

SERIES 90, PM9005 OPERATING INSTRUCTIONS

(2704/2708 PERSONALITY MODULE)

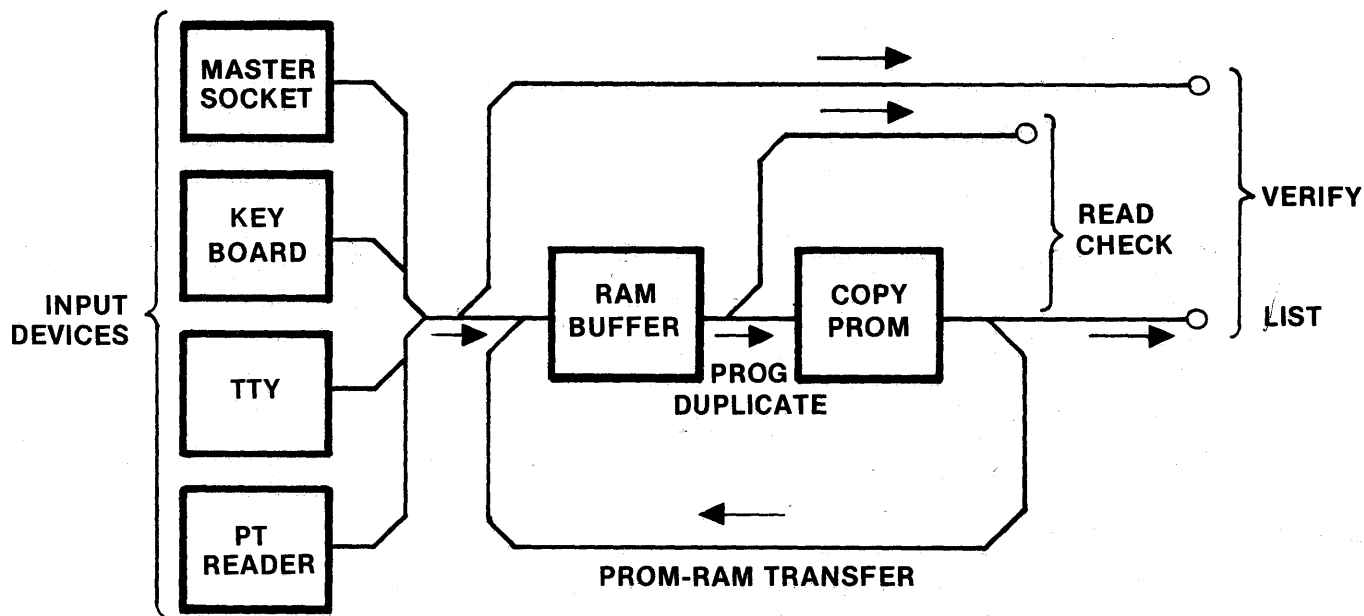
2704 and 2708 PROMS require a specialized programming sequence. This sequence causes the PM9005 personality module to operate in a manner different than other personality modules.

The programming characteristics of the 2704 and 2708 PROMs require that when any location is to be programmed, all other locations must be programmed to prevent data loss. It is important to note that if data is to be added to a partially programmed 2704 or 2708 the existing data must be reprogrammed when the new data is added.

MULTI-PASS PROGRAMMING

The programming technique for the 2704 or 2708 specifies a fixed number of passes through all addresses to guarantee programming of worse-case devices. Using the multi-pass technique the Series 90 performs 100 programming passes through all addresses. This operation requires just over 2 minutes for a 2708.

The required multi-pass programming is accomplished in PM9005 personality module by buffering all data in a RAM memory. The relationship of the RAM memory to the COPY ROM and input devices is shown below.



LAST ADDRESS (Buffer Full Signal)

The RAM buffer collects the data to be programmed into the PROM. When the RAM buffer is full the data is automatically transferred to the PROM by the multi-pass programming technique. The LAST ADDRESS location of the RAM buffer is used as a signal to start the multi-pass programming.

LAST ADDRESS condition occurs when data is entered into the last address location of the RAM. THE LAST ADDRESS is defined as either:

LAST ADDRESS for 2708 is 3FF
LAST ADDRESS for 2704 is 1FF

THE LAST ADDRESS must be programmed in order to transfer data from RAM to copy PROM.

MANUAL OPERATION

LIST and VERIFY modes are not affected by the multi-pass programming requirement. In LIST, data is listed direct from the COPY ROM. In VERIFY the COPY ROM is verified against the MASTER ROM or other input device data.

PROGRAM and DUPLICATE operate as described in the operating procedure except that data from the input device (Keyboard, MASTER socket, Paper Tape, TTY) is collected in a RAM memory until the LAST ADDRESS condition occurs. When the LAST ADDRESS is detected the Series 90 begins the required multi-pass programming sequence, transferring data from the RAM to the 2708/04.

As the programming operation proceeds in either the PROGRAM or DUPLICATE mode the Hexadecimal display will indicate the pass count in decimal from 00 to 99. At the end of pass 99 a read pass compares the RAM and PROM. If any address does not compare the read pass halts and displays the address and RAM data in the hexadecimal display, and the PROM data in the binary indicators. The read-check operation will continue with the ENTER key.

When the read-check, operation is complete an "F" will appear in the display indicating the operation is finished.

SPECIAL OPERATIONS

The RAM memory has special operating characteristics which may be useful for editing or adding to a partially programmed PROM. The contents of the PROM in the COPY socket are automatically transferred into the RAM when the first data character is entered in either PROGRAM or DUPLICATE. Data can also be entered to the RAM from any of the input devices (Keyboard, MASTER socket, Paper Tape, TTY, etc.). If the ADDRESS FIELD definition does not include the LAST ADDRESS the input operation will result in only filling the specific field of the RAM. Data can be entered to the RAM in segments from more than one input device.

It is important to note that the RESET key causes the entire COPY PROM contents to be transferred to the RAM. If multiple modes (PROG and DUP) are used to enter segments of data to the RAM the RESET key should be used only at the start to condition the RAM. Thereafter until the operation is complete, mode changes should be made without using the RESET key.

When the RAM is full, or when it is desired to initiate programming, the PROG mode can be used to enter the LAST ADDRESS. When the LAST ADDRESS is entered the programming operation will transfer the complete contents of the RAM to the PROM using the 100 pass programming technique.

OPERATIONAL DELAYS

Because of the size of the 2704 (512 addresses) or 2708 (1024 addresses) there will be some notable pauses as the Series 90 performs certain operations.

1. Erase check preceding any operation requires 3 seconds if the PROM is fully erased.
2. Transferring the contents of the PROM to RAM which automatically occurs when the first data character is entered in the PROGRAM or DUPLICATE modes requires three seconds.

SAMPLE PROGRAMMING SEQUENCE FOR 2708

	Operation	Display
1.	Push RESET.....	
2.	Push PROG. The display shows FIRST and LAST address.....	0 0 0 3 F F
3.	Define address field to be programmed using keyboard..... (EX: 010 01F)	0 1 0 0 1 F
4.	Push ENTER. Display shows START address.....	0 1 0
5.	Key in data desired. (EX: 73).....	0 1 0 7 3
6.	Push ENTER. The entire contents of the COPY PROM is transferred..... to the RAM buffer. The new data (73) is stored at its address (010) in the RAM. The address is automatically incremented and displayed for next data entry.	0 1 1
7.	Continue to key new data and enter until the last defined address..... has been entered. The display will show "F", noting the end of the defined address field. All old data from the COPY PROM and new DATA ENTERED FROM THE KEYBOARD IS NOW IN THE RAM buffer. To initiate programming of data from the RAM buffer to the COPY PROM the LAST ADDRESS must be entered as follows.	F
8.	WITHOUT resetting the programmer, push PROG. Display shows..... FIRST and LAST address.	0 0 0 3 F F
9.	Define the LAST ADDRESS of 3FF (use 1FF for 2704) by keying in a..... one location field starting at 3FF and ending at 3FF. Enter 3FF 3FF.	3 F F 3 F F
10.	Push ENTER. Display shows START address of 3FF.....	3 F F
11.	Key in whatever data is valid for address 3FF. If the address is..... empty, key in data FF (FF is the erased state of the PROM).	3 F F F F
12.	Push ENTER. The 100 pass programming automatically proceeds..... The display indicates the programming pass count in decimal from 00 to 99.	0 0
13.	When pass 99 is complete. An automatic read-check is made on all..... locations comparing the RAM buffer and the COPY PROM data. If the read-check is successful an "F" appears in the display.	F

OPERATION WITH SERIES 90 OPTIONS

All Series 90 options are designed to work unbuffered operating on one location at a time. Since the PM9005 requires buffered operation to do the multi-pass programming it operates with the Series 90 options in a different manner than the unbuffered personality modules.

Operation With The 9101 Paper Tape Reader Option

The 9101 VERIFY paper tape function operates normally. The 9101 DUPLICATE paper tape function proceeds normally but data is collected in RAM buffer instead of programming. If the LAST ADDRESS is included in the address field, control is transferred to the PM9005 personality module. The operation proceeds as defined for manual operation. Control is not regained by the paper tape.

If the LAST ADDRESS condition does not occur the data remains in the RAM buffer and programming does not occur.

Operation With 9102 Teletype Option

The LIST and VERIFY teletype-functions operate normally.

The PROGRAM and DUPLICATE teletype functions proceed normally but data is collected in the RAM buffer. If the LAST ADDRESS condition occurs, control is transferred to the PM9005 personality module. The programming operation proceeds as defined for the manual operation. Control is not regained by the teletype. If programming errors occur the error information appears in the Hex display as in the keyboard operation.

If the LAST ADDRESS condition does not occur the data remains in the RAM and programming does not occur.

Operation With 9104 Parallel Interface Option

The 9104 LIST mode operates normally with the PM9005.

The 9104 PROGRAM mode proceeds normally but data is collected in the RAM instead of programming. If the LAST ADDRESS is included in the address field, control is transferred to the PM9005 personality module when the last address data transfer occurs. The RESPONSE for the last data transfer will be delayed until the multi-pass programming is complete as defined below.

The programming operation proceeds as in the manual operation. When the programming and read-check operations are complete, control returns to the 9104 remote option. Successful programming is indicated by a normal RESPONSE signal. Unsuccessful programming is indicated by the RESPONSE-ERROR signal combination. If programming is unsuccessful it is necessary to LIST and compare to determine which locations failed to program.

If the LAST ADDRESS condition does not occur the data remains in the RAM buffer and programming does not occur.

Operation With 9105 RS232 Option

The 9105 LIST mode operates normally with the PM9005.

The 9105 PROGRAM mode proceeds normally but data is collected in the RAM instead of programming. If the LAST ADDRESS is included in the address field, control automatically transfers to the PM9005 personality module when the last address data transfer occurs. The acknowledgement for the last data transfer will be delayed until the multi-pass programming is complete as defined below.

The programming operation proceeds as in the manual operation. When the programming and read-check operations are complete, control returns to the 9105 remote option. Successful programming is indicated by a normal ACK control character. Unsuccessful programming is indicated by the NAK control character. If programming is unsuccessful it is necessary to LIST and compare to determine which locations failed to program.

If the LAST ADDRESS condition does not occur the data remains in the RAM buffer and programming does not occur.