ELECTROMECHANICAL INPUT DEVICES – BUT WHICH

When it comes to input devices or man-machine interfaces, touch screens are currently clearly in the focus. Despite its advantages, a keyboard is still the better alternative for many applications. And here, too, there are up-to-date solutions beyond the traditional keyboard, as known from computer and laptops.

In contrast to electromechanical input systems, touch screens offer the advantage, that their service life does not depend on the wear of electromechanical contacts. It is also highly interesting, in terms of design and hygiene, when the input system is directed outwards, e.g. is completely covered by glass. But not every application needs a real "touch" operation. Depending on the application, this is also not desired,

since a real tactile shifting feeling can not be represented in the form of pressure point and stroke. Therefore, even when no cognitive operation is possible, conventional electromechanical solutions are the first choice.

But what is "conventional"? Under the term "keyboards" is recapped the first approximation between keyboards of individual components (discrete keys) and flat input systems (membrane keypads, silicon mats).

KEYBOARD FROM INDIVIDUAL COMPONENTS

Speaking of a keyboard, one usually thinks first of all to a computer or laptop. Such a keyboard is characterized in that the variety of keys is rather small, but certain key stroke or operating force requirements must be met. These can be most easily realized by using individual keys.

However, the construction with discrete pushbuttons has a substantial disadvantage in handling. A plurality of individual components must be soldered onto a printed circuit board, and each soldering point is a critical point in term of keyboard reliability. Each button head needs an individual print, which causes costs for material management and storage. And finally, the design must find solutions to secure the comparatively bulky structures safely in or on the device.

KEYPAD

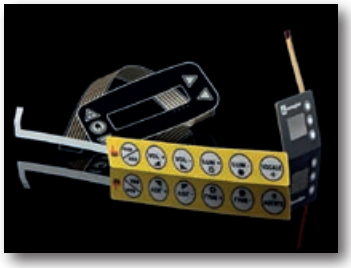
Keypads are often found on sports equipment such as ergometers, cross-trainers or treadmills, vending machines, robust portable devices, such as mobile measuring devices, robotic lawnmowers, or the like. Visible to the operator is a plastic film – if necessary with windows behind which are displays, numerical displays or light-emitting diodes. This front foil (also called a graphic film) is very frequently embossed in order to give the operating finger a certain guidance in the region of the keys. Conventionally, keys are encircling edge embossments, areal embossments on the entire key and embossed bubbles. Even if a key printing is desired in the Braille code – for example, when the application is used in the public space – the embossing of the front foil is recommended.

The synonym "graphic foil" clearly points to significant advantage: The graphic design possibilities are almost unlimited! In contrast to the keyboards made of individual components, which only allow round or rectangular buttons, any key contours can be realized without additional costs. Colours can be used at customer's option for logos, "corporate design" or the optical layout of the surface.

The printing always takes place from the back, so that no one has to worry about abrasion resistance. ***Picture foil stencils offer a wide range of design possibilities.***

Polyester or polycarbonate film is used as a starting material for front films – materials which are temperature-resistant and resistant to all kinds of influences. They make the keyboards oil-resistant for applications in the production or workshop, for example, or they provide the UV resistance of the colours in outdoor use. In addition to the various embossing and imprinting variants, the designer can also choose from different structures: glossy, matt or textured – even a combination, e.g. a matt film with a high-gloss button head is possible.

Finesse such as electrical shielding, interchangeable inscriptions, various illuminations etc. extend the possibilities of use again. On the back, a self-adhesive layer closes the membrane keypad. The mounting of the keyboard is therefore quite simple!



Picture pull off protective paper, lay cables, glue on - the mounting of a keypad is very easy and fast.

By the way, an effect such as touch buttons or "touch panels" can also be achieved with membrane keypads. If the stroke is made quite small, there's no noticeable stroke or pressure point – and the evaluation remains simple: Since

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these are “correct” electromechanical contacts, neither auxiliary energy nor controllers are necessary.
This means: Lower costs, simpler design and higher energy efficiency. There's drawback, however, - the third dimension: if the keypad is not only long and wide, but also “high” with regard to key shape and/or stroke, then a foil is physically bounded. Silicone keys, on the other hand, can also go up to several centimetres.

SILICONE KEYPAD

Silicone mats are e.g. for remote controls in the multimedia area. Exactly how one expects that of silicone rubber, thus larger strokes and thus a characteristic tactile feedback can be achieved. Actuation distances of up to 4 mm can be easily realized.

The robust silicone mats allow large key strokes.

To ensure, that the system works not only mechanically but also electrically, a conductive disc (or several of them), of carbon (carbonpill), alternatively of different conductive material mixtures or even gold surfaces, is located on the underside of each button. The latter has a lower resistance, which reduces the power consumption and thus increases the runtime of the application – a plus especially for battery powered devices.
The counterpart is mounted on a circuit board underneath the mat: a structure, usually in the form of two mutually inserted combs, the conductor sections of which are short-circuited at the push of a button by the disc.
Material-inherent properties of silicone rubber, such as a wide application temperature range and a simple, and thus low-cost, moldability, also have a positive effect.
The long life span of the keypads often speaks for silicone. This makes it all the more important, of course, to have a permanent solution for key inscription – because what is the use of the longest-lasting keyboard, if no one knows what's on it? Abrasion resistant screen printing processes, various coatings (from lacquering to PU coating) as well as laser inscriptions are suitable solutions. In combination with different rubber colours (also several per keypads are possible) and lighting thus an attractive possibility to design the silicone mats.
And when it comes to something else: a keypad with front panel and stainless steel buttons, clad in steelwork, looks robust to the outside, the substructure is a cost-saving flat keyboard.

Metal keyboards can be individually customized in small quantities.

COMBINATIONS OF SEVERAL TECHNOLOGIES

Not quite, but a little different are keyboards that combine the features of the last described or other technologies.
Possible applications are, for example, in medical technology and in the care sector, where distinctive habit is necessary while at the same time good cleaning possibilities.

INDIVIDUALITY IS TRUMP

Input systems based on the touch principle open up completely new fields of application and also offer concrete advantages. However, the majority of the applications can equally be reliable operated with the contacting methods described here in a cost-effective manner. Decisive for each solution is the individual adaption to the respective application. This applies to dimensions as well as environmental requirements or design requirements. In order to achieve the optimum in terms of requirements and costs, the specialists for membrane keypads and silicone mats knitter-switch supports at the customer's site. The manufacturer has been specialized in switch technologies for more than 50 years. Customers benefit from state-of-the-art products, many years of experience and extraordinary competence. Knitter-Switch develops all solutions in Germany and therefore offers a simple on-site support and fast coordination. Production in Asia allows for innovative products at competitive prices.

In addition to the broad standard portfolio, knitter-switch also implements individual solutions that meet every requirement.

WHEN NOW WHICH KEYBOARD?

A certain structural height, which may have a long life, and at low cost, is offered by the silicone mats. If the graphic design is very important, the membrane keypad is the object of choice – just as much as simple assembly or the achievement of a certain seal. A keyboard of discrete keys is only recommended for very specific applications, e.g. computer keyboards. On rubber or on membrane keypads you will still not be able to type longer texts in a flowing and fatigue-free manner.

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