

MC68HC(7)11 EEPROM Programming Tool

User's Guide

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1. PREFACE

This manual will guide you through the installation and operation of the ETL MC68HC(7)11 Programmer, referenced hereafter as the **HC11-Programmer**.

The **HC11-Programmer** has been designed for reading of EEPROM, (EP)ROM, BootROM contents and programming of EEPROM of the next Motorola Microcontroller Unit (MCU):

- | | |
|-------------------------------|--------------------------------|
| ✓ MC68HC11 A8 (AB95T)* | ✓ MC68HC711 E20 (1H19S) |
| ✓ MC68HC11 A8 (C96N) | ✓ MC68HC711 E9 (4K81H) |
| ✓ MC68HC11 A8 (D26E) | ✓ MC68HC711 E9 (5C47M) |
| ✓ MC68HC11 A8 (C11W) | ✓ MC68HC711 EA9 (0D46J) |
| ✓ MC68HC11 E20 (3E22B) | ✓ MC68HC711 K4 (K59D) |
| ✓ MC68HC11 E9 (1B60R) | ✓ MC68HC711 PH8 (0H30R) |
| ✓ MC68HC11 E9 (D82R) | ✓ MC68S711 E9 (5C47M) |
| ✓ MC68HC11 E9 (E22B) | ✓ XC68HC711 KS8 (1H96P) |
| ✓ MC68HC11 E9 (E28B) | ✓ XC68HC711 P2 (1E53M) |
| ✓ MC68HC11 E9 (1D35E) | |
| ✓ MC68HC11 L6 (0F11N) | |
| ✓ MC68HC11 EA9 (2D47J) | |
| ✓ MC68HC11 F1 (2F37E) | |
| ✓ MC68HC11 F1 (E87J) | |
| ✓ MC68HC11 K1 (2D58N) | |
| ✓ MC68HC11 K4 (1E62H) | |
| ✓ MC68HC11 K4 (OE75J) | |
| ✓ MC68HC11 KA4 (1E59B) | |
| ✓ MC68HC11 KS2 (0H95B) | |
| ✓ MC68HC11 KS4 (0E57S) | |
| ✓ MC68HC11 KS4 (0F60M) | |
| ✓ MC68HC11 P2 (2E74J) | |

* Package: 52-PLCC; 48-DIP



Note: Most number of devices can be programmed in two operating modes In-Circuit and On-Board.



Note: Devices that not mentioned above in list can't be guaranteed of correct reading, programming by **HC11-Programmer**.

2. CHECKLIST AND REQUIREMENTS

The following describes what items are supplied with the **HC11-Programmer** and the system requirements if used by a PC.

- ✓ **HC11-Programmer** – *supplied*
- ✓ One 11 EA9 PLCC52 Adaptor – *supplied*
- ✓ One 11 E PLCC52 Adaptor – *supplied*
- ✓ One 11 E QFP64 Adaptor – *supplied*
- ✓ One 11 K PLCC84 Adaptor – *supplied*
- ✓ One 11 K QFP80 Adaptors – *supplied*
- ✓ One 11 KA/KS PLCC68 Adaptor – *supplied*
- ✓ One 11 F PLCC68 Adaptor – *supplied*

- ✓ One 11 L6 PLCC68 Adaptor – *supplied*
 - ✓ One 11 PH PLCC84 Adaptor – *supplied*
 - ✓ One 11 A8 DIP48 Adaptor – *supplied*
 - ✓ One 40-40 pin flat cable
 - ✓ Cable -A DB9 “straight-thru” cable - *supplied*
 - ✓ **HC11-Programmer** PC software on CD-ROM – *Optional Extra*
-
- Desktop PC and a free Serial Communication Port (COM1...8)
 - Memory - Minimum 32 Mbytes
 - Display - Color SVGA display recommended
 - Power supply 12 Volt/500 mA linear power supply source
 - OS-MS-Windows (Win98, Win ME, Win2000/XP/2003)

3. INSTALLATION AND USE

The HC11-Programmer includes two LED's and mode jumper (Figure 1). LED's indicates programmer state and external power supply voltage (Table 1, 2).

GREEN	HC11-Programmer is ready.
GREEN Flashing	HC11-Programmer is busy.
DARK	Voltage applied to HC11-Programmer lower than 6 Volt.

Table 1. LED D1 color meaning

GREEN	Target MCU powered on. All bus signals are active.
DARK	Target microcontroller powered off. All bus signals are in three-state.

Table 2. LED D4 color meaning

Jumper-1 (JP1) is intended for HC11-Programmer mode selection (see Table 3).

JP1 Shorted	Normal programmer operation.
JP1 Opened	Service mode. HC11-Programmer firmware update.

Table 3. HC11-Programmer operation modes

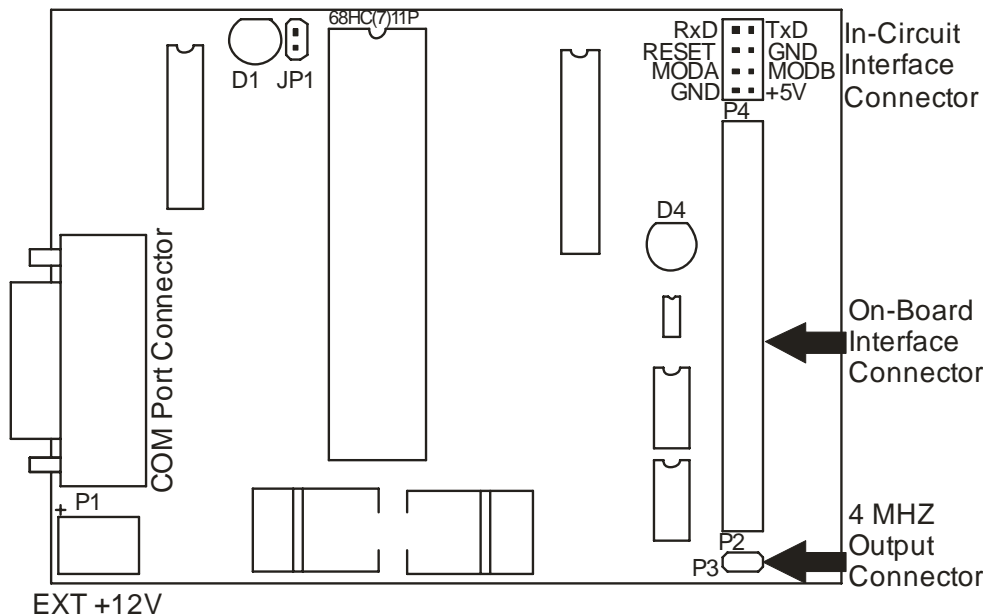


Figure 1. The HC11-Programmer board layout

3.1 PROGRAMMER CHECK AND CONNECTION TO PC

- Connect the power supply source to **HC11-Programmer** (an external 12 V DC power supply source is required).
- Attach a COM port cable to the 9-pin connector on the programmer and to a COM port on the PC.
- Insert jumper JP1 (see Figure 1).
- Remove adaptor from P4 and flat cable form P2.
- Turn On power supply source and make sure that LED D1 appear green.
- Start **HC11-Programmer** software.
- After few seconds you should see on display message: “MC68H(7)11 Programmer Ver-X.X detected”.
- In case when you should see message: “MC68H(7)11 Programmer Ver-X.X not found”, change COM port number. To do that select “Tools” menu item and than select “Comm Port Options”. Select new COM port number. After pressing “OK” button the new setting will be applied and software reattempts connection with programmer.
- Now **HC11-Programmer** ready to operate.



Note: To speed up connection between **HC11-Programmer** and PC communication port baud rate must be set to maximum value.



Note: Update **HC11-Programmer** firmware if required (see Section 3.2).

3.2 PROGRAMMER FIRMWARE UPDATE

This section describes how to update firmware (ATMEGA16) of **HC11-Programmer**.

- Remove JP1 (see Figure 1).
- Turn On power supply; make sure that LED D1 appears green.
- Start **HC11-Programmer** software.
- Compare firmware version “MC68HC(7)11 Programmer **Ver-X.X** detected” and version specified in “Help>About” menu item.
- If versions not coincide, follow next steps to update firmware.
- Select menu item “Tools>Firmware Update”.
- After message box “Firmware Update” appeared, press “OK” button.
- After firmware update completed, turn Off power supply, close **HC11-Programmer** software.
- Insert JP1.
- Turn On power supply. Make sure that LED D1 appears green.
- Start **HC11-Programmer** software on PC. New firmware version “MC68HC(7)11 Programmer **Ver-X.X** detected” will appear.

4. INTERFACE TYPES

This section describes two interfaces, In-Circuit Programming (ICP) and On-Board Programming (OBP) of HC11-Programmer.

4.1 IN-CIRCUIT PROGRAMMING

In-Circuit programming interface is basic for HC11-Programmer. In this mode HC11-Programmer automatically detect of target MCU bus speed. Ceramic resonator connected to target MCU must be in range from 400 KHz to 16 MHz. If device has PLL system, it must be disabled by connecting VDDSYN pin to ground (see Appendix, figure 2). For successive communication with target MCU only 4 wires (RxD, TxD, RESET and GND) required. But in this case target MCU must be powered from external power supply and mode pins MODA, MODB should be connected to GND. If this signals MODA, MODB and +5V taken from HC11-Programmer that allow to control logic levels in time on reset and overload on +5V power line. It is strongly recommended to supply MCU pins MODA, MODB and +5V from programmer.

Also, HC11-Programmer performs pin testing of TxD and RxD lines. This feature can be disabled in Options Tab->Ignore Pin Tester errors in ICP mode.

In this mode programmer can't detect security state of MCU. So, if device secured all EEPROM contents will be lost. To avoid loss of EEPROM data use On-Board Programming Interface described in next section.



Note: When using In-Circuit programming interface remove adaptor from On-Board interface connector. (see Figure 1).

4.2 ON-BOARD PROGRAMMING

On-board programming interface designed for establishing connection with target device when MCU secured. This mode allows Read/Program EEPROM without any restrictions. To work in this mode MCU must be mounted to the corresponding adaptor supplied with HC11-Programmer.

Also, HC11-Programmer performs pin testing of all communication lines. This feature can be disabled in Options Tab->Ignore Pin Tester errors in OBP mode. But disabling of this future can lead to all EEPROM contents will be lost.



Note: When target adaptor with MCU mounted, check contacts careful to avoid short circuit. Otherwise target MCU can be damaged!



Note: When On-board programming interface used, remove cable from ICP connector (see Figure 1).

5. WORKING WITH TARGET MCU

This section contains overall information about Motorola MCUs supported by HC11-Programmer. When HC11-Programmer successfully installed (see Section 3) target devices EEPROM can be read, program and verify.

5.1 MC68HC(7)11 Devices

This section describes basic rules working with target MCU.

EEPROM memory for all 68HC(7)11 devices can be read, program in both OBP and ICP modes. Each MCU from 6811 family has various memory map. That means EEPROM, (EP)ROM and BootROM located in different physical address space. For example for 6811E9 device EEPROM starts from \$B600 and for 6811F1 EEPROM starts from \$FE00. This information can be found in the Select Device window at the right side. Also all 6811 devices have CONFIG register which define device security feature, visibility of EEPROM and EP(ROM). CONFIG register is EEPROM based and can be programmed as ordinary EEPROM cell. To enable CONFIG programming in Options Tab->Enable Program of CONFIG Register must be selected. If this option selected, in time of EEPROM programming, CONFIG Register will be programmed. But be careful, changing of CONFIG register will change MCU configuration and can lead to unpredictable behavior of MCU. After CONFIG register programmed reset MCU to take effect of new MCU configuration. For more information refer to detailed MCU description.



Note: Complete Datasheet on MCU can be downloaded form <http://www.etlweb.net/> , from Documents section.

5.1.1 In-Circuit EEPROM/(EP)ROM/BootROM reading example

- Connect required pins to board with target MCU (see Appendix Figure 2).
- Remove cable from On-Board connector (see Figure 1).
- Apply power to HC11-Programmer. LED D1 became to green light (see Table 1).
- Select corresponding device in HC11-Programmer software (“Device” button).
- Select “Read Sequence” panel in HC11-Programmer software.
- Press “EEPROM/EPROM/ROM” button.
- Press “Start” button.
- LED D4 on HC11-Programmer became to green light. That means that +5 voltage regulator switched on and VCC applied to target MCU.
- Now HC11-Programmer automatically detects MCU bus speed.
- When LED D1 on HC11-Programmer became permanent green, reading completed. Target MCU powered off.
- After read sequence successfully completed it is necessarily to save memory dump to file (see Section 6.2).
- If some errors appeared during reading process refer to Section 7.

5.1.2 In-Circuit EEPROM programming example

- Connect required pins to board with target MCU (see Appendix Figure 2).
- Remove cable from On-Board connector (see Figure 1).
- Apply power to **HC11-Programmer**. LED D1 became to green light (see Table 1).
- Select corresponding device in **HC11-Programmer** software (“Device” Button).
- Load EEPROM data from file (see Section 6.1) or enter data to Hex Editor.
- Select “Program Sequence” panel in **HC11-Programmer** software.
- Press “EEPROM” button.
- Press “Start” button.
- LED D4 on **HC11-Programmer** became to green light. That means that +5 voltage regulator switched on and VCC applied to target MCU.
- Now **HC11-Programmer** automatically detects MCU bus speed.
- When LED D1 on **HC11-Programmer** became permanent green, programming completed. Target MCU powered off.
- If some errors appeared during programming process refer to Section 7.



Note: Extra care must be taken when programming the EEPROM based CONFIG Register.



Note: Strongly recommended before EEPROM programming, for a first time, read EEPROM contents and save it to file.

5.1.3 On-Board EEPROM/(EP)ROM/BootROM reading example

- Mount target MCU on corresponding adaptor.
- Attach adaptor to OBP connector with help of cable in according to 1 pin-key (see Figure 1).
- Remove cable from ICP connector (see Figure 1).
- Apply power to **HC11-Programmer**.
- Select device in **HC11-Programmer** software (“Device” Button).
- Select “Read Sequence” panel in **HC11-Programmer** software.
- Press “EEPROM/EPROM/ROM” button.
- Press “Start” button.
- LED D4 on **HC11-Programmer** became to green light. That means that +5 voltage regulator switched on and VCC applied to target MCU.
- When LED D1 on **HC11-Programmer** became permanent green light, reading completed.
- When read sequence successfully completed it is necessarily to save memory dump to file (see Section 6.2).
- If some errors appeared during reading process refer to Section 7.



Note: When target MCU mounted on adaptor check contacts careful to avoid short circuit. Otherwise target MCU can be damaged!



Note: During removing the adaptor with target MCU **HC11-Programmer** must be powered off to avoid damaging of programmer and target MCU!

5.1.4 On-Board EEPROM programming example

- Mount target MCU on corresponding adaptor.
- Attach adaptor to OBP connector with help of cable in according to 1 pin-key (see Figure 1).
- Remove cable from BDM ICP connector (see Figure 1).
- Apply power to **HC11-Programmer**.
- Select device in **HC11-Programmer** software (“Device” Button).
- Load EEPROM data from file (see Section 6.1) or enter data to Hex Editor.
- Select “Program Sequence” panel in **HC11-Programmer** software.
- Press “EEPROM” button.
- Press “Start” button.
- LED D4 on **HC11-Programmer** became to green light. That means that +5 voltage regulator switched on and VCC applied to target MCU.
- When LED D1 on **HC11-Programmer** became permanent green light, programming completed.
- If some errors appeared during programming process refer to Section 7.



Note: When target MCU mounted on adaptor check contacts careful to avoid short circuit. Otherwise target MCU can be damaged!



Note: During removing the adaptor with target MCU **HC11-Programmer** must be powered off to avoid damaging of programmer and target MCU!



Note: Extra care must be taken when programming the EEPROM based CONFIG Register.



Note: Strongly recommended before EEPROM programming, for a first time, read EEPROM contents and save it to file.

6. FILE OPERATIONS

This section describes basic rules working with files. Memory dump from Hex Editor (Buffer) can be load/save from/to hard disk. Also short descriptions such as project name, MCU type and memory cell assignment can be done for future fast remind. **HC11-Programmer** accepts tree types of file formats:

- ✓ BIN (Binary format)
- ✓ Motorola S-Record (4 byte address)
- ✓ Motorola S-Record (6 byte address)
- ✓ EEF (Extended ETL Format)

6.1 LOAD FILE INTO BUFFER

- Select “File>Open” menu item.
- Press “Browse” button.
- In File Open Dialog window, select file witch need to be open.
- Press “Open” button.
- Than opposite “Auto Format Detected:” text, select correct file format. Note that software try automatically detects file format, but unknown records in file will fail this detection. “Load Entire file” check box must be checked if automatically loading procedures required.
- Than press “OK” button.

Sometimes load data from file to specific buffer allocations required. For Example if required load buffer from \$B600 address from binary file beginning from \$0000 address follow next steps:

- Select “File>Open” menu item.
- Press “Browse” button.
- In File Open Dialog window, select file which need to be open.
- Press “Open” button.
- Than, opposite “Auto Format Detected:” select Binary format.
- Uncheck “Load Entire File” check box.
- In field “Offset Value to Place Data to Buffer:” enter 0xB600.
- Than press “OK” button.
- Now data placed to Hex Editor Buffer from the beginning of 0xB600 address.

If more complicated operations with files required, for example load Hex Editor Buffer from many files “Lowest Address From File To Load”, “Highest Address From File To Load” and “Clear Buffer Before Loading File” options are available.

6.2 SAVE FILE FROM BUFFER

- Select “File>Save” menu item.
- Press “Browse” button.
- Select directory in which file will be saved.
- Type file name, for example “test1”
- Press “Save” button.
- Than select format in which file will be saved*.
- Press “OK” button.



Note: Use EEF Format for future “Load File Into Buffer” automatically processing. Also, only in EEF Format Project Description, Device Name and Memory Cells attributes can be saved.

7. ERRORS AND TROUBLESHOOTING

This section describes most recently encountered problems, errors and fixing solutions.

- **Problem:** LED D1 (see Figure 1) Dark.
- **Causes:** This problem can accrue when external power supply connected to **HC11-Programmer** is damaged or connected in wrong polarity.
- **Solutions:** Check voltage on **HC11-Programmer** power clamps. It must be 12 V +/- 1V.

- **Error Message:** MC68HC(7)11 Programmer not found
- **Causes:** This message can appear when **HC11-Programmer** software couldn't establish connection with **HC11-Programmer** board.
- **Solutions:** Check connection of COM port cable from PC to **HC11-Programmer** board. Apply power from external power supply to **HC11-Programmer**. In menu item "Tools>Comm Port Options" select correct COM port number.

- **Error Message:** PC too Programmer Communication Error
- **Causes:** This message can appear when communication between **HC11-Programmer** and PC is broken. In some cases this message can appear after programmer fatal error.
- **Solutions:** Try to close programmer software and start it again. If it doesn't help decrease communication baud rate in "Tools>Comm Port Options" dialog window. Also this message can appear when COM port cable has poor contact with DB-9 connectors.

- **Error Message:** Programmer to MCU Communication error
- **Causes:** This message can appear when communication between **HC11-Programmer** and MCU is broken.
- **Solutions:** Check connection between programmer and MCU. In In-Circuit mode wires length must not exceed 20 cm.

- **Error Message:** No Echo from MCU
- **Causes:** This message can appear if there is no feedback from MCU.
- **Solutions:** Check connection between **HC11-Programmer** and MCU in according to wiring diagram (see Appendix). For example MODA and MODB pins not 'Low' in time of Reset.

- **Error Message:** Monitor Check sum Error
- **Causes:** This message can appear after monitor firmware loaded into target MCU with errors.
- **Solutions:** Try to reconnect to target MCU. If this error not disappeared, possible target MCU has damaged RAM.

- **Error Message:** Reset Pin 'Low'
- **Causes:** This message can appear when MCU Reset pin connected to ground through external components or no power supply on VCC pin or no oscillation on EXTAL, XTAL pins.
- **Solutions:** Cut any traces and external components from RESET pin. If error still remain check +5V on MCU Vcc pin in time when software trying to link the MCU. Check integrity of ceramic resonator and passive components connected to EXTAL, XTAL pins.

- **Error Message:** Reset Pin 'High'

■ **Causes:** This message can appear when MCU Reset pin connected to VCC(+5V) through external components.

■ **Solutions:** Cut any traces and external components form RESET pin. If error still remains it is possible MCU RESET pin damaged.

- **Error Message:** External Reset Occurs

■ **Causes:** This message can appear if external reset pulse is detected on RESET pin for example from external COP system.

■ **Solutions:** Cut any traces and external components form RESET pin.

- **Error Message:** MODA Pin 'High'

■ **Causes:** This message can appear when MCU MODA pin connected to VCC(+5V) through external components.

■ **Solutions:** Cut any traces and external components form MODA pin. If error still remains it is possible MCU MODA pin damaged.

- **Error Message:** MODB Pin 'High'

■ **Causes:** This message can appear when MCU MODB pin connected to VCC(+5V) through external components.

■ **Solutions:** Cut any traces and external components form MODB pin. If error still remains it is possible MCU MODB pin damaged.

- **Error Message:** Pintester Error: RxD Pin

■ **Causes:** This message can appear when MCU RxD pin connected to VCC (+5V) to ground through external components.

■ **Solutions:** Cut any traces and external components form RxD pin. If error still remains it is possible MCU RxD pin damaged. Or try to disable pinsetter feature in Option Tab.

- **Error Message:** Pintester Error: TxD Pin

■ **Causes:** This message can appear when MCU TxD pin connected to VCC (+5V) to ground through external components.

■ **Solutions:** Cut any traces and external components form TxD pin. If error still remains it is possible MCU TxD pin damaged. Or try to disable pinsetter feature in Option Tab.

- **Error Message:** MCU Bus Frequency too Low

■ **Causes:** This message can appear when MCU bus speed lower than 100 KHZ(400 KHz or lower frequency ceramic resonator connected to MCU).

■ **Solutions:** Replace ceramic resonator connected to EXTAL, XTAL pins to any accessible, from 4-16 MHz. OR supply MCU EXTAL pin from programmer built in clock generator in according to wiring diagram (see Appendix).

- **Error Message:** Pintester Error:

■ **Causes:** This message can appear in On-Board programming interface when some pins has poor contact with adaptor, or pins are damaged.

■ **Solutions:** Clean pins from colophony. Check contacts between adaptor and target MCU pins. Check short circuits between pins to pins, pins to GND and pins to VCC. This feature can be disabled via Options tab. But disabling of this features can lead to all EEPROM data will be lost if MCU secured.

- **Error Message:** No ECLK Pulse Detected. Check EXTAL Pin connection.

■ **Causes:** This message can appear in On-Board programming interface if MCU ECLK, EXTAL pins has pure contact with adapter socket or device damaged.

■ **Solutions:** Check connection between MCU ECLK, EXTAL pins and adapter socket.
- **Error Message:** Device Still Secured

■ **Causes:** This message can appear in On-Board programming mode when target MCU secured.

■ **Solutions:** Check accuracy of device type selected; take attention on MCU maskset. Try to reconnect to target MCU.
- **Error Message:** Wrong Adapter Selected

■ **Causes:** This message can appear in On-Board programming mode when device selected in software not match with adapter mounted on **HC11-Programmer**.

■ **Solutions:** Check matching between MCU type selected and mounted adapter.
- **Error Message:** Programming/Erasing Error

■ **Causes:** This message can appear in time of EEPROM programming or erasing.

■ **Solutions:** Check MCU type selection. Pay attention on MCU Mask Set. Try to realize device programming in On-board mode.
- **Error Message:** Overcurrent protection

■ **Causes:** This message can appear when current consumption from built-in power supply grater than 200 mA or +5V and GND pins are shorted.

■ **Solutions:** Check target MCU power pins on short circuit. Also check that +5V terminal connected to MCU VCC pin and GND terminal connected to MCU VSS pin.
- **Error Message:** Power Supply voltage lower

■ **Causes:** This message can appear when current consumption from built-in power supply grater than 200 mA or +5V and GND pins are shorted.

■ **Solutions:** Check target MCU power pins on short circuit. Also check that +5V terminal connected to MCU VCC pin and GND terminal connected to MCU VSS pin. If error still present leave +5V terminal unconnected and if error not disappear contact ETL technical support.
- **Error Message:** Power Supply voltage grater

■ **Causes:** This message can appear when +5V terminal connected to external power supply with voltage grater than +5V or built-in power supply damaged.

■ **Solutions:** Leave +5V terminal unconnected and if error not disappear contact ETL technical support.
- **Error Message:** External Power Supply Present

■ **Causes:** This message can appear in On-Board programming mode when external voltage applied to In-Circuit connector (see Figure 1).

■ **Solutions:** Disconnect cable from In-Circuit connector.
- **Error Message:** WRONG SUBROUTINE CALL
WRONG DEVICE TYPE

■ **Causes:** These messages can appear when fatal problems with **HC11-Programmer** hardware/firmware occurred.

- **Solutions:** Contact ETL technical support.

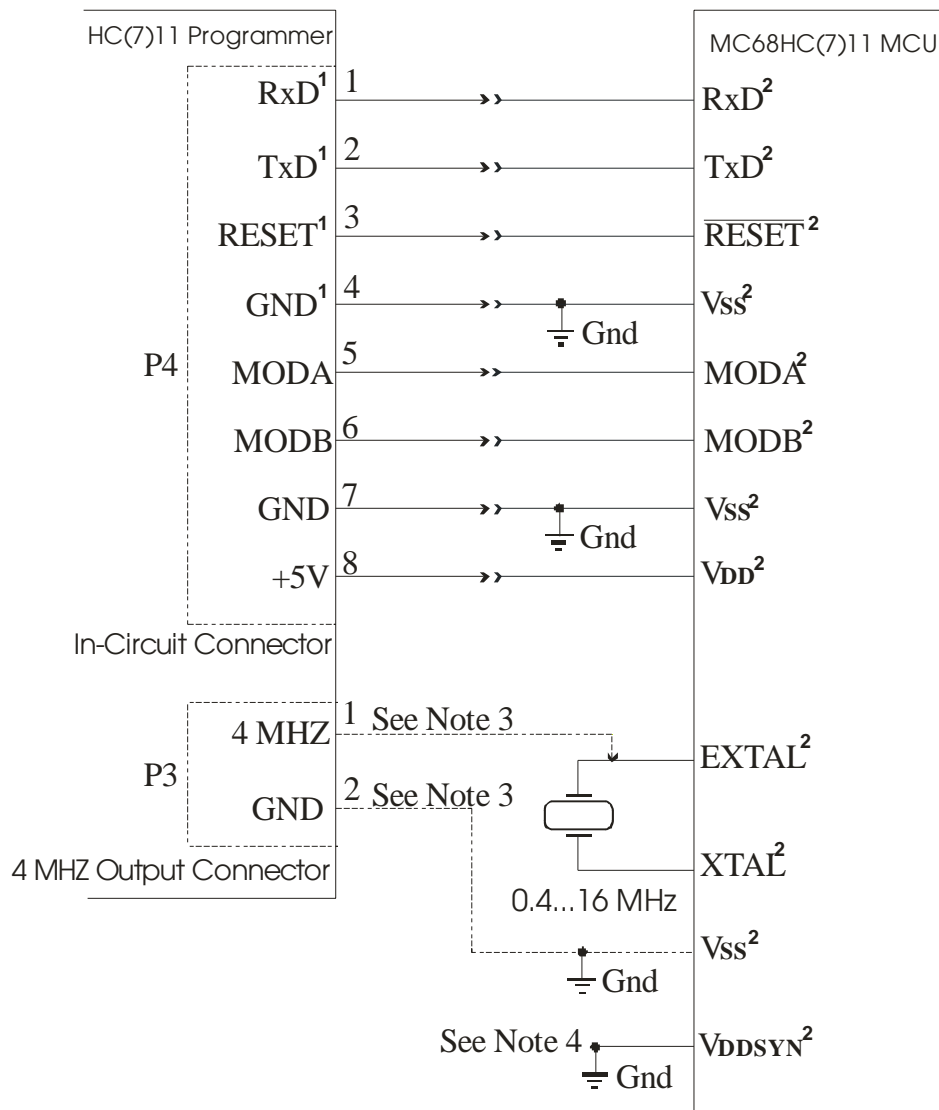


Note: HC11-Programmer has Log Window which can be stored to file. To perform this operation right clicks on Log Window. Than click on “Save to hc11prog.log file“ menu item. Now this file can be found in the same directory as HC11-Programmer software. Log File can be send by E-mail to techsupport@etlweb.net for non described problem solution.

8. WARRANTY STATEMENT

ETL warrants that Product delivered shall conform to applicable. Report any defects for a 45 days period, from the applicable data on invoice.

9. APPENDIX 1



Note 1: Pin mandatory must be connected.



Note 2: Pin number can be found in APPENDIX Section.



Note 3: 4 MHz generator must be used if crystal resonator frequency lower than 400 KHz.



Note 4: If MCU has PLL system, it must be disabled by connection VDDSYN pin to Ground.

Figure 2. In-Circuit programming schematic diagram for MC68HC(7)11 MCU

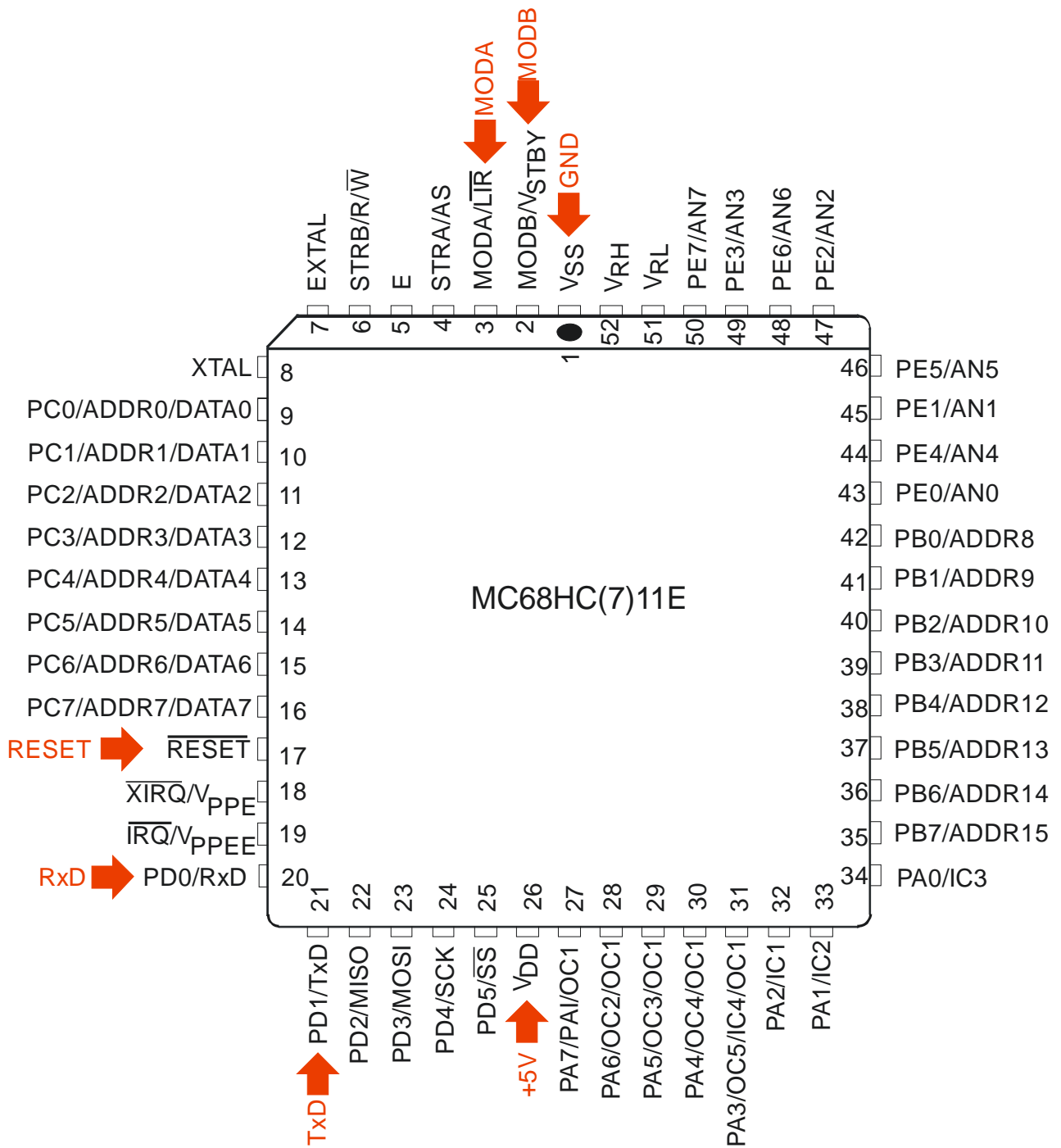


Figure 3. In-Circuit wiring diagram for 68HC(7)11 E Series MCU, PLCC 52 Package

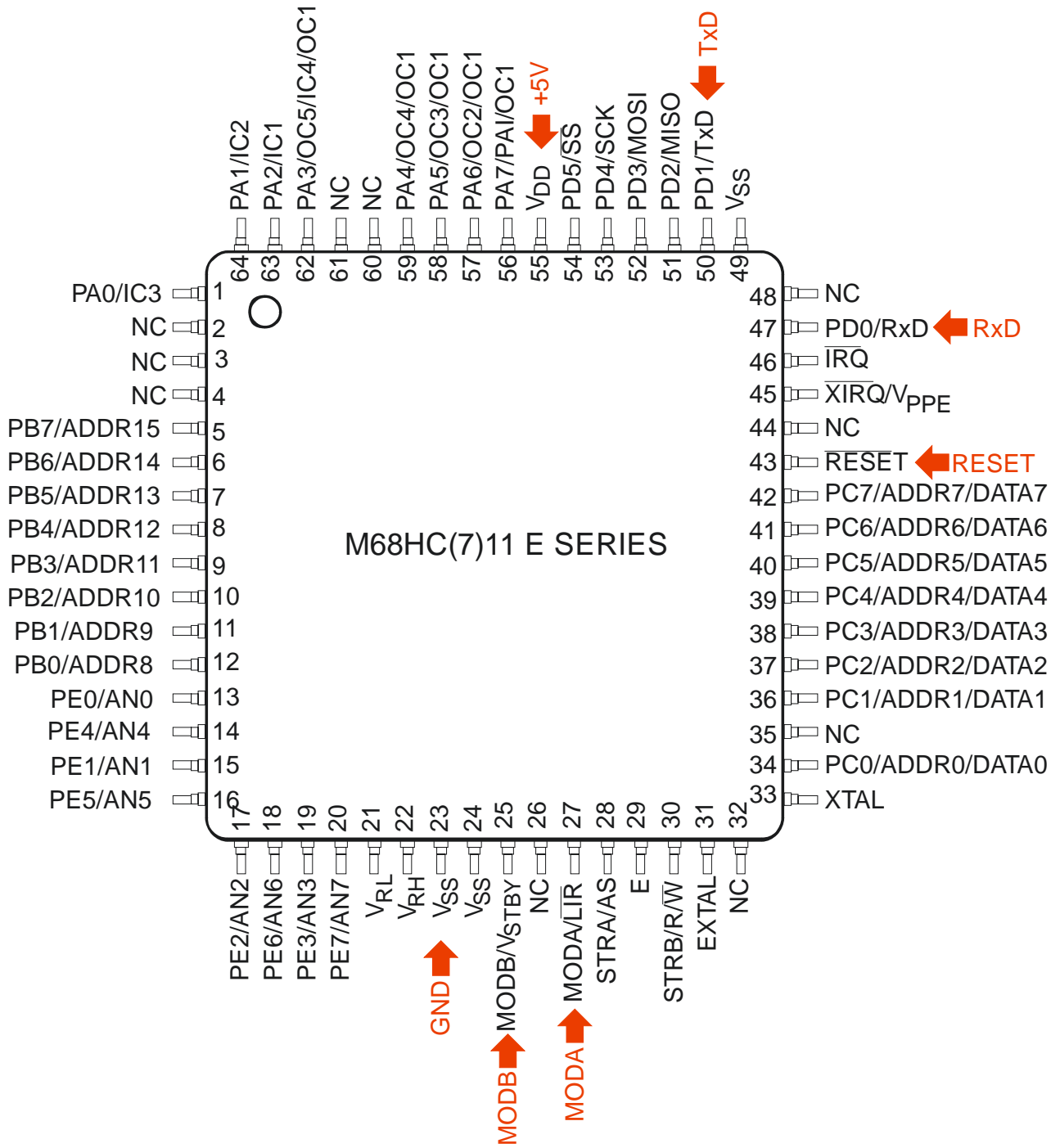


Figure 4. In-Circuit wiring diagram for 68HC(7)11E Series MCU, QFP64 Package

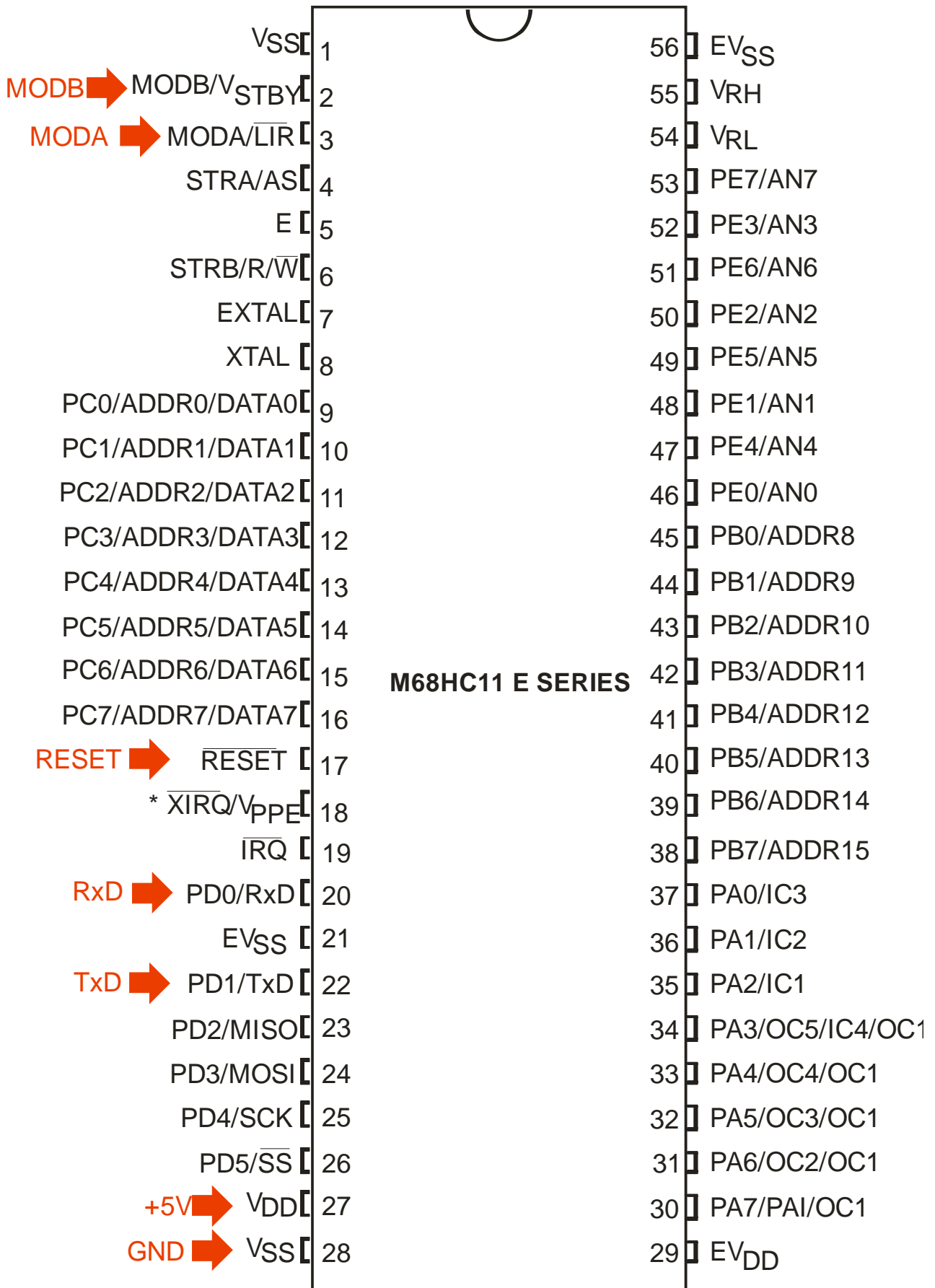


Figure 5. In-Circuit wiring diagram for 68HC(7)11E Series MCU, SDIP56 Package

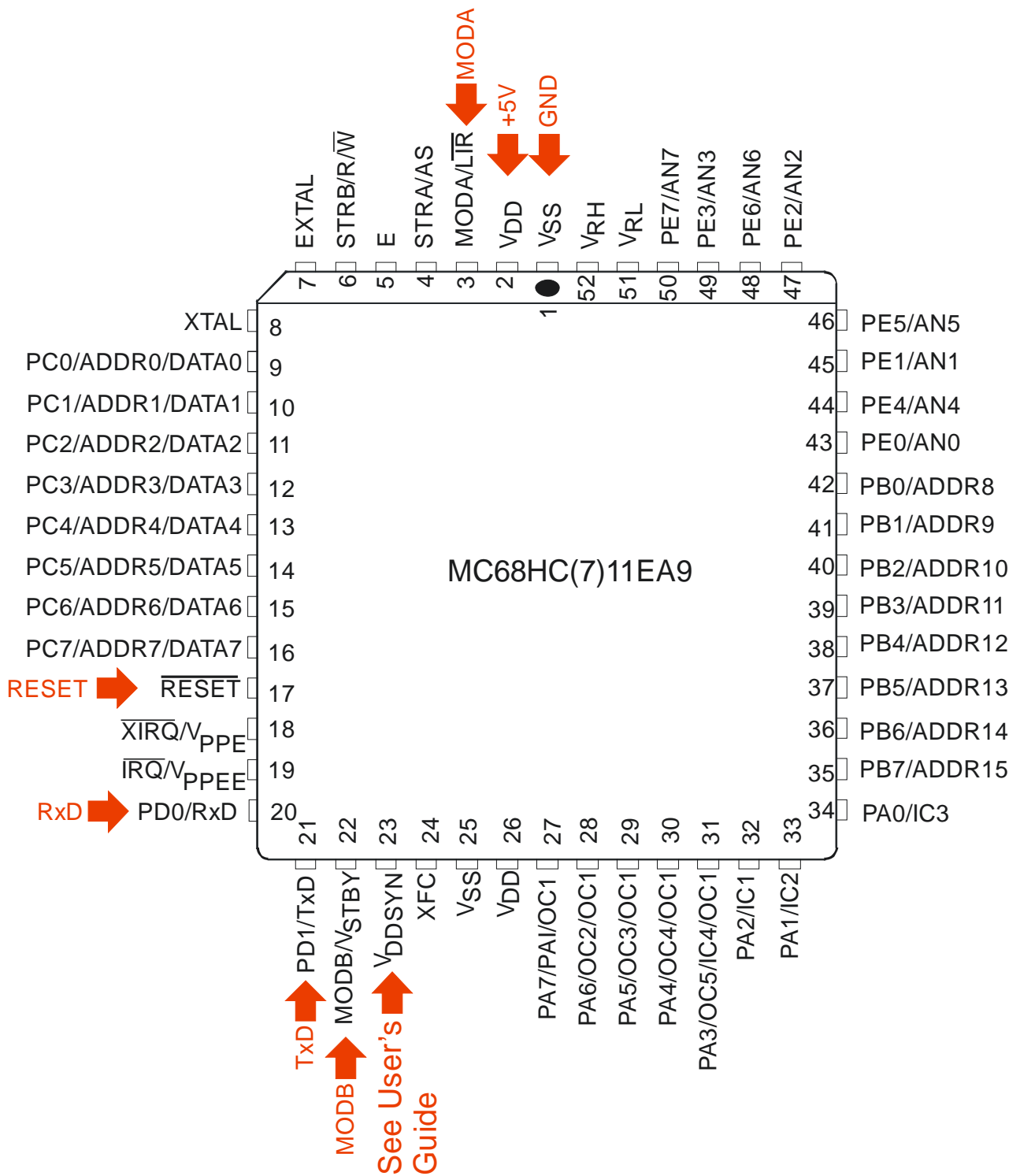


Figure 6. In-Circuit wiring diagram for 68HC(7)11EA9 MCU, PLCC 52 Package

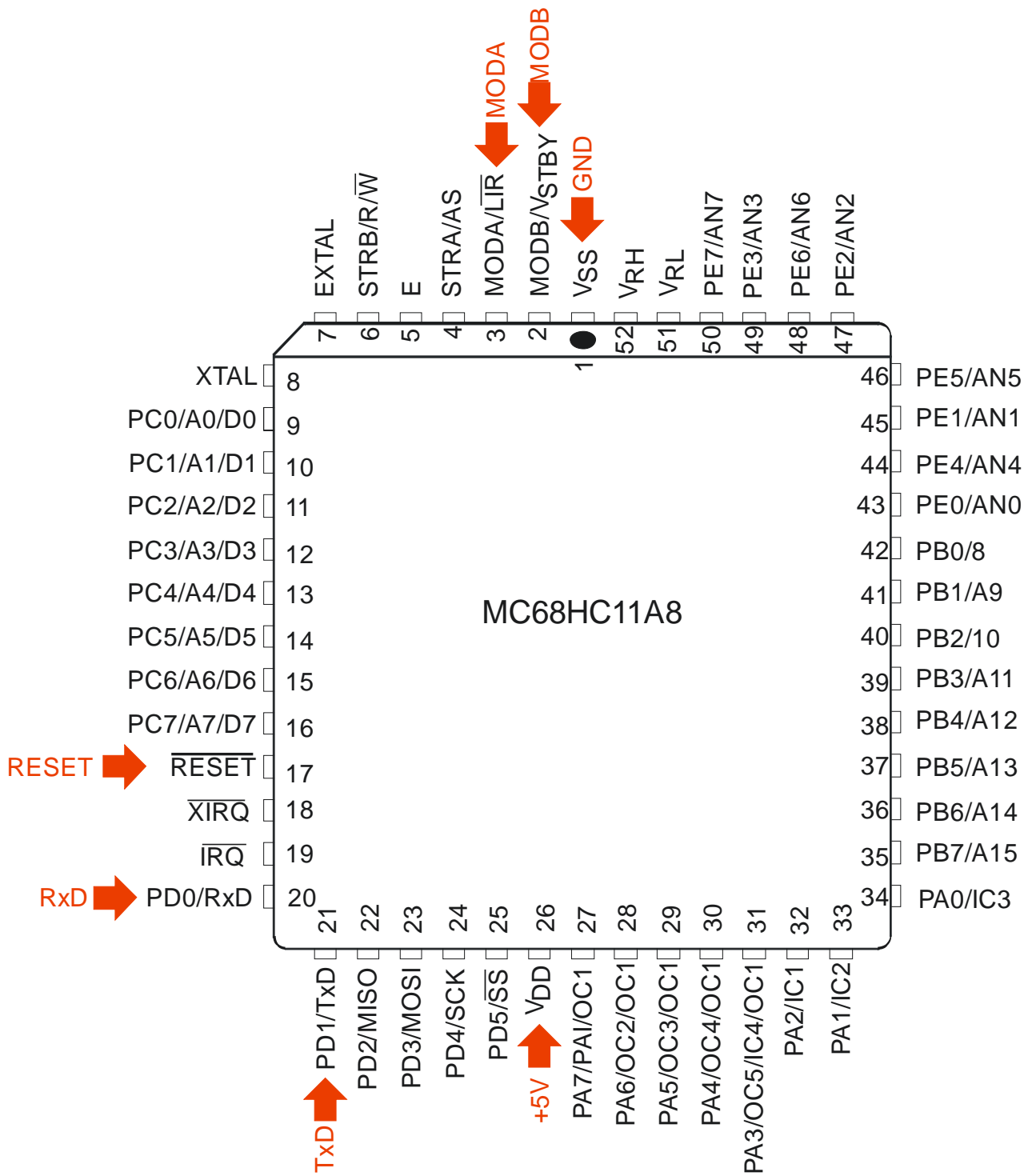


Figure 7. In-Circuit wiring diagram for 68HC11A8 MCU, PLCC 52 Package

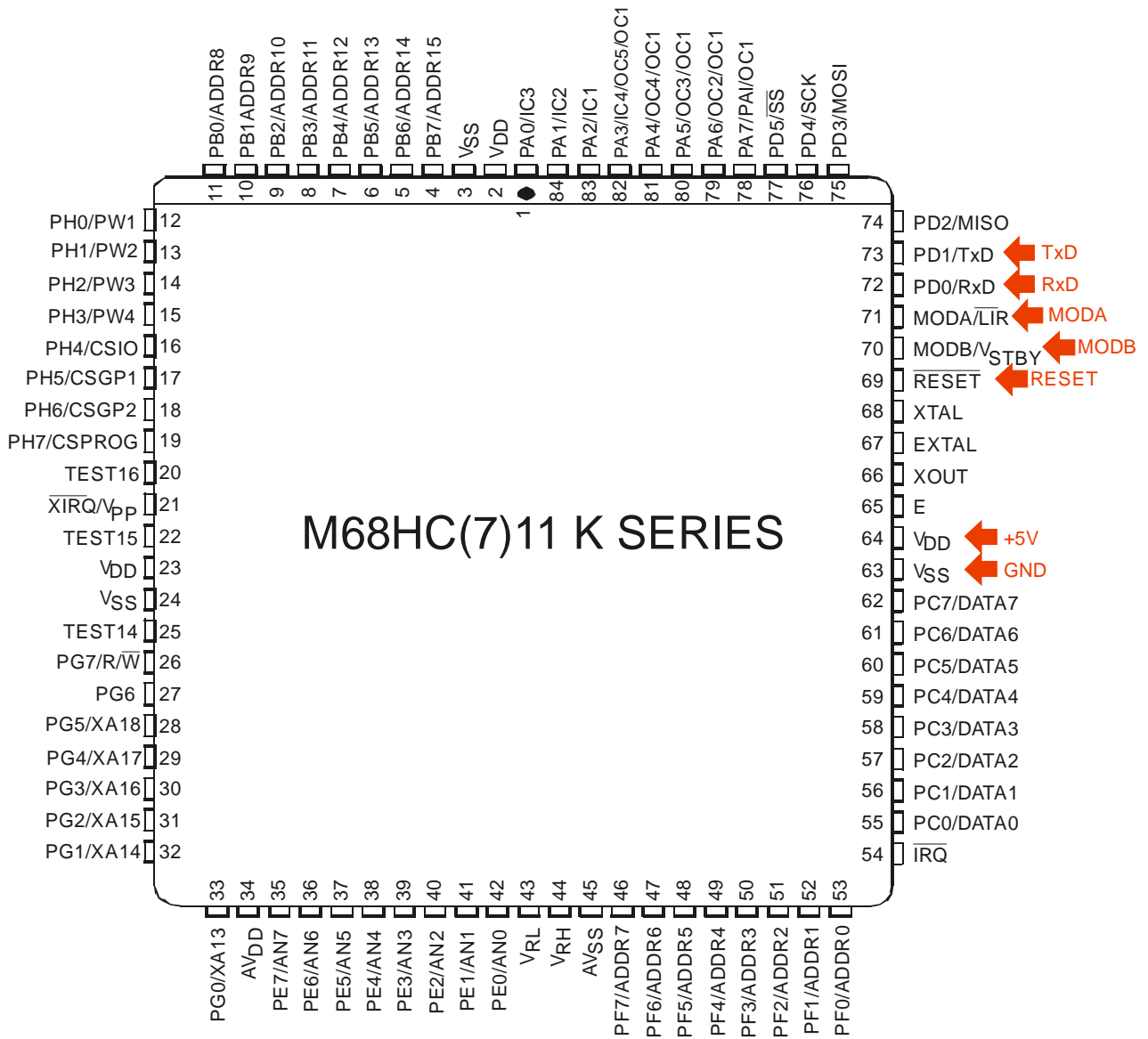


Figure 8. In-Circuit wiring diagram for 68HC(7)11K Series MCU, PLCC 84 Package

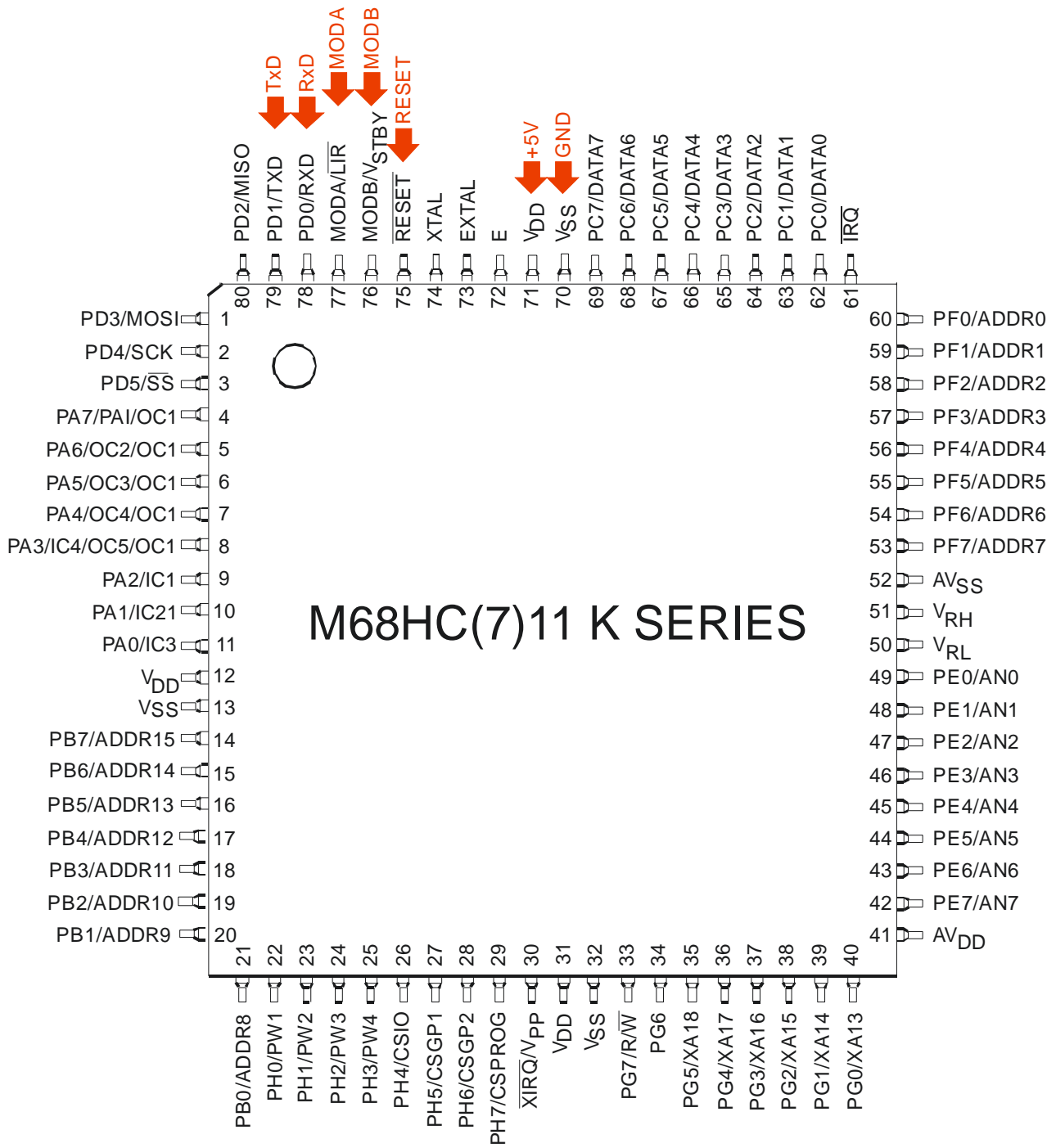


Figure 9. In-Circuit wiring diagram for 68HC(7)11K Series MCU, LQFP80 Package

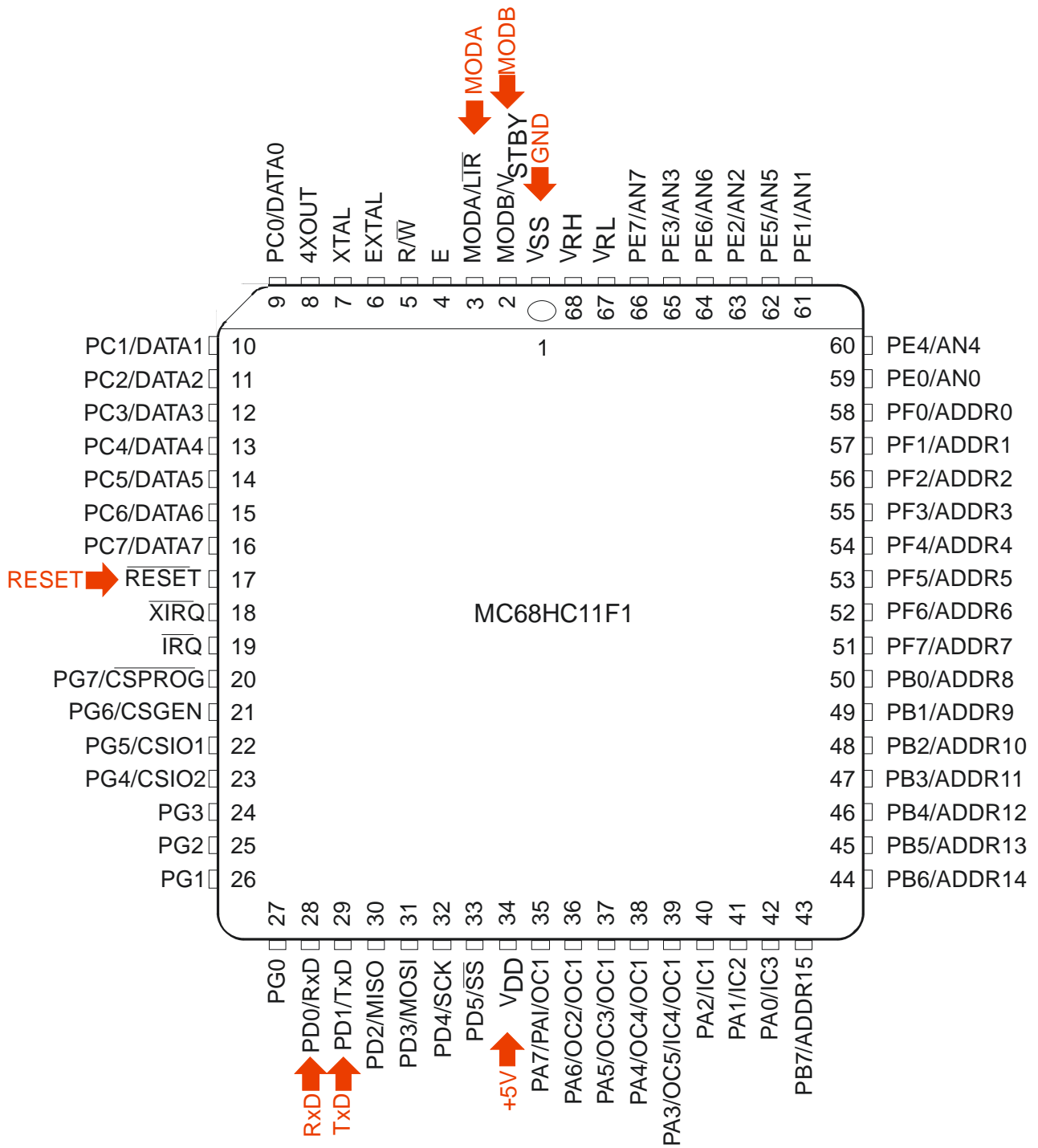


Figure 10. In-Circuit wiring diagram for 68HC11F1 MCU, PLCC68 Package

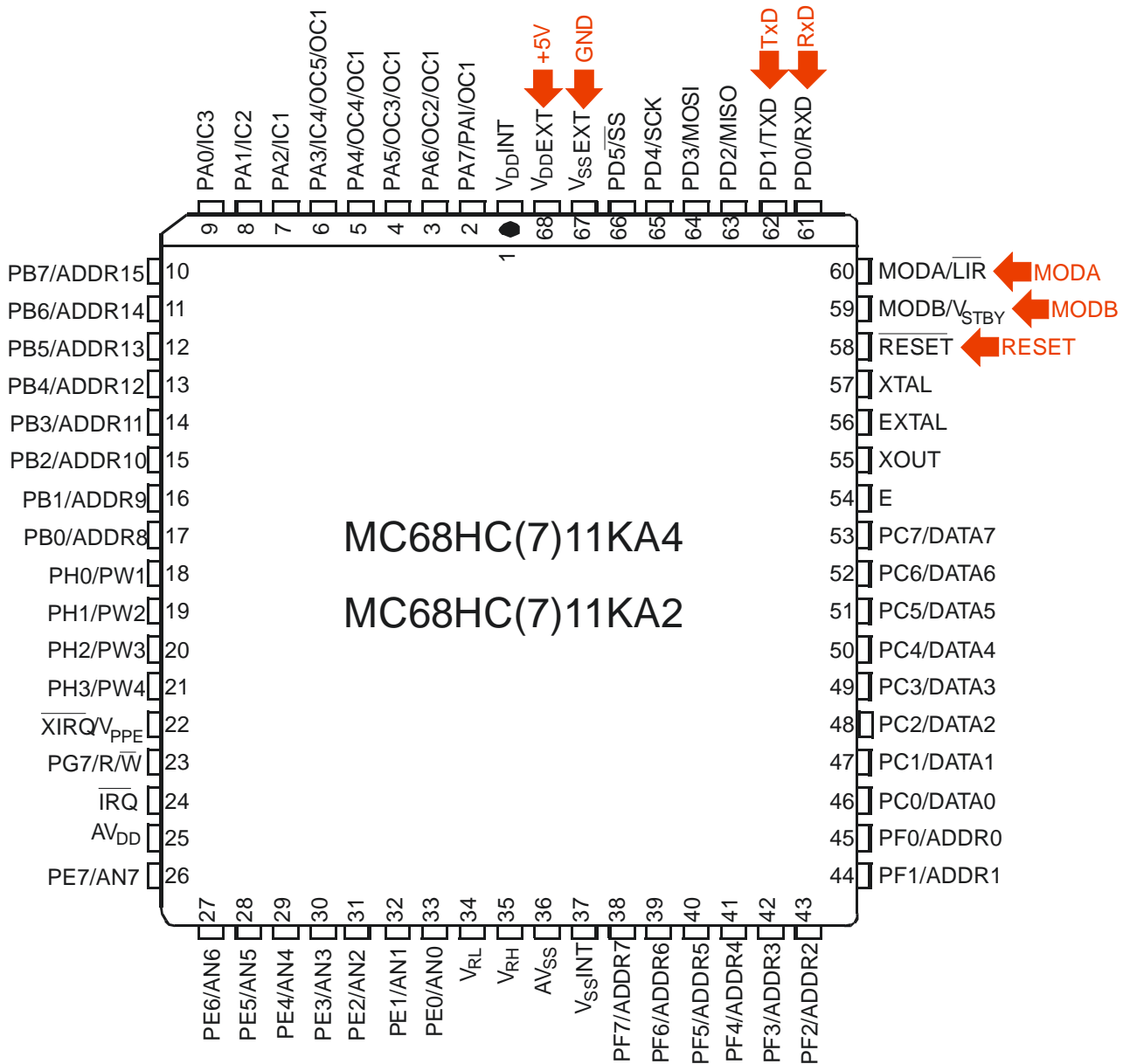


Figure 11. In-Circuit wiring diagram for 68HC(7)11KA Series MCU, PLCC 68 Package

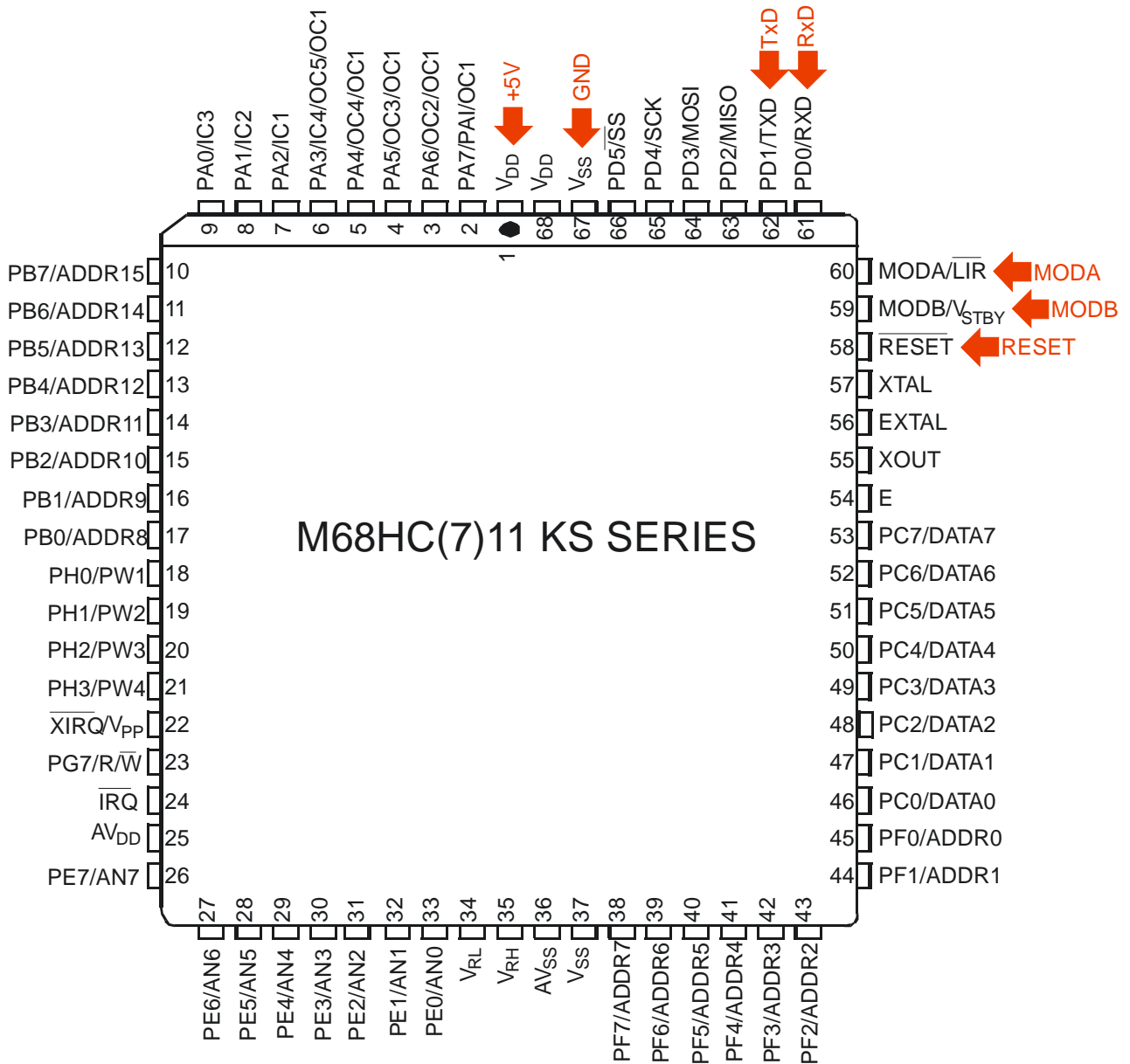


Figure 12. In-Circuit wiring diagram for 68HC(7)11KS Series MCU, PLCC 68 Package

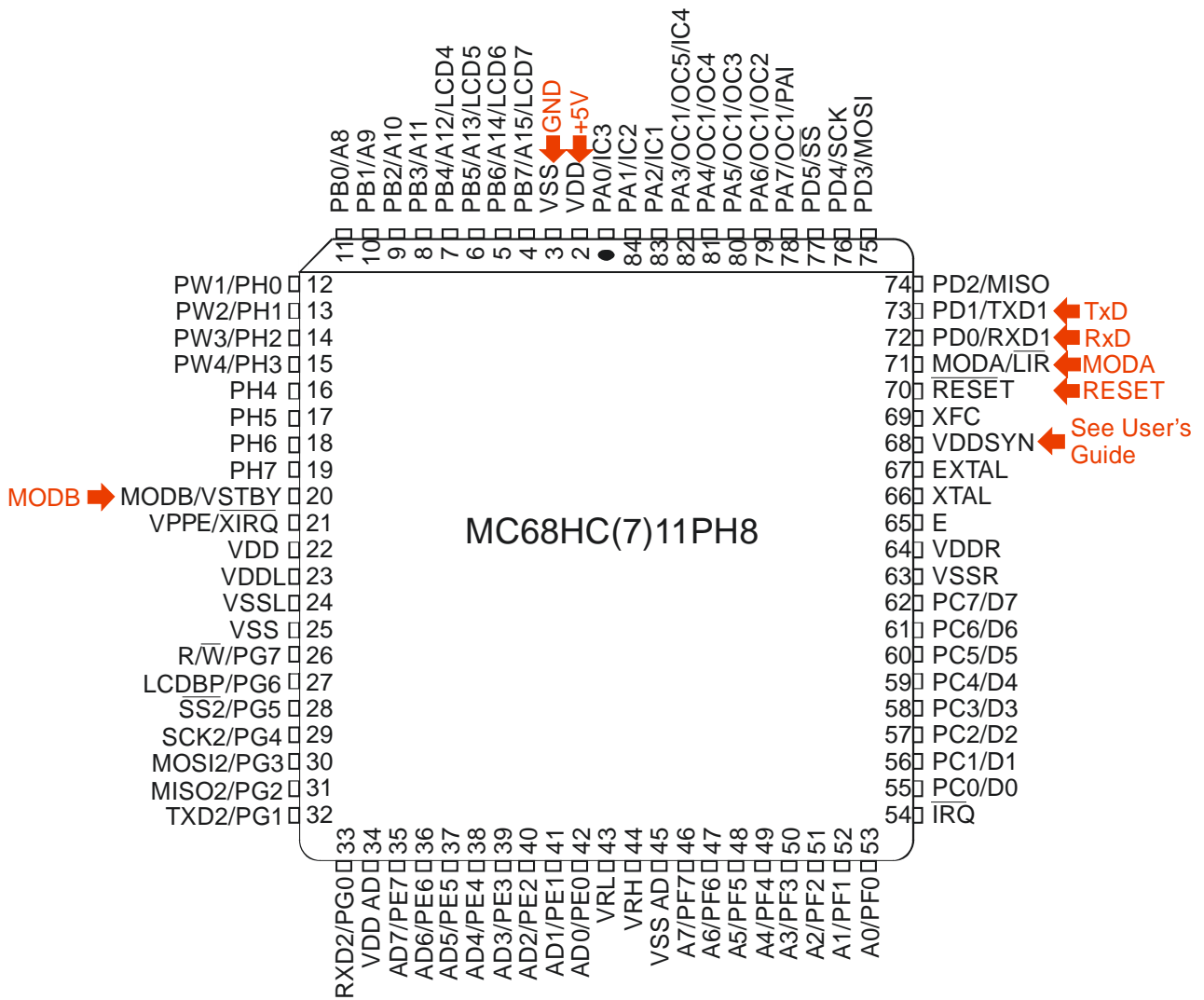


Figure 13. In-Circuit wiring diagram for 68HC(7)11PH8 MCU, PLCC84 Package

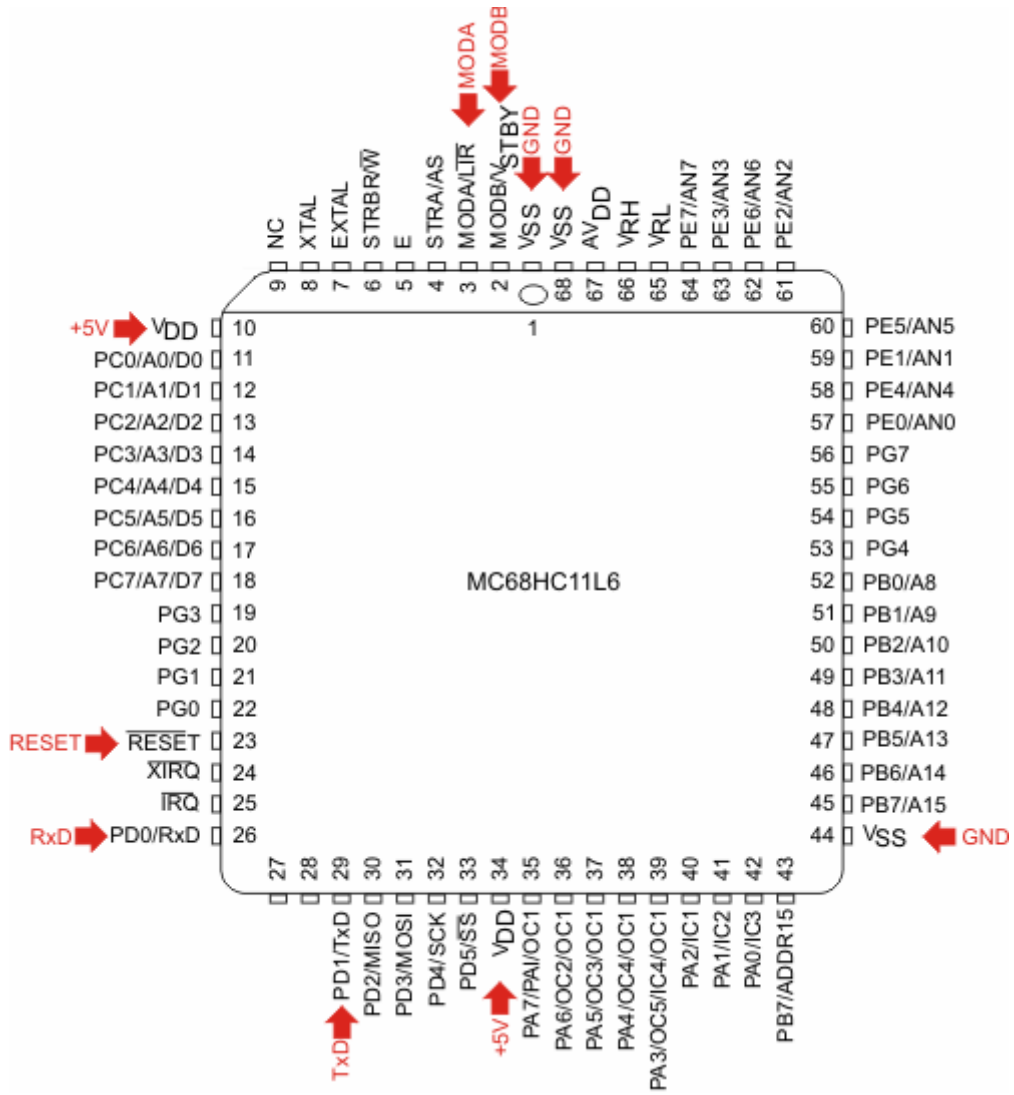


Figure 15. In-Circuit wiring diagram for 68HC(7)11L6 MCU, PLCC68 Package

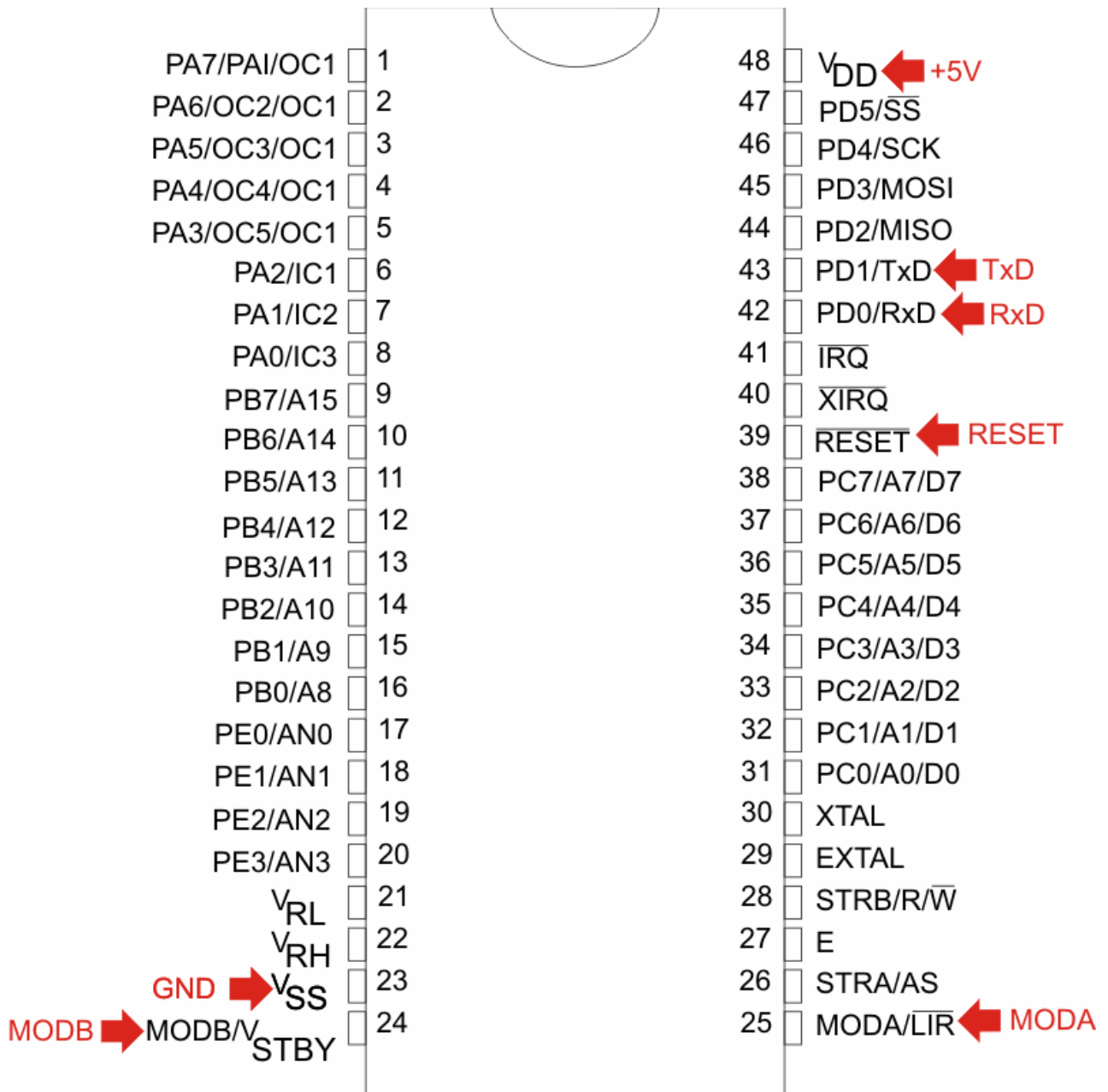


Figure 16. In-Circuit wiring diagram for 68HC11A8 MCU, DIP48 Package



Figure 17. 11 EA PLCC-52 programming adapter

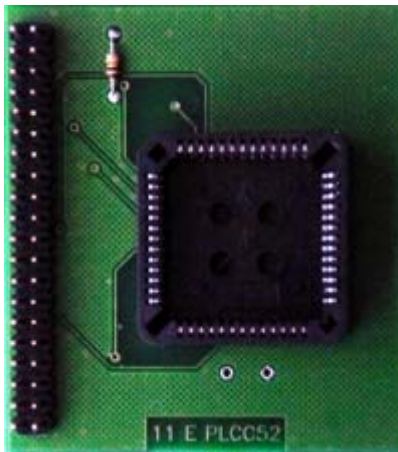


Figure 18. 11 E PLCC-52 programming adapter

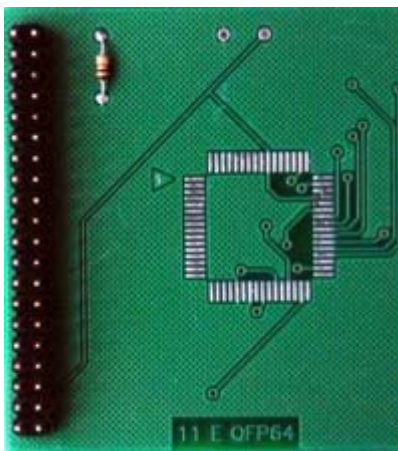


Figure 19. 11 E QFP-64 programming adapter

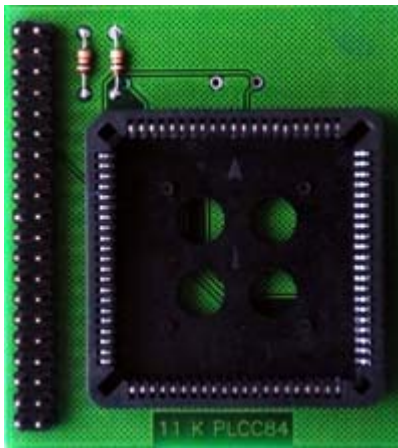


Figure 20. 11 K PLCC-84 programming adapter

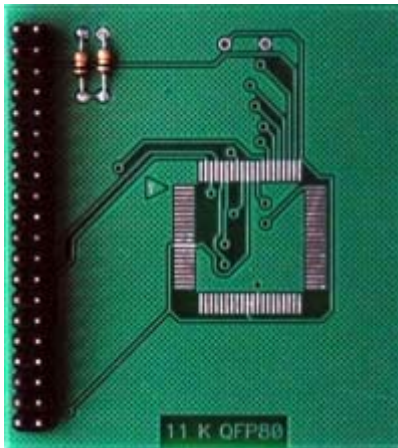


Figure 21. 11 K QFP-80 programming adapter



Figure 22. 11 KA/KS PLCC-68 programming adapter

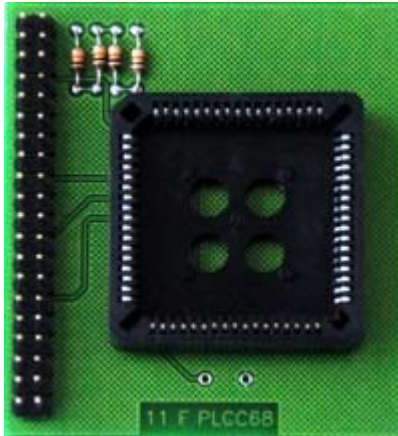


Figure 23. 11 F PLCC-68 programming adapter

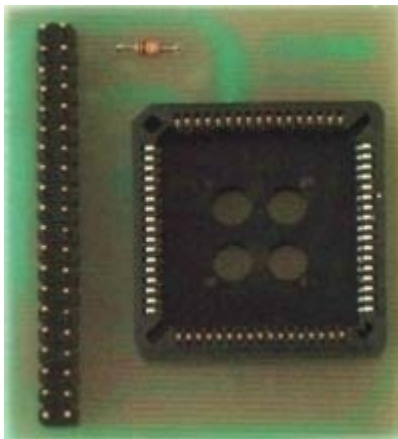


Figure 24. 11L6 PLCC-68 programming adapter

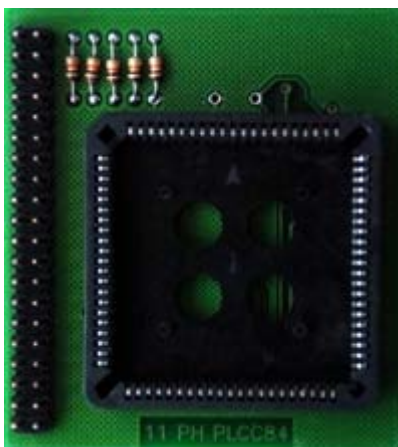


Figure 25. 11 PH PLCC-84 programming adapter



Figure 26. 11 A8 DIP-48 programming adapter