MINI-MAX/MSP430-C

Single Board Computer

Quick Start Guide

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BiPOM Electronics

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WARRANTY:
BiPOM Electronics warrants MINI-MAX/MSP430-C for a period of 1 year. If the board becomes defective during this period, BiPOM will at its option, replace or repair the board. This warranty is voided if the product is subjected to physical abuse or operated outside stated electrical limits. BiPOM Electronics will not be responsible for damage to any external devices connected to MINI-MAX/MSP430-C. BiPOM Electronics disclaims all warranties express or implied warranties of merchantability and fitness for a particular purpose. In no event shall BiPOM Electronics be liable for any indirect, special, incidental or consequential damages in connection with or arising from the use of this product. BiPOM Electronics' liability is limited to the purchase price of this product.

TABLE OF CONTENTS

1. Package Contents

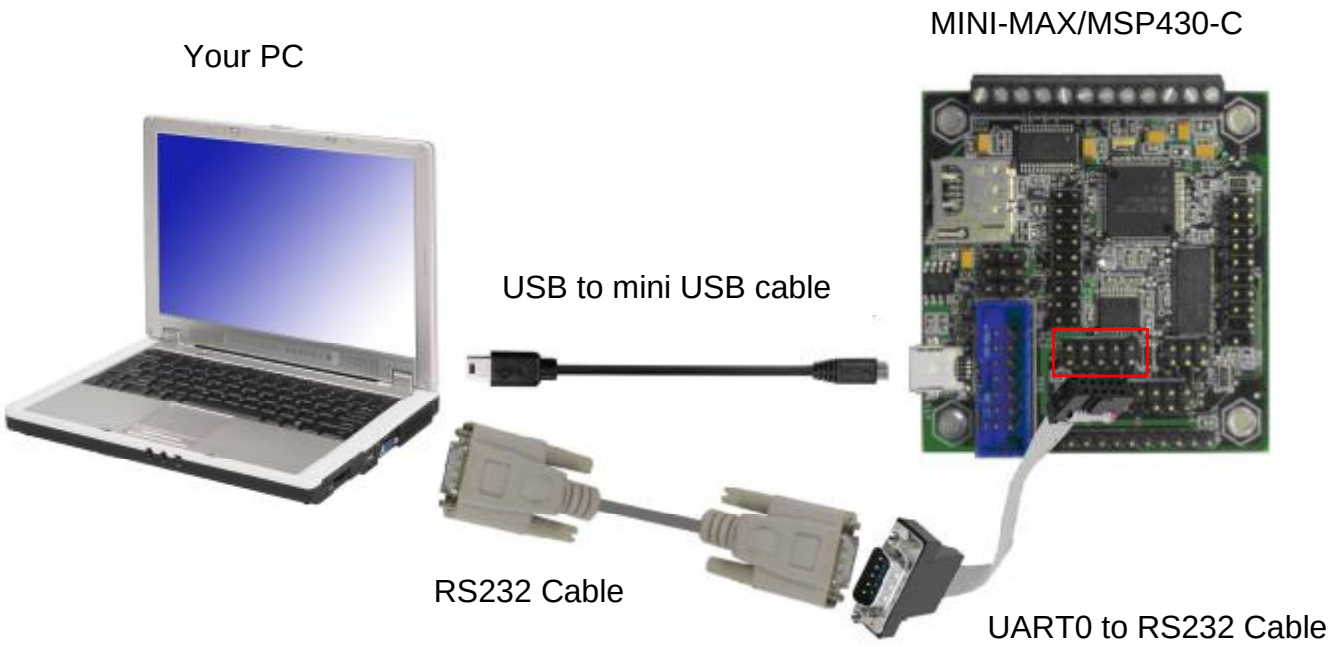
MINI-MAX/MSP430-C Micro-controller Board

Mini USB Cable

2. Hardware Setup

1. Place the MINI-MAX/MSP430-C Microcontroller board on a clean, non-conductive surface.

2. Connect the MINI-MAX/MSP430-C to an available USB port on the PC using the supplied Mini USB cable. USB cable is used for both powering the board and downloading programs. The board can also be connected through serial cable to COM port to watch serial output.



3 Software Installation

For programming the MINI-MAX/MSP430-C, BiPOM offers the MSP Development System that consists of:

- Micro-IDE – A Windows IDE for microcontroller development
- MSPGCC GNU C Compiler, Linker, Assembler
- Project examples for MINI-MAX/MSP430-C

3.1 Installing the MSP Development System

Download the MSP Development System from: http://www.bipom.com/msp_down.php

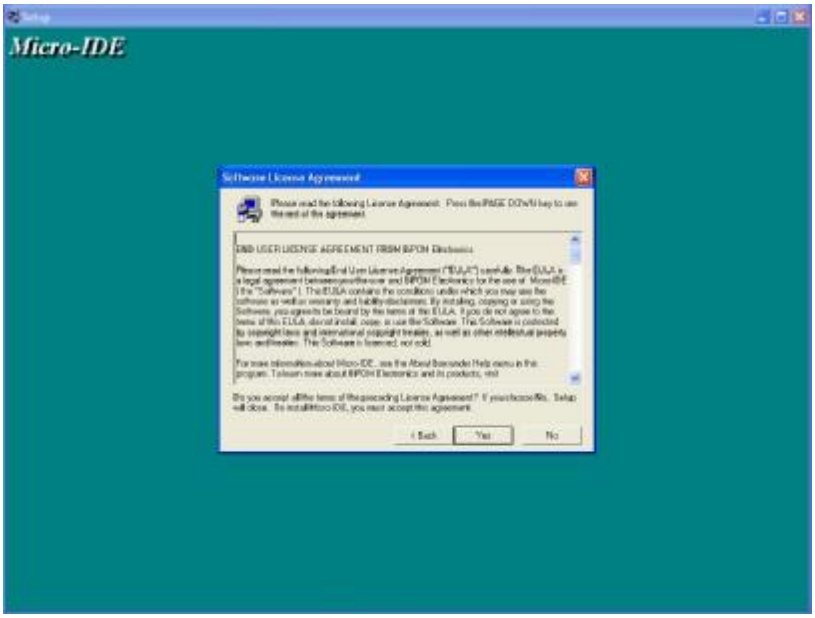
In opened form enter your first name, last name, email and click **Submit** button. After this you will see downloading page. Click msp_devsys.exe Free Download link to start downloading of **MSP Development System**.

Run downloaded **msp_devsys.exe** to start Installation process:

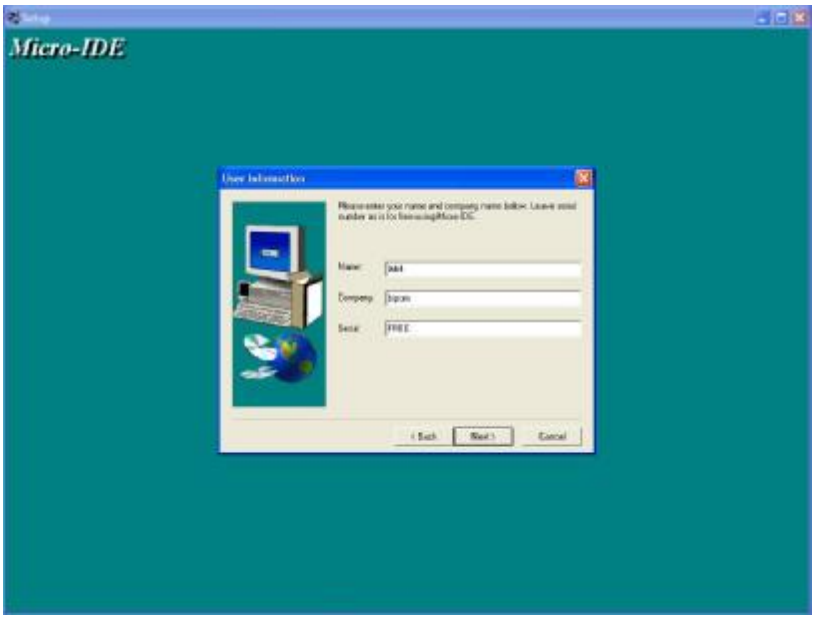
IMPORTANT: Before run installer, close all other running software.

A Welcome screen will appear:

Please click on ***Next***. End User Agreement will appear:

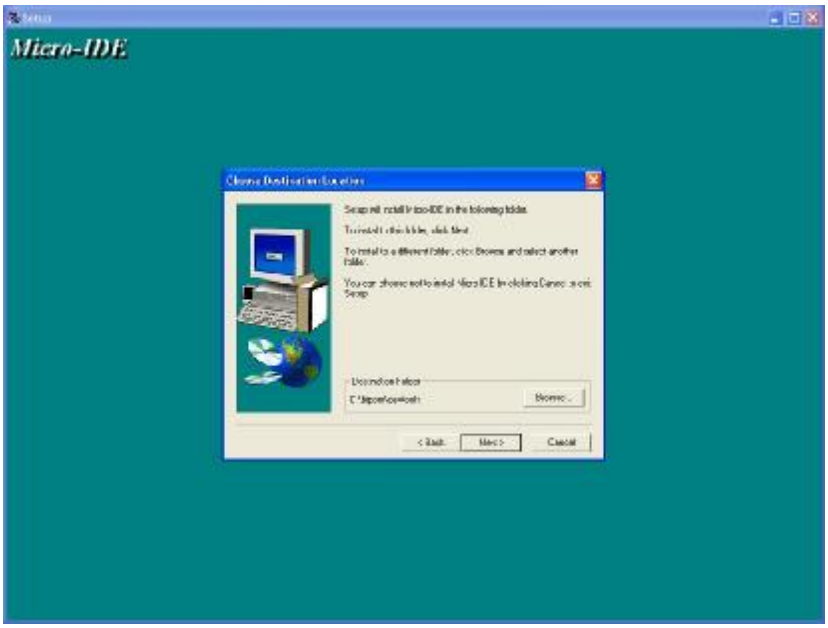


Please read the agreement and click on ***Yes*** if you wish to continue with installation.

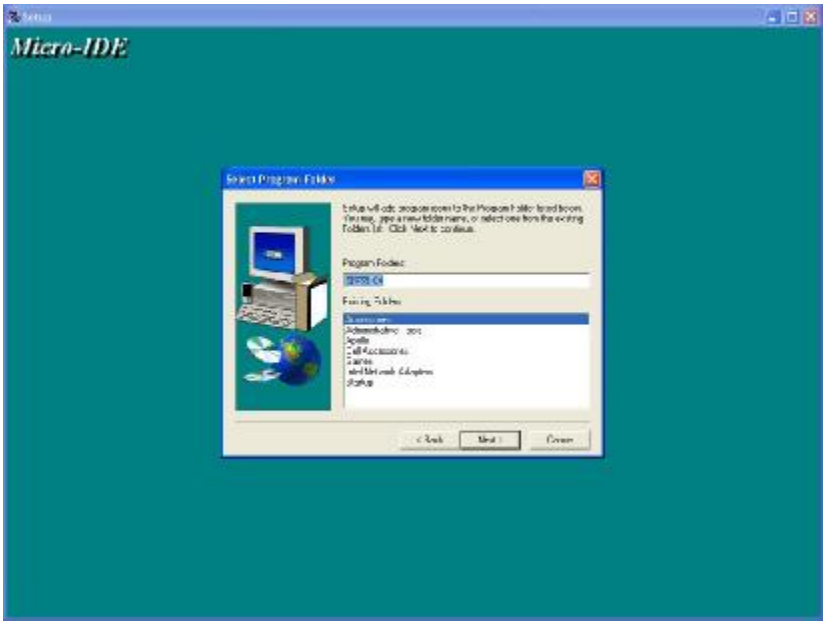


Enter your name, company (if applicable) and serial number:

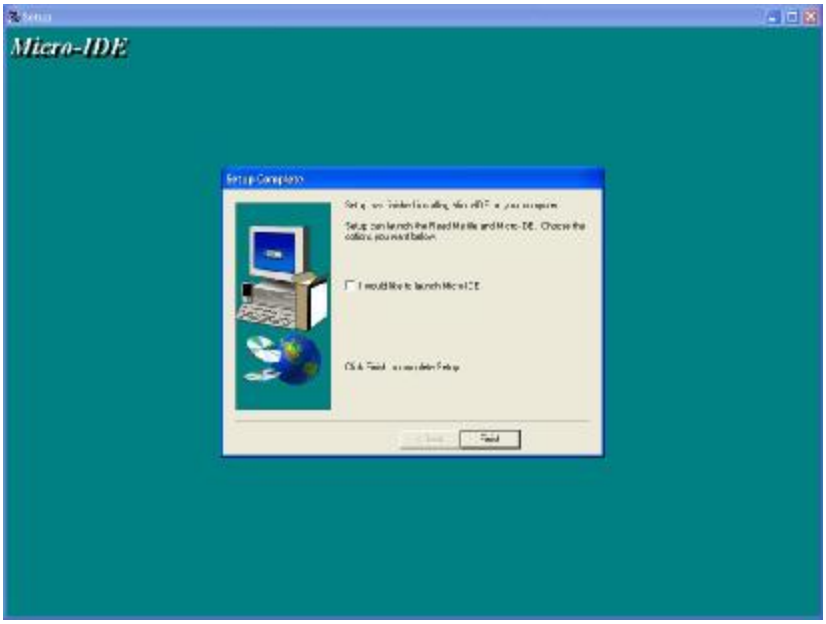
Click on ***Next*** to continue.



Select the disk location where the software will be installed.
Using the default location (c:\bipom\devtools) is recommended:
Click on ***Next*** and select the Program Folder where the icons for Micro-IDE will be installed.
Default selection is **Micro-IDE** folder.



Click on ***Next*** and Micro-IDE will be installed and you will see the Setup Complete window:



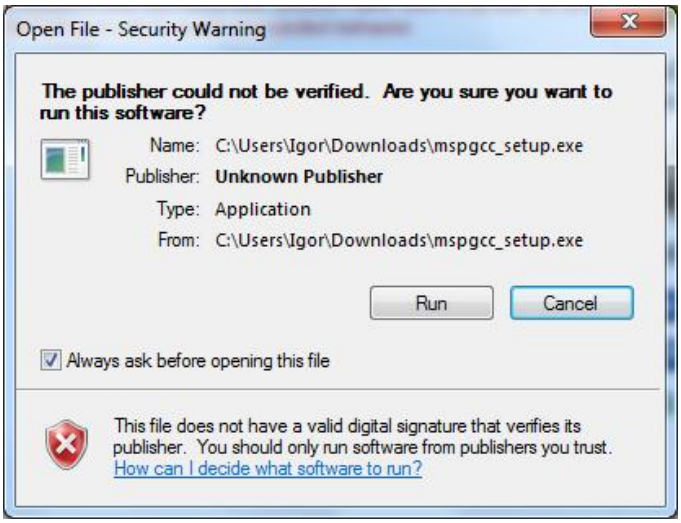
When the installation is complete, you will be given an option to start Micro-IDE now. Uncheck the option and click on ***Finish*** to finish the installation.

3.2 Installing MSPGCC GNU C Compiler

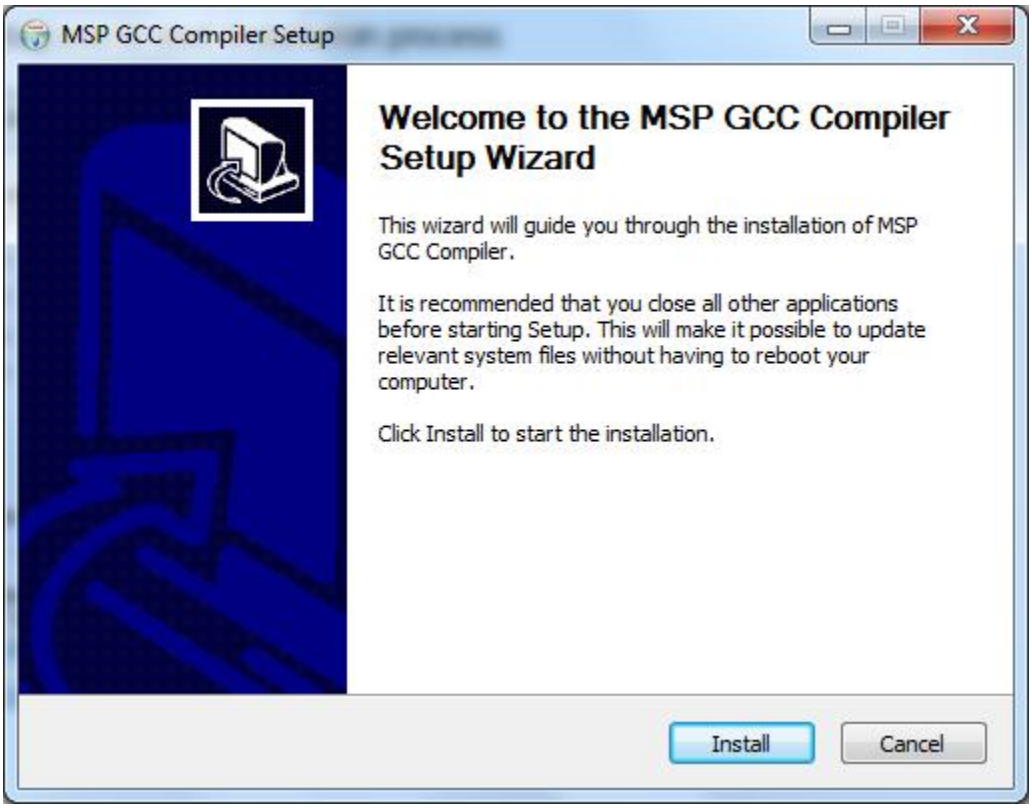
Download MSPGCC GNU C Compiler from: http://www.bipom.com/msp_down.php

Click MSPGCC GNU C Compiler Free Download link to download MSP GCC compiler installation file.

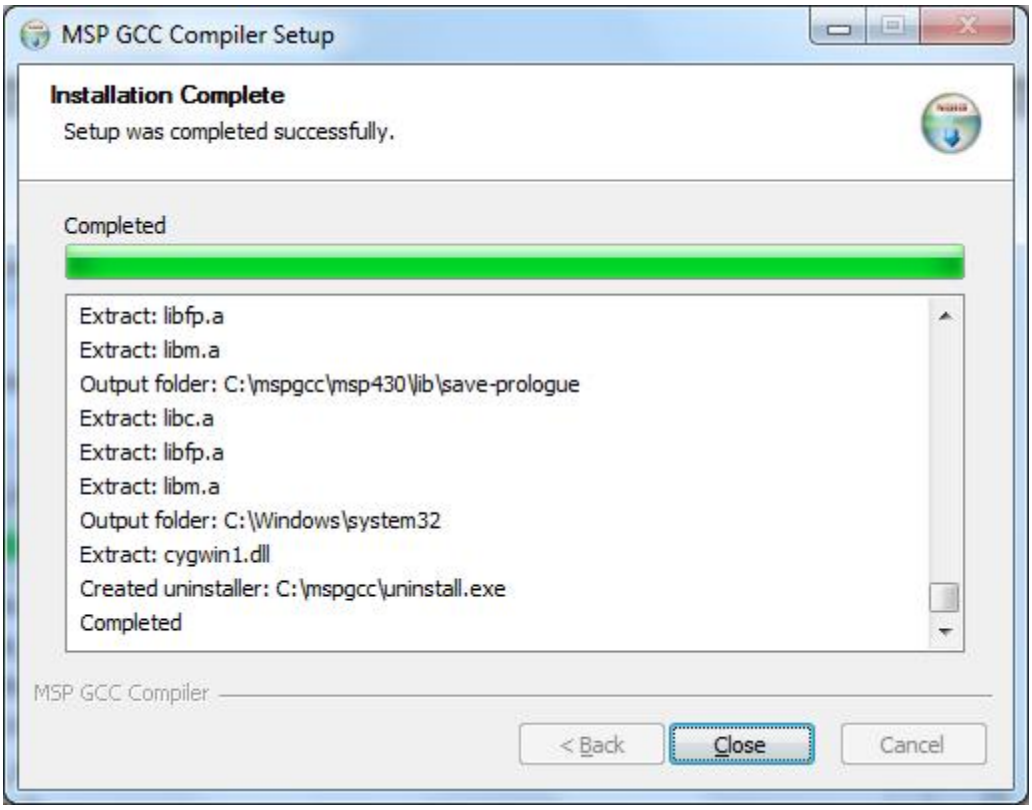
Run ***mspgcc_setup.exe*** to start Installation process:



A Welcome screen will appear:



Click ***Install*** to start installation. Setup will install MSP GCC compiler on your PC.



When installation is complete, click ***Close*** to exit.

3.3 Installing FTDI VCP (Virtual Communication Port) Driver

Download FTDI VCP Drivers for FT232R: http://www.ftdichip.com/Drivers/VCP.htm
You should download the “Microsoft WHQL certified” driver (typically a zip file) for your operating system and unzip to **c:\ftdi** directory.

(The zip filename will be something like “CDM 2.06.00 WHQL Certified.zip”).

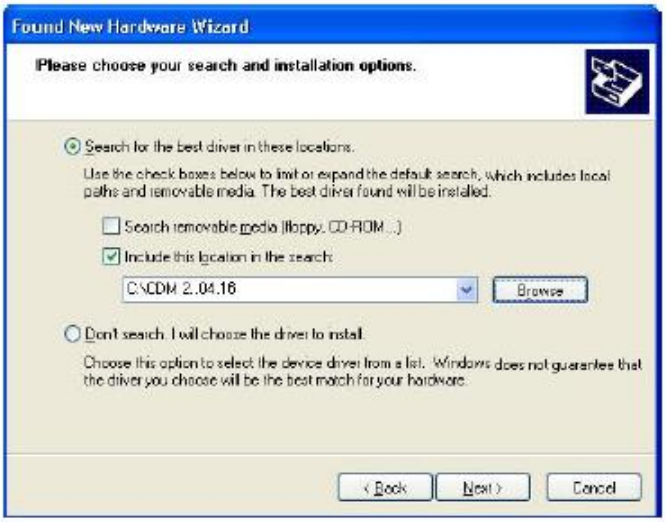
If you are running Windows XP (without any service pack) or Windows XP SP 1, temporarily disconnect your PC from the Internet.

Connect MINI-MAX/MSP board to USB port of your PC by using Mini USB Cable. Connect the device to a spare USB port on your PC. Microsoft composite device driver is automatically loaded in the background. Once the composite driver has been installed Windows Found New Hardware Wizard will launch.
If there is no available Internet connection or Windows XP SP 2 is configured to ask before connecting to Windows Update, the screen below is displayed:

Select "No, not this time" from the options available and then click ***Next*** to proceed with the installation.

Select "Install from a list or specific location (Advanced)" as shown below and then click on ***Next***.

Select "Search for the best driver in these locations" and enter the file path in the combo-box ("**c:\ftdi**") or browse to it by clicking the browse button.
Once the file path has been entered in the box, click ***Next*** to proceed.

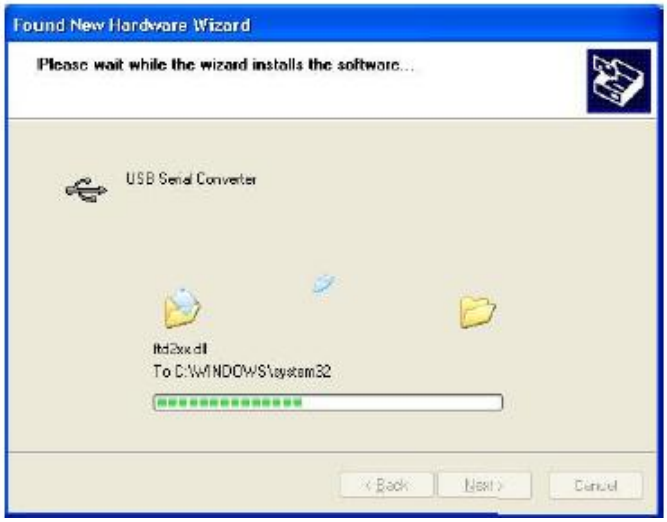


If Windows XP is configured to warn when unsigned (non-WHQL certified) drivers are about to be Installed, the message dialogue shown will be displayed unless installing a Microsoft WHQL certified driver.

Click on ***Continue Anyway*** to continue with the installation.

If Windows XP is configured to ignore file signature warnings, no message will appear.

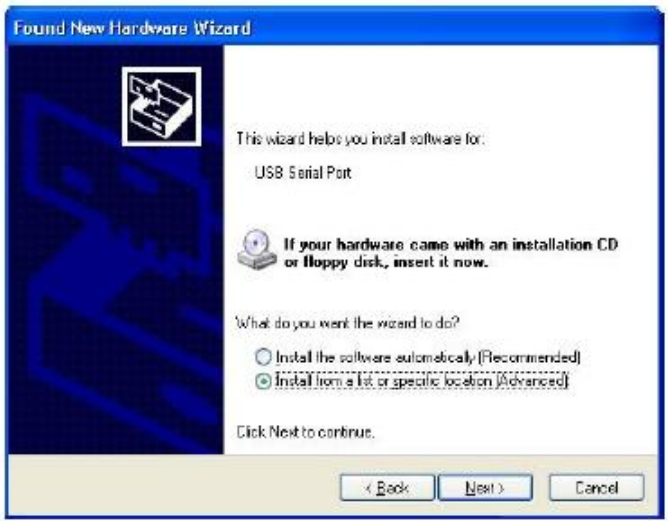
The screen shown will be displayed as Windows XP copies the required driver files.



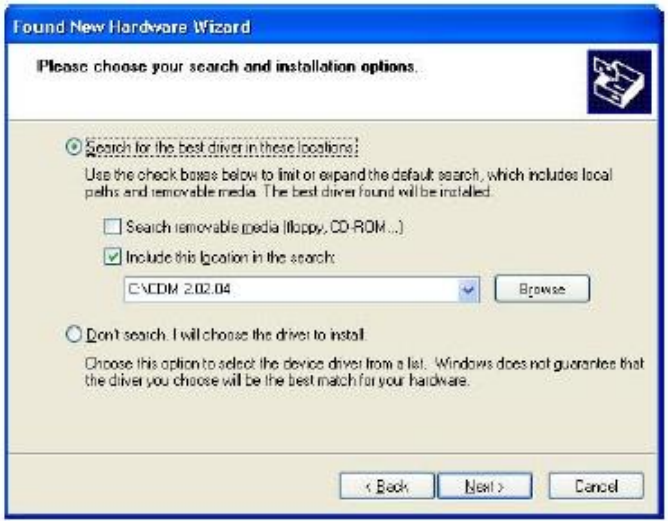
Windows should then display a message indicating that the installation was successful.
Click on ***Finish*** to complete the installation for the first port of the device.

The Found New Hardware Wizard will launch automatically to install the COM port drivers.
As above, select "No, not this time" From the options and click on ***Next*** to proceed with the installation.

Select “install from a list or specific location (Advanced)” and then click on ***Next.***

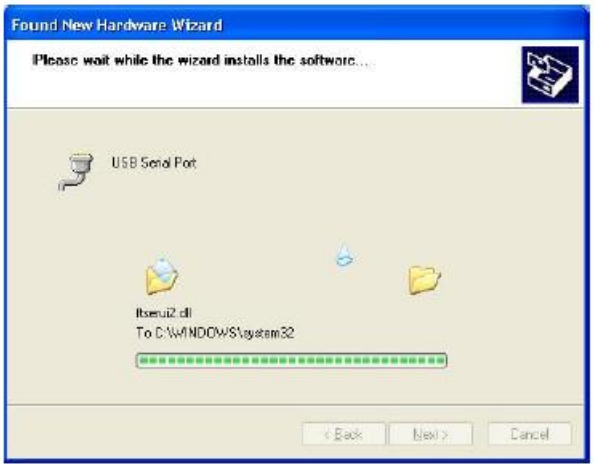


Select "Search for the best driver in these locations" and enter the file path in the combo-box "C:\CDM 2.04.16") or browse to it by clicking the browse button. Once the file path has been entered in the box, click ***Next*** to proceed.



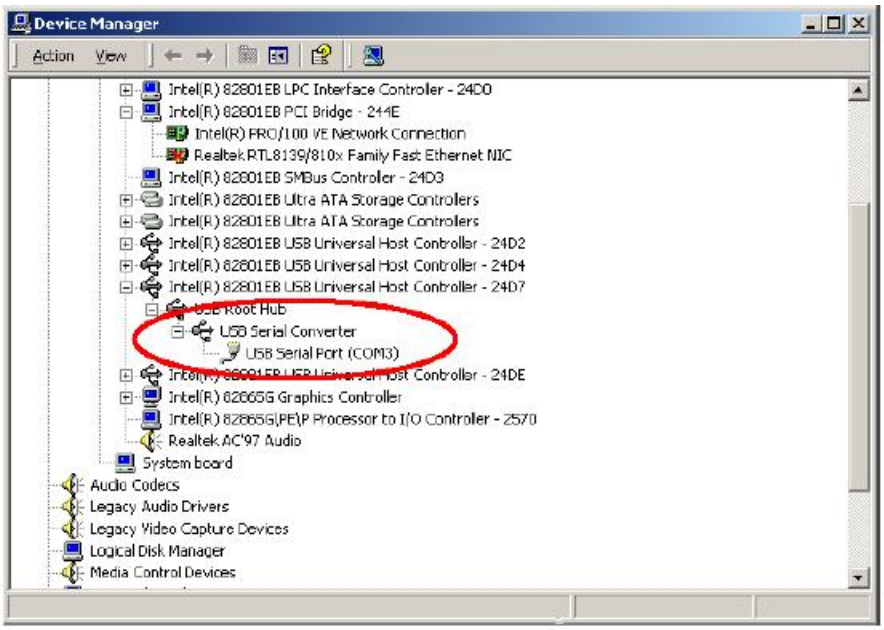
If Windows XP is configured to warn when unsigned (non-WHGL certified) drivers are about to be installed, the message dialogue will be displayed unless installing a Microsoft WHGL certified driver. Click on ***Continue Anyway*** to continue with the installation. If Windows XP is configured to ignore file signature warnings, no message will appear.

The screen shown will be displayed as Windows XP copies the required driver files.



Windows should then display a message indicating that the installation was successful. Click ***Finish*** to complete the installation for the first port of the device.

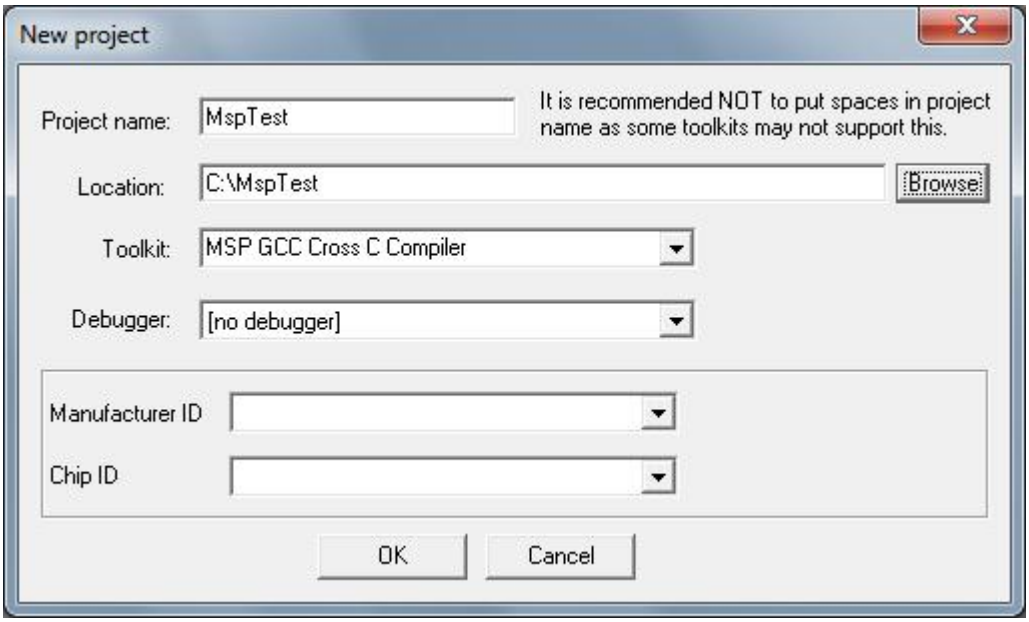
Open the Device Manager (located in "Control Panel\System" then select the "Hardware" tab and click "Device Manger") and select "View > Devices by Connection", the device appears as a "USB Serial Converter" with an additional COM port with the label "USB Serial Port".


Device Manager
Action View
Intel(R) 82801EB LPC Interface Controller - 24D0
Intel(R) 82801EB PCI Bridge - 244E
Intel(R) PRO/100 VE Network Connection
Realtek RTL8139/810x Family Fast Ethernet NIC
Intel(R) 82801EB SMBus Controller - 24D3
Intel(R) 82801EB Ultra ATA Storage Controllers
Intel(R) 82801EB Ultra ATA Storage Controllers
Intel(R) 82801EB USB Universal Host Controller - 24D2
Intel(R) 82801EB USB Universal Host Controller - 24D4
Intel(R) 82801EB USB Universal Host Controller - 24D7
USB Root Hub
USB Serial Converter
USB Serial Port (COM3)
Intel(R) 82801EB USB Universal Host Controller - 24DE
Intel(R) 82865G Graphics Controller
Intel(R) 82865G/PE/P Processor to I/O Controller - 2570
Realtek AC'97 Audio
System board
Audio Codecs
Legacy Audio Drivers
Legacy Video Capture Devices
Logical Disk Manager
Media Control Devices

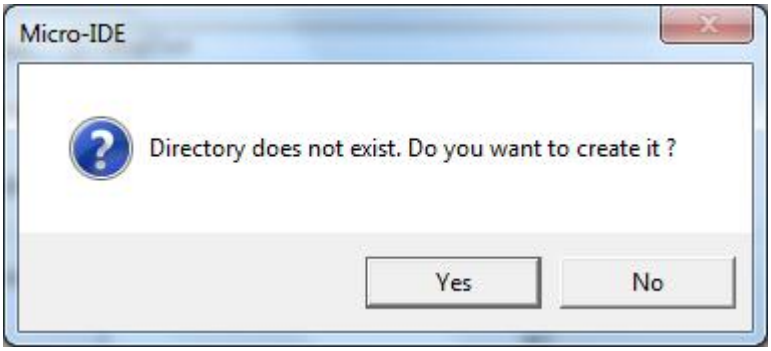
3.4 Writing Your Own Programs

Creating Projects

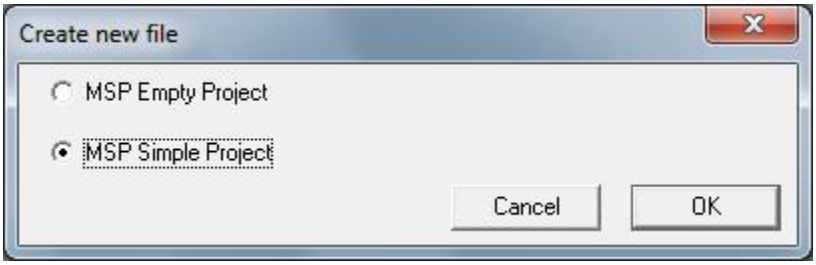
To create your own project, select **Project** menu and select **New Project**. This will display the **New Project** dialog:



Enter the name of the new project and its location (this example uses ***MspTest*** as the project name and ***C:\ MspTest*** as the project location). Select **MSP GCC Cross C Compiler** as the Toolkit. Click **OK**. You will be asked to create new directory for project.

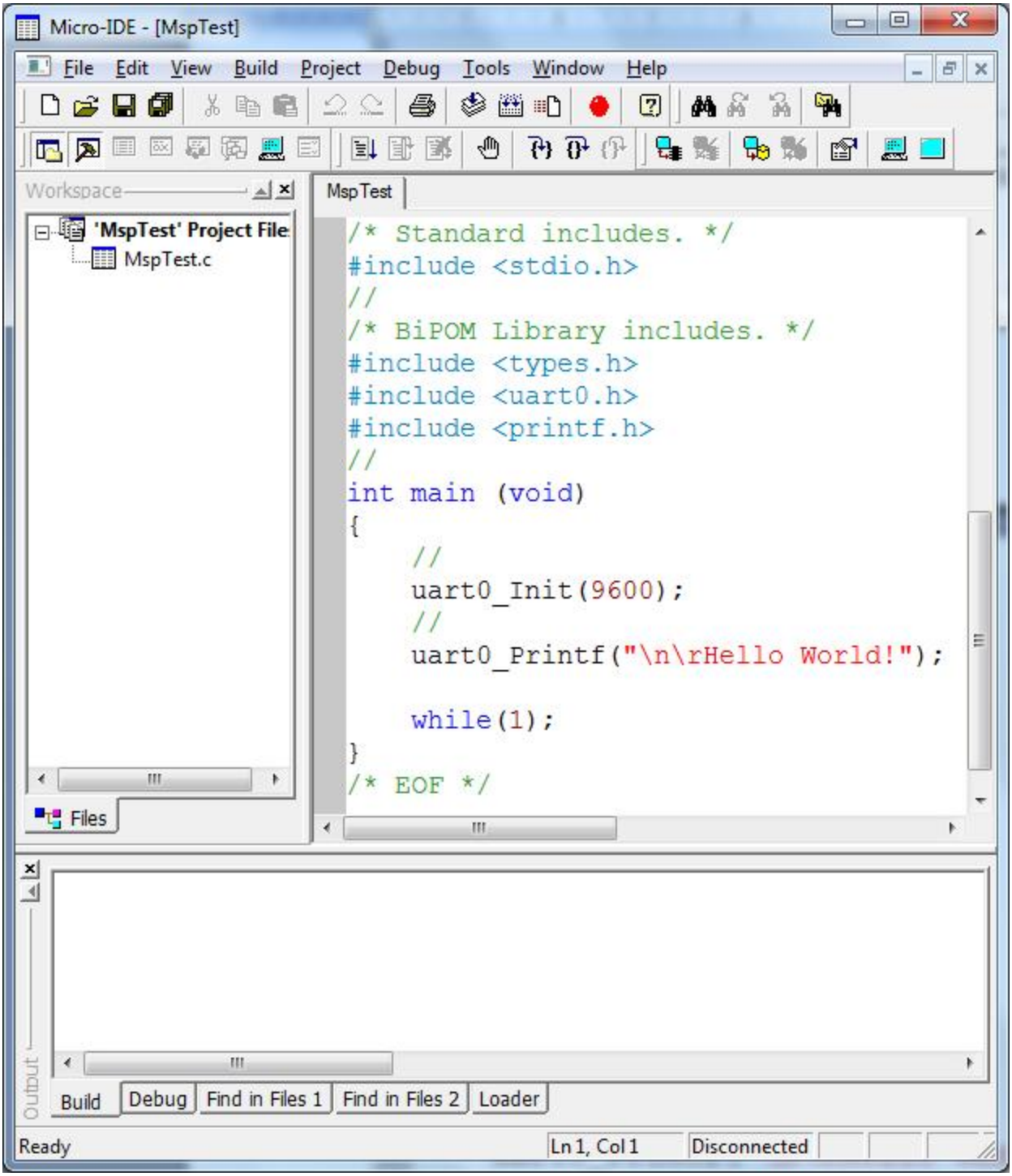


Click ***Yes***. Micro-IDE will prompt you create one of predefined project templates:



Select **MSP Simple Project** option and click OK.

The new project with the name of ***MspTest*** under ***C:\ MspTest*** will be created. Also Micro-IDE will create MspTest.c source file with minimum code which required to print “Hello World!” sentence on UART0 port.



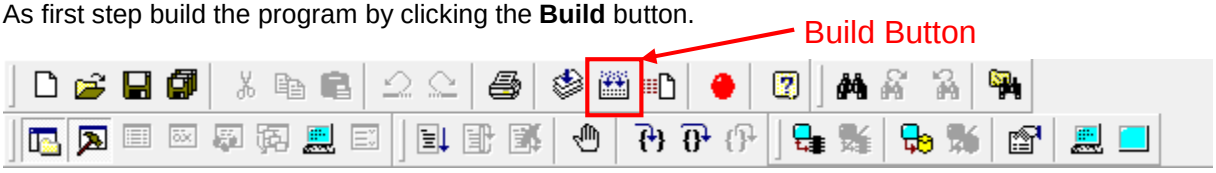
This simple firmware do following:

- call BiPOM Library function **uart0_Init** to initialize UART0 port with baudrate 9600 and options 8N1
- call BiPOM Library function **uart0_Printf** to print text “Hello World!” on UART0 port

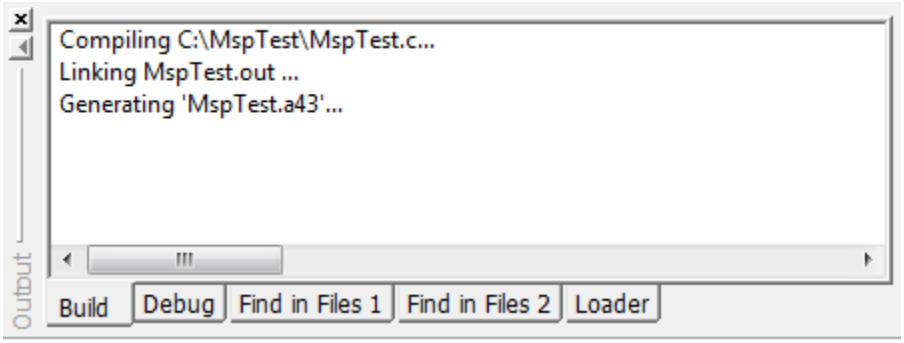
NOTE: If board’s UART0 is connected to PC serial port, you can use any terminal Windows software or Micro-IDE Terminal Window to see this output

Building the program

As first step build the program by clicking the **Build** button.

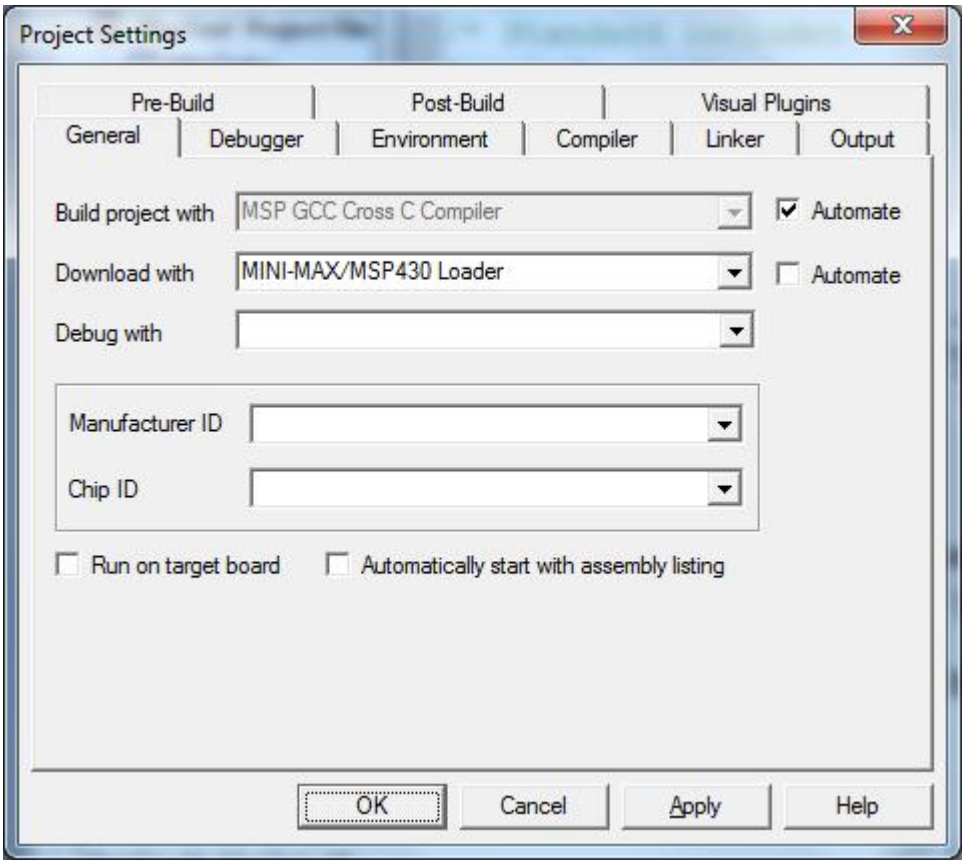


If the program builds successfully, you will see the following messages on the Output Window:



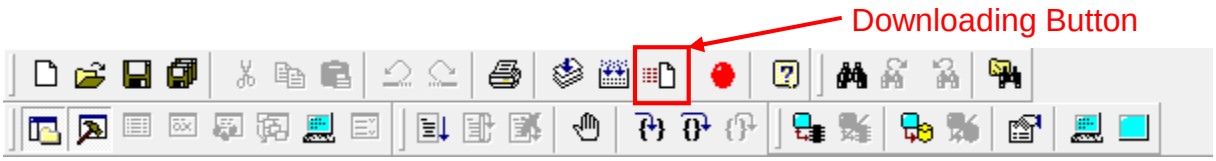
Downloading the program

Select **Project** menu and select **Settings.** Project Settings window appear and you will see settings on **General** tab:

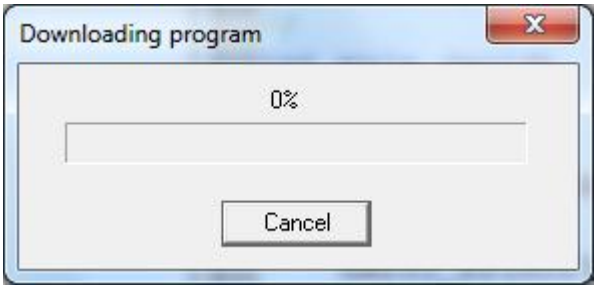


Select **MINI-MAX/MSP430 Loader** in **Download with** field. Click OK to close Project Settings window.

Download the program to the board by clicking the **Download** button on the main toolbar.



If the MINI-MAX/MSP430-C board is powered and connected properly to the PC, a progress dialog will appear:



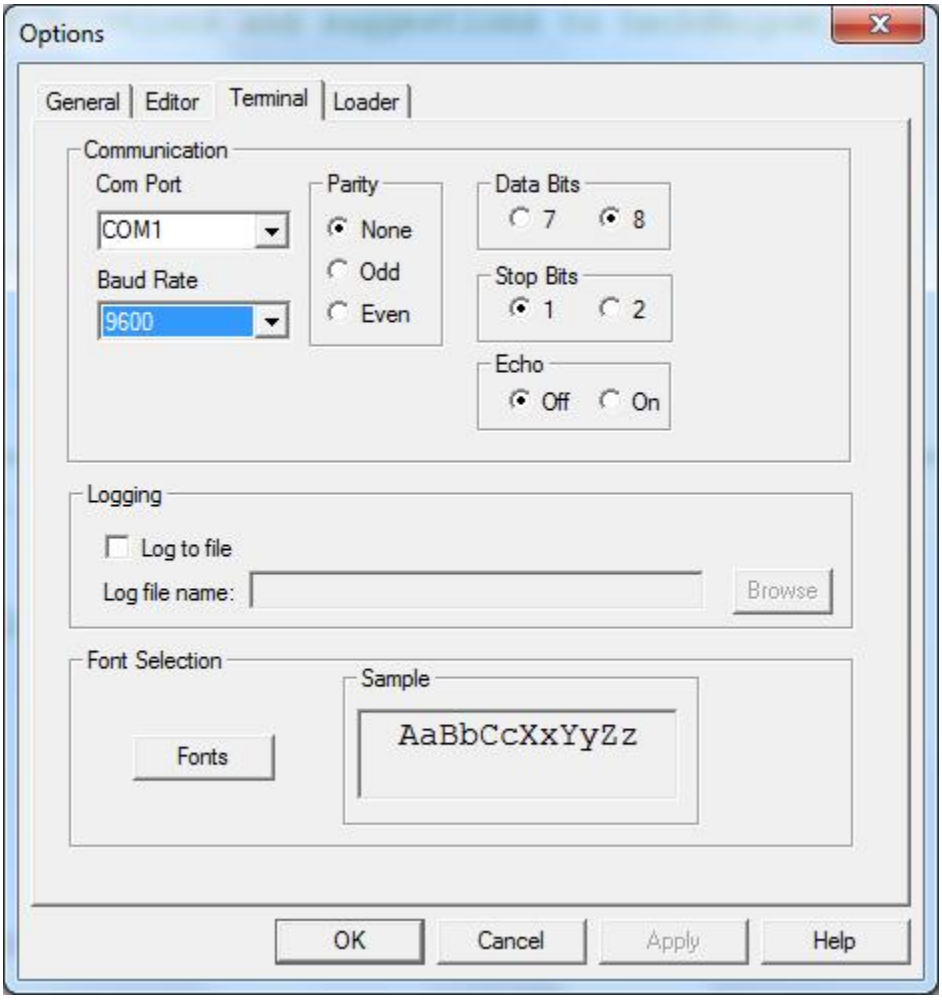
When the download is finished, the progress indicator disappears. This means that the board has received the program successfully. After the program has been successful downloaded, it can be started using the Mode button on the main Toolbar:

Mode button puts the board into **Run** or **Program** mode. In Run mode, the microcontroller is executing the program in its memory. In Program mode, the microcontroller is in Reset state so no programs are running. In Program mode, microcontroller's flash memory can be changed and a new program can be downloaded.

Configuring Terminal Window

To see the 'Hello World!' messages that the board sends to the serial port, Micro-IDE terminal window is used.

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

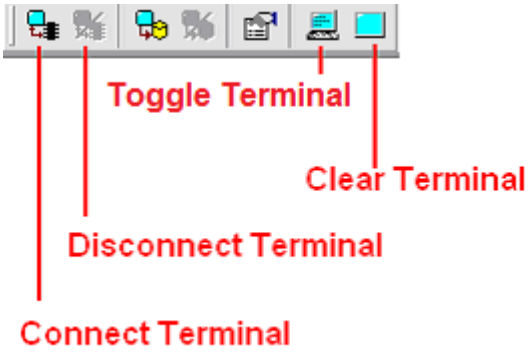


Select the correct PC COM port you have connected the MINI-MAX/MSP430-C.
The following settings match the example we run on the Mini-Max/MSP430-C board:

Baud rate: 9600
Parity: None
Data Bits: 8
Stop bits: 1
Echo: Off

Click the OK button.

Open the terminal window using the Toggle Terminal icon button



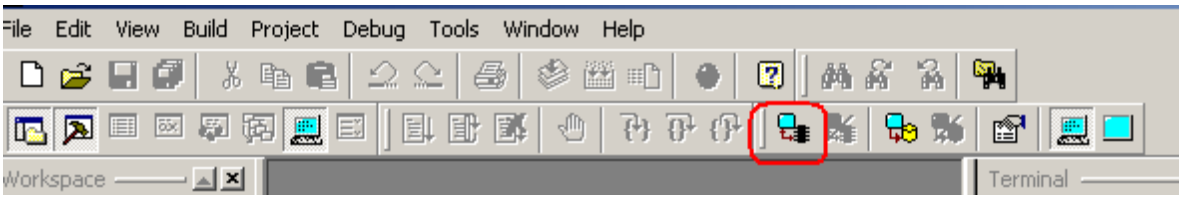
Connect Terminal connects the terminal window to the PC COM port. If a board sends data to the serial port, the messages will appear in Terminal window.

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

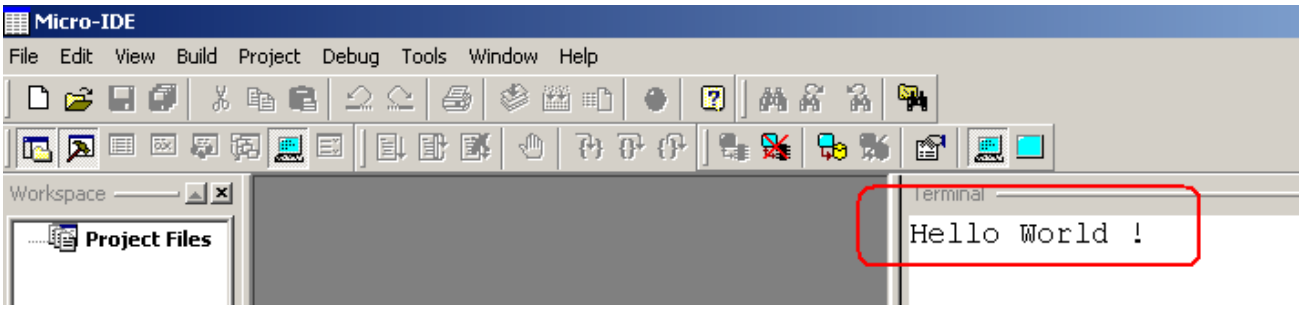
Toggle Terminal shows/hides the terminal window.

Clear Terminal clears all messages in the terminal window.

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



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



Congratulations!!! You have built and executed your first MSPGCC GNU C program on the MINI-MAX/MSP-430C.

NOTE: To see the output on Terminal Window, MINI-MAX/MSP430-C board should be connected to serial port of PC with serial cable. Please see **MINI-MAX/MSP430-C Technical Manual** for more information:

http://www.bipom.com/documents/boards/msp430c/mm_msp430.pdf

4 Expanding Your System

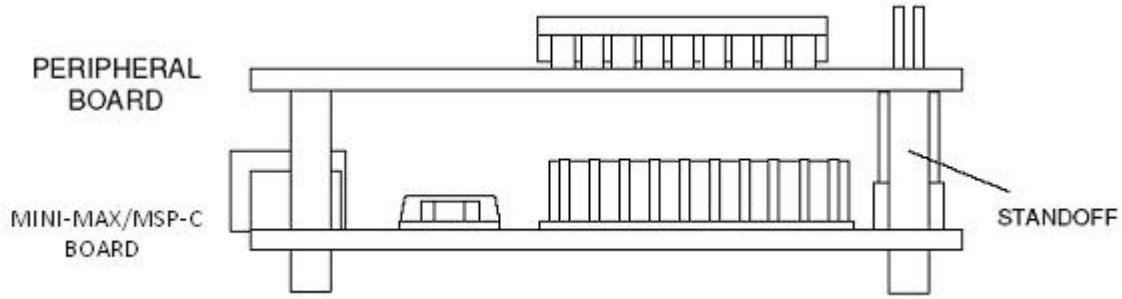
4.1 Connecting Peripheral Boards

MINI-MAX/MSP-430C can be connected to a wide variety of low-cost peripheral boards to enhance its functionality. Some possibilities are:

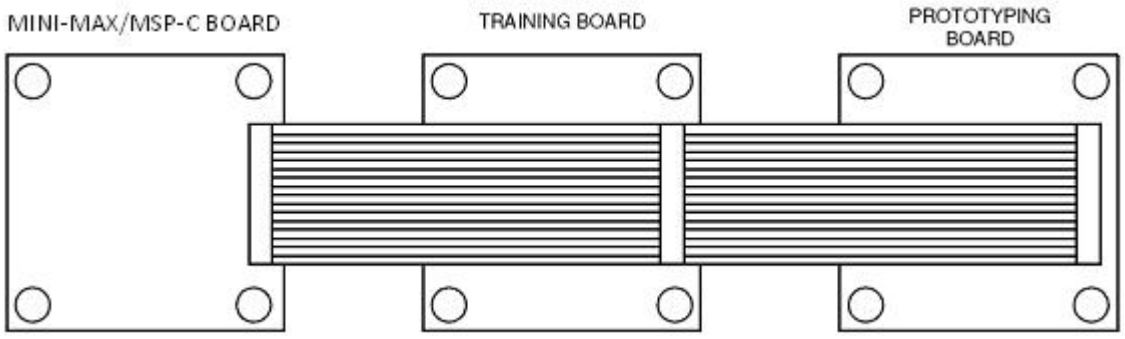
- Prototyping board (PROTO-1)
- Training Board (TB-1)
- Digital Input/Output Expander Board (DIO-1)
- Analog (ADC and DAC) Input/Output Boards (DAQ-2543, DAQ-2543-DA1)
- Relay peripheral boards (RELAY-1, RELAY-2, RELAY-4REED)
- Real Time Clock boards with a Multi Media Card socket (RTC board, MMC/RTC board)
- A peripheral board with four 7-segment LED displays with decimal point (LED-1).

Peripheral boards can either be stacked on top of MINI-MAX/MSP-430C using stand-offs or connected in a chain configuration using flat ribbon cable.

The following Figure shows how MINI-MAX/MSP-430C can be connected to a peripheral board in a stacked fashion.



The following Figure shows chain connection.



4.2 LCD

LCD connector on MINI-MAX/MSP-430C serves various types of character and graphic LCD modules. Please look at the “LCD connector” section of *Technical Manual* for reference.

4.3 Keypad

MINI-MAX/MSP-430C provides a Keypad Connector that contains 5 Volt power and ground lines and the 8 port lines of the micro-controller. It can be used to scan various types of keypads, such as 3 by 5 or 4 by 4. The lines can also be used as general-purpose inputs/outputs.

4.4 MicroTRAK

Please see http://www.bipom.com/periph_cat/us/37/117.html for training and project kits based on the MINI-MAX platform.

4.6 Accessories

Please see http://www.bipom.com/peripherals.php for a full range of accessories.