P3007-02A /P3007-01A
P3008-02A/ P3008-0GA/ P3008-01A
Projected Capacitive Touch Solution
Datasheet

Rev. : 1.1
Released date: 2013/08/22

Preface

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Revision Table

Date	Revision	Changes
2012/11/02	0.0	Initial Release
2013/04/19	1.0	Modify Power Consumption
2013/08/22	1.1	Added PM1302 control board & control board system block diagram

Table of Content

Chapter 1: Scope

1.1 Products

The 8.4” and 10.4” projected capacitive touch panels (AMT named it as ‘PCI’) with PenMount control boards, their part no. are:

- P3007-02A: 8.4” PCI with 1.1mm plain glass on top
- P3007-01A: 8.4” PCI without top glass, this item is only offered to specific partners
- P3008-02A:10.4” PCI with 1.1mm plain glass on top
- P3008-0GA:10.4” PCI with 1.8mm décor glass on top
- P3008-01A:10.4” PCI without top glass, this item is only offered to specific partners

The above touch panels are used the same PenMount control board, the part no. of this control board is PenMount 1300A (AMT named it as PM1300A) and PenMount 1302 (AMT named it as PM1302).

1.2 Part no. Definition

The entire part number of this PCI products is presented as 92-P30nn-xyz, code “nn” is the sequence number of AMT standard stock PCI items and the last 3 codes of the part number represent which types of controller/ glass/version are used and they are shown as follows:

92 - P 3 0 n n - x y z

x Code	Description
0	Use PenMount control board

y Code	Description
1	No top glass on the PCI touch
2	Use AMT defined plain glass
G	Use décor glass

z Code	Description
A	Version

For example, if the product part no. is P3007-02A, the last three codes represent that PenMount control board, AMT defined plain glass and version A are used in this product.

1.3 Serial no. Identification

The serial no. below is an example from a 8.4” touch panel. The sticker is on the PCI tail side, it shows the serial no. of this PCI touch panel as the picture below, it contains one letter and 15 digits for projected capacitive touch panels. The example below explains the serial no. representations of AMT’s products:

1 Part no. P3007	2 Which types of contoller / glass / version are used (refer to section 1.2)	3 Production Year, 2012	4 Production Week, week 29	5 Serial numbers

Chapter 2: Product Specifications

2.1 Mechanical Specification

Touch Panel Mechanical Specification:

Touch Panel Part No.	P3007-02A	P3007-01A	P3008-02A	P3008-01A	P3008-0GA
Touch Panel Size	8.4”		10.4”		
Total Thickness (mm)	1.70 ± 0.2	0.6± 0.2	1.70 ± 0.2	0.6± 0.2	2.40 ± 0.2
Thickness of Top glass (mm)	1.1	n/a	1.1	n/a	1.8
Outside Dimension LxW (mm)	192.90x153.30	191.90x152.30	228.20x180.10	227.20x179.10	251.03x202.42
View Area LxW (mm)	179.40x136.80		212.03x159.42		211.03x158.42
Active Area LxW (mm)	178.40x135.80		211.03x158.42		
Surface Finish	Clear Type	n/a	Clear Type	n/a	Clear Type
Haze	<3%				
Light Transmission rate	87 ± 3%				
Construction	GFFF	AFFF	GFFF	AFFF	GFFF

Note: n/a: Not Available AFFF: OCA-Film-Film-Film GFFF: Glass-Film-Film-Film

PM1300A Control Board Mechanical Specification:

Control Board Part No.	PM1300A Control Board
Support Touch Screen Size	For 8” to 10.4" PCI
Touch Controller	PenMount P2-04 * 1 pcs
Connector pins	Two 40 pins +40 pins ZIF connector for PCI touch screen FPC tail, one USB connector for 4-pin USB cable
Mechanical Size L*W (mm)	40 x 70
Max. support Sensing Lines	23
Max. support Driving Lines	30
EMC Spec.	IEC61000-4-3 Level 2 certified. (RS: Passed 3V/m testing) IEC61000-4-6 Level 2 certified. (CS: Passed 3Vrms testing)

PM1302 Control Board Mechanical Specification:

Control Board Part No.	PM1300A Control Board
Support Touch Screen Size	For 8” to 10.4" PCI
Touch Controller	PenMount P2-04 * 1 pcs
Connector pins	Two 40 pins +40 pins ZIF connector for PCI touch screen FPC tail, one USB connector for 4-pin USB cable (optional) , and one RS232 connector for 5-pin RS232 cable (optional) , and one I²C connector for 7-pin I²C cable (optional)
Mechanical Size L*W (mm)	40 x 70
Max. support Sensing Lines	23
Max. support Driving Lines	30
EMC Spec.	IEC61000-4-3 Level 3 certified. (RS: Passed 10V/m testing) IEC61000-4-6 Level 3 certified. (CS: Passed 10Vrms testing)

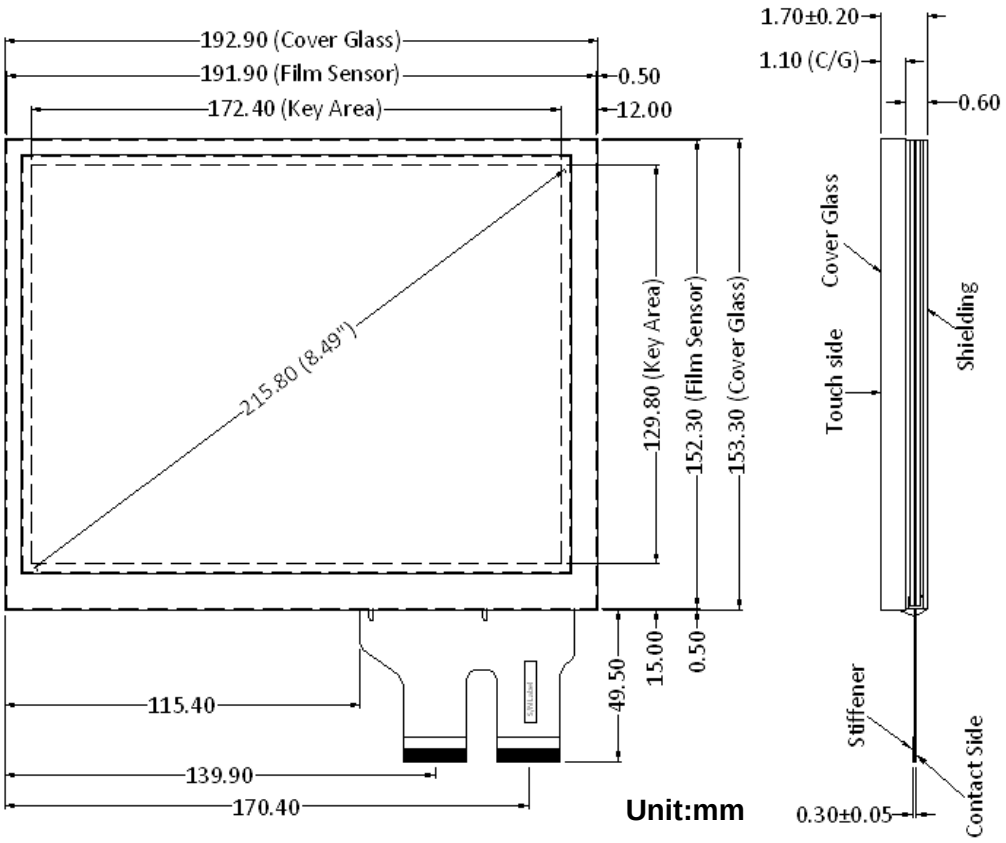
2.2 Mechanical Dimension

The followings are the drawings of P3007-02A, P3007-01A, P3008-02A, P3008-0GA, P3008-01A and PM1300A control board. If you need more detailed drawings or information, please visit our website and choose “support & download”, click on the item you need and then download.

2.2.1 Touch Panel Mechanical Drawing and Real Product View

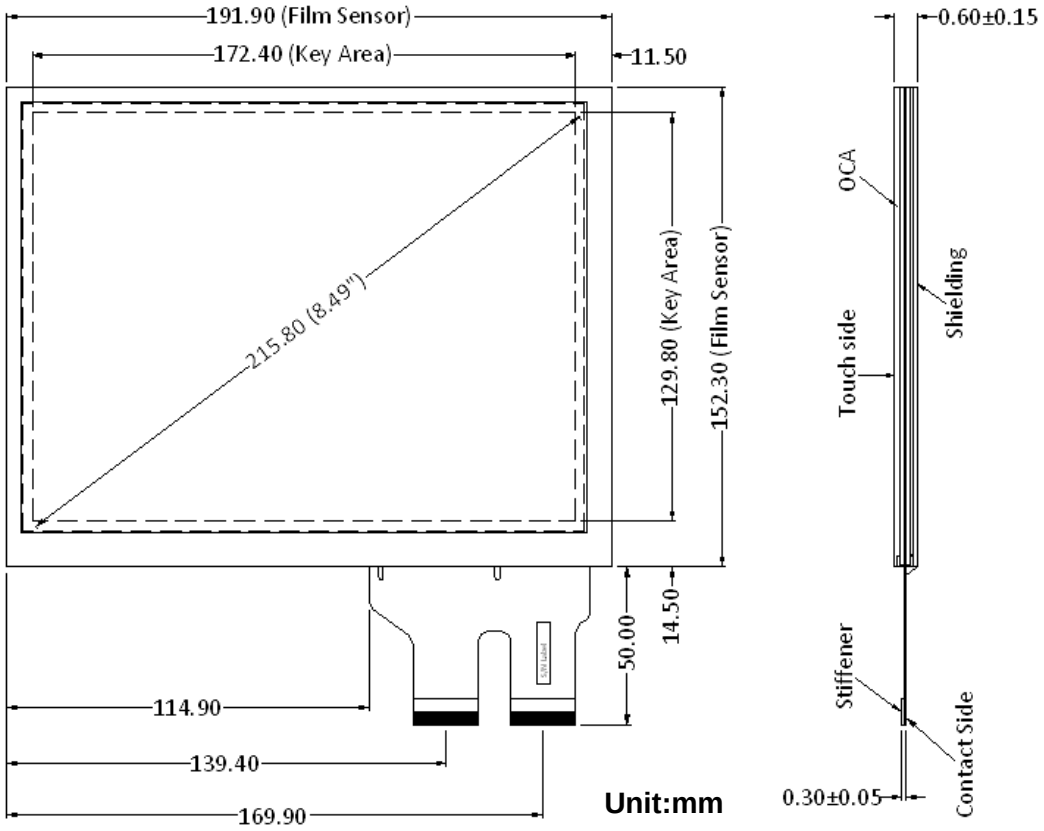
P3007-02A : 8.4” PCI with 1.1mm top glass

Front View



P3007-01A : 8.4” PCI without top glass

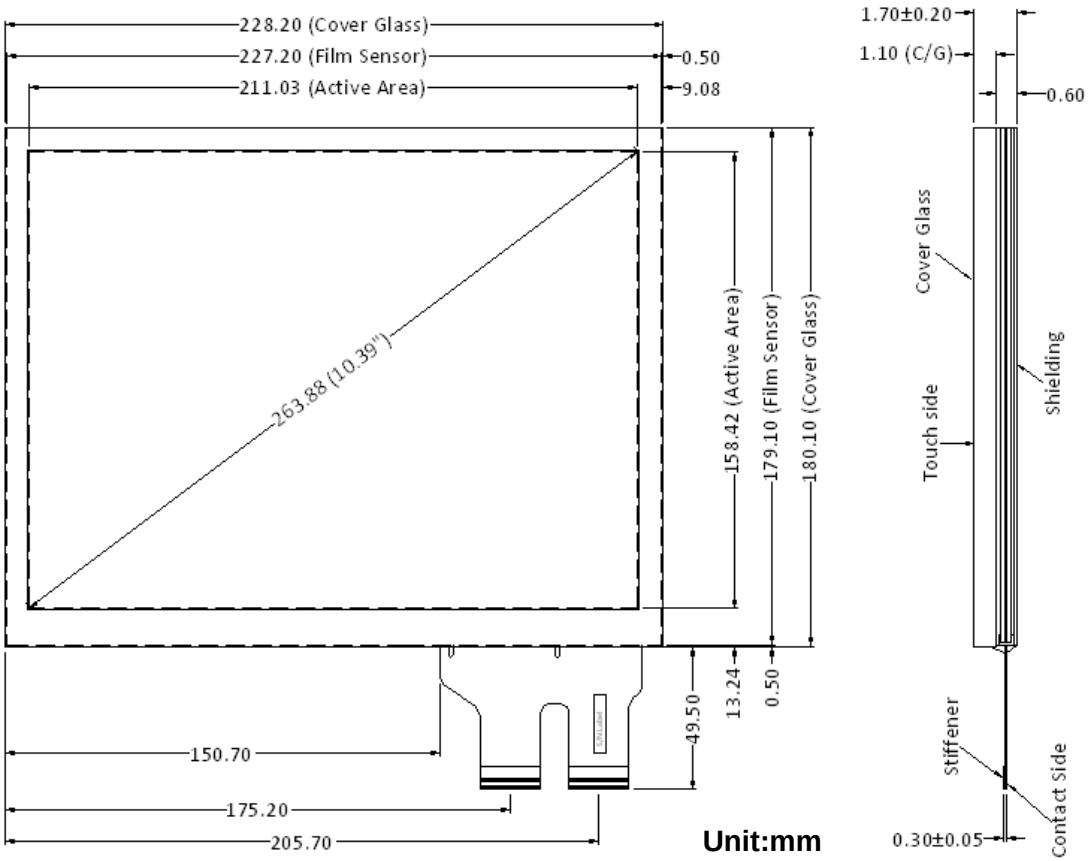
Front View



Remark: Item P3007-01A is only available for AMT’s selected partners.

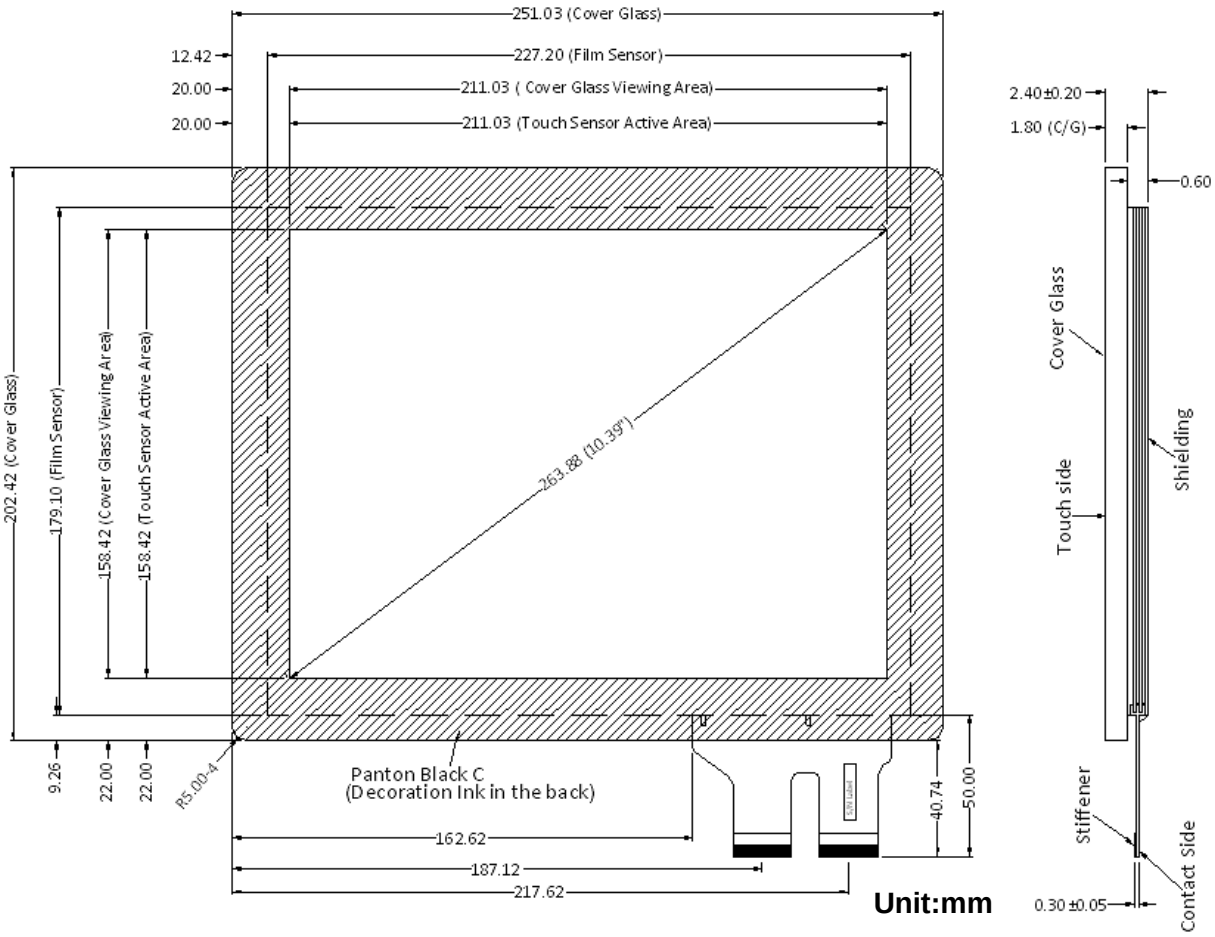
P3008-02A: 10.4” PCI with 1.1mm top glass

Front View



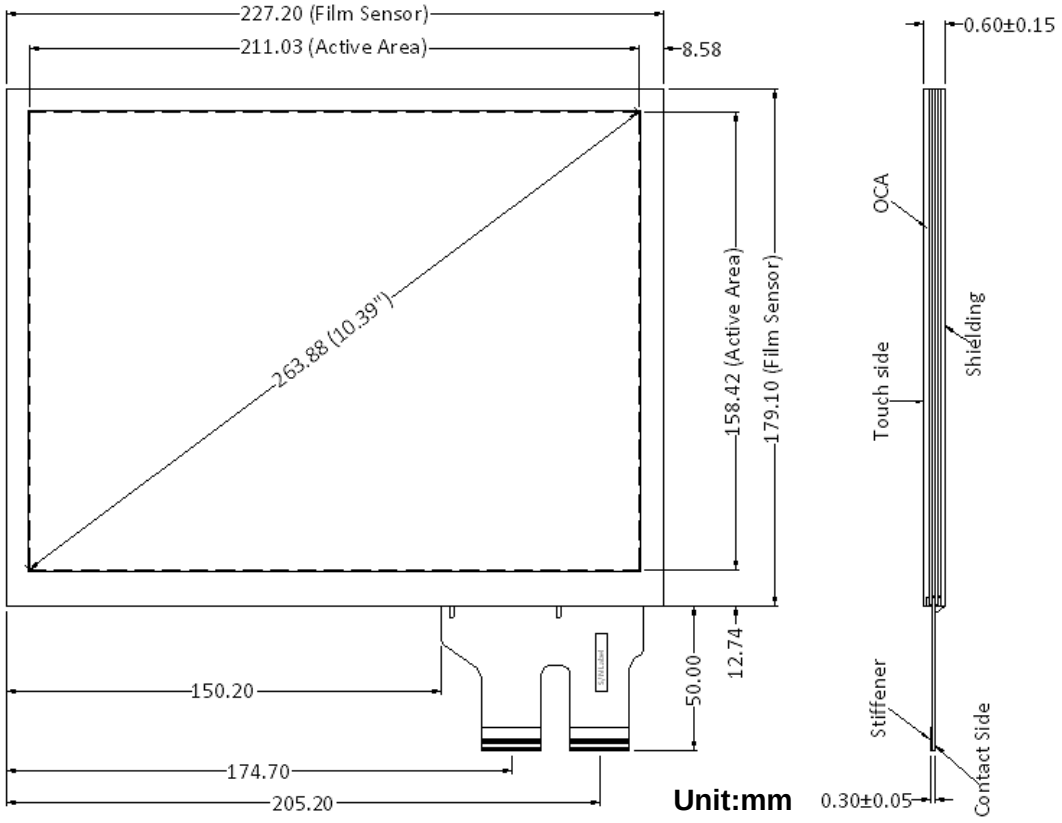
P3008-0GA : 10.4” PCI with 1.8mm black printed glass

Front View



P3008-01A : 10.4” PCI without top glass

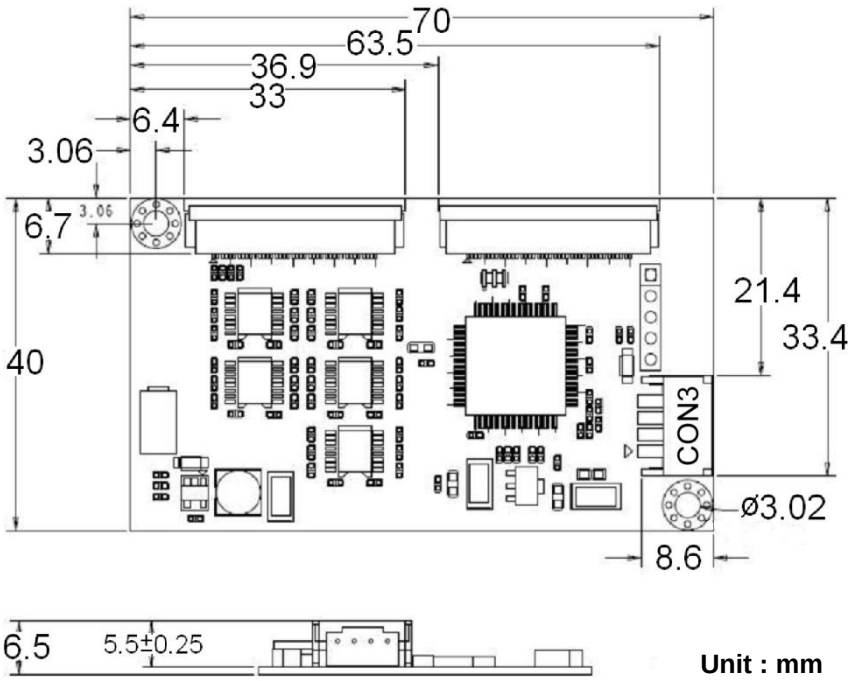
Front View



Remark: Item P3008-01A is only available for AMT’s selected partners.

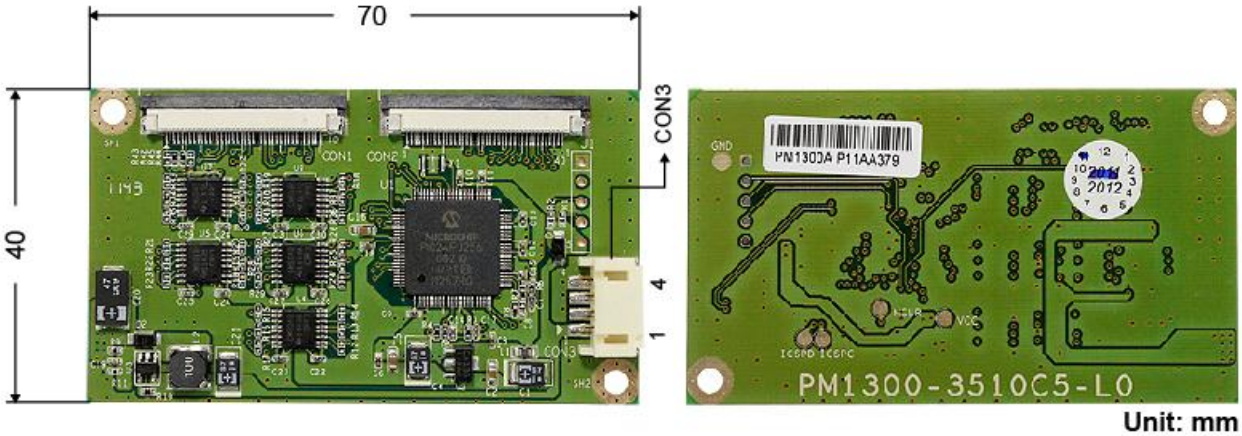
2.2.2 PM1300A Control Board Mechanical Size and Rear/ Front View

Mechanical Size



Unit : mm

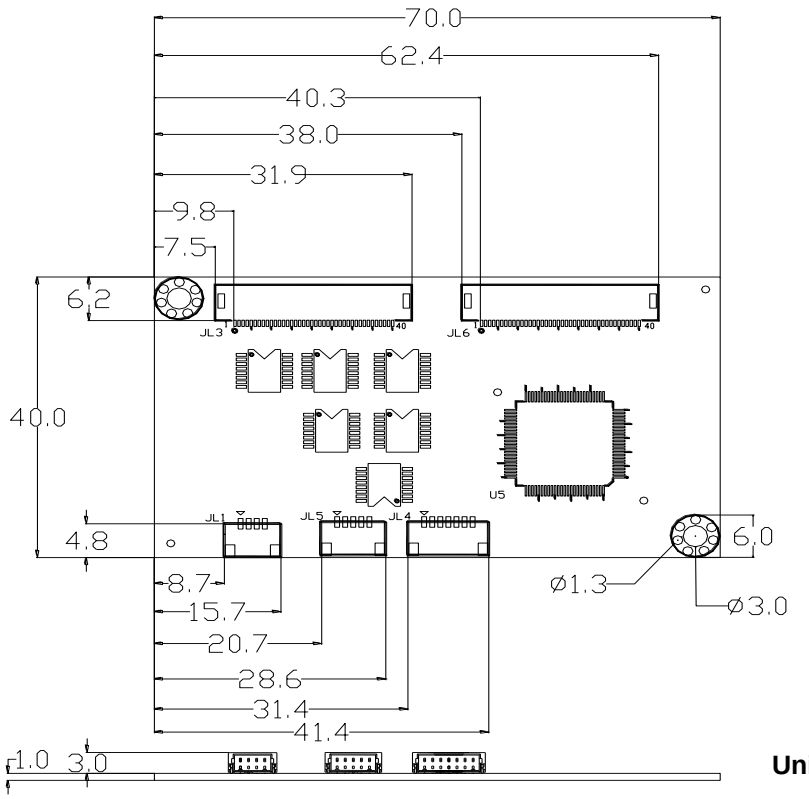
Front View *Rear View*



Unit: mm

2.2.3 PM1302 Control Board Mechanical Size and Rear/ Front View

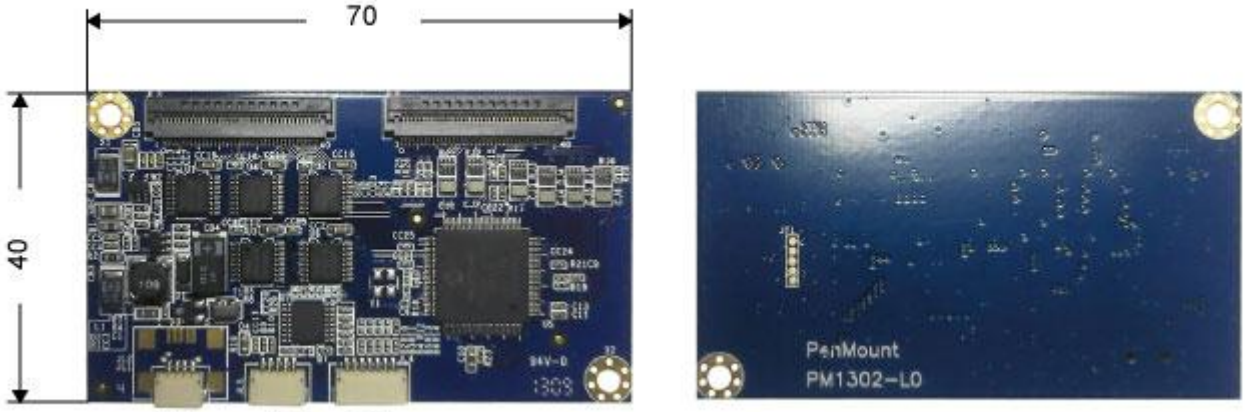
Mechanical Size



Unit : mm

Front View

Rear View



Unit : mm

Chapter 3: PM1300A & PM1302 Control Board Hardware Specifications

3.1 PM1300A Interface Specifications

There are three connectors on this board: two 40 Pins ZIF connectors for PCI touch screen FPC cable, one USB connector for 4-pin USB cable (optional), the pin definition is set as below:

CON3 / 4PIN / USB	
PIN NO.	DESIGNATION
1	5VIN
2	D-
3	D+
4	Ground

3.2 PM1302 Interface Specifications

There are five connectors on this board: two 40 Pins ZIF connectors for PCI touch screen FPC cable, one USB connector for 4-pin USB cable (optional) , and one RS232 connector for 5-pin RS232 cable (optional) , and one I²C connector for 7-pin I²C cable (optional), the pin definition is set as below:

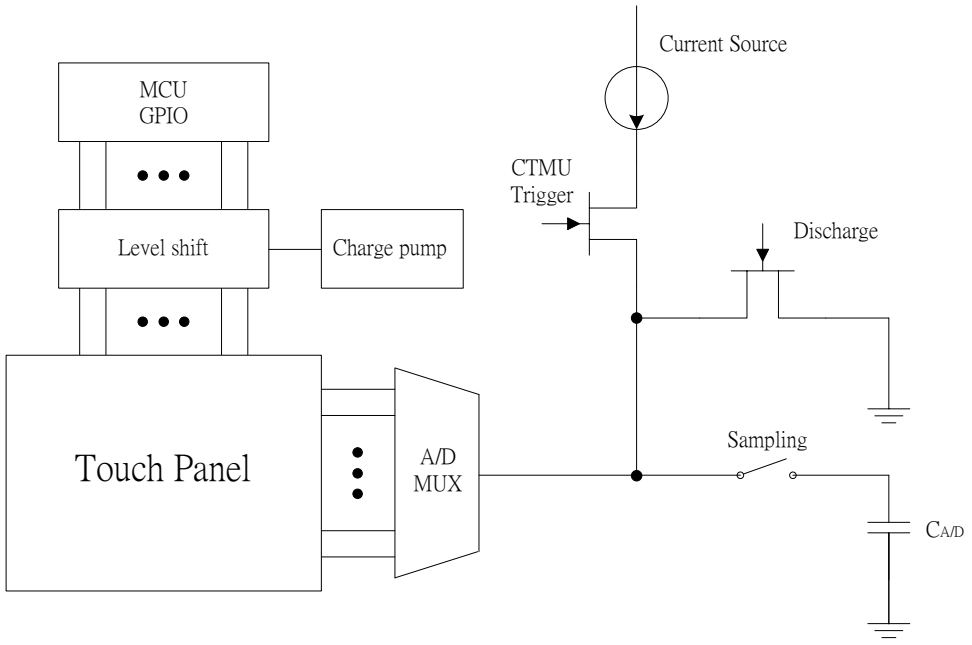
JL1 / 4PIN / USB	
PIN NO.	DESIGNATION
1	5VIN
2	D-
3	D+
4	Ground

JL5 / 5PIN / RS-232	
PIN NO.	DESIGNATION
1	5VIN
2	RXD
3	TXD
4	Ground
5	Ground

JL4 / 7PIN / UART/ I²C	
PIN NO.	DESIGNATION
1	5VIN
2	Ground
3	SCL,RXD
4	SDA,TXD
5	NC
6	NC
7	INTHM

Note :
If you use I²C interface, please add pull-up resistor 2.2K at SCL / SDA / INTHM.

3.3 Control Board System Block Diagram



3.4 Interface

USB connectors are provided for connecting this control board to your system. The followings are the functions, pin numbers and designations for different interfaces.

3.4.1 USB Interface and Data Communication

USB (Universal Serial Bus) is an industry standard, which is a connection between the computer/ notebook/ laptop and the external devices. It is commonly used in connecting to PC or handheld device. There are 4 pins on PM1300A & PM1302 control board to define USB connection.

3.4.2 RS-232

RS-232 (Recommended Standard 232) is the traditional name for a series of standards for serial binary single-ended data and control signals connecting between a DTE (Data Terminal Equipment) and a DCE (Data Circuit-terminating Equipment). It is a specification for serial communications between a DCE and DTE (eg, computer and modem); it defines electrical characteristics, the 25-way 'D' connector and the various functions of the various signal lines. There are 5 pins on PM1302 control board to define RS-232 connection.

3.4.3 UART

A UART (Universal Asynchronous Receiver/ Transmitter) is a serial port, it is commonly used in conjunction with communication standards such as RS-232 or others. There are 7 pins on PM1302 control board to define UART connection.

3.4.4 I²C

The I²C (Inter-IC) bus is a bi-directional two-wire serial bus that provides a communication link between integrated circuits (ICs). Typical voltages used are +5 V or +3.3 V.

The I²C bus has two roles for nodes: master and slave:

- Master node — node that issues the clock and addresses slaves
- Slave node — node that receives the clock line and address.

The bus is a multi-master bus which means any number of master nodes can be present. Additionally, master and slave roles may be changed between messages (after a STOP is sent).

There are four potential modes of operation for a given bus device, although most devices only use a single role and its two modes:

- master transmit — master node is sending data to a slave
- master receive — master node is receiving data from a slave
- slave transmit — slave node is sending data to the master
- slave receive — slave node is receiving data from the master

PenMount I²C interface provide ‘ INTHM’ pin as an optional. Generally, I²C (without INTHM pin) uses polling communication method, master communicates with slave in a period of time. If there is an INTHM pin, slave can “ask” master whether it gets ready or not, so that master no need to keep “asking” slave, thus it becomes more efficient. There are 7 pins on PM1302 control board to define I²C connection.

Chapter 4: PenMount PCI Controller IC Specifications

4.1 General Descriptions

Touch Controller IC	PenMount P2-04
Interface	**PM1300A :** USB,Full-speed, 12Mbps **PM1302 :** USB: Full-speed, 12Mbps UART,RS-232 Interface 38400 baud rate / 8bit data / non parity / one stop bit / non-PnP I²C, Slave, support 400 kHz specifications
ADC resolution	10 bits
Operating Voltage	+5V
Storage Temperature	-40°C ~ +85°C
Operating Temperature	-20°C ~ +70°C
Power Consumption	Typical – Working Mode: 23.9 mA / 5V; Idle Mode: 12 mA / 5V; Sleep Mode: 3 mA / 5V;
Sample rate/second	>100sps
Touch media	Finger, gloved hand (please contact us for details)
Firmware	Develop by PenMount team
Operation force	Light
Top glass thickness supported	**PM1300A :** Up to 6mm **PM1302 :** Up to 2.8mm
Driver supports	All popular O.S., like Microsoft Windows and Win CE and various Linux distribution

Note: Sample rate/second are varied based on different version of panel and firmware.
PenMount P2-04 is using Microchip PIC24FJ256GB210 IC.

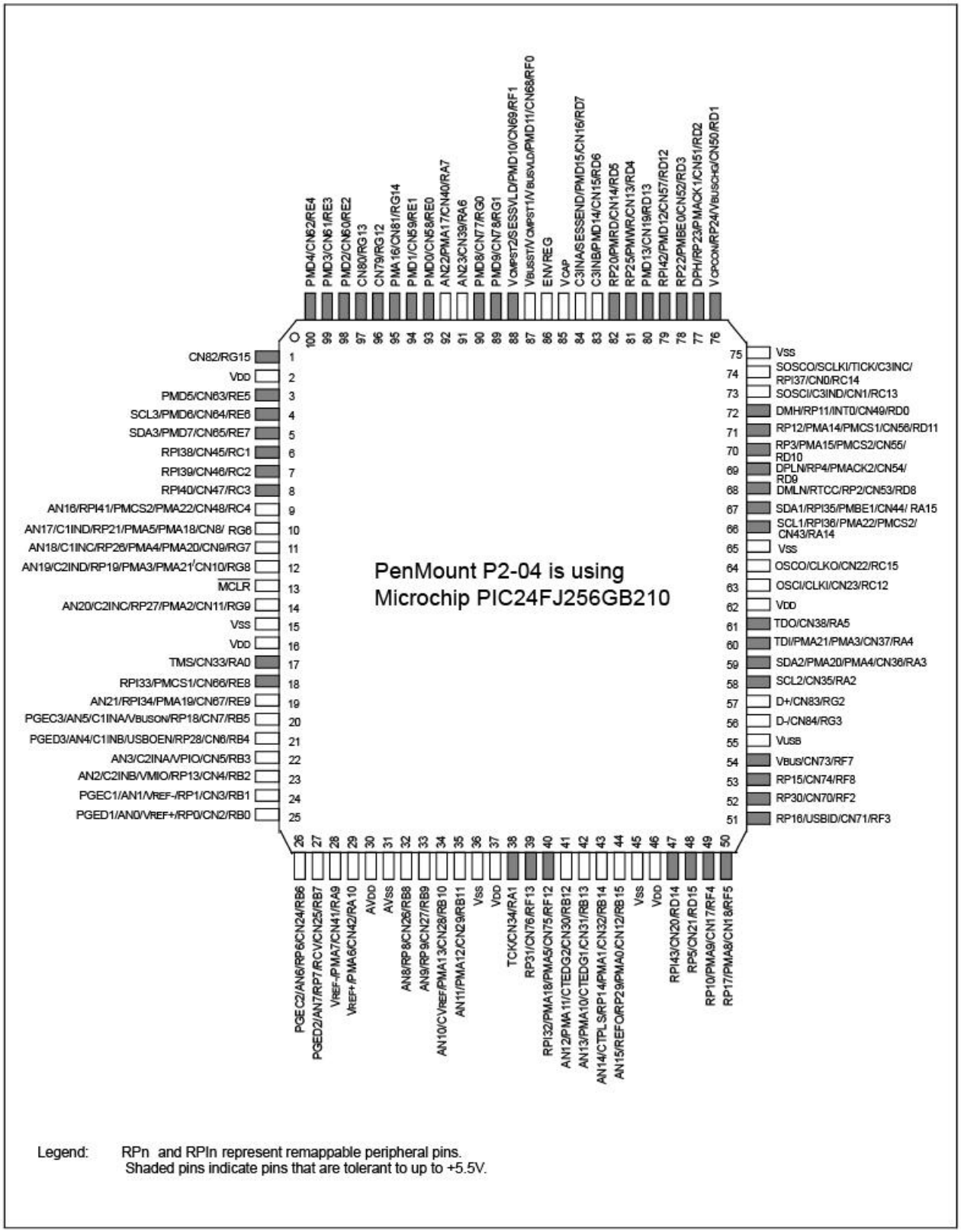
4.2 Control IC Features

- Charge Time Measurement Unit(CTMU)
- Single 16 MIPS operation at 32MHz CPU
- 256KB program memory
- 10-bit, up to 24 channel Analog-to-Digital converter
- On-Chip 1.8V Voltage Regulator
- Run mode: 800μA/MIPS, 3.3 Typical
- Sleep mode: Current down to 20μA , 3.3 Typical
- Standby Current with 32 KHz Oscillator: 22μA, 3.3V typical
- Other details controller specification, please refer to Microchip PIC24FJ256GB210 datasheet

4.3 Firmware Features

- On Field-update firmware
- Support controller power-saving : working, idle (No touch slow-scanning), and sleep (USB suspend)
- Signal sensitivity tuning capability
- With noise filter feature on firmware
- Perform smoothing & jitter filter for drawing
- Touch panel rotation with X-Y coordinate reverse and/or swap
- Touch linearity compensation in border area
- High sampling rate

4.4 Controller IC Pin out



Chapter 5: Software Drivers & PenMount Utility

5.1 Available Drivers & Where to Download

Please go to the link below for downloading PM1300A and PM1302 control board drivers.

http://www.amtouch.com.tw/support-downloads/penmount-drivers-and-utilities/pci-touch-controller/1000-series-linux-and-other-drivers/

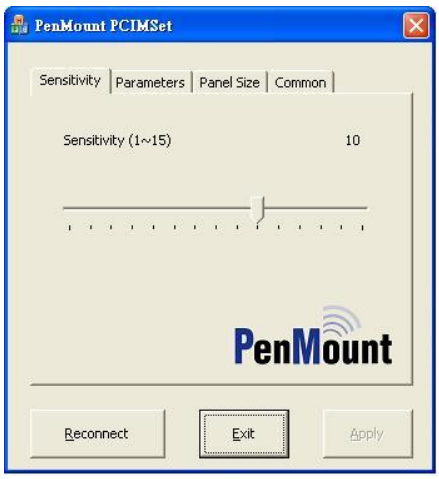
Please note that if you use USB interface and Windows Vista/7/8, the default driver is available inside the OS, so you no need to download and install an additional driver. The drivers will be modified and updated from time to time, the most updated drivers are available in AMT and PenMount website. Drivers’ versions are subject to change without notice.

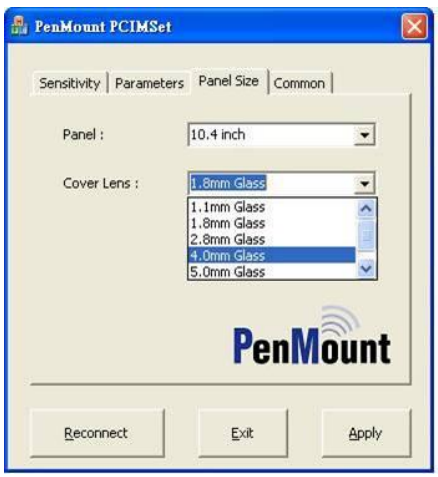
PM1300A drivers:
For USB
Windows 2000, XP, 2003: single touch, mouse driver.
Windows Vista: single touch, inbox driver.
Windows 7,8: dual touch, Inbox driver.
Linux: Ubuntu, Android, other Linux distributions under development.

PM1302 drivers:
For I²C:
Windows CE : Provide binary driver for freescale iMX platform. Other platform by request.
Linux / Android : Provide source code for integration.
For USB / RS-232 / UART:
Windows 2000, XP, 2003: single touch, mouse driver.
Windows Vista: single touch, inbox driver.
Windows 7,8: dual touch, Inbox driver.
Linux: Ubuntu, Android, other Linux distributions under development.

5.2 PCIMSet Introduction

PCIMSet is a utility software developed by PenMount for users to adjust the touch screen’s accuracy, sensitivity… and others features. When you have AMT PCI touch kits, we provide you this utility program, so you can choose the appropriate interface through PCIMSet setting. If you need more detailed information, please see chapter 3 “PenMount PCIMSet” of PenMount Projected Capacitive Input (PCI) User Guide.





5.3 Firmware Update

5.3.1 Firmware Interface

We provide different interface in firmware for PM1300A and PM1302 control board, the shipping default is set at USB interface. Once if there is any new firmware going to be updated, the details are all described in our User's Guide, please read it carefully before making the firmware update.

5.3.2 New Firmware Request

The latest PenMount controller firmware version is programmed inside the chip. PenMount controller firmware is able to be renewed in customer side, PenMount will release the new firmware with new features or modification, the new updated firmware is available in AMT or PenMount customer services team. As the new updated firmware is sent by request, if you need to update the new firmware, please follow the updated firmware request procedures as below:

a. First, please fill in the 'PenMount PCI Firmware Update Request' (FUR) form. The FUR form is sent by request, so please contact our sale representatives, customer services team or distributors in your region for requesting the FUR form.
b. Sent back the FUR form to AMT or PenMount sale representatives, customer services team or distributors in your region.
c. After checking and confirmed by AMT or PenMount team, we will send the updated firmware for customers to do on field update.

5.3.3 Firmware download and update

The PenMount field update utility (Pmfu) is developed for users to update the latest firmware version. Please note that only our standard firmware offers a free update service, if it is a special developed firmware in accordance with the requests of the client, or any adjustment has been made for the firmware due to the requests of the client, these are regarded as a special firmware, and they won't have a free firmware update. The firmware update will be provided once we have a new firmware ready. If you need any further information about this, please contact our sale representatives or distributors in your region. And if you want to get more information about the operation steps of PenMount Pmfu, you can read chapter 4.1 & 4.2 of the PenMount Projected Capacitive Input (PCI) User Guide.

Chapter 6: Product Test

The following test has been done by AMT Projected Capacitive Touch and PenMount controller or Control board.

6.1 Operating Test

PCI Touch panels were tested under the temperatures range at -20˚C and +70˚C, the PCI touch panels can operate normally under the above temperature.

6.2 Environmental Test

PCI touch panels were tested under the temperature:

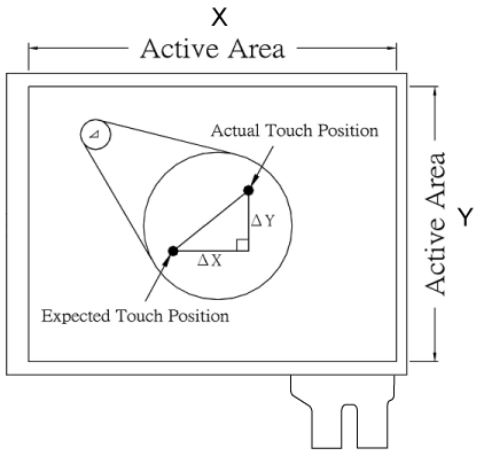
- -40˚C for 288H,
- 60 ˚C with 90RH for 288H,
- 80˚C for 288H,
- -40˚C ~ +80˚C for 20 cycles.

Touch panels can operate normally after the test, please see PCI approval sheet for details.

6.3 ESD

PCI touch solution can withstand 15KV air discharge and 8KV contact discharge. However, the PCI touch has to be integrated properly with good grounding.

6.4 Linearity Test



This test is to calculate the difference between the actual touch position and the expected touch position, which P3007 and P3008 linearity test, they are:

P3007 : $\frac{\Delta X}{X}\% < 1.5\%$ and $\frac{\Delta Y}{Y}\% < 1.5\%$

P3008 : Perimeter of Active Area: it is in the 10mm area inside from active area

$\frac{\Delta X}{X}\% < 2.5\%$ and $\frac{\Delta Y}{Y}\% < 2.5\%$

Inner Active Area: it is the area of 10mm inside of the active area

$\frac{\Delta X}{X}\% < 1.5\%$ and $\frac{\Delta Y}{Y}\% < 1.5\%$

6.5 Optical Inspection

AMT PCI has its optical specification, please refer to AMT PCI optical specification A003-1 and A003-2.

6.6 Others

For other test, please contact to our sale representatives or distributors for detailed information.

Chapter 7: Warranty

We provide one year limited liability warranty. We shall not be held responsible for any damage, destroy or defect caused by accident, misinstallation, misunderstanding of the instructions, customer modification, misuse of software or their use in a defective or deficient environment or any misuse during their operation of the touch panels.

Chapter 8: Other Documents

The following documents can be provided to our clients for guiding our customers how to install and operate our products:

- AMT PCI Integration Guide—AMT PCI Integration guide is the guide that to instruct you how to install the touch panel into your products, and what you should aware of.
- AMT PCI Design Guide—AMT PCI Design Guide describes the general design rules and requirements for AMT projective capacitive input (PCI) touch panels, such as their structure, size, pattern and lines.
- PCI PenMount 1000 Device Driver Development Guide—it provides necessary information about the protocols for PenMount and guide you to operate the USB, RS-232(UART) and I^2C protocols of PenMount 1000.
- PenMount Projected Capacitive Input (PCI) User Guide—it contains detailed information of our touch Screen kits, such as what software you need, how to install drivers, what is PenMount PCIMSet and firmware update instructions and etc. You can go to the link below to download the manual/ PenMount Projected Capacitive Input (PCI) User Guide.
  http://www.amtouch.com.tw/support-downloads/manuals-downloads/

Note: AMT PCI Integration Guide, AMT PCI Design Guide and PCI PenMount 1000 Device Driver Development Guide are sent by request, so please contact our sale representatives or distributors in your region for request if you need these guides. Document versions are subject to change without notice.

Chapter 9: Contact Information

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