

Low Power, High Impact

How Smart Energy Management Is Driving a Greener Future

Focus: IoT

Product: SRG-AM62

Introduction

Following in the footsteps of both local and global initiatives, organizations across economic sectors have become more aware of their carbon footprints. Establishing environmental sustainability goals and implementing clear steps through which to achieve them has become a key facet of corporate governance. One of the clearest ways an organization can reduce the environmental burden of their operations is by monitoring and reducing its energy consumption.

Working with AAEON, one company developed an application to help organizations automate the monitoring and control of their electricity consumption. Their application featured a multi-tiered approach to reducing power consumption, starting at the ground level with individual appliances such as air conditioning units, boilers, lighting systems, and heat pumps, and extending to broader cloud-based energy management frameworks.

The client's aim was to make this application easy to adopt across different sectors, from college campuses to office buildings and even factories. To do this, AAEON's client employed the [SRG-AM62](#), a RISC Gateway built on the low-power Arm-based Texas Instruments™ AM6254 Sitara™ Processor.

Combating Inefficiency

Equipment such as air conditioning units, boilers, lighting systems, and heat pumps all serve different functions. Therefore, creating a unified energy management solution capable of monitoring and controlling each device was a challenge recognized by AAEMON's client. Therefore, they identified the ability to maintain robust and reliable two-way communication with various equipment types as a key feature of the product they chose to serve as the heart of this application.



A second key factor in the client's product selection was the issue of deployment versatility. Unlike a solution installed in the same setting across multiple sites, the chosen product needed to operate just as reliably in harsh conditions as it did in standard deployments. This is best illustrated by the challenges faced by solutions deployed in schools when compared to those deployed in factories. Even if the purpose and function of the application was identical, the environmental challenges they would face would be very different. As such, the product needed to be robust and durable.

A final prerequisite from the client was that the chosen product be efficient, not only in terms of its energy consumption but also cost-efficient. Were they to select a product that exceeded expectations in functionality but consumed more energy than it saved for the building's equipment and appliances, there would be little benefit. Moreover, installing a product that could perform well, but required regular maintenance or replacement would not be cost-effective, especially at the scale the client intended to operate.

AAEON's SRG-AM62: Efficient, Scalable, & Built to Last



Equipment-Agnostic Communication

The [SRG-AM62](#) effectively addressed the challenge of obtaining energy consumption data from multiple different types of equipment through its multipurpose I/O connector, which despite its compact size, offered versatile industrial control functions such as RS-232/422/485 and CANBus. Most importantly, the device was equipped with a configurable, multipurpose I/O connector hosting two COM ports, of which four separate RS-485 devices could be connected through half-duplex RS-485 channels via Modbus RTU/TCP.



With this multi-device communication established, the [SRG-AM62](#) could obtain electricity consumption data from its connected devices while also issuing commands to automatically reduce the operation of non-essential functions if the device's energy consumption exceeded predetermined levels. The primary advantage of the [SRG-AM62](#) hosting these interfaces and their supporting communication protocols was that the client did not need to reconfigure the system to accommodate different interfaces for different premises, as it was compatible with both traditional and modern control systems.

Application Story

As a comprehensive solution, the application also benefitted from the SRG-AM62's wireless functionality, with both 4G and Wi-Fi module support available via its two Mini Card slots.



Augmenting the utility of these expansion options with respect to the application was their software-controlled power supply, which made it possible for the client to control the expansion's on/off setting even while the [SRG-AM62](#) was still powering-on, while also allowing the system to activate or deactivate Wi-Fi and 4G modules without

requiring physical disconnection or manual intervention, allowing it to preserve energy and maintain low power operation.

By utilizing these features for multiple types of wireless data transmission, the [SRG-AM62](#) could send notifications to the campus, factory, or office's building management personnel. This would not only serve as a stable reporting method, but also allow building management to identify operationally inefficient or defective equipment.

Compact, Robust, and Fanless Operation

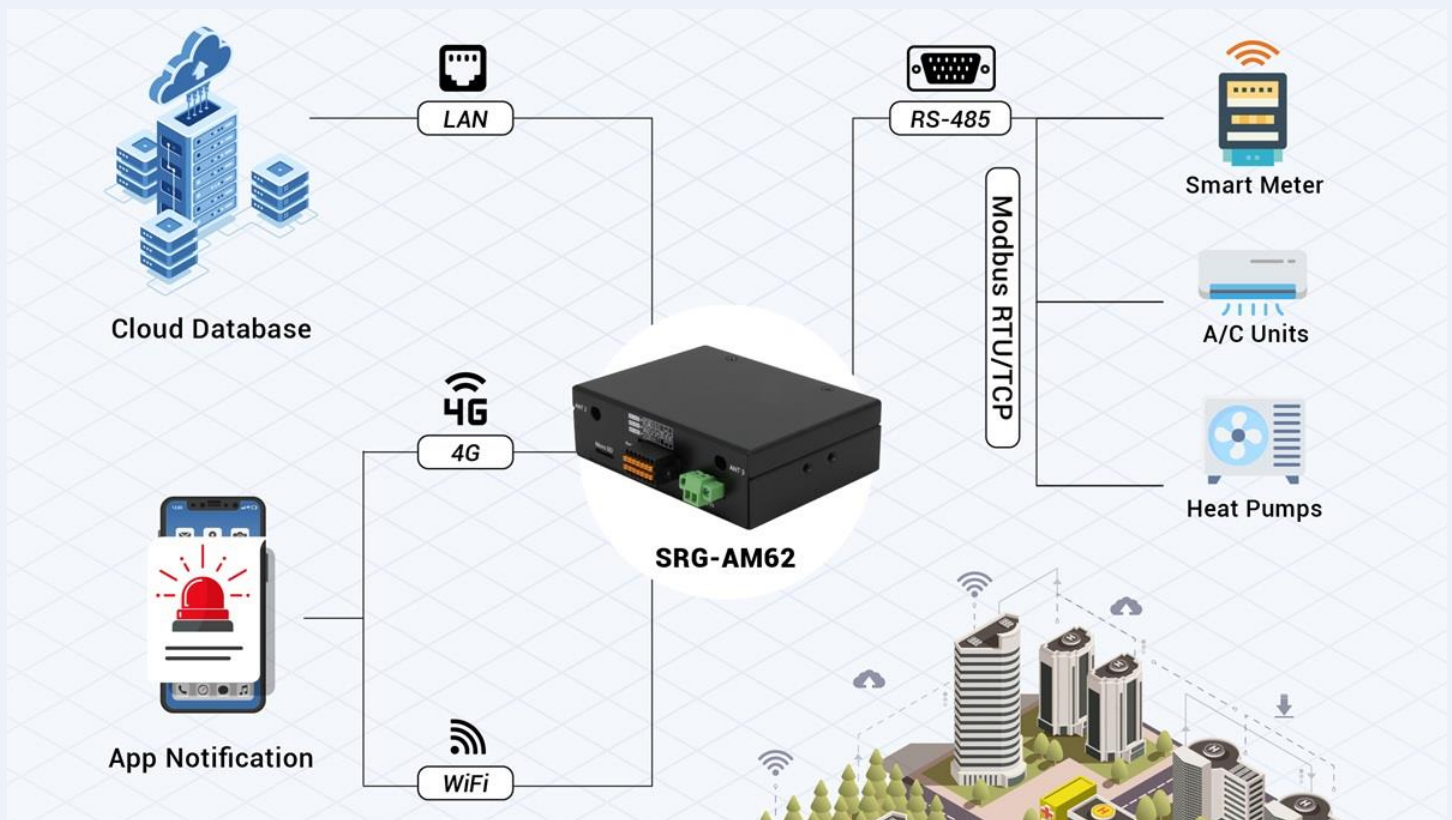
Designed for industrial applications, the SRG-AM62's durability addressed the application's need for hardware that could be installed in diverse environments. One feature emphasizing this is its wide 9V to 36V power input range, which allowed the system to function effectively in settings with variable power sources, such as factories or retail spaces.

Application Story

Given the application's varied deployment settings, the SRG-AM62's broad -40°C to 85°C temperature tolerance was instrumental in boosting its longevity, granting stability in even the harshest conditions. This was particularly remarkable and useful given the SRG-AM62's mechanical design, which could maintain fanless operation within the -40°C to 85°C temperature window without the need for alternative heat dissipation hardware like heatsinks. As a result, the application was not encumbered by common issues such as dust accumulation or component wear and tear, especially important for systems installed on the edge.

The SRG-AM62's incredibly compact 108mm x 79.5mm x 33mm form factor proved to be invaluable for organizations operating in space-constrained environments. Alongside this, the system was extremely lightweight at less than 1 lb., and could be installed via either wall mount or DIN rail, making it easy for the client to integrate it into existing infrastructure, based on the needs of the organization.

Application Architecture



Efficiency Personified

While the client's application needed to handle vast volumes of data, it also needed to be power-efficient. As such, the SRG-AM62's Arm-based Texas Instruments™ AM6254 Sitara™ Processor fit the bill, being a low power platform that could fully utilize all four cores of its CPU at just 1.2W. It was also armed with an excellent capacity for multitasking, dynamic power management, and scalable embedded interfaces, well-equipped to collect and manage energy consumption data.

The power consumption of the system as a whole also produced a minimal footprint with respect to energy consumption, operating at just 5.76W even under full load. A consequence of its exceptionally low power consumption was that the amount of heat produced by the [SRG-AM62](#) during operation was much lower than alternative options, thus reducing the need for active cooling solutions or heatsinks.

Given the scalability and continuous operation needed from the system, such a platform combined with AAEON's device design made the [SRG-AM62](#) well-suited to the creation of a solution with extended longevity as well as efficiency with respect to both cost and power.



In addition to simply handling the energy consumption data received from connected equipment, the SRG-AM62's Arm-based Texas Instruments™ AM6254 Sitara™ Processor's native CAN FD support made it possible for the device to execute the tasks necessary to reduce the power consumption of connected equipment detected to be over the threshold outlined.

Impact

Thanks to the durability, connectivity, and versatility of the [SRG-AM62](#), the client was able to produce an application capable of monitoring and reducing the energy consumption across various facilities, including office buildings, factories, and school campuses.

The application did not just have environmental benefits, with the businesses adopting the system realizing cost savings from reduced energy bills, as well as streamlining their building management frameworks. One of the larger impacts of the application from a high-level perspective is that it has proven such solutions can be rapidly deployed and scaled with minimal physical retrofitting.

Such a result has the potential to progress the rate of adoption of similar technologies by businesses seeking to achieve environmental sustainability goals. While time will tell, it is certainly evident that by utilizing low-cost, energy-efficient technologies that can monitor and reduce energy consumption, each successful deployment plants a seed with which a greener future can be cultivated.

About AAEON

Established in 1992, AAEON is one of the leading designers and manufacturers of industrial IoT and AI Edge solutions. With continual innovation as a core value, AAEON provides reliable, high-quality computing platforms including industrial motherboards and systems, rugged tablets, embedded AI Edge systems, uCPE network appliances, and LoRaWAN/WWAN solutions. AAEON also provides industry-leading experience and knowledge to provide OEM/ODM services worldwide. AAEON works closely with premier chip designers to deliver stable, reliable platforms. For an introduction to AAEON's expansive line of products and services, visit www.aaeon.com.

Follow Us



Contact Us

AAEON Technology Inc.

6F., No. 28, Baogao Rd., Xindian Dist.,
New Taipei City 231029, Taiwan R.O.C.

+886-2-8919-1234

www.aaeon.com