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## Revision history

| Rev. | Date        | By      | Summary   | Remark |
|------|-------------|---------|---|--------|
| 1.0  | 2015.09.16  | Kenhsu  | New Release   |        |
| 1.1  | 2015/12/22  | Ken Hsu | Operation temperature modified  |        |
| 1.2  | 2016/03/11  | Ken Hsu | Correct item 3.2 Interface pin definition   |        |
| 1.3  | 2.016/05/11 | Ken Hsu | Correct item 2.10 Operating temperature<br>Add item 2.12 Operating or Storage Humidity<br>Range<br>Add item 2.5 Firmware Resolution |        |
| 1.4  | 2016/11/18  | Ken Hsu | Correct item 3.3 Interface pin definition   |        |
|      |             |         |   |        |

## 1.0 Induction

The PenMount PM1210 control board is a high specification (Projected Capacitive Input, PCI) touch panel controller product introduced by PenMount. The PenMount PM1210 can be applied in the consumer, commercial and industrial fields.

The PenMount PM1210 provides four types of interfaces, USB、I<sup>2</sup>C、UART and RS232 and supports PCI touch panels sized from 5" to 7.9". The PenMount PM1210 also supports a wide range of operating systems such as Windows and Linux.

The PenMount PM1210 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.

There are five connectors on this board: 50 Pins ZIF connectors for PCI touch screen FPC cables, one USB connector for 4-pin USB cable (optional), and one I<sup>2</sup>C/UART connector for 7-pin I<sup>2</sup>C cable (optional), and one RS232 connector for 5-pin RS232 cable (optional)

## PenMount PM1210 PCI Controller Board Data Sheet

### 2.0 Specifications

#### 2.1 Controller part number:

PenMount P2-06 x 1pcs

#### 2.2 Supporting projected capacitive touch panel size

Projected capacitive type, from 5" to 7.9"

#### 2.3 Interface: USB, I<sup>2</sup>C, UART, RS-232

USB,Full-speed, 12Mbps

UART,RS-232 Interface 38400 baud rate / 8bit data / non parity / one stop bit / non-PnP

I<sup>2</sup>C,Slave, support 400 kHz specifications

#### 2.4 ADC resolution

10bits

#### 2.5 Firmware resolution

2048 x 2048 (Typical)

#### 2.6 Max touch line

24 Driving lines (Tx), 15 Sensing lines (Rx)

#### 2.7 Sampling rate

One finger touch 160 sps(Typ.) / Five fingers touch 100 sps(Typ.)

#### 2.8 Operating voltage

+5Vdc, ±5 %

#### 2.9 Power consumption

Working Mode : 41.0mA @ 5Vdc, Idle Mode : 23.5mA @ 5Vdc, Sleep Mode : 2.9mA @ 5Vdc

#### 2.10 Operating temperature

-40°C ~ +85°C

#### 2.11 Storage temperature

-40°C ~ +85°C

#### 2.12 Relative humidity range

95% RH at 60°C. RH Non-condensing

#### 2.13 RS specification

IEC61000-4-3 Level 3 , Criteria A, dual touch points.

#### 2.14 CS specification

IEC61000-4-6 Level 3 , Criteria A, dual touch points.

#### Note :

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



### 3.2 Touch line pin definition

| JL4 50Pin ZIF , PH 0.5mm ; HRS FH52-50S-05SH |              |     |               |     |               |     |              |
|--|--------------|-----|---------------|-----|---------------|-----|--------------|
| PIN  | Description  | PIN | Description   | PIN | Description   | PIN | Description  |
| 1  | Ground       | 14  | Cap Drive X10 | 27  | Cap Drive X23 | 40  | Cap Sense Y6 |
| 2  | Ground       | 15  | Cap Drive X11 | 28  | NC            | 41  | Cap Sense Y5 |
| 3  | NC           | 16  | Cap Drive X12 | 29  | Ground        | 42  | Cap Sense Y4 |
| 4  | Cap Drive X0 | 17  | Cap Drive X13 | 30  | Ground        | 43  | Cap Sense Y3 |
| 5  | Cap Drive X1 | 18  | Cap Drive X14 | 31  | NC            | 44  | Cap Sense Y2 |
| 6  | Cap Drive X2 | 19  | Cap Drive X15 | 32  | Cap Sense Y14 | 45  | Cap Sense Y1 |
| 7  | Cap Drive X3 | 20  | Cap Drive X16 | 33  | Cap Sense Y13 | 46  | Cap Sense Y0 |
| 8  | Cap Drive X4 | 21  | Cap Drive X17 | 34  | Cap Sense Y12 | 47  | NC           |
| 9  | Cap Drive X5 | 22  | Cap Drive X18 | 35  | Cap Sense Y11 | 48  | NC           |
| 10   | Cap Drive X6 | 23  | Cap Drive X19 | 36  | Cap Sense Y10 | 49  | NC           |
| 11   | Cap Drive X7 | 24  | Cap Drive X20 | 37  | Cap Sense Y9  | 50  | Ground       |
| 12   | Cap Drive X8 | 25  | Cap Drive X21 | 38  | Cap Sense Y8  |     |              |
| 13   | Cap Drive X9 | 26  | Cap Drive X22 | 39  | Cap Sense Y7  |     |              |

### 3.3 Interface pin definition

PM1210 includes USB/I2C/UART/RS232 communication interfaces, intends to maximize application flexibility and reliability, and minimizes cost through elimination of external components.

| JL1 / 4PIN / ACES 50224-00401-001 |     |                                    |     |     |     |      |
|-----------------------------------|-----|------------------------------------|-----|-----|-----|------|
| PIN NO.                           | USB | Description                        | Min | Typ | Max | Unit |
| 1                                 | VCC | Positive power supply              |     | 5   |     | V    |
| 2                                 | D-  | D- pin of internal USB transceiver |     | 3.3 |     | V    |
| 3                                 | D+  | D+ pin of internal USB transceiver |     | 3.3 |     | V    |
| 4                                 | GND | Ground                             |     | 0   |     | V    |

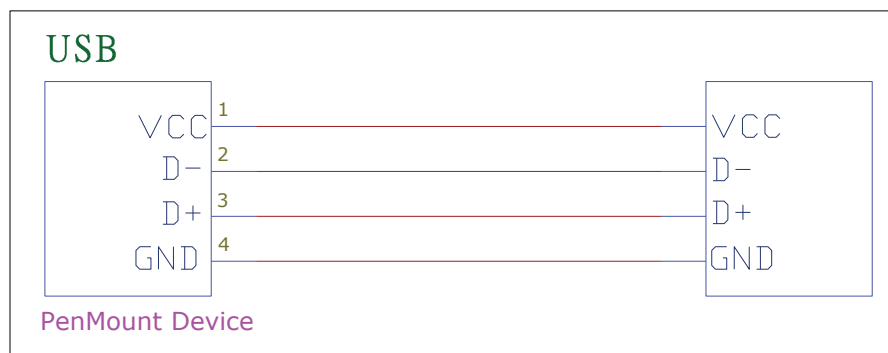


Figure1 USB interface

| JL2 / 5PIN / ACES 50224-00501-001 |       |                       |       |     |       |      |
|-----------------------------------|-------|-----------------------|-------|-----|-------|------|
| PIN NO.                           | RS232 | Description           | Min   | Typ | Max   | Unit |
| 1                                 | VCC   | Positive power supply |       | 5   |       | V    |
| 2                                 | RXD   | RS232 receive         | -25   |     | +25   | V    |
|                                   |       | input threshold low   | 0.8   | 1.5 |       |      |
|                                   |       | input threshold high  |       | 1.8 | 2.4   |      |
| 3                                 | TXD   | RS232 transmit        | -13.2 |     | +13.2 | V    |
|                                   |       | output threshold low  |       |     | 0.4   |      |
|                                   |       | output threshold high | 4.4   | 4.9 |       |      |
| 4                                 | GND   | Ground                |       | 0   |       | V    |
| 5                                 | GND   | Ground                |       | 0   |       | V    |

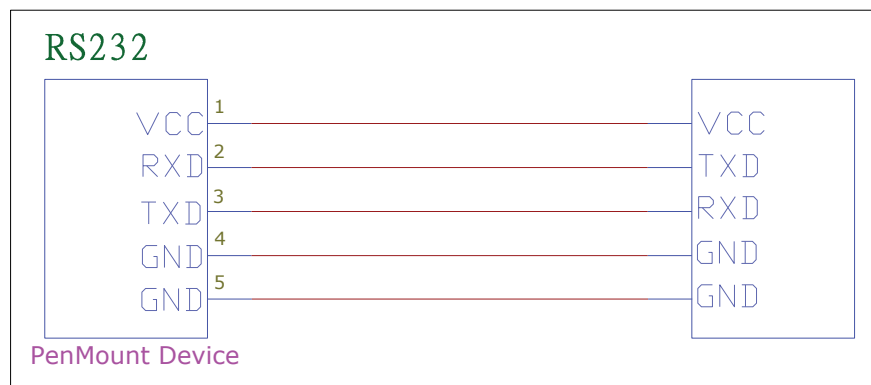


Figure2 RS232 interface



| JL3 / 7PIN ; ACES 50224-00701-001 |           |                  |        |
|-----------------------------------|-----------|------------------|--------|
| PIN NO.                           | SYMBOL    | PIN ASSIGNMENT   |        |
|                                   |           | I <sup>2</sup> C | UART   |
| 1                                 | VCC       | VCC              | VCC    |
| 2                                 | GND       | Ground           | Ground |
| 3                                 | SCL / RXD | SCL              | RXD    |
| 4                                 | SDA / TXD | SDA              | TXD    |
| 5                                 | nRESET    | N.C.             | N.C.   |
| 6                                 | nDetect   | Low              | Low    |
| 7                                 | nINT      | nINT             | Low    |

| PIN NO. | Type | Description  | Min | Typ | Max | Unit |
|---------|------|--|-----|-----|-----|------|
| VCC     | P    | Positive power supply  |     | 5   |     | V    |
| GND     | P    | Ground   |     | 0   |     | V    |
| SCL     | I/O  | Serial data line for I2C. Open drain requires external pull-up to 3.3V.  |     | 3.3 |     | V    |
| SDA     | I/O  | Serial clock line for I2C. 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 PM1210 and must be driven low for 5 $\mu$ s (typical) to be valid. Leave the pin unconnected if not used. |     |     |     | V    |
| nDETECT | I    | Pull low when selecting I2C 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    |

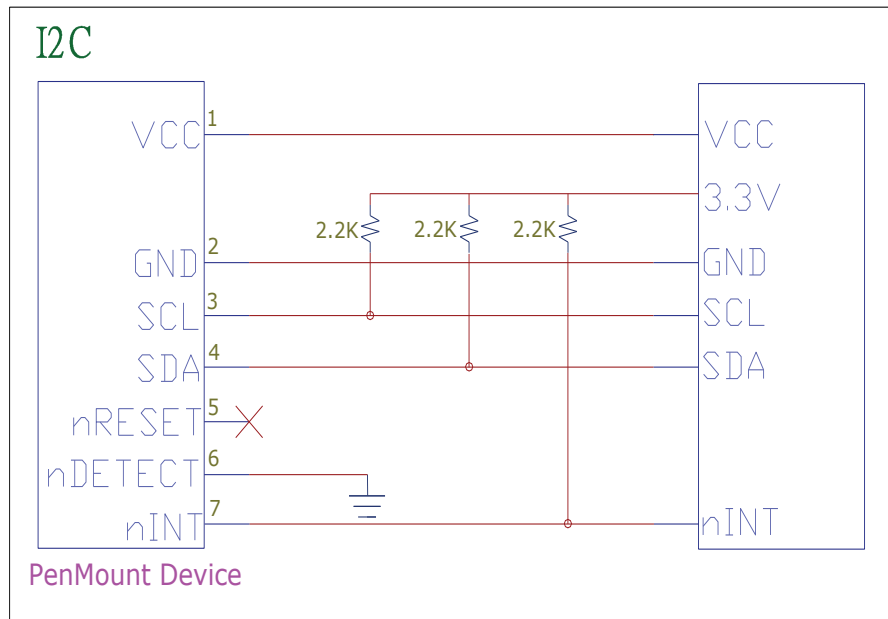


Figure3 I2C interface

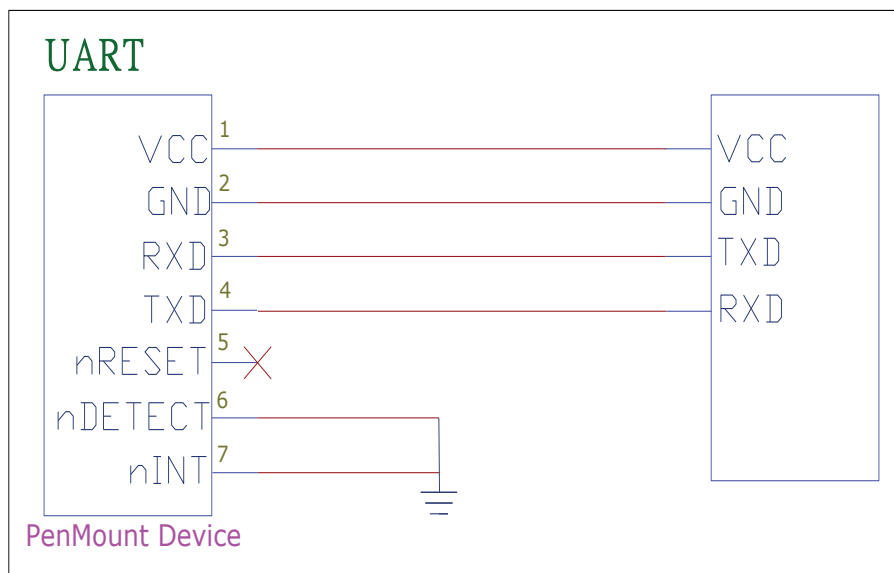
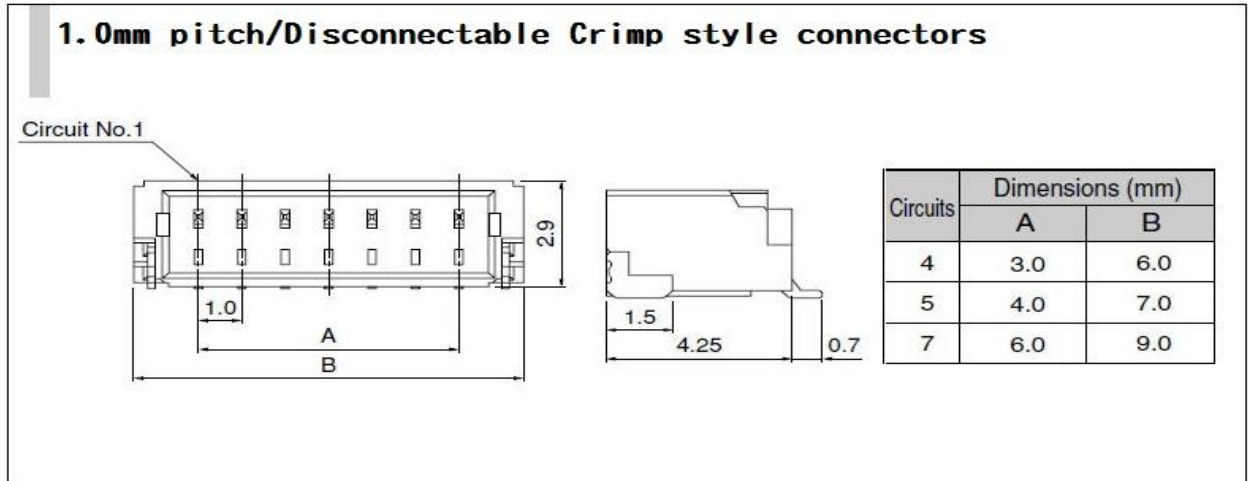


Figure4 UART interface

### 3.4 Connector specifications



## 4.0 Drivers and utilities

### 4.1 Drivers

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

- Windows CE : Binary driver for freescale iMX platform. Other platform by request.
- Linux / Android : Source code for integration.

For USB

- Windows 2000, XP, 2003: single touch, mouse driver.
- Windows Vista: single touch, inbox driver.
- Windows 7,8,10: five touch, Inbox driver.
- Linux: Ubuntu, Android, other versions of Linux support, please refer PenMount website

For UART / RS-232

- Windows 2000, XP, 2003: single touch, mouse driver.
- Windows Vista: single touch, digitizer driver.
- Windows 7,8,10: 5 touches support, digitizer driver.
- Linux: inbox driver after kernel 3.2, provide source code for kernel 2.6

(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.

The cable should have a woven or spirally copper shield with 360 ° shield coverage

The shield must be terminated to the receptacle and be connected to ground plane carefully.

Below is an example for 4-pin USB cable diagram. For other implementation, please follow the same design rules.

