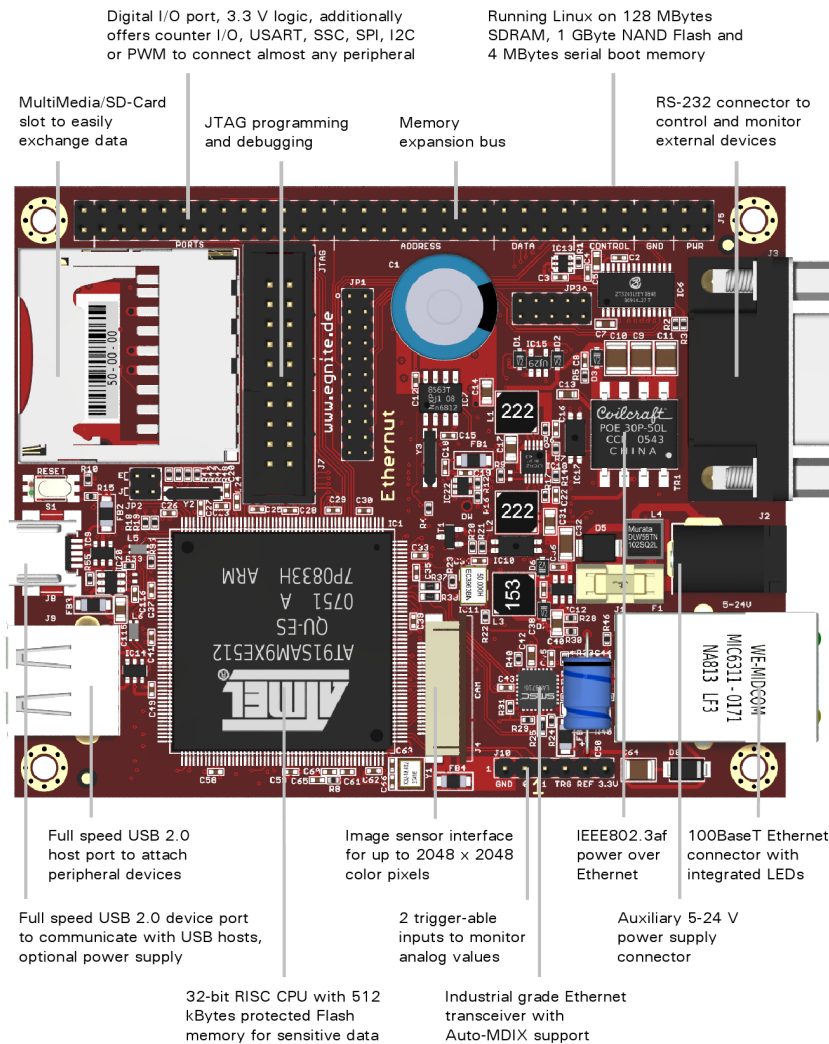


# Ethernut 5.0

## Embedded Ethernet



Digital I/O port, 3.3 V logic, additionally offers counter I/O, USART, SSC, SPI, I2C or PWM to connect almost any peripheral

Running Linux on 128 MBytes SDRAM, 1 GByte NAND Flash and 4 MBytes serial boot memory

MultiMedia/SD-Card slot to easily exchange data

JTAG programming and debugging

Memory expansion bus

RS-232 connector to control and monitor external devices

Full speed USB 2.0 host port to attach peripheral devices

Image sensor interface for up to 2048 x 2048 color pixels

IEEE802.3af power over Ethernet

100BaseT Ethernet connector with integrated LEDs

Full speed USB 2.0 device port to communicate with USB hosts, optional power supply

2 trigger-able inputs to monitor analog values

Auxiliary 5-24 V power supply connector

32-bit RISC CPU with 512 kBytes protected Flash memory for sensitive data

Industrial grade Ethernet transceiver with Auto-MDIX support

### Hardware

With Ethernut 5.0 the continuous development of the Ethernut family reached a new level. By using the same board geometry, this single board computer with its ARM9 CPU offers significantly higher performance and many more features than its predecessors.

Atmel's AT91SAM9XE512 CPU provides a large number of peripherals, like 10/100 Mbit Ethernet, USB 2.0, CMOS image sensor, SD card / SDIO / MMC, IrDA, I2S, ADC, TWI or SPI. Like all other Ethernut boards, it provides an extension connector for attaching additional hardware. Hence it is suitable for both the prototyping of your own hardware as well as for direct integration into your finished product.

The integrated Flash memory can be protected against external access and is complemented by 1 GByte NAND Flash, 128 MByte SDRAM and 4 MByte serial Flash. This may be further increased by using the MMC / SD card socket.

For power supply, a conventional DC input of 5-24 V is available.

Alternatively the USB or Ethernet cable may be used as well. Flexible power management is done by a dedicated ATmega168 CPU. The real time clock is backed up by a double layer capacitor.

This robust board has been in production since 2011. Our in-house quality control procedures guarantee a consistently high level of reliability.

### Software

Application development is carried out in the high level programming language C, using free GNU tools.

An active Open Source community created Nut/OS, a cooperative RTOS with TCP/IP stack specially designed with low memory consumption in mind. The well documented and

tested code provides a convenient, portable API. Programmers familiar with C for desktop PCs will soon feel comfortable with its standard C library functions.

Although pre-configured for Ethernut 5.0, an easy to use graphical interface is available on Linux, Windows and

OS X PCs to adapt the system to special requirements with just a few mouse clicks.

In addition to Nut/OS, the Linux operating system is available for Ethernut 5.0. The board support package is based on the Ångström distribution.

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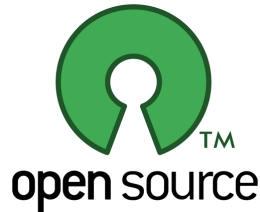
## Embedded Ethernet



### Support

Several companies with many years of experience in Nut/OS software and Ethernut hardware offer commercial support.

Furthermore, mailing lists are an important element of this Open Source project, which enable developers to share their experiences and to help one another in problem solving.



### Licence

All Nut/OS target source code as well as the hardware design are published under the permissive free BSD licence and can be used in commercial products for any purpose without licence fees. In opposite to some other Open Source licence models, it does not require to publish your own source code enhancements.

Development tools and the Linux operating system are published under the GNU Public licence Version 2.

### Specifications

#### Processor

CPU	AT91SAM9XE, 200 MHz clock
NOR Flash memory	Internal 512 kByte
NAND Flash memory	External 1 GByte
Serial Flash memory	External 4 MByte
Static RAM	Internal 32 kByte
SDRAM	External 128 MByte
RTC	Hardware (PCF8563T)

#### Interfaces

Ethernet	RJ45 10/100BaseT (LAN8710)
USB	USB 2.0 device at Mini-B and host at Standard-A receptacle
RS-232	1 x 9-pin DCE, 8-Wire
Memory card	SD card / SDIO / Multimedia card socket
Digital I/O	15 configurable GPIO lines with alternate functions
Analog I/O	2 channels with external trigger and reference
Programming	20-pin JTAG
Indicators	Power (red), link (yellow), activity (green), user (green)

#### Power supply

Regulator	600 mA switcher (LT1616, LTC3407, LTC4411)
Management	ATmega168 CPU
DC input	2.1 mm barrel connector, unregulated 5 to 24 V DC
USB	USB Mini-B, 5 V
Ethernet	IEEE 802.3af
Consumption	< 1 W at 12 V
Battery backup	Double layer capacitor for RTC

#### Protection

RS-232, USB	15 kV ESD protection
Ethernet	Transformer isolation
Power Supply	0.5 A replaceable fuse, rectifier bridge, current limiter, thermal shutdown

#### Environmental

Operating temperature	-20 to 85 °C (-4 to 185 °F)
Storage temperature	-65 to 140 °C (-85 to 284 °F)
Humidity	5 to 95 % non-condensing

#### Approvals

Immunity	EN 61326-1:2013 Class A EN 61000-4-2:2009 EN 61000-4-3:2011 EN 61000-4-4:2013 EN 61000-4-6:2009 EN 61000-4-8:2010
Emissions	EN 61326-1:2013 Class B EN 55011:2011
Safety	PCB flammability rating UL94-V-0
RoHS compliance	EU directive 2011/95/EU

#### Metrics

Dimensions (LxWxH)	98x78x17 mm (3.86x3.07x0.67 in)
Weight	75 g (0.165 lb)

#### Product identification

PCB revision	Written in copper on the PCB's backside
Serial number	IEEE registered MAC Address on barcode sticker label (Code 128C)

### Order information

#### Ethernut Starter Kit 5.0F

Item no.	EGN101911
Included in delivery	Ethernut Bulk 5.0F Turtelizer 2 (ARM in-system programmer) JTAG connector Spare fuse USB, Mini-USB and serial cable Manual, software CD 2-year warranty

#### Ethernut Bulk 5.0F

Item no.	EGN101811
Included in delivery	Ethernut Bulk 5.0F 2-year warranty