27th November 2015

Flashing your Attiny85 with Micronucleus Bootloader

[http://paperduino.eu/lib/exe/fetch.php?cache=&w=900&h=577&tok=1ad70d&media=paperduino.jpg]

I have recently acquired all the parts required to build a working Attiny based on Paperduino Tiny. Link to Paperduino site here [http://paperduino.eu/doku.php?id=start] .

Paperduino is very similar to the Digispark [http://digistump.com/products/1] USB Development board, which is both based on the Attiny85 and uses the Virtual USB (or V-SUB) software implementation to emulate an USB, allowing us to upload sketches without any additional chip or hardware!

However, after following Paperduino's instructions, I found it really difficult to load the Bootloader properly, thus I created this post

- Download ***micronucleus-1.06-upgrade.hex*** bootloader here [http://paperduino.eu/lib/exe/fetch.php?media=micronucleus-1.06-upgrade.hex.zip] as per Paperduino site
- OR the latest build here [https://github.com/micronucleus/micronucleus/tree/master/firmware/releases] . I am downloading the ***t85_default.hex*** for my Attiny85 build
- Ensure that you are able to upload a sketch to your Paperduino via an ***Arduino as ISP***
  - If you haven't, please follow the step by step instructions here [http://dumbpcs.blogspot.com/2015/11/programming-your-attiny85-with-arduino.html] .
  - This is CRUCIAL to get it working!

While Paperduino's Avrdude instruction was short and simple, it DIDN'T @#$%@#% work! It is because everybody have got a different setup, a different comp port used, or even using a different ISP.

To determine your Avrdude command line, you'll need to do the following

- Arduino IDE -> Preference -> Settings
  - Check both ***Compilation*** and ***Upload*** Check boxes under the ***Show verbose output*** option
- Upload the Blink sketch to your Attiny85 using an Arduino as ISP
- Look at the compilation output, and locate the line that has ***avrdude*** and some ***blink.hex*** at the end
- Copy that command line, and paste it into Notepad (or any editor)

The following are the original Avrdude instructions as per Paperduino site. Link here [http://paperduino.eu/doku.php?id=burning_bootloader] .

- 5 Data I/O Pins (reset Pin enabled) [Recommended]
  - avrdude -c usbasp -p t85 -U flash:w:micronucleus-1.06-upgrade.hex -U lfuse:w:0xe1:m -U hfuse:w:0xdd:m -U efuse:w:0xfe:m
- OR 6 Data I/O Pins (reset Pin disabled)
  - avrdude -c usbasp -p t85 -U flash:w:micronucleus-1.06-upgrade.hex -U lfuse:w:0xe1:m -U hfuse:w:0x5d:m -U efuse:w:0xfe:m
- The only difference in both the commands is the High Fuse is different! (0x5d)

Using the command line you copied earlier, and placed into your Notepad, replace your command line with the following

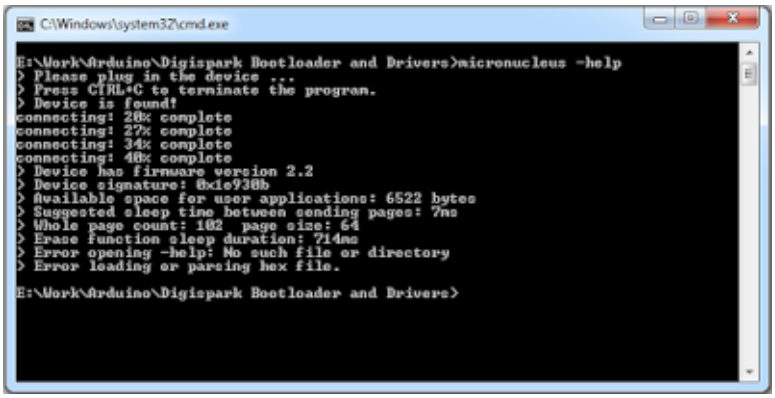
- blink.hex with ***t85_default.hex*** or ***micronucleus-1.06-upgrade.hex***
- add the fuse commands to the end of your command line

- -U lfuse:w:0xe1:m -U hfuse:w:0xdd:m -U efuse:w:0xfe:m

The following is an example of the command line that I used for my Bootloader upload

- E:\arduino-1.6.6\hardware\tools\avr/bin/avrdude -CE:\Work\arduino-1.6.6\hardware\tools\avr/etc/avrdude.conf -v -pattiny85 -cstk500v1 -PCOM3 -b19200 -Uflash:w:E:\Work\Arduino\t85_default.hex:i -U lfuse:w:0xe1:m -U hfuse:w:0xdd:m -U efuse:w:0xfe:m
- Replaced the hex file (in red)
- Added the fuse bits at the end (in blue)

Test and Verify that you have Successfully uploaded the Bootloader



[http://2.bp.blogspot.com/-wli58l9g--k/Vlh5IvkbX2I/AAAAAAAAPvE/r7J1Y7t3xmg/s1600/1.png]

- Download micronucleus.exe from the following link [https://github.com/micronucleus/micronucleus/tree/master/commandline/builds/Windows]
- Open a ***Windows Command prompt*** and run the following command
  - micronucleus -help
- Plug in your Paperduino
- You should see a similar output (as per image above)

Upload your Sketch directly to your Paperduino (without an ISP)

First you'll need to install and setup the Digispark boards (in details here [https://digistump.com/wiki/digispark/tutorials/connecting])

- Arduino's IDE -> File -> Preferences
- Under Additional Boards Manager -> http://digistump.com/package_digistump_index.json
- OK
- Tools -> Boards -> Boards Manager
- Allow it to load, and then select Digispark -> Install

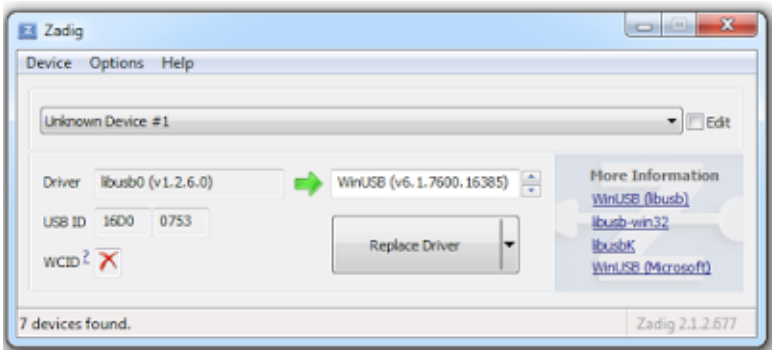
Setup your Arduino IDE

- Now, we'll try to upload the Blink sketch onto your Attiny
  - File -> Examples -> 01.Basics -> Blink
  - Change the pin numbers from 13 to 0
- Select your target device

- Tools -> Boards -> Digispark (Default - 16.5MHz)

- Select your programmer
  - Tools -> Programmer -> Micronucleus
- Upload

USB Device Error (possibly?)



[http://3.bp.blogspot.com/-sjLxe8t2rLE/Vlh8S_4I3sI/AAAAAAAAPvQ/vo-Tu5UPu-g/s1600/1.png]

- Download the following USB Driver from the Zadig site [http://zadig.akeo.ie/]
- Replace the USB driver. For me, its either WinUSB or lib-usb-win32
- Reupload your Blink Sketch!

Posted 27th November 2015 by Eric Tan

Labels: Arduino as ISP, ArduinoISP, Attiny85, Bootloader, Fuse, ISP, Micronucleus, Paperduino, Zadig

1 View comments

Chris Leech May 18, 2016 at 1:56 AM

Nice of you to take the time out and post this.
I have had the problem with fuse settings and Win7 driver issues so I am soooo tired of seeing the Device not Recognized thing. I hope you could update your Zadig remedy. When you download the micronucleus _master file from github. There is a folder in there called windows driver installer. Inside that there is the Zadig App, and a file called micronucleus.cfg > you are to insert this file in the box where in your creenprint you show "Unknown Device"

Of course this is all conjecture....
Right now I am just about to do the last ISP 6 wire connection to my ATtiny85 dev board (digispark) and see if after flashing and fues set, I finally have a USB device that may bw programmed via a USB cable and the Micronucleus programmer under the Arduino IDE.
Of course it is all going to go into the trash if I see that Win7 still does not see the device still after all this effort and huge amount of time and reading.

All for a postage stmp sized MCU

FIngers crossed

Reply

Enter your comment...

Comment as: Select profile...

Publish Preview