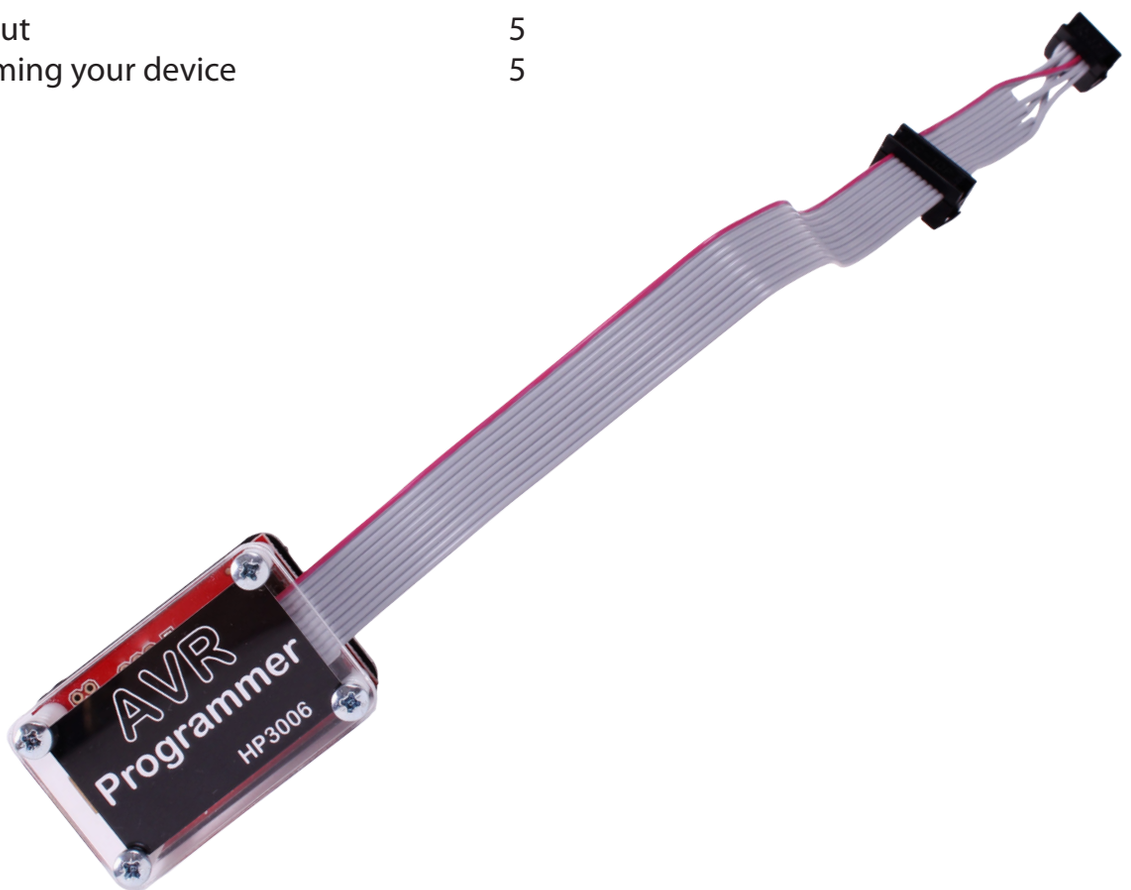
MATRIX

eBLOCKS®

AVR - In Circuit Serial Programmer

Contents



About this document

This document concerns the HP3006 AVR in circuit serial programmer (ICSP), referred to in this document as the 'HP3006 programmer'.

1. Trademarks and copyright

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2. Disclaimer

The information provided within this document is correct at the time of going to press. Matrix TSL reserves the right to change specifications from time to time.

3. Testing this product

It is advisable to test the product upon receiving it to ensure it works correctly. Matrix provides test procedures for all E-blocks, which can be found in the Support section of the website.

4. Product support

If you require support for this product then please visit the Matrix website, which contains many learning resources for the E-blocks series. On our website you will find:

- How to get started with E-blocks - if you are new to E-blocks and wish to learn how to use them from the beginning there are resources available to help.
- Relevant software and hardware that allow you to use your E-blocks product better.
- Example files and programs.
- Ways to get technical support for your product, either via the forums or by contacting us directly.

Board layout

1. USB mini-B port
2. 10-pin ICSP connector
3. 6-pin ICSP connector

General information

The HP3006 programmer is used to reprogram Atmel 8-bit AVR devices while they are still attached to their host application circuitry. The device works to replace the now end of life AVRISP mkII programmer from Atmel.

The HP3006 programmer is fully compatible with both Flowcode and AVRdude applications.
The HP3006 programmer is based on a USBtiny and allows the AVR circuitry to be powered externally or via the programmer. The board used is the Pocket AVR Programmer by SparkFun.

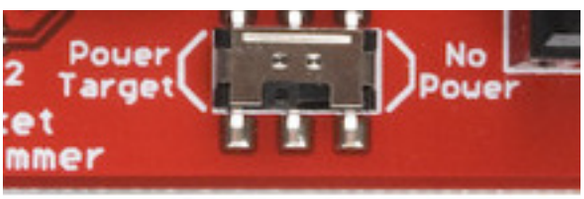
- Standard AVR ICSP programmer
- Buffered output
- PTC fuse protected power supply
- Can supply your circuit with 5V, up to 500mA via USB
- 2 x status LEDs
- 10-pin and 6-pin ICSP target types supported

Power target switch

If you're working with an AVR on a breadboard or a prototype, power may be hard to come by. The HP3006 programmer allows you to route 5V out to your AVR. It can deliver upwards of 500mA before tripping the on-board current limit.

If the switch is in the Power Target position, it will route 5V out to your AVR. Otherwise, if the switch is pointing towards No Power, no signal will be connected to the 5V pin on the ISP connector.

Be careful using this feature! It will output 5V and only 5V! If you're working with a 3.3V or 1.8V system, make sure this switch is in the No Power position.



1. Note; the power target switch should always be positioned to 'No Power' when using the EB019 E-Block, as power is provided by the seperate PSU.

USB device drivers

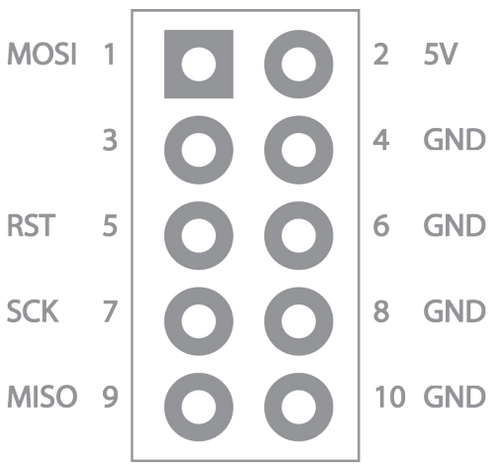
In order to use the HP3006 programmer, device drivers can be downloaded and installed from the following location;

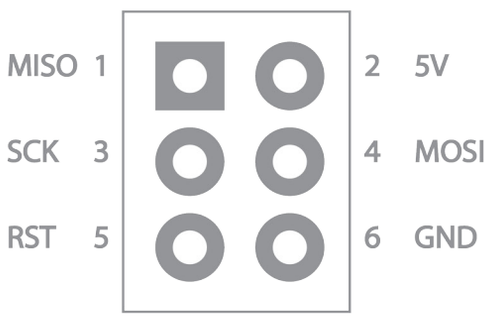
http://www.matrixtsl.com/resources/getresource.php?id=921

Two versions of the driver are available; the original adafruit driver, which is signed, and the SparkFun version, which is not signed. BOth are available from the above link. Windows 8 users are encouraged to use the adafruit version, or ensure they boot into Windows with 'Driver Signature Enforcement' disabled.

ICSP pinout

The HP3006 programmer offers both 10-pin and 6-pin ICSP target types. The ICSP pinout can be seen below;





Programming your device

The following method must be applied to program your device from Flowcode using the HP3006 programmer;

Programming via Flowcode;

- To change the programmer options, click on the 'Build' menu and select 'Compiler Options'.
- Go to the programmer tab and the programmer location will be:
  "$(appdir)compilers\avr\batchfiles\avrc.bat"
- Change the command line to the following to point to the ICSP programmer.
  "$(appdir)compilers\avr\batchfiles\avrc_usbtiny.bat"

You can also be able to use AVRdude, although it is only advised for experienced users;

Programming Via AVRdude;

- AVRdude is a command line application for programming Atmel AVR devices. There is a version of the software with a graphical front end named AVRdudess. We recommend you start with AVRdudess and then when you are familiar with the interface you can look at the AVRdude settings to create your command line programming calls.

Programming your device cont...

The final method in which you can program your device is to use Atmel Studio;

If you choose to use Flowcode to create a hex file, but then desire to use Atmel Studio to program your target, please follow this guide. The AVR Programmer is not natively supported by Atmel Studio, however as previously metioned, AVRDude is and can be configured to work with Atmel Studio. *This guide was created using Atmel Studio 6.1.*

To create a programmer profile navigate to 'Tools – External Tools…' and follow the instructions below;

Note, a profile can only program one target device, defined by the parameters in this profile. If you wish to program multiple different target devices we recommend creating multiple profiles, each with a unique, recognisable title. In this example we will create a profile to allow us to write to a ATMEGA324P, the default target device on the EB019 board.

Title: (You can call this anything you like)

AVRProgrammer 324P

Command: (This is the location of AVRDude, provided as part of the Flowcode installation)

C:\Program Files (x86)\Flowcode 6\compilers\avr\bin\avrdude.exe

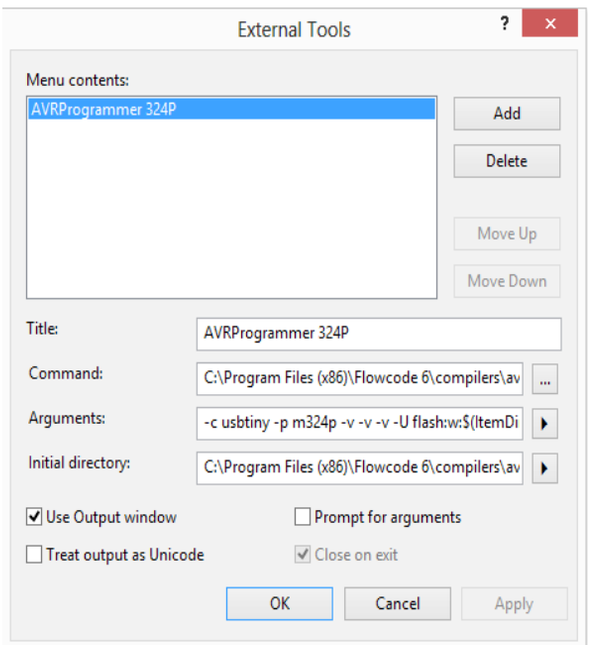
Arguments: (These are the parameters passed to AVRDude. The 'm324P' is the chip used, so change this if you require writing to a different target)

-c usbtiny -p m324p -v -v -v -U flash:w:$(ItemDir)$(ItemFilename).hex:i

Initial Directory: (The root directory of where AVRDude will be found)

C:\Program Files (x86)\Flowcode 6\compilers\avr\bin

We also recommend checking the 'Use Output Window' box, to allow debugging in case of any problems.



Once your profile is created, you can use it to program your device;
To program your device you should navigate to 'Tools – AVRProgrammer 324P' (or whatever title you used). Selecting this will automatically write the .hex file you opened to the microcontroller. The status of which should appear in the 'Output' window of Atmel Studio.

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