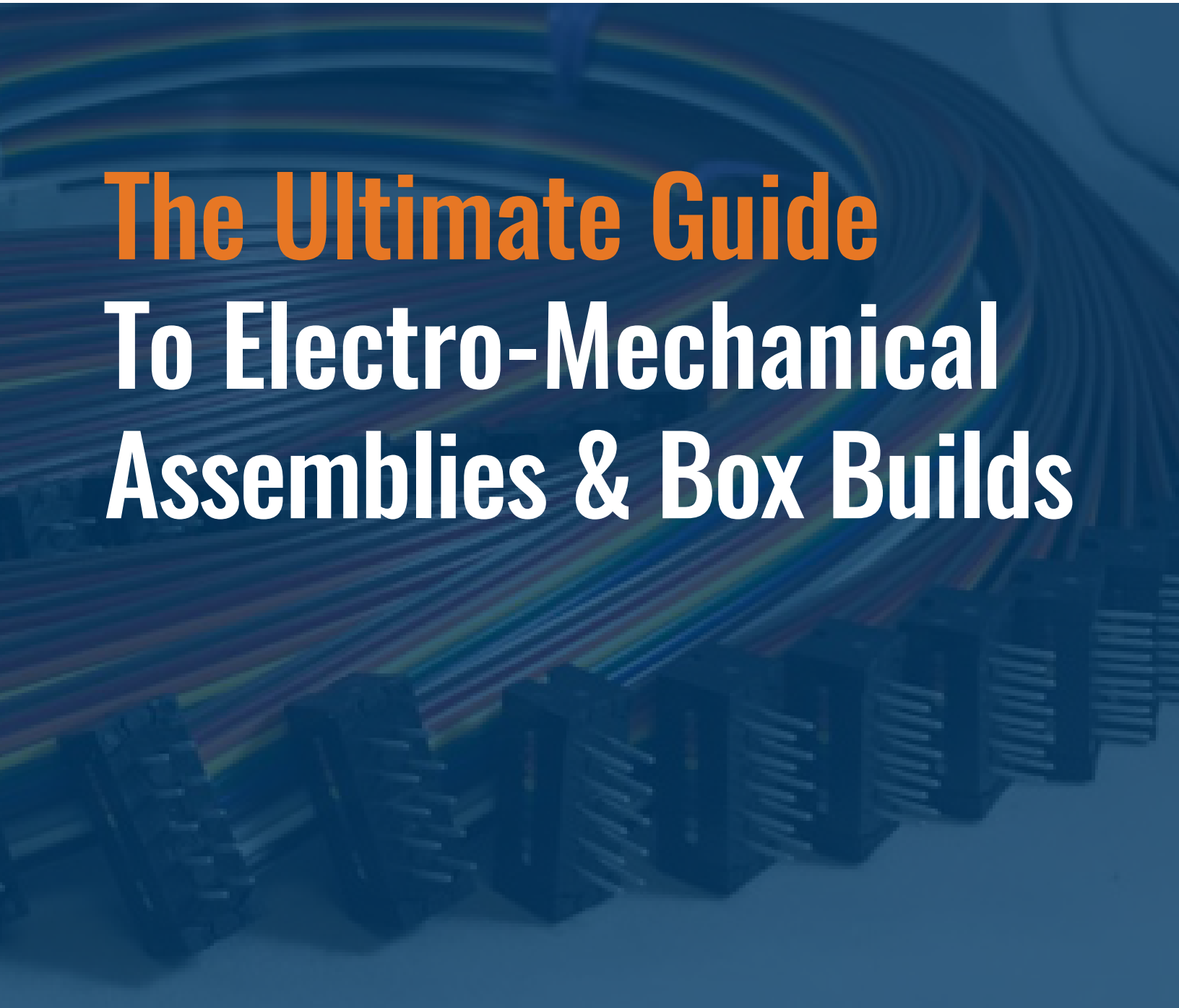


ELECTRO-PREP



The Ultimate Guide To Electro-Mechanical Assemblies & Box Builds

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What Is a Box Build?

The term “box build” refers to the integration of electro-mechanical components and/or subassemblies into an enclosure or panel to create a finished product assembly. It is also sometimes called system integration. Typical components and subassemblies may include printed circuit boards (PCBs), wire harnesses and cable assemblies, programmable logic controllers (PLCs), pneumatics, relays, DIN rails, safety elements, and power supplies.

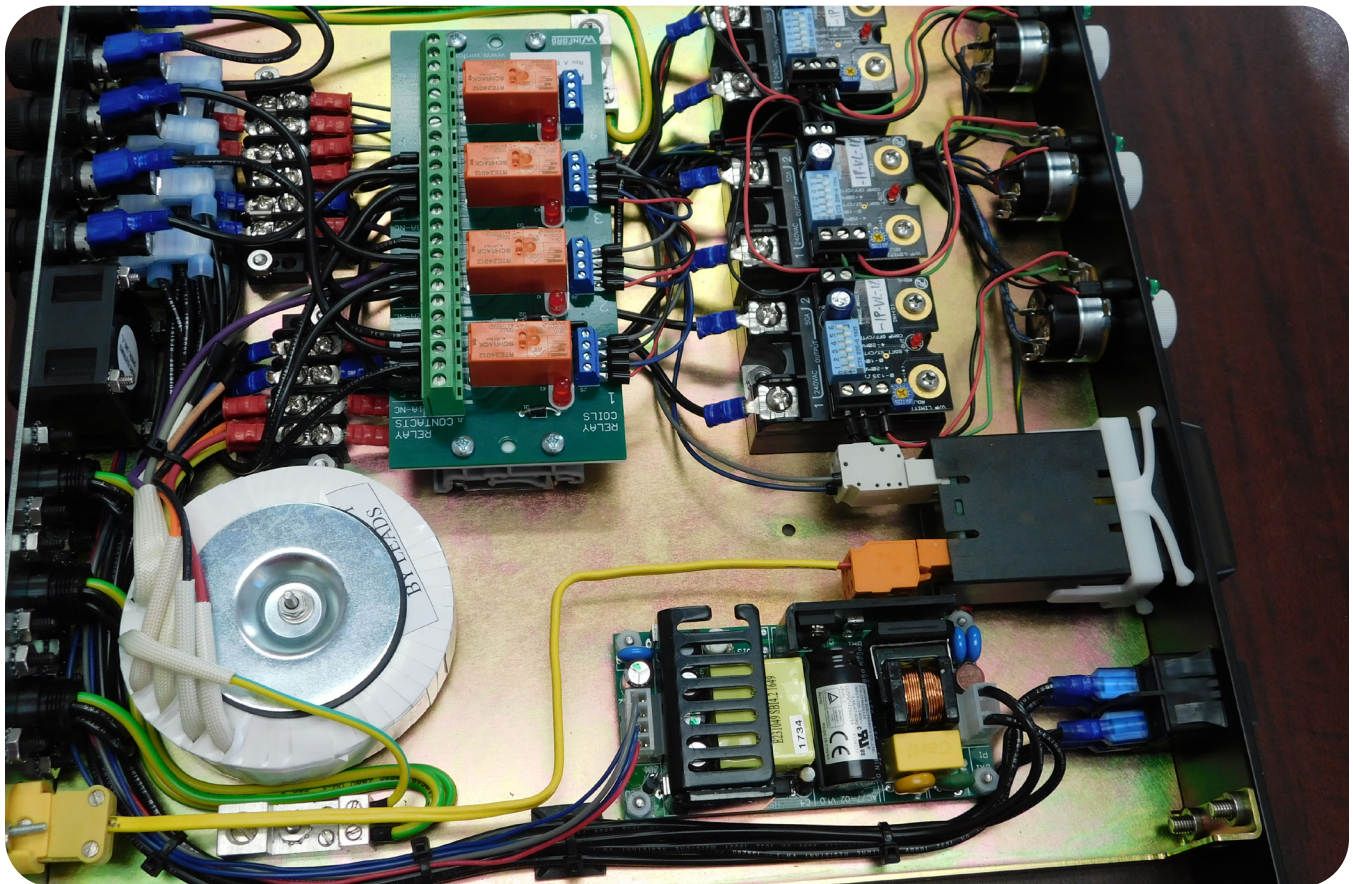
Box builds can range from simple (e.g., installation of a single PCB in a small enclosure) to highly complex (e.g., installation of numerous components and subassemblies into large panels), depending on the product and project specifications. In addition to the installation of components and subassemblies, they often encompass the manufacture of the enclosure or panel and the routing of the wires and cables.



Box Build Design Goals

In the manufacturing sector, one of the main challenges is finding a balance between product design and product manufacturability. While some designs may have the desired functional and aesthetic elements, they may be difficult to manufacture, which can lead to lower product quality and higher assembly costs. One method of achieving the best product quality at the lowest cost necessitates involving the product manufacturer in the design process whenever possible. The manufacturer's insight and input facilitate the identification of which designs and design elements are practical.

Given that box builds are highly specific to the product and the project, it is essential to ensure the final design and process plan leads to a product with the proper form, fit, and function. However, the box build manufacturer must also have the knowledge and skills to actualize them. As such, it is critical to include the box build manufacturer to ensure the design is feasible and affordable before proceeding with the project.



Overview of the Box Build Assembly Process

Box builds vary depending on the complexity and specifications of the project, but often involve the following steps:

- Cutting, stripping, crimping, labeling, and otherwise preparing the wires and cables
- Building and testing the electro-mechanical components and subassemblies, wire harnesses, and cable assemblies
- Assembling the system from the bottom up, including installing components and completing point-to-point wiring
- Inspecting and testing the assembly at defined intervals
- Labeling all of the necessary components and subassemblies
- Installing the necessary software
- Testing the fully assembled system

Before performing these steps, a box build manufacturer must acquire certain information to ensure the finished assembly fully meets the needs of the customer. While projects can be completed with only a bill of materials (BOM) and schematics, additional documentation and data (e.g., drawings, wire run lists, test protocols, and sample units) decrease the risk of product and process errors.

Case Study:

A Box Build Solution for the Water Purification Industry

One of the best ways to understand the box build process is through an example. Outlined below is an overview of a box build project completed by Electro-Prep, a New England-based contract manufacturer specializing in custom wire harness, cable, box build, electro-mechanical, and other assemblies.

The customer was a multinational company in the water purification industry looking for a custom junction box. Initially, Electro-Prep only supplied them with the necessary wire and cable assembly components. However, the customer eventually approached the Electro-Prep team for a turnkey electro-mechanical assembly solution.

The junction box design originally featured a custom pressure-rated, watertight housing that raised the overall cost of the project above the budgeted amount. The experts at Electro-Prep determined that switching to a standard housing would resolve the issue and worked with the customer to identify and modify an alternative that met the design and cost objectives.



Afterward, the modified housing was integrated with the necessary components and subassemblies, including custom gaskets, cable glands, and DIN rail terminal blocks. The assembly team utilized custom-developed tooling and fixtures to optimize the accuracy and speed of the assembly operation, combined with quality assurance analytics to ensure the product met the required specifications and standards. This ensured the customer received the products they needed when they needed them.

Why Partner With Box Build Experts?

As demonstrated by the case study above, box build manufacturers can help identify and resolve challenges that arise during an electro-mechanical system integration project. Some of the other benefits of partnering with box build experts include:

- **They streamline the production process.** Working with a box build company eliminates the need for the contracting company to maintain communications with multiple component suppliers and manage the production process. As a result, the contracting company can focus their time and energy on key business strengths (e.g., marketing).
- **They increase the cost-effectiveness of the manufacturing project.** Compared to internally manufactured box builds, outsourced box builds often carry a lower burdened cost per unit. The expert box build company's insight can help optimize product designs, while its integrated manufacturing setup can offer economies of scale. Utilizing one vendor also helps streamline assembly operations and reduces lead time.
- **They maintain higher product and process quality.** Partnering with a turnkey box build solution provider allows for greater quality control over the project.
- **They decrease the risk of miscommunication.** Working with multiple suppliers opens the door to errors and miscommunication and makes it far more difficult to coordinate the many firms involved in the project.

Electro-Prep: Your Electro-Mechanical Assembly and Box Build Expert and Partner

Every box build is unique to its application and client and as such, there is no one-size-fits-all solution. Partnering with an experienced and knowledgeable manufacturer can help ensure you receive a quality product that meets your exact needs.

At Electro-Prep, we provide custom wire harness, cable, box build, electro-mechanical, and other assemblies to customers across the United States and Canada. By choosing us, our customers benefit from our:

- **Extensive industry experience.** We've provided high-quality electro-mechanical products for over 40 years. This experience enables us to answer and address any design and manufacturing questions that may arise during a project.
- **Commitment to quality.** We maintain ISO 9001:2015 certification and the discipline to adhere to the highest quality standards for all of our products and services.
- **Broad range of in-house capabilities.** In addition to our system integration services, we provide build capabilities for wire harnesses and cable assemblies.
- **Highly skilled workforce.** All of our employees are certified to IPC-620A (IPC/WHMA-A-620) and J-STD-001 standards. We also maintain a certified trainer on staff.

If you have additional questions about electro-mechanical assemblies and box builds, [contact us](#) today. To partner with us on your next project, [request a quote](#).

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