# PenMount PM2504
# PCAP Control Board Datasheet

Version 1.0
2021/3/16

## Table of contents



## Revision history

| Rev. | Date | By | Summary | Remark |
|---|---|---|---|---|
| 1.0 | 2021/3/16 | Willi | New Release | |
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## 1.0 Introduction

The PenMount PM2504 control board is a high specification (Projected Capacitive Input, PCAP) touch panel controller product introduced by PenMount. The PenMount PM2504 can be applied in the consumer, commercial and the industrial fields.

The PenMount PM2504 provides USB and I²C interfaces and supports PCAP touch panels sized from 8.4” to 12.1”. PenMount PM2504 also supports a wide range of operating systems such as Windows and Linux.

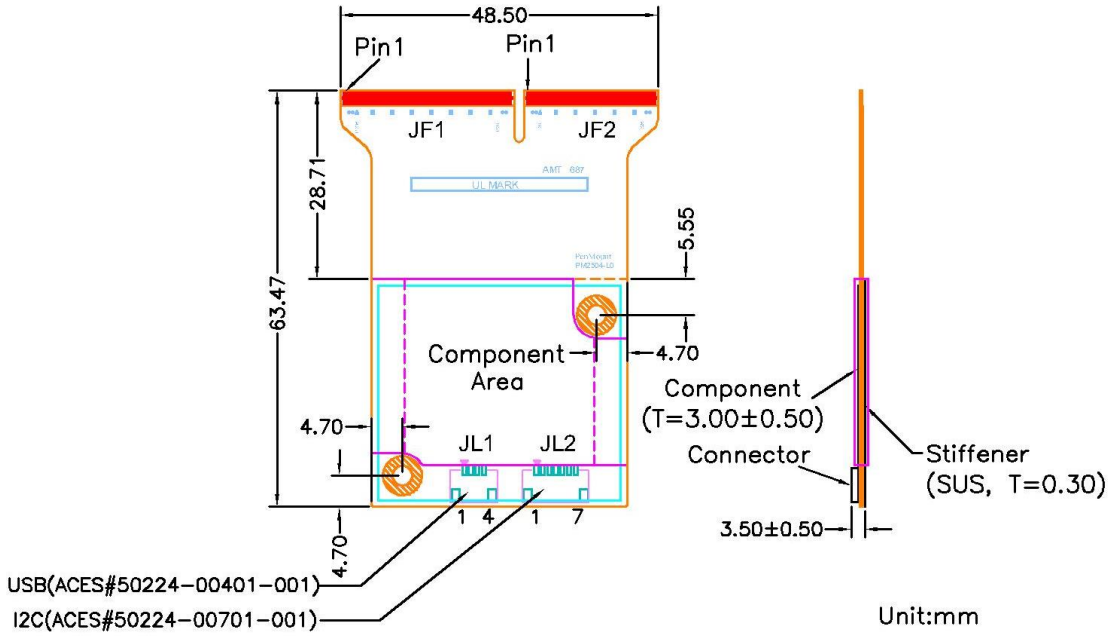
## 2.0 Specifications

| Parameter | | feature |
|---|---|---|
| Controller part number | | PenMount K1-01 |
| Number of sensing line | | 37 |
| Number of driving line | | 27 |
| Supporting projected capacitive touch panel size | | Projected capacitive type, from 8.4" to 12.1" |
| Interface | USB | 12Mbps full-speed and 1.5Mbps low-speed |
| | I²C | 100kHz standard mode and 400kHz fast mode |
| Firmware resolution | | 16384 x 9600 (Typical) |
| Response time | | Average < 40ms |
| Sampling rate | One point | 110 Hz(Typical) |
| | Ten points | 110 Hz(Typical) |
| Operating voltage | | USB: 4.75~5.25Vdc<br>I²C: 2.97~3.4Vdc |
| Power consumption | Working mode | 145mA @ 5Vdc (Typical) |
| | Idle mode | 45mA @ 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 |

Note :
CS and RS performance, power consumption, response time and sample rate will vary according to different firmware versions and parameter settings.

## 3.0 Mechanical drawing

### 3.1 Mechanical size

### 3.2 Touch line pin definition

| JF1 | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | NC | 12 | Rx28 | 23 | Rx17 | 34 | Rx6 |
| 2 | System_GND | 13 | Rx27 | 24 | Rx16 | 35 | Rx5 |
| 3 | Guard Ring | 14 | Rx26 | 25 | Rx15 | 36 | Rx4 |
| 4 | Rx36 | 15 | Rx25 | 26 | Rx14 | 37 | Rx3 |
| 5 | Rx35 | 16 | Rx24 | 27 | Rx13 | 38 | Rx2 |
| 6 | Rx34 | 17 | Rx23 | 28 | Rx12 | 39 | Rx1 |
| 7 | Rx33 | 18 | Rx22 | 29 | Rx11 | 40 | Rx0 |
| 8 | Rx32 | 19 | Rx21 | 30 | Rx10 | 41 | Guard Ring |
| 9 | Rx31 | 20 | Rx20 | 31 | Rx9 | 42 | System_GND |
| 10 | Rx30 | 21 | Rx19 | 32 | Rx8 | 43 | NC |
| 11 | Rx29 | 22 | Rx18 | 33 | Rx7 | | |

| JF2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| PIN | Description | PIN | Description | PIN | Description | PIN | Description |
| 1 | NC | 10 | Tx6 | 19 | Tx15 | 28 | Tx24 |
| 2 | System_GND | 11 | Tx7 | 20 | Tx16 | 29 | Tx25 |
| 3 | Guard Ring | 12 | Tx8 | 21 | Tx17 | 30 | Tx26 |
| 4 | Tx0 | 13 | Tx9 | 22 | Tx18 | 31 | Guard Ring |
| 5 | Tx1 | 14 | Tx10 | 23 | Tx19 | 32 | System_GND |
| 6 | Tx2 | 15 | Tx11 | 24 | Tx20 | 33 | NC |
| 7 | Tx3 | 16 | Tx12 | 25 | Tx21 | | |
| 8 | Tx4 | 17 | Tx13 | 26 | Tx22 | | |
| 9 | Tx5 | 18 | Tx14 | 27 | Tx23 | | |

### 3.3 Interface pin definition

PM2504 includes USB/I²C 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 | USB_5V | Positive power supply | 4.75 | 5 | 5.25 | V |
| 2 | D- | D- pin of internal USB transceiver | | 3.3 | | V |
| 3 | D+ | D+ pin of internal USB transceiver | | 3.3 | | V |
| 4 | System_GND | Ground | | 0 | | V |

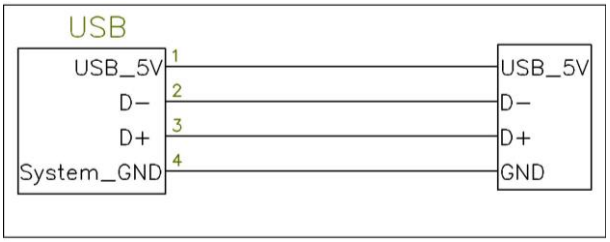



Figure1 USB interface

| JL2 / 7PIN / ACES#50224-00701-001 | | | | | | |
|---|---|---|---|---|---|---|
| PIN NO. | I²C | Description | Min | Typ | Max | Unit |
| 1 | VCC | Positive power supply | 2.97 | 3.3 | 3.4 | V |
| 2 | System_GND | Ground | | 0 | | V |
| 3 | SDA | Serial data line for I²C. Open drain requires external pull-up to 3.3V. | | 3.3 | | V |
| 4 | SCL | Serial clock line for I²C. Open drain requires external pull-up to 3.3V | | 3.3 | | V |
| 5 | INT | Processor Interrupt. This pin is active low, open drain requires external pull-up to 3.3V. | | | | V |
| 6 | NC | | | | | |
| 7 | TP_EN | Chip reset signal.<br>Normal: High, Active Reset: Low | | 3.3 | | V |

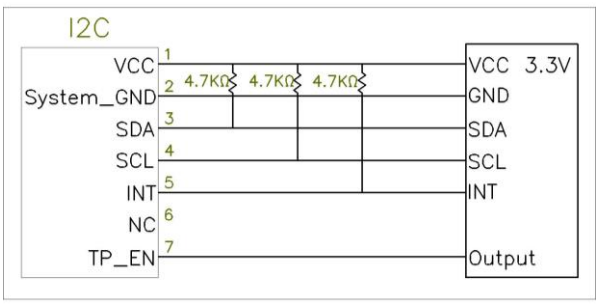
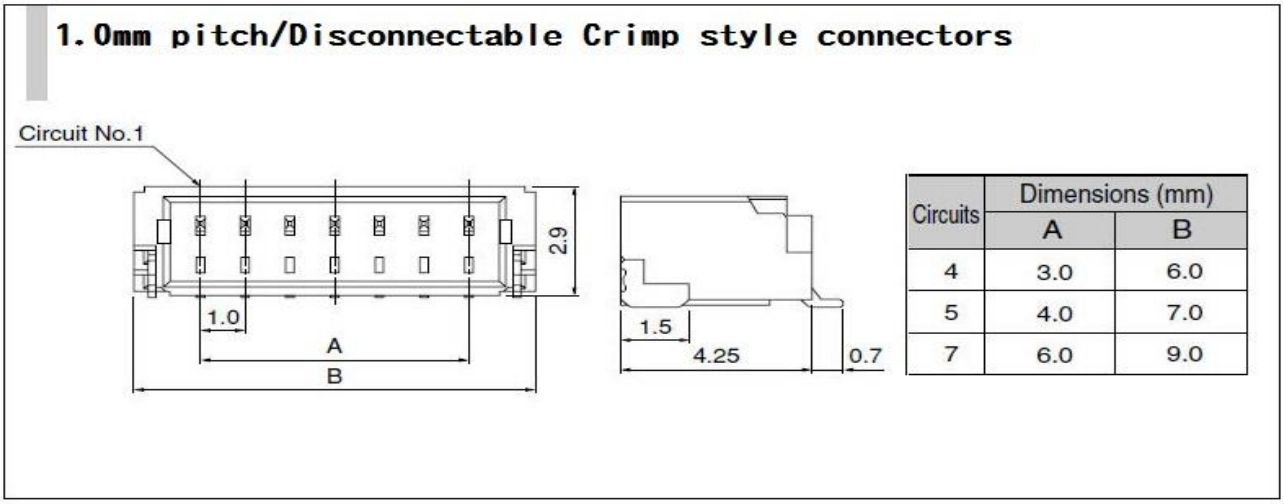



Figure2 I²C interface

### 3.4 Connector specifications




| Circuits | Dimensions (mm) | |
|---|---|---|
| | A | B |
| 4 | 3.0 | 6.0 |
| 5 | 4.0 | 7.0 |
| 7 | 6.0 | 9.0 |

## 4.0 Drivers and Utilities

### 4.1 Drivers

**For I²C:**

- Windows 8,10: HID over I2C protocol.
- Linux / Android : provide source code for integration.

**For USB**

- Windows 7,8,10: multi touch, Inbox driver.
- Linux: inbox driver after kernel 3.0.8, provide source code for kernel 2.6.32 ~ 3.0.8.

Note:

Please contact us for further information.

### 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 PCAP 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 360º 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.