

# **PenMount Touch Screen Controller Board Installation Guide**

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# Chapter 1: Introduction

The PenMount Touch Screen Controller Board is the most popular touch screen control board on the market. PenMount control boards, chipsets, and software support a wide range of configurations, applications, and operating systems. Designed for easy configuration and superior touch screen performance, the PenMount control boards are offered for both RS-232 and USB interfaces.

The PenMount Touch Screen Controller Board is a circuit board that you install between a touch screen and a host computer. The control board converts touch input into digital data, which is then converted by software into data that emulates the input from a computer's mouse device.

The control boards are comprised of an interface board for mounting on a host computer, a controller chip, other supporting components, and software drivers. The bundled software drivers offer unique functions and support the most popular hardware platforms and operating systems.

The PenMount control boards are designed not only to be user-friendly, but also to support engineers. All PenMount control boards provide a diagnostic LED that allows both users and engineers to check the touch screen and the control board functions.

## ***About this Manual***

This manual describes the features of the PenMount Touch Screen Controller Board series, how to connect a controller board, and how to install and use the software drivers and utilities with your operating system.

This manual is for users who are using the PenMount Touch Screen Controller Board and software, as well as for engineers who are integrating and customizing the control board for use with other products.

## PenMount Control Boards

PenMount control boards are configured for use with either the RS-232 or USB interface. Depending on design or product requirements, PenMount also provides controller ICs. A control board connects to a touch screen, a power supply and a computer system's RS-232 port or USB port. PenMount offers six control boards:

| Model                | Interface     | Touch Screen Wire Support |
|----------------------|---------------|---------------------------|
| <b>PenMount 9084</b> | <b>RS-232</b> | <b>4,8</b>                |
| <b>PenMount 9026</b> | <b>RS-232</b> | <b>4,8</b>                |
| <b>PenMount 9036</b> | <b>RS-232</b> | <b>4, 5, 8</b>            |
| <b>PenMount 90A4</b> | <b>RS-232</b> | <b>4</b>                  |
| <b>PenMount 5184</b> | <b>USB</b>    | <b>4,8</b>                |
| <b>PenMount 5126</b> | <b>USB</b>    | <b>4,8</b>                |
| <b>PenMount 51A5</b> | <b>USB</b>    | <b>5</b>                  |

## Drivers & Utilities

All of the control boards come bundled with software drivers and utilities that support the most popular hardware platforms and operating systems. Once you install the drivers and utilities, you can use this software to configure and calibrate your touch screen. The PenMount drivers support the following operating systems:

### **PenMount 9000 Series (RS-232 Interface)**

Windows XP, Windows 2000, Windows NT, Windows 95/98/Me, Windows 3.1, Windows CE, DOS, Linux, QNX

### **PenMount 5000 Series (USB Interface)**

Windows XP, Windows 2000, Windows 95/98/Me, Windows CE, Linux

## After Sales Service

PenMount control boards and software is modified and updated on a regular basis. For more latest updated information, downloads, and technical support, please refer to our website at: [www.salt.com.tw](http://www.salt.com.tw)



# Chapter 2: Installing PenMount Control Boards

The procedures that follow describe how to install and configure the hardware for each of the PenMount Touch Screen Control Boards.

## ***Installation Requirements***

You need the following to install a touch screen using a PenMount Touch Screen Control Board:

### **Computer**

- An IBM-compatible host computer
- A communications port, either RS-232 or USB
- A Compact Disc drive
- One of the following operating systems installed on the computer: Windows XP, Windows 2000, Windows NT, Windows 95/98/Me, Windows 3.1,
- Windows CE, DOS, Linux, QNX

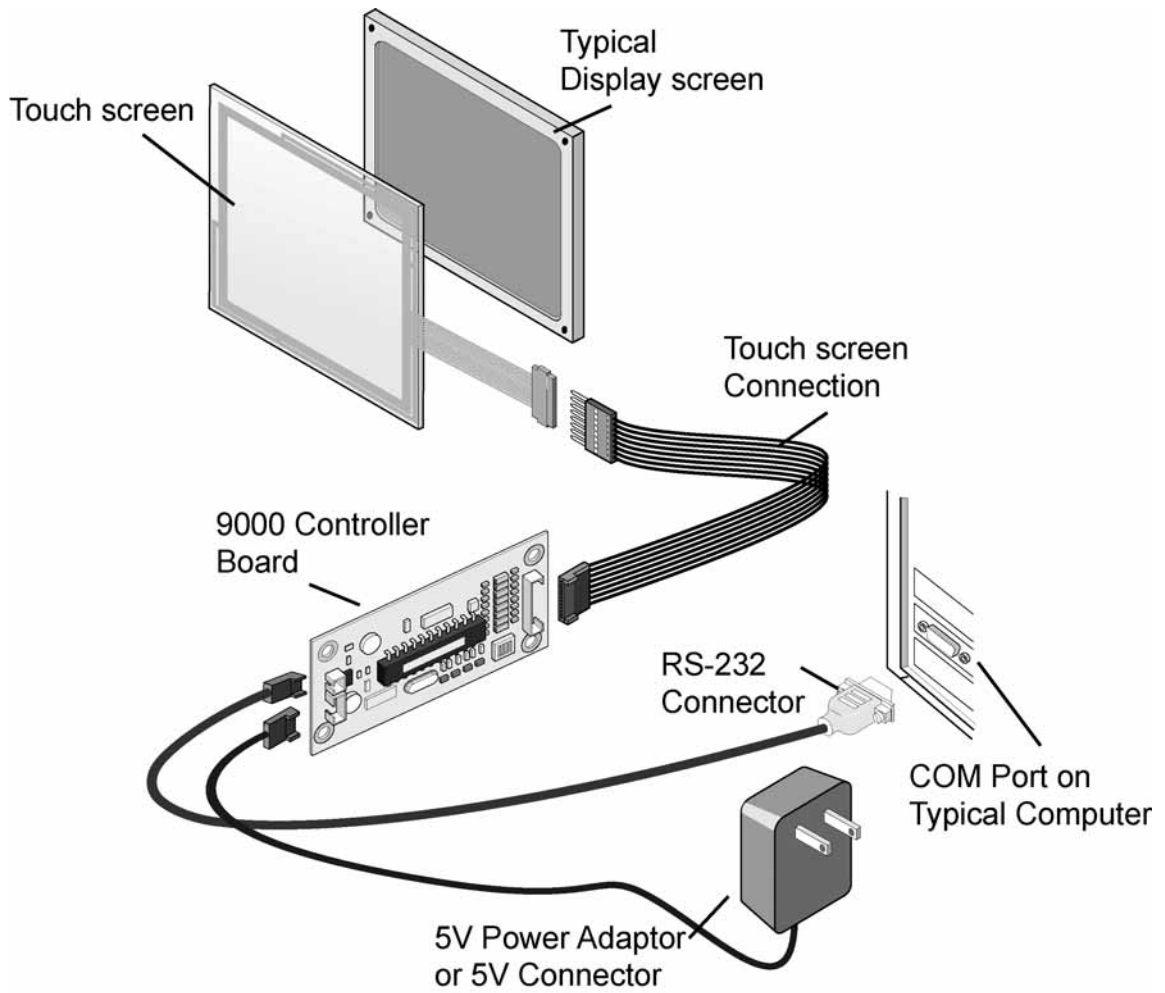
### **Touch Screen**

- A 4-wire tail analog resistive touch screen
- A 5-wire tail analog resistive touch screen
- A 8-wire tail analog resistive touch screen

### **Control Board**

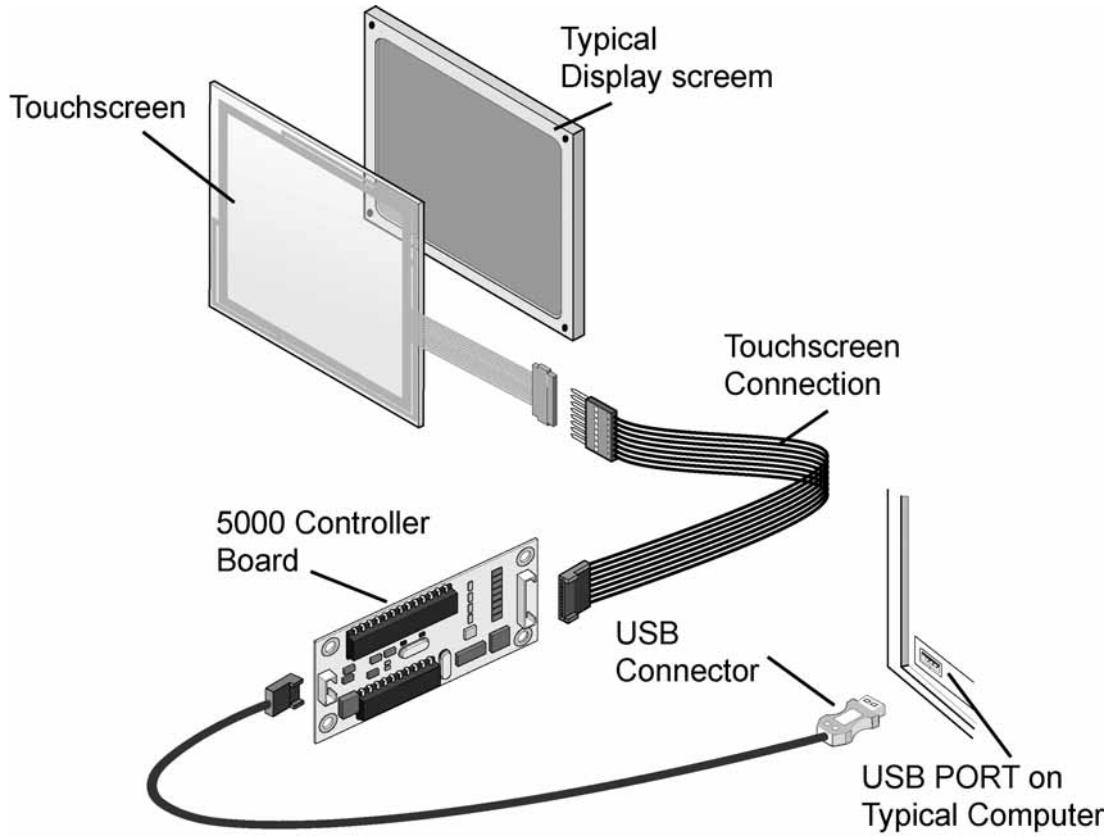
- A PenMount Touch Screen Control Board
- Cables to connect the control board to the touch screen, the computer's communications port
- A cable to connect the power supply (This is only required for 9000 control boards using the RS-232 port)
- The PenMount Drivers & Utilities disk

### Connecting a 9000 Control Board (RS-232)



*Connecting a PenMount 9000 (RS-232) Control Board*

**Connecting a 5000 Control Board (USB)**



*Connecting a PenMount 5000 (USB) Control Board*

## RS-232 Serial Boards (9000 Series)

The PenMount 9000 control boards use the RS-232 serial interface. There are four models in the 9000 Series. The general procedure for board installation is similar, though hardware connection and configuration varies for each board.

### PenMount 9036

The PenMount 9036 control board is an RS-232 interface touch screen control board that supports 4-wire, 5-wire, and 8-wire touch screens. The size of the board is 25 x 60mm and it has two connectors and one dipswitch on-board. Follow the steps below to install the 9036 control board.

**NOTE:** See Appendix A for the control board's connector pin definitions.

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 3φ screw holes.



*PenMount 9036 Touch Screen Control Board*

2. Find the white 6-pin right angle connector (on the left in the photo above). 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 photo above). Attach the female end of the touch screen cable to this connector. If you have a 4-wire touch screen attach the cable to pins 1~5. If you have a 5-wire touch screen attach the cable to pins 1~6. If you have an 8-wire touch screen attach the cable to pins 1~9. Attach the male end of the cable to the touch screen tail.
4. Mount your touch screen to the display.

## Chapter 2 Installing PenMount Control Boards

- Find the on-board DIP switch (on the upper right of the photo above). 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.

### DIP Switch Settings

| 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     |

- Turn on power to the computer and the display.
- Install the software drivers and utilities and calibrate the touch screen. See Chapter 4.

### PenMount 9026B

The PenMount 9026B control board is an RS-232 interface touch screen control board that supports 4-wire and 8-wire touch screens. The size of the board is 20 x 60mm and it has two connectors on-board. Follow the steps below to install the 9026B control board.

**NOTE:** See Appendix A for the control board's connector pin definitions.

- 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 2φ screw holes.



*PenMount 9026B Touch Screen Control Board*

- Find the white 6-pin right angle connector (on the left in the photo above). The power cable is pin 1 and pin 2. Solder the power and ground wire to the system.

## Chapter 2 *Installing PenMount Control Boards*

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The RS-232 cable is from 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 photo above). Attach the female end of the touch screen cable to this connector. If you have a 4-wire touch screen attach the cable to pins 1~5. If you have an 8-wire touch screen attach the cable to pins 1~9. Attach the male end of the cable to the touch screen tail.
4. Mount your touch screen to the display using tape or Velcro.
5. Turn on power to the computer and the display.
6. Install the software drivers and utilities and calibrate the touch screen. See Chapter 4.

### **PenMount 9084**

The PenMount 9084 control board is an RS-232 interface touch screen control board that supports 4-wire and 8-wire touch screens. The size of the board is 40 x 80mm and it has three connectors on-board. Follow the steps below to install the 9084 control board.

**NOTE:** See Appendix A for the control board's connector pin definitions.

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 4φ screw holes.



*PenMount 9084 Touch Screen Control Board*

2. Find the 2-pin and 4-pin white right angle connectors (on the left in the photo above). Attach the power cable to the 2-pin connector, then solder the power and ground wire to the system. Attach the RS-232 cable to the 4-pin connector, and then 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 photo above).

## Chapter 2 *Installing PenMount Control Boards*

Attach the female end of the touch screen cable to this connector. If you have a 4-wire touch screen attach the cable to pins 1~5. If you have an 8-wire touch screen attach the cable to pins 1~9. Attach the male end of the cable to the touch screen tail.

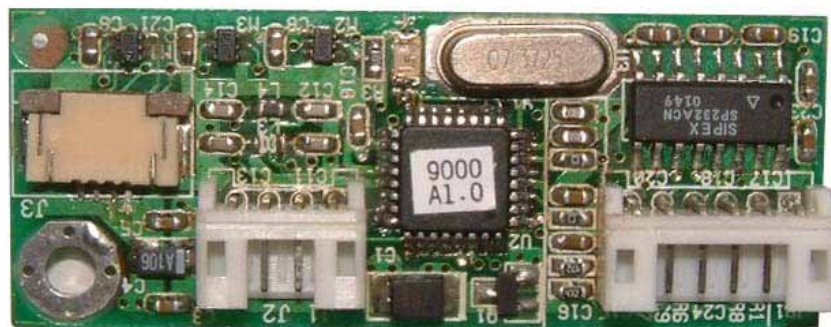
4. Mount your touch screen to the display using tape or Velcro.
5. Turn on power to the computer and the display.
6. Install the software drivers and utilities and calibrate the touch screen. See Chapter 4.

### **PenMount 90A4**

The PenMount 90A4 control board is an RS-232 interface touch screen control board that only supports 4-wire touch screens. The size of the board is 20 x 50mm and it has three connectors on-board. Follow the steps below to install the 90A4 control board.

**NOTE:** The 90A4 control board features automatic adjustment of touch pin assignments, so there is no need to worry about touch pin definitions. After you plug the touch screen tail to the connector, the PenMount touch screen drivers adjust the pin assignment through calibration.

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 3φ screw holes.



*PenMount 90A4 Touch Screen Control Board*

2. Find the white 6-pin right angle connector (on the left in the photo above). 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 4-pin right angle connector (on the left in the photo above). This

connector's pitch is 2.0mm. Attach the female end of the touch screen cable to this connector. There is also a ZIF connector with 1.0mm pitch for ZIF type touch screen tails (on the left in the photo above). The contact side is 'UP'. Attach the touch screen tail to the ZIF connector.

**NOTE 1:** If you need a 1.25mm pitch connector, the circuit is ready underneath the 4-pin white connector. Remove the 4-pin right angle connector and plug in a new 1.25mm pitch connector for use with this type of touch screen.

**NOTE 2:** We welcome inquiries for OEM production of this board with different ZIF type connectors, or other connectors, or other board designs. Please contact us for details.

4. Mount your touch screen to the display using tape or Velcro.
5. Turn on power to the computer and the display.
6. Install the software drivers and utilities and calibrate the touch screen. See Chapter 4.



### USB Boards (5000 Series)

The PenMount 5000 control boards use the USB interface. There are two models in the 5000 Series. The general procedure for board installation is similar, though hardware connection and configuration varies for each board.

#### PenMount 5184

The PenMount 5184 control board is a USB interface touch screen control board that supports 4-wire and 8-wire touch screens. The size of the board is 40 x 80mm and it has two connectors and two DIP switches on-board. This board can support up to 15 USB devices. Follow the steps below to install the 5184 control board.

**NOTE:** See Appendix A for the control board's connector pin definitions.

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 4φ screw holes.



*PenMount 5184 Touch Screen Control Board*

2. Find the white 4-pin right angle connector (on the left in the photo above). Attach the USB cable to this connector and then fix the other end of the cable to the USB connector at the back of the display.
3. Find the white 9-pin right angle connector (on the right in the photo above). Attach the female end of the touch screen cable to this connector. If you have a 4-wire touch screen attach the cable to pins 1~5. If you have an 8-wire touch screen attach the cable to pins 1~9. Attach the male end of the cable to the touch screen tail.
4. Set the dipswitch SW2 if you are connecting multiple displays
5. Mount your touch screen to the display using tape or Velcro.
6. Turn on power to the computer and the display.

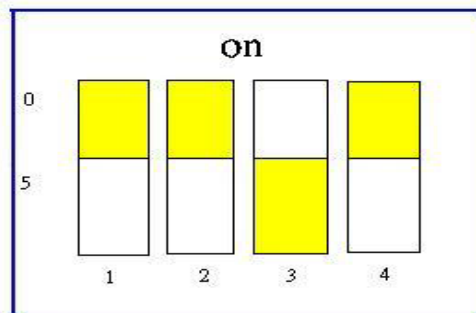
## Chapter 2 Installing PenMount Control Boards

7. Install the software drivers and utilities and calibrate the touch screen. See Chapter 4.

### *Setting the SW2 Dipswitch for Multiple Displays*

The dipswitch SW2 is for setting the control board for use with ‘Multiple Displays.’ The PenMount 5184 control board supports up to 15 displays. Settings are described in the table below, where 0 means ‘OFF’ and 1 means ‘ON’.

For example, the setting the board for the fifth display is illustrated in the following diagram:



*Dipswitch SW2*

### **SW2 Dipswitch Settings for Multiple Displays**

| The 1 <sup>st</sup> display | The 2 <sup>nd</sup> display | The 3 <sup>rd</sup> display | The 4 <sup>th</sup> display | The 5 <sup>th</sup> display |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| 1111                        | 0111                        | 1011                        | 0011                        | 1101                        |

| The 6 <sup>th</sup> display | The 7 <sup>th</sup> display | The 8 <sup>th</sup> display | The 9 <sup>th</sup> display | The 10 <sup>th</sup> display |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|
| 0101                        | 1001                        | 0001                        | 1110                        | 0110                         |

| The 11 <sup>th</sup> display | The 12 <sup>th</sup> display | The 13 <sup>th</sup> display | The 14 <sup>th</sup> display | The 15 <sup>th</sup> display |
|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| 1010                         | 0010                         | 1100                         | 0100                         | 1000                         |

If the USB control board is connected to only one display there is no need to adjust the SW2 dipswitch, any setting is OK. If you connect several displays the sequence should be from small number to larger number, for example, if there are 3 PenMount USB control boards connected to a USB port, it will work in the sequence 1, 2, 3. It will not work if the sequence is 1, 3, 2 or 3, 2, 1.

**NOTE:** The dipswitch SW1 on the PenMount 5184 USB board is set at ‘ON’.

### PenMount 51A5

The PenMount 51A5 control board is a USB interface touch screen control board that supports only 5-wire touch screens. The size of the board is 25 x 60mm and it has two connectors and one DIP switch on-board. This board can support up to 15 USB devices. Follow the steps below to install the 51A5 control board.

**NOTE:** See Appendix A for the control board's connector pin definitions.

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 3φ screw holes.



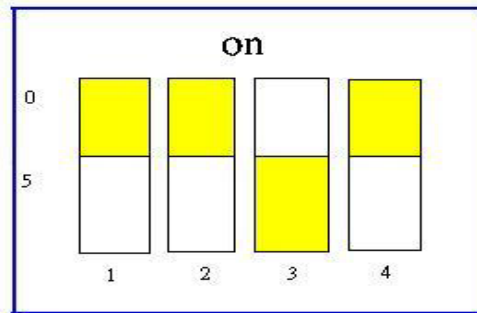
*PenMount 51A5 Touch Screen Control Board*

2. Find the white 4-pin right angle connector (on the left in the photo above). Attach the USB cable to this connector and then fix the other end of the cable to the USB connector at the back of the display.
3. Find the white 9-pin right angle connector (on the right in the photo above). Attach the female end of the touch screen cable to this connector. Attach the 5-wire touch screen cable to pins 1~5. Attach the male end of the cable to the touch screen tail.
4. Set the dipswitch SW1 if you are connecting multiple displays
5. Mount your touch screen to the display using tape or Velcro.
6. Turn on power to the computer and the display.
7. Install the software drivers and utilities and calibrate the touch screen. See Chapter 4.

*Setting the SW1 Dipswitch for Multiple Displays*

The dipswitch SW1 is for setting the control board for use with ‘Multiple Displays.’ The PenMount 51A4 control board supports up to 15 displays. Settings are described in the table below, where 0 means ‘OFF’ and 1 means ‘ON’.

For example, the setting the board for the fifth display is illustrated in the following diagram:



*Dipswitch SW1*

**SW1 Dipswitch Settings for Multiple Displays**

|                              |                              |                              |                              |                              |
|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| The 1 <sup>st</sup> display  | The 2 <sup>nd</sup> display  | The 3 <sup>rd</sup> display  | The 4 <sup>th</sup> display  | The 5 <sup>th</sup> display  |
| 1111                         | 0111                         | 1011                         | 0011                         | 1101                         |
| The 6 <sup>th</sup> display  | The 7 <sup>th</sup> display  | The 8 <sup>th</sup> display  | The 9 <sup>th</sup> display  | The 10 <sup>th</sup> display |
| 0101                         | 1001                         | 0001                         | 1110                         | 0110                         |
| The 11 <sup>th</sup> display | The 12 <sup>th</sup> display | The 13 <sup>th</sup> display | The 14 <sup>th</sup> display | The 15 <sup>th</sup> display |
| 1010                         | 0010                         | 1100                         | 0100                         | 1000                         |

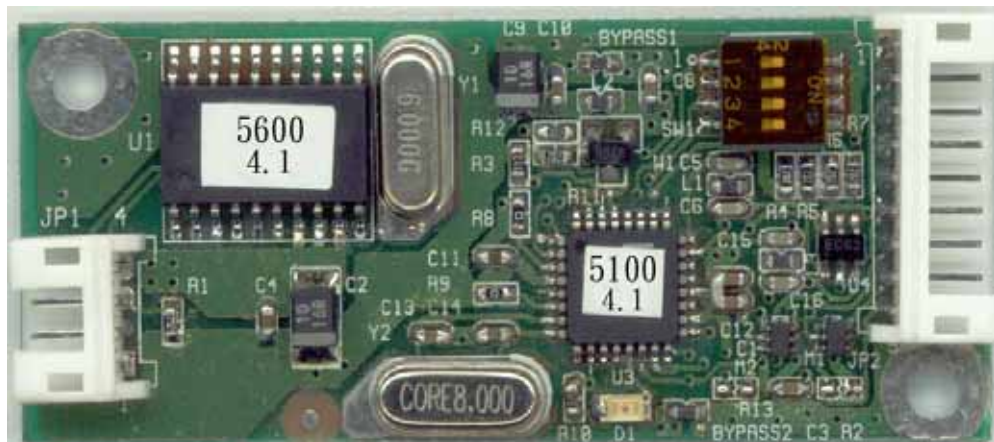
If the USB control board is connected to only one display there is no need to adjust the SW1 dipswitch, any setting is OK. If you connect several displays the sequence should be from small number to larger number, for example, if there are 3 PenMount USB control boards connected to a USB port, it will work in the sequence 1, 2, 3. It will not work if the sequence is 1, 3, 2 or 3, 2, 1.

### PenMount 5126

The PenMount 5126 control board is a USB interface touch screen control board that supports 4-wire and 8-wire touch screens. The size of the board is 25 x 60mm and it has two connectors and one DIP switch on-board. This board can support up to 15 USB devices. Follow the steps below to install the 5126 control board.

**NOTE:** See Appendix A for the control board's connector pin definitions.

8. 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 3φ screw holes.



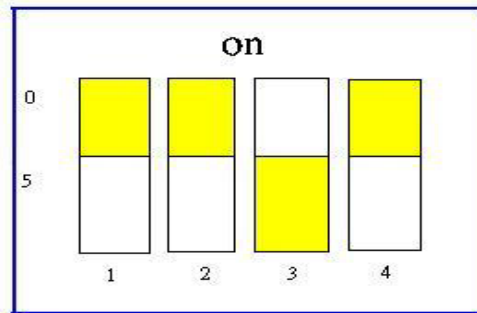
*PenMount 5126 Touch Screen Control Board*

9. Find the white 4-pin right angle connector (on the left in the photo above). Attach the USB cable to this connector and then fix the other end of the cable to the USB connector at the back of the display.
10. Find the white 9-pin right angle connector (on the right in the photo above). Attach the female end of the touch screen cable to this connector. Attach the 4-wire touch screen cable to pins 1~5. If you have an 8-wire touch screen attach the cable to pins 1~9. Attach the male end of the cable to the touch screen tail.
11. Set the dipswitch SW1 if you are connecting multiple displays
12. Mount your touch screen to the display using tape or Velcro.
13. Turn on power to the computer and the display.
14. Install the software drivers and utilities and calibrate the touch screen. See Chapter 4.

*Setting the SW1 Dipswitch for Multiple Displays*

The dipswitch SW1 is for setting the control board for use with ‘Multiple Displays.’ The PenMount 5126 control board supports up to 15 displays. Settings are described in the table below, where 0 means ‘OFF’ and 1 means ‘ON’.

For example, the setting the board for the fifth display is illustrated in the following diagram:



*Dipswitch SW1*

**SW1 Dipswitch Settings for Multiple Displays**

|                              |                              |                              |                              |                              |
|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| The 1 <sup>st</sup> display  | The 2 <sup>nd</sup> display  | The 3 <sup>rd</sup> display  | The 4 <sup>th</sup> display  | The 5 <sup>th</sup> display  |
| 1111                         | 0111                         | 1011                         | 0011                         | 1101                         |
| The 6 <sup>th</sup> display  | The 7 <sup>th</sup> display  | The 8 <sup>th</sup> display  | The 9 <sup>th</sup> display  | The 10 <sup>th</sup> display |
| 0101                         | 1001                         | 0001                         | 1110                         | 0110                         |
| The 11 <sup>th</sup> display | The 12 <sup>th</sup> display | The 13 <sup>th</sup> display | The 14 <sup>th</sup> display | The 15 <sup>th</sup> display |
| 1010                         | 0010                         | 1100                         | 0100                         | 1000                         |

If the USB control board is connected to only one display there is no need to adjust the SW1 dipswitch, any setting is OK. If you connect several displays the sequence should be from small number to larger number, for example, if there are 3 PenMount USB control boards connected to a USB port, it will work in the sequence 1, 2, 3. It will not work if the sequence is 1, 3, 2 or 3, 2, 1.

# Chapter 3: Installing Software for 9000 Boards

This chapter describes how to install drivers and other software that will allow your PenMount 9000 Controller Boards (RS-232) work with various operating systems.

## **3-1. DOS Driver Installation for the 9000 Controller Board**

Before installing the DOS driver software, you must have the DOS system installed and running on your computer. You must also have one of the following PenMount Serial Interface controller boards installed: 90A4, 9026B, 9036 or 9084. Contents of the PenMount DOS driver folder are listed below.

**INSTALL.EXE** — general purpose installation utility

**PMTSR.COM**

**README.TXT**

**PMOUSE.EXE**

**PMOUSE.CFG**

**ICECREAM.EXE** — demo program

**PMDETECT.EXE** — identifies the communication port and IRQ number of the PenMount Touch Screen. Detected data is saved to the PMOUSE.CFG file.

**PMSET.EXE**

**SWITCH.COM**

**PM.BAT** — the PenMount Touch Screen driver functions

**PMINIT.BAT** — starts the PenMount driver in the system

**CALIBRAT.BAT** — the calibration utility

**SVGA256.BGI**

**SVGA16.BGI**

**EGAVGA.BGI**

**ICECREAM.KEY**

**PMGET.EXE** — retrieves touch data

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

### **Step 1: Use the "INSTALL.EXE" utility**

1. Insert the driver CD-ROM and type "INSTALL".  
“Salt International Corp. PenMount Install Utilities” appears on the screen.

2. Press the ENTER key to install the drivers to drive C or type the hard disc drive where you plan to install the drivers.
3. “Do you want to modify your Autoexec.bat to initialize PenMount? (Y/N)” appears. Choose “Y” to generate initialization instructions for the AUTOEXEC.BAT files. Follow the instructions to complete the installation.

### **Step 2: Identify the communication port and IRQ number.**

1. For first time installation, or changing the PenMount Touch Screen's COM port, use PMDETECT (e.g. C:\PENMOUNT\PMDETECT) to check the COM port and IRQ number. PMDETECT saves the correct data to PMOUSE.CFG file for further use.
2. The driver detects your communication COM port and IRQ number from COM1 IRQ4, COM2 IRQ3, COM3....to COM4 IRQ15. The PenMount driver finds the COM port and IRQ number automatically. The screen then shows:

**PenMount is initialized successfully!!!  
Create file "pmouse.cfg". Success.  
PenMount internal settings:  
Comm. Port: COM<n> IRQ<n>**

**NOTE:** If you do not need a specific IRQ number, the PMDETECT program allows you to skip that IRQ number detection.

For example, if you do not need to detect IRQ5 the command is:

**C:\PENMOUNT\PMDETECT -N5**

If you do not need to detect IRQ5 and IRQ9, the command is:

**C:\PENMOUNT\PMDETECT -N5 -N9**

### **Step 3: Calibration**

1. Use PM.BAT (C:\PENMOUNT\PM) to properly adjust touch screen mapping to the display.
2. Choose "1" DO CALIBRATION (adjusts screen mapping). A screen message asks you to select a video mode number.
3. Use the keyboard to select a video mode number to start the calibration.
4. Touch the upper-center point, then right-center point, bottom-center point and left-center point in sequence. After calibration, the data is shown on the screen. Press any key to continue.



## Chapter 3 *Installing Software for 9000 Boards*

**NOTE:** If the initialization commands are not in AUTOEXEC.BAT, you must initialize the PenMount controller before using the PenMount Touch Screen.

The initialization command is: **C:\PENMOUNT\PMINIT**

The following initialization message should appear:

**PenMount V7.10 Copyright(c) SALT International Corp.**  
**Test:COM<n> IRQ<n> (<n> is the number after PMDETECT done)**  
**PenMount communication settings: COM<N> IRQ<n> Baud Rate:**  
**<xxxx>**  
.....

### **Step 4: Demo**

1. To demo touch screen operation, select "3" DRAWING TEST in PM.BAT file of Utility Directory.
2. Draw on the screen to demo.
3. You can also use the "ICECREAM.EXE" demo program in the "PENMOUNT" directory. The PenMount DOS driver is now installed.

### **PenMount DOS Driver Functions**

The PenMount DOS driver offers several functions. You can change the settings with the following utilities:

|                |   |
|----------------|---|
| Show Settings  | <b>Current setting data is found in the PM.BAT file. View the status with the command: C:\PENMOUNT\PM.</b><br><b>Choose "2" SHOW CURRENT SETTINGS</b>   |
| Beep On or Off | <b>Enable Beep command is:</b><br><b>C:\PENMOUNT\PMOUSE /S</b><br><b>Disable Beep (Default) command is:</b><br><b>C:\PENMOUNT\PMOUSE</b>  |
| Get Touch Data | <b>Get touch data with the "PMGET.EXE" utility. This utility is only available for COM 1 or COM 2 ports.</b><br><b>C:\PENMOUNT\PMGET &lt;COM port&gt; &lt;baud rate&gt;</b><br><b>Touch point addresses appear on the screen.</b> |
| Hide Cursor    | <b>To hide the cursor the command is:</b><br><b>C:\PENMOUNT\PMOUSE /H</b>   |

## **3-2. Windows 3.1 Driver Installation for 9000 Controller Boards**

Before installing the Windows 3.1 driver software, you must have the Windows 3.1 system installed and running on your computer. You must also have one of the following PenMount Serial Interface controller boards installed: 90A4, 9026B, 9036 or 9084. Contents of the PenMount Windows 3.1 driver folder are listed below.

**COMPRESS.EXE**

**CTRLPAL.EX\$**

**DETCMD.DL\_**

**DIALOGUE**

**INSTALL.EXE** — Installation program for PenMount Windows 3.1 driver

**MPEN.38\$**

**MPEN.DR\$**

**SHOWCUR.EX\$**

**STFSETUP.EX\_**

**STFSETUP.IN\_**

**UNINSTPM.EXE**

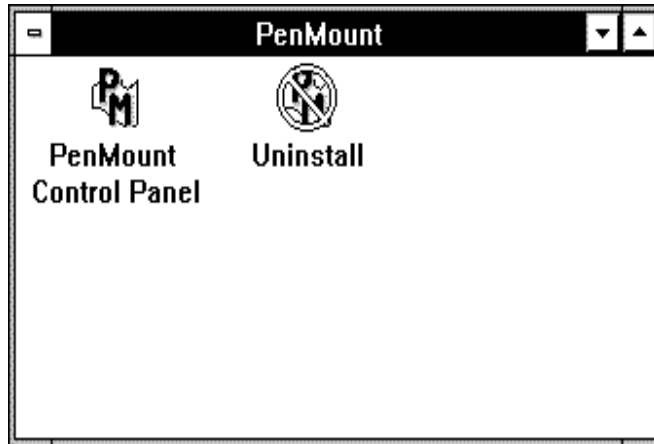
**VER.DL\_**

If you have an older version of PenMount Windows 3.1 driver installed in your system, please remove it first. Follow the procedure below to install the PenMount Windows 3.1 driver.

1. Make sure the Windows 3.1 system is installed in your computer. The PenMount Windows 3.1 driver lets your touch screen coexist with a mouse. If you wish to use a mouse and touch screen at the same time, plug a mouse into one COM port and the PenMount touch screen to another COM port before installing the PenMount Windows 3.1 driver.
2. Open the FILE MANAGER and under the MAIN group, run the "Install.exe" software in the PenMount "WIN31" directory. The first display shows "Welcome to install the PenMouse Driver." Click "Continue" to begin installation.
3. Select the COM port you plugged the PenMount touch screen into, and click "Continue."
4. The next screen is "Set the PORT address for com<x>, select "...[default]" or choose "User define". Then "Set the IRQ Number", select "...[default]" or choose "User define." If you choose "User define," key in an IRQ number. Click "Continue".
5. The last screen shows "Setup succeeded...." Click 'EXIT' to finish setup. A new "PENMOUNT" group is generated after installing the PenMount Windows 3.1

## Chapter 3 Installing Software for 9000 Boards

driver. Restart Windows 3.1. In the PenMount group, two icons appear, “PenMount Control Panel” and “UNINSTALL,” The PenMount Windows 3.1 driver is working concurrently with mouse.



### PenMount Windows 3.1 Driver Functions

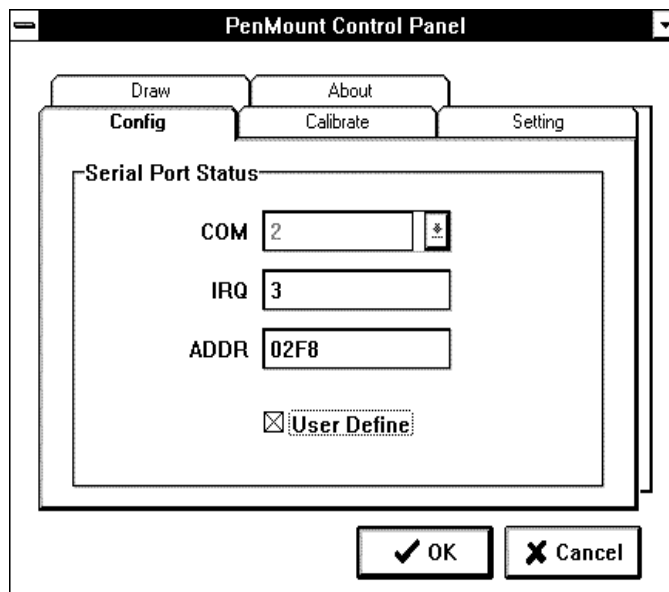
After installing PenMount the Windows 3.1 driver, the system generates a Group named "PenMount" with two icons in the Group.

#### *PenMount Control Panel*

The functions of the PenMount Control Panel are described as follows:

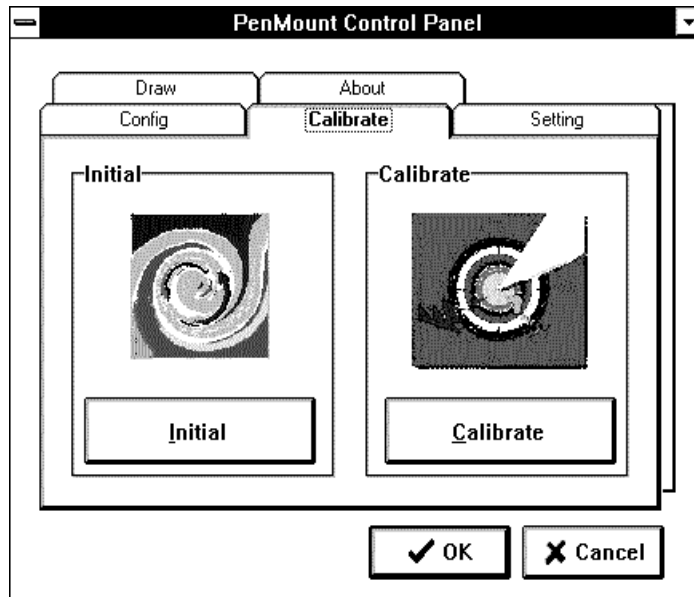
#### **Config**

This sets the COM port, IRQ number and base address. Select COM port and a default IRQ number appears. If the default IRQ number is not what you require, click “USER DEFINE” and key-in an IRQ number and base address.



**Calibrate**

The two screen areas are **Initial** and **Calibrate**. Click **Calibrate** to map the touch screen. The display shows a circle in the screen's upper-center, touch it. The display then shows a circle in the right-center, bottom-center and left-center of the screen. Touch these circles to map the touch screen to the display. Press the **Initial** button to conveniently re-establish connection with the controller board if the RS-232 serial port becomes disconnected.



**Setting**

This sets mouse performance, double click area, speed and testing area.

**Draw**

This drawing function tests and demonstrates the touch screen. Menu items include CLEAR and EXIT.

**About**

This displays the PenMount controller information.

**Uninstall**

Click this icon and the system removes all utilities and the PenMount group automatically.

### 3-3. Windows 95 Driver Installation for 9000 Controller Boards

Before installing the Windows 95 driver software, you must have the Windows 95 system installed and running on your computer. You must also have one of the following PenMount Serial Interface controller boards installed: 90A4, 9026B, 9036 or 9084. Contents of the PenMount Windows 95 driver folder are listed below.

|                     |                   |
|---------------------|-------------------|
| <b>_INST32I.EXE</b> | <b>_SETUP.EXE</b> |
| <b>_ISDEL.EXE</b>   | <b>OS.DAT</b>     |
| <b>LANG.DAT</b>     | <b>_SETUP.DLL</b> |
| <b>SETUP.INS</b>    | <b>DATA.TAG</b>   |
| <b>SETUP.INI</b>    | <b>_SYS1.HDR</b>  |
| <b>_SYS1.CAB</b>    | <b>_USER1.HDR</b> |
| <b>_USER1.CAB</b>   | <b>SETUP.LID</b>  |
| <b>SETUP.BMP</b>    | <b>DATA1.HDR</b>  |
| <b>DATA1.CAB</b>    | <b>LAYOUT.BIN</b> |
| <b>CONFIG.INI</b>   | <b>README.TXT</b> |

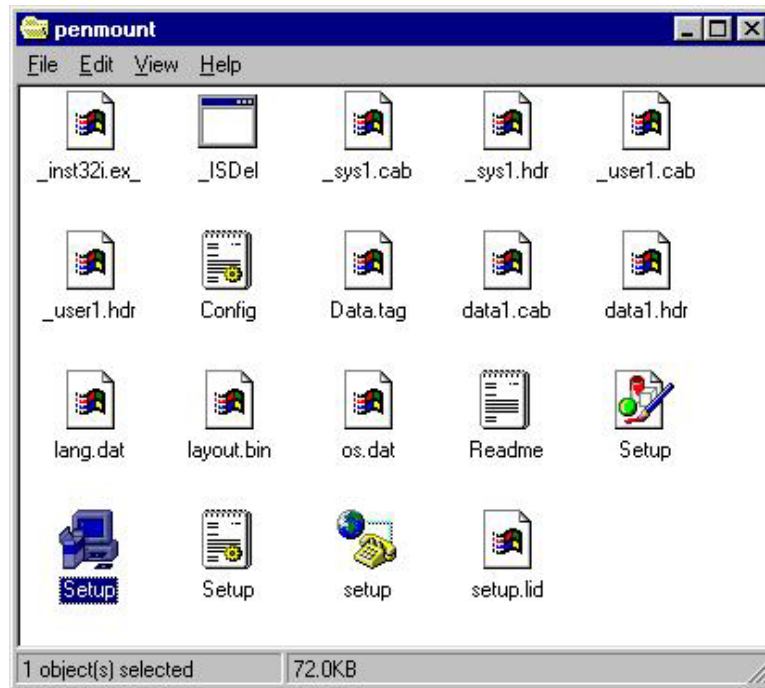
If you have an older version of the PenMount Windows 95 driver installed in your system, please remove it first. Follow the steps below to install the PenMount Windows 95 driver.

1. When the system first detects the controller board, a screen appears that shows "Unknown Device." Press Cancel.



2. From the "Start" menu select "Run".

3. Find "setup.exe" in the Windows 95 driver folder.

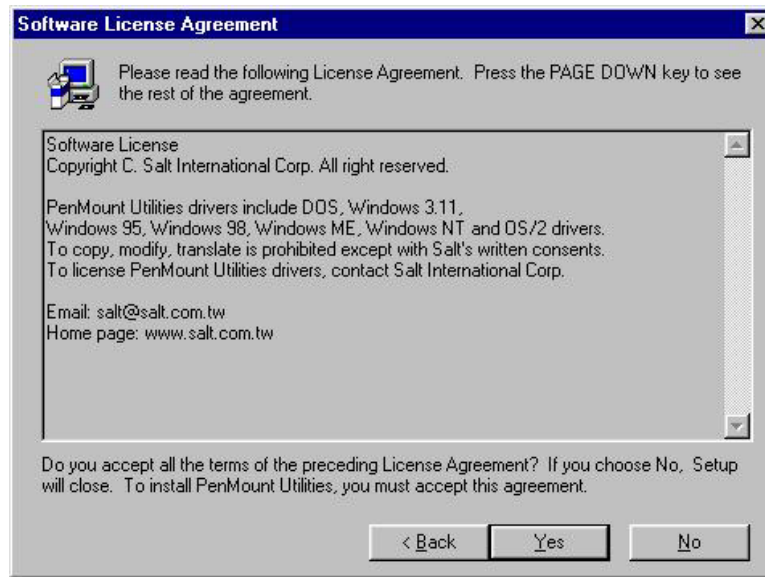


4. The PenMount logo appears, then "Installation Wizard," "PenMount Utilities" and a "Welcome" message appear. Select "Next."



## Chapter 3 Installing Software for 9000 Boards

5. The Software License Agreement screen and Information screen appear. Select "Yes" and "Next."



6. The Choose Destination Location screen appears. The installs PenMount Utilities in the folder: C:\Program Files\PenMount\Win9x. Select "Next" or modify the folder name to one you would like to use.



7. The Select Program screen appears. The default is "PenMount Utilities." Select "Next" or change it.



8. The Start Copying Files screen appears. Select "Next" to copy files to the system.



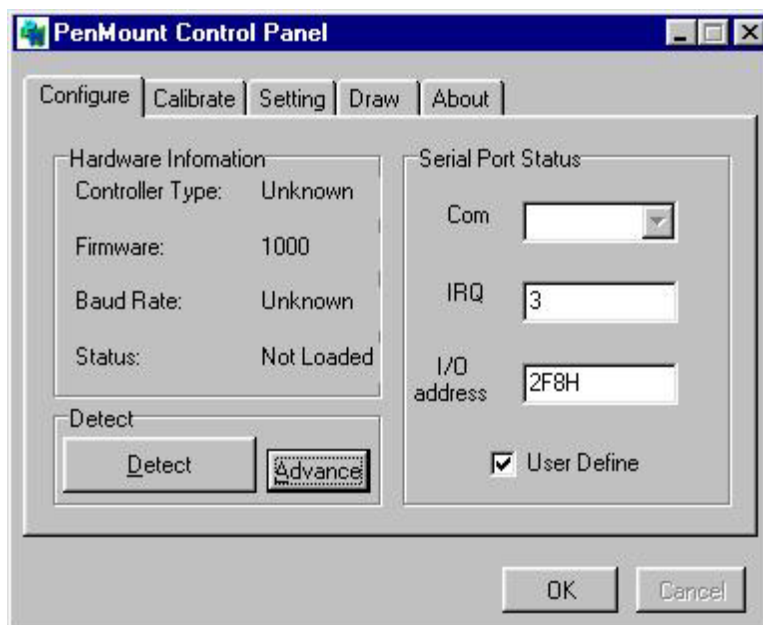


9. The Setup Complete screen appears. Select "Finish."



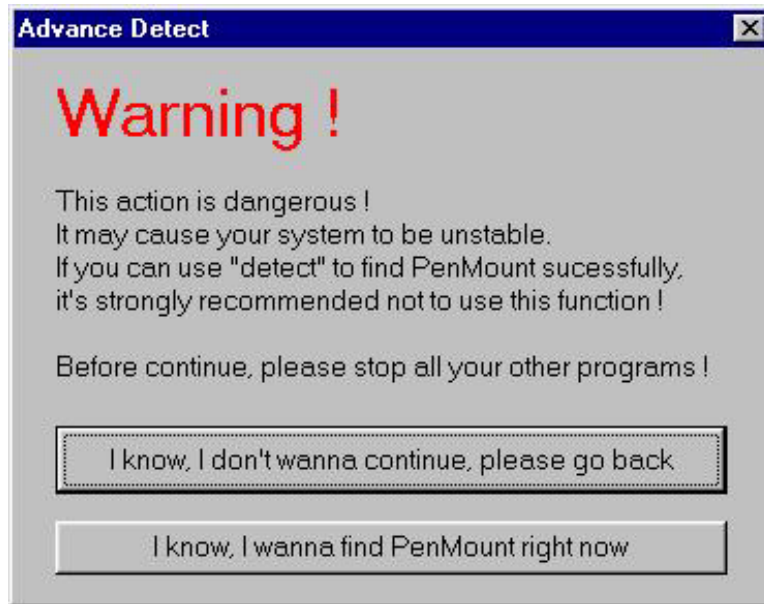
### Configuring the Software

After you install the software the PenMount Control Panel appears. In the “Configure” panel set the correct COM port, IRQ number and base address. Each of the functions in the PenMount Control Panel is explained in the following section.

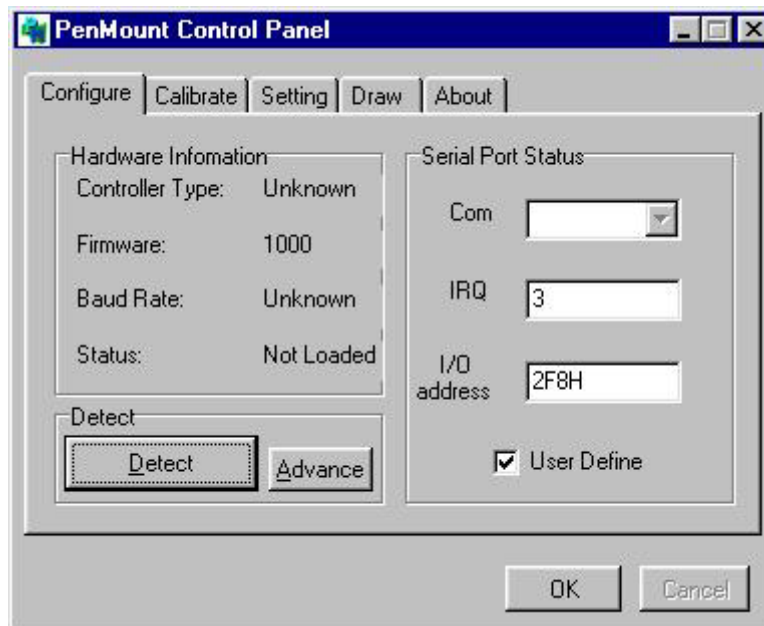


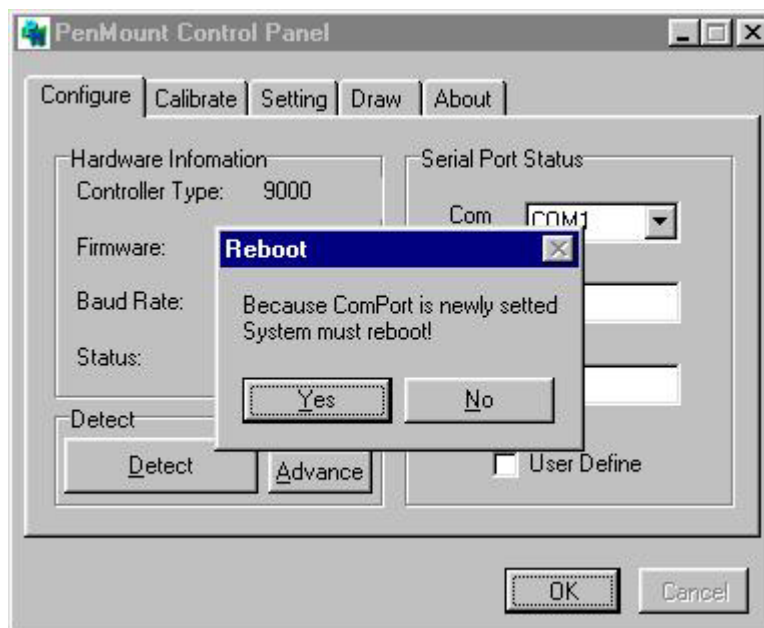
If your touch screen is connected to the COM1 or COM2 port, use the “Detect” button to auto-detect the COM port. If you do not know which COM port is connected, the “Advance” detect button helps you find the correct data. Before

selecting the “Advance” button you must close all other programs first, otherwise it may cause these programs to crash. A third way to define the COM port is to input the data directly by selecting “User Define.” After making selections click OK and the system asks to reboot. Once the system reboots, the PenMount touch screen should be working.



You must perform a calibration after rebooting the system. Select ‘PenMount Control Panel’ from ‘PenMount Utilities’ that is in ‘Programs’, or select the ‘PM Control Panel’ by clicking the ‘PM’ icon in the menu bar. Refer to the PenMount Windows 95 Driver Functions below on how to perform a calibration.





### PenMount Windows 95 Driver Functions

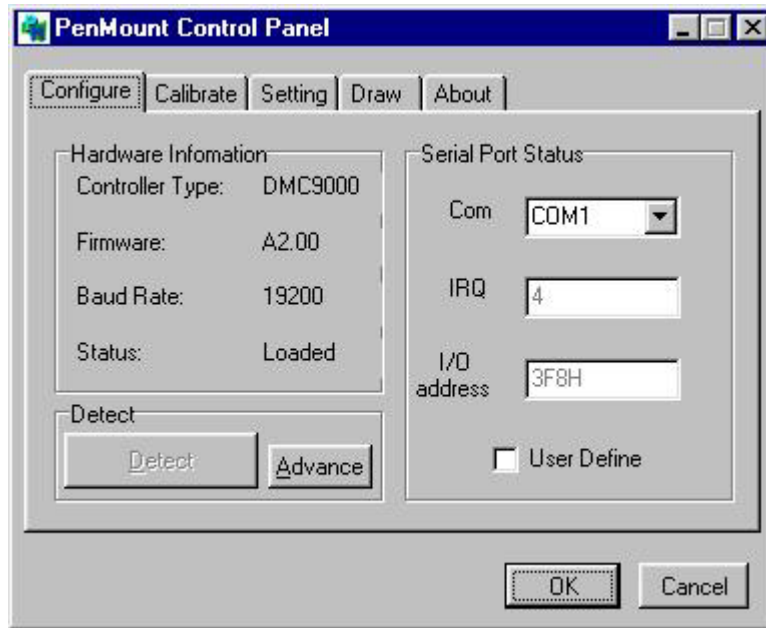
The Windows 95 driver functions are described below.

#### *PenMount Control Panel*

##### **Configure**

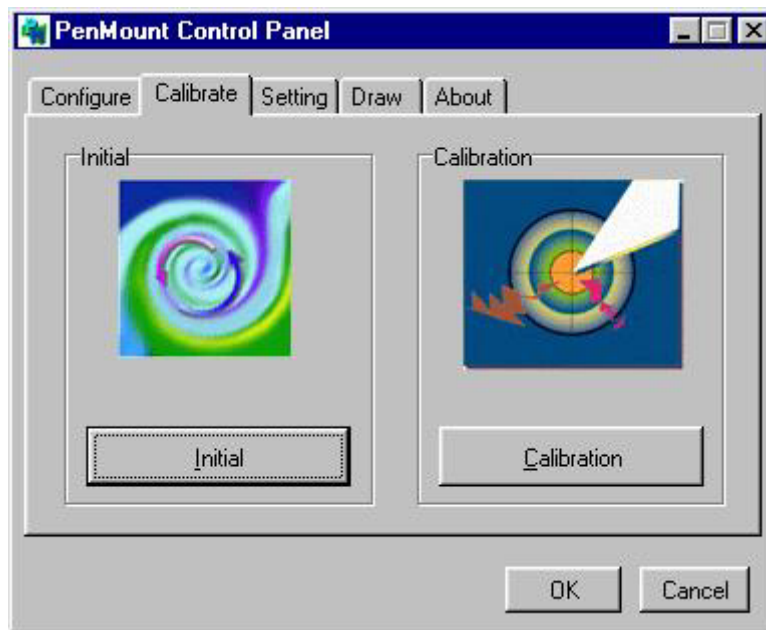
This item screen sets hardware connections, such as the RS-232 port, the IRQ number and the base address.

- |                 |  |
|-----------------|--|
| Controller Type | <b>This shows the PenMount controller type, which is DMC9000.</b>  |
| Baud Rate       | <b>Baud rate is fixed at 19200 for DMC9000.</b>  |
| Detect          | <b>Detects the connected port only if it is COM1 or COM2.</b>  |
| Advance         | <b>This detects COM1 to COM4 port, detecting the COM port and IRQ number in sequence. Note that you must close all other programs running before you select this function.</b> |
| User Define     | <b>Lets you input this data from your keyboard.</b>  |



**Calibrate:**

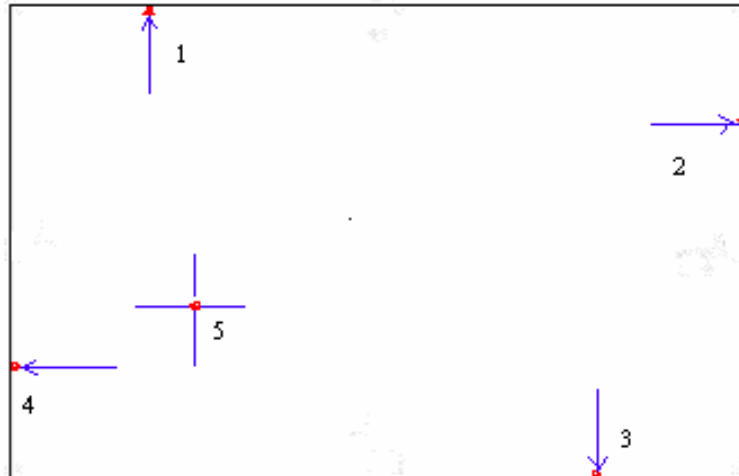
This item provides the **Initial** and **Calibration** functions.



**Initial**                    **This button conveniently re-establishes connection with the controller board if the RS-232 serial port becomes disconnected.**

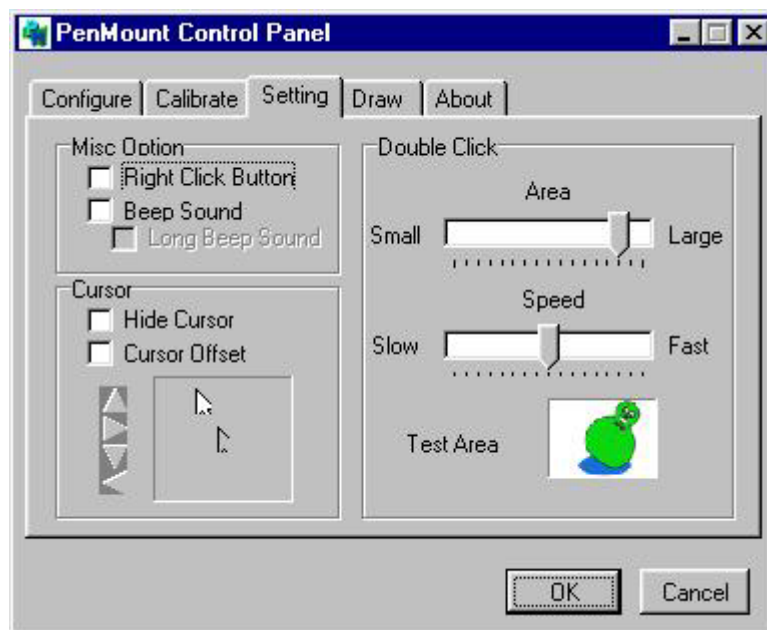
**Calibration**           **This button maps the touch panel to the display. Click Calibration and touch the five points in sequence to calibrate.**

## Chapter 3 Installing Software for 9000 Boards



### Setting

This item allows setting the mouse and other interface functions.



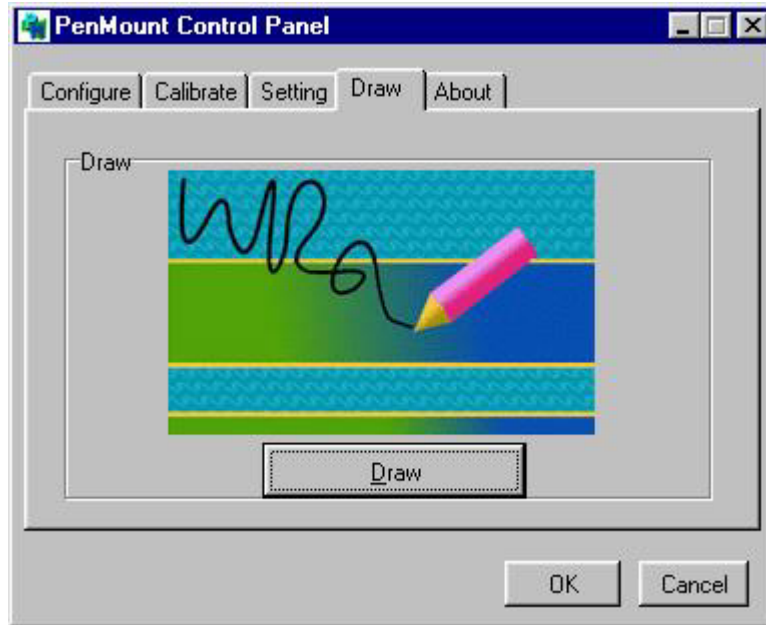
Misc. Option     **Set the Right Click Button, Beep Sound and Long Beep Sound.**

Cursor            **Set Hide Cursor or Cursor Offset. Use the arrow keys to adjust cursor offset.**

Double Click     **Adjusts and tests double click area and speed. Double click in the test area and the tumbler swings back and forth.**

**Draw**

Tests or demos PenMount touch screen operation. The display shows touch location. Click **Draw** to start.

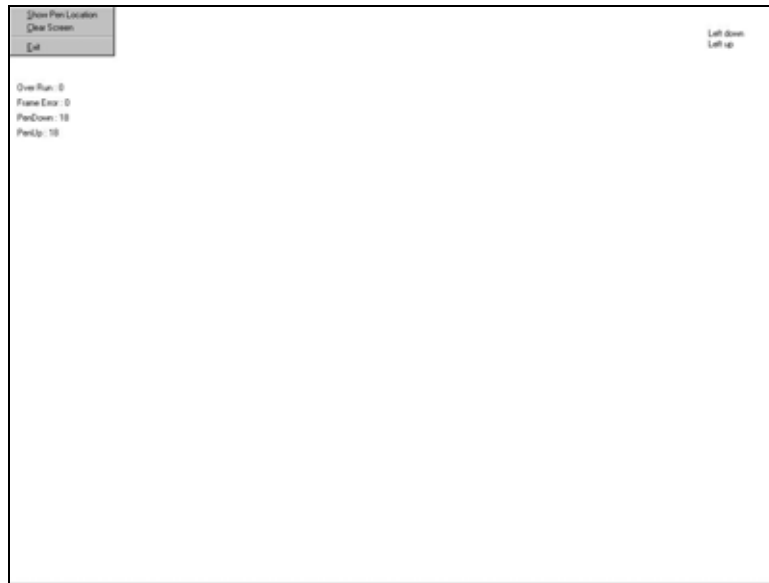


Touch the screen with your finger or a stylus and the drawing screen registers touch activity such **left**, **right**, **up**, **down**, **pen up**, and **pen down**.



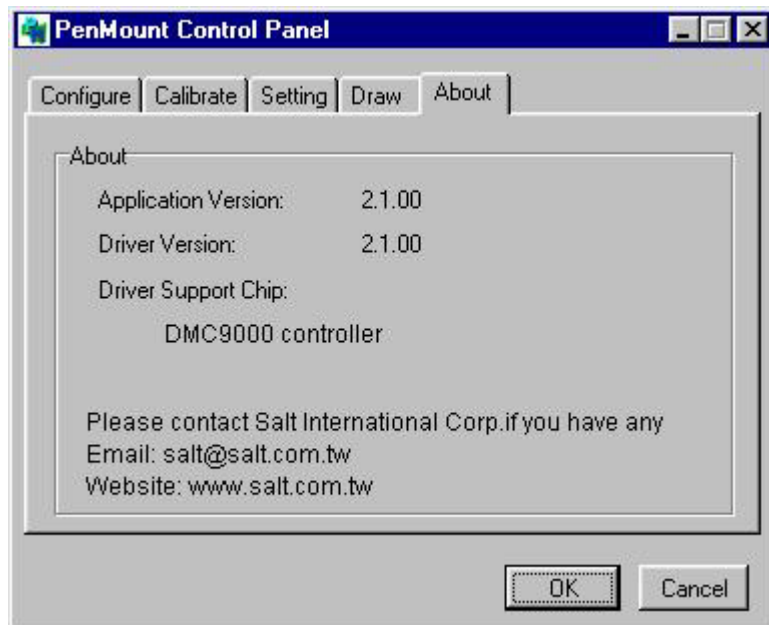
## Chapter 3 *Installing Software for 9000 Boards*

Click Clear Screen to clear the drawing.



### **About**

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



*PenMount Monitor Menu Icon*

The PenMount monitor icon (PM) appears in the menu bar of Windows 95 system when you turn on PenMount Monitor in PenMount Utilities.



PenMount Monitor has the following functions.



**Initial**                      **This resets the PenMount controller chipset. Normally, you do not need to use this function. The Windows 95 driver checks the controller chipset automatically.**

**Right Click 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.**



**Hide Cursor**                **Set to hide or show cursor.**

**Cursor Offset**              **Adjust the cursor offset. See Setting of PenMount Control Panel.**

**Beep Sound**                **Turns beep on or off.**

**Exit**                         **Exits the PenMount Monitor function.**



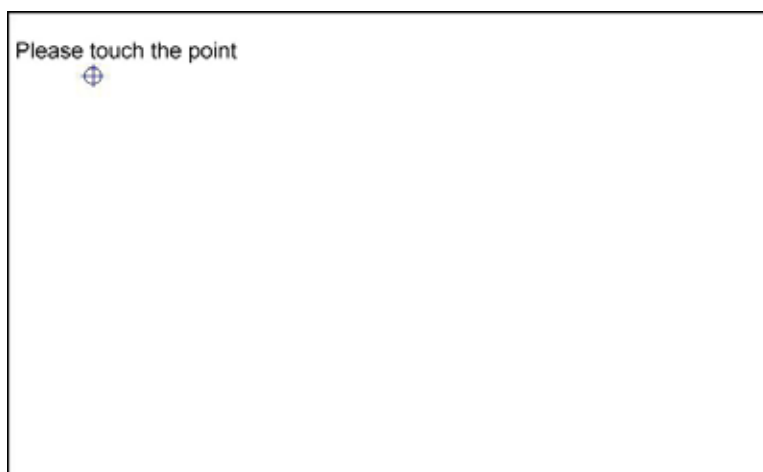
### *PenMount Rotating Functions*

The PenMount driver for Windows 95 supports several display rotating software packages. Please see Chapter 5 for more information. The PenMount drivers for Windows 95, Windows 98/Me, Windows 2000/XP, as well as Windows 98 USB and 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 3<sup>rd</sup> party software. The calibration screen appears automatically. Touch this point and rotation is

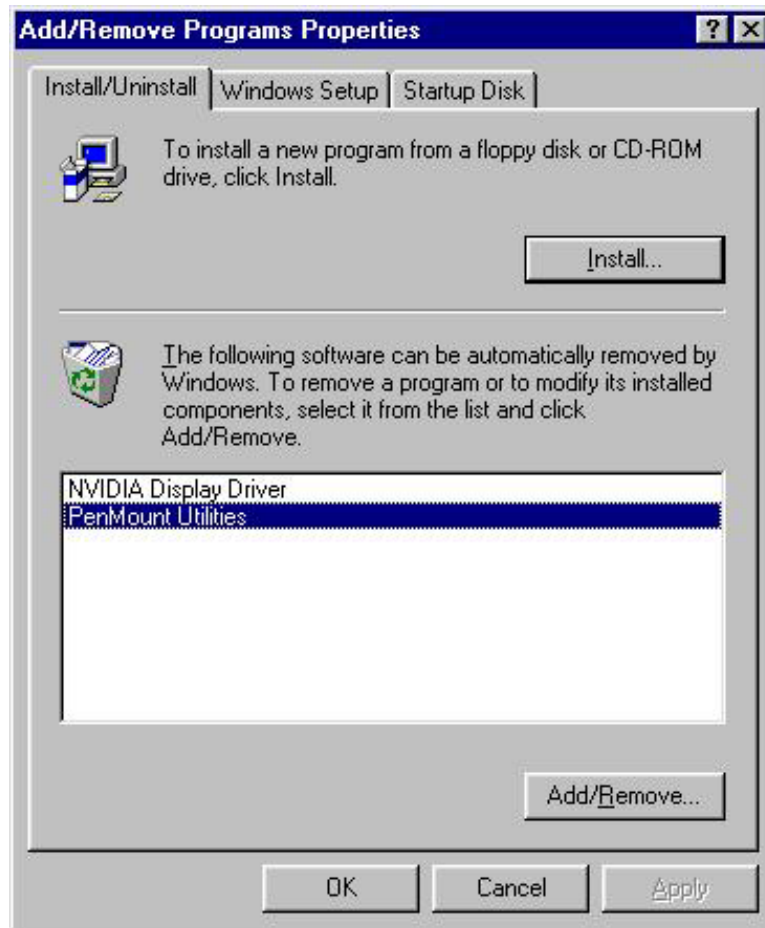


mapped.

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

### **Uninstall the PenMount Windows 95 driver**

1. Exit the PenMount monitor (PM) in the menu bar.
2. From 'PenMount Utilities' in 'Programs', select the 'Uninstall' utility.



3. This message appears: "Are you sure you want to completely remove 'PenMount Utilities' and all its components?"
4. Select 'Yes' to remove the PenMount Windows 95 driver.
5. Reboot system and the PenMount Windows 95 driver is removed from system.

### **3-4. Windows 98/Me Driver Installation for 9000 Controller Boards**

Before installing the Windows 98/Me driver software, you must have the Windows 98/Me system installed and running on your computer. You must also have one of the following PenMount Serial Interface controller boards installed: 90A4, 9026B, 9036 or 9084. Contents of the PenMount Windows 98/Me driver folder are listed below.

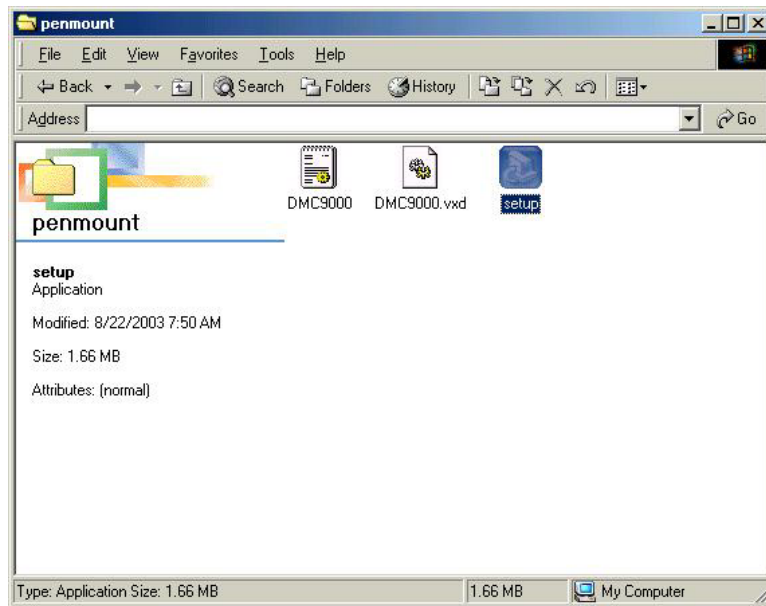
**SETUP.EXE**  
**DMC9000.INF**  
**DMC9000.VXD**

If you have an older version of the PenMount Windows 98/Me driver installed in your system, please remove it first. Follow the steps below to install the PenMount Windows 98/Me driver.

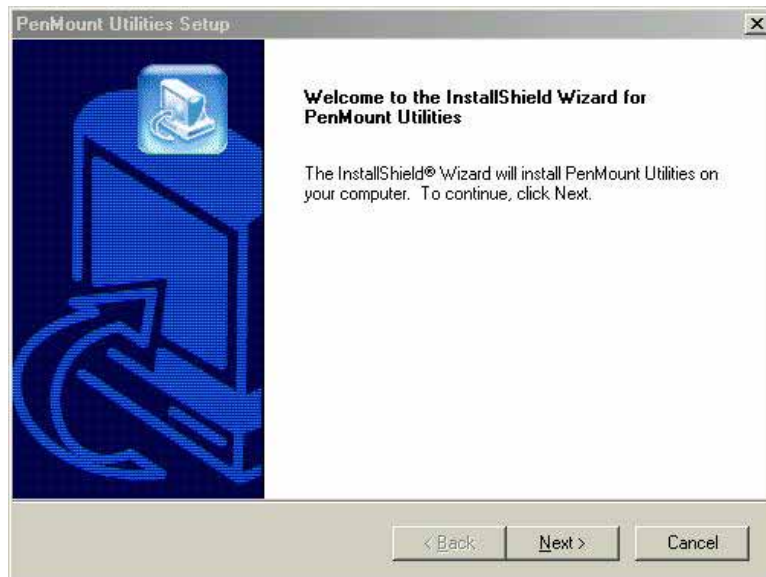
1. When the system first detects the controller board, a screen appears that shows “Unknown Device.” Do not use this hardware wizard. Press Cancel.



2. Install PenMount Windows 98/Me driver to your system from the CD-ROM:

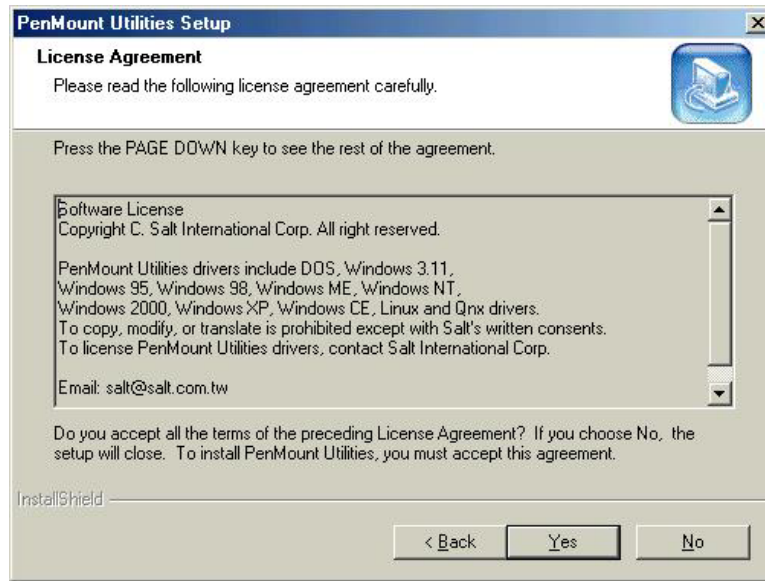


3. A welcome message for the PenMount utilities setup program appears. Select “Next.”

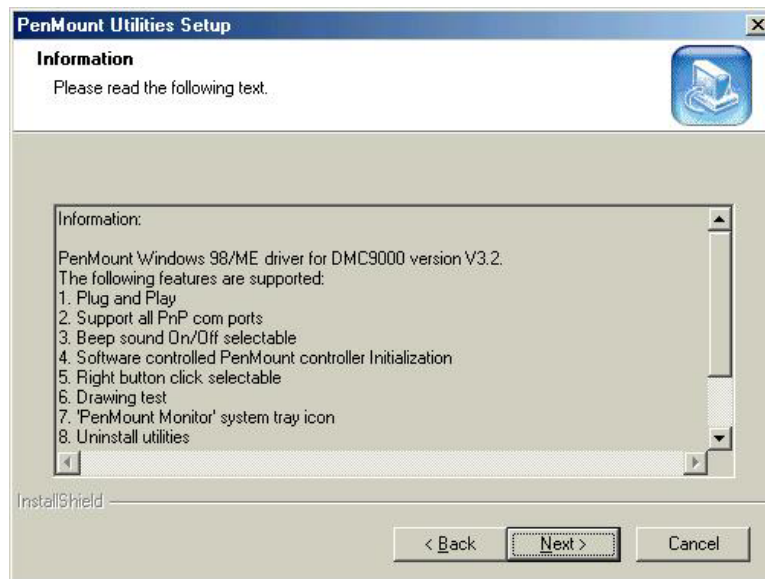


## Chapter 3 Installing Software for 9000 Boards

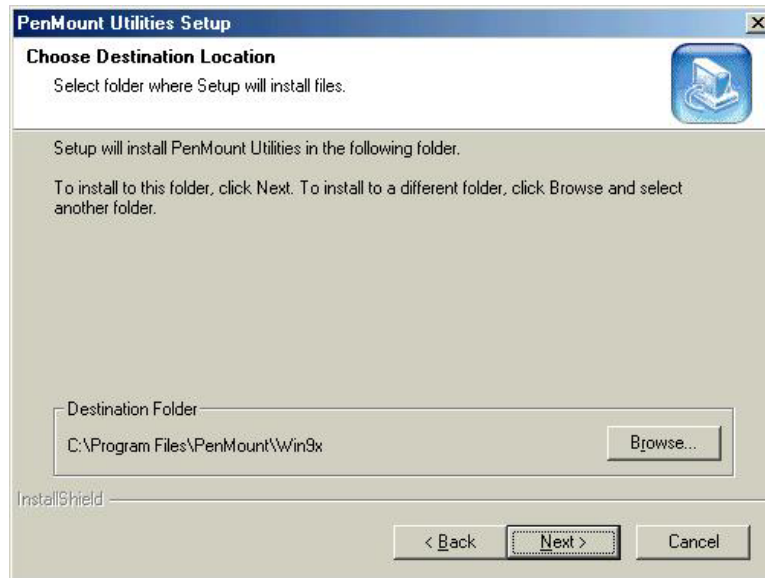
4. The Software License Agreement screen appears. Select "Yes."



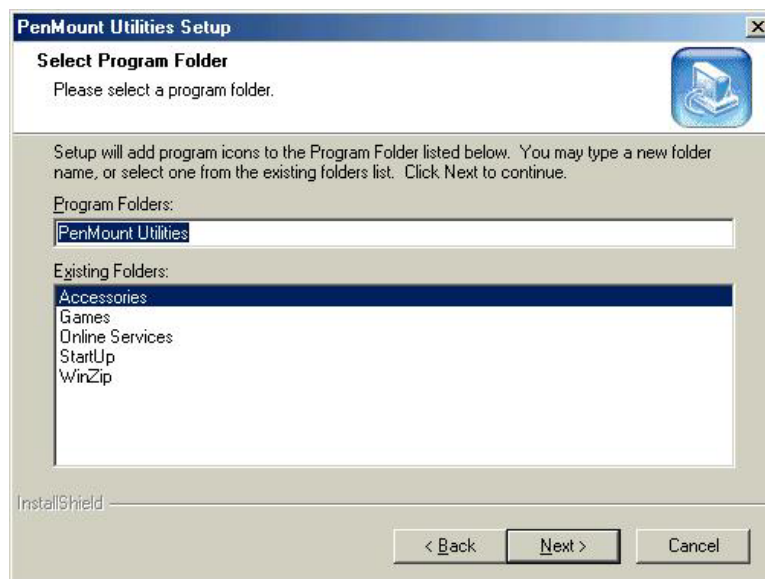
5. The Information screen appears. Select "Next."



6. The Choose Destination Location screen appears. This installs PenMount Utilities in the folder: C:\Program Files\PenMount\Win9x. Select "Next" or modify the folder name to one you would like to use.

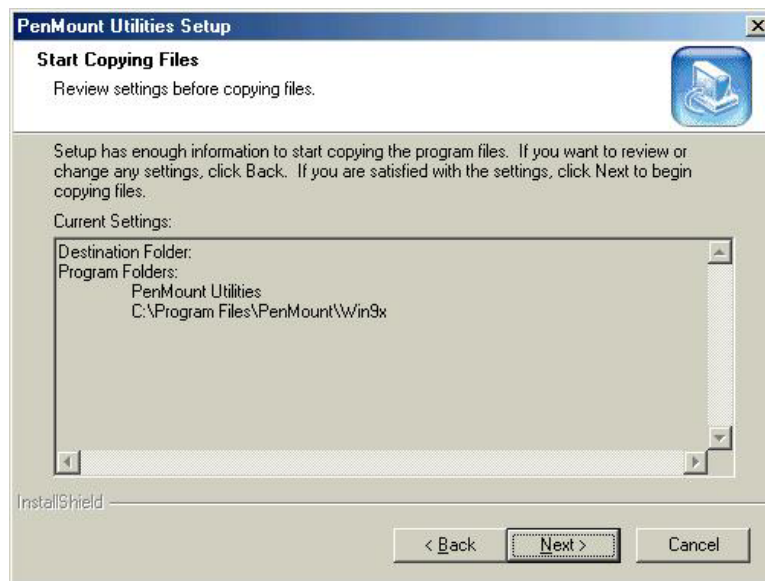


7. The Select Program Folder screen appears. The default is "PenMount Utilities." Select "Next" or change it.

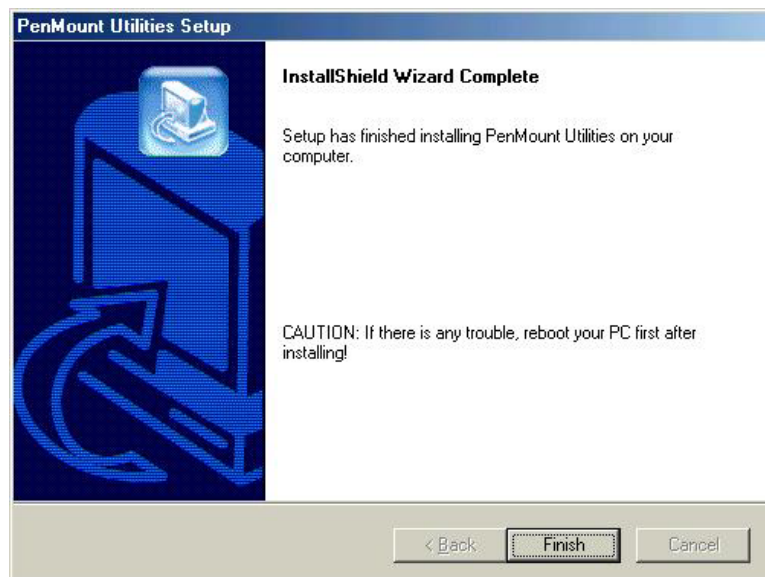


## Chapter 3 Installing Software for 9000 Boards

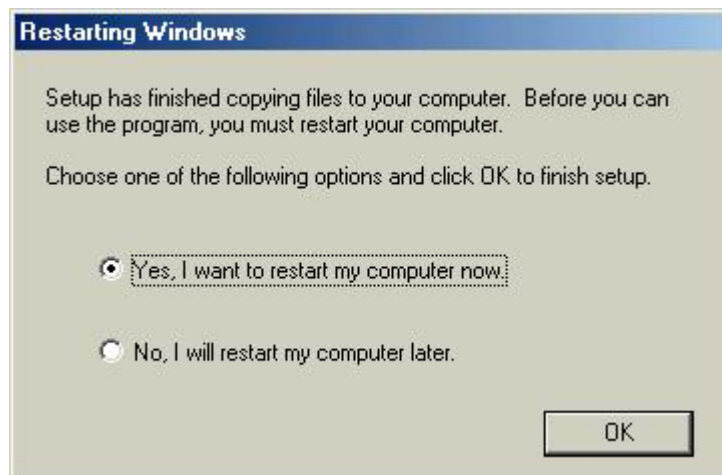
8. The Start Copying Files screen appears. Select "Next" to copy files to the system.



9. The Setup Complete screen appears. Select "Finish."



10. The “Restarting Windows” screen appears, choose “Yes, I want to restart my computer now,” and “OK.”



### **Configuring the PenMount Windows 98/Me Driver**

Upon restarting, the computer automatically finds the new 9000 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, click “Calibrate.”

#### *PenMount Control Panel*

The functions of the PenMount Control Panel are explained in the following sections.

#### **Calibrate**

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

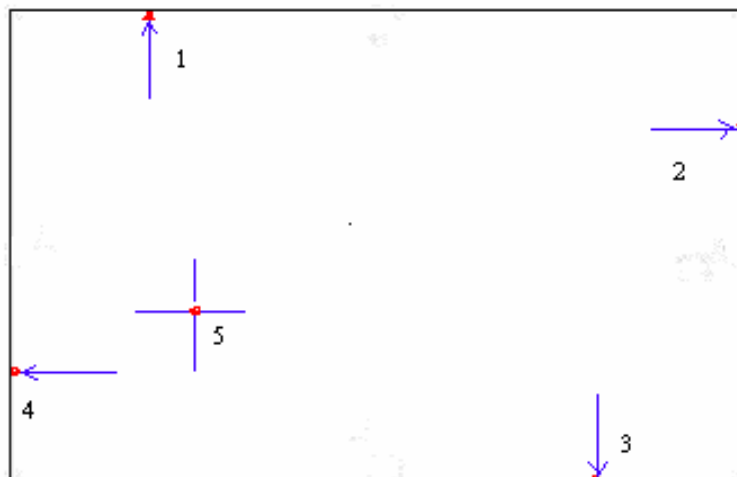
- |                      |  |
|----------------------|--|
| Standard Calibration | <b>Click this button and arrows appear pointing to red squares. Use your finger or stylus to touch the red squares in sequence. After the fifth red point calibration is complete. To skip, press ‘ESC’.</b>             |
| Advanced Calibration | <b>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’.</b> |



## Chapter 3 Installing Software for 9000 Boards



**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.



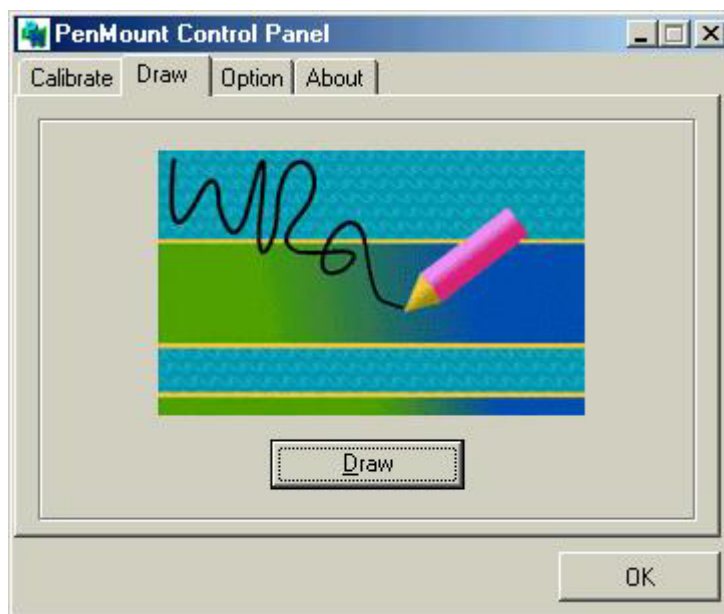


Plot Calibration Data      **Check this function and a touch panel linearity comparison graph appears when you have finished Advanced Calibration. The blue lines show linearity before calibration and black lines show linearity after calibration.**



**Draw**

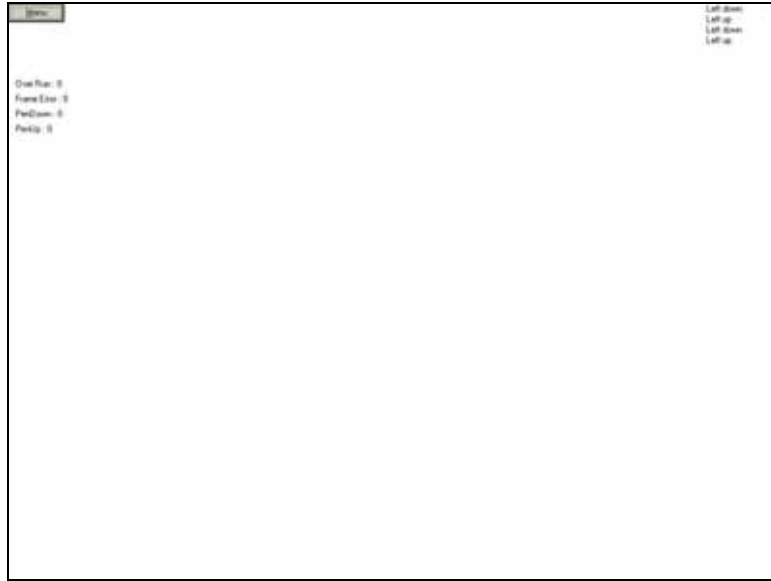
Tests or demonstrates the PenMount touch screen operation. The display shows touch location. Click **Draw** to start.



## Chapter 3 *Installing Software for 9000 Boards*

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Touch the screen with your finger or a stylus and the drawing screen registers touch activity such **left**, **right**, **up**, **down**, **pen up**, and **pen down**.



Click Clear Screen to clear the drawing.



### Option

This panel function supports two modes—Operation Mode and Beep Sound Mode—which allow configuration for specific touch screen applications, such as point-of-sales (POS) terminals.

**Operation Mode**      **This mode enables and disables the mouse’s ability to drag on-screen icons—useful for configuring POS terminals.**

*Stream Mode* – Select this mode and the mouse functions as normal and allows dragging of icons.

*Point Mode* – Select this mode and the mouse only provides a click function, and dragging is disabled.

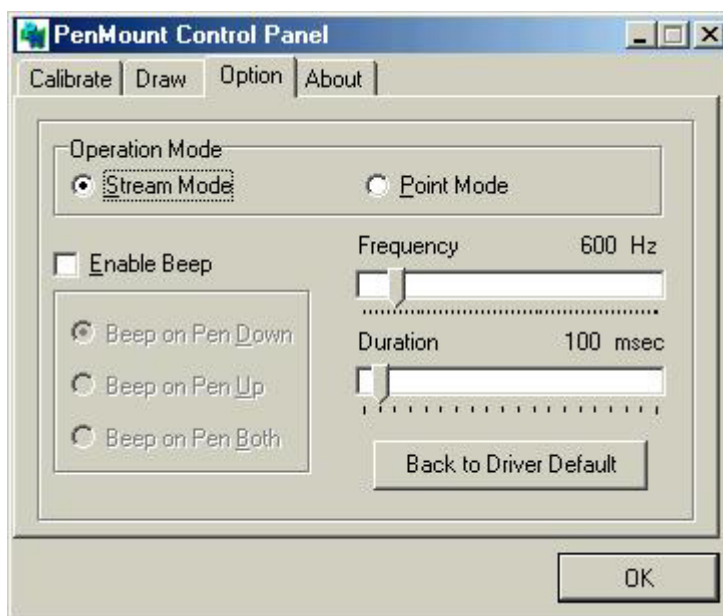
**Beep Sound Mode**      **Enable Beep Sound** – turns beep function on and off  
**Beep on Pen Down** – beep occurs when pen comes down

**Beep on Pen Up** – beep occurs when pen is lifted up

**Beep on both of Pen Down/Up** – beep occurs on both

**Beep Frequency** – modifies sound frequency

**Beep Duration** – modifies sound duration



**About**

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



*PenMount Monitor Menu Icon*

The PenMount monitor icon (PM) appears in the menu bar of Windows 98/Me system when you turn on PenMount Monitor in PenMount Utilities.



PenMount Monitor has the following functions.



## Chapter 3 *Installing Software for 9000 Boards*

Right Click 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.**



Beep Sound      **Turns beep on or off.**

Enable PNP      **Turns PNP on or off. When this is unchecked PNP is off and the RS-232 transfer signal is continuous when unplugging and plugging the cable into the serial port.**

Exit      **Exits the PenMount Monitor function.**

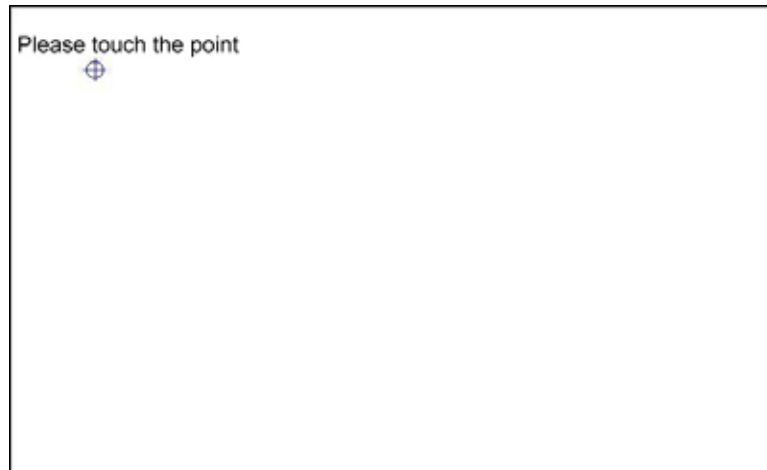
### *PenMount Rotating Functions*

The PenMount driver for Windows 98/Me supports several display rotating software packages. Please see Chapter 5 for more information. The PenMount drivers for Windows 95, Windows 98/Me, Windows 2000/XP, as well as Windows 98 USB and 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 3<sup>rd</sup> party software. The calibration screen appears automatically. Touch this point and rotation is mapped.

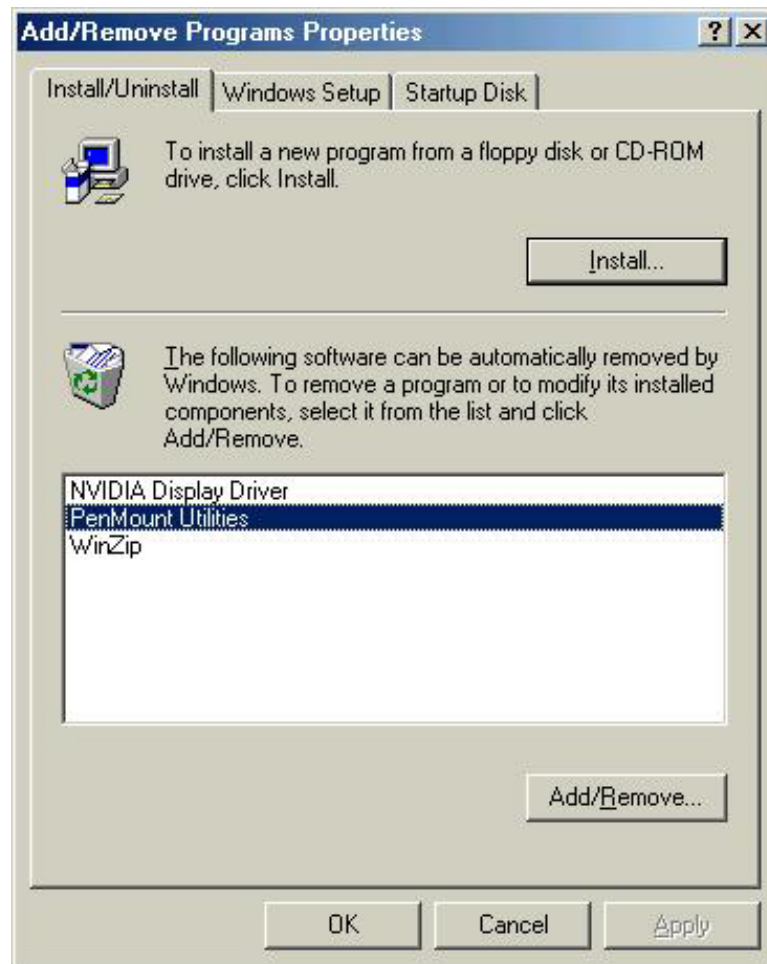


**NOTE:** The Rotate function is disabled if you use Monitor Mapping



## Uninstall the PenMount Windows 98/Me driver

1. Exit the PenMount monitor (PM) in the menu bar.



2. From 'PenMount Utilities' in 'Programs', select the 'Uninstall' utility
3. This message appears: "Are you sure you want to completely remove 'PenMount Utilities' and all its components?"
4. Select 'Yes' to remove the PenMount Windows 98/Me driver.
5. Reboot system and the PenMount Windows 98/Me driver is removed from system.

### 3-5. Windows 2000/XP Driver Installation for 9000 Controller Board

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 Serial Interface controller boards installed: 90A4, 9026B, 9036 or 9084. Contents of the PenMount Windows 2000/XP driver folder are listed below. (PenMount 9000 driver version 5.0 designed for Microsoft Windows XP )

**DMC9000.inf**  
**DMC9000.sys**  
**DMC9000.cat**  
**SETUP.EXE**



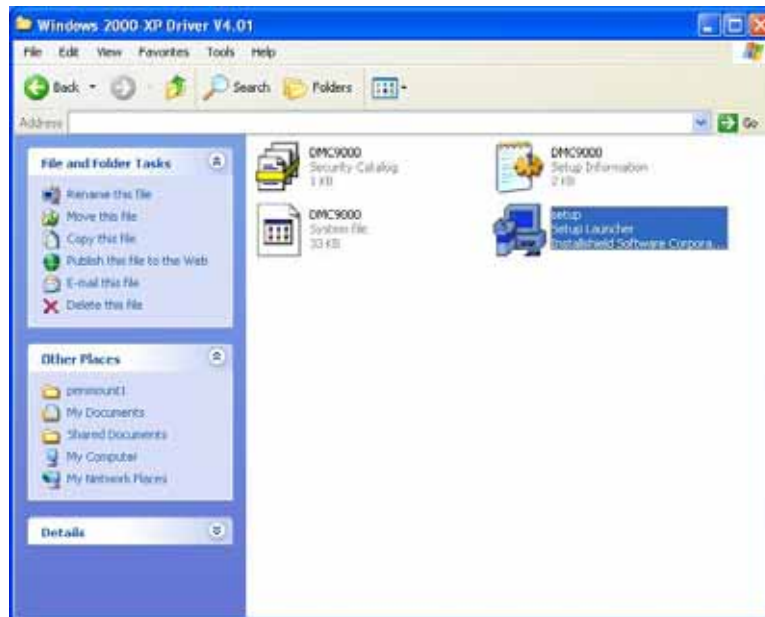
If you have an older version of the PenMount Windows 2000/XP driver installed in your system, please remove it first. Follow the steps below to install the PenMount Windows 2000/XP driver.

1. When the system first detects the controller board, a screen appears that shows “Unknown Device.” Do not use this hardware wizard. Press Cancel.

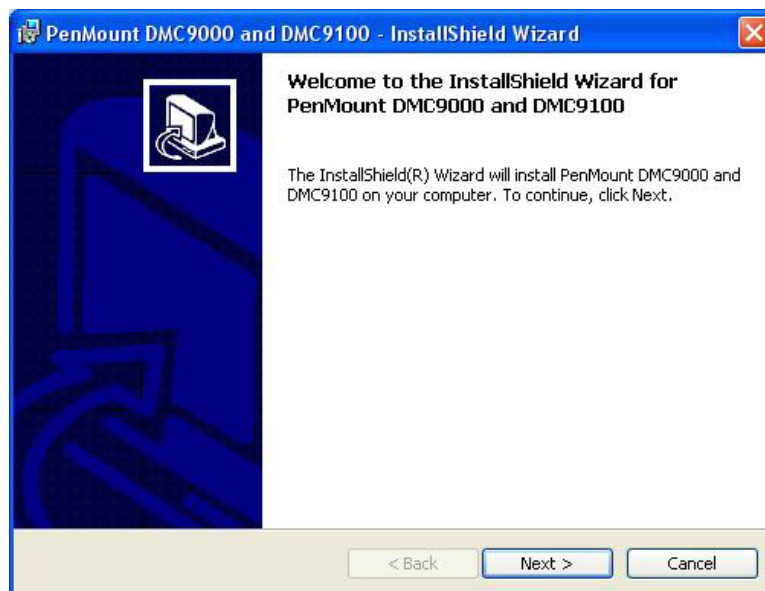


## Chapter 3 Installing Software for 9000 Boards

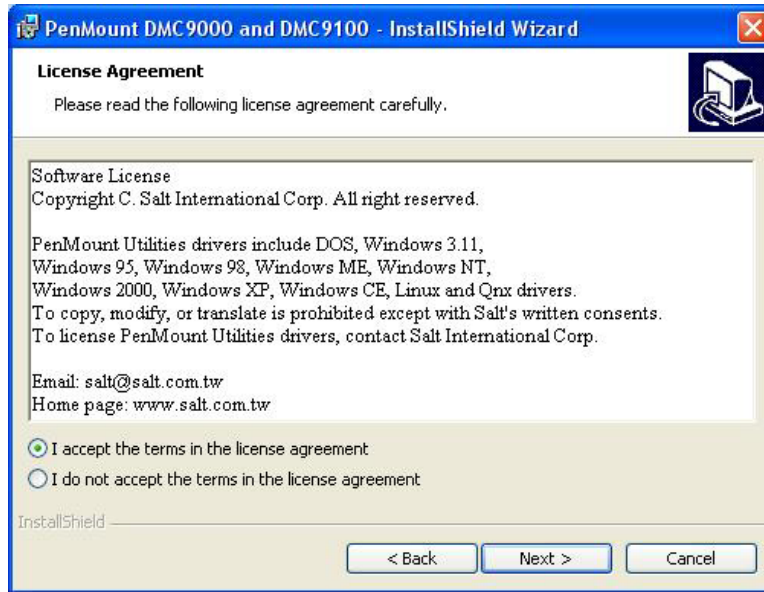
2. Insert the PenMount Driver CD-ROM. Go to the Windows 2000-XP Driver folder. Click **setup.exe**.



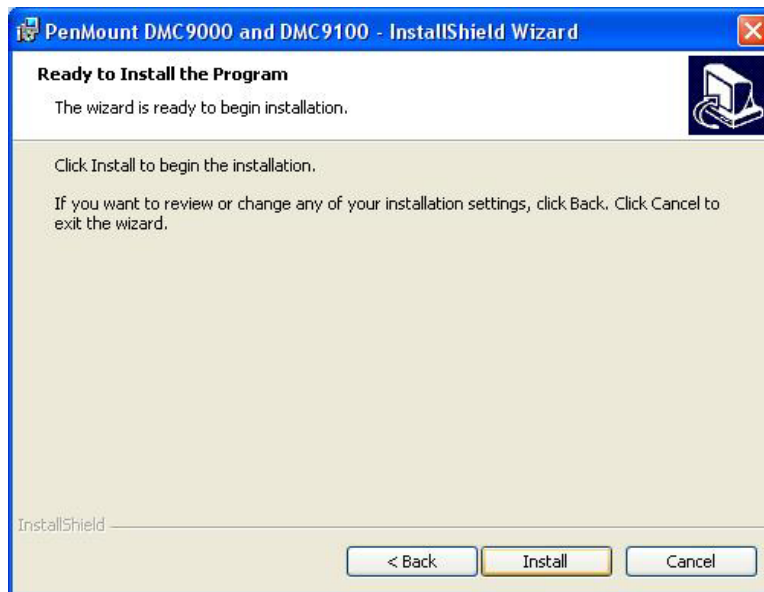
3. The screen displays the installation wizard for the PenMount software. Click "Next".



3. A License Agreement appears. Click “I accept...” and “Next”



4. The “Ready to Install the Program” screen appears. Select “Install.”

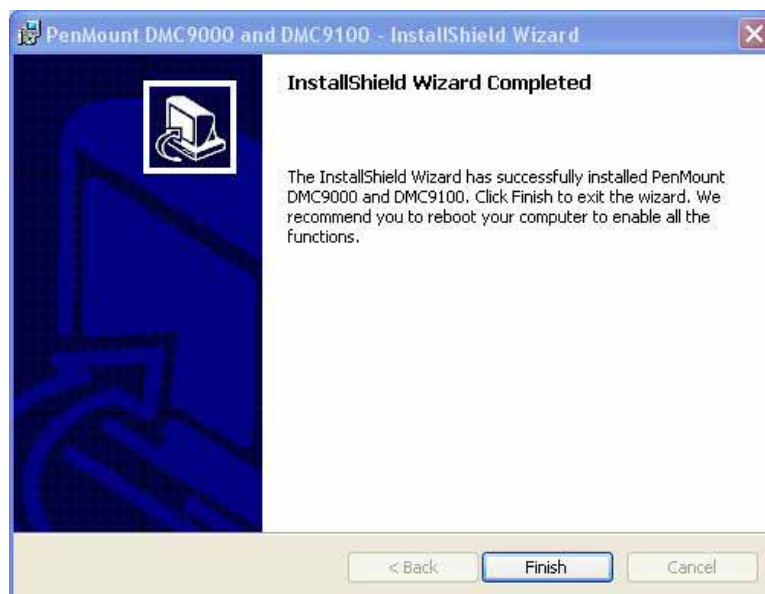


## Chapter 3 Installing Software for 9000 Boards

5. If next screen is “Hardware Installation.” Please Select “Continue Anyway.”



6. The “InstallShield Wizard Completed” appears. Click “Finish.”



## Configuring the PenMount Windows 2000/XP Driver

Upon rebooting, the computer automatically finds the new 9000 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, click “Calibrate.”

### *PenMount Control Panel*

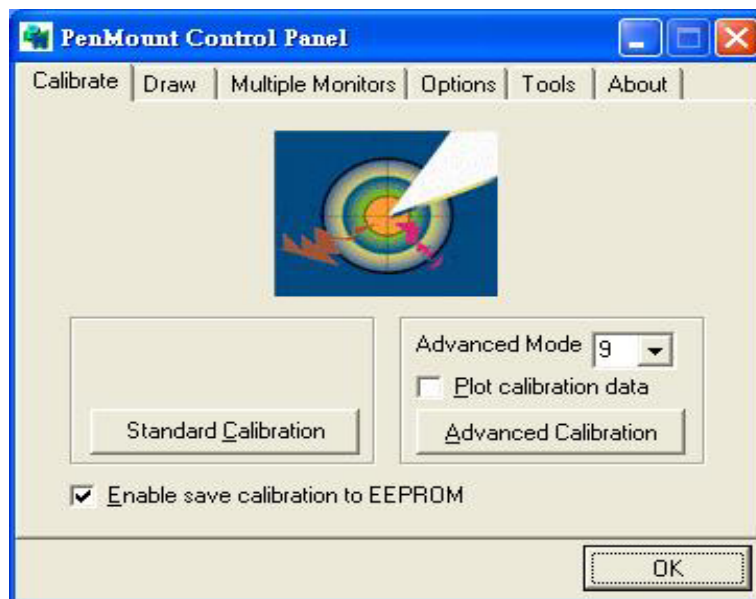
The functions of the PenMount Control Panel are **Calibrate**, **Draw**, **Multiple Monitors**, **Option**, **Tools** and **About**, which are explained in the following sections.

#### **Calibrate**

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

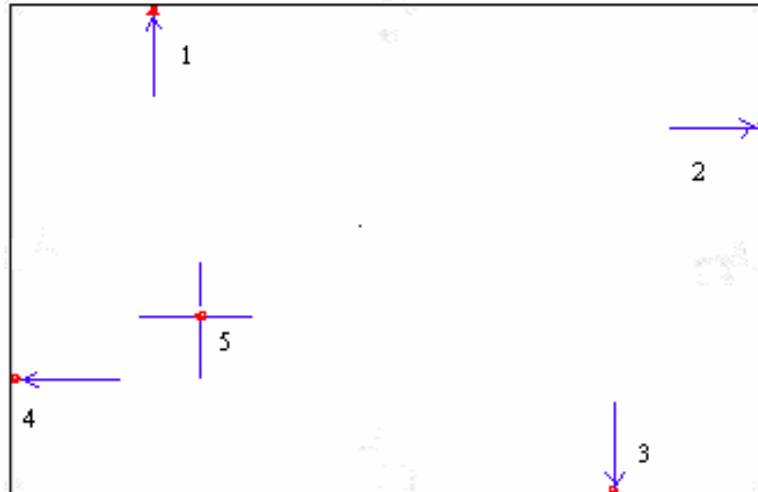
Standard Calibration      **Click this button and arrows appear pointing to red squares. Use your finger or stylus to touch the red squares in sequence. After the fifth red point calibration is complete. To skip, press ‘ESC’.**

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’.**

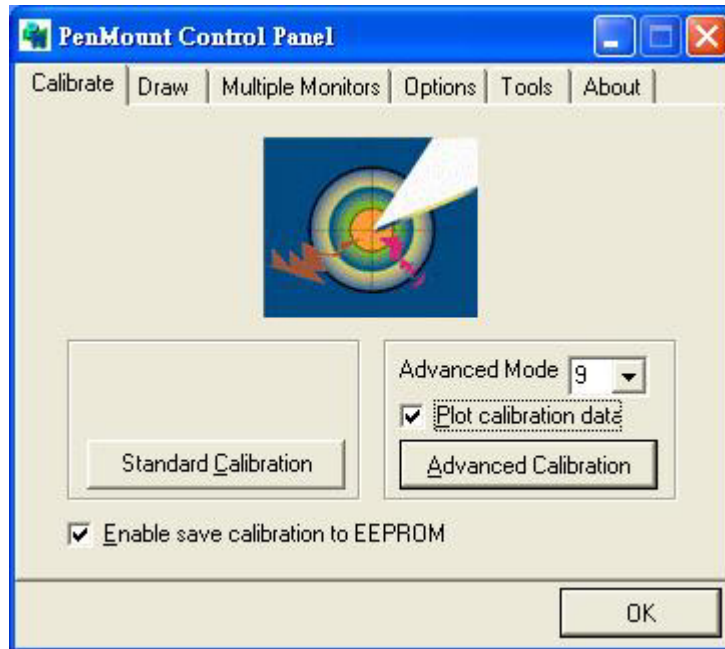


**NOTE:** The older the touch screen, the more Advanced Mode calibration points you need for an accurate calibration. Use a stylus during Advanced Calibration for greater accuracy.

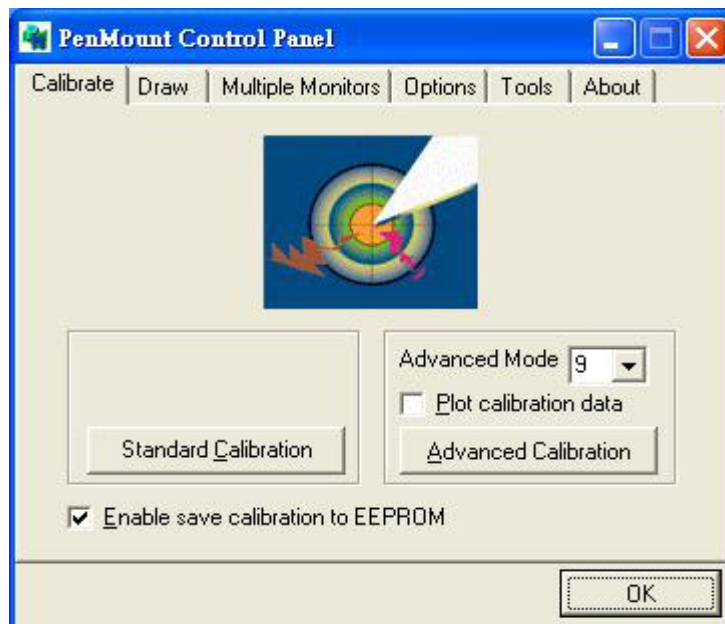
### Chapter 3 *Installing Software for 9000 Boards*



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.**



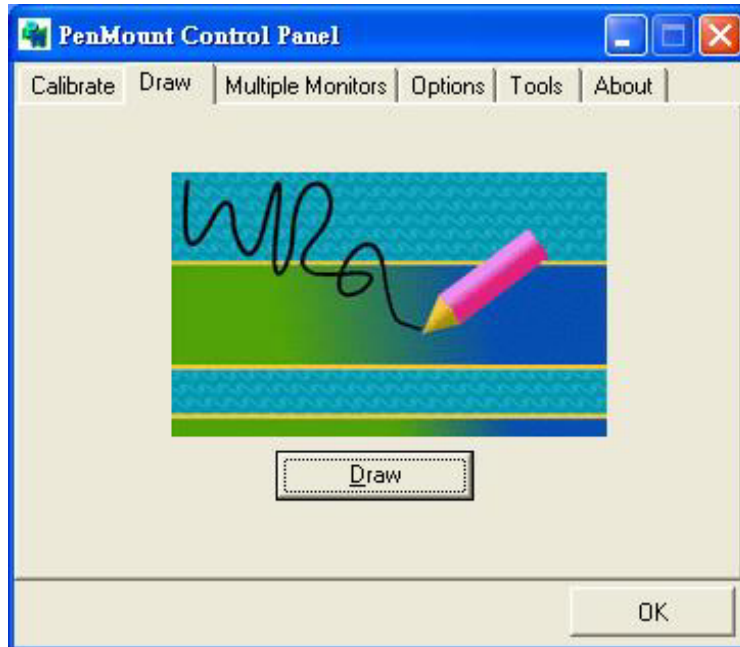
Enable Save to EEPROM      **It is save calibration data into control board function, if was select this function that colluded. But need control board firmware version support.**





### Draw

Tests or demonstrates the PenMount touch screen operation. The display shows touch location. Click **Draw** to start. Touch the screen with your finger or a stylus and the drawing screen registers touch activity such **left**, **right**, **up**, **down**, **pen up**, and **pen down**.



Touch the screen with your finger or a stylus and the drawing screen registers touch activity such **left**, **right**, **up**, **down**, **pen up**, and **pen down**.



Click Clear Screen to clear the drawing.



### 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

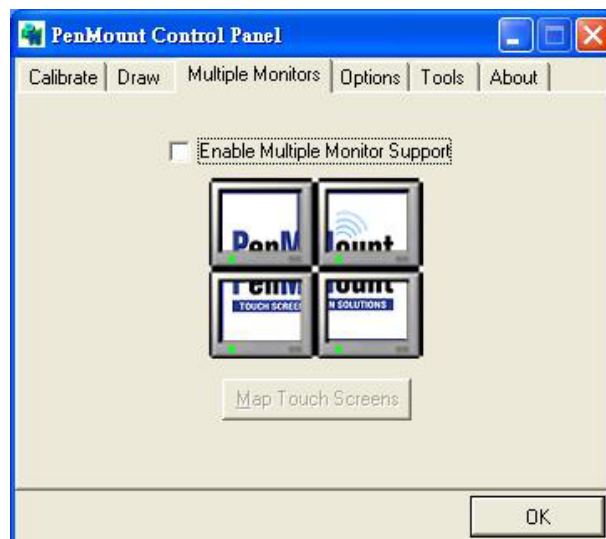
Matrox DualHead Multi-Screen Function

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.

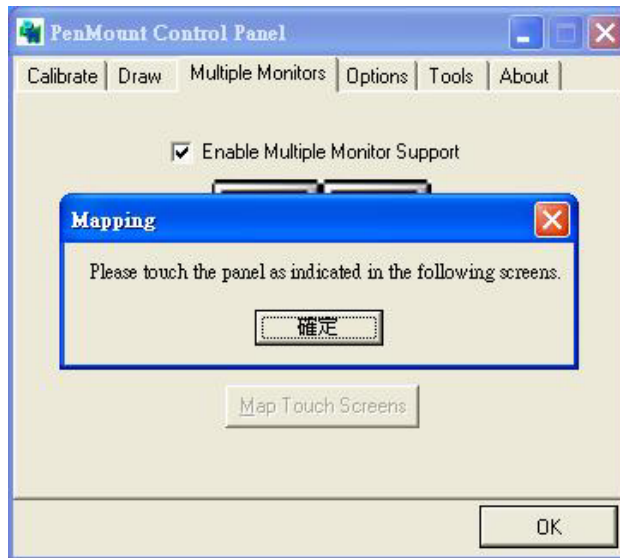
Enable the multiple display function as follows:

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



## Chapter 3 Installing Software for 9000 Boards

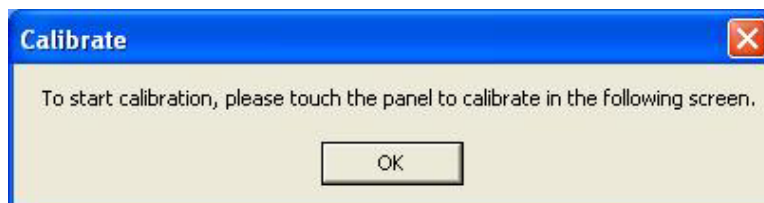
2. When the mapping screen message appears, click OK.



3. Touch each screen as it displays “Please touch this monitor.” Following this sequence and touching each screen is called **mapping the touch screens**.



4. Touching all screens completes the mapping and the desktop reappears on the monitors.
5. Select a display and execute the ‘Calibration’ function. A message to start calibration appears. Click OK.



6. “Touch this screen to start its calibration” appears on one of the screens. Touch the screen.

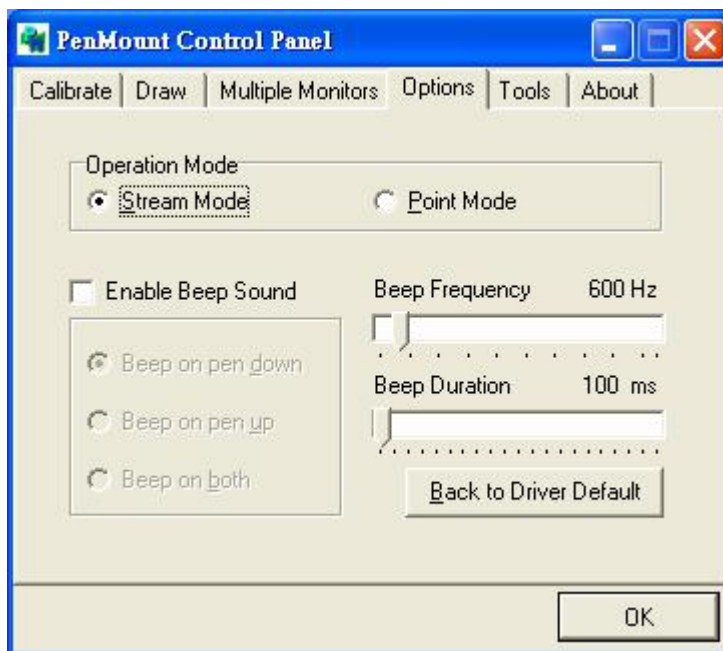
7. “Touch the red square” messages appear. Touch the red squares in sequence.
8. Continue calibration for each monitor by clicking **Standard Calibration** and touching the red squares.

- 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.

### Option


This panel function supports two modes—Operation Mode and Beep Sound Mode—which allow configuration for specific touch screen applications, such as point-of-sales (POS) terminals.

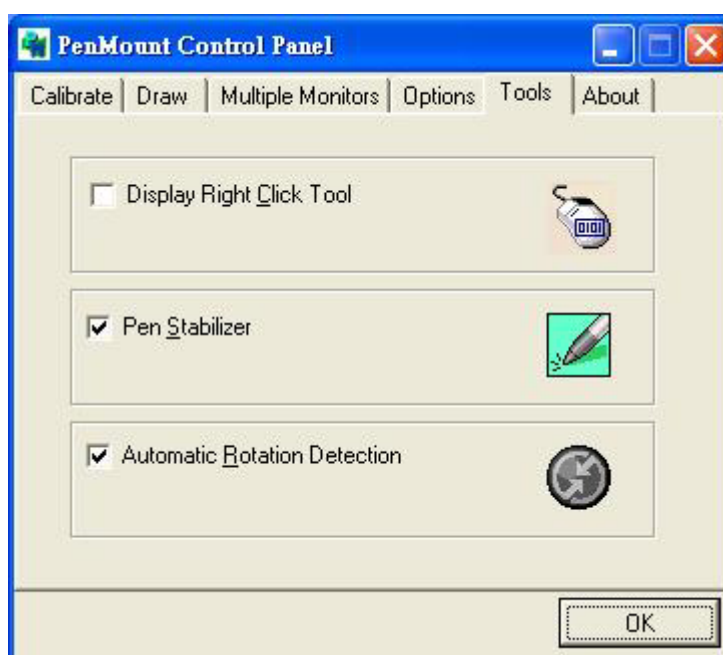
|                 |  |
|-----------------|--|
| Operation Mode  | <p><b>This mode enables and disables the mouse’s ability to drag on-screen icons—useful for configuring POS terminals.</b></p> <p><i>Stream Mode</i> – Select this mode and the mouse functions as normal and allows dragging of icons.</p> <p><i>Point Mode</i> – Select this mode and the mouse only provides a click function, and dragging is disabled.</p>                  |
| Beep Sound Mode | <p><i>Enable Beep Sound</i> – turns beep function on and off</p> <p><i>Beep on Pen Down</i> – beep occurs when pen comes down</p> <p><i>Beep on Pen Up</i> – beep occurs when pen is lifted up</p> <p><i>Beep on both of Pen Down/Up</i> – beep occurs on both</p> <p><i>Beep Frequency</i> – modifies sound frequency</p> <p><i>Beep Duration</i> – modifies sound duration</p> |



**Tools**

This panel displays have three functions --- Display Right Click Tool, Pen Stabilizer and Automatic Rotation Detection.

|                              |  |   |
|------------------------------|--|---|
| Display Right Click Tool     | Enable right button function, and show right button area on desktop.   |  |
| Pen Stabilizer               | Enable the function support to prevent cursor shake.   |   |
| Automatic Rotation Detection | The function support nVidia, Intel, SMI or ATI and software such as Portrait Pivot Pro rotation automatic detection. |   |



**About**

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



*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 functions.



Beep

**Turns beep on or off.**

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.**



## Chapter 3 *Installing Software for 9000 Boards*

|                |   |
|----------------|---|
| Pen Stabilizer | <b>Check this function to reduce cursor vibration for relatively unstable touch screens, or where there may be excess vibration. Normally this function is not checked.</b> |
| Exit           | <b>Exits the PenMount Monitor function.</b>   |

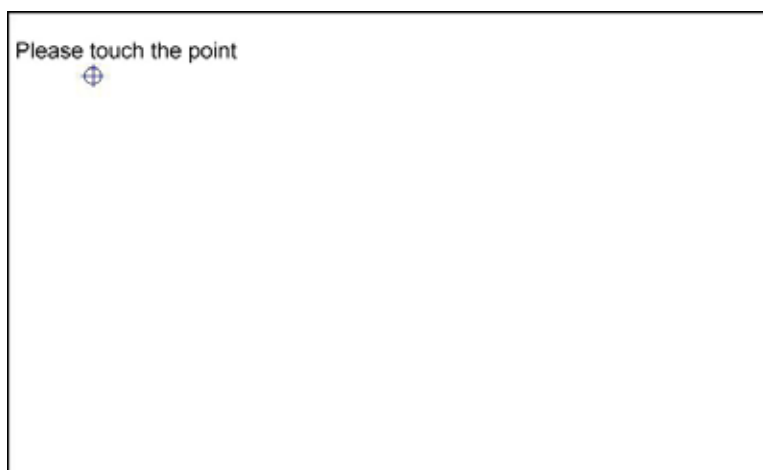
### *PenMount Rotating Functions*

The PenMount driver for Windows 2000/XP supports several display rotating software packages. Please see Chapter 5 for more information. The PenMount drivers for Windows 95, Windows 98/Me, Windows 2000/XP, as well as Windows 98 USB and 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 3<sup>rd</sup> party software. The calibration screen appears automatically. Touch this point and rotation is mapped.

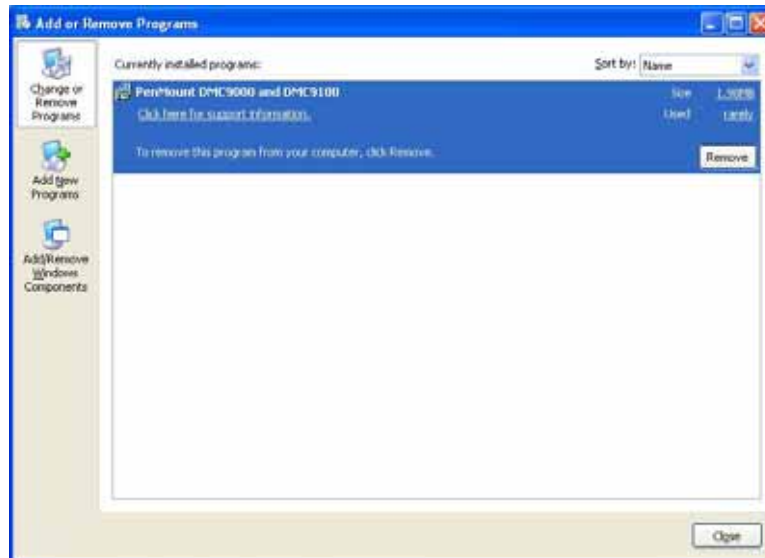


**NOTE:** The Rotate function is disabled if you use Monitor Mapping

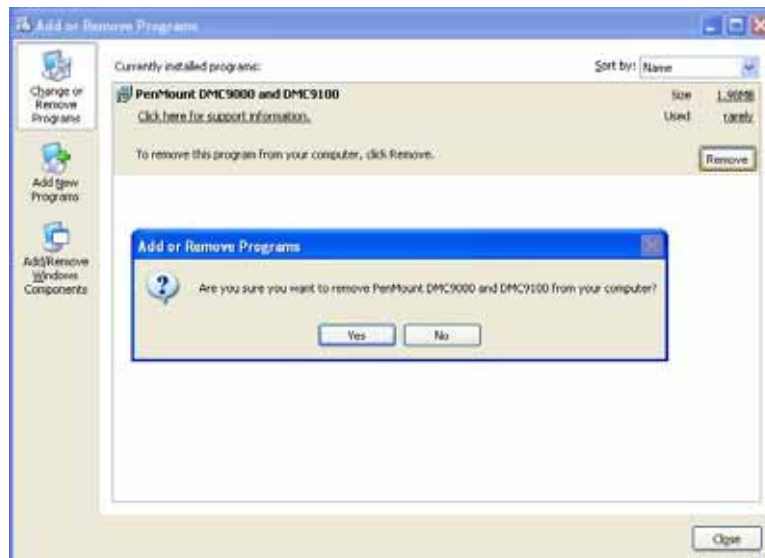
### **Uninstall the PenMount Windows 2000/XP driver**

## Chapter 3 Installing Software for 9000 Boards

1. Exit the PenMount monitor (PM) in the menu bar.
2. Go to **Settings**, then **Control Panel**, and then click **Add/Remove program**. Select **PenMount DMC9000** and click the **Add/Remove** button.



3. Select **PenMount DMC9000 and DMC9100**. Click the **Remove** button.



4. Select 'Yes' and "Close" to remove the PenMount Windows 2000/XP driver, and reboot the system.



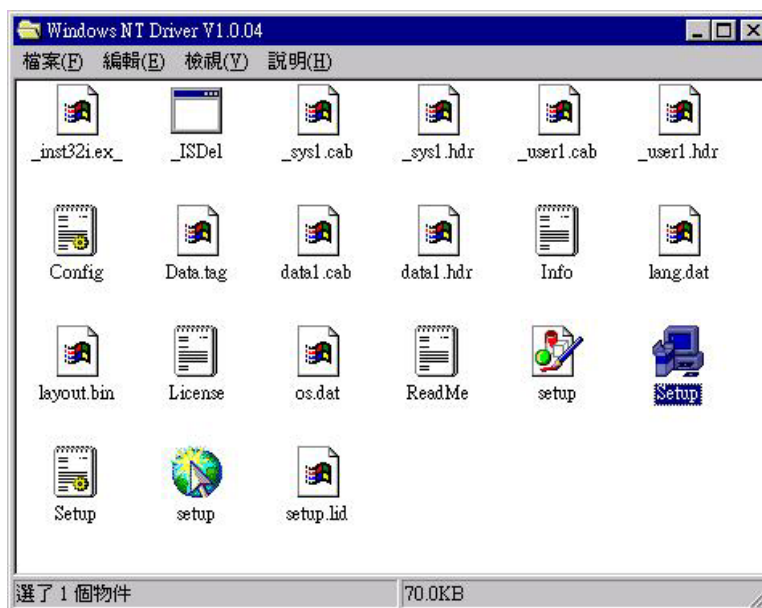
### 3-6. Windows NT Driver Installation for the 9000 Controller Board

Before installing the Windows NT driver software, you must have the Windows NT system installed and running on your computer. You must also have one of the following PenMount Serial Interface controller boards installed: 90A4, 9026B, 9036 or 9084. Contents of the PenMount Windows NT driver folder are listed below.

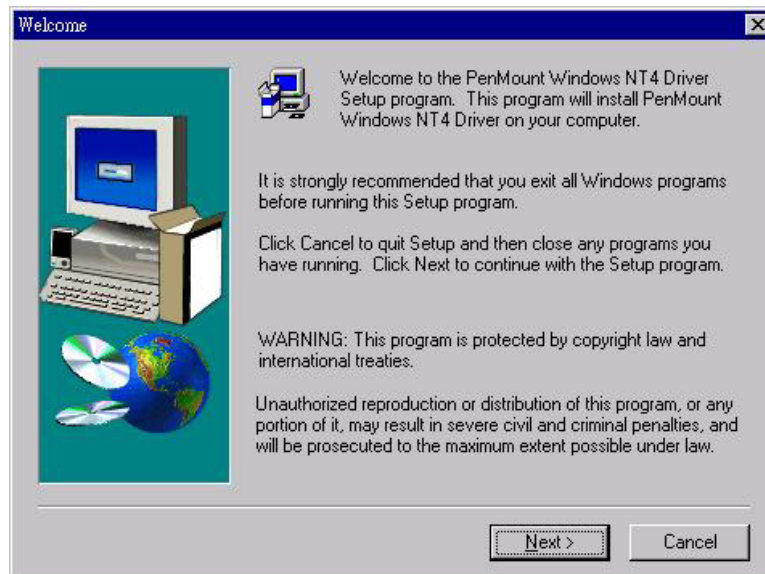
|                    |                   |
|--------------------|-------------------|
| <b>_USER1.HDR</b>  | <b>_ISDEL.EXE</b> |
| <b>_SETUP.DLL</b>  | <b>_SYS1.CAB</b>  |
| <b>_SYS1.HDR</b>   | <b>_USER1.CAB</b> |
| <b>_INST32I.EX</b> | <b>CONFIG.INI</b> |
| <b>DATA.TAG</b>    | <b>DATA1.CAB</b>  |
| <b>DATA1.HDR</b>   | <b>INFO.TXT</b>   |
| <b>LANG.DAT</b>    | <b>LAYOUT.BIN</b> |
| <b>LICENSE.TXT</b> | <b>OS.DAT</b>     |
| <b>README.TXT</b>  | <b>SETUP.LID</b>  |
| <b>SETUP.INS</b>   | <b>SETUP.INI</b>  |
| <b>SETUP.EXE</b>   | <b>SETUP.BMP</b>  |

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

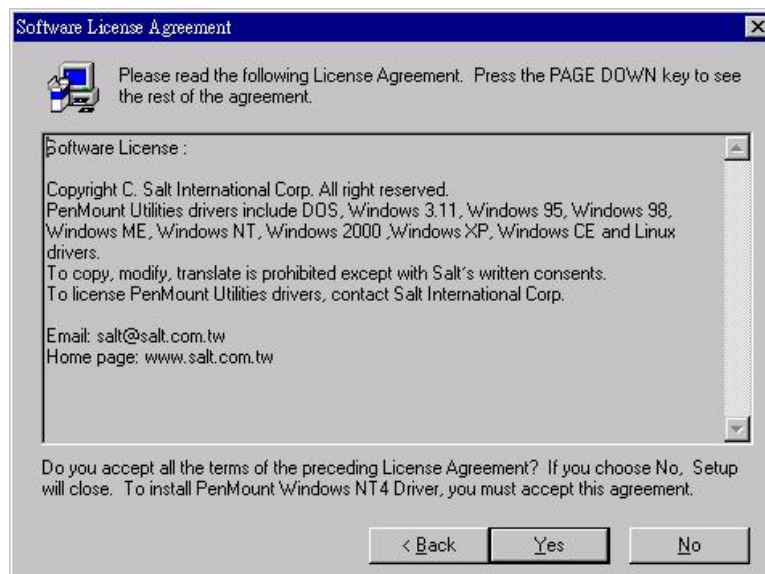
1. Insert the PenMount Driver CD-ROM. Go to the Windows NT Driver folder. Click **setup.exe**.



2. A welcome message for the PenMount setup program appears. Select "Next."

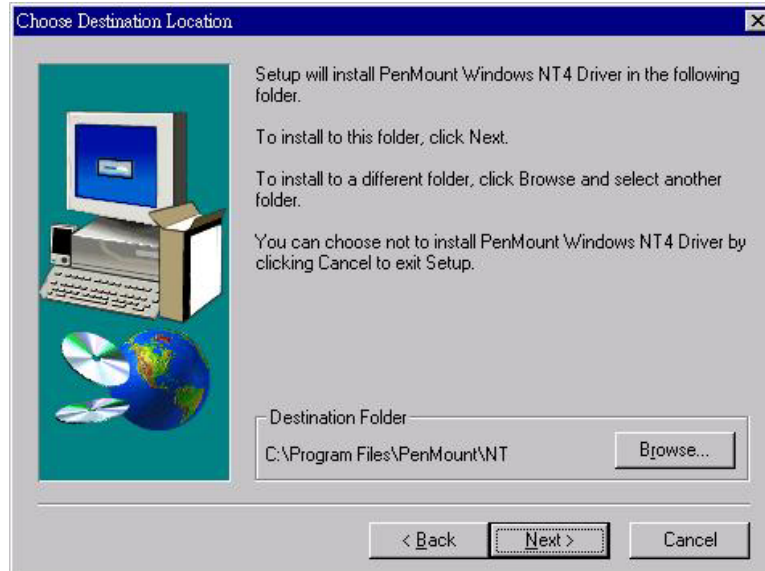


3. The Software License Agreement screen appears. Select "Yes."

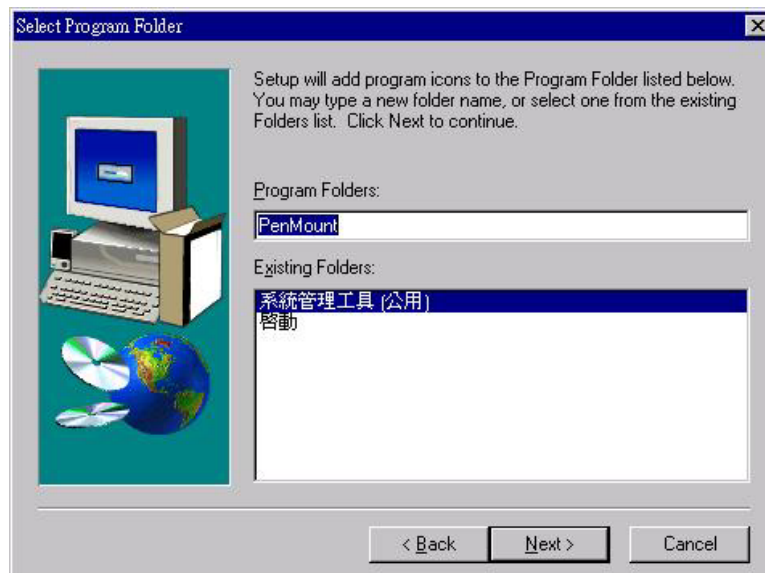


## Chapter 3 Installing Software for 9000 Boards

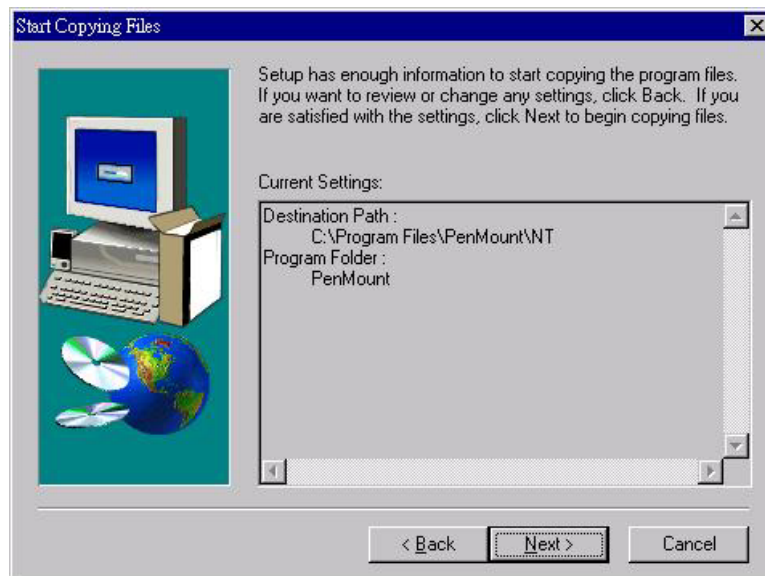
5. The Choose Destination Location screen appears. The installs PenMount Utilities in the folder: C:\Program Files\PenMount\NT. Select "Next" or modify the folder name to one you would like to use.



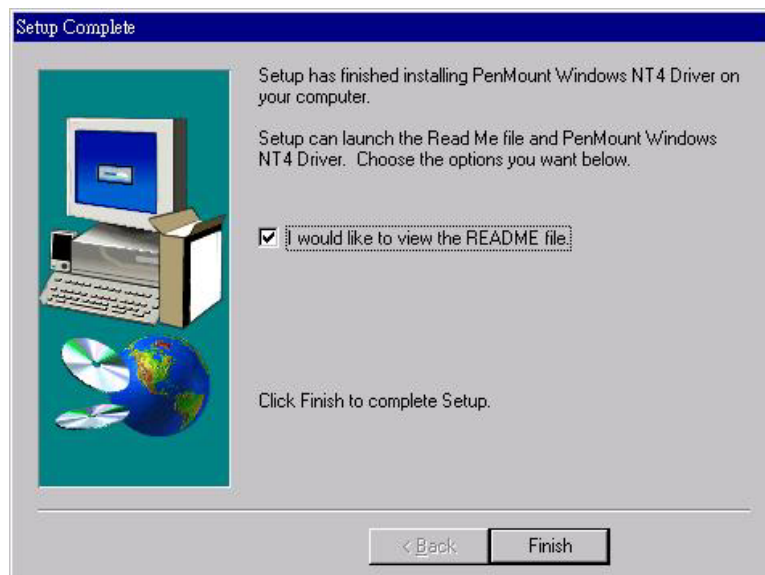
6. The Select Program Folder screen appears. The default is "PenMount Utilities." Select "Next" or change it.



7. The Start Copying Files screen appears. Select "Next" to copy files to the system.



8. The Setup Complete screen appears. Check "I would like to view the README file." Select "Finish."

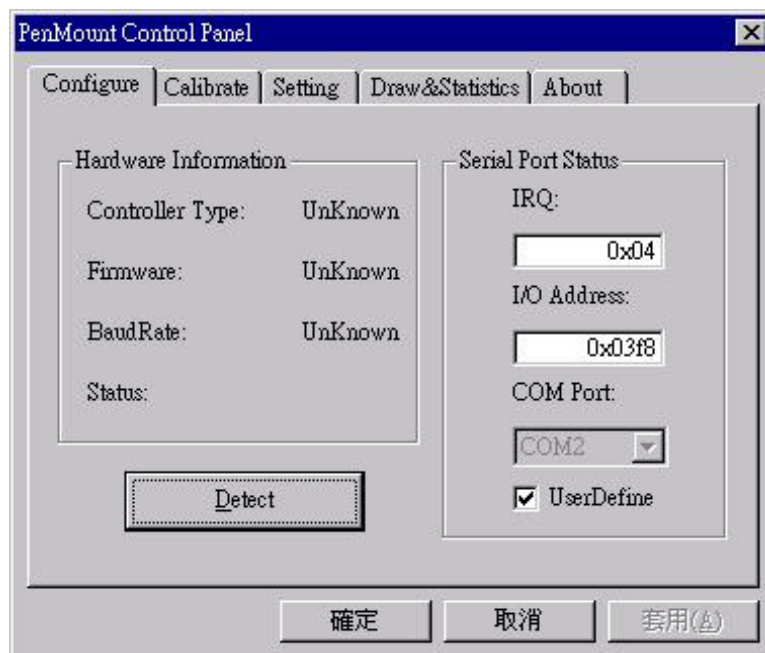


## Chapter 3 Installing Software for 9000 Boards

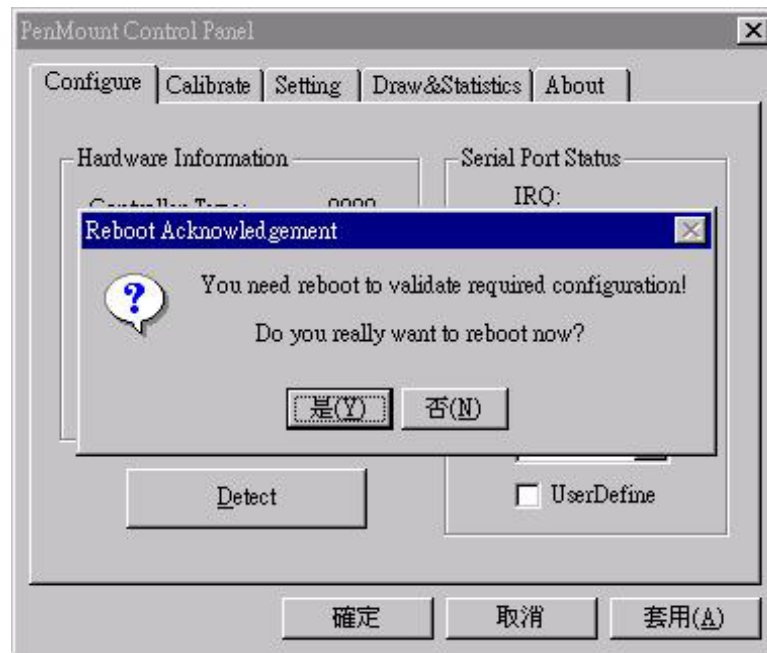
- The README file appears. After reading, cancel the window and press "Finish" again.



- The PenMount Control Panel appears. In the configure panel press the **Detect** button to auto-detect the correct COM port.



11. Reboot the system.



12. After rebooting go to “Programs,” “PenMount Utilities,” then “PenMount Control Panel.” The PenMount Control Panel appears. Select **Calibrate** and begin calibration to adjust the mapping of the touch screen and display.





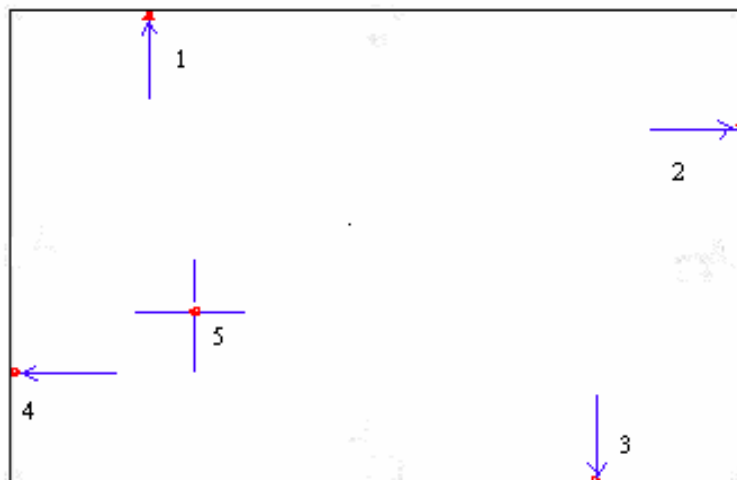
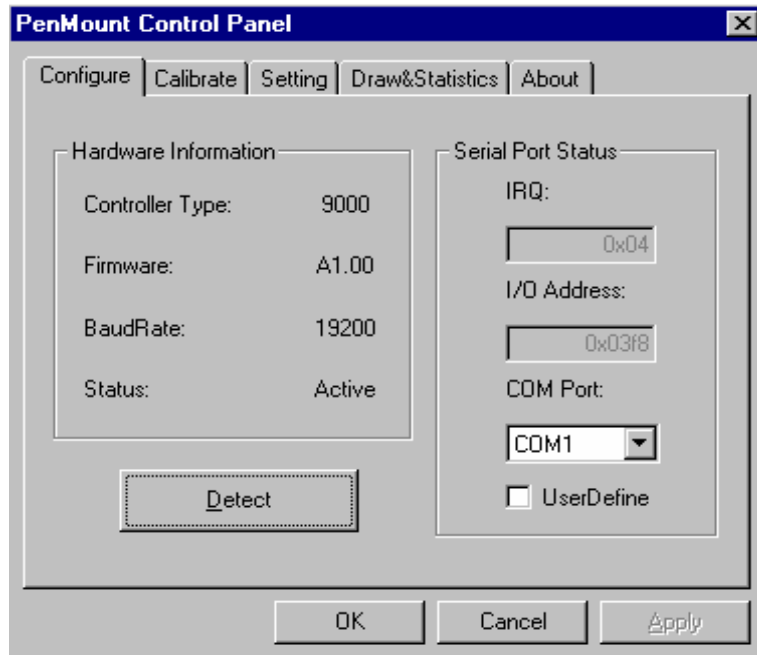
### *PenMount Control Panel*

You can access the PenMount control panel from the “PM” menu bar icon. Functions of the PenMount Control Panel are explained in the following sections.

#### **Configure**

This item configures the driver for use with the hardware by setting COM port, IRQ number and I/O address.

|                 |  |
|-----------------|--|
| Controller Type | <b>This shows the PenMount controller type, which is DMC9000.</b>              |
| Baud Rate       | <b>Baud rate is fixed at 19200 for DMC9000.</b>                                |
| Detect          | <b>Click this button to auto-detect COM port, IRQ number, or base address.</b> |
| User Define     | <b>Lets you input this data from your keyboard.</b>                            |





**Calibrate:**

This item provides **Initialize** and **Calibration** functions.

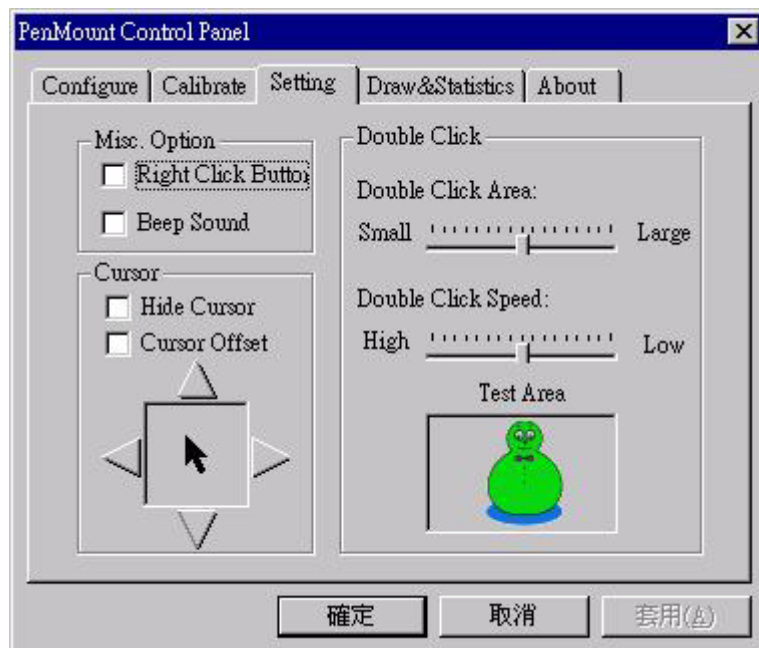


**Initialize**      **This button re-establishes connection with the controller board if the RS-232 serial port becomes disconnected.**

**Calibration**      **This button maps the touch panel to the display. Click Calibration and touch the five points in sequence to calibrate.**

**Setting**

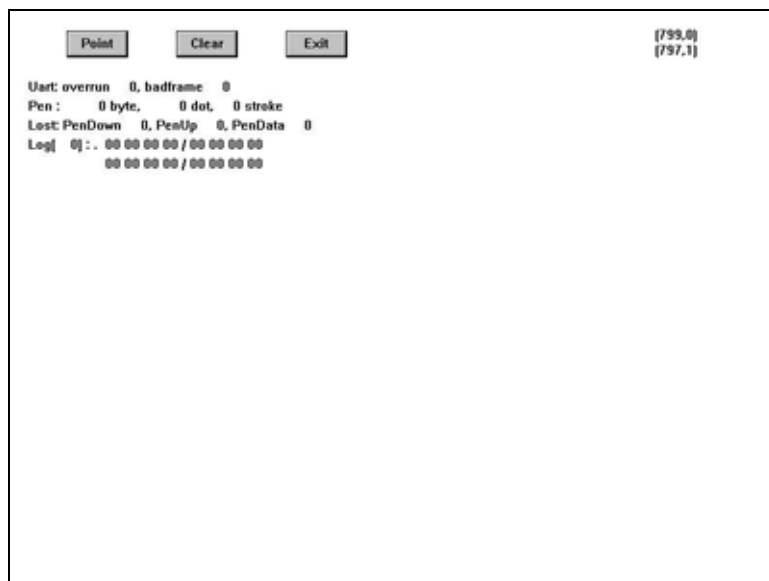
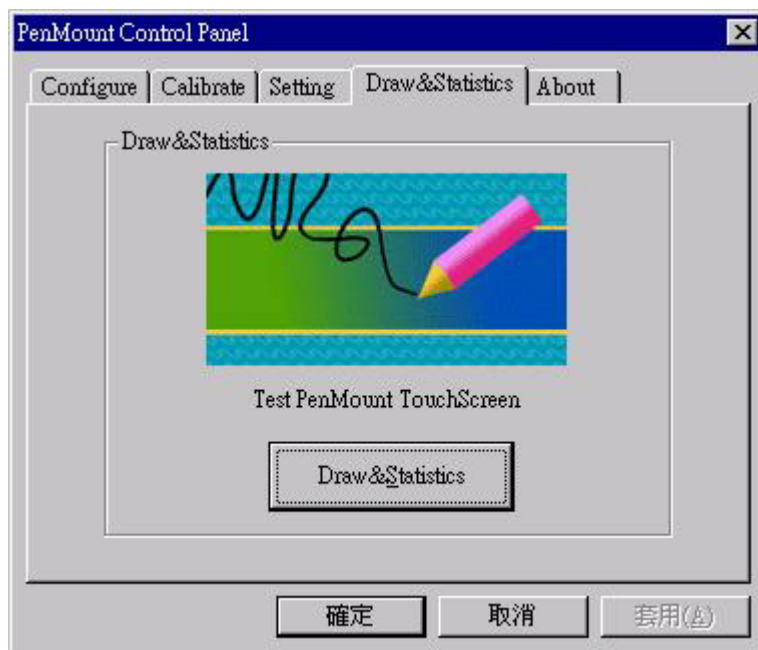
This item allows setting the mouse and other interface functions.



- Misc. Option    **Sets the Right Click Button, Beep Sound**
- Cursor        **Sets Hide Cursor or Cursor Offset. Press the four triangles with a stylus to adjust cursor offset.**
- Double Click   **Adjusts and tests double click area and speed. Double click in the test area and the tumbler swings back and forth.**

**Draw & Statistics**

Tests or demonstrates PenMount touch screen operation. The display also shows touch location. Click **Draw & Statistics** to start.



### About

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



### *PenMount Monitor Menu Icon*

The PenMount monitor icon (PM) appears in the menu bar of Windows NT system when you turn on PenMount Monitor in PenMount Utilities. PenMount Monitor has the following functions.



Initialize

**This resets the PenMount controller chipset. Normally, you do not need to use this function because the Windows NT driver checks the controller chipset automatically.**

Right Click

**When you select this function, a mouse icon appears in**

|               |   |
|---------------|---|
|               | <b>the right-bottom of the screen. Click this icon to switch between Right and Left Button functions.</b> |
| Hide Cursor   | <b>Set to hide or show cursor.</b>  |
| Cursor Offset | <b>Adjust the cursor offset. See Setting the PenMount Control Panel.</b>                                  |
| Beep Sound    | <b>Turns beep on or off.</b>  |
| Exit          | <b>Exits the PenMount Monitor function.</b>   |

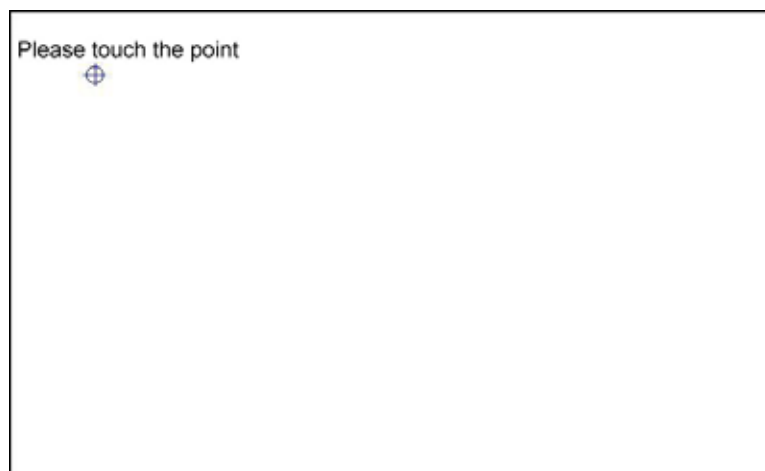
### *PenMount Rotating Functions*

The PenMount driver for Windows NT supports several display rotating software packages. Please see Chapter 5 for more information. The PenMount drivers for Windows 95, Windows 98/Me, Windows 2000/XP, as well as Windows 98 USB and 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 3<sup>rd</sup> 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

**Uninstall the PenMount Windows NT driver**

1. Exit the PenMount monitor (PM) in the menu bar.
2. From 'PenMount Utilities' in 'Programs', select the 'Uninstall' utility
3. This message appears: "Are you sure you want to completely remove 'PenMount Utilities' and all its components?"
4. Select 'PenMount Windows NT driver' and click Remove.
5. Reboot system and the PenMount Windows NT driver is removed from system.

### 3-7. Linux X Window 3.3.6 Driver Installation for 9000 Boards

Before installing the Linux X Window 3.3.6 driver software, you must have the Linux X Window 3.3.6 system installed and running on your computer. You must also have one of the following PenMount Serial Interface controller boards installed: 90A4, 9026B, 9036 or 9084.

**NOTE:** This is one way to install the drivers, but you may be accustomed to other installation methods.

#### Driver Installation Procedures

1. Login system with "root"

2. Check XFree86 version

```
# X -version
```

(If the screen shows "XFree86 Version 3.3.6 / X Window System", then go to Next. If not, please use another driver that fits XFree86 driver.)

3. Copy PenMount driver "xf86PenMount.so" to the directory

```
"/usr/X11R6/lib/modules".
```

```
# cp /mnt/cdrom/Driver/Linux\ XFree86\ 3.3.6\
```

```
V1.0/XWindow_336/xf86PenMount.so /usr/X11R6/lib/modules
```

4. Edit XF86Config

```
"gedit /etc/X11/XF86Config" (or use "vi" Editor)(You can use Copy & Paste)
```

- a. In the Section "Files", add a statement:

```
ModulePath "/usr/X11R6/lib/modules"
```

- b. Add a Section "Module"

```
Section "Module"
```

```
Load "xf86PenMount.so"
```

```
EndSection
```

- c. Under the "Pointer Section"(after the "EndSection" of the "Pointer"), add

another Section "XInput": (refer to the sample file XF86Config.sample)

Here we assume Touch screen controller is connecting to COM1)

```
Section "XInput"
```

```
SubSection "PenMount"
```

```
Port "/dev/ttyS0"
```

```
#ttyS0=COM1 ttyS1=COM2
```

```
DeviceName "PenMount"
```

```
PMode 1
```

```
MinX 10
```

## Chapter 3 *Installing Software for 9000 Boards*

```
MaxX 1000
MinY 10
MaxY 1000
AlwaysCore
EndSubSection
```

```
SubSection "Mouse"
    Protocol      "PS/2"
    Device        "/dev/mouse"
    AlwaysCore
EndSubSection
EndSection
```

### **Calibration Utilities**

#### *For Redhat 7.1/7.2/7.X.. & other Linux Distribution*

1. Copy the Calibrate file into the "/usr/local/pencal" directory.  
# mkdir /usr/local/pencal  
# cp /mnt/cdrom/Driver/Linux\ XFree86\ 3.3.6\ V1.0/Calibration/\*.\*  
/usr/local/pencal
2. Run X window and perform calibration.  
#startx  
# cd /usr/local/pencal  
#./pencal2 (pencal is for Redhat 6.X , pencal2 is for Redhat 7.x)

#### *For Redhat 6.X & 5.X & other older Linux Distribution*

1. Copy the "libqt.tgz" file to the "/usr/lib" directory.
2. In the "/usr/lib" directory, input "tar zxvf libqt.tgz".
3. In the "/usr/lib" directory, input "ldconfig".
4. Copy the "bcircle.xpm" and "bcircle.xpm" file into the "/usr/local/pencal" directory.  
# mkdir /usr/local/pencal  
# cp /mnt/cdrom/Driver/Linux\ XFree86\ 3.3.6\ V1.0/Calibration/\*.\*  
/usr/local/pencal
5. Run X window and perform calibration.  
#startx  
#cd /usr/local/pencal  
#./pencal (pencal is for Redhat 6.X , pencal2 is for Redhat 7.x)

A PenCal window appears on the display. Follow the four red points to perform the calibration. When the PenCal window shows: “Finished! Please restart X window”, wait a moment until the PenCal window disappears, and then restart the X window system.



### 3-8. Linux X Window Driver v2.1 Installation for 9000 Boards (supports XFree86 v4.x.x)

Before installing the Linux X Window 4.x.x driver software, you must have the Linux X Window 4.x.x system installed and running on your computer. You must also have one of the following PenMount Serial Interface controller boards installed: 90A4, 9026B, 9036 or 9084. Contents of the PenMount driver folder are listed below.

|                                |  |
|--------------------------------|--|
| <b>Driver/penmount_drv.o</b>   | -- Penmount driver                               |
| <b>Driver/Source</b>           | -- Penmount driver source code                   |
| <b>Calibration/pencal-2.00</b> | -- Penmount calibration utility                  |
| <b>Calibration/bcircle.xpm</b> | -- bitmap file, for Penmount calibration utility |
| <b>Calibration/rcircle.xpm</b> | -- bitmap file, for Penmount calibration utility |
| <b>XF86Config.sample</b>       | -- XF86Config sample                             |

Please check your X Window XFree86 version first and download the suitable PenMount driver, then follow the procedures below to install Linux driver and calibration utilities.

**NOTE:** If your X window version is 3.3.x, please install the Penmount 3.3.x driver.

#### Driver Installation Procedures

1. Login system with "root"
2. # cd /root
3. Copy penmount driver "penmount\_drv.o" into the directory named "/usr/X11R6/lib/modules/input".  
#mount /dev/cdrom /mnt/cdrom  
#cp /mnt/cdrom/Driver/Linux\ XFree86\ 4.x.x\ V2.0/Driver/penmount\_drv.o /usr/X11R6/lib/modules/input
4. Edit XF86Config file to load driver. You can refer to /mnt/cdrom/Driver/Linux\ XFree86\ 4.x.x\ V2.0/XF86Config.sample

**NOTE:** Make sure your XFree86 server is using XF86Config or XF86Config-4 first.

```
# X -version  
*(If the screen shows "XFree86 Version 4.x.x / X Window System", then go to  
Next, if it does not, you are using the XFree86 Version 3.x.x driver.)  
#cd /etc/X11  
#ls -al
```

\*(If your XFree86 is running the XFree86 4.x.x, and you do not find "XF86Config-4" files, please ignore the following step and go to 4.a directly for continued installation.)

```
#rm X
#ln -s /usr/X11R6/bin/XFree86 X
#mv XF86Config XF86Config.old
#mv XF86Config-4 XF86Config
#ln -s XF86Config XF86Config-4
```

- a. # gedit /etc/X11/XF86Config (in Xwindow only, or you can use "vi" text mode editor)

(use copy and paste to modify the following lines)

- b. In the Section "ServerLayout", add a statement:

```
InputDevice      "Penmount"  "AlwaysCore"
```

- c. Add a Section "InputDevice" (Here we assume the touch screen controller is connected to COM1)

Section "InputDevice"

```
Identifier "PenMount"
Driver     "penmount"
Option     "Protocol"      "Auto"
Option     "Device"       "/dev/ttyS0 #ttys0=COM1,ttys1=COM2"
E
ndSection Option "PMode"      "1"
Option     "MinX"         "10"
Option     "MinX"         "1000"
Option     "MinY"         "10"
Option     "MinY"         "1000"
Option     "Beep"         "1"           # 0 = no beep, 1 = beep enabled
Option     "PressVol"     "100"          # volume of beep (press event)
Option     "PressPitch"  "880"           # pitch of beep (press event)
Option     "PressDur"    "15"            # length of beep in 10ms (press event)
Option     "ReleaseVol"  "0"             # volume of beep (release event)
Option     "ReleasePitch" "1200"         # pitch of beep (release event)
Option     "ReleaseDur"  "10"           # length of beep in 10ms (release event)
r
tx
```

**NOTE:** The touch cursor should be working now. If not, then please review the steps above.

- 6. Perform calibration for the first installation.

### Calibrating Utilities

1. Copy the calibrate file into the "/usr/local/pencal" directory.  
# mkdir /usr/local/pencal  
# cp /mnt/cdrom/Driver/Linux\ XFree86\ 4.x.x\ V2.0/Calibration/\*.\*  
/usr/local/pencal
2. Input "startx" to start X window.  
# startx
3. In the X window system, open a terminal window and type  
# cd /usr/local/pencal  
# ./pencal-2.00

A PenCal window appears on the display. Follow the four red points to perform the calibration. When the PenCal window shows: "Finished! Please restart X window," wait a moment until the PenCal window disappears, and then restart the X window system.

4. For more information, type  
# ./pencal-2.00 --help

### 3-9. Win CE Driver Installation for 9000 Boards

Before installing the Win CE driver software, you must have the Win CE system installed and running on your device. You must also have one of the following PenMount Serial Interface controller boards installed: 90A4, 9026B, 9036 or 9084.

**NOTE:** Make sure you can move the Win CE cursor with a serial mouse attached to the target COM port (e.g. COM2) before connecting the 9000 controller board.

#### Driver Installation Procedures

1. mkdir \$(\_WINCEROOT)\PUBLIC\PENMOUNT\ReleaseDisk\  
Copy all files to this directory.
2. Run Platform Builder. From menu, select Tools -> CEC Editors
3. From CEC Editors menu, select File -> Open  
From the file dialog, select:  
\$( \_WINCEROOT)\PUBLIC\PENMOUNT\ReleaseDisk\penmount.cec and click Open.  
From CEC Editors menu, select Catalog -> Add to Catalog
4. Return to Platform Builder and right-click on the Catalog and select Refresh Catalog. A New item named "PenMount Products" should appear in your Catalog.
5. Expand it and select 'PenMount'. Then right-click and select 'Add to Platform'.
6. Edit PROJECT.BIB in the Parameter View of MS WinCE Platform Builder 4.0.  
Add these lines in MODULES:

```
dmc9x00.dll      $( _FLATRELEASEDIR)\dmc9x00.dll      NK  SH
drawdemo.exe    $( _FLATRELEASEDIR)\drawdemo.exe     NK
calibrate.exe   $( _FLATRELEASEDIR)\calibrate.exe    NK
rbutton.exe     $( _FLATRELEASEDIR)\rbutton.exe      NK
```

Add these lines in FILES:

```
Calibration.lnk $( _FLATRELEASEDIR)\calibration.lnk  NK  SH
DrawDemo.lnk    $( _FLATRELEASEDIR)\DrawDemo.lnk      NK  SH
RightButton.lnk $( _FLATRELEASEDIR)\RightButton.lnk    NK  SH
```

## Chapter 3 Installing Software for 9000 Boards

### 7. Edit PROJECT.DAT in the Parameter View of MS WinCE Platform Builder 4.0.

Add these lines:

```
root:-Directory( "\Windows" )
Directory( "\Windows" ):-Directory( "LOC_DESKTOP_DIR" )
Directory( "\Windows" ):-Directory( "LOC_PROGRAMS_DIR" )
Directory( "\Windows\LOC_PROGRAMS_DIR" ):-Directory( "PenMount
TouchPanel" )
Directory( "\Windows\LOC_DESKTOP_DIR" ):-File( "Calibration.lnk"
, "\Windows\Calibration.lnk" )
Directory( "\Windows\LOC_PROGRAMS_DIR\PenMount
TouchPanel" ):-File( "Calibration.lnk" , "\Windows\Calibration.ln
k" )
Directory( "\Windows\LOC_PROGRAMS_DIR\PenMount
TouchPanel" ):-File( "Right
Button.lnk" , "\Windows\RightButton.lnk" )
Directory( "\Windows\LOC_PROGRAMS_DIR\PenMount
TouchPanel" ):-File( "Draw Demo.lnk" , "\Windows\DrawDemo.lnk" )
```

### 8. Edit PROJECT.REG in the Parameter View of MS WinCE Platform Builder 4.0.

Add these lines:

```
[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\Dmc9x00]
    "Index"=dword:8
    "Dll"="dmc9x00.dll"
    "Prefix"="SRM"
    "Order"=dword:3
    "Port"=dword:1
    "pmode"=dword:1
    "cax1"=dword:1240
    "cay1"=dword:2c50
    "cax2"=dword:dab0
    "cay2"=dword:e2a0
```

**NOTE:** You can change the "port" to the ComPort number which is connected to the 9000 controller board. "Port"=dword:1 means COM1 in the CEPC system, but that is COM2 for the Standard PC. COM1 of the Standard PC is for debugging in CEPC. Please refer to MS WinCE documents.)

### 9. Build your Platform (use "Build Platform", not "Rebuild"), and boot it. Execute Calibration and DrawDemo to test 9000 controller board.

### 10. If you want to keep the calibration data after WINCE reboot, please write "WINCE REGISTRY" to FLASH in your machine.



# Chapter 4: Installing Software for 5000 Boards

This chapter describes how to install drivers and other software that will allow your PenMount 5000 Controller Boards (USB) to work with different operating systems.

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

## 4-1. Windows 98 USB Driver Installation for 5000 Boards

Before installing the Windows 98 USB driver software, you must have the Windows 98 system installed and running on your computer. You must also have one of the following PenMount USB controller boards installed: 5184 or 51A5. Follow the steps below to install the PenMount Windows 98 USB driver.

1. Plug the PenMount 5000 Series USB controller board's connector into a USB port. The screen displays "Salt USB PenMount."

**IMPORTANT!** Before installing the driver software you *must* plug the board into a USB port.

2. The 'Add New Hardware Wizard' appears. Click 'Next'. If this screen does not appear it means the USB Human Interface Device Driver is already installed and you can go directly to step 6.



3. Select 'Search for the best driver for your device.' Click 'Next'.



4. Choose 'CD-ROM drive' to assign the route for the Windows 98 CD.



5. Select 'Next' and then 'Next'. To update the new driver insert the Windows 98 system disk into the CD device if the system asks for it.



## Chapter 4 *Installing Software for 5000 Boards*

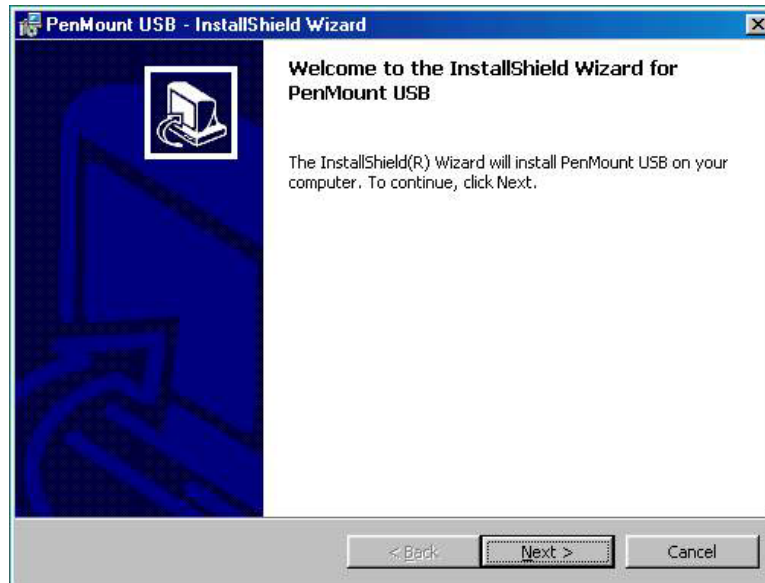


The system shows the new driver installed for the new hardware device, select 'Finish'.

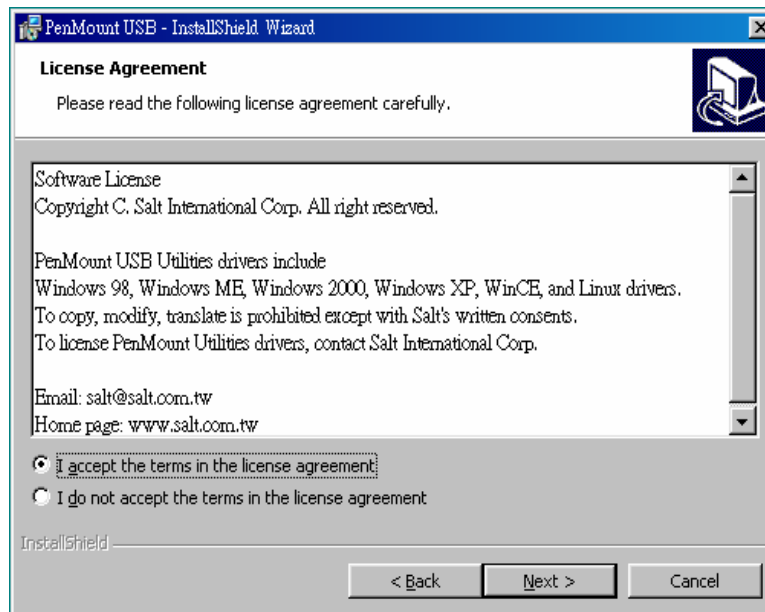


## Chapter 4 Installing Software for 5000 Boards

6. Select CD-ROM 'PenMount USB\Driver\Setup' to install the PenMount USB driver to the system.
  - a. The screen shows 'InstallShield Wizard' to install the Windows 98 driver

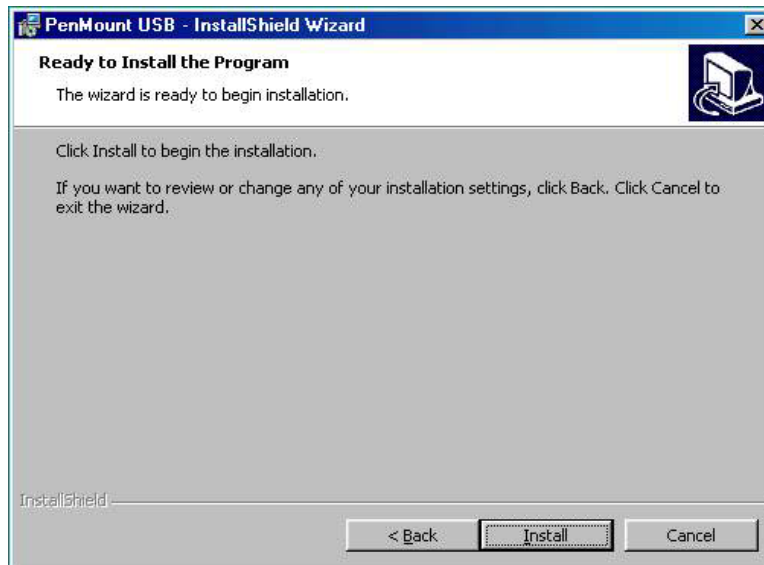


- b. Click 'Next' to begin installing the PenMount USB driver to the system
    - c. A License agreement appears. Click 'Next'.

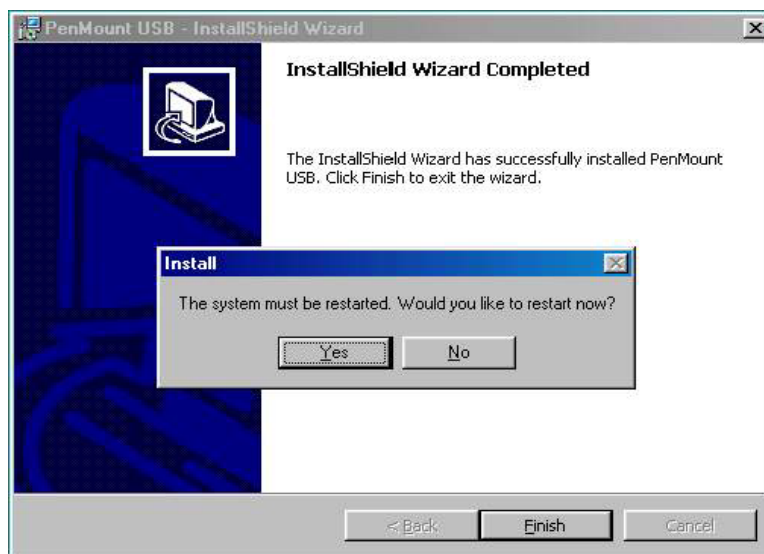


## Chapter 4 Installing Software for 5000 Boards

- d. The next screen displays 'Ready to Install the Program'. Click 'Install'.



- e. The last screen shows 'InstallShield Wizard complete', select 'Yes' to reboot the system.



7. After the system reboots perform touch screen **Calibration** as described below.

### **Configuring the PenMount Windows 98 Driver**

Upon restarting, the computer automatically finds the new 5000 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, click “Calibrate.”

#### *PenMount Control Panel*

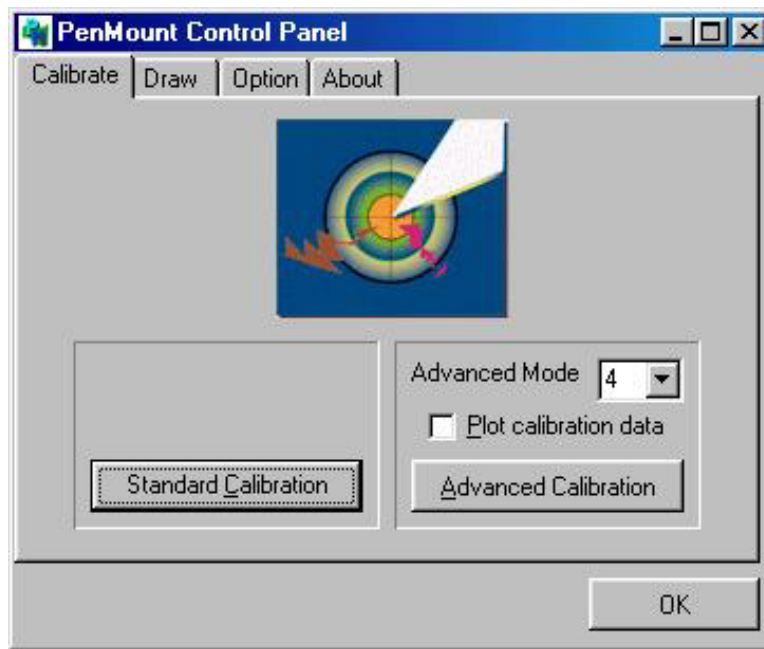
The functions of the PenMount Control Panel are explained in the following sections.

#### **Calibrate**

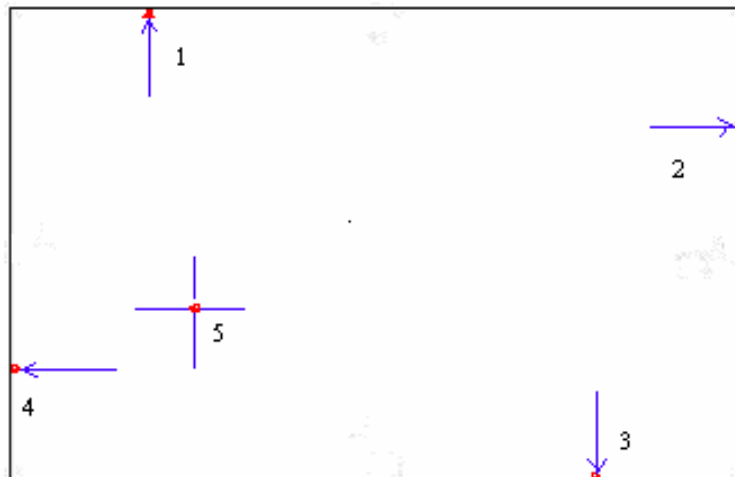
This function offers two ways to calibrate your touch screen. ‘Standard Calibration’ adjusts most touch screens. ‘Advanced Calibration’ adjusts aging touch screens.

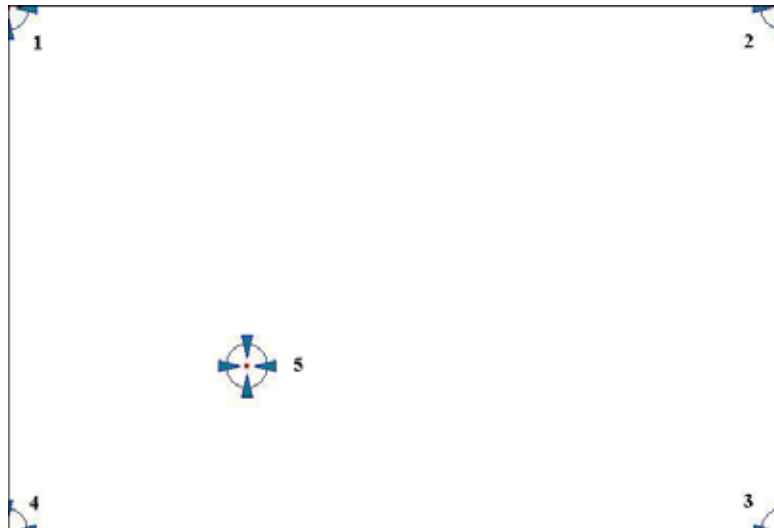
- |                      |  |
|----------------------|--|
| Standard Calibration | <b>Click this button and arrows appear pointing to red squares. Use your finger or stylus to touch the red squares in sequence. After the fifth red point, calibration is complete. To skip, press ‘ESC’.</b>                |
| Advanced Calibration | <b>Advanced Calibration uses 4, 9, 16 or 25 points to effectively calibrate the touch panel linearity of aged touch screens. Click this button and touch the red squares in sequence with a stylus. To skip, press ESC’.</b> |

## Chapter 4 *Installing Software for 5000 Boards*



**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.





Plot Calibration Data

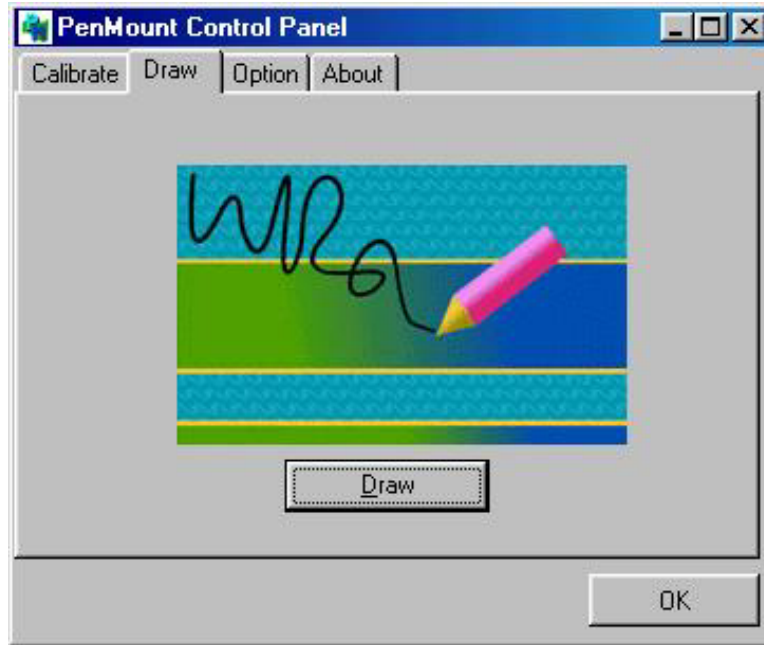
**Check this function and a touch panel linearity comparison graph appears when you have finished Advanced Calibration. The blue lines show linearity before calibration and black lines show linearity after calibration.**

## Chapter 4 *Installing Software for 5000 Boards*



**Draw**

Tests or demonstrates the PenMount touch screen operation. The display shows touch location. Click **Draw** to start.

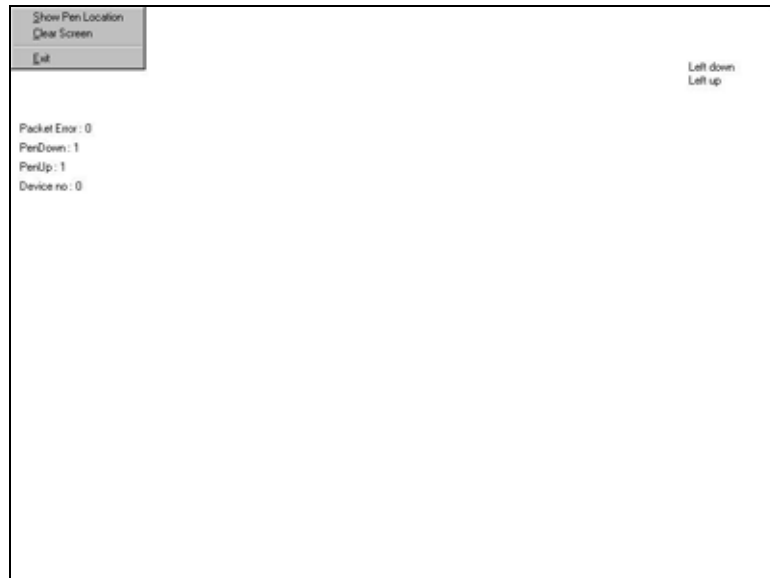


Touch the screen with your finger or a stylus and the drawing screen registers touch activity such **left**, **right**, **up**, **down**, **pen up**, and **pen down**.





Click Clear Screen to clear the drawing.



### Option

This panel function supports two modes—Operation Mode and Beep Sound Mode—which allow configuration for specific touch screen applications, such as point-of-sales (POS) terminals.

#### Operation Mode

**This mode enables and disables the mouse's ability to drag on-screen icons—useful for configuring POS terminals.**

***Stream Mode* – Select this mode and the mouse functions as normal and allows dragging of icons.**

***Point Mode* – Select this mode and the mouse only provides a click function, and dragging is disabled.**

#### Beep Sound Mode

***Enable 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 is lifted up**

***Beep on both of Pen Down/Up* – beep occurs on both**

***Beep Frequency* – modifies sound frequency**

***Beep Duration* – modifies sound duration**



**About**

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

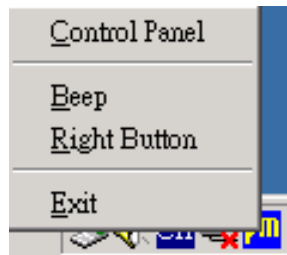


### *PenMount Monitor Menu Icon*

The PenMount monitor icon (PM) appears in the menu bar of the Windows 98 system after the Windows 98 USB driver is installed.



PenMount Monitor has the following functions.



Beep

**Turns touch screen beep on or off.**

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 98 USB supports several display rotating software packages. Please see Chapter 5 for more information. The PenMount drivers for Windows 95, Windows 98/Me, Windows 2000/XP, as well as Windows 98 USB and 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**

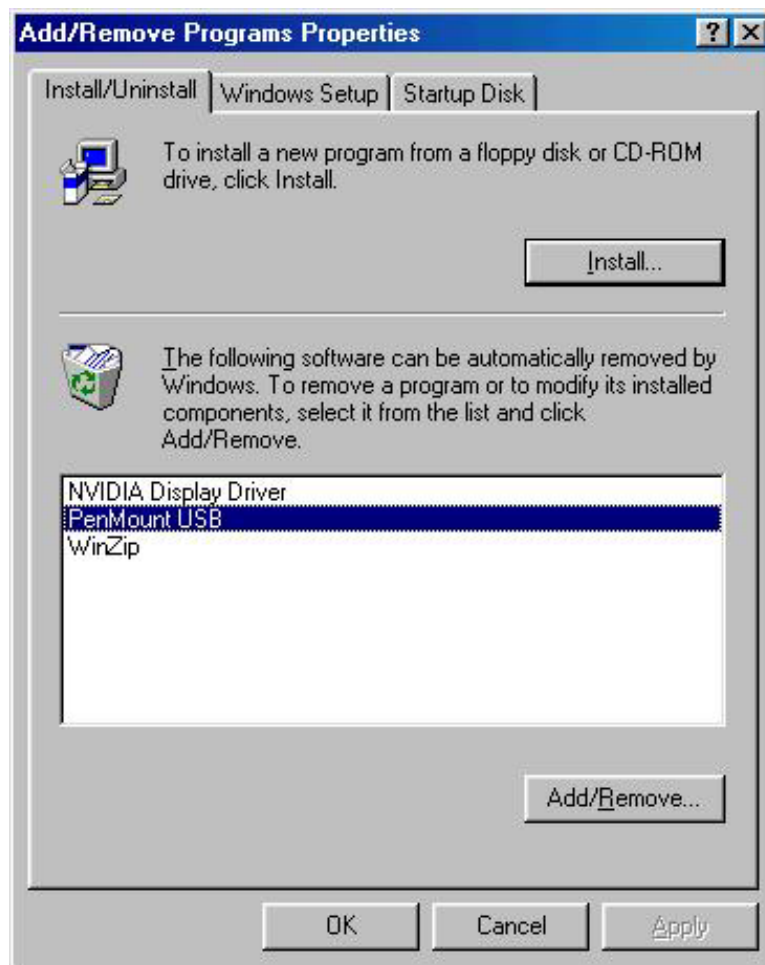
1. Install the rotation software package.
2. Choose the rotate function (0°, 90°, 180°, 270°) in the 3<sup>rd</sup> party software. The calibration screen appears automatically. Touch this point and rotation is mapped.



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

### Uninstall the PenMount Windows 98 USB driver

1. Exit the PenMount monitor (PM) in the menu bar.
2. In the 'Device Manager' select 'Human Device'. Select 'PenMount USB' and then 'Uninstall'.
3. After removing the PenMount USB software from the 'Device Manager' go to 'Control panel' then 'Add/Delete program' and select 'PenMount USB' and click 'Remove'. This removes all of the software.



4. Select 'Next' to confirm removal of the driver.
5. Select 'Finish' and the PenMount Windows 98 USB driver is completely removed.

## 4-2. Windows Me/2000/XP USB Driver Installation for 5000 Boards

Before installing the Windows Me/2000/XP USB driver software, you must have the Windows Me/2000/XP system installed and running on your computer. You must also have one of the following PenMount USB controller boards installed: 5184, 51A5 or 5126. Contents of the PenMount Windows Me/2000/XP USB driver folder are listed below. (PenMount USB driver Version 4.0 designed for Microsoft Windows XP )

**Setup.exe**

**PenMount 98.inf**

**PenMount.inf**

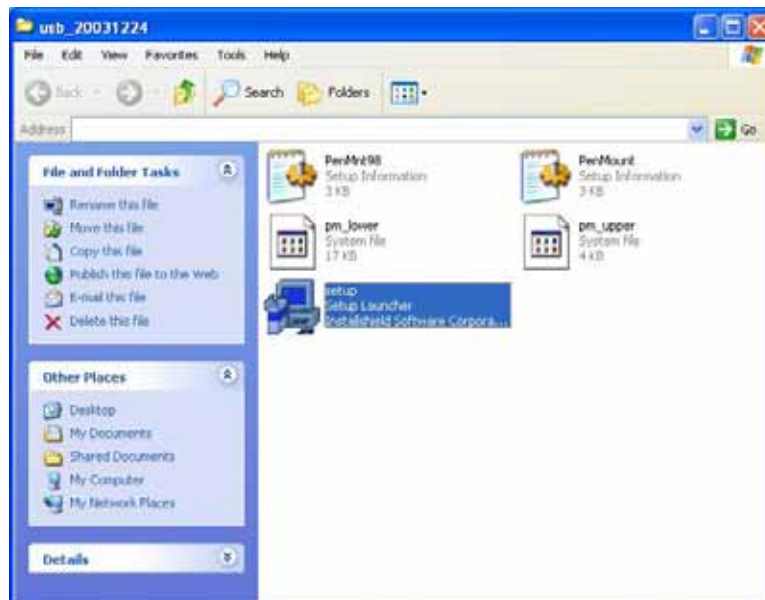
**Pm\_lower.sys**

**Pm\_upper.sys**



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

1. Insert and select the PenMount Driver CD-ROM to start installation. Find the PenMount Windows Me/2000/XP USB driver folder and select 'setup'.

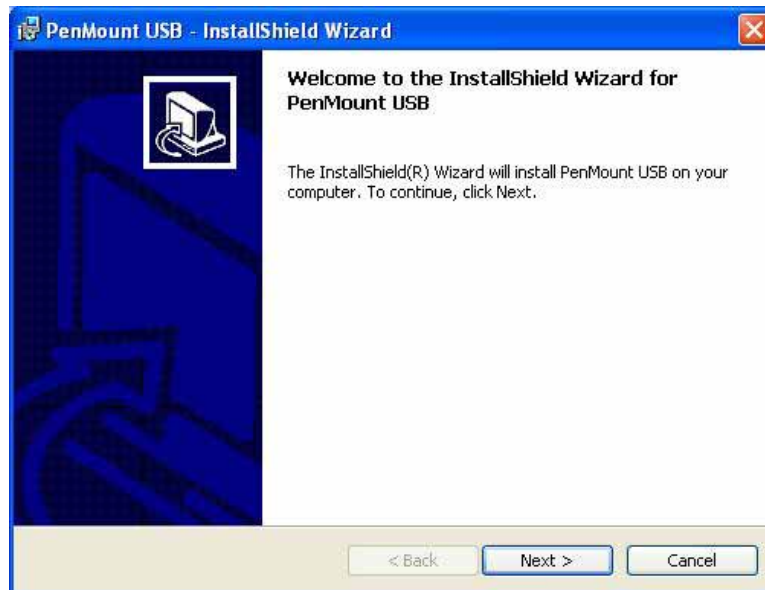


## Chapter 4 Installing Software for 5000 Boards

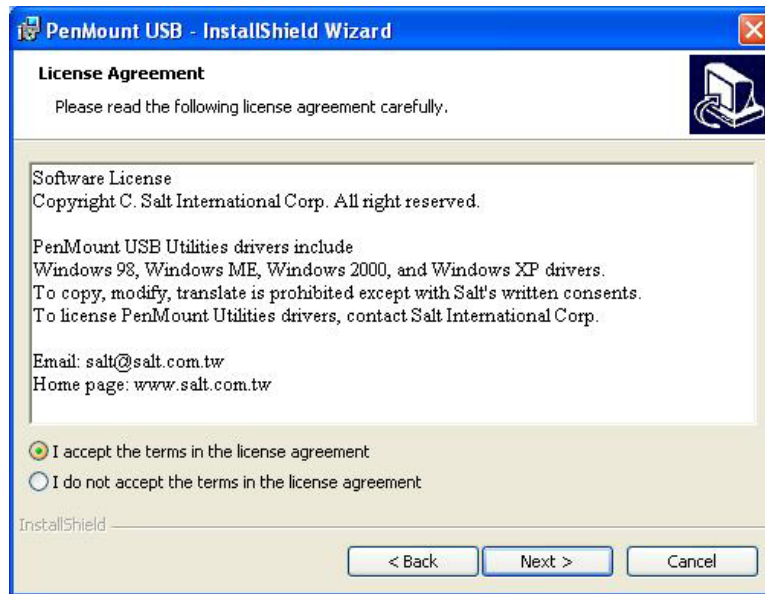
**IMPORTANT!** Before installing the driver software you *must* plug the board into a USB port.



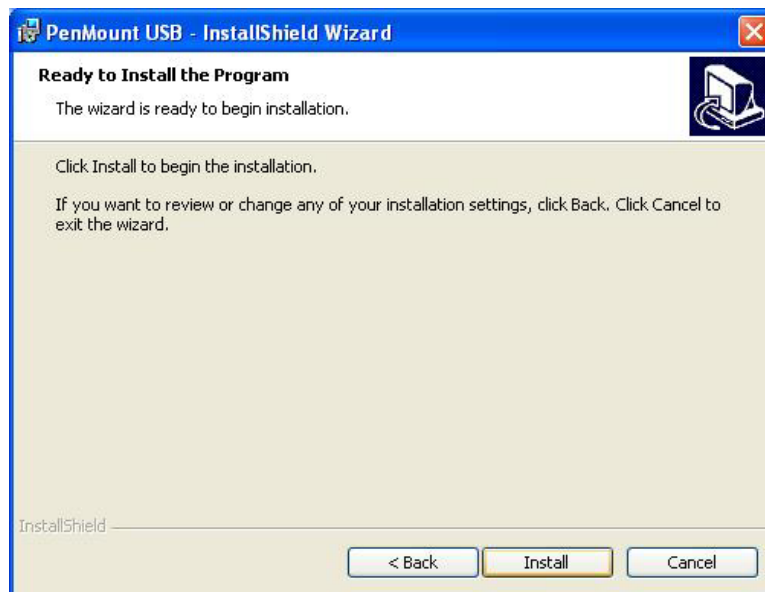
2. The screen displays 'InstallShield Wizard' to install the PenMount Windows Me/2000/XP driver. Click 'Next' to begin installing the PenMount USB driver to system.



3. The license agreement appears. Click 'Next'.



4. The next screen shows 'Ready to Install the Program'. Click 'Install'.



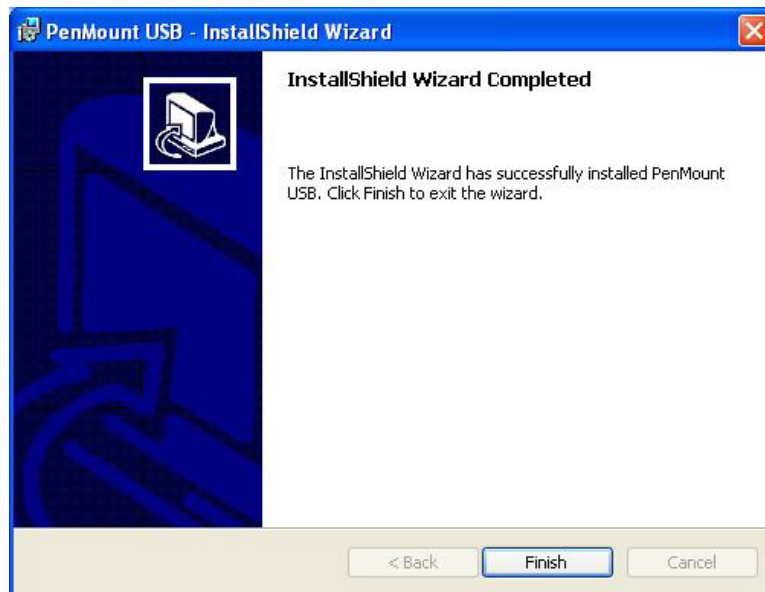


## Chapter 4 Installing Software for 5000 Boards

5. The 'InstallShield Wizard completed' screen appears. Click 'Finish'.



6. If show message box appears stating the driver does not have an MS Logo. Please select 'Continue Anyway' to finish the installation. The PenMount USB driver is now completely installed.



### Configuring the PenMount Windows Me/2000/XP USB Driver

Upon rebooting, the computer automatically finds the new 5000 USB 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, click "Calibrate."

*PenMount Control Panel*

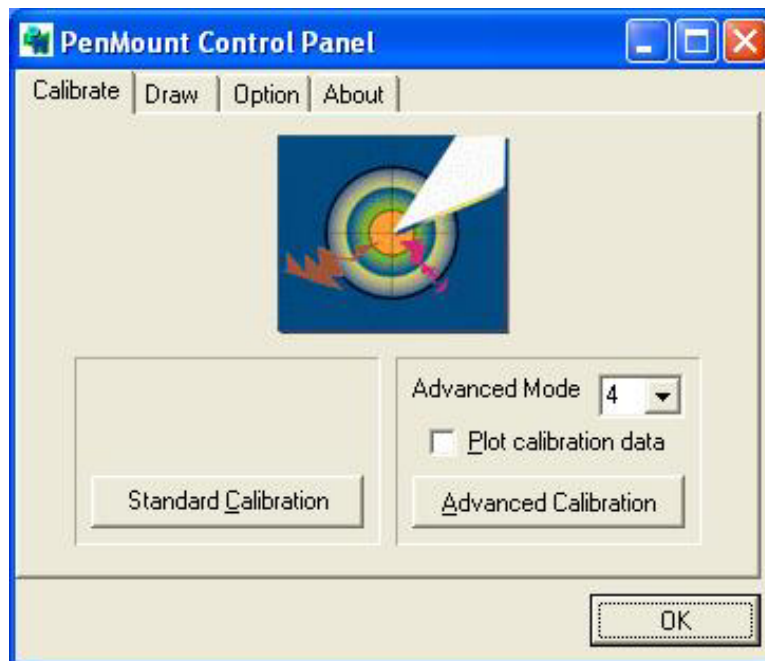
The functions of the PenMount Control Panel are **Calibrate**, **Draw**, and **About**, which are explained in the following sections.

**Calibrate**

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

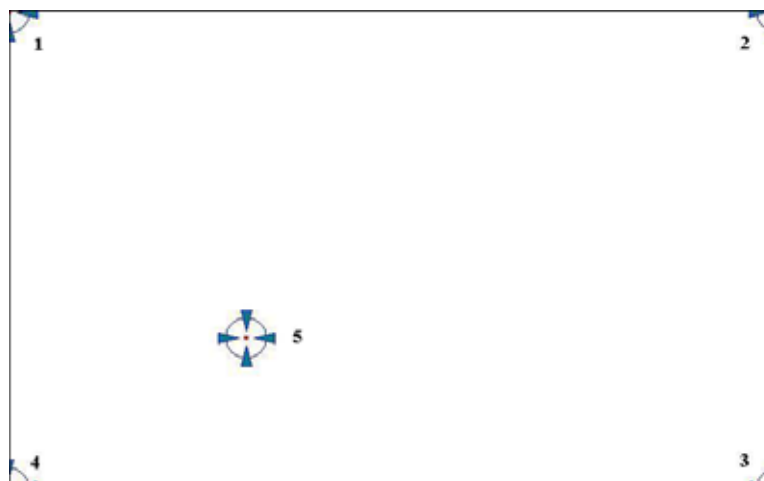
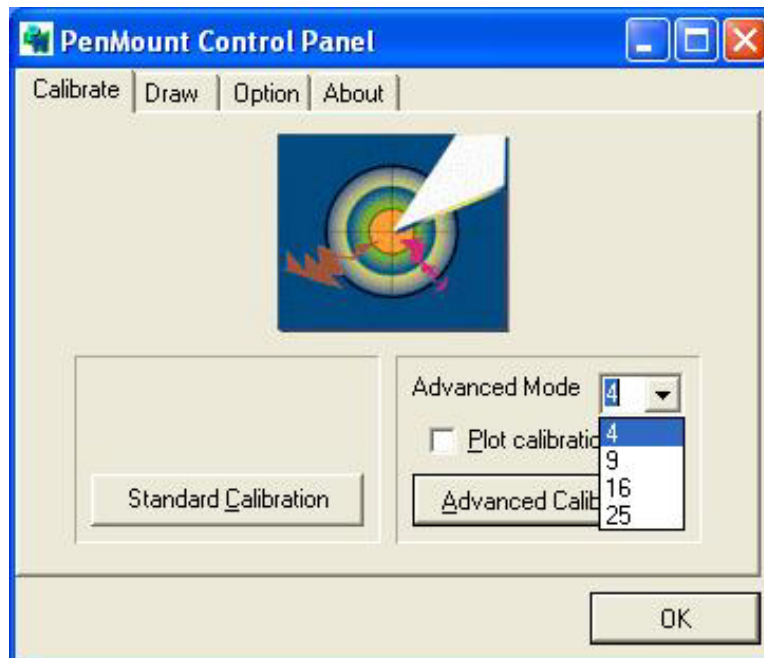
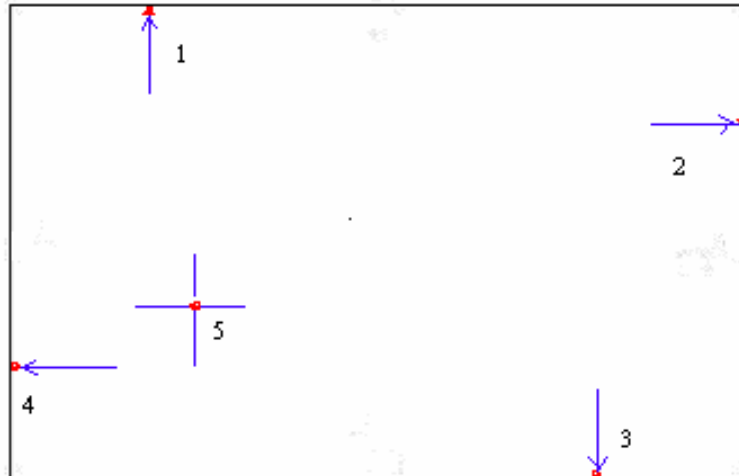
Standard Calibration      **Click this button and arrows appear pointing to red squares. Use your finger or stylus to touch the red squares in sequence. After the fifth red point calibration is complete. To skip, press ‘ESC’.**

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’.**



**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.

## Chapter 4 *Installing Software for 5000 Boards*



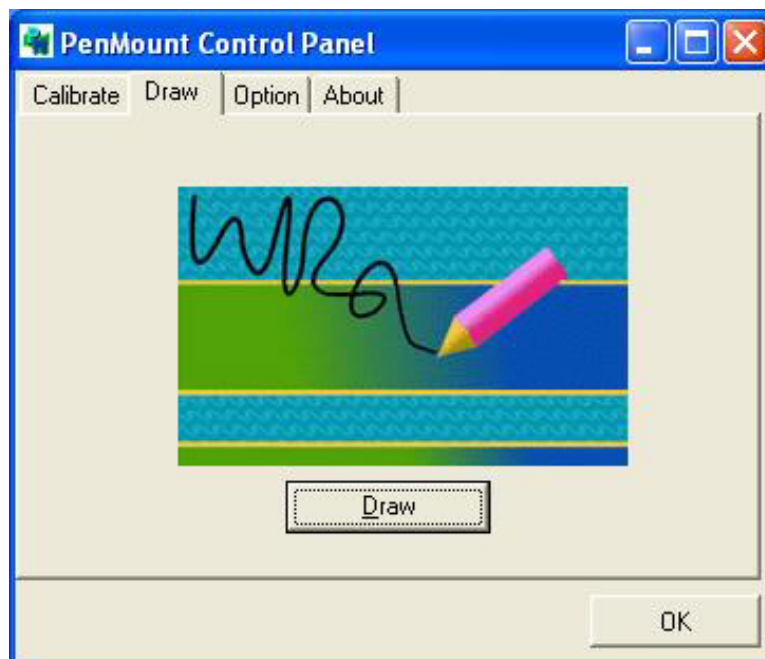
Plot Calibration Data

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.



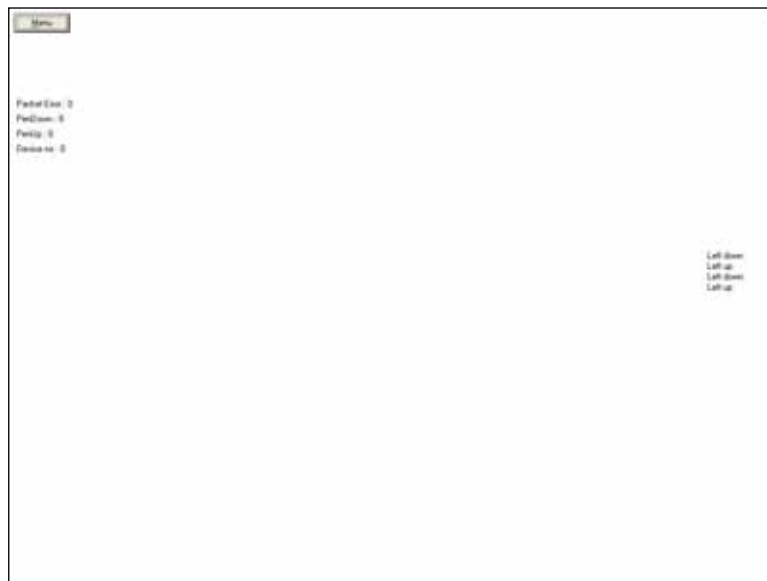
**Draw**

Tests or demonstrates the PenMount touch screen operation. The display shows touch location. Click **Draw** to start.



## Chapter 4 *Installing Software for 5000 Boards*

Touch the screen with your finger or a stylus and the drawing screen registers touch activity such **left**, **right**, **up**, **down**, **pen up**, and **pen down**.



Click Clear Screen to clear the drawing.



**Option**

This panel function supports two modes—Operation Mode and Beep Sound Mode—which allow configuration for specific touch screen applications, such as point-of-sales (POS) terminals.

Operation Mode      **This mode enables and disables the mouse’s ability to drag on-screen icons—useful for configuring POS terminals.**

*Stream Mode* – Select this mode and the mouse functions as normal and allows dragging of icons.

*Point Mode* – Select this mode and the mouse only provides a click function, and dragging is disabled.

Beep Sound Mode      **Enable 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 is lifted up

**Beep on both of Pen Down/Up** – beep occurs on both

**Beep Frequency** – modifies sound frequency

**Beep Duration** – modifies sound duration



### About

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



### *PenMount Monitor Menu Icon*

The PenMount monitor icon (PM) appears in the menu bar of Windows Me/2000/XP system after the Windows Me/2000/XP USB driver is installed.



PenMount Monitor has the following functions.



|              |  |
|--------------|--|
| Beep         | <b>Turns touch screen beep on or off.</b>  |
| Right Button | <b>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.</b> |



|      |   |
|------|---|
| Exit | <b>Exits the PenMount Monitor function.</b> |
|------|---|

### *PenMount Rotating Functions*

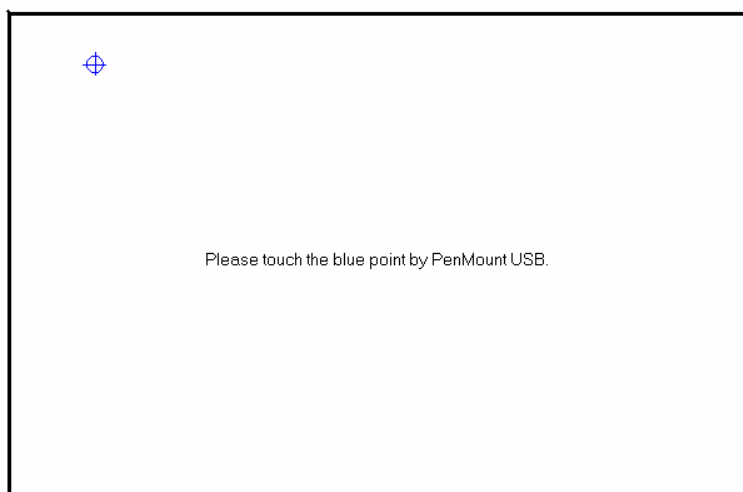
The PenMount driver for Windows Me/2000/XP supports several display rotating software packages. Please see Chapter 5 for more information. The PenMount drivers for Windows 95, Windows 98/Me, Windows 2000/XP, as well as Windows 98 USB and Windows Me/2000/XP support display rotating software packages such 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

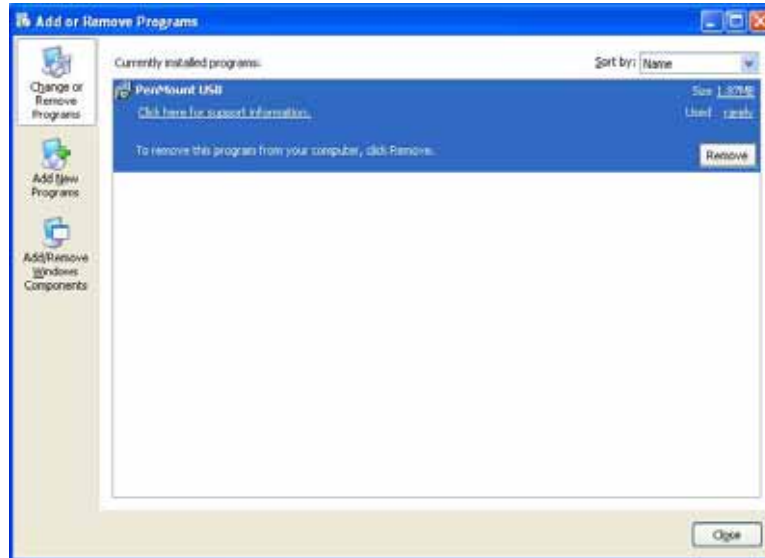
1. Install the rotation software package.
2. Choose the rotate function (0°, 90°, 180°, 270°) in the 3<sup>rd</sup> party software. The calibration screen appears automatically. Touch this point and rotation is mapped.



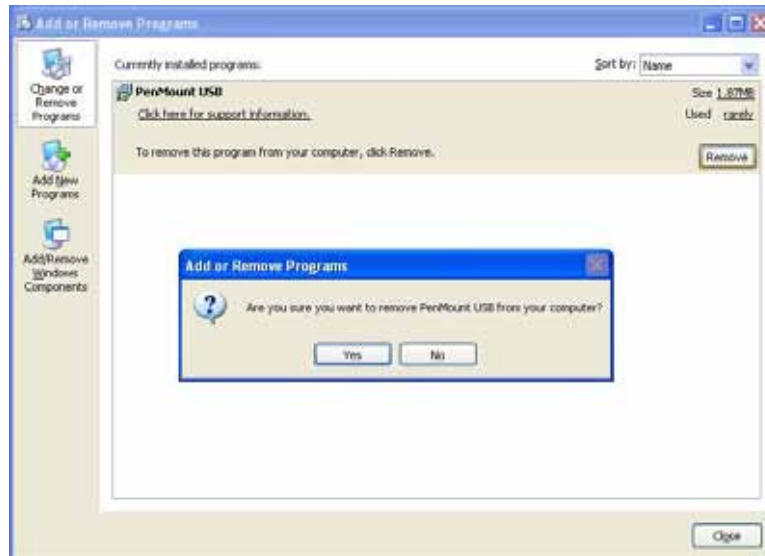
**NOTE:** The Rotate function is disabled if you use Monitor Mapping.

### Uninstall the PenMount Windows Me/2000/XP USB driver

1. Exit the PenMount monitor (PM) in the menu bar.
2. Remove the PenMount USB driver from “Start/Control Panel/Add/Remove Programs. Select ‘PenMount USB’ and click ‘Remove’.



3. Click 'Yes' to confirm removal of the driver and the PenMount Windows 98 USB driver is completely removed from the system.



### **4-3. Linux X Window USB drivers Version 1.01 for 5000 Boards (Supports XFree86 version 4.x.x only)**

Before installing the Linux X Window 4.x.x driver software, you must have the Linux X Window 4.x.x system installed and running on your computer. You must also have one of the following PenMount USB controller boards installed: 5134 or 51A5. Contents of the PenMount driver folder are listed below.

**Driver/penmount\_drv.o** -- Penmount XFree86 4.X driver  
**Driver/RedHat7.1/** -- Penmount Linux 2.4 kernel module driver for RedHat 7.1  
**Driver/RedHat7.2/** -- Penmount Linux 2.4 kernel module driver for RedHat 7.2  
**Driver/RedHat7.3/** -- Penmount Linux 2.4 kernel module driver for RedHat 7.3  
**Driver/RedHat8/** -- Penmount Linux 2.4 kernel module driver for RedHat 8  
**Driver/RedHat9/** -- Penmount Linux 2.4 kernel module driver for RedHat 9  
**Driver/Module\_src** -- Penmount Linux 2.4 kernel module driver source code  
**Calibration/pencal-2.00** -- Penmount calibration utility  
**Calibration/bcircle.xpm** -- bitmap file, for Penmount calibration utility  
**Calibration/rcircle.xpm** -- bitmap file, for Penmount calibration utility  
**XF86Config.sample** -- XF86Config sample  
**usb.handmap.sample** -- usb.handmap sample

**NOTE:** If "New Hardware Checking" finds a new "USB MOUSE" while booting Linux with the PenMount USB, please click 'Ignore'.

#### **Kernel Driver Module Installation Procedures**

1. Login system with "root", and check your XFree86 version  
# cd /root
2. Copy kernel module "penmountusb.o" to /lib/modules/<kernel version>/kernel/drivers/usb.

\*\*For Redhat 7.1,  
#cp Driver/RedHat7.1/penmountusb.o /lib/modules/2.4.2-2/kernel/drivers/usb  
#depmod -a

\*\*For Redhat 7.2,  
#cp Driver/RedHat7.2/penmountusb.o/lib/modules/2.4.7-10/kernel/drivers/usb  
#depmod -a

\*\*For Redhat 7.3,

```
#cp Driver/RedHat7.3/penmountusb.o /lib/modules/2.4.18-3/kernel/drivers/usb
#depmod -a
```

\*\*For Redhat 8,

```
#cp Driver/RedHat8/penmountusb.o /lib/modules/2.4.18-14/kernel/drivers/usb
#depmod -a
```

\*\*For Redhat 9,

```
#cp Driver/RedHat9/penmountusb.o /lib/modules/2.4.20-8/kernel/drivers/usb
#depmod -a
```

\*\*For Other Distribution and Other Kernel Version, please rebuild the module source

```
#cd Driver/Module_src/ (Modify "build" for your "kernel version" first)
#./build
```

```
#cp penmountusb.o /lib/modules/2.4.x-x/kernel/drivers/usb (2.4.x-x by your
kernel version)
#depmod -a
```

3. Edit /etc/hotplug/usb.handmap and copy&paste a new line for Penmount USB.  
#gedit usb.handmap (or you can use "vi" Text Editor) (Please refer to usb.handmap.sample)

```
evdev    0x0003    0x1204    0x9998    0x0000    0x0000    0x00
0x00     0x00     0x00     0x00     0x00     0x00000000
```

4. Add the penmountusb module by executing the following script.

```
#modprobe -r hid
#modprobe -r usbmouse
#modprobe evdev
#modprobe penmountusb
#modprobe hid
```

### **XFree86 4.0 Driver Module Installation Procedures**

1. Copy penmount driver "penmount\_drv.o" to "/usr/X11R6/lib/modules/input".

## Chapter 4 Installing Software for 5000 Boards

```
# cp Driver/penmount_drv.o /usr/X11R6/lib/modules/input
```

### 2. Check your XFree86 Version

```
# cd /etc/X11
```

```
# X -version
```

(If the screen shows "XFree86 Version 4.x.x / X Window System", go to step 3.

If not, you can not run the driver.)

You must make sure 4.x.x supports your video card, and then re-link X file.

```
#rm X
```

```
#ln -s /usr/X11R6/bin/XFree86 X
```

```
#mv XF86Config XF86Config.old
```

```
#mv XF86Config-4 XF86Config
```

```
#ln -s XF86Config XF86Config-4
```

### 3. Edit XF86Config file to load driver. You can refer to "XF86Config.sample".

a. # gedit /etc/X11/XF86Config (or you can use "vi" Text Editor) (Copy & Paste)

b. In the Section "ServerLayout", add a statement :

```
InputDevice      "Penmount" "AlwaysCore"
```

c. Add a Section "InputDevice":

```
Section "InputDevice"
```

```
Identifier "PenMount"
```

```
Driver "penmount"
```

```
Option "Protocol" "Auto"
```

```
Option "Device" "/dev/input/event0"
```

```
Option "PMode" "1"
```

```
Option "MinX" "10"
```

```
Option "MaxX" "1000"
```

```
Option "MinY" "10"
```

```
Option "MaxY" "1000"
```

```
Option "Beep" "1" # 0 = no beep, 1 = beep enabled
```

```
Option "PressVol" "100" # volume of beep (press event)
```

```
Option "PressPitch" "880" # pitch of beep (press event)
```

```
Option "PressDur" "15" # length of beep in 10ms (press event)
```

```
Option "ReleaseVol" "0" # volume of beep (release event)
```

```
Option "ReleasePitch" "1200" # pitch of beep (release event)
```

```
Option "ReleaseDur" "10" # length of beep in 10ms (release event)
```

```
EndSection
```

### Calibrating Utilities

1. Copy the calibrate file into the "/usr/local/pencal" directory.  
# mkdir /usr/local/pencal  
# cp /mnt/cdrom/Driver/Linux\ XFree86\ 4.x.x\ V2.0/Calibration/\*.\*  
/usr/local/pencal
2. Input "startx" to start X window.  
# startx
3. In the X window system, open a terminal window and type  
# cd /usr/local/pencal  
# ./pencal-2.00

A PenCal window appears on the display. Follow the four red points to perform the calibration. When the PenCal window shows: "Finished! Please restart X window," wait a moment until the PenCal window disappears, and then restart the X window system.

4. For more information, type  
# ./pencal-2.00 --help

### 4-4. Win CE USB Driver Installation for 5000 Boards

Before installing the Win CE driver software, you must have the Win CE system installed and running on your device. You must also have one of the following PenMount USB controller boards installed: 5184, or 51A5.

**NOTE 1:** Before connecting USB PenMount (ex. to USB), you *must* add the UHCI or OHCI Host Control driver (USB Host) into the platform that is supported by computer.

**NOTE 2:** Make sure your Win CE cursor is compatible with a USB mouse in the same port.

#### Driver Installation Procedures

1. mkdir \$(\_WINCEROOT)\PUBLIC\PENMOUNT\ReleaseDisk\  
Copy All files to this directory.
2. Run Platform Builder menu -> Tools -> CEC Editors
3. In the CEC Editors menu -> File ->  
Open \$(\_WINCEROOT)\PUBLIC\PENMOUNT\ReleaseDisk\penmount.cec  
In the CEC Editors menu -> Catalog -> Add to Catalog
4. Return Platform Builder and Refresh Catalog. In the Catalog Screen you can see the new item named "PenMount Products" to be added to your Catalog.
5. Open the PenMount product folder. Select 'PenMount' and right mouse click to execute 'Add to Platform'.
6. Go to Parameter View and open Project Specific Files folder. Double click on the PROJECT.BIB file

Add the following lines under MODULES:

|               |                                    |    |    |
|---------------|------------------------------------|----|----|
| usbpm.dll     | \$( _FLATRELEASEDIR)\usbpm.dll     | NK | SH |
| drawdemo.exe  | \$( _FLATRELEASEDIR)\drawdemo.exe  | NK |    |
| calibrate.exe | \$( _FLATRELEASEDIR)\calibrate.exe | NK |    |
| rbutton.exe   | \$( _FLATRELEASEDIR)\rbutton.exe   | NK |    |

Add these lines under FILES:

|                 |                                      |    |    |
|-----------------|--------------------------------------|----|----|
| Calibration.lnk | \$( _FLATRELEASEDIR)\calibration.lnk | NK | SH |
| DrawDemo.lnk    | \$( _FLATRELEASEDIR)\DrawDemo.lnk    | NK | SH |
| RightButton.lnk | \$( _FLATRELEASEDIR)\RightButton.lnk | NK | SH |

7. In PROJECT.DAT file in Parameter View of MS WinCE Platform Builder 4.0.

Add these lines:

```
root:-Directory( "\Windows" )
Directory( "\Windows" ):-Directory( "LOC_DESKTOP_DIR" )
Directory( "\Windows" ):-Directory( "LOC_PROGRAMS_DIR" )
Directory( "\Windows\LOC_PROGRAMS_DIR" ):-Directory( "PenMount
TouchPanel" )
Directory( "\Windows\LOC_DESKTOP_DIR" ):-File( "Calibration.lnk"
, "\Windows\Calibration.lnk" )
Directory( "\Windows\LOC_PROGRAMS_DIR\PenMount
TouchPanel" ):-File( "Calibration.lnk" , "\Windows\Calibration.ln
Directory( "\Windows\LOC_PROGRAMS_DIR\PenMount
TouchPanel" ):-File( "Right
Button.lnk" , "\Windows\RightButton.lnk" )
Directory( "\Windows\LOC_PROGRAMS_DIR\PenMount
TouchPanel" ):-File( "Draw Demo.lnk" , "\Windows\DrawDemo.lnk" )
```

8. Build your Platform (use "Build Platform", not "Rebuild"), and boot it. Execute Calibration and DrawDemo to test USB PenMount.
9. If you wish to keep the calibration data after WINCE reboots, please write "WINCE REGISTRY" to FLASH in your machine.



# Chapter 5: Software Functions

This chapter describes the special software functions that configure and adjust the PenMount controller boards and touch screen hardware. Please note that not all of the functions are available for every driver. Software functions and their availability for specific interface and systems are shown in the table below—a description for each function follows.

| Software Function                      | DOS | Win 3.1 | 95 | 98/Me | NT | 2000/XP | CE | Linux | QNX |
|--|-----|---------|----|-------|----|---------|----|-------|-----|
| Standard Calibration                   | ●   | ●       | ●  | ●■    | ●  | ●■      | ●■ | ●■    | ●   |
| Advanced Calibration                   |     |         |    | ●■    | ●  | ●■      | ●■ |       |     |
| Multiple Monitors                      |     |         |    |       |    | ●       |    |       |     |
| Multi Device                           |     |         |    | ■     |    | ●■      | ■  |       |     |
| Rotation                               |     |         | ●  | ●■    | ●  | ●■      |    |       |     |
| Stream/Point mode                      |     |         |    | ●■    |    | ●■      |    |       |     |
| Drawing mode                           | ●   | ●       | ●  | ●■    | ●  | ●■      | ●■ |       |     |
| Beep Sound                             | ●   | ●       | ●  | ●■    | ●  | ●■      |    | ●■    | ●   |
| Beep sound adjustable                  |     |         |    | ●■    |    | ●■      |    |       |     |
| Wake up function                       |     |         |    | ●■    |    | ■       |    |       |     |
| Showing linearity                      |     |         |    | ●■    |    | ●■      |    |       |     |
| Right button                           |     | ●       | ●  | ●■    | ●  | ●■      | ●■ |       | ●   |
| Hide cursor                            | ●   | ●       | ●  |       | ●  |         |    |       |     |
| Double click area and speed adjustable |     |         | ●  |       | ●  |         |    |       |     |
| About                                  |     | ●       | ●  | ●■    | ●  | ●■      |    |       |     |

- RS-232 Interface (9000 series)
- USB Interface (5000 series)

### **Software Function Description**

Description for each of the software functions shown in the table above follows.

#### **Standard Calibration**

The Standard Calibration function lets you match the touch screen to your display so that the point you touch is accurately tracked on screen. Standard calibration only requires four points for calibration and one point for confirmation. Under normal circumstances Standard Calibration is all you need to perform an accurate calibration.

#### **Advanced Calibration**

The Advanced Calibration function improves the accuracy of calibration by using more involved engineering calculations. Use this function only if you have tried the Standard Calibration and there is still a discrepancy in the way the touch screen maps to the display. You can choose 4, 9, 16 or 25 points to calibrate, though we suggest that you first try 9 points, if it is still not tracking well then try 16 or 25 points. The more points you use for calibration, the greater the accuracy. Errors in calibration may occur due to viewing angle, or individual skill, and there may be little difference in using 16 or 25 points. Note that a stylus is recommended for the most accurate results.

#### **Multiple Monitors**

Until now most touch screen systems only support one monitor, and users of multiple monitors have not been able to use touch screen systems. This situation has inspired PenMount to design and develop Multiple Monitors support using PenMount 9000 control boards and Windows 2000/XP drivers. Our advanced design supports from 2 to 6 monitors that can be split horizontally or vertically.

#### *Requirements*

Before using the Multiple Monitors function you need the following:

1. A display card that supports multiple monitors such as the Matrox, nVidia, ATI, etc. (Two or more display cards supported by Windows are also ok.)
2. Two or more touch screens
3. Two or more Serial Ports
4. Two or more PenMount 9000 control boards such as the 9036, 9026, 9084, or 90A4

5. The PenMount 9000 Windows 2000/XP v4.01 or greater software driver

Before using Multiple Monitors you must have two or more monitors that are in extension mode. For display cards that support multiple monitors, we suggest you consider Matrox, nVidia, or ATI cards and inquire about operation and usability issues.

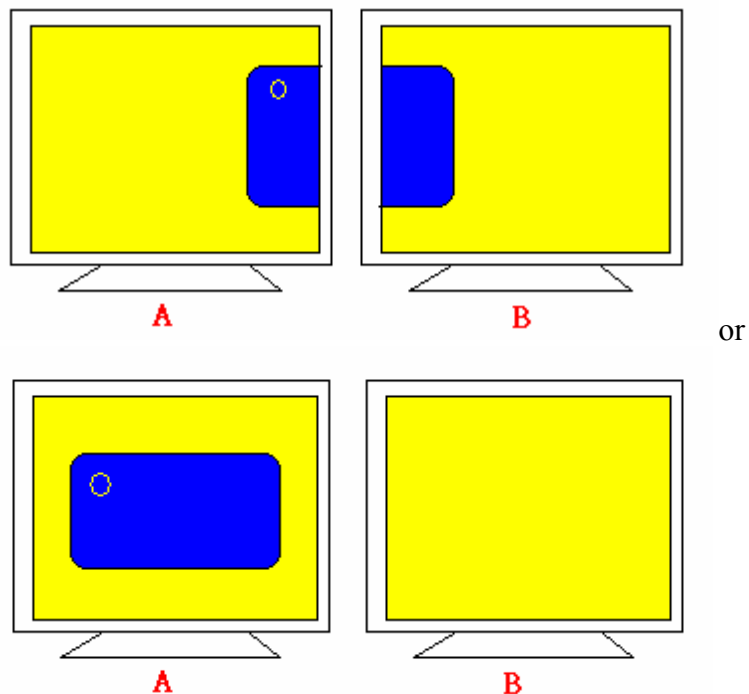
**Note:** Before you can use multiple monitors you need to map each monitor.

### Multiple Devices

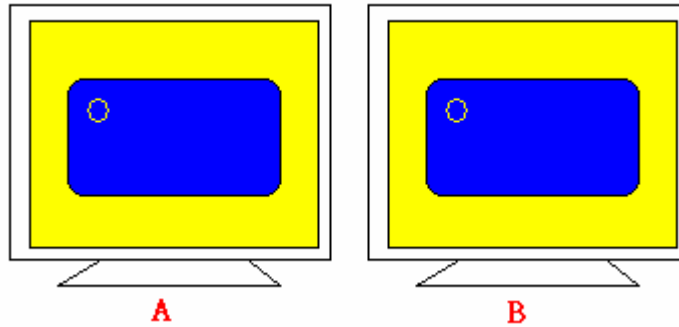
The Multiple Devices function is designed to let you use two or more monitors to display the same image. Software that supports this function includes the PenMount 9000 2000/XP drivers and the PenMount 5000 98/Me/2000/XP/CE drivers. The drivers for PenMount 9000 can support up to six control boards, and the drivers for PenMount 5000 support up to sixteen control boards.

### Comparing Functions

The difference between the Multiple Monitors function and the Multiple Devices function are illustrated below.



The Multiple Monitors function shown above extends the screen into 2 or more monitors.



The Multiple Devices function displays the same image on two or more monitors.

### *Requirements*

Before using the Multiple Monitors function you need the following:

1. A display card that supports Dual Monitors such as the Matrox, nVidia, ATI, etc., or that outputs into a 1-into-2 VGA signal box
2. Two or more touch screens
3. Two or more Serial Ports or USB Ports
4. Two or more PenMount 9000 control boards such as the 9036, 9026, 9084, or 90A4, or PenMount 5000 control boards such as the 5184 or 51A5
5. If using the PenMount 9000 control board the driver must be the PenMount 9000 Windows 2000/XP v4.01 or greater software driver
6. If using the PenMount 5000 control board the driver must be for Windows 98/Me/2000/XP/CE

### *9000 Control Boards*

To use multiple devices with 9000 Control Boards:

1. Configure your computer hardware
2. Attach each 9000 Control Board to a different computer's serial port
3. Install the appropriate PenMount software driver in each computer—see Chapter 3
4. Use each driver's Calibration function to calibrate each computer's touch screen. You must calibrate each touch screen before configuration is complete

### *5000 Control Boards*

To use multiple devices with 5000 Control Boards:

1. Configure your computer hardware and the Control Board ID Dipswitch—refer to your control board's hardware description in Chapter 2
2. Install the appropriate PenMount software driver in each computer—see Chapter 4
3. Use each driver's Calibration function to calibrate each computer's touch

screen. You must calibrate each touch screen before configuration is complete

**Note:** You must set the Control Board ID Dipswitches. Do not use the same setting on different control boards; otherwise the hardware will not operate correctly.

### Rotation

There are currently a number of software packages on the market that support rotating monitors 0°, 90°, 180°, and 270°. However you will not be able to use a touch screen unless it is matched to the appropriate rotation. Our rotation configuration function allows you to easily match the touch screen when you rotate your monitor.

If you use a rotating monitor you will need a display card such as from nVidia, Intel, SMI or ATI and software such as Portrait Pivot Pro. For software operation and features, please refer to your software manual.

Configuring the rotation function is easy. Select this option and a 'point' appears for you to touch. Once the point is touched the software driver understands which degree you plan to rotate your display. The rotation function supports 90, 180 and 270 degree rotation.



**0 degrees**



**90 degrees**



**180 degrees**



**270 degrees**

### **Stream / Point Mode**

Stream and point modes control the touch and drag function of the touch screen. The point mode only allows “touch” interaction with the screen and does not allow the user to drag objects. The point mode is useful for maintaining the location of screen icons such on POS terminals. The stream mode allows a user to touch and drag icons and other items around on the screen, similar to using a mouse.

### **Drawing Mode**

Drawing mode is a utility that lets the user draw on the screen using a finger or stylus. This allows the user to test the touch screen and touch controller to see if it is operational or is mapped correctly. The drawing mode can display either the matrix address of points touched or just show lines drawn. One of the PenMount driver’s strengths is a special mathematical algorithm that minimizes the occurrence of noise and smoothes the drawing of lines.

### **Beep Sound**

All of PenMount’s drivers support the beep sound function; however some PC systems may only offer a fixed buzzer sound.

### **Beep Sound Adjustable**

Software drivers for Windows systems let the user adjust the frequency and length of the beep sound. The drivers let the user adjust the desired touch screen sound, as well as turn the sound off.

### **Wake Up Function**

The Wake Up function lets the user touch the screen and wake the system up from ‘suspend’ mode.

### **Point Calibration Data**

The Plot Calibration Data function displays the touch screen linearity map, which is available if the PenMount driver provides an Advance Calibration function. When touch screens age their touch linearity declines. This non-linearity is apparent when the touched point on the touch screen is not the same as the point on the display. The plot calibration data function shows the linearity status of the touch screen. This is only a support function for the user. The exact linearity of a touch screen requires a linearity test machine.

### **Right Button**

The Right Button function simulates the right button function of a mouse. Click the right button and the user can only touch the screen once and the driver changes the touch definition to the left button.

### **Hide Cursor**

The Hide Cursor function keeps the cursor arrow and other cursor symbols from appearing when using the touch screen. The cursor appears when user turns this function off.

### **Cursor Offset**

The Cursor Offset function lets the user adjust the position of the touch point to a desired location away from the real touch point.

### **Double Click Area and Speed**

The Double Click Area and Speed function lets the user adjust the double click area and speed to their personal preference.

### **About**

This option shows the exact version of the drivers and controller firmware. Updated drivers are available for download on the PenMount website.



# Appendix A: Board Descriptions & Specifications

This appendix provides information on controller board features and specifications.

## **PenMount 9036 Control Board**

The PenMount 9036 control board is configured for the RS-232 interface and it supports 4-wire, 5-wire and 8-wire touch screens.

### **PenMount 9036 Features**

- DMC9000 touch controller
- Diagnostic LED on board
- Supports PnP and non-PnP mode
- Supports 4-wire, 5-wire and 8-wire touch screen
- Baud rate 19200 or 9600 bps selectable
- Automatic pin assignment adjustment
- Input voltage is 5V to 12V
- Bundled with PenMount drivers, which are also available for download from our website

### **Connector Pin Definitions**

Pin definitions for the two connectors on the PenMount 9036 control board follow:

#### **Connector Pin Definitions for Touch Screen**

| <b>Pin definition<br/>/ wires</b> | <b>4-wire<br/>touch screen</b> | <b>5-wire<br/>touch screen</b> | <b>8-wire<br/>touch screen</b> |
|-----------------------------------|--------------------------------|--------------------------------|--------------------------------|
| PIN 9                             | N/A                            | N/A                            | Right Sense                    |
| PIN 8                             | N/A                            | N/A                            | Left Sense                     |
| PIN 7                             | N/A                            | N/A                            | Bottom Sense                   |
| PIN 6                             | N/A                            | Sense                          | Top Sense                      |
| PIN 5                             | Right                          | LR                             | Right                          |
| PIN 4                             | Left                           | LL                             | Left                           |
| PIN 3                             | Bottom                         | UR                             | Bottom                         |
| PIN 2                             | Top                            | UL                             | Top                            |
| PIN 1                             | Ground                         | Ground                         | Ground                         |

**Connector Pin Definitions for Power and RS-232**

|            | Power Lines |              | RS-232 Interface |       |       |        |
|------------|-------------|--------------|------------------|-------|-------|--------|
| Pin #      | PIN 1       | PIN 2        | PIN 3            | PIN 4 | PIN 5 | PIN 6  |
| Definition | Ground      | 5V~12V power | RTS              | TXD   | RXD   | Ground |

**PenMount 9026B Control Board**

The PenMount 9026B control board is configured for the RS-232 interface and it supports 4-wire and 8-wire touch screens.

**PenMount 9026B Features**

- DMC9000 touch controller
- Diagnostic LED on board
- Supports PnP mode
- Supports 4-wire and 8-wire touch screens
- Baud rate 19200 fixed
- Automatic pin assignment adjustment
- Input voltage is 5V to 12V
- Bundled with PenMount drivers, which are also available for download from our website

**Connector Pin Definitions**

Pin definitions for the two connectors on the PenMount 9026B control board follow:

**Connector Pin Definitions for Touch Screen**

| Pin definition / wires | 4-wire touch screen | 8-wire touch screen |
|------------------------|---------------------|---------------------|
| PIN 9                  | N/A                 | Right Sense         |
| PIN 8                  | N/A                 | Left Sense          |
| PIN 7                  | N/A                 | Bottom Sense        |
| PIN 6                  | N/A                 | Top Sense           |
| PIN 5                  | Right               | Right               |
| PIN 4                  | Left                | Left                |
| PIN 3                  | Bottom              | Bottom              |
| PIN 2                  | Top                 | Top                 |
| PIN 1                  | Ground              | Ground              |

**Connector Pin Definitions for Power and RS-232**

|            | Power Lines |              | RS-232 Interface |       |       |        |
|------------|-------------|--------------|------------------|-------|-------|--------|
| Pin #      | PIN 1       | PIN 2        | PIN 3            | PIN 4 | PIN 5 | PIN 6  |
| Definition | Ground      | 5V~12V power | RTS              | TXD   | RXD   | Ground |

## ***PenMount 9084 Control Board***

The PenMount 9084 control board is configured for the RS-232 interface and it supports 4-wire and 8-wire touch screens.

### **PenMount 9084 Features**

- DMC9000 touch controller
- Diagnostic LED on board
- Supports PnP mode
- Supports 4-wire and 8-wire touch screens
- Baud rate 19200 fixed
- Automatic pin assignment adjustment
- Input voltage is 5V to 12V
- Bundled with PenMount drivers, which are also available for download from our website

### **Connector Pin Definitions**

Pin definitions for the three connectors on the PenMount 9084 control board follow:

#### **Connector Pin Definitions for Touch Screen**

| Pin definition / wires | 4-wire touch screen | 8-wire touch screen |
|------------------------|---------------------|---------------------|
| PIN 9                  | N/A                 | Right Sense         |
| PIN 8                  | N/A                 | Left Sense          |
| PIN 7                  | N/A                 | Bottom Sense        |
| PIN 6                  | N/A                 | Top Sense           |
| PIN 5                  | Right               | Right               |
| PIN 4                  | Left                | Left                |
| PIN 3                  | Bottom              | Bottom              |
| PIN 2                  | Top                 | Top                 |
| PIN 1                  | Ground              | Ground              |

### Connector Pin Definitions for Power

|            | Power Lines |         |
|------------|-------------|---------|
| Pin #      | PIN 1       | PIN 2   |
| Definition | 5V~12V      | Groundr |

### Connector Pin Definitions for RS-232

|            | RS-232 Interface |       |       |        |
|------------|------------------|-------|-------|--------|
| Pin #      | PIN 1            | PIN 2 | PIN 3 | PIN 4  |
| Definition | RTS              | TXD   | RXD   | Ground |

## PenMount 90A4 Control Board

The PenMount 90A4 control board is configured for the RS-232 interface and it supports only 4-wire touch screens.

### PenMount 90A4 Features

- DMC9000 touch controller
- Diagnostic LED on board
- Supports PnP mode
- Supports 4-wire touch screens
- Baud rate 19200 fixed
- Input voltage is 5V
- Supports 1.0mm, 1.25mm, 2.0mm, and 2.54mm touch screen tail pitches
- Automatic pin assignment adjustment
- OEM board design inquiries welcome
- Bundled with PenMount drivers, which are also available for download from our website

### Connector Pin Definitions

Pin definitions for the two connectors on the PenMount 90A4 control board follow:

#### Connector Pin Definitions for Power and RS-232

|            | Power Lines |              | RS-232 Interface |       |       |        |
|------------|-------------|--------------|------------------|-------|-------|--------|
| Pin #      | PIN 1       | PIN 2        | PIN 3            | PIN 4 | PIN 5 | PIN 6  |
| Definition | Ground      | 5V~12V power | RTS              | TXD   | RXD   | Ground |

## **PenMount 5184 Control Board**

The PenMount 5184 control board is configured for the USB interface and it supports 4-wire and 8-wire touch screens.

### **PenMount 5184 Features**

- DMC5100 touch controller and DMC5600 USB controller
- Diagnostic LED on board
- Supports PnP mode
- Supports 4-wire and 8-wire touch screens
- Supports up to 15 USB devices
- Automatic pin assignment
- Input voltage is 5V to 12V
- Bundled with PenMount drivers, which are also available for download from our website

### **Connector Pin Definitions**

Pin definitions for the two connectors on the PenMount 5184 control board follow:

#### **Connector Pin Definitions for Touch Screen**

| <b>Pin definition / wires</b> | <b>4-wire touch screen</b> | <b>8-wire touch screen</b> |
|-------------------------------|----------------------------|----------------------------|
| PIN 9                         | N/A                        | Right Sense                |
| PIN 8                         | N/A                        | Left Sense                 |
| PIN 7                         | N/A                        | Bottom Sense               |
| PIN 6                         | N/A                        | Top Sense                  |
| PIN 5                         | Right                      | Right                      |
| PIN 4                         | Left                       | Left                       |
| PIN 3                         | Bottom                     | Bottom                     |
| PIN 2                         | Top                        | Top                        |
| PIN 1                         | Ground                     | Ground                     |

#### **Connector Pin Definitions for USB**

|                   | <b>USB Interface</b> |       |       |        |
|-------------------|----------------------|-------|-------|--------|
| <b>Pin #</b>      | PIN 1                | PIN 2 | PIN 3 | PIN 4  |
| <b>Definition</b> | Vcc                  | D-    | D+    | Ground |

## PenMount 51A5 Control Board

The PenMount 51A5 control board is configured for the USB interface and it supports 5-wire touch screens only.

### PenMount 51A5 Features

- DMC5100 touch controller and DMC5600 USB controller
- Diagnostic LED on board
- Supports PnP mode
- Supports 5-wire touch screens
- Supports up to 15 USB devices
- Bundled with PenMount drivers, which are also available for download from our website

### Connector Pin Definitions

Pin definitions for the two connectors on the PenMount 51A5 control board follow:

#### Connector Pin Definitions for Touch Screen

| Pin definition<br>/ wires | 5-wire<br>touch screen |
|---------------------------|------------------------|
| PIN 9                     | N/A                    |
| PIN 8                     | N/A                    |
| PIN 7                     | N/A                    |
| PIN 6                     | Sense                  |
| PIN 5                     | LR                     |
| PIN 4                     | LL                     |
| PIN 3                     | UR                     |
| PIN 2                     | UL                     |
| PIN 1                     | Ground                 |

#### Connector Pin Definitions for USB

|            | USB Interface |       |       |        |
|------------|---------------|-------|-------|--------|
| Pin #      | PIN 4         | PIN 3 | PIN 2 | PIN 1  |
| Definition | Vcc           | D-    | D+    | Ground |

## **PenMount 5126 Control Board**

The PenMount 5126 control board is configured for the USB interface and it supports 4-wire and 8-wire touch screens.

### **PenMount 5126 Features**

- DMC5100 touch controller and DMC5600 USB controller
- Diagnostic LED on board
- Supports PnP mode
- Supports 4-wire and 8-wire touch screens
- Supports up to 15 USB devices
- Bundled with PenMount drivers, which are also available for download from our website

### **Connector Pin Definitions**

Pin definitions for the two connectors on the PenMount 5126 control board follow:

#### **Connector Pin Definitions for Touch Screen**

| <b>Pin definition / wires</b> | <b>4-wire touch screen</b> | <b>8-wire touch screen</b> |
|-------------------------------|----------------------------|----------------------------|
| PIN 9                         | N/A                        | Right Sense                |
| PIN 8                         | N/A                        | Left Sense                 |
| PIN 7                         | N/A                        | Bottom Sense               |
| PIN 6                         | N/A                        | Top Sense                  |
| PIN 5                         | Right                      | Right                      |
| PIN 4                         | Left                       | Left                       |
| PIN 3                         | Bottom                     | Bottom                     |
| PIN 2                         | Top                        | Top                        |
| PIN 1                         | Ground                     | Ground                     |

#### **Connector Pin Definitions for USB**

|                   | <b>USB Interface</b> |       |       |        |
|-------------------|----------------------|-------|-------|--------|
| <b>Pin #</b>      | PIN 4                | PIN 3 | PIN 2 | PIN 1  |
| <b>Definition</b> | Vcc                  | D-    | D+    | Ground |

## Appendix B: Controller IC Specifications


This appendix offers information on touch screen controller IC features and specs.

### **PenMount DMC9000 Touch Screen Controller IC**

The PenMount DMC9000 is the best performance touch screen controller from Salt. Designed with PnP features for new system trends, it offers RS-232 touch screen interface. The DMC9000 is designed for those who need an all-in-one solution with a built-in A/D converter for a denser total printed circuit board.



#### **Electrical Specifications**

|   |  |   |
|---|--|---|
| <b>Touch Screen:</b>                          | 4, 5 & 8 wire  |  |
| <b>Package:</b>                               | 28-pin PDIP or 32-pin TQFP   |   |
| <b>Communications:</b>                        | RS-232   |   |
| <b>Nature:</b>                                | 8-bit RISC microprocessor with built-in functions including 10-bit ADC, UART, Timer, Counter, Comparator, Watchdog, Memory, etc. |   |
| <b>Voltage Range:</b>                         | + 4.0V to +6.0V  |   |
| <b>Power Consumption:</b><br>(at 4 MHz, 3V)   | Active: 3.4 mA / Idle Mode: 1.4mA<br>Power Down Mode: <1 $\mu$ A   |   |
| <b>Operating Temperature:</b>                 | -40° C to +85° C   |   |
| <b>Storage Temperature:</b>                   | -65° C to +150° C  |   |
| <b>Volt. on RESET with respect to Ground:</b> | -1.0V to +13.0V  |   |
| <b>DC Current per I/O Pin:</b>                | 40.0 mA  |   |
| <b>DC Current Vcc and GND Pins:</b>           | 300.0 mA   |   |

#### **Driver Software**

DOS, Windows 3.11, Windows 95/98/Me, Windows NT/2000/XP, Linux, QNX, Windows CE (for both X86 and SA CPUs)



## **PenMount DMC5100 and 5600 Touch Screen Controller ICs**

The PenMount DMC5100 and DMC5600 are USB interface touch screen controllers.

The function of the DMC5100 in a PenMount touch screen kit is to:

- read an analog signal from a touch screen and transform it into a digital signal by ADC
- construct a packet according to PenMount's protocol
- send a signal using the SPI interface to a USB microcontroller

The DMC5600 function in a PenMount touch screen kit is to:

- act as the USB controller in 'device' mode
- receive the signal from the SPI interface to send to the PC



**Note:** The DMC5100 is designed with an ATMEL AT90S4433 ASIC.  
The DMC5600 is designed with a CYPRESS CY7C63000A.

### **DMC5100 Electrical Specifications**

|   |  |
|---|--|
| <b>Package:</b>                               | 28-pin PDIP or 32-pin TQFP for DMC5100   |
| <b>Process</b>                                | Low-power, High-speed CMOS   |
| <b>Nature:</b>                                | 8-bit RISC microprocessor with built-in functions including 10-bit ADC, UART, Timer, Counter, Comparator, Watchdog, Memory, etc. |
| <b>Voltage Range:</b>                         | + 4.0V to +6.0V  |
| <b>Power Consumption:</b><br>(at 4 MHz, 3V)   | Active: 3.4 mA / Idle Mode: 1.4mA<br>Power Down Mode: <1 μA  |
| <b>Operating Temperature:</b>                 | -40° C to +85° C   |
| <b>Storage Temperature:</b>                   | -65° C to +150° C  |
| <b>Volt. on RESET with respect to Ground:</b> | -1.0V to +13.0V  |
| <b>DC Current per I/O Pin:</b>                | 40.0 mA  |
| <b>DC Current Vcc and GND Pins:</b>           | 300.0 mA   |

### **DMC5600 Electrical Specifications**

|                               |   |
|-------------------------------|---|
| <b>Package:</b>               | 20-pin PDIP or 20-pin SOIC for DMC5600  |
| <b>Process</b>                | Low-power, High-speed CMOS  |
| <b>Nature:</b>                | 8-bit RISC microprocessor<br>-6 MHz external ceramic resonator or crystal<br>-12 MHz internal operation<br>-USB optimized instruction set |
| <b>Voltage Range:</b>         | + 4.0V to +5.25V DC   |
| <b>Operating Temperature:</b> | 0o C to +70o C  |
| <b>Storage Temperature:</b>   | -65o C to +150o C   |

### **Driver Software**

Windows 98/Me, Windows 2000/XP, Linux, Windows CE (for both X86 and SA CPUs)