MINI-MAX/AVR-C

Quick Start Guide

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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 bootloader. 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 bootloader is erased from ATMEGA2560 Boot Flash memory for any reason, please read the special document from BiPOM on how to restore the boot loader:

http://www.bipom.com/documents/boards/mmavr/ATMEGA2560 bootloader.pdf

Hardware Setup

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

Connect the provided 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.

Connect the 10-pin header of serial cable to X5 connector (UART0) of MINI-MAX/AVR board.

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

Make sure that JP2 jumper is installed so PC can download programs to the board.



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



Tools

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++.

AVR Development System from BiPOM includes Micro-IDE which is a Windows-based Integrated Development Environment for micro-controller application development. Micro-IDE has a built-in terminal window to interact with MINI-MAX boards through a PC COM port.

Software Setup

Download and install WinAVR C Compiler from http://www.bipom.com/avrdev_down.php



💮 WinAVR 20081205 Setup	
Choose Install Location Choose the folder in which to install WinAVR 20081205.	
Setup will install WinAVR 20081205 in the following folder. To install in a different folder Browse and select another folder. Click Next to continue.	r, click
Destination Folder C:\WinAVR-20081205 Browse	
Space required: 119.2MB Space available: 6.5GB	
< Back Next > C	ancel

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: Add Directories to PATH (Recommended) Install Programmers Notepad			
Space required: 119.2MB			
< Back Install	Iancel		

🛞 WinA¥R 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

Download and install the AVR Development System from http://www.bipom.com/avrdev_down.php

Execute the downloaded *avr_devsys.exe* to start the installation. A welcome screen will appear:



Click Next. End User Agreement will appear:

Software License Agreement	—		
Please read the following License Agreement. Press the rest of the agreement.	the PAGE DOWN key to see		
END USER LICENSE AGREEMENT FROM BIPOM Electronics			
Please read the following End User License Agreement ("EULA") carefully. The EULA is a legal agreement between you the user and BiPOM Electronics for the use of Micro-IDE (the "Software"). This EULA contains the conditions under which you may use the software as well as warranty and liability disclaimers. By installing, copying or using the Software, you agree to be bound by the terms of this EULA. If you do not agree to the terms of this EULA, do not install, copy, or use the Software. This Software is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties. This Software is licensed, not sold.			
For more information about Micro-IDE, see the About box under Help menu in this program. To learn more about BiPOM Electronics and its products, visit			
Do you accept all the terms of the preceding License Agreement? If you choose No, Setup will close. To install Micro-IDE, you must accept this agreement.			
< <u>B</u> ack	Yes <u>N</u> o		

Please read the agreement and click Yes to continue.

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

User Information		
	Please ente number as i N <u>a</u> me: <u>C</u> ompany: <u>S</u> erial:	er your name and company name below. Leave serial is for free using Micro-IDE. Jack BiPOM FREE
		< <u>B</u> ack <u>N</u> ext > Cancel

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

Choose Destination Locat	ion 🗧	x
Setup will install Micro-IDE in the following folder. To install to this folder, click Next. To install to a different folder, click Browse and select anot folder. You can choose not to install Micro-IDE by clicking Cancel Setup.		ait
<i>~</i>	Destination Folder C:\bipom\devtools Browse	
	< <u>B</u> ack <u>N</u> ext > Cancel	

[缦 Setup		
Micro-IDE		
	A7 % Cancel	

Setup Complete		
	Setup has finished installing Micro-IDE on your computer.	
	Setup can launch the Read Me file and Micro-IDE. Choose the options you want below.	
	I would like to launch Micro-IDE.	
	Click Finish to complete Setup.	
	< <u>B</u> ack Finish	

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

Downloading Example Programs

After installing the software, you can build programs and download programs to the board. Follow the steps below: Make sure the board is powered and connected to the PC as described in the section **Installing the Hardware**. Run Micro-IDE from Windows Start menu. When Micro-IDE is started, the Project selection window appears:

Welcome to Micro-IDE program Development Environment		
What do you want to start with:		
C Create a new project		
 Open an existing project 		
C Open an example project		
		-
Project	Description	
· · · · · · · · · · · · · · · · · · ·		4
✓ Show this dialog at startup.	ОК	Cancel

Micro-IDE is distributed with several example programs that show how to program the ATMEGA2560 microcontroller. Example projects are located under the *Examples* folder under the folder where you installed Micro-IDE. Select Open an Example Project option:

Welcome to Micro-IDE program Development Environment			
What do you want to start with:			
C Create a new project			
O Open an existing project			
 Open an example project 			
WinAVR C Compiler		-	
Project bootloader_atmega2560 dio1 ds1621 hello keypad4x4 keypad4x4_2 \Labs\lab1 \Labs\lab2 \Labs\Lab03\lab3 1 ◀	Description	• 	
✓ Show this dialog at startup.	ОК	Cancel	

Select *hello* project and click OK.

<pre>File Edit View Build Project Debug Tools Window Help File Edit View Build Project Debug Tools Window Help File Edit View Build Project Debug Tools Window Help File Edit View Build Project Files File Edit View Build Project File Build Project</pre>
Image: Solution of the system Image: Solution of the
Workspace Image: Section of the system */ Image: Section of the system */ Image: Section of the system */ Image: Section of the system system */ Image: Section of the system system */ Image: Section of the system
<pre>Workspace // Image: Project Files // Image: Proje</pre>
<pre> This program is written using WinAVR GNU GCC Compiler int main (void) /* Initialize the system */ uartOInit(19200); /* Send a simple message */ uartOPrintf("\n\rHello World!"); for (;;); </pre>
<pre># Held.d #include "hello.h" int main (void) { /* Initialize the system */ uart0Init(19200); /* Send a simple message */ uart0Printf("\n\rHello World!"); for (;;); *</pre>
<pre>#include "hello.h" int main (void) { /* Initialize the system */ uart0Init(19200); /* Send a simple message */ uart0Printf("\n\rHello World!"); for (;;); *</pre>
<pre>int main (void) { /* Initialize the system */ uart0Init(19200); /* Send a simple message */ uart0Printf("\n\rHello World!"); for (;;); /* Files</pre>
<pre>{ /* Initialize the system */ uart0Init(19200); /* Send a simple message */ uart0Printf("\n\rHello World!"); for (;;); /* </pre>
<pre>/* Initialize the system */ uartOInit(19200); /* Send a simple message */ uartOPrintf("\n\rHello World!"); for (;;); </pre>
<pre>uartOInit(19200); /* Send a simple message */ uartOPrintf("\n\rHello World!"); for (;;); </pre>
<pre>uartOPrintf("\n\rHello World!"); for (;;); </pre>
for (;;);
tig Files →
X
Build Debug Find in Files 1 Find in Files 2 Loader
Ready Ln 1, Col 1 Disconnected

Click the Build button on the main toolbar. This will build the Hello project:



If the project builds successfully, you should see a message indicating no errors on the Output Window:



Download the executable (hello.hex) file to the board by selecting Download under Build menu:



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

Downloading program	×
47%	
Cancel	

The progress dialog will disappear following a successful download. Details of the download are shown on the Output Window:

III Micro-IDE - [hello.c]				
🗌 Eile Edit View Build Project Debug Tools Window Help	_ Ə ×			
Workspace A X helio.c				
E 🗐 'hello' Project Files	<u>^</u>			
hello.h This module is presented here only to serve as a sample for				
hello.c ATmega2560 program development.				
: BiPOM Electronics provides this module as is and				
; Please e-mail any questions and suggestions to tech@bipon.com				
Module: hello c				
	~			
The second secon	Note: Solution: Solutio			
Success checking target, signature='STK500_2'	<u>~</u>			
Downloading helio.hex				
Er cosilig cargas clip				
Load Address 0x0				
Writing FLASH				
Success writing 256 bytes, 000000-000100				
Success writing 256 bytes, 000100-000200				
Success writing 256 bytes, 000200-000300				
Success writing 256 bytes, 000300-000400 Success writing 256 bytes, 000400-000500				
Success within 250 bytes, 00500-00600				
Success writing 256 bytes, 000600-000700				
Success writing 256 bytes, 000700-000800				
Success writing 256 bytes, 000800-0008FC				
Writing FLASH is completed				
Load Address 0x0				
Reading rubbin				
Success reading 256 yebs, 000100-000200				
Success reading 256 bytes, 000200-000300				
Success reading 256 bytes, 000300-000400				
Success reading 256 bytes, 000400-000500				
Success reading 25b bytes, 00050-000500				
Surveys reading 250 bytes; 00700-00800				
Success reading 256 bytes, 000800-0008FC				
Download is completed	×			
	>			
8 Build Debug Find in Files 1 Find in Files 2 Loader				
Ready	Ln 1, Col 1 Disconnected			

As can be seen from the Output Window messages, the downloader downloads the program to the microcontroller 256 bytes at a time.

To see the messages that the board prints to the serial port, Micro-DE terminal window is used. From the menu, select Options->Terminal:

Options				×
Editor Terminal Loader				
Communication				
Baud Rate	- <u>P</u> arity	Com Port		
19200 🔻		COM1	C COM5	
	None	C COM2	C COM6	
<u>D</u> ata Bits	C Odd	C COM3	C COM7	
○7 ●8	C Even	C COM4	C COM8	
Echo ⓒ Off ◯ On	Stop Bits ● 1 ○ 2			

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

Baud rate: 19200 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

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.



Connect Button

After the program has been successful downloaded, it can be started using the Mode button on the main Toolbar:



The Mode button is Red in Program mode and Green in Run mode. Following a download, the Mode button will be Red. Click the Mode button to change the mode to Run mode. The program **hello.c** that you just downloaded starts executing.

The "Hello World!" message appears in the terminal window.

Micro-IDE	
File Edit View Build Project Debug Tools Window Help	
D 😅 🖬 🕼 X 🃭 🛍 🗅 🗠 🥌 🖉 🖉 🖬 🕷 🔏 🖓 🎬 🖬 🔶 🛛 🛛 🗛 縃 🔏 🤇	P
🖪 🗩 🗉 🖉 疑 🧱 🗉 目 目 副 🖉 🕘 子 子 子	
Workspace —— 💵	terminal
Project Files	Hello World !

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