

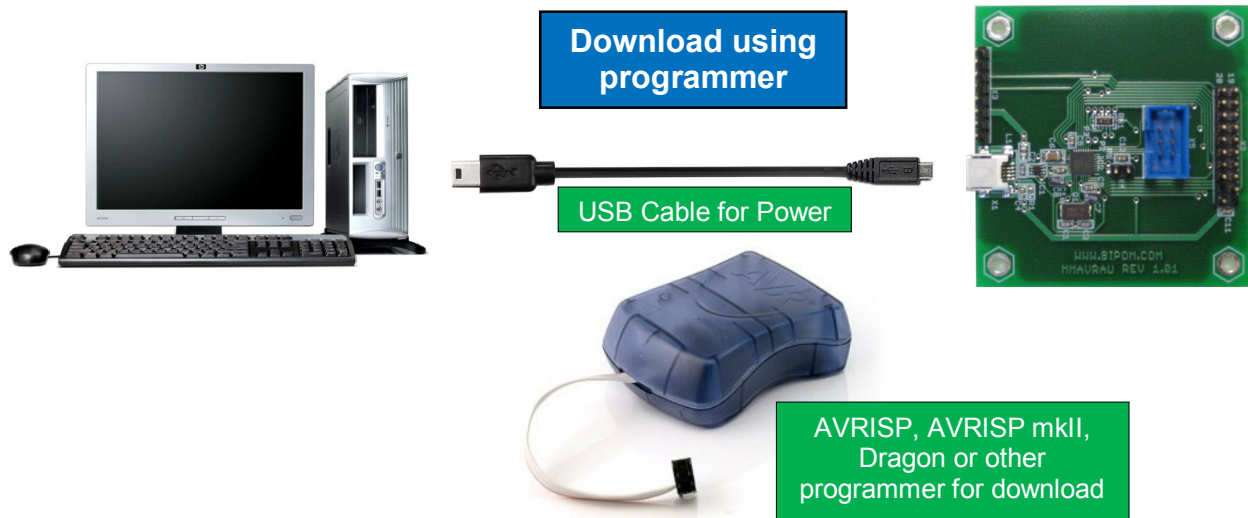
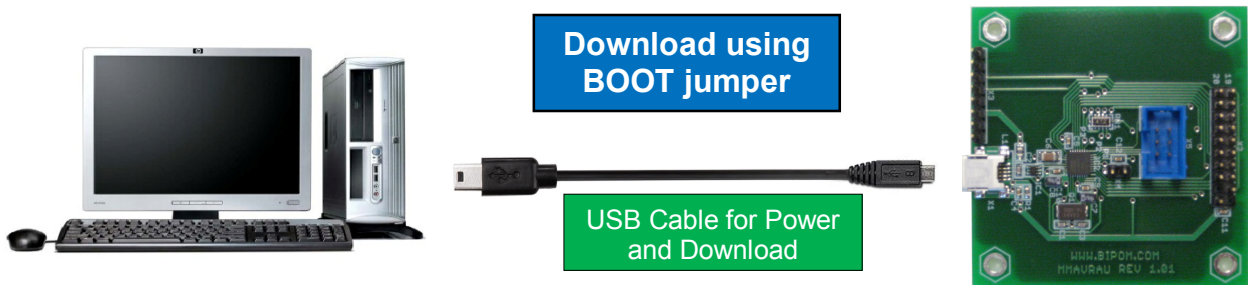
Downloading programs to BiPOM MINI-MAX/AVR-AU board

There are 2 methods to download user programs into the MINI-MAX/AVR-AU board:

1. Using the BOOT jumper
2. Using an external programmer

Using the BOOT jumper requires no external programmer. Download takes place through the board's own bootloader.

Using an external programmer requires an extra device (that is, the programmer) but it is more convenient (no need to remove and reinstall jumpers when programming).



1. Downloading using BOOT Jumper

Downloading programs to the MINI-MAX/AVR-AU board using BOOT jumper is accomplished through a program called FLIP from ATMEL. FLIP interacts with the built-in bootloader of USB-based ATMEL microcontrollers. FLIP allows downloading any AVR hex file (Intel hex format) that is generated by any software development tool (for example, WinAVR C Compiler, BASCOM AVR BASIC Compiler, Flowcode).

1.1 Downloading a program (hex) file

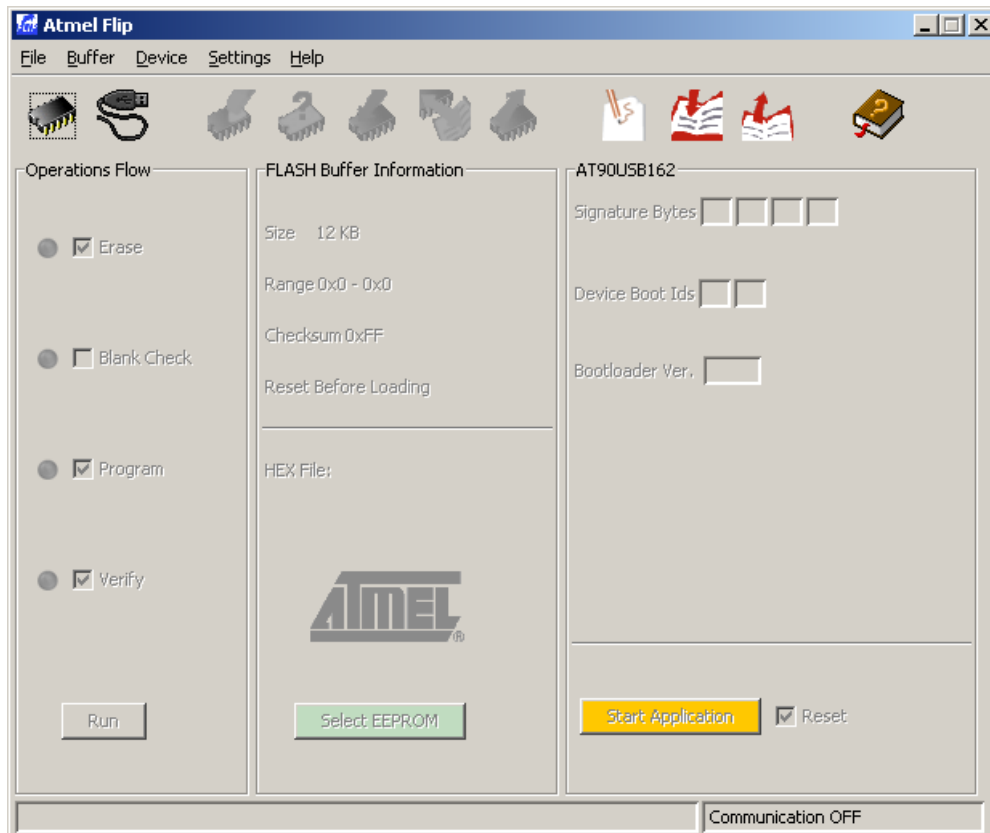
Download and install FLIP from ATMEL website:

http://www.atmel.com/dyn/products/tools_card.asp?tool_id=3886

Start FLIP from Programs menu:



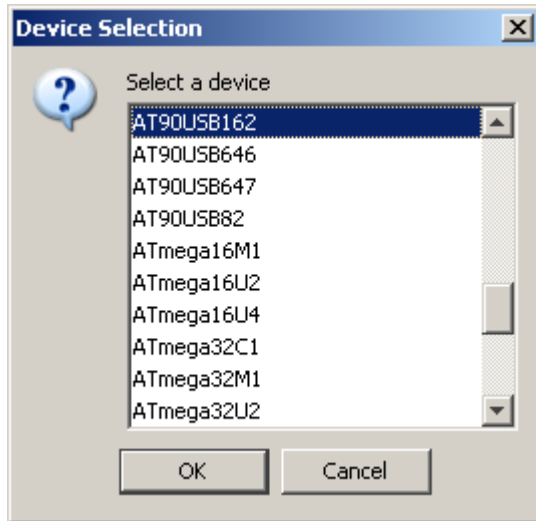
FLIP will start and the following window will appear:



If you are using FLIP for the first time, select the AVR microcontroller type.

MINI-MAX/AVR-AU board has ATMEL AT90USB162 microcontroller.

From FLIP Device menu, select AT90UB162 and click OK:



Now, we will prepare the MINI-MAX/AVR-AU board for download. To do this:

Connect the BOOT jumper on the MINI-MAX/AVR-AU board as shown in Figure 1.

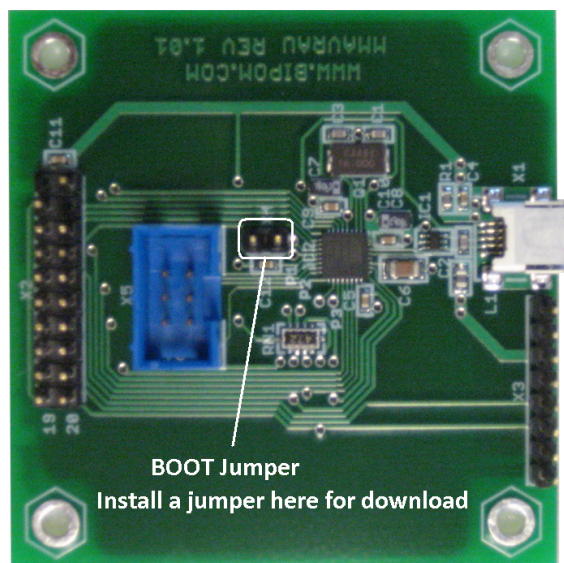
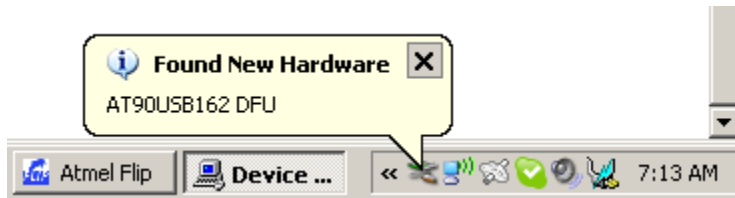


Figure 1

Connect MINI-MAX/AVR-AU board to an available USB port of your computer.

When MINI-MAX/AVR-AU is connected to the USB port of your computer for the first time, it will be detected as a USB device:



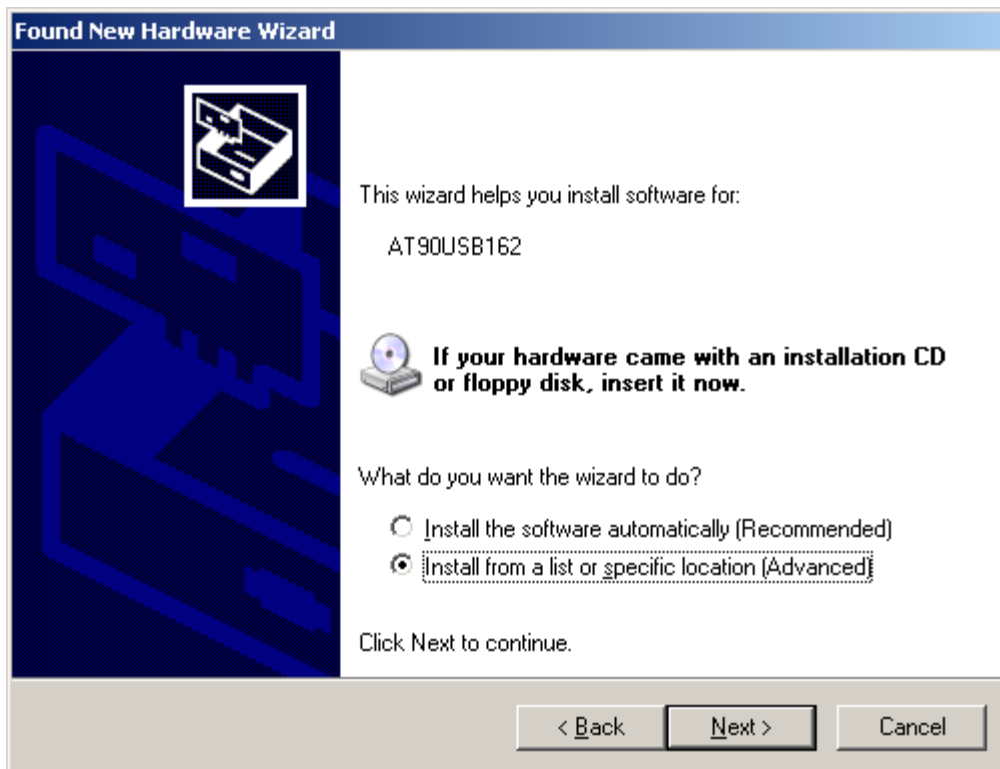
Windows will start the “Found New Hardware Wizard”:



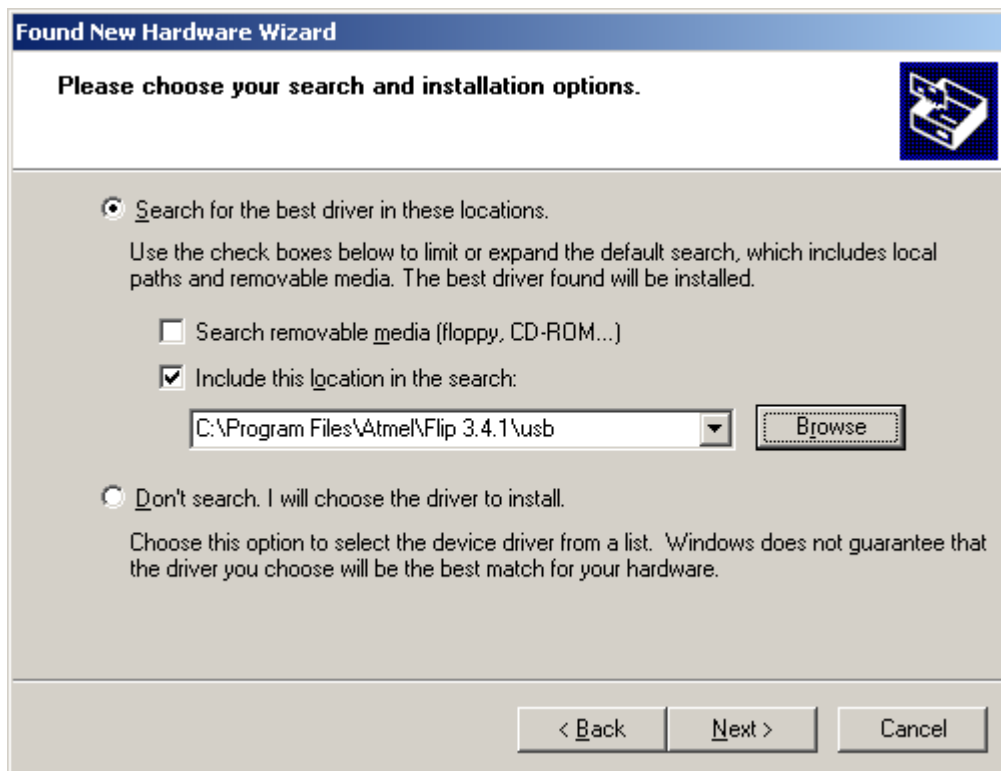
Click “No, not this time” option and click Next:



You will see the following window:



Select "Install from a list or specific location (Advanced)" option and click Next:

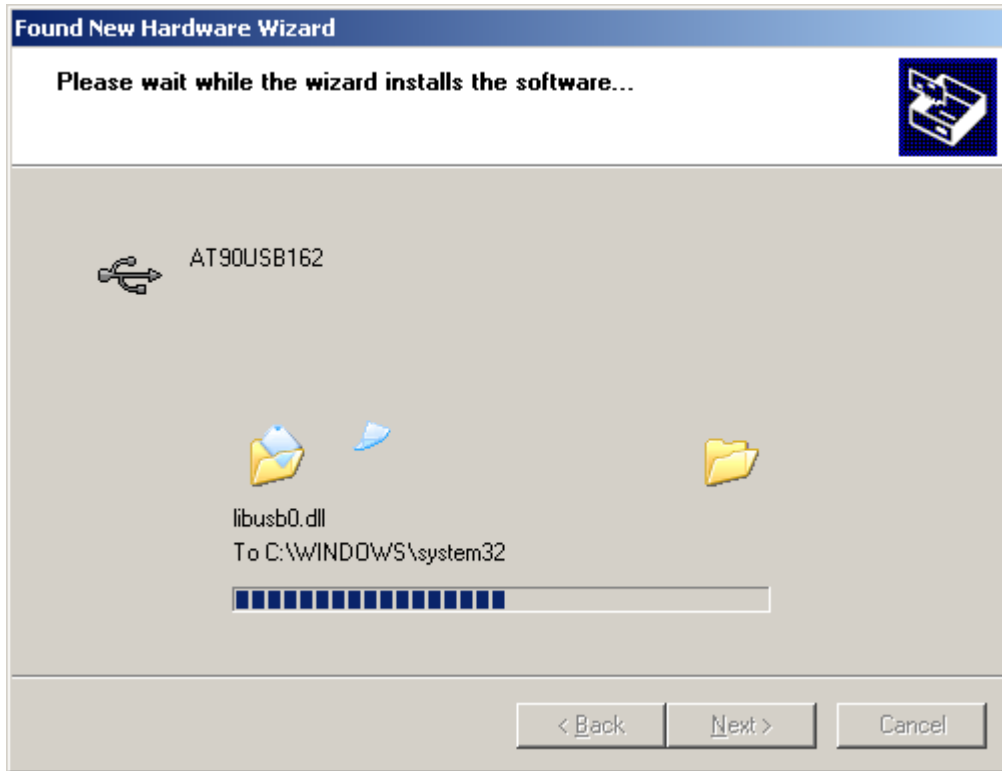


Select “Search for the best driver in these locations” option. Using the Browse button, select the directory:

C:\Program Files\Atmel\Flip 3.4.1\usb

Click Next.

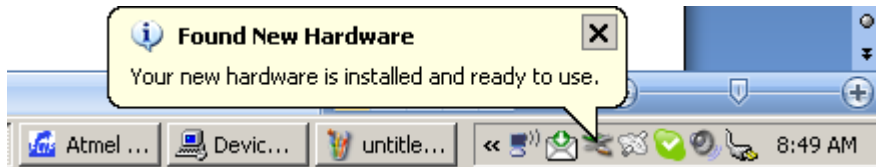
Windows will install the ATMEL AT90USB162 USB driver:



When the operation is finished, click the Finish button:

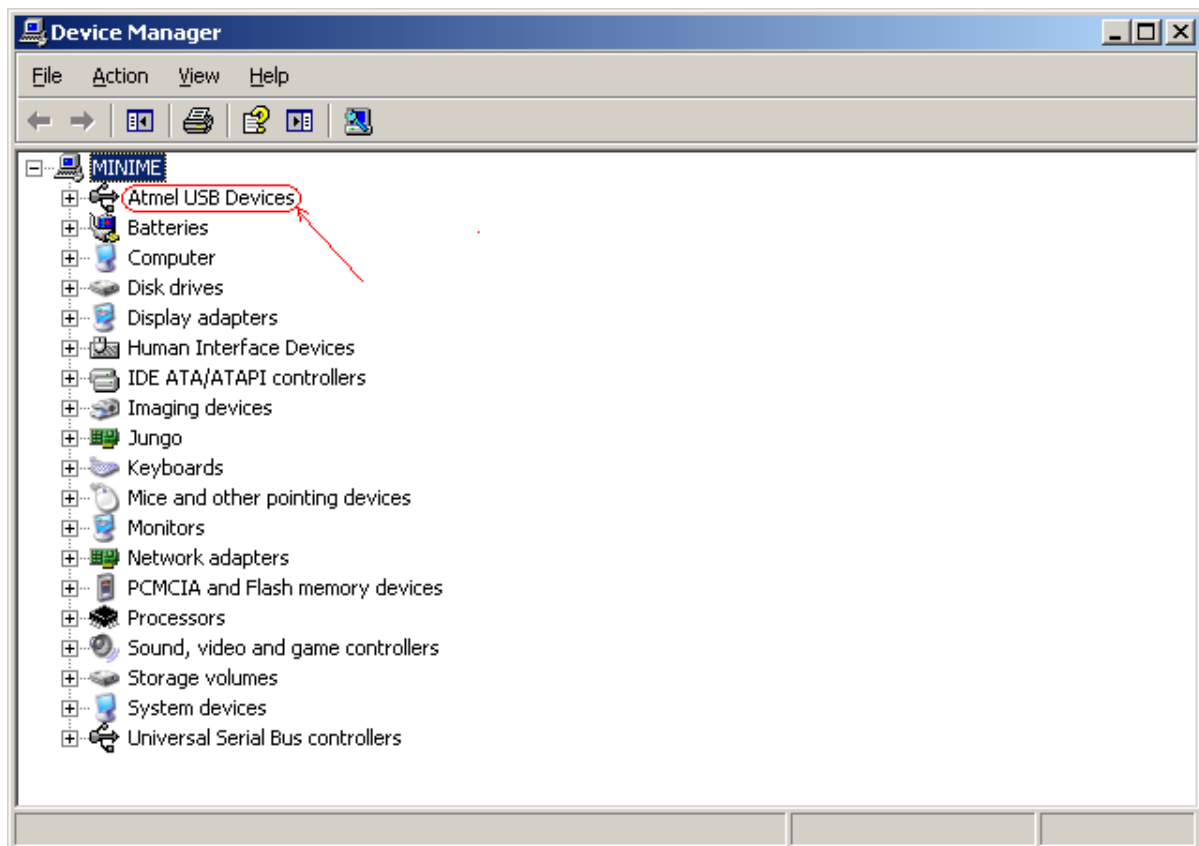


You should see the “Found New Hardware” notification at the bottom right corner of the Windows screen:

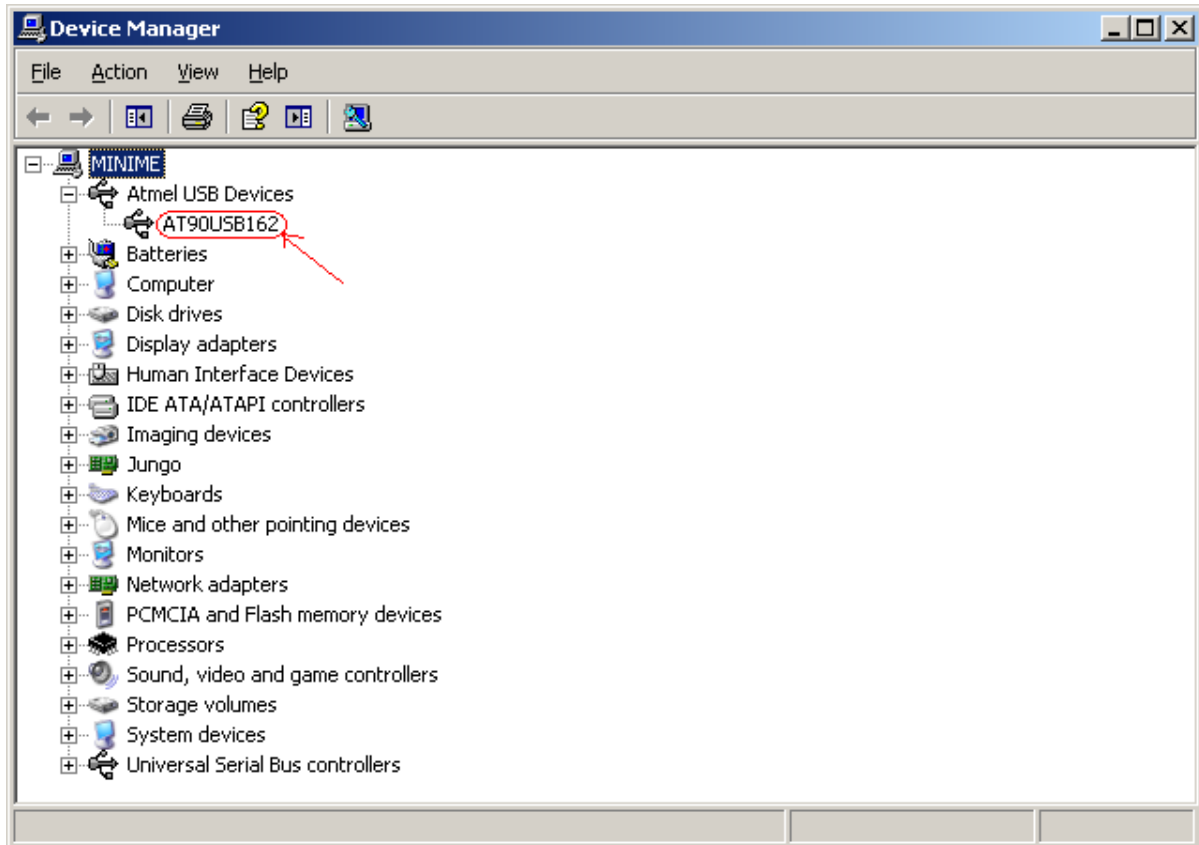


To make sure that the board was recognized correctly, you can start Windows Device Manager under Control Panel (use Start->Control Panel->System->Hardware->Device Manager under Windows XP; the sequence to start Device Manager may be different for other versions of Windows).

You will see an entry called “Atmel USB Devices” under the Device Manager:

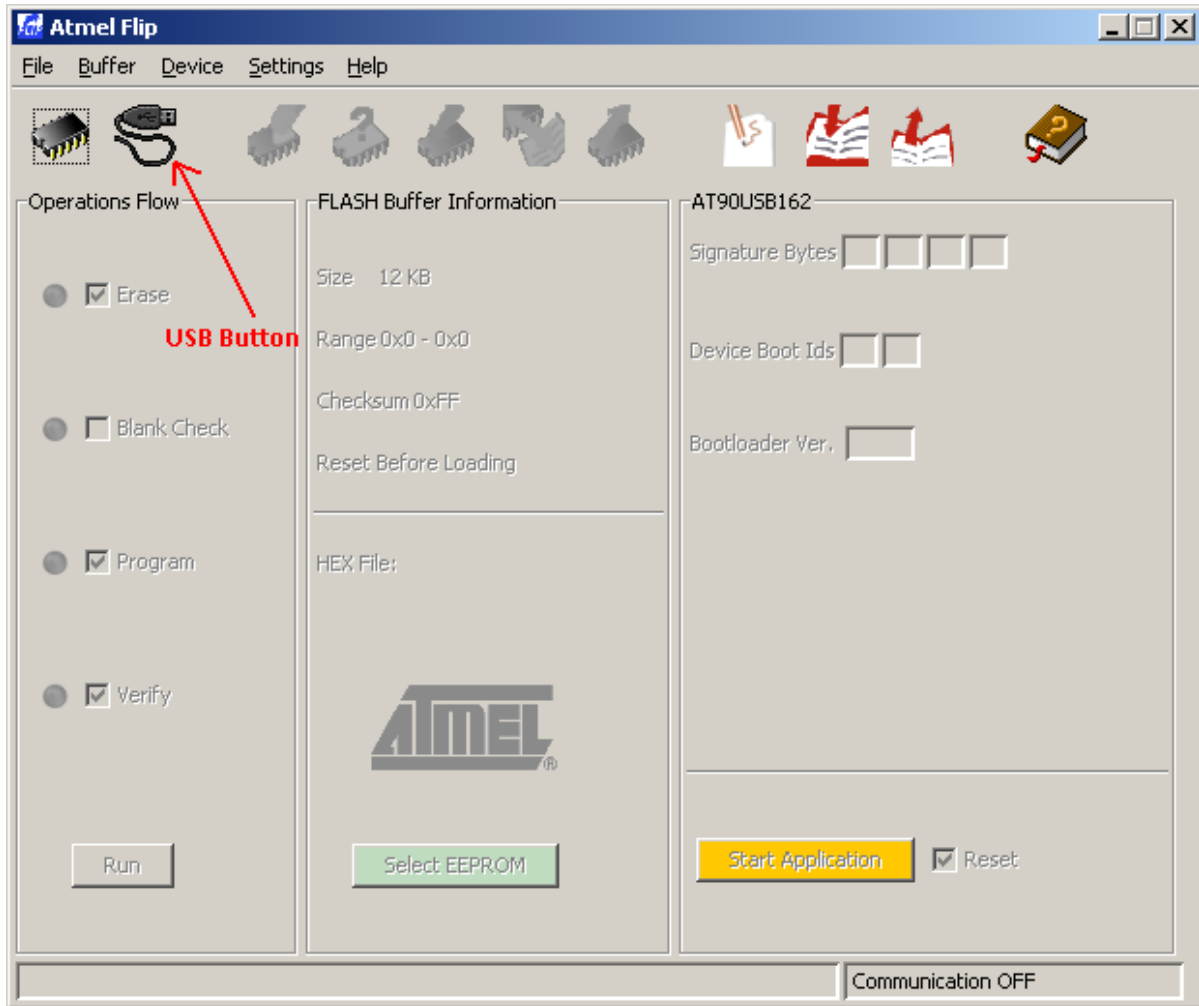


Click on the + sign to the left of “Atmel USB Devices” entry. This will expand the entry and show the “AT90USB162” entry:

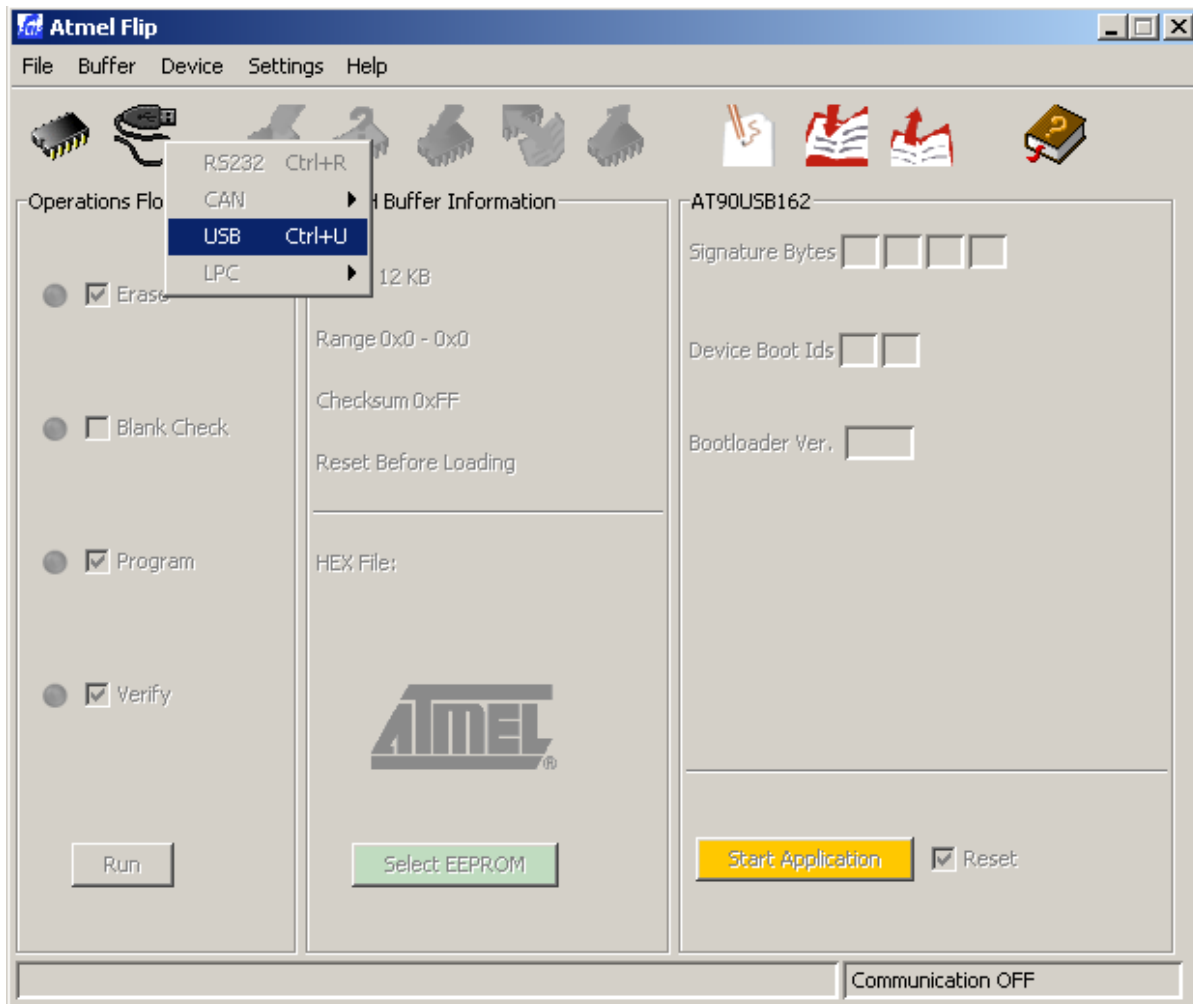


At this point, the MINI-MAX/AVR-AU board is ready to accept programs.

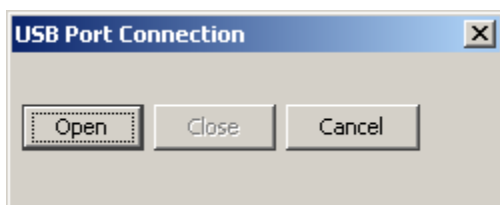
Click the USB button on the FLIP toolbar:



Select USB from the menu that appears. (USB may be the only option in this menu):

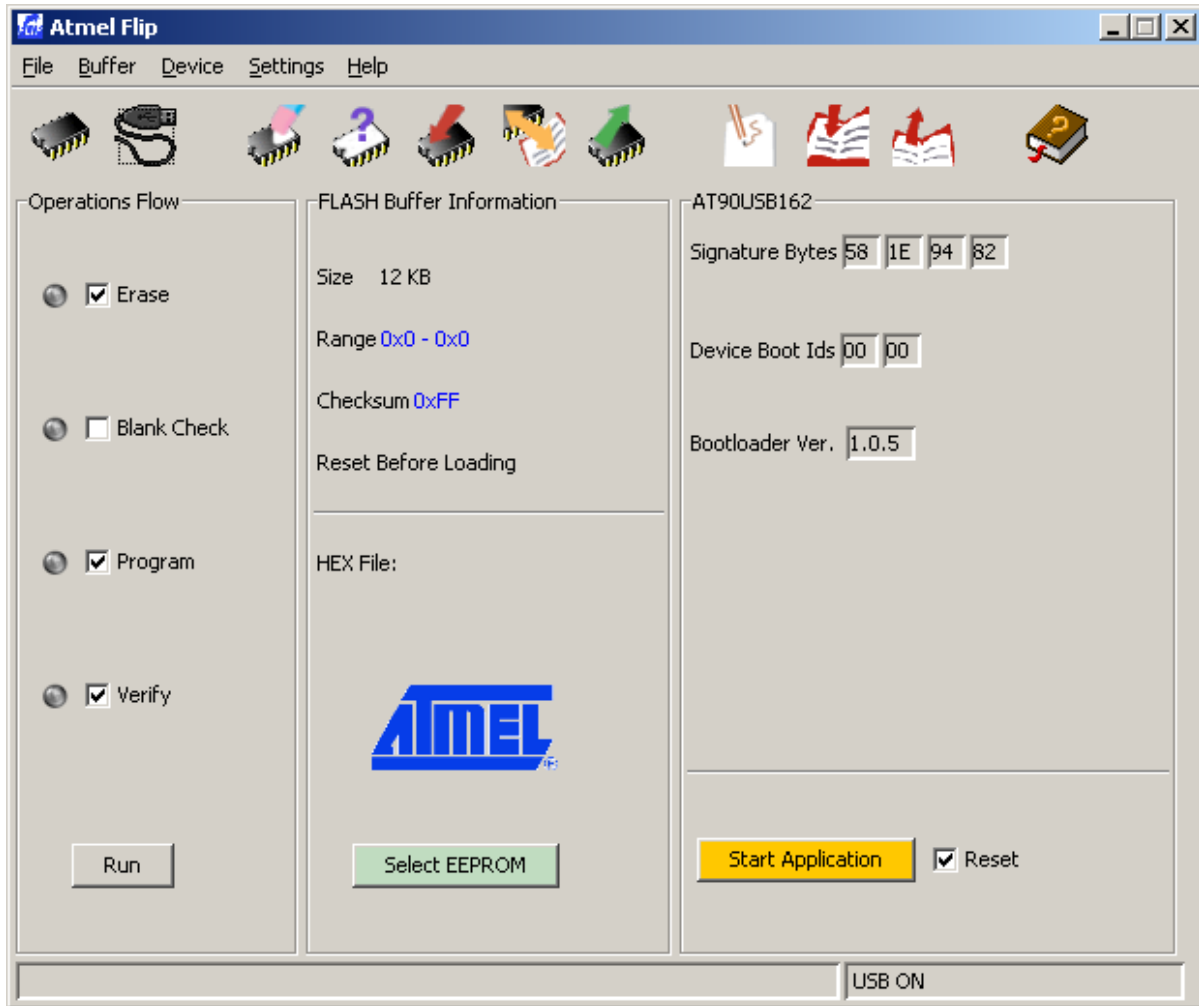


This will display a small window:

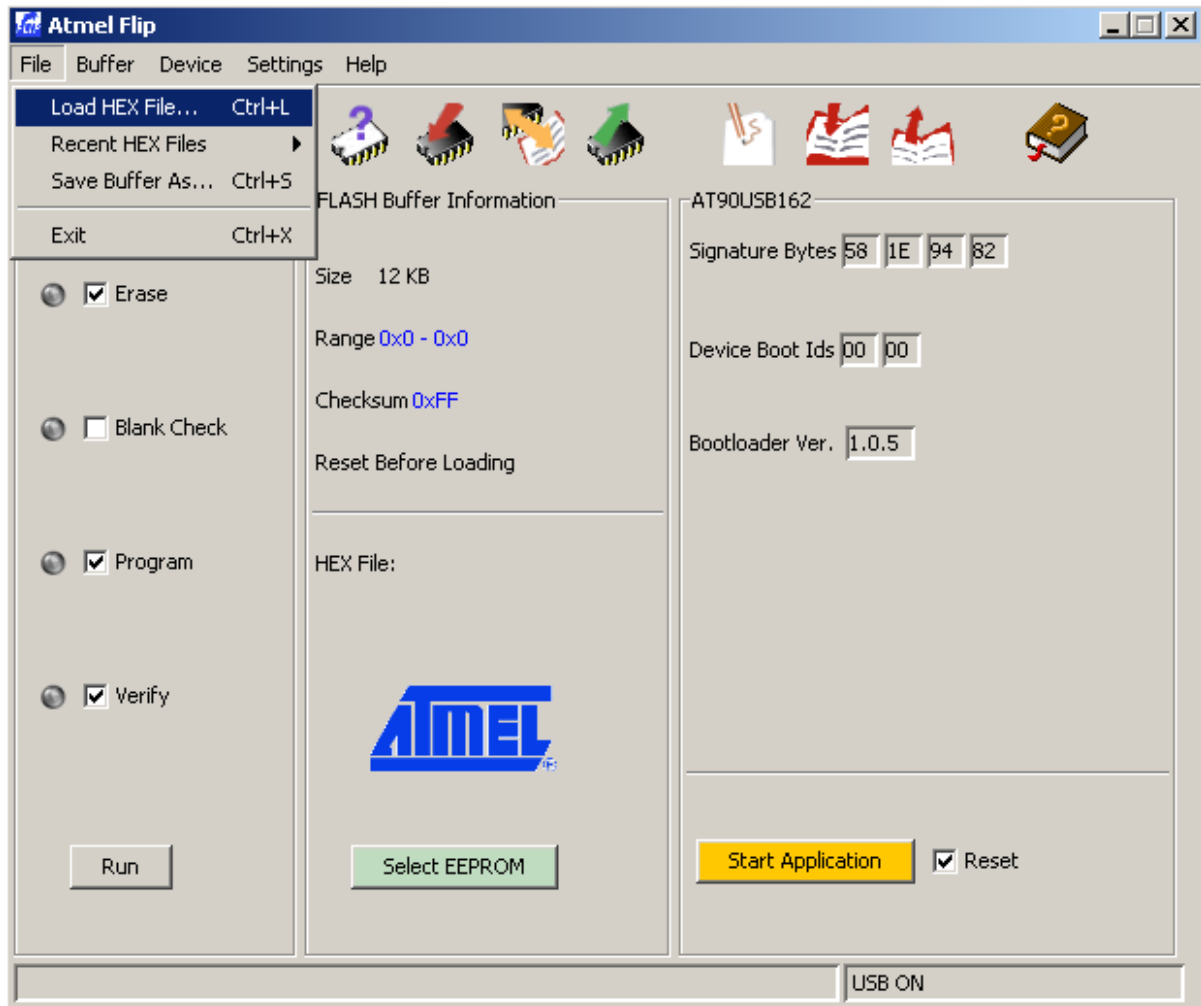


Click Open.

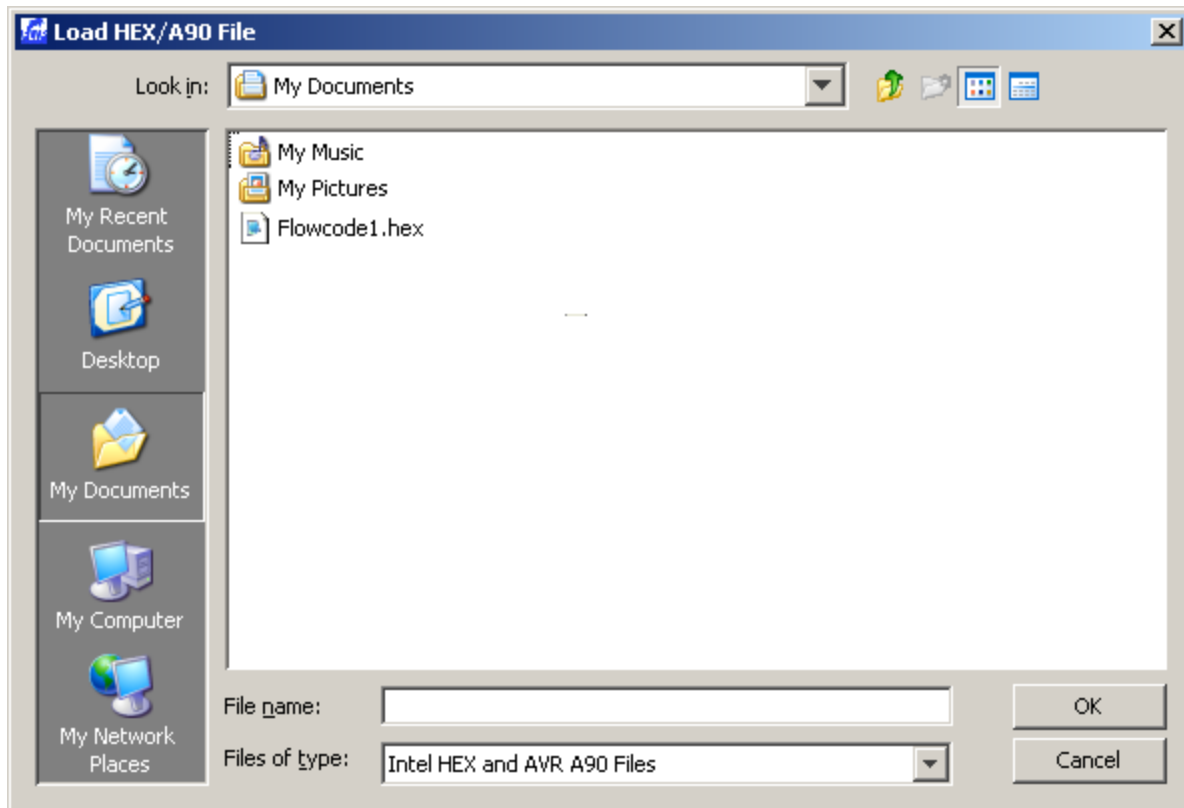
The following screen will appear:



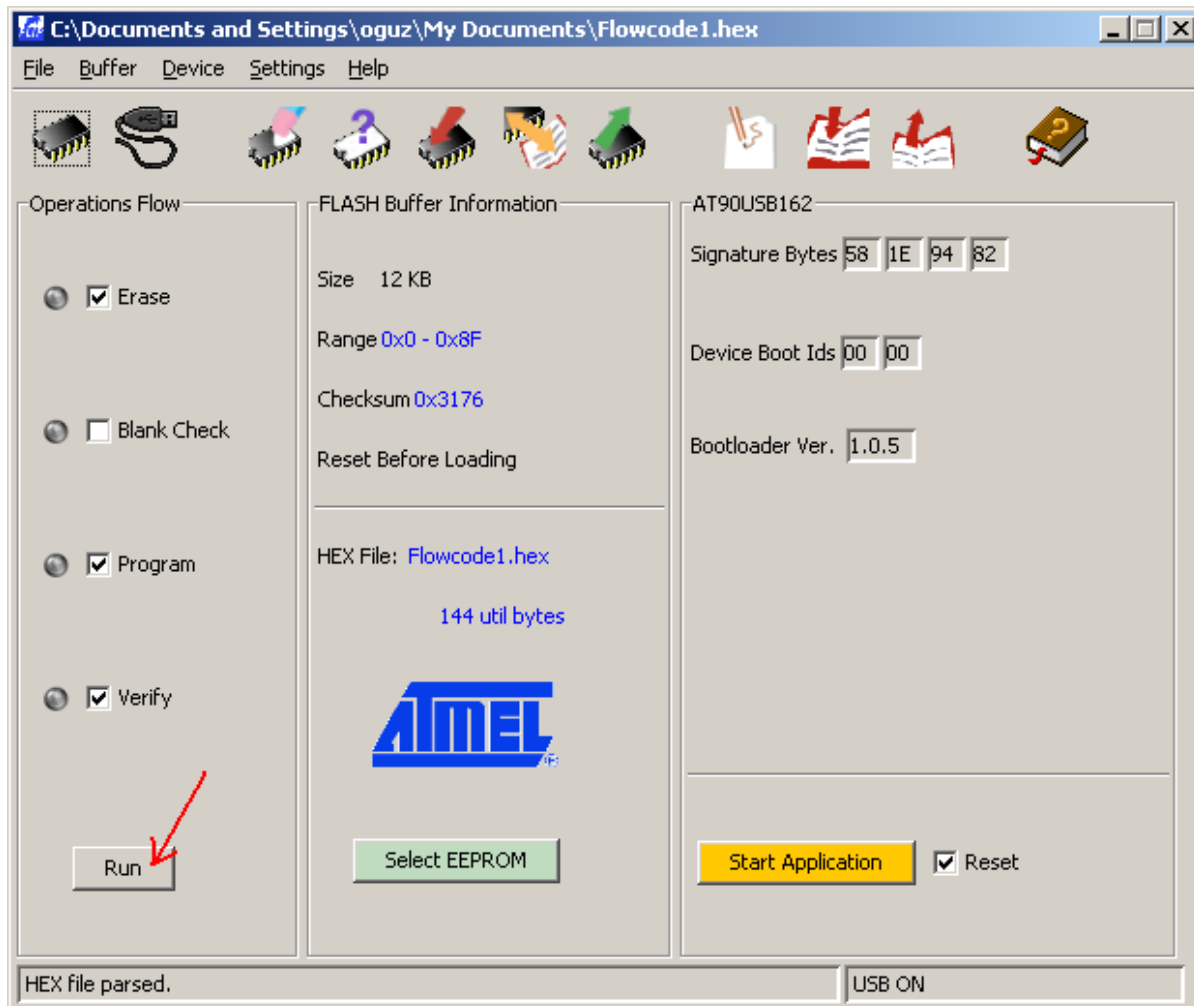
To download the hex file to the microcontroller, select File->Load Hex File:



Select the hex file to open:



Click the RUN button to download the hex file to the MINI-MAX/AVR-AU board:



This will erase the AT90USB162's Flash memory and download the program.

To run the program on the MINI-MAX/AVR-AU board, simply remove the BOOT jumper and remove and reinstall the USB cable. The program will start running.

1.2 Downloading from within Flowcode

A hex program file that is generated by Flowcode can be downloaded to MINI-MAX/AVR-AU using the ATMEL FLIP program as described in Section 1.1 above. This download method takes place outside of Flowcode.

Flowcode also has the ability to launch external programs to download to target microcontroller boards the hex files that are generated by Flowcode. Downloading from within Flowcode in this way makes it more convenient to download programs to the target board.

FLIP includes a command line version called **batchisp** that has most of the features of FLIP and can be executed from command line.

BiPOM offers a simple batch file called **batch_isp.bat** that helps integrate **batchisp** with Flowcode. Programs can be developed in Flowcode and downloaded to MINI-MAX/AVR-AU with a single click.

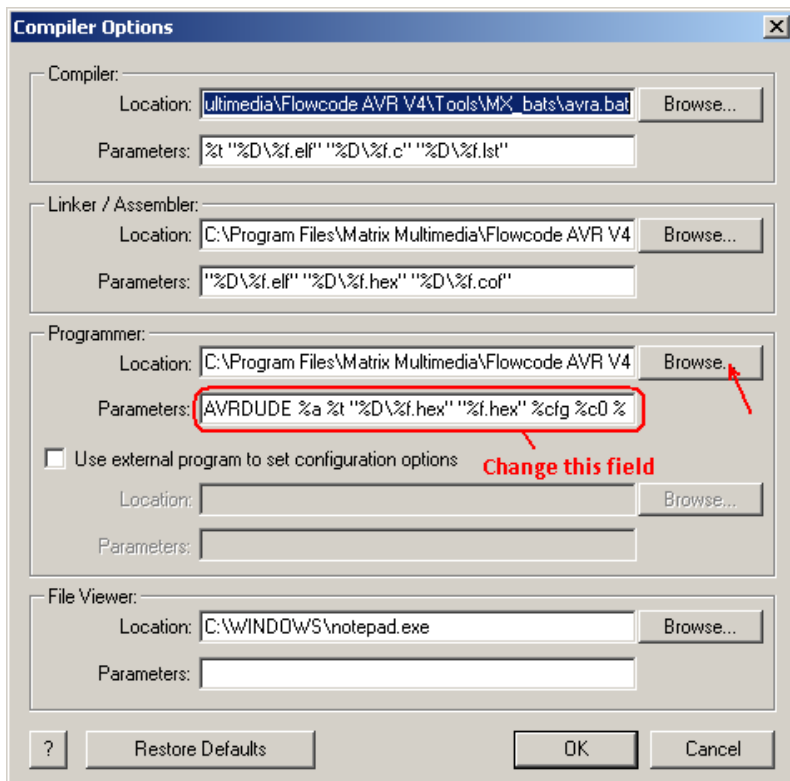
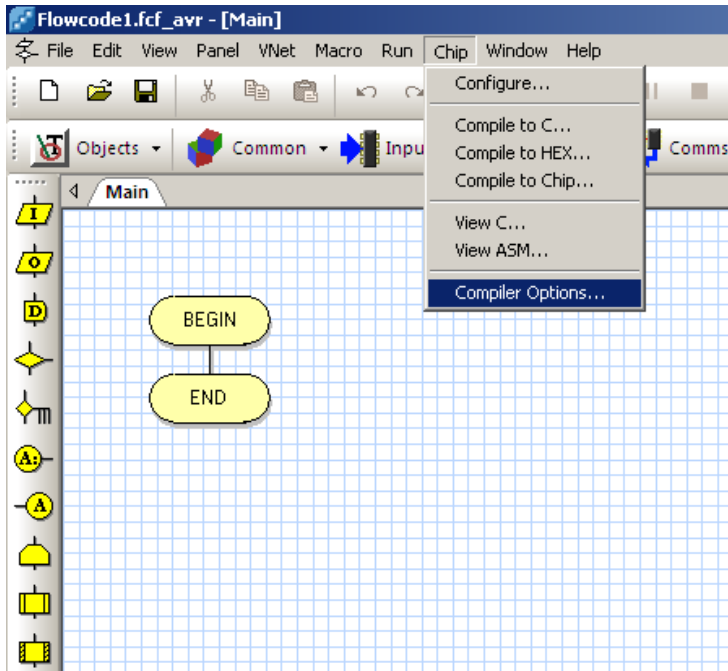
Download **batch_isp.bat** from BiPOM web site at:

http://www.bipom.com/files/mmavr/mmavr_au

and save it to the Flowcode directory:

C:\Program Files\Matrix Multimedia\Flowcode AVR V4\Tools\MX_bats

Assuming that Flowcode has already been installed, start Flowcode. Open the Flowcode program that you want to download. Select Chip->Compiler Options:



Only the Location and Parameters fields in the Programmer section will be modified. All other fields will be left untouched.

Delete the contents of the Parameter field and enter:

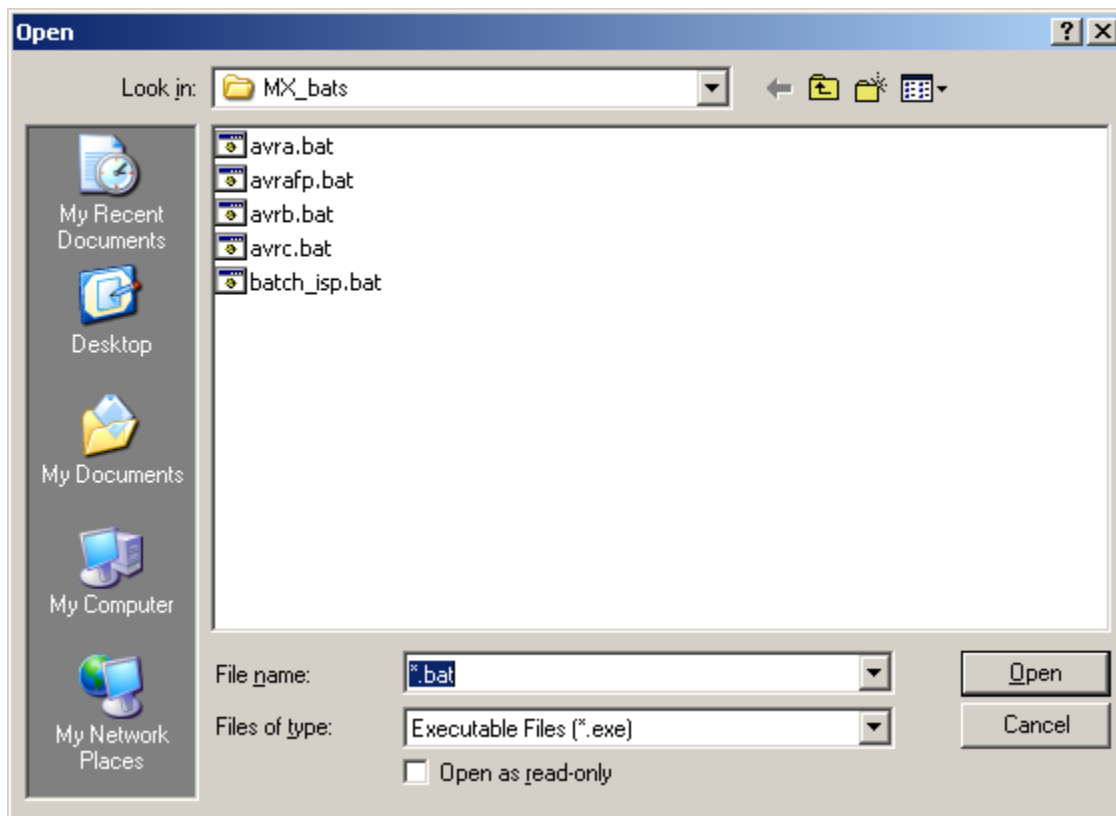
"%D%\f.hex" %t

in the Parameters field.

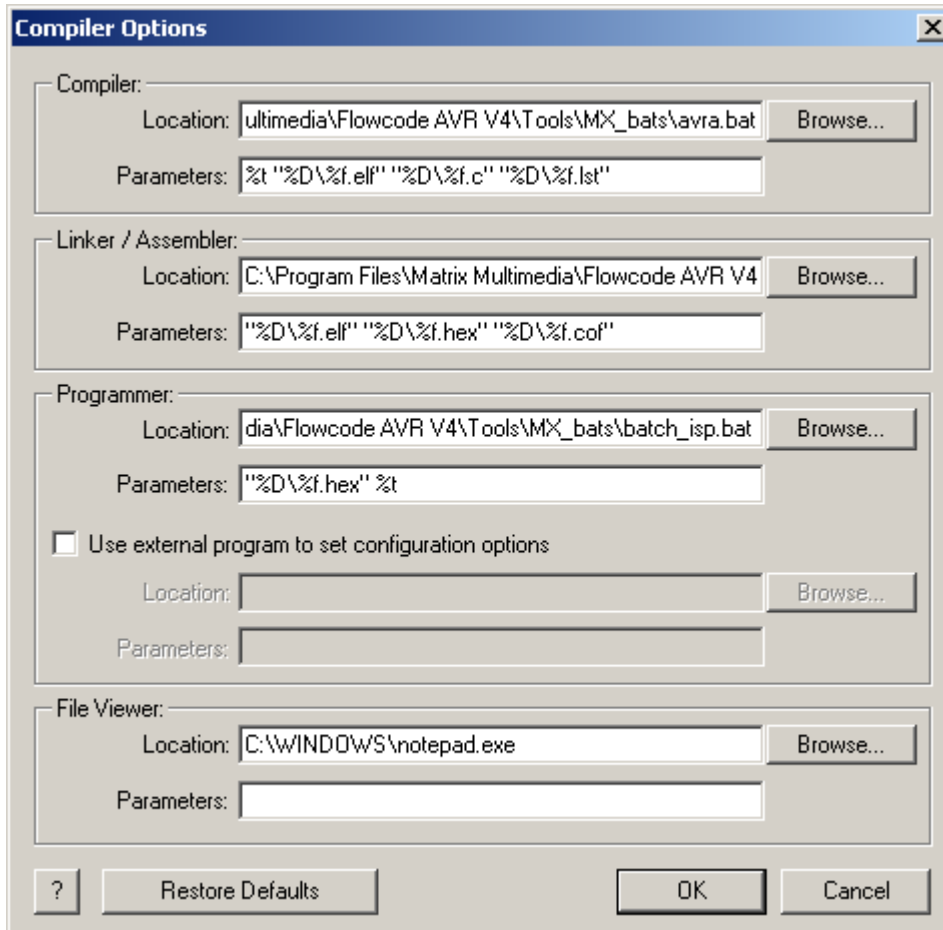
Click on Browse button in Programmer section. Select:

C:\Program Files\Matrix Multimedia\Flowcode AVR V4\Tools\MX_bats\batch_isp.bat

Flowcode limits the file types to **.exe** files in the file selection window. To work around this, you can enter ***.bat** in the Filename field and see all the batch files:



Compiler Options window will now look like this:



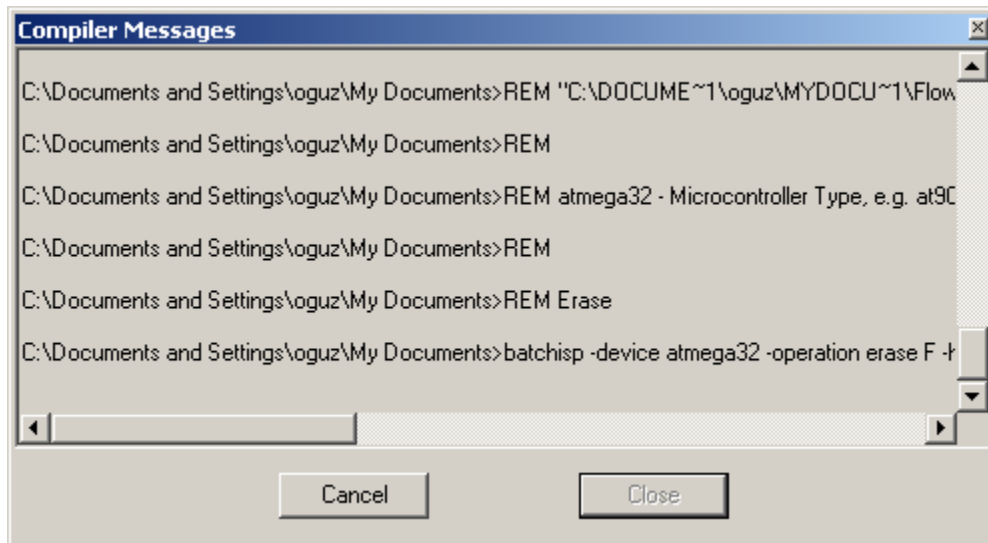
Click OK to save the changes.

Put the MINI-MAX/AVR-AU board to Download mode by installing the BOOT jumper and removing and reconnecting the mini USB cable to the board.

To download the Flowcode program to the MINI-MAX/AVR-AU board, select

Chip->Compile to Chip

This will start the compiler and when the program is compiled successfully, the external batch file batch_isp.bat will be launched to complete the program download to the board:



If the download fails for some reason, you will see messages in this window as to why the download failed. Download may fail if you forgot to install BOOT jumper on MINI-MAX/AVR-AU or if MINI-MAX/AVR-AU is not connected to the USB port of your computer.

2. Downloading with an external programmer

MINI-MAX/AVR-AU board has a 6-pin In-System Programming (ISP) connector that supports various programmers from ATMEL and other third party suppliers. Supported programmers include (but not limited to):

- AVRISP
- AVRISP mkII
- Dragon

Theoretically, any programmer that supports ISP method for AVR programming should work. Figure 2 shows the location of the ISP connector on the MINI-MAX/AVR-AU board:

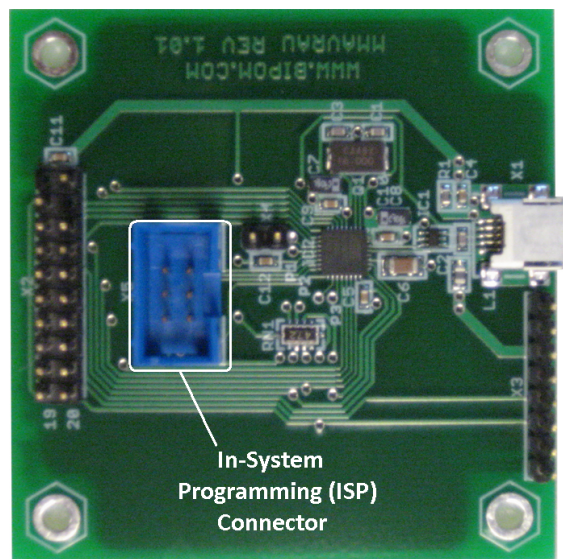
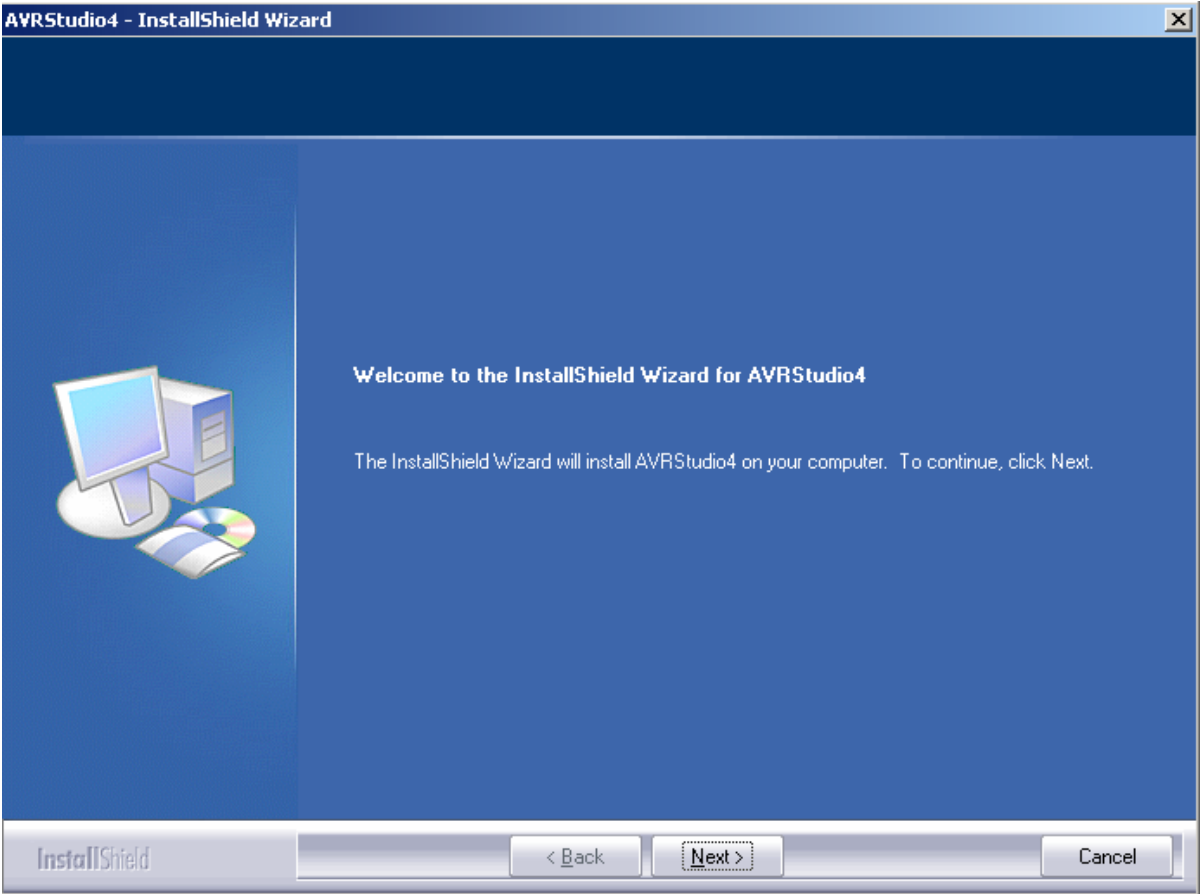


Figure 2

For our description of the download process using an external programmer, we will assume that AVRISP mkII is used. Instructions for other programmers are very similar.

AVRISP mkII uses AVR Studio from ATMEL. AVR Studio has a built-in downloader that works with AVRISP mkII.

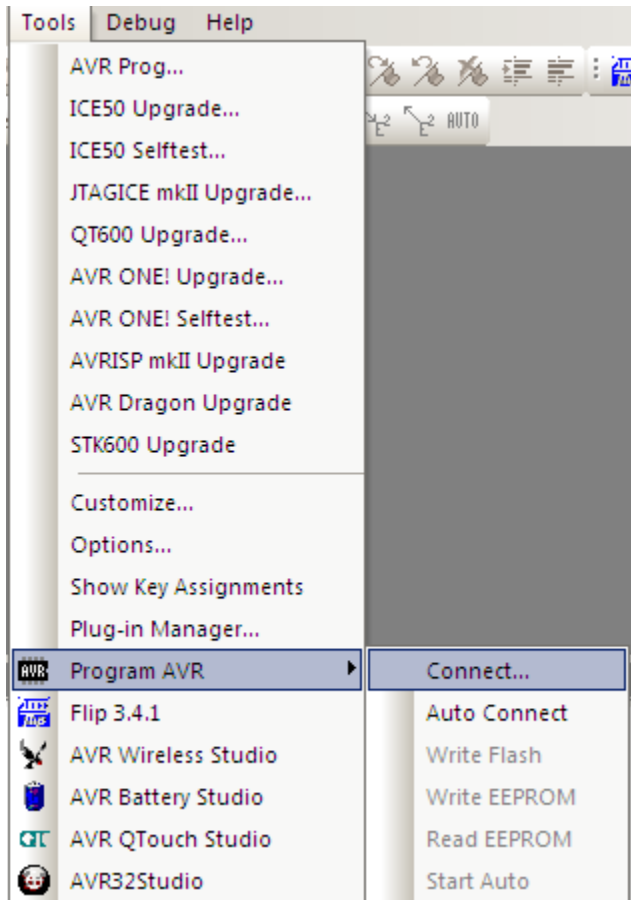
Download and install AVR Studio 4.16 or later from <http://www.atmel.com/avrstudio>. Also download any service pack for AVR Studio that may be available on ATMEL website. Service pack should be installed after AVR Studio has been installed.

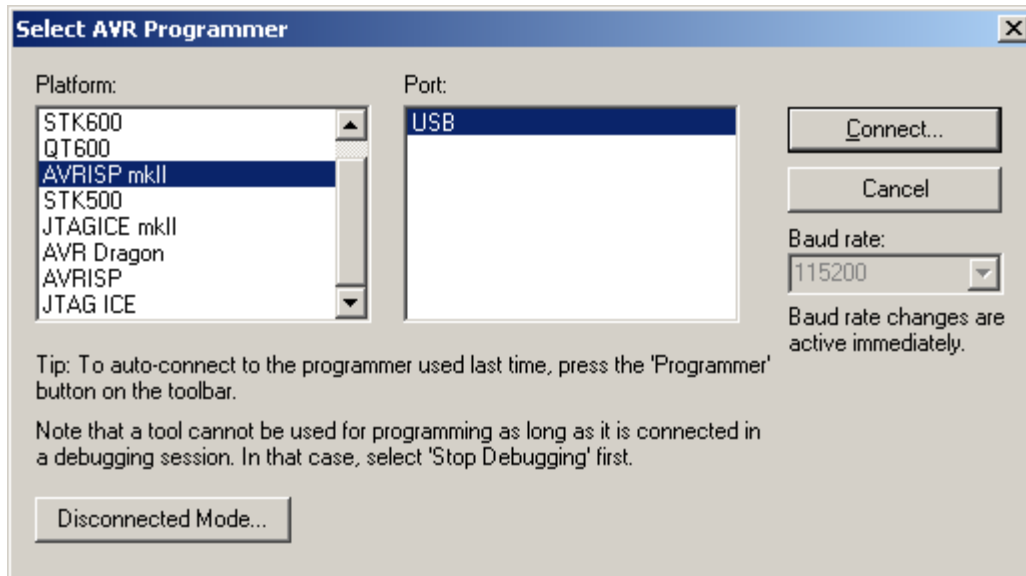


Start AVR Studio. If AVR Studio asks to create or open a project, click Cancel.

If you see a message like **"gcc plug-in: No WinAVR installation found. The AVR GCC plug-in can still be used if you set up your own build tools."** in the Output window of AVR Studio, you can ignore this message. AVR Studio is used only as a download tool; we do not need WinAVR C Compiler for this purpose.

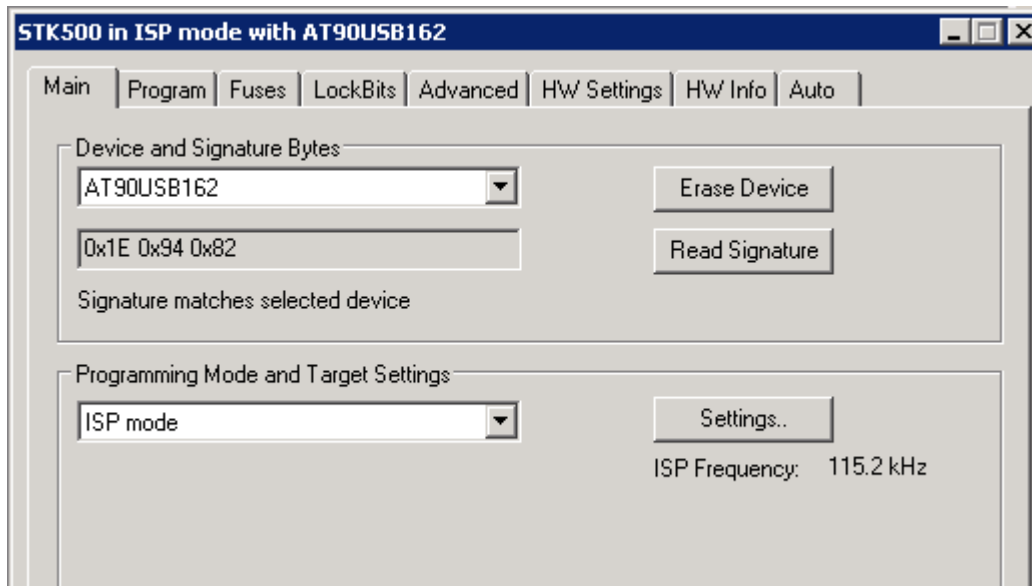
Select Tools->Program AVR->Connect:



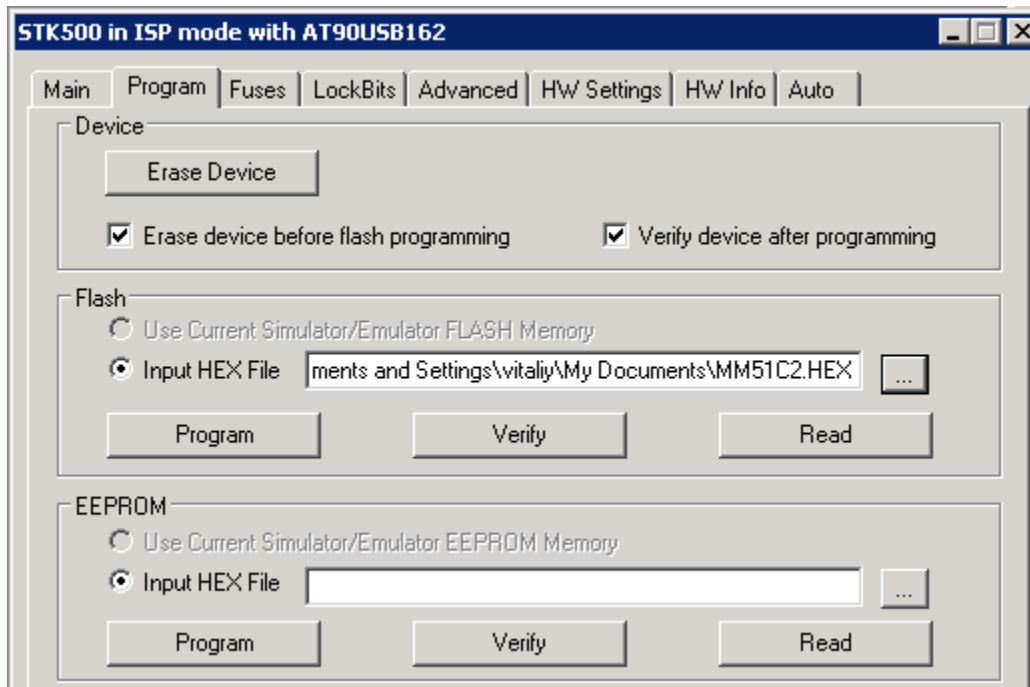


Select AVRISP mkII and USB as the Port. Click Connect.

Select AT90USB162 as the Device under Main tab. Click Read Signature to see if there is connection to the board. If you can read the signature of AT90USB162 and it matches, this means that the board is connected, powered and ready to accept programs:



Select the Program tab. Click the Browse button to select the hex file to be downloaded:



Click the Program button to download the program to the board.

Note: Fuses tab will not be used at all. All the fuses have already been set correctly at the factory. There is no need to alter the fuse settings.

After a successful download, the program will start running on the board. There is no need to detach the AVRISP mkII programmer from the board.