Nine Dot Connects PCB-Centric Training Courses & Schedule

What's stopping you from designing hardware?

In the world of PCB design, more than cursory knowledge of the PCB process and circuit theory is required. There are dozens of processes, hundreds of tasks, and thousands of decisions to get a PCB from conception to physical reality. At Nine Dot Connects, we "get it", and we get where you are coming from. That's why we developed these PCB centric classes so you can be more engrossed in developing your ideas into hardware rather than being held back by a process that can be messy and extremely frustrating.

The classes we developed come from accumulative decades of PCB experience as designers, managers, technical writers, application engineers, and course instructors. We have seen what is out there and, quite frankly, we believe that there is room for improvement in the general understanding of PCB design. We have embarked on an effort to provide what we at Nine Dot Connects believe are the missing pieces to a well-rounded education on PCB design.

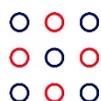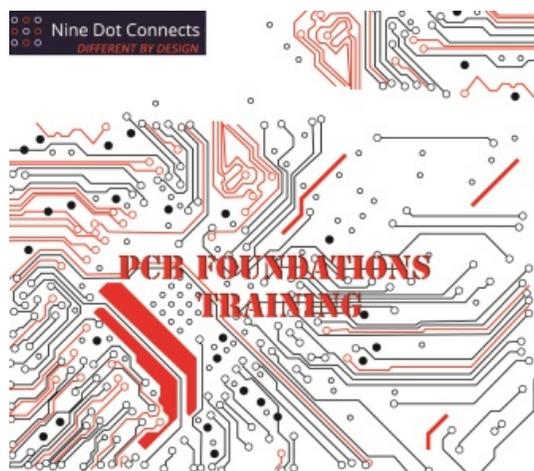We are proud to offer the classes below. Many more to come...

Additional training information such as cost, registration, student, review, etc. is available at https://ninedotconnects.com/training and the embedded pictures are linked to specific training course overview webpage.

Foundations – PCB Design – 3 Days

This training is complete overview of the PCB process, from conception to manufacturing. It was created to provide all the important details a PCB designer would need for a smooth, efficient design process. In addition to looking at the schematics and PCB from a process point of view, the lesser understood but vitally important topics of fabrication, assembly, DFM, DFT, and specification writing are also presented.

- Day 1 – PCB Manufacturing Flow
- Day 2 – Library Etiquette and Schematic Capture Flow
- Day 3 – PCB Design Flow and Documentation

This training will be hands on in addition to lecture. No prior tool knowledge is necessary; a basic understanding of circuit design is recommended. Though this training is designed to educate designers on the entire process, those in managerial positions seeking to improve their group's design flow will find this training valuable.
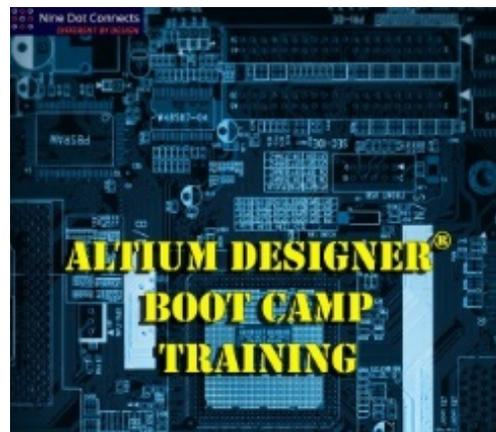
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Boot Camp - Altium Designer – 3 Days

This training helps you quickly ramp up on the fundamentals of Altium Designer. In this training, students will create components using the symbol and footprint libraries, and use these components in both a schematic design and PCB layout. The PCB layout instruction includes: preliminary groundwork necessary such as layer stack up and rules; placement of footprints; and routing of connections. You will also get hands-on practice generating manufacturing files from schematics (BOM) and PCB (Gerber and drill files).

- Day 1 – Schematic and PCB Libraries
- Day 2 – Schematics
- Day 3 – PCB Layout

This class is a combination of lectures introducing workspace panels and relevant dialog boxes, with exercises to create components, draw schematics, layout the PCB, and generate manufacturing files.
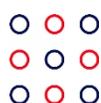

Spec Ops - Altium Designer – 3 Days

The Spec Ops course will continue where boot camp leaves off, taking the design and documentation processes to the next level.

In 3 days, Spec Ops will help you become more productive in the PCB environment through effective us of Altium Designer and its features. Along with detailed documentation and data management topics, advanced routing and construction techniques will be explored. Mastering high-speed design constructs like differential pair routing, length matching and tuning will be introduced and reinforced. Additionally, you will be introduced to many of Altium Designer's latest features, geared toward maximizing innovation and efficiency.

- Day 1 – Data Mgmt, What's new in AD18/19 & Schem Spec Ops
- Day 2 – Board Setup, Rules and Placement
- Day 3 – Routing, Length Tuning and PCB Spec Ops

The ideal entrant into our Spec Ops course will be a Nine Dot Connects Boot Camp graduate or an Altium Designer user who is comfortable with navigating the software. The student gaining the most would be the PCB designer who wants a boost in productivity, design accuracy, or level of detail in their designs, as well as the engineer who is looking to achieve the next level of creativity and innovation.

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Refresher – Altium Designer – 2 Days

This class is designed to provide a 2-day (12 hours total, 6 hours per day) refresher training with Altium Designer Version 17 (AD17) for engineers and designers who don't use Altium Designer on a consistent basis due to the nature of their jobs. The class focuses on the areas where lack of familiarity with the tool will impede the design flow.

Note that this class should only be taken after attending the Altium Designer Boot Camp offered by Nine Dot Connects or has prior experience of design, layout and manufacturing of a PCB using Altium Designer.

- Day 1 – Altium Designer Environment and Schematic Editor
- Day 2 – PCB Editor and Output Files
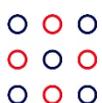
Schematics - Altium Designer – 1 Day

All too often in our efforts to learn an EDA tool, you get bogged down in the libraries and the general tool methodology. When following a tutorial, the schematic is boiled down to a place where we simply place parts and connect them together. For introductory purposes, this will get us to the PCB layout.

This training walks you through placing schematic components from various sources into Altium Designer schematics. You connect the schematic components and check the design for errors. PCB footprints are linked to the schematic components, as well as parameters to be placed into a Bill of Materials. Output files are rendered from the schematics (BOM and .PDF) and the Outjob file introduced.

The course concludes with a study of how repeated circuitry is implemented in Altium Designer (also known as multi-channel design) and introduces you to the self-study resources available for simulation and signal integrity tools in Altium Designer.

Whether you are new to Altium Designer or have a few boards under your belt, this tool was created to help everyone. For the beginners, you will gain proficiency. For those who are proficient, you will gain efficiency. With Altium Designer, if you understand the methodology of the schematic capture tool, you will have a good foundation for using the PCB layout editor.

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Libraries - Altium Designer – 1 Day

This course teaches you how to create basic schematic component libraries (.SchLib) and associated printed circuit board footprint libraries (.PcbLib). You will also learn how to create Library Projects (.LibPkg), Integrated Libraries (.IntLib) and Database Libraries (.DbLib).

You will progress through a standard component creation flow, as they are introduced to the various available workspace panels and dialog boxes to facilitate component creation.

- Modules 1 – 4: creating schematic symbols
- Modules 5 – 8: creating associated printed circuit board footprints
- Modules 9 – 10: creating integrated libraries and database libraries, respectively

The example project used in this course (Developer Tool – DT01) is available from the same example projects folder included with the Altium Designer installation.
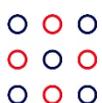
You will be introduced to the available workspace panels related to the schematic library editor. You will examine the different preferences used to configure components and then work through the creation of new schematic symbols. Similarly, the same process will be followed to acquaint you with how to create PCB footprints.

Many tips and tricks will be presented throughout the course to give you the information you need that can only be gained through years of experience with the tool.

At the conclusion of the course, you will have a good understanding the types of libraries offered in Altium Designer and their configurations, in addition to component creation.

This class can also be used as Day 1 of a 3-day Altium Designer Boot camp course for PCB development. Alternatively, it can also be used as Day 1 of a 2-day Library Training class, where day 2 introduces more advanced features.

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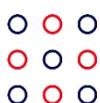## Onsite – Customized Training – 2 or More Days

Though we offer coaching and consulting services, the focus is on specific needs of a tool or process or project. Therefore, we realize that some clients may have some specific training needs that just aren't going to get adequately addressed even with our various course offerings. This is especially true when it comes to tool flow, cabling, libraries, and process flow.

This is exactly the reason why we offer a customized onsite training that can be customized to meet the needs of your organization. We offering customization based on the following scenarios:

- Mix and Match
- Topics that Aren't Covered in Courses
- Best Practice and Maximizing Reuse Concept

Our onsite training offerings are customizable to fit your needs:

- **Schedule** – Can't do weekdays? If you are using your Saturdays to 'catch up', we can be there, too! You pick the start date!
- **Time** - Can't do 9 to 5? Training does not have to be all day. The number of hours and the start time can be set by you.
- **Location** – Can't leave the facility due to the travel downtime? We can come to you and save you the travel hassle and all expenses.
- **Cost** - Don't want to bear the travel cost of your employees? The cost is much more effective due to volume discount and no travel cost.
- **Content** – Worried that you will waste time on unnecessary content? We can customize the training to meet your needs.
- **Equipment** – Don't have laptops that can be spared for training? We have equipment that can be shipped to any location.
- **Quality** – Worried about the level of excellence in the instruction and/or instructors? Our instructors have worked extensively as engineers prior to becoming instructors. Combined, they have delivered over 500+ classes and thousands of hours highly regarded training. Take a look at some reviews here.
- **On Demand** – Just need someone to guide you every so often? We provide a block of consulting hours to be used to allow you to continue to do your work with the assurance that there is someone available to assist when the going gets tough.

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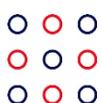
Spec Ops Training – 2 or More Days

Not all class can be offered as a standard course which addresses the needs of many and we recognized some training topics are just as important as the ones offered as a standard course.

To accommodate your needs when it comes to topics of this nature, we offer the Spec Ops training series. These training courses are customized to your needs and agenda. The training can be done on-site or on-line, depending on best way to interact with you and your colleagues.

Listed below are training courses that we have done in the past for our customers. If you have a need that is not listed, please contact us to see what we may be able to do for you.
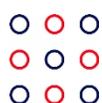Listed below are training courses that we have done in the past for our customers. If you have a need that is not listed, please contact us to see what we may be able to do for you. Check out these specialized Spec Ops training courses:

- High Speed Signal Layout
- NEXUS / Vault
- Library Methodology and Data Management
- Configuration Management
- Cabling in Altium Designer
- SPICE

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Start Date	Training Course & Registeration	Location
May 14	Boot Camp - Altium Designer (3-days)	*Interactive Online*
May 21	***Spec Ops - Altium Designer (3-days)***	Boston, MA
May 28	Boot Camp - Altium Designer (3-days)	Columbus, OH
June 11	Boot Camp - Altium Designer (3-days)	Columbia, MD
June 25	***Spec Ops - Altium Designer (3-days)***	*Interactive Online*
July 9	Foundations – PCB Design (3-days)	*Interactive Online*
July 16	Foundations – PCB Design (3-days)	Boston, MA
July 23	Foundations – PCB Design (3-days)	San Diego, CA
July 23	Boot Camp - Altium Designer (3-days)	*Interactive Online*
August 13	Lib & Sch – Altium Designer (2-days)	*Interactive Online*
August 13	Libraries – Altium Designer (1-day)	*Interactive Online*
August 14	Schematics – Altium Designer (1-day)	*Interactive Online*
August 20	Foundations – PCB Design (3-days)	*Interactive Online*
September 10	***Spec Ops - Altium Designer (3-days)***	*Interactive Online*
September 17	Boot Camp - Altium Designer (3-days)	San Diego, CA
October 8	Boot Camp - Altium Designer (3-days)	*Interactive Online*
October 15	Foundations – PCB Design (3-days)	San Jose, CA
November 5	Boot Camp - Altium Designer (3-days)	Detroit, MI
November 12	Foundations – PCB Design (3-days)	*Interactive Online*
November 19	Lib & Sch – Altium Designer (2-days)	*Interactive Online*
November 19	Libraries – Altium Designer (1-day)	*Interactive Online*
November 20	Schematics – Altium Designer (1-day)	*Interactive Online*
December 3	***Spec Ops - Altium Designer (3-days)***	*Interactive Online*
December 10	Boot Camp - Altium Designer (3-days)	*Interactive Online*

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January 28	[Boot Camp - Altium Designer (3-days)](#)	*San Jose, CA*
February 4	[Foundations – PCB Design (3-days)](#)	*Interactive Online*
February 18	[Boot Camp - Altium Designer (3-days)](#)	*Interactive Online*
March 3	[***Spec Ops - Altium Designer (3-days)***](#)	*Interactive Online*