

## **MC68HC912/9S12 FLASH/EEPROM Programmer**

### **Quick MCU tutorial**

## **ATTENTION:**

Before use MC68HC912/9S12 FLASH/EEPROM programmer we strongly recommend to familiarize with operation of 912/9S12 family microcontrollers. Complete data sheets and information could be found here: <http://www.etlweb.net/doc/>

When using MC68HC912/9S12 FLASH/EEPROM programmer please remember next points:

- **Modes of Operation**

The operating mode out of reset is determined by the states of the MODC, MODB, MODA pins during reset. The MODC, MODB, MODA bits in the MODE register show the current operating mode.

Mode Selection:

1. Normal modes: Some registers and bits are protected against accident changes.
2. Special modes: Allow greater to protected control registers and bits for special purposes such as testing.

**Table MODE SELECTION**

MODC	MODB	MODA	Mode Description
0	0	0	Special Single Chip, BDM allowed and ACTIVE. BDM is allowed in all other modes but a serial command is required to make BDM active.
0	0	1	Emulation Expanded Narrow, BDM allowed
0	1	0	Special Test (Expanded Wide), BDM allowed
0	1	1	Emulation Expanded Wide, BDM allowed
1	0	0	Normal Single Chip, BDM allowed
1	0	1	Normal Expanded Narrow, BDM allowed
1	1	0	Peripheral; BDM allowed but bus operations would cause bus conflicts (must not be used)
1	1	1	Normal Expanded Wide, BDM allowed

- **BDM lock/unlock feature (MC68HC912 family)**

The EEPROM module contains an extra word called SHADOW word which is loaded at reset into the EEMCR, EEDIVH and EEDIVL registers.

**EEMCR** — EEPROM Module Configuration **\$00F0**

Bit 7	6	5	4	3	2	1	0
NOBDML	NOSHW	RES	RES	1	EESWAI	PROTCLK	DMI

NOBDML — Background Debug Mode Lockout Disable

0 = The BDM lockout is enabled.

1 = The BDM lockout is disabled.

Loaded from SHADOW word at reset. Read anytime. Write anytime in special modes (SMODN=0).

### **To unlock BDM with storage rest data contents of register please do next:**

1) Read register data at address \$000F0

2) Set ***MOST significant bit to "1"***

For example: If data at address \$000F0 contain \$78 make logical or with \$80  
 **$\$78 \text{ OR } \$80 = \$F8$ ;**

3) Next write this value to EEPROM using EEPROM write button

4) After next reset BDM will be enable

*NOTE: MC68HC912 without post fix "A" has EEPROM shadow byte only  
But it located at the same address \$000F0*

- **Flash Security feature** (9S12 family)

This FSEC register holds all bits associated with the device security. This register is unbanked.

<b>Bit 7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>
<b>KEYEN</b>	<b>NV6</b>	<b>NV5</b>	<b>NV4</b>	<b>NV3</b>	<b>NV2</b>	<b>SEC1</b>	<b>SEC0</b>

*Note: For supported MCU types see table "SELECT DEVICE" that contained calculated Register address Base + \$101*

KEYEN — Enable backdoor key to security.

1 = backdoor to Flash is enabled.

0 = backdoor to Flash is disabled.

NV[6:2] — Non Volatile Flag Bits.

These 5 bits are available to the user as non-volatile flags.

SEC[1:0] — Memory Security Bits.

The SEC[1:0] bits define the security state of the device as shown in Security states table:

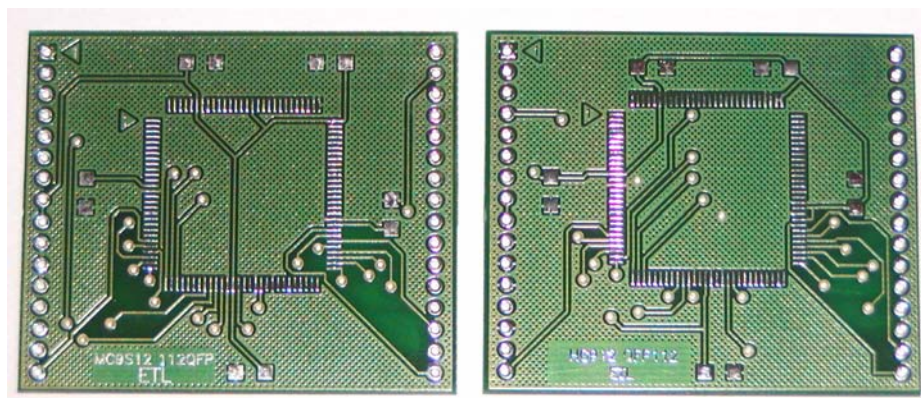
**Security states table**

<b>SEC 1:0</b>	<b>Description</b>
<b>00</b>	<b>Secured</b>
<b>01</b>	<b>Secured</b>
<b>10</b>	<b>Unsecured</b>
<b>11</b>	<b>Secured</b>

**CAUTION:**

***DURING USING IN-CIRCUIT INTERFACE DON'T ERASE DATA INTO FLASH AREA SEPARATELY, BECAUSE AFTER NEXT RESET 9S12 WILL BE SECURED!  
ERASE FLASH AND EEPROM SIMULTANEOUSLY***

**For devices in which BDM module disabled or when device secured there is on-board operation only. Use corresponding programming adapter**



**9S12 series adapter**

**912 series adapter**