OrCAD™
CADENCE PCB SOLUTIONS

Building Connectivity for a Better World Begins with Reliable Hardware

LumenRadio and Cadence

About LumenRadio

LumenRadio was founded with a clear vision of how wireless technology will change the world. By consistently being the first to introduce new groundbreaking technologies, they are rapidly transforming the entertainment lighting and internet of things (IoT) industries. This Swedish company's mission is to provide the world with reliable wireless connectivity. Connectivity can enable exciting new business opportunities and revenue streams, but it is also an opportunity to make the world a better place through smarter products with less energy consumption and improved resource utilization.

Key Challenges

IoT is here, and it's huge. In a report by Globe and Mail[1], Siemens described the future of smart, connected devices as being the catalyst for the fourth Industrial Revolution. And Business Insider[2] projects that by 2020, there will be more than 34 billion devices connected to the internet. In the midst of this revolution of breathing intelligence into our world with a variety of sensors and systems, there's just one problem: all of those devices are relying on the same radio-frequency spectrum for their communication. This is where LumenRadio comes in.

Connecting billions of smart devices is no easy feat, and doing it wirelessly adds even more reliability and cost concerns. To address these problems, LumenRadio developed a complete IoT platform, Mira, which enables businesses to quickly deploy an IoT network with top-notch reliability and self-healing technologies. When connectivity becomes the pathway to prosperity for IoT systems, Mira offers:

Challenges

- Enable businesses to deploy IoT networks with top-notch reliability and self-healing technologies
- Use the RF spectrum in the most efficient way possible

Cadence Solutions

- OrCAD® Capture
- OrCAD PCB Designer
- OrCAD PCB SI
- Cadence® Allegro® PCB Designer

Lessons Learned

- Look for a complete ecosystem to support hardware development
- Take advantage of OrCAD Capture solution's seamless integration between front-end and back-end
- Get into business as fast as possible during tough times

Results

- Captured ideas in the OrCAD schematic editor in a fraction of the time it would take in competitive tools
- Easily created complex, hierarchical schematics and reused circuitry from successful hardware designs
- Imported OrCAD schematic in OrCAD PCB Designer to quickly complete a physical layout

- Reliability. Their patented Cognitive Coexistence technology delivers RF signals that are clear from interference and fully secured.
- Scalability. Mira's wireless mesh network technology allows their platform to scale as the needs of a business grow.
- Affordability. Businesses don't need to invest thousands in R&F and certification procedures, Mira handles it all.
- Upgradability. System-wide updates on the Mira platform are deployed in real time without requiring any downtime.

The Solution

When they set out to create Mira, the question on the minds of Lumen Radio's designers was not just how to develop the most reliable IoT platform, but how to use the RF spectrum in the most efficient way possible. This means not just developing another piece of hardware that broadcasts at all hours of the day. Rather, it requires hardware that is flexible and aware of its surroundings, able to adapt to constantly changing RF traffic at exactly the right time.

To design this hardware, LumenRadio needed the right tools for the job. LumenRadio chose the Cadence solution from day one to design the most reliable hardware for their complete IoT platform. And at the heart of their engineering workflow is OrCAD Capture and OrCAD PCB Designer.

Niclas Norlén, CTO at LumenRadio, said "It was really easy to pick up the basics and start my design. I didn't really need to attend any class. [My previous company] used tools from other competitors, and they were really hard to get started with. I remember I spent days in training just to get started. But OrCAD was easy to get started with, and I could do pretty advanced things with the tools immediately."

The Results

LumenRadio completed all their schematic designs for their RF hardware in-house, allowing them to take advantage of the OrCAD Capture solutions:

- Ease of use and productivity. LumenRadio was able to easily capture their ideas in the OrCAD schematic editor in a fraction of the time it would take in competitive tools.
- Powerful design entry. OrCAD Capture allowed LumenRadio to easily create complex, hierarchical schematics and reuse circuitry from their successful hardware designs.
- Support for multiple tools. Working with a contractor, LumenRadio was able to easily import their OrCAD schematic in OrCAD PCB Designer to quickly complete a physical layout.

> *"Cadence is a strong company. You can expand with Cadence, you have lots of tools. It's a great way forward for us as we are growing, we can just expand what we're using from Cadence."*
>
> Niclas Norlén, CTO at LumenRadio

Lessons Learned

As LumenRadio initially outsourced board layout and routing, they looked for a complete ecosystem to support their hardware development. With a large base of OrCAD PCB Designer and Allegro PCB Designer layout experts in Sweden and around the world, there was a natural draw to OrCAD Capture due to the seamless integration between the front-end and the back-end.

"One thing I learned is that you need to get into business as fast as possible during tough times," explained Norlén. "With OrCAD, I got started on day one on my design, and got products ordered [that year] that we were selling to customers. OrCAD was one of the keys for LumenRadio's early success."

The Future

As LumenRadio continues to expand their IoT platform to a variety of new business applications, a unique opportunity has arisen to bring their complete hardware design experience in-house. This will allow LumenRadio to expand on their core competencies, delivering the most reliable hardware to their customers throughout an entire product lifecycle. Once the hardware design experience is in-house, LumenRadio will be able to:

- Reduce time to market. With their own in-house testing lab, LumenRadio has the opportunity to quickly design and simulate in OrCAD and quickly test their ideas with physical prototypes, reducing their overall time to market.
- Identify EMC problems at design time. By introducing OrCAD PCB SI into their workflow, LumenRadio will be able to quickly identify electromagnetic capability (EMC) problems at design time before they become an issue in the field.
- Manage design data efficiently. By closely integrating OrCAD with their chosen product lifecycle management (PLM) system, LumenRadio will be able to efficiently manage and track design data as changes occur, without any duplication of effort.

Summary

As LumenRadio continues to push the future of connected devices forward with their complete IoT platform, the capabilities of the OrCAD solution will grow with them. From schematic editing to PCB layout and simulation, LumenRadio's continued growth is dependent on meeting their every engineering need. OrCAD is that solution.

References

1. The Future Is Smart: How the Internet of Things Is Changing Business, Alec Scott. The Globe and Mail, undated. https://www.theglobeandmail.com/report-on-business/rob-magazine/the-future-is-smart/article24586994/

2. Here Are IoT Trends that Will Change the Way Businesses, Governments, and Consumers Interact with the World. John Greenough and Jonathan Camhi. Business Insider, Aug. 29, 2016. http://www.businessinsider.com/top-internet-of-things-trends-2016-1