NXP®'s Multi-Protocol Kinetis® KW41Z Wireless MCU Helps Simplify Aquarium Systems Control

NXP makes it easy for C2 Development to simplify connecting, configuring and controlling aquarium lighting and pumps.

Challenge: Reduce the cost and complexity of creating an aquarium ecosystem that connects AquaIllumination® systems with each other – and with EcoTech Marine® pumps

Solution: NXP's Kinetis KW41Z wireless MCU supports multiple connectivity protocols, providing C2 Development with a flexible, cost-efficient foundation for an IoT-driven aquarium ecosystem

Benefit: Enable aquarium enthusiasts to quickly and easily create a connected system of aquarium lights and pumps, and control it all from anywhere with just a smartphone

MAKING LIFE EASY FOR AQUARIUM OWNERS

C2 Development pioneered the use of sophisticated, network-controlled lighting in aquariums with its AquaIllumination (AI) line of high-performance and high-efficiency reef lighting systems. And now, they are leading the way in making those systems easy for aquarium enthusiasts to install and control. With C2's technology, lighting devices can be easily wirelessly connected to each other to provide direct device-to-device connectivity which streamlines the installation and monitoring processes. Not only that, AquaIllumination lighting systems can also be connected to EcoTech Marine's line of aquarium pumps, extending automation and control to even more of the aquarium.

What makes it so simple to create this wireless network is the integrated functionality of the NXP Kinetis KW41Z wireless MCU that C2 uses as the foundation for its differentiated technology. The Kinetis KW41Z MCU combines multiple connectivity protocols in one microcontroller. That in turn enables C2 to offer customers a complete, integrated solution that provides Thread IP-based mesh networking for device-to-device and device-to-cloud communications as well as Bluetooth® low energy (BLE) communications for setup, monitoring and controlling system functions directly via a smartphone.

KEEPING AQUARIUM OWNERS FROM GETTING IN OVER THEIR HEADS

Thanks to the IoT approach C2 offers, aquarium owners no longer must commandeer many IP addresses from their home router. Instead, they can use Thread capabilities to quickly create a connected system that only requires one IP address for everything, no matter how large the aquarium, leaving those valuable IP addresses for other connected devices.

Another way C2 streamlines and simplifies networked communications for aquarium owners is with the BLE user interface that enables owners to commission their Thread devices in a straightforward, easy to understand method that many consumers are familiar with today. With that connection, customers can use their smartphones to configure lighting systems, set up automatic on/off schedules and control lighting – whether they are in the room, at the other end of the house or halfway across the country. In addition, the network can sense when there's a problem with any connected lighting device (or a pump, for that matter) and alert the owner immediately, before an event like a temperature change or pump failure leads to disaster.

IT'S POSSIBLE TO CONTROL YOUR HOME AQUARIUM WHILE YOU'RE AWAY WITH AQUAILLUMINATION® SYSTEMS AND ECOTECH MARINE® PUMPS – POWERED BY NXP KINETIS MCUS.

C2 DEVELOPMENT MAKES IT POSSIBLE. NXP MAKES IT WORK.

C2 President Chris Clough says it was the multi-protocol functionality that sold the company on the Kinetis KW41Z device. "The fact that we can run both BLE and Thread was the single most important consideration for us in choosing the Kinetis KW41Z wireless MCU," he says. "There are certainly plenty of Bluetooth solutions out there, but none of them would allow us to combine BLE with other standards based protocols in the same solution, saving development time, reducing product size and most importantly lowering cost."

Clough explains that C2 previously relied solely on Wi-Fi or its own proprietary RF technology for connectivity and communications in its aquarium control solutions. But that technology wasn't capable of 'communicating' with a smartphone. BLE solves that problem. And relying solely on Wi-Fi was a problem because an IP address had to be assigned for each system by the access point router. With the Kinetis KW41Z wireless MCU, C2 can implement and benefit from a Thread mesh network. The KW41Z device provides a smooth and flexible path away from proprietary RF and Wi-Fi toward a combination of BLE and Thread.

"The multi-protocol functionality of the Kinetis KW41Z wireless MCU gives us the flexibility to continue to use our proprietary RF technology in combination with BLE while we fully transition to Thread over time through over-the-air firmware updates after the product has been installed in consumers' homes," says Clough. "We don't have to change our product, just add to it."

As the industry's first multi-protocol wireless microcontroller solution, the Kinetis KW41Z device is a game-changer for companies like C2 that want to help their customers take full advantage of the Internet of Things (IoT). The KW41Z MCU with Thread and BLE makes it possible to meet the growing requirement for IoT devices to reliably communicate with each other in a secure and scalable way.

"With the Kinetis KW41Z wireless MCU, we can establish a mesh network that consists of many devices using Thread and that provides point-to-point communications," says Clough. "That gives our customers the ultimate in ease of use in controlling their aquarium LED lighting and pumps."

NXP: SMART HOME SOLUTIONS FOR THE INTERNET OF THINGS

NXP's robust portfolio of smart home solutions makes homes more connected, convenient and secure. We offer comprehensive solutions, each integrating a vast array of technologies critical for the creation of end products like smart gateways, smart lighting and smart access for buildings and homes. If you're designing innovative connected consumer applications, you need cost-effective solutions that raise the performance bar in integration, efficiency and functionality. To complete or customize your consumer system, our portfolio gives you an outstanding choice of leading ICs and discrete components.

C2 DEVELOPMENT: PUSHING THE LIMITS OF ILLUMINATION TECHNOLOGY

Founded in 2007, C2 Development, Inc. is the leader in high performance, high efficiency reef aquarium lighting systems, constantly pushing the limits of illumination and control technology. The company assembles all PCBs in-house with its high throughput SMT lines, which makes it possible to oversee quality control to the highest degree while keeping prices down. C2 Development has always engineered, designed and assembled all products in Ames, Iowa. For more information, visit aquaillumination.com.

For more information on NXP's smart home solutions, visit **nxp.com/SmartHome**

To learn more about how C2 Development's Aqualllumination systems are powered by NXP technology, visit **nxp.com/C2**

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Document Number: KW41ZAQUASYSCOCS REV 0

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