

*What others have to say about:*  
**The Alarm Science Manual**

*Spellbinding, Mesmerizing, Captivating.*

Having been in the electronic life safety and security industry for thirty-plus years, I can count on one hand the number of speakers who I would describe with these terms. . . Jeffrey Zwirn is clearly one of these individuals. . .

I have witnessed, firsthand, seminar session rooms overflowing with alarm company owners, managers, technicians, and salespersons hanging on every word Jeffrey spoke, and those sessions ran thirty to sixty minutes past their scheduled conclusion time due to the continuous barrage of attendee questions.

A truly gifted teacher and subject matter expert, Jeffrey is one of our industry's masters who now has taken his wealth of knowledge and penned what I am sure will quickly become a must read for anyone who wants to make a living in this industry "the right way."

*Dale R. Eller, Owner/Executive Director, ITZ Solutions!*

*Executive Director, PBFAA*

*Executive Director, NYSESA*

*Executive Director, Installation Quality Certification Program*

*The Alarm Science Manual* is the first of its kind in the Security Alarm Industry and a welcoming addition to any alarm dealer's "tool box."

Ignore Mr. Zwirn's guidance, tips, strategies, and warnings in this industry bible at your own risk. There is a good reason he is one of the most respected and sought after alarm security experts in the United States. It would do you well to listen to him.

This manual is peppered with "life safety" and "company saving" gems which, if followed, will most certainly reduce your risk of having to spend some unpleasant and unwelcome time with litigation attorneys like myself! Enjoy the read and the education—I most certainly did.

*Michael J. Revness, Esquire*

*(Attorney in the Security Alarm Industry)*

As the author of the longest running magazine article on fire alarm systems in the United States, I was surprised to discover a new level of in-depth scientific and technical alarm information which has never been provided to the alarm industry before. *The Alarm Science Manual* does just that in going behind the scenes and forensically examining court cases where “electronic security” didn’t live up to its name. I can safely bet that every alarm company owner or professional technician who reads this book will have a newly found respect for each of their duties and tasks. Whether readers dive into this text mid-stream, or start from the first chapter, all will eventually experience the author’s skilled intent to ensure that the reader is provided with the awareness and importance of doing it right, or accepting the serious and negative consequences of its actions and inactions from doing it wrong.

Readers will discover highly advanced methodologies from Zwirn that they can adopt and integrate into their own business model which may save their customers from loss, serious personal injury, and even death. If *The Alarm Science Manual* readers follow Zwirn’s expert advice and guidance it could dramatically improve the way they conduct their businesses.

*Greg Kessinger, SET, CFPS, IMSA, CDT. SD&I Columnist and  
National Training Director for Zenith Design Group, Inc.*

Don’t walk—RUN to get a copy of *The Alarm Science Manual* by Jeffrey Zwirn, CPP. If you install, service, test, inspect or monitor security systems this is a MUST READ. Learn how to minimize your liability on all types of electronic security systems, from fire and burglary to panic and carbon monoxide alarms.

Mr. Zwirn’s extensive experience with forensic investigations of systems that failed is critical in ensuring the same does not happen to you.

Attend any of Mr. Zwirn’s lectures, industry training, or license renewal courses and you will hear firsthand about systems that did not function or were circumvented, leading to catastrophic losses. Read this manual to discover why alarm systems failed and what you can do to prevent a disastrous loss for your company. Learn techniques to keep yourself out of the news media and out of the courtroom. Get *The Alarm Science Manual* TODAY!!

*Peter Lowitt, President, Lowitt Alarms & Security Systems  
Member: CSAA Board of Directors, AHJ Liaison Committee*

# THE ALARM SCIENCE MANUAL™

*Scientific advice and advanced methodologies to help your alarm company minimize liability now, while providing your customers with the most advanced, effective, and reliable security systems available.*

by  
Jeffrey D. Zwirn, President  
CPP, CFPS, CFE, DABFET, CHS-III, SET, CCI  
Zwirn Corporation  
[www.alarmexpert.com](http://www.alarmexpert.com)

*The Alarm Science Manual*

ISBN: 978-0-9852766-0-7

LCCN: 2011942857

Copyright © 2014 by Zwirn Corporation. All rights reserved. Printed in the United States of America. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. For information, contact Zwirn Corporation, 46 West Clinton Avenue, Tenafly, New Jersey 07670 or info@alarmexpert.com, 800-353-0733.

All brand names, trademarks, and registered trademarks are the property of their respective holders.

*The Alarm Science Manual* is based on the educational and scientific training curriculum developed by Jeffrey D. Zwirn, President, Zwirn Corporation, for The Alarm University™ and the Alarm Science Boot Camp™ training programs.

In most instances, alarm company names, manufacturer names, and/or individuals involved in the respective cases referenced have been intentionally withheld. Any similarity to actual persons or companies is purely coincidental.

**WARNING—DISCLAIMER:**

This book is for informational purposes only.

The reader and/or recipient of *The Alarm Science Manual* confirms and understands that all of the material contained in this book is being provided for informational purposes only and is based solely on the specialized education, skill, knowledge, training, experience, and credentials of Jeffrey D. Zwirn, CPP, CFPS, CFE, DABFET, CHS-III, SET, CCI, and President of Zwirn Corporation. The reader of *The Alarm Science Manual* agrees not to hold Mr. Zwirn, Zwirn Corporation or its shareholders, directors, officers, or employees responsible for any damages whatsoever relating to any of the information contained in *The Alarm Science Manual*. The reader agrees not to make any changes to the way it operates any aspect of its alarm contracting practice, or any other business or operation, unless and until said changes fully comply with all applicable codes, authorities having jurisdiction, and standards of care and practices in the industry, and are first approved by the reader's insurance carrier, if applicable, and attorneys. The reader of *The Alarm Science Manual* further agrees, confirms, and understands that none of the information provided in *The Alarm Science Manual* is intended to be relied on or used as legal advice, nor does any of the information posited guarantee, represent, or warrant that your company or the reader will not be exposed to a legal claim or be found legally liable for any aspect of the alarm system(s) that you survey, design, install, recommend, program, service, maintain, inspect, test, take over, and/or monitor. Finally, the reader of *The Alarm Science Manual* agrees to indemnify, defend, and hold harmless Mr. Zwirn, Zwirn Corporation, and its shareholders, directors, officers, and employees from any first or third-party claim and/or lawsuit based on or arising from any of the information provided through *The Alarm Science Manual*. If any of the foregoing is not acceptable to the reader, please do not read this book.

To the extent that an alarm company and/or equipment manufacturers name and/or their installation or product appears in one or more of the forensic photographs subsumed within this book, it should not be construed by the reader in any way to imply that said company, manufacturer and/or their product was involved in litigation, and/or that their installation, equipment or product failed in any respects.

# About the Author

---

**F**EW PEOPLE HAVE HAD AS MUCH EXPERTISE IN FORENSICALLY investigating electronic security and fire alarm systems as nationally recognized alarm expert and industry veteran Jeffrey D. Zwirn, CPP, CFPS, CFE, DABFET, CHS-III, SET, CCI, and President of Zwirn Corporation. At the age of nine, Zwirn built his first alarm system. For the next forty plus years, Zwirn has been immersed in all aspects of owning and operating an alarm contracting practice including performing security surveys and needs analysis, providing recommendations, as well as the sales, design, installation, programming, inspection, service, repair, maintenance, testing, and monitoring of thousands of security and fire alarm systems.

In addition to being designated and recognized by the New York City Police Department (NYPD) as an expert instructor, Zwirn has been retained to investigate a multitude of cases and claims involving electronic security systems, from burglary and fire losses to events where security systems have stood as silent witnesses to catastrophic crimes, such as arson, fraud, rape, and murder.

Zwirn's highly specialized skills are further amplified through the crucial application of his education, skill, knowledge, training, experience, and credentials in the alarm and security industry. To that end, Zwirn has educated and taught juries and the technical community of the alarm, security, and law enforcement industries across the country, about all of this mission-critical information, and his forensic methodologies. By employing a combination of reliable scientific and technical formulas, Zwirn is able to uncover the reasons why a system is alleged to have failed, did not fail, was circumvented, or

bypassed by an intruder, or otherwise what, if any, impact his forensic investigative analysis and findings bring to the case.

One measure used to quantify Zwirn's unparalleled expertise in forensic alarm investigations is that he has been retained by some of the world's largest alarm companies and manufacturers as their expert. In just one example, the reliability of Zwirn's forensic expertise was a contributing factor in securing a defense verdict in a plaintiff's \$90 million fire loss claim against a nationally recognized alarm company. Conversely, Zwirn has also been retained as the plaintiff's alarm expert. In fact, in the first seven months of 2010 alone, Zwirn's testimony was a contributing factor in jury awards and verdicts in excess of millions of dollars.

Zwirn is also nationally known for the groundbreaking scientific and technical forensic investigation that he performed, and testified to, in the first degree murder retrial case of the State of Missouri versus George Revelle. During the deliberations, the jury stated that they believed that Revelle killed his wife. However, after hearing Zwirn testify for the defense, the jury came back with a *not guilty* verdict. In particular, not only did the jury state that Zwirn was a reliable witness, but also the jury unilaterally relied on Zwirn's expertise and testimony to reach its *not guilty* verdict.

Zwirn has also been selected to provide test questions for the internationally recognized Certified Protection Professional® credential and for each level of the National Institute for Certification in Engineering Technologies Fire Alarm Systems Certification Program (NICET®).

Zwirn was also appointed as a principal technical committee panel member for NFPA 72®, the National Fire Alarm Code® and for the National Fire Alarm and Signaling Code®, in the special expert category, and he currently serves on twenty-two UL® Standards Technical Panels.

Ralph Wayne Sevinor  
President, Wayne Alarm Systems, Inc.  
Lynn, Massachusetts

# Foreword

---

AT LAST, A BOOK ABOUT AN IMPORTANT SUBJECT THAT THE NONTECHNICAL among us can read and understand. Although those of us in the safety and security professions are fully aware of the importance of intrusion detection systems and fire alarms, rarely can we find a book on the subject that is both highly informative and yet very readable, or “user friendly.”

The book’s author is Jeffrey D. Zwirn, a nationally known alarm specialist with extensive history in all aspects of alarm development, operations, installation, and monitoring. Zwirn holds multiple, respected certifications such as CPP, CFE, CFPS, and a host of others.

Zwirn is also a master alarm technician and is a burglar and fire alarm certified contractor in Florida, New York, and New Jersey. Not only is he a master of his trade, Zwirn also has wide-ranging experience as a forensic consultant who has served as an expert witness in various courts across the country. In addition, he has produced training curricula for the New York City Police Department (NYPD) and the Joint Terrorism Task Force, among others.

*The Alarm Science Manual* is divided into seven information-filled chapters. Chapter 1 introduces the reader to alarm basics while Chapter 2 delves into specific technologies, features, and devices. Chapter 3 focuses on fire protection in particular while Chapter 4 discusses best practices in the industry. Chapter 5 includes case histories detailing the human tragedies that have occurred due to a variety of technical and human errors. Chapter 6 appropriately details the liability consequences of failing to follow acceptable alarm practices. Finally, Chapter 7 provides an overview of certain current issues in the industry.

This book is to be commended for its authority, content, and clarity. It reminds me of the enormously popular *Protection of Assets Manual*<sup>®</sup> in terms of its readability and focus on the most important issues concerning the alarms segment of security and safety efforts emphasized in modern societies.

Daniel B. Kennedy, Ph.D., CPP  
Consulting Forensic Criminologist and Professor Emeritus,  
Criminal Justice and Security Administration  
University of Detroit Mercy



Jeff Zwirn has made the security industry more observant and responsive. During the years I have represented the industry it has gone through a very significant evolution. When I first represented the industry, there was little if any regulation or oversight. Technology was years behind in innovation and communication. Security companies were fortunate in what they were able to include within their contracts, i.e., language, which under most circumstances protected them from liability.

As the industry joined the computer age and technology became a part of the industry, legal challenges became more prevalent. Security companies were required to assess the risk and recommend appropriate security coverage for each individual installation. This gave rise to a new industry, “expert evaluation of the risk.” Security companies were required to make certain not only that the security they recommended was appropriate, but that it was properly installed, serviced and maintained.

Then emerged Jeff Zwirn. A number of expert witnesses, knowledgeable in the industry preceded Jeff, but none who possessed his technical and engineering skill and prowess. He has become the leading expert witness in the field and has positively impacted the industry on the importance of doing it right. Jeff is widely relied upon by the security industry in determining the proper installation, maintenance and use of security systems. Plaintiffs and defendants race to call Jeff to make sure they get to him first.

Lessing (Les) Gold  
Partner, Mitchell Silberberg & Knupp

# Preface

---

## An Early Unorthodox Entry into the Alarm Industry

### WHAT IS ALARM SCIENCE?

*Reliable methodologies of how alarm systems are properly designed, applied, installed, programmed, serviced, maintained, tested, inspected, and monitored utilizing a scientific and technical level of performance-based standards and countermeasures.*

In 1969, I received a RadioShack® electronics kit from my parents, Ely and Sidney Zwirn, of North Miami Beach, Florida. The kit included a multitude of projects that young inventors, like me, could put together by following instructions and electronic diagrams. Buried deep in the dozens and dozens of do-it-yourself projects was a simple burglar alarm system that involved assembling a functional photoelectric beam. Once this project was completed, I was able to set it up so that anyone who walked into my room, including my big sister, Bari, would trigger the alarm. While it is true that the alarm wasn't terribly loud by any stretch of the imagination, it surely was annoying enough to keep my sister out, or at the very least deter her. Little did I know that this would turn into my lifelong passion.

As a result of successfully building my first simple alarm system from a kit, a spark was created, a spark that ignited my profound passion and interest in alarm systems. That passion has now lasted for over forty years.

What was my passion before the age of nine? I had none. However, my mother says (you will hear a lot about this very special person in my life) that I actually built my very first alarm system at the age of three. (Sure, Mom!) Mom claims that I took thread and created a spiderweb-like contraption, then called

her into the room so that she would get tangled up in this pseudo-security trap. But you will have to take her word for it.

Whether I was three or nine, this was only the beginning of my adventure. Soon, I began to convert my many insecurities into a secure feeling, with my newly found passion—security systems. It wasn't long before my love of alarms, security, and protecting all the valuable contents in my bedroom figuratively wired my brain to “eat, work, play, and sleep” alarms and security. Nothing else mattered. I decided that I wanted to explore this field more deeply. I wanted to learn much, much, more. I would beg my father to help me find places where I could research more about alarm equipment. I did not want to play football, baseball, or softball like the other kids on the block; all I wanted to do was learn about, and work with alarms.

Little did I know what I was actually getting myself into. I felt like I was born to do this, and I guess now with over forty years in the business, I was right. As my journey continued, photoelectric beams grew into footprints of protection. I added alarm contacts to my interior bedroom door (at the time they were electro-mechanical), and wire laced the inside of my bedroom door, using screen wire that my dad picked up for me at the local alarm supply house. Later on, after learning about door cords, I realized that my previous techniques needed a face lift. So I took off the stapled wire that I had installed between the door and its frame.

I protected the three awning-type windows in my bedroom with foil. After I finally got it to stick and look somewhat straight, I figured out how to work the foil blocks, closed the windows, took off all the window handles, and literally screwed the windows shut. Thinking back on it now, it was probably very dangerous for a nine-year-old boy to work with a drill and not have a clue how to use it. But I knew that if the windows were screwed shut it would mean more security for me. Of course, the rest of the entire home, for a while, remained completely unprotected. But I had to start somewhere.

As for the next layer of protection, I took apart my tetherball set stand, and by happenstance the bars actually fit into the center of the windows. All it took to get them installed was the help of my hammer. So yes, now I had access to a drill, a hammer, and unlimited electricity. Playtime was very different for kids in the '60s.

To this day, I never finish adding onto projects. To round out my bedroom perimeter detection system, I installed contacts on the window shades at both corners. As you can imagine, I had a big mess on my hands. Arming and

disarming of the system was performed with some more RadioShack® parts, which consisted of an experimenter’s plastic universal box and a cassette tape holder made out of plastic. I glued a magnet into the plastic holder and carried it with me everywhere; the switch portion was glued inside the cutout of the box that I had made for entry. When I pushed the cassette tape through the somewhat jagged hole I had cut out, it momentarily came in close proximity with the internal “concealed” switch, which I had glued in. This in turn activated a ratchet relay that was tied into an incandescent Ademco® light to tell me the status of the system—on or off. Just like many systems in the real world during those years, there was only one zone for everything.

Inside my closet was the brain trust of my security system. Since I felt like the closet structure alone did not provide me with sufficient security, I also contacted both of the closet doors. Then, I had one section of the back wall of the closet set up with hundreds of feet of wire mounted and stapled to it in all different directions. The funny thing was that I intentionally never connected any of this exposed wiring. It was my plan instead to make it a decoy, or what my parents called “my son’s creation.” Does the word *monster* come to mind?

No matter what the effect, it looked like a mess; a mess that took hours and hours of time to create. Its only purpose was to trick a potential intruder, or maybe my sister, who could not even figure out how to get around my photo-beam system. Essentially, cutting any of this wiring would not stop “the system” from working, it would just waste the intruder’s time. However, if any intruder happened to look over to the right of the closet, he or she would see, and have access to, the EICO® control panel. But again, that did not matter to me. I knew that both of the doors were contacted, and besides, this was merely the testing ground for the next stage of my journey.

When I learned about the concept of the central station, I was temporarily stuck until I could figure out a way to set one up. I had to recruit my best friend, Jan Michael Morris, to allow me to run an airborne wire from my bedroom directly into his room since his house was situated about forty yards behind mine. After that connection was made, it allowed the system to operate like this: If my bedroom alarm was activated, or if the wiring was cut between our houses (also known as the Zwirn direct wire), the 10-inch Ademco bell in my best friend’s house would become energized. Next, I took a car shaker switch and taped it onto the interconnected “direct-wire” and then tied it in series with another sounder and power supply, so that if the wire was cut it would

drop and activate the weighted shaker switch, triggering the “line security” portion of the system repeatedly. This would also detect any movement of the wire as would naturally occur if anyone were trying to cut the line. As it turned out, the wind caused this same security system to be triggered.

It worked for a while until my friend, and his entire family, were ready to yank out the bells and sirens. You can use your imagination as to what they wanted to do with them! That unpleasantness forced me to use the Ademco 612 deluxe telephone tape dialer. While it did not have a line security component, the tape dialer worked well enough. More importantly, it afforded me a measure of assurance that I could walk in the neighborhood safely without the threat of my former best friend and his entire family using the “direct wire” incident against me in a nefarious way. This is where my plan B began to take shape. Using a Ramset® bullet gun tool, I proudly mounted three Ademco bell boxes and housings, and one motor siren, in another tampered housing, onto the outside perimeter wall of my house. From a visual and noise perspective this was awesome! Given that bell timers were not something I used back then, I am sure that had these boxes not been attached firmly, I would soon have found them lying in the grass below. Anyway, it was a lot of fun to develop a security plan, even if it changed on a daily basis. Thankfully my parents allowed the creative juices to flow, or in my case overflow, almost like a deluge system. I used my creative energies for as long as I could. When all is said and done, had my parents not given me this freedom, who knows what may or may not have transpired? Additionally, my parents became my first central station operators. After all, who was going to answer my recorded message that “A burglar alarm had activated in Jeff’s bedroom. Please send help at once. End of first message,” along with three others I recorded as backups? The answer was simple—Dad!

I asked, “Dad, may I program my tape dialer to call your answering service and if they receive a message will you have them call the police?”

Dad said emphatically, “Are you crazy?”

“Dad, please? This is my ‘creativity’ at work here,” I pleaded. Of course, if my eighteen-year-old daughter, Anna, asked me that today, I would reply similarly.

But, at the time, there were no false alarm fines and the police were quick to respond. My system provided me with security, and my dad caved in. We struck a deal, and my bedroom became my first monitored account. I still wanted to learn more, so I asked my dad if he would make appointments with other alarm companies to come to our home to sell us an alarm system. The