

# HMI SOLUTIONS

Enhancing user experience through interface technology





# YOUR HMI TECHNOLOGY PARTNER

TT Electronics has led the market in customised human machine interface technologies for more than 30 years, partnering with customers to deliver HMI solutions that improve user experience, enhance communications and boost productivity.

With a long history of developing innovative solutions for the most demanding environments, including patented thin film backlighting, capacitive touch technology, integral RFI screening and flexible illumination techniques, the company is a trusted value-added partner to global OEMs in the aerospace, military, medical, industrial and transportation industries.

## PRODUCTS

- Thin Film Backlighting
- Capacitive Switching
- Signage and Illuminated Indicators
- Ambient, Accent and Mood Lighting
- Tactile Membrane Switches
- Touch Screen Assemblies

## INTEGRATED SOLUTIONS

- Electronic, Mechanical and Software Design
- R&D, Prototyping and NPI
- HMI Design for Product Optimisation
- Global Manufacturing Including SMT
- Testing
- Qualifications
- Supply Chain Management



**INDUSTRIAL**



**MEDICAL**



**AIRCRAFT INTERIORS**



**DEFENCE**

# THIN FILM BACKLIGHTING

HIGH IMPACT BACKLIT INTERFACES.  
SAVE SPACE AND POWER WITHOUT COMPROMISING QUALITY.

Thin film backlighting is a light-guide solution with embedded LEDs and capacitive switch sensors that provides illuminated control, display indicators and ambient lighting for user interfaces and illuminated control panels.

The patented thin film printed light-guide manufactured by TT Electronics uses specialised printing processes using side emitting LEDs embedded within the light-guide structure.

In this advanced technology, the light extraction from the light-guide is determined by the size and location of printed micro lenses, achieving luminance uniformity >70%. The LED circuit can range from a mechanically flexible construction, nominally <1.2mm thick to a standard FR4 PCB.

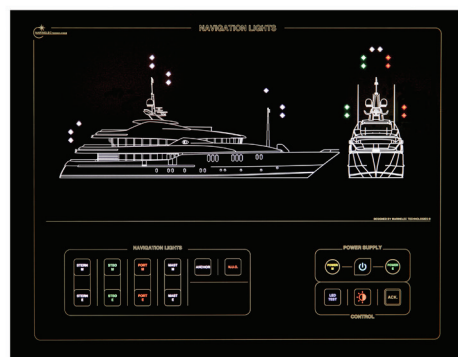
Side emitting LEDs are placed on a circuit substrate which supports the inclusion of capacitive switch sensor pads coplanar to the LED circuit, thereby providing a cost efficient means of uniformly illuminating the graphic detail of a capacitive switch. The use of opaque barriers within the light-guide supports the design of HMI panels with independently illuminated capacitive switches with a high contrast ratio.

Thin film backlighting can be used on switches, keypads and keyboards. LGF backlighting can be directly placed over metal domes. Light transmitted through the tight area resulting in a uniform distribution, ensuring no light leakage between specific colours and areas.

## BENEFITS

Compared to other backlighting technologies, Thin Film Backlighting does not degrade over time and enables backlighting across larger areas with multiple colour options. Thin Film Backlighting provides a sleek yet durable solution that enhances user experience..

- High Impact
- Ultra Thin
- Space and Weight Saving
- Low Power
- High Illumination Uniformity – No Hot Spots
- Precise illumination



## AMBIENT, ACCENT AND MOOD LIGHTING

Ambience and high-impact illumination provided by LED-based mood lighting is a fundamental design element that can be tailored to customers' colour, intensity, zoning and transition requirements.

Our lightweight and flexible ambient, accent and mood lighting solutions incorporate single colour and RGB lighting with the ECU controlled with a variety of interfaces.

## APPLICATIONS

- Hospitality and Retail
- Aircraft Interiors
- Entertainment
- Automotive
- Product Branding / Logo Illumination
- Mirror Lighting





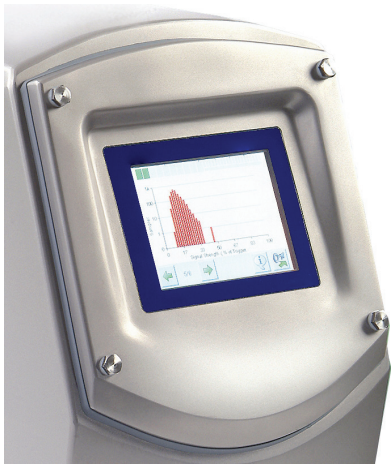
# TOUCH TECHNOLOGY

## CAPACITIVE AND RESISTIVE TOUCH SCREENS

Our customised touch switching technology includes Resistive and Capacitive Touch Screens for all applications including ruggedised, military and medical. Our turnkey solution includes design, manufacturing and integration, with a wide range of tailored solutions including decorative lens, EMI shielding, function buttons, anti-microbial films, privacy films, ruggedized bezels, anti-glare or anti-reflective surface treatments.

## PROJECTED CAPACITIVE

Projected capacitive touch screens do not rely on physical movement of the substrate to register a point of contact they can be bonded to the reverse of several different types and thicknesses of front cover material. These include glass, polyester, polycarbonate and others. This means assemblies can be made extremely robust, waterproof and vandal resistant. They have a high optical transparency are easy to clean and have no moving parts. Multi-touch and gesture support are simple to implement and open up a range of possibilities for GUI's.



### FEATURES

- Flexible
- Up to 10mm Thick
- Glass, Polycarbonate or Acrylic
- Fully Sealed – Suitable for Harsh Environments
- Support of SPI, UART, RS232, I2C, and USB Interface Protocol
- ATMEL Components

### RESISTIVE

- Up to 24" Diagonal Size
- Low cost
- Custom Sizes Available
- Standalone Unit or Fully Integrated



## CAPSWITCH®

### SINGLE ILLUMINATED CAPACITIVE SWITCH MODULES

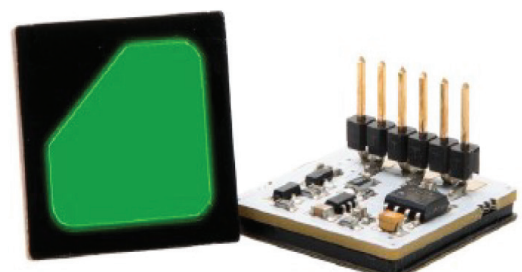
Our standard capacitive switch modules feature our innovative method of combining the benefits of capacitive switching with multi-colour area-specific backlighting which until now has only been available in custom designed HMI solutions.

20mm and 35mm versions are available suitable for mounting into panel thickness of up to 11mm and providing high brightness full RGB illumination of touch area with unmatched uniformity of illumination. The solid state switch design has a non-latching output of 40mA max operating from a supply voltage of 6Vdc to 28Vdc. The 35mm version offers designers adjustable low, medium and high touch sensitivity to suit the application. The operating temperature of the switch modules is 0°C to 50°C.

This new, off the shelf standard backlit switching solution allows panel designers to prototype and evaluate HMI designs without the need to develop custom capacitive sensors and backlighting.

### FEATURES

- 20mm and 35mm Versions (latching and non-latching functions)
- High Brightness
- Full RGB Illumination
- Cable Assembly Available



# TACTILE MEMBRANE SWITCHES

Custom control panels using membrane switches, silicone keypads and metalized keys provide low-cost, high impact interface solutions with full design customisation and manufacturing.

PCB Based control panels, combining a keypad with a double sided or multilayer PCB will substitute the need of a support panel. We provide a turnkey service to populate the switching PCB plus any additional daughter PCBs with electronic components from your bill of materials saving space, interconnection and final assembly time. We can provide integration into complex sub-assemblies or provide a fully assembled and tested unit.

Graphic overlays can be used to enhance a product or to provide an easy clean unbroken cover for mechanical switches and display. They produce an attractive finish and boost the all-important corporate image and we utilise a full range of materials, inks and adhesives to offer the best solution for the application.

Materials include Polyester (textured, gloss or chrome effect finish), PVC (textured or gloss finish), Polycarbonate (textured or gloss finish) Stainless Steel foil (brushed, etched and printed), silicone and machined etched and filled aluminium.

We can also incorporate almost any HMI technologies including capacitive glide pads, joysticks, tracker balls, touch pads, mechanical switches TFT display and touch screen solutions.

## FEATURES

- Sealing to IP65, IP67 or IP69K
- Tactile or Non-Tactile Key Resing
- Chemical and UV Resistant Overlay Materials
- RFI / EMC / ESD Protection
- Surface Mount LED's can be Integrated into the Membrane Assembly
- Interchangeable Legends or Inserts
- Colour Matching via Photo Spectrometer and VeriVide
- Various Interface Solutions Including CanBus, RS485, I2C and USB



# CONTROL PANEL ASSEMBLIES

## END TO END SOLUTIONS

We work closely with our customers at the early stage of the development process in partnership to provide design, engineering and integration expertise for control panel assemblies. With over 30 years experience in HMI assemblies we understand integration.

From electronics, software and mechanical design to choosing the right interface and technology for your application, we work as an extension of your team to help you get to market faster.

## INTEGRATED SOLUTIONS

- Electronic, Mechanical and Software Design
- HMI Design for Product Optimisation
- R&D
- Prototyping
- NPI

## SERVICES

- Global Manufacturing Solutions
- Multi-technology Integration
- PCBA
- Testing Solutions
- Certification Support
- Global Supply Chain Management



## QUALITY ASSURANCE

- ISO 9001
- ISO 14001
- AS9100D
- SC21







## ABOUT TT ELECTRONICS HMI

TT Electronics HMI Solutions, a wholly owned subsidiary of TT Electronics plc, a leader in the market for customised human machine interface technologies for more than 30 years, partnering with customers to deliver HMI solutions that improve user experience, enhance communications and boost productivity. With a long history of developing innovative solutions for the most demanding environments, including patented thin film backlighting, capacitive touch technology, integral RFI screening and flexible illumination techniques, the company is a trusted value-added partner to global OEMs in the aerospace, military, medical, industrial and transportation industries.

### EUROPE

Woodside Road Industrial Estate, Woodside  
Road, Eastleigh, Hampshire SO50 4ET, UK

T: +44 23 806 10818

[www.ttelectronics.com/hmi](http://www.ttelectronics.com/hmi)

