MINI-MAX/AVR-C

Quick Start Guide

Document Revision: 1.01

Date: 21 May, 2009

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1. Overview

Thank you for your purchase of the MINI-MAX/AVR-C Single Board Computer. MINI-MAX/AVR-C is a general purpose, low-cost and highly expandable micro-controller system. It is based on the ATMEL Atmega2560 single-chip Flash micro-controller. All Mini-Max/AVR-C boards are shipped with a pre-programmed serial boot loader. This way the ATmega2560 Flash memory can be downloaded through a standard PC COM port. Through the boot loader, the MINI-MAX/AVR-C appears to AVR Studio and other development tools as the ATMEL STK500 board. If the loader is not present in ATmega2560 Boot Flash memory, please read the special document from BiPOM on how to restore the boot loader:

http://www.bipom.com/documents/boards/mmavr/atmega2560_bootloader.pdf

2. Tools

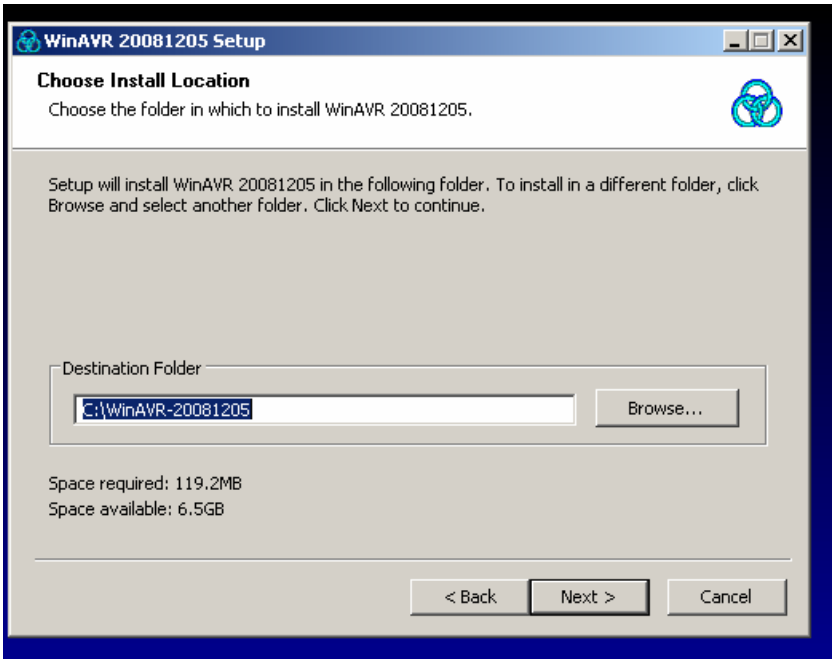
2.1 AVR Studio® 4 from ATMEL (www.atmel.com) is a professional Integrated Development Environment (IDE) for writing and debugging AVR® applications in Windows® 9x/NT/2000/XP/Vista (32- and 64-bit) environments. AVR Studio 4 includes an assembler and a simulator.

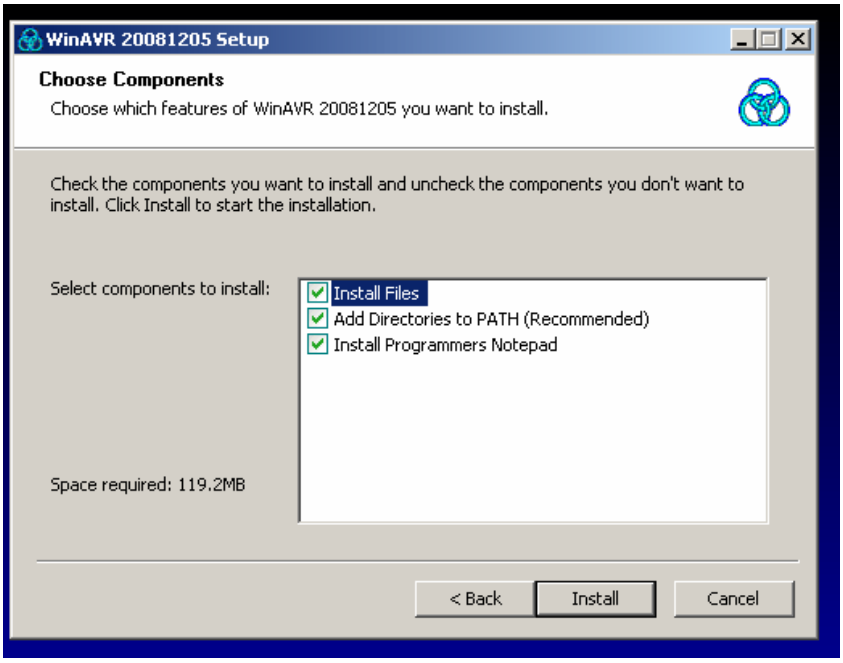
2.2 WinAVR (TM) is a suite of executable, open source software development tools for the Atmel AVR series of RISC microprocessors hosted on the Windows platform. WinAVR includes the GNU GCC compiler for C and C++.

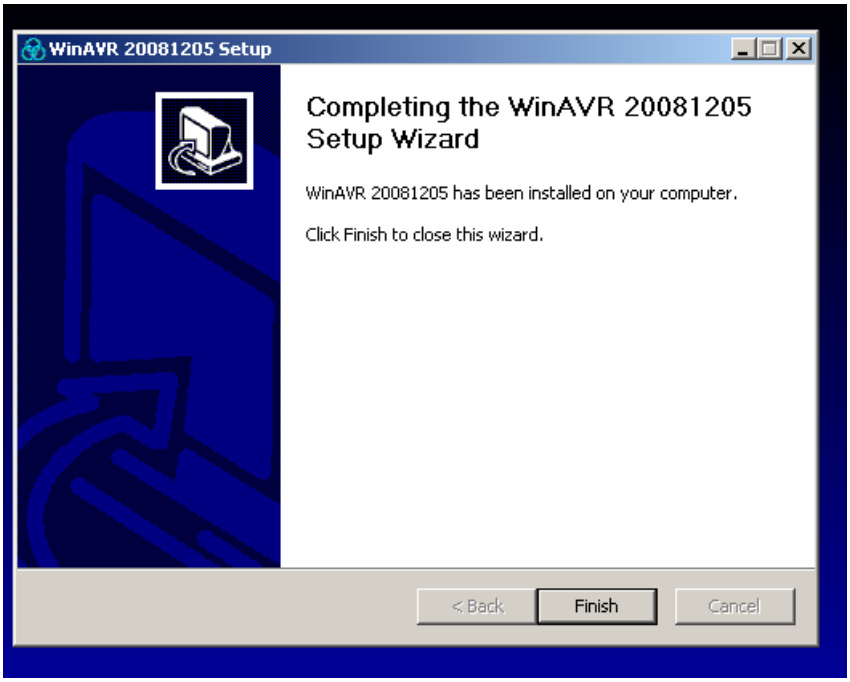
2.3 Micro-IDE from BiPOM (www.bipom.com) is a Windows-based Integrated Development Environment for micro-controller application development. The IDE provides a built-in terminal window to interact with MINI-MAX boards through a PC COM port.

3. Software setup

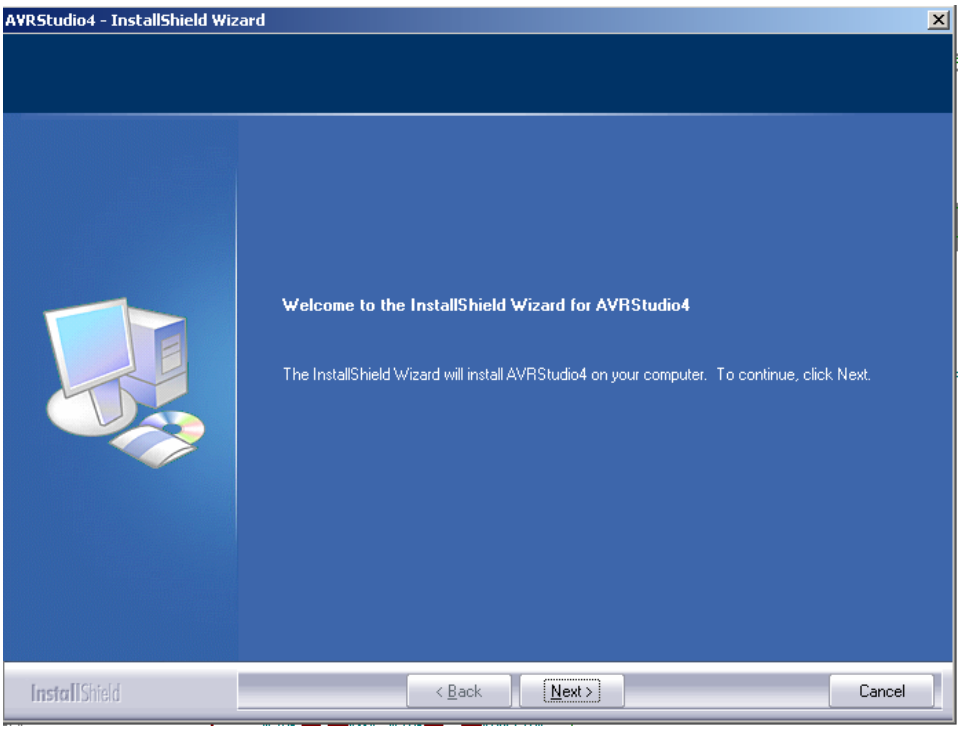
3.1. Download and install WinAVR from http://winavr.sourceforge.net/

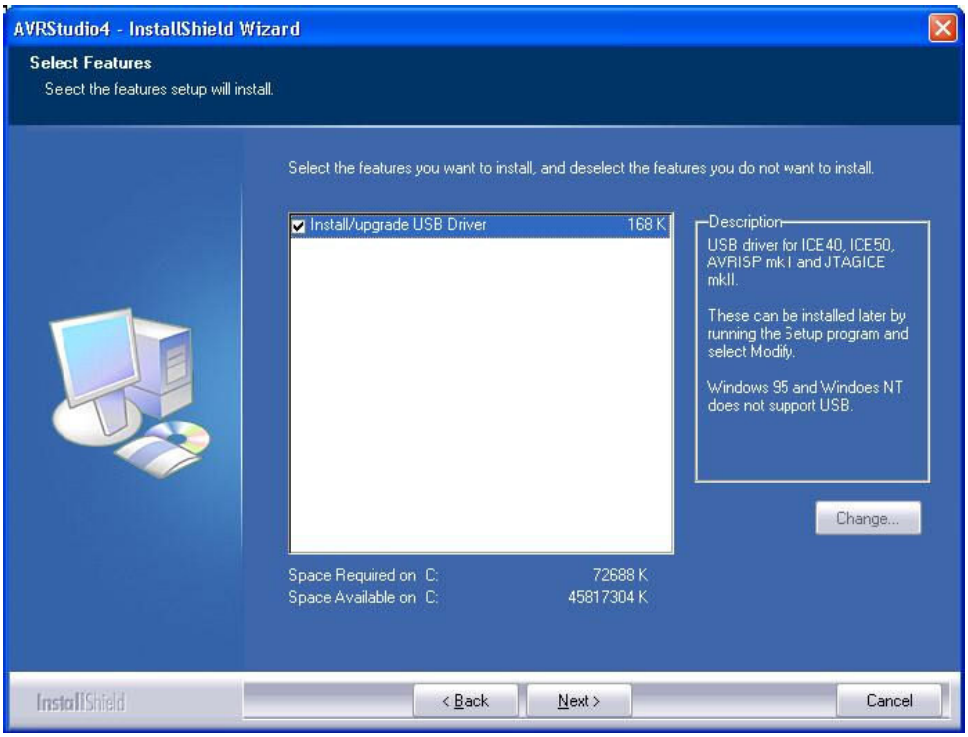



WinAVR 20081205 Setup
Choose Components
Choose which features of WinAVR 20081205 you want to install.
Check the components you want to install and uncheck the components you don't want to install. Click Install to start the installation.
Select components to install:
Install Files
Add Directories to PATH (Recommended)
Install Programmers Notepad
Space required: 119.2MB
< Back
Install
Cancel


WinAVR 20081205 Setup
Completing the WinAVR 20081205 Setup Wizard
WinAVR 20081205 has been installed on your computer.
Click Finish to close this wizard.
< Back
Finish
Cancel

3.2 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.

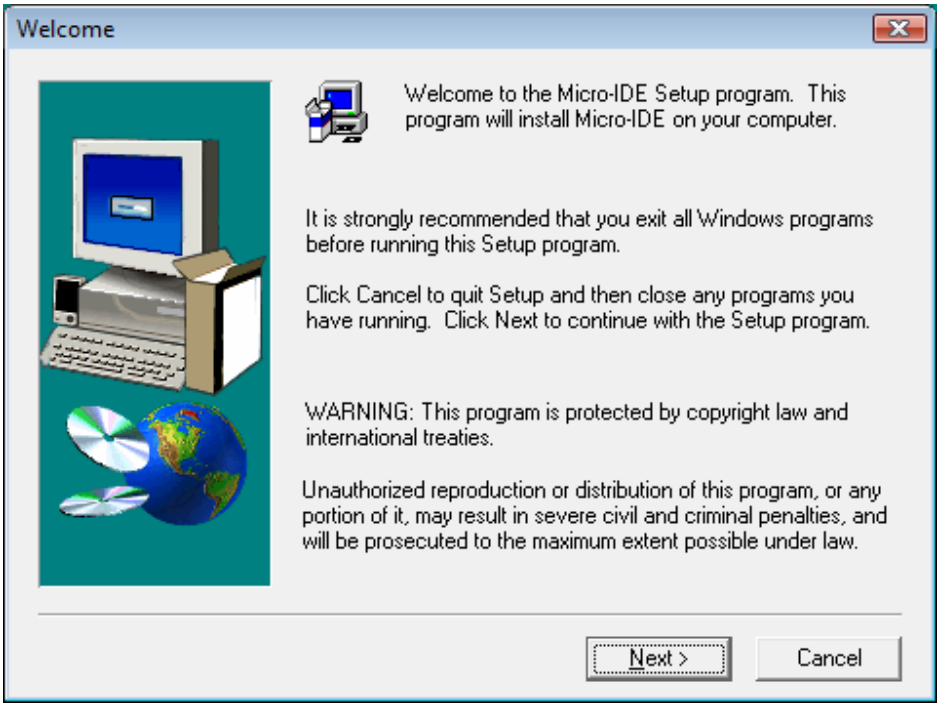


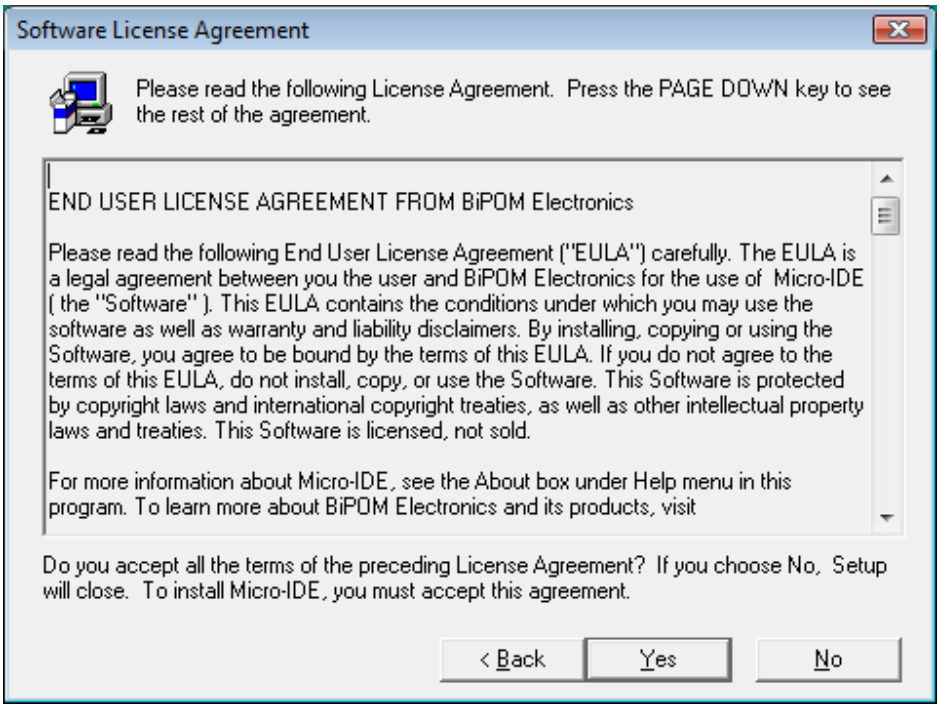


3.3 Micro-IDE is a part of BiPOM's ARM Development System.

Download and install the development system from http://www.bipom.com/armdev.php

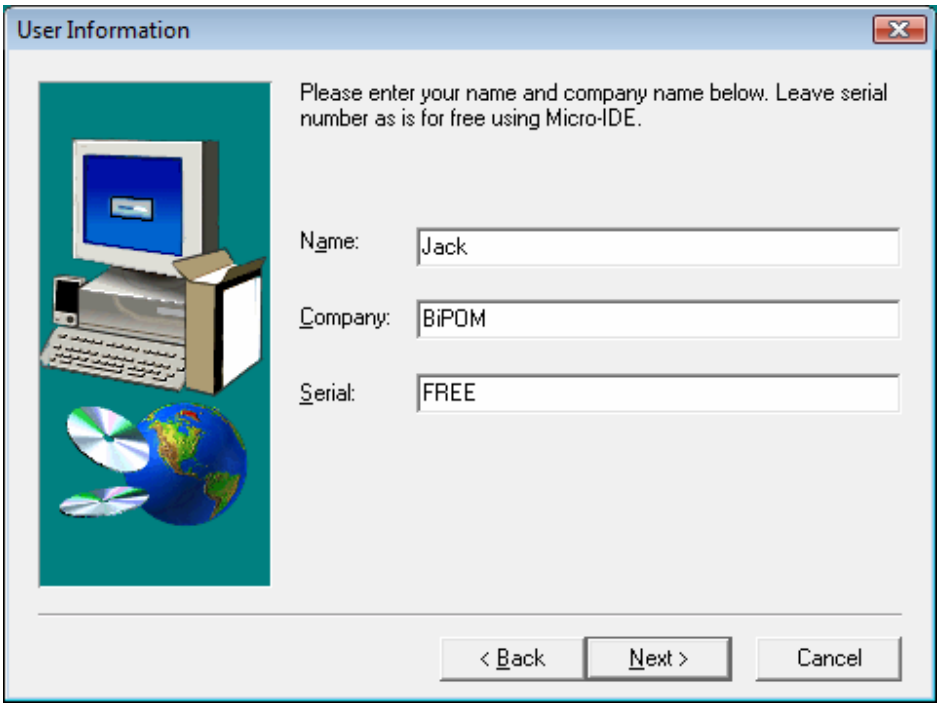
Unzip the arm7dev.zip file to any folder of your hard drive and run setup.exe.





Please read the agreement and click Yes to continue.

Enter your name, company and ‘FREE’ as a serial number. Then click the Next button.



Select the disk location where the software has to be installed. The default location (c:\bipom\devtools) is recommended. Click the Next button to start the installation.

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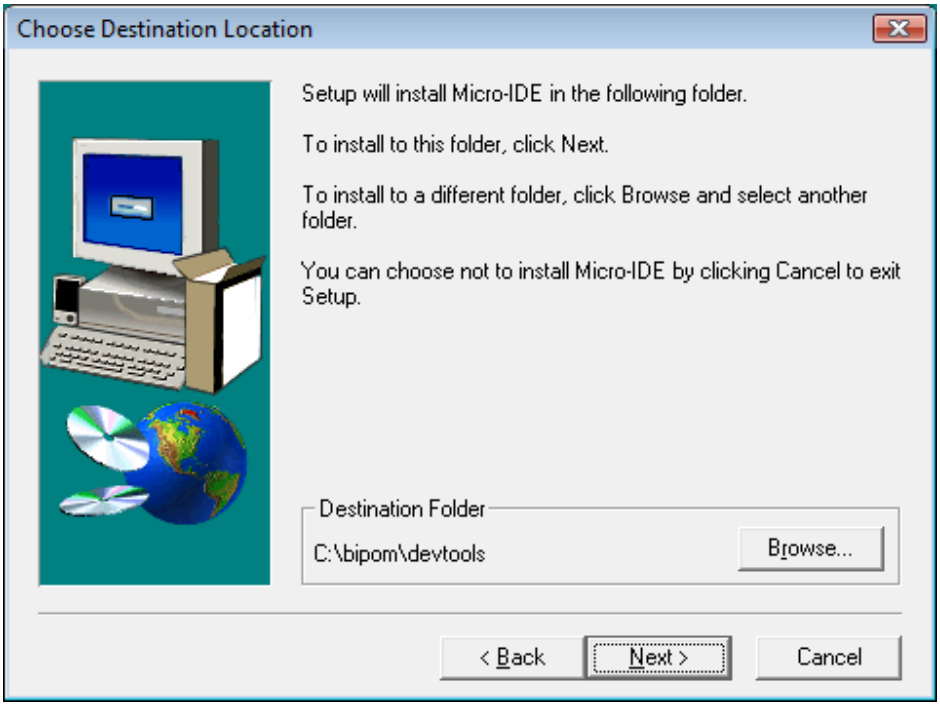
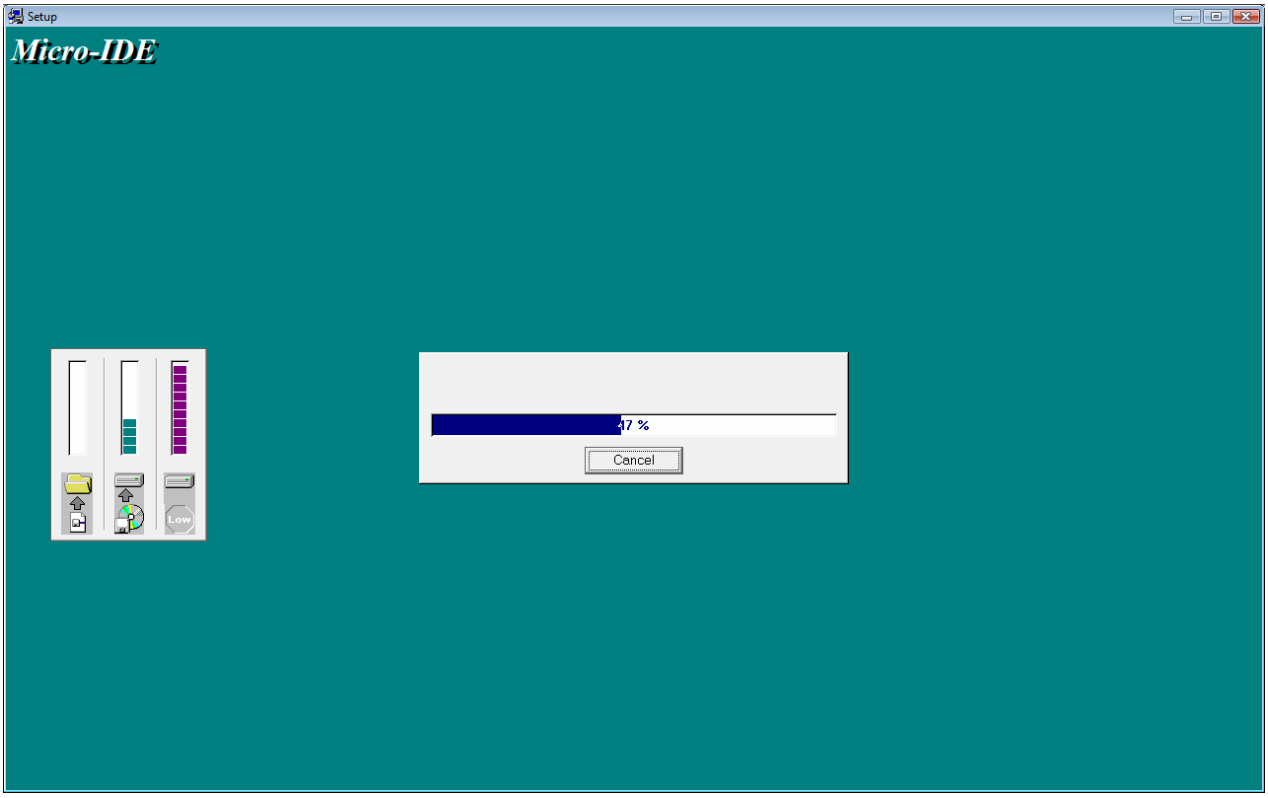
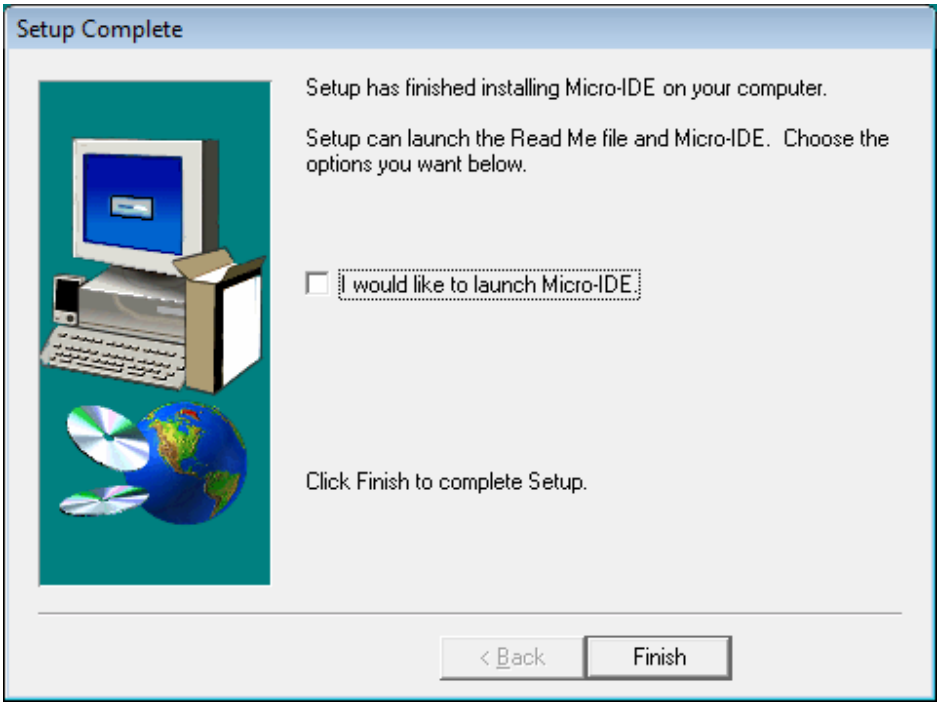






Uncheck the “I would like to launch Micro-IDE” option and click the Finish button.

4. Hardware Setup

4.1 Place the MINI-MAX/AVR-C Microcontroller board on a clean, non-conductive surface.

4.2 Connect the provided a 6VDC power supply plug to the power jack on the MINI-MAX/AVR-C. Do not connect the power supply to the outlet yet.

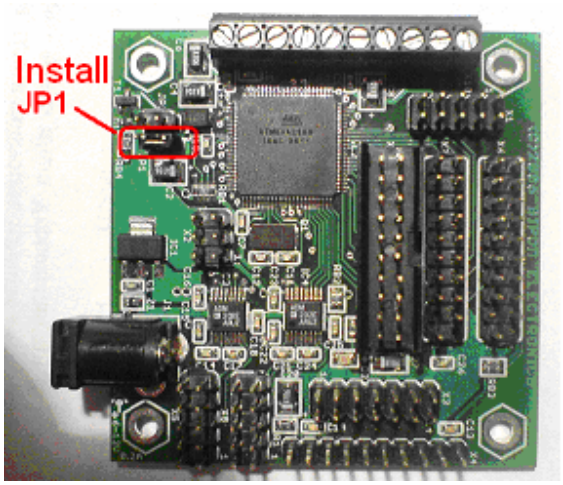
Do not use a power supply other than one that is supplied or approved by BiPOM Electronics. Use of another power supply voids the warranty and may permanently DAMAGE the board or the computer to which the board is connected.

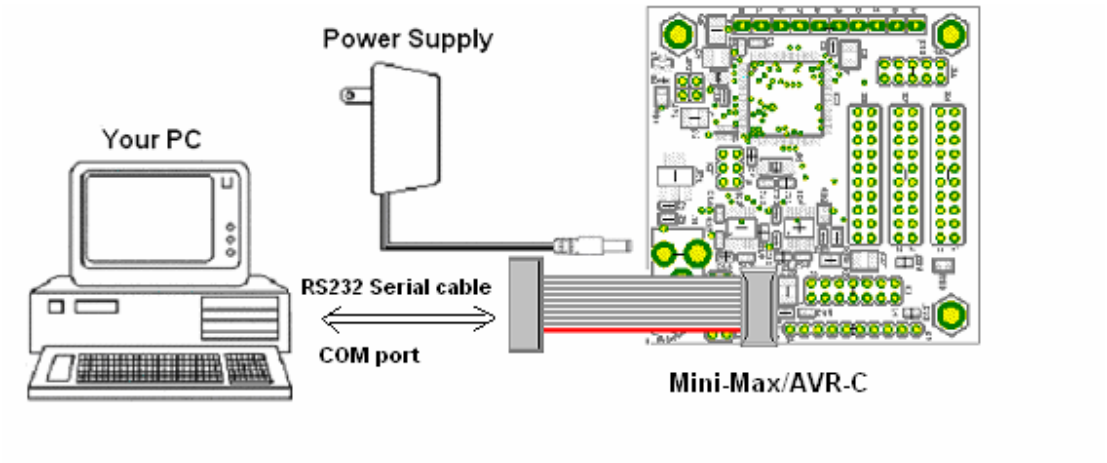
4.3 Connect the 10-pin header of serial cable to X8 connector of MINI-MAX/AVR board.
Mini-Max/AVR-C board uses UART1 as BOOT serial port.

4.4 Connect the other end of the serial cable to your PC's COM port.

4.5 Install JP1 jumper. When this jumper is installed, the board runs in BOOT mode.

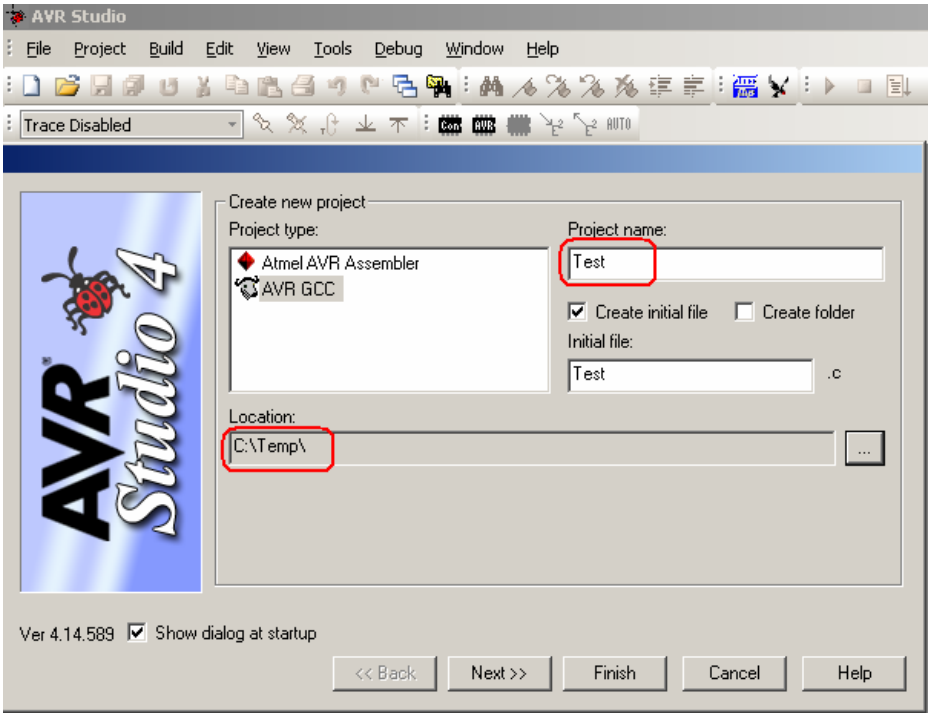
4.6 Connect the 6VDC power supply to a suitable wall outlet. Red LED on MINI-MAX/AVR-C board will turn ON.



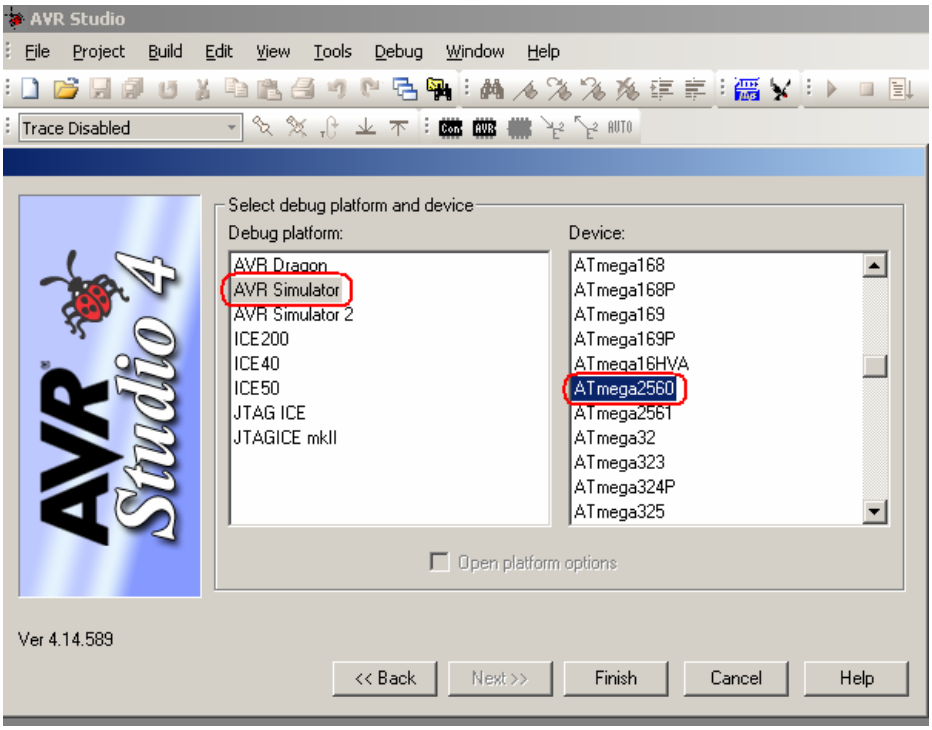


5. Test example

5.1 To create your own test project please run AVR Studio, select Project menu and select New Project. This will display the New Project dialog (see below). Select AVR GCC, enter the name of the new project and its location and click Next button.

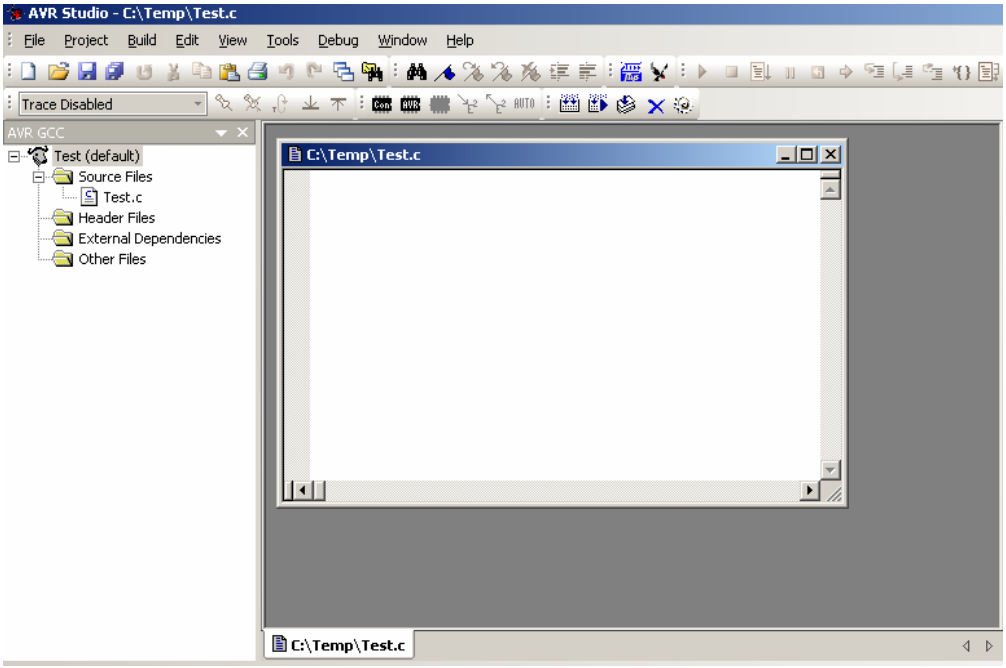


5.2 Select a debug platform and device, then click Finish button.



The new project with ‘Test’ name will be created under c:\Temp.

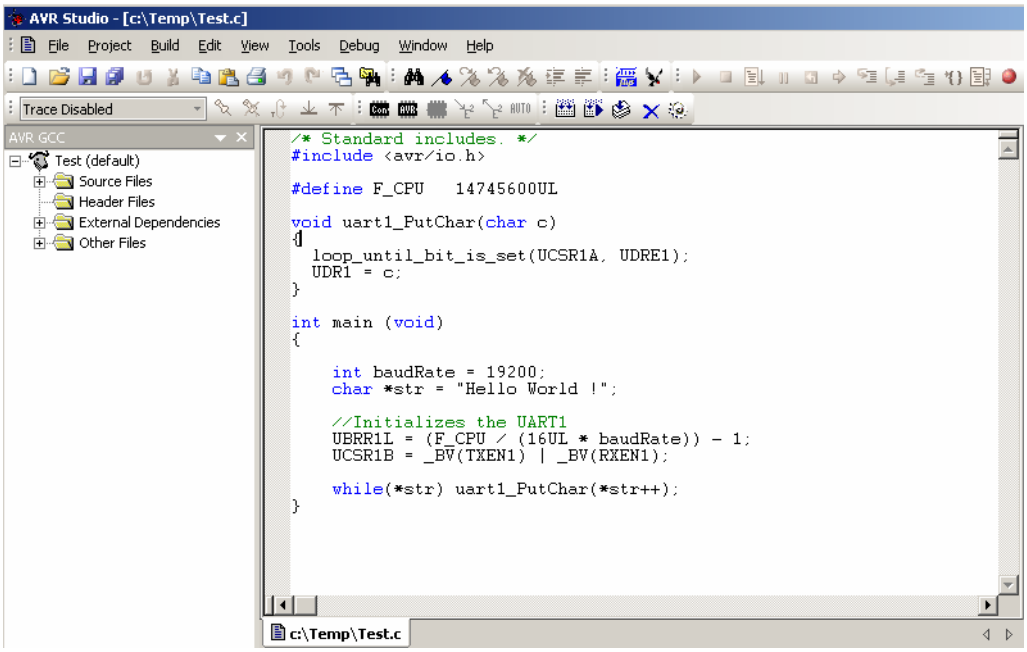
5.3 A blank C file (Test.c) will be created automatically as well.



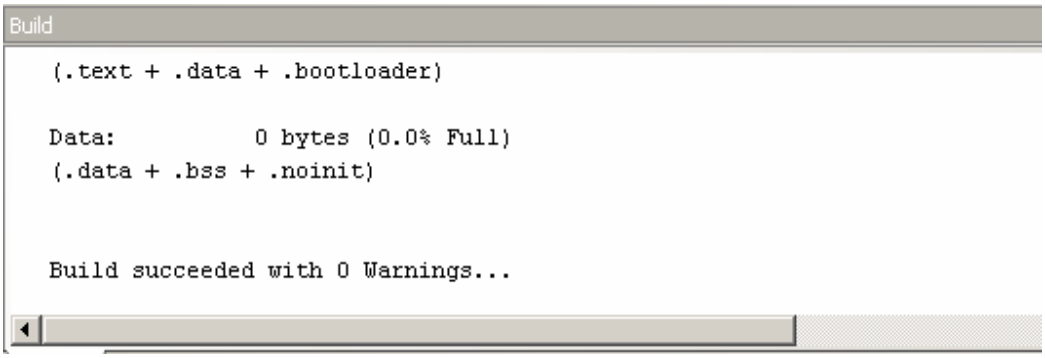
5.4 Type the following C-code:

```
/* Standard includes. */
#include <avr/io.h>

#define F_CPU 14745600UL

void uart1_PutChar(char c)
{
        loop_until_bit_is_set(UCSR1A, UDRE1);
        UDR1 = c;
}

int main (void)
{

        int baudRate = 19200;
        char *str = "Hello World !";

        //Initialize the UART1
        UBRR1L = (F_CPU / (16UL * baudRate)) - 1;
        UCSR1B = _BV(TXEN1) | _BV(RXEN1);

        while(*str) uart1_PutChar(*str++);
}
```

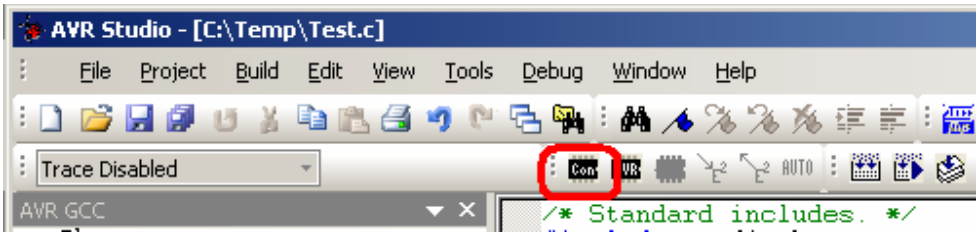
The complete C program should look like this:



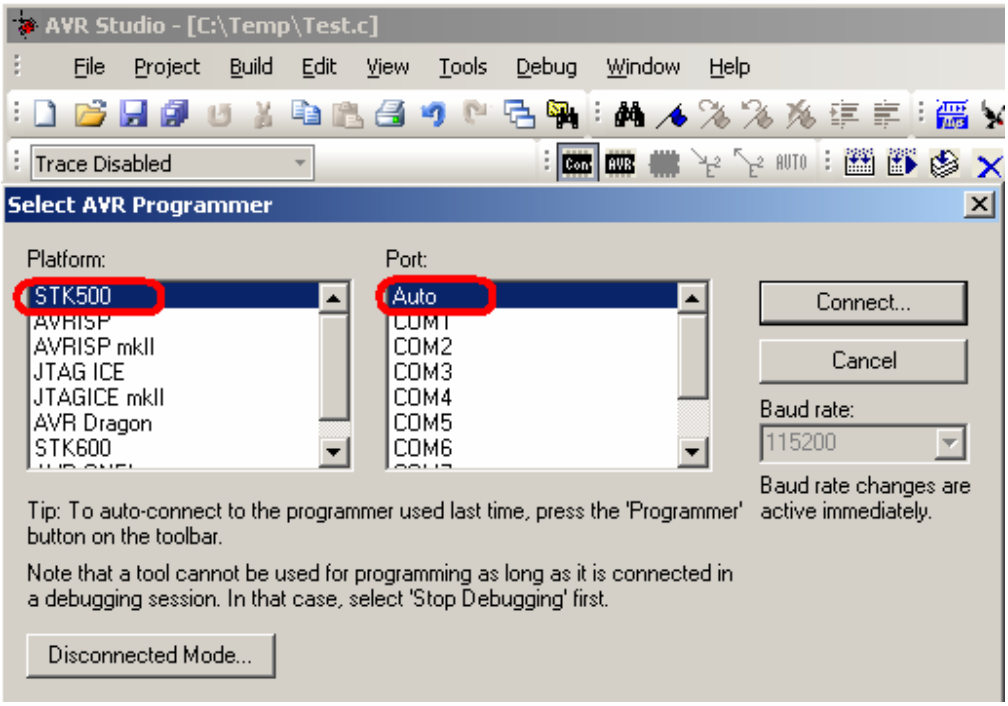
5.5 Build the program by clicking the Build button. If the program builds successfully, you will see the following messages on the Build Window.



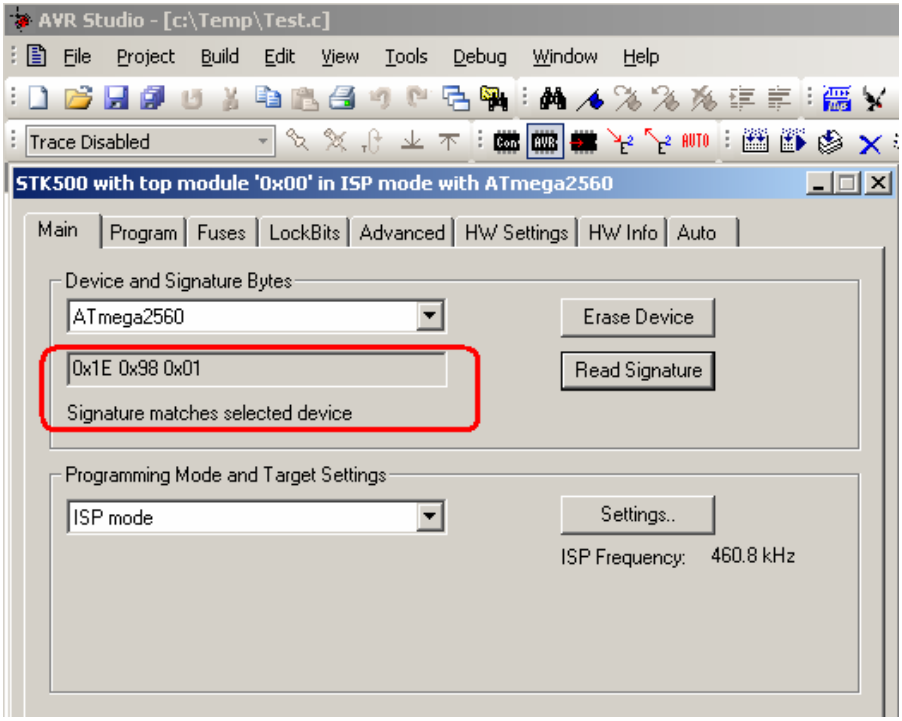
5.6 To download the compiled Test.hex firmware to the board, please click the Con icon button on the toolbar.



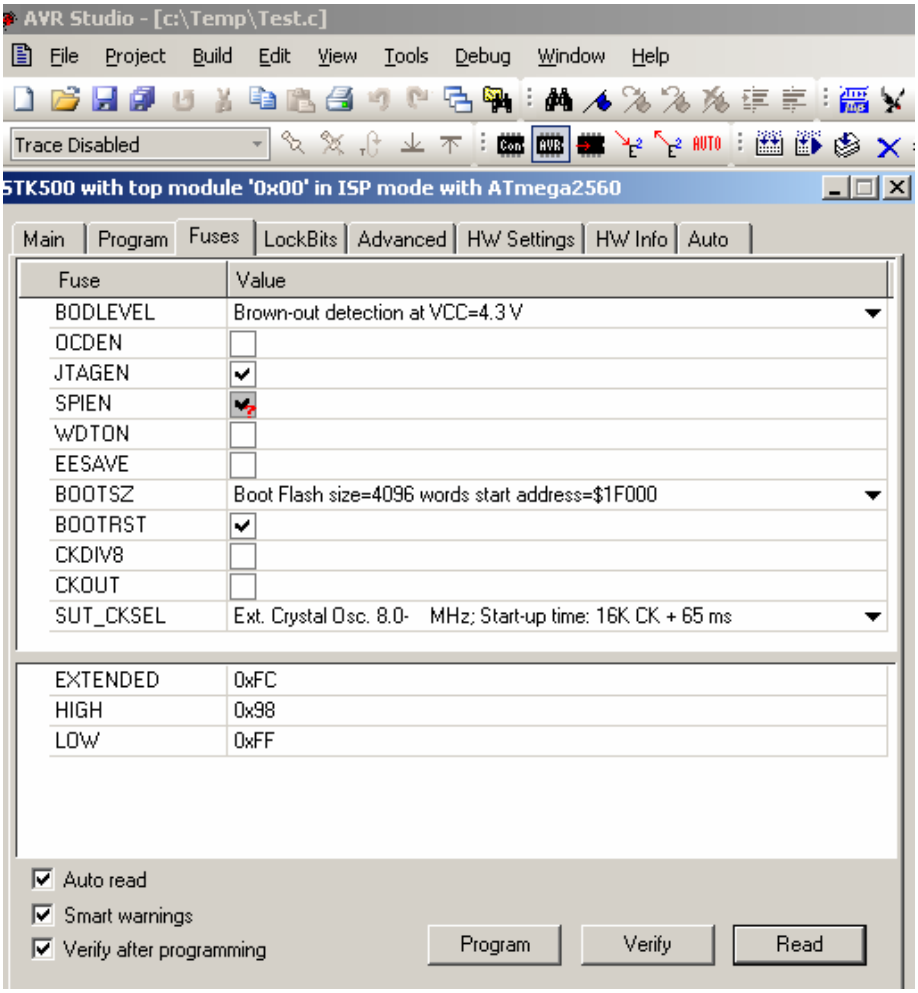
5.7 Select STK500 platform, select Auto, and then click the Connect button.



5.8 Select ATmega2560 device and click the Read Signature button.
The signature should match ATmega2560.

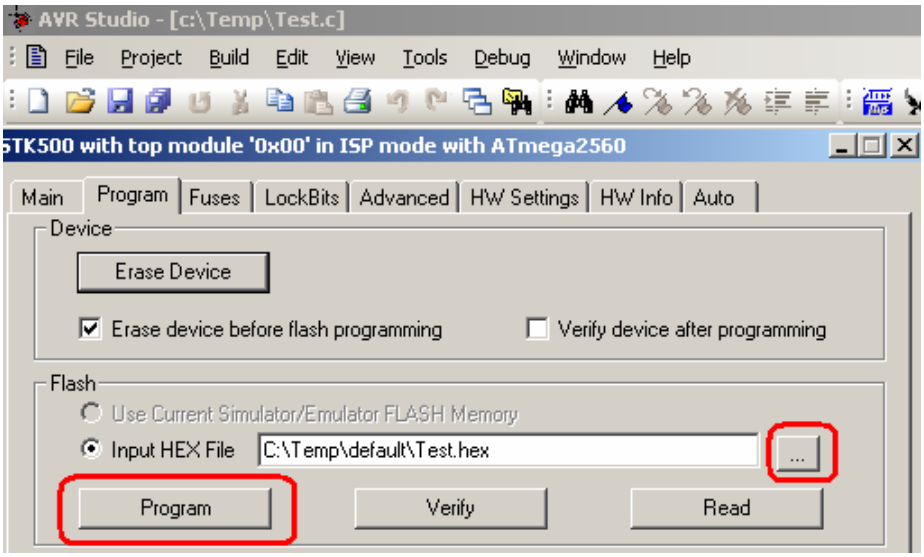


5.9 Check fuses



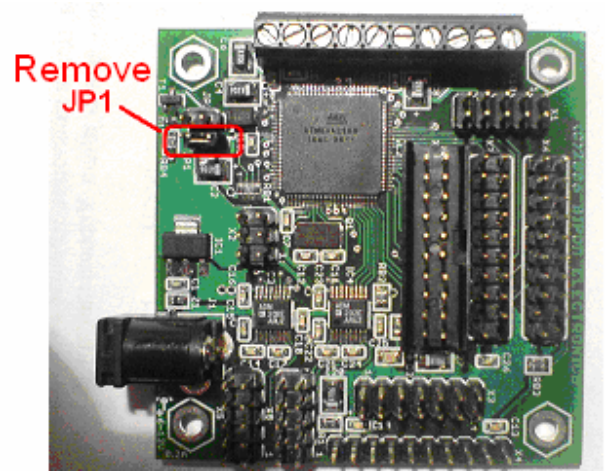
The fuses cannot be changed using the serial boot loader.
To do that it is necessary to use a real programmer such as AVR ISP or AVR Dragon.

5.10 Select Test.hex file and click the Program button

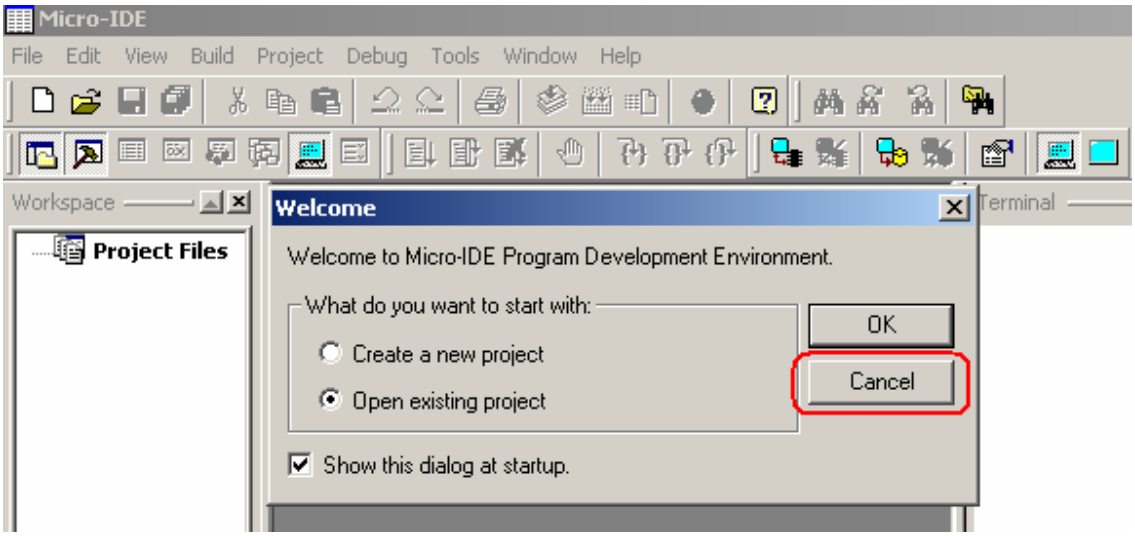


5.11 Close AVR Studio dialog to release the PC COM port.

5.12 Turn off power to the MINI-MAX/AVR-C. Remove the JP1 jumper.



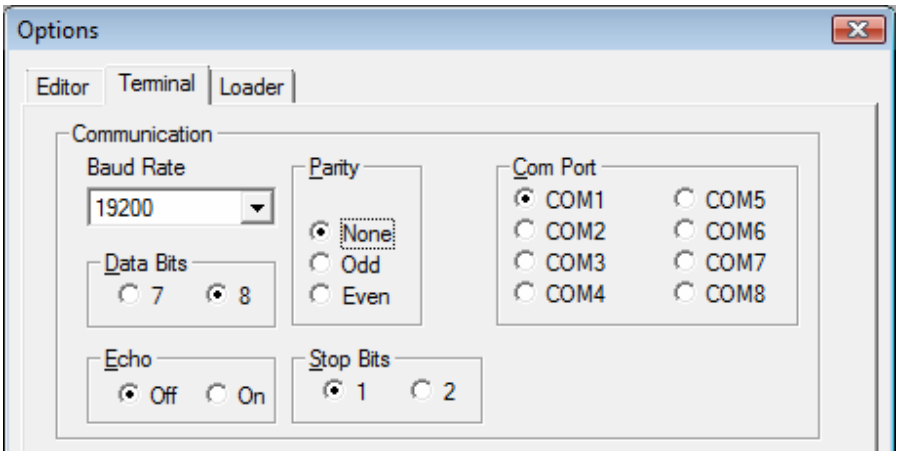
5.13 To see the 'Hello World!' messages that the board sends to the serial port, Micro-DE terminal window is used. This is because the AVR Studio does not have its own terminal window. Run Micro-IDE from Start->Programs->Micro-IDE.



Click the Cancel button.

We don't need to create any project.
We need only a terminal window. Instead of Micro-IDE, you can also use any other terminal program that can receive messages through a COM port (for example, HyperTerminal).

5.14 To specify the correct terminal settings please select Tools->Options menu:

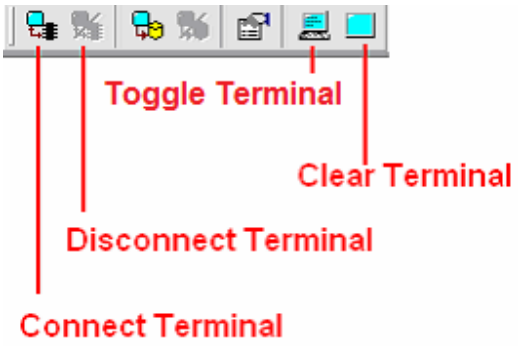


Select the correct PC COM port you have connected the MINI-MAX/AVR-C.
The following settings match the example we run on the Mini-Max/AVR-C board:

Baud rate: 19200
Parity: None
Data Bits: 8
Stop bits: 1
Echo: Off

Click the OK button.

5.15 Open the terminal window using the Toggle Terminal icon button



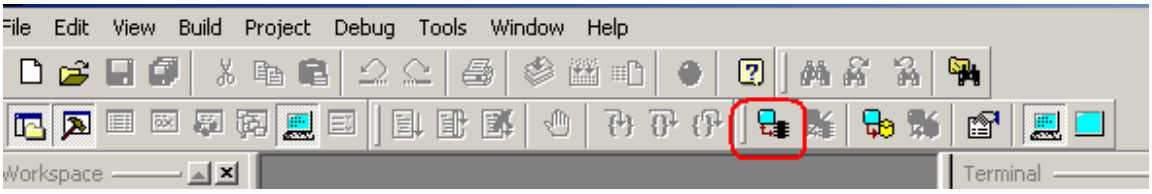
Connect Terminal connects the terminal window to the PC COM port. If a board sends data to the serial port, the messages will appear in Terminal window.

Disconnect Terminal disconnects the terminal window from the PC COM port.

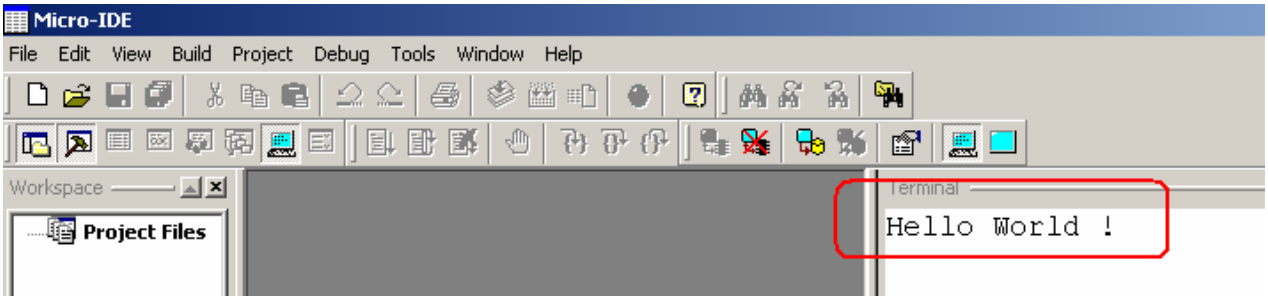
Toggle Terminal shows/hides the terminal window.

Clear Terminal clears all messages in the terminal window.

5.16 Click the Connect icon button to connect the terminal window to the board.



5.17 Power the board. The “Hello World!” message appears in the terminal window.



Congratulations!!! You have created and executed your first program on the MINI-MAX/AVR-C. ☺