# **Using MINI-MAX/AVR-C**

# with **AVR Dragon**

# **Quick Start Guide**

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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 ATMEGA2560-16 single-chip Flash micro-controller.

## 2. Tools

**2.1**. AVR Studio® 4 from ATMEL (<u>www.atmel.com</u>) is the 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. Includes the GNU GCC compiler for C and C++.

**2.3**. The AVR Dragon from ATMEL (<u>www.atmel.com</u>) is a low cost development tool. AVR Dragon supports all programming modes for the AVR device family.

## 3. Software setup

Please install AVR Studio and USB driver **BEFORE** connecting AVR Dragon to your PC.

3.1. Download and install WinAVR from <a href="http://sourceforge.net/">http://sourceforge.net/</a>

🛞 WinAVR 20081205 Setup	
	Welcome to the WinAVR 20081205 Setup Wizard This wizard will guide you through the installation of WinAVR 20081205. It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer. Click Next to continue.
	Next > Cancel
😵 WinAVR 20081205 Setup	
Choose Install Location Choose the folder in which to ins	stall WinAVR 20081205.
Setup will install WinAVR 200812 Browse and select another folde	205 in the following folder. To install in a different folder, click er. Click Next to continue.
Destination Folder	Browse
Space required: 119.2MB Space available: 6.5GB	

🛞 WinAVR 20081205 Setup		
Choose Components Choose which features of WinAVF	R 20081205 you want to install.	
Check the components you want install. Click Install to start the ins	to install and uncheck the components you don't wan tallation.	t to
Select components to install:	✓ Install Files ✓ Add Directories to PATH (Recommended) ✓ Install Programmers Notepad	
Space required: 119.2MB		
	< Back Install C	ancel



3.2. Download and install AVR Studio 4.12 SP3 or later from http://www.atmel.com/



In order to use the AVR Dragon it is required to install the USB driver. Check the Install/Upgrade USB Driver checkbox, and the USB Driver will be installed automatically.



**3.3.** When AVR Studio/USB driver installation is finished, please attach the USB cable to both PC and AVR Dragon. The AVR Dragon will be powered from the USB. If it is the first time the AVR Dragon is connected to the computer, the box below will appear:

Found New Hardware Wizard	
	Welcome to the Found New Hardware Wizard This wizard helps you install software for: AVRISP mkII
	If your hardware came with an installation CD or floppy disk, insert it now. What do you want the wizard to do?
	<ul> <li>Install the software automatically [Recommended]</li> <li>Install from a list or specific location (Advanced)</li> <li>Click Next to continue.</li> </ul>
	< <u>B</u> ack <u>N</u> ext > Cancel

Please, click "Next" a couple of times and wait until the installation process completes. It may take from a few seconds up to a few minutes.

If the USB driver is correctly installed and AVR Dragon is connected to the PC, the Green LED inside AVR Dragon enclosure will get ON.

If the AVR Studio for some reason can't detect the AVR Dragon, try to restart the computer in order to get the driver properly loaded.

### 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 a 6-pin header of AVR Dragon to X2 connector of MINI-MAX/AVR-C board.4.4. Connect the 6VDC power supply to a suitable wall outlet.RED LED on MINI-MAX/AVR-C board will get 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.

AVR Studio
- Eile <u>P</u> roject <u>B</u> uild Edit <u>V</u> iew <u>T</u> ools <u>D</u> ebug <u>Wi</u> ndow <u>H</u> elp
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: Trace Disabled 🚽 🛠 🛠 , 🖯 🔟 木 : 🚥 🗰 🗰 ど を 🕬 TO
Create new project       Project name:       ↑ Atmel AVR Assembler       ↑ Atmel AVR Assembler       ↑ Create initial file       ↑ Create initial file       ↑ Create initial file       ↓ Create initial file
Ver 4.14.589 🔽 Show dialog at startup
<< Back Next >> Finish Cancel Help

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

🍃 AVR Studio		
<u>Eile Project Build E</u>	<u>dit Yiew T</u> ools <u>D</u> ebug <u>W</u> indow <u>H</u> e	elp
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Trace Disabled	👻 🛠 🕀 🔺 🛪 🖬 🗰 🗰	Le AUTO
	Select debug platform and device	
	Debug platform:	Device:
- S	AVB Dragon	ATmega168
	AVR Simulator	ATmega168P
	AVR Simulator 2	ATmega169
. 9	ICE200	ATmega169P
	ICE 50	
		ATmega2561
		ATmega2301
		ATmega323
		ATmega324P
		ATmega325 🔹
	Upen platfo	rm options
Ver 4.14.589		
	<< Back   Next >>	Finish Cancel Help

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.

AVR Studio - C:\Temp\Test.c		
Eile Project Build Edit View Tools Debug	<u>W</u> indow <u>H</u> elp	
i 🗋 💕 🖬 🖉 🙂 🐒 🖏 📇 🧐 🕾 🕾	🐂 🛚 🗚 🔧 % % 律 前 🗑 🖌 🕬	□ I I I I I I I I I I I I I I I I I I I
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Ave socc	p\Test.c	
🖹 C:\Temp	Test.c	4 Þ

#### 5.4. Type the following C-code:





The program changes PB5 port pin to low level. if aTB-1 board is installed (TB-1 peripheral board from BiPOM, <u>http://www.bipom.com/periph\_item.php?id=213</u>) PB5 port pin will turn the Green LED ON on a training board.

**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 AVR Dragon platform and click Connect button.

Select AVR Programmer		<b>X</b>
Platform:	Port: USB	<u>C</u> onnect Cancel Baud rate: 115200 ▼
Tip: To auto-connect to the programmer button on the toolbar.	r used last time, press the 'Programmer'	Baud rate changes are active immediately.
Note that a tool cannot be used for prog a debugging session. In that case, selec Disconnected Mode	gramming as long as it is connected in ct 'Stop Debugging' first.	

**5.8.** Select ATmega2560 device and click Read Signature button.

AVR Dragon in ISP mode with ATmega2560	
Main Program Fuses LockBits Advanced HW	Settings HW Info Auto
Device and Signature Bytes ATmega2560	Erase Device
0x1E 0x98 0x01	Read Signature
Signature matches selected device	
Programming Mode and Target Settings	
ISP mode	Settings
	ISP Frequency: 250.0 kHz
	Daisy Chain: Disabled
	Changes to daisy chain settings are only valid from the next time the programming dialog is opened
Setting device parameters OK! Entering programming mode OK! Reading signature 0x1E, 0x98, 0x01 OK! Leaving programming mode OK!	A

#### Important Note!!!

The signature should match ATmega2560.

If there is any problem with this step please check your hardware, connections, etc. Do not try to program the ATmega2560 chip if the signature does not match. The chip may be permanently blocked.

#### 5.9. Check fuses

AVR Dragon in ISP mo	de with ATmega2560
Main Program Fus	es LockBits Advanced HW Settings HW Info Auto
Main Program Pos BODLEVEL OCDEN JTAGEN SPIEN WDTON EESAVE BOOTSZ BOOTRST CKDIV8	EockBits Advanced HW Settings HW Info Auto
CKOUT SUT_CKSEL	Ext. Crystal Osc. 8.0- MHz; Start-up time: 16K CK + 65 ms 🔹
EXTENDED	0xFC
HIGH	0x98
	0xFF
🔽 Auto read	
🔽 Smart warnings	
Verify after program	nming Program Verify Read
Setting device paramete Entering programming m Reading fuses address ( Leaving programming m	rrs OK! ode OK! 0 to 2 0xFF, 0x98, 0xFC OK! ode OK!

### **5.10.** Select Test.hex file and press Program button

AVR Dragon in ISP mode with ATmega2560
Main Program Fuses LockBits Advanced HW Settings HW Info Auto
Erase Device
Erase device before flash programming Verify device after programming
Flash
O Use Current Simulator/Emulator FLASH Memory
Input HEX File C:\Temp\default\Test.hex
Program Verify Read

Green LED on TB-1 will be switched ON as soon as the download is complete.