

# **ETSMARTUSB UNIVERSAL PROGRAMMER**

## **User's Guide**

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## 1. Introduction

This manual will guide you through the installation of the ETSMARTUSB universal programmer, referenced hereafter as the ETSMARTUSB. The ETSMARTUSB has been designed for serial memories such as IIC, Microwire, SPI, M-Bus interfaces and for most of popular various 8/16 bits most popular microcontollers (see Appendix).

## 2. Check list and Requirements

### *Hardware requirements:*

<b>Host</b>	- A 32-bit x86 based with a USB a hard disk system
<b>Memory</b>	- Minimum 16 Mbytes
<b>Display</b>	- Color VGA display recommended
<b>Power supply</b>	- USB port supplied
<b>Tool</b>	- ETSMARTUSB programmer board*
<b>Cable</b>	- An USB cable*

### *Software checklist:*

<b>OS</b>	- MS-Windows (Win95, Win98, Win2000, WinXP)
<b>Software tool -</b>	- ETL ETSMARTUSB control software*

### *\* Package check list:*

- Programmer board
- USB cable
- CD-R (included control software)
- This manual
- AT24C02 memory

## 3. Installing

To understand ETSMARTUSB components meaning see Figure 1. To install and use the ETSMARTUSB follow these steps:

- Connect ETSMARTUSB to computer. Use USB cable ETL shipped.
- LED1 (Green colour) will be lit now, telling that power is present and ETSMARTUSB Programmer ready to operate.
- Install ETSMARTUSB control software. Insert the supplied ETL CD-ROM in the computer and navigate to “Install Software” > “ETSMARTUSB programmer”, then execute the “ETSmart USB Setup.exe” file; this will guide you through the setup process.
- Before connecting ETSMARTUSB in ICP mode or make sure that ETSMARTUSB Programmer and the target board are not powered.

**NOTE:** *Only one mode (on-board or ICP) should be used during operate at a time. Don't use at the same time programmer when any IC inserted in the target socket. When you using ICP mode make sure, that target socket is empty. When you using target socket make sure that ICP interface not connected.*

- Insert explored IC into target socket or connect ICP interface cable.

- Software can be started now.

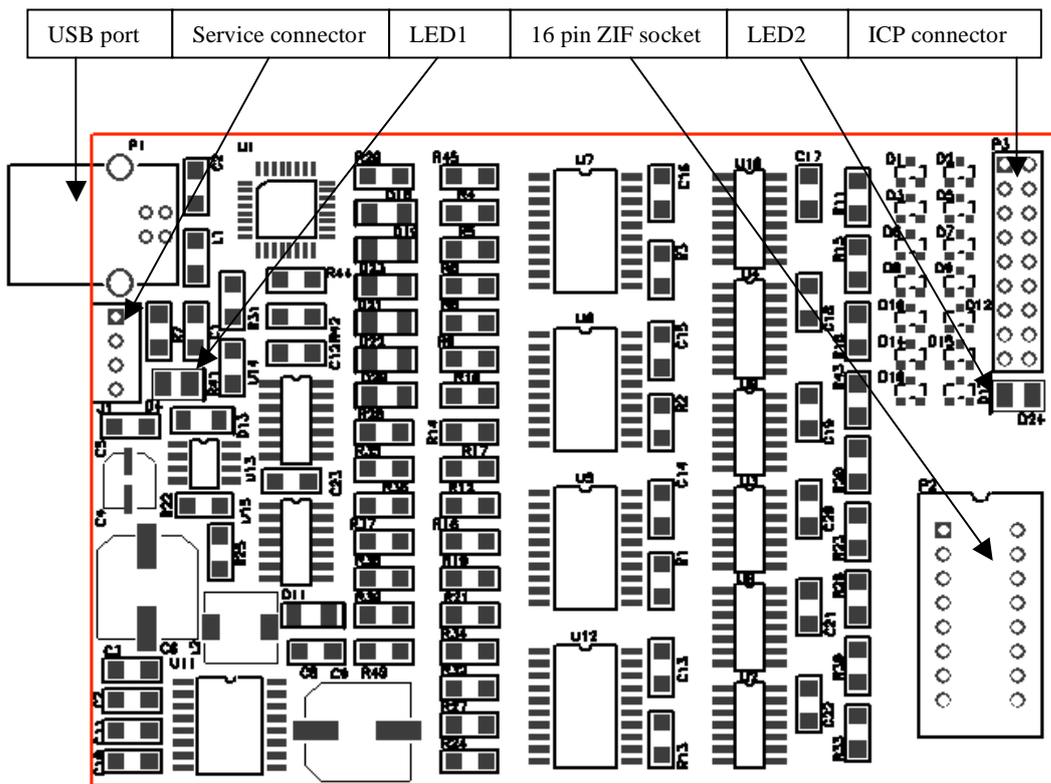


Figure 1. ETSMARTUSB programmer components

ESMARTUSB components meaning:

- USB port: Universal serial bus connector (cable series “B” plug)
- Service connector: No in use
- LED 1: Power LED indicator indicate power supply voltage; green light colour
- 16 pin ZIF socket: suitable for all types of 8-pin devices
- LED2: target device VCC voltage indicator; red light colour
- ICP connector: In Circuit Programming connector designed for ICP programming memories and microcontrollers without removing from a target board

## 4. Quick Start

Make sure, that ETSMARTUSB programmer attached to your computer properly and LED1 will be lit now. Insert into 16 pin ZIF socket AT24C02 device (ETL shipped).

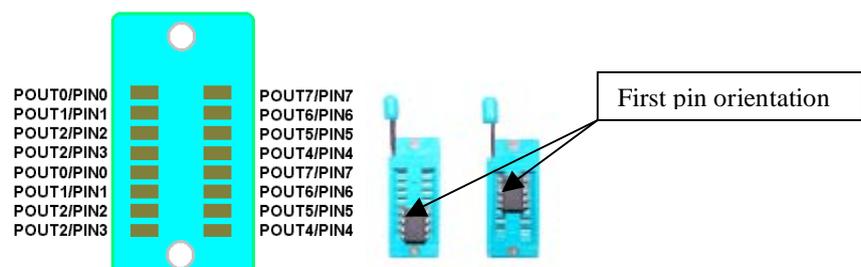


Figure 2. 16 pin ZIF socket pin out

Check correct insertion of the target device (See Figure 2) before start any operation.

Execute ETSmart.exe file. After start you should see screen similar to shown below:

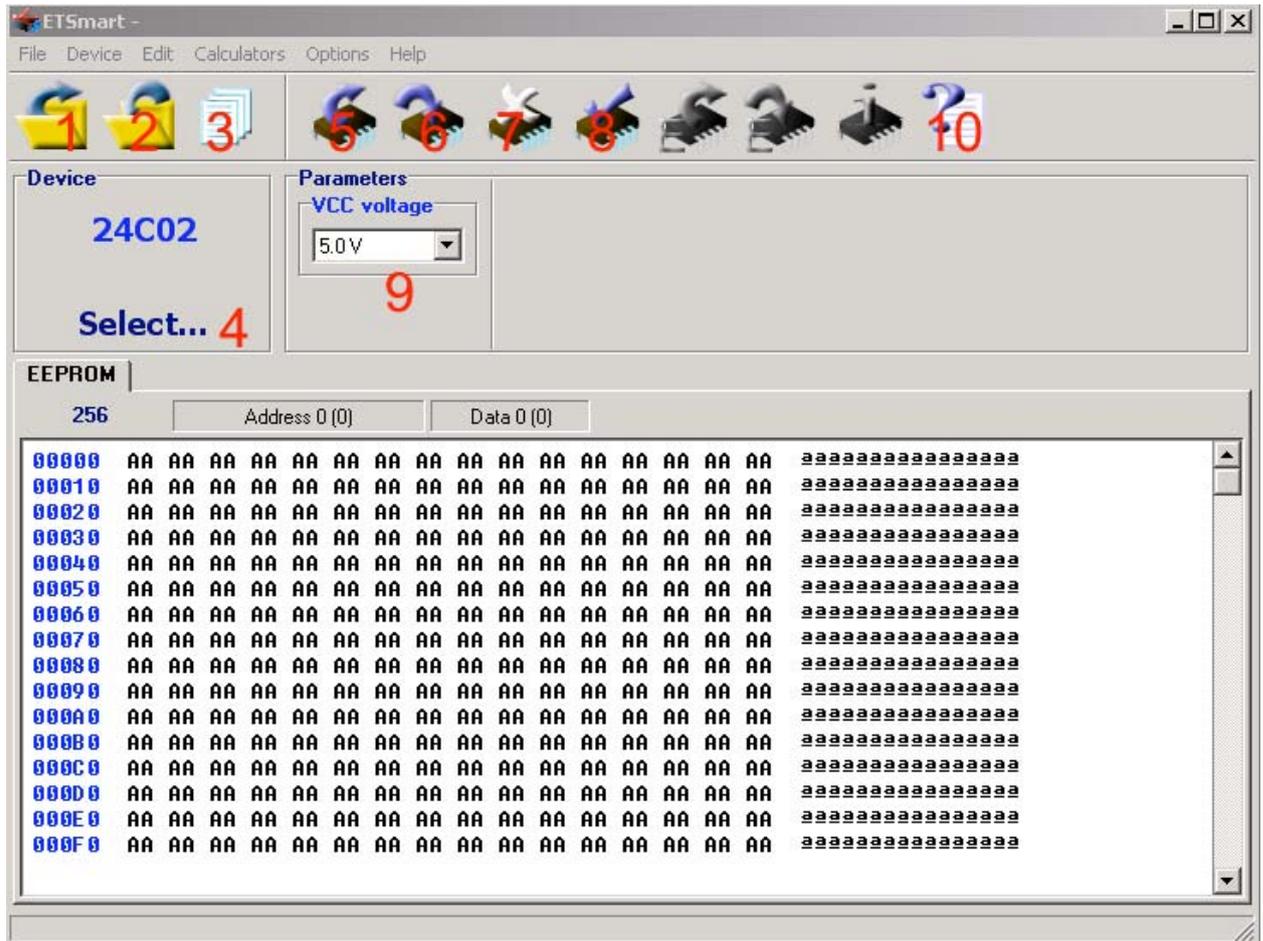


Figure 3. User interface ETSMARTUSB programmer

Buttons meaning:

- 1 – “Open File”: Open a file from selected directory to ETSMARTUSB buffer editor
- 2 – “Save file”: Save file from ETSMARTUSB buffer editor to selected file
- 3 – “File library”: Immediately access to files from library
- 4 – “Select device”: Select target device from modules list
- 5 – “Read device”: Read target device command
- 6 – “Write device”: Write target device command
- 7 – “Erase device”: Erase target device button
- 8 – “Verify device”: Read target device data and compare with buffer editor
- 9 – “Select voltage”: Set target device VCC voltage
- 10 – “Module information”: Display current module information

Follow to quick start steps:

- Step 1: Select target device from modules list (4)
- Step 2: Select programming VCC voltage (9)
- Step 3: Click Read device button (5)
- Step 4: Click Save file button (2)

As result: memory data read to buffer editor and saved to selected file.

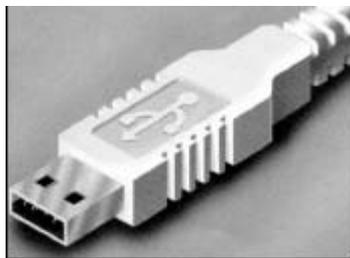
## 5. Hardware specifications; features; hardware test

Table 1 summarizes the ETSMARTUSB hardware specifications:

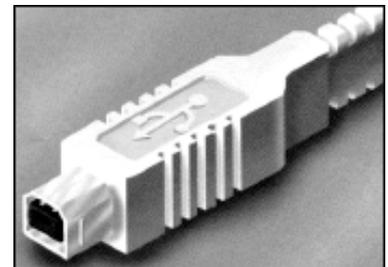
Temperature operating	10 C - 40 C
Relative humidity	0 to 95%; non condensing
Power requirement	+5V DC from USB port**

Table 1.

\*\* The maximum voltage drop (for detachable cables) between the A-series plug and B-series plug 125 mV.



“A” plug to PC



“B” plug to ETSMARTUSB

Figure 4. USB plugs

***ESD CAUTION: Ordinary amounts of static electricity from clothing or the work environment can damage or degrade electronic devices and equipment. For example, the electronic components installed on printed circuit boards are extremely sensitive to electrostatic discharge (ESD). Wear a grounding wrist strap whenever handling any printed circuit board. This strap provides a conductive path for safely discharging static electricity to ground.***

16 pin ZIF socket suitable for 8-DIP memory devices and microcontrollers only (See Figure 1; Figure 2). ICP connector (expansion bus) designed for support devices more than 8 pins with special programming adapters and In-Circuit Programming mode. Bus meaning see Figure 7. The ETSMARTUSB programmer includes two LEDs (see Figure 2):

LED 1: Power supply indicator (see Figure 1). Appear to Green color when power supply voltage applied to ETSMARTUSB.

LED 2: Target device VCC indicator, this solution give a difference amount of light from LED 2 for all target voltages from 2.8 to 5.0 V (see Figure 1; Figure 3 item 9). Appear to Red color when target power supply applied to target device or ICP connector.

It is necessary to remove any device from 16 pin ZIF socket while ETSMART running in ICP mode. To make sure, that 16 pin ZIF socket bus operate properly start hardware test pin drivers, then execute test for each single pin of the target socket (See Figure 6). See step-by-step detailed example see Figure5 and Figure 6.

Start hardware test to check the pins contacts. Remove all devices from socket. Click main menu button “Options” then “Hardware Test”. Set all OUTS to logic “1” to start test. Short pins №3 and №4 on 16 ZIP socket (see Figure 2). Turn On Power supply then set voltage.

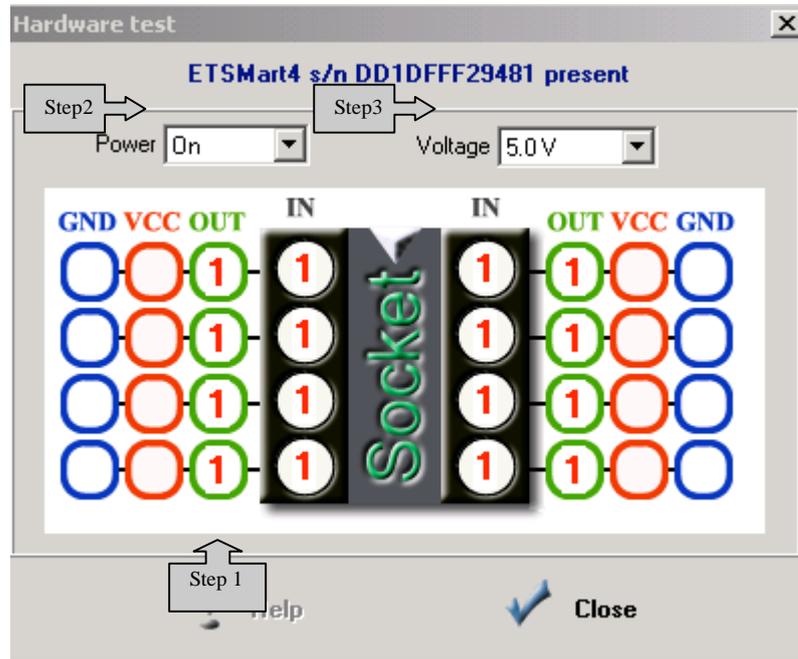


Figure 5. Hardware test example

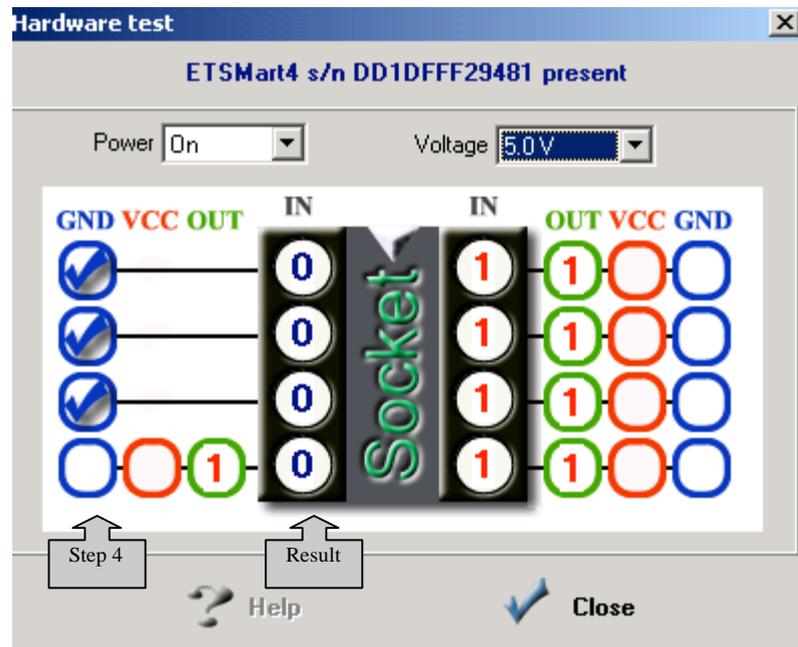


Figure 6. Hardware test example

Set (flags) 1-2-3 pins to GND. As result pin №4 IN set to logic “0” when out still set to logic “1”, this mean pin 4 shorted to GND. Now open pin №3 and №4 and repeat test to see changes. Hardware test indicate all shorts, overloads and broken pins. All test operations realized in real time mode, so users have possibility to control pins no delays directly from the program.

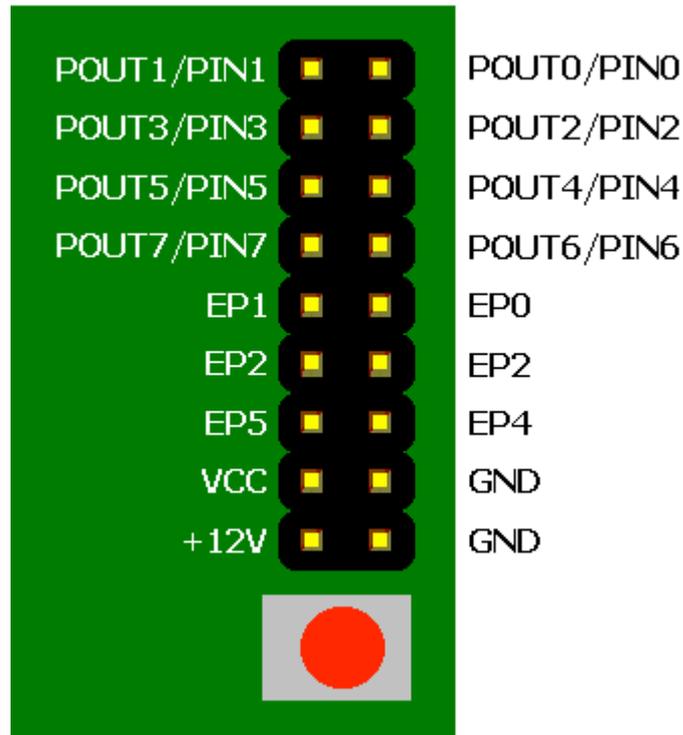


Figure 7. ICP connector bus meaning

POUT1- OUT7 8 pins memory devices bus; EP0...EP5 – extended memory and microcontollers bus for devices more than 8 pins.

## 6. Quick guide

After reading Quick start charter, you may to know the specific process of programming. This chapter helps users understand the whole process of IC program. The content consist of software interface description and steps of device programming. Buttons meaning for items 1-10 see Figure 3, rest is as following:

- 11 – “Read EEPROM” button: Read EEPROM (microcontrollers only)
- 12 – “Write EEPROM” button: Write EEPROM (microcontrollers only)
- 13 – “Chip Info button”: device information (signature bytes, fuses and etc.)
- 14 – “Menu bar”: Menu bar commands
- 15 – “Buffer editor”: The HEX/ASCII data buffer is 8-bit wide
- 16 – “Run time window”: Displays status information of a current operation and errors

Menu Bar includes following items: File; Device; Edit; Calculators; Option; Help.

File:

Open > Save > Save part of buffer > Add file to dump library > Dump library > Exit

Device:

Read > Write > Erase > Verify > About Module

Edit:

Color and Font > Swap bytes > Hide Mismatch > Erase buffer > Fill > Insert > Compare with file

Calculators:

Option:  
Parameters > Hardware test > Modules

Help:  
About > Contents

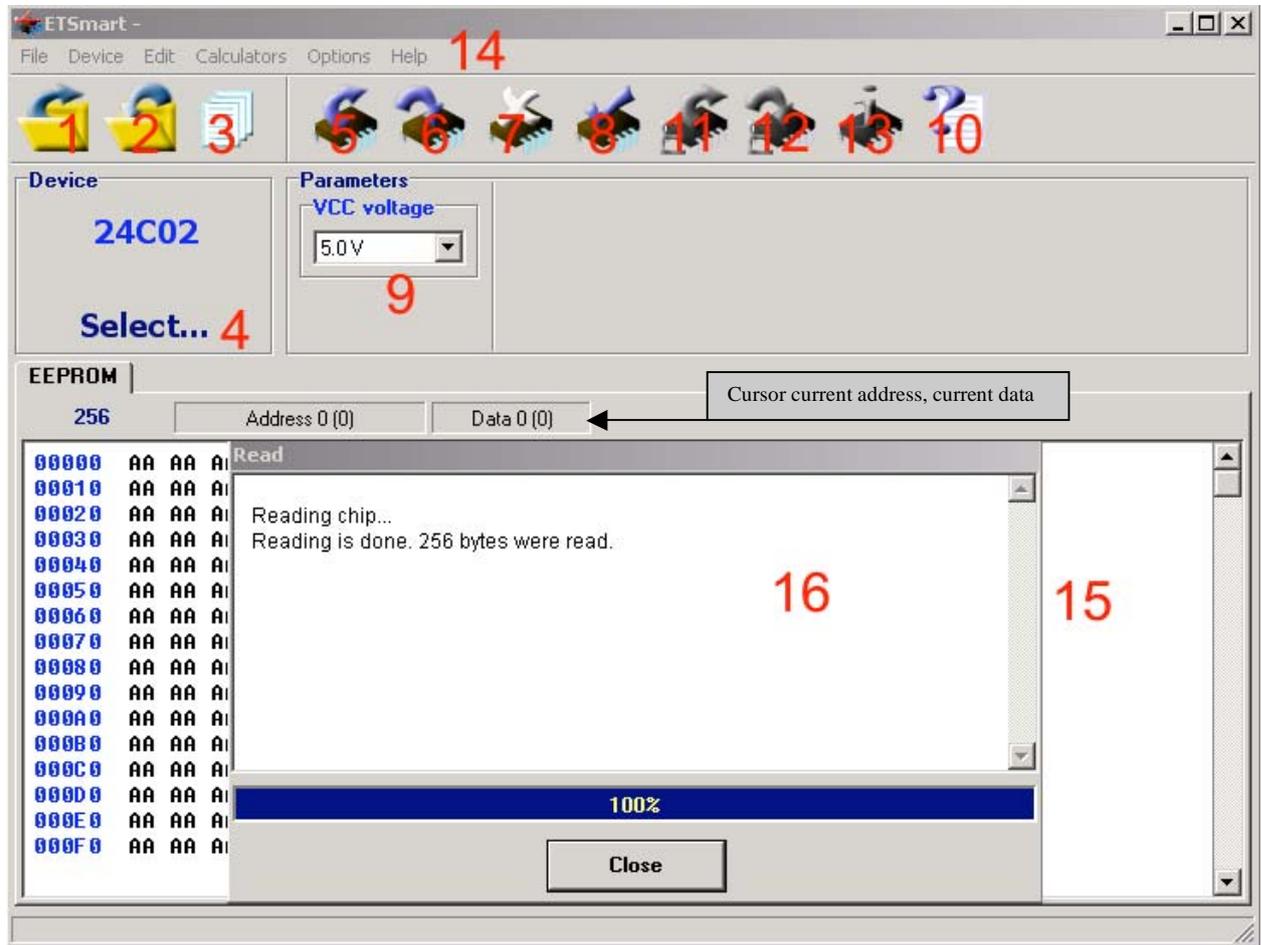


Figure 8. Users interface; Run time window

Select device first before start any (item 4, see Figure 8), so that the ETSMARTUSB could select the proper algorithm to the name and manufacturer of the devices (see Figure 9). Device and package information you should see in the right part of select device window. Some special devices, like microcontrollers have special requests in operation except the basic steps, which included special programming fuses for security protection, clock source selection and etc., these special information contain in the device's data sheets (device's manual) see Figure 10. Click "Open file" button or corresponding menu item. After device selection, the software will not identify the data type automatically, just select type of file manually according with corresponding extension. The editor supported three types of file formats as Binary (\*.bin), Intel HEX (\*.hex), Motorola S-Records (\*.s19). If the extension of the file unknown, choose All files e.g. \*.\*. As default start address starts from \$00 pointer. Uncorrected file offset address (like large offset address) may case data overflow in the buffer and system failure may occur. Click edit brings lower menu items. You may edit the buffer data like insert bytes, swap bytes, fill buffer, erase buffer, compare to other file. Loading mode normal, that's mean all files can be loaded. After edit buffer click "Save file" button, it will save the current edited data in the buffer to disk.

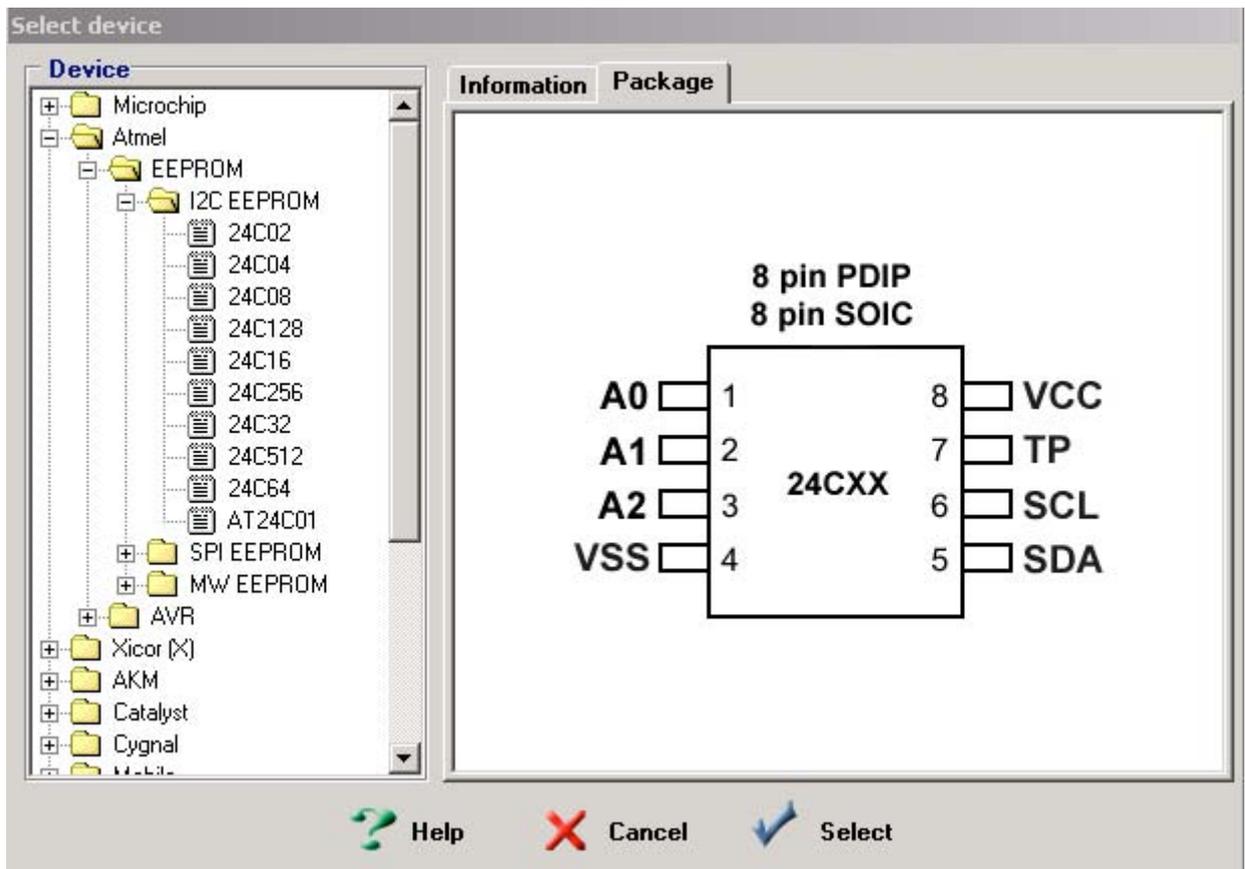


Figure 9. Select device window

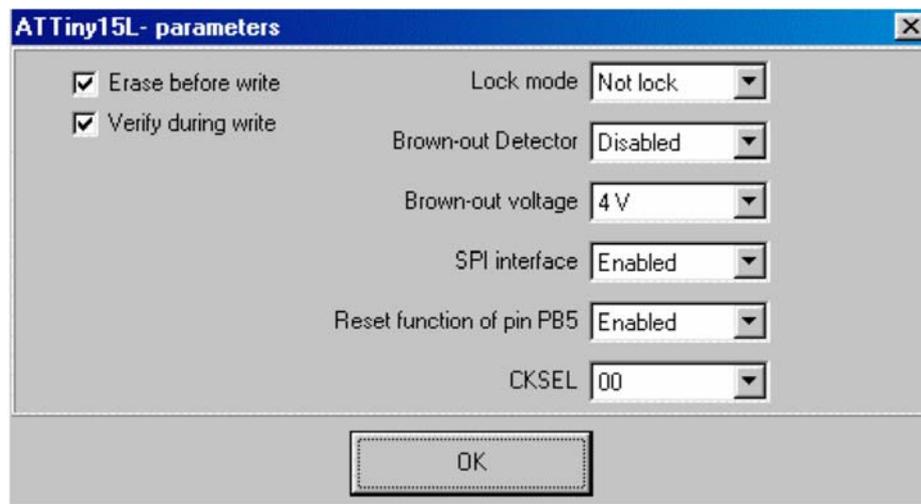


Figure 10. Special parameters window

Program function (“Write device” button) writes the data from the buffer into the chip. The verify function (“Verify device” button) not verifying device during programming. Even if an errors occurs, the process will not be ceased. All errors, mismatches you should see into run time window (see Figure 8). The processes of operation indicated via status bar. Click “Close” button when operation is finished. “Dump Library” menu command allow to load files from library, device selection for this case not necessary, because type of target device recalled from library. “Calculators” menu command included useful algorithms for car radios.

## 7. Adapters

The ETSMARTUSB is equipped with standard 8-pin DIP socket. For some device types users need to use appropriate adapters. Socket adapters are available for PLCC, QFP, SOIC etc., contact ETL to receive additional information.

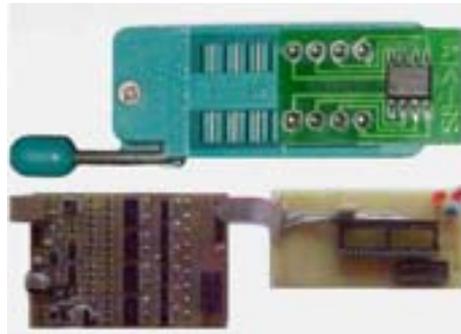


Figure 11. Programming adapters sample

Adapters such as 8-SOIC to 8-PDIP and AT90S8515/AT90S2313 shown on Figure 11. To pay attention to is be careful when determining the device names during selection before using a special programming adapters.

## 8. ICP programming

Before using ICP mode always make sure, that target board power consumption less then 500 mA. Remove any devices from ZIF socket before start any ICP connection and operations.

IIC bus ICP programming:

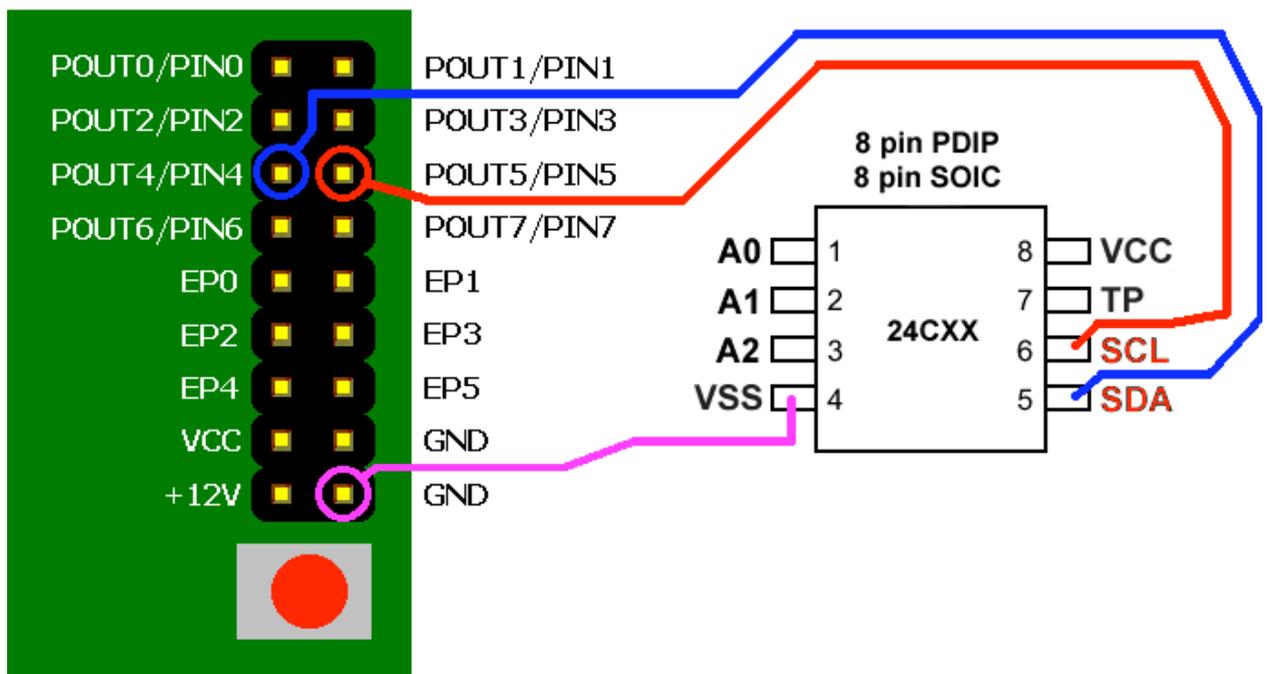


Figure 12. IIC ICP connection

To access memories via a 2 wire serial interface use schematic capture above (see Figure 12).

In case of programming memory devices located at difference address than A0/A1; connect pins A0, A1, A2 to GND before access the target device.

AVR serial IIC programming:

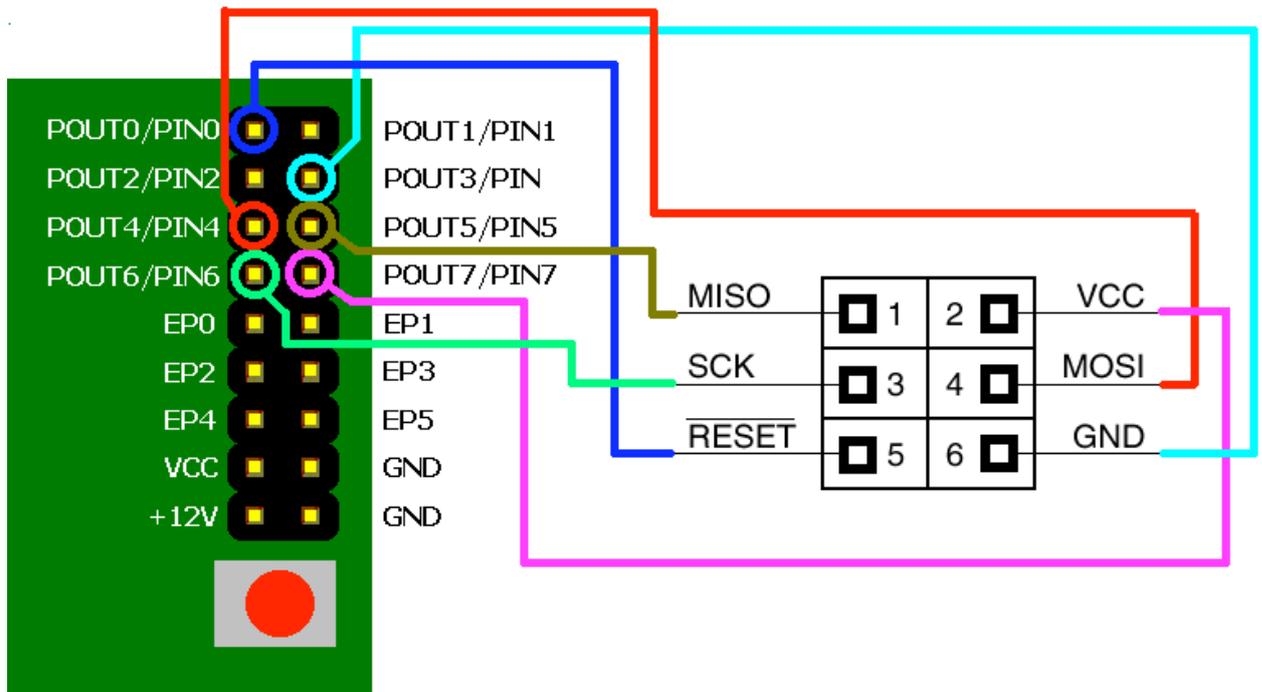


Figure 13. AVR microcontrollers STK200; STK500 connection

AVR microcontrollers memory arrays can be programmed using the Serial SPI bus. The serial interface consist of pins SCK, MOSI, MISO. Reset, VCC, GND pins also must be connected to target board. ETSMARTUSB supported serial programming algorithm AVR microcontrollers only.



Figure 14. A microcontrollers EEPROM memory access buttons

For the EEPROM, an auto-erase cycle is provided, access can be available via two buttons (See Figure 14)

- 1 – “Read EEPROM” button: Read EEPROM
- 2 – “Write (Program) EEPROM” button: Write EEPROM

Power supply source to target microcontroller could be connected from ETSMARTUSB programmer to target device directly, but for cases when target board power consumption more than 500 mA ETL strongly recommend use labor external power supply source with over current protection.

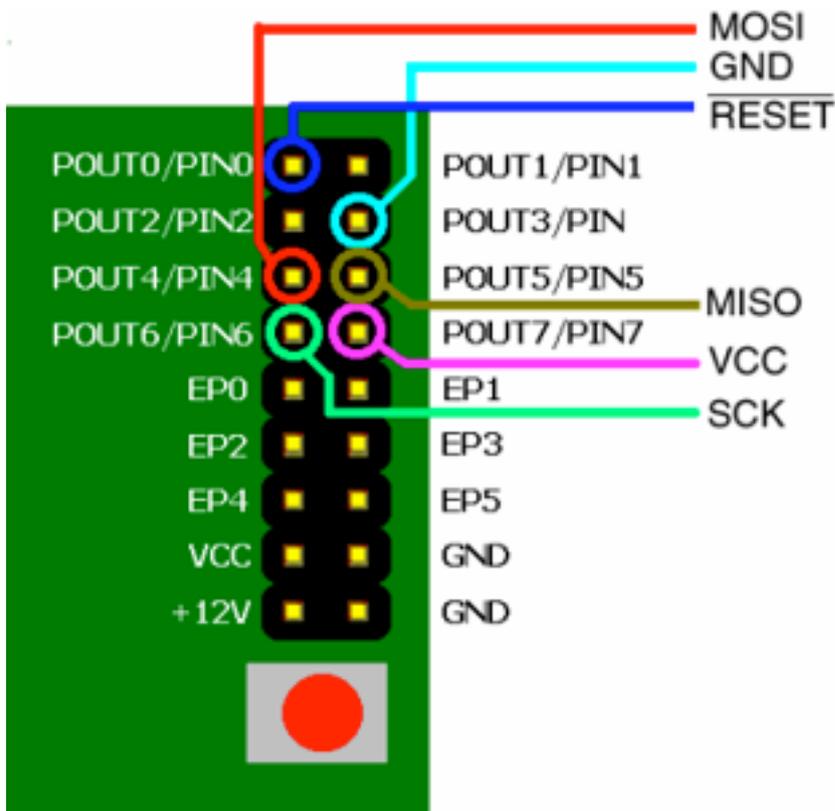


Figure 15. AVR microcontrollers ICP connection

## 9. Trouble Shooting

During the operation, user is able to monitor the progress of the operation through run time and message windows. Wrong programming adapters, backwards insertion may destroy a chip, short cuts can destroy your programmer. Keep all conductive materials away of your ETSMARTUSB. IC socket contacts check could be pass via software control (see Chapter 5). USB bus timeout and Power delay could be adjusted to most suitable value from menu Option: Option > Parameters

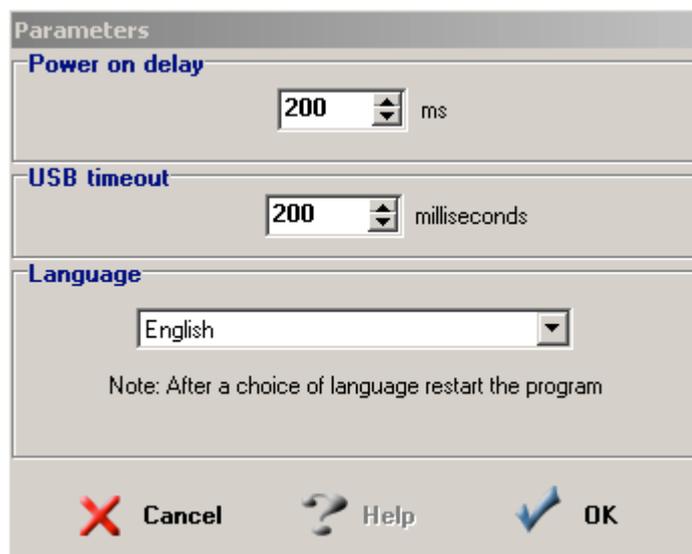


Figure 16. Parameters window

If programming failed please check following steps: whether improperly select the device type of device or not, including package, adapter, etc. Whether the chip is protected or write protected? For this case erase the chip or de-protect before start operation. If your cases not included above, please contact us to check if it is a hardware error.

## 10. Warranty statement and disclaimer

ETL warrants that product delivered shall conform to applicable. Report any defects for a 45 days period, from the applicable data on invoice. All ETL's products are intended for lawful service, repair or replacement of various electronic equipment with the laws of the country in which the product is being sold or used.

## APPENDIX

USBFLASHER utility designed for firmware update. ETSMARTUSB software must be installed before using USBFLASHER utility.



Figure 17. USBFLASHER utility interface