

Beginners Guide to C# and the .NET Micro Framework

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1. About the Book

1.1. Intended Audience

This book is for beginners wanting to get started on .NET Micro Framework. No prior knowledge is necessary. The book covers the basics of .NET Micro Framework, Visual Studio and even C#!

If you're a hobbyist or an engineer, you will find a good deal of info in this book. This book makes no assumption about what you, the reader, knows so everything is explained extensively.

1.2. Disclaimer

This is a free book use it for your own knowledge and at your own risk. Neither the writer nor GHI Electronics is responsible for any damage or loss caused by this free eBook or by any information supplied by it. There is no guarantee any information in this book is valid.

2. Introduction

Have you ever thought of some great idea for a product but you couldn't bring it to life because technology wasn't on your side? Or maybe thought, "there's got to be an easier way!" Maybe you are a programmer that wanted to make a security system but then thought using a PC is too expensive to run a simple system? The answer is Microsoft's .NET Micro Framework!

Here is a scenario, you want to make a pocket-GPS-data-logger that saves positions, acceleration, and temperatures on a memory card and displays them on a small display. GPS devices can send position data over a serial port, so you can easily write some code on a PC to read the GPS data and save it on a file. But a PC won't fit in your pocket! Another problem is how would you measure temperature and acceleration on a PC? If you make this project using classic microcontrollers, like AVR, or PIC micro, all this can be done but then you need a compiler for the microcontroller you chose (which probably very expensive), a week to learn the processor, a week to write a serial driver, a month or more to figure out the FAT file system and more time for memory cards...etc. Basically, it can be done in few weeks or months of work.

2.1. Advantages

If you are using .NET Micro Framework then there are many advantages:

1. It runs on Microsoft's Visual C# Express, free and high-end IDE.
2. .NET Micro Framework is open-source and free.
3. Your same code will run any NETMF device with almost no changes.
4. Full debugging capabilities. (Breakpoints, stepping in code, variables...etc.)
5. Has been tested in many commercial products, with assured quality.
6. Includes many bus drivers.(SPI, UART , I2C...etc.)
7. Eliminates the need to use complicated and long processors' datasheets.
8. If you are already a PC C# programmer then you are know NETMF.

Throughout this document, I will refer to .NET Micro Framework as NETMF.

3. .NET Gadgeteer

.NET Gadgeteer platform definitions take NETMF's flexibility to the next level. It is a set of rules on how hardware modules can interact with a mainboard. The complete specifications and software are open-source. GHI Electronics is proud to be the first to offer a .NET Gadgeteer platform.

More details are found at <http://www.ghielectronics.com/products/dotnet-gadgeteer>

This book is not meant to be used for Gadgeteer devices but it is a great tool to understanding NETMF, which is Gadgeteer's core engine.



4. Getting Started

Important note: If you have just received your hardware or you are not sure what firmware is loaded on it, you **MUST** update the firmware. This page summarizes the firmware update steps http://wiki.tinyclr.com/index.php?title=Firmware_Update

Also, make sure to read the “firmware/assembly matching” section in this book.

4.1. System Setup

Before we try anything, we want to make sure the PC is setup with needed software. First download and install **Visual C# express 2010**

<http://www.microsoft.com/express/vcsharp/>

Now, download and install .NET Micro Framework 4.2 SDK (not the porting kit) and the GHI package installer. Both are found on this page

<http://www.ghielectronics.com/support/dotnet-micro-framework>

By the way, you may want to bookmark this page as it has about everything you need to use NETMF.

4.2. The Emulator

NETMF includes an emulator that allows you to run NETMF applications right on your PC. For our first project, we will use the emulator to run a very simple application.

Create a Project

Open Visual C# Express and, from the menu, select **file -> New Project**. The wizard should now have the “Micro Framework” option in the left menu. Click on it, and from the templates, select “Console Application”.

This is a sample, click download link to get the full Tutorial

CLICK BELOW

