ST products and solutions

ST delivers intelligent and energy-efficient products and solutions that power the electronics at the heart of everyday life. Our chips and systems are found in billions of products, from cars and factory machines, through washing machines and air conditioning systems, to smartphones and telecommunications equipment. Our technology helps our customers make all these products more intelligent, more energy-efficient, more connected, safer and more secure. I 102-2 I

Our strategy is based on long-term trends: smart mobility, power and energy, Internet of Things (IoT) and 5G. We address four end markets – Automotive; Industrial; Personal Electronics; and Communications Equipment, Computers and Peripherals – where these trends drive the evolving requirements of our customers. I 102-6 I

Internet of Things and 5G

To support the needs of IoT and 5G, we provide a variety of products and solutions for embedded processing, connectivity, security, sensing and actuating.

High level of embedded security in general-purpose microcontrollers

Security is critical for all connected devices, and our portfolio covers the full range of secure solutions. These include software and hardware embedded in general-purpose microcontrollers and microprocessors. These are supported by the STM32Trust ecosystem, which offers a multi-level strategy to enhance security. In 2021, our latest general-purpose microcontroller achieved key security certifications that typically require a dedicated security chip to resist cyber-attacks.

We also provide dedicated secure microcontrollers that meet the highest security standards. These can be found in smartcards used for ID, transport, banking, and SIM cards, as well as pay TV applications.

NANOEDGE AI STUDIO

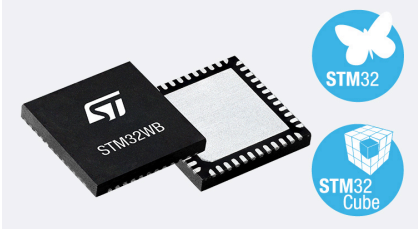
Increased support for machine learning on microcontrollers

Embedded processing capabilities are essential for every smart object. We offer general-purpose microcontrollers, such as our STM32 family, with a wide variety of device options. This ensures designers can find the best solution for their application, whether they require ultra-low power consumption, high performance, artificial intelligence (AI), advanced security or a high level of wireless and wired connectivity.

Our comprehensive development ecosystem saves on design costs and reduces time to market. Recent enhancements include new features in our STM32Cube software-development ecosystem to increase software-development productivity. In 2021, we acquired Cartesiam, a company that specializes in AI development tools, and announced a major upgrade of the associated software tool for machine learning on STM32.

Expanding the ecosystem for our microprocessors

Our STM32 microprocessor family addresses demanding industrial and IoT applications that require support for large open-source software. We have now extended this ecosystem with tools and software that increase security, allow customers to leverage AI, and support the creation of functional safety systems for industrial applications.



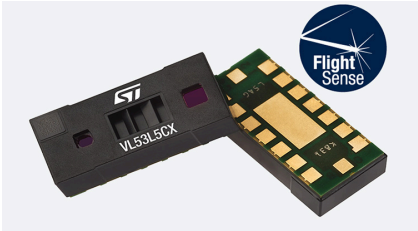
Easing the development of integrated wireless systems

Our wireless connectivity solutions include STM32 microcontrollers with embedded wireless, standalone RF transceivers, and network processors for Bluetooth, Bluetooth Low Energy, Zigbee, Thread and sub-1GHz long-range networks. We work with partners to make it easier for our customers to use services with Cloud connectivity software.

In 2021, we introduced new devices, development tools and software. These make it easier to design competitively priced and power-efficient wireless equipment for applications such as smart buildings and smart industry.

Supporting the development of industrial sensor applications

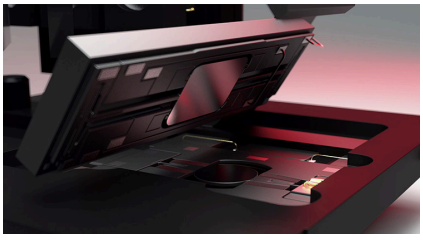
ST motion and environmental MEMS and sensors offer customers increased accuracy and sensitivity, with ultra-low power consumption. Our products power flagship personal electronics devices and help deliver the best user experience. We are present in many automotive and industrial applications, with products designed to meet the performance and reliability requirements of harsh environments. Our industrial sensor kit, introduced in 2021, simplifies the development of compact IO-Link sensors in industrial applications.



Multi-zone Time-of-Flight sensor for general-purpose applications

Our patented FlightSense technology, based on the Time-of-Flight (ToF) principle, ensures a high-accuracy, low-power, all-in-one solution for proximity and ranging sensors for personal electronics and industrial applications, as well as 3D sensing for smartphones and smart driving (LiDAR) features. In 2021, we announced a first multi-zone ToF sensor for general-purpose applications, bringing sophisticated distance sensing to the full spectrum of consumer and industrial products.

Laser beam scanning system



Our innovative thin-film piezoelectric microactuators ensure higher efficiency and lower costs for traditional applications such as inkjet printing, while enabling innovation with MEMS speakers, micromirrors and fluid dispensing technologies.

In 2021, we made further advances in enabling the fast development of high-performance augmented reality glasses through a reference design and a manufacturing ecosystem. This provides a one-stop-shop solution for laser beam scanning systems, including semiconductor technologies, products and reference designs.

Power and energy management

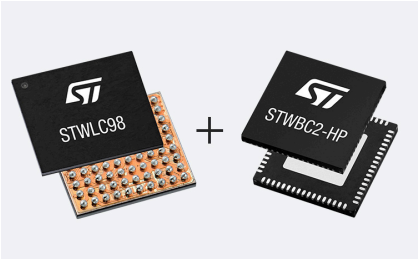
Our technology and solutions for power and energy management enable customers to increase energy efficiency everywhere and support the use of renewable energy sources.

Products for slimmer, more energy efficient power supplies

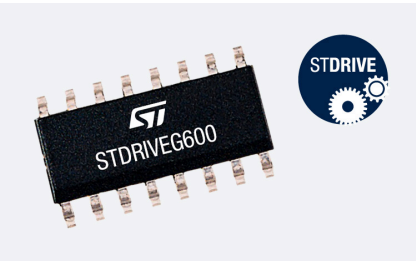
We offer power discrete devices serving applications across our end markets. Our Silicon Carbide (SiC) and Gallium Carbide (GaN) power devices deliver energy efficiency and enhanced performance to applications in all of the end markets we serve. We introduced a new family of GaN power semiconductors in 2021 that can significantly reduce energy use and enable slimmer designs in a wide variety of electronic products.

Other products are first choice solutions for high-end power conversion, home appliances, power supplies, and motor control.

Wireless power solutions with high system efficiency



We address applications that require generic and application-specific solutions for power management. Our solutions enable energy-saving, high-power-density and lower-standby-power designs. Our offering includes SiC and GaN power discretes, Silicon MOSFETs, IGBTs and customized power modules, AC-DC and DC-DC converters, battery management ICs, wireless power ICs, digital controllers, and gate drivers. One of the innovations we introduced in 2021 is a 70-Watt wireless charging solution that delivers faster wireless charging and flexible charge sharing for diverse applications in personal electronics, industrial and automotive.



Gallium Nitride driver for high efficiency motor drive

We provide an array of motor control solutions that enable motors to run with higher efficiency and greater precision. We cover the requirements of brushed DC motors, stepper motors and brushless DC motors over an extensive range of voltage and current ratings. We offer highly integrated motor drivers that embed all the functions needed to drive motors efficiently and with the highest accuracy. They include a low-voltage series designed for battery-powered smart devices, and a series embedding an STM32 microcontroller.

In 2021, we introduced a single-chip gate driver for high-efficiency GaN devices addressing energy-saving in applications such as **motor drivers** for home appliances, factory automation and industrial drives.

Smart mobility

To meet the smart mobility needs of our global customer base, we provide products and solutions that serve the key trends in the automotive market – vehicle digitalization and electrification. We enable them to create the next generation of vehicles that are safer, greener and more connected.

Third generation Silicon Carbide solutions for EVs and charging stations

Our wide bandgap solutions for electric vehicles (EVs) and charging stations enable our customers to create EVs with longer range and faster charging, and that weigh less. We introduced our third generation of SiC devices in 2021, which set new benchmarks for transistor efficiency, power density, and switching performance. We provide high-efficiency smart power solutions and processors to ensure that every device used to power, control and monitor car subsystems consumes less energy.

Powerful automotive integration MCUs for new levels of performance and safety

To enable increasing car digitalization, we develop automotive microcontrollers. These range from microcontroller units (MCUs) for cost-sensitive applications to advanced integration MCUs.

Advanced Driver Assistance Systems (ADAS)

We work with partners to provide ADAS solutions that make driving safer by reducing road accidents through products that include cutting-edge RF and vision systems, as well as advanced vehicle communications solutions. In 2021, our partner and customer Intel-Mobileye delivered its 100 millionth EyeQ® system-on-chip, working with 25 global carmakers to make their vehicles safer. The broad family of EyeQ® powers the entire range of ADAS visual functionality, from driver-assistance to automated driving features.

High-precision solutions for car navigation

We offer ICs dedicated to body and convenience solutions, including body control modules and car lighting systems as well as ASIC and ASSP solutions for engine control. Our in-vehicle telematics and infotainment systems cover high-end integrated platforms, digital radio, audio power amplifiers, and satellite navigation receivers.

We demonstrated our innovation once more in 2021 with the introduction of the first automotive-qualified single-chip GNSS receiver to integrate a triple-band positioning measurement engine on the chip.