Danotech

Capacitive Touch Sensor
Installation Guide

Version : V1.5

Date : 2017 / January

Index

CHAPTER 1 Preparation for Installation 2
Installation Warming and Safety Precautions 2
Preparing Your Work Space 3
Open Your Container 4

CHAPTER 2 Installing Danotech Capacitive Touch Sensor 5
Installation Consideration 5
Touch Sensor Care and Cleaning 10
Installing the Touch Sensor 11

CHAPTER 3 Installing the Touch Screen Controller 12
Controller Outline Dimension 12
Controller Specifications 12
Completing Controller Mounting 13
Turning on Your System 15
Installing Software 15
Calibrating the Touch Screen 16

CHAPTER 4 Touch Screen Application Considerations 18
Electrical Field Effect 18
Metal Enclosures 18
Danotech Touch Systems Support Service 18

CHAPTER 1 Preparation for Installation

Installation Warming and Safety Precautions

Installation Warming

- Please follow the Installation Guide for your assembly steps.
- Pay attention to the CAUTION Mark in the Installation Guide.
- Please install each assembly component carefully.

Important Safety Information

> ⚠ CAUTION
>
> Before installation, please read below Safety Information. Wrong assembly way may hurt yourself and damage the assembly components. Please be sure to read and understand all Warning and Safety information.

- Please make sure you have enough experience in assembling and disassembling for the different types of display, and understand the electronic properties of the components.
- Please take off the items that may scratch the Sensor or the Display from you, such as watch, ring, necklace, and so on. In order to protect your safety and keep the components working correctly, wearing an anti-ESD wrist strap is necessary.
- Avoid placing any foreign objects or connecting cables onto the Touch Sensor and Display.
- Pay attention to the FPC tail creasing and routing, and do not try to use the tail to pick up the sensor.

Preparing Your Work Space

Preparing your work space will be described step by step in the following categories, respectively: **Protective Demand, Supplies Demand, and Tools Demand**. Please be sure to prepare your work space for good work efficiency.

Protective Demand

- A working space that make you feel comfortable.
- An anti-ESD wrist strap or gloves.
- A working pad with anti-ESD function and good protection for collision.

Supplies Demand

- Natural cleaner and soft wiper
- Sealing Tapes
- Double-side foam Tapes
- Plastic washers or spacers
- Electrical Tapes (for affixing the tail)
- Container for holding loose parts (Such as a paper cup)

Tools Demand

- Screwdriver
- Screws for the controller
- Knife
- Mounting poles for the controller
- Wire stripper

Open Your Container

Before your installation, please open the shipping container and check following necessary components for a complete installation.

- A capacitive touch sensor
- A controller board for touch sensor
- Y-Cable (switch to USB or RS232 interface)
- A Serial (RS-232) cable or USB cable
- A CD-ROM (Include driver software and documentation.)
- Extension cable (Optional)

The following components are necessary for your integration:

- A Danotech touch sensor
- A touch screen controller board
- Y-Cable
- Controller driver

Remove all tapes on the package, handle the touch sensor carefully, place it on a clean, anti-static pad, then remove the protective film and clean the touch sensor with natural cleaner and soft wiper.

CHAPTER 2 Installing Danotech Capacitive Touch Sensor

Installation Consideration

Confirm Your Work Space

Before installation, confirming following things is necessary for smooth installation:

- Please confirm if the workspace and the necessary tools are prepared completely, and refer to Chapter 1 **"Preparing your work space"** for detail.
- Please connect the display and the sensor to the computer then turn on, for the sake of confirming if the components are working well, and without damage or shortage. Then remove the power plugs and the connecting cables.

After confirmation, please follow below assembly steps to perform the installation.

Basic Mounting Procedure

Step1. Verify if the display and the sensor work correctly.

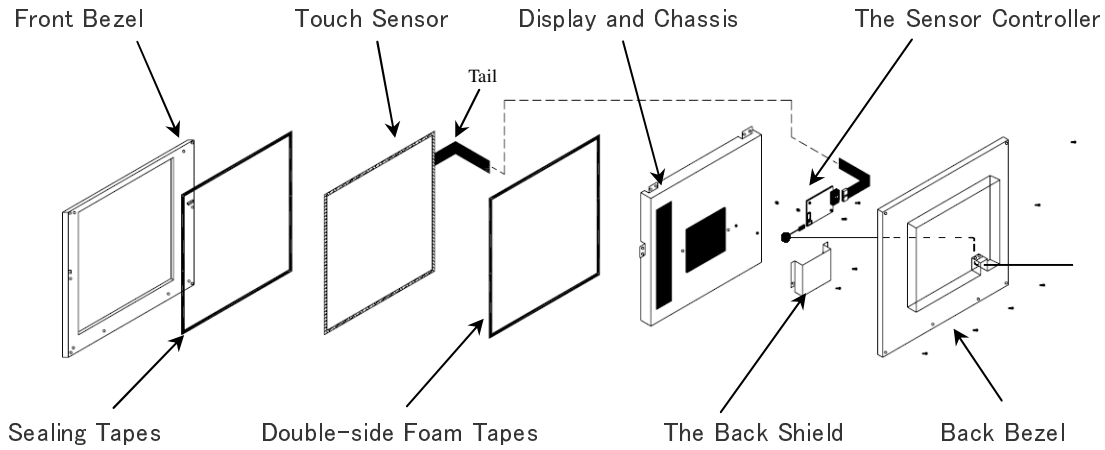
Step2. Disassemble the bezel of the display.

Step3. Mount the sensor onto the display.

Step4. Install controller.

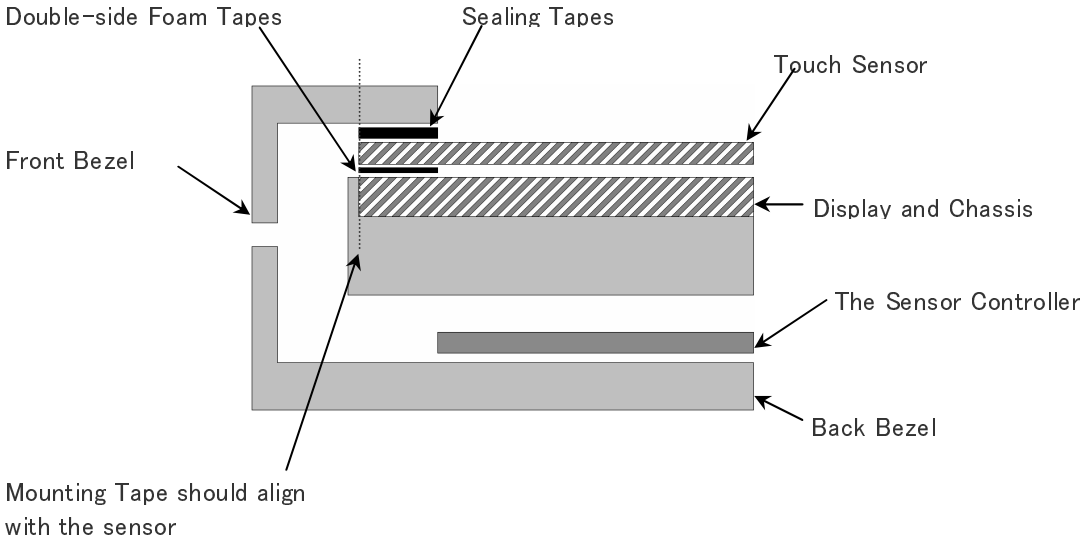
Step5. Connect the tail and the cable to the controller.

Step6. Reassemble the bezel of the display and then connect to the computer.



Important Note for the Components

Front Bezel and Sealing Tapes



⚠ CAUTION

Please do not use rubber containing the ingredient of sulfur as the sealing tapes. In high temperature environment, the sulfur will damage the reliability of silver trace somehow.

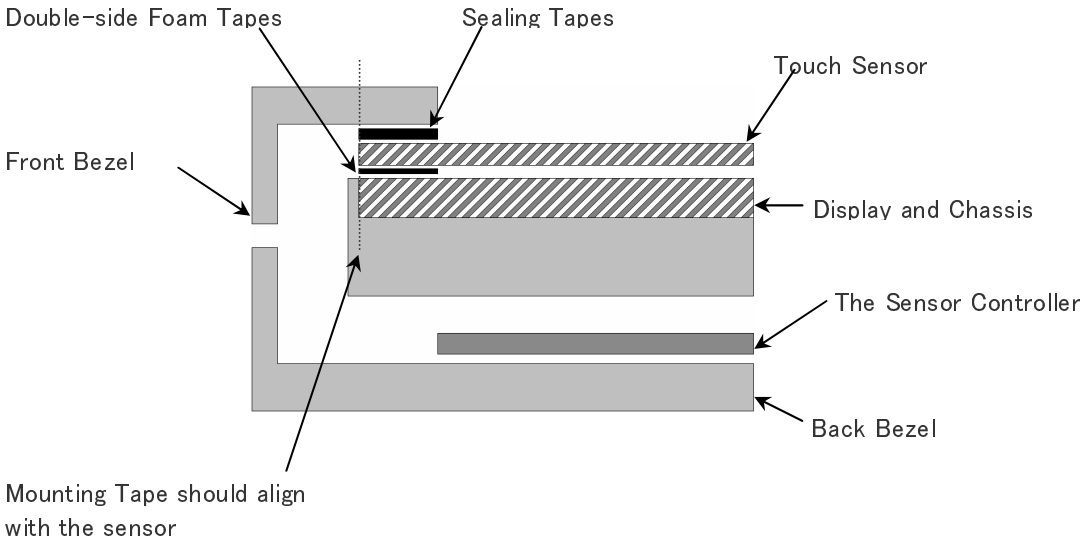
It is important for using Sealing Tapes to prevent dust, dirt, water, and particle. Normally, it's recommended to use Single-side Foam Tapes as the sealing tape. Please simply align and adhere the tape to the front bezel edge. The tape should contact the Sensor perimeter to ensure a good seal without touching the viewing area to avoid interference. Do not adhere the tape to the sensor surface.

The gap between the Front Bezel and the Touch Sensor is important for good assembly. Especially, if the Front Bezel is metal or has conductive paint, please keep a proper distance to avoid interference from the Front Bezel. The optimal distance is 3~6mm for metal enclosures, but it is adjustable per your system design.

Please mount the sensor directly to LCD. Avoid mounting LCD and sensor independently to a common bezel. The gap between the sensor and the LCD may be influenced, while the stresses are applied to the bezel. It may cause erratic operation and false touches.

Please avoid attaching the sensor to a door, if the display is attached to a cabinet for the same reason as above. If this cannot be avoided, do not operate the sensor with a partially open door. Upon closing the door, always reset the controller. It can prevent erratic operation such as jittery cursor and variable offsets.

Double-side Foam Tapes



The Touch Sensor must be mounted onto Display by Double-side Foam Tape. It will keep the Touch Sensor away from the Display metal frame to prevent electric interference. Please make sure the gap between the Sensor and the Display will not vary due to compression or expansion from touch forces or temperature changes. The foam tape should have a minimum thickness of 1.5mm. (3M VHB 4956 for recommended) to mount Touch Sensor on the Display for the optimal performance of the Touch Sensor. When the Touch Sensor size is large (for example, larger than 24"), suggest to use foam tape with over 2 mm thickness in order to get better touch performance. The thickness is still adjustable per your system design.

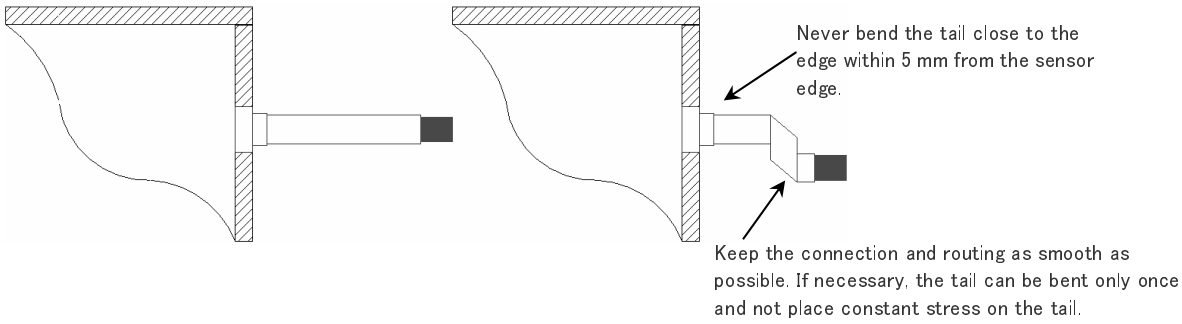
⚠ Optimal Distance for each Component		
Sensor Size	Metal Front Bezel ⟷ Sensor	⟷ Display
5.8" ～ 22.4"	3~6mm	≧1.5mm
24.2" ～ 31.8"	3~6mm	≧2.0mm

Touch Sensor and Tail Routing

⚠ CAUTION

Please handle the touch sensor with care and avoid placing any foreign objects or connecting cables on the touch sensor. The tail is an electrical connection and not designed for high stress. Please take care with the tail when assembly. Do not bend the tail with constant stress and be sure it will not move freely after assembly.

- If you need to remove the sensor for service, do not try to pry the sensor away from the display. You may break the glass and injure yourself or others.
- Never pick up the touch sensor by holding the tail. If necessary, the tail can be bent only once and not place constant stress on the tail. Never bend the tail close to the edge within 5mm from the sensor edge. Keep the connection and routing as smooth as possible.
- After assembling the touch sensor and display, affix the tail to the display chassis, and use Electrical Tape to fix Tail near the connector end to make sure the connection between Tail and controller is well. If necessary, the Tail can be extended by an optional extension cable. If extension cable is used, please always affix the cable and two ends of the extension cable to chassis by using Electrical Tape to prevent the unstable connection from shaking. In some application, unstable connection will affect the performance of touch. Never Route the Tail and the extension cable near the Backlight Inverter and Power Supply of the Display in order to reduce the EMI interference. Do not bend the extension cable with a sharp angle.



Display and Chassis

> ⚠ CAUTION
>
> Keep the display to be powered off when assembling and disassembling the touch sensor.
>
> There may be hazardous voltages present in the display.

First, please check the condition of the display before you install the touch sensor into the display. If the display is working properly, please turn off the power, disconnect all cables and power plugs, and then disassemble your display for installation.

- Keep all components in care after removing them from the display.
- Avoid placing any foreign objects or connecting cables on the display.

Touch Sensor Controller

- The controller supports USB & RS232 interface. Before installation, please make sure the interface is chosen and connected correctly.
- Avoid dropping or making a collision, and keep it dry.

The Back Shield

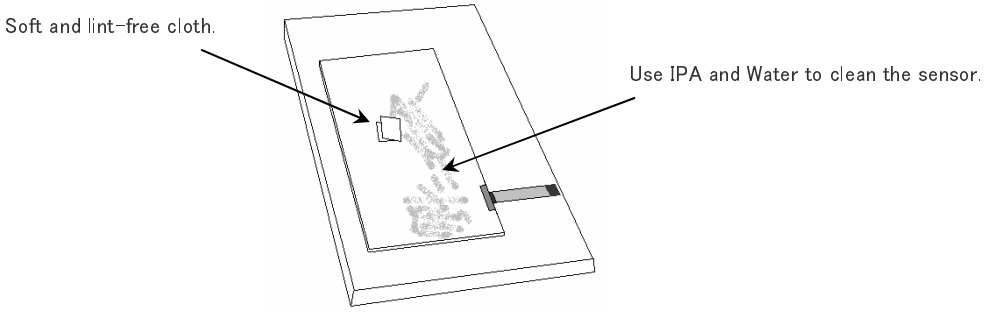
If the back shield of the DISPLAY module is removed, please make sure to put back the back shield. It can protect the controller from electronic noise and get the best performance.

Touch Sensor Care and Cleaning

⚠ CAUTION

Avoid placing any foreign objects or connecting cables on the touch sensor, and do not let any metal physically contact the front or sides of touch sensor and tail. This may induce an electrical field effect and confuse the controller.

- Ensure no any metal material or sand on the surface of the touch sensor before you start cleaning the touch sensor. Especially when you add pressure on a small material such as sand and then scratch the surface. This action always damages the touch sensor and unrecoverable.
- It's recommended to use an isopropyl alcohol and water solution ration of 50:50 for cleaning your touch sensor. Please use soft and lint-free cloth for cleaning purpose. Always dampen the cloth and then clean the sensor.



Installing the Touch Sensor

Disassembling the Display

> ⚠ CAUTION
>
> Before disassemble the Display casing, the power must be disconnected and remove the pedestal.

Removing the Front Bezel

After removing the power and the pedestal, face down the Display on a pad with anti-ESD function and good protection for collision. Remove the screws from Display, and being sure to label them and put them into the prepared paper cup, then put them aside with the Front Bezel together.

Mounting the Sensor to the Display

Step1. Apply the double-side foam tape around the Display surface. And then pull off about 5 mm of tape liner near one end of each side, but not tear off all. Fold the liner at 90 degree angle, not cut off the liner.

Step2. After tearing off the protective film of the back side of the sensor, align the center of the sensor viewing area to the center of the display.

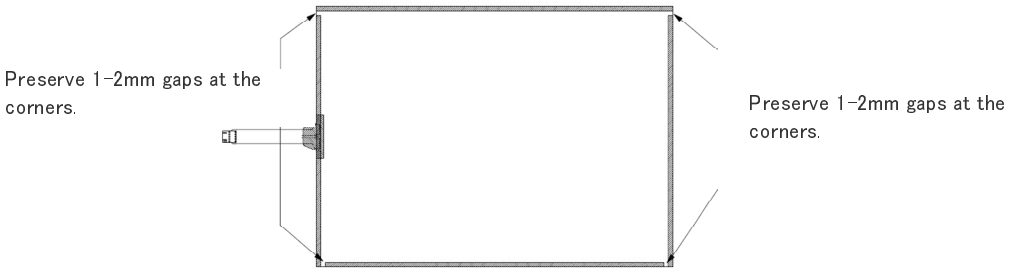
Step3. Attach the Touch Sensor to Display carefully. Make sure it without dirt, dust, and particles between them, and align for the correct position.

Step4. Slowly pull out the remained liner of the double-side tape each side after holding the sensor in place.

Step5. Press firmly down each side of the sensor, make sure the sensor are adhered to the display completely .

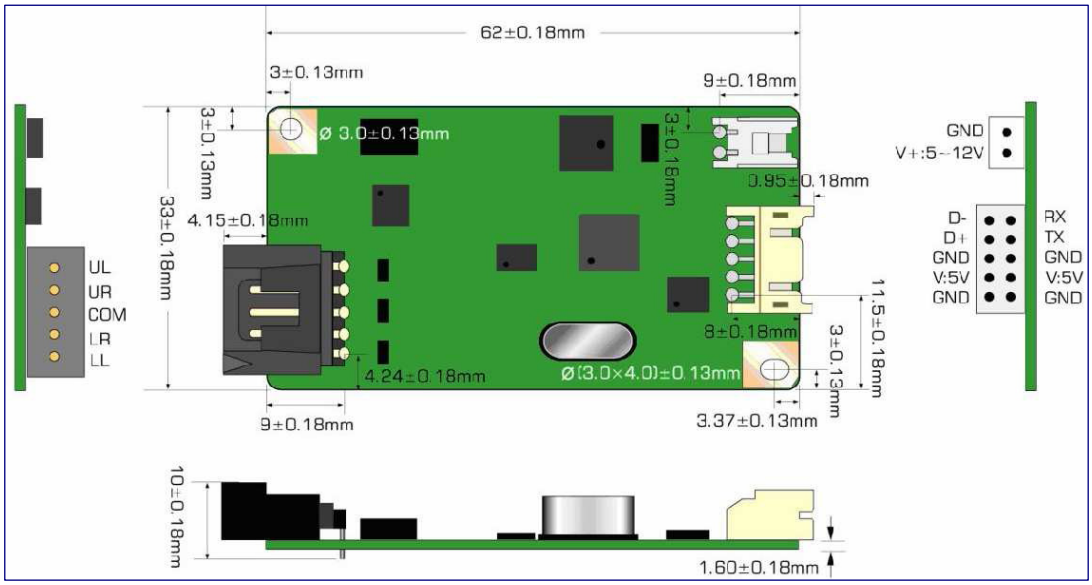
Step6. Use natural cleaner and soft wiper to clean the Touch Sensor.

> ⚠ CAUTION
>
> The tape should not form a full seal. Preserve 1-2 mm gaps at the corners for ventilation to avoid damaging the Display with temperature and pressure equalization issues. If you need to remove the sensor for service, do not try to pry the sensor away from the display. You may break the glass and injure yourself or others.



CHAPTER 3 Installing the Touch Screen Controller

Controller Outline Dimension



Controller Specifications

Circuit Board Dimension	62mm x 33mm (2.445inches x 1.299inches)
Power Requirements	D.C.+5V, external 5~12V unregulated power (Maximum 65mA, typical 55mA, 50mV peak to peak maximum ripple and noise)
Operating Temperature	-40 to 80 ℃
Interface	Bi-directional RS-232 serial communication USB: 2.0 compliant
Protocol	RS232:No parity,8 data bits,1 stop bit,9600 baud (N,8,1,9600) USB: Full Speed, USB 2.0 compliant
Resolution	2048 × 2048
Report rate	Adaptive Sampling Rate. Max. 180 points/sec
Response time	Max. 25 ms
Electro-Static Discharge (ESD)	Contact: 8KV / Air: 27KV

Completing Controller Mounting

Positioning Your Controller

Before installing the controller, please wear Anti-ESD wrist strap first. Make sure that there is enough internal space for accommodating touch panel controller. Choose a proper location for the controller on the back side of the LCD chassis. Determine the positions of the controller mounting holes. Drill at least two mounting holes and tap the holes for mounting screws. Choose proper length of poles for the electrical isolation between the controller and the LCD chassis.

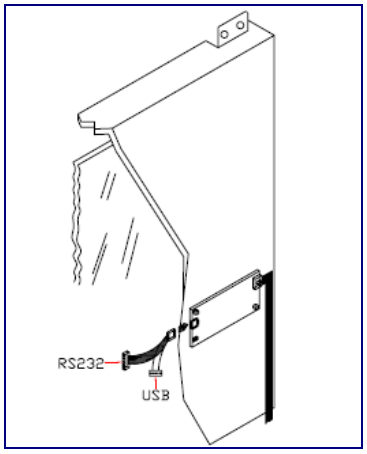
⚠ CAUTION

Ensure the controller board is proper grounding to the chassis with the mounting screws. This can provide a stable reference voltage for controller and prevent from ESD shock.

Do not positioning the controller near the backlight inverter or LED power supply.

Interface Selection

Upon your selection of computer/controller interface (RS232 or USB), simply connect the cable (RS232 or USB) to the proper interface of the Y converter cable.



Controller Mounting Steps

Step1. Secure the controller onto the back side of the LCD chassis by using proper size screws.

Step2. Reconfirm controller interface selection (RS232 or USB).

Step3. Connect the tail of touch sensor to the locking connector on the controller, and affix the tail to the chassis of LCD panel by electrical tape. Be aware not to bend the tail more than once as mentioned earlier.

Step4. Connect your Serial or USB cable to the controller and route the other side of cable out of the rear case, and then secure the cable to the case.

Step5. Test your touch controller by connecting the interface cable to your computer. For serial type controller, connect both PS/2 and RS232 cables to the PS/2 port and RS232 port on your computer respectively. For USB type controller, use a USB cable to connect the controller with your computer. After the connection, the LED light on the controller should keep blinking.

Step6. Reassemble the LCD panel and rear cover.

⚠ CAUTION

It will interfere the controller if you change the assembly when the controller is under working, for example, changing the distance between sensor & front bezel, or changing the distance between sensor & LCD, or attaching metal front bezel onto sensor, or mounting sensor onto the LCD, and so on. If you have done something mentioned above, especially in testing phase, you will sometimes experience poor performance of Touch Screen. In this case, please reboot the controller to make everything back to normal situation. An easy way to reboot the controller is to re-power on the controller (for example, re-plug the USB cable connecting controller with host system).

Turning on Your System

Make sure all cables and screws are connected properly and fixed. Then turn on your monitor and computer.

- For most operation systems today, it should find a new device automatically and have a basic function for operation.
- When we touch the touch screen, the LED light on the touch screen controller will have a corresponding signal light.
- If we may find a new device on the operation system, we can make sure that the device is connected well.
- For the next step, we need to install the correct driver for the new device, touch controller device.

Congratulation! You successfully installed the touch controller and connected the touch screen to your computer. You are now ready for the final task.

Installing Software

Danotech provides user the following operating systems for touch panel system.

- Windows 10
- Windows 8.1 / 8 / 7 / Vista / XP / 2000 / ME / 9X
- Windows NT4.0 / CE.Net / CE6.0 / Embedded Compact 7 / Embedded Compact 2013 / Embedded XP
- Android
- MAC OS 9.x / MAC OS X (Power PC) / MAC OS X (Intel CPU)
- Linux (Kernel 2.6.24 Upwards) / Linux (Kernel 2.6.23 Downwards) / Linux (Kernel 2.4.x)
- Linux (Customization for SUSE Linux Enterprise Desktop 11 SP3)
- QNX Neutrino RTOS V6.3 / V6.4 / V 6.5
- MS-DOS

Please install your driver and application according to User' s Manual in the CD-ROM.

Calibrating the Touch Screen

> ⚠ CAUTION
>
> Please make sure all cables are connected properly and the controller is connected to the computer correctly. If all cables have been connected correctly but the touch does not response, please re-plug the cable connecting between computer & controller to make host system re-detect the controller.

We provide the functions list below for calibration and linearization. Calibration aligns the touch sensor with the underlying monitor and defines the dimensions and directions of the image areas. The Linearization function is used to compensate the touch screen linearity. After linearization is completed, the linearity of the touch screen will be shown in the Linearity Curve window. In drawing test window, users can verify the panel linearity, calibration capability, and drawing line quality.

4 points calibration

It needs calibration before the touch screen can work accurately. Whenever the user feel the accuracy lost, user can do calibration again to get a more accuracy touch function. Pressing this button, a new window will be popped-up at the location when the touch screen was mapped to area for this touch system to guide the user do 4 points calibration. User should follows the guide to touch and hold the blinking symbol in the calibration window until it shows "OK" to make sure that the utility can gather enough data for computation.

Clear and Calibration

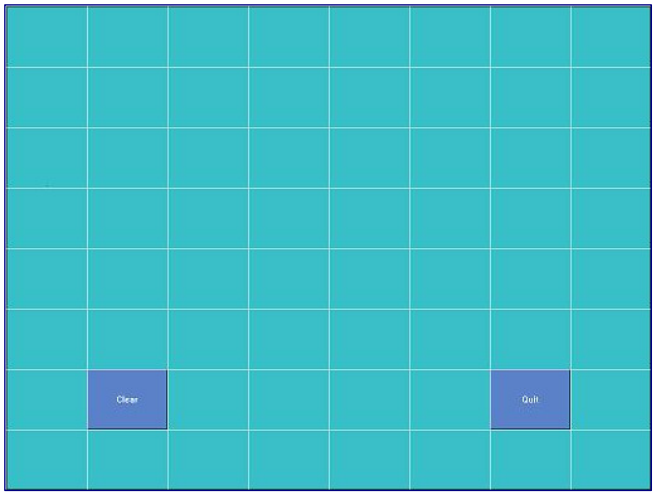
Press this button to erase the 25 points calibration/linearization parameters and force user to do 4 points calibration again. After 25 points calibration/linearization data was clear, the 4 points calibration data will be invalid. It needs to do 4 points calibration.

Linearization

Linearization (9 or 25 points calibration) function is used to compensate the touch screen linearity. After linearization completed, the linearity of the touch screen will be shown in the Linearity curve window. Pressing this button, a new window will be popped-up at the location when the touch screen was mapped to area for this touch system to guide the user do 25 points calibration. User should follows the guide to touch and hold the blinking symbol in the calibration window until it shows "OK" to make sure that the utility can gather enough data for computation.

Draw Test

This function is used for accuracy and performance check. Press this button and a new pop up window will be popped up in the location where the touch screen was mapped to the touch system as below. User can press the 'Clear' button to clear the window. Press 'Quit' button to terminate this draw test.



CHAPTER 4 Touch Screen Application Considerations

Electrical Field Effect

Any electrical devices that generate electrical fields can cause problems. Such as inverters inside the LCD monitor or radio transmitters from the environment.

Metal Enclosures

- It's strongly recommended to use plastic bezel for application consideration. Some plastic bezels with conductive paint could act as a metal bezel. If your current product has a metal bezel, make sure it does not directly contact the front or sides of touch sensor.
- The metal bezel should be appropriately grounded and very rigid. Use insulating tape or gasket as a spacer. For metal enclosures or bezels the gap to the touch sensor at least need 3~6mm.
- If there is a metal door and sometime needs to be open/close. The stray capacitance might be changed and a reset sequence will start for few seconds. If your touch device is designed for outdoor use, we recommend you to make a bevel design in the front bezel below/around the touch area for the sake of avoiding rain water staying here to affect the performance of the touch.

Danotech Touch Systems Support Service

Please visit Danotech official website at http://www.danotech.com.tw/
You can download touch screen drivers and get related data sheet for your requirement.
You may contact Danotech for any technical support by calling, a fax or email.

Tel: +886-3-4757888 **Fax**: +886-3-4859158 **E-mail**: fae@danotech.com.tw