CUSTOMER SUCCESS STORY

Admetsys

Creating Safer, More Precise Acute Care Treatment with DS28E83 and DS28E38

When Admetsys' Chief Scientist was working as a physician a few years back, a nurse presented him with a formidable challenge: improve glucose control tools for patients at diabetic risk. "The gauntlet was thrown down. Clinicians needed better tools. That was the genesis of Admetsys," said Jeff Valk, the company's CEO and co-founder.

Challenge

- Needed a cryptographically secure solution for authenticating medication

Solution

- **DS28E83**
- **DS28E38**
- **DeepCover® Secure Microcontrollers**

Benefits

- Robust authentication to prevent unauthorized use, cloning, and other security breaches

Based in Boston, Massachusetts, and incorporated in 2014, Admetsys has developed a first-of-its-kind artificial pancreas for hospital and surgical care. Glucose control is particularly critical during surgery and hospitalization in order to speed the recovery, prevent infections, and reduce complications. This process, however, has traditionally been manual, involving testing, dosage calculations, and treatment for each patient. It's difficult and time-consuming in busy hospital settings, and yields imprecise results.

Admetsys' artificial pancreas automates the process of patient glycemic control, using biosensors and adaptive learning algorithms to counterbalance treatment of insulin and glucose. In the company's three clinical trials, the results speak for themselves: 97% control between 80mg to 25mg/dL, 0% hypoglycemia <70mg/dL, and 2.5 hours mean time to normoglycemia. This device attaches to a patient's IV line, which draws a small blood sample for real-time analysis.

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- **Jeff Valk**, CEO, Admetsys

Next, the system creates a metabolic model for the patient and treats the patient with insulin or dextrose to effectively control that patient's blood sugar. Additionally, the system allows clinicians to perform real-time, continuous diagnostics on patients to drive information-driven precision medicine and deliver therapeutic products reliably and safely.

Challenges

When it comes to hospital care, quality assurance is a challenge. For its device's consumables including insulin and dextrose cartridges, Admetsys' engineers need to assure that the information accompanying the medication dispensed is accurate and valid. So, they sought a way to authenticate the medication cartridges in a cryptographically secure way. The team also needed to protect the system against hacking. While in their design phase, the company's engineers met with some Maxim engineers at an event and "found a great like-mindedness," said Valk.

Solution and Benefits

Admetsys is using three Maxim security ICs in its artificial pancreas solution:

- **DS28E83** radiation-resistant, 1-Wire® secure authenticator, which protects medical equipment that is processed through gamma or e-beam sterilization with ECDSA and SHA-256 authentication. In the artificial pancreas, the DS28E83 secures the system's sterilized sensors.
- **DS28E38** secure authenticator with ChipDNA™ physically unclonable function (PUF) technology, which provides cost-effective protection of the medication cartridges against invasive physical attacks
- DeepCover secure microcontroller for secure storage of keys and certificates to ensure device integrity and authenticity

"In medical care, security is about patient safety," Valk noted. "Maxim's security ICs, including the DS28E83 and DS28E38 secure authenticators, enable us to ensure that the medication cartridges for our artificial pancreas will be used as intended and deliver the right dosages to the right patients. These solutions are helping us create a practical standard of care, enabling high-precision infusion and real-time, continuous diagnostics while allowing the patient's circulatory system to operate unaltered."

In Valk's view, the medical technology industry hasn't taken security as seriously as it should. Working with Maxim, he noted, has been positive because of how proactive and forward-looking the team has been in terms of addressing security challenges. "In the time we've been talking to Maxim, the product lines have only gotten better," he said. "Maxim's focus on meeting next-generation needs is something we like very much."

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