APA9XXX

7” / 10.1” / 12.1“ / 15” LCD Monitor
Aluminum Die-casting Chassis
IP 65 Rated Flat Front Bezel

Industrial Monitors

User Manual

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Electric Shock Hazard – Do not operate the machine with its back cover removed. There are dangerous high voltages inside.

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Chapter 1 Getting Started

1.1 Features

- Solid Aluminum Die-casting chassis
- Variety of LCD panel size selections
- Front bezel IP65
- VGA/DVI input
- 9~36V DC wide range power input

1.2 Specifications

	APA9070	APA9101	APA9120	APA9150
Hardware				
Display Type	7” 800x480 TFT LCD	10.1” 1280x800 TFT LCD	12.1” 800x600 TFT LCD	15” 1024x768 TFT LCD
External I/O Port	**Default I/O:** 1 x VGA 1 x USB for Touch control 1 x 3 pins terminal block power input 9~36V DC 1 x DVI 1 x Tack switch for VGA / DVI transform **Option I/O:** 1 x Line in by phone jack(option) 1 x DB-9 for Resistive Touch control			
On Screen Display Control	On board controller, extendable key pad from connector Transfer Board OSD Membrane Keypad			
LCD				
Max. Resolution	800x480	1280x800	800x600	1024x768
Max. Color	262 K	262K	16.2 M	16.2 M
Luminance (cd/m^2)	350	350	330	350
Contrast Ratio	400:1	800:1	300:1	800:1

Viewing Angle (H/V)	140°/110°	160°/160°	160°/140°	160°/145°
Backlight Lifetime	40,000 hrs		50,000 hrs	
Power Input	9~36V DC on board			
Touch Screen APA9XXX				
Type	Resistive Touch Window			
Interface	USB / RS-232 auto detect, when both connected USB is primary			
Light Transmission	Over 80%			
Touch Screen APA9XXXP				
Type	Projected Capacitive			
Interface	USB interface on tail			
Light Transmission	Over 90%			
Mechanical				
Construction	Aluminum Die-casting chassis			
Dimensions (WxHxD)	202x149x39 mm	285x189x49 mm	319x245x52 mm	410x310x55 mm
Net Weight	1.0 kg	1.9 kg	2.6 kg	4.3 kg
Mounting	Panel / VESA 75x75	Panel / VESA 100x100		
Environment Specifications				
Operating Temperature	0 ~ 50 ℃ (32 ~ 122 ℉)			
Storage Temperature	-20 ~ 60 ℃ (-4 ~ 140 ℉)			
Storage Humidity	10 ~ 90% @40℃ Non-condensing			
IP Rating	Front Panel IP65			
Certificate	CE/FCC Class A			

* If you choose different touch interface (such as USB change to RS-232), it is necessary to reset the power.(plug on/off power supply)

1.3 Dimensions

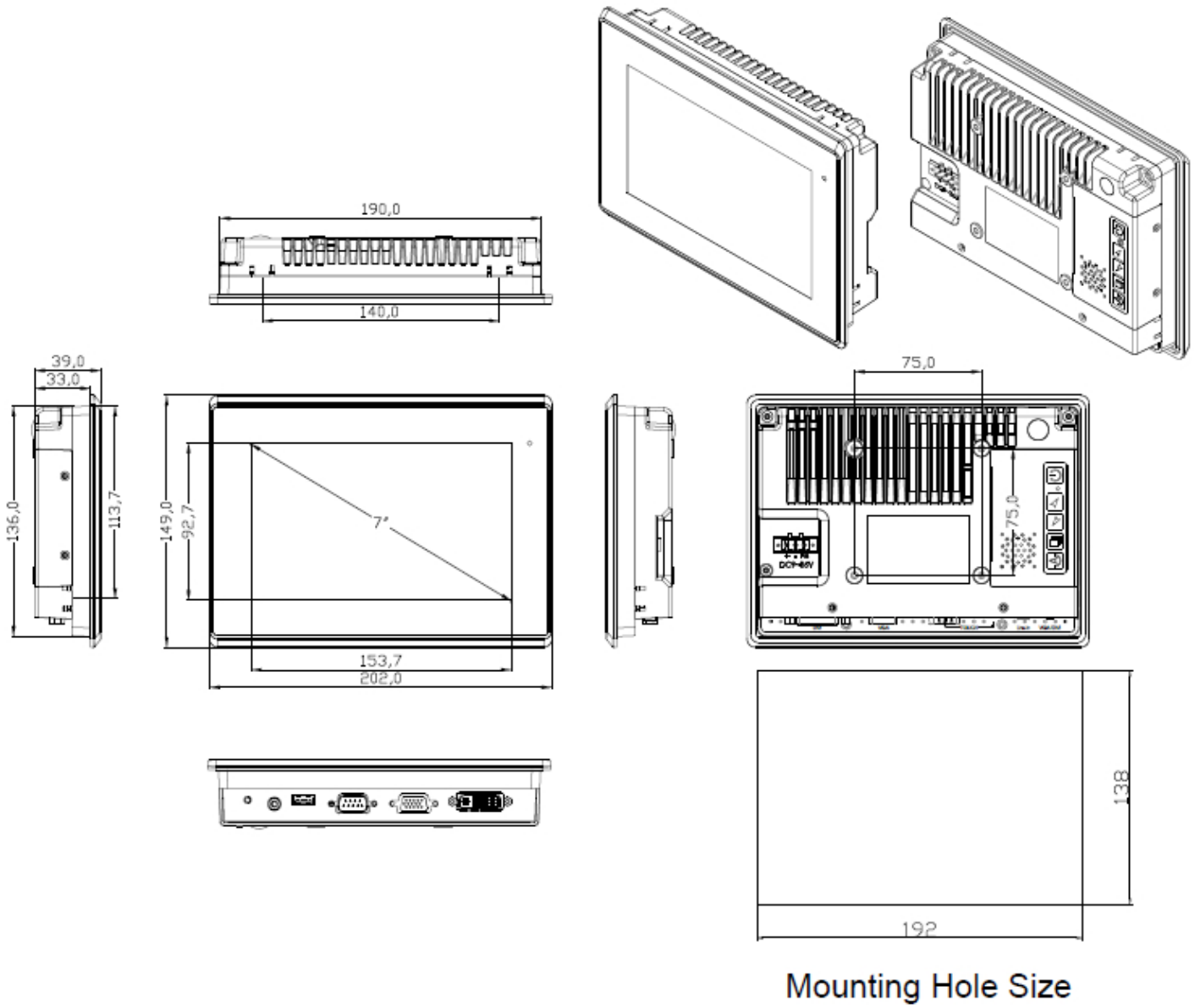


Figure 1.1: Dimensions of APA9070

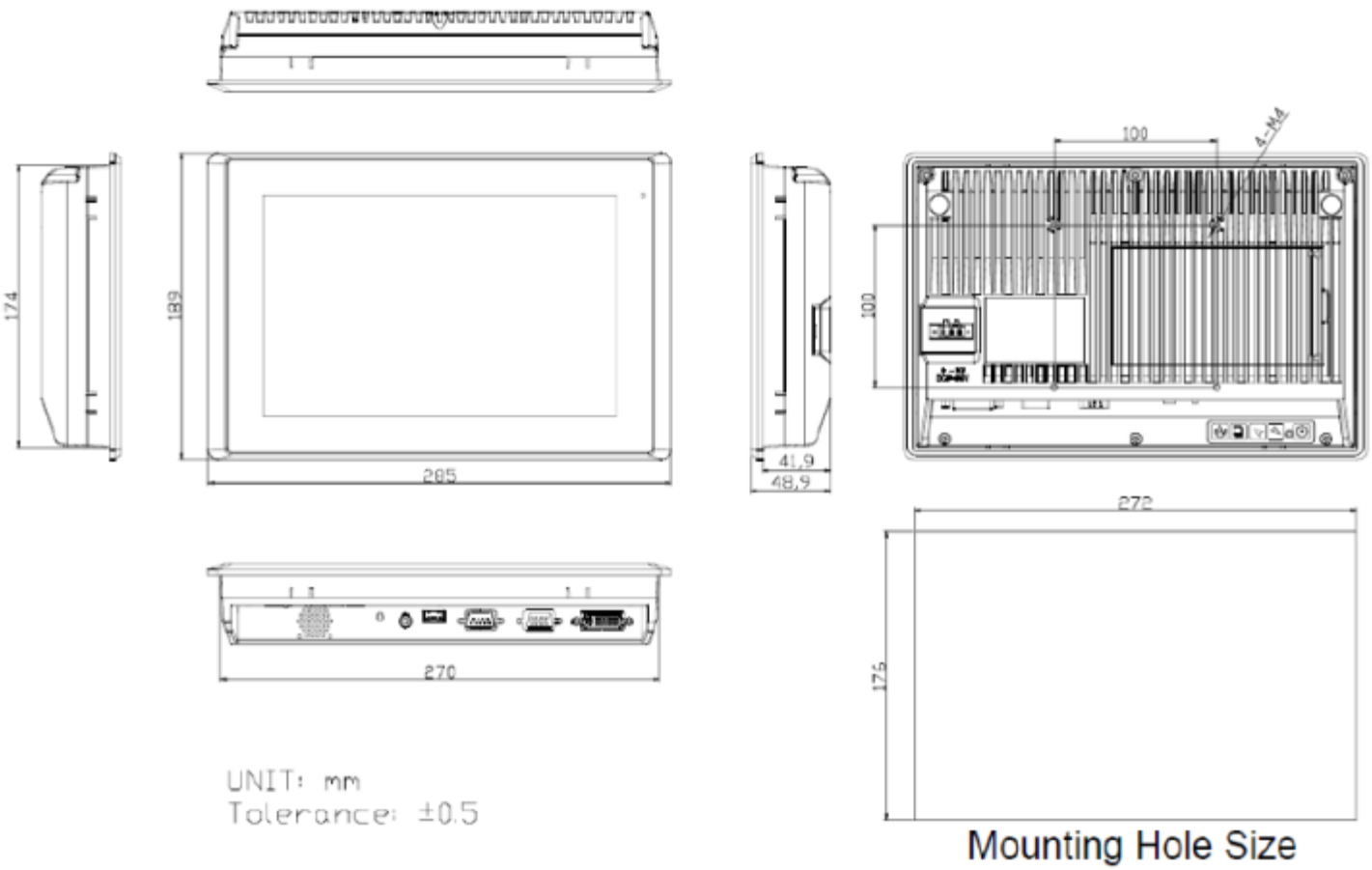


Figure 1.2: Dimensions of APA9101

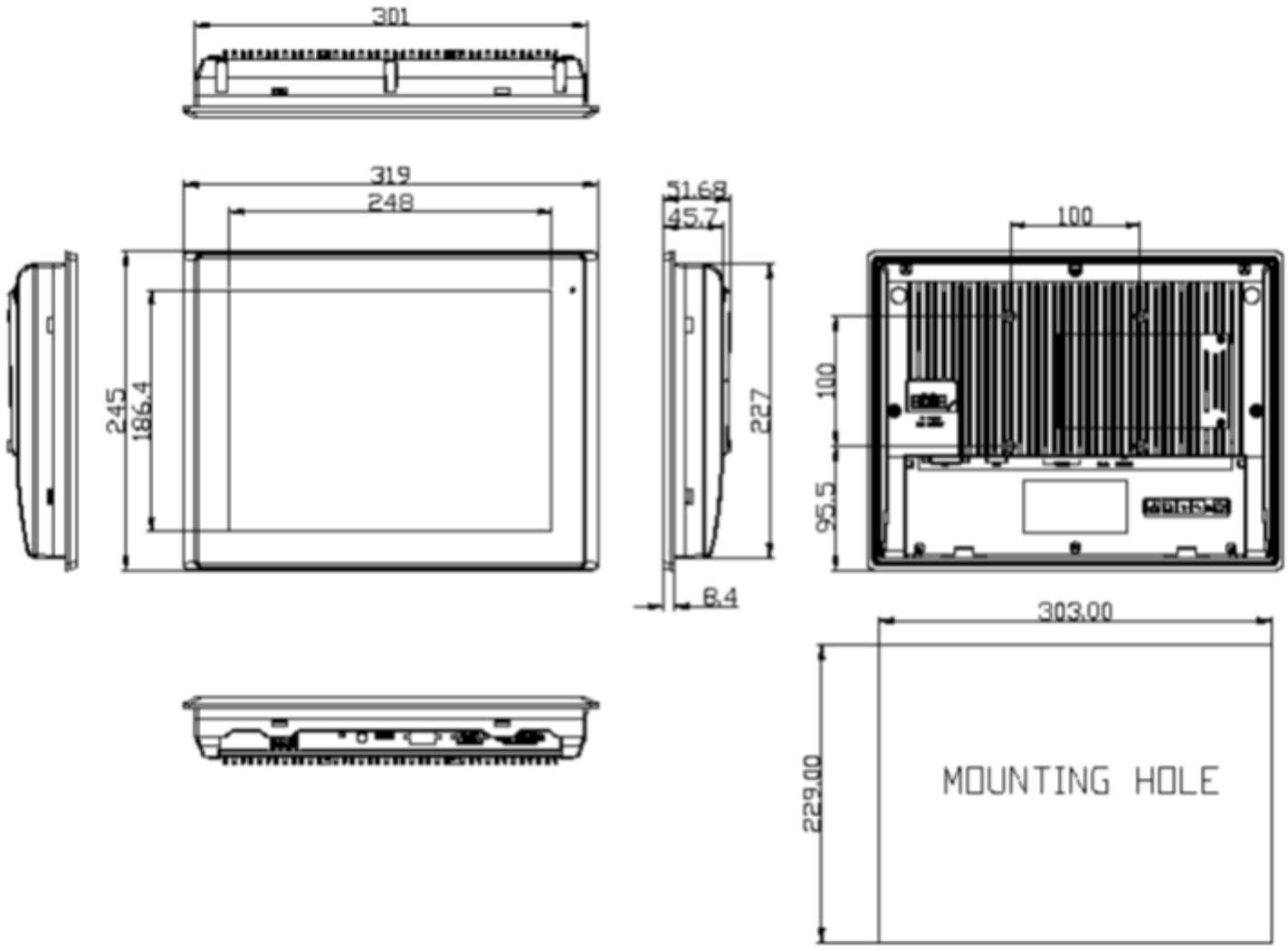


Figure 1.3: Dimensions of APA9120

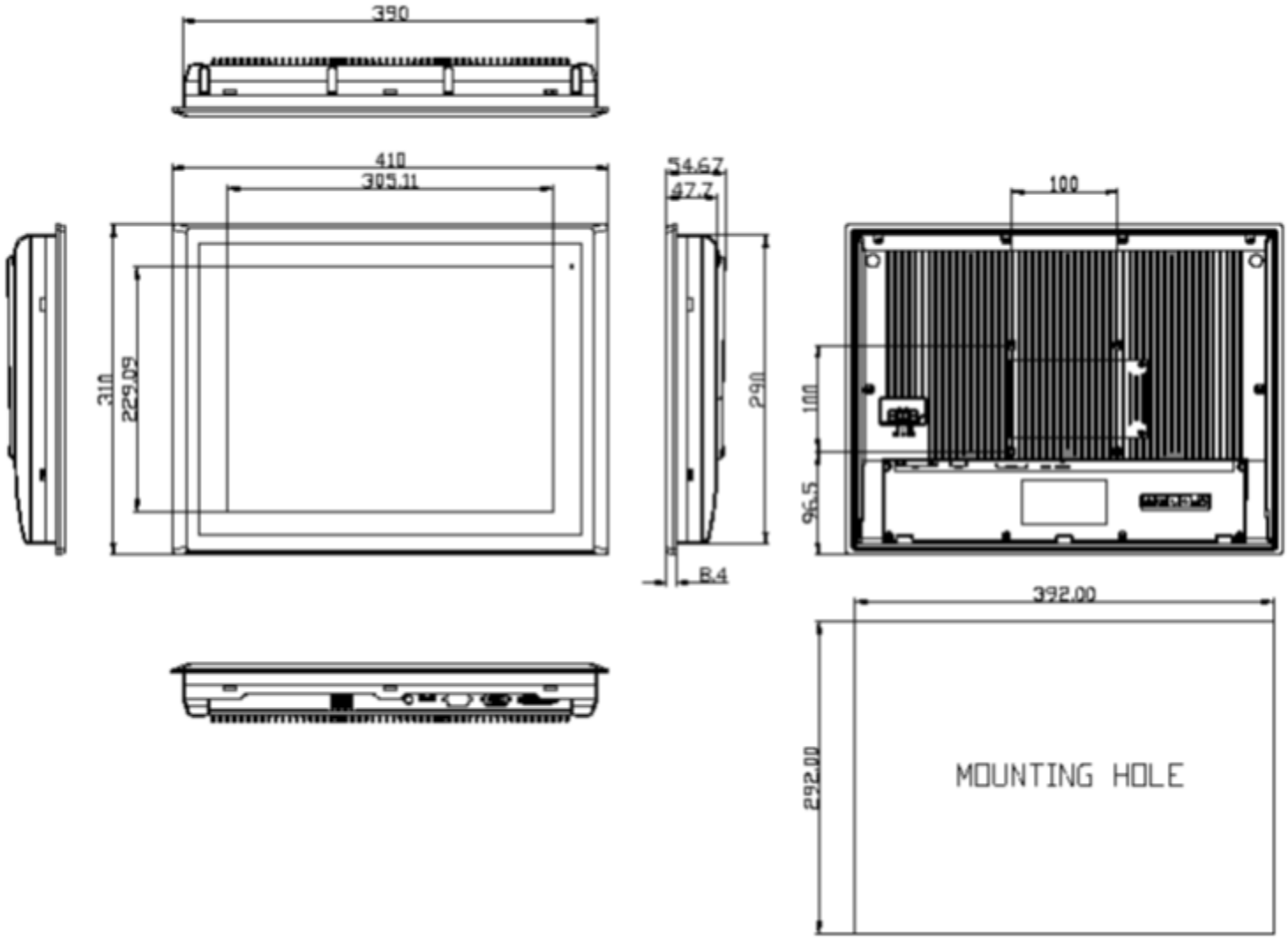


Figure 1.4: Dimensions of APA9150

1.4 Brief Description of APA9XXX

APA9XXX is a total IP65 aluminum front bezel and chassis LCD Display, which comes with a 7 inch (luminance of 350 cd/m²) / 10.1 inch (luminance of 350 cd/m²) / 12.1 inch (luminance of 330 cd/m²) / 15 inch (luminance of 350 cd/m²) TFT LCD. APA9070(P) comes with a viewing angle of 140 (H) degress and 110 (V) degress. APA9101(P) comes with a viewing angle of 160 (H) degrees and 160 (V) degress. APA9120(P) comes with a viewing angle of 160 (H) degrees and 140 (V) degrees. APA9150(P) comes with a viewing angle of 160 (H) degrees and 145 (V) degrees. APA9XXX has more outstanding features, thus giving the best in monitoring and control applications.
APA9070 can be VESA-75 mounted. APA9101, APA9120 and APA9150 can be VESA-100 mounted.

Figure 1.5: Front View of APA9070(P)

Figure 1.6: Rear View of APA9070(P)

Figure 1.7: Front View of APA9101(P)

Figure 1.8: Rear View of APA9101(P)

Figure 1.9: Front View of APA9120(P)

Figure 1.10: Rear View of APA9120(P)

Figure 1.11: Front View of APA9150(P)

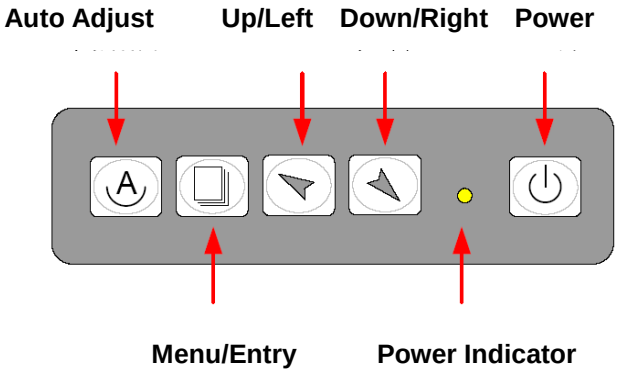
Figure 1.12: Rear View of APA9150(P)

1.5 Display Mode

Item	Resolution	H Freq.(kHz)	V Freq.(Hz)	Remark
1	640x350@70	31.469	70.087	VGA
2	640x400@70	31.469	70.087	VGA
3*	640x480@60	31.469	59.940	VESA
4	640x480@66	35.000	66.667	MAC
5	640x480@72	37.861	72.809	VESA
6*	640x480@75	37.500	75.000	VESA
7	720x400@70	31.469	75.000	TEXT
8	800x600@56	35.156	56.250	VESA
9*	800x600@60	37.879	60.317	VESA
10	800x600@72	48.077	72.188	VESA
11*	800x600@75	46.875	75.000	VESA
12	832x624@75	49.107	75.087	MAC
13	848x480@60	31.020	60.000	VESA
14*	1024x768@60	48.363	60.004	VESA
15*	1024x768@75	60.023	75.029	VESA
17	1152x864@70	63.850	70.000	VESA
18	1152x864@75	67.500	75.000	VESA
19	1152x900@76	71.809	76.149	SUN
20*	1280x768@60	47.730	60.000	VESA
21*	1280x768@75	60.290	74.890	VESA

Chapter 2 OSD

2.1 AD Board OSD Functions



Power switch: To turn ON or OFF the power

Shift the icon to the right side or shift it up

Shift the icon to the left side or shift it down

Menu: To enter OSD menu for related icon and item.

Auto Button: One-touch auto adjustment

1.) Getting into Burn-in Mode

Before setting into a burn-in mode, first disconnect the AC power cord. Then press (don't let them go) the buttons until the AC power cord is connected and the "RGB" appears on the top left corner of your screen. Now it can be put into the burn-in mode for changing colors.

2.) Getting Out of Burn-in Mode

Before getting out of the burn-in mode, please first disconnect the AC power cord. Then press the button (If not workable, press the button and don't let them go) until the AC power cord is connected. Please don't let your fingers go until the AC power cord is connected again and the wording of "RGB" appears on the top left corner of your screen, and wait for 3 second. Under the non-signal entry situation, if **Cable Not Connected** is seen, exit is thus successfully made.

When the Burn-in Mode is Unable to Eradicate…

1.) If the “RGB” is still on the top left corner of the screen, press to enter “Miscellaneous” and choose “Reset”, and then **Yes,** and press . When the screen goes black, disconnect power and repeat the above steps.

2.) If the “RGB” is not found, disconnect the AC power cord first. Then press the buttons (don’t let them go) until the AC power cord is connected, and wait for 2 to 3 seconds. When “RGB” appears, repeat the above steps.

3.) Functions of OSD Keys

2.2 OSD Controls

To make any adjustment, select the following:

1. Press (Menu) to show the OSD menu or disable the OSD menu.
2. Select the icon that you wish to adjust with the (/ or +/-) key in the menu.
3. Press (Menu) and then choose the item with the (/ or +/-) key.
4. Press (Menu) and then adjust the quality with the (/ or +/-) key.

4.) If the “RGB” is still on the top left corner of the screen, press to enter “Miscellaneous” and choose “Reset”, and then **Yes,** and press . When the screen goes black, disconnect power and repeat the above steps.

5.) If the “RGB” is not found, disconnect the AC power cord first. Then press the buttons (don’t let them go) until the AC power cord is connected, and wait for 2 to 3 seconds. When “RGB” appears, repeat the above steps.

6.) Functions of OSD Keys

2.3 OSD Function

1. Power button: Power on/off
2. Down button: Brightness
3. Up button: Volume
4. Menu button: Menu
5. Auto button: Auto adjustment

2.4 OSD Default Parameter

	APA9XXX
1. Luminance	
1.1 Brightness	70 (50 for APA9101) 50
1.2 Contrast	3
1.3 Sharpness	
2. Management	auto
2.1 H. Position	auto
2.2 V. Position	auto
2.3 Pixel Clock	auto
2.4 Phase	
	6500
3. Color	80
3.1 Red	80
3.2 Green	80
3.3 Blue	
4.	
5. Volume	50
4.1 Volume	on
4.2 Mute	
5. OSD	auto
5.1 H. Position	auto
5.2 V. Position	auto
5.3 OSD time	
6. Language	
6.1 English	

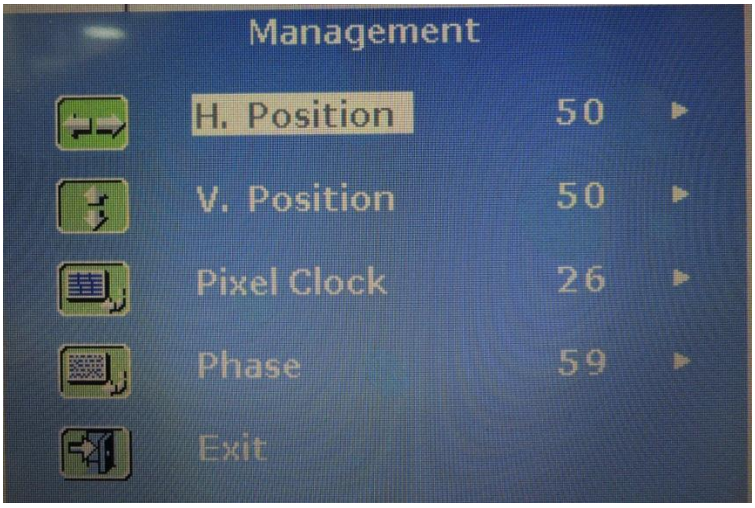
2.5 Main Menu

In the **Main menu**, there are the following items:

- Auto Adjust
- Luminance
- Management
- Color
- Volume
- OSD
- Language
- Recall
- Information
- Exit

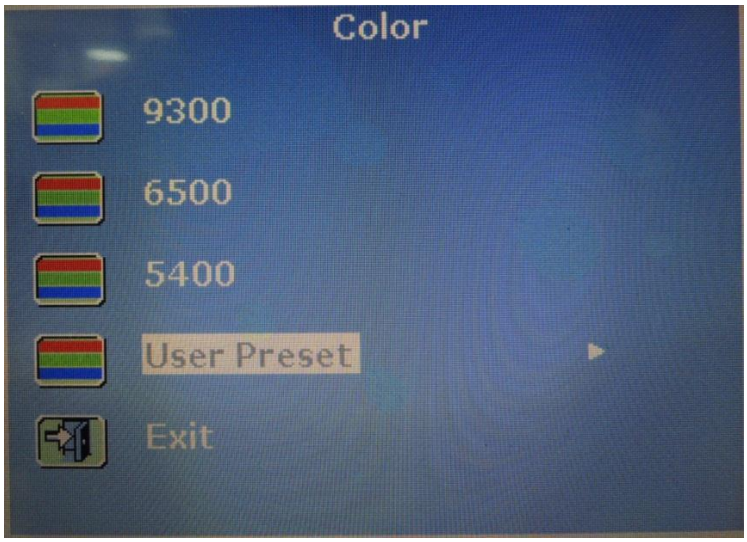
For **Luminance** list, there are the following:

- Brightness
- Contrast
- Sharpness
- Exit



For **Management** list, there are the following:

- H. Position
- V. Position
- Pixel Clock
- Phase
- Exit

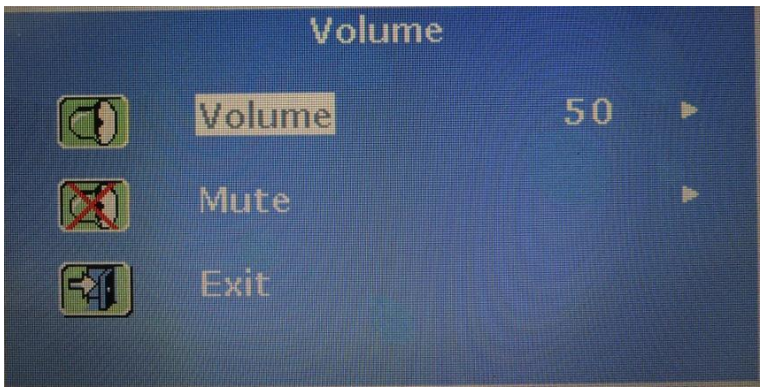


For **Color** list, there are the following:

- 9300
- 6500
- 5400
- User Preset
- Exit

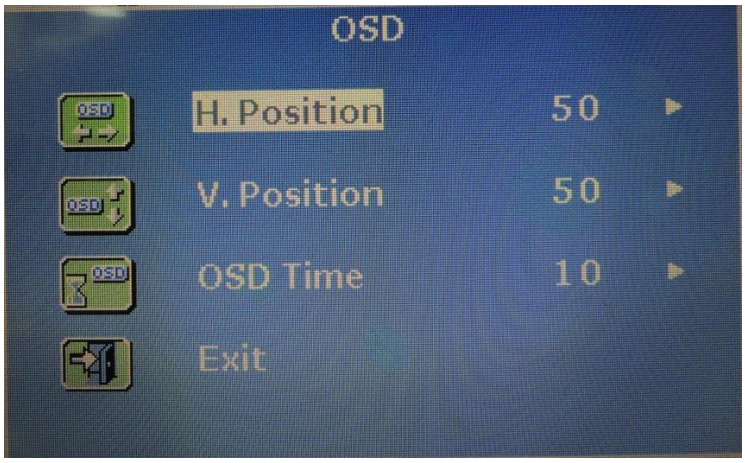
In **User Preset,** there are the following:

- Red
- Green
- Blue
- Exit



For **Volume** list, there are the following:

- Volume
- Mute
- Exit

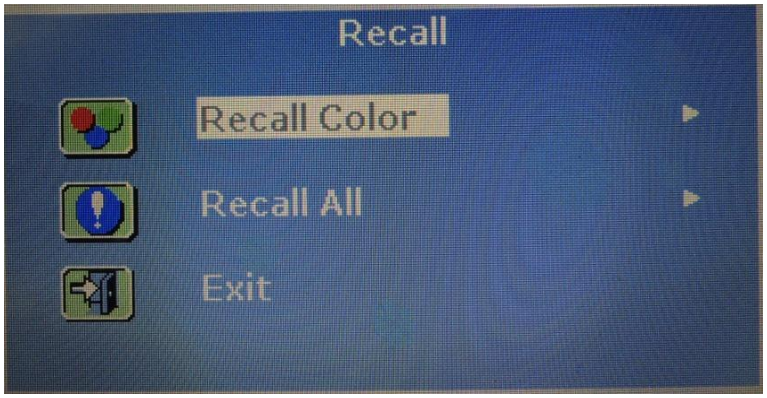


For **OSD** list, there are the following:

- H. Position
- V. Position
- OSD Time
- Exit

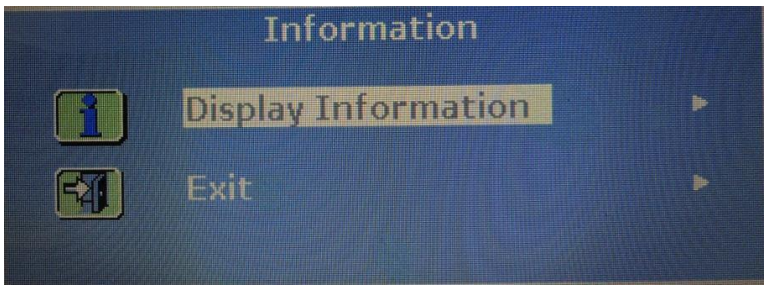
For **Language** list, there are the following:

- English
- Francais
- Deutsch
- Italiano
- Espanol
- 日本語
- 繁體中文
- 简体中文
- Portuguese
- 한국의
- Русский



For **Recall** list, there are the following:

- Recall Color
- Recall All
- Exit



For **Information** list, there are the following:

- Display Information
- Exit

Chapter 3 Installation

3.1 Introduction to the PenMount 9036 Controller Board

The PenMount 9036 control board is configured for use with the RS-232 interface. It connects to the touch screen, power supply and computer system's RS-232 port, and supports 4-, 5- and 8-wire touch screens. The control board has some advanced functions, such as PnP and non-PnP mode adjustable baud rate, thus making easy for customers to select different touch screens without changing the control board. The size of the board is 25 by 60mm, and it has two connectors and one dipswitch on-board.

3.2 Features

- RS-232 interface
- Touch controller is DMC9000
- Design for the best touch performance and easy configuration
- PnP or Non-PnP mode selectable
- Design for best cost arrangement
- Supporting 2048x2048 pen device resolution
- 19200 or 9600 baud rate transmission selectable
- Upgraded noise handling mechanism (3 level scheme)
- Fixed and high-speed sampling rate
- 4-, 5- and 8-wire touch screen supported
- Touch screen cable, RS-232 with power cable connectors onboard
- 5V to 12V power input
- Circuit protection for input voltage
- Touch-activated LED indicator onboard

3.3 Electrical Specifications

Touch Screen:
4-, 5- and 8-wire analog resistive type

Touch Screen Controller:
DMC9000

Communications:
RS-232
Baud Rate:
19200 and 9600 baud rate selection

Resolution:
1024x1024 (10-bit A/D converter inside)

Power Input:
5V ~ 12V DC

Power Consumption:
12V: 24mA+ i where (i=v/touch screen sheet R)
5V: 20mA+ i where (i=v/touch screen sheet R)
Board Size:
6.0 x 2.5cm

Portrait:
Support 90° to 279° screen rotation

Static Protection:
ESD device (optional)

3.4 Installation of the 9036 Controller Board

Follow the steps below to install the 9036 control board:

1. Power down your computer and display, and open your display or system case. Find space on your system and attach the control board to your system with screws. The control board has industry standard 3 φ screw holes.
2. Find the white 6-pin right-angle connector (on the left in the image above [see Figure 3.1]). The power cable is pin 1 and pin 2. Solder the power and ground wire to the system. The RS-232 cable is for pins 3 to 6. Attach the RS-232 cable's D-sub connector to a COM port at the back of the computer.
3. Find the white 9-pin right-angle connector (on the right in the image above [see Figure 3.1]). Attach the female end of the touch screen cable to this connector. If you attach the cable of a 4-/5-/8-wire touch screen to pins 1~5/1~6/1~9, attach the male end of the cable to the touch screen tail.
4. Mount your touch screen to the display.
5. Find the onboard DIP switch (on the upper right of the image above [see Figure 3.1]). This switch selects baud rate, PnP or non-PnP mode, and touch screen type. Set the DIP switch to configure your control board according to the definitions and settings of the table below:

Switch	Definition	ON	OFF
S1	Baud Rate Adjustment	9600	19200
S2	PnP enable or disable	Disable	Enable
S3	Touch screen type	5-wire	4-, 8-wire
S4	Touch screen type	4-, 8-wire	5-wire

6. Turn on power to the computer and the display.
7. Install the software drivers and utilities and calibrate the touch screen.

This chapter describes how to install drivers and other software that will allow your PenMount 6000 Controller Board to work with different operating systems.

NOTE: PenMount USB drivers support up to 15 USB controllers.

3.5 Introduction to Touch Screen Controller Board

PenMount 6300 USB control board is a touch screen control board designed for USB interface and specific for 4, 5, 8-wire touch screens. It is designed with USB interface features with multiple devices supporting function. PenMount 6300 control board using PenMount 6000 controller that has been designed for those who may like and all-in-one solution with 10-bit A/D converter built-in to make the total printed circuit board denser, circuit diagram also designed for 12-bit ADC for optional. There are two connectors on this board, one connector is for 4, 5, 8-wire touch screen cable (optional), and another is for 4-pin USB A type cable (optional).

3.6 Windows 2000/XP/2003/Vista Universal Driver Installation for PenMount 6000 Series

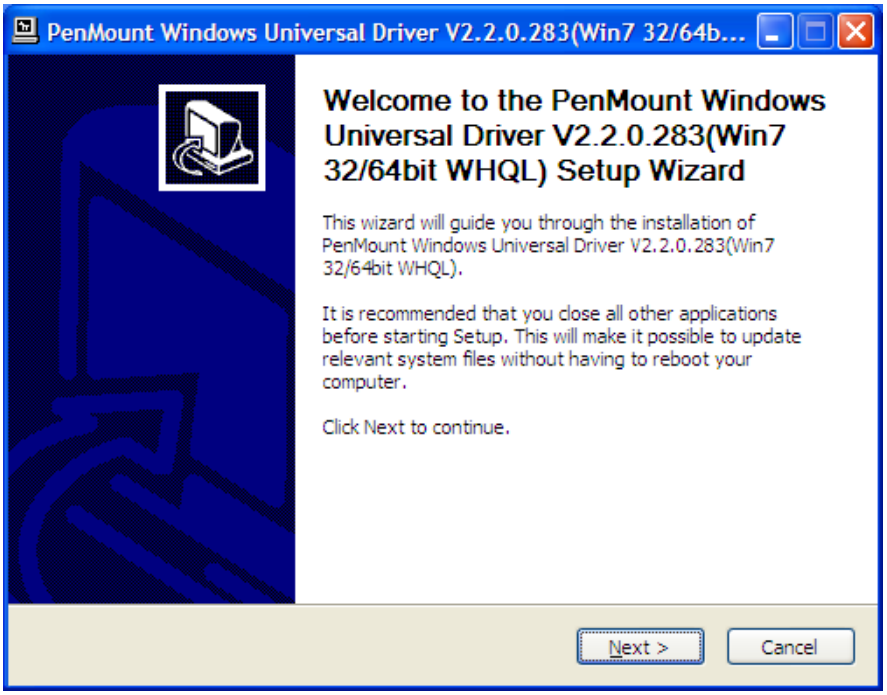
Before installing the Windows 2000/XP driver software, you must have the Windows 2000/XP system installed and running on your computer. You must also have one of the following PenMount 6000 series controller or control boards installed: PM6500, PM6300.

3.6.1 Installing Software

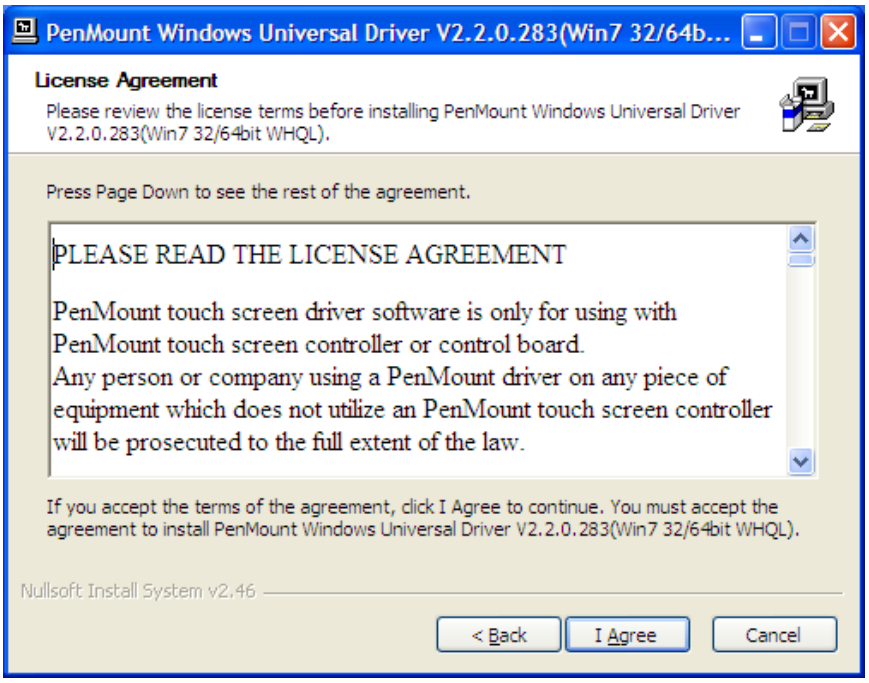
If you have an older version of the PenMount Windows 2000/XP driver installed in your system, please remove it first. Follow the steps below to install the PenMount DMC6000 Windows 2000/XP driver.

Step 1. Please make sure your PenMount 6000 device had plugged in advance. If your device uses RS232 interface, please plugged in before the machine is turned on. When the system first detects the controller board, a screen appears that shows “Unknown Device”. Do not use this hardware wizard. Press Cancel.

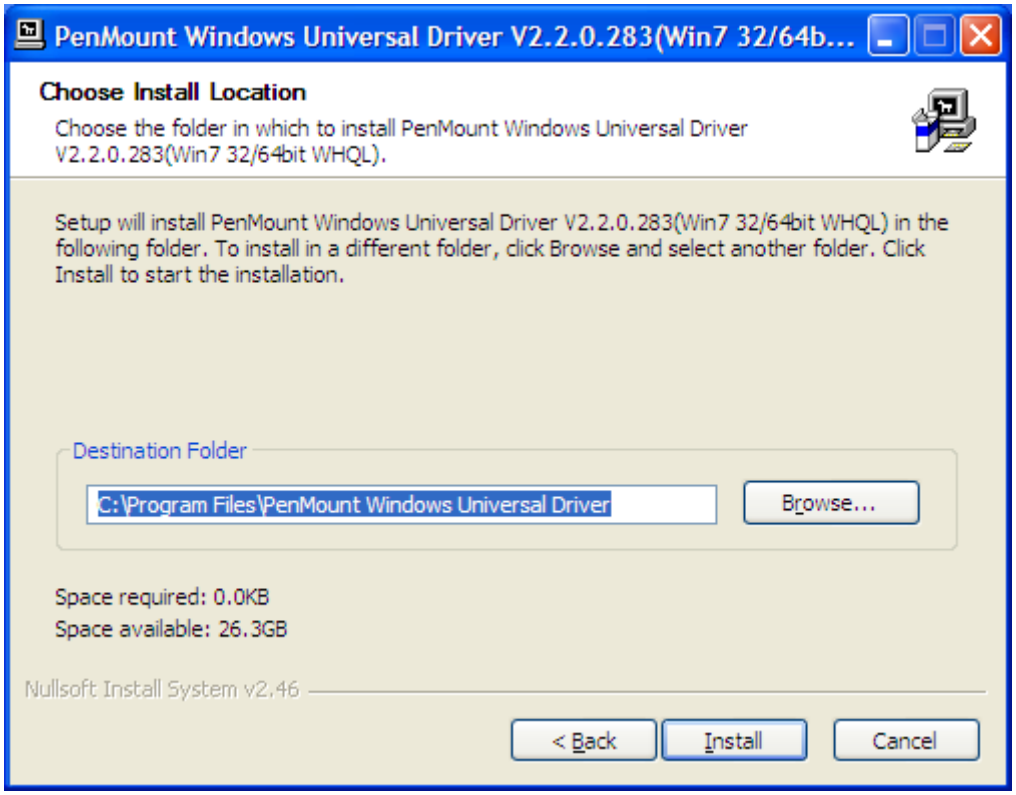
Step 2. Insert the product CD install **setup.exe.** Click touch panel driver



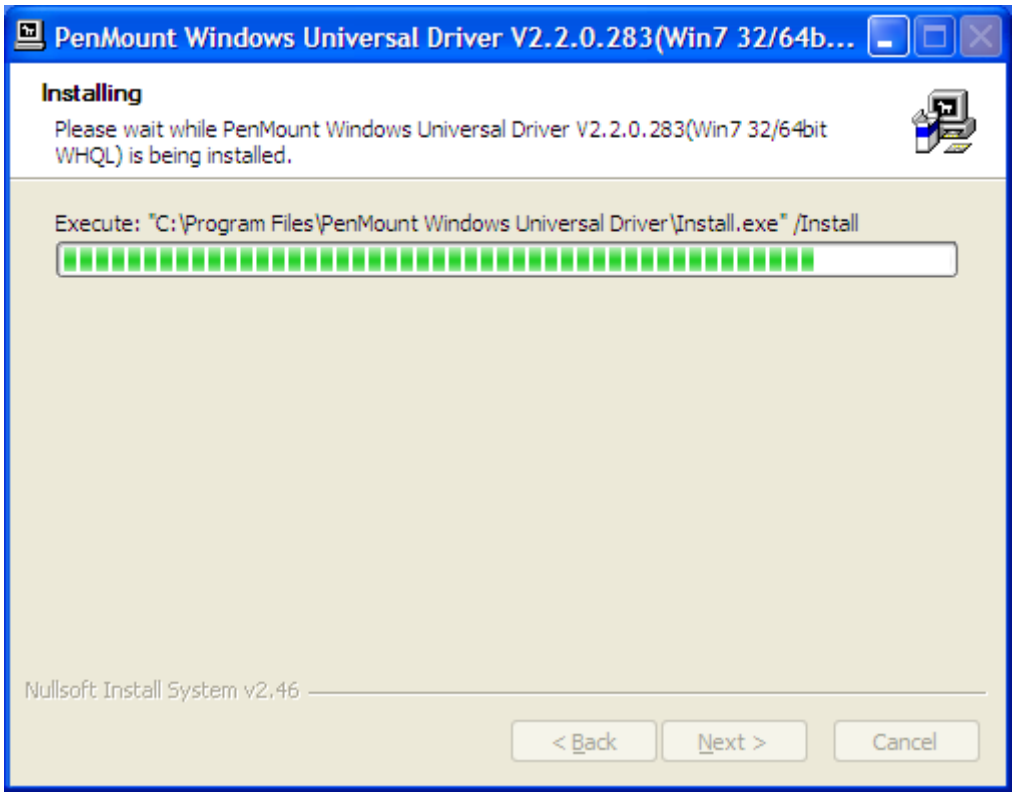
Step 3. A License Agreement appears. Click "**I Agree…**" and "**Next**"



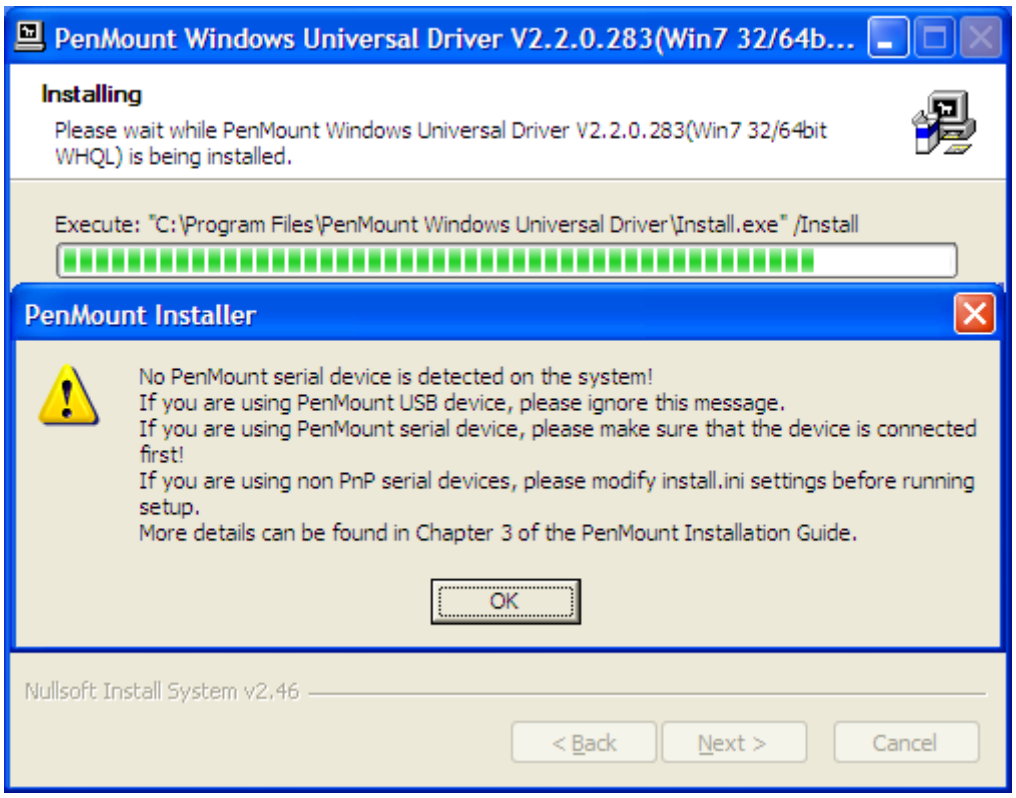
Step 4. Choose the folder in which to install PenMount Windows Universal Driver. Click **Install.**



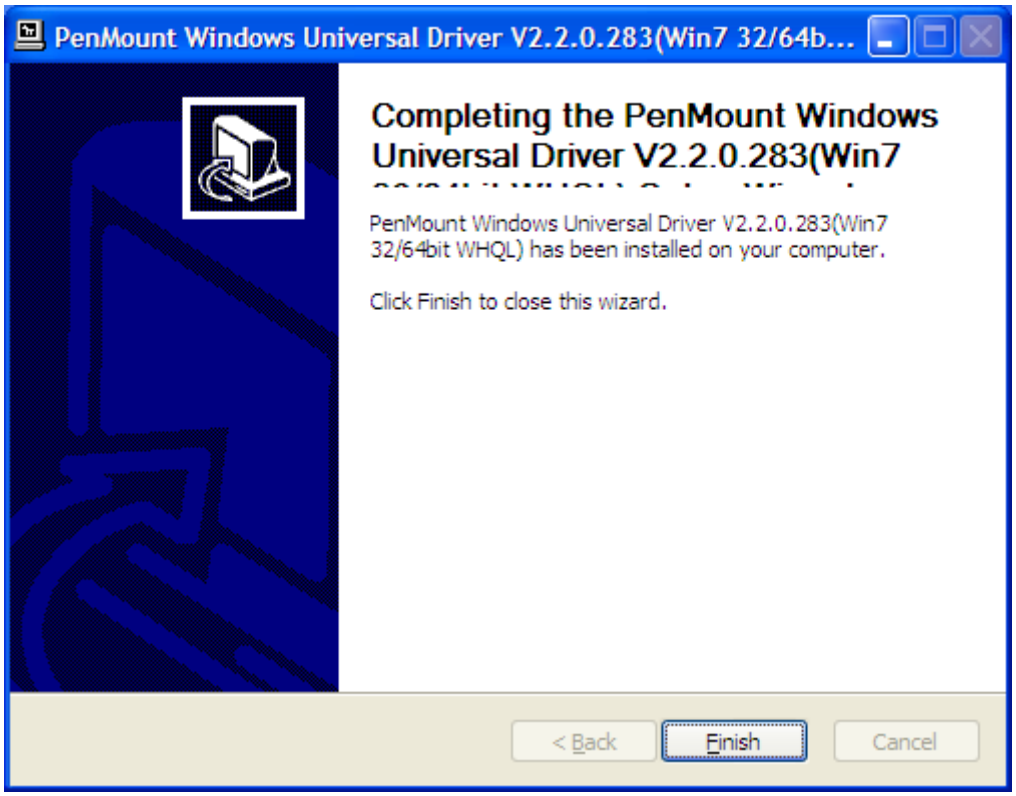
Step 5. Wait for installation. Click **Next** to continue.



Step 6. Click **OK**.



Step 7. Click **Finish** to complete installation.



3.6.2 Software Functions

Upon rebooting, the computer automatically finds the new 6000 controller board. The touch screen is connected but not calibrated. Follow the procedures below to carry out calibration.

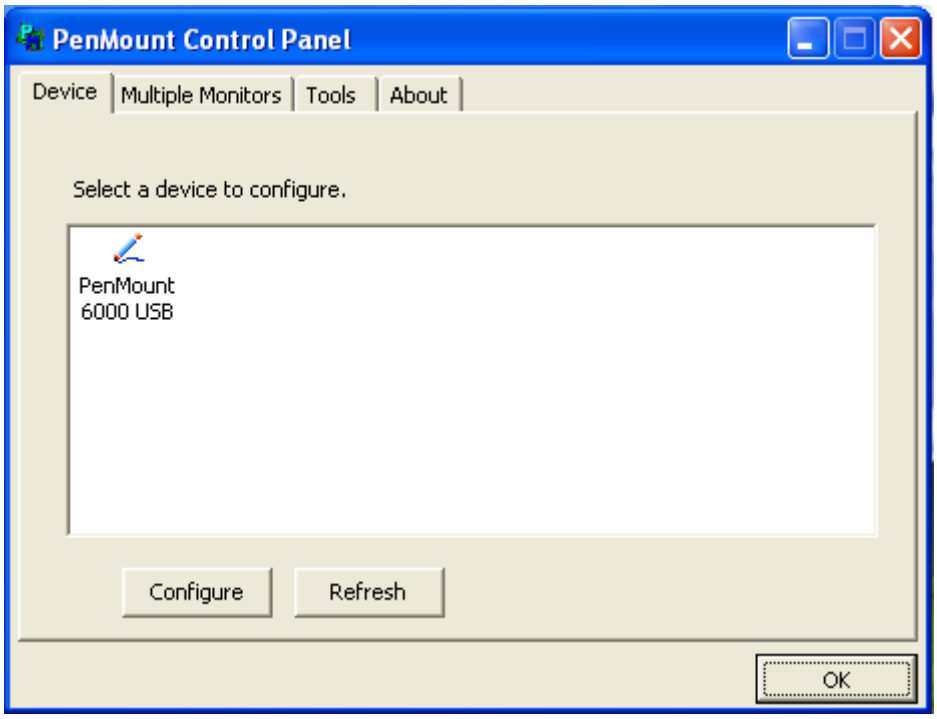
1. After installation, click the PenMount Monitor icon “PM” in the menu bar.
2. When the PenMount Control Panel appears, select a device to “Calibrate.”

PenMount Control Panel

The functions of the PenMount Control Panel are **Device, Multiple Monitors, Tools** and **About**, which are explained in the following sections.

Device

In this window, you can find out that how many devices are detected on your system.

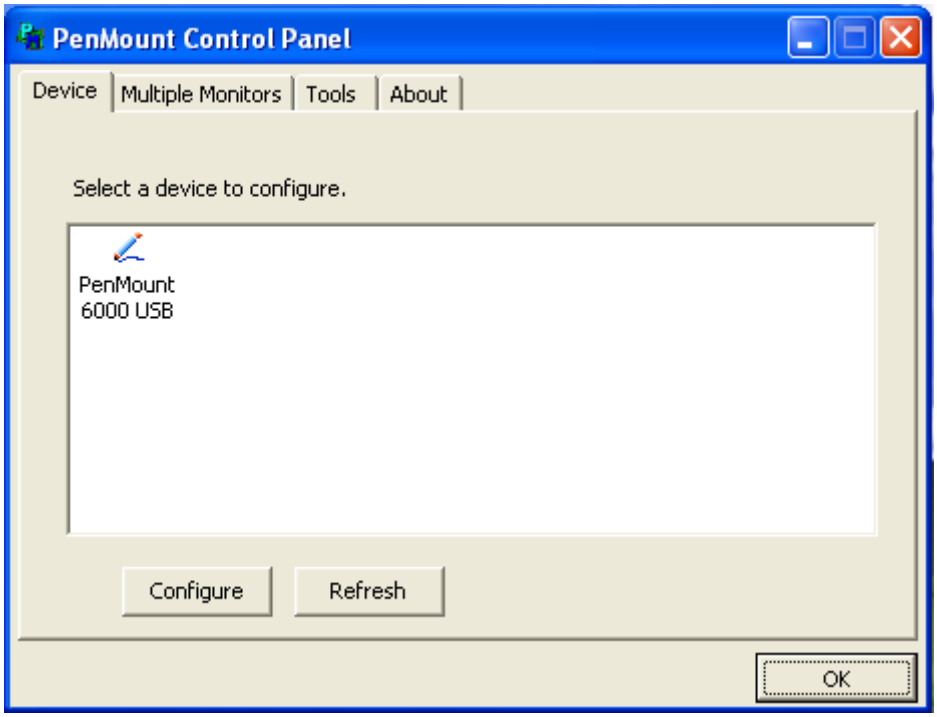


Calibrate

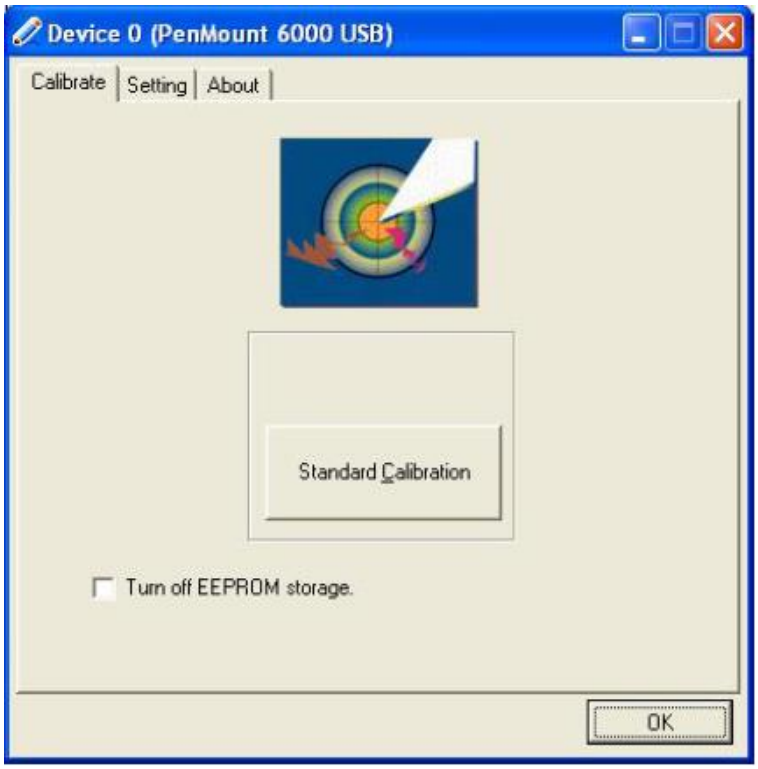
This function offers two ways to calibrate your touch screen. ‘Standard Calibration’ adjusts most touch screens. ‘Advanced Calibration’ adjusts aging touch screens.

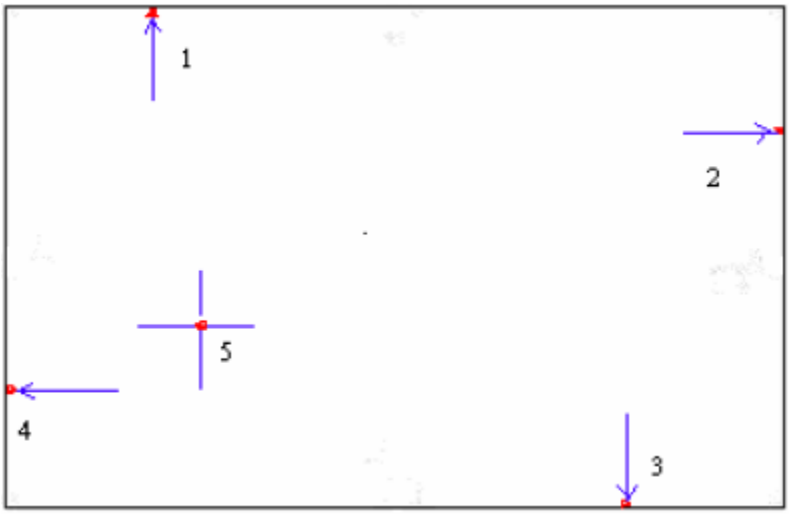
Standard Calibration	**Click this button and arrows appear pointing to red squares. Use your finger or stylus to touch the red squares in sequence. After the fifth red point calibration is complete. To skip, press ‘ESC’.**
Advanced Calibration	**Advanced Calibration uses 4, 9, 16 or 25 points to effectively calibrate touch panel linearity of aged touch screens. Click this button and touch the red squares in sequence with a stylus. To skip, press ESC’.**
Command Calibration	**Command call calibration function. Use command mode call calibration function, this can uses Standard, 4, 9, 16 or 25 points to calibrate** E.g. Please run ms-dos prompt or command prompt c:\Program Files\PenMount Universa Driver\Dmcctrl.exe -calibration 0 (Standard Calibration) Dmcctrl.exe - calibration ($) 0= Standard Calibration 4=Advanced Calibration 4 9=Advanced Calibration 9 16=Advanced Calibration 16 25=Advanced Calibration 25

Step 1. Please select a device then click “Configure”. You can also double click the device too.



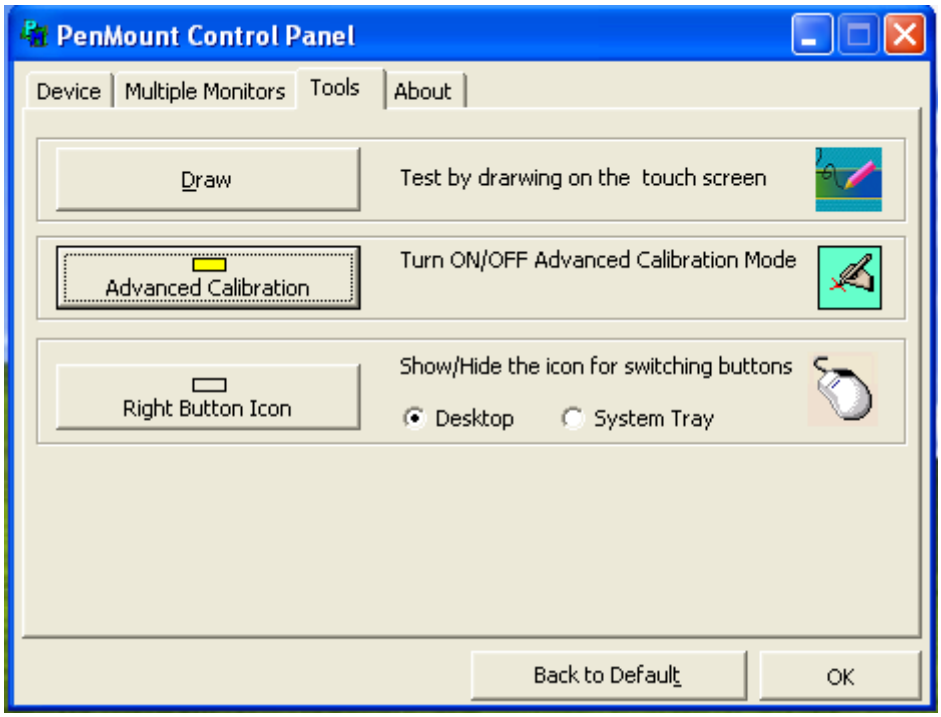
Step 2.Click “Standard Calibration” to start calibration procedure



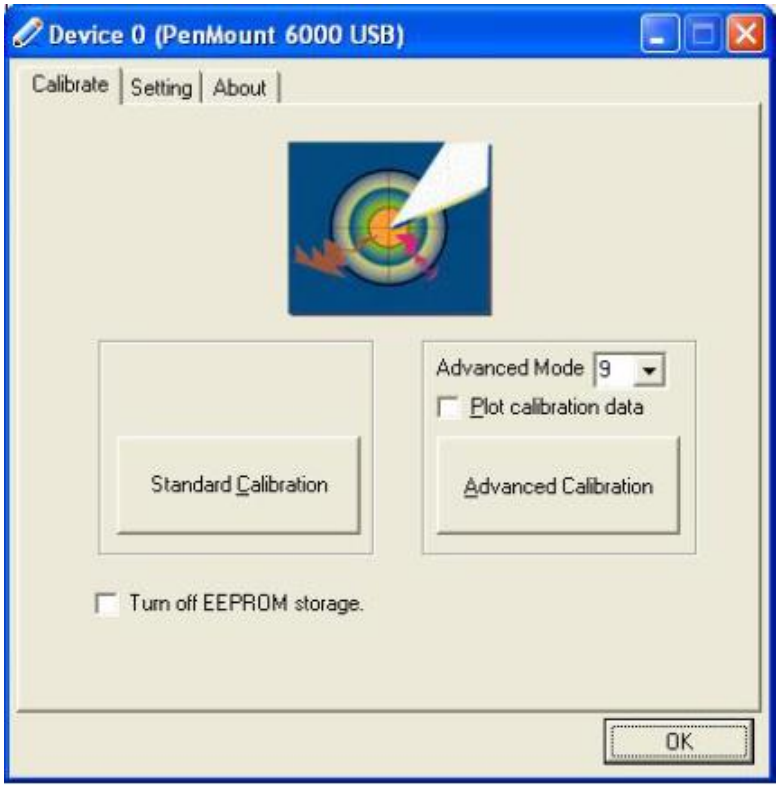


NOTE: The older the touch screen, the more Advanced Mode calibration points you need for an accurate calibration. Use a stylus during Advanced Calibration for greater accuracy. Please follow the step as below:

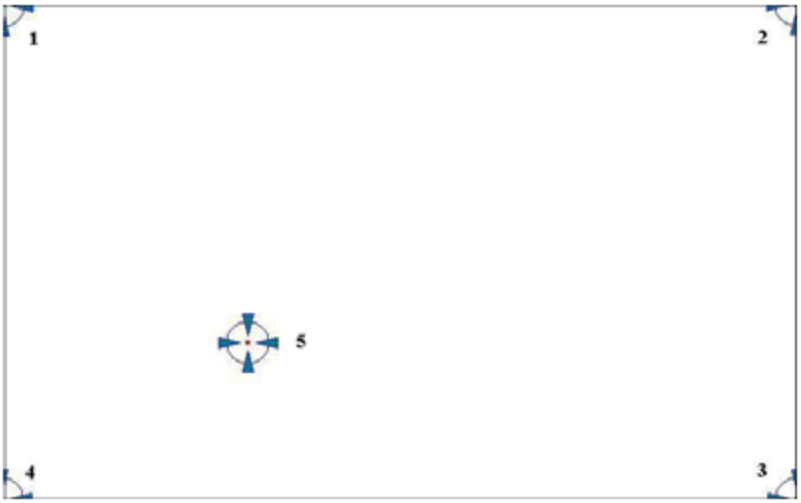
Step 3. Come back to “PenMount Control Panel” and select “**Tools**” then Click “**Advanced Calibration**”.



Select “**Device**” to calibrate, then you can start to do “Advanced Calibration”.



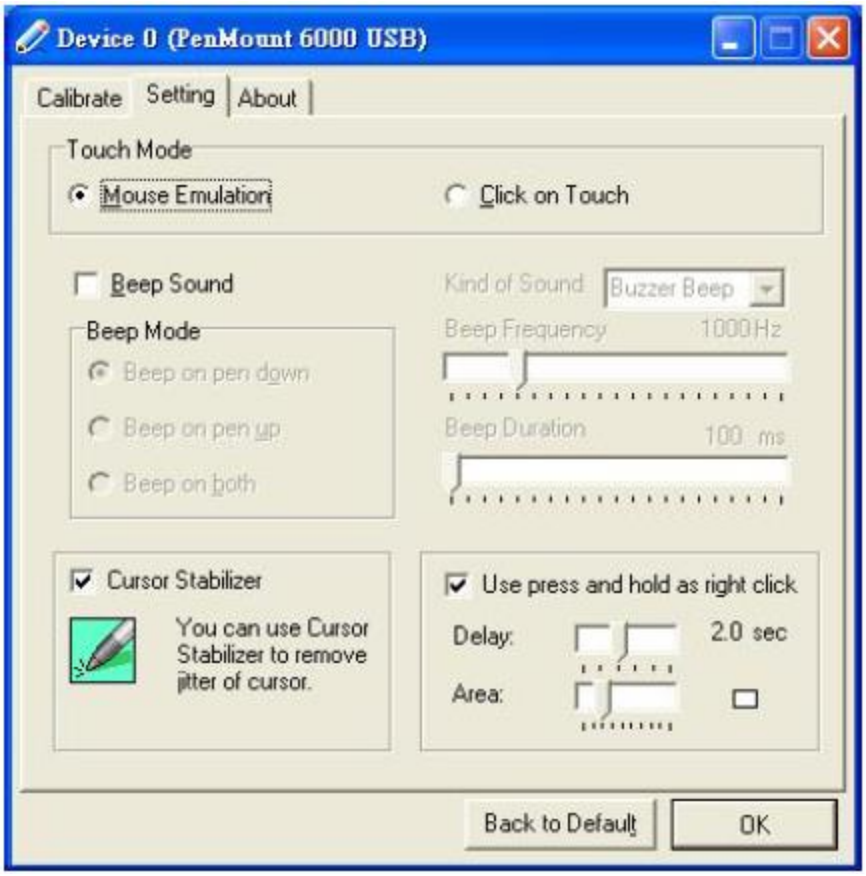
NOTE: Recommend to use a stylus during Advanced Calibration for greater accuracy.



Plot Calibration Data	**Check this function and a touch panel linearity comparison graph appears when you have finished Advanced Calibration. The blue lines show linearity before calibration and black lines show linearity after calibration.**
Turn off EEPROM storage	**The function disable for calibration data to write in Controller. The default setting is Enable.**

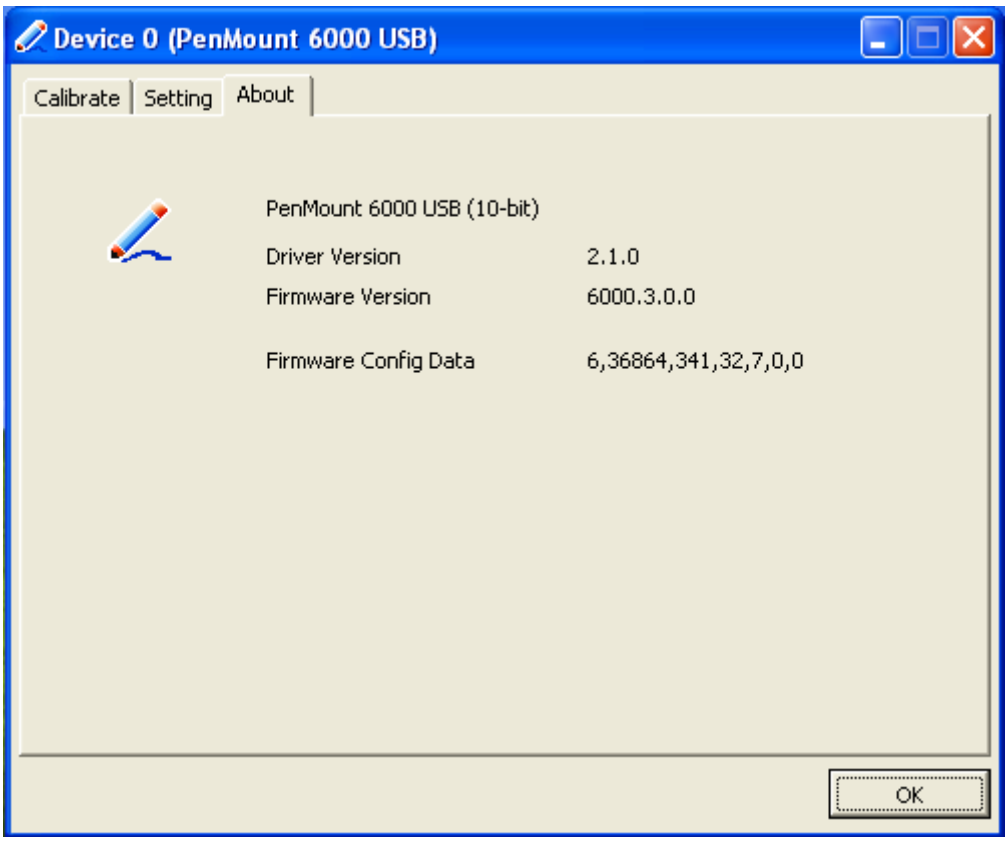
Setting

Touch Mode	**This mode enables and disalbes the mouse's ability to drag on-screen icons – useful for congifuring POS terminals.** **Mouse Emulation – Select this mode and the mouse functions as normal and allows dragging of icons.** **Click on Touch – Select this mode and the mouse only provides a click function, and dragging is disabled**
Beep Sound	**Enabled Beep Sound – turns beep function on and off** **Beep on Pen Down – beep occurs when pen comes down** **Beep on Pen Up – beep occurs when pen comes down** **Beep on both – beep occurs when comes down and lifted up** **Beep Frequency – modifies sound frequency** **Beep Duration – modifies sound duration**
Cursor Stabilizer	**Enable the function support to prevent cursor shake**
Use press and hold as right click	**You can set the time out and area for you need.**



About

This panel displays information about the PenMount controller and driver version.



Multiple Monitors

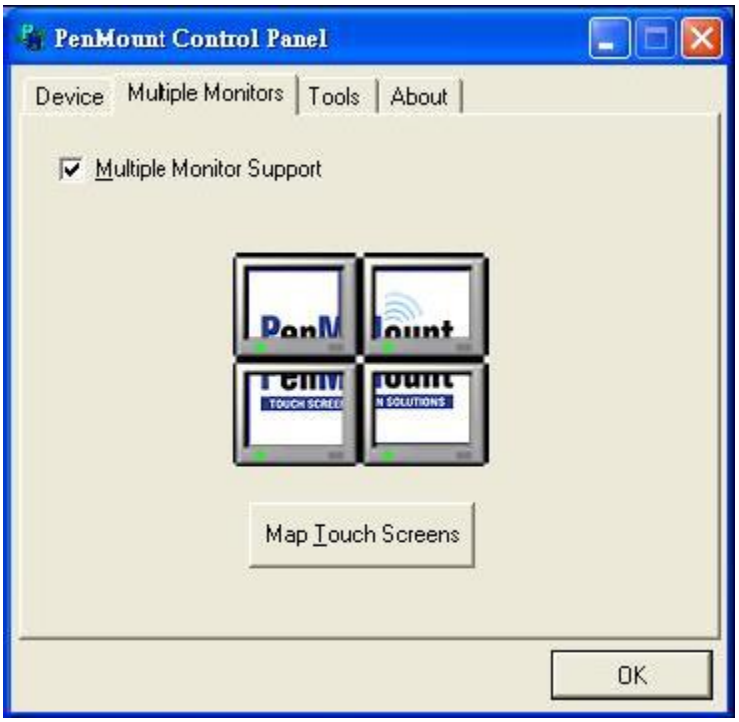
Multiple Monitors supports from two to six touch screen displays for one system. The PenMount drivers for Windows 2000/XP support Multiple Monitors. This function supports from two to six touch screen displays for one system. Each monitor requires its own PenMount touch screen control board, either installed inside the display or in a central unit. The PenMount control boards must be connected to the computer COM ports via the RS-232 interface. Driver installation procedures are the same as for a single monitor. Multiple Monitors supports the following modes:

Windows Extend Monitor Function
Matrox DualHead Multi-Screen Function
nVidia nView Function

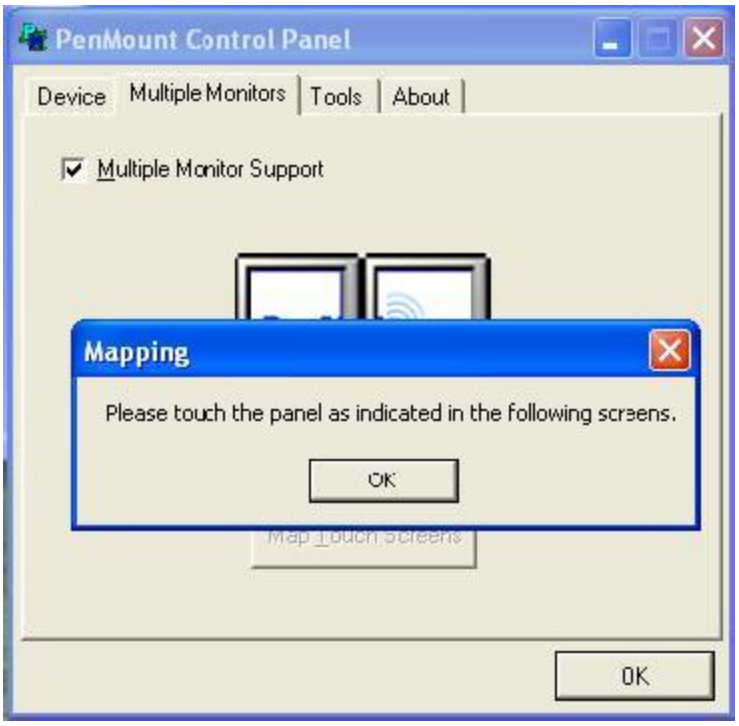
NOTE: The Multiple Monitors function is for use with multiple displays only. Do not use this function if you have only one touch screen display. Please note once you turn on this function the Rotating function is disabled.

Enable the multiple display function as follows:

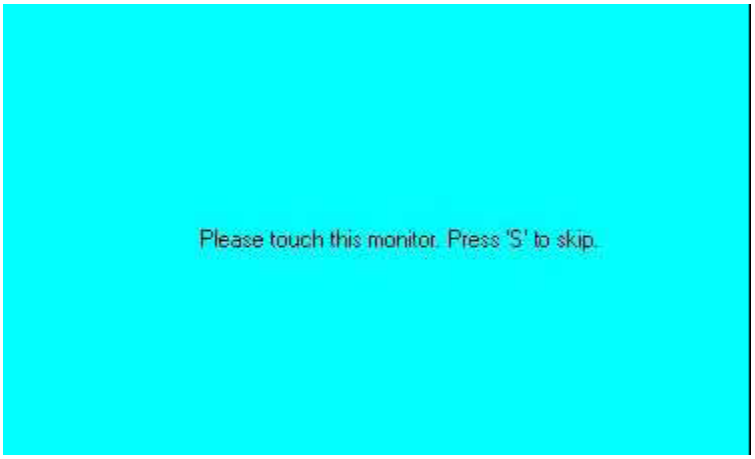
Step 1. Check the **Multiple Monitor Support** box; then click **Map Touch Screens** to assign touch controllers to displays.



Step 2. When the mapping screen message appears, click "**OK"**



Step 3. Touch each screen as it displays **Please touch this monitor. Press 'S' to skip** Following this sequence and touching each screen is called **mapping the touch screens**.



Step 4. After the setting procedure is finished, maybe you need to calibrate for each panel and controller

NOTES:

1. If you used a single VGA output for multiple monitors, please do not use the **Multiple Monitors** function. Just follow the regular procedure for calibration on each of your desktop monitors.

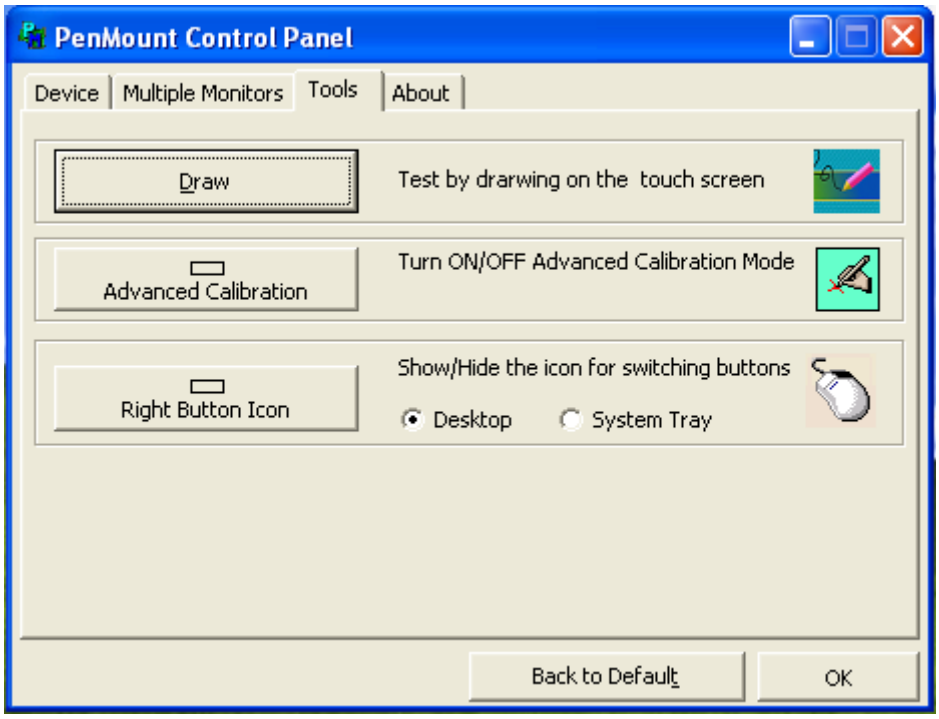
2. The Rotating function is disabled if you use the Multiple Monitors function.

3. If you change the resolution of display or screen address, you have to redo **Map Touch Screens** so the system understands where the displays are.

4. If you more monitor mapping one touch screen, **Please press 'S' to skip mapping step.**

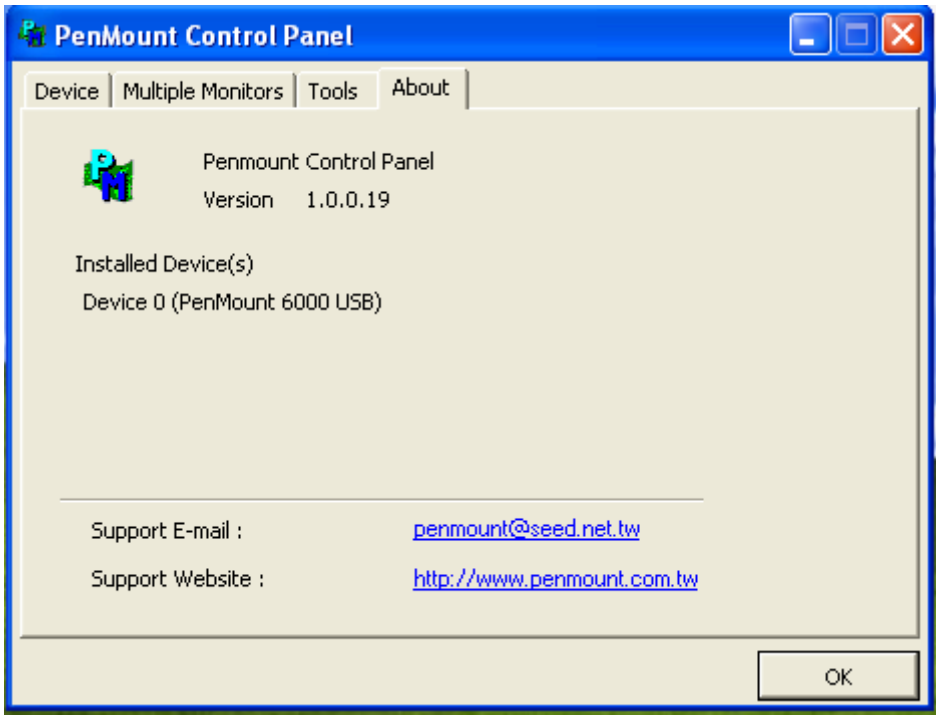
Tools

Draw	**Tests or demonstrates the PenMount touch screen operation.**
Advanced Calibration	**Enable Advanced Calibration function**
Right Button Icon	**Enable right button function. The icon can show on Desktop or System Tray (menu bar).**



About

You can see how many devices of PenMount controller that are plugged to your system



PenMount Monitor Menu Icon

The PenMount monitor icon (PM) appears in the menu bar of Windows 2000/XP system when you turn on PenMount Monitor in PenMount Utilities.

PenMount Monitor has the following function

Control Panel	**Open Control Panel Windows**
Beep	**Setting Beep function for each device**
Right Button	**When you select this function, a mouse icon appears in the right-bottom of the screen.** **Click this icon to switch between Right and Left Button functions.**
Exit	**Exits the PenMount Monitor function.**

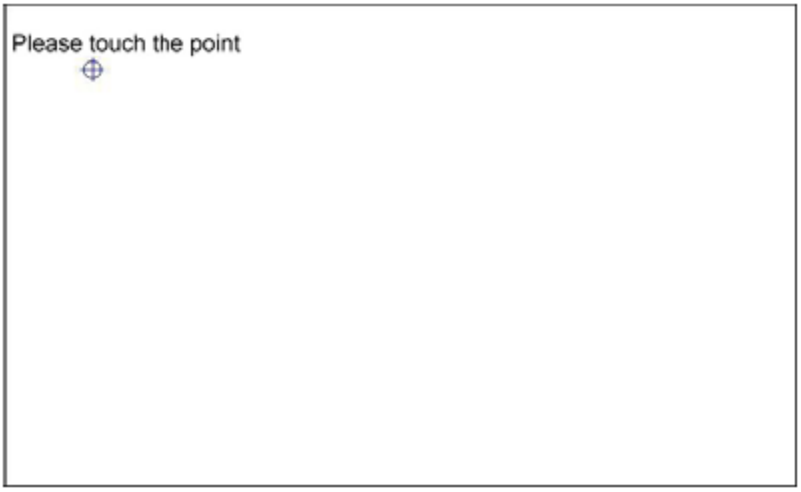
PenMount Rotating Functions

The PenMount driver for Windows 2000/XP supports several display rotating software packages. Windows Me/2000/XP support display rotating software packages such as:

- Portrait's Pivot Screen Rotation Software
- ATI Display Driver Rotate Function
- nVidia Display Driver Rotate Function
- SMI Display Driver Rotate Function
- Intel 845G/GE Display Driver Rotate Function

Configuring the Rotate Function

1. Install the rotation software package.
2. Choose the rotate function (0°, 90°, 180°, 270°) in the 3rd party software. The calibration screen appears automatically. Touch this point and rotation is mapped.



NOTE: The Rotate function is disabled if you use Monitor Mapping

Appendix A: Board Descriptions & Specifications

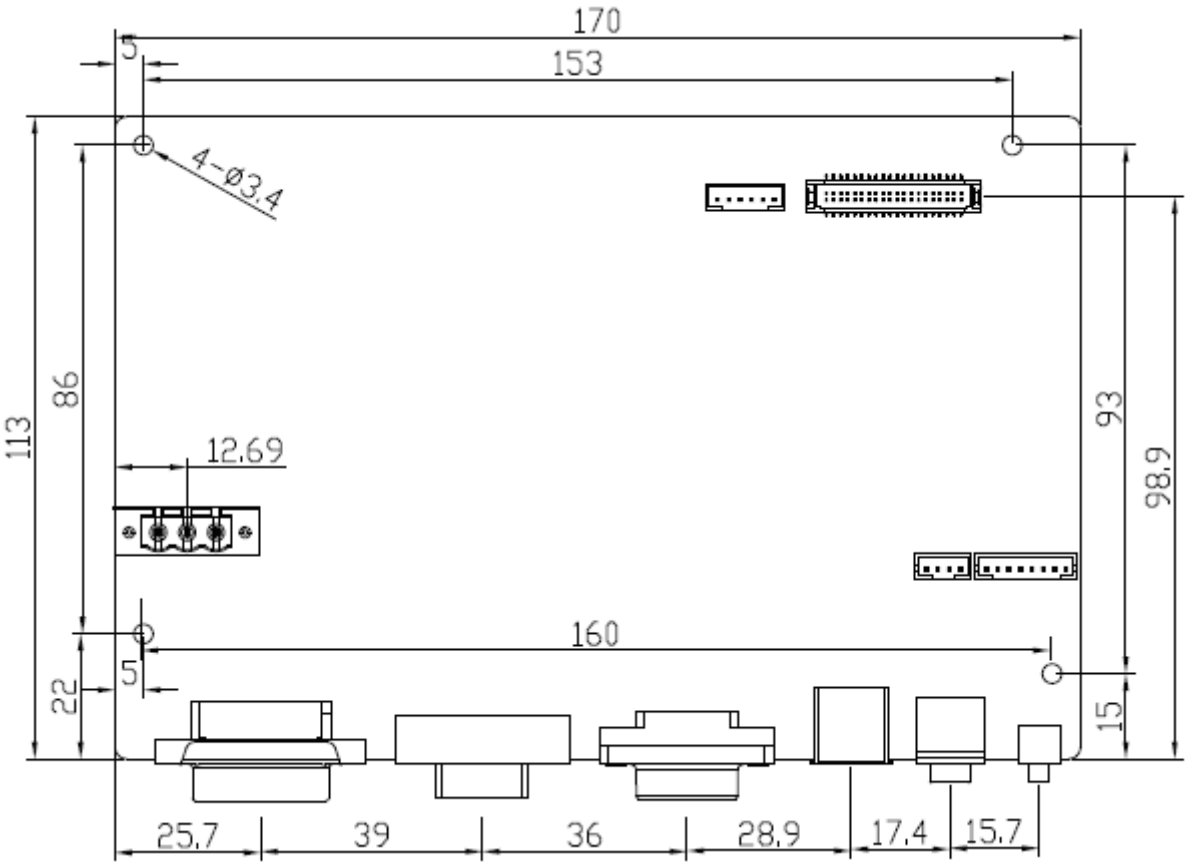
Descriptions

Model	Function Descriptions
TB-6027	AD board,VGA /DVI input,LVDS output,Audio
TB-6027T	AD board,VGA/DVI input,LVDS output,Audio,Touch controller

Specifications

Specifications	
Board Size	113mm x 170mm
Chipset	Mstar TSUMU58NWHJ-LF PQFP128
Input	1 x VGA input Port,DB15 connector 1 x DVI-D input（option） 1 x RS232 input port, DB9 connector (option) 1 x USB 2.0 input port, Single USB connector 1 x Line in port,JACK (option) 1 x 3-pin power input connector (Wide range DC+9V~32V) 1 x SW1 (Select VGA or DVI signal input) 1 x OSD function support 1 x Touch controller
Output	1 x LVDS output 1 x Audio Power Amplifier (Line out)
Resolution	Up to 1920 x1080 for LVDS
Power input	DC9V-36V
Temperature	Operating: -20℃ to 70℃ Storage: -40℃ to 85℃
Humidity	10% - 90%, non-condensing, operating
EMI/EMS	Meet CE/FCC class A

Board Dimensions



(units :mm)

Figure A: Dimensions of TB-6027(P)

Appendix B: Panel Mounting and VESA Mounting

The APA9XXX is designed to be panel-mounted and VESA mounted as shown in Picture. Just carefully place the unit through the hole and tighten the given 10 screws from the rear to secure the mounting.

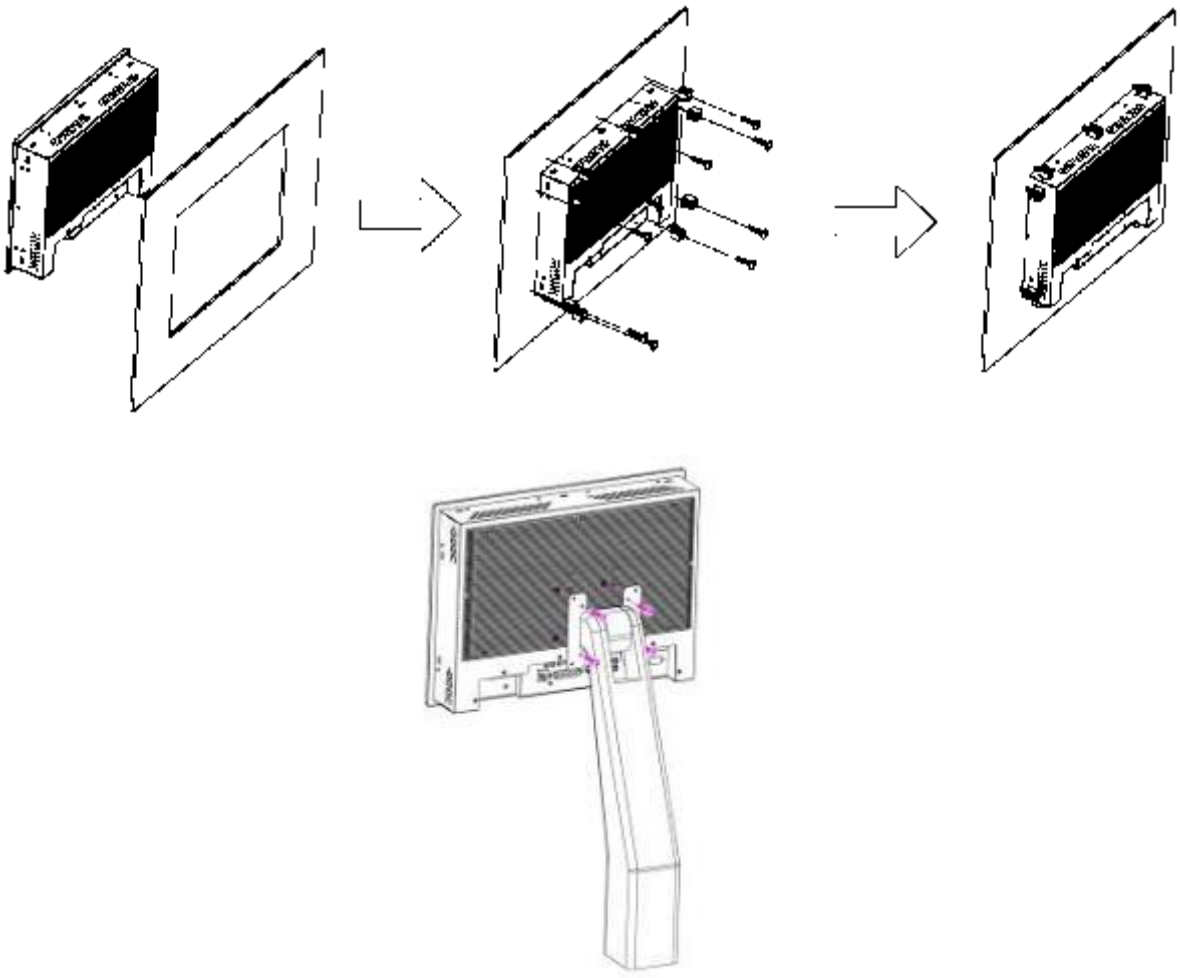


Figure B: Panel mounting and VESA mounting

Attention

*Notice：

Tighten the mounting clip screws by hand until the gasket seal contacts the mounting surface uniformly.

Tighten the mounting clips screws to a torque of 8 ~ 10 kgf-cm by using the specified sequence, making sure not to overtighten.

*Tighten the mounting clips to the specified torque to provide a proper seal and to prevent damage to the product. Acnodes assumes no responsibility for water or chemical damage to the product or other equipment within the enclosure due to improper installation.