

IDE SET UP

1. Open the library manager (Sketch->Include library->Manage libraries)

2. Search for "Ethernet2" and install the library.

3. In "Arduino/Libraries/Ethernet2/src/utility/w5500.cpp", change the SPI frequency to 4MHz.

Line 24: // SPI details
Line 25: "SPISettings wiznet_spi_settings(4000000, MSBFIRST, SPI_MODE0);"

4. Search for "Fram" and install the Industruino FRAM library.

5. Use the library example sketches as a starting point for your application

- Ethernet functions:
File->Examples->Ethernet2
- FRAM functions:
File->Examples->Fram
- SD functions:
File->Examples->SD



For more detailed documentation please visit our tech support page: industruino.com/support

COMMANDS

Default chip select setup

```
Setup(){
  pinMode(4, OUTPUT);
  pinMode(6, OUTPUT);
  pinMode(10, OUTPUT);

  digitalWrite(4, HIGH);
  digitalWrite(6, HIGH);
  digitalWrite(10, HIGH);
}
```

SD card library

```
#include <SPI.h>
#include <SD.h>
```

SD card active

```
digitalWrite(4, LOW);
digitalWrite(6, HIGH);
digitalWrite(10, HIGH);
```

FRAM library

```
#include "Fram.h"
```

FRAM active

```
digitalWrite(4, HIGH);
digitalWrite(6, LOW);
digitalWrite(10, HIGH);
```

Ethernet library

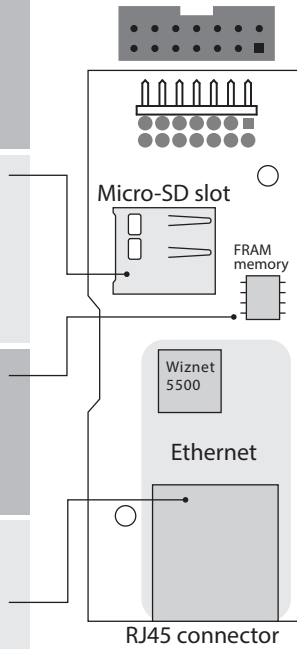
```
#include <SPI.h>
#include <Ethernet2.h>
```

Ethernet active

```
digitalWrite(4, HIGH);
digitalWrite(6, HIGH);
digitalWrite(10, LOW);
```

Ethernet hardware reset

```
digitalWrite(5, HIGH);
delay(500);
digitalWrite(5, LOW);
```



ETHERNET MODULE

14P IDC Expansion Port

+5V	MOSI	GND	RST	FR-CS	D1	D3
MISO	SCLK	Et-CS	SD-CS	IRQ	D0	D2

When using the Ethernet module with the Industruino PROTO, it is important to be aware of the I/O pins it is using, and which should not be used for other I/O functions; see below table.

The IDC pins can also be used to connect other 5V devices to the PROTO and IND.I/O; they are accessible with standard pinMode, digitalWrite and digitalWrite commands (different from the IND.I/O digital I/O channels, see below).

IDC pin No	Module function	Arduino pin	Default connect	Required for standard functions
1	MISO	D14	yes	yes
2	+5V	+5V	yes	yes
3	SCLK	D15/SCLK	yes	yes
4	MOSI	D16/MOSI	yes	yes
5	Ethernet CS	D10	yes	yes
6	GND	GND	yes	yes
7	SD CS	D4	yes	yes
8	Ethernet ext reset	D5	yes	no
9	Ethernet IRQ	D7	yes	no
10	FRAM CS	D6	yes	yes
11	/	D0/RX	no	no
12	/	D1/TX	no	no
13	/	D2/SDA	no	no
14	/	D3/SCL	no	no

GUIDE BOOK: ETHERNET MODULE



INDUSTRUINO

Operation instructions

Before using Industruino Ethernet Expansion Module please read the manual carefully, and pay full attention to safety to handle the product correctly. For the full manual and instructions regarding installation, usage and operation of the ethernet module please visit: www.industruino.com/support

Before using Industruino Ethernet Expansion Module please refer to our conditions of use: www.industruino.com/conditions-of-use

Safety instructions

WARNING: Always power down the Industruino controller before connecting or disconnecting the Ethernet Expansion Module via the 14 pin IDC connector.

INDUSTRUINO®

- Always power down the Industruino controller before inserting or removing a MicroSD card.
- When accessing the MicroSD card slot, avoid touching nearby components to avoid ESD damage.
- Do not operate with suspected failures. If suspected damage occurs with the device, have it inspected by qualified service personnel before further operations.
- Do not operate in an explosive atmosphere.
- Do not use in wet/damp conditions.
- Do not use in wet/damp conditions.
- Keep device surfaces clean and dry.
- Use only for applications described in the catalog and the manual, and only with third party devices or components if they have been approved or recommended by Industruino.
- The device can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.
- The device must be installed and wired by a trained technician following the applicable local safety standards and regulations.

Conditions of use

(1) Industruino Ethernet expansion module("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries. ES GEAR LTD. OR ITS DISTRIBUTORS SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY THE PRODUCT

THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN ES GEAR LTD. OR ITS DISTRIBUTORS' USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.

("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;

Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.

Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.

Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions ES Gear Ltd. may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by ES Gear Ltd. and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTS are required. For details, please contact an ES Gear Ltd. representative.

REGULATORY

CE COMPLIANCE

This product meets the essential requirements of applicable European Directives as follows:



2004/108/EC; Electromagnetic Compatibility Directive (EMC).
2011/65/EU; Restriction of Hazardous Substances Directive (RoHS).

FCC COMPLIANCE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:



This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

All Industruino products that are subject to the WEEE directive shipped from September 1, 2014 are compliant with the WEEE marking requirement.



Such products are marked with the "crossed-out wheellie bin" WEEE symbol (shown, above) in accordance with European Standard EN50419.

Manufacturer: ES Gear Limited
9B, Amtel Building, 148 Des Voeux Road, Central, Hong Kong

Importer in EU: BTL cvba
Jan Mioenstraat 13,
8610 Kortemark, Belgium

Product: Industruino Ethernet Expansion Module