

MuntsOS Embedded Linux

Application Note #12: C# LED Flash Example

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Introduction

This application note describes how to create, build, and run a C# program to flash an LED on a target computer running **MuntsOS Embedded Linux**, using the [.Net](#) SDK (Software Development Kit).

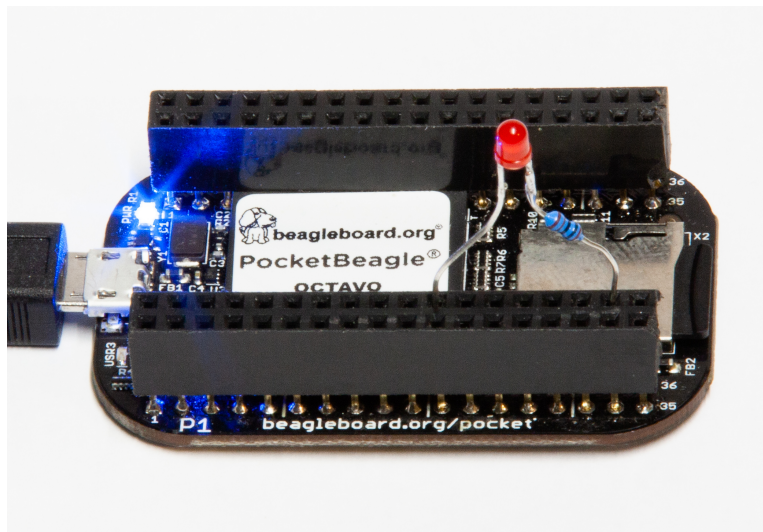
Prerequisites

The **.Net** SDK must be installed on a Linux, MacOS, or Windows host system.

MuntsOS Embedded Linux must be installed on the target computer and USB Network Gadget mode configured ([AppNote #11](#)).

The **.Net** runtime extension [dotnet-muntsos-BeagleBone.deb](#) must be installed on the target computer.

Test Platform Hardware



Unfortunately, the **.Net** runtime is not available for the ARMv6 instruction set of the Raspberry Pi 1 and Zero boards. It requires the 32-bit ARMv7 instruction set (any BeagleBone or Raspberry Pi 2 or 3) or the 64-bit ARMv8 instruction set (Raspberry Pi 3 or 4).

The test platform for the purposes of this application node consists of a [PocketBeagle](#) with female headers mounted on top. The PocketBeagle is a small, reduced cost member of the [BeagleBone](#) family that targets the same market niche as the lower cost [Raspberry Pi Zero](#). It is likely the smallest platform that can run **.Net** applications.

An LED with a 1 kilohm current limiting resistor is plugged in to the PocketBeagle header, from P1.34 (GPIO26) to P1.22 (GND).

Test Program Source Code

Available for download at: <http://git.munts.com/muntsos/doc/blinky/blinky.cs>

```
using System;

namespace blinky
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.WriteLine("\nMuntsOS C# LED Test\n");

            // Configure a GPIO output to drive an LED

            IO.Objects.libsimpleio.Device.Designator desg_LED =
                new IO.Objects.libsimpleio.Device.Designator(0, 26);

            IO.Interfaces.GPIO.Pin LED =
                new IO.Objects.libsimpleio.GPIO.Pin(desg_LED,
                    IO.Interfaces.GPIO.Direction.Output);

            // Flash the LED forever (until killed)

            Console.WriteLine("Press CONTROL-C to exit.\n");

            for (;;)
            {
                LED.state = !LED.state;
                System.Threading.Thread.Sleep(500);
            }
        }
    }
}
```

Exercise

This example exercise demonstrates how to create a C# program project (outside of the **MuntsOS** code tree checkout), compile it with the **.Net** SDK, and run it on the test platform hardware.

Step 1: Install **.Net** project templates for the Linux Simple I/O Library, from <https://www.nuget.org> :

```
dotnet new -i libsimpleio-templates
```

Step 2: Create an empty **.Net** console application using a **libsimpleio** project template:

```
mkdir blinky
cd blinky
dotnet new csharp_console_libsimpleio
rm *.cs
```

Step 3: Download **blinky.cs**:

```
wget http://git.munts.com/muntsos/doc/.blinky/blinky.cs
```

Step 4: Compile the application:

```
dotnet publish
```

Step 5: Copy the program files to the target platform:

```
scp bin/Debug/net5.0/publish/* root@usb gadget.munts.net:.
```

Step 6: Run the test program on the test platform:

```
ssh root@usb gadget.munts.net
dotnet blinky.dll
```

The LED should begin flashing once a second, until you press **CONTROL-C**.