



Detailed Technical Specification  
SmartEpad® Mouse Pad

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## 1. INTRODUCTION

### 1.1. General Overview

The SmartEpad® Mouse Pad is an “intelligent matrix” USB mouse pad that contains a smart card reader. Figure 1 is a picture representing the design of the device:



Figure 1: SmartEpad® Mouse Pad

When your finger pushes each button or “intelligent” point on the mouse pad it directs you immediately to a partner/merchant Internet site or the distributing institution’s web site sub-url’s.

Other intelligent points allow you to quickly navigate to your shopping cart and ultimately buy with one button click, when the SmartEpad® is used for e-commerce applications.

There are 20 buttons on the pad and interchangeable templates allow partner/consumer variation to their web experience. Each template can have partner sites identified, “purchase” type buttons as well as custom consumer buttons.

Web shopping made easy. Security and authentication can be enhanced by the institution smart card. The smart card reader is yet PC/SC compliant.

The business case for SmartEpad® is that every time you insert your smart card and authenticate yourself to SmartEpad®, they record it. They can determine age group based on multiple cards per family. With each “buying template” inserted into the reader to assist the user with Internet navigation, SmartEpad® records what site you went to and your activity on that site. SmartEpad® will data mine this data to partners. However they will NOT sell the names. Revenue will come by advertising, “click” revenue, revenue sharing, customer acquisition fees, etc.

## 1.2. SmartEpad® Mouse Pad Overview

The SmartEpad® Mouse Pad is based on the GEMPLUS GemCore Keyboard USB technology.

The SmartEpad® Mouse Pad includes a Chip Set composed of:

- A GEMPLUS Micro Controller,
- One GEMPLUS Interface Chip.

The SmartEpad® Mouse Pad application of the Chip Set is presented figure 2:

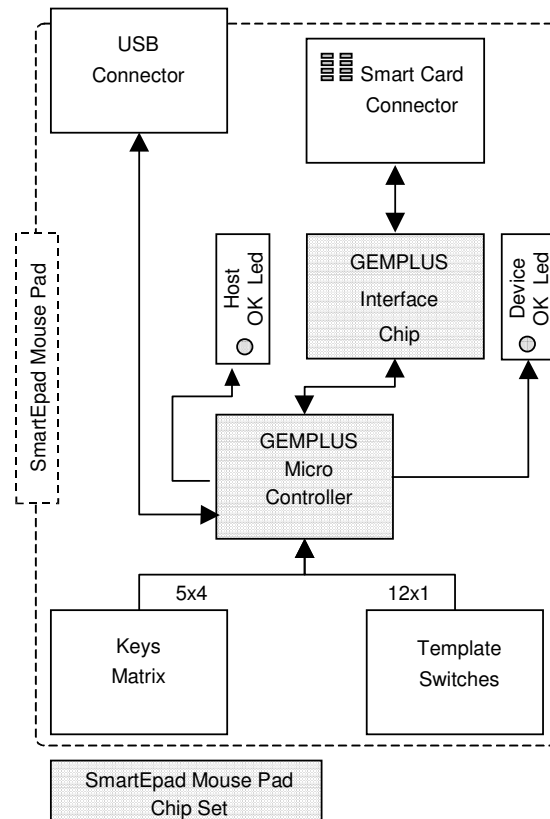


Figure 2: SmartEpad® Mouse Pad Chip Set application

This document is the Technical Specification. It details all the interfaces and all the functions related to the SmartEpad® Mouse Pad.

### 1.3. Reference documents and elements

The documents and elements, which are used as reference, are presented in table 1:

Document	Reference
<b>Standard</b>	
[1] Identification Cards, Part 3: Electronic signals and Transmission Protocols	ISO/IEC 7816-3:1997(E)
[2] Identification Cards, Part 4: Inter industry commands for interchange	ISO/IEC 7816-4:1995(E)
[3] Identification Cards, Part 4: Inter industry commands for interchange. AMENDMENT 1: Impact of secure messaging on structures of APDU messages	ISO/IEC 7816-4:1995 /Amd.1:1997(E)
[4] EMV '96 Integrated Circuit Card Specification for Payment Systems: PART I, Electromechanical Characteristics, Logical Interface, and Transmission Protocols	Version 3.1.1, May 31, 1998
[5] EMV '96 Integrated Circuit Card Specification for Payment Systems: PART II, Data Elements and Commands	Version 3.1.1, May 31, 1998
[6] Universal Serial Bus Specification	Revision 1.1, September 23, 1998
[7] Universal Serial Bus: Device Class Definition for Human Interface Devices (HID)	04/07/1999 Version 1.1
[8] Universal Serial Bus: HID Usage Tables	04/08/1999 Version 1.1
[9] Universal Serial Bus: Device Class Specification for USB Chip/Smart Card Interface Devices (CCID)	Revision 0.7i, April 10, 2000
[10] Interoperability Specification for ICCs and Personal Computer Systems	Revision 1.0, December 1997
<b>Gemplus documents</b>	
[11] IC100 / MC 33560 Data Sheet, advanced information	Rev 8/4/98

Table 1: Reference Documents

### 1.4. Abbreviations

USB	Universal Serial Bus
LED	Led Emitting Diode

## 2. MOUSE PAD FUNCTIONS

The functions of the SmartEpad® Mouse Pad are:

1. Keypad management,
2. Template switches management,
3. LED management,
4. Smart Card management,
5. USB management.

The functions are included in the GemCore Controller Chip as depicted in figure 3:

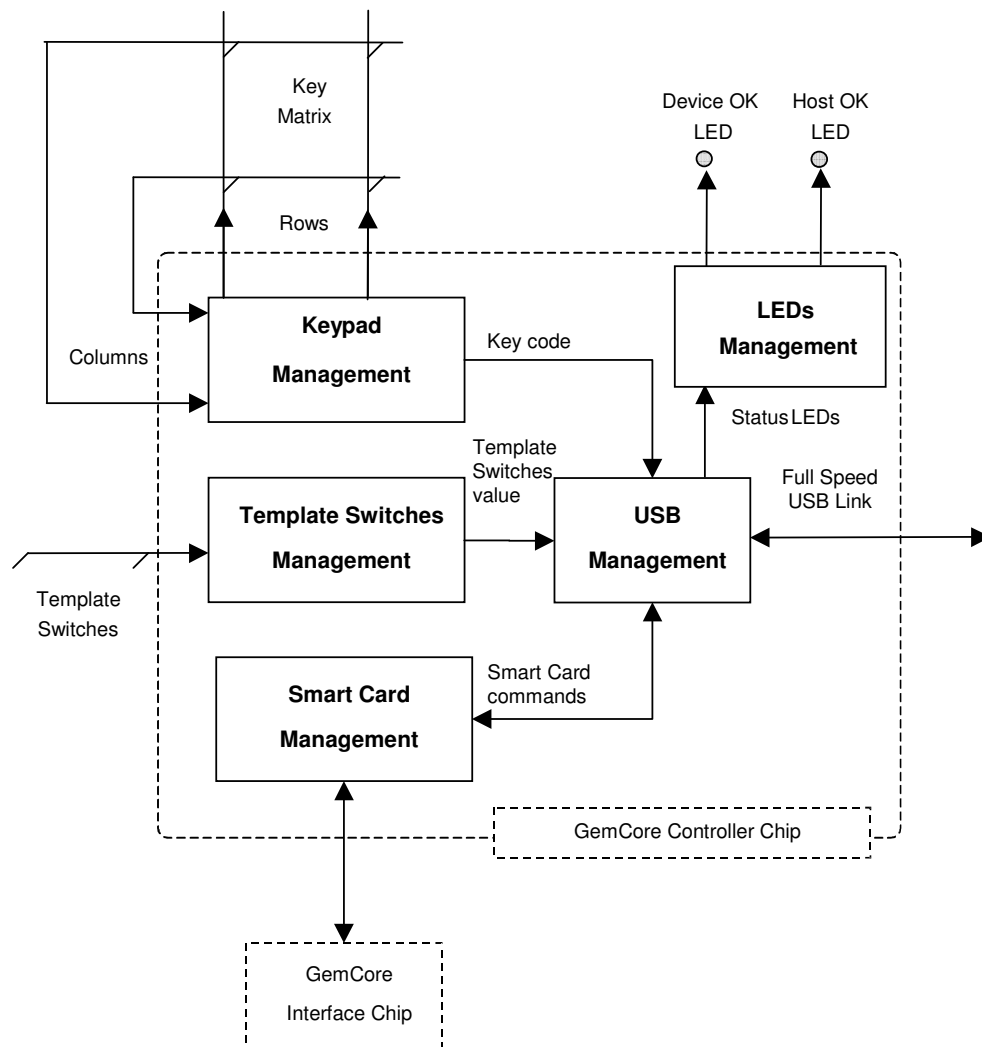


Figure 3: GemCore Controller Chip Block Diagram

## 2.1. Keypad management

The 20 Keys are included in a 5 x 4 keypad matrix built in the template.

The keypad matrix is regularly scanned in order to obtain the Key pressed (cf. figure 4).

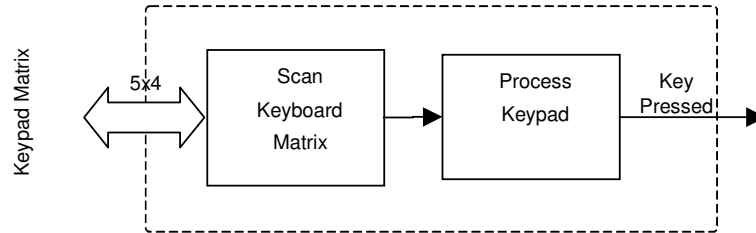


Figure 4: Keypad function

The key pressed is reported through the USB interface.

In the USB suspend mode, any key pressed activates the remote wake up of the device.

## 2.2. Template Switches management

The 12 template switches are regularly read in order to obtain the switches status (cf. figure 5).

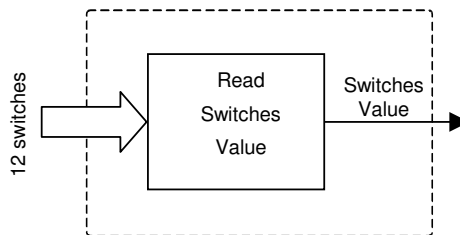


Figure 5: Template Switches function

The template switches are reported through the USB interface.

In the USB suspend mode, a template change is not detected.

## 2.3. LEDs management

The host through the USB interface drives the 2 LEDs 'Device OK' and 'Host OK' (cf. figure 6).

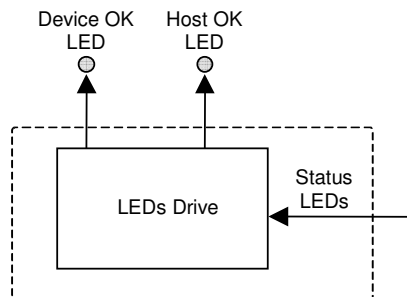


Figure 6: LEDs function

In the USB suspend mode, the two LEDs are set to OFF. When the device is powered up, the two LEDs are flashing for 100 ms to indicate a proper start.

## 2.4. Smart Card management

The smart card operating mode is locked to EMV Specifications (cf. figure 7).

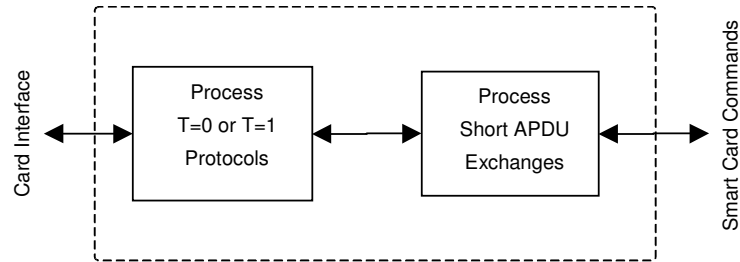


Figure 7: Smart Card function

In the USB suspend mode, any card insertion or removal activates the remote wake up of the device.

## 2.5. USB management

The USB management complies with revision 1.10 USB Standards.

This Full Speed link is used to transmit and receive information between the Mouse Pad and the Host (cf. figure 8).

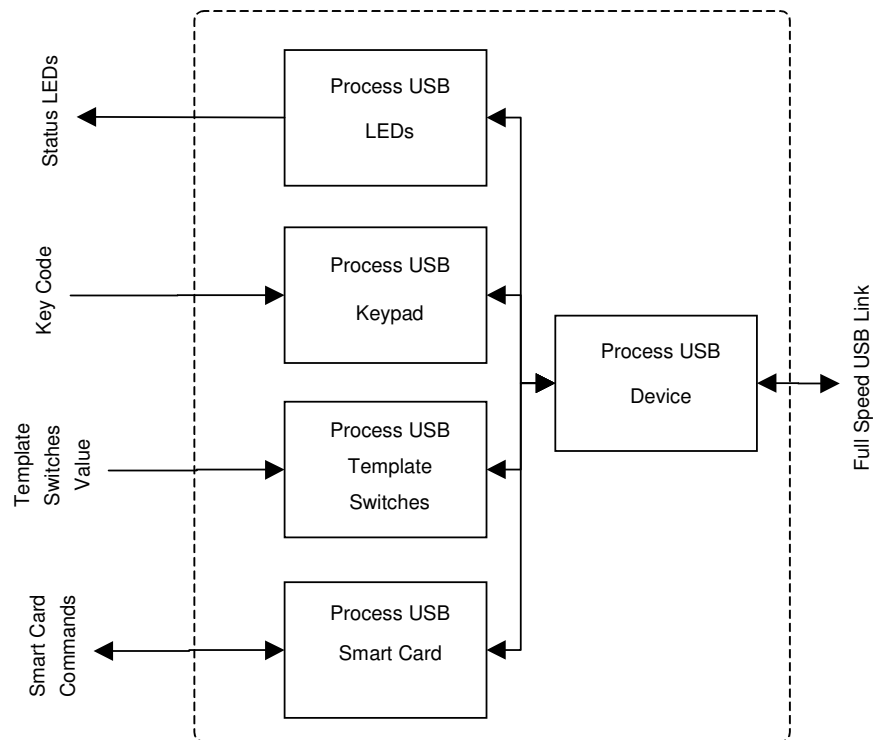


Figure 8: USB function



### 3. MOUSE PAD INTERFACES

#### 3.1. SmartEpad® Mouse Pad Block diagram

The block diagram is shown in figure 9:

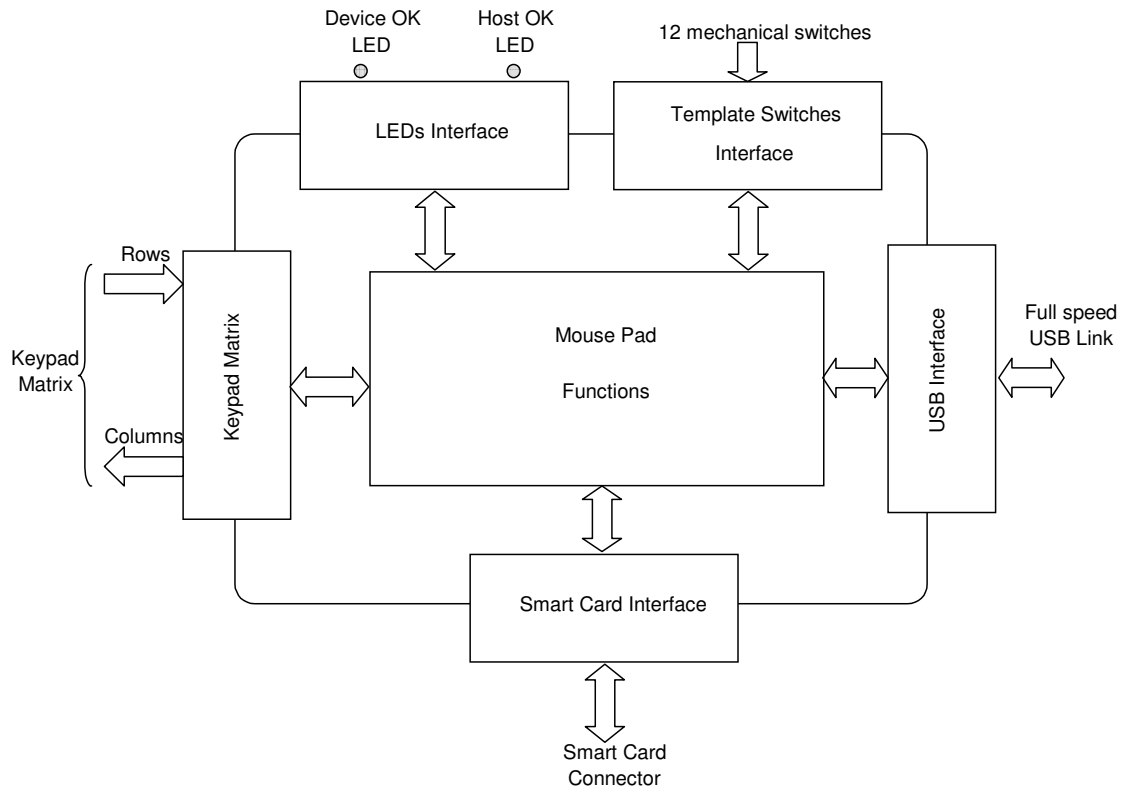


Figure 9: Mouse Pad block diagram

The SmartEpad® Mouse Pad has 5 interfaces:

- The Key matrix,
- The Smart Card Reader,
- The LED's,
- The template switches,
- The USB.

### 3.2. Key Matrix interface

The key matrix is composed of a mechanical keyboard build with 5 columns and 4 rows.

The keys are spread around the template in order to have a flat zone where a mouse can be placed (cf. figure 10).

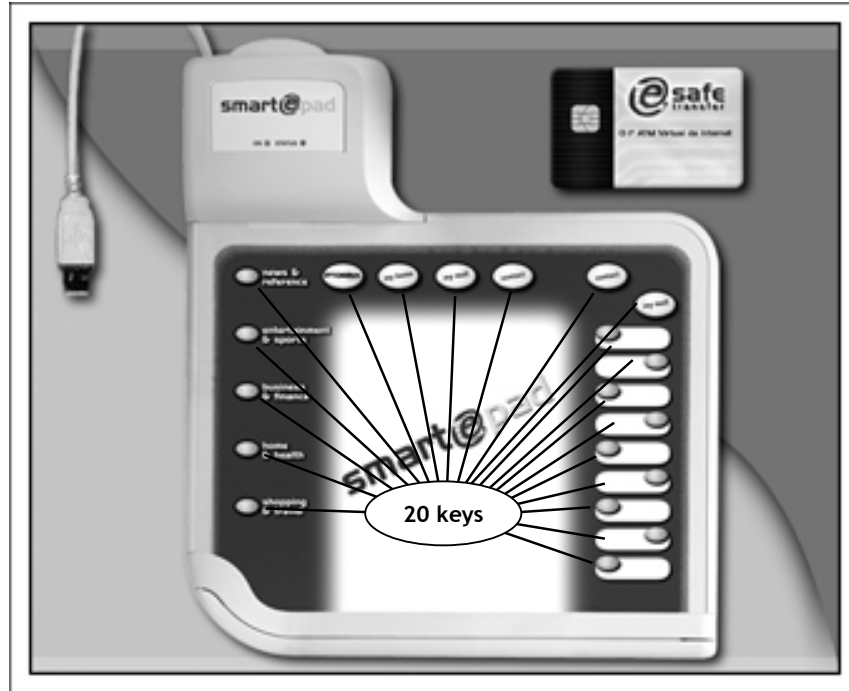


Figure 10: Key position

### 3.3. Smart Card Interface

The Smart Card interface complies with EMV asynchronous cards.

A slot allows the card to be inserted inside the Mouse Pad (cf. figure 11).

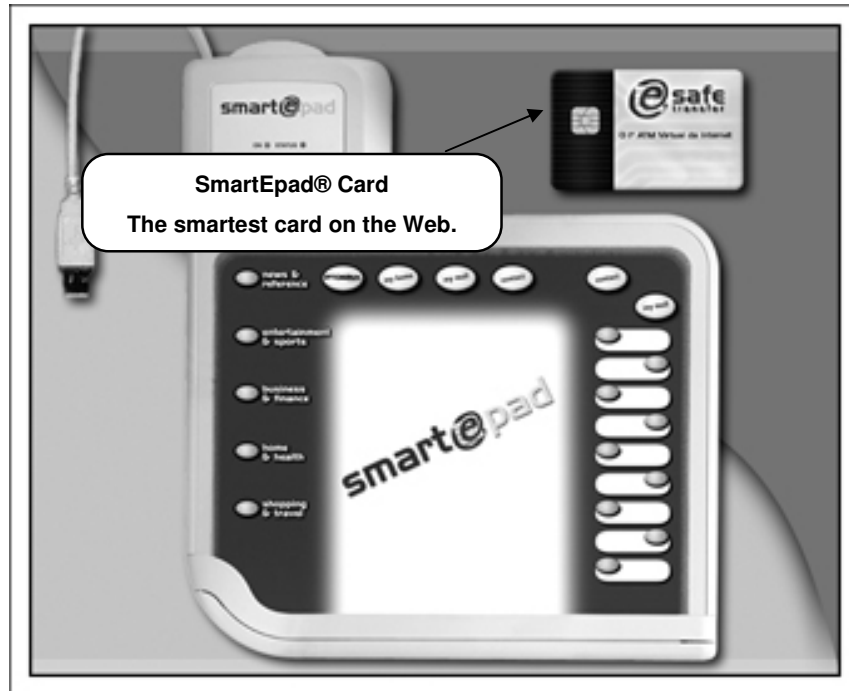


Figure 11: Smart Card Insertion

The physical interface with a smart card is done with the IC100 GEMPLUS Integrated Circuit dedicated to smart card interface.

### 3.4. LED's Interface

The LED's interface is composed of 2 LED's (cf. figure 12):

- One green LED indicates that the mouse pad is recognized by the system (Host OK),
- One yellow LED indicates that the inserted smart card is recognized (Device OK).

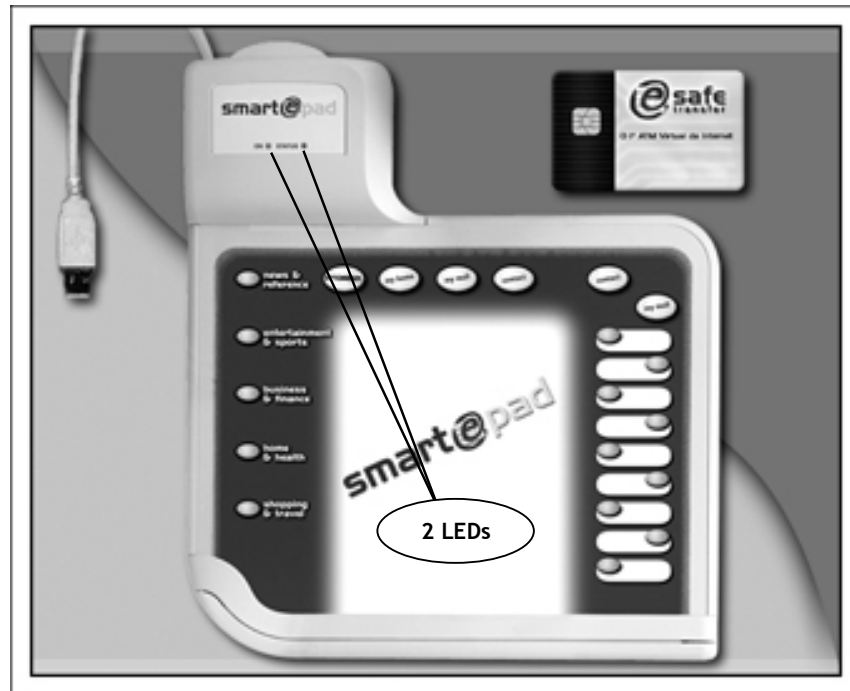


Figure 12: LEDs position

### 3.5. Template switches

This interface is able to read the 12 switches activated by the insert of the template.  
The value of the switches gives the insert identification (cf. figure 13).

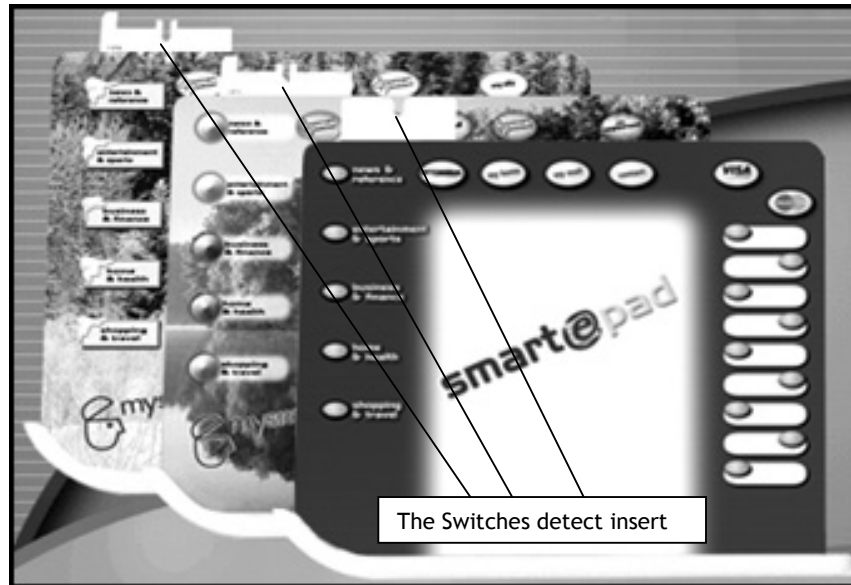


Figure 13: Insert detection

### 3.6. USB Interface

The USB interface implemented complies with 1.1 version, full speed USB.

The 4 pins cable is terminated by an USB "A" plug connector as indicated figure 14 and 15:

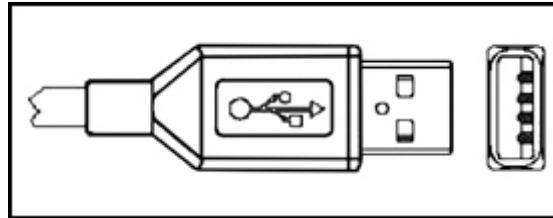


Figure 14: "A" plug USB connector



Figure 15: Mouse Pad USB connector

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