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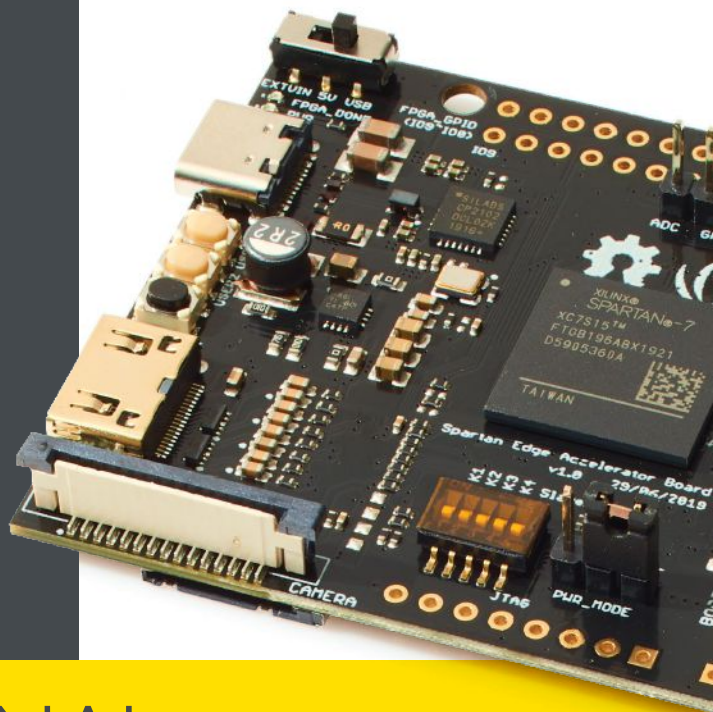
THE ORIGINAL
GUIDE TO
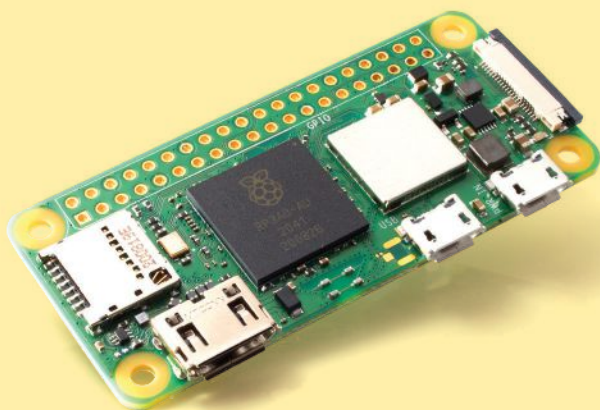## BOARDS

2021

Boardspotting

The world of development boards has grown tremendously since the education-led microcontroller revolution of the mid-aughts. We've watched the emergence of easy-to-use learning tools from Arduino, Raspberry Pi, micro:bit, and others, and followed along as they've evolved into serious machines suitable even for professional applications. Makers and enthusiasts can now choose from a dizzying assortment of practical microcontroller, single board computer, and even FPGA options. Fear not, however, this guide will help you narrow down the options for your project. What are you working on next?

Scan the QR code to get the Boards Guide app and see the guide come to life in dynamic AUGMENTED REALITY!

STOP THE PRESSES!!

As we finalized this year's *Guide to Boards*, we got our hands on another surprise from Raspberry Pi — a much-desired update to the original Raspberry Pi Zero. This version, aptly named the Zero 2 W (yep, that means it includes wireless capabilities) crams the same processor under the hood as the Raspberry Pi 3, albeit slightly underclocked at 1GHz. Get all the specs on page 12.

LATEST TRENDS: THE PROS WEIGH IN

No one knows the board world better than those that live and breathe it on a daily basis. We've asked the leading board makers to chime in on 2021: what they've been working on, developments they've been watching, surprises that have come up, and what are some of their favorite new boards from their peers.

Scan this image with the **Boards Guide augmented reality app** to watch the video and hear from them all.

A CHIP IS BORN

RP2040-BASED BOARDS GO FROM 0–60+ WITH IMPRESSIVE SPEED

The microcontroller market — where chips designed for real-time embedded use are placed into development boards typically referred to as "microcontrollers" themselves — is rarely shaken up. If you want something friendly to beginners, you pick an Arduino with a Microchip ATmega328; if you want connectivity, an Espressif ESP32-based board; for performance, STMicro's STM32 series.

The Raspberry Pi Pico, a $4 development board with a powerful, custom dual-core Arm Cortex-M0+ microcontroller and flexible programmable input/output (PIO) blocks, shook things up with its launch this year — but it was the news that these new RP2040 chips would be sold individually at just $1 each that caused the biggest aftershocks.

Accompanying the Pico's launch, a number of manufacturers released boards based on the RP2040: Adafruit, Arduino, Pimoroni, and SparkFun to start. In the months since, nearly 70 announcements have followed with designs spanning the gamut from domain-specific gadgets like the Raspberry Fish synth from TINRS to general-purpose tinkering boards like Invector Labs' Challenger RP2040.

"We're pretty happy with how things are going," Raspberry Pi co-founder Eben Upton told us. "Lots of enthusiasm for the community as people really start to understand what the chip can do. We're still on track to clear our Pico backlog, and get RP2040 into high-volume, over 1 million unit availability before the end of the year."
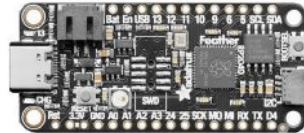
Adafruit's Limor Fried amplifies the excitement, saying "It's one of the best things to ever happen for electronics."

At time of writing, we've identified over 60 distinct boards that utilize this new chip, with more coming continuously. Here are images of just a few; see more at makezine.com/go/rp2040boards.

— *Gareth Halfacree*

Raspberry Pi Pico

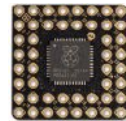Adafruit Feather RP2040

Arducam Pico4ML

Pimoroni PGA2040
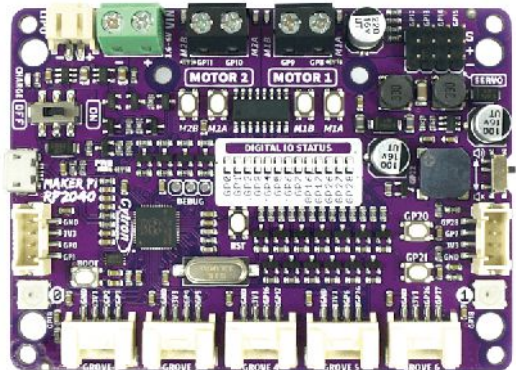

Adafruit Trinkey QT2040

Sparkfun Thing Plus RP2040

Pimoroni Tiny 2040

Arturo 152 RP2040 Stamp

Arduino Nano RP2040 Connect

Seeed Xiao RP2040

Maker Pi RP2040

Pimoroni PicoSystem

MICROCONTROLLERS (MCU) * Price field reflects current market prices, which have been affected by 2021 component shortages

Board Name	Price*	Dimensions	Software	Clock Speed	Processor	Memory
Adafruit Circuit Playground Bluefruit	$25	2.0" dia.	Arduino IDE, CircuitPython	64MHz	32-bit Nordic nRF52840 (single-core Cortex-M4F)	1MB flash, 256 kB RAM, 2 MB QSPI flash
Adafruit CLUE	$45	2.0"×1.6"	Arduino IDE, CircuitPython	64MHz	32-bit Nordic nRF52840 (single-core Cortex-M4F)	1MB flash, 256kB RAM, 2MB QSPI flash
Adafruit Feather M0 with RFM95 LoRa Radio - 900MHz - RadioFruit	$35	2.0"×0.9"×0.3"	CircuitPython, Arduino IDE	48MHz	ATSAMD21G18 (single-core Cortex-M0)	256kB flash, 32kB RAM
Adafruit Feather RP2040	$12	2.0"×0.9"×0.3"	CircuitPython, MicroPython, Arduino IDE, C/C++	125MHz	32-bit RP2040 (dual-core Cortex M0+)	264kB SRAM, 8MB SPI flash
Adafruit Flora	$15	1.75" dia.	Arduino IDE	8MHz	8-bit ATmega32u4	32kB flash, 2.5kB SRAM
Adafruit FunHouse	$35	3.35"×2.2"×0.43"	CircuitPython, Arduino IDE	240MHz	32-bit ESP32-S2 (single-core Xtensa LX7)	4MB flash, 2MB PSRAM
Adafruit Gemma M0	$10	1.1" dia.	Arduino IDE, CircuitPython, MakeCode	48MHz	32-bit ATSAMD21 (single-core Cortex-M0+)	256kB flash, 32kB RAM
Adafruit ItsyBitsy RP2040	$10	1.4"×0.7"×0.2"	CircuitPython, MicroPython, Arduino IDE, C/C++	125MHz	32-bit RP2040 (dual-core Cortex M0+)	264kB RAM, 8MB SPI flash
Adafruit Metro ESP32-S2	$20	2"×2.8"×0.6"	CircuitPython, Arduino IDE	240MHz	32-bit ESP32-S2 (single-core Xtensa LX7)	4MB flash, 2MB PSRAM
Adafruit Neo Trinkey	$7	1.2"×0.5"×0.1"	CircuitPython, Arduino IDE	48MHz	32-bit ATSAMD21E18 (single-core Cortex M0+)	256kB flash, 32kB RAM
Adafruit QT Py RP2040	$10	0.9"×0.7"×0.2"	CircuitPython, MicroPython, C/C++	125MHz	32-bit RP2040 (dual-core Cortex M0+)	264kB RAM, 8MB SPI flash
Adafruit Trinket M0	$9	1.07"×0.6"	Arduino IDE, CircuitPython	48MHz	32-bit ATSAMD21E18 (single-core Cortex-M0+)	256kB flash, 32kB RAM
Adafruit Trinkey QT2040	$8	1.5"×0.7"×0.2"	CircuitPython, MicroPython, Arduino IDE, C/C++ SDK	125MHz	32-bit RP2040 (dual-core Cortex M0+)	264kB RAM, 8MB SPI flash
Arducam Pico4ML	$50	0.9"×2.0"	MicroPython	133MHz	32-bit RP2040 (dual-core Cortex M0+)	2MB flash 264kB RAM
Arduino Mega	$40	4.0"×2.1"	Arduino IDE	16MHz	8-bit ATmega2560	256kB flash, 8kB SRAM, 4kB EEPROM
Arduino MKR GSM 1400	$69	2.6"×1.0"	Arduino IDE	48MHz	32-bit ATSAMD21 (single-core Cortex-M0+)	256 kB flash, 32kB SRAM
Arduino MKR WAN 1310	$38	2.7"×1.0"	Arduino IDE	48MHz	32-bit ATSAMD21 (single-core Cortex-M0+)	256kB flash, 32kB SRAM, 2MB QSPI flash
Arduino MKR WiFi 1010	$35	2.4"×1.0"	Arduino IDE	48MHz	32-bit ATSAMD21 (single-core Cortex-M0+)	256kB flash, 32kB RAM
Arduino Nano 33 BLE Sense	$33	1.8"×0.7"	Arduino IDE	64MHz	32-bit Nordic nRF52840 (single-core Cortex-M4F)	1MB flash, 256kB RAM

Digital Pins	Analog Pins	Radio	Video	Input Voltage	Battery Connection	Operating Voltage
8	8 PWM, 6 ADC	Bluetooth	—	3.7V–5V	✓	3.3V
18	18 PWM, 8 ADC	Bluetooth	1.3" 240×240 Color IPS TFT LCD display	3V–6V	✓	3.3V
20	8 PWM, 10 ADC, 1 DAC	LoRa	—	3.3V–5V	✓	3.3V
21	16 PWM, 4 ADC	—	—	3.3V–5V	✓	3.3V
8	4 PWM, 4 ADC	—	—	3.5V–16V	✓	3.3V
5	5 PWM, 3 ADC	Wi-Fi	1.54" 240×240 Color TFT Display	5V	—	3.3V
3	2 PWM, 3 ADC, 1 DAC	—	—	3V–6V	✓	3.3V
23	16 PWM, 4 ADC	—	—	3.3V–5V	—	3.3V
25	8 PWM, 18 ADC, 2 DAC	Wi-Fi	—	3.7V–12V	✓	3.3V
0	0	—	—	5V	—	3.3V
13	13 PWM, 4 ADC	—	—	3.3V–5V	—	3.3V
5	5 PWM, 3 ADC, 1 DAC	—	—	3.3V/5V	—	3.3V
0	0	—	—	5V	—	3.3V
26	16 PWM, 3 ADC	—	0.96" 160×80 Color LCD	5V–5.5V	—	3.3V
54	15 PWM, 16 ADC	—	—	6V–20V	✓	5V
22	13 PWM, 7 ADC, 1 DAC	GSM 1400	—	3.7V–5V	✓	3.3V
22	13 PWM, 7 ADC, 1 DAC	LoRa	—	3.7V–5V	✓	3.3V
22	13 PWM, 7 ADC, 1 DAC	Bluetooth	—	3.7V–5V	✓	3.3V
22	5 PWM, 8 ADC	Bluetooth	—	5V–21V	—	3.3V

NEW & NOTABLE

RASPBERRY PI PICO

The speedy Pico is the first microcontroller developed by the Raspberry Pi Foundation and is powered by their new RP2040 chip. Pico also provides something that other boards don't: eight Programmable I/O (PIO) state machines to interface with unsupported devices or additional peripherals. And at $4? It's a steal.

BBC MICRO:BIT V2

The updated micro:bit V2 keeps its familiar form factor and education-friendly design, but features a big performance boost that lets it handle more complex and heavy tasks (like AI and machine learning!) than its predecessor. And it's still cheap enough that it won't break the bank outfitting a classroom full of students.

MICROCONTROLLERS (MCU)

| Board Name	Price	Dimensions	Software	Clock Speed	Processor	Memory
Arduino Nano Every	$13	1.8"×0.7"	Arduino IDE	20MHz	8-bit ATMega4809	48kB flash, 6kB RAM, 256B EEPROM
Arduino Nano RP2040 Connect	$25	0.7"×1.8"	Arduino IDE, C/C++	133MHz	32-bit RP2040 (dual-core Cortex M0+)	16MB flash, 264 kB RAM
Arduino Portenta H7	$103	2.6''×1.0"	Arduino IDE, MicroPython, JavaScript, TensorFlow Lite, Mbed OS	480MHz Cortex-M7, 240MHz Cortex-M4	32-bit STMicro STM32H747XI (dual-core Cortex-M7, M4 coprocessor)	2MB/16MB Int/Ext flash, 1MB/8MB Int/Ext RAM
Arduino Portenta H7 Lite	$72	2.6''×1.0"	Arduino IDE, MicroPython, JavaScript, TensorFlow Lite, Mbed OS	480MHz Cortex-M7, 240MHz Cortex-M4	32-bit STM32H747XI dual-core Cortex-M7+M4	2MB/16MB Int/Ext flash, 1MB/8MB Int/Ext RAM
Arduino Uno/Uno WiFi Rev2	$23 / $45	2.7"×2.1"	Arduino IDE	16MHz	8-bit ATmega328PU/ATmega4809	32kB flash, 2kB RAM, 1kB EEPROM/48kB flash, 6kB RAM, 256B EEPROM
BBC micro:bit V2	$15	2"×1.6"	Javascript, MicroPython, CircuitPython, C++	64MHz	32-bit Nordic nRF52833 (single-core Cortex-M4F)	512kB flash, 128kB RAM
Cypress PSoC 62S2 Pioneer Kit	$113	5.08"×3.62"	ModusToolbox, Mbed OS	150MHz Cortex-M4, 100MHz Cortex-M0+	32-bit Cypress PSOC 62 (Cortex M4, Cortex M0+ coprocessor)	2MB/64MB Int/Ext flash, 1MB SRAM, 512kB FRAM
Espressif ESP32-S2 Saola-1	$8	2.22"×1.1"	Arduino IDE, CircuitPython, ESP IDF	240MHz	32-bit ESP32-S2 (single-core Xtensa LX7)	128kB flash, 320kB SRAM, 16kB SRAM (RTC)
Espressif ESP8266-DevKitC	$8	1.77"×1"	Arduino IDE, MicroPython, NodeMCU	80MHz	32-bit ESP8266 (single-core Tensilica L106)	2MB flash, 80kB RAM
Espruino Pico	$25	1.3"×0.6"	Espruino JavaScript Interpreter	84MHz	32-bit STMicro STM32F401CDU6 (single-core Cortex-M4)	384kB flash, 96kB RAM
Invector Labs Challenger M0 WiFi Feather	$16	2.0"×0.9"×0.3"	Arduino IDE, Micropython	48MHz	32-bit ATSAMD21G18A (single-core Cortex-M0+)	256kB/2MB Int/Ext flash, 32 kB SRAM, 1MB flash (ESP8285)
LilyPad Arduino USB	$25	2.0" dia.	Arduino IDE	8MHz	8-bit ATmega32u4	32kB flash, 2.5kB SRAM, 1kB EEPROM
M5 Stamp Pico	$5	0.71"×0.94"×0.17"	Arduino IDE, MicroPython, UIFlow	240MHz	32-bit ESP32-PICO-D4 (dual-core Xtensa LX6)	4MB flash, 520kB SRAM, 8kB SRAM (RTC)
M5Stick C+ dev kit	$16	1.89"×0.95"×0.71"	Arduino IDE, MicroPython, UIFlow	240MHz	32-bit ESP32-PICO-D4 (dual-core Xtensa LX6)	4MB flash, 520kB SRAM, 8kB SRAM (RTC)
Meadow F7 v2	$45	1.9"×0.9"	Meadow.OS	216MHz Cortex-M7, 240MHz ESP32	32-bit STM32F7 (single-core Cortex-M7), ESP32 coprocessor	64MB flash, 32MB RAM
Microchip AVR128DA48 Curiosity Nano	$19	3.3"×0.77"	MPLAB X / Microchip Studio	24MHz	8-bit AVR128DA48	128kB flash, 16kB SRAM, 512B EEPROM
Nordic Thingy:52	$37	2.4"×2.4"	Nordic Thingy, Zephyr OS	64MHz	32-bit Nordic nRF52832 (single-core Cortex-M4F)	512kB flash, 64kB RAM
Nordic Thingy:91	$121	2.4"×2.4"	Nordic Thingy, Zephyr OS	64MHz	32-bit Nordic nRF9160 (single-core Cortex-M33)	1MB flash, 256kB RAM
OpenMV Cam H7 R2	$65	1.77"×1.41"	MicroPython	480MHz	32-bit STMicro STM32H743VI (single-core Cortex-M7)	2MB flash, 1MB RAM, μSD Card Slot

Digital Pins	Analog Pins	Radio	Video	Input Voltage	Battery Connection	Operating Voltage
22	5 PWM, 8 ADC	–	–	7V–21V	–	5V
22	20 PWM, 8 ADC	Wi-Fi, Bluetooth	–	5V–21V	–	3.3V
22	10 PWM, 8 ADC, 2 DAC	Wi-Fi, Bluetooth	MIPI DSI Host & MIPI D-PHY	3.7V–5V	✓	3.3V
22	10 PWM, 8 ADC, 2 DAC	–	–	3.7V–5V	✓	3.3V
14	6 PWM, 6 ADC/ 5 PWM, 6 ADC	Uno WiFi: Wi-Fi, Bluetooth	–	6V–20V/ 7V–12V	–	5V
19	3 PWM, 6 ADC	Bluetooth	–	3V–5V	✓	3V–3.3V
48	32 PWM, 15 ADC	Wi-Fi, Bluetooth	–	7V–12V	–	1.8V/3.3V
43	8 PWM, 20 ADC, 2 DAC	Wi-Fi	Serial LCD, Parallel LCD	3.3V–5V	–	3.3V
11	4 PWM, 1 ADC	Wi-Fi	–	3.3V–5V	–	3.3V
22	21 PWM, 9 ADC	–	–	3.5V–16V	–	3.3V
20	20 PWM, 6 ADC, 1 DAC	Wi-Fi	–	3.3V–5V	✓	3.3V
9	4 PWM, 4 ADC	–	–	2.7V–5.5V	–	3.3V
12	2 PWM, 3 ADC, 2 DAC	Wi-Fi, Bluetooth	–	5V	–	5V
3 (2 more via Grove)	1 ADC	Wi-Fi, Bluetooth	0.96" 80×160 RGB LCD	5V	✓	3.3V
24	12 PWM, 6 ADC, 2 DAC	Wi-Fi, Bluetooth	–	3.3V–12V	✓	3.3V (5V-tolerant digital IO)
40, 8 digital-only	3 PWM, 8 ADC, 1 DAC, 3 Analog Comparator	–	–	5V	–	1.6V–5V
14	4 PWM, 6 ADC	Bluetooth	–	5V	✓	3.3V
10	4 PWM, 3 ADC	LTE-M, NB-IoT, Bluetooth LE, NFC	–	5V	✓	3.3V
10	10 PWM, 1 ADC, 1 DAC	–	680x480 RGB Camera	5V	✓	3.3V

NEW & NOTABLE

ADAFRUIT NEO TRINKEY

This tiny little board is part USB key, part microcontroller, emphasis on the micro. Coming in just slightly longer than a quarter, but even thinner, this board is perfect for simple tasks such as notifications or hot keys. The M0 processor can more than handle the four built-in RGB NeoPixel LEDs and two capacitive touch pads. The Neo Trinkey is one of many Trinkeys in a new line from Adafruit.
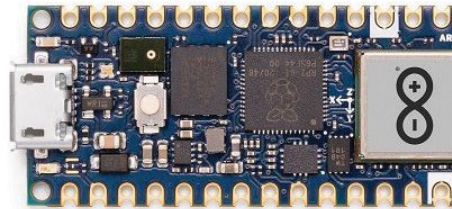
ARDUINO NANO RP2040 CONNECT

The diminutive Nano Connect RP2040's wireless connectivity (both Wi-Fi and Bluetooth/BLE) provide compatibility to the Arduino Cloud for IoT endeavors. A built-in microphone input and the 6-axis inertial sensor allows for onboard environmental awareness. Its 133MHz RP2040 chip offers speeds beyond those of the other Arduino Nano variants, and the 16MB of processor-external memory is enough for advanced tasks.

MICROCONTROLLERS (MCU)

Board Name	Price	Dimensions	Software	Clock Speed	Processor	Memory
Particle Argon	$28	2.0"×0.8"	Particle Device OS	64MHz Cortex-M4F, 240MHz ESP32	32-bit Nordic nRF52840 (single-core Cortex-M4F), ESP32 coprocessor	1MB flash, 256kB RAM, 4MB SPI flash, 4MB flash (ESP32)
Particle Boron	$59	2.0"×0.9"	Particle Device OS	64MHz	32-bit Nordic nRF52840 (single-core Cortex-M4F)	1MB flash, 256kB RAM, 4MB SPI flash
Particle Electron Development Kit	$72	2.0"×0.8"×0.3"	Particle Device OS	120MHz	32-bit STMicro STM32F205 (single-core Cortex-M3)	1MB flash, 128kB RAM
Pimoroni PGA2040	$8	0.8"×0.8"	Arduino IDE, MicroPython, CircuitPython, C/C++	133MHz	32-bit RP2040 (dual-core Cortex M0+)	8MB QSPI flash, 264kB RAM
Pimoroni Pico LiPo	$15 (16MB), $11 (4MB)	2.09"×0.83"	Arduino IDE, MicroPython, CircuitPython, C/C++	133MHz	32-bit RP2040 (dual-core Cortex M0+)	4MB/16MB QSPI flash, 264kB RAM
Pimoroni Plasma 2040	$15	1.9"×1.1"×0.5"	MicroPython, CircuitPython, C/C++	133MHz	32-bit RP2040 (dual-core Cortex M0+)	2MB QSPI flash, 264kB RAM
Pimoroni Tiny 2040	$10	0.90"×0.72"	Arduino IDE, MicroPython, CircuitPython, C/C++	133MHz	32-bit RP2040 (dual-core Cortex M0+)	8MB QSPI flash, 264kB RAM
PJRC Teensy 4.0	$20	1.4"×0.7"	Arduino IDE with Teensyduino extension, CircuitPython	600MHz	32-bit NXP iMX RT1062 (single-core Cortex-M7)	2MB flash, 1MB RAM, 1kB EEPROM (emulated)
PJRC Teensy 4.1	$27	2.4"×0.7"	Arduino IDE with Teensyduino extension, CircuitPython	600MHz	32-bit NXP iMX RT1062 (single-core Cortex-M7)	8MB flash, 1MB RAM, 4kB EEPROM (emulated)
Pycom FiPy	$61	2.1"×0.7"	MicroPython	160MHz	32-bit ESP32 (dual-core Xtensa LX6)	8MB flash, 4MB RAM
Pycom Lopy4	$40	2.1"×0.7"	MicroPython	160MHz	32-bit ESP32 (dual-core Xtensa LX6)	8MB flash, 4MB RAM
Raspberry Pi Pico	$4	2"×0.827"	Arduino IDE, MicroPython, CircuitPython, FreeRTOS, RT-Thread, Rust, C/C++	133MHz	32-bit RP2040 (dual-core Cortex M0+)	2MB flash, 264kB RAM
Seeed Wio Terminal	$37	2.83"×2.24"× 0.47"	Arduino IDE, MicroPython, CircuitPython, ArduPy	120MHz	32-bit ATSAMD51 (single-core Cortex-M4F)	4MB SPI flash, 192kB RAM
Seeed Xiao RP2040	$5	0.8"×0.7"	Arduino IDE, MicroPython, CircuitPython	133MHz	32-bit RP2040 (dual-core Cortex M0+)	2MB flash, 264kB RAM
Sipeed Maixduino	$28	2.7"×2.1"	MaixPy IDE, Arduino IDE, MicroPython, OpenMV IDE, PlatformIO IDE, FreeRTOS	400MHz	64-bit Sipeed M1 (dual-core RISC-V), KPU coprocessor	16MB flash, 8MB SRAM
Sony Spresense	$65	1.96"×0.81"	NuttX emulating Arduino IDE, CircuitPython	156MHz	32-bit Sony CXD5602 (six-core Cortex-M4F)	8MB flash, 1.5MB SRAM
SparkFun ESP32 Thing	$22	2.35"×1.0"	ESP-IDF, Arduino IDE	240MHz	32-bit ESP32 (dual-core Tensilica LX6)	4MB flash, 520kB SRAM
SparkFun MicroMod Artemis	$15	0.86"×0.86"	Arduino IDE, TensorFlow Lite, C++ with the Ambiq SDK	48MHz/ 96MHz Turbo	32-bit Ambiq Apollo3 (single-core Cortex-M4F)	1M flash, 384kB RAM
SparkFun MicroMod RP2040	$12	0.86"×0.86"	Arduino IDE, MicroPython, CircuitPython, C/C++	133MHz	32-bit RP2040 (dual-core Cortex M0+)	16MB flash, 264kB SRAM

Digital Pins	Analog Pins	Radio	Video	Input Voltage	Battery Connection	Operating Voltage
20	8 PWM, 6 ADC	Wi-Fi, Bluetooth	—	4.5V–5.5V	✓	3.3V
20	8 PWM, 6 ADC	LTE-M1, Bluetooth, NFC	—	USB 4.5V–5V, Battery 3.6V–4.2V	✓	3.3V
28	11 PWM, 14 ADC	Cellular 2G/3G	—	3.9V–12V	✓	3.3V
30	16 PWM, 4 ADC	—	—	3V–5.5V	—	3.3V
23	16 PWM, 3 ADC	—	—	3V–5.5V	✓	3.3V
3	3 PWM, 3 ADC	—	—	5V	—	3.3V
12	12 PWM, 4 ADC	—	—	3V–5.5V	—	3.3V
40	31 PWM, 14 ADC	—	—	3.6V–5.5V	—	3.3V
55	35 PWM, 18 ADC	—	—	3.6V–5.5V	—	3.3V
22	18 PWM, 8 ADC, 2 DAC	Wi-Fi, Bluetooth, CAT—M1/NB—IOT, LoRa, Sigfox	—	3.3V–5V	—	3.3V
24	18 PWM, 8 ADC, 2 DAC	Wi-Fi, Bluetooth, LoRa, Sigfox	—	3.3V–5V	—	3.3V
26	16 PWM, 3 ADC	—	—	1.8V–5.5V	—	3.3V
26	5 PWM, 9 ADC	Wi-Fi, Bluetooth	2.4" 320x240 Color LCD	5V	—	3.3V
11	11 PWM, 4 ADC	—	—	5V	—	3.3V
48	6 ADC	Wi-Fi, Bluetooth	8-bit LCD interface	5V–12V	—	3.3V
17; extension:14	2 ADC; extension: 6 PWM, 6 ADC	—	—	5V	—	1.8V
28	16 PWM, 18 ADC, 2 DAC	Wi-Fi, Bluetooth	—	2.2V–5V	✓	3.3V
8; 48 via shared MIcroMod pins	2 PWM, 2 ADC, 31 PWM, 10 ADC (via pins)	Bluetooth	—	3.3V	—	1.755V–3.63V
30	16 PWM, 3 ADC	—	—	3.3V	—	3.3V

NEW & NOTABLE

SPARKFUN MICROMOD TEENSY

The MicroMod system puts interchangeable processors onto M.2-socket-laden boards, allowing users to jump between platforms by simply swapping the modules on the carrier board, of which there are many options. The Teensy MicroMod puts the ridiculously fast (up to 600MHz!) Teensy processor into numerous scenarios. If you need speed, this is worth a look.

PIMORONI TINY2040

This postage stamp-sized board really brings the micro to microcontroller. It's tiny enough to fit anywhere, but, powered by the RP2040 chip, still offers 4 ADCs, a debug port, an RGB LED, and 8 Megs of storage. Pimoroni even set it up to allow the boot button to double as a user input — a surprisingly handy feature.

MICROCONTROLLERS (MCU)

Board Name	Price	Dimensions	Software	Clock Speed	Processor	Memory
SparkFun MicroMod Teensy	$20	0.86"×0.86"	Arduino IDE, C/C++	600MHz/ 1GHz Turbo	32-bit NXP iMX RT1062 (single-core Cortex-M7)	16MB flash, 1MB RAM
SparkFun Pro Micro - RP2040	$10	1.3"×0.7"	Arduino IDE, MicroPython, C/C++	133MHz	32-bit RP2040 (dual-core Cortex M0+)	16MB flash, 264kB RAM
SparkFun RedBoard Edge	$23	4.0"×1.5"	Arduino IDE	16MHz	8-bit ATmega328	32kB flash, 2kB SRAM, 1kB EEPROM
SparkFun Thing Plus RP2040	$18	0.9"×2.3"	Arduino IDE, MicroPython, CircuitPython, C/C++	133MHz	32-bit RP2040 (dual-core Cortex M0+)	16MB QSPI flash, 264kB RAM
Texas Instruments TM 4C1294XL	$24	4.9"×2.2"×0.43	Energia, Code Composer, others	120MHz	32-bit TM4C1294NCPDT (single-core Cortex-M4F)	1MB flash, 256kB SRAM, 6kB EEPROM
TinyLily Mini	$10	0.55" dia.	Arduino IDE	8MHz	8-bit ATmega328P	32kB flash, 2kB SRAM, 1kB EEPROM
Unexpected Maker FeatherS2	$22	0.9"×2.0"	Arduino IDE, MicroPython, CircuitPython, ESP-IDF	240MHz	32-bit ESP32-S2 (single-core Xtensa LX7)	16MB SPI flash, 320kB SRAM, 8MB PSRAM
Unexpected Maker FeatherS2 NEO	$20	0.9"×2.0"	Arduino IDE, MicroPython, CircuitPython, ESP-IDF	240MHz	32-bit ESP32-S2 (single-core Xtensa LX7)	4MB SPI flash, 320kB SRAM, 2MB PSRAM
Unexpected Maker TinyPICO V2	$20	0.71"×1.26"	Arduino IDE, MicroPython, CircuitPython, ESP-IDF	240MHz	32-bit ESP32 (dual-core Xtensa LX6)	4MB SPI flash, 520kB SRAM, 4MB PSRAM, 8kB SRAM (RTC)

SINGLE-BOARD COMPUTERS (SBC)

Board Name	Price	Dimensions	Software	Clock Speed	Processor	Memory
Asus Tinker Edge R	$235	3.9"×2.8"	Debian 9, Android 10	1.8GHz Cortex-A72, 1.4GHz Cortex-A53	64-bit Rockchip RK3399Pro (dual-core Cortex-A72, quad-core Cortex-A53)	4GB dual-channel LPDDR4 (System) + LPDDR3 2GB (NPU) RAM, 16GB eMMC
Asus Tinker Board 2S	$129	3.37"×2.13"	Debian 9, Android 10	2.0GHz Cortex-A72, 1.5GHz Cortex-A53	64-bit Rockchip RK3399 (dual-core Cortex-A72, quad-core Cortex-A53)	2GB/4GB dual-channel LPDDR4 RAM, 16GB eMMC
Banana Pi M2 Berry	$32	3.35"×2.2"	Ubuntu 16.04, Debian 9, Raspbian Stretch, Armbian Bionic, Tina Linux, Android 6	1GHz	32-bit Allwinner R40 (quad-core Cortex-A7)	1GB DDR3 RAM
BeagleBoard PocketBeagle	$39	2.2"×1.4"	Debian 10, Debian 9, Cloud 9 IDE	1GHz	32-bit Sitara AM3357 (Cortex-A8), 2 PRU coprocessors	512MB DDR3 RAM
BeagleBone AI	$116	3.4"×2.1"	Debian 10, Debian 9, Cloud 9 IDE	1.5GHz	32-bit Sitara AM5729 (dual-core Cortex-A15), 2 32-bit Cortex-M4, 2 C66x, 4 Vision Engine, 4 PRU, SGX544 GPU coprocessors	1GB DDR3L RAM, 16GB eMMC
BeagleBone Black Wireless	$55	3.4"×2.1"	Debian 10, Debian 9, Cloud 9 IDE	1GHz	32-bit Sitara AM335X (Cortex-A8), 2 PRU, SGX530 coprocessors	512MB DDR3 RAM, 4GB eMMC
BeagleBone Blue	$70	3.4"×2.1"	Debian 10, Debian 9, Cloud9 IDE, libroboticscape	1GHz	32-bit Sitara AM335x (Cortex-A8), Cortex-M3, 4 PRU coprocessors	512MB DDR3 RAM, 4GB eMMC
DFRobot LattePanda v1	$99/$159	2.8"×3.47"	Windows 10, Ubuntu 16.04, OpenSuSE 15	1.92GHz	64-bit Intel Z8350 (quad-core x86-64), ATmega32u4 coprocessor	2GB DDR3L RAM 32GB eMMC/4GB DDR3L RAM, 64GB eMMC

Digital Pins	Analog Pins	Radio	Video	Input Voltage	Battery Connection	Operating Voltage
12; 35 via shared MicroMod pins	16 PWM, 2 ADC (14 with signal sharing)	–	–	3.3V	–	3.3V
20–18 on the board edge and 2 through the Qwiic connector	10 PWM, 3 ADC	–	–	5V	–	3.3V
14	4 PWM, 8 ADC	–	–	7V–15V	–	5V
18	16 PWM, 3 ADC	–	–	3.7V–5V	✓	3.3V
84	8 PWM, 20 ADC, 3 Analog Comparators	–	–	4.75V–5.25V	–	3.3V
8	1 PWM, 4 ADC	–	–	2.7V–5.5V	–	3V
21	21 PWM, 13 ADC, 2 DAC	Wi-Fi	–	3.7V–5V	✓	3.3V
22	22 PWM, 13 ADC, 2 DAC	Wi-Fi	–	3.7V–5V	✓	3.3V
14	14 ADC, 2 DAC	Wi-Fi, Bluetooth	–	5V	✓	3V

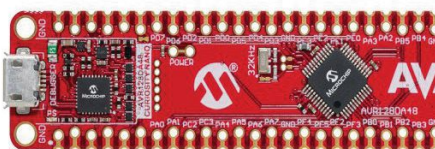| Digital Pins	Analog Pins	Radio	Video	Ethernet On Board	Input Voltage	Operating Voltage
28	3 PWM	Wi-Fi, Bluetooth, Mini PCIe slot (for for 4G/LTE)	HDMI, USB-C, MIPI DSI	✓	12V–19V	5V
28	3 PWM	Wi-Fi, Bluetooth	HDMI, USB-C, MIPI DSI	✓	12V–19V	3.3V and 5V
28	4 PWM	Wi-Fi, Bluetooth	HDMI, MIPI DSI, LVDS	✓	5V	3.3V
44	4 PWM, 8 ADC (6 at 1.8V, 2 at 3.3V)	–	–	–	5V	3.3V
69	7 PWM, 7 ADC	Wi-Fi, Bluetooth	Micro-HDMI	✓	5V	1.8V and 3.3V
69	7 PWM, 7 ADC	Wi-Fi	Micro-HDMI	✓	5V	1.8V and 3.3V
8	4 PWM, 4 ADC	Wi-Fi, Bluetooth	–	–	9V–18V	1.8V–7.4V
6, 20 via ATmega32u4	6 PWM, 12 ADC	Wi-Fi, Bluetooth	HDMI, MIPI DSI	✓	5V	5V

NEW & NOTABLE

M5 STAMP PICO

The Stamp Pico is an incredibly compact controller, even with its heat-resistant plastic front cover installed. Based on the ESP32-PICO-D4, it offers wireless integration with the UIFlow programming software, allowing for simple and fast application development. Compatibility with other M5Stack components will let you build almost any project idea, quick and easy.

MICROCHIP CURIOSITY NANO

Debugging a microcontroller project can be a specialized skill. The new AVR-based Curiosity Nano board from Microchip makes that a lot less painful by including a hardware debugger directly on the board itself. Program in Atmel Studio 7 or MPLAB X IDE. Compatible with growing list of adapters and sensors for evaluation and full project making.

SINGLE-BOARD COMPUTERS (SBC)

Board Name	Price	Dimensions	Software	Clock Speed	Processor	Memory
Google Coral Dev Board Mini	$100	1.9"×2.52"	Mendel Linux (Debian based)	1.5GHz	64-bit MediaTek 8167s (quad-core Cortex-A35), GE8300, Edge TPU coprocessors	2GB LPDDR3 RAM, 8GB eMMC
Google Coral Edge TPU Dev Board	$130/$170	3.5"×2.4"	Mendel Linux (Debian based)	1.3GHz	64-bit NXP i.MX8MQ (quad-core Cortex-A53), Cortex-M4F, GC7000 Lite, Edge TPU coprocessors	1GB/4GB LPDDR4 RAM, 8GB eMMC
Hackboard 2	$199/$249	4.72"×3.15"	Microsoft Windows 10 Pro, Debian 9 (subtract $24)	2.8GHz	64-bit Intel Celeron N4020 (dual-core x86-64)	4GB/8GB LPDDR4, 64GB eMMC
Mangoh Yellow	$140	1.65"×2.56"	Legato Linux	1.2GHz	32-bit Sierra WP7702 (single-core Cortex-A7)	2GB DDR RAM, 4GB eMMC
Myir MYS-8MMX	$99/$119	3.74"×2.72"	Ubuntu 18.04, Yocto 3.0	1.8GHz/ 1.6GHz	64-bit NXP i.MX 8M Mini (quad-core Cortex-A53), Vivante GC320, Cortex-M4F coprocessors	2GB DDR4 RAM, 8GB eMMC, 32MB QSPI flash
Nvidia Jetson Nano Dev Kit	$54/$99	3.95"×3.15"× 1.14"	Ubuntu-based JetPack	1.43GHz CPU, 921MHz GPU	64-bit Nvidia CPU (quad-core Cortex-A57), 128-CUDA-core Maxwell GPU coprocessor	2GB/4GB LPDDR4 RAM
Nvidia Jetson Xavier NX Dev Kit	$399	4.06"×3.56"× 1.22"	Ubuntu-based JetPack SDK	1.9GHz CPU, 1.1GHz GPU	64-bit Carmel ARM CPU (six-core Cortex-A57), 384-CUDA-core 48-Tensor-core Volta GPU, 2 NVDLA, 7-way Vision Processor coprocessors	8GB 128-bit LPDDR4x RAM
Odroid C4	$54	3.35"×2.2"	Ubuntu 20.04, Android 9	2.0GHz CPU, 640MHz GPU	64-bit Amlogic S905X3 (quad-core Cortex-A55), Mali-G31 GPU	4GB 32-bit DDR4 RAM
Odroid N2+	$66/$83	3.54"×3.54"	Ubuntu 20.04, Android 9	2.4GHz Cortex-A73, 2GHz Cortex-A53	64-bit Amlogic S922X (quad-core Cortex-A73, dual-core Cortex-A53); Mali-G52 GPU	2GB/4GB 32-bit DDR4 RAM
Onion Omega2+	$13	1.1"×1.7"	Customized OpenWRT	580MHz	32-bit MT7688 (single-core MIPS)	128MB DDR2 RAM, 32MB Flash
Qualcomm DragonBoard 410c	$75	3.35"×2.12"	Debian 8, Ubuntu Core, Windows 10 IoT Core, Open Embedded, Andriod 5.1	1.2GHz	64-bit Snapdragon 410 (quad-core Cortex-A53) CPU, Adreno 306 GPU, Hexagon QDSP6 V5 coprocessor	1GB LPDDR3 RAM, 8GB eMMC
Raspberry Pi 3, Model A+	$25	2.6"×2.2"	Raspberry Pi OS, Raspbian, Ubuntu 20.04/21.04, RISC OS, Windows 10 IoT, more	1.4GHz CPU, 400MHz GPU	64-bit Broadcom BCM2837 (quad-core Cortex-A53), VideoCore IV GPU	512MB LPDDR2 RAM
Raspberry Pi 4, Model B	$35/$55/$75	3.4"×2.2"	Raspberry Pi OS, Raspbian, Ubuntu 20.04/21.04, RISC OS, Windows 10 IoT, more	1.5GHz CPU, 500MHz GPU	64-bit Broadcom BCM2711 (quad-core Cortex-A72), VideoCore VI GPU	2GB/4GB/8GB LPDDR4 RAM
Raspberry Pi Zero W	$10	2.56"×1.18"	Raspberry Pi OS, Raspbian, RISC OS, more	1GHz CPU, 400MHz GPU	32-bit Broadcom BCM2835 (single-core ARMv6), VideoCore IV GPU	512MB LPDDR2 RAM
Raspberry Pi Zero W 2	$15	2.56"×1.18"	Raspberry Pi OS, Raspbian, Ubuntu 20.04/21.04, RISC OS, Windows 10 IoT, more	1GHz CPU, 400MHz GPU	64-bit Broadcom BCM2837 (quad-core Cortex-A53), VideoCore IV GPU	512MB LPDDR2 RAM
Rock Pi 4	$39–$75	3.37"×2.22"	Debian 10, Ubuntu 20.04, Android 7/9/10, more	1.8GHz Cortex-A72, 1.4GHz Cortex-A53	64-bit Rockchip RK3399 (dual-core Cortex-A72, quad-core Cortex-A53) CPU, Mali T860MP4 GPU	1GB/2GB/4GB 64-bit Dual-Channel LPDDR4 RAM
Seeed Odyssey STM32MP157C Evaluation Board	$55	2.2"×3.3"	Debian 10	800MHz Cortex-A7, 209MHz Cortex-M4	32-bit STMicro STM32MP157C (dual-core Cortex-A7, Cortex-M4 coprocessor)	512MB DDR3 RAM, 4GB eMMC
Seeed Odyssey X86J4125800	$218	4.33"×4.33"	Windows 10, Ubuntu 16.04, OpenSuSE 15, OpenWRT	2GHz–2.7GHz	64-bit Intel Celeron J4125 (quad-core x86-64), SAMD21 Cort ex-M0+ coprocessor	8GB LPDDR4 RAM
UDOO Bolt	$459	4.72"×4.72"	Windows 8.1/10, any Linux distribution	2GHz–3.6GHz	AMD Ryzen Embedded V1000 (quad-core eight-thread x86-64) CPU, Radeon Vega 8 GPU, ATmega32u4 coprocessor	None included, supports up to 32GB DDR4 RAM, 32GB eMMC

Digital Pins	Analog Pins	Radio	Video	Ethernet On Board	Input Voltage	Operating Voltage
28	3 PWM	Wi-Fi, Bluetooth	Micro-HDMI, MIPI DSI	—	5V	5V
28	3 PWM	Wi-Fi, Bluetooth	HDMI, MIPI DSI	✓	5V	5V
28	2 PWM	Wi-Fi, Bluetooth	HDMI, eDP	—	12V	GPIO 5V; 3.3V
6	2 ADC	Wi-Fi, Bluetooth, Cellular (NB-IOT, cat-m1, 2G, 3G, LTE cat-1, cat-4), NFC, GPS	—	—	4.75V–6V	3.3V
30	3 PWM	Wi-Fi, Bluetooth	HDMI, LVDS LCD	✓	5V	5V
28	2 PWM	—	HDMI, DP (4GB only)	✓	5V	5V
28	2 PWM	Wi-Fi, Bluetooth	HDMI, DP	✓	9V–20V	5V
25	6 PWM, 2 ADC	—	HDMI	✓	5.5V–13V	1.8V and 3.3V
25	4 PWM, 2 ADC	—	HDMI, Composite	✓	7.5V–18V	1.8V and 3.3V
18	2 PWM	Wi-Fi	—	✓ Via pins	3.3V	3.3V
12	1 PWM	Wi-Fi, Bluetooth	HDMI, MIPI DSI	—	6.5V–18V	1.8V
26	4 PWM	Wi-Fi, Bluetooth	HDMI, Composite, MIPI DSI	—	5V	3.3V
26	4 PWM	Wi-Fi, Bluetooth	2 micro-HDMI, Composite, MIPI DSI	✓	5V	3.3V
26	4 PWM	Wi-Fi, Bluetooth	Mini-HDMI, Composite	—	5V	3.3V
26	4 PWM	Wi-Fi, Bluetooth	Mini-HDMI	—	5V	3.3V
27	1 PWM, 1 ADC	Wi-Fi, Bluetooth (on Models B and C only)	HDMI, MIPI DSI, mini-DP (Model C only)	✓	6V–28V	3.3V
28, 2 via Grove	4 PWM	Wi-Fi, Bluetooth	HDMI, MIPI DSI	✓	5V, 12v–24V	5V
53	20 PWM, 6 ADC	Wi-Fi, Bluetooth	HDMI	✓	12V–19V	12V
10, 23 via ATmega32u4, 2 via Grove	7 PWM, 12 ADC, 1 ADC via Grove	—	2 HDMI, 2 USB-C DP	✓	19V	3.3V

NEW & NOTABLE

NVIDIA JETSON XAVIER NX

The Jetson Xavier NX offers seriously impressive performance. Where other devices may allow you to handle one AI task at a time, the Xavier NX is powerful enough to run multiple such tasks. This makes it a great device for robotics projects that navigate around a room while also identifying humans and responding to their commands.

HACKBOARD 2

Most maker-focused SBCs run Linux, while only a few offer Windows support. New to the scene, Hackboard 2 goes all in on that with Windows 10 running on a 2.8GHz dual-core Intel Celeron N4020. Configurable options allow for up to 8GB of RAM and 512GB of storage. It's capable of being a desktop computer, but the 40-pin GPIO still let you tinker away. (And don't worry, it'll do Linux too.)

SINGLE-BOARD COMPUTERS (SBC)

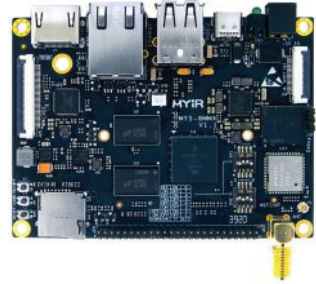| Board Name	Price	Dimensions	Software	Clock Speed	Processor	Memory
UDOO Neo Full	$71	3.5"×2.32"	UDOObuntu2 14.04, Android 6	1GHz Cortex-A9, 227MHz Cortex-M4	32-bit Freescale i.MX 6SoloX (single-core Cortex-A9 CPU, Cortex-M4 coprocessor), Vivante GC420 GPU	1GB RAM
UDOO X86 II Ultra	$294	4.72"×3.35"	Windows 8.1/10, any Linux distribution, Android-x86	1.6GHz–2.56Hz CPU, 700MHz GPU	64-bit Intel Pentium N3710 (quad-core x86-64, HD Graphics 405), ATmega32u4 coprocessor	8GB DDR3L RAM, 32GB eMMC
VoCore 2	$18	1.0"×1.0"	OpenWRT	580MHz	32-bit Mediatek MT7628AN (single-core MIPS 24K)	128MB DDR2 RAM, 16MB flash

FIELD-PROGRAMMABLE GATE ARRAY BOARDS (FPGA)

Board Name	Price	Dimensions	Software	Clock Speed	Processor	Memory
Alchitry Au	$100	2.56"×1.77"	Alchitry Labs, Vivado	100MHz oscillator on board	Xilinx Artix 7 XC7A35T-1FTG256C	256MB DDR3 RAM, 32MB configuration flash; FPGA: 225kB block RAM, 33,280 logic cells
Alchitry Cu	$50	2.56"×1.77"	Alchitry Labs, IceCube2, IceStorm	100MHz oscillator on board	Lattice iCE40HX8K-CB132	32MB configuration flash; FPGA: 16kB block RAM, 7,680 logic cells
Arduino MKR Vidor 4000	$72	3.27"×1"	Intel Quartus, Arduino IDE (for Cortex-M0+ only)	48MHz–200MHz FPGA, 48MHz Cortex-M0+	Intel Cyclone 10CL016, 32-bit ATSAMD21 (single-core Cortex-M0+) coprocessor	256kB flash, 32kB SRAM, FPGA 2MB flash, 8MB SDRAM, 16,000 logic cells
Arty Z7-10	$169	3.46"×4.3"	Vivado, Xilinx SDK, Vitis	650MHz Cortex-A9, 125MHz external clock	Xilinx Zynq-7000 XC7Z010-1CLG400C with dual-core Cortex-A9 CPU	16MB QSPI flash, 512 MB DDR3 RAM; FPGA: 270kB block RAM, 28,000 logic cells
Fomu	$50	0.38"×0.5"	Yosys/Nextpnr	12MHz VexRISC-V, 48MHz external oscillator	Lattice iCE40UP5K with VexRISC-V core	2MB flash, 128kB SRAM, 5,280 logic cells
Minized	$89	3"×2.8"	Vivado, Xilinx SDK, Vitis	667MHz, 33.33MHz external oscillator	Xilinx Zynq XC7Z007S with single-core Cortex-A9 CPU	512MB DDR3L RAM, 16MB flash, 8GB eMMC; FPGA: 225kB block RAM, 23,000 logic cells
Seeed Spartan Edge Accelerator	$40	2.09"×2.7"	ivado, Arduino IDE (ESP32 Only)	100MHz	Xilinx Spartan-7 XC7S15-1FTGB196C FPGA, spressif ESP32 coprocessor	4MB flash, FPGA 360kB block RAM, 12,800 logic cells
Snickerdoodle Black	$245	2.0"×3.5"	Vivado, Xilinx SDK, Vitis, PYNQ	866MHz	Xilinx Zynq XC7Z020-3CLG400E with dual-core Cortex-A9 CPU	16MB flash, 256kB SRAM, 1GB LPDDR2 RAM; FPGA :630kB block RAM, 85,000 logic cells
Snickerdoodle One	$115	2.0"×3.5"	Vivado, Xilinx SDK, Vitis, PYNQ	667MHz	Xilinx Zynq XC7Z010-1 with dual-core Cortex-A9 CPU	16MB flash, 256kB SRAM, 512MB LPDDR2 RAM; FPGA: 270kB block RAM, 28,000 logic cells
TinyFPGA AX2	$19	1.2"×0.7"	Lattice Diamond	133MHz	Lattice LCMXO2-1200	8kB flash, 8kB RAM, 1.25kB block RAM, 1,280 logic cells
TinyFPGA BX	$39	1.4"×0.7"	IceStorm, APIO-IDE	16MHz external oscillator	Lattice iCE40LP8K	1MB flash, 16kB block RAM, 7,680 logic cells
WebFPGA	$38	2.2"×0.9"	WebFPGA, IceStorm	120MHz, 16MHz external oscillator, 48MHz (STM32F04)	Lattice iCE40UP5k, STMicro STM32F04 coprocessor	32kB flash, 6kB RAM, 16MB ext. flash; FPGA: 128kB SRAM, 15kB block RAM, 5,280 logic cells
Zynqberry	$127	3.4"×2.2"	Vivado	667MHz, 33.33MHz oscillator	Xilinx Zynq XC7Z010-1CLG225C with dual-core Cortex-A9 CPU	16MB flash, 512MB DDR3L RAM; FPGA: 270kB block RAM, 28,000 logic cells
Zynqberry Zero	$115	2.56"×1.18"	Vivado	667MHz, 33.33MHz oscillator	Xilinx Zynq XC7Z010-1CLG225C with dual-core Cortex-A9 CPU	16MB flash, 512MB DDR3L RAM: FPGA: 270kB block RAM, 28,000 logic cells

Digital Pins	Analog Pins	Radio	Video	Ethernet On Board	Input Voltage	Operating Voltage
32, 22 via Cortex-M4	8 PWM, 6 ADC	Wi-Fi, Bluetooth	Micro-HDMI, LVDS LCD	✓	5V–15V	3.3V
23	7 PWM, 12 ADC	—	HDMI, 2 mDP++	✓	12V	3.3V
40	4 PWM	Wi-Fi	—	✓ Via pins	3.6V–5.5V	3.3V

Digital Pins	Analog Pins	Radio	Video	Ethernet On Board	Input Voltage	Operating Voltage
111	9 ADC	—	—	—	5V	3.3V and 1.8V
79	—	—	—	—	5V	3.3V
22, 25 via Mini PCI Express header	22 PWM, 25 via mPCIe, 13 via M0+, 7 ADC, 1 DAC	Wi-Fi, Bluetooth	Micro-HDMI, LVDS	—	5V	3.3V
65	6 XADC, 4 Differential XADC	—	HDMI	✓	7V–15V	3.3V
4	—	—	—	—	5V	3.3V
38	6 ADC	Wi-Fi, Bluetooth	—	—	5V	3.3V
20, 10 in Shield Mode	20 PWM, 1 ADC; 10 PWM, 1 ADC in Shield Mode	Wi-Fi, Bluetooth	Mini HDMI	—	5V–17V	5V
180	16 ADC, 2 DAC	Wi-Fi, Bluetooth, BLE	—	✓ Via pins	3.7V–17V	1.8V–3.3V
155	16 ADC, 2 DAC	Wi-Fi	—	✓ Via pins	3.7V–17V	1.8V–3.3V
21	—	—	—	—	3.3V	3.3V
41	—	—	—	—	5V	3.3V
32	—	—	—	—	5V	3.3V
26	—	—	HDMI, MIPI DSI	✓	5V	1.8V–3.3V
26	—	—	Mini HDMI	—	5V	1.8V–3.3V

NEW & NOTABLE

MYIR MYS-8MMX

Looking into embedded projects? This quick, power-efficient Linux machine should be on your list. Built around NXP's powerful new i.MX 8 Mini processor, this 1.8GHz quad-core SBC brings all the goodies: gigabit ethernet; MicroSD and M.2 slots; HDMI; Wi-Fi and Bluetooth; LVDS, QSPI, and MIPI interfaces; and lots more.
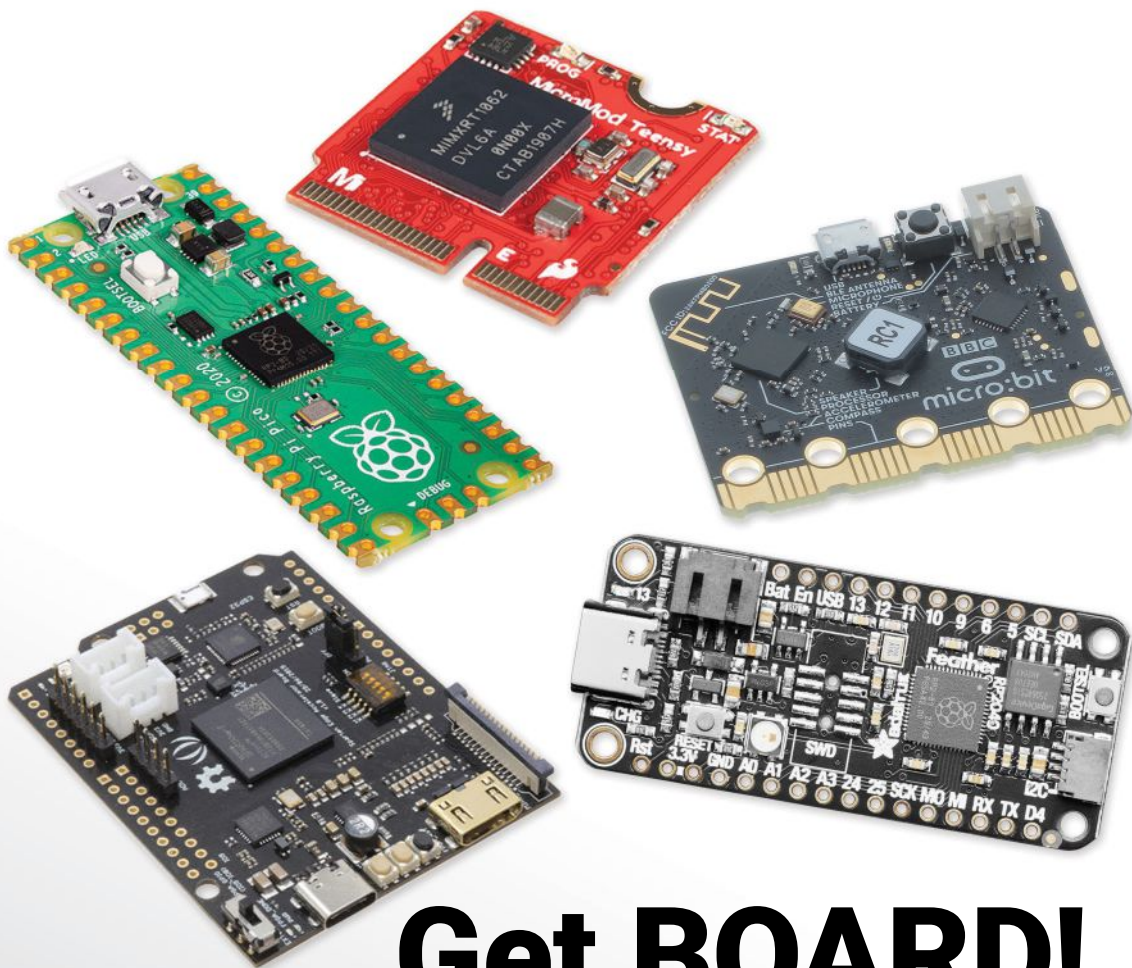

SEEED SPARTAN EDGE ACCELERATOR

FPGA development boards can get expensive quickly, especially if matching all of the peripherals that the Spartan Edge Accelerator has for wireless, high-speed image processing, and user I/O. Targeting a wide range of developers from Arduino, to IoT, to FPGA, this is a good tool for any hobbyist, maker or engineer to have on hand.