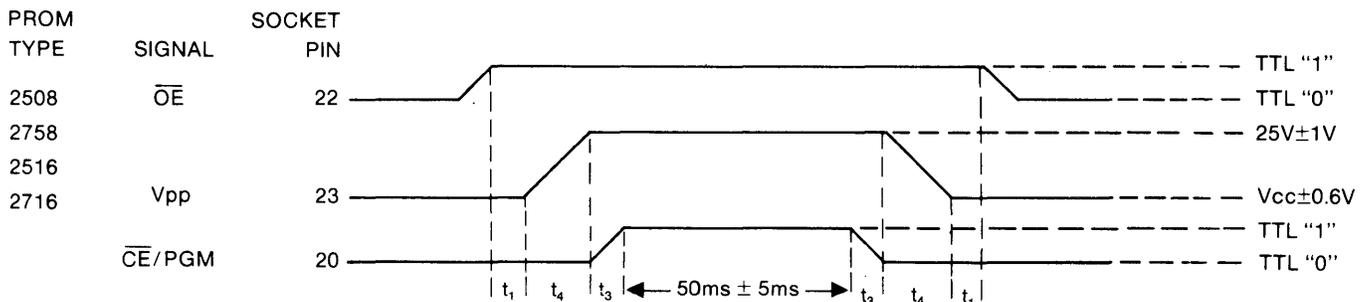


Figure 7-3. Programming Waveforms for Dynamic Test

<sup>1</sup> Address line A9 will toggle from TTL "0" to a  $V_{IH}$  level of  $11.75V \pm 25V$ .

<sup>2</sup> Data lines cannot be tested for shorts on the PA40-80, 81, or 82.

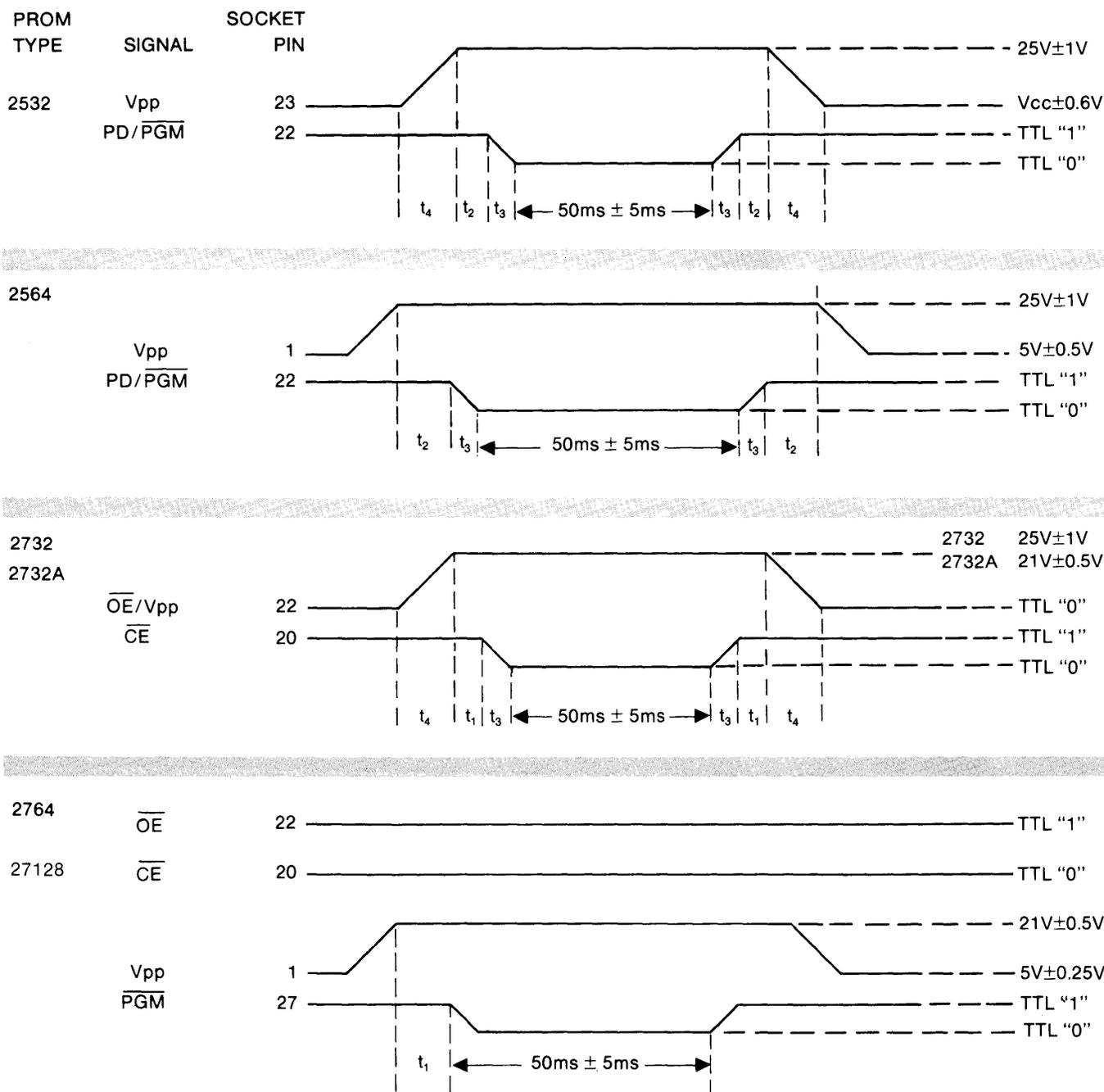


Figure 7-4. Programming Waveforms for Dynamic Test

Field Assurance Confidence Test (FACT) M910A

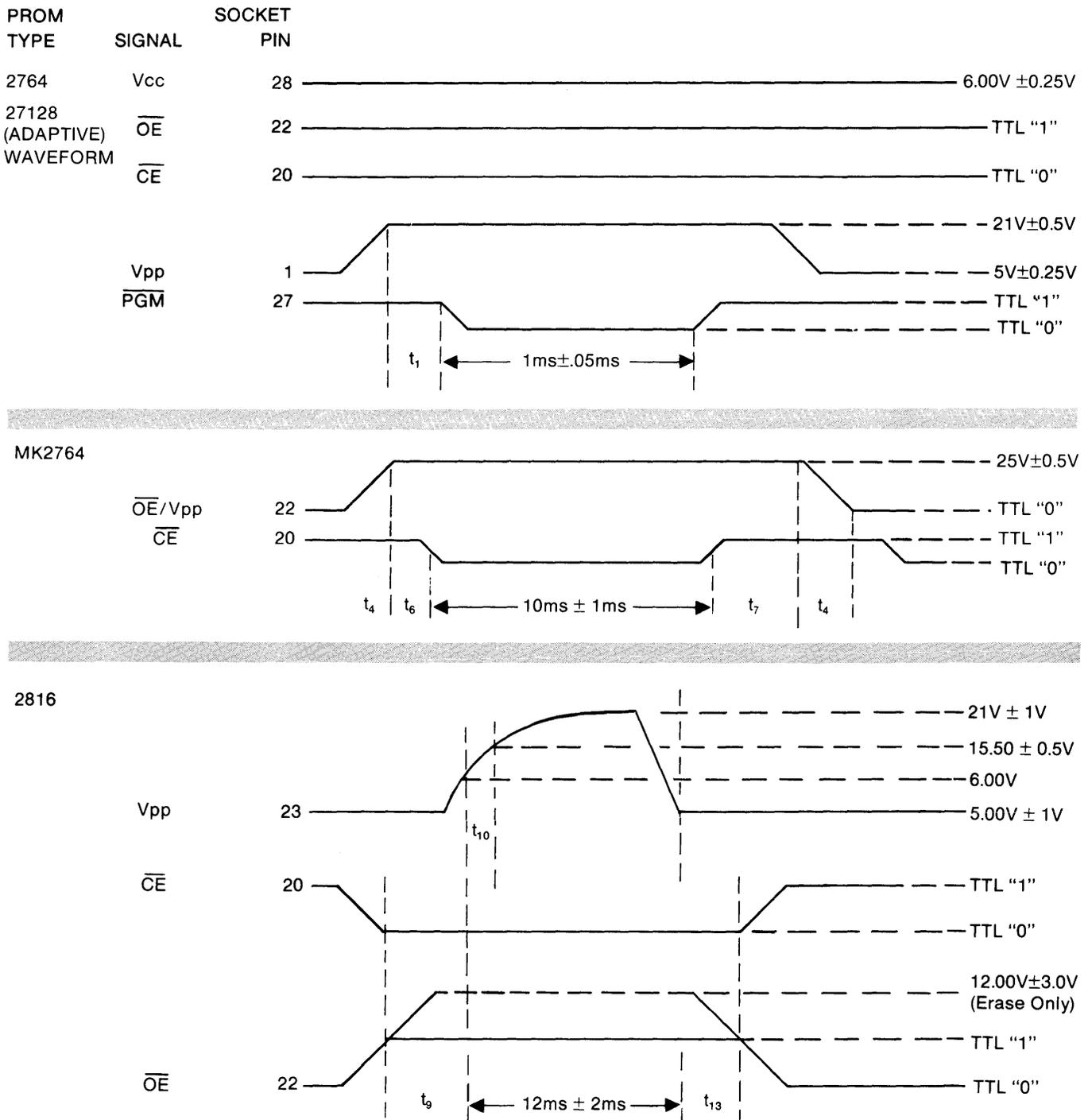


Figure 7-5. Programming Waveforms for Dynamic Test

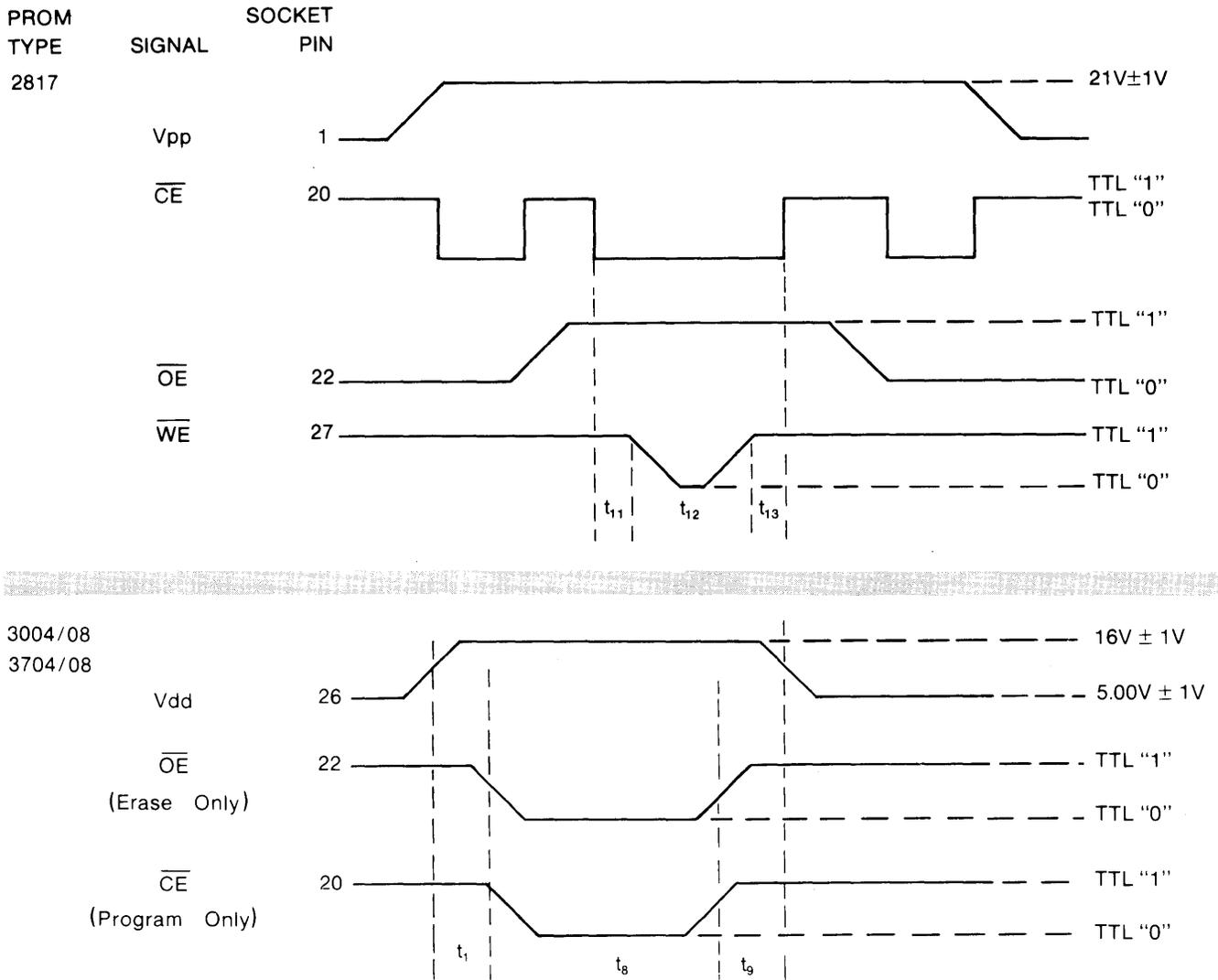


Figure 7-6. Programming Waveforms for Dynamic Test

Field Assurance Confidence Test (FACT) M910A

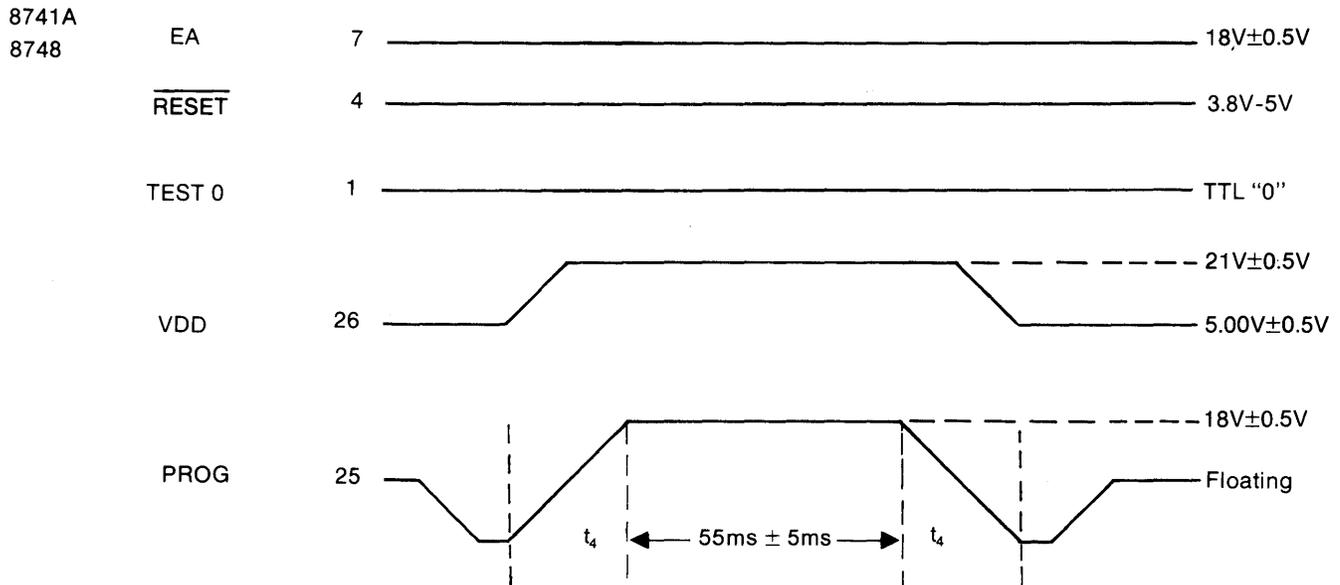
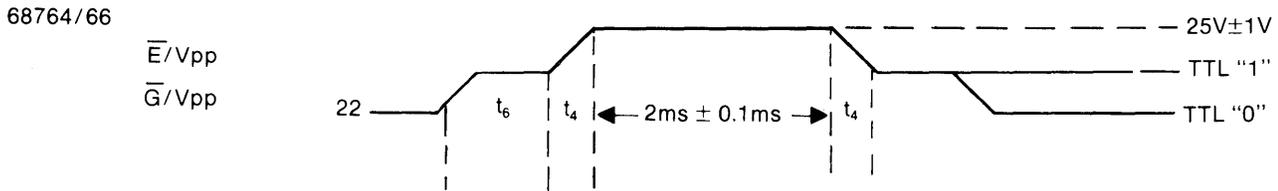
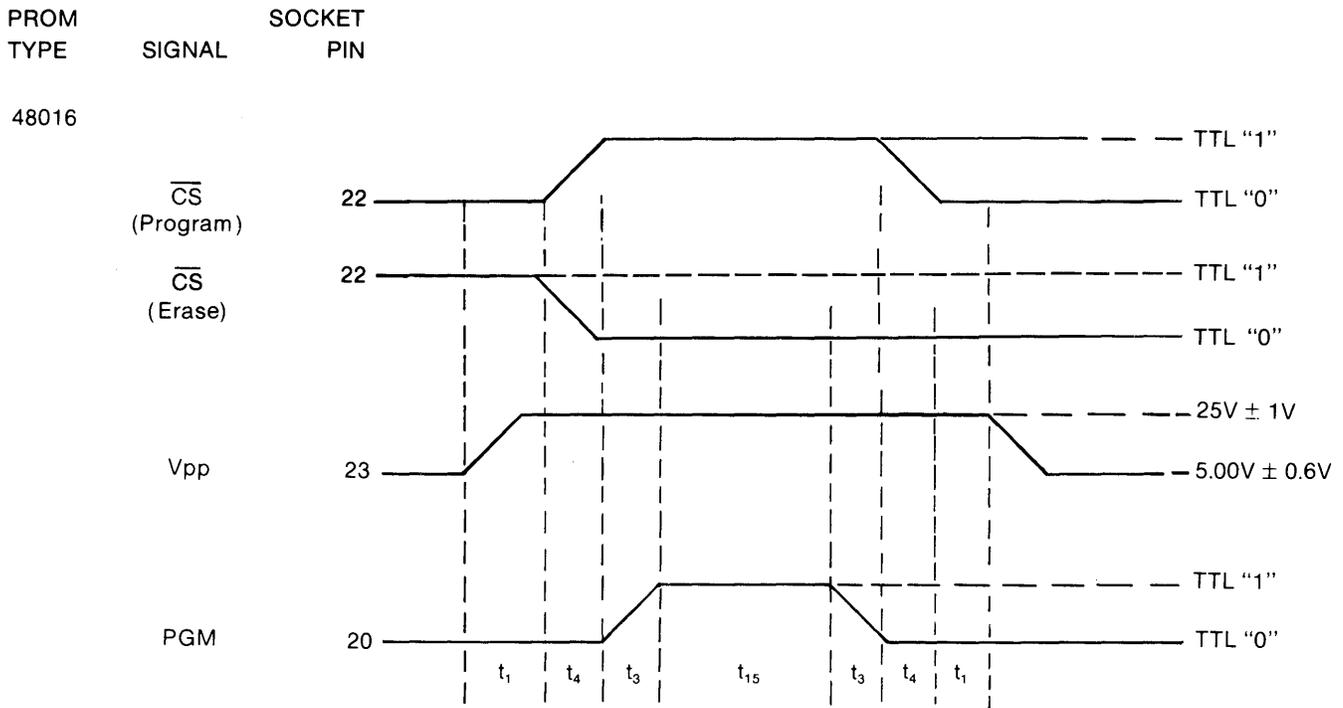


Figure 7-7. Programming Waveforms for Dynamic Test

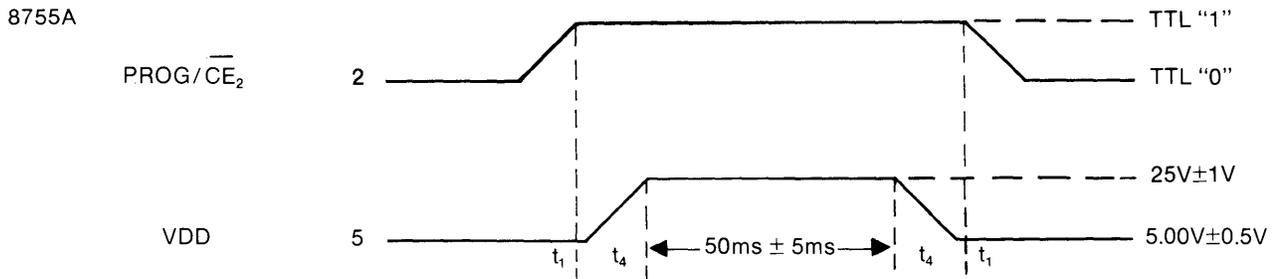
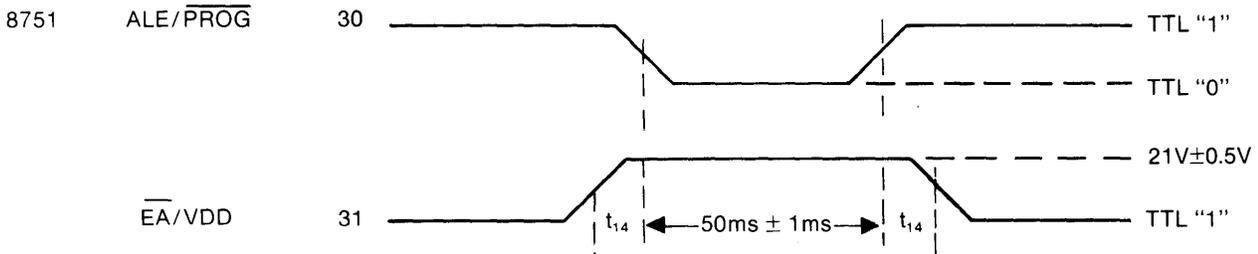
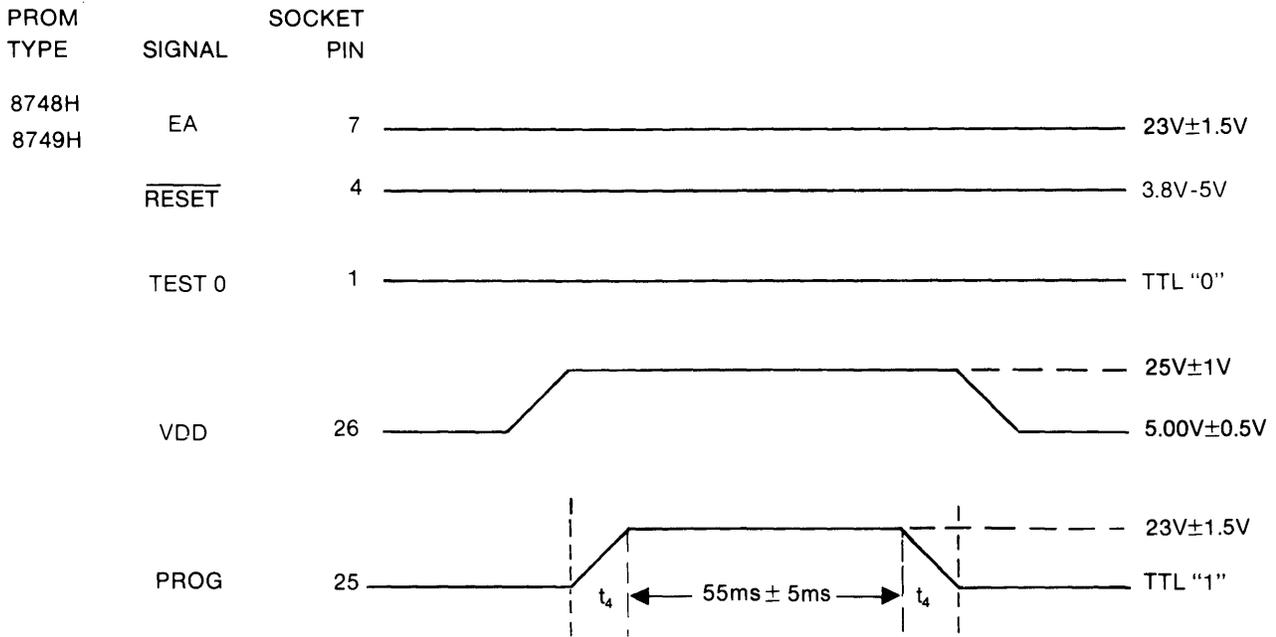


Figure 7-8. Programming Waveforms for Dynamic Test

**TIMING NOTES FOR FIGURES 7-3 to 7-8**

$t_1=2\mu\text{s}$ minimum*	$t_2=0\text{ns}$ minimum*	$t_3=5\text{ns}$ minimum*
$t_4=TR \ \& \ TF=0.5\mu\text{s}-2\mu\text{s}$	$t_5=4\mu\text{s}$ minimum*	$t_6=1\text{ms}$ minimum*
$t_7=0.5\text{ms}-10\text{ms}$	$t_8=200\text{ns}$ minimum*	$t_9=600\mu\text{s}$
$t_{10}=20\text{ns}$ minimum*	$t_{11}=100\text{ns}$ minimum*	$t_{12}=50\text{ns}$ minimum*
$t_{13}=10\mu\text{s}$ minimum*	$t_{14}=20\text{ms}$ minimum (Program) or 200ms minimum (Erase)	
TTL "1" = +2.4V minimum	TTL "0" = +0.4V maximum	

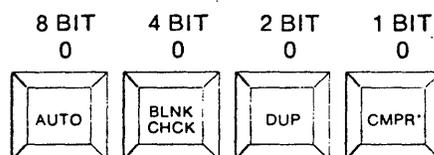
\*Minimum times are given. Typical times are much greater and are not critical for a proper programming sequence.

## PM9080 FIELD ASSURANCE CONFIDENCE TEST (M910A)

### HOW TO SELECT THE FIELD ASSURANCE CONFIDENCE TEST (FACT)

To select the PM9080 confidence test with the M910A, first select the device type to be tested by using the two DEVICE SELECTION switches<sup>1</sup> on the PM9080. Then, while holding down the RUN key, press and release the RESET key. The PASS, FAIL, and RUN indicators on the M910A illuminate to indicate that the unit is in the PM9080 confidence test.

The four indicators above the mode keys on the M910A display a binary pattern that shows which of the PM9080 confidence tests is selected (test 1 through test A). To exit from the confidence-test mode, press RESET.



<sup>\*</sup>On earlier models of the M910A this key says "VER."

### VPP Test<sup>1</sup>

Connect the DVM ground (-) lead to pin 14 for a 28-pin Copy socket or pin 20 for a 40-pin Copy socket. See appendix D for pin assignments and voltages.

**Test 1.** Press CMPR (binary "2" shown in indicators). This sets VPP to its low voltage value.

**Test 2.** Press RUN (binary "3" shown in indicators). This sets VPP to its high voltage value. Note that the BUSY indicator on the PM9080 is illuminated.

**Test 3.** Press RUN (binary "4" shown in indicators). This sets VPP to less than 0.6V.

### VCC Test<sup>2</sup>

VCC is pin 26 for 24-pin devices and pin 28 for 28-pin devices when using the PA28-80, 28-80A, or 28-80B. VCC is pin 40 when using the PA40-80, 40-81, or 40-82.

<sup>1</sup>For devices having two positions (i.e., PROGRAM and ERASE), select the PROGRAM position. The ERASE position need only be used with the dynamic test.

<sup>2</sup>For 24- and 28-pin devices, all pin references are made to a 28-pin socket.

**Test 5 (VCC High).** Press RUN (binary "5" shown in indicators). This sets VCC to  $5.20 \pm 0.05V$ .

**Test 6 (VCC Nominal).** Press RUN (binary "6" shown in indicators). This sets VCC to  $5.00 \pm 0.05V$ .

**Test 7 (VCC Low).** Press RUN (binary "7" shown in indicators). This sets VCC to  $4.80 \pm 0.05V$ .

### Address Line Test

**Test A.** Press AUTO (binary "A" shown in indicators). The address lines (see appendix D) toggle from a TTL "0" to a TTL "1" level.<sup>3</sup> Check with an oscilloscope set to  $50 \mu s/div$ . To exit from the address test, press RUN.

### Dynamic Test

**Test 8.** Press DUP (binary "8" shown in indicators). The BUSY indicator on the PM9080 illuminates. This test puts the PM9080 into a continuous programming cycle. Check the appropriate pins for the programming waveforms. The device selected by the hex switches determines which of the waveforms in appendix D is generated.

### Short-Detection Test<sup>4</sup>

**Test 9.** Press BLNK CHK (binary "9" shown in indicators). This test checks for shorts on VCC, VPP, and address lines. If a short is detected, the M910A sounds the FAIL tone and the PASS Light goes off. When the short is removed, press RUN to continue the test. To exit the preliminary test, press RUN for approximately one second.

---

<sup>3</sup> Address line A9 toggles from TTL "0" to a VIH level of  $11.75 \pm .25V$ .

<sup>4</sup> Data lines cannot be tested for shorts on the PA40-80, 40-81, 40-82, 40-83, or 40-84.

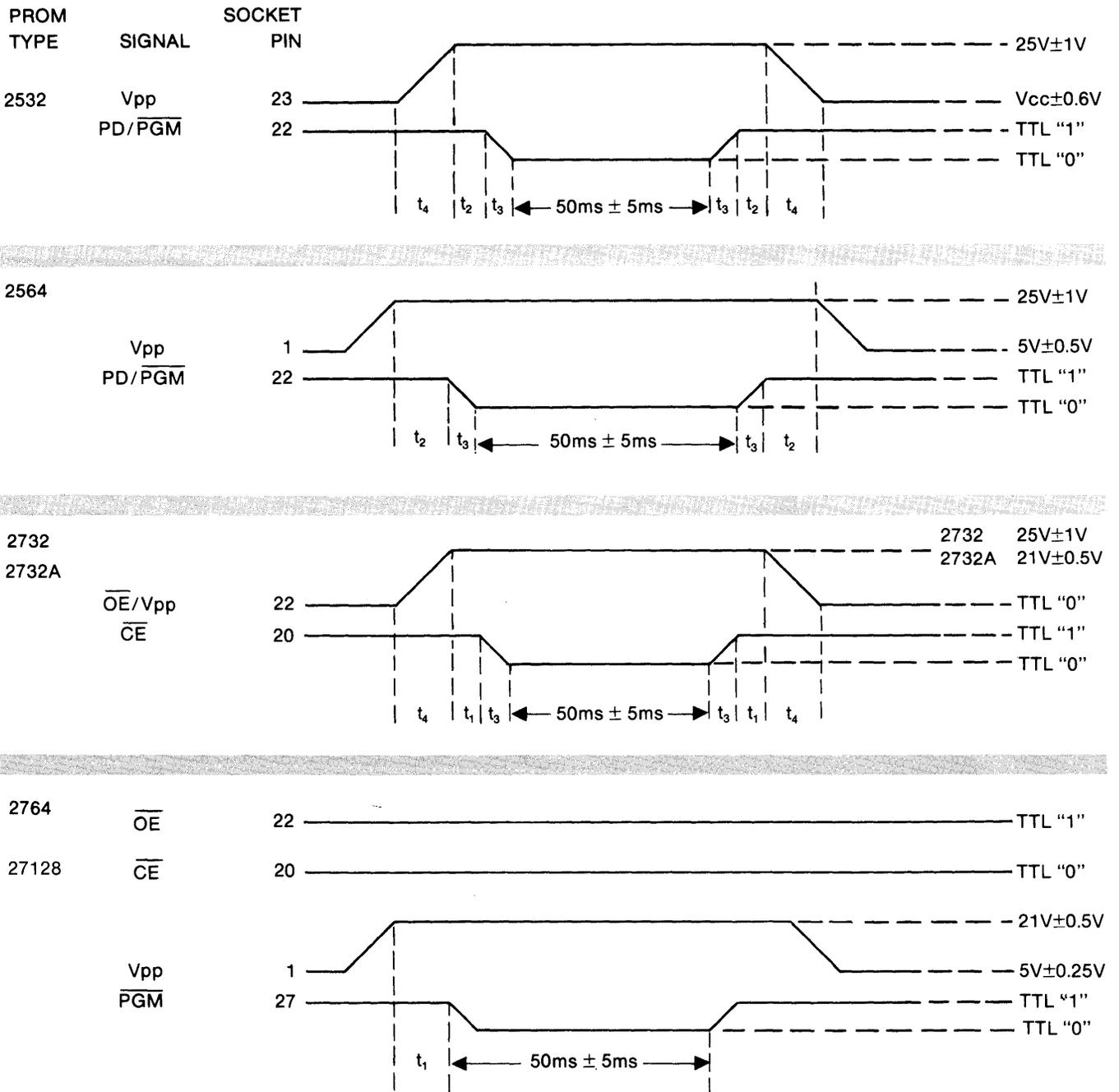


Figure 8-4. Programming Waveforms for Dynamic Test

Field Assurance Confidence Test (FACT) M910A

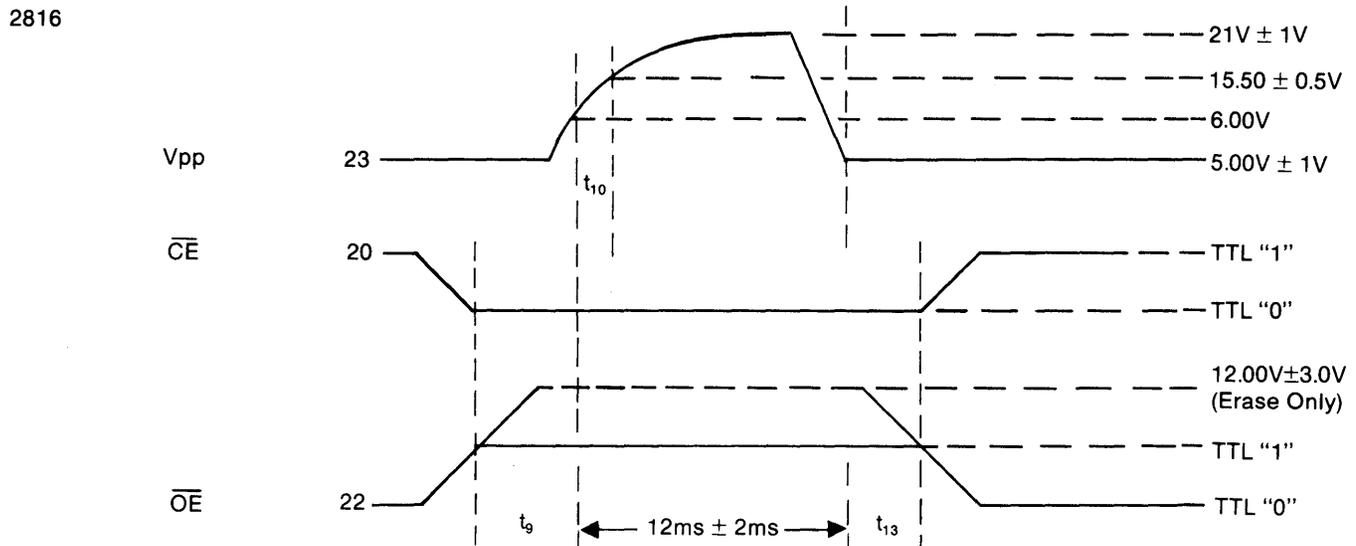
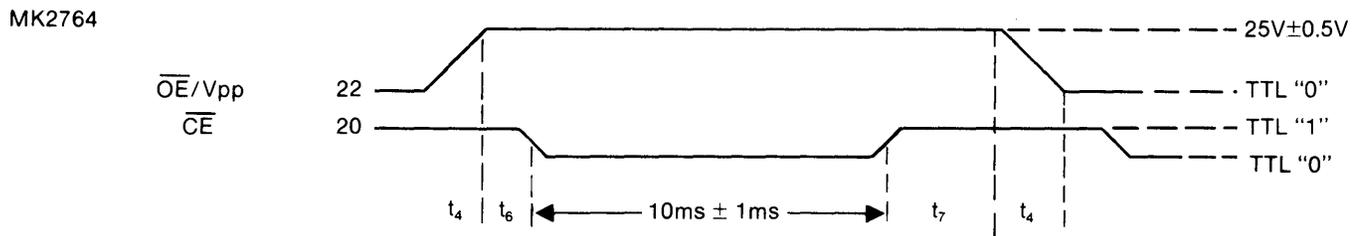
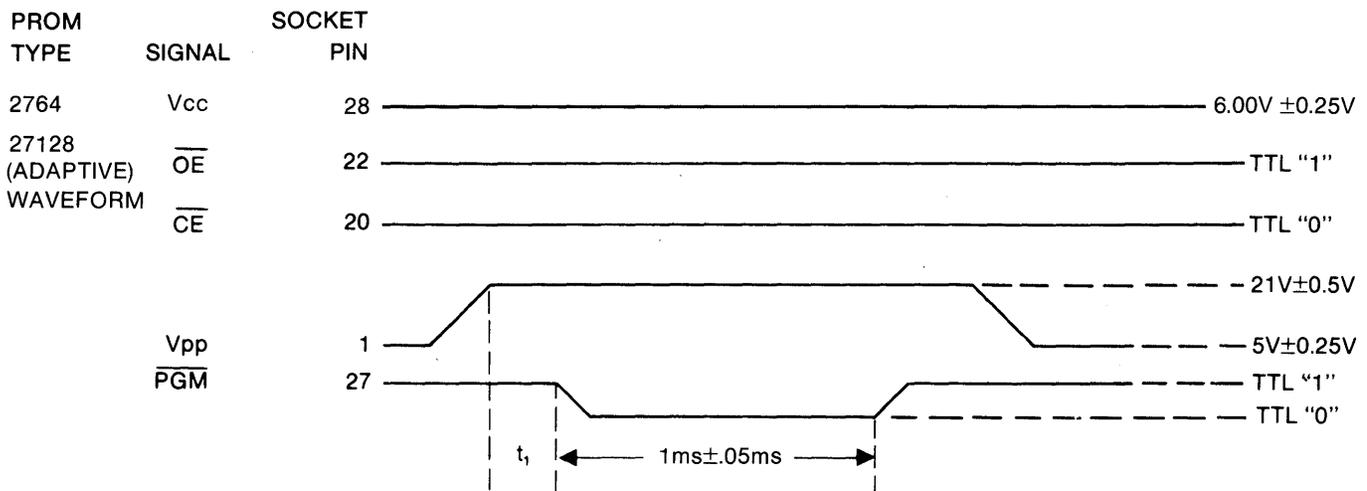


Figure 8-5. Programming Waveforms for Dynamic Test

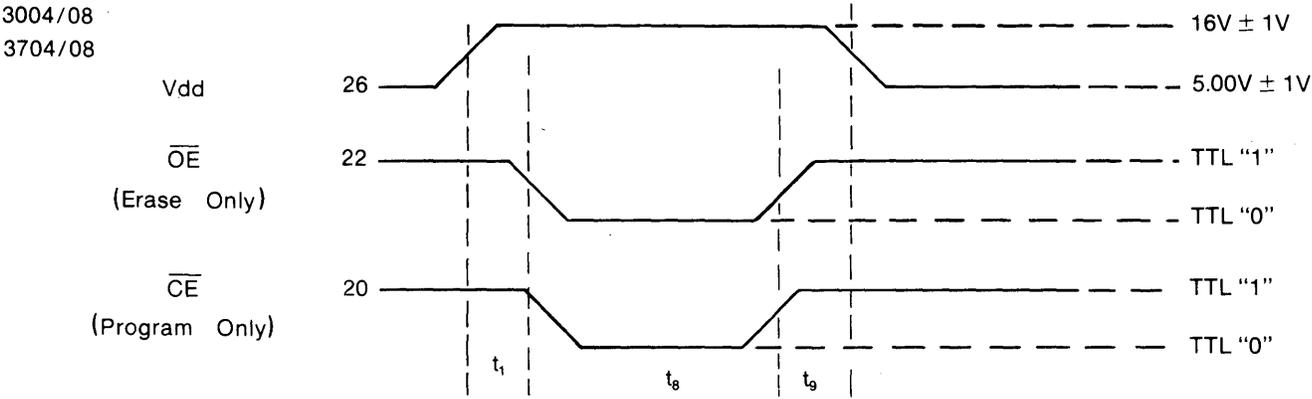
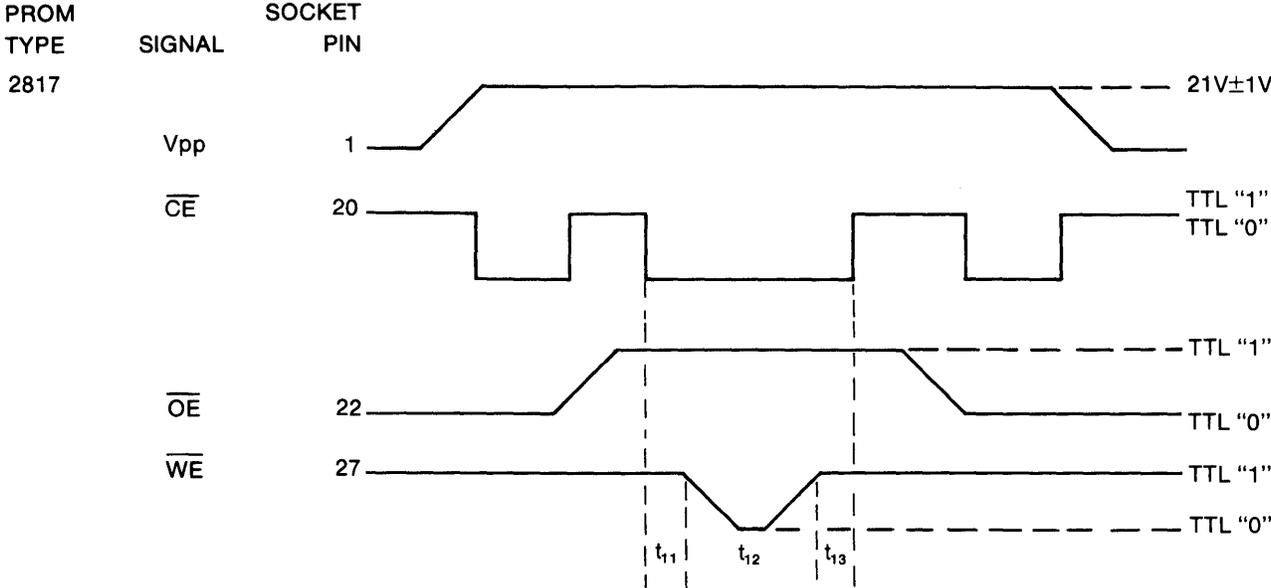


Figure 8-6. Programming Waveforms for Dynamic Test

Field Assurance Confidence Test (FACT) M910A

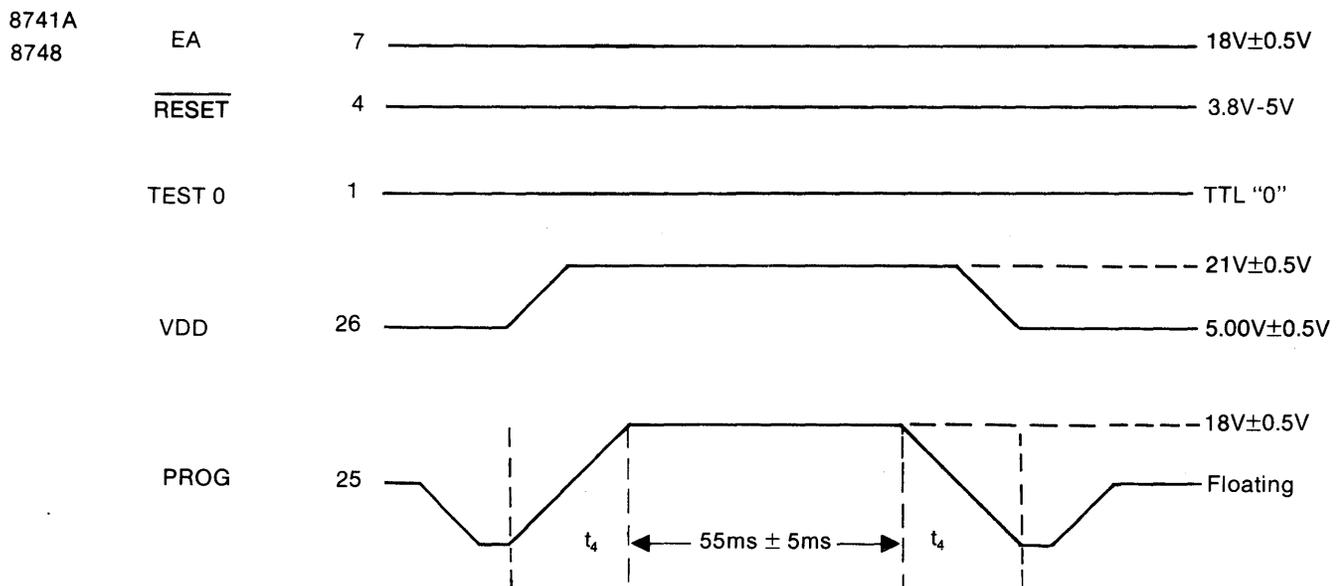
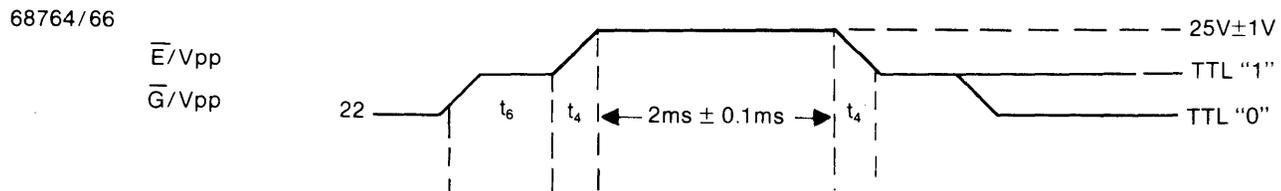
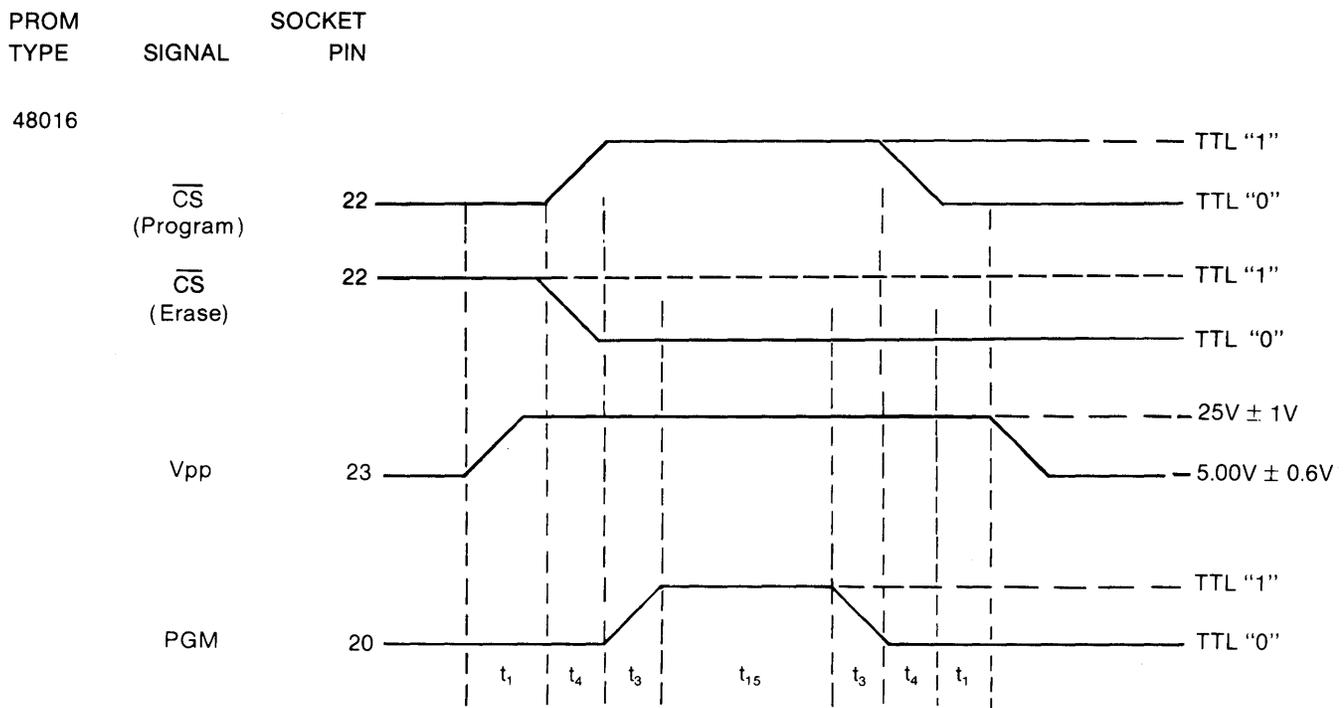


Figure 8-7. Programming Waveforms for Dynamic Test

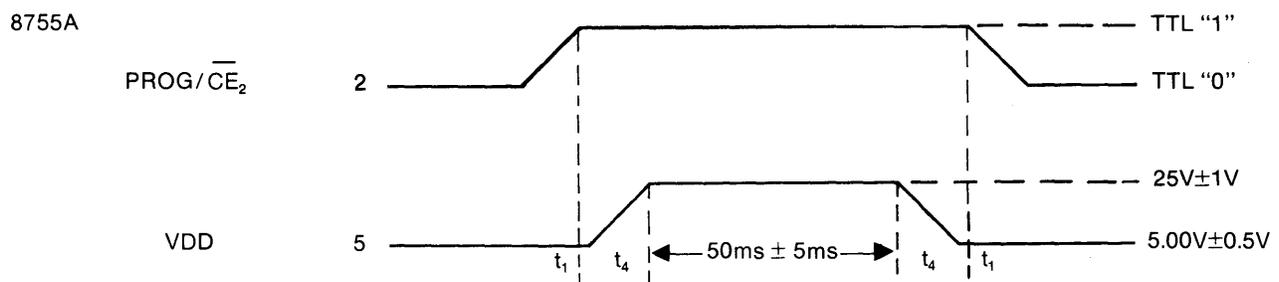
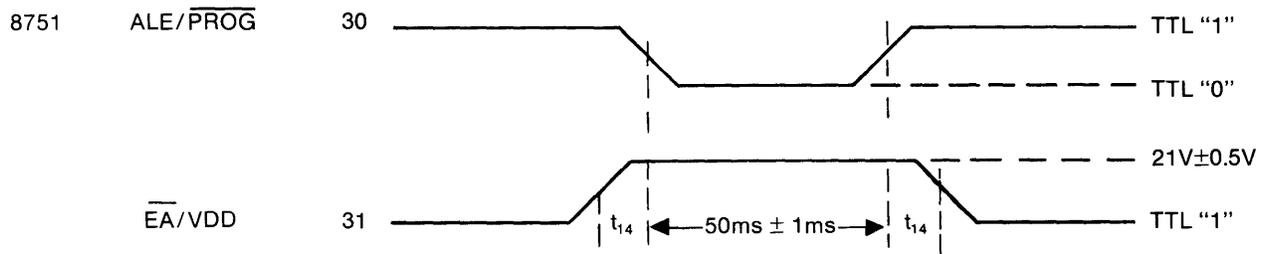
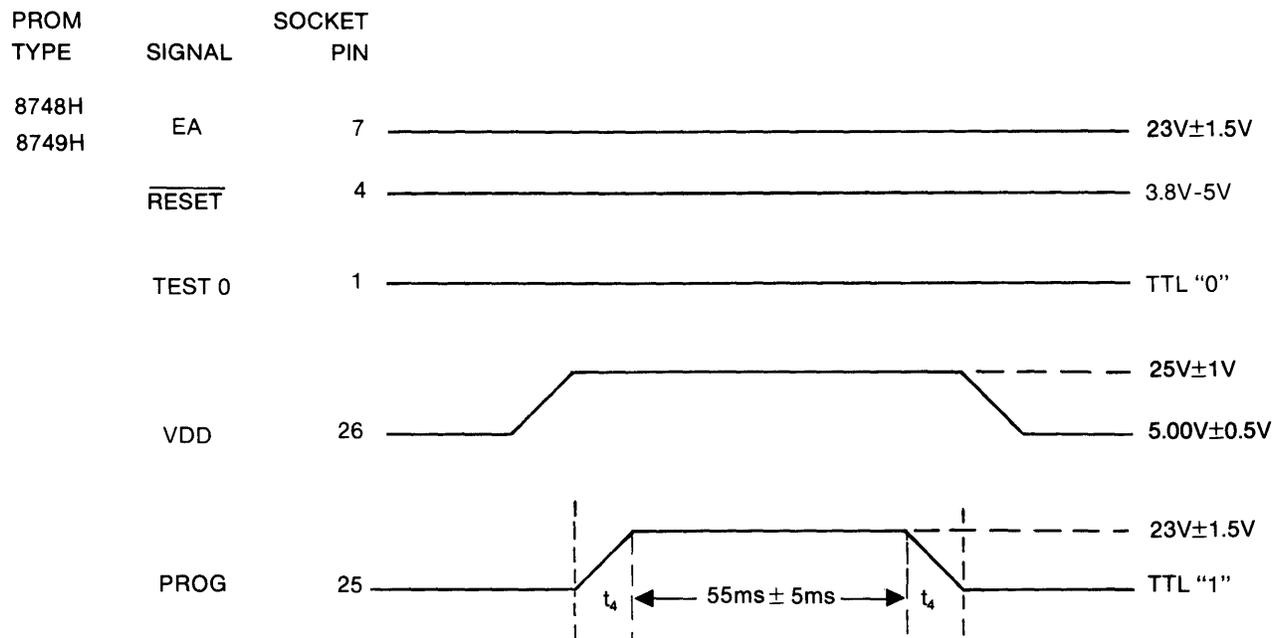


Figure 8-8. Programming Waveforms for Dynamic Test

**TIMING NOTES FOR FIGURES 8-3 to 8-8**

$t_1=2\mu\text{s}$ minimum*	$t_2=0\text{ns}$ minimum*	$t_3=5\text{ns}$ minimum*
$t_4=TR \ \& \ TF=0.5\mu\text{s}-2\mu\text{s}$	$t_5=4\mu\text{s}$ minimum*	$t_6=1\text{ms}$ minimum*
$t_7=0.5\text{ms}-10\text{ms}$	$t_8=200\text{ns}$ minimum*	$t_9=600\mu\text{s}$
$t_{11}=20\text{ns}$ minimum*	$t_{12}=100\text{ns}$ minimum*	$t_{13}=50\text{ns}$ minimum*
$t_{14}=10\mu\text{s}$ minimum*	$t_{15}=20\text{ms}$ minimum (Program) or 200ms minimum (Erase)	
TTL "1" = +2.4V minimum	TTL "0" = +0.4V maximum	

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

## DEVICE SELECTION GUIDE

## CAUTION

Use only the appropriate pinout adapter as shown here. Insertion of a pinout adapter other than those listed may damage the PM9080 and will void the Pro-Log warranty.

MANUFACTURER	PART #	SWITCH POSITION	DISPLAY <sup>1</sup>	PINOUT ADAPTER
AMD	2716	0A	2716	28-80,80A,B
	2732	0E	2732	28-80,80A,B
	2732A	0F	2732A	28-80,80A,B
	2764	14	2764/FASTALGO	28-80,80A,B
	2764A	15	2764A/FASTALGO	28-80,80A,B
	27128	1B	27128/FASTALGO	28-80B
	27128A	1C	27128A/FASTALGO	28-80B
	27256	1D	27256/FASTALGO	28-80B
	8751H	4D	8751H/FASTALGO	40-81A
	9761H	51	9761H/FASTALGO	40-81A
EUROTECHNIQUE	9864	52	9864	28-80,80A,B
	2716	0A	2716	28-80,80A,B
EXEL	2732	0E	2732	28-80,80A,B
	2816A	26	2816A	28-80,80A,B
FAIRCHILD	2532	04	2532	28-80,80A,B
	2564	06	2564	28-80,80A,B
	2716	0A	2716	28-80,80A,B
	2732	0E	2732	28-80,80A,B
	2764	13	2764	28-80,80A,B
FUJITSU	MBM8516(2716)	0A	2716	28-80,80A,B
	MBM8532(2732)	0E	2732	28-80,80A,B
	2732A	0F	2732A	28-80,80A,B
	MBM2764	14	2764/FASTALGO	28-80,80A,B
	MBM27C64	16	27C64/FUJITSU	28-80A,B
	MBM27128	1B	27128/FASTALGO	28-80B
	MBM27C256	1E	27C256/FUJITSU	28-80B

MANUFACTURER	PART #	SWITCH POSITION	DISPLAY'	PINOUT ADAPTER
HITACHI	462532	04	2532	28-80,80A,B
	462716	0A	2716	28-80,80A,B
	462732	0E	2732	28-80,80A,B
	27C64	17	27C64/HITACHI	28-80A,B
	48XXX(ERASE)	31	48XXX/ERASE	28-80,80A,B
	48016(PROG)	32	48016/PROGRAM	28-80,80A,B
	482764	13	2764	28-80,80A,B
	4827128	1B	27128/FASTALGO	28-80B
HUGHES	30XX(ERASE)	2B	30XX/ERASE	28-80,80A,B
	3004(PROG)	2C	3004/PROGRAM	28-80,80A,B
	3008(PROG)	2D	3008/PROGRAM	28-80,80A,B
	37XX(ERASE)	2E	37XX/ERASE	28-80,80A,B
	3704(PROG)	2F	3704/PROGRAM	28-80,80A,B
	3708(PROG)	30	3708/PROGRAM	28-80,80A,B
INTEL	2716	0A	2716	28-80,80A,B
	2716	0B	2716/FASTALGO	28-80,80A,B
	2732	0E	2732	28-80,80A,B
	2732A	0F	2732A	28-80,80A,B
	P2732A	0F	2732A	28-80,80A,B
	2758	12	2758	28-80,80A,B
	2764	14	2764/FASTALGO	28-80,80A,B
	P2764	14	2764/FASTALGO	28-80,80A,B
	2764A	15	2764A/FASTALGO	28-80,80A,B
	27C64	18	27C64/INTEL	28-80A,B
	27128	1B	27128/FASTALGO	28-80B
	27128A	1C	27128A/FASTALGO	28-80B
	27256	1D	27256/FASTALGO	28-80B
	27C256	1F	27C256/INTEL	28-80B
	28XX(ERASE)	22	28XX/ERASE	28-80,80A,B
	2815(PROG)	24	2815/PROGRAM	28-80,80A,B
	2816(PROG)	25	2816/PROGRAM	28-80,80A,B
	2817A <sup>3</sup>	28	2817A	28-80B
	8741A	45	8741A	40-80
	8742	46	8742	40-80
	8748	48	8748	40-80
	8748H	49	8748H	40-80
	8749H	4A	8749H	40-80
	8751	4B	8751	40-81,81A
	8751H	4D	8751H/FASTALGO	40-81A
	8755A	4E	8755A	40-82

MANUFACTURER	PART #	SWITCH POSITION	DISPLAY'	PINOUT ADAPTER
MARUMAN	2716	0A	2716	28-80,80A,B
MITSUBISHI	2716	0A	2716	28-80,80A,B
	2732	0E	2732	28-80,80A,B
	2764	13	2764	28-80,80A,B
	27C64	19	27C64/MITSUBIS	28-80A,B
	27128	1B	27128/FASTALGO	28-80B
MOSTEK	2716	0A	2716	28-80,80A,B
MOTOROLA	2532/L32	04	2532	28-80,80A,B
	2716/L16	0A	2716	28-80,80A,B
	68701	3F	68701	PA40-84
	68701U4	40	68701U4	PA40-84
	68705P3	41	68705	PA40-83
	68705R3	41	68705	PA40-83
	68705U3	41	68705	PA40-83
	68705P5	41	68705	PA40-83
	68764/L764	43	68764/FASTALGO	28-80,80A,B
68766	44	68766/FASTALGO	28-80,80A,B	
NATIONAL	2532	04	2532	28-80,80A,B
	2564	06	2564	28-80,80A,B
	2716	0A	2716	28-80,80A,B
	27C16	0C	27C16	28-80A,B
	27C16HQ	0D	27C16HQ	28-80A,B
	2732/L32	0E	2732	28-80,80A,B
	27C32	11	27C32	28-80A,B
	2732A/L32A	0F	2732A	28-80,80A,B
	2758Q-A	12	2758	28-80,80A,B
	2758Q-B	0A	2716	28-80,80A,B
NEC	2716	0A	2716	28-80,80A,B
	2732	0E	2732	28-80,80A,B
	2764	13	2764	28-80,80A,B
	27128	1B	27128/FASTALGO	28-80B
	8741A	45	8741A	40-80
	8748	48	8748	40-80
	8749H	4A	8749H	40-80
OKI	2532	04	2532	28-80,80A,B
	2716	0A	2716	28-80,80A,B
	2732	0E	2732	28-80,80A,B
	2758	12	2758	28-80,80A,B

MANUFACTURER	PART #	SWITCH POSITION	DISPLAY <sup>1</sup>	PINOUT ADAPTER
SEEQ	2764 (5133)	14	2764/FASTALGO	28-80,80A,B
	27128 (5143)	1B	27128/FASTALGO	28-80B
	2817A	28	2817A	28-80B
	2817AH	29	2817AH	28-80B
	52B13	36	52B13	28-80,80A,B
	52B33	38	52B33	28-80,80A,B
	52B33H	39	52B33H	28-80,80A,B
	5517A	3D	5517A	28-80B
	5517AH	3E	5517AH	28-80B
	55B33	3A	55B33	28-80,80A,B
55B33H	3B	55B33H	28-80,80A,B	
SGS	2716	0A	2716	28-80,80A,B
	2764	14	2764/FASTALGO	28-80,80A,B
SYNERTEK	2716	0A	2716	28-80,80A,B
TI*	TMS2508	01	2508	28-80,80A,B
	2516 <sup>5</sup>	02	2516	28-80,80A,B
	TMS2516 <sup>6</sup>	03	TMS2516	28-80,80A,B
	2532 <sup>5</sup>	04	2532	28-80,80A,B
	TMS2532 <sup>6</sup>	05	TMS2532	28-80,80A,B
	2564 <sup>5</sup>	06	2564	28-80,80A,B
	TMS2564 <sup>6</sup>	07	TMS2564	28-80,80A,B
	2732	0E	2732	28-80,80A,B
	2732A <sup>5</sup>	0F	2732A	28-80,80A,B
	TMS2732A <sup>6</sup>	10	TMS2732A	28-80,80A,B
	2758-JL0	12	2758	28-80,80A,B
	2758-JL1 <sup>4</sup>	0A	2716	28-80,80A,B
	TMS2764	14	2764/FASTALGO	28-80,80A,B
	TMS27128	1B	27128/FASTALGO	28-80B
TOSHIBA	TMM323 (2716)	0A	2716	28-80,80A,B
	2732	0E	2732	28-80,80A,B
	27128	1A	27128	28-80B
	8755A	4E	8755A	40-82
XICOR	2804A	23	2804A	28-80,80A,B
	2816A <sup>3</sup>	26	2816A	28-80,80A,B
	2864A <sup>3</sup>	2A	2864A	28-80,80A,B

\*NOTE: Before any attempt to program TI devices TMS2516, TMS2532, TMS2564, and TMS2732A, check the date code on the devices.

<sup>1</sup> If two different messages are needed to identify the device to be programmed, the display alternates between messages every 1.5 seconds.

<sup>2</sup> Under development.

<sup>3</sup> The device has built-in erasure. Do not use 28XX ERASE or damage may occur.

<sup>4</sup> These devices can only be programmed on the M980 control unit because the address field to program these devices must be redefined as 400 through 7FF (upper half of a 2716 EPROM).

<sup>5</sup> If the date code is prior to 8440, use the 50 ms (standard) setting indicated for 2516, 2532, 2564, and 2732A.

<sup>6</sup> If the date code is later than 8440, use the setting indicated for TMS2516, TMS2532, TMS2564, and TMS2732A.

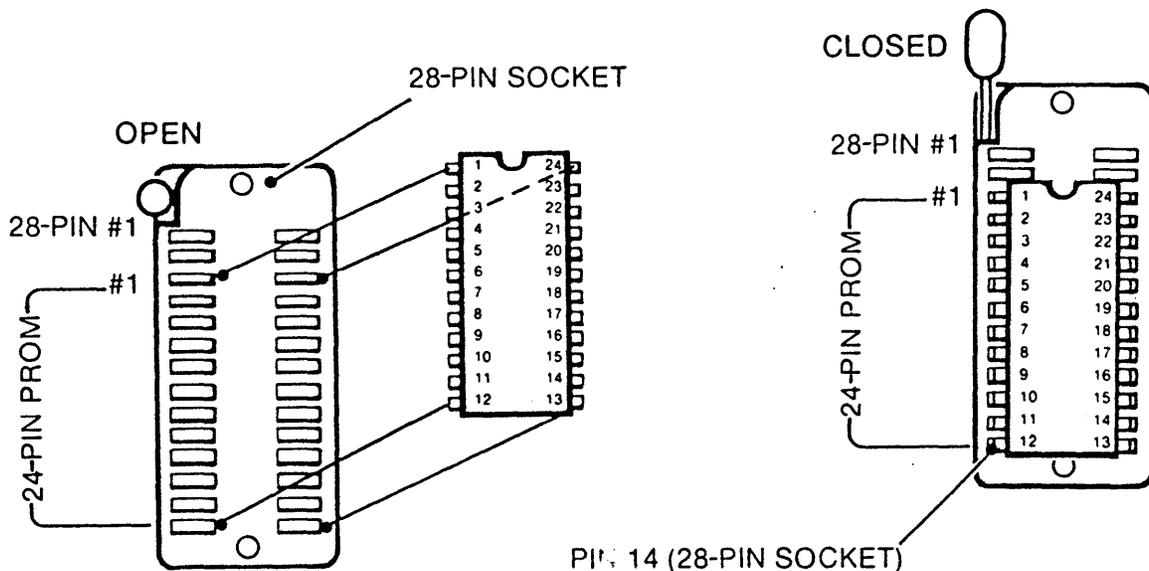


Figure A-1. 28-Pin ZIF Socket

### MASTER/COPY Sockets

All pinout adapters have one Master socket and one Copy socket. The Master socket is a read-only socket to protect the master device from being accidentally programmed.

### PA28-80, 28-80A, and 28-80B Pinout Adapters

These pinout adapters plug into the PM9080 using two 25-pin D connectors. For user convenience, these pinout adapters incorporate a 28-pin zero insertion force (ZIF) socket for both the Master and Copy sockets. All 24- and 28-pin EPROMs use the appropriate 28-pin pinout adapter.

### PA40-80, 40-81, 40-82, 40-83, and 40-84 Pinout Adapters

These adapters plug into the PM9080 using two 25-pin D connectors. For convenience, the pinout adapters use a zero insertion force (ZIF) socket for both the Master and Copy sockets.

### PROM Positioning

These 28-pin ZIF sockets are activated by a handle adjacent to pin 1 of the socket. When the handle is raised, the contacts are open and the PROM can be inserted. Lowering the handle engages the contacts and locks the PROM in place. PROMs containing 24 pins must be positioned in the socket as indicated by the silk screened indexing reference, "24-Pin PROM." Line up pin 1 of the PROM with the indexing mark to ensure that pin 12 of the PROM is in the lowest position of the socket (pin 14 of the 28-pin socket). Installation of PROMs is shown in figure A-1.

QUICK LOOKUP TABLE FOR  
PM9080 DEVICE SELECT SWITCHES

DEVICE TYPE	SWITCH POSITION	PINOUT ADAPTER	DEVICE TYPE	SWITCH POSITION	PINOUT ADAPTER
2508	01	PA28-80,80A,B	37XX (ERASE) <sup>3</sup>	2E	PA28-80,80A,B
TMS2516 <sup>6</sup>	See Note 6	PA28-80,80A,B	3704 (PROGRAM)	2F	PA28-80,80A,B
TMS2532 <sup>6</sup>	See Note 6	PA28-80,80A,B	3708 (PROGRAM)	30	PA28-80,80A,B
TMS2564 <sup>6</sup>	See Note 6	PA28-80,80A,B			
TMS2732A	10	PA28-80,80A,B	48XXX (ERASE) <sup>3</sup>	31	PA28-80,80A,B
			48016 (PROGRAM)	32	PA28-80,80A,B
2716	0A	PA28-80,80A,B			
27C16	0C	PA28-80A,B	52B13	36	PA28-80,80A,B
2732	0E	PA28-80,80A,B	52B33	38	PA28-80,80A,B
27C32	11	PA28-80,80A,B	52B33H	39	PA28-80,80A,B
2732A	0F	PA28-80,80A,B	5517A	3D	PA28-80B
2758	12	PA28-80,80A,B	5517AH	3E	PA28-80B
2764	13	PA28-80,80A,B	55B33	3A	PA28-80,80A,B
27C64 <sup>7</sup>	See Note 7	PA28-80A,B	55B33H	3B	PA28-80,80A,B
27128	1A	PA28-80B			
2716 (FASTALGO) <sup>2</sup>	0B	PA28-80,80A,B	68701	3F	PA40-84
2764 (FASTALGO) <sup>2</sup>	14	PA28-80,80A,B	68701U4	40	PA40-84
P2764 (FASTALGO) <sup>2</sup>	14	PA28-80,80A,B	68705	41	PA40-83
2764A (FASTALGO) <sup>2</sup>	15	PA28-80,80A,B	68764 (FASTALGO) <sup>2</sup>	43	PA28-80,80A,B
27128 (FASTALGO) <sup>2</sup>	1B	PA28-80B	68766 (FASTALGO) <sup>2</sup>	44	PA28-80,80A,B
27128A (FASTALGO) <sup>2</sup>	1C	PA28-80B			
27256 (FASTALGO) <sup>2</sup>	1D	PA28-80B	8741A	45	PA40-80A
27C256 <sup>7</sup>	See Note 7	PA28-80B	8742	46	PA40-80A
			8748	48	PA40-80A
28XX (ERASE) <sup>3</sup>	22	PA28-80,80A,B	8748H	49	PA40-80A
2804A	23	PA28-80,80A,B	8749H	4A	PA40-80A
2815 (PROGRAM)	24	PA28-80,80A,B	8751	4B	PA40-81,81A
2816 (PROGRAM)	25	PA28-80,80A,B	8751H (FASTALGO) <sup>2</sup>	4D	PA40-81A
2816A	26	PA28-80,80A,B	8755A	4E	PA40-82
2817A	28	PA28-80B	9761H (FASTALGO) <sup>2</sup>	51	PA40-81A
2817AH	29	PA28-80B	9864	52	PA28-80,80A,B
2864A	2A	PA28-80,80A,B			
30XX (ERASE) <sup>3</sup>	2B	PA28-80,80A,B	<b>REMOTE</b> <sup>1</sup>	<b>00</b>	
3004 (PROGRAM)	2C	PA28-80, 80A,B	<b>IDENTIFY DEVICE</b> <sup>8</sup>	<b>A0</b>	
3008 (PROGRAM)	2D	PA28-80, 80A,B	<b>REMOTE UPDATE</b> <sup>4</sup>	<b>FF</b>	
			<b>87-97XXX SECURE</b> <sup>5</sup>	<b>4C</b>	

<sup>1</sup> When the Device Select switches are placed in the 00 position, the word "REMOTE" flashes.

<sup>2</sup> FASTALGO should only be used on those devices indicated in the Device Selection Guide.

<sup>3</sup> This position allows the erasure of the entire E<sup>2</sup>PROM family starting with the same number.

<sup>4</sup> This position remotely programs onboard memory for adding or updating programming algorithms. Contact Pro-Log for further details.

<sup>5</sup> This position is used to secure 40-pin microcomputer devices.

<sup>6</sup> The correct switch position depends on the device date code. See Appendix A-3 for more information.

<sup>7</sup> The correct switch position depends on the manufacturer. See Appendix A-3 for more information.

<sup>8</sup> This position allows automatic selection of the correct programming algorithm. See Appendix C-1 for more information.

NOTE: Switch positions E0 through FE are not valid device select switch positions.

# APPENDIX B

## PM9080 Software Updating

### INTRODUCTION

All PM9080s shipped after October 31, 1982, have built-in update capability. The addition of programming algorithms is made simple by the PM9080 update control program. When enabled, this program will allow the duplication of new programming algorithms into the PM9080. As a safety feature, this duplication is only allowed if the new algorithms contain the proper recognition code. Thus, no accidental programming of the PM9080 control software can be made. Note: If you are not sure of your PM9080's configuration<sup>1</sup>, call Pro-Log's Customer Service Department at (408) 646-3617 for assistance. For those PM9080s which do not contain this capability, a modification kit (MK9080) may be ordered from Pro-Log.

### UPDATE PROCEDURE

1. Order the latest programming algorithms from Pro-Log.
2. After receiving the Field Update PROM, set the PM9080 Device Select switches for the type of EPROM received.
3. Duplicate this EPROM into the M980/M910A's RAM buffer.
4. Change the PM9080 Device Select switch to "FF."
5. Duplicate the RAM buffer contents into the PM9080's COPY socket. The COPY socket **must** be empty.
6. Select the new part numbers to verify their switch position and new algorithms.

The update program in the PM9080 will automatically:

- a. Check the algorithm program contained in the RAM buffer for the proper recognition code.<sup>2</sup>
- b. When the proper recognition code is found, the PM9080 update program will check each algorithm against the algorithms already installed.
- c. All new programming algorithms will be duplicated<sup>3</sup> into the PM9080.
- d. When completed, the control unit will indicate Pass.

### REMOTE UPDATING

Updating the PM9080's programming algorithms can be performed through the RS-232-C port. For companies with a number of PROM programmers, this means that their units at remote sites or in the field can be updated over the phone lines.

A typical remote updating set-up would have one central PROM programmer, or system, with the update data in it. Operators at the remote sites would then call the central location and interface their units with the central unit via modems. Only one update PROM needs to be purchased — the one for the central unit.

The remote update procedure involves sending the update data to the RAM buffer of the unit to be updated. Then, as in the procedure above, the updating is performed by placing the PM9080 in the update mode and duplicating the update data to the COPY Socket.

There are two ways the remote update procedure can be carried out. First, the central unit can send only the update data. The remote operator then performs the update manually. This method only requires the central unit to have a PROM programmer and a modem, no terminal or other equipment is required.

In the second method, the central unit sends not only the update data, but also the remote control commands to complete the update. The remote control commands can include selecting the update mode by remote device selection (see section 6). This method requires the central unit to be an intelligent system or have a terminal connected to it. If it is a PROM programmer with a terminal, an operator can key in the remote control commands. Alternatively, the central unit can be a computer or other intelligent system which sends the update data and the remote control commands automatically.

<sup>1</sup>To check the configuration of your PM9080 for updating: a) Remove the PM9080 from the control unit b) Check the PM9080 program control board (bottom board) to see if its 28-pin sockets have 25-pin devices (2764s or equivalent). If the 25-pin devices are installed, the PM9080 has update capability.

<sup>2</sup>If the proper recognition code is not found, the control unit will indicate an error condition (see page 1-2 Rev A). Call Customer Service for assistance.  
<sup>3</sup>If the new algorithm should fail to duplicate properly, the M980 will indicate an error condition (see page 1-2 Rev A). Call Customer Service for assistance.

## SIGNATURE MODE

## SIGNATURE MODE DESCRIPTION

Some programmable devices have a device type identification number, or "signature," built into the part by the manufacturer. This signature is contained in memory locations which can be read by the PM9080. These memory locations are not part of the normal memory array. They are extra locations accessible only when address A9 on the device is raised to 11.75V. When placed in the Signature mode, the PM9080 raises that pin on the device in the Copy socket to 11.75V, reads the signature of the device, and selects the correct programming algorithm.

## USING THE SIGNATURE MODE

1. Place the Device Select switches in the Identify Device position, A0. The words "IDENTIFY" and "DEVICE" alternate on the display.
2. Install the device to be identified into the Copy socket.
3. Press the RESET button on the control unit (or perform a reset by remote control, see section 6, *Remote Mode*). The PM9080 reads the signature of the device and selects the proper programming algorithm. The display shows the device part number. The part number remains in the display.

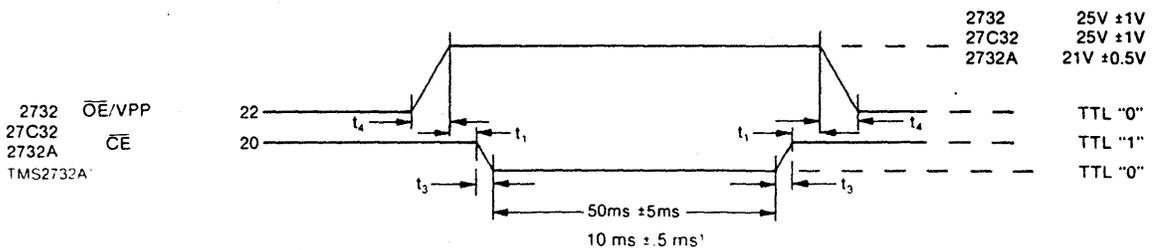
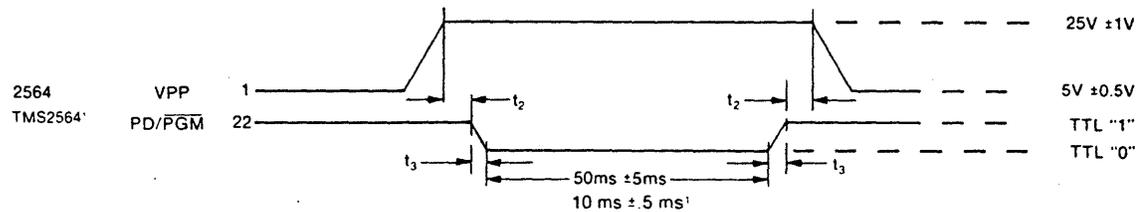
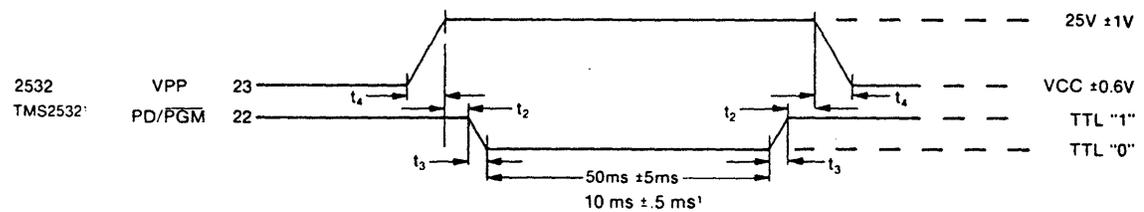
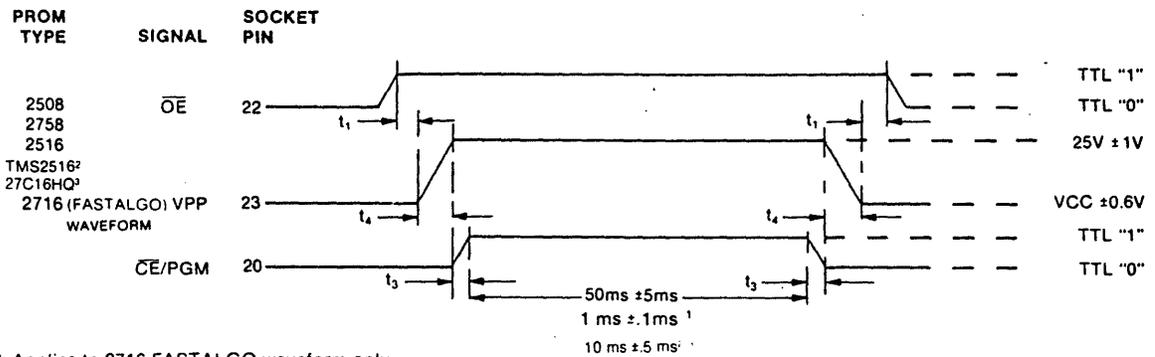
The PM9080 stays in that programming mode until the control unit is reset. If the Device Select switches are still in the Identify Device position when the control unit is reset, the signature of the device in the Copy socket is read again and the PM9080 selects the correct programming algorithm for that device. If the control unit is reset with a device that has no signature in the Copy socket, an E4 error is indicated.

**CAUTION**

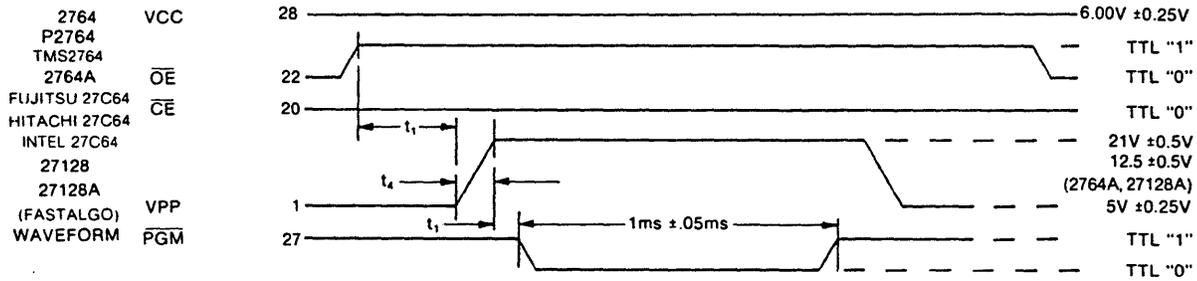
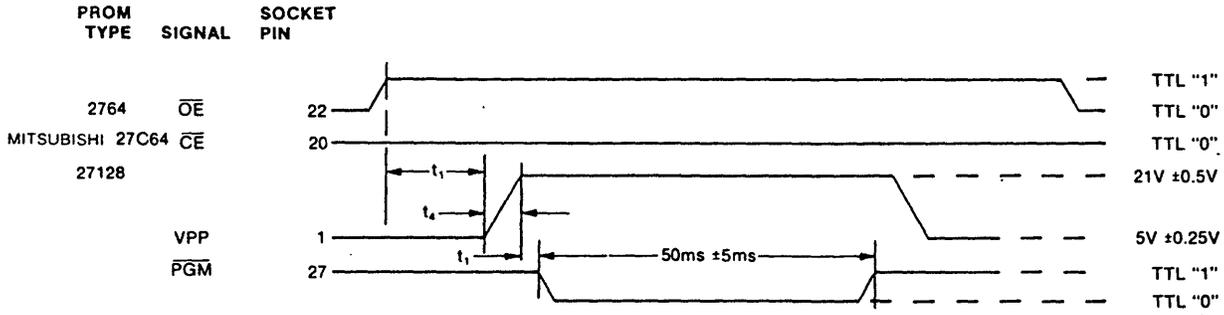
Do not use the Signature mode with manufacturers' devices that do not have the signature feature. Such devices may be damaged if used with the Signature mode.



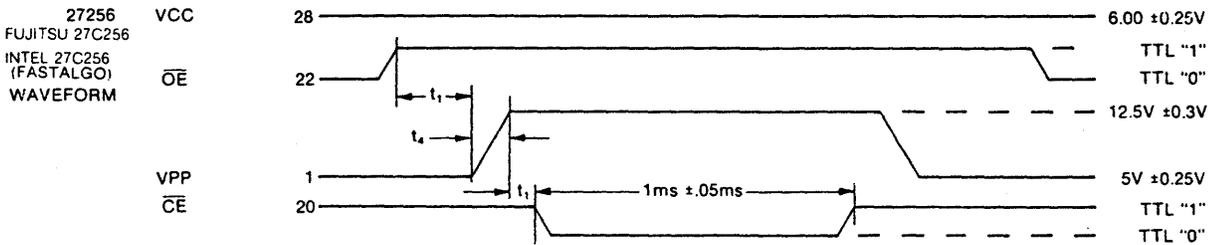
PROGRAMMING WAVEFORMS



# Programming Waveforms (continued)

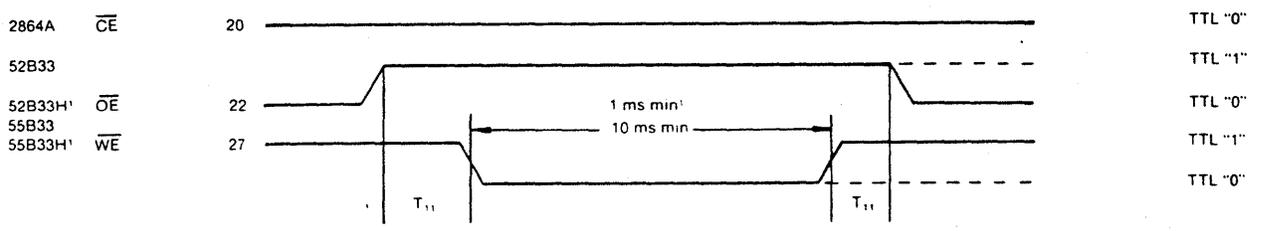
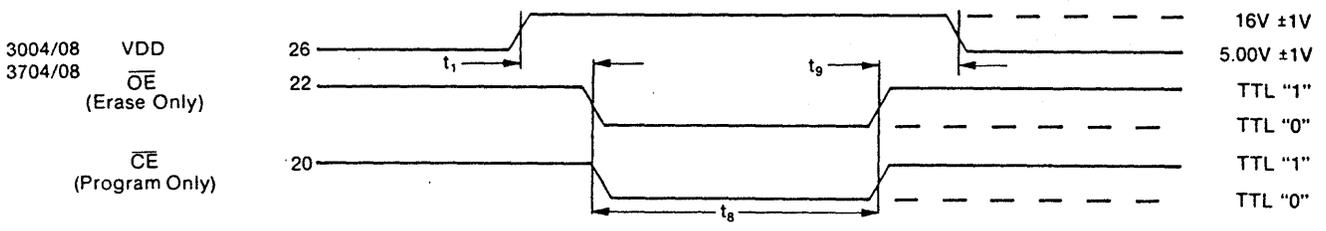
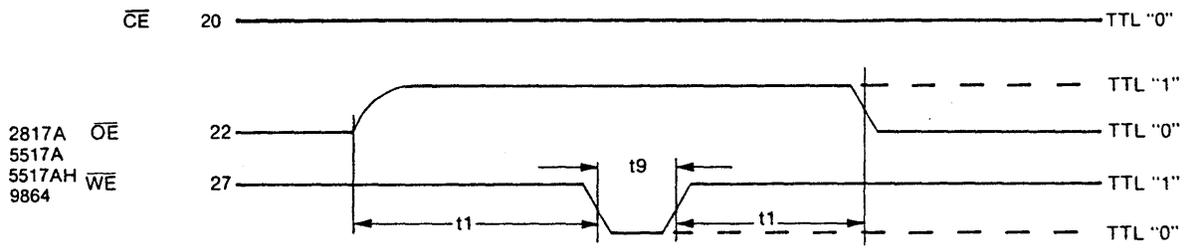
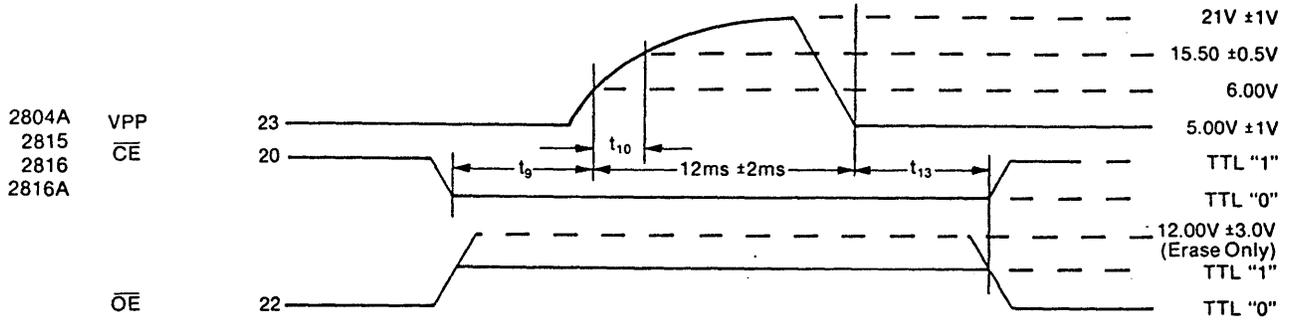


NOTE: VPP for Fujitsu and Hitachi 27C64 is 21V  $\pm$  0.5V  
 VPP for Intel 27C64 is 12.5V  $\pm$  0.3V

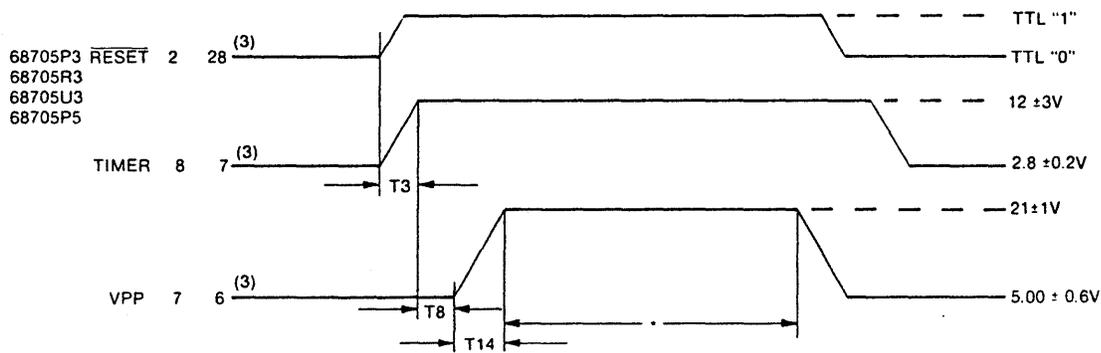
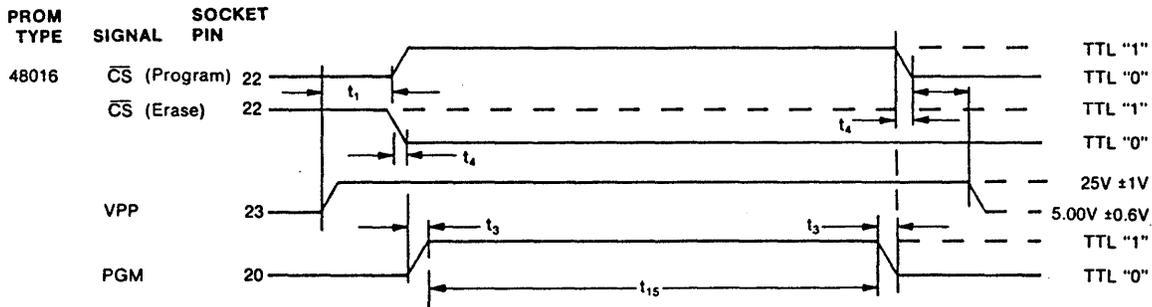


NOTE: VPP for Fujitsu 27C256 is 21V  $\pm$  0.5V

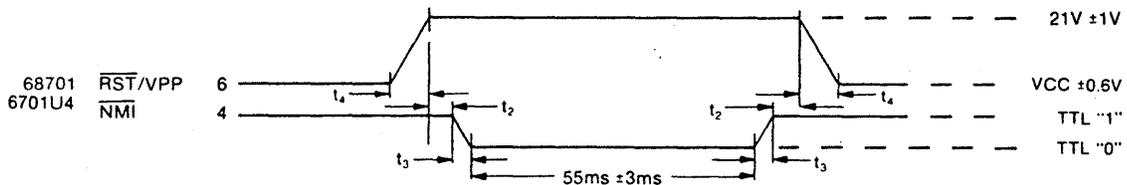
# Programming Waveforms (continued)



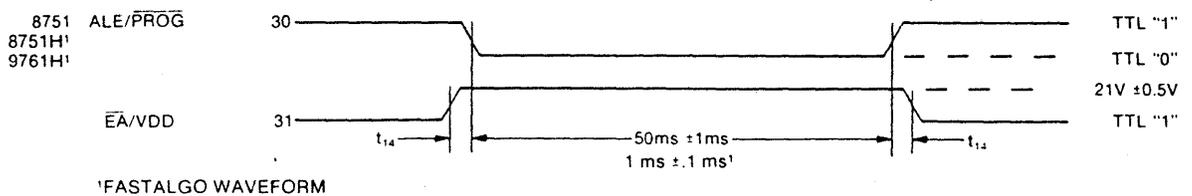
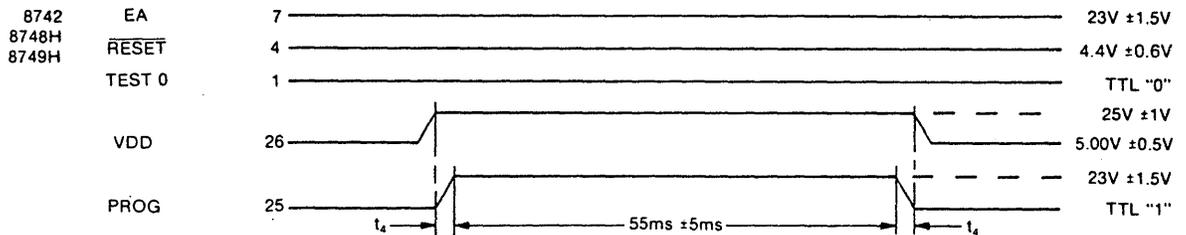
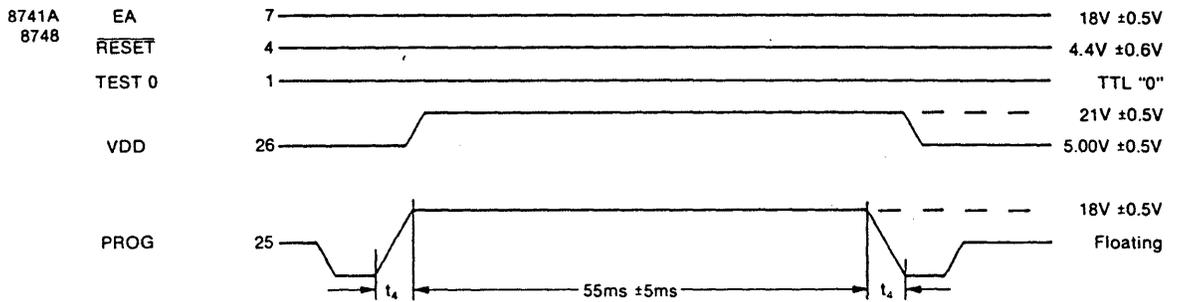
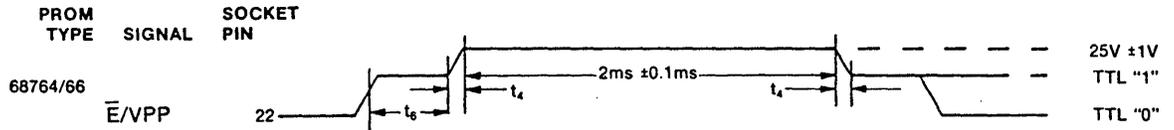
# Programming Waveforms (continued)



(3) APPLIES TO 68705P3 AND 68705P5 ONLY  
 \*TYPICAL PROGRAMMING TIME  
 68705P3 1 MIN 45 SEC  
 68705R3 3 MIN 30 SEC  
 68705U3 3 MIN 30 SEC  
 68705P5 1 MIN 45 SEC

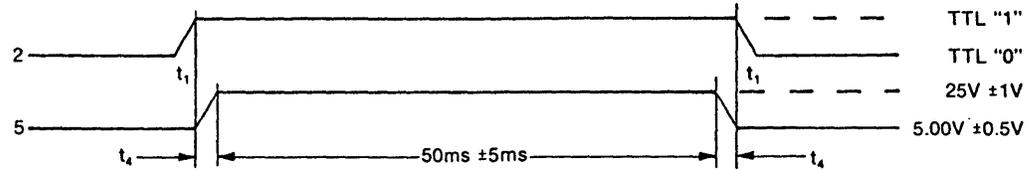


## Programming Waveforms (Continued)



8755A PROG/ $\overline{CE}_2$

VDD



### TIMING NOTES FOR PROGRAMMING WAVEFORMS

$t_1=2 \mu\text{s}$ minimum*	$t_2=0 \text{ ns}$ minimum*	$t_3=5 \text{ ns}$ minimum*
$t_4=TR \ \& \ TF=0.5 \mu\text{s}$ minimum*	$t_6=4 \mu\text{s}$ minimum*	$t_7=1 \text{ ms}$ minimum*
$t_8=0.5 \text{ ms}-10 \text{ ms}$	$t_9=200 \text{ ns}$ minimum*	$t_{10}=600 \mu\text{s}$
$t_{11}=20 \text{ ns}$ minimum*	$t_{12}=100 \text{ ns}$ minimum*	$t_{13}=50 \text{ ns}$ minimum*
$t_{14}=10 \mu\text{s}$ minimum*	$t_{15}=20 \text{ ms}$ minimum (Program) or 200 ms minimum (Erase)	
TTL "1" = +2.4V minimum	TTL "0" = +0.4V maximum	

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

### PIN ASSIGNMENTS FOR ADDRESS LINES

PINOUT ADAPTER	A0 Pin 10 (All devices)	A1 Pin 9 (All devices)	A2 Pin 8 (All devices)	A3 Pin 7 (All devices)	A4 Pin 6 (All devices)	A5 Pin 5 (All devices)	A6 Pin 4 (All devices)	A7 Pin 3 (All devices)	A8 Pin 25 (All devices)	A9 Pin 24 (All devices)	A10 Pin 21 (2K and larger devices)	A11 Pin 20 (2532/64,68764/66) Pin 23 (2732/64)	A12 Pin 23 (2564,68764/66) Pin 2 (2764)	A13 Pin 26 (27128)	A14 Pin 27 (27256)
PA28-80 PA28-80A PA28-80B	A0 Pin 12 (All devices)	A1 Pin 13 (All devices)	A2 Pin 14 (All devices)	A3 Pin 15 (All devices)	A4 Pin 16 (All devices)	A5 Pin 17 (All devices)	A6 Pin 18 (All devices)	A7 Pin 19 (All devices)	A8 Pin 21 (All devices)	A9 Pin 22 (All devices)	A10 Pin 23 (All devices)	A11 Pin 24 (2K devices)			
PA40-80/82	A0 Pin 1	A1 Pin 2	A2 Pin 3	A3 Pin 4	A4 Pin 5	A5 Pin 6	A6 Pin 7	A7 Pin 8	A8 Pin 21	A9 Pin 22	A10 Pin 23	A11 Pin 24	A12 Pin 25		
PA40-81	Addresses are generated internally during programming and do not appear on the device pins.														
PA40-83	A0 Pin 13	A1 Pin 14	A2 Pin 15	A3 Pin 16	A4 Pin 17	A5 Pin 18	A6 Pin 19	A7 Pin 20	A8 Pin 8	A9 Pin 9	A10 Pin 10	A11 Pin 11	A12 Pin 12		
PA40-84															

VPP TEST PIN ASSIGNMENTS AND VOLTAGES			
DEVICE TYPE	VPP PIN	VPP LOW	VPP HIGH
2508/16	23	5.00±0.6V	25±1V
2532	23	5.00±0.6V	25±1V
2564	1	5.00±0.5V	25±1V
2716/58, 27C16, 27C16HQ	23	5.00±0.6V	25±1V
2732, 27C32	22	TTL "0"	25±1V
2732A, P2732A	22	TTL "0"	21±0.5V
2764, P2764	1	5.00±0.25V	21±0.5V
Fujitsu 27C16	23	5.00 ±0.6V	21±0.5V
Hitachi 27C16	23	5.00 ±0.6V	21±0.5V
Intel 27C16	23	5.00 ±0.6V	12.5±0.3V
Mitsubishi 27C16	23	5.00 ±0.6V	21±0.5V
27128	1	5.00±0.25V	21±0.5V
2764A, 27128A, 27256	1	5.00±0.25V	12.5±0.3V
Fujitsu 27C256	1	5.00 ±0.6V	21±0.5V
Intel 27C256	1	5.00 ±0.6V	12.5±0.3V
2804A, 2816A, 52B13	23	5.00±1V	21±1V
3004/08,3704/08	26	5.00±1V	16±1V
48016	23	5.00±0.5V	25±1V
68701	6	5.00±0.5V	21±0.5V
68701U4	6	5.00±0.5V	21±0.5V
68705P3, P5	6	5.00±0.5V	21±0.5V
68705R3, U3	7	5.00±0.5V	21±0.5V
68764/766	22	TTL "1"	25±1V
8741A	26	5.00±0.25V	25±1.5V
8742	26	5.00±0.25V	21±0.5V
8748	26	5.00±0.25V	25±1.5V
8748H	26	5.00±0.25V	21±0.5V
8749H	26	5.00±0.25V	21±0.5V
8751, 8751H	31	5.00±0.6V	21±0.5V
8755A	1	5.00±0.6V	25±1V
9761H	31	5.00±0.6V	21±0.5V

NOTE: For 24- and 28-pin devices, all pin references are made to a 28-pin socket.

## RETURN FOR REPAIR PROCEDURES

### Domestic Customers:

1. Call Customer Support at (800) 538-9570, ext. 3617. In California call (408) 646-3617 from 7 a.m. to 4 p.m. (Pacific Time).
2. Explain the problem and we may be able to solve it on the phone. If not, we will give you a Customer Return Order (CRO) number.

Mark the CRO number on the shipping label, packing slip, and other paperwork accompanying the return. We cannot accept returns without a CRO.

3. Please be sure to enclose a packing slip with CRO number, serial number of the equipment, if applicable, and reason for return, with the name and telephone number of the person we should contact (preferably the user), if we have any further questions.
4. Pack the equipment in a solid cardboard box secured with packing material.

### CAUTION

Loose MOS integrated circuits, or any product containing CMOS integrated circuits, must be protected from electrostatic discharge during handling. Use conductive foam pads or conductive plastic bags, and never place MOS or CMOS circuitry in contact with Styrofoam materials.

5. Ship prepaid and insured to:

Pro-Log Corporation  
2411 Garden Road  
Monterey, California 93940

Reference CRO # \_\_\_\_\_

### International Customers:

Equipment repair is handled by your local Pro-Log distributor. If you need to contact Pro-Log, the factory can be reached at any time by TWX at 910-360-7082.

## Limited Warranty

**Limited Warranty:** Seller warrants that the articles furnished hereunder are free from defects in material and workmanship and perform to applicable, published Pro-Log specifications for two years from date of shipment on PROM Programmers and STD BUS Series 7000 cards. This warranty is in lieu of any other warranty expressed or implied. In no event will Seller be liable for special or consequential damages as a result of any alleged breach of this warranty provision. The liability of Seller hereunder shall be limited to replacing or repairing, at its option, any defective units which are returned F.O.B. Seller's plant. Equipment or parts which have been subject to abuse, misuse, accident, alteration, neglect, unauthorized repair or installation are not covered by warranty. Seller shall have the right of final determination as to the existence and cause of defect. As to items repaired or replaced, the warranty shall continue in effect for the remainder of the warranty period, or for ninety (90) days following date of shipment by Seller of the repaired or replaced part whichever period is longer. No liability is assumed for expendable items such as lamps and fuses. No warranty is made with respect to custom equipment or products produced to Buyer's specifications except as specifically stated in writing by Seller and contained in the contract.



2411 Garden Rd., Monterey, CA 93940  
Phone: (408) 372-4593, (800) 538-9570  
TWX: 910-360-7082, Telex: 171879