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CADENCE PCB SOLUTIONS

Parallel Systems

simprints
every person counts

Every Person Counts

Simprints Technology Ltd

About the Customer

Simprints is a nonprofit tech company from the University of Cambridge that seeks to break the identification bottleneck in less-than-laboratory settings. Recognizing a significant gap in current biometric technology, Simprints is building an affordable, secure, rugged, and open-source fingerprint system that works anywhere.

With the ultimate goals set by the *United Nations Sustainable Development Goals* initiative, Simprints addresses the challenges of:

- Improving maternal health
- Improving education accountability
- Data collection
- Microfinance
- Immunization
- Aid distribution

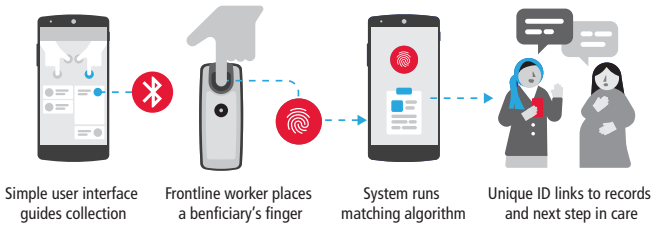

Figure 1: How It Works

Using a fingerprint scanner designed for and by frontline healthcare workers, Simprints' system helps to address these challenges by ensuring accurate identification of any individual, regardless of access to formal or government-issued identification methods. This way, aid organizations can measure accurately those who have been reached, and—critically—who haven't. Frontline care workers can learn to use Simprints with less than 30 minutes of training, and then can make critical decisions based on the secure medical records of their patients.

Challenges

- Extreme environments that require robust products
- Flexibility to modify the designs as needed
- Low power consumption
- Robust security protocols
- Low cost

Cadence Solutions

- OrCAD is an industry standard, used by leaders in PCB design, from design houses to in-house engineers
- OrCAD Capture allows Simprints to integrate their design from concept to product in a short amount of time, helping them to achieve the desired standards and certifications
- OrCAD helps design the PCB with the goals of low power and low cost in mind

Key Challenges

Extreme environments

The main challenge to develop the device was that it must function properly in extremely remote and harsh conditions. These devices are used in deserts, monsoon areas, mountaintops, and rainforests. Frontline health workers go door-to-door—or tent-to-tent, or even cookfire-to-cookfire—and the devices get

wet, dirty, dropped on the floor, jostled around the backs of jeeps, thrown in backpacks and rucksacks, and "borrowed" by children. Developing a robust product was very high on Simprints' list of priorities.

Power

The challenge of power usage is critical, as well. Simprints' product is powered by a lithium-ion battery that can function for two full days on a single charge. The device connects to a mobile phone via Bluetooth. Conservative power usage in the design is a must.

Security

Because this kind of biological tracking is of a sensitive nature, great care has been taken to ensure clients' privacy. Simprints' device only matches the fingerprint template of each individual with a unique user ID; the service provider must use that identification to access that person's records. No personal details are stored with the fingerprint templates.

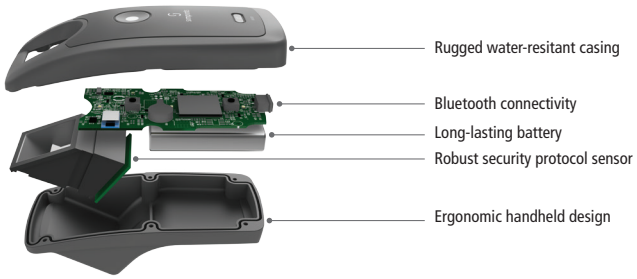

Figure 2: The Simprints Fingerprint Scanner

The Solution

Giles Hutchison handles product design and manufacturing at Simprints, and was responsible for making the decision to use Cadence® products in Simprints' design. He says, "OrCAD is a widely recognized as an excellent piece of software if you design consumer or industrial embedded electronic products...
I have used other less capable but simpler packages, but really, if I'm working on schematic capture, I end up using OrCAD. I never considered using anything else for our designs."

> *"I never considered using anything other than OrCAD for our designs. I don't really have an alternative! If I had to choose something, it would be OrCAD."*
>
> *Giles Hutchison, Engineer and Project Manager*

Using OrCAD® Capture, Simprints can make small changes to the design, ensuring that the product achieves the proper environmental standards, CE certifications, and FCC markings; they can also make the changes requested by the workers in the field with little disruption to the production of their prototypes. They are also exploring OrCAD PSpice® Designer. Instead of going outside of the tool, the OrCAD PSpice Designer can optimize a component choice, especially if doing it in an extreme environment.

"OrCAD allows us to develop and deploy prototypes really quite quickly. That is the key thing," says Hutchison. "It allows us to evaluate technology. System-level design is outside the schematic capture world—that's more about engaging with partners, evaluating different technologies and components and modules—but we use OrCAD to integrate, allowing us to move on from a concept to an actual product. That's what OrCAD will do for us."

The Results

Moving forward, as the company grows and more of their PCBs are designed in-house, Simprints hope to import all their past designs into one easy-to-use GUI, using the OrCAD PCB Editor tool.

Currently, Simprints has approximately 250 units live out in the field. How many units will come out of the second generation has yet to be decided; predicting the future is difficult, "even just five years ahead," said Hutchison. But, as he also said, in his very British way, "We will crack on."

Considering the importance of Simprints' work of saving lives, Cadence is glad to help.