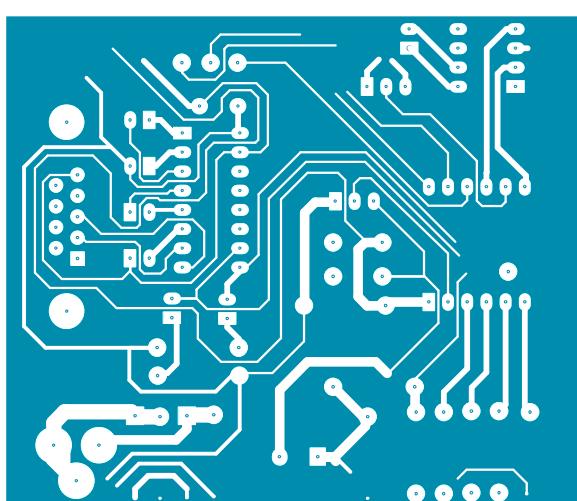
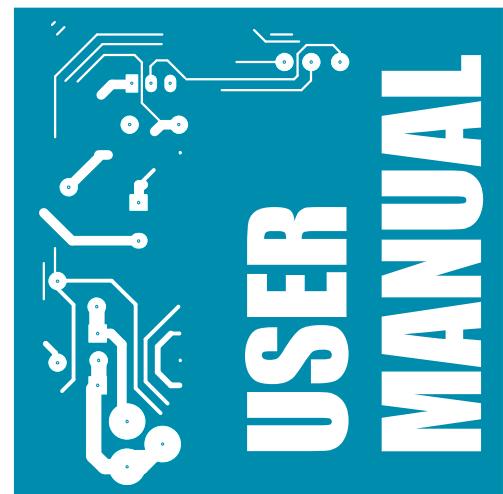
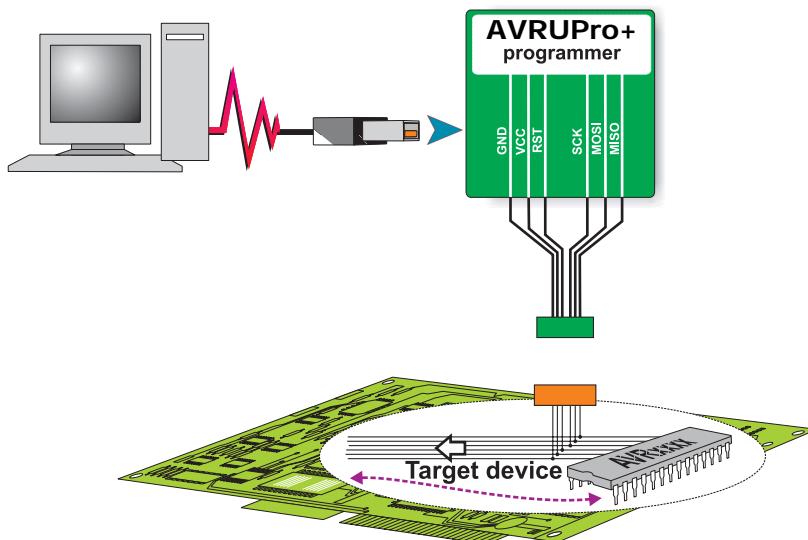


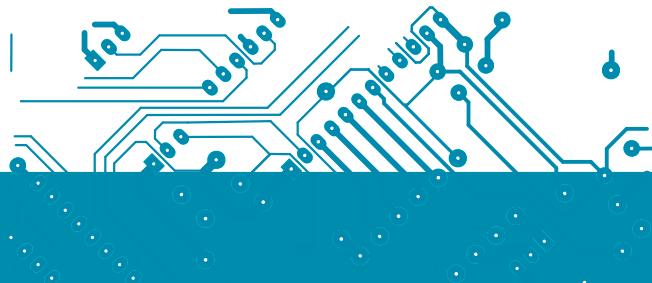
# AVRUPro+®



AVRUPro+ is a high performance programmer for Atmel's Microcontroller family. It connects to target device through 2x5 FRC cable & act as ICSP (In-Circuit Serial Programmer). This manual contains a detail description of this device. It also guides you, that how to program device through it

# Flash Programming Tool

# Development System



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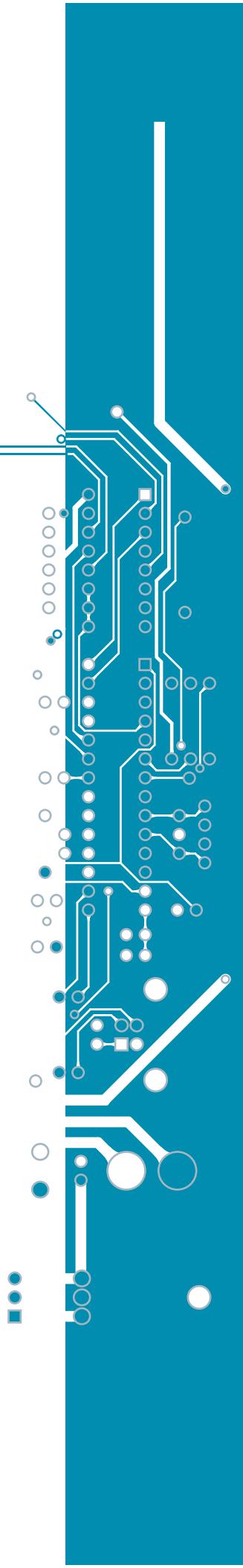
***EleSof Technologies®***

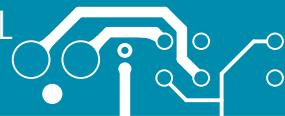
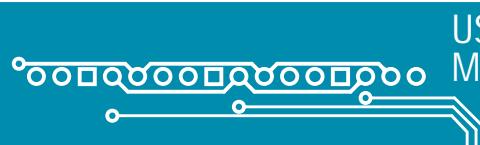
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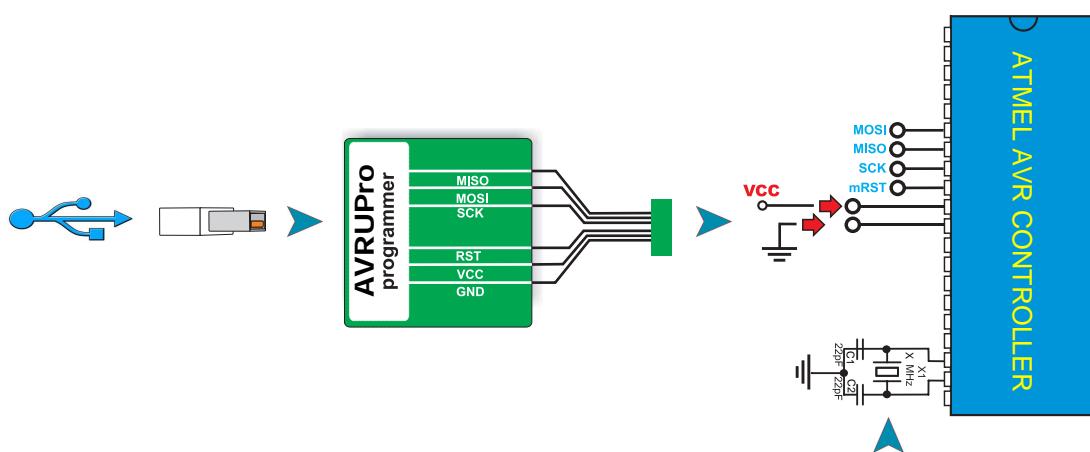


## Introduction to In-System Programming

In-System Programming allows programming and reprogramming of any Microcontroller positioned inside the end system, using a simple three-wire SPI interface. The In-System Programmer communicates serially with Microcontroller, reprogramming all non volatile memories on the chip. In-System Programming eliminates the physical removal of chips from the system. This will save time, and money, both during development in the lab, and when updating the software or parameters in the field. The entire In-System Programmer can be built into the system allowing it to reprogram itself.

## Programming Interface

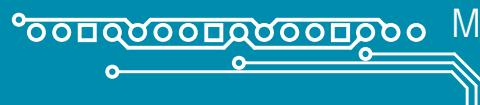
For In-System Programming, the programmer is connected to the target using as few wires as possible. To program any AVR & AT89S microcontroller in any target system, a simple Six-wire interface is used to connect the programmer to the target PCB. Figure below shows the connections needed.



**Note:** There should be separate clock source (External Crystal Oscillator) for taget device, and external crystal oscillator range is depend upon, what range target device support.

The Serial Peripheral Interface (SPI) consists of three wires: Serial Clock (SCK), Master In-Slave Out (MISO) and Master Out-Slave In (MOSI). When programming the AVR & AT89S, the In System Programmer always operates as the Master, and the target system always operate as the Slave.

The In-System Programmer (Master) provides the clock for the communication on the SCK Line. Each pulse on the SCK Line transfers one bit from the Programmer (Master) to the Target (Slave) on the Master Out - Slave in (MOSI) line. Simultaneously, each pulse on the SCK Line transfers one bit from the target (Slave) to the Programmer (Master) on the Master In – Slave Out (MISO) line. To assure proper communication on the three SPI lines, it is necessary to connect ground on the programmer to ground on the target (GND).



## AVRUPro+

Along with complementary software, **AVRUPro+** programmer represents as an irreplaceable tool for those who are working with AVR & AT89S microcontroller. By means of this programmer, it is possible to program almost any AVR & AT89S microcontroller. The **AVRUPro+** programmer is connected to the microcontroller via six lines and through PC by USB port, two of them are GND and +5V, while others are used for signal transmission (SPI protocol) and reset:

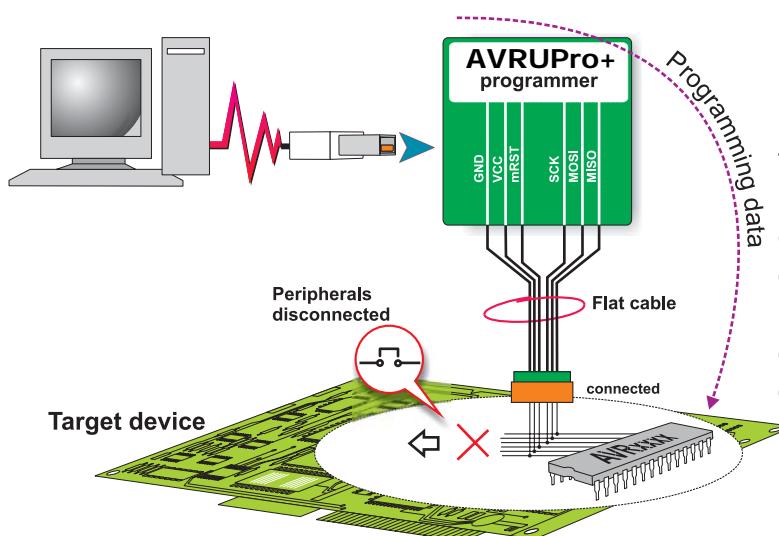
**MISO (Master In – Slave Out)**

**MOSI (Master Out – Slave In)**

**SCK (Serial Clock)**

**RST (Reset)**

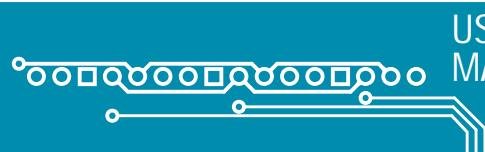
These lines are contained with 2x5 pins FRC connector. When creating target device, the appropriate 2x5 pins FRC connector should be place on it and connector pins should be connected to microcontroller pins. Their position varies depending on the microcontroller's type's package. Exact connection schematics are provided at [AVRUPro+ Programmer Interface](#) section.



**Note:** If your target device uses Microcontroller programming pins for the operation of some other peripherals, then it should be enabled to these peripherals to be disconnected during programming. During normal operation of target device, the programmer should be disconnected.

**AVRUPro+ has been designed with capabilities and features of:**

- **AVRUPro+** works under multiple platforms. Linux, Mac OS X and Windows are tested.
- Its speed for the programming is up to 5kBytes/sec.
- Its SCK option is supported to the targets with low clock speed (<1.5Mhz).



## Supported Devices

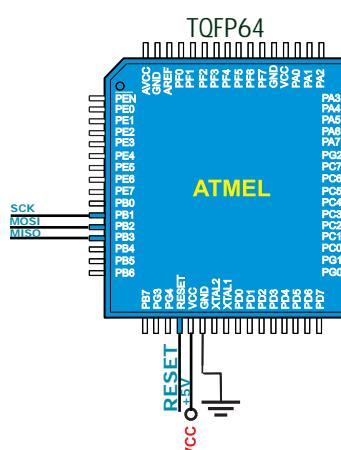
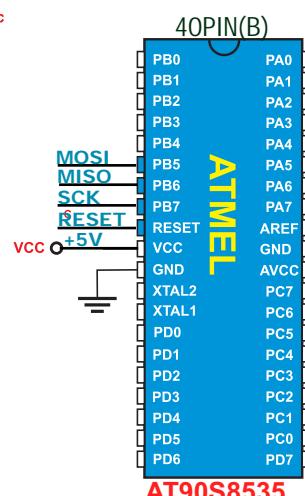
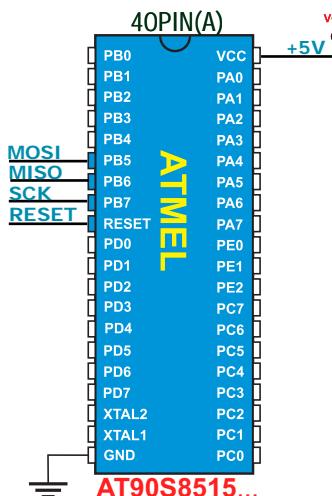
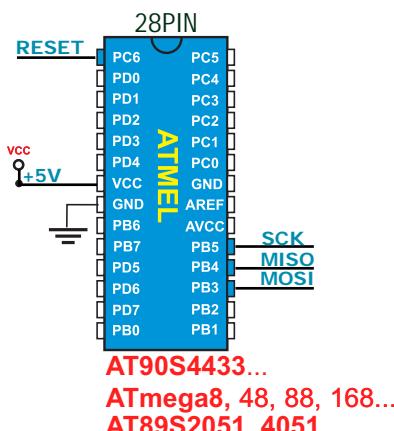
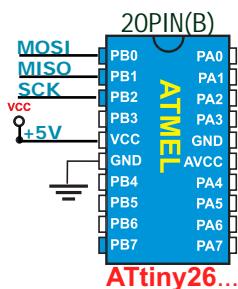
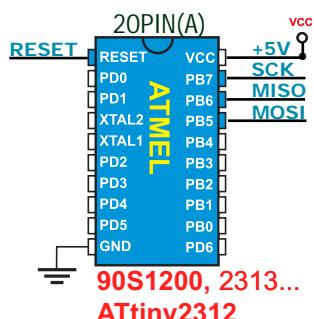
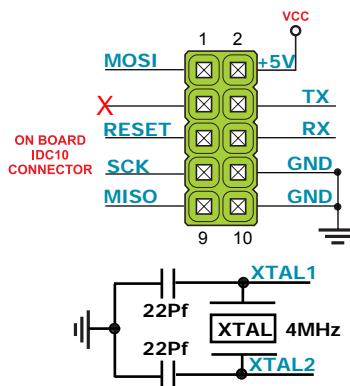
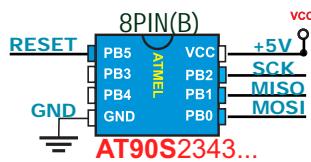
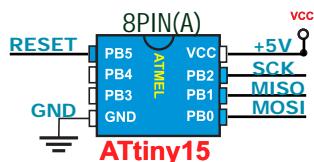
Microcontrollers supported by **AVRUPro+** are listed below.

Mega AVR	90S AVR	Tiny AVR	AT89S
ATmega103	AT90S1200	ATTiny12	AT89S51
ATmega128	AT90S2313	ATTiny13	AT89S52
ATmega1280	AT90S2333	ATTiny15	AT89S53
ATmega1281	AT90S2343	ATTiny25	AT89S8252
ATmega16	AT90S4414	ATTiny26	AT89S8253
ATmega161	AT90S4433	ATTiny45	AT89S2051
ATmega162	AT90S4434	ATTiny85	AT89S4051
ATmega163	AT90S8515	ATTiny2313	
ATmega164	AT90S8535		
ATmega168	AT90CAN128		
ATmega169	AT90PWM2		
ATmega2560	AT90PWM3		
ATmega2561			
ATmega32			
ATmega324			
ATmega329			
ATmega3290			
ATmega48			
ATmega64			
ATmega640			
ATmega644			
ATmega649			
ATmega6490			
ATmega8			
ATmega8515			
ATmega8535			
ATmega88			
ATmega328			

## AVRUPRO+ Programmer Interface

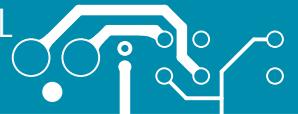
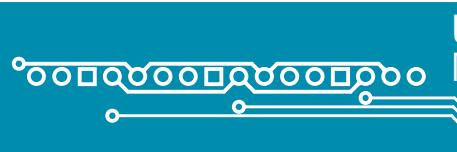
Below there are schematic for interfacing ATMEAL AVR & AT89S Microcontroller with **AVRUPRO+** Programmer.

**Note:** External crystal oscillator is compulsory to connect with target device.



### Cautions:

There is a +5V which supply directly from USB port of computer to programmer; it is advised not to use this power source to power application circuit or device. Wrong connection such as wrong polarity, wrong voltage, shorted might permanently damage computer.



## Flash Software

There are many tools which support **AVRUPro+** programmer for flashing ATMEL microcontrollers.

- **AVRDUDE.**
- **BASCOM-AVR.**
- **Khazama AVR Programmer.**
- **eXtreme Burner -AVR.**
- **Progisp**

In this manual, Progisp tool is explain to program ATMEL controller by the help of **AVRUPro+**, but before Progisp programming software it is necessary to install USB driver for **AVRUPro+**. Here we are going to explain procedure for installing USB driver first.

## USB Driver Installation

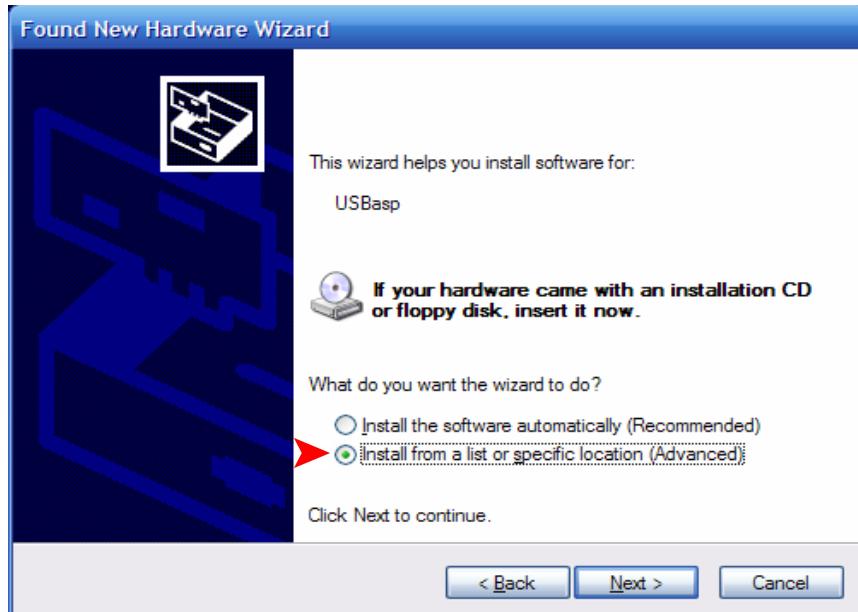
### Step I

Plug the **AVRUPro+** programmer into an available USB port of your PC. Wait until Windows® shows found new hardware wizard as follows. Select No, not this time and click next.



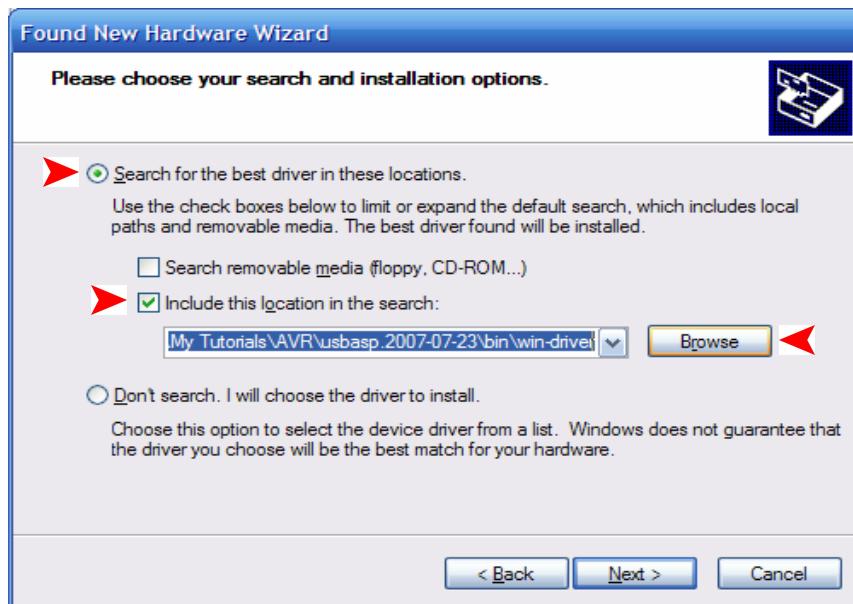


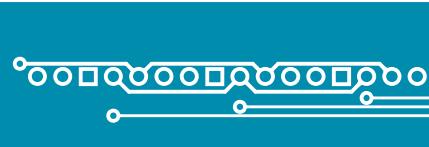
## Step II



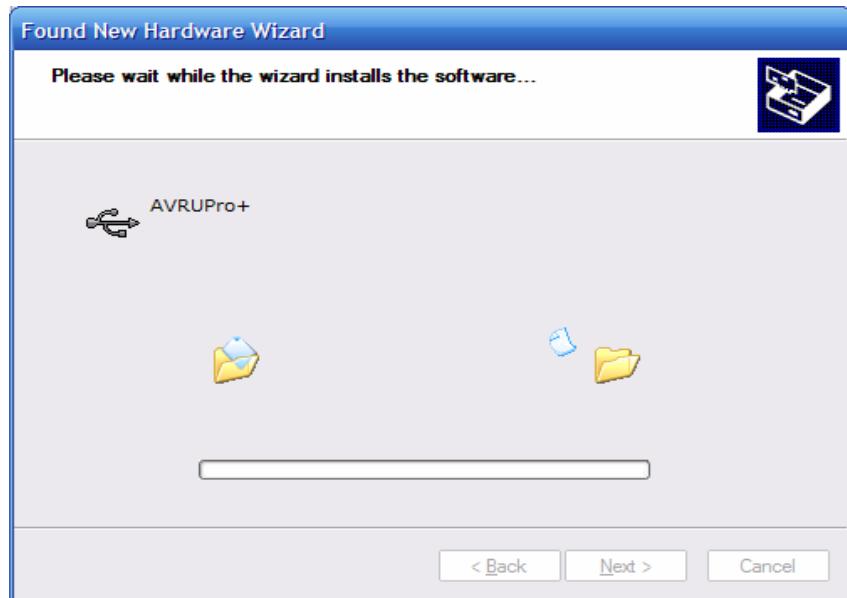
## Step III

- Select “search the best driver in the following location”
- Select “Include this location in the search” and click browse.
- Select the “win-driver” in the Driver CD and click next. (“win-driver” is located in the Folder “AVRUpo+ ” in CD/DVD)

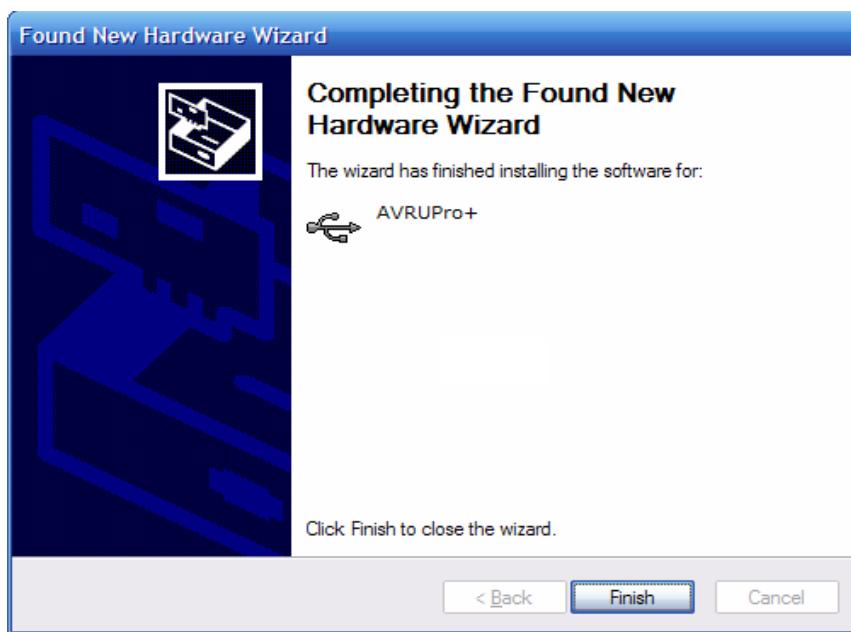


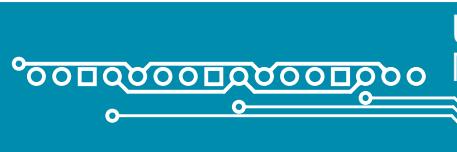


## Step IV

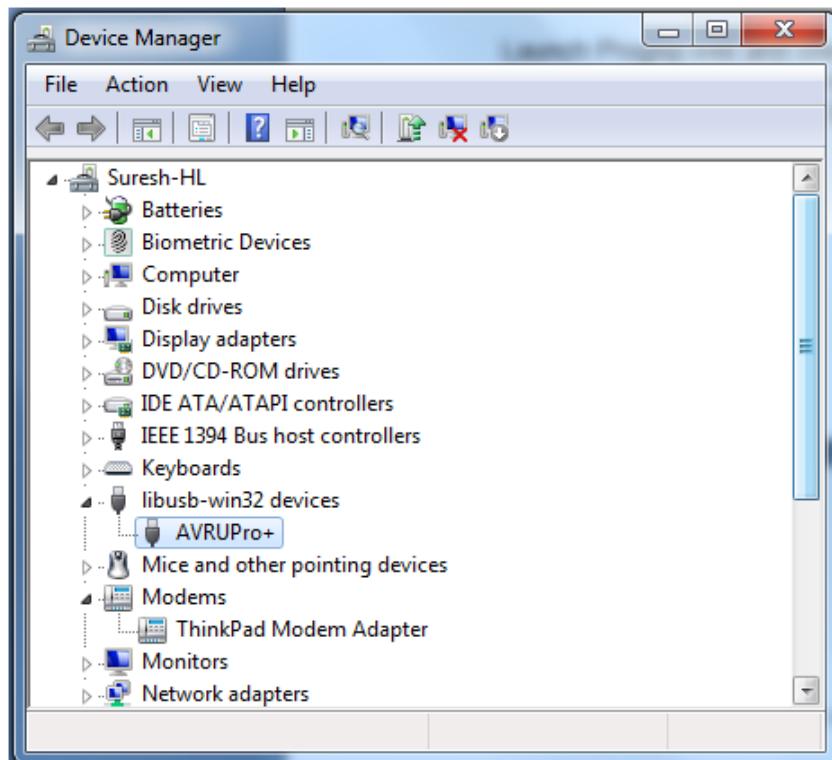


## Step V





## Step VI



Now hardware is installed and ready to use. After this you just need to run programmer software. Go to "[AVRUPro+](#)" folder in "Flash Tool" and run Progisp.exe.



## Programming Tutorial

In this tutorial, you will how to use the **AVRUPRO+** Programmer for programming your microcontroller by using Progisp Flashing tool.

### Step I

Connect the **AVRUPRO+** Programmer to your PCs USB port. Make sure you connect it to that USB port in you installed it during its installation. Wait for a “ding” sound from PC. Now the programmer is installed correctly. The **RED LED** will glow to show programmer is ready.

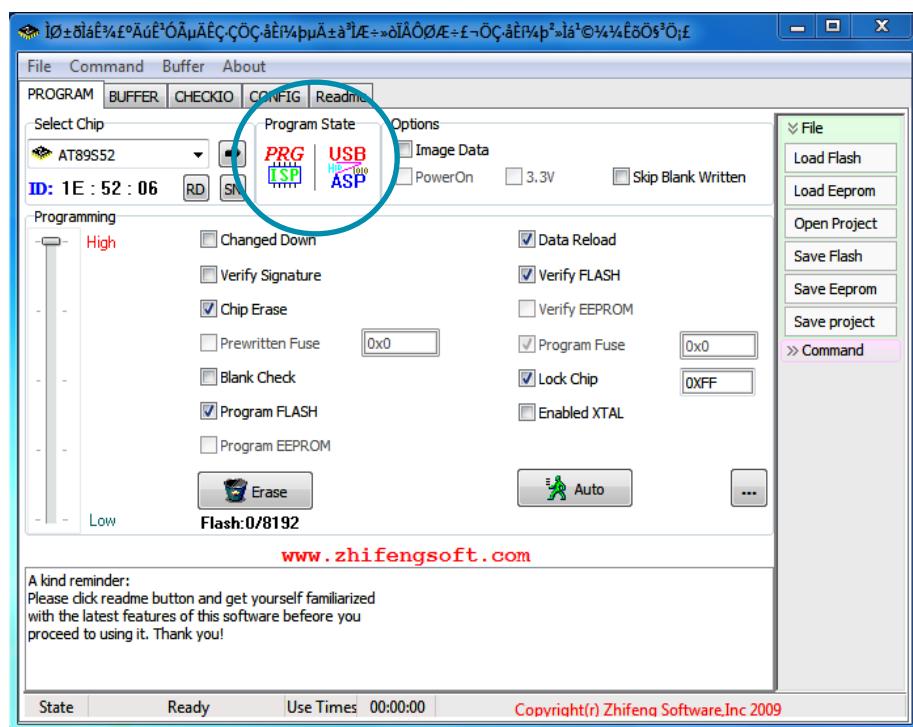
**Note:** If windows says “USB Device not recognized” make sure the USB cables are not broken.

**Note:** If windows says “New hardware found” you have connected the programmer to a different port than which you have installed. Or you have not yet installed the **AVRUPRO+** programmer USB driver ! please see installation instruction in **AVRUPRO+** manual.

**Note:** Please disconnect the Programmer after programming to ensure that your computer is safe.

### Step II

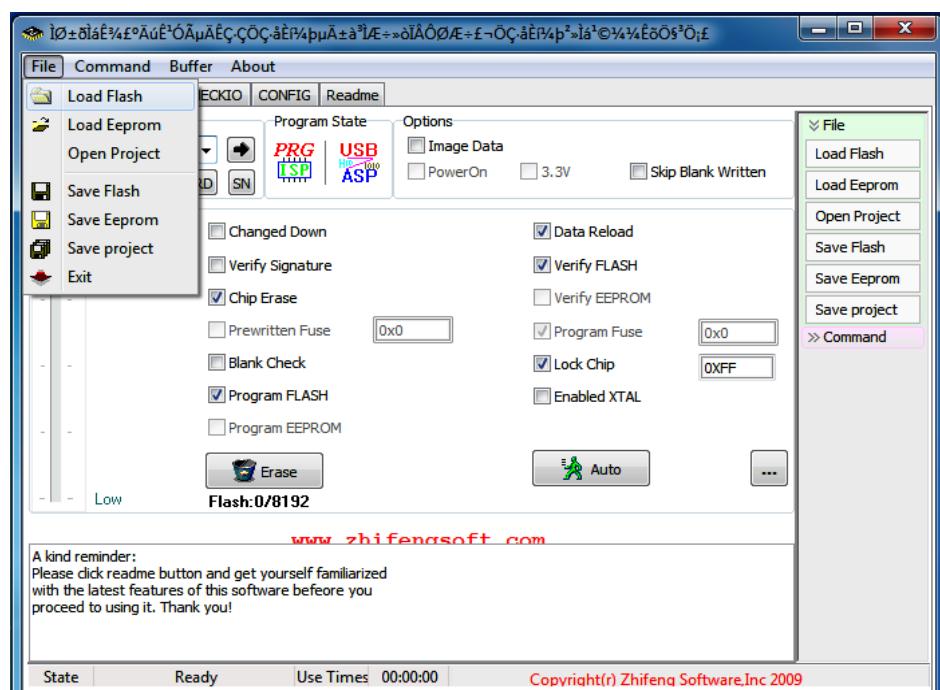
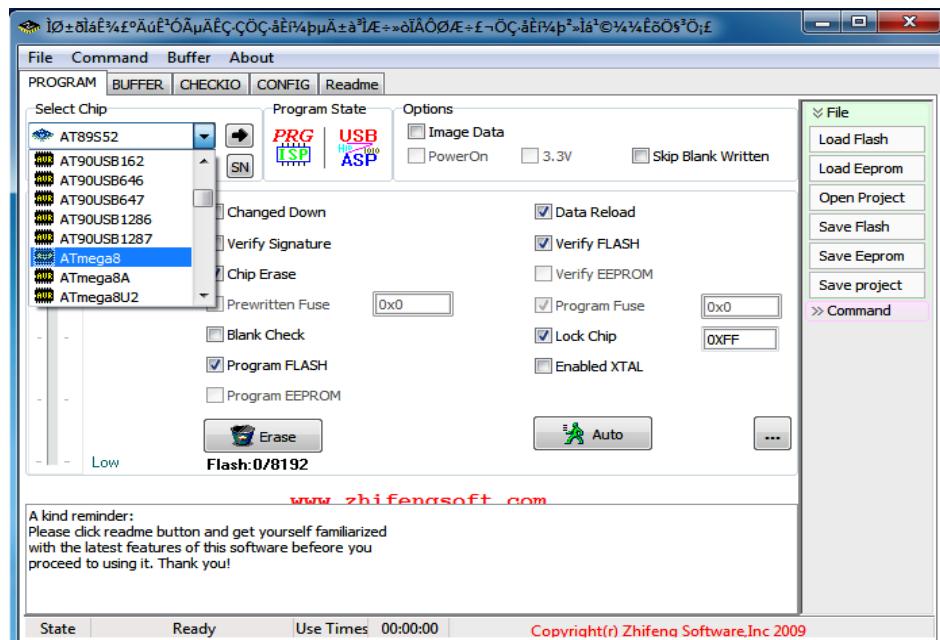
Launch Progisp.exe and check in **Program State** function **PRG ISP** function should be enable if it is showing disable than check **AVRUPRO+** programmer device is connected with PC and its driver are properly installed.

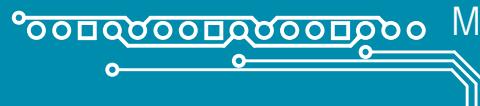




The software is very easy to use.

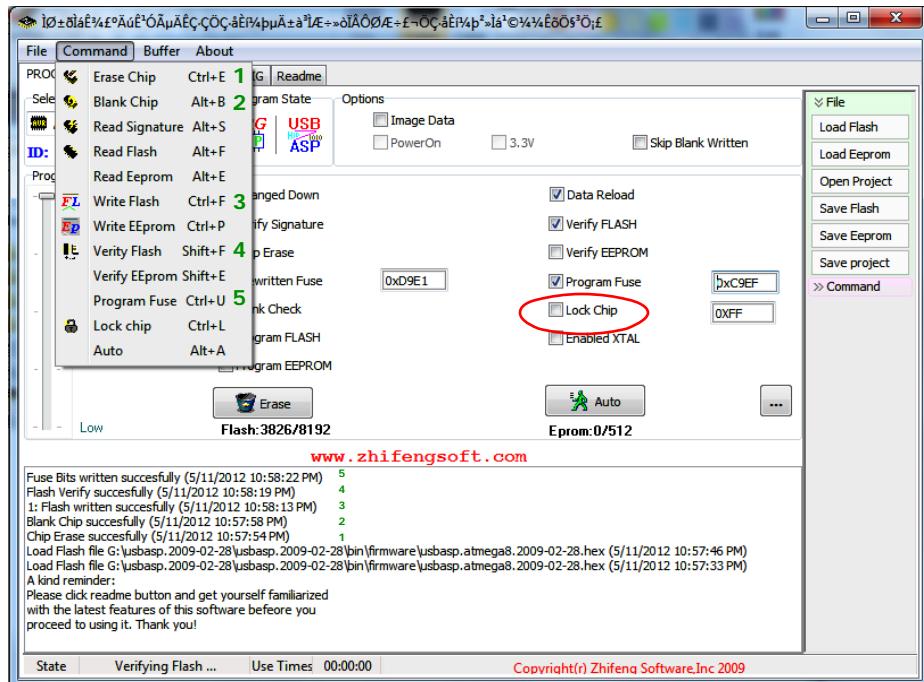
- From **Select Chip** Menu Select the MCU in use, say ATmega8
- Select **File->Load Flash**
- Select the **HEX** file
- EEPROM:** If you want to program the on-chip EEPROM load a .eep file by selecting **File->Load Eeprom File**
- For fuse bits select **Fuse** and **Lock** option





For final flashing target device after selecting chip & uploading hex file follow steps shown in below image. To check status of steps execution check **Status Box** in **Progisp.exe**

**Note:** Please ensure Lock Chip before programming

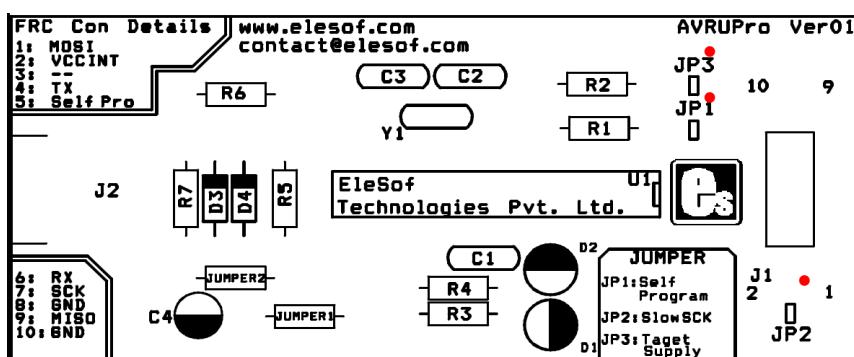


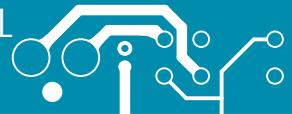
Now your chip is programmed successfully. Please disconnect the programmer from the target and your PC. When programmer is busy **Green LED** will on.

**Note:** Before programming ensure for jumper selection in **AVRUPRO** programmer.

#### Setting jumpers:

- **JP3** Power target Supply target with 5V (USB voltage). Be careful with this option, the circuit isn't protected against short circuit!
- **JP1** Jumper for firmware upgrade (not self-upgradable) Set this jumper for flashing the ATMega(4)8 of USBasp with another working programmer.
- **JP2** SCK option If the target clock is lower than 1,5 MHz, you have to set this jumper. Then SCK is scaled down from 375 kHz to about 8 kHz.



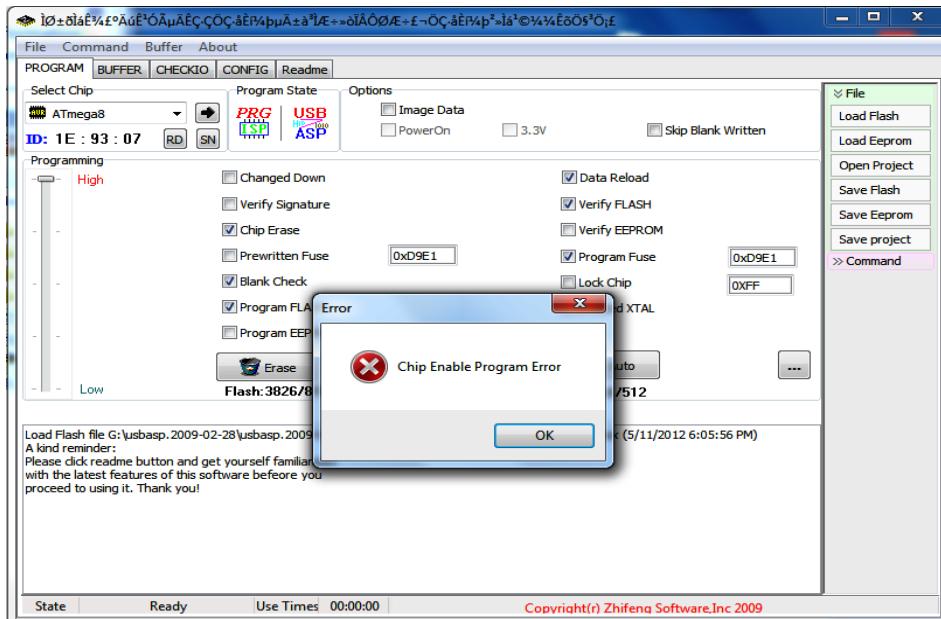


## Troubleshooting

If you are having any problem, this section may be helpful to you.

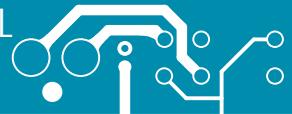
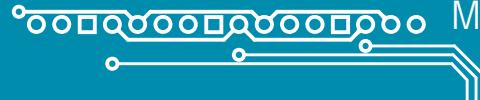
### Problem

- Chip Enable Program Error.



### Causes

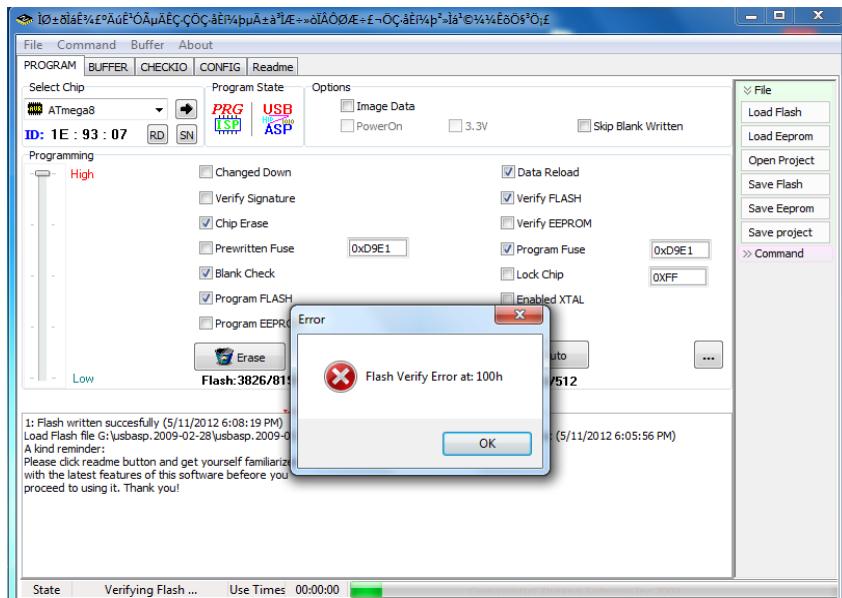
- The ISP connections are not connected properly. So make sure you have designed the target correctly so that ISP connector connects with the correct PINS of the MCU. The signal names are clearly mentioned in the programmer PCB.
- The target is switched off.
- The crystal is not connected properly and the CPU is not running.



If you are having any problem, this section may be helpful to you.

## Problem

- Flash Verify Error.
- Fail at any step of flashing or erasing target device



## Causes

- Remove Slow SCK jumper to program target device at high speed.

# Development System

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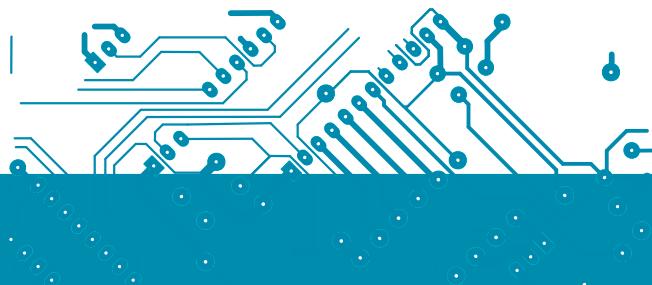
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