Hello World!

Step by Step HBBR Basic Tutorial

Version 2.000

Open HBBR Basic IDE

After installing HBBR Basic start the IDE by selecting menu: **Start->Programs->HBBR Basic->HBBR Basic**

Create Project

Go to menu: **File->New Project.**

This command will create new project

Go to menu: **File->New.**

This command will create empty **HBBR1.bas** basic file

Once you have added the file to the project go ahead and save the project and give it a name.

Go to menu: **File->Save Project**

Windows file dialog will open and will let you change name of the project. Give it a name it **tutorial1** and save it, project file **tutorial1.hbbr** will be saved on the disk. Project file is a text file describing all of the files that belong to the project as well as configurations options.

Once the project has been created is is good time to familiarize yourself with the layout of the **HBBR Basic IDE**. You will recognize standard features of the **HBBR IDE** such as Menus and a Toolbar. The main window is divided into 3 panes:

1 – The upper left pane **Project Navigator** is showing project settings as well as files included in the project. It is using Tree Control to show all of the options, you can click on the options and files to navigate the settings. When you click on a file the file will be shown in the upper right pane.

2 – Upper right pane is a multipurpose **Edit Window** used to edit source files, view memory as well as for the terminal.

3 – Lower pane is **Message Window** used to display messages from the IDE as well as the compiler (like compilation errors,warnings)

Enter Source Code

Once you have familiarized yourself with the layout enter source code for the **"Hello World!"**. Go back to the **HBBR1.bas**, you can either select it from the

menu: **Window->1 HBBR1.bas** or by clicking in the upper left pane on the **HBBR1.bas** under Files subtree.

First enter following lines:

```
Const msg$ As String="Hello World!"
Sub main()
          Print #0, msg$
End Sub
```

Now save the file. Go to menu: **File->Save.**

First line is a declaration of the global string constant holding the message "Hello World!". It is followed be the main **Sub**, **Sub** is BASIC keyword declaring a subroutine **main** which ends with the **End Sub** . The subroutine named main is mandatory in **HBBR Basic**, this where execution of the user program starts. There is just one more line to explain, the **Print** statement. **Print** is a runtime subroutine that takes variable number of arguments separated by the come, in this case there are 2 arguments. The first argument preceded by the # character is the file number, in this cases it is number 0 which in **HBBR Runtime** represents Serial Port 0, there will be more on the this topic later in the tutorial. The second argument for the **Print** is the string constant **msg$** which holds the **"Hello World!"** message, which will be printed out when program executes on the micro controller.

Compile Project

Now the source is entered and it has to be compiled and uploaded to the micro controller to be executed. Before compiling there is one more step necessary, the compiler has to know which file in the project has the main subroutine. Go to the upper left pane with project tree, select **HBBR1.bas** file and do a **Right Click** with the mouse which will bring-up a context menu for the file. Select **Set as MAIN** from the menu, you will notice that the icon for the file has changed to the same icon as the **HBBR IDE**. Now the **HBBR1.bas** file is the main file in the project, in this case the project contains only one source file but projects can have many source files. You have probably noticed another file listed under project files the **lpc2148m.mod**. This is a **HBBR Runtime** file for the **LPC2148** micro controller. It is a binary file with all of the support functions and **BASIC runtime**, do not remove it from the project! This file is necessary to compile your source code.

Go to menu: **Project->Compile**, if there are no errors you should see messages saying that the compilation was successful,

look in the log window for a message similar to the one below:

```
...
Syntax parsing
Parsing RUNTIME
Parsing LPC2148IO
Parsing LPC2148
Parsing MATH
Parsing ...\helloworld.bas
done! errors : 0 warnings : 0
Translating
done! errors : 0 warnings : 0
Generating code
done! errors : 0 warnings : 0
Compiling finished
...
```

View HEX

To verify compilation view the **HEX** representation of the compiled program. Go to menu: **Window->View HEX**. Once you selected it the memory hex viewer will show up in the upper right pane. The HEX viewer shows memory content as it will be uploaded to the micro controller. On the left side of the **HEX** view there is an address of the first byte followed by the line of bytes, all values are shown in Hexadecimal notation. You can save **HEX** file at this point. Go to menu: **File->Save Project HEX File**, the file will be saved in the same directory as the project and with the same name except for the extension, the extension will be set to .hex. The **HEX** file can be uploaded to the micro controller at the later time.

Upload To Micro controller

The program is compiled and ready to be uploaded to the micro controller. Assuming that you have connected it and powered the micro controller as explained in the **Installing HBBR Basic IDE** upload it! Go to menu: **Project->Program Flash,** the upload dialog box **Upload to FLASH** will appear. Click the **Start** button, the upload will start. Wait until upload is done and then click **OK** button.

In the log window you should see messages like below during upload:

Synchronizing ...

Port opened COM1:

Synchronized!

Processor has been RESET

Boot loader responds

ID Read : 67305253

FLASH write buffer size : 256

Number of bytes to send : 0

Sector : 0

Bytes in sector erased : 4096

Bytes sent : 256

..

Sector : 5

Bytes in sector erased : 4096

...

Bytes sent : 22032

Done!

Terminal

Once the program has been uploaded open terminal window. Go to menu: **Window->View Terminal**. When the terminal window opens in the upper right pane it will be empty because it is not yet connected to the micro controller. Go to menu: **Project->Connect**. At this point **Terminal** is connected but if you have followed the steps in the tutorial you will not see any output. Yo need to to reset the micron controller either by pushing **Reset** button on the board or by going to the menu: **Project->Reset**. Once you have done that you will see banner **HBBR Basic** banner message followed by the **Hello World!**

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Hello World!

Congratulations you have finished the **Hello World!** HBBR Basic tutorial!