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**Revision History**

Rev.	Date	By	Summary	Remark
1.0	2015/05/05	Ken Hsu	New release	
1.1	2015/06/15	Ken Hsu	Correct item 2.7 Operating Voltage	
1.2	2016/09/23	Ken Hsu	Correct item 2.7 RS specification Correct item 2.8 CS specification Correct item 3.3 Interface pin definition	
1.3	2018/01/24	Ken Hsu	1. Add item 2.0 Response time 2. Correct item 3.2 Touch line pin definition 3. Correct item 2.0 Sampling rate ,change the unit from sps to Hz 4. Correct item 3.1 Mechanical size	

## 1.0 Introduction

The PenMount PM2103 control board is a high specification (Projected Capacitive Input, PCI) touch panel controller product introduced by PenMount. The PenMount PM2103 can be applied in the consumer, commercial and the industrial fields.

The PenMount PM2103 provides three types of interfaces, USB, UART and I<sup>2</sup>C and supports PCI touch panels sized from 3" to 4.9". PenMount PM2103 also supports a wide range of operating systems such as Windows and Linux.

The PenMount PM2103 was developed based on Microchip microprocessors and is paired with PenMount's in-house hardware design and firmware algorithmic mechanism. It provides high performance computing and possesses excellent anti-noise capabilities.

## 2.0 Specifications

Parameter	feature	
Controller part number	PenMount P2-06	
Number of sensing line	10	
Number of driving line	17	
Supporting projected capacitive touch panel size	Projected capacitive type, from 3" to 4.9"	
Interface	USB	Full-speed, 12Mbps
	UART	38400 baud rate / 8bit data / non parity / one stop bit / non-PnP
	I <sup>2</sup> C	Slave, support 100 / 400 kHz specifications
ADC resolution	10bits (Typical)	
Firmware resolution	2048 x 2048 (Typical)	
Response time	Average < 30ms	
Sampling rate	One point	150 Hz(Typical)
	Five points	100 Hz(Typical)
Operating voltage	+3.3Vdc ~ +5Vdc, ±5 %	
Power consumption	Working mode	40mA @ 5Vdc (Typical)
	Idle mode	20mA @ 5Vdc (Typical)
	Sleep mode	3mA @ 5Vdc (Typical)
Operating temperature	-40°C ~ +85°C	
Storage temperature	-40°C ~ +85°C	
Relative humidity range	95% RH at 60°C. RH Non-condensing	
EMS specification	RS	IEC61000-4-3 Level 3 , Criteria A
	CS	IEC61000-4-6 Level 3 , Criteria A
Watchdog Timer	Support WDT function through firmware programming	

Note :

CS and RS performance, Power consumption and sample rate will vary according to different firmware versions.



### 3.2 Touch line pin definition

<b>JF1</b>			
<b>PIN</b>	<b>Description</b>	<b>PIN</b>	<b>Description</b>
1	GND	11	Cap Drive 8
2	GND	12	Cap Drive 9
3	Cap Drive 0	13	Cap Drive 10
4	Cap Drive 1	14	Cap Drive 11
5	Cap Drive 2	15	Cap Drive 12
6	Cap Drive 3	16	Cap Drive 13
7	Cap Drive 4	17	Cap Drive 14
8	Cap Drive 5	18	Cap Drive 15
9	Cap Drive 6	19	Cap Drive 16
10	Cap Drive 7	20	GND

<b>JF2</b>			
<b>PIN</b>	<b>Description</b>	<b>PIN</b>	<b>Description</b>
1	GND	11	Cap Sense 0
2	Cap Sense 9	12	GND
3	Cap Sense 8		
4	Cap Sense 7		
5	Cap Sense 6		
6	Cap Sense 5		
7	Cap Sense 4		
8	Cap Sense 3		
9	Cap Sense 2		
10	Cap Sense 1		

### 3.3 Interface pin definition

PM2103 includes USB/I<sup>2</sup>C/UART communication interfaces, intends to maximize application flexibility and reliability, and minimizes cost through elimination of external components.

When interface setting of Firmware is auto-detection, user can select interface by Pin8 and Pin9. Please follow hardware setting as table 1 to assign interface.

<b>JF3</b>				
PIN NO.	SYMBOL	PIN ASSIGNMENT		
		USB	UART	I <sup>2</sup> C
1	VCC	VCC	VCC	VCC
2	D-	D-	N.C.	N.C.
3	D+	D+	N.C.	N.C.
4	GND	Ground	Ground	Ground
5	SCL / RXD	N.C.	RXD	SCL
6	SDA / TXD	N.C.	TXD	SDA
7	nRESET	N.C.	N.C.	N.C.
8	nDetect	N.C.	Low	Low
9	nINT	N.C.	Low	nINT
10	N/A	N.C.	N.C.	N.C.

Table 1. Interface pin assignment

Note:

- (1) N.C. is No Connection
- (2) \* means the setting of the interface selection. Leave these pins unconnected when the interface setting of firmware is fixed

Pin Name	Type	Description	Min	Typ	Max	Unit
VCC	P	Positive power supply	3.3	5		V
GND	P	Ground		0		V
D-	I/O	D- pin of internal USB transceiver		3.3		V
D+	I/O	D+ pin of internal USB transceiver		3.3		V
SCL	I/O	Serial clock line for I <sup>2</sup> C. Open drain requires external pull-up to 3.3V		3.3		V
SDA	I/O	Serial data line for I <sup>2</sup> C. Open drain requires external pull-up to 3.3V.		3.3		V
RXD	I	UART receive		3.3		V
TXD	O	UART transmit		3.3		V
nRESET	I	Open-drain and active low to reset PM103 and must be driven low for 5 μs (typical) to be valid. Leave the pin unconnected if not used.				V
nDETECT	I	Pull low when selecting I <sup>2</sup> C or UART interface		0		V
nINT	O	Processor Interrupt. This pin is active low, open drain requires external pull-up to 3.3V.		3.3		V
SW	I	Pull low for disable touch function, release this pin will back to enable touch function, Leave the pin unconnected if not used.		0		V



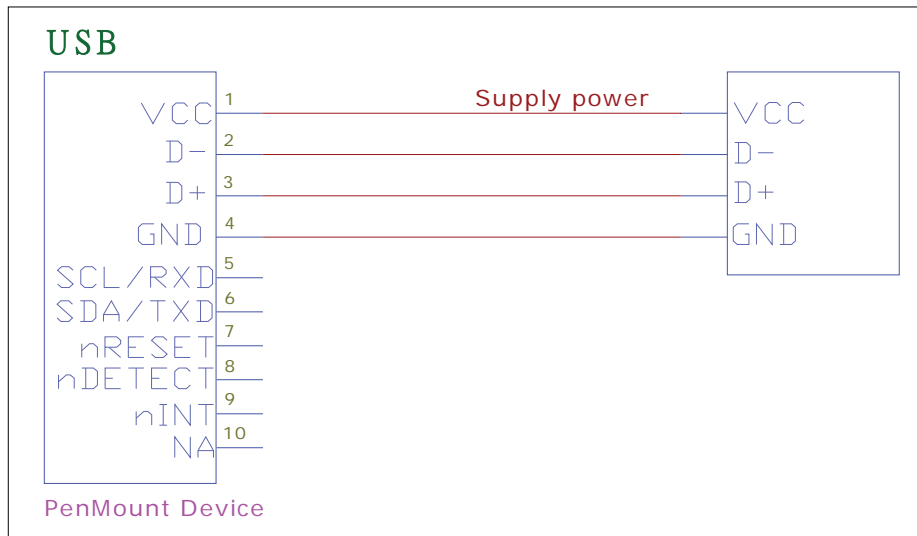


Figure 1.USB interface

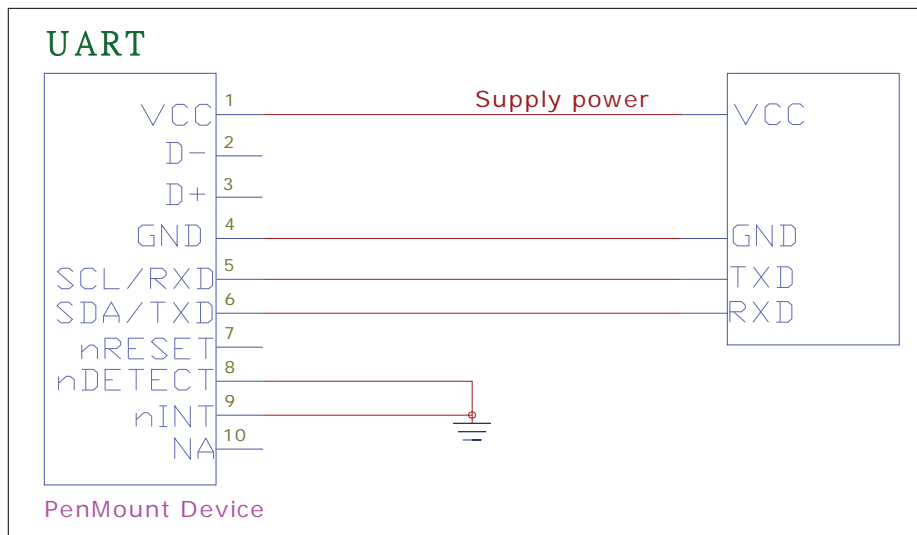


Figure 2.UART interface

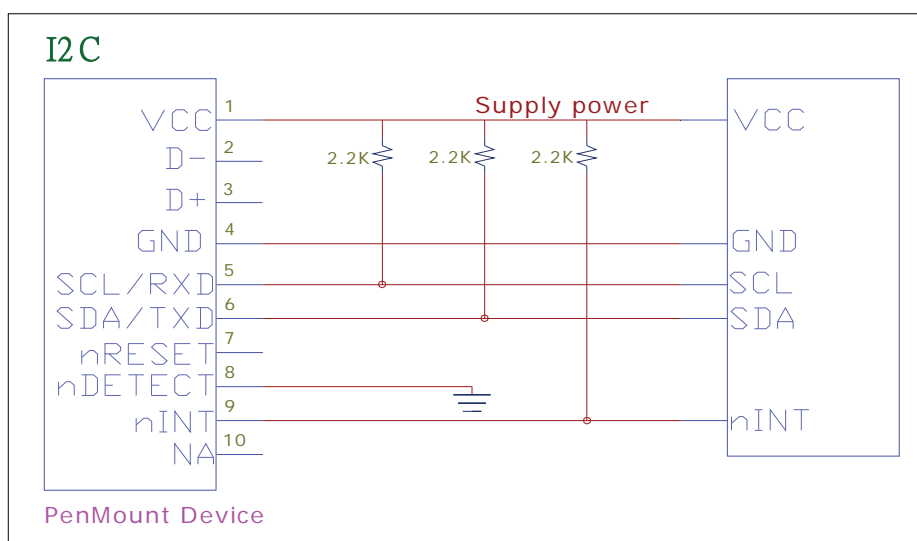


Figure 3.I2C interface

## 4.0 Drivers and Utilities

### 4.1 Drivers

For I<sup>2</sup>C:

- Windows CE : Provide binary driver for freescale iMX platform. Other platform by request.
- Linux / Android : Provide source code for integration.

For USB and UART

- Windows 2000, XP, 2003: single touch, mouse driver.
- Windows Vista: single touch, inbox driver.
- Windows 7,8,10: multi touch, Inbox driver.
- Linux: Ubuntu, Android, other Linux distributions under development.  
(Provide source code for integration if any)

### 4.2 Utilities

Firmware adjustment utility allows user to fine tune the touch panel sensitivity.

Note:

All drivers and utilities are available on PenMount websites. Please contact us for further information.

## 5.0 Others

### 5.1 ROHS compliance

This control board is ROHS compliant

### 5.2 EMC protection recommendations

Please refer to PCI touch screen integration guides.

### 5.3 Noise Protection

To achieve good noise interference protection capabilities, PenMount requires paired interface cables possess comprehensive EMI shielding.