



# **XPROG-m Programmer**

**Users Manual**

**Rev. 1.6**

**2004.11.19**

## Revision History

Revision	Date	Description of Changes
1.2	2004.08.06	Added MC68HC05P3 target connection
1.3	2004.08.16	Corrected MC68HC05H12 target connection
1.4	2004.09.10	Added M35080 SPI EEPROM target connection
1.5	2004.11.02	Added MC68HC11KS2 (LQFP80) target connection Added MC68HC705P3 target connection Added TMS374 family target connection Added BMW EWS3 target connection
1.6	2004.11.19	Corrected EWS3 target connection. K-Line pin

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# 1. INTRODUCTION

The XPROG-m™ programmer is designed to replace the earlier version of XPROG™ programmer. XPROG-m™ programmer is fully upward-compatible hardware with XPROG™ programmer and have many additional features.

The XPROG-m™ supports in circuit and on board programming 68HC05, 68HC08, 68HC11, 68HC(S)12, TMS370, AVR, ATMEGA, PIC, I<sup>2</sup>C,  $\mu$ W, SPI, EEPROM and FLASH memories.

## 1.1. Main Features

- Fully compatible with all software versions of Device Programmer Desktop™
- Software update (ATMEGA) - directly from Device Programmer Desktop™;
- Software version control mechanism;
- Self check for errors handling;
- High speed RS232 communication interface, fully compatible with USB→RS232 adapter;
- Fully upward-compatible XPROG™ connector;
- Multifunctional XPROG-m™ connector;
- 8 pin DIP socked for on board programming;
- Supports many PLCC, QFP, LQFP adapters for on board programming;
- High speed hardware engine(PLD);
- Two PWM regulated and ADC controlled voltage regulators.

## 1.2. Technical Data

### Power Supply

- universal power provider: 100/240 Vac – 47/63 Hz/ 15 Vdc – 300mA;

### Dimensions

Width 90mm

Length 90mm

Height 18mm

### 1.3. Programmer board layout

Figure 1 shows the XPROG-m™ Programmer board layout.

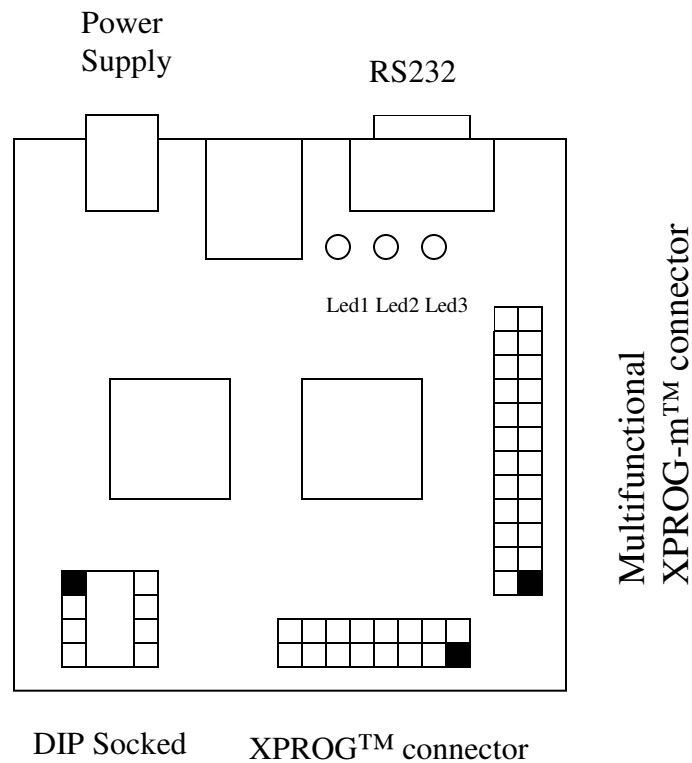


Figure 1. The XPROG-m™ board layout

XPROG™ connector used both in circuit both on board programming.  
Figure 2 and Table 1 shows XPROG™ connector signals and descriptions.  
XPROG-m™ connector used only for on board programming and not described in this section.

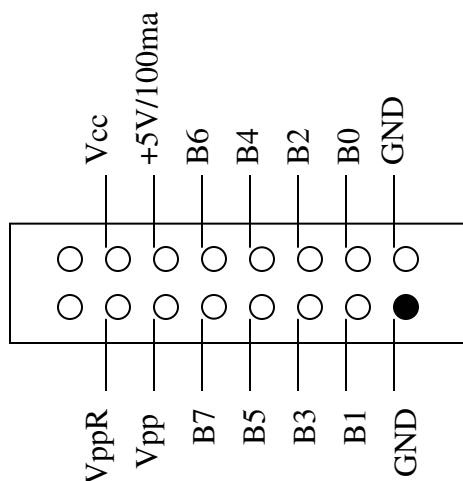


Figure 2. The XPROG™ connector

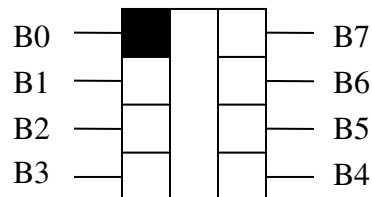


Figure 3. The DIP socked

Table 1. Signals description

Signal name	Description
GND	Signal and power ground
B0, B1...B7	Protected, high current ( $\pm 40\text{mA}$ ), multifunctional input/output pins.
+5V/100mA	$\pm 5\%$ accuracy, output voltage.
Vcc	PWM regulated, ADC controlled output target supply voltage. Max. current 100mA
Vpp	PWM regulated, ADC controlled output target programming voltage. Max. current 100mA
VppR	Vpp with series 4.7K resistor

## 2. TARGET CONNECTION

This section contains information how to connect XPROG-m™ to various targets to access internal target resources such as EEPROM, FLASH, ROM,...etc.

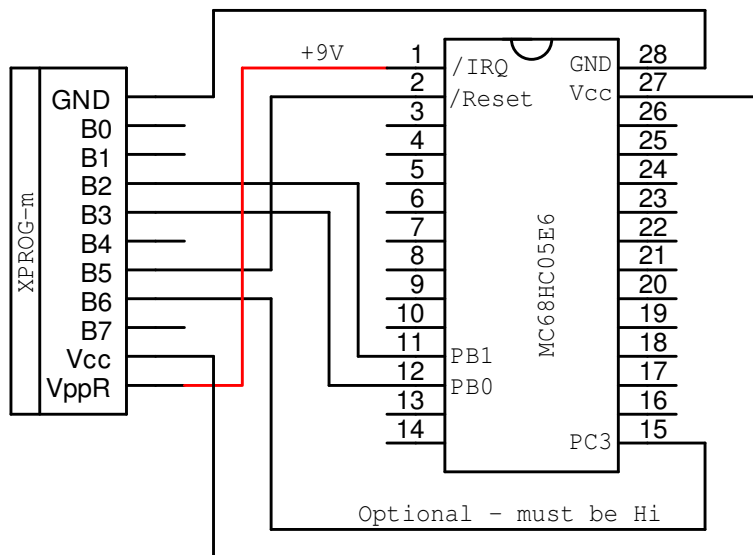
**Note:** Nets marked “Optional - must be Lo or Hi TTL logic level” not require connection with XPROG if they have described level in the circuit.

**Note:** Some circuit connections can disturb proper XPROG operation. In this case you must disconnect corresponding MCU pin from circuit.

**Warnig:** XPROG Vpp and VppR pins have hi voltage who can damage circuit. If you are not sure that you can't damage circuit , you must disconnect this MCU pin from circuit.

### 2.1. MC68HC05 family

#### 2.1.1. MC68HC05E6

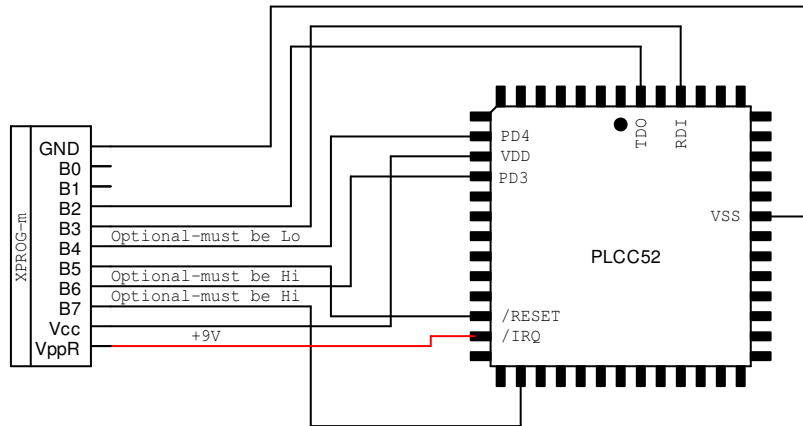


Mask sets: 0F82B, 0G72G  
Oscillator: 3, 4 pin  
Packages: SOIC28, SDIP28  
EEPROM: 0x0100 – 0x019F

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	-	0/1	1	-	+5V±5%	+9V±5%



### 2.1.2. MC68HC05B6/B8/B16/B32 (PLCC52)



Mask sets:

Oscillator: 16, 17 pin

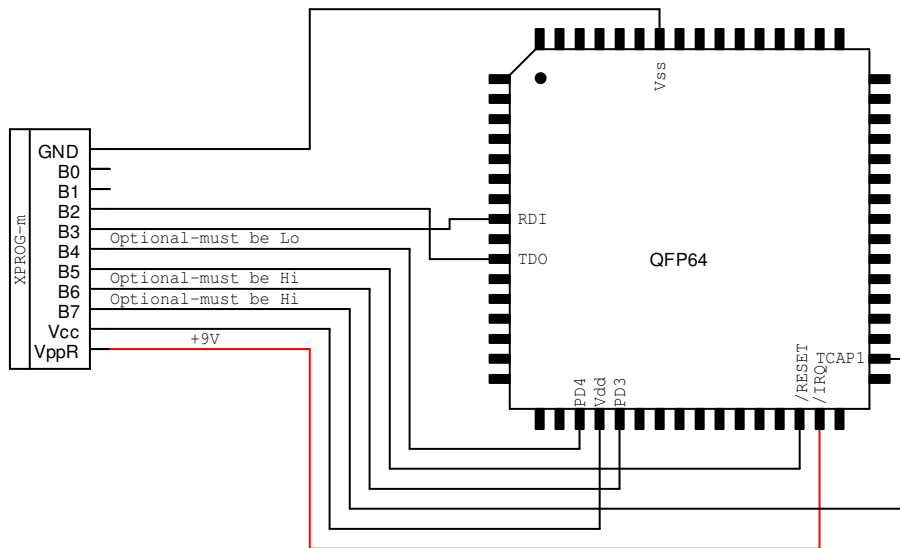
Packages: PLCC52

EEPROM: 0x0101 – 0x01FF

CFG(EEPROM): 0x0100

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	1	1	+5V±5%	+9V±5%

### 2.1.3. MC68HC05B6/B8/B16/B32 (QFP64)



Mask sets:

Oscillator: 28, 29 pin

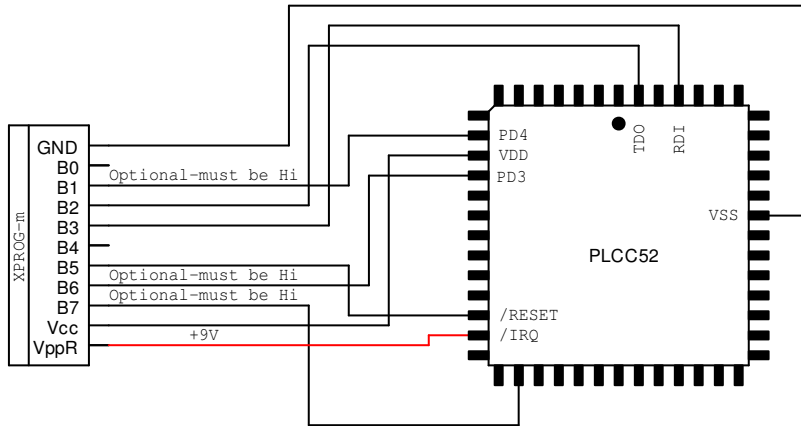
Packages: QFP64

EEPROM: 0x0101 – 0x01FF

CFG(EEPROM): 0x0100

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	1	1	+5V±5%	+9V±5%

#### 2.1.4. MC68HC705B16N/B32 (PLCC52)



Mask sets:

Oscillator: 16, 17 pin

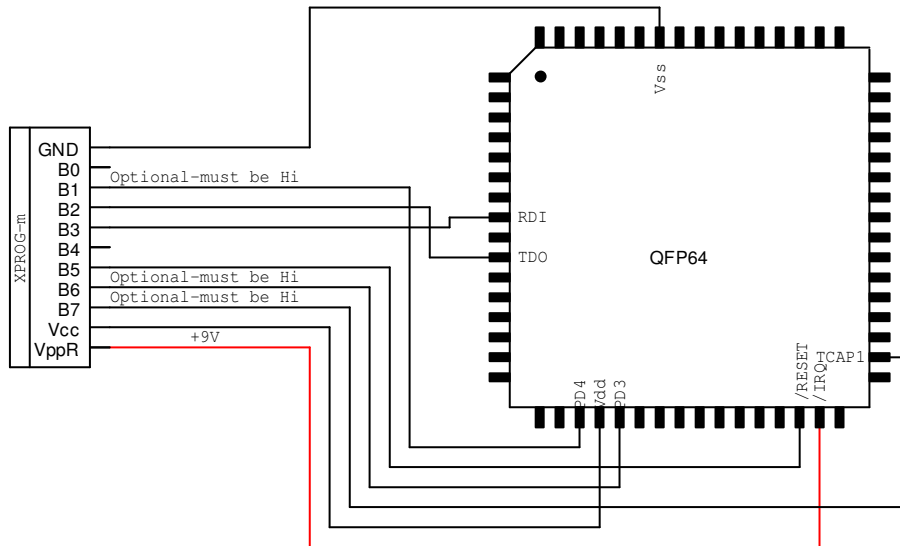
Packages: PLCC52

EEPROM: 0x0101 – 0x01FF

CFG(EEPROM): 0x0100

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	1	0/1	0/1	-	0/1	1	1	+5V±5%	+9V±5%

#### 2.1.5. MC68HC705B16N/B32 (QFP64)



Mask sets:

Oscillator: 28, 29 pin

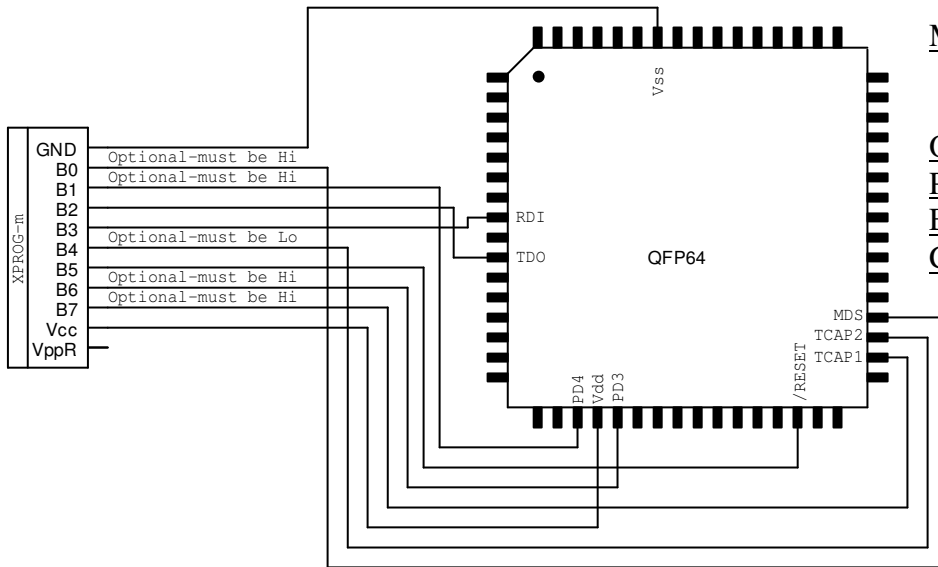
Packages: QFP64

EEPROM: 0x0101 – 0x01FF

CFG(EEPROM): 0x0100

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	1	0/1	0/1	-	0/1	1	1	+5V±5%	+9V±5%

### 2.1.6. MC68HC(7)05X16/X32 (QFP64)



Mask sets: 0D53J, 0D69J,  
1D69J, 1H52A,  
2D59J

Oscillator: 28, 29 pin

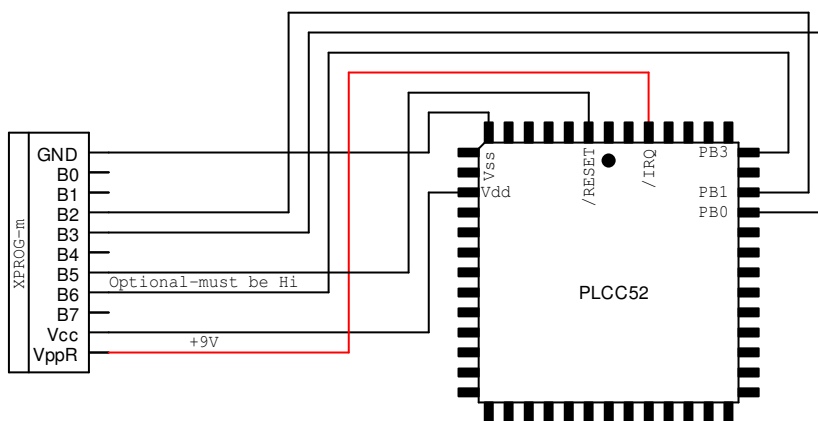
Packages: QFP64

EEPROM: 0x0101 – 0x01FF

CFG(EEPROM): 0x0100

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	1	1	0/1	0/1	0	0/1	1	1	+5V±5%	

### 2.1.7. MC68HC(7)05H12



Mask sets: 0H57A

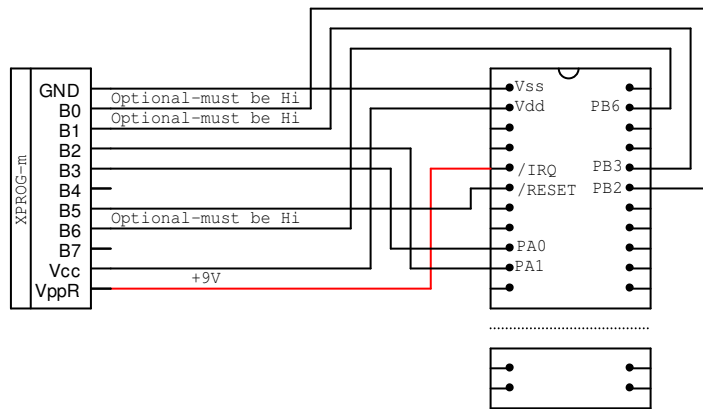
Oscillator: 1, 52 pin

Packages: PLCC52

EEPROM: 0x0400 – 0x04FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	-	0/1	1	-	+5V±5%	+9V±5%

### 2.1.8. MC68HC(7)05L28



Mask sets:

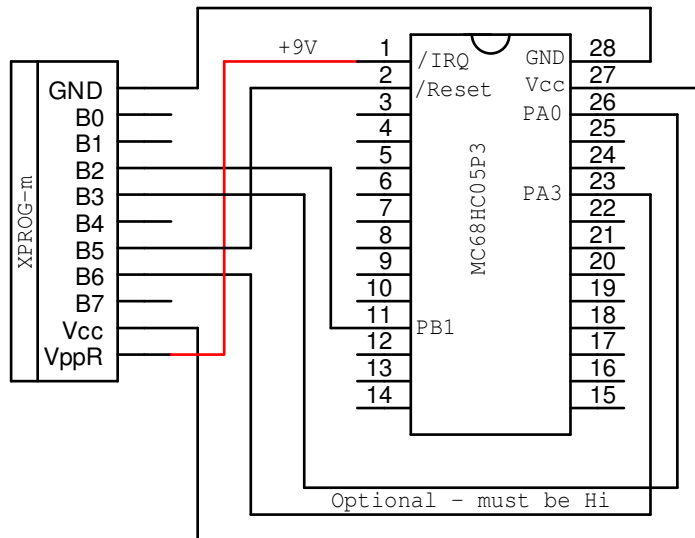
Oscillator: 7, 8 pin

Packages: SDIP56

EEPROM: 0x0300 – 0x03EF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	1	1	0/1	0/1	-	0/1	1	-	+5V±5%	+9V±5%

### 2.1.9. MC68HC05P3



Mask sets: 1E25B

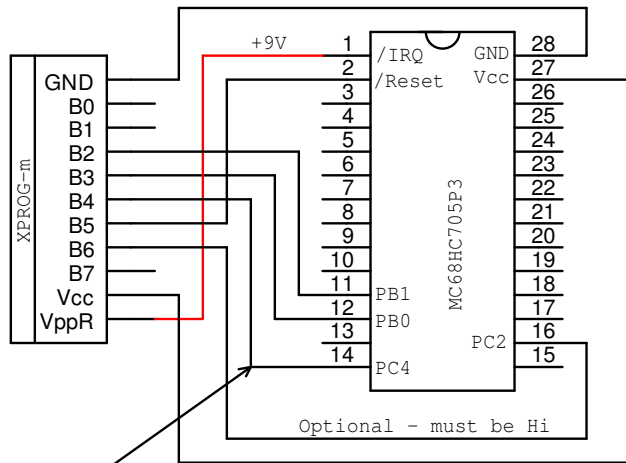
Oscillator: 3, 4 pin

Packages: SOIC28, SDIP28

EEPROM: 0x0100 – 0x017F

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	-	0/1	1	-	+5V±5%	+9V±5%

## 2.1.10. MC68HC05P3



Optional - must be Lo

Mask sets: 1F75B

Oscillator: 3, 4 pin

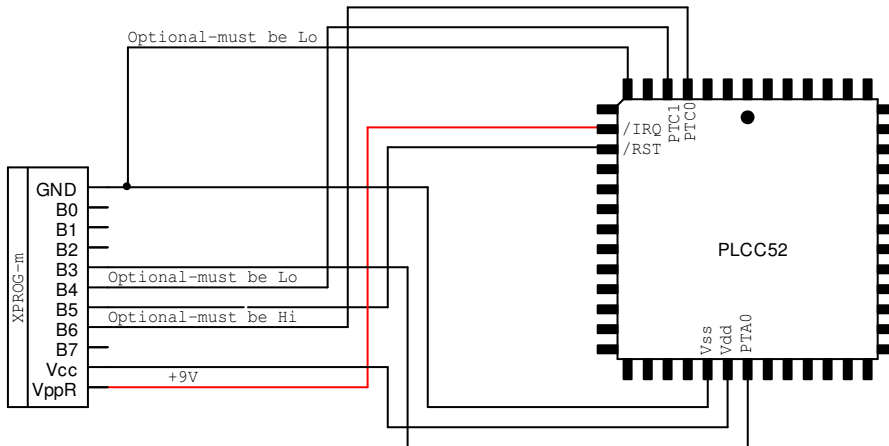
Packages: SOIC28, SDIP28

EEPROM: 0x0100 – 0x017F

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	1	-	+5V±5%	+9V±5%

## 2.2. MC68HC08 family

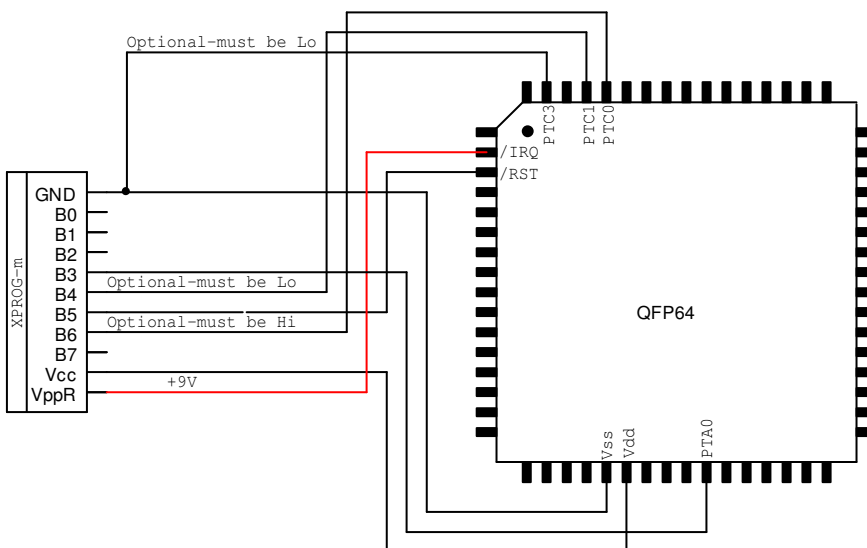
### 2.2.1. MC68HC08AS32/AS32A (PLCC52)



Mask sets: 1J27F  
 Oscillator: 2, 3 pin  
 Packages: PLCC52  
 EEPROM: 0x0800 – 0x09FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	0	0/1	1	-	+5V±5%	+9V±5%

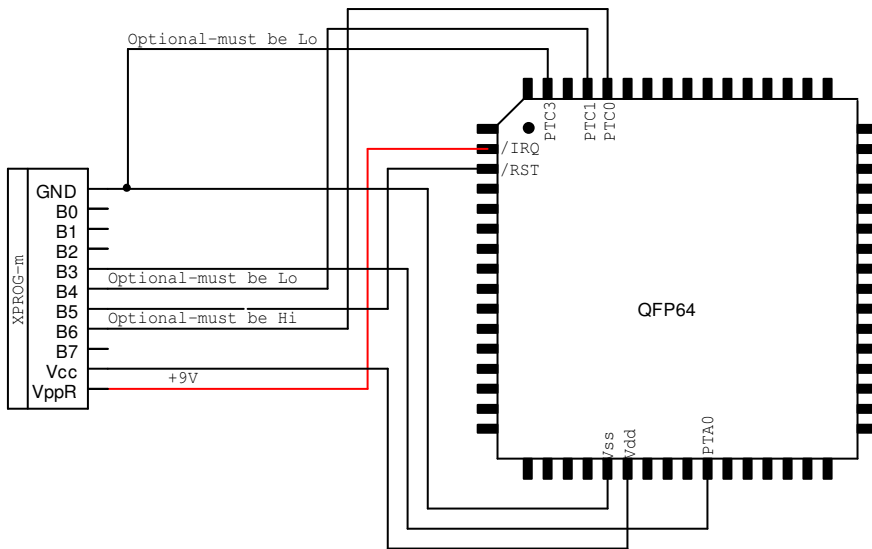
### 2.2.2. MC68HC08AS32/AS32A (QFP64)



Mask sets: 1J27F  
 Oscillator: 58, 59 pin  
 Packages: QFP64  
 EEPROM: 0x0800 – 0x09FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	0	0/1	1	-	+5V±5%	+9V±5%

### 2.2.3. MC68HC08AZ32A



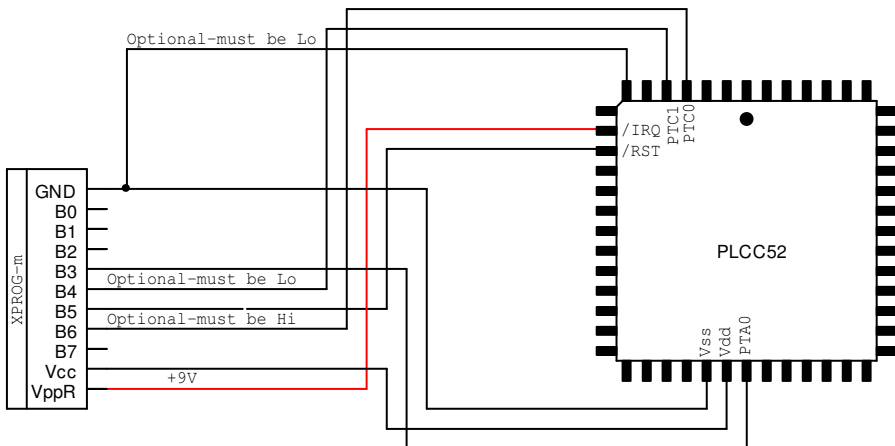
Mask sets: 0J66D

Oscillator: 58, 59 pin

Packages: QFP64

EEPROM: 0x0800 – 0x09FF

### 2.2.4. MC68HC08AS60/AS60A(PLCC52)



Mask sets: 0H62A, 8H62A

Oscillator: 2, 3 pin

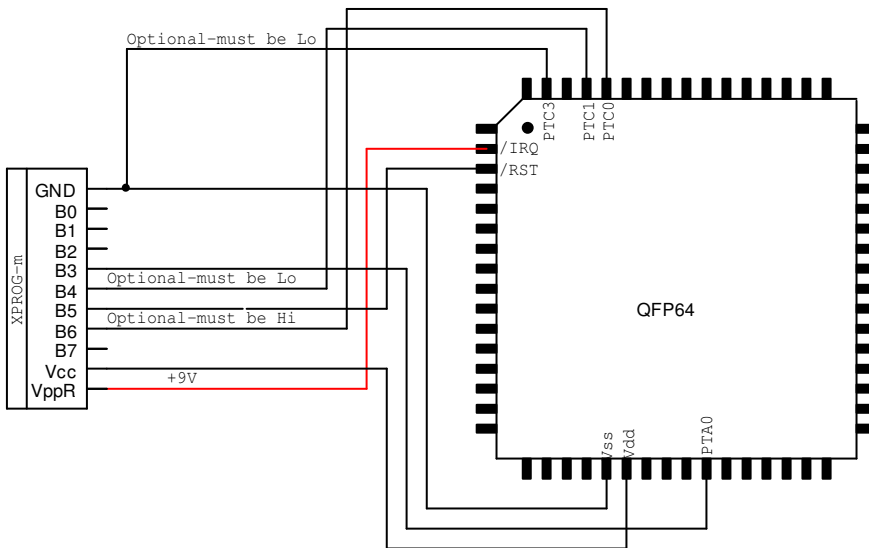
Packages: PLCC52

EEPROM1: 0x0800 – 0x09FF

EEPROM2: 0x0600 – 0x07FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	0	0/1	1	-	+5V±5%	+9V±5%

### 2.2.5. MC68HC08AS60/AS60A(QFP64)



Mask sets: 0H62A, 8H62A

Oscillator: 58, 59 pin

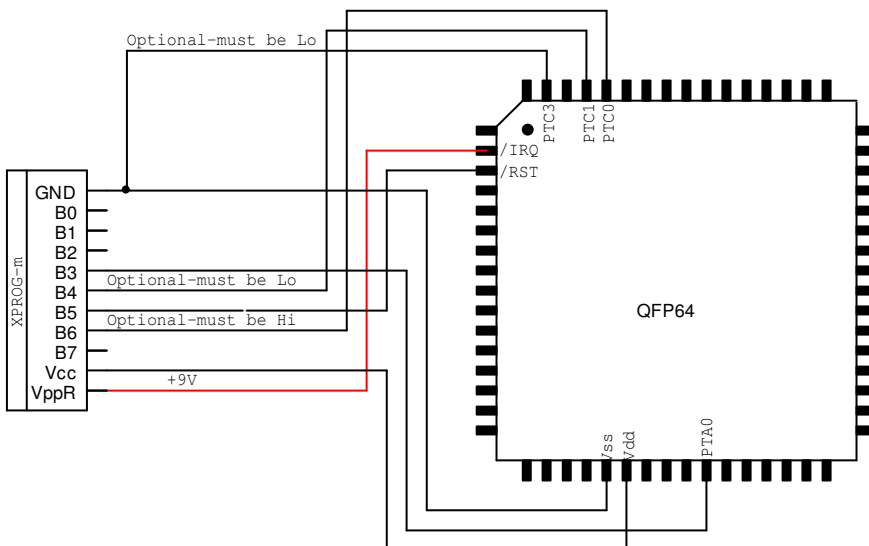
Packages: QFP64

EEPROM1: 0x0800 – 0x09FF

EEPROM2: 0x0600 – 0x07FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	0	0/1	1	-	+5V±5%	+9V±5%

### 2.2.6. MC68HC08AZ60A(QFP64)



Mask sets:

Oscillator: 58, 59 pin

Packages: QFP64

EEPROM1: 0x0800 – 0x09FF

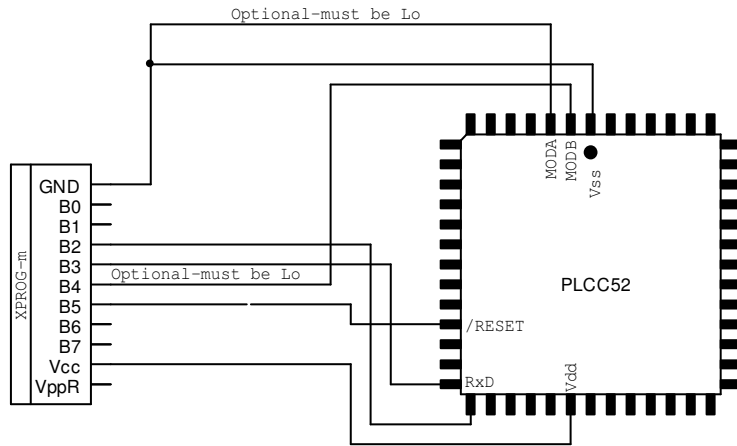
EEPROM2: 0x0600 – 0x07FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	0	0/1	1	-	+5V±5%	+9V±5%



## 2.3. MC68HC11 family

### 2.3.1. MC68HC11A8/E1/E9/E20(PLCC52)



Mask sets:

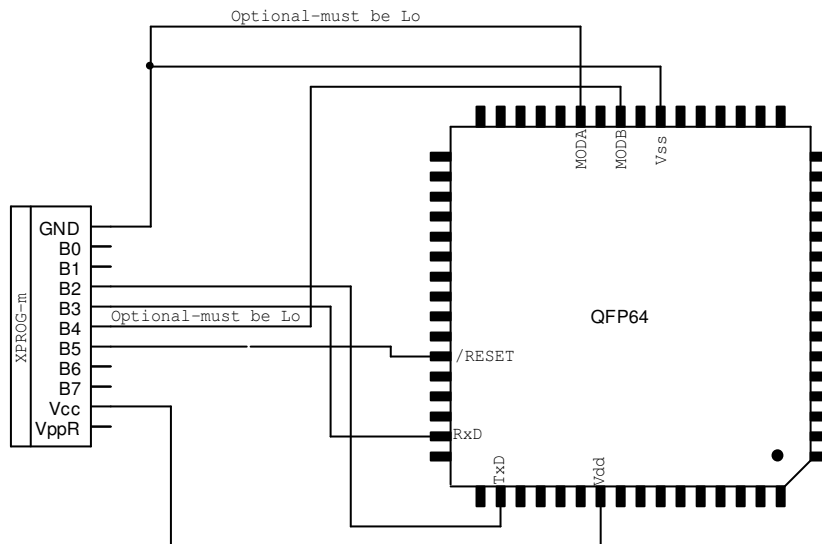
Oscillator: 7, 8 pin

Packages: PLCC52

EEPROM: 0xB600 – 0xB7FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

### 2.3.2. MC68HC11A8/E1/E9/E20(QFP64)



Mask sets:

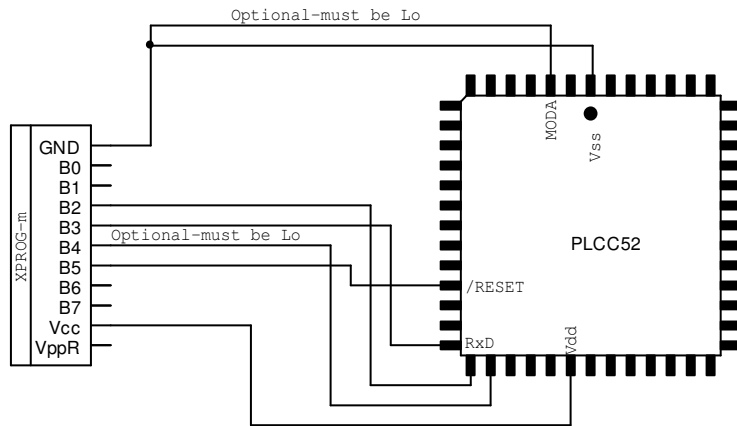
Oscillator: 31, 33 pin

Packages: QFP64

EEPROM: 0xB600 – 0xB7FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

### 2.3.3. MC68HC11EA9



Mask sets: 0D46J, 1D47J,  
2D47J

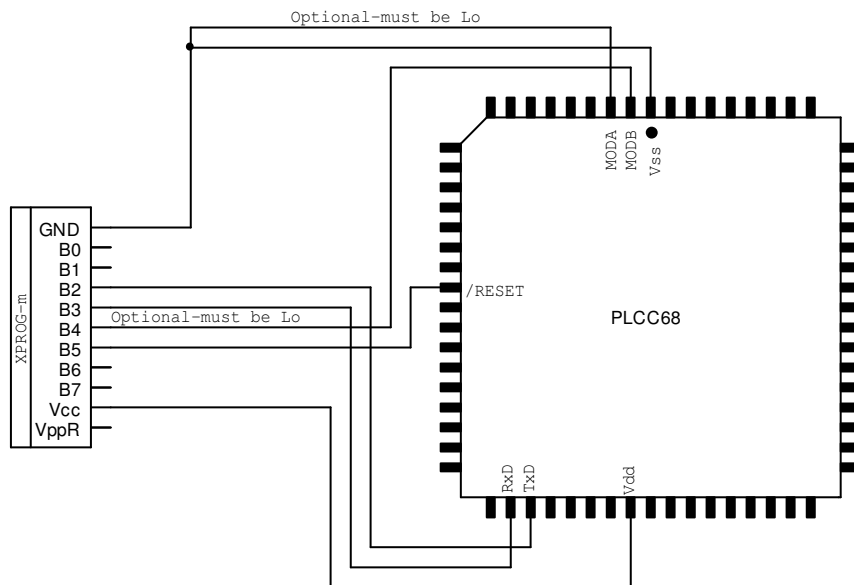
Oscillator: 7, 8 pin

Packages: PLCC52

EEPROM: 0xB600 – 0xB7FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

### 2.3.4. MC68HC11F1(PLCC68)



Mask sets: 2F37E, E87J

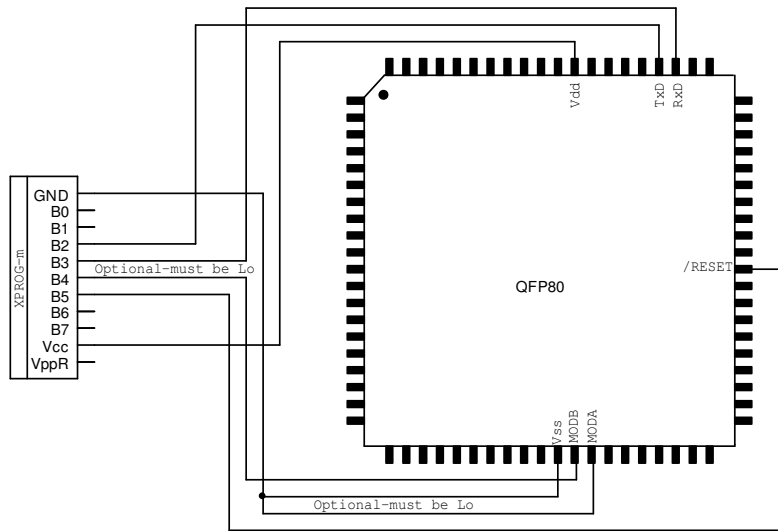
Oscillator: 6, 7 pin

Packages: PLCC68

EEPROM: 0xFE00 – 0xFFFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

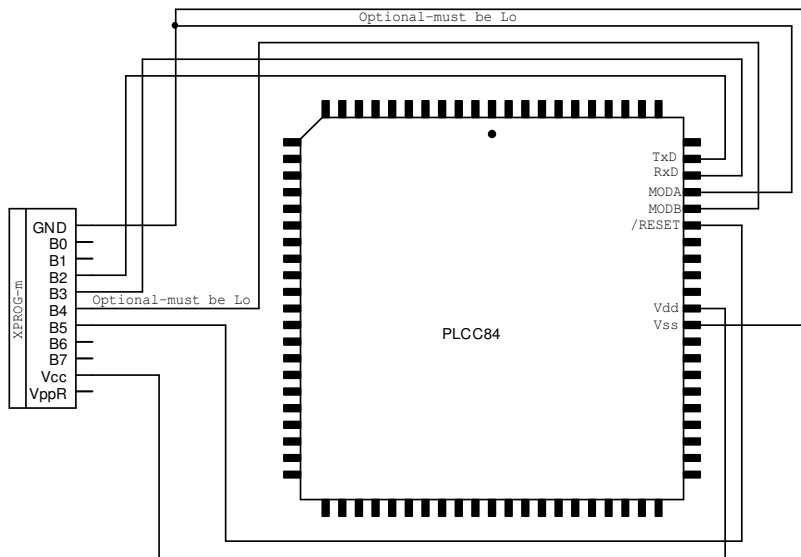
### 2.3.5. MC68HC11F1(QFP80)



Mask sets: 2F37E  
Oscillator: 36, 37 pin  
Packages: QFP80  
EEPROM: 0xFE00 – 0xFFFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

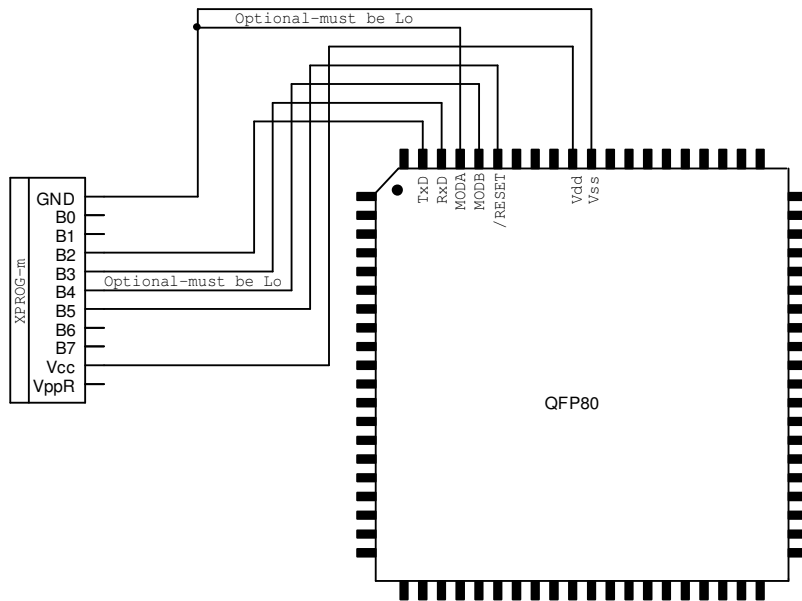
### 2.3.6. MC68HC11K4(PLCC84)



Mask sets: 1E62H  
Oscillator: 67, 68 pin  
Packages: PLCC84  
EEPROM: 0xD80 – 0xFFFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

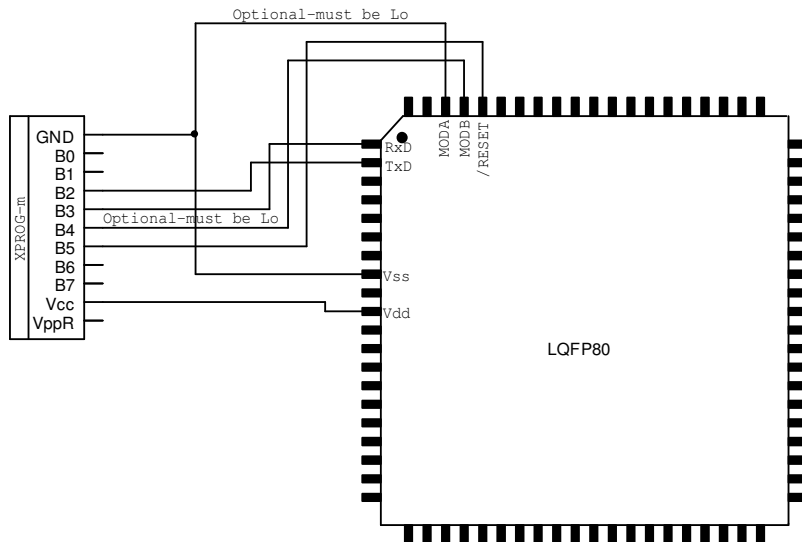
### 2.3.7. MC68HC11K4(QFP80)



Mask sets: 1E62H  
 Oscillator: 73, 74 pin  
 Packages: OFP80  
 EEPROM: 0x0D80 – 0x0FFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

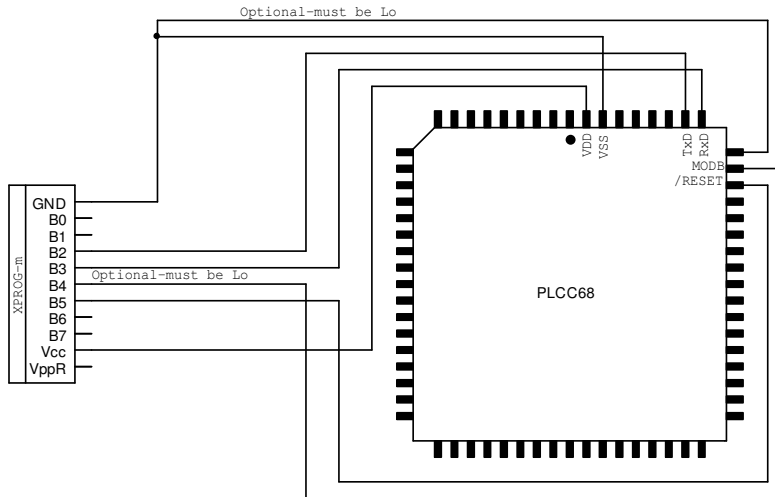
### 2.3.8. MC68HC11KS2(LQFP80)



Mask sets: 1E59B, 2E59B  
 Oscillator: 74, 75 pin  
 Packages: LOFP80  
 EEPROM: 0x0D80 – 0x0FFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

### 2.3.9. MC68HC11KA4(PLCC68)



Mask sets: 0E57S

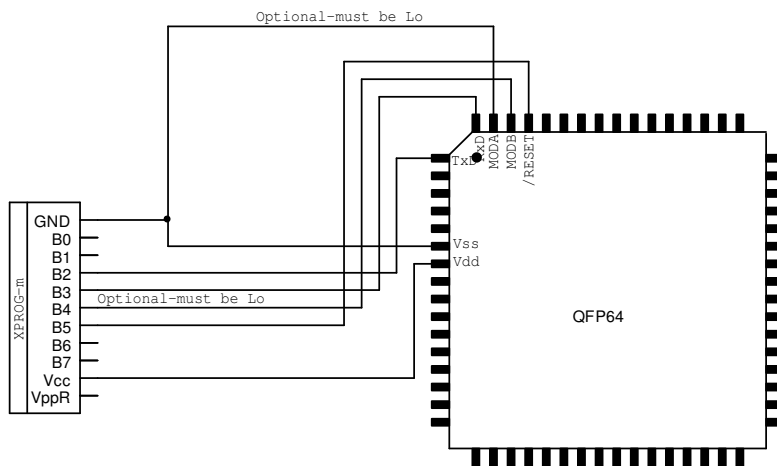
Oscillator: 56, 57 pin

Packages: PLCC68

EEPROM: 0x0D80 – 0x0FFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

### 2.3.10. MC68HC11KA4(QFP64)



Mask sets: 0E57S

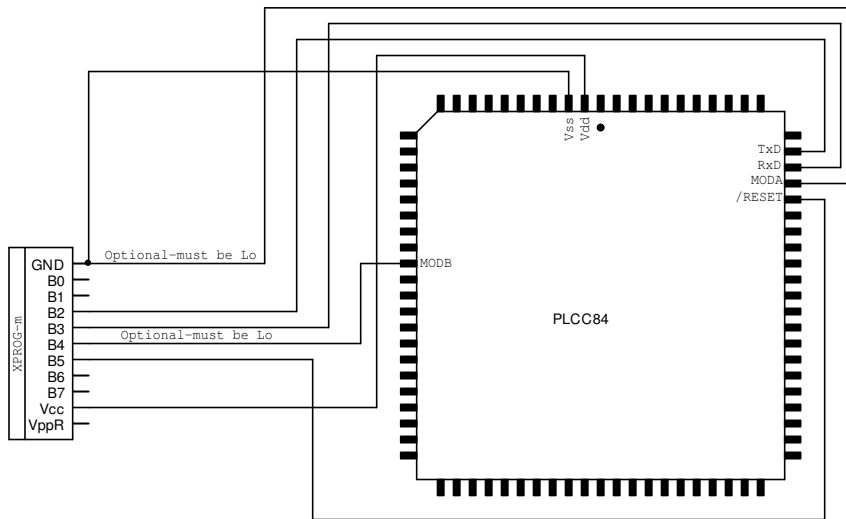
Oscillator: 59, 60 pin

Packages: QFP64

EEPROM: 0x0D80 – 0x0FFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

### 2.3.11. MC68HC11PH8



Mask sets: 3D64J, 0H30R

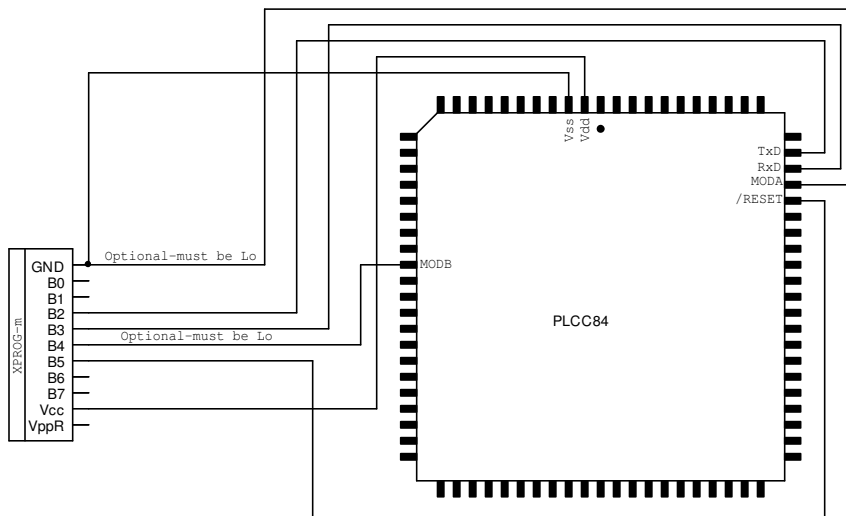
Oscillator: 66, 67 pin

Packages: PLCC84

EEPROM: 0x0D00 – 0x0FFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

### 2.3.12. MC68HC11P2



Mask sets: 3E74J, 1E53M,  
0G10V

Oscillator: 66, 67 pin

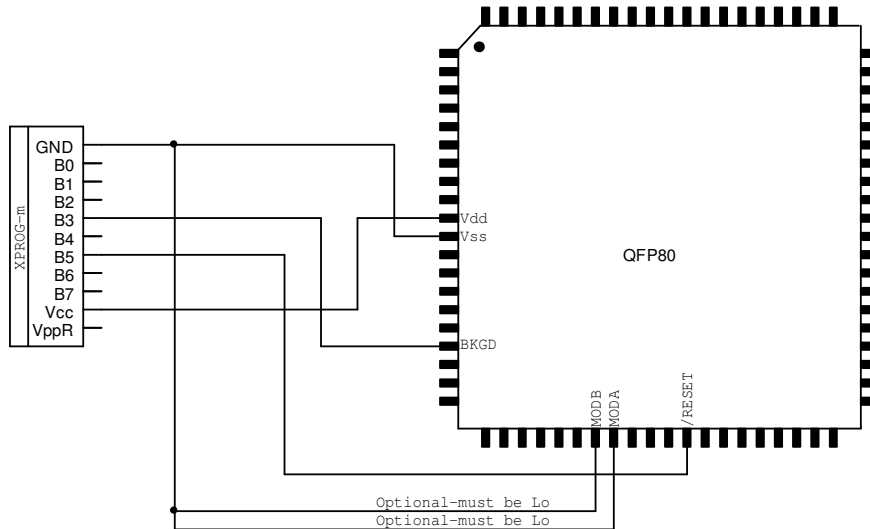
Packages: PLCC84

EEPROM: 0x0D80 – 0x0FFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	0/1	0/1	0	0/1	-	-	+5V±5%	

## 2.4. MC68HC(S)12 family

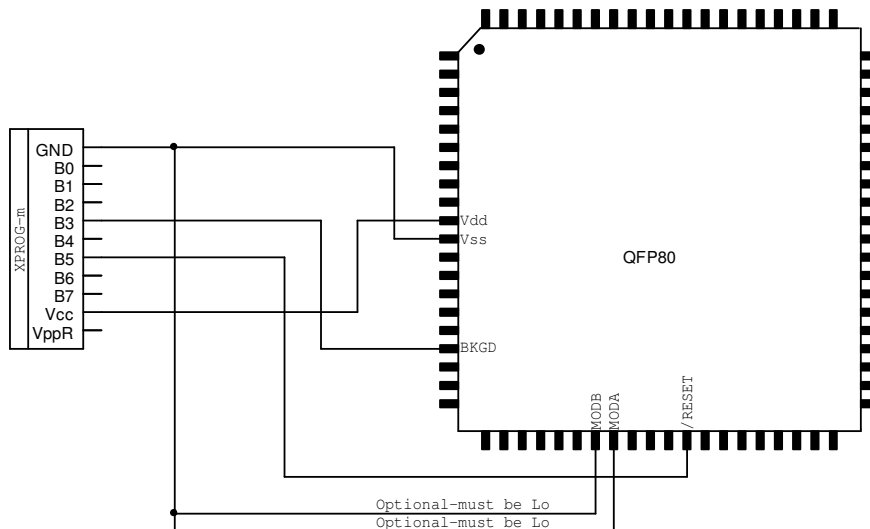
### 2.4.1. MC68HC12B32



Mask sets: 1H91F, 3H91F  
Oscillator: 33, 34 pin  
Packages: QFP80  
EEPROM: 0x0D00 – 0x0FFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	-	0/1	-	-	+5V±5%	

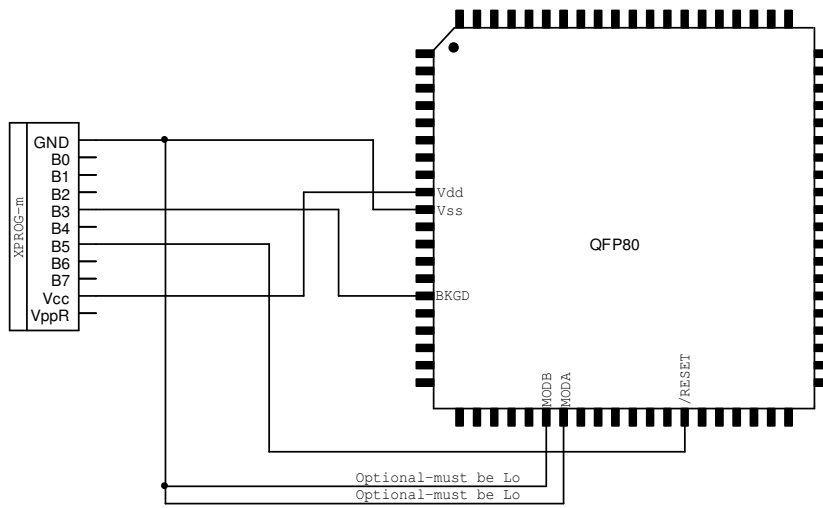
### 2.4.2. MC68HC12BE32



Mask sets: 2H54T  
Oscillator: 33, 34 pin  
Packages: QFP80  
EEPROM: 0x0D00 – 0x0FFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	-	0/1	-	-	+5V±5%	

### 2.4.3. MC68HC12D60



Mask sets: 1F68K, 0K75,  
1L28M

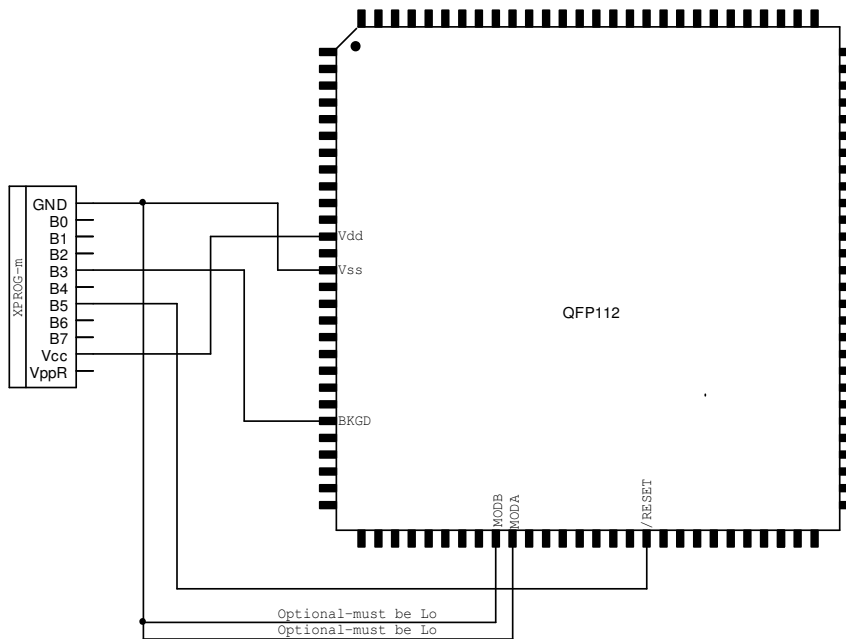
Oscillator: 35, 36 pin

Packages: QFP80

EEPROM: 0x0C00 – 0x0FFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	-	0/1	-	-	+5V±5%	

### 2.4.4. MC68HC12DG128



Mask sets: 5H55W

Oscillator: 47, 48 pin

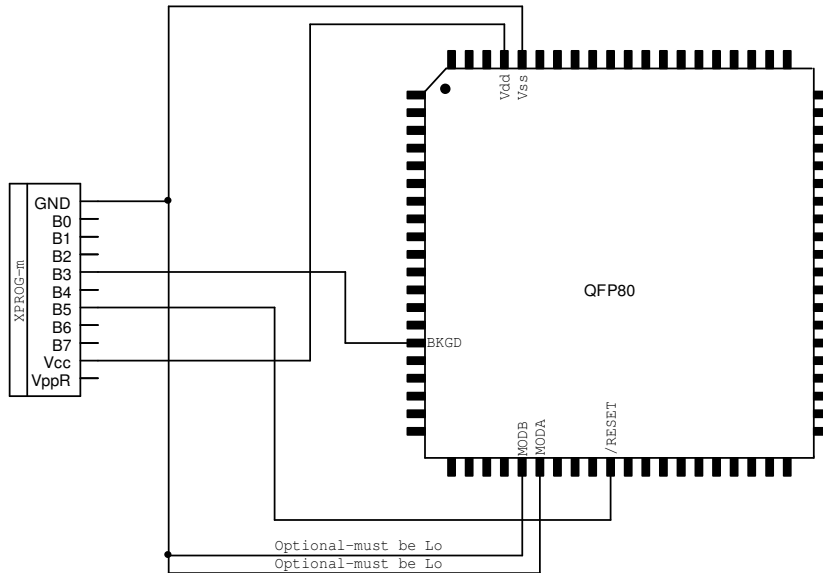
Packages: QFP112

EEPROM: 0x0800 – 0x0FFF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	-	0/1	-	-	+5V±5%	



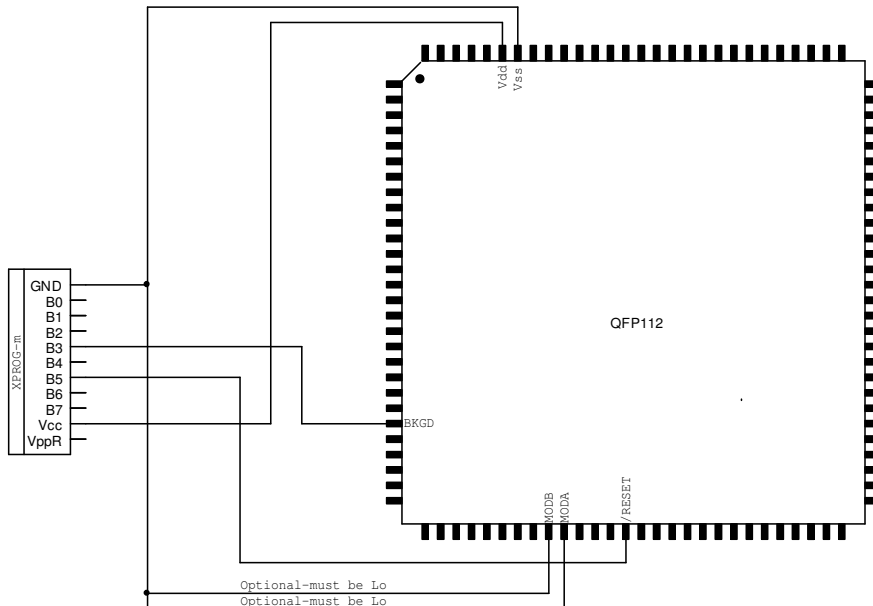
### 2.4.5. MC9S12D64(QFP80)



Mask sets: 2L86D  
Oscillator: 34, 35 pin  
Packages: QFP80  
EEPROM: 0x4000 – 0x43FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	-	0/1	-	-	+5V±5%	

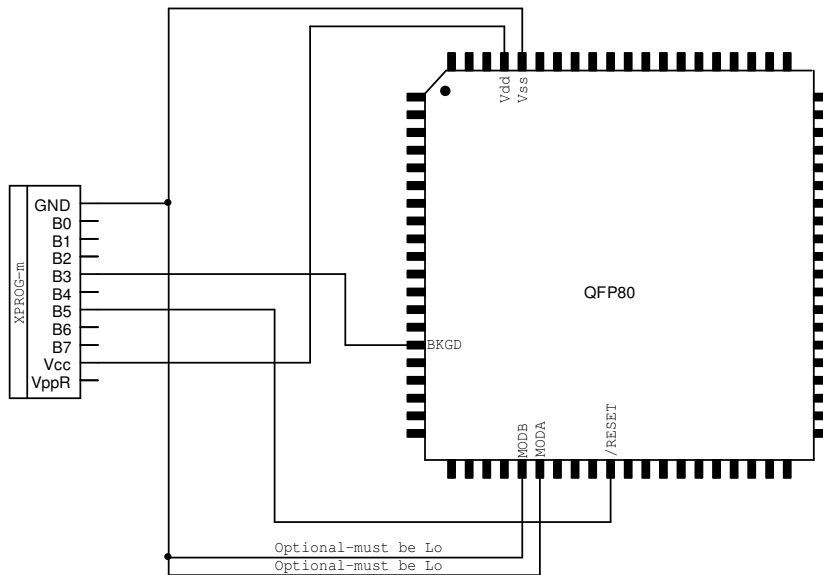
### 2.4.6. MC9S12D64(QFP112)



Mask sets: 2L86D  
Oscillator: 46, 47 pin  
Packages: QFP112  
EEPROM: 0x4000 – 0x43FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	-	0/1	-	-	+5V±5%	

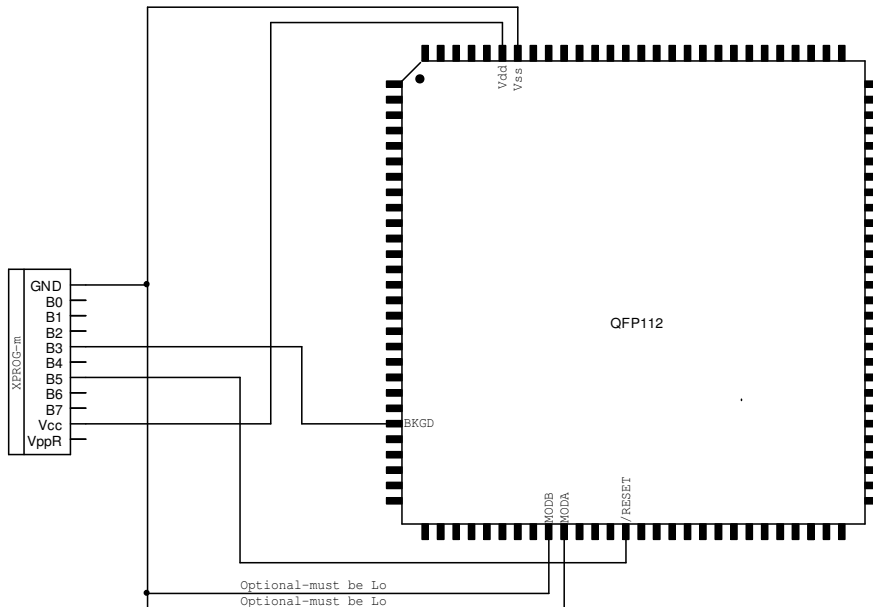
### 2.4.7. MC9S12DG256(QFP80)



Mask sets: 2K79X  
Oscillator: 34, 35 pin  
Packages: QFP80  
EEPROM: 0x4000 – 0x43FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	-	0/1	-	-	+5V±5%	

### 2.4.8. MC9S12DG256(QFP112)



Mask sets: 2K79X  
Oscillator: 46, 47 pin  
Packages: QFP112  
EEPROM: 0x4000 – 0x43FF

XPROG pin	B0	B1	B2	B3	B4	B5	B6	B7	Vcc	VppR
Signal level	-	-	-	0/1	-	0/1	-	-	+5V±5%	

## 2.5. TMS370 family

The TMS370 family supported only by on board programming. The suitable PLCC adapter must be mounted (see Figure 4).

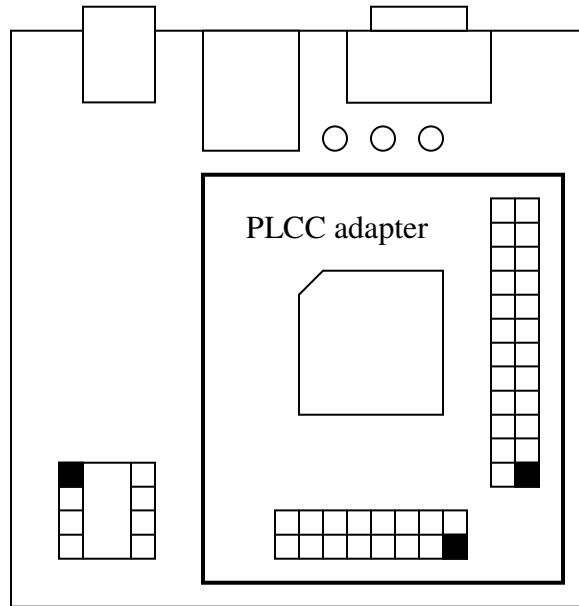


Figure 4. The XPROG-m™ with PLCC adapter

Supported PLCC adapters shown in the Table 2.

Table 2. PLCC adapters

Product code	Type
1-002-0001	TMS370 PLCC28 programming adapter
1-002-0002	TMS370 PLCC44 programming adapter
1-002-0003	TMS370 PLCC68 programming adapter

## 2.6. TMS374 family

The TMS374 family supported 14 wires in-circuit programming. The suitable in-circuit programming interface must be used (see Figure 5). For detailed in-circuit programming connections refer to “TMS374 family in-circuit programming users manual” (P/C: 3-001-0002).

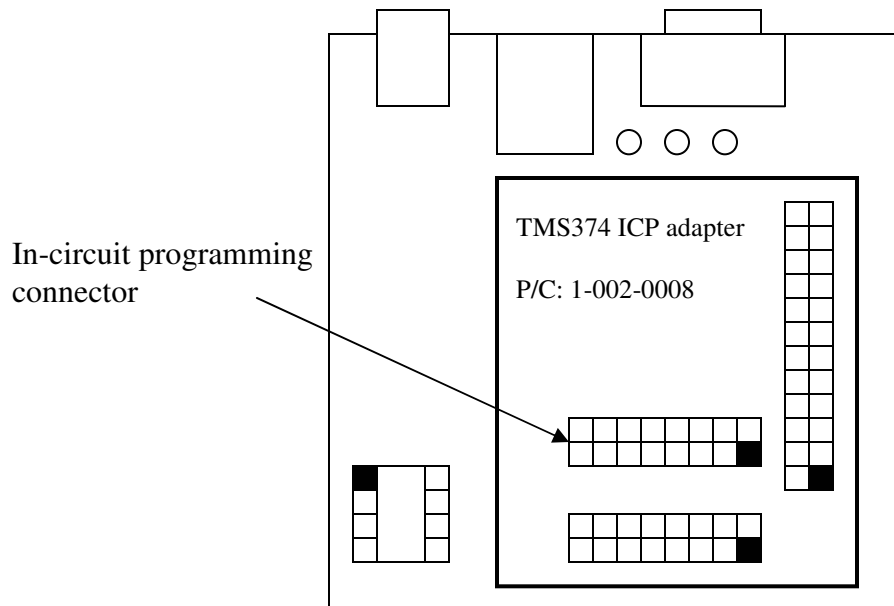
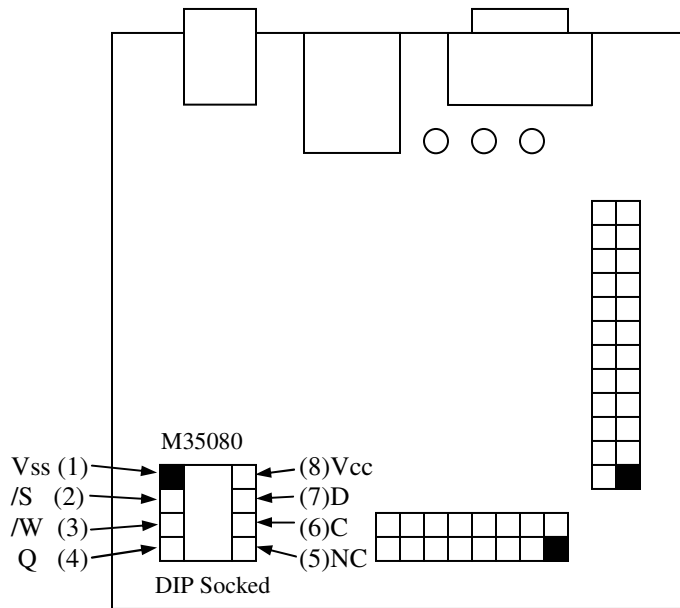


Figure 5. The XPROG-m™ with TMS374 in-circuit programming adapter

## 2.7. M35080 SPI Bus EEPROM

The M35080 SPI Bus EEPROM memory with incremental registers area support on-board and ICP (in-circuit programming) modes for reading all EEPROM data, incremental area EEPROM writing, EEPROM writing, erasing all EEPROM data to delivery state. Figure 6. shows M35080 on board programming mode. In this mode M35080 device must be properly inserted into XPROG-m DIP Socked. Figure 7. shows ICP programming mode. In this mode, for best performance, ICP adapter must be used.



Note1. NC = Not Connected

Figure 6. M35080 on board programming

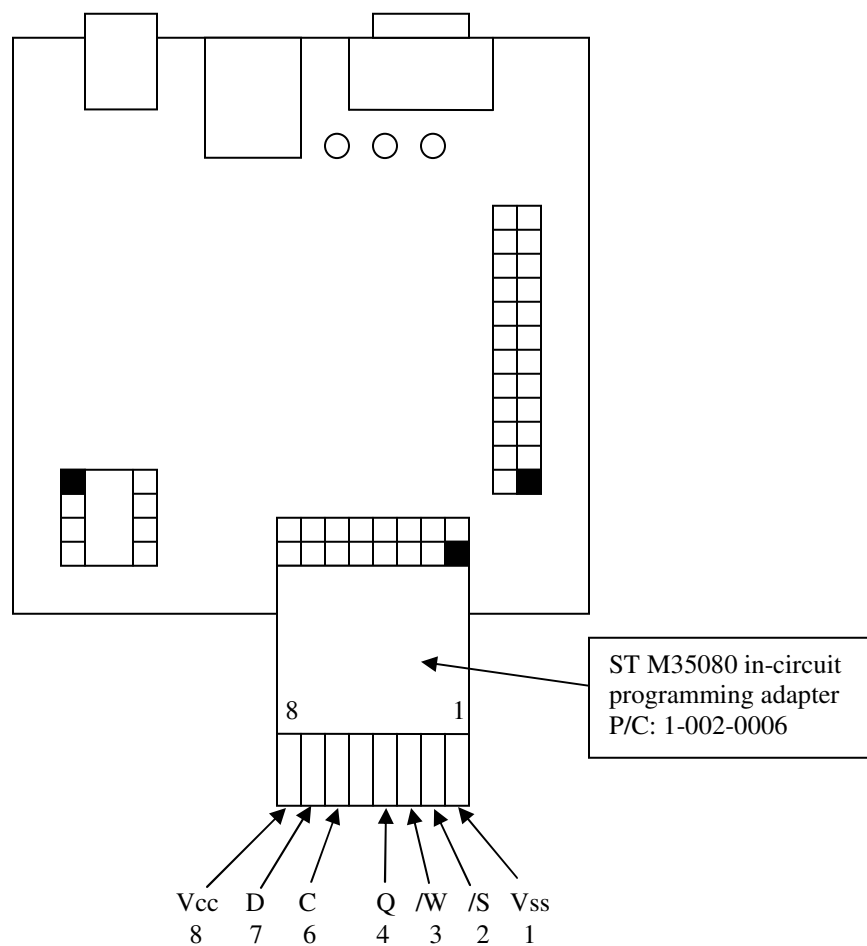


Figure 7. M35080 ICP programming

## 2.8. BMW EWS3

This section contains overall information about BMW EWS3 connection. This is not intervention connection way uses EWS3 diagnostic line. With the “Device Programmer Desktop” software (P/C: 2-001-0001) you can read, write, decode and modify (VIN, Keys,...) EEPROM data (see Figure 9). Figure 8. shows BMW EWS3 and XPROG-m connection using K-Line adapter (P/C: 1-002-0007) adapter.

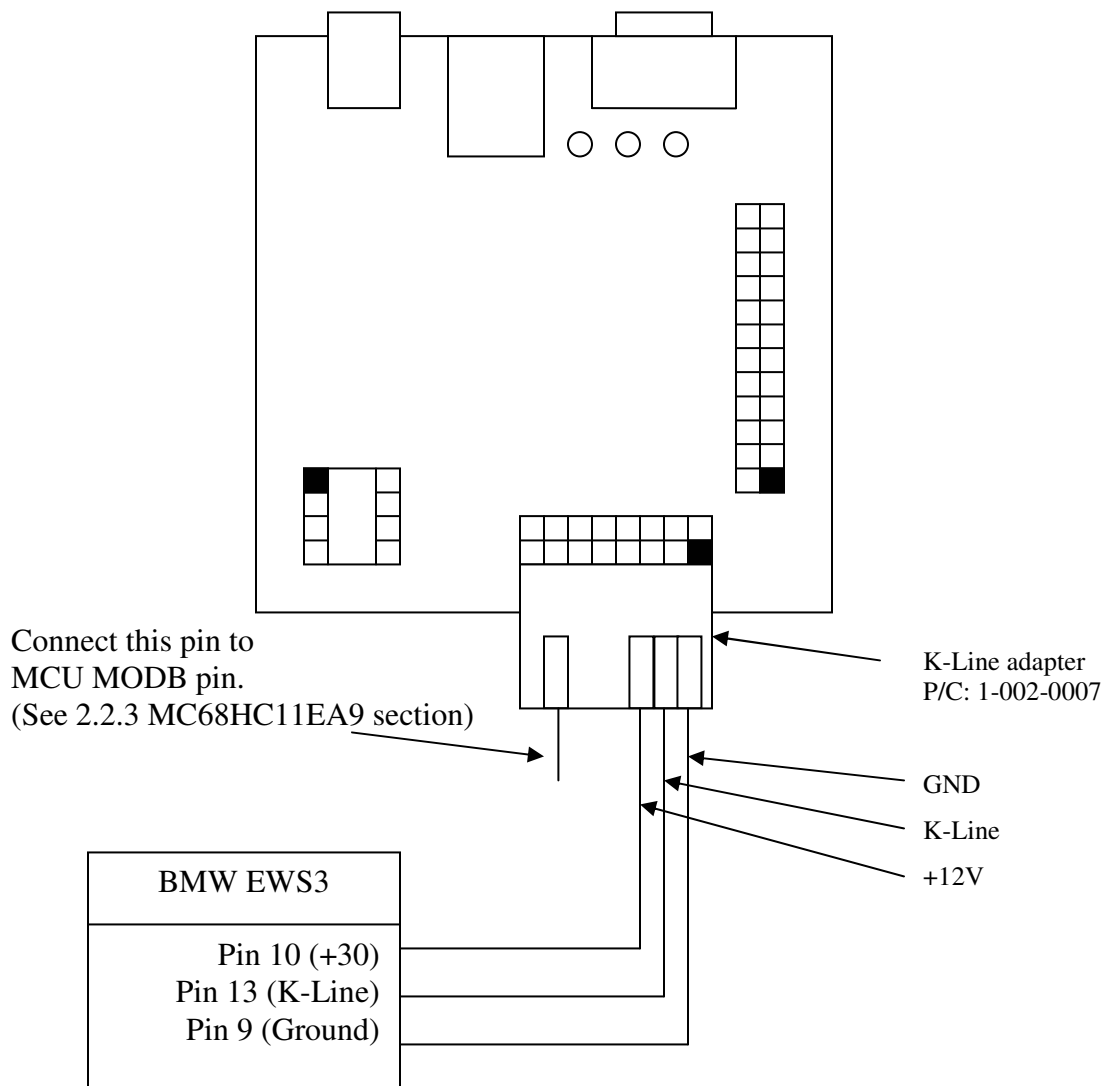


Figure 8. BMW EWS3 connection

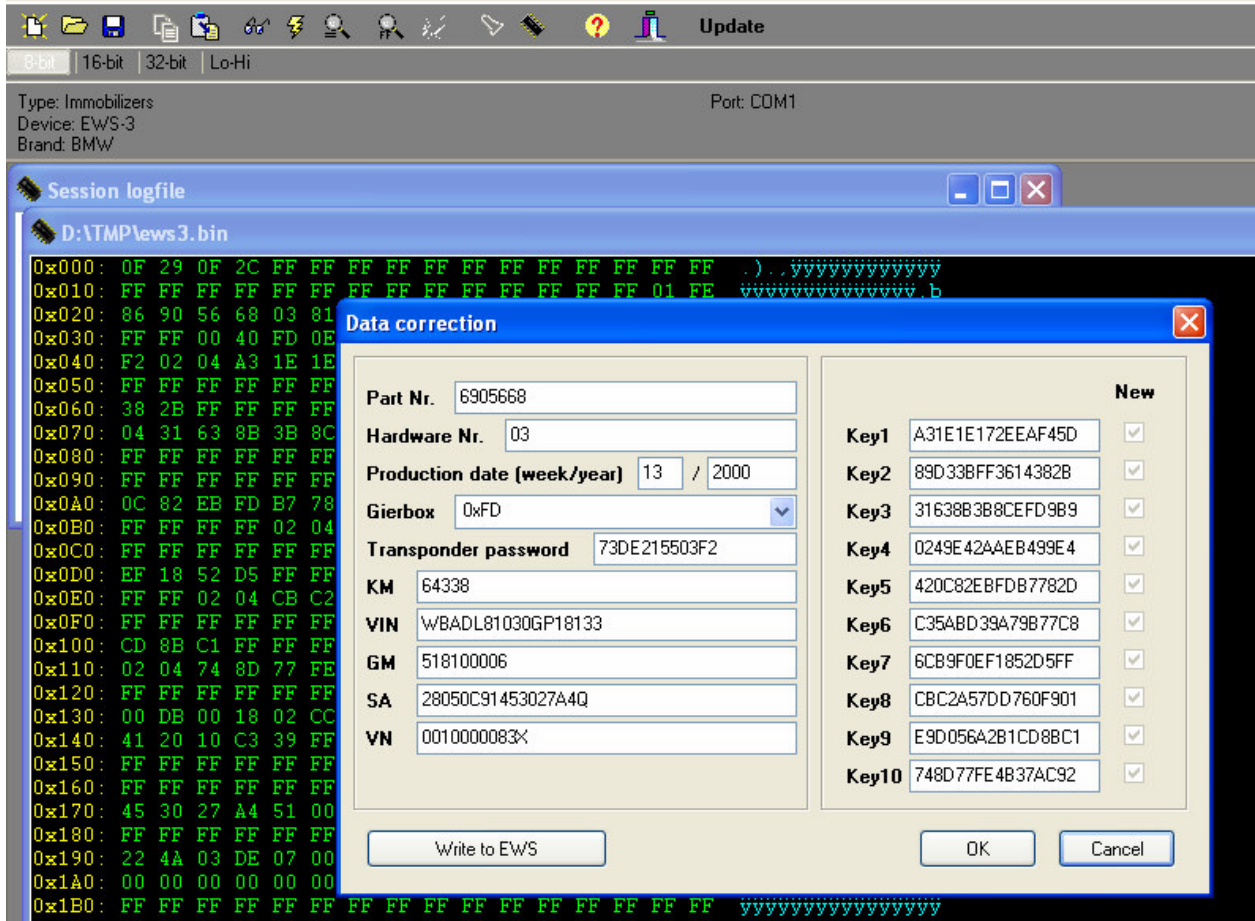


Figure 9. BMW EWS3 tools dialog