



**Freescale Semiconductor, Inc.**

**MOTOROLA  
SEMICONDUCTOR  
USER'S MANUAL**

**M68HC705F6PGMR64  
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PROGRAMMER  
USER'S MANUAL**



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## 1. INTRODUCTION

This document contains information on the operation of M68HC705F6PGMR, a programmer board for programming MC68HC705F6 devices.

The on-chip EPROM feature of MC68HC705F6 MCU enables the user to emulate the MC68HC05F6 device. EPROM programming is facilitated through a program contained in the on-chip bootstrap ROM of the MC68HC705F6, and this program is invoked by using the programmer board described herein. Besides programming, verification between the contents of the MCU EPROM can also be performed with this board.

## 2. PROGRAMMER BOARD OPERATION

Operating procedure for the M68HC705F6PGMR is described in this section. The M68HC705F6PGMR enables programming of the MCU internal EPROM or ROM areas directly from an external 2764 EPROM. The 2764 external EPROM should contain the data to be programmed. To perform programming the MC68HC705F6 MCU device and the target code 2764 EPROM should be inserted into the MCU socket and the EPROM socket on the programmer board respectively. There is a direct correspondence of addresses between the target MCU and the external EPROM, locations of the external EPROM not in the internal EPROM or ROM address range are omitted, as are locations containing the data \$FF, thus speeding up the programming operation. Bootstrap mode function of the MC68HC705F6 are selected via SW1. Placing SW2 from the off state to on state will enable the MCU to enter the selected bootstrap mode.

The procedure for invoking the bootstrap routine is as follows:

1. Place SW2 in OFF position.
2. Connect +5V, Vpp (+15V) and GND to power connector P1.
3. Place the 2764 EPROM and MC68HC705F6 in the appropriate sockets.  
(ONLY one MCU should be placed on the board at any time)
4. Select the desire bootstrap routine via SW1.
5. Place switch SW2 to ON position to start the selected bootstrap function.
6. During programming/verification operation the LED D2 is illuminated to indicate normal operation.  
The result of the operation is finished and indicated by LED D1.
7. When the programming operation is completed place switch SW2 to OFF position.
8. Remove the MC68HC705F6 from the programming sockets.
9. Repeat step 3 to 8 to program additional MCUs.

Once the bootstrap mode is entered, mode switch setting of SW1 is scanned and the selected bootstrap routine will be executed accordingly, refer to the following table for mode selection.

1 = ON  
0 = OFF

| SW1 |   |   |   | Bootstrap Mode        |
|-----|---|---|---|-----------------------|
| 1   | 2 | 3 | 4 |                       |
| 0   | 0 | 0 | 0 | Program & Verify PROM |
| 0   | 0 | 1 | 0 | Verify PROM Contents  |
| 0   | 1 | 0 | 0 | Load Ram & Execute    |
| 0   | 1 | 1 | 0 | Dump PROM Contents    |
| 1   | 0 | 1 | 0 | Secure                |
| X   | X | X | 1 | Execute               |

## 2.1 Program and Verify PROM

This routine enables the contents of an external EPROM to be copied into the PROM area of MC68HC705F6 device. The programming LED D2 will be illuminated while programming is in progress. When programming operation is completed, the verification routine is entered. If the contents of the MCU PROM and external EPROM are the same, the verification LED D1 will be illuminated within 1 minute.

## 2.2 Verify EPROM Contents

When this routine is executed the contents of the MCU PROM are compared with those of the external EPROM. LED D1 & D2 will turn off to indicate verification is being performed. Upon completion of the verification routine (i.e. every location verified), the VERIFIED LED D1 is illuminated. If D1 does not illuminate within 1 minute, a discrepancy has been detected and the error address location will be placed on the external memory address bus.

## 2.3 Load Program and Execute

Entry of this mode will load the RAM of the F6 from external PROM from \$30. And execute will be passed to \$30

## 2.4 Dump PROM Contents

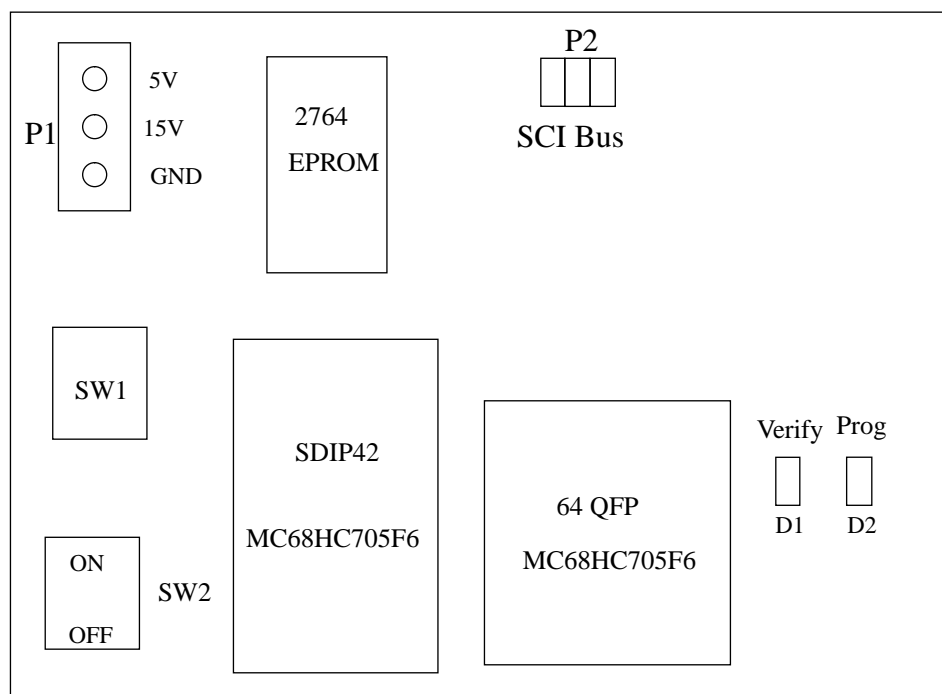
In the dump routine, the contents of the PROM are dumped sequentially to the SCI output. Unused locations are skipped so that no gaps exist in the data stream.

## 2.5 Secure

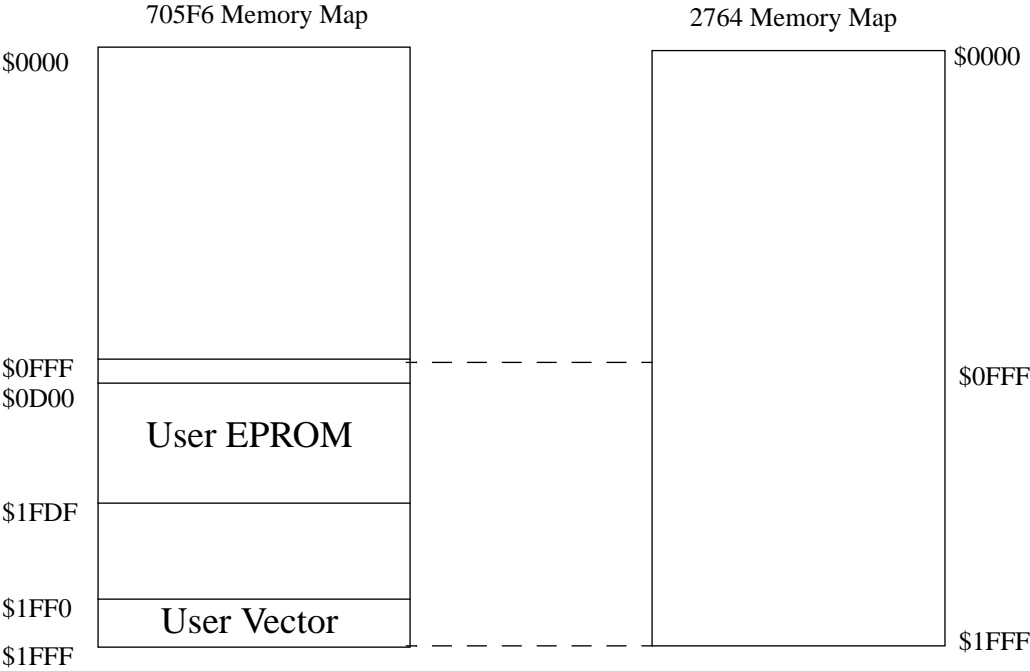
The secure PROM routines are used after the PROM is successfully programmed and verified. Only the SEC bit of the OPTION register is programmed, but VPP is necessary. Once this bit is programmed, PROM is secure, and can be neither verified nor dumped.

## 2.6 Execute

This routine allows the MCU to transfer control to a program previously loaded in RAM. For further information refer to the appropriate device specification.



LAYOUT OF F6PGMR COMPONENTS



Mapping between 705F6 and Programming EPROM 2764