



COM Express®: A RECIPE FOR IIoT SUCCESS

Ectron leverages AI and machine learning to enhance industrial baking, achieving higher efficiency and consistently delicious products

When the average person hears the word 'bread,' they generally think 'yum' and 'yes, please!' The bread making process doesn't even enter their minds. But to those professionals charged with baking perfect loaf after perfect loaf, process is a priority, with a number of things to consider – from simple ingredients to a wide variety of kitchen gadgets and even large equipment. Much of a baker's process may be born out of trial and error, but once a particular recipe and its methodology are perfected, it's imperative to replicate them for utmost quality, product consistency, and brand recognition.



Ectron Corporation
San Diego

Project:
Oven Market Ready Kit

Kontron Platform:
COMe-bKL6R

www.ectron.com



Ectron has decades of experience specializing in ruggedized, reliable metrology instrumentation designed to provide highly accurate data, even in harsh environmental conditions. Today, Ectron is also leading the field in Industrial IoT (IIoT) by providing First Mile Solutions to the Cloud using Edge Computing with AI/ML capability including solutions covering the entire manufacturing value chain from first sensor touchpoints to the Cloud.



THE CHALLENGE

- ▶ It is typical for small-to-mid-sized bakeries (\$1M-\$20M annual revenues) to manually monitor specialty ovens; this can negatively impact operational efficiency and product consistency/quality
- ▶ While the application of digitization and real-time process compliance monitoring in professional baking is commonplace at large baking facilities, tech vendors have largely ignored small and mid-sized operations
- ▶ To entice this underserved market, Ectron set out to create an effective solution containing the right components to convince small and mid-sized bakeries to leverage connected technologies and real-time data to their advantage



THE SOLUTION

- ▶ Ectron's SmartEYE™ Platform-as-a-Service uses Ectron's AI/ML-capable rugged edge industrial computers leveraging Kontron's COM Express® industry standard Computer-on-Module (COM) form factor for powerful CPU and graphics performance and low-power consumption, which allows SmartEYE™ to monitor every step of the baking process for efficiencies and consistency and send real-time alerts of any anomalies or deviations to the customer, at very little cost
- ▶ Kontron's off-the-shelf, fully pre-tested and ruggedized COMs offer Ectron a faster, more flexible, and highly-scalable solution that simplifies future processor upgrades
- ▶ Compared to commodity PC motherboard alternatives, Kontron COMs ensure maximum reliability and durability, and are backed by extended lifecycle guarantees, key to maintaining Ectron's reputation as a trusted solutions provider



THE BENEFIT

- ▶ Kontron COM Express® modules help Ectron reap the rewards from its new range of Industrial IoT Edge Computers and expand into new, lucrative markets
- ▶ Taking a collaborative approach with bakeries produces a right-fit solution that digitizes industrial machinery (old and new) including baking ovens to ensure consistency, speed, accuracy, efficiency, and predictive maintenance
- ▶ Digitization is more efficient and exponentially more reliable than human oversight alone ensuring maximum efficiency and minimum waste
- ▶ Instead of worrying about the oven, bakers can concentrate on their artistry, assured of a consistent baking process that yields the same results time and again

Smart EYE

- › Installed and online in a matter of weeks
- › No changes to your equipment
- › Customized to fit any budget
- › No interruptions to production



The Company: applying expertise to new markets

With a rich history in ruggedized, reliable embedded computer systems, Ectron manufactures products that have been deployed in a large number of military, aerospace, automotive, and industrial installations. New management, charged with ushering in the company's next phase, sought to leverage Ectron's existing expertise and reputation as a manufacturer of highly reliable, high-performance products. Their goal was to expand further into the Industrial IoT (IIoT) arena with more comprehensive, end-to-end solutions – from first sensor touchpoint to the Cloud.

To drive this initiative, the company has in recent years broadened its portfolio to include SmartEYE™, an IIoT-based factory 4.0 PaaS (Platform as a Service) that offers a 360-degree view of operations including machines, personnel, processes, and energy usage. At the heart of these systems are Kontron COM Express® industry-standard form factor Computer-on-Modules.

With Ectron's SmartEYE™, users have access to data, analytics, and AI-enabled machine learning at the Edge for the monitoring of up to several hundred data points. This purpose-built system enables personnel to make informed decisions in real-time that facilitate OpEx reduction, product improvement, and revenue growth.

The Challenge

Giving small and mid-sized bakeries an opportunity to find the same efficiencies and consistencies that large bakeries have, without the hefty price tag

In looking for ways to tap into fresh industrial markets, new leadership explored how they could utilize the company's expertise to meet needs that were going unfulfilled. One area identified that holds great promise is the baking business, more specifically, the application of industrial baking ovens at small to mid-sized bakeries. Ectron had been using curing ovens in its own product manufacturing for decades and, through SmartEYE™, had mastered a means to use existing data for performance monitoring and to achieve maximum efficiency. What if these same concepts were applied to commercial baking ovens?

Current commercial baking processes require expensive, large scale solutions or manual oven monitoring to achieve quality and consistency. There is little middle ground. Even perfect dough is not enough to ensure perfect results every time – variations in temperature, timing, and human action render the manual approach less than ideal. Yet process automation and digital monitoring can be costly for a small to mid-sized bakery.

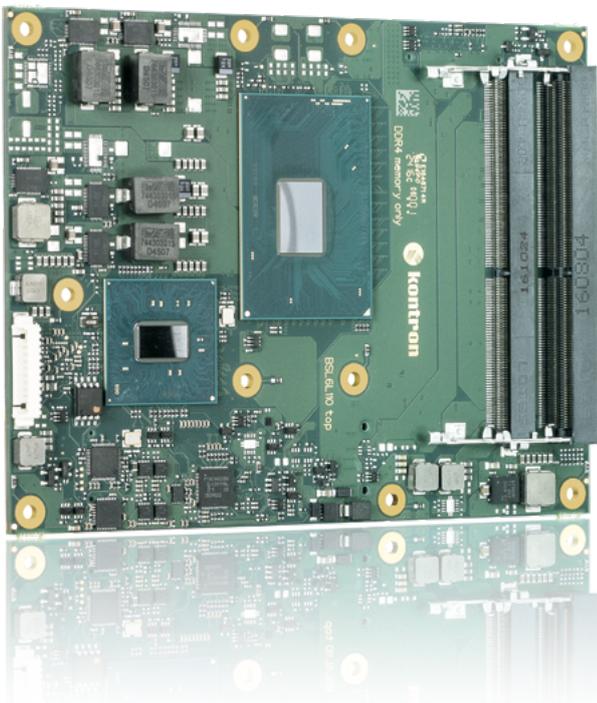
The Solution

Consistency yields better baked goods

Ectron had been working closely with Kontron to develop SmartEYE™ from its inception. With market research pointing to small to mid-sized bakeries as an underserved industry, the two companies collaborated on how best to adapt the PaaS to identify and alleviate efficiency issues in this space.

Focusing on gaps in industrial oven performance in the baking process, the team devised two sensor-based options – a tailored solution in an ongoing subscription model and a DIY (do-it-yourself) kit for self-deployment. The solution features Ectron's proprietary Edge computer with AI/ML capabilities featuring Kontron COM Express®, local hierarchical dashboards accessible from any desktop/laptop computer or tablet, and the Azure Cloud. With this arsenal of capabilities packed into a readymade platform, bakeries could leverage data and analytics to monitor and control their ovens.

To meet Ectron's ambitious goals and underlying criteria, Kontron recommended its COMe-bKL6R E2S i3-7100E CM238, a COM Express® module that features superior CPU and graphics performance. The COM Express® standard strikes a balance between cost and performance and is uniquely positioned for rugged, small form factor applications that incorporate custom development. Because all customization is designed into the module's carrier board (rather than the COM itself), systems can perform for technology generations using a range of CPU cores, for example, swapping out one for the next. The end result is that COMs work well for devices that not only require scalability from generation to generation, but also within a single generation. These design characteristics add longevity that strongly aligns with industrial computing environments – where equipment is defined as major assets, expected to perform for decades.



Bakeries represent a unique kind of Edge environment – computing systems require a rugged physical presence, as well as the data performance necessary to ensure real-time insight that is actionable and can make a difference to the baker's bottom line.

Gautam Kavipurapu, COO and VP of Engineering, Ectron



Ectron's proprietary Edge computers are compact, ruggedized to IP67 standards, and resistant to the heat and moisture common in baking environments. Thermal performance is validated in these self-contained fanless systems, rated for performance in environments ranging from -40 °C to 85 °C.

Understanding that there are two camps when it comes to technology deployment, Ectron offers two distinct options. The company's DIY kit was devised for those who want to take a hands-on approach, buying an off the shelf solution and running the units themselves. For bakery management who appreciate a turnkey system, Ectron offers a subscription-based solution tailor-made for the bakery's unique needs – one that does not require specialist expertise.

COM Express® basic pin-out type 6

- ▶ Computer-on-Module with Intel® Core™i3-7100E
- ▶ 2x 2.9 GHz, CM238 PCH, GT2
- ▶ 2x DDR4 non-ECC/ECC SO-DIMM, Rapid Shut down
- ▶ industrial temperature grade

In the subscription model, Ectron dispatches its experts to the customer's location to conduct a site survey in which the team examines bakery processes in use. Ectron personnel inspect the customer's ovens and enquire as to the existing workflow, including bottlenecks and pain points. Further investigation centered on energy use helps uncover a path to improvement there as well. Subscriptions run between three to five years, and typically require no upfront capital costs. Ectron customizes the dashboards and service, providing cloud access, storage, and fully-featured software including security and routine updates. Maintenance, warranties for sensors and computers, and network installation are also covered by the subscription cost.



The Benefits

➤ The right ingredients for tasty success

By taking a collaborative approach with the customer, Ectron is able to design an architecture tailored to that particular bakery's needs. Integrated seamlessly into systems that were previously not instrumented for real-time data handling, the SmartEYE™ platform helps bakers make sustainable operational improvements which can be maintained over time and offer real cost savings in terms of OpEx.

As a key component to the SmartEYE™ PaaS, Kontron's COM Express® modules provide the low power, compact performance that ensures real-time data handling under rigorous conditions. Data is captured, processed, and shared for new insights into bakery performance – knowledge that was previously hidden from competitive perspective. This level of computational power allows for faster and more accurate results than those that can be yielded by bakery personnel. Significant improvements in productivity and efficiency result, giving skilled baking staff the freedom to further explore their artistry and improve the deliciousness of their breads, cakes, cookies, and other baked goods.

"Baking is both art and science, so attention to detail is an absolute imperative. With SmartEYE™, we're giving bakers the ability to automate some of that science and concentrate on what they do best," added Kavipurapu. *"While commercial baking is a manually intensive profession in general, small and mid-sized bakeries now have the means to focus more on their artistry which requires a human touch."*

By tapping into ruggedized COM Express® technology, bakers can access the value of data today and position themselves for long-term market leadership via a system designed for longevity and one that can be scaled as the need arises.

The Ectron SmartEYE™ platform is making a competitive difference for small to medium-sized bakeries. With real-world operational data no longer hidden or inaccessible, bakers can now apply that data in day-to-day operations to help their businesses thrive – and enjoy the sweet taste of success.

➤ More Information:
Ectron Smarteye
Kontron COMe-bKL6



About Kontron

Kontron is a global leader in IoT/Embedded Computing Technology (ECT) and offers individual solutions in the areas of Internet of Things (IoT) and Industry 4.0 through a combined portfolio of hardware, software and services. With its standard and customized products based on highly reliable state-of-the-art technologies, Kontron provides secure and innovative applications for a wide variety of industries. As a result, customers benefit from accelerated time-to-market, lower total cost of ownership, extended product lifecycles and the best fully integrated applications.

For more information, please visit: www.kontron.com

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