



CASE STUDY:

NKK Switches Helps Create Reliability for
Portable Sound Equipment



Figure 1: The Alexis Sound Mixer by the Professional Sound Corporation (PSC). It features NKK's B and G Series toggle switches.

Introduction

Since 1986, Professional Sound Corporation (PSC) has designed and manufactured highly portable, rugged audio equipment for the television and motion picture industries. Based in Valencia, California the company's products have been used all over the world to capture sound. They are used for everything from television shows, commercials, newscasts and major sporting events to documentaries, feature films and corporate videos.

The rigorous demands placed on PSC's equipment present unique switching challenges that NKK's switches have overcome.

Challenges

All of PSC's products are specially designed for use in the field. Sometimes, they are slung over a sound technician's shoulder as he treks through the jungle during the filming of a reality television show. They can also be tossed in and out of a news van as a broadcast team keeps up with daily headlines.

"We never know exactly where our equipment will go, but we do know it will be used on the go," said Ron Meyer, president, PSC. "Because of this, our products must be made as small and lightweight as possible."

Even though the equipment is portable and compact, it must also be feature-rich.

Meyer added:

“In most locations where our products are used – from mountain tops to stadium sidelines – the ability to carry one piece of equipment to get the job done as opposed to two or three is invaluable to our customers.

An incredible amount of functionality must be condensed to fit into a small package. PSC must take the same core functionality of an in-studio audio mixer that takes up half a small room and put it into a package no

Most importantly, PSC's equipment must be capable of withstanding the harshest environmental conditions.

"Our equipment has been used on every single continent and is found in every kind of environment possible," Meyer added. "From the Sahara Desert to Mount Everest and everywhere in between, it is exposed to a vast range of temperatures, dust and humidity."

Despite this, PSC's equipment must work without fail every time their customers call on it.

Meyer said:

“If a piece of our equipment fails, film production can come to a complete standstill. You've also got to consider that because our equipment is used in the field, replacement parts aren't usually within reach. This all equates to a lot of lost time and money. In many instances, it can even result in our customers – who are often freelance sound specialists – losing their contracts.

These three factors – compact design, high functionality and extreme environmental exposure – create a perfect storm of a design challenge.

Meyer added:

“Because our products are compact but feature-rich, we have to use miniature switches on them to make everything fit. However, by the nature of their size, miniature switches can be a bit delicate. This, combined with where and how our products are used, means switch failure and subsequent equipment failure is a real possibility.

Solution

PSC's designs therefore call for miniature switches capable of standing up to the same abuse as the equipment they are used on. Early on, PSC tried switches from C&K and TE Connectivity/Alcoswitch.

Meyer explained:

“The simple fact of the matter is that the switches were breaking. They just could not stand up to the demands our customers were putting on our products. The switches were the weak link in our products' reliability.

In searching for a solution, Meyer saw switches from NKK Switches used on a competing company's product and was impressed.



Figure 2: PSC's Solace Mixer featuring switches by NKK.

"We switched to NKK Switches 25 years ago and have never looked back," he added. "They're just that good. I'm convinced no other company makes switches good enough to stand up to our customers and the places they take our equipment."

NKK's B Series of miniature switches can be found on nearly all of PSC's field audio mixers, distribution amplifiers, press boxes and power supplies. "These switches are remarkably dependable," Meyer said. "Our customers use them every day in extreme temperatures, dust, dirt and rain and they just keep going and going; they're the Energizer Bunny of switches."

Meyer said NKK's B Series has stood up to his customers' rigorous demands because of three primary NKK features: an excellent mechanical design, a very good seal and ingenious self-cleaning contacts.

Meyer stated:

“We're also starting to use NKK's G Series. I was really skeptical when I first saw it because it is so small. I said to myself, "I know I can break that thing." So, I put it in a PanaVise and pushed on the actuator with everything I had. I ended up with a bloody thumb, but no broken actuator. They're now one of my favorite switches, and my customers love them, too.

Meyer added that his experience thus far with NKK's G Series not only illustrates the switch's quality, but also the quality of NKK's customer service.

He explained:

“The G Series comes with the option for red, green or amber illumination. But I wanted blue, and they're doing it for me. No matter the size of customer, NKK seems to bend over backwards to meet their needs. That's been my experience, at least.

According to Meyer, in 25 years at most two dozen out of the literally thousands of NKK switches they have implemented in their products have failed, and these failures were all the result of extreme impact or other extraordinary circumstances.

Finally Meyer said:

“The fact that we don't hear from our customers until they're ready to buy more equipment from us is the best feedback we can receive from them. NKK's switches play a huge role in that. I build our products around them and simply don't even think about them again because I know they will just work.

Meet the B Series

Process Sealed Subminiature Antistatic Toggles

- Subminiature size saves on PC boards.
- Specifically designed for logic-level applications.
- Antistatic superstructure, consisting of the carbon impregnated bushing and the support bracket, prevents static discharge to the contacts. Static electricity from an operator's touch travels from actuator through the bushing and bracket to the PC board.
- Locking lever mechanism offered as a toggle option.
- Optional threaded, 6mm diameter bushing for panel seal mounting meets IP65 of IEC60529 specification (similar to NEMA 4 and 12).
- Totally sealed body construction prevents contact contamination and allows time and money saving soldering and cleaning. Epoxy sealed terminals lock out flux and other contaminates.
- Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smoother, positive detent actuation, increased contact stability and unparalleled logic-level reliability.
- .100" x .100" (2.54mm x 2.54mm) terminal spacing conforms to standard PC board spacing.



Figure 3: NKK's B Series Toggle

Meet the G Series

Process Sealed Ultra-Miniature Toggles

- Ultra-miniature size allows high density mounting, and extremely light weight of 0.25 gram makes these switches ideal for handheld equipment.
- Totally sealed body construction prevents contact contamination and allows time and money saving automated soldering and cleaning.
- Molded-in, epoxy sealed terminals lock out flux, solvents, and other contaminates.
- Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smooth, positive detent actuation, increased contact stability, and unparalleled logic-level reliability.
- .100" x .100" (2.54mm x 2.54mm) terminal spacing conforms to standard PC board grid spacing. Round terminals facilitate easier through-hole mounting on PC boards.
- Matching indicators available.



Figure 4: The ultra-miniature G Series Toggle

About Professional Sound Corporation

Professional Sound Corporation (PSC) is a leading manufacturer and distributor of professional audio products for the film and video industries. Since 1986, PSC has provided excellence in product engineering, assembly and service.

PSC's catalog of products covers virtually every aspect of production audio for film and video, including: audio mixers, boom poles, phone interfaces, RF antennas, microphones, microphone power supplies, distribution amplifiers, equipment carts, cables, and adapters. For more information, visit: www.professionalsound.com.

About NKK Switches

NKK is a leading designer and producer of electromechanical switches. They offer one of the industry's most extensive selection of switches. These include: toggles, rockers, pushbuttons, programmable, keylocks, rotaries, slides, tactile, and tilt switches. They also offer touch screens, membrane keypads, and LED indicators. NKK has produced more than 3.5 million switches. Each switch can be used as the foundation for a customized design. All of NKK's switches are designed and manufactured for quality and dependability. NKK has been the benchmark for reliability for over half a century.

NKK leads the marketplace with a commitment to constant innovation, high reliability, customization, and excellence. The company provides a full suite of customized solutions that include: design, programming, value added options, and support. Downloadable 3D CAD models of the company's switches are available, allowing design engineers to quickly integrate complex models into their designs at no charge. NKK maintains a complete network of qualified representatives and distributors throughout the United States, Canada, Central and South America, Europe and Asia.

Engineers rely on the broad product line, specialized design expertise, and customer support of NKK Switches. For more information, visit: www.nkkswitches.com.