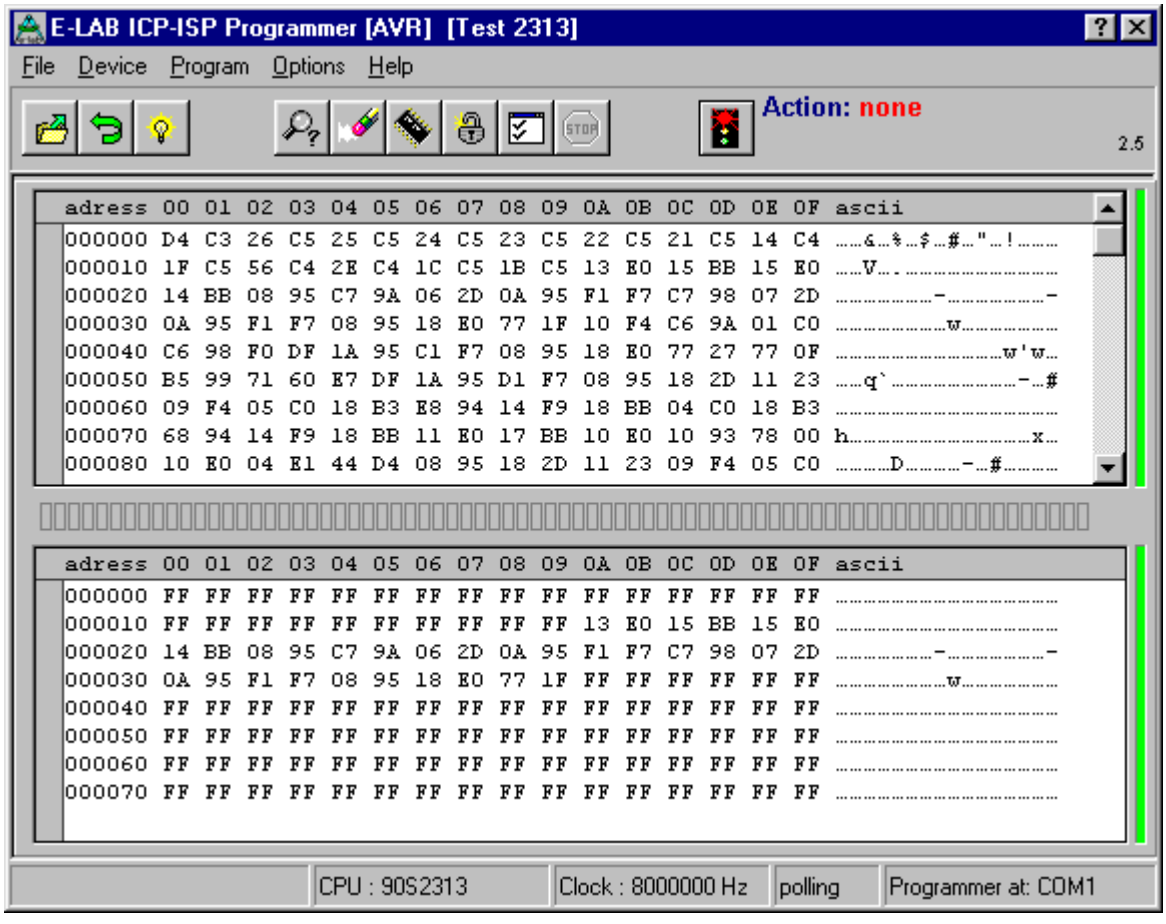
User Manual AVR ISP Programmer

AVR ISP

V24 and USB Programmer



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Overview

In-Circuit Programming (ISP or JTAG) is the technology of the future at least for small and medium series of electronic components with embedded processors. At least with SMD parts there is the problem of programming because many expensive and specialized adapters are required. An additional advantage of ISP/JTAG in conjunction with the AVR is the practically unlimit reprogrammability of the CPU's .

This ISP-Programmer emphasizes by minimum size, extensive software and ease of use. This manual is only valid for the new **ISP-V24 ISP-USB** and with restrictions for the formerly **ISP-II** versions of programmers.

Features

- Connection to the PC through a serial port (COM1..COM8) (Option USB)
- No powersupply necessary. The unit is powered direct from PC-interface (USB) or the target.
- Adapts automatical to the targets voltage (2.7-6Volt ca. 17mA)
- Easy and extensive software
- Software runs under Win98/2000/NT/XP
- USB version only for Win2000 and XP
- Small, light weight and handy unit 80x45x20mm
- New CPU-types are configurable by the user through ascii text files
- Programmable supply voltage (source) for the target system 2.7..5.2Volt 30mA/100mA
- Self update feature via the PC
- Supports **JTAG and SPI** programming
- Supports also **JTAG Boundary Scan** of the target system
- Supports also the AT89S53 and AT89S8252

Connections

Windows-98/NT/XP or WIN2000 is required. The USB version is only working with Win2000 and XP.

V24 Version

The E-LAB programmer must be plugged to any serial interface (COM1 – COM8) of the PC.
The 9-pin plug must be completely connected. A simple wiring of RxD, TxD and GND is not allowed. Pin7/RTS and Pin4/DTR serve as a powersupply and for ACCU charging. In addition DTR generates a **Hardware Reset**, when it changed from –10Volt to +10Volt.

USB Version

The included USB cable must be connected to a free USB connector of the PC. The USB drivers must be installed one time in order to work properly. See the USB section at the end of this manual.

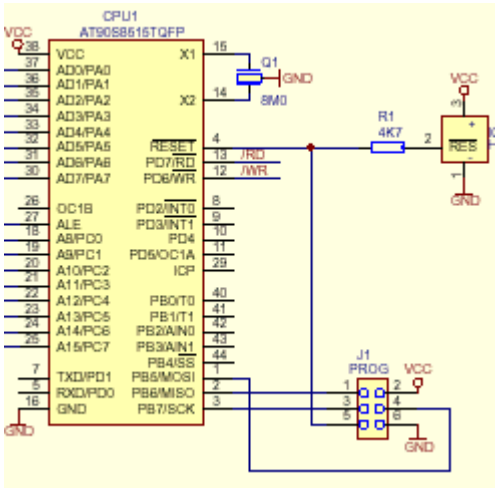
The internal voltage is 3.3Volt. If the voltage of the target exceeds 3.3Volt the supply of the target is used automatically. Don't apply high loads at the target pins used for programing. No capcitors are allowed at these pins, also the reset pin. Capacitors at the RESET pin must not exceed 100nF.

The definition of the 6-pin target plug (0.1 inch pitch male header, dual inline) conforms to a recommendation from Atmel. The **TOP VIEW** onto the connector of the Target is below:

CPU MISO(TxD)	**o1 2o**	VCC
CPU SCLK	**o3 4o**	CPU MOSI(RxD)
/RES	**o5 6o**	GND

TopView SPI header

Attention!
The /PEN pin of the **mega64/103/128** has to be connected to VCC. These megas use TxD, RxD and SCLK for programming!!

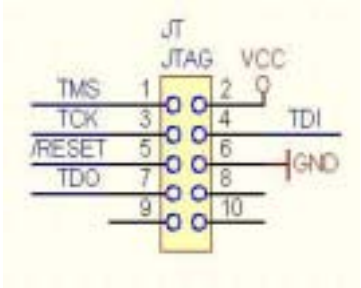


Pin1 of the 6pin plug of the programmer can be located by a small triangle on the front of it. A missalignment of the plug leads to malfunction and can possibly **DESTROY** the unit.

The working voltage of the Target CPU must be in the range of 3.0V..5.5V. Voltages below 3Volts are also possible, but correct programming of the target can not be guaranteed.

None of the 4 control lines of the device must be shortened. A **continous short circuit** can destroy the programmer permanently. Only electrical tested boards should be connected.

JTAG programming



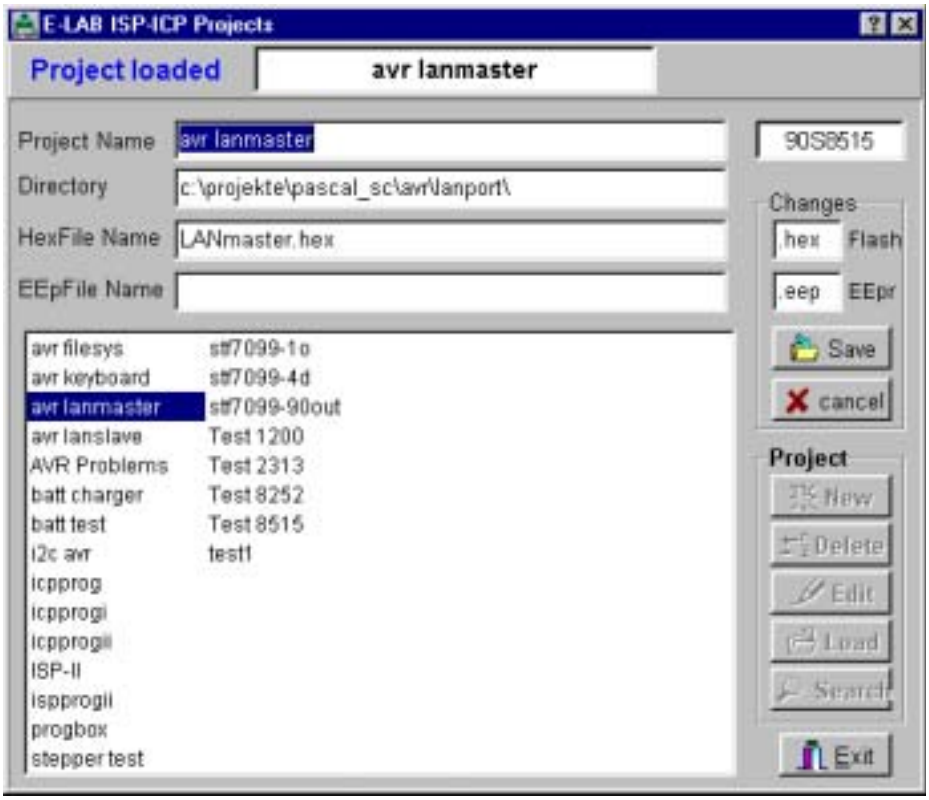
For JTAG programming of the target CPU the 6-wire ribbon cable must be replaced by 10-wire type. Because the ISP-V24 uses the same plug for ISP and also for JTAG programming the JTAG plug on the target system differs from the original Atmel JTAG plug. See the schematic on the left.

On the left is the recommended E-LAB plug connection which must be used for the target system if the JTAG interface of the target AVR must be used for programming. Please note that also the **/RESET** line must be connected to the target CPU.

Stand-alone

The programmer can be invoked from the Compiler's IDE (PED32) and also stand-alone by it's EXE name. Calling it from the AVRco-IDE (PED32) automatically several application parameters (CPU-Type, Clock, Hex-file etc.) are passed to the programmer.

With Stand-alone (direct call of the EXE by the user) the Project select dialog is opened. A project can be opened and loaded by a double click onto the desired entry or by a single click onto the entry and an additional click onto the Load-Button. All project relevated parameters and files are loaded, so one can start with a download or the programming.



Display of the project in the PC
Details of the highlighted project from the select window with CPUtype.
Accompanying project path.
The Flash Hexfile with file extension.
EEprom file with extension
Store changed or new project.

Commands
Build a new project
Delete a project

Edit an existing projectkt

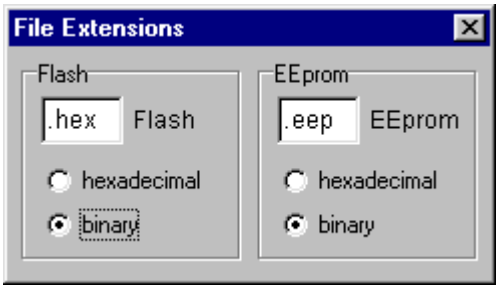
Load a project

Search project on network
Exit this dialog.

With each project it is possible to store a text comment. See "Comment" dialog below.

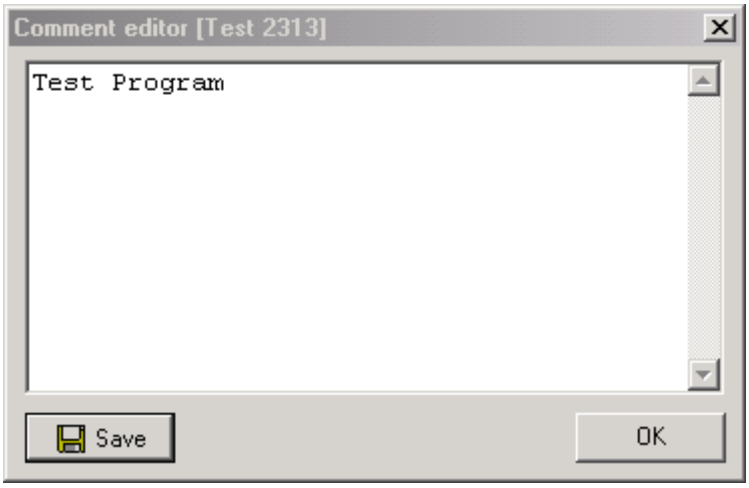
Build a new project: Click button **New**. Type the desired name into the field**Project Name**. Click to the field **Directory**. From the appearing dialog select the desired directory. Now the dialog for selecting the file extensions and file types appears. Select/edit extensions and file types. The Flash file dialog appears. Select the file which contains the Flash contents. At last the CPU type must be selected from the CPU-Select dialog.Up to here the selections etc. are a must. The following dialog for selecting an EEprom file can be ignored, if nothing exists. The new project must be stored by the **Save** button.

Editing an existing project: Click the button **Edit**. The program is now in edit mode. With a click onto the items and fields the accompnying dialog is opens. After all changes are done, store them with a click onto the **Save** button.



Dialog for the file types and extensions of a project. These parameters are project related und must be defined for each new project.

Edit of an existing project: click Button **Edit**. By a click to any edit field a dialog opens. After changing of the project's properties the project must be stored with the **Save** button.

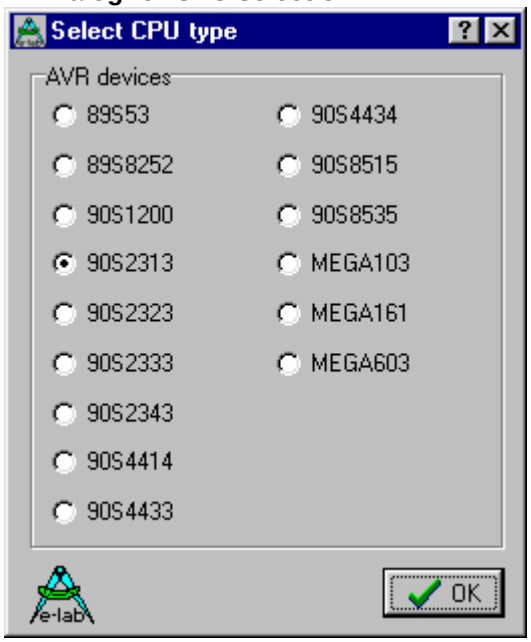


Comment Editor

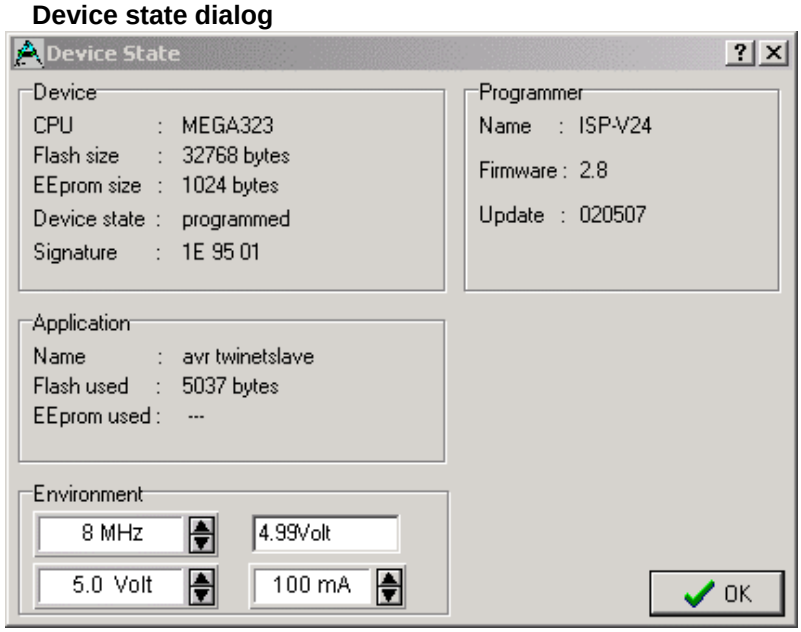
A right click to an entry in the project select/load dialog opens this Comment dialog.

With this dialog it's possible to add or view a comment for each project.

Dialog for CPU selection



Device state dialog



After selecting the CPU the clock-frequency of the target must be set. To do this, the button opens the Device State Dialog. The dialog shows the parameters of the PC-loaded project resp. the parameters of the hex-files loaded.

Editable parameters are located in the **Environment** box.

The clock defines the SPI speed for **ISP** programming and can be changed every time. If this value is too high, the programming can fail. For **JTAG** programming mode this value has no meaning. But this parameter should have always the correct value.

The voltage field on the right of it reflects the current voltage value which the ISP programmer measures on the target board, if connected. The voltage defines the length of the program pulse and by that also the total programming time (except JTAG programming).

The lower two fields of voltage and current are only visible if a programmer type is connected which has the feature of supplying the the target with a selectable voltage. The ISP-V24 is such a device.

The current field selects the maximal allowed current to supply. 0.0mA sets the internal supply to the off state. The other values enable the ISP-internal supply. If a current > 0mA is selected the desired supply voltage can be selected in the voltage field. If enabled the ISP programmer supplies the selected voltage to the target system (only in programming state), provided that a power supply is connected (6..10V=). The current will be limited to the selected value.

The field **Application** shows the actual loaded project in the PC.

The field **Programmer** shows the information about the connected programmer device: programmer type, firmware revision and the last firmware update. The last item is important because all update files start with their date-of-build **yy-mm-dd**. In the picture above this is 2002, May, 05.

So one can easily find out whether a new downloaded file from the WEB is the same or newer than the one already downloaded in the ISP.

The download of an update into the ISP is described below.