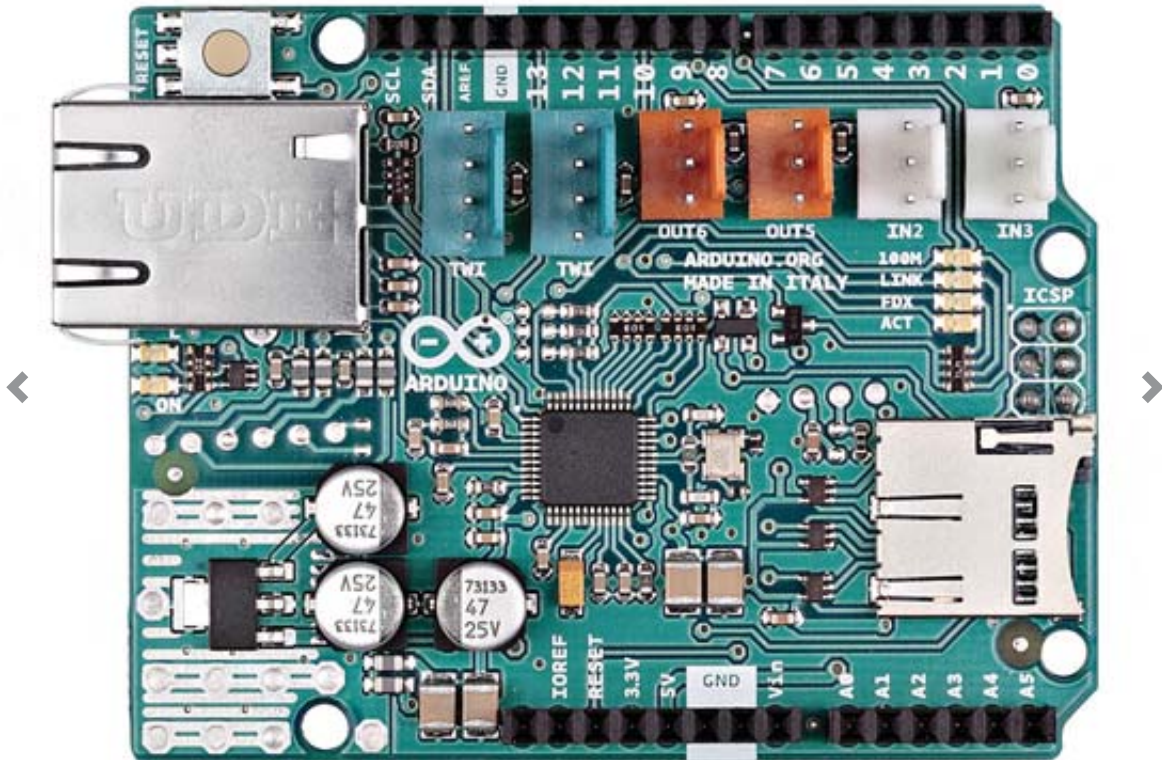# Arduino Ethernet Shield 2

Overview

The Arduino Ethernet Shield 2 connects your Arduino to the internet in mere minutes. Just plug this module onto your Arduino Board, connect it to your network with an RJ45 cable (not included) and follow a few simple steps to start controlling your world through the internet. As always with Arduino, every element of the platform – hardware, software and documentation – is freely available and open-source. This means you can learn exactly how it's made and use its design as the starting point for your own circuits. Hundreds of thousands of Arduino Boards are already fueling people's creativity all over the world, everyday. Join us now, Arduino is you!

- Requires an Arduino Board (not included)
- Operating voltage 5V (supplied from the Arduino Board)

- Ethernet Controller: W5500 with internal 32K buffer
- Connection speed: 10/100Mb
- Connection with Arduino on SPI port

Schematic & Reference Design

EAGLE files: arduino-Ethernet-Shield2-V2-reference-design.zip
(http://download.arduino.org/products/ETHERNETSHIELD2/arduino-
Ethernet-Shield2-V2-rd.zip)

Schematic: arduino-Ethernet-Shield2-V2-reference-design.pdf
(http://download.arduino.org/products/ETHERNETSHIELD2/arduino-
Ethernet-Shield2-V2-sch.pdf)

Description

The Arduino Ethernet Shield 2 allows an Arduino Board to connect to the
internet. It is based on the Wiznet W5500 Ethernet chip (datasheet
(http://download.arduino.org/products/ETHERNETSHIELD2/w5500_ds_v1
00e.pdf)). The Wiznet W5500 provides a network (IP) stack capable of both
TCP and UDP. It supports up to eight simultaneous socket connections. Use
the Ethernet library to write sketches that connect to the Internet using
the Shield. The Ethernet Shield 2 connects to an Arduino Board using long
wire-wrap headers extending through the Shield. This keeps the pin layout
intact and allows another Shield to be stacked on top of it.

The most recent revision of the board exposes the 1.0 pinout on rev 3 of the
Arduino UNO Board.

The Ethernet Shield 2 has a standard RJ-45 connection, with an integrated
line transformer and Power over Ethernet enabled.

There is an onboard micro-SD card slot, which can be used to store files for
serving over the network. It is compatible with the Arduino Uno and Mega
(using the Ethernet library). The onboard micro-SD card reader is accessible
through the SD Library. When working with this library, SS is on Pin 4. The
original revision of the Shield contained a full-size SD card slot; this is not
supported.

The Shield also includes a reset controller, to ensure that the W5500 Ethernet module is properly reset on power-up. Previous revisions of the Shield were not compatible with the Mega and needed to be manually reset after power-up.

The current Shield has a Power over Ethernet (PoE) module designed to extract power from a conventional twisted pair Category 5 Ethernet cable.

PoE module features as follows:

- IEEE802.3af compliant
- Input voltage range 36V to 57V
- Overload and short-circuit protection
- 12V Output
- High efficiency DC/DC converter: typ 85% @ 80% load
- 1500V isolation (input to output)

The Shield does not come with a built in PoE module, it is a separate component that must be added on.

Arduino communicates with both the W5500 and SD card using the SPI bus (through the ICSP header). This is on digital pins 10, 11, 12, and 13 on the Uno and pins 50, 51, and 52 on the Mega. On both boards, pin 10 is used to select the W5500 and pin 4 for the SD card. These pins cannot be used for general I/O. On the Mega, the hardware SS pin, 53, is not used to select either the W5500 or the SD card, but it must be kept as an output or the SPI interface won't work.

Note that because the W5500 and SD card share the SPI bus, only one at a time can be active. If you are using both peripherals in your program, this should be taken care of by the corresponding libraries. If you're not using one of the peripherals in your program, however, you'll need to explicitly deselect it. To do this with the SD card, set pin 4 as an output and write a high to it. For the W5500, set digital pin 10 as a high output.

The Shield provides a standard RJ45 Ethernet jack.

The reset button on the Shield resets both the W5500 and the Arduino Board.

The Shield contains a number of information LEDs:

- ON: indicates that the Board and Shield are powered
- LINK: indicates the presence of a network link and flashes when the Shield transmits or receives data
- FDX: indicates that the network connection is full duplex
- 100M: indicates the presence of a 100 Mb/s network connection (as opposed to 10 Mb/s)
- ACT: flashes when RX or TX activity is present

Important Note

The Ethernet Shield 2 is, at present time, not compatible with the Arduino Zero Pro Board.

Physical Characteristics

The maximum length and width of the Uno PCB are 2.7 and 2.1 inches respectively, with the USB connector and power jack extending beyond the former dimension. Four screw holes allow the board to be attached to a surface or case. Note that the distance between digital pins 7 and 8 is 160 mil (0.16"), not an even multiple of the 100 mil spacing of the other pins.

Product Code

A000024 (without PoE)

A000025 (with PoE)

Previous Versions

Arduino Ethernet Shield (/products/arduino-ethernet-shield)

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