

# Let's Get Cooking: How Premio Helps Bring the Robot Fry Cook to Life

Enhancing Robotics as a Service (RaaS) at the Rugged Edge



Premio's customer is transforming the restaurant industry with robotics and intelligent automation for the kitchen, giving establishments the advantage in a highly competitive market. While experts in AI, this company knew it would be best served through collaboration with an experienced hardware provider. By partnering with a skilled rugged computer supplier, also capable in sourcing, manufacturing, and support, they would have the ingredients necessary to streamline back-of-house tasks and deliver tangible value to customers directly in the United States.

### The Challenge

- According to the National Restaurant Association, as of May 2022, the restaurant industry is still down 750,000 jobs from pre-pandemic levels — roughly 6.1% of its workforce
- Food preparation can be mundane, monotonous, and downright boring – three characteristics that don't necessarily help in attracting or retaining quality talent
- When labor is 100% manual, it can be difficult to generate consistent output, keep pace with customer traffic, and maintain healthy work conditions
- This company developed a powerful AI algorithm that mitigates these issues, but required a powerful hardware solution to deploy its robotics software and hardware that automates these processes
- They were also on the lookout for a contract manufacturer in the USA to build its Robotics Process Automation control panel as turn-key solutions; RMA support was on their wishlist as well

#### **The Solution**

- This developer of AI algorithms for the automation of routine tasks in restaurant kitchens, tapped
  Premio for the compute engine to bring its food prep technology to life
- Automating manual fry cook tasks via robotic arms would ensure consistency, speed, and accuracy, and mitigate in-house safety concerns
- With superior logistics, manufacturing, and quality control expertise in its wheelhouse, Premio had the exact combination of capabilities required
- With 30+ years of design and manufacturing of industrial-grade computing solutions, Premio's advanced, rugged edge computers are far more suitable for commercial/industrial use of this type specifically for reliability and embedded longevity.
- The Premio KCO-3000 with Premio mATX Coffee Lake motherboard, an Intel i9 processor, and Nvidia RTX 4000/A4000 graphics card could provide the 'brains' to the robotic system
- Premio also streamlined its customer's initial electronics panel design for performance and accelerated manufacturing at a massive scale
- Premio's proven approach to contract manufacturing and new product introduction (NPI) supported the customer from prototype to first article inspection to pilot to mass production



# The Benefit

- The partnership allowed the customer to focus its internal resources on improving its Al/software and expand its offerings in kitchen automation
- By leveraging Premio's rugged edge compute products, as well as its logistics, manufacturing, and support capabilities, the company has been able to accelerate time to market and save enormous operational costs
- These kitchen automation systems remove manual labor, improve working conditions, and enhance food quality, safety, and throughput in commercial kitchens
- Fry staff can be reassigned to managing system activity, rather than performing it giving them valuable robotics management skills that can impact professional growth opportunities and increase job satisfaction
- Rugged edge computing hardware is purpose-built to handle the data-intensive workloads driving automation, robotics, and artificial intelligence in demanding environments. Systems can tap into real-time data close to where it is generated and effectively manage latency, bandwidth, and reliability to deliver advanced food prep processes fueled by data.
- Such modernization for digital transformation demonstrates a restaurant's commitment to efficiency which impacts everything from employee and customer satisfaction to reputation and profitability



The back panel of the kitchen robotics system with KCO-3000-CFL as the 'brains' of the automation system.



# The Company

Premio's robotics customer is revolutionizing commercial foodservice through intelligent automation solutions that solve some of the largest gaps in back-of-house kitchen operations. Ready to make an immediate financial impact on a restaurant's bottom line, the company's AI-driven platform incorporates robotics, machine learning, computer vision, and data analytics to power and develop its breakthrough products.

With deep industry knowledge and learnings accrued through brand partnerships over its first five years, this company's products are constantly evolving to drive consistency, increase productivity, reduce costs, and improve the overall dining experience.

# The Challenge

The restaurant industry has certainly taken a beating over the last few years. Stay-at-home and shelter-in-place orders early in the pandemic heavily impacted the industry as a whole, often leading to restaurant closures or abbreviated schedules and staff layoffs. Once COVID vaccines became available and health safety measures began to ease, there was hope that the industry could return to business as usual. But a new normal has since taken shape, leaving food preparation workers less motivated to return to their posts for a variety of reasons. This robotics company is in a prime position to help these institutions get back to work – and in a more efficient manner.

Having worked directly with real restaurant kitchen workers to improve restaurant kitchen efficiency, the company's product engineering team has made significant breakthroughs. By designing software algorithms that empower intelligent food service applications, the company has brought to market several products designed to streamline repetitive kitchen processes via robotics and Edge AI.

Edge AI compute hardware is certainly part of the robotics menu; however, this company was not inclined to attempt such an undertaking. Instead, it opted to leave this aspect of the platform to the experts. This would allow personnel to remain focused on improving its AI and software and expand its business. But who had the chops to make their robotics dream a reality?

They set out to find an experienced hardware partner capable of building industrial quality computers for rigorous environments. These compute systems would have to fulfill specific technical requirements such as CPU, sufficient USB ports, and a powerful GPU to provide real-time edge processing for their robotics. They were also in need of a contract manufacturer to build products as turn-key solutions, as well as provide full RMA support to clients in order to scale in the United States. Enter Premio Inc., based in Los Angeles, California.

# The Solution

Premio, a global solutions provider specializing in ruggedized computer hardware, was selected as the partner that could do it all – an experienced and collaborative team entrenched in industrial-grade compute systems with in-house manufacturing capabilities built for scale at a moment's notice, and outstanding product support. The company's role was ultimately twofold. Centered on developing the processes and operations to ensure successful production, Premio supported the manufacturer's core software capabilities, streamlined its initial electronics panel design for performance, and accelerated manufacturing at a massive scale.



From prototype to first article inspection (FAI) to pilot to mass production, Premio's unique and in-depth approach to contract manufacturing and new product introduction (NPI) was crucial to go-to-market success. Premio assured that key checkpoints were handled with precision and care, hitting optimum milestones to assure successful mass production.

Premio was first tasked with understanding what the manufacturer needed to support its software algorithm, ensuring seamless robotics performance based on realtime sensor data. After engaging with the customer's team and learning about the product's design, Premio recommended its KCO-3000 with Premio mATX Coffee Lake motherboard, an Intel<sup>™</sup> i9 processor, and Nvidia RTX 4000/A4000 graphics card. As a COTS product, the Premio KCO-3000 is designed for easy installation and interoperability with existing system components – making customization unnecessary and a rapid time to market.

The manufacturer's initial prototype design was created using Premio's KCO-3000 and shared with Premio for manufacturing the FAI. Premio's FAI is a golden sample based on customer requirements and applicable data standards, designed to trigger pilot production. In this case, the FAI revealed areas where the customer could streamline components and complexity of the full electronics panel, a critical element to power the robotic automation process. Premio further helped smooth out the company's initial 'design for design' approach and



embraced a strategy featuring design for manufacturing and service as a better method for success. The system electronics panel was quite complex and extensive – not only did Premio deliver the brains and compute node of the robotics module to handle sensor data, but the company also unified the entire electronics panel into a smart, deployable design driving the robotics arm itself.

Pilot production featured five units and established the manufacturing process including assembly and test. Premio assigned a project manager, an account manager, and supply chain team to work hand in hand with the customer to document the assembly, internal parts, and testing procedures. Premio's manufacturing engineers designed an efficient, high quality process ensuring the customer's product was built to spec using an optimal mix of automated lines and cell-based shop floor set-ups. Operations were scaled efficiently within a localized manufacturing facility.

In a just-in-time manufacturing strategy, Premio coordinates labor, materials, and resources for an unprecedented level of product quality and fulfillment efficiency, including unit-specific traceability data throughout the entire manufacturing process. The customer benefitted from Premio's zero setup time, real-time instructions, adaptive tools and equipment, shared shop floor control system, and well-trained operators for flexible, scalable manufacturing services that accelerated time to market. Premio also worked with the customer to implement a custom image on all units, as well as a customized BIOS that ensures consistent settings as a common denominator that applies across the deployed field of products. (Specific settings, such as IP addresses, are set by a third-party installer.)

Mass production has initiated, with initial orders of hundreds of units being manufactured and deployed.



Premio's Manufacturing Facility in Los Angeles, California.

"Manufacturing at scale is a huge hurdle in any product development cycle," said Kevin Wu, VP of Manufacturing for Premio "For a startup company, especially one focused on perfecting advanced software algorithms, having a resource to manage the challenges of hardware quality, reliability, and deployability supports our long-term success."

Because the customer is a startup that is not hardware oriented, many of the hardware engineering disciplines required to scale up production and volume were not available in-house. Premio was able to leverage its decades of hardware and customer-specific experience to help them achieve this milestone while also advising product design. The customer went from building a few assemblies on its own to ramping up to dozens and shortly thereafter hundreds of units through its partnership with Premio, who has the physical space, personnel, and manufacturing floor to manage assembly. The customer benefitted from Premio's purpose-built systems for industrial compute environments – the locked Bill of Materials (BOM) and long-life support would not be subject to risk and sudden changes, and previous labor-intensive production efforts would be stemmed.

"Our engineering and operations teams have been engaging with Premio to outsource the computer subsystems of our first flagship product," said the customer's VP of Operations. "Taking advantage of Premio's established logistics, manufacturing, and quality control expertise has elevated our offering to another level."



# The Benefits

To achieve a reliable system built for mass production at scale, it was important to recognize the clear differentiation between a general-purpose embedded computer and one that's designed to handle AI algorithms and real-time data workloads. Premio's heritage in rugged edge computing and product engineering was the perfect recipe, and helped the customer balance the performance, reliability, footprint, and longevity requirements of their fast-evolving robotic system. Premio also brought to the table a mindset of partnership and scalability for commercial product success, exploring the customer's challenges and engaging with demands of product customization, NRE, material lead time, costs, and time-to-market schedules.

By combining smart AI algorithms with the latest in industrial automation hardware, this customer and Premio are modernizing the restaurant kitchen. Autonomous commercial food prep has the potential to be less reliant on manual labor while improving working conditions for cook staff. Restaurant tasks performed by robots enhance food quality, safety, and throughput, and can also result in significant cost savings, particularly those related to payroll and human error. Autonomous restaurants also provide greater operational data for fine-tuning smart decisions related to operations, translating into broad savings over the long term.

"Engaging with Premio has allowed for scalability that was just not possible before," added the company's VP of Operations. "Having Premio as a partner allows us to pursue more customers, deliver more projects simultaneously, and go to market faster."

With its mission to simplify repetitive back-of-house restaurant tasks, this robotics innovator is definitely "in the right place at the right time." And by engaging with a partner that can help bring their robotic software into restaurant kitchens around the country, they are on the path to rapid expansion and market leadership.



Premio's Manufacturing Facility in Los Angeles, California.

