

54-B-PMC-08
Projected Capacitive Controller
2 PSoC
Specification Guide

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Document Revision History				
Revision	Page	Content	Revised By	Date
1	1-12	Technical Specification	Bhushan Vaidya	05/14/2009

Product Overview

54-B-PMC-08

Touch International's Extreme Touch Products is based on the projected capacitive technology. The 54-B-PMC-08 is a general purpose controller designed to interface with computer systems through a wide variety

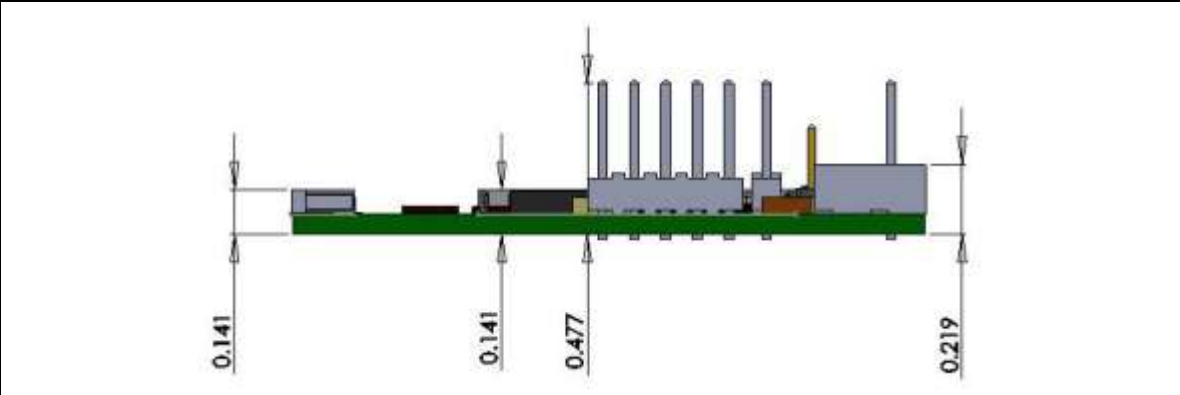
of standard interfaces; USB, I2C, etc. With Touch International's proprietary firmware, the controller can easily be tuned to all types of custom designs as well as different applications. Gestures and multi-touch are some of the unique product offerings that are supported.

Features	
Motion Detection Method	Capacitive sensing using a Sigma-Delta modulator
X/Y Position Reporting	Absolute Position
Touch Force	No contact pressure required
Calibration	No need for calibration
Chip Set Solution	Available
Touch	Single touch
Interface	HID Compliant
RoHS	Compliant
REACH	Compliant

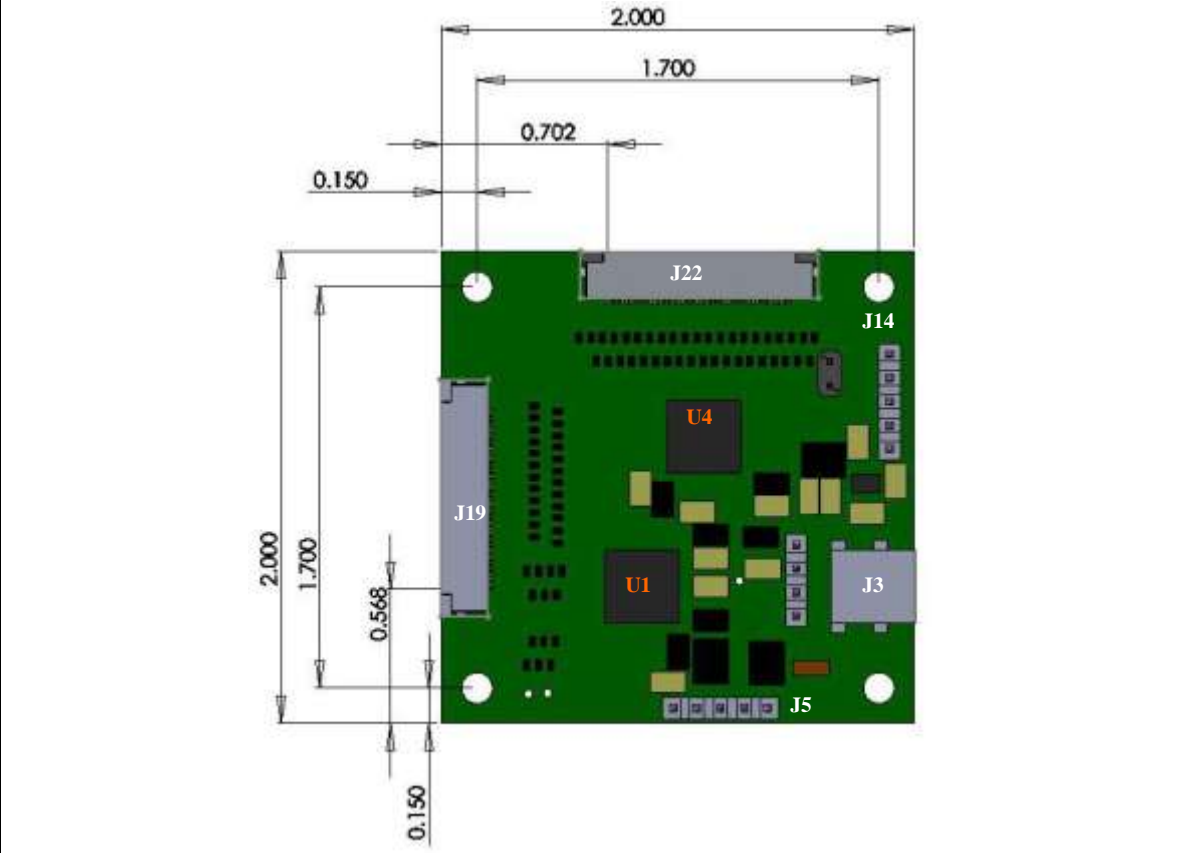
Specifications	
Controller Size	2.0" x 2.0" (50.80mm x 50.8mm)
Power Requirements	5 ~ 9V DC unregulated power, typical 60mA.
Operating Temperature	-40 to 85°C
Storage Temperature	-40 to 85°C
Relative Humidity	35°C at 95% RH non-condensing.
Interface	USB 2.0, 1.1 compliant. USB – UART. I2C (Optional).
Communication Cables	A Plug/5-Pin Mini-B Plug (USB & USB - UART): TI# 1300264
Resolution	2048 x 2048
Report Rate	Approx. 25 – 50 points/sec
Mean Time Between Failure	> 5,600,000 hrs.
Maximum Screen Size Supported:	15"
Supported Operating Systems	Windows 2000, XP, Vista and 7. Linux Ubuntu. Mac OSX 10.x (Leopard).

Controller Drawings

Side View*



Top View*



**Note: All headers are optional. Contact your sales representative for more information.*

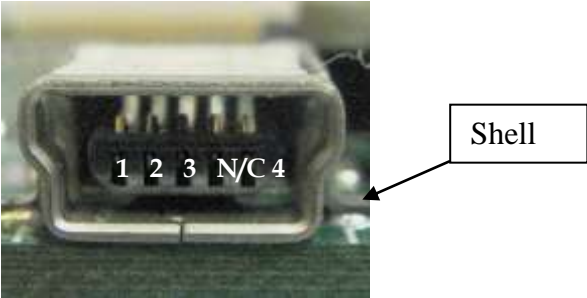
Jumper Configuration

Header J5	Connect the Cypress PSoC MiniProg device into J5 to program the U1PSoC
Header J14	Connect the Cypress PSoC MiniProg device into J14 to program the U4 PSoC

Interface Specifications - Connection to the Host Computer

USB Communication (TI# 1300264)

The USB cable is also 6 ft long, has a USB4P (A) male connector at one end and a Mini USB5P (B) to connect to the controller.

J3		Pin #	J3
		1	VBUS
		2	D-
		3	D+
		4	GND
		Shell	GND

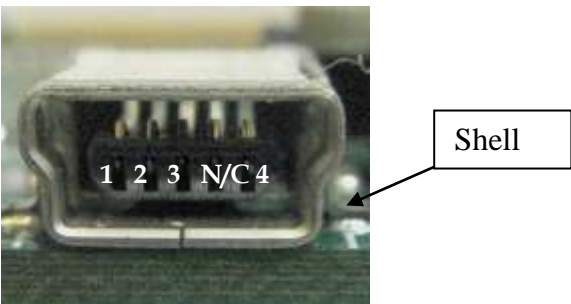
Interface Specifications - Connection to the Host Computer

USB-UART Communication (TI# 1300264)

This protocol emulates RS-232 over the USB bus. The primary advantage of this method is that PC applications will use the USB connection as an RS-232 COM connection, making it very simple to debug. This method uses a standard Windows[®] driver that is included with all versions Microsoft[®] Windows from Windows 98SE through Windows XP.

For more information, either contact the TI support team or look up the Cypress USB - UART protocol on their web page www.cypress.com

The USB cable is also 6 ft long, has a USB4P (A) male connector at one end and a Mini USB5P (B) to connect to the controller.

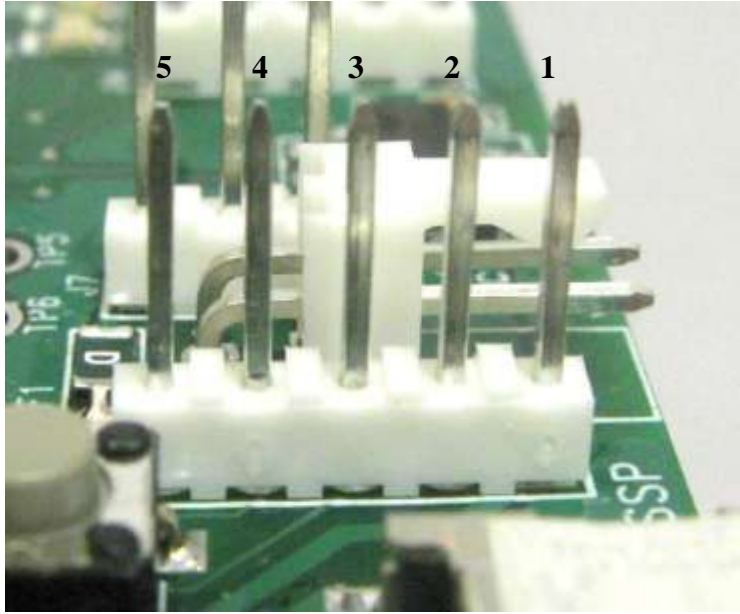
J3		Pin #	J3
		1	VBUS
		2	D-
		3	D+
		4	GND
		Shell	GND

Interface Specifications - Connection to the Host Computer

I2C Communication

I2C connected as slave.
Address : 0x9
Clock: 400Khz.

J5



Pin #	Name
1	VDD
2	GND
3	XRES
4	SCLK
5	SDATA

Notes:

- The I2C connector is labeled ISSP and J5 on the PC board.
- Pin 3 is used only for programming the PSoC and is typically not used for I2C communication.

Interface Specifications (USB)

Communication with the Host Computer

USB Communication	USB Communication between the controller and the host computer is based upon USB HID class protocols as presented in “Universal Serial Bus Revision 2.0 specification” and “USB Class Definition for Human Interface Devices (HID)”.
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USB Communication using Single finger touch and when touch is released from the screen.	The Controller is programmed as per the dual touch firmware. The value of bit # 0 of the first byte will be 1, which will activate the selected mouse button. Refer Table 1A and 1B for Data Byte Format.
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Table 1A: 54-B-PMC-08- USB Data Byte Format (With single finger touch on the screen)

	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 1	0	0	0	0	0	0	0	1
BYTE 2	X _{1 3}	X _{1 2}	X _{1 1}	X _{1 0}	0	0	0	0
BYTE 3	0	X _{1 10}	X _{1 9}	X _{1 8}	X _{1 7}	X _{1 6}	X _{1 5}	X _{1 4}
BYTE 4	Y _{1 3}	Y _{1 2}	Y _{1 1}	Y _{1 0}	0	0	0	0
BYTE 5	0	Y _{1 10}	Y _{1 9}	Y _{1 8}	Y _{1 7}	Y _{1 6}	Y _{1 5}	Y _{1 4}

Table 1B: 54-B-PMC-08- USB Data Byte Format (Single transaction only when touch is released from the screen)

	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 1	0	0	0	0	0	0	0	0
BYTE 2	X _{1 3}	X _{1 2}	X _{1 1}	X _{1 0}	0	0	0	0
BYTE 3	0	X _{1 10}	X _{1 9}	X _{1 8}	X _{1 7}	X _{1 6}	X _{1 5}	X _{1 4}
BYTE 4	Y _{1 3}	Y _{1 2}	Y _{1 1}	Y _{1 0}	0	0	0	0
BYTE 5	0	Y _{1 10}	Y _{1 9}	Y _{1 8}	Y _{1 7}	Y _{1 6}	Y _{1 5}	Y _{1 4}

Interface Specifications (USB Cont):

USB Data Byte Format

USB Communication when Gesture (Two Finger Touch).

The data output to the USB will be 2 packets of 5 bytes and the data format will look as Table 2A and 2B. There is no selected mouse button to press. Bit 4 is always 1 at both the 'BYTE 1' of both the 'packets'. Also, bit 5 at both the 'BYTE 1' of both the 'packets' is the finger identifier (0 for the first finger, and 1 for the second finger respectively).

2 Finger Touch

Table 2A: 54-B-PMC-08- USB Data Byte Format

(With 2 fingers touch on the screen)

1st Packet

	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 1	0	0	0	1	0	0	0	0
BYTE 2	X ₁ 3	X ₁ 2	X ₁ 1	X ₁ 0	0	0	0	0
BYTE 3	0	X ₁ 10	X ₁ 9	X ₁ 8	X ₁ 7	X ₁ 6	X ₁ 5	X ₁ 4
BYTE 4	Y ₁ 3	Y ₁ 2	Y ₁ 1	Y ₁ 0	0	0	0	0
BYTE 5	0	Y ₁ 10	Y ₁ 9	Y ₁ 8	Y ₁ 7	Y ₁ 6	Y ₁ 5	Y ₁ 4

Table 2B: 54-B-PMC-08- USB Data Byte Format

2nd Packet

	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 1	0	0	1	1	0	0	0	0
BYTE 2	X ₂ 3	X ₂ 2	X ₂ 1	X ₂ 0	0	0	0	0
BYTE 3	0	X ₂ 10	X ₂ 9	X ₂ 8	X ₂ 7	X ₂ 6	X ₂ 5	X ₂ 4
BYTE 4	Y ₂ 3	Y ₂ 2	Y ₂ 1	Y ₂ 0	0	0	0	0
BYTE 5	0	Y ₂ 10	Y ₂ 9	Y ₂ 8	Y ₂ 7	Y ₂ 6	Y ₂ 5	Y ₂ 4

Note: Touch International's chipset is using the HID Microsoft Compliance mouse driver by default; however, you may use your own driver to control the gesture base using the Table 2A-2B format.

Interface Specifications (I2C)

Communication with the Host Device

I2C Communication	I2C Address: 0x9 Clock: 400Khz Data Byte Format: Table 3A
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Table 3A: 54-B-PMC-08 - I2C Data Byte Format

	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 1	0	0	0	0	0	X ₁ 10	X ₁ 9	X ₁ 8
BYTE 2	X ₁ 7	X ₁ 6	X ₁ 5	X ₁ 4	X ₁ 3	X ₁ 2	X ₁ 1	X ₁ 0
BYTE 3	0	0	0	0	0	Y ₁ 10	Y ₁ 9	Y ₁ 8
BYTE 4	Y ₁ 7	Y ₁ 6	Y ₁ 5	Y ₁ 4	Y ₁ 3	Y ₁ 2	Y ₁ 1	Y ₁ 0
BYTE 5	0	0	0	0	0	X ₂ 10	X ₂ 9	X ₂ 8
BYTE 6	X ₂ 7	X ₂ 6	X ₂ 5	X ₂ 4	X ₂ 3	X ₂ 2	X ₂ 1	X ₂ 0
BYTE 7	0	0	0	0	0	Y ₂ 10	Y ₂ 9	Y ₂ 8
BYTE 8	Y ₂ 7	Y ₂ 6	Y ₂ 5	Y ₂ 4	Y ₂ 3	Y ₂ 2	Y ₂ 1	Y ₂ 0
BYTE 9	-	-	-	-	-	-	-	-
BYTE 10	1	0	1	0	1	0	1	0

* BYTE 9: Counter

Ordering Information

Part Number	Description
54-B-PMC-08	Projected Capacitive Controller (2 PSoC)
<p data-bbox="310 380 1308 411">Contact TI sales representative for a complete list of TI's OEM and retail products.</p> <p data-bbox="602 447 1016 636">Touch International 2222 W. Rundberg Ln. Suite 200 Austin, TX 78758 Tel: 512.832.8292 Fax: 512.491.6381 technicalsupport@touchintl.com www.touchinternational.com</p>	