

# No Lab Access? Check Out These Tips and Tools to Keep Your Design on Track

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As a hardware engineer, you may be used to performing at least some of your work at home. But it can be challenging – if not impossible – to build, validate and test your designs without access to the lab.

To keep you moving forward, TI has a variety of online tools and resources for each phase of the design process, from investigation and brainstorming to design, testing and support. With access to resources like these, you will find it easier to keep innovating while working remotely.

## Phase 1: Investigation and brainstorming

Under normal circumstances, short deadlines may make it difficult to step back and think holistically about your system design. For instance, is this the most efficient design? Is there another way to solve your problem?

It may now be worth investing the time to explore doing something differently, especially if you discover an innovative method or a way to save costs. For example:

- **Explore tested design ideas for your application.** When you're looking for a new way to solve a challenge, [reference designs](#) are a good place to start. Even if you're not yet able to test your design in the lab, TI's reference designs include schematics, test data and design files, giving you a head start by showing you how devices perform in scenarios similar to your application.
- **Find potential savings in your bill of materials (BOM).** With our [cross-reference search](#), you can upload your BOM to view information about equivalent TI part numbers, data sheets and cost for your entire list. In addition, you can see our available inventory in real time.
- **Learn a new skill or reassess your system's capabilities.** Now may be a good time to dream big and explore ways to level-up your system design. Perhaps you have considered adding connectivity to your system. You can learn the basics of designing with [Bluetooth®](#), [Wi-Fi®](#) or other connectivity standards with our [SimpleLink™ Academy](#) or [Connect](#) video and podcast series. You can also explore interactive block diagrams on our [applications pages](#) to explore other functions for your design.

## Phase 2: Design

When you're ready to start building your system, a number of tools are available online, whether you're designing a power supply, signal chain or embedded processing subsystem. For example:

- **Start with ready-made analog subcircuits.** If you're designing for signal chain, you can explore amplifier and data-converter subcircuit ideas and easily adapt them to meet the needs of your specific system. Our [Analog Engineer's Circuit Cookbooks](#) for amplifiers and data converters include more than 100 subcircuit ideas, including step-by-step instructions, basic formulas, schematic diagrams and SPICE models.
- **Build a power test bench.** Find parts and create power schematics using [WEBENCH® Power Designer](#). With this tool, you can design and analyze a full end-to-end power supply and then export that design to your favorite computer-aided design environment for simulation.
- **Look for ways to simplify your design.** For example, using power modules with an integrated inductor in your power supply design is one way to eliminate some of the testing that would typically take place in a lab. This option can also help you reduce printed circuit board (PCB) area and optimize electromagnetic

interference (EMI) performance. Explore [this training series](#) to learn how to incorporate modules into your design.

- **Problem-solve with online training and tutorials.** When you're stuck on a design issue, our [library of training videos](#) can help you learn how to use TI products, tools, software and applications. Whether you've got a fundamental question or are looking to explore an issue in-depth, you can search by application or product to find step-by-step tutorials with specific examples.

### Phase 3: Testing and simulation

While there's no substitute for lab testing in the final stages of design, tools do exist that can help you assess device performance in the meantime. Consider:

- **Evaluating device performance with evaluation modules (EVMs).** If you don't currently have a complete lab available for board testing, EVMs allow you to test device performance in a pre-made system, which can help you reduce prototype development time later. Many TI EVMs come with GUI software to provide graphical outputs of results on a PC. Our EVMs are available to ship anywhere in the world – including your home – when ordered from [TI.com](#).
- **Spending time with simulations.** A number of free simulation tools are available to help you simulate how a device will work in your system. TI offers [free models and simulation tools](#) to help you accelerate development, including the newest addition to our design resources portfolio, PSpice for TI. You can learn more about it in the technical article, "[How to simulate complex analog power and signal-chain circuits with PSpice for TI.](#)"
- **Doing software development work.** For designs requiring software development, you can evaluate our company's embedded processing products using [TI cloud tools](#); you'll find code examples, development tools and device documentation within Resource Explorer on that page. To further your development, software on TI.com is free.

### Phase 4: Support

For support along the way, don't forget about the [TI E2E™ support forums](#). You can ask technical questions about your specific design issues and receive help from our product experts. You can also seek specific product support through the [TI Customer Support Center](#).

No matter your design stage, there are easy-to-use online resources to keep you productive and innovating.

And if you just want to take a break and have a laugh, check out:

- [7 signs you might be a power-supply designer](#)
- [7 things that only an analog engineer would understand](#)

Here are a few other miscellaneous resources:

- Explore the [TI Precision Labs](#) video training curriculum for analog signal-chain design, from foundational knowledge to advanced concepts.
- Explore resources, tips and tools for embedded design in TI's [Fundamentals of Embedded](#) hub online at Electronic Design.
- Start a new power-supply design with in-depth calculations of voltages and currents using the [Power Stage Designer™](#) software tool.

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