

- 3 inch
- capacitive touch
- USB/PS2

## INDUSTRIAL 3 INCH OEM TOUCHPAD MODULES

Utilizing the latest and most advanced touch sensing technology, the TPM Series touchpad module is an extremely high specification pointing device, ideal for the most demanding of cursor control applications. The device provides both conventional X and Y-axis cursor movement with plug-and-play, multi-finger gesture support for enhanced user interaction. The mutual-capacitance based tracking engine combines the benefits of solid state sensing (no moving parts) with the precision, functionality and performance associated with the NSI & Cursor Controls product range. The unit has been designed to be panel mounted as part of OEM keyboards and consoles.

- Solid state sensing technology – capacitive touch sensing tracking engine.
- Multi-finger gesture support
- Output: USB/PS2 (auto-select)
- Smooth operation in rugged environments
- Immunity to moisture, water and liquid contaminants
- Various overlay configurations available
- Custom connector options available

### APPLICATIONS

- Industrial consoles
- Medical systems
- Marine systems
- Sound and lighting desks
- Video editing consoles
- Custom keyboard applications
- OEM custom solutions available

### MECHANICAL FEATURES

Dimensions	65.0mm x 49.0mm
Weight	~15 grams
PCB Overlay Colour	RAL 7011 Iron Grey
PCB Overlay Material	Polyester 0.25mm thick (or the option to have no overlay, see order info)

### OPERATIONAL FEATURES

Motion Detection Method	Mutual capacitance sensing
X/Y Position Reporting	Relative
Sample Rate	Up to 100 samples/sec.

### ELECTRICAL FEATURES

Protocol	USB, PS/2 (auto-select)
Supply Voltage	4.40 – 5.25V
Supply Current	10mA typical, 15mA max
Resolution (X, Y)	500 x 300 counts (~8 counts per mm) – linear tracking mode
Output Connector (Cn1)	12-way connector, Molex PicoBlade Series PN: 53261-1271
Switch Connector (Cn2)	6-way connector, Molex PicoBlade Series PN: 53261-0671

### ENVIRONMENTAL FEATURES

Operating Temperature	0° to 70°C
Operating Humidity	5% to 95% relative humidity
Storage Temperature	-40° to +85°C
ESD	15kV air-discharge and 8kV contact discharge (IEC 61000-4-2)
EMC	Radiated immunity - limits according to level 3 of IEC 61000-4-3 Radiated emissions to EN55022 class B

### OPERATING SYSTEM COMPATIBILITY

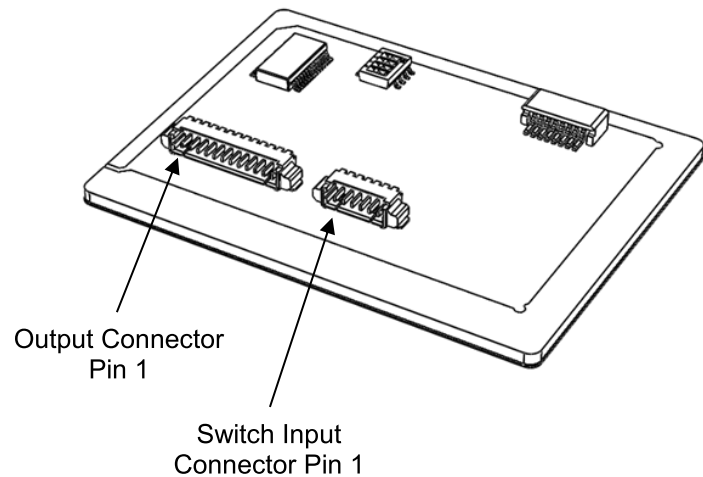
USB	Windows, Linux, Mac OS, and Android. Fully compliant with USB 2.0 framework (chapter 9) & HID specifications
PS/2	Windows, Linux

## CONNECTION DETAILS

### Output Connector: CN1

<b>Description</b>	12-way, 1.25mm pitch, right-angled connector
<b>Manufacturer</b>	Molex (or equivalent) – Pico Blade Series
<b>Manufacturer Part Number:</b>	53261-1271 (or equivalent)
<b>Mating Connector:</b>	51021-1200 Crimp Housing (or equivalent)

PIN No.	USB	PS/2
1	NC <sup>1</sup>	NC <sup>1</sup>
2	NC <sup>1</sup>	NC <sup>1</sup>
3	NC <sup>1</sup>	NC <sup>1</sup>
4	NC <sup>1</sup>	NC <sup>1</sup>
5	EARTH <sup>2</sup>	EARTH <sup>2</sup>
6	NC <sup>1</sup>	NC <sup>1</sup>
7	VBUS (+5V)	V <sub>CC</sub> (+5V)
8	D -	DATA
9	D +	CLK
10	GND (0V)	GND (0V)
11	NC <sup>1</sup>	NC <sup>1</sup>
12	NC <sup>1</sup>	NC <sup>1</sup>



**Table 1:** Output Connector Pinout

*Notes:*

1. Pin to be left unconnected (floating).
2. Earth connection required for ESD management.

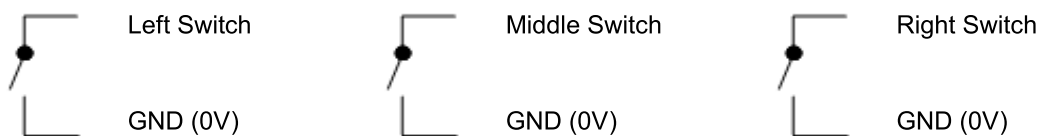
### Switch Input Connector: CN2

<b>Description</b>	6-way, 1.25mm pitch, right-angled connector
<b>Manufacturer</b>	Molex (or equivalent) – Pico Blade Series
<b>Manufacturer Part Number:</b>	53261-0671 (or equivalent)
<b>Mating Connector:</b>	51021-0600 Crimp Housing (or equivalent)

PIN No.	FUNCTION
1	Left Switch
2	GND (0V)
3	Middle Switch
4	GND (0V)
5	Right Switch
6	GND (0V)

**Table 2:** Switch Connector Pin Out

### Switch Connection Schematic



**Figure 2:** Switch connection schematic

## TOUCHPAD CONFIGURATION

The touchpad provides embedded features that may be selected using the DIP switches located on the printed circuit board. Table 3 below details the assigned function of each switch;

### DIP Switch Functions

DIP SWITCH	FUNCTION	OFF	ON
1	<b>Orientation</b>	Connector Up (See Section 6.2)	Connector Down (See Section 6.2)
2	<b>Gesture Mode</b>	Gestures Enabled (See Section 6.3)	Gestures Disabled (See Section 6.3)
3	<b>Tracking Mode</b>	Ballistic Tracking Mode (See Section 6.4)	Linear Tracking Mode (See Section 6.4)
4	<b>Factory Setting</b>	Switch must be set to OFF	

**Table 3:** DIP Switch Functions

**Factory default setting:** All DIP switches OFF

### Orientation

The orientation function allows the user to mount the touchpad in one of two positions (see table 4 below). The orientation of the device is determined by the direction of which the output connector is facing when viewed from the top of the touchpad device. The direction of the connector is indicated by the red arrow. The touchpad orientation can be selected to accommodate customer requirements for connector location and wiring.




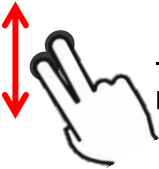





ORIENTATION SWITCH	OFF	ON

**Table 4:** Orientation Settings

## Gesture Operations

The touchpad incorporates an in-built gesture recognition engine designed to enhance user experience and increase the overall efficiency of user interaction with a host system. Use of gesture control enables the user to access frequented functions such as button clicks, scrolling and zooming by means of highly intuitive multi-finger operations. Disabling the gestures via DIP switch 2 will result in the touchpad outputting X & Y movement data only. Please note that not all gestures are available when operating in PS/2 mode. See table 5 below for details on the available gesture actions.

GESTURE ACTION	FUNCTION	PROTOCOL	
		USB	PS/2
 <b>Single-Finger Tap</b>	Left mouse button click Double/triple tap supported	✓	✓
 <b>Two-Finger Tap</b>	Right mouse button click Double/triple tap supported	✓	✓
 <b>Three-Finger Tap</b>	Middle mouse button click Double/triple tap supported	✓	✓
 <b>Two-Finger Vertical Drag</b>	Scroll Up/Down	✓	✓
 <b>Two-Finger Horizontal Drag</b>	Scroll Left/Right <sup>1</sup>	✓	✗
 <b>Two-Finger Splay</b>	Zoom In <sup>1</sup>	✓	✗
 <b>Two-Finger Pinch</b>	Zoom Out <sup>1</sup>	✓	✗

**Table 5:** Gesture Operations

### Notes:

1. Horizontal scroll and zoom functions are dependent on application support.

## Tracking Mode

*Ballistic Tracking:* Intuitive tracking algorithm to provide increased cursor resolution when tracking fast whilst retaining the original resolution for tracking accurately at slow speeds.

*Linear Tracking:* No tracking algorithm. 500 x 300-count resolution is achieved at all tracking speeds.

## ELECTROSTATIC DISCHARGE (ESD) PROTECTION

The TPM series touchpad module provides measures to protect against hardware damage due to ESD however, in order to achieve a high-level of immunity to ESD events (up to 15kV), it is necessary to provide adequate earthing methods during system/panel integration, thus providing a low impedance path for charge to dissipate.

The most likely route for ESD is the creepage path between the user accessible touch surface and the touchpad PCB. The touchpad module provides a conductive perimeter frame on both the top and bottom layers to protect the circuit from ESD strikes (see figure 3). It is necessary to provide a suitable connection between the perimeter frame and earth or chassis-ground.

Possible earthing methods include;

1. Housing the touchpad module within an earthed conductive interface panel (e.g. metal keyboard frame), ensuring that there is sufficient contact between the perimeter frame of the touchpad module and the interface panel.
2. Attaching an earth connection to Pin 5 (EARTH) of the output connector CN1 – this pin is internally connected to the perimeter frames. A convenient method for providing an earth connection to this pin is to use the USB or PS/2 cable shield or drain wire.
3. Attach an earth wire directly to the perimeter frame.

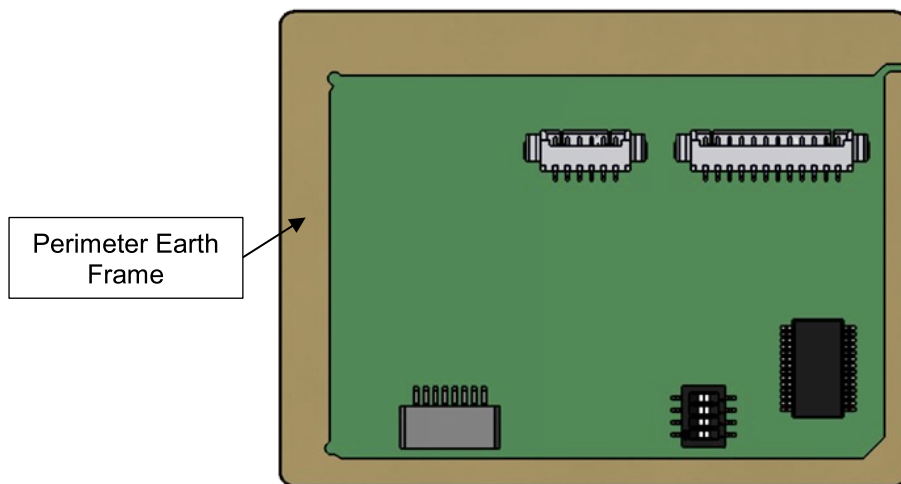
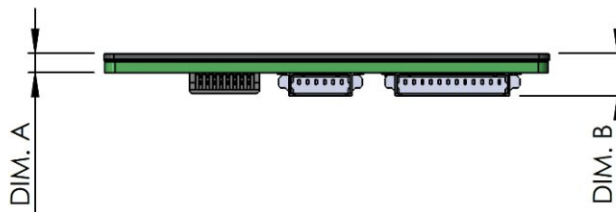
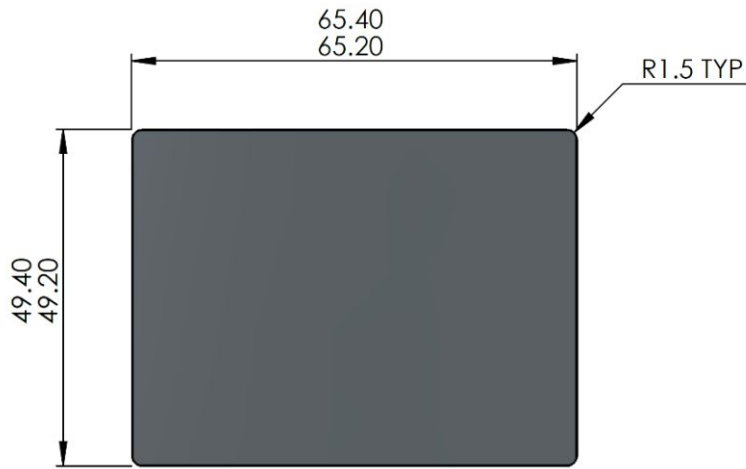
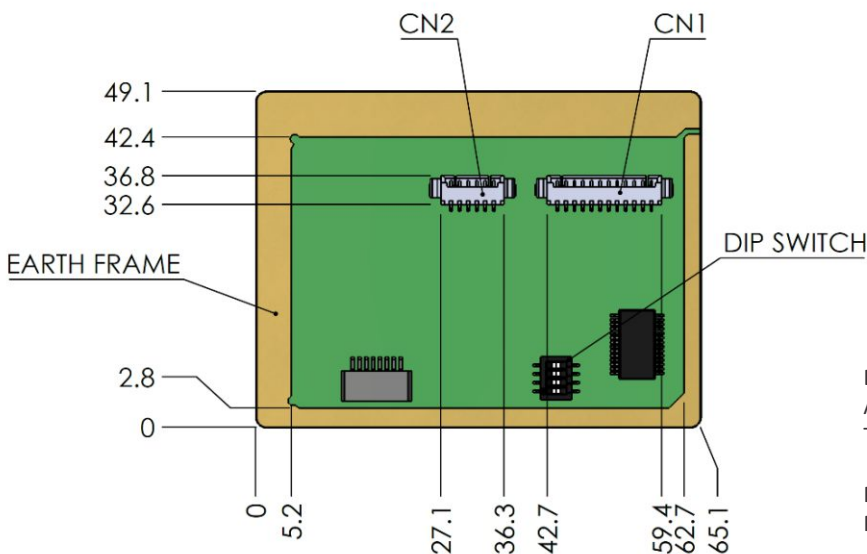


Figure 3: Perimeter Earth Frame on TPM Series PCB.

TOUCHPAD DIMENSION DRAWING



	DIM. A	DIM. B
NO OVERLAY	1.6	5.0
POLYESTER OVERLAY	2.0	5.4



Dimensional drawing specifies factory default orientation. All dimensions are in mm unless otherwise stated. Tolerances +/- 0.2mm unless otherwise stated.

Please note that an IGES model is available on request. Please contact your local sales office for more information

ORDER INFO

Touchpadmodule

No overlay	<b>TPM-860503</b>
Polyester overlay	<b>TPM-860513</b>

Optional cables

USB output cable 1,6m long, outer diameter 5mm, with extra shielding connection	<b>A033-80-01</b>
Interconnection switch cable, 7cm long, JST 4-pin PH connector, 2mm pitch	<b>A032-80-03</b>
Adaptor to PS/2	<b>APPD-USBPS2</b>

MANUFACTURER

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