

## >> SWITCH SENSOR TEX

### Technical Description

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Confidential



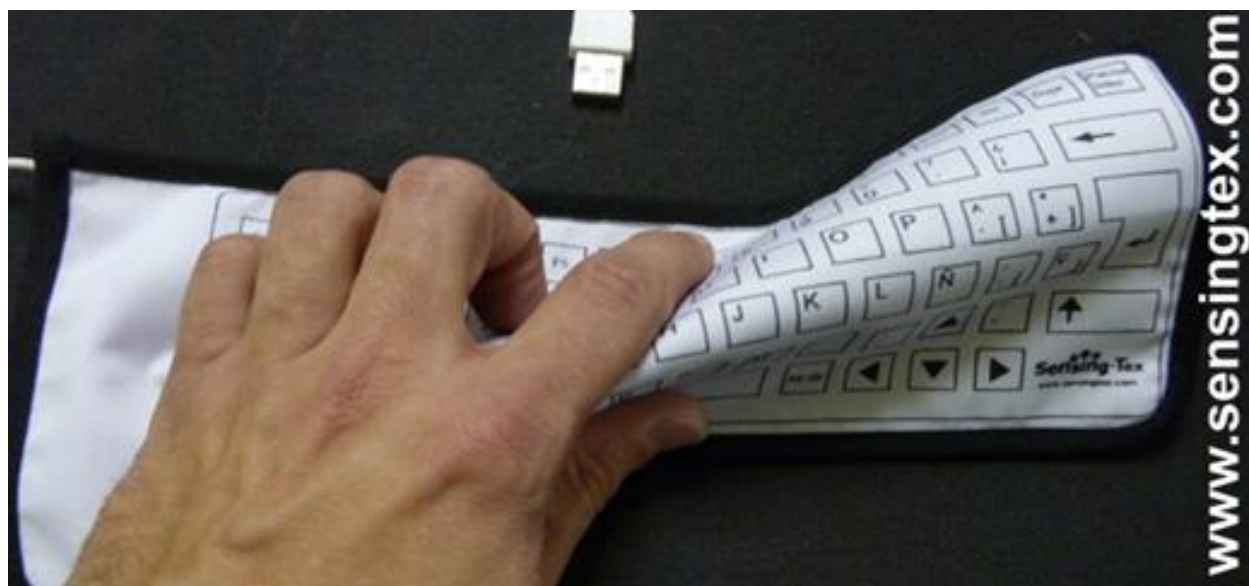
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## 1. Introduction

### Textile keyboards: Flexible, highly portable and washable!

Convert any fabric or textile backing into a keyboard with **Switch Sensor Tex**. Incorporate keypad control functionality directly into sports fabric, car interior upholstery or stand-alone textile keyboards which can be connected to laptops, tablets and other handheld devices.

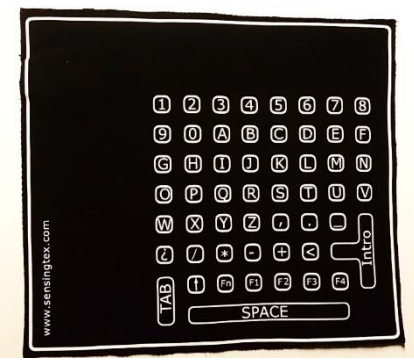


## Product

**Switch Sensor Tex** is an innovative product based on a patented technology which uses electrically conductive inks printed onto textile backings.

The product consists of an area of fabric with resistive switches distributed across its surface. The number, size and distribution of switches are completely flexible, allowing any type of keyboard or control pad to be defined. The result is fabric which allows keyboard functionality whilst retaining its textile properties: Flexibility, washable, elastic, etc. Sensing Tex offers feasibility and development services for textile based sensing products with its new SDK development Kit: an electronic module with some inputs to our Pressure Sensor standard samples and Bluetooth Classic, Bluetooth Low Power and USB connectivity for rapid prototyping.

### Applications



Sensing Tex offers a wide variety of market applications based on its **Switch Sensor Tex** product:

**Separate Cloth Keyboards:** Light and flexible, these can be used for input to Smart Phones, Tablets, handheld devices etc.

**Clothing Integrated Keypads:** Easily integrated functionality to provide control of MP3s, mobiles etc. Discrete design for everyday clothing to large functional keys for use on ski/winter jackets without removing gloves.

**Upholstery and Carpet Integrated Control Pads:** Instead of a hard intrusive keypad, used to control electronic functions in soft furnishings: Reclining armchairs, beds, adjustable car seats, carpets and mats, etc.



## 2. Technical Data

**Switch Sensor Tex** allows the X-Y positions of points of low pressure points, acting on the surface of the fabric, to be determined (switch functionality). The sensor is composed of a sequence of elements: one or two layers are used to detect position (coordinates X-Y) and the third layer is used to establish the minimum pressure that must be applied in order to activate the detection.

Property	Unit	Value
<b>Operating Conditions</b>		
Temperature Range ( <sup>1</sup> )	[°C]	-15 – 90
Relative Humidity Range	[%]	0-100
Repetitions (lifespan)	#	>10 <sup>8</sup>
Minimum Pressure to Activate	[N/cm <sup>2</sup> ]	0,2 -3 ( <sup>2</sup> )
<b>Physical Characteristics</b>		
Minimum Sensor Thickness	[µm]	400
Minimum Resolution	[mm]	1,5
<b>Electrical Characteristics</b>		
Dynamic Response Time Rising	[ms]	10
Dynamic Response Time Falling	[ms]	60
Contact Resistance	[Ω]	Ω Level
Sensitivity Error (0,2-0,5N)	[%]	0,2

**Table 1:** Technical properties X-Y position detection layer

<sup>1</sup> Tested in the laboratory. The range of measurements described should not be considered as a limit,

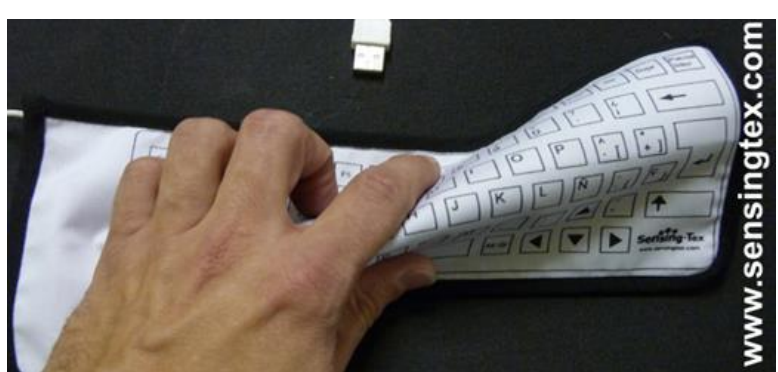
<sup>2</sup> Depending on isolating textile used, minimum pressure level can be controlled.



### 3. Applications

Switch Sensor Tex allows the development of products which can locate X-Y positions in a flexible, thin, lightweight surface, which can be adapted to different shapes and designs. The button/switch points can be customized in size, shape and distribution. These features make Switch Sensor Tex ideal for integration in countless applications such as control of electronic devices, PDAs, MP3s, PCs and integration into electronically adjustable car seats, curtains, blinds, doors, etc.

#### Separate Cloth Keyboards:



#### Clothing Integrated Keyboards:



#### Upholstery and Carpet Integrated Control Pads:



[www.sensingtex.com](http://www.sensingtex.com)

### 4. Samples

We have a set of standard textile sensor samples for testing and rapid prototyping of products based on **Switch Sensor Tex**.

#### 4.1 113 Switch Sensor Tex Sample 01

This sample consists of a textile element having a size of 20x20 cm and one sensor element; the sample has been wired with a textile cable and a JST connector. This sample has been designed for testing and rapid prototyping of products based on **Switch Sensor Tex**.



#### SAMPLE CHARACTERISTICS

This sample has the following characteristics:

- Textile Element:** Textile Sensor. Textile Backing: PES. **Size:** 20x20 cm with one sensor zone. **Cable:** Textile cable 2 ways.
- Connector:** 2,54mm pitch

#### SAMPLE ORDER

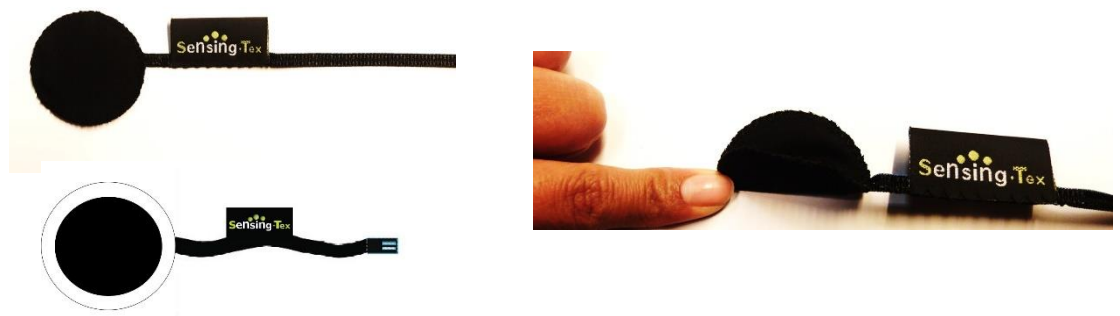
- Sample Reference:** 113 SST 01
- Sample price:** 24.90 € + Ex Works.

To proceed with your order, please contact with [info@sensingtex.com](mailto:info@sensingtex.com) or visit our Online Shop at [113 SST 01](#)

[www.sensingtex.com](http://www.sensingtex.com)

### 4.2 113 Switch Sensor Tex Sample 11

This sample consists of a textile element having a size of 35 mm of diameter and one sensor element; the sample has been wired with a textile cable and a JST connector. This sample has been designed for testing and rapid prototyping of products based on **Switch Sensor Tex**.



#### SAMPLE CHARACTERISTICS

This sample has the following characteristics:

- Textile Element:** Textile Keypad.
- Textile Backing:** Polyester.
- Size:** 35 mm diameter with one sensor element.
- Sensor Spot Size:** 30 mm diameter, round shape.
- Cable:** 2-way, 900 mm long textile cable.
- Connector:** 2-pin, flat connector, 2.54mm pitch.

#### SAMPLE ORDER

- Sample Reference:** 113 SST 11
- Sample price:** 12.90 € + Ex Works.

To proceed with your order, please contact with [info@sensingtex.com](mailto:info@sensingtex.com) or visit our Online Shop at [113 SST 11](#)



### **Customized development of specific keypad layouts with Switch Sensor Tex**

Sensing Tex offers the possibility to develop and customize the Switch Sensor Technology under the specifications given by the customer.

What can be customized:

- Size and position of the buttons.
- Position of the connector. It may be placed at one end of the keyboard or lengthen with a textile connecting strip.
- Thickness, flexibility and elasticity.
- Connector.

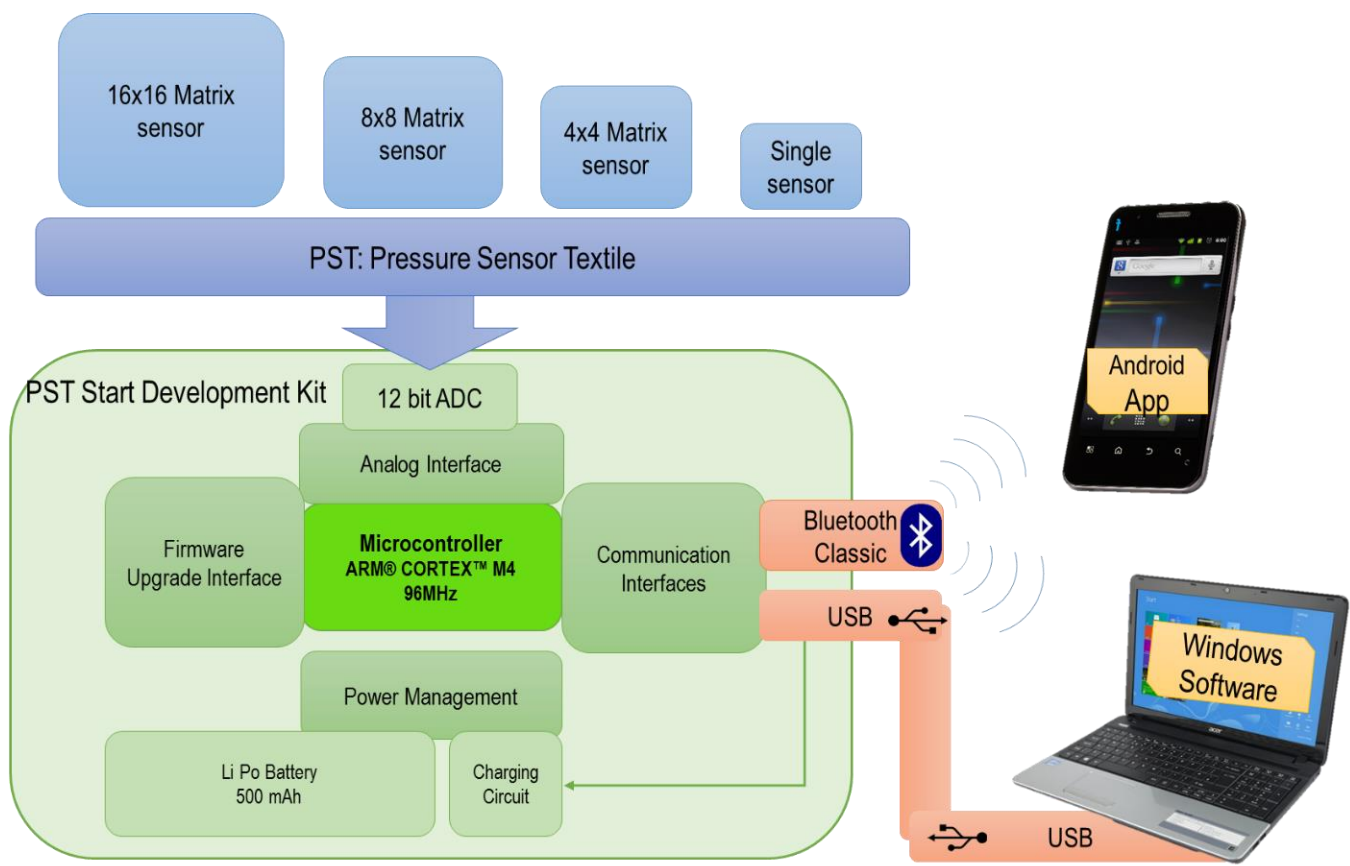
Other features:

- Specifically designed to prevent inadvertent operation due to bending of the keypad (for example, when we roll up the sleeve if the keypad is placed in this position).
- Specifically designed for activation on soft surfaces. (Soft spots on the skin, on foam fabric, etc).

### 4.3 114 Pressure Sensor Tex SDK 05

The 114 PST SDK 05 is an Electronic and Software Development Kit developed by Sensing Tex, a proposed compact, cheaper solution for customers that incorporates all the major features of inputs, processing and outputs for **Switch and Pressure Sensor Tex** technologies.

A flexible architecture allows the PST SDK to use different sizes of PST matrix sensors, allowing the acquisition of pressure data, and the communication interface to computers or smartphones. Users can use the Bluetooth or USB ports in order to communicate the PST SDK with external devices, and then visualize the pressure maps with the Sensing Tex software. The following graph is an outline of the architecture.





**SAMPLE CHARACTERISTICS** //////////////////////////////////////

14 PST SDK 05 is a Portable Data Acquisition for Pressure Sensor Tex with the following features:

Hardware:

- Signal conditioning for PST sensors
- ARM® Cortex M4 96 MHz Microcontroller
- 32 I/O Channels that allows up to 16x16 matrix sensor
- USB PC Interface
- Bluetooth classic interface for Wireless Data Acquisition
- 12 bit resolution ADC
- Firmware upgrade circuit interface
- 500 mAh lithium polymer rechargeable battery
- Small Plastic Box (90x46x17 mm)

Software:

- It implements a proprietary Sensing Tex communication protocol
- Windows Demo Software
- Android PST Dev Kit application

Ask for the 114\_Developer\_Guide\_Pressure\_Sensor\_Tex for further information on this development KIT

- Technical Description of the SDK Board
- Control Protocol SDK Board
- Basic software SDK Windows

**SAMPLE ORDER** //////////////////////////////////////

**Sample Reference:** 114 PST SDK 05  
**Sample Price:** € 399.00 + Ex-Works.

To proceed with your order, please contact with [info@sensingtex.com](mailto:info@sensingtex.com) or visit our Online Shop at [114 PST SDK 05](#)

[www.sensingtex.com](http://www.sensingtex.com)

## 5. Maintenance and Operating Instructions

Taking into account that the products described are standard Samples, they are thought to be used in tests. That is why the connector is not protected in order to be connected to different devices, and we recommend not to wash the Samples and fold them carefully. Regarding customized solutions, we can develop products that can be washable and be fold in any possible way.

The following instructions apply only to standard Samples:

### Switch Sensor Tex:

- Switch Sensor Tex fabric is has the same touch and feel than any other synthetic fabric.
- Switch Sensor Tex Fabric can be folded and creased as any other fabric.
- Switch Sensor Tex Fabric can be gently machine washed with water up to 30°C and natural soap when the connector is protected.

### PST 01 to PST 12

- Sample Sensor Mats can be carefully fold and rolled up
- Sample Sensor Mats can be cleaned with some soap and water with a tissue (please ask for washability, the connector is not protected)

More information included in the User Guide.

### PST SDK 05

- Perform a correct battery charge in each use to achieve better long life battery.
- Never charge the SDK for more than an hour, it will decrease the battery capacity.
- Always turn OFF the SDK when it is going to be disconnected.
- Use 0.100" (2.54 mm) male double-sided header pins to connect the SDK and PST.
- Be careful when connecting or disconnecting the SDK with the sensor, because the pins may damage the fabric of PST.

## 6. Legal Note

Sensing Tex commercialized products require a careful handling according to the provided instructions. Therefore, any manipulation, modification or transformation applied to Sensing Tex commercialized materials which do not match the standard existing protocols also given to the clients, or which are not strictly authorized by Sensing Tex, will cause an invalid existing product operation warranty, and Sensing Tex will not be responsible for any damage to the product or malfunction.

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