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New microcontrollers from STMicroelectronics expand STM32U5 series, raising performance and energy efficiency for IoT and embedded applications

- *Lead customer Ajax Systems uses STM32U5 MCUs in next-gen wireless security and smart home solutions*
- *STM32U5 series MCUs are first general-purpose MCUs to receive NIST embedded random-number entropy source certification*

Geneva, Switzerland, February 21, 2023 – STMicroelectronics (NYSE: STM), a global semiconductor leader serving customers across the spectrum of electronics applications, has expanded its STM32 family of advanced microcontrollers (MCUs) with extra STM32U5 devices that raise performance while squeezing power consumption for longer runtimes and energy efficiency. The STM32U5 has also received NIST embedded random-number entropy source certification[1]; the industry's first to receive this endorsement.

The new MCUs extend the range of code and data storage to 128Kbyte Flash for cost-sensitive applications, while also adding high-density versions for complex applications and sophisticated smartphone-like user interfaces. Among these, the STM32U59x/5Ax with 4Mbyte Flash and 2.5Mbyte SRAM has the largest on-chip memory of any STM32 MCU to date.

With their increased capabilities, the new MCUs enhance deeply embedded applications like environmental sensors, industrial actuators, building automation, smart appliances, wearable devices, eMobility controls, and others, especially in remote, difficult to access locations. As billions of such devices are being deployed worldwide for smart living and working, ST's new MCUs accelerate progress by boosting performance, enhancing energy efficiency, and strengthening cybersecurity.

All STM32 MCUs are based on industry-standard Arm® Cortex®-M embedded CPU cores and benefit from the powerful and easy-to-use STM32Cube and STM32Cube.AI development ecosystem. This ecosystem consolidates tools and software to support customers' projects from start to finish, including the creation of cutting-edge AI/ML solutions through conversion of pretrained neural networks into optimized code.

The STM32U5 series leverages the latest generation, the Cortex-M33, which incorporates advancements that increase performance, energy efficiency, and resistance to online and hardware attacks. Around this core, ST has added its ultra-low-power MCU knowhow and implemented an architecture that leverages established Arm principles for superior cybersecurity. Some devices in the series provide a 2.5D graphics accelerator. The result is a groundbreaking MCU series that offers a large selection of pin-to-pin and software-compatible products ready to tackle next-generation applications.

[1] A certified random number generator is an important source of non-deterministic (random) data needed for security algorithms in cryptography and to fulfil the SP800-90B specification.

"*Because many applications demand extra functionality, richer graphics, and faster performance while running longer, using a smaller battery, or employing energy harvesting, we've developed the STM32U5 and are extending the series, today*," said Ricardo De Sa Earp, Executive Vice President General-Purpose Microcontroller Sub-Group, STMicroelectronics. "*This MCU combines the latest Arm core, our unique ultra-low-power technologies, generous on-chip memory, and the option of our NeoChrom graphics engine to elevate the user's visual experience*."

Among ST's lead customers for the STM32U5 series, Ajax Systems is already designing future generations of its advanced wireless security and smart home solutions using the new MCUs. Max Melnyk, Device Department R&D Director at Ajax, commented, "*Working with STMicroelectronics, a global giant in the semiconductor market, helps us evolve and strengthen Ajax products. The STM32U5 series significantly lowers power consumption while maintaining the same performance we achieved using other MCUs that contain DSP and floating-point co-processors. And we can reuse 90 percent of our existing code. An additional, major advantage for us is the large integrated SRAM, which is enough to handle a double frame buffer for fast and fluid graphics performance. There is also generous flash for loading resources. I'm sure it'll drive the development of the next generations of Ajax products.*"

Further technical information
Proprietary energy-saving features of the STM32U5 series include autonomous peripherals and ST's low-power background autonomous mode (LPBAM). The LPBAM lets the application maintain critical functionality while the core and other unused blocks power down into any of the MCU's flexible energy-saving modes. From this state, the MCU can quickly wake the core to process a batch of data efficiently then transition back into a low-power mode.

On the other hand, STM32U5 MCUs provide up to 4Mbytes of flash storage for code and data, as well as up to 2.5Mbytes SRAM, for handling sophisticated applications. The large on-chip memory saves additional discrete memory chips that otherwise increase power consumption, bill-of-materials (BOM) cost, and PCB size.

The STM32U5 series also breaks the constraints on graphics performance that typically apply to ultra-low-power MCUs. Variants with ST's advanced NeoChrom graphics processing unit (GPU) on-chip can run a sophisticated graphical user interface (GUI) previously only possible with an expensive microprocessor-based system. A tiny, embedded processor can now host smartphone-like user experiences and GUI development can leverage ST's TouchGFX framework that now features SVG support and rich graphical assets.

Also, unlike the processors typically needed to support such sophisticated capabilities, STM32U5 MCUs come in an economical LQFP100 package that permits a simplified PCB construction with minimal layer count. Developers can accelerate their projects using resources including the STM32CubeU5 software package, new NUCLEO-U545RE and NUCLEO-U5A5ZJ development boards, and the STM32U5A9J-DK Discovery kit for graphics.

The STM32U5 series also enhances cyber security, leveraging the Cortex-M33 with its memory protection unit and Arm's TrustZone® architecture featuring hardware isolation. The MCUs also integrate cryptographic accelerators for advanced AES algorithms, support for public key architecture (PKA), and resistance to physical attacks. In addition, error correction code (ECC) support on flash and SRAM prevents corruption thereby enhancing both cyber-protection and safety.

On top of this, the STM32U5 is the first general-purpose group of MCUs to receive the NIST (US National Institute of Standards and Technology) embedded random-number entropy source certification. As the certification is reusable by customers, it simplifies and speeds certification for those applications that need SP800-90B final certification.

The new STM32U5 devices are scheduled to begin volume production in Q2 2023. MCUs will be available from ST's eStore and distributors, priced from $2.15 for orders of 10,000 pieces. Please contact your local ST sales office for other pricing options.

For further information please go to www.st.com/stm32u5.

About STMicroelectronics

At ST, we are more than 50,000 creators and makers of semiconductor technologies mastering the semiconductor supply chain with state-of-the-art manufacturing facilities. An integrated device manufacturer, we work with more than 200,000 customers and thousands of partners to design and build products, solutions, and ecosystems that address their challenges and opportunities, and the need to support a more sustainable world. Our technologies enable smarter mobility, more efficient power and energy management, and the wide-scale deployment of the Internet of Things and connectivity. ST is committed to becoming carbon neutral by 2027. Further information can be found at www.st.com.

For Press Information Contact:

Michael Markowitz
STMicroelectronics
Tel: +1 781 591 0354
Email: michael.markowitz@st.com