LCD SWITCHES EASE DESIGNERS' WOES

Designing a user friendly control panel can be a daunting task. As technology continues to advance, designers continue to include more and more options in their product lines. As the functionality of these new products increase, engineers are forced to find new, innovative ways to interface with the operator. To date, the two most common input devices used are dedicated function keys and touchscreens**.** However, an emerging new technology offers engineers another option to consider.

A majority of control panels in the marketplace incorporate dedicated function keys. Looking around the office, you will see computer keyboards, telephones, fax machines, and test instrumentation all using dedicated function keys as input devices. Each button is engraved with the appropriate letter, number, or symbol and assigned a specific function.

Dedicated function keys have their limitations. As the number of new options increase, so do the number of function keys. Complex equipment tends to become littered with dedicated function keys. In addition, the size of the equipment grows as support hardware is added.

Another option, touchscreens, has become a popular method of operator input. Touchscreens give users easy access to vast amounts of information. Users are guided through a series of choices with a simple touch of a screen. Control panels incorporating touchscreens tend to be smaller in scale and more user friendly than dedicated function keys.

The drawback to touchscreens is the lack of tactile feedback and inadvertent input errors. Occasionally, users are uncertain if 'contact' has been made with a touchscreen. In addition, often time's users inadvertently touch the screen where they didn't intend to. This incidental contact and uncertainty about positive 'contact' increases user reluctance towards touchscreens.

Today, another option has emerged onto the scene. NKK Switches has developed a programmable LCD switch. The product combines an LCD key cap with a switch base. The key cap has all advantages of a programmable LCD while the base provides the functionality of a switch.

As a function key, the LCD switch can be programmed to perform many specific functions. The image on the LCD can be presented in text or graphics depending on the application. Unlike a dedicated function key, an LCD switch can be labeled with and perform numerous options.

As an example, a hydro power plant application required 1,600 different switch functions from a control panel. The company chose to incorporate a panel of 116 LCD switches. The panel has five rows of switches, 16 in the top row and 25 in the bottom four rows. The 16 switches on the top row are assigned and labeled with specific functions. Pressing any one of these 16 switches changes the lettering (or graphic) of the 100 switches below. Each of the 100 switches is capable of sending a signal to perform the function shown on the key cap. With this arrangement, operators are able to access over 1,600 different control options in only 2 keystrokes.

This design not only decreased the overall size of the control panel but it also reduced the number of switches per panel. In addition, it is likely that each of the switches eliminated from the design had a unique part number. The reduction in part numbers simplified the company's inventory.

Smaller LCD switch applications can be just as effective. A concept computer design uses only one NKK SMARTSWITCH™ per panel. The LCD switch is used to indicate critical CPU characteristics quickly and conveniently. As the operator pushes the switch, the LCD key cap indicates CPU temperature, processor speed, hard drive space, and critical errors. This compact design utilizes only one switch yet performs many functions.

More than just a display of text and graphics, the LCD switch can be programmed to display different colors of backlighting. LED backlighting options include red, green, amber, blue, yellow, purple, violet, and white. Each of these color combinations can be used to create an attractive front panel display. The backlighting can also be programmed to blink on and off. In certain applications, a blinking switch can be an effective way to alert an operator's attention.

Aligned in a matrix pattern, LCD switches can be programmed to resemble the operation of a touchscreen. Various designs can be incorporated depending on the application. A 2-switch X 2-switch matrix design might read (from top to bottom, left to right): English-Spanish-French-German. Pressing the switch labeled English would change the message on all four key caps to: Start – Stop – Forward - Back. Now, pressing one of these options would affect the outcome of a specific process. In the beginning, had the operator chosen the button labeled Spanish, the switches would have read: Empesar – Alto – Continuar - Atras. From this point forward, all text would have been in Spanish.

One control panel can be re-programmed in any many different languages. The ability to program the LCD switch in various languages gives a company the option of selling a single product line worldwide. If an upgrade in the product takes place, users can upgrade via software rather than replacing an entire control panel.

As a final example, flight simulator manufacturers have long used LCD switches in their control panels. A 6 X 3 matrix of switches is used to control the instrumentation inside a simulated airplane cockpit. The operator advances through the switches until the desired test effect is found. Once the affect has been located, a simple push of the switch launches the function and initiates a change in the flight instrumentation. Operators have access to over 100 different simulation conditions in a single 6 X 3-switch control panel.

Designs like these are fast becoming a viable option for engineers. The ability to perform several functions from a single switch improves functionality yet reduces panel size. As technology presses on, new products will continue to incorporate more options. With the introduction of new products like NKK Switches SMARTSWITCH™, engineers have one more interface option to choose from when considering a new design.