Committed to excellence

RUTRONIK
ELECTRONICS WORLDWIDE

MAKING IOT EASY

CONNECTED SECURE SYSTEM SOLUTIONS

V 1.0

50 Years

Infineon

Our Product Portfolio

- Semiconductors
- Passive Components
- Electromechanical Components
- Displays & Monitors
- Boards & Systems
- Storage Technologies
- Wireless Technologies

Our Initiatives

RUTRONIK AUTOMOTIVE · RUTRONIK EMBEDDED · RUTRONIK POWER · RUTRONIK SMART

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Committed to excellence

Consult – Know-how. Built-in.
The Technical Competence from RUTRONIK
Worldwide and individual consulting on the spot by competent sales staff, application engineers & product specialists.

Components – Variety. Built-in.
The Product Portfolio from RUTRONIK
Wide product range of semiconductors, passive and electromechanical components, displays & monitors, boards & systems, storage and wireless technologies for optimum coverage of your needs.

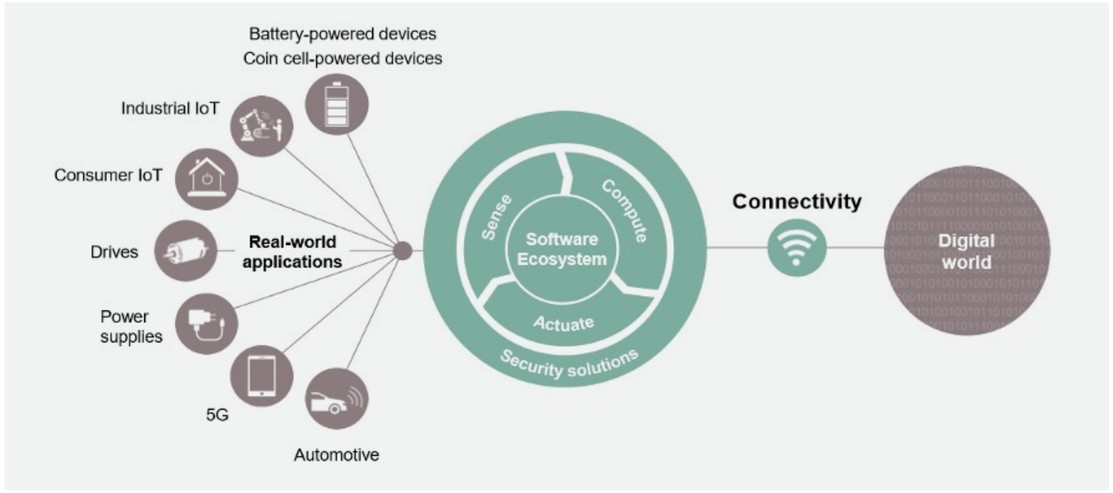
Logistics – Reliability. Built-in.
The Delivery Service from RUTRONIK
Innovative and flexible solutions: from supply chain management to individual logistics systems.

Quality – Security. Built-in.
Quality without Compromise from RUTRONIK
The integrated management system (IMS) encompasses quality control, information security, environmental protection, occupational health and safety.

CONTENT

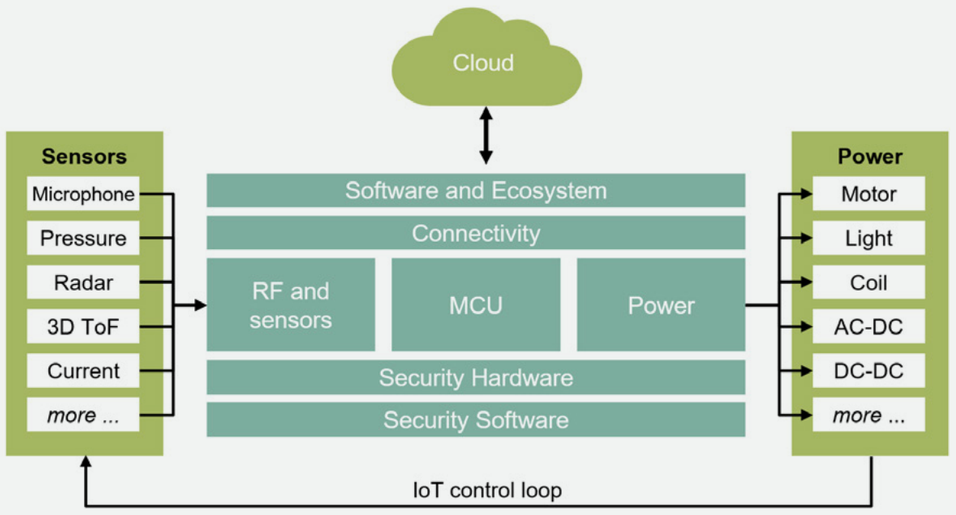
Linking the real and the digital world

Infineon powers the digitalization for IoT with an extensive portfolio of products including sensors, microcontrollers, actuators, wireless connectivity, and security to link the real and digital world. With robust software developments tools and an extensive partner ecosystem, you can easily bring your IoT products to market.



Build any IoT application with Infineon's extensive portfolio

With over 15,000 products, Infineon's product portfolio gives you one place to get all the products you need for your IoT application. Products are supported with development boards, evaluation kits, software, and design tools to **make IoT work!**



Accelerating IoT development with system solutions

By combining a comprehensive IoT portfolio with deep system expertise, Infineon delivers solutions that let you build IoT systems faster, with less effort, and better results. As a trusted partner for 8 of the top 10 IoT companies, Infineon leverages over 20 years of IoT leadership, with over 3 billion IoT chips shipped to help you bring your IoT application to market.

With products for key IoT technologies like HMI, wireless connectivity, and security, Infineon delivers solutions that let you focus on your business model, product design, and go-to-market instead of struggling to incorporate multiple technology systems. Our design resources, tools, reference designs, and partners let you jump-start your project and get to production faster.

Below is an example of a system solution for a smart lock application that incorporates multiple Infineon technologies and services into a reference platform.

Wireless connectivity
Infineon AIROC™ Wi-Fi/ Bluetooth®/802.15.4

Cloud/Analytics
Public Cloud support
Infineon IoT Cirrent™ IoT Network Intelligence
Infineon Cirrent™ Cloud ID

Compute
Infineon PSoC™ 6 ultra-low power Microcontroller

Actuation
Infineon H Bridge Motor Driver

Mobile Application Analytics
Infineon Cirrent™ Mobile Application Intelligence

Sensors
Infineon 3D Time-of-Flight face ID
Infineon CAPSENSE™ Proximity Detection

Touch
Infineon CAPSENSE™ Touch

NFC
Infineon NFC Connected Tags or Reader
Infineon NFC Battery authentication

Security
Infineon OPTIGA™ Trust-M

NFC Smart Cards
Infineon CIPURSE™

Solving major IoT technology pain points

IoT requires key technical building blocks to create any application including HMI, intelligent sensors, wireless connectivity, security and privacy, edge machine learning, cloud, actuation, and power. With IoT applications using multiple technology areas, the time and expertise required to implement and integrate these areas together only increases. By providing reference examples that combine multiple technical building blocks, Infineon products and expertise simplify development complexity and get you to market faster.

Human Machine Interfaces (HMI)

The smooth, intuitive experience of a smartphone interface has become the standard that every IoT application is expected to deliver for HMI. With the addition of voice as an HMI, the knowledge and expertise needed to quickly integrate these seamless interfaces into your device only increases. Infineon's deep expertise lets you create HMI solutions like touch control built with CAPSENSE™, which has been used to replace over 6 billion mechanical buttons.

Touch control

Creating a smooth touch interface requires accurate touch detection along with a responsive interface. To prevent false touch detections from ruining the experience, you have to manage the noise and electromagnetic interference from other components like the power supply. Infineon's CAPSENSE™ with industry leading signal to noise ratio performance lets you overcome these challenges. Choose from a variety of CAPSENSE™ based kits to quickly prototype your touch solution.

Smart home display demo video

Industrial environments require a touch interface that can perform under extreme conditions created by water and dust, while also accurately detecting touches from operators wearing gloves. Infineon along with partner UICO has created a solution that shows how Infineon's CAPSENSE™ and the technology from UICO can meet industrial touch screen requirements.

Industrial touch tech talk | Touch sensing web site
Partner: UICO

Proximity detection and gesture control

Touchless control solutions let you keep control surfaces clean while also reducing wear and tear. The challenge is to build a realistic solution for touchless controls that is both cost effective and energy efficient. Infineon's CAPSENSE™ lets you build low-cost and low-power solutions for proximity detection and gesture control that other technologies can't.

Gesture control demo video
Touchless gesture based UI video

Local voice commands

Modern voice controlled interfaces require high performance microphones along with machine learning for audio processing so that you can do things like detect wake words or process voice command locally. Infineon provides local voice control solutions for low power and constrained edge devices using **XENSIV™ MEMS microphones** and **PSoC™ 6 Arm® Cortex M4 microcontrollers** for audio processing. Infineon also partners with Cyberon to simplify machine learning for wake word and intent recognition.

Partner: **Cyberon**

Graphic display

IoT applications require all types of graphics from simple displays to rich, full graphics. With a broad family of microcontrollers, Infineon supports many of the IoT displays that you need to build. Combined with the knowledge from partnerships with graphics experts like Embedded Wizard, Segger emWin, and Altia, Infineon has the solutions for all your graphics needs.

PSoC™ 6 Wi-Fi BT Prototyping Kit
Partners: **Segger | Embedded Wizard | Altia**

Infineon's broad portfolio includes ready-to-use sensor solutions that enable fast time-to-market and reliable functionality. Based on 40 years of experience developing sensor products and a world-leading sensing technology portfolio, Infineon's XENSIV™ delivers exceptional accuracy, best-in-class measurement performance, reliability, field proven quality, system stability, durability, and integrity.

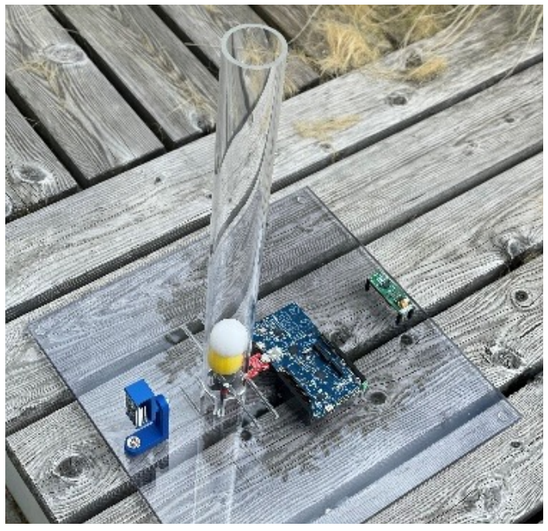
Connected sensors

Infineon's XENSIV™ connected sensor kit (CSK) lets you connect to the cloud with AIROC™ Wi-Fi to quickly visualize sensor data on a cloud dashboard. Connect different sensors to the cloud using adapter boards that come with the CSK like the PAS CO2 and 60GHz RADAR sensor boards.

Connected Sensor Kit

Intelligent environmental control

Environmental controls rely on static and preset programs that can quickly get out of touch with how people actually use a physical space. Intelligent sensors provide the crucial feedback loop to ensure that environmental systems like air conditioning are used efficiently and for maximum comfort. The Smart Aircon demo showcases connected air conditioning using Wi-Fi and Bluetooth®. Using CO2 data and occupancy sensing with 60GHz radar, the demo shows intelligent automation that responds to people.



Smart air conditioner demo

Eliminating false alarms with sensor fusion

Alarm systems have to tell the difference between an intruder breaking a window and common household sounds. Infineon's sensor fusion-based smart alarm system (SAS) combines Infineon microphones, barometric pressure sensors, and ML powered sensor fusion algorithms running on the PSoC™ microcontroller to eliminate false alarms. By detecting changes in the room pressure level, the SAS can increase glass break detection accuracy.

Smart alarm system website

Crowd control using high accuracy sensing

Presence detection and people counting applications are used to limit overcrowding in public space to maintain health and safety. Infineon's XENSIV™ 60GHz radar combined with software algorithms running on the PSoC™ microcontroller let you track room occupancy, while maintaining user privacy.

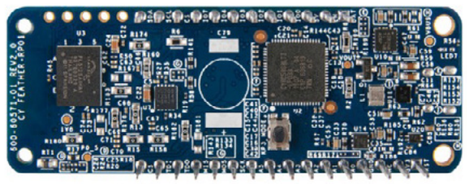
People counting website

In an increasingly digital world filled with connected devices, device security is key to protecting user privacy and stopping hackers. To address this growing need for secure devices, Infineon delivers hardware-based security to protect data from the end device to the cloud.

Secure elements and microcontrollers

More and more security breaches are the result of devices that have been compromised. Infineon protects device integrity with logical and physical security measures. The security portfolio includes **OPTIGA™** secure elements and **PSoC™** secure microcontrollers.

PSoC™ 64 Secure Boot Kit



OPTIGA™ Trust M IoT Security Development Kit
Embedded World Tech Talk

Secure device management

Authentication plays a key role for IoT security, but it can be a challenge to develop and evaluate end-to-end authentication for all your IoT devices. The OPTIGA™ Trust M IoT Security Development Kit lets you test out security use cases such as IP protection, crypto offloading, and secured firmware updates. The kit demonstrates secured cloud communication with crypto support from OPTIGA™ Trust M and secured zero-touch cloud provisioning using CIRRENT™ Cloud ID with a pre-provisioned X.509 certificate delivered with OPTIGA™ Trust M.

Accessory authentication

Counterfeit products can ruin device functionality and user experience, in some cases even leading to safety issues. By giving accessories like filters, cartridges, and batteries a secured and unique ID, Infineon's **OPTIGA™ Authenticate** product family lets you verify their authenticity so users can trust them.

Accessory authentication demo

Payments

Infineon's **SECORA™ Pay** lets you add contactless payment functionality to almost anything from contact cards to smart payment accessories. Along with outstanding transaction speeds and superior performance, SECORA™ Pay secures contactless payments through a range of solutions including: sophisticated Java Card™ technologies, pre-certified payment options, support for wearables, and payment support for major providers like Visa, Mastercard, Discover, and American Express.

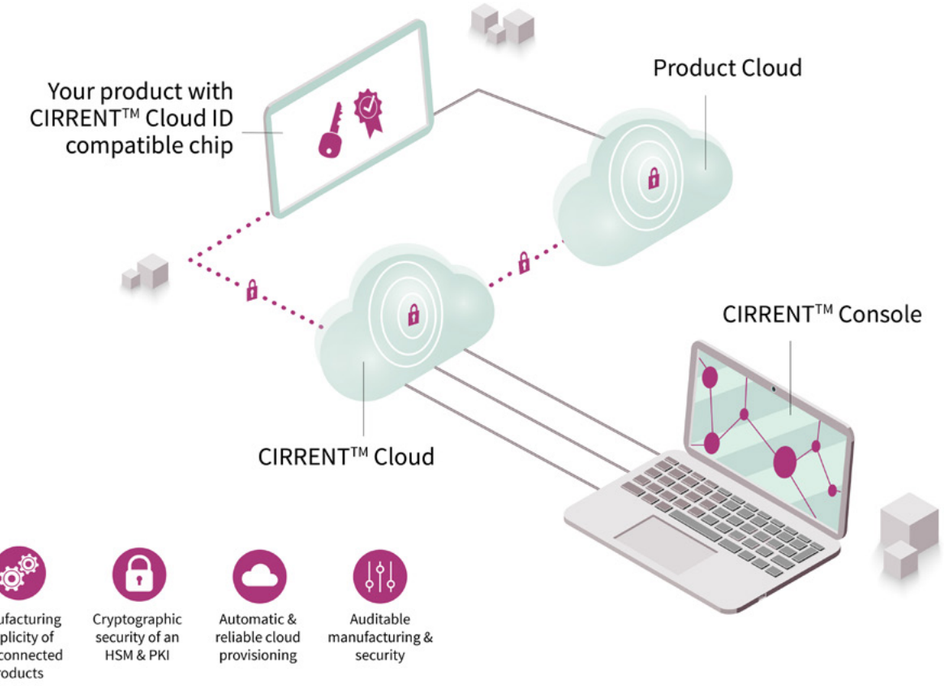
Payment website

Automatic device-to-cloud provisioning

For the best security, IoT devices require a unique identifier assigned at the time of manufacturing. Simple approaches like using a list of device IDs or a generic certificate to assign the identity in the factory create a security risk if the list or certificate is compromised. More sophisticated processes like hardware security modules and public-key infrastructure require security expertise and expensive setup at each manufacturing facility.

CIRRENT™ Cloud ID is a unique approach to device-to-cloud authentication making it easier, cost effective, and secure by automating cloud provisioning of device certificates.

CIRRENT™ Cloud ID

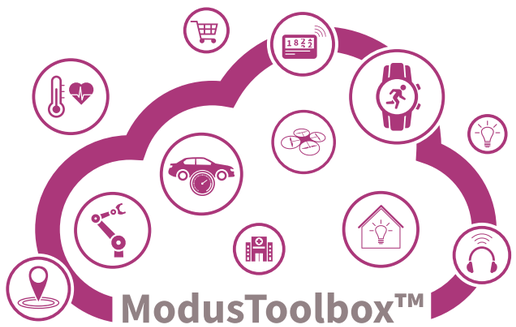


Cirrent Cloud ID

TinyML brings machine learning to low-power IoT devices and lets them transform raw sensor data into meaningful insights in real time. With TinyML, running ML on the edge lets you process sensor data on the device and put intelligence at the IoT edge while avoiding privacy and latency issues caused by sending data to the cloud. With key ML partnerships, Infineon makes tool flow and inference model development easy for anyone, even people just getting started.

Build your own models

Building and deploying ML for embedded devices has many challenges including optimizing trained ML models for embedded devices, validating model performance, and generating model code and libraries. **ModusToolbox™ Machine Learning** lets you rapidly evaluate and deploy ML applications on low-power edge devices. With configurators, tools, code examples, and supporting libraries ModusToolbox™ ML lets you evaluate and benchmark pre-trained ML models created from frameworks like TensorFlow, Keras, and PyTorch.



ModusToolbox™ Machine Learning

SensiML™ | Cyberon Leading Speech Solution Provider | EDGE IMPULSE

Partners: **Cyberon | Edge Impulse | SensiML**

Train your own model

Building your own AI models can be a complex and expensive effort that can be difficult for anyone to take on. Infineon has worked with key ML partners to provide developers a seamless process for things like recognizing patterns in sensor data, wake word detection, training ML models, and deploying realtime inferencing models. Each of these partners let you quickly deploy models with seamless integration with ModusToolbox™.

Edge Machine Learning

Predictive maintenance

ML presents the promise of detecting upcoming system failures for crucial HVAC elements such as filters, compressors, motors, and fans. With the XENSIV™ predictive maintenance evaluation kit you can start evaluating sensor-based condition monitoring and predictive maintenance use cases for HVAC equipment. We have created a demo using the kit that shows Infineon sensors and edge ML from our partner MicroAI to detect anomalies and infer predictions on impending failures. The demo deploys ML on the **XMC4700** to show unsupervised AI algorithms running locally to predict failures that could lead to expensive repairs and down time. The demo shows XENSIV™ sensors measuring vibration, current consumption and patterns, temperature, and acoustic noise levels with all the data shown on the MicroAI Launchpad dashboard along with a health score.

Anomaly detection demo video
XENSIV™ predictive maintenance evaluation kit
Partner: **MicroAI**

Micr.ai

Wireless technologies like Wi-Fi, Bluetooth®LE, and NFC make up the backbone of everyday IoT applications. As a wireless pioneer and market leader with over 1 billion units shipped, Infineon has solved the technical challenges of wireless connectivity including wireless co-existence and low-power wireless. Infineon also drives the future direction of Wi-Fi, Bluetooth®, and Matter through their standards bodies

Infineon's AIROC™ Wi-Fi 6E Solution

Wi-Fi 6E promises to bring improved reliability and bandwidth for congested wireless environments by opening up the 6 GHz band. With lower latency and power consumption, communication is more efficient compared to the 2.4 GHz and 5 GHz bands. Infineon has partnered with NVIDIA on a demo to show Infineon's Wi-Fi 6E capabilities with NVIDIA's AI platform deliver low latency and improved user experience for AI applications.

Infineon Wi-Fi 6E and NVIDIA AI demo video

Wireless partner ecosystem

Designing wireless IoT systems requires RF and certification expertise. Infineon's global wireless module partners let you develop your IoT application on-time, on-budget, and with minimal risk. Using a pre-certified wireless module, you avoid costly antenna and RF design and spend less time for wireless certification.

muRata INNOVATOR IN ELECTRONICS
Laird CONNECTIVITY
AzureWave
USI®
LANTRONIX CONNECT SMART. DO MORE.
Inventek Systems Embedding Connectivity Everywhere

Partner module selection guide

Bluetooth® mesh

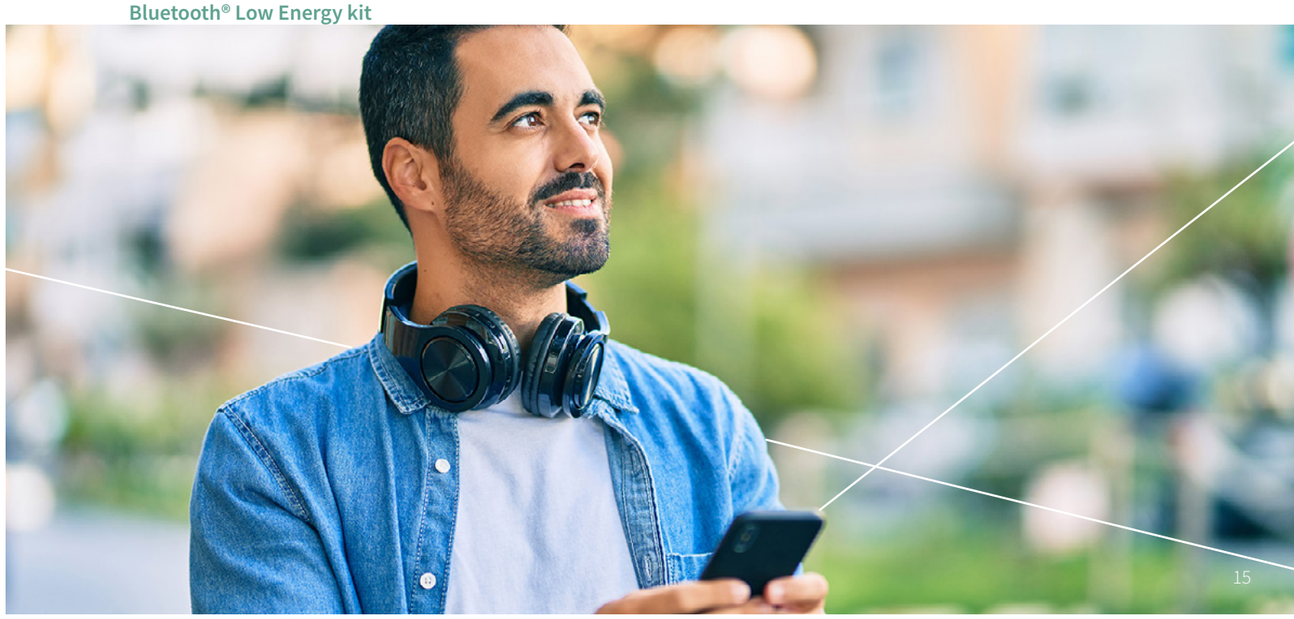
The Bluetooth® Mesh Evaluation kit enables the evaluation of SIG mesh functionality using a Bluetooth® 5.0-qualified module. Implement real-life mesh systems such as a dimmable lightbulb, occupancy sensor, and a thermometer in a few minutes using code examples in the Bluetooth® SDK. Infineon also provides multiple code examples and samples to showcase mesh functionality.

Bluetooth® mesh demo video
Bluetooth® mesh kit

Full Bluetooth® portfolio

For the most reliable and highest performing connectivity for your applications, Infineon offers the AIROC™ Bluetooth® portfolio, consisting of Bluetooth® Low Energy-only and dual-mode Bluetooth® solutions that support Bluetooth® Classic as well as Bluetooth® Low Energy. The portfolio includes Bluetooth® SIG-compliant devices and modules that integrate Bluetooth® standard profiles and protocols for embedded applications. Build products like a Bluetooth® voice remote, headset, or speaker faster and easier with the AIROC™ Bluetooth® modules that are fully integrated, certified, and programmable.

Bluetooth® Low Energy kit



NFC for smart wearables

Smart wearables equipped with NFC can let you pay at a store, ride public transportation, and even enter your office building. With Infineon's **SECORA™ Connect** you can easily add secure payments and biometric authentication within the size and power limitations for wearables.

SECORA™ Connect

NFC for Wi-Fi commissioning

Quick, easy, and secure onboarding remains a challenge for any IoT device using Wi-Fi, especially the devices without a keyboard or screen. Infineon's NFC for Wi-Fi onboarding demo shows how quick and secure Wi-Fi onboarding can be done for applications like appliances, lighting, speakers, TVs, and thermostats.

NFC for Wi-Fi commissioning demo video
NFC solutions

NFC for authentication, personalization, and product activation

Using genuine accessories and consumables enhances consumer trust by ensuring a reliable and consistent product experience. Infineon's embedded NFC tags and microcontroller solution lets you authenticate accessories like an electric toothbrush head and to personalize the way the toothbrush performs based on the type of toothbrush head attached. Embedded NFC tags also can be used to require merchandise activation to discourage theft.

Secured NFC tags

Wireless support for Matter

Emerging protocol standards like Matter facilitate the interoperability and adoption of smart home products. As a member of the Connectivity Standards Alliance board, Infineon shapes the Matter specification and also supports Matter over Wi-Fi and Thread with its AIROC™ wireless connectivity portfolio.

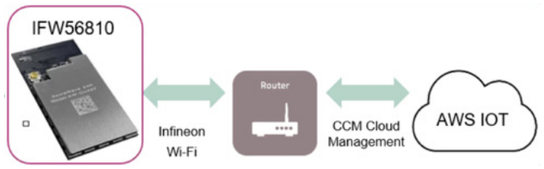
Matter demo video
Matter web page

Cloud

Connecting to the cloud has become a central part of an IoT solution as it unlocks the potential for greater analytics, insights, and accessibility for connected devices. With the advent of hybrid cloud and deployments using multiple cloud providers, you need to know that your device can work with any cloud.

Support for major cloud providers

As IoT deployments increase in size and complexity, the cloud vendor you choose today may not be the one you use tomorrow. This uncertainty requires the flexibility to work with any cloud provider. With support for major public clouds, Infineon makes it easy for you to work with the cloud you need.



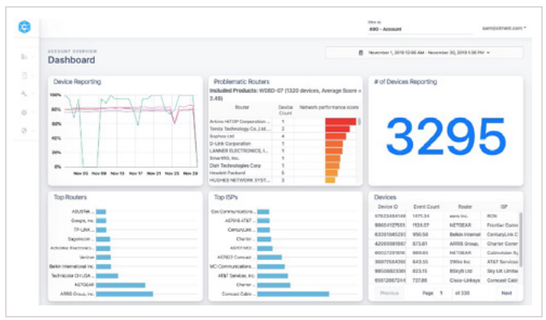
CCM kit

Secure provisioning and deployment

The AIROC™ Cloud Connectivity Manager (CCM), supporting AWS IoT ExpressLink lets IoT devices connect easily and securely to AWS over Wi-Fi. The CCM eliminates the need to manage connectivity, cloud networking, and security for IoT products, enabling faster time to market.

Product analytics

CIRRENT™ Product Analytics is a portfolio of cloud software solutions that give you actionable data for your IoT products in the field to improve performance, reliability, and connectivity. The portfolio includes the CIRRENT™ IoT Network Intelligence (INI) and CIRRENT™ Mobile App Intelligence (MAI), which provide data insights via a web portal that lets your product and engineering teams monitor and solve customer and product problems faster.



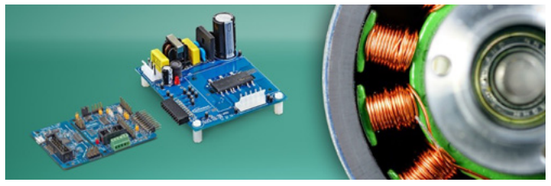
CIRRENT™ IoT Network Intelligence
CIRRENT™ Mobile App Intelligence

Actuation

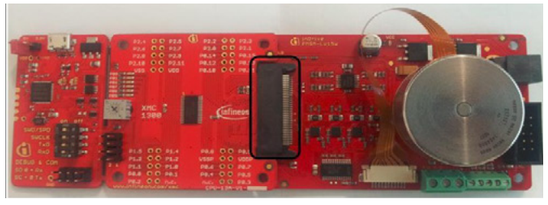
When your IoT device sets things in motion, you need the right combination of hardware and software to implement embedded motor control. The challenge is to find the right expertise to develop the software correctly, especially for things like motor control. Infineon's powerful combination of microcontrollers and motor control software lets you quickly customize your motor control solution.

Easy motor control development

Developing motor control can be difficult with all the different varieties of motors. You can often find yourself struggling to find the right combination of motor control drivers along with support for different power levels. The Infineon iMOTION™ evaluation kit lets you get a motor running in less than 1 hour. The kit's modular approach gives you maximum flexibility and scalability during the evaluation and development phases, letting you easily set up a complete motor drive evaluation system.



iMOTION™ design kit



XMC1000 Motor Control Application Kit

Customized motor control

Developing the right control scheme can be difficult given the wide variety of motor control applications. The XMC1000 Motor Control Application Kit lets you quickly prototype PMSM and BLDC motor control schemes with various position and current feedback sensors to balance cost and performance. This modular system allows users to evaluate the XMC1302 or XMC1404 microcontrollers with respect to motor control feature set and performance.

Power

As more devices get connected and smarter, a reliable and efficient power source remains a key requirement. From high voltage to battery power, devices need to effectively manage the power limits and requirements to ensure reliability, performance, and fast time to market. To meet these wide ranging needs, Infineon provides a full spectrum of power solutions from USB-C to Qi wireless charging to battery management systems.

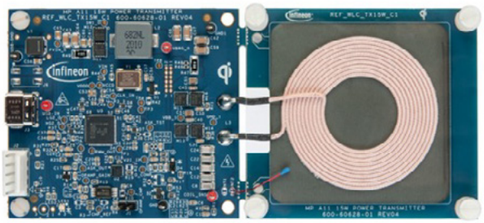
USB-C power

The world has started moving to USB-C which is becoming the most common power source for portable electronics. To correctly design a USB-C power source requires in-depth knowledge to handle the software and hardware requirements. With a rich portfolio of USB-C and power delivery products, Infineon provides end-to-end solutions for USB-C Power Delivery.

The EZ-PD™ Barrel Connector Replacement (BCR) is an easy to use, cost effective solution to replace old, incompatible barrel jacks or custom connectors with Infineon's highly integrated USB Type-C port controller -all with no firmware development and few external components.

Barrel connector replacement tech talk video
Barrel connector replacement kit

Wireless charging



Wireless charging kit website

With the widespread adoption of the Qi wireless charging standard, there is a growing risk of using unauthorized wireless chargers. Infineon lets you easily build authorized Qi compliant wireless chargers. As your partner for secured authentication according to the Qi wireless charging standard, Infineon makes the Qi certification process easy by handling the entire provisioning process, including the WPC-compliant certificate chain. The Wireless Charging kit makes development easy by offering a highly efficient and secure wireless charging platform.

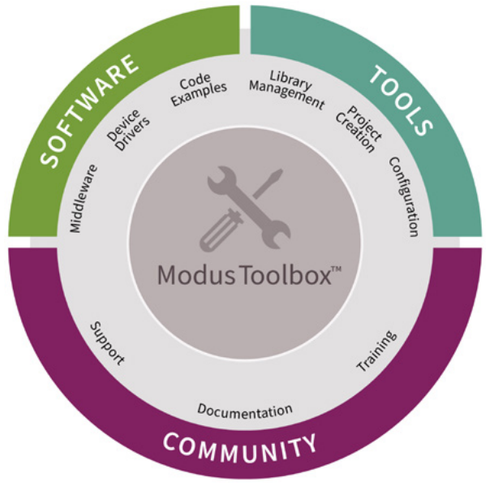
Software

Developers often have to choose between closed, proprietary flows that struggle to keep pace with modern innovations and open platforms that fail to support the unique features and value of their target device. ModusToolbox™ delivers the best of both worlds with a platform that gives you a wonderful development experience, increased productivity, and feature-rich, bullet-proof applications. ModusToolbox™ makes your life easier and more efficient by removing development barriers and allowing you to deliver quality products to market faster.

Embedded software

ModusToolbox™ accelerates the software development lifecycle without imposing a rigid, inflexible flow on engineering and validation teams. Unlike traditional IDE-centric approaches, ModusToolbox™ provides powerful standalone tools like our ground-breaking configurators and leaves the choice of compiler, editor, debugger, and revision control system up to you.

Ready-to-use software components, code, and applications let you reduce errors. Even the traditionally tedious tasks of creating a new project and keeping software up-to-date are easy with the ModusToolbox™ Project Creator and Library Manager tools.



ModusToolbox™

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