Datasheet
M-Duino 21+
LoRa

Industrial Shields

Technical Features   CONECTABLE PLC ARDUINO 24Vcc M-DUINO LoRa

MODEL TYPE	M-Duino
Input Voltage	12 to 24Vdc (Fuse protection (2.5A) Polarity protection)
Input rated voltage	24Vdc
Rated Power	30 W
I max.	1.5A
Size	101x70.1x119.5
Clock Speed	16MHz
Flash Memory	256KB of which 8KB used by bootloader
SRAM	8KB
EEPROM	4KB
Communications & Accessories	I2C, Ethernet, USB, RS485, RS232, SPI , LoRa, RTC, microSD
USB consideration!	Only for uploading or debugging. NOT connected as a serial Cannot be working in a final application

General Features

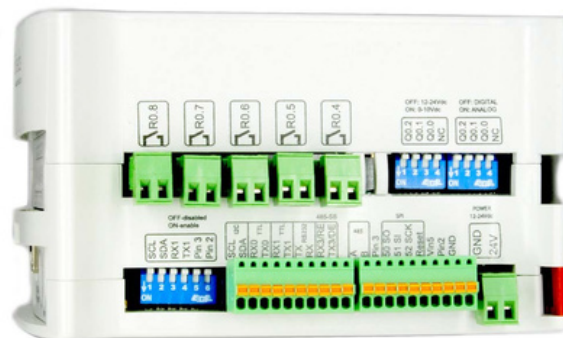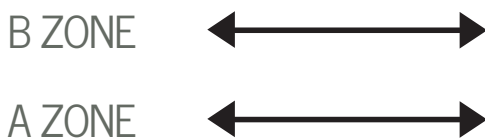| Power supply voltage	DC power supply	12 to 24Vdc
Operating voltage range	DC power supply	11.4 to 25.4Vdc
Power consumption	DC power supply	30 W MAX.
External power supply	Power supply voltage	24Vdc
	Power supply voltage	700Ma
Insulation resistance		20MΩ min.at 500Vdc between the AC terminals and the protective earth terminal.
Dielectric strength		2.300 VAC at 50/60 Hz for one minute with a leakage current of 10mA max. Between all the external AC terminals and the protective ground terminal.
Shock resistance		80m/s2 in the X, Y and Z direction 2 times each.
Ambient temperature (operating)		0° to 60°C
Ambient humidity (operating)		10% to 90% (no condensation)
Ambient environment (operating)		With no corrosive gas
Ambient temperature (storage)		-20° to 60°C
Power supply holding time		2ms min.
Weight		380g max.

INPUTS (x12)

An/Dig Input 10bit (0-10Vcc) - (x6)	0 to 10Vac Input Impedance: 39K Separated PCB ground Rated Voltage: 10Vac 5 to 24Vdc I min: 2 to 12 mA Galvanic Isolation Rated Voltage: 24 Vdc
Digital Isolated Input (24Vcc) - (x5)	5 to 24Vdc I min: 2 to 12 mA Galvanic Isolation Rated Voltage: 24 Vdc
Interrupt isolated Input HS (24Vcc) * - (x1)	5 to 24Vdc I min: 2 to 12 mA Galvanic Isolation Rated Voltage: 24 Vdc

* The Interrupt isolated Inputs can also work as Digital isolated Inputs

Expandability

I2C : 127 elements - ModbusRTU with RS485: 32 elements - LoRa

OUTPUTS (x8)

Analog Output 8bit (0-10Vcc) / PWM Isolated Output 8bit (24Vcc) - (x3)	Analog Output 0 to 10Vac I max: 20 mA Separated PCB ground Rated Voltage: 10Vac
* The Analog & PWM outputs can also work as Digital outputs, * The configuration between Analog and PWM Isolated Outputs can be done by switch.	PWM Isolated Output 5 to 24Vdc I max: 70 mA Galvanic Isolation Diode Protected for Digital Isolated Output Rated Voltage: 24Vdc

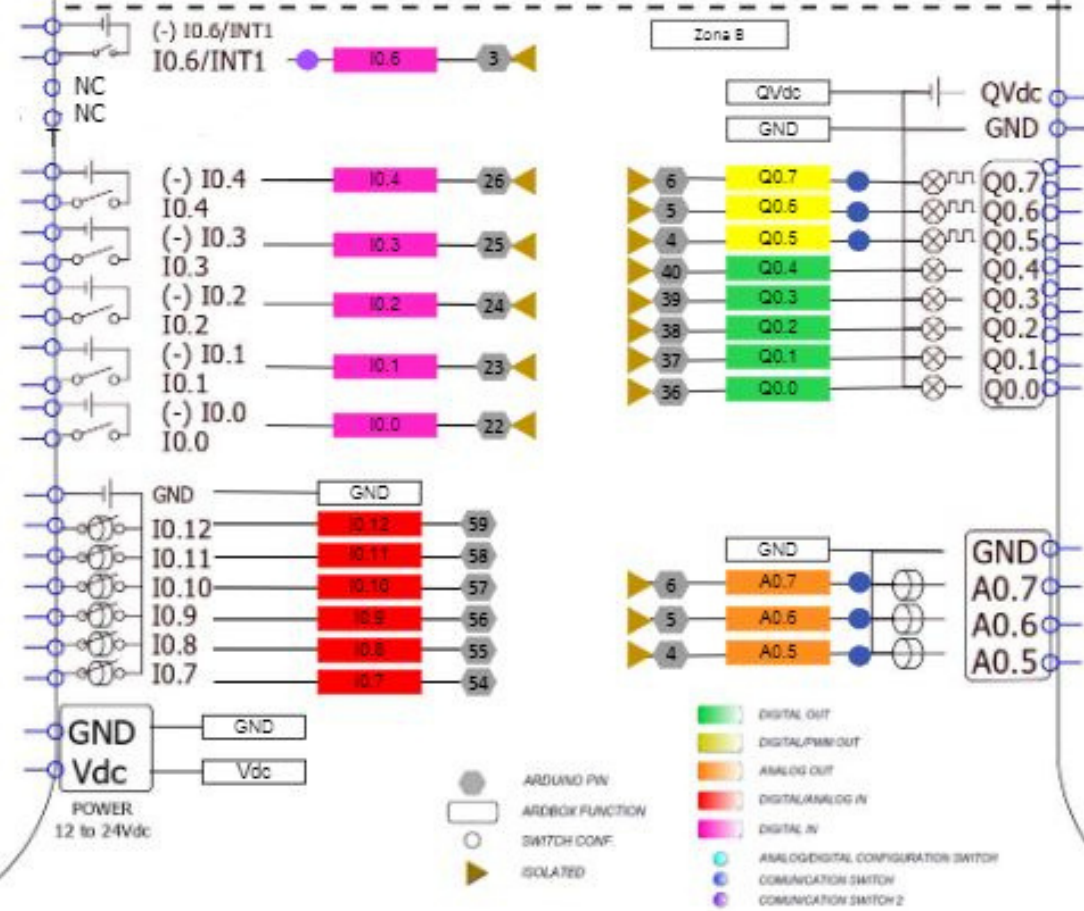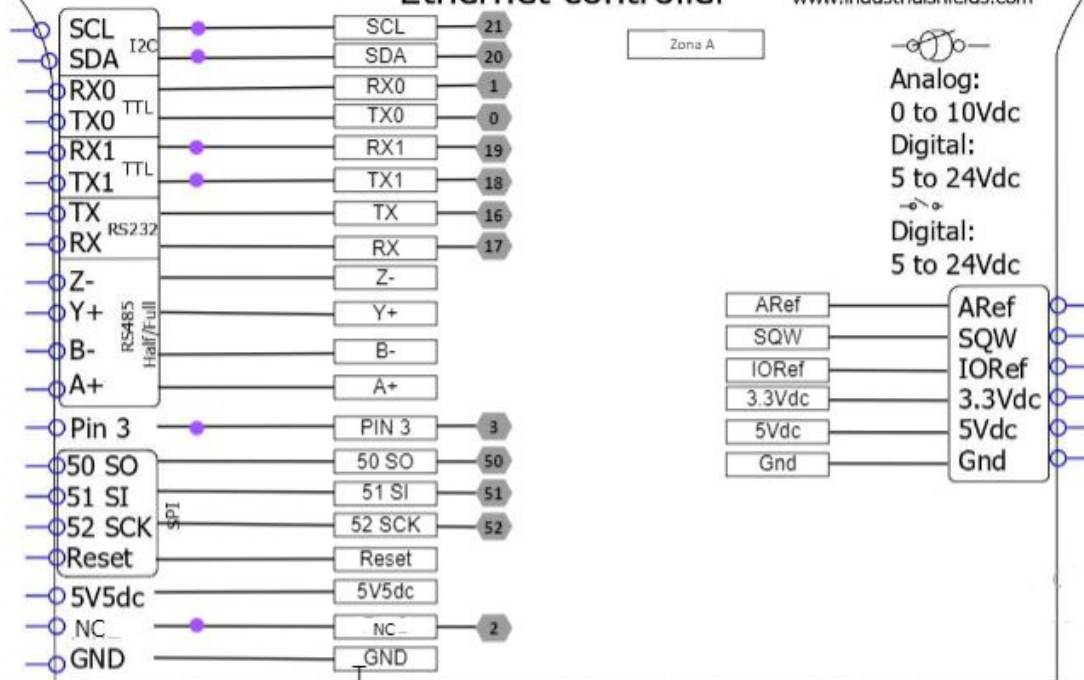| Digital Isolated Output (24Vcc) - (x5)	5 to 24Vdc I max: 70 mA Galvanic Isolation Diode Protected for Digital Isolated Output Rated Voltage: 24Vdc

Original **Arduino Mega** included

Pinout

B ZONE ←→

A ZONE ←→

Industrial Shields
M-Duino 21+ LoRa
Ethernet controller

www.industrialshields.com

Zona A

Analog:
0 to 10Vdc
Digital:
5 to 24Vdc
Digital:
5 to 24Vdc

I2C
| SCL | SCL | 21 |
| SDA | SDA | 20 |

TTL
| RX0 | RX0 | 1 |
| TX0 | TX0 | 0 |

TTL
| RX1 | RX1 | 19 |
| TX1 | TX1 | 18 |

RS232
| TX | TX | 16 |
| RX | RX | 17 |

RS485 Half/Full
Z-	Z-
Y+	Y+
B-	B-
A+	A+

| Pin 3 | PIN 3 | 3 |

SPI
50 SO	50 SO	50
51 SI	51 SI	51
52 SCK	52 SCK	52
Reset	Reset

5V5dc	5V5dc
NC	NC	2
GND	GND

ARef	ARef
SQW	SQW
IORef	IORef
3.3Vdc	3.3Vdc
5Vdc	5Vdc
Gnd	Gnd

Zona B

| (-) I0.6/INT1 | | | |
| I0.6/INT1 | I0.6 | 3 | |

| NC |
| NC |

| QVdc | QVdc |
| GND | GND |

(-) I0.4	I0.4	26
I0.4		
(-) I0.3	I0.3	25
I0.3		
(-) I0.2	I0.2	24
I0.2		
(-) I0.1	I0.1	23
I0.1		
(-) I0.0	I0.0	22
I0.0		

6	Q0.7	Q0.7
5	Q0.6	Q0.6
4	Q0.5	Q0.5
40	Q0.4	Q0.4
39	Q0.3	Q0.3
38	Q0.2	Q0.2
37	Q0.1	Q0.1
36	Q0.0	Q0.0

GND	GND
I0.12	I0.12	59
I0.11	I0.11	58
I0.10	I0.10	57
I0.9	I0.9	56
I0.8	I0.8	55
I0.7	I0.7	54

| GND |
| GND |

6	A0.7	A0.7
5	A0.6	A0.6
4	A0.5	A0.5

| GND | GND |

| GND | GND |
| Vdc | Vdc |

POWER
12 to 24Vdc

Legend:
- ARDUINO PIN
- ARDBOX FUNCTION
- SWITCH CONF.
- ISOLATED
- DIGITAL OUT
- DIGITAL/PWM OUT
- ANALOG OUT
- DIGITAL/ANALOG IN
- DIGITAL IN
- ANALOG/DIGITAL CONFIGURATION SWITCH
- COMUNICATION SWITCH
- COMUNICATION SWITCH 2

Performance Specifications

Arduino Board	Arduino Mega 2560
Control method	Stored program method
I/O control method	Combination of the cyclic scan and immediate refresh processing methods.
Programming language	Arduino IDE. Based on wiring (Wiring is an Open Source electronics platform composed of a programming language. "similar to the C")
Microcontroller	ATmega2560
	http://arduino.cc/en/Tutorial/HomePage

Install Arduino IDE and the Industrial Shields boards

The steps to follow to install our equipment's to Arduino IDE are:
• Open the Arduino IDE, versión 1.8.0 or superior. If you don't have it yet , you can download here
https://www.arduino.cc/en/Main/Software .

• Press the "Preferences"option to "File" menu and open the preferences window.

• In the text box "Additional boards manager URLs", add the direction:
http://apps.industrialshields.com/main/arduino/boards/package_industrialshields_index.json

• Close the preferences window with the "OK" button.

• Click on "Tools" menu, and open the "Boards" submenu, and click the "Boards Manager" option, to open the Boards Manager window.

• Search "industrialshields" to the search filter and select to the list and click "Install"

• Close the "Boards Manager". Once it is performed that steps, you are available to select each PLC that you wish to work on "Tools" -> "Boards" : M-Duino...

To get more information:
https://www.industrialshields.com/first-steps-with-the-industrial-arduino-based-plc-s-and-the-panel-pc-s-raspberry-pi-based#boards

Warnings ⚠️

Unused pins should not be connected. Ignoring the directive may damage the controller.

Before using this product, it is the responsibility of the user to read the product's User Guide and all accompanying documentation.

Industrial Shields PLCs must be powered between 12Vdc and 24Vdc. If a higher voltage is supplied to the equipment can suffer irreversible damage.

Maintenance must be performed by qualified personnel familiarized with the construction, operation, and hazards involved with the control.

Maintenance should be performed with the control out of operation and disconnected from all sources of power.

The Industrial Shields Family PLCs are Open Type Controllers. It is required that you install the M-Duino PLC in a housing, cabinet, or electric control room. Entry to the housing, cabinet, or electric control room should be limited to authorized personnel.

Inside the housing, cabinet or electric control room, the Industrial Shields PLC must be at a minimum distance from the rest of the components of a minimum of 25 cm, it can be severely damaged.

Failure to follow these installation requirements could result in severe personal injury and/or property damage. Always follow these requirements when installing M-Duino family PLCs.

In case of installation or maintenance of the M-Duino please follow the instructions marked in the Installation and Maintenance section on the User Guide.

Do not disconnect equipment when a flammable or combustible atmosphere is present.
Disconnection of equipment when a flammable or combustible atmosphere is present may cause a fire or explosion which could result in death, serious injury and/or property damage.

Symbology

Symbol	Description
▬▬▬	Indicates that the equipment is suitable for direct current only; to identify relevant terminals
∼	Indicates that the equipment is suitable for alternating current only; to identify relevant terminals
⊓	To identify the control by which a pulse is started.
⏚	To identify an earth (ground) terminal in cases where neither the symbol 5018 nor 5019 is explicitly required.
⊗	To identify the switch by means of which the signal lamp(s) is (are) switched on or off.
CE	CE marking indicates that a product complies with applicable European Union regulations
⚠	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
⚡	To indicate hazards arising from dangerous voltages

Technical Support

You can contact with us using the best channel for you:

@ support@industrialshields.com

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