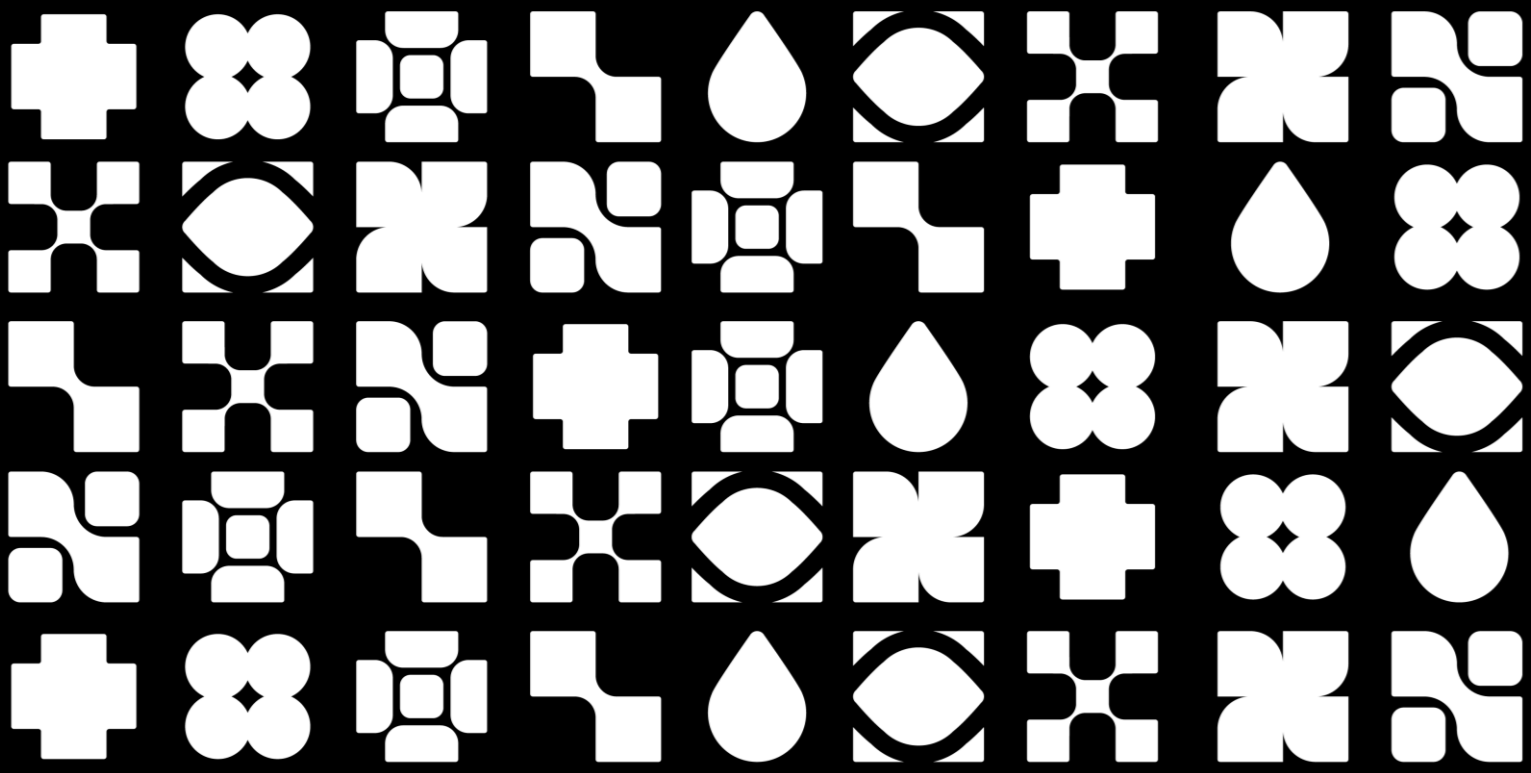
Endless ways to the future

SOLUTION BRIEF

High Performance and Low Power with MediaTek's Next-gen Architectures



High Performance and Low Power with MediaTek's Next-gen Architectures

Equipping products and solutions with the proper hardware is a perpetual challenge. Technical specifications that must be considered include the processor, connectivity, thermal capabilities, video resolution, energy efficiency, and, most recently, edge AI and cloud connectivity.

There is a clear trend toward finding the best balance between performance and power efficiency. The market for solutions is moving between high-performance processors such as those from Intel and energy-efficient yet fast Arm® processors. But what if what's needed is a solution that finds a middle ground between high performance and energy efficiency?

MediaTek's processor technology fills the gap from entry-level to premium applications. No more choosing between high-performance (x86) and low-power (Arm®) processor performance. MediaTek's Genio processor family delivers that performance with low-power consumption. A strategic cooperation between SECO and MediaTek offers a new alternative to the embedded industry. MediaTek ships over 2 billion processors a year, brings its vast experience from the consumer market, and produces solutions for sectors such as smartphones, TV, connectivity, and gaming. Through a cooperation with SECO, MediaTek is entering the embedded market.

With the **SOM-SMARC-Genio700** and **SOM-SMARC-Genio510**, SECO brings performance to the embedded industry. These modules can be implemented in various applications, including:

- **Smart Home:** Imagine smart devices in everyday use, such as refrigerators that can adjust the temperature based on the products in the fridge and even send messages for shopping lists.
- **Industrial IoT:** Factories are becoming more intelligent, and machines are being equipped with sensors and cameras for monitoring. The monitoring (sensors and cameras) is done at the exact level of performance required - there is no need for high performance like an Intel processor.
- **Healthcare:** Live monitoring of vital signs on handheld devices requires high and high-speed performance and must be designed for battery/accumulator operation.

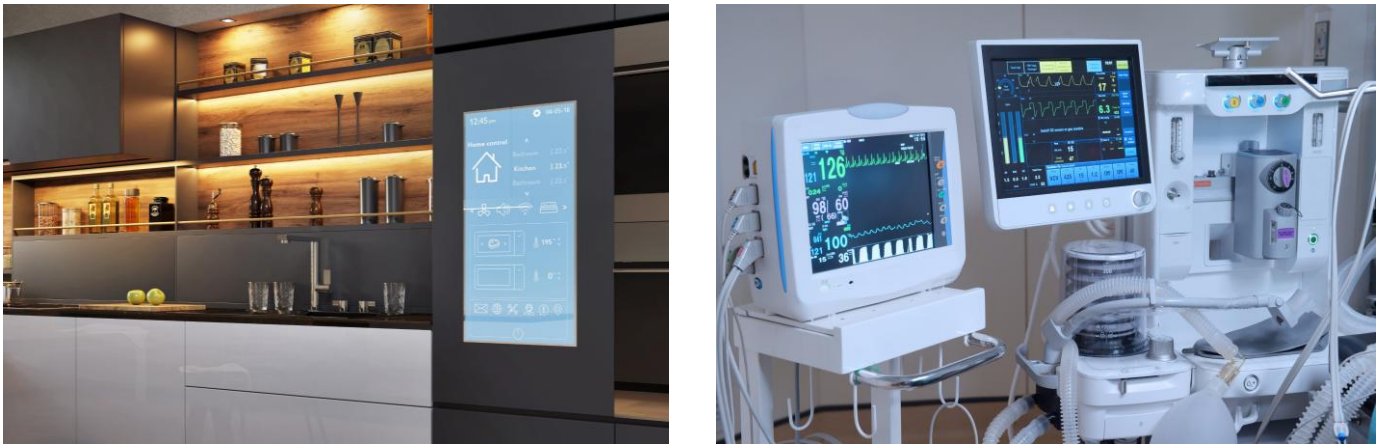


Figure 1: *Smart Monitoring through SECO SOM-SMARC-Genio700 and SOM-SMARC-Genio510*

1. Pioneering achievements with Arm® processors

SECO has always been a pioneer in improving the performance of processor technologies. Thus, the achievement was accomplished to raise the StrongARM processor to the level of a PC at that time, so that the performance was comparable to identical. SECO also developed the first CPU module based on Arm®, demonstrating the pioneering use of energy-saving modules with a small form factor combined with the highest possible performance. As a result, SECO was involved in the initial uptake of Arm® processors at the time.

The MediaTek Genio700 and Genio510 processors bring the same potential to reach PC level again, enabling SECO to take energy-efficient module embedded technology to a new level of performance. SECO has integrated both processors on a SMARC module, the **SOM-SMARC-Genio700** and **SOM-SMARC-Genio510**.

Figure 2: *Pioneering achievement in cooperation: The SIMPad equipped with SECO technology long before the release of the first iPad*

Figure 3: *Successful pioneering work by SECO to bring StrongARM performance to PC level*

2. New level of application technology

2.1 Processor power in comparison

FEATURE	MEDIATEK GENIO 700 (MT8370)	MEDIATEK GENIO 510 (MT8390)	ROCKCHIP RK3568
CPU architecture	2x Arm® Cortex®-A78, 6x Cortex®-A55	2x Arm® Cortex®-A78, 4x Cortex®-A55	4x Arm® Cortex®-A55
Clock speed	2x Arm® Cortex®-A78 @ 2.2 GHz, 6x Cortex®-A55 @ 2.0 GHz	2x Arm ® Cortex®-A78 @ 2.2 GHz, 4x Cortex®-A55 @ 2.0 GHz	Up to 2.0 GHz
GPU	Arm® Mali™-G57 MC3, 48 Shaders	Arm® Mali™-G57 MC2, 32 Shaders	Arm® Mali™-G52-2EE
Memory support	LPDDR4X-3733/LPDDR4-3200 up to 8GB	LPDDR4X-3733/LPDDR4-3200 up to 8GB	LPDDR4, LPDDR4x up to 8GB
Interfaces	1xUSB 3.1, 1xUSB OTG 2.0, 4x USB2.0 PCIe 2.1, UART, SPI, I2C, I2S	1xUSB 3.1, 1xUSB OTG 2.0, 4x USB2.0 PCIe 2.1, UART, SPI, I2C, I2S	USB 3.0, PCIe 2.1, SATA, UART, SPI, I2C
Connectivity	Wifi 802.11 a/b/g/n/ac 2x2 and BT 5.3	Wifi 802.11 a/b/g/n/ac 2x2 and BT 5.3	Wi-Fi 5, BT 4.2
AI capabilities	AI Accelerator: Cadence Tensilica VP6 with MediaTek APU3.0	AI Accelerator: Cadence Tensilica VP6 with MediaTek APU3.0	NPU with 1 TOPS
Display	LVDS dual channel or eDP (factory alternatives) HDMI® up to 4K60, DP	LVDS dual channel or eDP (factory alternatives) HDMI® up to 4K60, DP	HDMI® 2.0a, eDP 1.3, LVDS, MIPI-DSI
Imaging	32MP @ 30fps single camera, 16MP + 16MP @ 30fps dual camera, ISP Support	32MP @ 30fps single camera, 16MP + 16MP @ 30fps dual camera, ISP Support	8MP ISP, 16-bit camera interface

2.2 SECO SOMs in comparison

FEATURE	SOM-SMARC-GENIO700	SOM-SMARC-GENIO510
Processor	MediaTek Genio 700	MediaTek Genio 510
Memory interface	eMMC 5.1 up to 64GB, SDIO	eMMC 5.1 up to 64GB, SDIO
Network	1x Gigabit Ethernet, optional Wi-Fi and BT 5.3 (M2.16 Std)	1x Gigabit Ethernet, optional Wi-Fi and BT 5.0 (M2.16 Std)
USB	1x USB 3.1, 1x USB 2.0 Host/Slave 4x USB 2.0 Host	1x USB 3.1, 1x USB 2.0 Host/Slave 4x USB 2.0 Host
Video outputs	LVDS dual channel or eDP, HDMI®, DP	LVDS dual channel or eDP, HDMI®, DP
Video resolution	MIPI/eDP: up to 2560x1600p60, HDMI®/DP: up to 4K60	MIPI/eDP: up to 2560x1600p60, HDMI®/DP: up to 4K60
Operating systems	Linux Yocto Kirkstone Android T (13)	Linux Yocto Kirkstone Android T (13)
Operating temperature	0 to +60°C (Commercial) -20 to +85°C (Extended Commercial) -40 to +85°C (Industrial)	0 to +60°C (Commercial) -20 to +85°C (Extended Commercial) -40 to +85°C (Industrial)

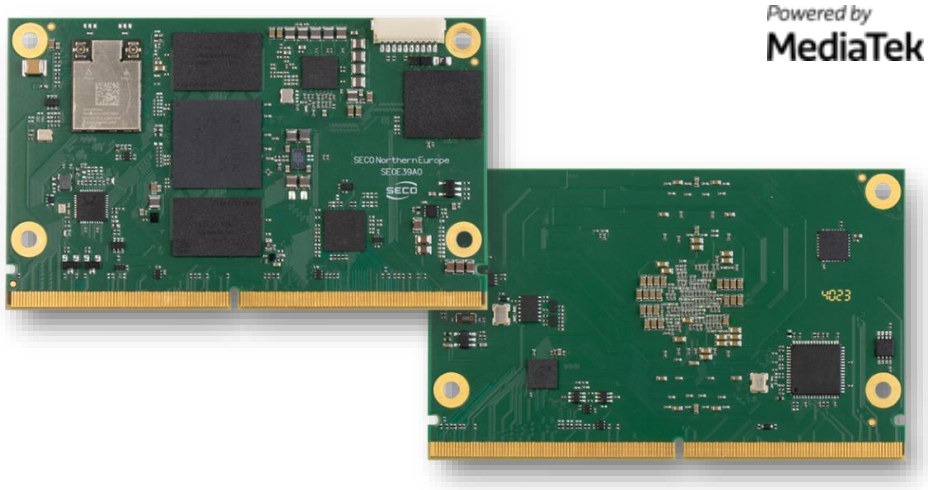


Figure 4: SOM-SMARC-Genio700

3. A new kind of visual experience

Both SMARC® modules demonstrate their full potential in applications requiring high image resolutions of up to 4K (maximum 2K with two screens) and a smooth user interface. The integrated graphics processors are optimized to overlay multiple layers to support smooth animation.

In comparison, modules with Arm® processors generally have lower performance in terms of achieving the same quality and resolution.. When animations are involved, they are often limited to a maximum resolution of FullHD.

- **Medical:** The SOM-SMARC-Genio700 is used by medical micro camera manufacturers. Its 4K screen displays images in real-time, providing optimal support for diagnostics and examinations.
- **Digital Signage:** The SOM-SMARC-Genio700 effortlessly displays seamless product presentations in 4K on crystal-clear screens, and smooth animations and transitions can be reproduced. The SOM-SMARC-Genio700 shines when battery operation is required. The module is already being used in the early stages of development for smaller advertising spaces.

This is made possible by the remarkable processor architecture of the Genio processors: 2x Arm® Cortex®-A78, 6x Cortex®-A55 in the Genio700 and 2x Arm® Cortex®-A78, 4x Cortex®-A55 in the Genio510.

The interaction of these processor cores enables the efficient distribution of power. Intensive video data processing is carried out on the Cortex®-A78 cores, while low-load or idle processing is carried out on the Cortex®-A55 cores. In addition, this architecture allows small applications (e.g., repetitive processing) to be processed in the cache memory, which increases efficiency and performance.

Figure 5: Dentist microcamera in action

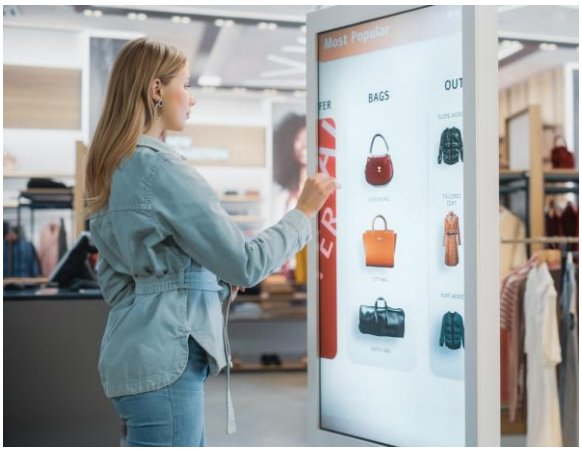


Figure 6: 4K interactive Signage

4. Unlimited surveillance and monitoring

Real-time monitoring is also required for automated production. Manufacturing systems can fail, or robots can fail due to latency, fail to perform, or perform dangerous movements. **The SOM-SMARC-Genio700 and SOM-SMARC-Genio510 are designed for monitoring and surveillance in production**. Sensors and cameras can be placed in machines or work areas and the SOM processes the collected data. In this application, the SOM checks the quality and accuracy of a packaging machine. Real-time analysis is especially important for quality assurance and error detection. The analysis takes place entirely in the SOM and only the relevant data is sent to the cloud.

The SOM-SMARC-Genio700 is also used in building monitoring. Surveillance data is processed in the module and then transmitted to the central surveillance system. The Genio processor's neural accelerators enable the real-time analysis of video data for facial recognition and motion analysis. Routine monitoring is carried out in the energy-efficient processor cores, while person identification takes place in the Cortex®-A78 cores.

5. Battery-powered performance

As mentioned before, MediaTek Genio processors are energy efficient. This means that they consume less power and generate less heat than other (especially older) processors. These properties are advantageous when **using the SOM-SMARC-Genio700 and SOM-SMARC-Genio510 in compact and battery-powered devices** that do not have active cooling.

For example, the SOM is used in a portable patient monitoring device that collects and processes medical health data such as heart rate, oxygen saturation, blood pressure, and ECG data.

Another example is a portable environmental monitor that uses sensors to monitor air quality, temperature, humidity, particulate matter and other environmental parameters in real time, providing critical information to city planners.

Both devices use the computing power of the Cortex®-A78 cores to perform all data processing within SECO's SMARC module, thus reducing power consumption.

6. MediaTek Genio processors at the core of SMARC® modules

MediaTek's processor technology opens up new possibilities and brings the advantages of smartphone processors to the embedded market. **Implementing the Genio 700 and 510 processors on SECO SMARC modules creates new opportunities for those looking for solutions for 4K displays or image data processing**.

With a rich history in Arm® processors, we have honed our skills to maximize their performance. This expertise now allows us to bridge the performance gap between Arm® and x86, pushing processor performance to its limits.

Anyone looking for solutions for the smooth display of 4K with energy-efficient power requirements or real-time monitoring of image and sensor data should consider the unique advantages of the SOM-SMARC-Genio700 and SOM-SMARC-Genio510 modules.

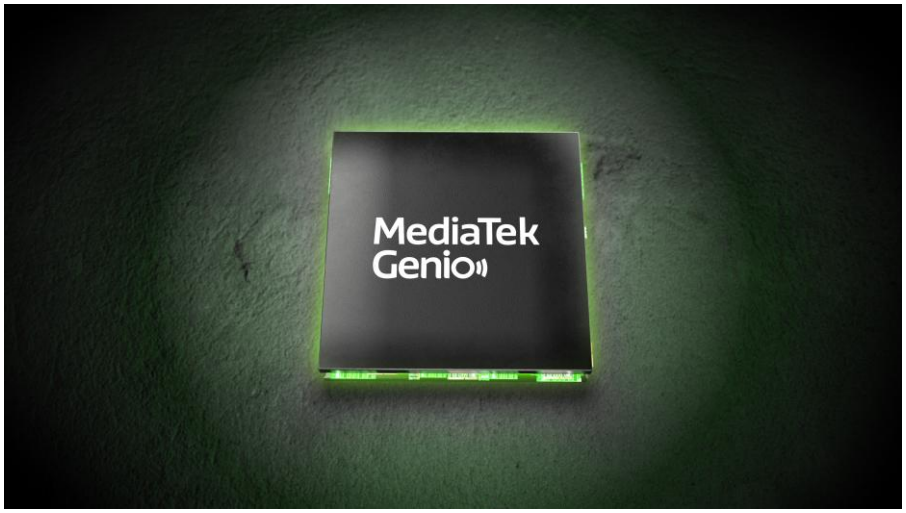


Figure 7: *MediaTek Genio SoCs helps design and create intelligent connected devices*

7. Seeing beyond computing power: Clea and SMARC Genio modules

The true potential of these modules can only be realized when they are integrated into final solutions. SOM-SMARC-Genio700 and SOM-SMARC-Genio510 modules both offer out-of-the-box compatibility with SECO's Clea IoT Software Suite, providing a comprehensive infrastructure that simplifies the creation of complex applications at scale.

By harnessing Clea's advanced capabilities, you can confidently enable real-time analytics for predictive maintenance, ensuring the smooth operation of your critical systems. With over-the-air updates, your applications remain secure, efficient, and functional. Combined with the Clea platform, these modules enable customers to develop the next generation of industrial automation systems, smart cities, and computer vision applications.

7. Start Building Your Next project implementing SOM-SMARC-Genio700 or SOM-SMARC-Genio510

Let's discover together your next project.

As you reach out contacting us and order now, imagine a future where you enjoy these benefits and look back to today as the start of it.

Explore the products

Do you have a project?

Talk to us about it!

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SECO is a high-tech company that develops and manufactures cutting-edge solutions for the digitalization of industrial products and processes. SECO's hardware and software offering enables B2B companies to introduce edge computing, Internet of Things, data analytics and artificial intelligence in their businesses. SECO's technology spans across multiple fields of application: serving more than 450 customers, operating in sectors like Medical, Industrial Automation, Fitness, Vending, Transportation and many others. Enabling to accurately monitor the functioning of on-field devices, SECO solutions contribute to creating low environmental impact business models thanks to a more efficient use of resources.

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