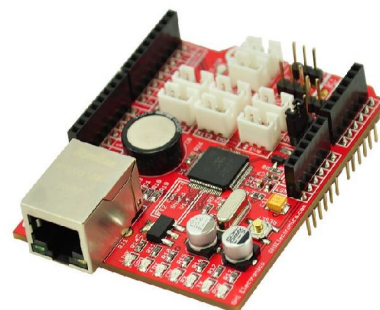# FEZ Connect Shield

This shield is a perfect FEZ connection to the outer world. The "Internet of things" and physical computing has never been easier before FEZ Connect shield.
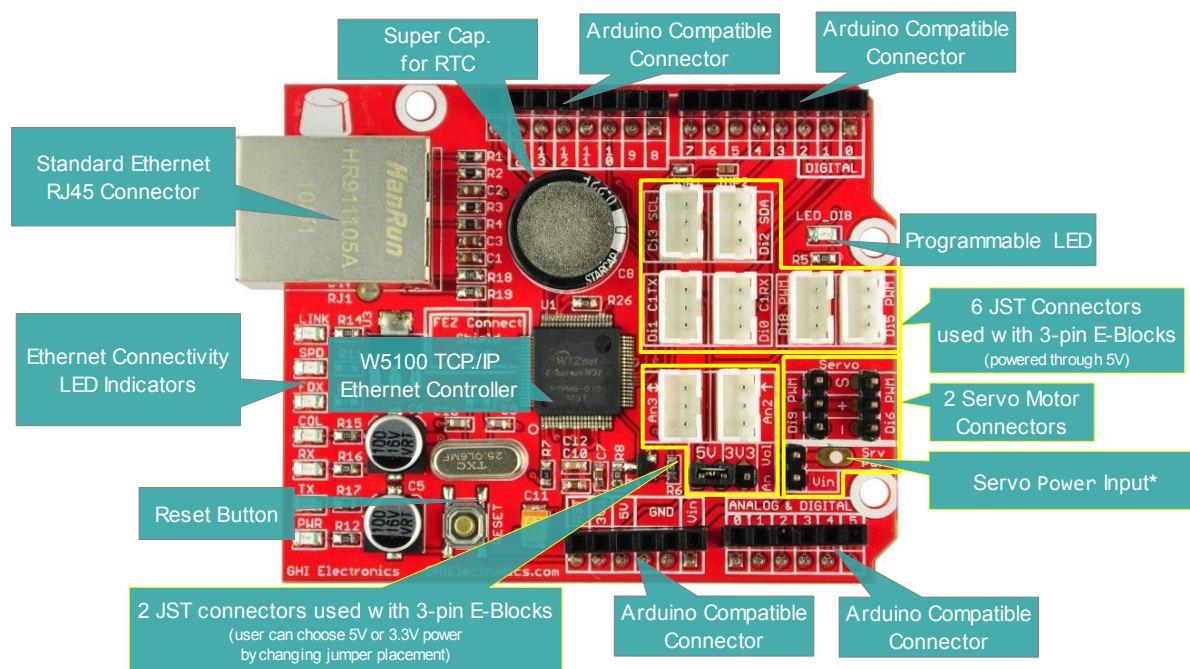
It supports\Includes:

- Ethernet RJ45 connector.
- 8x JST connectors that accepts 3-pin E-Blocks.
- 2x Standard servo motor connections.
- 0.22 F super capacitor that feeds FEZ Domino's or FEZ Panda II's Real Time Clock when the power is off.
- Reset button.
- Programmable LED connected to Di8.
- 7x indication LEDs (power, Ethernet traffic, speed and connection status).
- Jumper to choose the VCC source (5V or 3.3V) at An3 and An2 JST connectors.
- 5 Volt regulator (making it compatible with Arduino).
- Arduino compatible Male/Female Connectors for easier stacking.

An Ethernet shield with much more!

FEZ Connect Shield Front View

Super Cap. for RTC

Arduino Compatible Connector

Arduino Compatible Connector

Standard Ethernet RJ45 Connector

Programmable LED

6 JST Connectors used with 3-pin E-Blocks (powered through 5V)

Ethernet Connectivity LED Indicators

W5100 TCP./IP Ethernet Controller

2 Servo Motor Connectors

Servo Power Input*

Reset Button

2 JST connectors used with 3-pin E-Blocks (user can choose 5V or 3.3V power by changing jumper placement)

Arduino Compatible Connector

Arduino Compatible Connector

* User must provide suitable servo motor voltage, typically 6V. A **wrong voltage** may **damage** the servo, FEZ Connect shield and FEZ Panda.
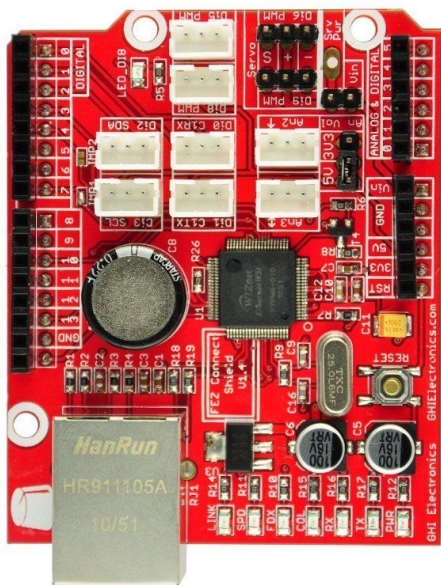
Ethernet Feature

FEZ Connect Shield is an Ethernet shield but with more capabilities and less cost

FEZ Connect Shield
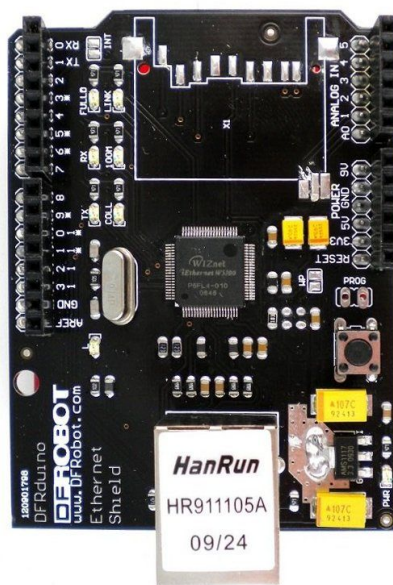
Regular Ethernet Shield

USBizi, which is the core processor of FEZ Domino and FEZ Panda II. It supports FEZ Connect's core chipset natively (WIZnet W5100) exposed as standard .NET sockets user interface, while using very little system resources. This means that it is very easy to implement embedded Server/Client using TCP or UDP sockets. The native drivers are optimized to achieve high data transfer speed, up to 500Kbps. Also, it supports DNS to query websites' IP addresses and DHCP to automatic IP address leasing. With minimal resources consumption, developers can enjoy the RAM and FLASH available on USBizi.

Used IOs for Ethernet feature

IO	Functionality	Description
Di13	SPI Clock	SPI interface is the access interface to W5100 controller.
Di12	SPI MISO	This interface can be shared to access other SPI devices connected at
Di11	SPI MISO	the same bus by using other Chip Select signals
Di10	SPI Chip Select	This IO is reserved for W5100 controller SPI Chip Select signal
Di7	W5100 Reset	This IO is connected and reserved for W5100 controller reset. If Di7 is used with another shield. the user can disconnect the on-board jumper JMP1 and wire the reset signal to another unused IO.

Important Note: Due to the high current need for Ethernet (about 135mA), the voltage used to power FEZ should be 6V to 7.5V. A higher voltage may overheat the regulators.

Software Settings:

If you are using FEZ Connect with one of GHI's FEZ base boards such as FEZ Panda II, FEZ Domino or FEZ Panda, then you just need to add these two libraries (assemblies) GHIElectronics.NETMF.W5100.dll and Microsoft.SPOT.Hardware.dll.

To initialize the Ethernet controller you need to choose the SPI module connected to Di13, Di12 and Di11 (SPI.SPI_module.SPI1) on FEZ boards. Also you need to choose Di10 as Chip Select and Di7 as W5100 Reset.

```
WIZnet_W5100.Enable(SPI.SPI_module.SPI1, (Cpu.Pin)FEZ_Pin.Digital.Di10,
(Cpu.Pin)FEZ_Pin.Digital.Di7, true); // WIZnet interface with FEZ Connect
```

Then you need to provide the network settings according to your needs, static or dynamic settings using DHCP. For more information on the software, consult GHI NETMF library documentation. Many code examples using TCP, UDP and HTTP are available on code.tinyclr.com.

In the network settings, MAC address (physical address) is needed. This tool is a good tool to generate MAC addresses: http://www.macvendorlookup.com/

FEZ Connect with Arduino, If you are using FEZ Connect with other systems such as Arduino. The provided libraries and code will not work. You need to use the native platform's drivers with minor changes because FEZ Connect uses the same Ethernet controller used on Arduino Ethernet shield.

Go wireless with WiFi-Ethernet Bridge

GHI is offering an easy-to-configure WiFi Ethernet bridge that works well with FEZ Connect Shield. It can also work with other shields or other Ethernet devices, even an XBOX!

Real Time Clock Backup Super Cap

FEZ Connect includes a 0.22 F super capacitor that feeds FEZ Domino's or FEZ Panda II's Real Time Clock when the power is off. The super cap is connected to the VBAT pin.

JST Connectors

FEZ Connect has eight JST connectors compatible with 3-pin E-Blocks. Two of them, connected to An2 and An3, have a configurable VCC. The user can choose between 3.3V or 5.0V by changing the jumper's position. If you are not sure what to use, always keep the jumper in the 5V position.
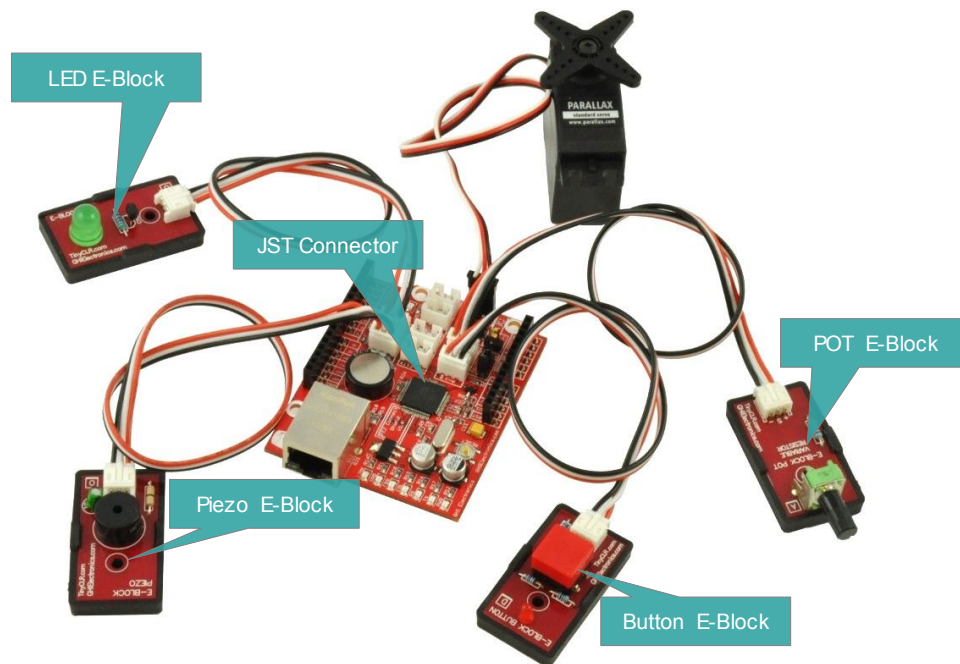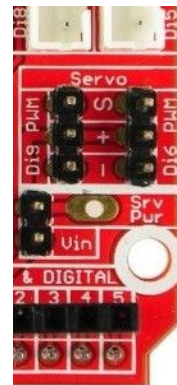

GHI Electronics offers a wide range of 3-pin E-Blocks such as light sensors, temperature sensors, XBee and many others.

Connecting the Servo Motor

FEZ Connect provides two connections for servo motors. The signals (marked with **S**) are wired to Di9 and Di6. The ground signal (marked with **-**) is wired to the common ground **GND**.

The servo power signal is wired to **SrvPwr** pad on FEZ Connect. This pad is intentionally disconnected. The user needs to provide a suitable external power at this pad according to the used servo rating, typically 6V. For advanced users only, there is an optional jumper (not populated) to connect SrvPwr to Vin. If this is used then the input voltage **must** be regulated 6V, or whatever the servo needs for power.

WARNING: Supplying the wrong external power might **damage** the servo motor and **damage** your controller board (FEZ Panda/FEZ Domino).