# BASCOM51

# **Quick Start Guide**

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## 1. Hardware Setup

1. Please follow the hardware setup instructions below to use BASCOM51 with BiPOM's MINI-MAX/51 boards. For using BASCOM51 with other 8051 hardware, please follow the hardware setup and download instructions that apply to your hardware.

2. Place the MINI-MAX/51-C2 Microcontroller board on a clean, non-conductive surface.

3. Connect the provided 6VDC power supply plug to the power jack on the MINI-MAX/51-C2. Do not connect the power supply to the outlet yet.

**CAUTION:** 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. Connect the MINI-MAX/51-C2 to an available serial port on the PC using the supplied serial cable as shown below.

5. Connect the 6VDC power supply to a suitable wall outlet.



#### MINI-MAX/51-C2 Board





# 2. BASCOM51 Installation Instructions

#### 2.1 Micro-IDE Installation

Download BASCOM51 from:

http://www.bipom.com/bascom51\_down.php



Click on bascom51\_devsys.exe link. Select Save File. Downloading will start.

Opening bascom51_devsys.exe	×
You have chosen to open	
🛅 bascom51_devsys.exe	
which is a: Binary File	
from: http://www.bipom.com	
Would you like to save this file?	
	Save File Cancel

When the download completes, double click on the file **bascom51\_devsys.exe** to start installation:







X

Click Next.

Software Li	icense Agreement
æ	Please read the following License Agreement. Press the PAGE DOWN key to see the rest of the agreement.
END USE	
agreeme "Software as warrar be bound copy, or u copyright	ead the following End User License Agreement ("EULA") carefully. The EULA is a legal ent between you the user and BiPOM Electronics for the use of ThermoPC ( the e"). This EULA contains the conditions under which you may use the software as well inty and liability disclaimers. By installing, copying or using the Software, you agree to d by the terms of this EULA. If you do not agree to the terms of this EULA, do not install, use the Software. This Software is protected by copyright laws and international it treaties, as well as other intellectual property laws and treaties. This Software is 1, not sold.
	e information about ThermoPC, see the About box under Help menu in this program. To re about BiPOM Electronics and its products, visit http://www.bipom.com or send email
	ccept all the terms of the preceding License Agreement? If you choose No, Setup will o install Micro-IDE, you must accept this agreement.
	< Back Yes No

Agree to the license agreement by clicking **Yes**.

User Information			×
User Information	You may lea	r your name, company name and serial number below. We the serial number field blank to run this software in ad demo mode.	
		< <u>B</u> ack <u>N</u> ext > Cancel	

If you have a serial number from BiPOM, enter your serial number in the Serial field. If it says DEMO in this field, delete DEMO and enter your serial number.

Choose Destination Locati	on	×
	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 another folder. You can choose not to install Micro-IDE by clicking Cancel to exit Setup.	
	Destination Folder C:\bipom\devtools\ Browse	
	< <u>B</u> ack <u>N</u> ext≻ Cancel	

## Install to default location: c:\bipom\devtools

Click Next.

Select Program Folder	×
Select Program Folder	Setup will add program icons to the Program Folder listed below. You may type a new folder name, or select one from the existing Folders list. Click Next to continue.         Program Folders:         Micro-IDE         Existing Folders:         FlashBoot         Flowcode V4         Flowcode V4 for AVRs         GadgetPC
~~	Games GNUARM Maintenance Matrix Multimedia Microchip Micro-IDE
	< <u>B</u> ack <u>N</u> ext> Cancel

Use default Program Folder Micro-IDE. Click Next.

Installation will start.

∯ setup Micro-IDE	
	83 %
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.
	vould like to launch Micro-IDE
	IMPORTANT NOTE: If you have other development systems that use Micro-IDE, please make sure to update all other development systems to the latest versions from BiPOM web site to avoid
	unexpected behavior.
	< Back Finish

Click **Finish**. This will start **Micro-IDE**.

When Micro-IDE starts, you will be asked to open or create a project:



Click Cancel.

#### 2.2 Registering Layered Products

If you have additional serial numbers to specify ( for example, for layered products such as 8051 Simulator and 8051 Debugger ), you can enter these one by one using **Help->Add Serial Number**:

Enter Serial Number	×
Please enter the serial number to be added to the existing licenses for Micro-IDE and layered products:	
000-00000-000000000	
OK Cancel	

Type your serial on the field shown with 0's; there is no need to type dashes. Click **OK** when finished.

Do this for each additional serial number that you have.

Exit **Micro-IDE** using **File->Exit** or by closing the **Micro-IDE** window.

## 2.3 Activating BASCOM51 Compiler License

Copy BASCOM51 license files to activate the BASCOM51 license. This step is important because BASCOM51 will run in demo mode if it does not detect the two license files that it needs.

To do this, open the original order email that was sent to you from info@bipom.com:



Open the zip attachment ( bascom51.zip ):



Copy the 2 license DLL files from bascom51.zip to BASCOM51 folder as shown below:



Check to see if the license files BASC5132.DLL and BSC5132L.DLL are in the BASCOM51 folder:

→ ↓ ▼ Computer ▼ SQ004511V0	03 (C:) ▼ bipom ▼ devtools ▼ BASCOM51 ▼			
	are with 🔻 Burn New folder			
☆ Favorites	▲ Name ▲	Date modified	Туре	Size
E Desktop	89c1051.dat	4/27/2010 5:20 AM	DAT File	1 K
Downloads	89c2051.dat	2/9/2010 9:36 AM	DAT File	1 K
Recent Places	89c4051.dat	2/9/2010 9:36 AM	DAT File	1
	89S2051.DAT	4/27/2010 5:20 AM	DAT File	1 🖡
Libraries	89S4051.DAT	4/27/2010 5:20 AM	DAT File	11
Documents      Music	89s8252.dat	2/9/2010 9:36 AM	DAT File	1
± 🤳 Music ∃ 🏊 Pictures	8958253.DAT	4/27/2010 5:20 AM	DAT File	1
± J Videos	812.dat	2/9/2010 9:36 AM	DAT File	1
	8051F000.dat	4/27/2010 5:20 AM	DAT File	31
ille Computer	8051F020.dat	4/27/2010 5:20 AM	DAT File	3
🗆 👞 SQ004511V03 (C:)	8051F300.dat	4/27/2010 5:20 AM	DAT File	21
🖃 🗼 bipom	8052.dat	2/9/2010 9:36 AM	DAT File	1
	80515c.dat	2/9/2010 9:36 AM	DAT File	2
BASCOM51	80517.dat	2/9/2010 9:36 AM	DAT File	3
🕀 🗼 MicroIDE	80535.dat	2/9/2010 9:36 AM	DAT File	1
	80537.dat	2/9/2010 9:36 AM	DAT File	2
	80552.dat	2/9/2010 9:36 AM	DAT File	1
	■ b8051.exe	2/9/2010 9:36 AM	Application	42
	Basc5132.dll	4/27/2010 5:29 AM	Application extension	117
	BSC5132L.DLL	4/6/2007 11:13 AM	Application extension	8
	history.txt	4/27/2010 5:20 AM	Text Document	67
	INSTALL.LOG	2/9/2010 5:20 AM	Text Document	15

Your BASCOM51 license should not be activated. Start Micro-IDE and use BASCOM51 without any restrictions.

You can check the status of licenses using Help->About in Micro-IDE:

A	bout Micro	-IDE		×
	Licensed Pr	Micro-IDE Version 2.22. Build: 2 Copyright © 1998-2010 by BiPOI roducts:		OK
	Product		License Status	Serial #
	8051 Online	e Debugger	Licensed	005-36457-747106
		e Debugger Site License	Demo	Demo
	8051 Simul	ator for 'ATMEL'	Demo	Demo 🔟
	8051 Simul	ator for 'Philips'	Demo	Demo
	8051 Simul	ator/Offline Debugger	Licensed	087-36053-749776
	8051 Simul	ator/Offline Debugger Site Lice	Demo	Demo
	ASM51 As:	sembler for 8051-8052	Demo	Demo
	BASCOM 8	3051	Unknown	•
	4			
		Parts derived from code by Andr <u>E-mail: info@bipom.com</u>	ei Stcherbatchenko <u>Web: www.bi</u>	pom.com

**IMPORTANT:** BASCOM51 status is Unknown because Micro-IDE does not keep track of license status of layered compilers. This is OK and it means that BASCOM51 may or may not have a license.

# 3. Downloading an Example Program

## 3.1 Opening the Example Project

To open and run an existing BASIC program example, please follows these instructions:

Start Micro-IDE from Start → Programs → Micro-IDE.

When Micro-IDE starts, the Project Selection window appears:



Click Open existing project and then OK.

BASCOM51 Development System is distributed with several examples. Example projects are located under the **Examples** folder under **C:\bipom\devtools\Bascom51\Examples\**.

Open the project file C:\bipom\devtools\Bascom51\Examples\hello\hello.prj. When the project opens, you will see the source of the 'hello' program.



#### 3.2 Building the Project

Click **Toggle Output** icon button. This will display the **Output** pane.

**NOTE:** If the **Output** pane was already open from before, do not click Toggle Output button as this will hide the **Output** pane.



Press the Build All icon button. This will generate the output file hello.hex under following folder:

C:\bipom\devtools\Bascom51\Examples\hello\

III Micro-IDE - [hello]	
File Edit View Build Project Debug Tools Window Help	
] D 😅 🖬 🕼 🐁 🖻 🛍 🕰 🖉 🏙 🕒 🔶	
Workspace A	Build All button
' MINI-MAX/51-C \$BAUD = 19200	day, July 06, 2001 Configuration 'set baud rate to 19200 8400 '22.1184 MHz crystal ( clock frequency )
T Files	
Compiling C:\bipom\devtools\BASCOM51\Examples\hello\hello.bas Running post-build command Build Successful.	Building output
Build Debug Find in Files 1 Find in Files 2 Loader	
Ready	Ln 1, Col 1 Disconnected

The output messages above indicate that the program compiled successfully. If there are errors in the program, you will see the corresponding error messages in the Output Pane.

#### 3.3 Downloading the Program

To download the output **hello.hex** file to the target board, press the **Download** icon button on the toolbar. If the board is powered and connected properly to the PC, a progress dialog will appear:



The progress dialog will disappear after a successful download. Details of the download are shown on the **Output** pane:



#### 3.4 Running the Program

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



Mode button puts the board either 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.

Before running the program, open the Terminal window first to see the output of the example program. Following are the buttons on **Terminal Toolbar**:



**Connect Terminal** - When you click this button, the terminal opens and connects to the selected COM port. When the target board sends data to its serial port, the messages will appear in Terminal window.

Any characters typed in the Terminal window will be sent to the board through the COM port to which Terminal is connected.

Disconnect Terminal - Disconnects from and closes the COM port.

**Open Terminal** – Displays or hides the Terminal.

Clear Terminal – Erases the contents of the Terminal window.

To specify the options for Terminal, select **Tools**  $\rightarrow$  **Options** in main menu to open the **Options** dialog. Select **Terminal** tab:

Options X
Editor Terminal Loader
Communication Com Port COM1 Baud Rate 13200 Even Communication Com Port Com Port Codd Codd Codd Cod Codf Com Port Codd Codf Com Port Codd Codf Com Port Com Port Codd Codf Codf Codf Com Port Com Port Codd Codf Codf Codf Codf Codf Codf Codf Codf Codf Codf Codf Codf Codf Codf Codf Codf Con Port Com
Logging Log to file Log file name:
Font Selection Sample AaBbCcXxYyZz
OK Cancel Apply Help

Select the correct PC COM port that you have connected the board. Other settings should be set as below:

Baudrate: 19200

Parity: None

Data Bits: 8

Stop bits: 1

**Echo**: On – Micro IDE echoes to (prints) in terminal window what the user types; Off - Micro IDE does not print in terminal window what the user types.

Click the OK button to save the settings and close the **Options** dialog.

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 that was downloaded last starts executing.

You should now see the message "hello world" being displayed on the Terminal window.

#### Congratulations!!! You have built and executed your first program on the BASCOM51.

For more help, please read Help for Micro-IDE (BASCOM-51) under Help menu of Micro-IDE.

A full set of BASCOM commands is under **BASIC Language Reference** under Help menu of **Micro-IDE**.

#### 3.5 What to do if download fails ?

The MINI-MAX/51-C Downloader has been available for several years now and is a highly reliable downloader.

You should only pay attention to few details to make sure that the download works:

- Make sure that the board is powered.

- Make sure that you are using the NULL modem cross cable (Laplink cable) that came with the board. Other NULL modem cables may not work. Straight through cables will NOT work.

- Make sure that you are using the correct serial (COM) port. Some PC's have more than one serial port. Check **Tools->Options->Loader** in **Micro-IDE** for the correct COM port. Baud rate, parity, data bits, stop bits, etc. do not make a difference for the MINI-MAX/51-C Loader. All these are automatically detected by the loader. Similarly, the microcontroller type on the board is detected automatically.

Options	x
Editor Terminal Loader Communication Com Port Parity Data Bits	1
COM1     Image: Comparison of the compar	
Stop Bits © 1 © 2	
Run Command Command String:	
Inter-packet Delay (10-50 ms): 20	
OK Cancel Apply Help	

- Make sure that you use the latest software from our website. Older versions of the software may not support newer processors such as the AT89C51ED2. Both the 8051 Development System and BASCOM51 include the latest MINI-MAX/51-C Loader.

# 4. Creating Your Own BASIC Program

### 4.1 Creating a New Project

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

New project	×
Project name:	example It is recommended NOT to put spaces in project name as some toolkits may not support this.
Location:	C:\bipom\devtools\BASCOM51\Examples\example\ Browse
Toolkit:	BASCOM 8051
Debugger:	[no debugger]
Manufacturer II	
Chip ID	
	Cancel

Enter the name of the new project and its location (this example uses **example** as the project name and **C:\bipom\devtools\BASCOM51\Examples\example\** as the project location ). Select **BASCOM 8051** as the Toolkit.

Click **OK.** You will be prompted to create directory for the project. Click **Yes**.

Micro-ID			×
2	Directory does not exis	st. Do you want to create	eit?
	Yes	No	

After this you will be prompted to create new source file. Also click Yes.

Source fi	le		×
?	Do you want to	create a new so	urce file?
	Yes	No	

The new project with the name of **example** will be created under:

#### C:\bipom\devtools\BASCOM51\Examples\example\

The project will now have an **example.bas** program file that was automatically created by Micro-IDE. This is a blank template file of a BASCOM51 BASIC program. Comments contain configuration commands for LCD, I2C and Serial port. In this example we will use only Serial port so uncomment the lines that have Serial port configuration.

The resulting code is shown below:

Micro-IDE - [example*]	
File Edit View Build Project De	
	1 🗈 🕼 🗢 (7) (7) (1) 🗣 💥 😓 🐝 😰 📃
Workspace	example
- 4 'example' Project Files - 4 minimize example.bas	<pre>'LCD CONFIGURATION 'CONFIG LCDPIN=PIN,DB4=P0.4,DB5=P0.5,DB6=P0.6,DB7=P0.</pre>
	'SERIAL PORT CONFIGURATION <b>\$BAUD = 19200</b> 'set 19200 baud rate for <b>\$CRYSTAL = 22118400</b> '22.1184 MHz crystal
	'I2C BUS CONFIGURATION 'CONFIG SCL = P1.6 'P1.6 is the SCL line 'CONFIG SDA = P1.7 'P1.7 is the SDA line 'CONFIG I2CDELAY = 25
Files	✓ Ln 11, Col 22 Disconnected // // // // // // // // // // // // //

#### 4.2 Adding program lines

Now add aliases for ports on the MINI-MAX/51-C2 board. These will be used to control LED's on TB-1 Peripheral Board if this board is connected. Otherwise program will simply change the logic levels on the port pins.

**NOTE:** More information about TB-1 Peripheral board is available on BiPOM web site:

TB-1 Peripheral Board	- http://www.bipom.com/products/us/213.html			
MINI-MAX/51-C2 Board	- http://www.bipom.com/products/us/318646.html			
Add the following lines of code below all text in examples.bas:				

RED	Alias P	P1.3	'define	port	pin	of	Red LED
YELLOW	Alias P	P1.1	'define	port	pin	of	Yellow LED
GREEN	Alias P	P1.0	'define	port	pin	of	Green LED

These lines of BASIC code creates aliases for three pins on PORT 1. This way, we can use RED instead of P1.3 to make the program more readable.

Below this, add code to print a greeting message as soon the program is started. Program will print message to the Serial port.

```
Print "Checking LEDs..."
```

As soon the program starts running, Checking LEDs... message will be displayed in Micro-IDE Terminal window.

The following code adds an infinite loop that turns on/off all three LED's on TB-1 board one by one with a one second delay in between:

Do

Print	"RED"
Reset	RED
WaitMs	1000
Set	RED
Print	"YELLOW"
Reset	YELLOW
WaitMs	1000
Set	YELLOW
Print	"GREEN"
Reset	GREEN
WaitMs	1000
Set	GREEN

Loop

Do Loop	<ul> <li>This statement makes a forever loop</li> </ul>
Print	- Sends specified string to Serial port
Reset	- Resets a bit of a microcontroller output port
Set	- Sets a bit of a microcontroller output port
WaitMs	- Suspends program execution for a given time in milliseconds

The End statement at the very end of program code tells BASCOM51 Compiler that this is the end of program.

NOTE: More information about BASCOM 8051 Language is on BiPOM web site:

http://www.bipom.com/bashelp/bascom51.htm

After all these changes, the program should look like the following:

```
'LCD CONFIGURATION
'CONFIG LCDPIN=PIN, DB4=P0.4, DB5=P0.5, DB6=P0.6, DB7=P0.7, E=P0.2, RS=P0.0
'SERIAL PORT CONFIGURATION
$BAUD = 19200 'set 19200 baud rate for
$CRYSTAL = 22118400 '22.1184 MHz crystal
'I2C BUS CONFIGURATION
'CONFIG SCL = P1.6 'P1.6 is the SCL line
'CONFIG SDA = P1.7 'P1.7 is the SDA line
'CONFIG I2CDELAY = 25
RED
          Alias P1.3
                           'define port pin of Red LED
YELLOW
                           'define port pin of Yellow LED
         Alias P1.1
GREEN
                           'define port pin of Green LED
         Alias P1.0
Print
Print "Checking LEDs..."
Do
     Print
               "RED"
     Reset
               RED
     WaitMs
               1000
     Set
               RED
     Print
               "YELLOW"
               YELLOW
     Reset
     WaitMs
               1000
     Set
               YELLOW
              "GREEN"
     Print
               GREEN
     Reset
     WaitMs
               1000
                GREEN
     Set
Loop
End
```

### 4.3 Building and Running a Program

Press **Build All** icon button. This will generate the output file **example.hex** in project folder. If program is built successfully, the following messages will be displayed in **Output** pane:

× •	Compiling C:\bipom\devtools\BASCOM51\Examples\example\example.bas Running post-build command
	Build Successful.
1 1	
Outp	Build Debug Find in Files 1 Find in Files 2 Loader

Download the program to the board by clicking the **Download** button on the main toolbar. If the board is powered and connected properly to the PC COM port, a progress dialog will appear.

When download completes, run the program by clicking the **Mode** button on the main toolbar. The Mode button should be green now. You will see that the LED's on TB-1 turn on and off if TB-1 board is connected.

Congratulations!!! You have built and executed your first BASCOM 8051 program on the MINI-MAX/51-C2.