

Moduino⁺ series

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 **8MB pSRAM** and up to **16MB 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.

* 4MB / 8MB / 16MB Flash 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:

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

UNLEASH THE **TRUE POTENTIAL**
OF **INDUSTRIAL IoT**



INDUSTRIAL
IoTReady



Moduino⁺ series FEATURES



ESP32 MODULE

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



BATTERY POWERED

Moduino X0 can be battery powered, making it perfect for remote installations and scattered objects monitoring



WIRELESS COMMUNICATION

Optional SMA 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 RS-232/485
ExCARD 8xDIO
ExCARD 8x AI
ExCARD 4xAI-PRO 24bit
ExCARD 12/8/4xAO
ExCARD 4xAO-PRO 16bit
ExCARD 4x Relay
ExCARD 1x Ethernet
DIO opto-isolation
Accelerometer

BATTERY

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

SCREEN

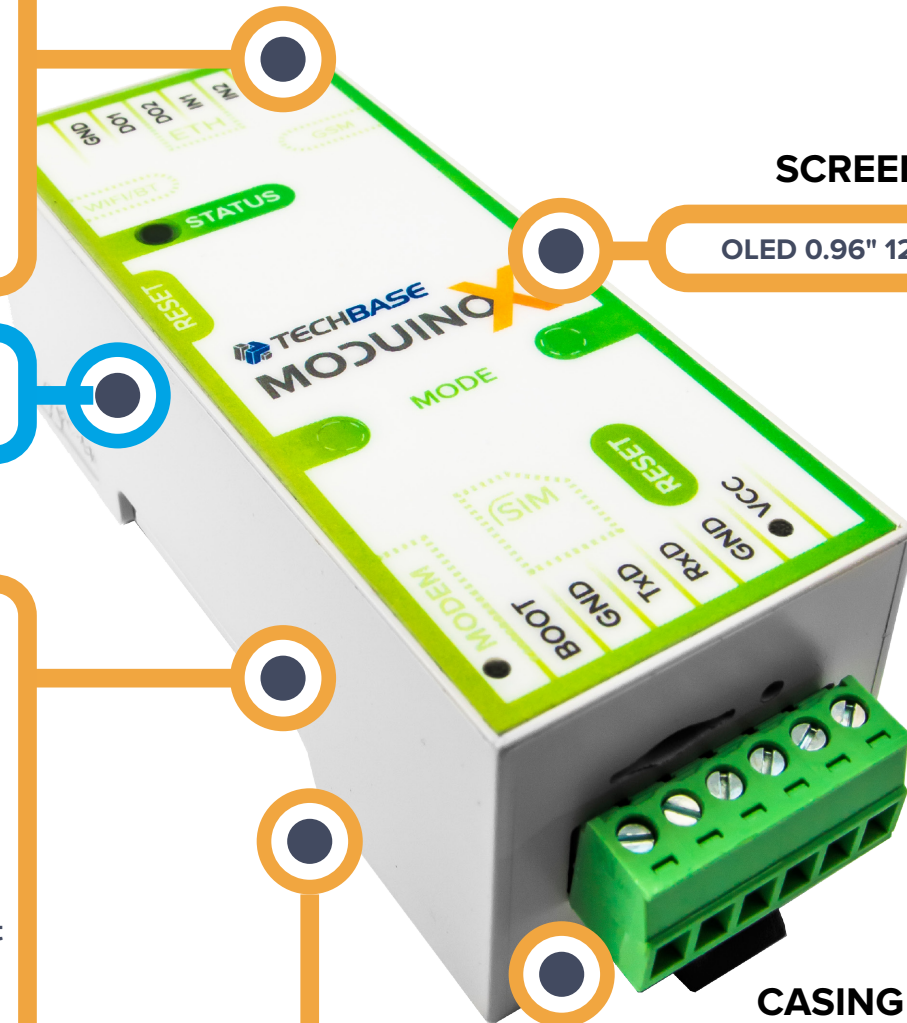
OLED 0.96" 128x64

CASING

ABS
ALUMINUM
IP65-IP67 SEALED

 BUILT-IN

 OPTIONAL



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ver. 2005261200



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SPECIFICATION



COST-EFFECTIVE & WIRELESS INDUSTRIAL IoT



BATTERY POWERED

Moduino X0

Moduino X1

Moduino X2

Chipset:	ESP32-WROVER-B		
Processor:	Dual-Core Tensilica LX6 240 MHz, RTC		
RAM:	8 MB pSRAM		
Flash:	4 / 8 / 16 MB SPI		
SD card:	-	-	+ microSD slot (optional)
RS-232/485:	T1 + 1x RS-232/485 (optional)	T1 1x RS-232/485	T1 + 1x RS-232/485 (default) + 2x RS-232/485 (optional)
Inputs:	T2 2x DI (surge protection: 30VDC) or 2x AI (0 ~ 10VDC)	T2 2x DI (surge protection: 30VDC) or 2x AI (0 ~ 10VDC)	T2 2x DI (surge protection: 30VDC) or 2x AI (0 ~ 10VDC)
Outputs:	T3 2x DO Open Collector (surge protection: 30VDC) max. Current 500mA, peak min. 600W	T3 2x DO Open Collector (surge protection: 30VDC) max. Current 500mA, peak min. 600W	T3 + 2x DI (surge protection: 30VDC) 2x DO Open Collector (surge protection: 30VDC) max. Current 500mA, peak min. 600W
Ethernet:	1x Ethernet 10/100 Mbps (optional)	1x Ethernet 10/100 Mbps (optional)	1x Ethernet 10/100 Mbps (optional)
CAN:	-	-	+ 1x CAN (optional)
USB:	-	-	+ 1x microUSB 2.0
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:	max. 1x ExCard module (optional)	max. 1x ExCard module (optional)	+ max. 3x ExCard module (optional)
Battery:	+ Battery power support (optional)	UPS (LiPo or Supercapacitor) (optional)	UPS (LiPo or Supercapacitor) (optional)
Display:	OLED 0.96" 128x64 (optional)		
Power supply:	6~30 V DC (depending on configuration)		
Casing:	ABS (default) or Aluminum (optional), DIN rail mount		
Working cond.:	-40 ~ 70°C, humidity 5 ~ 95% RH (no condensation)		
Dimensions:	ABS (2M): 90 x 36 x 32 mm (LxWxH) Aluminum: 95 x 37 x 41 mm (LxWxH)	ABS (2M): 90 x 36 x 32 mm (LxWxH) Aluminum: 95 x 37 x 41 mm (LxWxH)	ABS (4M): 90 x 71 x 32 mm (LxWxH) Aluminum: 95 x 73 x 41 mm (LxWxH)



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SPECIFICATION



COST-EFFECTIVE & WIRELESS INDUSTRIAL IoT



Moduino X3

Moduino X4

Moduino X7

Chipset:	ESP32-WROVER-B		
Processor:	Dual-Core Tensilica LX6 240 MHz, RTC		
RAM:	8 MB pSRAM		
Flash:	4 / 8 / 16 MB SPI		
SD card:	+ microSD slot (optional)		
RS-232/485:	T1 1x RS-232/485	T1 + 1x RS-232 1x RS-485	T1 + 1x RS-232 1x RS-232/485 (optional)
Inputs:	T2 2x DI (surge protection: 30VDC) or 2x AI (0 ~ 10VDC)	T2 2x AI (0 ~ 10VDC)	T2 + 4x AI (0 ~ 10VDC)
Outputs:	T3 + 2x DIO OPTO or 2x Relay (optional) T2 2x DO Open Collector (surge protection: 30VDC) max. 500mA, peak min. 600W T3 2x DO, typical max current 50mA or 2x AO 10bit	T3 + 3x DI, 2x AI (0 ~ 10VDC) T2 3x DO Open Collector (surge protection: 30VDC) + max. 500mA, peak min. 600W T3 -	T3 + 2x DI/AI (0 ~ 10VDC) + 3x DI/AI (optional) T2 + 3x DO Open Collector + 2x DO (optional) (s.p.: 30VDC), max. 500mA, peak min. 600W T3 -
Ethernet:	1x Ethernet 10/100 Mbps (optional)	1x Ethernet 10/100 Mbps (optional)	1x Ethernet 10/100 Mbps (optional)
CAN:	-	-	-
USB:	-	-	-
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		
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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:	+ max. 2x ExCard module (optional)	+ max. 2x ExCard module (optional)	+ max. 3x ExCard module (optional)
Battery:	UPS (LiPo or Supercapacitor) (optional)	UPS (LiPo or Supercapacitor) (optional)	+ Battery power support (optional)
Display:	OLED 0.96" 128x64 (optional)		
Power supply:	6~30 V DC (depending on configuration)		
Casing:	ABS (default) or Aluminum (optional), DIN rail mount		
Working cond.:	-40 ~ 70°C, humidity 5 ~ 95% RH (no condensation)		
Dimensions:	ABS (4M): 90 x 71 x 32 mm (LxWxH) Aluminum: 95 x 73 x 41 mm (LxWxH)	ABS (4M): 90 x 71 x 32 mm (LxWxH) Aluminum: 95 x 73 x 41 mm (LxWxH)	ABS (4M): 106 x 71 x 32 mm (LxWxH) Aluminum: 110 x 73 x 41 mm (LxWxH)



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