R&D

R&D

Creating Unique Products by Fusing Analog and **Digital Technologies**

MegaChips meets customers' needs based on its proprietary technologies and puts all its effort into the research and development of application technologies to distinguish our own products from those of competitors.

To ensure our superiority and uniqueness through research and development, we promote the protection of our own intellectual property rights.

R&D Policy

Game software storage LSI

Major Achievements in R&D for FY2021

Provide system LSI and solutions with our unique analog and digital technologies

LSI for wired (twisted pair cable, coaxial cable and power cable) multi-hop communications Intellectual property and LSI for optical communications

Intellectual Property Strategy

Since MegaChips is a fabless manufacturer, our unique ideas, expertise, and other intellectual properties derived from R&D activities constitute the foundation of our competitive advantage. Accordingly, protecting our intellectual property rights is vital to enhance competitiveness and raise growth.

In FY2021, we filed patent applications such as performance enhancement technology for LSI in game consoles, OVP (Over Voltage Protection) technology for wired communication LSI, and detection signal circuit for communication LSI. A patent application was also submitted for security technology for IoT devices as basic/application technology.

Patent Applications and Registrations by Region*1

Total number of Applications: Total number of Registrations



*1 The number of cases shown are the cumulative total as of the end of March 2022. *2 "Others" denotes the number of applications for patents that are valid under internation patent treaties in multiple countries where MegaChips may begin operations in the future

About Corporate Venture Capital Fund (CVC)

We have established Corporate Venture Capital Fund (CVC) funded by MegaChips LSI USA Corporation (MLU) to transfer the management structure by centralizing managerial resources to growth market including industrial equipment, telecommunication, energy, robot, and Al.

We will develop a new market and provide new solutions through investments in the startups that drive innovation with advanced technology and aim for sustainable growth for mid-long term by accelerating a launch of new business.



Product Information

R&D

oint Project w Santa Clara University (SC Partner with Santa Clara University Research Institute

in the heart of Silicon Valley

MegaChips is moving toward launching new businesses through collaborations with companies and universities with cutting-edge technologies and ideas, mainly in the United States. As part of this initiative, we have launched a joint project in the field of robotics with the SCU Robotic Systems Laboratory (SCU), a research institute at Santa Clara University, in anticipation of the coming era in which robots will be utilized.

Preparation of Environment Dedicated to Research and Development with the Latest Equipment

SCU promotes research and development of functional materials, devices, and systems of 100 nm or less, including the possession of a high-resolution electron scanning microscope. In addition, SCU offers a supportive environment for researchers, with such things, as a newly constructed STEM building equipped with tools and machines to create the equipment and instruments necessary for conducting research and development.

Prof. Kitts' Lab Mentors Engineers through "Hands-on Development"

The laboratory of Dr. Kitts, a professor at Santa Clara University and director of the SCU, emphasizes hands-on development that not only develops prototypes with a development concept and target, but also keeps the deadlines and quality required by companies. By mastering the development process at the company in this way, students will gradually evolve as full-fledged engineers.

Joint Research with SCU on Recognition and Control Technology

In collaboration with Professor Kitts' laboratory, MegaChips has embarked on the development of the basic technology for "Cobot", a robot that supports human work at factories, construction sites, farms, livestock farms, and other production sites. Currently, as a control technology for "Cobot", we are developing a system utilizing AI technology that allows robots to recognize human gestures and perform corresponding actions.

Development of "Cobot" Control Platform to Launch New Businesses

In the future, MegaChips plans to increase the components of the basic technology for "Cobot" and offer our own platform populated with a library of "Cobot" controls. By allowing customers in the robotics industry to use this platform, we will generate a wide range of new businesses by expanding not only the ASIC/ASSP business, but also by developing embedded modules and application software.







R&D

Collaborative Projects with Japanese Universities

Achieving Innovations that Create New Value through Collaborative Research

MegaChips is also collaborating with universities in Japan to take on the challenge of achieving new innovations.

This is an initiative for MegaChips' mid- to long-term sustainable growth, which will contribute to the resolution of regional and social issues through collaboration with universities.

Collaborative Project with Nara Institute of Science and Technology





Purpose of Research

MegaChips is promoting the edge AI business as a new business to achieve a sustainable society. We have embarked on collaborative research with the Nara Institute of Science and Technology concerning "high-speed robot controls" by applying Spiking Neural Network (SNN) to high-rate 3D sensors.

Background of Project Launch

The edge AI that MegaChips is working on aims AI branded sensors that directly connect the sensor to AI process. The data is then processed by the edge device into information required for the robotic system, which is passed on to the controller. By doing so, the entire system's transmission volume can be reduced, resulting in an overall improvement of the entire system's speed and latency. Especially in the industrial/FA field, high-speed and low-latency systems are desired for use cases, such as robotic arms and automated guided vehicles. In the industrial/FA field, we are starting research about AI-based action planning and high-speed control design of robots, with the aim of contributing to improved safety and work efficiency of robotic and other systems.

Research Initiatives

Our goal is to establish technology for high-speed control (reflexive motion) of robots and provide technical feedback to our products to improve the superiority of our business.

- Application of low power consumption and high-speed processing AI HW by SNN to robots
- Investigation of quantization algorithm for model reduction and its application to reinforcement learning

Collaborative Project with Tokyo Metropolitan University



Purpose of Research

We are promoting business expansion in the growing markets of AI, robotics, and other fields. In collaboration with Tokyo Metropolitan University, we have commenced research on initiatives related to "Robot Intelligence Innovation Based on Local 5G for Super Real-Time Tracking" to realize a highly advanced, networked society in which everything is connected to the Web and equipped with AI technology.

Background of Joint Research

The high-performance, compact, and ultra-low power consumption technology of edge AI that we are working on can contribute to the automation and autonomy of robots, such as personal mobility and automated guided vehicles. MegaChips is also participating in a consortium for a local 5G project. We aim to strategically launch and grow new businesses by building trust with new partners through proactive communication and the acquisition of new knowledge in the robotics field, where the market is expected to expand.

Research Initiatives

In collaboration with the consortium members, we will identify issues and study prototyping for social implementation. MegaChips is responsible for the systematization infrastructure and will take on the challenge of achieving a society in which intelligent technology and robotic technology are integrated.