EIU

ELECTRONICS INFORMATION UPDATE

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In this issue...

We close this year by spotlighting advances in medical technology and applications. We hope you find the following articles interesting and informative: Secure connectivity for at-home healthcare; Robodoctors shaping the future of healthcare; 3D metal printing improves implants; Confidence in connected care - why IEC 60601-1 matters; and Fixed-frequency DCS-control.

Stuart Cording posts his Christmas T&M present list, while David 'Connector Geek' Pike remains fascinated yet challenged by connectors. Meanwhile in Tech Ideas we consider a world without electricity! Plus Mark Patrick's Dev Kit Pick, the news round-up, and, of course, a review of the most innovative products now in stock at Mouser. We thank you for your company this year, wish you a very merry Christmas and a happy and healthy new year, and promise to keep you up to date in 2026 with even more from Mouser's Electronics Information Update. Cheers! Nick Foot, Editor, Mouser's EIU.
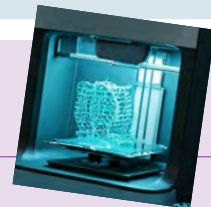
SECO and QNX to deliver robust HW/SW for mission-critical embedded applications

Offering a robust hardware/software foundation for next-generation mission-critical embedded application solutions, SECO and QNX (a division of BlackBerry Limited) have announced a collaboration to support QNX OS 8.0 on the SOM-SMARC-ASL, SECO's high-performance SMARC module that leverages Intel Atom x7000RE processors. Built on the QNX microkernel architecture, the solution is engineered to power mission-critical embedded systems safely and reliably.

Optimized for multi-core processing, the module delivers deterministic real-time capabilities with integrated cybersecurity assets to address industries including industrial automation, robotics, medical devices, defence, and transportation. Combined with the SOM-SMARC-ASL, it becomes a unified hardware-software foundation to reduce development complexity and accelerate time-to-market. QNX OS 8.0 and the SOM-SMARC-ASL provide a comprehensive, advanced solution for mission-critical environments that also addresses regulatory compliance

In the future, the companies plan to expand support to SECO's COM Express modules using next-generation Intel silicon, including the Intel Core Ultra (Series 1) processors (codename: Meteor Lake) and Intel Core Ultra (Series 2) (codename: Arrow Lake), enabling continued performance and scalability improvements across SECO's high-performance embedded platforms.

www.seco.com | blackberry.qnx.com/en

Skyworks and Qorvo to join forces

Creating a US-based, $22B RF, analogue and mixed-signal solutions company, Skyworks and Qorvo have entered into an agreement to combine the two companies in a cash-and-stock transaction. The transaction is expected to deliver significant long-term value for customers, employees, and shareholders. With a combined pro forma revenue of approximately US$7.7B and an Adjusted EBITDA of US$2.1B, the combined company will be better supported by a stronger, more balanced revenue base that enables more predictable performance and a more efficient cost structure

The new company will provide customers with more highly integrated, complete solutions, as well as a broad range of products and technologies. It will bring together world-class engineering talent, including approximately 8,000 engineers and technical experts, and over 12,000 issued and pending patents. The combination brings together complementary RF technologies and best-in-class products, enhancing competitiveness across platforms, deepening customer integration, and diversifying the technology base.

The transaction will create a $2.6B Broad Markets platform across defence & aerospace, Edge IoT, AI data centre, and automotive markets. The combined company will strengthen its domestic production capacity and enhance its capital efficiency, supported by a network of supply chain partners to meet the needs of high-volume and highly specialized customers.

www.qorvo.com | www.skyworksinc.com

TT Electronics secures Collins Aerospace contract

Reinforcing a strategic collaboration in mission-critical defense technologies, TT Electronics has announced that Collins Aerospace has awarded the company a $10.3 million, multi-year production contract to supply high-reliability power modules and power filter assemblies for a classified US Department of Defense (DoD) program. The first prototypes are to be delivered in early 2026, with development and manufacturing at TT Electronics' facility in Kansas City.

"This contract award reaffirms our position as a trusted engineering and manufacturing collaborator to Collins Aerospace," commented Matt Freeman, Executive Vice President at TT Electronics. "Through mutual trust and collaboration, we provide technical expertise and product innovation at the highest level."

Freeman added: "Our strategic relationship with Collins Aerospace exemplifies the power of aligned R&D efforts and synchronized technology roadmaps. By working closely together, we're not only delivering cutting-edge solutions but also strengthening the US defense supply chain through domestic manufacturing capabilities and technological innovation that directly supports our warfighters and national security objectives."

www.ttelectronics.com

Secure Connectivity for At-Home Healthcare:
Challenges Beyond the Clinic

Image credit: Prostock-studio/Shutterstock.com

By Jackson Coole, Systems Applications Engineer, and
Michael Haight, Director of Product Line Management, Analog Devices

Abstract

This article will showcase how Analog Devices offers secure connectivity solutions that address the unique security and patient safety concerns across a broad range of medical devices used in at-home healthcare.

Introduction

Building on the foundation of secure authentication for medical disposables described in "Secure Authentication for Medical Disposables," this article explores the growing trend of shifting healthcare from hospitals to patients' homes (Figure 1). It discusses the unique security challenges of providing healthcare outside a medical setting and the requirements for securing data during network transfer.
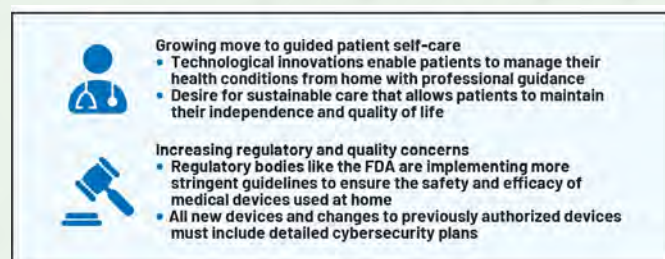
Trends in At-Home Healthcare

Figure 1. Trends in at-home healthcare.

Growing Move to Guided Patient Self-Care

The trend toward guided patient self-care is gaining momentum, driven by technological innovations that empower patients to manage their health conditions from the comfort of their homes. Advanced tools such as wearable devices, mobile health apps, and telehealth platforms provide real-time health data and professional guidance, enabling patients to monitor their conditions and make informed decisions about their care. This shift toward self-care is not only about convenience but also about promoting sustainable healthcare practices. By allowing patients to maintain their independence and quality of life, guided self-care supports long-term health management and expands access to healthcare while simultaneously reducing the burden on healthcare facilities.

Increasing Regulatory and Quality Concerns

As at-home healthcare continues to expand, regulatory bodies like the FDA are implementing more stringent guidelines (FDA-2021-D-1158; Section 524B, HR 2617 Act of Congress; UL2900-2-1; and IEC62443) to ensure the safety and efficacy of medical devices used in home settings. These regulations are crucial for protecting patients and maintaining high standards of care. New devices, as well as modifications to existing ones, must now include detailed cybersecurity plans to address potential vulnerabilities and protect sensitive health data. This increased focus on regulatory compliance and quality assurance is essential for building trust in at-home healthcare solutions and ensuring that patients receive safe, reliable, and effective care.

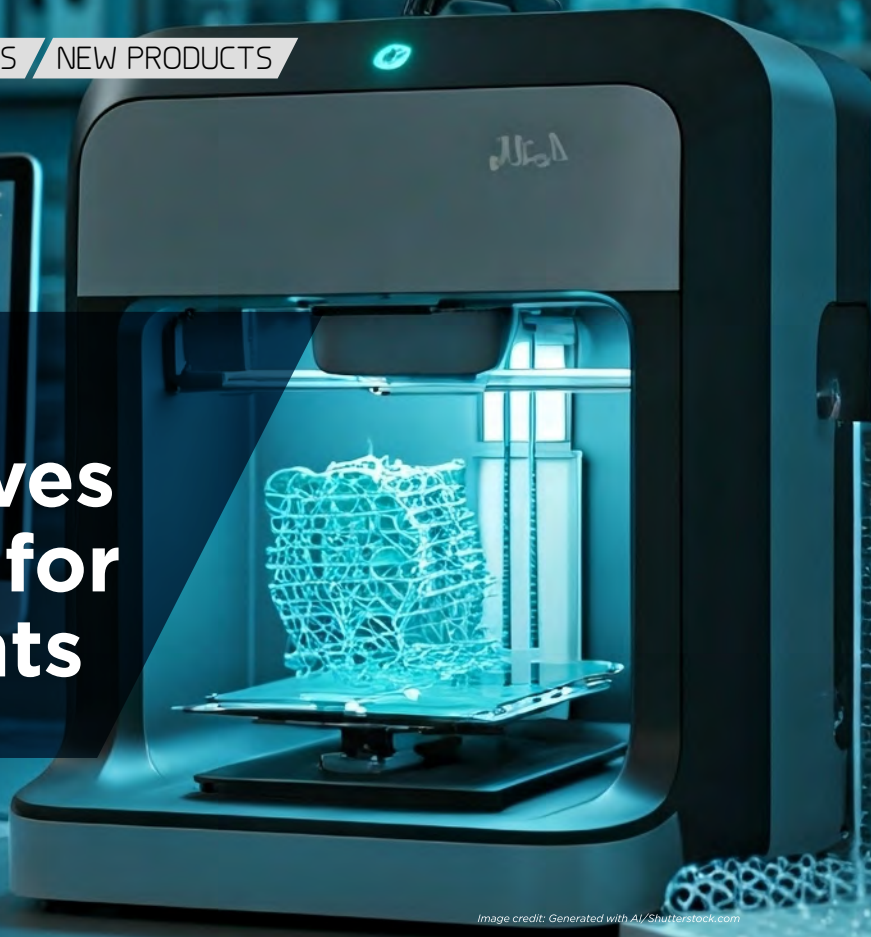# 3D Metal Printing Improves Customization for Medical Implants

Image credit: Generated with AI/Shutterstock.com

By Liam Critchley for Mouser

Implantable medical devices (IMDs) are vital medical technology that helps many people overcome various ailments, from joint replacement to stents and pacemakers. For many patients, an off-the-shelf component is sometimes the only option due to cost constraints or material availability. In other cases, fabricating customized IMDs can keep patients waiting to receive treatment, often causing prolonged discomfort and potentially exacerbating the condition.

In recent years, 3D metal printing has emerged as a quick way to produce IMDs. In some cases, 3D metal printers can be installed in medical facilities to further speed the process and allow clinicians to have an input into the design process in real time. 3D metal printing can also work with difficult materials, meaning that it can manufacture more robust IMDs and achieve more complex geometries to provide a better fit for the patient.

Image credit: MarinaGrigorivna/Shutterstock.com

This article discusses how 3D metal printing brings design freedom into the medical space, enabling patients to have more biocompatible and properly fitted implants.

Ideal IMDs with 3D Metal Printing

3D printing provides design freedom and material customizability that is unavailable with almost any other manufacturing technique. In medical applications, 3D-printed implants need to be robust, biocompatible, resistant to biofluids and biofouling, and integrate easily into the surrounding tissue (i.e., osseointegration, the ability for the natural bone tissue to grow into the synthetic implant to ensure that the implant functions like its natural counterpart). Generally, metal is a better 3D printing material for IMDs when compared to plastics and ceramics. In many cases, conventional IMDs are made from different metals and metal alloys, so 3D metal printing is essentially a more efficient extension of existing IMD manufacturing methods.

The customization of 3D metal printing gives medical professionals the ability to create specific IMDs with the ideal shape, size, and surface finish for their patients, instead of taking one off the shelf that might not fit properly.

Implants that don't fit properly and cause discomfort may need to be replaced during another surgical procedure, which puts more strain on patients and health care providers. 3D-printed IMDs enable medical professionals to design a more suitable implant for a patient, meaning lower chances that it will need to be replaced.

Some of the more common IMDs starting to use 3D metal printing include:

- Acetabular (hip) cups
- Foot and ankle implants
- Spinal implants and spinal cages
- Stents
- Knee implants
- Shoulder implants
- Bone plates

## Benefits of 3D Metal Printing

Two key benefits of 3D metal printing are speed and design customization. In most cases, using 3D metal printing negates the need for extra post-processing steps—such as a hot isostatic press (HIP) or polishing—that are common in traditional manufacturing processes. As a result, the overall manufacturing time (not just the part production itself) can be reduced significantly.

Talking Test

By Stuart Cording, Consulting Engineer

Whether you are based in a lab, or operating remotely, you need appropriate test resources with the emphasis on accuracy, flexibility, portability and affordability. Electronics engineer and technical writer Stuart Cording, who focuses primarily on the semiconductor and embedded systems sectors, is here to help.
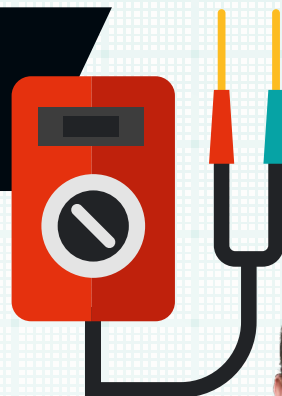
Investing your remaining budget before year's end

"Christmas is coming, your finance team knows that; Your budget isn't fully spent — better spend what's left of that."

It's that time of year when a flurry of messages get sent around the office asking if there is anything anyone needs to order. Many organisations don't allow budget to be carried over into the new fiscal year, so, rather than lose it, your department head will probably be eager to use it. Naturally, it's not really the engineer's way of doing things – we'd rather hold on to the cash to cover extra costs that arise on a future project. However, the bean counters insist, and thus we must obey.

Admittedly, this approach isn't the worst thing that can happen. In fact, it can be quite enjoyable – almost like having a pre-Christmas celebration. Simply open your browser, type in mouser.com, and begin searching for a few test and measurement items that catch your interest. If you know what's on the horizon, perhaps you could order a current probe that could help with your next design project. Or maybe the team has recently struggled with serial interface issues, and you'd like to have one of those portable logic analysers to hand the next time the problem arises.

If you're at a loss as to what you might need, then you're in luck! Here is my carefully curated list of ideas that might make a great addition to your lab bench.

Testing those capacitors

The classic multimeter is excellent for measuring voltage, current, resistance, and continuity. However, few entry-level devices are capable of measuring capacitance. This is a shame since capacitors often have a wide tolerance and, in circuits like oscillators and filters, it helps to know precisely which component value you've fitted to your prototype. Benchtop meters often start at a four-figure price point, making them a more carefully considered purchase.

If your needs are straightforward and a handheld device appeals, you may like to consider the B&K Precision 830C Dual Display Capacitance Meter. This 11,000-count meter measures capacitance up to 200 mF using a constant current that briefly charges and then discharges the device under test (Figure 1). Resolution lies at 0.1pF in the 1,000 pF range, rising to 0.01mF in the 199.99 mF range.

***Figure 1.** The B&K Precision 830C handheld capacitance meter uses a constant current for its measurements.*

With fast autoranging and bright LCD backlight, it makes light work of sorting or binning a bag of capacitors. Powered by a 9 V battery or AC adapter, the unit offers several modes of operation.

In static mode, the minimum, maximum, and average values of several capacitors are recorded. Alternatively, the difference to a reference value can be output. An initial capacitor is measured, and the meter is zeroed. Subsequent measurements indicate the difference in capacitance to the reference device. Tolerance mode allows capacitors to be binned into tolerance ranges of 1%, 5%, 10%, and 20%. Finally, compare mode allows definition of up to 25 sets of high and low testing limits.

At the bottom front of the unit, there are banana sockets for test leads as well as blades to insert leaded components. Often, specially adapted tweezers are then used, wired with 4 mm plugs, to measure surface-mount components. An additional GUARD terminal is also provided to help minimise noise and parasitic components during measurements.

To support automated testing and logging of measurements, the 830C also includes a mini USB interface, allowing the unit to be connected to a PC or laptop. The simple AK80C/BK830C software (Figure 2) and a virtual COM port driver are available on the B&K Precision website.

Image credit: spainter_vfx/Shutterstock.com

Tech Ideas

A world without electricity

How prepared are countries to cope?

Image credit: hpphtns/Shutterstock.com

By Mouser's Technical Content team

We rely on electricity for almost every part of modern daily life, from the obvious, such as turning the lights on in our homes, to the essentials we may not realise require electricity, such as clean running water.

When power fails, battery efficiency becomes critical. This blog presents a thought experiment, imagining how societies might cope in the event of a prolonged power outage, based on current infrastructure and preparedness.

General Effects of a National Blackout

Imagine the lights go out, not just in a city, but across an entire country—no power for homes, hospitals, or businesses. While power outages are challenging, many nations are taking proactive steps to build resilience in the face of disruption, such as investing in renewable energy sources, modernising their power grids, and developing energy storage technologies.

To explore how countries are preparing for such scenarios, Mouser Electronics commissioned a study to analyse data on electricity use, banking access, internet reliance, urbanisation, emergency backups, economic strength, disaster preparedness, and clean water supply for over 200 countries. Together, these criteria created a resilience score intended to reveal how long nations could continue essential daily operations without electricity.

But what could a world in a widespread power outage look like?

Instant: The First Few Hours of No Electricity
Within minutes, homes, streets, and cities go dark. Traffic lights fail, trains halt, and airports experience widespread disruptions. Internet, phones, and landlines cut out. Emergency services struggle to communicate. Hospitals switch to generators, but most last only a few hours to a few days at most.

1–3 Days of a Blackout
If the blackout continued for a couple of days, food and water supplies would become disrupted. Supermarkets rely on refrigeration, and food spoils fast. Sewage treatment centres would shut down, leading to unsafe drinking water. There would also be no ATMs, card payments, or digital transactions.

1–2 Weeks Without Power
After a week or two, supply chains would fail, as there would be no refrigerated transport, no functioning factories, and no restocking shops. Sanitation would break down as waste collection stops and water becomes contaminated. Medicines would become unsafe to use due to a lack of refrigeration, and drug manufacturers would not be able to produce new ones.

Long-Term: A Few Months of No Electricity
After weeks or months, economies would collapse as banks, markets, and businesses grind to a halt. Without farming machinery, refrigeration, or transport, food production and distribution fail.

Although it's unlikely that something like this would happen—or last so long if it did—there have been at least four significant power outages worldwide in 2025, including the widely discussed Iberian Peninsula blackout, which affected approximately 60 million people.

The Surprisingly Resilient Countries Embracing Electrical Independence

Which countries are actively building resilience to power outages (Figure 1)? To discover this, the study's researchers analysed data on electricity use, banking access, internet reliance, urbanisation, emergency backups, economic strength, disaster preparedness, and clean water supply.

Human detection sensor for IoT applications

Mouser Electronics, industry's leading New Product Introduction (NPI) distributor with the widest selection of semiconductors and electronic components, is now stocking the IRS-D200ST00R1 infrared sensor from Murata Electronics.

The IRS-D200ST00R1 IR sensor offers a small size, reflowable SMD design, and a digital I2C output. It features a high signal-to-noise ratio and strong noise resistance, making it simple to add a human detection function to IoT devices and other equipment. Specifications include 6 x 6 x 2.6 mm3 dimensions, 8 µA current consumption, 2V to 3V supply voltage range, and a wide operating temperature range of -25°C to +85°C.

The Murata IRS-D200ST00R1 sensor is suitable for IP cameras, doorbells, thermostats, smart lighting, and IoT devices that need wake-up and human detection features.

NEW PRODUCT at mouser.com
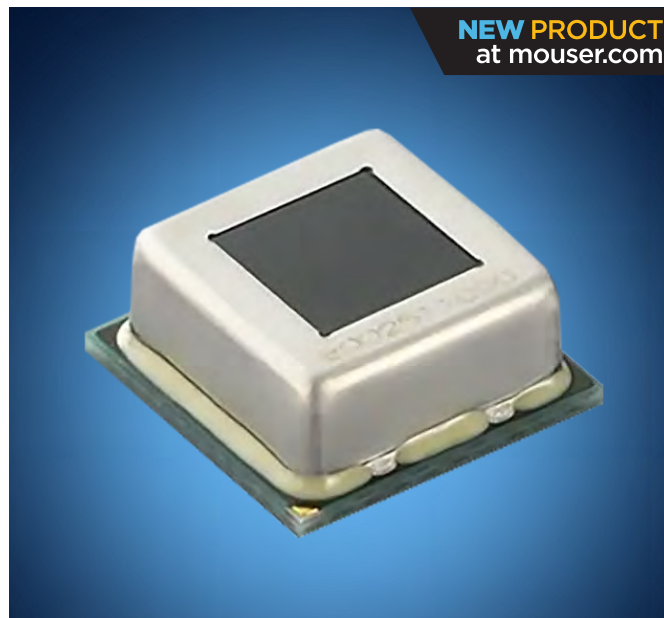
Learn more about the Murata IRS-D200ST00R1 sensor

mouser.com

Versatile, feature-rich platform for robotics, imaging, IoT and more

Mouser is now shipping the new Atum A3 Nano from Terasic Technologies. Powered by the Altera Agilex™ 3 FPGA, the board delivers powerful performance in a compact, affordable platform for robotics, automotive, IoT, smart city, consumer, or advanced image applications.

The Atum A3 Nano is a feature-rich and cost-effective platform powered by Altera's largest Agilex 3 FPGA, with 135K LEs, 64MB SDRAM, an onboard USB-Blaster III with USB Type-C connection, HDMI output, Gigabit Ethernet, and MicroSD storage. The Agilex 3 FPGA devices bring Altera's HyperFlex FPGA architecture and dual, on-chip, Arm Cortex-A55 cores with hardened peripherals, delivering a 1.9x performance improvement over Altera's previous cost-optimized family, Cyclone V, as well as higher speed transceivers, and additional memory support for LPDDR4, all within a compact 85 × 70 mm2 form factor.

The Atum A3 Nano also delivers small form factor expandability and flexibility with Intel's innovative variable pitch BGA packaging technology, enabling up to 22% more balls in the same footprint as traditional 0.8mm packages while maintaining the same 0.8mm PCB design rules. With multiple user I/Os (LEDs, buttons, and switches), a 2x20 GPIO connector, and dual 2x6 TMD GPIO headers, this board seamlessly integrates cameras, displays, and other peripherals for next-generation design.

NEW PRODUCT at mouser.com

Learn more about the Terasic Technologies Atum A3 Nano

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