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CEO of ODIN Technologies, an RFID company

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by Patrick J. Sweeney II

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About the Author

As you may have guessed by the dangling participles and misused gerunds, this is the first book by **Patrick J. Sweeney II** (despite Amazon's link to books on gynecology by an author of the same name). When not negotiating with his editor to push back book deadlines, he leads ODIN technologies as President and CEO.

ODIN technologies is a global RFID software and services company focusing on RFID infrastructure. Mr. Sweeney is well recognized as a visionary in the RFID industry with several RFID patents in various stages of approval. He has appeared in such publications as *CIO Magazine, The Washington Post, Fortune* magazine, *Internet Week,* and many others. He has been interviewed by ABC news and CNN, among others, and is a frequent speaker worldwide on all topics relating to RFID. He is also an active member of several standards bodies and regulatory groups helping to shape the evolution of the RFID industry.

Mr. Sweeney is a second-generation IT professional; his father was one of the first employees at Electronic Data Systems (EDS), where "Pops" entertained him and his brother on weekends by teaching them to read punch cards and other useful skills. Mr. Sweeney took that genetic proclivity toward data centers and started a successful, secure managed hosting company in the late 1990s, which he later sold. His brother took that same

early training and started XS Speed Choppers, making custom motorcycles — go figure.

Mr. Sweeney finished second in the 1996 Olympic trials in the single scull, is an avid outdoorsman, enjoys helping other entrepreneurs, and is passionate about various Irish causes. He is a board member of Trinity College business school in Dublin, Ireland, and an Alumni Board member at the Darden School of Business at the University of Virginia. He graduated from Darden and received a Bachelor of Science degree from the University of New Hampshire. He is blessed with a great family—wife Christen, daughter Shannon, son P.J., and three dogs. They live in Middleburg, Virginia, in a house full of useless RFID gadgets.

Dedication

This book is dedicated to everyone who makes the dream of entrepreneurship and innovation possible, from the brave men and women defending our freedom in the armed forces, police, and fire departments to college professors, mentors, and angel investors.

Topping the list of people who make entrepreneurship (and crazy book projects) possible are loving, understanding, and helpful spouses like mine. This book is especially dedicated to my beautiful wife Christen, who helps and supports me as I build companies, write books, and travel around the world chasing birds and the Red Sox.

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Applied Wireless Identifications (AWID)

FOX IV Technologies

Impinj

Intermec Technologies

MARKEM

Symbol Technologies, Inc. (Formerly Matrics)

ODIN technologies

OMRON electronics

SAMSys Technologies

Texas Instruments (TI)

ThingMagic

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RFID Journal Online

EPCglobal

IDTechEx

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RFID Exchange

RFID Update

Auto-ID Labs

Auto-ID Lab @ Adelaide

The RFID Gazette

UCLA's RFID@WINMEC site

Slashdot

Chapter 20: Ten Tips from the Experts

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Chapter 21: Ten (Or So) RFID Standards and Protocols

EAN.UCC

EPCglobal

UCCnet

ISO/IEC JT1/SC17

ISO/IEC JTC1/SC31/WG4

AIAG

Container Shipments

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Introduction

S omewhere, separated from you by just a few degrees, is not Kevin Bacon, but an 800-pound gorilla demanding that you adopt radio frequency identification, or RFID — a technology you may have never even heard of until just a few months ago. Chances are that gorilla wears a stylish blue smock with a yellow smiley face on it and greets you with a "Welcome to Wal-Mart." If not Wal-Mart, the US Department of Defense, Target, Albertsons, Best Buy, Tesco, Metro, the FDA or a number of other companies may be requiring you to implement this technology by a certain deadline. If you don't have a mandated deadline for adopting RFID, consider yourself lucky. You can discover and make decisions about this exciting technology based on your normal process for evaluating new business tools.

Whatever your situation is, you either want or need to set up an RFID network. So you went out and picked up *RFID For Dummies* and are ready to go — yippee!

About This Book

This is a book that is on a mission to take the confusion out of RFID. RFID is based on well-known laws of physics. It's easy to understand how things work after you get your arms around those basics. The better news is that the technology works really well if you know what

you’re doing. So without sending you to MIT for a couple of years of RF engineering school, this book explains everything you need to know to start setting up and deploying your own RFID network — what more could you ask for?

Who This Book Is For

Whether you are just curious, scared, worried, or simply mad at the prospect of implementing yet another new technology — even if you know nothing about RFID — *RFID For Dummies* is here to help. And, unlike a similar promise by the IRS, this book really will help. You find out what RFID is, what it does, and how it works. I guide you through the concepts and ideas in plain English, walk you through the basics of RFID from a business perspective, and speculate on where this technology is headed (although I do, from time to time, provide sufficient Geek Speak for the engineers and systems guys who, no doubt reluctantly, bought this book in an attempt to actually understand the mechanics of Radio Frequency Identification).

If you know the basics about running a laptop or PC and know what an IP address is, you are armed with just about all you need to know to initially set up an RFID network. If you have any background in physics and understand some things from an electronics perspective, you've got a running start. I assume that you come from a supply chain or warehouse background and might not have a detailed IT background.

You Don't Need a Slide Rule and Pocket Protector

to Use This Book

Other than the willingness to learn and basic knowledge, you need some equipment to set up your RFID network and follow some of the processes outlined in this book. At some point, plan to get

- A spectrum analyzer (discussed in Chapter 8)
- A budget to buy an RFID reader, antennas, tags, and a rack (about $7,500 total)
- An area large enough to begin testing and using the equipment (at least 20 feet x 20 feet)
- Another person to help you occasionally try out the technology
- A penchant for experimentation and thirst for knowledge

How This Book Is Organized

RFID For Dummies is broken into six different parts. If you are new to the technology, it is helpful to read the parts in sequential order. If you have a physics or RF background and you want to get into the nuts and bolts of the technology, skip right to Part II and then move on to Part III. If you are trying to justify the RFID project, you may want to go right to Part V, which addresses some of the business concerns around strategic planning and ROI. You can read all the technical chapters in Parts II and III by themselves and use them for reference, as well as the last part, the Part of Tens. Here's a quick rundown of what you'll find in each part.

Part I: Now That You Can Spell RFID, Here’s the Rest of the Story

This part introduces the basics of RFID. In Chapter 1, you find an overview of the technology, what advantages are driving the mandates, and a blueprint for implementing RFID, which I call the four Ps. In Chapter 2, I explain how RFID fits into the world of Auto-ID technology and explain some of the basics about the protocols that make it work. Chapter 3 helps you start assessing the impact RFID will have on your business and helps you make some basic decisions about how you’ll use RFID.

Part II: Ride the Electromagnetic Wave: The Physics of RFID

In this part, I peel away the layers of RFID to uncover the underlying science of RFID. This part gives you the physics knowledge you need in order to design your network for optimal performance and make wise purchases. In Chapter 4, you can find an overview of how the physics of RFID systems work. Chap- ter 5 digs a little deeper by delving it parts inside each of the key components of a system. Whereas Chapters 4 and 5 focus on the invisible realm of electromagnetic waves, Chapter 6 is focused squarely in warehouse or marketplace, covering common setups of RFID systems and case studies so that you can learn from early adopters.

Part III: Fitting an RFID Application into Your World

This part is your key to designing an RFID network specifically for your environment and needs. In Chapter 7, I walk you through the process of testing for electromagnetic noise in your warehouse or building using a spectrum analyzer. Chapter 8 helps you set up a lab (or find one you can use) so that you test for the right tag (Chapter 9) and tag reader (Chapter 10). And last but not least, Chapter 11 helps you wend your way through maze of *middleware* (the software the connects the RFID network) by explaining what features to look for and how to fit middleware into your network architecture.

Part IV: Raising the Beams for Your Network

This part walks you through the process of actually implementing your carefully planned-out RFID network. Chapter 12 explains a few project management tools that will keep your trial run and follow-up network designs on schedule. Chapter 13 covers the process of setting up the hardware in the warehouse, or other real-world setting (as opposed to a lab), and how to train your employees to use the new system. And Chapter 14 explains now to set up monitoring systems for both operators and system administrators, so that your system keeps running strong, and thus helps your bottom line.