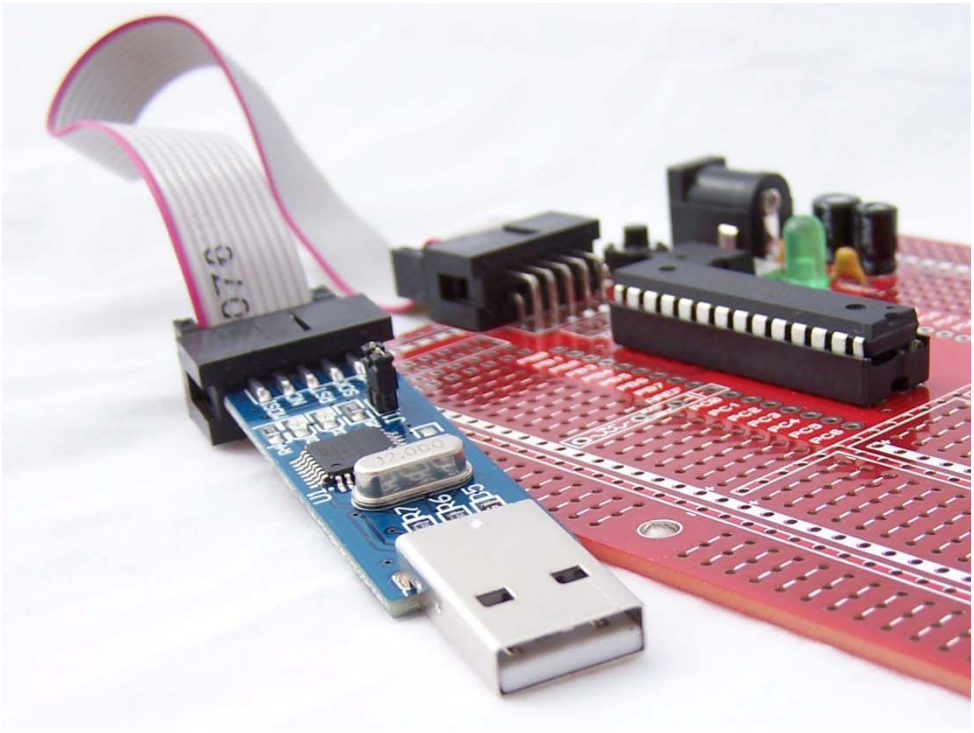
AC-PG-USBASP USBASP AVR Programmer



User Guide

Version 1.2
26 April 2010

AC-PG-USBASP-UG

TABLE OF CONTENTS

TABLE OF TABLES

TABLE OF FIGURES

1. Overview

1.1. Introduction

USBasp is a USB in-circuit programmer for Atmel AVR controllers. It simply consists of an ATMega8 and a few passive components. The programmer uses a firmware-only USB driver, no special USB controller is needed.

Some of the key features include:

a. Works under multiple platforms. Linux, Mac OS X and Windows are tested,

b. Programming speed is up to 5kBytes/sec, and

c. SCK option to support targets with low clock speed (< 1,5MHz).

1.2. References

1.2.1. Referenced Web Pages

The web pages referenced in this User Guide are listed in Table 1.

Name	Address
USBasp - USB programmer for Atmel AVR controllers	http://www.fischl.de/usbasp/
AVRdude	http://savannah.nongnu.org/projects/avrdude/
AVRdude Documentation	http://www.nongnu.org/avrdude/user-manual/avrdude.html
V-USB	http://www.obdev.at/products/vusb/index.html
WinAVR	http://winavr.sourceforge.net/
MacAVR	http://www.harbaum.org/till/macavr/index.shtml

Table 1. Referenced Documents

1.2.2. Acronyms and Abbreviations

The acronyms and abbreviations utilised in this User Guide are listed in Table 2.

Acronym and Abbreviation	Description
AVR	According to Atmel, AVR stands for nothing, it's just a name. Others say it stands for Advanced Virtual RISC. However, the inventors of the AVR series chips are named Alf Egil Bogen and Vegard Wollan, so you be the judge.
IDC	Insulation Displacement Connector
ISP	In System Programmer
LED	Light Emitting Diode
RISC	Reduced Instruction Set Computing
SCK	Slow Clock
SIL	Single in Line
SPI	Serial Peripheral Interface
USB	Universal Serial Bus

Table 2. Acronyms and Abbreviations

1.3. Supported Microcontrollers

Table 3 lists the microcontrollers that are supported by the USB AVR Programmer.

Supported Microcontrollers				
Mega Series				
ATmega8	ATmega48	ATmega88	ATmega168	ATmega328
ATmega103	ATmega128	ATmega1280	ATmega1281	ATmega16
ATmega161	ATmega162	ATmega163	ATmega164	ATmega169
ATmega2560	ATmega2561	ATmega32	ATmega324	ATmega329
ATmega3290	ATmega64	ATmega640	ATmega644	ATmega649
ATmega6490	ATmega8515	ATmega8535		
Tiny Series				
ATtiny12	ATtiny13	ATtiny15	ATtiny25	ATtiny26
ATtiny45	ATtiny85	ATtiny2313		
Classic Series				
AT90S1200	AT90S2313	AT90S2333	AT90S2343	AT90S4414
AT90S4433	AT90S4434	AT90S8515		
AT90S8535				
Can Series				
AT90CAN128				
PWN Series				
AT90PWM2	AT90PWM3			

Table 3. Supported Microcontrollers

1.4. Warnings

Some of the components discussed in this document are very sensitive to electrical static discharges. The reader should take precautions to ensure that components are protected against these discharges**.**

Whilst the voltages typically seen in microcontroller circuits are low, the reader should be aware of the risk of working with electrical circuits and take necessary precautions.

2. Layout

The layout of the USBASP programmer is shown in Figure 1.

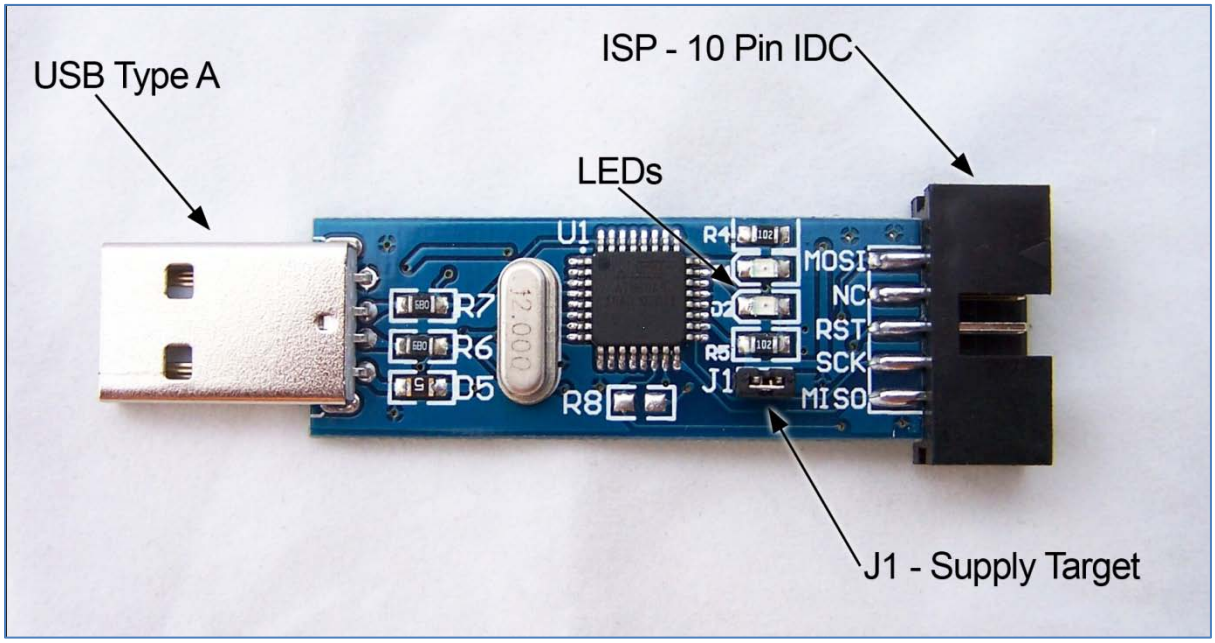


Figure 1. Device Layout

2.1. USB Type A

The USB end of the programmer connects directly into your computers USB port.

2.2. ISP – 10 pin IDC

The 10 pin ISP connection provides an interface to the microcontroller. This interface uses a 10 pin IDC connector and the pinout is shown in Figure 2

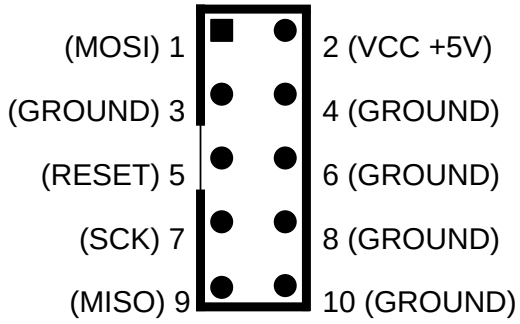


Figure 2. 10 Pin ISP pinout

2.3. J1 – Supply Target

If this jumper is bridged, then +5V supply from the USB port will go tho the target device via the ISP VCC connector. Disable this jumper if the target device has its own power source.

2.4. LEDs

The USBASP programmer has 2 LEDs near the ISP connection. These have the following functions:

a. LED 1 – Programmer communicating with target device

b. LED 2 – Power

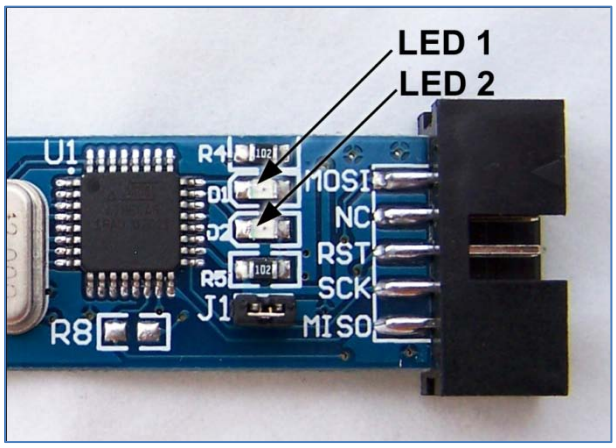


Figure 3. LEDs

3. Using the Programmer

3.1. Connecting the programmer to your computer

Connecting the programmer to your computer comprises of 2 steps:

a. Physically connecting the programmer to the USB port, and

b. Installing drivers in order for it to work.

Whilst the USBasp programmer will work on a wide variety of operating systems, this procedure will focus on Widows Vista 32 bit and Windows XPs

3.1.1. Windows Vista (32 Bit)

3.1.1.1. Required items

Items required to run this procedure are:

a. USBasp programmer

b. Computer with USB port and Windows Vista 32 bit installed

c. USBasp drivers downloaded and unzipped from http://www.protostack.com/download/USBasp-driver-0.1.12.2.zip

3.1.1.2. Assumptions

This procedure assumes that:

a. The logged in user has sufficient permissions to install unsigned device drivers

3.1.1.3. Procedure

To install the USBasp programmer:

a. Insert the programmer into an available USB port

b. When the “Found New Hardware” dialog opens, select “Locate and install driver sotware (recommended)”

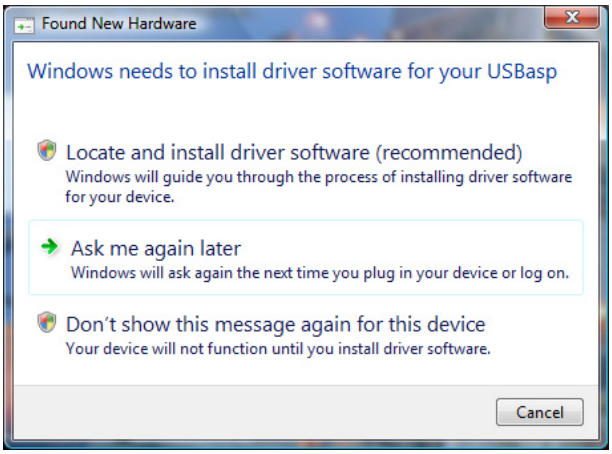


Figure 4. Driver Installation on Vista 32 bit – Found new hardware

c. Wait while Windows Vista attempts to locate a driver

d. When the "Found New Hardware – USBasp" dialog box is displayed, select "I don't have the disc. Show me other options"

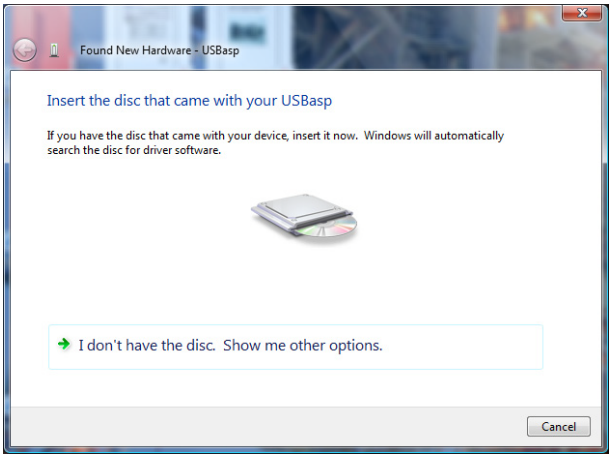


Figure 5. Driver Installation on Vista 32 bit - Found New Hardware – USBasp

e. On the next screen select “Browse my computer for driver software (advanced)”

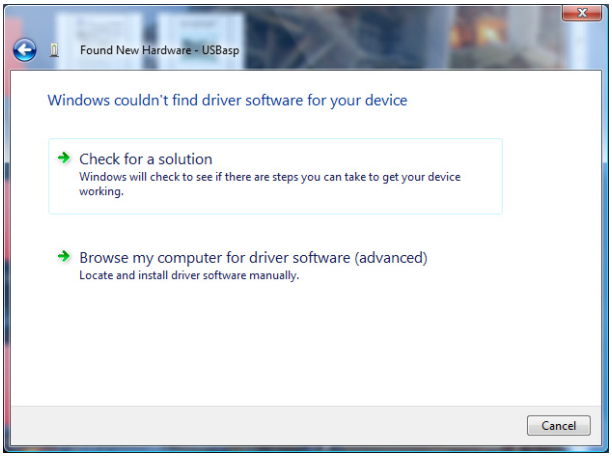


Figure 6. Driver Installation on Vista 32 bit – Windows couldn’t find driver software for your device

f. Click Browse and select the folder where you unzipped the USBasp drivers, then click Next

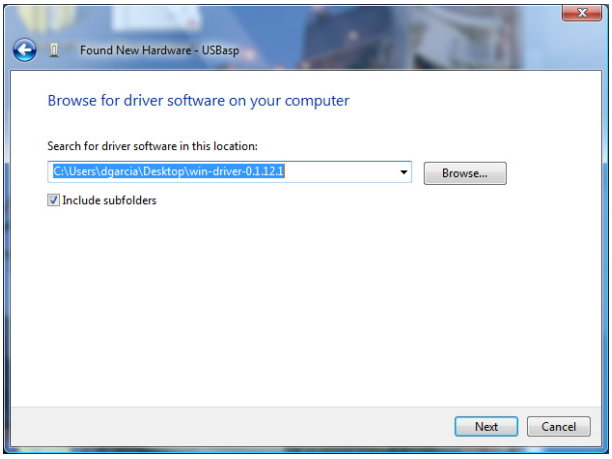


Figure 7. Driver Installation on Vista 32 bit – Browse for driver software

g. When the windows security dialog box is opened, select “Install this driver software anyway”. *Note: This security warning is raised because the device driver files are not signed with a digital certificate. This does not mean that the file will cause a security problem, but rather that windows cannot guarantee it source. Click on “see details” for more information.*

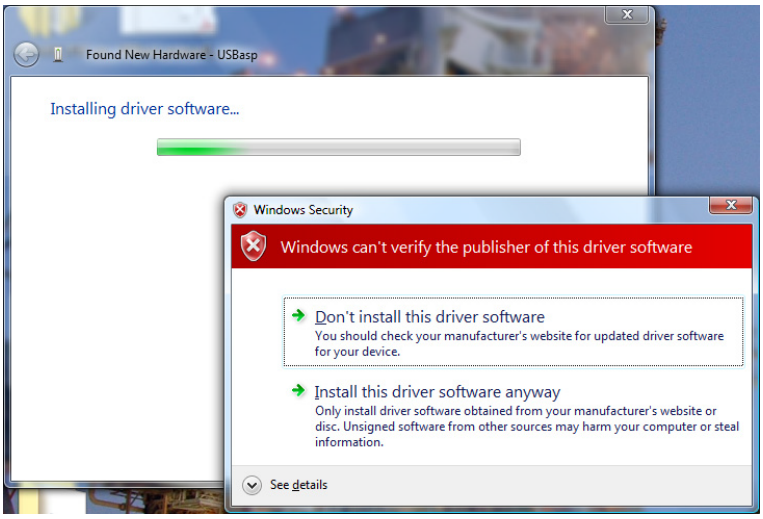


Figure 8. Installation on Vista 32 bit – Security warning

h. When the installation is complete, a confirmation screen will be displayed. Click close to close it.

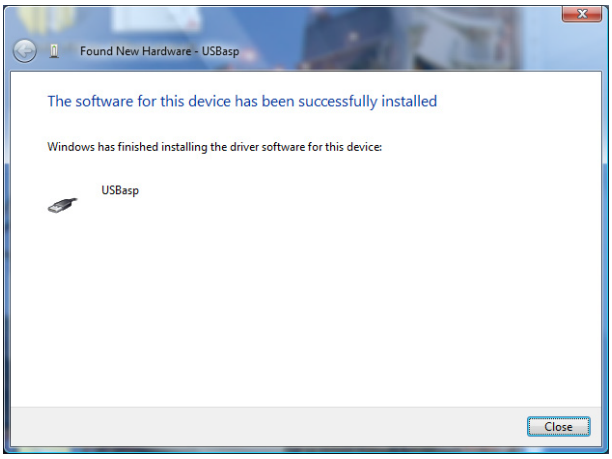


Figure 9. Installation on Vista 32 bit – Confirmation

i. Your programmer is now ready for use

3.1.2. Windows XP (32 bit)

3.1.2.1. Required items

Items required to run this procedure are:

a. USBasp programmer

b. Computer with USB port and Windows XP 32 bit installed

c. USBasp drivers downloaded and unzipped from http://www.protostack.com/download/USBasp-driver-0.1.12.2.zip

3.1.2.2. Assumptions

This procedure assumes that:

a. The logged in user has sufficient permissions to install unsigned device drivers

3.1.2.3. Procedure

To install the USBasp programmer:

a. Insert the programmer into an available USB port

b. When the “New Hardware Wizard” dialog box is displayed, select “No, not this time” then click Next

Figure 10. Installation on Windows XP – New Hardware Wizard

c. On the next page select “Install from a list of specific location (Advanced)” then click Next

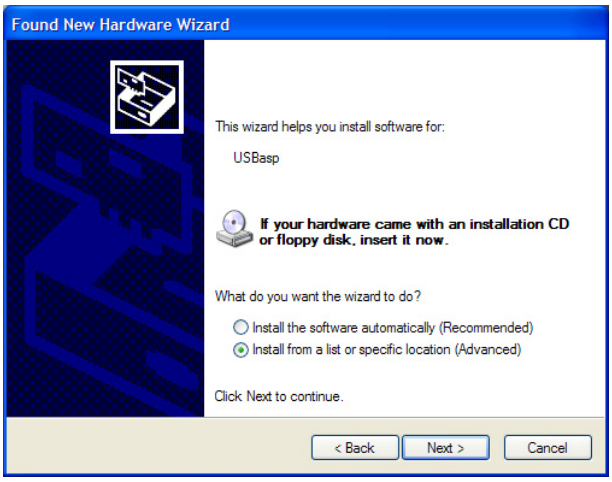


Figure 11. Installation on Windows XP – Insert CD or install from specific location

d. On the Search and Installation options page

(1) Ensure that “Include this location in the search” is checked,

(2) Click Browse and select the folder where you unzipped the USBasp drivers, then

(3) Click Next

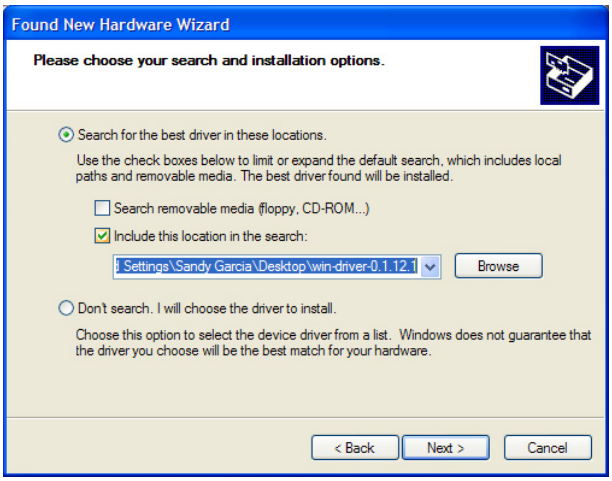


Figure 12. Installation on Windows XP – Specify Location

e. Wait for the driver to install

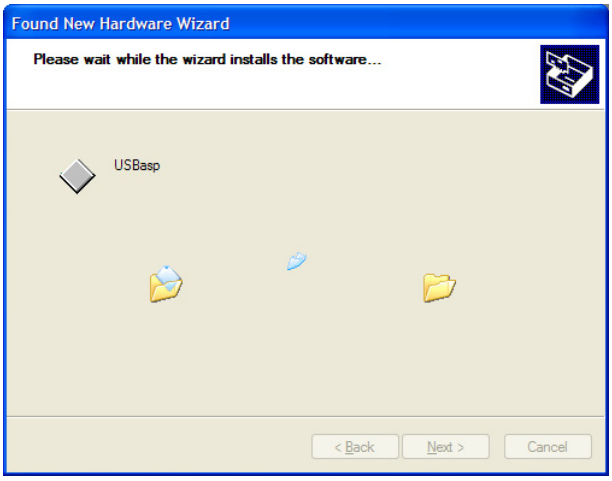


Figure 13. Installation on Windows XP – Driver installation

f. When the installation is complete, a confirmation screen will be displayed. Click close to close it.

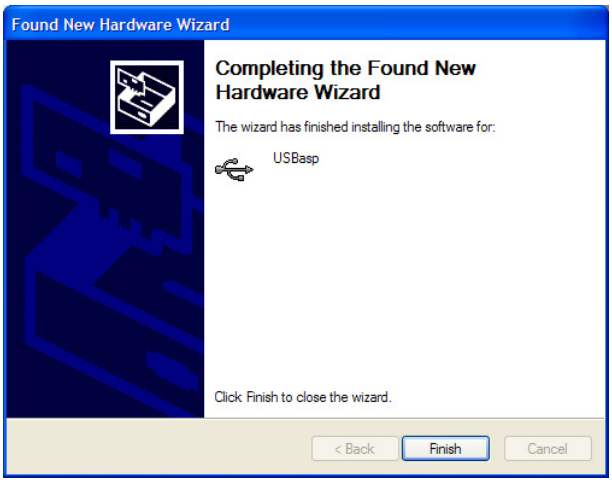


Figure 14. Installation on Windows XP – Installation Confirmation

g. Your programmer is now ready for use

3.1.3. Other operating systems

USBasp works under other operating systems such as Mac OS X and Linux, by drivers are not provided by Protostack nor are installation instructions included in this user's guide.

The USBasp programmer uses the AVR-USB library and driver source code can be downloaded this page http://www.obdev.at/products/avrusb/index.html .

Mac users may also want to look at http://www.harbaum.org/till/macavr/index.shtml .

3.2. Downloading firmware to your microcontroller

3.2.1. Required Items

Item required for this procedure include:

a. USBasp programmer,

b. Computer with USB port and AVRdude software installed,

c. Precompiled firmware to be loaded,

d. 10 pin or 6 pin ISP cable, and

e. AVR Microcontroller with ISP interface wired to it (e.g. an AVR microcontroller on a Protostack 29 pin AVR board)

3.2.2. Assumptions

This procedure assumes that

a. The procedure is being executed on Microsoft Windows XP or Windows Vista,

b. AVRdude is in the path,and

c. USBasp drivers have already been installed.

3.2.3. Procedure

To download the firmware to your microcontroller:

a. Insert the programmer into an available USB port

b. Open a command prompt

c. Enter the following command where

(1) <DEVICE> is the micro controller type you are programming (eg ATMEGA8), and

(2) <FILE> is the filename of the precompiled binary file

```
avrdude -p <DEVICE> -P usb -c usbasp  -U flash:w:<FILE>
```

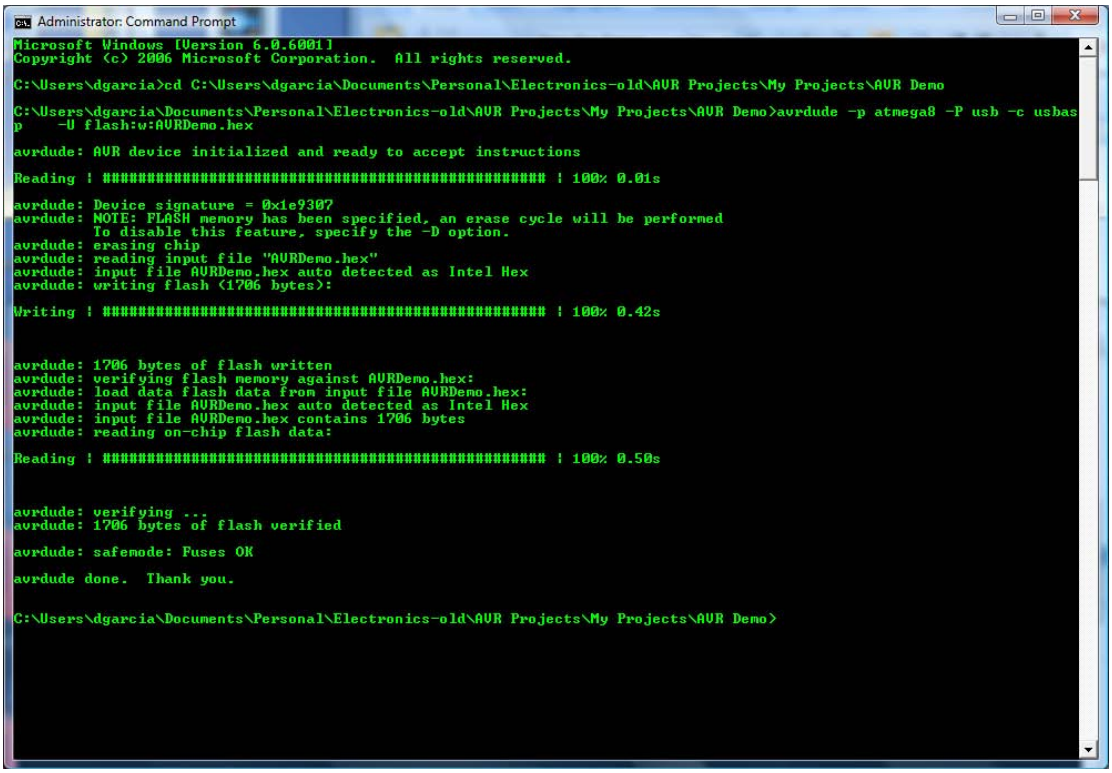


Figure 15. AVRdude writing a flash image to the microcontroller

3.2.4. More information

Please refer to the AVRdude documentation at http://www.nongnu.org/avrdude/user-manual/avrdude.html for more information.

4. Comment and Questions

If you have any questions or comments regarding this documentation or any of our products, please post to the Protostack forum at http://www.protostack.com/forum/. The forum will allow you to interact with peers and are constantly monitored by our support engineers.