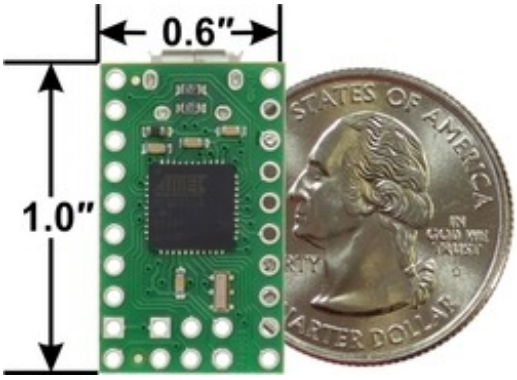
A-Star 32U4 Micro



A-Star 32U4 Micro, bottom view with U.S. quarter for size reference.

Overview

The Pololu A-Star 32U4 Micro is a general-purpose programmable module based on Atmel's ATmega32U4 AVR microcontroller, which has 32 KB of flash program memory, 2.5 KB of RAM, and built-in USB functionality. Onboard features of the A-Star (areviated A*) include a 16 MHz resonator, a USB Micro-B connector, an in-system programming (ISP) header, and a pair of indicator LEDs. A voltage regulator and power selection circuit allow the board to be powered from either USB or an external 5.5 V to 15 V source, while a resettable PTC fuse on the USB VBUS supply and reverse protection on VIN help protect it from accidental damage.

The A-Star 32U4 Micro breaks out 15 general-purpose I/O lines along two rows of pins, including 7 usable as PWM outputs and 8 usable as analog inputs. It fits all this into a 20-pin dual in-line package (DIP) measuring only 1″ × 0.6″ (even smaller than competing ATmega32U4 boards like the Teensy 2.0 and Pro Micro), and its 0.1″ pin spacing makes the A* easy to use with solderless breadboards, perfboards, and 0.1″-pitch connectors.

Our comprehensive user's guide provides the basics you need to get started with the A-Star as well as detailed technical information for advanced users.

This product requires a USB A to Micro-B cable (not included) to connect to a computer.

Features

- **Dimensions: 1″ × 0.6″ (1.05″ × 0.6″ including USB Micro-B connector)**
- **Programmable 16 MHz Atmel ATmega32U4 AVR microcontroller**
  - **32 KB flash (4 KB used by bootloader, leaving 28 KB available for user program by default)**
  - **2.5 KB SRAM**
  - **1 KB EEPROM**
  - **Native full-speed USB (12 Mbps)**
- **Preloaded with Arduino-compatible bootloader (no external programmer required)**
- **Many I/O lines in a small package**
  - **15 general-purpose I/O pins available along the sides of the board**

    - **3 additional I/O pins available on ISP header**
    - **7 pins can be configured as hardware PWM outputs**
    - **8 pins can be configured as analog inputs**
- **2 user-controllable LEDs**
- **Can be powered from USB or external 5.5 V to 15 V source on VIN**
- **PTC fuse on VBUS supply**
- **Reverse-voltage protection on VIN supply**
- **6-pin ISP header for use with an external programmer**
- **Comprehensive user's guide**

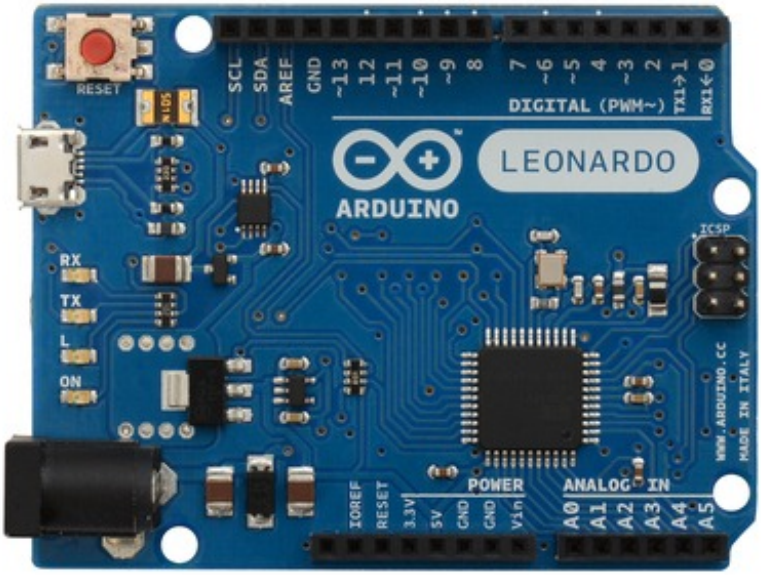
Arduino compatibility
The A-Star 32U4 ships with a preloaded Arduino-compatible bootloader (which uses 4 KB of flash memory, leaving 28 KB available for the user program). We provide a software add-on that enables the board to be easily programmed from the Arduino environment.

The A-Star 32U4 uses the same microcontroller as the Arduino Leonardo and Arduino Micro and runs at the same frequency, making it just as powerful. Although the larger boards offer a few more I/O pins, the A-Star 32U4 Micro fits in an area half that of the Arduino Micro, and it takes up only 11% as much area as a standard full-size Arduino!

A0 A1 RST 3V3 5V GND VIN
Pololu
LED 13

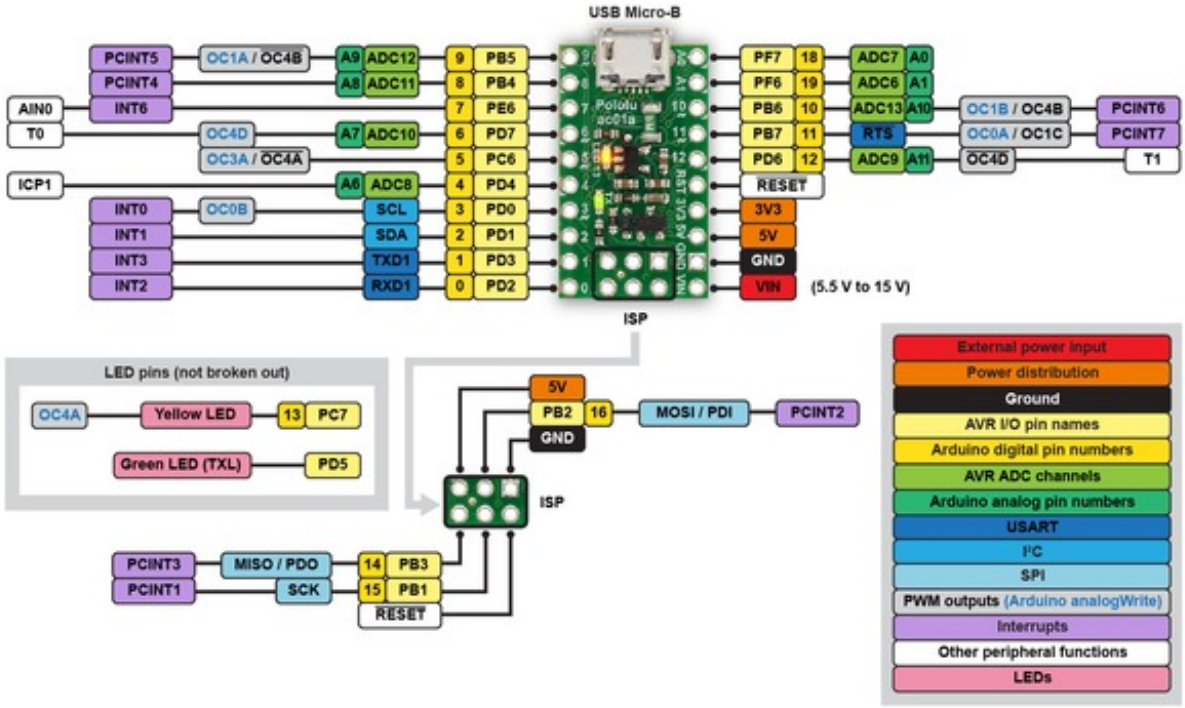
~BAT+ VIN GND A0 A1 A2 A3 A4 A5 AREF TXL RXL SCK MOSI MISO RST
A-Star
TX
RX
LED 13
Pololu
RESET
HWB
STAT
SHDN
GND 5V 3V3

ARDUINO
MICRO
TX RX


RESET
SCL
SDA
AREF
GND
~13 12 ~11 ~10 ~9 8 7 ~6 ~5 4 ~3 2 TX1→1 RX1←0
DIGITAL (PWM~)
ARDUINO
LEONARDO
ICSP
RX
TX
L
ON
POWER
ANALOG IN
IOREF RESET 3.3V 5V GND GND Vin A0 A1 A2 A3 A4 A5
WWW.ARDUINO.CC
MADE IN ITALY

Pololu A-Star 32U4 Micro, Pololu A-Star 32U4 Mini SV, Arduino Micro, and Arduino Leonardo.

Pinout



This diagram identifies the I/O and power pins on the A-Star 32U4 Micro; it is also available as a printable PDF (409k pdf). For more information about the ATmega32U4 microcontroller on this board, see Atmel's ATmega32U4 documentation.

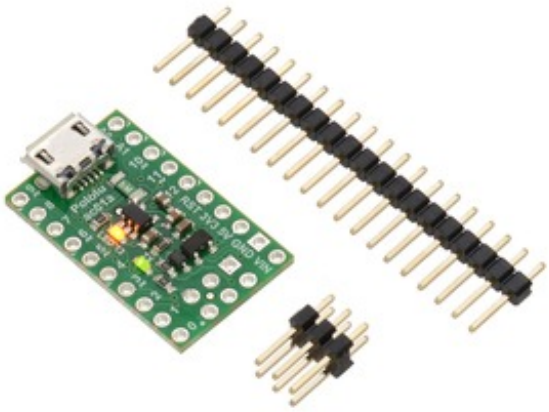
Printed on the A* circuit board are indicators that you can use to quickly identify each pin's capabilities: a triangle next to the pin means it can be used as an analog input, and a square wave symbol under the pin number means it can be used as a PWM output.

The board can either be powered directly from the USB 5 V supply or from a separate 5.5 V to 15 V source on the VIN pin, which is reduced to 5 V by a 100 mA low-dropout (LDO) regulator; you can access this 5 V supply through the 5V power output pin. Additionally, the ATmega32U4 contains an internal 3.3 V regulator whose output is available on the 3V3 pin. Current drawn from the 3V3 output should not exceed about 50 mA, and when the board is being powered through VIN, the sum of the 5V output current, 3V3 output current, GPIO output current, and current used by the board itself (typically about 25 mA) should not exceed 100 mA.

Included hardware

A 1×20-pin breakaway 0.1″ male header is included with the A-Star 32U4 Micro, which can be soldered in to use the board with perfboards, breadboards, or 0.1″ female connectors. (The headers might ship already separated into two 1×10 pieces.) Also included is a 2×3 header that

can be installed to allow external programming of the microcontroller through the AVR ISP interface, such as with our USB AVR programmer.



A-Star 32U4 Micro with included optional headers.

A-Star 32U4 Micro with soldered headers and connected USB cable.

The A-Star family

The table below shows some key features and specifications of our A-Star microcontroller boards to help you choose the right one for your application.

	A-Star 32U4 Micro	A-Star 32U4 Mini ULV	A-Star 32U4 Mini LV	A-Star 32U4 Mini SV
Microcontroller:	ATmega32U4	ATmega32U4		
User I/O lines:	151	26		
PWM outputs:	7	7		
Analog inputs:	8	12		
User LEDs:	2	3		
Reset button:				
Operating voltage:	5.5 V to 15 V	0.5 V to 5.5 V	2.7 V to 11.8 V	5 V to 36 V
Regulator type:	linear	switching step-up	switching step-up/step-down	switching step-down
Regulated current2:	100 mA	500 mA	1000 mA	500 mA
Dimensions:	1″ × 0.6″	1.9″ × 0.7″		
Weight3:	1.3 g	3.4 g		

1 Three extra digital I/O lines are accessible through the ISP header.

2 These values are rough approximations for comparison purposes. Available current depends on input voltage, current consumed by the board, ambient conditions, and regulator topology. See product documentation and performance graphs for details.

3 Without included optional headers.

Documentation on producer website.

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