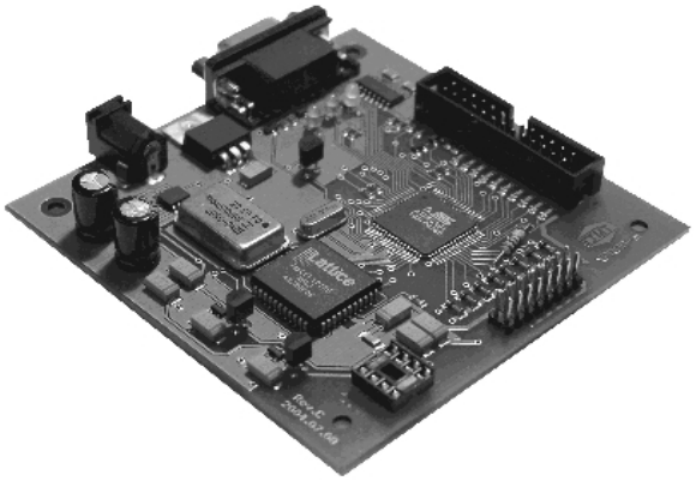

XPROG-m Programmer

Users Manual
Rev. 1.8
2005.04.29

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P/C: 3-001-0001

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
1.7	2005.03.31	Added MC68HC05V12 target connection
1.8	2005.04.29	Added MC68HC11KW1 target connection

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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, I²C, µW, 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.

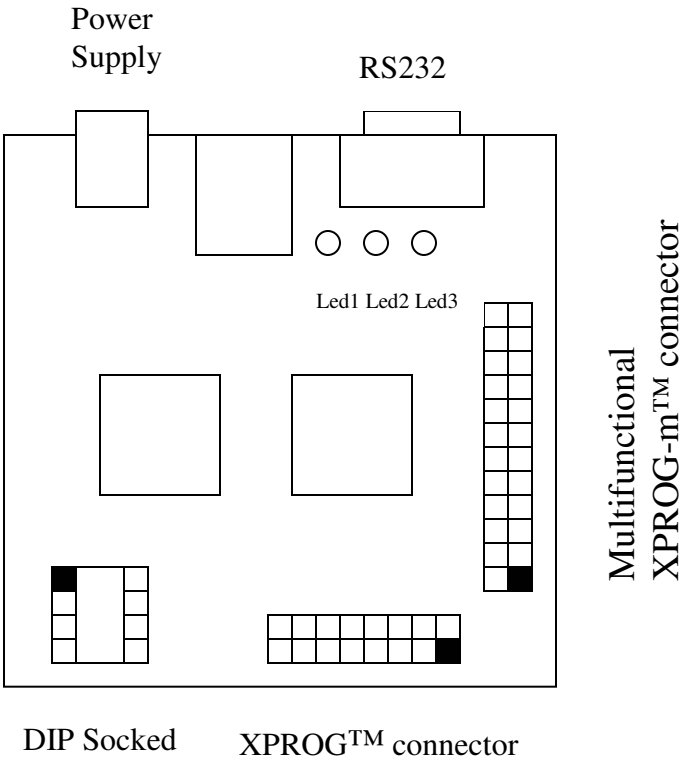


Figure 1. The XPROG-m™ board layout

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.

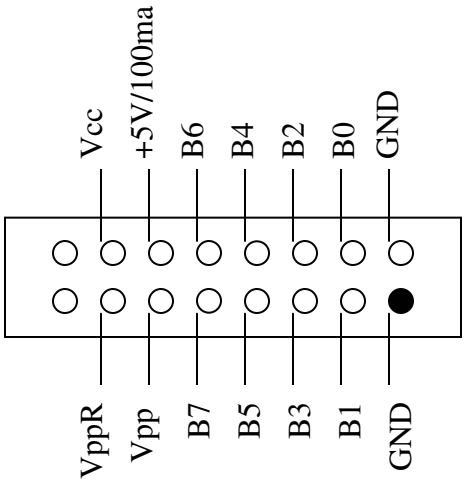


Figure 2. The XPROG™ connector

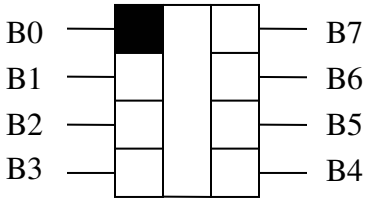


Figure 3. The DIP socked

Table 1. Signals description

Signal name	Description
GND	Signal and power ground
B0, B1…B7	Protected, high current (±40mA), multifunctional input/output pins.
+5V/100mA	±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.

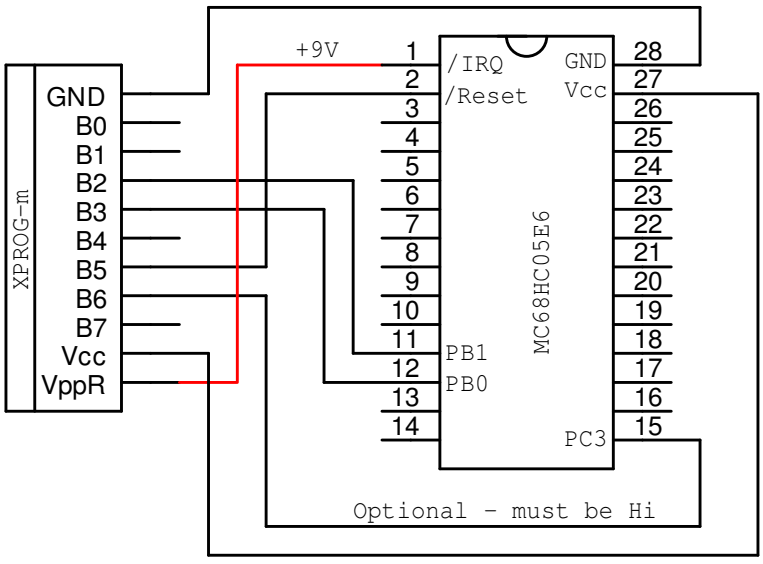
Note: Nets marked "Optional - must be Lo or Hi TTL logic level" not require connection with XPROG if they have described level in the circuit.

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

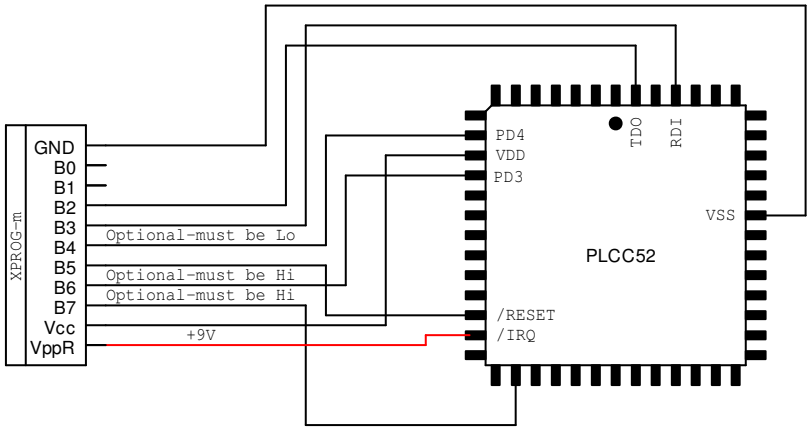
2.1.1. MC68HC05E6



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%

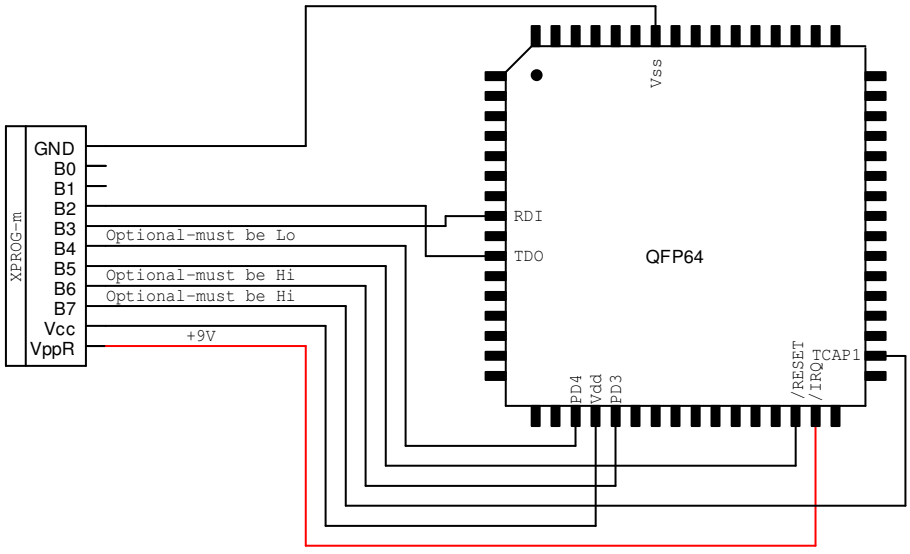
2.1.2. MC68HC05B6/B8/B16/B32 (PLCC52)



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%

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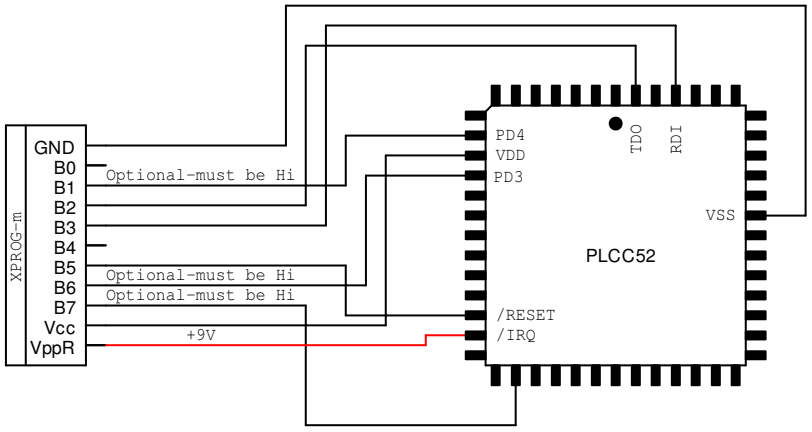
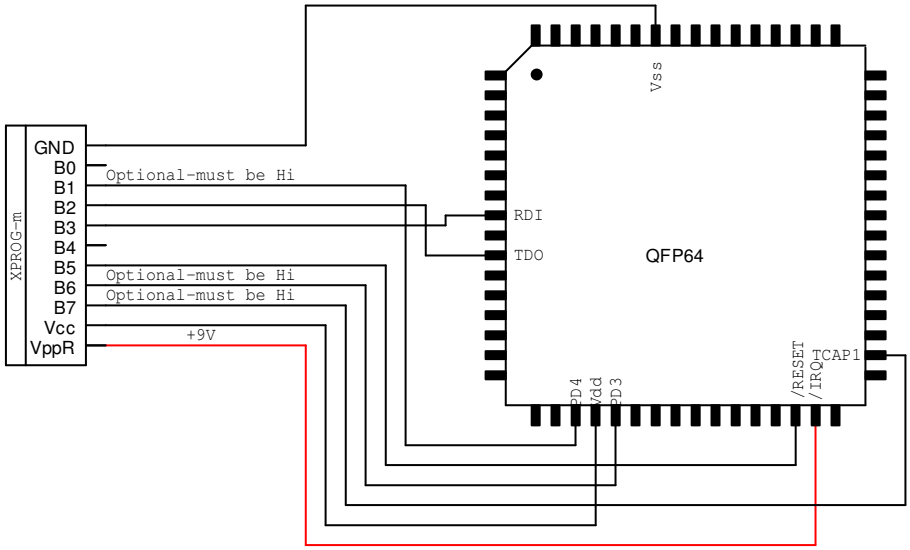
2.1.4. MC68HC705B16N/B32 (PLCC52)



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%

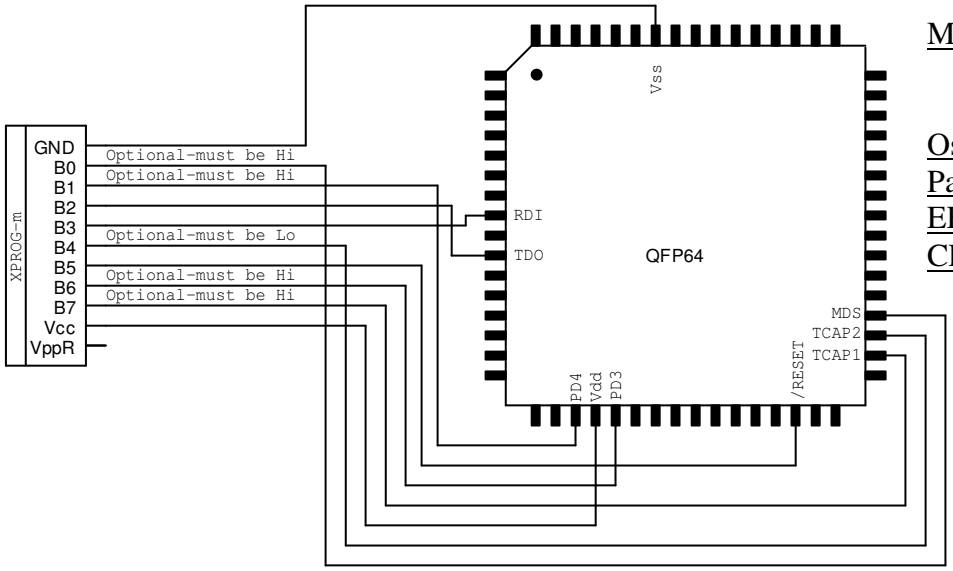
2.1.5. MC68HC705B16N/B32 (QFP64)



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%

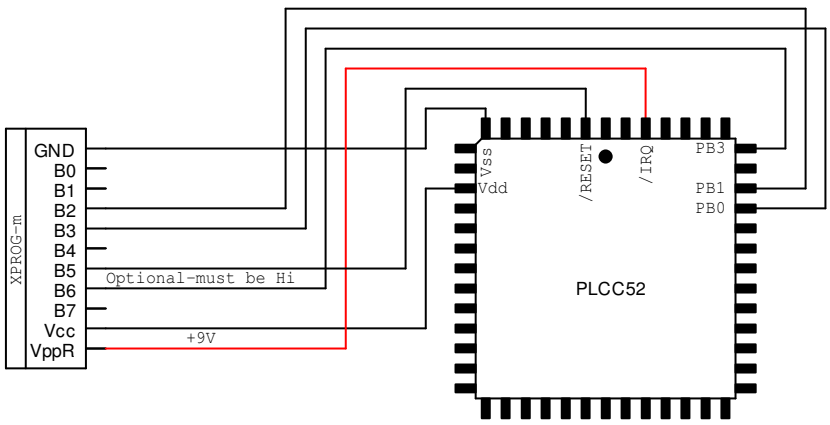
2.1.6. MC68HC(7)05X16/X32 (QFP64)



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%

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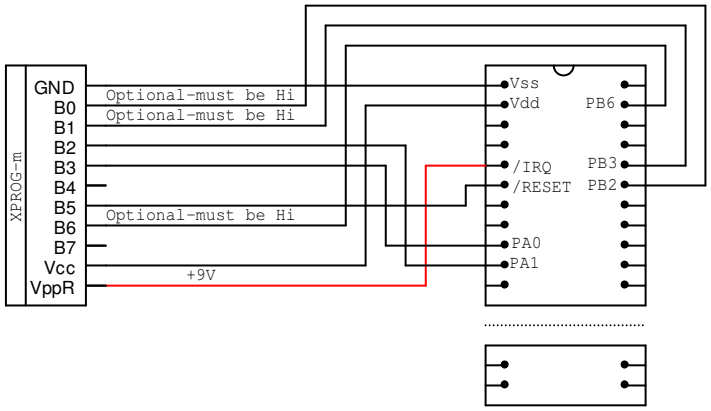
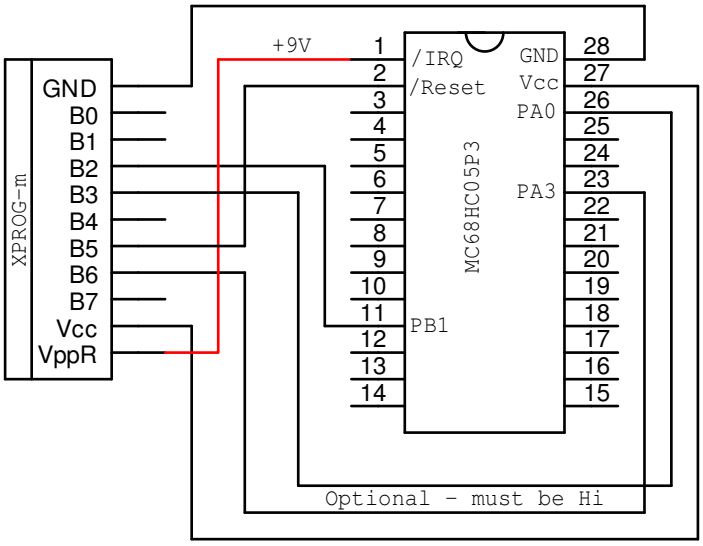
2.1.8. MC68HC(7)05L28



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%

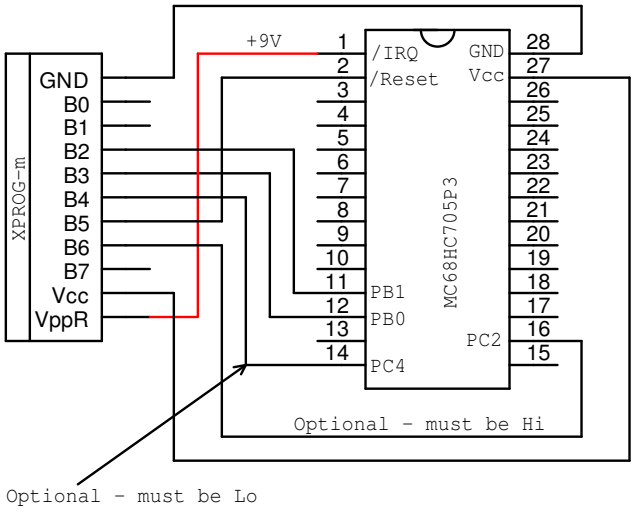
2.1.9. MC68HC05P3



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. MC68HC705P3



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%

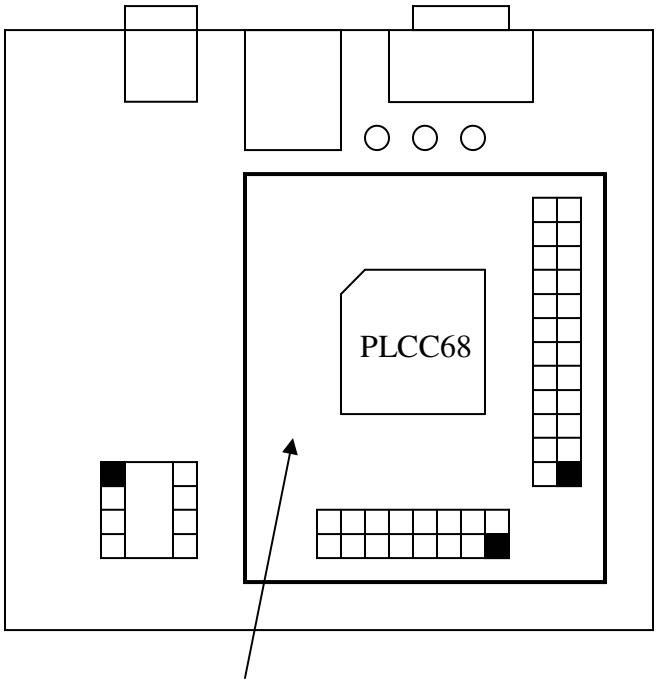
2.1.11. MC68HC05V12

Mask sets: 1H24M
Packages: PLCC68
EEPROM: 0x0240 – 0x033F

The MC68HC05V12 support on-board and ICP (in-circuit programming) modes for reading and writing EEPROM data.

MC68HC05V12 on-board programming

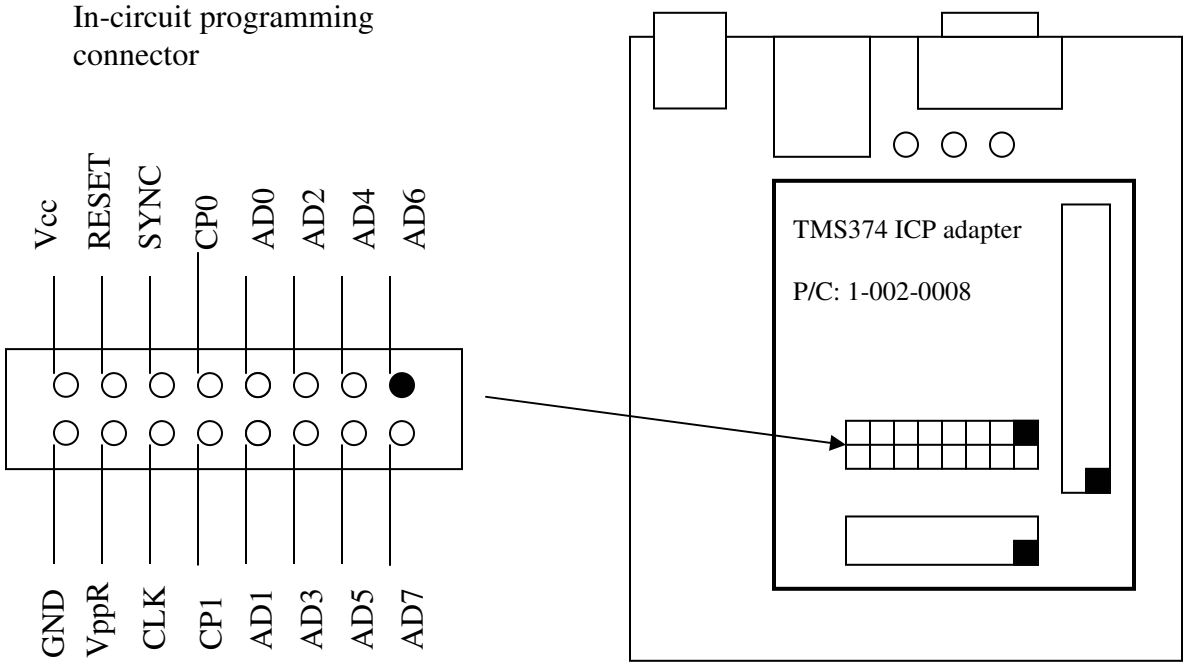
The suitable programming adapter must be mounted (see Figure).

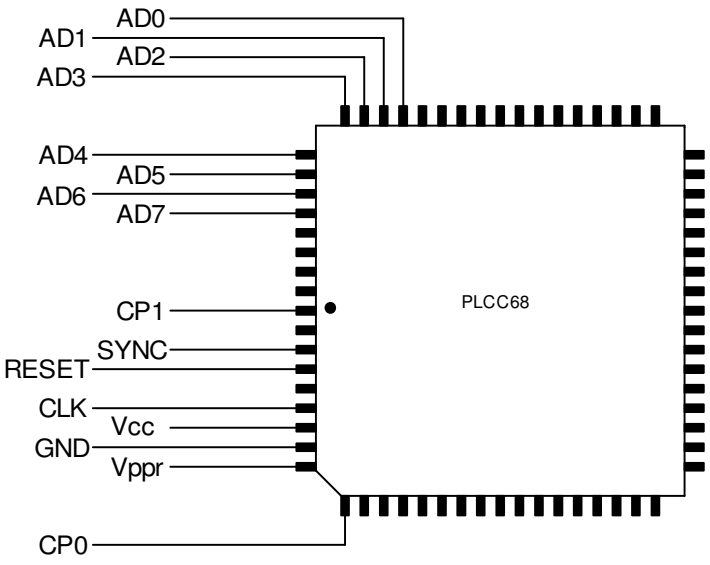


MC68HC05V12 programming adapter
P/C: 1-002-0009

MC68HC05V12 in-circuit programming

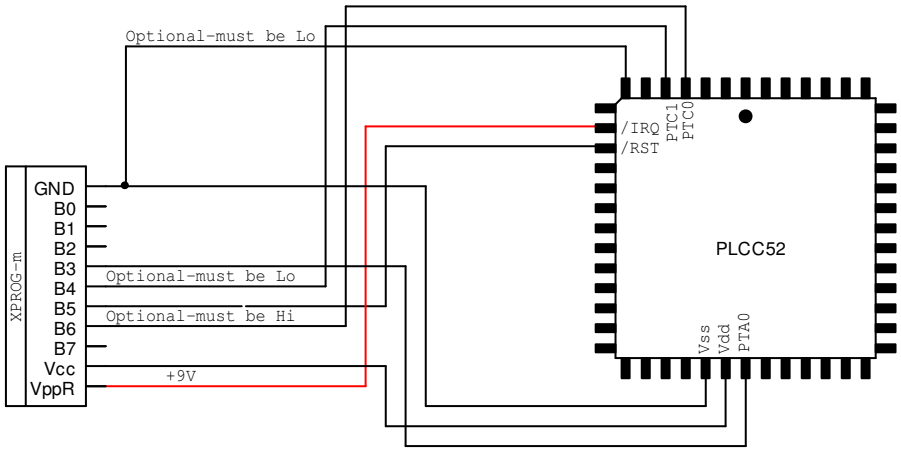
The MC68HC05V12 supported 16 wires in-circuit programming. The suitable in-circuit programming interface must be used (see Figure).





2.2. MC68HC08 family

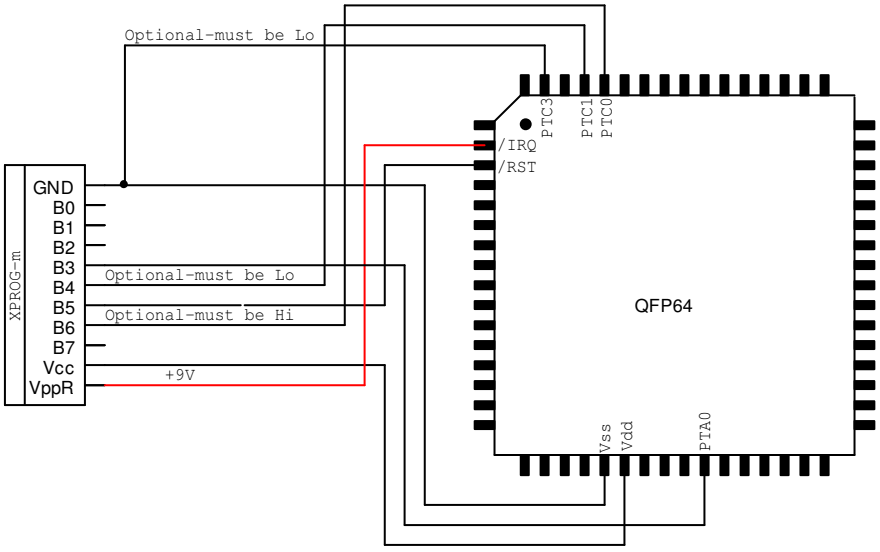
2.2.1. MC68HC08AS32/AS32A (PLCC52)



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%

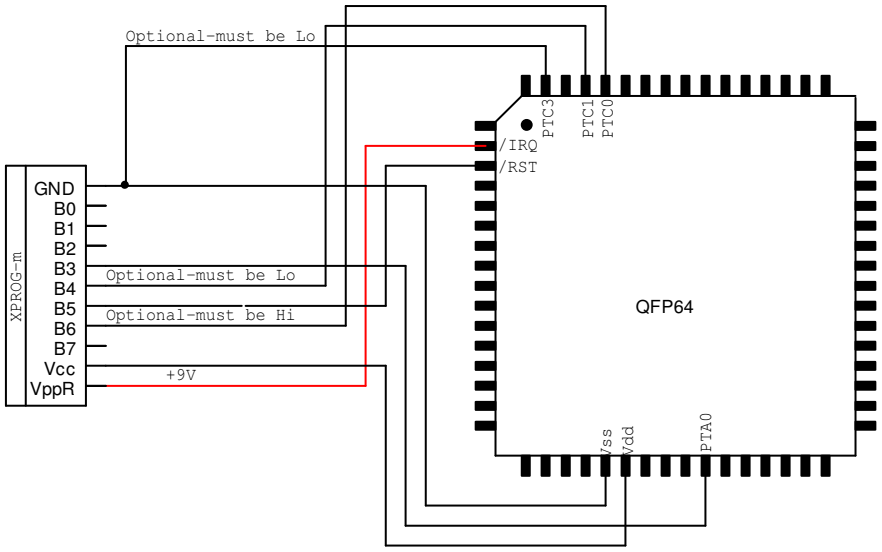
2.2.2. MC68HC08AS32/AS32A (QFP64)



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

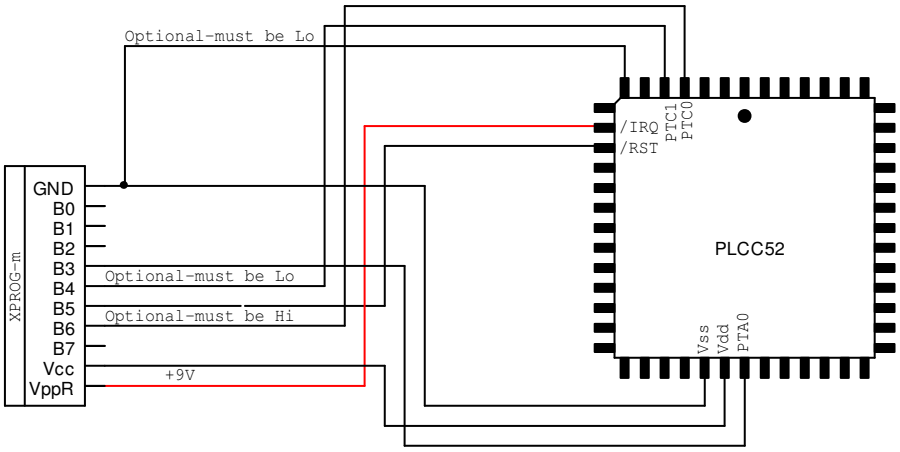
XPROG pin	**B0**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**Vcc**	**VppR**
Signal level	-	-	-	0/1	0	0/1	1	-	+5V±5%	+9V±5%

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%

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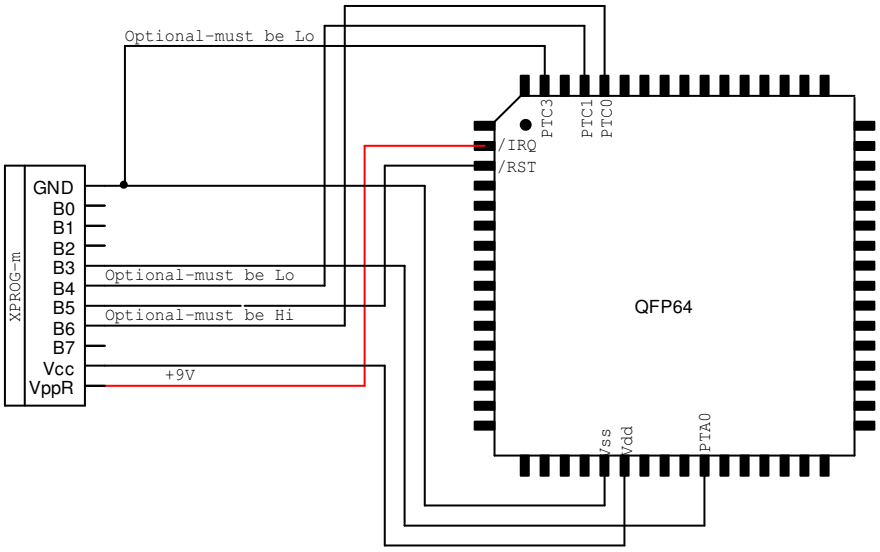
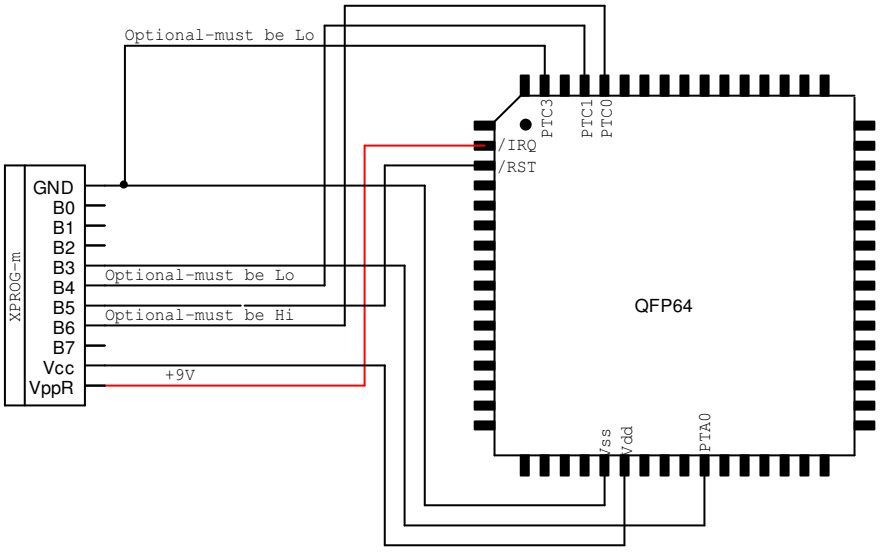
2.2.5. MC68HC08AS60/AS60A(QFP64)



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)

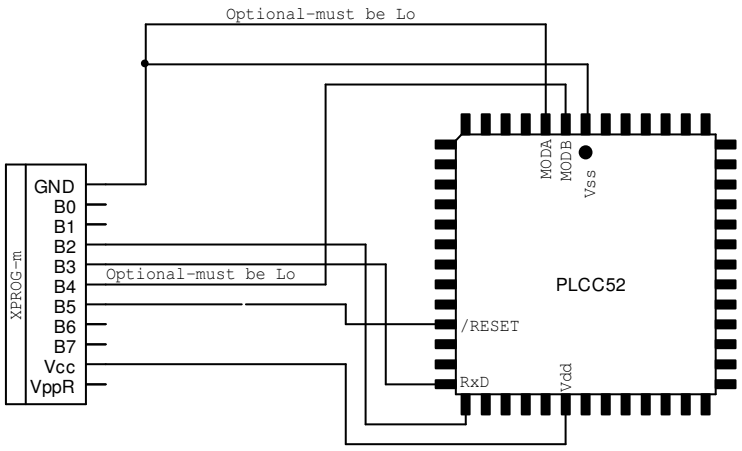


Mask sets:
Oscillator: 58, 59 pin
Packages: QFP64
EEPROM1: 0x0800 – 0x09FF
EEPROM2: 0x0600 – 0x07FF

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

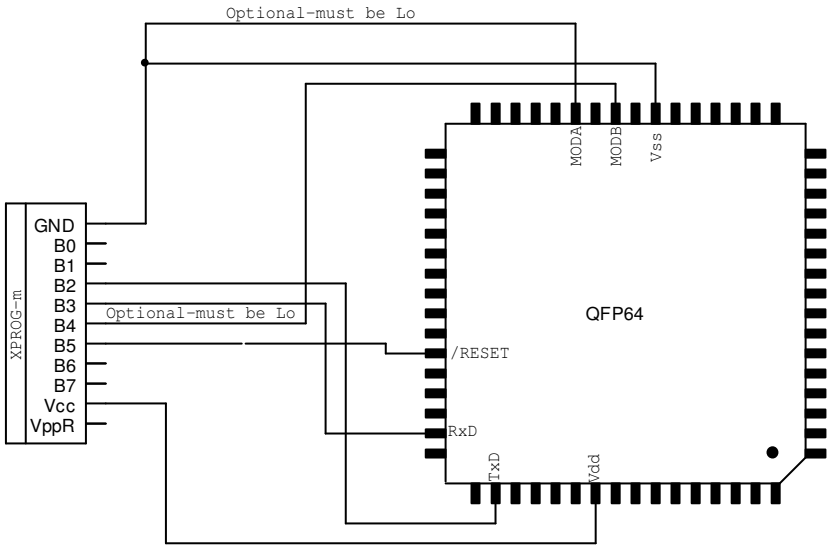
2.3.1. MC68HC11A8/E1/E9/E20(PLCC52)



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%	

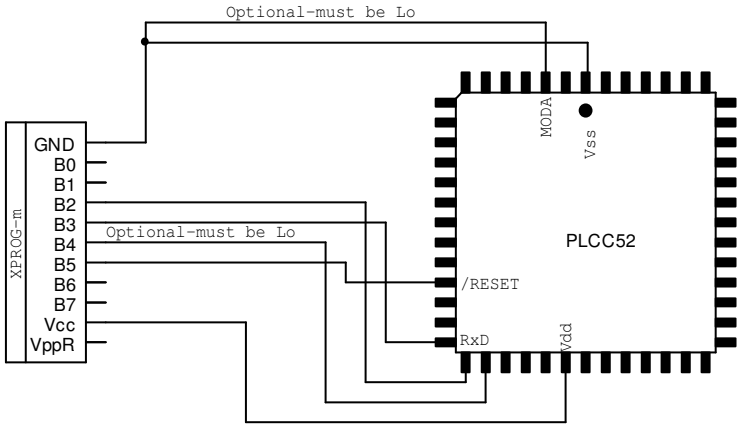
2.3.2. MC68HC11A8/E1/E9/E20(QFP64)



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

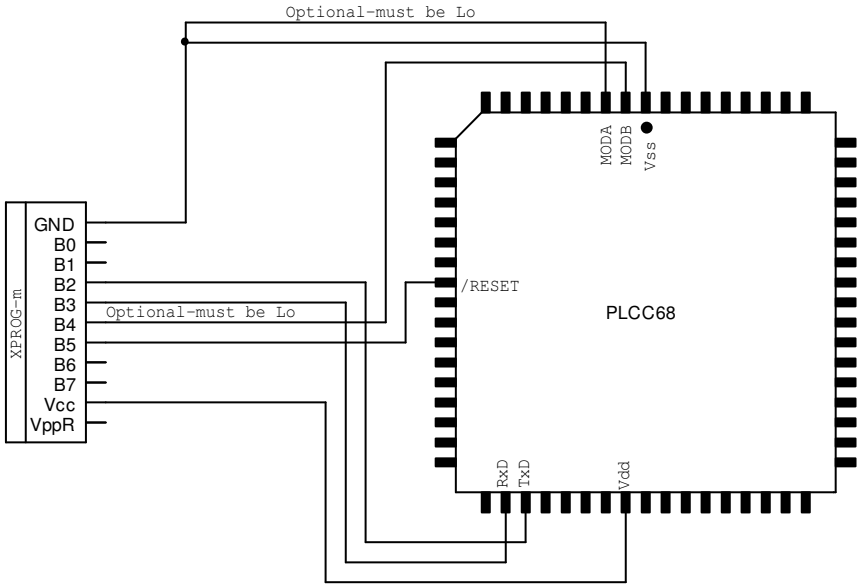


Mask sets: 0D46J, 1D47J, 2D47J
Oscillator: 7, 8 pin
Packages: PLCC52
EEPROM: 0xB600 – 0xB7FF

MODB: 22 pin (B4)

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

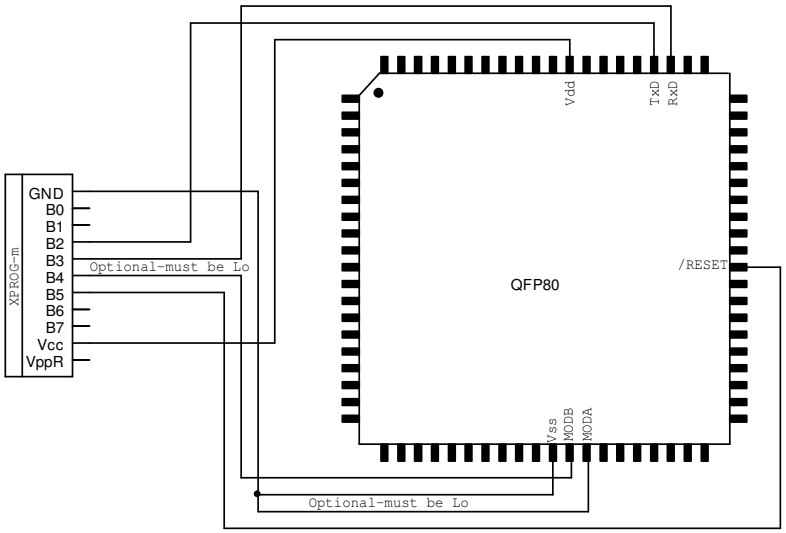
2.3.4. MC68HC11F1(PLCC68)



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%	

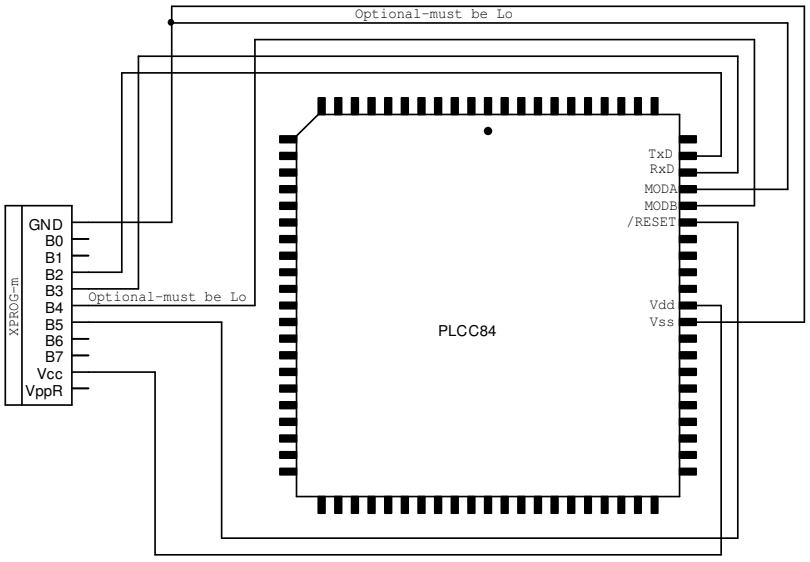
2.3.5. MC68HC11F1(QFP80)



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%	

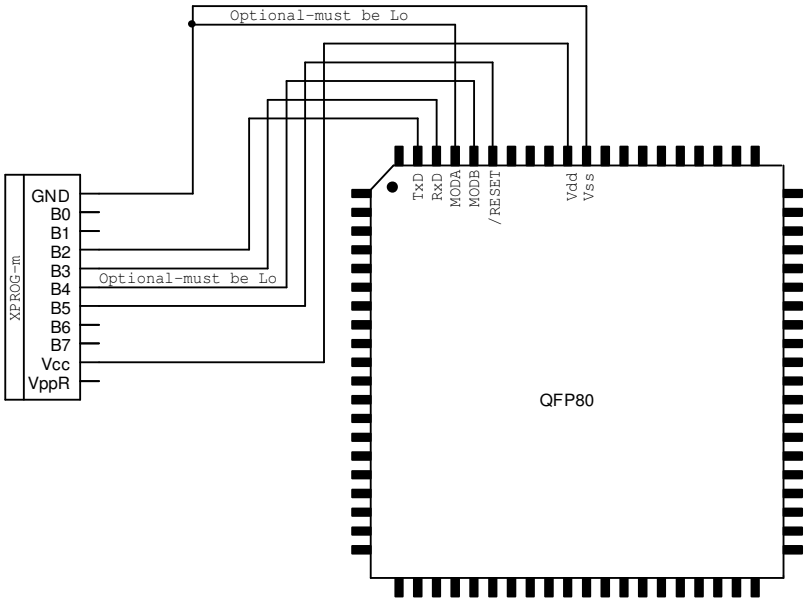
2.3.6. MC68HC11K4(PLCC84)



Mask sets: 1E62H
Oscillator: 67, 68 pin
Packages: PLCC84
EEPROM: 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%	

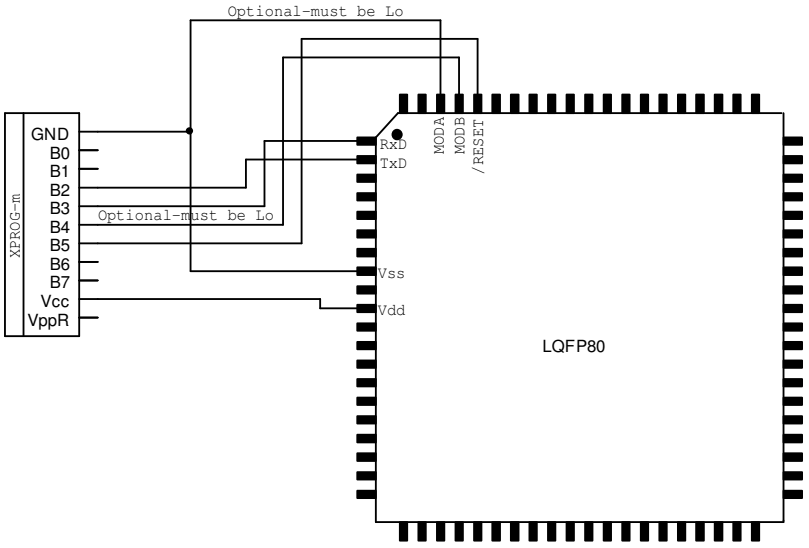
2.3.7. MC68HC11K4(QFP80)



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%	

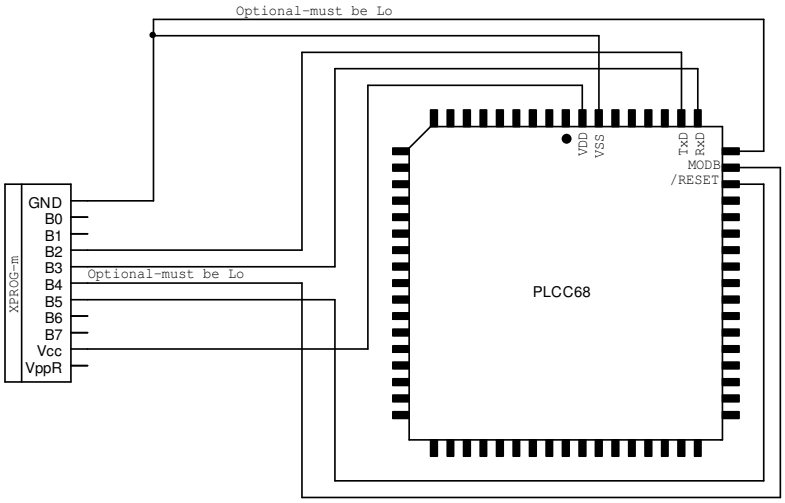
2.3.8. MC68HC11KS2(LQFP80)



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%	

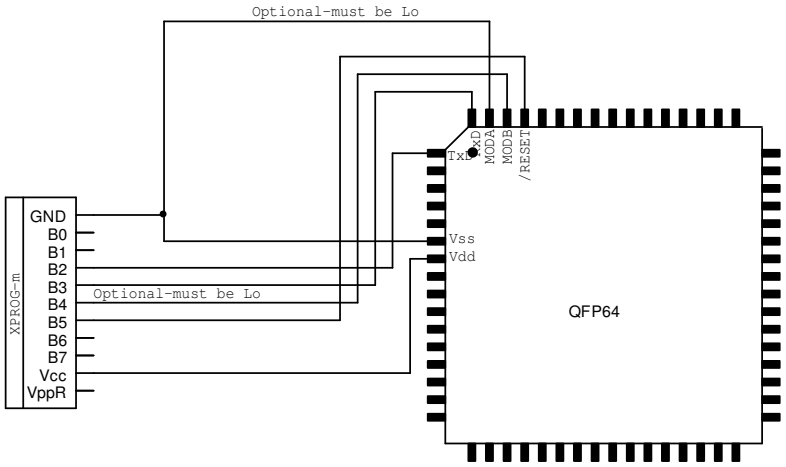
2.3.9. MC68HC11KA4(PLCC68)



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%	

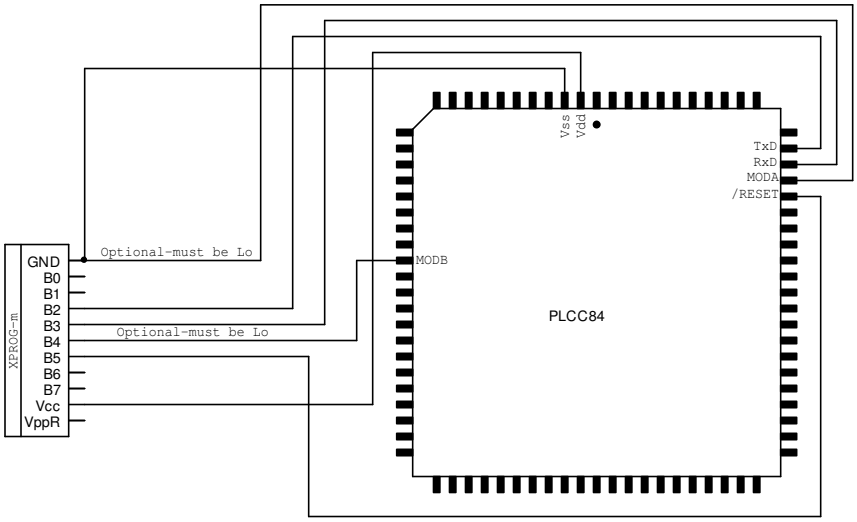
2.3.10. MC68HC11KA4(QFP64)



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%	

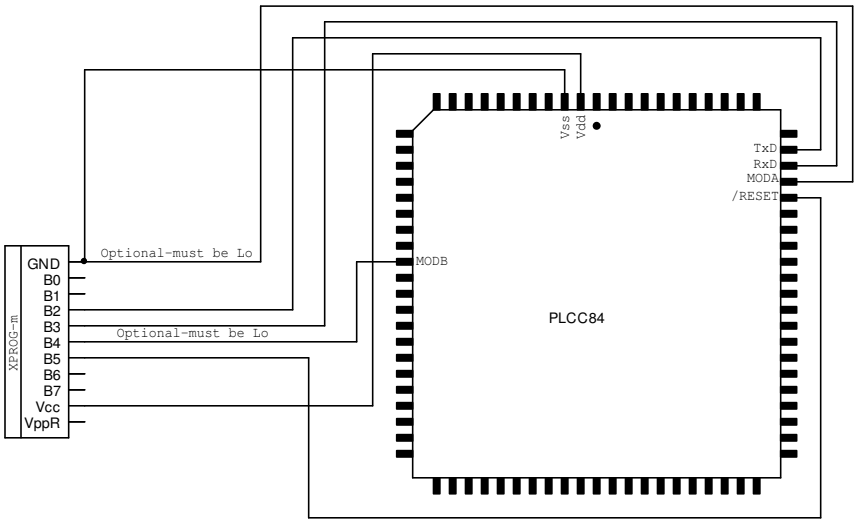
2.3.11. MC68HC11PH8



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%	

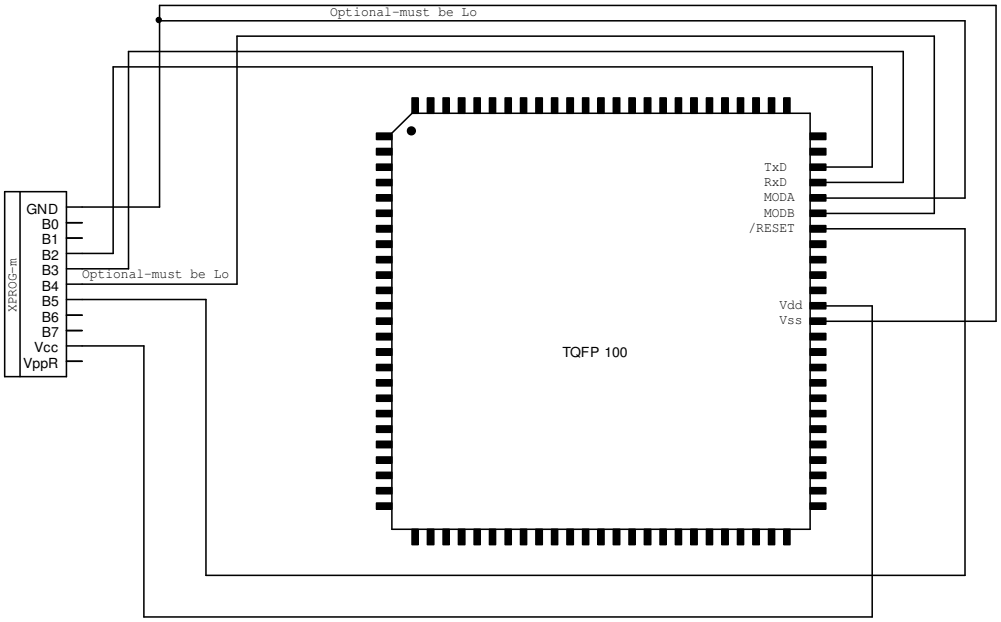
2.3.12. MC68HC11P2



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%	

2.3.13. MC68HC11KW1

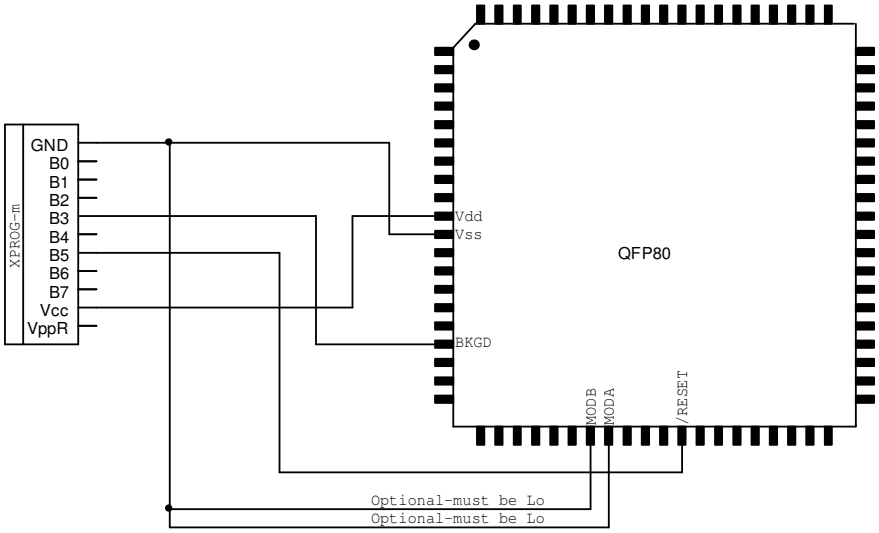


Mask sets:
Oscillator: 68, 67 pin
Packages: TQFP 100
EEPROM: 0x0D80 – 0x0FFF

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

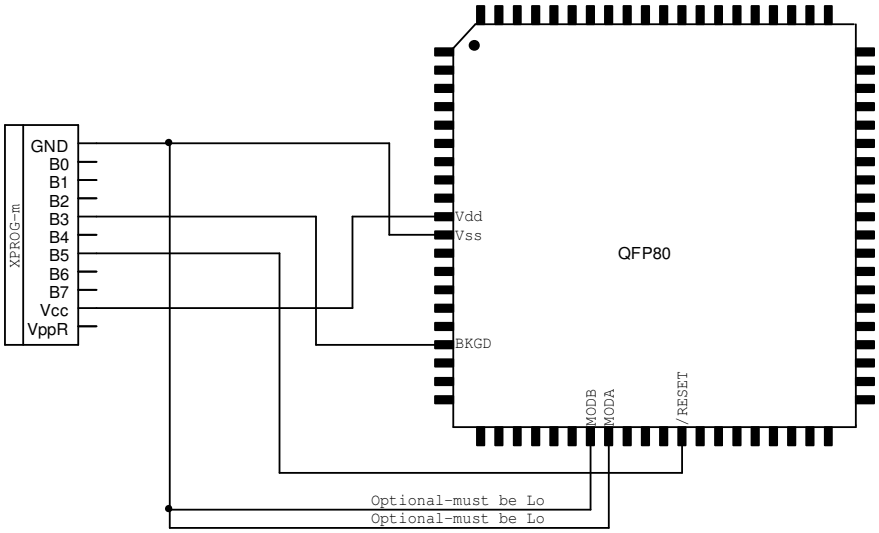
2.4.1. MC68HC12B32



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%	

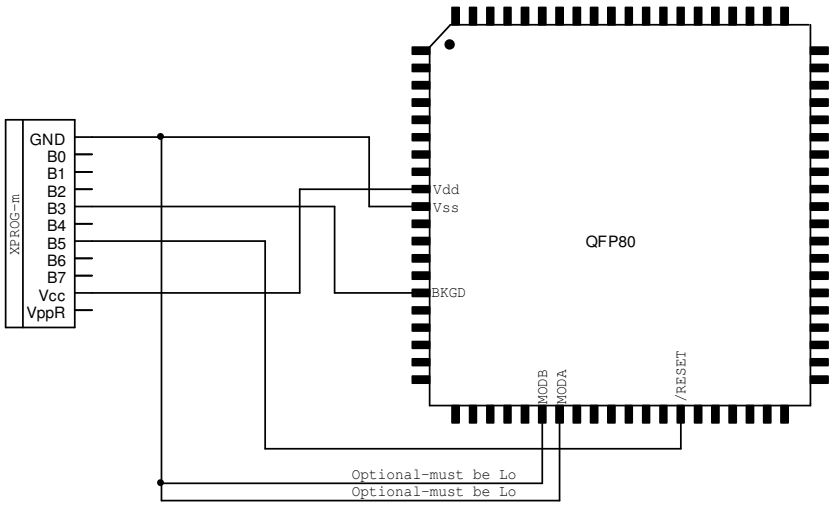
2.4.2. MC68HC12BE32



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%	

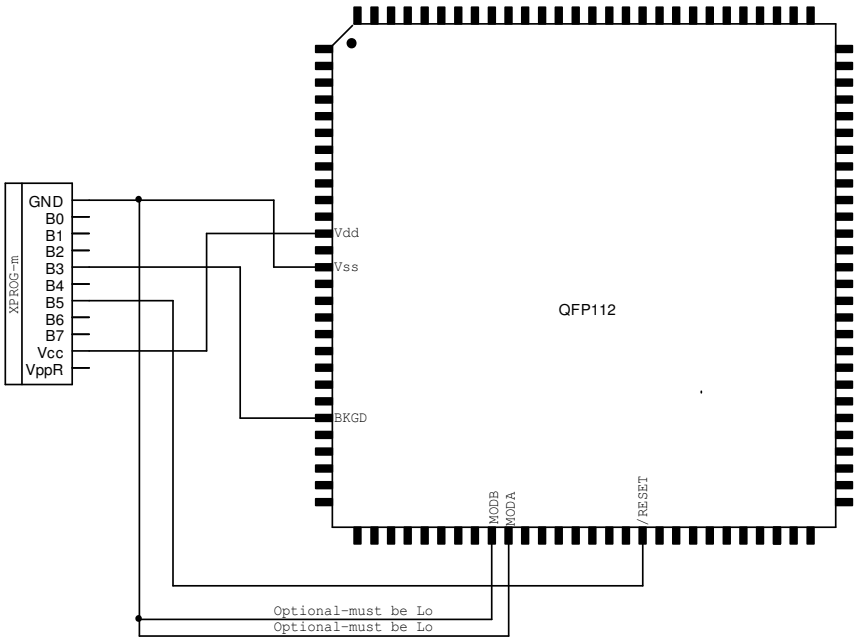
2.4.3. MC68HC12D60



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%	

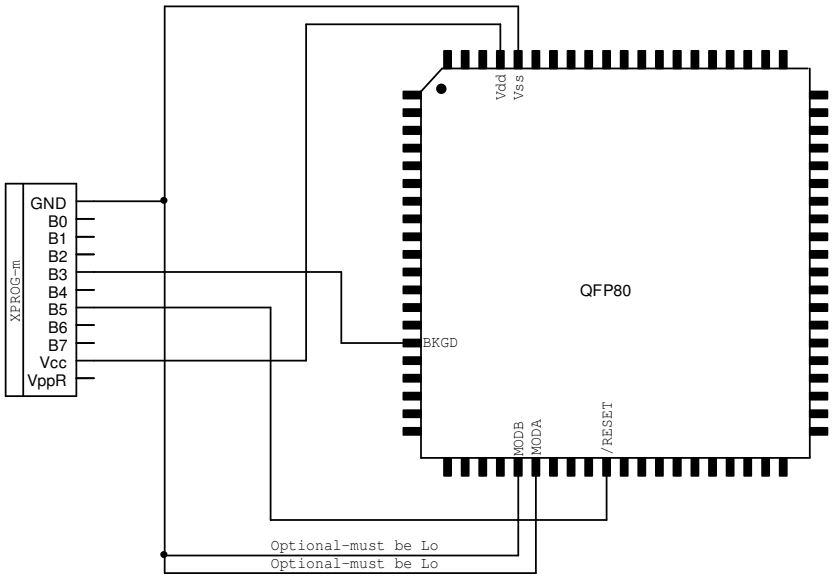
2.4.4. MC68HC12DG128



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%	

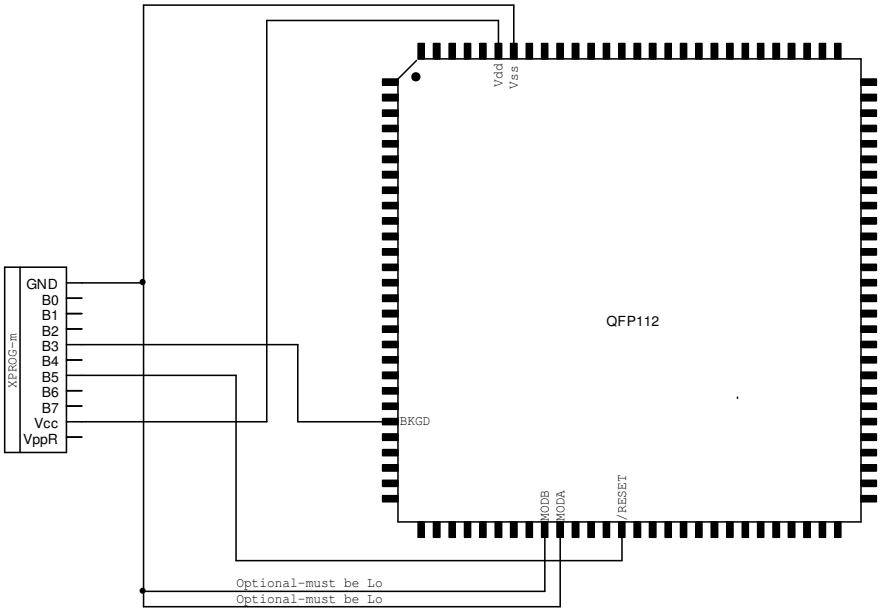
2.4.5. MC9S12D64(QFP80)



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%	

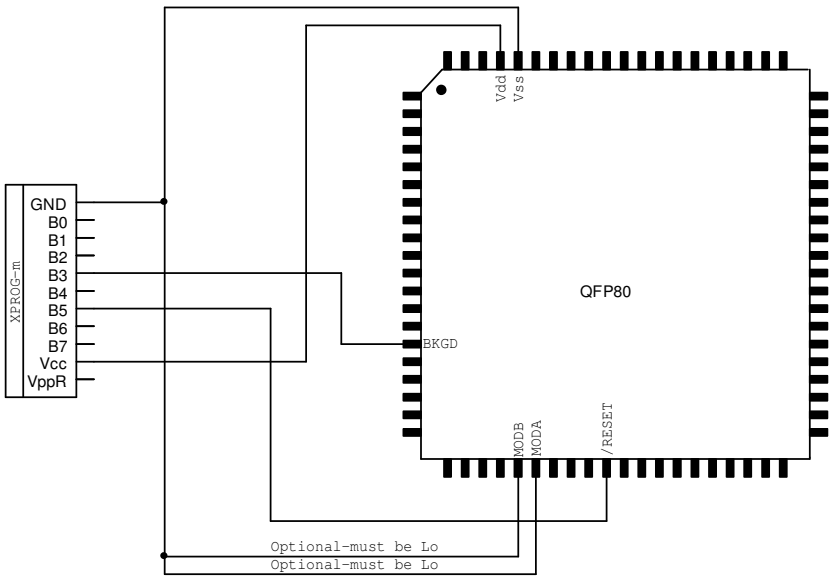
2.4.6. MC9S12D64(QFP112)



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%	

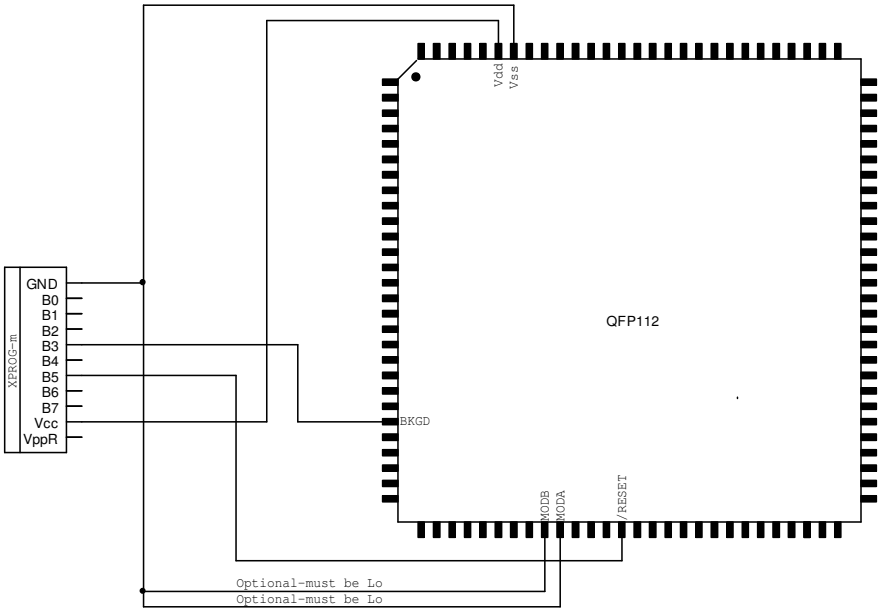
2.4.7. MC9S12DG256(QFP80)



Mask sets: 2K79X
Oscillator: 34, 35 pin
Packages: QFP80
EEPROM: 0x4000 – 0x4FFF

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 – 0x4FFF

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).

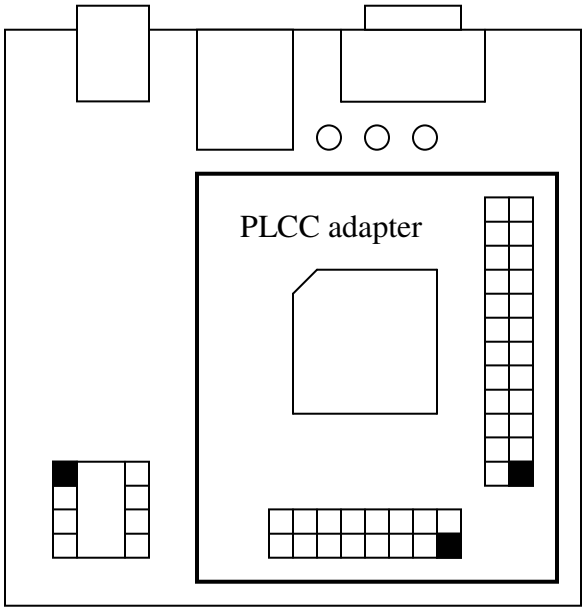


Figure 4. The XPROG-m™ with PLCC adapter

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).

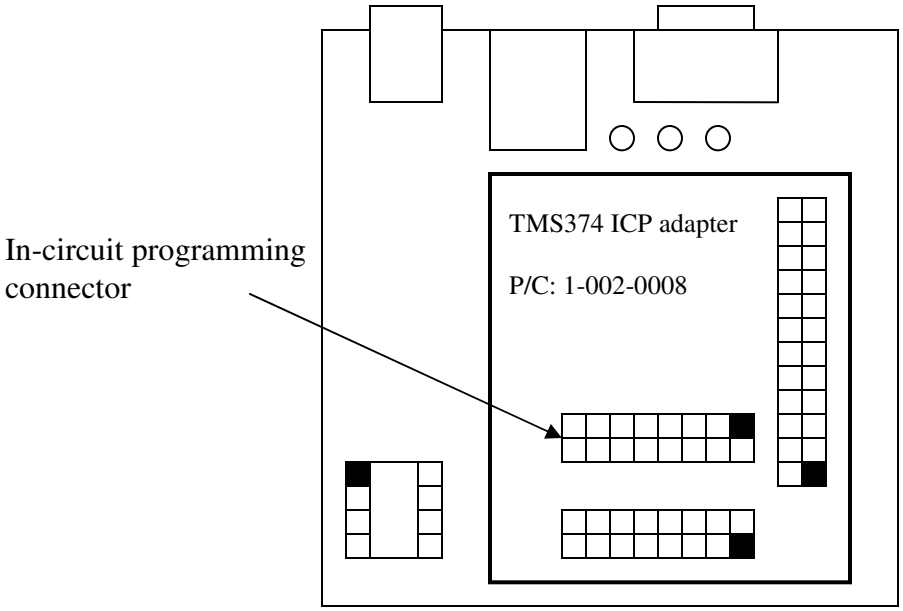
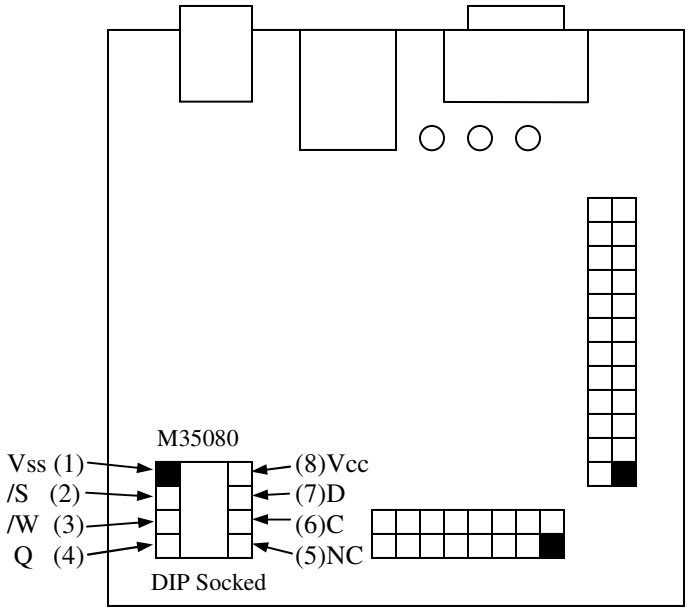


Figure 5. The XPROG-m™ with TMS374 in-circuit programming adapter

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

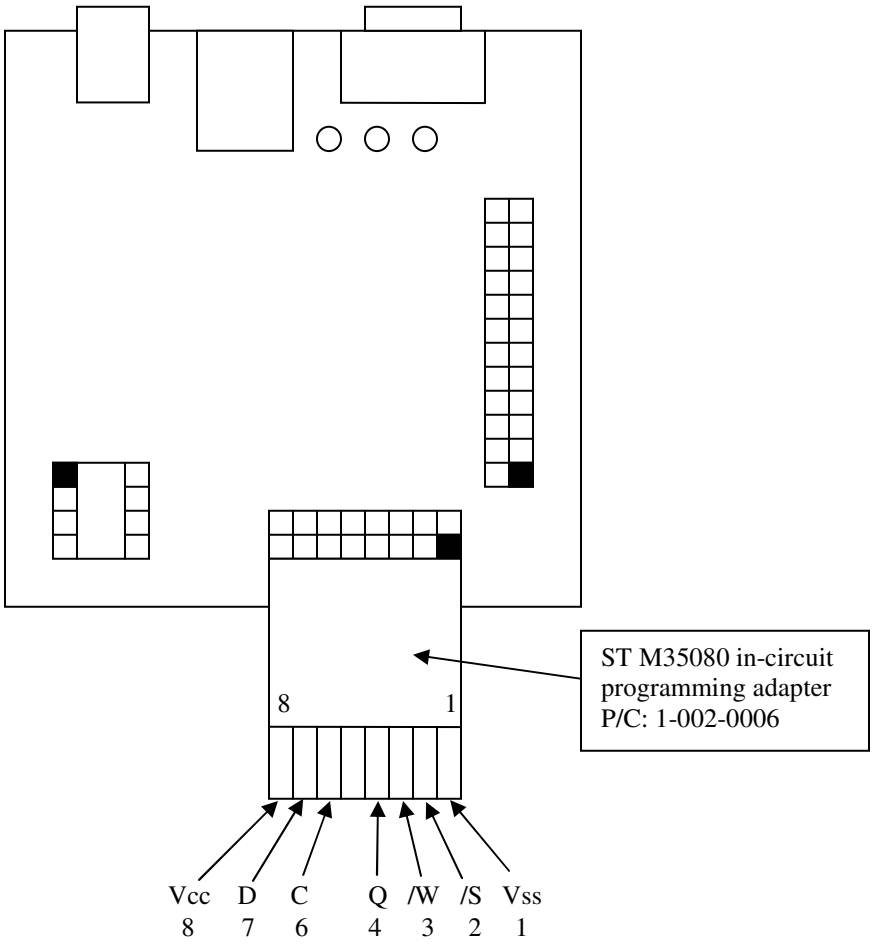


Figure 7. M35080 ICP programming

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 (P/C: 1-002-0007)
adapter.

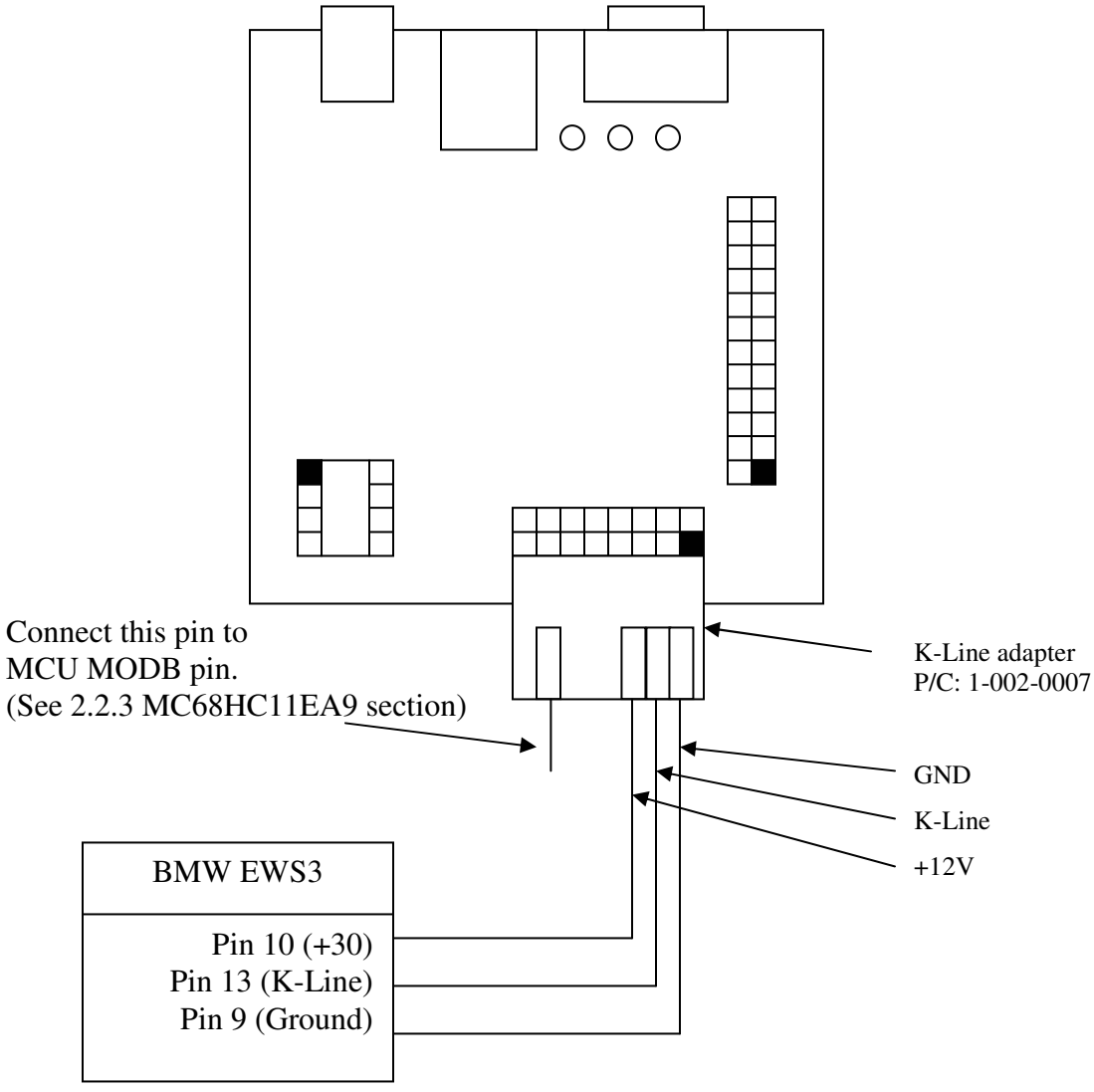


Figure 8. BMW EWS3 connection

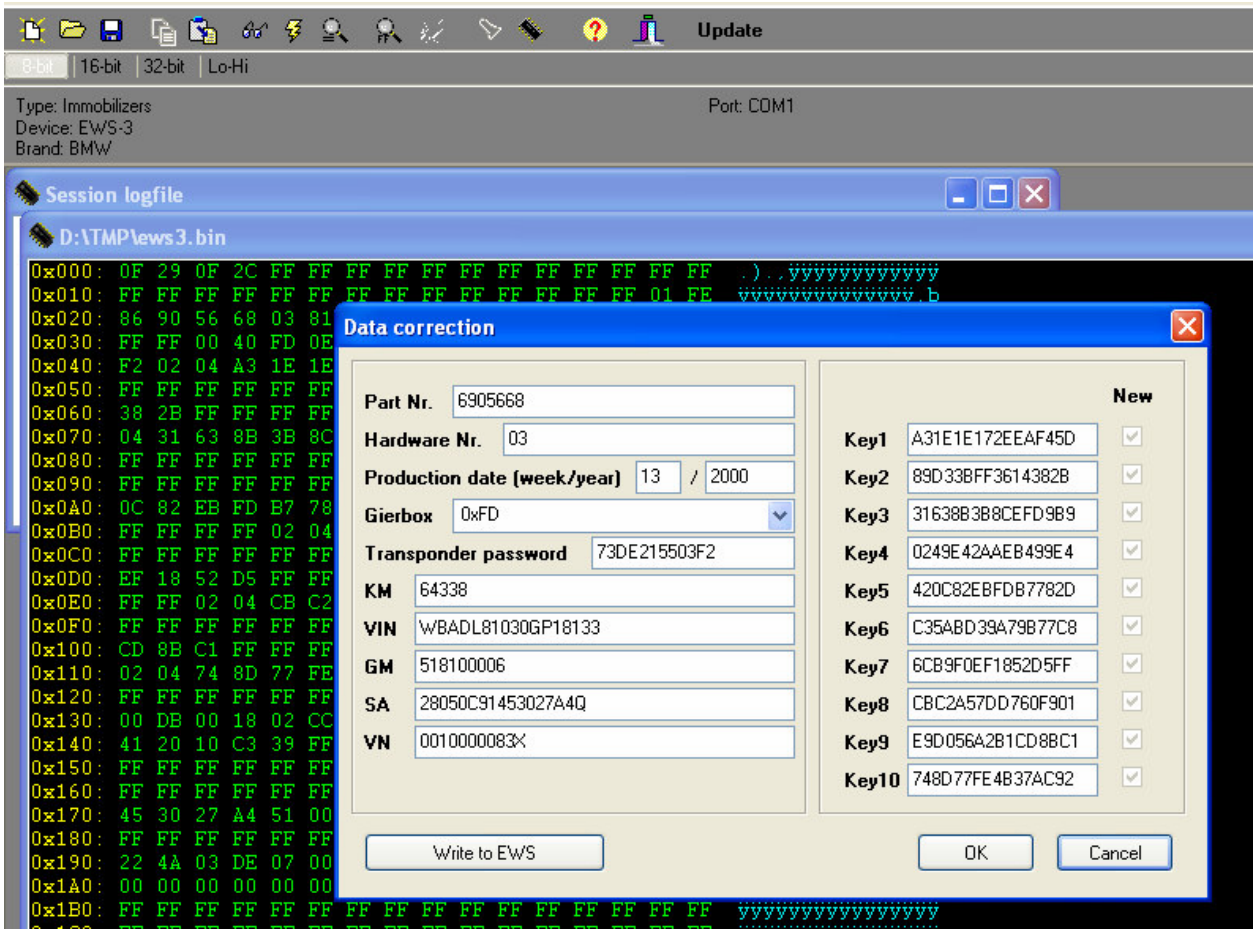


Figure 9. BMW EWS3 tools dialog