UNLEASH THE TRUE POTENTIAL OF INDUSTRIAL IoT

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 up to 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.

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.

END-POINT SENSORS

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

BATTERY POWERED

Moduino X1 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

SMALL SIZE

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

WIRELESS COMMUNICATION

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

Wi-Fi
Bluetooth

SCREEN

OLED 0.96" 128x64

I/O EXTENSIONS

CAN
mBus 10
ExCARD 2/4x 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

CASING

ABS
ALUMINUM
IP65-IP67 SEALED

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## SPECIFICATION

### COST-EFFECTIVE & WIRELESS INDUSTRIAL IoT

<table>
<thead>
<tr>
<th>Moduino X1</th>
<th>Moduino X2</th>
<th>Moduino X3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chipset:</strong></td>
<td>ESP32-WROVER-B</td>
<td>ESP32-WROVER-B</td>
</tr>
<tr>
<td><strong>Processor:</strong></td>
<td>Dual-Core Tensilica LX6 240 MHz, RTC</td>
<td>Dual-Core Tensilica LX6 240 MHz, RTC</td>
</tr>
<tr>
<td><strong>RAM:</strong></td>
<td>4 / 8 MB pSRAM</td>
<td>4 / 8 MB pSRAM</td>
</tr>
<tr>
<td><strong>Flash:</strong></td>
<td>4 / 8 / 16 MB SPI</td>
<td>4 / 8 / 16 MB SPI</td>
</tr>
<tr>
<td><strong>SD card:</strong></td>
<td>-</td>
<td>+ microSD slot (optional)</td>
</tr>
<tr>
<td><strong>RS-232/485:</strong></td>
<td>1x RS-232/485</td>
<td>1x RS-232/485 (default)</td>
</tr>
<tr>
<td><strong>Inputs:</strong></td>
<td>2x DI (surge protection: 30VDC)</td>
<td>2x DI (surge protection: 30VDC)</td>
</tr>
<tr>
<td></td>
<td>or 2x AI (0 ~ 10VDC)</td>
<td>or 2x AI (0 ~ 10VDC)</td>
</tr>
<tr>
<td><strong>Outputs:</strong></td>
<td>2x DO Open Collector (surge protection: 30VDC)</td>
<td>2x DO Open Collector (surge protection: 30VDC)</td>
</tr>
<tr>
<td></td>
<td>max. Current 500mA, peak min. 600W</td>
<td>max. Current 500mA, peak min. 600W</td>
</tr>
<tr>
<td><strong>Ethernet:</strong></td>
<td>1x Ethernet 10/100 Mbps (optional)</td>
<td>1x Ethernet 10/100 Mbps (optional)</td>
</tr>
<tr>
<td><strong>CAN:</strong></td>
<td>-</td>
<td>+ 1x CAN (optional)</td>
</tr>
<tr>
<td><strong>USB:</strong></td>
<td>-</td>
<td>+ 1x microUSB 2.0</td>
</tr>
</tbody>
</table>

### Wi-Fi:
- Bluetooth v4.2 BR/EDR and Bluetooth Low Energy (BLE)
- 802.11b/g/n 16mbps

### Bluetooth (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 CC1125 Narrowband Transceiver, 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. 3x ExCard module (optional)
- max. 2x 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 condi.:
- -40 ~ 70°C, humidity 5 ~ 95% RH (no condensation)

### Dimensions:
- ABS (2M): 90 x 36 x 32 mm (LxWxH)
- ABS (4M): 90 x 37 x 41 mm (LxWxH)
- Aluminum: 95 x 37 x 41 mm (LxWxH)
- Aluminum: 95 x 37 x 41 mm (LxWxH)

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