ESP32-based Industrial PLC

Liberalisation of Industry with Open Source Technology

Industrial Shields®

10 IOS MODULE

10 IOS Digital Module with ESP32
· **10 GPIOs**
· **I2C - RS485 - Ethernet - WiFi**

10 IOS Relay Module with ESP32
· **10 GPIOs**
. **10 Relay Outputs**
· **I2C - RS485 - Ethernet - WiFi**

Industrial Protocols
RS485 · RS232 · SPI · I2C · Modbus RTU

EEPROM 1KB | SRAM 2.5 KB | Flash 32 KB | CPU Speed 16 MHz

REFERENCE LIST – 10IOS

| Reference | Description | Communications | | | | | | | | Inputs / Outputs | | | | | | |
		Serial TTL (UART)	I2C	SPI	RS232	RS485 Half / Full	Ethernet	Wi-Fi & BLE	GPRS / GSM	Digital Inputs	Analogue inputs	Interruption Inputs	Digital Outputs	Analogue Outputs	Relay Outputs	Input / Output 5Vdc
013001000100	10 I/Os Digital Module - Arduino NANO CPU	-	x1	-	-	x1	x1	-	-	x10 GPIOS	-	-	-	-	-	-
013002000100	10 I/Os Digital Module - ESP32 CPU	-	x1	-	-	x1	x1	x1	-	x10 GPIOS	-	-	-	-	-	-
013001000200	10 I/Os Relay Module - Arduino NANO CPU	-	x1	-	-	x1	x1	-	-	x10	-	-	-	-	x10	-
013002000200	10 I/Os Relay Module - ESP32 CPU	-	x1	-	-	x1	x1	x1	-	x10		-	-	-	x10	-

ESP32 PLC

Original board included

ESP32 PLC 19R I/Os
Relay / Analog / Digital

6 Inputs:
- (4x) Analogue (0-10Vdc, 10bit) / Digital (7-24Vdc) configurable via software.
- (2x) Interrupt (7-24Vdc). "Can work as Digital (24Vdc)".
- (2x) Optoisolated Digital Inputs(7-24Vdc).

11 Outputs:
- (8x) Relay (220Vac - 5A)
- (3x) Analogue (0-10Vdc, 8bit) / Digital (5 - 24Vdc)
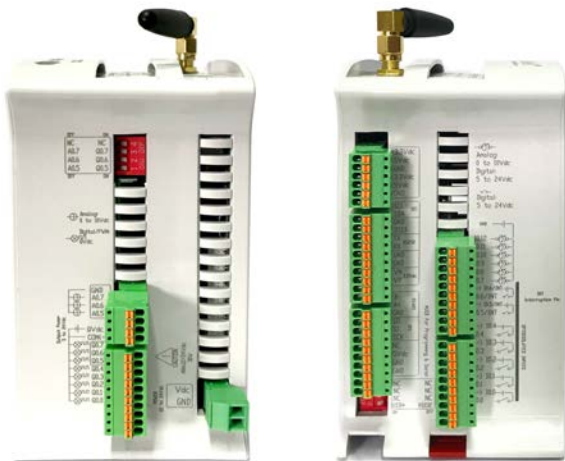
ESP32 PLC 21 I/Os
Analog / Digital

13 Inputs:
- (6x) Analogue (0-10Vdc)/ Digital (7-24Vdc) configurable via software
- (5x) Isolated Digital (7-24Vdc).
- (2x) Interrupt (7-24Vdc). "Can work as Digital (24Vdc)".

8 Outputs:
- (8x) Isolated Digital (5-24Vdc) / (3 each) Isolated Analogue PWM (0-10Vdc) switch configurable

Ethernet
WiFi
Bluetooth LE
TCP / IP
Modbus RTU
Modbus TCP
RS485
Serial Port
SPI
I2C

Industrial Standard Communications

ESP32 PLC 38AR I/Os
Relay / Analog / Digital

19 Inputs:
- (10x) Analogue (0-10Vdc, 10bit) / Digital (7-24Vdc) configurable via software.
- (4x) Interrupt (7-24Vdc). "They can work as Digital (24Vdc)".
- (5x) Isolated Digital (7-24Vdc)

19 Outputs:
- (8x) Relay Outputs (220Vac-5A).
- (6x) Analogue (0-10Vdc, 8 bit) / Digital (5-24Vdc) / Isolated PWM (5 - 24Vdc)
- (5x) Digital (5-24Vdc)

ESP32 PLC 38R I/Os
Analog / Digital / Relay

12 Inputs:
- (8x) 10 bits - Analogue (0-10Vdc) / Digital (7-24Vdc) software configurable.
- (4x) Opto-isolated Digital (7-24Vdc) inputs | can function as INT interrupt (7-24Vdc).

22 Outputs:
- (16x) Relay Outputs (220Vac - 5A)
- (6x) Digital Optoisolated and PWM (5-24Vdc) | 8 bits Analogue (0-10V) Outputs configurable by switch

ESP32 PLC 42 I/Os
Analog / Digital

26 Inputs:
- (12x) Analogue (0-10Vdc) / Digital (7-24Vdc), software configurable.
- (10x) Isolated Digital (7-24Vdc).
- (4x) Interrupt (7-24Vdc). "They can work as Digital (24Vdc)".

16 Outputs:
- (10x) Optoisolated Digital Outputs (5-24Vdc)
- (6x) Optoisolated Digital and PWM (5-24Vdc) | 8 bits Analogue (0-10V) Switchable outputs

ESP32 PLC 50RRA I/Os
Relay / Analog / Digital +

22 Inputs:
· (12x) Analogue (0-10Vdc, 10bit) / Digital (7-24Vdc) configurable via software.
· (4x) Isolated Digital (7-24Vdc).
· (6x) Interrupt (7-24Vdc). "They can work as digital (24Vdc)".

36 Outputs:
· (16x) Relay (220Vac-5A)
· (8x) Analogue (0-10Vdc, 8bits) / Digital (5-24Vdc)
· (12x) Digital (5-24Vdc)

ESP32 PLC 53ARR I/Os
Relay / Analog / Digital +

25 Inputs:
· (14x) Analogue (0-10Vdc, 10 bits) / Digital (7-24Vdc) software configurable.
· (5x) Digital (7-24Vdc).
· (6x) Interrupt (7-24Vdc). "They Can work as Digital 24Vdc".

28 Outputs:
· (15x) Relay (220Vac-5A)
· (8x) Analogue (0-10Vdc, 8bits) / Digital (5-24Vdc)
· (5x) Digital (Optoisolated 24Vdc max).

ESP32 PLC 54ARA I/Os
Relay / Analog / Digital +

29 Inputs:
· (14x) Analogue (0-10Vdc, 10 bits) / Digital (7-24Vdc) , configurable via software.
· (9x) Isolated Digital (7-24Vdc).
· (6x) Interrupt (7-24Vdc). "They can work as Digital (24Vdc)".

25 Outputs:
· (8x) Relay (220Vac-5A)
· (8x) Analogue (0-10Vdc, 8 bits)/ Digital (5-24Vdc)
· (9x) Digital (Isolated 24Vdc max)

Industrial Standard Communications

WiFi – Bluetooth LE
RS485 – Serial Port – SPI – I2C
Ethernet – TCP / IP – Modbus RTU / TCP

ESP32   SRAM 512 KB | CPU Speed 160/240 MHz

ESP32 PLC 57R I/Os
Relay / Analog / Digital +

18 Inputs:
· (12x) Analogue (0-10Vdc, 10 bits) / Digital (7-24Vdc) software configurable
· (6x) Interruption (5-24Vdc) "They Can work as Digital (24Vdc)".

31 Outputs:
· (23x) Relay (220Vac - 5A).
· (8x) Analogue (0-10Vdc, 8 bit) / Digital (5-24Vdc)

ESP32 PLC 57AAR I/Os
Analog / Digital +

32 Inputs:
· (16x) Analogue (0-10Vdc, 10bits) / Digital (7-24Vdc) software-configurable
· (6x) Interrupt (5-24Vdc). "They can work as Digital (24Vdc)".
· (10x) Isolated Digital (5-24Vdc)

25 Outputs:
· (7x) Relay (220Vac - 5A)
· (8x) Analogue (0-10Vdc, 8bits) / Digital (5-24Vdc) / PWM Isolated (5-24Vdc)
· (10x) Isolated Digital (5-24Vdc)

ESP32 PLC 58 I/Os
Analog / Digital +

36 Inputs:
· (16x) Analogue (0-10Vdc) / Digital (7-24Vdc) configurable by software.
· (14x) Isolated Digital (7-24Vdc).
· (6x) Interrupt (7-24Vdc). "They work as Digital (24Vdc)".

22 Outputs:
· (14x) Isolated Digital (5-24Vdc)/ (8 each) PWM software configurable
· (8 of each) Analogue (0-10Vdc)

REFERENCE LIST – ESP32 PLC

| Reference | Description | Communications | | | | | | | | Inputs / Outputs | | | | | | |
		Serial TTL (UART)	I2C	SPI	RS232	RS485 Half / Full	Ethernet	Wi-Fi & BLE	GPRS / GSM	Digital Inputs	Analog Inputs	Interruption inputs	Digital Outputs	Analog Outputs	Relay Outputs	Inputs / Outputs 5Vdc
034001000200	ESP32 PLC Ethernet 21 I/Os Analog Digital +	x2 n.11	x1 n.12	x1	-	x1	x1	-	-	x13	x6 n.4	x2 n.5	x8	x3	-	x2 n.7
034001000400	ESP32 PLC Ethernet 42 I/Os Analog Digital +	x2 n.11	x1 n.12	x1	-	x1	x1	-	-	x26	x12 n.4	x4 n.5	x16	x6	-	x2 n.7
034001000600	ESP32 PLC Ethernet 58 I/Os Analog Digital +	x2 n.11	x1 n.12	x1	-	x1	x1	-	-	x36	x16 n.4	x6 n.5	x22	x8	-	x2 n.7
034001000100	ESP32 PLC Ethernet 19R I/Os Analog Digital +	x2 n.11	x1 n.12	x1	-	x1	x1	-	-	x6	x4 n.4	x2 n.5	x3	x3	x8	x2 n.7
034001000300	ESP32 PLC Ethernet 38R I/Os Analog Digital +	x2 n.11	x1 n.12	x1	-	x1	x1	-	-	x12	x8 n.4	x4 n.5	x6	x6	x16	x2 n.7
034001000500	ESP32 PLC Ethernet 57R I/Os Analog Digital +	x2 n.11	x1 n.12	x1	-	x1	x1	-	-	x18	x12 n.4	x6 n.5	x8	x8	x23	x2 n.7
034001000700	ESP32 PLC Ethernet 38AR+ I/Os Analog Digital +	x2 n.11	x1 n.12	x1	-	x1	x1	-	-	x19	x10 n.4	x4 n.5	x11	x6	x8	x2 n.7
034001000800	ESP32 PLC Ethernet 53AAR+ I/Os Analog Digital +	x2 n.11	x1 n.12	x1	-	x1	x1	-	-	x25	x14 n.4	x6 n.5	x13	x8	x15	x2 n.7
034001000900	ESP32 PLC Ethernet 57AAR+ I/Os Analog Digital +	x2 n.11	x1 n.12	x1	-	x1	x1	-	-	x32	x16 n.4	x6 n.5	x18	x8	x7	x2 n.7
034001001000	ESP32 PLC Ethernet 54ARA+ I/Os Analog Digital +	x2 n.11	x1 n.12	x1	-	x1	x1	-	-	x29	x14 n.4	x6 n.5	x17	x8	x8	x2 n.7
034001001100	ESP32 PLC Ethernet 50RRA+ I/Os Analog Digital +	x2 n.11	x1 n.12	x1	-	x1	x1	-	-	x22	x12 n.4	x6 n.5	x20	x8	x16	x2 n.7

n.4: From (Xx) Digital, (Yx) can be configured as Analog (Xx = Total Digital Input, Yx = Number of Analog Inputs) | n.5 : From (Xx) Digital, (Zx) can be configured as Switch (Xx = Total Digital Inputs, Zx = Number of Switch pins) | n.7 : If pin 2 and pin 3 are used, (x2) Inputs are lost | n.11 : USB only for uploading or debugging, not always connected as serial in a project! : If pin 2 and pin 3 are used, (x2) Inputs are lost | n.11: USB only for charging or debugging, not always connected as serial in a project! | n.12: 2 Inputs are lost.


INDUSTRY 4.0

Programming with Arduino IDE.
The original Arduino platform

Our ESP32-based PLCs use original boards assembled inside all devices.
ESP32 boards are also programmed with Arduino IDE.

Some of the most notable benefits of using the Arduino IDE are as follows:

- Free software licences
- Standard libraries available
- Documentation and examples available, ready to use
- Industrial Shields libraries available to facilitate the programming of our PLCs
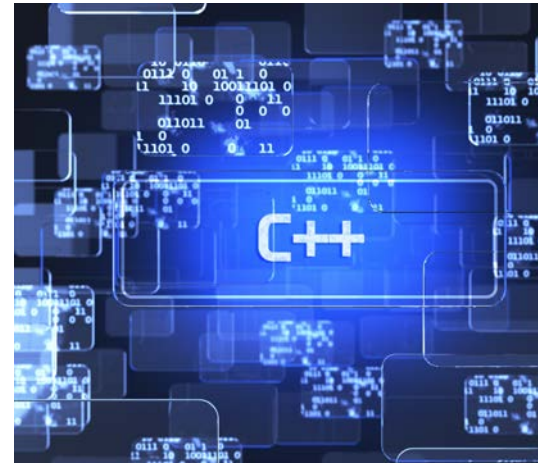
In October 2012, **Industrial Shields** was born was created through the initiative of an engineer who, searching a more flexible PLC at a better price, decided to develop his own solution using **Open Source Hardware**.

Therefore, **Industrial Shields** is the brand that provides **Open Source Hardware** for industrial use, including all the required design and security, combining the best of both worlds.

Industrial Shields designs, produces and markets the range of products based on **Open Source Hardware**.
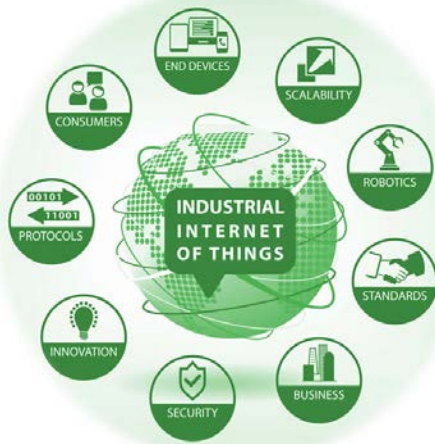
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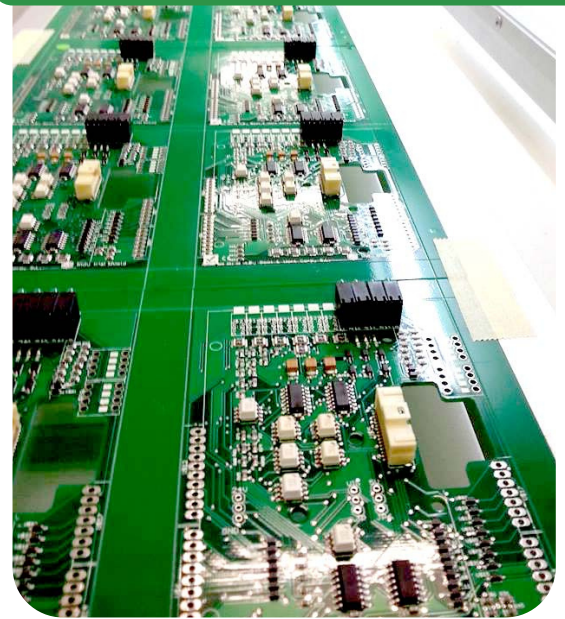
Bigdata
Cloud
Hardware Flexible
Industrial Internet of Things

Boot & Work Corp. S.L. is a company committed to the promotion, development, manufacture and sale of products based on Open Source technology to liberalise the industrial sector and boost the growth of its customers.

The aim of our company is to provide low cost solutions for automation in industrial environments.

Open Source Hardware solutions are being introduced in the industrial sector, it is a growing market and we are its pioneers.

The balance between **quality and price** is very important to us and therefore to the market; by using open source solutions we can provide more specifications at a better price.

In addition, open source solutions are more **flexible and accessible** than standard industrial solutions, and the software is **licence-free**.

At Industrial Shields we are convinced of a focused perspective on **Industry 4.0 and the Internet of Things**.

QUALITY

In compliance with:

EN61010-1 | EN61010-2-201 | EN61131-2:2007 (Clause 8: Zone A/B EMC and clause 11:LVD) | EN61000-6-4:2007 + A1 2011 (Emissions) | EN 61000-6-2:2005 (Immunity) | EMC: FCC Part 15

2007-2010

Through the IEEE-UNEDsb, we got to know Arduino and use it for prototyping machinery. We create the first Shields for industrial use for labelling machinery and automatic production lines.

2012

Boot & Work Corp. is created with the aim of standardising a product based on Open Source technology for use in industrial environments.

2013

Boot & Work Corp wins the award for the best innovative company in Barberà del Valles. First prototype units. The Ardbox is getting closer.
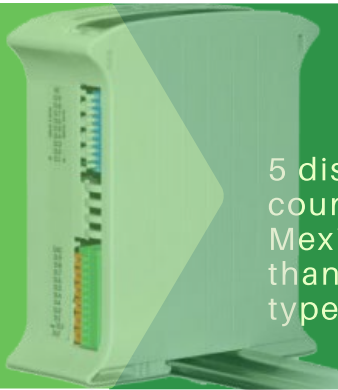
2014

We create the Industrial Shields brand, from where we start marketing the first family of basic products. The first unit is sold online to Libya.

2015

Industrial Shields has commercialised equipment based on Open Source technology in more than 20 countries..

2016

5 distributors in different countries (UK, Germany, USA, Mexico and Italy) and more than 500 customers in all types of industrial sectors.

2017

We have more than 17 distributors in 15 countries on all continents and have reached more than 75 countries.
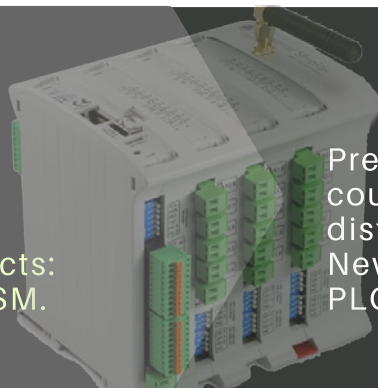
2018

International trade exhibitions in Barcelona, Paris and Bangalore. Investment in the improvement of facilities, quality processes, industrial certifications.

2019

Presence in more than 90 countries, more than 20 distributors worldwide. Development of new products: PLC with WiFi and GPRS/GSM.

2020

Presence in more than 100 countries, more than 40 distributors worldwide. New developments: Raspberry PLC, Dali PLC, LoRa PLC.

CONTACT US

Industrial Shields has been working all over the world through distributors, or in direct contact with customers.

Our s**ales, technical and support team** will help you by phone, email, skype; or by using the ticketing system or chatting directly on our website.

Please contact us. We are here to help and assist you.

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