



FEZ Domino Board



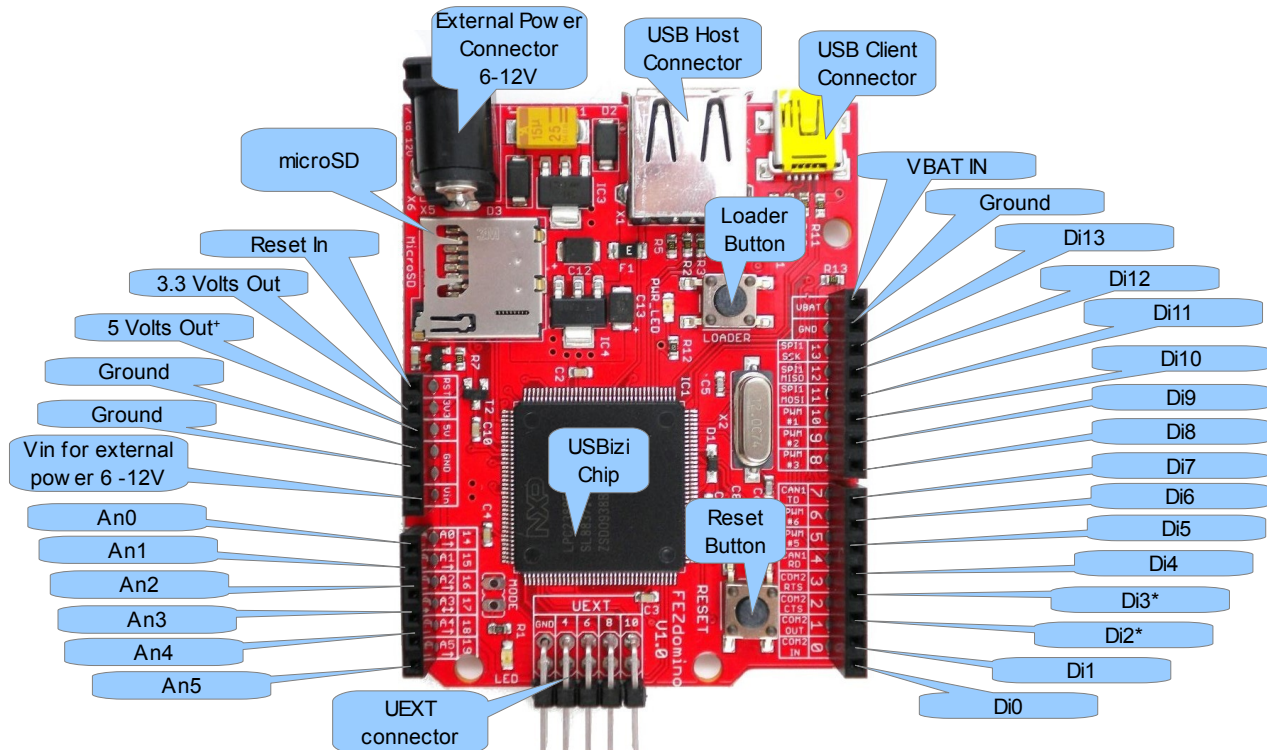
FEZ Domino is a small board running Microsoft .NET Micro Framework. This means you can write code with greater efficiency using C# programming language and Microsoft's free Visual C# Express edition.

You can see that FEZ Domino's outline looks similar to Arduino Duemilanove. The reason for this compatibility is that many shields already exist for the Arduino board. TinyCLR.com offers several shields (Ethernet, Display, Motor Driver, etc.) that are fully tested and supported with FEZ Domino.

Furthermore, with the **FEZ Domino Expansion** shield and on-board **extension header**, the user can easily add extensions and components. This allows FEZ Domino to remain simple yet extremely flexible, making it one of the easiest devices to use in the embedded market. Developers, professionals, and hobbyists can now create a multitude of designs using simple plug-in components.

Many libraries come included, such as FAT file system, threading, UART, SPI, I2C, GPIO, PWM, ADC, DAC, CAN and more.

To get started with FEZ, please take a look at the FEZ Tutorial and .NET Micro Framework Beginners Guide available on www.tinyclr.com



* An4 and An5 are open drain pins with 2.2K pull up resistors.
 + Available only with external power (not USB powered).



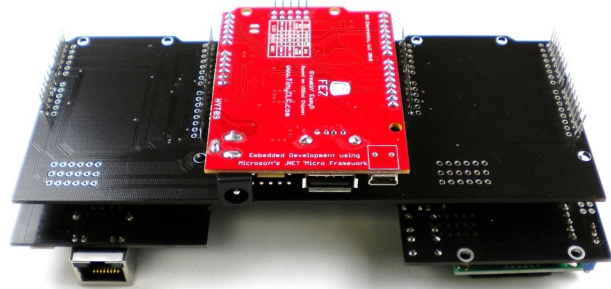
Stackable Shields

Boards that install directly on top of FEZ Domino are called shields. The pin-out is compatible with Arduino allowing developers to use most of the available Arduino shields.

Although shields plug in directly to all the pin headers, not all signals are actually used; therefore, multiple shields may be used. Multiple shields can be stacked up, like an LCD shield and Ethernet shield.



For shields that can't be stacked up, an extender shield can be used instead. Extender shields are available from www.liquidware.com.



To use multiple shields, we need to make sure they are not using the same pin. This can be accomplished by looking at the schematics of each shield. A simpler option is to create a project and include the driver files of all shields. If the shields are using the same pins then an exception will be raised signaling an error.

Powering FEZ Domino

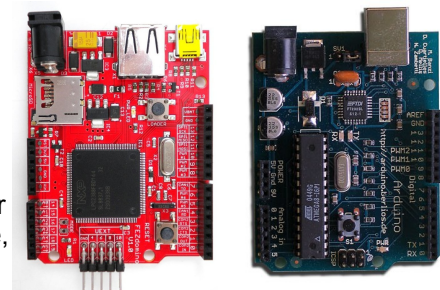
The easiest way to power FEZ Domino is through the USB cable. Optionally, the power connector can be used as well. Using either power source will efficiently supply power to the 3.3V and 5V pins (exposed for shields). The 5V shield pin is a special case, it can be used to power the shields and FEZ Domino as well.

FEZ Domino and Arduino Compatibility

The similar form factor between FEZ Domino and Arduino allows developers to use almost any of the available Arduino shields.

While using the same shields, FEZ offers greater flexibility and far more features. Starting with Microsoft Visual C# Express and the possibility for debugging and ending with high-end libraries like USB host, USB device, threading, XML and many others.

Note that all digital/analog pins, PWM, COM1 and SPI are in the same place, other peripherals can be different. For example FEZ Domino provides three serial ports that are available for developers. Arduino only has one and it is used for debugging!



FEZ Domino Pins Features

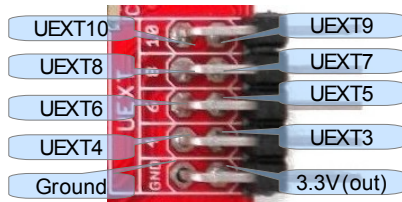
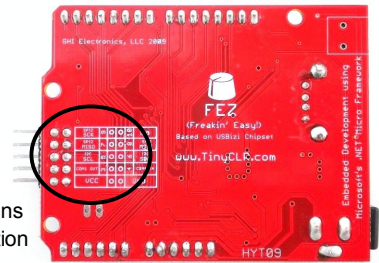
All pins on the 0.1" female headers and extension headers can be used as digital input/output. Some pins have secondary features. Do not attempt to use a pin as digital and as secondary feature simultaneously. For example, when using Di5 as PWM, you can not use Di5 as a digital I/O until you release the PWM feature (in code).

Pin	Secondary Features	Pin	Secondary Features
An0*	Analog Input	Di0*	COM1 IN
An1*	Analog Input	Di1*	COM1 OUT
An2*	Analog Input	Di2*	(Open Drain Pin) I2C SDA
An3*	Analog Input/ Analog Output	Di3	(Open Drain Pin) I2C SCL
An4	Analog Input	Di4*	CAN Channel 1 IN
An5	Analog Input	Di5	PWM
Di11*	SPI1 MOSI	Di6	PWM
Di12*	SPI1 MISO	Di7*	CAN Channel 1 OUT
Di13*	SPI1 SCK	Di8*	PWM
LED	Controls on-board LED/PWM	Di9*	PWM
Loader	on-board button	Di10*	PWM

* These pins can work as interrupt inputs

UEXT Connector

UEXT connector is made to be compatible with extensions such as MP3 decoder, GPS or 3-axis accelerometer. Many extensions are already available on www.tinyclr.com



Pin	Secondary Features	Pin	Secondary Features
UEXT10*	None	UEXT9*	SPI2 SCK
UEXT8*	SPI2 MOSI	UEXT7*	SPI2 MISO
UEXT6*	COM2 CTS	UEXT5*	COM2 RTS
UEXT4*	COM2 RX(IN)	UEXT3*	COM2 TX(OUT)

*These pins can work as interrupt inputs

Remapping COM4

An2 and An3 are special cases where they can be digital, analog or can be remapped to work as COM4, where An2 is COM4 OUT and An3 is COM3 IN. Call the function below to remap COM4

```
// add this on top of your code
using GHIElectronics.NETMF.Hardware.LowLevel;
using System.IO.Ports;
//...
//...
// add this function anywhere
static public void RemapCOM4to_TXAn2_RXAn3(SerialPort ser)
{
    // call this function **after** you open COM4 port
    if (ser.PortName != "COM4" || ser.IsOpen == false)
        throw new Exception("Only use COM4 and make sure it is open");
    // remap COM4 RX (in) pin from P4.29/DIO17 to P0.26 (that is An3)
    // remap COM4 TX (out) pin from P4.28/DIO13 to P0.25 (that is An2)
}
```



```

Register PINSEL9 = new Register(0xE002C024);
PINSEL9.Write(0); // COM4 is now disconnected from P4.28 and P4.29
Register PINSEL1 = new Register(0xE002C004);
PINSEL1.SetBits(0xf << 18); // COM4 is now connected to An3 and An4
}

```

Once the code above is added, you can use COM4 on An2 and An3 as shown below.

```

public static void Main()
{
    SerialPort MyCOM4 = new SerialPort("COM4", 115200, Parity.None, 8, StopBits.One);
    //MyCOM4.ReadTimeout = 1000;
    MyCOM4.Open();
    RemapCOM4to_TXAn2_RXAn3(MyCOM4);
    byte[] helloBytes = Encoding.UTF8.GetBytes("Hello!");
    // write data to COM4 which will be sent out on pin An2
    MyCOM4.Write(helloBytes, 0, helloBytes.Length);
    // .....
    // .....
}

```

USB Host Connector

USB host allows FEZ Domino to access most USB devices. Need to read a mouse, keyboard or joystick? How about reading and writing files on your thumb drive? Or controlling your printer? No problem, FEZ Domino can do it.



Micro SD card Connector

Developers can read/write files on micro SD cards directly with FEZ Domino with an on-board micro SD socket and FAT file system library.

