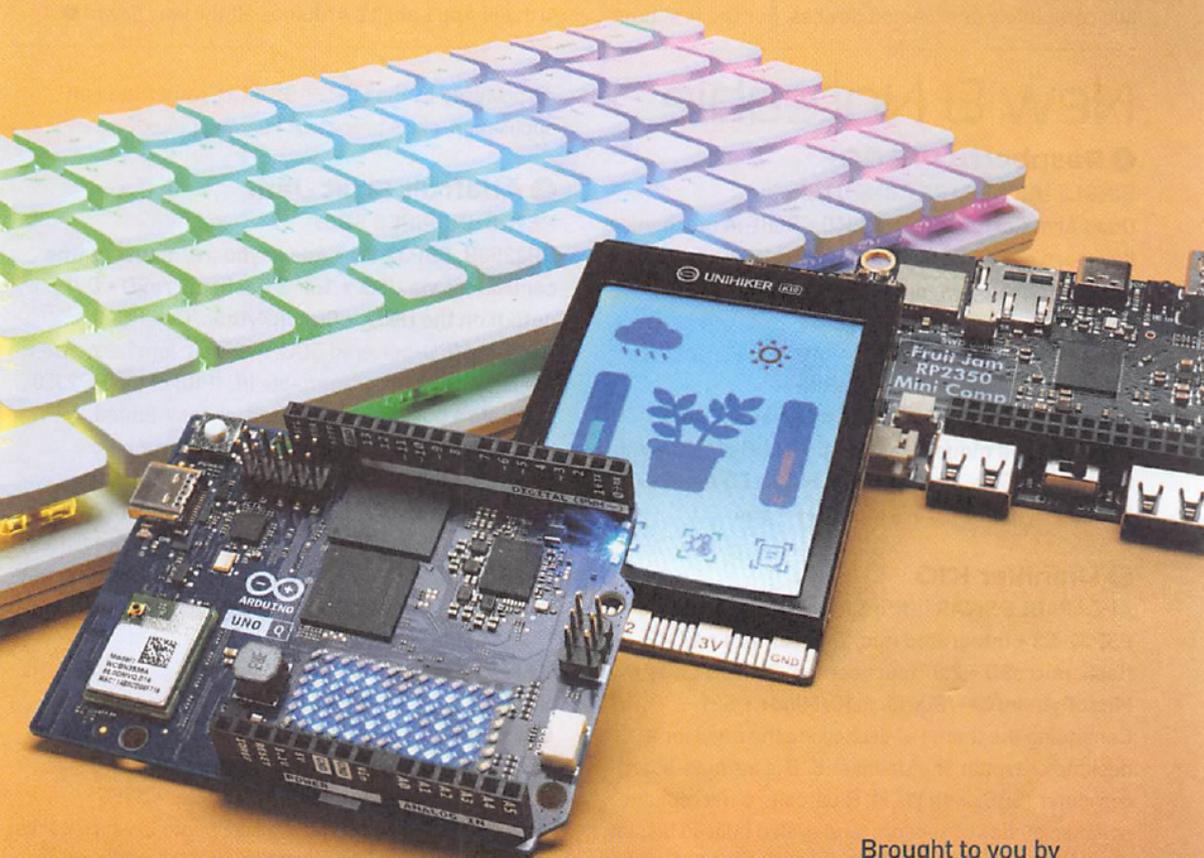# Make:
THE ORIGINAL
GUIDE TO
BOARDS
2026

COMPUTER OPTIONAL

With no flagships to grace our cover last year, our focus was on the many and varied RP2350-based boards being released. After a deluge of SKUs last year, the Pi people had been fairly quiet, and it was with great relief that my final "anything before the cut-off?" email to Raspberry Pi's Eben Upton got an eager late-night response that something special was indeed brewing (and in time for Maker Faire Bay Area in September!). Arduino had been similarly quiet, releasing a smaller R4 in their Nano form factor, and some kits and accessories, but not much else of note since our last guide. So it was again with relief that I received some extremely cryptic news that "Project Imola" was coming soon, and would be "revolutionary" and "unlike anything Arduino have ever done."

So this year we have another "Arduino vs. Raspberry Pi" cover, but instead of an Uno R5 and Pi 6, we have two completely unexpected devices. For the first time ever, Raspberry Pi has released an actual computer! They've been doing similar since 2012, but this is the first consumer-ready, plug-and-play model with on-board storage and a pre-installed OS image. Plus the RP2040 powering the clicky mechanical keyboard's LED animations is completely hackable, unlocking limitless possibilities!

Meanwhile, Arduino asks: when is an Uno not an Uno? When you add a powerful system-on-chip (Soc) to the usual microcontroller's (MCU) form factor. This means that you can use all the shields and libraries you're already familiar with on the MCU side, paired with a full-blown Linux machine for running AI models, hosting a web server, or connecting to USB peripherals — such as a keyboard and mouse, which when combined with an HDMI monitor let you program the Arduino (MCU) *on* the Arduino (SoC) with the new Arduino App Lab! It's Arduinos all the way down! ●

New & Noteable

❶ Raspberry Pi 500+
SINGLE (KEY)BOARD COMPUTER:
Quad Arm Cortex-A76, RP2040 • Built-in mechanical keyboard • 256GB NVMe SSD • 2x mHDMI, 84 RGB LEDs • Debian-based Raspberry Pi OS • $200

❷ Arduino UNO Q
DUAL-BRAIN SBC+MCU HYBRID:
Quad Arm Cortex-A53, Arm Cortex-M33 • Add keyboard and mouse via USB-C • 16GB eMMC • Video output via USB-C, 4 RGB LEDs, 8×13 LED matrix • Debian+Python/MicroPython/C++ • $44

❸ Unihiker K10
AI-CAPABLE SMART DISPLAY:
ESP32-S3 • Integrated mic, 2MP camera • 16MB flash, microSD • 2.8" touchscreen, 3x RGB LEDs • MicroPython/C++/Platform IO/Mind+ • $29
Continuing the theme of eschewing the need for a desktop or laptop, the Unihiker K10 is a single-board computer (SBC) with Wi-Fi, Bluetooth, a microphone, speaker, oodles of sensors, and even a built-in display. You can explore powerful examples right out of the box without a computer, and then combine with the Arduino IDE or MicroPython to create new functionality, since it's powered by the ESP32-S3 MCU, rather than an application-class processor running Linux.

❹ Adafruit Fruit Jam
RETRO-INSPIRED SBC:
RP2350B, ESP32-C6 • Add keyboard/mouse/game controllers via USB • 16MB flash, microSD • DVI output on the HSTX • CircuitPython/C++ • $40
Another MCU-powered SBC, the Fruit Jam harnesses the power and Programmable I/O (PIO) of the RP2350 to create a business-card-sized, chonky-fonted, retro-reminiscent computer. Instead of running BASIC like those classic machines and the Japanese Programming Club Network's Ichigo (Strawberry) Jam that partially inspired it, this fruity evolution predictably runs CircuitPython. There's even a pico-umac fork that lets you go fully retro and run an Apple Macintosh 128K!

❺ Bela Gem Multi
POCKET AUDIO WORKSTATION:
Quad-core Arm Cortex-A53 • Browser-based IDE MicroSD • 10-channel, 24-bit, 96kHz audio • C++/Pure Data/SuperCollider/FAUST/Max • $175
I'm very excited about the PocketBeagle 2, which packs a ton more power into the same Altoids Smalls tin as the original, and was going to feature it here, until I realized that the Bela team is also extremely excited

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Mark Madeo
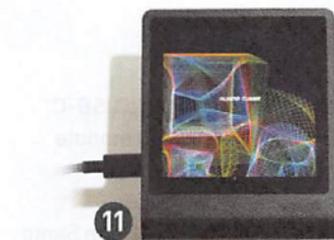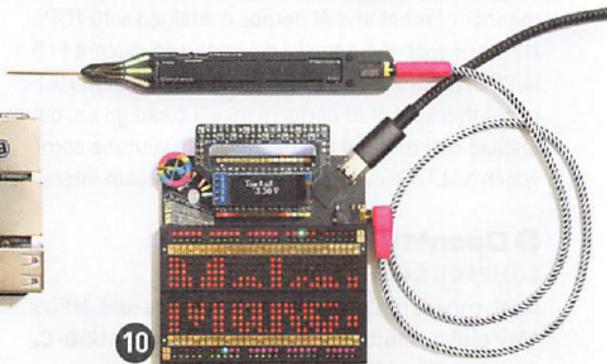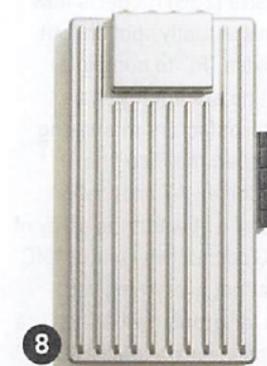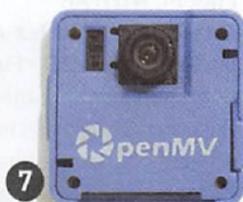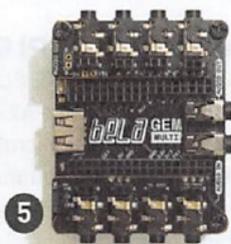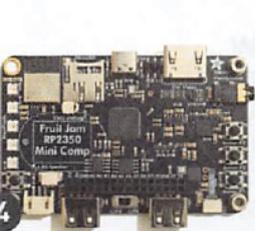
about the PB2, and I could feature their amazing new Bela Gem line and get two boards stoned at once. The Gem family are the new cheat code for creating powerful musical instruments and sound installations, pairing PB2 power with 10 channels of high-resolution audio, plus a browser-based IDE that lets you jump into the jam with zero setup, with inline documentation and autocompletion.

➏ D-Robotics RDK X5
LIKE PI, WITH AI:
Octa-core Arm Cortex-A55 • 4x USB A, 1x USB-C, 40-pin GPIO • MicroSD • Full-size HDMI • Ubuntu • $90
At Maker Faire Shenzhen last year, I stumbled upon a Raspberry Pi form-factor board I'd never seen before, with striking orange headers against a black PCB. They were as excited to talk to me as I was to them, and I quickly learned that this board that I saw powering all manner of robot and AI demos contained a 10 TOPs NPU, yet cost about the same as the equivalent Pi 5 (4/8GB) model, which requires an additional AI HAT to get this kind of AI performance. I could go on, but instead recommend you head over to youtube.com/watch?v=LTbOFcviaB0 to see our livestream interview!

➐ OpenMV AE3
COMPACT, CAPABLE AI CAM:
Dual-core Arm Cortex-M55, dual Ethos-U55 NPUs 1MP global shutter camera • 32MB flash • USB-C, OpenMV IDE • MicroPython • $80
I'm a huge fan of OpenMV, and last year when we featured their RT1062 in this section, co-founder Kwabena Agyeman told me they had something exponentially more mind-blowing on the way. I was extremely lucky to get my hands on one half of the pair of boards that tripled this year's Kickstarter goal, and these claims were not exaggerated: the tiny AE3's performance with object detection frameworks like YoloV8 is more reminiscent of a multi-watt Jetson Nano than a 50mA MCU production-ready platform that's the size of a quarter.

➑ IceWhale ZimaBoard 2
POCKET-ZIZED ZERVER
Quad-core Intel N150 • 2x USB 3.1, 1x PCIe 3.0 • 32GB eMMC+2x SATA 3.0 • Mini DisplayPort • ZimaOS/CasaOS/Linux/Windows • $199
My first ZimaBoard arrived in a striking James Bond-style briefcase with the words "World's First Hackable Single Board Server" emblazoned on it. Instead of Yet Another SBC, the IceWhale team carved out their own segment with an Intel-based processor that lent itself more easily to deployment as a media server, NAS, or homelab than the Arm-based Pi. After an incredible amount of customer research (see "Indie Boards," page 32), Lauren and his team are back with the ZimaBoard 2 and the lofty goal of restoring digital sovereignty with a personal local cloud instead of relying on the giant evil platforms that dominate today.

➒ Luckfox Lyra Pi B W
PARSIMONIOUS PI-LIKE PLATFORM:
Triple-core Arm Cortex-A7 + Arm Cortex-M0 • 2x USB-A, 40-pin GPIO • MicroSD (optional 8GB eMMC) • MIPI DSI • Buildroot/Ubuntu • $27 with Wi-Fi
My original Raspberry Pi cost $35, and while the latest Pi 5 may represent a huge leap forward in performance, the least expensive (2GB) model is now $50. Adjusted for inflation that's actually spot on, but sometimes you just want an extra "Pi" to bung in a project, and the Luckfox Lyra line are emerging as an attractive candidate. With form factors mimicking the traditional Pi, Zero W, and even the Pico, the Lyra brings a triple-core Arm Cortex-A7 application processor, M0 MCU, 512MB, and a bewildering array of optional add-ons, including 4G connectivity and eMMC storage. Just keep in mind that not everything you expect from a Pi can be taken for granted with the Lyra — for example, screen connections are via MIPI DSI rather than HDMI.

➓ Jumperless V5
BONKERS BOUJEE BREADBOARD:
RP2350B • Probe, clickwheel, terminal via USB-C 16MB flash • 451x RGB LEDs, 0.91" OLED module (optional), Bus Pirate adapter, runs Doom • MicroPython/C++/Jumperless apps • $369
We shared a peek at the latest features of Kevin Santo Cappuccio's newest Jumperless iteration in last year's guide (Make: Volume 91, page 23), but its evolution has been significant, and in some ways absurd, since then. In addition to the glorious V5 probe, a new adapter board breaks through the Arduino Nano form factor limitation with a Pi-style 40-pin header, and, amazingly an OLED capability which duplicates the breadboard "display." As I witnessed in Kevin's hotel room at Teardown (Volume 94, page 118), that same display can now be echoed to a connected computer's

command line — including while playing Jumperless' own *Doom* port. Plus a bonus Bus Pirate/Qwiic/Stemma QT/Whatever adapter board, Lego/Technic compatibility, an onboard MicroPython interpreter with JFS (Jumperless FileSystem), and, and ... !

⑪ Pimoroni Presto
DELIGHTFUL DESKTOP DISPLAY:
RP2350B • Qwiic/Stemma QT (Starter Kit also includes sensor stick and game controller) • 16MB flash, microSD • 4" touchscreen, 7x RGB LEDs • MicroPython/C++ • $76 ($110 for Starter Kit)
I've been a huge fan of passive desktop displays ever since the original Chumby, and the new RP2350-powered Presto feels like a deliciously hackable modern spiritual successor to my beloved beanbag, with exponentially more panache to boot. The 4" touchscreen with RGB ambient lighting and RM2 wireless module form the basis of a super-Chumby for the new era!

⑫ CrowPanel E-paper HMI Display
EASY E-PAPER EXHIBITOR:
ESP32-S3 • Rotary switch+buttons • MicroSD • 5.79" e-paper display • MicroPython/C++/ESP-IDF • $30
Another glorious canvas for your imagination, the CrowPanel features a gorgeous 272×792 electrophoretic display (EPD) with anti-glare coating for incredible readability under natural lighting. Since the display only consumes power when refreshing, it's ideal for low-power dashboards, home automation displays, or signage — it even continues to show the most recent content after losing power. Available in at least half a dozen different sizes, the CrowPanel E-paper Display adds a striking interface to your next project.

⑬ M5Stack Tab5
ITINERANT OVERACHIEVING TERMINAL:
ESP32-P4, ESP32-C6 • Dual-mic array, 2MP camera, 1x USB-C OTG, 1x USB A host • 16MB flash, microSD • 5" touchscreen • UIFlow2/C++/ESP-IDF • $55
M5Stack are an absolute powerhouse when it comes to creative, useful products for makers. I was lucky enough to attend the grand opening of their new Shenzhen office last year, and beheld a wall displaying a series of new products that they somehow managed to release weekly every single Friday. The Tab5 is perhaps one of their most ambitious yet, with too many features to list here, the sum of which results in actual tablet-like capabilities, including a 1280x720 display, a front-facing camera, and a 400MHz dual-core ESP32-P4 to power it all. My favorite feature? Adoption of the NP-F550 camcorder battery standard for convenience and safety (same as my 1995 IBM PC110!).

⑭ LilyGo T-Deck Plus
OFF-GRID NEO-BLACKBERRY:
ESP32-S3 • LoRa (433/868/915 MHz), GPS, trackball, backlit keyboard • 16MB flash, microSD • 2.8" display, optional external antenna • Meshtastic • $71
LilyGo is another prolific creative device purveyor who I had the chance to get to know in Shenzhen, and along with the hardware we've mentioned from Seeed, Elecrow, RAK, and others in this issue (see also "Meshtastic Walkie-Textie," page 54), Lily and her crew have really been innovating in the LoRa/Meshtastic space. The T-Deck Plus is a delightful class of Meshtastic device, in that rather than needing to pair with a phone to send messages and perform other advanced functionality, it contains its own Blackberry-style keyboard, display, and everything you need to get on the mesh and start sharing messages. Available with internal or external antenna for optimal convenience or performance.

⑮ Seeed Wio Tracker L1 Pro
MINIMALIST MOBILE MESH:
nRF52840 • LoRa (862–930MHz), GPS, button, 4-way joystick • 1MB flash • 0.91" OLED, external antenna • Meshtastic • $43
I've been experimenting with LoRa for years, but it wasn't until I encountered Meshtastic via Seeed's T1000-E that it became part of my daily life. In addition to that small tracker, which I carry everywhere in order to stay connected to the mesh ("Meshtastic Walkie-Textie," page 54), I've tooled up with dedicated home, car, office, and makerspace nodes. But if I had to pick just one, the Wio Tracker L1 Pro is the perfect blend of consumer readiness, hackability, portability, and signal strength. Also available without the case, or without a display, for directly embedding in projects. ◗

DAVID J. GROOM loves writing code that you can touch. If he's not hacking on wearables, he's building a companion bot, growing his extensive collection of dev boards, or hacking on 90s DOS-based palmtops. Find him online at ishjr.com

AI

Written by Shawn Hymel

❶ Raspberry Pi 5

Released in 2023, Raspberry Pi's flagship single-board computer (SBC) is still capable of crunching the numbers required for many AI applications, including lightweight large language models (LLMs). Add a Raspberry Pi Camera Module or USB webcam for image classification or object detection. You also have the option of adding an official AI HAT+, which offers up to 13 (Hailo-8 variant) or 26 (Hailo-8L) tera operations per second (TOPS), allowing you to process larger machine learning (ML) models faster.

❷ Nvidia Jetson Orin Nano Super

The Jetson Orin Nano Super is an update to the Jetson Orin Nano, and cheaper, too! Boasting an Nvidia Ampere GPU with 1024 CUDA cores and 32 Tensor cores, the Super variant can achieve up to 67 TOPS. Much like the Raspberry Pi, the Jetson Orin Nano Super is an SBC, but installing the required operating system and drivers can be a little trickier than the Pi experience. However, the Jetson Orin Nano Super's MSRP is $249, around half the price of the original Jetson Orin Nano, making it a strong competitor in the edge AI SBC market.
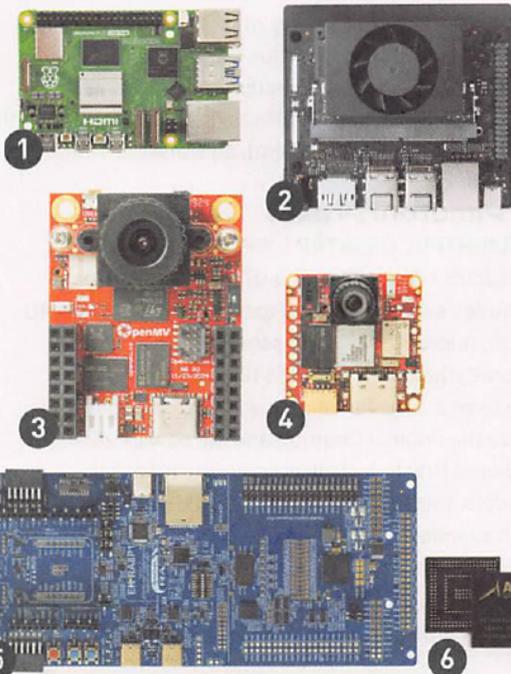
If you already have an Nvidia Jetson Orin Nano 8GB model, you can simply apply a software patch to upgrade it to the Super version. See more information at wiki.seeedstudio.com/update_orin_nano_developer_kit_to_super_kit.

❸ OpenMV N6 and ❹ AE3

For small, low-power vision processing, OpenMV's new MicroPython-based offerings are hard to beat.

The flagship N6 is based on the STM32N6 Arm Cortex-M55 microcontroller with the ST Neural-ART accelerator. It can achieve 0.6 TOPS at around 0.75W and is capable of performing full object detection (with the YOLOv8 model) at 30 frames per second (FPS) with a color image resolution of 256×256.

The AE3 is a small, production-ready module built around the Alif Ensemble E3 microcontroller, which is based on a dual-core Arm Cortex-M55 that includes a dual-core Ethos-U55 AI accelerator. Maximum processing power clocks in at around 0.2 TOPS at around 0.25W, and the board is capable of full object detection (YOLOv8) at 13 FPS with 256×256 color image resolution.

Microcontroller Options

If you are OK getting your hands dirty by laying out your own PCB (or don't mind expensive vendor-built development boards) and navigating low-level vendor libraries, then the following two microcontrollers offer some promising edge AI features.

The powerful new **Renesas RA8P1** (Figure ❺) features an ARM Cortex-M85 core with an Ethos-U55 accelerator, achieving up to around 0.26 TOPS. Renesas' e² studio is similar to other vendor software experiences: an Eclipse-based development environment with hardware libraries provided through a hardware abstraction layer (HAL).

Alif offers a line of microcontrollers based around the Cortex-M55 core and Ethos-U55 and U85 accelerators. The **Ensemble E3** (Figure ❻) (the same microcontroller used in the OpenMV AE3) offers a particularly enticing sweet spot, and it can reach up to 0.2 TOPS. Alif relies on a software development kit (SDK) that includes HAL libraries, which need to be manually included in your development environment. They also started adding support for Zephyr in 2024, which makes developing professional, cross-platform applications much easier. ◐

LEDS

Written by Debra Ansell

Pairing addressable LEDs with a programmable LED controller simplifies hardware and animations. Many controllers run on the ESP32, using Wi-Fi to host browser-based software that customizes patterns and organizes playlists, no coding required. Anyone can flash open-source control software like WLED to an off-the-shelf board, but a prefab controller provides power management and built-in sensor integration to optimize space and simplify wiring. From plug-and-play to completely customizable, the right LED controller will perk up any project!

① Pixelblaze V3 Standard

Expandable Innovation: Pixelblaze V3 Standard's proprietary browser-accessible software makes it easy to assemble a pattern playlist. Its unique JavaScript pattern editor creates and modifies animations while instantly propagating changes to the display. A 3D pixel map feature keeps animations looking consistent on any possible LED configuration. Multiple Pixelblaze controllers can synchronize over Wi-Fi to easily scale up a project's size. LED strips attach via screw terminals. Pixelblaze supports many LED types, beyond just WS2812 and APA102, from 5V–18V with reverse polarity protection.

The smaller, **Pixelblaze Pico** form factor includes a 6-axis IMU and works well in wearables. A sensor expansion board, available separately, adds motion, sound and light reactivity to the Pixelblaze V3.

② Adafruit Sparkle Motion

Comprehensive Control: Adafruit's Sparkle Motion runs WLED with sound-reactive patterns enabled by its I²S microphone. Its Stemma QT I²C port and exposed GPIO pins make it easy to attach external sensors, and a built-in IR receiver responds to remote control. Jumper-selected power input accepts 5, 12, or 20V into the board, protected by a 5A fuse. Three dedicated LED strip outputs attach via screw terminals with an additional GPIO data pin adding a fourth strip, enabling large-scale projects.

The Sparkle Motion's smaller form factors, the **Stick** and **Mini**, trade power for portability, opening the door to create a wide range of NeoPixel projects.
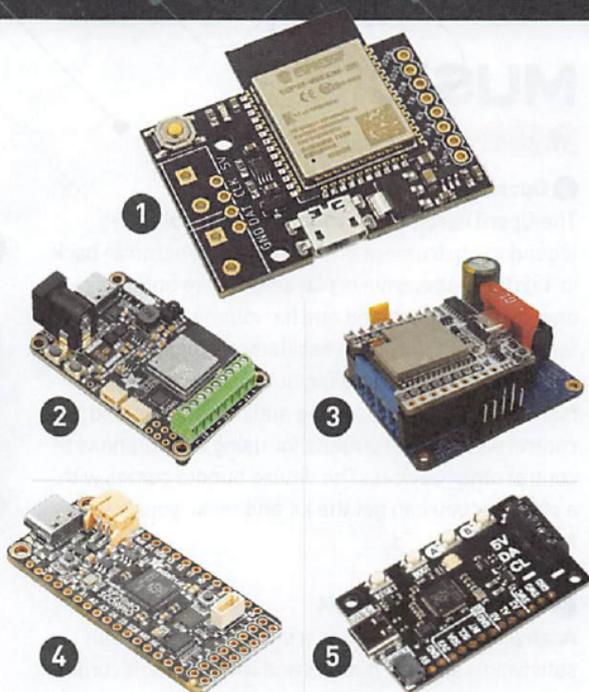
③ QuinLED DigUno

Powerful Protection: QuinLED's DigUno optimizes power management for WLED projects. The 2oz copper board handles up to 15A continuous current with a 10A built-in fuse to prevent overload and automatically adjusts for 5V–24V input without jumpers. Dual data outputs can control two WS2812 strips or one APA102 via screw terminals. Power is automatically cut off to LEDs when patterns aren't displayed to make battery power last longer. Other QuinLED WLED boards are available for both large and small projects.

④ Adafruit Feather RP2040 Scorpio and
⑤ Pimoroni Plasma RP2040

Programmable Prototyping: RP2040 boards can be programmed in C++ and CiruitPython using Adafruit's open-source LED and animation libraries. The RP2040's PIO processors offload the work of bit-banging data signals, pushing patterns quickly to long LED strings.

Adafruit's Feather Scorpio RP2040 has eight level-shifted data pins capable of controlling an octet of NeoPixel strips, which require a separate power supply. Pimoroni's Plasma RP2040 can run 3A at 5V through its USB connector to two level-shifted data pins. Both boards are great for quick prototyping of simpler projects. ✐

MUSIC

Written by Helen Leigh

❶ OpenTheremin

The OpenTheremin is a modern version of the legendary instrument invented by Lev Theremin back in 1920. The theremin is played with two antennas, one to control pitch and one for volume. This kit features two heterodyne oscillators, a built-in Arduino-compatible microcontroller, auto-calibration, a high-quality digital to analog audio converter, and two control voltage (CV) outputs for using the antennas to control other devices. The deluxe bundle comes with a stand, or you can get the kit and make your own enclosure like I did.
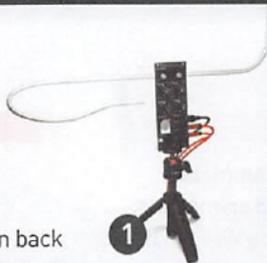
❷ Adafruit NeoTrellis M4

Adafruit's NeoTrellis M4 is a delightful device with satisfyingly squishy buttons and many uses. It comes with a tranche of excellent resources and materials, including several example projects with step-by-step instructions. The device comes fully assembled so you don't need to break out your soldering iron or find your collection of jumper cables to get started.

Powered by the SAMD51, the NeoTrellis M4 has enough flash and SRAM to run CircuitPython, plus an 8MB flash chip for files and audio samples. You can also use Arduino with Adafruit's fork of PJRC's Teensy Audio Library (more below) for super speedy audio with a ton of useful functionality. NeoTrellis M4 also works with MakeCode's block-based GUI, giving you several different options for programming your sounds.

❸ Bela Music

Bela is a high-performance audio and sensor system with a range of boards. Their latest devices, Bela Gem Stereo and Multi, boast flexible I/O, ultra-low latency and excellent compatibility: make music using C++, Pure Data, SuperCollider, Faust, Max RNBO, or Csound.

Capacitive touch is a staple technology of many instrument inventors, many of whom use the trusty MPR121 or one of many cap touch libraries. My favorite way to work with cap touch is Trill Craft, an I²C sensor board made by Bela with great resolution and 30 channels (chainable up to 270) of capacitive touch to play with. Trill Craft works with Bela, Arduino, Teensy, Raspberry Pi, or any other board that supports I²C.

NOTE: *I work for Crowd Supply/Mouser Electronics, who partner with Bela to crowdfund and distribute their device, but I've been enthusiastic about Bela much longer.*

❹ Teensy 4.0 + Audio Shield

The teeny tiny Teensy is blisteringly fast, super low power, and has an excellent toolkit for building audio projects: Teensy Audio Library. This impressive library can handle polyphonic playback, MIDI, recording, synthesis, effects, and much more. Teensy is also a classic choice for capacitive touch projects.

Most Teensy projects use Arduino with Teensyduino extensions, or C language, but other user-contributed options include Rust, Python, Max MSP, and Pure Data. There are lots of example projects and learning materials for Teensy, and an active forum with frequent contributions from Teensy's creator, Paul Stoffregen. The Teensy 4.0 and Audio Shield are now made and sold by the folks at SparkFun.

❺ EMF Explorer Badge

The EMF Explorer Badge is an electromagnetic frequency sensing circuit that lets you listen to the world of hidden electromagnetic frequencies all around you, designed by Portland-based audio hacker Darcy Neal. The EMF Explorer Badge is a beginner-friendly soldering kit with a beautiful PCB and a lanyard so you can illuminate yourself at night, ready to sniff out hidden EMF signals with the use of headphones or external speaker. (See also Darcy Neal's article "Electromagnetic Symphony" in *Make: Volume 90, page 70.)* ❷

COSPLAY

Written by Erin St Blaine

Beginner-Friendly Boards

❶ Adafruit Circuit Playground Express

This board is packed with features: 10 onboard NeoPixels, capacitive touch inputs, and sensors for motion, sound, light, and temperature. It's ideal for newcomers, with support for MakeCode, CircuitPython, and Arduino. The large, sewable pads make it easy to integrate into fabric-based builds. There's also a Bluetooth version (Circuit Playground Bluefruit) for wireless interaction.

- **Try it in:** reactive fairy wings, glowing hat decor, necklaces, motion-triggered lights.

❷ Adafruit Sparkle Motion Stick

This board was designed with cosplay in mind. It runs WLED and plugs directly into a USB battery (no cords required). It includes a screw terminal block for LEDs, a mic, and an IR sensor, and fits inside a custom enclosure that allows for button control. Power your lights right through the USB port with no need for separate power supply wiring (up to 2A draw). It's small and compact and perfect for costume use.

- **Try it in:** LED headdresses, synced costume pieces, glowing staffs.

❸ SMLight A1-SLWF-03

Not a coder? This plug-and-play controller comes pre-loaded with WLED and is perfect for fast LED integration. It features screw terminals for direct LED strip connection, a built-in microphone for sound-reactive effects, and an IR remote for easy control — no coding required. It's a little bulkier than other options, but great for medium-to-large-scale projects.

- **Try it in:** light-up coats, bicycle lights, sound-reactive WLED projects.

More Advanced Options

❹ Adafruit Prop-Maker Feather

Designed for interactive props, this board includes a 3-axis accelerometer, microphone with amplifier, servo support, and a 5V output for high-current LED strips. A JST connector allows for LiPo battery power, making it a strong platform for detailed, responsive builds.

- **Try it in:** motion-reactive lightsabers, sound-activated helmets, animatronic costume pieces.

Erin St Blaine
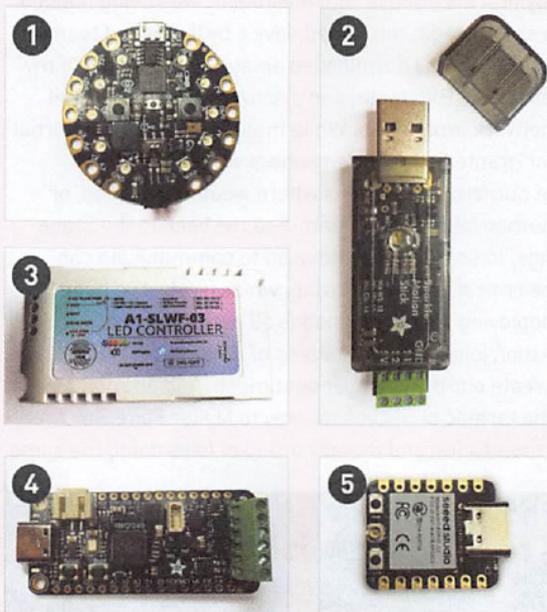
❺ Seeed Studio Xiao

For costume pieces where space is at a premium, this board is a top contender. Its ultra-compact design offers built-in Wi-Fi and Bluetooth, making it ideal for syncing LED animations, controlling effects from your phone, or linking multiple costume pieces, and it can handle addressable LEDs, sensors, and more. The low cost and tiny footprint make it perfect for tight spaces.

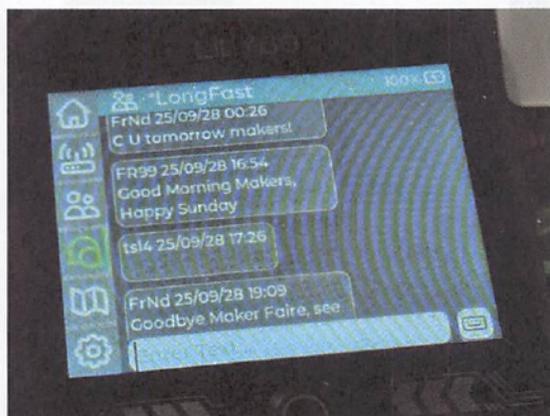- **Try it in:** masks, handheld props, crowns. ❂

WORD IS BOARD

Written by David J. Groom

Another great year in boards comes to an end. As we continue to evolve our guide, we made the hard decision to skip the **Education** category, mostly because the BBC micro:bit, Adafruit Circuit Playground Express, and Arduino Uno family still rule. Maybe we'll see the $44 **Uno Q** make big inroads in this space though, with its low price and lack of need for a host computer. The **IoT** category was also given the heave-ho since connectivity in modern devices is fairly standard. However, one of the interesting ways that devices are connecting today though is with LoRa's killer app: **Meshtastic.**

Join the Mesh

My first experience with Meshtastic was being handed a small credit-card-sized device by the Seeed team in Shenzhen. I downloaded an app, connected it to my phone via Bluetooth, and discovered a whole secret network around me. While most of us take the internet for granted almost everywhere we go, I can think of numerous occasions where weather, location, or human fallibility has slammed me back to the Stone Age. In some cases, the need to communicate can be critical, even life-saving, which is why I've been deploying Meshtastic nodes all over the city of Ann Arbor, joining *literally dozens* of other enthusiasts to create our own independent mesh. And as soon as I hit the tarmac at SFO on my way to Maker Faire Bay Area, I found a fun and friendly group of folks doing the same

Espressif imagines consumer AI applications such as the EchoEar and ESP32-P4-EYE.

thing. While the simple **Seeed T1000-E** got me hooked, my addiction has been fueled by a diverse group of folks. Rokland Technologies is emerging as a premier outfitter of Meshtastic devices in the U.S., and they sent us the slim **WisMesh Tag**, similar to the T1000-E, as well as the **LowMesh Pocket-M** which uses MagSafe to attach to your phone. The **RAKwireless WisMesh Pocket**, with its external antenna, rugged case, large OLED display, and huge battery is probably my choice if I could only have one device in the field, although I'm most enamored with the **T-Deck Plus** [See "New & Notable," page 5] all-in-one communicator. LilyGo has a slew of other Meshtastic devices in their stable, and their **T-Beam Supreme** is doing a great job as a fixed node on the wall by my desk at the coworking space. **Elecrow's ThinkNode** range is also one to watch; the nRF52840-powered **M1** has the appearance of a chibi walkie-talkie with its stubby external antenna and delightful backlight-adjusting knob — coupled with an easy-to-read e-paper display, this is quickly becoming another favorite.

So Many Boards!

As excited as I am about Meshtastic, my recent trips to Shenzhen have meant an even wider range of samples this year — in addition to favorites like **Seeed,**

Meshtastic messages in motion at Maker Faire Bay Area.

DFRobot, LilyGo, and **M5Stack,** connections I've made recently meant shipments straight from Espressif, Waveshare, and others. While most of us probably get our ESP32s in the form of boards from folks like Seeed and others mentioned above, it's a real treat to experience Espressif's own dev kits. It was great to get my hands on the RISC-V dual-band Wi-Fi 6 **ESP32-C5-DevKitC-1.** What the **ESP32-P4-Function-EV-Board** lacks in clever naming, it certainly makes up for in grandeur; with dual 400MHz RISC-V cores, Wi-Fi 6, oodles of connectors, and a 7" capacitive touchscreen, the "EPFEB" (for short) is ready to prototype your next multimedia or AI project. I was not expecting the **Espressif EchoEar** — a Chumby-like device with cat ears and a 1.85" circular touchscreen and dual-microphone array, which demonstrates the ESP32-S3's ability to serve as the center of a smart speaker or voice assistant. The **ESP32-P4-EYE** imagines the flagship SoC as a tiny, AI-enabled point-and-click camera.

The king of cameras and embedded vision, **Arducam,** is back with a slew of SKUs, chief among them the Arducam **RGBD ToF Camera Kit.** Resembling a cross between a Raspberry Pi 5 and a consumer camera, the kit adds their **T2** camera to the SBC and case, providing accessible RGBD (that's Red, Green, Blue, and Depth!) imaging for under $300, enabling applications like 3D scanning, AR/VR depth sensing, and object detection and recognition in robotics. Another interesting Arducam development is their **GMSL2 12MP Camera Extension Kit for Raspberry Pi,** which uses ADI's automotive technology to transmit video up to 15 meters, to a Raspberry Pi HAT.

Waveshare is one of China's most prolific hardware innovators. In addition to their **Luckfox Lyra** ("New & Notable," page 4) and **Pico** lines, Waveshare offer a range of solutions for the Raspberry Pi CM5, a brilliant array of RP2350-based solutions (my favorite might be the $10 **RP2350-GEEK** USB development stick), and the widest range of ESP32-P4-based boards I've seen from any vendor.

DFRobot is another ESP32-P4 pioneer, with their new **FireBeetle 2 AI Vision** board, which provides astonishing AI performance for just $12, and an ESP32-C6 coprocessor for Wi-Fi 6 and Bluetooth 5. The board I'm most excited about, though, literally arrived right before press time: the N150-based Raspberry Pi annihilator known as the **LattePanda Iota.** With up to 16GB of RAM and 128GB eMMC storage, this



The RP2350-GEEK plugs right in for easy development.

Cardputer ADV is M5's latest credit-card-sized marvel.

Pi-punisher claims 2x–3x CPU performance and a whopping 10x–30x GPU capabilities compared to the Pi 5, starting at $129. I've yet to put it through its paces fully, but the LattePanda range has continued to impress, and no doubt the latest will carry on that tradition.

M5Stack is another of my favorite innovators, and in addition to their Tab5 ("New & Notable," page 5) and Stamp, Stick, Atom, and Core lines, they've created my favorite credit-card-sized all-in-one, the **Cardputer,** and have released both v1.1 with larger keyboard buttons and improved antenna design, and also the **Adv** version, which I have not yet tested, that adds a 3.5mm audio jack, improved audio, an IMU, more expansion, and a bigger battery.

Head over to makezine.com/go/2026-boards for the extended version of this monster round-up to read about more boards from Seeed, SparkFun, Onion, AAEON, ADLink, Parallax, as well as the Ubo Pod and Drumboy/Synthgirl, Game Bub, and ADSBee projects — I only get to do this once a year, and I'll be damned if anyone gets left out! ●
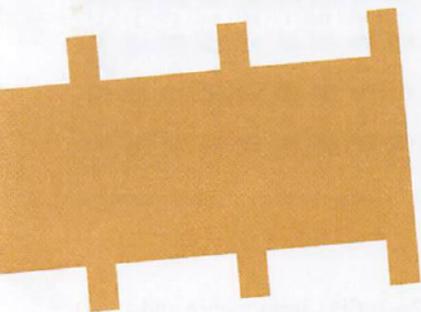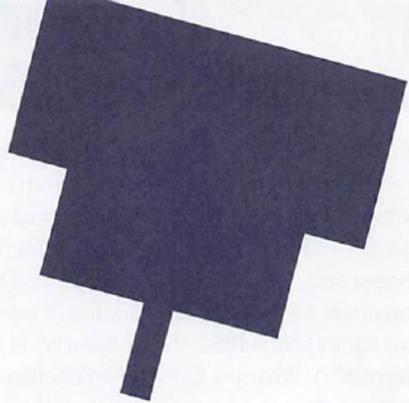
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