

# Moduino<sup>series</sup>

## Energy-efficient **ESP32-based** Industrial Automation Controller

**Moduino** is a lightweight, but powerful energy-efficient and fully capable automation controller series - an industrial computer for remote data control and management, equipped with latest **ESP32** compute module, wide range of serial, digital and analog inputs/outputs and wireless communication interfaces.

This cost effective solution is perfect for end-point devices. Moduino is powered by **ultra-low power Dual-Core Tensilica LX6 240 MHz** processor with **4MB pSRAM\*** and **4MB SPI flash** memory on-board. Integrated Wi-Fi/BLE modem and extra wireline/wireless interfaces make the Moduino micro-computer a versatile addition to Industrial IoT solutions offered by TECHBASE company.

**Moduino** devices can easily work remotely with existing **ModBerry gateway** for data accumulation and monitoring, to perform specific actions before sending the data to cloud services. The Moduino-ModBerry installation can work as standalone Ecosystem (for example via MQTT), providing fog-computing to any installation.

\* 512KB / 4MB RAM options available

## END-POINT SENSORS

The Moduino device is a comprehensive end-point controller for variety of sensors located throughout any installation. It fully supports temperature and humidity sensors and new ones are currently developed, e.g. accelerometer, gyroscope, magnetometer, etc.

## SOFTWARE & OS

Use of **ESP32-WROVER** compute module adds the support for **real-time operating systems** (compared to most Raspberry Pi based Linux and Windows OS versions), and openness of the Espressif's platform to Moduino industrial automation controller. Thanks to **enormous community of ESP32 and Arduino users and developers**, the Moduino can now adapt existing software solutions, tools and programming environments, for example:

- / **ESP-IDF** (Espressif IoT Development Framework)
- / **Zephyr Project** (scalable RTOS)
- / **Arduino** (C++)
- / **MicroPython**
- / **Mongoose OS**
- / etc.



## Moduino<sup>series</sup> FEATURES



### ESP32 MODULE

Energy-efficient compute module with real-time OS support incl. Zephyr Project, MicroPython, Arduino, etc.



### BATTERY POWERED

**Moduino X1** can be battery powered, making it perfect for remote installations and scattered objects monitoring



### WIRELESS COMMUNICATION

Available U.FL (IPEX) antenna connectors allows the **Moduino** device to increase the effective range of Wi-Fi / Bluetooth module and additional communication interfaces, e.g. LoRa, Sigfox, NarrowBand-IoT & more



### END-POINT SENSORS

Full support of temperature, humidity, pressure, accelerometer & light sensors with new ones in development, e.g. gyroscope, magnetometer, etc.



### SMALL SIZE

Dimensions of the device allows the use in limited space and difficult industrial environments

## WIRELESS COMMUNICATION

LoRa  
Sigfox  
GPRS/GPRS + GPS  
LTE/LTE+GPS  
LTE-NarrowBand-IoT  
WMBus 169/868MHz  
Z-Wave READY  
ZigBee

Wi-Fi  
Bluetooth

## I/O EXTENSIONS

CAN  
mBus 10  
ExCARD 2/4x RS-232/485  
ExCARD 12xDIO  
ExCARD 8x AI  
ExCARD 4xAI-PRO 24bit  
ExCARD 12/8/4xAO  
ExCARD 4xAO-PRO 16bit  
ExCARD 4x Relay  
ExCARD 1x Ethernet  
DIO isolation  
Accelerometer

## BATTERY

Battery Ready  
Battery up to 3 years  
UPS Supercap 1-15 min  
UPS Li-Po 1-2 days

## SCREEN

OLED 0.96" 128x64

## CASING

ABS  
ALUMINUM  
IP67 SEALED



**BUILT-IN**



**OPTIONAL**



! Specifications is subject to change without notice. Some of the features are optional. Technical parameters should be confirmed in the order details.

# SPECIFICATION



## COST-EFFECTIVE & WIRELESS INDUSTRIAL IoT



### Moduino X1

### Moduino X2

Chipset:	ESP32*	ESP32*
Processor:	Dual-Core Tensilica LX6 240 MHz, RTC	Dual-Core Tensilica LX6 240 MHz, RTC
RAM:	4 MB pSRAM**	4 MB pSRAM**
Flash:	4 MB SPI	4 MB SPI
SD card:	-	+ microSD slot (optional)
RS-232/485:	1x RS-232/485	1x RS-232/485 (default) 2x RS-232/485 (optional)
Digital I/O:	4x DIO	8x DIO
• incl. DI:	2x DI ( optional 4x DI ), Protection: Over-Voltage 30VDC	4x DI ( optional 8x DI ), Protection: Over-Voltage 30VDC
• incl. DO:	2x DO, Open Collector, Protection: Over-Voltage 30VDC max. Current 500mA, peak min. 600W	2x DO, Open Collector, Protection: Over-Voltage 30VDC, max. Current 500mA, peak min. 600W 2x DO, typical max current 50mA
Analog Input:	2x AI (0 ~ 10VDC) (optional)	+ 4x AI (0 ~ 10VDC) (optional)
Analog Output:	-	+ 2x AO 10bit (optional)
Ethernet:	1x Ethernet 10/100 Mbps (optional)	1x Ethernet 10/100 Mbps (optional)
CAN:	-	+ 1x CAN (optional)
Wi-Fi:	802.11b/g/n 16mbps	
Bluetooth:	Bluetooth v4.2 BR/EDR and Bluetooth Low Energy (BLE)	
WMBus (optional):	Wireless M-Bus 868 MHz and 169MHz band	
LoRa (optional):	Semtech LoRa transceiver SX1272, LoRaWAN stack, Class A and C devices	
Sigfox (optional):	TI CC1125NarrowbandTransceiver, Class 0 devices, Sigfox pre-certified (January 2017)	
LTE (optional):	Narrowband LTE UE categories M1/NB1, 34 bands supported from 699Mhz to 2690Mhz (Total worldwide support)	
ZigBee (optional):	Compatible with IEEE 802.15.4, ZigBee 2007 / PRO	
Ext. antenna:	SMA female antenna connectors (optional)	
Ext. modules:	+ ExCard / mBus module support	+ ExCard / mBus module support
Display:	OLED 0.96" 128x64 (optional)	OLED 0.96" 128x64 (optional)
Battery:	Battery power support (optional)	UPS (LiPo or Supercapacitor) (optional)
Power supply:	5V or 9~30 V DC (depending on configuration)	5V or 9~30 V DC (depending on configuration)
Casing:	ABS (default) or Aluminum (optional), DIN rail mount	ABS (default) or Aluminum (optional), DIN rail mount
Working cond.:	-40 ~ 85°C, humidity 5 ~ 95% RH (no condensation)	-40 ~ 85°C, humidity 5 ~ 95% RH (no condensation)
Dimensions:	ABS: 90 x 36 x 32 mm (LxWxH) Aluminum: 95 x 35 x 41 mm (LxWxH)	ABS: 90 x 71 x 32 mm (LxWxH) Aluminum: 95 x 71 x 41 mm (LxWxH)

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\* also available with ESP32-WROVER/ESP32-WROVER-I  
\*\* 512KB / 4MB RAM options available

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