



54-B-PMC-14
Projected Capacitive Controller
3 PSoC
Specification Guide

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Document Revision History

Revision	Page	Content	Revised By	Date
1.0	1-11	Technical Specification	Bhushan Vaidya	05/14/2009

Product Overview

54-B-PMC-14

Touch International's 54-B-PMC-14 projected capacitive controller is one of several options the Extreme Touch product line has to offer. Designed to interface with computer systems through a wide variety of standard interfaces, the controller is compatible with USB, I2C and Serial communications. Combined with Touch International's proprietary firmware, the controller can easily be tuned to your custom design, as well as a range of different applications.

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 Complaint
RoHS	Complaint
REACH	Complaint

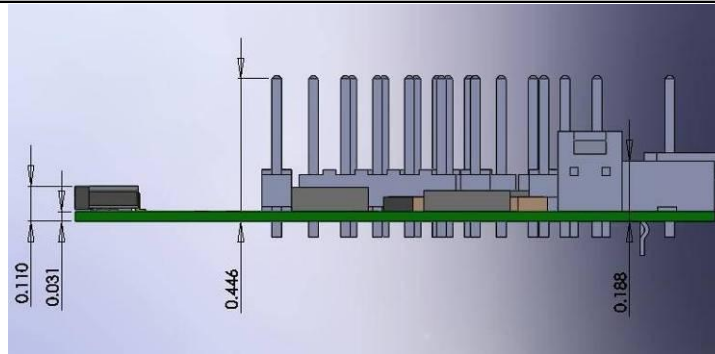
Specifications

Controller Size	3.300" x 2.000" (83.82mm x 50.80mm)
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 (Standard) Optional: USB – UART RS-232 Serial Communication Protocol: No parity, 8 data bits, 1 stop bit, 115200 baud, no flow control. I2C Communication
Communication Cables	A Plug/5-Pin Mini-B Plug (USB & USB - UART): TI# 1300264
Resolution	2048 x 2048
Report Rate	Approx. 20 – 40 points/sec depending on screen size.
Mean Time Between Failure	> 5,600,000 Hrs.
Maximum Screen Size Supported:	22" Diagonal
Supported Operating Systems	Windows 2000, XP, Vista and 7; Linux Ubuntu; Mac OSX 10.x (Leopard)

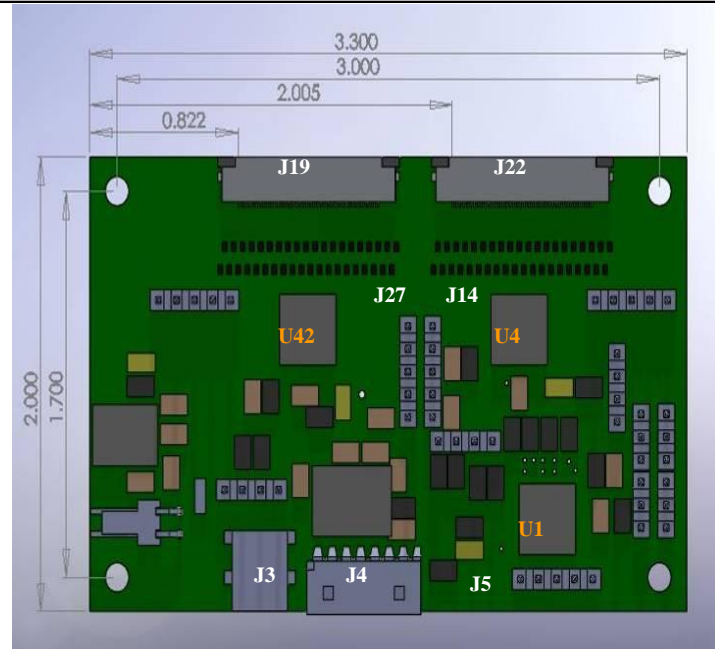
* Requires 2 controllers for 22" Screen Size.

Controller Drawings

Side View*



Top View



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

Jumper Configuration

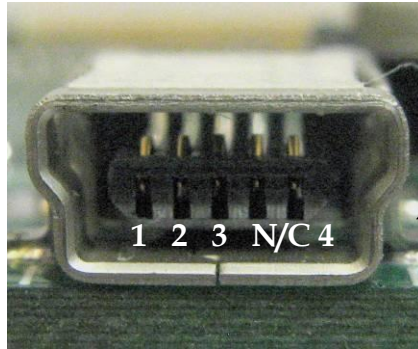
Header J5	Connect the Cypress PSoC MiniProg device into J5 to program the PSoC – U1 as master controller communicator with PC.
Header J14	Connect the Cypress PSoC MiniProg device into J14 to program the PSoC – U4
Header J27	Connect the Cypress PSoC MiniProg device into J27 to program the PSoC – U42

Interface Specifications - Connection to the Host Computer

USB Communication (TI# 1300264)

The USB cable is 6' long with a USB4P (A) male connector at one end and a Mini USB5P (B) at the other 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)

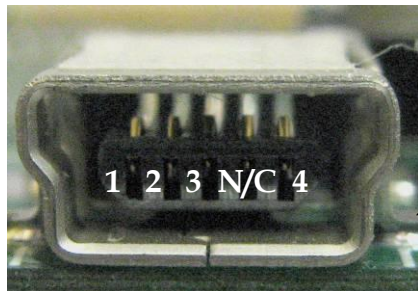
This protocol emulates RS-232 over the USB bus. The primary advantage of using this method is that PC applications will use the USB connection as an RS-232 COM connection, making it very simple to debug.

This method uses a standard Windows[®] driver that is included with all versions Microsoft[®] Windows from Windows 98SE through Windows 7.

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

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

J3



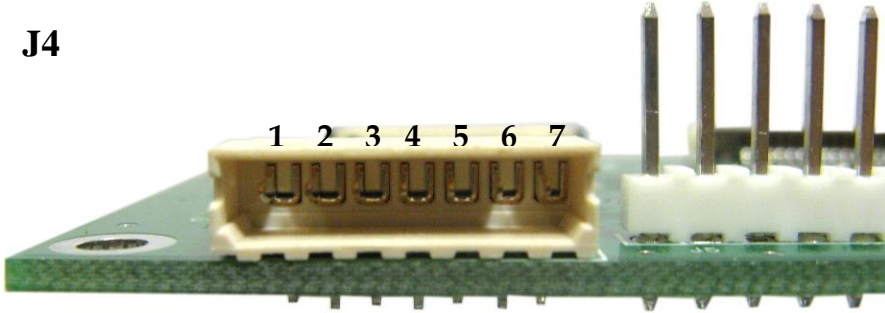
Pin #	J3
1	VBUS
2	D-
3	D+
4	GND
Shell	GND

Interface Specifications - Connection to the Host Computer

RS232 Communication (TI # 1300210)

The cable is 8' long with a DB-9 female connector at one end and a 1x7 header female connector at the other to connect to the controller.

J4



Pin #	J4
1	N/C
2	TxD
3	RxD
4	N/C
5	GND
6	N/C
7	GND

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 Single Finger Touch and/or Touch is released from the screen.	<p>The Controller is programmed with dual touch firmware.</p> <p>The value of bit # 0 of the first byte will be 1, which will activate the selected mouse button.</p> <p>For the entire Data Byte Format, refer to Table 1A and 1B.</p>
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Table 1A: 54-B-PMC-14 - 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-14 - 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 (RS232)

Communication with the Host Computer

RS232 Communication

Internal to the PSoC ASIC chip, the TX8 User Module is an 8-bit RS-232 data-format compliant serial transmitter with programmable clocking and selectable interrupt or polling style operation.

The data transmitted is framed with a leading start bit, an optional parity bit and a stop bit.

Transmitter firmware is used to initialize, start, stop, read status and write data to the TX8.

The Controller Assembly communicates with the host computer using a 6-byte communication protocol.

The data packet format is shown in Table 2A and Table 2B.

Data Byte Format for Single Touch

Table 2A: 54-B-PMC-14 – RS232 Data Byte Format
(With Touch on the screen.)

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

BYTE 6: Message Checksum

Description: The message checksum is a one byte checksum for the message. The 1 byte sum of the following bytes should add up to zero (message start byte, message data byte and message checksum byte).

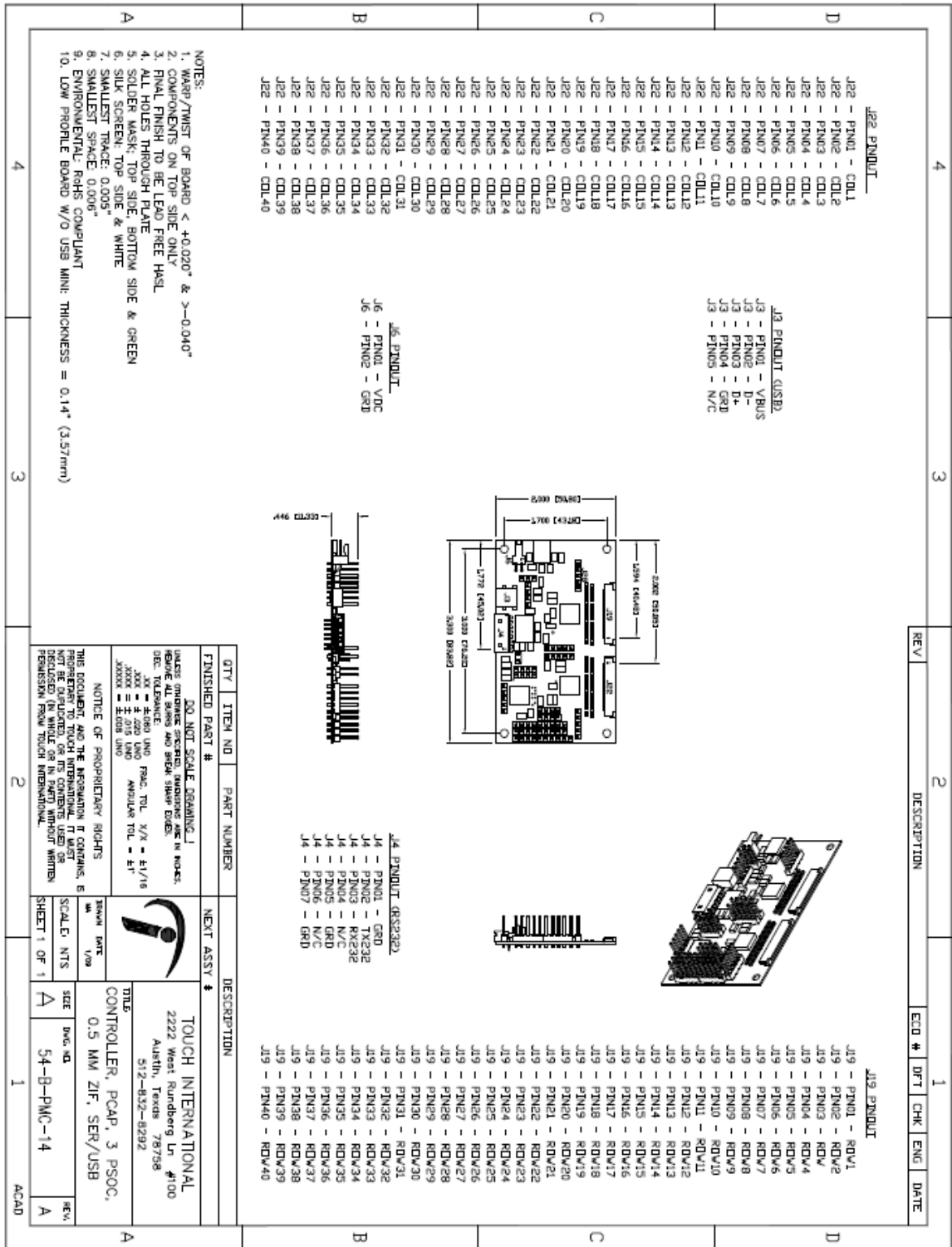
Table 2B: 54-B-PMC-14 – RS232 Data Byte Format
(Without Touch on the screen.)

	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 1	1	0	1	0	1	0	1	0
BYTE 2	1	1	1	1	1	1	1	1
BYTE 3	1	1	1	1	1	1	1	1
BYTE 4	1	1	1	1	1	1	1	1
BYTE 5	1	1	1	1	1	1	1	1
BYTE 6	-	-	-	-	-	-	-	-

BYTE 6: Message Checksum

Description: The message checksum is a one byte checksum for the message. The 1 byte sum of the following bytes should add up to zero (message start byte, message data byte and message checksum byte).

Drawing:



Ordering Information

Part Number	Description
54-B-PMC-14	Projected Capacitive Controller (3 PSoC)
<p style="text-align: center;">Contact TI sales representative for a complete list of TI's OEM and retail products.</p> <p style="text-align: center;">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>	