



ISPcable III In-System Programmer for Atmel AVR microcontrollers, STK500 compatible.

User's Guide

REV 1.0

PROPOX®

Many ideas one solution

Introduction

Thank you for buying our ISPCable III programmer. We hope that the great power it offers will allow you to appreciate fully the virtues of in system programming provided by Atmel microcontrollers.

ISPCable III is an In-System Programmer for Atmel AVR microcontrollers. ISPCable III gives the designer a compact and reliable programming tool to program most Atmel AVR microcontrollers through standard 6- or 10-pin ISP connector. The programmer connects to a PC through a USB interface and draws the necessary power from the computer eliminating the need for an additional power supply. ISPCable III can co-operate with microcontrollers supplied with voltages from 1.5 to 6 V. Such a broad range of supply voltages was achieved through buffering of signals on the ISP line, additionally enhancing the immunity of the circuit to interference. Thanks to STK500 compatibility it works with Atmel AVRStudio programming environment and open source software like AVRDUDE.

Let us wish you nothing but success and a lot of satisfaction in designing and putting new microprocessor devices to work.

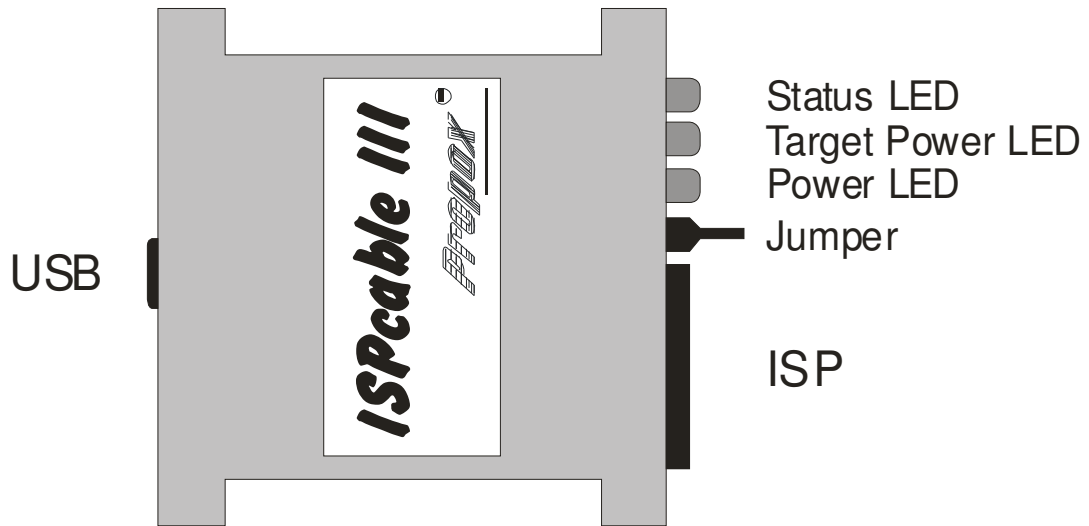
Features

- Compatible with STK500 v2
- Co-operates with Atmel AVRStudio software
- Programming of all AVR devices supported by AVRStudio and STK500 in ISP mode
- Connection to PC through USB port
- Buffering of the ISP bus, allowing proper operation with systems powered from a broad range of supply voltages and enhancing immunity to external interference
- Operates with target voltages in the range of 1.8 - 6 V
- Supports LED signal for multiplexer controlling and programming indication
- Operation of the programmer signaled by built-in LED indicator
- Standard 10-pin connector to the target circuit in the Atmel standard
- No need for external power supply, power is taken from USB
- The programmer can supply power to target circuit
- Small size

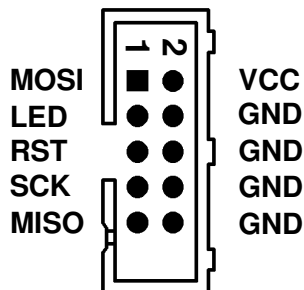
Supported devices

ISPCable III supports all Atmel AVR microcontrollers equipped with ISP interface. Most current devices list can be found in AVRStudio after connecting with STK500 programmer.

Description of the programmer



USB	- USB B mini connector for connecting with the PC
ISP	- 10-pin connector to the target circuit in the Atmel standard
Jumper	- Jumper closed when supplying target from programmer
Power LED	- Indicates programmer power supply
Target Power LED	- Indicates target circuit Power supply
Status LED	- Indicates operation of programmer



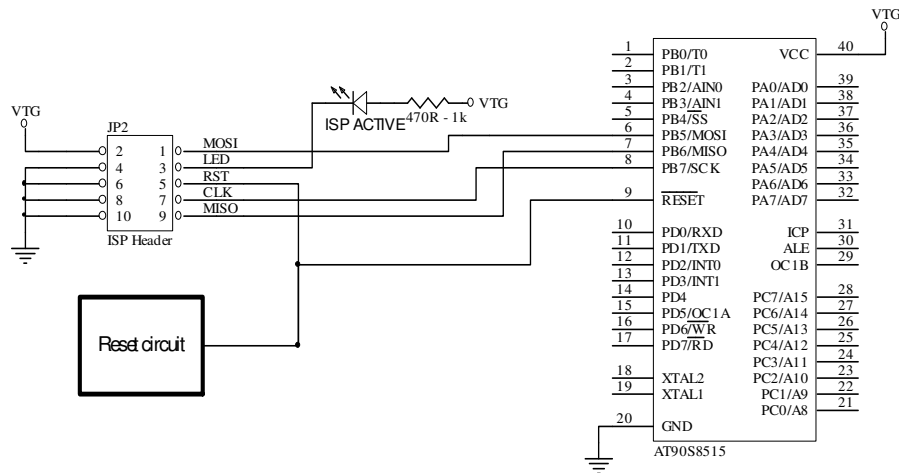
Programmer ISP connector

CONNECTOR PINOUT	
MOSI	SPI - data signal Master out / Slave in
LED	LED diode and multiplexer signal
RST	Target RESET control pin
SCK	SPI - serial clock signal
MISO	SPI - data signal Master in / Slave out
VCC	Power supply from target circuit 1.5 - 6V
GND	Programmer Ground

The ISP connector is compatible with the 10-pin standard from Atmel.

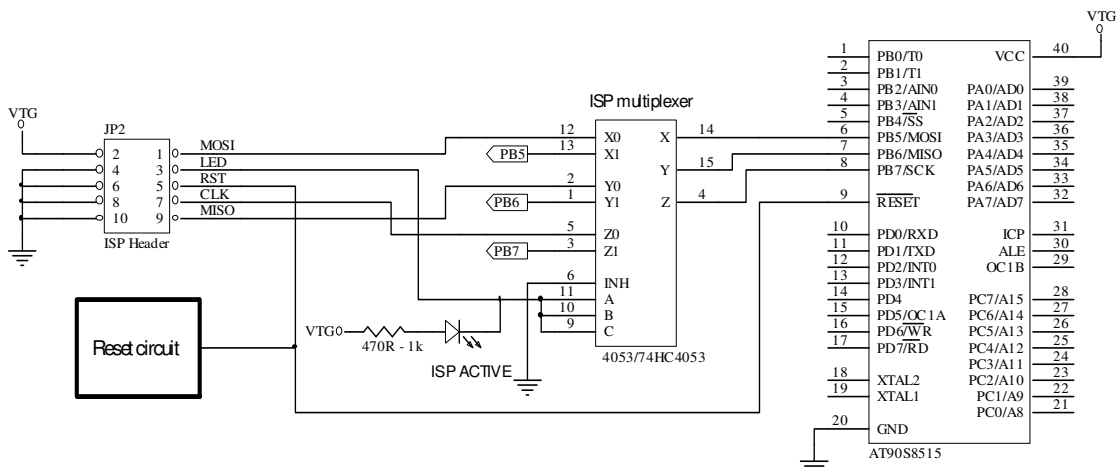
Connection with the target circuit

The connection to the target circuit should be realized through the attached 10-lead ribbon cable, terminated with standard IDC plugs with 2.54 mm raster. In case of using another cable it should be kept in mind that it should not be longer than 30 cm (~12 inches). The target device should be equipped with a ISP connector with lead-out identical to that of the programmer ISP connector. We connect the ISP bus lines with their corresponding ISP bus lines of the microcontroller as shown in the figure below.



Connection with the AT90S8515 microcontroller

The LED signal can also serve to switching multiplexer the separating the signals MOSI, MISO, SCK from the rest of system on time the programming. Solution such should be use in systems in which to SPI BUS be connected different arrangements like Flash memory or RTC. It eliminates the possibility of accidental record to these arrangements in time the programming the microcontroller. Signal LED in programming moment switch to low level. The connection using multiplexer is shown in the figure below.



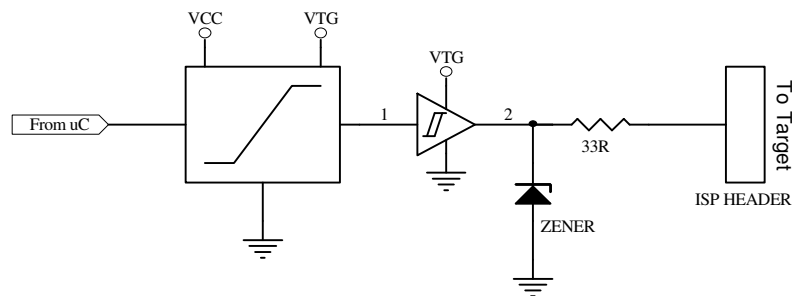
Connection with the AT90S8515 microcontroller with multiplexer

Level converter of ISP signals

In order to assure proper operation of the programmer when the supply voltages of the target circuit differ from the programmer's supply voltage, level converters of ISP signals come into use. The conversion circuits have been designed for operation with a target circuit supplied from a voltage between 1.8 and 6 V.

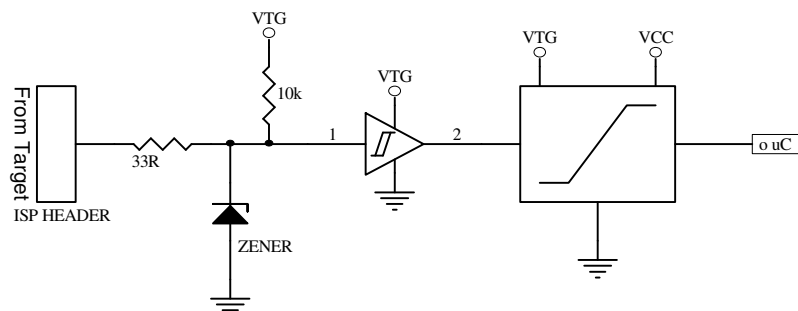
The ISPcable III can be supplied from an external source or directly from the target circuit. In the last case, the supply voltage should have a value between 4.5 and 5.5 V.

Signals between the programmer and the target circuit can be divided into two groups: input signals (MISO), output (MOSI, SCK, RST, LED). Besides regenerating ISP bus signals, the signal level converter buffers limit the input and output currents. Buffering has been applied on all signal lines of the programmer. The implementation of a signal level converter for output lines has been shown in the figure below.



Voltage level converter (outputs)

The implementation of a signal level converter in the input line of the MISO programmer is shown below.



Voltage level converter (input)

Supplying the programmer

Programmer is powered form USB bus and do not need external power supply. Additionally, after closing jumper, power to the target circuit can be supplied. In this case you should remember that accordingly to the USB bus standard, supplied voltage can be between 4.3 and 5.25V. Current drawn by the target circuit should not exceed 100mA.

Drivers installation and operation with AVRStudio

Drivers installation guide can be fund at:

Windows XP:

http://www.ftdichip.com/Documents/InstallGuides/Windows_XP_Installation_Guide.pdf

Windows 2000:


http://www.ftdichip.com/Documents/InstallGuides/Windows_2000_Installation_Guide.pdf

Windows 98:

http://www.ftdichip.com/Documents/InstallGuides/Windows_98_Installation_Guide.pdf

During installation directory „Propox_ISPcable_III_drivers” should be chosen, it can be found at CD-ROM or downloaded from our website as a zip file:

http://www.propox.com/download/software/Propox_ISPcable_III_drivers_CDM_2.00.00.zip

After installing drivers you can start the programming dialog by clicking on one of the two connect buttons  found on the toolbar in AVRStudio. The button to the left makes it possible to select witch programmer and communication port to connect to (you should choose STK500). The button to the right will make a direct connect to the last chosen tool and communication port.

Manual for AVRStudio programmer application can be found in documentation: „STK500 User Guide” chapter 5 „Using AVRStudio”:

http://www.atmel.com/dyn/resources/prod_documents/doc1925.pdf

and „AVRISP mkII User Guide”:

http://www.atmel.com/dyn/resources/prod_documents/AVRISPMkII_UG.pdf

Technical data

Dimensions	: 55 x 53 x 16 mm
Weight	: about 0.1 kg
Connection to the PC	: USB port
Programming cable	: length 30 cm
ISP clock frequency	: max. 921.6 kHz
Target circuit supply voltage	: VTG 1.8 – 6.0 V
Power for the target circuit	: VTG 4.5 – 5.5 V Is max. 50 mA
Supply current form USB	: Is max. 50 mA

Technical assistance

In order to obtain technical assistance, please contact support@propox.com

Please provide the following data:

- Version of ISPCable III programmer and AVRStudio
- Version of PC operating system
- Processor type (complete number of the device) and oscillator's frequency
- Detailed description of the problem