



PANEL SWITCHES

PCB SWITCHES

LED INDICATORS

JOYSTICKS

PANEL SOLUTIONS

# YOUR PROJECTS, OUR SOLUTIONS



**APEM**  
an IDEC company



# A LEADING WORLDWIDE MANUFACTURER OF HUMAN- MACHINE INTERFACE PRODUCTS AND SOLUTIONS SINCE 1952

## SWITCHING TECHNOLOGIES, OUR CORE BUSINESS

Organized in 3 businesses, APEM's HMI solutions are designed, fully tested and qualified for demanding applications. They guarantee the highest level of robustness and reliability to meet international standards.

### Components

Toggle, pushbutton, rocker, slide, tact and rotary switches, industrial controls, LED indicators, for panel or PCB: APEM offers the broadest range in these switch markets.



### Joysticks

Easy to operate and highly reliable, APEM joysticks are suitable for all size and shape requirements from thumb and finger operation to full hand grip products.



### Panel solutions

Relying on APEM's already qualified product ranges and mastery of the main panel technologies, the teams are able to design complete and fully customized HMI solutions for customers.



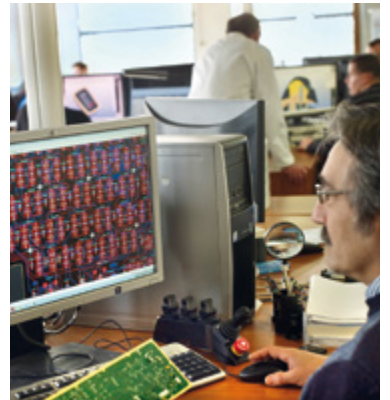




## TECHNICAL AND INDUSTRIAL EXCELLENCE

APEM controls all phases of product development and manufacturing with vertically integrated production and advanced technologies.

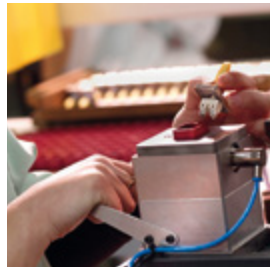
APEM's dedication and experience facilitates a quick and effective response to the most complex requirements. This technical expertise ensures the continuity of APEM's vast portfolio of products and the strength of our valued partnerships.



## YOUR EXPERT PARTNER

APEM's expansive product range is comprised of more than 50,000 part numbers. Colors, markings, finishes, shapes and dimensions offer an unlimited number of options, creating complete custom solutions for unique customer requirements.

For over 65 years, top manufacturers worldwide have placed their trust in APEM to develop and manufacture reliable high performance HMI components & solutions for their most demanding applications. APEM continues to meet and exceed these demands with innovation, quality and service.





# APEM PANEL SOLUTION OFFICES

Our Panel Solution Business Unit takes APEM's high quality components and the knowledge of panel technologies along with their applications in various environments and provides you with a remote control or complete dashboard to fit your exact need. Our integration experience affords us the opportunity to deliver the right solution for the environment in which they are meant for. Your development will be driven from beginning to end, starting with your first request for information to mass production delivery by our fully dedicated project team of specialists. Having your project tracked by the same team of specialists ensures that the design will be aligned with the production capabilities, therefore saving you time and money.



# PLUG & PLAY SOLUTIONS



## PREVIOUS PARTNERSHIPS



# APEM STRENGTHS

Whatever your project, you need the solution to be reliable, user-friendly and withstand the environment throughout the application's lifetime.

With over three decades of experience under our belt, we have gained a great deal of expertise on how to deliver your request.

## HERE ARE THE THREE STRENGTHS THAT GO INTO EACH SOLUTION



# 1

### INGRESS RESISTANCE:

Is it meant for inside or outside use?

Is there water, dust, UV exposure, vibration, potential for vandalism or shock, oils, chemicals, need for sterile environment or shielding from electromagnetic radiation?

Each custom project requires its own environmental study to establish the external factors that the solution will have to withstand. All the panel technologies that APEM masters have a different level of ingress resistance. This means that this environmental study conducted by APEM will help you select the best technology for your application.

APEM has its own testing lab, where we can determine the level of IP, IK, perform lifecycles and provide support for qualifying to standards, like safety and EMC.





## 2

### ERGONOMICS:

Is it operated in daylight or nighttime?

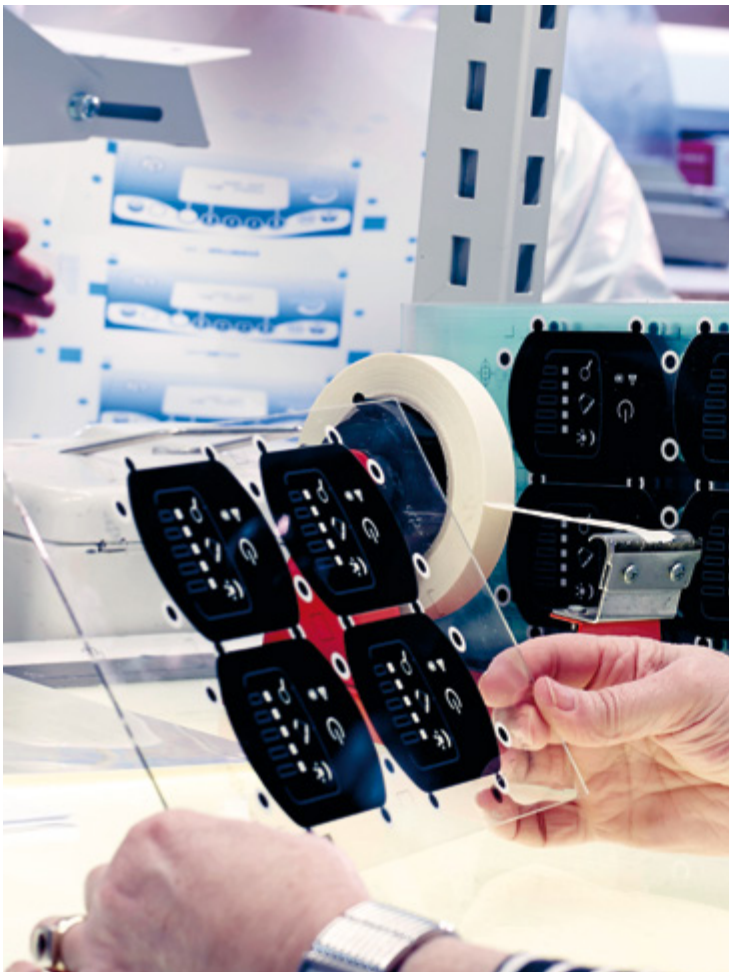
Can the operator look at where they are clicking, or will they need to operate intuitively?

Are gloves being used?

Is it one person for long hours or many people for short periods of time?

Checking off all requirements is nothing if the solution isn't user-friendly to the person who will operate it. The purpose and use of the application are relevant information in making decisions about layout, if and what kind of backlighting or marking to use, surface feel, and tactile force and feel.

All technologies have their various possibilities, and our in-house R&D engineers take these considerations and provide the best solution to the end-user.



## 3

### PROCESS REPEATABILITY:

To warranty fulfillment of customer specifications, a strong control of the development and production processes is needed.

It is important not to just provide "golden" samples but also bring that level of quality to the production. APEM takes pride in being able to provide consistent "goldness" from prototype to mass production that can last a decade.

# FROM IDEA TO COMPLETE HMI

## VERTICAL INTEGRATION FOR CUSTOMER SERVICE.

One of our major assets is a production mode integrating all design and manufacturing stages, along with the fabrication of specific tooling. This strategic choice allows the company to rapidly meet your need for quality products.

APEM controls all the stages of panel solution production and the related technologies such as digital printing, screen printing, thermoforming, stamping, plastic injection and embossing. The vertical integration allows us to have a strong quality control over all processes throughout the development of the custom solution. Furthermore, it gives us a close understanding of the technology and its advantages and challenges and therefore make us better qualified to make design recommendations.

## HERE IS HOW APEM OFFERS ASSISTANCE FROM DESIGN TO MASS PRODUCTION:



### DESIGN CONCEPT

Additional details for the mechanical design and interface with the equipment.



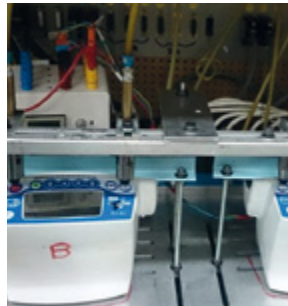
### PROTOTYPING

Rapid prototyping equipment is used to provide you a sample for general design approval. For dimensions, to check ergonomics and ease of use. If necessary, then it can also be electrically functional.



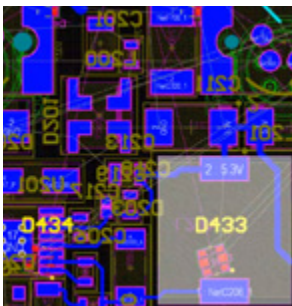
### FEASIBILITY

A quick mechanical design is created to get the overview of what the needs are.



### QUALIFICATION

Most of the environmental tests are done in-house. This includes impact, water, dust, salt spray, UV, shock, temperature, chemicals, and lifecycle.



### ELECTRONICS STUDY

Electronics schematic, software for protocol communication and design testing equipment.



### INDUSTRIALIZATION

Ensure process repeatability in mass production with strong process control.



# PANEL TECHNOLOGIES

APEM masters many different panel technologies. Each technology has its unique advantages and possibilities, and better suited for different environments and uses.

The nine technologies described on the next pages are the most asked ones. If the technology you are looking for is not on the following pages, then please contact us for further consultation.



## MEMBRANE KEYBOARD SOLUTIONS

Membrane keypad technology carries out switching functions and enhances the final product with a tailored, decorative appearance. It consists of several layers of printed polyester and adhesive.



There are three main types of membranes:

- > without tactile feedback
- > with tactile feedback: by embossing
- > with tactile feedback: by snap dome

A quality membrane solution requires strong process control to ensure that the layers are placed the same way each time to guarantee that the sealing holds. Other important aspects are a well-planned layout, quality and surface of the adhesive, and material thickness.



This technology is a good choice when...

- > small volume or variable layout project due to limited investment
- > mobile applications due to lightness
- > easy cleaning is important due to sealing and optional surface processing that can kill microbes

## MEMBRANE ON A PCB

Membrane keypad technology on a PCB provides more design options.

The PCB provides an opportunity to add intelligence to the solutions, e.g. more options regarding backlighting. It also means that communication protocols can be used.

Furthermore, the wider choice of components allows the option for more efficient components on the PCB.



This technology is a good choice when...

- > Outside applications require full sealing from the front (no gap between the keys and front face)
- > A project requires many backlighting possibilities (backlighting keys, bar graph, phantom/secret marking, etc.)
- > Thin and intelligent design due to extra possibilities with the PCB

## ELASTOMERIC SOLUTIONS



Elastomer panel solutions consist of a silicone overlay mounted over a flexible or rigid circuit. This technology provides a specific soft tactile feel and flexibility in the panel design.

The contact is established with a snap dome or a plunger and the keys can be in all shapes and sizes.

This technology is a good choice when...

- > Hand-held outdoor use due to sealing and light weight
- > Need for ergonomic key design due to flexibility in the molding
- > Unique tactile feel because you can select the travel and force according to elastomeric rib design





## MEC PCB SWITCH PANELS



Keyboards based on the MEC product range offer high end features including panel sealing, exceptional illumination, durability, and elegance.

The MEC range includes high performance tactile switches and aesthetic caps & accessories. The high performance of the switches means you can rely on them to work throughout your equipment's lifetime. They provide reliability while giving options for illumination and NC/NO function. All this in the same switch so you don't have to worry about different behind panel heights.

You can design the exact panel you need with MEC's large selection of accessories, providing a wide range of design options including shape, size, height, surface shape, panel sealing, color, and illumination. It also offers various solutions, including four-way navigational solutions with a confirmation button in the middle, or two-way rocker solution.



### This technology is a good choice when...

- > There is a need for different tactile functions as there is NO and NC/NO option with Multimec
- > Unique panel design due to the large standard range of accessories
- > Need for extra reliability when using the overlay as the switches are also sealed

## PLASTIC CAPACITIVE TECHNOLOGY



Made with either polycarbonate or glass filled materials, the capacitive keyboards meet the strict requirements necessary in critical applications including shock resistance while having a modern look.

When an operator touches the front face, it will create a change in the capacitance on the top layer. The sensor sees this modification and opens/closes the circuit.

Plastic capacitive technology provides the ability to create a versatile design with different sizes and shapes buttons, sliders, and proximity sensing.

APEM has developed this technology to be used even with gloves, allowing the device to be fine-tuned according to glove type.



### This technology is a good choice when...

- > Looking for a reliable and modern looking design with illumination
- > Customization is required as the panel can include different type and function of keys
- > Project requires easy cleaning and resistance to chemicals

## METAL KEYCAP SOLUTIONS

Metal keycap keypads are mechanical pushbuttons mounted on a PCB. These keypads also have a metal frame to meet the highest level of vandal resistant specifications with a visually appealing design. Our different standard ranges are composed of different shapes and sizes and can be assembled to provide a custom aesthetic look. Key backlighting is available in all colors, including RGB.

Different possibilities for finishes (stainless-steel with brushing and aluminum with different anodization colors) are available, providing an eye-catching panel design. You can add abrasion resistant marking to make the panel more user friendly.



This technology is a good choice for:

- > Outside applications that require robustness and UV resistance
- > Heavily used public applications such as ATMs and lifts which require the IK10 level antivandal
- > Industries which include chemical, food, and oil as the technology can handle staining corrosive materials and extreme temperature

## METAL PIEZO TECHNOLOGY

The piezo keyboards incorporate a highly reliable pressure sensitive keypad in a visually appealing package. This technology uses a thin membrane behind the keycap that moves slightly when pressed and this movement activates the switch. The need for a micromovement in the membrane ensures that the changes in outside environment won't create inadvert activation.

Furthermore, this need for the micromovement means that a piezo switch is a mechanical switch and consumes no power when idle.

The piezo technology is available in round and square shaped keys.

The keys are incorporated in a one-piece panel design which gives a smooth and aesthetic look.

This technology is a good choice when:

- > Frequent cleaning is necessary due to its flat sealed surface
- > Frequent use is necessary due to its lifetime of more than 50 million activations
- > Reduced power consumption is important as it consumes none when idle





## METAL CAPACITIVE TECHNOLOGY

APEM Metal Capacitive mixes the advantages of both capacitive technology and mechanical push to provide your HMI a new look and feel. This all-metal capacitive technology is robust and smooth looking.

This technology, along with the electronics, provides endless possibilities for control and illumination.

The need for a mechanical push (a micromovement) ensures that the changes in outside environment, including water, dust, wind, and other elements, will not activate the switch.

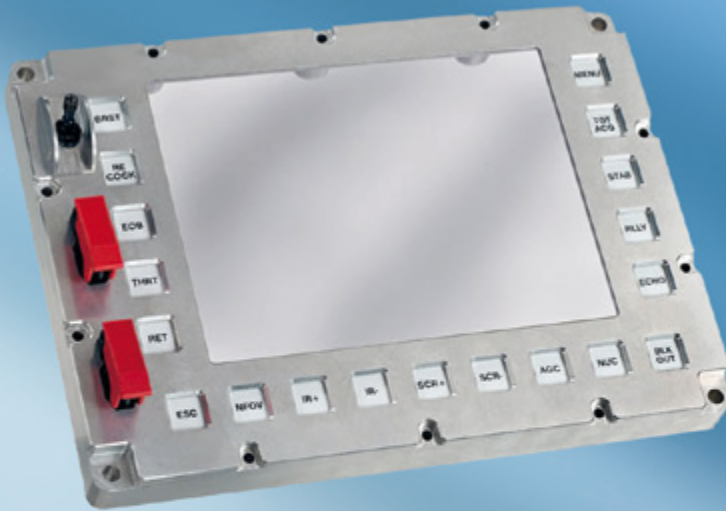
The number and the position of the large 18 mm round keys are completely customizable, as is its illumination and marking. A tailor-made keypad is available specifically for your application.



This technology is good choice for:

- > Outside applications requiring robustness and UV resistance
- > Public use due to its reliability and 2 million lifecycles
- > Easy status recognition is required due to availability of RGB illumination

## MIL-AERO



Mil-aero solutions are fully customized panels. They are designed to handle harsh environments and can withstand dust, liquid, chemicals, shocks, impact, vibration, and pressure.

The panel is available with metal, elastomer, or membrane keys in a metal housing with the integration of extra functions, like MIL tactile screen, rotary, and guards.

The metal housing can also be milled to provide an even stronger housing.

These panels include customized communication protocols and endure heavy qualification standards.

This technology is good choice for:

- > Control panels for military vehicles
- > Personal equipment for soldiers
- > Accessories for weapon systems

# ELECTRONICS CAPABILITIES

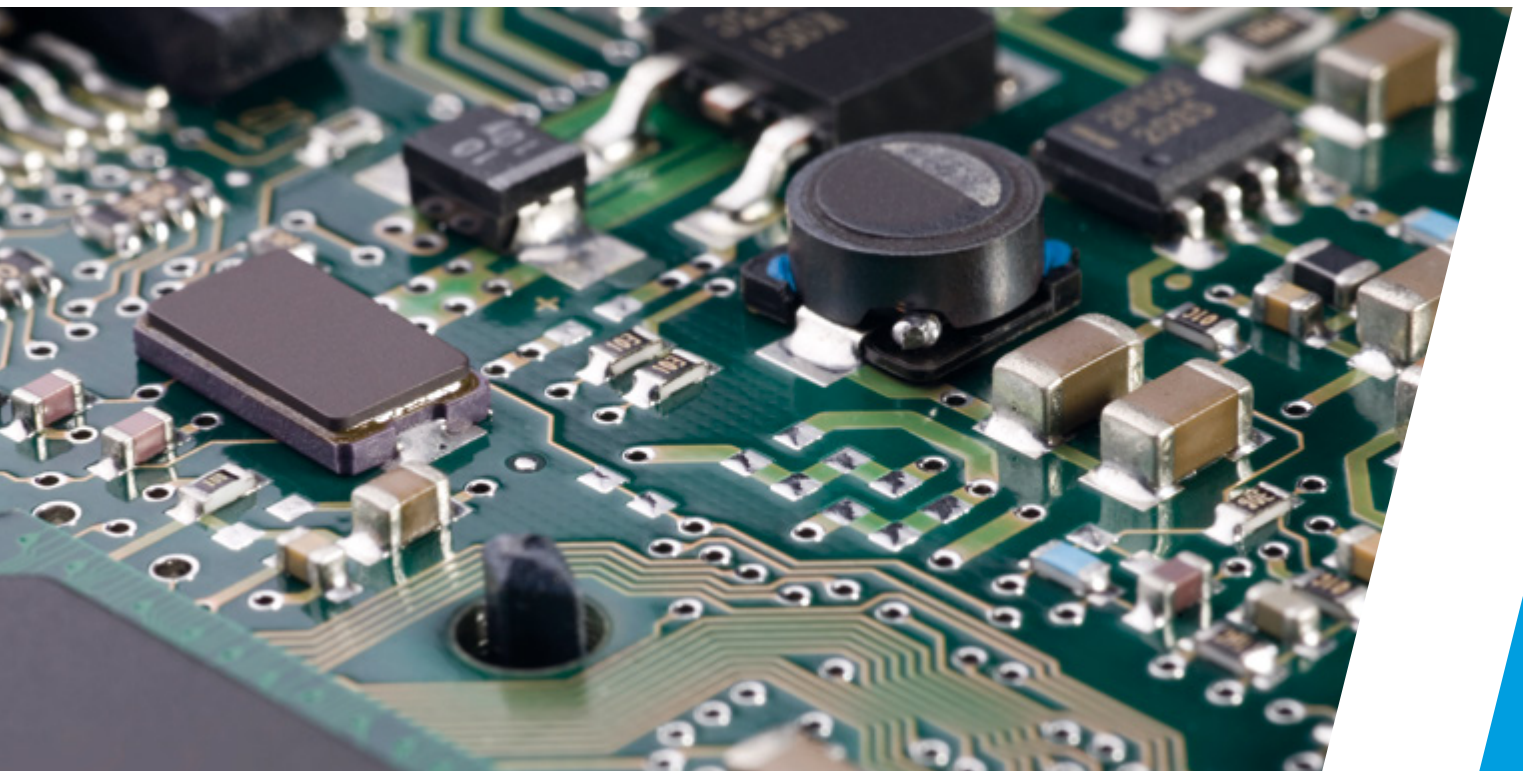
**We have an internal team dedicated to work with the electronics throughout the development and production.**

**They are the experts who take care of the testing and qualification of the solution.**

The increasing number of options and connected equipment leads to the choice of bus type interconnections (CAN, USB, RS485, RS422...).

APEM simplifies the integration of communication protocols by proposing electronic and software designs complying with the needs of most applications.

Our internal electronic teams manage the integration of communication protocols such as CAN, RS485, RS422, USB, specific displays (LCD graphics, 5 segments, NVIS LEDs), as well as protection filters (ESD, EMI, power network) and power supplies (power converters).



## SAFETY STANDARDS AND LEVELS

APEM develops ISO/EN safety compatible products, combining hardware and software solutions which provide customers with integrated HMI products or solutions and bringing high levels of safety to their systems.

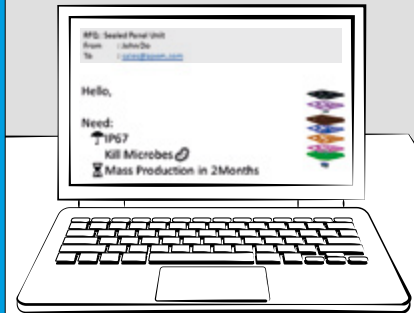
APEM follows the evolution of safety standards in different areas to ensure correct PL (performance level) as well as compatible SIL (safety integrity level) of customer applications.

With our dedicated product offering, quick and efficient customization, mastery of switching technology and industry standards, we understand and work with our customers as a preferred partner.

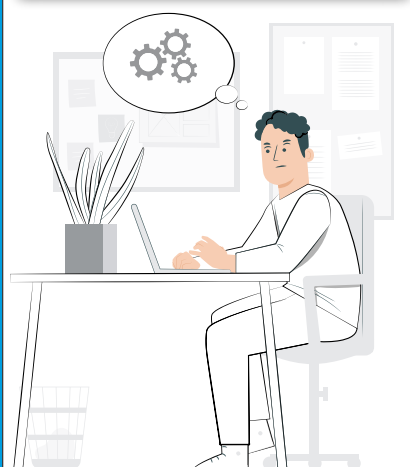




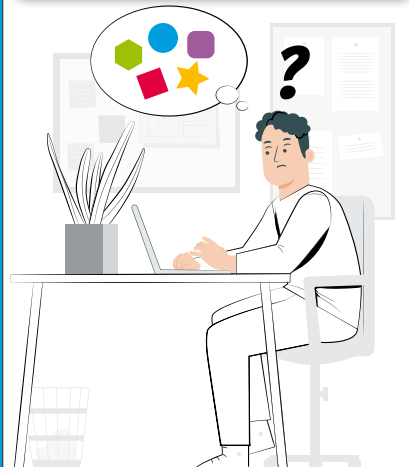
## CUSTOMER REQUIRES ASSISTANCE



## CONSIDERING POSSILITIES



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









## WE KNOW THE SOLUTION



## PICKING THE RIGHT TECHNOLOGY



 <b>Plastic capacitive</b>	 <b>Metal piezo</b>	 <b>Mil-Aero</b>	 <b>Metal capacitive</b>
 <b>MEC PCB Switch Panel</b>	 <b>Metal keycap</b>	 <b>Elastomer</b>	 <b>Membrane on PCB</b>
 <b>Indicators</b>	 <b>Joysticks</b>	 <b>Switches</b>	 <b>Membrane</b>



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an IDEC company

**AT A GLANCE**



**70** YEARS OF TRUST BUILT ON QUALITY



**1,400** EMPLOYEES WORLDWIDE



**50,000 +** PART NUMBERS

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