premio

›» Case Study

Locking in a Great Interactive Kiosk Experience

Making the most of a tight space, Premio SBCs powered by AMD Ryzen™ Embedded SoCs are key to expanding high-speed USB I/O for sensors and delivering greater overall efficiency.

The Challenge

- Legacy key-cutting methods result in an average error rate of 15%
- With over a decade in the kiosk business, this automated access solution provider had made significant software advancements that could not be fully leveraged in the existing design
- Commercial computer boards in use were extremely limiting to future-proofing kiosk design
- To support next-gen capabilities, the OEM's new units required more I/O connections in a limited space
- A significant upgrade in compute hardware was necessary to power the software algorithms and accommodate the additional connections
- With thousands of kiosks deployed, the company required a backward compatible hardware solution to retrofit existing and next-generation kiosk deployments

The Solution

- Premio had proven itself with its compute design for the customer's initial kiosks, and was ready for next gen advances
- With 30+ years of design and manufacturing of industrial-grade computing solutions, Premio's advanced, rugged edge computers are highly suitable for commercial/industrial applications
- Premio's close ties to major semiconductor manufacturers gives them the edge in evaluating new technologies before they're made widely available
- To meet customer requirements, Premio selected AMD Ryzen™ embedded technology for its low thermal design and ultra-performance characteristics in their SoC designs
- AMD's new chip spawned Premio to develop its own 3.5" SBC powered by AMD's multifaceted Ryzen™ embedded processor

The Benefit

- The new design, incorporating the Premio 3.5” SBC with AMD Ryzen™ Embedded series processor, consumes much less power and offers passive cooling in a compact form factor
- Commitment to high reliability and embedded longevity helps reduce cost and maximize long-term deployments in rugged settings
- AMD’s embedded processors follow an extensive 10-year support cycle for prolonged reliability and longevity
- The kiosk OEM effectively taps into Premio’s effective, hands-on supply chain management that sustains massive kiosk deployment worldwide at mass scale

The Company

The rugged edge has forged significant advancements in the modern-day kiosk. Beautiful touch screen displays and elegant signage invite patrons to explore what is offered. Fast food restaurants, mass retailers, service businesses, airports, and so many others have recognized the inherent usefulness of interactive, self-service kiosks. Whether dispensing information, enabling a brick-and-mortar shopper to place an online order for an out-of-stock item, checking luggage for a cross-country flight, or even making extra house keys for family members, kiosks offer all the convenience without costly and error-prone face-to-face human interaction.

“We Are Our Own Customer, as We Own and Operate All the Machines We Build With Premio Product. In General, the Pace of Communication and Response Has Trickled Its Way Into Our Operations Team, and They Also View Premio as a Trusted Partner” – Chief of Manufacturing and Supply Chain

The Challenge

While the traditional method of cutting keys has a 15% average error rate, one leading ‘access solutions’ company is leveraging advanced robotics and AI to transform the $12 billion locksmith services industry. Its cross-country network of 4,000+ self-service kiosks gives consumers in heavily trafficked environments the option to duplicate brass keys as well as sophisticated electronic keys (i.e., RFID and vehicle transponder) on the spot – instead of calling in a locksmith.

In business for more than a decade, this solutions provider has been creating spare keys with its patented technology that digitally decodes the original key and resets the new one to factory specs, leaving the consumer with a more accurate key than the original. The company’s self-service key-making kiosks can be found in a wide range of convenience stores, grocery chains, drug stores, and hardware retailers.

With so many recent advances in AI and robotics technology, the company is constantly improving its software algorithms and was eager to migrate these improvements to its key-making kiosk design. In order to pack as much functionality as possible into a very limited footprint, engineers knew the hardware ‘brains’ of the system would need a significant update. The standard commercial computer boards in use just weren’t cutting it as components take up valuable space – space that, if the board itself were smaller to accommodate more connections, could be leveraged to increase operational capacity. In addition, the commercial parts in use could be difficult to source over time, creating a costly and frustrating scramble come replacement time.

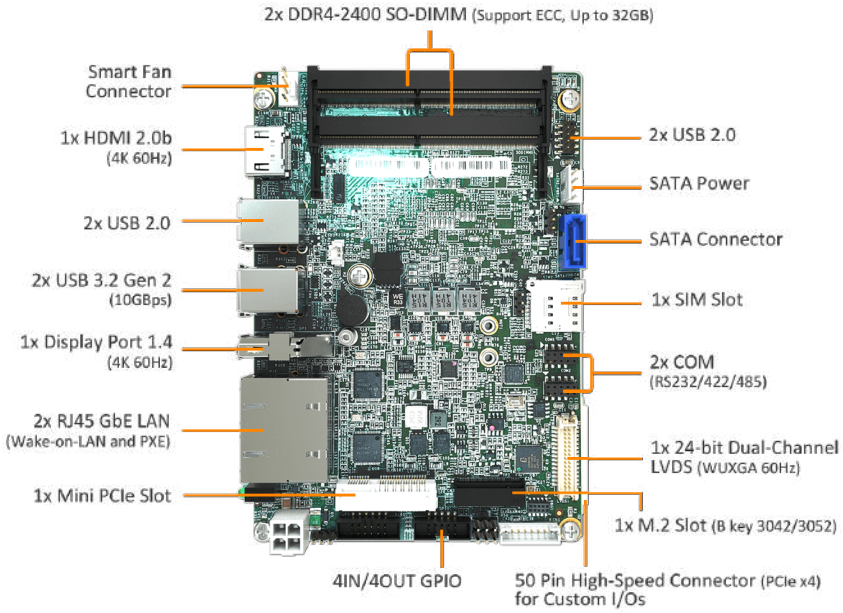
Having successfully partnered with Premio on the design of its original kiosks, the automated access solutions company once again turned to the collaborative and insightful expert. With modernization goals and objectives, this OEM asked Premio for an industrial-grade computing system that would incorporate the latest technology and accommodate a more compact design – two characteristics that seldom align. They also required a drop-in replacement, backward compatible with the previous generation kiosk to extend the usefulness of existing units. And finally, the hardware solution must be minimally impacted by current global supply chain issues. None of these are simple tasks. But Premio was up for the challenge.

The Solution

With its industry clout as a leader in rugged edge computing, Premio has solid relationships with world-class semiconductor manufacturers large and small. These liaisons mean Premio is one of the first to learn about innovations in embedded technology – innovations it can leverage on behalf of its customers.

One such development is the recently introduced AMD Ryzen™ Embedded Series processor. AMD embedded system on chip (SoC) processors offer low thermal design power (TDP; as low as 6W and as high as 54W) and ultra-performance on a single chip solution. Through the utilization of AMD's "Vega" integrated graphics architecture, Ryzen™ supports multiple UHD 4K displays for more graphic-driven performance without compromising power and costs. These SoCs also deliver a long embedded lifespan, lasting up to 10 years without need for replacement. Additionally, AMD SoCs offer dual-channel and ECC memory, doubling the bandwidth and speed for faster data exchange and protection from memory failure and corruption in critical applications. AMD embedded chips also leverage the AMD secure processor (ASP) to ensure maximum security by encrypting its data before feeding it to any I/O component.

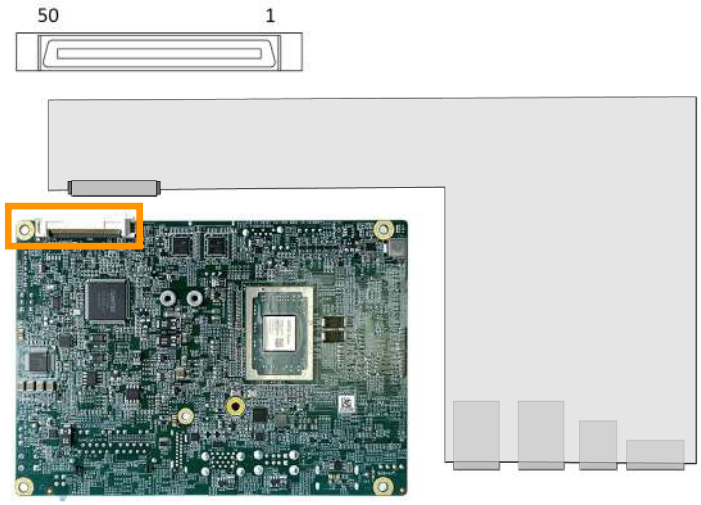
AMD's advancements on the embedded front inspired Premio to develop its first-ever x86 single board computer (SBC) on AMD's architecture. This integrated solution provides multi-core performance and rich visual graphics from AMD's semiconductor design – ideal for meeting the needs of Premio's key-making kiosk customer. SBCs are the perfect building blocks for embedded applications like kiosks that require significant compute power within a constrained space.



Premio's CT-DR101 3.5" SBCs are Configurable with AMD Ryzen™ Embedded R1606G and V1605B SoC

Model	TDP Range	CPU Core Thread Count	CPU Base Freq. (up to)	1T Boost Freq. GHz (up to)	Graphics Computing Units (SIMD)	GPU Freq. GHz (up to)	L2 Cache	Package	Max DDR4 Rate (MT/s)	Junction Temperature Range (°C)
R1606G	12-25 W	2/4	2.6	3.5	3	1.2	1 MB	FP5	2,400	0°C~105°C
V1605B	12-25 W	4/8	2	3.6	8	1.1	2 MB	FP5	2,400	0°C~105°C

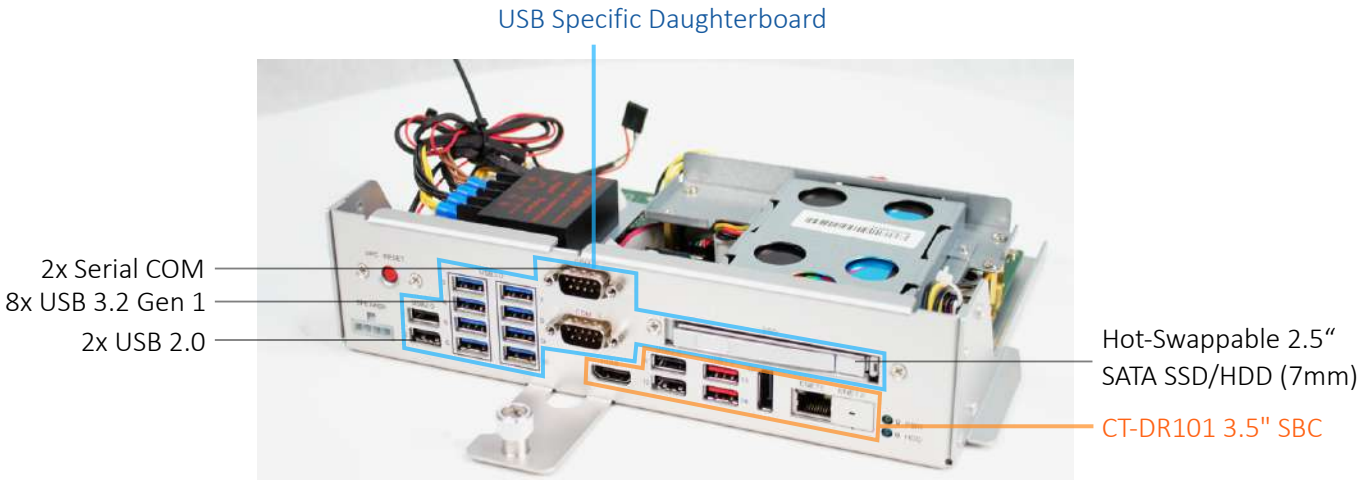
Premio's 3.5" AMD Ryzen Embedded SBC offers a 50-pin high speed connector (PCIe x4) that can be used for customization of additional high-speed I/O. The connector allowed Premio's engineering team to design a unique USB specific daughterboard – in lieu of the customary USB hub that would have required unavailable space. This daughterboard offers 14 USB 3.0 ports with software-based remote power management capabilities onboard to enable consolidation of several separate electronic devices (including multiple cameras) into a single compute assembly. Premio's mechanical engineers also designed the SBC as a complete solution (containing compute, memory, storage, and extensive I/O) that fit into an easily accessible electronics panel thereby reducing overall kiosk equipment costs.



CT-DR101 Series
(Bottom View)

Customizable Daughterboard

When diving into the customer's next-generation kiosk compute solution design, it was determined that the new unit's digital signage required a significant GPU graphics performance upgrade. The new printed board circuit assembly (PCBA) design must include a power distribution board, audio amplifier, USB power switching, removeable data drive tray, chassis power control, and LED relays. Passive cooling thermal design within a much smaller and slimmer form factor was also key.



After discussing requirements with its customer, Premio recommended the CT-DR101 Series 3.5-inch industrial-grade SBC, a commercial-off-the-shelf (COTS) solution developed by Premio and powered by AMD Ryzen™ Embedded processors V1605B). The board incorporates two DDR4 SO-DIMM slots to handle up to 32GB of ECC/non-ECC memory for powerful data processing and smooth multitasking from various IoT sensors and devices at the rugged edge. Configured with various I/Os, multiple 4K resolution display outputs, SATA, mPCIe, and M.2 expansion slots, the SBC ensures compatibility and expandability for important technology drivers. Compact enough to fit into tight spaces while hosting feature-rich I/O ports and expansion slots, this SBC is ideal for space-constrained kiosk applications that require powerful computing in a small footprint.

The Benefit

With the understanding that standard commercial computer boards could seriously limit the competitive progress they were making, this access solution provider trusted in Premio, its long-standing partner, to design its next generation computing hardware for its kiosks. Premio offered both compute performance and engineering capabilities to solve their pain points, developing a custom USB daughterboard based on a powerful COTS solution from Premio's embedded product portfolio. The solution delivered the 14 USB ports required via a smart connector approach, allowing a slate of peripherals to be easily deployed – especially as kiosk performance requirements evolve. And finally, this high performance compute solution (essentially the brains of their overall system) is uniquely capable of long-term robust performance in the limited physical space of the company's kiosk enclosure design. The reliability of this long-life embedded platform also means the company can shift its focus from the constant effort of sourcing consumer components to the comfort of embedded longevity.

"We Feel Premio Is a Strategic Partner to Our Business. They Take the Time to Understand Our Needs and Develop and Ship an Optimized Solution That Simply Works. Furthermore, They Go to Great Lengths to Ensure We Have Access to That Solution for Embedded Longevity." – Chief of Manufacturing and Supply Chain

By leveraging the Premio SBC with AMD Ryzen™ Embedded series processor, the new design consumes much less power and offers passive cooling in a compact form factor. The "all-in-one" hardware solution replaces many separate devices for streamlined kiosk operation in a slim design. This offers huge potential for expanding deployment in compact and urban settings for nationwide scale.

CT-DR101 3.5" AMD SBC			USB Specific Daughterboard	
AMD Ryzen™ Embedded Low-Power Consumption (12-25W)	**ECC** 2x DDR4 Up to 32GB (ECC/non-ECC)	**10-Year** 10-Year Support Cycle	**14x USB** Delivers 14x USB Ports	**50-Pin** 4x PCIe 3.0 Lanes Connection
Rich I/O USB 3.2 Gen 2, GbE LAN, M.2, mPCIe	**5G** Blazing Fast Wireless Connectivity Bluetooth 5, Wi-Fi 6, 4G/LTE	**4K** 2x 4K Displays 1x WUXGA Display	**Hot-Swappable** Hot-Swappable SATA SSD/HDD Storage	**Remote** Software-Based Remote Power Management Capabilities

Powered by AMD Vega, the kiosks now support multiple ultra-high definition 4K displays at 60Hz simultaneously, for more graphic-driven performance. Premio's SBC also serves as a drop-in replacement, backward compatible with the previous generation kiosk enclosure, allowing for rapid deployment and scale. Premio's system hardware design also enables remote management and system self-service capabilities which result in maximum unit uptime to generate non-stop revenue streams on each kiosk. And by using industrial components with a long lifespan, Premio is lowering its customer's total cost of ownership.

And these benefits are not just limited to kiosks. Other market verticals – like casino gaming machines, digital signage, medical imaging, and industrial automation and controls – will most certainly benefit from AMD's Embedded Ryzen™ capabilities and its long-life roadmap.

In summary, Premio has been working closely with this access solutions provider from its very first key-making kiosk. It's a lasting partnership that has allowed Premio to demonstrate its technical acumen and offer practical guidance as technology evolves – both from a technology and computing engineering perspective. By leveraging powerful SBCs from Premio, this OEM has unlocked the full potential of its software and a successful deployment of its latest robotic kiosks for new key duplication.

Premio's Manufacturing Facility in Los Angeles, California.

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We Design, Manufacture, and Service customers around the world

NEW

3.5" SBC Industrial Motherboard

NEW

1.8" SBC Industrial Motherboard

Processor	Support AMD Ryzen™ Embedded R1606G or V1605B Processor	Support AMD Ryzen™ Embedded R1606G Processor
System Memory	2x 260-Pin DDR4 2400 MHz SO-DIMM. Max. up to 32GB (ECC and Non-ECC)	DDR4-2400 Single-Channel Memory 4GB (Up to 8GB, Optional)
Display	1 x DisplayPort, 1 x HDMI, 1 x LVDS	2 x Micro HDMI
Storage	1x SIM socket (M.2 B Key attached) 1x M.2 B Key, 3042, Support SATA 1x SATA 7-Pin Connector	eMMC up to 64GB
Expansion	1 x Full-size Mini PCIe (PCIe x1, USB 2.0)	
I/O	1 x DisplayPort, 1x HDMI, 2x RJ45 2 x USB 3.2 Gen2 (10Gbps), 2x USB 2.0	2 x 5-pin header (4 In/4 Out), 1x RJ45 1 x USB 3.2 Gen 1 Type C (5V/3A) 1 x USB 2.0 (4-pin header, internal)
Internal I/O	2 x 6-Pin Front Panel Header 2 x RS-232/422/485 2 x 4-Bit DIO (4 In / 4 Out) 1 x Front Panel header 1 x 4-Pin FAN Connector 1 x RTC Battery Cable	1 x RTC battery cable
Power	ACPI OVP / OCP / Power reverse protection support, 4-pin power connector (internal), AT/ATX 12V	ACPI 2-pin Terminal Block Pitch=5.0mm, DC 12V
Operating Temperature	-40°C ~ 75°C	0°C ~ 60°C
Dimension	146 mm x 102 mm	84 mm x 55 mm