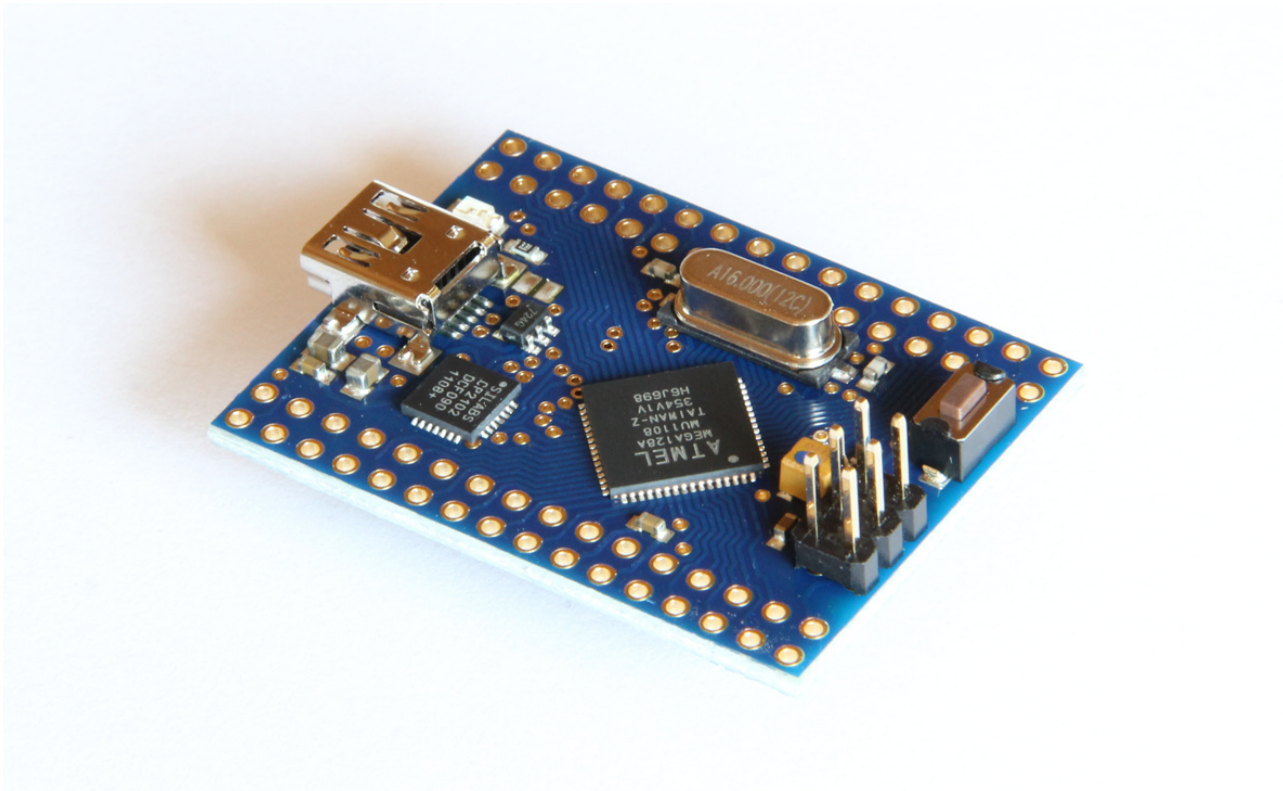


# Microcontroller Module

## MEGA128-USB-V2



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## Module Key Features

Microcontrollermodule with ATmega128A-MU AVR microcontroller and Silabs CP2102 USB-UART-Bridge.

- Microcontroller ATmega128A-MU TQFP64 (0-16MHz 2,7V...5,5V)
- USB-UART-Bridge CP2102 (connected to USART1 – PD2/PD3)
- Power supply configuration
  - External 2,7V to 5V Power Supply connected to any VCC Pin or
  - VBUS voltage 5V (solder jumper closed)
- USB-side ESD-protected (VBUS, D+, D-, Suppressor-Diode-Array)
- USB-Connector Mini-USB SMD
- Reset-Button (new to version 2)
- USB VBUS power status LED
- C-L connected to AVCC pin, decoupling capacitors connected to VCC path
- Atmel<sup>®</sup>-pin-compatible ISP programming connector (6-pin, 2-row, soldered)
- All microcontroller IO pins are routed to pinheader connector pads (CON1 and CON2, 2 x 16-pin 2-row, contact spacing 2,54mm, module fits on 2,54mm perfboard)
- Quartz 16MHz connected to XTAL1/2 (soldered, smd)
- Pcb dimensions 30,5mm x 40,5mm
- Pcb technology: FR4, two layers, solder resist, surface NiAu, solder stop mask: dev-tools-blue

### **Optional available:**

- Pinheader 2 x 16-pin 2-row, Au, contact spacing 2,54mm
- Receptacle 2 x 16-pin 2-row, Au, contact spacing 2,54mm

### **Changes related to previous version:**

- Reset-Button added
- Undervoltage-detector removed
- Reset-Signal pullup resistor value changed (see schematic drawing)

## Pin Assignment

### Port Pin Assignment

PORT	SIGNAL	ALTERNATE PORT FUNCTION	MODULE CONNECTOR
PORTA	PA0	AD0	JP2-20
	PA1	AD1	JP2-17
	PA2	AD2	JP2-18
	PA3	AD3	JP2-15
	PA4	AD4	JP2-16
	PA5	AD5	JP2-13
	PA6	AD6	JP2-14
	PA7	AD7	JP2-11
PORTB	PB0	SS\	JP1-21
	PB1 (ISP)	SCK	JP1-20
	PB2	MOSI	JP1-19
	PB3	MISO	JP1-18
	PB4	OC0	JP1-17
	PB5	OC1A	JP1-16
	PB6	OC1B	JP1-15
	PB7	OC2 OC1C	JP1-14
PORTC	PC0	A8	JP2-03
	PC1	A9	JP2-04
	PC2	A10	JP2-05
	PC3	A11	JP2-06
	PC4	A12	JP2-07
	PC5	A13	JP2-08
	PC6	A14	JP2-09
	PC7	A15	JP2-10
PORTD	PD0	INT0 SCL	JP1-08
	PD1	INT1 SDA	JP1-07
	PD2 (CP2102)	INT2 RXD1	JP1-06
	PD3 (CP2102)	INT3 TXD1	JP1-05
	PD4	ICP1	JP1-04
	PD5	XCK1	JP1-03
	PD6	T1	JP1-02
	PD7	T2	JP1-01
PORTE	PE0 (ISP)	PDI RXD0	JP1-29
	PE1 (ISP)	PDO TXD0	JP1-28
	PE2	AIN0 XCK0	JP1-27
	PE3	AIN1 OC3A	JP1-26
	PE4	INT4 OC3B	JP1-25
	PE5	INT5 OC3C	JP1-24
	PE6	INT6 T3	JP1-23
	PE7	INT7 IC3P	JP1-22
PORTF	PF0	ADC0	JP2-29
	PF1	ADC1	JP2-28
	PF2	ADC2	JP2-27
	PF3	ADC3	JP2-26
	PF4 (JTAG)	ADC4 TCK	JP2-25
	PF5 (JTAG)	ADC5 TMS	JP2-24
	PF6 (JTAG)	ADC6 TDO	JP2-23
	PF7 (JTAG)	ADC7 TDI	JP2-22
PORTG	PG0	WR\	JP2-01
	PG1	RD\	JP2-02
	PG2	ALE	JP2-12
	PG3	TOSC2	JP1-13
	PG4	TOSC1	JP1-12

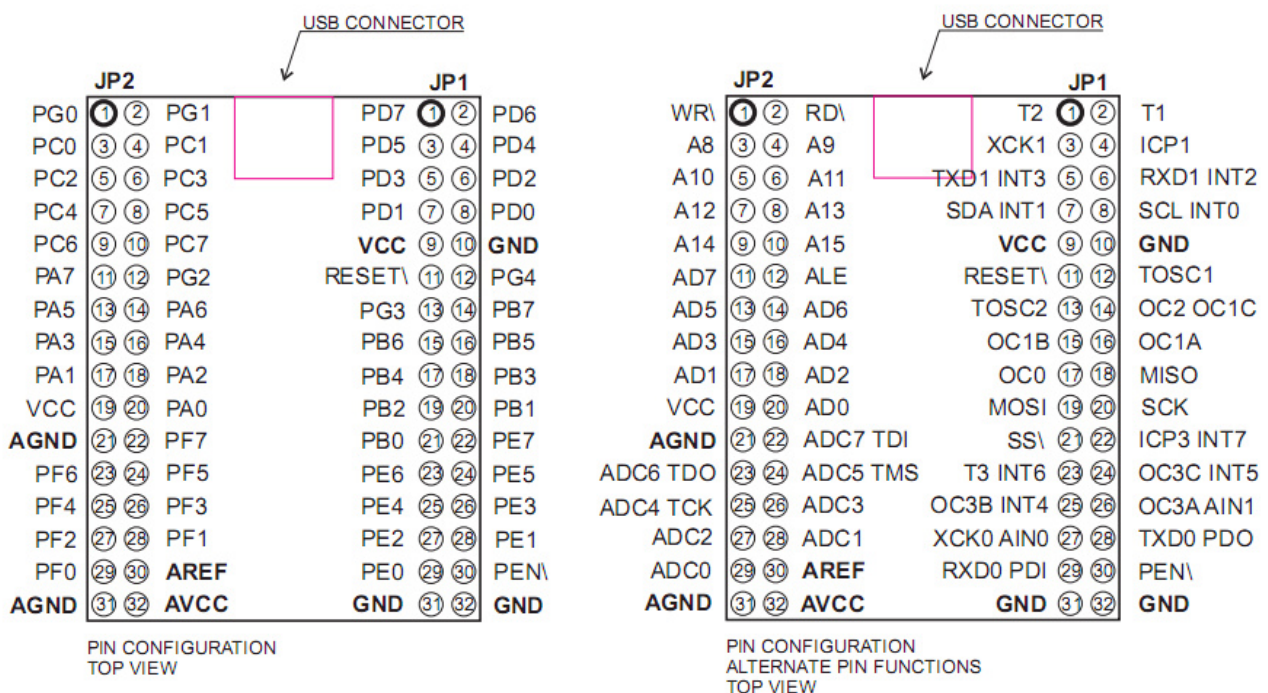
## Additional Signals

SIGNAL		MODULE CONNECTOR
RESET\	RESET LOW ACTIVE	JP1-11
PEN	PROGRAMMING ENABLE	JP1-30

## Power Domains

POWER DOMAINS	DESCRIPTION	MODULE CONNECTOR
VCC	TARGET VOLTAGE (ALL VCC PINS ARE CONNECTED)	JP1-09 JP2-19
GND	GROUND (ALL GND PINS ARE CONNECTED)	JP1-10 JP1-31 JP1-32 JP2-21 (near by AGND) JP2-31 (near by AGND)
AREF	AREF PIN (use external 100nF capacitor to GND for internal reference or VCC used as reference)	JP2-30
AVCC*	AVCC (supply voltage for ADC module. A LC-filter network is connected to AVCC pin)	JP2-32

## Pin Assignment Overview



## Power Supply Configuration

It is possible to choose between following power supply configurations:

- External Power Supply connected to any VCC Pin (2,7V to 5,0V)
- VBUS voltage 5V

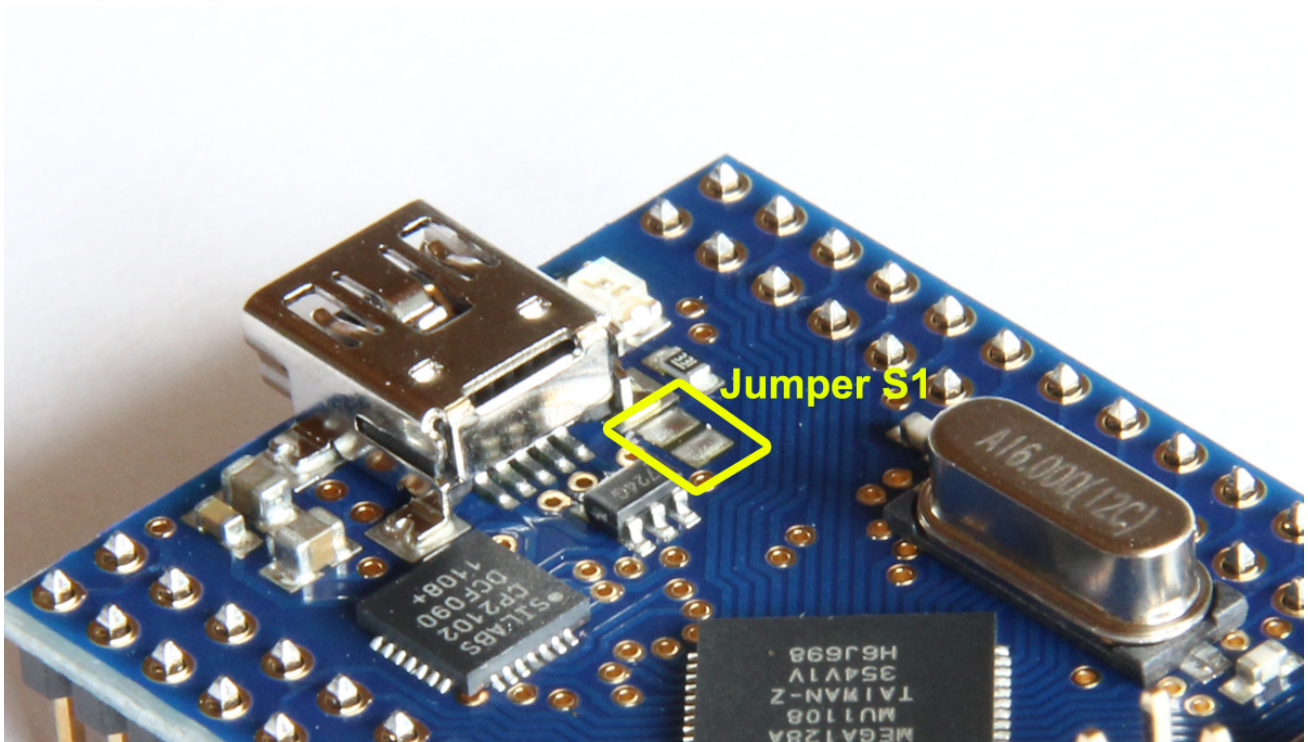
POWER SUPPLY CONFIGURATION	JUMPER	JUMPER STATUS
EXTERNAL SUPPLY VOTAGE APPLIED TO ANY VCC PIN	S1	OPENED
USB VBUS VOLTAGE 5V <sup>(1)(2)(3)</sup>	S1	CLOSED



**(1)** USB VBUS voltage 5V is always available at VCC pins.

**(2)** If supplying external components with VBUS voltage **PLEASE NOTE THE MAXIMUM CURRENT CAPABILITY OF USB VBUS!**

**(3)** **DO NOT APPLY ANY EXTERNAL VOTAGE TO VCC PINS!**



## USB UART Bridge

Due to CP2102 USB UART Bridge, the microcontroller module provides the opportunity to send and receive data via USB, either using the virtual com port VCP or the direkt USB driver DLL USBxpress.

The UART of CP2102 is connected to PORTD USART1 of ATmega128A.

USART	CP2102	ATmega128A
PORTD	TXD	PD2 (RXD1)
	RXD	PD3 (TXD1) <sup>(1)</sup>

(1) DO NOT SET PD3 AS OUTPUT, due CP2102 drives RXD as an output.

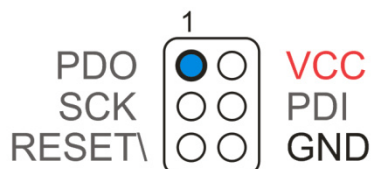
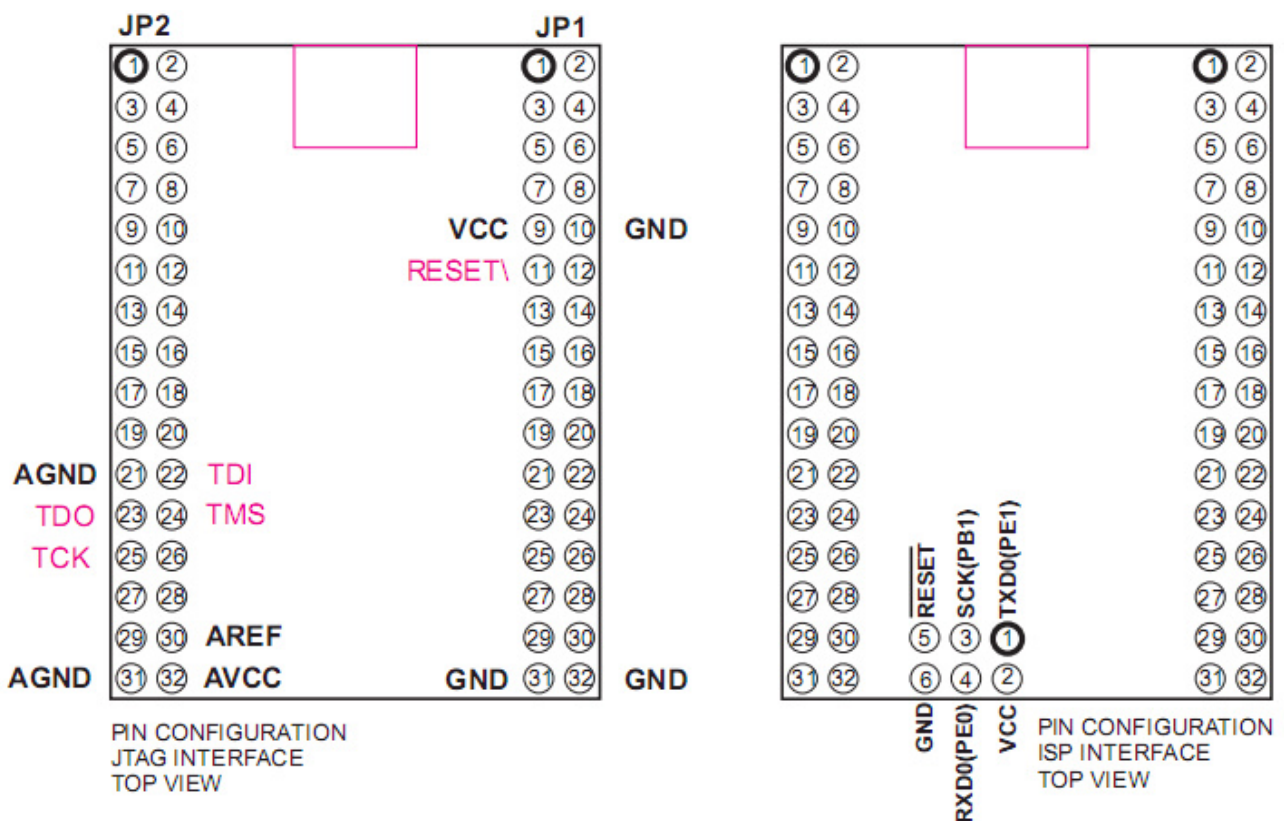
## On-board LED

The on-board LED is connected to USB VBUS.



## Program and Debug Interface

PROGRAM AND DEBUG	SIGNAL	PORT PIN ATMEGA128A	MODULE CONNECTOR
ISP	PDI (RXD0)	PE0	JP3-04
	PDO (TXD0)	PE1	JP3-01
	SCK	PB1	JP3-03
	RESET\	RESET\	JP3-05
	VCC	VCC	JP3-02
	GND	GND	JP3-06
JTAG	TDI	PF7	JP2-22
	TDO	PF6	JP2-23
	TCK	PF4	JP2-25
	TMS	PF5	JP2-24
	RESET\	RESET\	JP1-11
	VCC	VCC	ANY VCC PIN OF JP1/JP2
	GND	GND	ANY GND PIN OF JP1/JP2



Pin signal assignment of the ISP connector complies to ATMEL® design recommendations. Directly connect AVRISPmkII®, JTAGICEmkII®, JTAGICE3®, AVR ONE!® and compatible programmers to ISP connector of microcontroller module.

## Charakteristics

### Target Voltage and System Clock

ATmega128A		Condition	Value			Unit
			min	typ	max	
<b>Target Supply Voltage</b>	VCC	$f_{\text{SYS}}=0..16\text{MHz}$	2,7	-	5,5	V
<b>System Clock</b>	$f_{\text{SYS}}$		-	-	16	MHz

### Power Supply Voltages

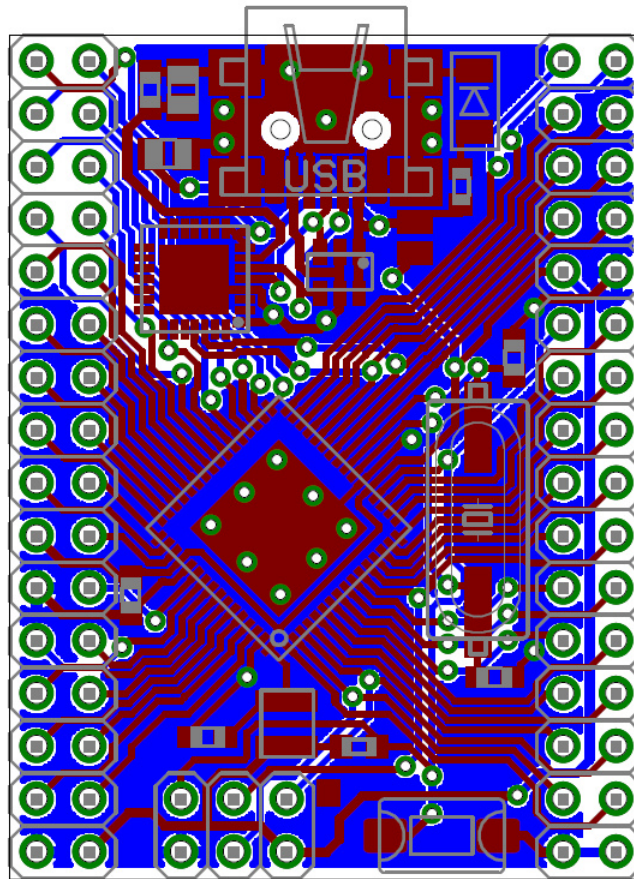
	Pin	Condition	Value			Unit
			min	typ	max	
<b>External Supply Voltage applied to any VCC Pin</b>	VCC	Jumper S1 opened	2,7	-	5,0	V

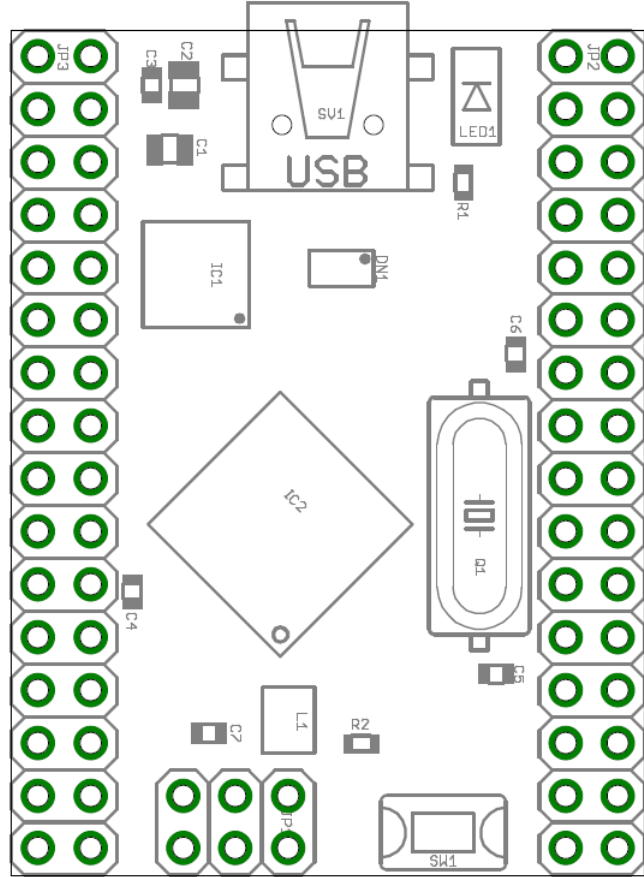
### USB-UART-Bridge Baudrate

		Note	Value			Unit
			min	typ	max	
<b>Transferrate</b>	TR	See also Silabs Application Note AN205 for Baudrates	-	-	921600	bps



## Dimensions and Layout

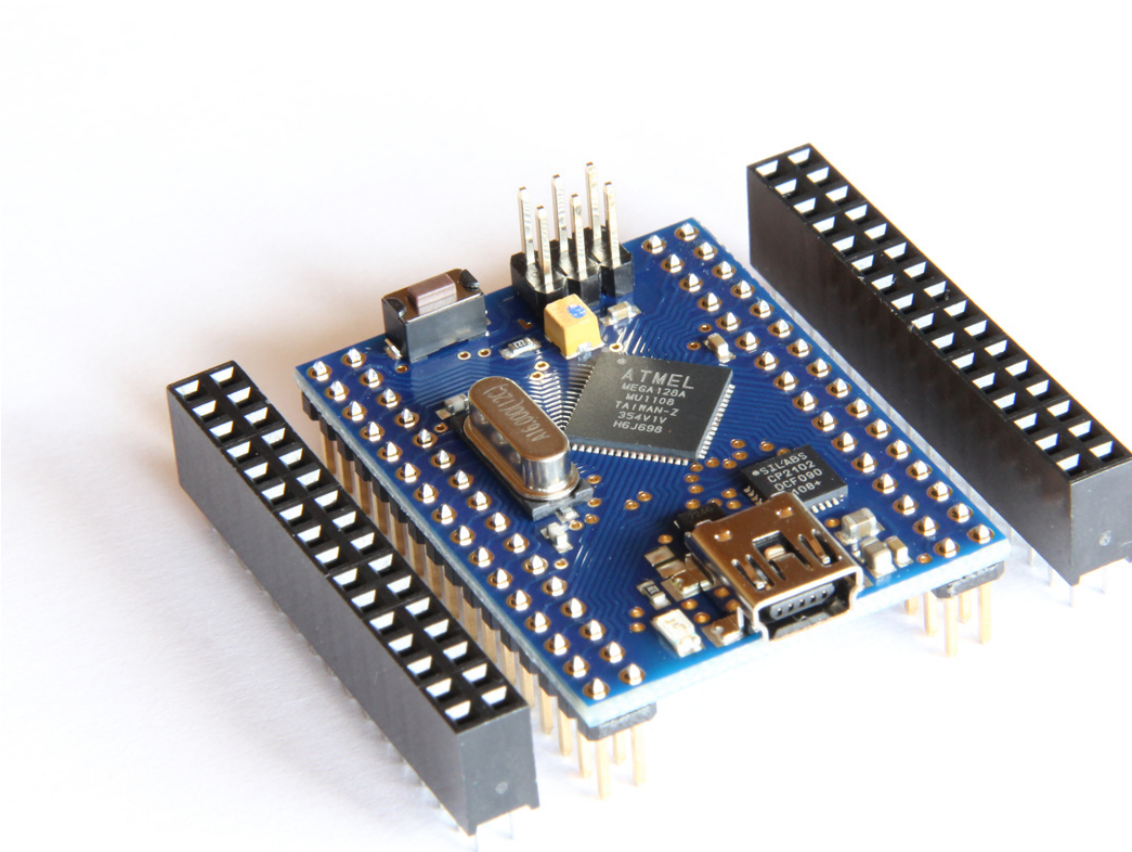




## Accessoires

### Optional available:

- Pinheader 2 x 16-pin 2-row, Au, contact spacing 2,54mm
- Receptacle 2 x 16-pin 2-row, Au, contact spacing 2,54mm





Intended use	This product is intended to use as development and evaluation board for developing microcontroller based applications.
Warning	To avoid damage due to electrostatic discharge (ESD), appropriate measures for ESD protection are to be taken for handling and only appropriately trained personnel should handle the board.
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