Andino IO: Industrial Raspberry Pi PC

Overview, Variants, Accessories

Shop – https://andino.shop/

Products – https://andino.systems/

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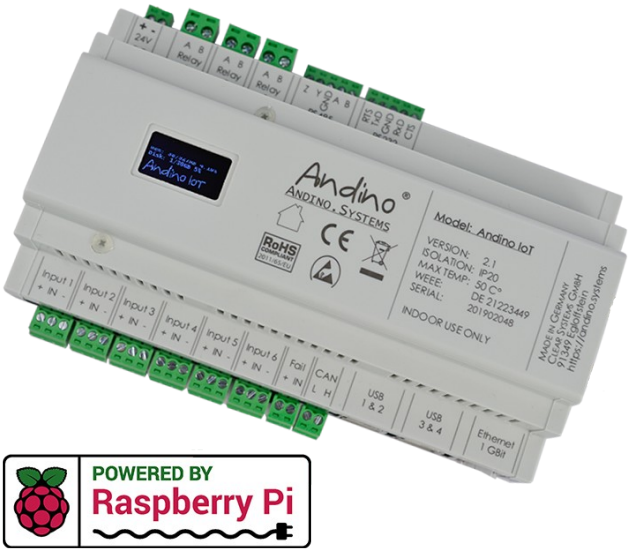
Andino IO – Overview



Overview

The Andino IO is an expansion board for the Raspberry Pi in a DIN rail housing, e.g. for mounting in the control cabinet in industrial environments. It is used to adapt digital inputs and outputs for a voltage of 24 volts. Additionally it accepts a Raspberry Pi (3B+/4). With the Andino IO, all relevant interfaces of the Pi are protected in such a way that they meet the requirements for robust use, according to the relevant standards.

The digital inputs and outputs are galvanically isolated and protect the Pi from voltage peaks up to 5 kV. For this purpose, the power supply is designed to filter out noise signals and voltage spikes. The numerous included possibilities for inputs and outputs of the IO (6 galvanically isolated inputs, RS232, RS485/RS422, CAN bus) also allow versatile applications in the industrial as well as private sector.

Contents of Delivery

- Andino IO
- Raspberry Pi 3B+/4
- Breadboard
- High quality DIN rail housing

Features

- Protection of Pi GPIO interfaces: Filtering out noise signals and voltage spikes
- Versatile software resources (Node-Red & Python library)
- DIN rail & 24V industrial power supply allow installation in control cabinets
- Galvanic isolation of the GPIOs of the Raspberry Pi transferred to protected terminals
- RS232, CAN Bus, RS485/RS422
- OLED display
- RTC (Real-Time Clock)

Andino IO – Overview

Raspberry Pi compatible

The 40-pin connector is compatible with Raspberry Pi 3B+/4, allowing easy data processing with our specially developed software, Python libraries and Node Red nodes. In addition, since this software runs under Raspberry Pi OS, it can be used with a variety of other software developed for the Raspberry Pi or Debian.

Integrated Power Supply

The IO board has a 9 – 24 V wide range DC input with reverse polarity protection. Powerful, reliable, stable power supply: 5 volts, 2.6 amps – enough power for the Raspberry, your USB hardware and custom adaptation. Built-in EMC protection circuits protect the Pi from voltage spikes and power surges on the supply line.

Galvanic Isolation

The IO board has six galvanically isolated inputs (isolated up to 5kV) and three relay outputs for 42 Volt and 1 Ampere. All inputs and further IO (CAN, RS232, RS485/422) are connected to an internal pin header.

Real Time Clock (RTC)

The integrated, battery-buffered RTC provides the correct time even if no NTP (time) server is available. The high precision time chip DS3231 from Dallas Semiconductors is used. Due to the internal temperature compensation of the oscillator, the chip achieves a very high accuracy of ±2ppm at 0°C to +40°C.

RS232, RS485/RS422, CAN Bus

The IO has a wide range of built-in interfaces, including RS232, CAN and RS485/RS422. This allows the board to be connected to a wide range of machines in an industrial environment.

OLED Display

The integrated 0.98 inch OLED display with a resolution of 128x64 pixels can display important key data directly visible on the IO. Writing to the display is made easy by our Node-Red Nodes, specially designed for the Andino IO, as well as the Andino Python Library.

Andino IO – Overview

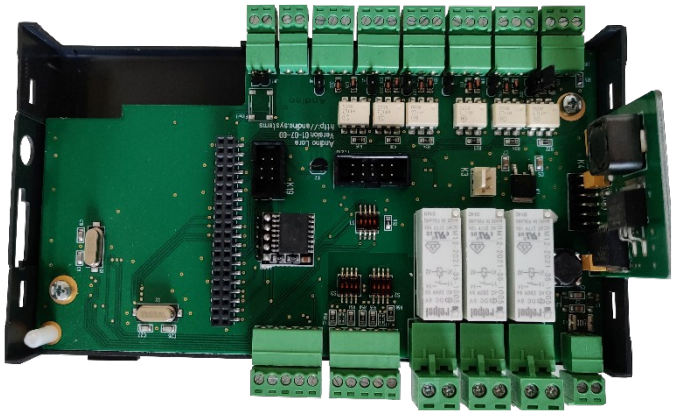
Tested Standards – EMC

The Andino IO was tested together with a Raspberry Pi in its DIN rail housing for its electromagnetic compatibility (EMC).

The tests included immunity to static electricity discharge, high-frequency electromagnetic fields, fast transient electrical disturbances (burst), surge voltages, conducted disturbances – induced by high-frequency fields, and magnetic fields with energy-related frequencies.

The Andino IO not only passed these tests, but also met the more stringent limit in each case. This underlines its industrial suitability and brings the Raspberry Pi into the industrial environment.

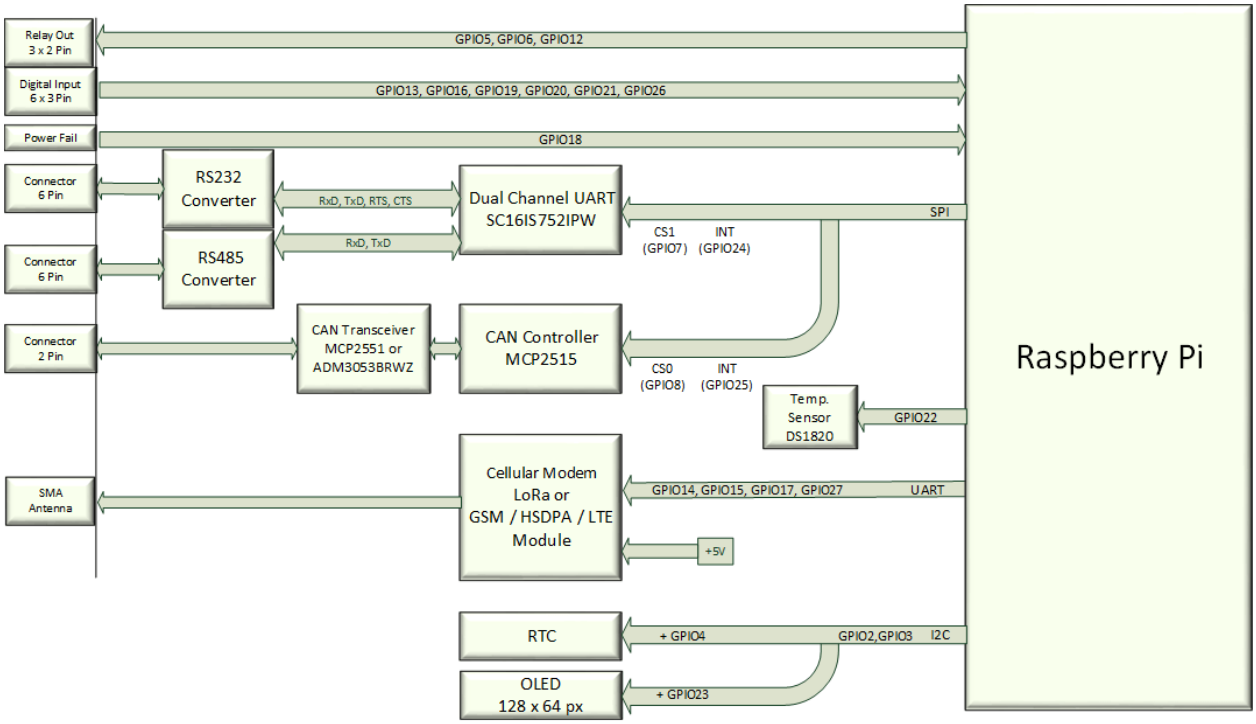
More Information**:** https://andino.systems/andino-io



Andino IO: Offen ohne Raspberry Pi

Andino IO: Offen mit Raspberry Pi & Deckel

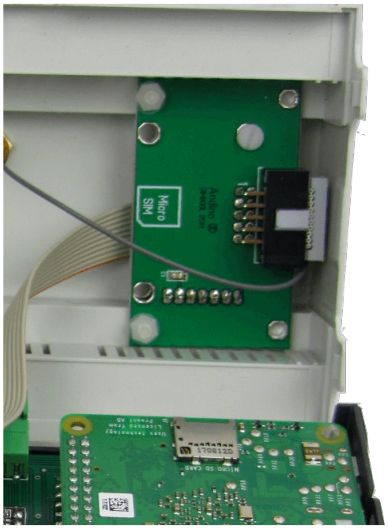
Andino IO – Overview



Andino IO: Block Diagram

Andino IO – Variants

Andino IO: Raspberry Pi PC with 2G/EDGE Modem, RS232, RS485/RS422, *CAN Bus*

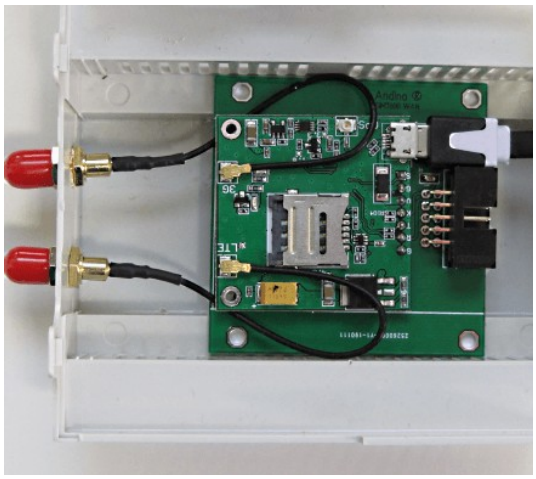


2G-Modem (SimCom SIM800L)

The integration of a 2G modem enables the sending and receiving of SMS as well as basic Internet connectivity of the Andino IO with up to 220 kbit/s via EDGE.

This allows the use even far away from existing network infrastructure: Status messages can for example be transmitted or read out via SMS using our Node-Red Nodes, which are specially made for the IO. Due to the versatile possibilities of programming the Andino IO (e.g. Python), many other options of data transmission are also available.

Andino IO: Raspberry Pi PC with 4G/LTE Modem, RS232, RS485/RS422, *CAN Bus*



4G-Modem (SimCom SIM7600)

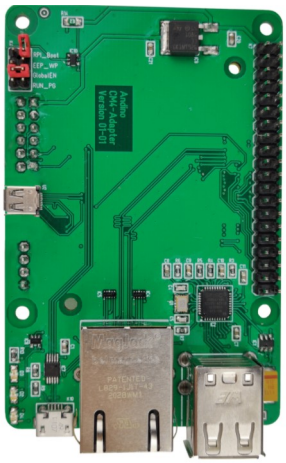
The integration of a 4G modem enables a fast data transfer of the Andino IO by dialing into the Internet - even far away from existing network infrastructure. The connection between Raspberry Pi and modem is made via USB. This way, not only status messages, but also larger amounts of data from any sensors, cameras or similar can be reliably transferred.

In addition, the 4G modem allows convenient sending and receiving of SMS via our Node-Red Nodes, which were specially made for the IO.

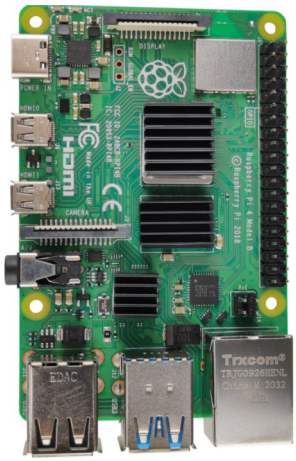
Andino IO – Variants

Raspberry Pi Compute Module 4 IO Board

The Andino IO can also be ordered with the Raspberry Pi Compute Module 4. In this case, the CM4 is delivered with the help of a specially developed IO board with otherwise identical hardware to the other Andino IO variants. The board adapts the CM4 to the same Raspberry Pi form factor. It also allows connecting SSDs via a PCIe to M.2 adapter and thus faster boot times, higher storage capacities and a better longevity than an SD card.



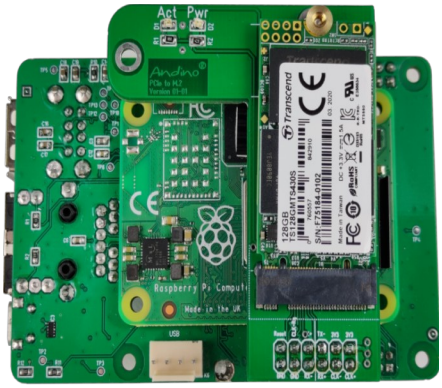
Compute Module 4 IO Board



Raspberry Pi 4

The board has the following IO capabilities:

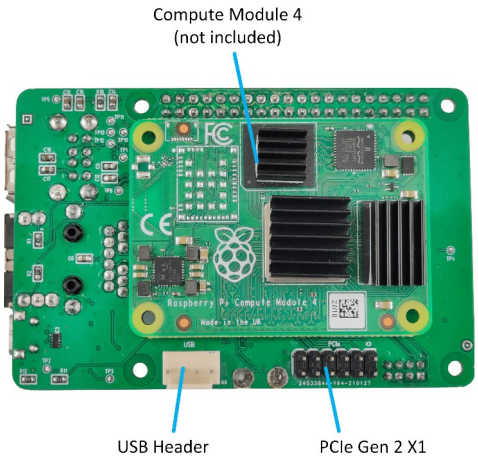
- Raspberry Pi GPIO pins
- 2x USB 2.0
- Gigabit Ethernet
- Internal USB Header
- PCI-e Gen2 X1
- Micro HDMI

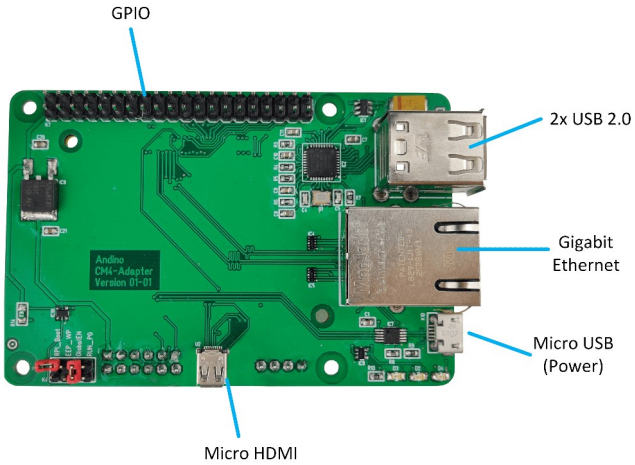


CM4 IO-Board mit PCIe auf M.2 Adapter

Furthermore, the compute module itself offers the following capabilities:

- Broadcom BCM2711 quad-core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
- H.265 (HEVC) (up to 4Kp60 decode), H.264 (up to 1080p60 decode, 1080p30 encode)
- OpenGL ES 3.0 graphics
- 1GB – 8GB LPDDR4-3200 SDRAM (depending on variant)
- 0GB ("Lite") - 32GB eMMC Flash memory (depending on variant)
- Optional 2.4 GHz, 5.0 GHz 802.11 b/g/n/ac wireless
- Bluetooth 5.0





Andino IO – Technical Specifications

Andino IO specifications:

Power Supply	In: 9-24V Power Supply / Out: 5V, 2.6A
Digital Inputs	6 Inputs galvanically isolated up to 5kV
Relay Outputs	3 Relays 240V, 3A
Connectivity	RS232 (not galvanically isolated) RS485/RS422 (galvanically isolated) CAN-Bus
Real Time Clock	Dallas Semiconductors – DS3231 Accuracy: ± 2ppm between 0 °C and +40 °C

Raspberry Pi 4 specifications:

SoC	Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
RAM	2GB LPDDR4-3200 SDRAM
WiFi	2.4 GHz and 5.0 GHz IEEE 802.11ac wireless
Bluetooth	Bluetooth 5.0, BLE
Ethernet	Gigabit Ethernet
Connectivity	2 USB 3.0 ports; 2 USB 2.0 ports. Raspberry Pi standard 40 pin GPIO header 2 × micro-HDMI ports (up to 4kp60) Micro-SD card slot (accessible from outside Andino housing)

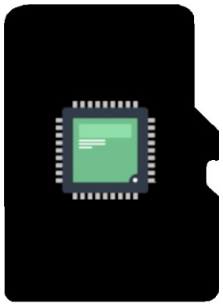
Andino IO – Technical Specifications

Raspberry Pi 3B+ specifications:

SoC	Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.4GHz
RAM	1GB LPDDR2 SDRAM
WiFi	2.4GHz and 5GHz IEEE 802.11.b/g/n/ac
Bluetooth	Bluetooth 4.2, BLE
Ethernet	Gigabit Ethernet over USB 2.0 (maximum throughput 300 Mbps)
Connectivity	4 USB 2.0 ports Full-size HDMI Extended 40-pin GPIO header 4-pole stereo output and composite video port Micro-SD card slot (accessible from outside Andino housing)

Andino SD-Cards (Accessories)

Overview



Andino SD cards are intended for use with an Andino X1, Andino IO or Andino Terminal and can be ordered as accessories. These SD cards already contain a pre-installed version of Raspberry Pi OS and include all necessary drivers to start using the Andino PC immediately. An installation of drivers or other software is therefore no longer necessary.

The SD cards are 32GB Samsung Evo+ Class 10 UHS-1 cards.

Included Drivers:

- Driver for the Real Time Clock
- Driver for UART
- Driver for CAN-Bus (only when ordering corresponding hardware)

Included Software:

- Node-Red for Raspberry Pi
- Custom Raspberry Pi Nodes & Custom Andino Nodes
- Andinopy Python Library / TCP Stack
- Several useful testing and debugging tools

More information about Andino SD cards on: https://andino.systems/home/sd-cards

Andino SD Cards – Technical Specifications

General

Type	Micro SD
Size	32 GB

Manufacturer Details

Manufacturer	Samsung
Model	Evo+

Antenna for 2G/4G Modem (Accessories)

Overview

The 2G/4G antenna for Andino boards allows the use of the 2G/4G modems. It has a magnetic stand and a cable with a length of 1m.

Antenna for 2G/4G Modem – Technical Specifications

Frequency range	700-960Mhz / 1710-2690Mhz
Amplification (dBi)	7dBi
Polarisation vertical	Ja
Impedance	50 Ohm
Wattage	50 Watt
Cable Type	RG174
Cable Length	1m
Connector	SMA-Stecker
Directivity	Omni Directional