

ST7 EPB User Manual

Release 2.2

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INSTRUCTIONS FOR USE—WARNING

This product is conform to the 89/336/EEC Directive. It complies with the ITE EN55022 standard for EMC emissions and generic 50082-1 (1992 edition) immunity standards.

This product is an FCC Class-A apparatus. In a residential environment, it may cause radioelectrical disturbances.

In addition, this programming board is not contained in an outer casing; consequently, it cannot be immune against electrostatic discharges (ESD). It should therefore be handled only in static safe working areas. Please refer to *Appendix: EMC Conformity and Safety Requirements* on page 15 for relevant safety information.

USE IN LIFE SUPPORT DEVICES OR SYSTEMS MUST BE EXPRESSLY AUTHORIZED.

STMicroelectronics PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF STMicroelectronics. As used herein:

1. Life support devices or systems are those which (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided with the product, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can reasonably be expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Table of Contents

| | |
|--|-----------|
| Chapter 1: Introduction | 5 |
| 1.1 Overview | 5 |
| 1.2 Hardware features | 6 |
| 1.3 Software features | 6 |
| Chapter 2: Getting Started | 7 |
| 2.1 Delivery checklist | 7 |
| 2.2 Setting up the EPB | 7 |
| 2.3 Installing the software | 8 |
| Chapter 3: How to Program | 9 |
| 3.1 Programming Methods | 9 |
| 3.1.1 Installing a device for programming with the ZIF sockets | 9 |
| 3.1.2 Installing a device for programming using ISP mode | 10 |
| 3.2 A typical programming session | 11 |
| Appendix: EMC Conformity and Safety Requirements | 15 |
| Product Support | 17 |
| Getting prepared before you call | 17 |
| Contact List | 17 |
| Software updates | 18 |

Table of Contents

1 INTRODUCTION

1.1 Overview

The ST7 EPB is a programming board kit which allows you to program ST7 microcontrollers having EPROM, EEPROM and FLASH memories.

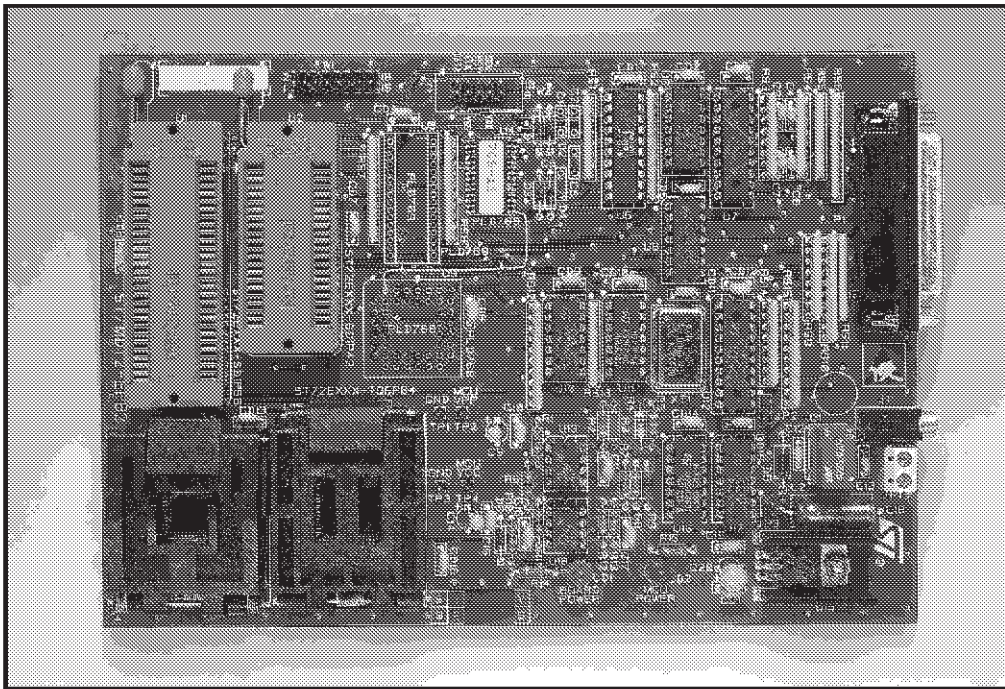


Figure 1: Typical ST7_EPB programming board

The layout of the programming board included in your ST7 EPB kit varies depending on the type and package of the ST7 microcontroller you wish to program (a typical example is shown in *Figure 1*). However, the general programming procedure explained in this book remains the same for all boards.

A complete listing of the ST7 family of programming boards, with a summary of the devices they support is given in *ST7_EPB.pdf*, available on the *MCU on CD* CD-ROM.

Note: The ST7 EPB is meant to program small numbers of microcontrollers (i.e. prototypes in the development stage). For mass production programming, it is recommended that you use the appropriate gang programmer.

The programming board is linked via the parallel port, to a host PC running the Windows Epromer software (WINEE). This software interface allows you to customize and control the programming.

1.2 Hardware features

A range of programming boards allow you to program all of the EPROM, EEPROM and FLASH versions of the ST7 family. In Situ Programming (ISP) is also available for the newer EEPROM devices.

1.3 Software features

A host PC running the Windows Epromer software (WINEE) is the control interface for the ST7 EPB.

WINEE is a graphical Windows[®] interface that lets you:

- Read, view, edit and save executable files in the Intel[®] HEX and Motorola[®] S19 formats, generated by the Assembler, Linker or C Compiler for ST microcontrollers.
- Program executable files into ST microcontrollers.
- View and verify a microcontroller's memory contents.
- Either create a project that defines how to program the microcontroller(s) or load the files whose contents you want to program and then execute the program.

WINEE includes a detailed online help utility.

2 GETTING STARTED

2.1 Delivery checklist

Check that your ST7 EPB kit contains the following:

- 1 ST7 EPB Eprom Programming Board (i.e. the EPB appropriate to the sales type ordered).
- 1 power supply.
- 1 parallel cable.
- 1 *MCU on CD* CDROM containing the Windows® Epromer software.
- 1 10-pin HE10 type ribbon cable for ISP mode (if provided on the programming board for the sales type ordered).

2.2 Setting up the EPB

To set up the ST7 EPB hardware, follow these instructions:

- 1 Shut down and power-off the host PC.
- 2 Connect one end of the supplied parallel cable to connector P1 of the ST7 EPB and the other end to one of the host PC's parallel ports (LPT1 or LPT2).

Note: Be sure to use the parallel cable provided with your kit—using a longer parallel cable may cause malfunctions.

Connect the cable directly between the host PC and the programming board—the insertion of additional cables or switch boxes between the host PC and the programming board may cause malfunctions.

If a dongle (a hardware key required by some software packages) is already connected to the PC's parallel port, it should not interfere with the programming board. However, if a malfunction of the board should occur, please remove the dongle and restart the above sequence.

- 3 Power on the programming board by connecting the power supply to the programming board and to the mains. Ensure that the power supply is adapted to the mains voltage and outlet type used in your country.

Note: The board can be supplied from the integrated power supply provided with the board, or from an external +15 V_{DC} / 0.5 A power supply.

- 4 Power on the host PC and install the software provided as described in the next section.

2.3 Installing the software

Your ST7 EPB comes with the *MCU on CD* CD-ROM which contains a number of ST7 software tools. These tools are compatible with Windows® 95, 98, 2000 and Windows® NT® operating systems.

Note: Windows® 2000 and NT® users must have administrator privileges to install the Windows Epromer.

To install and setup the ST7 software tools, follow these steps:

- 1 Close all other open applications on your Windows desktop.
- 2 Insert the *MCU on CD* into your CD-ROM drive. The CD-ROM's autorun feature will open up a welcome screen on your PC. If the autorun feature does not work, use Windows® Explorer to browse to the CD-ROM's root folder, and double-click on `Welcome.exe`.
- 3 Select ***Install Your Development Tools*** from the list of options. A new screen will appear listing the different families of STMicroelectronics MCUs.
- 4 Use your mouse to place the cursor over the ***ST7 Tools*** option. Choose ***ST Tools***, then ***ST7 Toolchain*** from the lists that appear.
- 5 The install wizard will be launched. Follow the instructions that appear on the screen.

You can choose to install the complete toolchain (i.e. the appropriate version of STVD7, the Windows Epromer and the Assembler-Linker) for each type of development tool (Development Kit, HDS2 or EMU3 emulators or simulator), or perform a customized installation.

If you choose a customized installation, you can choose to install only the Windows Epromer (WINEE).

The installation is now complete. You will be prompted to reboot your computer. You should do so before launching the Windows Epromer (described in *Chapter 3: How to Program* on page 9).

3 HOW TO PROGRAM

3.1 Programming Methods

Your ST7 EPB programming board is provided with at least one Zero Insertion Force (ZIF) socket which allows the programming of packaged MCUs. In addition to classic MCU programming using ZIF sockets, some of the newer EEPROM memories can be programmed using the In Situ Programming (ISP) mode. ISP mode allows the ST7 program memory contents to be updated using a standard ST7 programming tool **after** the device is mounted on the application board.

Here we describe how to connect your device for programming using these methods.

3.1.1 Installing a device for programming with the ZIF sockets

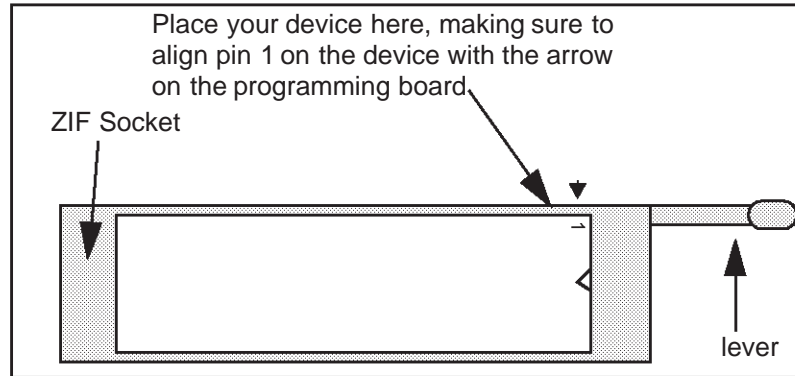
This section gives general guidelines on how to insert a device you wish to program into the ZIF sockets on the programming board.

The online help for the Windows Epromer includes programming board layouts for all of the ST7 EPBs.

- 1 Set up the EPB as described in *Section 2.2* on page 7.
- 2 Make sure that your EPB is powered off.
- 3 From your host PC select **Start>Programs>ST7 Tool Chain> Development Tools>Windows Epromer** to launch the Windows Epromer software program. From the main menu bar, select **Help>Hardware**.
- 4 A list of ST7MDTx and ST72xx programming boards will appear in the online Help window. Scroll down until you find your programming board model, and click on it.
- 5 Using the board layout that appears for your programming board, identify the ZIF socket for your device package on the programming board.

Caution: *Take care when placing the device into a socket so as not to damage the device or the board. Forcing the MCU into the socket may result in damage to the socket. Never insert or remove devices when the programming board is powered. Devices are powered only during read or write operations.*

- 6 Lift the relevant ZIF socket lever and place the device into the socket with pin 1 matching the mark on the board. Lock the device in place by lowering the lever again.



- 7 Power on the EPB.

3.1.2 Installing a device for programming using ISP mode

To see whether programming in ISP mode is possible for your target MCU, refer to the MCU's datasheet, or consult *ST7_EPB.pdf*, installed with the Windows Epromer, and available by selecting **Start>Programs>ST7 Toolchain>User Manuals**.

If ISP mode is supported, the datasheet will provide the connection information necessary to set up your application board for ISP programming.

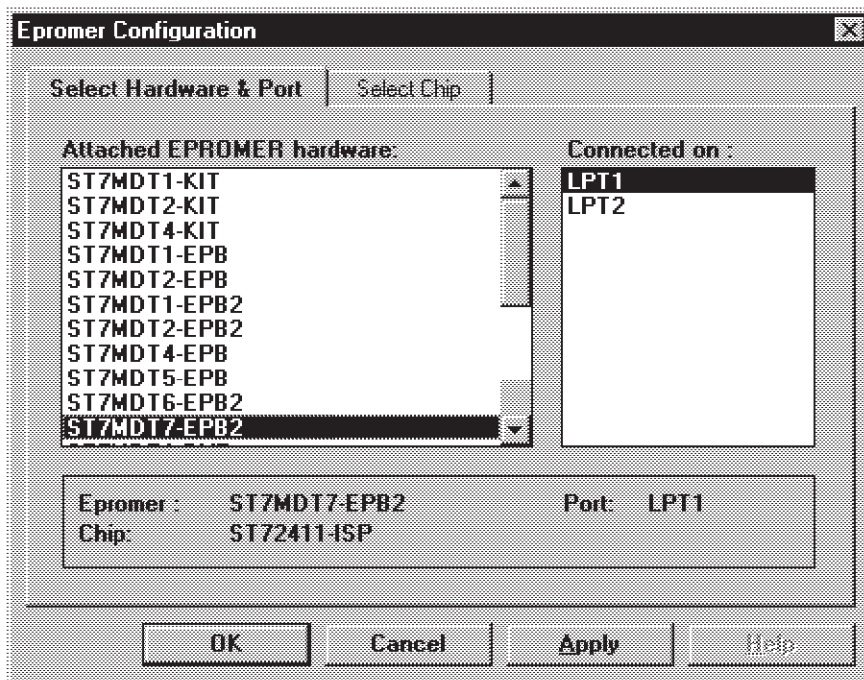
Once you have ensured that you have correctly set up your application board to support ISP mode, and that the ST7 EPB programming board is a type that supports ISP mode, follow these instructions:

- 1 Set up the EPB as described in *Section 2.2* on page 7.
- 2 Make sure that your EPB and application board are powered off.
- 3 From your host PC select **Start>Programs>ST7 Tool Chain> Development Tools>Windows Epromer** to launch the Windows Epromer software program.
- 4 Connect one end of the ISP ribbon cable to the 10-pin ISP connector on the EPB and the other end to the same type of connector on your application board.
- 5 Switch on your application board.
- 6 Power on the EPB.

3.2 A typical programming session

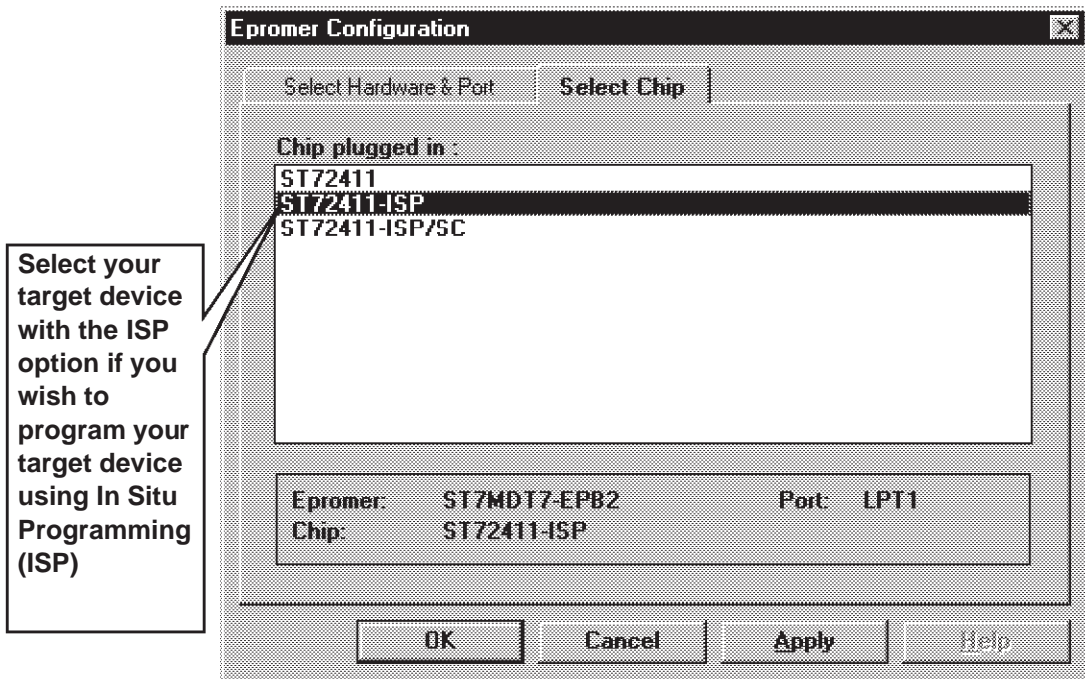
The following instructions describe how you would typically program an ST microcontroller using Windows Epromer. Note that this is not the only way to program an ST microcontroller using Windows Epromer; for more information on how to use the Windows Epromer, click the **Help** command in the main menu bar.

- 1 Make sure that the microcontroller you want to program is correctly connected for programming, either via the ZIF socket or in ISP mode.
- 2 In the Windows Epromer window, from the main menu, select **Configure>Configure EPROMER**. The epromer configuration dialog box is displayed:



- 3 In the **Select Hardware and Port** tab of the Epromer Configuration window, choose the programming device you are using from the list and the host PC parallel port to which it is connected (i.e. LPT1 or LPT2).
- 4 Click on the **Select Chip** tab of the Epromer Configuration window.

The list box shown below appears.



The following table list the suffixes which may appear following device names in the **Select Chip** tab of the Epromer Configuration window, with the memory type associated with each suffix and a comment describing the significance of the suffix:

| Suffix | Associated memory type | Comment |
|--------|------------------------|--|
| ISP | EEPROM | If you select a ST72xxx-ISP device then you can program using the In Situ Programming (ISP) mode. ISP mode allows the ST7 program memory contents to be updated using a standard ST7 programming tool <i>after</i> the device is mounted on the application board. |

| Suffix | Associated memory type | Comment |
|----------------|------------------------|---|
| S0 S1 S2 | FLASH | <p>With Windows Epromer you can perform READ, PROGRAM and BLANK functions on specific sectors of certain FLASH devices. In Windows Epromer, some device names are listed with a S0, S1 or S2 suffix; this suffix indicates which sector of the FLASH memory space is accessible if you select this device name. When the device name doesn't have a S0, S1 or S2 suffix, then access is to the whole memory space. For example:</p> <p>If you select a ST72Fxxx-S0 device, the READ, PROGRAM and BLANK functions are performed only on sector 0 of the FLASH memory space; the option bytes are not accessible. Likewise for S1 and S2.</p> <p>If you select a ST72Fxxx device, the READ and PROGRAM functions are performed either on all FLASH memory space or on the option bytes. The BLANK function erases and blank checks all FLASH memory space (sectors 0, 1 and 2), the option bytes are not erased.</p> |

- 5 From the list shown in the **Select Chip** tab of the Epromer Configuration window, select the device to be programmed:
- 6 Click **Apply** to save your changes without closing the dialog box, or **OK** to save your changes and close the dialog box.

Note: You can also select a microcontroller type from the drop-down list in the toolbar.

- 7 In the Epromer main window, click on a tab (EPROM, EEPROM or Options)
- 8 From the main menu, select **File>Open** and type the name of, or browse to, the file you want to load.
- 9 In the list of files, click the file holding the code you want to program.
- 10 Click **OK**. When the file is loaded, the information area displays file checksum and global device checksum (global device checksum represents checksum calculated without reserved area).
- 11 To program the other device memory areas, repeat steps 7 to 10 above, first clicking the tab associated with the memory area (EPROM, EEPROM or Options) you want to program.

Note: To open a file you've used recently, click its name at the bottom of the File menu.

12 FOR EPROM ONLY: From the main menu, select **Verify>Blank Check** to check that the ST microcontroller memory has not already been programmed. (You cannot perform a blank check on EEPROM memory).

The results of the check are displayed in the information area.

13 From the main menu, select **Program>All** to program and verify all tabs.

14 From the main menu, select **Verify>All** to check that the programming session was successfully completed (that the file contents match those programmed into the microcontroller memory).

APPENDIX: EMC CONFORMITY AND SAFETY REQUIREMENTS

This programming board respects the EMC requirements of the European guideline 89/336/EEC under the following conditions:

- Any tester, equipment, or tool used at any production step or for any manipulation of semi-conductor devices must have its shield connected to ground.
- All ferrites provided with the must be attached as described in the hardware installation instructions of the relevant user manual(s).
- Your programming board must be placed on a conductive table top, made of steel or clean aluminum or covered by an antistatic surface (superficial resistivity equal to or higher than $0.5 \text{ M}\Omega/\text{cm}^2$), grounded through a ground cable (conductive cable from protected equipment to ground isolated through a $1 \text{ M}\Omega$ resistor placed in series).

All manipulation of finished goods must be made at such a grounded worktable.

- The worktable must be free of all non-antistatic plastic objects.
- An antistatic floor covering grounded through a conductive ground cable (with serial resistor between 0.9 and $1.5 \text{ M}\Omega$).
- It is recommended that you wear an antistatic wrist or ankle strap, connected to the antistatic floor covering or to the grounded equipment.
- If no antistatic wrist or ankle strap is worn, before each manipulation of the powered-on programming board, you must touch the surface of the grounded worktable.
- It is recommended that antistatic gloves or finger coats be worn.
- It is recommended that nylon clothing be avoided while performing any manipulation of parts.

PRODUCT SUPPORT

If you experience any problems with this product or if you need spare parts or repair, contact the distributor or ST sales office where you purchased the product:

Getting prepared before you call

Collect the following information about the product before contacting ST or your distributor:

- 1 Name of the company where you purchased the programmer kit.
- 2 Date of purchase.
- 3 Order Code: Refer to the side of your programmer kit box. The order code will depend on the region for which it was ordered (i.e. the UK, Continental Europe or the USA).
- 4 Serial Number: The serial number is located on a label on the programming board.
- 5 Target Device: The sales type of the ST7 microcontroller you are using in your development.

Contact List

*Note: For **American and Canadian customers** seeking technical support the US/Canada is split in 3 territories. According to your area, contact the following sales office and ask to be transferred to an 8-bit microcontroller Field Applications Engineer (FAE).*

Canada and East Coast

STMicroelectronics
Lexington Corporate Center
10 Maguire Road, Building 1, 3rd floor
Lexington, MA 02421
Phone: 781-402-2650

Mid West

STMicroelectronics
1300 East Woodfield Road, Suite 410
Schaumburg, IL 60173
Phone: 847-517-1890

West coast

STMicroelectronics, Inc.
30101 Agoura Court
Suite 118
Agoura Hills, CA 91301
Phone: 818-865-6850

Europe

France (33-1) 47407575
Germany (49-89) 460060
U.K. (44-1628) 890800

Asia/Pacific Region

Japan (81-3) 3280-4120
Hong-Kong (852) 2861 5700
Sydney (61-2) 9580 3811
Taipei (886-2) 2378-8088

Software updates

You can get software updates from the ST Internet web site <http://mcu.st.com>. For information on firmware and hardware revisions, call your distributor or ST using the contact list given above.

Index

D

delivery checklist 7

E

EMC compliancy
requirements for 15
EPB
setting up 7

F

finished goods
manipulation of 15
safety requirements 15

H

hardware
features 6
setting up 7
supplied 7

I

ISP
programming in ISP mode 10

O

overview 5

P

parallel connection
restrictions/requirements 7
power supply
restrictions/requirements 7

S

safety requirements 15
setting up the EPB 7
software
features 6
installing 8
updates 18
support
contact numbers for 17
for development kit 17
information required 17

W

working environment recommendations 15

Z

ZIF sockets 9

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