

Microcontroller Module

NanoXmegaA1U

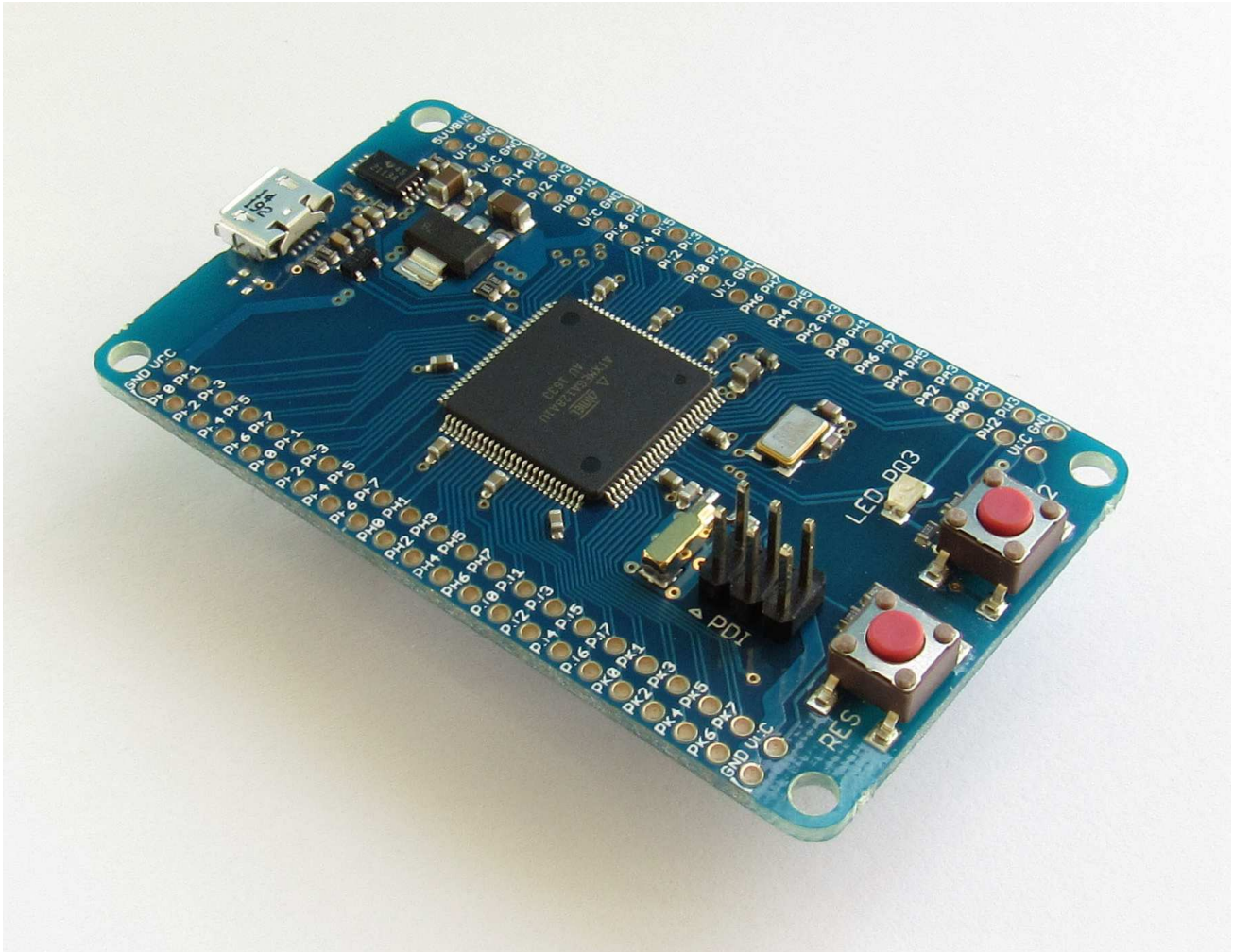


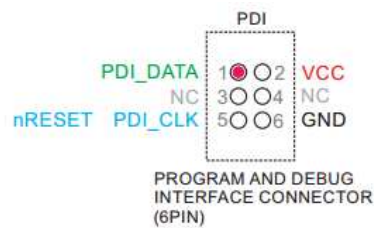
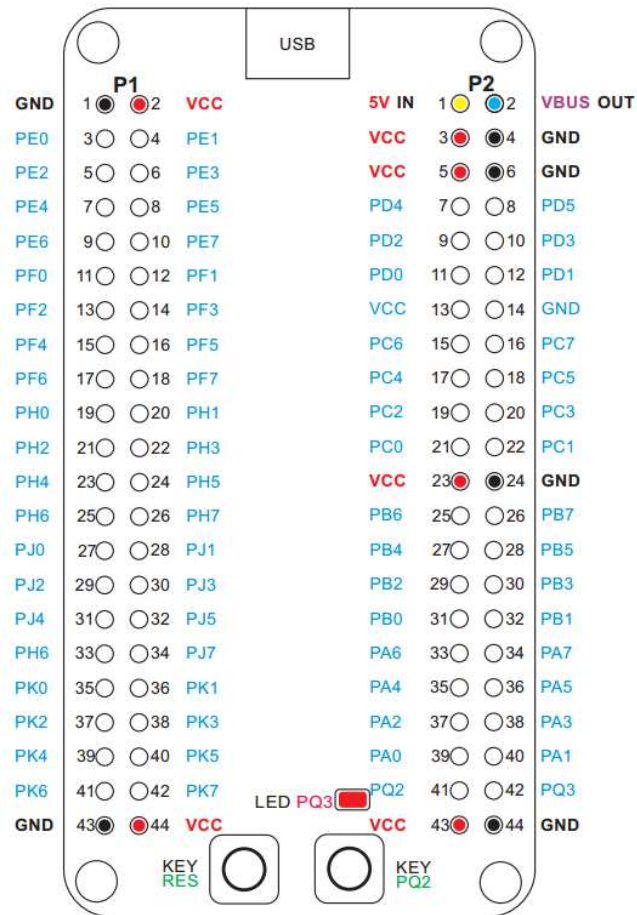
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Microcontroller Module NanoXmegaA1U Key Features

- Microcontroller module based on AVR **Xmega128A1U** microcontroller (Atme^l®), maximum CPU frequency 32MHz
- Program-and-debug Connector (6pin) pin-compatible to **PDI interface** of Atme^l®-ICE Programmer
- **Power Switch** TPS2113APW (typ. 84mOhm on-resistance)
- Power supply configuration:
 - External 5V Power Supply connected to P2-1 Pin or
 - VBUS
- On board LDO **voltage regulator** 3,3V
- Micro USB-Connector
- USB section ESD and EMI protected (Filters and Suppressor diode array: VBUS, D+, D-)
- USB Detection Resistor Divider connected to PK7
- **User-Key** Reset the microcontroller
- **User-Key** connected to PQ2
- **User-LED** connected to PQ3
- C-L filter connected to AVCC pin, decoupling capacitors connected to VCC path
- Microcontroller IO pins are routed to pinheader connector pads P1 and P2 (2 x 44-pin 2-row, contact spacing 2,54mm, module fits on 2,54mm perfboard)
- **Quartz 16MHz** connected to XTAL pins
- **Quartz 32,768kHz** connected to TOSC pins
- Pcb dimensions 38mm x 66mm
- Maximum module high of 6,1mm
- Pcb technology: FR4, two layers, solder resist, surface immersion gold, RoHS

Pin Assignment



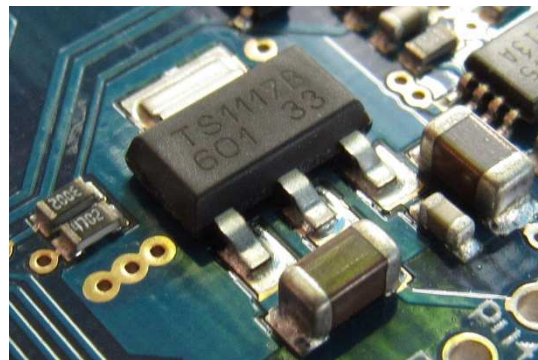
Power Supply Configuration

The microcontroller module can be powered via **USB VBUS** or an **external 5V** supply voltage.

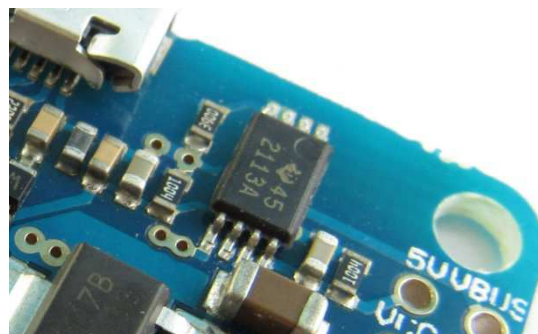
If an external 5V supply voltage is applied, this voltage has priority over USB VBUS voltage.

The linear low-drop-out regulator **TS1117** regulates the 3,3V supply voltage VCC of the microcontroller.

The TS1117 has a typical dropout voltage of 1,3V @ 1A, maximum 1,5V.



The power switch **TPS2113A** blocks reverse and cross-conduction. The current through this switch is limited to 641mA ($I_{limit}=250/R_{limit}$, $R_{limit}=390\Omega$). This is a typical value and according to the datasheet we can expect a minimum of 510mA and a maximum of 800mA. The power switch TPS2113A has an on-resistance of typically 84mOhm and maximal 110mOhm.



USB cable connected	External 5V connected at P2-1	Voltage source
Yes	No	VBUS
Yes	Yes	external 5V connected to P2-1
No	Yes	external 5V connected to P2-1

Precaution using VBUS connected to P2-2 (VBUS OUT):

USB VBUS voltage 5V is always available at pin P2-2. USB VBUS is direct connected to this pin!



If supplying external components with VBUS voltage

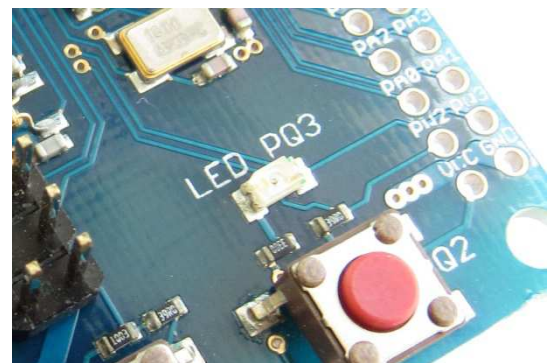
**PLEASE NOTE THE MAXIMUM CURRENT CAPABILITY OF USB VBUS!
DO NOT CONNECT EXTERNAL SUPPLY VOLTAGE TO THIS PIN!**

Power Supply Voltage

	Pin	Condition	Value			Unit
			min	typ	max	
External Supply Voltage applied to Pin P2-1	P2-1		4,7	5,0	5,5	V

User LED

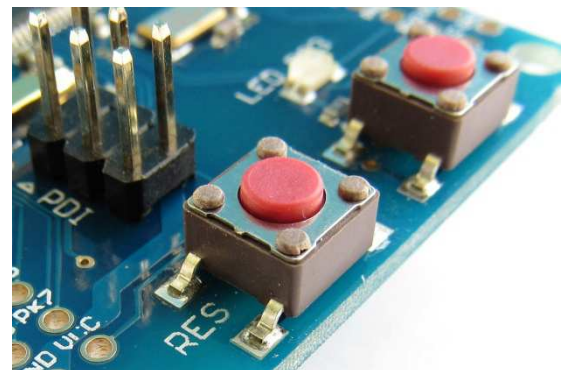
The cathode of the user on-board LED is connected to PQ3.



User Keys

Press the key RES to reset the microcontroller.

The right user key is connected to PQ2. The signal PQ2 is set to low level if key is pressed.



Clock

Quartz 16MHz connected to XTAL (PR0, PR1) pins

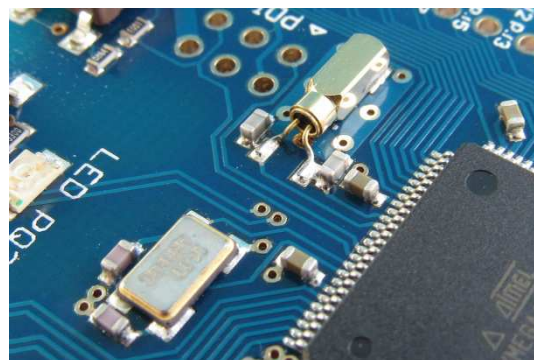
(CLKcpu = 32MHz: XTAL 16MHz and PLL x2)

Quartz 32,768kHz connected to TOSC (PQ0, PQ1) pins

Note:

CLKusb = 48MHz

For example you can use internal RC oscillator OSCRC32 with AutoCal and ID USB Sync.



Program and debug connector

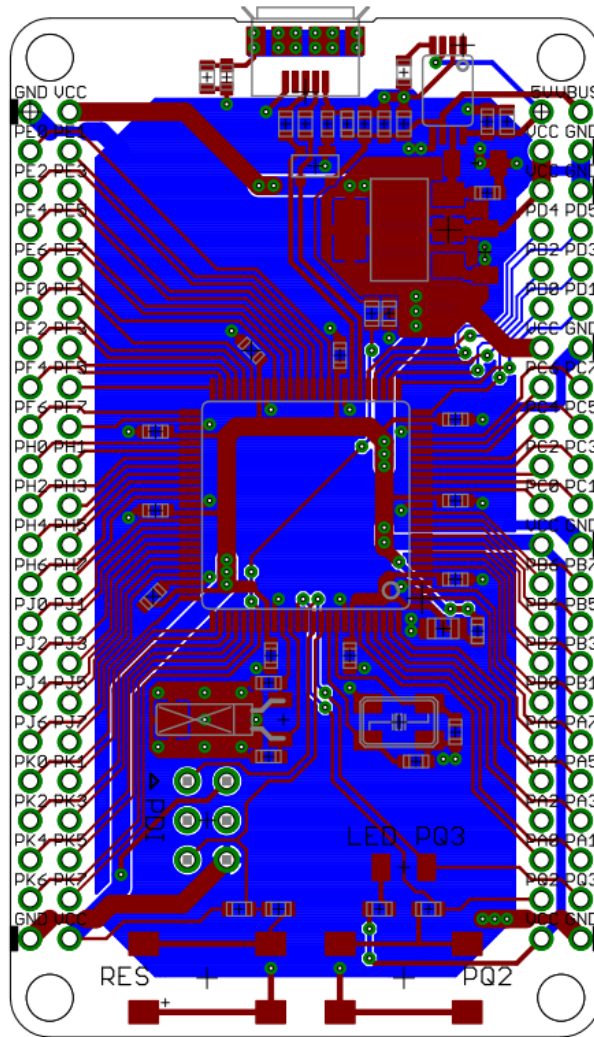
Pin	Signal
1	PDI_DATA
2	VCC
3	NC
4	NC
5	PDI_CLK
6	GND



Layout

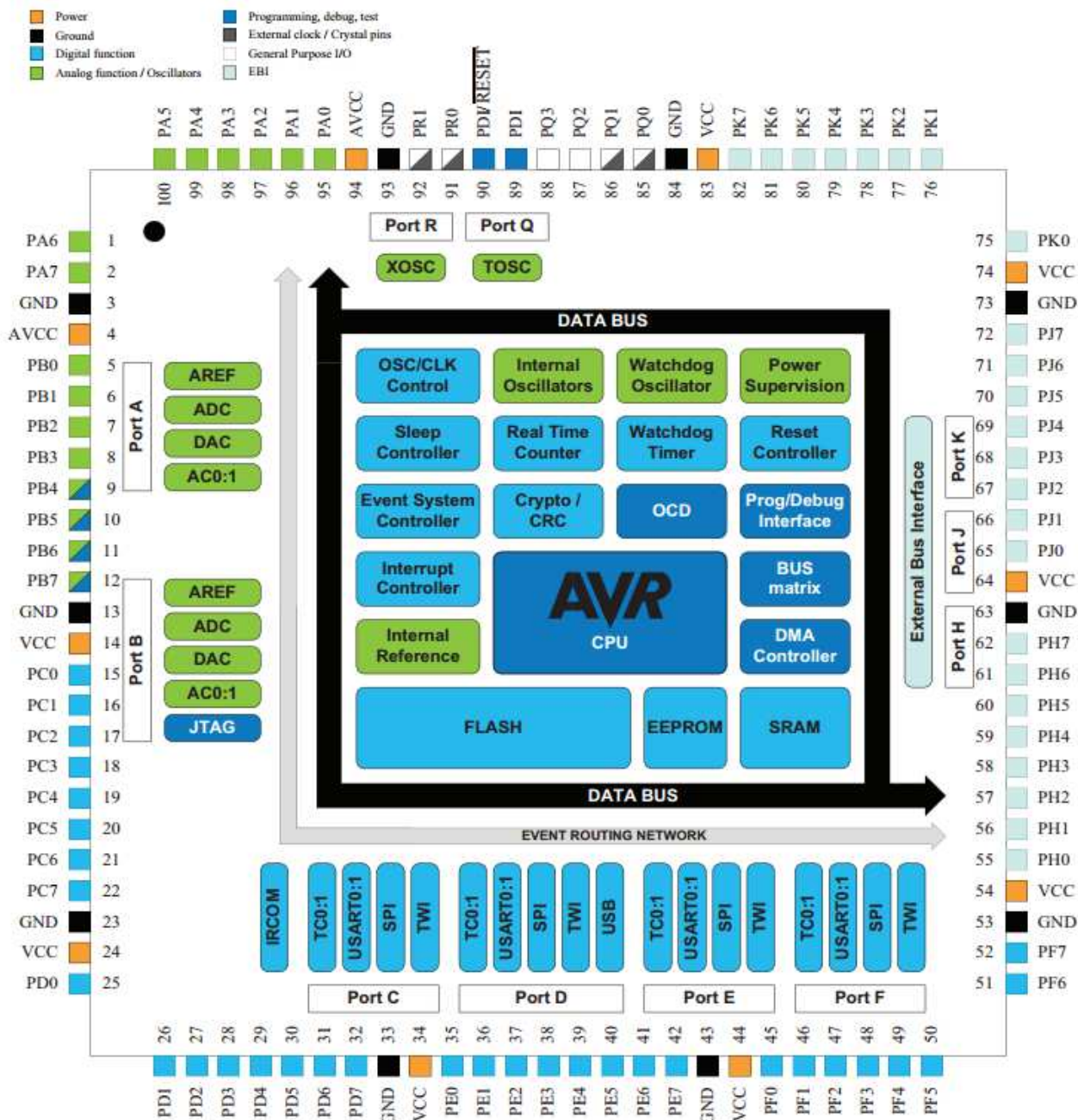
PCB Size	38mm x 66mm, 1,6mm thickness
Design	2 Layers, SMD Top Layer
Material	FR4
Surface	Immersion Gold
Soldermask	Dev-Tools blue
Silk Skreen	White
Panel Processing	Milled, Rounded Corners
E-Test	Yes
RoHS	Yes





Xmega128A1U Features

Pins	100
General Purpose I/O-pins (GPIOs)	78
Flash	128 kBytes
SRAM	8 kBytes
EEPROM	2048 Bytes
Max. Operating Freq. (MHz)	32 MHz
Ext Interrupts	78
USB Transceiver	1
USB Speed	Full Speed
USB Interface	Device
SPI	12
WI (I2C)	4
UART	8
ADC Channels	16
ADC Resolution (bits)	12
ADC Speed (ksps)	2000
Analog Comparators	4
DAC Channels	4
DAC Resolution (bits)	12
Temp. Sensor	Yes
Crypto Engine	AES/DES
External Bus Interface	1
picoPower	Yes
Operating Voltage (Vcc)	1.6 to 3.6
Timers	8
Output Compare Channels	24
Input Capture Channels	24
PWM Channels	24
32kHz RTC	Yes
Calibrated RC Oscillator	Yes
Watchdog	Yes
Quadrature Decoder Channels	3
Debug Interface	JTAG and PDI



**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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