

Electromechanical modules: More than just the switch

David Webber, Director of Product Development, C&K Components

Today, switch manufacturers are no longer developing just the switch. Original equipment manufacturers are frequently requesting that switch manufacturers develop the complete module, which may include an electro-mechanical switch or sensor, complementary electronics, a source of illumination, and a means of connection. Utilizing the switch manufacturer for the complete switching module reduces the number of suppliers an OEM must interface with, and in turn, minimizes costs and shortens design cycles.

Developing a sub-assembly that includes the switch, connection, complementary electronics and housing used to mean OEM design teams had to evaluate a number of vendors. Such outsourcing also significantly slowed prototyping, development and testing. However, this is not the case today. Because switch manufacturers are now designing and manufacturing the complete module—as opposed to just the switch—these challenges are no longer the concern of the OEM. For applications in the automotive, consumer electronics, medical and marine markets, as well as other industries, utilizing switch manufacturers for the complete module is becoming increasingly common.



Automotive headliners employ switches with backlit illumination and customized graphics

For example, solutions optimized for

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automotive and off-highway equipment, such as interior headliners, feature not only customized switches with insert molded housings, custom circuitry and terminations, but paint and laser etched switch graphics and decoration capabilities, as well as backlighting for nighttime use. Today, switch manufacturers are doing even these customized graphics and decorations in-house.

Working closely with customers to solve a larger problem or need with the complete switch design eliminates outside vendors from the supply chain, resulting in reduced inventory, shorter lead times and faster design time. It also yields a faster time-to-market due to a more streamlined process of prototyping for sample orientation, ramping up to production volumes faster, and getting the overall product to market quicker. If a customer is buying multiple switches, for example, the switch manufacturer can gang them together in a bracket and add wire leads to a connector, allowing the entire assembly to be easily snapped into the customer's application. This not only increases reliability by removing the potential for improper installation, it also reduces the amount of scrap and results in a faster assembly time. By using the switch supplier to design, test, and integrate the user interface module, customers are able to expand their design staff without adding to their headcount.

Working with a switch manufacturer for designs beyond the switch itself also results in increased design flexibility. Because switch manufacturers are now dealing with the entire module, they are spending an increasing amount of time with customers to determine how the module is being impacted in the application to assess potential challenges that were not previously considered. For instance, switch manufacturers can identify materials that interface with the operator, and those in the actual contact mechanism can be re-evaluated and altered to conform to performance, reliability, lifespan and robustness standards.

For example, a navigation assembly may be designed with a variety of standard or customizable connectors, wire harnessing (including strain relief to prevent damage during installation), as well as illumination and customizable decorative effects. To efficiently and effectively provide the complete module, switch manufacturers must have the comprehensive in-house component fabrication, decorative molding, wire harnessing and assembly capabilities. Designing the proven framework for the product and then offering the ability to vary a number of features per each customer requirement provides the added value that customers are looking for today, where complete solutions often include backlit illumination, a fully decorated face surface with painted and laser-etched buttons, company logo graphics, and a wire harness to plug into the receiver box.



Even for extremely high reliability applications such as medical equipment, there are significant advantages to partnering with a switch manufacturer that serves as a “one-stop” shop. There is no room for error in medical equipment and the more vendors required to develop a single solution, the more risk there is of a problem. For example, in an electronic surgical staple counting mechanism, accuracy is of utmost importance. Utilizing the switch manufacturer to develop a module that may include the tactile switch for actuation (implementation) of each staple as well as the accompanying counting mechanism to track the number of times the actuator is pressed (the number of staples used), results in a streamlined, highly reliable solution.

Controlling the basic elements of the design provides further added value to the customer. By one company managing the most basic assembly element (the switch) while also developing the molding or designing and implementing the wire leads in the connector, one source is in control of the whole process, leaving less room for error. Switch manufacturers are also able to ascertain whether materials within the component or module are capable of withstanding certain levels of temperature, humidity or contamination, thus deeming it suitable for various applications. Additionally, if there is a quality problem, there is no question as to where it came from, thus streamlining the identification of the solution.

Cost also plays a significant role as OEMs continue to turn to switch manufacturers for the development of complete electromechanical modules. In some instances, customers require multiple vendors, such as a cable harness vendor and a separate vendor to integrate the switch into the application. Some even require an additional vendor if customizable graphics are required. When the switch manufacturer is responsible for each element of the solution, the number of outside vendors is reduced and customers are afforded additional cost savings. Plus, when a customer

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is looking for a cost reduction, the switch manufacturer owns the entire assembly process, allowing them to work to try to get cost down in various areas over the life of the program.

Employing a switch manufacturer to design and manufacturer the switch while also developing the molding or designing and implementing the wire leads in the connector means one supplier is in control of the whole process. By understanding the purpose of the switch, not just in terms of the end application, but also within its environment, there is greater opportunity for implementation of that same switch into more applications beyond the original intent. There is even the opportunity for switch manufacturers to utilize an existing, proven design rather than reinventing a custom part, saving time and money. Standard catalog switches are often developed as a result of having a number of customers with similar design challenges. Engaging with a switch manufacturer for the complete module affords OEMs a significant number of benefits.

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